STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT L. MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

August 27, 2013

U.S. Army Corps of Engineers
Regulatory Field Office
2407 West 5th Street
Washington, NC 27889

ATTN: Ms. Tracey Wheeler
NCDOT Coordinator

N.C. Division of Coastal Management
1367 US 17 South
Elizabeth City, NC 27909

ATTN: Mr. Paul Williams
NCDOT Coordinator

Subject: **Application for Section 404 Nationwide Permit 14, and Request for Modifications to the Section 401 Water Quality Certification, and CAMA Major Development Permit** for the Pea Island Long-Term Improvements on NC 12 in Dare County, Division 1; TIP No. B-2500 A, Debit $475 from WBS Element 13201.1028011.

References: Applications for Section 404 General Permit 31 and Section 401 Water Quality Certification and Modification Request of CAMA Permit dated February 13, 2013 for B-2500A.
CAMA Permit No. 106-12 modified April 26, 2013.
401 Certification # 20130144v.1 issued April 15, 2013.

Dear Madam and Sir:

During the development of the Special Use Permit from the U.S. Fish and Wildlife Service Pea Island National Wildlife Refuge (PINWR or "Refuge") for the B-2500 A project, the Refuge has indicated that public access to the Pamlico Sound should be retained at the current parking lot south of the terminus of the existing temporary bridge over New Inlet.

This requirement results in the permanent retention of approximately 1.75 miles of road that was originally proposed to be used to temporarily maintain NC 12 traffic during project construction. With the retention of this road, the B-2500 A project will result in a total impact of 0.22 ac of permanent fill in wetlands (0.07 in 404 wetlands, 0.15 in CAMA wetlands). Please find attached: adjacent riparian landowner certified mail receipt, revised MP forms, revised PCN, Jurisdictional Determination, Revised Draft Wetland Mitigation Plan-NC 12 Replacement of Herbert C. Bonner Bridge (Bridge No. 11) over Oregon Inlet, revised permit drawings, and revised roadway drawings.

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

TELEPHONE: 919-707-6100
FAX: 919-212-5785

WEBSITE: WWW.NCDOT.ORG

LOCATION:
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610-4328

NEPA Document Status

In December 2010, following extensive environmental study and coordination with other agencies, a Record of Decision (ROD) was issued for TIP Project No. B-2500 (NC 12 Replacement of the Herbert C. Bonner Bridge). The environmental documents studied several detailed alternatives for maintaining the NC 12 corridor between Bodie Island and the village of Rodanthe. The Record of Decision authorized an initial phase consisting of a parallel bridge replacement for Bonner Bridge and established a Transportation Management Plan (TMP) for the study and selection of future project phases along the NC 12 corridor. Although the ROD deferred final decisions for future phases, the various Parallel Bridge Corridor alternatives (Nourishment, Road North/Bridge South, All Bridge, and Phased Approach) were encompassed within the environmental study as potential phases beyond Phase I and were representative of the range of potential impacts under the ROD's selected alternative.

As a result of coastal conditions following Hurricane Irene (August 2011), NCDOT initiated Phases IIA (New Inlet/Pea Island) and IIB (Rodanthe) of TIP Project No. B-2500 in order to implement long-term improvements at two roadway sections breached by the hurricane. In accordance with the TMP, NCDOT has performed environmental monitoring, hosted a Peer Exchange panel of coastal experts, held informational public workshops, convened the Merger Team and obtained concurrence from agency partners on key points.

FHWA and NCDOT issued a new Environmental Assessment in February 2013. This EA explains the screening of alternatives for Phase IIA, a process that identified the "Bridge within Existing NC 12 Easement Alternative" as the sole detailed-study alternative, the Preferred Alternative, and the Least Environmentally Damaging Practicable Alternative (LEDPA). The EA updated the previous environmental analyses with respect to this alternative.

Based on the EA and on coordination with state and federal environmental resource and regulatory agencies, FHWA has expressed the belief that the changes identified and assessed in the EA do not appear to result in any new, significant impacts not previously identified in the 2008 Final Environmental Impact Statement, 2010 Environmental Assessment, or 2010 ROD.

Compensatory Mitigation

NCDOT coordinated with the National Park Service (NPS) to identify potential compensatory mitigation sites for the anticipated impacts to Section 404 jurisdictional wetlands. Several mitigation options were explored and prioritized. These options are discussed in detail in the Final Environmental Impact Statement (FEIS) dated September 17, 2008.

Mitigation preferences were discussed by regulatory agency personnel and documented in the merger meeting minutes dated September 17, 2009. The minutes state: "*All agencies agreed that offsite wetland mitigation is not preferred for this project. FHWA questioned the use of existing wetland mitigation sites for offsetting impacts. USACE pointed to the exceptional quality and type of habitats associated with the Outer Banks as justification for alternative mitigation and allowed within the new federal mitigation rule. NPS requires that all impacts to Park Service property is mitigated within the Park Service. Other agencies agreed that alternative mitigation or conservation measures would be acceptable. NPS suggested that a phragmites control program could be an appropriate mitigative measure using a 5:1 ratio. WRC recommended that any measures take into account site conditions and adjacent phragmites populations, which may require a larger treatment area other than what is*

dictated by ratios. Additional areas could be used to offset impacts from future phases of the roadway project. DWQ will have to discuss fulfillment of no-net-loss policy with their management."

As such, NCDOT proposes to offset unavoidable permanent impacts of 0.22 acres of jurisdictional wetlands associated with B-2500A at a 5:1 ratio of wetland mitigation at the Bodie Island Lighthouse Pond approximately 1.5 miles north of the Project. The mitigation includes control of *Phragmites* sp. on over 50 acres at the Bodie Island Lighthouse Pond via aerial herbicide treatments, vegetative controlled burns and development of a long term management plan. All details are included in the attached mitigation plan.

The proposed on-site mitigation, defined below as restoration, provides for the rehabilitation of the integrity of natural resources, native vegetation mosaic, and habitat values at the Bodie Island Lighthouse Pond. Mitigation options are defined according to **COMPENSATORY MITIGATION FOR LOSSES OF AQUATIC RESOURCES**, **33 CFR PART 332:**

*1. **Restoration** means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.*

*a. **Re-establishment** means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.*

*b. **Rehabilitation** means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.*

Proposed Let Date

This project calls for a let date of September 17, 2013.

Regulatory Approvals

Section 404 Permit: Due to the changes described above, the Regional General Permit 31 originally applied for on February 13, 2013, will no longer be applicable to this activity, per guidance from the USACE Washington Field Office. Therefore, application is hereby made for a USACE Nationwide 14 Permit for the above-described activities.

Section 401 Permit: Application is hereby made for a modification to the existing Water Quality Certification for the above mentioned activities. We are providing 2 copies of this modification request to the NCDWQ for its approval.

CAMA: Application is hereby made for a modification to the existing CAMA permit for the above-mentioned activities. The adjacent riparian landowner return receipt will be forwarded upon receipt. Authorization to debit $475 from WBS 13201.1028011 is hereby given for the permit application fee.

A copy of this request and its distribution list will be posted on the NCDOT Website at: https://connect.ncdot.gov/resources/Environmental. If you have any questions or need additional information, contact Michael Turchy at maturchy@ncdot.gov or 919 707-6157.

Sincerely,

for Deborah M. Barbour, P.E.
Director of Preconstruction

The "cc" List:
NCDOT Permit Application Standard Distribution List

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. SAW-2013-00107 County: Dare U.S.G.S. Quad: Oregon Inlet, Pea Island and Rodanthe, NC

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner:	Dr. Gregory J. Thorpe, Ph.D. Environmental Management Director, PDEA	Agent:	Ms. Lorrie Laliberte Boswell CZR Incorporated
Address:	N.C. Department of Transportation 1548 Mail Service Center Raleigh, North Carolina 27699-1548	Address:	4709 College Acres Drive, Suite 2 Wilmington, North Carolina 28403-1725

Property description: NC Highway 12

Size (acres)	3,399	River Basin	Pasquotank
Nearest Waterway	Pamlico Sound	Coordinates	Start- 35.800649, 75.46219 End
USGS HUC	03020105	35.5911, 75.46810	
Nearest Town	Rodanthe		

Location description: A project corridor paralleling the existing NC Highway 12 corridor varing in width from approximately 700 - 3800 feet. The northern portion of the project starts at the Bodie Island Campground entrance on Bodie Island and extends southward ending in Rodanthe at Sudie Payne Road. The total project length is approximately 15.7 miles and is adjacent to the Pamlico Sound and the Atlantic Ocean.

Indicate Which of the Following Apply:

A. Preliminary Determination

_ Based on preliminary information, there may be wetlands on the above described property. We strongly suggest you have this property inspected to determine the extent of Department of the Army (DA) jurisdiction. To be considered final, a jurisdictional determination must be verified by the Corps. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also, you may provide new information for further consideration by the Corps to reevaluate the JD.

B. Approved Determination

X There are Navigable Waters of the United States within the above described project area subject to the permit requirements of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

X There are waters of the U.S. including wetlands on the above described project area subject to the permit requirements of Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ We strongly suggest you have the wetlands on your property delineated. Due to the size of your property and/or our present workload, the Corps may not be able to accomplish this wetland delineation in a timely manner. For a more timely delineation, you may wish to obtain a consultant. To be considered final, any delineation must be verified by the Corps.

X The waters of the U.S. including wetlands on your project area have been delineated and the delineation has been verified by the Corps. We strongly suggest you have this delineation surveyed. Upon completion, this survey should be reviewed and verified by the Corps. Once verified, this survey will provide an accurate depiction of all areas subject to CWA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.

_ The waters of the U.S. including wetlands have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on ___. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ There are no waters of the U.S., to include wetlands, present on the above described project area which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our

published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

X The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Morehead City, NC, at (252) 808-2808 to determine their requirements.

Placement of dredged or fill material within waters of the US and/or wetlands without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). If you have any questions regarding this determination and/or the Corps regulatory program, please contact **Bill Biddlecome** at**(910) 251-4558.**

C. Basis For Determination This site exhibits wetland criteria as described in the 1987 Corps Wetland Delineation Manual and the Atlantic and Gulf Coastal Plain Interim Regional Supplement (Supplement) to the 1987 Wetland Delineation Manual and is part of a broad continuum of wetlands connected to the Pamlico Sound.

D. Remarks Approved jurisdictional delineation/determination for the entire Bonner Bridge TIP # B-2500 project area including Phase I, Phase IIA & B, and all the areas between these Phases from north of Oregon Inlet to Rodanthe. This determination incorporates all previously approved actions (Reference Action ID 2012-00715 for Phase I and 2012-00836 & 2012-00715 for Phase II) and is considered the complete approved juridictional determination for the entire project length superseding the above mentioned actions.

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information (This information applies only to approved jurisdictional determinations as indicated in B. above)

This correspondence constitutes an approved jurisdictional determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by March 23, 2013.

It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: BIDDLECOME.WILLIAM.J.JR.1228726504

Digitally signed by BIDDLECOME.WILLIAM.J.JR.1228726504
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BIDDLECOME.WILLIAM.J.JR.1228726504
Date: 2013.01.22 16:36:41 -05'00'

Date: **1/22/2013** Expiration Date: **1/22/2018**

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the attached customer Satisfaction Survey or visit http://per2.nwp.usace.army.mil/survey.html to complete the survey online.

Office Use Only:
Corps action ID no. _____
DWQ project no. _____
Form Version 1.3 Dec 10 2008

Pre-Construction Notification (PCN) Form

A. Applicant Information

1. Processing

1a. Type(s) of approval sought from the Corps:	☒ Section 404 Permit	☐ Section 10 Permit
1b. Specify Nationwide Permit (NWP) number: 14	and General Permit (GP) number:	
1c. Has the NWP or GP number been verified by the Corps?	☒ Yes	☐ No

1d. Type(s) of approval sought from the DWQ (check all that apply):

☒ 401 Water Quality Certification – Regular ☐ Non-404 Jurisdictional General Permit

☐ 401 Water Quality Certification – Express ☐ Riparian Buffer Authorization

1e. Is this notification solely for the record because written approval is not required?	For the record only for DWQ 401 Certification: ☐ Yes ☒ No	For the record only for Corps Permit: ☐ Yes ☒ No
1f. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts? If so, attach the acceptance letter from mitigation bank or in-lieu fee program.		☐ Yes ☒ No
1g. Is the project located in any of NC's twenty coastal counties. If yes, answer 1h below.		☒ Yes ☐ No
1h. Is the project located within a NC DCM Area of Environmental Concern (AEC)?		☒ Yes ☐ No

2. Project Information

2a. Name of project:	Replacement of the temporary bridge over New Inlet on NC 12 in Dare County.
2b. County:	Dare
2c. Nearest municipality / town:	Rodanthe
2d. Subdivision name:	*not applicable*
2e. NCDOT only, T.I.P. or state project no:	B-2500 A

3. Owner Information

3a. Name(s) on Recorded Deed:	North Carolina Department of Transportation
3b. Deed Book and Page No.	*not applicable*
3c. Responsible Party (for LLC if applicable):	*not applicable*
3d. Street address:	1598 Mail Service Center
3e. City, state, zip:	Raleigh, NC 27699-1598
3f. Telephone no.:	(919) 707-6157
3g. Fax no.:	(919) 212-5785
3h. Email address:	maturchy@ncdot.gov

4. Applicant Information (if different from owner)	
4a. Applicant is:	☐ Agent ☐ Other, specify:
4b. Name:	*not applicable*
4c. Business name (if applicable):	
4d. Street address:	
4e. City, state, zip:	
4f. Telephone no.:	
4g. Fax no.:	
4h. Email address:	
5. Agent/Consultant Information (if applicable)	
5a. Name:	*not applicable*
5b. Business name (if applicable):	
5c. Street address:	
5d. City, state, zip:	
5e. Telephone no.:	
5f. Fax no.:	
5g. Email address:	

B. Project Information and Prior Project History		
1. Property Identification		
1a. Property identification no. (tax PIN or parcel ID):	*not applicable*	
1b. Site coordinates (in decimal degrees):	Latitude: 35.68427 (DD.DDDDDD)	Longitude: - 75.48389 (-DD.DDDDDD)
1c. Property size:	30.3 acres	
2. Surface Waters		
2a. Name of nearest body of water (stream, river, etc.) to proposed project:	Pamlico Sound/ Atlantic Ocean	
2b. Water Quality Classification of nearest receiving water:	SA	
2c. River basin:	Pasquotank	
3. Project Description		
3a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application: Natural barrier island conditions. Area protected by USFWS Pea Island National Wildife Refuge.		
3b. List the total estimated acreage of all existing wetlands on the property: 170 acres, as approved by the Corps on the 7/18/2012 JD, which includes wetlands outside of the easement.		
3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property: 100 feet (New Inlet)		
3d. Explain the purpose of the proposed project: To replace a temporary bridge built in 2011 to span an inlet opened in August 2011 by Hurricane Irene, with a 2.1 mile permanent structure in order to restore and improve the transportation infrastructure along NC 12 serving the Outer Banks.		
3e. Describe the overall project in detail, including the type of equipment to be used: The project involves replacing a temporary bridge near the existing alignment with a permanent 2.1 mile bridge. Standard road building equipment, such as trucks, dozers, and cranes will be used.		
4. Jurisdictional Determinations		
4a. Have jurisdictional wetland or stream determinations by the Corps or State been requested or obtained for this property / project (including all prior phases) in the past? Comments:	☒ Yes	☐ No ☐ Unknown
4b. If the Corps made the jurisdictional determination, what type of determination was made?	☐ Preliminary ☒ Final	
4c. If yes, who delineated the jurisdictional areas? Name (if known): Ms. Lorrie Laliberte Boswell	Agency/Consultant Company: CZR Incorporated Other:	
4d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attached documentation. 7/18/2012		
5. Project History		
5a. Have permits or certifications been requested or obtained for this project (including all prior phases) in the past?	☒ Yes	☐ No ☐ Unknown
5b. If yes, explain in detail according to “help file” instructions. Application for a 404 RGP 31 on February 13, 2013, 401 WQC No. 20130144v.1 issued April 15, 2013.		
6. Future Project Plans		
6a. Is this a phased project?	☐ Yes	☐ No See attached cover letter.
6b. If yes, explain.		

C. Proposed Impacts Inventory

1. Impacts Summary

1a. Which sections were completed below for your project (check all that apply):

☒ Wetlands ☐ Streams - tributaries ☐ Buffers

☒ Open Waters ☐ Pond Construction

2. Wetland Impacts

If there are wetland impacts proposed on the site, then complete this question for each wetland area impacted.

2a. Wetland impact number – Permanent (P) or Temporary (T)	2b. Type of impact	2c. Type of wetland (if known)	2d. Forested	2e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	2f. Area of impact (acres)
Site 1 ☐ P ☒ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.1
Site 2 ☒ P ☐ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.02
Site 2 ☐ P ☒ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.07
Site 3 ☒ P ☐ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.18
Site 3 ☐ P ☒ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.15
Site 4 ☒ P ☐ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.01
Site 4 ☐ P ☒ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.03
Site 5 ☒ P ☐ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	< 0.01
Site 5 ☐ P ☒ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.02
Site 6 ☐ P ☒ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.03
Site 7 ☐ P ☒ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.02
Site 11 ☐ P ☒ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	< 0.01
Site 12 ☐ P ☒ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.23
Site 13 ☐ P ☒ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.22
Site 14 ☐ P ☒ T	Fill	Marsh	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.02
				2g. **Total wetland impacts**	Permanent: 0.22 Temporary: 0.90

2h. Comments:

There will be < 0.01 acre of permanent fill in wetlands due to Bent #67.

There will be 0.40 acre of hand clearing.

0.08 acre of temporary fill in wetlands in the hand clearing areas for erosion control measures

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3. Stream Impacts

If there are perennial or intermittent stream impacts (including temporary impacts) proposed on the site, then complete this question for all stream sites impacted.

3a. Stream impact number - Permanent (P) or Temporary (T)	3b. Type of impact	3c. Stream name	3d. Perennial (PER) or intermittent (INT)?	3e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	3f. Average stream width (feet)	3g. Impact length (linear feet)
Site 1 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 2 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 3 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 4 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 5 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 6 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
					3h. **Total stream and tributary impacts**	

3i. Comments:

4. Open Water Impacts

If there are proposed impacts to lakes, ponds, estuaries, tributaries, sounds, the Atlantic Ocean, or any other open water of the U.S. then individually list all open water impacts below.

4a. Open water impact number – Permanent (P) or Temporary (T)	4b. Name of waterbody (if applicable)	4c. Type of impact	4d. Waterbody type	4e. Area of impact (acres)
O1 ☐ P ☒ T	Pamlico Sound	Fill	Sound	0.01
O7 ☐ P ☒ T	Isolated Pond	Fill	Isolated Pond	0.03
O8 ☐ P ☒ T	Isolated Pond	Fill	Isolated Pond	0.1
O10 ☐ P ☒ T	New Inlet	Fill	Inlet	0.04
O11 ☐ P ☒ T	Isolated Pond	Fill	Isolated Pond	0.05
O15 ☐ P ☒ T	New Inlet	Fill	Inlet	0.02
O16 ☐ P ☒ T	Pamlico Sound	Fill	Sound	0.03
			4f. Total open water impacts	0.28 Temporary

4g. Comments: There will be 0.04 acre of permanent fill in surface waters due to Bents 71, 72, and 73.

5. Pond or Lake Construction

If pond or lake construction proposed, then complete the chart below.

5a. Pond ID number	5b. Proposed use or purpose of pond	5c. Wetland Impacts (acres)			5d. Stream Impacts (feet)			5e. Upland (acres)
		Flooded	Filled	Excavated	Flooded	Filled	Excavated	Flooded
P1								
P2								
5f. Total								

5g. Comments:	
5h. Is a dam high hazard permit required?	☐ Yes ☐ No If yes, permit ID no:
5i. Expected pond surface area (acres):	
5j. Size of pond watershed (acres):	
5k. Method of construction:	

6. Buffer Impacts (for DWQ)

If project will impact a protected riparian buffer, then complete the chart below. If yes, then individually list all buffer impacts below. If any impacts require mitigation, then you **MUST** fill out Section D of this form.

6a. Project is in which protected basin?			☐ Neuse ☐ Catawba ☐ Tar-Pamlico ☐ Randleman ☐ Other:		
6b. Buffer impact number – Permanent (P) or Temporary (T)	6c. Reason for impact	6d. Stream name	6e. Buffer mitigation required?	6f. Zone 1 impact (square feet)	6g. Zone 2 impact (square feet)
B1 ☐ P ☐ T			☐ Yes ☐ No		
B2 ☐ P ☐ T			☐ Yes ☐ No		
B3 ☐ P ☐ T			☐ Yes ☐ No		
		6h. **Total buffer impacts**			
6i. Comments:					

D. Impact Justification and Mitigation

1. Avoidance and Minimization

1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing project.

The final bridge structure will be entirely within the 100' Transportation Easement within the Pea Island National Wildlife Refuge (PINWR). All jetting spoils will also be disposed of within this 100' Transportation Easement unless the Pea Island National Wildlife Refuge accepts the material for Refuge use.

Redesign of the intersection of the access road and NC 12 to reduce wetland impacts.

Reduced the pavement width and removed a proposed concrete barrier between the boating access road and the elevated NC 12 to allow the access road to be placed closer to the elevated NC 12, thus reducing the impact footprint.

The bridge design will have the flexibility to accommodate later phases or lengthening as practicable in the future.

1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques.

Temporary construction runoff will be controlled by using Silt Fence, Special Silt Fence, Temporary Slope Drains, Rock Silt Checks, and Temporary Matting and Grassing.

Preventative measures will be taken to minimize impacts to fish species during water intake for jetting operations.

Temporary fill in wetlands will be required. Areas will be re-graded to preconstruction elevations and replanted with native vegetation.

Jetting spoils will not be disposed of in jurisdictional areas. Jetting spoils may be used by the PINWR at their discretion.

A screen will be used on the intake of the jetting pumping operations to prevent the intake of larval species.

Jetting piping will be placed by hand to reduce impacts in wetland areas.

Jetting installation of the bents in New Inlet will occur at ebb tide.

2. Compensatory Mitigation for Impacts to Waters of the U.S. or Waters of the State

2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?	☒ Yes ☐ No If no, explain
2b. If yes, mitigation is required by (check all that apply):	☐ DWQ ☒ Corps
2c. If yes, which mitigation option will be used for this project?	☐ Mitigation bank ☐ Payment to in-lieu fee program ☒ Permittee Responsible Mitigation

3. Complete if Using a Mitigation Bank

3a. Name of Mitigation Bank: not applicable

3b. Credits Purchased (attach receipt and letter)	Type	Quantity

3c. Comments:	
4. Complete if Making a Payment to In-lieu Fee Program	
4a. Approval letter from in-lieu fee program is attached.	☐ Yes
4b. Stream mitigation requested:	linear feet
4c. If using stream mitigation, stream temperature:	☐ warm ☐ cool ☐ cold
4d. Buffer mitigation requested (DWQ only):	n/a square feet
4e. Riparian wetland mitigation requested:	n/a acres
4f. Non-riparian wetland mitigation requested:	n/a acres
4g. Coastal (tidal) wetland mitigation requested:	acres
4h. Comments:	
5. Complete if Using a Permittee Responsible Mitigation Plan	
5a. If using a permittee responsible mitigation plan, provide a description of the proposed mitigation plan. See attached Revised Draft Wetland Mitigation Plan NC 12 Replacement of Herbert C. Bonner Bridge over Oregon Inlet	
6. Buffer Mitigation (State Regulated Riparian Buffer Rules) – required by DWQ	
6a. Will the project result in an impact within a protected riparian buffer that requires buffer mitigation?	☐ Yes ☒ No

6b. If yes, then identify the square feet of impact to each zone of the riparian buffer that requires mitigation. Calculate the amount of mitigation required.

Zone	6c. Reason for impact	6d. Total impact (square feet)	Multiplier	6e. Required mitigation (square feet)
Zone 1			3 (2 for Catawba)	
Zone 2			1.5	
	6f. **Total buffer mitigation required:**			

6g. If buffer mitigation is required, discuss what type of mitigation is proposed (e.g., payment to private mitigation bank, permittee responsible riparian buffer restoration, payment into an approved in-lieu fee fund).

6h. Comments:

E. Stormwater Management and Diffuse Flow Plan (required by DWQ)	
1. Diffuse Flow Plan	
1a. Does the project include or is it adjacent to protected riparian buffers identified within one of the NC Riparian Buffer Protection Rules?	☐ Yes ☒ No
1b. If yes, then is a diffuse flow plan included? If not, explain why. Comments:	☐ Yes ☐ No
2. Stormwater Management Plan	
2a. What is the overall percent imperviousness of this project?	N/A
2b. Does this project require a Stormwater Management Plan?	☒ Yes ☐ No
2c. If this project DOES NOT require a Stormwater Management Plan, explain why:	
2d. If this project DOES require a Stormwater Management Plan, then provide a brief, narrative description of the plan: See attached permit drawings.	
2e. Who will be responsible for the review of the Stormwater Management Plan?	☐ Certified Local Government ☐ DWQ Stormwater Program ☒ DWQ 401 Unit
3. Certified Local Government Stormwater Review	
3a. In which local government's jurisdiction is this project?	not applicable
3b. Which of the following locally-implemented stormwater management programs apply (check all that apply):	☐ Phase II ☐ NSW ☐ USMP ☐ Water Supply Watershed ☐ Other:
3c. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
4. DWQ Stormwater Program Review	
4a. Which of the following state-implemented stormwater management programs apply (check all that apply):	☒ Coastal counties ☐ HQW ☐ ORW ☐ Session Law 2006-246 ☐ Other:
4b. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No n/a
5. DWQ 401 Unit Stormwater Review	
5a. Does the Stormwater Management Plan meet the appropriate requirements?	☒ Yes ☐ No
5b. Have all of the 401 Unit submittal requirements been met?	☒ Yes ☐ No

F. Supplementary Information	
1. Environmental Documentation (DWQ Requirement)	
1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land?	☒ Yes ☐ No
1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)?	☒ Yes ☐ No
1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.) Comments: Previously provided under separate cover	☒ Yes ☐ No
2. Violations (DWQ Requirement)	
2a. Is the site in violation of DWQ Wetland Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 2B .0200)?	☐ Yes ☒ No
2b. Is this an after-the-fact permit application?	☐ Yes ☒ No
2c. If you answered "yes" to one or both of the above questions, provide an explanation of the violation(s):	
3. Cumulative Impacts (DWQ Requirement)	
3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality?	☐ Yes ☒ No
3b. If you answered "yes" to the above, submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent DWQ policy. If you answered "no," provide a short narrative description. Due to the minimal transportation impact resulting from this bridge replacement, this project will neither influence nearby land uses nor stimulate growth. Therefore, a detailed indirect or cumulative effects study will not be necessary.	
4. Sewage Disposal (DWQ Requirement)	
4a. Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility. not applicable	

5. Endangered Species and Designated Critical Habitat (Corps Requirement)		
5a. Will this project occur in or near an area with federally protected species or habitat?	☒ Yes	☐ No
5b. Have you checked with the USFWS concerning Endangered Species Act impacts?	☒ Yes	☐ No
5c. If yes, ind icate the USFWS Field Office you have contacted.	☒ Raleigh ☐ Asheville	
5d. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat? Consultation with the USFWS		
6. Essential Fish Habitat (Corps Requirement)		
6a. Will this project occur in or near an area designated as essential fish habitat?	☒ Yes	☐ No
6b. What data sources did you use to determine whether your site would impact Essential Fish Habitat? NMFS County Index		
7. Historic or Prehistoric Cultural Resources (Corps Requirement)		
7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)?	☒ Yes	☐ No
7b. What data sources did you use to determine whether your site would impact historic or archeological resources? NEPA Documentation		
8. Flood Zone Designation (Corps Requirement)		
8a. Will this project occur in a FEMA-designated 100-year floodplain?	☒ Yes	☐ No
8b. If yes, explain how project meets FEMA requirements: NCDOT Hydraulics Unit coordination with FEMA		
8c. What source(s) did you use to make the floodplain determination? FEMA Maps		

Deborah M. Barbour, P.E. Applicant/Agent's Printed Name	E. L. Lusk Applicant/Agent's Signature (Agent's signature is valid only if an authorization letter from the applicant is provided.)	8-27-13 Date

DCM MP-1

APPLICATION for Major Development Permit

(last revised 12/27/06)

North Carolina DIVISION OF COASTAL MANAGEMENT

1. Primary Applicant/ Landowner Information

Business Name North Carolina Department Of Transportation		Project Name (if applicable) B-2500 A		
Applicant 1: First Name Deborah	MI M	Last Name Barbour, PE		
Applicant 2: First Name	MI	Last Name		
If additional applicants, please attach an additional page(s) with names listed.				
Mailing Address 1020 Birch Ridge Drive		PO Box	City Raleigh	State NC
ZIP 27623	Country US	Phone No. 919 - 707 - 6157 ext.	FAX No. - -	
Street Address *(if different from above)*		City	State	ZIP -
Email				

2. Agent/Contractor Information

Business Name N/A				
Agent/ Contractor 1: First Name	MI	Last Name		
Agent/ Contractor 2: First Name	MI	Last Name		
Mailing Address		PO Box	City	State
ZIP		Phone No. 1 - - ext.	Phone No. 2 - - ext.	
FAX No.		Contractor #		
Street Address *(if different from above)*		City	State	ZIP -
Email				

<Form continues on back>

3. Project Location

County (can be multiple)	Street Address	State Rd. #
Dare	Existing NC 12 from just south of southern most freshwater pond to north of Rodanthe. 21111 A NC Highway 12	NC-12

Subdivision Name	City	State	Zip
N/A	Rodanthe	NC	n/a -

Phone No.	Lot No.(s) *(if many, attach additional page with list)*
N/A - - ext.	N/A, , , ,

a. In which NC river basin is the project located?	b. Name of body of water nearest to proposed project
Pasquotank	Pamlico Sound
c. Is the water body identified in (b) above, natural or manmade? ☒Natural ☐Manmade ☐Unknown	d. Name the closest major water body to the proposed project site. Atlantic Ocean
e. Is proposed work within city limits or planning jurisdiction? ☐Yes ☒No	f. If applicable, list the planning jurisdiction or city limit the proposed work falls within. N/A

4. Site Description

a. Total length of shoreline on the tract (ft.)	b. Size of entire tract (sq.ft.)
300 ft	1,226,000
c. Size of individual lot(s) N/A, , , *(If many lot sizes, please attach additional page with a list)*	d. Approximate elevation of tract above NHW *(normal high water)* or NWL *(normal water level)* 3' ☒NHW or ☐NWL

e. Vegetation on tract

Brackish marsh, smooth cordgrass, maritime shrub thicket, salt/shrub grassland, maritime grassland, black needlerush, reed stands, beach, dunes and disturbed wetland and upland vegetation.

f. Man-made features and uses now on tract

Existing NC-12, utility lines, recreation.

g. Identify and describe the existing land uses <u>adjacent</u> to the proposed project site.

Recreational (federal Seashore and Refuge lands), open space, open water and water foul impoundments.

h. How does local government zone the tract?	i. Is the proposed project consistent with the applicable zoning? (Attach zoning compliance certificate, if applicable) ☐Yes ☐No ☒NA
Unzoned	

j. Is the proposed activity part of an urban waterfront redevelopment proposal? ☐Yes ☒No

k. Has a professional archaeological assessment been done for the tract? If yes, attach a copy. ☒Yes ☐No ☐NA

If yes, by whom? NCDOT

l. Is the proposed project located in a National Registered Historic District or does it involve a National Register listed or eligible property? ☒Yes ☐No ☐NA

<Form continues on next page>

m. (i) Are there wetlands on the site?	☒Yes ☐No
(ii) Are there coastal wetlands on the site?	☒Yes ☐No
(iii) If yes to either (i) or (ii) above, has a delineation been conducted? *(Attach documentation, if available)*	☒Yes ☐No

n. Describe existing wastewater treatment facilities.

N/A

o. Describe existing drinking water supply source.

N/A

p. Describe existing storm water management or treatment systems.

Grass swales and Rip rap pads at the pipe ends

5. Activities and Impacts

a. Will the project be for commercial, public, or private use? ☐Commercial ☒Public/Government ☐Private/Community

b. Give a brief description of purpose, use, and daily operations of the project when complete.

NCDOT Roadway

c. Describe the proposed construction methodology, types of construction equipment to be used during construction, the number of each type of equipment and where it is to be stored.

Work bridge over open water. Crane and backhoe for pier construction.

d. List all development activities you propose.

Roadway re-alignment and new bridge.

e. Are the proposed activities maintenance of an existing project, new work, or both? Both

f. What is the approximate total disturbed land area resulting from the proposed project? 207,250 ☒Sq.Ft or ☐Acres

g. Will the proposed project encroach on any public easement, public accessway or other area that the public has established use of? ☒Yes ☐No ☐NA

h. Describe location and type of existing and proposed discharges to waters of the state.

Runoff from paved surface will drain to roadside grass swales.
Bridge deck will drain using open scuppers. Bridge is 15'-25' above the ground elevation.

i. Will wastewater or stormwater be discharged into a wetland?	☒Yes ☐No ☐NA
If yes, will this discharged water be of the same salinity as the receiving water?	☐Yes ☒No ☐NA
j. Is there any mitigation proposed? If yes, attach a mitigation proposal.	☒Yes ☐No ☐NA

<Form continues on back>

6. Additional Information

In addition to this completed application form, (MP-1) the following items below, if applicable, must be submitted in order for the application package to be complete. Items (a) – (f) are always applicable to any major development application. Please consult the application instruction booklet on how to properly prepare the required items below.

a. A project narrative.

b. An accurate, dated work plat (including plan view and cross-sectional drawings) drawn to scale. Please give the present status of the proposed project. Is any portion already complete? If previously authorized work, clearly indicate on maps, plats, drawings to distinguish between work completed and proposed.

c. A site or location map that is sufficiently detailed to guide agency personnel unfamiliar with the area to the site.

d. A copy of the deed (with state application only) or other instrument under which the applicant claims title to the affected properties.

e. The appropriate application fee. Check or money order made payable to DENR.

f. A list of the names and complete addresses of the adjacent waterfront (riparian) landowners and signed return receipts as proof that such owners have received a copy of the application and plats by certified mail. Such landowners must be advised that they have 30 days in which to submit comments on the proposed project to the Division of Coastal Management.

Name Pea Island National Wildlife Refuge, Attn: Mr. Dennis Stewart	Phone No.
Address PO Box 1969, Manteo, NC 27954-1969	
Name	Phone No.
Address	
Name	Phone No.
Address	

g. A list of previous state or federal permits issued for work on the project tract. Include permit numbers, permittee, and issuing dates.

CAMA Permit No. 106-12 modified April 26, 2013

401 Certification # 20130144v.1 issued April 15, 2013

h. Signed consultant or agent authorization form, if applicable.

i. Wetland delineation, if necessary.

j. A signed AEC hazard notice for projects in oceanfront and inlet areas. *(Must be signed by property owner)*

k. A statement of compliance with the N.C. Environmental Policy Act (N.C.G.S. 113A 1-10), if necessary. If the project involves expenditure of public funds or use of public lands, attach a statement documenting compliance with the North Carolina Environmental Policy Act.

7. Certification and Permission to Enter on Land

I understand that any permit issued in response to this application will allow only the development described in the application. The project will be subject to the conditions and restrictions contained in the permit.

I certify that I am authorized to grant, and do in fact grant permission to representatives of state and federal review agencies to enter on the aforementioned lands in connection with evaluating information related to this permit application and follow-up monitoring of the project.

I further certify that the information provided in this application is truthful to the best of my knowledge.

Date 8-27-13 Print Name Deborah M. Barbour, P.E.

Signature E.L. Lusk for

Please indicate application attachments pertaining to your proposed project.

☐DCM MP-2 Excavation and Fill Information ☒DCM MP-5 Bridges and Culverts

☐DCM MP-3 Upland Development

☐DCM MP-4 Structures Information

Form DCM MP-5

BRIDGES and CULVERTS

Attach this form to Joint Application for CAMA Major Permit, Form DCM MP-1. Be sure to complete all other sections of the Joint Application that relate to this proposed project. Please include all supplemental information.

1. BRIDGES

☐ *This section not applicable*

a. Is the proposed bridge:
☐Commercial ☒Public/Government ☐Private/Community

b. Water body to be crossed by bridge:
Pea Island Breach

c. Type of bridge (construction material):
Reinforced Concrete

d. Water depth at the proposed crossing at NLW or NWL:
Approx. 8' (NWL) at breach

e. (i) Will proposed bridge replace an existing bridge? ☒Yes ☐No
If yes,
(ii) Length of existing bridge: 650'
(iii) Width of existing bridge: 24'
(iv) Navigation clearance underneath existing bridge: 15'
(v) Will all, or a part of, the existing bridge be removed? (Explain) All parts of the existing bridge will be removed.

f. (i) Will proposed bridge replace an existing culvert? ☐Yes ☒No
If yes,
(ii) Length of existing culvert: _____
(iii) Width of existing culvert: _____
(iv) Height of the top of the existing culvert above the NHW or NWL: _____
(v) Will all, or a part of, the existing culvert be removed? (Explain)

g. Length of proposed bridge: 11,160'

h. Width of proposed bridge: 42'-7"

i. Will the proposed bridge affect existing water flow? ☐Yes ☒No
If yes, explain:

j. Will the proposed bridge affect navigation by reducing or increasing the existing navigable opening? ☒Yes ☐No
If yes, explain: New breach between Pamlico Sound and Atlantic Ocean. Vertical clearance will be increased.

k. Navigation clearance underneath proposed bridge: Approx. 25'

l. Have you contacted the U.S. Coast Guard concerning their approval? ☒Yes ☐No
If yes, explain: Advanced approval is anticipated.

m. Will the proposed bridge cross wetlands containing no navigable waters? ☒Yes ☐No
If yes, explain: Coastal wetlands

n. Height of proposed bridge above wetlands: Approx. 15'-25'

2. CULVERTS

☒ *This section not applicable*

a. Number of culverts proposed: _____

b. Water body in which the culvert is to be placed:

< Form continues on back>

c. Type of culvert (construction material):

_____

d. (i) Will proposed culvert replace an existing bridge? ☐Yes ☐No

If yes,

(ii) Length of existing bridge: _____

(iii) Width of existing bridge: _____

(iv) Navigation clearance underneath existing bridge: _____

(v) Will all, or a part of, the existing bridge be removed? (Explain)

_____

_____

_____

e. (i) Will proposed culvert replace an existing culvert? ☒Yes ☐No

If yes,

(ii) Length of existing culvert(s): 70'

(iii) Width of existing culvert(s): 24"

(iv) Height of the top of the existing culvert above the NHW or NWL: ~3'

(v) Will all, or a part of, the existing culvert be removed? (Explain) The entire pipe will be removed.

_____

_____

_____

f. Length of proposed culvert: _____

g. Width of proposed culvert: _____

h. Height of the top of the proposed culvert above the NHW or NWL.

_____

i. Depth of culvert to be buried below existing bottom contour.

_____

j. Will the proposed culvert affect navigation by reducing or increasing the existing navigable opening? ☐Yes ☐No

If yes, explain:

_____

_____

_____

k. Will the proposed culvert affect existing water flow? ☐Yes ☐No

If yes, explain:

_____

_____

_____

3. EXCAVATION and FILL

☐*This section not applicable*

a. (i) Will the placement of the proposed bridge or culvert require any excavation below the NHW or NWL? ☐Yes ☒No

If yes,

(ii) Avg. length of area to be excavated: _____

(iii) Avg. width of area to be excavated: _____

(iv) Avg. depth of area to be excavated: _____

(v) Amount of material to be excavated in cubic yards: _____

b. (i) Will the placement of the proposed bridge or culvert require any excavation within coastal wetlands/marsh (CW), submerged aquatic vegetation (SAV), shell bottom (SB), or other wetlands (WL)? If any boxes are checked, provide the number of square feet affected.

☐CW _____ ☐SAV _____ ☐SB _____

☐WL _____ ☒None

(ii) Describe the purpose of the excavation in these areas:

_____

_____

_____

c. (i) Will the placement of the proposed bridge or culvert require any high-ground excavation? ☐Yes ☒No

If yes,

(ii) Avg. length of area to be excavated: _____

(iii) Avg. width of area to be excavated: _____

(iv) Avg. depth of area to be excavated: _____

(v) Amount of material to be excavated in cubic yards: _____

d. If the placement of the bridge or culvert involves any excavation, please complete the following:

(i) Location of the spoil disposal area: Jetting spoils will be confined to the 100' Transportation Easement within the Pea Island National Wildlife Refuge, unless the Refuge accepts the material for Refuge use.

(ii) Dimensions of the spoil disposal area: TBD by contractor, possibly in conjunction with the Refuge.

(iii) Do you claim title to the disposal area? ☐Yes ☒No (*If no, attach a letter granting permission from the owner.)*

(iv) Will the disposal area be available for future maintenance? ☐Yes ☒No

(v) Does the disposal area include any coastal wetlands/marsh (CW), submerged aquatic vegetation (SAVs), other wetlands (WL), or shell bottom (SB)?

☐CW ☐SAV ☐WL ☐SB ☒None

If any boxes are checked, give dimensions if different from (ii) above.

(vi) Does the disposal area include any area below the NHW or NWL? ? ☐Yes ☒No

If yes, give dimensions if different from (ii) above.

e. (i) Will the placement of the proposed bridge or culvert result in any fill (other than excavated material described in Item **d** above) to be placed below NHW or NWL? ☒Yes ☐No

If yes,

(ii) Avg. length of area to be filled: temporary: 855' total

(iii) Avg. width of area to be filled: temporary: 3'

(iv) Purpose of fill: Temporary fill for temporary roadway to for shifting to build permanent bridge in transportation easment.

f. (i) Will the placement of the proposed bridge or culvert result in any fill (other than excavated material described in Item **d** above) to be placed within coastal wetlands/marsh (CW), submerged aquatic vegetation (SAV), shell bottom (SB), or other wetlands (WL)? If any boxes are checked, provide the number of square feet affected.

☒CW 14,811 ☐SAV ____ ☐SB ____

☒WL 34,412 ☐None

(ii) Describe the purpose of the excavation in these areas:

Roadway approach to bridge and bridge piers.

g. (i) Will the placement of the proposed bridge or culvert result in any fill (other than excavated material described in Item **d** above) to be placed on high-ground? ☒Yes ☐No

If yes,

(ii) Avg. length of area to be filled: 1000'

(iii) Avg. width of area to be filled: 60'

(iv) Purpose of fill: Roadway approaches to bridge

4. GENERAL

a. Will the proposed project require the relocation of any existing utility lines? ☒Yes ☐No

If yes, explain: Application has been submitted as a CAMA General to authorize the utility impacts.

If this portion of the proposed project has already received approval from local authorities, please attach a copy of the approval or certification.

b. Will the proposed project require the construction of any temporary detour structures? ☐Yes ☒No

If yes, explain:

< Form continues on back>

c. Will the proposed project require any work channels? ☐Yes ☒No

If yes, complete Form DCM-MP-2.

d. How will excavated or fill material be kept on site and erosion controlled?

Standard erosion control measures such as silt fence and rock filter dams.

e. What type of construction equipment will be used (for example, dragline, backhoe, or hydraulic dredge)?

Work bridge over open water; Crane and backhoe for piers.

f. Will wetlands be crossed in transporting equipment to project site? ☐Yes ☒No

If yes, explain steps that will be taken to avoid or minimize environmental impacts.

g. Will the placement of the proposed bridge or culvert require any shoreline stabilization? ☐Yes ☒No

If yes, complete form MP-2, Section 3 for Shoreline Stabilization only.

8-27-13

Date

B-2500A

Project Name

Deborah M. Barbour, PE

Applicant Name

E. L. Lusk for

Applicant Signature

OCEAN HAZARD AEC NOTICE

Project is in an: ___X___ **Ocean Erodible Area** ___X___ **High Hazard Flood Area** ___X___ **Inlet Hazard Area**

Property Owner: N. C. Department of Transportation

Property Address: Approximately 21111 A NC Highway 12, Rodanthe, NC

Date Lot Was Platted: _____

This notice is intended to make you, the applicant, aware of the special risks and conditions associated with development in this area, which is subject to natural hazards such as storms, erosion and currents. The rules of the Coastal Resources Commission require that you receive an AEC Hazard Notice and acknowledge that notice in writing before a permit for development can be issued.

The Commission's rules on building standards, oceanfront setbacks and dune alterations are designed to minimize, but not eliminate, property loss from hazards. By granting permits, the Coastal Resources Commission does not guarantee the safety of the development and assumes no liability for future damage to the development. Permits issued in the Ocean Hazard Area of Environmental Concern include the condition that structures be relocated or dismantled if they become imminently threatened by changes in shoreline configuration. The structure(s) must be relocated or dismantled within two (2) years of becoming imminently threatened, and in any case upon its collapse or subsidence.

The best available information, as accepted by the Coastal Resources Commission, indicates that the annual long-term average ocean erosion rate for the area where your property is located is **up to 8** feet per year.

The rate was established by careful analysis of aerial photographs of the coastline taken over the past 50 years.

Studies also indicate that the shoreline could move as much as 30 feet landward in a major storm.

The flood waters in a major storm are predicted to be about 11 feet deep in this area.

Preferred oceanfront protection measures are beach nourishment and relocation of threatened structures. Hard erosion control structures such as bulkheads, seawalls, revetments, groins, jetties and breakwaters are prohibited. Temporary sand bags may be authorized under certain conditions.

The applicant must acknowledge this information and requirements by signing this notice in the space below. Without the proper signature, the application will not be complete.

SPECIAL NOTE: This hazard notice is required for development in areas subject to sudden and massive storms and erosion. Permits issued for development in this area expire on December 31 of the third year following the year in which the permit was issued. Shortly before work begins on the project site, the Local Permit Officer must be contacted to determine the vegetation line and setback distance at your site. If the property has seen little change since the time of permit issuance, and the proposed development can still meet the setback requirement, the LPO will inform you that you may begin work. Substantial progress on the project must be made within 60 days of this setback determination, or the setback must be re-measured. Also, the occurrence of a major shoreline change as the result of a storm within the 60-day period will necessitate re-measurement of the setback. It is important that you check with the LPO before the permit expires for official approval to continue the work after the permit has expired. Generally, if foundation pilings have been placed and substantial progress is continuing, permit renewal can be authorized. It is unlawful to continue work after permit expiration.

For more information, contact:

Paul C. Williams, Jr., DOT Field Rep.

Local Permit Officer

1367 US 17 South, Elizabeth City, NC 27909

Address

NCDOT Division 1

Locality

252-264-3901

Phone Number

E. L. Lusk for Deborah M. Barbour, P.E.

Applicant Signature *Date*

Aug 27, 2013

Revised May 2010

BEFORE YOU BUILD

Setting Back for Safety: A Guide to Wise Development Along the Oceanfront

When you build along the oceanfront, you take a calculated risk. Natural forces of water and wind collide with tons of force, even on calm days.

Man-made structures cannot be guaranteed to survive the force of a hurricane. Long-term erosion (or barrier island migration) may take from two to ten feet of the beach each year, and, sooner or later, will threaten oceanfront structures. These are the facts of life for oceanfront property owners.

The Coastal Resources Commission (CRC) has adopted rules for building along the oceanfront. The rules are intended to avoid an unreasonable risk to life and property, and to limit public and private losses from storm and long-term erosion. These rules lessen but do not eliminate the element of risk in oceanfront development.

As you consider building along the oceanfront, the CRC wants you to understand the rules and the risks. With this knowledge, you can make a more informed decision about where and how to build in the coastal area.

The Rules

When you build along the oceanfront, coastal management rules require that the structure be sited to fit safely into the beach environment.

Structures along the oceanfront, less than 5,000 square feet in size, must be behind the frontal dune, landward of the crest of the primary dune, and set back from the first line of stable natural vegetation a distance equal to 30 times the annual erosion rate (a minimum of 60 feet). The setback calculation increases as the size of the structure increases [15A NCAC 7H.0306(a)(2)]. For example**:** A structure between 5,000 and 10,000 square feet would require a setback from the first line of stable, natural vegetation to a distance equal to 60 times the annual erosion rate (a minimum of 120 feet). The graduated setback continues to increase through structure sizes greater than 100,000 square feet.

The Reasons

The beachfront is an ever-changing landform. The beach and the dunes are natural "shock absorbers," taking the beating of the wind and waves and protecting the inland areas. By incorporating building setbacks into the regulations, you have a good chance of enjoying the full life of the structure. At first, it seems very inviting to build your dream house as close to the beach as possible, but in five years you could find the dream has become a nightmare as high tides and storm tides threaten your investment.

The Exception

The Coastal Resources Commission recognized that these rules, initially passed in June 1979, might prove a hardship for some property owners. Therefore, they established an exception for lots that cannot meet the setback requirement. The exception allows buildings in front of the current setback, if the following conditions apply:

1) the lot must have been platted as of June 1, 1979, and is not capable of being enlarged by combining with adjoining land under the same ownership;
2) development must be constructed as far back on the property as possible and in no case less than 60 feet landward of the vegetation line;
3) no development can take place on the frontal dune;
4) special construction standards on piling depth and square footage must be met; and
5) all other CAMA, state and local regulations must be met.

<u>The exception is not available in the Inlet Hazard Area.</u>

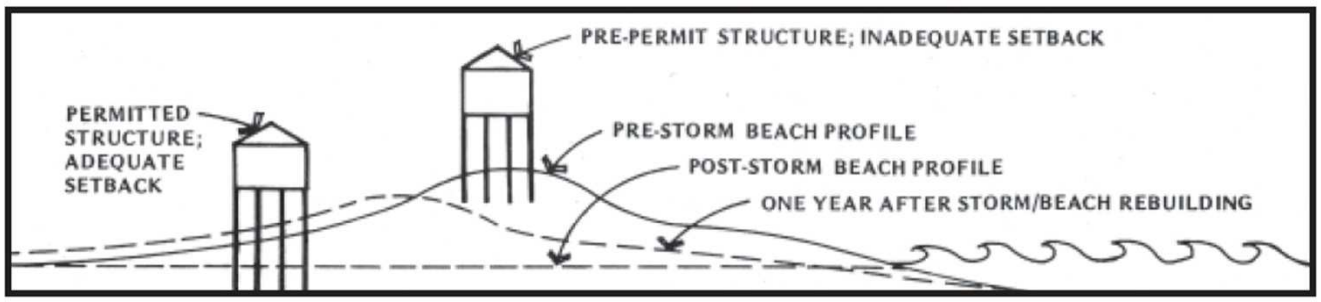
To determine eligibility for the exception the Local Permit Officer will make these measurements and observations:

_____ required setback from vegetation line

_____ exception setback (maximum feasible)

_____ rear property line setback

_____ max. allowable square footage on lowest floor



After the storm, the house on the dune will be gone. The other house has a much better chance of survival.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT L. MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

August 27, 2013

Pea Island National Wildlife Refuge
ATTN: Mr. Dennis Stewart
PO BOX 1969
Manteo, NC 27954-1969

Dear Landowner:

As you are aware, the North Carolina Department of Transportation (NCDOT) proposes to replace the existing three span temporary bridge over "New Inlet," which was reopened by Hurricane Irene in September 2011, with a 2.1 mile bridge. This project crosses an Area of Environmental Concern, as defined by the North Carolina Division of Coastal Management (DCM), and must be approved by the DCM under provisions of the Coastal Area Management Act (CAMA). One of the prerequisites to this approval is that adjacent riparian landowners be given an opportunity to comment on the proposal. Changes have occurred since our previous submittal and as a result, a revised permit application and site drawings are enclosed for your review.

The attached form is submitted to ensure that you have an opportunity to comment on the proposal. The work planned is depicted in the attached drawings. If you have **no** objections to the proposal, please return the form with your response within 30 days to this office. If you **do** have objections to the project, please forward your comments to:

Mr. Paul Williams
N.C. Division of Coastal Management
1367 US 17 South
Elizabeth City, NC 27909

Thank you for your cooperation.

Sincerely,

for E. L. Lush

Deborah M. Barbour, PE,
Director of Preconstruction

Enclosures

cc: Paul Williams, NCDCM
File B-2500 A

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
NATURAL ENVIRONMENT UNIT
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-707-6100
FAX: 919-212-5785
WEBSITE: WWW.NCDOT.ORG

LOCATION:
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610-4328

ADJACENT RIPARIAN LANDOWNER STATEMENT

(Dare County: Construction of Bridge over New Inlet)
NCDOT TIP B-2500 A

General Statutes and Division of Coastal Management Major Development Permit approval procedures require that riparian landowners with property adjoining a proposed development in an Area of Environmental Concern (AEC) be given thirty (30) days in which to comment on the proposed development. This form allows the adjacent riparian landowner to express either: (1) that he objects to the project; or, (2) that he does not object and desires to waive his/her right to the 30-day period so that the processing of the application can progress more rapidly. Of course, the adjacent riparian landowner need not sign this form at all if he/she so chooses.

I, _____ , am an adjacent riparian property owner and am aware of the North Carolina Department of Transportation's plans for constructing a permanent bridge over New Inlet in Dare County, North Carolina. I am further aware that this work will occur in one or more Areas of Environmental Concern and therefore will require authorization from the Division of Coastal Management in accordance with the Coastal Area Management Act (CAMA).

_____ I have no objection to the project as presently proposed and hereby waive that right of objection as provided in General Statute 113-229

_____ I have objections to the project as presently proposed and my comments are attached

_____ _____
Signature of Adjacent Riparian Landowner Date

_____
Phone Number with Area Code

Revised Draft Wetland Mitigation Plan
NC 12 Replacement of Herbert C. Bonner Bridge
(Bridge No. 11) over Oregon Inlet

Federal-Aid No. BRS-2358(15)
NCDOT Project Definition: 32635
TIP Project No. B-2500
Dare County, North Carolina
Prepared by
United States National Park Service
North Carolina Department of Transportation
January 16, 2013

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BASELINE INFORMATION

This Wetland Mitigation Plan details the proposed mitigation to be performed by the North Carolina Department of Transportation (NCDOT) for wetland impacts associated with the NC 12 Replacement of the Herbert C. Bonner Bridge over Oregon Inlet. Impacts to Section 404 jurisdictional wetlands on Federally owned lands managed by the National Park Service (NPS) and by the United States Fish and Wildlife Service (USFWS), within the Cape Hatteras National Seashore (the Seashore), will occur during Phase I of the bridge replacement. The proposed mitigation will be used to offset impacts for Phase I and for future phases as appropriate. Section 404 jurisdictional wetland impacts associated with Phase I of the Selected Alternative will be approximately 0.50 acres, of which 0.02 acres are considered CAMA jurisdictional wetlands.

The NPS worked with NCDOT to identify potential compensatory mitigation sites for the anticipated impacts to Section 404 jurisdictional wetlands. Several mitigation options were explored and prioritized. These options are discussed in detail in the Final Environmental Impact Statement (FEIS) dated September 17, 2008.

The NPS identified restoration of high-quality wetland communities designated as Significant Natural Heritage Areas (SNHAs) within the NPS property as the highest priority mitigation option. Many sites with high-quality or rare natural communities, rare species, and special animal habitats have been identified by the NPS and North Carolina Heritage Program (NCNHP) as being important for conservation of the State's biodiversity. The ecological significance of these areas has been documented through a 1987 Registry agreement, as amended, for the protection and management of Significant Natural Heritage Areas (SNHAs).

The NPS has identified the Bodie Island Lighthouse Pond SNHA as one such area (vicinity of 35°49'7.07"N, 75°33'48.60"W). NCDOT field surveys and mapping efforts estimated that approximately 50 acres of formerly Spartina-dominated marsh habitat has been displaced by the invasion of the exotic plant Phragmites in an area surrounding the Bodie Island Lighthouse. This *Draft Wetland Mitigation Plan* identifies the proposed work plan and performance measures to guide the restoration of the former marsh habitat through exotic plant control measures in this area of high management priority within the Seashore.

MITIGATION GOALS AND OBJECTIVES

The goal of this proposed mitigation plan is to compensate for unavoidable wetland impacts by developing a single proposal that (a) meets the compensation requirements of both the Executive Order 11990: Protection of Wetlands and the USACE Section 404 permit procedures (33 CFR 320-330); and (b) meets the NPS goal of "no net loss of wetlands" on NPS property. As explained in E.O. 11990, a Wetland Statement of Findings (SOF) must be prepared if an NPS action has the potential to have adverse impacts on wetlands unless the action is "excepted". A Wetland SOF is being prepared under separate cover for the B-2500 bridge replacement project. This mitigation plan is excepted from the requirement of a Wetland SOF under Section 4.2.1 (h): **Actions designed to restore degraded (or completely lost) wetland, stream, riparian, or other aquatic habitats or ecological processes**.

Compensatory mitigation means the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved. Restoration should generally be the first option considered because the likelihood of success is greater and the impacts to potentially ecologically important uplands are reduced compared to establishment, and the potential gains in terms of aquatic resource functions are greater, compared to enhancement and preservation.

Mitigation options are defined below according to **COMPENSATORY MITIGATION FOR LOSSES OF AQUATIC RESOURCES**, **33 CFR PART 332:**

1. ***Restoration*** means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.
    a. ***Re-establishment*** means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a

former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

b. ***Rehabilitation*** means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

2. ***Establishment*** (creation) means the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions.
3. ***Enhancement*** means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.
4. ***Preservation*** means the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

MITIGATION OBJECTIVES

The proposed on-site mitigation, defined as restoration above, provides for the rehabilitation of the integrity of natural resources, native vegetation mosaic, and habitat values at the Bodie Island Lighthouse Pond. In a December 2010 meeting with NCDOT, the NPS identified this site as a high management priority within the Seashore. Examples of high management priority areas are areas that have been jointly identified by NPS and the North Carolina Natural Heritage Program (NCNHP) and are Registered Significant Natural Heritage Areas (SNHAs). Registration of SNHAs means that the NPS and NCNHP have signed a Registry agreement that documents their joint interest and

commitment to protect the integrity of natural resources within a particular area. The 1987 Registry agreement states that the NPS will:

> ….refrain from making or permitting changes that negatively affect the natural values for which [these areas were] registered….Specifically, the National Park Service agrees to manage and maintain the designated natural areas for the perpetuation and protection of their primary biological resources. In some cases, manipulation—by burning, mowing, cutting, control of exotic species, managed water levels, or placement of dredged materials—may be appropriate to control natural vegetational succession and maintain habitats for rare or special-interest species…A monitoring program will be maintained for endangered and threatened species of animals and plants.

Each SNHA profile includes specific management action recommendations. The following management goals in this plan are based on those identified in national invasive species guidance, including the *National Invasive Species Management Plan* (National Invasive Species Council, 2008). Each goal has a set of related management objectives, which are statements of purpose that describe what must be accomplished for the plan to be considered a success in the Seashore. Adaptive management, an integral part of this plan, is a process that allows for decision making in spite of uncertainty, with an aim to reduce uncertainty over time via system monitoring. This process allows resource objectives to be met while information is gathered and lessons are learned, in hopes of continually improving future management.

Independent of the specific project location, the following goals and management objectives are applicable to exotic plant control efforts within the Seashore:

Goal 1: Inventory – Initiate a comprehensive and systematic exotic plant inventory to establish a baseline from which to measure progress.

Management Objectives:

- Document the abundance and distribution of exotic plants in the target areas
- Provide a foundation for prioritizing threats and for carrying out management planning efforts
- Provide a foundation for the development of short- and long-term programmatic plans

Goal 2: Treatment – Treat exotic plant populations that pose the greatest threat to park resources.

Management Objectives:

- Use the most effective and appropriate tool, or combination of tools, to eradicate or reduce the impact of exotic plants
- Reduce the impact of exotic plants on sites of cultural, scenic, and high ecological value, including habitat for special status species
- Restore ecosystems and key ecological processes that have been affected by invasive species to meet desired future conditions
- Integrate ecological restoration practices in exotic plant control treatments to guard against reinfestation
- Minimize secondary impacts from control efforts
- Protect human health and safety of persons potentially affected by the exotic plant control treatments

Goal 3: Monitoring – Ensure that the exotic plant control program is regularly monitored and improved, environmentally safe, and supported by science and research.

Management Objectives:

- Monitor and evaluate the overall program effectiveness to inform management regarding whether the program is of sufficient scope to meet program goals
- Monitor and evaluate the effectiveness of control techniques by species and adapt as necessary, based on results
- Monitor effects on native plant communities, based on results, adapt control techniques

- Identify vectors of spread to determine ways of preventing new species and populations from becoming established in targeted areas
- Promote research in the park upon which to base future management decisions

Goal 4: Educate, Outreach, and Research – Educate, inform, consult, and collaborate with stakeholders (e.g., NPS and other government agencies, organizations, concessioners, visitors, partners, private property owners, and gateway communities) to share information and address exotic plant issues.

Management Objectives:

- Continue developing partnerships to encourage participation in the management of exotic plants throughout the Outer Banks region
- Expand collaborative efforts among park neighbors, park partners, gateway communities, and the public to share methods of preventing and controlling the spread of exotic plants
- Ensure that interested parties are well-informed about the timing and locations of upcoming exotic plant control treatments
- Educate and inform park visitors on exotic plants
- Provide stewardship opportunities for the public
- Continue to support and develop exotic plant research

AFFECTED WETLANDS AND MITIGATION

INTENDED COMPENSATION CONTRIBUTION

The proposed construction of B-2500 will permanently impact 0.50 acre of jurisdictional wetlands, which includes 0.01 acre CAMA jurisdictional wetlands.

Individual impact sites and acres are summarized in the wetland impact sheet included in the permit application. Specific community descriptions and wetland types are described in detail in the Final Environmental Impact Statement dated September 2008.

ONSITE MITIGATION

To date, the NPS has identified the rehabilitation of approximately 50 acres of wetland within the Bodie Island Lighthouse Pond SNHA as the highest priority site for the proposed on-site mitigation for wetland impacts. The NPS and NCNHP identified control of exotic plant species is essential to prevent the degradation or loss of function of this SNHA.

Bodie Island Ligthouse Pond SNHA (Site Id #1134)

The Bodie Island Lighthouse Pond is located on the Oregon Inlet 7.5 USGS topographic quad map, approximately 3 miles north of Oregon Inlet. It is the largest pond in the Seashore, measuring nearly one mile long and 0.4 mile wide. This fresh to slightly brackish pond is likely not a natural body of water. It was probably created by a waterfowl hunt club by placing a dam on a small outlet stream to the Pamlico Sound. However, the history of the pond is poorly known, and it predates the designation of the Cape Hatteras National Seashore.

Today, the Lighthouse Pond is primarily used for nature study. Large numbers of birdwatchers and sightseers visit the pond each year, accessing the Pond area on a recently upgraded (now handicap-accessible) wildlife viewing platform. Hunting and fishing are prohibited.

The site was described by the NCNHP as having significance due to its outstanding collection of water birds, with several rare plant and animal species. Historically, the pond was bordered by a diverse, though somewhat narrow, border of fresh-brackish marsh. Several rare plants occurred in the marsh. The Lighthouse Pond is habitat for very large numbers of waterbirds, making it one of the best bird watching sites in North Carolina (Buchanan 2009). For most of the year, thousands of waterbirds forage in the mud and shallow water at the pond. Several species of waterfowl nest in the vegetation at the edge of the pond, including black duck, gadwall, and blue-winged teal. During the warmer

months a large variety of shorebirds, herons, egrets, and ibises forage at the pond. Several uncommon shorebird species occur annually, including Hudsonian godwit and Wilson's phalarope. From early autumn into spring, the pond is often covered with waterfowl including tundra swans, Canada geese, and snow geese. Peregrine falcons pass through the area in fall migration, and one or two individuals are often present in the vicinity of the pond in fall or winter.

The following lists the special status species of plants and animals known to occur in the vicinity of the pond:

- Black-necked stilt (*Himantopus mexicanus*), State Significantly Rare
- Peregrine falcon (*Falco peregrinus*), State Endangered
- Black rail (*Laterallus jamaicensis*), State Species of Concern
- Saltmarsh spikerush (*Eleocharis halophila*), State Threatened
- Beaked spikerush (*Eleocharis rostellata*), State Threatened
- Olney's three-square (*Schoenoplectus americanus*), State Watch List

The 1987 Registry agreement includes specific management and protection recommendations for the Bodie Island Lighthouse Pond SNHA. The site will continue to be a visitor destination within the Seashore, for birdwatchers and lighthouse tourists alike. However, the NPS is presently neither managing the water level for the benefit of the bird populations nor is the NPS presently monitoring or managing infestations of exotic plant species, with a specific emphasis on *Phragmites australis*.

The European genotype of the common reed (*P. australis*) occurs in large bands around the edge of the pond; this is an exotic species which is now abundant in habitats once occupied by the genotype native to the United States. Population decline and local extinctions of the native genotypes may be a result of competitive displacement by the exotic genotype and/or anthropogenic disturbance. Approximately 900 acres of marsh are infested by the exotic *P. australis* throughout the entire Seashore. In 2008, the NPS originally estimated and mapped approximately 35 acres of marsh infested by the exotic *P. australis* within the Bodie Island Lighthouse Pond SNHA. In 2011, NCDOT in coordination with NPS mapped 51.73 acres of phragmites within the marsh at Bodie Island Lighthouse pond.

EFFECTS OF PHRAGMITES INVASION OF COASTAL MARSHES

Phragmites australis is a tall perennial grass which can attain heights of up to 4.5 m (USACE 2005), significantly greater than that of native marsh species, such as *Spartina alterniflora*, *Spartina patens*, *Juncus roemarianus*, and *Typha latifolia*. Although it is a prolific seed producer, *Phragmites* most often spreads locally through vigorous growth of rhizomes and stolons, which can grow up to 2 m per year (Batterson and Hall 1984). *Phragmites* can eventually sustain stem densities of up to 300 culms per square meter through development of a dense root mat (Hara et al. 1993). In addition to vigorous biomass growth, *Phragmites* is also reported to release the allelopathic chemical gallic acid into the soil, which inhibits the establishment and growth of other marsh species (Rudrappa et al. 2007). As a result of these physiological characteristics, *Phragmites*, once established, frequently develops dense, monospecific colonies over extensive areas and can exclude shorter native marsh species (USACE 2005). The Virginia Department of Conservation and Recreation (2009) reported that aggressive *Phragmites* colonies threatened the habitat of 29 rare plant species in Virginia.

The effect of *Phragmites* invasion on communities of associated wildlife has been most pronounced with respect to birds. While the observed effect on populations of native fish, benthic infauna, aquatic invertebrates, and decapod crustaceans has been variable (Posey et al. 2003, Hanson et al. 2002, Able and Hagan 2000, Fell et al. 1998), the shift in habitat from native low marsh vegetation to monotypic stands of *Phragmites* has demonstrated a more consistent effect on bird populations. In a study of marsh birds in Connecticut, it was demonstrated that there were fewer species present in *Phragmites*-dominated stands than in native short-grass marshes, particularly among rare bird species (Benoit and Askins 1999). The authors concluded that the dense, montypic stands of *Phragmites* reduce the structural habitat heterogeneity and plant diversity needed by many species. In addition, the height and density of the thick *Phragmites* stems may physically exclude waterfowl and wading birds from the marsh interior, or substantially reduce hunting efficiency, rendering these sites unproductive. Similarly, Bontje (1987) found increased bird richness in restored cordgrass marshes compared with reference *Phragmites*, and Paxton (2007) reported that

avian marsh species in Virginia rarely utilized stands of *Phragmites*. *Phragmites* has been reported to negatively affect the habitat of 22 rare animal species including 13 birds in the state of Virginia (VDCR 2009).

Some researchers have suggested that changes in vegetation growth form and structure between native marsh grasses and invasive *Phragmites* may affect soil and hydrology characteristics of wetland sites. *Phragmites* colonies typically have fewer but significantly larger stems than native species, which may affect water flow through the marsh, sediment deposition rates and processes, detrital production and accumulation rates, sediment organic content, and nutrient cycling (Meyerson et al. 2000, Talley and Levin 2001, Rooth and Stevenson 2000, Windham 2001, Leonard et al. 2002). Windham and Lathrop (1999) stated that *Phragmites* stands may increase detritus accumulation over time, and thus, may elevate the substrate surface and smooth surface microtopography. Such gradual aggredation of the substrate surface may ultimately eliminate surface hydrology features relevant to aquatic species. *Phragmites* stands have demonstrated significantly greater rates of internal nitrogen cycling (both immobilization and mineralization) as compared to stands of native *Spartina patens* (Windham and Ehrenfeld 2003). *Phragmites* sequestered more nitrogen in live biomass and detritus compared to *Spartina patens*, but simultaneously stimulated microbial nitrogen mineralization at an equivalent rate, potentially affecting total nitrogen pools within the wetland along with pathways of nitrogen export. Similarly, Findlay et al. (2003) demonstrated that the ability of wetlands to serve as a nitrogen sink was reduced when former *Phragmites* stands were restored to a more diverse plant community.

TREATMENT OPTIONS

Throughout the United States and Europe, a full suite and combination of physical and chemical techniques have been tested experimentally in laboratory and field conditions to gain insight into the control and eradication of exotic *P. australis*. Experimental control efforts have varying degrees of success, and no singular effective technique has been identified as the best approach to managing *P. australis* infestations. Physical controls

tested include manual and mechanical means of inducing stress (e.g., shading, drowning, mowing, burning), alteration of site hydrology (e.g., filling ditches, creating ditches, creating ponds), and excavation of root systems.

Minchinton and Bertness (2003) demonstrated that alteration of vegetation adjacent to *P. australis* plots and nutrient pulses each resulted in increased density, height, and biomass of *P. australis* shoots. The combination of these treatments also resulted in an increase in the distance that shoots expanded and their reproductive output. Thus, limiting disturbance of native vegetation and reducing nutrient loading are critical to preventing the spread of existing *P. australis* infestations.

Chemical controls include herbicide application, typically in combination with some form of physical control for well-established infestations in large areas. Chemical control of *P. australis* has been achieved most frequently with a foliar application of imazapyr or glyphosate, a non-selective herbicide, applied in July to mid-September. (Mozdzer et al, 2008) Herbicide application followed by burning has shown to be relatively effective and may stimulate the native plant community recovery (Boone et al, 1987)

The NPS has completed an Environmental Assessment for the Outer Banks Group Fire Management Plan (2001) and a Finding of No Significant Impact (FONSI) was received (2002) to allow the Seashore to use prescribed burning to manage hazardous fuel loads. The Seashore conducted a prescribed burn in early 2012.

PROPOSED MITIGATION

The NCDOT proposes to restore of approximately 50 acres of phragmites dominated wetland within the Bodie Island Lighthouse Pond SNHA by rehabilitation to its former function as a brackish marsh. NCDOT proposes a 5:1 ratio for this onsite wetland restoration to offset wetland impacts associated with Phase I of B-2500. Remaining assets on the site must have regulatory agency approval prior to use as mitigation on other projects.

WORK PLAN

Goal 1: Inventory

The NPS identified that control of exotic plant infestation in the Bodie Island SNHAs is the highest priority site for the proposed mitigation for wetland impacts resulting from the bridge replacement project.. In 2008, the NPS preliminarily estimated and mapped approximately 35 acres infested by the exotic *P. australis* within this SNHA. In 2011, NCDOT mapped 51.73 acres based on field surveys and photogrammetric analysis as shown in Figure 1 below.

Prior to site treatment, fixed photo points and vegetation survey plots and will be established within the marsh area. Photo points will be established near the edges of phragmites stands. Fourteen (14) 1 square-meter plots will be randomly located within the surveyed phragmites stands outlined in yellow on Figure 1 below. Additional plots will be located outside the phragmites stands as control plots. Vegetation plots will be inventoried for % aerial coverage of phragmites within each plot. Native vegetation will also be recorded.

Figure 1

Goal 2: Treatment

The use of herbicide treatment(s) (initial and spot treatments) is recommended as the primary control method and the first step toward effective control. After the initial herbicide treatment, one or more follow-up methods at each site will be required.

NCDOT and NPS treatment plan follows procedures established in *A Guide to the Control and Management of Invasive Phragmites,2nd Edition* published by the Michigan Department of Natural Resources in cooperation with several other state and federal agencies. The guide presents a compilation of techniques, based on four years of research and more than ten years of land managers' on-the-ground experience, to control the nonnative variety of phragmites.

NCDOT will follow the Guide's specific recommendations of Approach 2 management strategy for large, dense stands of phragmites on a wet site:

1. Treat phragmites stands with Imazapyr and Glyphosate herbicides in mid-summer or late summer. Wait at least two weeks to allow plant exposure.
2. If needed, conduct the prescribed fire in the year following herbicide treatment either in winter (January until prior to spring green-up) or during the summer.
3. Check site the following growing season for phragmites regrowth and spot-treat with herbicide if needed.

ADAPTIVE MANAGEMENT

Controlling *Phragmites* infestations has proven to be a challenging and unpredictable undertaking for resource managers and landowners across the country. Therefore, adaptive management is crucial for this wetland restoration project to be successful. Adaptive management is a process that allows for decision making in spite of uncertainty, with an aim to reduce uncertainty over time via system monitoring. Our goal is that NCDOT and NPS Resource Management (RM) staff at CAHA keeps open communication throughout the duration of the mitigation project in order to achieve success. The following outline is proposed for the

duration of the monitoring period to allow for annual adjustment in the treatment plan based on success criteria.

- January-March, annually
    - Prepare and submit NPS Pesticide Use Proposal (PUP) must be submitted by NPS on annual basis, requesting authorization to apply specific herbicide.
    - NPS will notify NCDOT of authorization to apply herbicides via PUP approval from the NPS Southeast Regional Office.
    - NPS authorizes herbicides on individual basis; therefore, there shall be no substitution of herbicide without written authorization via PUP approval.
    - Submit copy of current NC Certified Applicator License(s) must be submitted to NPS annually and prior to application of herbicide

- March-June, annually
    - Identify areas aerial treatment proposed to occur
        - Initial aerial treatment area includes the entire band of marsh around the Lighthouse pond (except where spot treatment preferred)
        - Subsequent aerial treatment areas will be determined by annual evaluation
    - Identify areas spot treatment proposed to occur
        - Initial spot treatment areas include areas in close proximity of listed species as identified by field surveys and areas in close proximity to visitor use as identified by NPS
        - Subsequent spot treatment areas will be determined by annual evaluation
    - Evaluate recover of target species
        - Identify areas not on target to meet success criteria for recover of target species (bare areas)
        - Determine if supplemental planting is appropriate

- Mid Summer through mid-November, annually
    - Conduct aerial or spot application of aquatic herbicide in identified areas
    - Herbicide must be stored, handled, applied, and disposed of by a NC Certified Applicator in accordance with the label and MSDS
    - NC Certified Applicator must be on-site when herbicides are being applied
    - NC Certified Applicator is accountable for any and all individuals working under Applicator's License
    - Daily Pesticide Use Log must be maintained by applicator

- By December 31, annually
    - Pesticide Use Log must be submitted to NPS
    - Monitoring report must be submitted to NPS and agencies

AVOIDANCE MEASURES

In order to minimize adverse impacts to the resources at Bodie Island Lighthouse Pond, several mitigation measures must be put in place for proposed activities. These include, but are not limited to:

- Avoid impacts of herbicides to rare plants:
    - Physical cover for individual stems
    - Establish buffer zones around sizeable populations of rare plants
    - Minimize drift by applying herbicides with proper technique and under proper conditions through contract specifications. Table 1 below relates droplet size and expected drift.

Accuflow nozzles allow the user to customize the orifice size to accommodate different spray jobs. Each nozzle has an array of 32 needle outlets in a circular configuration. The system operates with 20 psi boom pressure and under 5 psi nozzle pressure. This boom/nozzle combination produces droplet sizes of 1000 - 1500 microns, depending on which orifice used.

Table 1: Influence of droplet size on distance of drift. (Klingman, Potts, Akesson, Yates)

Droplet diameter (microns)	Type of Droplet	Time Required to fall 10 feet	Lateral distance droplets travel in a 3 mph wind
5	Fog	66 minutes	3 miles
20	Very fine spray	4.2 minutes	1,100 feet
100	Fine spray	10 seconds	44 feet
240	Medium spray	6 seconds	28 feet
400	Coarse spray	2 seconds	8.5 feet
1,000	Fine rain	1 second	4.7 feet

- Avoid impacts to wetland soils/hydrology:
  - Use aerial application for initial treatments
  - Convert to backpack application after control established

- Avoid impacts to water quality:
  - Use herbicides that are safe for application in standing water
  - Prevent spills of contaminants from entering water bodies or wetlands

- Avoid impacts to visitor experience:
  - Perform herbicide application and prescribed burns when visitor use in the area is as minimal as possible (CAHA staff will provide preferred timeline)
  - Inform public of activities through posting signs, press releases, etc.

- Actions must be consistent with NC Coastal Area Management Act

- Prescribed burn actions must be consistent with Minimum Impact Suppression Tactics (MIST) practices and follow an approved burn plan

Goal 3: Monitoring

Monitoring the results of *Phragmites* control treatments provides critical information that will allow NPS and NCDOT to assess the efficacy of their actions at the site. NCDOT will be responsible for all monitoring activities, including coordination with NPS and NHP.

- Fixed photo points will be established across the site at edges or boundaries of phragmites stands.
- Fourteen (14) 1 square-meter plots will be randomly located within the surveyed phragmites stands as shown on Figure 1. This density is less than recommended in the NMFS guidelines but data will be supplemented by aerial photo interpretation. Three (3) additional plots will be located outside the phragmites stands as control plots.
- The vegetation component of the wetland site will be deemed successful if the following criteria are met:
    - After the first year treatment, the total aerial coverage of dense phragmites stands decreases from the current 50 acres mapped as shown on Figure 1. This will be reported in the Spring of the following year.
    - This trend of decreased aerial coverage of mapped phragmites will continue each treatment year.
    - At the end of the final monitoring year, the total aerial coverage of dense phragmites stands will be 10 acres or less with stems less than three feet tall.
- Annual reports will be prepared and distributed at the end of each treatment year.
- Subsequent year treatment areas and type of treatment (aerial or spot) will be mapped and reported in the Spring of each year.

Goal 4: Educate, Outreach, and Research

The project will provide an educational opportunity for NPS by incorporating invasive species issues into the interpretive programs provided to visitors. According to NPS, the goal of these programs "is to provide memorable and meaningful learning and recreational experiences, foster

development of a personal stewardship ethic, and broaden public support for preserving park resources. Such programs will be successful when they forge emotional and intellectual connections among park resources, visitors, the community, and park management". Visitors may learn how to identify phragmites, the cause and effects of invasive species in our state's natural communities and how they can help to prevent the spread of invasive species. NCDOT will continue to coordinate with NPS to notify all stakeholders and potential visitors when treatment will take place. Additionally, as large stands of phragmites die-off, it will be important to provide the visitors an explanation of what may temporarily appear as destructive, is actually crucial to restoring the natural community. To this end, NCDOT will explore installing interpretive signage with NPS near the lighthouse illustrating the needs and goals of the restoration process.

An adaptive management plan will provide a valuable site specific opportunity for the NCDOT, NPS and other stakeholders to learn and understand the best methods of treatment and how the natural community responds. This information will help provide an effective method of treatment to ensure the long-term success of phragmites control that may also be applied to other areas of the Seashore and surrounding coastal areas. Specific details regarding methods, rates and timing of pesticide application, prescribed burns and effectiveness will be recorded and available to the public and stakeholders.

SITE PROTECTION AND MAINTENANCE

The site is located completely on National Park Service land and is afforded long-term protection under federal laws and maintained under NPS regulations.

FINANCIAL ASSURANCES

NCDOT is held by permit conditions associated with B-2500 to complete the mitigation and monitoring plan for this site. NCDOT has established funds for each project and within each Division to monitor the mitigation site.

PROJECT COMMITMENTS

NCDOT will work with NPS to solicit grant funding for long term management of the site by NPS. NCDOT has coordinated with the Division and utility personnel to minimize encroachment of phragmites from outside the site along the eastern boundary. Dominion Power and NCDOT Division Roadside Environmental Unit have agreed to discontinue mowing of phragmites stands within the utility easement and along the roadway adjacent to the Bodie Island Lighthouse pond. Vegetation management in these areas will be achieved through herbicide treatment.

REFERENCES

Able, K.W. and Hagan, S.M. 2000. Effects of common reed (*Phragmites australis*) invasion on marsh surface macrofauna: response of fishes and decapod crustaceans. Estuaries 23(5): 633-646.

Batterson, T.R. and Hall, D.W. 1984. Common reed – *Phragmites australis* (Cav.) Trin. ex Steudel. Aquatics 6(2): 16-17, 20.

Benoit, L.K. and Askins, R.A. 1999. Impact of the spread of *Phragmites* on the distribution of birds in Connecticut tidal marshes. Wetlands 19(1): 194-208.

Bertness, M.D., P.J. Ewanchuk, and B.R. Silliman. 2002. Anthropogenic modification of New England salt marsh landscapes. Proceedings of the National Academy of Science 99: 1395-1398.

Bontje, M.P. 1987. The application of science and engineering to restore a salt marsh. pp. 16-23 *In* Proceedings of the 15th Annual Conference on Wetlands Restoration and Creation. Hillsborough Community College, Tampa, FL, USA.

Boone, J.L., C.E. Furbish, and K. Turner. 1987. Control of *Phragmites communis*. Results of burning, cutting, and covering with plastic in a North Carolina salt marsh. Institute of Ecology, University of Georgia, CPSU Technical Report No. 42.

Chambers, R.M., L.A. Meyerson, and K. Saltonstall. 1999. Expansion of Phragmites australis into tidal wetlands of North America. Aquatic Botany 64: 261-273.

Fell, P. Weissbach, S.P., Jones, D.A., Fallon, M.A., Zeppieri, J.A., Faison, E.K., Lennon, K.A., Newberry, K.J., Reddington, L.K. 1998. Does invasion of oligohaline tidal marshes by reed grass, *Phragmites australis* (Cav.) Trin. ex Steud., affect the availability of prey sources for the mummichog, *Fundulus heteroclitus* L. Journal of Experimental Marine Biology and Ecology 222: 59-77.

Findlay, S., Groffman, P., Dye, S. 2003. Effects of *Phragmites australis* removal on marsh nutrient cycling. Wetlands Ecology and Management 11(3): 157-165.

Hanson, S.R., Osgood, D.T., Yozzo, D.J. 2002. Nekton use of a *Phragmites australis* marsh on the Hudson River, New York. Wetlands 22(2): 326-337.

Hara, T., van der Toorn, J., Mook, J.H. 1993. Growth dynamics and size structure of shoots of *Phragmites australis*, clonal plant. Journal of Ecology 81: 47-60.

Leonard, L.A., Wren, P.A., Beavers, R.L. 2002. Flow dynamics and sedimentation in *Spartina alterniflora* and *Phragmites australis* marshes of the Chesapeake Bay. Wetlands 22: 415-424.

Meyerson, L.A., K. Saltonstall, L. Windham, E. Kiviat, and S. Findlay. 2000. A comparison of Phragmites australis in freshwater and brackish environments in North America. Wetlands Ecology and Management 8: 89-103.

Minchinton, T. E. and M. D. Bertness. 2003. Disturbance-Mediated Competition and the Spread of *Phragmites australis* in a Coastal Marsh. Ecological Applications 13(5): 1400-1416.

Mozdzer, T.J., C. J. Hutto, P.A. Clarke, and D. P. 2008. Field Efficacy of Imazapyr and Glyphosate in the Control of Non-Native *Phragmites australis*. Restoration Ecology, 16(2): 221–224.

National Invasive Species Council. 2008. 2008-2012 National Invasive Species Management Plan. 35 pp.

National Park Service. 2002. Director's Order #77-1: Wetland Protection. Available on the internet at: http://www.nps.gov/policy/DOrders/DO77-1-Reissue.htm

National Park Service. 2012. National Park Service Procedural Manual #77-1: Wetland Protection. Available on the internet at: http://www.nature.nps.gov/water/wetlands/assets/docs/DO_77-1_PROC_MANUAL_2012_Revision_FINAL.pdf

Paxton, B. 2007. Potential impact of common reed expansion on threatened high-marsh bird communities on the seaside: breeding bird surveys of selected high-marsh patches. Center for Conservation Biology Technical Report Series, CCBTR-07-03. College of William and Mary, Williamsburg, VA. 19 pp.

Posey, M.H., Alphin, T.D., Meyer, D.L., and Johnson, J.M. 2003. Benthic communities of common reed *Phragmites australis* and marsh cordgrass *Spartina alterniflora* marshes in Chesapeake Bay. Marine Ecology Progress Series 261: 51-61.

Rooth, J.E., Stevenson, J.C. 2000. Sediment deposition patters in *Phragmites australis* communities: implications for coastal areas threatened by rising sea level. Wetlands Ecol. and Manag. 8: 173-183.

Rudrappa, T., Bonsall, J., Gallagher, J., Seliskar, D., Bais, H. 2007. Root-secreted allelochemical in the noxious weed *Phragmites australis* deploys a reactive oxygen species response and microtubule assembly disruption to execute rhizotoxicity. Journal of Chemical Ecology 33: 1898-1919.

Talley, T.S., Levin, L.A. 2001. Modification of sediments and macrofauna by an invasive marsh plant. Biol. Invasions 3: 51-68.

U.S. Army Corps of Engineers. 2005. Environmental Assessment for Control of *Phragmites australis* in South Carolina. 49 pp.

Virginia Department of Conservation and Recreation. 2009. Management Plan for *Phragmites australis* on the Seaside of Virginia's Eastern Shore. Nat. Heritage Tech. Rep. 09-04. 81 pp.

Windham, L. and Ehrenfeld, J.G. 2003. Net impact of a plant invasion on nitrogen-cycling processes within a brackish tidal marsh. Ecological Applications 13(4): 883-896.

Windham, L. 2001. Comparison of biomass production and decomposition between *Phragmites australis* (common reed) and *Spartina patens* (salt hay grass) in brackish tidal marshes of New Jersey, USA. Wetlands 21: 179-188.

Windham, L. and Lathrop, R. 1999. Effects of *Phragmites australis* (common reed) invasion on above-ground biomass and soil properties in brackish tidal marsh of the Mullica River, New Jersey. Estuaries 22: 927-935.

US Army Corps of Engineers and US Environmental Protection Agency. 2003. Memorandum to the Field: Model Compensatory Mitigation Plan Checklist for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Dated November 7, 2003. Available on the internet at http://www.mitigationactionplan.gov/checklist.pdf

Appendix A: Material Safety Data Sheets

Habitat – Imazapyr

Rodeo – Glyphosate

BASF
The Chemical Company

Safety Data Sheet
HABITAT HERBICIDE

1. Product and Company Identification

Company
BASF CORPORATION
100 Park Avenue
Florham Park, NJ 07932, USA

24 Hour Emergency Response Information
CHEMTREC: 1-800-424-9300
BASF HOTLINE: 1-800-832-HELP (4357)

Substance number:	000000063383
Molecular formula:	C(13) H(15) N(3) O(3). C(3) H(9) N
Chemical family:	imidazole derivative
Synonyms:	Isopropylamine salt of imazapyr

2. Hazards Identification

Emergency overview

CAUTION:
KEEP OUT OF REACH OF CHILDREN.
Avoid contact with the skin, eyes and clothing.
Avoid inhalation of mists/vapours.

See Product Label for additional precautionary statements.

State of matter: liquid
Colour: blue, clear
Odour: ammonia-like, faint odour

Potential health effects

Primary routes of exposure:
Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

Acute toxicity:
Relatively nontoxic after single ingestion. Slightly toxic after short-term skin contact. Relatively nontoxic after short-term inhalation.

Irritation / corrosion:
May cause slight but temporary irritation to the eyes. May cause slight irritation to the skin.

Sensitization:
Skin sensitizing effects were not observed in animal studies.

Potential environmental effects

Aquatic toxicity:
There is a high probability that the product is not acutely harmful to fish. There is a high probability that the product is not acutely harmful to aquatic invertebrates. Acutely harmful for aquatic plants.

Terrestrial toxicity:
With high probability not acutely harmful to terrestrial organisms.

3. Composition / Information on Ingredients

CAS Number	Content (W/W)	Chemical name
81510-83-0	>= 27.77 - <= 27.8 %	Isopropylamine salt of imazapyr
	72.2 %	Proprietary ingredients

4. First-Aid Measures

General advice:
First aid providers should wear personal protective equipment to prevent exposure. Remove contaminated clothing. Move person to fresh air. If person is not breathing, call 911 or ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or physician for treatment advice. Have the product container or label with you when calling a poison control center or doctor or going for treatment.

If inhaled:
Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary.

If on skin:
Rinse skin immediately with plenty of water for 15 - 20 minutes.

If in eyes:
Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing.

If swallowed:
Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions.

Note to physician
Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Flash point: Non-flammable.
Self-ignition temperature: not self-igniting

Suitable extinguishing media:
foam, dry powder, carbon dioxide, water spray

Hazards during fire-fighting:
carbon monoxide, carbon dioxide, nitrogen oxide, nitrogen dioxide, Hydrocarbons,
If product is heated above decomposition temperature, toxic vapours will be released. The substances/groups of substances mentioned can be released if the product is involved in a fire.

Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

Further information:
Evacuate area of all unnecessary personnel. Contain contaminated water/firefighting water. Do not allow to enter drains or waterways.

6. Accidental release measures

Personal precautions:
Take appropriate protective measures. Clear area. Shut off source of leak only under safe conditions. Extinguish sources of ignition nearby and downwind. Ensure adequate ventilation. Wear suitable personal protective clothing and equipment.

Environmental precautions:
Do not discharge into the subsoil/soil. Do not discharge into drains/surface waters/groundwater. Contain contaminated water/firefighting water.

Cleanup:
Dike spillage. Pick up with suitable absorbent material. Place into suitable containers for reuse or disposal in a licensed facility. Spilled substance/product should be recovered and applied according to label rates whenever possible. If application of spilled substance/product is not possible, then spills should be contained, solidified, and placed in suitable containers for disposal. After decontamination, spill area can be washed with water. Collect wash water for approved disposal.

7. Handling and Storage

Handling

General advice:
RECOMMENDATIONS ARE FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS. PESTICIDE APPLICATORS & WORKERS must refer to the Product Label and Directions for Use attached to the product for Agricultural Use Requirements in accordance with the EPA Worker Protection Standard 40 CFR part 170. Ensure adequate ventilation. Provide good ventilation of working area (local exhaust ventilation if necessary). Keep away from sources of ignition - No smoking. Keep container tightly sealed. Protect contents from the effects of light. Protect against heat. Protect from air. Handle and open container with care. Do not open until ready to use. Once container is opened, content should be used as soon as possible. Avoid aerosol formation. Avoid dust formation. Provide means for controlling leaks and spills. Do not return residues to the storage containers. Follow label warnings even after container is emptied. The substance/ product may be handled only by appropriately trained personnel. Avoid all direct contact with the substance/product. Avoid contact with the skin, eyes and clothing. Avoid inhalation of dusts/mists/vapours. Wear suitable personal protective clothing and equipment.

Protection against fire and explosion:
The relevant fire protection measures should be noted. Fire extinguishers should be kept handy. Avoid all sources of ignition: heat, sparks, open flame. Sources of ignition should be kept well clear. Avoid extreme heat. Keep away from oxidizable substances. Electrical equipment should conform to national electric code. Ground all transfer equipment properly to prevent electrostatic discharge. Electrostatic discharge may cause ignition.

Storage

General advice:
Keep only in the original container in a cool, dry, well-ventilated place away from ignition sources, heat or flame. Protect containers from physical damage. Protect against contamination. The authority permits and storage regulations must be observed.

Storage incompatibility:
General advice: Segregate from incompatible substances. Segregate from foods and animal feeds. Segregate from textiles and similar materials.

Temperature tolerance
Protect from temperatures below: 0 °C
Changes in the properties of the product may occur if substance/product is stored below indicated temperature for extended periods of time.

Protect from temperatures above: 40 °C
Changes in the properties of the product may occur if substance/product is stored above indicated temperature for extended periods of time.

8. Exposure Controls and Personal Protection

Users of a pesticidal product should refer to the product label for personal protective equipment requirements.

Advice on system design:
Whenever possible, engineering controls should be used to minimize the need for personal protective equipment.

Personal protective equipment

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

Respiratory protection:
Wear respiratory protection if ventilation is inadequate. Wear a NIOSH-certified (or equivalent) TC23C Chemical/Mechanical type filter system to remove a combination of particles, gas and vapours. For situations where the airborne concentrations may exceed the level for which an air purifying respirator is effective, or where the levels are unknown or Immediately Dangerous to Life or Health (IDLH), use NIOSH-certified full facepiece pressure demand self-contained breathing apparatus (SCBA) or a full facepiece pressure demand supplied-air respirator (SAR) with escape provisions.

Hand protection:
Chemical resistant protective gloves, Protective glove selection must be based on the user's assessment of the workplace hazards.

Eye protection:
Safety glasses with side-shields. Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

Body protection:
Body protection must be chosen depending on activity and possible exposure, e.g. head protection, apron, protective boots, chemical-protection suit.

General safety and hygiene measures:
Wear long sleeved work shirt and long work pants in addition to other stated personal protective equipment. Work place should be equipped with a shower and an eye wash. Handle in accordance with good industrial hygiene and safety practice. Personal protective equipment should be decontaminated prior to reuse. Gloves must be inspected regularly and prior to each use. Replace if necessary (e.g. pinhole leaks). Take off immediately all contaminated clothing. Store work clothing separately. Hands and/or face should be washed before breaks and at the end of the shift. No eating, drinking, smoking or tobacco use at the place of work. Keep away from food, drink and animal feeding stuffs.

9. Physical and Chemical Properties

Form:	liquid		
Odour:	ammonia-like, faint odour		
Colour:	blue, clear		
pH value:	6.6 - 7.2		
Freezing point:	approx. 0 °C	(1,013.3 hPa)	Information applies to the solvent.
Boiling point:	approx. 100 °C	(1,013.3 hPa)	Information applies to the solvent.
Vapour pressure:	approx. 23.3 hPa	(20 °C)	Information applies to the solvent.
	< 100 hPa	(50 °C)	Information applies to the solvent.

Density:	1.04 - 1.09 g/ml	
	1.0956 g/cm3	(15 °C)
	1.0755 g/cm3	(50 °C)
Vapour density:		not determined
Viscosity, dynamic:	approx. > 1 mPa.s	(20 °C)
Solubility in water:		miscible
Molar mass:	320.4 g/mol	

10. Stability and Reactivity

Conditions to avoid:
Avoid all sources of ignition: heat, sparks, open flame. Avoid prolonged storage. Avoid electro-static discharge. Avoid contamination. Avoid prolonged exposure to extreme heat. Avoid extreme temperatures.

Substances to avoid:
oxidizing agents, reducing agents

Hazardous reactions:
The product is chemically stable.

Decomposition products:
Hazardous decomposition products: No hazardous decomposition products if stored and handled as prescribed/indicated., Prolonged thermal loading can result in products of degradation being given off.

Thermal decomposition:
Possible thermal decomposition products:
carbon monoxide, carbon dioxide, nitrogen oxide
Stable at ambient temperature. If product is heated above decomposition temperature toxic vapours may be released. If product is heated above decomposition temperature hazardous fumes may be released.

Corrosion to metals:
Corrosive effect on: mild steel brass

Oxidizing properties:
not fire-propagating
Not an oxidizer.

11. Toxicological information

Acute toxicity

Oral:
Type of value: LD50
Species: rat (male/female)
Value: > 5,000 mg/kg

Inhalation:
Type of value: LC50
Species: rat (male/female)
Value: > 5.3 mg/l (OECD Guideline 403)
Exposure time: 4 h
An aerosol was tested.

Dermal:
Type of value: LD50
Species: rabbit (male/female)
Value: > 2,000 mg/kg

Irritation / corrosion

Skin:
Species: rabbit
Result: mildly irritating
Method: Primary skin irritation test

Eye:
Species: rabbit
Result: non-irritant

Sensitization:
Skin sensitization test
Species: guinea pig
Result: Skin sensitizing effects were not observed in animal studies.

Genetic toxicity

Information on: imazapyr
No mutagenic effect was found in various tests with microorganisms and mammals.

Carcinogenicity

Information on: imazapyr
In long-term studies in rats and mice in which the substance was given by feed, a carcinogenic effect was not observed.

Reproductive toxicity

Information on: imazapyr
The results of animal studies gave no indication of a fertility impairing effect.

Development:

Information on: imazapyr
No indications of a developmental toxic / teratogenic effect were seen in animal studies.
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12. Ecological Information

Fish

Information on: imazapyr
Acute:
Oncorhynchus mykiss/LC50 (96 h): > 100 mg/l

Aquatic invertebrates

Information on: imazapyr
Acute:
Daphnia magna/EC50 (48 h): > 100 mg/l

Aquatic plants

Toxicity to aquatic plants:
other swollen duckweed/EC50 (14 d): 0.0228 mg/l
The product has not been tested. The statement has been derived from products of a similar structure or composition.

Non-Mammals

Information on: imazapyr
Other terrestrial non-mammals:
mallard duck/LC50: > 5,000 ppm
With high probability not acutely harmful to terrestrial organisms.
Honey bee/LD50: > 100 ug/bee
With high probability not acutely harmful to terrestrial organisms.

Degradability / Persistence
Biological / Abiological Degradation

Evaluation: Not readily biodegradable (by OECD criteria).

Other adverse effects:

The ecological data given are those of the active ingredient. Do not release untreated into natural waters.

13. Disposal considerations

Waste disposal of substance:
Pesticide wastes are regulated. Improper disposal of excess pesticide, spray mix or rinsate is a violation of federal law. If pesticide wastes cannot be disposed of according to label instructions, contact the State Pesticide or Environmental Control Agency or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container disposal:
Rinse thoroughly at least three times (triple rinse) in accordance with EPA recommendations. Consult state or local disposal authorities for approved alternative procedures such as container recycling. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers.

RCRA:
This product is not regulated by RCRA.

14. Transport Information

Land transport
USDOT

Not classified as a dangerous good under transport regulations

Sea transport
IMDG

Hazard class:	9
Packing group:	III
ID number:	UN 3082
Hazard label:	9, EHSM
Marine pollutant:	YES
Proper shipping name:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains IMAZAPYR 23%)

Air transport
IATA/ICAO

Hazard class:	9

Packing group:	III
ID number:	UN 3082
Hazard label:	9, EHSM
Proper shipping name:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains IMAZAPYR 23%)

15. Regulatory Information

Federal Regulations

Registration status:

Crop Protection	TSCA, US	released / exempt
Chemical	TSCA, US	blocked / not listed

OSHA hazard category: Chronic target organ effects reported; ACGIH TLV established

EPCRA 311/312 (Hazard categories): Acute; Chronic

State regulations

CA Prop. 65:
There are no listed chemicals in this product.

16. Other Information

Refer to product label for EPA registration number.

Recommended use: herbicide

NFPA Hazard codes:
Health : 1 Fire: 1 Reactivity: 1 Special:

We support worldwide Responsible Care® initiatives. We value the health and safety of our employees, customers, suppliers and neighbors, and the protection of the environment. Our commitment to Responsible Care is integral to conducting our business and operating our facilities in a safe and environmentally responsible fashion, supporting our customers and suppliers in ensuring the safe and environmentally sound handling of our products, and minimizing the impact of our operations on society and the environment during production, storage, transport, use and disposal of our products.

MSDS Prepared by:
BASF NA Product Regulations
msds@basf.com

MSDS Prepared on: 2012/03/08

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END OF DATA SHEET

MATERIAL SAFETY DATA SHEET

Dow AgroSciences

Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

RODEO* HERBICIDE

Effective Date: 3/23/04
Product Code: 84825
MSDS: 006694

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Rodeo* Herbicide

COMPANY IDENTIFICATION:
Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268-1189

2. COMPOSITION/INFORMATION ON INGREDIENTS:

Glyphosate IPA: N-(phosphono-methyl) glycine, Isopropylamine Salt	CAS # 038641-94-0	53.8%
Balance, Total		46.2%

3. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW
Clear, pale yellow liquid. May cause eye irritation. Slightly toxic to aquatic organisms.
EMERGENCY PHONE NUMBER: 800-992-5994

4. FIRST AID:

EYE: Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

SKIN: Wash skin with plenty of water.

INGESTION: No emergency medical treatment necessary.

INHALATION: Remove person to fresh air; if effects occur, consult a physician.

NOTE TO PHYSICIAN: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES:

FLASH POINT: >214°F (>101°C)
METHOD USED: Setaflash

FLAMMABLE LIMITS:
LFL: Not applicable
UFL: Not applicable

EXTINGUISHING MEDIA: Foam, CO_2, Dry Chemical

FIRE AND EXPLOSION HAZARDS: Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Toxic irritating gases may be formed under fire conditions.

FIRE-FIGHTING EQUIPMENT: Use positive-pressure, self-contained breathing apparatus and full protective equipment.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS: Absorb small spills with an inert absorbent material such as Hazorb, Zorball, sand, or dirt. Report large spills to Dow AgroSciences on 800-992-5994.

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep out of reach of children. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing vapors and spray mist. Handle concentrate in ventilated area. Wash thoroughly with soap and water after handling and before eating, chewing gum, using tobacco, using the toilet or smoking. Keep away from food, feedstuffs, and water supplies. Store in original container with the lid tightly closed. Store above 10°F (-12°C) to keep from crystallizing.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINES: None established

ENGINEERING CONTROLS: Good general ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

EYE/FACE PROTECTION: Use safety glasses.

SKIN PROTECTION: No precautions other than clean body-covering clothing should be needed.

RESPIRATORY PROTECTION: For most conditions, no respiratory protection should be needed; however, if discomfort is experienced, use a NIOSH approved air-purifying respirator.

APPLICATIONS AND ALL OTHER HANDLERS: Please refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES:

APPEARANCE: Clear, pale yellow liquid
DENSITY: 10.0 - 10.5 lbs/gal
pH: 4.8 – 5.0
ODOR: None
SOLUBILITY IN WATER: Miscible
SPECIFIC GRAVITY: 1.21 gm/L
FREEZING POINT: -7°F - -10°F (-21°C - -25°C)

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Stable under normal storage conditions.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Galvanized or unlined steel (except stainless steel) containers or spray tanks may produce hydrogen gas which may form a highly combustible gas mixture.

HAZARDOUS DECOMPOSITION PRODUCTS: None known.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

EYE: May cause slight temporary eye irritation. Corneal injury is unlikely.

SKIN: Essentially non-irritating to skin. Prolonged skin contact is unlikely to result in absorption of harmful amounts. The LD_{50} for skin absorption in rabbits is >5000 mg/kg. Did not cause allergic skin reactions when tested in guinea pigs.

INGESTION: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. The oral LD_{50} for rats is >5000 mg/kg.

INHALATION: Brief exposure (minutes) is not likely to cause adverse effects. The aerosol LC_{50} for rats is >6.37 mg/L for 4 hours.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: For a similar material, glyphosate, in animals, effects have been reported on the following organ: liver.

CANCER INFORMATION: A similar material, glyphosate, did not cause cancer in laboratory animals.

TERATOLOGY (BIRTH DEFECTS): For glyphosate IPA, available data are inadequate for evaluation of potential to cause birth defects.

REPRODUCTIVE EFFECTS: For glyphosate IPA, available data are inadequate to determine effects on reproduction.

MUTAGENICITY: For a similar material, glyphosate, in-vitro and animal genetic toxicity studies were negative.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL DATA:

ECOTOXICOLOGY:
Material is practically non-toxic to aquatic organisms on an acute basis (LC_{50} or EC_{50} is >100 mg/L in most sensitive species tested).
Acute LC_{50} for rainbow trout *(Oncorhynchus mykiss)* is >2500 mg/L.
Acute immobilization EC_{50} in water flea *(Daphnia magna)* is 918 mg/L.
Material is practically non-toxic to birds on an acute basis (LD_{50} is >2000 mg/kg).
Acute oral LD_{50} in bobwhite *(Colinus virginianus)* is >2000 mg/kg.
The LC_{50} in earthworm Eisenia foetida is >1000 mg/kg.
Acute contact LD_{50} in honey bee *(Apis mellifera)* is >100 µg/bee.
Acute oral LD_{50} in honey bee *(Apis mellifera)* is >100 µg/bee.
Growth inhibition EC_{50} in green alga *(Selenastrum capricornutum)* is 127 mg/L.
Growth inhibition EC_{50} in duckweed *(Lemna sp.)* is 24.4 mg/L.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities.

MATERIAL SAFETY DATA SHEET

Dow AgroSciences

Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

RODEO* HERBICIDE

Effective Date: 3/23/04
Product Code: 84825
MSDS: 006694

This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

If the material as supplied becomes a waste, follow all applicable regional, national and local laws and regulations.

14. TRANSPORT INFORMATION:

U.S. DEPARTMENT OF TRANSPORTATION (DOT) INFORMATION:

For all package sizes and modes of transportation:
This material is not regulated for transport.

15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Not to have met any hazard category

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: This product is not known to contain any substances subject to the disclosure requirements of

New Jersey
Pennsylvania

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND): To the best of our knowledge, this product contains no chemical subject to reporting under CERCLA.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

CATEGORY	RATING
Health	1
Flammability	1
Reactivity	0

16. OTHER INFORMATION:

MSDS STATUS: Revised Sections: 3,4,11,12,13,14 & 15
Reference: DR-0361-8028
Replaces MSDS Dated: 1/12/00
Document Code: D03-148-002
Replaces Document Code: D03-148-001

The Information Herein Is Given In Good Faith, But No Warranty, Express Or Implied, Is Made. Consult Dow AgroSciences For Further Information.

STORMWATER MANAGEMENT PLAN

Project: 13201.1028011
I.D. No.: B2500-Ph. 2
County: Dare County
Date: 04/09/12

Hydraulics Project Manager: Edward Vance, P.E. (STV Incorporated)
Marshall Clawson, P.E. (NCDOT Hydraulics Unit)

ROADWAY DESCRIPTION

The project consists of constructing a new 2.1 mile long coastal bridge on NC-12. This project was initiated by the breach at Pea Island as a result of Hurricane Irene. The total project length which includes the temporary roadway alignment is 2.7 miles. The proposed bridge will be a two-lane section (12' travel lanes with 8' shoulders), and will have 98 spans. The drainage system will consist of open scuppers on the main bridge spans, grate inlets and pipe systems for the ramps and end spans, and roadside ditches for the approach pavement.

ENVIRONMENTAL DESCRIPTION

The project is located within the Pasquotank Basin in Dare County which is also a CAMA county. Since the project is sited on a coastal barrier island, runoff from the roadway will outfall either directly to the ocean, sound, or to the abutting coastal wetlands. Impacts have been minimized by using roadside ditches which are generally flat and will infiltrate stormwater into the sandy soils.

BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES

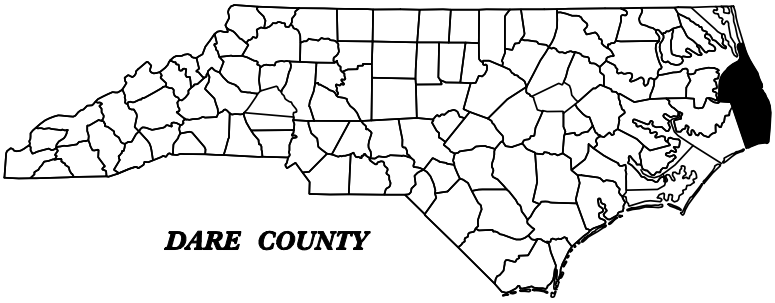
Temporary construction runoff will be controlled by using Silt Fence, Special Silt Fence, Temporary Slope Drains, Rock Silt Checks, and Temporary Matting and Grassing.

Open scuppers are proposed for the main spans of the permanent bridge because the height of the low chord of the bridge is approximately 15' above the ground elevation. The bridge height will allow the wind to disperse stormwater from the bridge drains before it impacts the ground. Also, open scuppers are typically allowed in locations where the volume of runoff is very small relative to the open water body to which the runoff is discharging such as sounds and Intracoastal Waterways.

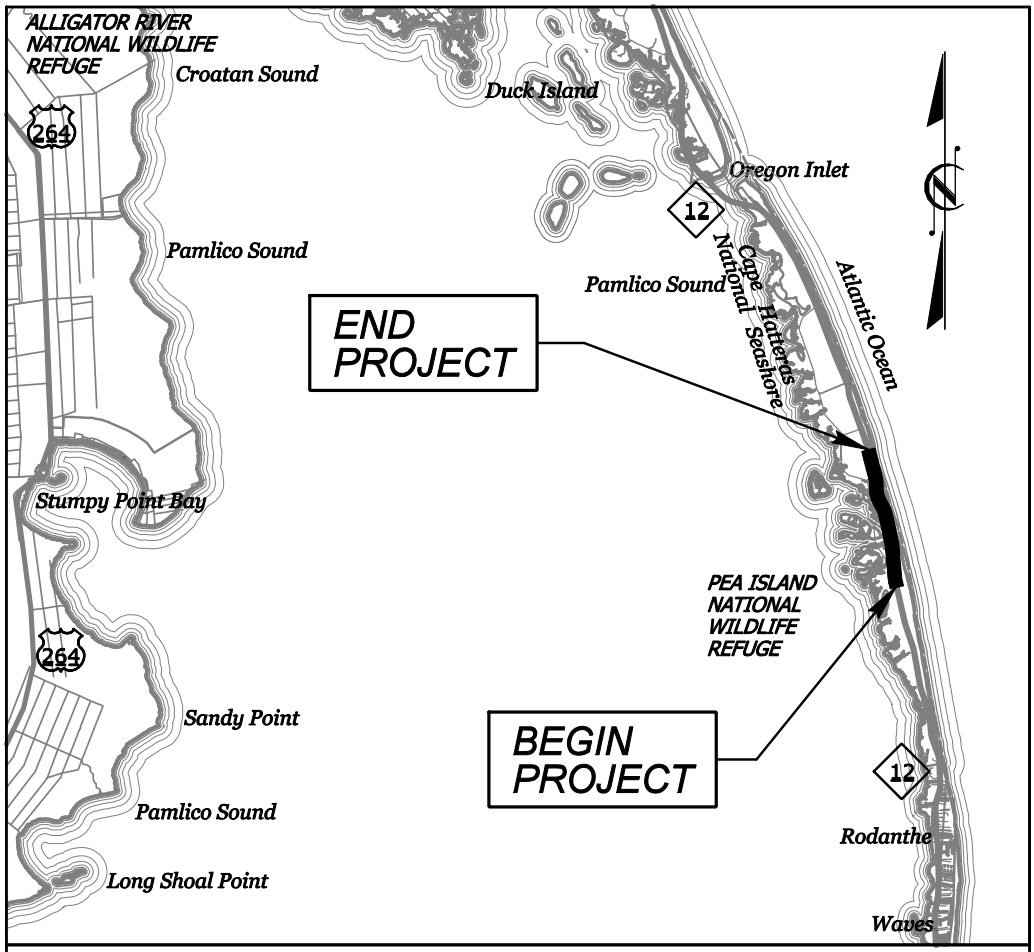
Permanent BMP measures used on this project to reduce stormwater impacts are:

- Grass swales,
- Rip rap pads at the pipe ends.

NORTH CAROLINA



DARE COUNTY



VICINITY MAP

VICINITY MAP

NCDOT

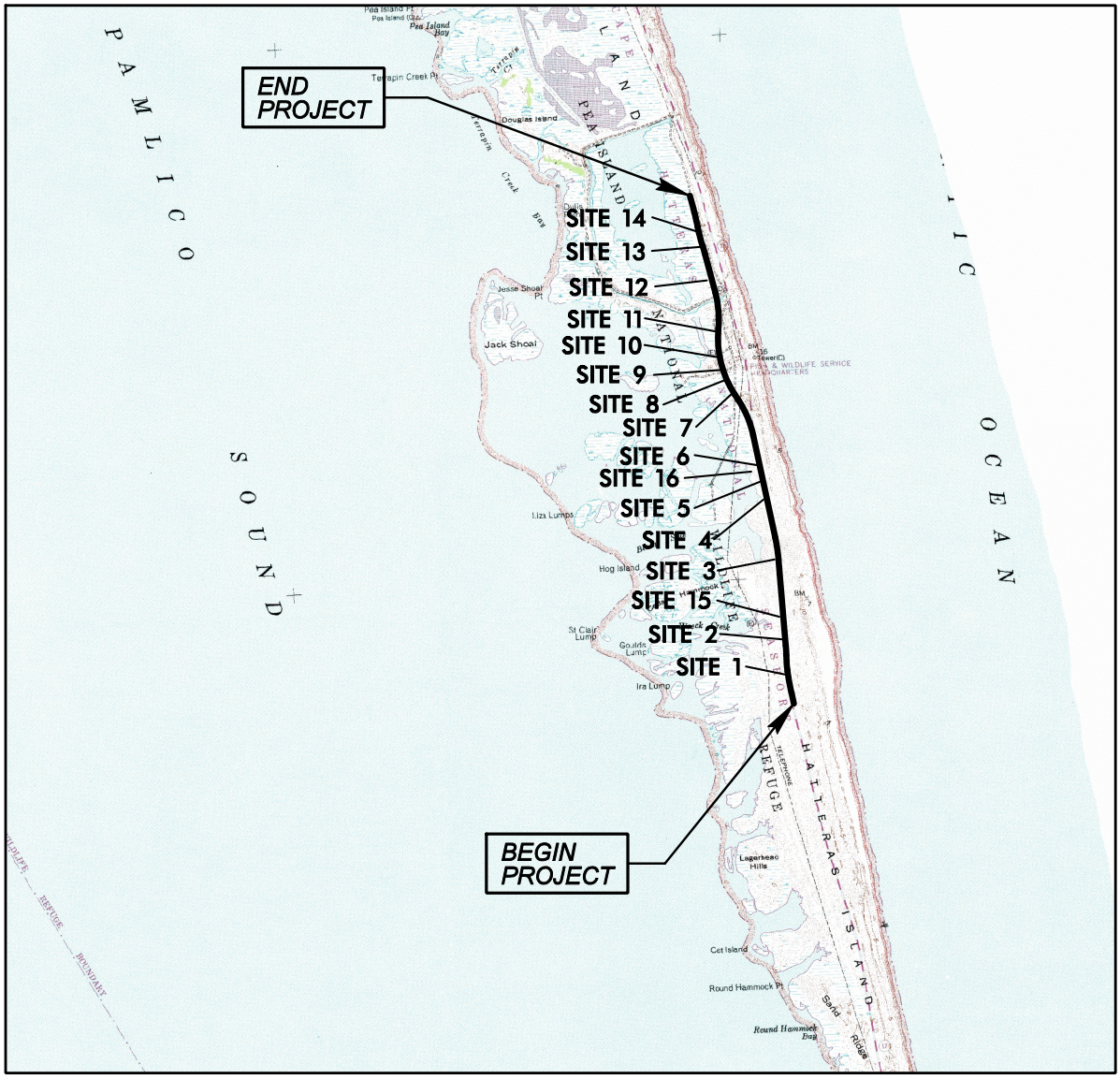
DIVISION OF HIGHWAYS

DARE COUNTY

PROJECT: B-2500A

NC HWY 12 OVER PEA ISLAND BREACH

2/11/2013



PEA ISLAND, NC QUAD MAP

LOCATION MAP

NCDOT

DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A
NC HWY 12 OVER
PEA ISLAND BREACH

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	WETLAND IMPACTS: Temp. Fill In Wetlands (ac)	WETLAND IMPACTS: Excavation in Wetlands (ac)	WETLAND IMPACTS: Mechanized Clearing in Wetlands (ac)	WETLAND IMPACTS: Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	SURFACE WATER IMPACTS: Temp. SW impacts (ac)	SURFACE WATER IMPACTS: Natural Stream Design (ft)
1	-L- 3078+90 to 3082+59			0.10			0.02		0.01	
2	-L- 3088+86 to 3092+69		0.02	0.07			0.03			
3	-L- 3107+55 to 3115+62		0.18	0.15			0.06			
4	-L- 3128+60 to 3132+06		0.01	0.03			0.02			
5	-L- 3134+54 to 3136+31		<0.01	0.02			0.01			
6	-L- 3139+49 to 3140+49			0.03			<0.01			
7	-L- 3159+81 to 3163+48			0.02			<0.01		0.03	
8	-L- 3163+62 to 3167+76								0.10	
9	-L- 3166+66 to 3166+94	Bent #67	<0.01				<0.01			
10	-L- 3170+97 to 3173+74	Bent #71, #72, & #73						0.04	0.04	
		* Temp. Work Bridge 1								
		** Temp. Work Bridge 2								
		*** Remove Exist Bridge								
		Jetting Intake Pipe								
11	-L- 3177+49 to 3181+18			<0.01			<0.01		0.05	
		**** Temp. Work Bridge 2								
12	-L- 3191+04 to 3197+22			0.23			0.04			
13	-L- 3200+13 to 3205+63			0.22			0.04			
14	-L- 3206+52 to 3210+71			0.02			0.02			
15	-L- 3097+22 to 3097+32	Jetting Intake Pipe					0.14		0.02	
16	-L- 3136+15 to 3136+48	Jetting Intake Pipe							0.03	
TOTALS:			0.22	0.90			0.40	0.04	0.28	

Notes:

* Temp. Work Bridge #1 (16 Bents @ 40 SF = 640 SF Total Impact)
** Temp. Work Bridge #2 (25 Bents @ 40 SF = 1,000 SF Total Impact)
*** Remove Exist. Bridge (6 Footings @ 130 SF = 780 SF Total Impact)
**** Site 11 Temp. Work Bridge #2 (2 Bents @ 20 SF = 40 SF Total Impact)

CAMA Wetland Impacts by Site:

Site 1: 0.04 ac Temporary Fill, <0.01 ac Hand Clearing
Site 3: 0.13 Permanent Fill, 0.11 ac Temporary Fill, 0.05 ac Hand Clearing
Site 4: 0.01 Permanent Fill, 0.03 ac Temporary Fill, 0.02 ac Hand Clearing
Site 5: <0.01 Permanent Fill, 0.02 ac Temporary Fill, 0.01 ac Hand Clearing
Site 7: 0.02 ac Temporary Fill, <0.01 ac Hand Clearing
Site 9: (bridge bent) <0.01 ac Permanent Fill, 0.01 ac Hand Clearing
Site 15: 0.11 ac Hand Clearing

Total CAMA Impacts:

Permanent Fill in Wetlands: 0.15 ac
Temporary Fill in Wetlands: 0.22 ac
Hand Clearing in Wetlands: 0.21 ac

Erosion Control Measures Impacts:

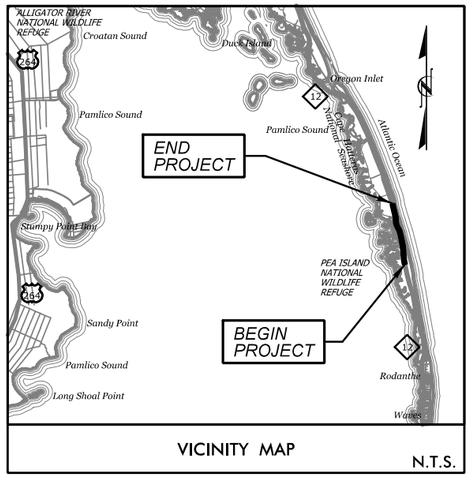
0.08 acre of Temporary Fill in Wetlands in the Hand Clearing areas for erosion control measures.

PROJECT: B–2500A

CONTRACT:

PERMIT DRAWINGS
8/12/2013

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Standard Symbology Sheet



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

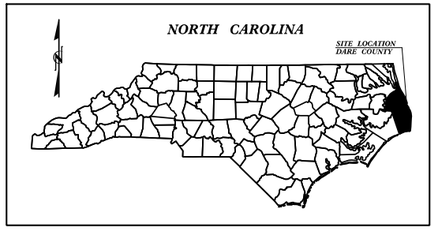
DARE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B–2500A	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
32635.1.6		P.E.
32635.2.2	BRNHF–0012(55)	UTIL.
32635.3.6	BRNHF–0012(55)	CONST.

LOCATION: PHASE II, NC 12 LONG–TERM IMPROVEMENTS AT PEA ISLAND
TYPE OF WORK: GRADING, PAVING, DRAINAGE & STRUCTURE

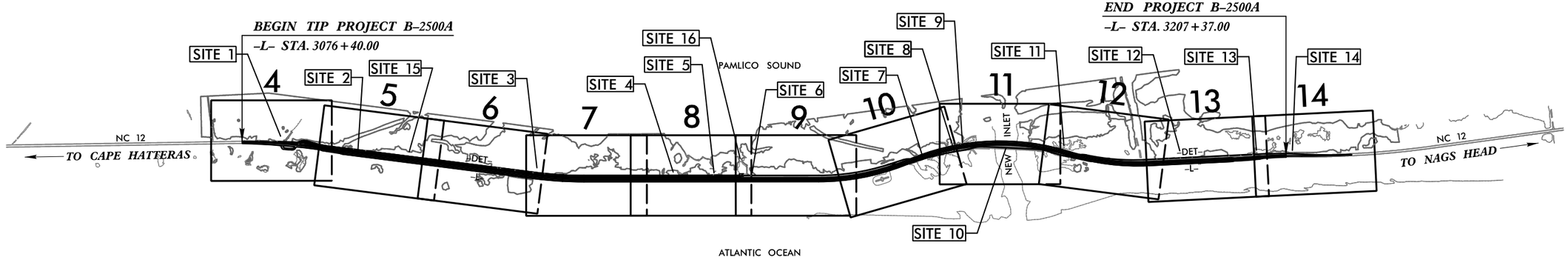
WETLAND & SURFACE WATER IMPACTS



NAD 83 NSRS 2007

BEGIN TIP PROJECT B–2500A
–L– STA. 3076 + 40.00

END PROJECT B–2500A
–L– STA. 3207 + 37.00



Permit Drawing
Sheet 4 of 59

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2012 = 7,300
ADT 2032 = 10,900
DHV = N/A
D = N/A
T = 6%
V = 60 MPH
FUNC. CLASSIFICATION: COLLECTOR
T = 1% TTST + 5% DUALS
REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B–2500A = 0.366 MILES
LENGTH OF STRUCTURE TIP PROJECT B–2500A = 2.114 MILES
TOTAL LENGTH OF TIP PROJECT B–2500A = 2.480 MILES

NCDOT CONTACT: GARY LOVERING, PE
Project Engineer, Roadway Design

PLANS PREPARED FOR THE NCDOT BY:
STV/RALPH WHITEHEAD ASSOCIATES, INC.
1000 West Morehead St., Ste. 200, Charlotte NC, 28208
NC License Number F–0991

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
N/A

LETTING DATE:
SEPTEMBER 17, 2013

JOHN N. JOHNSON, PE
PROJECT ENGINEER

SEAN C. STEPHENS, EI
PROJECT DESIGNER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029555 ENGINEER KEVIN C. MORRISON

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

P.E.

SIGNATURE:

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029555 ENGINEER KIT A. PERSIANI

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

P.E.

SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	4
R/W SHEET NO.	

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036825 KIT A. PERSIANI	NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036825 ALVIN C. MORRISON

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

NAD 83 / NSRS 2007

LEGEND

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

UNITED STATES OF AMERICA

SITE 1

SEE FIGURE SITE 1

3075

3080

3085

50' POWER LINE EASEMENT

EXIST R/W

30' BST

18" CMP

T FO

CONT. ON PSH 05

MATCHLINE -L- STA 3087+00 (SHEET 5)

100' 0' 100'

GRAPHIC SCALE

Permit Drawing
Sheet 5 of 59

-L-

BEGIN TIP PROJECT B-2500A
-L- STA. 3076+40.00
ELEV = 2.83'

PI = 3077+30.00
EL = 2.64'
VC = 180'
K = 335

PI = 3079+20.00
EL = 3.26'
VC = 200'
K = 614

PI = 3084+31.00
EL = 3.26'
VC = 70'
K = 137

PI = 3086+70.00
EL = 4.48'
VC = 408'
K = 131

(-)0.2111%

(+)0.3259%

(+)0.0000%

(+)0.5108%

PROPOSED GRADE

EXISTING GROUND

50 40 30 20 10 0

3074 3075 3076 3077 3078 3079 3080 3081 3082 3083 3084 3085 3086 3087

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\WCI2PEA_Hyd_Prm_pshl04.dgn

8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / NSRS 2007

LEGEND

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

UNITED STATES OF AMERICA

SITE 1

SEE FIGURE SITE 1

50' POWER LINE EASEMENT

EXIST R/W

30' BST

18" CMP

T FO

3075

3080

3085

CONT. ON PSH 05

MATCHLINE -L- STA 3087+00 (SHEET 5)

100' 0' 100'
GRAPHIC SCALE

Permit Drawing
Sheet 6 of 59

-L-

BEGIN TIP PROJECT B-2500A
-L- STA. 3076+40.00
ELEV = 2.83'

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PROPOSED GRADE
EXISTING GROUND

50 40 30 20 10 0

3074 3075 3076 3077 3078 3079 3080 3081 3082 3083 3084 3085 3086 3087

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8/11/2013

SITE 1

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
SEAL NOT USE FOR CONSTRUCTION

NAD 83 NSRS 2007

3080

TEMPORARY IMPACTS IN SURFACE WATER

HAND CLEARING

TEMPORARY SLOPE STAKES

HAND CLEARING

TEMPORARY FILL IN WETLAND

PERMANENT SLOPE STAKES

TEMPORARY FILL IN WETLAND

PERMANENT SLOPE STAKES

LEGEND	
IS / IS	DENOTES IMPACTS IN SURFACE WATER
TS / TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
TF / TF	DENOTES TEMPORARY FILL IN WETLAND
HC / HC	DENOTES HAND CLEARING

40′ 0′ 40′
GRAPHIC SCALE

Permit Drawing
Sheet 7 of 59

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

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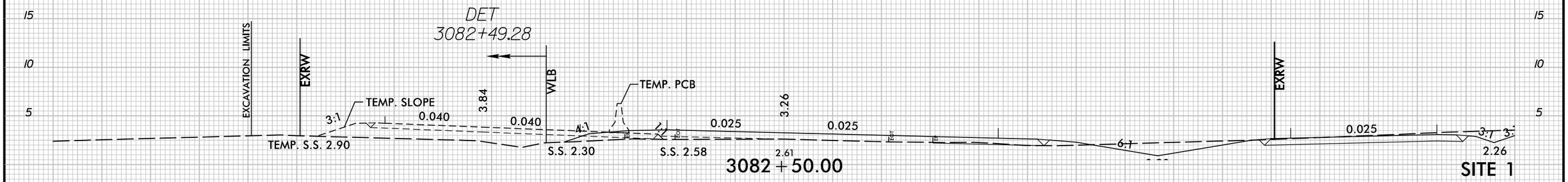
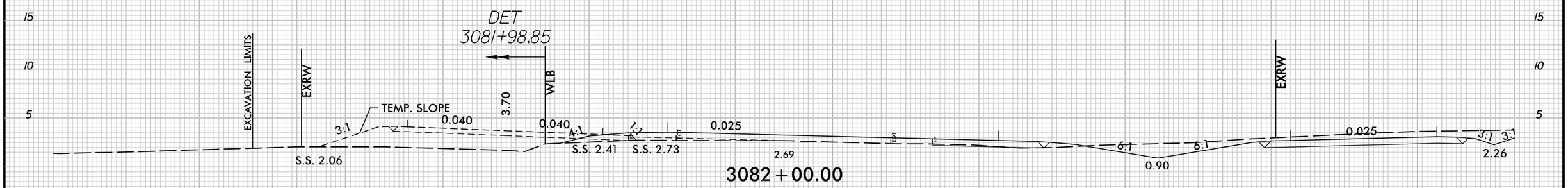
8/11/2013

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-2500A	X-1

Permit Drawing
Sheet 8 of 59





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stephesc

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

UNITED STATES OF AMERICA

NAD 83 CORS96

MATCHLINE THIS SHEET

SITE 2

SEE FIGURE SITE 2

SITE 15

NOTE: JETTING INTAKE PIPE LOCATION

50' POWER LINE EASEMENT

EXIST R/W

30' BST

MATCHLINE -L- STA 3087+00 (SHEET 4)

MATCHLINE -L- STA 3100+00 (SHEET 6)

100' 0' 100'
GRAPHIC SCALE

LEGEND

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

Permit Drawing
Sheet 9 of 59

-L-

PI = 3092+48.00
EL = 24.70'
VC = 530'
K = 152

BEGIN BRIDGE
-L- STA. 3089+00.00

PI = 3086+70.00
EL = 4.48'
VC = 408'
K = 137

(+)3.4983%

14.28

(+)3.4983%

(+)0.0000%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50 40 30 20 10 0

3087 3088 3089 3090 3091 3092 3093 3094 3095 3096 3097 3098 3099 3100

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8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

UNITED STATES OF AMERICA

NAD 83 CORS96

MATCHLINE THIS SHEET

SITE 2

SEE FIGURE SITE 2

3090

3095

SITE 15

50' POWER LINE EASEMENT

NOTE: JETTING INTAKE PIPE LOCATION

EXIST R/W

30' BST

MATCHLINE -L- STA 3087+00 (SHEET 4)

MATCHLINE -L- STA 3100+00 (SHEET 6)

100' 0' 100'
GRAPHIC SCALE

LEGEND

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

Permit Drawing
Sheet 10 of 59

-L-

PI = 3092+48.00
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BEGIN BRIDGE
-L- STA. 3089+00.00

PI = 3086+70.00
EL = 4.48'
VC = 408'
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(+)3.4983%

14.28

(+)3.4983%

(+)0.0000%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50 40 30 20 10 0

3087 3088 3089 3090 3091 3092 3093 3094 3095 3096 3097 3098 3099 3100

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8/11/2013

SITE 2

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVIN C. MORRISON

LEGEND

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

NAD 83 NSRS 2007

WLB

WL

3090

E

50' POWER LINE EASEMENT

HAND CLEARING

TEMPORARY SLOPE STAKES

HAND CLEARING

TEMPORARY FILL IN WETLAND

PERMANENT SLOPE STAKES

PERMANENT FILL IN WETLAND

TEMPORARY FILL IN WETLAND

T

F

FO

30' 0' 30'

GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

Permit Drawing
Sheet 11 of 59

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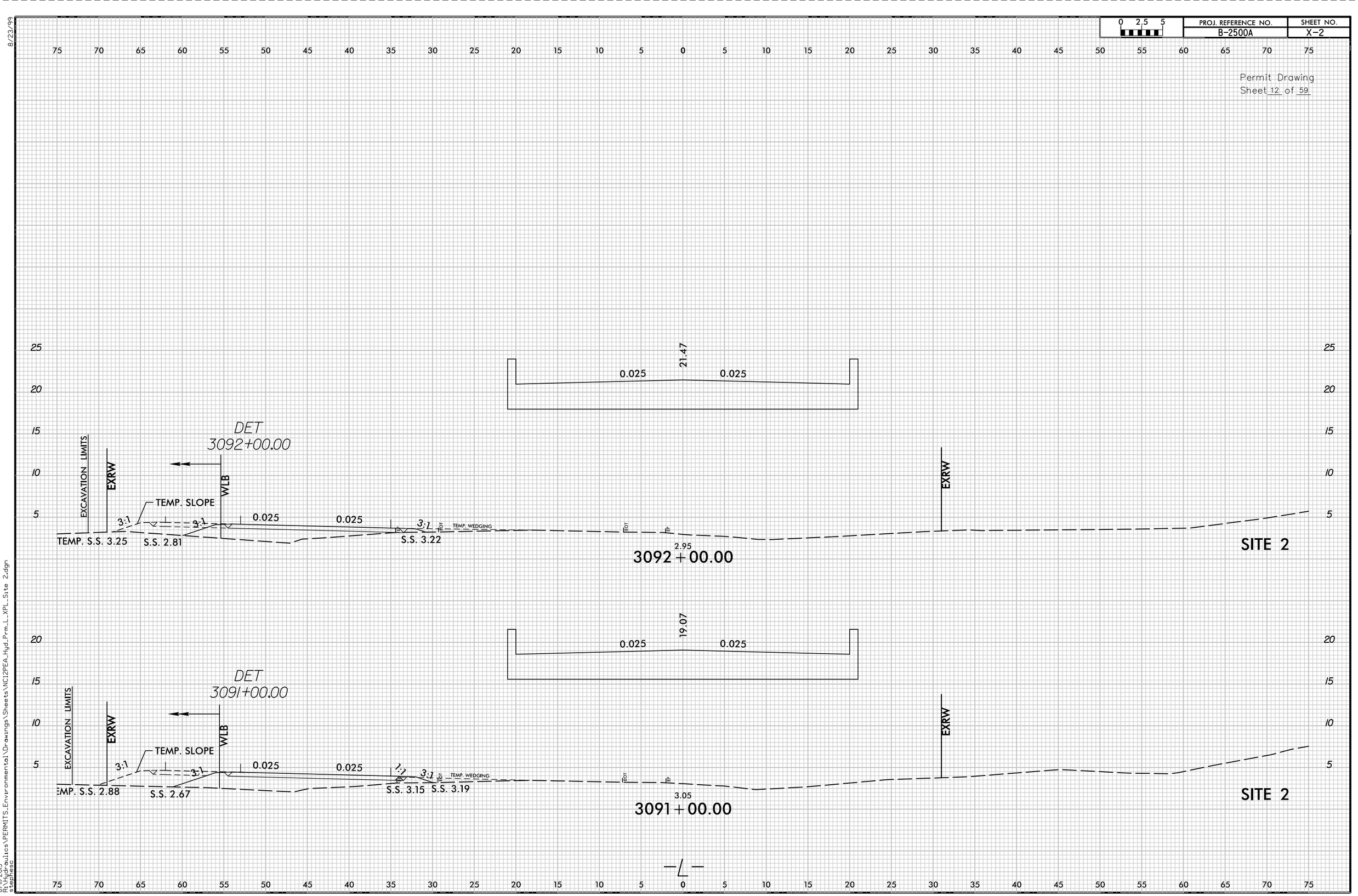
8/11/2013

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-2500A	X-2

Permit Drawing
Sheet 12 of 59



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stephesc

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Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 NSRS 2007

UNITED STATES OF AMERICA

MATCHLINE -L- STA 3100+00 (SHEET 5)

MATCHLINE -L- STA 3113+00 (SHEET 7)

SITE 3

SEE FIGURE SITE 3

3105

3110

50' POWER LINE EASEMENT

CONT. ON PSH 07

EXIST R/W

30' BST

LEGEND

SI/SI	DENOTES IMPACTS IN SURFACE WATER
TS/TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F/F	DENOTES PERMANENT FILL IN WETLAND
T/T	DENOTES TEMPORARY FILL IN WETLAND
HC/HC	DENOTES HAND CLEARING

100' 0' 100'

GRAPHIC SCALE

Permit Drawing
Sheet 13 of 59

-L-

PROPOSED GRADE

BRIDGE

PI = 3111+34.00
EL = 24.70'
VC = 180'
K = 600

(+)0.0000% (+)0.3002%

EXISTING GROUND

50 40 30 20 10 0

3100 3101 3102 3103 3104 3105 3106 3107 3108 3109 3110 3111 3112 3113

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PROJECT REFERENCE NO.	SHEET NO.
B-2500A	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 NSRS 2007

MATCHLINE -L- STA 3100+00 (SHEET 5)

MATCHLINE -L- STA 3113+00 (SHEET 7)

UNITED STATES OF AMERICA

SITE 3

SEE FIGURE SITE 3

50' POWER LINE EASEMENT

CONT. ON PSH 07

EXIST R/W

30' BST

3105

3110

LEGEND

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

100' 0' 100'

GRAPHIC SCALE

Permit Drawing
Sheet 14 of 59

-L-

PROPOSED GRADE

BRIDGE

EXISTING GROUND

PI = 3111+34.00
EL = 24.70'
VC = 180'
K = 600

(+)0.0000% (+)10.3002%

50 40 30 20 10 0

3100 3101 3102 3103 3104 3105 3106 3107 3108 3109 3110 3111 3112 3113

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8/11/2013

SITE 3
(SHEET 1 OF 2)

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PROJECT REFERENCE NO.	SHEET NO.
B-2500A	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVIN C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

LEGEND	
S/S	DENOTES IMPACTS IN SURFACE WATER
TS/TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F/F	DENOTES PERMANENT FILL IN WETLAND
T/T	DENOTES TEMPORARY FILL IN WETLAND
HC/HC	DENOTES HAND CLEARING

NAD 83 NSRS 2007

3110

E

WLB

TEMPORARY SLOPE STAKES

HAND CLEARING

HC

T

F

PERMANENT SLOPE STAKES

TEMPORARY FILL IN WETLAND

T FO T

TEMPORARY SLOPE STAKES

PERMANENT FILL IN WETLAND

PERMANENT SLOPE STAKES

MATCHLINE -L- STA 3111+50 (SHEET 6)

WL

LB

-B-

30′ 0′ 30′

GRAPHIC SCALE

Permit Drawing
Sheet 15 of 59

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NCI2PEA_Hyd_Prm_pst06_Site 3A.dgn

8/11/2013

SITE 3
(SHEET 2 OF 2)

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / NSRS 2007

LEGEND

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

3/5

50' POWER LINE EASEMENT

50' POWER LINE EASEMENT

E

HC

T

F

WLF

T FO T

HAND CLEARING

TEMPORARY SLOPE STAKES

PERMANENT SLOPE STAKES

PERMANENT FILL IN WETLAND

TEMPORARY FILL IN WETLAND

MATCHLINE -L- STA 3111+50 (SHEET 6)

WLB

30' 0' 30'

GRAPHIC SCALE

Permit Drawing
Sheet 16 of 59

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_psh06_Site 3B.dgn

8/11/2013

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-2500A	X-3

Permit Drawing
Sheet 17 of 59

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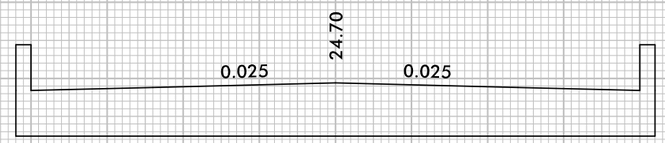
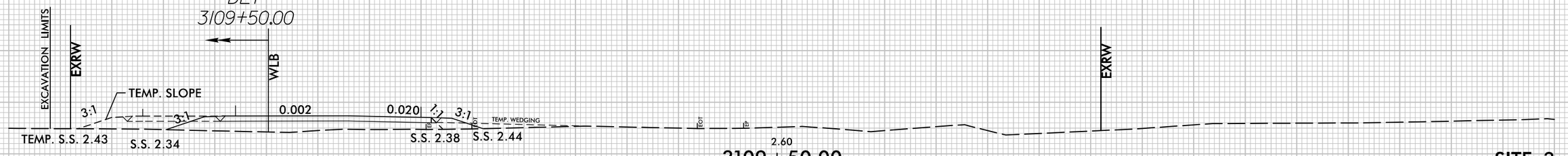
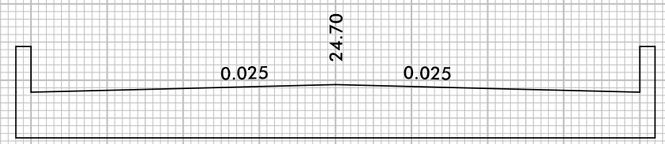
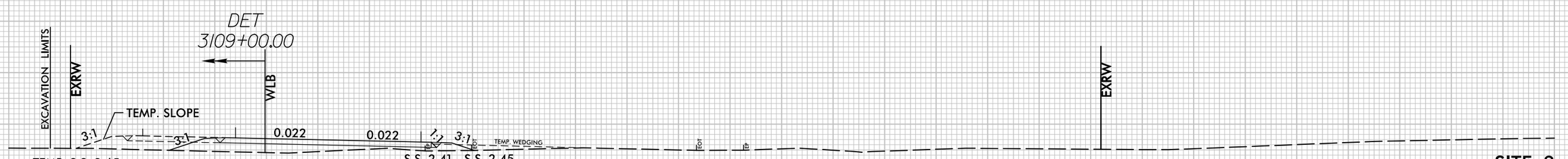




3109 + 50.00

SITE 3





3109 + 00.00

SITE 3

8/11/2013
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stephesc

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PROJECT REFERENCE NO.	SHEET NO.
B-2500A	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
SEAL NOT USE FOR CONSTRUCTION

NAD 83 NSRS 2007

MATCHLINE -L- STA 3113+00 (SHEET 6)

MATCHLINE -L- STA 3126+00 (SHEET 8)

SEE FIGURE SITE 3

SITE 3

CONT. ON PSH 06

50' POWER LINE EASEMENT

EXIST R/W

30' BST

UNITED STATES OF AMERICA

3115 3120 3125

LEGEND

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

100' 0' 100'

GRAPHIC SCALE

Permit Drawing
Sheet 18 of 59

-L-

PI = 3121+00.00
EL = 27.60'
VC = 180'
K = 225

(+)0.3002% (-)0.4991%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50 40 30 20 10 0

3113 3114 3115 3116 3117 3118 3119 3120 3121 3122 3123 3124 3125 3126

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PROJECT REFERENCE NO.	SHEET NO.
B-2500A	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

MATCHLINE -L- STA 3113+00 (SHEET 6)

MATCHLINE -L- STA 3126+00 (SHEET 8)

NAD 83 NSRS 2007

SEE FIGURE SITE 3

SITE 3

CONT. ON PSH 06

50' POWER LINE EASEMENT

EXIST R/W

30' BST

UNITED STATES OF AMERICA

3115 3120 3125

LEGEND

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

100' 0' 100'
GRAPHIC SCALE

Permit Drawing
Sheet 19 of 59

-L-

PI = 3121+00.00
EL = 27.60'
VC = 180'
K = 225

(+)0.3002% (-)0.4991%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50 40 30 20 10 0

3113 3114 3115 3116 3117 3118 3119 3120 3121 3122 3123 3124 3125 3126

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PROJECT REFERENCE NO.	SHEET NO.
B-2500A	8
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 | NSRS 2007

MATCHLINE -L- STA 3126+00 (SHEET 7)

MATCHLINE -L- STA 3139+00 (SHEET 9)

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

SEE FIGURE SITE 4

SITE 4

3130

SEE FIGURE SITE 5

SITE 5

3135

50' POWER LINE EASEMENT

BST

EXIST R/W

30' BST

REMOVE

EXIST R/W

EXIST R/W

UNITED STATES OF AMERICA

100' 0' 100'

GRAPHIC SCALE

LEGEND

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

Permit Drawing
Sheet 20 of 59

-L-

PI = 3126+81.00
EL = 24.70'
VC = 180'
K = 361

(-)0.4991%

(+)0.0000%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50 40 30 20 10 0

3126 3127 3128 3129 3130 3131 3132 3133 3134 3135 3136 3137 3138 3139

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PROJECT REFERENCE NO.	SHEET NO.
B-2500A	8
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 | NSRS 2007

MATCHLINE -L- STA 3126+00 (SHEET 7)

MATCHLINE -L- STA 3139+00 (SHEET 9)

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

SEE FIGURE SITE 4

SITE 4

3130

SEE FIGURE SITE 5

SITE 5

3135

50' POWER LINE EASEMENT

BST

EXIST R/W

30' BST

REMOVE

EXIST R/W

EXIST R/W

UNITED STATES OF AMERICA

100' 0' 100'

GRAPHIC SCALE

LEGEND

- SS — DENOTES IMPACTS IN SURFACE WATER
- TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- F — DENOTES PERMANENT FILL IN WETLAND
- TF — DENOTES TEMPORARY FILL IN WETLAND
- HC — DENOTES HAND CLEARING

Permit Drawing
Sheet 21 of 59

-L-

PI = 3126+81.00
EL = 24.70'
VC = 180'
K = 361

(-)0.4991%

(+)0.0000%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50
40
30
20
10
0

3124 3125 3126 3127 3128 3129 3130 3131 3132 3133 3134 3135 3136 3137 3138 3139 3140

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PROJECT REFERENCE NO.	SHEET NO.
B-2500A	8
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

SITE 4

NAD 83 NSRS 2007

LEGEND

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

E

3130

WLB

HAND CLEARING

HC

T

F

TEMPORARY SLOPE STAKES

PERMANENT FILL IN WETLAND

TEMPORARY FILL IN WETLAND

TEMPORARY SLOPE STAKES

PERMANENT SLOPE STAKES

T FO T

PERMANENT SLOPE STAKES

30' BST

30' 0' 30'

GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

Permit Drawing
Sheet 22 of 59

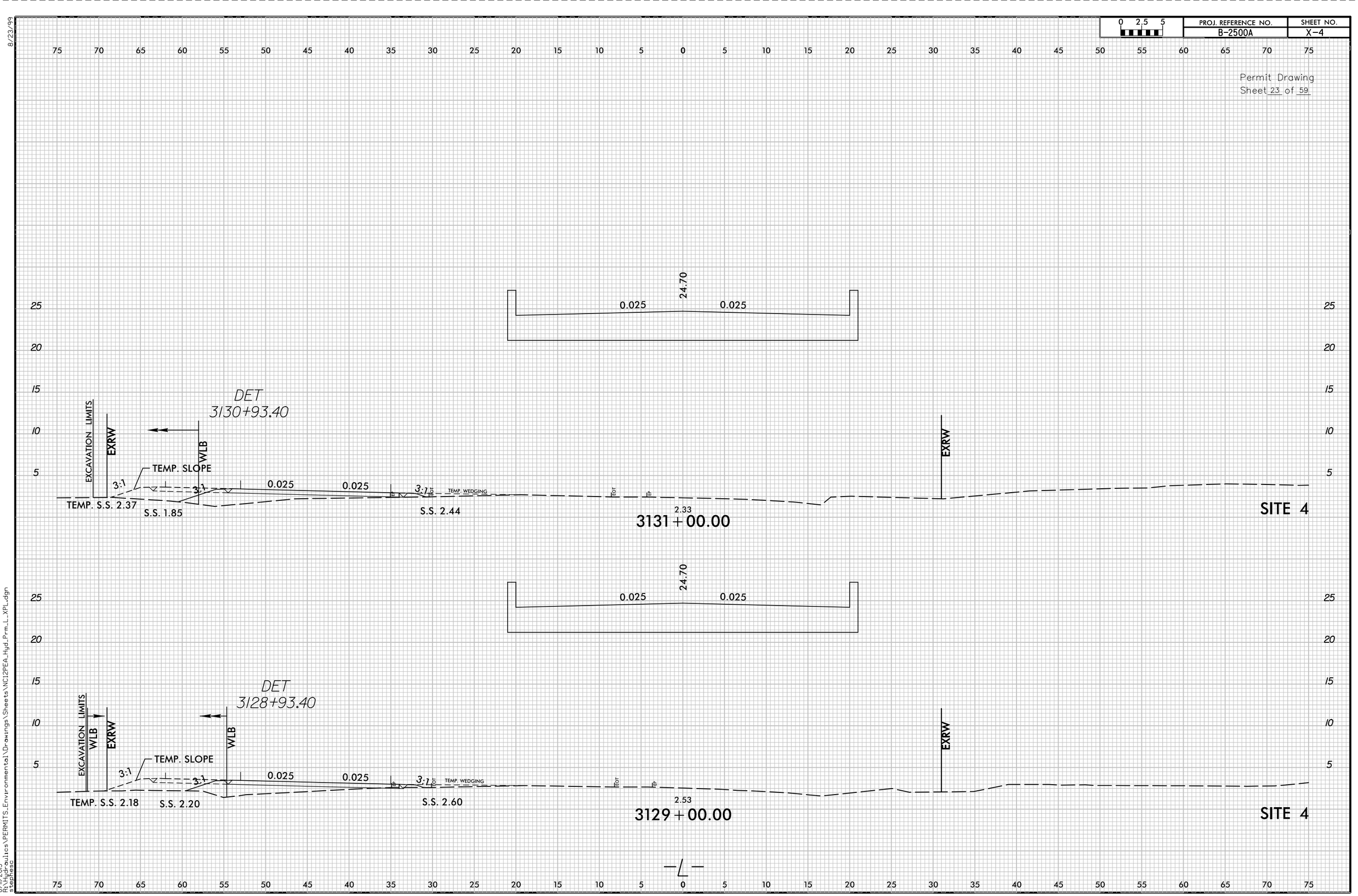
R:\HydraulicsPERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_psh08_Site 4.dgn

8/11/2013

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-2500A	X-4

Permit Drawing
Sheet 23 of 59



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stephesc

SITE 5

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Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	8
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVIN C. MORRISON

PRELIMINARY PLANS
NOT TO BE USED FOR CONSTRUCTION

NAD 83 / NSRS 2007

LEGEND

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

3/35

HAND CLEARING

HC

T

F

PERMANENT FILL IN WETLAND

TEMPORARY FILL IN WETLAND

REMOVE

24" CMP

E

T FO

WLB

30′ 0′ 30′
GRAPHIC SCALE

Permit Drawing
Sheet 24 of 59

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_psht08_Site 5.dgn

8/11/2013

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-2500A	X-5

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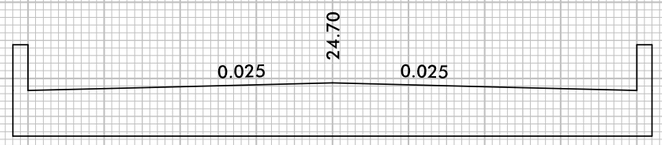
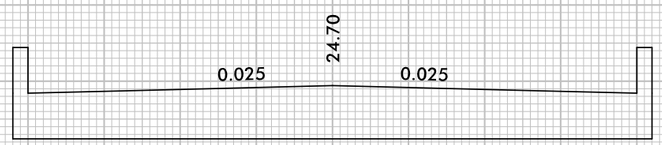
Permit Drawing
Sheet 25 of 59



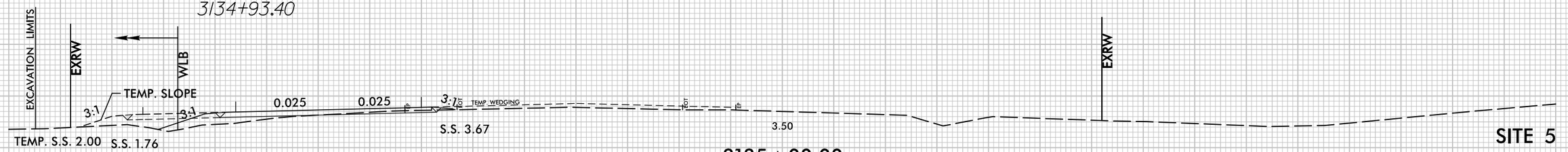
DET
3135+43.40

3135+50.00

SITE 5



DET
3134+93.40



3135+00.00

SITE 5

—L—

8/11/2013
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stephesc

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Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

MATCHLINE -L- STA 3139+00 (SHEET 8)

MATCHLINE -L- STA 3152+00 (SHEET 10)

SEE FIGURE SITE 5

SITE 6

50' POWER LINE EASEMENT

UNITED STATES OF AMERICA

3140 3145 3150

EXIST R/W

30' BST

T FO

LEGEND

- SS — DENOTES IMPACTS IN SURFACE WATER
- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- T — DENOTES TEMPORARY FILL IN WETLAND
- HC HC — DENOTES HAND CLEARING

100' 0' 100'
GRAPHIC SCALE

Permit Drawing
Sheet 26 of 59

-L-

PI = 3146+39.00
EL = 24.70'
VC = 180'
K = 600

(+)0.0000% (+)0.3001%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50 40 30 20 10 0

3139 3140 3141 3142 3143 3144 3145 3146 3147 3148 3149 3150 3151 3152

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_psht09.dgn

8/11/2013

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

MATCHLINE -L- STA 3139+00 (SHEET 8)

MATCHLINE -L- STA 3152+00 (SHEET 10)

SEE FIGURE SITE 5

SITE 6

50' POWER LINE EASEMENT

UNITED STATES OF AMERICA

3140

3145

3150

EXIST R/W

30' BST

LEGEND

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

100' 0' 100'
GRAPHIC SCALE

Permit Drawing
Sheet 27 of 59

-L-

PI = 3146+39.00
EL = 24.70'
VC = 180'
K = 600

PROPOSED GRADE

(+)0.0000%

(+)0.3001%

BRIDGE

EXISTING GROUND

50
40
30
20
10
0

3139 3140 3141 3142 3143 3144 3145 3146 3147 3148 3149 3150 3151 3152

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_psht09A.dgn

8/11/2013

SITE 6

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

POWER LINE EASEMENT

50' POWER LINE EASEMENT

NAD 83/NSRS 2007

BST

3140

SITE 6

HAND CLEARING

EXIST R/W

EXIST R/W

TEMPORARY FILL IN WETLAND

TEMPORARY SLOPE STAKES

PERMANENT SLOPE STAKES

LEGEND

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

30' 0' 30'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

Permit Drawing
Sheet 28 of 59

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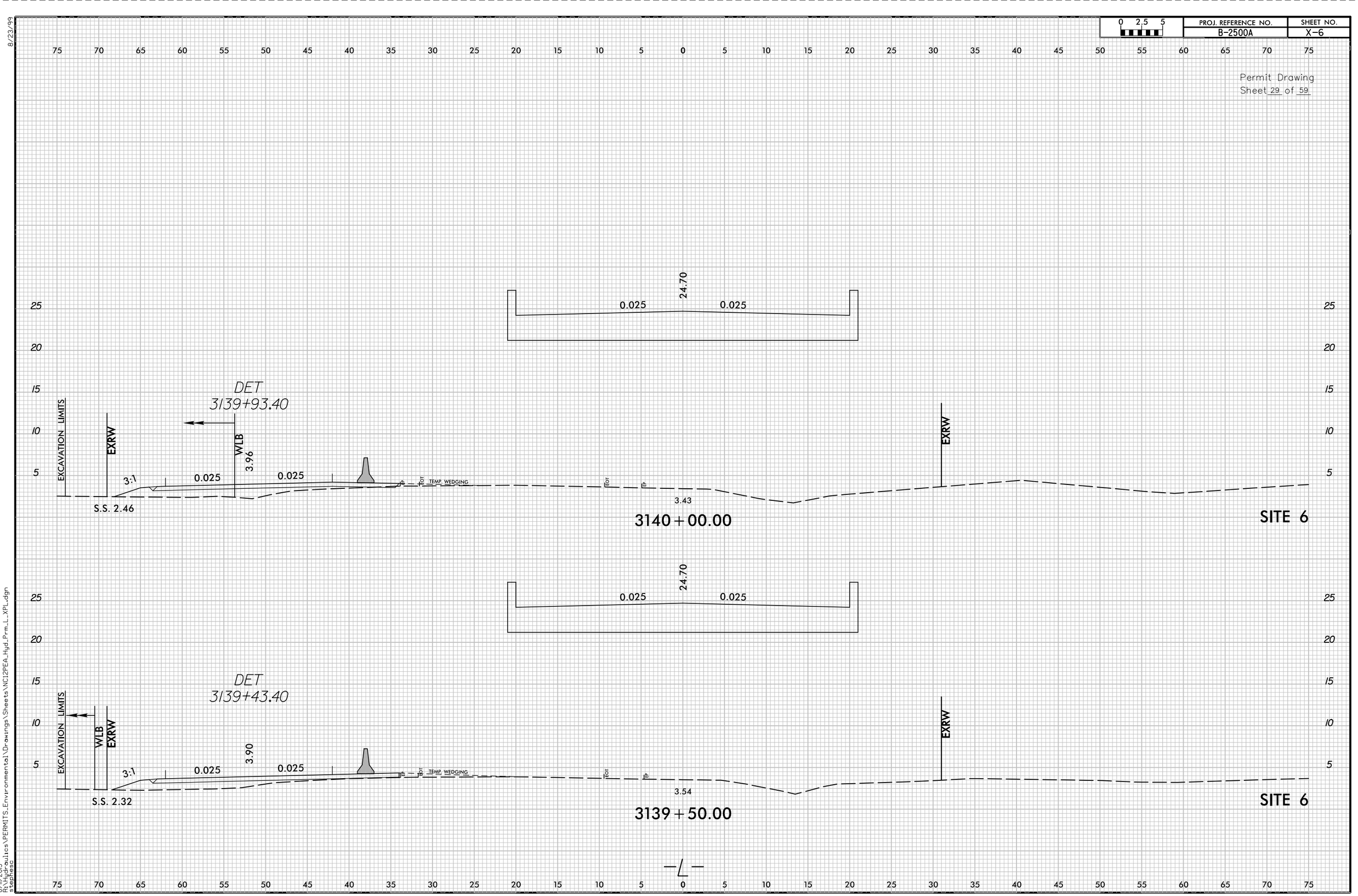
8/11/2013

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-2500A	X-6

Permit Drawing
Sheet 29 of 59



8/11/2013
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stephesc

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	10
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / NSRS 2007

MATCHLINE -L- STA 3152+00 (SHEET 9)

MATCHLINE -L- STA 3165+00 (SHEET 11)

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

3155

3160

SITE 7

SITE 8

SEE FIGURE SITE 8

SEE FIGURE SITE 7

EXIST R/W

FIBER OPTICS SPLICE BOX

30' BST

2 ROWS OF SANDBAGS

CONT. ON PSH 11

BST

CURB

LEGEND

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

100' 0' 100'
GRAPHIC SCALE

Permit Drawing
Sheet 30 of 59

-L-

PI = 3161+55.00
EL = 29.25'
VC = 180'
K = 904

PROPOSED GRADE

(+)0.3001%

(+)0.4993%

BRIDGE

EXISTING GROUND

50
40
30
20
10
0

3152 3153 3154 3155 3156 3157 3158 3159 3160 3161 3162 3163 3164 3165

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PROJECT REFERENCE NO.	SHEET NO.
B-2500A	10
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / NSRS 2007

MATCHLINE -L- STA 3152+00 (SHEET 9)

MATCHLINE -L- STA 3165+00 (SHEET 11)

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

3155

3160

SITE 7

SITE 8

SEE FIGURE SITE 8

SEE FIGURE SITE 7

EXIST R/W

FIBER OPTICS SPLICE BOX

30' BST

2 ROWS OF SANDBAGS

CONT. ON PSH 11

BST

CURB

CURB

LEGEND

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

100' 0' 100'

GRAPHIC SCALE

Permit Drawing
Sheet 31 of 59

-L-

PI = 3161+55.00
EL = 29.25'
VC = 180'
K = 904

PROPOSED GRADE

(+)0.3001%

(+)0.4993%

BRIDGE

EXISTING GROUND

50
40
30
20
10
0

3152 3153 3154 3155 3156 3157 3158 3159 3160 3161 3162 3163 3164 3165

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8/11/2013

SITE 7

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PROJECT REFERENCE NO.	SHEET NO.
B-2500A	10
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 NSRS 2007

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

3160

HAND CLEARING

TEMPORARY FILL IN WETLAND

TEMPORARY SLOPE STAKES

TEMPORARY SLOPE STAKES

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

S OF SANDBAGS

30′ 0′ 30′
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

Permit Drawing
Sheet 32 of 59

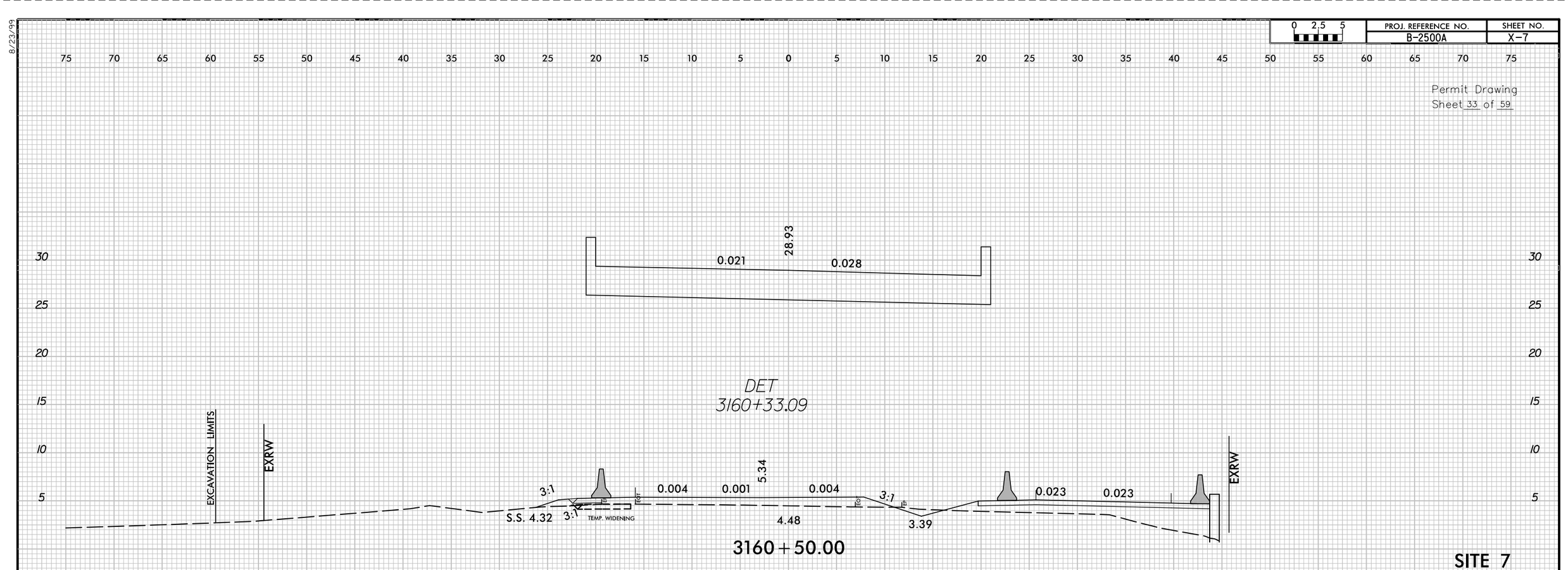
R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_psh10_Site 7.dgn

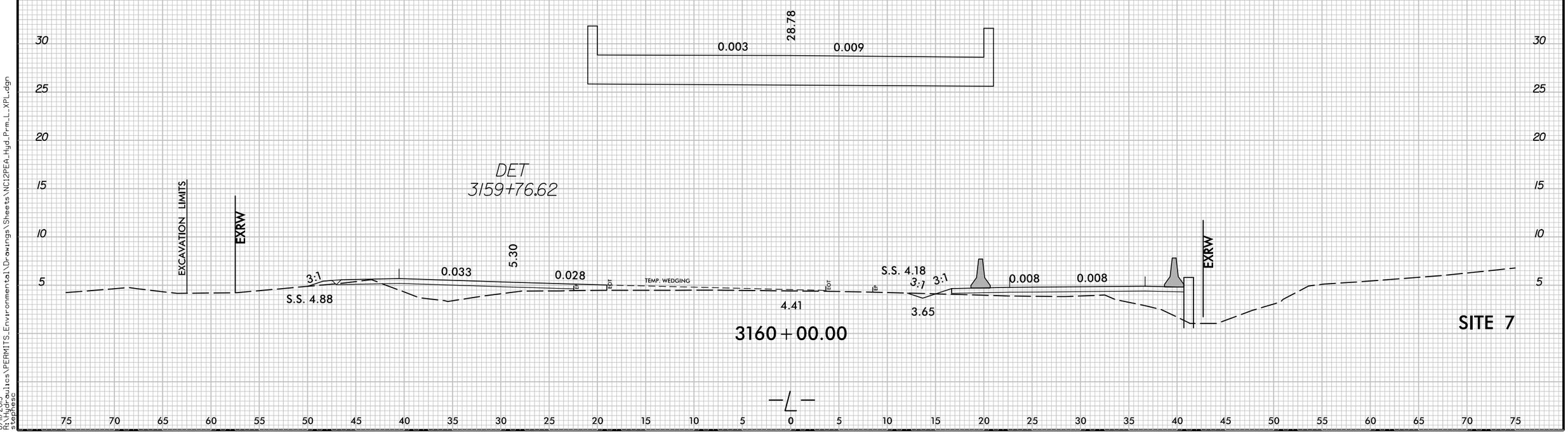
8/11/2013

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-2500A	X-7

Permit Drawing
Sheet 33 of 59





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stephesc

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Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	11
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER CALVIN C. MORRISON

PRELIMINARY PLANS
SEAL NOT USE FOR CONSTRUCTION

NAD 83 / NSRS 2007

SITE 8

SITE 9

SITE 10

SITE 11

SEE FIGURE SITE 8

SEE FIGURE SITE 9

SEE FIGURE SITE 10

SEE FIGURE SITE 11

MATCHLINE -L- STA 3165+00 (SHEET 10)

MATCHLINE -L- STA 3178+00 (SHEET 12)

UNITED STATES OF AMERICA

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

50' POWER LINE EASEMENT

NOTE: JETTING INTAKE PIPE LOCATIONS TO BE DETERMINED WITHIN EXISTING EASEMENT

TEMPORARY WORK BRIDGE #1

TEMPORARY WORK BRIDGE #2

3170

3175

EXIST R/W

2 ROWS OF SANDBAGS

SOIL

STEEL SHEET PILING

RIP RAP

CONC.

CONT. ON PSH 10

CONT. ON PSH 12

50' BST

LEGEND

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- TEMPORARY WORK BRIDGE
- REMOVE TEMPORARY BRIDGE (CURRENTLY CARRYING TRAFFIC)

100' 0' 100'
GRAPHIC SCALE

Permit Drawing
Sheet 34 of 59

-L-

PI = 3168+60.00
EL = 32.77'
VC = 180'
K = 361

PI = 3177+30.00
EL = 32.77'
VC = 180'
K = 231

(+)0.4993%

(+)0.0000%

(+)0.0000%

(−)0.7796%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50
40
30
20
10
0

3165 3166 3167 3168 3169 3170 3171 3172 3173 3174 3175 3176 3177 3178

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	11
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
SEAL NOT USE FOR CONSTRUCTION

NAD 83 / NSRS 2007

MATCHLINE -L- STA 3165+00 (SHEET 10)

MATCHLINE -L- STA 3178+00 (SHEET 12)

SITE 8

SITE 9

SITE 10

SITE 11

SEE FIGURE SITE 8

SEE FIGURE SITE 9

SEE FIGURE SITE 10

SEE FIGURE SITE 11

UNITED STATES OF AMERICA

NOTE: JETTING INTAKE PIPE LOCATIONS TO BE DETERMINED WITHIN EXISTING EASEMENT

TEMPORARY WORK BRIDGE #1

TEMPORARY WORK BRIDGE #2

50' POWER LINE EASEMENT

2 ROWS OF SANDBAGS

STEEL SHEET PILING

CONC

CONT ON PSH 10

CONT ON PSH 12

EXIST R/W

LEGEND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- TEMPORARY WORK BRIDGE
- REMOVE TEMPORARY BRIDGE (CURRENTLY CARRYING TRAFFIC)

100' 0' 100'
GRAPHIC SCALE

Permit Drawing
Sheet 35 of 59

-L-

PI = 3168+60.00
EL = 32.77'
VC = 180'
K = 361

PI = 3177+30.00
EL = 32.77'
VC = 180'
K = 231

(+)0.4993%

(+)0.0000%

(+)0.0000%

(−)0.7796%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50
40
30
20
10
0

3165 3166 3167 3168 3169 3170 3171 3172 3173 3174 3175 3176 3177 3178

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PROJECT REFERENCE NO.	SHEET NO.
B-2500A	11
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

SITE 8 & 9

SITE 9

SITE 8

NAD 83 / NSRS 2007

50' POWER LINE EASEMENT

INE EASEMENT

30' 0' 30'
GRAPHIC SCALE

EXIST R/W

FIBER OPTICS SPLICE BOX

2 ROWS OF SANDBAGS

TEMPORARY SLOPE STAKES

HAND CLEARING

FILL IN WETLAND

30' BST

SOIL

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY WORK BRIDGE #2

LEGEND

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY FILL IN WETLAND
- DENOTES HAND CLEARING
- TEMPORARY WORK BRIDGE

Permit Drawing
Sheet 36 of 59

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

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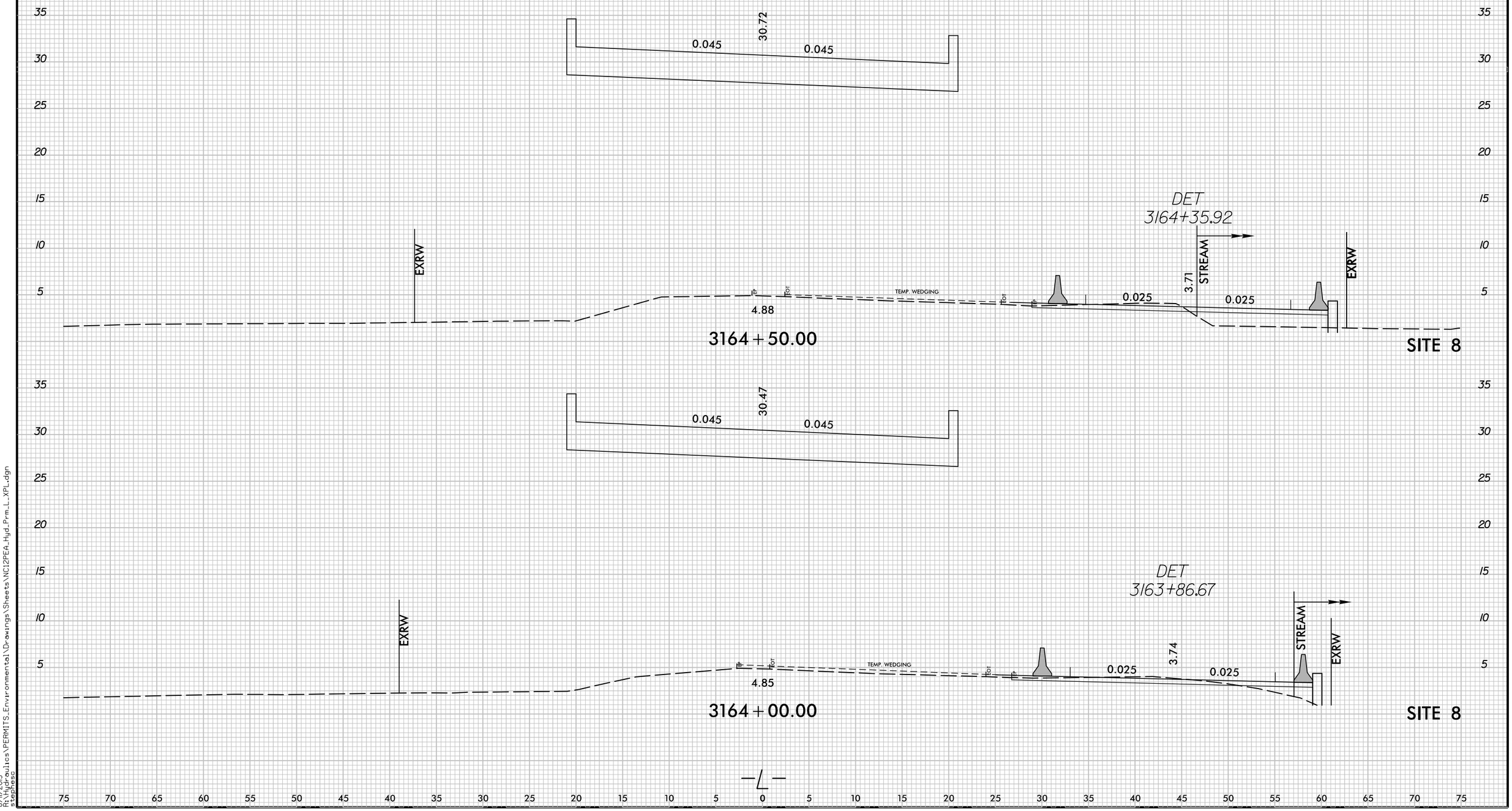
8/11/2013

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-2500A	X-8

Permit Drawing
Sheet 37 of 59



8/11/2013
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stephesc

SITE 10

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	11
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVIN C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / NSRS 2007

LEGEND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- TEMPORARY WORK BRIDGE
- REMOVE TEMPORARY WORK BRIDGE (CARRYING TRAFFIC)

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY WORK BRIDGE #1

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

CONC

NOTE:
JETTING INTAKE PIPE LOCATIONS TO BE DETERMINED WITHIN EXISTING EASEMENT

TEMPORARY WORK BRIDGE #2

UNITED STATES OF AMERICA

30′ 0′ 30′
GRAPHIC SCALE

Permit Drawing
Sheet 38 of 59

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_pshII_Site 10.dgn

8/11/2013

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Charlotte, NC 28208
NC License Number F-0991

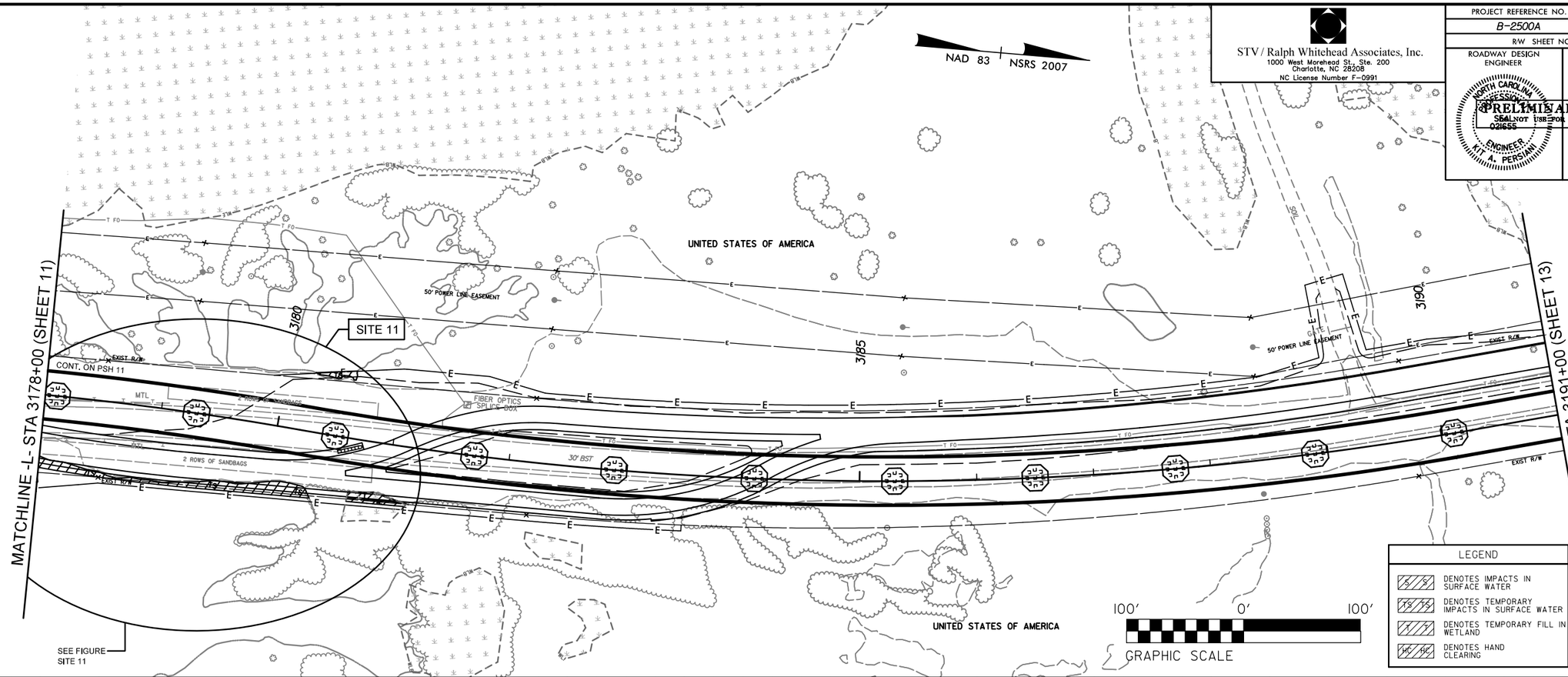
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER CALVIN C. MORRISON

PRELIMINARY PLANS
SEAL NOT USE FOR CONSTRUCTION

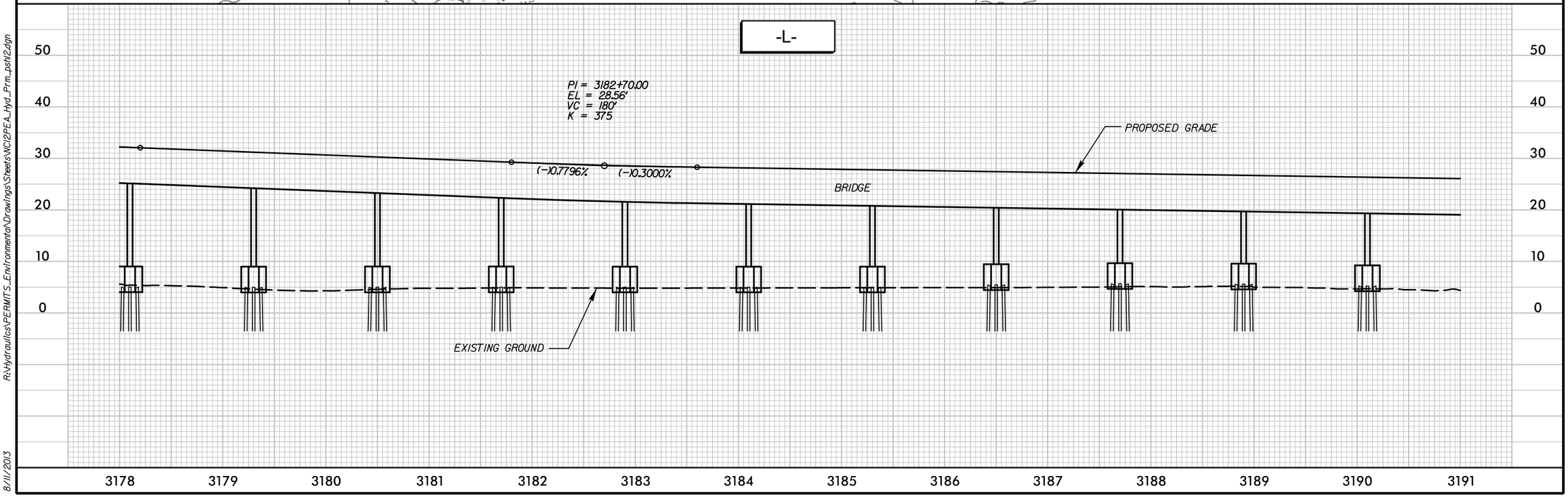
NAD 83 NSRS 2007



LEGEND

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

Permit Drawing
Sheet 39 of 59



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8/11/2013

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PROJECT REFERENCE NO.	SHEET NO.
B-2500A	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 NSRS 2007

MATCHLINE -L- STA 3178+00 (SHEET 11)

MATCHLINE -L- STA 3191+00 (SHEET 13)

SITE 11

SEE FIGURE SITE 11

CONT. ON PSH 11

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

EXIST R/W

2 ROWS OF SANDBAGS

30' BST

FIBER OPTICS OR TELECOM BOX

3180

3185

3190

100' 0' 100'

GRAPHIC SCALE

LEGEND

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

Permit Drawing
Sheet 40 of 59

-L-

PI = 3182+70.00
EL = 28.56'
VC = 180'
K = 375

(-)0.7796%

(-)0.3000%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50 40 30 20 10 0

3178 3179 3180 3181 3182 3183 3184 3185 3186 3187 3188 3189 3190 3191

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8/11/2013

SITE 11

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 | NSRS 2007

ER LINE EASEMENT

E

EXIST R/W

EXIST R/W

MTL

MTL

MTL

2 ROWS OF SANDBAGS

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY SLOPE STAKES

TEMPORARY FILL IN WETLAND

HAND CLEARING

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY WORK BRIDGE #2

TS

T

HC

30′ 0′ 30′

GRAPHIC SCALE

LEGEND

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY FILL IN WETLAND
- DENOTES HAND CLEARING
- TEMPORARY WORK BRIDGE

Permit Drawing
Sheet 41 of 59

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

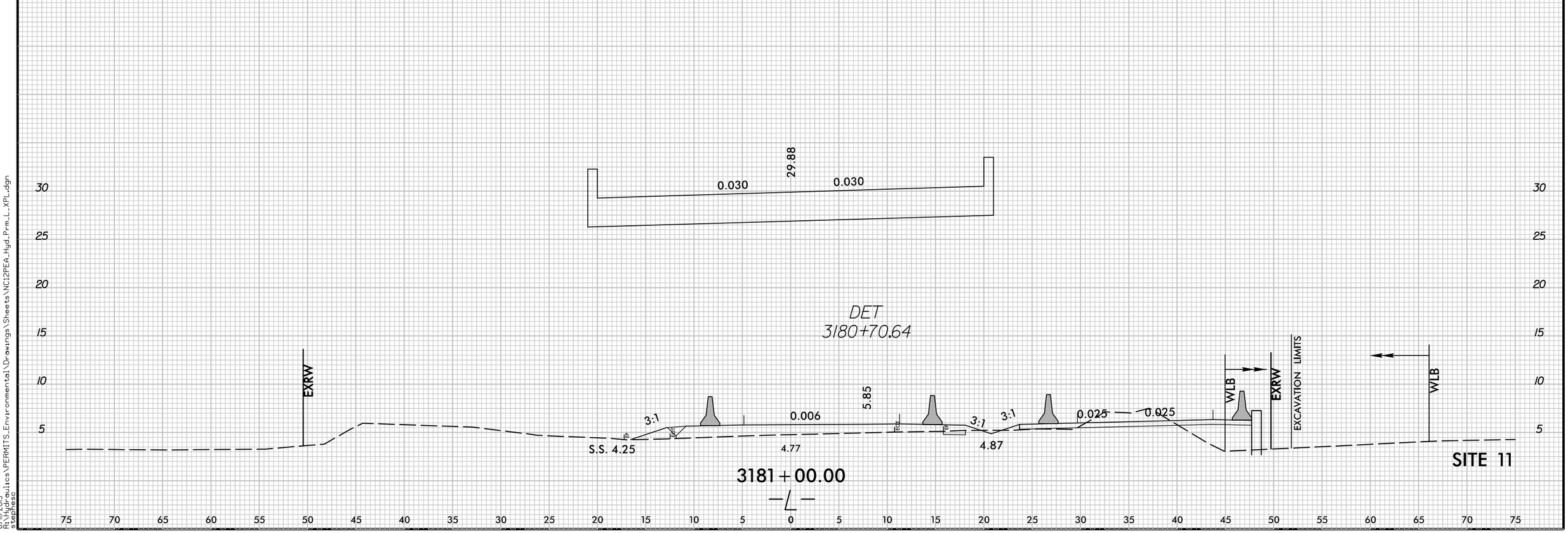
R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_pshl2_Site 11.dgn

8/11/2013

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-2500A	X-9

Permit Drawing
Sheet 42 of 59



8/11/2013
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stephesc

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Charlotte, NC 28208
NC License Number F-0991

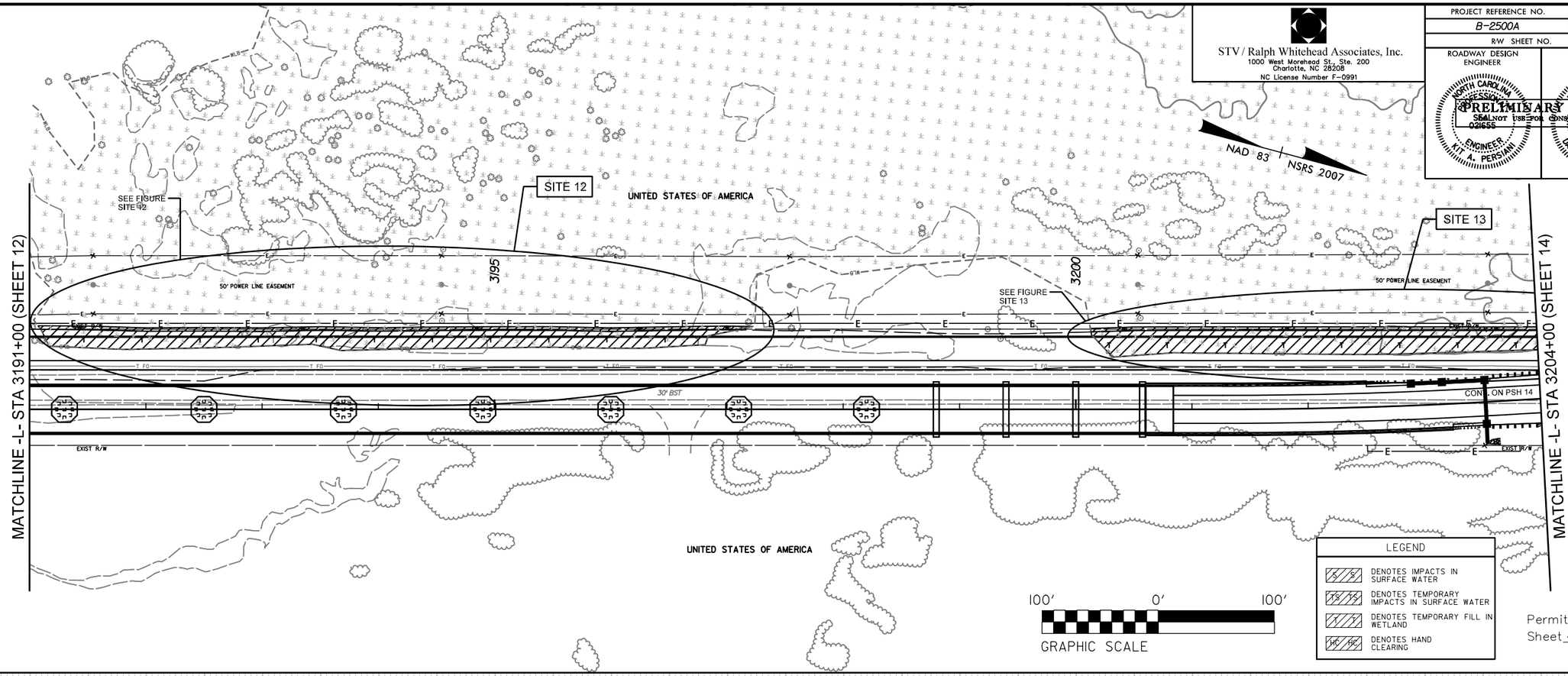
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
SEAL NOT USE FOR CONSTRUCTION

NAD 83 | NSRS 2007

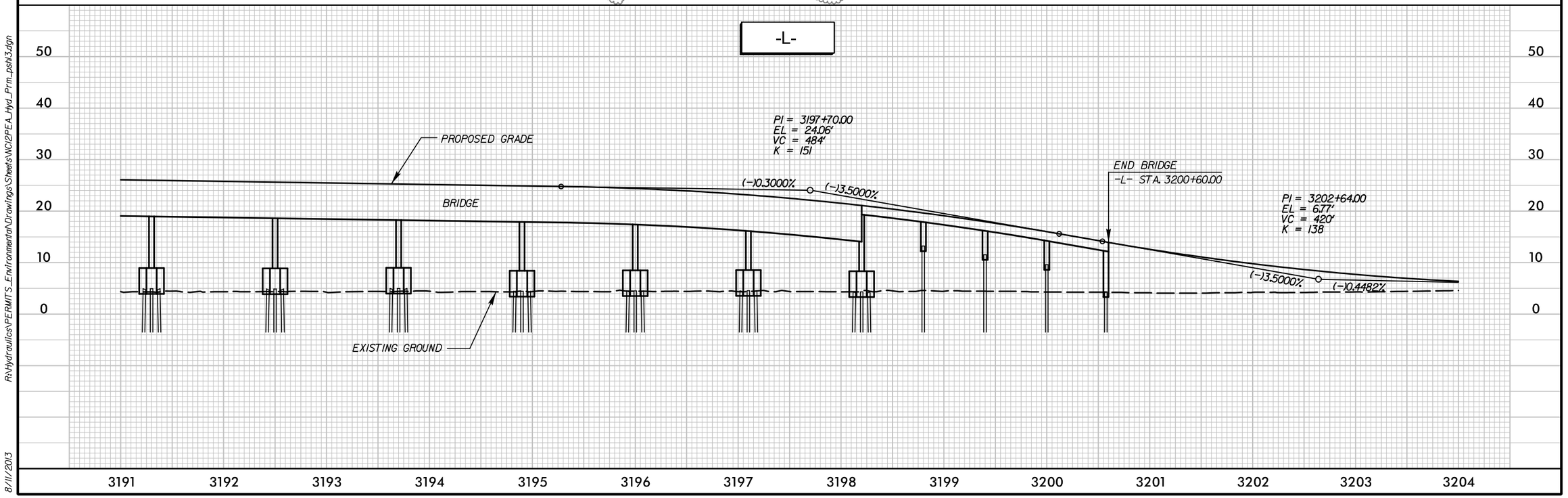


LEGEND

SF/SF	DENOTES IMPACTS IN SURFACE WATER
TS/TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
TF/TF	DENOTES TEMPORARY FILL IN WETLAND
HC/HC	DENOTES HAND CLEARING

100' 0' 100'
GRAPHIC SCALE

Permit Drawing
Sheet 43 of 59



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8/11/2013

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Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	13
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 NSRS 2007

MATCHLINE -L- STA 3191+00 (SHEET 12)

MATCHLINE -L- STA 3204+00 (SHEET 14)

SITE 12

SITE 13

SEE FIGURE SITE 12

SEE FIGURE SITE 13

UNITED STATES OF AMERICA

UNITED STATES OF AMERICA

3195

3200

50' POWER LINE EASEMENT

50' POWER LINE EASEMENT

30' BST

CONC ON PSH 14

EXIST R/W

EXIST R/W

LEGEND

- SW — DENOTES IMPACTS IN SURFACE WATER
- TSW — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- TF — DENOTES TEMPORARY FILL IN WETLAND
- HC — DENOTES HAND CLEARING

100' 0' 100'

GRAPHIC SCALE

Permit Drawing
Sheet 44 of 59

-L-

PROPOSED GRADE

BRIDGE

EXISTING GROUND

PI = 3197+70.00
EL = 24.06'
VC = 484'
K = 151

(-)10.3000%

(-)13.5000%

END BRIDGE
-L- STA. 3200+60.00

PI = 3202+64.00
EL = 6.77'
VC = 420'
K = 138

(-)13.5000%

(-)10.4482%

50 40 30 20 10 0

3191 3192 3193 3194 3195 3196 3197 3198 3199 3200 3201 3202 3203 3204

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_pshi3A.dgn

8/11/2013

SITE 12

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1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	13
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / NSRS 2007

LEGEND

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

WLB

50' POWER LINE EASEMENT

3195

HAND CLEARING

E

EXIST R/W

HC

CSW

T FO

TEMPORARY SLOPE STAKES

TEMPORARY FILL IN WETLAND

30' BST

50' 0' 50'

GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

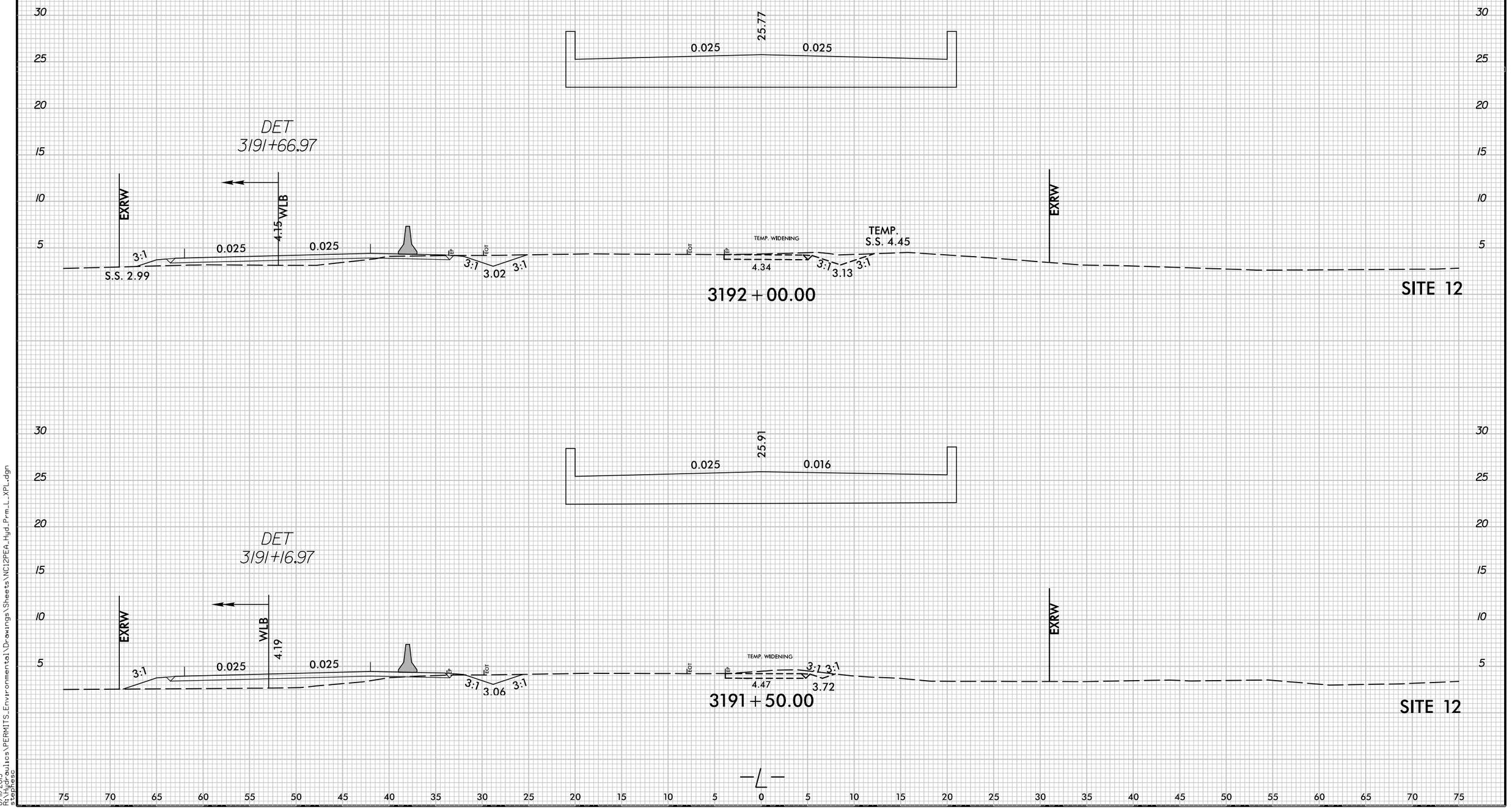
8/11/2013

Permit Drawing
Sheet 45 of 59

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_dsh3_Site 12.dgn

8/11/2013

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-2500A	X-10



STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	14
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / NSRS 2007

MATCHLINE -L- STA 3204+00 (SHEET 13)

SEE FIGURE SITE 13

SITE 13

SITE 14

SEE FIGURE SITE 14

CONT. ON PSH 13

50' POWER LINE EASEMENT

UNITED STATES OF AMERICA

EXIST R/W

30' BST

T FO

WLB

3205

3210

3215

100' 0' 100'
GRAPHIC SCALE

LEGEND

- S S — DENOTES IMPACTS IN SURFACE WATER
- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- T T — DENOTES TEMPORARY FILL IN WETLAND
- HC HC — DENOTES HAND CLEARING

Permit Drawing
Sheet 47 of 59

-L-

END TIP PROJECT B-2500A
-L- STA. 3207+37.00
ELEV = 4.65'

PROPOSED GRADE

(-)0.4482%

EXISTING GROUND

50
40
30
20
10
0

3204 3205 3206 3207 3208 3209 3210 3211 3212 3213 3214 3215 3216 3217

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8/11/2013

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1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	14
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 | NSRS 2007

MATCHLINE -L- STA 3204+00 (SHEET 13)

SEE FIGURE SITE 13

SITE 13

SITE 14

SEE FIGURE SITE 14

CONT. ON PSH 13

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

EXIST R/W

30' BST

T FO

WLB

3205

3210

3215

LEGEND

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

100' 0' 100'
GRAPHIC SCALE

Permit Drawing Sheet 48 of 59

-L-

END TIP PROJECT B-2500A
-L- STA. 3207+37.00
ELEV = 4.65'

PROPOSED GRADE

(-)0.4482%

EXISTING GROUND

50 40 30 20 10 0

3204 3205 3206 3207 3208 3209 3210 3211 3212 3213 3214 3215 3216 3217

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8/11/2013

SITE 13

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	14
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / NSRS 2007

LEGEND

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

3200

3205

50' POWER LINE EASEMENT

HAND CLEARING

EXIST R/W

TEMPORARY SLOPE STAKES

TEMPORARY FILL IN WETLAND

50' 0' 50'

GRAPHIC SCALE

Permit Drawing
Sheet 49 of 59

NCDOT

DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_dsh4_Site 13.dgn

8/11/2013

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-2500A	X-11

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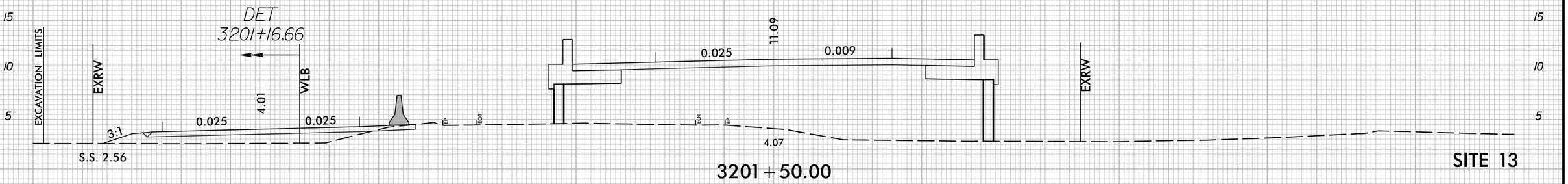
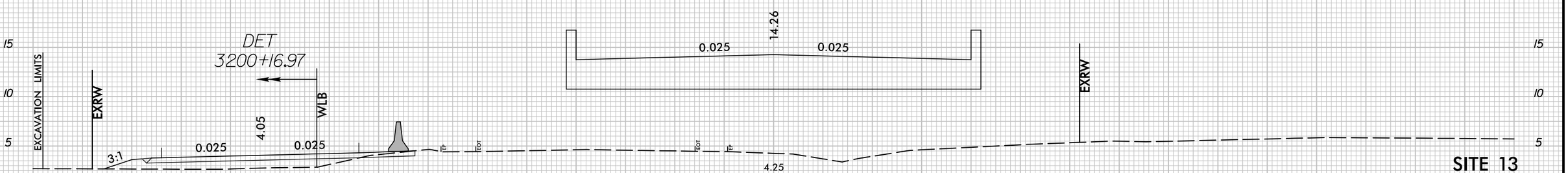
Permit Drawing
Sheet 50 of 59



3201 + 50.00

SITE 13



3200 + 50.00

SITE 13

8/11/2013
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stephesc

SITE 14

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	14
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / NSRS 2007

50' POWER LINE EASEMENT

3210

HAND CLEARING

HAND CLEARING

HAND CLEARING

TEMPORARY SLOPE STAKES

TEMPORARY FILL IN WETLAND

TEMPORARY FILL IN WETLAND

E

HC

T

WLB

T FO

30' 0' 30'
GRAPHIC SCALE

LEGEND

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

Permit Drawing
Sheet 51 of 59

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_psh14_Site 14.dgn

8/11/2013

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-2500A	X-12

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

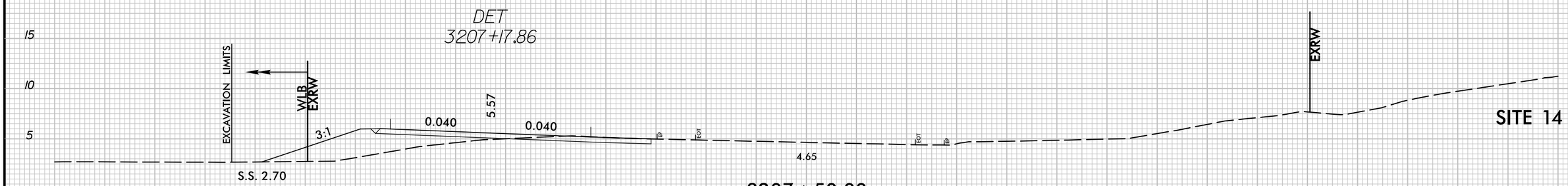
Permit Drawing
Sheet 52 of 59

DET
3208+18.31

3208+50.00

SITE 14

DET
3207+17.86



3207+50.00

SITE 14

—L—

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

8/11/2013
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stephesc

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

UNITED STATES OF AMERICA

NAD 83 CORS96

MATCHLINE THIS SHEET

SITE 2

SEE FIGURE SITE 2

SITE 15

NOTE: JETTING INTAKE PIPE LOCATION

50' POWER LINE EASEMENT

EXIST R/W

30' BST

MATCHLINE -L- STA 3087+00 (SHEET 4)

MATCHLINE -L- STA 3100+00 (SHEET 6)

100' 0' 100'
GRAPHIC SCALE

LEGEND

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

Permit Drawing
Sheet 53 of 59

-L-

PI = 3092+48.00
EL = 24.70'
VC = 530'
K = 152

BEGIN BRIDGE
-L- STA. 3089+00.00

PI = 3086+70.00
EL = 4.48'
VC = 408'
K = 137

(+)3.4983%

14.28

(+)3.4983%

(+)0.0000%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50 40 30 20 10 0

3087 3088 3089 3090 3091 3092 3093 3094 3095 3096 3097 3098 3099 3100

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_pshi05X.dgn

8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

UNITED STATES OF AMERICA

NAD 83 CORS96

MATCHLINE THIS SHEET

SITE 2

SEE FIGURE SITE 2

3090

3095

SITE 15

50' POWER LINE EASEMENT

NOTE: JETTING INTAKE PIPE LOCATION

EXIST R/W

30' BST

MATCHLINE -L- STA 3087+00 (SHEET 4)

MATCHLINE -L- STA 3100+00 (SHEET 6)

100' 0' 100'

GRAPHIC SCALE

LEGEND

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

Permit Drawing
Sheet 54 of 59

-L-

PI = 3092+48.00
EL = 24.70'
VC = 530'
K = 152

BEGIN BRIDGE
-L- STA. 3089+00.00

PI = 3086+70.00
EL = 4.48'
VC = 408'
K = 137

(+)3.4983%

14.28

(+)3.4983%

(+)0.0000%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50 40 30 20 10 0

3087 3088 3089 3090 3091 3092 3093 3094 3095 3096 3097 3098 3099 3100

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_pshl05XAdgn

8/11/2013

SITE 15
(SHEET 1 OF 2)

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

LEGEND

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

NAD 83
NSRS 2007

HAND CLEARING

NOTE:
JETTING INTAKE PIPE LOCATION

50' POWER

MATCHLINE

30' 0' 30'
GRAPHIC SCALE

Permit Drawing
Sheet 55 of 59

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_psh05x_Site 15Adgn

8/11/2013

SITE 15
(SHEET 2 OF 2)

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

PRELIMINARY PLANS
SEAL NOT USE FOR CONSTRUCTION

NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

LEGEND

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

NAD 83 / NSRS 2007

FROM AERIAL

HAND CLEARING

NOTE:
JETTING INTAKE
PIPE LOCATION

HAND CLEARING

TEMPORARY IMPACTS
IN SURFACE WATER

MATCHLINE

WLB

FROM AERIAL

30′ 0′ 30′
GRAPHIC SCALE

Permit Drawing
Sheet 56 of 59

NCDOT
DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

8/11/2013

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_psh05X_Site 15B.dgn

8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	8
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / NSRS 2007

SEE FIGURE SITE 16

SITE 16

SITE 5

SITE 6

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

50' POWER LINE EASEMENT

BST

3135

3140

EXIST R/W

EXIST R/W

EXIST R/W

EXIST R/W

LEGEND

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

100' 0' 100'

GRAPHIC SCALE

Permit Drawing
Sheet 57 of 59

-L-

PROPOSED GRADE

PROPOSED GRADE

BRIDGE

BRI

50 40 30 20 10 0

3132 3133 3134 3135 3136 3137 3138 3139 3140 3141 3142 3143 3144 3145

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8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	8
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
SEAL NOT USE FOR CONSTRUCTION

SEE FIGURE SITE 16

SITE 16

SITE 6

NAD 83 / NSRS 2007

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

50' POWER LINE EASEMENT

3135

3140

BST

EXIST R/W

EXIST R/W

EXIST R/W

EXIST R/W

LEGEND

- SS — DENOTES IMPACTS IN SURFACE WATER
- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- TF TF — DENOTES TEMPORARY FILL IN WETLAND
- HC HC — DENOTES HAND CLEARING

100' 0' 100'
GRAPHIC SCALE

Permit Drawing
Sheet 58 of 59

"ED STATES OF AMERICA

-L-

PROPOSED GRADE

PROPOSED GRADE

BRIDGE

BRI

50 40 30 20 10 0

3132 3133 3134 3135 3136 3137 3138 3139 3140 3141 3142 3143 3144 3145

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8/11/2013

SITE 16

SITE 16

TS

E

TEMPORARY IMPACTS IN SURFACE WATER

NOTES:
1) JETTING INTAKE PIPE LOCATION
2) EXISTING BOAT ACCESS

WLB

WL

50' POWER LINE EASEMENT

BST

50' POW

3140

SITE 6

EXIST R/W

EXIST R/W

HC

T

TM

T FO T

PERMANENT SLOPE STAKES

PERMANENT SLOPE STAKES

TEMPORARY SLOPE STAKES

LEGEND

- S / S — DENOTES IMPACTS IN SURFACE WATER
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- T / T — DENOTES TEMPORARY FILL IN WETLAND
- HC / HC — DENOTES HAND CLEARING

30' 0' 30'

GRAPHIC SCALE

Permit Drawing Sheet 59 of 59

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

NAD 83 NSRS 2007

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

R:\Hydraulics\PERMITS_Environmental\Drawings\Sheets\NC12PEA_Hyd_Prm_psh08X_Site 16.dgn

8/11/2013

NCDOT

DIVISION OF HIGHWAYS
DARE COUNTY
PROJECT: B-2500A

NC HWY 12 OVER
PEA ISLAND BREACH

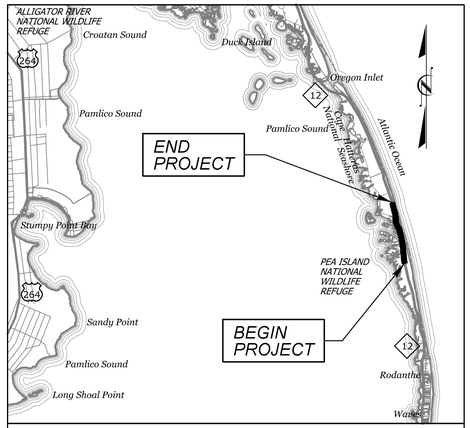
8/11/2013

PROJECT: B–2500A

CONTRACT: C203171

8/12/2013

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Standard Symbology Sheet



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

DARE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B–2500A	1	

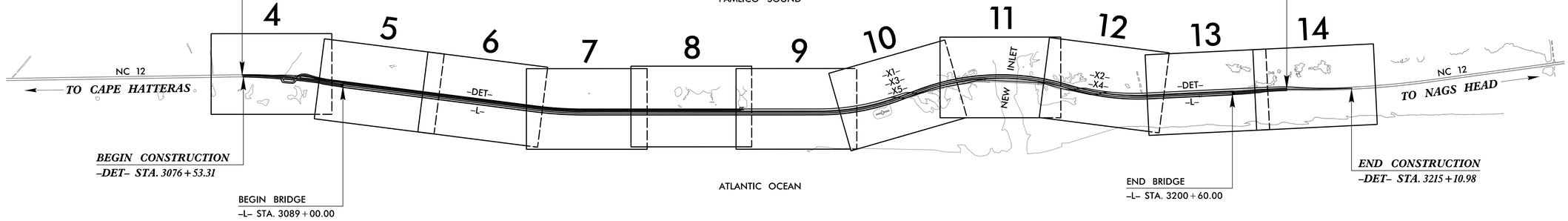
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
32635.1.6		P.E.
32635.2.2	BRNHF–0012(55)	UTIL.
32635.3.6	BRNHF–0012(55)	CONST.

LOCATION: PHASE II, NC 12 LONG–TERM IMPROVEMENTS AT PEA ISLAND
TYPE OF WORK: GRADING, PAVING, DRAINAGE & STRUCTURE

NAD 83
CORS96

BEGIN TIP PROJECT B–2500A
–L– STA. 3076+40.00

END TIP PROJECT B–2500A
–L– STA. 3207+37.00



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2012 = 7,300
ADT 2032 = 10,900
DHV = N/A
D = N/A
T = 6%
V = 60 MPH
FUNC. CLASSIFICATION: COLLECTOR
T = 1% TTST+5% DUALS
REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B–2500A = 0.366 MILES
LENGTH OF STRUCTURE TIP PROJECT B–2500A = 2.114 MILES
TOTAL LENGTH OF TIP PROJECT B–2500A = 2.480 MILES

NCDOT CONTACT: GARY LOVERING, PE
Project Engineer, Roadway Design

PLANS PREPARED FOR THE NCDOT BY:
STV/RALPH WHITEHEAD ASSOCIATES, INC.
1000 West Morehead St., Ste. 200, Charlotte NC, 28208
NC License Number F–0991

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
N/A

LETTING DATE:
SEPTEMBER 17, 2013

JOHN N. JOHNSON, PE
PROJECT ENGINEER

SEAN C. STEPHENS, EI
PROJECT DESIGNER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SEAL 036510
NORTH CAROLINA PROFESSIONAL ENGINEER DAVID C. MORRISON
P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SEAL 036510
NORTH CAROLINA PROFESSIONAL ENGINEER MATT A. PERSIAN
P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	1-B

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Known Soil Contamination: Area or Site
- Potential Soil Contamination: Area or Site

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H–Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

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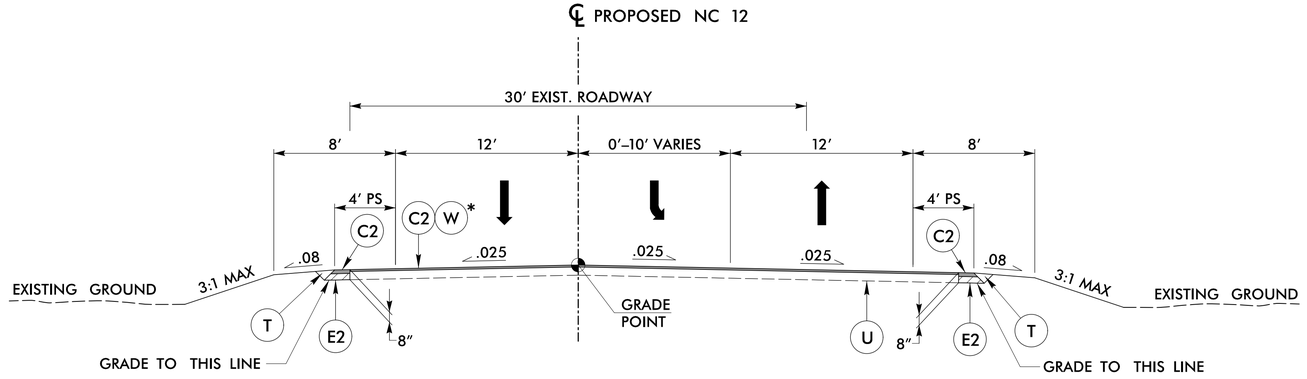
8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

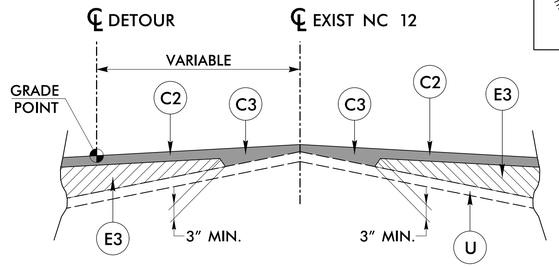
PRELIMINARY PLANS
SHALL NOT BE USED FOR CONSTRUCTION



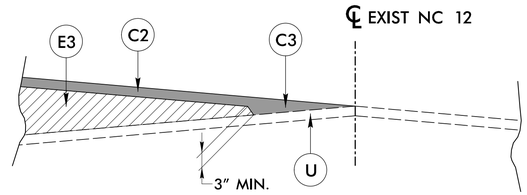
TYPICAL SECTION #1

–L– STA. 3076+40.00 TO STA. 3083+22.63
–L– STA. 3204+46.89 TO STA. 3207+37.00

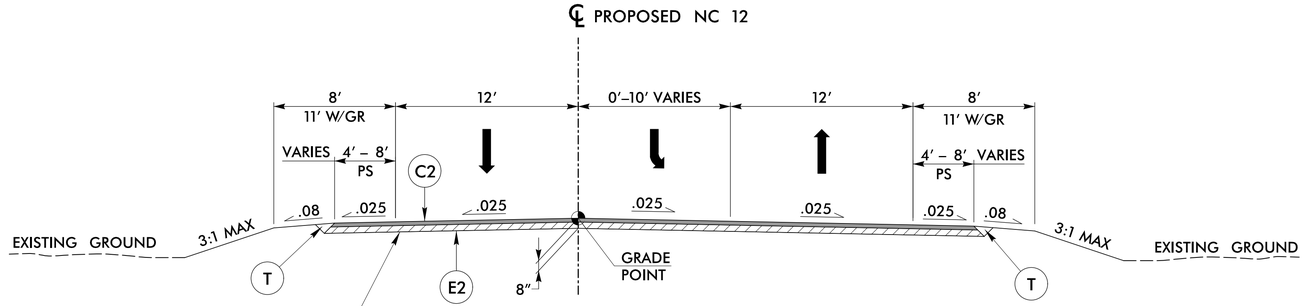
* NOTES:
1. USE WEDGING DETAIL #1



WEDGING DETAIL #1

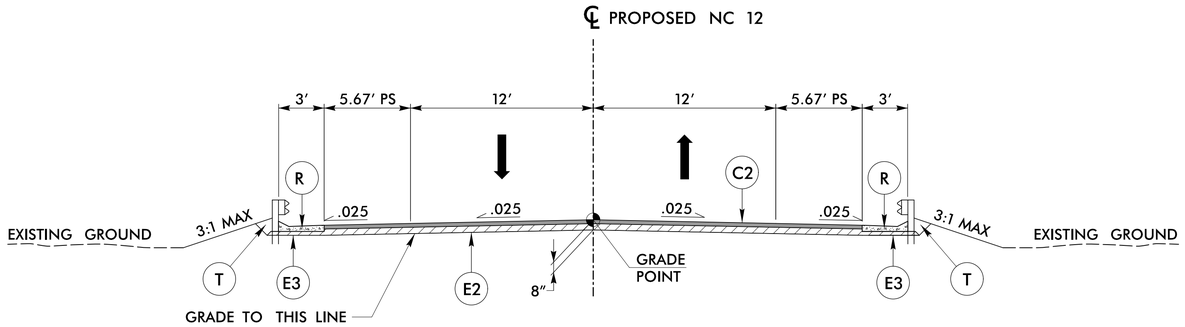


WEDGING DETAIL #2



TYPICAL SECTION #2

–L– STA. 3083+22.63 TO STA. 3086+92.67
–L– STA. 3203+55.04 TO STA. 3204+46.89



TYPICAL SECTION #3

–L– STA. 3086+92.67 TO STA. 3087+25.91
–L– STA. 3202+50.66 TO STA. 3203+55.04

PAVEMENT SCHEDULE

C1	PROP. APPROX. 2″ ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ.YD.
C2	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ.YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ.YD. PER 1″ DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1.5″ IN DEPTH OR GREATER THAN 2″ IN DEPTH.
E1	PROP. APPROX. 4″ ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ.YD.
E2	PROP. APPROX. 5″ ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ.YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ.YD. PER 1″ DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3″ OR GREATER THAN 5.5″ IN DEPTH.
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT (SEE WEDGING DETAIL THIS SHEET)

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

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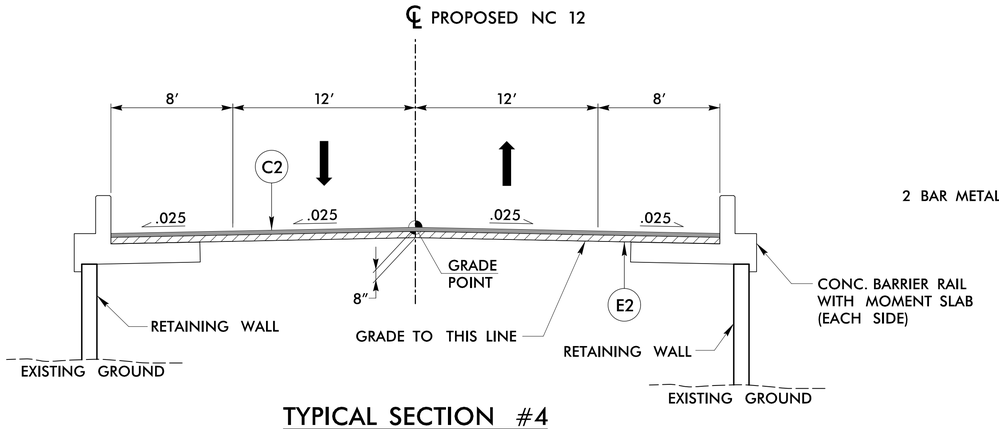
8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

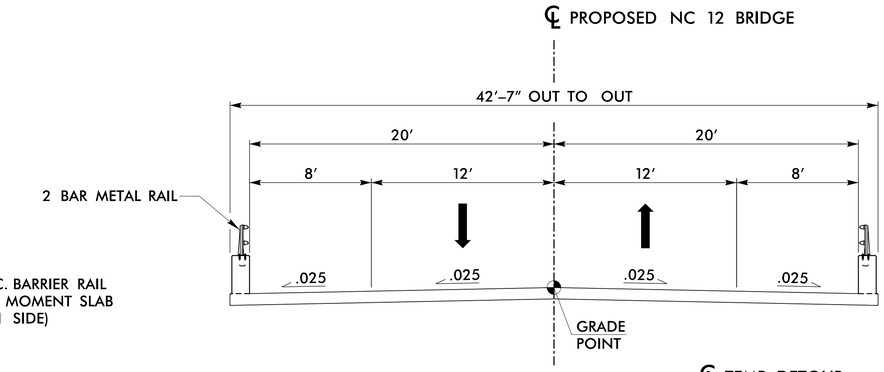
NORTH CAROLINA PROFESSIONAL SEAL 026655 ENGINEER KIT A. PERSIANI

PRELIMINARY PLANS
SEAL NOT USE FOR CONSTRUCTION



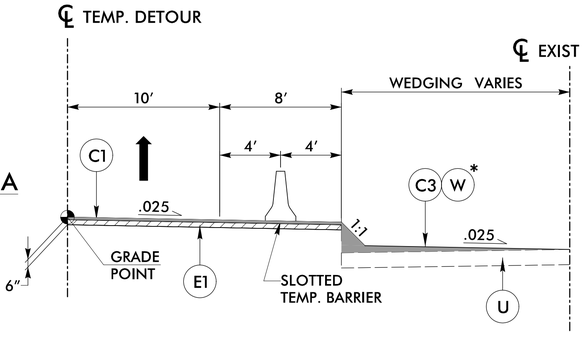
TYPICAL SECTION #4

–L– STA. 3087+50.00 TO STA. 3089+00.00 (BEGIN BRIDGE)
–L– STA. 3200+60.00 (END BRIDGE) TO STA. 3202+50.00



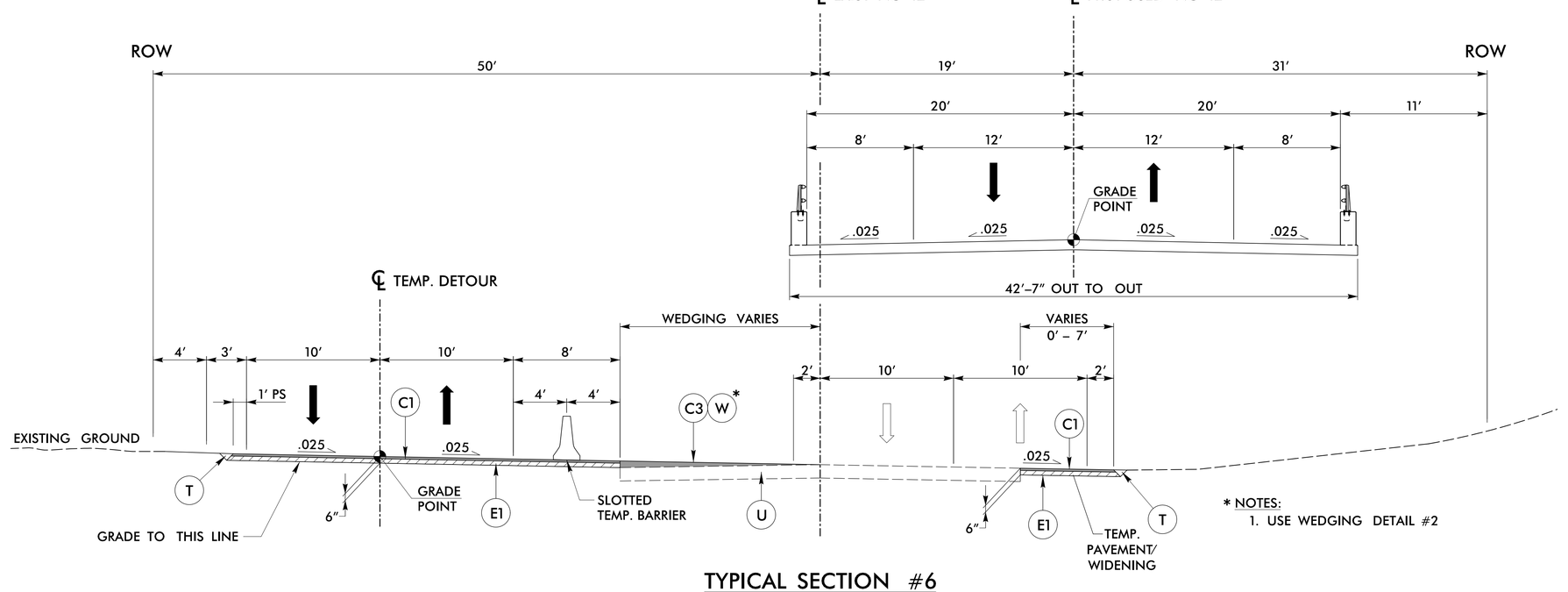
TYPICAL SECTION #5

–L– STA. 3089+00.00 (BEGIN BRIDGE)
TO STA. 3200+60.00 (END BRIDGE)



PARTIAL TYPICAL #6A

STATION RANGE VARIES
(SEE CROSS–SECTIONS)



TYPICAL SECTION #6

–DET– STA. 3078+12.67 TO STA. 3115+00.00
–DET– STA. 3119+50.00 TO STA. 3148+00.00

* NOTES:
1. USE WEDGING DETAIL #2

C1	2″ S9.5B
C2	3″ S9.5B
C3	VAR. S9.5B
E1	4″ B25.0B
E2	5″ B25.0B
E3	VAR. B25.0B
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

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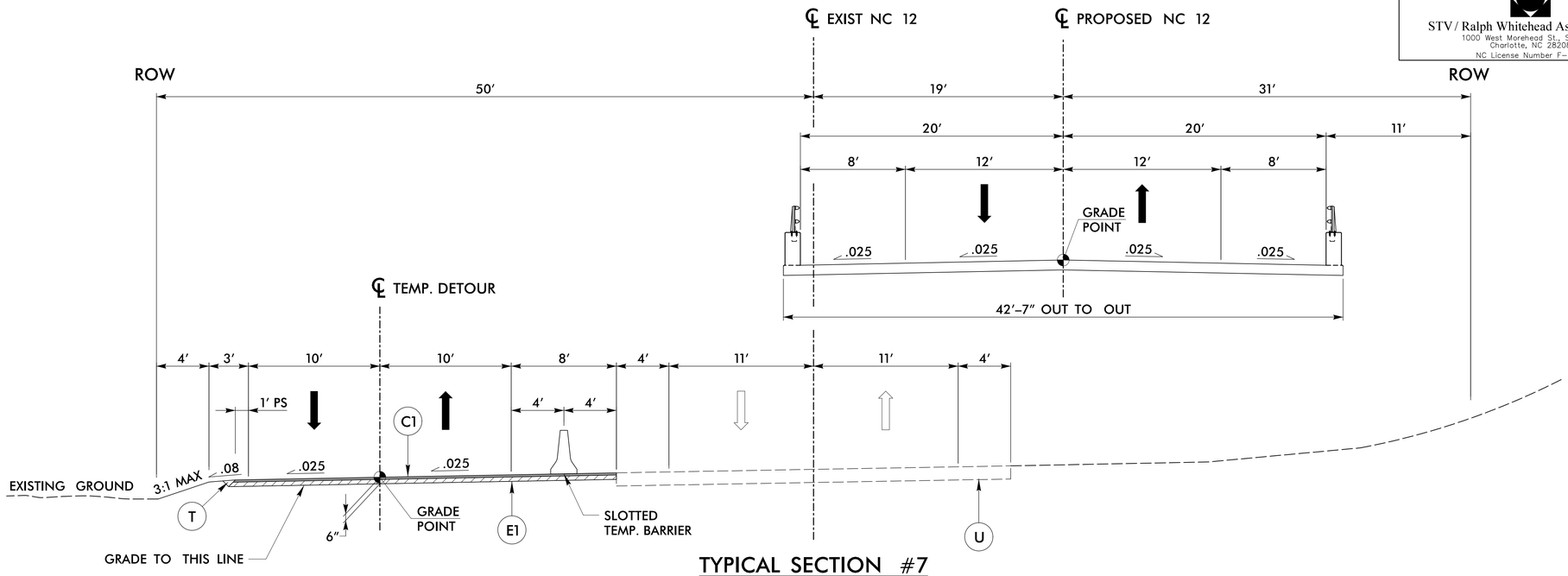
8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

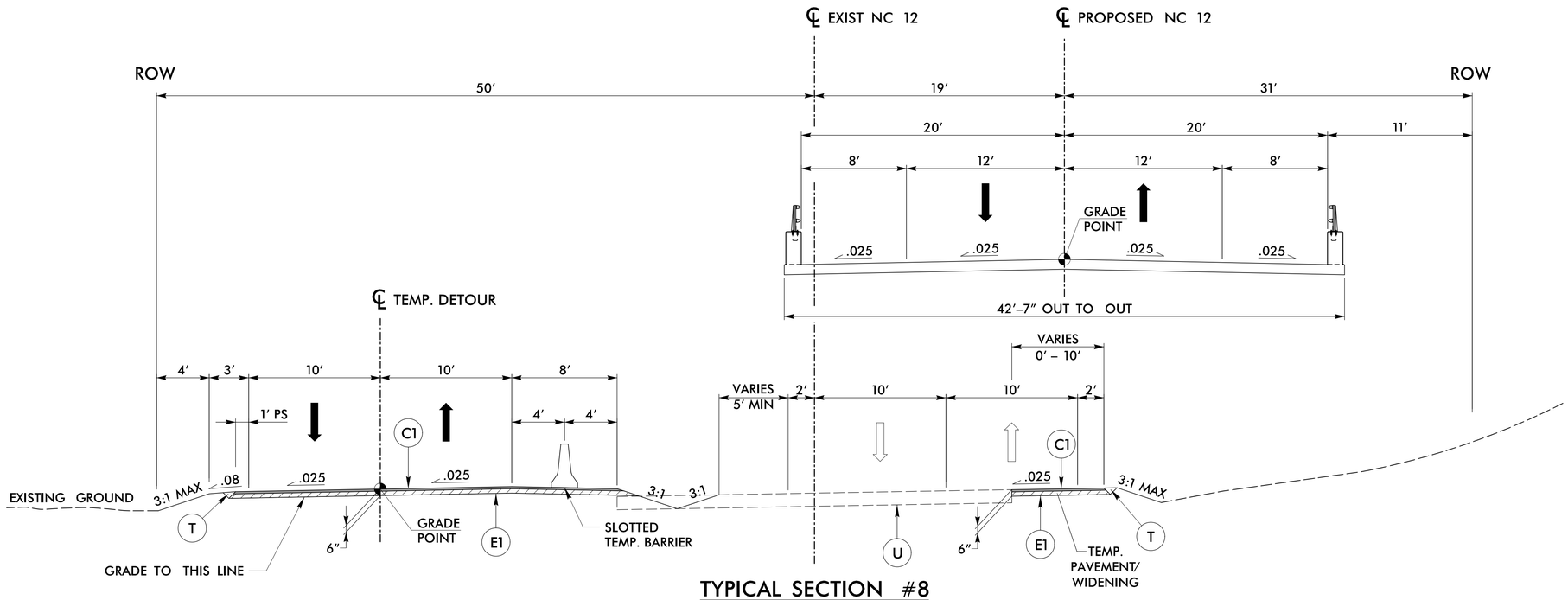
NORTH CAROLINA PROFESSIONAL 021655 ENGINEER KIT A. PERSIANI

PRELIMINARY PLANS
Sealed NOT USE FOR CONSTRUCTION



TYPICAL SECTION #7

–DET– STA. 3193+00.00 TO STA. 3213+87.65



TYPICAL SECTION #8

–DET– STA. 3115+00.00 TO STA. 3119+50.00
–DET– STA. 3148+00.00 TO STA. 3157+01.57
–DET– STA. 3185+09.32 TO STA. 3193+00.00

C1	2″ S9.5B
C2	3″ S9.5B
C3	VAR. S9.5B
E1	4″ B25.0B
E2	5″ B25.0B
E3	VAR. B25.0B
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

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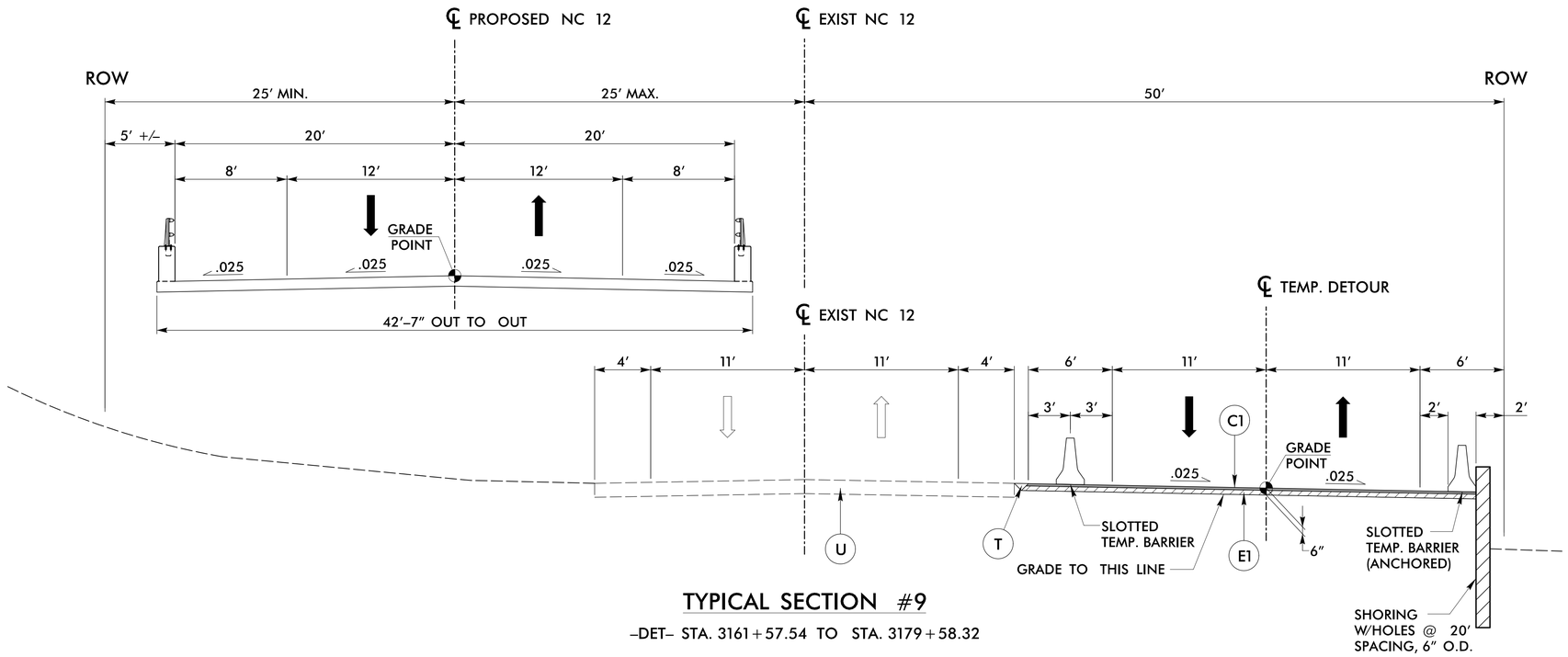
8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

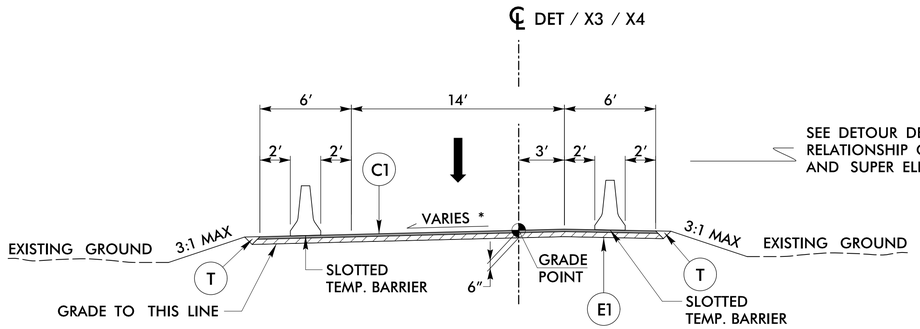
NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

PRELIMINARY PLANS
SEAL NOT USE FOR CONSTRUCTION



TYPICAL SECTION #9

–DET– STA. 3161+57.54 TO STA. 3179+58.32

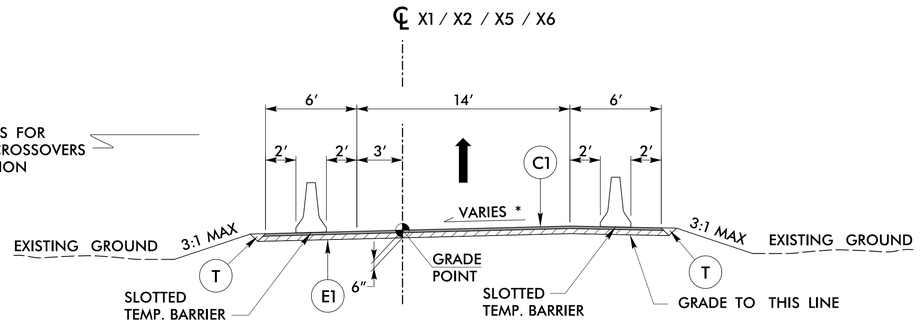


SEE DETOUR DETAILS FOR RELATIONSHIP OF CROSSOVERS AND SUPER ELEVATION

TYPICAL SECTION #10

–DET– STA. 3157+01.57 TO STA. 3161+57.54 (–X3–)
–DET– STA. 3179+58.32 TO STA. 3185+09.32 (–X4–)

* NOTES:
1. VARIABLE SUPER ROTATES IN OPPOSITE DIRECTION FOR CURVES TO THE LEFT. SEE DETOUR PLANS FOR DETAILS.



TYPICAL SECTION #11

–DET– STA. 3157+01.57 TO STA. 3161+57.54 (–X1– & –X5–)
–DET– STA. 3179+58.32 TO STA. 3185+09.32 (–X2– & –X6–)

* NOTES:
1. VARIABLE SUPER ROTATES IN OPPOSITE DIRECTION FOR CURVES TO THE RIGHT. SEE DETOUR PLANS FOR DETAILS.

C1	2″ S9.5B
C2	3″ S9.5B
C3	VAR. S9.5B
E1	4″ B25.0B
E2	5″ B25.0B
E3	VAR. B25.0B
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

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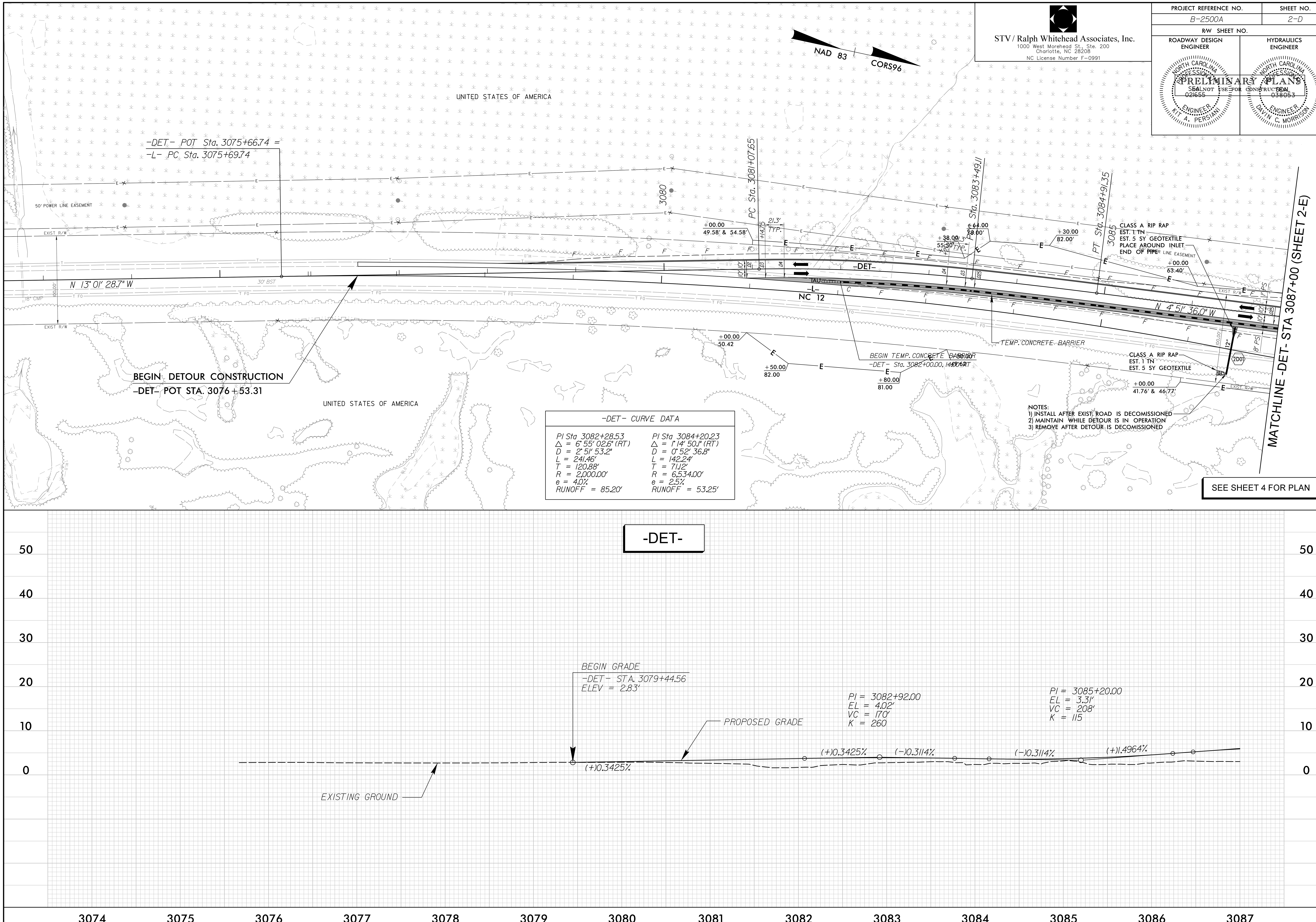
8/11/2013



-DET- CURVE DATA

PI Sta 3082+28.53	PI Sta 3084+20.23
Δ = 6° 55' 02.6" (RT)	Δ = 1° 14' 50.1" (RT)
D = 2° 51' 53.2"	D = 0° 52' 36.8"
L = 241.46'	L = 142.24'
T = 120.88'	T = 71.12'
R = 2,000.00'	R = 6,534.00'
e = 4.0%	e = 2.5%
RUNOFF = 85.20'	RUNOFF = 53.25'

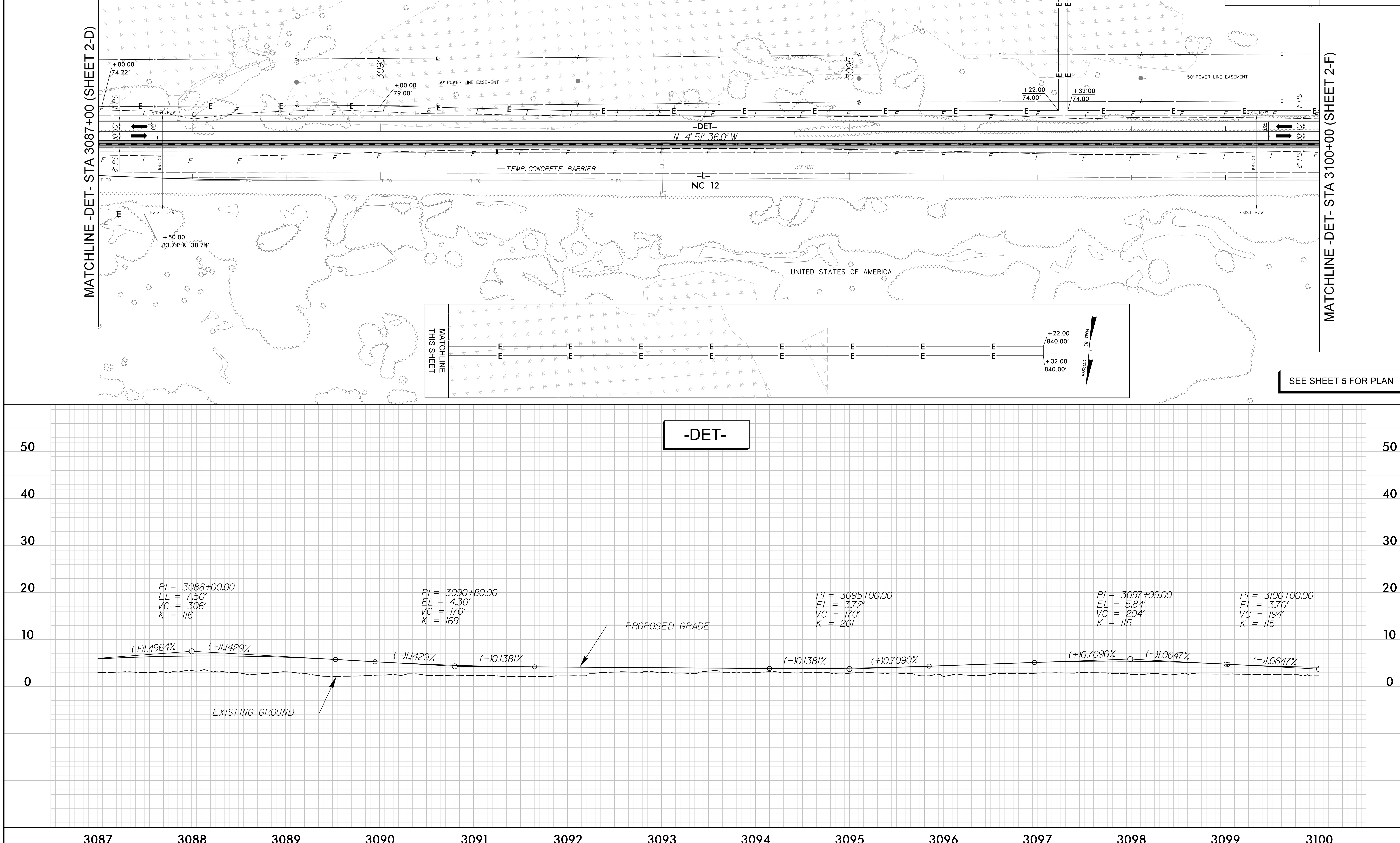
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-E

R/W SHEET NO.

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION



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1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

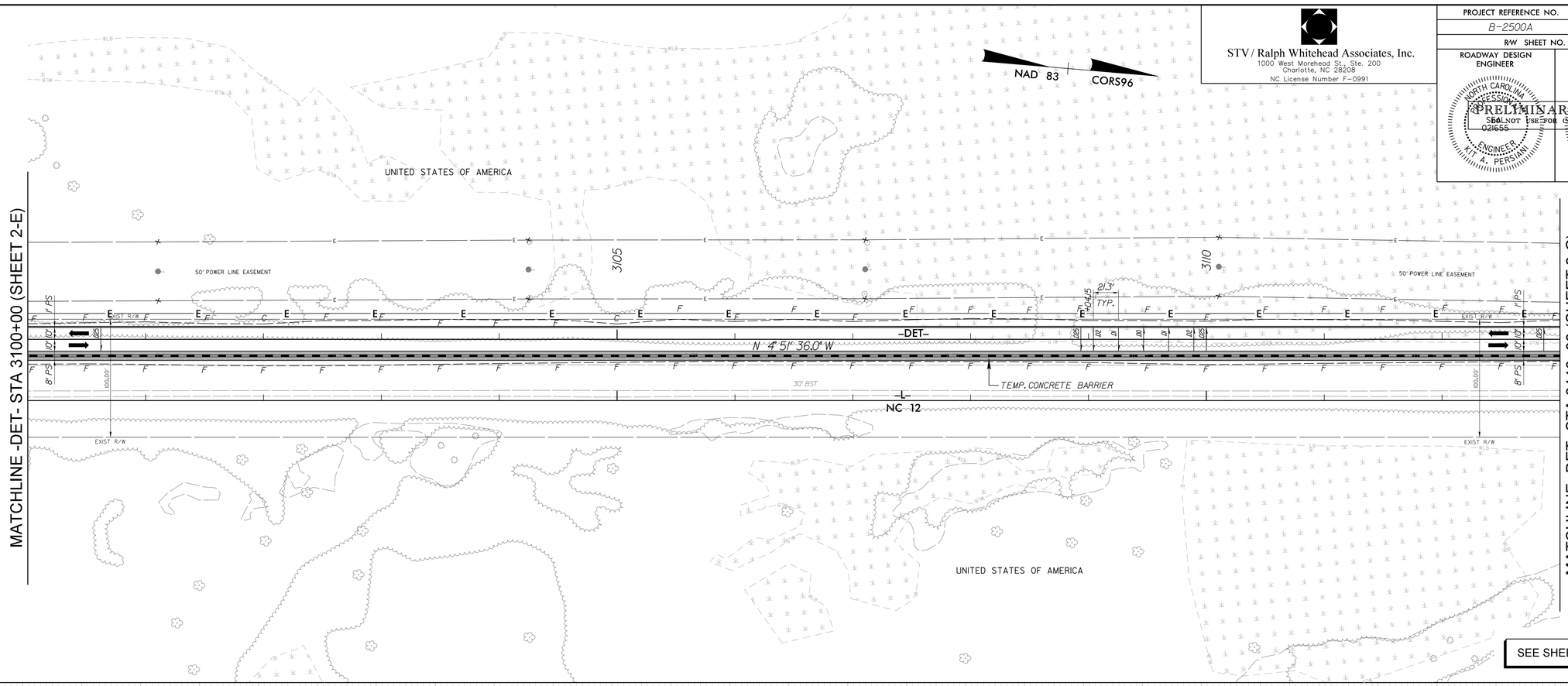
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-F
R/W SHEET NO.	

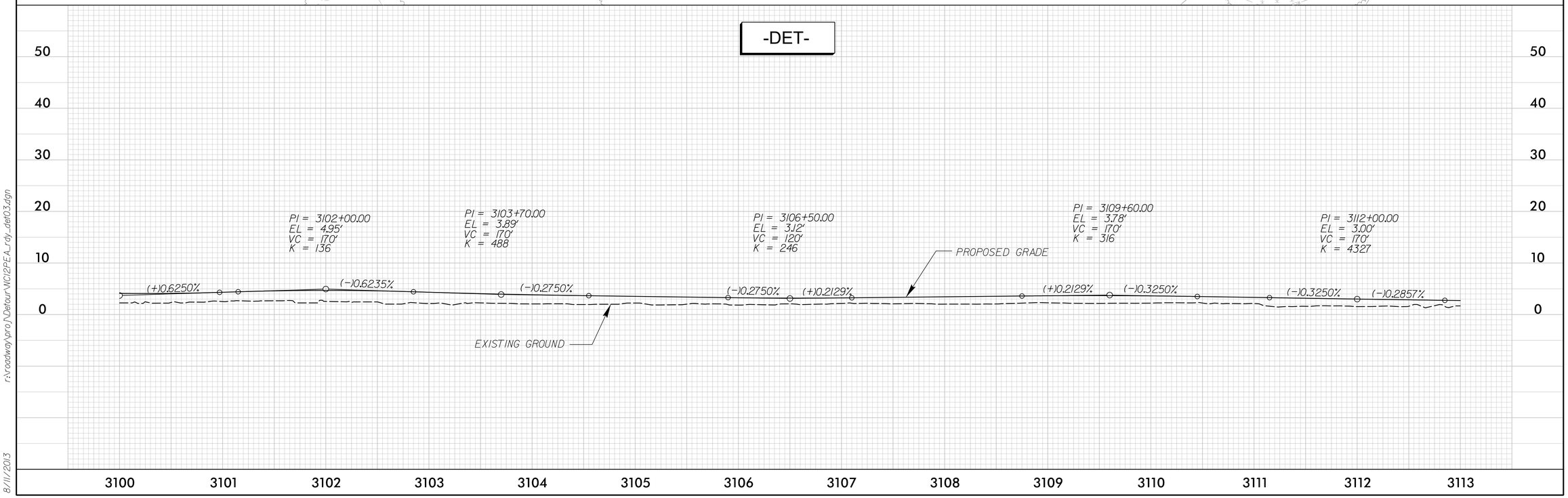
ROADWAY DESIGN ENGINEER — SEAL 026655 — ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — SEAL 038053 — ENGINEER CALVIN C. MORRISON

PRELIMINARY PLANS
Shall not use for construction

NAD 83 CORS96





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8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-G
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / CORS96

MATCHLINE -DET- STA 3113+00 (SHEET 2-F)

MATCHLINE -DET- STA 3126+00 (SHEET 2-H)

UNITED STATES OF AMERICA

PC Sta. 3113+06.16
+06.13
74.00'
+43.9'
8' PS
EXIST R/W
10'
12'
100.00'
50' POWER LINE EASEMENT
3115
PT Sta. 3119+12.45
+19.07
74.00'
+26.65
21.3' TYP.
3120
3125
-DET-
N 12° 07' 54.6" W
30' BST
TEMP. CONCRETE BARRIER
12"
2G01
NC 12
CLASS A RIP RAP
EST. 1 TN
EST. 5 SY GEOTEXTILE
PLACE AROUND
INLET END OF PIPE
NOTES:
1) INSTALL AFTER EXIST. ROAD IS DECOMISSIONED
2) MAINTAIN WHILE DETOUR IS IN OPERATION
3) REMOVE AFTER DETOUR IS DECOMISSIONED
CLASS A RIP RAP
EST. 1 TN
EST. 5 SY GEOTEXTILE

-DET- CURVE DATA

PI Sta 3116+09.71
△ = 7° 16' 18.6" (LT)
D = 1° 11' 57.9"
L = 606.29'
T = 303.55'
R = 4,777.00'
e = 2.5%
RUNOFF = 53.25'

SEE SHEET 7 FOR PLAN

-DET-

PI = 3114+80.00
EL = 2.20'
VC = 170'
K = 151

PI = 3117+60.00
EL = 4.55'
VC = 186'
K = 116

PI = 3120+00.00
EL = 2.70'
VC = 186'
K = 116

PI = 3121+78.00
EL = 4.17'
VC = 170'
K = 172

(−)0.2857%
(+)0.8393%
(+)0.8393%
(−)0.7708%
(+)0.8258%
(−)0.1608%
PROPOSED GRADE
EXISTING GROUND

50
40
30
20
10
0

3113 3114 3115 3116 3117 3118 3119 3120 3121 3122 3123 3124 3125 3126

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8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-H
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 026655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAWN C. MORRISON

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83 / CORS96

MATCHLINE -DET- STA 3126+00 (SHEET 2-G)

MATCHLINE -DET- STA 3139+00 (SHEET 2-I)

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

3130

3135

+53.00 275.00

+76.00 275.00

+53.00 230.00

+76.00 232.00

+28.04 182.06

+28.00 74.00

+10.65

21.3' TYP.

-DET-
N 12° 07' 54.6" W

8' PS

10' 10'

12

10

30' BST

TEMP. CONCRETE BARRIER

NC 12

EXIST R/W

100.00'

UNITED STATES OF AMERICA

SEE SHEET 8 FOR PLAN

-DET-

PI = 3127+50.00
EL = 3.25'
VC = 170'
K = 595

PI = 3129+50.00
EL = 3.50'
VC = 170'
K = 779

PI = 3132+50.00
EL = 3.22'
VC = 170'
K = 855

PI = 3138+00.00
EL = 3.80'
VC = 170'
K = 9383

(−)0.1608%

(+)0.1250%

(−)0.0933%

(−)0.0933%

(+)0.1055%

(+)0.1055%

(+)0.0873%

PROPOSED GRADE

EXISTING GROUND

50
40
30
20
10
0

3126 3127 3128 3129 3130 3131 3132 3133 3134 3135 3136 3137 3138 3139

r:\roadway\proj\Detour\NC12PEA_rdy_det05.dgn

8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-I
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
EXP. DATE:

-DET- CURVE DATA

PI Sta 3152+67.46
Δ = 17° 33' 38.4" (LT)
D = 2° 01' 23.4"
L = 867.98'
T = 437.42'
R = 2,832.00'
e = 4.0%
RUNOFF = 85.20'

NAD 83 / CORS96

MATCHLINE -DET- STA 3139+00 (SHEET 2-H)

MATCHLINE -DET- STA 3152+00 (SHEET 2-J)

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

3140 3145 3150

PC Sta. 3148+30.03

+40.00
170.00

+42.50
74.00

+36.62
74.00'

21.3' TYP.

+58.43

1' PS

EXIST R/W

10' 10' 10' 10'

N 12° 07' 54.6" W

-DET-

8' PS

100.00'

TEMP. CONCRETE BARRIER

30' BST

-L-
NC 12

12"

210'

CLASS A RIP RAP
EST. 1 TN
EST. 5 SY GEOTEXTILE
PLACE AROUND INLET
END OF PIPE

CLASS A RIP RAP
EST. 1 TN
EST. 5 SY GEOTEXTILE

NOTES:
1) INSTALL AFTER EXIST. ROAD IS DECOMISSIONED
2) MAINTAIN WHILE DETOUR IS IN OPERATION.
3) REMOVE AFTER DETOUR IS DECOMISSIONED

SEE SHEET 9 FOR PLAN

-DET-

PI = 3140+29.00
EL = 4.00'
VC = 170'
K = 2401

PI = 3142+44.00
EL = 4.34'
VC = 170'
K = 18275

PI = 3144+59.00
EL = 4.70'
VC = 170'
K = 560

PI = 3146+50.00
EL = 5.60'
VC = 170'
K = 159

PI = 3150+50.00
EL = 3.20'
VC = 204'
K = 115

(+)0.0873%
(+)0.1581%
(+)0.1581%
(+)0.1674%
(+)0.1674%
(+)0.4712%
(+)0.4712%
(−)0.6000%
(−)0.6000%
(+)1.1667%

PROPOSED GRADE

EXISTING GROUND

50 40 30 20 10 0

3139 3140 3141 3142 3143 3144 3145 3146 3147 3148 3149 3150 3151 3152

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8/11/2013

-DET- CURVE DATA			
PI Sta 3152+67.46	PI Sta 3159+66.56	PI Sta 3160+95.24	PI Sta 3164+05.24
Δ = 17° 33' 38.4" (LT)	Δ = 29° 49' 07.6" (RT)	Δ = 29° 12' 15.4" (LT)	Δ = 8° 44' 28.2" (RT)
D = 2° 01' 23.4"	D = 22° 55' 05.9"	D = 22° 55' 05.9"	D = 1° 46' 04.2"
L = 867.98'	L = 130.11'	L = 127.43'	L = 494.45'
T = 437.42'	T = 66.56'	T = 65.13'	T = 247.71'
R = 2,832.00'	R = 250.00'	R = 250.00'	R = 3,241.00'
e = 4.0%	e = 4.0%	e = 4.0%	e = 2.5%
RUNOFF = 85.20'	RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 39.33'

-X1- CURVE DATA		
PI Sta 3157+68.03	PI Sta 3158+97.93	PI Sta 3161+40.11
Δ = 29° 46' 20.5" (RT)	Δ = 29° 46' 19.7" (LT)	Δ = 0° 36' 51.5" (RT)
D = 22° 55' 05.9"	D = 22° 55' 05.9"	D = 1° 46' 04.2"
L = 129.91'	L = 129.91'	L = 34.75'
T = 66.46'	T = 66.45'	T = 17.37'
R = 250.00'	R = 250.00'	R = 3,241.00'
e = 4.0%	e = 4.0%	e = 2.5%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 39.33'

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Charlotte, NC 28208
NC License Number F-0991

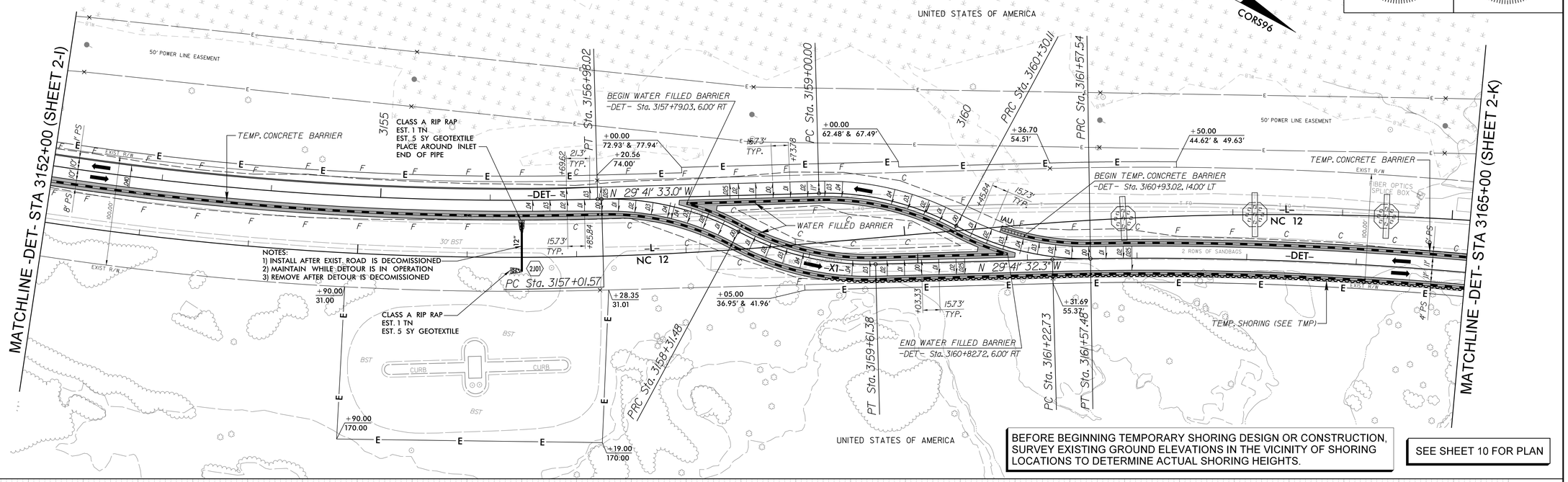
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-J
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

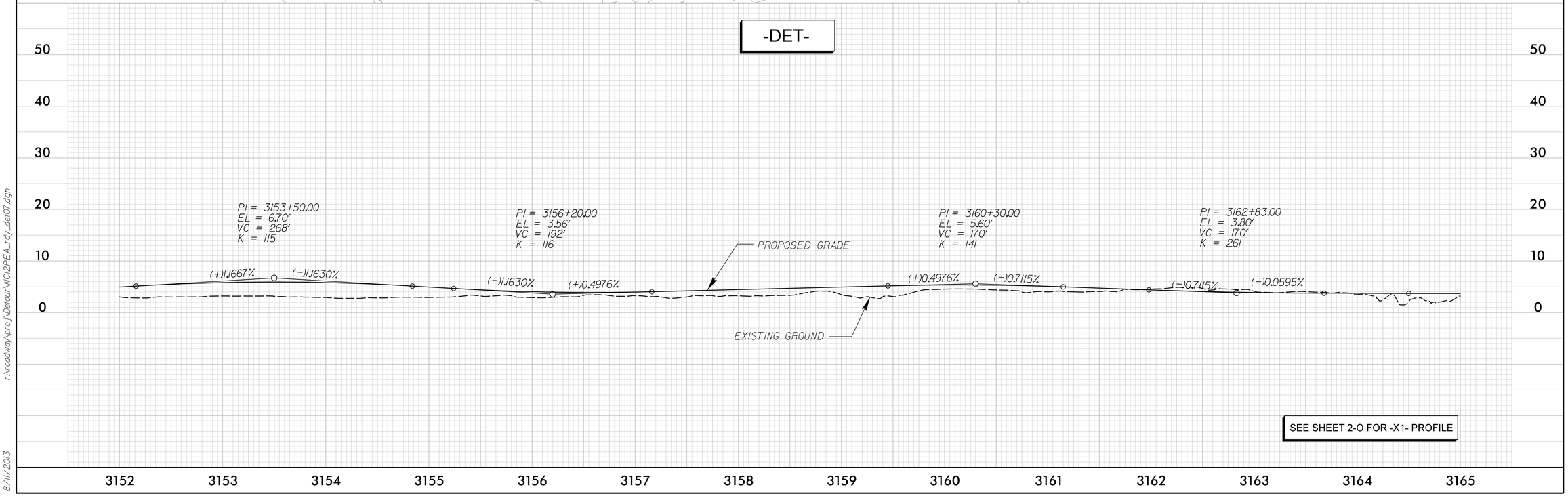
PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / CORS96



BEFORE BEGINNING TEMPORARY SHORING DESIGN OR CONSTRUCTION, SURVEY EXISTING GROUND ELEVATIONS IN THE VICINITY OF SHORING LOCATIONS TO DETERMINE ACTUAL SHORING HEIGHTS.

SEE SHEET 10 FOR PLAN



SEE SHEET 2-O FOR -X1- PROFILE

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NC License Number F-0991

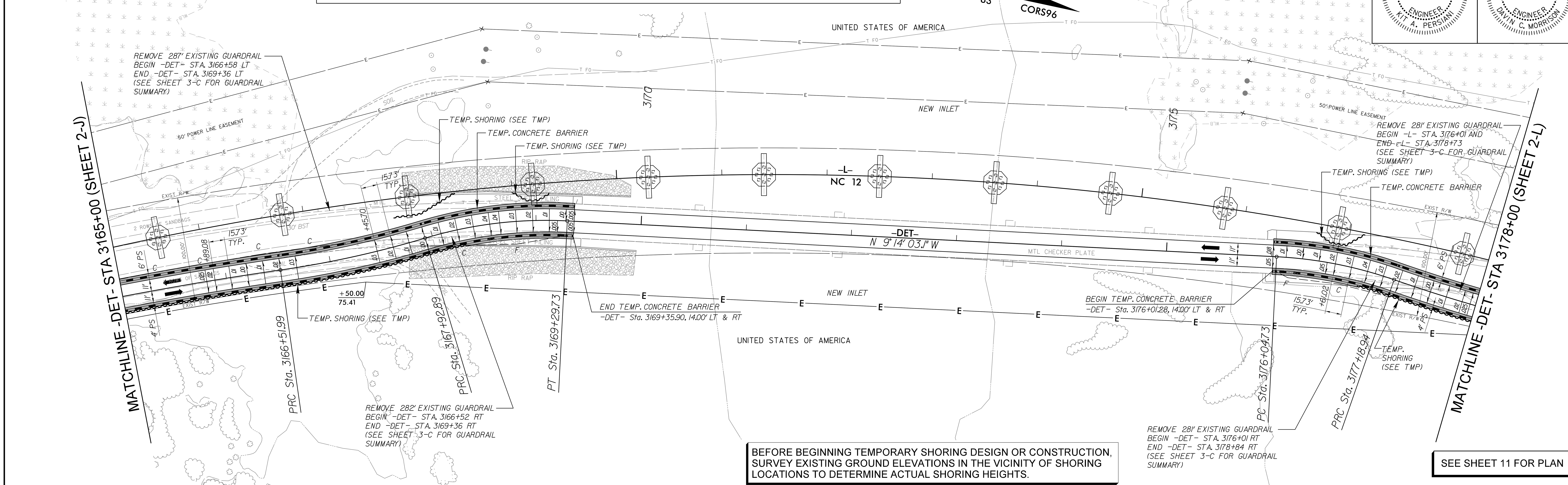
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-K
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 021655 KIT A. PERSIANI	NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038053 DAVIN C. MORRISON

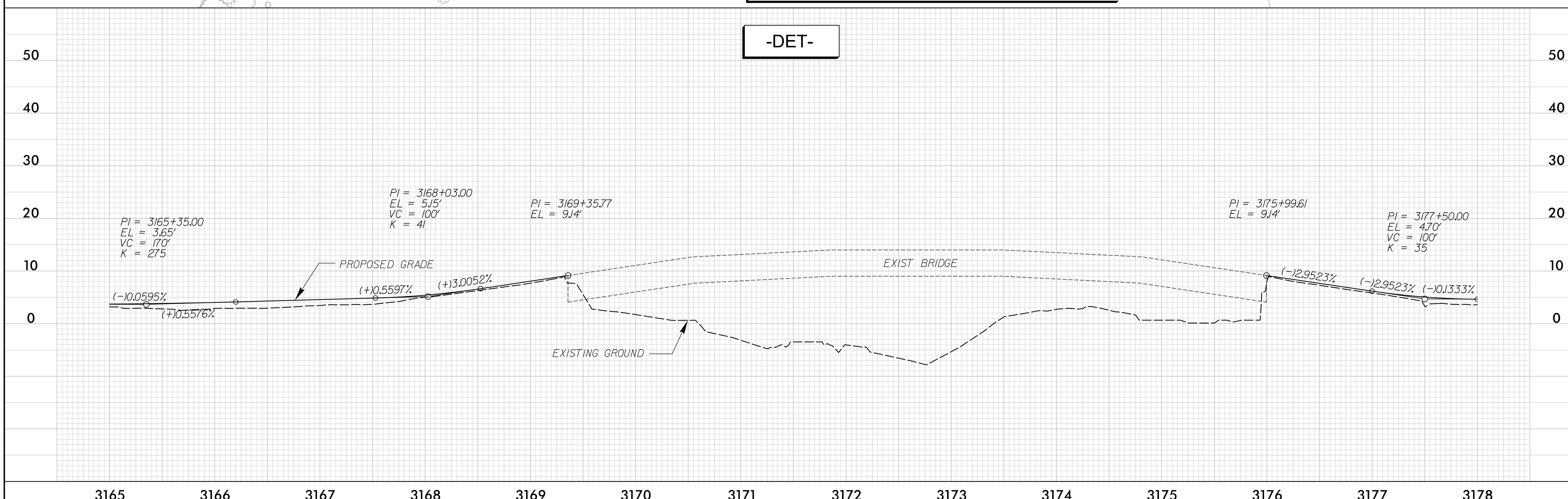
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DET- CURVE DATA

PI Sta 3164+05.24	PI Sta 3167+22.57	PI Sta 3168+61.99	PI Sta 3176+62.23	PI Sta 3178+10.07
Δ = 8° 44′ 28.2″ (RT)	Δ = 8° 29′ 52.9″ (LT)	Δ = 19° 36′ 02.3″ (RT)	Δ = 16° 21′ 34.5″ (RT)	Δ = 6° 57′ 10.3″ (LT)
D = 1° 46′ 04.2″	D = 6° 01′ 52.1″	D = 14° 19′ 26.2″	D = 14° 19′ 26.2″	D = 3° 49′ 11.0″
L = 494.45′	L = 140.90′	L = 136.84′	L = 114.21′	L = 182.03′
T = 247.71′	T = 70.58′	T = 69.09′	T = 57.50′	T = 91.12′
R = 3,241.00′	R = 950.00′	R = 400.00′	R = 400.00′	R = 1,500.00′
e = 2.5%	e = 3.0%	e = 4.0%	e = 4.0%	e = 2.5%
RUNOFF = 39.33′	RUNOFF = 47.19′	RUNOFF = 62.92′	RUNOFF = 62.92′	RUNOFF = 39.33′



NAD 83 / CORS96
UNITED STATES OF AMERICA
REMOVE 287′ EXISTING GUARDRAIL BEGIN -DET- STA. 3166+58 LT END -DET- STA. 3169+36 LT (SEE SHEET 3-C FOR GUARDRAIL SUMMARY)
TEMP. SHORING (SEE TMP)
TEMP. CONCRETE BARRIER
TEMP. SHORING (SEE TMP)
50′ POWER LINE EASEMENT
NEW INLET
-L- NC 12
-DET- N 9° 14′ 03.1″ W
REMOVE 281′ EXISTING GUARDRAIL BEGIN -L- STA. 3176+01 AND END -L- STA. 3178+73 (SEE SHEET 3-C FOR GUARDRAIL SUMMARY)
MATCHLINE -DET- STA 3165+00 (SHEET 2-J)
MATCHLINE -DET- STA 3178+00 (SHEET 2-L)
PRC Sta. 3166+51.99
PRC Sta. 3167+92.89
PT Sta. 3169+29.73
TEMP. SHORING (SEE TMP)
END TEMP. CONCRETE BARRIER -DET- Sta. 3169+35.90, 14.00′ LT & RT
BEGIN TEMP. CONCRETE BARRIER -DET- Sta. 3176+01.28, 14.00′ LT & RT
PC Sta. 3176+04.73
PRC Sta. 3177+18.94
REMOVE 282′ EXISTING GUARDRAIL BEGIN -DET- STA. 3166+52 RT END -DET- STA. 3169+36 RT (SEE SHEET 3-C FOR GUARDRAIL SUMMARY)
REMOVE 281′ EXISTING GUARDRAIL BEGIN -DET- STA. 3176+01 RT END -DET- STA. 3178+84 RT (SEE SHEET 3-C FOR GUARDRAIL SUMMARY)
BEFORE BEGINNING TEMPORARY SHORING DESIGN OR CONSTRUCTION, SURVEY EXISTING GROUND ELEVATIONS IN THE VICINITY OF SHORING LOCATIONS TO DETERMINE ACTUAL SHORING HEIGHTS.
SEE SHEET 11 FOR PLAN



-DET-
50
40
30
20
10
0
PI = 3165+35.00 EL = 3.65′ VC = 170′ K = 275
PI = 3168+03.00 EL = 5.15′ VC = 100′ K = 41
PI = 3169+35.77 EL = 9.14′
PI = 3175+99.61 EL = 9.14′
PI = 3177+50.00 EL = 4.70′ VC = 100′ K = 35
PROPOSED GRADE
EXIST BRIDGE
EXISTING GROUND
(−)0.0595%
(+)0.5576%
(+)0.5597%
(+)3.0052%
(−)2.9523%
(−)2.9523%
(−)0.1333%
3165
3166
3167
3168
3169
3170
3171
3172
3173
3174
3175
3176
3177
3178

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8/11/2013

-DET- CURVE DATA			
PI Sta 3178+10.07	PI Sta 3180+24.82	PI Sta 3181+53.90	PI Sta 3185+80.79
Δ = 6° 57' 10.3" (LT)	Δ = 29° 47' 20.0" (LT)	Δ = 29° 24' 17.8" (RT)	Δ = 14° 39' 21.0" (LT)
D = 3° 49' 11.0"	D = 22° 55' 05.9"	D = 22° 55' 05.9"	D = 2° 01' 23.4"
L = 182.03'	L = 129.98'	L = 128.30'	L = 724.40'
T = 91.12'	T = 66.49'	T = 65.60'	T = 364.19'
R = 1,500.00'	R = 250.00'	R = 250.00'	R = 2,832.00'
e = 2.5%	e = 4.0%	e = 4.0%	e = 4.0%
RUNOFF = 39.33'	RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 85.20'

-X2- CURVE DATA	
PI Sta 3183+22.26	PI Sta 3184+55.07
Δ = 33° 49' 43.7" (LT)	Δ = 27° 31' 22.1" (RT)
D = 22° 55' 05.9"	D = 22° 55' 05.9"
L = 147.61'	L = 120.09'
T = 76.02'	T = 61.23'
R = 250.00'	R = 250.00'
e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'

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PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-L
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: SEAL 026655 — ENGINEER KIT A. PERSIANI
HYDRAULICS ENGINEER: SEAL 038053 — ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT TO BE USED FOR CONSTRUCTION

NAD 83 | CORS96

MATCHLINE -DET- STA 3178+00 (SHEET 2-K)

MATCHLINE -DET- STA 3191+00 (SHEET 2-M)

END TEMP. CONCRETE BARRIER
-DET- Sta. 3180+25.44, 14.00' LT

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

PRC Sta. 3180+88.30

PT Sta. 3179+00.97

PC Sta. 3179+58.32

PRC Sta. 3182+46.80

PC Sta. 3182+46.24

PRC Sta. 3183+93.84

PT Sta. 3185+13.93

3180

3185

3190

TEMP. CONCRETE BARRIER

TEMP. SHORING (SEE TMP)

15.73' TYP. ROWS OF SANDBAGS

FIBER OR HOG

END WATER FILLED BARRIER
-DET- Sta. 3184+35.14, 6.00' RT

BEGIN WATER FILLED BARRIER
-DET- Sta. 3180+35.17, 6.00' RT

WATER FILLED BARRIER

-DET-

-X2-

N 0° 10' 21.1" E

N 14° 52' 02.1" W

NC 12

REMOVE AND RESET GATE

GRADE AREA TO REMAIN OPEN FOR ACCESS

GATE

TEMP. CONCRETE BARRIER

CLASS A RIP RAP
EST. 1 TN
EST. 5 SY GEOTEXTILE
PLACE AROUND INLET
END OF PIPE

NOTES:
1) INSTALL AFTER EXIST. ROAD IS DECOMISSIONED
2) MAINTAIN WHILE DETOUR IS IN OPERATION
3) REMOVE AFTER DETOUR IS DECOMISSIONED

CLASS A RIP RAP
EST. 1 TN
EST. 5 SY GEOTEXTILE

BEFORE BEGINNING TEMPORARY SHORING DESIGN OR CONSTRUCTION, SURVEY EXISTING GROUND ELEVATIONS IN THE VICINITY OF SHORING LOCATIONS TO DETERMINE ACTUAL SHORING HEIGHTS.

SEE SHEET 12 FOR PLAN

-DET-

PI = 3179+00.00
EL = 4.50'
VC = 100'
K = 86

PI = 3180+65.00
EL = 6.20'
VC = 170'
K = 101

PI = 3182+65.00
EL = 4.90'
VC = 170'
K = 179

PI = 3184+59.00
EL = 5.48'
VC = 170'
K = 239

PI = 3186+73.00
EL = 4.60'
VC = 234'
K = 733

PROPOSED GRADE

(−)0.1333%
(+)1.0303%
(+)1.0303%
(−)0.6500%
(−)0.6500%
(+)0.2990%
(−)0.4412%
(−)0.4412%
(−)0.0920%

50 40 30 20 10 0

3178 3179 3180 3181 3182 3183 3184 3185 3186 3187 3188 3189 3190 3191

SEE SHEET 2-P FOR -X2- PROFILE

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8/11/2013

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Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-M
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / CORS96

MATCHLINE -DET- STA 3191+00 (SHEET 2-L)

MATCHLINE -DET- STA 3204+00 (SHEET 2-N)

UNITED STATES OF AMERICA

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

50' POWER LINE EASEMENT

3195

3200

PC Sta. 3203+19.07

+56.10
67.52'

EXIST R/W

EXIST R/W

EXIST R/W

EXIST R/W

-DET-

N 14° 52' 02.1" W

TEMP. CONCRETE BARRIER

30' BST

-L-
NC 12

12"Ø

2M01

CLASS A RIP RAP
EST. 1 TN
EST. 5 SY GEOTEXTLE
PLACE AROUND INLET
END OF PIPE

NOTES:
1) INSTALL AFTER EXIST. ROAD IS DECOMMISSIONED
2) MAINTAIN WHILE DETOUR IS IN OPERATION
3) REMOVE AFTER DETOUR IS DECOMMISSIONED

CLASS A RIP RAP
EST. 1 TN
EST. 5 SY GEOTEXTLE

+50.00
32.92' & 37.93'

+49.86
42.30'

+80.00
39.11' & 44.12'

-DET- CURVE DATA

PI Sta. 3204+79.61
Δ = 1° 36' 02.2" (RT)
D = 0° 29' 54.7"
L = 321.07'
T = 160.55'
R = 11,493.00'
e = 2.5%
RUNOFF = 53.25'

SEE SHEET 13 FOR PLAN

-DET-

PI = 3193+25.00
EL = 4.00'
VC = 176'
K = 1913

PI = 3197+30.00
EL = 4.00'
VC = 170'
K = 2890

PI = 3199+00.00
EL = 4.10'
VC = 170'
K = 1720

PI = 3204+00.00
EL = 3.90'
VC = 170'
K = 218

(-)0.0920%

(+)0.0008%

(+)0.0000%

(+)0.0588%

(+)0.0588%

(-)0.0400%

(-)0.0400%

PROPOSED GRADE

EXISTING GROUND

50
40
30
20
10
0

3191 3192 3193 3194 3195 3196 3197 3198 3199 3200 3201 3202 3203 3204

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-N
R/W SHEET NO.	

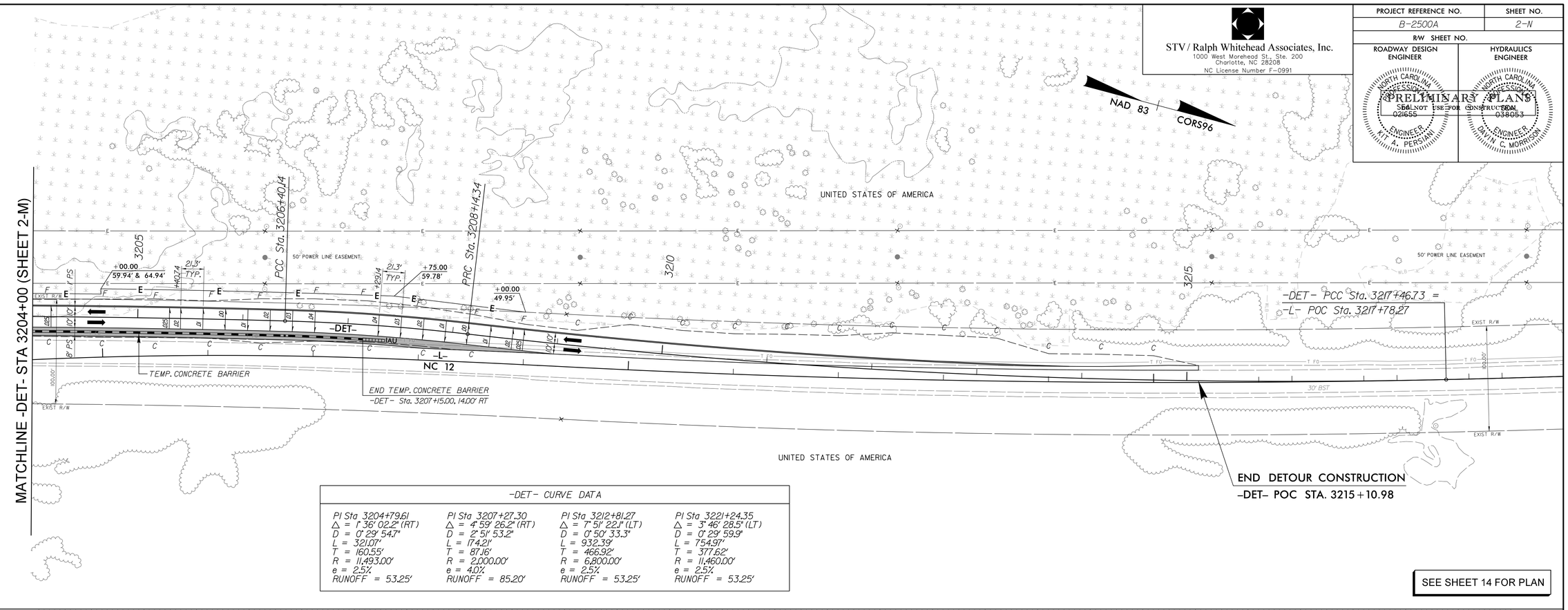
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 | CORS96

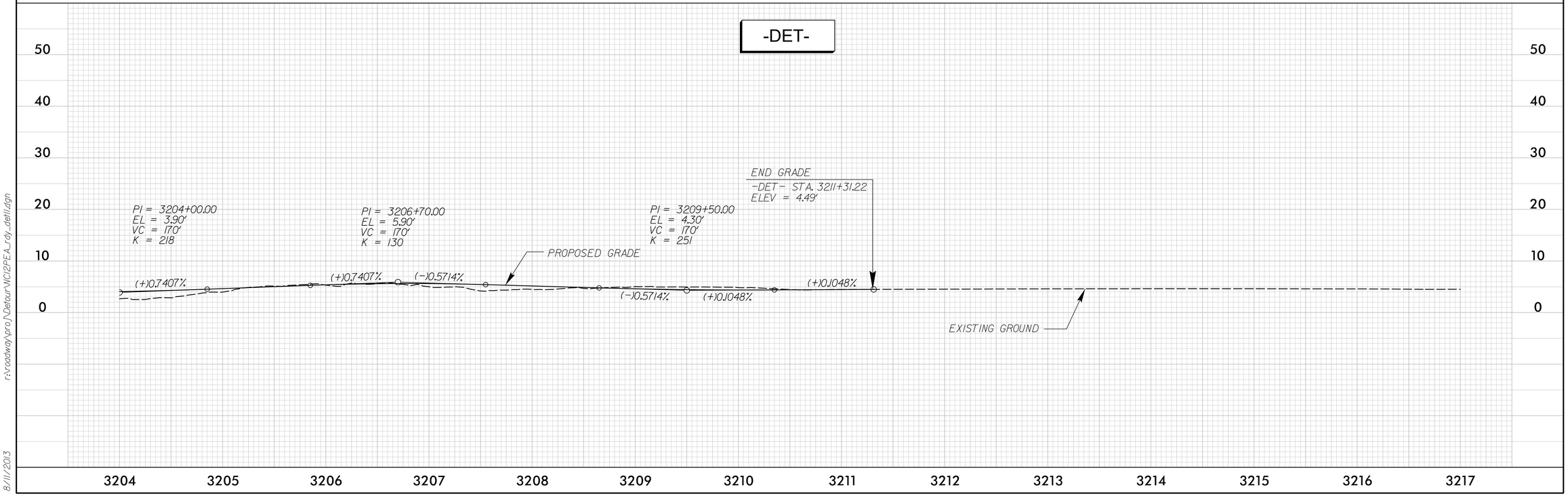
MATCHLINE -DET- STA 3204+00 (SHEET 2-M)



-DET- CURVE DATA

PI Sta 3204+79.61	PI Sta 3207+27.30	PI Sta 3212+81.27	PI Sta 3221+24.35
△ = 1° 36' 02.2" (RT)	△ = 4° 59' 26.2" (RT)	△ = 7° 51' 22.1" (LT)	△ = 3° 46' 28.5" (LT)
D = 0° 29' 54.7"	D = 2° 51' 53.2'	D = 0° 50' 33.3"	D = 0° 29' 59.9"
L = 321.07'	L = 174.21'	L = 932.39'	L = 754.97'
T = 160.55'	T = 87.16'	T = 466.92'	T = 377.62'
R = 11,493.00'	R = 2,000.00'	R = 6,800.00'	R = 11,460.00'
e = 2.5%	e = 4.0%	e = 2.5%	e = 2.5%
RUNOFF = 53.25'	RUNOFF = 85.20'	RUNOFF = 53.25'	RUNOFF = 53.25'

SEE SHEET 14 FOR PLAN



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8/11/2013

-X1- CURVE DATA		
PI Sta 3157+68.03	PI Sta 3158+97.93	PI Sta 3161+40.11
△ = 29° 46' 20.5" (RT)	△ = 29° 46' 19.7" (LT)	△ = 0° 36' 51.5" (RT)
D = 22° 55' 05.9"	D = 22° 55' 05.9"	D = 1° 46' 04.2"
L = 129.91'	L = 129.91'	L = 34.75'
T = 66.46'	T = 66.45'	T = 17.37'
R = 250.00'	R = 250.00'	R = 3,241.00'
e = 4.0%	e = 4.0%	e = 2.5%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 39.33'

-X3- CURVE DATA		
PI Sta 3161+29.70	PI Sta 3162+03.42	PI Sta 3163+04.38
△ = 0° 38' 28.4" (RT)	△ = 40° 24' 44.6" (RT)	△ = 37° 07' 27.4" (LT)
D = 1° 43' 57.2"	D = 38° 11' 49.9"	D = 38° 11' 49.9"
L = 37.01'	L = 105.80'	L = 97.19'
T = 18.51'	T = 55.21'	T = 50.37'
R = 3,307.00'	R = 150.00'	R = 150.00'
e = 4.0%	e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 62.92'

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Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-0
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

UNITED STATES OF AMERICA

NAD 83 / CORS96

BEGIN WATER FILLED BARRIER
-X1- Sta. 3157+78.42, 6.00' LT

TEMP. CONCRETE BARRIER

21.3' TYP.

+69.62

POT Sta. 3159+00.00

PC Sta. 3161+11.20

PCC Sta. 3161+48.21

15.73' TYP.

+80.35

-X3-

-DET-

N 29° 41' 33.0" W

WATER FILLED BARRIER

15.73' TYP.

+85.84

-L-
NC 12

PC Sta. 3157+01.57

N 29° 41' 32.3" W

-X1-

+03.33

15.73' TYP.

PRC Sta. 3158+31.48

PT Sta. 3159+61.38

PC Sta. 3161+22.73

PT Sta. 3161+57.48

END WATER FILLED BARRIER
-X3- Sta. 3162+93.32, 6.00' RT

PRC Sta. 3162+54.01

BEGIN TEMP. CONCRETE BARRIER
-X3- Sta. 3163+00.52, 14.00' LT

TEMP. SHORING (SEE TMP)

PT Sta. 3163+51.20

TEMP. SHORING (SEE TMP)

50' POWER LINE EASEMENT

EXIST. R/W

30' BST

FIBER OPTICS SPLICE BOX

2 ROWS OF SANDBAGS

SOIL

RIP RAP

BST

CURB

-X1-

BEGIN GRADE
-X1- STA. 3157+01.57
ELEV = 3.97'

PI = 3158+80.00
EL = 5.29'
VC = 80'
K = 63

PI = 3160+00.00
EL = 4.66'
VC = 80'
K = 56

PI = 3160+80.00
EL = 5.39'
VC = 80'
K = 44

END GRADE
-X1- STA. 3161+57.48
ELEV = 4.69'

PROPOSED GRADE

(+)0.7406%

(−)0.5222%

(+)0.9032%

(−)0.9000%

EXISTING GROUND

-X3-

BEGIN GRADE
-X3- STA. 3159+00.00
ELEV = 4.95'

PI = 3159+90.00
EL = 5.90'
VC = 75'
K = 18

PI = 3160+80.00
EL = 3.20'
VC = 100'
K = 26

PI = 3162+40.00
EL = 4.60'
VC = 120'
K = 74

END GRADE
-X3- STA. 3163+51.20
ELEV = 3.77'

(+)11.0556%

(−)3.0000%

(+)0.8750%

(−)0.7464%

EXISTING GROUND

PROPOSED GRADE

50 40 30 20 10 0

3157 3158 3159 3160 3161 3162

3159 3160 3161 3162 3163 3164

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8/11/2013

-X4- CURVE DATA		
PI Sta 3179+01.82	PI Sta 3180+04.90	PI Sta 3182+10.35
△ = 40° 33' 00.6" (LT)	△ = 38° 27' 57.9" (RT)	△ = 0° 23' 02.3" (LT)
D = 38° 11' 49.9"	D = 38° 11' 49.9"	D = 2° 01' 23.4"
L = 106.16'	L = 100.70'	L = 18.98'
T = 55.41'	T = 52.33'	T = 9.49'
R = 150.00'	R = 150.00'	R = 2,832.00'
e = 4.0%	e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 62.92'

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-P
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026155 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 CORS96

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

END TEMP. CONCRETE BARRIER
-X4- Sta. 3179+00.61, 14.00' LT

TEMP. SHORING (SEE TMP)

TEMP. CONCRETE BARRIER

PRC Sta. 3179+52.57

PT Sta. 3180+53.27

PC Sta. 3182+00.86

PT Sta. 3182+19.84

END WATER FILLED BARRIER
-X2- Sta. 3184+40.29, 6.00' LT

-L- NC 12

-DET-

-X4- N 0° 10' 21.1" E

-X2- N 0° 10' 21.1" E

MTL CHECKER PLATE

EXIST R/W

100.00'

+90.00
42.22'

16.88' TYP.

+00.00
65.48'

+75.00
68.83'

+25.00
60.02'

21.3' TYP.

+38.23

+50.00
71.27'

15.73' TYP.

+49.02

+53.13
70.19'

TEMP. SHORING (SEE TMP)

PC Sta. 3178+46.41

PC Sta. 3179+58.32

BEGIN WATER FILLED BARRIER
-X4- Sta. 3179+08.81, 6.00' RT

30' WATER FILLED BARRIER

+19.67
50.09'

+51.48

15.79' TYP.

+50.00
42.78' & 47.78'

PC Sta. 3182+46.24

PRC Sta. 3182+93.84

PT Sta. 3185+13.93

UNITED STATES OF AMERICA

TEMP. CONCRETE BARRIER

-X2- CURVE DATA	
PI Sta 3183+22.26	PI Sta 3184+55.07
△ = 33° 49' 43.7" (LT)	△ = 27° 31' 22.1" (RT)
D = 22° 55' 05.9"	D = 22° 55' 05.9"
L = 147.61'	L = 120.09'
T = 76.02'	T = 61.23'
R = 250.00'	R = 250.00'
e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'

-X2-

BEGIN GRADE
-X2- STA. 3179+58.32
ELEV = 5.10'

PI = 3180+84.00
EL = 6.39'
VC = 150'
K = 116

(+)1.0264%

(−)0.2652%

PROPOSED GRADE

END GRADE
-X2- STA. 3185+13.93
ELEV = 5.25'

EXISTING GROUND

50
40
30
20
10
0

3179 3180 3181 3182 3183 3184 3185

-X4-

BEGIN GRADE
-X4- STA. 3178+46.41
ELEV = 4.57'

PI = 3179+05.00
EL = 4.67'
VC = 100'
K = 283

(+)0.1707%

PROPOSED GRADE

(+)0.5243%

PI = 3181+11.00
EL = 5.75'
VC = 100'
K = 102

(−)0.4594%

END GRADE
-X4- STA. 3182+19.84
ELEV = 5.25'

EXISTING GROUND

50
40
30
20
10
0

3177 3178 3179 3180 3181 3182 3183

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8/11/2013

-X3- CURVE DATA		
PI Sta 3161+29.70	PI Sta 3162+03.42	PI Sta 3163+04.38
△ = 0° 38' 28.4" (RT)	△ = 40° 24' 44.6" (RT)	△ = 37° 07' 27.4" (LT)
D = 1° 43' 57.2"	D = 38° 11' 49.9"	D = 38° 11' 49.9"
L = 37.01'	L = 105.80'	L = 97.19'
T = 18.51'	T = 55.21'	T = 50.37'
R = 3,307.00'	R = 150.00'	R = 150.00'
e = 4.0%	e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 62.92'

-X5- CURVE DATA	
PI Sta 3160+94.10	PI Sta 3161+94.22
△ = 39° 22' 40.4" (RT)	△ = 37° 21' 26.2" (LT)
D = 38° 11' 49.9"	D = 38° 11' 49.9"
L = 103.09'	L = 97.80'
T = 53.68'	T = 50.71'
R = 150.00'	R = 150.00'
e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-Q
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / CORS96

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

BEGIN WATER FILLED BARRIER
-X3- Sta. 3161+00.46, 6.00' RT

WATER FILLED BARRIER

BEGIN TEMP. CONCRETE BARRIER
-X3- Sta. 3163+00.52, 14.00' LT

TEMP. CONCRETE BARRIER

TEMP. SHORING (SEE TMP)

POT Sta. 3159+00.00

PC Sta. 3161+11.20

PCC Sta. 3161+48.21

PRC Sta. 3162+54.01

PRC Sta. 3161+43.51

PT Sta. 3162+41.31

PT Sta. 3163+51.20

PC Sta. 3160+40.42

END WATER FILLED BARRIER
-X3- Sta. 3162+93.32, 6.00' RT

15.73' TYP.

15.78' TYP.

FIBER OPTICS SPLICE BOX

N 29° 41' 33.0" W

-X5-

-DET-

-L- NC 12

2 ROWS OF SANDBAGS

30' BST

EXIST. R/W

CURB

BST

SOIL

RIP RAP

STEEL PILING

-X3-

BEGIN GRADE	PI = 3159+90.00	PI = 3160+80.00	PI = 3162+40.00	END GRADE
-X3- STA. 3159+00.00	EL = 5.90'	EL = 3.20'	EL = 4.60'	-X3- STA. 3163+51.20
ELEV = 4.95'	VC = 75'	VC = 100'	VC = 120'	ELEV = 3.77'
	K = 18	K = 26	K = 74	

(+)1.0556% (−)3.0000% (+)0.8750% (−)0.7464%

EXISTING GROUND

PROPOSED GRADE

-X5-

BEGIN GRADE	PI = 3159+90.00	PI = 3160+85.00	PI = 3161+85.00	END GRADE
-X5- STA. 3159+00.00	EL = 5.90'	EL = 3.30'	EL = 4.78'	-X5- STA. 3162+37.07
ELEV = 4.95'	VC = 75'	VC = 110'	VC = 75'	ELEV = 4.16'
	K = 20	K = 26	K = 28	

(+)1.0556% (−)2.7368% (+)1.4764% (−)1.1838%

PROPOSED GRADE

EXISTING GROUND

50 40 30 20 10 0

3159 3160 3161 3162 3163 3164

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8/11/2013

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-R
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026155 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT TO BE USED FOR CONSTRUCTION

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

NAD 83 CORS96

-X4- CURVE DATA

PI Sta 3179+01.82	PI Sta 3180+04.90	PI Sta 3182+10.35
Δ = 40° 33' 00.6" (LT)	Δ = 38° 27' 57.9" (RT)	Δ = 0° 23' 02.3" (LT)
D = 38° 11' 49.9"	D = 38° 11' 49.9"	D = 2° 01' 23.4"
L = 106.16'	L = 100.70'	L = 18.98'
T = 55.41'	T = 52.33'	T = 9.49'
R = 150.00'	R = 150.00'	R = 2,832.00'
e = 4.0%	e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 62.92'

-X6- CURVE DATA

PI Sta 3179+39.53	PI Sta 3180+25.72	PI Sta 3181+22.27
Δ = 2° 56' 41.2" (LT)	Δ = 35° 14' 50.2" (LT)	Δ = 38° 11' 31.5" (RT)
D = 3° 49' 11.0"	D = 38° 11' 49.9"	D = 38° 11' 49.9"
L = 77.09'	L = 92.28'	L = 99.99'
T = 38.56'	T = 47.65'	T = 51.93'
R = 1,500.00'	R = 150.00'	R = 150.00'
e = 4.0%	e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 62.92'

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

END TEMP. CONCRETE BARRIER
-X4- Sta. 3179+00.61, 14.00' LT

TEMP. SHORING (SEE TMP)

TEMP. CONCRETE BARRIER

PRC Sta. 3179+52.57

WATER FILLED BARRIER

PT Sta. 3180+53.27

END WATER FILLED BARRIER
-X4- Sta. 3181+10.60, 6.00' RT

PC Sta. 3182+00.86

PT Sta. 3182+19.84

-L- NC 12

-DET-

MTL CHECKER PLATE

EXIST R/W

100.00'

MTL

FIBER OPTICS BOX

WATCH -DET- SUPER

-X4-

N 0° 10' 21.1" E

-X6-

30' BST

TEMP. SHORING (SEE TMP)

PC Sta. 3178+46.41

PC Sta. 3179+00.97

PCC Sta. 3179+78.06

PRC Sta. 3180+70.34

WATER FILLED BARRIER

PT Sta. 3181+70.33

BEGIN WATER FILLED BARRIER
-X4- Sta. 3179+08.81, 6.00' RT

TEMP. CONCRETE BARRIER

UNITED STATES OF AMERICA

-X4-

BEGIN GRADE
-X4- STA. 3178+46.41
ELEV = 4.57'

END GRADE
-X4- STA. 3182+19.84
ELEV = 5.25'

PI = 3179+05.00
EL = 4.67'
VC = 100'
K = 283

PI = 3181+11.00
EL = 5.75'
VC = 100'
K = 102

PROPOSED GRADE

(+)0.5243%

(−)0.4594%

(+)0.1707%

EXISTING GROUND

50
40
30
20
10
0

3177 3178 3179 3180 3181 3182 3183

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8/11/2013

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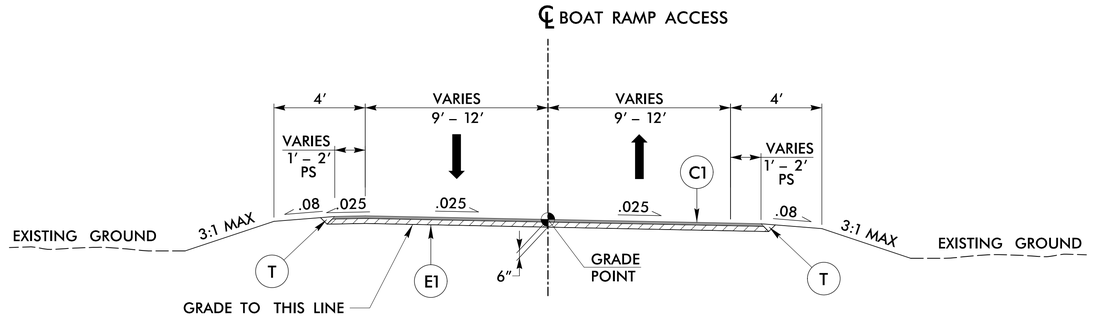
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-U
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

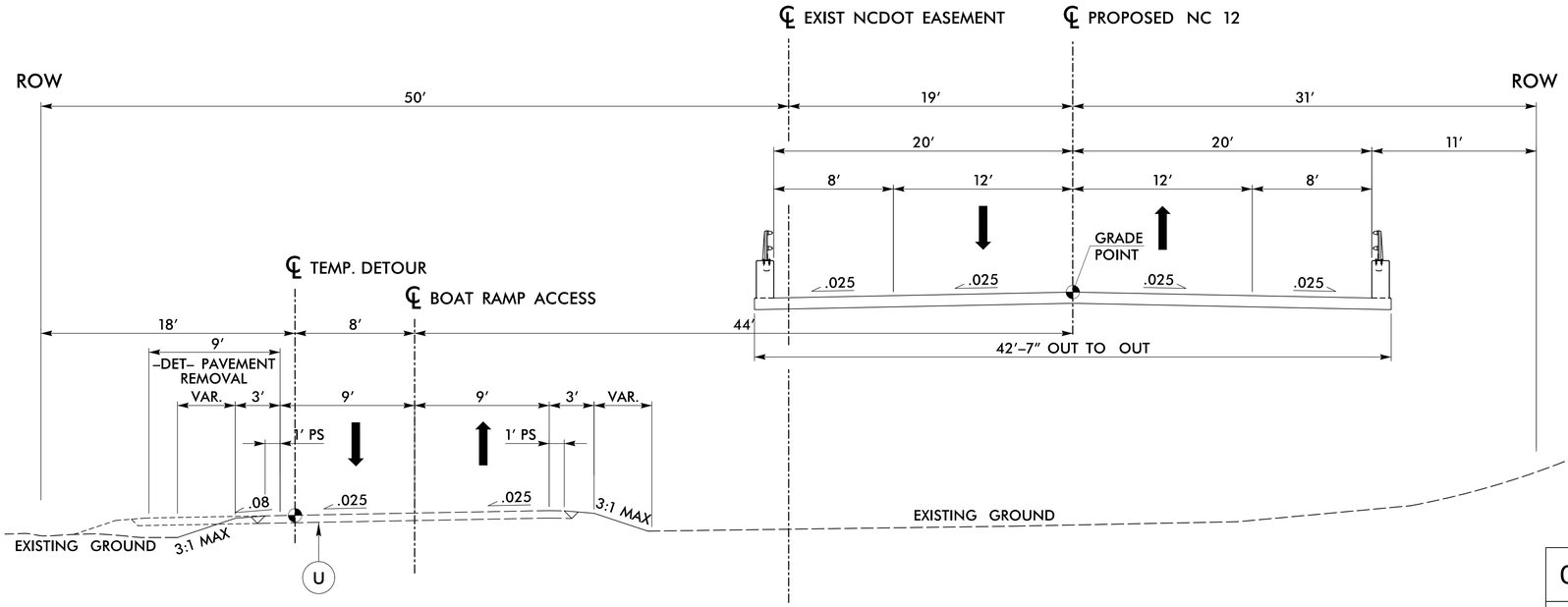
NORTH CAROLINA PROFESSIONAL SEAL 026555 ENGINEER KIT A. PERSIANI

PRELIMINARY PLANS
SEAL NOT USE FOR CONSTRUCTION



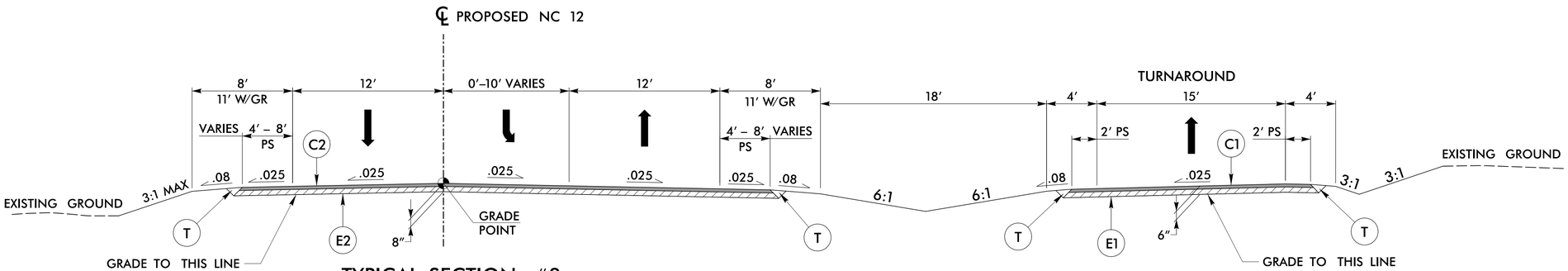
TYPICAL SECTION #1

–ACCESS– STA. 3083+11.33 TO STA. 3087+27.65



TYPICAL SECTION #2

–ACCESS– STA. 3087+27.65 TO STA. 3139+00.00



TYPICAL SECTION #3

–L– STA. 3081+05.21 TO STA. 3083+29.84

C1	2″ S9.5B
C2	3″ S9.5B
C3	VAR. S9.5B
E1	4″ B25.0B
E2	5″ B25.0B
E3	VAR. B25.0B
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSTAIN

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83 / CORS96

UNITED STATES OF AMERICA

-L- PC Sta. 3075+69.74 =
-DET- POT Sta. 3075+66.74

BEGIN TIP PROJECT B-2500A
-L- POC STA. 3076+40.00

50' POWER LINE EASEMENT

EXIST R/W

100.00'

N 13° 01' 28.7" W

30' BST

18" CMP

MATCH EXIST

266.67' TYP.

+66.67

500' TAPER RT

+00.00
49.58' & 54.58'

-DET-

4" PS

2" PS

-L-

PCC Sta. 3081+87.30

100' LT TURN LANE

NC 12

+00.00
50.42

+50.00
82.00

+80.00
81.00

-ACCESS- PC Sta. 3082+95.00 =
-L- POC Sta. 3083+08.16 =

100' BAY TAPER

+64.00
78.00'

38.00
55.50'

+30.00
82.00'

PRC Sta. 3084+58.28

+30.00
49.62

3085

+00.00
63.40'

GRAU-350

PRC Sta. 3086+37.31

+65.98

26.67' TYP.

+45.08

334.80' TAPER RT

+00.00
41.76' & 46.77

15" CL-5 RCP

CLASS A RIP RAP
EST. 2 TN
EST. 7 SY GEOTEXTILE

MATCHLINE -L- STA 3087+00 (SHEET 5)

UNITED STATES OF AMERICA

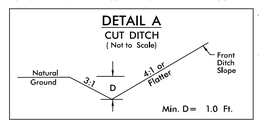
-ACCESS- CURVE DATA

PI Sta 3083+85.78	PI Sta 3085+93.38
Δ = 62° 22' 00.7" (RT)	Δ = 11° 01' 27.6" (LT)
D = 38° 11' 49.9"	D = 4° 05' 33.2"
L = 163.28'	L = 269.37'
T = 90.78'	T = 135.10'
R = 150.00'	R = 1,400.00'

-L- CURVE DATA

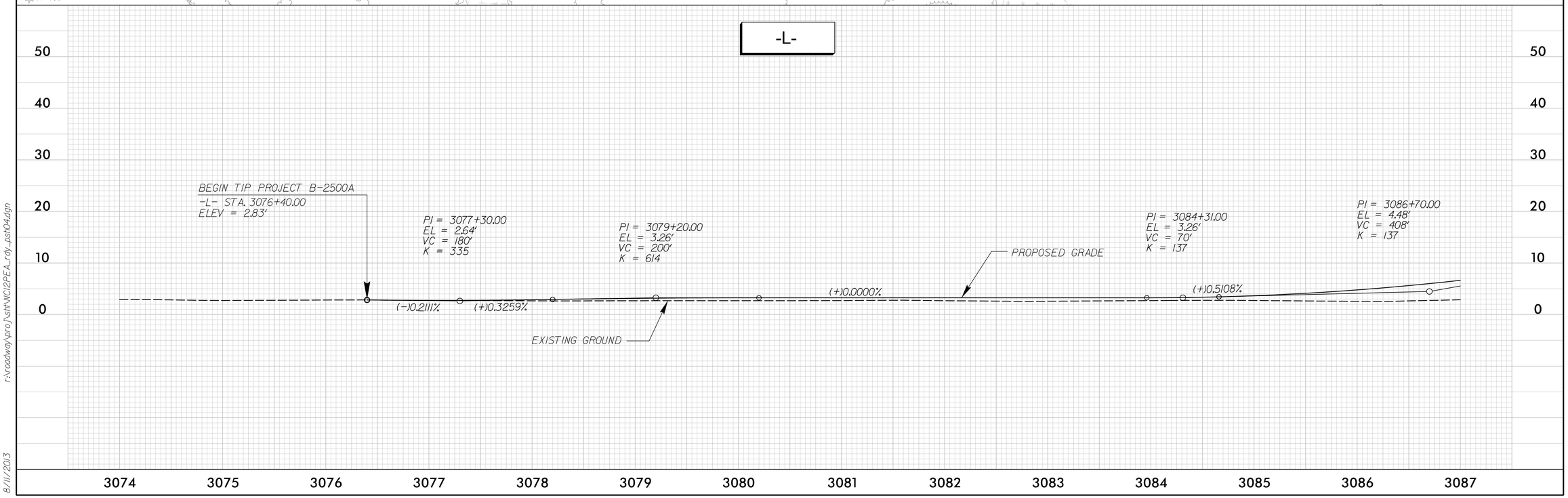
PI Sta 3078+78.75	PI Sta 3084+12.54	PI Sta 3087+67.38
Δ = 5° 26' 37.2" (RT)	Δ = 6° 26' 45.1" (RT)	Δ = 3° 43' 29.5" (LT)
D = 0° 52' 53.3"	D = 1° 25' 56.6"	D = 1° 25' 56.6"
L = 617.56'	L = 450.01'	L = 260.04'
T = 309.01'	T = 225.24'	T = 130.07'
R = 6,500.00'	R = 4,000.00'	R = 4,000.00'
	e = 4.0%	e = 4.0%
	RUNOFF = 107.00'	RUNOFF = 107.00'

DETAIL A
CUT DITCH
(Not to Scale)



FROM STA. 3085+75 TO STA. 3086+97 RT.

SEE SHEET 2-D FOR DETOUR
SEE SHEET 4-A FOR ACCESS DETAIL
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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-ACCESS- (BOAT RAMP) DETAIL

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	4A
R/W SHEET NO.	

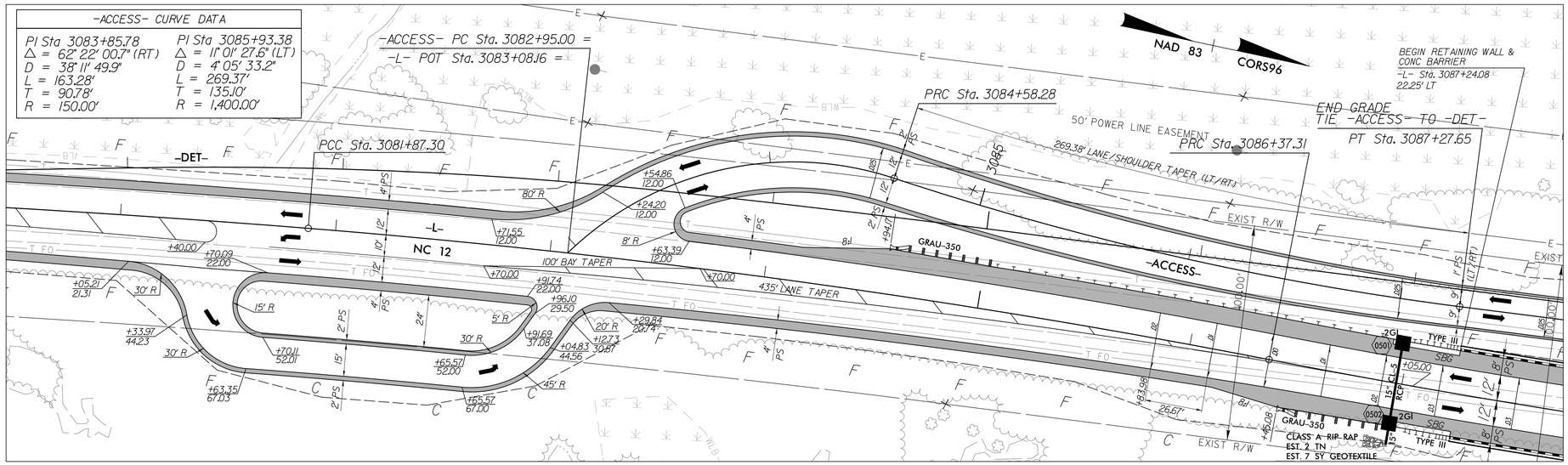
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAN C. MORRISON

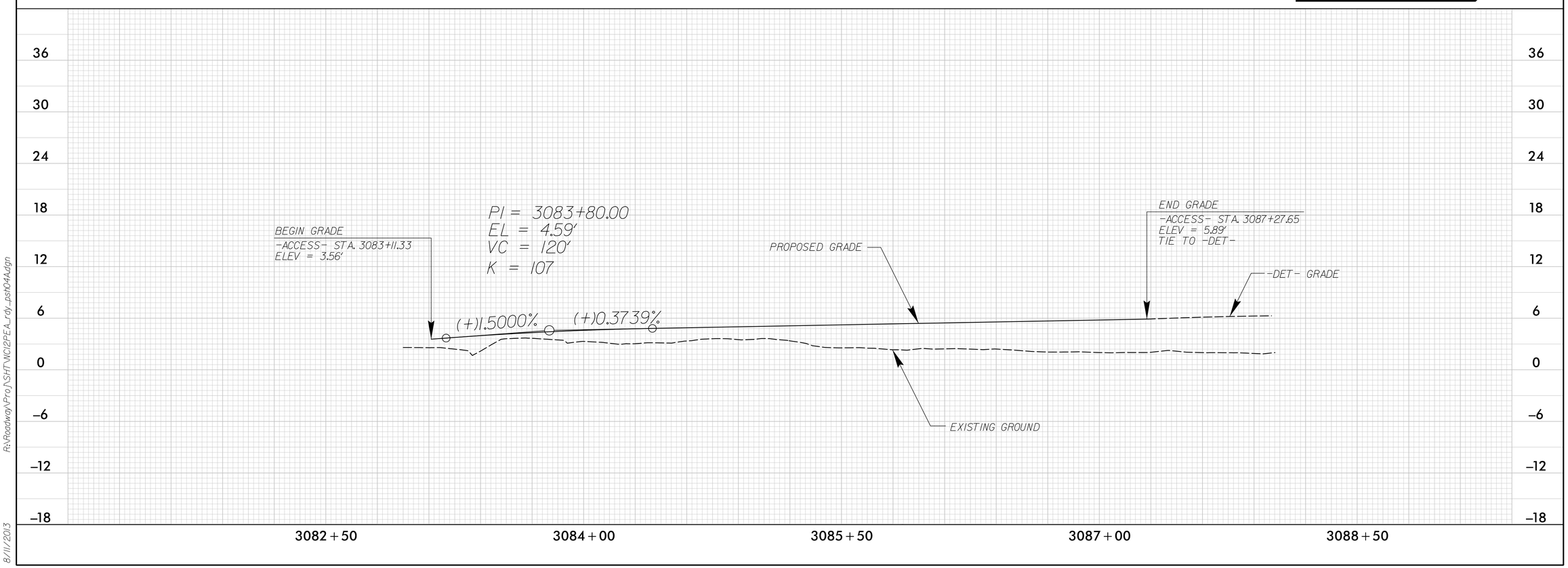
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALE
0 30 60 HORZ.
PLAN

GRAPHIC SCALE
HORZ. 0 50 100
VERT. 0 6 12
PROFILE



SEE SHEET 4 FOR FULL PLAN VIEW



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Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 026155 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

END GRADE
TIE -ACCESS- TO -DET-
PT Sta. 3087+27.65

MATCHLINE -L- STA 3087+00 (SHEET 4)

MATCHLINE -L- STA 3100+00 (SHEET 6)

MATCHLINE THIS SHEET

NAD 83 CORS96

UNITED STATES OF AMERICA

BEGIN APPROACH SLAB
-L- Sta. 3088+76.00

PROPOSED RETAINING WALL AND CONC BARRIER (STRUCTURE PAY ITEM)

+00.00
74.22' BEGIN RETAINING WALL & CONC BARRIER
-L- Sta. 3087+24.08
22.25' LT

PT Sta. 3088+97.35

BEGIN BRIDGE
-L- Sta. 3089+00.00

+00.00
79.00'

3090

3095

50' POWER LINE EASEMENT

+22.00
74.00'

+32.00
74.00'

EXIST R/W

-DET-

N 4° 51' 36.0" W

TYPE III

STRG

-L-
NC 12

20'

+06.65

26.67'
TYP.

+50.00
33.74' & 38.74'
BEGIN RETAINING WALL & CONC BARRIER
-L- Sta. 3087+25.91
22.25' RT

334.80' TAPER RT

8" PS

PROPOSED RETAINING WALL AND CONC BARRIER (STRUCTURE PAY ITEM)

REINFORCED APPROACH FILL (STRUCTURE PAY ITEM)

-L- CURVE DATA

PI Sta 3087+67.38
△ = 3° 43' 29.5" (LT)
D = 1° 25' 56.6"
L = 260.04'
T = 130.07'
R = 4,000.00'
e = 4.0%
RUNOFF = 107.00'

MATCHLINE THIS SHEET

+22.00
840.00'

+32.00
840.00'

SEE SHEET 2-E FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS

-L-

BEGIN BRIDGE
-L- STA. 3089+00.00

PI = 3086+70.00
EL = 4.48'
VC = 408'
K = 137

(+)3.4983%

14.28

PI = 3092+48.00
EL = 24.70'
VC = 530'
K = 152

(+)0.0000%

PROPOSED GRADE

BRIDGE

EXISTING GROUND

50 40 30 20 10 0

3087 3088 3089 3090 3091 3092 3093 3094 3095 3096 3097 3098 3099 3100

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8/11/2013

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Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 CORS96

MATCHLINE -L- STA 3100+00 (SHEET 5)

MATCHLINE -L- STA 3113+00 (SHEET 7)

UNITED STATES OF AMERICA

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

50' POWER LINE EASEMENT

3105

3110

EXIST R/W

EXIST R/W

EXIST R/W

EXIST R/W

1' PS

1' PS

1' PS

1' PS

-DET-

-L-

NC 12

30' BST

N 4° 51' 36.0" W

N 4° 51' 36.0" W

9'

9'

20'

20'

20'

20'

9'

9'

.025

.025

.025

.025

.045

.045

21.3' TYP.

99.48

26.67' TYP.

SEE SHEET 2-F FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS

-L-

PROPOSED GRADE

BRIDGE

EXISTING GROUND

PI = 3111+34.00
EL = 24.70'
VC = 180'
K = 600

(+)0.0000%

(+)0.3002%

50
40
30
20
10
0

3100 3101 3102 3103 3104 3105 3106 3107 3108 3109 3110 3111 3112 3113

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8/11/2013

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	7
R/W SHEET NO.	

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83 / CORS96

-DET- CURVE DATA
PI Sta 3116+15.80
△ = 7° 16' 18.6" (LT)
D = 1° 11' 50.7"
L = 607.30'
T = 304.06'
R = 4,785.00'

-L- CURVE DATA
PI Sta 3116+13.01
△ = 7° 16' 18.6" (LT)
D = 1° 11' 11.4"
L = 612.89'
T = 306.85'
R = 4,829.00'
e = 3.0%
RUNOFF = 80'

MATCHLINE -L- STA 3113+00 (SHEET 6)

MATCHLINE -L- STA 3126+00 (SHEET 8)

PC Sta. 3113+06.16
+06.13
74.00'
+28.62
+32.83
26.67' TYP.
EXIST R/W
1' PS
4" PS
20'
50' POWER LINE EASEMENT
3115
3120
3125
PT Sta. 3119+19.04
+19.07
74.00'
+33.24
21.3' TYP.
-DET-
N 12° 07' 54.6" W
-L-
NC 12
30' BST
+19.04
26.67' TYP.
UNITED STATES OF AMERICA

SEE SHEET 2-G FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS

-L-

PI = 3121+00.00
EL = 27.60'
VC = 180'
K = 225
(+)0.3002%
(-)0.4991%
PROPOSED GRADE
BRIDGE
EXISTING GROUND

50
40
30
20
10
0

3113 3114 3115 3116 3117 3118 3119 3120 3121 3122 3123 3124 3125 3126

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8/11/2013

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	8

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 021655 KIT A. PERSIANI

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038053 GAVIN C. MORRISON

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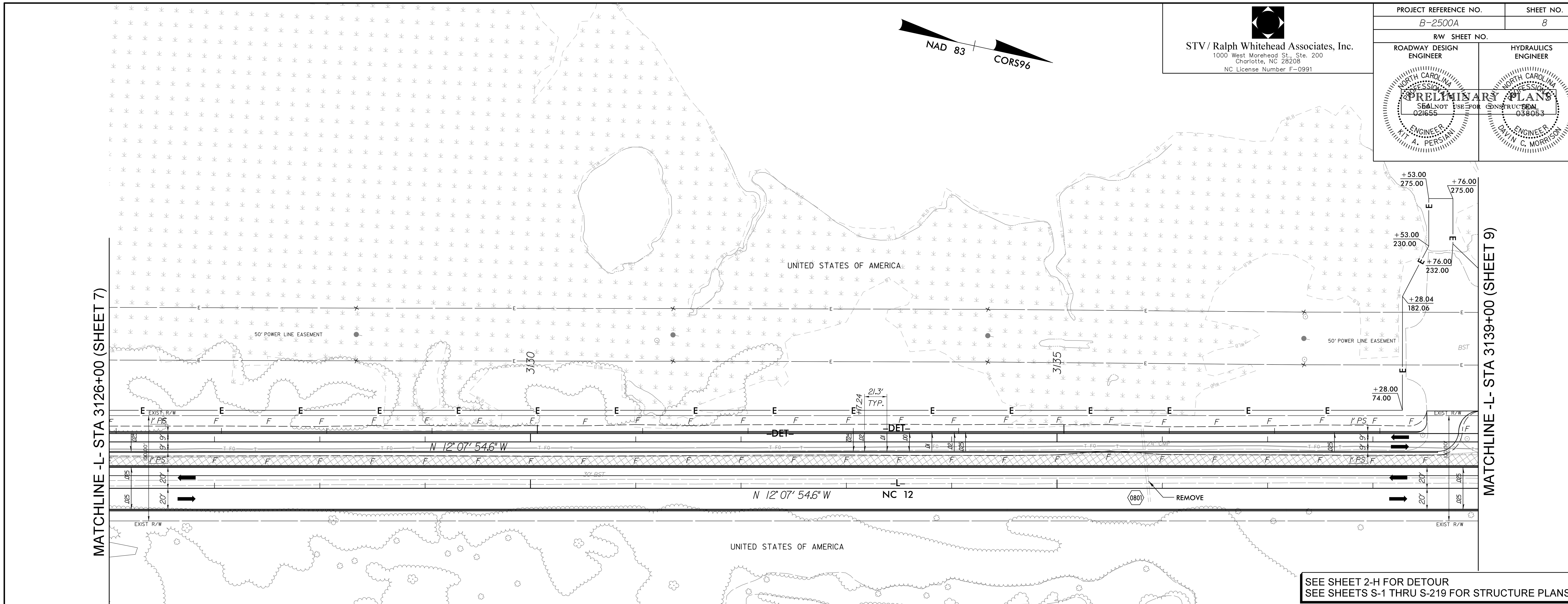
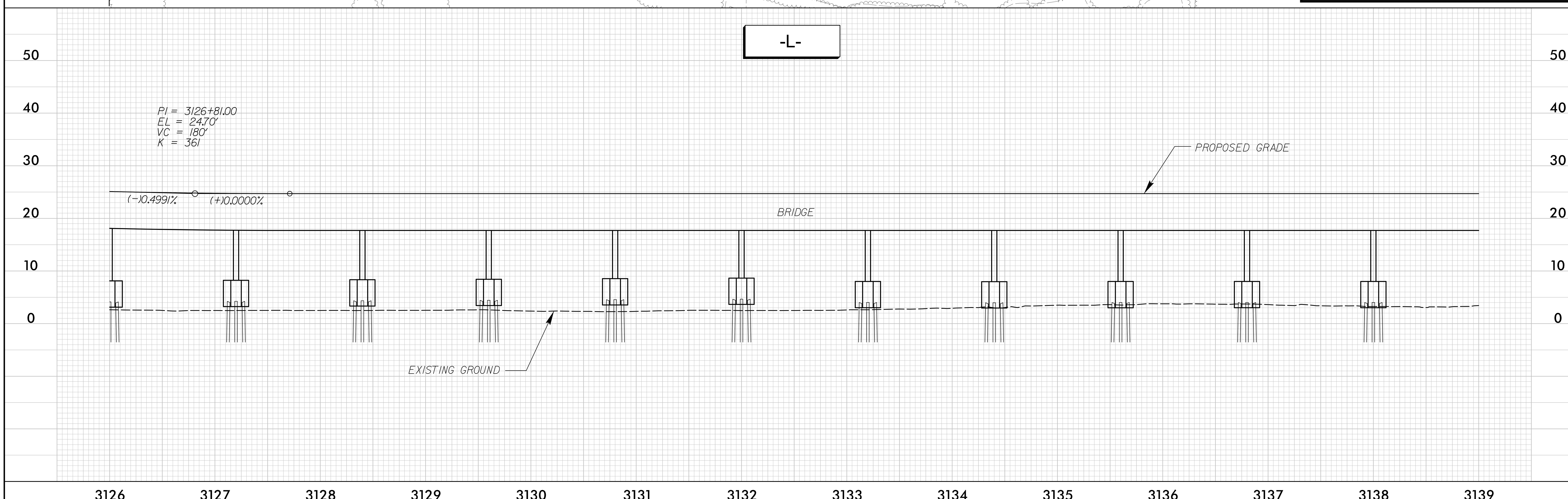
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991



SEE SHEET 2-H FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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8/11/2013

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Charlotte, NC 28208
NC License Number F-0991

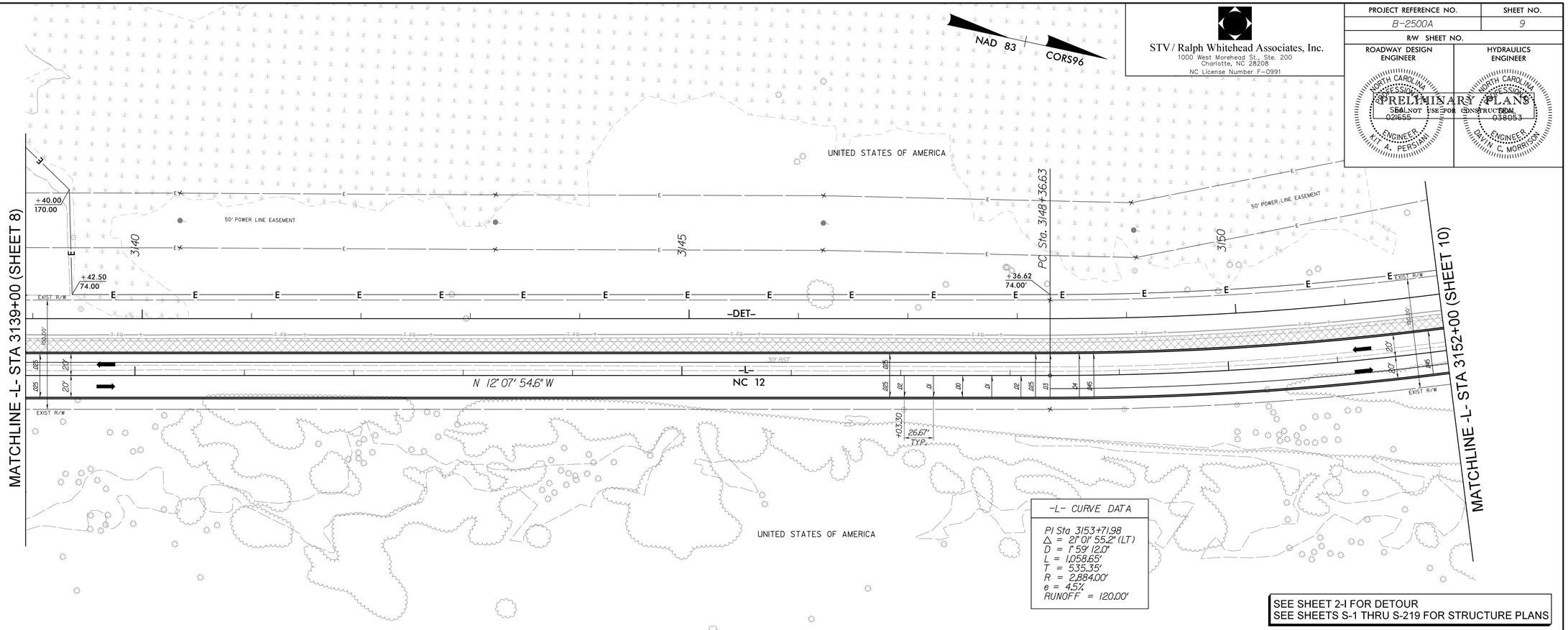
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — SEAL 021655 — ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — SEAL 038053 — ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

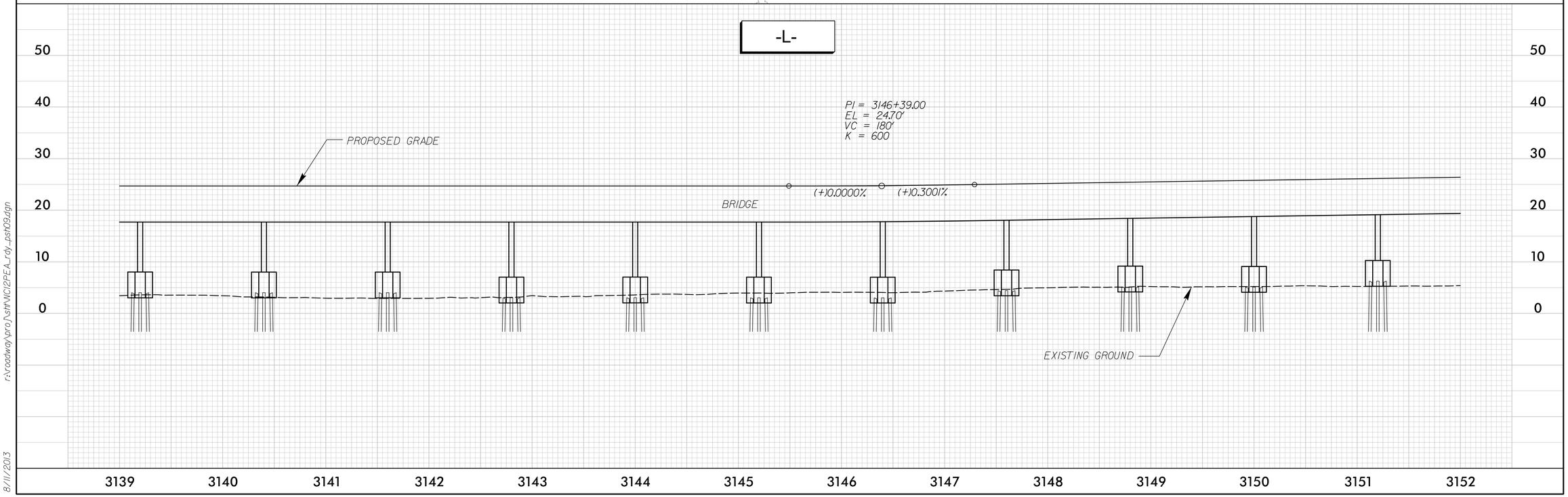
NAD 83 / CORS96



-L- CURVE DATA

PI Sta 3153+71.98
Δ = 21° 01' 55.2" (LT)
D = 1° 59' 12.0"
L = 1,058.65'
T = 535.35'
R = 2,884.00'
e = 4.5%
RUNOFF = 120.00'

SEE SHEET 2-I FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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8/11/2013

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Charlotte, NC 28208
NC License Number F-0991

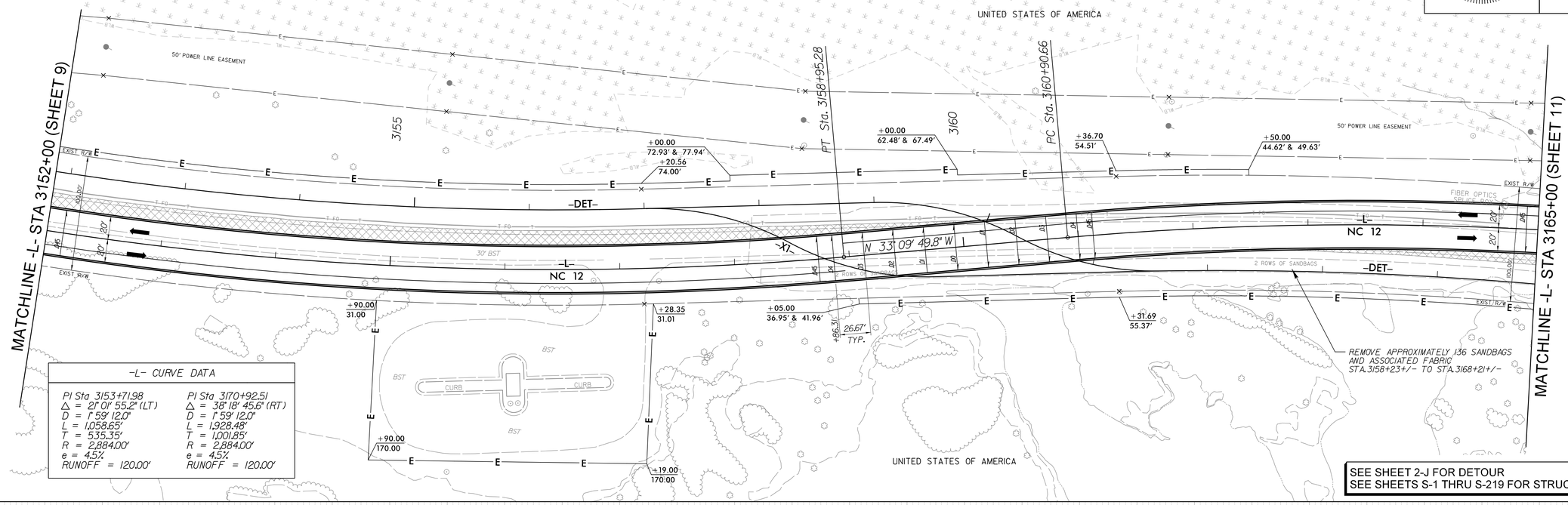
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	10
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 026655 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
SHALL NOT BE USED FOR CONSTRUCTION

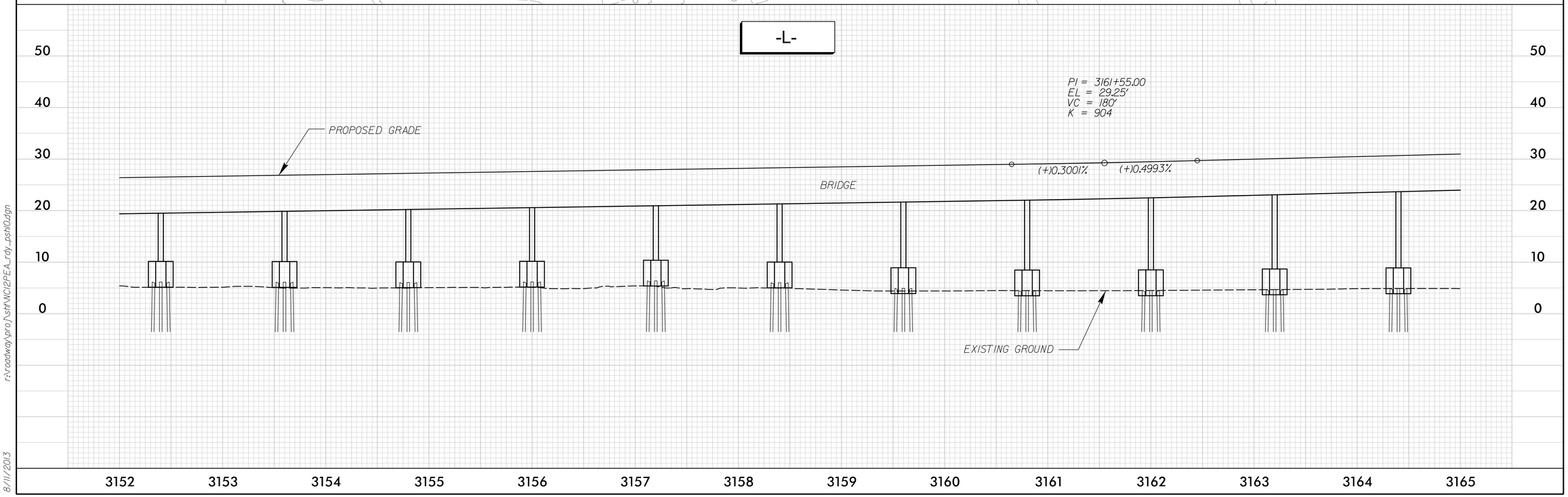
NAD 83 / CORS96



-L- CURVE DATA

PI Sta 3153+71.98	PI Sta 3170+92.51
△ = 21° 01' 55.2" (LT)	△ = 38° 18' 45.6" (RT)
D = 1° 59' 12.0"	D = 1° 59' 12.0"
L = 1,058.65'	L = 1,928.48'
T = 535.35'	T = 1,001.85'
R = 2,884.00'	R = 2,884.00'
e = 4.5%	e = 4.5%
RUNOFF = 120.00'	RUNOFF = 120.00'

SEE SHEET 2-J FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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8/11/2013

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	11
R/W SHEET NO.	

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

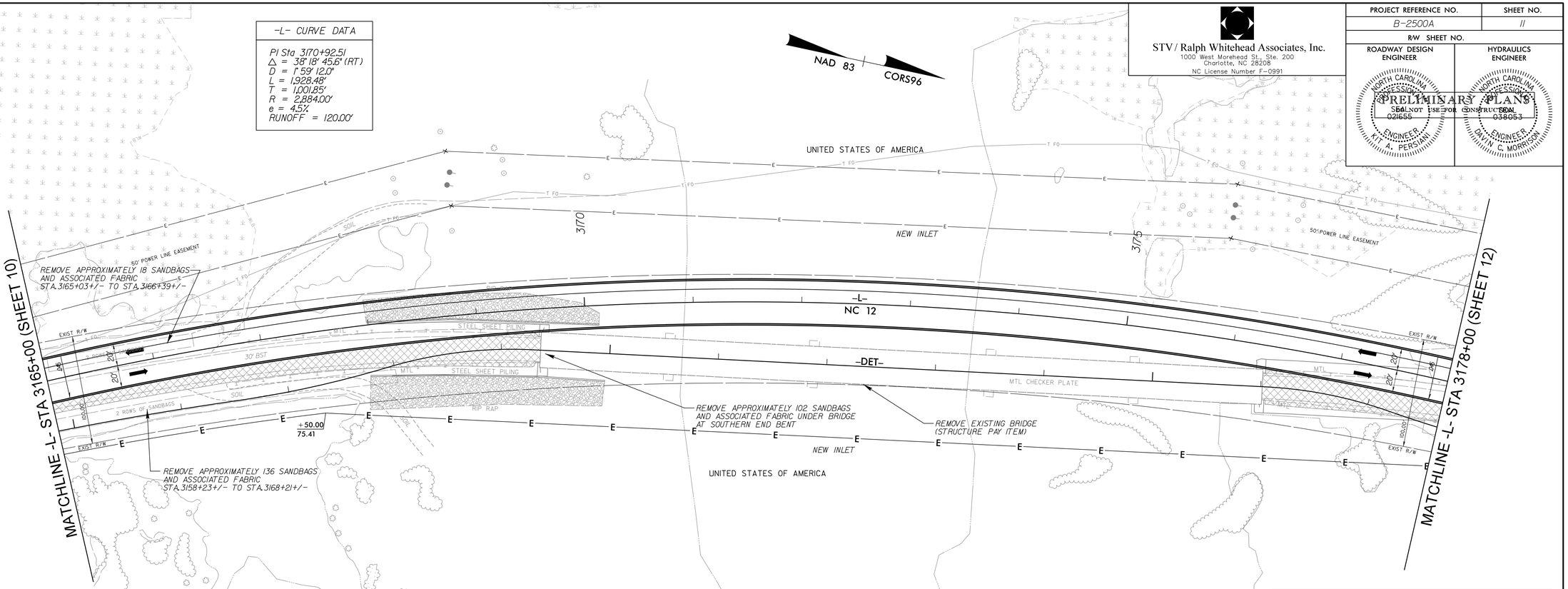
ROADWAY DESIGN ENGINEER: SEAL 026655 — ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER: SEAL 038053 — ENGINEER DAVID C. MORRISON

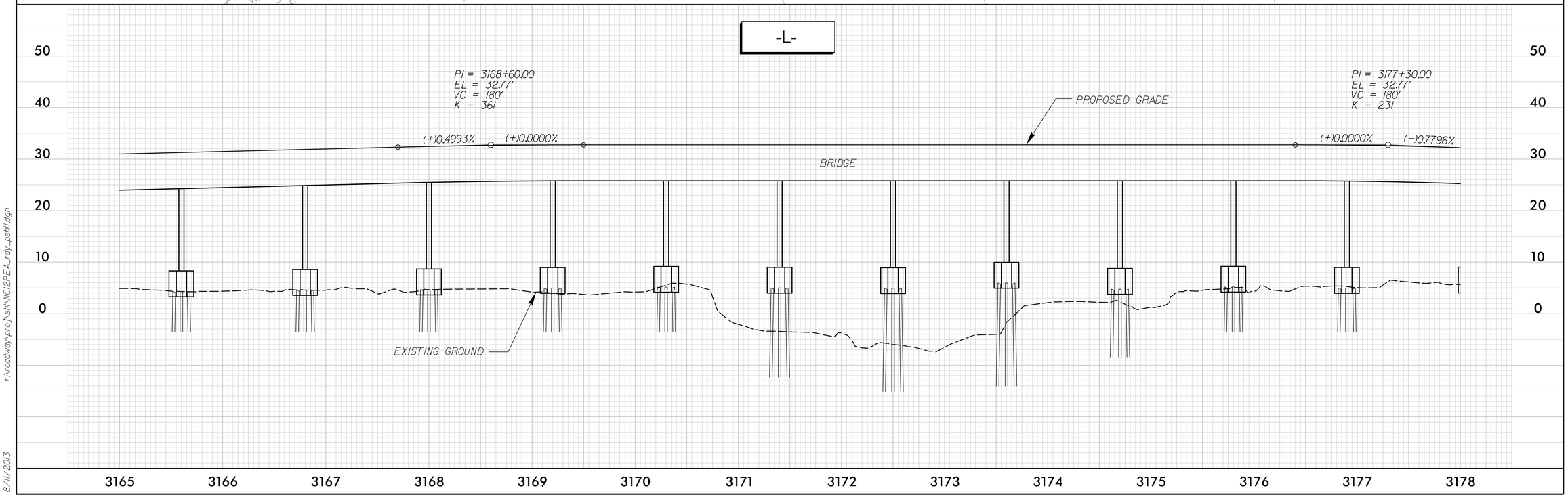
PRELIMINARY PLANS
NOT TO BE USED FOR CONSTRUCTION

-L- CURVE DATA
PI Sta 3170+92.51
△ = 38° 18' 45.6" (RT)
D = 1° 59' 12.0"
L = 1,928.48'
T = 1,001.85'
R = 2,884.00'
e = 4.5%
RUNOFF = 120.00'

NAD 83 / CORS96



SEE SHEET 2-K FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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8/11/2013

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	12
R/W SHEET NO.	

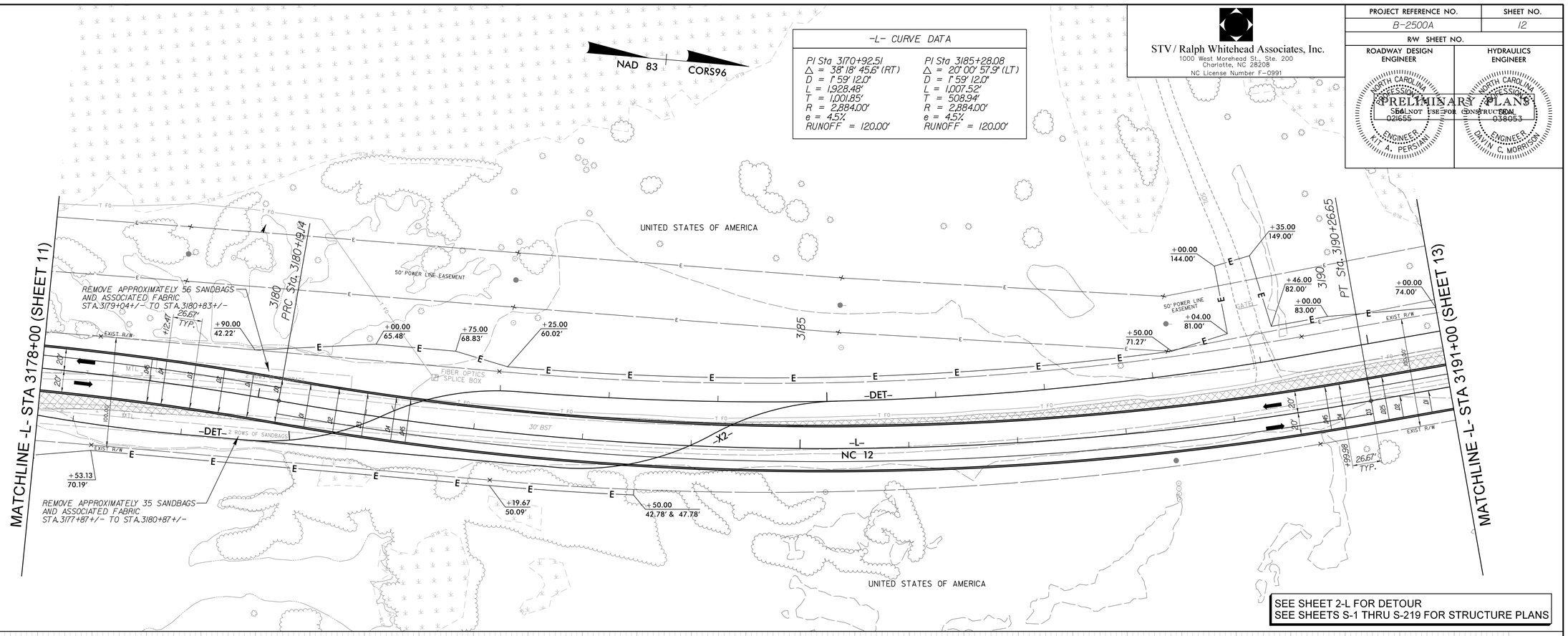
STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026655 ENGINEER KIT A. PERSIANI

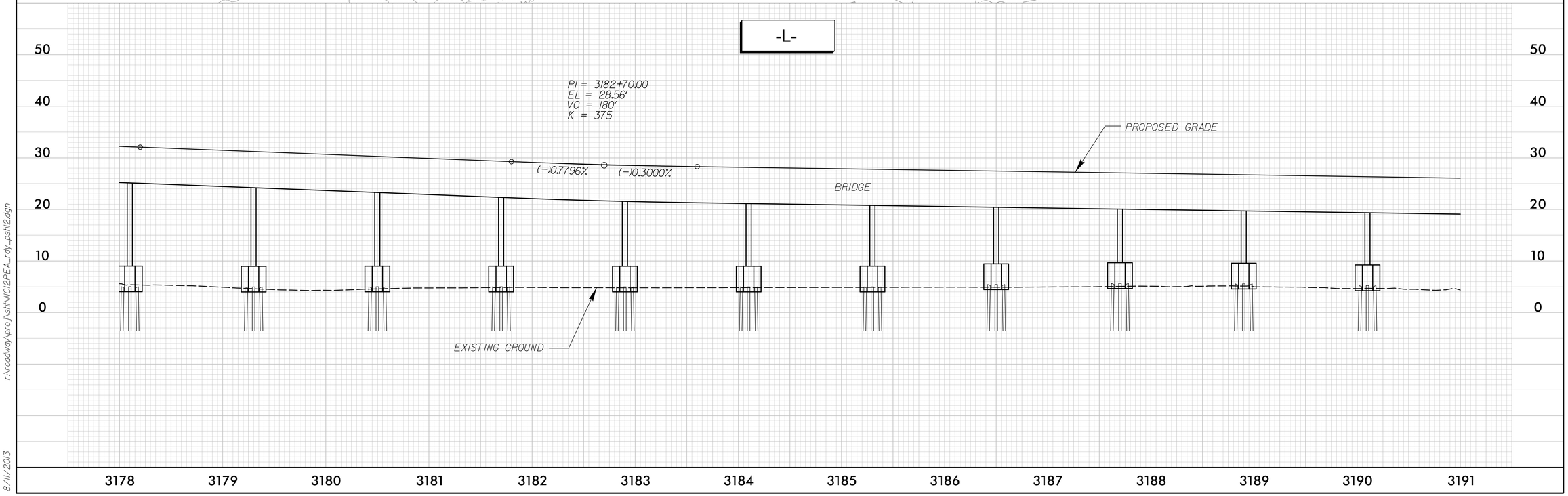
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L- CURVE DATA	
PI Sta 3170+92.51	PI Sta 3185+28.08
Δ = 38° 18' 45.6" (RT)	Δ = 20° 00' 57.9" (LT)
D = 1° 59' 12.0"	D = 1° 59' 12.0"
L = 1,928.48'	L = 1,007.52'
T = 1,001.85'	T = 508.94'
R = 2,884.00'	R = 2,884.00'
e = 4.5%	e = 4.5%
RUNOFF = 120.00'	RUNOFF = 120.00'



SEE SHEET 2-L FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	13
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026155 ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER CALVIN C. MORRISON

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83 CORS96

MATCHLINE -L- STA 3191+00 (SHEET 12)

MATCHLINE -L- STA 3204+00 (SHEET 14)

UNITED STATES OF AMERICA

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

3195

3200

EXIST R/W

-DET-

N 14° 52' 02.1" W

-L-

NC 12

END APPROACH SLAB
-L- Sta. 3200+84.00

END BRIDGE
-L- Sta. 3200+60.00

PC Sta. 3201+26.48

PROPOSED RETAINING WALL & CONC BARRIER (STRUCTURE PAY ITEM)

END RETAINING WALL & CONC BARRIER
-L- Sta. 3202+50.66
22.25' LT

PPC Sta. 3203+69.23

+56.10
67.52'

26.67' TYP.

+33.32

100.00'

20'

8" PS

TYPE III 2GI 15" 2GI 15" 2GI

GRAU-350

SBO

73.34

+50.00
32.92' & 37.93'

+49.86
42.30'

+80.00
39.11' & 44.12'

GRADE TO DRAIN

END RETAINING WALL & CONC BARRIER
-L- Sta. 3203+23.95
22.25' RT

15" CL-5 RCP

REINFORCED APPROACH FILL (STRUCTURE PAY ITEM)

CLASS A RIP RAP
EST. 2 TN
EST. 7 SY GEOTEXTILE

-L- CURVE DATA

PI Sta. 3202+47.89	PI Sta. 3205+64.56
△ = 3° 28' 37.9" (LT)	△ = 5° 35' 28.7" (RT)
D = 1° 25' 56.6"	D = 1° 25' 56.6"
L = 242.75'	L = 390.35'
T = 121.41'	T = 195.33'
R = 4,000.00'	R = 4,000.00'
e = 4.0%	e = 4.0%
RUNOFF = 107.00'	RUNOFF = 107.00'

SEE SHEET 2-M FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS

-L-

PROPOSED GRADE

BRIDGE

EXISTING GROUND

PI = 3197+70.00
EL = 24.06'
VC = 484'
K = 151

(−)0.3000%

(−)3.5000%

END BRIDGE
-L- STA. 3200+60.00

PI = 3202+64.00
EL = 6.77'
VC = 420'
K = 138

(−)3.5000%

(−)0.4482%

50
40
30
20
10
0

3191 3192 3193 3194 3195 3196 3197 3198 3199 3200 3201 3202 3203 3204

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8/11/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	14
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — SEAL 026655 — ENGINEER KIT A. PERSIANI

HYDRAULICS ENGINEER — SEAL 038053 — ENGINEER DAVID C. MORRISON

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCHLINE -L- STA 3204+00 (SHEET 13)

NAD 83 CORS96

UNITED STATES OF AMERICA

50' POWER LINE EASEMENT

PCC Sta. 3207+59.58

PRC Sta. 3209+31.00

3205 3210 3215

+00.00
59.94' & 64.94'

+75.00
59.78'

+00.00
49.95'

-DET-

-L-
NC 12

MATCH EXIST

END TIP PROJECT B-2500A
-L- POC STA. 3207+37.00

END CONSTRUCTION
-L- POC STA. 3215+42.66

-L- POC Sta. 3217+78.27 =
-DET- PCC Sta. 3217+46.73

EXIST R/W

100.00'

T FO

8'

12'

4' PS

+07.40

+05.15

+49.23

+28.00

26.67' TYP.

30' BST

UNITED STATES OF AMERICA

-L- CURVE DATA

PI Sta 3205+64.56 Δ = 5° 35' 28.7" (RT) D = 1° 25' 56.6" L = 390.35' T = 195.33' R = 4,000.00' e = 4.0% RUNOFF = 107.00'	PI Sta 3208+45.29 Δ = 0° 51' 25.3" (RT) D = 0° 29' 59.9" L = 171.42' T = 85.71' R = 11,460.00'	PI Sta 3217+33.43 Δ = 8° 00' 38.4" (LT) D = 0° 29' 59.9" L = 1,602.25' T = 802.43' R = 11,460.00'

SEE SHEET 2-M FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS

-L-

END TIP PROJECT B-2500A
-L- STA. 3207+37.00
ELEV = 4.65'

PROPOSED GRADE

(-)0.4482%

EXISTING GROUND

50 40 30 20 10 0

3204 3205 3206 3207 3208 3209 3210 3211 3212 3213 3214 3215 3216 3217

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8/11/2013