STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT L. MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

August 25, 2014

U. S. Army Corps of Engineers
Regulatory Field Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, NC 27587

ATTN: Mr. Eric Alsmeyer
NCDOT Division 5 Project Coordinator

SUBJECT: **Application for Section 404 Nationwide Permit Nos. 13, 23, and 33, Section 401 Water Quality Certification, and Neuse River Riparian Buffer Authorization** for the replacement of Bridge No. 373 over Basal Creek on SR 1393 (Bass Lake Road), Wake County, North Carolina. Federal Aid Project No. BRZ-1393(3), TIP No. B-4659.

Debit $240.00 from WBS Element No. 38456.1.1

Please find enclosed the Pre-Construction Notification (PCN), Preliminary Jurisdictional Determination (JD), Jefferies Warehouse Mitigation Site Debit Ledger, Marks Creek Mitigation Site Debit Ledger, Stormwater Management Plan, permit drawings, buffer drawings, and roadway design plans for the subject project. A Programmatic Categorical Exclusion (PCE) was completed for this project in August 2013.

The proposed let date for this project is March 17, 2015, with a let review date of January 27, 2015. However, the let date may advance as additional funds become available.

A copy of this permit application will be posted on the NCDOT Website at https://connect.ncdot.gov/resources/Environmental/Pages/default.aspx, under *Quick Links > Permit Applications*. A copy of the PCE is also available at the above website address under *Quick Links > Environmental Documents*. Thank you for your assistance with this project. If you have any questions or need additional information, please contact Jim Mason at either jsmason@ncdot.gov or (919) 707-6136.

Sincerely,

for Richard W. Hancock, P.E., Manager
Project Development and Environmental Analysis Unit

cc: NCDOT Permit Application Standard Distribution List

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

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PHYSICAL ADDRESS:
Century Center - Building B
1020 Birch Ridge Dr
Raleigh, NC 27610-4328

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: 13 23 33 or 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 Bridge No. 373 over Basal Creek on SR 1393 (Bass Lake Road)
2b. County:	Wake
2c. Nearest municipality / town:	Holly Springs
2d. Subdivision name:	*not applicable*
2e. NCDOT only, T.I.P. or state project no:	B-4659

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) 707-6136
3g. Fax no.:	(919) 212-5785
3h. Email address:	jsmason@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: 35.6423 (DD.DDDDDD) Longitude: - 78.8019 (-DD.DDDDDD)
1c. Property size:	3.5 acres
2. Surface Waters	
2a. Name of nearest body of water (stream, river, etc.) to proposed project:	Basal Creek ([Bass Lake],[Mills Pond])
2b. Water Quality Classification of nearest receiving water:	B NSW
2c. River basin:	Neuse
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: SR 1393 (Bass Lake Road) is classified as a Major Collector in the Statewide Functional Classification System and is not a National Highway System Route. Land use within the vicinity includes Forested Land, Agriculture, Medium- to High-Density Residential, and Recreational.	
3b. List the total estimated acreage of all existing wetlands on the property: 0.42 acres	
3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property: 700 linear feet	
3d. Explain the purpose of the proposed project: To replace a structurally deficient and functionally obsolete bridge.	
3e. Describe the overall project in detail, including the type of equipment to be used: The project consists of replacing the existing two-span, 81-foot long bridge with a three-span, 143-foot bridge on the existing alignment. Traffic will be maintained via off-site detour. 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: SAW-2009-01781	☒ 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): Principal Investigator: Jim Mason	Agency/Consultant Company: NCDOT Other:
4d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attach documentation. 03/25/14	
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.	
6. Future Project Plans	
6a. Is this a phased project?	☐ Yes ☒ No
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	Perm. Fill	Floodplain Pool	☒ Yes ☐ No	☒ Corps ☐ DWQ	<0.01
Site 1 ☒ P ☐ T	Mechanized Clearing	Floodplain Pool	☒ Yes ☐ No	☒ Corps ☐ DWQ	0.01
Site 2 ☒ P ☐ T	Perm. Fill	Non-tidal Freshwater Marsh (NTFM)/ Bottomland Hardwood Forest (BHF)	☒ Yes ☒ No	☒ Corps ☐ DWQ	0.02
Site 2 ☒ P ☐ T	Mechanized Clearing	NTFM/BHF	☒ Yes ☒ No	☒ Corps ☐ DWQ	0.04
Site 2 ☐ P ☒ T	Temp. Fill (Utility)	NTFM/BHF	☐ Yes ☒ No	☒ Corps ☐ DWQ	0.03*
Site 3 ☒ P ☐ T	Perm. Fill	BHF	☒ Yes ☐ No	☒ Corps ☐ DWQ	<0.01
Site 3 ☒ P ☐ T	Mechanized Clearing	BHF	☒ Yes ☐ No	☒ Corps ☐ DWQ	0.02
				2g. **Total wetland impacts**	0.11 ac Perm.** 0.03 ac Temp.

2h. Comments: *It is assumed that timber mats will be used to contain all utility equipment.
** Total is the rounded sum of the actual impacts.

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 3 ☒ P ☐ T	Bank Stabilization	Basal Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	15-20	61
Site 3 ☐ P ☒ T	Temp. Causeways	Basal Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	15-20	61
				3h. **Total stream and tributary impacts**		61 ft Perm. 61 ft Temp.

3i. Comments: 1) Only one temporary causeway will be installed and in use at a time (two will be employed). Once causeway use is completed, the causeways will be mostly removed except for Class II rip rap that will be retained on the streambanks to provide the above-noted bank stabilization. 2) Bridge piers will be installed within Basal Creek, resulting in <0.01 ac. (85 sq. ft.) of impact. All piers will be located in rip-rapped areas and are included in the permanent bank stabilization impacts.

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				
O2 ☐ P ☐ T				
			4f. Total open water impacts	0 Permanent 0 Temporary

4g. Comments:

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	Impact Other Than Road Crossing (Parallel)	UT of Basal Creek (Stream SA)	☒ Yes ☐ No	2,782	3,045
B3 ☒ P ☐ T	Bridge	Basal Creek	☐ Yes ☒ No	7,562	2,185
B3 ☒ P ☐ T	Road Crossing	Basal Creek	☐ Yes ☒ No	533	2,000
		6h. **Total buffer impacts**		10,877	7,230

6i. Comments: At Site 2, in association with the temp. wetland fill utility impacts, there will be utility buffer impacts (AUE STA. 12+00 to 12+50 -L-). However, these impacts are Exempt and not inlcluded in the above table.

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 new bridge will be longer than the existing one; An off-site detour will be employed; A preformed scour hole will be installed at Station 14+50 -L- (RT). The scour hole will dissipate stormwater from the bridge, which will be collected in a storm system and piped to the scour hole; A lateral base ditch will be installed from Station 17+20 to Station 18+50 -L- (LT). A Class II rip-rapped energy dissipator basin will be installed from Station 16+80 to Station 17+20 -L- (LT) at the end of the lateral base ditch. The basin will be installed to reduce stormwater velocity prior to it entering the buffer; A lateral grassed swale will be installed from Station 16+55 to Station 18+15.3 -L- (RT). A rip rap pad will be installed at the end of the swale in Wetland WA to further reduce stormwater velocity and prevent erosion; Two Class B rip rap pads will be installed on the south side of the road, one within Wetland WB and one just north of WB.

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

NCDOT Best Management Practices for Construction and Maintenance Activities and Best Management Practices for the Protection of Surface Waters will be employed. Due to the project being in a buffer basin, Design Standards in Sensitive Watersheds will also be employed.

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):	square feet
4e. Riparian wetland mitigation requested:	acres
4f. Non-riparian wetland mitigation requested:	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.

The 0.11 ac. of permanent riparian wetland impacts will be mitigated for at a 2:1 ratio, resulting in 0.22 ac. of mitigation credits being required. The 0.22 ac. of mitigation required will be offset by credits from the Jefferies Warehouse Mitigation Site Debit Ledger (please see attached).

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	Impact Other Than Road Crossing (Parallel)	2,782	3 (2 for Catawba)	8,346
Zone 2	Impact Other Than Road Crossing (Parallel)	3,045	1.5	4,568
		6f. **Total buffer mitigation required:**		12,914

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).

Permittee-responsible riparan buffer restoration will be used. Mitigable riparian buffer impacts associated with this project will be offset by credits from the Marks Creek Mitigation Site Debit Ledger (please see attached).

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: See attached permit drawings	☒ 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:	☒ 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? NC Natural Heritage Program data, USFWS website, NCDOT field surveys		
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		

for Richard W. Hancock, P.E. Applicant/Agent's Printed Name	Applicant/Agent's Signature (Agent's signature is valid only if an authorization letter from the applicant is provided.)	8-25-14 Date

Jeffrey's Warehouse Mitigation Site
ONEID 096-003

The Jeffrey's Warehouse Mitigation Site is located in Wayne County within the USGS hydrologic unit 03020201 of the Neuse River. NCDOT acquired the 93.16 acre site to mitigate for unavoidable, jurisdictional impacts associated with TIP R-1030AA. Monitoring requirements were performed from 2007 to 2011 and the site was closed out in 2012. Table 1 shows the final mitigation quantities approved for the site. The site has been placed on the NCDOT On-site Debit Ledger for use within HUC 03020201. Tables 2-6 indicate all mitigation debits that have occurred per regulatory agency approval.

In order to offset unavoidable impacts affiliated with TIP B-4659, the Jeffery's Warehouse Mitigation Site will be debited 0.22 acres of Riparian Wetland Restoration. The original impacts were 0.11 acres and NCDOT debited the mitigation site at a 2:1 ratio.

Table 1. Mitigation Quantities Approved

Mitigation Type	Debit Amount	Status	Notes
3020201	Non Riparian Wetland Restoration	16.23	
3020201	Riparian Wetland Preservation	12.36	
3020201	Riparian Wetland Restoration	3.66	
3020201	Stream Restoration	3731	
3020201	Buffer Restoration	316507	Do not debit further until NCDOT determines final mitigation quantities

Table 2. Mitigation Debits – Non Riparian Wetlands

Mitigation Type	Debit Amount	Status	Site TIP	Action ID#	Notes
Non Riparian Restoration	2.76	Close Out	R-2719A	2008-02460	
Non Riparian Restoration	0.92	Close Out	B-4304	2004-20510	
Non Riparian Restoration	1.96	Close Out	R-2814A&B	2008-01316	

Table 3. Mitigation Debits – Riparian Wetland Preservation

Mitigation Type	Debit Amount	Status	Site TIP	Action ID#	Notes
Riparian Wetland Preservation	3.05	Close Out	R-2814A&B	2008-01316	
Riparian Wetland Preservation	8.61	Close Out	R-2554A	2008-00252	

Table 4. Mitigation Debits – Riparian Wetland Restoration

Mitigation Type	Debit Amount	Status	Site TIP	Action ID#	Notes
Riparian Wetland Restoration	2.49	Close Out	R-2814A&B	2008-01316	
Riparian Wetland Restoration	0.21	Close Out	R-2554A		
Riparian Wetland Restoration	0.22	Close Out	B-4659		2:1 Ratio

Table 5. Mitigation Debits – Stream Restoration

Mitigation Type	Debit Amount	Status	Site TIP	Action ID#	Notes
Stream Restoration	452	Close Out	B-3528 226ft@2:1	2008-00153	
Stream Restoration	61	Close Out	U-4011	2005-20914	
Stream Restoration	25	Close Out	U-3344A	2003-20445	
Stream Restoration	279	Close Out	EB-4993	2011-00602	
Stream Restoration	174	Close Out	R-3825a	2011-01695	
Stream Restoration	20	Close Out	I-5311/I-5338	2013-00068	

Table 6. Mitigation Debits – Non-Riparian Wetland Restoration

Mitigation Type	Debit Amount	Status	Site TIP	Action ID#	Notes
Buffer Restoration	38648	Close Out	B-4300	2004-20705	
Buffer Restoration	161453	Close Out	R-2719A	2008-02460	
Buffer Restoration	3653	Close Out	B-4304	2004-20510	
Buffer Restoration	16398	Close Out	B-4592	2008-02056	
Buffer Restoration	24458	Close Out	U-4703	2005-20126	
Buffer Restoration	45558	Close Out	U-3344A	2003-20445	
Buffer Restoration	11393	Close Out	Div Proj. SR 1340	2010-00420	
Buffer Restoration	2199	Close Out	DIV Proj SR1204	No action ID due to a non-reporting NWP14	
Buffer Restoration	3861	Close Out	I-5311/I5338	2013-00068	

Marks Creek Mitigation Site
ONEID 092-011

The Marks Creek Mitigation Site is located in Wake County within the USGS hydrologic unit 03020201 of the Neuse River. NCDOT acquired the 66 acre site to mitigate for unavoidable, jurisdictional impacts associated with TIP R-2547. Monitoring requirements were performed from 2004 to 2008 and the site was closed out in 2009. Table 1 shows the final mitigation quantities approved for the site. The site has been placed on the NCDOT On-site Debit Ledger for use within HUC 03020201. Tables 2-5 indicate all mitigation debits that have occurred per regulatory agency approval.

To offset unavoidable buffer impacts associated with T.I.P. B-4659 the Marks Creek Mitigation Site will be debited 12,914 square feet of buffer restoration. The impacts numbers were 2,782 sq ft for zone 1 and 3,045 sq ft for zone 2. These impacts numbers were debited from the ledger with a 3:1 ratio for zone 1 and 1.5:1 ratio for zone 2. This debit is reflected in the debit ledger below.

Table 1. Mitigation Quantities Approved

HUC	Mitigation Type	Starting Amount	Additional Notes
3020201	Stream Preservation	3247 (Ln.Ft.)	
3020201	Riparian Wetland Restoration	3.33 (Ac.)	No debits as of 8/18/14
3020201	Riparian Wetland Preservation	11 (Ac.)	No Debit as of 8/18/2014
3020201	Riparian Wetland Enhancement	13 (Ac)	
3020201	Buffer Restoration	324700 (Sq.Ft.)	

Table 2. Mitigation Debits – Stream Restoration

Mitigation Type	Debit Amount (Ln.Ft.)	Status	Site TIP	Action ID#	NOTES
Stream Restoration	2873	Close Out	R-2814A&B	2008-01316	Mod
Stream Restoration	80	Close Out	I-5338 (Areas 1, 2A, and 2b)		Impacts were 40 lin. Ft. @ 2:1 ratio

Table 3. Mitigation Debits – Riparian Wetland Enhancement

Mitigation Type	Debit Amount (Ac)	Status	Site TIP	Action ID#	NOTES
Riparian Wetland Enhancement	10.9	Close Out	R-2000F&G	199920387	
Riparian Wetland Enhancement	0.98	Close Out	R-3825A	201101695	.49 @2:1
Riparian Wetland Enhancement	.14	Close Out	B-5113		

Table 4. Mitigation Debits – Buffer Restoration

Mitigation Type	Debit Amount (Sq.Ft.)	Status	Site TIP	Action ID#	NOTES
Buffer Restoration	114659	Close Out	U-3804	200421647	
Buffer Restoration	114	Close Out	R-2814-B Mod	2008-01316	
Buffer Restoration	75581	Close Out	B-3528	2008-00153	
Buffer Restoration	1655	Close Out	B-4944	2009-00207	
Buffer Restoration	4242	Close Out	B-5113		
Buffer Restoration	34683	Close Out	I-5338 (Areas 1, 2A, and 2b)		6,915 sq ft of impacts for zone 1 and 9292 sq ft of zone 2 totaling 34,683 sq ft with 3:1 ratio for zone 1 and 1.5:1 for zone 2
Buffer Restoration	12,914	Close Out	B-4659		NCDOT was required to use a 3:1 ratio for zone 1 and a1.5:1 ratio for zone 2.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: 38456.1.1 (B-4659) **County(ies):** Wake

General Project Information

Project No.:	38456.1.1 (B-4659)	**Project Type:**	Bridge Replacement	**Date:**	6/25/2014
NCDOT Contact:	Charles Smith, PE	**Contractor / Designer:**	Anne Gamber, PE, CFM Wetherill Engineering, Inc.		
Address:	Hydraulic Unit 1590 Mail Service Center Raleigh, NC 27610	**Address:**	559 Jones Franklin Road Suite 164 Raleigh, NC 27606		
Phone:	919-707-6716	**Phone:**	919-851-8077		
Email:	crsmith5@ncdot.gov	**Email:**	agamber@wetherilleng.com		
City/Town:	Holly Springs	**County(ies):**	Wake		
River Basin(s):	Neuse	**CAMA County?**	No		
Primary Receiving Water:	Basal Creek (Basin 22, Stream16)	**NCDWQ Stream Index No.:**	27-43-15-3		
NCDWQ Surface Water Classification for Primary Receiving Water	**Primary:**	Class B			
	Supplemental:	Nutrient Sensitive Waters (NSW)			
Other Stream Classification:					
303(d) Impairments:					
Buffer Rules in Effect	Neuse				

Project Description

Project Length (lin. Miles or feet):	0.232 miles	**Surrounding Land Use:**	Residential, City Park

	Proposed Project	**Existing Site**
Project Built-Upon Area (ac.)	1.10 ac.	0.58 ac.
Typical Cross Section Description:	One side is a 12' lane with 4' shoulder and the other is a 14' lane with curb and gutter and sidewalk. Roadway is supered to curb and gutter.	10' lanes with 3' shoulder normal crown
Average Daily Traffic (veh/hr/day):	Design/Future: 10,220 VPD	Existing: 6,540 VPD

General Project Narrative:

The bridge drainage is collected in a storm system and outletted into a preformed scour hole near wetlands. The drainage upstation of the bridge is collected in the curb and gutter at two locations and outletted onto rip rap pads to the reduce the velocity before it enters into a wetland. The drainage upstation of the bridge is collected in a storm system from the curb and gutter and outletted into a 133' swale before it is outletted into the wetlands through a rip rap energy dissipator. At the tie into the existing roadway at the end of the project, there is no curb and gutter and the roadway is in normal crown. This drainage sheet flows through the grassed shouolder before being ditched to Basal Creek.

References

Project/TIP No.: 38456.1.1 (B-4659) **County(ies):** Wake

Project Environmental Summary

Surface Water Impacts

Sheet No.	Station (From / To)	Feature Impacted	Water / Wetland / Buffer Type	Receiving Surface Water Name	NRTR Map ID	NCDWQ Stream Index	NCDWQ Surface Water Classification	303(d) Impairments	Type of Impact	Existing SCM	Proposed SCM
	12+00 To 14+50 -L- rt	Wetland		Basal Creek		24-43-15-3	B	None	Fill	N/A	Rip Rap Pad
	15+80 To 16+35	Stream	Perennial	Basal Creek		24-43-15-3	B	None	Stabilization	N/A	Rip Rap Pad
	16+25 To 16+45 -L- rt	Stream	Perennial	Basal Creek		24-43-15-3	B	None	Fill	N/A	Rip Rap Pad
	12+00 to 12+60 -L- lt	Wetland		Basal Creek		24-43-15-3	B	None	Fill	N/A	Rip Rap Toe Protection

* List all stream and surface water impact locations regardless of jurisdiction or size.
Equalizer Pipes to be noted as a minimization of impacts.
All proposed SCMs listed must also be listed under Swales, Preformed Sour Holes and other Energy Dissipators, or Other Stormwater Control Measures.

Description of Minimization of Impacts or Mitigation

References

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: 38456.1.1 (B-4659) **County(ies):** Wake

Swales

Sheet No.	Station (From / To)	Stream Crossing Station	Base Width (ft)	Front Slope (H:V)	Back Slope (H:V)	Drainage Area (ac)	Recommended Treatment Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used
	16+55 To 18+15 -L- rt	NA	2.0	3	3	0.49	49	140	2.53%	1.0	1.7	2.8	2.0	No
							0							
							0							
							0							
							0							
							0							
							0							
							0							
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							0							
							0							
							0							
							0							
							0							
							0							
							0							

☐ YES ☑ NO Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), been met and verified? If No, provide further explanantion of why design criteria was not met.

Additional Comments

Topography and proposed greenway restrict swale geometry.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: 38456.1.1 (B-4659) **County(ies):** Wake

Preformed Scour Holes and Energy Dissipators

Sheet No.	Station	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)
	14+50 -L- rt	PFSH	Class 'B'	0.24	Pipe	15	1.3	0.7
	16+80 to 17+20 -L- lt	Riprap Energy Dissipator Basin	Class II	5.10	Ditch	2' BASE 2:1 SS	11.1	0.9

☑ YES ☐ NO Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox (2008), NCDOT Standard Details, or FHWA HEC-14 (July 2006), been met and verified, as applicable? If No, provide further explanantion of why design criteria was not met.

Additional Comments

* Refer to the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), NCDOT Standard Details, the Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 14 (HEC-14), Third Edition, Hydraulic Design of Energy Dissipators for Culverts and Channels (July 2006), as applicable, for design guidance and criteria.

TIP PROJECT: B-4659

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

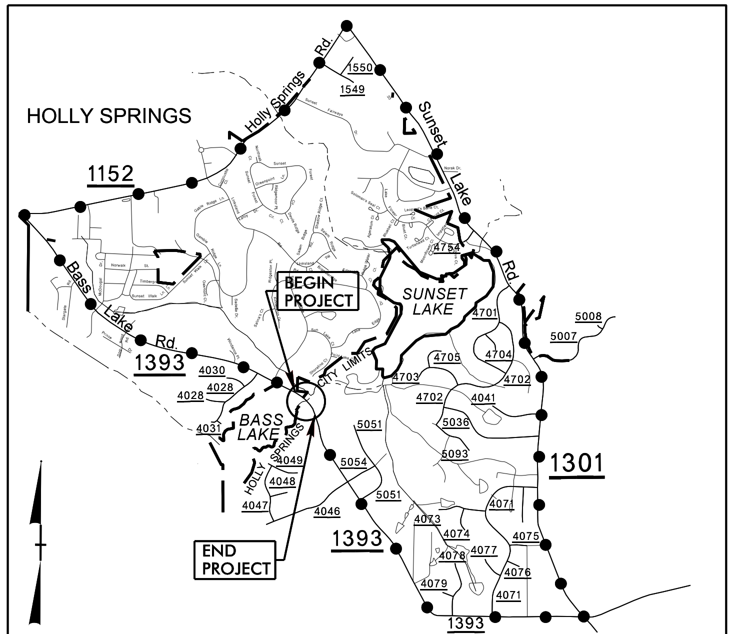
LOCATION: BRIDGE NO. 373 OVER BASAL CREEK ON SR 1393 (BASS LAKE RD.)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE

PERMIT DRAWING
SHEET 1 OF 10

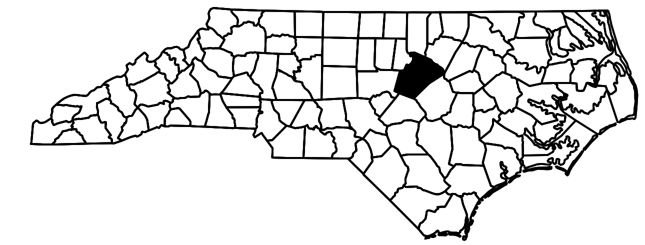
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4659	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38456.1.1	BRZ-1393(3)	P.E.
38456.2.FDU1	BRZ-1393(3)	UTIL.
38456.2.FD1	BRZ-1393(3)	R/W

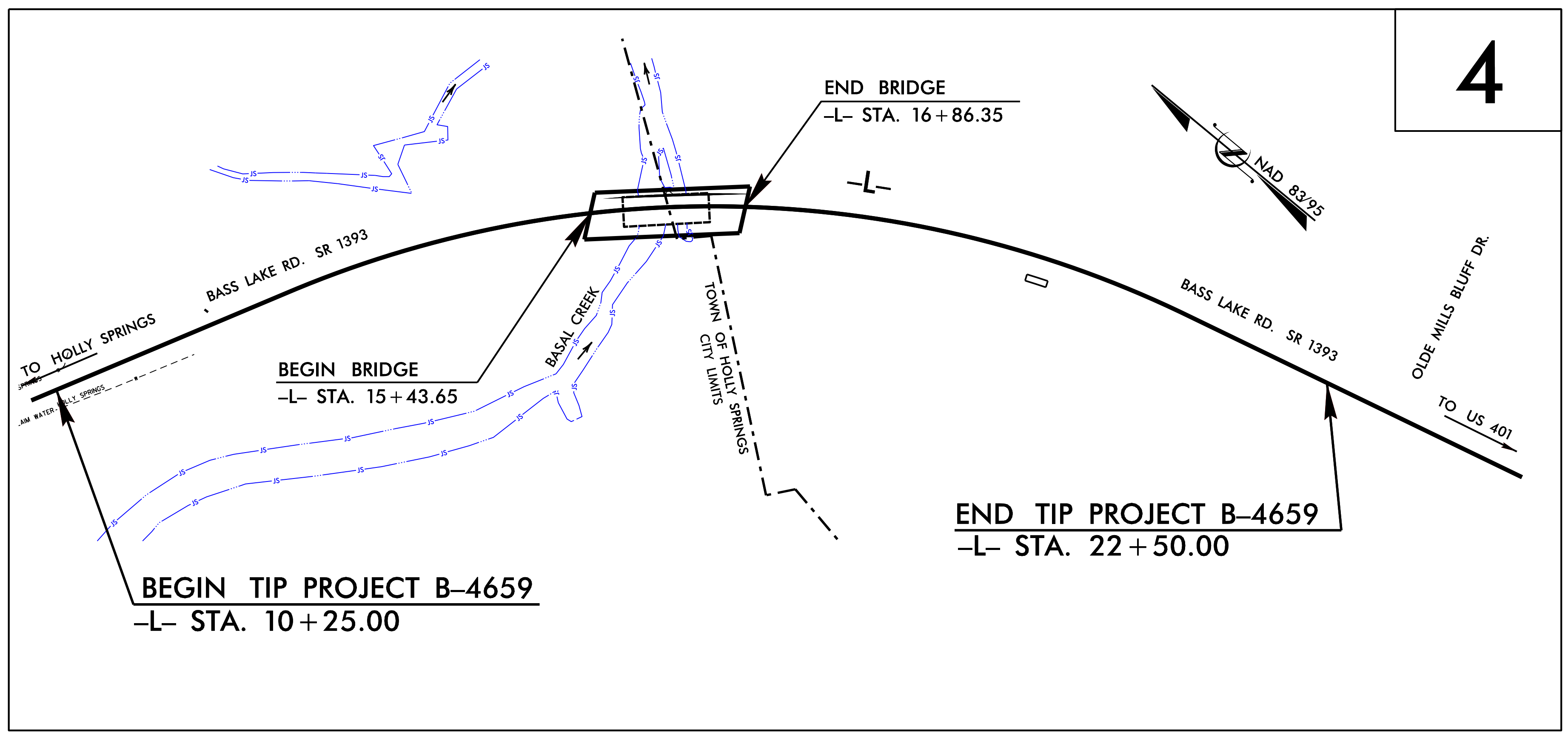


VICINITY MAP

OFF-SITE DETOUR



WETLAND AND SURFACE WATER IMPACTS PERMIT



A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF HOLLY SPRINGS.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 6,540 VPD
ADT 2035 = 10,220 VPD
DHV = 10 %
D = 60 %
* T = 4 %
V = 40 MPH
*(TTST 1% + DUAL 3%)
FUNC. CLASS. = URBAN COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4659 = 0.205 MILE
LENGTH STRUCTURE TIP PROJECT B-4659 = 0.027 MILE
TOTAL LENGTH TIP PROJECT B-4659 = 0.232 MILE

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MARCH 31, 2014

LETTING DATE: MARCH 17, 2015

TONY HOUSER, PE
PROJECT ENGINEER

JEFFREY L. TEAGUE, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER | HYDRAULICS ENGINEER

SIGNATURE: SIGNATURE:

ROADWAY DESIGN ENGINEER | ROADWAY DESIGN ENGINEER

SIGNATURE: SIGNATURE:

STATE OF NORTH CAROLINA * DEPARTMENT OF TRANSPORTATION *

CONTRACT:

09/08/99

$$$$SYSTIME$$$$
$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

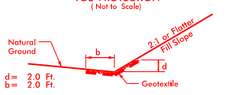
8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4659	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 2 OF 10

DETAIL 1
TOE PROTECTION
(Not to Scale)

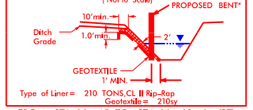


d= 2.0 Ft.
b= 2.0 Ft.

Type of Liner= CL B Rip-Rap

FROM STA. 12+05 TO STA. 14+40 –L– (LT)
FROM STA. 18+50 TO STA. 19+75 –L– (LT)

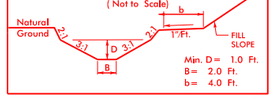
DETAIL 2
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 210 TONS CL II Rip-Rap
Geotextile = 210sy

FROM STA. 16+45 TO STA. 16+60 –L– (RT)
FROM STA. 15+25 TO 15+95 –L– (LT & RT)*
FROM STA. 16+25 TO 16+50 –L– (LT & RT)*

DETAIL 3
LATERAL GRASSED SWALE
(Not to Scale)



Min. D= 1.0 Ft.
B= 2.0 Ft.
b= 4.0 Ft.

FROM STA. 16+55 TO STA. 18+15.3 –L– (RT)

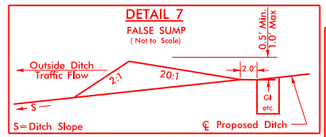
DETAIL 5
LATERAL BASE DITCH
(Not to Scale)

Min. D= 1.1 Ft.
Max. d= 1.1 Ft.
B= 2.0 Ft.
b= 5.0 Ft.

Type of Liner= CL II Rip-Rap

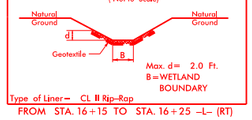
FROM STA. 17+20 TO STA. 18+50 –L– (LT)

DETAIL 7
FALSE SUMP
(Not to Scale)



FROM STA. 19+64 TO STA. 19+90 –L– LT

DETAIL 6
COUNTER SUNK RIP RAP PAD
(Not to Scale)



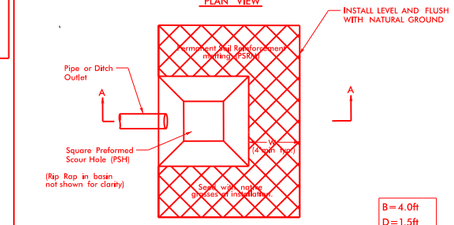
Max. d= 2.0 Ft.
B=WETLAND BOUNDARY

Type of Liner= CL II Rip-Rap

FROM STA. 16+15 TO STA. 16+25 –L– (RT)

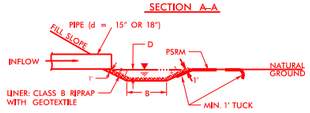
DETAIL 8
PREFORMED SCOUR HOLE
*NOT TO SCALE

PLAN VIEW



B=4.0ft
D=1.5ft
W=4.0ft

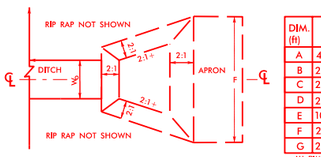
SECTION A-A



308

STA. 14+50 –L– (RT)

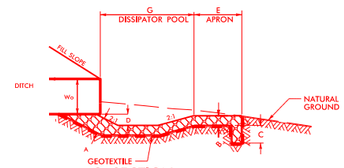
DETAIL 4
CLASS II RIP-RAPPED ENERGY DISSIPATOR BASIN



DIM. (ft)	
A	4'
B	2'
C	2'
D	2'
E	10' min
F	23.5'
G	20'

ALL DIMENSIONS APPROXIMATE

PLAN

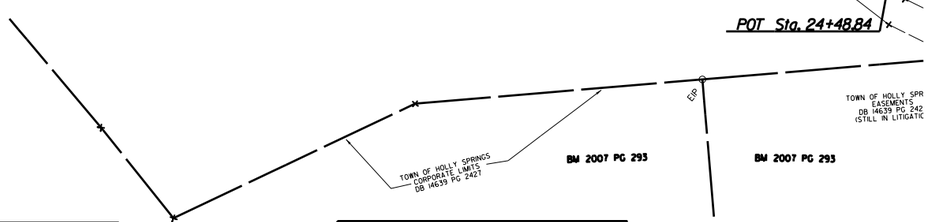


℄ SECTION

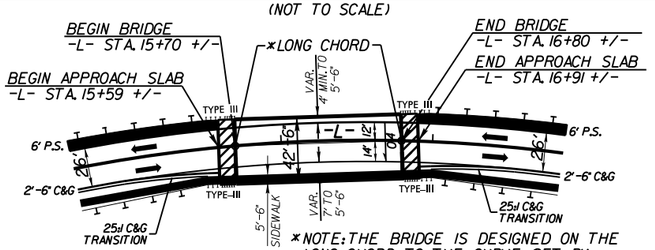
FROM STA. 16+80 TO STA. 17+20
EST 67 TONS CLASS II RIP RAP
EST 86 SY GEOTEXTILE

WETLAND AND SURFACE WATER IMPACTS PERMIT

PI Sta 11+03.37
Δ = 48° 38' 50.3" (RT)
D = 5° 43' 46.5"
L = 849.06'
T = 452.01'
R = 1,000.00'
SE = 0.04
RO = 84'



SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP
(NOT TO SCALE)



*NOTE: THE BRIDGE IS DESIGNED ON THE LONG CHORD TO THE CURVE SET BY STRUCTURE DESIGN (SEE STRUCTURE PLANS).

NOTE: THE CONCRETE SIDEWALK LOCATED ON THE BRIDGE AND APPROACH SLABS IS A STRUCTURE PAY ITEM.

PAVED SHOULDER
SIDEWALK
FOR –L– PROFILE, SEE SHEET NO. 5
FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-?

$$$$SYSTIME$$$$
$$$$DGN$$$$
$$$$USERNAME$$$$

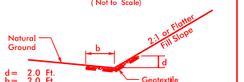
8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4659	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 3 OF 10

DETAIL 1
TOE PROTECTION
(Not to Scale)

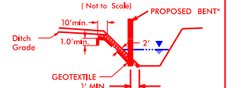


d= 2.0 Ft.
b= 2.0 Ft.

Type of Liner= CL B Rip-Rap

FROM STA. 12+05 TO STA. 14+40 –L– (LT)
FROM STA. 18+50 TO STA. 19+75 –L– (LT)

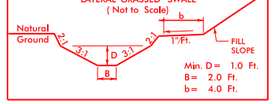
DETAIL 2
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 210 TONS CL II Rip-Rap
Geotextile = 210sy

FROM STA. 16+45 TO STA. 16+60 –L– (RT)
FROM STA. 15+25 TO 15+95 –L– (LT & RT)*
FROM STA. 16+25 TO 16+50 –L– (LT & RT)*

DETAIL 3
LATERAL GRASSED SWALE
(Not to Scale)



Min. D= 1.0 Ft.
B= 2.0 Ft.
b= 4.0 Ft.

FROM STA. 16+55 TO STA. 18+15.3 –L– (RT)

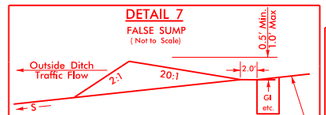
DETAIL 5
LATERAL BASE DITCH
(Not to Scale)

Min. D= 1.1 Ft.
Max. d= 1.1 Ft.
B= 2.0 Ft.
b= 5.0 Ft.

Type of Liner= CL II Rip-Rap

FROM STA. 17+20 TO STA. 18+50 –L– (LT)

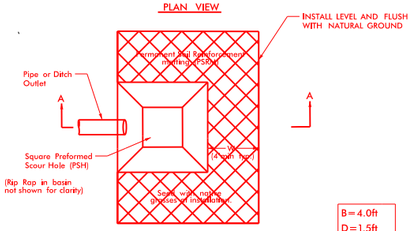
DETAIL 7
FALSE SUMP
(Not to Scale)



FROM STA. 19+64 TO STA. 19+90 –L– LT

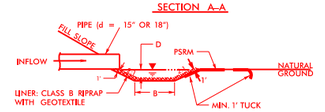
DETAIL 8
PREFORMED SCOUR HOLE
*NOT TO SCALE

PLAN VIEW



B=4.0ft
D=1.5ft
W=4.0ft

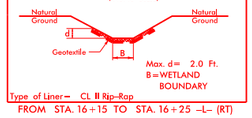
SECTION A-A



308

STA. 14+50 –L– (RT)

DETAIL 6
COUNTER SUNK RIP RAP PAD
(Not to Scale)

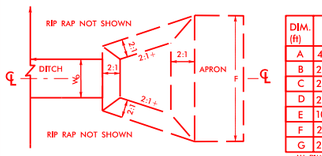


Max. d= 2.0 Ft.
B=WETLAND BOUNDARY

Type of Liner= CL II Rip-Rap

FROM STA. 16+15 TO STA. 16+25 –L– (RT)

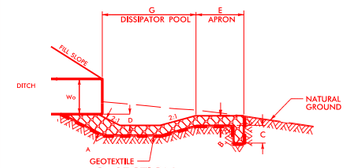
DETAIL 4
CLASS II RIP-RAPPED
ENERGY DISSIPATOR BASIN



DIM. (ft)	
A	4'
B	2'
C	2'
D	2'
E	10' min
F	23.5'
G	20'

ALL DIMENSIONS APPROXIMATE

PLAN



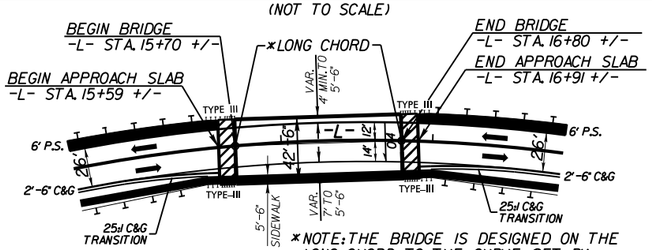
℄ SECTION

FROM STA. 16+80 TO STA. 17+20
EST 67 TONS CLASS II RIP RAP
EST 86 SY GEOTEXTILE

WETLAND AND SURFACE WATER IMPACTS PERMIT

PI Sta 11+03.**
Δ = 48° 38' 50.3" (RT)
D = 5° 43' 46.5"
L = 849.06'
T = 452.01'
R = 1,000.00'
SE = 0.04
RO = 84'

SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP
(NOT TO SCALE)



*NOTE: THE BRIDGE IS DESIGNED ON THE LONG CHORD TO THE CURVE SET BY STRUCTURE DESIGN (SEE STRUCTURE PLANS).

NOTE: THE CONCRETE SIDEWALK LOCATED ON THE BRIDGE AND APPROACH SLABS IS A STRUCTURE PAY ITEM.

PAVED SHOULDER
SIDEWALK

FOR –L– PROFILE, SEE SHEET NO. 5

FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-?

$$$$SYSTIME$$$$
$$$$SYSDIR$$$$
$$$$SYSLEGEND$$$$

WETLAND AND SURFACE WATER IMPACTS PERMIT

PROJECT REFERENCE NO.	SHEET NO.
B-4659	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 4 OF 10

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

DENOTES TEMPORARY FILL IN WETLAND

SITE 1

TOE PROTECTION
SEE DETAIL 1
CL B RIP RAP
EST. 135 TONS
GEOTEXTILE
EST. 363 SY

Q10 = 5.3 CFS
V10 = 1.0 FPS

CL B RIP RAP
EST. 3 TONS
GEOTEXTILE
EST. 11 SY

24" RCP-IV

15" RCP-IV

20' BST

CB

Q10 = 1.3 CFS
V10 = 0.7 FPS

CLASS II RIP RAP
TO ELEV 314.4'

CL B RIP RAP
EST. 1 TON
GEOTEXTILE
EST. 5 SY

Q10 = 1.3 CFS
V10 = 1.2 FPS

SITE 2

PC Sta. 12+57.40

SR 1393 BASS LAKE RD.

12+00

NC GRID NAD 83/95

30' 0' 30' 60' 90'

30 scale

REVISIONS

8/17/99

WETLAND AND SURFACE WATER IMPACTS PERMIT

PROJECT REFERENCE NO.	SHEET NO.
B-4659	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 5 OF 10

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

DENOTES TEMPORARY FILL IN WETLAND

SITE 1

TOE PROTECTION
SEE DETAIL 1
CL B RIP RAP
EST. 135 TONS
GEOTEXTILE
EST. 363 SY

BZ 1

BZ 2

12+00

PUE

3SBW

EXISTING R/W

JS

F

E

GR

SR 1393

BASS LAKE RD.

20' BST

CB

15" RCP-IV

24" RCP-IV

24"

CB 3' x 3' JB w/ SLAB

PDE

AUE

T

R/W

Q10 = 5.3 CFS
V10 = 1.0 FPS

CL B RIP RAP
EST. 3 TONS
GEOTEXTILE
EST. 11 SY

Q10 = 1.3 CFS
V10 = 0.7 FPS

CLASS II RIP RAP
TO ELEV 314.4'

CL B RIP RAP
EST. 1 TON
GEOTEXTILE
EST. 5 SY

Q10 = 1.3 CFS
V10 = 1.2 FPS

WLB

Mulch Path

TB

C

PC Sta. 12+57.40

SITE 2

NC GRID
NAD 83/95

30' 0' 30' 60' 90'

30 scale

REVISIONS

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-4659	4
R/W SHEET NO.	

PERMIT DRAWING
SHEET 6 OF 10

DENOTES MECHANIZED CLEARING

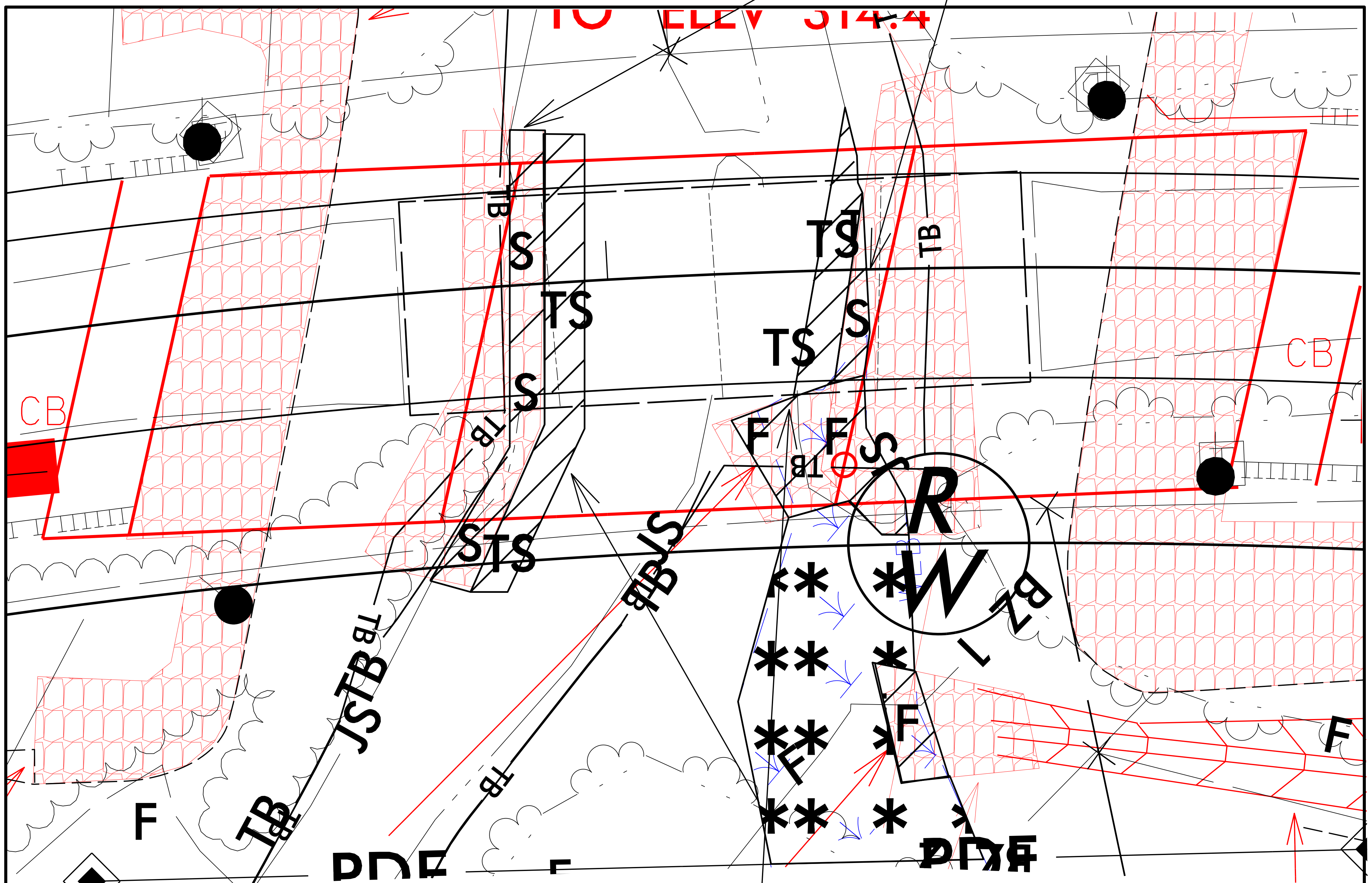
DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 3

BANK STABILIZATION
SEE DETAIL 2



NC GRID NAD 83/95

TEMPORARY CAUSEWAY
SEE PERMIT SHEET 8

15′ 0′ 15′ 30′ 45′

REVISIONS

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-4659	4
R/W SHEET NO.	

PERMIT DRAWING
SHEET 7 OF 10

DENOTES MECHANIZED CLEARING

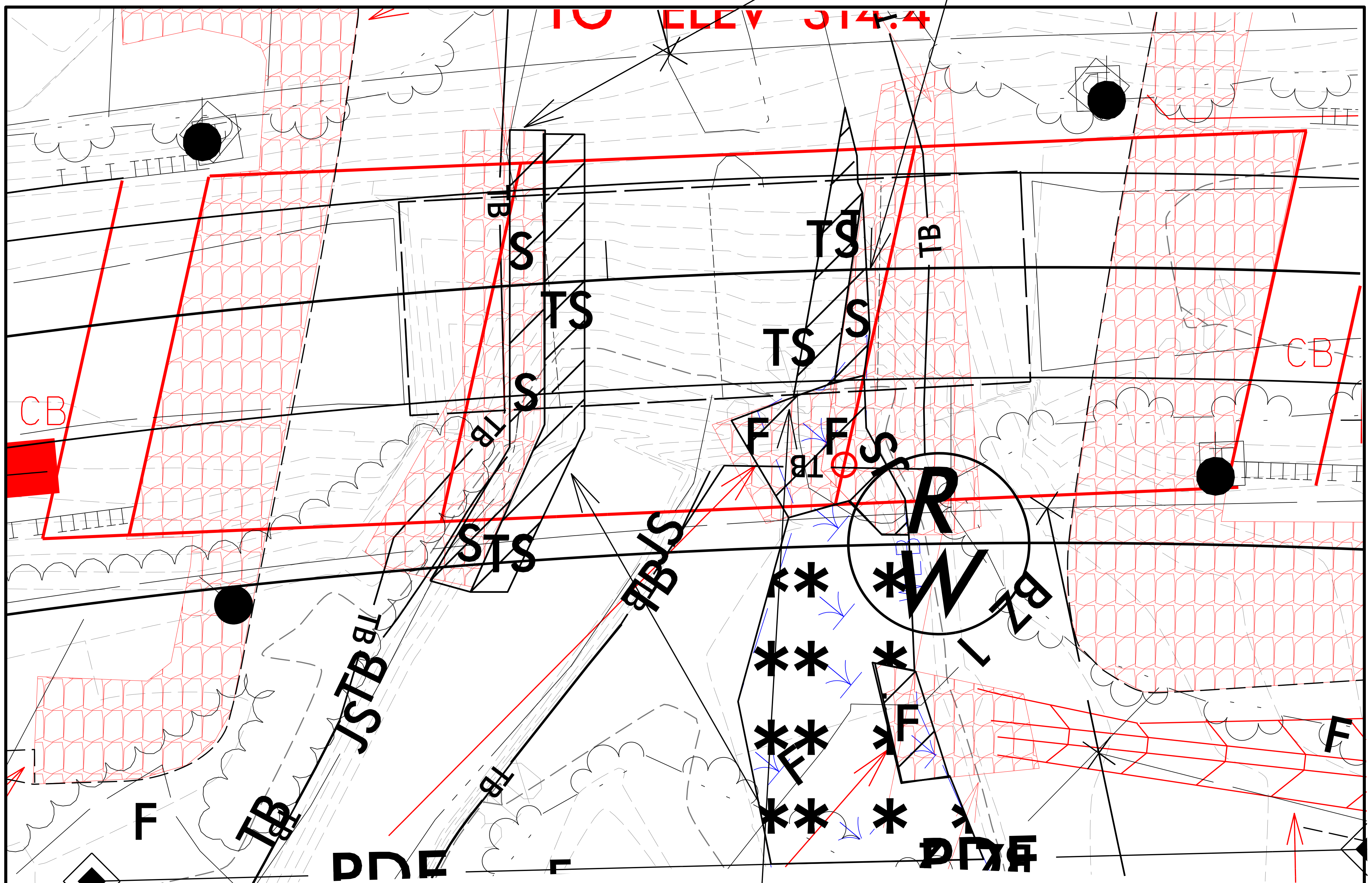
DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 3

BANK STABILIZATION
SEE DETAIL 2



TEMPORARY CAUSEWAY
SEE PERMIT SHEET 8

15′ 0′ 15′ 30′ 45′

REVISIONS

8/17/99

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$USERNAME$$$$$

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-4659	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BUFFER DRAWING
SHEET 8 OF 10

BM* 50
-L- STA.14+64
74' LT.
ELEV.= 313.65'
RR SPIKE IN 16" POPLAR

BEGIN OVERLAY
-L- STA.10+25.00

END OVERLAY
BEGIN GRADE
-L- STA.10+90.00
EL = 321.47'

PI = 13+75.00
EL = 318.34'
VC = 265'
K = 65

BEGIN BRIDGE
-L- STA.15+43.65

℄ -L- STA. 16+15.00
21" CORED SLAB
SPANS = 1@40', 1@50', 1@50'
EL. = 325.54' SKEW = 105°

CLASS II RIP RAP
SEE STRUCTURE PLANS
(STRUCTURE PAY ITEM)

END BRIDGE
-L- STA.16+86.35

PI = 18+75.00
EL = 333.34'
VC = 350'
K = 66

END GRADE
-L- STA.22+50.00
EL = 363.90'

PI = 21+50.00
EL = 356.10'
VC = 200'
K = 420

(+)18.2764%
(+)17.8000%
18" RCP

(+)3.0000%
(+)18.2764%
(-)1.0992%
(+)3.0000%
NG LEFT
NG RIGHT

EXCAVATION TO ELEV 311.4'
N.W.S. EL=307.9'
(+) 7.00%
(+) 2.53%
1.5:1
NORMAL TO BRIDGE
KEY-IN 3.5'
TEMPORARY CAUSEWAY

BEGIN RT DITCH GRADE
-L- STA.16+55.00
EL = 310.95'

BEGIN LT DITCH GRADE
-L- STA.17+20.00
EL = 313.80'

END RT DITCH GRADE
-L- STA.18+15.30
EL = 315.00'

END LT DITCH GRADE
-L- STA.18+50.00
EL = 322.90'

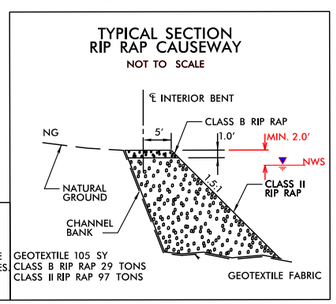
BM #51
-L- STA.22+50
S 03° 28' 56" E DIST (RT.) 418'
ELEV.= 393.81'
RR SPIKE IN 20" PINE

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1,451	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 313.5	FT
BASE DISCHARGE	= 2,763	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 315.56	FT
OVERTOPPING DISCHARGE	= 11,500	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 322.5	FT
ESTIMATED N.W.S. ELEVATION	= 307.9	FT
DATE OF SURVEY	= 5/24/13	
W.S. ELEVATION AT DATE OF SURVEY	= 307.4	FT

SITE 3
SEE SHEETS 6 AND 7

TYPICAL SECTION
RIP RAP CAUSEWAY
NOT TO SCALE



NOTES:
1.) ONLY ONE TEMPORARY CAUSEWAY SHALL BE INSTALLED AND IN USE AT A TIME.
2.) TEMPORARY IN-STREAM CAUSEWAYS TO PROVIDE ACCESS DURING CONSTRUCTION TO INTERIOR PILES.
3.) CLASS II RIP-RAP TO BE RETAINED ON STREAMBANK TO PROVIDE PERMANENT STABILITY.

END BENT EXCAVATION
SEE STRUCTURE PLANS
(STRUCTURE PAY ITEM)

FOR -L- PLAN VIEW, SEE SHEET NO. 4

FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-?

390 380 370 360 350 340 330 320 310 300 290 280 270 260 250 240 230 220

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00

7:30:06 AM
6/24/2014
P:\2013.09 B4659 Bridge 373 over Basal Creek\Hydraulics\CADD\B4659_Hyd_pf1_L.dgn

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4659	X-2

PERMIT DRAWING
SHEET 9 OF 10

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

325 320 315 310

PROP R/W
EXIST R/W
2:1
0.040
0.040
319.26
318.45
2:1
CE
WETLAND
EXIST R/W
PROP R/W
14+00.00

PROP R/W
EXIST R/W
2:1
0.040
0.040
318.79
318.45
2:1
CE
WETLAND
EXIST R/W
PROP R/W
13+50.00

PROP R/W
EXIST R/W
2:1
0.040
0.040
318.70
318.71
2:1
CE
WETLAND
EXIST R/W
PROP R/W
13+00.00

PUE
WETLAND
PROP R/W
EXIST R/W
2:1
0.023
0.023
319.27
319.08
2:1
CE
WETLAND
EXIST R/W
PROP R/W
12+50.00

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

I:\28\08\3113.09\Drawings\Hydraulics\CADD\XSC\B4659_Hyd_XPL.dgn
6/23/2014 11:28:08 AM

3113.09 B4659 Bridge 373 over Basal Creek

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	12+00 to 12+60 LT	Roadway Fill	< 0.01			0.01						
2	12+00 to 14+60 RT	Roadway Fill	0.02			0.04						
2**	12+00 to 12+50 RT	Utility Impact		0.03								
3	15+65 to 16+60 LT/RT	Temporary Causeway							< 0.01		61	
3	15+65 to 16+60 LT/RT	Riprap at Embankment						< 0.01		61		
3	16+15 to 16+45 RT	Rip Rap	< 0.01			0.02						
TOTALS*:			0.04	0.03		0.07		< 0.01	< 0.01	61	61	

*Rounded totals are sum of actual impacts

** Assumed timber mats used to contain utility equipment

NOTES: Permanent bridge pier impacts are < 0.01 acres (85 sq. ft.).
All piers are located in rip-rapped areas and included in permanent SW impacts.

Revised 2013 10 24

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
2014 07 30
WAKE COUNTY
BRIDGE 373 ON SR 1393 BASS LAKE ROAD
OVER BASAL CREEK
SHEET 10 OF 10

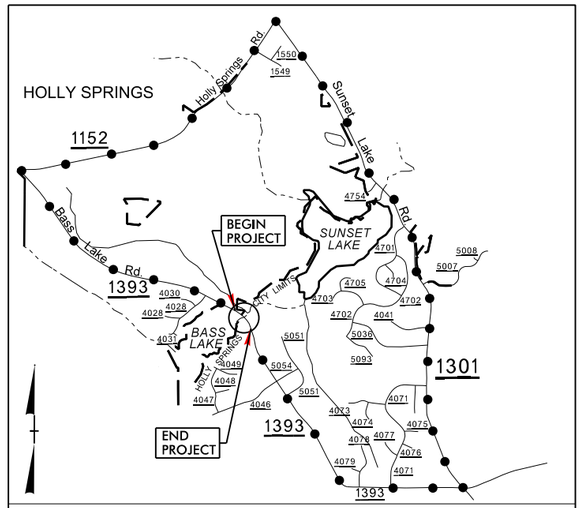
09/08/99

TIP PROJECT: B-4659

CONTRACT:

$$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

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



VICINITY MAP

OFF–SITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

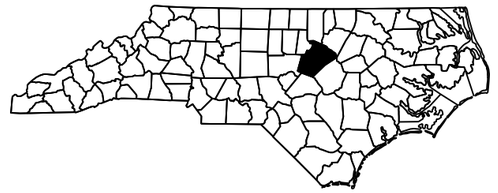
BUFFER DRAWING SHEET 1 OF 4

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B–4659	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38456.1.1	BRZ–1393(3)	P.E.
38456.2.FDU1	BRZ–1393(3)	UTIL.
38456.2.FD1	BRZ–1393(3)	R/W

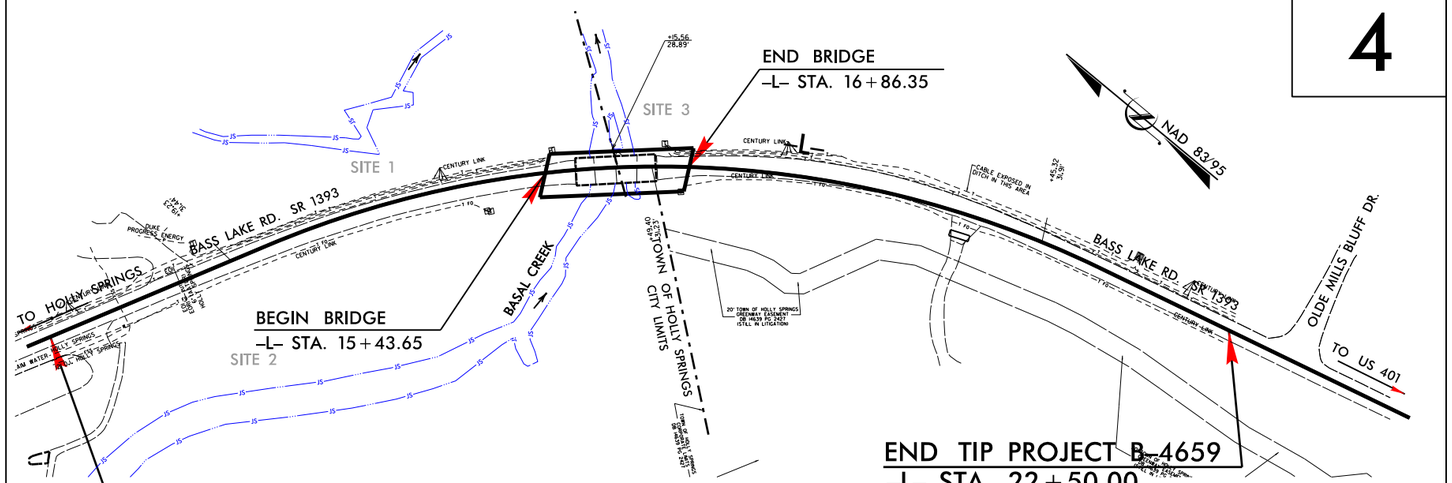
LOCATION: BRIDGE NO. 373 OVER BASAL CREEK ON SR 1393 (BASS LAKE RD.)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE



BUFFER IMPACTS PERMIT

4



A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF HOLLY SPRINGS.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ___.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 6,540 VPD
ADT 2035 = 10,220 VPD
DHV = 10 %
D = 60 %
*T = 4 %
V = 40 MPH
*(TTST 1% + DUAL 3%)
FUNC. CLASS. = URBAN COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B–4659 = 0.205 MILE
LENGTH STRUCTURE TIP PROJECT B–4659 = 0.027 MILE
TOTAL LENGTH TIP PROJECT B–4659 = 0.232 MILE

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:
MARCH 17, 2015

TONY HOUSER, PE
PROJECT ENGINEER

JEFFREY L. TEAGUE, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE:

ROADWAY DESIGN ENGINEER

SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

8/17/99

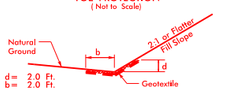
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4659	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BUFFER DRAWING SHEET 2 OF 4

BUFFER IMPACTS PERMIT

DETAIL 1
TOE PROTECTION
(Not to Scale)

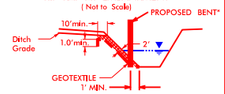


d= 2.0 Ft.
b= 2.0 Ft.

Type of Liner= CL B Rip-Rap

12+05 TO STA. 14+40 –L– (LT)
18+50 TO STA. 19+75 –L– (LT)

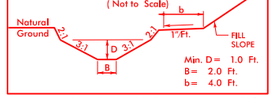
DETAIL 2
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 210 TONS CL II Rip-Rap
Geotextile = 210sy

FROM STA. 16+45 TO STA. 16+60 –L– (RT)
FROM STA. 15+25 TO 15+95 –L– (LT & RT)*
FROM STA. 16+25 TO 16+50 –L– (LT & RT)*

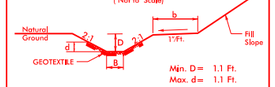
DETAIL 3
LATERAL GRASSED SWALE
(Not to Scale)



Min. D= 1.0 Ft.
B= 2.0 Ft.
b= 4.0 Ft.

FROM STA. 16+55 TO STA. 18+15.3 –L– (RT)

DETAIL 5
LATERAL BASE DITCH
(Not to Scale)

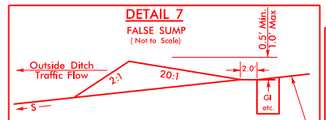


Min. D= 1.1 Ft.
Max. d= 1.1 Ft.
B= 2.0 Ft.
b= 5.0 Ft.

Type of Liner= CL II Rip-Rap

FROM STA. 17+20 TO STA. 18+50 –L– (LT)

DETAIL 7
FALSE SUMP
(Not to Scale)



FROM STA. 19+64 TO STA. 19+90 –L– LT

DETAIL 6
COUNTER SUNK RIP RAP PAD
(Not to Scale)

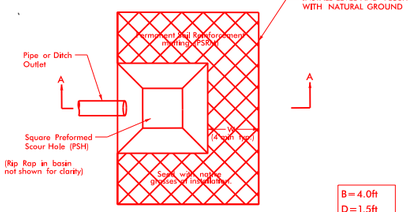
Max. d= 2.0 Ft.
B=WETLAND BOUNDARY

Type of Liner= CL II Rip-Rap

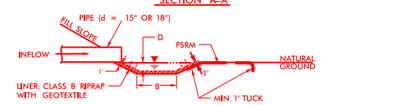
FROM STA. 16+15 TO STA. 16+25 –L– (RT)

DETAIL 8
PREFORMED SCOUR HOLE
*NOT TO SCALE

PLAN VIEW



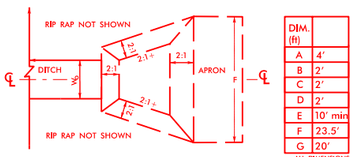
SECTION A-A



B=4.0ft
D=1.5ft
W=4.0ft

STA. 14+50 –L– (RT)

DETAIL 4
CLASS II RIP-RAPPED
ENERGY DISSIPATOR BASIN



DIM. (ft)	
A	4'
B	2'
C	2'
D	2'
E	10' min
F	23.5'
G	20'

ALL DIMENSIONS APPROXIMATE

PLAN

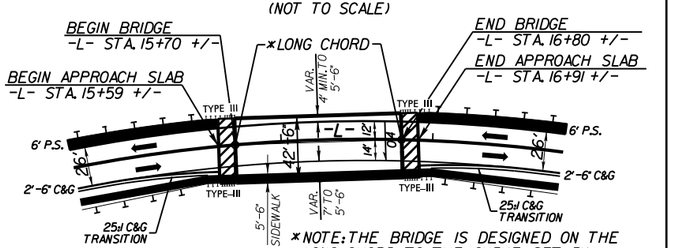
℄ SECTION

STA. 17+20 TO STA. 17+20
EST. 7 TONS CLASS II RIP RAP
EST 86 SY GEOTEXTILE

UTILITY IMPACTS ZONE 1 (EXEMPT)
ALLOWABLE IMPACTS ZONE 1 – ROADWAY
ALLOWABLE IMPACTS ZONE 1 – BRIDGE
MITIGABLE IMPACTS ZONE 1
UTILITY IMPACTS ZONE 2 (EXEMPT)
ALLOWABLE IMPACTS ZONE 2 – ROADWAY
ALLOWABLE IMPACTS ZONE 2 – BRIDGE
MITIGABLE IMPACTS ZONE 2

30' 0' 30' 60' 90'
30' Scale

SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP
(NOT TO SCALE)



*NOTE: THE BRIDGE IS DESIGNED ON THE LONG CHORD TO THE CURVE SET BY STRUCTURE DESIGN (SEE STRUCTURE PLANS).

NOTE: THE CONCRETE SIDEWALK LOCATED ON THE BRIDGE AND APPROACH SLABS IS A STRUCTURE PAY ITEM.

PAVED SHOULDER
SIDEWALK
FOR –L– PROFILE, SEE SHEET NO. 5
FOR STRUCTURE PLANS, SEE SHEETS S–1 THRU S–?

$$$$SYSTIME$$$$
$$$$DGN$$$$
$$$$USERNAME$$$$

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	ROADWAY FILL	12+50 to 14+80 LT			X				2782	3045	5827		
3	ROADWAY FILL	14+85 to 15+30 LT/RT	X			533	2000	2533					
3	BRIDGE	15+30 to 17+00 LT / RT		X		7562	2185	9747					
TOTAL:						8095	4185	12280	2782	3045	5827		

* Site 2: The utility buffer impacts within the AUE station 12+00 to 12+50 -L- rt are exempt.

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRG 373 OVER BASAL CK ON SR 1393
WAKE COUNTY
PROJECT: 38456.1.1 (B-4659)

7/30/2014
SHEET 3 OF 4

Rev. May 2006

WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO.	STATION (FROM/TO)		WETLANDS IN BUFFERS ZONE 1 (ft^2)	WETLANDS IN BUFFERS ZONE 2 (ft^2)
3	16+50 RT		865	399
TOTAL:			865	399

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRG 373 OVER BASAL CK ON SR 1393
WAKE COUNTY
PROJECT: 38456.1.1 (B-4659)

7/30/2014
SHEET 4 OF 4

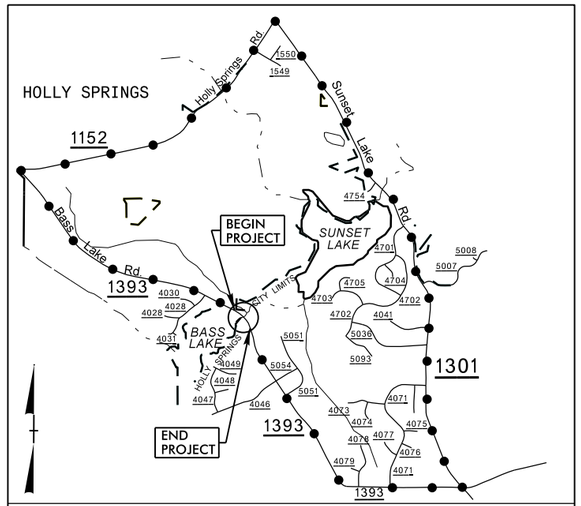
Rev. Jan 2009

09/08/99

TIP PROJECT: B-4659

CONTRACT:

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



VICINITY MAP

OFF-SITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

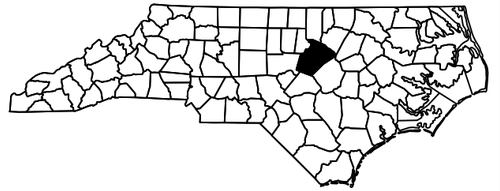
WAKE COUNTY

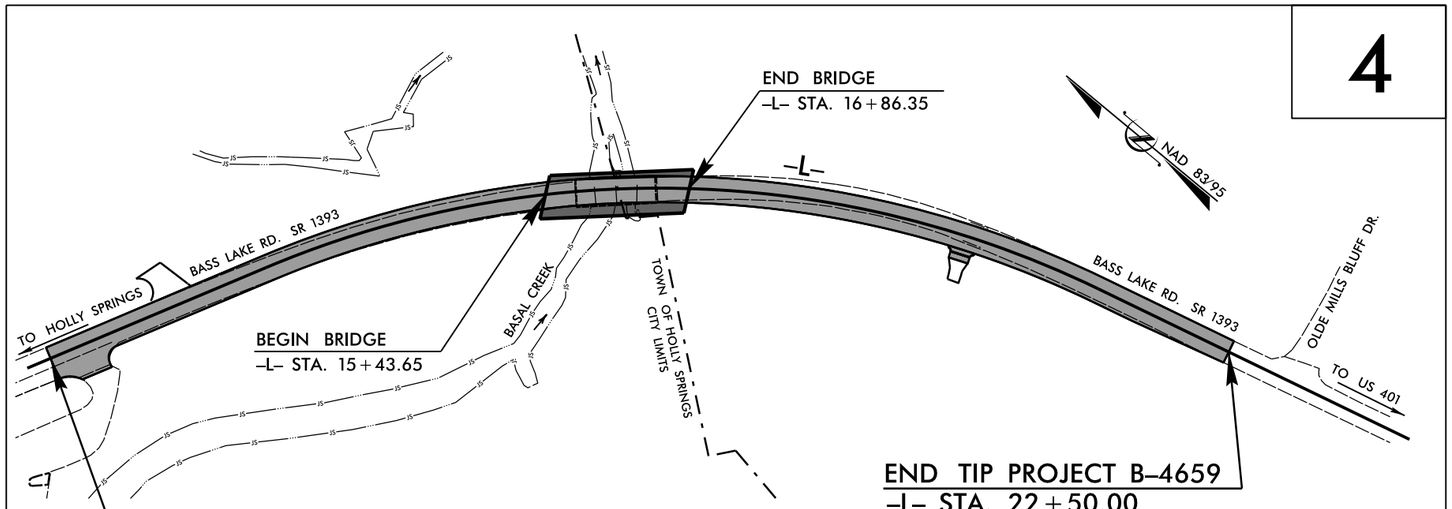
LOCATION: BRIDGE NO. 373 OVER BASAL CREEK ON SR 1393 (BASS LAKE RD.)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4659	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38456.1.1	BRZ-1393(3)	P.E.
38456.2.FDU1	BRZ-1393(3)	UTIL.
38456.2.FD1	BRZ-1393(3)	R/W





4

A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF HOLLY SPRINGS.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 6,540 VPD
ADT 2035 = 10,220 VPD
DHV = 10 %
D = 60 %
*T = 4 %
V = 40 MPH
*(TTST 1% + DUAL 3%)
FUNC. CLASS. = URBAN COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4659 = 0.205 MILE
LENGTH STRUCTURE TIP PROJECT B-4659 = 0.027 MILE
TOTAL LENGTH TIP PROJECT B-4659 = 0.232 MILE

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH 31, 2014

LETTING DATE:
MARCH 17, 2015

TONY HOUSER, PE
PROJECT ENGINEER

JEFFREY L. TEAGUE, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE:

ROADWAY DESIGN ENGINEER

SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

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$$$$USERNAME$$$$

12/05/11

PROJECT REFERENCE NO.	SHEET NO.
B-4659	1-B

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 R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A Marker — CA
- 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.

03/22/13

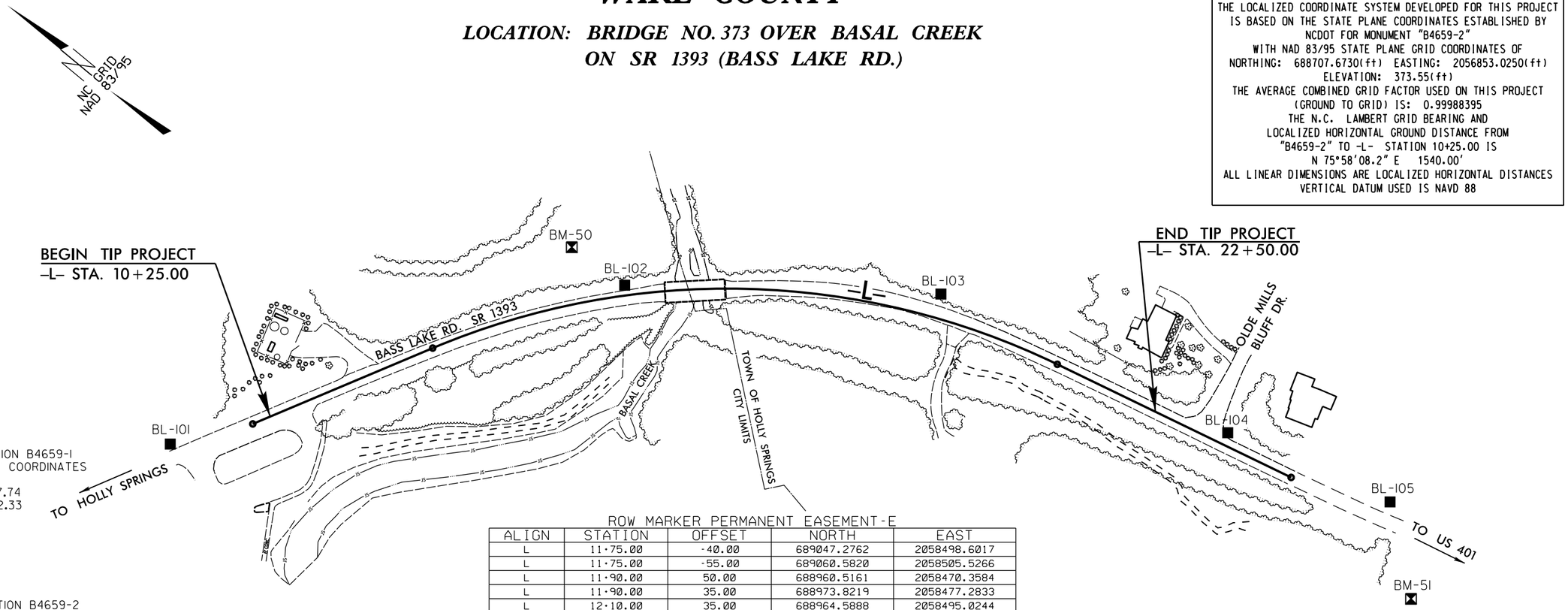
PROJECT REFERENCE NO.	SHEET NO.
B-4659	1-C
Location and Surveys	

SURVEY CONTROL SHEET B-4659
WAKE COUNTY

LOCATION: BRIDGE NO. 373 OVER BASAL CREEK ON SR 1393 (BASS LAKE RD.)

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4659-2"
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 688707.6730(ft) EASTING: 2056853.0250(ft)
ELEVATION: 373.55(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988395
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4659-2" TO -L- STATION 10+25.00 IS
N 75°58'08.2" E 1540.00'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88



NCDOT GPS STATION B4659-1
LOCALIZED PROJECT COORDINATES

N=689427.74
E=2057712.33

NCDOT GPS STATION B4659-2
LOCALIZED PROJECT COORDINATES

N=688707.673
E=2056853.025

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	689092.5839	2058324.9003
PC	12+57.40	688973.7555	2058553.2246
PT	21+06.45	688326.2234	2059062.4568
POT	24+48.84	687993.8040	2059144.4672

CONTROL DATA
BASELINE

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
101	BL-101	689159.4194	2058234.9865	328.46	OUTSIDE PROJECT LIMITS	
102	BL-102	688831.8942	2058778.5901	318.08	15+22.33	13.57 LT
103	BL-103	688503.5115	2059035.7130	337.28	19+32.59	32.06 LT
104	BL-104	688095.7967	2059136.4005	371.82	OUTSIDE PROJECT LIMITS	
105	BL-105	687872.8882	2059202.7996	388.43	OUTSIDE PROJECT LIMITS	

BENCHMARK DATA

```
**************************************
50       ELEVATION = 313.65'
N 688918      E 2058773
L STATION 14+64  74' LEFT
RR SPIKE IN 16" POPLAR
**************************************
**************************************
51       ELEVATION = 393.81'
N 687770      E 2059122
L STATION 22+50
  S 03°28'56" E   DIST (RIGHT)  418'
RR SPIKE IN 20" PINE
**************************************
```

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	11+75.00	-40.00	689047.2762	2058498.6017
L	11+75.00	-55.00	689060.5820	2058505.5266
L	11+90.00	50.00	688960.5161	2058470.3584
L	11+90.00	35.00	688973.8219	2058477.2833
L	12+10.00	35.00	688964.5888	2058495.0244
L	12+10.00	50.00	688951.2829	2058488.0996
L	12+30.00	110.00	688888.8263	2058478.1413
L	12+35.00	35.00	688953.0473	2058517.2009
L	12+55.00	115.00	688872.8495	2058498.0094
L	13+00.00	55.00	688905.6251	2058563.1412
L	13+00.00	35.00	688922.9569	2058573.1216
L	13+30.00	55.00	688891.1115	2058587.4932
L	13+30.00	35.00	688908.1362	2058597.9890
L	14+35.00	35.00	688850.5355	2058681.2925
L	14+35.00	70.00	688822.8315	2058659.9035
L	14+35.00	-70.00	688933.6474	2058745.4596
L	14+35.00	-55.00	688921.7743	2058736.2929
L	15+25.00	70.00	688768.7709	2058723.7660
L	15+80.00	-55.00	688819.8529	2058850.1893
L	15+80.00	-85.00	688840.7009	2058871.7615
L	17+00.00	73.00	688646.4707	2058830.4734
L	17+40.00	-85.00	688706.7710	2058981.9228
L	17+40.00	-100.00	688715.3434	2058994.2319
L	18+15.00	35.00	688577.3055	2058922.5474
L	18+15.00	84.00	688552.3938	2058880.3525
L	18+40.00	35.00	688556.3798	2058934.5517
L	18+60.00	-55.00	688581.6508	2059023.2568
L	18+60.00	-100.00	688602.7626	2059062.9971
L	18+65.00	135.00	688488.6878	2058857.4838
L	18+72.00	35.00	688529.1685	2058949.1474
L	19+00.00	130.00	688463.8072	2058875.5874
L	21+35.00	50.00	688286.5288	2059020.7506
L	21+35.00	35.00	688290.1217	2059035.3140
L	21+55.00	35.00	688270.7039	2059040.1045
L	21+55.00	50.00	688267.1110	2059025.5411

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+90.00	-30.00	689077.6465	2058418.5852
L	10+90.00	-40.00	689086.5171	2058423.2018
L	11+00.00	35.00	689015.3711	2058397.4481
L	11+00.00	30.00	689019.8040	2058399.7551
L	12+57.40	35.00	688942.7085	2058537.0666
L	12+57.40	-40.00	689009.2378	2058571.6909
L	12+57.40	-55.00	689022.5437	2058578.6158
L	20+50.00	-55.00	688396.7858	2059099.9666
L	20+50.00	-35.98	688391.1958	2059081.7878
L	21+06.45	35.00	688317.8400	2059028.4757
L	21+06.45	-34.98	688334.6010	2059096.4146
L	22+50.00	35.00	688178.4693	2059062.8594
L	22+50.00	30.00	688179.6670	2059067.7139

NOTE: DRAWING NOT TO SCALE

NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
   HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/PAGES

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   B4659_LS_CONTROL.TXT

   SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS).

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6/2/99

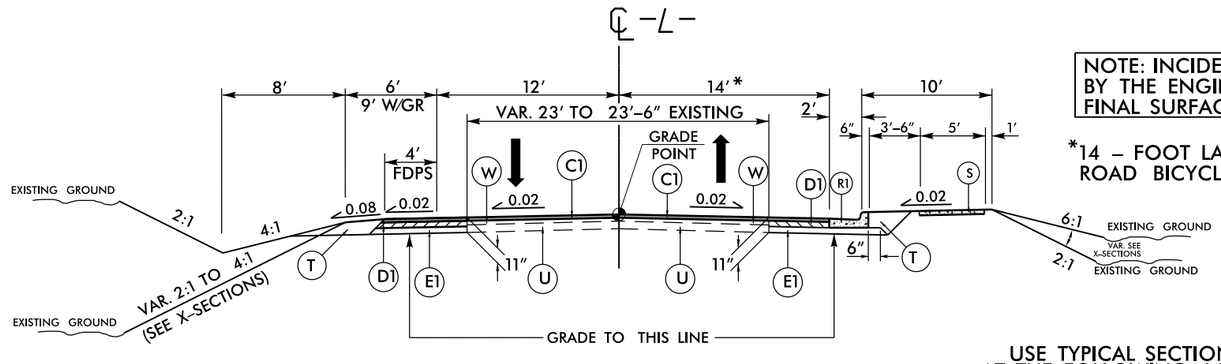
PROJECT REFERENCE NO.	SHEET NO.
B-4659	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN)

C1	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.
C2	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 TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" 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. 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" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
R1	2'-6" CONCRETE CURB AND GUTTER.
S	4" CONCRETE SIDEWALK.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE DETAIL SHOWING METHOD OF WEDGING.)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION NO. 1

NOTE: INCIDENTAL MILLING AS DIRECTED BY THE ENGINEER TO TIE PROPOSED FINAL SURFACE TO EXISTING PAVEMENT.

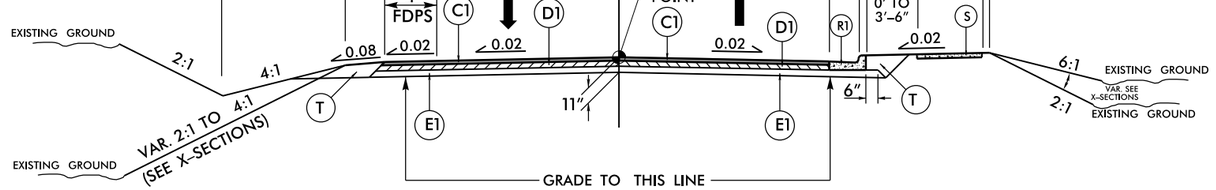
*14 – FOOT LANE USED FOR SHARE THE ROAD BICYCLE ACCOMODATION.

USE TYPICAL SECTION NO. 1
AT THE FOLLOWING LOCATIONS:

–L– STA. 10+90.00 TO –L– STA. 13+75.00

NOTE: OVERLAY EXISTING PAVEMENT WITH 1 1/2" OF S9.5B –L– STA. 10+25.00 TO –L– STA. 10+90.00

NOTE: SEE PLANS FOR SIDEWALK LIMITS



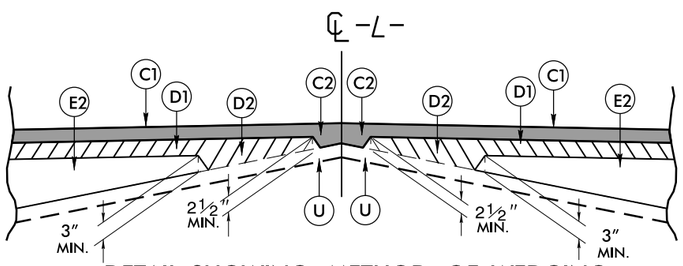
TYPICAL SECTION NO. 2

*14 – FOOT LANE USED FOR SHARE THE ROAD BICYCLE ACCOMODATION.

USE TYPICAL SECTION NO. 2
AT THE FOLLOWING LOCATIONS:

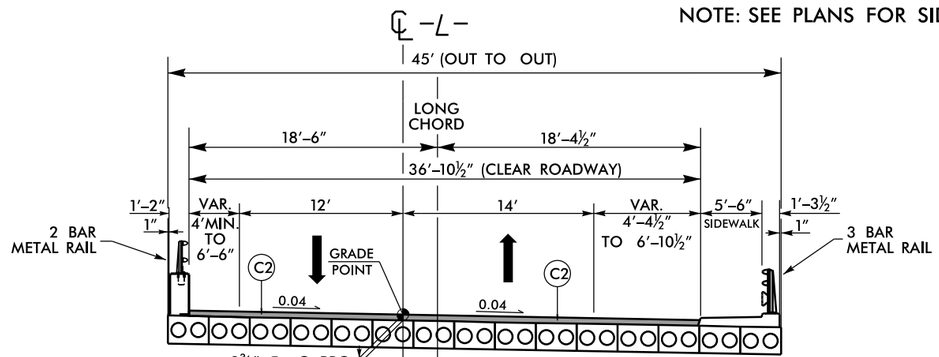
–L– STA. 13+75.00 TO –L– STA. 15+43.65 (BEGIN BRIDGE)
–L– STA. 16+86.35 (END BRIDGE) TO –L– STA. 22+50.00

NOTE: SEE PLANS FOR SIDEWALK LIMITS



DETAIL SHOWING METHOD OF WEDGING

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1



TYPICAL SECTION NO. 3

CORED SLAB BRIDGE
SEE STRUCTURE PLANS

USE TYPICAL SECTION NO. 3
AT THE FOLLOWING LOCATION:

–L– STA. 15+43.65 (BEGIN BRIDGE) TO
–L– STA. 16+86.35 (END BRIDGE)

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REVISIONS

R/W REVISION : THE PERMANENT DRAINAGE EASEMENT (PDE) RIGHT OF –L– STA. 18+00 HAS BEEN INCREASED ON PARCEL 4. THE DRAINAGE/UTILITY EASEMENT (DUE) LEFT OF –L– STA. 17+90 HAS BEEN REDUCED ON PARCEL 5. CEH 6/1/14.

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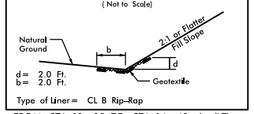
PROJECT REFERENCE NO.	SHEET NO.
B-4659	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL 1
TOE PROTECTION
(Not to Scale)

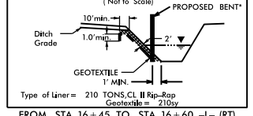


d= 2.0 Ft.
b= 2.0 Ft.

Type of Liner= CL B Rip-Rap

FROM STA. 12+05 TO STA. 14+40 –L– (LT)
FROM STA. 18+50 TO STA. 19+75 –L– (LT)

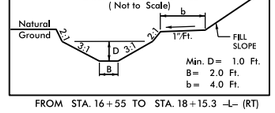
DETAIL 2
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 210 TONS, CL II Rip-Rap
Geotextile = 210sy

FROM STA. 16+45 TO STA. 16+60 –L– (RT)
FROM STA. 15+65 TO 15+95 –L– (LT & RT)*
FROM STA. 16+25 TO 16+50 –L– (LT & RT)*

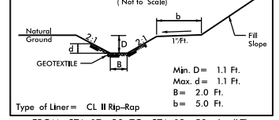
DETAIL 3
LATERAL GRASSED SWALE
(Not to Scale)



Min. D= 1.0 Ft.
B= 2.0 Ft.
b= 4.0 Ft.

FROM STA. 16+55 TO STA. 18+15.3 –L– (RT)

DETAIL 5
LATERAL BASE DITCH
(Not to Scale)

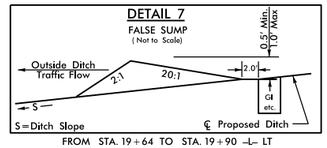


Min. D= 1.1 Ft.
Max. d= 1.1 Ft.
B= 2.0 Ft.
b= 5.0 Ft.

Type of Liner= CL II Rip-Rap

FROM STA. 17+20 TO STA. 18+50 –L– (LT)

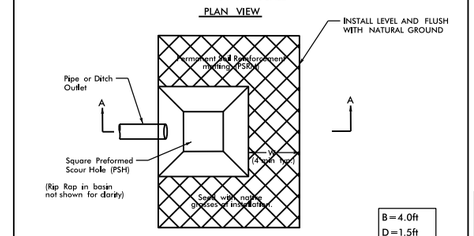
DETAIL 7
FALSE SUMP
(Not to Scale)



S=Ditch Slope ℄ Proposed Ditch

FROM STA. 19+64 TO STA. 19+90 –L– LT

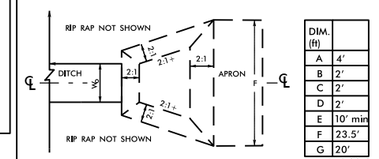
DETAIL 8
PREFORMED SCOUR HOLE
*NOT TO SCALE



308

STA. 14+50 –L– (RT)

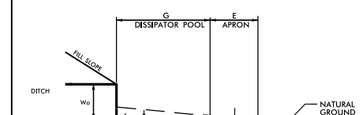
DETAIL 4
CLASS II RIP-RAPPED ENERGY DISSIPATOR BASIN



DIM. (ft)	
A	4'
B	2'
C	2'
D	2'
E	10' min
F	23.5'
G	20'

ALL DIMENSIONS APPROXIMATE

PLAN



℄ SECTION

BEGIN TIP PROJECT B–4659
–L– POT STA. 10+25.00

NAD 83/95

(1) TOWN OF HOLLY SPRINGS DB 7197 PG 260 BM 1992 PG 1037

(2) TOWN OF HOLLY SPRINGS DB 8447 PG 2041 BM 1999 PG 1962

(3) TOWN OF HOLLY SPRINGS DB 8447 PG 2050 BM 1999 PG 1962-4

(4) SANDRA BLANKS SIMPSON DB 13325 PG 1972 DB 14639 PG 2427

(5) ANITA G. CURTIS 2000-E-1902 DB 3606 PG 722

(6) CHRISTOPHAE C. FORMONT & ERICA J. FORMANT DB 9356 PG 1740 BM 2000 PG 1240

DO NOT DISTURB FENCE

TOE PROTECTION SEE DETAIL 1 CL B RIP RAP EST. 135 TONS GEOTEXTILE EST. 363 SY

PAVE TO FACE OF GUARDRAIL

TRANSITION SIDEWALK W/ GUARDRAIL

RIP RAP ENERGY DISSIPATOR BASIN SEE DETAIL 4

LATERAL BASE DITCH SEE DETAIL 5

CL B RIP RAP EST. 3 TONS GEOTEXTILE EST. 10 SY

TOE PROTECTION SEE DETAIL 1 CL B RIP RAP EST. 72 TONS GEOTEXTILE EST. 193 SY

CLASS II RIP RAP (STRUCTURE PAY ITEM) ELEV. 314.5'

RIP RAP AT EMBANKMENT SEE DETAIL 2

PSH SEE DETAIL 8

CLASS II RIP RAP TO SHLD PT FILL SLOPE 1.6:1 (STRUCTURE PAY ITEM) 20' TOWN OF HOLLY SPRINGS GREENWAY/ EASEMENT DB 14639 PG 2427 (STILL IN LITIGATION)

RIP RAP AT EMBANKMENT SEE DETAIL 2 EST. 11 TONS CL II RIP RAP EST. 11 SY GEOTEXTILE

CL B RIP RAP EST. 3 TONS GEOTEXTILE EST. 11 SY

CL B RIP RAP EST. 2 TONS GEOTEXTILE EST. 7 SY

COUNTER SUNK RIP RAP PAD SEE DETAIL 6 EST 19 TONS RIP-RAP EST 19 SY GEOTEXTILE

LATERAL GRASSED SWALE SEE DETAIL 3

FUTURE BRIDGE

FUTURE GREENWAY TRAIL TO BE DONE BY OTHERS

BEGIN TRAIL

END TRAIL

TRANSITION PROP. SIDEWALK TO EXISTING

POT Sta. 10+00.00

PC Sta. 12+57.40

PT Sta. 21+06.45

POT Sta. 24+48.84

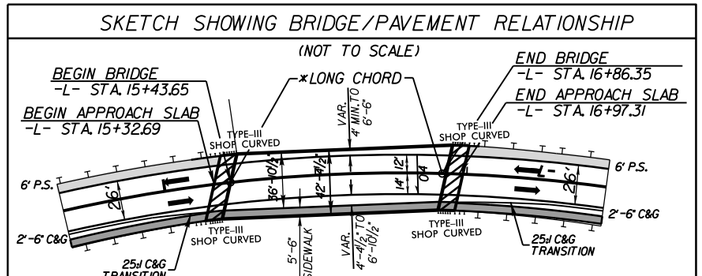
FROM STA. 16+80 TO STA. 17+20 EST 67 TONS CLASS II RIP RAP EST 86 SY GEOTEXTILE

RECLAIMED WATERLINE MARKER

SS MANHOLE

–L–
PI Sta 17+09.41
Δ = 48° 38' 50.3" (RT)
D = 5° 43' 46.5"
L = 849.06'
T = 452.01'
R = 1,000.00'
SE = 0.04
RO = 84'
Ⓐ S 62° 30' 21.1" E

SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP
(NOT TO SCALE)



*NOTE: THE BRIDGE IS DESIGNED ON THE LONG CHORD TO THE CURVE SET BY STRUCTURE DESIGN (SEE STRUCTURE PLANS).

NOTE: THE CONCRETE SIDEWALK LOCATED ON THE BRIDGE AND APPROACH SLABS IS A STRUCTURE PAY ITEM.

END TIP PROJECT B–4659
–L– POT STA. 22+50.00

PROP. PAVED SHOULDER

PROP. SIDEWALK

FOR –L– PROFILE, SEE SHEET NO. 5

FOR STRUCTURE PLANS, SEE SHEETS S–1 THRU S–?

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-4659	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DITCH LEGEND	
LEFT DITCH	— - - — -
RIGHT DITCH	- - - - - - -

BM# 50
-L- STA.14+64
74' LT.
ELEV.= 313.65'
RR SPIKE IN 16" POPLAR

-L-

BEGIN OVERLAY
-L- STA.10+25.00

END OVERLAY
BEGIN GRADE
-L- STA.10+90.00
EL = 321.47'

BEGIN BRIDGE
-L- STA.15+43.65

℄ -L- STA. 16+15.00
21" CORED SLAB
SPANS = 1@40', 1@50', 1@50'
EL. = 325.54' SKEW = 105°

END BRIDGE
-L- STA.16+86.35

PI = 13+75.00
EL = 318.34'
VC = 265'
K = 65

PI = 18+75.00
EL = 333.34'
VC = 350'
K = 66

PI = 21+50.00
EL = 356.10'
VC = 200'
K = 420

END GRADE
-L- STA.22+50.00
EL = 363.90'

CLASS II RIP RAP
SEE STRUCTURE PLANS
(STRUCTURE PAY ITEM)

(-)11.0982%
(+)3.0000%
(+)5.0000%
(+)8.2164%
(+)8.2164%
(+)7.9000%
(+)7.00%
(+)2.53%

18" RCP

N.W.S.
EL= 307.9

BEGIN RT DITCH GRADE
-L- STA.16+55.00
EL = 310.95'

BEGIN LT DITCH GRADE
-L- STA.17+20.00
EL = 313.80'

END RT DITCH GRADE
-L- STA.18+15.30
EL = 315.00'

END LT DITCH GRADE
-L- STA.18+50.00
EL = 322.90'

BM #51
-L- STA.22+50
S 03° 28' 56" E DIST (RT.) 418'
ELEV.= 393.81'
RR SPIKE IN 20" PINE

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1,451	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 313.5	FT
BASE DISCHARGE	= 2,763	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 315.56	FT
OVERTOPPING DISCHARGE	= 11,500	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 322.5	FT
ESTIMATED N.W.S. ELEVATION	= 307.9	FT
DATE OF SURVEY	= 5/24/13	
W.S.ELEVATION AT DATE OF SURVEY	= 307.4	FT

END BENT EXCAVATION
SEE STRUCTURE PLANS
(STRUCTURE PAY ITEM)

FOR -L- PLAN VIEW, SEE SHEET NO. 4

FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-?

390 380 370 360 350 340 330 320 310 300 290 280 270 260 250 240 230 220

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00

12-JUN-2014 09:50
R:\Roadway\PFC\B4659_Rdy_pf1_L.dgn
$$$$IDENTIFY$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4659	X-1

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

325
320
315
310

0.020 0.020 319.86
3:1 2:1
319.80
12+00.00

DRIVEWAY
15%
0.020 0.020 320.41
2:1
320.48
11+50.00

0.005 0.025 320.88
4:1 6:1
321.14
11+00.00

322.17
10+50.00

323.70
10+00.00

-4-

12-JUN-2014 09:47
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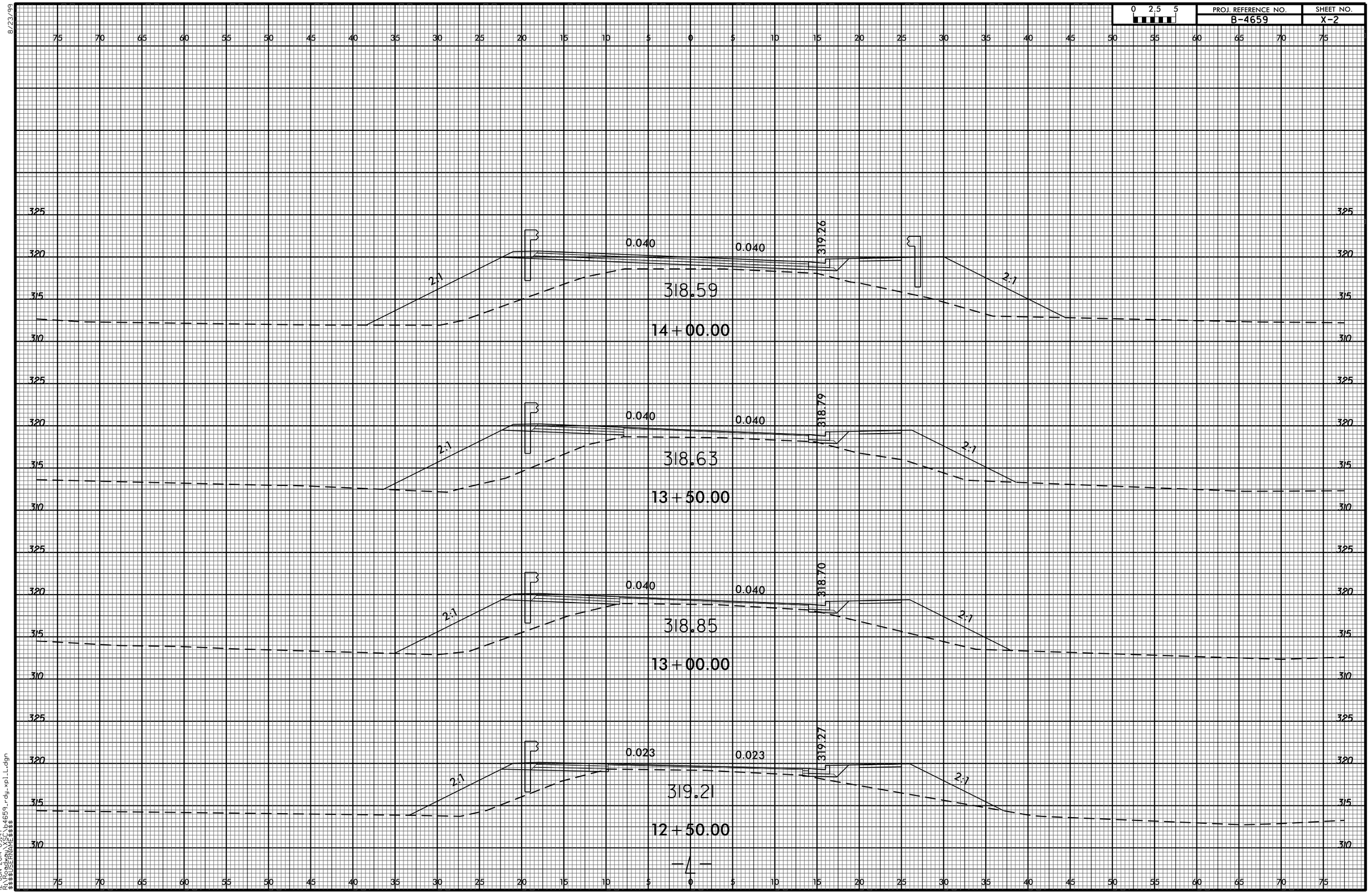
8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4659	X-2

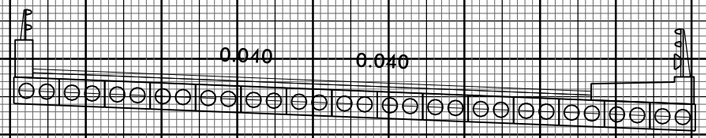


8/23/99

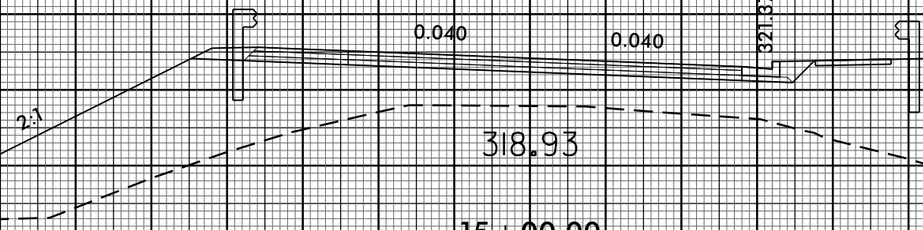
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4659	X-3

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

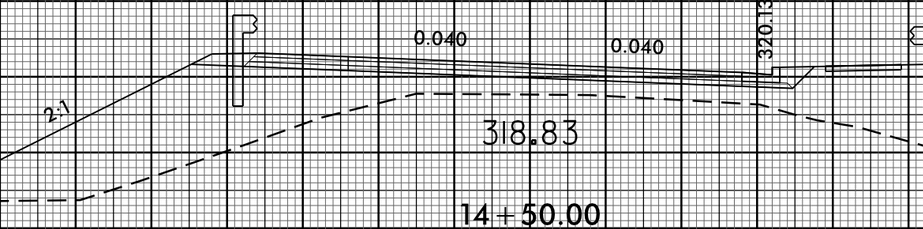
330 325 320 315 310 305 300



15+50.00



15+00.00



14+50.00

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8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4659	X-4

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

335 330 325 320 315 310 305 300

0.040

0.040

327.30

2:1

1.5:1

320.18

17+00.00

2:1

3:1

3:1

2:1

312.09

0.040

0.040

314.10

16+50.00

0.040

0.040

305.97

16+00.00

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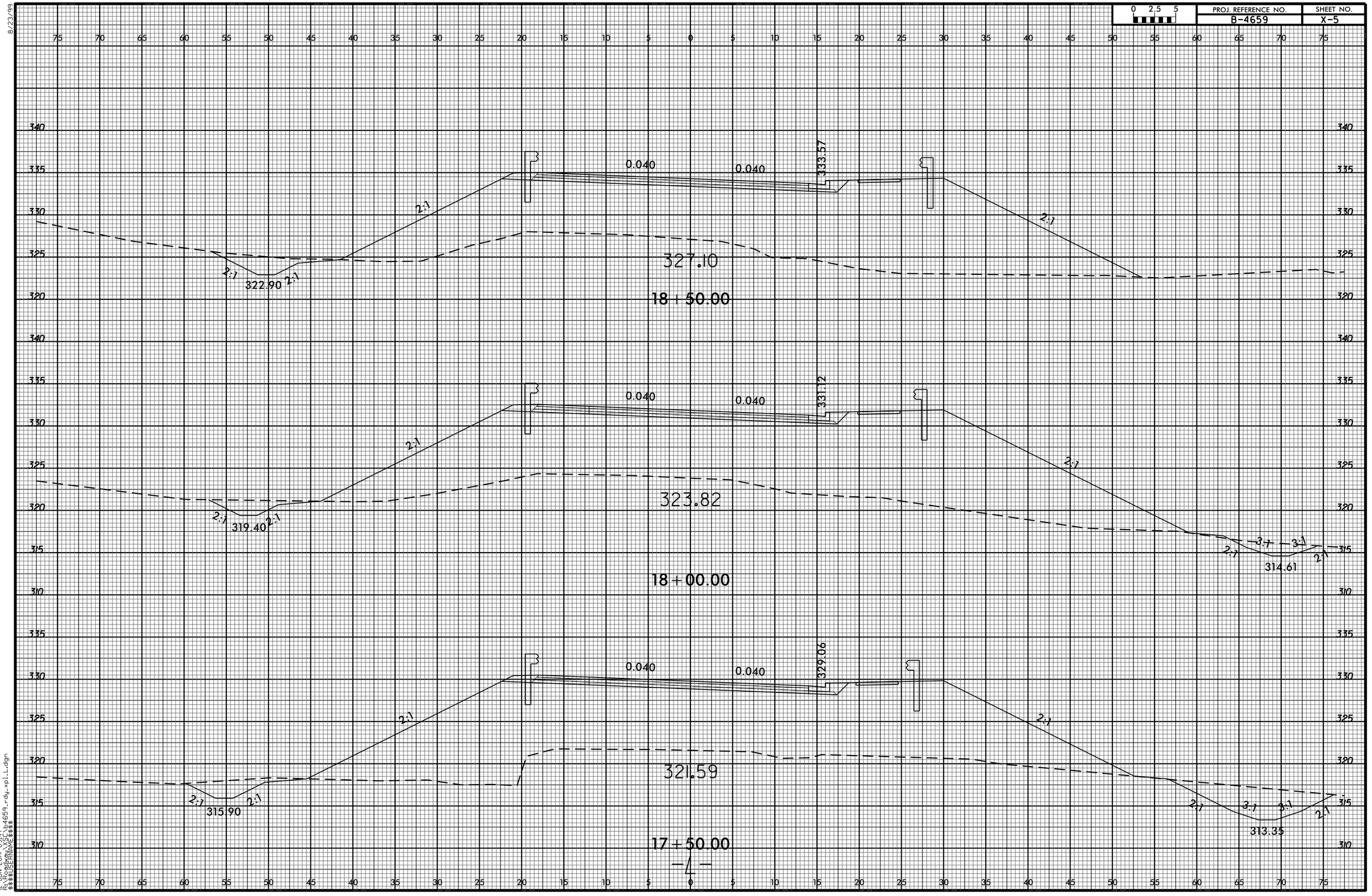
8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4659	X-5



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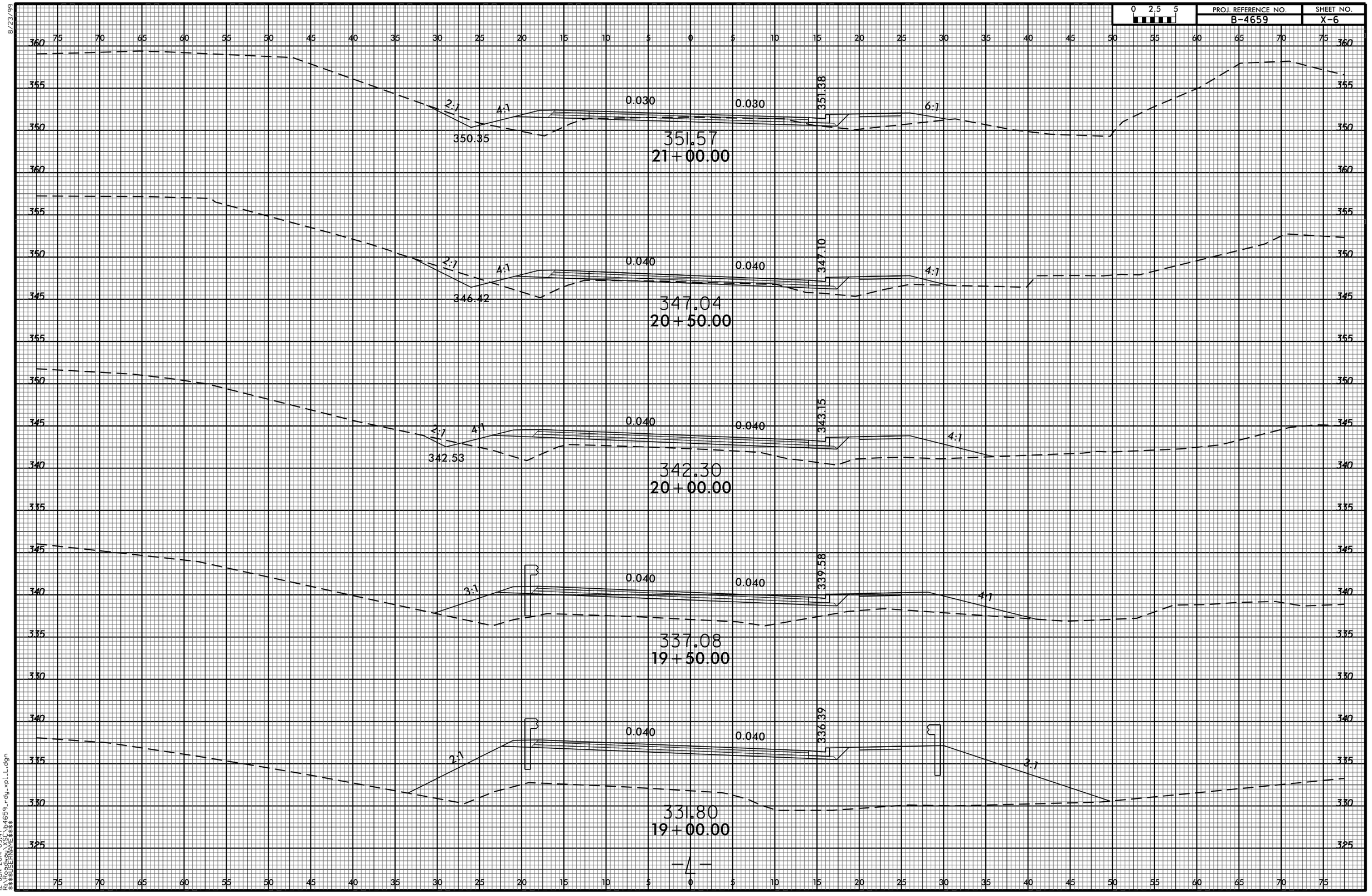
8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4659	X-6



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8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4659	X-7

376.11
24+00.00

372.18
23+50.00

368.09
23+00.00

2′ 2′
2:1 4:1 0.020 0.020 4:1
361.51
363.90
22+50.00

4′ 7′
2:1 4:1 0.018 0.020 4:1 2:1
357.56 357.21
359.76
22+00.00

6′
2:1 4:1 0.006 0.020 2%
353.97 355.61
355.74
21+50.00