



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT L. MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

November 20, 2014

US Army Corps of Engineers
Raleigh Regulatory Field Office
3331 Heritage Trade Dr., Suite 105
Wake Forest, NC 27587

Attention: David Bailey
NCDOT Coordinator, Division 7

Subject: **Application for the Modification to the Section 404 Individual Permit, Section 401 Water Quality Certification and Randleman Lake Buffer Authorization** for proposed widening from SR 1003 (North Main Street) and SR 1820 (Skeet Club Road) to NC 68 in High Point, Guilford County, Division 7, Federal Aid Project No. STP-1820(2), TIP No. U-3615B.

Reference: Section 404 Individual Permit, issued September 20, 2013, USACE
Action ID SAW-1999-21179

Section 401 Individual Water Quality Certification and Randleman Buffer
Authorization, issued August 29, 2013, NCDENR-DWQ Water Quality
Certification Project No. 2013-0477

Debit \$570.00 from WBS Element No. 34962.1.1

Dear Sir:

The North Carolina Department of Transportation (NCDOT) proposes to widen and improve Skeet Club Road to a multi-lane facility from SR 1003 (North Main Street) and SR 1820 (Skeet Club Road) between US 311 to NC 68 and reconfigure the intersection at North Main Street and Skeet Club Road in High Point. This permit modification request is for revisions to Sites 1, 2, 2A, 2B, 5, 5A, and 6. Attached are the revised Wetland and Surface Waters Permit Plan Sheets 1, 16, 17, 19, and 20 of 27, Buffer Permit Plan Sheets 1-4, 8, 12, and 13 of 13, and corresponding roadway plans.

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

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

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

Sites 1, 2A, and 2B

The roadway design at the beginning of Section B from station 169+46.53 to station 190+71.44 has been revised from a four lane section to a three lane section. NCDOT Congestion Management felt a three lane section or smaller footprint would work through the design and with the change in funding for the project. This change increased the allowable buffer impacts in Zone 1 and 2 for Sites 1 and 2A and decreased the mitigable buffers impacts in Zones 1 and 2 for Sites 2A and 2B. See Revised Buffer Permit Plan Sheet 12 of 13 for Sites 1, 2A, and 2B impact amounts and see Table 4A below for overall buffer impact changes.

Table 4A. U-3615B Randleman Lake Watershed Buffer Impacts (ft²) Final

Impact Type	Zone 1 Impacts	Updated Zone 1 Impacts	Difference Zone 1	Zone 2 Impacts	Updated Zone 2 Impacts	Difference Zone 2
Allowable Road Crossing Impacts	31,767	36,226	+4,459	19,521 ¹	20,237	+716
Mitigable Road Crossing Impacts	13,765	10,287	-3,478	7,825	6,151	-1,674
Mitigable Parallel Impacts	90,736	86,004	-4,732	64,268	50,474	-13,794
Other Allowable Impacts ²	2,437	2,437	0	1,947	1,947	0
Total Allowable Impacts	31,767	36,226	4,459	19,521	20,237	+716
Total Mitigable Impacts	104,501	96,291	-8,210	72,093	56,625	-15,468
TOTAL IMPACTS	138,705	134,594	-3,751	93,561	78,809	-14,752

¹ Correction to made to original allowable impact total for Zone 2. Calculation error made due to adding Site 2B impacts to both Road Crossing Allowable and Other Impacts Totals. Site 2B accounted for in Other Impacts Total.

²No mitigation required if treatment is provided prior to buffers under new Randleman rules.

Sites 5 and 5A

In the original permit, the roadway design showed fill being placed over the gas line where it crosses Skeet Club Road near Oak Hollow Lake. However, it was determined after permitting that the gas line was not designed for this much fill to be placed on top of it. NCDOT has decided to construct dual bridges over the gas line to safely cross the line and to allow for the gas company to access their line beneath the road, which they did not have before. In adding the dual bridges right of way had to be adjusted and more treatment for stormwater had to be implemented. This change decreased the buffer impacts at Sites 5 and decreased the permanent surface water impacts from 0.02 to 0.01

acres at Site 5A. See Revised Buffer Permit Plan Sheet 12 of 13 for Site 5 and 5A impact amounts and see Table 4A above for overall buffer impact changes.

Site 6

Due to the length of the retaining wall on the left side of bridge increasing for the construction of the dual utility bridges and the reduction of fill slopes on both sides of the bridge the wetland impacts have been eliminated for this site. There will now be a decrease of 0.01 acre for a total of 0.81 acres of permanent riparian wetland impacts associated with this section. These impacts result from 0.13 acres of permanent fill, 0.67 of excavation, and 0.01 acres of mechanized clearing. Wetland impacts are summarized below in Table 3.

Table 3. U-3615B Wetland Impacts (Final) - Updated

Site	Wetland JD ID	Impact Type	Old Permanent Impacts (acres)	Updated Permanent Impacts (acres)
3C	Wetland WF	Excavation	0.67	0.67
4	Wetland 3	Excavation	<0.01	<0.01
		Permanent Fill	0.13	0.13
5	Wetland B	Mechanized Clearing	0.01	0.01
		Permanent Fill	<0.01	<0.01
6	Wetland D	Mechanized Clearing	<0.01	0
		Permanent Fill	<0.01	0
Total Impacts*			0.82	0.81

*Total impacts due to rounding.

Also, the amount of permanent surface water impacts at the Site 6 has been reduced by 0.01 acres from 0.20 to 0.19 acres. Overall permanent surface water impacts are now 0.21 acres.

Mitigation

No additional mitigation is proposed for these impacts. Both the mitigable buffer impacts and the wetland impacts have decreased since the previous permit was issued.

Mitigable buffer impacts decreased overall. The new mitigable Zone 1 buffers impacts are 96,291 square feet. The new mitigable Zone 2 buffer impacts are 56,625 square feet.

The permanent riparian wetland impacts were reduced by 0.01 acre and are now 0.81 acres.


Regulatory Approvals

Application is hereby made for a modification to the Department of the Army Section 404 Individual Permit as required for the above-described activities.

We are also hereby requesting a Modification to the Individual Section 401 Water Quality Certification from the Division of Water Quality.

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 CE 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 Deanna Riffey at driffey@ncdot.gov or (919) 707-6151.

Sincerely,


for Richard W. Hancock, P.E., Manager

Project Development and Environmental Analysis Unit

cc: NCDOT Permit Application Standard Distribution List

209/08/99

GUILFORD COUNTY

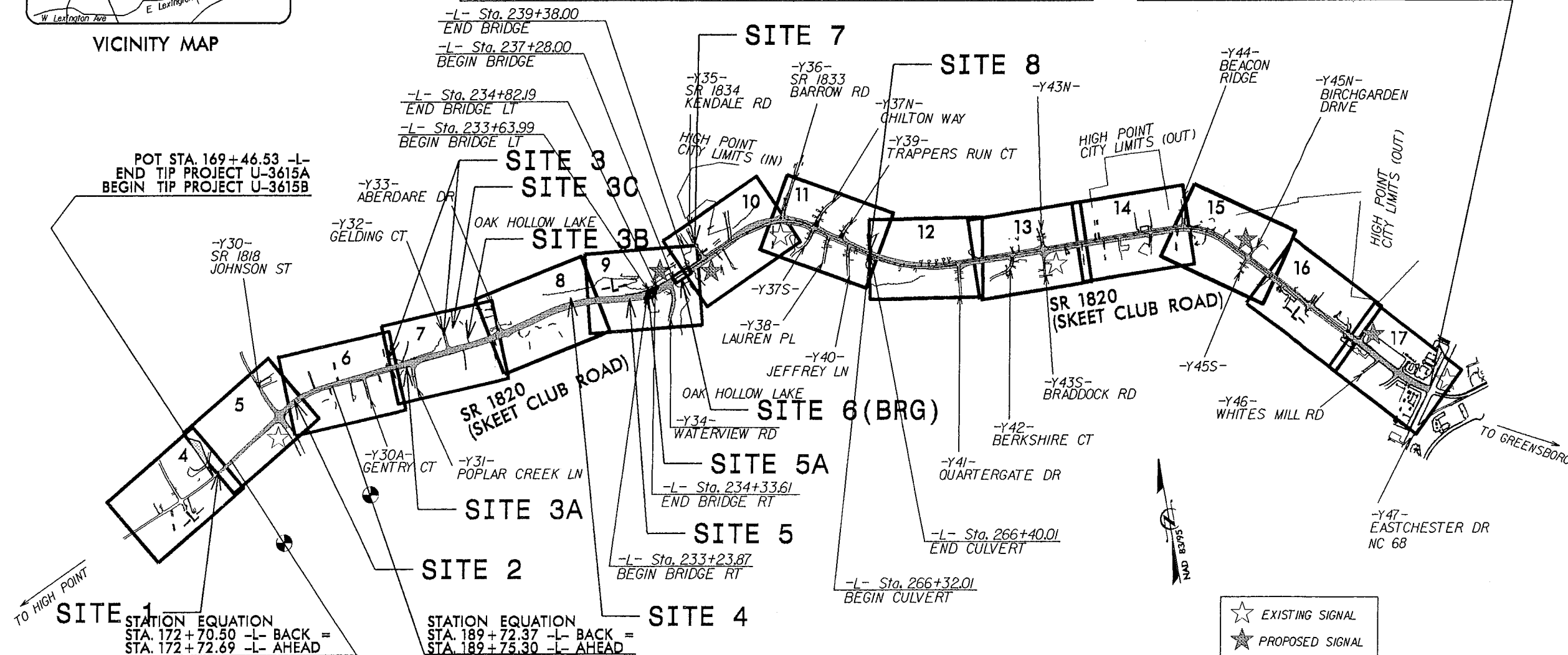
Permit Drawing
Sheet 1 of 27

Revised 10/28/14

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS,
STRUCTURES, CULVERT, RETAINING WALLS**

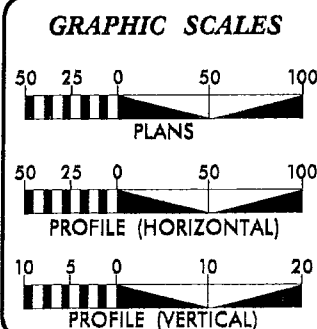
WETLAND AND SURFACE WATER IMPACTS PERMIT

STA. 348+41.04 -L- END TIP PROJECT U-3615B



UNIP PROJECT: U-3615B

CONTRACT: C203256



ADT 2015 = 24540
ADT 2035 = 34700
K = 10 %
D = 60 %
T = 5 % *
V = 50 MPH
* (TTST = 2% + DUAL 3%)
FUNC CLASS =
URBAN MINOR ARTERIAL
SUBREGIONAL TIER

LENGTH ROADWAY TIP PROJECT U-3615B = 3.326 MI
LENGTH STRUCTURE TIP PROJECT U-3615B = 0.062 MI
TOTAL LENGTH OF TIP PROJECT U-3615B = 3.388 MI



SUITE 164
Raleigh, N.C. 27606
Licenses No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

RIGHT OF WAY DATE:
APRIL 27, 2009

LETTING DATE:
JANUARY 20, 2015

NCDOT CONTACT:

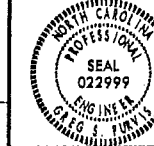
EDWARD G. WETHERILL, PE
PROJECT ENGINEER

GREG S. PURVIS, PE
PROJECT DESIGN ENGINEER

BRENDA L. MOORE, PE
ROADWAY DESIGN: ENGINEERING
COORDINATION SECTION PROJECT ENGINEER



SIGNATURE:



**ROADWAY DESIGN
ENGINEER**



8/17/14

Revised 10/28/14
Permit Drawing
Sheet 16 of 27

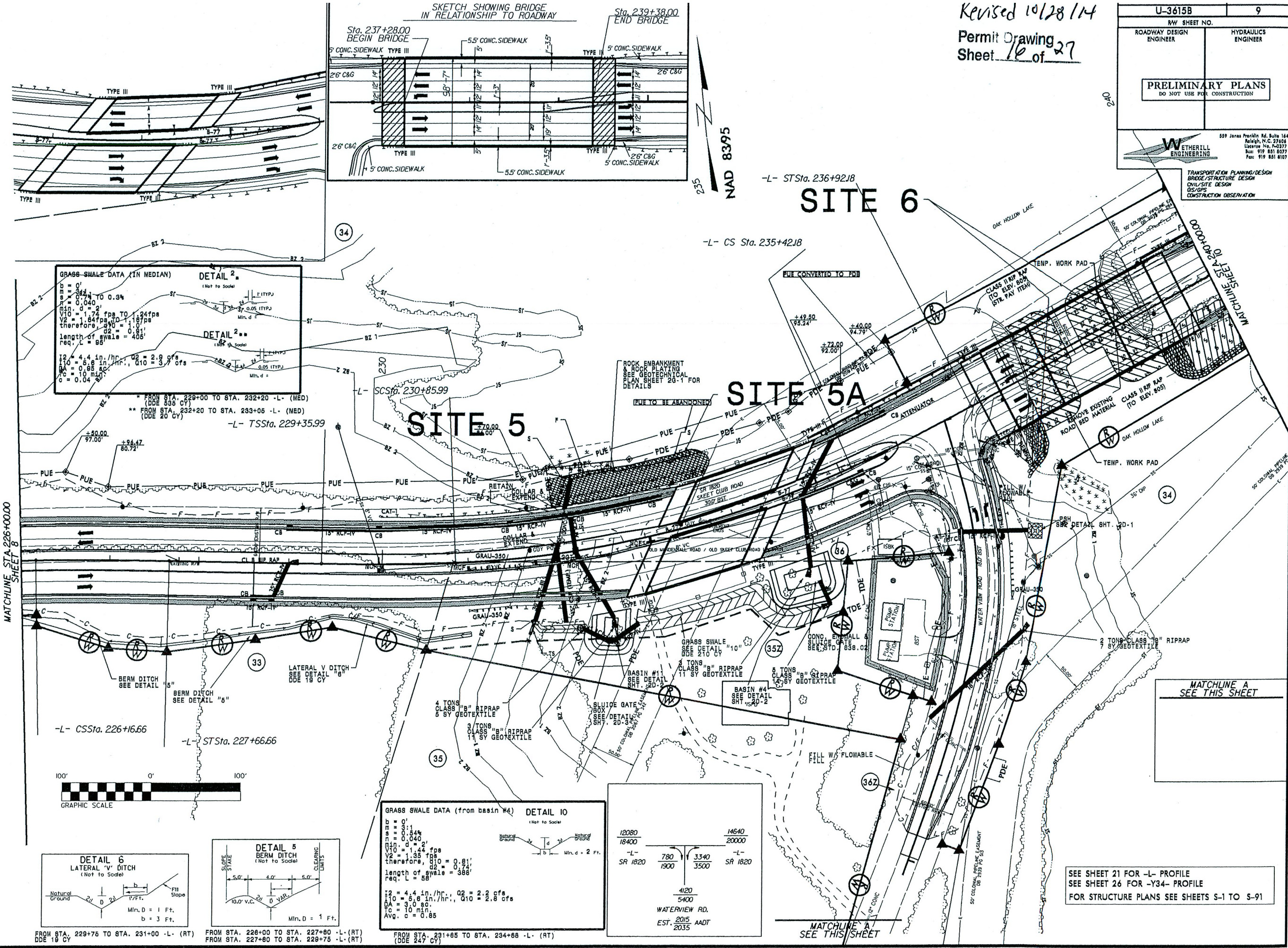
U-3615B
RW SHEET NO. 9

ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27604
Licenses No. 4-0377
State: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN
BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN
GS/GPS
CONSTRUCTION OBSERVATION



GRASS SWALE DATA (IN MEDIAN) DETAIL 2 (Not to Scale)

$b = 0'$
 $s = 0.040$
 $V_{10} = 1.74 \text{ fps TO } 2.4 \text{ fps}$
 $V_2 = 1.84 \text{ fps TO } 1.18 \text{ fps}$
therefore $d_2 = 0.81'$
length of swale = 406'
req. $L = 88'$

$i_2 = 4.4 \text{ in./hr.}$ $Q_2 = 2.8 \text{ cfs}$
 $i_{10} = 5.6 \text{ in./hr.}$ $Q_{10} = 3.7 \text{ cfs}$
 $DA = 0.85 \text{ ft.}$
 $TC = 10 \text{ min.}$
 $c = 0.04$

DETAIL 2** (Not to Scale)

Min. $d = 0.05 \text{ (TYP.)}$

GRASS SWALE DATA (from basin #4) DETAIL 10 (Not to Scale)

$b = 0'$
 $s = 0.040$
 $V_{10} = 1.74 \text{ fps}$
 $V_2 = 1.84 \text{ fps}$
therefore $d_2 = 0.81'$
length of swale = 388'
req. $L = 88'$

$i_2 = 4.4 \text{ in./hr.}$ $Q_2 = 2.2 \text{ cfs}$
 $i_{10} = 5.6 \text{ in./hr.}$ $Q_{10} = 2.8 \text{ cfs}$
 $DA = 3.0 \text{ ft.}$
 $TC = 10 \text{ min.}$
 $c = 0.85$

12080	14640
18400	20000
-L-	-L-
SR 1820	SR 1820
780	3340
1900	3500
4120	5400
WATERVIEW RD.	
EST. 2015 AADT	
2035	

DETAIL 6 LATERAL V DITCH (Not to Scale)

Natural Ground

Min. $D = 1 \text{ Ft.}$
 $b = 3 \text{ Ft.}$

FROM STA. 229+75 TO STA. 231+00 -L- (RT)
DDE 18 CY

DETAIL 5 BERM DITCH (Not to Scale)

SLOPE STAKE

Min. $D = 1 \text{ Ft.}$

FROM STA. 226+00 TO STA. 227+80 -L- (RT)
FROM STA. 227+80 TO STA. 229+75 -L- (RT)

SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 26 FOR -Y34- PROFILE
FOR STRUCTURE PLANS SEE SHEETS S-1 TO S-91

REVISIONS

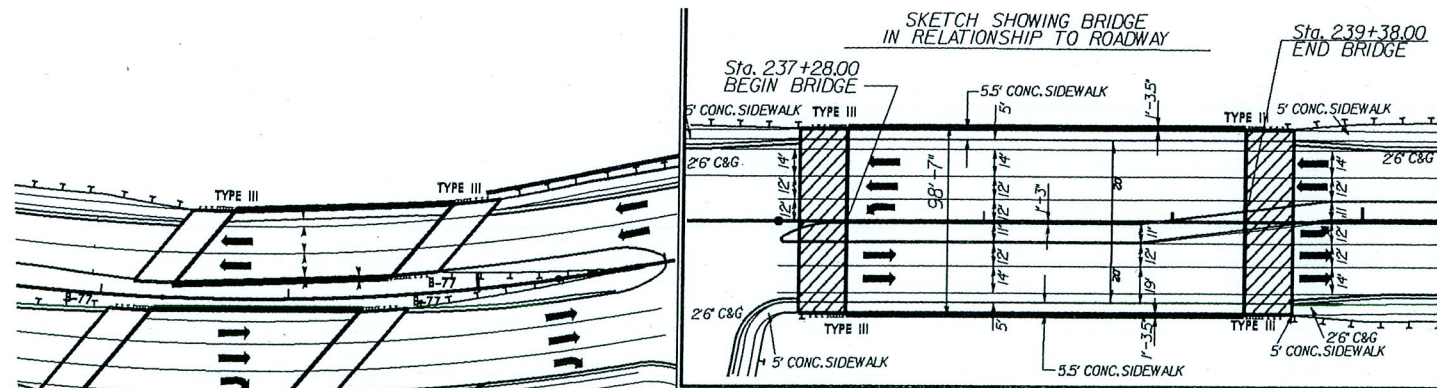
Permit Drawing
Sheet 17 of 22

Revised 10/28/14

PROJECT REFERENCE NO.		SHEET NO.	
U-3615B		9	
RAW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>PRELIMINARY PLANS</p> <p>DO NOT USE FOR CONSTRUCTION</p> </div>			

TRANSPORTATION PLANNING/DESIGN
BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN
GIS/GPS
CONSTRUCTION OBSERVATION

359 Jones Franklin Rd. Suite 1
Raleigh, N.C. 27603
License No. F-037
Bus: 919 851 807
Fax: 919 851 810



235
FIAD 8395

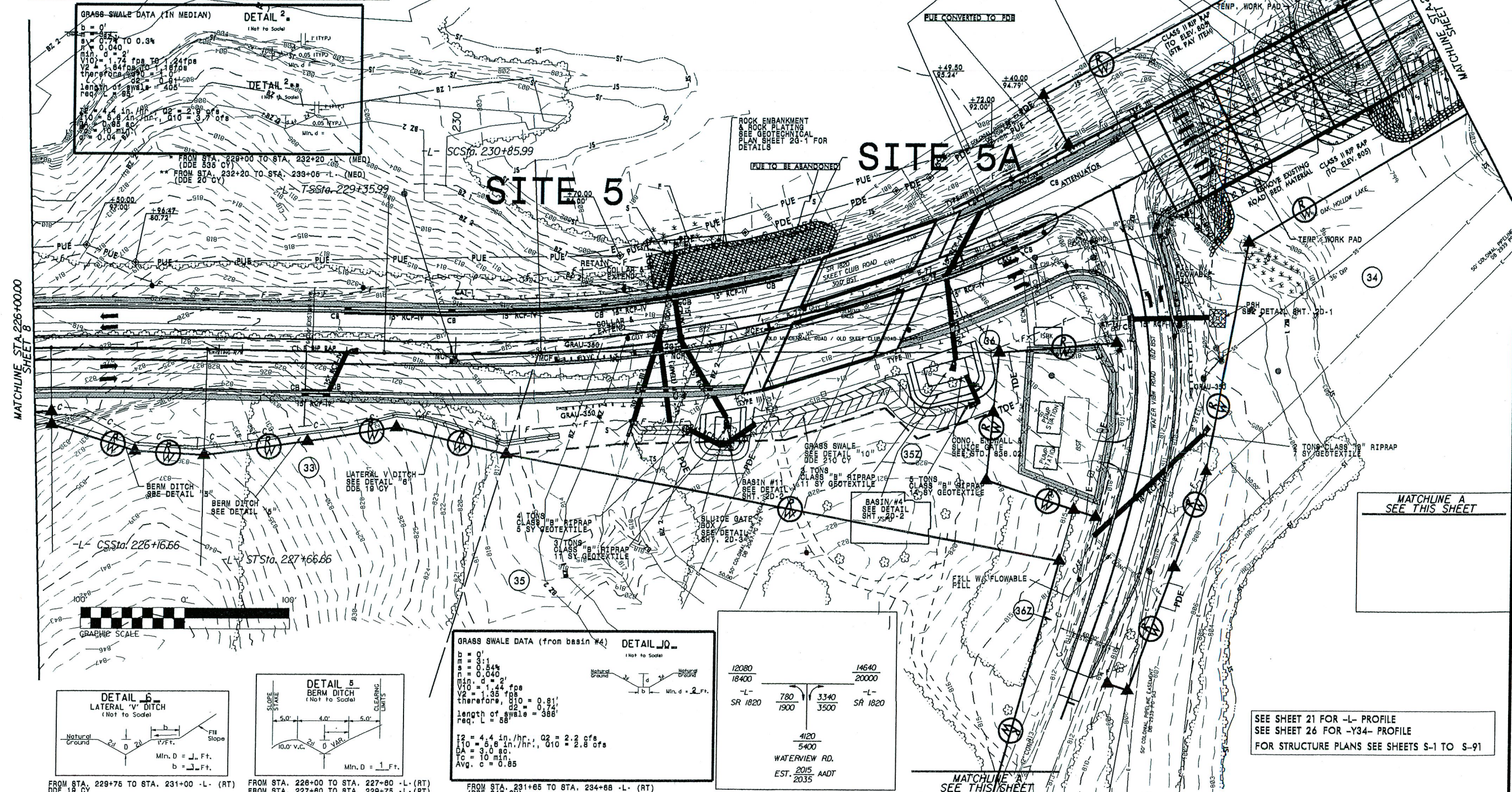
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SITE 6

-L- CS Sta. 235+42.18

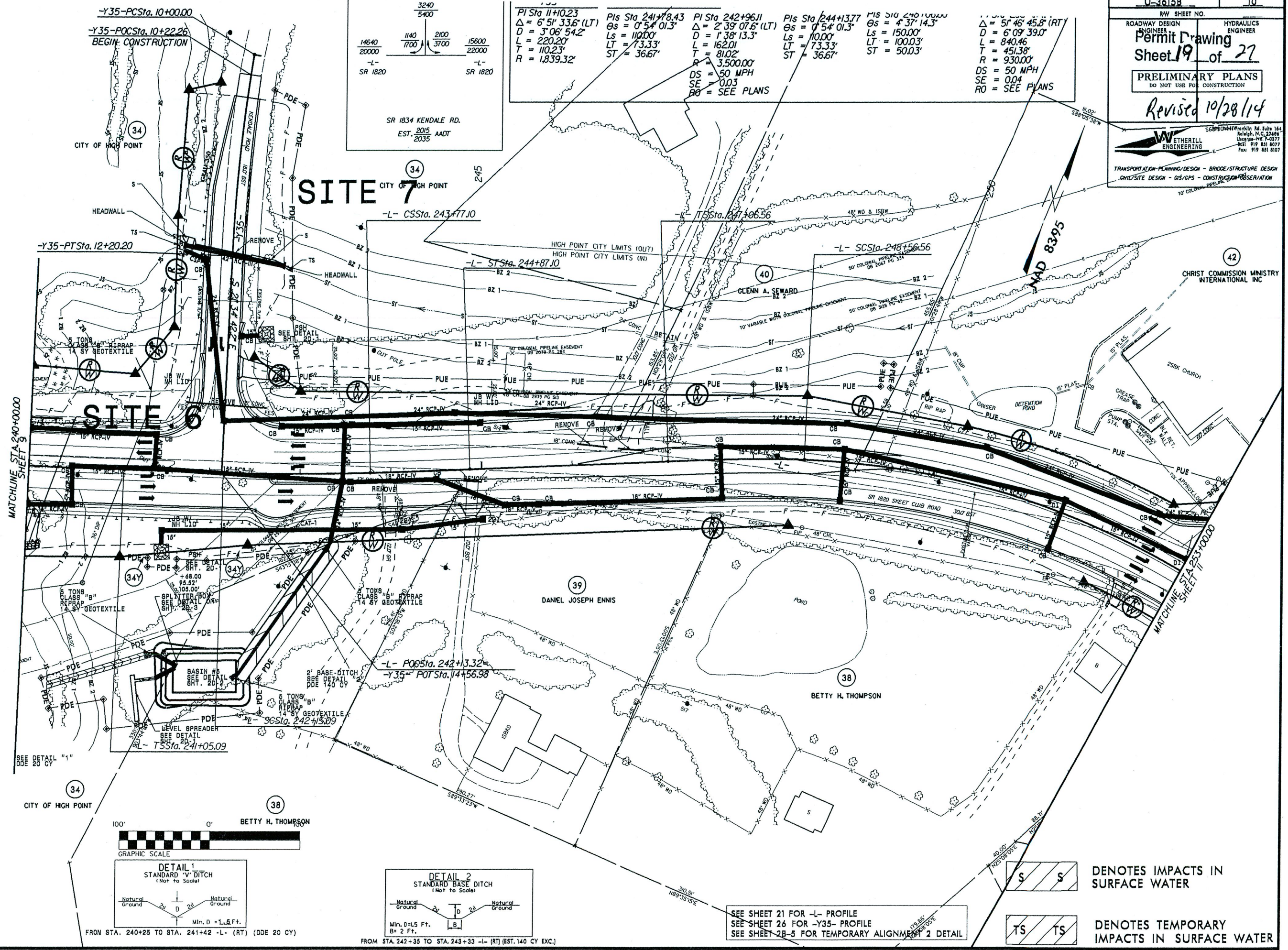
SITE 5

SITE 5A



SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 26 FOR -Y34- PROFILE
FOR STRUCTURE PLANS SEE SHEETS S-1 TO S-91

NO.	REVISIONS
1	ISSUED FOR PERMIT
2	REVISED FOR CONSTRUCTION
3	REVISED FOR CONSTRUCTION
4	REVISED FOR CONSTRUCTION
5	REVISED FOR CONSTRUCTION
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7	REVISED FOR CONSTRUCTION
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100	REVISED FOR CONSTRUCTION



PI Sta 11+0.23 $\Delta = 6' 51'' 33.6''$ (LT) $D = 3' 06'' 54.2''$ $L = 220.20'$ $T = 110.23'$ $R = 1,839.32'$	PI Sta 241+78.43 $\Delta = 0' 54'' 01.3''$ $Ls = 110.00'$ $LT = 73.33'$ $ST = 36.67'$	PI Sta 242+96.11 $\Delta = 2' 39'' 07.6''$ (LT) $D = 1' 38'' 13.3''$ $L = 162.01'$ $T = 81.02'$ $R = 3,500.00'$ $DS = 50$ MPH $SE = 0.03$ $RO = \text{SEE PLANS}$	PI Sta 244+13.77 $\Delta = 0' 54'' 01.3''$ $Ls = 110.00'$ $LT = 73.33'$ $ST = 36.67'$	PI Sta 240+100.00 $\Delta = 4' 37'' 14.3''$ $D = 150.00'$ $L = 100.03'$ $T = 50.03'$ $R = 930.00'$ $DS = 50$ MPH $SE = 0.04$ $RO = \text{SEE PLANS}$	PI Sta 246+45.8'' (RT) $\Delta = 6' 09'' 39.0''$ $D = 840.46'$ $T = 451.38'$ $R = 930.00'$ $DS = 50$ MPH $SE = 0.04$ $RO = \text{SEE PLANS}$
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U-3615B

10

RW SHEET NO.

ROADWAY DESIGN

HYDRAULICS

ENGINEER

ENGINEER

Permit Drawing

Sheet 19 of 27

PRELIMINARY PLANS

DO NOT USE FOR CONSTRUCTION

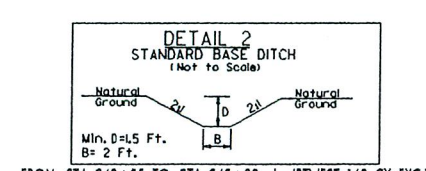
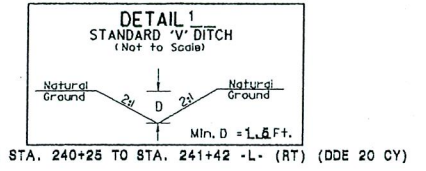
Revised 10/28/14

ETHERILL

ENGINEERING

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN

CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 26 FOR -Y35- PROFILE
SEE SHEET 28-5 FOR TEMPORARY ALIGNMENT 2 DETAIL

DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

14640 20000		3240 5400	1140 1700		2100 3700	15800 22000	
-L-			-L-			-L-	
SR 1820			SR 1820			SR 1820	

SR 1834 KENDALE RD.
EST. 2015 ADOT
2035

PI Sta 11+0.23 Δ = 6° 51' 33.6" (LT) D = 3° 06' 54.2" L = 220.20' T = 110.23' R = 1,839.32'	PI Sta 241+78.43 Δs = 0° 54' 01.3" Ls = 110.00' LT = 73.33' ST = 36.67'	PI Sta 242+96.11 Δ = 2° 39' 07.6" (LT) D = 1° 38' 13.3" L = 162.01' T = 81.02' R = 3,500.00' DS = 50 MPH SE = 0.03 RO = SEE PLANS	PI Sta 244+33.77 Δs = 0° 54' 01.3" Ls = 110.00' LT = 73.33' ST = 36.67'	PI Sta 240+00.00 Δs = 4° 37' 14.3" Ls = 150.00' LT = 100.03' ST = 50.03'	Δ = 51° 46' 45.8" (RT) D = 6° 09' 39.0" L = 840.46' T = 451.38' R = 930.00' DS = 50 MPH SE = 0.04 RO = SEE PLANS
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U-3615B 10

RW SHEET NO. ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER

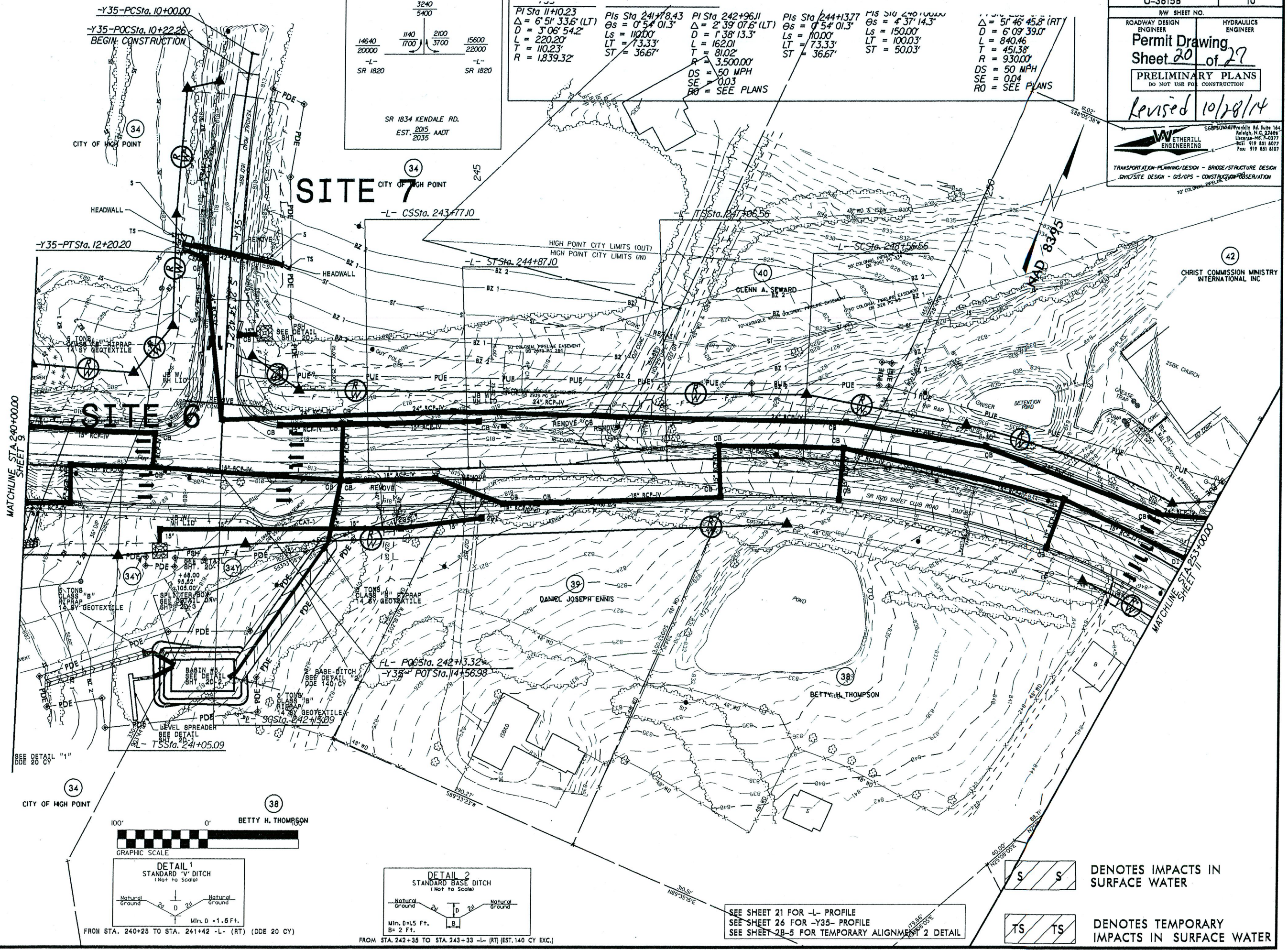
Permit Drawing Sheet 20 of 27

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Revised 10/28/14

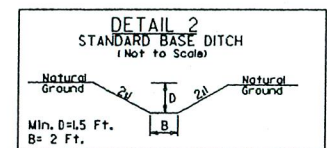
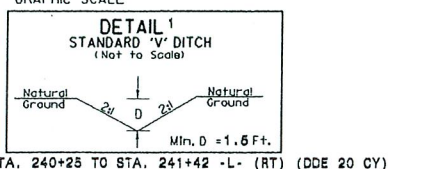
ETHERILL ENGINEERING

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
SITE/SITE DESIGN - GS/GPS - CONSTRUCTION OBSERVATION



MATCHLINE STA 240+00.00
SHEET 9

MATCHLINE STA 253+00.00
SHEET 11



SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 26 FOR -Y35- PROFILE
SEE SHEET 28-5 FOR TEMPORARY ALIGNMENT 2 DETAIL

SS DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	170+67 -L-	2@66" RCP						0.01	<0.01	119	16	
2	180+59/188+46 -L-	RELOCATE CHANNEL						2.20		594	10	
2A	187+00/188+46 -L-	ROCK FILL IN POND						0.02				
3	197+50/204+26 -L-	NAT. STREAM DESIGN								699	10	760
3A	199+27/199+95 -L-	2@54" RCP						<0.01	<0.01	38	10	
3B	208+63 -L-	48" RCP						<0.01	<0.01	109	4	
		BANK STABILIZATION								10		
3C	201+27/204+76 -L-	NAT. STREAM DESIGN			0.67			<0.01		63		
4	218+72/219+72 -L-	2@30" RCP	0.13		<0.01							
5	231+60/232+27 -L-	30" RCP	<0.01			0.01		<0.01		131	16	
5A	232+87/236+40 -L-	ROCK FILL IN LAKE						0.01				
6	237+28/239+38 -L-	BRIDGE						0.19	0.29			
SUBTOTALS:			0.13		0.67	0.01		2.45	0.30	1763	66	760

Note: Site 2A has been eliminated due to Roadway Design eliminating two travel lanes and median.

Revised 11/20/14

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILDFORD COUNTY

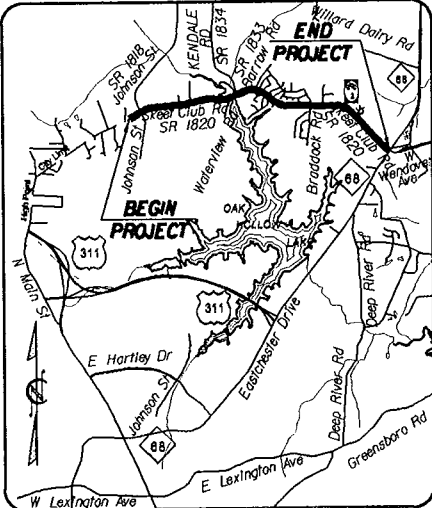
WBS - 34962.1.1 (U-3615B)
SHEET 26 of 27 Rev'd 10/28/14

4/9/2013

TIP PROJECT: U-3615B

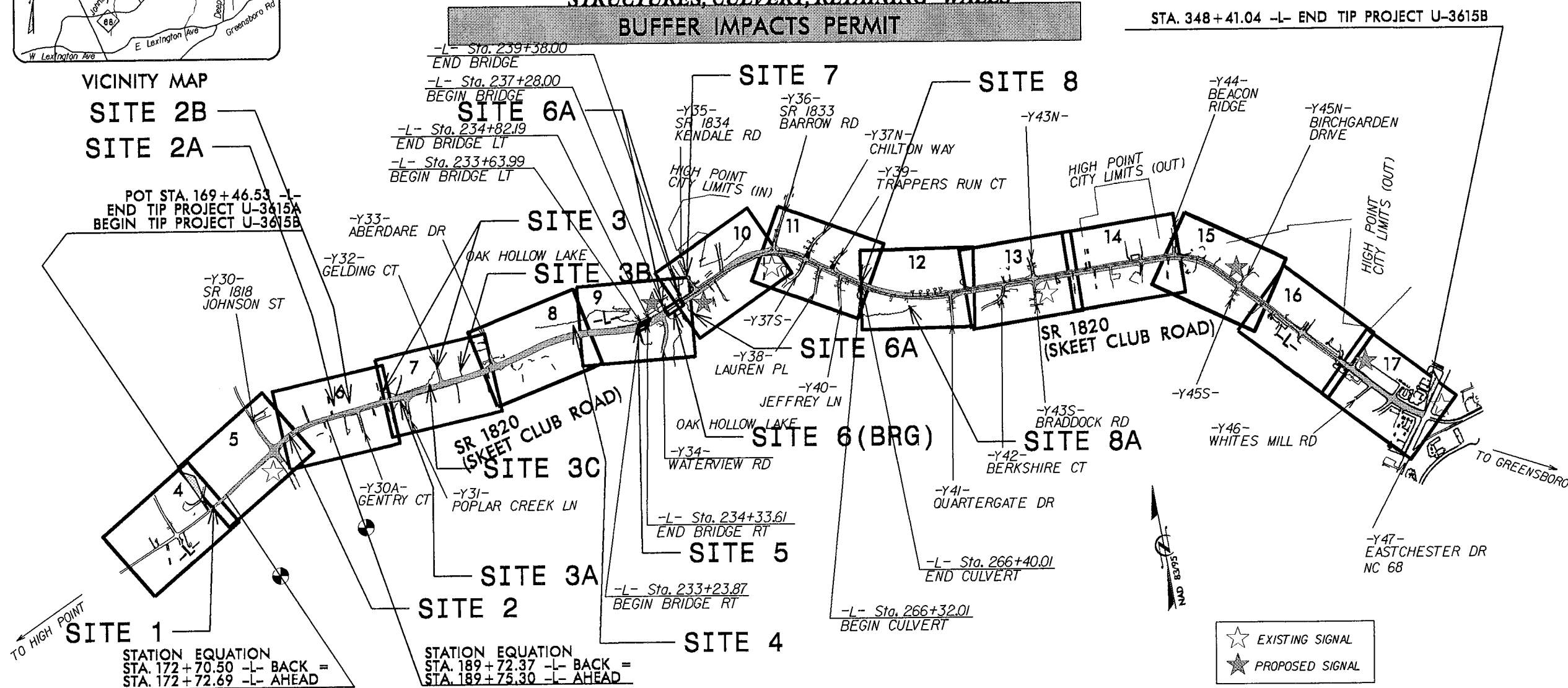
CONTRACT: C203256

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols
See Sheet 1-C To 1-F For Survey Control Sheets



VICINITY MAP
SITE 2B
SITE 2A

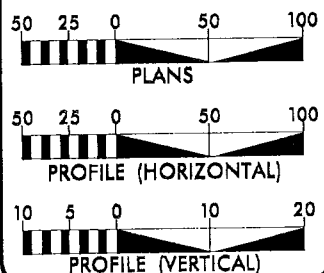
POT STA. 169+46.53 -L-
END TIP PROJECT U-3615A
BEGIN TIP PROJECT U-3615B



STATION EQUATION
STA. 172+70.50 -L- BACK =
STA. 172+72.69 -L- AHEAD

STATION EQUATION
STA. 189+72.37 -L- BACK =
STA. 189+75.30 -L- AHEAD

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 24540
ADT 2035 = 34700
K = 10 %
D = 60 %
T = 5 % *
V = 50 MPH
* (TTST = 2% + DUAL 3%)
FUNC CLASS =
URBAN MINOR ARTERIAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-3615B = 3.326 MI
LENGTH STRUCTURE TIP PROJECT U-3615B = 0.062 MI
TOTAL LENGTH OF TIP PROJECT U-3615B = 3.388 MI

Prepared for the North Carolina Department of Transportation in the Office of:
BUTTS, N.C. 27406
Tel: 919 831 8077
Fax: 919 831 8107

1012 STANDARD SPECIFICATIONS
RIGHT OF WAY DATE: APRIL 27, 2009
LETTING DATE: JANUARY 20, 2015
NCDOT CONTACT:

EDWARD G. WETHERILL, PE
PROJECT ENGINEER
GREG S. PURVIS, PE
PROJECT DESIGN ENGINEER
BRENDA L. MOORE, PE
ROADWAY DESIGN, ENGINEERING
COORDINATION SECTION PROJECT ENGINEER

HYDRAULICS ENGINEER
SEAL 012575
SIGNATURE: _____
P.E.

ROADWAY DESIGN ENGINEER
SEAL 022999
SIGNATURE: _____
P.E.



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
GUILFORD COUNTY

LOCATION: HIGH POINT - SR 1820 (SKEET CLUB ROAD) FROM EAST OF SR 1818 (JOHNSON STREET) TO WEST OF NC 68 (EASTCHESTER DRIVE).

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS,
STRUCTURES, CULVERT, RETAINING WALLS


BUFFER IMPACTS PERMIT

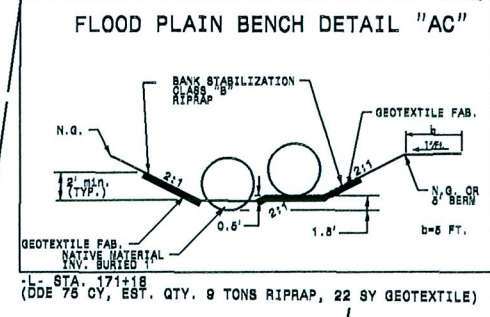
Revised
10/28/14
Buffer Drawing
Sheet 1 of 13

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3615B	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34962.1.1	STP-1820(2)	P.E.	
34962.2.3	STP-1820(5)	R/W, UTL.	
34962.3.FD1	STP-1820(5)	CONST.	

STA. 348+41.04 -L- END TIP PROJECT U-3615B

5/14/99

PROJECT REFERENCE NO.		SHEET NO.	
U-3615B		4	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
			
559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Licenses No. A-6377 Bus: 919 851 8077 Fax: 919 851 8107			
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CHUL/SITE DESIGN - GS/GPS - CONSTRUCTION OBSERVATION			



-L-	-L-	-L-	-L- TEMP
PI Sta 158+44.07	PI Sta 163+70.31	PI Sta 167+89.17	PI Sta 171+59.42
Δs = 0' 22' 00"	Δs = 0' 33' 00"	Δ = 8' 50' 54.9" (LT)	Δ = 6' 27' 19.5" (LT)
Ls = 96.00'	Ls = 96.00'	D = 1' 08' 45.3"	D = 1' 31' 04"
LT = 64.00'	LT = 64.00'	L = 772.19'	L = 425.31'
ST = 32.00'	ST = 32.00'	T = 386.86'	T = 212.89'
		R = 5,000.00'	R = 3,775.00'
		DS = 50 MPH	DS = 50 MPH
		SE = 0.02	SE = 0.02
		RO = SEE PLANS	RO = SEE PLANS

NAD 83 8395

ORCHARD KNOB OWNERS ASSOCIATION

Buffer Drawing
Sheet 2 of 13
Revised 10/20/14

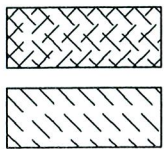
-L- STA. 169+46.53 POC
END TIP PROJECT U-3615A
BEGIN TIP PROJECT U-3615B

ZONE 1 ALLOWABLE
ZONE 2 ALLOWABLE

SITE 1
BEGIN CONSTRUCTION
-L- TEMP POC STA. 169+46.53
OFFSET = 21.07' RT.

ZONE 2 ALLOWABLE
ZONE 1 ALLOWABLE

SEE SHEET 18 FOR -L- PROFILE



ALLOWABLE IMPACTS ZONE 1

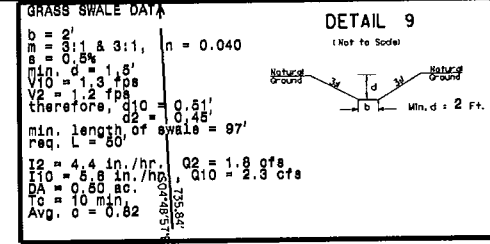
ALLOWABLE IMPACTS ZONE 2



MATCHLINE STA 171+00.00
SHEET 5



8/17/99



PROJECT REFERENCE NO. U-3615B SHEET NO. 6

ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER

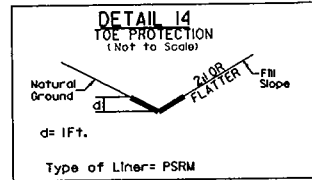
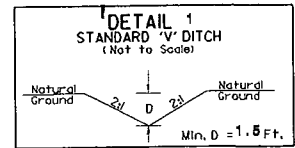
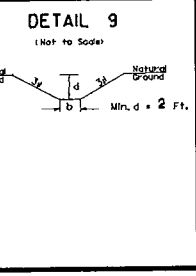
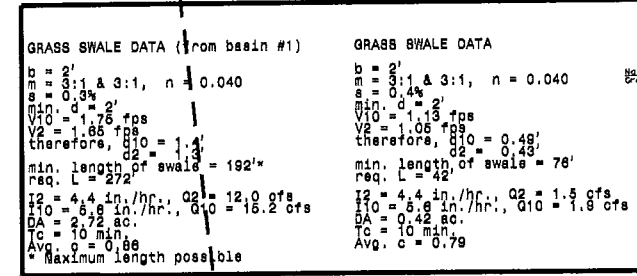
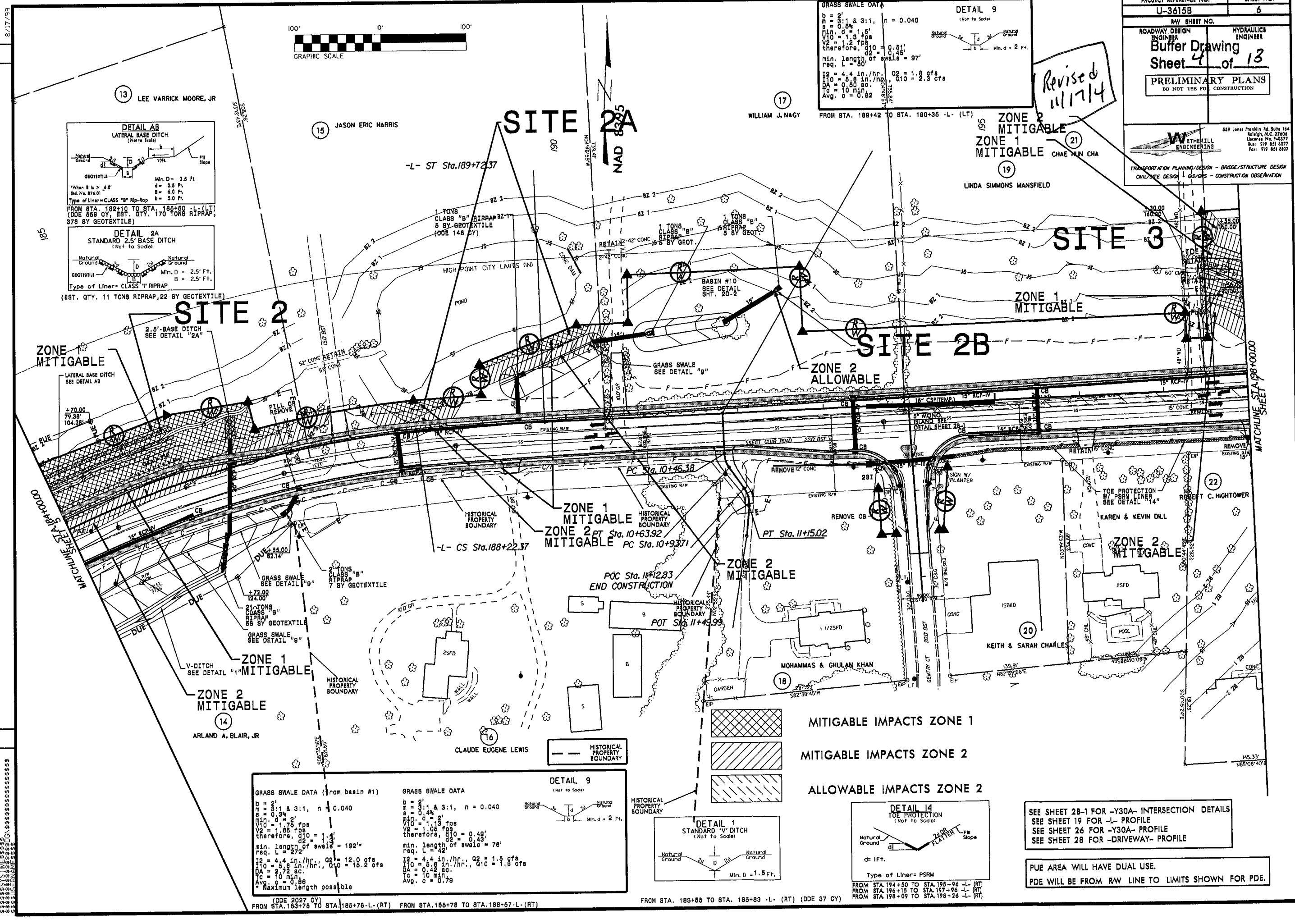
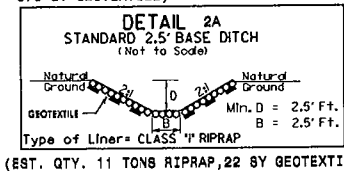
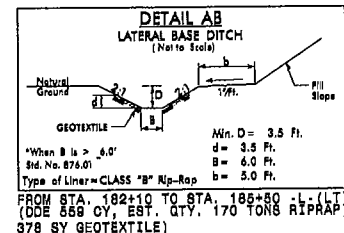
Buffer Drawing Sheet 4 of 13

PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING

559 Jones Franklin Rd, Suite 144
Nashville, TN 37204
Licenses No. F-0377
Bus: 615 851 8077
Fax: 615 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - G.S./G.S. - CONSTRUCTION OBSERVATION

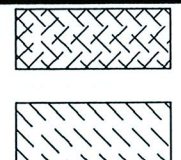
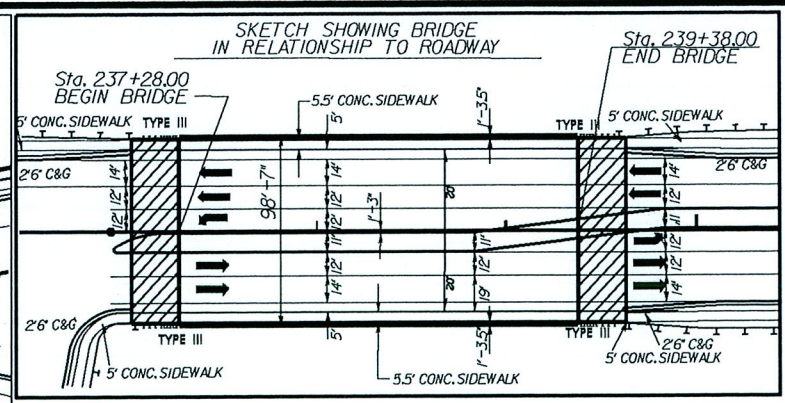
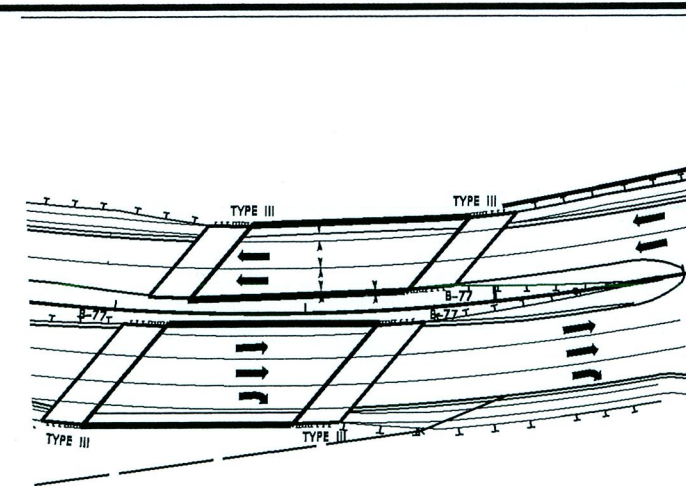


SEE SHEET 28-1 FOR -Y30A- INTERSECTION DETAILS
SEE SHEET 19 FOR -L- PROFILE
SEE SHEET 26 FOR -Y30A- PROFILE
SEE SHEET 28 FOR -DRIVEWAY- PROFILE

PUE AREA WILL HAVE DUAL USE.
PDE WILL BE FROM RW LINE TO LIMITS SHOWN FOR PDE.

8/17/99

REVISIONS



ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

Buffer Drawing
Sheet 8 of 13
Revised 11/17/14

SITE 6

PROJECT REFERENCE NO. U-3615B		SHEET NO. 9
RW SHEET NO.		HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER		
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		
 559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Licenses No. 7-4337 Bus: 919 851 6077 Fax: 919 851 6107		
TRANSPORTATION PLANNING/DESIGN BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN GIS/GPS CONSTRUCTION OBSERVATION		

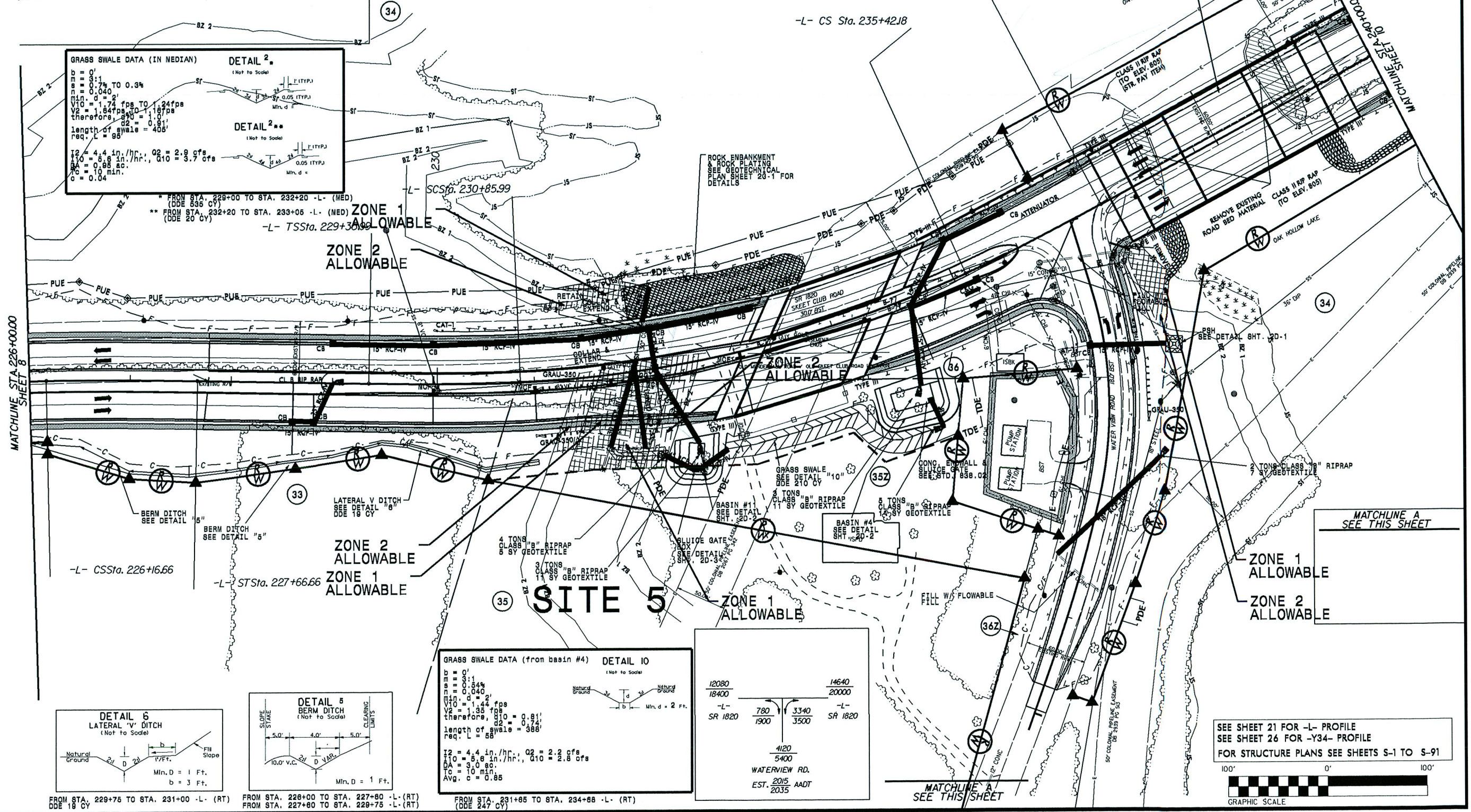
GRASS SWALE DATA (IN MEDIAN) DETAIL 2
(Not to Scale)

$b = 0.1$
 $m = 0.7\%$ TO 0.3%
 $n = 0.040$
 $V_{10} = 1.74$ fps TO 24 fps
 $V_2 = 1.84$ fps TO 1.18 fps
therefore, $Q_2 = 0.81$
length of swale = $405'$
req. $L = 98'$

$I_2 = 4.4$ in./hr., $Q_2 = 2.8$ cfs
 $V_{10} = 5.8$ in./hr., $Q_{10} = 3.7$ cfs
 $Q_2 = 0.81$ cfs
 $Q_{10} = 3.7$ cfs
 $c = 0.04$

DETAIL 2**
(Not to Scale)

$I_2 = 4.4$ in./hr., $Q_2 = 2.8$ cfs
 $V_{10} = 5.8$ in./hr., $Q_{10} = 3.7$ cfs
 $Q_2 = 0.81$ cfs
 $Q_{10} = 3.7$ cfs
 $c = 0.04$



DETAIL 6
LATERAL 'V' DITCH
(Not to Scale)

Natural Ground
 $2\frac{1}{2} : 1$
 $b = 3$ Ft.
Min. D = 1 Ft.

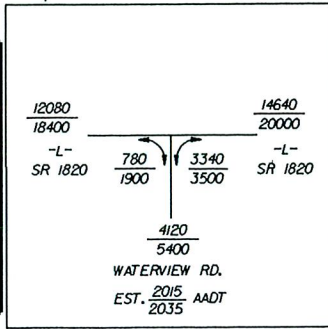
DETAIL 5
BERM DITCH
(Not to Scale)

SLOPE STAKE
 $5.0' : 1$
 $4.0' : 1$
 $5.0' : 1$
Min. D = 1 Ft.

GRASS SWALE DATA (from basin #4) DETAIL 10
(Not to Scale)

$b = 0.1$
 $m = 0.54\%$
 $n = 0.040$
 $V_{10} = 1.44$ fps
 $V_2 = 1.35$ fps
therefore, $Q_2 = 0.81$
length of swale = $388'$
req. $L = 58'$

$I_2 = 4.4$ in./hr., $Q_2 = 2.2$ cfs
 $V_{10} = 5.8$ in./hr., $Q_{10} = 2.8$ cfs
 $Q_2 = 0.81$ cfs
 $Q_{10} = 2.8$ cfs
Avg. $c = 0.85$



SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 26 FOR -Y34- PROFILE
FOR STRUCTURE PLANS SEE SHEETS S-1 TO S-91

100' 0' 100'

GRAPHIC SCALE

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
SITE NO.	STATION (FROM/TO)	STRUCTURE SIZE / TYPE	TYPE			ALLOWABLE			MITIGABLE				
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft²)	ZONE 2 (ft²)	TOTAL (ft²)	ZONE 1 (ft²)	ZONE 2 (ft²)	TOTAL (ft²)	ZONE 1 (ft²)	ZONE 2 (ft²)
1	170+02/172+39 -L-	2 @66" RCP & 24"RCP	X			5869	1671						
2	180+10/187+26 -L-(LT)	RELOCATE CHANNEL	X		X	3975	2546		31061	13632			
2A	187+61/190+55-L-(LT)	ROADWAY FILL & GRASS SWALE			X				2456	5717			
2B	192+48 -L-(LT)	RIPRAP PAD			X		51						
3	197+50/205+22-L-(LT)	NAT. STREAM DESIGN			X				52487	31125		45810	29829
3A	198+75/200+23 -L-(RT)	2@54" RCP	X			2216	623						
3B	208+02/209+14 -L-(LT)	48" RCP	X			6967	4638						
3C	202+96-L-(LT)	LEVEL SPREADER			X		64						
4	221+87 /223+01-L-(LT)	2' BASE DITCH(BYPASS)			X	1166	998						
5	231+05/232+65-L-(LT&RT)	30" RCP	X			8562	4228						
SUBTOTALS=:						28755	14819		86004	50474		45810	29829

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 34962.1.1 (U-3615B)

6/6/2013
Revised 11/17/2014
12 of 13

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
SITE NO.	STATION (FROM/TO)	STRUCTURE SIZE / TYPE	TYPE			ALLOWABLE			MITIGABLE				
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft²)	ZONE 2 (ft²)	TOTAL (ft²)	ZONE 1 (ft²)	ZONE 2 (ft²)	TOTAL (ft²)	ZONE 1 (ft²)	ZONE 2 (ft²)
6	237+28 /239+38-L-	BRIDGE APPROACH	X			3478	1674						
6A	240+18/240+81 -L-(RT)	"V" DITCH (BYPASS)			X	1271	834						
7	11+52/12+86-L-(LT&RT)	42" RCP	X			3933	2411						
8	265+24/266+91-L-(LT&RT)	8'X8' RCBC	X						8902	4658			
8A	271+16/273+92 -L-(RT)	30" & 24" RCP	X			1226	2536		1385	1493			
SUBTOTALS=:	THIS SHEET					9908	7455		10287	6151			
SUBTOTALS=:	SHEET 1					28755	14819		86004	50474		45810	29829
TOTALS=:						38663	22274		96291	56625		45810	29829

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 34962.1.1 (U-3615B)

6/6/2013
Revised 11/17/2014
SHEET 13 OF 13

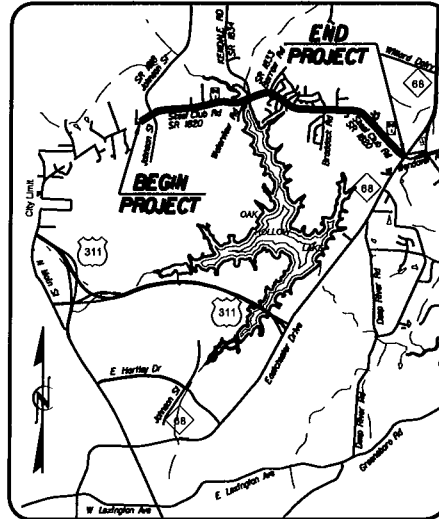
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CONTRACT:

TIP: U-3615B

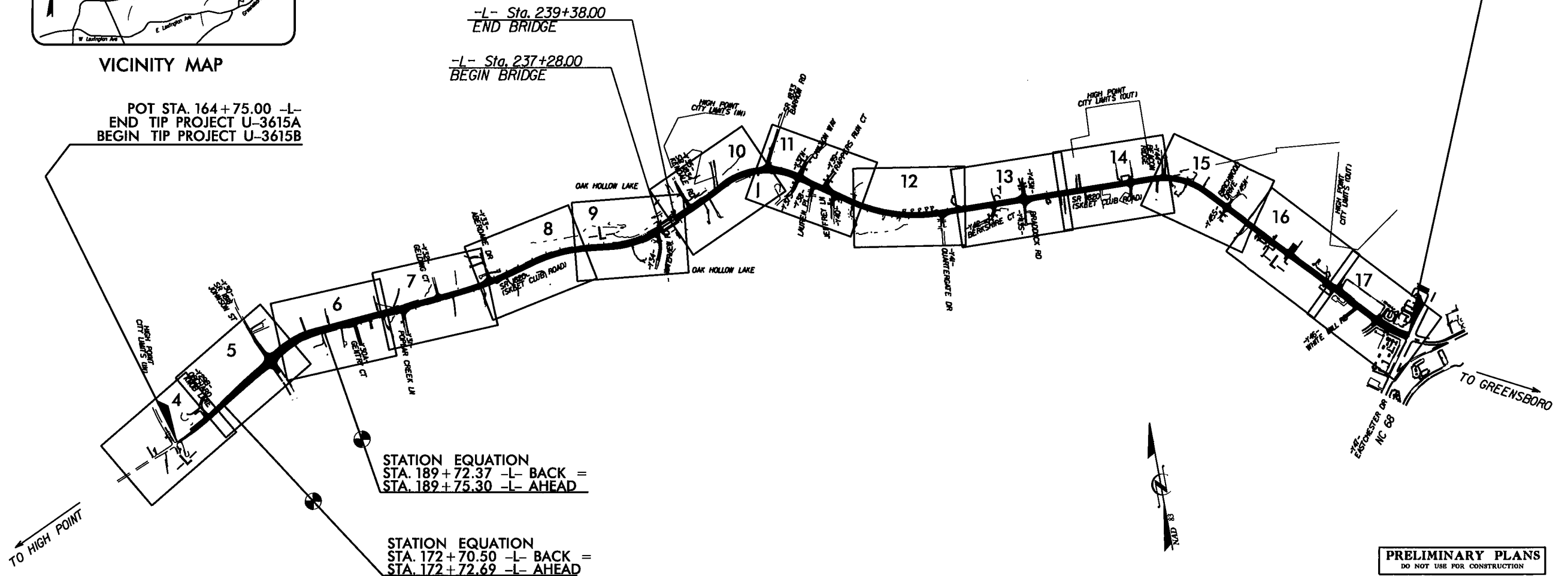
09/28/99

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



VICINITY MAP

POT STA. 164+75.00 -L-
END TIP PROJECT U-3615A
BEGIN TIP PROJECT U-3615B

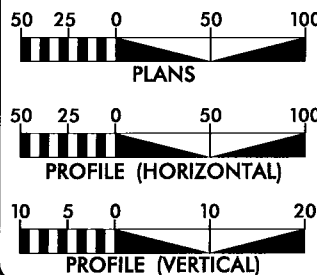


A PORTION OF THIS PROJECT IS
WITHIN THE MUNICIPAL BOUNDARIES
OF CITY OF HIGH POINT

NCDOT CONTACT: B. Doug Taylor, P.E., PROJECT ENGINEER - ROADWAY DESIGN UNIT

"CLEARING ON THIS PROJECT SHALL BE ESTABLISHED BY METHOD III"

GRAPHIC SCALES



DESIGN DATA

ADT 2008 = 9600-23400
ADT 2030 = 18100-40400
DHV = 10 %
D = 60 %
T = 5 %
V = 50 MPH
TTST 2% DUAL 3%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-3615B = 3.438 MI
LENGTH STRUCTURE TIP PROJECT U-3615B = 0.040 MI
TOTAL LENGTH OF TIP PROJECT U-3615B = 3.478 MI

Prepared in the Office of:
WANG ENGINEERING COMPANY, INC.
CARY, N.C.

FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 27, 2009

LETTING DATE:
OCTOBER 15, 2013

CLIFTON T. REGISTER, PE
PROJECT ENGINEER

SCOTT L. KENNEDY
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.
**ROADWAY DESIGN
ENGINEER**

SIGNATURE: _____ P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER
**DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION**

APPROVED
DIVISION ADMINISTRATOR DATE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

LOCATION: SR 1820 (SKEET CLUB ROAD) FROM WEST OF SR 1818
(JOHNSON STREET) TO NC 68 (EASTCHESTER DRIVE).

TYPE OF WORK: PAVING, GRADING, DRAINAGE, CURB & GUTTER,
STRUCTURE, CULVERT, SIGNING AND SIGNALS

STATE	STATE PROJECT REFERENCE NO.	SUBST NO.	TOTAL SHEETS
N.C.	U-3615B	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34962.1.1	STP-1820(2)	P.E.	
34962.2.3	STP-1820(5)	RW, UTIL.	

Revised 10/28/14

STA. 348+41.04 -L- END TIP PROJECT U-3615B

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 2B-1 FOR INTERSECTION DETAILS

REVISIONS

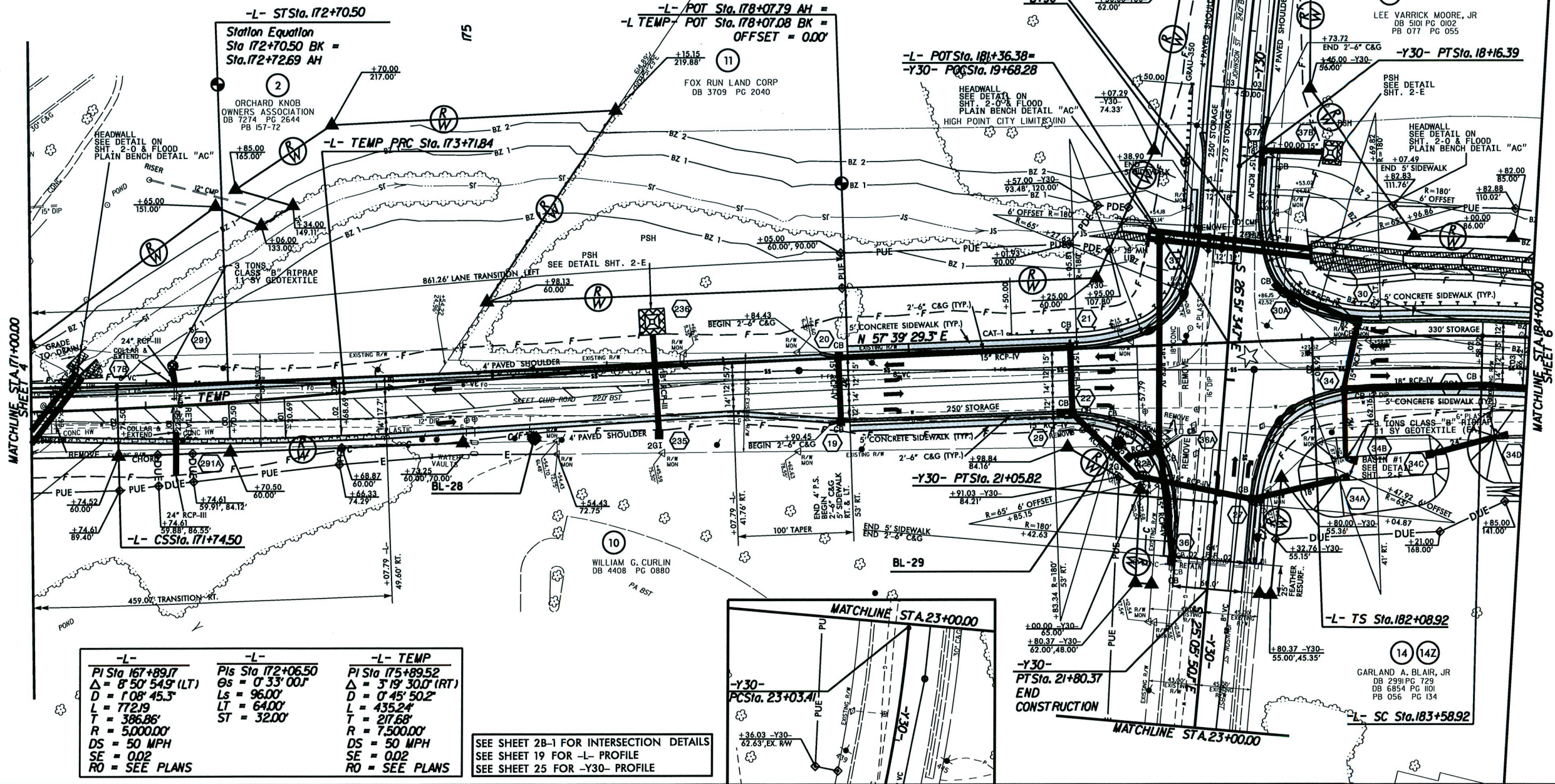
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 \$\$\$\$SERNAME\$\$\$\$



FLOOD PLAIN BENCH DETAIL "AC"

The diagram shows a cross-section of a flood plain bench. Key features include:

- BANK STABILIZATION CLASS B RIPRAP (OUTLET ONLY):** Indicated by arrows pointing to the riprap areas on either side of the bench.
- N.G. (Not Gravel):** Label for the ground surface on the left.
- 2' min. (TYP.):** Dimension for the height of the riprap slope on the left.
- 0.5':** Dimension for the width of the riprap area on the left.
- 1.5':** Dimension for the width of the riprap area on the right.
- NATIVE MATERIAL INV. BURIED:** Label for the ground surface on the left, below the riprap.
- h = 12" ±:** Dimension for the height of the bench.
- N.G. OR 5' BERM:** Label for the ground surface on the right.
- b = 5 FT.:** Dimension for the width of the bench.



-L-	-L-	-L- TEMP
Pi Sta 167+89.17	Pis Sta 172+06.50	Pi Sta 175+89.52
$\Delta = 8^{\circ} 50' 54.9" (LT)$	$\Theta s = 0^{\circ} 33' 00.0"$	$\Delta = 3^{\circ} 19' 30.0" (RT)$
D = 1' 08" 45.3'	Ls = 96.00'	D = 0' 45" 50.2'
L = 772.19	LT = 64.00'	L = 435.24'
T = 386.86'	ST = 32.00'	T = 217.68'
R = 5,000.00'		R = 7,500.00'
DS = 50 MPH		DS = 50 MPH
SE = 0.02		SE = 0.02
RO = SEE PLANS		RO = SEE PLANS

SEE SHEET 2B-1 FOR INTERSECTION DETAILS
SEE SHEET 19 FOR -L- PROFILE
SEE SHEET 25 FOR -Y30- PROFILE

-Y30- POT Sta.13+00.00
BEGIN CONSTRUCTION

PROJECT REFERENCE NO.		SHEET NO.	
U-3615B		5	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
Revised		10/28/14	
<div style="border: 2px solid black; padding: 5px; text-align: center;"> PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION </div>			

WETHERILL
ENGINEERING

559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27660
License No. F-0377
BUS: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CONCEPT DESIGN - DESIGN - CONSTRUCTION OBSERVATION

559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

18-NOV-2013 09:27
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