PROJECT REFERENCE NO.	SHEET NO.
U-3615A	14
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

Permit Drawing
Sheet 7 of 14

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL
TRANSPORTATION
CIVIL
203 TOWN HALL DR., STE C, MORRISVILLE, NC 27560
TEL 919.380.8753 FAX 919.380.8752

WETLAND/SURFACE WATER PERMIT DWG.

GRAPHIC SCALE 100' 0' 100'

ENGLISH

DENOTES MONOLITHIC CONCRETE ISLAND

REVISIONS

8/17/99

MATCHLINE -L- STA. 137+00 SEE SHEET NO. 13

MATCHLINE -L- STA. 151+00 SEE SHEET NO. 15

SHUGART ENTERPRISES LLC

SHUGART MANAGEMENT INC

SHUGART MANAGEMENT INC

SHUGART ENTERPRISES LLC

SHUGART MANAGEMENT INC

SHUGART MANAGEMENT INC

(99) GERARD B. EING

(100)

(101) CALVIN C. QUINN

(102) HERMAN & GWENDOLYN MOORE

(103) SAMART PROPERTIES, LLC

(104) SHUGART MANAGEMENT INC

(105)

(106) HOMER GLENN HALL, III

(107) JOHN K. LINDSAY

(108) RAYMOND WILLIAMS JR. et al

(109) BOBBY D. CURTIS

(110) WANDA SEAGRAVES CAYLOR

(111) NCDOT (formerly THOMAS C. GALLMORE)

(112) NCDOT (formerly GARY W. ADAMS)

(113) JOSEPH M. DRAOLA

(114) MIRIAM FOSTER KINDLE

(115) GLORIA FOSTER BASS

(116) GLORIA FOSTER BASS

(117) LAWRENCE CURTIS

(119)

JOHN EDWARDS RACZENSKI

DELORES N. DUREN

SITE 3
(SEE ENLARGEMENT)

IMPACTS IN SURFACE WATER

TEMP. IMPACTS IN SURFACE WATER

SPECIAL BACK OF CURB CUT DITCH SEE DETAIL "CC"

LATERAL 'V' DITCH SEE DETAIL 'Y'

GLASS "B" RIP RAP

Rob & LUG CONNECTORS W/SLEEVE GASKETS & 2 ELBOWS

CLASS "I" RIP RAP SEE DETAIL "AA"

STANDARD GRASS SWALE SEE DETAIL "BB"

CLASS "B" RIP RAP

DETAIL "Y"
LATERAL 'V' DITCH
(Not To Scale)

Natural Ground, 3:1, D, b, 3:1, Fill Slope, 1 FT.

Min. D= 1.0 Ft.
b= 3.0 Ft.

FROM STA.136+10 TO STA. 136+94.12-L-(LT)
FROM STA.136+94.12 TO STA. 138+00-L-(LT)

DETAIL "CC"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)

NATURAL GROUND, 4:1, 4:1

FROM STA. 138+00 TO STA. 142+85 -L-(LT)
FROM STA. 143+00 TO STA. 146+50 -L-(LT)
FROM STA. 148+00 TO STA. 148+50 -L-(LT)
FROM STA. 149+50 TO STA. 152+27 -L-(LT)
FROM STA. 156+00 TO STA. 160+50 -L-(LT)

DETAIL "BB"
STANDARD GRASSED SWALE
(Not To Scale)

Natural Ground, 3:1, D, 3:1, Natural Ground, B

Min. D= 1.5 Ft.
B= 2.0 Ft.

STA. 138+00-L-(RT), DDE=2.50 CY
L=85 FT, SLOPE = 0.59% & L=150 FT, SLOPE =3.89%

DETAIL "DD"
STANDARD BASE DITCH
(Not To Scale)

Natural Ground, 4:1, D, 4:1, Natural Ground, B

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

STA. 150+79 RT. DDE=17.0 CY

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SYSTIME=$$$$$ SYSDATE=$$$$$ SYSTEM=$$$$$ SYSUSER=$$$$$ SYSDRIVE=$$$$$ SYSFILE=$$$$$ SYSCONN=$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing Sheet 8 of 14

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
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8/17/99

REVISIONS

WETLAND/SURFACE WATER PERMIT DWG.

100' 0' 100'
GRAPHIC SCALE

DENOTES MONOLITHIC CONCRETE ISLAND

DETAIL "CC"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)

FROM STA. 143+00 TO STA. 146+20 -L-(LT)
FROM STA. 148+00 TO STA. 148+50 -L-(LT)
FROM STA. 149+50 TO STA. 152+27 -L-(LT)
FROM STA. 156+00 TO STA. 160+60 -L-(LT)

ENGLISH

MATCHLINE -L- STA. 151+00 SEE SHEET NO. 14

MATCHLINE -L- STA. 163+00 SEE SHEET NO. 16

LAWRENCE CURTIS (117)
J.W. CURTIS (118)
BRIAN & CARRIE BOTTOMLEY (122)
CALVIN LEON JOHNSON (123)
HILDA H. PATTON (127)
(124) (125) (126) (131)
(34) (39) (37) (136)
HARRE
SKH ASSOC. OF THE TRIAD NC
SKH ASSOC. OF THE TRIAD NC
LUXURY HOME RENTALS
TEMPLE OF PRAYER PRAISE & DELIVERENCE INC
JOHN & MARTHA YOR
INGA M. STREETMAN (130)
STANLEY S. BITTNER (120)
EARL PAUL MCCRACKEN
FRANK & ANN CUMMINGS (121)
JOLENE BOOR (119)
JOHN D. BAKER
(128) (129) (132) (133) (135)

SPECIAL BACK OF CURB CUT DITCH SEE DETAIL "CC"

TYPE "A" WILL ALSO SERVE AS A JB FOR EXISTING 18"/24" RCP

REMOVE 52'± OF EXISTING 18 INCH RCP

REMOVE 24" CURB & GUTTER

15 FT. MAINTENANCE ROAD

STANDARD BASE DITCH SEE DETAIL "GG"

STANDARD BASE DITCH SEE DETAIL "HH"

STANDARD BASE DITCH SEE DETAIL "FF"

SPECIAL CUT DITCH SEE DETAIL "EE"

CLASS "B" RIP RAP

PIPE COLLAR

IMPACTS IN SURFACE WATER

TEMP. IMPACTS IN SURFACE WATER

SITE 4
(SEE ENLARGEMENT)

DETAIL "EE"
SPECIAL CUT DITCH
(Not To Scale)
Min. D= 3.0 Ft.
FROM STA. 11+00 TO STA. 11+50 Y-24 RT.

DETAIL "FF"
STANDARD BASE DITCH
(Not To Scale)
Min. D= 2.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
*When B is < 6.0'
Type of Liner= PSRM Proposed Slope=2.7%
FROM STA. 154+13 TO STA. 156+99 -L- RT.
DDE = 174 CY, 262 SY PSRM

DETAIL "GG"
STANDARD BASE DITCH
(Not To Scale)
Min. D= 2.0 Ft.
B= 2.0 Ft.
Proposed Slope=2.0%
STA. 154+60 RT. (OUTLET FOR INLET 259 & 290)
DDE=160 CY

DETAIL "HH"
STANDARD BASE DITCH
(Not To Scale)
Min. D= 2.0 Ft.
B= 2.0 Ft.
Proposed Slope=1.5%
STA. 155+50 RT. (OUTLET FOR INLET 261)
DDE=93 CY

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SYSTEM$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	15
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing
Sheet 9 of 14

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL
TRANSPORTATION
CIVIL
263 TOWN HALL DR., STE C, MORRISVILLE, NC 27560
TEL 919.380.8353 FAX 919.380.8757

WETLAND/SURFACE WATER PERMIT DWG.

GRAPHIC SCALE 100' 0' 100'

DENOTES MONOLITHIC CONCRETE ISLAND

DETAIL "CC"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)

FROM STA. 143+00 TO STA. 146+20 -L-(LT)
FROM STA. 148+00 TO STA. 148+80 -L-(LT)
FROM STA. 149+50 TO STA. 152+87 -L-(LT)
FROM STA. 156+00 TO STA. 160+60 -L-(LT)

ENGLISH

MATCHLINE -L- STA. 151+00 SEE SHEET NO. 14

MATCHLINE -L- STA. 163+00 SEE SHEET NO. 16

LAWRENCE CURTIS

J.W. CURTIS

BRIAN & CARRIE BOTTOMLEY

CALVIN LEON JOHNSON

HILDA H. PATTON

LUXURY HOME RENTALS

SMH ASSOC. OF THE TRIAD NC

TEMPLE OF PRAYER PRAISE & DELIVERENCE INC

STANLEY S. BITTNER

JOLENE BOOR

FRANK & ANN CUMMINGS

JOHN D. BAKER

INGA M. STREETMAN

ST. ANDREW

IMPACTS IN SURFACE WATER

TEMP. IMPACTS IN SURFACE WATER

SPECIAL BACK OF CURB CUT DITCH SEE DETAIL "CC"

DIGITATE "A" WILL ALSO SERVE AS A JB FOR EXISTING 18"X24" RCP

REMOVE 56 L.F. OF EXISTING 18 INCH RCP

15 FT. MAINTENANCE ROAD

STANDARD BASE DITCH SEE DETAIL "FF"

CLASS "B" RIP RAP

SITE 4
(SEE ENLARGEMENT)

DETAIL "GG"
STANDARD BASE DITCH
(Not To Scale)

Min. D= 2.0 Ft.
B= 2.0 Ft.
Proposed Slope=2.0%

STA. 154+60 RT. (OUTLET FOR INLET 259 & 290)
DDE=168 CY

DETAIL "EE"
SPECIAL CUT DITCH
(Not To Scale)

Min. D= 3.0 Ft.

FROM STA. 11+00 TO STA. 11+50 Y-24 RT.

DETAIL "FF"
STANDARD BASE DITCH
(Not To Scale)

Min. D= 2.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
*When B Is < 6.0'
Type of Liner= PSRM Proposed Slope=2.7%

FROM STA. 154+13 TO STA. 156+99 -L- RT.
DDE = 174 CY, 262 SY PSRM

DETAIL "HH"
STANDARD BASE DITCH
(Not To Scale)

Min. D= 2.0 Ft.
B= 2.0 Ft.
Proposed Slope=1.5%

STA. 155+50 RT. (OUTLET FOR INLET 261)
DDE=93 CY

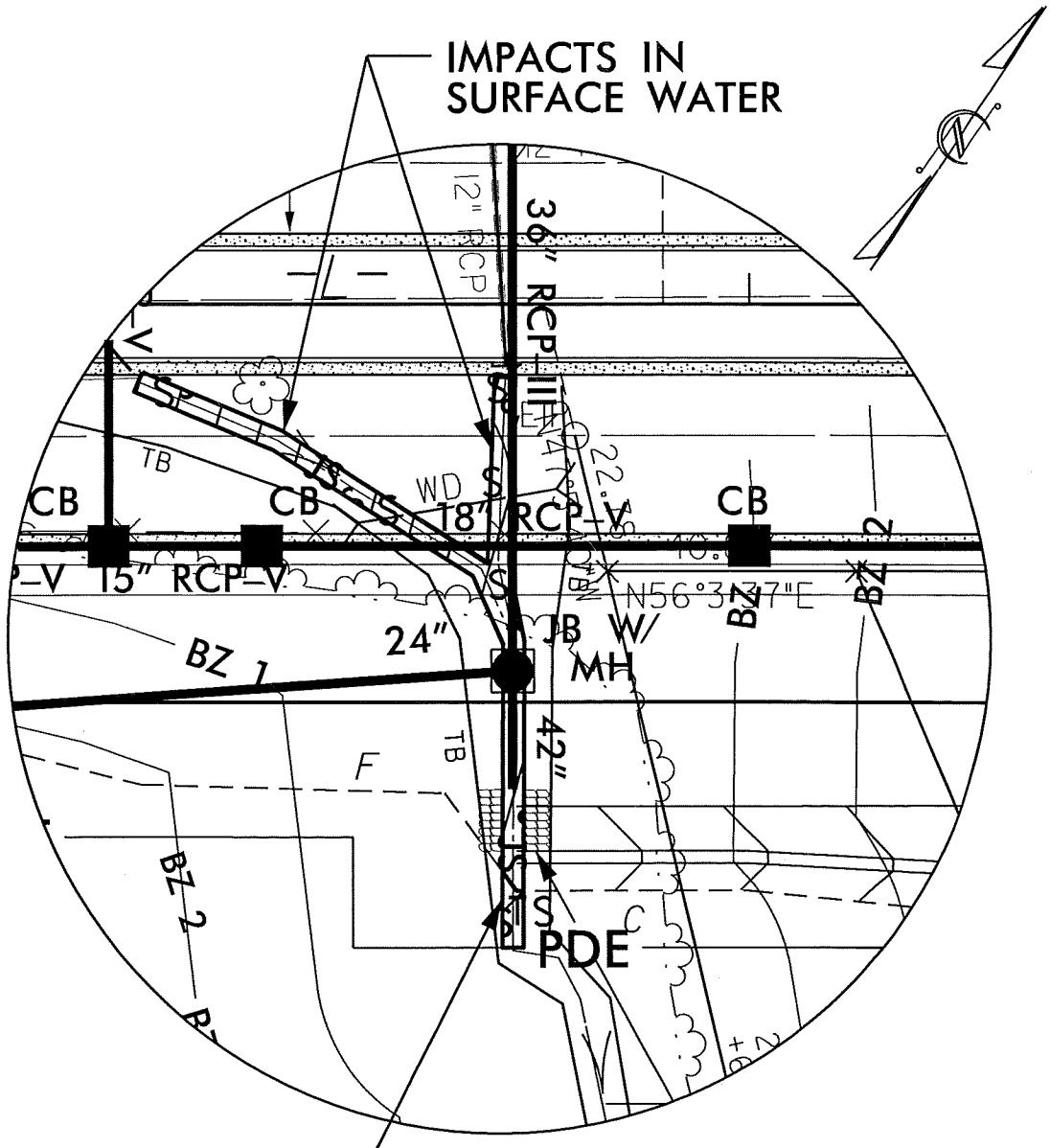
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

SYSTIME 08/17/99 15:09:06 USER: DGUNN



SITE 2 ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

30' 0' 30'

GRAPHIC SCALE

NCDOT

DIVISION OF HIGHWAYS

GUILFORD COUNTY

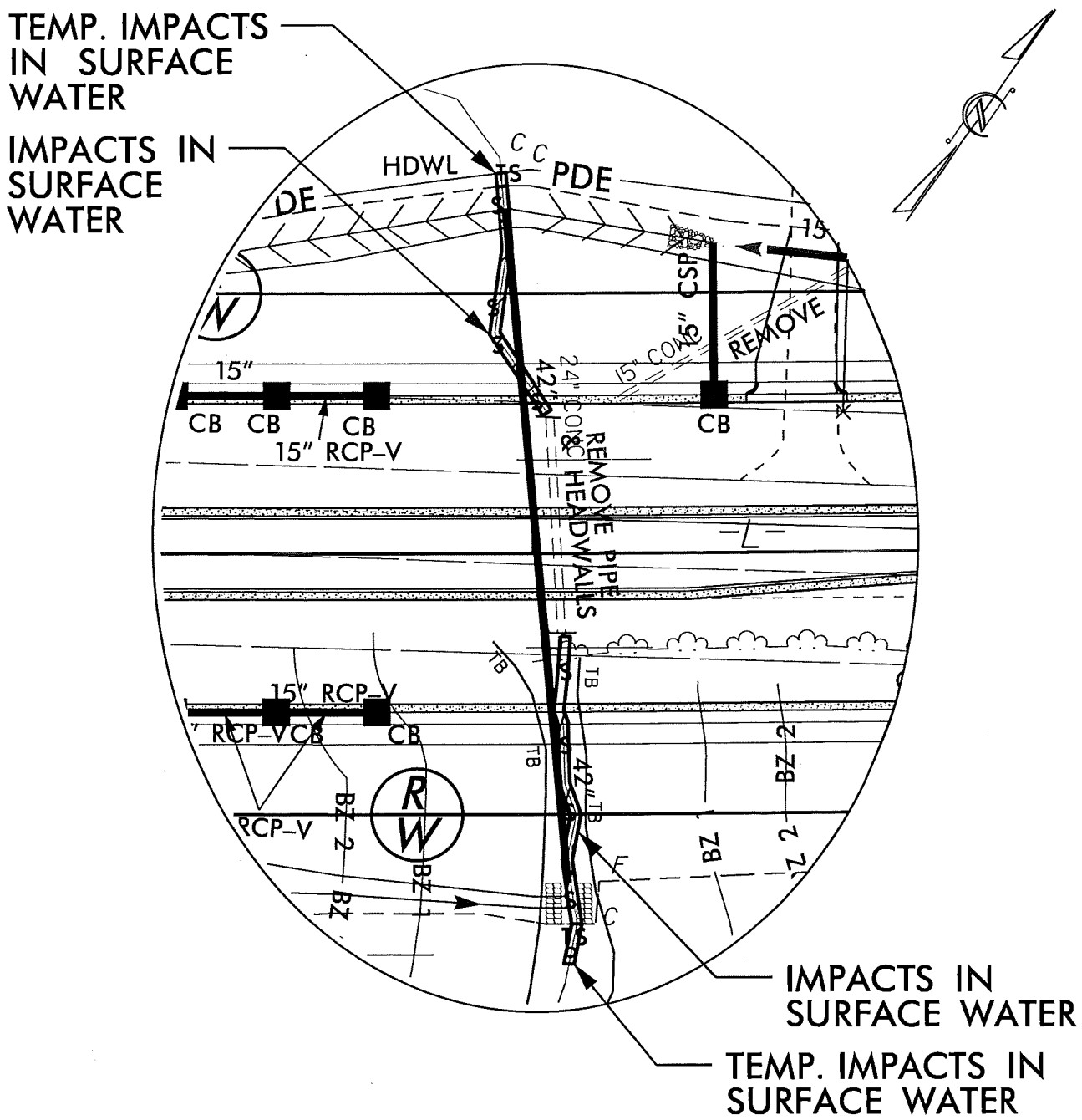
PROJECT: 8.2494701 (U-3615A)

SR 1003 (NORTH MAIN STREET)

AND SR 1820 (SKEET CLUB ROAD)

BETWEEN US 311 AND

SR 1818 (JOHNSON STREET)



SITE 3 ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

40' 0' 40'

GRAPHIC SCALE

NCDOT

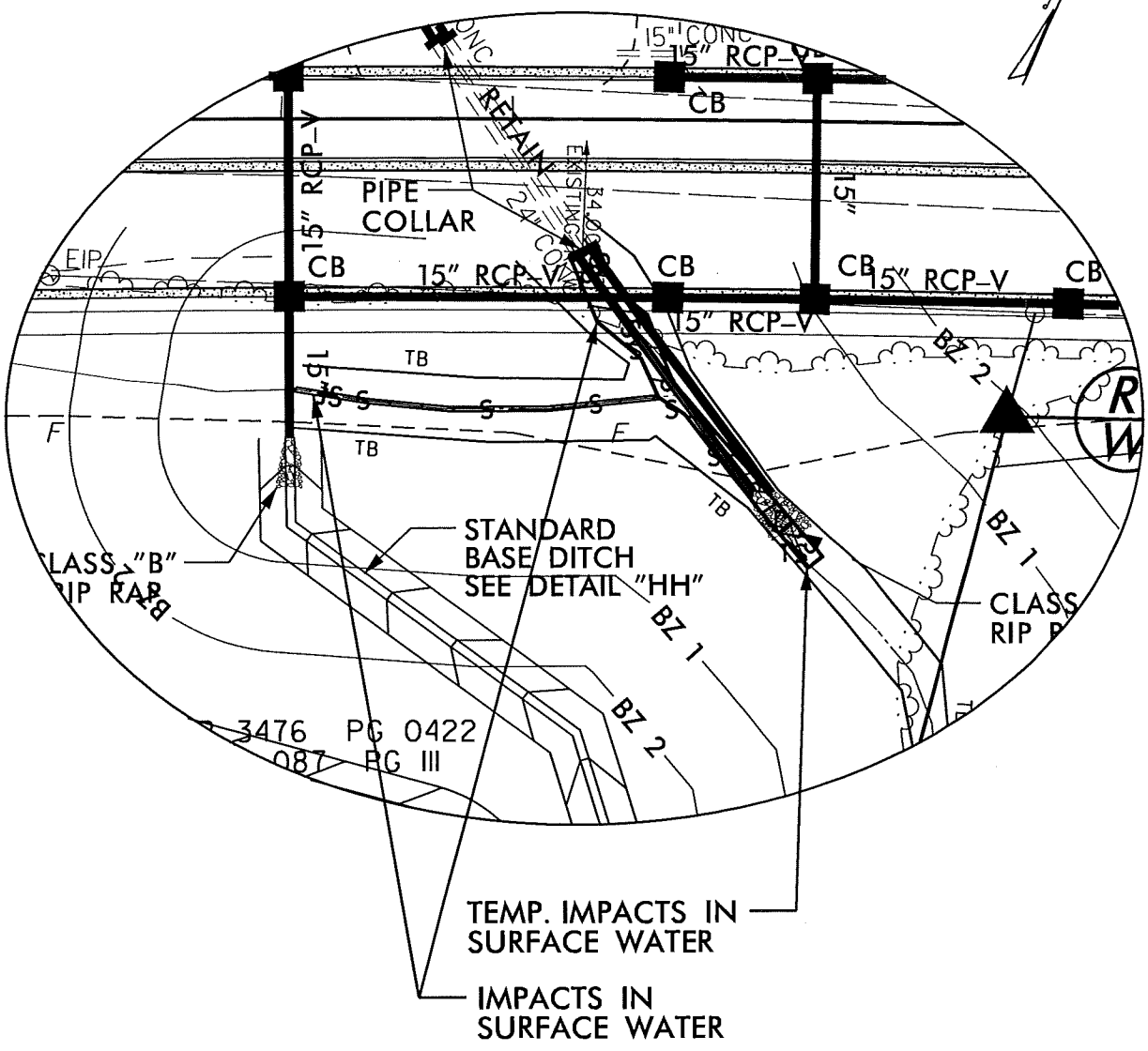
DIVISION OF HIGHWAYS

GUILFORD COUNTY

PROJECT: 8.2494701 (U-3615A)

SR 1003 (NORTH MAIN STREET) AND SR 1820 (SKEET CLUB ROAD) BETWEEN US 311 AND SR 1818 (JOHNSON STREET)

SHEET 11 OF 14 **10/16/01**



SITE 4 ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

40' 0' 40'

GRAPHIC SCALE

NCDOT

DIVISION OF HIGHWAYS
GUILFORD COUNTY
PROJECT: 8.2494701 (U-3615A)
SR 1003 (NORTH MAIN STREET)
AND SR 1820 (SKEET CLUB ROAD)
BETWEEN US 311 AND
SR 1818 (JOHNSON STREET)

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
71	McLarty, George C., Jr.	716 Skeet Club Rd., High Point, NC 27265
99	Einig, Gerard B.	3817 Langdale Dr., High Point, NC 27265
100	Boykin, Judy G.	3311 Hillside Dr., High Point, NC 27265
120	Bittner, Stanley S.	3612 Huntingridge Dr., High Point, NC 27265

WETLAND PERMIT DRAWING

NCDOT

DIVISION OF HIGHWAYS
GUILFORD COUNTY
PROJECT: 8.2494701 (U-3615A)
SR 1003 (NORTH MAIN STREET)
AND SR 1820 (SKEET CLUB ROAD)
BETWEEN US 311 AND
SR 1818 (JOHNSON STREET)

 9/24/12

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
2	-L- STA. 120+50 RT.	36" RCP						0.01	<0.01	148	10	
3	-L- STA. 137+00 LT & RT.	48" RCP						0.01	<0.01	132	13	
4	-L- STA. 156+00 RT.	24" RCP						0.01	<0.01	159	10	
TOTALS:			0.00	0.00	0.00	0.00	0.00	0.03	<0.01	439	33	0.00

N.C.D.O.T.
DIVISION OF HIGHWAYS
GUILFORD COUNTY
PROJECT: 8.2494701 (U-3615A)
SR 1003 (NORTH MAIN STREET)
AND SR 1820 (SKEET CLUB ROAD)
BETWEEN US 311 AND
SR 1818 (JOHNSON STREET)

(9/19/2012)

ATN Revised 3/31/05

9/09/99

TIP: U-3615A

CONTRACT:

$$$

BUFFER PERMIT DWG.

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing
Sheet 2 of 9

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL
TRANSPORTATION
CIVIL
260 TOWN HALL DR., STE. C, MOCKSVILLE, NC 27560
TEL: 919.383.8750
FAX: 919.383.8752

8/17/99

REVISIONS

100' 0' 100'
GRAPHIC SCALE

ENGLISH

SITE 1

(10) MEADOWBROOK APARTMENTS LLC
25BK APT
PA BST
10.00' COLONIAL PIPELINE GAS EASEMENT
RIP RAP
24" RCP
WALDEN LANE
150' BST
(11) 150.00' DUKE POWER R/W
DB 1770 PG 323
40
EXIST R/W
15" RCP-V
18" RCP-V
CB
REMOVE
15" CONC
18" CONC
CHORD
PDE
ISBK BUS
MATCHLINE -L- STA. 33+00 SEE SHEET NO. 5
MATCHLINE -L- STA. 45+00 SEE SHEET NO. 7
ZONE 2 ALLOWABLE
ZONE 1 ALLOWABLE

DETAIL "E"
SPECIAL CUT DITCH
(Not To Scale)
Natural Ground
2ft
D
4:1
Front Ditch Slope
Min. D= 4.0 Ft.
FROM STA. 11+17.14-Y5-TO STA. 11+47.50-Y5-(RT)

DETAIL "F"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)
NATURAL GROUND
4ft
4:1
.02
FROM STA. 37+50 TO STA. 43+03.59 -L-(RT)
FROM STA. 10+78.01-Y5- TO STA. 11+17.14-Y5-(RT)

SPECIAL BACK OF CURB /CUT DITCH SEE DETAIL "F"
SPECIAL BACK OF CURB CUT DITCH SEE DETAIL "F"
SPECIAL CUT DITCH SEE DETAIL "E"

(9)
(12) ROBERT JOSEPH TRAVERS, JR
DVM PROPERTIES LLC
(13) JESSE R. KEMP
(14) HOFFMAN/HOLBROOK DEVELOPMENT LLC
ISMTL BUS
DOROTHY O. HOLT
WALTER B. THORBURN, III
R/W DUKE POWER 2490
R/W DUKE POWER 2490

STA. 44+23.26 -L- (LT)
STA. 45+50 -L- (LT)

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	1
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing Sheet 1 of 9

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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STRUCTURAL
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CIVIL
560 TOWN HALL DR. STE C, MACKSVILLE, NC 27560
TEL 919 380 8750 FAX 919 380 8752

8/17/99

REVISIONS

BUFFER PERMIT DWG.

ENGLISH

100' 0' 100'
GRAPHIC SCALE

MATCHLINE -Y8- STA. 15+00 SEE SHEET NO. 17

MATCHLINE -Y6- STA. 18+00 SEE SHEET NO. 17

MATCHLINE -L- STA. 45+00 SEE SHEET NO. 6

MATCHLINE -L- STA. 57+00 SEE SHEET NO. 8

SITE 1

LIMITS

ZONE 1 ALLOWABLE

ZONE 2 ALLOWABLE

(17) JOAN REYNOLDS HUGGINS

HUGGINS TIRE SALES, INC.

(19) BILLY CHARLES WARREN

(16) JOAN REYNOLDS HUGGINS

(15) BRENDA WHITE SMITH

(22) KENNEDY OIL CO INC.

ISMAS CHURCH

(10)

(14) HOFFMAN/HOLBROOK DEVELOPMENT LLC

ISBK CHURCH

(18) ST. MICHAELS LUTHERAN CHURCH

(20) JIMMY ROY GARNER

(21) RANDY & GINA MACDONALD

(23) ROGER LEE DAVIS

(28) ROBERT WAYNE DAVIS

(27) B. R. DAVIS HEIRS

ISBK BUS

ISBK

ISFD

ISBKD

WELL HOUSE

POOL

CANOPY

FORSYTH COUNTY / GUILFORD COUNTY LINE

HIGH POINT CITY LIMITS (IN)

HIGH POINT CITY LIMITS

EXISTING R/W

REMOVE EXIST. DI

REMOVE EXIST. DI & PIPE

SPECIAL LATERAL "V" DITCH SEE DETAIL "G"

STANDARD "V" DITCH SEE DETAIL "G2"

LATERAL BASE DITCH SEE DETAIL "H"

SPECIAL BACK OF CURB CUT DITCH SEE DETAIL "I"

SPECIAL BACK OF CURB BASE DITCH SEE DETAIL "I2"

CONC. FLUME EXTEND TO BOTTOM OF DITCH

PDE

DETAIL "G"
SPECIAL LATERAL "V" DITCH
(Not To Scale)

Natural Ground
4:1
D
Adjacent Fill Slope
Min. D= 1.0 Ft.

FROM STA. 19+50 TO STA. 20+39 -Y6-(LT)
FROM STA. 19+00 TO STA. 20+39 -Y6-(RT)

DETAIL "H"
LATERAL BASE DITCH
(Not To Scale)

Natural Ground
d
T
B
b
F/Ft.
Fill Slope

*When B is ≥ 6.0'
Std. No. 876.01

Min. D = 1.5 Ft.
Max. d= 1.5 Ft.
B= 3.0 Ft.
b= 3.0 Ft.

Type of Liner = RSRM

FROM STA. 48+00 TO STA. 51+49.7 -L-(LT)
FROM STA. 21+00 TO 20+39 -Y6-(RT)

DETAIL "I"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)

NATURAL GROUND
4:1
4:1
Shoulder

FROM STA. 47+00 TO STA. 58+00 -L-(RT)

DETAIL "I2"
SPECIAL BACK OF CURB BASE DITCH
(NOT TO SCALE)

NATURAL GROUND
3:1
4:1
D
B

Min. D= 1.0 Ft.
B= 3.0 Ft.

FROM STA. 52+46 TO STA. 56+00 -L-(LT)
FROM STA. 20+39 TO 21+00 -Y6-(LT)

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	12
RW SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

Buffer Drawing Sheet 4 of 9

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL
TRANSPORTATION
CIVIL
263 TOWN HALL DR., STE. C, WORRYSVILLE, NC 27560
TEL 919.550.8353 FAX 919.550.8753

BUFFER PERMIT DRAWING

ENGLISH

GRAPHIC SCALE 100' 0' 100'

REVISIONS

8/17/18

MATCHLINE -L- STA. 109+00 SEE SHEET NO. 11

MATCHLINE -L- STA. 123+00 SEE SHEET NO. 13

DALE H. CUTHRIE

ALEX W. STOUT

(66) ELTON D. MILLER

(69) JAMES E. HARRIS

(70) ROBERT LEE SKIDMORE

(72) BRENDA W. NEALY

(73) G. LARRY GUY

(74) EDWARD D. GIBSON

(75) ANNIE WELBORN ESTATE

(76)

(67) NCDOT (formerly DAKOTA CONSULTANTS)

(68) NCDOT (formerly NANCY C. JOYCE)

CHRISTOPHER & CHRISTAN HOLT

PERLEY A. THOMAS, JR

(71) GEORGE C. MCILRAY, JR

THANG CAO NGUYEN
DB 6458 PG 879
LOT 20 PB 52 PG 015

SITE 2

ZONE 2 ALLOWABLE

ZONE 1 ALLOWABLE

ZONE 2 ALLOWABLE

DENOTES MONOLITHIC CONCRETE ISLAND

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

DETAIL "R"
SPECIAL BACK OF CURB BASE DITCH
(NOT TO SCALE)
Min. D= 1.0 Ft.
B= 8.0 Ft.
FROM STA.112+46 TO STA.119+00 -L-(RT)

DETAIL "T"
SPECIAL BACK OF CURB BASE DITCH
(NOT TO SCALE)
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
Type of Liner= PSRM
FROM STA.120+84 TO STA.124+00-L-(LT)

DETAIL "V"
LATERAL BASE DITCH
(Not To Scale)
Min. D= 1.0 Ft.
Max. d= 3.0 Ft.
B= 2.0 Ft.
D= 5.0 Ft.
*When B is < 6.0'
Type of Liner= PSRM
FROM STA.120+41.80 TO STA.122+80-L-(RT)

BUFFER PERMIT DRAWING

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing Sheet 5 of 9

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL TRANSPORTATION CIVIL
200 TOWN HALL DR., STE. C, MORRISVILLE, NC 27560
TEL 919.363.8750 FAX 919.363.8752

ENGLISH

100' 0' 100'
GRAPHIC SCALE

MITIGABLE IMPACTS ZONE 1
FROM STA.124+00 TO STA.127+50-L-(LT)

MITIGABLE IMPACTS ZONE 2
FROM STA.122+50-L-(LT) TO STA.116+00-L-(LT)

DETAIL "W"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)

DETAIL "X"
SPECIAL BACK OF CURB BASE DITCH
(NOT TO SCALE)

DETAIL "T"
SPECIAL BACK OF CURB BASE DITCH
(NOT TO SCALE)
FROM STA.120+84 TO STA.124+00-L-(LT)

DETAIL "Y"
LATERAL 'V' DITCH
(Not To Scale)
FROM STA.136+10 TO STA.136+94.12-L-(LT)
FROM STA.136+94.12 TO STA.138+00-L-(LT)
FROM STA.135+75 TO STA.135+08.50-L-(RT)

MATCHLINE -L- STA. 123+00 SEE SHEET NO. 12

MATCHLINE -L- STA. 137+00 SEE SHEET NO. 14

ZONE 2 MITIGABLE

SITE 3

ZONE 1 MITIGABLE

REVISIONS

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing Sheet 6 of 9

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL
TRANSPORTATION
CIVIL
260 TOWN HALL DR., STE C, MORRISVILLE, NC 27560
TEL 919.380.8750 FAX 919.380.8752

8/17/99

REVISIONS

BUFFER PERMIT DRAWING

ENGLISH

GRAPHIC SCALE 100' 0 100'

DENOTES MONOLITHIC CONCRETE ISLAND

MATCHLINE –L– STA. 137+00 SEE SHEET NO. 13

MATCHLINE –L– STA. 151+00 SEE SHEET NO. 15

SHUGART ENTERPRISES LLC

SHUGART MANAGEMENT INC

SHUGART MANAGEMENT INC

SHUGART ENTERPRISES LLC

SHUGART MANAGEMENT INC

SHUGART MANAGEMENT INC

(99) GERARD B. EING

(100) CALVIN C. QUINN

(101)

(102) HERMAN & GWENDOLYN MOORE

(103) SAMART PROPERTIES LLC

(104) SHUGART MANAGEMENT INC

(105)

(106) HOMER GLENN HALL, III

(107) JOHN K. LINDSAY

(108) RAYMOND WILLIAMS JR. et al

(109) BOBBY D. CURTIS

(110) WANDA SEAGRAVES CAYLOR

(111) NCDOT (formerly THOMAS C. GALLMORE)

(112) NCDOT (formerly GARY W. ADAMS)

(113) JOSEPH M. DRAOLA

(114) MIRIAM FOSTER KINDLE

(115) GLORIA FOSTER BASS

(116) GLORIA FOSTER BASS

(117) LAWRENCE CURTIS

(119)

JOHN EDWARDS RACZENSKI

DELORES N. DUREN

WILLIAM R. SHAMBURG

ZONE 1 MITIGABLE

ZONE 2 MITIGABLE

SITE 3

SPECIAL BACK OF CURB CUT DITCH SEE DETAIL "CC"

LATERAL "Y" DITCH SEE DETAIL "Y"

DETAIL "Y"
LATERAL "Y" DITCH
(Not To Scale)

Min. D= 1.0 Ft.
b= 3.0 Ft.

FROM STA.136+10 TO STA. 136+94.12-L-(LT)
FROM STA.136+94.12 TO STA. 138+00-L-(LT)

DETAIL "CC"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)

FROM STA. 138+00 TO STA. 142+85 -L-(LT)
FROM STA. 143+00 TO STA. 146+50 -L-(LT)
FROM STA. 148+00 TO STA. 148+50 -L-(LT)
FROM STA. 149+50 TO STA. 152+27 -L-(LT)
FROM STA. 156+00 TO STA. 160+50 -L-(LT)

DETAIL "BB"
STANDARD GRASSED SWALE
(Not To Scale)

Min. D= 1.5 Ft.
B= 2.0 Ft.

STA. 138+00-L-(RT), DDE=2.50 CY
L=85 FT, SLOPE = 0.59% & L=150 FT, SLOPE =3.89%

DETAIL "DD"
STANDARD BASE DITCH
(Not To Scale)

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

STA. 150+79 RT. DDE=17.0 CY

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing Sheet 7 of 9

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL
TRANSPORTATION
CIVIL
260 TOWN HALL DR., STE C, WOODSVILLE, NC 27560
TEL 919.360.8959 FAX 919.360.8752

BUFFER PERMIT DRAWING

100' 0' 100'
GRAPHIC SCALE

ENGLISH

DENOTES MONOLITHIC CONCRETE ISLAND

DETAIL "CC"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)

NATURAL GROUND

FROM STA. 143+00 TO STA. 146+50 -L-(LT)
FROM STA. 148+00 TO STA. 148+50 -L-(LT)
FROM STA. 149+50 TO STA. 152+27 -L-(LT)
FROM STA. 156+00 TO STA. 160+50 -L-(LT)

MATCHLINE -L- STA. 151+00 SEE SHEET NO. 14

MATCHLINE -L- STA. 163+00 SEE SHEET NO. 16

LAWRENCE CURTIS

(117) (118) J.W. CURTIS

(122) BRIAN & CARRIE BOTTOMLEY

(123) CALVIN LEON JOHNSON

(124) HILDA H. PATTON

(125) (126) (127) (131)

(34) (39) (37) HARR

(36)

SMH ASSOC. OF THE TRIAD NC

LUXURY HOME RENTALS

TEMPLE OF PRAYER PRAISE & DELIVERENCE INC.

ST. ANDREW

(130) INGA M. STREETMAN

(119) JOLENE BOOR

(121) FRANK & ANN CUMMINGS

(120) STANLEY S. BITTNER

(128) (129) (132) (133) (135)

EARL PAIR MCCRACKEN

JOHN & MARTHA TOW

HUNTING RIDGE

HAROLD YARGAS

15 FT. MAINTENANCE ROAD

STANDARD BASE DITCH
SEE DETAIL "GG"

STANDARD BASE DITCH
SEE DETAIL "FF"

SPECIAL CUT DITCH
SEE DETAIL "EE"

REMOVE 50 L.F. OF EXISTING 15 INCH RCP

SITE 4
JOHN D. BAKER

ZONE 2 MITIGABLE
ZONE 1 MITIGABLE
ZONE 2 MITIGABLE
ZONE 1 MITIGABLE

MITIGABLE IMPACTS ZONE 1

DETAIL "EE"
SPECIAL CUT DITCH
(Not To Scale)

Min. D= 3.0 Ft.

FROM STA. 11+00 TO STA. 11+50 Y-24 RT.

DETAIL "FF"
STANDARD BASE DITCH
(Not To Scale)

Min. D= 2.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
*When B is < 6.0'
Type of Liner= PSRM

FROM STA. 154+13 TO STA. 156+99 -L- RT.
DDE = 174 CY, 262 SY PSRM

DETAIL "GG"
STANDARD BASE DITCH
(Not To Scale)

Min. D= 2.0 Ft.
B= 2.0 Ft.

STA. 154+60 RT. (OUTLET FOR INLET 259 & 290)
DDE=160 CY

DETAIL "HH"
STANDARD BASE DITCH
(Not To Scale)

Min. D= 2.0 Ft.
B= 2.0 Ft.

STA. 155+50 RT. (OUTLET FOR INLET 261)
DDE=93 CY

$$$$$$$SYSTIME$$$$$$$
$$$$$$$USERNAME$$$$$$$

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
10	Meadowbrook Apt.'s LLC	338 N Elm St., Ste 108, Greensboro, NC 27401
71	McLarty, George C. Jr.	716 Skeet Club Rd., High Point, NC 27265
78	Nguyen, Thang Cao	587 Camden Park Ct., High Point, NC 27265
99	Einig, Gerard B.	3817 Langdale Dr., High Point, NC 27265
120	Bittner, Stanley S.	3612 Huntingridge Dr., High Point, NC 27265
128	McCracken, Earl Paul	920 Skeet Club Rd., High Point, NC 27265
144	Britt Development Co of Archdale LLC	PO Box 4587, High Point, NC 27263

BUFFER PERMIT DRAWING

NCDOT

DIVISION OF HIGHWAYS
GUILFORD COUNTY
PROJECT: 8.2494701 (U-3615A)
SR 1003 (NORTH MAIN STREET)
AND SR 1820 (SKEET CLUB ROAD)
BETWEEN US 311 AND
SR 1818 (JOHNSON STREET)

9/24/12

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	48" RCP	-L- STA. 45+00 LT.	X			2370	1792	4162					
2	42" RCP	-L- STA. 120+50 RT.	X			6278	3988	10266					
3	42" RCP	-L- STA. 137+00 RT.	X						10201	5639	15840		
4	2 @ 24" RCP	-L- STA. 156+00 RT.	X						7174	3536	10710		
4	2 @ 24" RCP	-L- STA. 156+00 RT.			X				5898	3605	9503		
TOTAL:						8648	5780	14428	23273	12780	36053		

N.C.D.O.T.
DIVISION OF HIGHWAYS
GUILFORD COUNTY
PROJECT: 8.2494701 (U-3615A)
SR 1003 (NORTH MAIN STREET)
AND SR 1820 (SKEET CLUB ROAD)
BETWEEN US 311 AND
SR 1818 (JOHNSON STREET)

SHEET 9 OF 9 (9/19/2012)

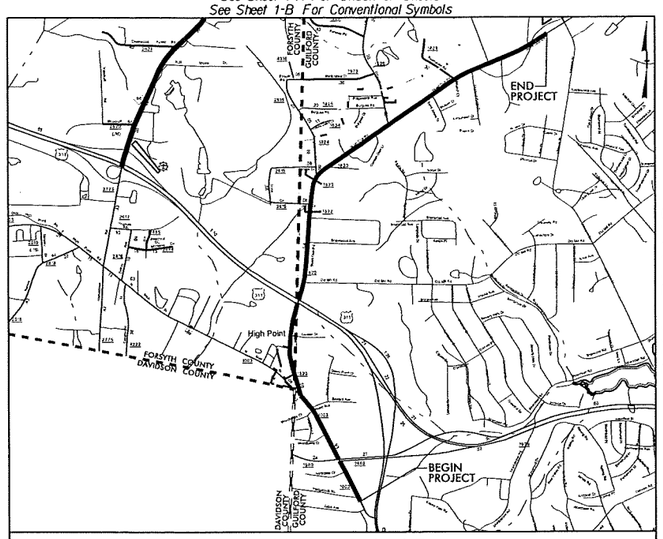
Rev. May 2006

9/09/99

TIP: U-3615A

CONTRACT:

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



VICINITY MAP Not To Scale

R/W PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

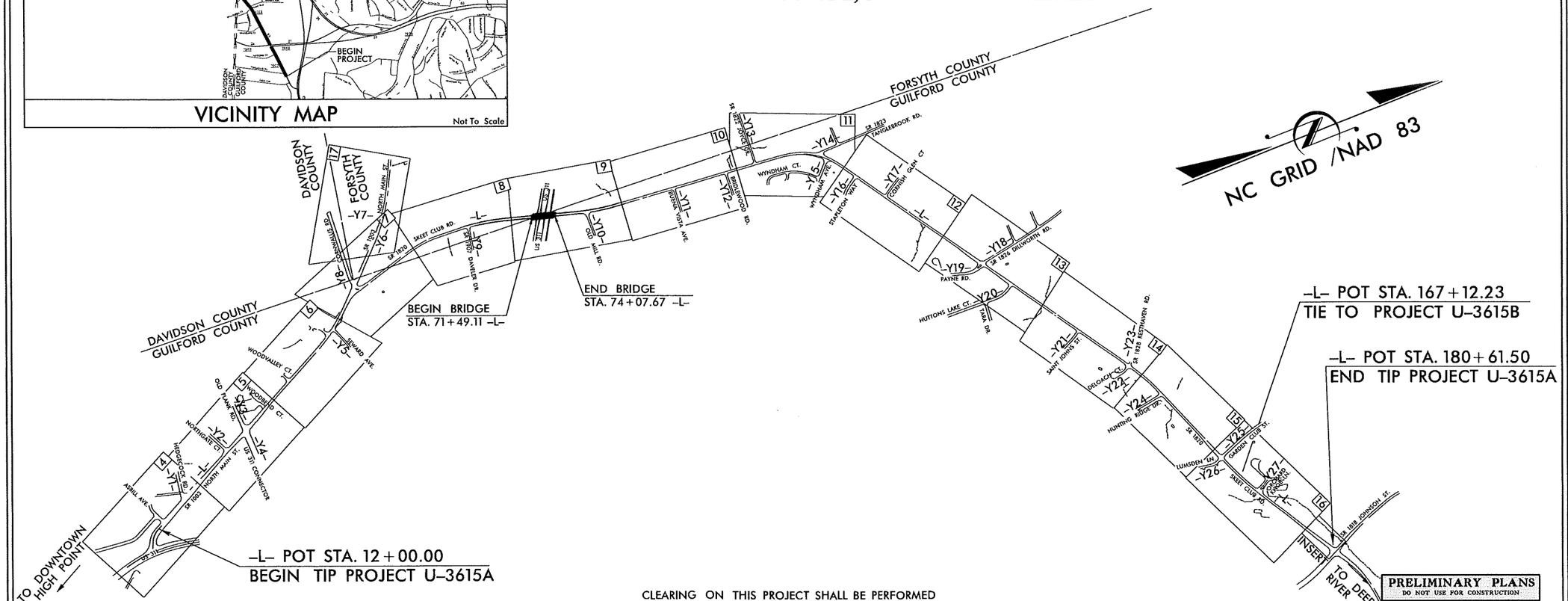
GUILFORD COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3615A	1	

WBS NO.	F.A. PROJ. NO.	DESCRIPTION
34962.1.1	STP-1820(2)	P.E.
34962.2.2	STP-1820(4)	R/W & UTILITIES

LOCATION: *SR 1003 (NORTH MAIN STREET) AND SR 1820 (SKEET CLUB ROAD) BETWEEN US 311 AND SR 1818 (JOHNSON STREET).*

TYPE OF WORK: *GRADING, PAVING, DRAINAGE, GUARDRAIL, STRUCTURE, SIGNING AND SIGNALS*



NC GRID /NAD 83

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

GRAPHIC SCALES

PLANS 50 25 0 50 100

PROFILE (HORIZONTAL) 50 25 0 50 100

PROFILE (VERTICAL) 10 5 0 10 20

DESIGN DATA

ADT 2015 = 18,100
ADT 2035 = 29,800
DHV = 10 %
D = 55 %
T = 3 % *
V = 50 MPH
* TTST 1 % DUAL 2 %

FUNCTIONAL CLASS: MINOR ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-3615A = 3.144mi.
LENGTH STRUCTURE TIP PROJECT U-3615A = 0.049mi.
TOTAL LENGTH TIP PROJECT U-3615A = 3.193mi.

NCDOT CONTACT: CATHY HOUSER, PE
PROJECT ENGINEER, ROADWAY DESIGN UNIT

Prepared In the Office of: STEWART ENGINEERING, INC.
STEWART ENGINEERING STRUCTURAL TRANSPORTATION CIVIL
250 JOHN KNOX DR., STE C WORTHVILLE NC 27560 TEL 919 553 8725 FAX 919 260 8725
FOR: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: OCT 18, 2013

LETTING DATE: OCT 20, 2015

DAVID RUGGLES, PE
PROJECT ENGINEER

DREW BAIRD, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER *P.E.*

DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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PROJECT REFERENCE NO.	SHEET NO.
U-3615A	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL TRANSPORTATION CIVIL
240 TOWN VILLA DR, STE C, MORRISVILLE, NC 27560
TEL 919 380 8750 FAX 919 380 8752

8/17/99

REVISIONS

-L-
PI Sta 12+11.94
Δ = 39° 24' 23.7" (RT)
D = 26° 02' 36.7"
L = 151.31'
T = 78.79'
R = 220.00'
SE = NA
DS = 50 mph

-L- POT Sta. 12+00.00
BEGIN STATE PROJECT U-3615A
BEGIN CONSTRUCTION
BEGIN RESURFACING

-Y1- POT Sta. 10+88.11
BEGIN CONSTRUCTION

END RESURFACING
-L- POT Sta. 16+50.00

-L- POT Sta. 11+31.11
-Y1- POT Sta. 12+00.00

-BL- POT Sta. 5+00.00
-BL- PINC 11+64.70
-BY3- PINC 12+60.47

-BY3- PINC 13+24.09 (LT)

-BL- PINC U3615-2 16+92.53 -L- 32.83 (LT)

-Y1- PINC 18+23.75 -Y1- 16+92.53 -L- 32.83 (LT)

-BL- POT Sta. 11+64.70
-BY3- POT Sta. 12+60.47

PC Sta. 11+33.15
PT Sta. 12+84.46

N 66° 05' 34.9" W

N 26° 41' 11.1" W

S 81° 40' 05.5" E

NC GRID / NAD 83

ANITA EAGLE
DB 3830 PG 1412

CLIFTON H. LAMB
DB 3494 PG 0297

DAVID W. MABE
DB 5141 PG 0160
PB 014 PG 025

KEVIN A. ROTHROCK
DB 4480 PG 1004
PB 016 PG 013

KEVIN A. ROTHROCK
DB 4346 PG 1350
PB 016 PG 013

WOODLAWN BAPTIST CHURCH
DB 1609 PG 025
PB 014 PG 025

CLIFTON H. LAMB
DB 3899 PG 0852
PB 014 PG 025

DIXON AUTO REPAIR INC.
DB 3797 PG 2177

CO. OF MASONIC BUILDING
DB 4766 PG 0316
PB 15 PG 12

NORTH STATE TELEPHONE
DB 2503 PG 0366

NORTHSIDE CHURCH OF CHRIST TRUSTEES
NO DEED RECORD FOUND
PB 016 PG 002

TED LARRY CLOOFELTER
DB 2942 PG 0771
PB 016 PG 002

RANDALL HICKS
DB 6348 PG 0446
PB 016 PG 002

TRAFFIC DIAGRAM

HEDGECOCK ROAD
2400 / 3500
1900 / 2800 — 400 / 700
16700 / 27800 — NORTH MAIN ST. SR 1003 — 15200 / 25700
2015 / 2035 ADT

NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE.
PROPOSED R/W WIDTH FOR -L- LINE IS 110' UNLESS OTHERWISE NOTED

SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 24 FOR -Y1- PROFILE

MATCHLINE -L- STA. 20+00 SEE SHEET NO. 5

07-OCT-2012 12:01
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PROJECT REFERENCE NO.	SHEET NO.
U-3615A	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL TRANSPORTATION CIVIL
200 TOWN HALL DR. STE. C, MOORESVILLE, NC 28150
TEL 919 380 8150 FAX 919 380 8152

8/17/99

REVISIONS

DETAIL "C"
STANDARD BASE DITCH
(Not TO Scale)

Natural Ground 2d D 2d Natural Ground
B
Min. D= 1.0 Ft.
B= 3.0 Ft.

STA. 20+71.89 -L-(RT) DDE=10 CY

DETAIL "A"
STANDARD BASE DITCH
(Not TO Scale)

Natural Ground 2d D 2d Natural Ground
B
Min. D= 1.0Ft.
B= 3.0Ft.

STA. 10+15.2 -Y3-(RT) DDE=10 CY

DETAIL "B"
STANDARD BASE DITCH
(Not TO Scale)

Natural Ground 2d D 2d Natural Ground
d B
Min. D= 1.0Ft.
Max. d= 2.0Ft.
B= 3.0Ft.
*when B Is < 6.0'

Type of Liner= PSRM

FROM STA.29+45 -L-(LT) TO STA. 10+15.3-Y3-(LT) DDE=50CY

NC GRID / NAD 83

MATCHLINE -L- STA. 20+00 SEE SHEET NO. 4

MATCHLINE -L- STA. 33+00 SEE SHEET NO. 6

-Y2- POT Sta. 10+64.00
BEGIN CONSTRUCTION

-Y3- POT Sta. 10+15.00
BEGIN CONSTRUCTION

-L- POT Sta. 25+01.35
-Y2- POT Sta. 11+50.00

-L- POT Sta. 28+15.02
-Y3- POT Sta. 11+50.00
-Y4- POT Sta. 10+00.00

-Y4- POT Sta. 11+54.85
END CONSTRUCTION

3 RONALD & SHARON CROWDER
DB 6513 PG 287
PB 014 PG 025

4 WILLIARD INVESTMENT LLC
DB 4969 PG 1393
PB 042 PG 058

5 WILLIARD INVESTMENT LLC
DB 4969 PG 1393
PB 132 PG 051

6 DCK, LLC
DB 6289 PG 246
PB 171PG 15

7 VON STROUPE LLC
DB 6554 PG 1821

8 TWO DAUGHTERS LLC
DB 6778 PG 2668

9 BENCKI REALTY LTD
DB 3829 PG 0089
PB 101 PG 137

AREA U/C 6/13/2006

35' ACCESS EASEMENT DB 6789 PG 104 PB 171PG 15

30' ACCESS EASEMENT AND 30' POND ACCESS EASEMENT DB 6789 PG 104 PB 171PG 15

NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE.
PROPOSED R/W WIDTH FOR -L- LINE IS 110' UNLESS OTHERWISE NOTED

SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 24 FOR -Y2- PROFILE
SEE SHEET 24 FOR -Y3- PROFILE
SEE SHEET 24 FOR -Y4- PROFILE

TRAFFIC DIAGRAM

NORTHGATE CT
700/1100
500/600 200/500
15200/25700 NORTH MAIN ST. SR 1003 14900/25600
2015/2035 ADT

TRAFFIC DIAGRAM

OLD PLANK RD.
2015/2035 ADT
2000/3300
200/600 600/900
14900/25600 14900/25400
1300/1800 900/1300
NORTH MAIN ST. SR 1003
3400/4900
US 311 CONNECTOR

07-OCT-2012 12:02
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ssstewart

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL TRANSPORTATION CIVIL
200 TOWN HALL DR., STE. C, MOORESVILLE, NC 28560
TEL 919 330 8750 FAX 919 330 8752

-L-		-Y5-	
PIs Sta 42+11.10	PI Sta 42+96.03	PIs Sta 43+81.04	PI Sta 12+18.96
Θs = 5° 10' 30.4"	Δ = 3° 34' 12.5" (LT)	Θs = 5° 10' 30.4"	Δ = 6° 00' 05.1" (RT)
Ls = 168.00'	D = 6° 09' 39.0"	Ls = 168.00'	D = 4° 24' 26.5"
LT = 112.05'	L = 57.95	LT = 112.05'	L = 136.17'
ST = 56.04'	T = 28.98'	ST = 56.04'	T = 68.15'
	R = 930.00'		R = 1,300.00'
	SE = 0.040		
	DS = 50 mph		

NC GRID / NAD 83

MATCHLINE -L- STA. 33+00 SEE SHEET NO. 5

MATCHLINE -L- STA. 45+00 SEE SHEET NO. 7

(10) MEADOWBROOK APARTMENTS LLC DB 5195 PG 0327

(11) 150.00' DUKE POWER R/W DB 1170 PG 323

(12) ROBERT JOSEPH TRAVERS, JR DB 3879 PG 1663 PB 101 PG 137

(13) JESSE R. KEMP DB 6417 PG 0655 PB 021 PG 001

(14) HOFFMAN/HOLBROOK DEVELOPMENT LLC DB 4184 PG 0056 PB 021 PG 001

DVM PROPERTIES, LLC PG 2532 PG 21

DOROTHY O. HOLT DB 2789 PG 0544 PB 021 PG 001

WALTER B. THORBURN, III DB 4276 PG 1245 PB 109 PG 083

BM#2 ELEVATION = 886.92'
N = 823074 E = 1692177
-BL- STATION 28+83.84' LEFT
CHISLED SE CORNER OF CONCRETE PAD UNDER TRANSFORMER

-T-100 5+00.00 POT
ELEV=876.29
#5 REBAR SET

-L- POT Sta. 43+67.47
-Y5- POT Sta. 10+00.00

-BL- 38+67.21 POT =
-T-101 7+49.00 POT
ELEV=882.91
#5 REBAR SET

-Y5- POT Sta. 12+86.58

END CONSTRUCTION
-Y5- POT Sta. 12+05.00

PC Sta. 11+50.81
N 67° 25' 24.1" E

WALDEN LANE (80' BST)

N 26° 41' 11" W

SLOPE STAKE LINE

SPECIAL BACK OF CURB CUT DITCH SEE DETAIL "F"

SPECIAL CUT DITCH SEE DETAIL "E"

RIP RAP

ISMTL BUS

DETAIL "E"
SPECIAL CUT DITCH
(Not To Scale)

DETAIL "F"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)

FROM STA. 37+50 TO STA. 43+03.59 -L-(RT)
FROM STA. 10+78.01-Y5- TO STA. 11+17.14-Y5-(RT)

DETAIL "D"
PIPE OUTLET CHANNEL
(Not To Scale)

Length= 20 Ft.
D= 2.0 Ft.
Est.= 1 TONS of Class 'I' Rip-Rap

STA. 44+87.40 -L-(LT)

DETAIL "D1"

PLAN VIEW

SECTION A-A

B= 5.0 Ft.
D= 1.0 Ft.
B= 5.0 Ft.
d= 0.5 Ft.

STA. 44+23.26 -L- (LT)
STA. 45+50 -L- (LT)

NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE. PROPOSED R/W WIDTH FOR -L- LINE IS 110' UNLESS OTHERWISE NOTED

SEE SHEETS 18 & 19 FOR -L- PROFILE
SEE SHEET 25 FOR -Y5- PROFILE

TRAFFIC DIAGRAM

WOODBEND CT.
100/300
100/200 | 0/100
14900/25400 NORTH MAIN ST. SR 1003 14800/25300
2015/2035 ADT

TRAFFIC DIAGRAM

WOODVALLEY CT.
100/300
100/200 | 0/100
14800/25300 NORTH MAIN ST. SR 1003 14700/25200
2015/2035 ADT

TRAFFIC DIAGRAM

2015/2035 ADT
NORTH MAIN ST. SR 1003
14700/25200 | 300/300 | 100/100 | 14500/25000
400/400
SEWARD AVE.

REVISIONS

8/17/99

07-OCT-2012 12:03
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL TRANSPORTATION CIVIL
560 TOWN HALL DR. STE. C, MORRISVILLE, NC 27560
TEL: 919.380.8750 FAX: 919.380.8752

-L-		
PIs Sta 46+57.98 Θs = 5° 10' 30.4" Ls = 168.00' LT = 112.05' ST = 56.04'	PI Sta 48+50.52 Δ = 16° 42' 40.1" (RT) D = 6° 09' 39.0" L = 271.25 T = 136.59' R = 930.00' SE = 0.040 DS = 50 mph	PIs Sta 50+41.22 Θs = 5° 10' 30.4" Ls = 168.00' LT = 112.05' ST = 56.04'

-Y6-
PI Sta 19+84.03 Δ = 58° 57' 38.1" (LT) D = 19° 05' 54.9" L = 308.72' T = 169.60' R = 300.00' SE = 0.04 DS = 40 mph

MATCHLINE -Y8- STA. 15+00 SEE SHEET NO. 17

MATCHLINE -Y6- STA. 18+00 SEE SHEET NO. 17

MATCHLINE -L- STA. 45+00 SEE SHEET NO. 6

MATCHLINE -L- STA. 57+00 SEE SHEET NO. 8

NC GRID / NAD 83

-Y8- POT Sta. 16+67.50
BEGIN CONSTRUCTION

-Y8- S 86° 35' 04.5" E

-BY10-55 PINC
-L- 49+02.45
162.06' (LT)

-BY12-56 PINC 8+04.93
-Y6- 18+82.89
36.58' (RT)

-BL-14 PINC 44+19.23=
-BY10- PINC 12+54.16=
-BY12- PINC 5+00.00
-L- 49+84.53
17.69' (LT)

TS Sta. 45+45.93

SC Sta. 47+13.93

CS Sta. 49+85.18

ST Sta. 51+53.38

TS Sta. 55+42.36

PC Sta. 18+14.23
S 44° 33' 52.5" E

PT Sta. 21+23.15
W 76° 28' 29.7" E

-L- POT Sta. 52+01.49
-Y6- POT Sta. 21+82.58

N 13° 32' 43.5" W

N 20° 36' 24.3" W

S 03° 03' 04.2" E

S 00° 48' 09.6" E

N 02° 58' 31.6" E

N 00° 50' 02.6" E

N 89° 47' 15.6" E

N 89° 24' 55.6" E

N 89° 19' 55.6" E

N 89° 55' 55.6" E

(17) JOAN REYNOLDS HUGGINS
DB 1087 PG 095

(16) JOAN REYNOLDS HUGGINS
DB 4110 PG 068

(15) BRENDA WHITE SMITH
DB 5090 PG 2014

(14) HOFFMAN/HOLBROOK DEVELOPMENT LLC
DB 4884 PG 0056
PB 071 PG 001

(18) ST. MICHAELS LUTHERAN CHURCH
DB 2201 PG 0629

(20) JIMMY ROY GARNER
DB 3375 PG 0862
PB 059 PG 051

(21) RANDY & GINA MACDONALD
DB 6687 PG 3060
PB 059 PG 051

(23) ROGER LEE DAVIS
DB 5212 PG 0745

(22) KENNEDY OIL CO INC.
DB 0884 PG 0421

(28) ROBERT WAYNE DAVIS
DB 5144 PG 1549
PB 140 PG 051

(27) B. R. DAVIS HEIRS
DB 1941 PG 144
PB 140 PG 051

HUGGINS TIRE SALES, INC.
DB 0993 PG 0520

BILLY CHARLES WARREN
DB 1836 PG 2095
PB 113 PG 076

ISBK CHURCH

ISMAS CHURCH

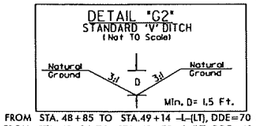
ISFD

WELL HOUSE

POOL

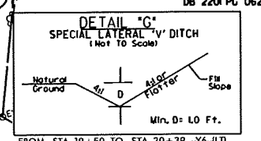
BST PARKING

DETAIL "G2"
STANDARD "V" DITCH
(Not To Scale)



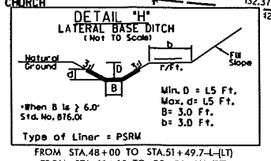
FROM STA. 48+85 TO STA. 49+14 -L-(LT), DDE=70 CY
FROM STA. 49+14 TO STA. 49+52 -L-(LT), DDE=40 CY

DETAIL "G"
SPECIAL LATERAL "V" DITCH
(Not To Scale)



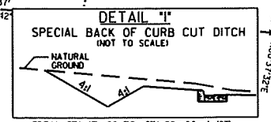
FROM STA. 19+50 TO STA. 20+39 -Y6-(LT)
FROM STA. 19+00 TO STA. 20+39 -Y6-(RT)

DETAIL "H"
LATERAL BASE DITCH
(Not To Scale)



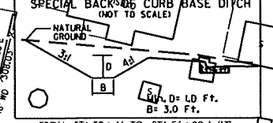
FROM STA.48+00 TO STA.51+49.7-L-(LT)
FROM STA. 21+00 TO 20+39 -Y6-(RT)

DETAIL "I"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



FROM STA.47+00 TO STA.58+00 -L-(RT)

DETAIL "I20"
SPECIAL BACK OF CURB BASE DITCH
(NOT TO SCALE)



FROM STA.52+46 TO STA.56+00-L-(LT)
FROM STA. 20+39 TO 21+00 -Y6-(LT)

TRAFFIC DIAGRAM

SR 1003 NORTH MAIN ST.

5800 / 9300

4000 / 6400 — 1800 / 2900

14500 / 25000 — SKEET CLUB ROAD SR 1820 — 12300 / 21500

2015 / 2035 ADT

PAVEMENT REMOVAL

NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE.
PROPOSED R/W WIDTH FOR -L- LINE IS 110' UNLESS OTHERWISE NOTED

SEE SHEET 19 FOR -L- PROFILE
SEE SHEET 25 FOR -Y6- PROFILE

REVISIONS 8/17/99

07-OCT-2012 12:12
C:\Projects\PROJECTS\U3615A_rdy_psh7.dgn
dsteward

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL
TRANSPORTATION
CIVIL
240 TOWN HALL DR., STE C, MORRISVILLE, NC 27560
TEL 919.233.8150 FAX 919.233.8152

-L-		
PIs Sta 56+63.25 Θs = 1°54' 21.9" Ls = 134.40' LT = 89.61' ST = 44.80'	PI Sta 61+77.36 Δ = 26°09' 33.4" (RT) D = 2°50' 11.1" L = 922.26 T = 469.31' R = 2,020.00' SE = 0.032 DS = 50 mph	PIs Sta 66+75.11 Θs = 1°54' 21.9" Ls = 134.40' LT = 89.61' ST = 44.80'

NC GRID / NAD 83

-BL- STATION 53+66 279' LEFT
CHISLED EAST END OF BLOCK WALL BEHIND CHURCH

-L- POC Sta. 63+93.93
-Y9- POT Sta. 10+00.00

-Y9- POT Sta. 11+66.90
END CONSTRUCTION

STA. 57+00 SEE SHEET NO. 7

STA. 69+00 SEE SHEET NO. 9

MATCHLINE -L- STA. 57+00

MATCHLINE -L- STA. 69+00

SMAS CHURCH

PA BST

HEPHZIBAH IN SPIRIT MINISTRY
DB 1582 PG 1809

JAMES B. DAVIS
DB 1558 PG 1061

CHM & S PARTNERSHIP
DB 2140 PG 0142

JAMES C. DAVIS
DB 4001 PG 0476

BILLY O. STUTTS
DB 3932 PG 872
PB 046 PG 086

JAMES C. DAVIS
DB 3791 PG 1928
DB 3941 PG 0039
PB 140 PG 051

BETTY EUGENE HAYWORTH
DB 2949 PG 0976
PB 039 PG 077

JOSIE W. RIPPEY
DB 2235 PG 059
PB 039 PG 077

RONALD J. KENDRICK
DB 4400 PG 1212
PB 039 PG 077

DORIS MILAN
DB 2328 PG 024
PB 039 PG 077

TIMOTHY & SHELBY PARNELL
DB 6140 PG 0733

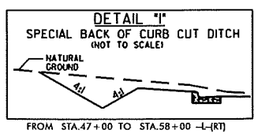
SPECIAL BACK OF CURB CUT DITCH SEE DETAIL "I"

HIGH POINT CITY LIMITS (OUT)

HIGH POINT CITY LIMITS (IN)

SEE SHEETS 19 & 20 FOR -L- PROFILE
SEE SHEET 26 FOR -Y9- PROFILE

DETAIL "I"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



FROM STA.47+00 TO STA.58+00 -L-(RT)

NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE.
PROPOSED R/W WIDTH FOR -L- LINE IS 110' UNLESS OTHERWISE NOTED

TRAFFIC DIAGRAM

2015 / 2035 ADT

SKEET CLUB ROAD
SR 1820

12300 / 21500 — 12300 / 21500

100 / 100 — 100 / 100

200 / 200

SR 1907 DAVELER DR.

R7-OCT-2012 12:01
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL TRANSPORTATION CIVIL
260 TOWN HALL DR., STE. C, MOORESVILLE, NC 28160
TEL: 919 393 8750 FAX: 919 393 8752

NC GRID / NAD 83

REVISIONS

8/17/99

-L-		
PIs Sta 75+82.95 Θs = 2° 10' 42.1" Ls = 153.60' LT = 102.41' ST = 51.21'	PI Sta 77+56.96 Δ = 6° 57' 30.5" (LT) D = 2° 50' 11.1" L = 245.33 T = 122.81' R = 2,020.00' SE = 0.032 DS = 50 mph	PIs Sta 79+30.68 Θs = 2° 10' 42.1" Ls = 153.60' LT = 102.41' ST = 51.21'

DETAIL "L"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)

FROM STA.79+00 TO STA.81+05-L-(RT)

HI-POINT DISCOUNT CENTER INC
DB 2990 PG 0733
DB 3245 PG 0562

DETAIL "J"
STANDARD BASE DITCH
(Not To Scale)

*When B is < 6.0'

Type of Liner= PSRM

STA. 70+45-L-(RT) DDE= 5 CY
STA. 74+31-L-(RT) DDE= 5 CY
STA. 74+98.07-L-(LT) DDE= 5 CY

DETAIL "K"
SPECIAL LATERAL BASE DITCH
(Not To Scale)

Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 3.0 Ft.

Type of Liner= PSRM

FROM STA. 81+05 TO STA. 82+30 -L-(RT)

HI-POINT DISCOUNT CENTER INC
DB 2990 PG 0733

NCDOT
DB 2854 PG 0021

NCDOT
DB 2811 PG 0056

CHW & S PARTNERSHIP
DB 2140 PG 0042

JASON K. CHARLES
DB 6903 PG 0643

FROGS HAVEN LIMITED PARTNERSHIP
DB 5127 PG 2077
PB 005 PG 290

BERON KENT HARRISON
DB 4288 PG 883

NANCY S. JANNEY
DB 6008 PG 2534

PAUL F. ELLIOTT
DB 4322 PG 1205

JONATHAN & FLOR MENDOZA
DB 6595 PG 0073

BENCINI REALTY LTD
DB 2755 PG 0529

BENCINI REALTY LTD
DB 4607 PG 808

-BY14-97 POT
-L- 73+50.67
308.91' (LT)
5+00.00

-L- POT Sta. 71+50.35
BEGIN BRIDGE

-BY14-60 PINC 6+72.97
-L- 73+07.54
91.41' (LT)

-BL- POT 67+21.89=
-BY14- POT 7+87.87
(POINT NOT SET)

-L- POC Sta. 77+77.82
-Y10- POT Sta. 10+00.00

-L- POT Sta. 74+08.92
END BRIDGE

-BY14-61 POT
-L- 72+22.73
188.07' (RT)
Θ=13.20

-Y10- POT Sta. 12+51.35
END CONSTRUCTION

TS Sta. 74+80.55
ST Sta. 78+79.47
ST Sta. 80+33.07

-BL- PINC 70+76.23
-L- 76+31.67
19.10' (LT)

-BL- PINC 76+34.57
-L- 81+86.12
50.83' (RT)

MATCHLINE -L- STA. 69+00 SEE SHEET NO. 8

MATCHLINE -L- STA. 82+00 SEE SHEET NO. 10

N 16°25'33"E 1486.60'

FORSYTH COUNTY LINE

DECK DRAINS
STA. 71+53 TO STA. 71+95 -L- (RT.) ON 7' CENTERS
STA. 72+56 TO STA. 72+62 -L- (RT.) ON 3' CENTERS
STA. 73+54 TO STA. 73+89 -L- (RT.) ON 7' CENTERS

STA. 71+72 TO STA. 72+14 -L- (LT.) ON 7' CENTERS
STA. 72+76 TO STA. 72+82 -L- (LT.) ON 3' CENTERS
STA. 73+73 TO STA. 74+08 -L- (LT.) ON 7' CENTERS

DENOTES MONOLITHIC CONCRETE ISLAND

SEE SHEET 20 FOR -L- PROFILE
SEE SHEET 26 FOR -Y10- PROFILE

NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE. PROPOSED R/W WIDTH FOR -L- LINE IS 110' UPTO US 311 BRIDGE. R/W TRANSITIONS TO 130' AFTER US 311 BRIDGE.

BM#4
ELEVATION = 908.03'
N = 851962 E = 1691940
-BL- STATION 76+35 135' RIGHT
60D NAIL IN ROOT OF 6" MAPLE TREE

TRAFFIC DIAGRAM

2015 / 2035 ADT

SKEET CLUB ROAD
SR 1820
12300 / 21500 — 11500 / 20600
1500 / 2000 — 700 / 1100
2200 / 3100
SR 1829 OLD MILL RD.

07-OCT-2012 12:04
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL TRANSPORTATION CIVIL
560 TOWN HALL DR., STE. C, MOCKSVILLE, NC 27560
TEL 919 393 8150 FAX 919 320 5752

8/17/99

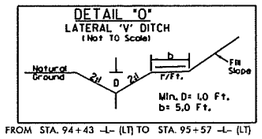
REVISIONS

NC GRID / NAD 83

MATCHLINE -L- STA. 82+00 SEE SHEET NO. 9

MATCHLINE -L- STA. 96+00 SEE SHEET NO. 11

DETAIL "O"
LATERAL 'V' DITCH
(Not To Scale)



Min. D= 1.0 Ft.
b= 5.0 Ft.

FROM STA. 94+43 -L- (LT) TO STA. 95+57 -L- (LT)

FORSYTH COUNTY LINE
GUILFORD COUNTY LINE

HIGH POINT CITY LIMITS (OUT)
HIGH POINT CITY LIMITS (IN)

-L- POT Sta. 88+28.90
-Y11- POT Sta. 10+00.00

-L- POT Sta. 94+64.65
-Y12- POT Sta. 10+00.00

-Y11- POT Sta. 4+71.42
END CONSTRUCTION

-Y12- POT Sta. 12+00.00
END CONSTRUCTION

-L- PINE 83+00.08
BK 17 88+59.80
423' RT

N 5°06'38.8" E

S 87°09'00" E

S 87°22'04" E

ROD & LUG CONNECTORS W/SLEEVE GASKETS & 2 ELBOWS

CLASS "B" RIP-RAP

LATERAL 'V' DITCH SEE DETAIL "O"

CL "I" RIP RAP

5' MONOLITHIC CONCRETE ISLAND KEYED IN

SLOPE STAKE LINE

2.5' PROP. C&G

5' PROP. SIDEWALK

SPECIAL LATERAL BASE DITCH, SEE SHEET 9

SPECIAL BACK OF CURB CUT DITCH SEE DETAIL "N"

SPECIAL CUT DITCH SEE DETAIL "M"

END C&G BEGIN LANE TAPER 11+71.42 -Y11-

END C&G BEGIN LANE TAPER 19+23

SKEET CLUB RD

SKEET CLUB RD 221' BST

BEGIN MEDIAN 4" CONC. 96.00

END MEDIAN 4" CONC. 96.00

(45) CHARLES MICHAEL JOYNER
DB 2759 PG 0727

(46) MICHAEL SCOTT RIFFELL
DB 3984 PG 0068

(47) JOHN & NANCY SCHRULL
DB 6158 PG 153

(48) EDWARD R. TRACY
DB 3971 PG 2025

(49) RALPH W. GIBSON
DB 2585 PG 0336
PB 014 PG 052

(50) DAVID B. WALL
DB 3223 PG 0276

(51) RALPH & BEVERLY GIBSON
DB 7097 PG 2382
PB 014 PG 052

(52) RODNEY JAMES OWEN
DB 4522 PG 0544
PB 014 PG 052

(53) BRANDI ARNOLD
DB 7057 PG 2710
PB 014 PG 052

(54) BURTRESS RIDGE
DB 822 PG 0194
PB 014 PG 052

(55) KAREN T. HAYNECK
DB 7023 PG 0433
PB 014 PG 052

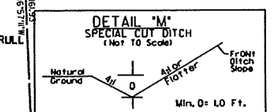
(56) R.B. MARROW, II
DB 4449 PG 1346
PB 014 PG 052

(57) BENCINI REALTY LTD
DB 3345 PG 1026

(58) CARL COOK, JR
DB 1294 PG 0582
PB 043 PG 028

THOMAS F. HOVORKA
DB 3887 PG 0403

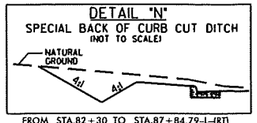
DETAIL "M"
SPECIAL CUT DITCH
(Not To Scale)



Min. D= 1.0 Ft.

FROM STA. 10+71.42 TO STA. 11+00 -Y11-(RT)
FROM STA. 10+71.42 TO STA. 11+00 -Y11-(LT)

DETAIL "N"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



FROM STA.82+30 TO STA.87+84.79-L-(RT)
FROM STA.10+61.95 TO STA.10+71.42-Y11-(RT)
FROM STA.10+62.97 TO STA.10+71.42-Y11-(LT)

DENOTES MONOLITHIC CONCRETE ISLAND

NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE. PROPOSED R/W WIDTH FOR -L- LINE IS 130' UNLESS OTHERWISE NOTED

SEE SHEETS 20 & 21 FOR -L- PROFILE
SEE SHEET 26 FOR -Y11- PROFILE
SEE SHEET 27 FOR -Y12- PROFILE

TRAFFIC DIAGRAM

2015 / 2035 ADT

SKEET CLUB ROAD
SR 1820

11500 / 20600 — 11400 / 20500

200 / 200 — 100 / 100

300 / 300

BUENA VISTA AVE.

TRAFFIC DIAGRAM

2015 / 2035 ADT

SKEET CLUB ROAD
SR 1820

11400 / 20500 — 11400 / 20500

100 / 100 — 100 / 100

200 / 200

BRIDLEWOOD AVE.

07-OCT-2012 12:05
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mstephens

SSHEETS

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
U-3615A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL
TRANSPORTATION
CIVIL
249 TOWN HALL CT., STE. C, WOMBLE, NC. 27560
TEL. 919 550 8750
FAX 919 550 8752

-L-	-Y13-	-Y14-
PIs Sta 100+79.55 Θs = 5° 54' 51.9" Ls = 192.00' LT = 128.07' ST = 64.07'	PI Sta 104+74.80 Δ = 39° 13' 03.8" (RT) D = 6° 09' 39.0" L = 636.56 T = 331.32' R = 930.00' SE = 0.040 DS = 50 mph	PIs Sta 108+44.11 Θs = 5° 54' 51.9" Ls = 192.00' LT = 128.07' ST = 64.07'	PI Sta 10+87.77 Δ = 1° 45' 18.7" (RT) D = 0° 59' 59.7" L = 175.53' T = 87.77' R = 5,730.00' SE = NC DS = 30 mph	PI Sta 13+19.16 Δ = 49° 51' 29.6" (LT) D = 81° 51' 04.0" L = 60.91' T = 32.54' R = 70.00' SE = NC DS = 30 mph
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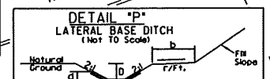
NC GRID / NAD 83

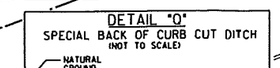
DETAIL "P"
LATERAL BASE DITCH
(Not To Scale)



FROM STA.10+84 TO STA.11+50-Y13-(RT)

DENOTES MONOLITHIC CONCRETE ISLAND

DETAIL "Q"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



FROM STA.98+00 TO STA.102+50-L-(RT)

BM#5 ELEVATION = 932.68
N = 829965 E = 1691927
-BL- STATION 99+70 137' LEFT
60D NAIL IN ROOT OF 18" OAK TREE

-Y13- POT Sta. 10+00.00
BEGIN CONSTRUCTION

-Y14- POT Sta. 10+50.00
BEGIN CONSTRUCTION

PI -Sta. 13+47.54
S 51° 17' 56.0" E

PC Sta. 12+38.38

PT Sta. 12+06.08
S 85° 34' 50.0" E

-BL-19 PINC 99+70.30=
-BY19- POT 10+75.58
-L- 105+19.77
37.21' (LT)

-L- POC Sta. 105+87.79
-Y14- POT Sta. 13+67.19

-BL-18 PINC 92+85.75=
-BY18- PINC 09+99.93
-L- 98+33.90
56.44' (RT)

-L- POT Sta. 98+22.90
-Y13- POT Sta. 12+38.63

POC Sta. 108+80.18
-Y15- POT Sta. 10+30.00

-Y16- POT Sta. 11+21.22
END CONSTRUCTION

TIE TO EXISTING

MATCHLINE -L- STA. 96+00 SEE SHEET NO. 10

MATCHLINE -L- STA. 109+00 SEE SHEET NO. 12

CHARLES PERCY HEDGECOCK DB 102 PG 0434

DONALD R. HEDGECOCK DB 2528 PG 0487

RUBY J. HEDGECOCK DB 0638 PG 0035

BENCOR REALTY LTD DB 3345 PG 1026

SYLVIA L. RIDGE DB 3521 PG 0839 PB 081 PG 031

SYLVIA L. RIDGE DB 5813 PG 197 PB 081 PG 031

RAWFORD & SHARO DB 5630 PG 1453 PB 048 PG 045

HAZEL B. THOMAS DB 2901 PG 0650 PB 048 PG 045

M&P DEVELOPERS, LLC DB 4712 PG 1389 PB 138 PG 086 PG 087 PG 032 PG 137 PG 086 PB 138 PG 086

GRETA COX TRUSTEE DB 16466 PG 1656 PB 138 PG 086

MARCO MARINELLI DB 4571 PG 1505 PB 014 PG 052

GELMURA W. WHITSTONE DB 5259 PG 0845 PB 140 PG 128

ROY AND J. DOWN DB 4432 PG 0201 PB 138 PG 086

DONALD RAY NICHOLS DB 4432 PG 1432

ARTHUR E. KING AND RUTH W. KING DB 623 PG 1432 PB 140 PG 128

JAKE H. HINKLE DB 5316 PG 0734 PB 142 PG 104

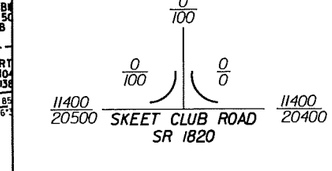
HERBERT S. WARNER AND PEGGY T. WARNER DB 5358 PG 0661 PB 142 PG 104

CECIL & SARAH WILSON DB 5143 PG 1892 PB 131 PG 150

DONNA C. PARRISH DB 5950 PG 0203 PB 131 PG 150

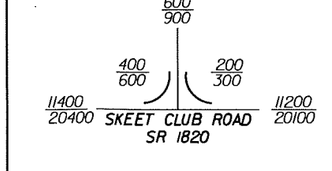
TRAFFIC DIAGRAM

SR 1822 JOYCE CR.



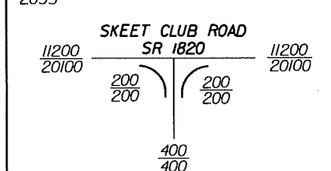
2015/2035 ADT

SR 1823 TANGLEBROOK RD.



2015/2035 ADT

2015/2035 ADT



NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE. PROPOSED R/W WIDTH FOR -L- LINE IS 130' UNLESS OTHERWISE NOTED

SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 27 FOR -Y13- PROFILE
SEE SHEET 27 FOR -Y14- PROFILE
SEE SHEET 27 FOR -Y15- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
U-3615A	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL TRANSPORTATION CIVIL
200 TOWN HALL DR., STE. C, HICKORY, NC 28603
TEL 919 303 8750 FAX 919 303 8752

8/17/99

REVISIONS

-Y17-
PI Sta 10+77.95
Δ = 12° 21' 29.5" (LT)
D = 7° 57' 27.9"
L = 155.30'
T = 77.95'
R = 720.00'
SE = NC
DS = 30 mph

PC Sta 10+00.00
-Y17- POT Sta. 11+25.05 BEGIN CONSTRUCTION
PT Sta. 11+55.30
S 34° 08' 19.5" E
-Y16- POT Sta. 10+00.06
-L- POT Sta. 110+68.44
-Y16- POT Sta. 11+20.00 END CONSTRUCTION
-L- POT Sta. 114+85.90
-Y17- POT Sta. 12+98.80
-L- 23.21' (RT)
-BL- 20 PINC 107+63.56
ST Sta 109+72.04
N 56° 09' 26.3" E
MATCHLINE -L- STA. 109+00 SEE SHEET NO. 11
MATCHLINE -L- STA. 123+00 SEE SHEET NO. 13

DALE H. GUTHRIE DB 3771 PG 0686 PB 048 PG 045
ALEX W. STOUT DB 4424 PG 0808 PB 048 PG 045
JAMES E. HARRIS DB 4748 PG 0171 PB 048 PG 045
ROBERT LEE SKIDMORE DB 3655 PG 0566 PB 048 PG 045
ELTON D. MILLER DB 2901 PG 0024 PB 048 PG 045
BRENDA W. NEALY DB 7075 PG 1887 PB 054 PG 087
G. LARRY GUY DB 4381 PG 0407 PB 064 PG 030
EDWARD W. GIBSON DB 4608 PG 0796 PB 064 PG 030
ANNE WELBORN ESTATE DB 3120 PG 0465 PB 064 PG 030
NCDOT (formerly DAKOTA CONSULTANTS) DB 6075 PG 2777 PB 82 PG 033
NCDOT (formerly NANCY C. JOYCE) DB 629 PG 0575 PB 12 PG 033
CHRISTOPHER & CHRISTIAN HOLT DB 6346 PG 1968 PB 82 PG 033
PERLEY A. THOMAS, JR DB 4693 PG 1721 PB 82 PG 033
GEORGE C. MCILRAY, JR DB 5999 PG 0069 PB 097 PG 013
THANG CAO NGUYEN DB 6435 PG 879 LOT 20 PB 52 PG 015

DENOTES MONOLITHIC CONCRETE ISLAND

DETAIL "R"
SPECIAL BACK OF CURB BASE DITCH
(NOT TO SCALE)
NATURAL GROUND
Min. D= 1.0 Ft.
B= 8.0 Ft.
FROM STA.112+46 TO STA.119+00 -L-(RT)

DETAIL "T"
SPECIAL BACK OF CURB BASE DITCH
(NOT TO SCALE)
NATURAL GROUND
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
Type of Liner= PSRM
FROM STA.120+84 TO STA.124+00-L-(LT)

DETAIL "U"
PIPE OUTLET CHANNEL
(Not To Scale)
d= 1.5'
Length= 20 Ft.
D= 2.0 Ft.
Est.= 1 TONs of Class "I" Rip-Rap
STA. 137+08.5 -L-(RT)

DETAIL "V"
LATERAL BASE DITCH
(Not To Scale)
Min. D= 1.0 Ft.
Max. ds 3.0 Ft.
B= 2.0 Ft.
Ds= 5.0 Ft.
*When B is < 6.0'
Type of Liner= PSRM
FROM STA. 120+49.80 TO STA.122+80-L-(RT)

TRAFFIC DIAGRAM
2015 / 2035 ADT
SKEET CLUB ROAD
SR 1820
11200 / 20100
11400 / 20300
100 / 100
300 / 300
400 / 400
STAPLETON WAY

SEE SHEETS 21 & 22 FOR -L- PROFILE
SEE SHEET 28 FOR -Y16- PROFILE
SEE SHEET 28 FOR -Y17- PROFILE

NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE.
PROPOSED R/W WIDTH FOR -L- LINE IS 130' UNLESS OTHERWISE NOTED

NC GRID / NAD 83

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PROJECT REFERENCE NO.	SHEET NO.
U-3615A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL
TRANSPORTATION
CIVIL
260 TOWN HALL DR. STE C, MOORESVILLE, NC 28560
TEL 919.383.8956 FAX 919.383.8962

8/17/99

REVISIONS

-L-	-Y18-
PI Sta 136+18.49	PI Sta 12+23.25
△= 2° 40' 47.2" (LT)	△= 2° 36' 15.1" (RT)
D = 0° 34' 22.6"	D = 0° 35' 00.0"
L = 467.71'	L = 446.43'
T = 233.90'	T = 223.25'
R = 10,000.00'	R = 9,822.00'
SE = NC	SE = NC
DS = 50 mph	DS = 40 mph
-Y19-	**-Y20-**
PI Sta 11+54.59	PI Sta 11+47.82
△ = 34° 10' 41.9" (RT)	△ = 35° 34' 54.8" (RT)
D = 22° 02' 12.6"	D = 17° 37' 46.1"
L = 155.10'	L = 201.83'
T = 79.93'	T = 104.29'
R = 260.00'	R = 325.00'
SE = NC	SE = NC
DS = 40 mph	DS = 30 mph

DETAIL "W"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)
FROM STA.124+00 TO STA.127+50-L-(LT)

DETAIL "X"
SPECIAL BACK OF CURB BASE DITCH
(NOT TO SCALE)
FROM STA.122+50-L-(LT) TO STA.126+00-Y18-(RT)

DETAIL "T"
SPECIAL BACK OF CURB BASE DITCH
(NOT TO SCALE)
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
Type of Liner: PSRM
FROM STA.120+84 TO STA.124+00-L-(LT)

DETAIL "Y"
LATERAL 'Y' DITCH
(Not To Scale)
Min. D= 1.0 Ft.
B= 3.0 Ft.
FROM STA.136+10 TO STA.136+94.12-L-(LT)
FROM STA.136+94.12 TO STA.138+00-L-(LT)
FROM STA.135+75 TO STA.138+08.50-L-(RT)

MATCHLINE -L- STA. 123+00 SEE SHEET NO. 12

MATCHLINE -L- STA. 137+00 SEE SHEET NO. 14

BM=7 ELEVATION = 913.56'
N = 831783.4 E = 1693910
-BY23- STATION 08+44.59' LEFT
60D NAIL IN ROOT OF 15" MAPLE TREE

-BL-22 PINC 122+88.51=
-BY23- POT 9+57.18
-BY23A- POT 5+08.00
-L- 128+29.20
53.25' (LT)

-L- POT Sta. 128+41.31
-Y18- POT Sta. 18+74.24

-Y18- POT Sta.13+50.00
BEGIN CONSTRUCTION

PT Sta. 14+45.43

-L- POT Sta. 132+62.59
-Y20- POT Sta. 10+00.00

-BL-23 PINC 127+54.70=
-BY24- POT 5+00.00
-L- 132+90.85
4.56' (RT)

PC Sta. 10+43.53
S 33° 59' 38.7" E

PC Sta. 10+74.66
S 19° 31' 34.4" E

-Y19- POT Sta. 10+00.00

-Y19- POT Sta. 12+00.00
END CONSTRUCTION

-BY23A- 97 POT 9+10.86

-L- POT Sta. 128+55.25

-Y20- POT Sta. 11+23.35
END CONSTRUCTION

PT Sta. 12+45.36

S 11° 38' 07.6" W

-BY24-65 POT 6+34.91

-L- POT Sta. 132+92.75

-BY23A- POT 6+29.75

BM=6 ELEVATION = 882.61'
N = 830980 E = 1693854
RT. STATION 120+00.236' RIGHT
60D NAIL IN ROOT OF 48" PIN OAK TREE

SEE SHEET 22 FOR -L- PROFILE	NOTE:
SEE SHEET 28 FOR -Y18- PROFILE	ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE.
SEE SHEET 29 FOR -Y19- PROFILE	PROPOSED R/W WIDTH FOR -L- LINE IS 130' UNLESS OTHERWISE NOTED
SEE SHEET 29 FOR -Y20- PROFILE	

DENOTES MONOLITHIC CONCRETE ISLAND

TRAFFIC DIAGRAM

DILLWORTH RD.
2600 / 4200
700 / 1100 — 1900 / 3100
11400 / 20300 SKEET CLUB ROAD SR 1820 12600 / 22300
2015 / 2035 ADT

2015 / 2035 ADT
SKEET CLUB ROAD SR 1820
12600 / 22300 — 0 / 100 — 100 / 200 — 12700 / 22400
100 / 300
HUTTONS LAKE CT.

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PROJECT REFERENCE NO.	SHEET NO.
U-3615A	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL TRANSPORTATION C.M.
260 TOWN HALL DR., STE. C, HOPE MILLS, NC 28348
TEL 919 303 8150 FAX 919 303 8152

-L-		-Y21-	-Y22-
PIs Sta 140+26.55 Θs = 0° 22' 00.1" Ls = 96.00' LT = 64.00' ST = 32.00'	PI Sta 149+39.32 Δ = 13° 23' 45.2" (RT) D = 0° 45' 50.2" L = 1,753.52 T = 880.77' R = 7,500.00' SE = 0.020 DS = 50 mph	PIs Sta 158+44.07 Θs = 0° 22' 00.1" Ls = 96.00' LT = 64.00' ST = 32.00'	PI Sta 11+02.51 Δ = 10° 11' 19.4" (RT) D = 8° 41' 39.7" L = 117.19' T = 58.75' R = 659.00' SE = NC DS = 30 mph	PI Sta 10+76.81 Δ = 18° 52' 51.1" (RT) D = 39° 47' 19.4" L = 47.45' T = 23.94' R = 144.00' SE = NC DS = 30 mph

DENOTES MONOLITHIC CONCRETE ISLAND

NC GRID / NAD 83

MATCHLINE -L- STA. 137+00 SEE SHEET NO. 13

MATCHLINE -L- STA. 151+00 SEE SHEET NO. 15

-L- POC Sta. 142+08.96
-Y21- POT Sta. 10+00.00

-Y23- POT Sta. 10+44.92
BEGIN CONSTRUCTION

-BL-26 PINC 144+23.34=
-Y127- POT 5+00.00
-L- 149+53.36
28.04' (LT)
-L- POC Sta. 149+33.22
-Y23- POT Sta. 12+50.06

-L- POC Sta. 149+14.11
-Y22- POT Sta. 10+00.00

PC Sta. 10+43.77
PT Sta. 11+60.95

PC Sta. 10+52.86
PT Sta. 11+39.00

-Y21- POT Sta. 11+80.00
END CONSTRUCTION

-Y22- POT Sta. 11+59.00
END CONSTRUCTION

BM#8 ELEVATION = 921.98'
N = 832259.6 E = 1695178
-BL- STATION 138+74.69' LEFT
60D NAIL IN ROOT OF 12" OAK TREE

-BL-25 PINC 140+44.32
-L- 145+78.60
29.06' (RT)

-BL-24 PINC 136+03.05
-L- 141+38.70
22.20' (LT)

PT Sta. 138+52.31
TS Sta. 139+62.55

DB 5810 PG 2854 (101)
SHUGART MANAGEMENT INC DB 6556 PG 2369 PB 172 PG 36 (104)
SHUGART ENTERPRISES LLC DB 7092 PG 0767 PB 172 PG 36 (105)
SHUGART MANAGEMENT INC DB 6556 PG 2369 PB 172 PG 36
RAYMOND WILLIAMS JR. et al DB 7181 PG 842 PB 044 PG 003 (108)
BOBBY D. CURTIS DB 2001 PG 0695 PB 044 PG 003 (109)
MIRIAM FOSTER KINDLE DB 2494 PG 0581 PB 044 PG 003 (114)
GLORIA FOSTER BASS DB 2906 PG 0234 PB 044 PG 003 (115)
GLORIA FOSTER BASS DB 2365 PG 0371 PB 044 PG 003 (116)
LAWRENCE CURTIS DB 2368 PG 0452 PB 044 PG 013 (117)
HOMER GLENN HALL, III DB 5272 PG 1450 PB 085 PG 046 (106)
SAMART PROPERTIES LLC DB 7083 PG 2658 PB 085 PG 046 (103)
JOHN K. LINDSAY DB 3894 PG 1894 PB 085 PG 046 (107)
WANDA SEAGRAVES CAYLOR DB 4447 PG 1275 PB 087 PG 138 (110)
HERMAN & GWENDOLYN MOORE DB 6288 PG 1017 PB 062 PG 025 (102)
GERARD B. EING DB 5228 PG 0400 PB 062 PG 025 (99)
WILLIAM R. SHAMBURG DB 3727 PG 1816 PB 085 PG 046
NCDOT (formerly THOMAS C. GALLIMORE) DB 6069 PG 2177 PB 087 PG 138 (111)
NCDOT (formerly GARY W. ADAMS) DB 5059 PG 2307 PB 087 PG 138 (112)
JOSEPH W. DIPAOLA DB 4545 PG 1912 PB 087 PG 138 (113)
JOHN EDWARDS RACZENSKI DB 13783 PG 1304 PB 087 PG 138
DELORES N. DUREN DB 4349 PG 0810 PB 087 PG 138 (119)

DETAIL "AA"
PIPE OUTLET CHANNEL
(Not To Scale)
Length= 20 Ft.
D= 2.0 Ft.
Est.= 7 TONs of Class 'I' Rip-Rap
STA. 137+08.5 -L-(RT)

DETAIL "Y"
LATERAL 'V' DITCH
(Not To Scale)
Min. D= 1.0 Ft.
b= 3.0 Ft.
FROM STA.136+10 TO STA. 136+94.12-L-(LT)
FROM STA.136+94.12 TO STA. 138+00-L-(LT)

DETAIL "CC"
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)
FROM STA. 138+00 TO STA. 142+85 -L-(LT)
FROM STA. 143+00 TO STA. 146+50 -L-(LT)
FROM STA. 148+00 TO STA. 148+50 -L-(LT)
FROM STA. 149+50 TO STA. 152+27 -L-(LT)
FROM STA. 156+00 TO STA. 160+50 -L-(LT)

DETAIL "BB"
STANDARD GRASSED SWALE
(Not To Scale)
Min. D= 1.5 Ft.
B= 2.0 Ft.
STA. 138+00-L-(RT), DDE=250 CY
L=85 FT, SLOPE = 0.59% & L=150 FT, SLOPE =3.89%

DETAIL "DD"
STANDARD BASE DITCH
(Not To Scale)
Min. D= 1.0 Ft.
B= 2.0 Ft.
STA. 150+79 RT. DDE=17.0 CY

NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE.
PROPOSED R/W WIDTH FOR -L- LINE IS 130' UNLESS OTHERWISE NOTED

SEE SHEETS 22 & 23 FOR -L- PROFILE
SEE SHEET 29 FOR -Y21- PROFILE
SEE SHEET 29 FOR -Y22- PROFILE
SEE SHEET 30 FOR -Y23- PROFILE

TRAFFIC DIAGRAM

2015 / 2035 ADT

SKEET CLUB ROAD SR 1820

12700 / 22400 — 12900 / 22600
200 / 200 — 400 / 400
600 / 600

SAINT JOHNS ST.

TRAFFIC DIAGRAM

SR 1828 RESTHAVEN RD.

100 / 200
50 / 100 — 50 / 100
12900 / 22600 — 12900 / 22600

SKEET CLUB ROAD SR 1820

2015 / 2035 ADT

REVISIONS 8/17/99

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8/17/99

REVISIONS

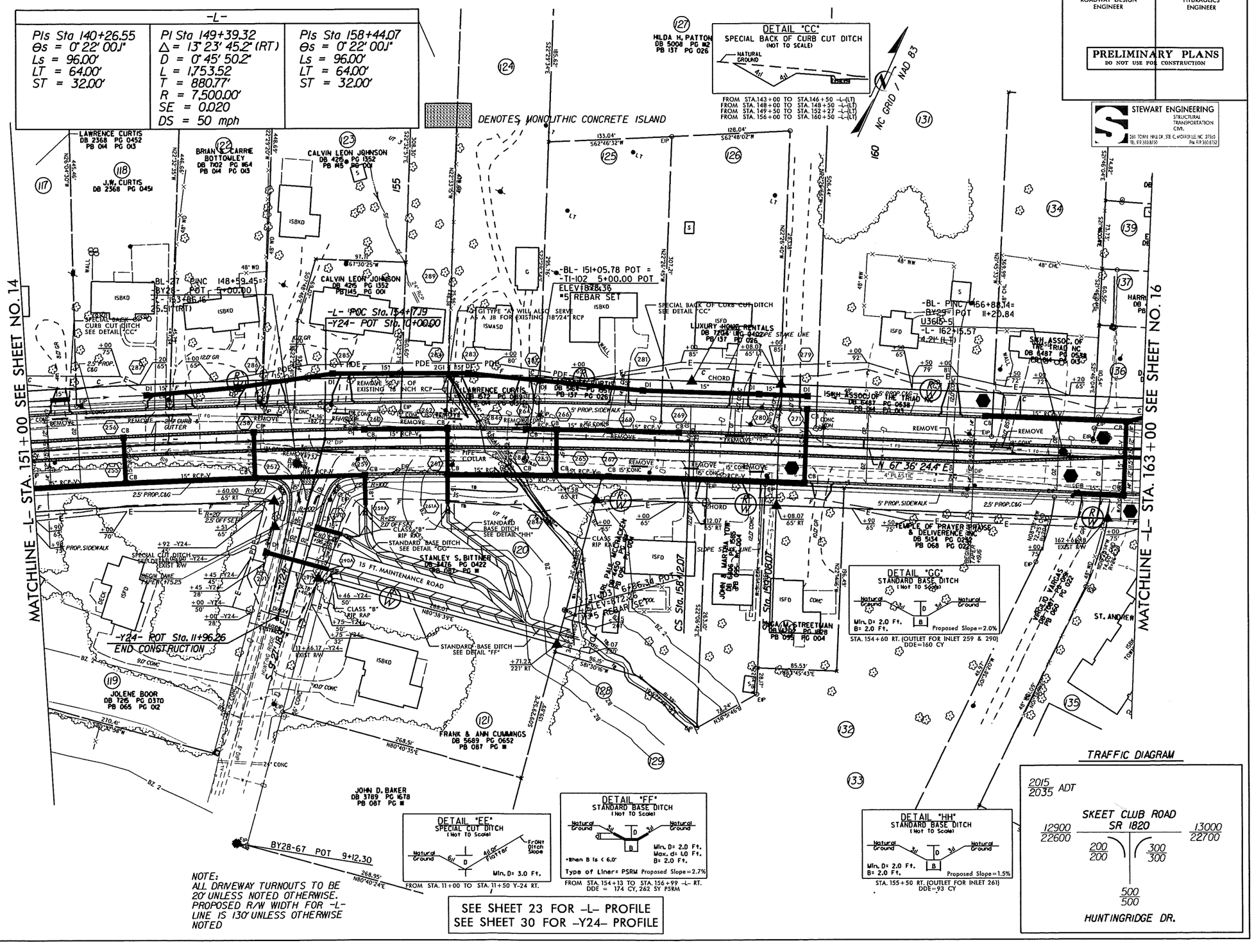
PROJECT REFERENCE NO.	SHEET NO.
U-3615A	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL TRANSPORTATION CIVIL
560 TOWN HALL DR. STE C, MORRISVILLE, NC. 27560
TEL 919.380.8750 FAX 919.380.8752

-L-		
PIs Sta 140+26.55 Θs = 0° 22' 00.1" Ls = 96.00' LT = 64.00' ST = 32.00'	PI Sta 149+39.32 Δ = 13° 23' 45.2" (RT) D = 0° 45' 50.2" L = 1,753.52 T = 880.77' R = 7,500.00' SE = 0.020 DS = 50 mph	PIs Sta 158+44.07 Θs = 0° 22' 00.1" Ls = 96.00' LT = 64.00' ST = 32.00'

DENOTES MONOLITHIC CONCRETE ISLAND



NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE.
PROPOSED R/W WIDTH FOR -L- LINE IS 130' UNLESS OTHERWISE NOTED

SEE SHEET 23 FOR -L- PROFILE
SEE SHEET 30 FOR -Y24- PROFILE

TRAFFIC DIAGRAM

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PROJECT REFERENCE NO.	SHEET NO.
U-3615A	16
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL TRANSPORTATION CIVIL
240 TOWN HALL DR., STE. C, WOMELSVILLE, NC 27560
TEL 919 330 8723 FAX 919 330 8732

-L-			-Y25-	-Y26-
PIs Sta 163+70.32 Θs = 0° 33' 00.1" Ls = 96.00' LT = 64.00' ST = 32.00'	PI Sta 167+89.18 Δ = 8° 50' 54.8" (LT) D = 1° 08' 45.3' L = 772.18 T = 386.86' R = 5,000.00' SE = 0.020 DS = 50 mph	PIs Sta 172+06.50 Θs = 0° 33' 00.1" Ls = 96.00' LT = 64.00' ST = 32.00'	PI Sta 11+75.71 Δ = 8° 22' 28.5" (LT) D = 2° 23' 14.4" L = 350.79' T = 175.71' R = 2,400.00' SE = NA DS = 30 mph	PI Sta 11+19.25 Δ = 33° 21' 55.5" (RT) D = 34° 56' 11.2" L = 95.50' T = 49.15' R = 164.00' SE = NC DS = 30 mph

NC GRID / NAD 83

8/17/99

REVISIONS

MATCHLINE -L- STA. 163+00 SEE SHEET NO. 15

MATCHLINE -L- STA. 177+00

-L- POT Sta. 180+61.50
END STATE PROJECT U-3615A
END CONSTRUCTION

-L- POC Sta. 164+22.86
-Y25- POT Sta. 15+58.08 FROM BEGIN CONSTRUCTION

-L- POC Sta. 164+23.57
-Y26- POT Sta. 10+00.00

PC Sta. 10+70.10

-L- POC 167+12.23
END 2.5' C&G, SIDEWALK AND PAVING
CONTINUE 5' CONC. ISLAND AHEAD

-Y26- POT Sta. 11+80.00
END CONSTRUCTION

-BL- 165+89.83 +0.91 POT
NO POINT SET

-BL- 165+89.83 +0.91 POT
-L- 164+47.68
18.54' (RT)

-BY29-69 PINC 8+68.95

-Y25- POT Sta. 15+60.00
BEGIN CONSTRUCTION

-T2-110 9+25.32 PINC
ELEV=860.55
#5 REBAR SET

-T2-111 10+06.36 PINC
ELEV=857.55
#5 REBAR SET

T2-112 13+11.70 PINC
ELEV=852.52
#5 REBAR SET

-BL-28 PINC 170+08.46
-L- 175+34.39
58.33' (RT)

-T2-109 6+51.39 POT
ELEV=857.66
#5 REBAR SET

-T2-108 5+00.00 POT
ELEV=854.79
#5 REBAR SET

-BL- PINC 165+86.90
-L- 169+14.51
5.97' (RT)

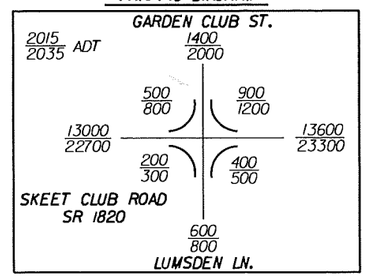
BM#9 ELEVATION = 857.37'
N = 833013 E = 1697536
-BL- STATION 163+36 213' RIGHT
60D NAIL IN BASE OF 8" ASH TREE

DENOTES MONOLITHIC CONCRETE ISLAND

NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE.
PROPOSED R/W WIDTH FOR -L- LINE IS 130' UNLESS OTHERWISE NOTED

SEE SHEET 23 FOR -L- PROFILE
SEE SHEET 30 FOR -Y25- PROFILE
SEE SHEET 30 FOR -Y26- PROFILE

TRAFFIC DIAGRAM



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PROJECT REFERENCE NO.	SHEET NO.
U-3615A	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STEWART ENGINEERING
STRUCTURAL TRANSPORTATION CIVIL
260 TOWN HALL DR. STE C MCKINNEY, NC. 27546
TEL 919 380 8350 FAX 919 380 8352

-Y6-	-Y7-	
PI Sta 14+98.96	PI Sta 11+29.17	PI Sta 14+74.82
Δ = 17° 54' 09.9" (RT)	Δ = 17° 38' 24.5" (RT)	Δ = 17° 04' 44.0" (RT)
D = 3° 05' 19.4"	D = 15° 04' 40.2"	D = 15° 04' 40.2"
L = 579.62'	L = 116.99'	L = 113.27'
T = 292.19'	T = 58.96'	T = 57.06'
R = 1,855.00'	R = 380.00'	R = 380.00'
SE = 0.04	SE = 0.0385	SE = 0.0385
DS = 40 mph	DS = 30 mph	DS = 30 mph

NC GRID / NAD 83

8/17/99

REVISIONS

MATCHLINE -Y8- STA. 15+00 SEE SHEET NO. 7

MATCHLINE -Y6- STA. 18+00 SEE SHEET NO. 7

-Y7- POT Sta. 10+00.00
-Y8- POT Sta. 11+44.27

-Y7- POT Sta. 10+18.57
BEGIN CONSTRUCTION

-BY10-54 POT 5+00.00=
-BY11- 5+00.00
18° 28' 12" 203.03' (RT)

CLASS "B" RIP RAP

TIE TO EXISTING -Y7- EXIST R/W

N 3° 28' 55.6" E

S 86° 35' 04.3" E

PC Sta. 10+70.21

PT Sta. 11+87.20

-BY11-58 PINC 7+17.40
-Y7- 11+41.26
49.65' (LT)

N 21° 03' 20.2" E

PT Sta. 17+86.35

PC Sta. 14+17.76

-BY12-57 POT 13+16.98=
-BY11- PINC 11+94.20
-Y6- 14+83.40
29.7' (LT)

-Y7- POT Sta. 15+50.00
END CONSTRUCTION

PT Sta. 15+51.03
N 38° 08' 04" E

-Y6- POC Sta. 15+50.00
POT Sta. 15+68.03

-Y6- POT Sta. 15+07.50
BEGIN CONSTRUCTION

BM#23 ELEVATION = 914.93'
N = 824967, E = 1691010
-BY12- STATION 12+48.58 RIGHT
60D NAIL IN BASE OF POWER POLE #12

S 62° 28' 02" E

PC Sta. 12+06.77

DETAIL "11"
SPECIAL CUT DITCH
(Not To Scale)
Natural Ground, 2H, D, 4:1 or Flatter, Front Ditch Slope
Min. D= 1.5 Ft.
FROM STA. 16+50 TO 17+50-Y6-(RT.)

SPECIAL CUT DITCH SEE DETAIL "11"

SLOPE STAKE LINE

OBLITERATE

2.5' PROP. C&G

HIGH POINT (LIMITS UNKNOWN)

REMOVE 15" CONC

REMOVE 24" CONC

EXISTING R/W

EXIST R/W

RETAIN 18" CONC

RETAIN 15" CONC

RETAIN 12" CONC

(17) JOAN REYNOLDS HUGGINS DB 1087 PG 045

(25) THURMAN HUGGINS DB 1614 PG 1645

THURMAN HUGGINS DB 1614 PG 1645

THURMAN HUGGINS DB 1614 PG 1645

THURMAN HUGGINS DB 1614 PG 1645

THURMAN HUGGINS DB 1614 PG 1645

(24) HEPHZIBAH IN SPRIT MINISTRY DB 1582 PG 1809

(26) EUGENE ALBERTSON DB 1727 PG 1863

NANCY C. STREETMAN DB 1927 PG 1580

FELIX F. MILLER, JR DB 1647 PG 2914

MAXINE MILLER NO DEED RECORD FOUND

SAMUEL A. CILLEY DB 1636 PG 2420

MICHAEL W. WILSON DB 1707 PG 1841

CLEMENT W. SOVIERO DB 1672 PG 1975

DAVIDSON COUNTY LINE
FORSYTH COUNTY LINE

ISMAS BUS

ISMAS CHURCH

ISF BUS

GREEN HOUSE

ISFD

ISBKD

S 86° 49' 25" E 230.04'

N 63° 12' 04" W 198.64'

S 63° 06' 16" E 100.50'

N 40° 00' 56" W 49.68'

N 57° 25' 02" W 84.77'

N 57° 25' 02" W 170.59'

N 57° 25' 02" W 105.14'

S 57° 25' 02" E 445.65'

NOTE:
ALL DRIVEWAY TURNOUTS TO BE 20' UNLESS NOTED OTHERWISE. PROPOSED R/W WIDTH FOR -L- LINE IS 130' UNLESS OTHERWISE NOTED

SEE SHEET 25 FOR -Y6- PROFILE
SEE SHEET 26 FOR -Y7- PROFILE

RT OCT 2012 12:10
R:\Roadway\Projects\U3615A_rdy.pshl7.dgn
$$$$USERNAME$$$$

NCDOT Project No. 34962.1.1 (U-3615B)
Guilford County
Widening of Skeet Club Road from west of Johnson Street to NC 68

NATURAL STREAM DESIGN

Unnamed tributary to Oak Hollow Lake
From Sta. 197+70 to Sta. 200+25 –L- Lt.
From Sta. 200+65 to Sta. 205+40 –L- Lt.

Introduction

The construction of this widening project will require the relocation of approximately 760' of stream that currently parallels the existing roadway. The relocation and restoration will be done with the analysis and design incorporating the principles of the Rosgen Classification System. There are two sites that will be restored. A total of 760' of stream will be restored, with a 50' or greater wooded buffer preserved within a Permanent Drainage Easement.

The two sites are located on the project as follows: from Sta. 197+70 to Sta. 200+25 –L- Lt. and from Sta. 200+65 to Sta. 205+40 –L- Lt.

The drainage areas for these sites range from 262 acres to 370 acres, and is predominantly rural, but urbanizing. Land use in the vicinity of the stream ranges from natural woods to residential subdivisions. Future development in the watershed is anticipated. Soils are generally classified as fine sandy loam, with 2-6% slopes. The streambed is predominantly sand and gravel.

No comparable hydraulic gage data exists on this stream nor on nearby streams. Discharges were estimated using Regional Curves for Southeast Pennsylvania.

Existing Stream

The stream relocations begin and end at culvert locations. Some culverts are to remain and some will be upgraded in size during this roadway widening project. The entire stretch of stream was straightened into a roadside ditch during the original road construction and has been in place for many years. The stream channel in this area does not exhibit good morphological data (due to its manmade channelization). No bedrock is evident in the stream near this site, which is a characteristic of riffle-pool morphology. Bed material distribution is defined as fine gravel with a d_{50} of approximately 7 mm. Grass, weeds, and small woody vegetation contribute to the stability of the stream. Average slope is 0.7%.

Reference Reaches

The reference reach was selected from the NCDOT Reference Reach Database with a classification based on the presumed natural condition of the stream in an urbanized location. In addition to profile and planimetric data, cross-sections were taken of the existing stream. Bankfull indicators were examined and noted, but not used in the design due to the unnatural nature of the existing stream. Indicators surveyed included riffles, pools, point bars, vegetation lines, and bankfull shelves. A bed material sample was obtained and a sieve analysis was completed.

Proposed Stream

The proposed streams were designed to closely match the stable B4c/1 stream classification of the reference reach. The proposed stream alignment was laid out proportionately to match the ratios (see Morphological Measurement Table). Cross vanes were used to provide grade control and reduce the channel grade to a more stable reach in the riffles. Since natural bed material reclamation will be difficult, constructed riffles have been designed for use in the proposed section. The constructed riffles will have a mix ratio of 10% Class B Rip Rap, 60% Class A Rip Rap and 30% No. 57 Stone.

Bed shear stress computations were performed in lieu of entrainment calculations. Streambanks will be stabilized with grass, and the floodprone area (and other disturbed areas) will be planted with woody vegetation according to the reforestation plan.

Bankfull bed shear stress was computed for the riffle sections. The permissible shear stress for the constructed riffle mix (d_{50} = 4") is 1.70 #/s.f. In riffle sections the bed shear stress (0.32 #/s.f.) does not exceed the permissible for the proposed bed material. Additionally, velocity and bed shear stress for a 10-yr. event were checked and found to be acceptable. The average velocity during a 10-yr. event is 4.3 fps, and the bed shear stress is 0.46 #/s.f. for the same event.

Comparison of proposed and existing stream power shows that the proposed stream will effectively move the current sediment load. Proposed and existing stream power are 0.33 lb/ft-s and 0.36 lb/ft-s respectively.

12/15/05

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	NS-CS

NATURAL STREAM DESIGN

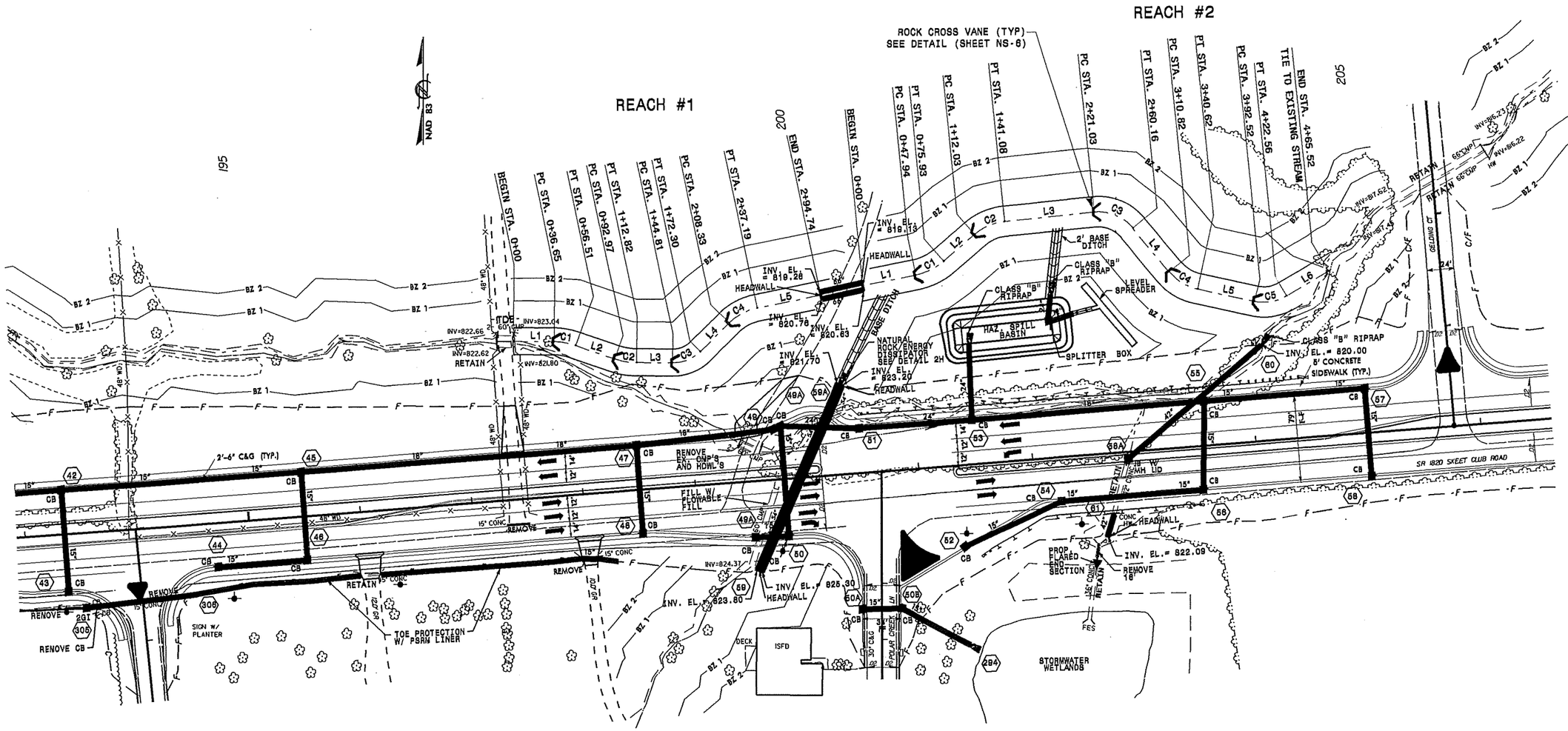
U-3615B, GUILFORD COUNTY

JUNE, 2011

$$$$$$$SYSTIME$$$$$
$$$$$$$

12/15/05

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	NS-1


REACH #1
REACH #2
NAD 83
195
205
200
BEGIN STA. 0+00
END STA. 2+94.74
BEGIN STA. 0+00
END STA. 4+65.52
TIE TO EXISTING STREAM
PC STA. 0+36.65
PT STA. 0+56.51
PC STA. 0+92.97
PT STA. 1+12.82
PC STA. 1+44.81
PT STA. 1+72.30
PC STA. 2+09.33
PT STA. 2+37.19
PC STA. 0+47.94
PT STA. 0+75.93
PC STA. 1+12.03
PT STA. 1+41.08
PC STA. 2+21.03
PT STA. 2+60.16
PC STA. 3+10.82
PT STA. 3+40.62
PC STA. 3+92.52
PT STA. 4+22.56
ROCK CROSS VANE (TYP)
SEE DETAIL (SHEET NS-8)
HEADWALL
INV EL = 819.28
INV EL = 819.13
INV EL = 820.70
INV EL = 820.63
INV EL = 821.70
INV EL = 823.20
NATURAL ROCK ENERGY DISSIPATOR SEE DETAIL 2H
BASE DITCH
2' BASE DITCH
CLASS "B" RIPRAP
LEVEL SPREADER
HAZ SPILL BASIN
SPLITTER BOX
INV. EL. = 820.00
5' CONCRETE SIDEWALK (TYP.)
INV=822.66
INV=822.62
RETAIN
INV=821.80
INV=823.04
INV=824.37
INV=87.52
INV=86.23
INV=86.22
RETAIN 65%SP
RETAIN 66%SP
C/F
24"
2'-6" C&G (TYP.)
RENOVE EX. DNP'S AND HDWL'S
FILL W/ FLOWABLE FILL
REMOVE
RENOVE CONC
RENOVE CB
SIGN W/ PLANTER
TOE PROTECTION W/ PSRM LINER
INV. EL. = 823.80
INV. EL. = 825.30
DECK
ISFD
30" CMP
30" CMP
SR CONC RETAIN
FES
STORMWATER WETLANDS
PROP. FLARED END SECTION
INV. EL. = 822.09
REMOVE 18"
CONC HEADWALL
SR 1820 SKEET CLUB ROAD
SMH W/ SMH LID
CB
RCP
CMP
C&G
HDWL
SMH
ITEM
ITEM
ITEM

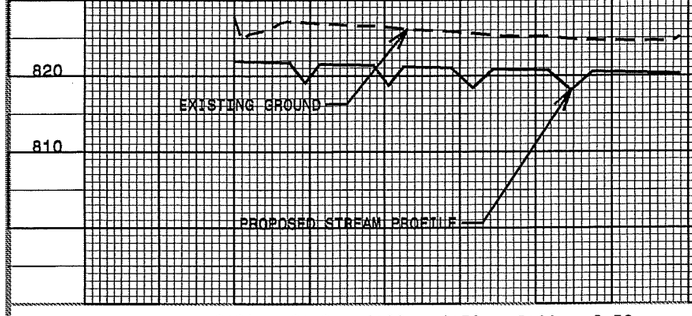
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
	NS-2

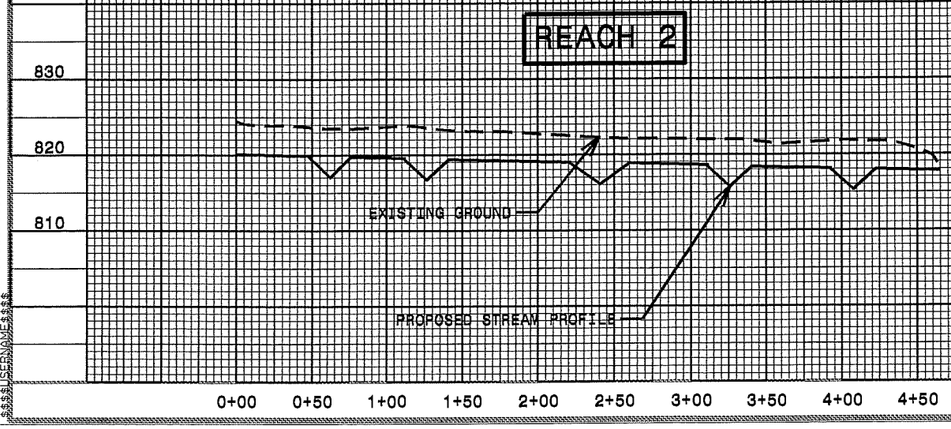
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
REVISED:

NORTH CAROLINA
DEPARTMENT OF
TRANSPORTATION
HYDRAULICS UNIT
PHONE:(919)250-4100
FAX:(919)250-4108

REACH 1



REACH 2



$$$$$SYSTIME$$$$$
$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	NS-3

MORPHOLOGICAL MEASUREMENT TABLE- APPENDIX B

	VARIABLE	UNITS	REACH #1	REACH #2	REFERENCE REACH
1	STREAM TYPE	-	B4c/1	B4c/1	B4c/1
2	DRAINAGE AREA	sq. mi.	0.41	0.58	3.3
3	BANKFULL WIDTH	ft.	12.3	13.4	25.6
4	BANKFULL MEAN DEPTH	ft.	0.97	1.07	1.7
5	WIDTH/DEPTH RATIO	-	12.7	12.5	15.1
6	BANKFULL X-SECTIONAL AREA	s.f.	11.9	14.4	43.3
7	BANKFULL MEAN VELOCITY	fps	2.5	2.7	4.6
8	BANKFULL DISCHARGE	cfs	30	39	199
9	BANKFULL MAX. DEPTH	ft.	1.2	1.35	3.0
10	WIDTH of FLOODPRONE AREA	ft.	24.3	26.9	36.6
11	ENTRENCHMENT RATIO	-	2.0	2.0	1.4
12	MEANDER LENGTH	ft.	105	174	170
13	RATIO of MEANDER LENGTH to BANKFULL WIDTH	-	8.5	13.0	6.6
14	RADIUS of CURVATURE (MIN. C/L)	ft.	35	40	41
15	RATIO of RADIUS of CURVATURE to BANKFULL WIDTH	-	2.8	3.0	1.6
16	BELT WIDTH (AVG)	ft.	36.5	47.5	43.7
17	MEANDER WIDTH RATIO	-	3.0	3.5	1.7
18	SINUOSITY	-	1.02	1.03	1.07
19	VALLEY (WS) SLOPE	ft./ft.	0.0057	0.0053	0.0088
20	AVERAGE (WS) SLOPE	ft./ft.	0.0056	0.0051	0.0082
21	POOL (WS) SLOPE	ft./ft.	0.0003	0.0003	0.0004
22	RATIO of POOL SLOPE to AVERAGE SLOPE	-	0.05	0.06	0.05
23	MAXIMUM POOL DEPTH	ft.	2.5	2.8	4.5
24	RATIO of MAX. POOL DEPTH to AVERAGE BANKFULL DEPTH	-	2.58	2.62	2.65
25	AVERAGE POOL WIDTH (at BANKFULL HEIGHT)	ft.	12.5	14.0	25.9
26	RATIO of POOL WIDTH to BANKFULL WIDTH	-	1.02	1.04	1.01
27	POOL-to-POOL SPACING	ft.	58.7	86.4	62.4
28	RATIO of POOL-to-POOL SPACING to BANKFULL WIDTH	-	4.8	6.4	2.4
29	RATIO of LOWEST BANK HEIGHT to BANKFULL HEIGHT	-	1.0	1.0	2.1
a	STREAM LENGTH	ft.	295	465	348
b	VALLEY LENGTH	ft.	290	450	325
c	LOWEST BANK HEIGHT	ft.	1.0	1.1	3.6

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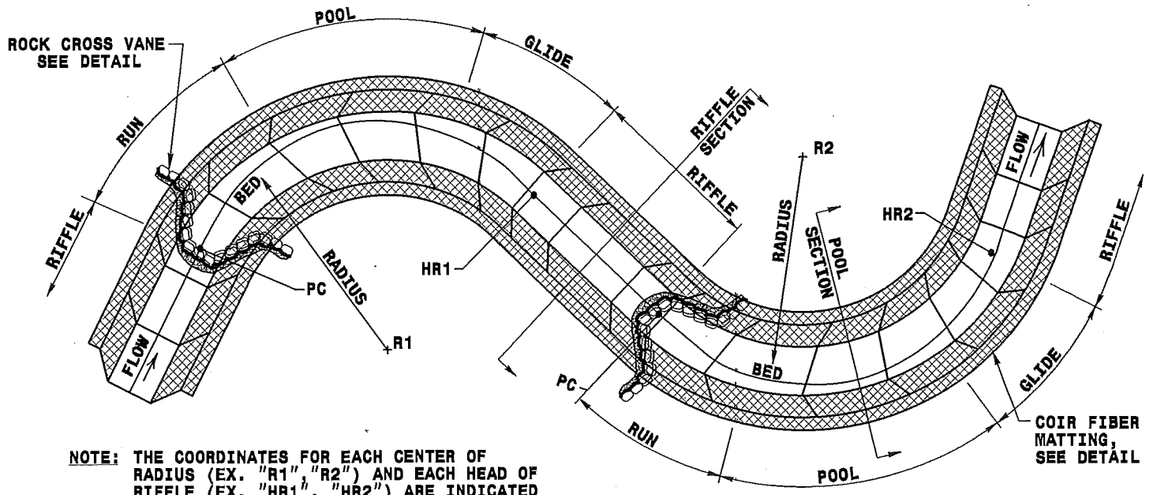
NATURAL STREAM DESIGN
APPENDIX B

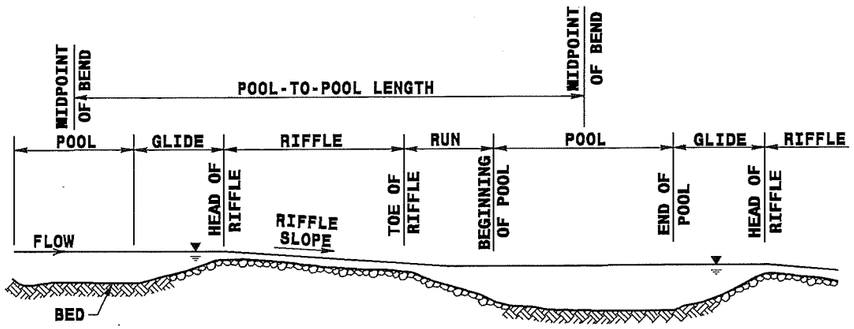
ORIGINAL BY:_____ DATE:_____
MODIFIED BY:_____ DATE:_____
CHECKED BY:_____ DATE:_____
FILE SPEC.:

$$$$$$$SYSTIME$$$$$$
$$$$$$$USERNAME$$$$$$$

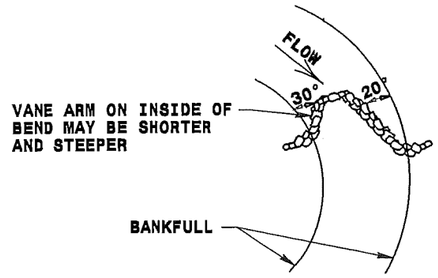


NOTE: THE COORDINATES FOR EACH CENTER OF RADIUS (EX. "R1", "R2") AND EACH HEAD OF RIFFLE (EX. "HR1", "HR2") ARE INDICATED ON THE "PROPOSED STREAM CENTERLINE TRAVERSE" SHEETS.

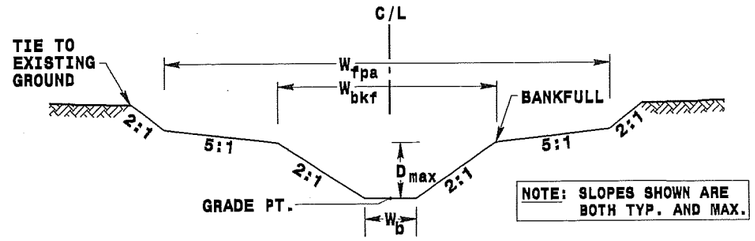
TYPICAL PLAN



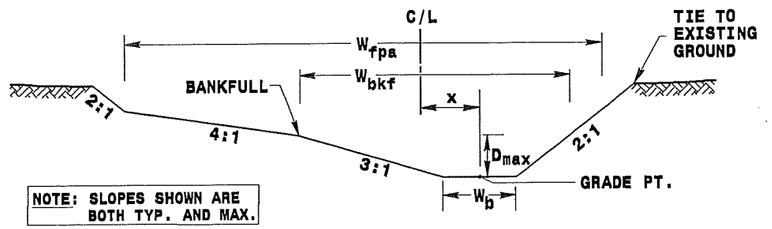
TYPICAL PROFILE FOR ARMORED RIFFLE SECTION



CROSS VANE CONSTRUCTION IN MEANDER-BEND PLAN VIEW



TYPICAL RIFFLE SECTION WITH BANKFULL BENCH



TYPICAL POOL SECTION WITH BANKFULL BENCH

CROSS SECTION DIMENSIONS

REACH	RIFFLE					POOL				
	W_{bkf}	D_{max}	W_b	W_{fpa}	W/D Ratio	W_{bkf}	D_{max}	W_b	W_{fpa}	x
#1	12.3'	1.20'	7.5'	24.3'	12.7	12.5'	2.5'	0	24.0'	3.2'
#2	13.4'	1.35'	8.0'	26.9'	12.5	14.0'	2.8'	0	27.0'	3.6'

CHANNEL TYPICAL DETAIL

NOT TO SCALE

ABBREVIATIONS:

R	= RADIUS POINT
HR	= HEAD OF RIFFLE
W/D	= WIDTH/DEPTH
W_{bkf}	= BANKFULL WIDTH
D_{max}	= MAXIMUM BANKFULL DEPTH
W_b	= BOTTOM WIDTH
W_{fpa}	= FLOOD PRONE AREA WIDTH
x	= CENTERLINE OFFSET

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NATURAL STREAM DESIGN
CHANNEL TYPICAL DETAIL

ORIGINAL BY: _____ DATE: _____
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CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

12/15/05

$$$$$$$$SYSTIME$$$$$$
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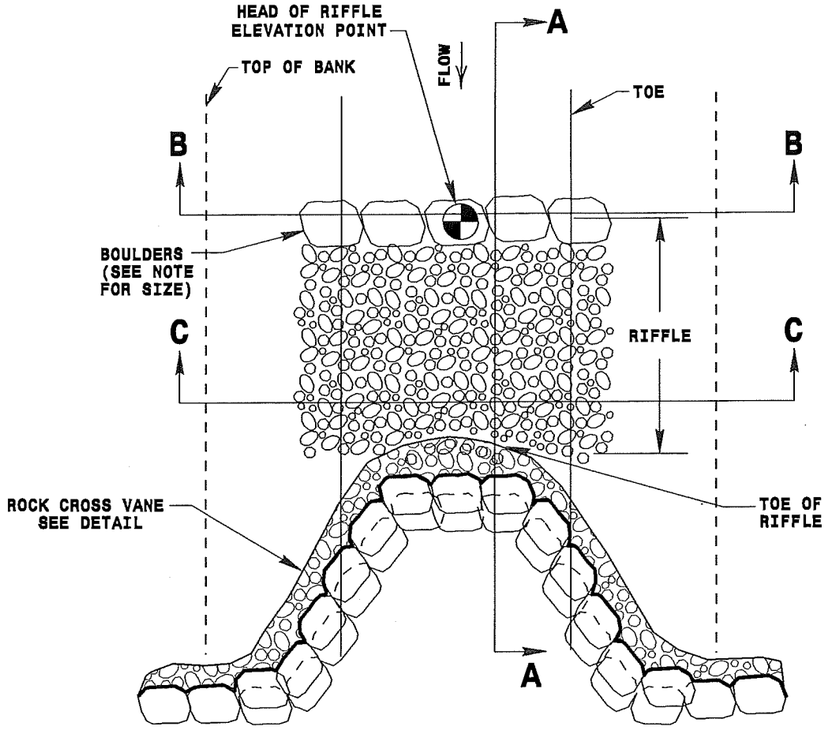
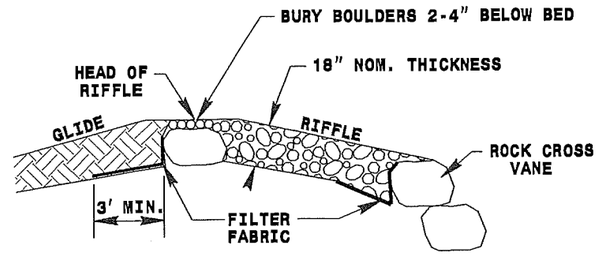
12/15/05

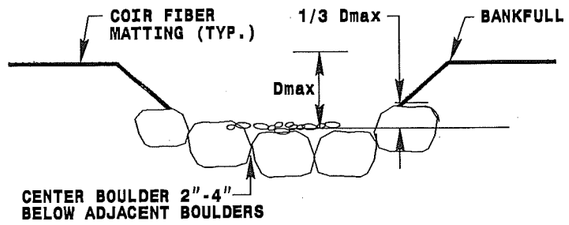


PLAN VIEW

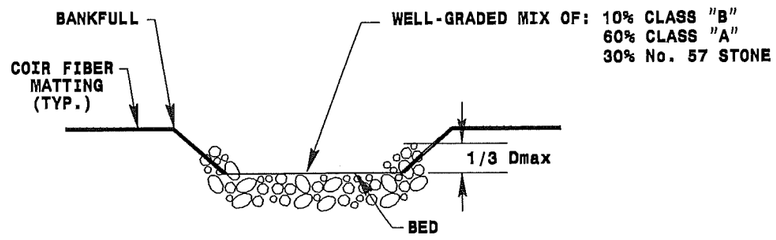
REACH	NO. RIFFLES	ESTIMATED QUANTITIES					
		#57 STONE	CL. A RIP RAP	CL. B RIP RAP	# BLDRS.	WT. BLDRS.	FILTER FABRIC
1	5	45 TONS	75 TONS	13 TONS	20	15 TONS	20 S.Y.
2	6	80 TONS	130 TONS	22 TONS	25	20 TONS	25 S.Y.
TOTAL	11	125 TONS	205 TONS	35 TONS	45	35 TONS	45 S.Y.



SECTION A-A



SECTION B-B



SECTION C-C

CONSTRUCTED RIFFLE DETAIL

NOT TO SCALE

NOTE:
1. BOULDERS SHOULD BE NATIVE STONES OR SHOT ROCK, ANGULAR AND OBLONG, WITH AXES APPROXIMATELY (3'L x 2'W x 1.5'D).

2. SEE CHANNEL TYPICAL DETAIL FOR RIFFLE DIMENSIONS.

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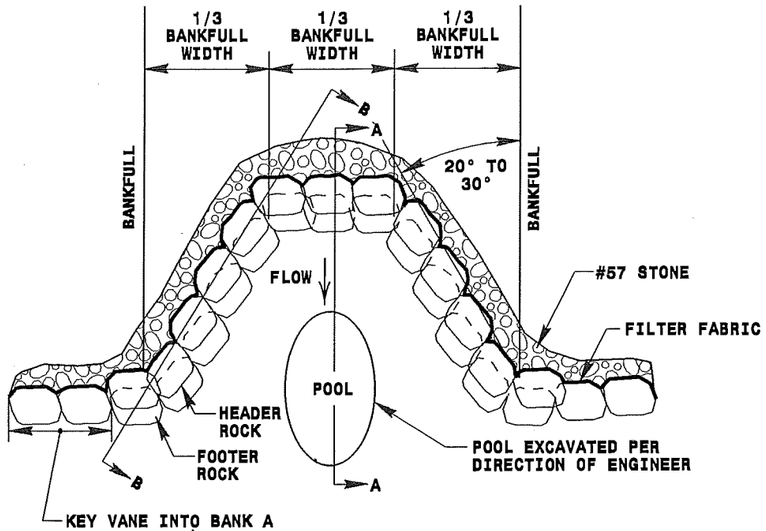
NATURAL STREAM DESIGN
CONSTRUCTED RIFFLE DETAIL

ORIGINAL BY:_____ DATE:_____
MODIFIED BY:_____ DATE:_____
CHECKED BY:_____ DATE:_____
FILE SPEC.:

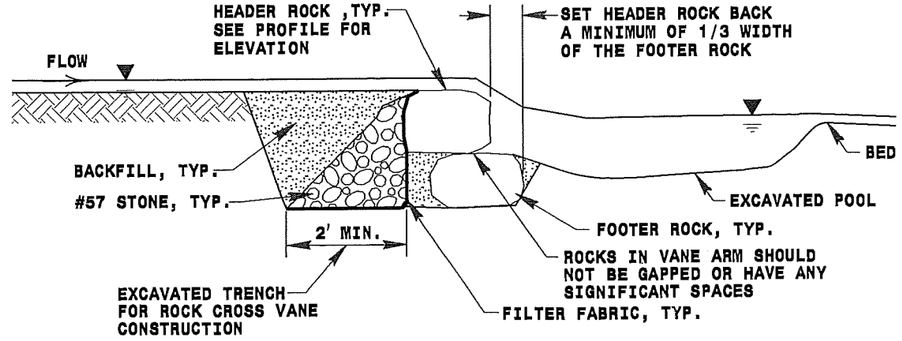
$$$$$$$SYSTIME$$$$$
$$$$$$$

12/15/05

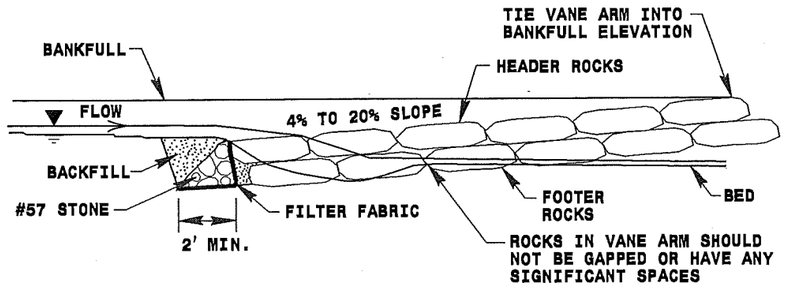
PROJECT REFERENCE NO.	SHEET NO.
U-3615B	NS-6



PLAN VIEW



SECTION A-A



SECTION B-B

REACH	NO. STRUCTURES	BOULDER DIMENSIONS (FT)			ESTIMATED QUANTITIES			
		HEIGHT	LENGTH	WIDTH	# BLDRS.	WT. BLDRS.	#57 STONE	FILTER FABRIC
1	4	1.5'	3'	2'	75	60 TONS	30 TONS	120 S.Y.
2	5	1.5'	3'	2'	90	70 TONS	40 TONS	150 S.Y.
TOTAL	9	1.5'	3'	2'	165	130 TONS	70 TONS	270 S.Y.

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

ROCK CROSS VANE DETAIL

NOT TO SCALE

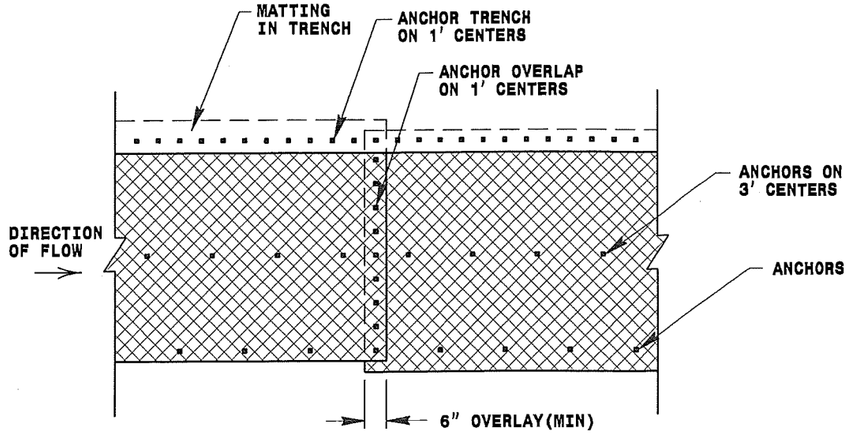
DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

NATURAL STREAM DESIGN
ROCK CROSS VANE DETAIL

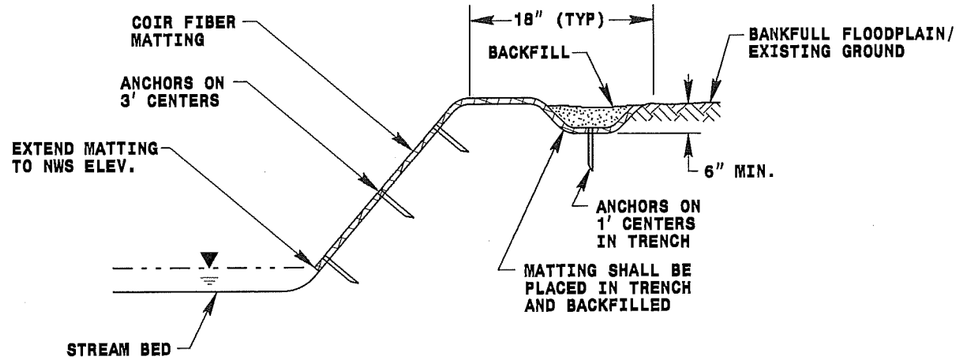
ORIGINAL BY:_____ DATE:_____
MODIFIED BY:_____ DATE:_____
CHECKED BY:_____ DATE:_____
FILE SPEC.:

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

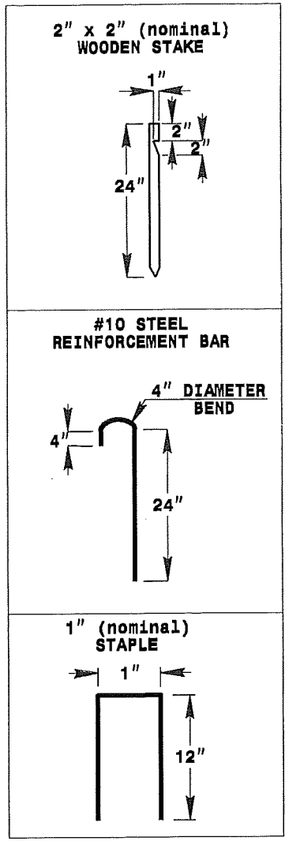
PROJECT REFERENCE NO.	SHEET NO.
U-3615B	NS-7



PLAN VIEW



TYPICAL CROSS SECTION



ANCHOR OPTIONS

ESTIMATED QUANTITIES	
REACH	COIR FIBER MATTING
1	900 S.Y.
2	1400 S.Y.
TOTAL	2300 S.Y.

NOTES:
1. IN AREAS TO BE MATTED, ALL SEEDING, SOIL AMENDMENTS, AND SOIL PREPARATION MUST BE COMPLETED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS PRIOR TO PLACEMENT OF COIR FIBER MATTING.
2. REBAR OR STAPLES MAY BE USED IN PLACE OF WOODEN STAKES AS DIRECTED BY THE ENGINEER.

COIR FIBER MATTING DETAIL

NOT TO SCALE

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

NATURAL STREAM DESIGN
COIR FIBER MATTING DETAIL

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.:

$$$$$$$SYSTIME$$$$$
$$$$$$$USERNAME$$$$$
$$$$$$$USERNAME$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	NS-8

PROPOSED STREAM CENTERLINE TRAVERSE:

REACH #1

Point PT1 N 834,349.4817 E 1,700,064.2386, Sta. 0+00.00

Note: PT1 may need to be adjusted to invert out of existing pipes.

Course from PT1 to PC Curve #1, S 89* 31' 53.68" E, Distance 36.6520

Curve #1 Data:

P.I. Station		0+46.67	N	834,349.1001	E	1,700,110.9083
Delta	=	18* 57' 37.89" (RT)				
Degree	=	95* 29' 34.66"				
Tangent	=	10.0193				
Length	=	19.8554				
Radius	=	60.0000				
External	=	0.8308				
Long Chord	=	19.7849				
Mid. Ord.	=	0.8195				
P.C. Station		0+36.65	N	834,349.1820	E	1,700,100.8893
P.T. Station		0+56.51	N	834,345.7673	E	1,700,120.3571
C.C.			N	834,289.1840	E	1,700,100.3988
Back	= S	89* 31' 53.68" E				
Ahead	= S	70* 34' 15.79" E				
Chord Bear	= S	80* 03' 04.73" E				

Course from PT Curve #1 to PC Curve #2, S 70* 34' 15.79" E, Distance 36.4614

Curve #2 Data:

P.I. Station		1+02.99	N	834,330.3061	E	1,700,164.1909
Delta	=	18* 57' 37.89" (LT)				
Degree	=	95* 29' 34.66"				
Tangent	=	10.0193				
Length	=	19.8554				
Radius	=	60.0000				
External	=	0.8308				
Long Chord	=	19.7649				
Mid. Ord.	=	0.8195				
P.C. Station		0+92.97	N	834,333.8389	E	1,700,154.7421
P.T. Station		1+12.82	N	834,330.2242	E	1,700,174.2099
C.C.			N	834,390.2222	E	1,700,174.7004
Back	= S	70* 34' 15.79" E				
Ahead	= S	89* 31' 53.68" E				
Chord Bear	= S	80* 03' 04.73" E				

Course from PT Curve #2 to PC Curve #3, S 89* 31' 53.68" E, Distance 31.9832

Curve #3 Data:

P.I. Station		1+59.30	N	834,329.8442	E	1,700,220.8690
Delta	=	45* 00' 00.00" (LT)				
Degree	=	163* 42' 08.02"				
Tangent	=	14.4975				
Length	=	27.4889				
Radius	=	35.0000				
External	=	2.8837				
Long Chord	=	26.7878				
Mid. Ord.	=	2.8642				
P.C. Station		1+44.81	N	834,329.9627	E	1,700,208.1920
P.T. Station		1+72.30	N	834,340.0113	E	1,700,231.0237
C.C.			N	834,384.9816	E	1,700,208.4782
Back	= S	89* 31' 53.68" E				
Ahead	= N	45* 28' 06.32" E				
Chord Bear	= N	67* 58' 06.32" E				

Course from PT Curve #3 to PC Curve #4, N 45* 28' 08.32" E, Distance 36.0340

Curve #4 Data:

P.I. Station		2+23.17	N	834,375.6910	E	1,700,267.2916
Delta	=	33* 04' 00.01" (RT)				
Degree	=	114* 35' 29.61"				
Tangent	=	14.8423				
Length	=	28.8581				
Radius	=	50.0000				
External	=	2.1564				
Long Chord	=	28.4573				
Mid. Ord.	=	2.0673				
P.C. Station		2+08.33	N	834,365.2820	E	1,700,256.7111
P.T. Station		2+37.19	N	834,378.6411	E	1,700,281.8378
C.C.			N	834,329.6388	E	1,700,291.7762
Back	= N	45* 28' 06.32" E				
Ahead	= N	78* 32' 06.33" E				
Chord Bear	= N	62* 00' 06.32" E				

Course from PT Curve #4 to PT2, N 78* 32' 08.33" E, Distance 57.5539

Point PT2 N 834,390.0810 E 1,700,336.2433, Sta. 2+94.74

Note: PT2 may need to be adjusted to invert in of proposed pipes.

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Office 919-250-4128 FAX 919-250-4119

NATURAL STREAM DESIGN

CENTERLINE TRAVERSE- REACH #1

ORIGINAL BY:_____ DATE:_____
MODIFIED BY:_____ DATE:_____
CHECKED BY:_____ DATE:_____
FILE SPEC.:

$$$$$$SYSTIME$$$$$$
$$$$$$USERNAME$$$$$$

12/15/05

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	NS-9

PROPOSED STREAM CENTERLINE TRAVERSE:

REACH #2

Point PT1 N 834,397.8948 E 1,700,376.7701, Sta. 0+00.00

Note: PT1 may need to be adjusted to invert out of proposed pipes.

Course from PT1 to PC Curve #1, N 78* 32' 08.33" E, Distance 47.9406

Curve #1 Data:

P.I. Station	0+82.25	N	834,410.2673	E	1,700,437.7739
Delta =	29* 09' 31.46" (LT)				
Degree =	104* 10' 26.92"				
Tangent =	14.3053				
Length =	27.9904				
Radius =	55.0000				
External =	1.8299				
Long Chord =	27.6893				
Mid. Ord. =	1.7710				
P.C. Station	0+47.94	N	834,407.4238	E	1,700,423.7541
P.T. Station	0+75.93	N	834,419.5613	E	1,700,448.6317
C.C.		N	834,481.3264	E	1,700,412.6219

Back = N 78* 32' 08.33" E
Ahead = N 49* 22' 34.85" E
Chord Bear = N 63* 57' 20.59" E

Course from PT Curve #1 to PC Curve #2, N 49* 22' 34.85" E, Distance 38.0998

Curve #2 Data:

P.I. Station	1+27.02	N	834,452.8467	E	1,700,467.4107
Delta =	35* 02' 04.45" (RT)				
Degree =	120* 37' 21.70"				
Tangent =	14.9924				
Length =	29.0448				
Radius =	47.5000				
External =	2.3099				
Long Chord =	28.5944				
Mid. Ord. =	2.2026				
P.C. Station	1+12.03	N	834,443.0853	E	1,700,476.0314
P.T. Station	1+41.08	N	834,454.3088	E	1,700,502.3319
C.C.		N	834,407.0327	E	1,700,508.9581

Back = N 49* 22' 34.85" E
Ahead = N 84* 24' 39.29" E
Chord Bear = N 66* 53' 37.07" E

Course from PT Curve #2 to PC Curve #3, N 84* 24' 39.29" E, Distance 79.9529

Curve #3 Data:

P.I. Station	2+42.32	N	834,464.1675	E	1,700,603.0961
Delta =	56* 03' 15.32" (RT)				
Degree =	143* 14' 22.02"				
Tangent =	21.2927				
Length =	39.1333				
Radius =	40.0000				
External =	5.3142				
Long Chord =	37.5912				
Mid. Ord. =	4.6910				
P.C. Station	2+21.03	N	834,462.0937	E	1,700,581.9047
P.T. Station	2+60.16	N	834,447.7456	E	1,700,616.8499
C.C.		N	834,422.2839	E	1,700,585.8004

Back = N 84* 24' 39.29" E
Ahead = S 39* 32' 05.38" E
Chord Bear = S 87* 33' 43.05" E

Course from PT Curve #3 to PC Curve #4, S 39* 32' 05.38" E, Distance 50.6630

Curve #4 Data:

P.I. Station	3+26.29	N	834,398.7447	E	1,700,658.7440
Delta =	37* 56' 03.32" (LT)				
Degree =	127* 19' 26.24"				
Tangent =	15.4659				
Length =	29.7935				
Radius =	45.0000				
External =	2.5835				
Long Chord =	29.2523				
Mid. Ord. =	2.4433				
P.C. Station	3+10.82	N	834,408.6725	E	1,700,648.8993
P.T. Station	3+40.82	N	834,393.3891	E	1,700,673.8415
C.C.		N	834,437.3172	E	1,700,683.6050

Back = S 39* 32' 05.38" E
Ahead = S 77* 28' 08.71" E
Chord Bear = S 58* 30' 07.05" E

Course from PT Curve #4 to PC Curve #5, S 77* 28' 08.71" E, Distance 51.9048

Curve #5 Data:

P.I. Station	4+08.29	N	834,378.7085	E	1,700,739.9018
Delta =	43* 01' 39.13" (LT)				
Degree =	143* 14' 22.02"				
Tangent =	15.7675				
Length =	30.0389				
Radius =	40.0000				
External =	2.9955				
Long Chord =	29.3380				
Mid. Ord. =	2.7868				
P.C. Station	3+92.52	N	834,382.1275	E	1,700,724.5099
P.T. Station	4+22.56	N	834,388.7083	E	1,700,753.4880
C.C.		N	834,421.1747	E	1,700,733.1885

Back = S 77* 28' 08.71" E
Ahead = N 59* 30' 12.16" E
Chord Bear = N 81* 01' 01.73" E

Course from PT Curve #5 to PT2, N 59* 30' 12.16" E, Distance 42.9544
Point PT2 N 834,408.5071 E 1,700,790.5001, Sta. 4+65.52

Note: PT2 may need to be adjusted to match invert of existing stream.

DESIGN SERVICES UNIT
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Office 919-250-4128 FAX 919-250-4119

NATURAL STREAM DESIGN

CENTERLINE TRAVERSE- REACH #2

ORIGINAL BY:_____ DATE:_____
MODIFIED BY:_____ DATE:_____
CHECKED BY:_____ DATE:_____
FILE SPEC.:

$$$$$$$SYSTIME$$$$$
$$$$$$$

REACH #1- PROFILE DATA TABLE

STATION	ELEVATION	DESCRIPTION
0+00.00	821.90	INVERT OUT
0+36.65	821.72	TOE OF RIFFLE (HIGH POINT)
0+46.58	819.06	POOL
0+56.51	821.56	HEAD OF RIFFLE
0+92.97	821.38	TOE OF RIFFLE (HIGH POINT)
1+02.90	818.72	POOL
1+12.82	821.22	HEAD OF RIFFLE
1+44.81	821.06	TOE OF RIFFLE (HIGH POINT)
1+58.56	818.40	POOL
1+72.30	820.89	HEAD OF RIFFLE
2+08.33	820.71	TOE OF RIFFLE (HIGH POINT)
2+22.76	818.06	POOL
2+37.19	820.55	HEAD OF RIFFLE
2+94.74	820.26	INVERT IN

REACH #2- PROFILE DATA TABLE

STATION	ELEVATION	DESCRIPTION
0+00.00	820.13	INVERT OUT
0+47.94	819.89	TOE OF RIFFLE (HIGH POINT)
0+61.94	817.03	POOL
0+75.93	819.73	HEAD OF RIFFLE
1+12.03	819.55	TOE OF RIFFLE (HIGH POINT)
1+26.55	816.69	POOL
1+41.08	819.38	HEAD OF RIFFLE
2+21.03	818.98	TOE OF RIFFLE (HIGH POINT)
2+40.60	816.13	POOL
2+60.16	818.82	HEAD OF RIFFLE
3+10.82	818.56	TOE OF RIFFLE (HIGH POINT)
3+25.73	815.71	POOL
3+40.62	818.40	HEAD OF RIFFLE
3+92.52	818.14	TOE OF RIFFLE (HIGH POINT)
4+07.54	815.28	POOL
4+22.56	817.98	HEAD OF RIFFLE
4+65.52	817.76	INVERT IN

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

NATURAL STREAM DESIGN
PROFILE DATA- REACHES #1 & #2

ORIGINAL BY:_____ DATE:_____
MODIFIED BY:_____ DATE:_____
CHECKED BY:_____ DATE:_____
FILE SPEC.:

$$$$$$$SYSTIME$$$$$
$$$$$$$USERNAME$$$$

Skeet Club Road Stream Mitigation Plan
Widening of Skeet Club Road from West of Johnson Street to NC 68
Guilford County, NC

U-3615B
34962.1.1
ONE ID# 041-018

01/12/2013

1.0 Baseline

The North Carolina Department of Transportation (NCDOT) will perform onsite mitigation for stream impacts associated with State Transportation Improvement Project (STIP) U-3615B, in Guilford County. The widening of Skeet Club Road will impact 699 feet of an unnamed tributary (UT) to West Fork Deep River. NCDOT will relocate the UT using natural stream design north of the existing stream location. The existing UT runs parallel to Skeet Club Road within a low density residential area. The UT has an unstable, incised G4/C channel with a sparse buffer consisting mainly of small trees and blackberry. All stream work will take place within the Hydrologic Cataloging Unit (HUC) 03030003 within the Cape River Basin in sub basin (03-06-08). Channel dimensions, substrate type and stream type are listed below in Table 1. Additional information can be acquired from the NRTR dated March 9, 2001.

Table 1

Stream Reach	Stream Channel Width	Channel Depth	Channel Substrate	Jurisdictional Status
UT 3-3 UT W Fork Deep R.	6 feet	2 feet	Silt, sand	Perennial

2.0 Site Selection

STIP U-3615B involves the widening and improvements of North Main Street (Old US 311/SR 1003) from the existing 5-lane, curb-and-gutter section north of US 311 to Skeet Club Road. Skeet Club Road will also be widened from North Main Street to the existing 5-lane, curb-and-gutter section just west of Eastchester Drive (NC 68). Permanent stream impacts

associated with this project are 2120 linear feet. These impacts include 699 feet of UT to West Fork Deep River that will be filled during construction and therefore will be relocated. The stream relocation will vary from 30 to 100 feet north of the existing location. The mitigation site is located between -L- Sta. 197+70 to Sta. 205+40. The stream between Sta. 200+25 and Sta. 200+65 is not included in the proposed mitigation due to an access to existing dwelling (see Appendix A)

3.0 Site Protection Instrument

The mitigation area is located within the NCDOT Right of Way that was acquired for the U-3515B. NCDOT will manage the proposed mitigation site to prohibit all use inconsistent with its use as mitigation property, including any activity that would materially alter the biological integrity or functional and educational value of the site, consistent with this mitigation plan. The site will be placed on the NES mitigation geodatabase, have annual field visits during the monitoring period, and then be placed in the NCDOT Stewardship Program for long term maintenance and protection.

4.0 Objectives

The project involves the relocation of 699 feet of the UT to West Fork Deep River, resulting in 760 feet of natural stream design to mitigate for impacts associated with STIP U-3615B. The functional restoration of the stream will be accomplished using natural stream design and buffer restoration. Buffer restoration will consist of planting trees over an area a minimum of 50 feet on both sides of the relocated channel (approximately 76,000 square feet total). NCDOT proposes a 1:1 mitigation ratio for the 760 foot UT to West Fork Deep River stream relocation and for the 76,000 square feet of buffer restoration.

5.0 Mitigation Work Plan

The mitigation site will be constructed in conjunction with STIP U-3615B. Construction activities related to the mitigation site involve floodplain excavation, stream channel grading, structure installation, and native vegetation planting. The design involves the relocation of an unstable, incised channel (G4C stream type) with the Rosgen Priority Level II approach, in which a new stream channel (B4C stream type) will be constructed through a newly established floodplain. In-stream structures will consist of (9) rock cross vanes to provide stability (See Appendix B). The stream banks and adjacent floodplain areas will be planted with native vegetation that are moderately to highly tolerant of flooded conditions.

Following the successful completion of site grading and stabilization, the vegetation plan for the site includes the planting of live stake trees along the face of the stream banks. A minimum 50

foot buffer (from top of bank) will also be established using bare root trees. Tree species commonly found in the piedmont area will be planted across the site No less than four native species appropriate for the site conditions, such as river birch (*Betula nigra*), green ash (*Fraxinus pennsylvanica*), sycamore (*Platanus occidentalis*), and overcup oak (*Quercus lyrata*), will be used. Final species selection will be based on availability.

Two small areas within the buffer restoration area will be planted with low growing shrubs such as silky dogwood (*Cornus amomum*) and button bush (*Cephalanthus occid*entalis*)* because of existing utility easements.

Native grass seeding and mulching will be performed on any disturbed areas along the stream relocation for stabilization purposes according to the guidance and standard procedures of NCDOT's Roadside Environmental Unit. An as-built report will be submitted within 60 days of completion of the project.

6.0 Performance Standards

Buffer vegetation success criteria are based on the survival of at least 260 stems per acre at year five. Stream channel relocation success will be based on channel stability, vegetation survival, and placement of structures.

7.0 Monitoring Requirements

NCDOT will visually monitor the stream relocation as well as established vegetation plots. These monitoring activities will be conducted bi-annually for a five year period and documented in an annual report distributed to the regulatory agencies.

8.0 Other Information

No additional pertinent information available.

9.0 Determination of Credits

Per NCDOT plans and 401/404 permit application for STIP U-3615B; NCDOT proposes to relocate 699 feet of UT West Fork Deep River. The proposed mitigation will result in 760 linear feet of stream relocation to be used as on-site mitigation for associated stream impacts for U-3615B at a 1:1 ratio. An as-built report will be submitted within 60 days of completion of the project to verify actual linear feet constructed and buffer acreage planted. The success of the mitigation area and determination of final credits will be based upon successful completion of the mitigation plan and closeout of the monitoring period.

9.1 Credit Release Schedule

NCDOT proposes immediate, full release of the proposed 760 feet of stream at a 1:1 ratio as on-site mitigation for the impacts associated with STIP U-3615B.

10.0 Geographic Service Area

The proposed geographic Service Area (GSA) for the mitigation is composed of the 8 digit Hydrologic Cataloging Unit (HUC) 03030003. It is anticipated that the entire 760 linear feet will be used on-site at a 1:1 ratio to offset stream impacts associated with U-3615B.

11.0 Maintenance Plan

The site will be held by NCDOT and placed on the NES mitigation geodatabase. Once monitoring is completed and the site is closed out, it will be placed in the NCDOT Stewardship Program for long term maintenance and protection.

If an appropriate third party recipient is identified in the future, then the transfer of the property will include a conservation easement or other measure to protect the natural features and mitigation value of the site in perpetuity.

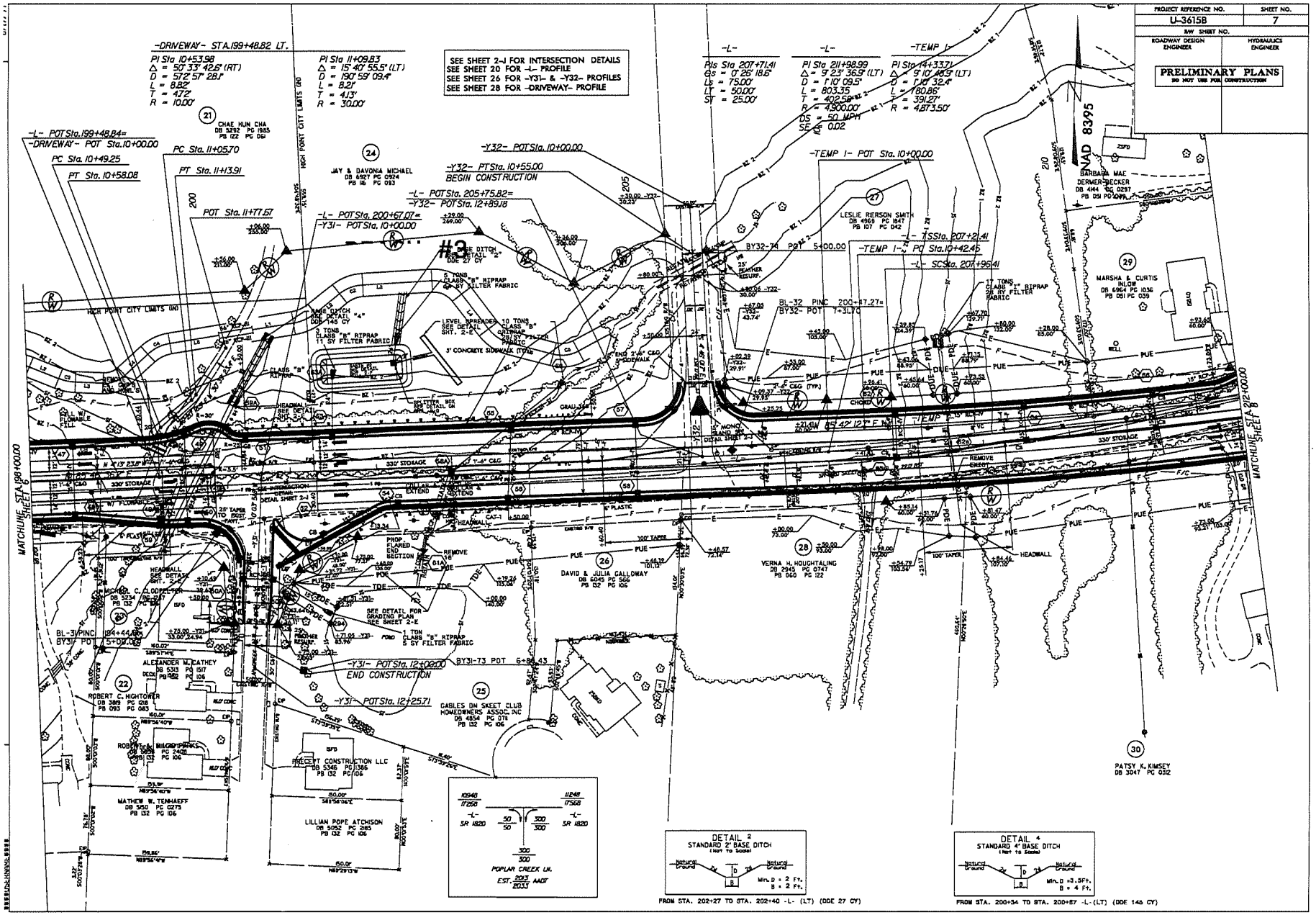
12.0 Long Term Adaptive Management Plan

The site will be managed by NCDOT according to the mitigation plan. In the event that unforeseen issues arise that affect the management of the site, any remediation will be addressed by NCDOT in coordination with the Interagency Review Team.

13.0 Financial Assurances

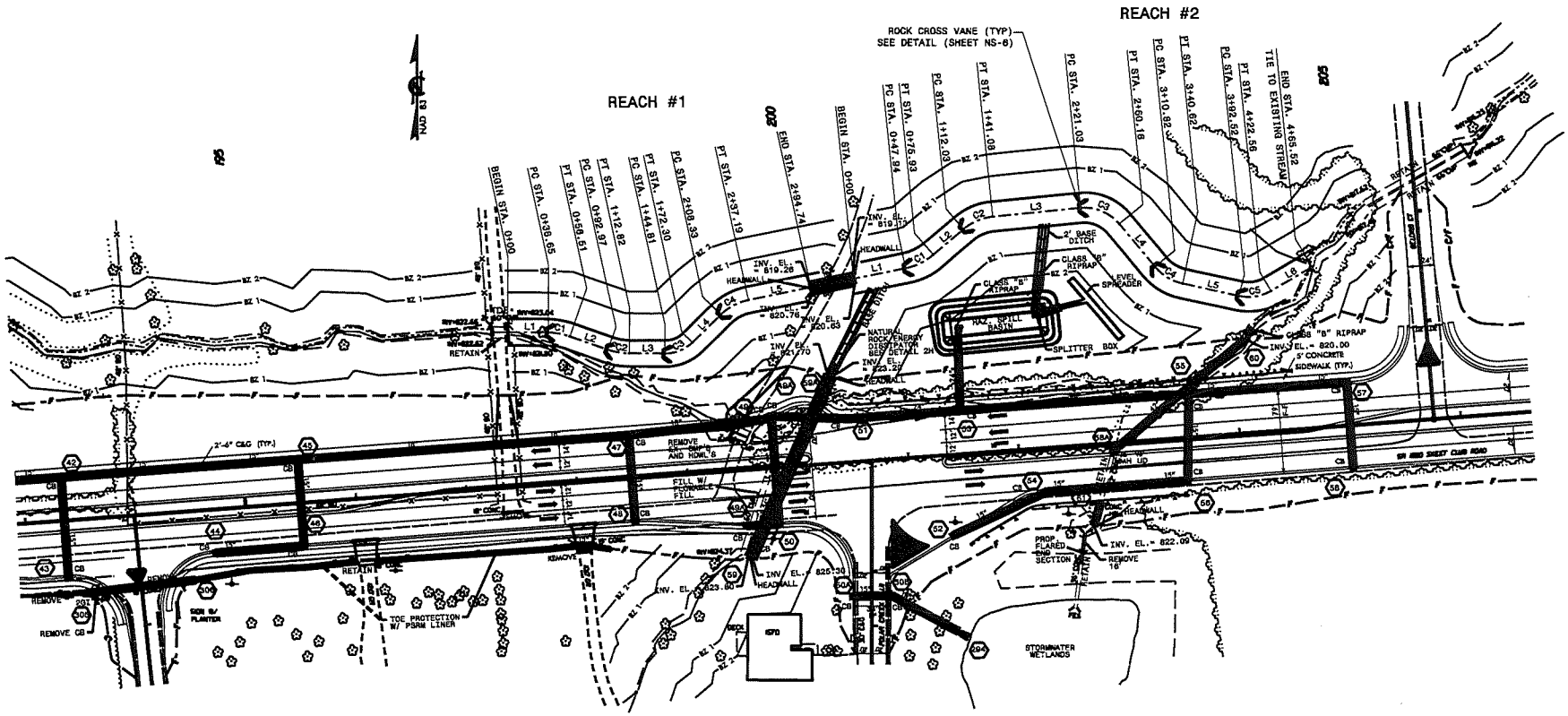
The site will be managed by NCDOT with its own distinct cost center number within the NCDOT budgeting and financial tracking system. Therefore, all accounting for revenues, contract encumbrances, fund transfers, and expenses will be performed and reported independently from other capital budget or operating budget accounting.

Appendix A


PROJECT REFERENCE NO.
U-3615B
SHEET NO.
7
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
NAD 83/95
-DRIVEWAY- STA.199+48.82 LT.
PI Sta 10+53.98
Δ = 50° 33' 42.6" (RT)
D = 57° 57' 28.1"
L = 8.82'
T = 4.72'
R = 10.00'
PI Sta 11+09.83
Δ = 15° 40' 55.5" (LT)
D = 190° 59' 09.4"
L = 8.21'
T = 4.13'
R = 30.00'
SEE SHEET 2-J FOR INTERSECTION DETAILS
SEE SHEET 20 FOR -L- PROFILE
SEE SHEET 26 FOR -Y31- & -Y32- PROFILES
SEE SHEET 28 FOR -DRIVEWAY- PROFILE
-L-
PIs Sta 207+71.41
Ls = 0°26' 18.6"
Ls = 75.00'
LT = 50.00'
ST = 25.00'
-L-
PI Sta 211+98.99
Δ = 9°23' 36.9" (LT)
D = 1°10' 09.5"
L = 803.35'
T = 402.58'
R = 4,500.00'
DS = 50 MPH
SE = 0.02
-TEMP 1-
PI Sta 14+33.71
Δ = 9°10' 48.5" (LT)
D = 1°10' 32.4"
L = 780.86'
T = 391.27'
R = 4,873.50'
-DRIVEWAY- POT Sta.10+00.00
PC Sta. 10+49.25
PT Sta. 10+58.08
PC Sta. 11+05.70
PT Sta. 11+13.91
POT Sta. 11+77.67
-L- POT Sta.199+48.84=
-DRIVEWAY- POT Sta.10+00.00
-Y32- POT Sta. 10+00.00
-Y32- PT Sta. 10+55.00
BEGIN CONSTRUCTION
-L- POT Sta. 205+75.82=
-Y32- POT Sta. 12+89.18
-L- POT Sta. 200+67.07=
-Y31- POT Sta. 10+00.00
-TEMP 1- POT Sta. 10+00.00
-L- TS Sta. 207+21.41
-TEMP 1- PC Sta.10+42.45
-L- SC Sta. 209+96.41
BY32-74 POT 5+00.00
BL-32 PINC 200+87.27=
BY32- POT 7+31.70
BL-31PINC 184+44.00=
BY31- POT 5+00.00
BY31-73 POT 6+86.43
-Y31- POT Sta. 12+00.00
END CONSTRUCTION
-Y31- POT Sta. 12+25.71
MATCHLINE STA.199+00.00 SHEET 6
MATCHLINE STA.212+00.00 SHEET 8
HIGH POINT CITY LIMITS (IN)
HIGH POINT CITY LIMITS (OUT)
#3 SIDE DITCH SEE DETAIL "2" DDE 27 CY
#4 SIDE DITCH SEE DETAIL "4" DDE 148 CY
2 TONS CLASS "B" RIPRAP 6SY FILTER FABRIC
10 TONS CLASS "B" RIPRAP 11 SY FILTER FABRIC
17 TONS CLASS "B" RIPRAP 25 SY FILTER FABRIC
LEVEL SPREADER SEE DETAIL SHT. 2-E
5' CONCRETE SIDEWALK (TYP.)
END 2'-6" C&G w/SIDEWALK
2'-6" C&G (TYP.)
2'-6" C&G
4'-0" C&G
MONO. BAND SEE DETAIL SHEET 2-J
SEE DETAIL FOR GRADING PLAN SEE SHEET 2-E
PROP. FLARED RIGHT SECTION
REMOVE EXIST. HEADWALL
HEADWALL SEE DETAIL SHT. 2-J
100' TAPER
25' TAPER TO EXIST.
330' STORAGE
CAT-1
6" PLASTIC
REMOVE EXIST. PIPE
PUE
TDE
PDE
ISFD
MLFF CONC.
21 CHAE HUN CHA DB 5282 PG 1985 PB 122 PG 092
22 ROBERT C. HIGHTOWER DB 3915 PG 026 PB 093 PG 083
ROBERT C. HIGHTOWER DB 5234 PG 2417 PB 132 PG 106
ALEXANDER M. CATHEY DB 5313 PG 1517 PB 132 PG 106
MATHEW W. TENHAEFF DB 5450 PG 0273 PB 132 PG 106
LILLIAN POPE ATCHISON DB 5052 PG 285 PB 132 PG 106
23 MICHAEL C. CLODFELTER DB 5234 PG 2417 PB 132 PG 106
24 JAY & DAVONIA MICHAEL DB 6927 PG 0924 PB 186 PG 093
25 CABLES ON SKEET CLUB HOMEOWNERS ASSOC INC DB 4854 PG 078 PB 132 PG 106
PRECEPT CONSTRUCTION LLC DB 5346 PG 1386 PB 132 PG 106
26 DAVID & JULIA CALLOWAY DB 6045 PG 566 PB 132 PG 106
27 LESLIE RIERSON SMITH DB 4968 PG 1847 PB 107 PG 042
28 VERNA H. HOUGHTALING DB 2945 PG 0747 PB 060 PG 122
29 MARSHA & CURTIS WILOW DB 6964 PG 1036 PB 051 PG 039
BARBARA MAE DERMER-BECKER DB 4444 PG 0297 PB 051 PG 039
30 PATSY K. KIMSEY DB 3047 PG 052
POPLAR CREEK LN. EST. 2021 2033 ADT
DETAIL 2
STANDARD 2' BASE DITCH
(Not To Scale)
Min. D = 2 Ft.
B = 2 Ft.
FROM STA. 202+27 TO STA. 202+40 -L- (LT) (DDE 27 CY)
DETAIL 4
STANDARD 4' BASE DITCH
(Not To Scale)
Min. D =3.5Ft.
B = 4 Ft.
FROM STA. 200+34 TO STA. 200+87 -L-(LT) (DDE 148 CY)

Appendix B

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	NS-1



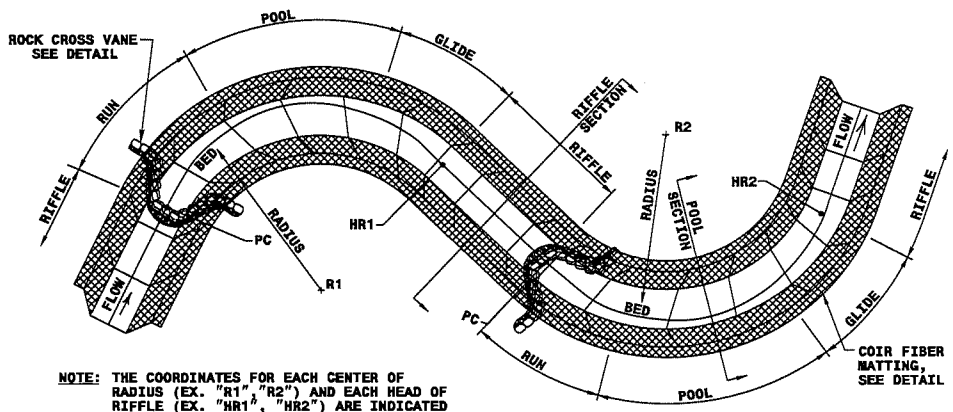
REACHES #1 & #2

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

NATURAL STREAM DESIGN
PLAN- REACHES #2 & #3

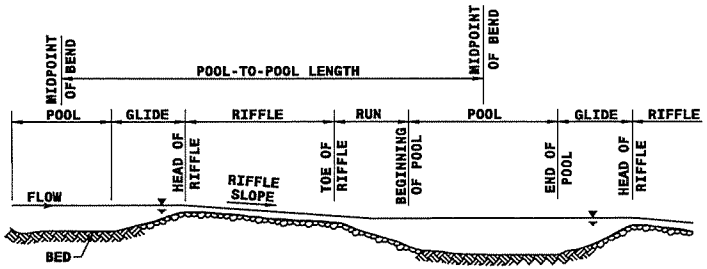
ORIGINAL BY:_____ DATE:_____
MODIFIED BY:_____ DATE:_____
CHECKED BY:_____ DATE:_____
FILE SPEC.:

PROJECT REFERENCE NO.	SHEET NO.
U-3615B	NS-4

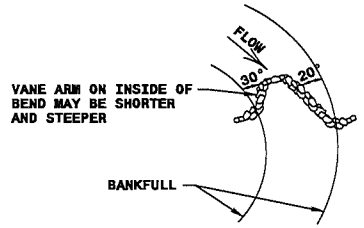


NOTE: THE COORDINATES FOR EACH CENTER OF RADIUS (EX. "R1","R2") AND EACH HEAD OF RIFFLE (EX. "HR1", "HR2") ARE INDICATED ON THE "PROPOSED STREAM CENTERLINE TRAVERSE" SHEETS.

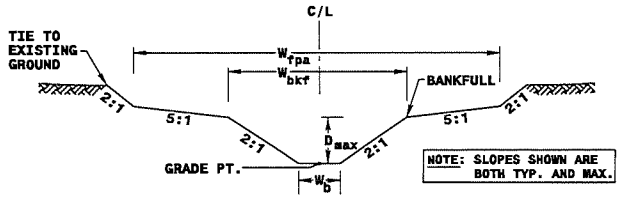
TYPICAL PLAN



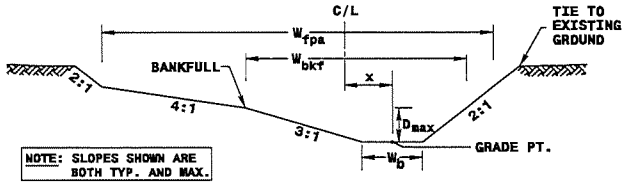
TYPICAL PROFILE FOR ARMORED RIFFLE SECTION



CROSS VANE CONSTRUCTION IN MEANDER-BEND PLAN VIEW



TYPICAL RIFFLE SECTION WITH BANKFULL BENCH



TYPICAL POOL SECTION WITH BANKFULL BENCH

CROSS SECTION DIMENSIONS

REACH	RIFFLE					POOL				
	W_{bkf}	D_{max}	W_b	W_{fpa}	W/D Ratio	W_{bkf}	D_{max}	W_b	W_{fpa}	x
#1	12.3'	1.20'	7.5'	24.3'	12.7	12.5'	2.5'	0	24.0'	3.2'
#2	13.4'	1.35'	8.0'	26.9'	12.5	14.0'	2.8'	0	27.0'	3.6'

CHANNEL TYPICAL DETAIL

NOT TO SCALE

ABBREVIATIONS:

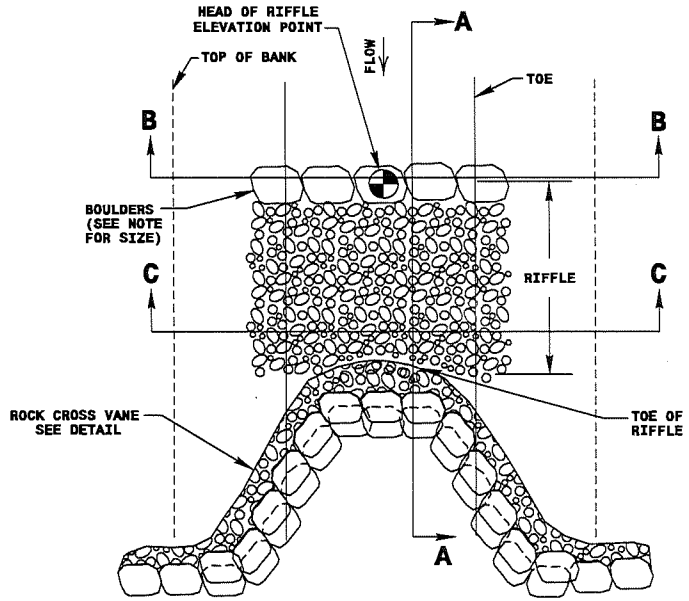
R	= RADIUS POINT
HR	= HEAD OF RIFFLE
W/D	= WIDTH/DEPTH
W_{bkf}	= BANKFULL WIDTH
D_{max}	= MAXIMUM BANKFULL DEPTH
W_b	= BOTTOM WIDTH
W_{fpa}	= FLOOD PRONE AREA WIDTH
x	= CENTERLINE OFFSET

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

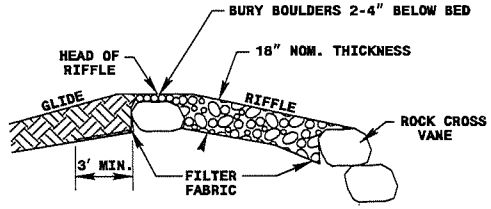
NATURAL STREAM DESIGN
CHANNEL TYPICAL DETAIL

ORIGINAL BY:_____ DATE:_____
MODIFIED BY:_____ DATE:_____
CHECKED BY:_____ DATE:_____
FILE SPEC.:_____

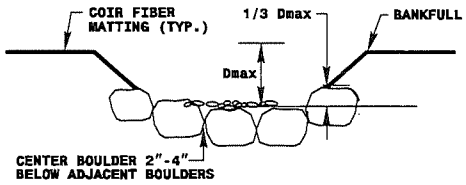
PROJECT REFERENCE NO.	SHEET NO.
U-3615B	NS-5



PLAN VIEW

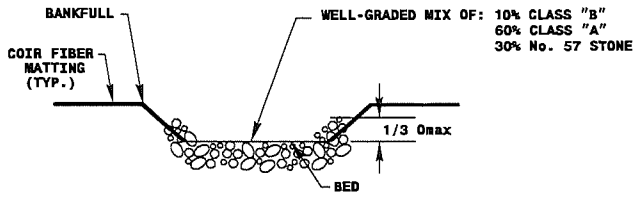


SECTION A-A



SECTION B-B

REACH	NO. RIFFLES	ESTIMATED QUANTITIES					
		#57 STONE	CL. A RIP RAP	CL. B RIP RAP	# BLDRS.	WT. BLDRS.	FILTER FABRIC
1	5	45 TONS	75 TONS	13 TONS	20	15 TONS	20 S.Y.
2	6	80 TONS	130 TONS	22 TONS	25	20 TONS	25 S.Y.
TOTAL	11	125 TONS	205 TONS	35 TONS	45	35 TONS	45 S.Y.



SECTION C-C

CONSTRUCTED RIFFLE DETAIL

NOT TO SCALE

NOTE:
1. BOULDERS SHOULD BE NATIVE STONES OR SHOT ROCK, ANGULAR AND OBLONG, WITH AXES APPROXIMATELY (3'L x 2'W x 1.5'D).

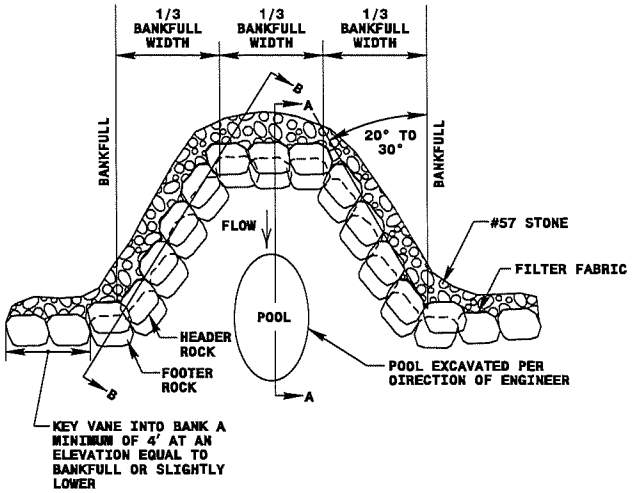
2. SEE CHANNEL TYPICAL DETAIL FOR RIFFLE DIMENSIONS.

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

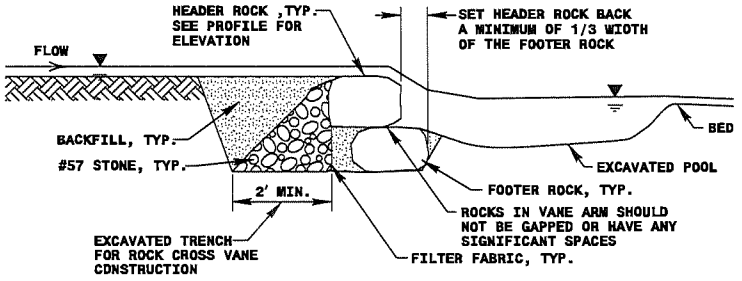
NATURAL STREAM DESIGN
CONSTRUCTED RIFFLE DETAIL

ORIGINAL BY:_____ DATE:_____
MODIFIED BY:_____ DATE:_____
CHECKED BY:_____ DATE:_____
FILE SPEC.:_____

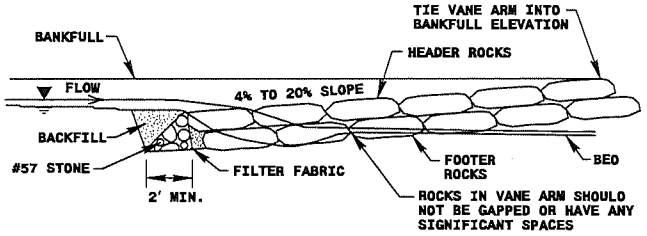
PROJECT REFERENCE NO.	SHEET NO.
U-3615B	NS-6



PLAN VIEW



SECTION A-A



SECTION B-B

REACH	NO. STRUCTURES	BOULDER DIMENSIONS (FT) HEIGHT	LENGTH	WIDTH	ESTIMATED QUANTITIES # BLDRS.	WT. BLDRS.	#57 STONE	FILTER FABRIC
1	4	1.5'	3'	2'	75	60 TONS	30 TONS	120 S.Y.
2	5	1.5'	3'	2'	90	70 TONS	40 TONS	150 S.Y.
TOTAL	9	1.5'	3'	2'	165	130 TONS	70 TONS	270 S.Y.

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

ROCK CROSS VANE DETAIL

NOT TO SCALE

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

NATURAL STREAM DESIGN
ROCK CROSS VANE DETAIL

ORIGINAL BY:_____ DATE:_____
MODIFIED BY:_____ DATE:_____
CHECKED BY:_____ DATE:_____
FILE SPEC.:_____

Ecosystem Enhancement PROGRAM

April 23, 2013

Mr. Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

U-3615B, SR 1820 (Skeet Club Road) from East of SR 1818 (Johnston Street) to West of NC 68, Guilford County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the stream and riparian wetland mitigation and buffer mitigation for the subject project. Based on the information supplied by you on April 19 and 23, 2013, the stream and riparian wetland impacts are located in CU 03030003 of the Cape Fear River basin in the Central Piedmont (CP) Eco-Region, and are as follows:

Stream and Wetlands	River Basin	CU Location	Eco-Region	Stream			Wetlands		
				Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh
Impacts	Cape Fear	03030003	CP	0	0	1,228.0	0.82	0	0

*Some of the stream and wetland impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details.

EEP's willingness to accept payment for the above impact is conditional and subject to the approval of the use of alternative mitigation options by the Division of Water Quality. All buffer mitigation requests and approvals are administrated through the Riparian Restoration Buffer Fund. The NCDOT will be responsible to ensure that appropriate compensation for the buffer mitigation will be provided in the agreed upon method of fund transfer. Upon receipt of the NCDWQ's Buffer Authorization Certification, EEP will transfer funds from the NCDOT 2984 Fund into the Riparian Restoration Buffer Fund. Upon completion of transfer payment, NCDOT will have completed its riparian buffer mitigation responsibility for TIP Number U-3615B. Subsequently, EEP will conduct a review of current NCDOT ILF Program mitigation projects in the river basin to determine if available buffer mitigation credits exist. If there are buffer mitigation credits available, then the Riparian Restoration Buffer Fund will purchase the appropriate amount of buffer mitigation credits from NCDOT ILF Program.

Buffer	River Basin / CU	Watershed	Eco-Region	Buffer		
				Zone 1	Zone 2	TOTAL
Impacts	Cape Fear / 03030003	Randleman	CP	58,691.0	42,264.0	100,955.0

EEP commits to implementing sufficient compensatory stream and riparian wetland mitigation credits and mitigation for the buffer impacts to offset the impacts associated with this project as determined by the regulatory agencies in accordance with the N.C. Department of Environment and Natural Resources' Ecosystem Enhancement Program In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-707-8420.

Sincerely,

James B. Stanfill
EEP Asset Management Supervisor

Cc: Mr. Andy Williams, USACE – Raleigh Regulatory Field Office
Ms. Amy Chapman, NC Division of Water Quality
File: U-3615B

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: U-3615B **County(ies):** Guilford

General Project Information

Project No.:	U-3615B	**Project Type:**	Roadway Widening	**Date:**	10/8/2012
NCDOT Contact:	Randy Henegar	**Contractor / Designer:**	Randy Henegar		
Address:	1590 Mail Service Center Raleigh, NC 27699-1590	**Address:**			
Phone:	(919)-707-6726	**Phone:**	(919)-707-6726		
Email:	rhenegar@ncdot.gov	**Email:**	rhenegar@ncdot.gov		
City/Town:	High Point	**County(ies):**	Guilford		
River Basin(s):	Cape Fear	**CAMA County?**	No		
Primary Receiving Water:	Oak Hollow Lake	**NCDWQ Stream Index No.:**	17-3-(0.7)		
NCDWQ Surface Water Classification for Primary Receiving Water	**Primary:**	Water Supply IV (WS-IV)			
	Supplemental:				
Other Stream Classification:	None				
303(d) Impairments:	None				
Buffer Rules in Effect	Randleman Lake				

Project Description

Project Length (lin. Miles or feet):	3.478 mi.	**Surrounding Land Use:**	Residential/Commercial

	Proposed Project	**Existing Site**
Project Built-Upon Area (ac.)	ac.	ac.
Typical Cross Section Description:	4 LANE CURB AND GUTTER	2 LANE SHOULDER SECTION
Average Daily Traffic (veh/hr/day):	Design/Future: 9600	Existing: 9600
General Project Narrative:	Widening of SR 1820 (Skeet Club Road) from West of SR 1818 (Johnson Street) to NC 68 (Eastchester Drive). This project will be adding hazardous spill basins throughout the project all having sluice gates and some of which are equiped with level spreaders, grass swales, and/or a bypass pipe. Preformed scour holes and grass swales where utilized where appropriate.	

References

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

(Version 1.2; Released July 2012) FOR LINEAR ROADWAY PROJECTS

Project/TIP No.: U-3615B **County(ies):** Guilford

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
4&5	170+67-L- (LT & RT)	Stream	Perennial						Culvert		
4&5	170+06 -L- (LT&RT) 172+39 -L- (LT&RT)	Buffer	Randleman Lake						Culvert		
5&6	180+59 -L- (LT&RT) 188+46 -L- (LT&RT)	Stream	Perennial						Culvert & Fill		
5&6	177+99 -L- (LT) 187+30 -L- (LT)	Buffer	Randleman Lake						Fill		
6	187+99 -L- (LT) 188+46 -L- (LT)	Open Water	Perennial						Fill		
6	187+45 -L- (LT) 196+55-L- (LT)	Buffer	Randleman Lake						Fill		
6&7	197+50 -L- (LT) 204+26 -L- (LT)	Stream	Perennial						Fill		
6&7	197+50 -L- (LT) 205+22-L- (LT)	Buffer	Randleman Lake						Fill		
7	199+27 -L-(RT) 199+95 -L- (LT)	Stream	Perennial						Culvert		
7	198+75 -L-(RT) 200+23 -L-(RT)	Buffer	Randleman Lake						Culvert		
7	208+63 -L- (LT)	Stream	Perennial						Culvert		
7	208+02 -L-(LT) 209+14 -L-(LT)	Stream	Perennial						Culvert		
8	218+72-L- (LT&RT) 219+72 -L- (LT&RT)	Wetland	Riverine Swamp Forest						Fill		
8	221+97 -L-(LT) 222+25 -L-(LT)	Stream	Perennial						Excavation		
8	221+87 -L-(LT) 223+01 -L-(LT)	Buffer	Perennial						Excavation		
9	231+60-L-(RT) 232+27-L-(LT)	Stream	Perennial						Excavation/Fill & Culvert		
9	230+94-L-(LT) 232+87-L-(RT)	Buffer	Randleman Lake								

* 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

Project/TIP No.: U-3615B **County(ies):** Guilford

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
9	232+00-L- (LT) 232+80-L-(LT)	Wetland	Unknown						Fill		
9	232+87-L-(LT) 236+40-L-(LT)	Open Water	Lake						Fill & Stabilization		
9	232+87-L-(LT) 236+40-L-(LT)	Buffer	N/A								
9	237+28 -L- 239+38 -L-	Open Water	Lake						Fill & Stablilization		
9&10	237+28-L-(LT) 239+38-L-(LT)	Buffer	Randleman Lake						Fill & Stablilization		
10	240+14-L- (LT) 240+31-L-(LT)	Wetland	Non-Riverine Swamp Forest						Fill Stablilization Clearing		
10	240+18-L- (RT) 240+35-L-(RT)	Open Water	Lake						Excavation		
10	240+18-L- (RT) 240+81-L-(RT)	Buffer	Randleman Lake						Excavation		
10	12+20 -Y35- (LT & RT)	Open Water & Stream	Lake & Perennial						Culvert		
10	11+52-L- (RT) 12+86-L- (LT)	Buffer	Randleman Lake						Culvert		
10	246+25 -L- (LT) 246+54 -L- (LT)	Stream	Perennial						Temp. Excavation		
10	246+09 -L- (LT) 246+54 -L- (LT)	Buffer	Randleman Lake						Excavation		
11	266+36 -L- (LT & RT)	Stream	Perennial						Culvert		
11	265+24-L- (LT) 266+91 -L-(RT)	Buffer	Randleman Lake						Fill/Excavation/ Stabilization/Cl		
12	273+60 -L- (RT)	Stream	Perennial						Temp. Excavation		
12	271+16-L-(RT) 273+92-L-(RT)	Buffer	Randleman Lake						Excavation & Clearing		
12	275+43-L-(RT) 276+59-L-(RT)	Open Water	Pond						Fill & Stablilization		

* 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.: U-3615B **County(ies):** Guilford

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
6	183+73 -L- 185+78-L-	186+01 -L-	2.0	3:1	3:1	2.43	243	192	0.30%	9.2	1.3	11.7	1.7	No
6	186+57 -L_ 185+78 -L-	186+01 -L-	2.0	3:1	3:1	0.62	62	76	0.40%	2.3	0.5	3.0	0.6	No
6	189+53 -L- 190+45 -L-	N/A	2.0	3:1	3:1	0.78	78	90	0.56%	3.0	1.5	3.8	1.6	No
9	234+68 -L- 231+65 -L-	231+98 -L-	0.0	3:1	3:1	3.00	300	323	0.54%	8.8	1.9	11.2	2.0	No
10	246+15 -L- 246+41 -L-	N/A	2.0	3:1	3:1	3.51	351	87	0.30%	13.3	1.7	16.9	1.8	No
16	329+27 -L- 331+59 -L-	N/A	4.0	4:1	3:1	2.00	200	232	0.80%	7.7	2.0	9.8	2.1	No
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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

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: U-3615B **County(ies):** Guilford

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)
4	176+40 -L- (LT)	PFSH	Class 'B'	2.60	Pipe	18	8.0	4.0
9	11+34 -Y34- (LT)	PFSH	Class 'B'	0.30	Pipe	15	1.5	1.2
10	13+18 -Y35- (LT)	PFSH	Class 'B'	0.10	Pipe	15	0.5	0.4

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.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

December 17, 2012

MEMORANDUM TO: M. Penney, Project Development Engineer

FROM: Deanna Riffey, Environmental Specialist

SUBJECT: Protected Species Update for U-3615 A
Guilford County: SR 1820 (Skeet Club Rd) from US 311 to East of SR 1818 (Johnston St.)

This memo serves to update the status of the federally protected species for the above referenced project.

Species: Small whorled pogonia, (*Isotria medeoloides*)

Survey Date: 5/21/08

Habitat Description/ Survey Information: Suitable habitat was not present within this section of the project. Suitable habitat consists of forested areas with north and east facing slopes with little to no understory with occasional breaks in the canopy allowing sunlight to reach the forest floor. South and west facing slopes could potentially provide habitat as well. Habitat was not suitable within this section of project study area due to areas having a densely populated forest floor or being early successional forests lacking available sunlight on the forest floor and manicured lawn areas. In addition to the survey, a review of NCNHP (updated July 1, 2010) revealed no known occurrences of this species within 1.0 mile of the project. Based on the lack of habitat and the lack of known occurrences within 1.0 mile of the project, a biological conclusion of No Effect has been rendered for this species.

Length of Survey: 2 Person Hours

Biological Conclusion: No Effect

Principal Investigators (please see attachment for qualifications):
Deanna Riffey
Sara Easterly
Kris Dramby
James Mason

If you have any questions, please contact Deanna Riffey at driffey@ncdot.gov or 919-707-6151.

MAILING ADDRESS:
N.C. DEPARTMENT OF TRANSPORTATION
PDEA – NATURAL ENVIRONMENT SECTION
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-707-6100

FAX: 919-212-5785

WEBSITE: WWW.NCDOT.ORG

PHYSICAL ADDRESS:
CENTURY CENTER – BUILDING B
1020 BIRCH RIDGE DR.
RALEIGH, NC 27610-4328

Qualifications of Principal Investigators

Investigator: Deanna Riffey
Education: B.S. Biology, University of Tennessee
M.S. Environmental Health Science, East Tennessee State University

Experience: Environmental Supervisor, NCDOT, Raleigh, NC, 6/05 to Present.
Environmental Specialist, NCDOT, Raleigh, NC, 10/03 to 6/05.
Environmental & Safety Compliance Officer, City of Bristol, VA, 9/96 to 10/03.

Investigator: Sara Easterly
Education: B.A. Biology, Carson Newman College
Master of Environmental Health Science, East Tennessee State University

Experience: Environmental Specialist, NCDOT, Raleigh, NC, January 2006-January 2012.
Environmental, Health & Safety Compliance Specialist, ARCADIS, Durham, NC, May 2000-January 2006.

Investigator: Kris Dramby
Education: Graduate Certificate, Natural Resource Management, Virginia Tech, 2005
B.S. Biology (Concentration in Wildlife Ecology), Towson University, 2000
Certification: Professional Wetland Scientist (Society of Wetland Scientists)
Certified Ecologist (Ecological Society of America)

Experience: Environmental Biologist, NCDOT, April 2006-April 2011.
Ecologist, Williamsburg Environmental Group, March 2001-March 2006
Wildland Firefighter, USFS, Salmon-Challis National Forest, Salmon, Idaho, September 2000
Wildlife Technician, USFS, Allegheny National Forest, April 2000- September 2000
Wildlife Technician, Howard County Parks & Recreation, April 1999- August 1999

Investigator: James Mason
Education: B.A., Biology, Colby College
M.S., Biology/Ecology, University of North Carolina at Charlotte

Experience: Environmental Specialist, NCDOT, Raleigh, NC, June 2006 to Present
Coastal Waterbird Monitor, Massachusetts Audubon Society, Westport, MA, 04/05 to 08/05
Osprey Monitor, Project Osprey Watch, Martha's Vineyard, MA, 05/02 to 08/02
Coastal Waterbird Monitor, Massachusetts Audubon Society, Barnstable, MA, 04/01 to 08/01

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

December 17, 2012

MEMORANDUM TO: M. Penney, Project Development Engineer

FROM: Deanna Riffey, Environmental Specialist

SUBJECT: Protected Species Update for U-3615 B
Guilford County: SR 1820 (Skeet Club Rd) from East of SR 1818 (Johnston St) to West of NC 68 (Eastchester Dr.).

This memo serves to update the status of the federally protected species for the above referenced project.

Species: Small whorled pogonia, (*Isotria medeoloides*)

Survey Date: 5/21/2008

Habitat Description/ Survey Information: As of January 31, 2008, the U.S. Fish and Wildlife Service (USFWS) lists one federally protected species for Guilford County: Small whorled pogonia (Isotria medeoloides). A species description and biological conclusion for the small whorled pogonia was not stated in either the EA or FONSI because the species was not added to the USFWS county list of protected species until after the documents were completed. A survey was done for the small whorled pogonia by NCDOT biologists in May 2008. Suitable habitat was present within the project area. Habitat consisted of forested areas with north and east facing slopes with little to no understory with occasional breaks in the canopy allowing sunlight to reach the forest floor. However, south and west facing slopes were also surveyed if preferred habitat conditions were present. Small whorled pogonia was not found within in the project area and a biological conclusion of No Effect was given. A search of the North Carolina Natural Heritage Database (NCNHP; updated August 2011) revealed no known occurrences of the federally protected species within 1.0 mile of the limits of this project. Therefore, the biological conclusion of No Effect remains valid for the small whorled pogonia.

Length of Survey: 4 Person Hours

Biological Conclusion: No Effect, but Habitat Present
Principal Investigators (please see attachment for qualifications):
Deanna Riffey
Sara Easterly
James Mason
Kris Dramby

If you have any questions, please contact Deanna Riffey at driffey@ncdot.gov or 919-707-6151.

MAILING ADDRESS:
N.C. DEPARTMENT OF TRANSPORTATION
PDEA – NATURAL ENVIRONMENT SECTION
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-707-6100

FAX: 919-212-5785

WEBSITE: WWW.NCDOT.ORG

PHYSICAL ADDRESS:
CENTURY CENTER – BUILDING B
1020 BIRCH RIDGE DR.
RALEIGH, NC 27610-4328

Qualifications of Principal Investigators

Investigator: Deanna Riffey
Education: B.S. Biology, University of Tennessee
M.S. Environmental Health Science, East Tennessee State University

Experience: Environmental Supervisor, NCDOT, Raleigh, NC, 6/05 to Present.
Environmental Specialist, NCDOT, Raleigh, NC, 10/03 to 6/05.
Environmental & Safety Compliance Officer, City of Bristol, VA, 9/96 to 10/03.

Investigator: Sara Easterly
Education: B.A. Biology, Carson Newman College
Master of Environmental Health Science, East Tennessee State University

Experience: Environmental Specialist, NCDOT, Raleigh, NC, January 2006-January 2012.
Environmental, Health & Safety Compliance Specialist, ARCADIS, Durham, NC, May 2000-January 2006.

Investigator: James Mason
Education: B.A., Biology, Colby College
M.S., Biology/Ecology, University of North Carolina at Charlotte

Experience: Environmental Specialist, NCDOT, Raleigh, NC, June 2006 to Present
Coastal Waterbird Monitor, Massachusetts Audubon Society, Westport, MA, 04/05 to 08/05
Osprey Monitor, Project Osprey Watch, Martha's Vineyard, MA, 05/02 to 08/02
Coastal Waterbird Monitor, Massachusetts Audubon Society, Barnstable, MA, 04/01 to 08/01

Investigator: Kris Dramby
Education: Graduate Certificate, Natural Resource Management, Virginia Tech, 2005
B.S. Biology (Concentration in Wildlife Ecology), Towson University, 2000
Certification: Professional Wetland Scientist (Society of Wetland Scientists)
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Ecologist, Williamsburg Environmental Group, March 2001-March 2006
Wildland Firefighter, USFS, Salmon-Challis National Forest, Salmon, Idaho, September 2000
Wildlife Technician, USFS, Allegheny National Forest, April 2000- September 2000
Wildlife Technician, Howard County Parks & Recreation, April 1999- August 1999

North Carolina Department of Cultural Resources

State Historic Preservation Office

Peter B. Sandbeck, Administrator

Beverly Eaves Perdue, Governor
Linda A. Carlisle, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

September 24, 2010

MEMORANDUM

To: Mary Pope Furr, Architectural Historian
NCDOT/PDEA/HEU

From: Peter Sandbeck

Re: Intensive evaluation of the Elihu and Abigail Mendenhall House, Improvements to US 311, U-3615, High Point, Guilford County, CH03-0404

Thank you for your letter of September 8, 2010, transmitting the above referenced evaluation for the Mendenhall House. Members of my staff reviewed the updated evaluation and visited the site on September 22, 2010 to get a better understanding the property and its setting. Based on the report and site visit, we reaffirm our concurrence with the North Carolina Department of Transportation (NCDOT) that the property is eligible for listing in the National Register of Historic Places under Criterion B for it association with prominent Quakers Elihu and Abigail Mendenhall and under Criterion C for it Greek Revival-style architecture. We also believe that it is eligible for listing under Criterion D as the spring house site is likely to yield information important to a better understanding of this early building type and its contribution to the history of the property. The proposed boundaries appear appropriate for this property.

We are also in receipt of a September 14, 2010, letter from the City of High Point's Mayor Rebecca Smothers, inviting us to participate in a meeting to discuss the boundaries of this property. As NCDOT and the Federal Highway Administration are the agencies responsible for identifying historic properties as part of the planning process for federally-funded transportation improvements, we would appreciate your responding to Mayor Smothers and arranging such a meeting, if appropriate. We will be happy to attend the meeting, if requested.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Mayor Rebecca Smothers
Donnie Brew, FHWA
Jeffrey Crow, SHPO

North Carolina Department of Cultural Resources

State Historic Preservation Office

Peter B. Sandbeck, Administrator

Beverly Eaves Perdue, Governor
Linda A. Carlisle, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

September 27, 2010

The Honorable Rebecca Smothers, Mayor
City of High Point
PO Box 230
High Point, NC 27261

RE: Historic Site Boundaries for Elihu and Abigail Mendenhall House, Skeet Club Road, High Point, Guilford County, ER03-0404

Dear Mayor Smothers:

Thank you for your September 14, 2010, letter concerning the above referenced property. We recently responded to the North Carolina Department of Transportation's reevaluation of the Mendenhall property's National Register eligibility and enclose a copy of our memorandum for your review.

As the proposed improvements of Skeet Club Road are a federally-funded undertaking, the Federal Highway Administration and North Carolina Department of Transportation are the agencies responsible for carrying out the regulatory process related to historic properties. We have asked them to discuss this matter with you and set up the requested meeting, if appropriate. We will be happy to attend any such meeting once scheduled.

Sincerely,

Renee Gledhill-Earley

Renee Gledhill-Earley
Environmental Review Coordinator

Enclosure

cc: Donnie Brew, FHWA
Mary Pope Furr, NCDOT
Jeffrey Crow, SHPO
Peter Sandbeck, DSHPO

Form Revised 6-10-92

North Carolina Department of Transportation
PROJECT ENVIRONMENTAL CONSULTATION FORM
I.D. No. U-3615

I. GENERAL INFORMATION

a.	Consultation Phase:	Right of Way	
b.	Project Description	SR 1820 (Skeet Club Road) – SR1003 (North Main Street) US 311 to NC 68 (Eastchester Drive), in Guilford County	
c.	WBS: State Project: Federal Project:	34962.1.1 8.2494701 STP-1820(2)	
d.	Document Type:	EA	December 2002 Date
		FONSI	May 2004 Date

II. CONCLUSIONS

The above environmental document has been reevaluated as required by 23 CFR 771. It was determined that the current proposed action is essentially the same as the original proposed action. Proposed changes are noted below in Section III. It has been determined that anticipated social, economic, and environmental impacts were accurately described in the above referenced document(s) unless noted otherwise herein. Therefore, the original Administration Action remains valid.

III. CHANGES IN PROPOSED ACTION AND ENVIRONMENTAL CONSEQUENCES

Property owned by the City of High Point at Oak Hollow Lake was purchased with grants from the US Department of Interior. That property is protected by Section 6(f)(3) of the Land and Water Conservation Fund (LWCF) Act of 1965. Right of way needs of this property for this project will be a LWCF Conversion. NC Department of Environment and Natural Resources, Division of Parks and Recreation, must approve mitigation by replacement with property of equal value. This project commitment has been added to the green sheets.

There are no significant changes that affect the FONSI. The Finding of No Significant Impact remains valid.

IV. LIST OF ENVIRONMENTAL COMMITMENTS

D.O.T. will implement all practical measures and procedures to minimize and avoid environmental impacts. (See attached project commitments.)

V. COORDINATION

Project Development and Environmental Analysis Branch personnel have discussed current project proposals with others as follows:

Design Engineer:	David Scheffel	February 3, 2009 Date
FHWA Engineer:	Felix Davila	December 19, 2008 Date
Permits Section:	Deanna Riffey	June 20, 2008 Date

VI. NCDOT CONCURRENCE

Richard Helms — 2/12/09

Project Planning Engineer — Date

Beverly Robinson — 2/12/09

Project Engineer — Date

VII. FHWA CONCURRENCE

for Felix Davila — 2-17-09

Federal Highway Administration — Date
Division Administrator

PROJECT COMMITMENTS
SR 1003 (North Main Street)-
SR 1820 (Skeet Club Road)
US311 To NC 68 (Eastchester Drive), Guilford County
Federal Aid Project No. STP-1820(2)
State Project No. 8.2494701
WBS Project No. 34962.1.1
T.I.P. Project No. U-3615

Structure Design Unit / Roadside Environmental Unit / Division Construction Engineer

For the removal of bridge #65 over Oak Hollow Lake, Best Management Practices will be employed to minimize sediment distribution downstream in the lake. Care will be taken in the removal of the bridge, and the removal of erosion control or sediment control devices so that sediment is not released downstream in the lake.

This is a standard operating procedure.

Roadway Design Unit

The Elihu Mendenhall property, a 4(f) resource, will be impacted with temporary easements. These easements will be needed only during the construction of the project. The easements will not cause permanent or adverse physical impacts, or interfere with the activities or purposes of the Farmstead. A note will be added to the roadway design plans and/or project special provisions instructing the contractor to fully restore each easement area to a condition equal to or better than what existed prior to the project. As specified in 23 CFR 771.135, the temporary easements will not constitute a use of property from the Farmstead within the meaning of Section 4(f), and a Section 4(f) Evaluation is not required. However, if modifications during final design result in any of the above conditions not being met, then a 4(f) evaluation will be required.

A note instructing the contractor to fully restore each easement in the area of Elihu Mendenhall property to a condition equal to or greater than what existed prior to the project was not included on the Right of Way Plans or in the Project Special Provisions. Roadway agreed the note will be added to the plans.

Hydraulics Unit / Project Development and Environmental Analysis Branch

Any impacts to wetlands, streams, and buffers must comply with the Randleman Buffer Rules, 404/401 regulations, water supply regulations (15A NCAC 2B .0216), and any other required federal, state, and local regulations.

This is a standard operating procedure.

Geotechnical Unit
It is anticipated that the proposed widening of Skeet Club Road will encroach on one property identified as an underground storage tank (UST) site. This impacted site will be further evaluated prior to right of way acquisition.

There are three (3) UST sites identified by NCDOT Geotechnical Unit that may be impacted by the proposed widening. 1) Bizzy Bee Grocery II at 3802 North Main Street 2) Dixon Produce at 3300 North Main Street 3) Former Tan Safeway at 3301 North Main Street. All three sites will be evaluated prior to acquisition.

Hydraulics Unit
Hazardous spill basins will be required on any part of the project that falls within a 0.5 mile of the Critical Area of the Water Supply Watershed.

Hazardous spill basins have been included in the Right of Way Plans as needed.

Hydraulics Unit / Structure Design Unit
In association with the replacement of Bridge #65, no deck drains will be allowed to discharge directly into Oak Hollow Lake.

Bridge design of Bridge #65 is complete and does not have deck drains.

Project Development and Environmental Analysis Branch
The noise analysis in this report assumed a worst-case scenario of a 4-lane median divided typical section. It is anticipated that the final recommendation on the typical section may reduce the number of impacted noise receptors. Once the typical section recommendation has been determined, the number of impacted noise receptors will be re-calculated and reported in the final environmental document.

A revised noise report has been completed and is summarized in Section V of the FONSI.

Project Development and Environmental Analysis Branch
In the area of the Historic Spring House, in order to accommodate for the widening of the road and avoid impacts to the Spring House ruins, two avoidance alternatives have been developed. Until final designs are complete, it cannot be determined at this time which alternate will be used. The State Historic Preservation Officer issued a determination of "no effect" for Alternative 1 (1:1 slope), and a determination of "adverse effect" for Alternative 2 (retaining wall) (see pages B-1 and B-2 in Appendix B for concurrence forms). Once more detailed survey and soils information is obtained, an alternative will be selected, and the project's impact on this 4(f) resource will be re-evaluated. If the "adverse effect" alternative is selected, a Memorandum of Agreement (MOA) will have to be issued. Impacts associated with the selected alternative will be included in the final environmental document.

After investigating the soils in the area of the Spring House Ruins, it was determined that a 2:1 slope could be utilized. After presenting this information to the SHPO, it was determined that the slope alternative would result in "no adverse effect" on the historic property, and the retaining wall alternative (which includes a handrail and guardrail) would result in an "adverse effect". Although the slope would impact the site, it would act as a protective covering for the Spring House. This decision was made with the condition that archaeological monitoring be provided during fill and construction of the project (see Appendix B in the FONSI, pages B-1 and B-2 for concurrence form). The retaining wall alternative was seen as a least desirable alternative due to the fact that the guardrail, handrail, and size and appearance of the retaining wall would not be consistent with the historic and rural nature of the National Register Property.

Right of Way Unit

Properties owned by the City of High Point at Oak Hollow Lake were purchased with grants from the US Department of Interior. That property is protected by Section 6(f)(3) of the Land and Water Conservation Fund (LWCF) Act of 1965. Rights of way needs of this property for this project are a LWCF Conversion. NC Department of Environment and Natural Resources, Division of Parks and Recreation, and the US Department of Interior have approved of the mitigation by replacement with property of equal value.

See the City of High Point Conversion attachment to the Consultation for U-3615 of February 2009.

The above referenced properties of Oak Hollow Lake are protected by Section 4(f). They are qualified as Deminimus.

See the City of High Point Letter of March 15, 2007 and the published Public Notice of January 2, 2009 attached to the Consultation of February 2009.

North Carolina Department of Environment and Natural Resources
Division of Parks and Recreation

Beverly Eaves Perdue, Governor | Dee Freeman, Secretary | Lewis Ledford, Director

February 2, 2009

Mr. Allen Oliver
High Point Parks and Recreation Department
1560 North Main Street, Suite 201
High Point, North Carolina 27262

SUBJECT: Section 6(f)(3) Conversion Approval for Oak Hollow Park Park, LWCF # 37-00174, Amendment # 19

Dear Mr. Oliver:

The State of North Carolina has received approval from the National Park Service (NPS) for the city's request to convert 6.36 acres at Oak Hollow Park and to replace it with 1.23 acres located along the eastern border of the park. The conversion will allow the N.C. Department of Transportation to widen Skeet Club Road in order to increase traffic capacity and to improve safety.

To complete the conversion process, the city will be require to place an "affidavit/notification of limitation of use" statement as part of the deed for the replacement property. The statement should include language such as "the property identified has been acquired with federal Land and Water Conservation Fund assistance from the National Park Service and pursuant to the requirements of that program must be used for public outdoor recreation purposes only in perpetuity."

Once the property have been transferred and the notice of limitation of use statement placed on the deed, three (3) copies of the deed are required to be sent to the State.

The conversion will be officially completed once the deeds are received by the State. We have enclosed a copy of the approved NPS conversion amendment for the city's Oak Hollow Park LWCF project file.

If you have any questions, please contact your regional consultant Vonda Martin at (336) 771-5065.

Sincerely,

John C. Poole
Grants Program Manager

cc: Vonda Martin, RRS

1615 Mail Service Center, Raleigh, North Carolina 27699-1615
Phone: 919-733-4181 | FAX: 919-715-3085 | Internet: www.ncparks.gov

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UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

STATE North Carolina

Project Amendment No. 19

AMENDMENT TO PROJECT AGREEMENT

(OMB No. 1024-0033, August 31, 2010)

THIS AMENDMENT To Project Agreement No. 37-00174 is hereby made and agreed upon by the United States of America, acting through the Director of the National Park Service and by the State of North Carolina pursuant to the Land and Water Conservation Fund Act of 1965, 78 Stat. 897 (1964).

The State and the United States, in mutual consideration of the promises made herein and in the agreement of which this is an amendment, do promise as follows:

That the above mentioned agreement is amended by adding the following:

In accordance with Section 6(f)(3), N.C. DENR requests to delete 6.36 acres valued at $ 87,200 and to replace the land with 1.23 acres valued at $ 93,000.

In all other respects the agreement of which this is an amendment, and the plans and specifications relevant thereto, shall remain in full force and effect. In witness thereof the parties hereto have executed this amendment as of the date entered below.

THE UNITED STATES OF AMERICA

By _____
(Signature)
Chief, Recreation Programs Branch
(Title)

National Park Service
United States Department of the Interior

Date 1-22-09

STATE

North Carolina
(State)

By _____
(Signature)

Lewis Ledford
(Name)

State Liaison Officer
(Title)

Estimated Burden Statement: The public reporting burden for this collection of information is estimated to average 3 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form should be sent to the National Park Service, State and Local Assistance Programs Division, 1849 C Street NW, Washington, DC 20240.

Paperwork Reduction Act Statement: This form is necessary to provide data input into an NPS project database which provides timely data on projects funded over the life of the program. Such data is used to monitor project progress and to analyze program trends. A Federal Agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Any comments on the burden estimate or other aspects of this collection of information may be addressed to the National Park Service, State and Local Assistance Programs Division, 1849 C Street NW, Washington, DC 20240.

NPS 10-902A (July 1981)

Parks & Recreation Department

Director

NORTH CAROLINA'S INTERNATIONAL CITY™

March 15, 2007

Mr. Gregory J. Thorpe, Ph.D., Manager
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Subject: Finding of No Adverse Affect to the recreational use of Oak Hollow Lake Recreation Park by NCDOT TIP Project U-3615B

Dear Mr. Thorpe:

The City of High Point confirms the finding that the proposed Skeet Club Road widening project will have no adverse affect on the Oak Hollow Lake Recreation Area. We agree that the impacts from the proposed project to be *de minimis*.

This letter will satisfy the requirement of Section 4(f) of the U. S. Department of Transportation Act of 1966.

If you or your staff needs additional information concerning this project, you can contact, me by email at allen.oliver@highpointnc.gov or by phone at (336) 883-3473.

Yours truly,

Allen Oliver, Director
City of High Point
Parks and Recreation Department

AO/gnr

cc: Pat Pate, Assistant City Manager
Kathy White, Recreation Resource Services
Phil Wylie, Transportation Director

1560 North Main Street, Suite 201 • P.O. Box 230 • High Point, NC • 27262 • USA
Phone: 336-883-3469 • Fax: 336-883-3281 • www.high-point.net/pr

PUBLIC NOTICE OF OAK HOLLOW PARK PROPERTY
CONVERSION AT SKEET CLUB ROAD IN HIGH POINT

TIP Project No. U-3615 Guilford County

The North Carolina Department of Transportation (NCDOT) is acquiring 3.39 acres of land adjacent to existing Skeet Club Road at Oak Hollow Park from the City of High Point. This property will be used as a part of the proposed improvements to Skeet Club Road. Improvements include widening Skeet Club Road to a multi-lane facility.

The purpose of this public notice is to allow the public an opportunity to comment on the use of the acquired property for the highway improvements. Right of Way acquisition is currently scheduled to begin in 2009 with construction scheduled to begin in 2011.

Comments will be received for 30 days from the first publishing date of this notice. Please send comments to Richard Helms, Project Development and Environmental Analysis Branch at 1548 Mail Service Center, Raleigh, NC 27699-1548. Anyone desiring additional information may contact Richard Helms by mail as noted above, by email at rhelms@ncdot.gov, or by phone at (919) 733-3141.

Minutes of the 30% Hydraulic Design Review (4b) Meeting on September 21, 2005 for U-3615B, Guilford County

Participant:

Team Members:
Randy Henegar, NCDOT Hydraulics (present)
John Thomas, USACE (present)
Sue Homewood, NCDWQ (present)
Eric Midkiff, NCDOT PD&EA (absent)
Travis Wilson, NCWRC (present)
Gary Jordan, USFWS (absent)
Chris Militscher, EPA (absent)
Deanna Riffey, NCDOT NEU(present)
Brad Wall, NCDOT Division 7 (absent)
David Scheffel, NCDOT Roadway (present)
Donnie Brew, FHWA (present)

Other Attendees
John Frye, NCDOT Structures
John Hennessy, NCDWQ
Paul Fisher, NCDOT Hydraulics
Shawn Harris, NCDOT Hydraulics

It should be noted that the Concurrence Points 2A and 4A meetings for this project have been held on 3/11/04. Concurrence was reached and a signed concurrence form was sent out to attendees with minutes from this meeting. The 4B meeting commenced at approximately 2:30 p.m. Randy Henegar (NCDOT Hydraulics Unit) began by providing an overview of the project noting that this was a continuation of U-3615A, but that most of this project would have Hazardous Spill Basins due to the proximity to Oak Hollow Lake (which is the City of High Point's water supply source.) Comments were as follows:

U-3615B

1. Plan Sheet #4: John Hennessy made the general comment that if NCDOT is going to use a splitter box before a level spreader, they should document the full design length of the level spreader without a splitter box and a reason why that was impractical to construct.

2. Plan Sheet #5: No Comments.

3. Plan Sheet #6: NCDOT will use 1.5:1 fill slopes at the pond near –L- Rev. Sta. 189+00 (LT) to minimize surface water impacts.

4. Plan Sheet #7: Add Buffer limits on UT-6.

5. Plan Sheet #8: Two small wetlands shown on plans are "isolated wetlands".

6. Plan Sheet #9: No Comments.

7. Plan Sheet # 10: There are no buffers around the pond near –L- Rev. Sta. 248+50 (RT).

8. Plan Sheet #11: Although the system has not yet been designed, Randy Henegar described the intention of keeping the off-site water in a separate system and discharging it directly into the stream inside the Transportation Facility. Everyone was in general agreement with this concept, which applies throughout the project.

9. Plan Sheet # 12: Since this part of the project has not yet been designed, NCDOT agreed to notify Sue Homewood of any potential conflicts before the 4C Meeting. Everyone in attendance was in agreement that there would be no buffers on the existing stormwater pond near –L- Sta. 275+00 (RT).

10. Plan Sheet # 13: No Comments.

11. Plan Sheet # 14: Everyone in attendance was in agreement that there would be no buffer on the stormwater outfall near –L- Sta. 305+50 (RT).

12. Plan Sheet # 15: Deanna Riffey and Sue Homewood agreed to investigate the buffer status of the stormwater outfall near –L- Sta. 315+00 (RT), and report back to NCDOT Hydraulics Unit.

13. Plan Sheet # 16: No Comments.

14. Plan Sheet # 17: NCDOT Hydraulics Unit indicated that they were going to try and treat their water from Skeet Club Road prior to discharging into UT-13, which is classified as Perennial.

No further comments were recorded, and the meeting adjourned at 3:45 p.m.

Minutes of the Interagency Hydraulic Design Review (4c) Meeting on September 12, 2012 for U-3615B, Guilford County

Participant:

Team Members:

Randy Henegar, NCDOT Hydraulics (present)
Thomas Brown, USACE (present)
Amy Euliss, NCDWQ (present)
Michael Penney, NCDOT PD&EA (present)
Travis Wilson, NCWRC (absent)
Gary Jordan, USFWS (absent)
Chris Militscher, EPA (telephone conference call)
Deanna Riffey, NCDOT NEU(present)
Brad Wall, NCDOT Division 7 (absent)
Tatia White, NCDOT Engineering Coordination(present)
Felix Davila, FHWA (present)

Other Attendees

Ting Fang, NCDOT Structures
Rachelle Beauregard, NCDOT NES
Paul Fisher, NCDOT Hydraulics
Shawn Harris, NCDOT Hydraulics
Barney Blackburn, NCDOT REU
Jennifer Parish, NCDOT REU
LeiLani Paugh, NCDOT NEU
Jason Elliott, NCDOT NEU

It should be noted that the 30% Hydraulic Design Review (4b) meeting for this project was held on 9/21/05. The 4C meeting commenced at approximately 10:30 a.m. Randy Henegar (NCDOT Hydraulics Unit) began by noting that this was a continuation of U-3615A, but that most of this project would have Hazardous Spill Basins due to the proximity to Oak Hollow Lake (which is the City of High Point's water supply source.) Comments were as follows:

U-3615B

1. Cover Sheet: The Let Date on the plans, October 15, 2013 is the current scheduled Let Date. The Engineer has changed from Wang Engineering to Wetherill Engineering.

2. Plan Sheet #5: The area between Sites 1 & 2 that encompasses the stream buffers and is in the Right-of-Way will be a Preservation Site.

3. Plan Sheet #6: Designate the pond impacts as Site 2A. This will help separate stream impacts from open water pond impacts.

4. Plan Sheet #7: Show impacts at the inlet of the 2 @ 54" and add a Site number for this.

5. Plan Sheet #8: Do a "total take" on the wetlands near –L- Sta. 219+00.

6. Plan Sheet #9: Do a Blow-Up to better show impacts near –L- Sta. 232+00. Have Location and Surveys extend the JS line from the inlet of the 30" pipe to the south. Separate the stream impacts from the open water impacts. Note on plans that there will be no direct discharge from the bridge to the water.

7. Plan Sheet # 10: There are no buffers around the pond near –L- Rev. Sta. 248+50 (RT).

8. Plan Sheet #11: Randy Henegar described the separate systems for off-site water and project water. The off-site system will discharge directly into the stream inside the Transportation Facility. Everyone was in general

agreement with this concept, which applies throughout the project. Provide a Blow-Up of the 8' x8' box culvert impacts for clarity.

9. Plan Sheet # 12: The stream at the outlet of the 24" pipe should be shown as a JS. There would be no buffer on the existing stormwater pond near –L- Sta. 275+00 (RT).

10. Plan Sheet # 13: No Comments.

11. Plan Sheet # 14: Everyone in attendance was in agreement that there would be no buffer on the stormwater outfall near –L- Sta. 305+50 (RT.) The stormwater pond near –L- Sta. 307+50 (LT.) is not a JS.

12. Plan Sheet # 15: There are no buffers on the stormwater outfall near –L- Sta. 315+00 (RT.)

13. Plan Sheet # 16: Remove the JS symbol on the stormwater pond near –L- Sta. 333+00 (RT.)

14. Plan Sheet # 17: NCDOT Hydraulics Unit indicated that they were going to tie the new storm drainage syster in Skeet Club Road into the existing storm drainage system prior to discharging into UT-13, which is classified as Perennial. The buffers on this stream begin at the end of the rip rap outlet.

The Corps of Engineers questioned whether a new Environmental assessment was required since the original is over five (5) years old. Michael Penney will coordinate this with the COE.

No further comments were recorded, and the meeting adjourned at 12:00 p.m.