

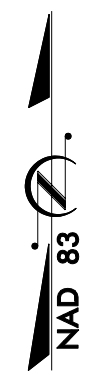
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	000532601	1	9

STATE OF NORTH CAROLINA
ECOSYSTEM ENHANCEMENT PROGRAM

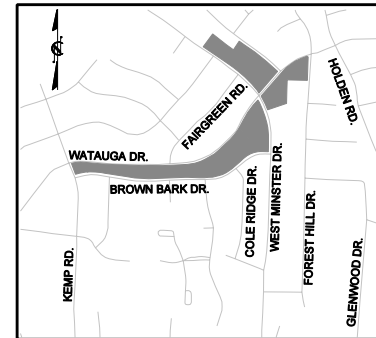
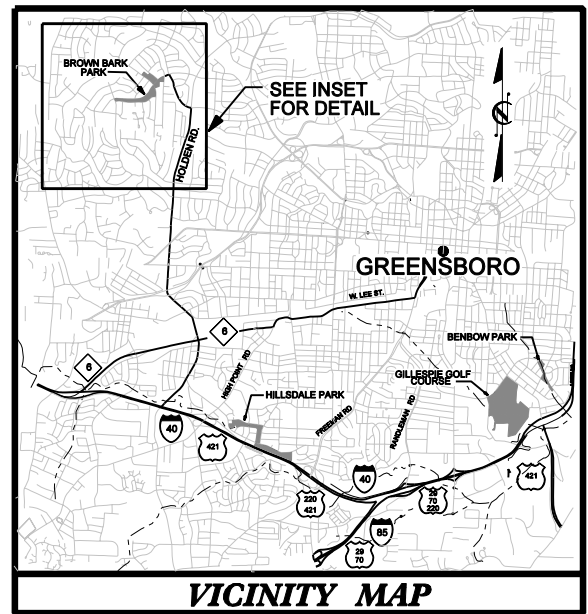
GUILFORD COUNTY

**LOCATION: BROWN BARK PARK
UNNAMED TRIBUTARY TO
NORTH BUFFALO CREEK
GREENSBORO, NORTH CAROLINA**

INSET TYPE OF WORK: AS-BUILT

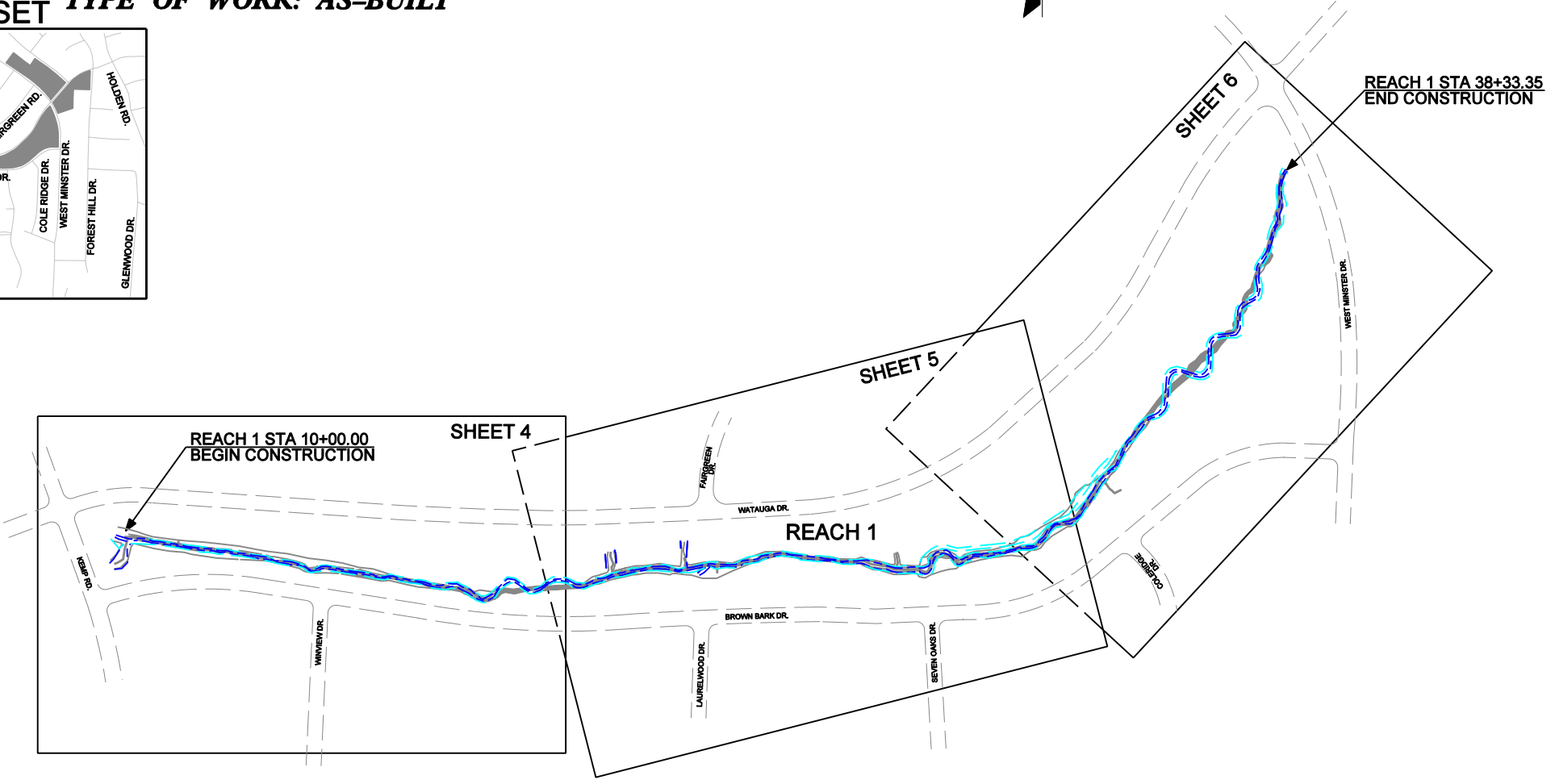


063



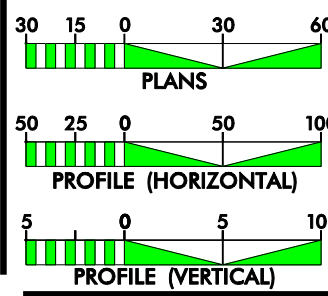
INDEX OF SHEETS:

- 1 TITLE SHEET
- 1-A SYMBOLOGY - BUCK ENGINEERING, GENERAL NOTES AND SPECIFICATIONS WETLAND CODES
- 1-B SYMBOLOGY - NCDOT
- 2 TO 2-B TYPICAL POOL AND RIFFLE CROSS SECTIONS, STRUCTURE DETAILS AND SPECIAL DETAILS
- 4-6 PLAN VIEW OF AS-BUILT



PROJECT: 000532601

GRAPHIC SCALES



DESIGN DATA

DESIGN STREAM TYPE = E4
DESIGN REACH LENGTH(FT) = 2844
BANKFULL XSEC AREA(FT²) = 12
BANKFULL WIDTH(FT) = 11
BANKFULL DEPTH(FT) = 1.6
W/D RATIO = 10

PROJECT LENGTH

EXISTING STREAM LENGTH = 2748 FEET
CONSTRUCTED STREAM LENGTH = 2833 FEET

CONTACT: JIM STANFILL
REP PROJECT MANAGER

PREPARED IN THE OFFICE OF:



8000 Regency Parkway Suite 200
Cary, North Carolina 27511
Phone: 919-483-5488
Fax: 919-483-5480

MAY 4, 2005
COMPLETION DATE:




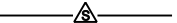


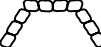

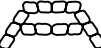

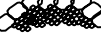
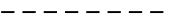

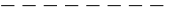
















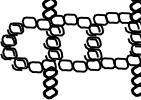
WILL HARMAN, PG
PROJECT MANAGER

C. HEATH WADSWORTH, PE
PROJECT ENGINEER

PROJECT ENGINEER

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028421
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STREAM CONVENTIONAL SYMBOLS
SUPERCEDES SHEET 1B

	ROCK J-HOOK		SILT FENCE
	ROCK VANE		SAFETY FENCE
	OUTLET PROTECTION		TAPE FENCE
	ROCK CROSS VANE		100 YEAR FLOOD PLAIN
	MODIFIED ROCK CROSS VANE		CONSERVATION EASEMENT
	SINGLE WING DEFLECTOR		EXISTING MAJOR CONTOUR
	DOUBLE WING DEFLECTOR		EXISTING MINOR CONTOUR
	TEMPORARY SILT CHECK		FOOT BRIDGE
	ROOT WAD		TEMPORARY STREAM CROSSING
	LOG J-HOOK		PERMANENT STREAM CROSSING
	LOG VANE		TRANSPLANTED VEGETATION
	LOG WEIR		TREE REMOVAL
	LOG CROSS VANE		TREE PROTECTION
	CONSTRUCTED RIFFLE		NON-DEDICATED TREE
	BOULDER CLUSTER		'MEMORY' TREE
	ROCK STEP POOL		

**NOTE: ALL ITEMS ABOVE MAY NOT BE USED ON THIS PROJECT

STANDARD SPECIFICATIONS

GENERAL NOTES

PROJECT REFERENCE NO. 000532601	SHEET NO. 1-A
PROJECT ENGINEER	
THIS DOCUMENT ORIGINALLY ISSUED AND SEALED BY:	
C. HEATH WADSWORTH 028421 DECEMBER 13, 2005	
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<small>8000 Regency Parkway Suite 200 Cary, North Carolina 27511 Phone: 919-483-5488 Fax: 919-483-5490</small>	

WETLAND CODES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

*S.U.E = SUBSURFACE UTILITY ENGINEER

CONVENTIONAL SYMBOLS

ROADS & RELATED ITEMS

Edge of Pavement	----
Curb	-----
Prop. Slope Stakes Cut	---C---
Prop. Slope Stakes Fill	---F---
Prop. Woven Wire Fence	○-----○
Prop. Chain Link Fence	□-----□
Prop. Barbed Wire Fence	◇-----◇
Prop. Wheelchair Ramp	WCR
Curb Cut for Future Wheelchair Ramp	CCFR
Exist. Guardrail	-----
Prop. Guardrail	-----
Equality Symbol	⊕
Pavement Removal	XXXXXX

RIGHT OF WAY

Baseline Control Point	◆
Existing Right of Way Marker	△
Exist. Right of Way Line w/Marker	---△---
Prop. Right of Way Line with Proposed	-----
R/W Marker (Iron Pin & Cap)	▲
Prop. Right of Way Line with Proposed	-----
(Concrete or Granite) R/W Marker	⊙
Exist. Control of Access Line	⊙
Prop. Control of Access Line	⊙
Exist. Easement Line	---E---
Prop. Temp. Construction Easement Line	---E---
Prop. Temp. Drainage Easement Line	---TDE---
Prop. Perm. Drainage Easement Line	---PDE---

HYDROLOGY

Stream or Body of Water	-----
River Basin Buffer	---RBB---
Flow Arrow	→
Disappearing Stream	-----
Spring	○
Swamp Marsh	-----
Shoreline	-----
Falls, Rapids	-----
Prop Lateral, Tail, Head Ditches	-----

STRUCTURES

MAJOR	
Bridge, Tunnel, or Box Culvert	CONC
Bridge Wing Wall, Head Wall and End Wall	CONC WW

MINOR

Head & End Wall	CONC HW
Pipe Culvert	=====
Footbridge	-----
Drainage Boxes	CB
Paved Ditch Gutter	-----

UTILITIES

Exist. Pole	•
Exist. Power Pole	⊙
Prop. Power Pole	⊙
Exist. Telephone Pole	⊙
Prop. Telephone Pole	⊙
Exist. Joint Use Pole	⊙
Prop. Joint Use Pole	⊙
Telephone Pedestal	⊕
UG Telephone Cable Hand Hold	⊕
Cable TV Pedestal	⊕
UG TV Cable Hand Hold	⊕
UG Power Cable Hand Hold	⊕
Hydrant	⊕
Satellite Dish	⊕
Exist. Water Valve	⊕
Sewer Clean Out	⊕
Power Manhole	⊕
Telephone Booth	⊕
Cellular Telephone Tower	⊕
Water Manhole	⊕
Light Pole	⊕
H-Frame Pole	⊕
Power Line Tower	⊕
Pole with Base	⊕
Gas Valve	⊕
Gas Meter	⊕
Telephone Manhole	⊕
Power Transformer	⊕
Sanitary Sewer Manhole	⊕
Storm Sewer Manhole	⊕
Tank; Water, Gas, Oil	⊕
Water Tank With Legs	⊕
Traffic Signal Junction Box	⊕
Fiber Optic Splice Box	⊕
Television or Radio Tower	⊕
Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement	---TS---

Recorded Water Line	-----
Designated Water Line (S.U.E.*)	-----
Sanitary Sewer	---SS---
Recorded Sanitary Sewer Force Main	---FSS---
Designated Sanitary Sewer Force Main(S.U.E.*)	---FSS---
Recorded Gas Line	---G---
Designated Gas Line (S.U.E.*)	---G---
Storm Sewer	---S---
Recorded Power Line	---P---
Designated Power Line (S.U.E.*)	---P---
Recorded Telephone Cable	---T---
Designated Telephone Cable (S.U.E.*)	---T---
Recorded U/G Telephone Conduit	---TC---
Designated U/G Telephone Conduit (S.U.E.*)	---TC---
Unknown Utility (S.U.E.*)	---UTL---
Recorded Television Cable	---TV---
Designated Television Cable (S.U.E.*)	---TV---
Recorded Fiber Optics Cable	---FO---
Designated Fiber Optics Cable (S.U.E.*)	---FO---
Exist. Water Meter	⊕
UG Test Hole (S.U.E.*)	⊕
Abandoned According to U/G Record	ATTUR
End of Information	E.O.I.

BOUNDARIES & PROPERTIES

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Property Line Symbol	PL
Exist. Iron Pin	⊕
Property Corner	⊕
Property Monument	⊕
Property Number	123
Parcel Number	6
Fence Line	---X---
Existing Wetland Boundaries	---WW & ISBW---
High Quality Wetland Boundary	---WLB---
Medium Quality Wetland Boundaries	---HO WLB---
Low Quality Wetland Boundaries	---MO WLB---
Proposed Wetland Boundaries	---LO WLB---
Existing Endangered Animal Boundaries	---EAB---
Existing Endangered Plant Boundaries	---EPB---

BUILDINGS & OTHER CULTURE

Buildings	-----
Foundations	-----
Area Outline	-----
Gate	-----
Gas Pump Vent or UG Tank Cap	-----
Church	-----
School	-----
Park	-----
Cemetery	-----
Dam	-----
Sign	-----
Well	-----
Small Mine	-----
Swimming Pool	-----

TOPOGRAPHY

Loose Surface	-----
Hard Surface	-----
Change in Road Surface	-----
Curb	-----
Right of Way Symbol	R/W
Guard Post	⊕ GP
Paved Walk	-----
Bridge	-----
Box Culvert or Tunnel	-----
Ferry	-----
Culvert	-----
Footbridge	-----
Trail, Footpath	-----
Light House	-----

VEGETATION

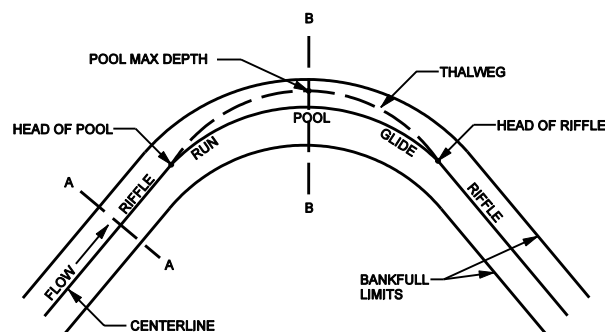
Single Tree	-----
Single Shrub	-----
Hedge	-----
Woods Line	-----
Orchard	-----
Vineyard	-----

RAILROADS

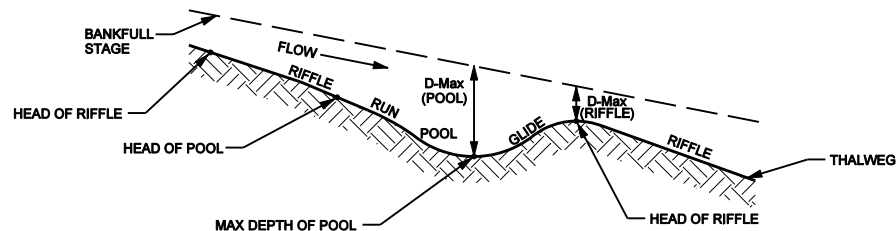
Standard Gauge	-----
RR Signal Milepost	-----
Switch	-----

TYPICAL PLAN VIEW AND PROFILE

PLAN VIEW



PROFILE VIEW

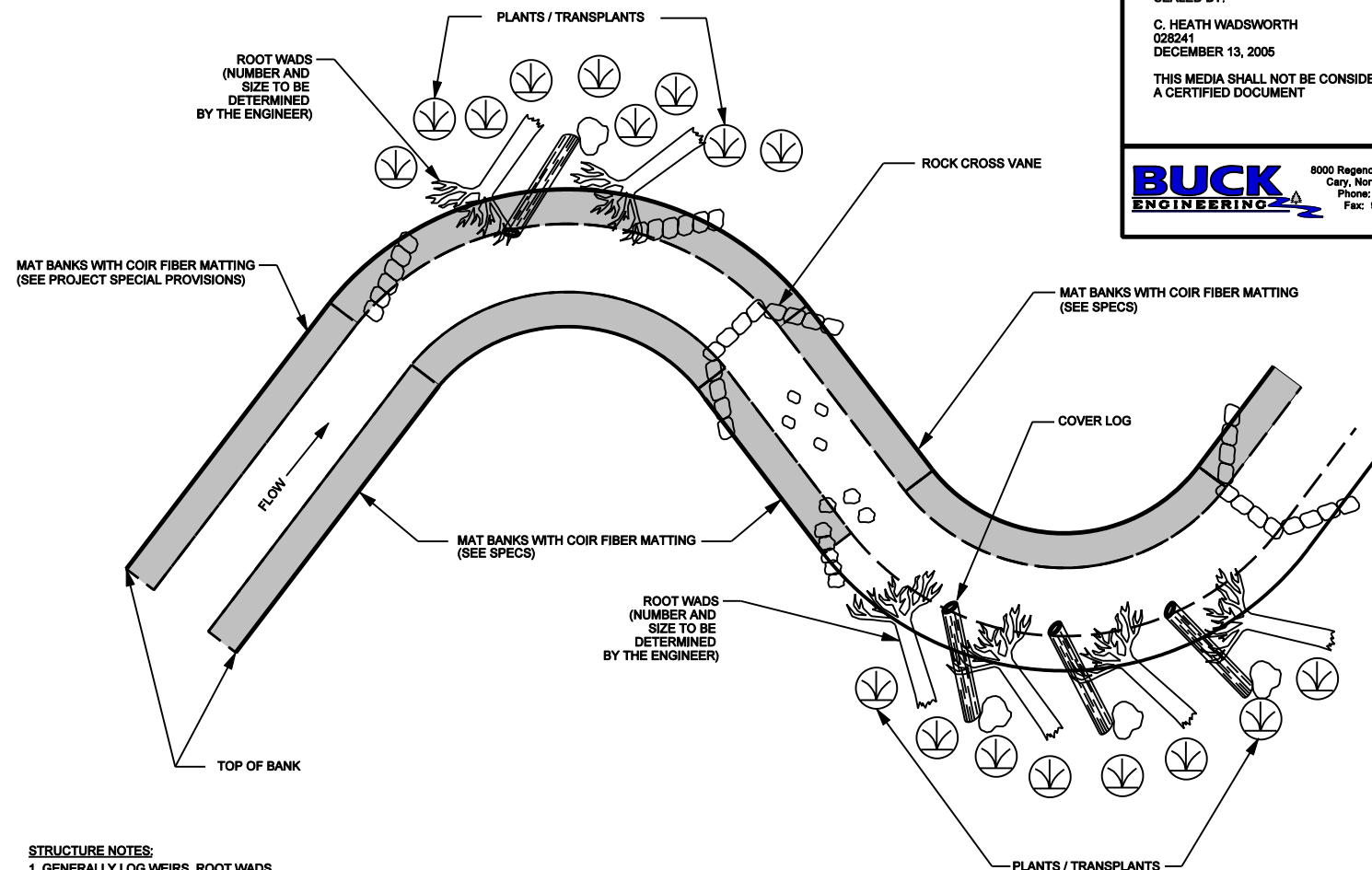


NOTES:

1. THE POINTS SHOWN, e.g. HEAD OF RIFFLE, HEAD OF POOL AND MAX DEPTH OF POOL ARE THE CONTROL POINTS USED TO CUT THE PROFILE; HOWEVER, THE CONTRACTOR SHOULD CREATE SMOOTH TRANSITIONS BETWEEN CONTROL POINTS AS SHOWN ABOVE.
2. USE THE FACET SLOPES IN THE TABLE AS A GUIDE TO ENSURE THAT THE FEATURES ARE APPROPRIATELY GRADED.
3. THE HEAD OF RIFFLE ELEVATION SHOULD NOT EXCEED THE HEAD OF POOL ELEVATION.
4. THE CHANGE IN WIDTH BETWEEN THE RIFFLES AND POOLS SHOULD OCCUR GRADUALLY OVER THE ENTIRE LENGTH OF THE BEND.

FACET	SLOPE RANGE
RIFFLE	.0053 - .011
RUN	.029 - .11
POOL	.001 - .010
GLIDE	.022 - .082

TYPICAL STRUCTURE PLACEMENT



STRUCTURE NOTES:

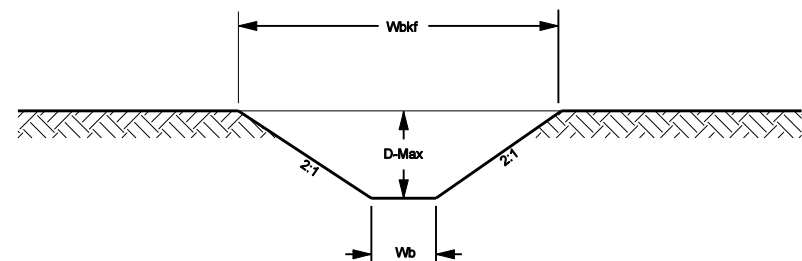
1. GENERALLY LOG WEIRS, ROOT WADS, LOG VANES AND COIR FIBER MATTING WILL BE INSTALLED IN THE LOCATION AND SEQUENCE AS SHOWN.
2. ADDITIONAL STRUCTURES OR CHANGES TO STRUCTURE LOCATIONS MAY BE MADE BY THE ENGINEER DURING CONSTRUCTION.

NOTES:

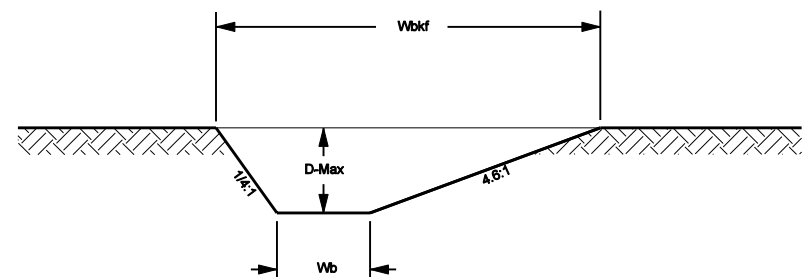
1. COIR FIBER MATTING TO BE INSTALLED ON RIFFLE/RUN SECTIONS BETWEEN BENDS.
2. IF ROOT WADS DO NOT COVER ENTIRE SLOPE ON OUTSIDE OF MEANDER BENDS, COIR FIBER MATTING IS NEEDED.

PROJECT REFERENCE NO. 000532601	SHEET NO. 2
PROJECT ENGINEER	
THIS DOCUMENT ORIGINALLY ISSUED AND SEALED BY: C. HEATH WADSWORTH 028241 DECEMBER 13, 2005	
THIS MEDIA SHALL NOT BE CONSIDERED A CERTIFIED DOCUMENT	
8000 Regency Parkway Suite 200 Cary, North Carolina 27511 Phone: 919-463-5488 Fax: 919-463-5490	

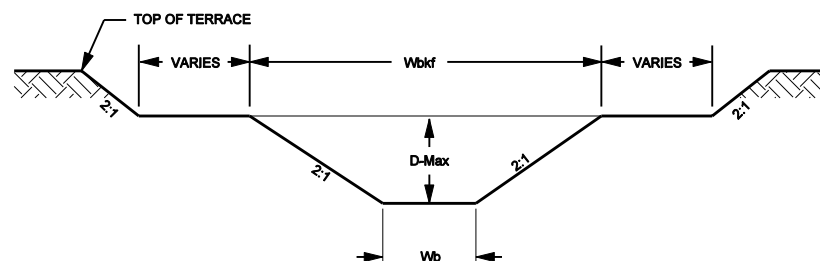
TYPICAL RIFFLE, POOL AND BANKFULL BENCH



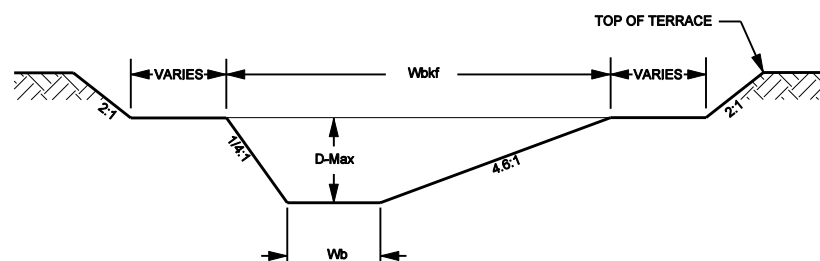
RIFFLE A-A



POOL B-B



RIFFLE WITH BANKFULL BENCH



POOL WITH BANKFULL BENCH

RIFFLE	POOL	
11	13.3	WIDTH OF BANKFULL (Wb _{kf})
1.1	1.3	AVERAGE DEPTH
1.6	2.3	MAXIMUM DEPTH (D-Max)
10	10.2	WIDTH TO DEPTH RATIO (b _{kf} /WD)
12	18	BANKFULL AREA (Ab _{kf})
5.2	2.7	BOTTOM WIDTH (W _b)

NOTES:

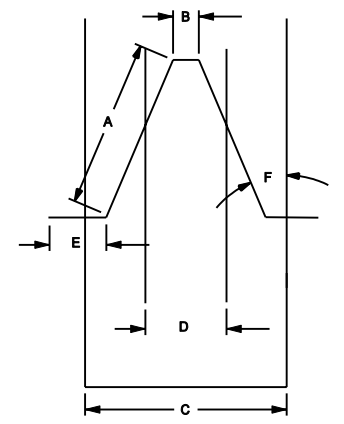
1. DURING CONSTRUCTION CORNERS OF DESIGN CHANNEL WILL BE ROUNDED AND A THALWEG WILL BE SHAPED PER DIRECTION OF ENGINEER.
2. POOLS SHOWN ABOVE ARE RIGHT POOLS ONLY.

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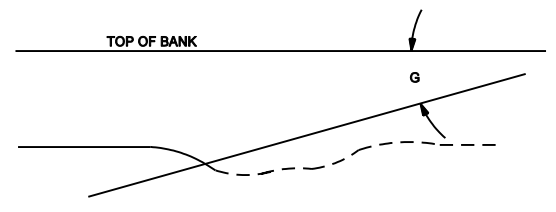
C. HEATH WADSWORTH
028241
DECEMBER 13, 2005

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CROSS VANE TYPICAL



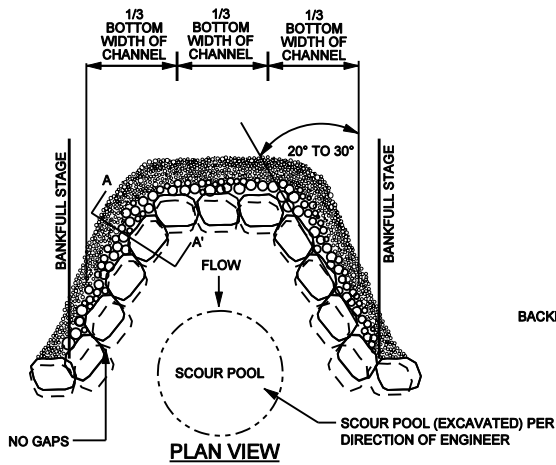
PLAN VIEW



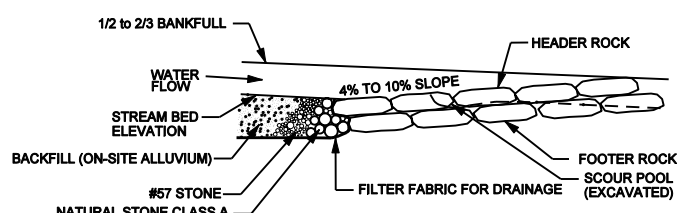
PROFILE VIEW

A	VANE ARM LENGTH	16 FT
B	INVERT LENGTH	2 FT
C	BANKFULL WIDTH	13.3 FT
D	BOTTOM WIDTH	5.2 FT
E	SILL LENGTH	4 FT
F	ARM ANGLE	21°
G	ARM SLOPE	10 %

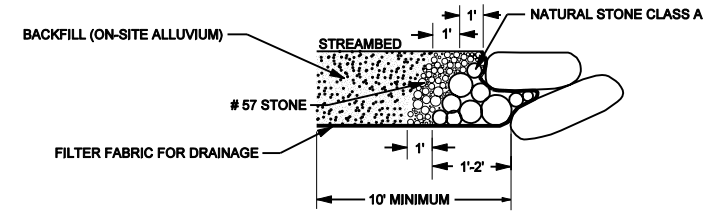
ROCK CROSS VANE



PLAN VIEW



PROFILE VIEW

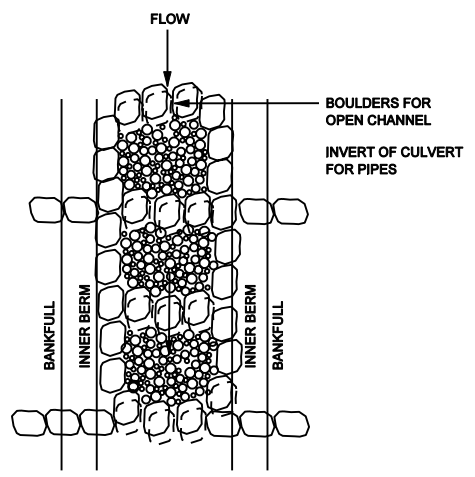


SECTION A-A'

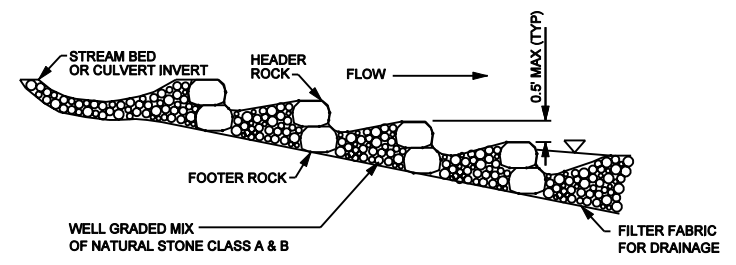
NOTES FOR ALL VANE STRUCTURES:

1. BOULDERS MUST BE AT LEAST 4' x 3' x 2'.
2. INSTALL FILTER FABRIC FOR DRAINAGE BEGINNING AT THE MIDDLE OF THE HEADER ROCKS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER ROCK, AND THEN UPSTREAM TO A MINIMUM OF TEN FEET.
3. DIG A TRENCH BELOW THE BED FOR FOOTER ROCKS AND PLACE FILL ON UPSTREAM SIDE OF VANE ARM, BETWEEN THE ARM AND STREAM BANK.
4. START AT BANK AND PLACE FOOTER ROCKS FIRST AND THEN HEADER (TOP) ROCK.
5. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS.
6. AN EXTRA BOULDER CAN BE PLACED IN SCOUR POOL FOR HABITAT IMPROVEMENT.
7. USE NATURAL STONE CLASS A TO FILL GAPS ON UPSTREAM SIDE OF BOULDERS, AND # 57 STONE TO FILL GAPS ON UPSTREAM SIDE OF NATURAL STONE CLASS A.
8. AFTER ALL STONE HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH ON-SITE ALLUVIUM TO THE ELEVATION OF THE TOP OF THE HEADER ROCK.
9. START SLOPE AT 1/2 TO 2/3 BANKFULL STAGE.

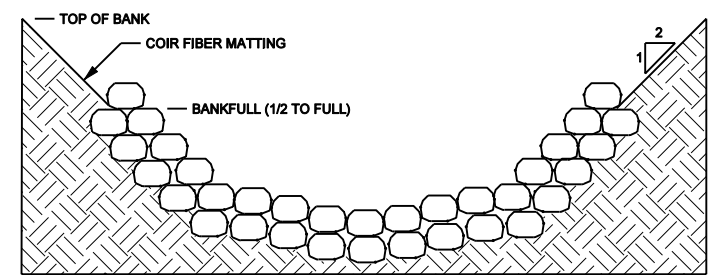
STEP POOL



PLAN VIEW

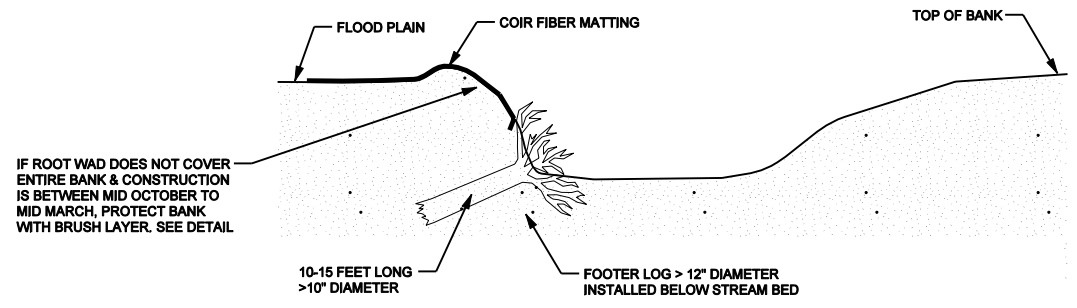


PROFILE VIEW



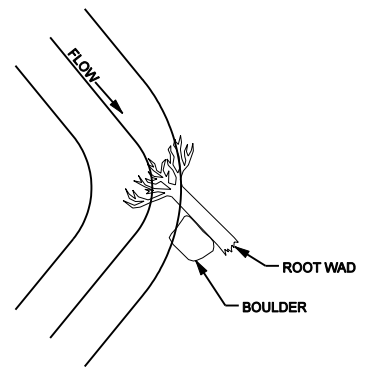
CROSS SECTION

ROOT WADS

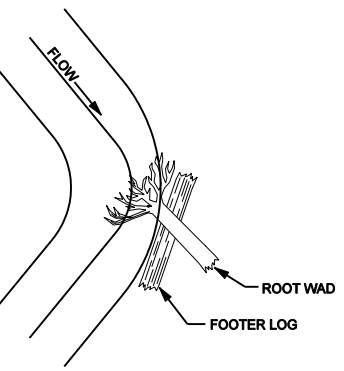


IF ROOT WAD DOES NOT COVER ENTIRE BANK & CONSTRUCTION IS BETWEEN MID OCTOBER TO MID MARCH, PROTECT BANK WITH BRUSH LAYER. SEE DETAIL

10-15 FEET LONG >10\"/>

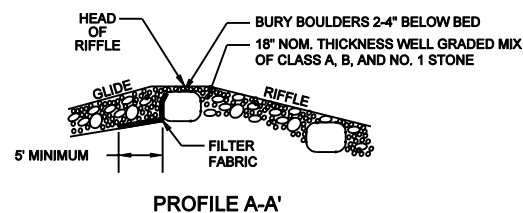
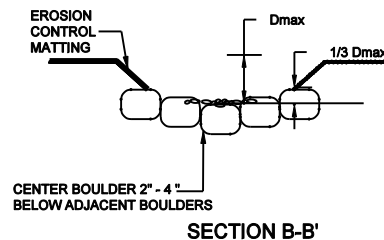
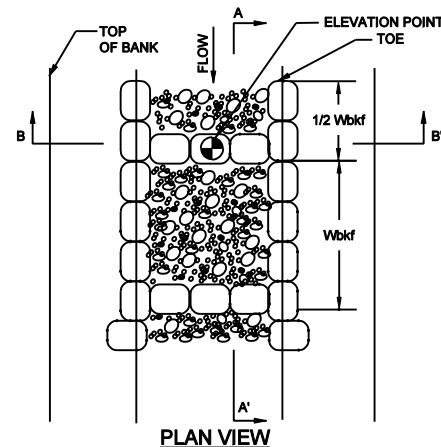


DRIVE POINT METHOD



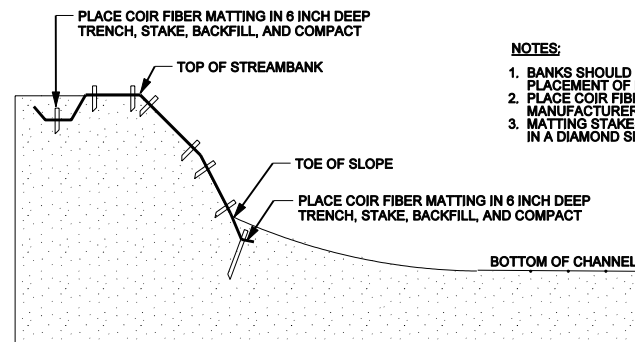
TRENCHING METHOD

CONSTRUCTED RIFFLE



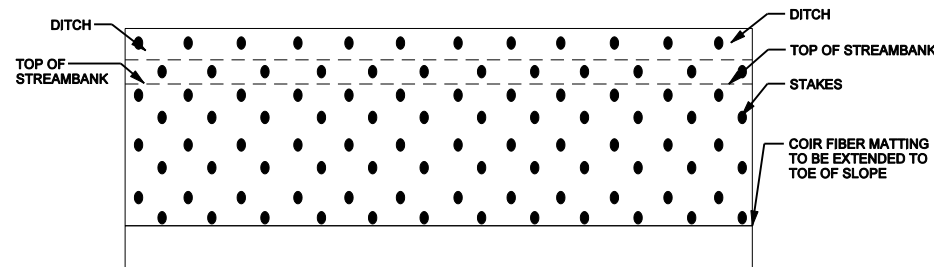
Wbkf (ft)	11.0
Dmax (ft)	1.6

EROSION CONTROL MATTING

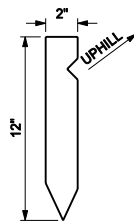


NOTES:

1. BANKS SHOULD BE SEEDED PRIOR TO PLACEMENT OF MATTING.
2. PLACE COIR FIBER MATTING ACCORDING TO MANUFACTURER RECOMMENDATIONS.
3. MATTING STAKES SHOULD BE PLACED IN A DIAMOND SHAPED PATTERN.



PLAN VIEW



TYPICAL MATTING STAKE

NOTES:

1. BANKS SHOULD BE SEEDED PRIOR TO PLACEMENT OF MATTING.
2. PLACE COIR FIBER MATTING ACCORDING TO MANUFACTURER RECOMMENDATIONS.
3. MATTING STAKES SHOULD BE PLACED IN A DIAMOND SHAPED PATTERN.
4. WOODEN 3 FT. STAKES SPACED APPROXIMATELY 4 FT. APART SHALL BE USED TO SECURE THE MATTING AT THE TOE OF THE SLOPE.

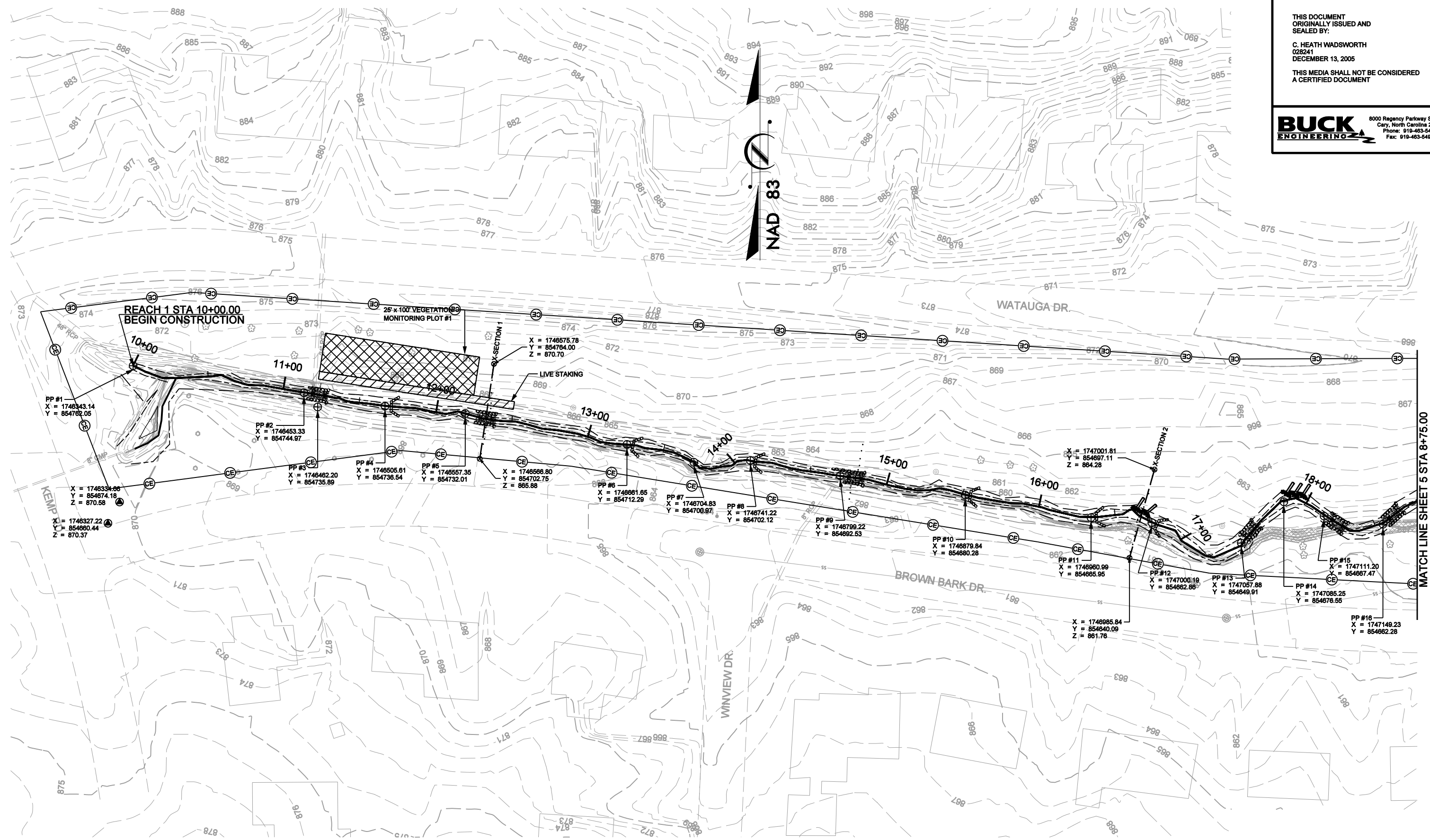
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C. HEATH WADSWORTH
028241
DECEMBER 13, 2005

THIS MEDIA SHALL NOT BE CONSIDERED
A CERTIFIED DOCUMENT

THIS DOCUMENT
ORIGINALLY ISSUED AND
SEALED BY:
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DECEMBER 13, 2005
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REACH 1 STA 10+00.00
BEGIN CONSTRUCTION

25' x 100' VEGETATION
MONITORING PLOT #1

X = 1748575.78
Y = 854764.00
Z = 870.70

LIVE STAKING

PP #1
X = 1746343.14
Y = 854762.05

PP #2
X = 1748453.33
Y = 854744.97

PP #3
X = 1746482.20
Y = 854735.89

PP #4
X = 1746505.81
Y = 854736.54

PP #5
X = 1746557.35
Y = 854732.01

PP #6
X = 1746586.80
Y = 854702.75
Z = 885.88

PP #7
X = 1746661.85
Y = 854712.29

PP #8
X = 1746704.83
Y = 854700.87

PP #9
X = 1746799.22
Y = 854692.53

PP #10
X = 1746879.84
Y = 854680.28

PP #11
X = 1746880.99
Y = 854685.95

PP #12
X = 1747000.19
Y = 854662.86

PP #13
X = 1747057.88
Y = 854649.91


PP #14
X = 1747085.25
Y = 854676.55

PP #15
X = 1747111.20
Y = 854667.47

PP #16
X = 1747149.23
Y = 854662.28

 VEGETATION MONITORING PLOT

PLAN VIEW

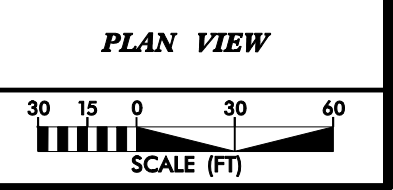


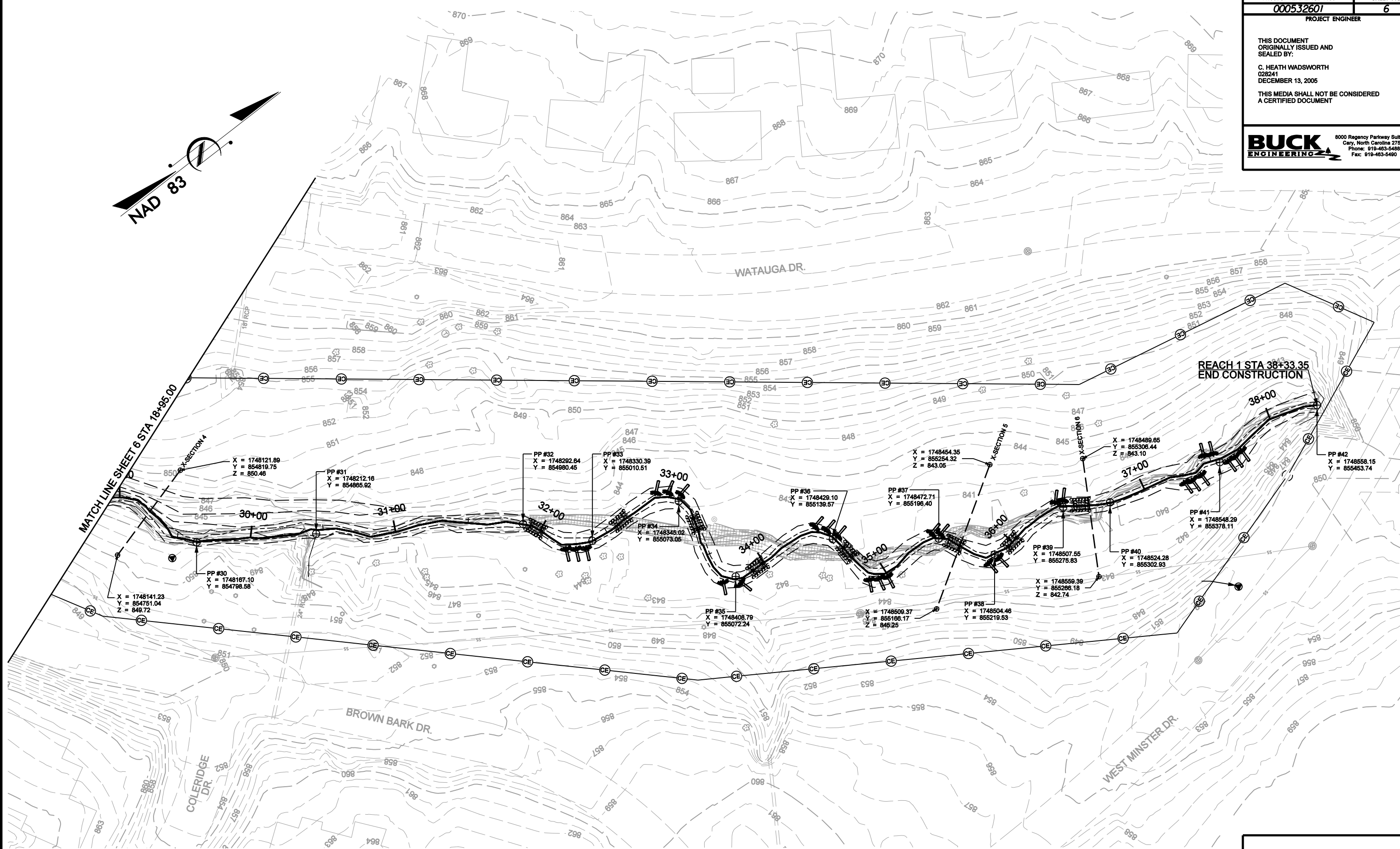
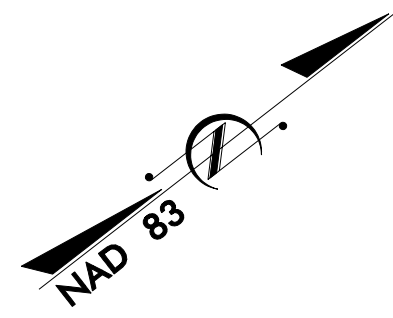
SCALE (FT)

MATCH LINE SHEET 5 STA 8+75.00



 VEGETATION MONITORING PLOT





REACH 1 STA 38+33.35
END CONSTRUCTION

MATCH LINE SHEET 6 STA 18+95.00

X = 1748121.89
Y = 854818.75
Z = 850.46

PP #31
X = 1748212.16
Y = 854865.92

PP #32
X = 1748292.64
Y = 854980.45

PP #33
X = 1748330.39
Y = 855010.51

PP #34
X = 1748345.02
Y = 855073.05

PP #36
X = 1748429.10
Y = 855139.57

PP #37
X = 1748472.71
Y = 855196.40

X = 1748454.35
Y = 855254.32
Z = 843.05

X = 1748489.65
Y = 855306.44
Z = 843.10

PP #42
X = 1748558.15
Y = 855453.74

PP #30
X = 1748167.10
Y = 854788.58

X = 1748141.23
Y = 854751.04
Z = 849.72

PP #35
X = 1748408.79
Y = 855072.24

X = 1748509.37
Y = 855168.17
Z = 846.25

PP #38
X = 1748504.46
Y = 855219.53

PP #39
X = 1748507.55
Y = 855275.83

PP #40
X = 1748524.28
Y = 855302.93

PP #41
X = 1748548.29
Y = 855378.11

 VEGETATION MONITORING PLOT

