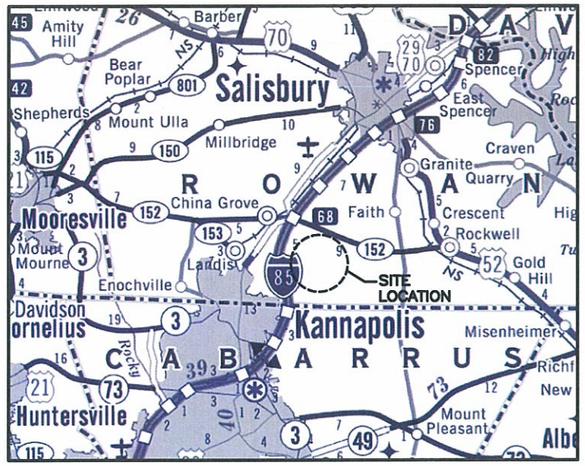
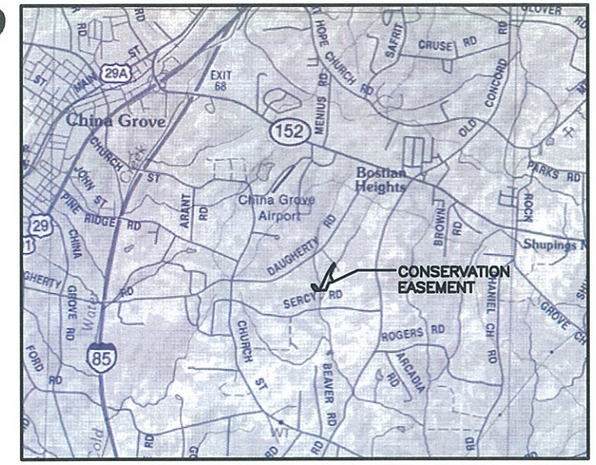
PROJECT: EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE

EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA



VICINITY MAP
NOT TO SCALE



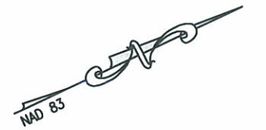
LOCATION MAP
NOT TO SCALE

LOCATION:

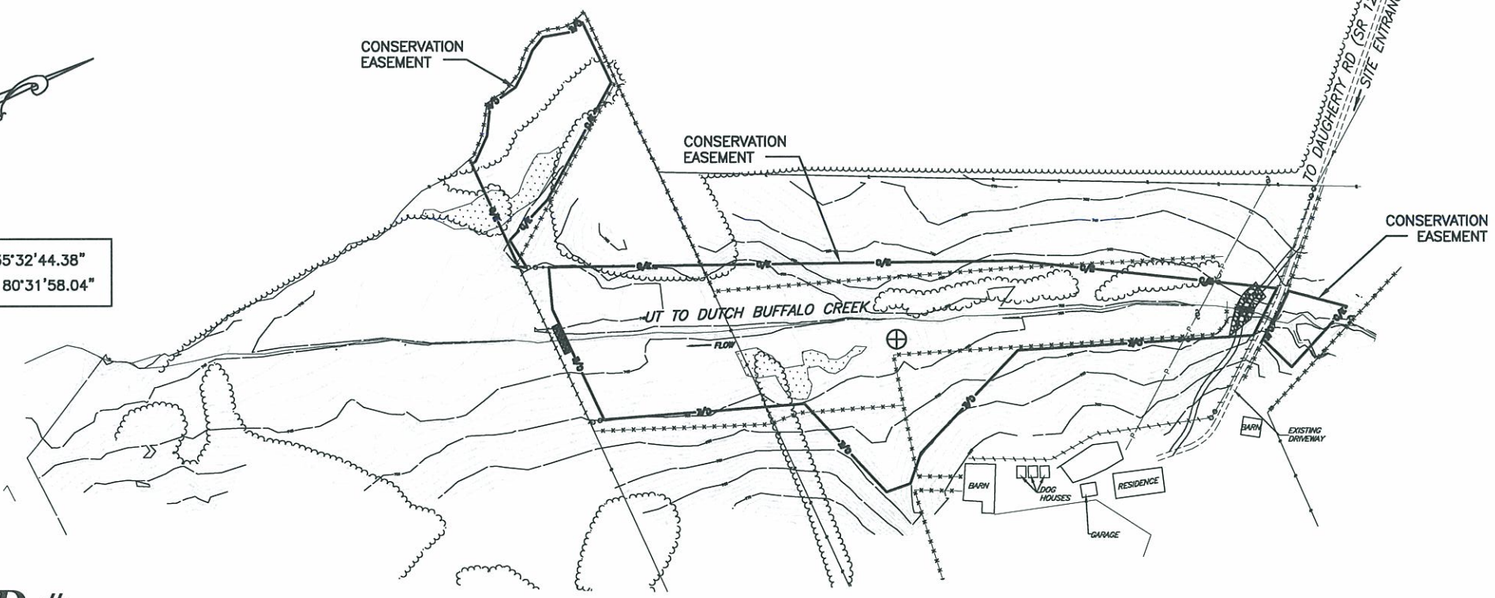
SITE IS LOCATED IN SOUTHERN ROWAN COUNTY APPROXIMATELY 5 MILES NORTHWEST OF KANNAPOLIS, JUST SOUTH OF NC 152 OFF DAUGHERTY ROAD (SR 1243).

TYPE OF WORK: STREAM AND WETLAND ENHANCEMENT

- SITE PLANTING
- CHANNEL FORD INSTALLATION
- BRIDGE REPLACEMENT
- FENCING



LATITUDE: 35°32'44.38"
LONGITUDE: 80°31'58.04"



Successor to Engineer-of-Record

The Engineer-of-Record for this project was Mr. Brian Burkhart, P.E. (NC-026951). Mr. Burkhart provided technical guidance through plan submittal and approval, and start-up of construction. Recently Mr. Burkhart moved on to another engineering firm. His successor on our firm's behalf is Mr. Charles McDuff, P.E. (NC9937).

Mr. McDuff participated in the final close-out inspection for the project to help assure that the technical intent of the plans was met and that the construction was done to acceptable standards. With no significant defects being found during the inspection, the successor is hereby sealing these As-Built drawings.

NORTH CAROLINA PROFESSIONAL SEAL 9937 ENGINEER CHARLES R. McDUFF

4/17/09

CHARLES R. MCDUFF, P.E.

SCO ID #

CONSERVATION EASEMENT AREA: 9.54± ACRES
AREA OF DISTURBANCE: 0.93 ± ACRES

No.	Revisions	Date

Prepared in the office of:

EcoScience Corporation
1101 Haynes Street, Suite 101
Raleigh, NC 27604
Ph: 919 828-3433
Fax: 919 828-3518

ENGINEER: E. BRIAN BURKHART, P.E.

PROJECT MANAGER: JAMES D. COOPER

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER E. BRIAN BURKHART

Prepared for:

Ecosystem Enhancement PROGRAM

Dsn. By:	Dwn. By:	Ckd. By:
JDC	TAL/DGJ	CRM/JDC

Date: NOV 2007

ESC Project No.: 05-229.00

SHEET 1

INDEX OF SHEETS

GENERAL NOTES

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING STANDARDS:
   A. NORTH CAROLINA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES," DATED JULY 2006, AND ANY SUPPLEMENTS THERETO ISSUED PRIOR TO THE DATE OF CONSTRUCTION,
   B. NORTH CAROLINA DEPARTMENT OF TRANSPORTATION "ROADWAY STANDARD DRAWINGS, ENGLISH" DATED JULY 2006, AND ANY SUPPLEMENTS THERETO ISSUED PRIOR TO THE DATE OF CONSTRUCTION.
   C. NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES "EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL" DATED JUNE 2006, AND ANY SUPPLEMENTS THERETO ISSUED PRIOR TO THE DATE OF CONSTRUCTION.
2. THE CONTRACTOR SHALL CONTACT THE NORTH CAROLINA ONE–CALL CENTER AT 1–800–632–4949 PRIOR TO INITIATING CONSTRUCTION ACTIVITIES.
3. THE CONTRACTOR SHALL FIELD–VERIFY EXISTING CONDITIONS AND DIMENSIONS PRIOR TO ANY CONSTRUCTION.
4. THE CONTRACTOR SHALL LOCATE AND EXPOSE EXISTING UTILITIES PRIOR TO INITIATING CONSTRUCTION ACTIVITIES. ANY CONFLICTS ENCOUNTERED WITH THE DESIGN PLAN SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION IMMEDIATELY FOR RESOLUTION.
5. THE CONTRACTOR SHALL PERFORM ALL WORK WITHIN THE LIMITS OF DISTURBANCE AS SHOWN ON SHEET EC1.
6. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR SITE SAFETY ASSOCIATED WITH THE WORK UNDER THIS CONTRACT AND FOR COMPLIANCE WITH ALL FEDERAL, STATE, AND LOCAL HEALTH AND SAFETY LAWS, CODES, REGULATIONS, AND ORDINANCES INCLUDING BUT NOT LIMITED TO THOSE CURRENTLY MANDATED BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).
7. THE CONTRACTOR IS RESPONSIBLE FOR ANY DISTURBANCE OR DAMAGE TO EXISTING UTILITIES AND SHALL BE FINANCIALLY RESPONSIBLE FOR ANY DAMAGES THAT MAY OCCUR.
8. WITH THE EXCEPTION OF THE INSTALLATION AND MAINTENNANCE OF TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES, ALL WORK ASSOCIATED WITH THE REMOVAL AND REPLACEMENT OF THE EXISTING DRIVEWAY STREAM CROSSING FALLS UNDER THE DIRECTION AND SPECIFICATIONS DOCUMENTED IN THE PLAN SET BY KO AND ASSOCIATES, P.C.
9. ALL DISTURBED AREAS SHALL BE SEEDED WITH TEMPORARY OR PERMANENT SEEDING AND MULCH, AS REQUIRED.
10. ALL STREAM BANKS EXPOSED AS A RESULT OF THE INSTALLATION OF THE PROPOSED CHANNEL FORD AND REMOVAL OF THE TEMPORARY DRIVEWAY CROSSING ARE TO BE STABILIZED WITH COIR FIBER MATTING AND SEEDED WITH EROSION CONTROL SEEDING.
11. SILT FENCE SHALL BE PLACED AROUND STOCKPILE LOCATIONS AND SHALL BE INSTALLED ACCORDING TO THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
12. THE CONTRACTOR MAY UTILIZE THE DESIGNATED STAGING AREA AND OTHER AREAS WITHIN THE SITE FOR STAGING AND STOCKPILING EQUIPMENT AND MATERIALS AS APPROVED BY THE ENGINEER.

CONSTRUCTION SEQUENCE

1. MOBILIZE EQUIPMENT AND MATERIALS TO THE SITE.
2. ESTABLISH STAGING AND STOCKPILE AREAS AS DEPICTED ON THE PLANS OR AS DIRECTED BY THE ENGINEER. CONSTRUCTION EQUIPMENT SHALL BE MAINTAINED AND SERVICED WITHIN THE LIMITS OF THE ESTABLISHED STAGING AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL STAGING AND STOCKPILE AREAS IN AN ENVIRONMENTALLY SENSITIVE MANNER.
3. INSTALL TEMPORARY EROSION CONTROL MEASURES (I.E., SILT FENCE, STONE OUTLETS, ETC.).
4. INSTALL TEMPORARY DRIVEWAY (AND ASSOCIATED CULVERTS FOR STREAM CROSSING) AT THE LOCATION DEPICTED ON THE PLAN SET OR AS DIRECTED BY THE ENGINEER.
5. INSTALL PUMP AROUND OPERATION AT EXISTING BRIDGE CROSSING TO DEWATER THE WORK AREA.
6. REMOVE EXISTING BRIDGE STRUCTURE. STOCKPILE EXISTING STONE HEADWALL BLOCKS AT STOCKPILE AREA DISPLAYED ON THE PLAN SET OR IN AN AREA DIRECTED BY THE ENGINEER. STOCKPILE OTHER MATERIAL IN LOCATIONS DISPLAYED ON THE PLAN SET OR IN AREAS DIRECTED BY THE ENGINEER.
7. INSTALL PROPOSED CHANNEL FORD AT LOCATION DEPICTED ON PLAN SET OR AS DIRECTED BY THE ENGINEER. IMMEDIATELY FOLLOWING FORD INSTALLATION, STABILIZE EXPOSED STREAM BANKS WITH COIR FIBER MATTING AND SEED WITH TEMPORARY EROSION CONTROL SEEDING.
8. INSTALL THREE–SIDED BOX CULVERT IN ACCORDANCE WITH THE PLAN SET PROVIDED BY KO & ASSOCIATES.
9. REMOVE TEMPORARY DRIVEWAY AND FILTER FABRIC, PROVIDE PERMANANT SEEDING AND MULCH AS REQUIRED ONCE NEW THREE–SIDED CULVERT IS IN PLACE.
10. REMOVE, REPLACE, AND INSTALL FENCING IN ACCORDANCE WITH THE LOCATIONS DEPICTED ON THE PLAN SET OR AS DIRECTED BY THE ENGINEER.
11. ONCE CONSTRUCTION IS COMPLETE, THE CONTRACTOR SHALL REMOVE ALL CONSTRUCTION MATERIALS FROM THE SITE INCLUDING BUT NOT LIMITED TO LEFTOVER STOCKPILED MATERIAL, SILT FENCING, T–POSTS, FILTER FABRIC, AND ALL OTHER DEBRIS. THE CONTRACTOR SHALL DISPOSE OF CONSTRUCTION MATERIALS IN AN APPROVED DUMP SITE.
12. PERFORM SITE PLANTING IN ACCORDANCE WITH THE PLANTING PLAN.

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER CHARLES R. McDUFFIE

18 MAY 2009

EcoScience Corporation
Raleigh, North Carolina

REVISIONS
1 MAY 18 2009 REQUESTED ADDITIONAL SHEET

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER E. BRIAN BURKHART

E. BRIAN BURKHART, P.E.

Client: Ecosystem Enhancement PROGRAM

Project:
EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA

Title:
INDEX OF SHEETS / GENERAL NOTES / CONSTRUCTION SEQUENCE

Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
CRM/JDC	NOV 2007

Scale: NO SCALE

ESC Project No.: 05–229.00

SHEET
1A

ECOSCIENCE CORPORATION

ELEMENT SYMBOLOGY

4/17/09

TOPOGRAPHY & HYDROGRAPHY

- MAJOR CONTOUR — 650
- MINOR CONTOUR
- GRAVEL / DIRT ROAD
- PAVED ROAD
- HYDRIC SOILS
- DIRECTION OF FLOW
- EXISTING STREAM
- EXISTING WETLAND BOUNDARY — WLB
- HIGH QUALITY WETLAND BOUNDARY — HQ WLB
- MEDIUM QUALITY WETLAND BOUNDARY — MQ WLB
- LOW QUALITY WETLAND BOUNDARY — LQ WLB
- PROPOSED WETLAND BOUNDARY — WLB
- EXISTING SPOT ELEVATION 648
- PROPOSED SPOT ELEVATION 648

BOUNDARIES, PROPERTIES, & EASEMENTS

- COUNTY LINE
- CITY LINE
- PROPERTY LINE — PL
- EXISTING IRON PIN — EIP
- RIGHT OF WAY — R/W
- PROPERTY MONUMENT — EPM
- PARCEL NUMBER — 6
- ESC BENCHMARK — ESC–BM1
- NCDOT MONUMENT — NCDOT–BM5
- UTILITY EASEMENT — E
- POWER LINE — O
- EXISTING EASEMENT — E
- PROPOSED CONSERVATION EASEMENT — C/E

BUILDINGS & OTHER STRUCTURES

- BUILDINGS
- WELL — W
- BRIDGE
- BOX CULVERT OR TUNNEL
- CULVERT
- BRIDGE WING WALL, HEAD WALL, AND END WALL — CONC WW
- HEAD AND END WALL — CONC HW
- PIPE CULVERT
- FOOTBRIDGE
- DRAINAGE BOXES — CB
- EXISTING FENCE — x
- POWER POLE — P
- TELEPHONE POLE — Q
- LIGHT POLE
- POWER LINE TOWER — T
- SANITARY SEWER MANHOLE — d
- STORM SEWER MANHOLE — S
- SANITARY SEWER — SS
- STORM SEWER — S
- FOOTBRIDGE
- TRAIL, FOOTPATH
- RAIL ROAD — CSX TRANSPORTATION

VEGETATION

- SINGLE TREE — X
- SINGLE SHRUB — Y
- EXISTING WOODS LINE

PROPOSED FEATURES & STRUCTURES

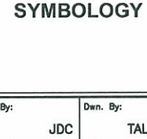
- PROPOSED CONSTRUCTION ENTRANCE
- PROPOSED ROCK SILL

PROPOSED FEATURES & STRUCTURES

- RADIUS OF CURVATURE CENTER MARK — R2
- CHANNEL FORD
- CROSS-VANE
- MODIFIED CROSS-VANE
- J-HOOK VANE
- STEP CROSS-VANE
- LOG VANE
- ROOT WAD
- TEMPORARY STAGING AREA, SOIL STOCKPILING
- NEW CHANNEL
- BORROW AREA
- CHANNEL BACKFILL
- MEANDER REVETMENT
- RIPRAP APRON
- IMPERVIOUS CHANNEL BLOCK
- TOP OF RIFFLE — TR1
- BOTTOM OF RIFFLE — BR1
- CONSTRUCTED BERM
- PROPOSED WOVEN WIRE FENCE
- REMOVE AND REPLACE EXISTING FENCE — x
- REMOVE EXISTING FENCE — x
- PROPOSED SAFETY FENCE — SF
- PROPOSED SILT FENCE — SF
- PROPOSED MAJOR CONTOURS — 755
- PROPOSED MINOR CONTOURS
- PROPOSED DIVERSION DITCH
- LIMITS OF DISTURBANCE — L.O.D.
- PROPOSED ACCESS ROAD
- PROPOSED STONE OUTLET
- PROPOSED SILT TRAP
- BRIDGE
- CULVERT

EcoScience Corporation
Raleigh, North Carolina

REVISIONS



E. BRIAN BURKHART, P.E.

Client: Ecosystem Enhancement PROGRAM

Project:

EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA

Title: **ELEMENT SYMBOLOGY**

Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
CRM/JDC	NOV 2007

Scale: NO SCALE

ESC Project No.: 05–229.00

SHEET **1B**

SUMMARY OF QUANTITIES

Helms Stream and Wetland Enhancement site

ITEM	SPEC[1]	ITEM DESCRIPTION	QUANTITY	UNIT
1	SP1	Mobilization	1	LS
2	SP3	Construction Entrance	75	LF
3	SP4	Surveying	1	LS
4	402	Removal of Existing Structure	1	LS
5	--	Excavation and Embankment:	1	LS
	412	Unclassified Structure Excavation	--	--
	230	Borrow Excavation	--	--
	410	Foundation Excavation	--	--
6	420	Class 'A' Concrete	42.1	CY
7	425	Reinforcing Steel	5490	LB
8	862	Steel Beam Guardrail	125	LF
9	862	Additional Guardrail Posts	5	EA
10	862	Guardrail Buffered End Unit	4	EA
11	1042	Plain Rip Rap Class II	32	TON
12	1610	Stone for Erosion Control, No. 57	20	TON
13	1605	Temporary Silt Fence	1310	LF
14	802	Fence Removal and Disposal	7560	LF
15	866	5-Strand Barbed Wire Fencing	6400	LF
16	866	4-inch Timber Posts, 8' Long	650	EA
17	SP5	16-Tubular Steel Cattle Gate	6	EA
18	SP6	Installation, Maintenance, and Removal of Temporary Driveway	500	LF
19	SP7	Bare Root Seedlings	6530	EA
20	SP8	Temporary Seeding and Mulching	1	ACR
21	SP8	Permanent Seeding and Mulching	1	ACR
22	SP10	Pump Around Operation	1	LS
23	SP12	Permanent Channel Ford	1	LS
24	SP14	Select Clearing	1	LS
25	1630	Silt Excavation	20	CY

1 – SP denotes special provisions described within project specifications. All other specifications reference July 2006 NCDOT Standard Specifications.

NORTH CAROLINA PROFESSIONAL SEAL 9952 ENGINEER CHARLES R. McDUFF

4/17/09

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

1	Revised Bare Root Seedling Quantity

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER E. BRIAN BURKHART

E. BRIAN BURKHART, P.E.

Client: Ecosystem Enhancement PROGRAM

Project:

EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA

Title:

SUMMARY OF QUANTITIES TABLE

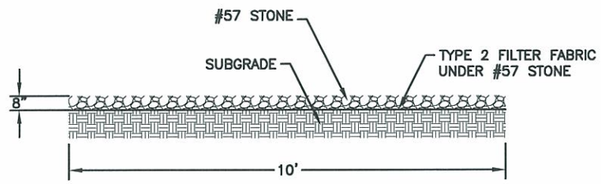
Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
CRM/JDC	FEB 2008

Scale: NO SCALE

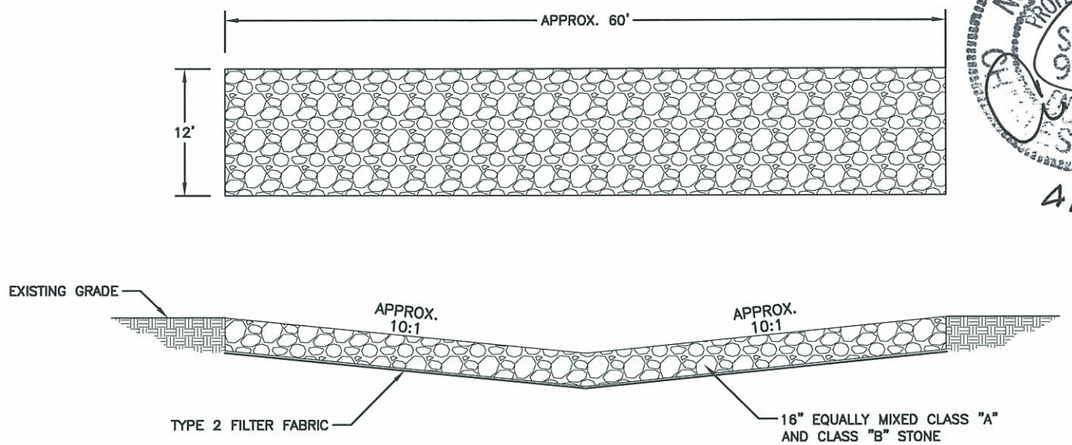
ESC Project No.: 05-229.00

SHEET

1C



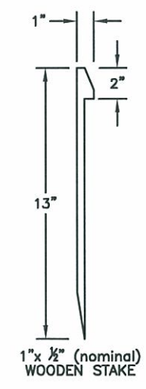
TEMPORARY DRIVEWAY

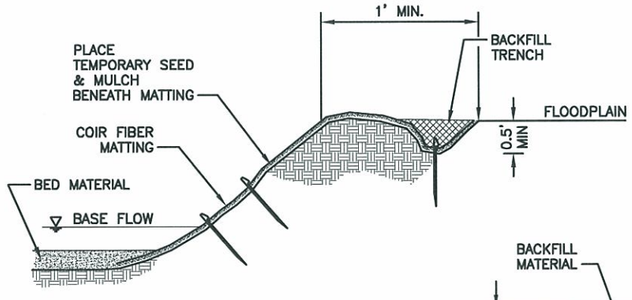


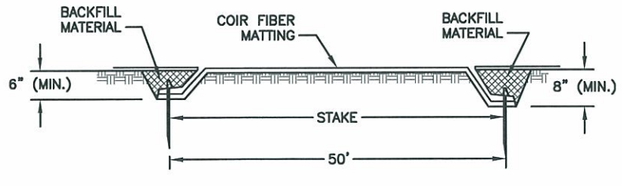
PERMANENT CHANNEL FORD

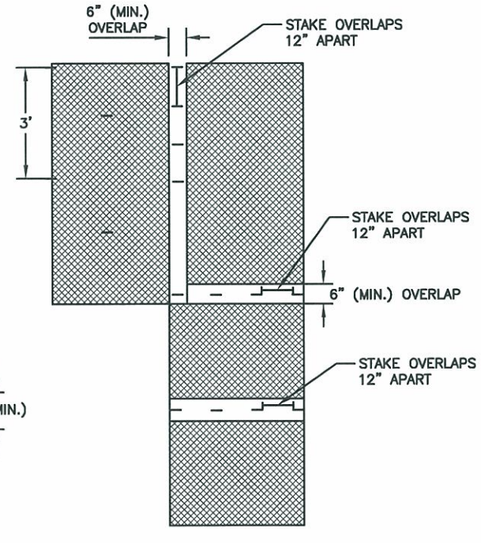
NORTH CAROLINA PROFESSIONAL SEAL 9957 ENGINEER S. R. McDUFF

4/17/09









COIR FIBER MATTING

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER E. BRIAN BURKHART

E. BRIAN BURKHART, P.E.

Client: Ecosystem Enhancement PROGRAM

Project:

EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA

Title:

GENERAL DETAILS

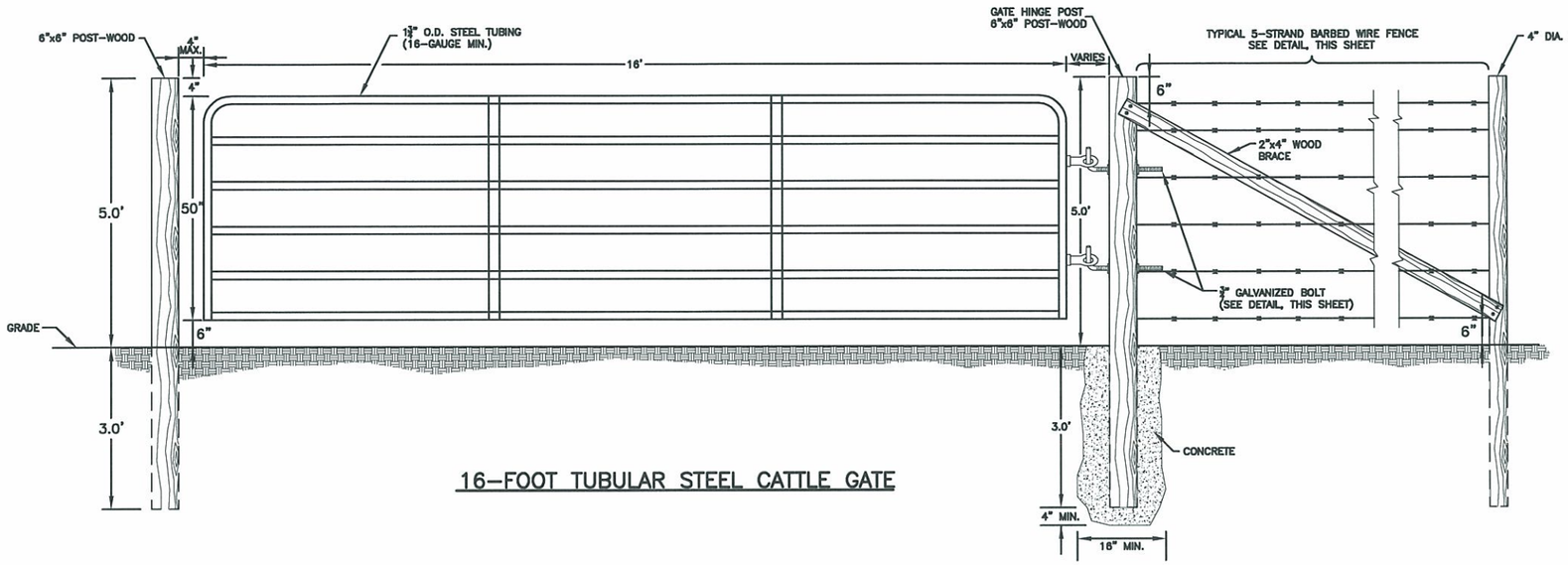
Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
CRM	NOV 2007

Scale: NO SCALE

ESC Project No.: 05-229.00

SHEET

2A

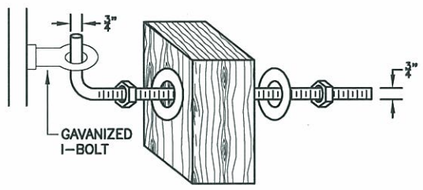


16-FOOT TUBULAR STEEL CATTLE GATE

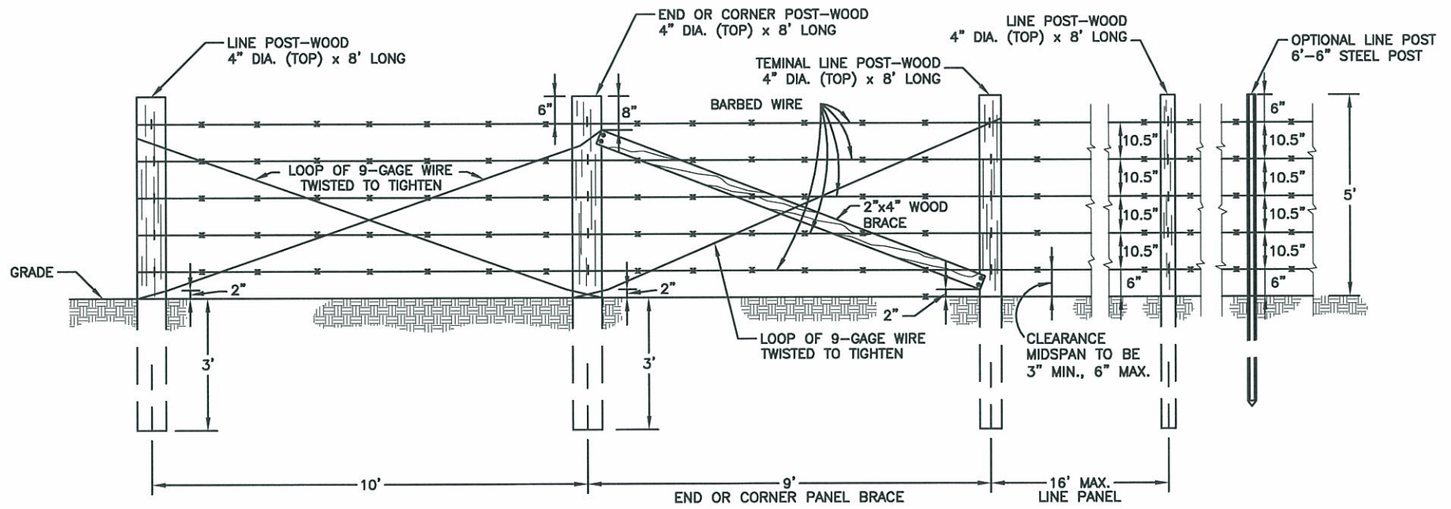
NOTES:

1. USE PRESSURE-TREATED LUMBER.
2. BOLTS, SCREWS, NAILS, STAPLES, WASHERS, AND NUTS SHOULD BE GALVANIZED METAL.
3. USE QUIKRETE CONCRETE MIX OR EQUIVALENT WHEN SETTING 6"x6" GATE HINGE POST.
4. THE GATE HINGE POST HOLE SHOULD BE NO LESS THAN 16"x16"x40" (LxWxD). POUR 4"-6" OF CONCRETE INTO THE HOLE BEFORE PLACING THE POST IN THE HOLE. PLACE THE POST IN THE HOLE AND BACKFILL WITH CONCRETE TO THE SURFACE.

NORTH CAROLINA PROFESSIONAL SEAL 9937 ENGINEER JAMES R. McDUFF
4/17/09



GALVANIZED BOLT



TYPICAL 5-STRAND BARBED WIRE FENCE

NOTES:

1. USE PRESSURE-TREATED LUMBER.
2. SCREWS, NAILS, AND STAPLES SHOULD BE GALVANIZED METAL.

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER E. BRIAN BURKHART
E. BRIAN BURKHART, P.E.

Client: Ecosystem Enhancement PROGRAM

Project:
EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT
ROWAN COUNTY, NORTH CAROLINA

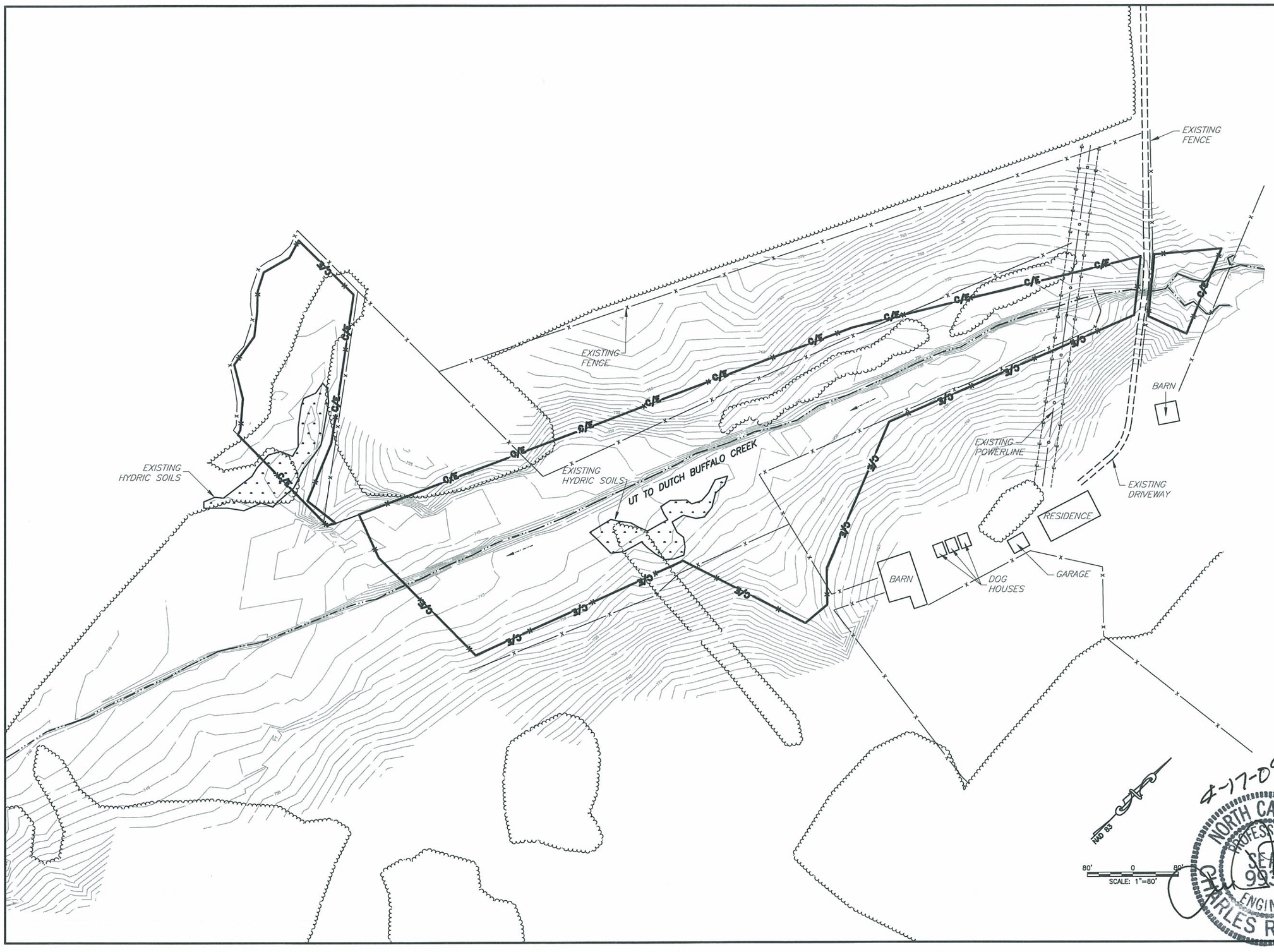
Title:
GENERAL DETAILS

Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
JDC	NOV 2007

Scale: NO SCALE

ESC Project No.: 05-229.00

SHEET
2B



EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER E. BRIAN BURKHART

E. BRIAN BURKHART, P.E.

Client:
Ecosystem Enhancement PROGRAM

Project:

EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA

Title:

EXISTING CONDITIONS

Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
EBB/JDC	NOV 2007
Scale:	AS SHOWN
ESC Project No.:	05-229.00

SHEET 3

4-17-09
NORTH CAROLINA PROFESSIONAL SEAL 9937 ENGINEER CHARLES R. McDUFF

NOTES:

1. SELECT GRUBBING TO BE PERFORMED IN SPARSE OVERGROWN SHRUB AREAS AS DIRECTED BY THE ENGINEER TO PREPARE FOR SITE PLANTING.
2. REFER TO PLAN SET PREPARED BY KO & ASSOCIATES FOR BRIDGE REPLACEMENT.

EXISTING FENCE TO BE REMOVED
EXISTING FENCE TO REMAIN
PROPOSED FENCE ALONG MITIGATION BOUNDARY
CONSERVATION EASEMENT
REMOVE EXISTING FENCE
EXISTING HYDRIC SOILS
PROPOSED 16-FOOT GATE SEE DETAIL, SHEET 2B TYP.
PROPOSED FORD. SEE DETAIL, SHEET 2A
REMOVE EXISTING FENCE AND REPLACE WITH NEW FENCE
PROPOSED 16-FOOT GATE
EXISTING FENCE TO BE REMOVED
PROPOSED FENCE ALONG MITIGATION BOUNDARY
CONSERVATION EASEMENT
EXISTING FENCE TO REMAIN
EXISTING FENCE
EXISTING HYDRIC SOILS
UT TO DUTCH BUFFALO CREEK
EXISTING FENCE TO BE REMOVED
PROPOSED NEW FENCE ALONG MITIGATION BOUNDARY
EXISTING POWERLINE
REMOVE FENCING TO WOODLINE
REMOVE EXISTING FENCE AND REPLACE WITH NEW FENCE
PROPOSED 16-FOOT GATE
EXISTING FENCE
REMOVE EXISTING FENCE
PROPOSED STAGING AREA
PROPOSED STOCKPILE AREA
(2) PROPOSED 40 LF 54-INCH HDPE SEE DETAIL, SHEET EC4
CONSERVATION EASEMENT
EXISTING BRIDGE TO BE REPLACED SEE NOTE 2
REMOVE EXISTING FENCE
PROPOSED TEMPORARY DRIVEWAY CROSSING SEE DETAIL, SHEET EC4
BARN
PROPOSED 16-FOOT GATE
500 LF PROPOSED TEMPORARY DRIVEWAY. SEE DETAIL, SHEET 2A
EXISTING DRIVEWAY
REMOVE EXISTING FENCE AND REPLACE WITH NEW FENCE
RESIDENCE
BARN
DOG HOUSES
GARAGE
NAD 83
80' 0 80'
SCALE: 1"=80'

4.17.09

NORTH CAROLINA PROFESSIONAL SEAL 9937 ENGINEER CHARLES R. McDUFF

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER E. BRIAN BURKHART

E. BRIAN BURKHART, P.E.

Client:
Ecosystem Enhancement PROGRAM

Project:

EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA

Title:

SITE PLAN

Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
EBB/JDC	NOV 2007

Scale: AS SHOWN

ESC Project No.: 05-229.00

SHEET 4

FENCE IS L.O.D.

PROPOSED STAGING AREA

STABILIZED TEMPORARY CONSTRUCTION ENTRANCE, SEE DETAIL SHEET EC4

FENCE IS L.O.D.

(2) PROPOSED 40 LF 54-INCH HDPE SEE DETAIL, SHEET EC4

PROPOSED STOCKPILE AREA

PROPOSED 450 LF ± TEMPORARY SILT FENCE

SILT FENCE IS L.O.D.

PROPOSED 225 LF ± TEMPORARY SILT FENCE

PROPOSED 235 LF ± TEMPORARY SILT FENCE

L.O.D.

CONSERVATION EASEMENT

PROPOSED 180 LF ± TEMPORARY SILT FENCE

PROPOSED 120 LF ± TEMPORARY SILT FENCE (TYP.) SEE DETAIL, SHEET EC4

BARN

LIMITS OF DISTURBANCE

EXISTING DRIVEWAY

UT TO DUTCH BUFFALO CREEK

RESIDENCE

NAD 83

60' 0 60'
SCALE: 1"=60'

4.17.09

NORTH CAROLINA PROFESSIONAL SEAL 9937 ENGINEER CHARLES R. McDUFF

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER E. BRIAN BURKHART

E. BRIAN BURKHART, P.E.

Client:
Ecosystem Enhancement PROGRAM

Project:

EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA

Title:

EROSION CONTROL PLAN

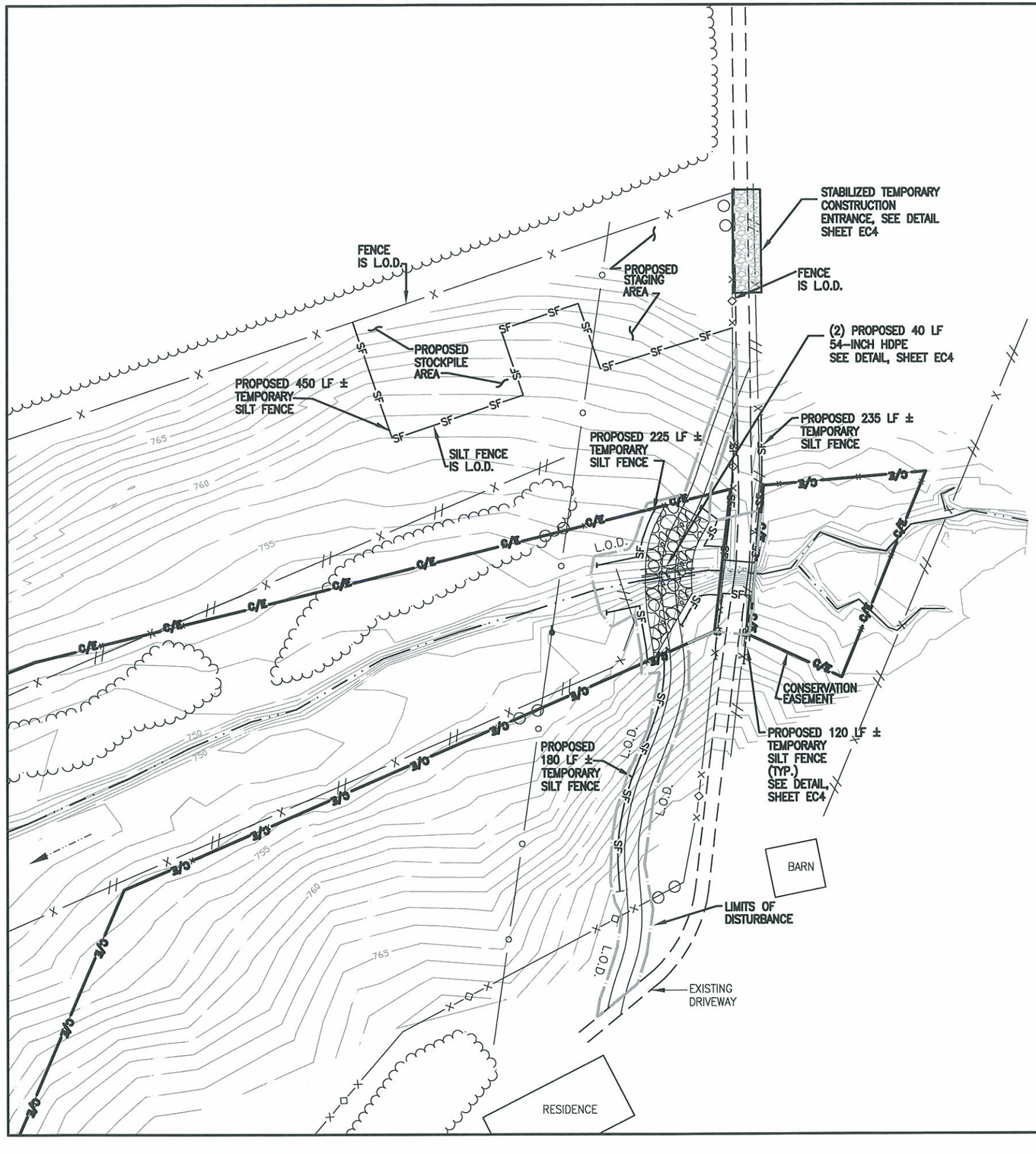
Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
EBB/JDC	NOV 2007

Scale: AS SHOWN

ESC Project No.: 05-229.00

SHEET

EC1



NORTH CAROLINA PROFESSIONAL SEAL 9937 ENGINEER CHARLES R. McDUFFIE

4.17.09

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER E. BRIAN BURKHART

E. BRIAN BURKHART, P.E.

Client:
Ecosystem Enhancement PROGRAM

Project:
EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA

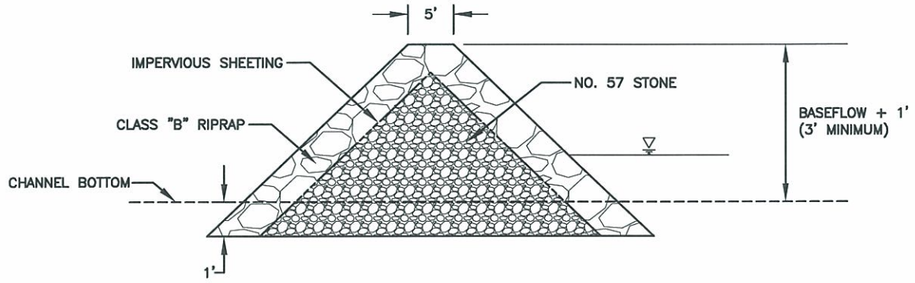
Title:
EROSION CONTROL PLAN INSET

Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
EBB/JDC	NOV 2007

Scale: AS SHOWN

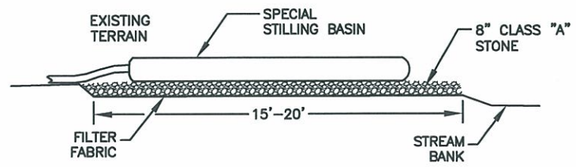
ESC Project No.: 05-229.00

SHEET
EC2



CROSS–SECTION

TEMPORARY IMPERVIOUS DIKE



NOTE:

1. WHEN PUMPING CLEAN WATER, THE CONTRACTOR MAY PROVID A STABILIZED OUTLET BY OMITTING THE SPECIAL STILLING BASIN AND PROVIDING THE ROCK PAD AS SHOWN WITH MINIMUM DIMENSIONS 10 FEET WIDE BY 15 FEET LONG.

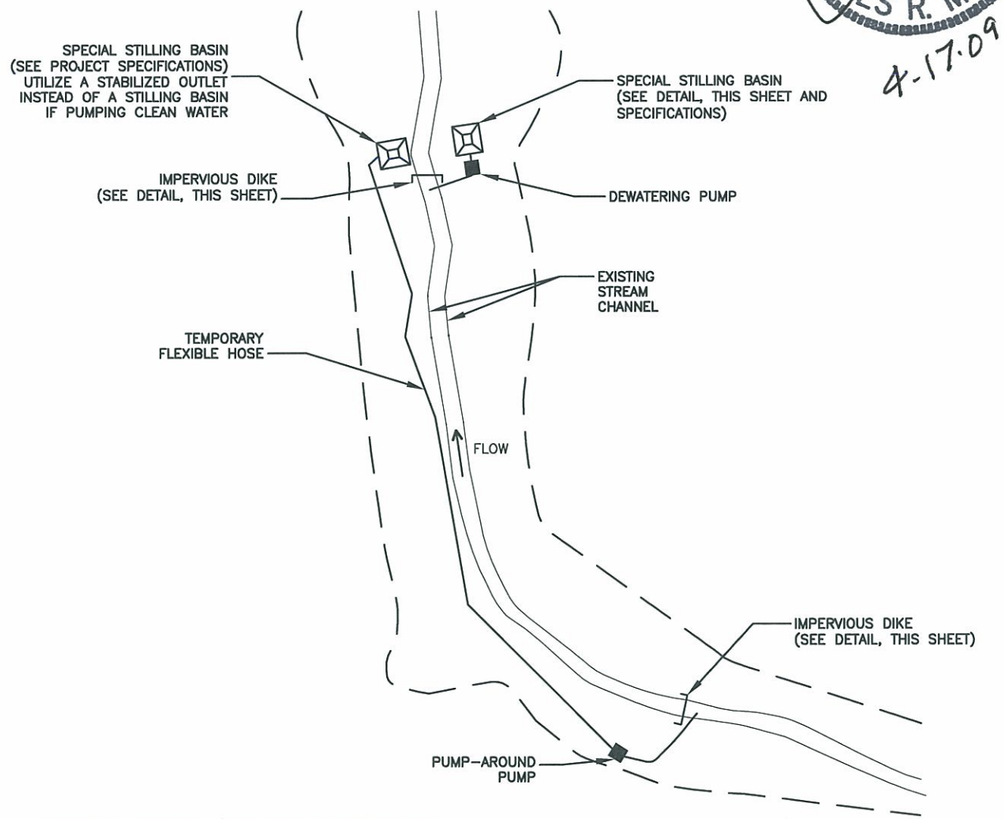
SPECIAL STILLING BASIN WITH ROCK PAD

SEQUENCE OF CONSTRUCTION FOR TYPICAL PUMP–AROUND

1. INSTALL SPECIAL STILLING BASIN(S).
2. INSTALL UPSTREAM PUMP AND TEMPORARY FLEXIBLE HOSE.
3. PLACE UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
4. PLACE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS. DEWATER ENTRAPPED AREA. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
5. PERFORM STREAM RESTORATION WORK IN ACCORDANCE WITH THE PLANS.
6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF IMPERVIOUS DIKE. REMOVE IMPERVIOUS DIKES, PUMPS, AND TEMPORARY FLEXIBLE HOSE (DOWNSTREAM IMPERVIOUS DIKE FIRST).
7. ALL GRADING AND STABILIZATION MUST BE COMPLETED AT THE END OF EACH DAY WITHIN THE PUMP AROUND AREAS BETWEEN THE IMPERVIOUS DIKES. THE IMPERVIOUS DIKE LOCATIONS AS SHOWN ON THIS SHEET ONLY SHOW THE UPPER AND LOWER EXTENT OF WORK FOR EACH STREAM SEGMENT. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF THE IMPERVIOUS DIKE(S) FOR EACH DAY'S WORK.
8. REMOVE SPECIAL STILLING BASIN(S) AND BACKFILL. STABILIZE DISTURBED AREA WITH SEED AND MULCH.

NOTES:

1. ALL EXCAVATION SHALL BE PERFORMED IN ONLY DRY OR ISOLATED SECTIONS OF CHANNEL.
2. IMPERVIOUS DIKES ARE TO BE USED TO ISOLATE WORK FROM STREAM FLOW WHEN NECESSARY.
3. ALL GRADED AREAS SHALL BE STABILIZED WITHIN 24 HOURS.
4. MAINTENANCE OF STREAM FLOW OPERATIONS SHALL BE INCIDENTAL TO THE WORK. THIS INCLUDES POLYETHYLENE SHEETING, DIVERSION PIPES, PUMPS, AND HOSES.
5. PUMPS AND HOSES SHALL BE OF SUFFICIENT SIZE TO DEWATER THE WORK AREA.



TYPICAL PUMP–AROUND OPERATION

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER E. BRIAN BURKHART

E. BRIAN BURKHART, P.E.

NORTH CAROLINA PROFESSIONAL SEAL 9937 ENGINEER CHARLES R. McDUFF

4-17-09

Client: Ecosystem Enhancement PROGRAM

Project:

EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA

Title:

EROSION CONTROL DETAILS

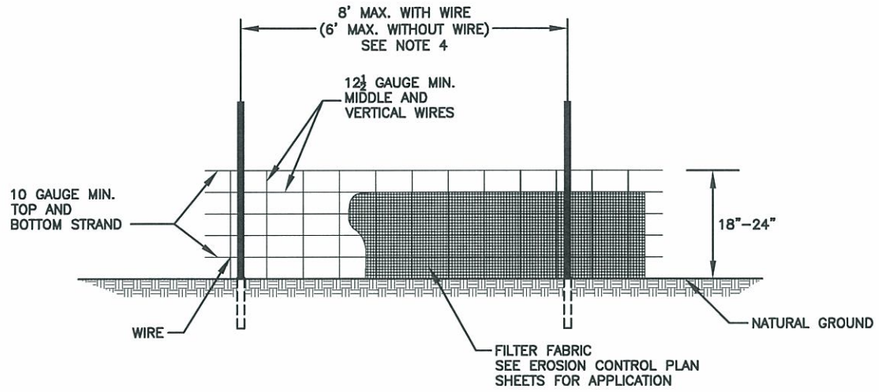
Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
EBB/JDC	NOV 2007

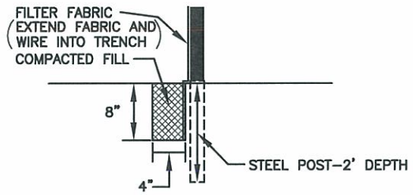
Scale: NO SCALE

ESC Project No.: 05–229.00

SHEET

EC3

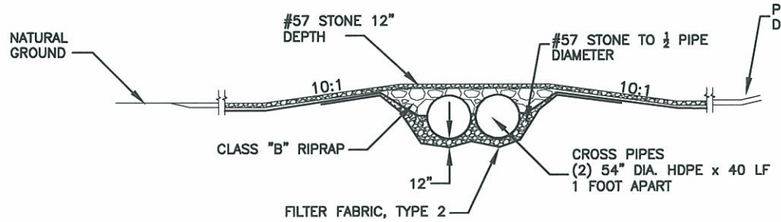




NOTES:

1. USE WIRE A MINIMUM OF 32 INCHES IN WIDTH AND WITH A MINIMUM OF 6 LINE WIRES WITH 12 INCH STAY SPACING.
2. USE FILTER FABRIC A MINIMUM OF 36 INCHES IN WIDTH AND FASTEN ADEQUATELY TO THE WIRE AS DIRECTED BY THE ENGINEER.
3. PROVIDE 5 FOOT STEEL POST OF THE SELF–FASTENER ANGLE STEEL TYPE.
4. USE EXTRA STRENGTH FABRIC IF WIRE FENCE IS NOT USED.

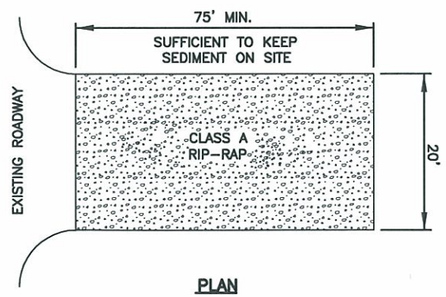
TEMPORARY SILT FENCE



TEMPORARY CHANNEL CROSSING DETAIL

NOTES:

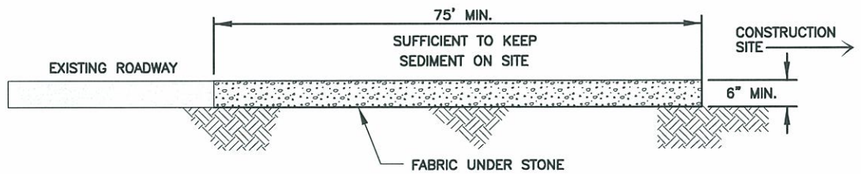
1. SIDE SLOPES FOR CROSSING SHALL BE 2:1 OR FLATTER.
2. TEMPORARY DRIVEWAY SHALL BE A MINIMUM OF 12' WIDE AT CHANNEL CROSSING.



PLAN

CONSTRUCTION ENTRANCE NOTES:

1. PROVIDE APPROPRIATE TRANSITION BETWEEN CONSTRUCTION ENTRANCE AND EXISTING ROADWAY
2. IF CONSTRUCTION ON THE SITE IS SUCH THAT THE MUD IS NOT REMOVED BY THE VEHICLES TRAVELLING OVER THE STONE, THEN THE TIRES OF THE VEHICLES MUST BE WASHED BEFORE ENTERING THE PUBLIC ROAD.



CROSS SECTION

STABILIZED TEMPORARY CONSTRUCTION ENTRANCE

NORTH CAROLINA PROFESSIONAL SEAL 9937 ENGINEER CHARLES R. McDUFF
4.17.09

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER E. BRIAN BURKHART

E. BRIAN BURKHART, P.E.

Client: Ecosystem Enhancement PROGRAM

Project:

EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA

Title:

EROSION CONTROL DETAILS

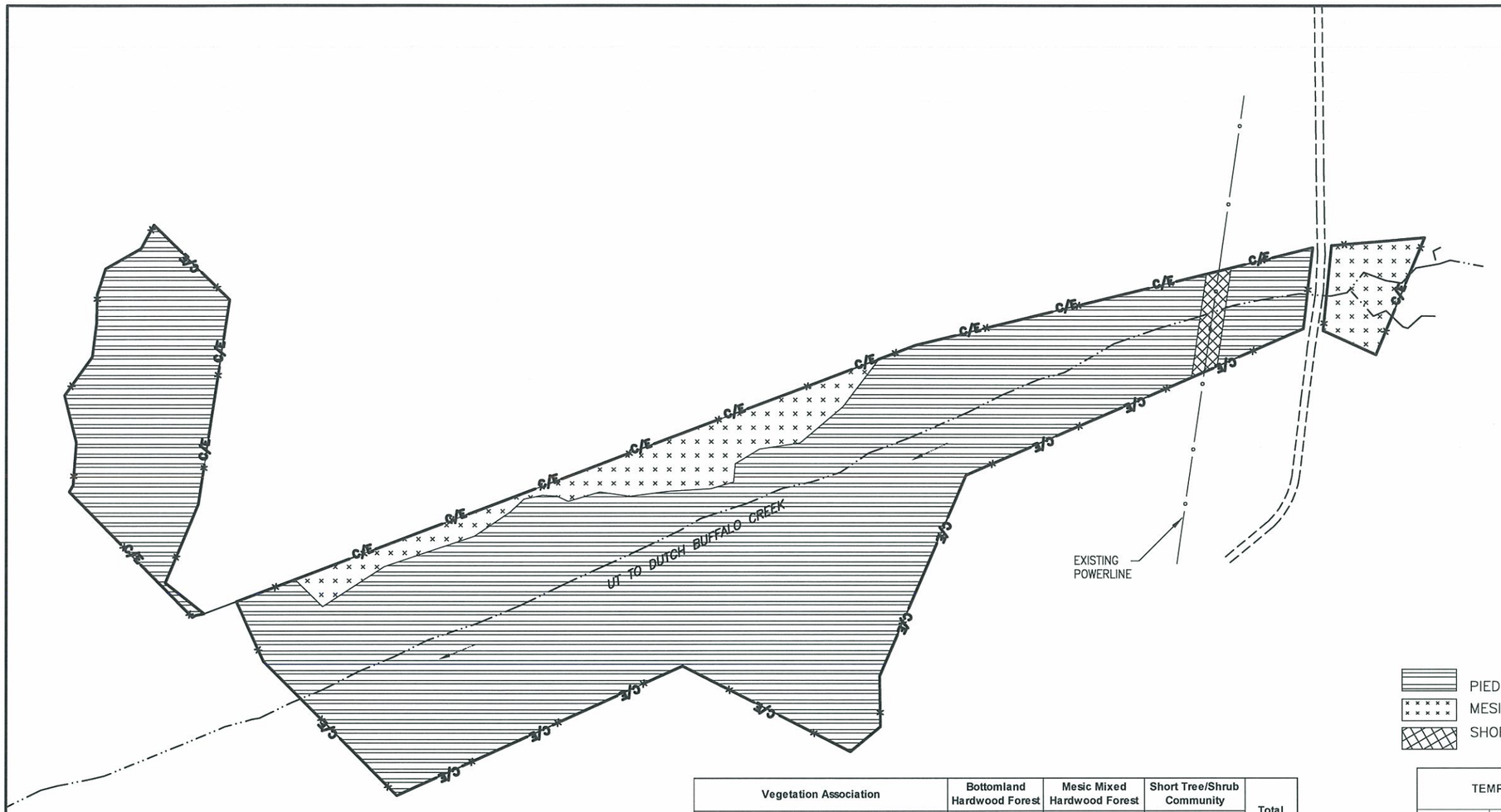
Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
EBB/JDC	NOV 2007

Scale: NO SCALE

ESC Project No.: 05–229.00

SHEET

EC4



LEGEND

- PIEDMONT BOTTOMLAND HARDWOOD FOREST
- MESIC MIXED HARDWOOD FOREST
- SHORT TREE/SHRUB COMMUNITY

Vegetation Association		Bottomland Hardwood Forest		Mesic Mixed Hardwood Forest		Short Tree/Shrub Community		Total	
Stems/Acre (Spacing)		680 (8-feet x 8-feet)		680 (8-feet x 8-feet)		680 (8-feet x 8-feet)			
Planted Area (acres)		8.5		1.0		0.1		9.6	
Species[1]	Common Name	Number Planted	% of Total	Number Planted	% of Total	Number Planted	% of Total	Number Planted	
Quercus michauxii	swamp chestnut oak	520	9					~~520~~	600
Ulmus americana	American elm	~~347~~	~~6~~			~~10~~	~~15~~	~~357~~	
Celtis laevigata	sugarberry	405	7					~~405~~	500
Fraxinus pennsylvanica	green ash	347	6					~~347~~	450
Carya ovata	shagbark hickory	~~405~~	~~7~~					~~405~~	
Quercus phellos	willow oak	520	9					~~520~~	600
Platanus occidentalis	sycamore	405	7					~~405~~	500
Quercus nigra	water oak	405	7					~~405~~	500
Carya cordiformis	bitter nut hickory	~~347~~	~~6~~					~~347~~	400
Quercus pagoda	cherrybark oak	347	6					~~347~~	500
Carpinus caroliniana	musclewood	347	6			10	15	~~357~~	10
Asimina triloba	pawpaw	347	6			10	15	~~357~~	400
Ilex opaca	American holly	~~347~~	~~6~~	54	8	7	10	~~408~~	450
Betula nigra	river birch	347	6					~~347~~	500
Alnus serrulata	tag alder	~~347~~	~~6~~					~~347~~	400
Ostrya virginiana	Hophornbeam					10	15	10	10
Viburnum dentatum	arrow-wood					~~7~~	~~10~~	~~7~~	
Vaccinium corymbosum	highbush blueberry					3	5	~~3~~	10
Fagus grandifolia	American beech			95	14			~~95~~	100
Carya tomentosa	mockernut hickory			82	12			82	
Carya glabra	sweet pignut hickory			82	12			82	
Quercus alba	white oak			109	16			~~109~~	200
Quercus rubra	northern red oak			95	14			~~95~~	150
Quercus falcata	southern red oak			95	14			~~95~~	150
Cornus florida	dogwood			68	10	10	15	~~78~~	150
Total		5780	100	680	100	68	100	6530	6570

BLACK GUM *(NYSSA SYLVATICA)*

WINTER BERRY *(ILEX DECIDUA)*

PERSIMMON *(DIOSPYROS VIRGINIANA)*

BLACK WALNUT *(JUGLANS NIGRA)*

[1]All stems are assumed to be bare-root seedlings

TEMPORARY AND PERMANENT SEEDING MIX

MATERIAL	SEED TYPE	APPLICATION RATE	OPTIMAL PLANTING DATES
Lime	N/A	2,000 lbs/acre or by Soil Test	Jan 1 – Dec 31
Fertilizer	N/A	1,000 lbs/acre or by Soil Test	Jan 1 – Dec 31
Mulch	Mulch shall be tacked down by **crimping only**	4,000 lbs/acre	Jan 1 – Dec 31
Temporary Seeding	Rye Grain (*Secale cereale*)	120 lbs/acre	Aug 15 – May 1
	German Millet (*Seteria italica*)	40 lbs/acre	May 1 – Aug 15
Permanent Seeding	Switchgrass (*Panicum virgatum*)	10-15% of total mix	Apr 1 – Aug 15
	Indiangrass (*Sorghastrum nutens*)	10-30% of total mix	Apr 1 – Aug 15
	Deertongue (*Dichanthelium clandestinum*)	5-25% of total mix	Apr 1 – Aug 15
	Big Bluestem (*Andropogon gerardii*)	10-30% of total mix	Apr 1 – Aug 15
	Little Bluestem (*Schizachyrium scoparium*)	10-30% of total mix	Apr 1 – Aug 15
	Sweet Woodreed (*Cinna arundinacea*)	1-10% of total mix	Apr 1 – Aug 15
	Rice Cutgrass (*Leersia oryzoides*)	5-25% of total mix	Apr 1 – Aug 15
	Indian Woodoats (*Chasmanthium latifolium*)	1-10% of total mix	Aug 15 – Oct 15 Feb 15 - Apr 1
	Virginia Wildrye (*Elymus virginicus*)	5-25% of total mix	Aug 15 – Oct 15 Feb 15 - Apr 1
	Eastern Bottlebrush Grass (*Elymus hystrix*)	5-10% of total mix	Aug 15 – Oct 15 Dec 1 - May 1

NORTH CAROLINA PROFESSIONAL SEAL 9937 ENGINEER CHARLES R. McDUFF

4.17.09

EcoScience Corporation
Raleigh, North Carolina

△ Planting Table Quantities Revised

NORTH CAROLINA PROFESSIONAL SEAL 026951 ENGINEER E. BRIAN BURKHART

E. BRIAN BURKHART, P.E.

Client:
Ecosystem Enhancement PROGRAM

Project:
EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA

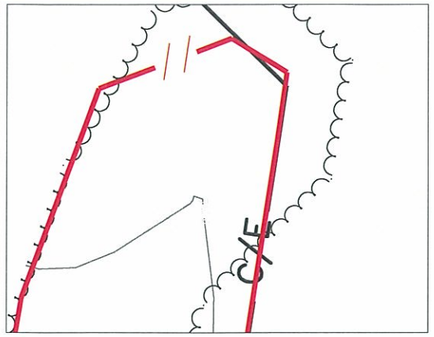
Title:
PLANTING PLAN

Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
JDC	FEB 2008

Scale: AS SHOWN

ESC Project No.: 05-229.00

SHEET
L1



INSET "A"
SCALE: 1"=30'

INSET "B"
SCALE: 1"=50'

FENCELINE DEVIATION (SEE INSET "A")

FENCELINE DEVIATION (MAX 0.68 FT)

FENCELINE DEVIATION (MAX 0.20 FT)

CHANNEL FORD

UT TO DUTCH BUFFALO CREEK

FENCELINE DEVIATION (SEE INSET "B")

MSS GPS BASE
NAD-83, NAVD 88
N: 657,016.3915'
E: 1,548,942.8600'
Z: 782.033'

LEGEND

—CE— CONSERVATION EASEMENT

—//— SURVEYED AS-BUILT FENCELINE

CHANNEL FORD

The fence and channel ford locations utilized in the Helms Stream and Wetland Enhancement Site As-Built Plans were developed by MSS Land Consultants, PC, 5540 McNeely Drive, Suite 101, Raleigh NC, 27612-7624 under the supervision of Wade A. Gowers, PLS L-4639 NC.

NORTH CAROLINA PROFESSIONAL SEAL 993 ENGINEER CHARLES R. McDUFFIE

18 MAY 2009

NAD 83

80' 0 80'
SCALE: 1"=80'

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

Client:
Ecosystem Enhancement PROGRAM

Project:

EEP HELMS STREAM AND WETLAND ENHANCEMENT SITE AS-BUILT

ROWAN COUNTY, NORTH CAROLINA

Title:

AS-BUILT SURVEY

Dsn. By:	Dwn. By:
JDC	TAL/DGJ
Ckd. By:	Date:
EBB/JDC	MAY 2009

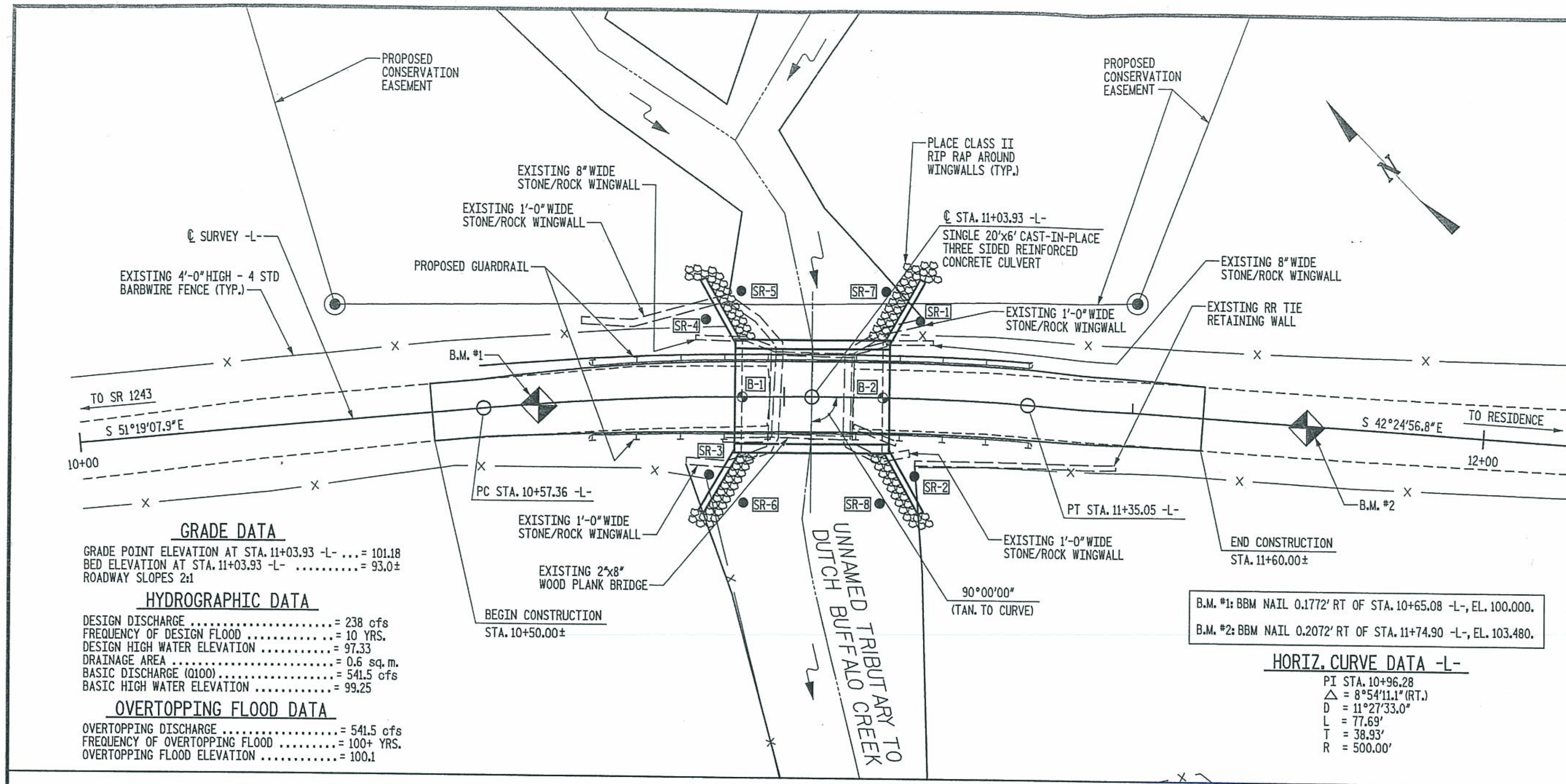
Scale: AS SHOWN

ESC Project No.: 05-229.00

SHEET

S1

F.A. PROJ. NO. NHS-85-2(47)69



GRADE DATA

GRADE POINT ELEVATION AT STA. 11+03.93 -L- ... = 101.18
BED ELEVATION AT STA. 11+03.93 -L- .... = 93.0±
ROADWAY SLOPES 2:1

HYDROGRAPHIC DATA

DESIGN DISCHARGE .... = 238 cfs
FREQUENCY OF DESIGN FLOOD .... = 10 YRS.
DESIGN HIGH WATER ELEVATION .... = 97.33
DRAINAGE AREA .... = 0.6 sq. m.
BASIC DISCHARGE (Q100) .... = 541.5 cfs
BASIC HIGH WATER ELEVATION .... = 99.25

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE .... = 541.5 cfs
FREQUENCY OF OVERTOPPING FLOOD .... = 100+ YRS.
OVERTOPPING FLOOD ELEVATION .... = 100.1

B.M. #1: BBM NAIL 0.1772' RT OF STA. 10+65.08 -L-, EL. 100.000.
B.M. #2: BBM NAIL 0.2072' RT OF STA. 11+74.90 -L-, EL. 103.480.

HORIZ. CURVE DATA -L-

PI STA. 10+96.28
△ = 8°54'11.1" (RT.)
D = 11°27'33.0"
L = 77.69'
T = 38.93'
R = 500.00'

LOCATION SKETCH

NOTES

THE CONTRACTOR SHALL PERFORM ALL CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF THE NCDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGES DATED JULY 2006 AND THE NCDOT ROADWAY STANDARD DRAWINGS DATED JULY 2006.

ASSUMED LIVE LOAD -------------- HS20-44 OR ALTERNATE LOADING.

DESIGN FILL --------------------- 3.00 FT.

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

1. FOOTINGS INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.

THE CONTRACTOR SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON SHEET 4.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.

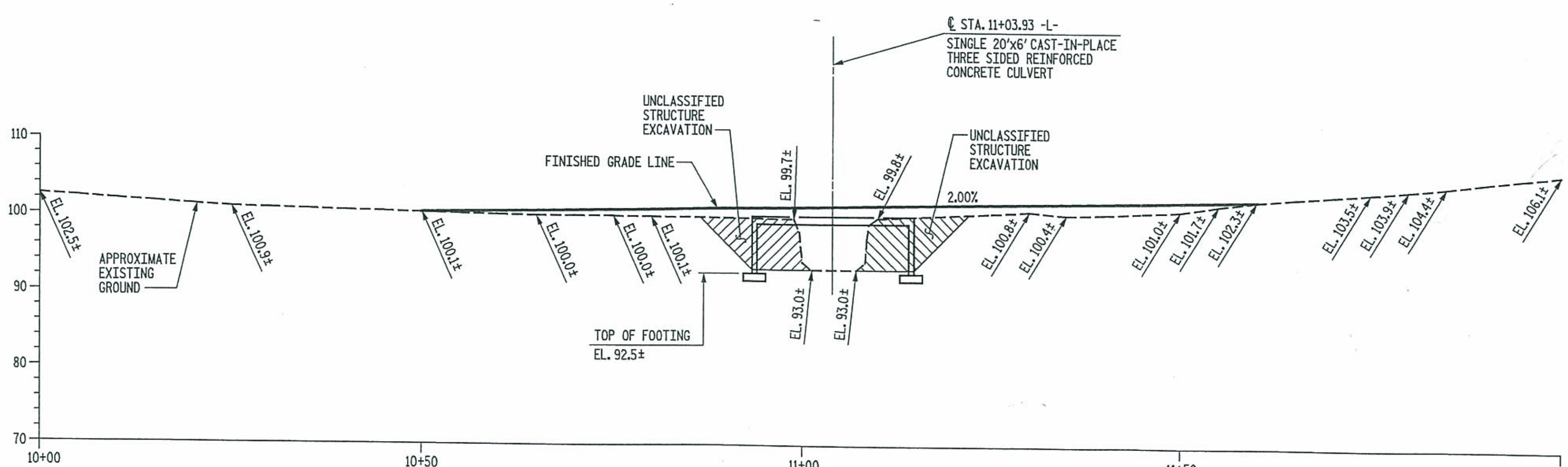
REMOVE AND SALVAGE EXISTING STONE AROUND EXISTING BRIDGE.

SALVAGED STONE SHALL BE STOCKPILED IN AREA DESIGNATED BY LAND OWNER.

⯁ GEOTECH BORE HOLES LOCATION

● GEOTECH SOUNDING ROD HOLES LOCATION

AS BUILT PLANS
OCTOBER 2008



PROFILE ALONG ℄ SURVEY -L-

KO & ASSOCIATES, P.C.
Consulting Engineers
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066

PROJECT NO. 8.1631509
ROWAN COUNTY
STATION: 11+03.93 -L-

STATE OF NORTH CAROLINA
ECOSYSTEM ENHANCEMENT PROGRAM
RALEIGH

THREE SIDED CULVERT
FOR EXISTING BRIDGE ON
EXISTING GRAVEL DRIVEWAY
OVER UNNAMED TRIBUTARY TO
DUTCH BUFFALO CREEK

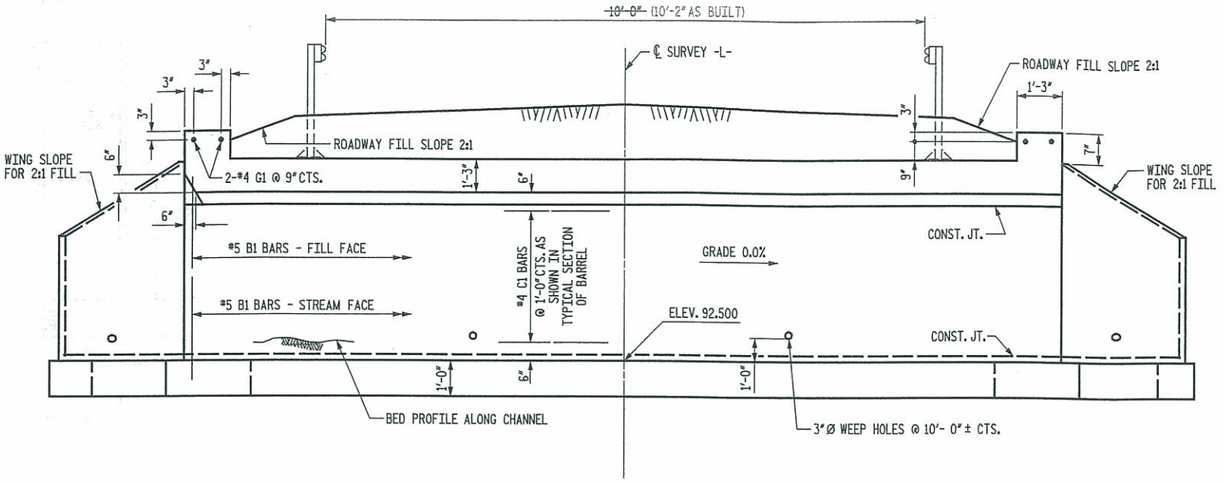
THIS DOCUMENT ORIGINALLY ISSUED AND SEALED BY: JAMES E. MONDOLFI, P.E. REG. NO. 20532 ON 11/16/07

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	K1
1			3			TOTAL SHEETS
2			4			K8

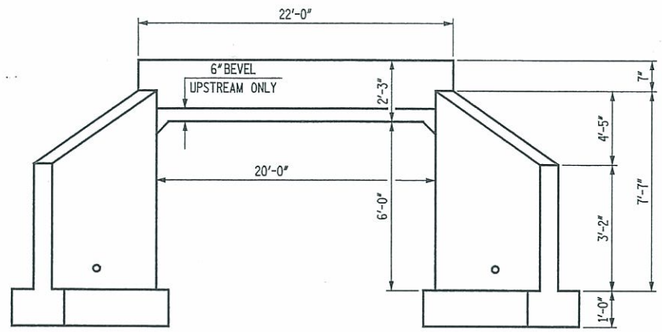
DRAWN BY B.E. LANNING DATE AUG. 2007
CHECKED BY J.E. MONDOLFI DATE AUG. 2007

PLOT: 10/17/2008 2:14:26 PM Ko & Associates, P.C.
FILE NAME: ...Culvert\dgn\...

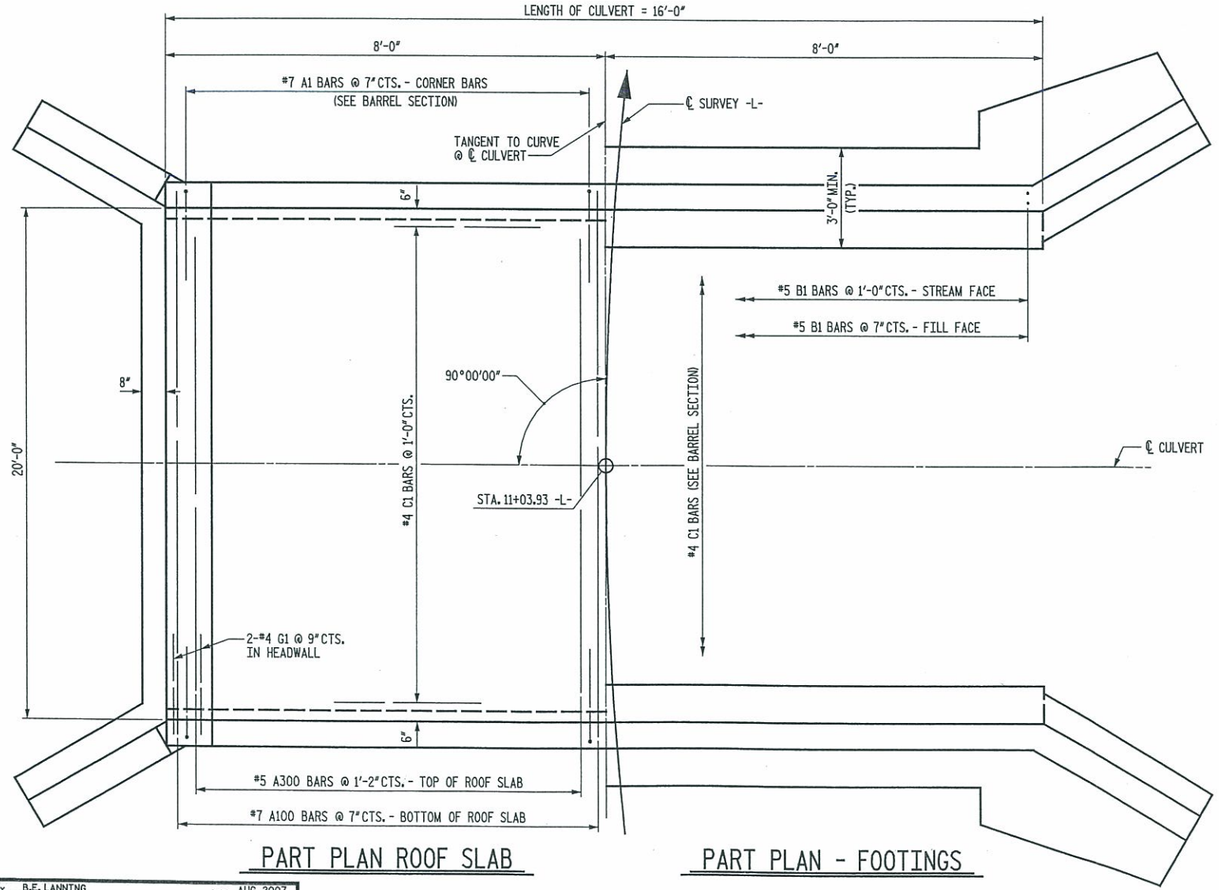
KO & ASSOCIATES, P.C.
Consulting Engineers
5121 KINGDOM WAY, SUITE 100
RALEIGH, N.C. 27607



CULVERT SECTION NORMAL TO ROADWAY

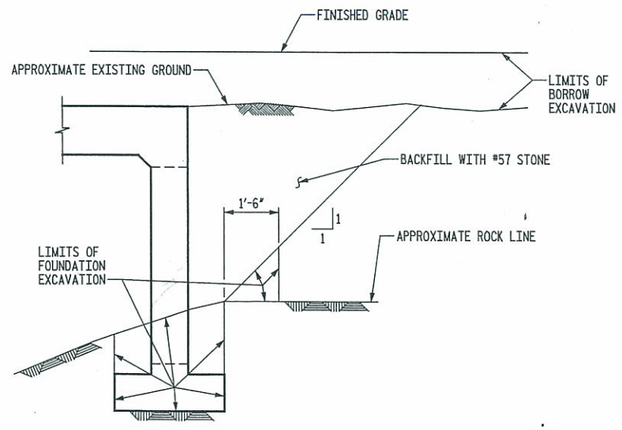


END ELEVATION



PART PLAN ROOF SLAB

PART PLAN - FOOTINGS



EXCAVATION AND EMBANKMENT AT CULVERT

(REINFORCING STEEL NOT SHOWN FOR CLARITY)

AS BUILT

This record drawing has been prepared in part, based upon information furnished by others. While this information is believed to be reliable, the Engineer cannot assure its accuracy, and thus is not responsible for the accuracy of this record drawing or for any errors or omissions which may have been incorporated into it as a result. Those relying on this record document are advised to obtain independent verification of its accuracy before applying for any purpose.

NORTH CAROLINA PROFESSIONAL SEAL 20532 ENGINEER JAMES E. MONDOLFI

SIGNATURE 10-17-08

KO & ASSOCIATES, P.C.
Consulting Engineers
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066

PROJECT NO. 8.1631509

ROWAN COUNTY

STATION: 11+03.93 -L-

DRAWN BY: B.E. LANNING DATE: AUG. 2007

CHECKED BY: J.E. MONDOLFI DATE: AUG. 2007

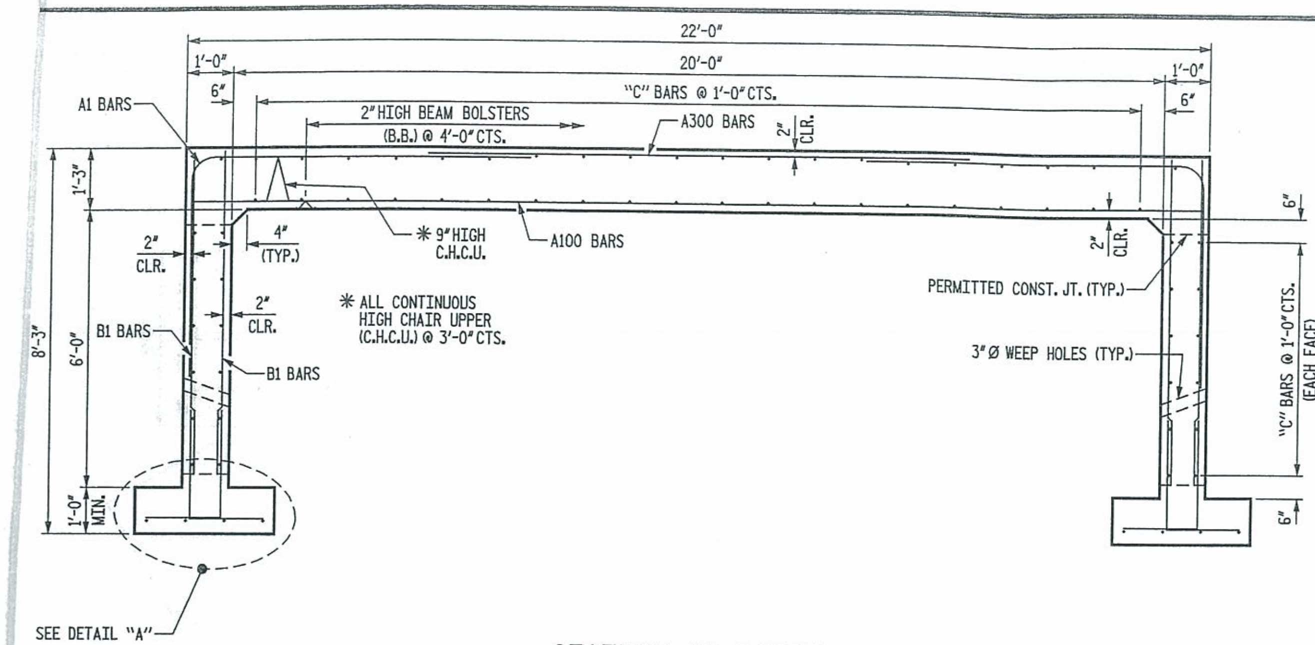
THIS DOCUMENT ORIGINALLY ISSUED AND SEALED BY: JAMES E. MONDOLFI, P.E. REG. NO. 20532 ON 11/16/07

STATE OF NORTH CAROLINA
ECOSYSTEM ENHANCEMENT PROGRAM
RALEIGH

SINGLE 20 FT. X 6 FT. THREE SIDED CULVERT 90°00'00" SKEW

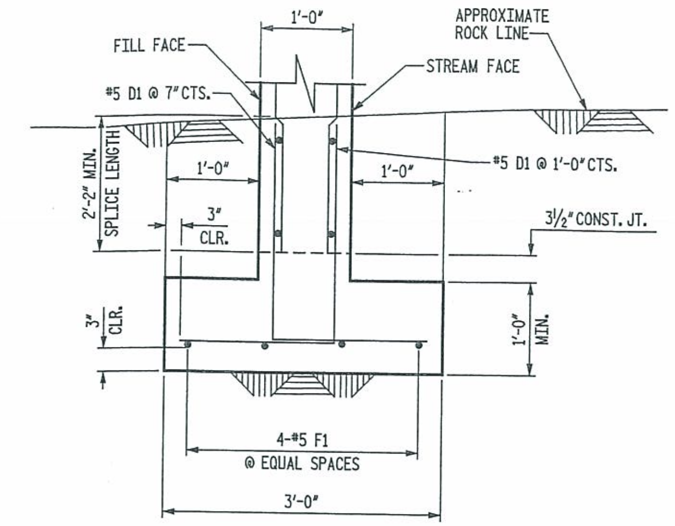
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	K2
1			3			TOTAL SHEETS
2			4			K8

PLOT: 10/17/2008
FILE NAME: S:\Value Site Culvert\Vdgn\Value_std_c2.dgn



SECTION OF BARREL

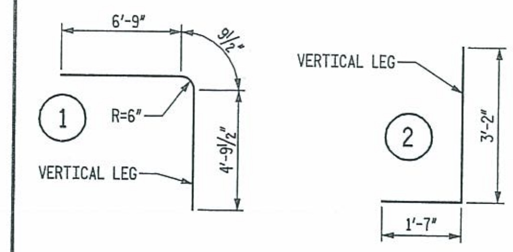
(LOOKING DOWNSTREAM)
THERE ARE 66 "C" BARS IN SECTION OF BARREL.



FOOTING DETAIL

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

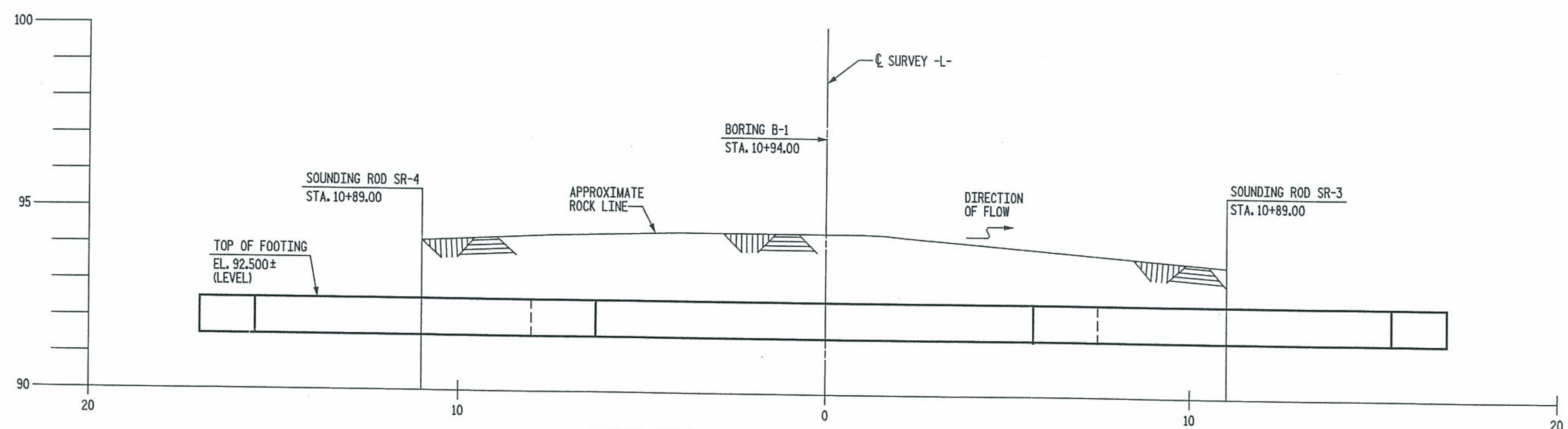


REINFORCING STEEL BAR SCHEDULE

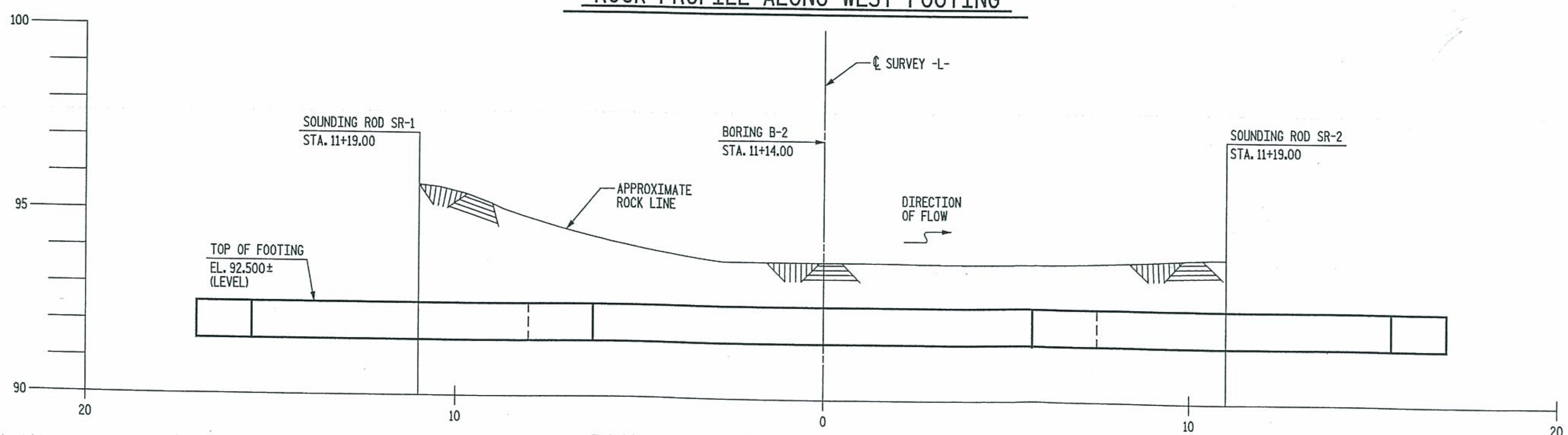
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	54	#7	1	12'-4"	1361
A100	27	#7	STR	21'-8"	1196
A300	14	#5	STR	11'-4"	165
B1	86	#5	STR	6'-9"	605
C1	66	#4	STR	15'-8"	691
D1	86	#5	2	4'-9"	426
F1	8	#5	STR	15'-6"	129
G1	4	#4	STR	21'-8"	58
REINFORCING STEEL				4631	LBS

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL	23.0	C.Y.
BARREL FOOTINGS	3.9	C.Y.
WINGS & HEADWALL	15.2	C.Y.
TOTAL	42.1	C.Y.
REINFORCING STEEL		
BARREL	4,076	LB.
BARREL FOOTINGS	555	LB.
WINGS	858	LB.
TOTAL	5,489	LB.
CULVERT EXCAVATION	LUMP SUM	



ROCK PROFILE ALONG WEST FOOTING



ROCK PROFILE ALONG EAST FOOTING

KO & ASSOCIATES, P.C.
Consulting Engineers
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066

PROJECT NO. 8.1631509
ROWAN COUNTY
STATION: 11+03.93 -L-

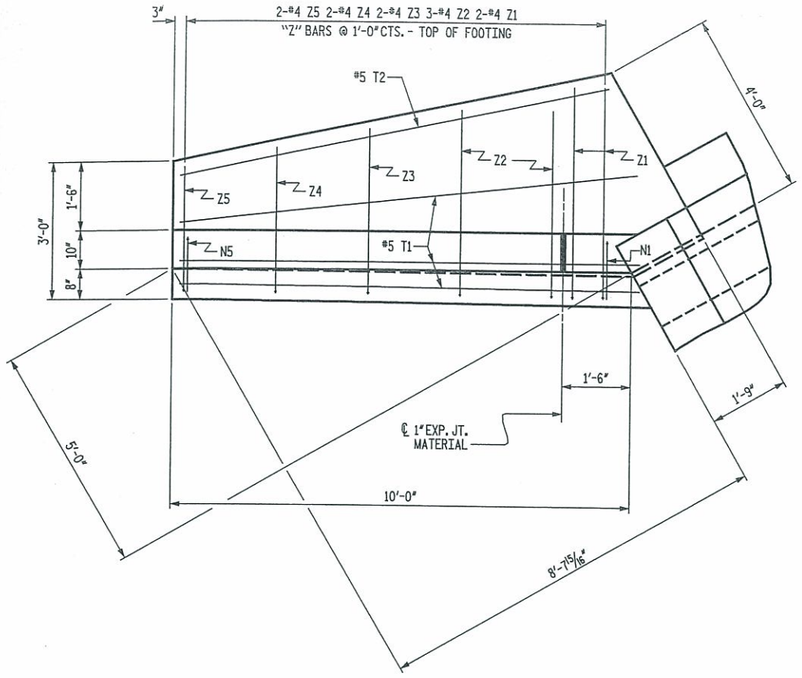
STATE OF NORTH CAROLINA
ECOSYSTEM ENHANCEMENT PROGRAM
RALEIGH

SINGLE 20 FT. X 6 FT.
THREE SIDED CULVERT
90°00'00" SKEW

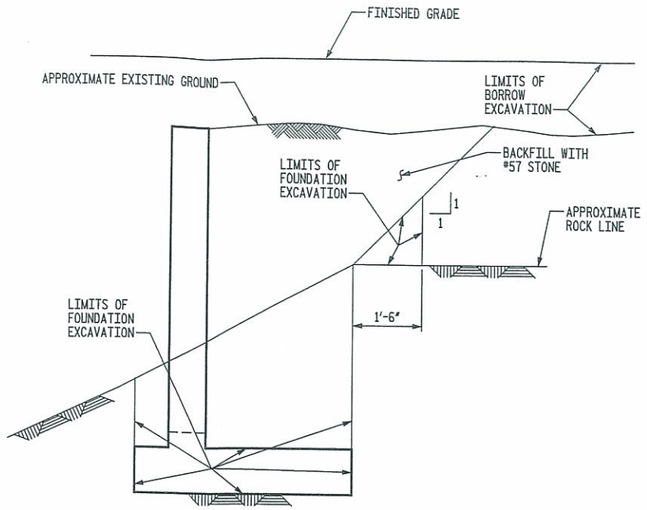
THIS DOCUMENT ORIGINALLY ISSUED AND SEALED BY: JAMES E. MONDOLFI, P.E. REG. NO. 20532 ON 1/16/07

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			K3
1			3					TOTAL SHEETS
2			4					K8

DRAWN BY B.E. LANNING DATE AUG. 2007
CHECKED BY J.E. MONDOLFI DATE AUG. 2007



PLAN

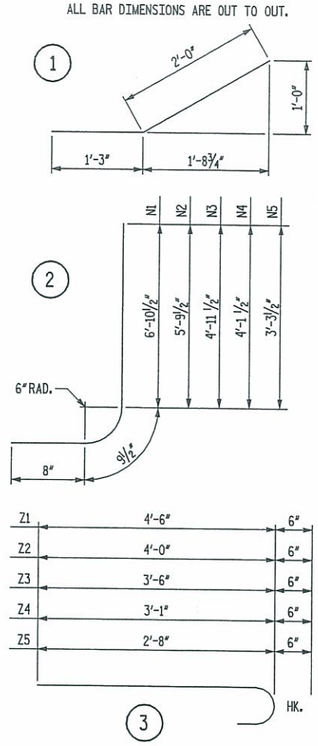


EXCAVATION AND EMBANKMENT AT WING

(REINFORCING STEEL NOT SHOWN FOR CLARITY)

BAR TYPES

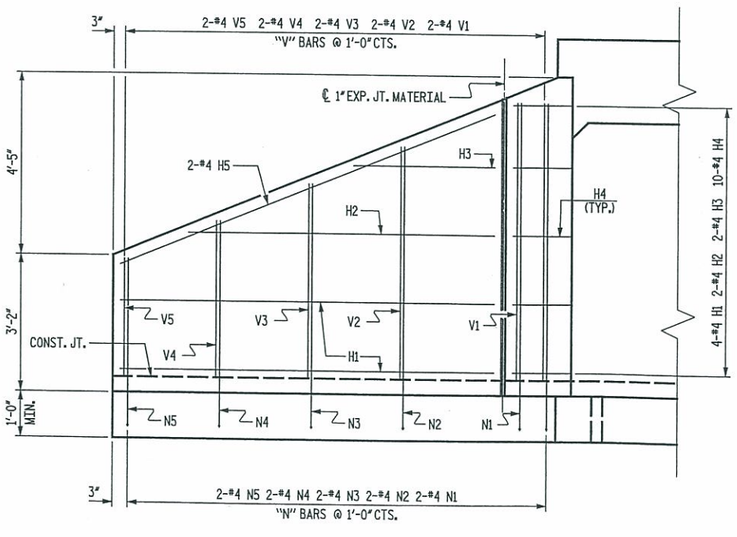
ALL BAR DIMENSIONS ARE OUT TO OUT.



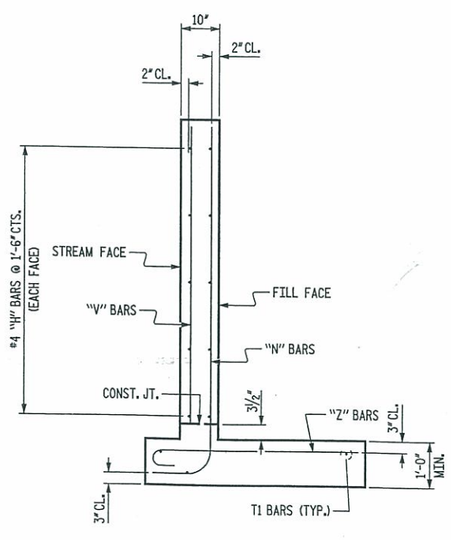
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	#4	STR	8'- 1"	86
H2	8	#4	STR	7'- 3"	39
H3	8	#4	STR	3'-11"	21
H4	40	#4	1	3'- 3"	87
H5	8	#4	STR	8'-11"	48
N1	8	#4	2	8'- 4"	45
N2	8	#4	2	7'- 3"	39
N3	8	#4	2	6'- 5"	34
N4	8	#4	2	5'- 7"	30
N5	8	#4	2	4'- 9"	25
T1	12	#5	STR	10'- 0"	125
T2	4	#5	STR	9'- 6"	40
V1	8	#4	STR	6'- 3"	33
V2	8	#4	STR	5'- 3"	28
V3	8	#4	STR	4'- 5"	24
V4	8	#4	STR	3'- 7"	19
V5	8	#4	STR	2'- 9"	15
Z1	8	#4	3	5'- 0"	27
Z2	12	#4	3	4'- 6"	36
Z3	8	#4	3	4'- 0"	21
Z4	8	#4	3	3'- 7"	19
Z5	8	#4	3	3'- 2"	17

REINFORCING STEEL FOR 4 WINGS & FOOTINGS	858	LBS
CLASS A CONCRETE		
4 WINGS & FOOTINGS	13.2	CY
2 HEADWALL	2.0	CY
TOTAL	15.2	CY



ELEVATION



TYPICAL WING SECTION

KO & ASSOCIATES, P.C.
Consulting Engineers
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-0066

PROJECT NO. 8.1631509

ROWAN COUNTY

STATION: 11+03.93 -L-

STATE OF NORTH CAROLINA
ECOSYSTEM ENHANCEMENT PROGRAM
RALEIGH

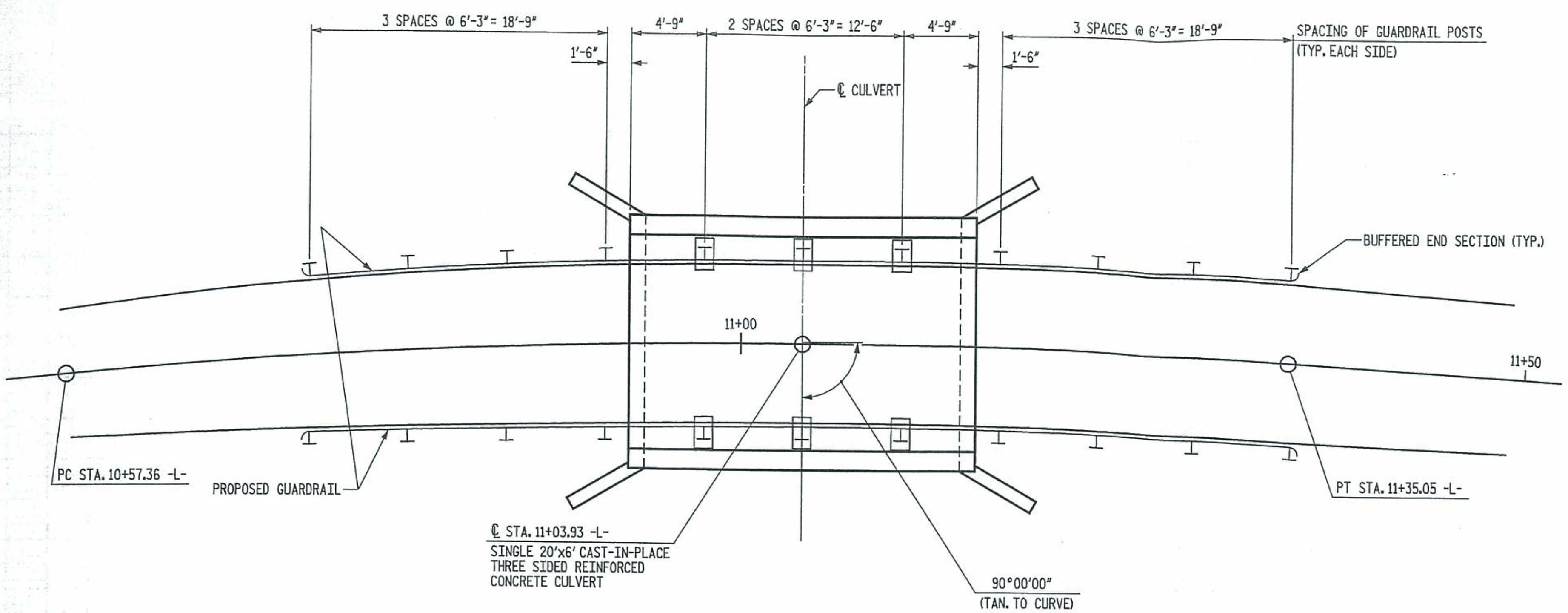
WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	K4
1			3			TOTAL SHEETS
2			4			K8

THIS DOCUMENT ORIGINALLY ISSUED AND SEALED BY:
JAMES E. MONDOLFI, P.E.
REG. NO. 20532
ON
11/16/07

DRAWN BY: B.E. LANNING DATE: AUG. 2007
CHECKED BY: J.E. MONDOLFI DATE: AUG. 2007

FILE NAME: S:\Maine Site Culvert\dgn\Maine_std_cul_Bridge



PLAN

SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2½".

B. 4 - 1"Ø x 2¼" BOLTS WITH WASHERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1"Ø x 2¼" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 7/16"Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 P.S.I. IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

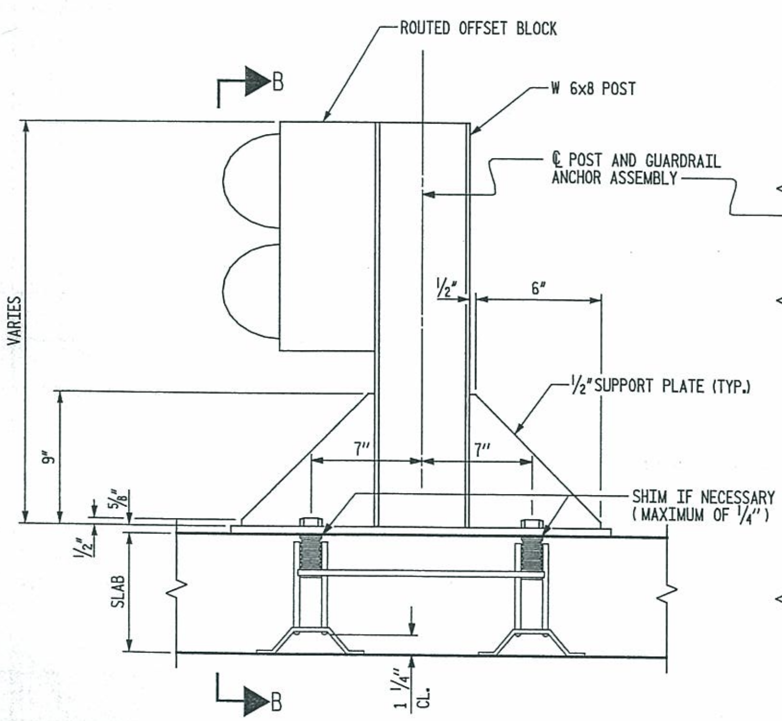
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

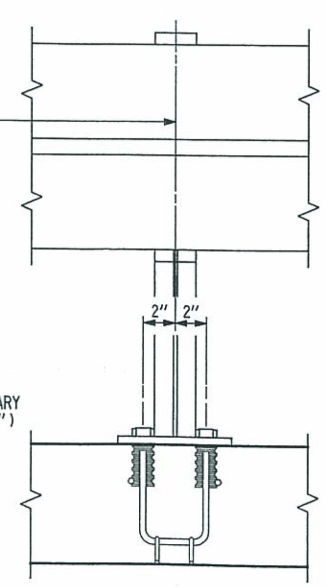
SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THIS OPTION WAS EXERCISED BY THE CONTRACTOR — * THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. THE YIELD LOAD OF THE 1"Ø BOLT IS 21.8 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS REQUIRED.

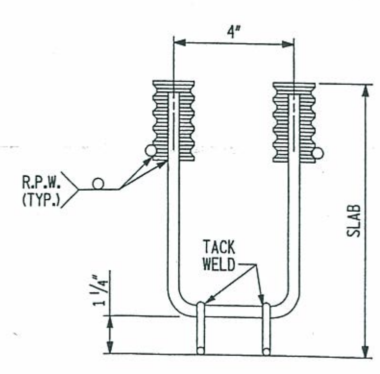
RAILS, POSTS AND BASE PLATES WITH SUPPORT PLATES SHALL BE AASHTO M270 GRADE 50W (WEATHERING STEEL).



SECTION A-A

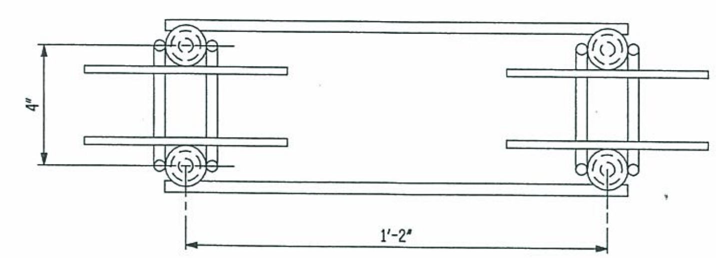


SECTION B-B

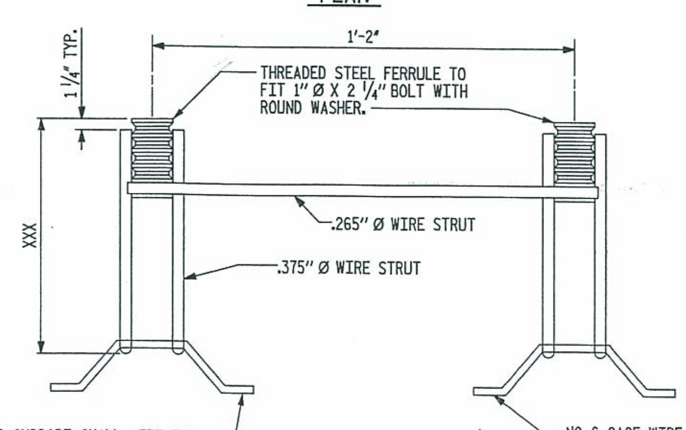


THIS SUPPORT SHALL MEET THE REQUIREMENTS AS SPECIFIED FOR SUPPORTS FOR REINFORCING STEEL. SEE SPECIFICATIONS.

ELEVATION



PLAN



SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

AS BUILT

This record drawing has been prepared in part, based upon information furnished by others. While this information is believed to be reliable, the Engineer cannot assure its accuracy, and thus is not responsible for the accuracy of this record drawing or for any errors or omissions which may have been incorporated into it as a result. Those relying on this record document are advised to obtain independent verification of its accuracy before applying for any purpose.

NORTH CAROLINA PROFESSIONAL SEAL 20532 ENGINEER JAMES E. MONDOLFI

SIGNATURE 10-17-08

KO & ASSOCIATES, P.C.
Consulting Engineers
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066

PROJECT NO. 8.1631509

ROWAN COUNTY

STATION: 11+03.93 -L-

THIS DOCUMENT ORIGINALLY ISSUED AND SEALED BY: JAMES E. MONDOLFI, P.E. REG. NO. 20532 ON 11/16/07

STATE OF NORTH CAROLINA
ECOSYSTEM ENHANCEMENT PROGRAM
RALEIGH

STANDARD
ANCHORAGE DETAILS FOR
GUARDRAIL ANCHOR ASSEMBLY
FOR CULVERTS

ASSEMBLED BY : B.E. LANNING	DATE : JUNE 2007	
CHECKED BY : J.E. MONDOLFI	DATE : JUNE 2007	
DRAWN BY : FCJ 6/88	REV. 7/10/01	LES/RDR
CHECKED BY : ARB 6/88	REV. 5/7/03	RWW/JTE
	REV. 5/1/06	TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	K5
1			3			TOTAL SHEETS
2			4			K8

STD. NO. GRA1

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	HELMS	K6

10+50.00

10+25.00

10+00.00

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	HELMS	K7

11+25.00 F = 26.6 sf

11+00.00

10+75.00 F = 19.5 sf

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	HELMS	K8

12+00.00

11+75.00

11+50.00

F = 16.9 sf

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	- - - - - - - - - - - - - - -	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	- - - - - - - - - - - - - - - - - -	SEE PLANS
IMPACT ALLOWANCE	- - - - - - - - - - - - - -	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF		
STRUCTURAL STEEL - AASHTO M270 GRADE 36	-	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	-	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	-	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION		
GRADE 60	- -	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	- - - - - - - - - -	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	- - - - - - - - - - - - -	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR		
UNTREATED - EXTREME FIBER STRESS	- - - - -	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	- - - -	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	- - - - -	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2006 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM (c) RGW REV. 5-7-03 RWW (c) JTE
REV. 8-16-99 RWW (c) LES REV. 5-1-06 TLA (c) GM