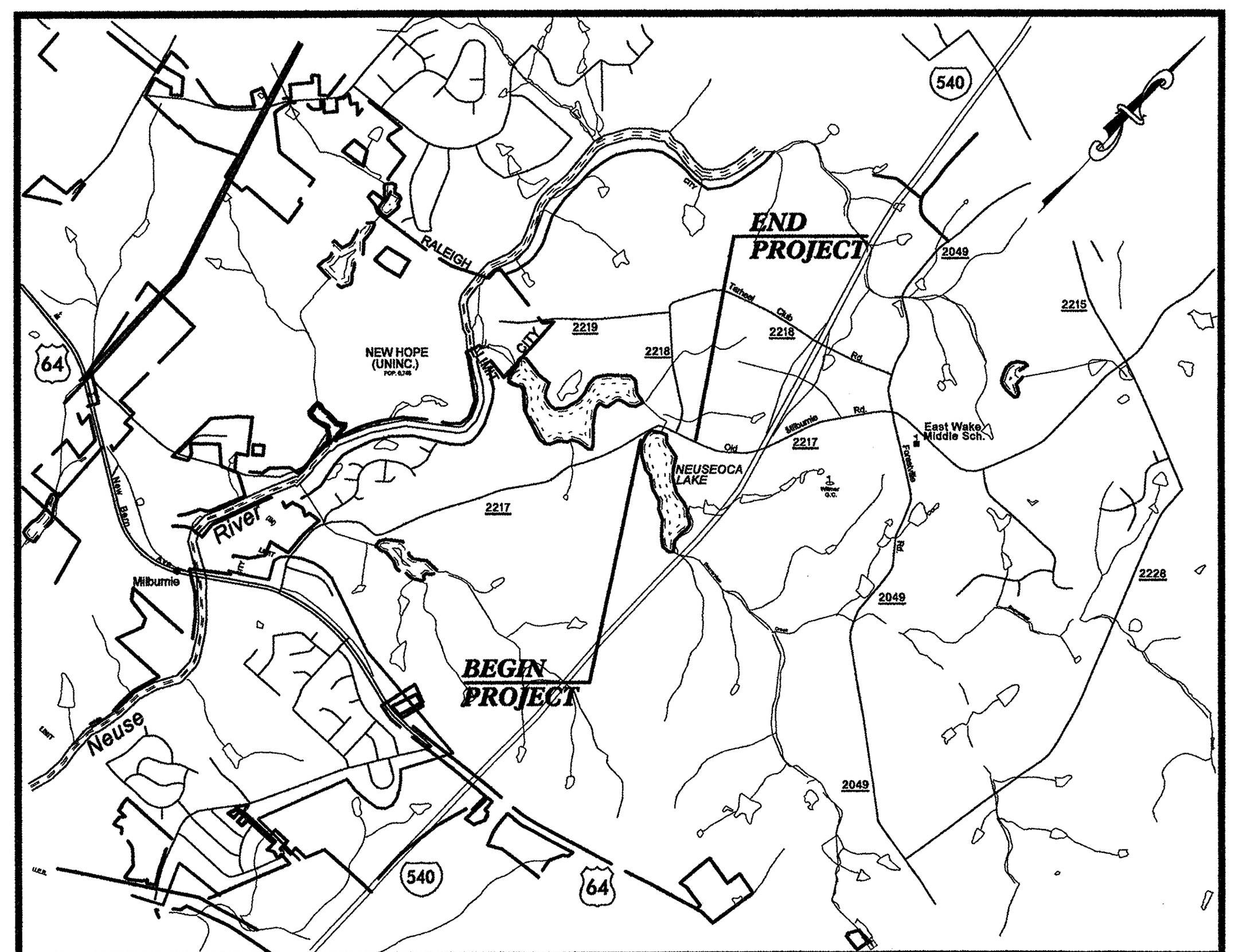
09/08/99

TIP PROJECT: B-4304

CONTRACT: 202069

11/15/2008
R:\Roadway\Proj\b4304_rdy_tsh.dgn
8:08:25 AM

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



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

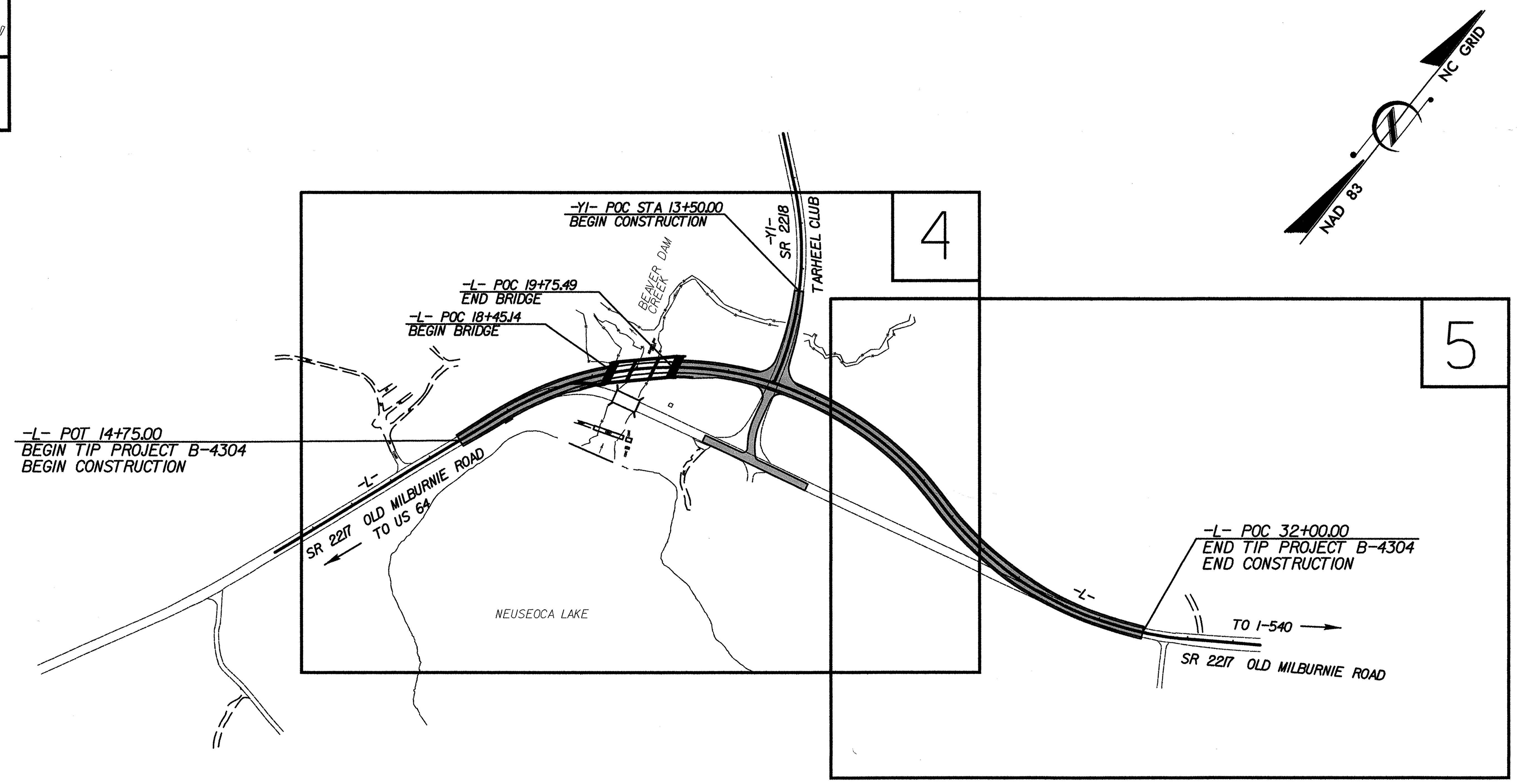
WAKE COUNTY

LOCATION: BRIDGE NO. 143 OVER BEAVER DAM CREEK ON SR 2217 (OLD MILBURNIE ROAD)

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4304	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
33641.1.1	BRZ-2217(1)	P.E.
33641.2.1	BRSTP-2217(2)	R/W /UTIL
33641.3.1	BRSTP-2217(2)	CONST.



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PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

NCDOT CONTACT : DOUG TAYLOR, PE
PROJECT ENGINEER - ROADWAY DESIGN

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 6,100
ADT 2030 = 11,400
DHV = 11 %
D = 60 %
T = 3% % *
V = 45 MPH
* (TTST 1% + DUALS 2%)
FUNCTIONAL CLASS. = MINOR COLLECTOR
**DESIGN EXCEPTION- STOPPING SIGHT DISTANCE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4304	=	0.302 MI
LENGTH STRUCTURE TIP PROJECT B-4304	=	0.025 MI
TOTAL LENGTH TIP PROJECT B-4304	=	0.327 MI

Prepared In the Office of:
MULKEY ENGINEERS & CONSULTANTS
FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 15, 2008

LETTING DATE:
APRIL 21, 2009

TIM S. HAYES, PE
PROJECT ENGINEER

JOHNNY R. BANKS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026696 ENGINEER JEFFREY L. REOK
SIGNATURE: P.E. 11-18-08

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19563 ENGINEER TIMOTHY SCOTT HAYES
SIGNATURE: 11-18-08 P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY DESIGN ENGINEER

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PROJECT REFERENCE NO.	SHEET NO.
B-4304	1-A
R/W SHEET NO.	

NORTH CAROLINA PROFESSIONAL SEAL 19593 ENGINEER SCOTT HAYES

11-20-08

REVISIONS

INDEX OF SHEETS

Sheet #	Description
1	Title Sheet
1-A	Index of Sheets, General Notes, and List of Standards
1-B	Conventional Symbols
1-C	Survey Control Sheet
2	Pavement Schedule, Wedging Detail, and Typical Sections
2-A	Typical Sections
2-B	Anchorage for Frames - Brick/Concrete/Precast Concrete
2-C thru 2M	Temporary Shoring Details
3	Summary of Quantities
3-A	List of Pipe, Endwalls, Etc. (For Pipes 48" & Under), Summary of Earthwork in Cubic Yards, & Summary of Pavement Removal
3-B	Guardrail Summary & Temporary Guardrail Summary
3-C	Parcel Index Sheet
4 & 5	Plan and Profile
6	-Y- Lines Profile
TCP-1 thru TCP-7	Traffic Control Plans
EC-1 thru EC-7	Erosion Control Plans
RF-1	Reforestation Detail Sheet
SIGN-1 thru SIGN-4	Signing Plans
UC-1 thru UC-3	Utility Construction Plans
UO-1 thru UO-3	Utilities By Others Plans
EW-Volume-1	Cross-Section Summary Sheet
X-1 thru X-14	Cross-Sections
S-1 thru S-31	Structure Plans

GENERAL NOTES:

2006 SPECIFICATIONS
EFFECTIVE: 07-18-06
REVISED: 07-18-06

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

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

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE PROGRESS ENERGY, Time Warner Co., & AT&T

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY CONTRACT.

EFF. 07-18-06
REV. 01-02-07

2006 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation - Method 'A'
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
846.02	Drop Inlet Installation in Expressway Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
850.01	Concrete Paved Ditches
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
866.01	Chain Link Fence - 4', 5' and 6' High Fence
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

Note: Not to Scale

**S.U.E. = Subsurface Utility Engineering*

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

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(919) 851-1815 (FAX)
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PROJECT REFERENCE NO.	SHEET NO.
B-4304	1-B
R/W SHEET NO.	

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1
- Buffer Zone 2
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — A
- Proposed Control of Access — A
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

REVISIONS

10/25/05

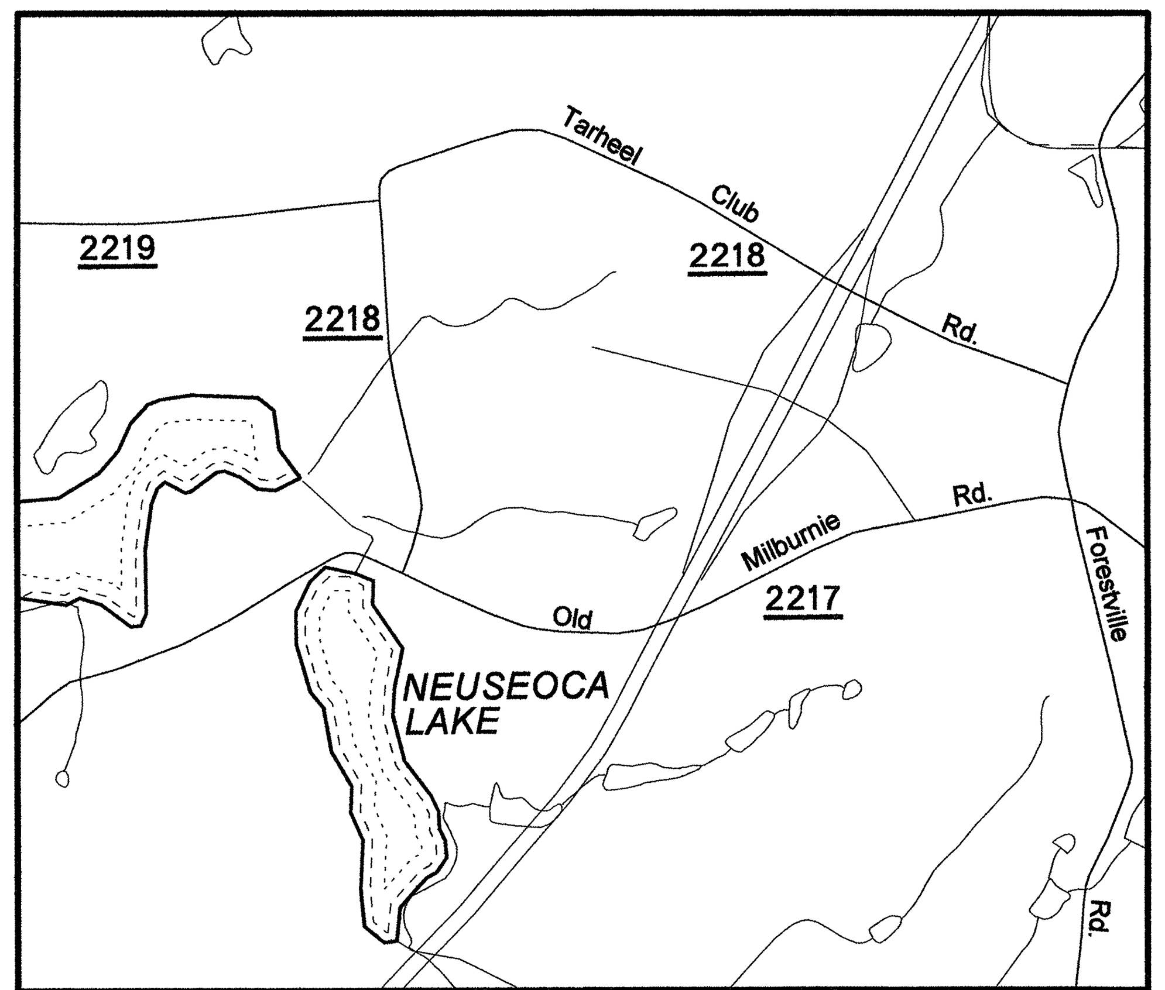
11/5/2008 7:51:00 AM R:\Roadway\Proj\b4304_rdy_tsh.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-4304	1C
Location and Surveys	

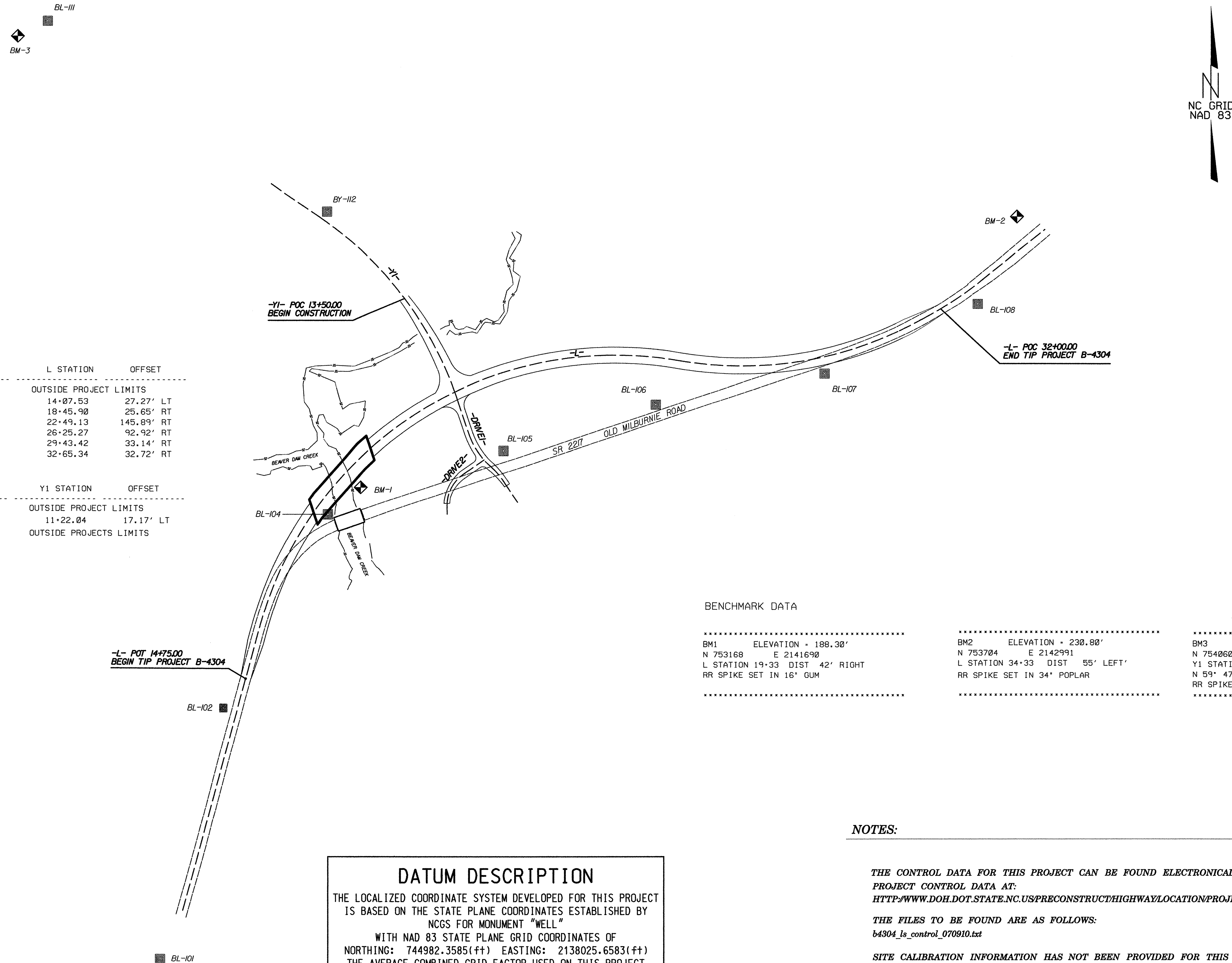
SURVEY CONTROL SHEET B-4304
WAKE COUNTY

LOCATION: BRIDGE NO. 143 OVER BEAVER DAM CREEK ON SR 2217 (OLD MILBURNIE RD)

B-4304



VICINITY MAP



BASELINE DATA

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
101	BL-101	752233.8640	2141292.7260	225.43'	OUTSIDE PROJECT LIMITS	
102	BL-102	752731.9860	2141418.2400	196.35'	14+07.53	27.27' LT
104	BL-103	753114.4180	2141625.2090	185.89'	18+45.90	25.65' RT
105	BL-105	753239.9460	2141973.1550	190.90'	22+49.13	145.89' RT
106	BL-106	753331.2260	2142274.9910	198.36'	26+25.27	92.92' RT
107	BL-107	753392.2190	2142609.8070	207.95'	29+43.42	33.14' RT
108	BL-108	753530.2660	2142913.2500	225.08'	32+65.34	32.72' RT

BY

POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
111	BY-111	754089.9330	2141070.5190	204.20'	OUTSIDE PROJECT LIMITS	
112	BY-112	753713.1930	2141623.7770	191.29'	11+22.04	17.17' LT
A105	BL-105	753239.9460	2141973.1550	190.90'	OUTSIDE PROJECTS LIMITS	

BENCHMARK DATA

BM1 ELEVATION = 188.30'
N 753168 E 2141690
L STATION 19+33 DIST 42' RIGHT
RR SPIKE SET IN 16" GUM

BM2 ELEVATION = 230.80'
N 753704 E 2142991
L STATION 34+33 DIST 55' LEFT'
RR SPIKE SET IN 34" POPLAR

BM3 ELEVATION = 209.50'
N 754060 E 2141011
Y1 STATION 10+00
N 59° 47' 29" W DIST 581'
RR SPIKE SET IN 12" GUM

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "WELL"
WITH NAD 83 STATE PLANE GRID COORDINATES OF
NORTHING: 744982.3585(ft) EASTING: 2138025.6583(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99990678
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "WELL" TO -L- STATION 14+75.00 IS
N 23°45'27" E 8,530.44'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NCGS "WELL" (NAD 83)
N= 744982.3585
E= 2138025.6583

⬡

NOTE: DRAWING NOT TO SCALE

NOTES:

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:
b4304_ls_control_070910.txt

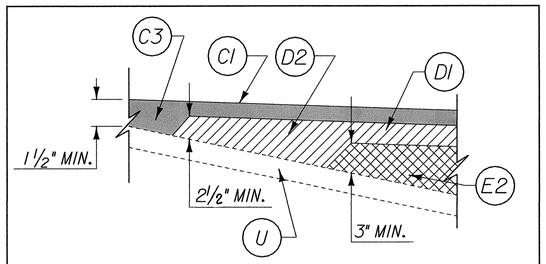
SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

⬡ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

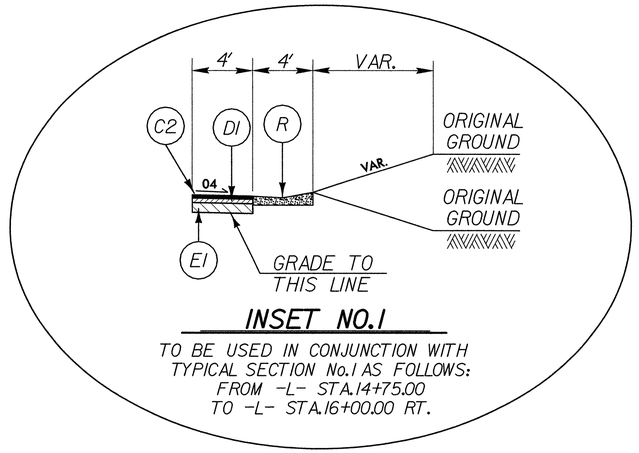
PAVEMENT SCHEDULE

C1	PROPOSED APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YARD
C2	PROPOSED APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YARD IN EACH OF TWO LAYERS.
C3	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1 1/2" OR GREATER THAN 2" IN DEPTH.
D1	PROPOSED APPROX. 2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YARD
D2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" OR GREATER THAN 4" IN DEPTH.
E1	PROPOSED APPROXIMATE 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YARD.
E2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" OR GREATER THAN 5 1/2" IN DEPTH.
R	EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING DETAIL

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

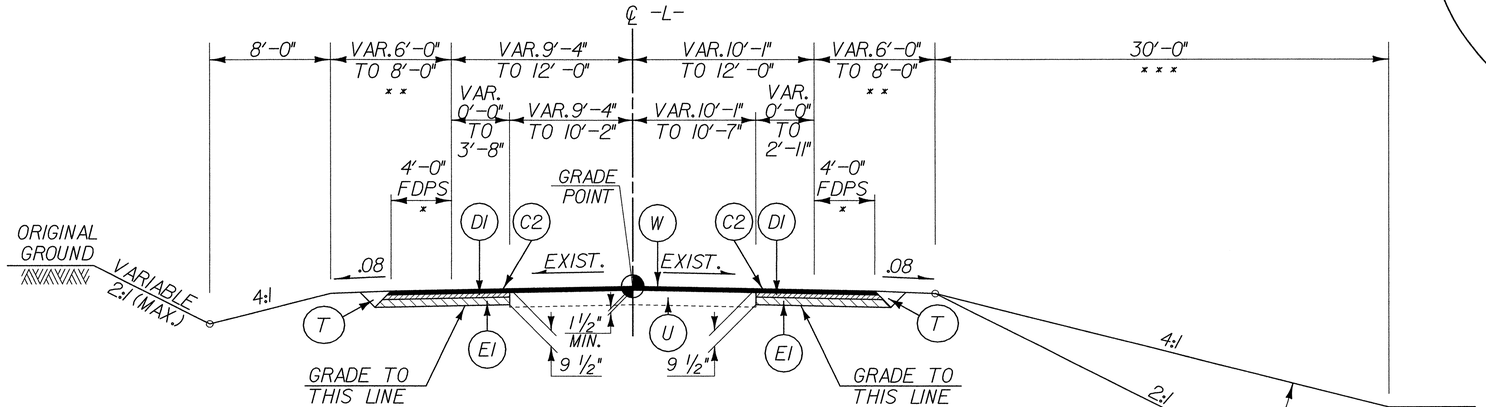


WEDGING DETAIL (W)



INSET NO.1

TO BE USED IN CONJUNCTION WITH TYPICAL SECTION No.1 AS FOLLOWS:
FROM -L- STA.14+75.00
TO -L- STA.16+00.00 RT.



TYPICAL SECTION No. 1

USE TYPICAL SECTION No.1 AS FOLLOWS:
TRANSITION FROM EXISTING TO T.S.NO.1 FROM -L- STA.14+75.00 TO -L- STA.15+35.00
FROM -L- STA.15+35.00.00 TO -L- STA.18+00.00
FROM -L- STA.28+50.00.00 TO -L- STA.31+50+00.00
TRANSITION FROM T.S.NO.1 TO EXISTING FROM -L- STA.31+50.00 TO -L- STA.32+00.00

* FDPS = FULL DEPTH PAVED SHOULDER

** ADD 3'-0" FOR GUARDRAIL

*** WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS OF 6:1 TO 2:1 THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

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PROJECT REFERENCE NO.	SHEET NO.
B-4304	2
RW SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19563 ENGINEER JIMMY SCOTT HAYES
11-18-08

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
11/19/08

REVISIONS

11/5/2008 8:19:54 AM R:\Roadway\Proj\b4304_rdy_typ.dgn

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PROJECT REFERENCE NO.	SHEET NO.
B-4304	2-A
R/W SHEET NO.	

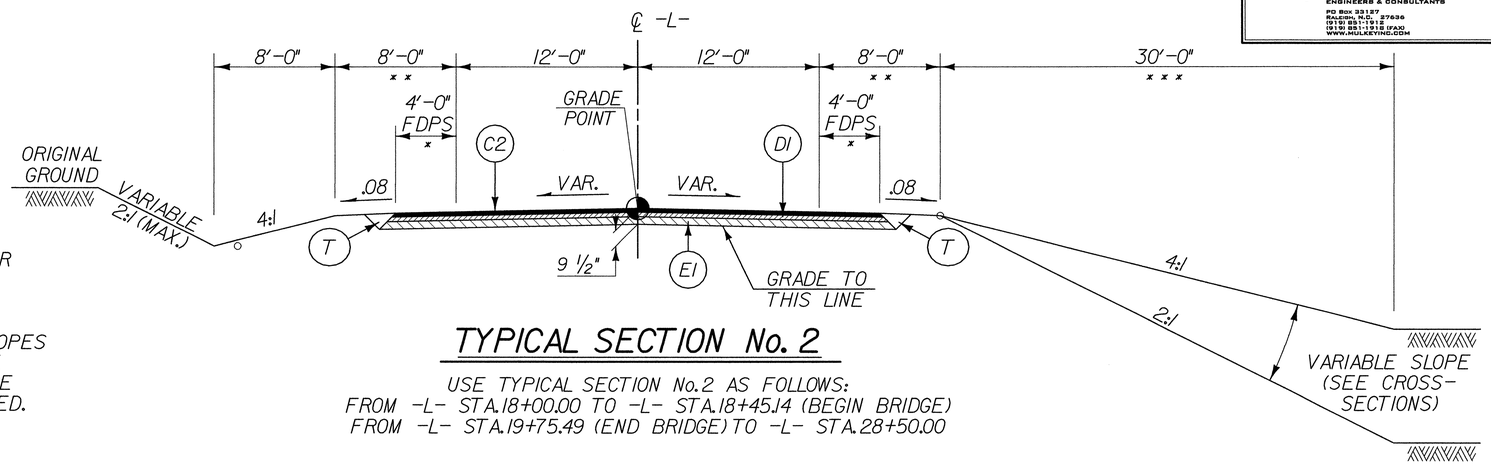
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19563 ENGINEER TIMOTHY SCOTT HAYES
11-18-08

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
11/19/08

REVISIONS



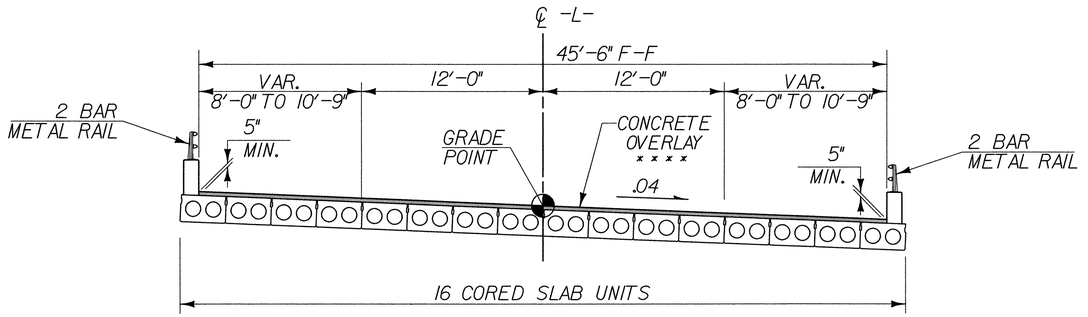
* FDPS = FULL DEPTH PAVED SHOULDER

** ADD 3'-0" FOR GUARDRAIL

*** WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS OF 6:1 TO 2:1 THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

TYPICAL SECTION No. 2

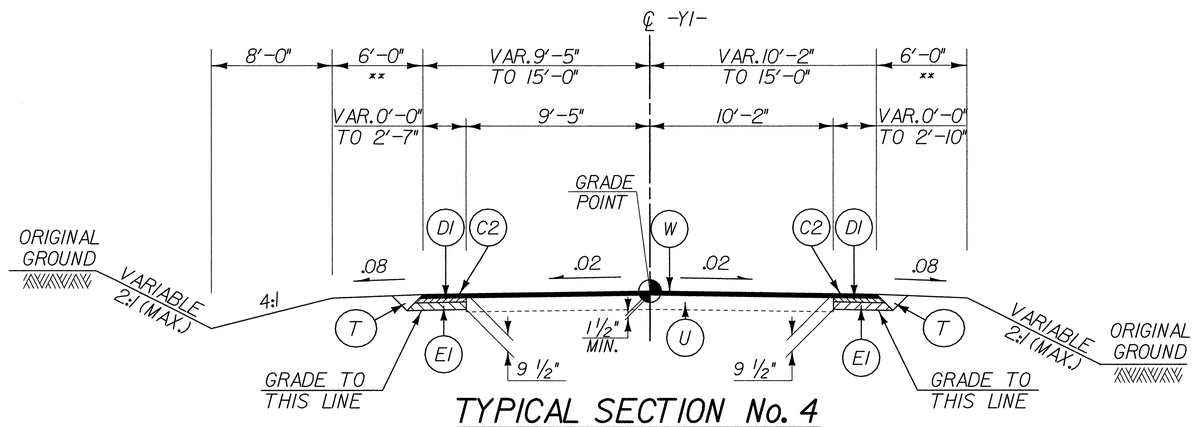
USE TYPICAL SECTION No.2 AS FOLLOWS:
FROM -L- STA.18+00.00 TO -L- STA.18+45.14 (BEGIN BRIDGE)
FROM -L- STA.19+75.49 (END BRIDGE) TO -L- STA.28+50.00



**** STRUCTURE PAY ITEM

TYPICAL SECTION No. 3

USE TYPICAL SECTION No.3 AS FOLLOWS:
FROM -L- STA.18+45.14 (BEGIN BRIDGE)
TO -L- STA.19+75.49 (END BRIDGE)



TYPICAL SECTION No. 4

USE TYPICAL SECTION No.4 AS FOLLOWS:
TRANSITION FROM EXISTING TO T.S.NO.4 FROM
-Y1- STA.13+50.00 TO STA.13+98.00
FROM -Y1- STA.13+98.00 TO STA.15+48.54

** ADD 3'-0" FOR GUARDRAIL

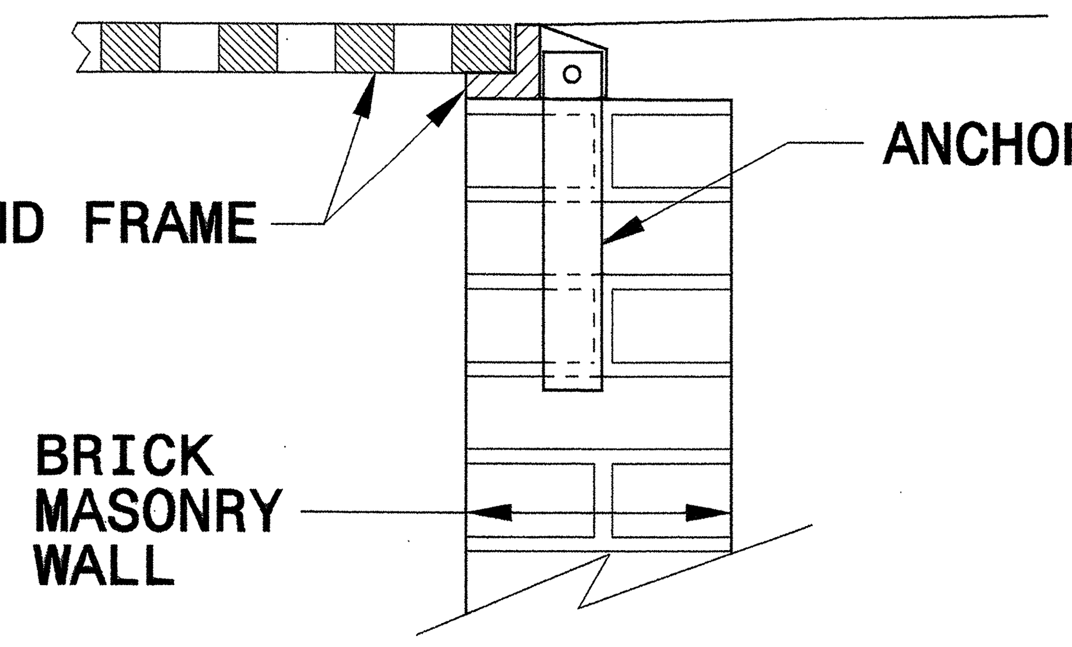
C1	1 1/2" S9.5B
C2	3" S9.5B
C3	VAR. DEPTH S9.5B
D1	2 1/2" I19.0B
D2	VAR. DEPTH I19.0B
E1	4" B25.0B
E2	VAR. DEPTH B25.0B
R	EXPRESSWAY GUT.
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING

NOTE:
1. SEE SHEET 2 FOR DETAILED DESCRIPTION OF PAVEMENT SCHEDULE
2. ALL PAVEMENT EDGES ARE 1:1 UNLESS OTHERWISE NOTED

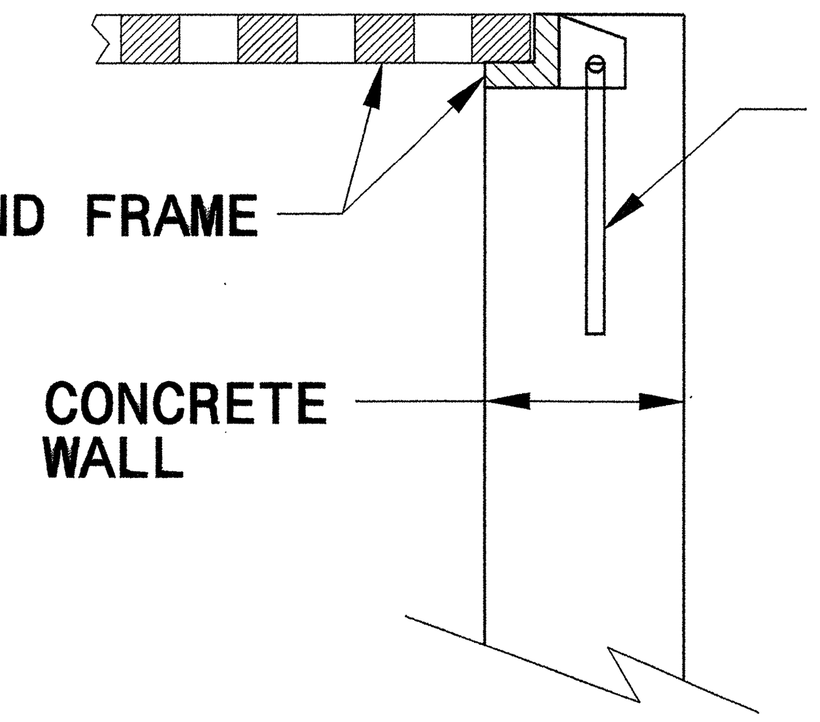
10:36:57 AM R:\Roadway\Proj\b4304_rdy_typ.dgn
11/5/2008

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

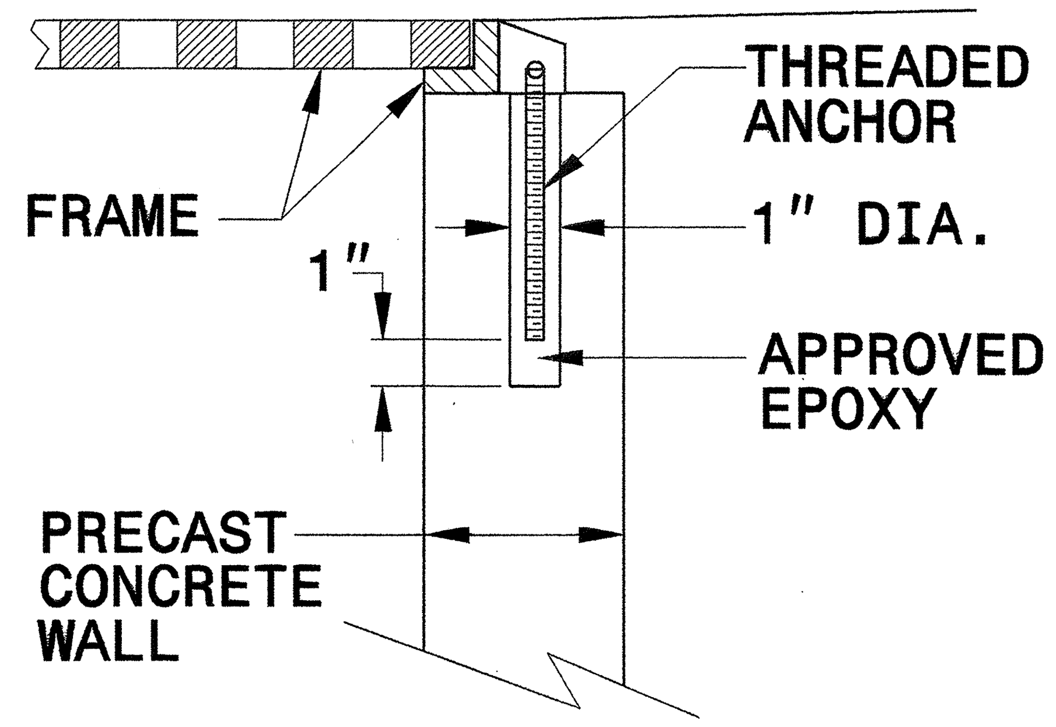
ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE



BRICK MASONRY CONSTRUCTION



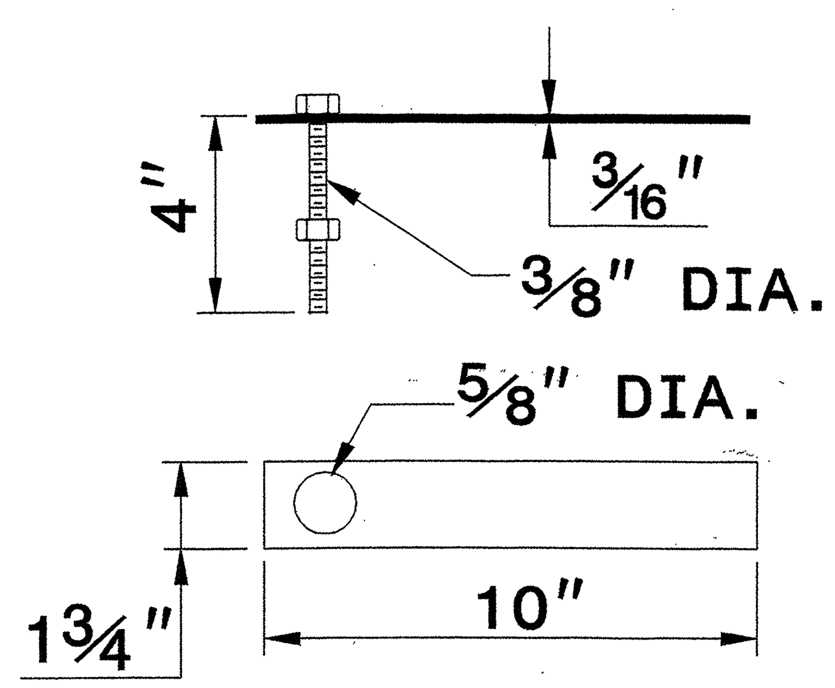
CONCRETE CONSTRUCTION



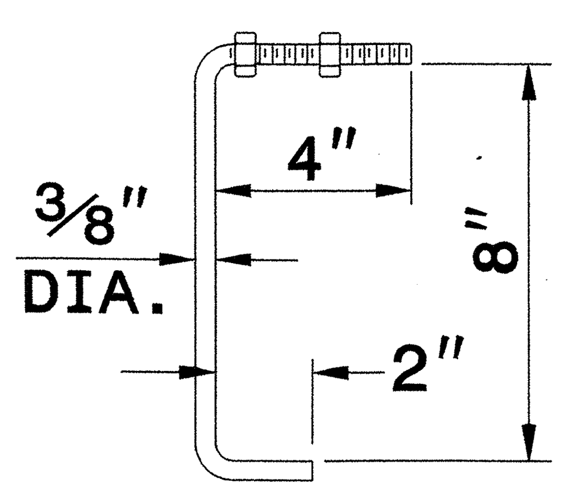
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

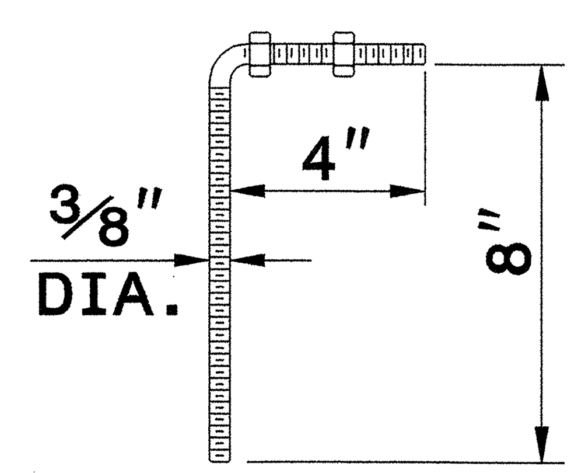
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



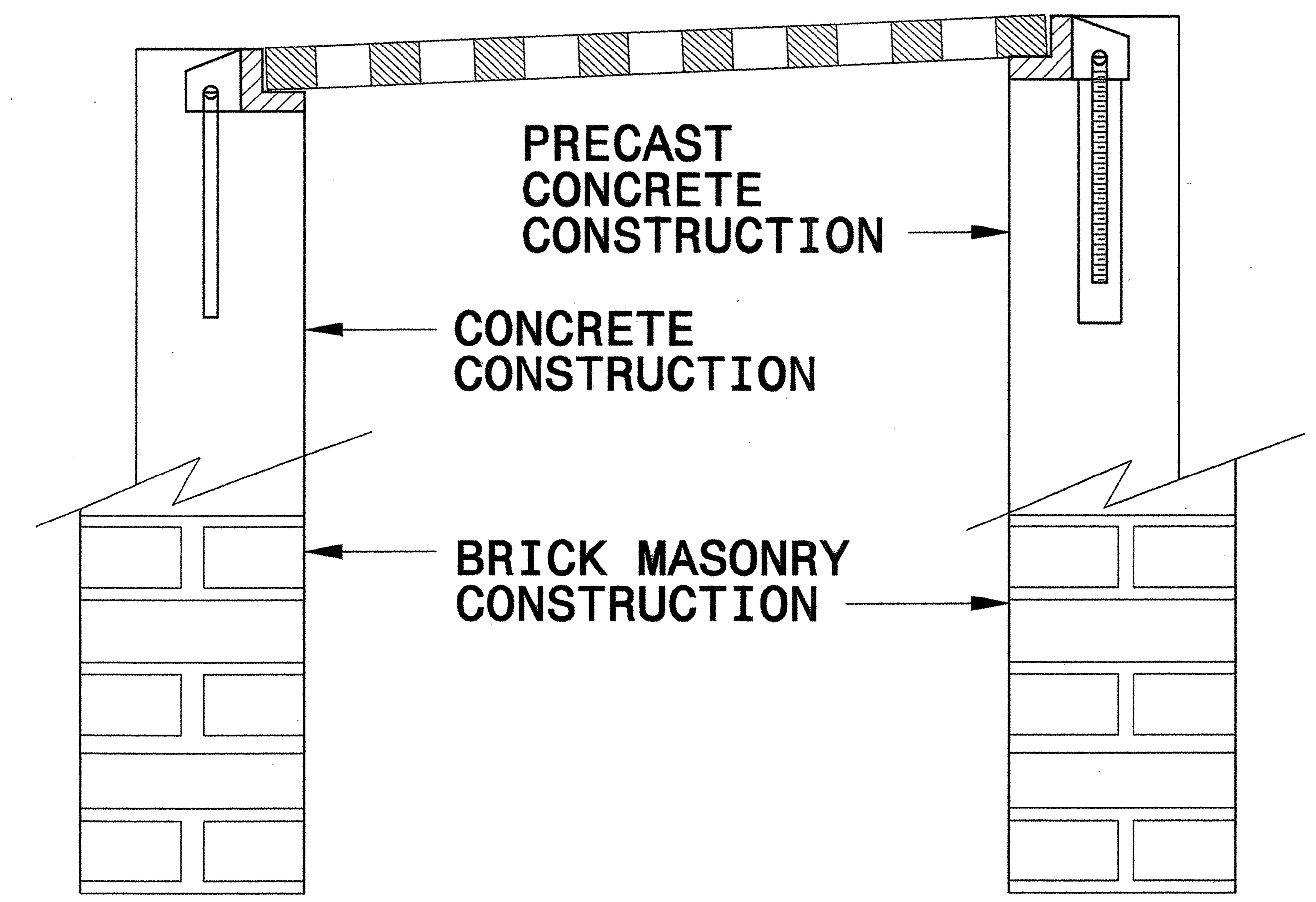
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



CONCRETE ANCHOR
3/8" DIA. BENT BAR



PRECAST CONCRETE ANCHOR
3/8" DIA. BENT BAR



FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1
840D25

SHEET 1 OF 1
840D25

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
[illegible] 12/1/08

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

SEE PLATE FOR TITLE

ORIGINAL BY: 2006 STD 840.25 DATE: 07/18/06
MODIFIED BY: E.E. WARD DATE: 9/25/06
CHECKED BY: DATE:
FILE SPEC.:

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

PROJECT REFERENCE NO.	SHEET
B-4304	2-C

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A HIDDEN

Scott A. Hidden 3/29/07

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

STANDARD TEMPORARY MSE WALL OPTIONS

TEMPORARY MSE WALL OPTION	VENDOR	CONTACT INFORMATION	REINFORCEMENT TYPE	SHEETS
TEMPORARY FABRIC WALL	N/A	N/A	POLYESTER OR POLYPROPYLENE FABRIC	3
HILFIKER TEMPORARY WALL	HILFIKER RETAINING WALLS	1902 HILFIKER LANE, EUREKA, CA 95503-5711 707-443-5093 WWW.HILFIKER.COM	WELDED WIRE MAT	4
SIERRASCAPE TEMPORARY WALL	TENSAR EARTH TECHNOLOGIES, INC	5883 GLENRIDGE DRIVE, SUITE 200 ATLANTA, GA 30328-5363 404-250-1290 WWW.TENSARCORP.COM	GEOGRID	5
RETAINED EARTH TEMPORARY WALL	THE REINFORCED EARTH COMPANY	8614 WESTWOOD CENTER DRIVE, SUITE 1100 VIENNA, VA 22182-2233 703-749-4325 WWW.REINFORCEDEARTH.COM	WELDED WIRE MESH	6-8
TERRATREL TEMPORARY WALL	THE REINFORCED EARTH COMPANY	8614 WESTWOOD CENTER DRIVE, SUITE 1100 VIENNA, VA 22182-2233 703-749-4325 WWW.REINFORCEDEARTH.COM	RIBBED STEEL STRIPS	9-11

FOR STANDARD TEMPORARY MSE WALLS, SEE TEMPORARY SHORING SPECIAL PROVISION.

WHEN NOTES ON PLANS DO NOT PROHIBIT TEMPORARY MSE WALLS OR STANDARD SHORING, STANDARD TEMPORARY MSE WALLS ARE OPTIONAL.

WHEN NOTES ON PLANS REQUIRE TEMPORARY MSE WALLS, USE STANDARD TEMPORARY MSE WALLS OR CONTRACTOR DESIGNED TEMPORARY MSE WALLS.

WHEN THE ALIGNMENT OF STANDARD TEMPORARY MSE WALLS RESULTS IN AN INTERIOR ANGLE LESS THAN 90 DEGREES, SUBMIT AN ACUTE CORNER DETAIL FOR THE SPECIFIC SITUATION IN ACCORDANCE WITH THE WALL VENDOR RECOMMENDATIONS. ALSO, SUBMIT A "STANDARD TEMPORARY MSE WALL SELECTION FORM" FOR EACH TEMPORARY MSE WALL LOCATION. SUBMIT THESE ITEMS AT LEAST 14 DAYS BEFORE BEGINNING WALL CONSTRUCTION.

STANDARD TEMPORARY MSE WALLS ARE BASED ON THE FOLLOWING CONDITIONS:
1) MAXIMUM WALL HEIGHT IS 28'-0" (8.5m).
2) TRAFFIC SURCHARGE IS 240 PSF (11.5 KPA) MAXIMUM OR BACKSLOPE IS 2:1 (H:V) OR FLATTER.
3) EXISTING OR FINISHED GRADE IN FRONT OF WALL IS 6:1 (H:V) SLOPE OR FLATTER.
4) THE GRADE OF THE TOP OF WALL IS LESS THAN 4% FOR RETAINED EARTH AND TERRATREL TEMPORARY WALLS.
5) DESIGN SERVICE LIFE IS 3 YEARS.
6) MATERIAL IN REINFORCED ZONE IS SHORING BACKFILL.
7) MAXIMUM APPLIED BEARING PRESSURE IS 1 TSF (100 KPA) FOR WALL HEIGHTS UP TO 8'-0" (2.4m), 2 TSF (195 KPA) FOR WALL HEIGHTS BETWEEN 8'-0" AND 18'-0" (2.4m AND 5.5m) AND 3 TSF (290 KPA) FOR WALL HEIGHTS OVER 18'-0" (5.5m).

STANDARD TEMPORARY MSE WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 KN/M^3)
FRICTION ANGLE = 30 DEGREES
COHESION = 0 PSF (0 KPA)
GROUNDWATER IS ASSUMED TO BE BELOW BOTTOM OF REINFORCED ZONE.

DO NOT USE STANDARD TEMPORARY MSE WALLS WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE BOTTOM OF REINFORCED ZONE.

CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF STANDARD TEMPORARY MSE WALLS. COLLECT AND DIRECT RUNOFF AWAY FROM WALLS AND SHORING BACKFILL.

EXCAVATE AS NECESSARY FOR STANDARD TEMPORARY MSE WALLS IN ACCORDANCE WITH THE FOLLOWING FOR THE WALL OPTION CHOSEN:
1) MINIMUM EMBEDMENT OF 18" (450mm) UNLESS WALL BEARS ON ROCK, CONCRETE OR PAVEMENT AS DETERMINED BY THE ENGINEER
2) VERTICAL STEPS IN INCREMENTS EQUAL TO THE VERTICAL REINFORCEMENT SPACING
3) WITH THE EXCEPTION OF EITHER THE FIRST OR LAST SECTION OF WALL, HORIZONTAL SECTION LENGTHS IN INCREMENTS EQUAL TO THE FOLLOWING:

STANDARD TEMPORARY MSE WALL OPTION	INCREMENT
TEMPORARY FABRIC WALL	9'-0" (2.7m) MIN (VARIES)
HILFIKER TEMPORARY WALL	10'-0" (3.0m) MIN (VARIES)
SIERRASCAPE TEMPORARY WALL	18'-7¼" (5.7m)
RETAINED EARTH TEMPORARY WALL	24'-0" (7.3m)
TERRATREL TEMPORARY WALL	19'-8" (6.0m)

DO NOT PLACE SHORING BACKFILL OR FIRST REINFORCEMENT LAYER UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

IF APPLICABLE, INSTALL FOUNDATIONS LOCATED WITHIN THE REINFORCED ZONE BEFORE BEGINNING WALL CONSTRUCTION UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

ERECT AND MAINTAIN FACINGS AND FORMS AS SHOWN ON THE STANDARD TEMPORARY MSE WALL DETAILS. STAGGER VERTICAL JOINTS OF FACINGS AND FORMS TO CREATE A RUNNING BOND WHEN POSSIBLE UNLESS SHOWN OTHERWISE ON THESE DETAILS.

PLACE FACINGS AND FORMS AS NEAR TO VERTICAL AS POSSIBLE WITH NO NEGATIVE BATTER. CONSTRUCT STANDARD TEMPORARY MSE WALLS WITH A VERTICAL AND HORIZONTAL TOLERANCE OF 3" (75mm) WHEN MEASURED WITH A 10'-0" (3m) STRAIGHT EDGE AND AN OVERALL VERTICAL PLUMBNESS (BATTER) AND HORIZONTAL ALIGNMENT OF LESS THAN 6" (150mm).

PLACE REINFORCEMENT AT LOCATIONS AND ELEVATIONS SHOWN ON THE STANDARD TEMPORARY MSE WALL DETAILS AND IN SLIGHT TENSION FREE OF KINKS, FOLDS, WRINKLES OR CREASES.

DO NOT SPLICE REINFORCEMENT IN THE REINFORCEMENT DIRECTION (RD), i.e., PARALLEL TO THE WALL FACE. SEAMS ARE ALLOWED IN THE CROSS-REINFORCEMENT DIRECTION (CRD).

CONTACT THE ENGINEER WHEN EXISTING OR FUTURE STRUCTURES SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT. TO AVOID STRUCTURES, DELFECT, SKEW AND MODIFY REINFORCEMENT.

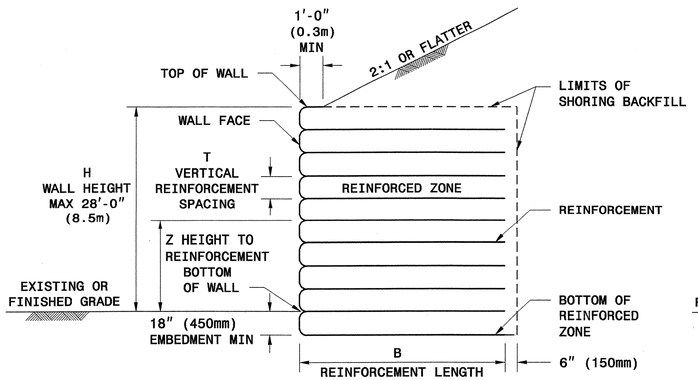
PLACE SHORING BACKFILL IN 8" TO 10" (200mm to 250mm) THICK LIFTS AND COMPACT IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. USE ONLY HAND OPERATED COMPACTION EQUIPMENT WITHIN 3'-0" (1m) OF THE WALL FACE.

DO NOT DAMAGE REINFORCEMENT WHEN PLACING AND COMPACTING SHORING BACKFILL. DO NOT OPERATE HEAVY EQUIPMENT ON REINFORCEMENT UNTIL IT IS COVERED WITH AT LEAST 10" (250mm) OF SHORING BACKFILL. DO NOT USE SHEEPSFOOT, GRID ROLLERS OR OTHER TYPES OF COMPACTION EQUIPMENT WITH FEET.

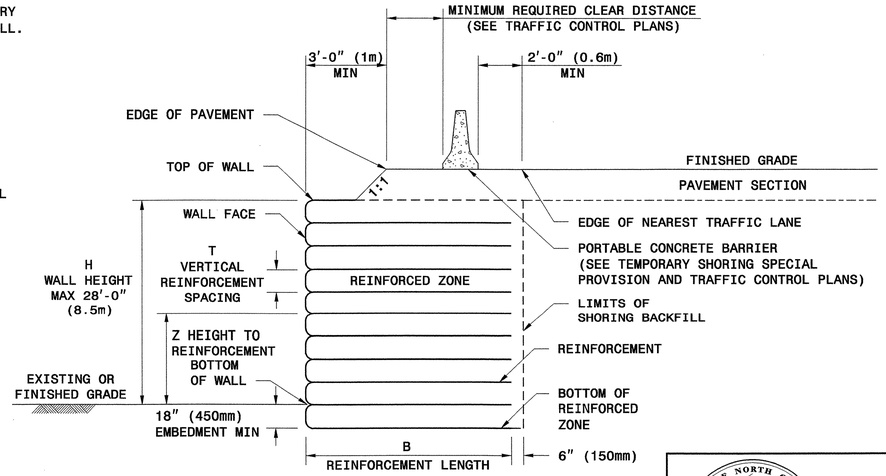
COVER REINFORCING AND RETENTION FABRIC WITH AT LEAST 3" (75mm) OF SHORING BACKFILL. PLACE TOP REINFORCEMENT LAYER BETWEEN 4" AND 24" (100mm and 600mm) BELOW TOP OF WALL DEPENDING ON WALL OPTION.

BENCH STANDARD TEMPORARY MSE WALLS INTO THE SIDES OF EXCAVATIONS WHERE APPLICABLE.

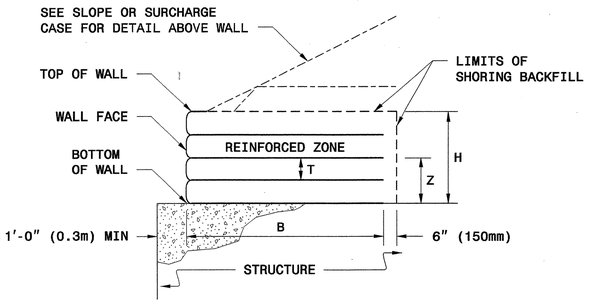
IF THE TOP OF WALL IS WITHIN 5'-0" (1.5m) OF FINISHED GRADE, REMOVE TOP FORM OR FACING AND INCORPORATE THE TOP REINFORCEMENT LAYER INTO THE FILL WHEN PLACING FILL IN FRONT OF THE WALL. STANDARD TEMPORARY MSE WALLS REMAIN IN PLACE PERMANENTLY UNLESS REQUIRED OTHERWISE.



SLOPE CASE



SURCHARGE CASE



TEMPORARY MSE WALL ON STRUCTURE

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY MECHANICALLY STABILIZED EARTH (MSE) WALLS

SHEET 1 OF 11 DATE: 2-20-07

PROJECT REFERENCE NO.	SHEET
B-4304	2-D

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

MINIMUM REQUIRED REINFORCEMENT LENGTH B (FT)

(FOR ALL WALL OPTIONS)

WALL HEIGHT H (FT)	<8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28
SLOPE CASE	8	11	13	14	16	18	20	22	24	25	27
SURCHARGE CASE	8	9	11	12	14	15	16	18	19	21	22

HOW TO USE THIS SHEET:

- FOR ALL WALL OPTIONS, DETERMINE MINIMUM REQUIRED REINFORCEMENT LENGTH (B) FROM TABLE AT RIGHT BASED ON WALL HEIGHT (H) AND SLOPE OR SURCHARGE CASE
- FOR STANDARD TEMPORARY FABRIC WALL, SEE SHEET 3 FOR FABRIC STRENGTH REQUIREMENTS BASED ON WALL HEIGHT (H)
- FOR ALL OTHER WALL OPTIONS, DETERMINE REINFORCEMENT TYPE FROM TABLES BELOW FOR EACH HEIGHT TO REINFORCEMENT (Z) BASED ON WALL HEIGHT (H) AND SLOPE OR SURCHARGE CASE

TERRATREL TEMPORARY WALL
(STRIPS PER LEVEL PER PANEL)

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT-INCHES)
												3	27 - 8
											3	3	26 -10
											3	3	25 - 2
										3	3	3	23 - 6
									3	3	3	3	21 -10
								3	3	3	3	3	20 - 2
							3	3	3	3	3	3	18 - 6
						3	3	3	3	3	3	3	16 -10
						3	3	3	3	3	3	3	15 - 2
					4	3	3	3	3	3	3	3	13 - 6
				4	4	3	3	3	3	3	3	3	11 -10
			5	4	4	3	3	3	3	3	3	3	10 - 2
		5	5	4	4	3	3	3	3	3	3	3	8 - 6
	5	5	5	4	4	3	3	3	3	3	3	3	6 -10
	5	5	5	4	4	3	3	3	3	3	3	3	5 - 2
5	5	5	5	4	4	3	3	3	3	3	3	3	3 - 6
5	5	5	5	4	4	3	3	3	3	3	3	3	1 -10
5	5	5	5	4	4	3	3	3	3	3	3	3	0 - 2
5	5	5	5	4	4	3	3	3	3	3	3	3	-0 - 8

SLOPE AND SURCHARGE CASES

SIERRASCAPE TEMPORARY WALL
(GEOGRID TYPE)

11 = UX1100MSE
14 = UX1400MSE
15 = UX1500MSE
16 = UX1600MSE
17 = UX1700MSE

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT)
												11	26.5
											11	11	25.5
											11	11	24
										11	11	11	22.5
									11	11	11	15	21
								11	11	11	14	15	19.5
								11	11	11	14	15	18
							11	11	11	11	14	15	16.5
						11	11	11	11	14	15	15	15
						11	11	11	11	15	15	15	13.5
						11	11	11	15	15	15	15	12
					11	11	11	11	15	15	15	16	10.5
				11	11	11	11	15	15	15	15	16	9
			11	11	11	11	14	15	15	15	15	16	7.5
			11	11	11	11	14	15	15	15	16	16	6
		11	11	11	11	15	15	15	15	15	16	16	4.5
	11	11	11	11	14	15	15	15	15	16	16	16	3
11	11	11	11	14	15	15	15	15	16	16	16	17	1.5
11	11	11	11	14	15	15	15	16	16	16	17	17	0
11	11	11	14	15	15	15	15	16	16	17	17	17	-1.5

SLOPE CASE

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT)
												11	26.5
												11	25.5
											11	11	24
											11	11	22.5
										11	11	11	21
									11	11	11	11	19.5
									11	11	11	15	18
								11	11	11	11	15	16.5
							11	11	11	11	15	15	15
							11	11	11	11	15	15	13.5
							11	11	11	15	15	15	12
						11	11	11	11	15	15	15	10.5
					11	11	11	11	15	15	15	15	9
				11	11	11	11	15	15	15	15	16	7.5
			11	11	11	11	15	15	15	15	15	16	6
		11	11	11	11	15	15	15	15	15	16	16	4.5
	11	11	11	11	15	15	15	15	15	16	16	16	3
11	11	11	11	15	15	15	15	15	16	16	16	17	1.5
11	11	11	11	15	15	15	15	16	16	16	17	17	0
11	11	11	15	15	15	15	15	16	16	17	17	17	-1.5

SURCHARGE CASE

HILFIKER TEMPORARY WALL
(WELDED WIRE MAT TYPE)

4.5 = W4.5 x W3.5
7.0 = W7.0 x W3.5
9.5 = W9.5 x W4.0

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT)
												4.5	26
											4.5	7.0	24
										4.5	7.0	7.0	22
									4.5	7.0	7.0	7.0	20
								4.5	7.0	7.0	7.0	7.0	18
							4.5	7.0	7.0	7.0	7.0	7.0	16
						4.5	7.0	7.0	7.0	7.0	7.0	9.5	14
					4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	12
				4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	10
			4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	8
		4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	6
	4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	4
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3
4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	2
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.0	7.0	1
7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	7.0	7.0	0
7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	-1.5

SLOPE CASE

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT)
												4.5	26
											4.5	7.0	24
										4.5	7.0	7.0	22
									4.5	7.0	7.0	7.0	20
								4.5	7.0	7.0	7.0	7.0	18
							4.5	7.0	7.0	7.0	7.0	7.0	16
						4.5	7.0	7.0	7.0	7.0	7.0	7.0	14
					4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	12
				4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	10
			4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	8
		4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	6
	4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	4
4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	2
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.0	1
7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	7.0	0
7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	-1.5

SURCHARGE CASE

RETAINED EARTH TEMPORARY WALL
(WELDED WIRE MESH TYPE)

3X1 = 3W8 x W8 x 1.0′
3X2 = 3W8 x W8 x 2.0′

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT-INCHES)
												3X1	27 - 6
												3X1	26 -10
											3X1	3X2	25 - 2
										3X1	3X1	3X2	23 - 6
									3X1	3X1	3X2	3X2	21 -10
								3X1	3X1	3X2	3X2	3X2	20 - 2
							3X1	3X1	3X2	3X2	3X2	3X2	18 - 6
							3X1	3X2	3X2	3X2	3X2	3X2	16 -10
						3X1	3X1	3X2	3X2	3X2	3X2	3X2	15 - 2
					3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	13 - 6
				3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	11 -10
			3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	10 - 2
		3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	8 - 6
		3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	6 -10
	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	5 - 2
3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3 - 6
3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	1 -10
3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	0 - 2
3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	-1 - 6

SLOPE AND SURCHARGE CASES

NOTES FOR HILFIKER TEMPORARY WALL

1) CAP MAT AT TOP OF WALL IS NOT INCLUDED IN TABLES.
2) REINFORCEMENT IS NOT REQUIRED AT 1′ LEVEL FOR SLOPE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 24′.
3) REINFORCEMENT IS NOT REQUIRED AT 3′ LEVEL FOR SLOPE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 26′.
4) REINFORCEMENT IS NOT REQUIRED AT 1′ LEVEL FOR SURCHARGE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 26′.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY MSE WALL REINFORCEMENT TABLES - ENGLISH UNITS

SHEET 2 OF 11 DATE: 2-20-07

PROJECT REFERENCE NO.	SHEET
B-4304	2-E

GEOTECHNICAL ENGINEER

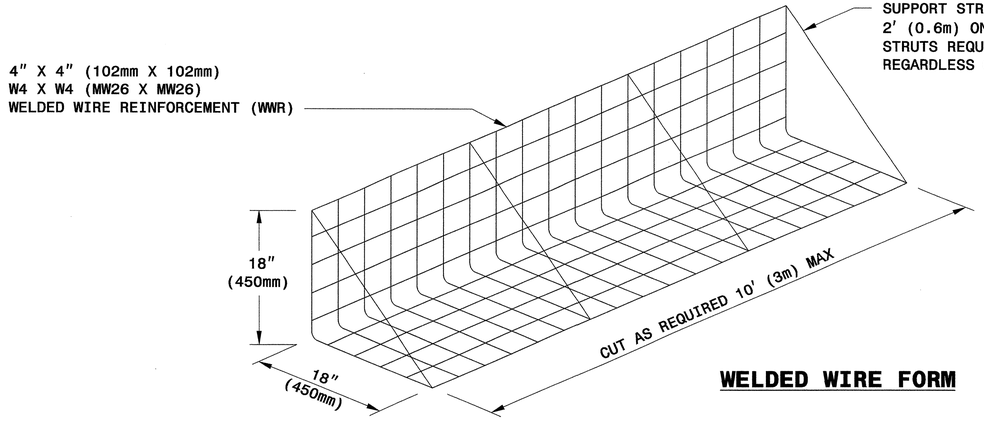
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

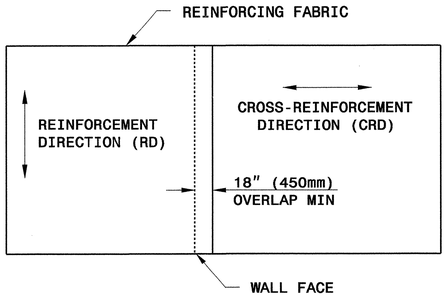
SIGNATURE DATE

ENGINEER

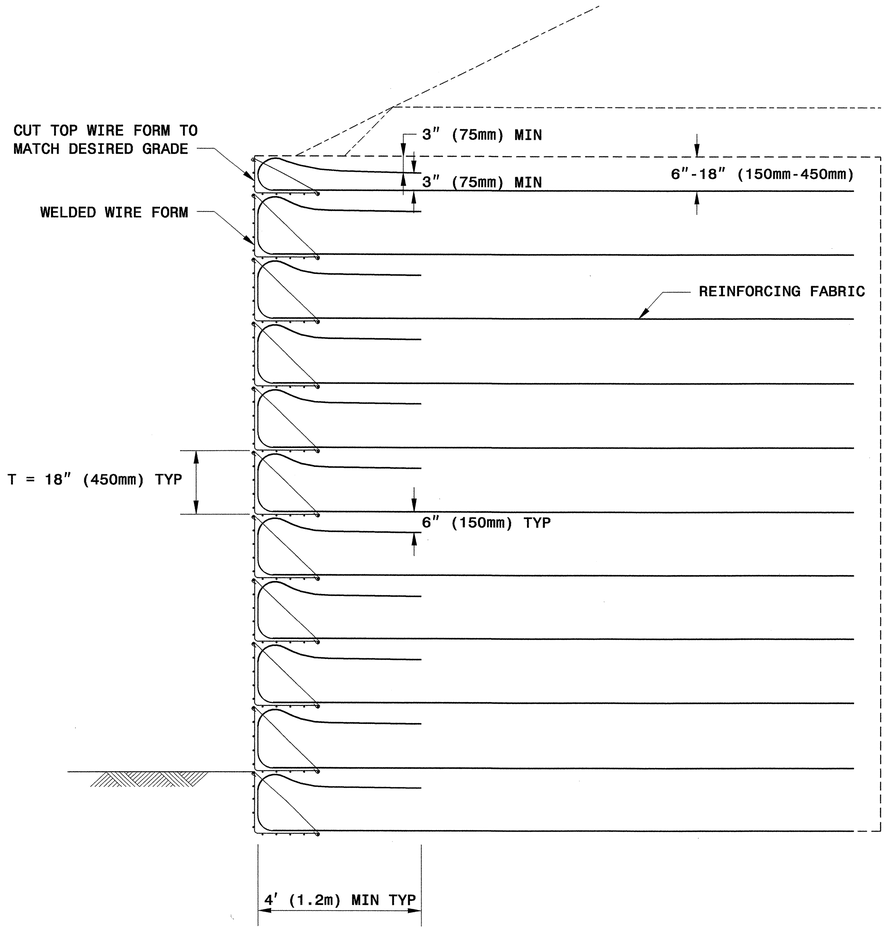
SIGNATURE DATE



WELDED WIRE FORM



PLAN VIEW OF FABRIC OVERLAP



TYPICAL SECTION

MINIMUM REQUIRED REINFORCING FABRIC STRENGTH FOR RD*
(SLOPE AND SURCHARGE CASES)

WALL HEIGHT H FEET (M)	POLYESTER WIDE WIDTH TENSILE STRENGTH @ ULTIMATE LB/INCH (KN/M)	POLYPROPYLENE WIDE WIDTH TENSILE STRENGTH @ ULTIMATE LB/INCH (KN/M)
4 (1.2)	200 (35)	200 (35)
6 (1.8)	200 (35)	200 (35)
8 (2.4)	200 (35)	200 (35)
10 (3.0)	200 (35)	230 (40)
12 (3.7)	220 (39)	264 (46)
14 (4.3)	248 (43)	297 (52)
16 (4.9)	276 (48)	330 (58)
18 (5.5)	304 (53)	364 (64)
20 (6.1)	332 (58)	397 (70)
22 (6.7)	359 (63)	431 (76)
24 (7.3)	387 (68)	464 (81)
26 (7.9)	415 (73)	497 (87)
28 (8.5)	443 (78)	531 (93)

*RD = REINFORCEMENT DIRECTION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

TEMPORARY
FABRIC WALL

SHEET 3 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
B-4304	2-F

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A HIDDEN

scott a hidden 3/29/07
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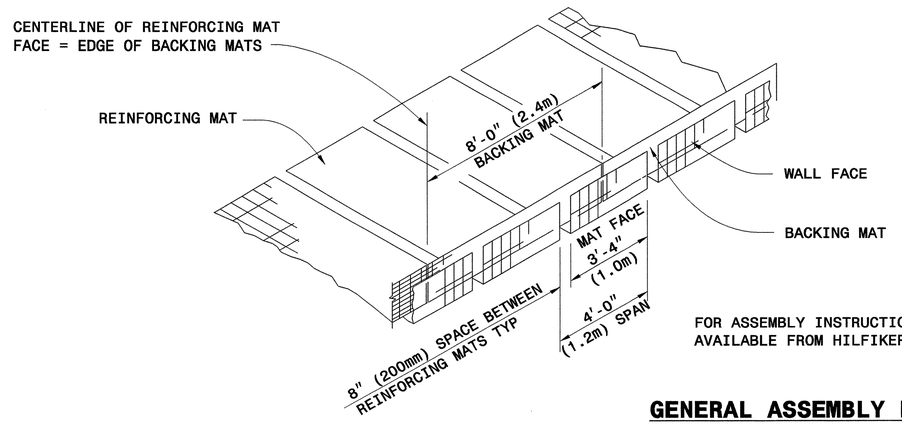
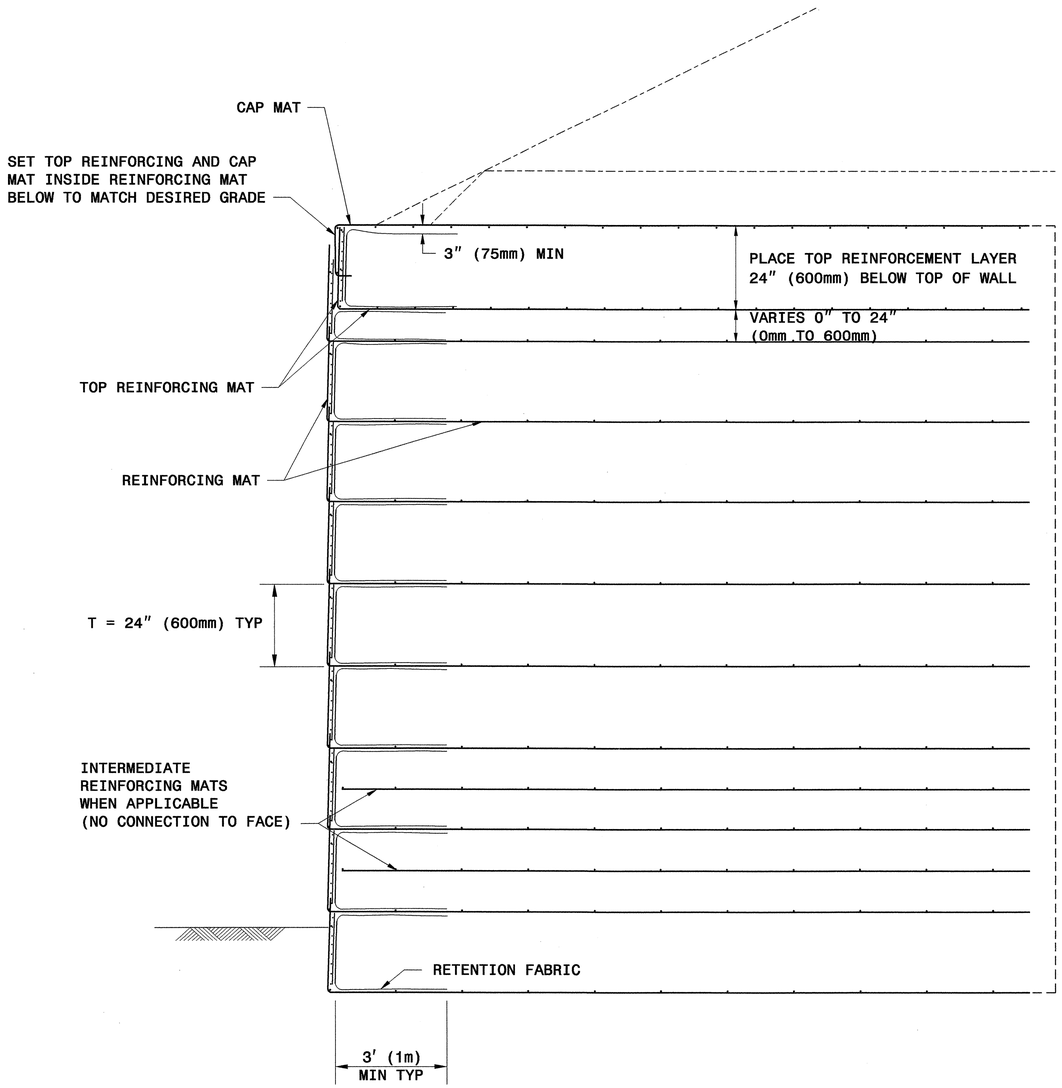
ENGINEER

SIGNATURE DATE

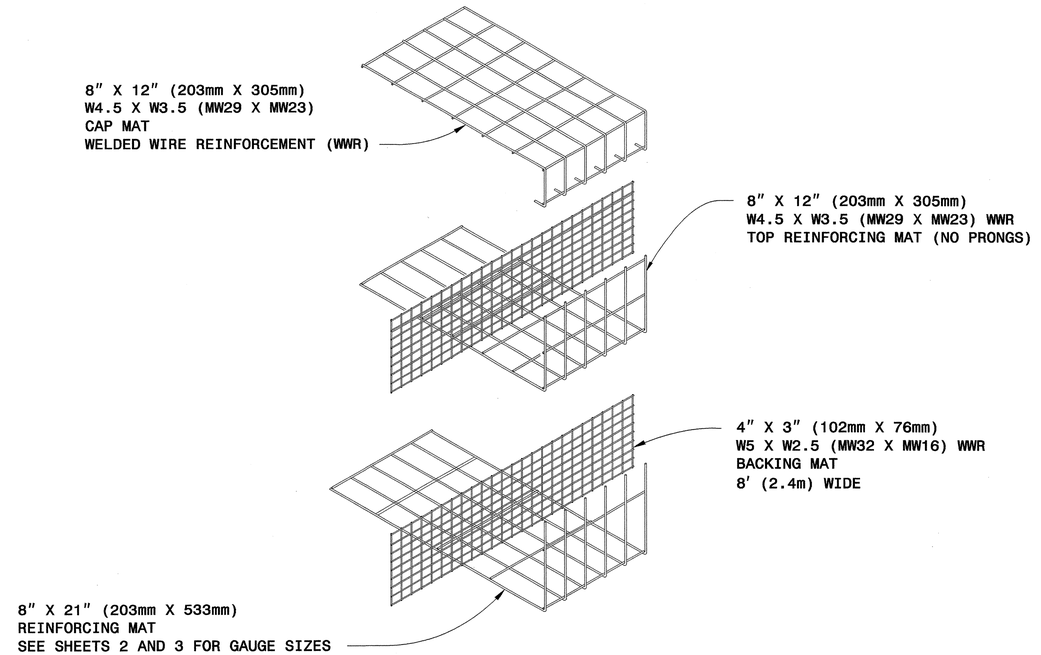


FOR ASSEMBLY INSTRUCTIONS, SEE WELDED WIRE WALL CONSTRUCTION GUIDE AVAILABLE FROM HILFIKER WEBSITE AT WWW.HILFIKER.COM/WWW

GENERAL ASSEMBLY DETAIL



TYPICAL SECTION



WALL COMPONENTS

HILFIKER RETAINING WALLS

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

HILFIKER
TEMPORARY WALL

SHEET 4 OF 11 DATE: 12-19-06

GEC221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
B-4304	2-G

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07
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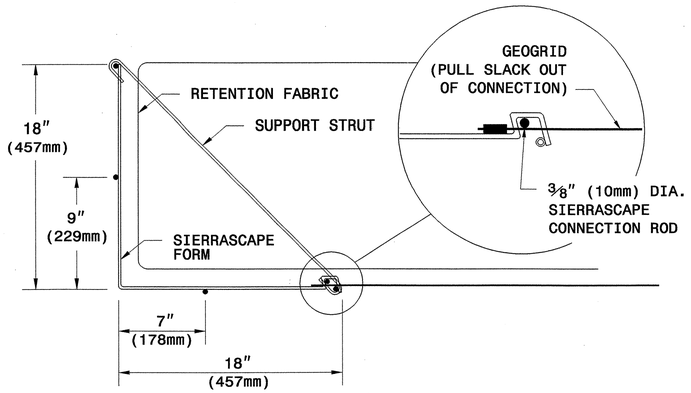
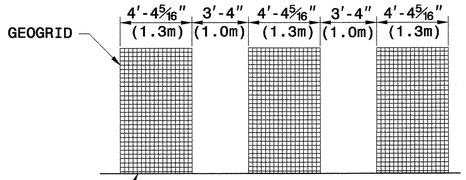
ENGINEER

SIGNATURE DATE

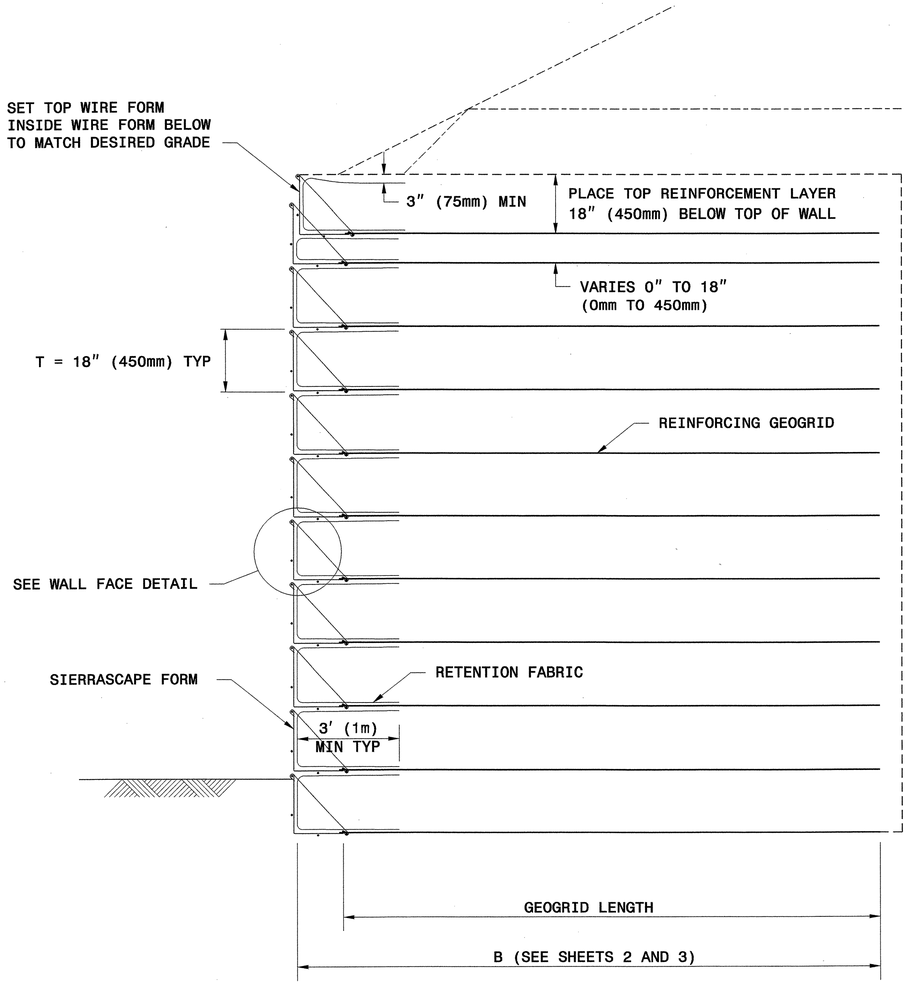


WALL FACE DETAIL

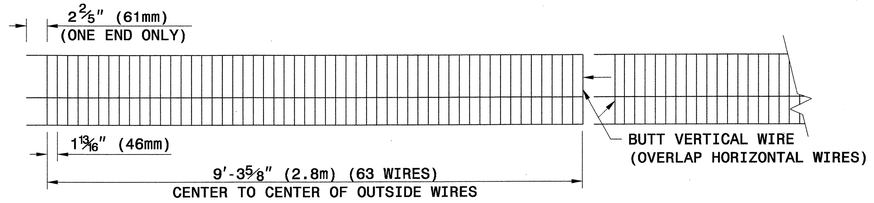


PLACE ALTERNATE LAYERS OF GEOGRID IN STAGGERED PATTERN
SUCH THAT THE LAYER ABOVE IS CENTERED OVER SPACE BELOW

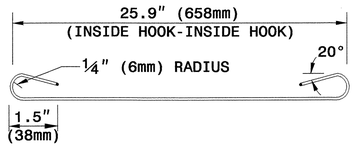
TYPICAL GEOGRID COVERAGE



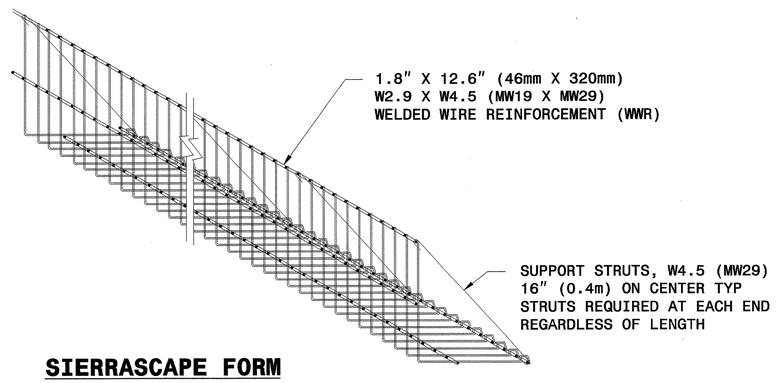
TYPICAL SECTION



ELEVATION VIEW



SUPPORT STRUT



SIERRASCAPE FORM

WALL COMPONENTS

TENSAR®
TENSAR EARTH TECHNOLOGIES, INC.

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

SIERRASCAPE
TEMPORARY WALL

SHEET 5 OF 11 DATE: 12-19-06

GEC221427 12/5/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
B-4304	2-H

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

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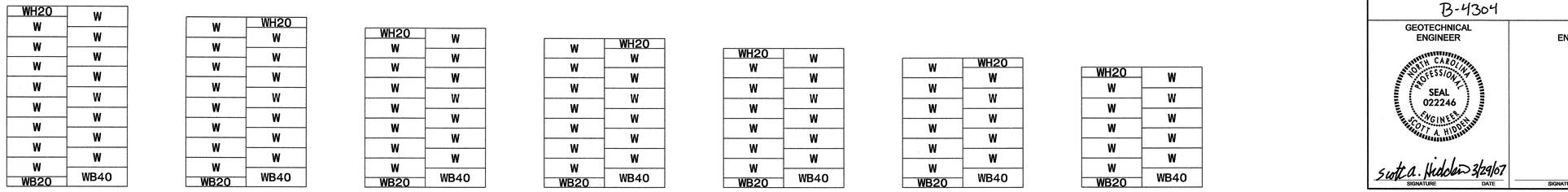
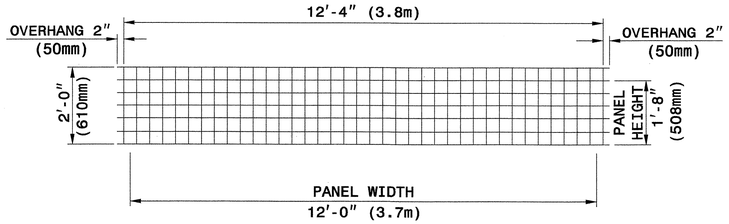
SIGNATURE DATE

ENGINEER

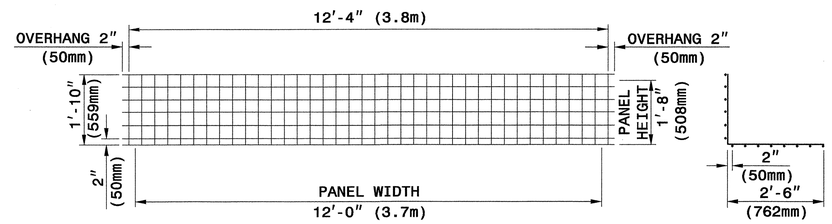
SIGNATURE DATE

PANEL LAYOUTS

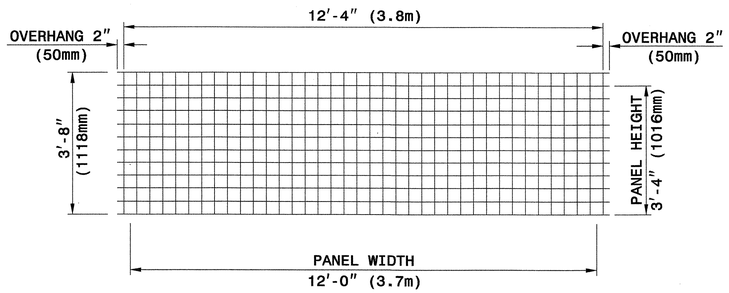




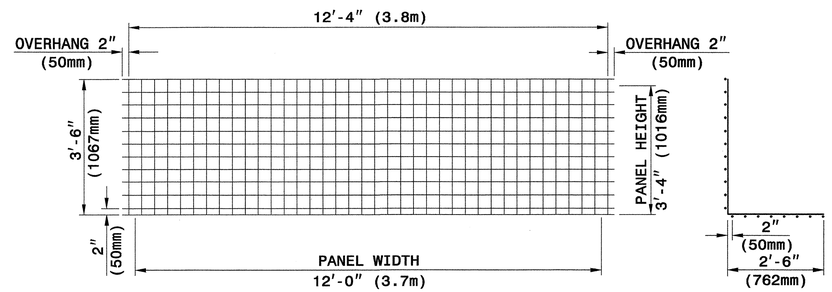
TYPE WH20



TYPE WB20 **SECTION**



TYPE W



TYPE WB40 **SECTION**

WELDED WIRE FACINGS **WELDED WIRE FORMS**

PANEL TYPES (WELDED WIRE FACINGS AND FORMS)

4" X 4" (100mm X 100mm), W8 X W8 (MW52 X MW52) WELDED WIRE REINFORCEMENT (WWR)

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

RETAINED EARTH TEMPORARY WALL

SHEET 6 OF 11 DATE: 12-19-06

GEC221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
B-4304	2-I

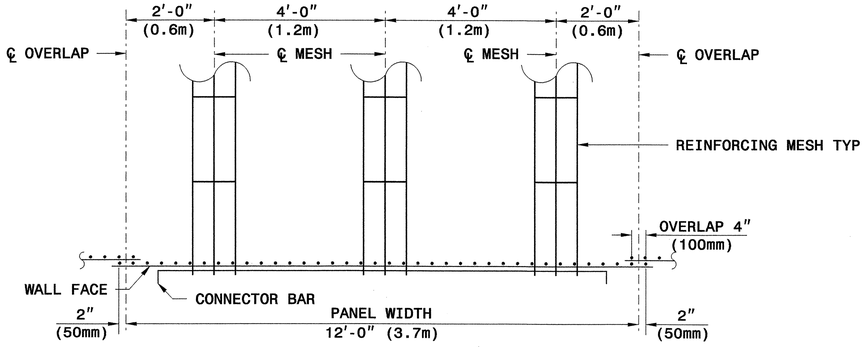
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

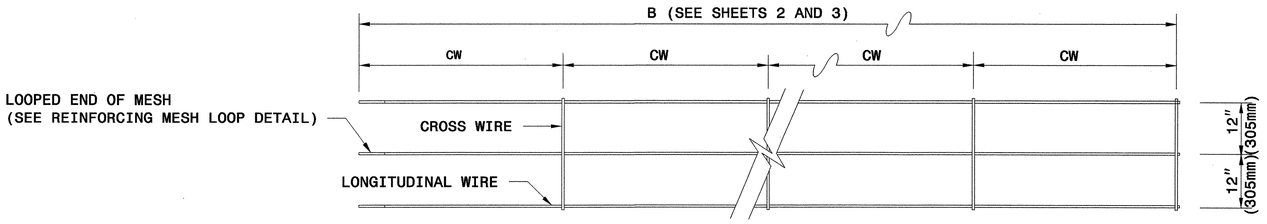
SIGNATURE DATE



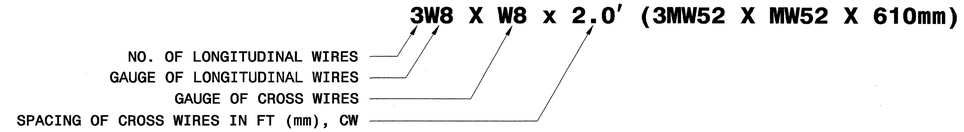
REINFORCING MESH PLACEMENT DETAIL
(PLAN VIEW)

½" (13mm) DIA. BAR

CONNECTOR BAR

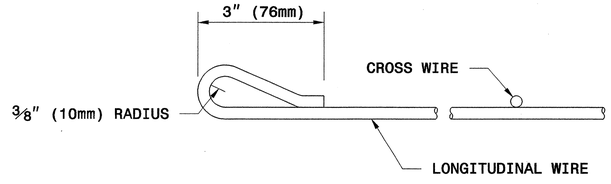


IF REINFORCEMENT LENGTH IS NOT AN INCREMENT OF 2'-0" (610mm) MAKE CW EQUAL TO 12" (305mm) AT THE END OF THE REINFORCING MESH OPPOSITE THE LOOPED END

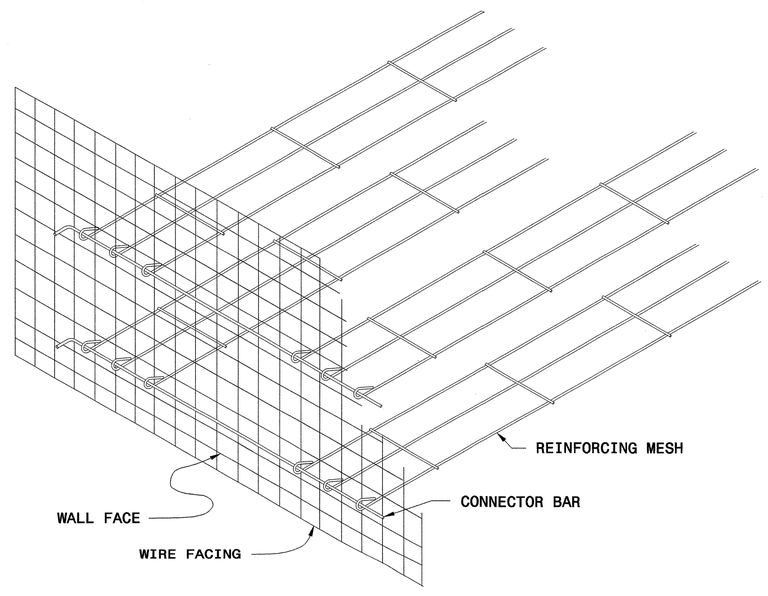


REINFORCING MESH DESIGNATION

REINFORCING MESH



REINFORCING MESH LOOP DETAIL



GENERAL ASSEMBLY DETAIL

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

RETAINED EARTH TEMPORARY WALL

SHEET 7 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
B-4304	2-J

GEOTECHNICAL ENGINEER

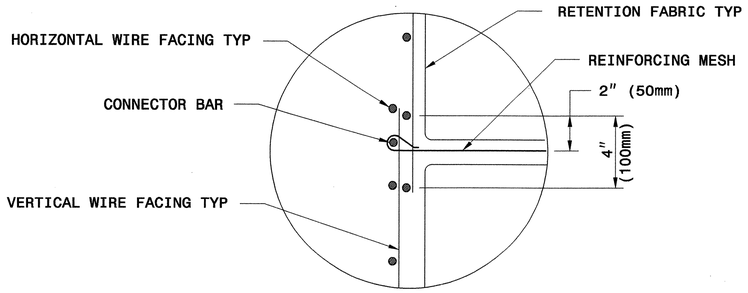
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

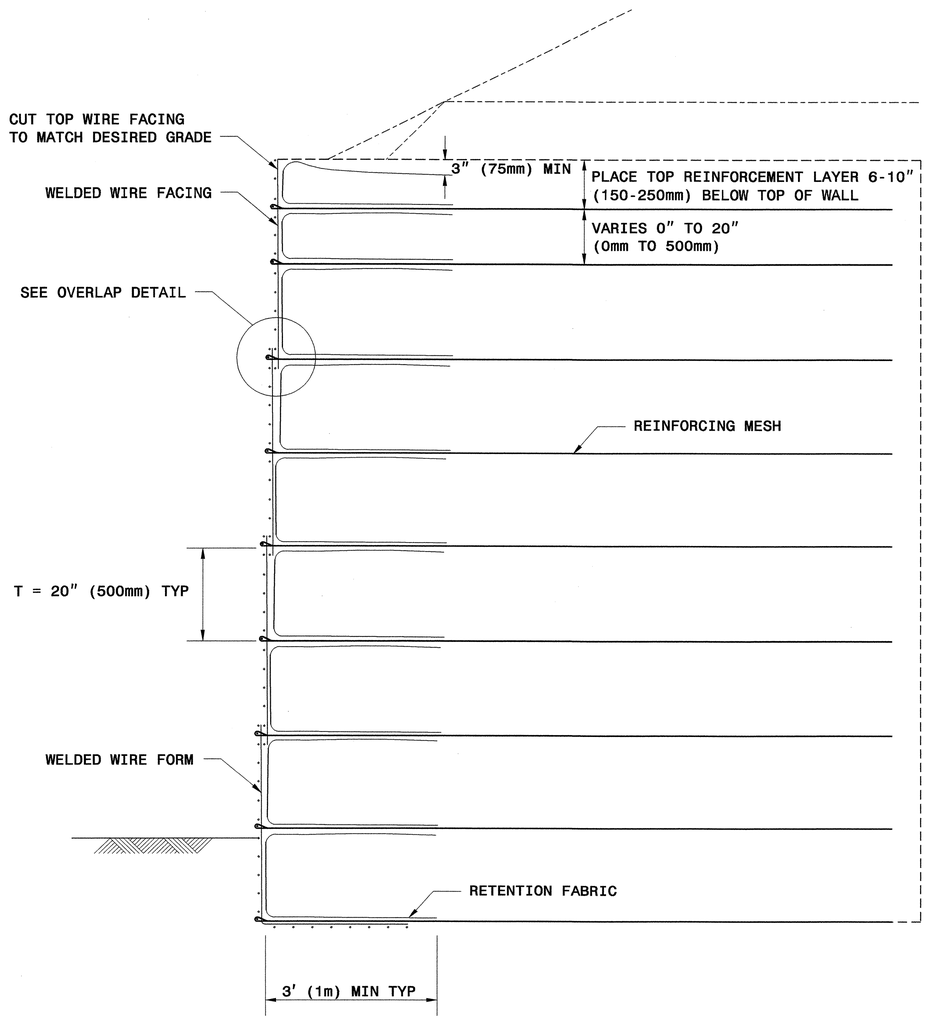
SIGNATURE DATE

ENGINEER

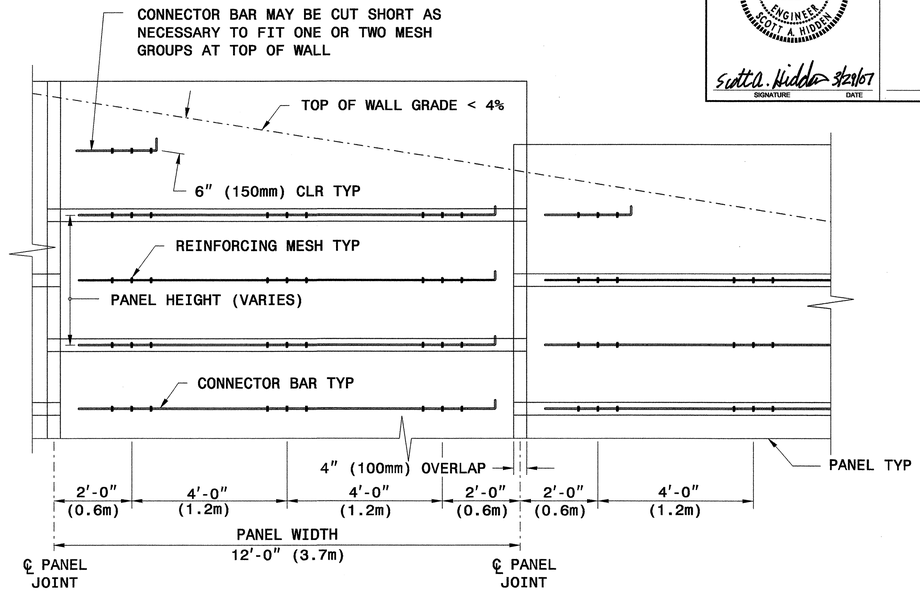
SIGNATURE DATE



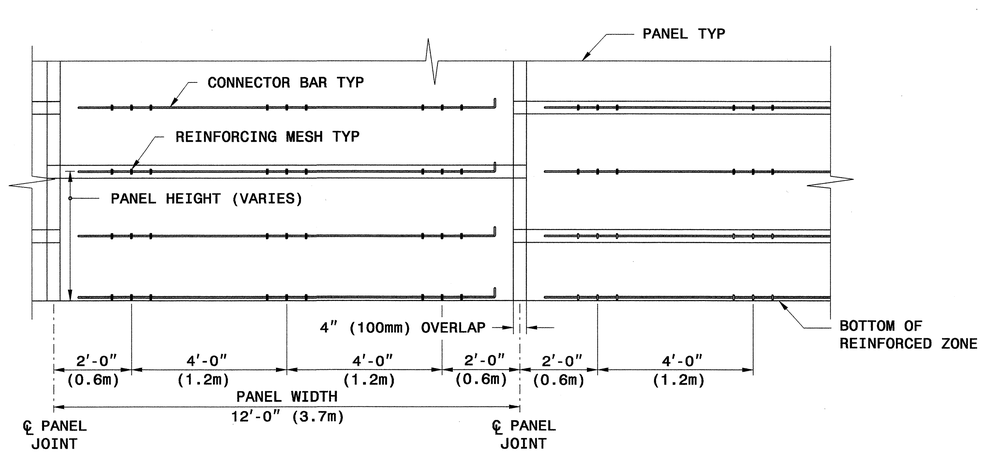
OVERLAP DETAIL



TYPICAL SECTION



TYPICAL ELEVATION @ TOP OF WALL
(WIRES NOT SHOWN FOR CLARITY)



TYPICAL ELEVATION @ BOTTOM OF WALL
(WIRES NOT SHOWN FOR CLARITY)

The Reinforced Earth Company

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

RETAINED EARTH TEMPORARY WALL

SHEET 8 OF 11 DATE: 12-19-06

GEC221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
B-4304	2-K

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A HIDDEN

scott a. hidden 3/29/07

SIGNATURE DATE

ENGINEER

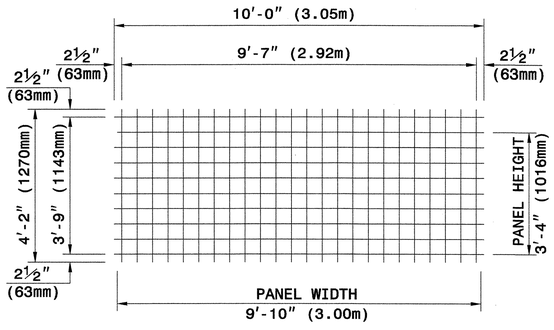
SIGNATURE DATE

PANEL LAYOUTS

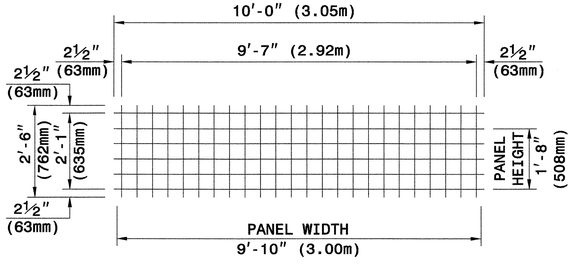
H - WALL HEIGHT

(FEET-INCHES)	< 28 - 0	< 27 - 8	< 26 - 0	< 24 - 4	< 22 - 8	< 21 - 0	< 19 - 4
(METER)	< 8.5	< 8.4	< 7.9	< 7.4	< 6.9	< 6.4	< 5.9

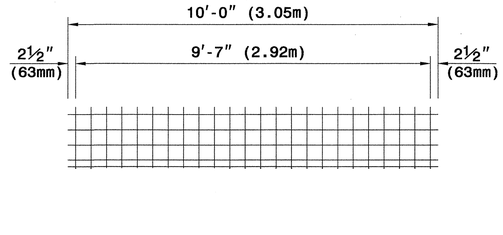
(FEET-INCHES)	< 17 - 8	< 16 - 0	< 14 - 4	< 12 - 8	< 11 - 0	< 9 - 4	< 7 - 8	< 6 - 0	< 4 - 4
(METER)	< 5.4	< 4.9	< 4.4	< 3.9	< 3.4	< 2.8	< 2.3	< 1.8	< 1.3



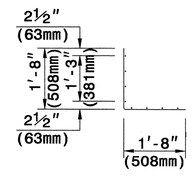
TYPE A



TYPE B



WELDED WIRE FORM



SECTION

WELDED WIRE FACINGS

PANEL TYPES (WELDED WIRE FACINGS AND FORM

5″ X 5″ (125mm X 125mm), W5 X W5 (MW32 X MW32) WELDED WIRE REINFORCEMENT (WWR)

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

TERRATREL TEMPORARY WALL

SHEET 9 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
B-4304	2-L

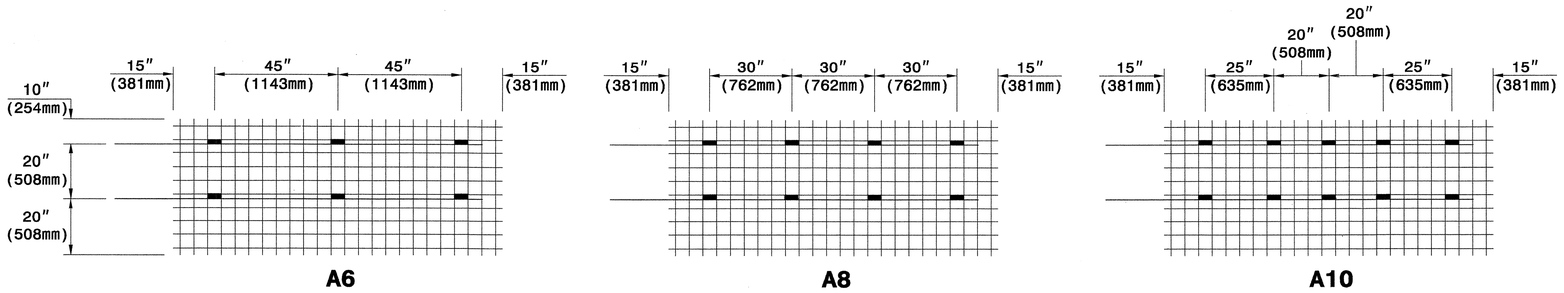
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

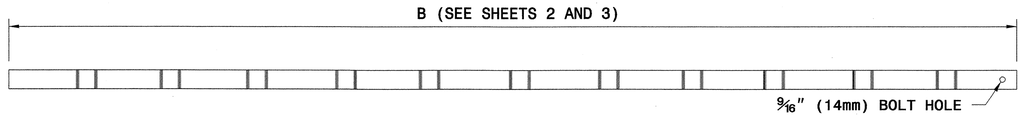
SIGNATURE DATE



KEY: A8

NUMBER OF REINFORCING STRIPS
PANEL TYPE

CONNECTOR ROD AND REINFORCING STRIP PLACEMENT DIAGRAMS



REINFORCING STRIP - 2" X 5/32" (50mm X 4mm)

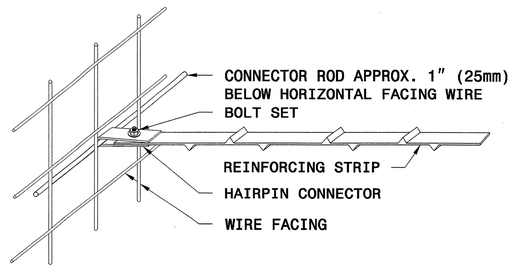
½" (13mm) DIA. ROD

CONNECTOR ROD

½" (13mm) BOLT WITH NUT AND WASHER

BOLT SET

HAIRPIN CONNECTOR



STRIP TO FACING CONNECTION

WALL COMPONENTS

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

TERRATREL
TEMPORARY WALL

SHEET 10 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
B-4304	2-M

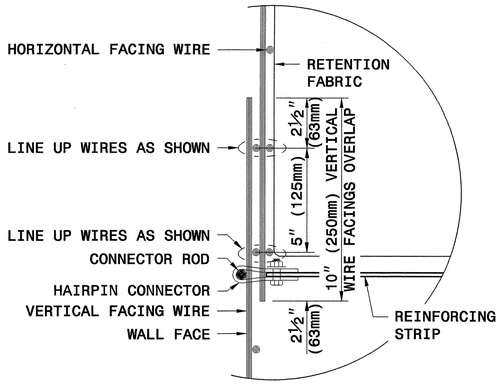
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07
SIGNATURE DATE

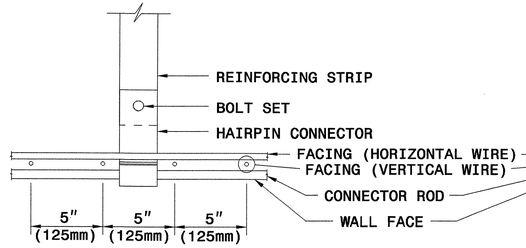
ENGINEER

SIGNATURE DATE

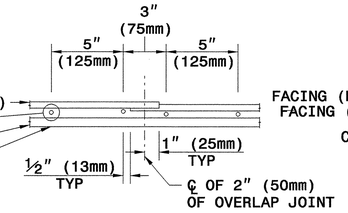


OVERLAP FACINGS VERTICALLY ONE FULL 5" (125mm) WIRE SQUARE DISREGARDING HALF SQUARES AT EDGES

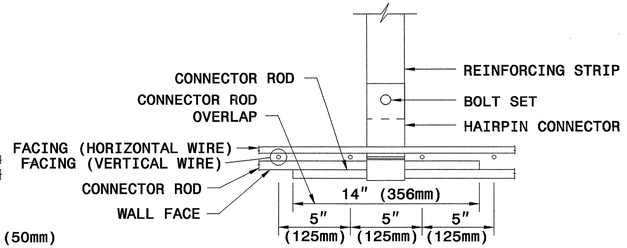
VERTICAL OVERLAP DETAIL



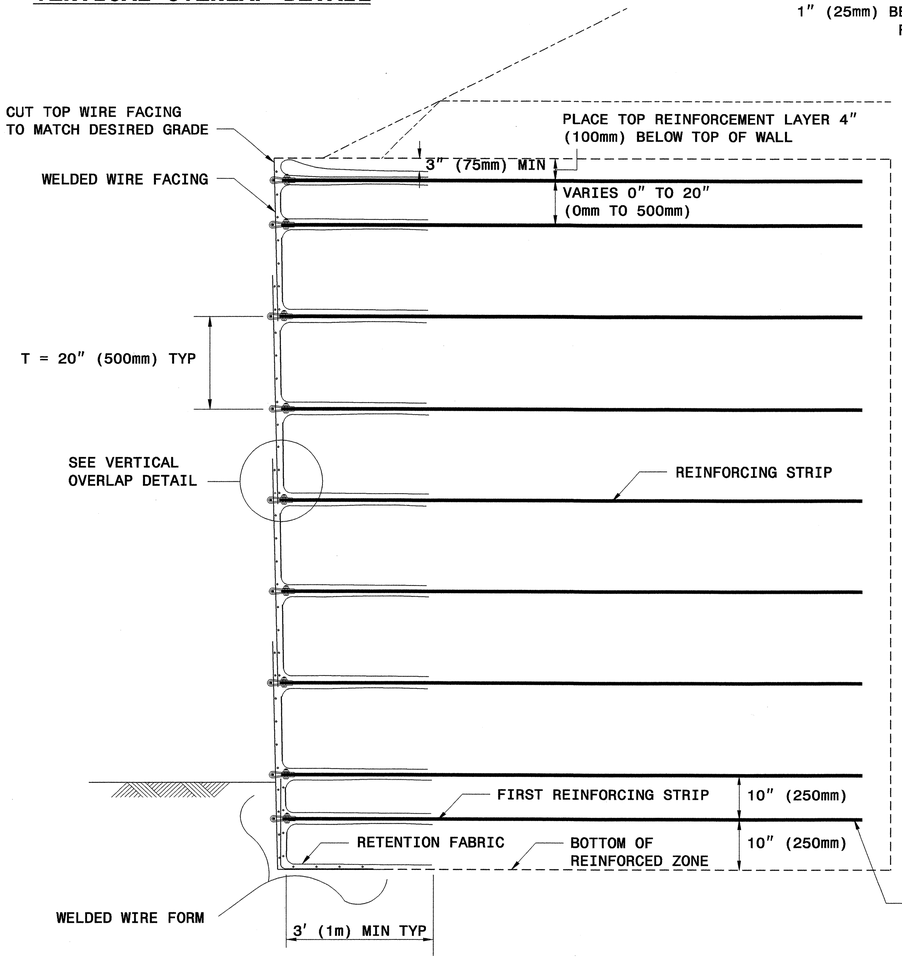
PLAN DETAIL 'A'
STRIP CONNECTION



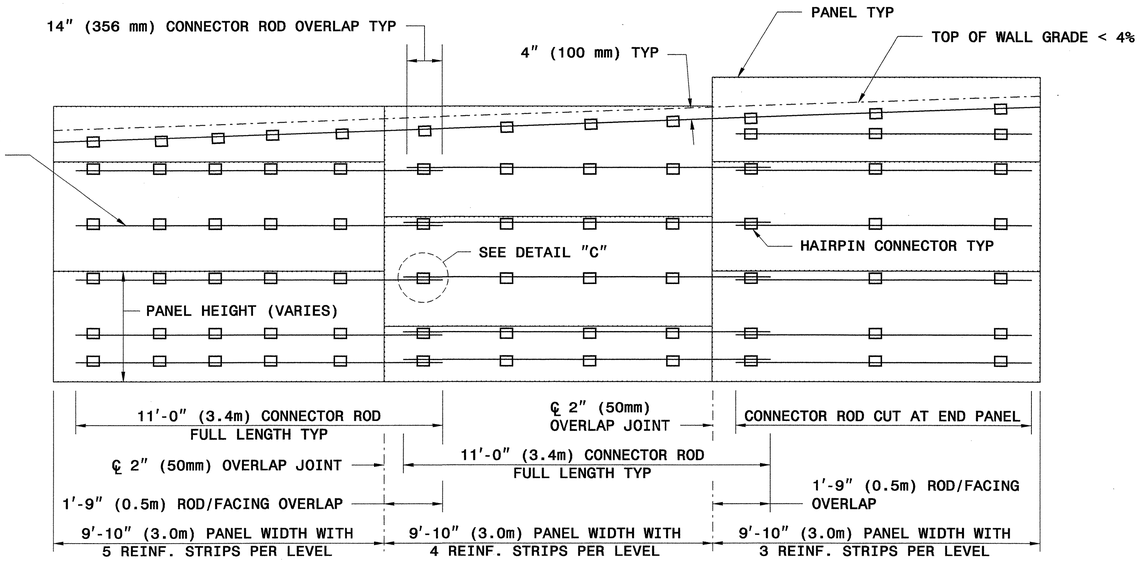
PLAN DETAIL 'B'
HORIZONTAL OVERLAP DETAIL



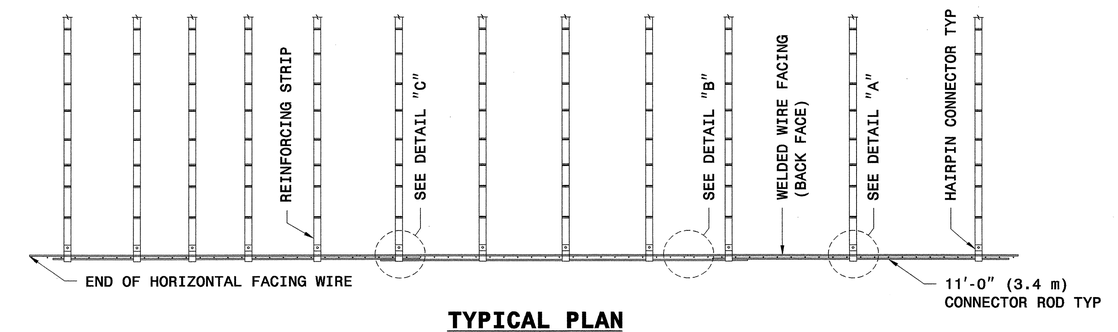
PLAN DETAIL 'C'
STRIP CONNECTION WITH HORIZONTAL OVERLAP DETAIL



TYPICAL SECTION



TYPICAL ELEVATION
(WIRES NOT SHOWN FOR CLARITY)



TYPICAL PLAN

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

TERRATREL TEMPORARY WALL

SHEET 11 OF 11 DATE: 12-19-06

GEC221427 3/29/2007 std no 1801 shidden GE-Oce34bond

MULKEY
ENGINEERS & CONSULTANTS
PO Box 33127
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(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
B-4304	3
R/W SHEET NO.	

REVISIONS

Summary of Quantities

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202069

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (19+10.00)
0043000000-N	226	Lump Sum		GRADING
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0057000000-E	226	1,500	CY	UNDERCUT EXCAVATION
0134000000-E	240	22	CY	DRAINAGE DITCH EXCAVATION
0195000000-E	265	400	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	1,300	SY	FABRIC FOR SOIL STABILIZATION
0199000000-E	SP	144	SF	TEMPORARY SHORING
0318000000-E	300	51	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0343000000-E	310	44	LF	15" SIDE DRAIN PIPE
0345000000-E	310	76	LF	24" SIDE DRAIN PIPE
0390000000-E	310	72	LF	36" RC PIPE CULVERTS, CLASS III
0995000000-E	340	64	LF	PIPE REMOVAL
1220000000-E	545	300	TON	INCIDENTAL STONE BASE
1489000000-E	610	1,530	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-E	610	820	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1519000000-E	610	980	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1560000000-E	620	165	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
1693000000-E	654	18	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
2000000000-N	806	13	EA	RIGHT OF WAY MARKERS
2209000000-E	838	3	CY	ENDWALLS
2253000000-E	840	1	CY	PIPE COLLARS
2286000000-N	840	3	EA	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	1.3	LF	MASONRY DRAINAGE STRUCTURES
2367000000-N	840	3	EA	FRAME WITH TWO GRATES, STD 840.29
2556000000-E	846	100	LF	SHOULDER BERM GUTTER
2577000000-E	846	125	LF	CONCRETE EXPRESSWAY GUTTER
2619000000-E	850	20	SY	4" CONCRETE PAVED DITCH
3030000000-E	862	337.5	LF	STEEL BM GUARDRAIL
3045000000-E	862	50	LF	STEEL BM GUARDRAIL, SHOP CURVED
3150000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS
3215000000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3380000000-E	862	100	LF	TEMPORARY STEEL BM GUARDRAIL
3389100000-N	SP	1	EA	GUARDRAIL ANCHOR UNITS, TYPE 350 TEMPORARY
3572000000-E	867	330	LF	CHAIN LINK FENCE RESET
3628000000-E	876	265	TON	RIP RAP, CLASS I
3649000000-E	876	200	TON	RIP RAP, CLASS B
3656000000-E	876	1,545	SY	FILTER FABRIC FOR DRAINAGE
4072000000-E	903	137	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4102000000-N	904	10	EA	SIGN ERECTION, TYPE E
4116100000-N	904	2	EA	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (E)
4155000000-N	907	21	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
4192000000-N	907	1	EA	DISPOSAL OF SUPPORT, U-CHANNEL
4400000000-E	1110	448	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	220	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	175	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4422000000-N	1120	42	DAY	CHANGEABLE MESSAGE SIGN (SHORT TERM)
4430000000-N	1130	48	EA	DRUMS
4435000000-N	1135	28	EA	CONES
4445000000-E	1145	192	LF	BARRICADES (TYPE III)
4450000000-N	1150	2,880	HR	FLAGGER
4516000000-N	1180	28	EA	SKINNY DRUM
4650000000-N	1251	45	EA	TEMPORARY RAISED PAVEMENT MARKERS
4685000000-E	1205	3,536	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	3,536	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4710000000-E	1205	12	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
4770000000-E	1205	628	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (I)
4770000000-E	1205	628	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)
4810000000-E	1205	14,144	LF	PAINT PAVEMENT MARKING LINES (4")
4835000000-E	1205	24	LF	PAINT PAVEMENT MARKING LINES (24")
4900000000-N	1251	23	EA	PERMANENT RAISED PAVEMENT MARKERS
5326200000-E	1510	113	LF	12" WATER LINE
5804000000-E	1530	102	LF	ABANDON 12" UTILITY PIPE
6000000000-E	1605	2,350	LF	TEMPORARY SILT FENCE
6006000000-E	1610	350	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	325	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	115	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	5	ACR	TEMPORARY MULCHING
6018000000-E	1620	150	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	1.5	TON	FERTILIZER FOR TEMPORARY SEEDING
6029000000-E	SP	1,750	LF	SAFETY FENCE
6030000000-E	1630	660	CY	SILT EXCAVATION
6036000000-E	1631	3,700	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	15	SY	COIR FIBER MAT
6038000000-E	SP	1,642	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	175	LF	1/4" HARDWARE CLOTH
6071010000-E	SP	125	LF	WATTLE
6071020000-E	SP	50	LB	POLYACRYLAMIDE (PAM)
6071030000-E	SP	130	LF	COIR FIBER BAFFLES
6071050000-E	SP	2	EA	** SKIMMER (1-1/2")
6084000000-E	1660	5.5	ACR	SEEDING & MULCHING
6087000000-E	1660	2	ACR	MOWING
6090000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	75	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	2.25	TON	FERTILIZER TOPDRESSING
6111000000-E	SP	125	LF	IMPERVIOUS DIKE
6114000000-N	SP	5	HR	SPECIALIZED HAND MOWING
6117000000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL
6123000000-E	1670	0.5	ACR	REFORESTATION

******* BEGIN SCHEDULE AA *******
******* (3 ALTERNATES) *******

0366000000-E AA1	310	188	LF	15" RC PIPE CULVERTS, CLASS III

*** OR ***

0366000000-E AA2	310	160	LF	15" RC PIPE CULVERTS, CLASS III
0536000000-E AA2	SP	28	LF	*** HDPE PIPE CULVERTS (15")

*** OR ***

0366000000-E AA3	310	160	LF	15" RC PIPE CULVERTS, CLASS III
0540000000-E AA3	SP	28	LF	*** ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, **** THICK (15", 0.064")

******* END SCHEDULE AA *******

COMPUTED BY:	W. A.	DATE:	08 /08
CHECKED BY:	J. B.	DATE:	08 /08

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
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(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
B-4304	3-A
R/W SHEET NO.	

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE
-L- 16+00.00	RT	1		192.4																														
-L- 16+00.00	RT	1	2		189.3	186.9			160																									
-L- 17+67.00	RT	2		190.9																														
-L- 17+67.00	RT	2	3		186.9	186.8																			16									
-L- 20+22.92	RT	4		190.9																														
-L- 20+22.92	RT	4	5		184.6	184.6																			12									
-L- 21+23.00	CL	6											68																					
-L- 21+39.84	RT	7																																76
-L- 21+74.33	RT	8																														44		
-Y1- 14+33.59	RT	9											4																					
TOTAL									160				72												28							44		76
SAY																																		

STATION	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G			D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	TRAFFIC BEARING DI STD. 840.35					CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
-L- 16+00.00			1																		1		1									
-L- 16+00.00																																
-L- 17+67.00			1																		1		1									
-L- 17+67.00																																
-L- 20+22.92			1	1.3																	1		1									
-L- 20+22.92																																
-L- 21+23.00																																EQUALIZER PIPE
-L- 21+39.84																																
-L- 21+74.33																															64	
-Y1- 14+33.59	2.8																													0.76			
TOTAL	2.8		3	1.3																	3		3							0.76		64	
SAY	3																													1			

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I. (N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

REVISIONS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

SURVEY LINE	STATION	STATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBANKMENT + %	BORROW	WASTE
-L-	14+75.00	18+45.14	96		634	538	0
BRIDGE							
SUBTOTAL			96		634	538	0
BRIDGE							
-L-	19+75.49	32+00	3,214		3,325	111	0
-Y1-	13+50	15+48	12		88	76	0
SUBTOTAL			3,226		3,413	187	0
PROJECT TOTALS			3,322		4,047	725	0
EST. 5% FOR REPLACING TOP SOIL ON BORROW						36	
GRAND TOTAL			3,322			761	0
SAY			3,400			800	

UNDERCUT EXCAVATION (CONTINGENCY) = 1500 CY
DRAINAGE DITCH EXCAVATION = 22 CY

NOTE: APPROXIMATE QUANTITIES ONLY. BORROW EXCAVATION, FINE GRADING, unc. exc, CLEARING AND GRUBBING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING".

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

SUMMARY OF PAVEMENT REMOVAL

IN SQUARE YARDS

LOCATION	ASPHALT REMOVAL	ASPHALT BREAK UP	CONCRETE REMOVAL	CONCRETE BREAK UP
-L- 17+59 TO 18+44 RT.	112.9			
-L- 18+85 TO 21+06 RT.	416.0			
-L- 20+92 TO 22+04 RT.	140.9			
-L- 20+96 TO 21+82 RT.	154.9			
-L- 22+00 TO 22+62 RT.	153.9			
-L- 22+15 TO 28+35 RT.	1254.1			
TOTAL	2,232.7			
SAY	2280			

COMPUTED BY: J.B. DATE: 05/07

CHECKED BY: T.H. DATE: 05/07

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MULKEY
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PROJECT REFERENCE NO.	SHEET NO.
B-4304	3-B
R/W SHEET NO.	

REVISIONS

GUARDRAIL SUMMARY

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS					IMPACT ATTENUATOR TYPE 350					REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	TYPE III	GRAU-350	CAT-1	AT-1	EA	G	NG			
-L-	16+30.52	18+30.52	RT	200.00'			18+30.52		8.00'	11.00'	50.0'		1.00'			1	1								
-L-	17+72.41	18+59.91	LT	87.50'				18+59.91	8.00'	11.00'		50.00'		1.00'		1	1								
-L-	19+64.74	20+52.24	RT	87.50'				19+64.74	8.00'	11.00'		50.00'		1.00'		1	1								
-L-	19+86.28	21+61.28	LT	175.00'			19+86.28		8.00'	11.00'						1									
-L- & -Y1-	-L- 21+49.37	-Y1- 14+55.48	LT /RT	50.00'	50.00'		-Y1- 14+55.48		6.00'	9.00'	50.00'		1.555'				1								
			SUB-TOTAL	600.00'												4	4								
			GRAU-350 - 4 @ 50.00' EA.	-200.00'																					
			TYPE III - 4 @ 18.75' EA.	-75.00'																					
			TOTAL	325.00'	50.00'											4	4								
			SAY	337.50'	50.00'											4	4								

ADDITIONAL GUARDRAIL POST = 5 EA.

TEMPORARY GUARDRAIL SUMMARY

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS					IMPACT ATTENUATOR TYPE 350					REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	TYPE III	GRAU-350	CAT-1	AT-1	EA	G	NG			
-L-	17+00.00	18+48.00	LT & RT	150.00'				17+50.00	2.00'	EXIST.		50.0'		1.00'			1								TIE TO EXISTING BRIDGE RAIL
			SUB-TOTAL	150.00'													1								
			GRAU-350 - 1 @ 50.00' EA.	-50.00'																					
			TOTAL	100.00'													1								
			SAY	100.00'													1								

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PROJECT REFERENCE NO.	SHEET NO.
B-4304	3-C
R/W SHEET NO.	

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNERS NAME
1	4	GRACE D. RAMSEY
2	4 & 5	BEAVER DAM LAKE, INC.
3	4	E. STEPHEN STROUD & GRACE D. RAMSEY
4	4 & 5	RICAHARD A. HILL
5	5	JOHNNY MARSHALL HILL (RICHARD ALEXANDER HILL)
6	5	RICHARD ALEXANDER HILL
7	5	JOHNNY MARSHALL HILL
8	5	JOHNNY MARSHALL HILL

PARCEL No.	SHEET No.	PROPERTY OWNERS NAME

REVISIONS

11/5/2008 I05929 AMR:\Roadway\Proj\b4304_rdy_sumdgn

PROJECT REFERENCE NO.	SHEET NO.
B-4304	4
R/W SHEET NO.	

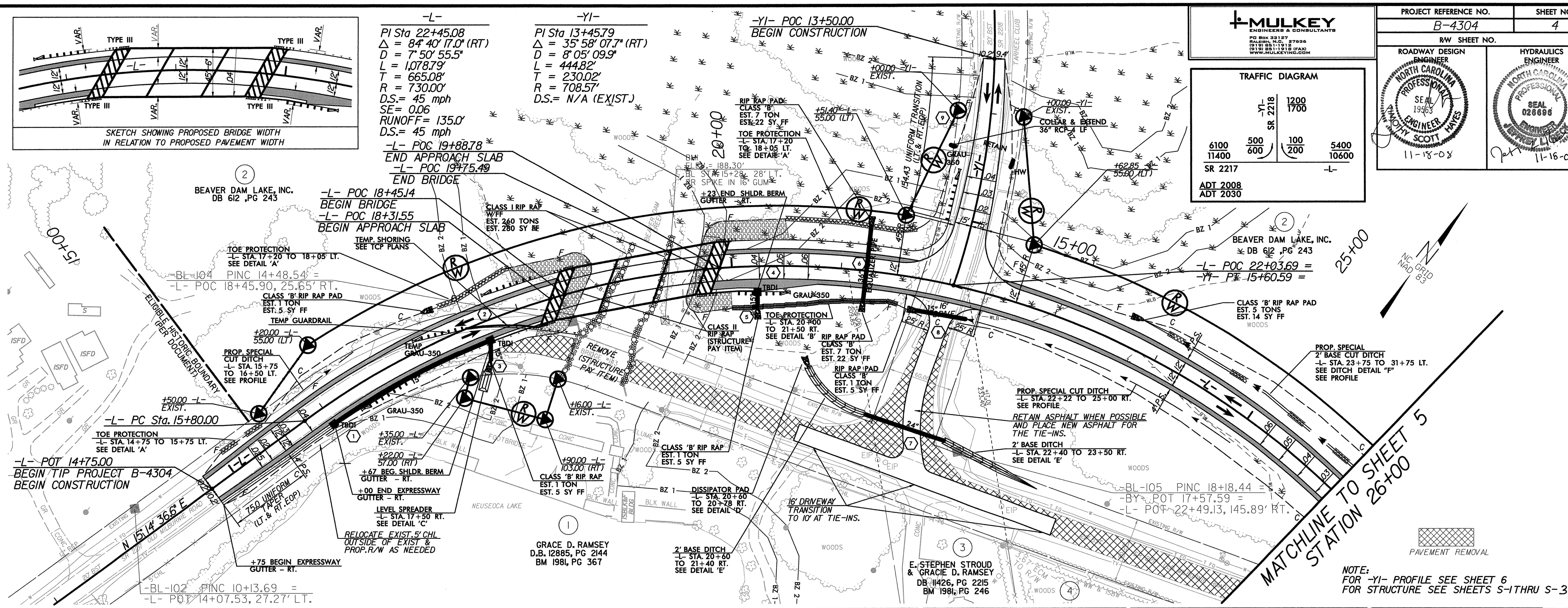
MULKEY ENGINEERS & CONSULTANTS, PO Box 33127, Raleigh, N.C. 27636, www.mulkeyinc.com

ROADWAY DESIGN ENGINEER — Timothy Scott Hayes, Seal 19563, 11-18-08

HYDRAULICS ENGINEER — Jeffrey L. Beck, Seal 028696, 11-16-08

-L-
PI Sta 22+45.08
Δ = 84° 40' 17.0" (RT)
D = 7° 50' 55.5"
L = 1,078.79'
T = 665.08'
R = 730.00'
D.S.= 45 mph
SE= 0.06
RUNOFF= 135.0'
D.S.= 45 mph

-Y1-
PI Sta 13+45.79
Δ = 35° 58' 07.7" (RT)
D = 8° 05' 09.9"
L = 444.82'
T = 230.02'
R = 708.57'
D.S.= N/A (EXIST.)



DETAIL 'A' — TOE PROTECTION (Not to Scale)

Type of Liner= Permanent Soil Reinforcement Matting

LINE	STA. TO STA.	PERM. SOIL REINF. MATTING (YD²)
-L-	14+75 - 15+75 LT.	105
-L-	17+20 - 18+05 LT.	89
-L-	20+50 - 21+65 LT.	120

DETAIL 'B' — TOE PROTECTION (Not to Scale)

Type of Liner= Class 'B' Rip-Rap

LINE	STA. TO STA.	RIP RAP (TONS)	FILTER FABRIC (YD²)
-L-	20+00 - 21+50 RT.	75	207

DETAIL 'C' — LEVEL SPREADER WITH NO BYPASS (NOT TO SCALE)

LINE	STA. TO STA.	RIP RAP (TONS)	FILTER FABRIC (YD²)	D.D.E. (YD³)
-L-	17+50 RT.	1	5	4

DETAIL 'D' — DISSIPATER PAD (Not to Scale)

W1= 7.5'
W2= 17.5'
La= 15'
TH= 22"
EST. 17 TONS CLASS B RIP RAP
EST. 21 SY FF

LINE	STA. TO STA.	RIP RAP (TONS)	FILTER FABRIC (YD²)
-L-	20+60 - 20+78 RT.	17	21

DETAIL 'E' — 2' BASE DITCH (Not to Scale)

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

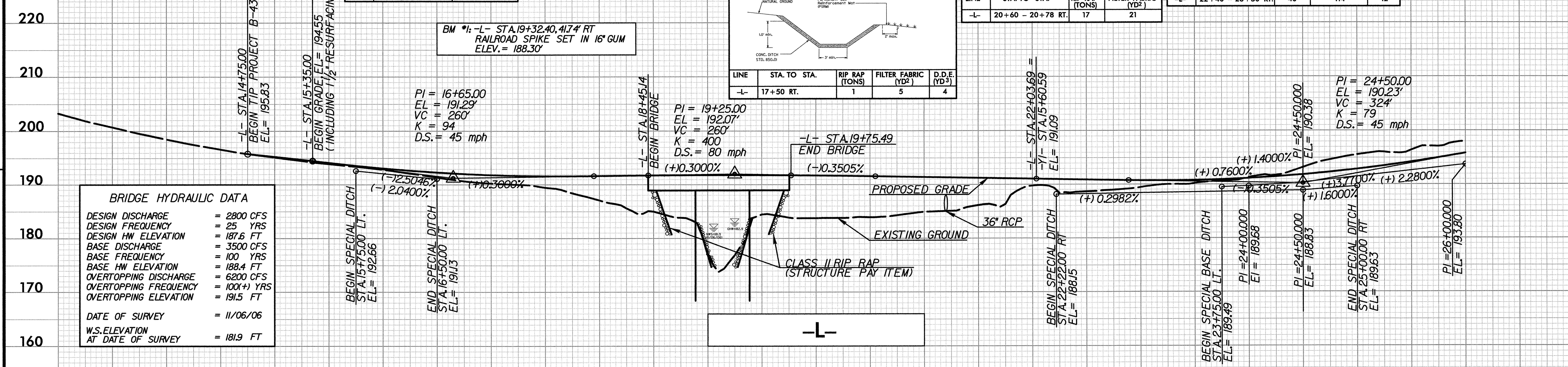
LINE	STA. TO STA.	RIP RAP (TONS)	FILTER FABRIC (YD²)	D.D.E. (YD³)
-L-	20+60 - 21+40 RT.	36	102	6
-L-	22+40 - 23+50 RT.	40	114	12

DETAIL 'F' — SPECIAL 2' BASE CUT DITCH (Not to Scale)

Min. D = 1.5 Ft.
Max. d = 1.0 Ft.
B = 2.0 Ft.
Type of Liner= Permanent Soil Reinforcement Matting

LINE	STA. TO STA.	PERM. SOIL REINF. MATTING (YD²)
-L-	23+75 - 31+75 LT.	1213

BM #1: -L- STA.19+32.40, 41.74' RT
RAILROAD SPIKE SET IN 16" GUM
ELEV.= 188.30'



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2800 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 187.6 FT
BASE DISCHARGE	= 3500 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 188.4 FT
OVERTOPPING DISCHARGE	= 6200 CFS
OVERTOPPING FREQUENCY	= 100(+) YRS
OVERTOPPING ELEVATION	= 191.5 FT
DATE OF SURVEY	= 11/06/06
W.S.ELEVATION AT DATE OF SURVEY	= 181.9 FT

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PROJECT REFERENCE NO.	SHEET NO.
B-4304	5
RW SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19563 TIMOTHY SCOTT HAYES 11-18-08

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028696 JEFFREY L. RECK 11-18-08

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

-L-

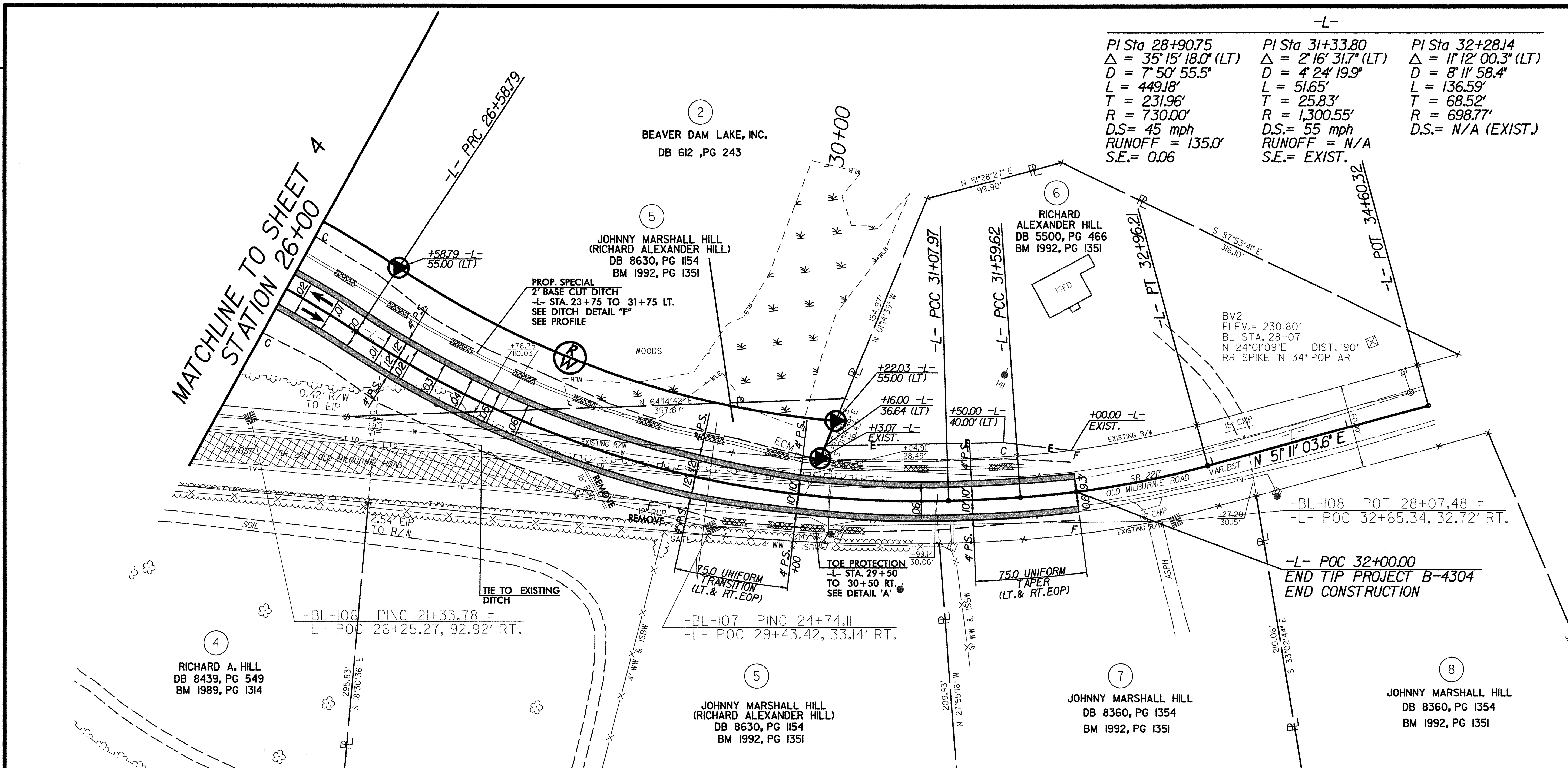
PI Sta 28+90.75	PI Sta 31+33.80	PI Sta 32+28.14
Δ = 35° 15' 18.0" (LT)	Δ = 2° 16' 31.7" (LT)	Δ = 11° 12' 00.3" (LT)
D = 7° 50' 55.5"	D = 4° 24' 19.9"	D = 8° 11' 58.4"
L = 449.18'	L = 51.65'	L = 136.59'
T = 231.96'	T = 25.83'	T = 68.52'
R = 730.00'	R = 1,300.55'	R = 698.77'
D.S.= 45 mph	D.S.= 55 mph	D.S.= N/A (EXIST.)
RUNOFF = 135.0'	RUNOFF = N/A	
S.E.= 0.06	S.E.= EXIST.	

DETAIL 'A'
TOE PROTECTION
(Not to Scale)

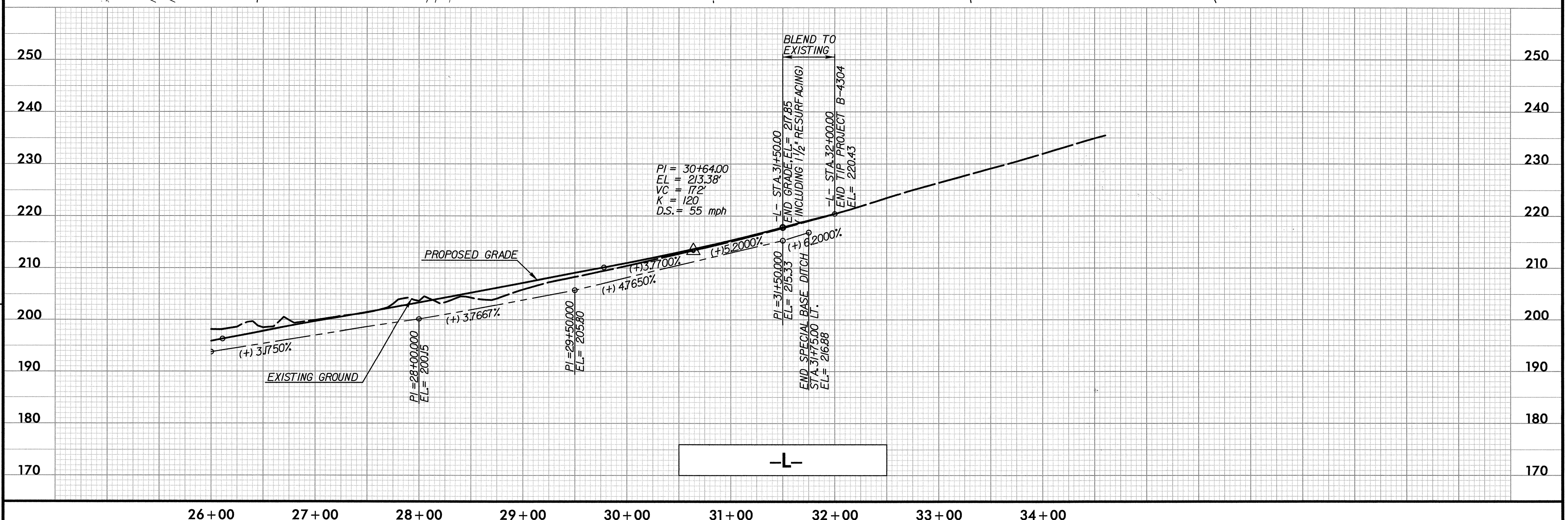
Natural Ground — PSRM — 1' min. — 2:1 — Fill Slope

Type of Liner = Permanent Soil Reinforcement Mattting

LINE	STA. TO STA.	PERM. SOIL REINF. MATTING (YD²)
-L-	29+50 - 30+50 RT.	105



MATCHLINE TO SHEET 4
STATION 26+00
-L- PRC 26+58.79
+58.79 -L- 55.00' (LT)
PROP. SPECIAL 2' BASE CUT DITCH -L- STA. 23+75 TO 31+75 LT. SEE DITCH DETAIL "F" SEE PROFILE
BEAVER DAM LAKE, INC. DB 612, PG 243
JOHNNY MARSHALL HILL (RICHARD ALEXANDER HILL) DB 8630, PG 1154 BM 1992, PG 1351
WOODS
30+00
-L- PCC 31+07.97
-L- PCC 31+59.62
-L- PT 32+96.21
-L- POT 34+60.32
RICHARD ALEXANDER HILL DB 5500, PG 466 BM 1992, PG 1351
BM2 ELEV.= 230.80' BL STA. 28+07 N 24°01'09"E DIST. 190' RR SPIKE IN 34" POPLAR
N 51° 11' 03.6" E
SR 2217 OLD MILBURNIE ROAD
-BL-108 POT 28+07.48 = -L- POC 32+65.34, 32.72' RT.
-L- POC 32+00.00
END TIP PROJECT B-4304
END CONSTRUCTION
TOE PROTECTION -L- STA. 29+50 TO 30+50 RT. SEE DETAIL 'A'
75.0 UNIFORM TRANSITION (LT.& RT.EOP)
75.0 UNIFORM TAPER (LT.& RT.EOP)
TIE TO EXISTING DITCH
-BL-106 PINC 21+33.78 = -L- POC 26+25.27, 92.92' RT.
-BL-107 PINC 24+74.11 = -L- POC 29+43.42, 33.14' RT.
RICHARD A. HILL DB 8439, PG 549 BM 1989, PG 1314
JOHNNY MARSHALL HILL (RICHARD ALEXANDER HILL) DB 8630, PG 1154 BM 1992, PG 1351
JOHNNY MARSHALL HILL DB 8360, PG 1354 BM 1992, PG 1351
JOHNNY MARSHALL HILL DB 8360, PG 1354 BM 1992, PG 1351
NC GRID NAD 83
PAVEMENT REMOVAL
REVISIONS



BLEND TO EXISTING
-L- STA. 31+50.00 END GRADE EL= 217.85 (INCLUDING 1½" RESURFACING)
-L- STA. 32+00.00 END TIP PROJECT B-4304 EL= 220.43
PI = 30+64.00
EL = 213.38'
VC = 172'
K = 120
D.S.= 55 mph
PROPOSED GRADE
EXISTING GROUND
(+) 3.1750%
(+) 3.7667%
(+) 4.7650%
(+) 3.7700%
(+) 5.2000%
(+) 6.2000%
PI =28+00.000 EL= 200.15
PI =29+50.000 EL= 205.80
PI =31+50.000 EL= 215.33
END SPECIAL BASE DITCH STA. 31+75.00 LT. EL= 216.88
-L-
250
240
230
220
210
200
190
180
170
26+00
27+00
28+00
29+00
30+00
31+00
32+00
33+00
34+00

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11/5/2008

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ENGINEERS & CONSULTANTS
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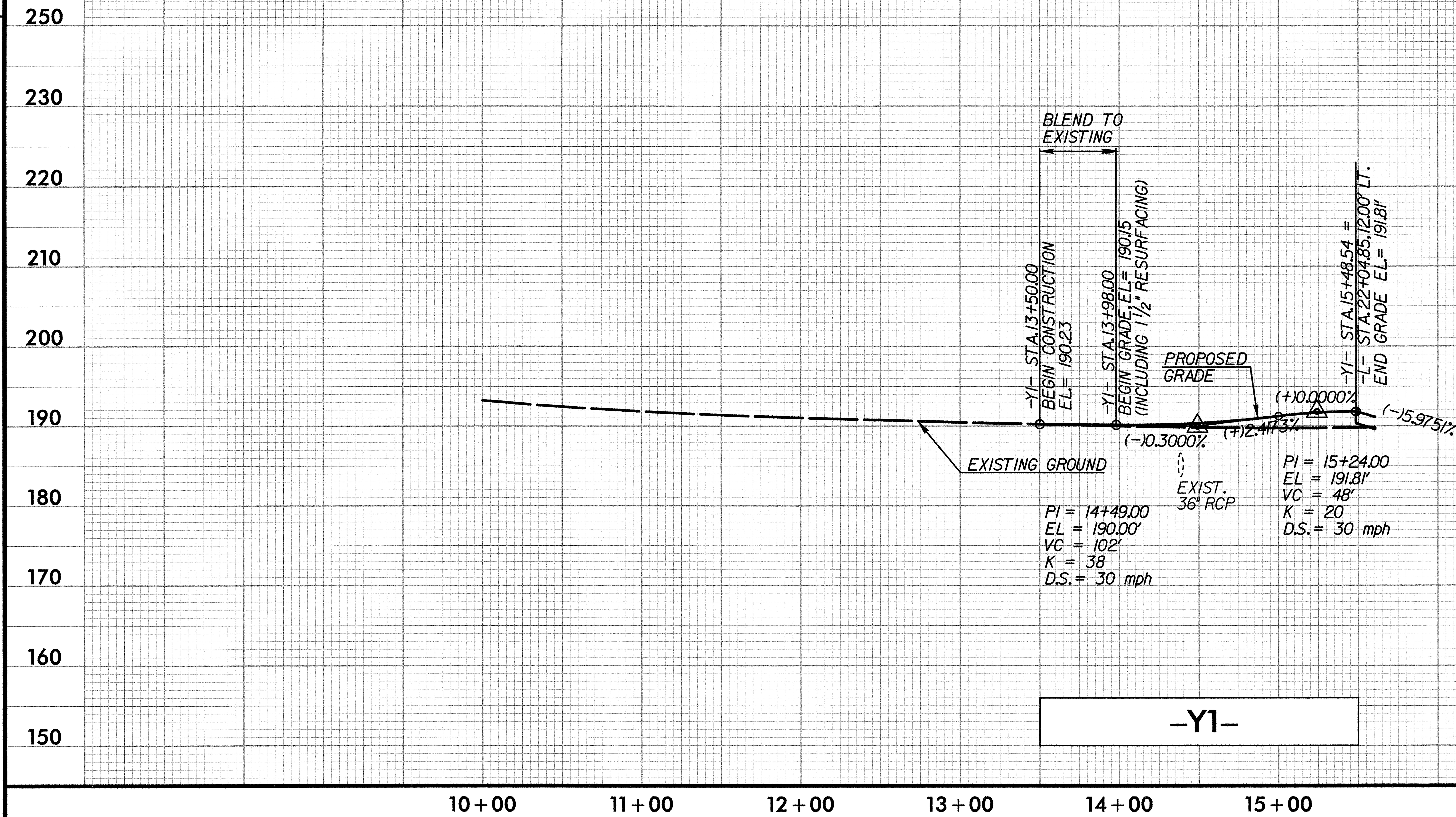
PROJECT REFERENCE NO.	SHEET NO.
B-4304	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19563 ENGINEER TIMOTHY SCOTT HAYES 11/18/08	NORTH CAROLINA PROFESSIONAL SEAL 026696 ENGINEER JEFFREY L. BECK 11-18-08

36" RCP W/ HEADWALL
HYDRAULIC DATA

DESIGN DISCHARGE	= 37 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 186.8 FT
BASE DISCHARGE	= 62 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 188.3 FT
OVERTOPPING DISCHARGE	= 80 CFS
OVERTOPPING FREQUENCY	= 100(+) YRS
OVERTOPPING ELEVATION	= 190.7 FT
DATE OF SURVEY	= 11/6/06
W.S. ELEVATION AT DATE OF SURVEY	= 181.9 FT



210
200
190
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REVISIONS

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