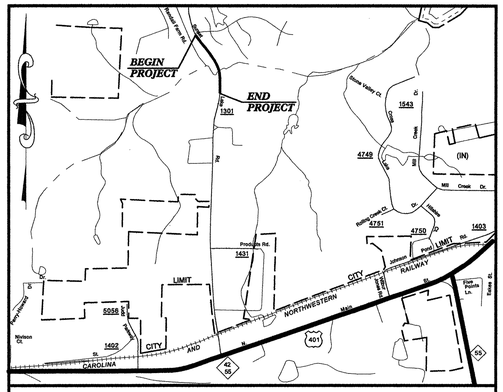
09/08/99

TIP PROJECT: B-4302

CONTRACT: 202089

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

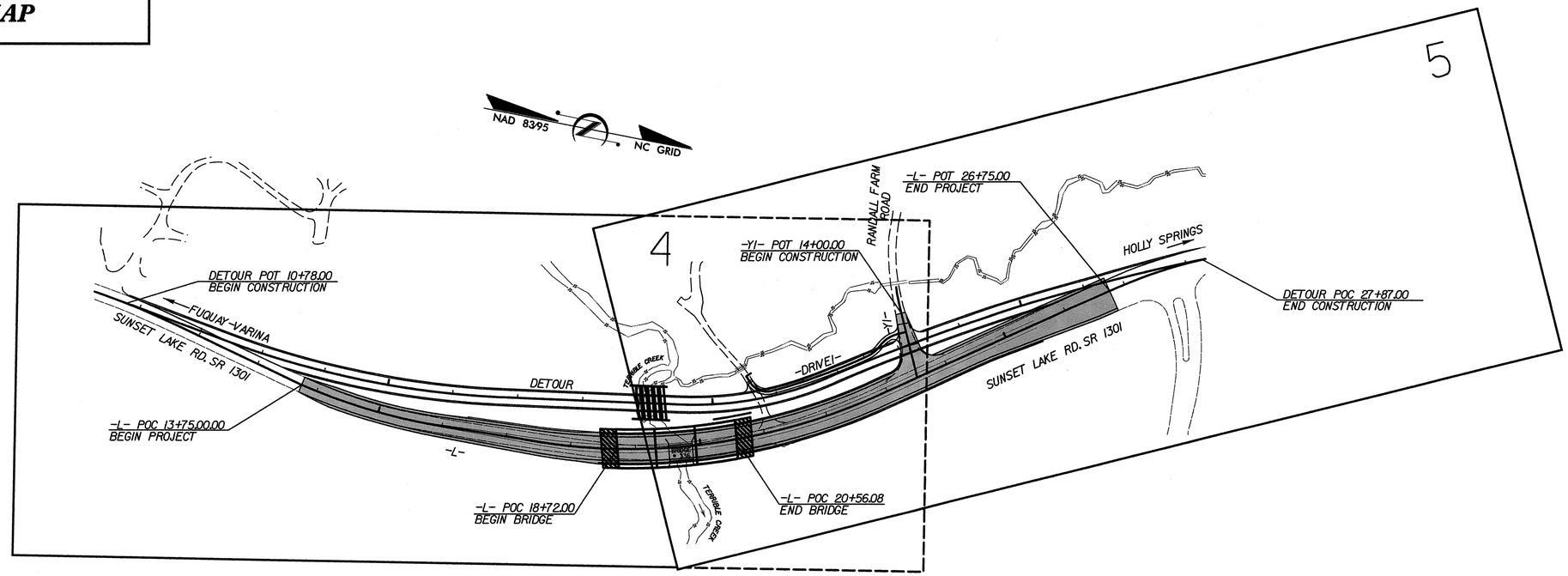
WAKE COUNTY

LOCATION: BRIDGE NO. 336 OVER TERRIBLE CREEK ON SR 1301 (SUNSET LAKE ROAD)

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4302	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33639.1.1	BRZ-1301(2)	P.E.
33639.2.1	BRZ-1301(2)	R /W, UTIL.
33639.3.1	BRZ-1301(2)	CONST.



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(919) 851-1918 (FAX)
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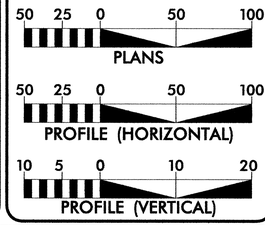
NCDOT CONTACT : DOUG TAYLOR, PE
PROJECT ENGINEER – ROADWAY DESIGN

GRAPHIC SCALES



DESIGN DATA

ADT 2008 = 14,100
ADT 2030 = 28,500
DHV = 10 %
D = 60 %
T = 4% % *
V = 50 MPH
* (TTST 1% + DUALS 3%)
FUNCTIONAL = MINOR
CLASS. COLLECTOR
** DESIGN EXCEPTION = STOPPING SIGHT DISTANCE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4302 = 0.211 MI
LENGTH STRUCTURE TIP PROJECT B-4302 = 0.035 MI
TOTAL LENGTH TIP PROJECT B-4302 = 0.246 MI

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 18, 2008

LETTING DATE:
MAY 19, 2009

TIM S. HAYES, PE
PROJECT ENGINEER

JOHNNY R. BANKS
PROJECT MANAGER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026656 ENGINEER JEFFREY L. RECK
SIGNATURE: 2-3-09

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19563 ENGINEER TIMOTHY SCOTT HAYES P.E.
SIGNATURE: 2-3-09

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

2/3/2009
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PROJECT REFERENCE NO.	SHEET NO.
B-4302	1-A
R/W SHEET NO.	

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

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 Section
2-A thru 2-C	Typical Sections
2-D thru 2-E	Detour Plan and Profile
2-F	Anchorage for Frames - Brick/Concrete/Precast Concrete
2-G	Special Detail of Concrete Bridge Sidewalk Approach
2-H	Reinforced Sandbag Headwall Detail
2-I thru 2-S	Temporary Shoring Plans
3	Summary of Quantities
3-A	Parcel Index Sheet
3-B	List of Pipe, Endwalls, Etc. (For Pipes 48" & Under) and List of Pipe, Endwalls, Etc. (For Pipes 54" & Over)
3-C	Guardrail Summary, Temporary Guardrail Summary and Summary of Pavement Removal
3-D	Summary of Earthwork in Cubic Yards
4 thru 5	Plan and Profile
TCP-1 thru TCP-10	Traffic Control Plans
PMP-1	Final Pavement Marking Detail
EC-1 thru EC-9	Erosion Control Plans
RF1 & RF2	Reforestation Detail Sheets
SIGN1 thru SIGN3	Signing Plans
UC-1 thru UC-2	Utility Construction Plans
UO-1 thru UO-3	Utilities By Others Plans
EW-Volume-1	Cross-Section Summary Sheet
X-1 thru X-11	Cross-Sections
S-1 thru S- 45	Structure Plans

GENERAL NOTES:

2006 SPECIFICATIONS
EFFECTIVE: 07-18-06
REVISED: 09-12-08

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.

UNDERDRAINS:

UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 AT LOCATIONS DIRECTED BY THE ENGINEER.

STREET TURNOUT:

STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADII NOTED ON PLANS.

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, PSNC, Embarq

Town of Fuquay-Varina, Time Warner Cable

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.

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'
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
815.03	Pipe Underdrain and Blind Drain
816.04	Markers for Drainage Structure and Concrete Pad
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
848.01	Concrete Sidewalk
848.04	Street Turnout
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

10/25/06
2/2/2009 4:37:30 PM G:\project\2006\26L00 (B-4302)\Roadway\Proj\b4302_rdy_tsh.dgn

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

MULKEY
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PROJECT REFERENCE NO.	SHEET NO.
B-4302	1-B
R/W SHEET NO.	

REVISIONS

12/25/05

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 — CA
- Proposed Control of Access — CA
- 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 — T
- 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.

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6/2/99

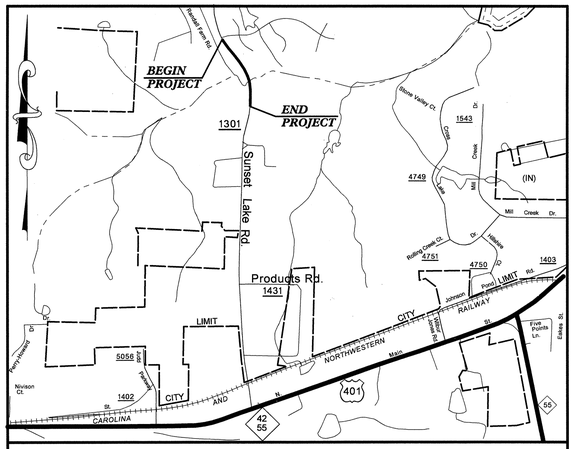
PROJECT REFERENCE NO.	SHEET NO.
B-4302	1C
Location and Surveys	

SURVEY CONTROL SHEET B-4302

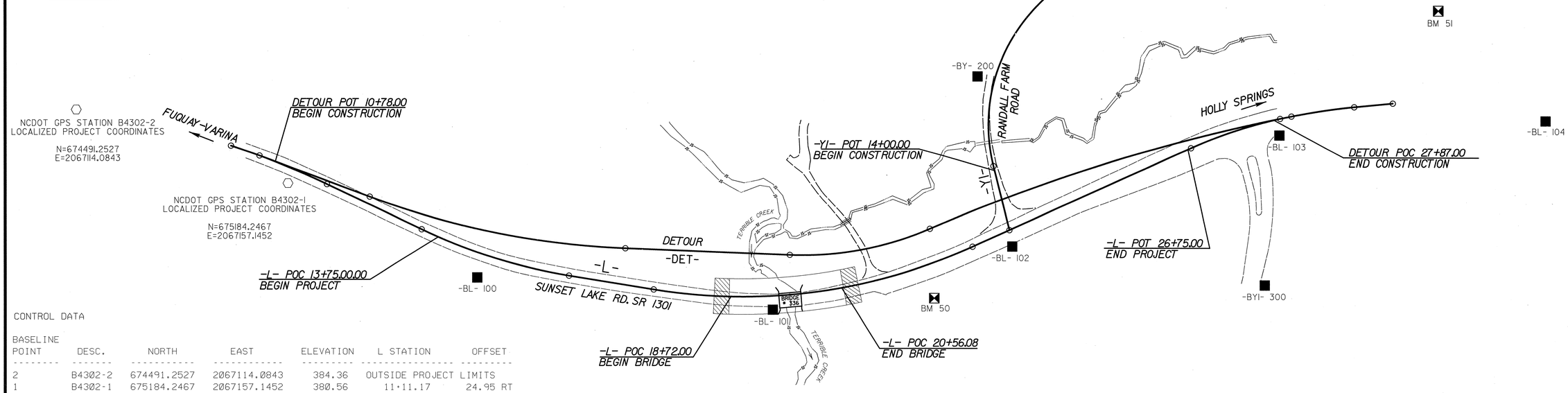
WAKE COUNTY

LOCATION: BRIDGE NO. 336 OVER TERRIBLE CREEK AND APPROACHES ON SR 1301 (SUNSET LAKE ROAD)

B-4302



VICINITY MAP
(NOT TO SCALE)



CONTROL DATA

BASELINE

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
2	B4302-2	674491.2527	2067114.0843	384.36	OUTSIDE PROJECT LIMITS	
1	B4302-1	675184.2467	2067157.1452	380.56	11+11.17	24.95 RT
100	BL-100	675521.3810	2067249.5260	369.83	14+57.25	38.97 RT
101	BL-101	676011.8730	2067208.7010	341.26	19+39.84	23.00 RT
102	BL-102	676381.4630	2067031.0600	343.37	23+43.70	26.54 RT
103	BL-103	676780.7790	2066766.1980	349.07	28+28.85	26.50 RT
104	BL-104	677208.5630	2066658.0540	364.22	OUTSIDE PROJECT LIMITS	

BY

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
200	BY-200	676271.3440	2066765.9380	357.08	24+06.74	253.54 LT
Y102	BL-102	676381.4630	2067031.0600	343.37	23+43.70	26.54 RT

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y103	BL-103	676780.7790	2066766.1980	349.07	28+28.85	26.50 RT
300	BY1-300	676804.2400	2067013.7210	360.16	27+08.60	255.98 RT

BENCHMARK DATA

50 ELEVATION = 344.47
N 676271 E 2067139
L STATION 21+96 55 RIGHT
R/R SPIKE IN 22 INCH PINE

51 ELEVATION = 350.73
N 677000 E 2066514
L STATION 30+25
N 74° 48' 56.5" W DIST 170.49
R/R SPIKE IN 28 INCH OAK

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4302-1" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 675184.2467(ft) EASTING: 2067157.1452(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987831 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4302-1" TO -L- STATION 10+00.00 IS S 22°25'24.6" W 112.94' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

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/

B4302_ls_control_080303.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 NGS ONLINE POSITIONING SERVICE (OPUS)

12/6/2006
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PROJECT REFERENCE NO.	SHEET NO.
B-4302	2
RW SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19663 ENGINEER TIMOTHY SCOTT HAYES
1-28-09

PAVEMENT DESIGN ENGINEER

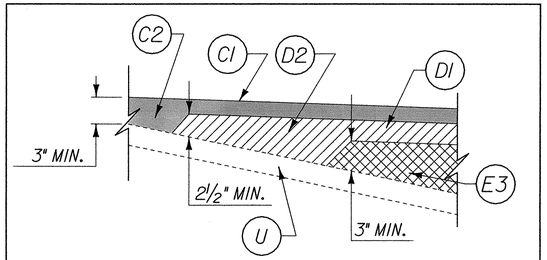
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
1-29-09

REVISIONS

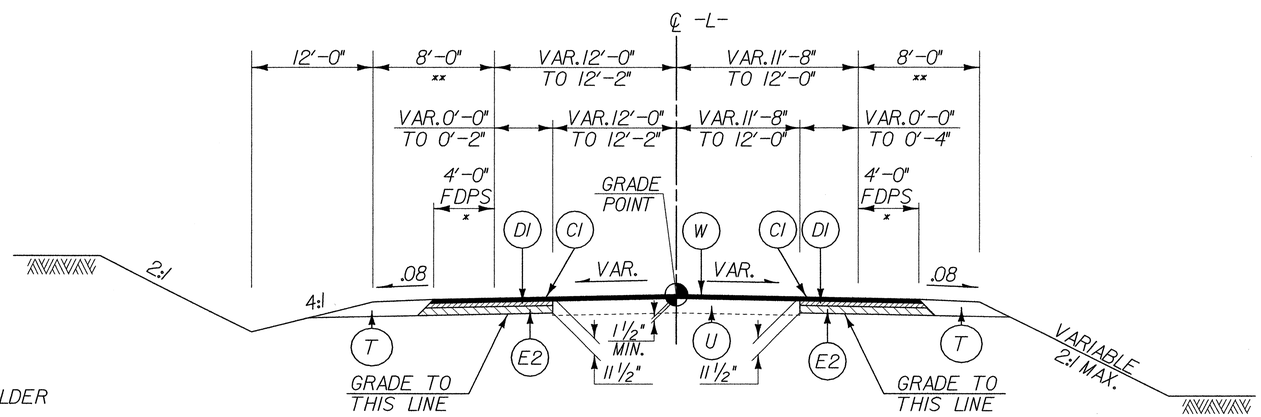
PAVEMENT SCHEDULE

C1	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.
C2	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. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 456 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 APPROXIMATE 4 1/2" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YARD.
E3	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.
J1	8" AGGREGATE BASE COURSE
P	PRIME COAT AT THE RATE OF 35 GAL. PER SQ. YARD
R1	2'-6" CONCRETE CURB & GUTTER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING DETAIL

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



WEDGING DETAIL (W)



TYPICAL SECTION No. 1

USE TYPICAL SECTION No. 1 AS FOLLOWS:
FROM -L- STA. 13+75.00 TO -L- STA. 15+14.00

* FDPS = FULL DEPTH PAVED SHOULDER

** ADD 3'-0" FOR GUARDRAIL

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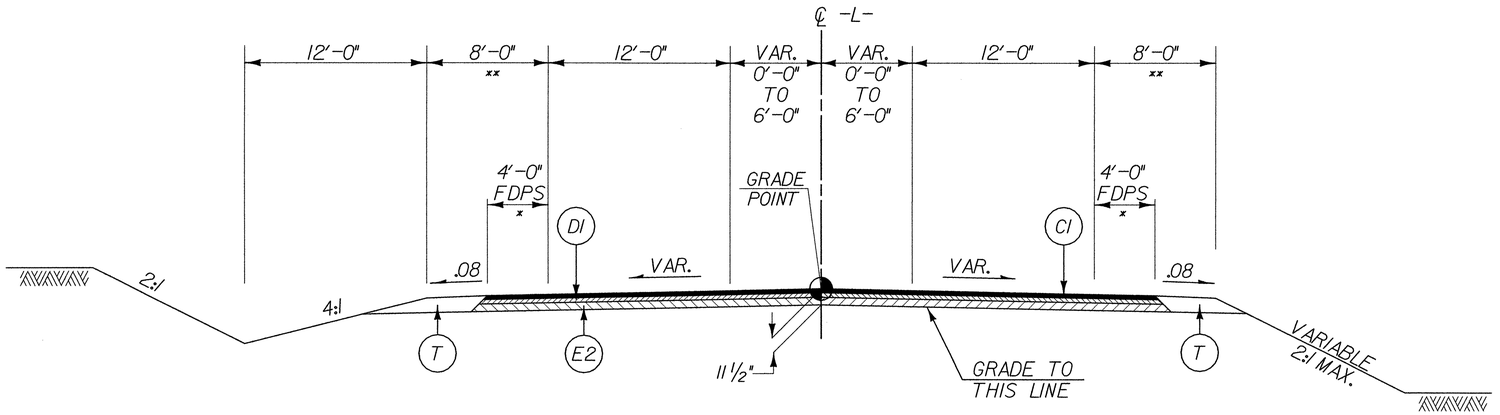
PROJECT REFERENCE NO.	SHEET NO.
B-4302	2-A
RW SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19583 ENGINEER JOHNNY SCOTT HAYES
1-28-09

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
1-29-09

REVISIONS

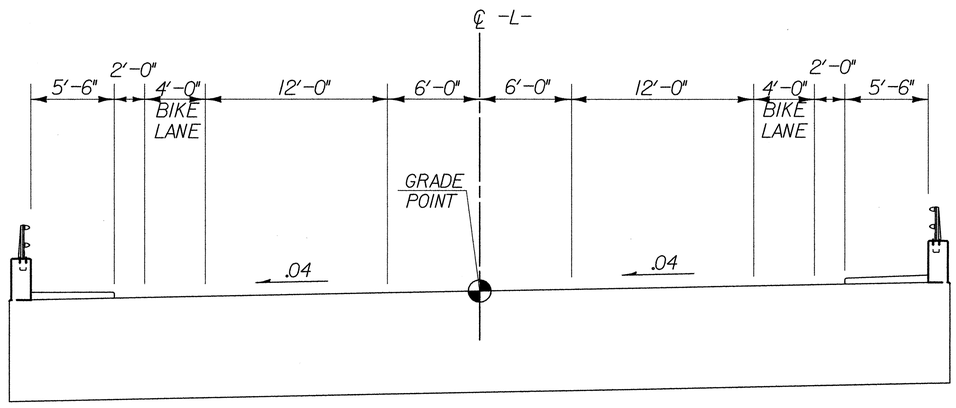


* FDPS = FULL DEPTH PAVED SHOULDER

** ADD 3'-0" FOR GUARDRAIL

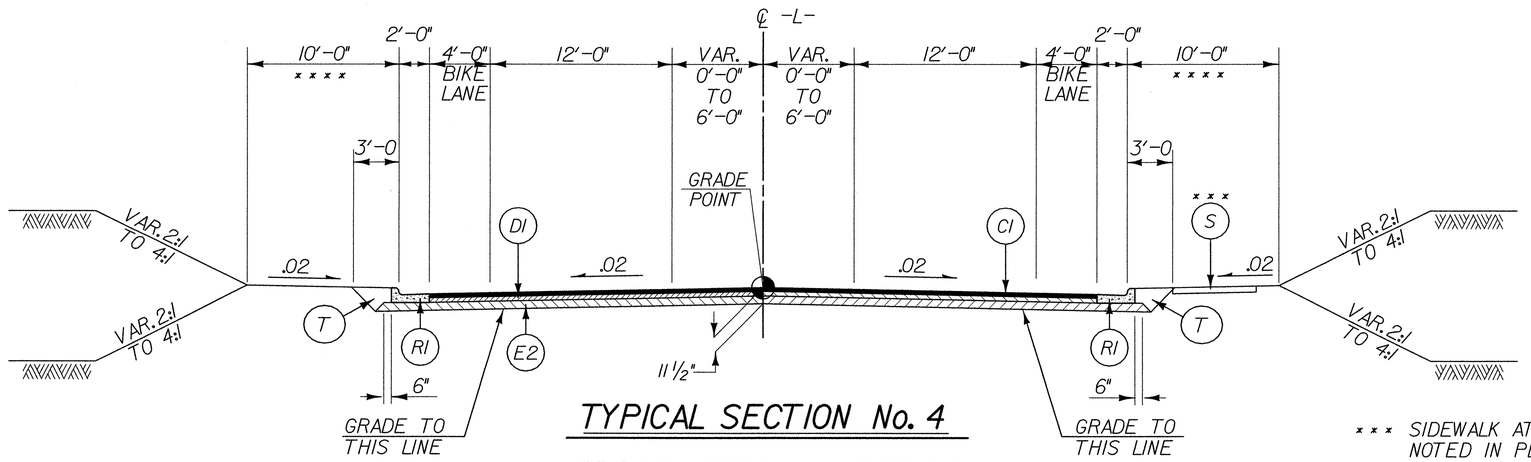
TYPICAL SECTION No. 2

USE TYPICAL SECTION No.2 AS FOLLOWS:
FROM -L- STA. 15+14.00 TO -L- STA. 18+72.00 (BEGIN BRIDGE)



TYPICAL SECTION No. 3

USE TYPICAL SECTION No. 3 AS FOLLOWS:
FROM -L- STA. 18+72.00 (BEGIN BRIDGE) TO -L- STA. 20+56.08 (END BRIDGE)

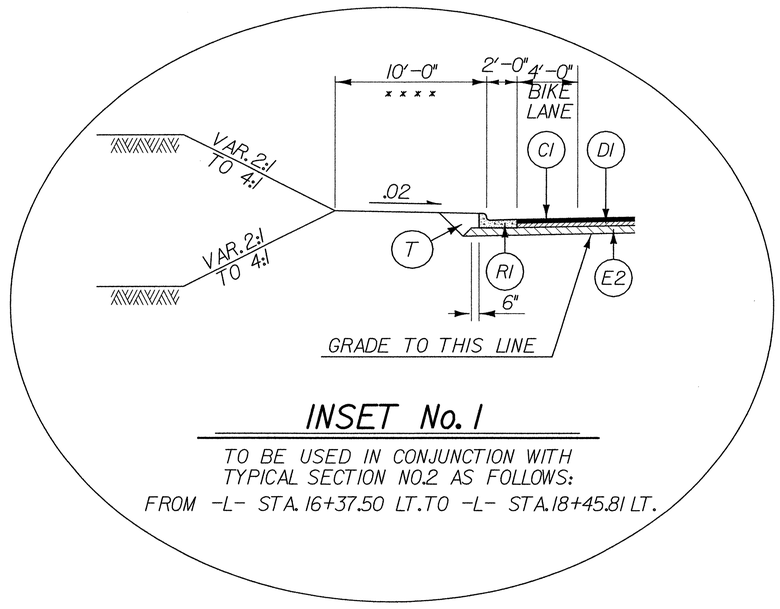


TYPICAL SECTION No. 4

USE TYPICAL SECTION No.4 AS FOLLOWS:
FROM -L- STA. 20+56.08 (END BRIDGE) TO -L- STA. 24+00.00

*** SIDEWALK AT LOCATIONS NOTED IN PLANS

**** ADD 4'-0" FOR GUARDRAIL



INSET No. 1

TO BE USED IN CONJUNCTION WITH TYPICAL SECTION NO.2 AS FOLLOWS:
FROM -L- STA. 16+37.50 LT. TO -L- STA. 18+45.81 LT.

CI	3" SF9.5B
C2	VAR. DEPTH SF9.5B
DI	4" I19.0B
D2	VAR. DEPTH I19.0B
E2	4½" B25.0B
E3	VAR. DEPTH B25.0B
JI	8" ABC
P	PRIME COAT
RI	2'-6" C&G
S	4" CONC. SIDEWALK
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

MULKEY
ENGINEERS & CONSULTANTS
PO BOX 33127
RALEIGH, NC 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

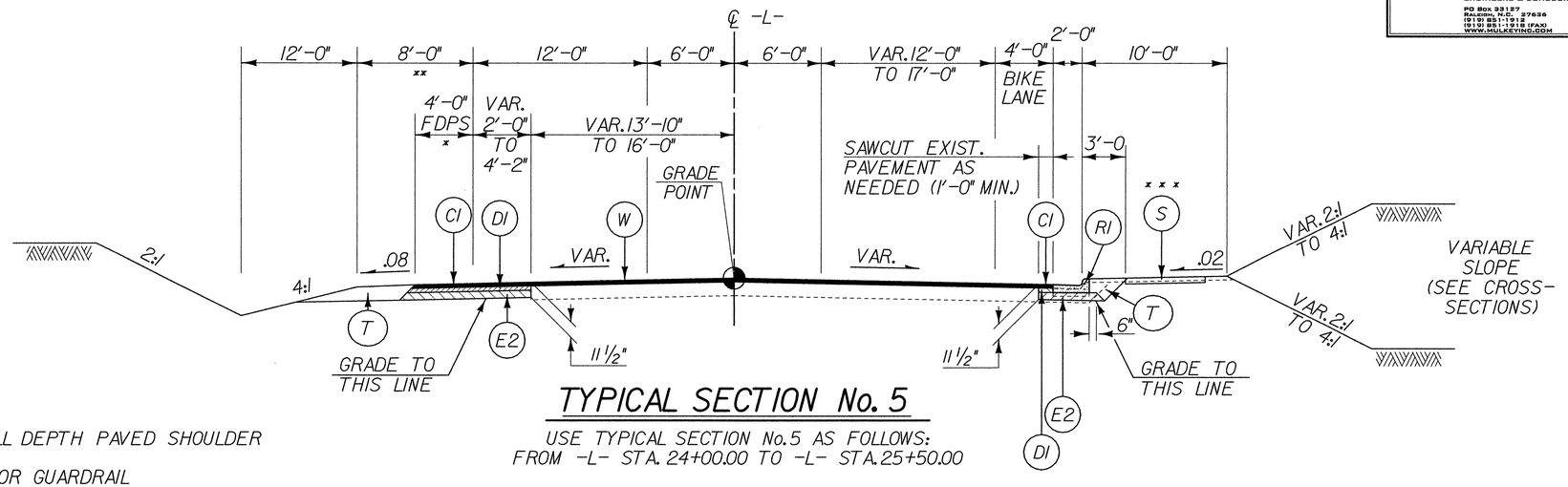
PROJECT REFERENCE NO.	SHEET NO.
B-4302	2-B
RW SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19563 ENGINEER TIMOTHY SCOTT HAYES
1-28-09

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
1-29-09



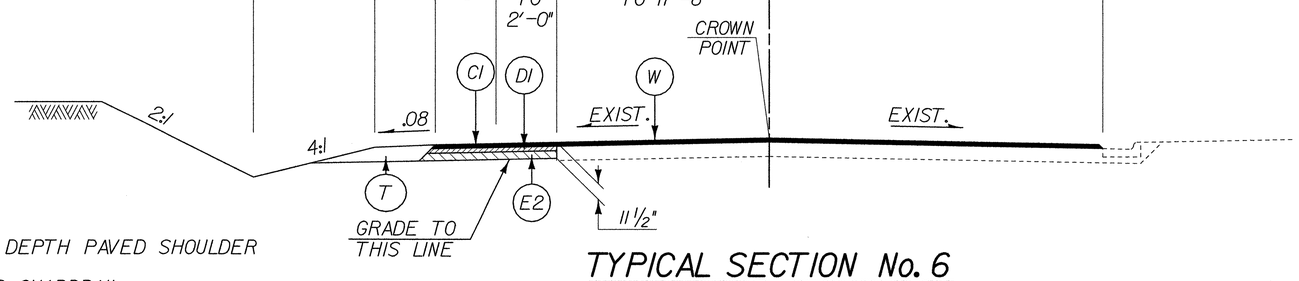
TYPICAL SECTION No. 5

USE TYPICAL SECTION No.5 AS FOLLOWS:
FROM -L- STA. 24+00.00 TO -L- STA. 25+50.00

* FDPS = FULL DEPTH PAVED SHOULDER

** ADD 3'-0" FOR GUARDRAIL

*** SIDEWALK AT LOCATIONS NOTED IN PLANS

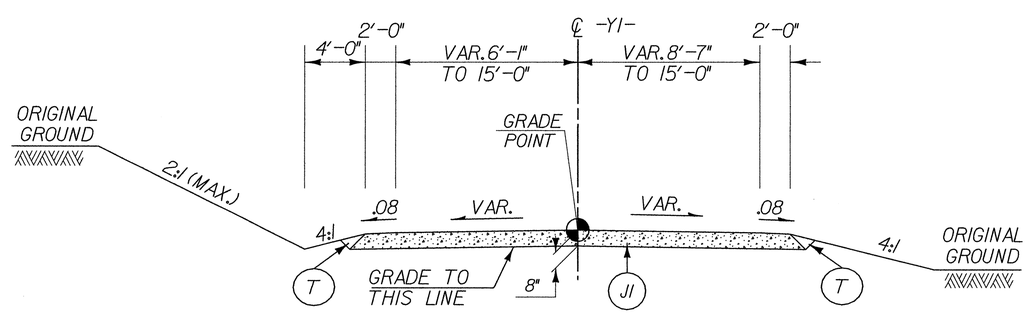


TYPICAL SECTION No. 6

USE TYPICAL SECTION No.6 AS FOLLOWS:
FROM -L- STA. 25+50.00 TO -L- STA. 26+75.00

* FDPS = FULL DEPTH PAVED SHOULDER

** ADD 3'-0" FOR GUARDRAIL



TYPICAL SECTION No. 7

USE TYPICAL SECTION No.7 AS FOLLOWS:
FROM -Y1- STA. 14+00.00 TO -Y1- STA. 14+50.60 +/-

CI	3" SF9.5B
C2	VAR. DEPTH SF9.5B
DI	4" I19.0B
D2	VAR. DEPTH I19.0B
E2	4½" B25.0B
E3	VAR. DEPTH B25.0B
JI	8" ABC
P	PRIME COAT
RI	2'-6" C&G
S	4" CONC. SIDEWALK
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

REVISIONS

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(919) 851-1916 (FAX)
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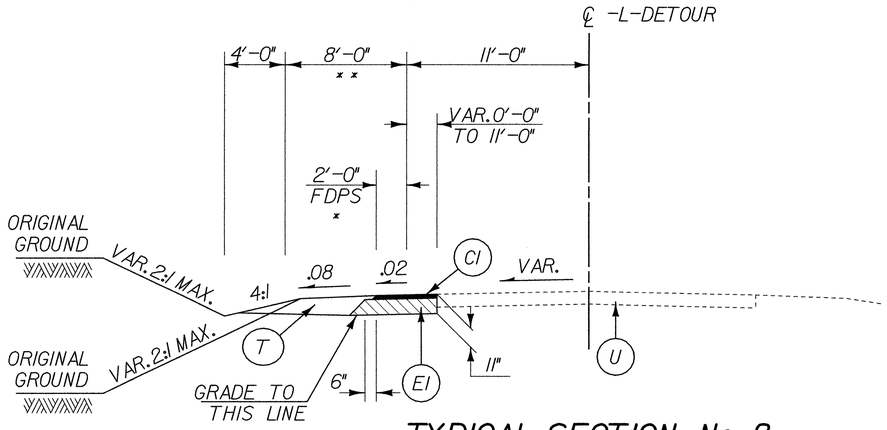
PROJECT REFERENCE NO.	SHEET NO.
B-4302	2-C
RW SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19963 ENGINEER TIMOTHY SCOTT HAYES
1-28-09

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
1-29-09

REVISIONS

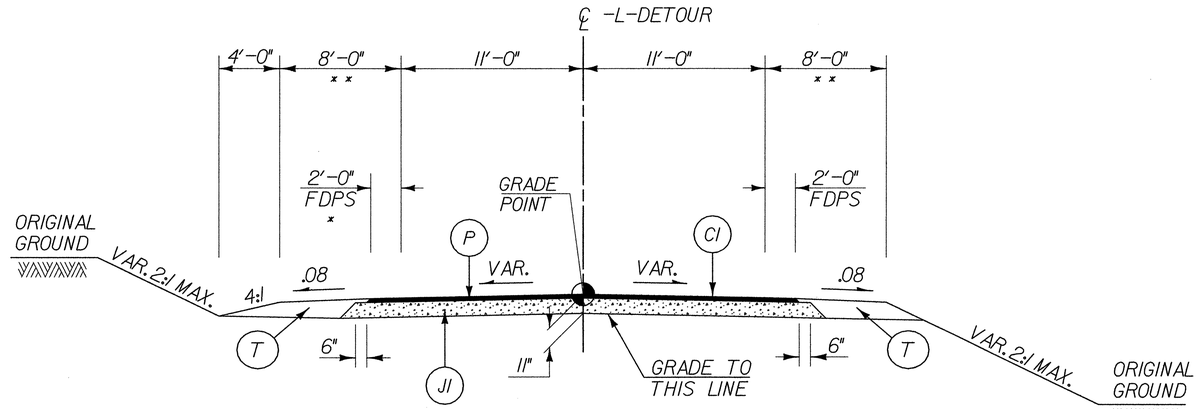


TYPICAL SECTION No. 8

USE TYPICAL SECTION No. 8 AS FOLLOWS:
FROM DETOUR STA. 10+78.00 TO DETOUR STA. 12+45.00
FROM DETOUR STA. 26+20.00 TO DETOUR STA. 27+87.00

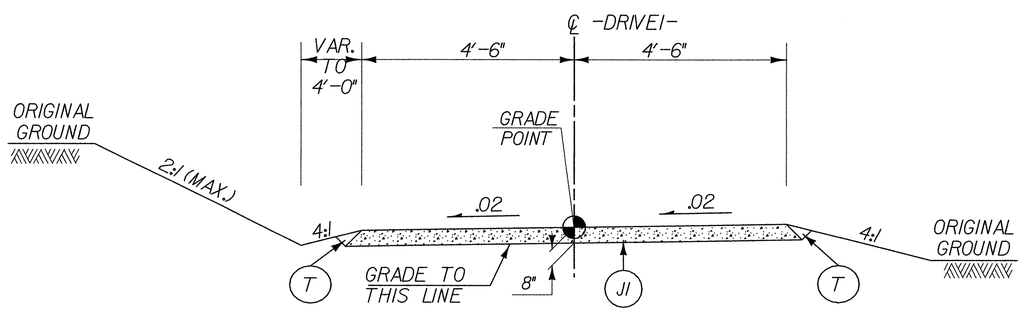
x FDPS = FULL DEPTH PAVED SHOULDER

x x ADD 2'-0" FOR GUARDRAIL



TYPICAL SECTION No. 9

USE TYPICAL SECTION No. 9 AS FOLLOWS:
FROM DETOUR STA. 12+45.00 TO DETOUR STA. 26+20.00



TYPICAL SECTION No. 10

USE TYPICAL SECTION No. 10 AS FOLLOWS:
FROM -DRIVE1- STA. 10+11.35 TO -DRIVE1- STA. 12+65.35

CI	3" SF9.5B
C2	VAR. DEPTH SF9.5B
DI	4" 119.0B
D2	VAR. DEPTH 119.0B
EI	4" B25.0B
E2	4 ½" B25.0B
E3	VAR. DEPTH B25.0B
JI	8" ABC
P	PRIME COAT
RI	2'-6" C&G
S	4" CONC. SIDEWALK
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

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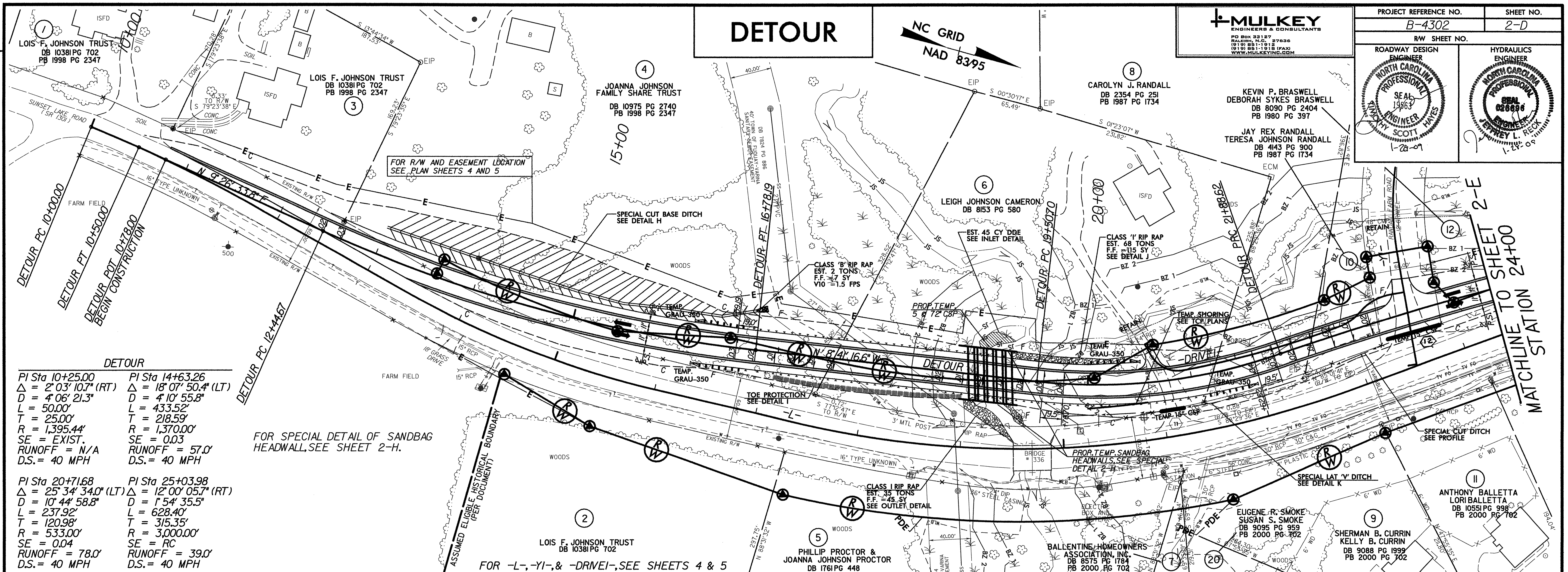
PROJECT REFERENCE NO.	SHEET NO.
B-4302	2-D
R/W SHEET NO.	

MULKEY ENGINEERS & CONSULTANTS

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

DETOUR



DETOUR

PI Sta 10+25.00	PI Sta 14+63.26
Δ = 2° 03′ 10.7″ (RT)	Δ = 18° 07′ 50.4″ (LT)
D = 4° 06′ 21.3″	D = 4° 10′ 55.8″
L = 50.00′	L = 433.52′
T = 25.00′	T = 218.59′
R = 1,395.44′	R = 1,370.00′
SE = EXIST.	SE = 0.03
RUNOFF = N/A	RUNOFF = 57.0′
D.S.= 40 MPH	D.S.= 40 MPH

PI Sta 20+71.68	PI Sta 25+03.98
Δ = 25° 34′ 34.0″ (LT)	Δ = 12° 00′ 05.7″ (RT)
D = 10° 44′ 58.8″	D = 1° 54′ 35.5″
L = 237.92′	L = 628.40′
T = 120.98′	T = 315.35′
R = 533.00′	R = 3,000.00′
SE = 0.04	SE = RC
RUNOFF = 78.0′	RUNOFF = 39.0′
D.S.= 40 MPH	D.S.= 40 MPH

DETAIL H
SPECIAL CUT BASE DITCH (Not to Scale)

Natural Ground, 2:1, D, B, 4:1 or Flatter, Front Ditch Slope. Min. D= 1.0 Ft. B= 2.0 Ft.

Type of Liner= PSRM

LINE	STA. TO STA.
DETOUR	12+51 TO 16+75 LT.

DETAIL I
TOE PROTECTION (Not to Scale)

Natural Ground, 2:1 OR FLATTER, Fill Slope, d= 1.0 Ft., 3.0′

Type of Liner= PSRM

LINE	STA. TO STA.	PERM. SOIL REINF. MAT. (YD²)
DETOUR	17+00 – 18+80 RT.	100

DETAIL J
RIP RAP AT EMBANKMENT (Not to Scale)

1.5′

Type of Liner = Class I Rip-Rap

LINE	STA. TO STA.	RIP RAP (TONS)	FILTER FABRIC (YD²)
-DET-	19+20 – 20+35 LT.	68	115

DETAIL K
SPECIAL LATERAL "V" DITCH (Not to Scale)

Natural Ground, 3:1 or Flatter, D, 3:1, Fill Slope. Min. D= 1.0 Ft.

LINE	STA. TO STA.	D.D.E. (YD³)
DETOUR	19+74 – 22+09 RT.	41

INLET DETAIL
(Not to Scale)

TYPICAL 0′ TO 25′ UPSTREAM. VARIES 10 TO 15′

LINE	STA. TO STA.	D.D.E. (YD³)
DETOUR	18+91 – 19+27 LT.	45

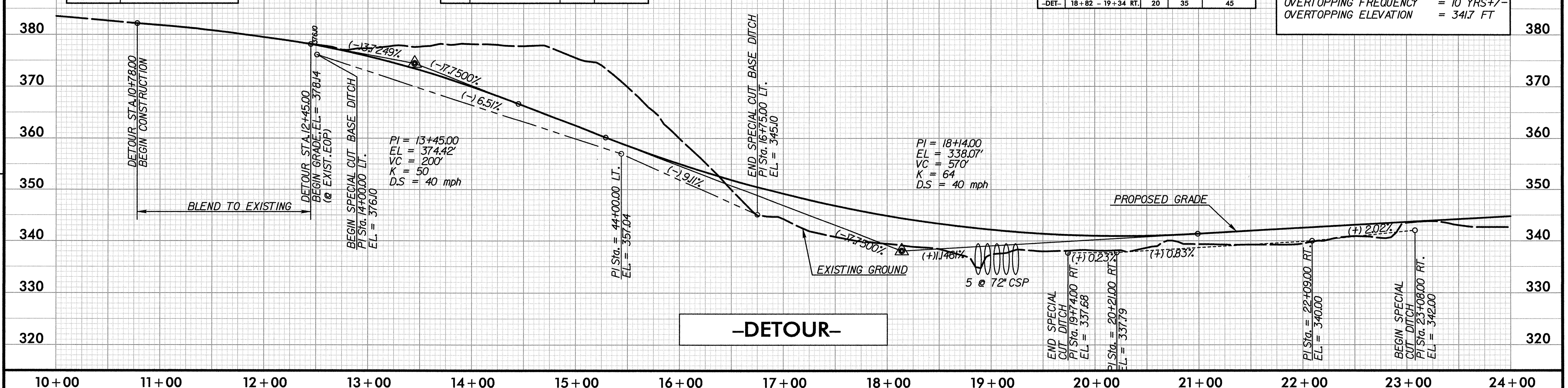
OUTLET DETAIL
(Not to Scale)

CLASS 'I' RIP RAP W/ FILTER FABRIC, 2:1, 18″, KEY IN 1.5 ft., TYPICAL 0′ TO 50′ DOWNSTREAM, VARIES

LINE	STA. TO STA.	D.D.E. (YD³)	RIP RAP (TONS)	FILTER FABRIC (YD²)
-DET-	18+82 – 19+34 RT.	20	35	45

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 950 CFS
DESIGN FREQUENCY	= 5 YRS
DESIGN HW ELEVATION	= 340.0 FT
BASE DISCHARGE	= N/A CFS
BASE FREQUENCY	= N/A YRS
BASE HW ELEVATION	= N/A FT
OVERTOPPING DISCHARGE	= 1800 CFS
OVERTOPPING FREQUENCY	= 10 YRS+/-
OVERTOPPING ELEVATION	= 341.7 FT



REVISIONS

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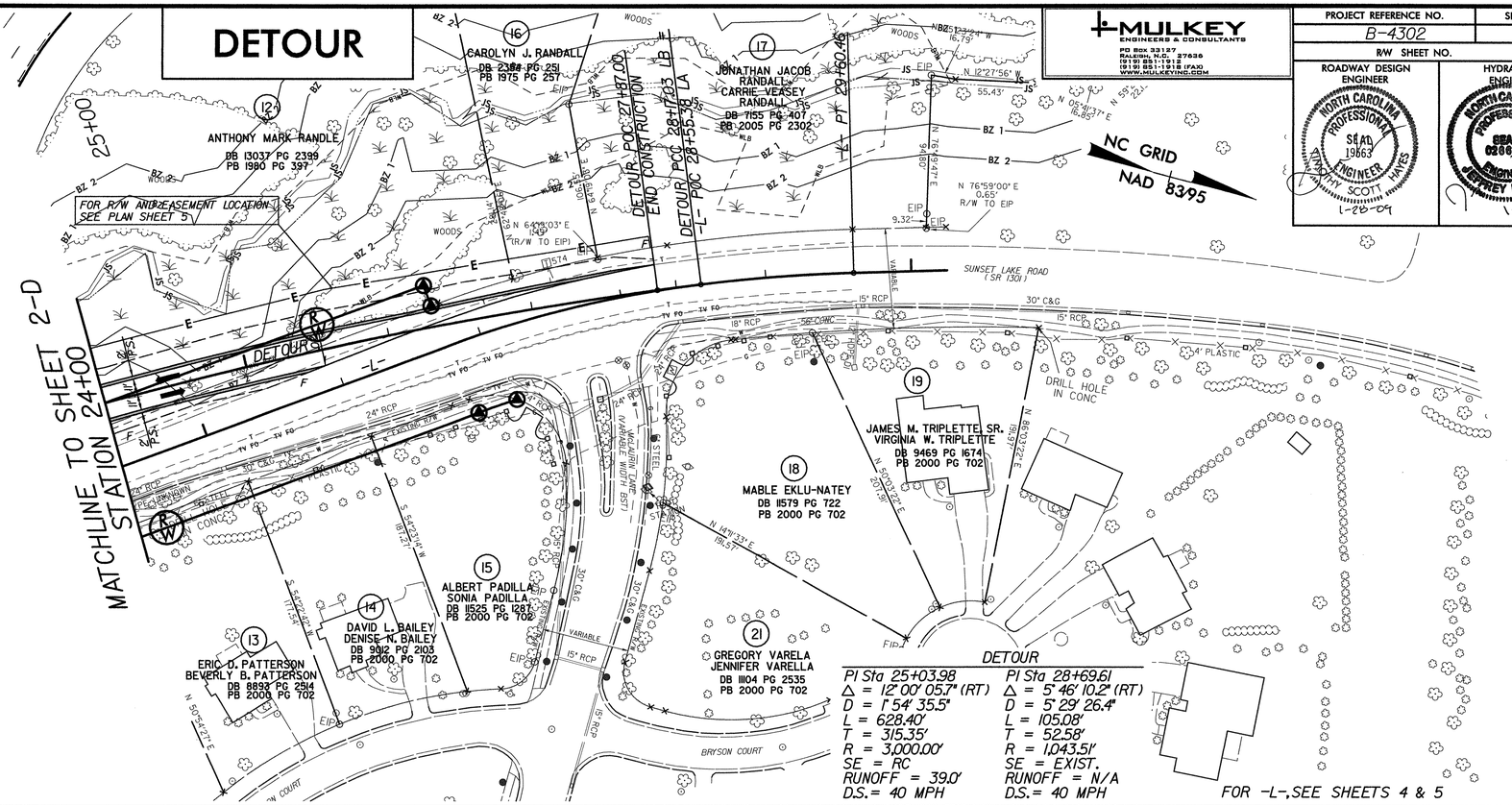
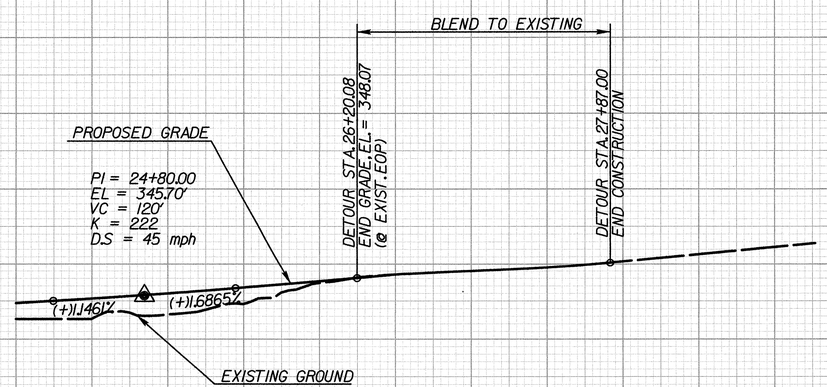
1/27/2009

DETOUR





-DETOUR-

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(919) 851-1918 (FAX)
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PROJECT REFERENCE NO.	SHEET NO.
B-4302	2-E
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19663 ENGINEER JOHNNY SCOTT HAYES
1-26-09

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026686 ENGINEER JEFFREY L. RECK
1-27-09

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
B-4302	2-F
RW SHEET NO.	

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

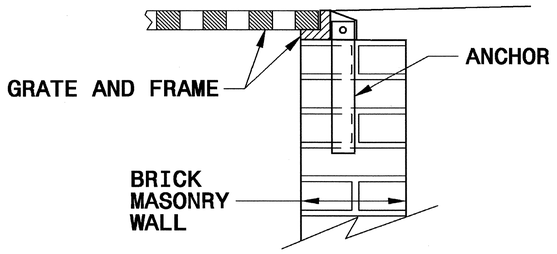
ENGLISH DETAIL DRAWING FOR

ANCHORAGE FOR FRAMES

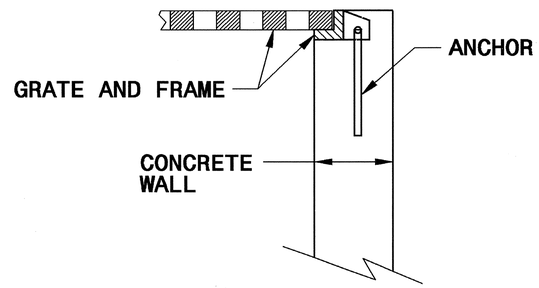
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1

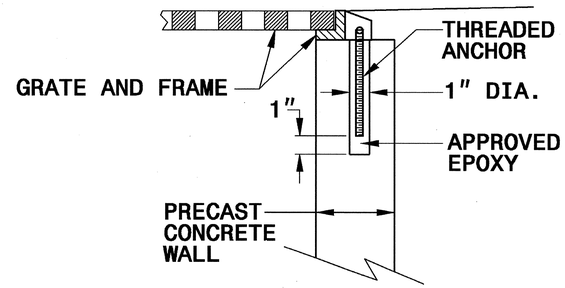
840D25



BRICK MASONRY CONSTRUCTION



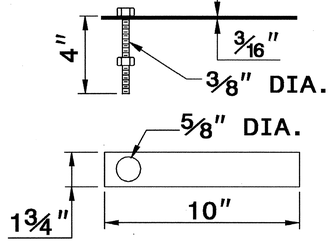
CONCRETE CONSTRUCTION



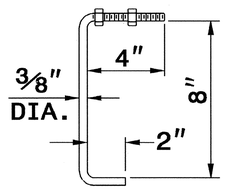
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

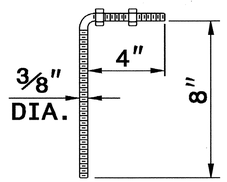
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



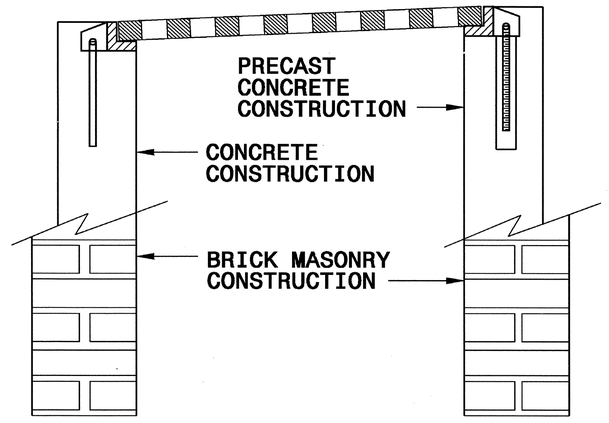
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



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

NORTH CAROLINA PROFESSIONAL SEAL 022066 ENGINEER DAVID E. HOWERTON 2/4/09

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.:

27-SEP-2006 08:59
S:\Contracts\Contracts\Special Details\ericward\stds\06' Stds to Special Details\840d25 Anchorage for Frames\0840d25.dgn
ericward AT PS222293
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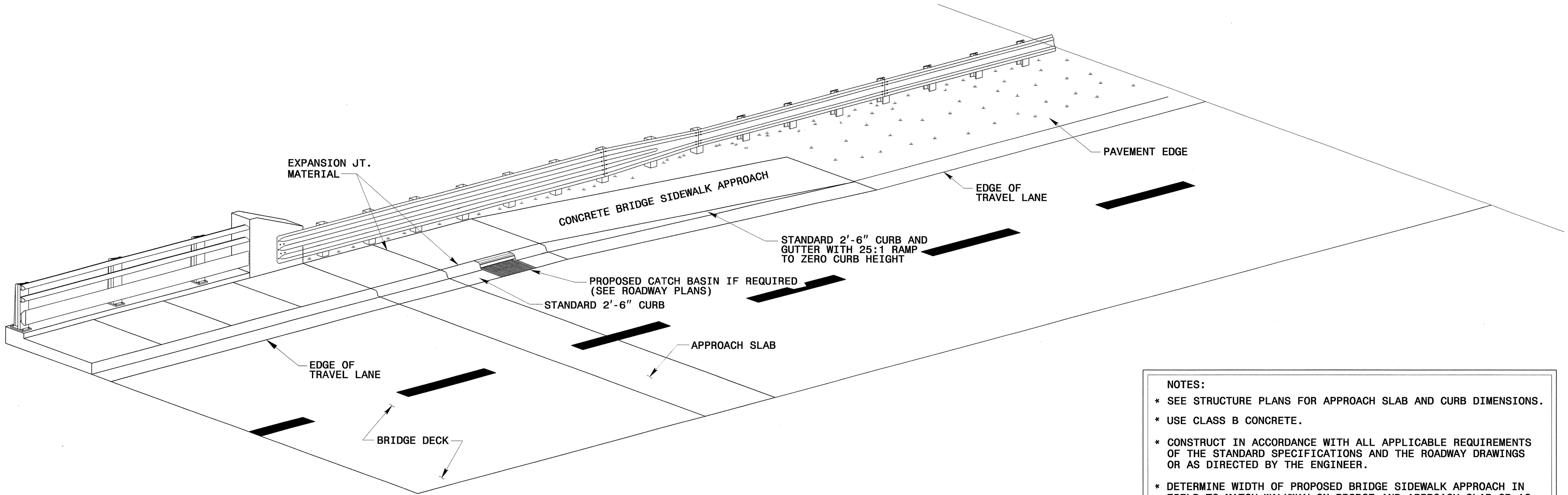
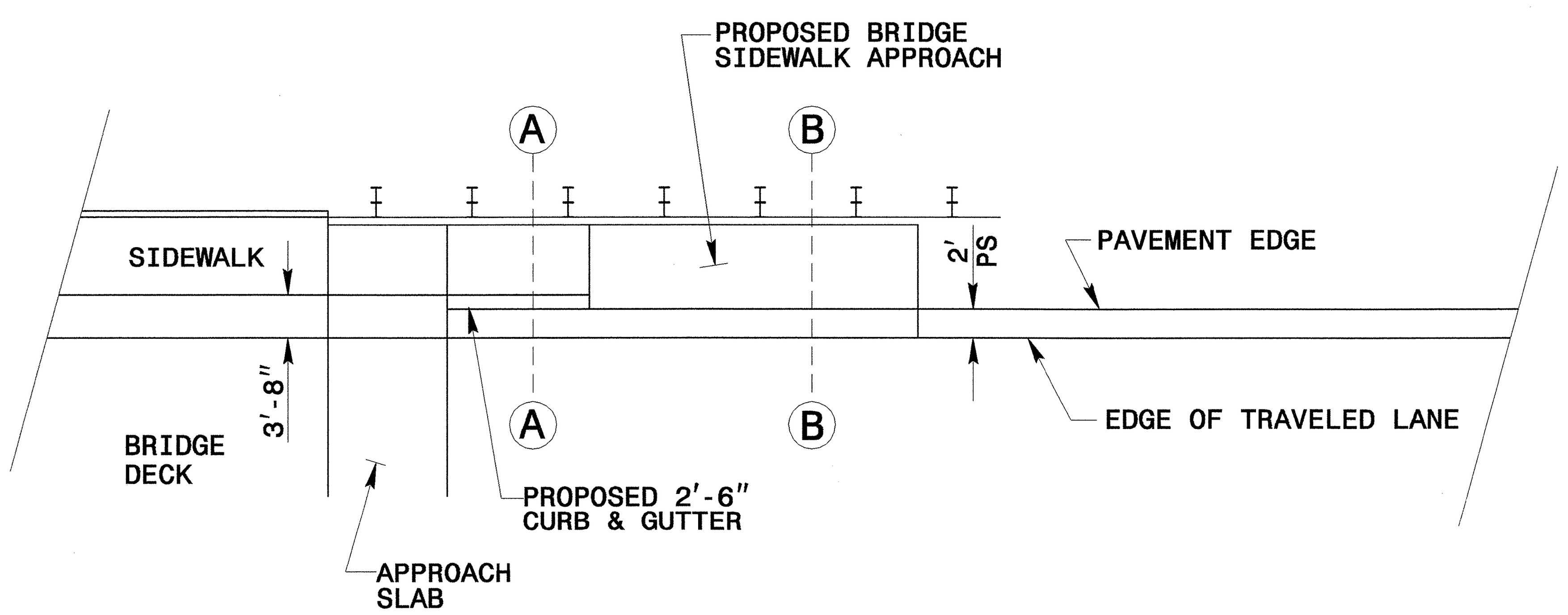
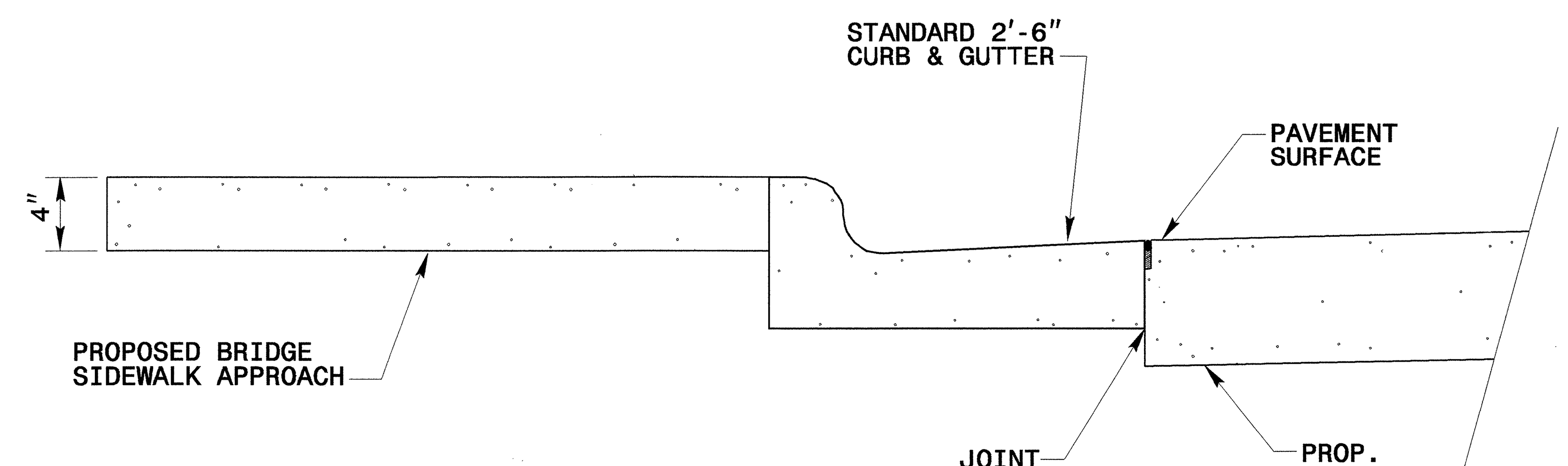


DETAIL OF PROPOSED CONCRETE BRIDGE SIDEWALK APPROACH

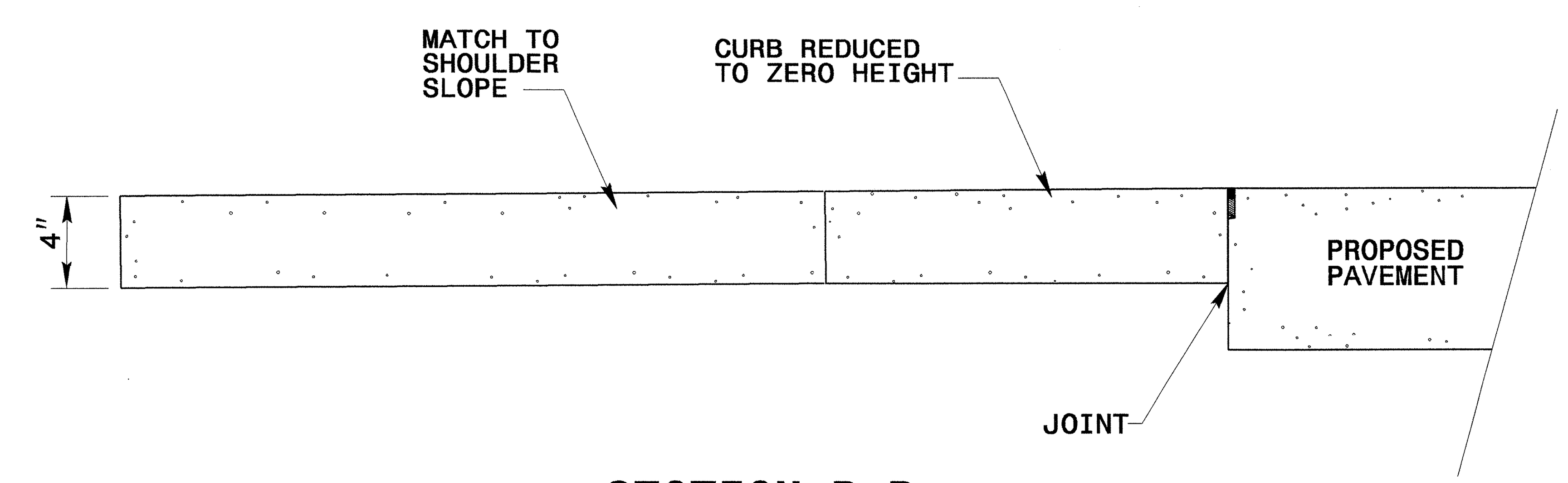
NOTES:

* SEE STRUCTURE PLANS FOR APPROACH SLAB AND CURB DIMENSIONS.
* USE CLASS B CONCRETE.
* CONSTRUCT IN ACCORDANCE WITH ALL APPLICABLE REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE ROADWAY DRAWINGS OR AS DIRECTED BY THE ENGINEER.
* DETERMINE WIDTH OF PROPOSED BRIDGE SIDEWALK APPROACH IN FIELD TO MATCH WALKWAY ON BRIDGE AND APPROACH SLAB OR AS DIRECTED BY THE ENGINEER.
* SEE ROADWAY PLANS FOR GUARDRAIL PLACEMENT AND CATCH BASIN PLACEMENT.





SECTION A-A



SECTION B-B

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON 2/4/09

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

DETAIL OF CONCRETE BRIDGE SIDEWALK APPROACH

ORIGINAL BY: DATE:
MODIFIED BY: rnbritt DATE: 10-12-04
CHECKED BY: DATE: 1/5/08
FILE SPEC.: details/nbritt/metric/misc/sidewalkapproach.dgn

5/14/99

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

PROJECT REFERENCE NO.	SHEET
B-4302	2-H

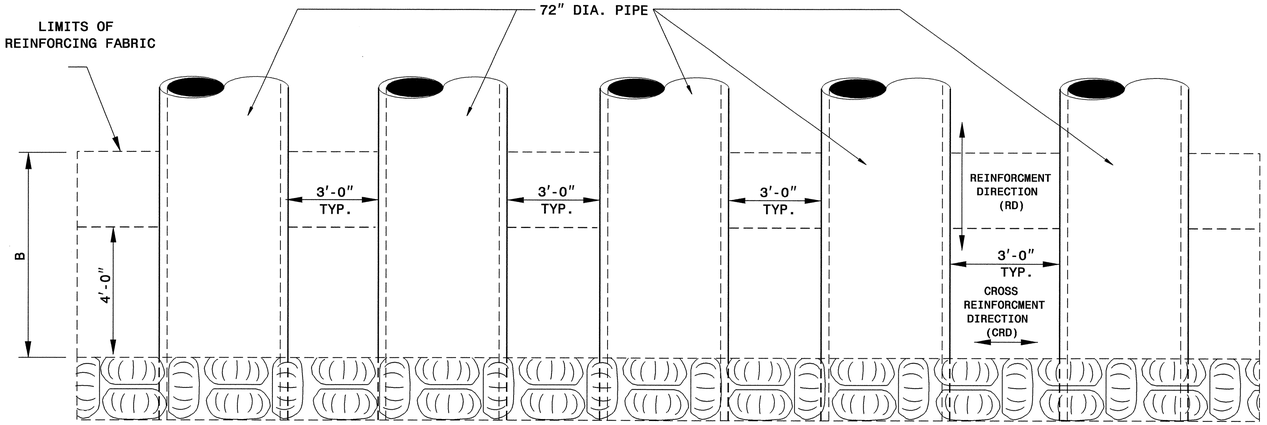
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18899 ENGINEER JAMES R. BATTS, JR. 1/13/09

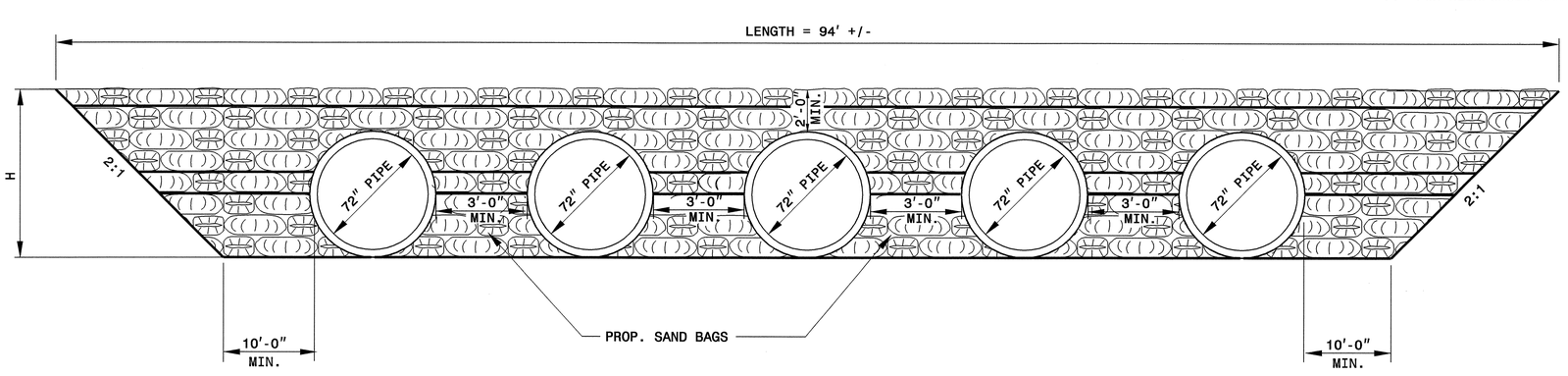
James R. Batts Jr. — SIGNATURE — DATE

ENGINEER

SIGNATURE — DATE



PLAN



FRONT ELEVATION
FOR H, SEE ROADWAY PLANS

NOTES:

1. REINFORCED SANDBAG HEADWALLS ARE BASED ON THE FOLLOWING ASSUMPTIONS:

   1) TRAFFIC SURCHARGE IS 240 PSF OR LESS AND BACKSLOPE IS 2:1 OR FLATTER.
   2) GRADE IN FRONT OF WALL IS 6:1 OR FLATTER
   3) MAXIMUM APPLIED BEARING PRESSURE IS LESS THAN 1 TSF.

2. REINFORCED SANDBAG HEADWALLS ARE BASED ON THE FOLLOWING IN-SITU SOIL PARAMETERS:

   1) UNIT WEIGHT = 120 PCF
   2) FRICTION ANGLE = 30 DEGREES

   DO NOT USE REINFORCED SANDBAG HEADWALL DETAIL WHEN ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW BOTTOM OF PIPE.

3. PLACE REINFORCEMENT IN SLIGHT TENSION AND FREE OF KINKS, FOLDS, WRINKLES AND CREASES.

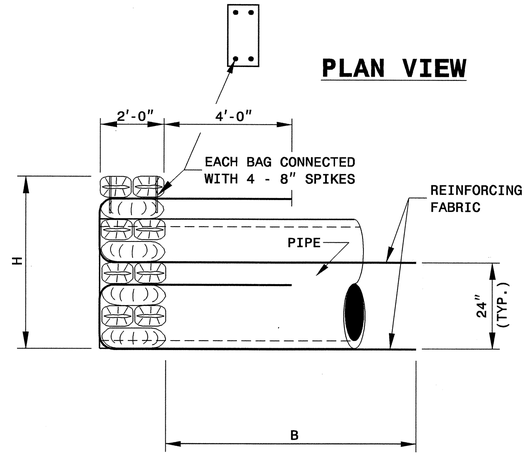
4. DO NOT SPLICE REINFORCEMENT IN THE REINFORCEMENT DIRECTION (RD). SEAMS ARE ALLOWED IN THE CROSS-REINFORCEMENT DIRECTION (CRD).

5. BACKFILL IN ACCORDANCE WITH SECTION 235 OF THE STANDARD SPECIFICATIONS.

   DO NOT BACKFILL WITH ROCK, BROKEN PAVEMENT OR SIMILAR MATERIAL.
   DO NOT DAMAGE REINFORCEMENT WHEN PLACING AND COMPACTING BACKFILL.
   DO NOT USE SHEEPSFOOT, GRID ROLLERS OR OTHER TYPES OF COMPACTION EQUIPMENT WITH FEET.
   DO NOT OPERATE HEAVY EQUIPMENT ON REINFORCEMENT UNITL IT IS COVERED WITH AT LEAST 10" OF BACKFILL.
   USE ONLY HAND OPERATED EQUIPMENT TO COMPACT WITHIN 3 ft OF THE HEADWALL FACE.

6. #4 REINFORCING BARS (GRADE 60) 24" LONG MAY BE SUBSTITUTED FOR 8" SPIKES. THE #4 BAR SHALL BE DRIVEN THRU 4 SANDBAGS MAXIMUM.

7. FOR REINFORCED SANDBAG HEADWALL, SEE SANDBAG HEADWALL SPECIAL PROVISION



PLAN VIEW

SIDE ELEVATION

REINFORCING FABRIC

WALL HEIGHT H (ft)	REINF. LENGTH B (ft)	ULTIMATE TENSILE STRENGTH (lb/ft)
< 4	6	2400
4 TO 6	6	3000
6 TO 8	= H	3600
8 TO 10	= H	4500

TOTAL AREA SAND BAG HEADWALL = 964* S.F.

* TWO SANDBAG HEADWALLS (ONE EACH SIDE)

PREPARED BY: NTR	DATE: 1/09
REVIEWED BY: JRB	DATE: 1/09

GEOTECHNICAL ENGINEERING UNIT

- [X] EASTERN REGIONAL OFFICE
- [ ] WESTERN REGIONAL OFFICE
- [ ] CONTRACT OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

REINFORCED SANDBAG HEADWALL

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1	-	-	3	-	-
2	-	-	4	-	-

GEC226158 1/13/2009 reinforced sand bag headwall_eng tzan GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
B-4302	2-I

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.

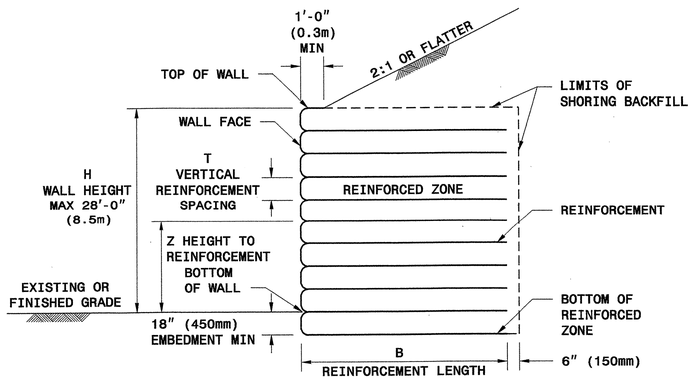
PLACE SHORING BACKFILL IN 8″ TO 10″ (200mm to 250mm) THICK LIFTS AND COMPACT IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. USE ONLY HAND OPERATED COMPACTION EQUIPMENT WITHIN 3′-0″ (1m) OF THE WALL FACE.

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.

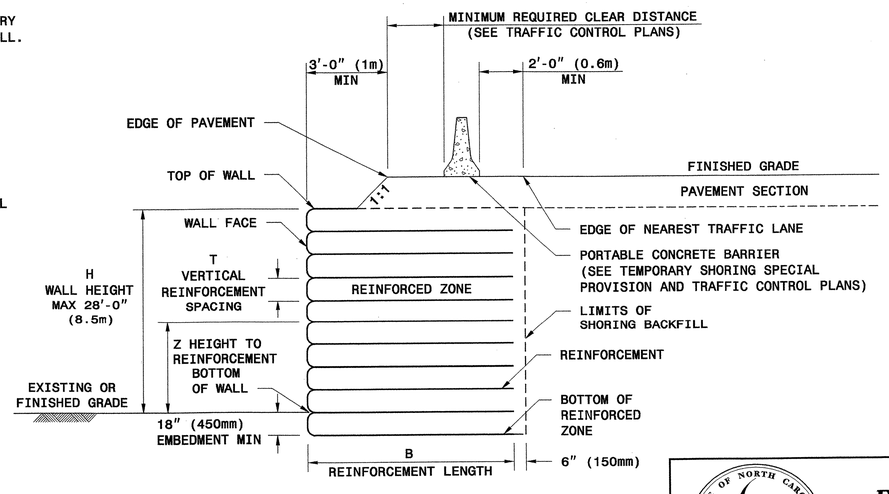
COVER REINFORCING AND RETENTION FABRIC WITH AT LEAST 3″ (75mm) OF SHORING BACKFILL. PLACE TOP REINFORCEMENT LAYER BETWEEN 4″ AND 24″ (100mm and 600mm) BELOW TOP OF WALL DEPENDING ON WALL OPTION.

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

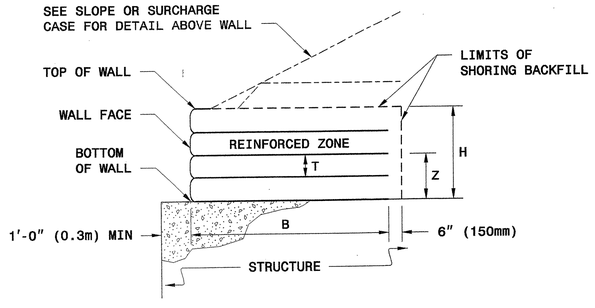
IF THE TOP OF WALL IS WITHIN 5′-0″ (1.5m) OF FINISHED GRADE, REMOVE TOP FORM OR FACING AND INCORPORATE THE TOP REINFORCEMENT LAYER INTO THE FILL WHEN PLACING FILL IN FRONT OF THE WALL. STANDARD TEMPORARY MSE WALLS REMAIN IN PLACE PERMANENTLY UNLESS REQUIRED OTHERWISE.



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-4302	2-J

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A HIDDEN

scott a hidden 3/29/07

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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

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

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	15	18
						11	11	11	11	14	15	15	16.5
						11	11	11	11	14	15	15	15
					11	11	11	11	15	15	15	15	13.5
					11	11	11	15	15	15	15	15	12
				11	11	11	11	15	15	15	15	16	10.5
			11	11	11	11	15	15	15	15	15	16	9
		11	11	11	11	14	15	15	15	15	16	16	7.5
		11	11	11	11	14	15	15	15	16	16	16	6
	11	11	11	11	15	15	15	15	15	16	16	17	4.5
11	11	11	11	14	15	15	15	15	16	16	16	17	3
11	11	11	11	14	15	15	15	16	16	16	17	17	1.5
11	11	11	14	15	15	15	15	16	16	17	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	11	15	18
							11	11	11	11	15	15	16.5
						11	11	11	11	11	15	15	15
						11	11	11	11	15	15	15	13.5
					11	11	11	11	15	15	15	15	12
					11	11	11	11	15	15	15	15	10.5
				11	11	11	11	15	15	15	15	15	9
			11	11	11	11	11	15	15	15	15	16	7.5
		11	11	11	11	14	15	15	15	15	15	16	6
	11	11	11	11	14	14	15	15	15	15	15	16	4.5
11	11	11	11	11	14	14	15	15	15	15	16	16	3
11	11	11	11	15	15	15	15	15	15	16	16	16	1.5
11	11	11	14	15	15	15	15	15	15	16	16	17	0
11	11	11	14	15	15	15	15	15	16	16	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	7.0	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	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
4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	7.0	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	N/A	1
7.0	7.0	7.0	7.0	7.0	7.0	7.0	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	7.0	9.5	9.5	9.5	9.5	9.5	9.5	-1.5

SURCHARGE CASE

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'.

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	3X2	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

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-4302	2-K

GEOTECHNICAL ENGINEER

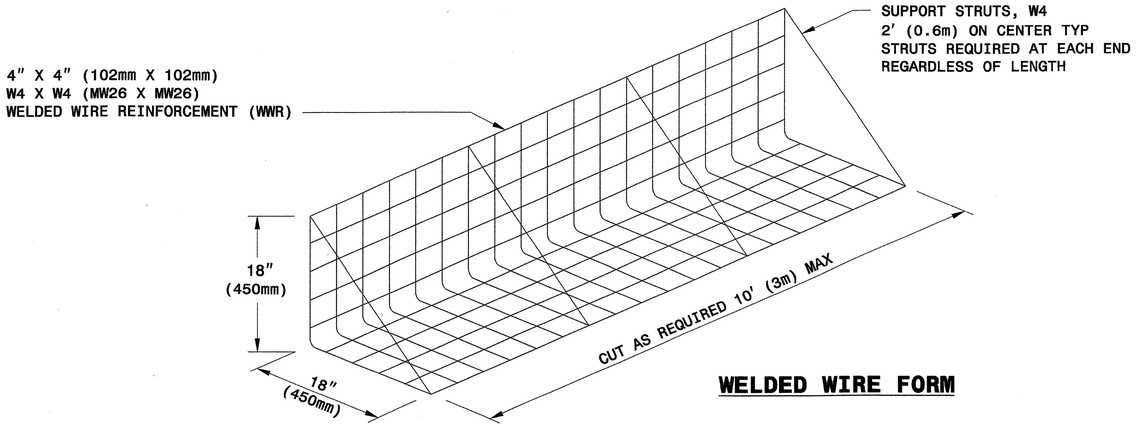
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

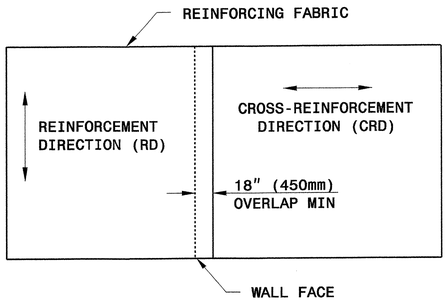
SIGNATURE DATE

ENGINEER

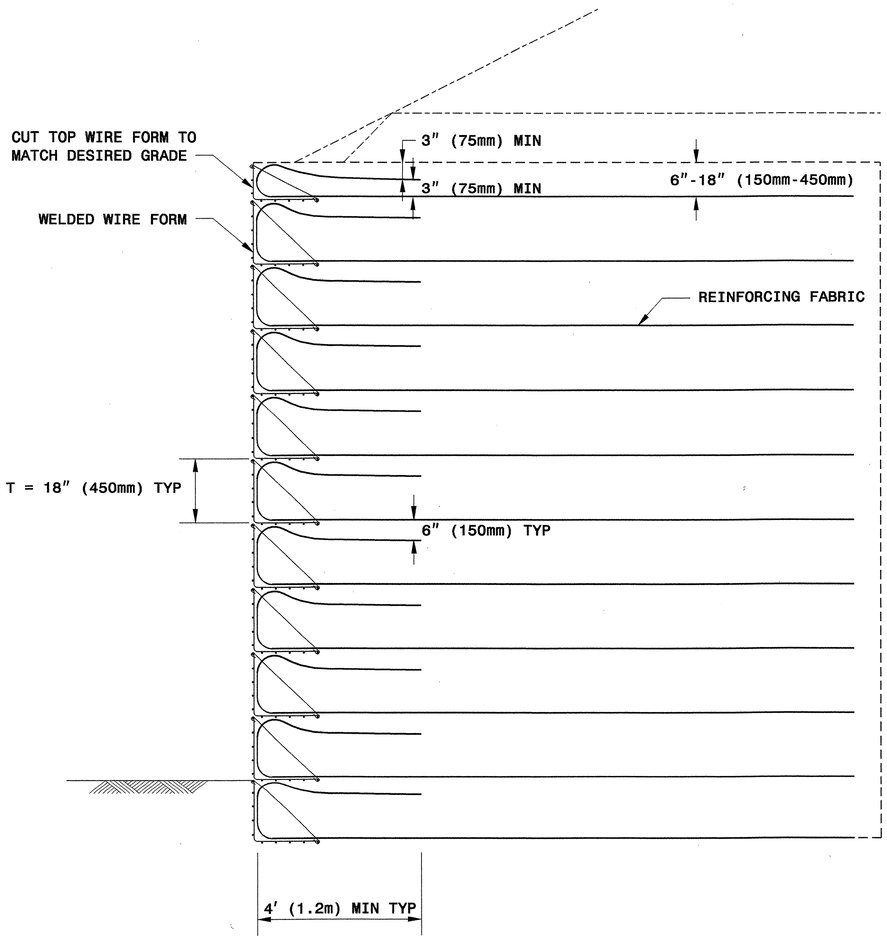
SIGNATURE DATE



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

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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-4302	2-L

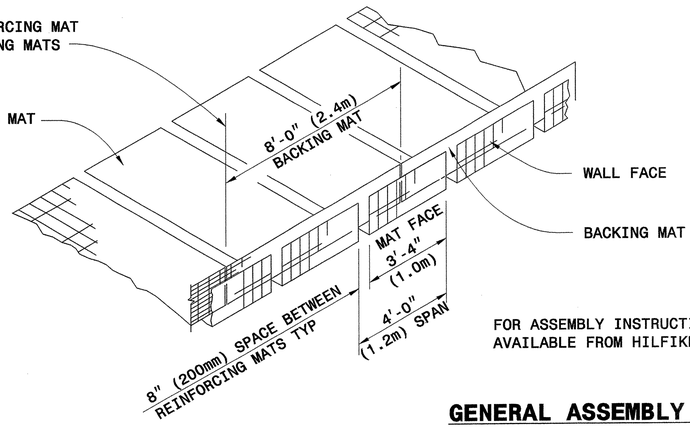
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. SHIDDEN

scott a. shidden 3/29/07
SIGNATURE DATE

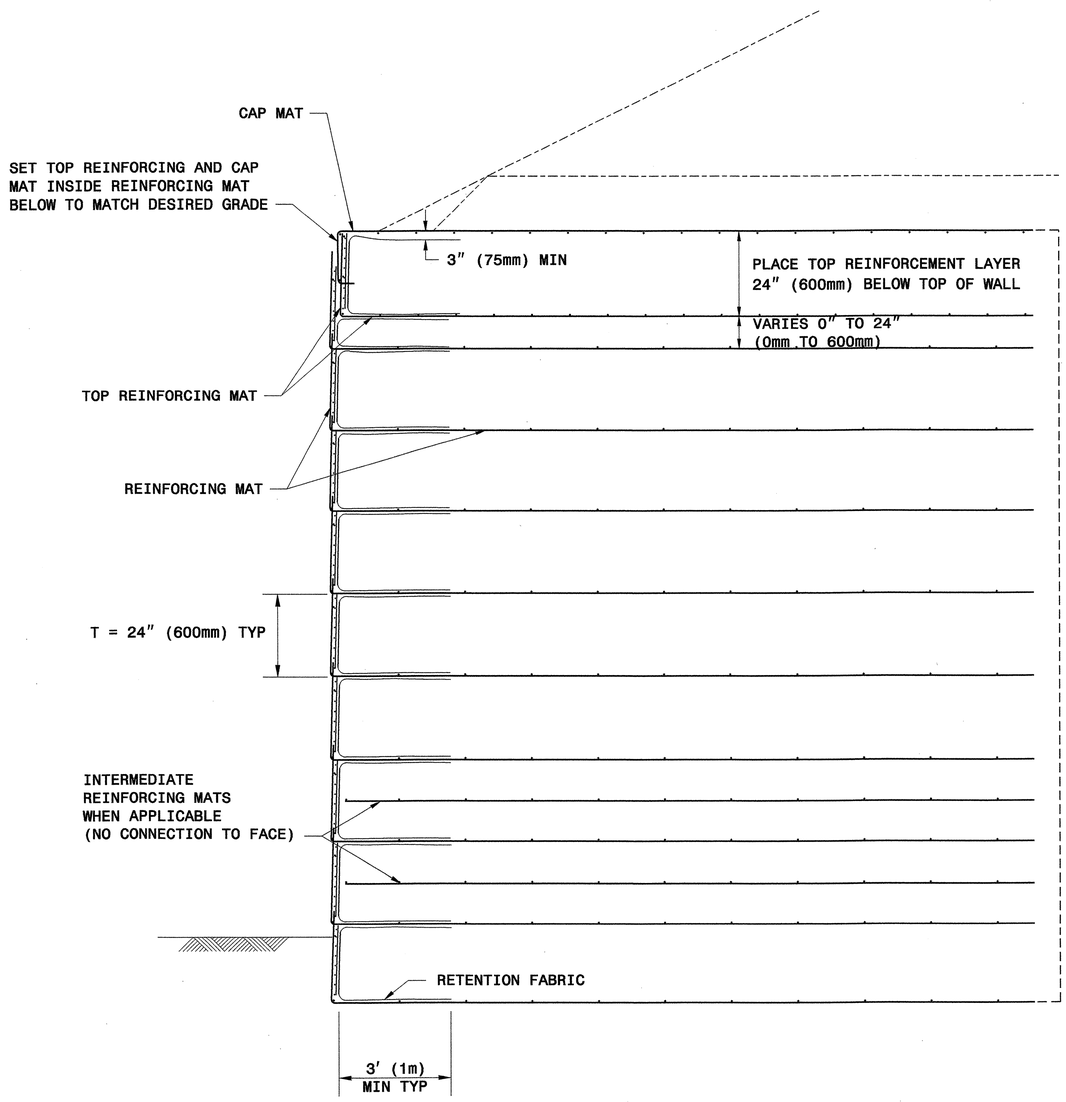
ENGINEER

SIGNATURE DATE

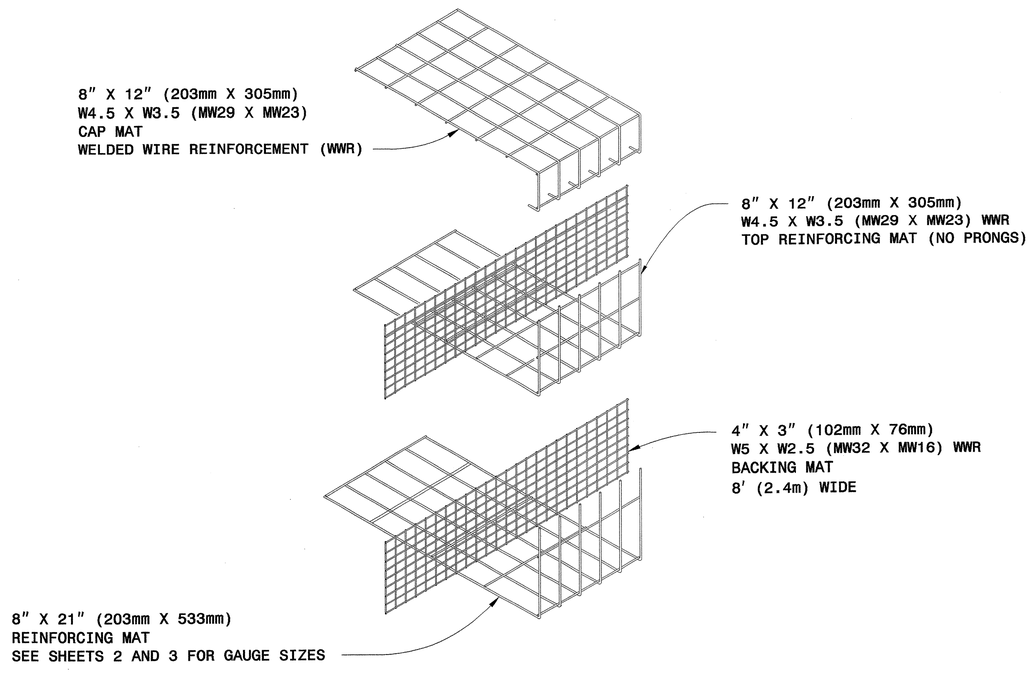


FOR ASSEMBLY INSTRUCTIONS, SEE WELDED WIRE WALL CONSTRUCTION GUIDE AVAILABLE FROM HILFIKER WEBSITE AT WWW.HILFIKER.COM/WWW

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

PROJECT REFERENCE NO.	SHEET
B-4302	2-M

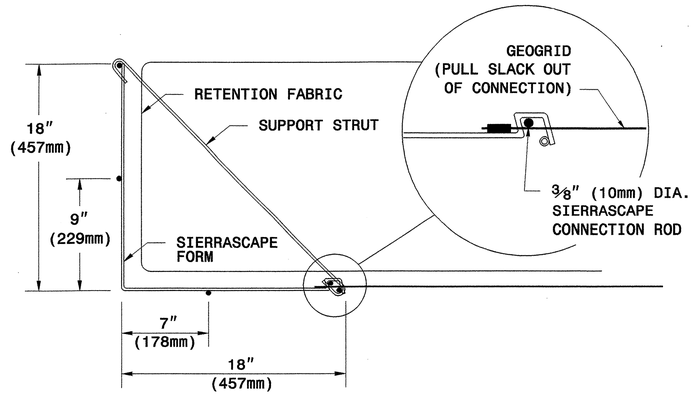
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

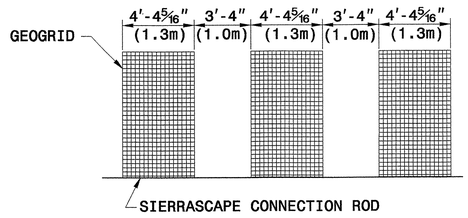
Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

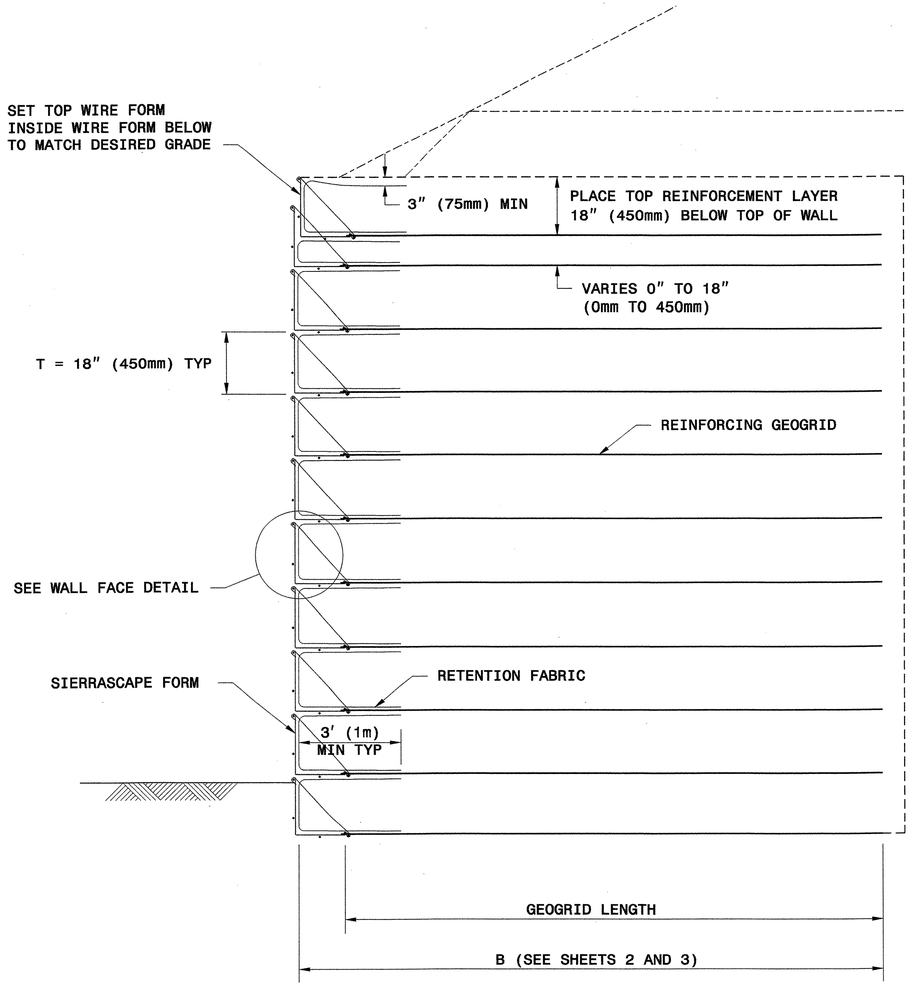


WALL FACE DETAIL

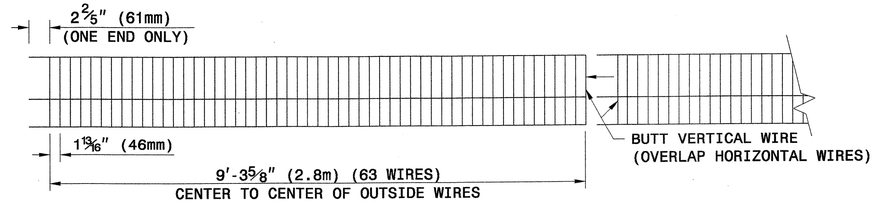


PLACE ALTERNATE LAYERS OF GEOGRID IN STAGGERED PATTERN
SUCH THAT THE LAYER ABOVE IS CENTERED OVER SPACE BELOW

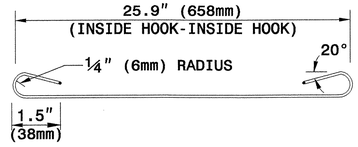
TYPICAL GEOGRID COVERAGE



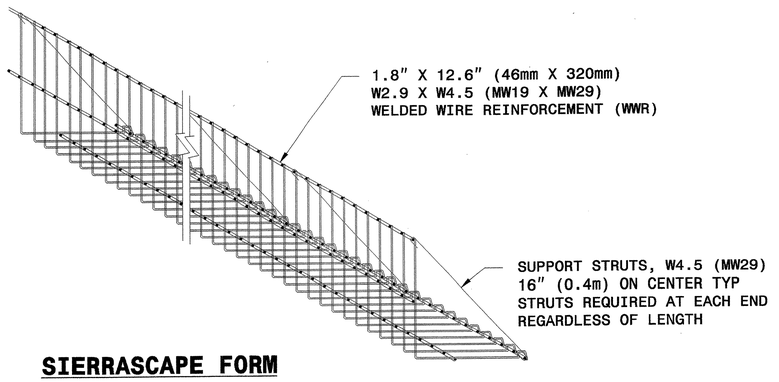
TYPICAL SECTION



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

PROJECT REFERENCE NO.	SHEET
B-4302	2-N

GEOTECHNICAL ENGINEER

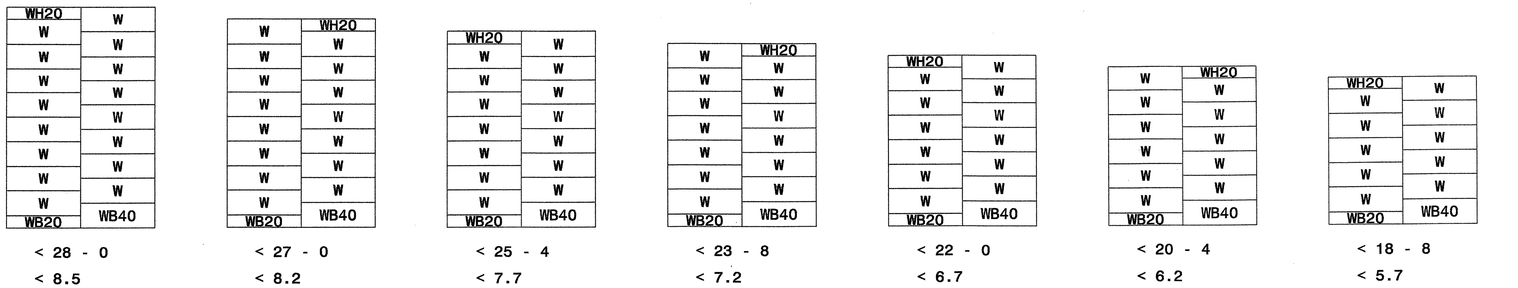
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

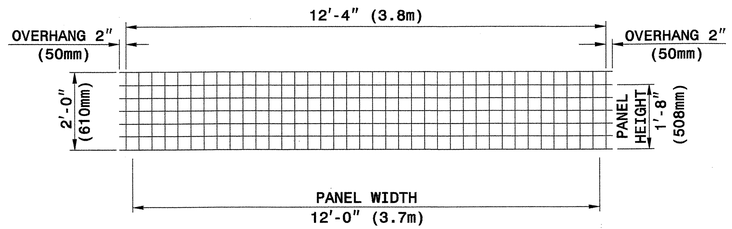
Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

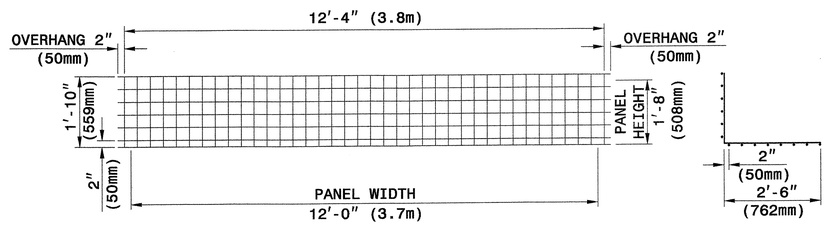
SIGNATURE DATE

PANEL LAYOUTS

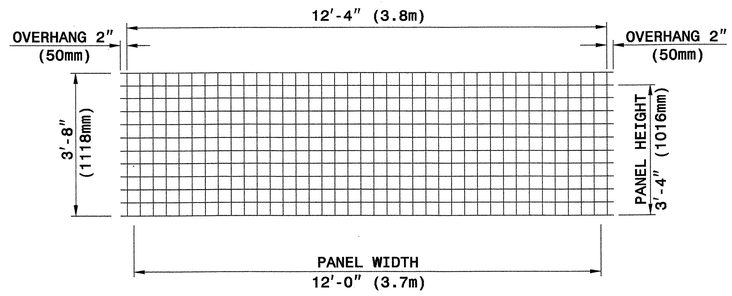




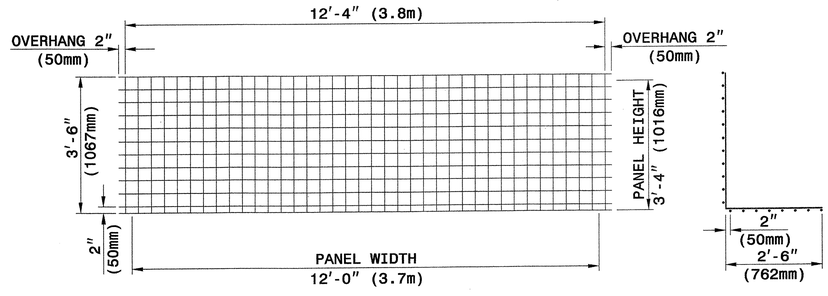
TYPE WH20



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

PROJECT REFERENCE NO.	SHEET
B-4302	2-0

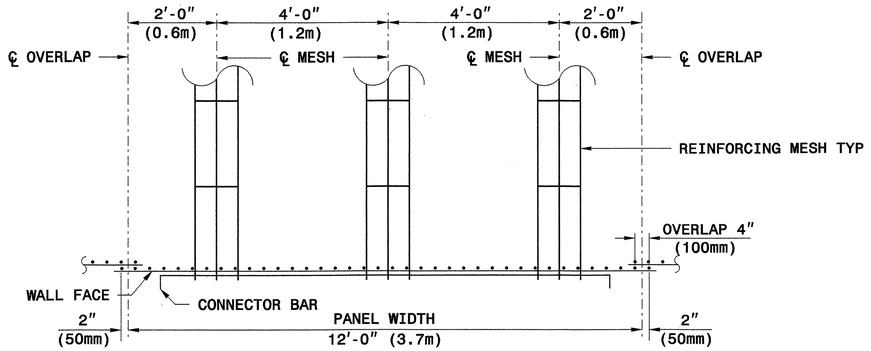
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

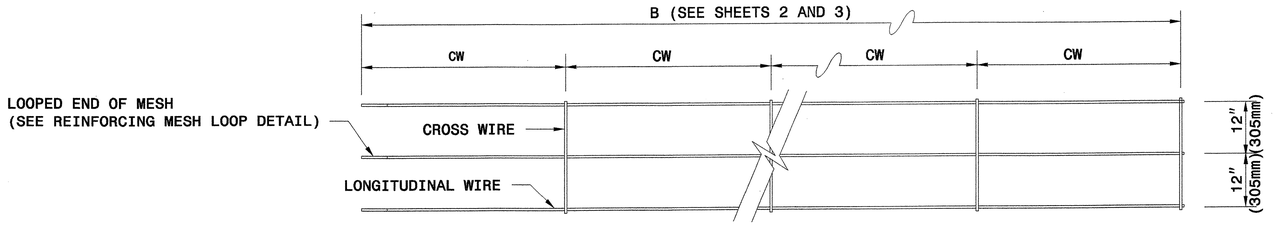
SIGNATURE DATE



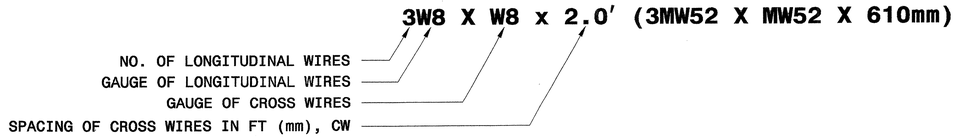
REINFORCING MESH PLACEMENT DETAIL (PLAN VIEW)

½" (13mm) DIA. BAR

CONNECTOR BAR

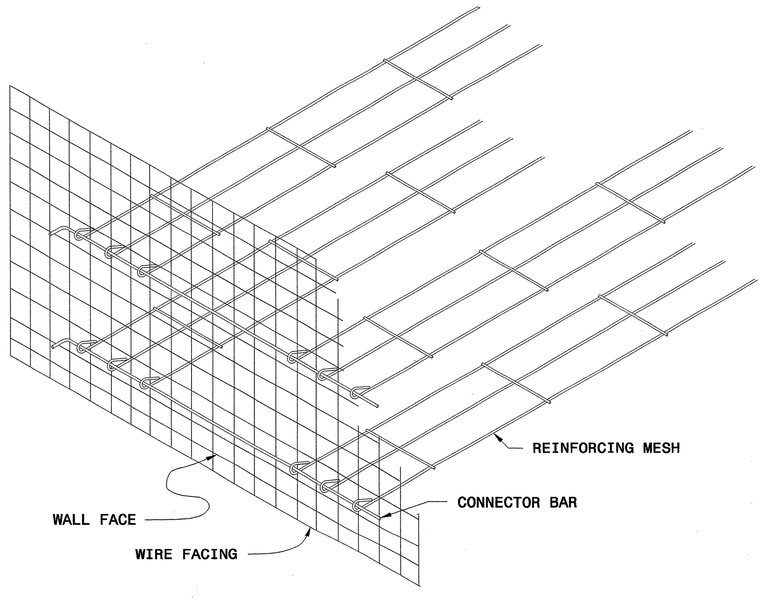


IF REINFORCEMENT LENGTH IS NOT AN INCREMENT OF 2'-0" (610mm) MAKE CW EQUAL TO 12" (305mm) AT THE END OF THE REINFORCING MESH OPPOSITE THE LOOPED END

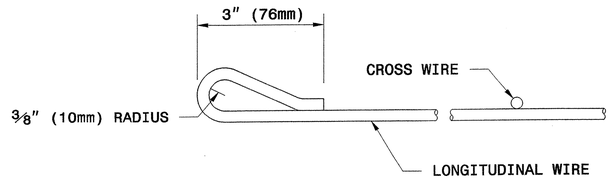


REINFORCING MESH DESIGNATION

REINFORCING MESH



GENERAL ASSEMBLY DETAIL



REINFORCING MESH LOOP DETAIL

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 7 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
B-4302	2-P

GEOTECHNICAL ENGINEER

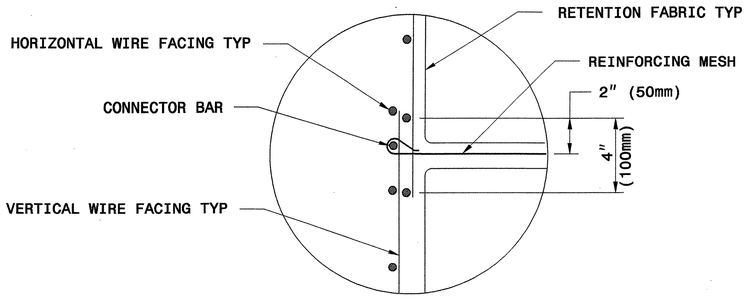
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

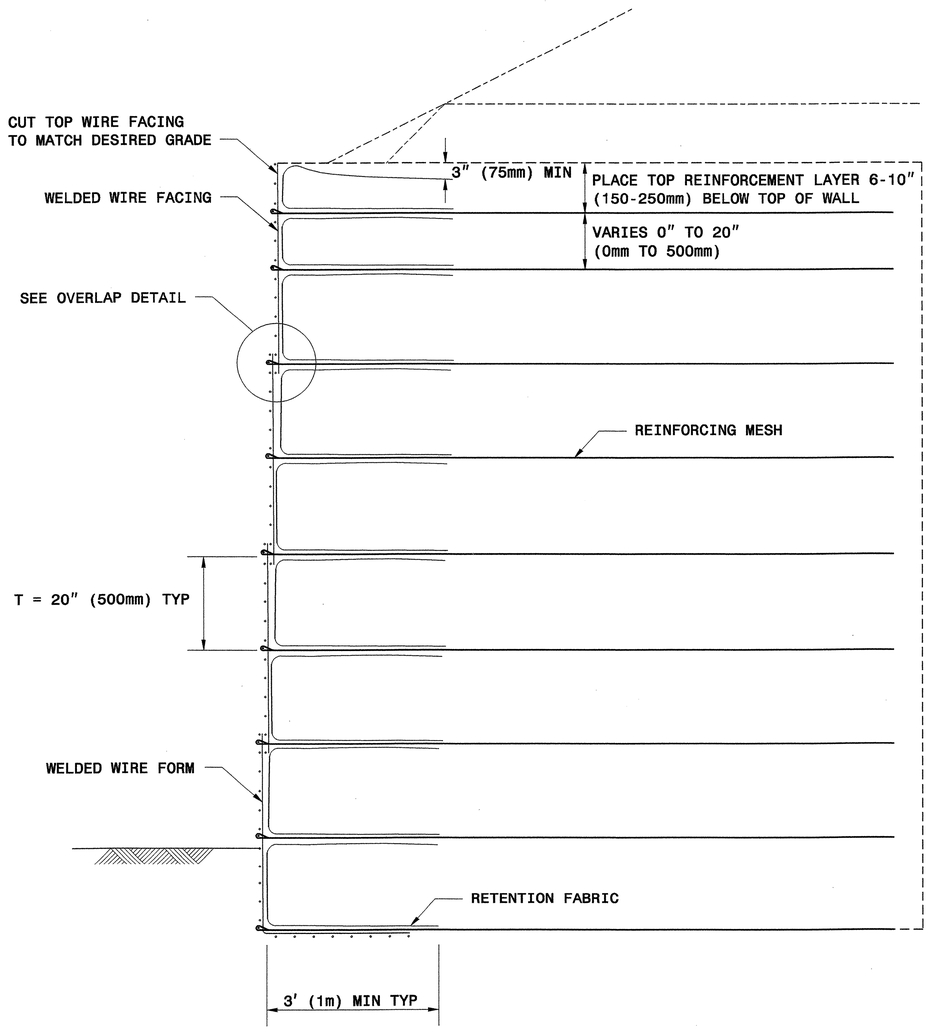
SIGNATURE DATE

ENGINEER

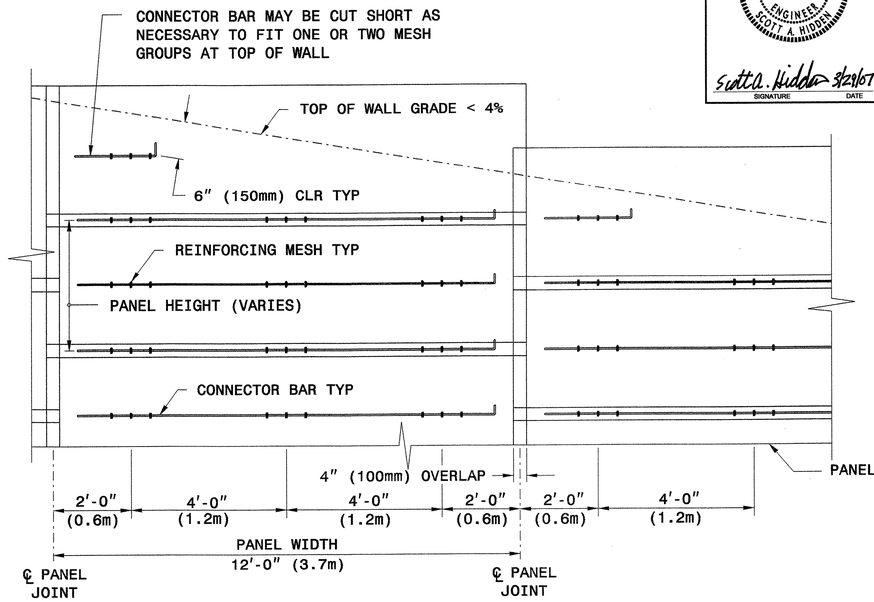
SIGNATURE DATE



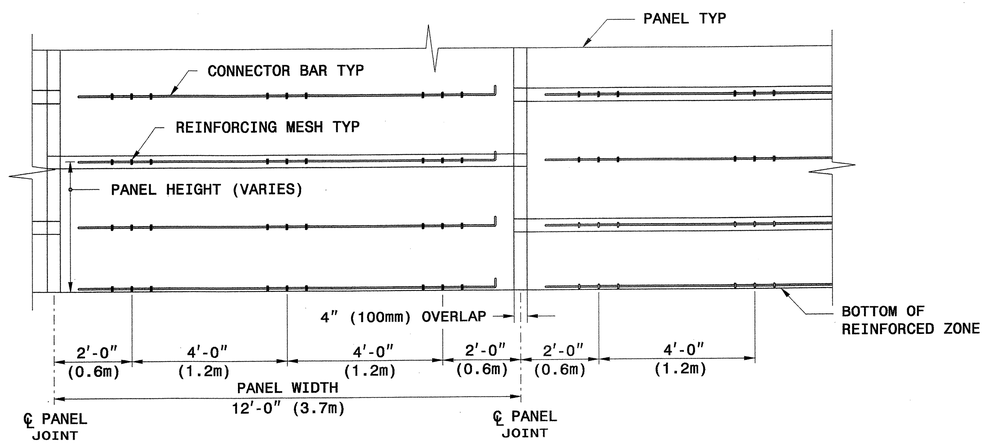
OVERLAP DETAIL



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

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

PROJECT REFERENCE NO.	SHEET
B-4302	2-Q

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

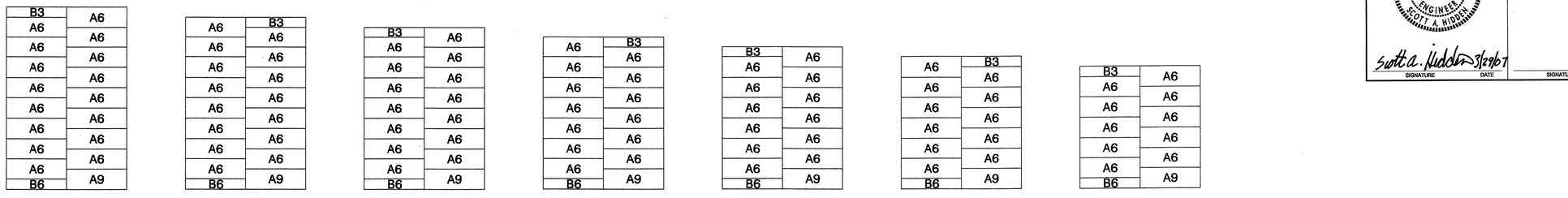
Scott A. Hidden 3/29/07

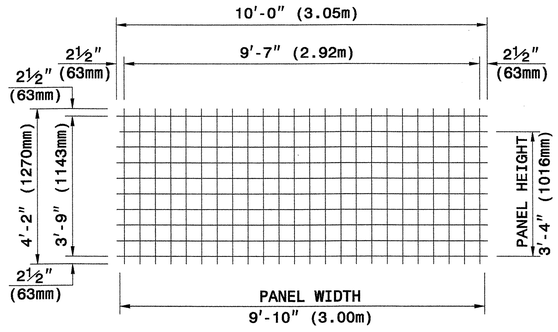
SIGNATURE DATE

ENGINEER

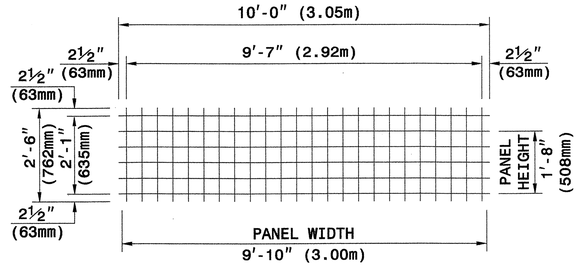
SIGNATURE DATE

PANEL LAYOUTS

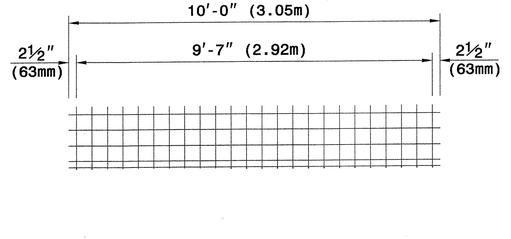




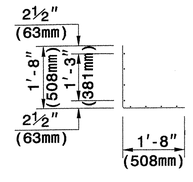
TYPE A



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-4302	2-R

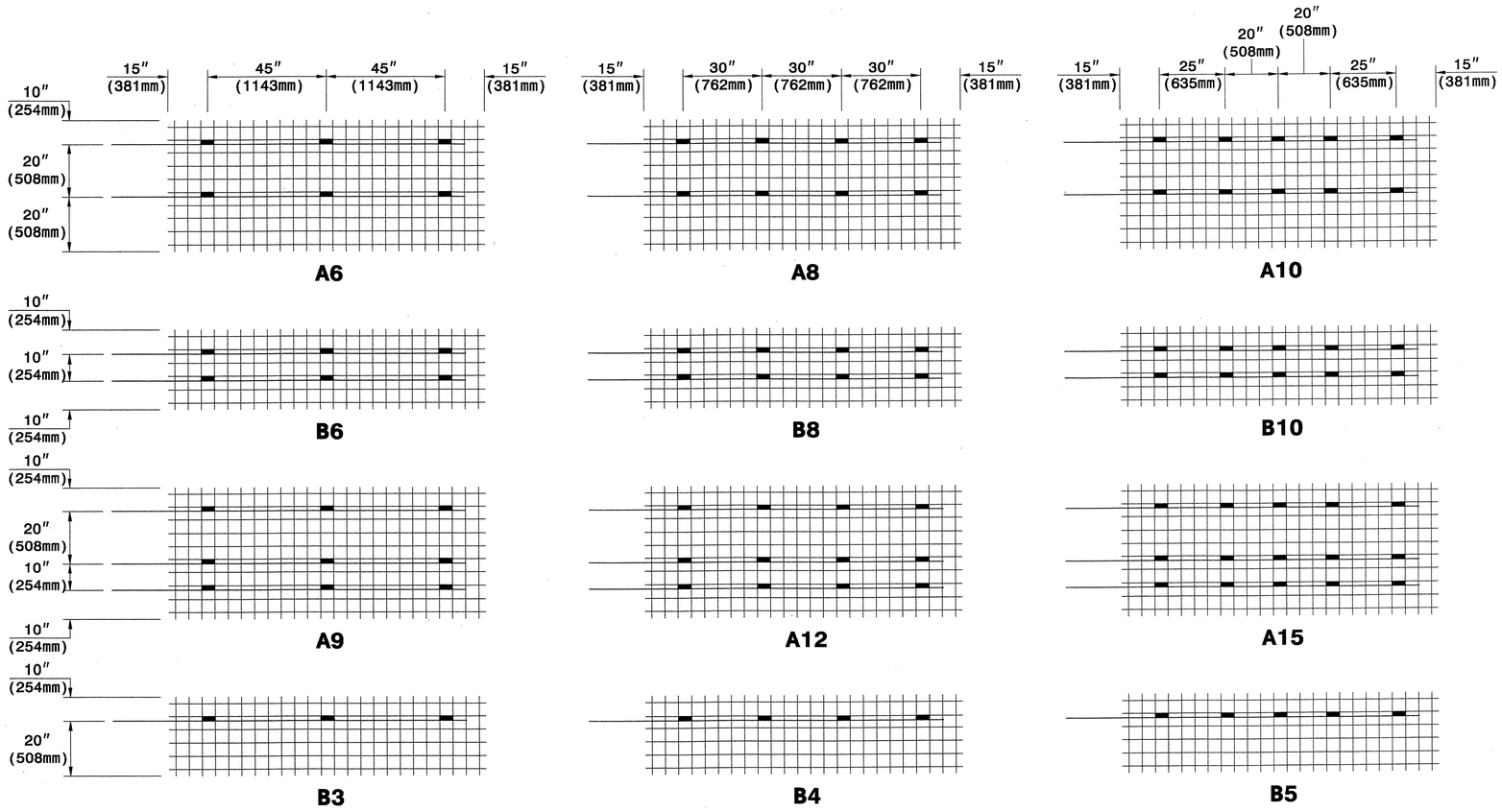
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

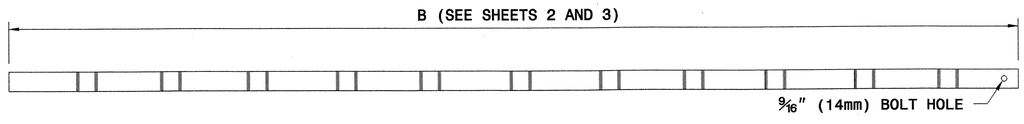
SIGNATURE DATE



KEY: A8

- A8 — NUMBER OF REINFORCING STRIPS
- A8 — PANEL TYPE

CONNECTOR ROD AND REINFORCING STRIP PLACEMENT DIAGRAMS



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

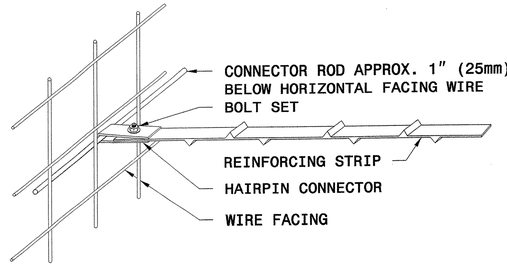
½" (13mm) DIA. ROD

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

221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
B-4302	2-S

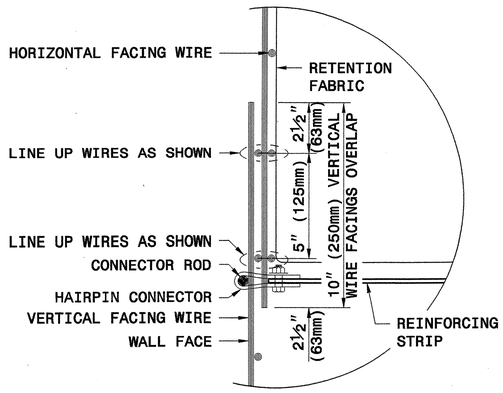
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07
SIGNATURE DATE

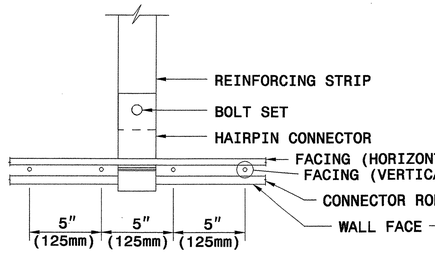
ENGINEER

SIGNATURE DATE

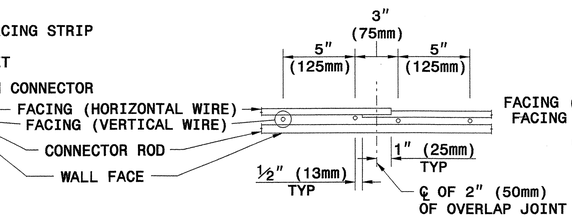


OVERLAP FACINGS VERTICALLY ONE FULL 5" (125mm)
WIRE SQUARE DISREGARDING HALF SQUARES AT EDGES

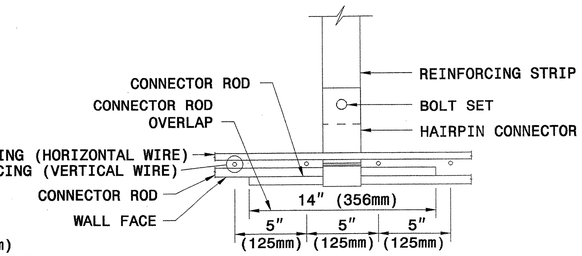
VERTICAL OVERLAP DETAIL



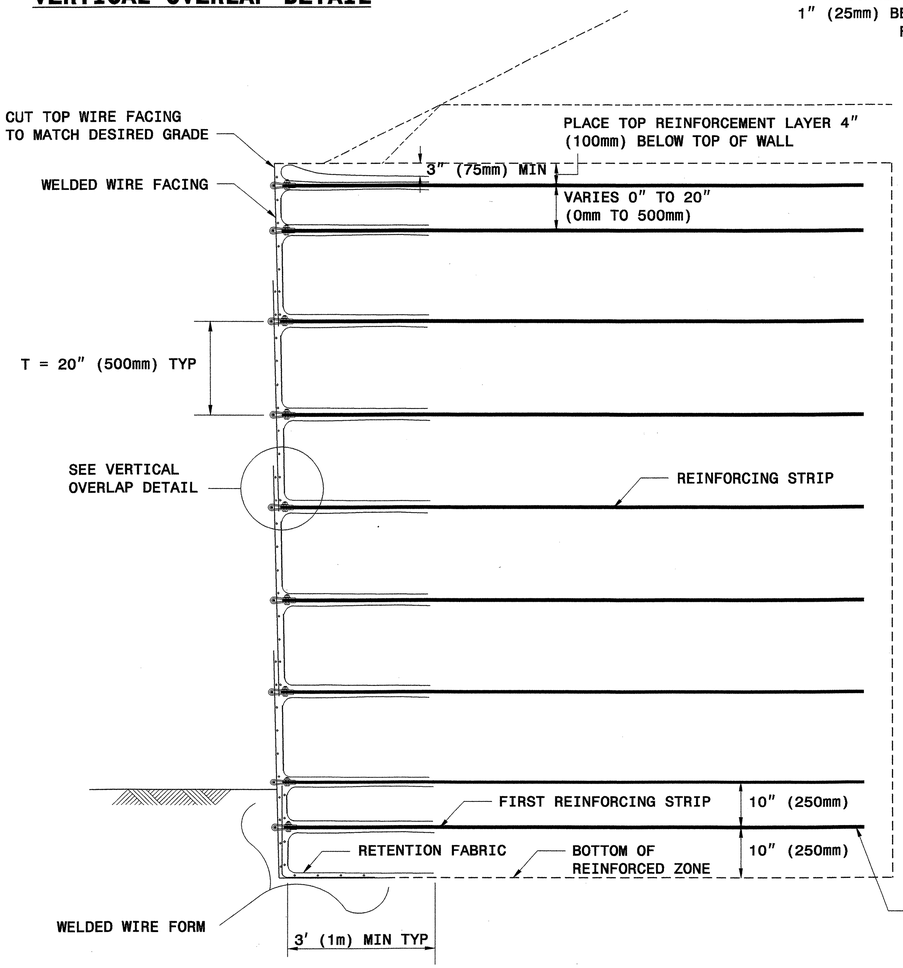
PLAN DETAIL 'A'
STRIP CONNECTION



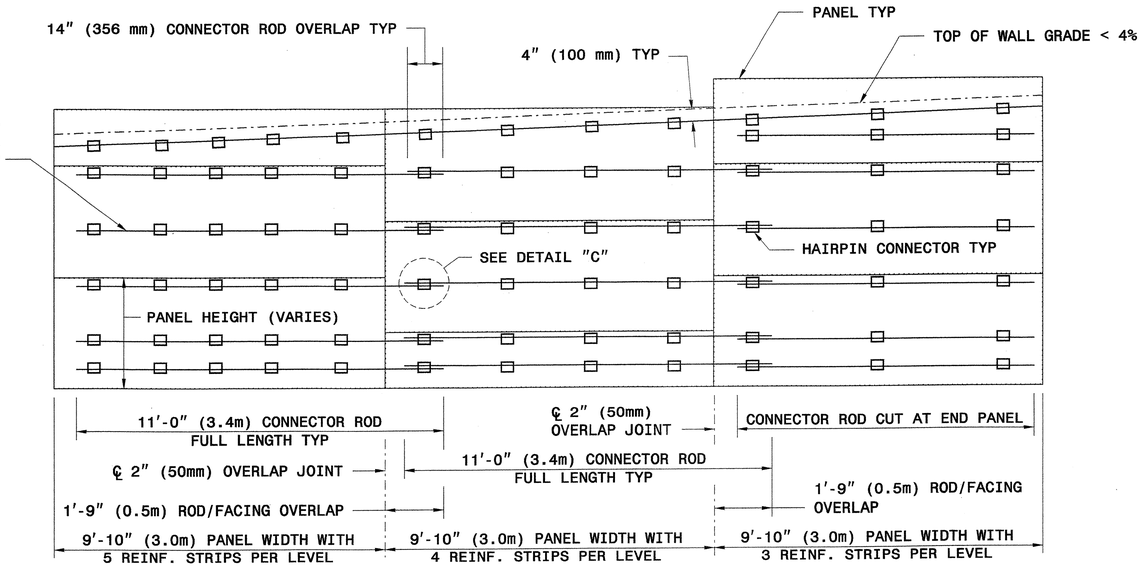
PLAN DETAIL 'B'
HORIZONTAL OVERLAP DETAIL



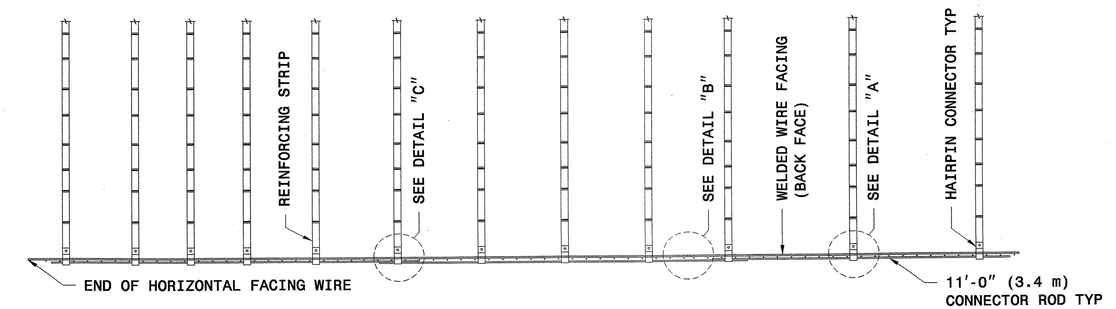
PLAN DETAIL 'C'
STRIP CONNECTION WITH HORIZONTAL OVERLAP DETAIL



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

221427 3/29/2007 std no 1801 shidden GE-Oce34bond

MULKEY
ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
www.mulkeyinc.com

PROJECT REFERENCE NO.	SHEET NO.
B-4302	3
RW SHEET NO.	

REVISIONS

Summary of Quantities

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202089

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0022000000-E	225	13,400	CY	UNCLASSIFIED EXCAVATION
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (19+64.00)
0036000000-E	225	250	CY	UNDERCUT EXCAVATION
0063000000-N	SP	Lump Sum		GRADING
0106000000-E	230	13,690	CY	BORROW EXCAVATION
0134000000-E	240	185	CY	DRAINAGE DITCH EXCAVATION
0195000000-E	265	250	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	250	SY	FABRIC FOR SOIL STABILIZATION
0199000000-E	SP	72	SF	TEMPORARY SHORING
0318000000-E	300	100	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0582000000-E	310	72	LF	15" CS PIPE CULVERTS, 0.064" THICK
0576000000-E	310	260	LF	**" CS PIPE CULVERTS, *****" THICK (72", 0.138")
0995000000-E	340	724	LF	PIPE REMOVAL
1121000000-E	520	2,075	TON	AGGREGATE BASE COURSE
1220000000-E	545	500	TON	INCIDENTAL STONE BASE
1275000000-E	600	1,425	GAL	PRIME COAT
1330000000-E	607	270	SY	INCIDENTAL MILLING
1489000000-E	610	1,100	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-E	610	830	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1519000000-E	610	1,750	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1560000000-E	620	205	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
1693000000-E	654	50	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
2000000000-N	806	21	EA	RIGHT OF WAY MARKERS
2022000000-E	815	34	CY	SUBDRAIN EXCAVATION
2033000000-E	815	26	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	150	LF	6" PERFORATED SUBDRAIN PIPE
2055000000-E	815	5	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS
2066000000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET
2077000000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)
2199000000-E	SP	964	SF	SANDBAG HEADWALL
2286000000-N	840	8	EA	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	12.1	LF	MASONRY DRAINAGE STRUCTURES
2354200000-N	840	2	EA	FRAME WITH GRATE, STD 840.24
2374000000-N	840	5	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)
2396000000-N	840	1	EA	FRAME WITH COVER, STD 840.54
2549000000-E	846	950	LF	2'-6" CONCRETE CURB & GUTTER
2591000000-E	848	300	SY	4" CONCRETE SIDEWALK
3030000000-E	862	556.25	LF	STEEL BM GUARDRAIL
3150000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS
3215000000-N	862	3	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	3	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3380000000-E	862	787.5	LF	TEMPORARY STEEL BM GUARDRAIL
3389100000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350 TEMPORARY
3628000000-E	876	445	TON	RIP RAP, CLASS I
3649000000-E	876	210	TON	RIP RAP, CLASS B
3656000000-E	876	1,500	SY	FILTER FABRIC FOR DRAINAGE
4072000000-E	903	97	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4102000000-N	904	6	EA	SIGN ERECTION, TYPE E
4116100000-N	904	2	EA	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (E)
4155000000-N	907	6	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
4158000000-N	907	3	EA	DISPOSAL OF SIGN SYSTEM, WOOD
4192000000-N	907	1	EA	DISPOSAL OF SUPPORT, U-CHANNEL
4400000000-E	1110	176	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	96	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	96	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4430000000-N	1130	110	EA	DRUMS
4435000000-N	1135	110	EA	CONES
4445000000-E	1145	48	LF	BARRICADES (TYPE III)
4455000000-N	1150	100	MD	FLAGGER
4465000000-N	1160	4	EA	TEMPORARY CRASH CUSHIONS
4485000000-E	1170	1,125	LF	PORTABLE CONCRETE BARRIER
4650000000-N	1251	95	EA	TEMPORARY RAISED PAVEMENT MARKERS
4685000000-E	1205	3,050	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	3,621	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4695000000-E	1205	314	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)
4721000000-E	1205	4	EA	THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS)
4725000000-E	1205	9	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
4770000000-E	1205	736	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (III)
4770000000-E	1205	1,104	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)
4780000000-E	1205	115	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (8") (IV)
4810000000-E	1205	12,936	LF	PAINT PAVEMENT MARKING LINES (4")
4850000000-E	1205	1,821	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
4900000000-N	1251	30	EA	PERMANENT RAISED PAVEMENT MARKERS
5326600000-E	1510	319	LF	16" WATER LINE
5572600000-E	1515	2	EA	16" TAPPING VALVE
5672000000-N	1515	1	EA	RELOCATE FIRE HYDRANT
5810000000-E	1530	570	LF	ABANDON 16" UTILITY PIPE
5871900000-E	1550	273	LF	TRENCHLESS INSTALLATION OF 16" IN SOIL
6000000000-E	1605	1,050	LF	TEMPORARY SILT FENCE
6006000000-E	1610	120	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	210	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	860	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	6.5	ACR	TEMPORARY MULCHING
6018000000-E	1620	200	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	2	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	80	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	1	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	1,750	LF	SAFETY FENCE
6030000000-E	1630	900	CY	SILT EXCAVATION
6036000000-E	1631	2,650	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	40	SY	COIR FIBER MAT
6038000000-E	SP	1,150	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	2,710	LF	1/4" HARDWARE CLOTH
6071010000-E	SP	220	LF	WATTLE
6071020000-E	SP	85	LB	POLYACRYLAMIDE (PAM)
6071030000-E	SP	270	LF	COIR FIBER BAFFLES
6071050000-E	SP	6	EA	**" SKIMMER (1-1/2")
6084000000-E	1660	10	ACR	SEEDING & MULCHING
6087000000-E	1660	5	ACR	MOWING
6090000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	150	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	4	TON	FERTILIZER TOPDRESSING
6114000000-N	SP	5	HR	SPECIALIZED HAND MOWING
6117000000-N	SP	27	EA	RESPONSE FOR EROSION CONTROL
6123000000-E	1670	0.5	ACR	REFORESTATION
6129000000-E	1670	0.5	ACR	WETLAND REFORESTATION
6135000000-E	SP	0.5	ACR	GENERIC EROSION CONTROL ITEM DISKING
6135000000-E	SP	0.5	ACR	GENERIC EROSION CONTROL ITEM RIPPING
******* BEGIN SCHEDULE AA ******* ******* (3 ALTERNATES) *******				
0366000000-E AA1	310	124	LF	15" RC PIPE CULVERTS, CLASS III
0384000000-E AA1	310	472	LF	30" RC PIPE CULVERTS, CLASS III
*** OR ***				
0366000000-E AA2	310	96	LF	15" RC PIPE CULVERTS, CLASS III
0536000000-E AA2	SP	28	LF	***" HDPE PIPE CULVERTS (15")
0536000000-E AA2	SP	472	LF	***" HDPE PIPE CULVERTS (30")
*** OR ***				
0366000000-E AA3	310	96	LF	15" RC PIPE CULVERTS, CLASS III
0540000000-E AA3	SP	28	LF	***" ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, ****" THICK (15", 0.064")
0540000000-E AA3	SP	472	LF	***" ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, ****" THICK (30", 0.064")
******* END SCHEDULE AA *******				

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PROJECT REFERENCE NO.	SHEET NO.
B-4302	3-A
R/W SHEET NO.	

REVISIONS

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNERS NAME
1	4	LOIS F. JOHNSON TRUST
2	4	LOIS F. JOHNSON TRUST
3	4	LOIS F. JOHNSON TRUST
4	4	JOANNA JOHNSON FAMILY SHARE TRUST
5	4	PHILLIP PROCTOR & JOANNA JOHNSON PROCTOR
6	4	LEIGH JOHNSON CAMERON
7	4	BALLENTINE HOMEOWNERS ASSOCIATION, INC.
8	4 & 5	CAROLYN J. RANDALL
9	4 & 5	SHERMAN B. CURRIN & KELLY B. CURRIN
10	5	JAY REX RANDALL & TERESA JOHNSON RANDALL
11	5	ANTHONY BALLETTA & LORI BALLETTA
12	5	KEVIN P. BRASWELL & DEBORAH SYKES BRASWELL
13	5	ERIC D. PATTERSON & BEVERLY B. PATTERSON
14	5	DAVID L. BAILEY & DENISE N. BAILEY
15	5	ALBERT PADILLA & SONIA PADILLA
16	5	CAROLYN J. RANDALL
17	5	JONATHAN JACOB RANDALL & CARRIE VEASEY RANDALL
18	5	MABLE EKLU-NATEY
19	5	JAMES M. TRIPLETTE, SR. & VIRGINIA W. TRIPLETTE
20	4	EUGENE R. SMOAK & SUSAN S. SMOKE
21	5	GREGORY VARELA & JENNIFER VARELLA

PARCEL No.	SHEET No.	PROPERTY OWNERS NAME

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COMPUTED BY: J.D. DATE: 09 /08
CHECKED BY: J.B. DATE: 10 /08

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PROJECT REFERENCE NO.	SHEET NO.
B-4302	3-B
R/W SHEET NO.	

REVISIONS

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

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"
21+00	LT	1		346.8	342.1										
21+00	LT	1	2		342.1	340.0									
21+12	RT	3	4		336.1	336.2									
21+17	RT	4		341.3	336.2										
21+17	RT	4	7		336.2	336.8	X								
22+85	LT	5		344.6	341.6										
22+85	LT	5	6		341.6	341.5	X		28						
23+14	LT	6		344.6	341.5										
23+14	CL	6	7		341.5	338.0	X		68						
23+12	RT	7		344.6	336.8										
23+12	RT	7	8		336.8	337.3	X								
25+00	RT	8		345.8	337.3										
25+00	RT	8	9		337.3	337.4	X								
25+01	RT	9		345.3	337.4										
25+01	RT	9	10		337.4	337.5	X								
25+50	RT	10		345.3	337.5										
-DET- 20+68	RT	11													
-DET- 22+92	RT	12													
TOTAL									96						
SAY															

STATION	STRUCTURE NO. FROM	TO	C.S. PIPE 12"	15" .064	18" .064	24" .064	24"	30" .079	30"	36" .079	36"	42" .109	42"	48" .109	48"	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"
21+00	1																						
21+00	1	2															28						
21+12	3	4																		16			
21+17	4																						
21+17	4	7																		208			
22+85	5																						
22+85	5	6																					
23+14	6																						
23+14	6	7																					
23+12	7																						
23+12	7	8																		188			
25+00	8																						
25+00	8	9																		12			
25+01	9																						
25+01	9	10																		48			
25+50	10																						
-DET- 20+68	11			20																			
-DET- 22+92	12			52																			
TOTAL				72													28			472			
SAY																							

STATION	STRUCTURE NO. FROM	TO	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	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		CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN
21+00	1							1			1			1			
21+00	1	2															
21+12	3	4															
21+17	4							1	0.1								
21+17	4	7															
22+85	5							1			1			1			
22+85	5	6															
23+14	6							1			1			1			
23+14	6	7															
23+12	7							1	2.8								
23+12	7	8															
25+00	8							1	3.5								
25+00	8	9															
25+01	9							1	2.9		1			1			
25+01	9	10															
25+50	10							1	2.8		1			1			
-DET- 20+68	11																
-DET- 22+92	12																
TOTAL								8	12.1		5			5			
SAY																	

STATION	STRUCTURE NO. FROM	TO	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. 840.29	J.B. STD. 840.31 OR 840.32	TRAFFIC BEARING DROP INLET STD. 840.35	M.D.I. ANGLED VANE FRAME WITH GRATE STD. 840.33	MANHOLE FRAME AND COVER STD. 840.54			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
21+00	1																					
21+00	1	2																				
21+12	3	4																				
21+17	4											1			1						36	
21+17	4	7																				
22+85	5																					
22+85	5	6																				
23+14	6																					
23+14	6	7																				
23+12	7				1					1											224	
23+12	7	8																				
25+00	8				1					1												
25+00	8	9																				
25+01	9																				132	
25+01	9	10																				
25+50	10																					
-DET- 20+68	11																				20	TEMPORARY
-DET- 22+92	12																				52	TEMPORARY
TOTAL					2					2		1			1						464	
SAY																						

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

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 54" & OVER)

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 54"	60"	66"	72"	78"	84"	
-DET- 19+06.00	CL													
TOTAL														

STATION	C.S. PIPE 54" .109	54" .138	54" .168	54" SHOP ELON-GATED .138	54" SHOP ELON-GATED .168	60" .138	60" .168	66" .138	66" .168	72" .138	72" .168		STRUCTURAL PLATE PIPE 60" 12	60" 10	60"	66" 12	66" 10	66"	72" 12	72" 10	72"			
-DET- 19+06.00										260														
TOTAL										260														

STATION	REINFORCED ENDWALLS WITH R.C. – C.Y.	WITH C.S. – C.Y.	MASONARY DRAINAGE STRUCTURES CUBIC YARDS	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G		CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN								REINF. CONC. FLARED END SECTIONS NO. & SIZE	CORR. STEEL FLARED END SECTIONS NO. & SIZE	REINF. CONC. ELBOWS NO. & SIZE	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	PIPE REMOVAL LIN.FT.	REMARKS
-DET- 19+06.00																						260	TEMPORARY
TOTAL																						260	

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

COMPUTED BY: J.B. DATE: 09/08

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DIVISION OF HIGHWAYS

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PROJECT REFERENCE NO.	SHEET NO.
B-4302	3-C
RW SHEET NO.	

"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.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

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	GRAU 350	TYPE III	AT-1						EA	G	NG				
-L-	16+00.00	18+68.96	LT	275.00'				16+00.00	7.50'	14.00'		206.25'		4.125'	1	1												
-L-	16+50.00	18+74.85	RT	225.00'			17+50.00		11.50'	14.50'	50.00'		1.00'		1	1												
-L-	20+59.12	23+16.00	LT	262.50'			22+50.00		7.50'	14.00'		193.75'	3.875'		1	1												
			SUB-TOTAL	762.50'																								
		GRAU-350 - 3 @ 50.00' EA.		- 150.00'																								
		TYPE III - 3 @ 18.75' EA.		-56.25'																								
			TOTAL	556.25'											3	3												
			SAY	556.25'											3	3												

ADDITIONAL GUARDRAIL POST = 5 EA.

"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.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

TEMPORARY GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		TEMPORARY ANCHORS								IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GRAU 350	TYPE III						AT-1	EA	G	NG				
-DET-	16+17.12	20+52.50	LT	437.50'			19+28	16+92.12	8.00'	11.00'	50.00'	50.00'	1.00'	1.00'	2														
-DET-	16+17.12	21+62.33	RT	550.00'			16+92.12	20+31.47	8.00'	11.00'	50.00'	50.00'	1.00'	1.00'	2														
			SUB-TOTAL	987.50'											4														
		GRAU-350 - 4 @ 50.00' EA.		-200.00'																									
			TOTAL	787.50'											4														
			SAY	787.50'											4														

SUMMARY OF PAVEMENT REMOVAL
IN SQUARE YARDS

LOCATION	ASPHALT REMOVAL	ASPHALT BREAK UP	CONCRETE REMOVAL	CONCRETE BREAK UP
-DET- 10+78 TO 12+45 CL.	123			
-DET- 12+45 TO 26+20 CL.	3889			
-DET- 26+20 TO 27+87 CL.	90			
		931		
-L- 15+14 TO 18+72 CL.		1248		
-L- 20+56 TO 24+00 CL.				
TOTAL	4102	2179		
SAY	4190	2230		

REVISIONS

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COMPUTED BY: J.B. DATE: 09 / 08

CHECKED BY: T.H. DATE: 10 / 08

MULKEY
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PROJECT REFERENCE NO.	SHEET NO.
B-4302	3-D
RW SHEET NO.	

REVISIONS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

SURVEY LINE	STATION	STATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBANKMENT (+ %)	BORROW	WASTE
-L-	13+75.00	18+72.00	160		9,487	9,335	8
BRIDGE							
SUBTOTAL			160		9,487	9,335	8
BRIDGE							
-L-	20+56.08	26+75.00	271		4,219	3,962	14
SUBTOTAL			271		4,219	3,962	14
DETOUR	10+78.00	27+87.00	9,115		4,417	0	4,698
PROJECT SUBTOTALS			9,546		18,124	13,297	4,720
LOSS DUE TO CLEARING & GRUBBING			-450			450	
UNCL. STR. EXCAV. IN LIEU OF BORROW						-1,330	
REMOVE DETOUR			3,681				3,681
PROJECT TOTALS			12,777		18,124	12,417	8,401
EST. 5% FOR REPLACING TOP SOIL ON BORROW						621	
GRAND TOTAL			12,777			13,038	8,401
SAY			13,400			13,690	8,820

DRAINAGE DITCH EXCAVATION = 185 CY
UNDERCUT EXCAVATION = 250 CY (CONTINGENCY)

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.

Note: Approximate quantities only. Fine Grading, Clearing and Grubbing, Removal of Existing Asphalt Pavement and Breaking of Exisitng Asphalt Pavement will be paid for at the contract Special Provision price for "Grading".

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PROJECT REFERENCE NO.	SHEET NO.
B-4302	4
R/W SHEET NO.	

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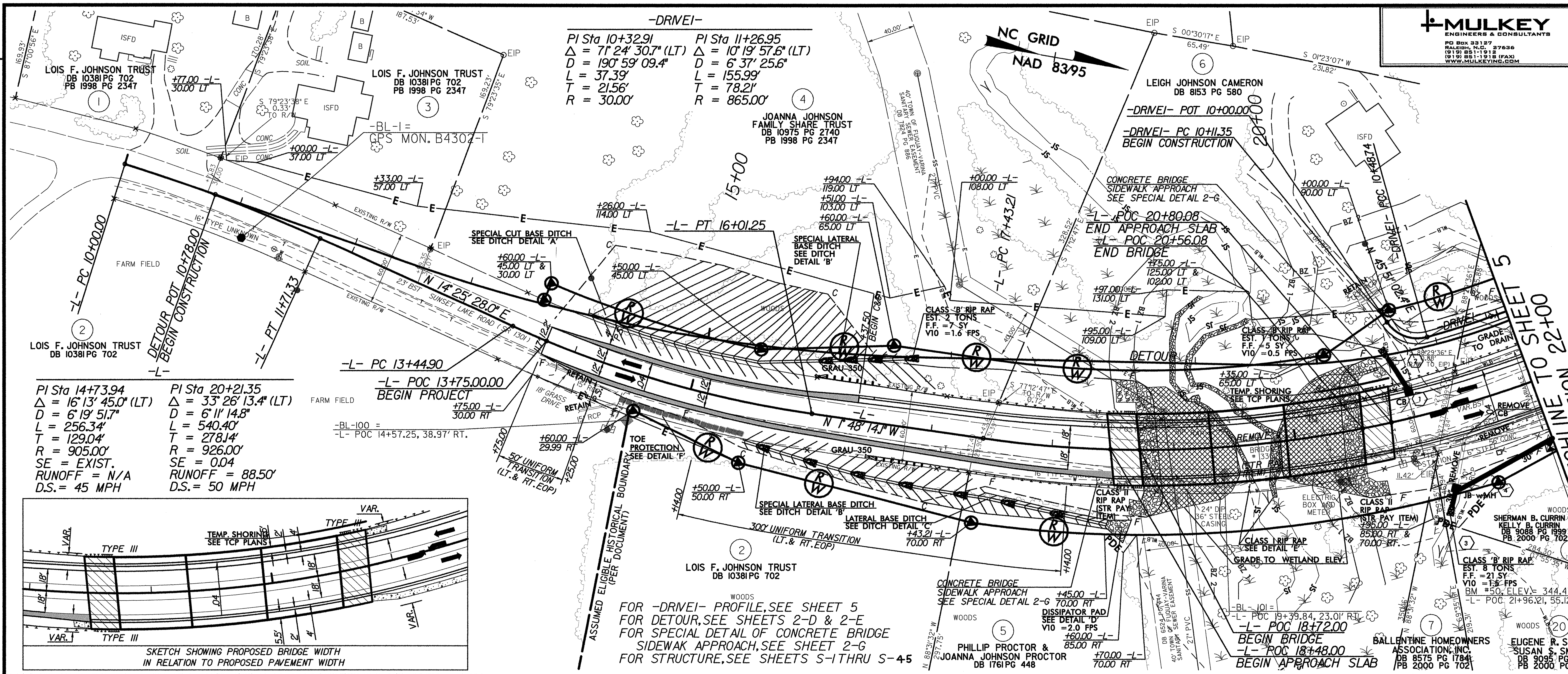
ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER



DETAIL 'E'
RIP RAP AT CHANNEL BANK (Not to Scale)

Type of Liner = Class I Rip-Rap

LINE	STA. TO STA.	RIP RAP (TONS)	FILTER FABRIC (YD²)
-L-	19+00 – 19+90 LT./RT.	340	480

DETAIL A
SPECIAL CUT BASE DITCH (Not to Scale)

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

LINE	STA. TO STA.
-L-	14+00 TO 16+00 LT.

DETAIL B
SPECIAL LATERAL BASE DITCH (Not to Scale)

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

Type of Liner= Class 'B' Rip-Rap

LINE	STA. TO STA.	RIP RAP (TONS)	FILTER FABRIC (YD²)
-L-	15+50 – 17+00 RT.	67	190
-L-	16+00 – 16+80 LT.	35	101

DETAIL C
LATERAL BASE DITCH (Not to Scale)

Min. D= 1.0 Ft. Max. d= 1.0 Ft. B= 2.0 Ft. b= 5.0 Ft.

Type of Liner= Class 'B' Rip-Rap

LINE	STA. TO STA.	D.D.E. (YD³)	RIP RAP (TONS)	FILTER FABRIC (YD²)
-L-	17+00 – 18+50 RT.	86	67	190

DETAIL D
DISSIPATOR PAD (Not to Scale)

W1= 6.0' W2= 14.0' La= 12.0' TH= 22" EST. 20 TONS CLASS B RIP RAP EST. 6 SY FF

LINE	STA.	RIP RAP (TONS)	FILTER FABRIC (YD²)
-L-	18+68 RT.	20	6

DETAIL F
TOE PROTECTION (Not to Scale)

d= 1.0 Ft.

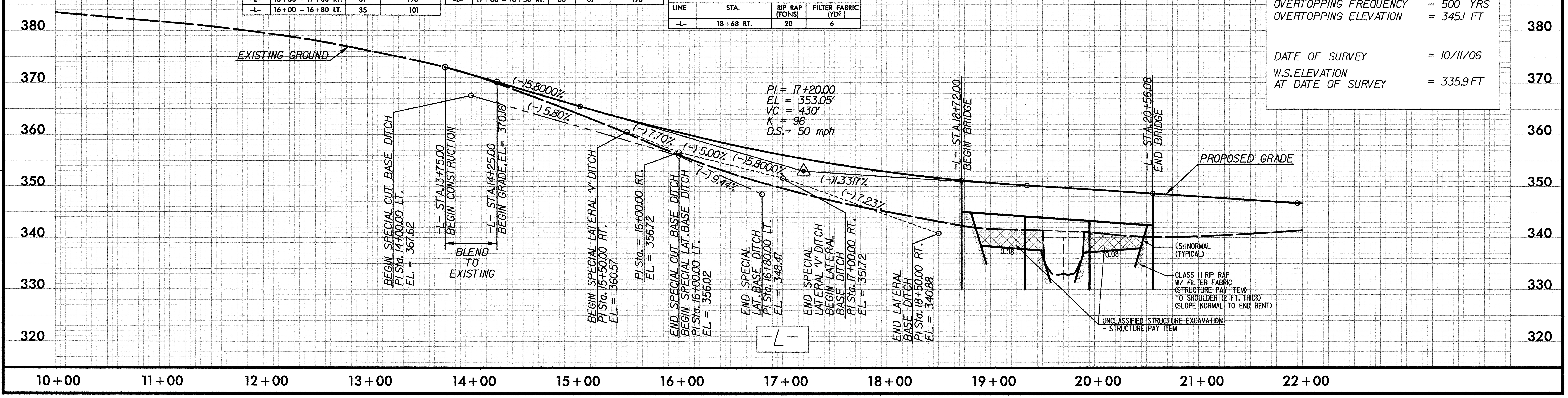
Type of Liner= PSRM

LINE	STA. TO STA.	PERM SOIL REINF. MAT. (YD²)
-L-	14+45 – 15+50 RT.	58

BM #50, ELEV.= 344.47'
-BL- STA. 22+99.74, 49.44' RT.
RR SPIKE IN 22" PINE

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1900 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 342.0 FT
BASE DISCHARGE	= 2200 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 342.4 FT
OVERTOPPING DISCHARGE	= 10000 CFS
OVERTOPPING FREQUENCY	= 500 YRS
OVERTOPPING ELEVATION	= 345.1 FT
DATE OF SURVEY	= 10/11/06
W.S. ELEVATION AT DATE OF SURVEY	= 335.9 FT



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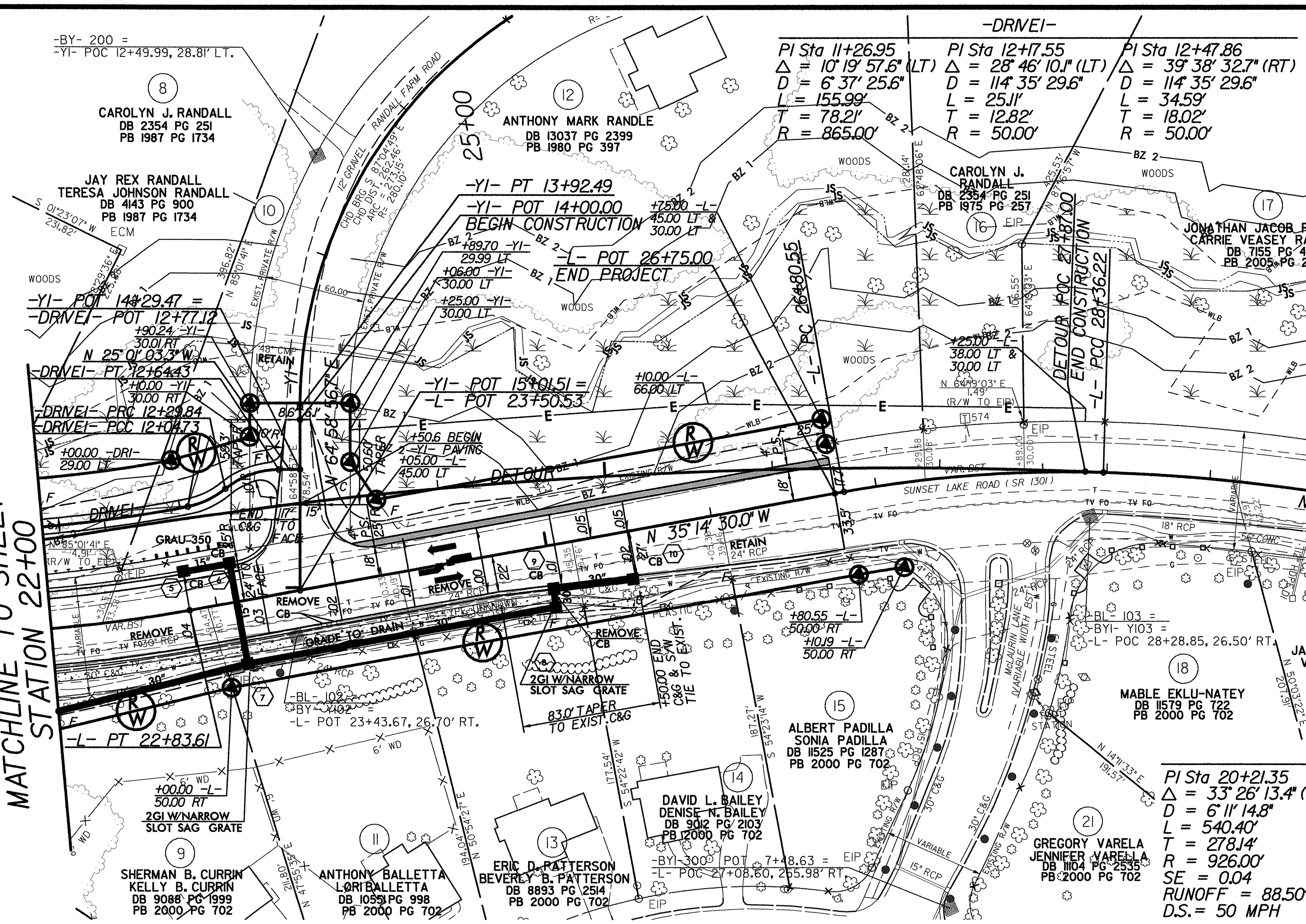
1/29/2009

PROJECT REFERENCE NO.	SHEET NO.
B-4302	5
RW SHEET NO.	

MULKEY ENGINEERS & CONSULTANTS

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 18563 ENGINEER TIMOTHY SCOTT HAYES 1-29-09

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL ENGINEER JEFFREY L. RECK 1-29-09



-DRIVE1-

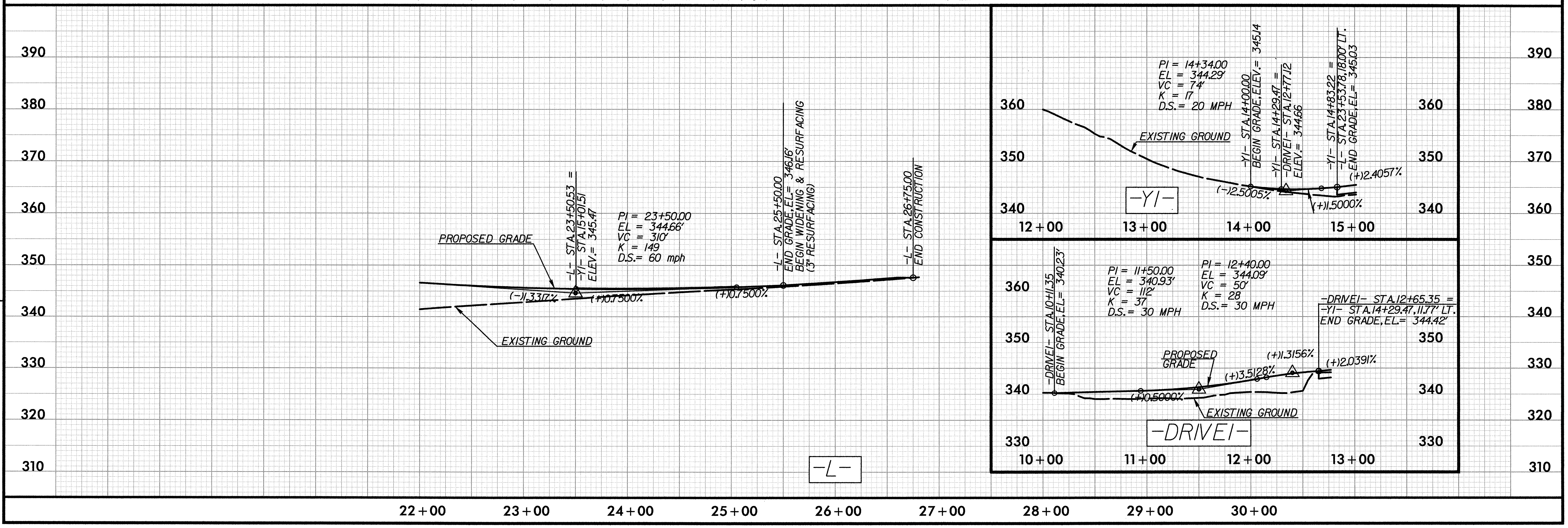
PI Sta 11+26.95	PI Sta 12+17.55	PI Sta 12+47.86
Δ = 10° 19' 57.6" (LT)	Δ = 28° 46' 10.1" (LT)	Δ = 39° 38' 32.7" (RT)
D = 6° 37' 25.6"	D = 114° 35' 29.6"	D = 114° 35' 29.6"
L = 155.99'	L = 25.11'	L = 34.59'
T = 78.21'	T = 12.82'	T = 18.02'
R = 865.00'	R = 50.00'	R = 50.00'

-L-

PI Sta 20+21.35	PI Sta 27+58.67	PI Sta 28+98.42
Δ = 33° 26' 13.4" (LT)	Δ = 11° 55' 38.3" (RT)	Δ = 6° 49' 16.9" (RT)
D = 6° 11' 14.8"	D = 7° 39' 43.1"	D = 5° 29' 26.3"
L = 540.40'	L = 155.39'	L = 124.24'
T = 278.14'	T = 78.12'	T = 62.19'
R = 926.00'	R = 747.79'	R = 1,043.52'
SE = 0.04	SE = EXIST.	SE = EXIST.
RUNOFF = 88.50'	RUNOFF = N/A	RUNOFF = N/A
D.S.= 50 MPH	D.S.= 45 MPH	D.S.= 45 MPH

-Y1-

PI Sta 12+36.23
Δ = 80° 17' 09.0" (LT)
D = 20° 27' 19.7"
L = 392.49'
T = 236.23'
R = 280.10'
SE = EXIST.
RUNOFF = N/A
D.S.= N/A



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1/29/2009