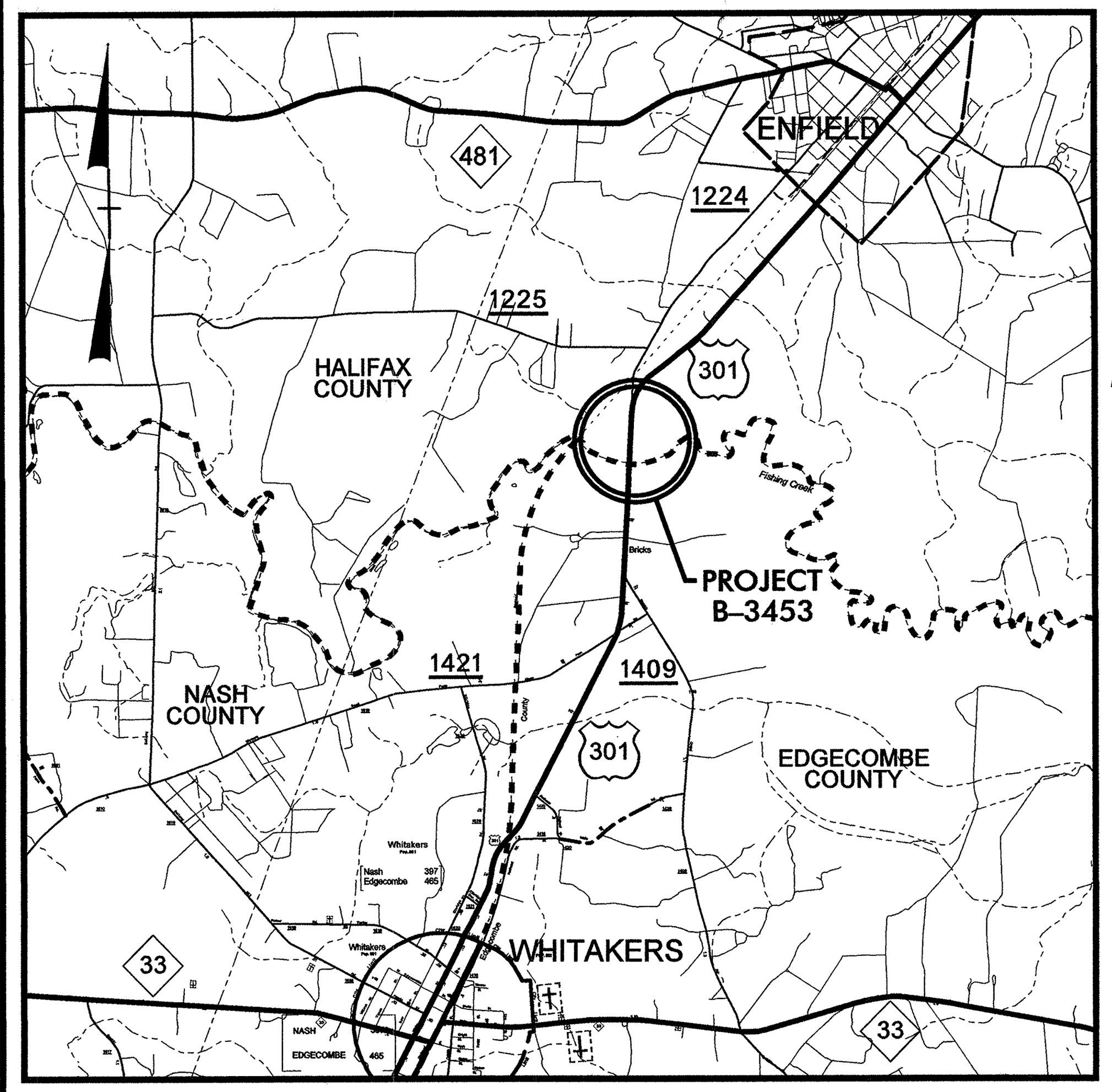
CONTRACT: C201794

TIP PROJECT: B-3453

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3453	1	

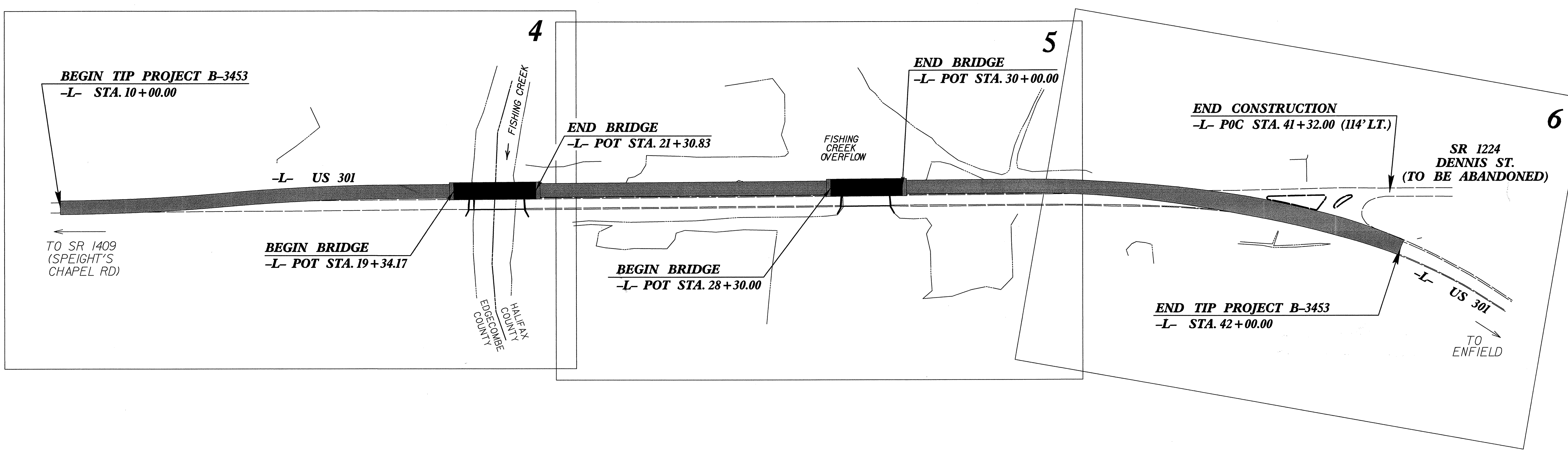
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33073.1.1	BRSTP-301(10)	PE
33073.2.1	BRSTP-301(10)	R/W, UTILITIES
33073.3.1	BRSTP-301(16)	CONSTRUCTION

EDGECOMBE & HALIFAX COUNTIES

LOCATION: BRIDGE NO. 23 OVER FISHING CREEK AND BRIDGE NO. 17 OVER FISHING CREEK OVERFLOW ON US 301

TYPE OF WORK: GRADING, DRAINAGE, STRUCTURES, PAVING, GUARDRAIL, AND SIGNING

NAD 83/95



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

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 2005 = 7,735
ADT 2025 = 14,900
DHV = 10 %
D = 60 %
T = 13 % *
V = 60 MPH

* TTST 9 % DUAL 4 %

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-3453	=	0.537 mi
LENGTH OF STRUCTURES TIP PROJECT B-3453	=	0.069 mi
TOTAL LENGTH OF TIP PROJECT B-3453	=	0.606 mi

Prepared for:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., NC, 27610
Prepared by:
MA ENGINEERING CONSULTANTS, INC.
598 E. CHATHAM STREET, SUITE 137
CARY, NORTH CAROLINA 27511
(919) 297-0220

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 21, 2003

LETTING DATE:
MAY 15, 2007

R.W. PORTER JR., PE
PROJECT ENGINEER

KEVIN S. HUTCHENS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19710
SIGNATURE: P.E. 1-19-07

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19814 ROBERT W. PORTER JR.
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

PROJECT REFERENCE NO.	SHEET NO.
B-3453	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.

2-15-05

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C	SURVEY CONTROL SHEET
2	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-A THRU 2-B	DETAIL OF REINFORCED BRIDGE APPROACH FILLS
~~2-C~~ OMITTED	~~DETAIL OF STANDARD TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC~~
2-D THRU 2-G	DETAIL OF GUARDRAIL INSTALLATION
2-H THRU 2-I	DETAIL OF STRUCTURE ANCHOR UNITS
2-J	DETAIL OF EMBANKMENT MONITORING
2-K	DETAIL OF TEMPORARY ANCHOR UNIT - TYPE W-BEAM
2-L THRU 2-M	DETAIL OF ROCK EMBANKMENT
2-N	STANDARD TEMPORARY SHORING
2-O THRU 2-Z	STANDARD TEMPORARY WALLS
3 (2 SHEETS)	SUMMARIES OF QUANTITIES, EARTHWORK, PAVEMENT REMOVAL, AND DRAINAGE DITCH EXCAVATION
3-A	SUMMARIES OF DRAINAGE AND GUARDRAIL
4 THRU 6	PLAN AND PROFILE SHEETS
TCP-1 THRU TCP-13	TRAFFIC CONTROL PLANS
PM-1 THRU PM-3	PAVEMENT MARKING PLANS
EC-1 THRU EC-9	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-3	SIGNING PLANS
UO-1 THRU UO-4	UTILITIES BY OTHERS PLANS
X-1 THRU X-13	CROSS-SECTIONS

GENERAL NOTES:

2002 SPECIFICATIONS
EFFECTIVE: 01-15-02
REVISED: 05-14-03

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.

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE AREAS IN THE PLANS DESIGNATED SAFETY CLEARING. THE LIMITS ARE AS SHOWN AND THE CLEARING AND GRUBBING IS CONSIDERED A PART OF THE LUMP SUM ITEM FOR "CLEARING AND GRUBBING".

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

UNDERDRAINS:

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

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" OR "TEMPORARY SHORING-BARRIER SUPPORTED" DEPENDING UPON THE LOCATION OF THE SHORING.

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:
SPRINT, DOMINION POWER, ADELPHIA, AND THE TOWN OF ENFIELD

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

EFF. 01-15-02
REV.11-23-04

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 January 15, 2002 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 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.03	Pipe Underdrain and Blind Drain
820.04	Drain Installation in Shoulder Berm Gutter
840.00	Concrete Base Pad for Drainage Structures
840.24	Frames and Narrow Slot Sag Grates
840.27	Brick Median Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Median Drop Inlet Type 'D' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
862.01	Guardrail Placement
876.02	Guide for Rip Rap at Pipe Outlets

5/28/99

02/09/2005 R:\Roadway\Proj\b3453_rdy_ndx_1a.dgn 04:01:04 PM

PROJECT REFERENCE NO.	SHEET NO.
B-3453	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

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 High Quality Wetland Boundary — HQ 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
- River Basin Buffer — RBB
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Guage — 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
- Equaility Symbol
- Pavement Removal

VEGETATION:

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

PROJECT REFERENCE NO.	SHEET NO.
B-3453	1-C
LOCATION AND SURVEYS	

SURVEY CONTROL SHEET B-3453

CONTROL DATA

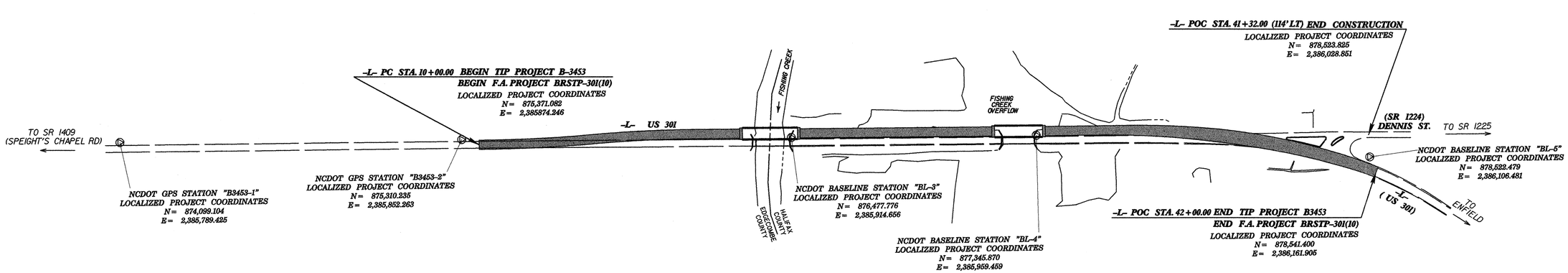
BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	GPS B3453-1	874099.1040	2385789.4250	92.89	OUTSIDE PROJECT LIMITS	
2	GPS B3453-2	875310.2350	2385852.2630	96.00	OUTSIDE PROJECT LIMITS	
3	BL-3	876477.7760	2385914.6560	99.42	21+08.12	14.25 RT
4	BL-4	877345.8700	2385959.4590	97.15	29+77.37	14.20 RT
5	BL-5	878522.4790	2386106.4810	101.19	41+60.09	42.27 LT

BENCHMARK DATA

****
BM6 ELEVATION = 96.75
N 875176 E 2385830
L STATION 10+00
S 12° 49' 02" W DIST 200.21
I.P. AND CAP SET +/- 0.70' DEEP.
STAMPED B-3453 BM6
****
****
BM9 ELEVATION = 90.59
N 876478 E 2386252
L STATION 21+26 351 RIGHT
R/R SPIKE SET IN BASE OF 42" SWEET GUM
TREE +/- 0.00' OFF OF THE GROUND.
****
****
BM10 ELEVATION = 92.58
N 877363 E 2385750
L STATION 29+84 195 LEFT
R/R SPIKE SET IN BASE OF 14" BEECH TREE
+/- 1.60' OFF OF THE GROUND.
****
****
BM11 ELEVATION = 106.90
N 878879 E 2386350
L STATION 44+35
N 26° 34' 38" E DIST 151.90
I.P. AND CAP SET +/- 0.40' DEEP.
STAMPED B-3453 BM11.
****

NC GRID NAD 83/95



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4134-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 874849.507(ft) EASTING: 2446551.521(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99999848 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4134-1" TO -L- STATION 10+00.00 IS N 89° 30' 27.02" W 60,679.514 FEET 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 HTTP:\WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT

FILE: b3453_ls_control_040312.txt

THERE IS NO CALIBRATION 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 UTILIZING GLOBAL POSITIONING SYSTEM.

CONTROL NETWORK FOR B-3453 ESTABLISHED USING EXISTING STATIC GPS FROM NCGS MONUMENTATION.

12/09/2004
11:52:04 AM
C:\projects\proj\b3453_ls_lc_040312.dgn
09:18:01 AM

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-3453	2

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19814 ROBERT W. PORTER, JR. 2-15-05

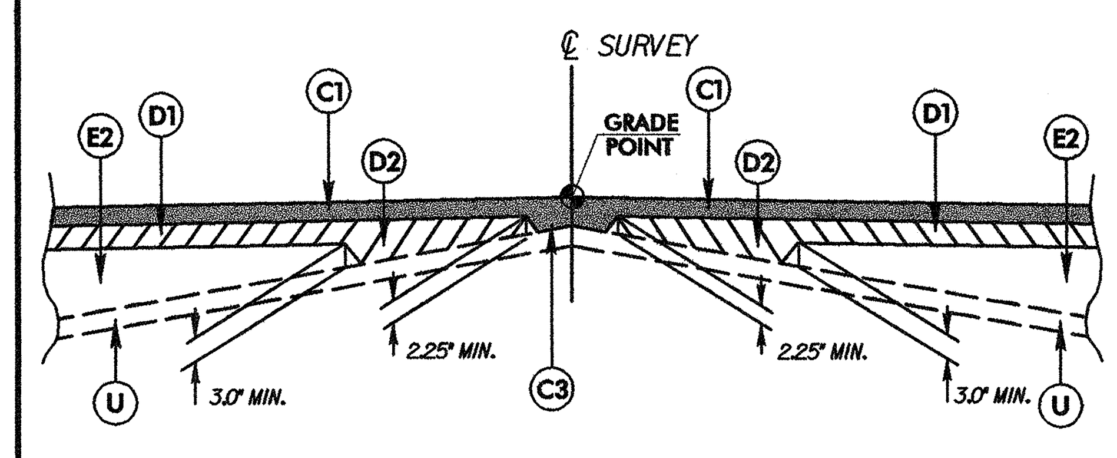
PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — DON-CHI CHEN 2/16/05

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

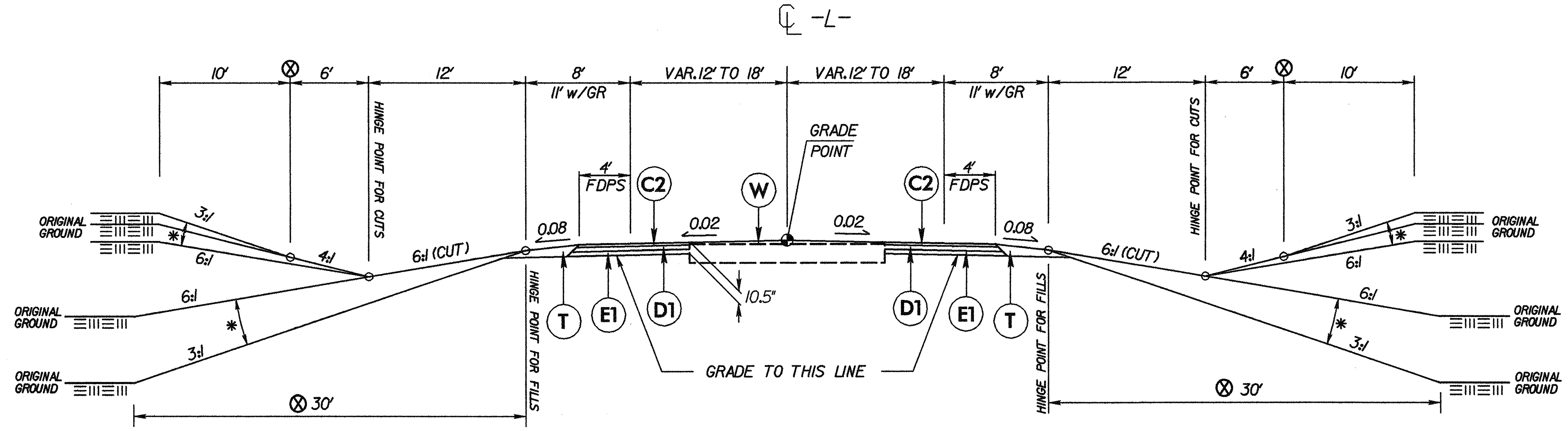
PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.25" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 140 Lbs PER SQUARE YARD.
C2	PROP. APPROX. 2.50" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 140 Lbs PER SQUARE YARD IN EACH OF TWO LAYERS.
C3	PROP. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1.25" OR GREATER THAN 1.5" IN DEPTH.
D1	PROP. APPROX. 4.0" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 Lbs PER SQUARE YARD.
D2	PROP. VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.25" OR GREATER THAN 4.0" IN DEPTH.
E1	PROP. APPROX. 4.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 Lbs PER SQUARE YARD.
E2	PROP. VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3.0" OR GREATER THAN 5.5" IN DEPTH.
J1	10" AGGREGATE BASE COURSE
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL THIS SHEET)

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



DETAIL SHOWING METHOD OF WEDGING



TYPICAL SECTION NO. 1

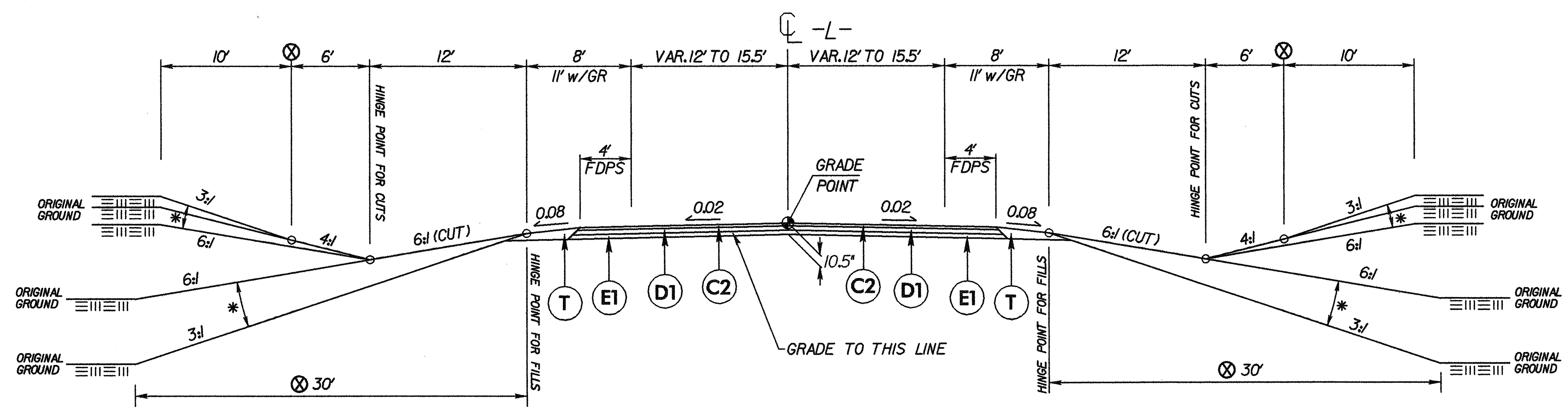
FROM -L- STA. 10+00.00 TO STA. 15+50.00
FROM -L- STA. 34+00.00 TO STA. 40+60.00

NOTE: RESURFACE WITH (C1) FROM:

-L- STA. 40+60.00 TO STA. 42+00.00

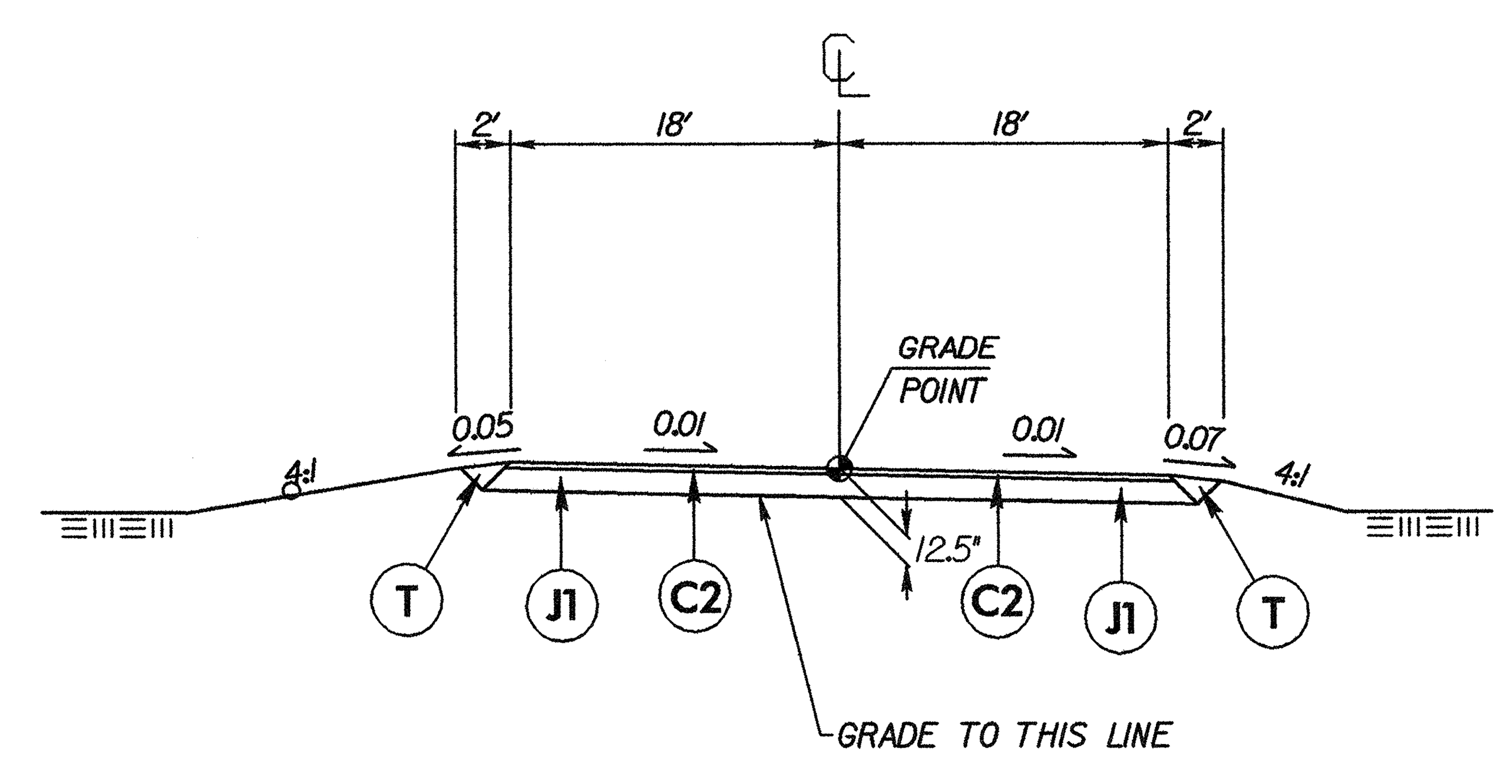
∗ - VARIABLE SLOPE

⊗ - WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 6:1 TO 3:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.



TYPICAL SECTION NO. 2

FROM -L- STA. 15+50.00 TO STA. 19+34.17 (BEGIN BRIDGE)
FROM -L- STA. 21+30.83 (END BRIDGE) TO STA. 28+30.00 (BEGIN BRIDGE)
FROM -L- STA. 30+00.00 (END BRIDGE) TO STA. 34+00.00



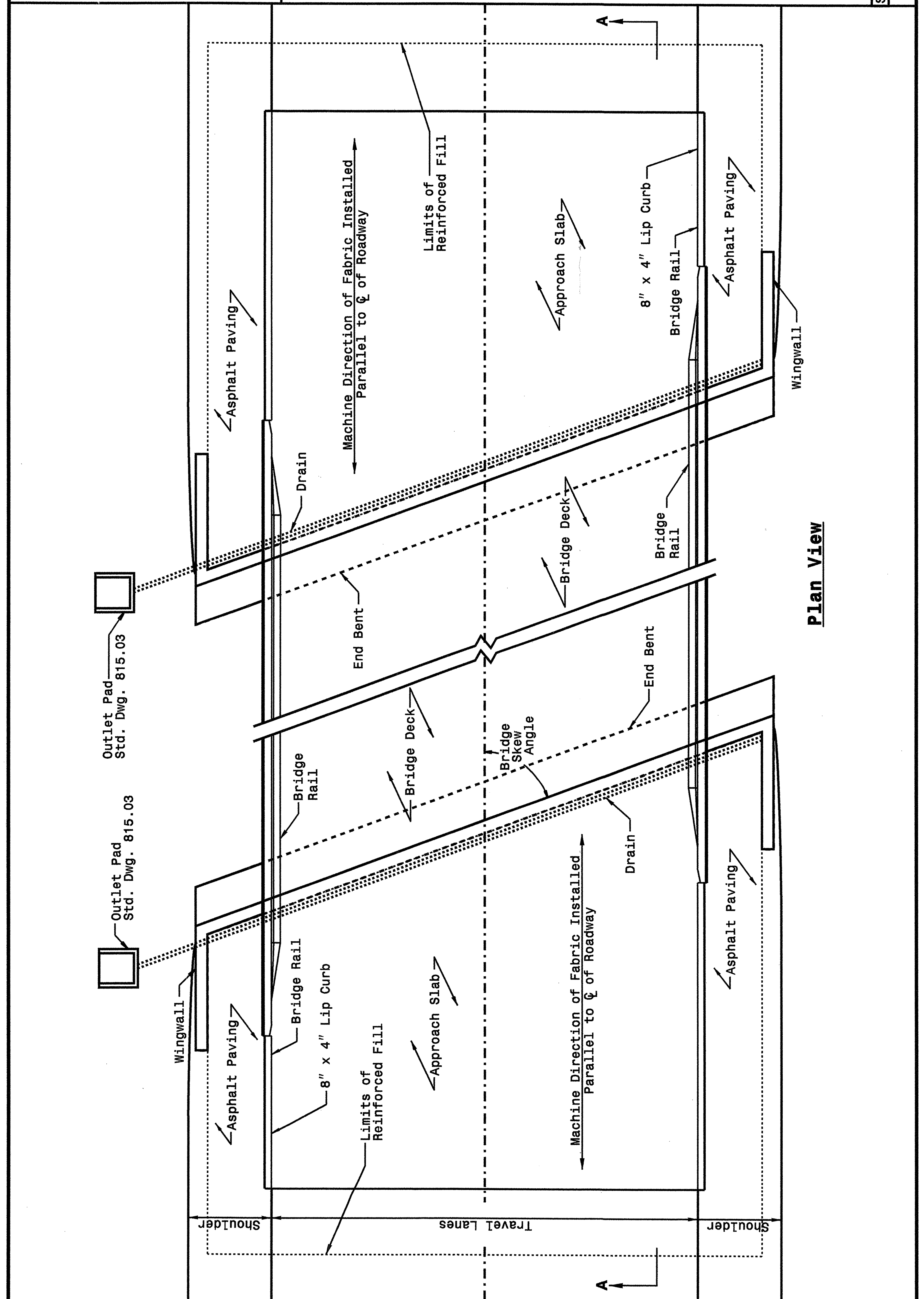
TYPICAL SECTION NO. 3

FROM -DRIVE- STA. 10+50.00 TO STA. 11+79.54

02/07/2005
R:\Roadway\Proj\b3453_rdy_typ.dgn
11:18:49 AM

PROJECT REFERENCE NO.	SHEET NO.
B-3453	2-A

ENGLISH DETAIL DRAWING FOR
REINFORCED BRIDGE APPROACH FILLS
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
SHEET 1 OF 4 422D10

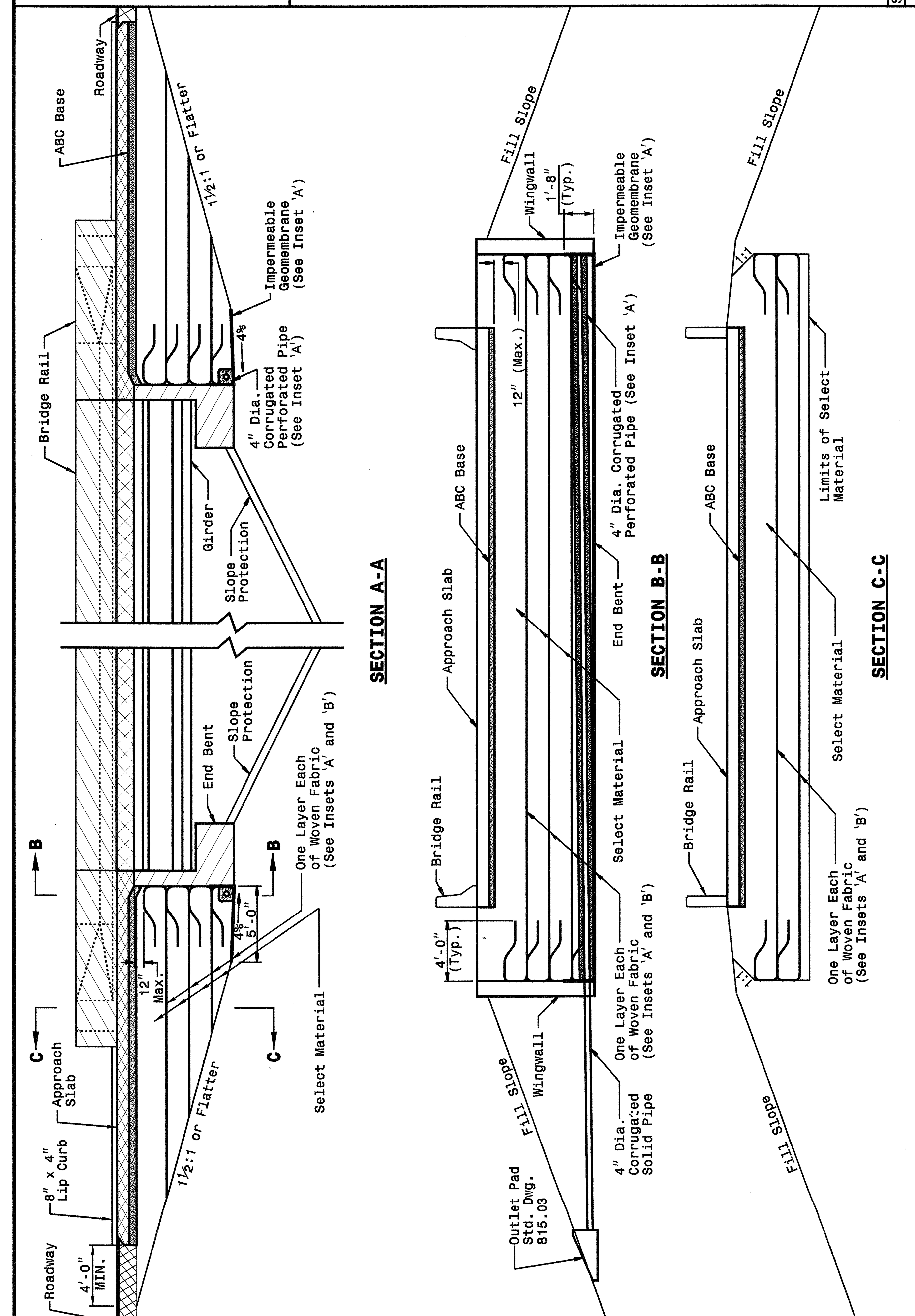


STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
REINFORCED BRIDGE APPROACH FILLS

SHEET 1 OF 4 **422D10**

ENGLISH DETAIL DRAWING FOR
REINFORCED BRIDGE APPROACH FILLS
PRESTRESSED AND PLATE GIRDER BRIDGES
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
SHEET 2 OF 4 422D10



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

ENGLISH DETAIL DRAWING FOR
REINFORCED BRIDGE APPROACH FILLS
PRESTRESSED AND PLATE GIRDER BRIDGES

SHEET 2 OF 4 **422D10**

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19761 CYNTHIA B. PERRY 2/18/05

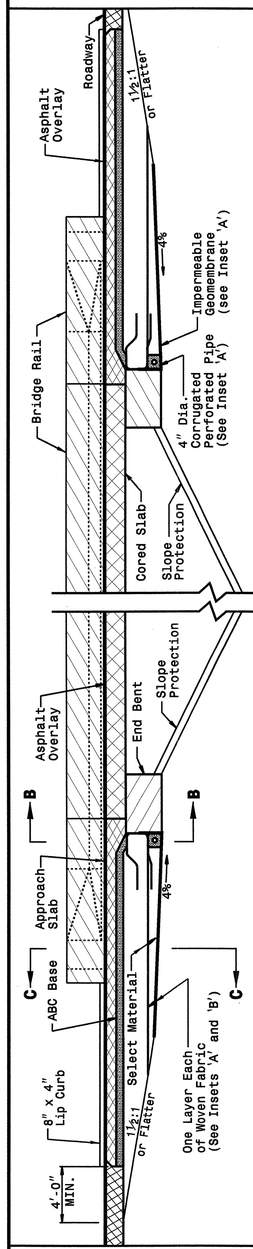
PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

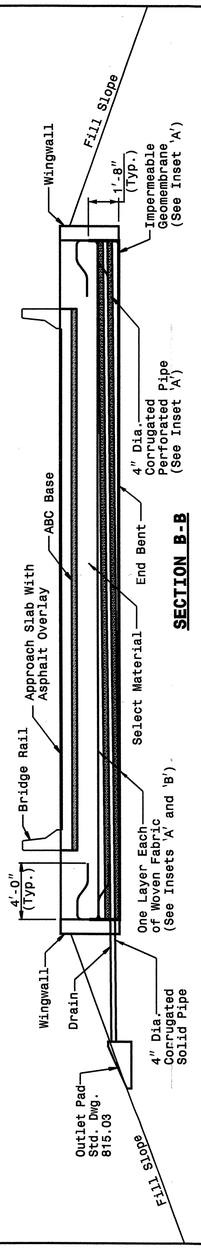
ORIGINAL BY: 2002 STANDARDS DATE: 01-15-02
MODIFIED BY: E.E. WARD DATE: 11-04-04
CHECKED BY: [signature] DATE: 11/12/04
FILE SPEC.: stds/02stdstodetails/english/422d10.dgn

05-NOV-2004 14:46
W:\Special Details\ericward\stds\02 Stds to Special Details\english\4221D\0422d10.dgn
ericward AT 05212260

PROJECT REFERENCE NO.	SHEET NO.
B-3453	2-B



SECTION A-A



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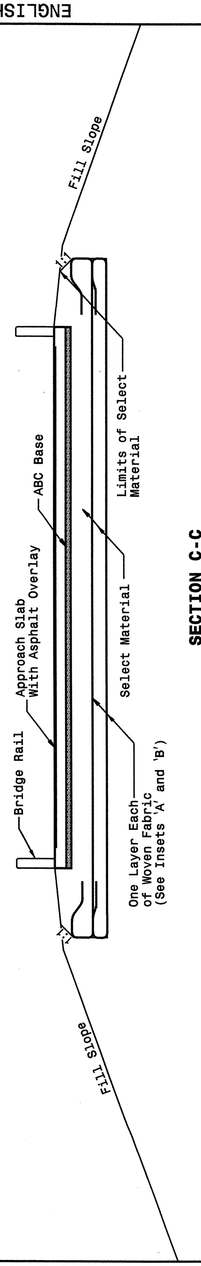

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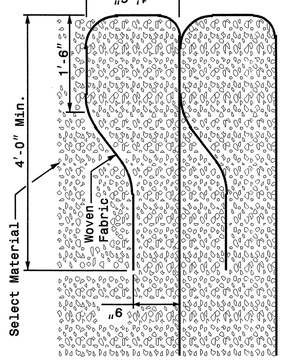


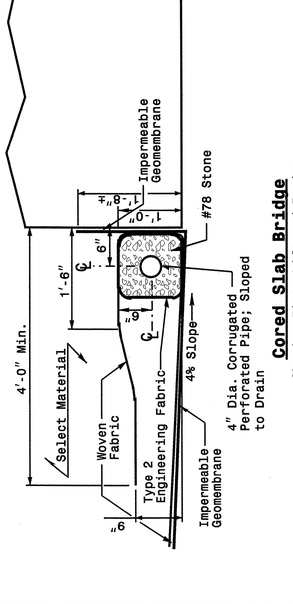
Typical Fabric Lift and Wrap
Showing Second and Above Lifts

Inset 'B'

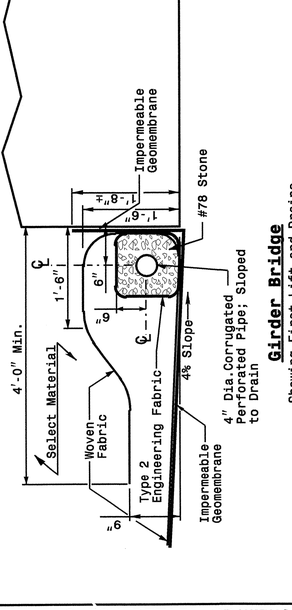
Height of Backwall	Number of Fabric Layers
4'-6" - 5'-9"	3
5'-10" - 7'-2"	4
7'-3" - 8'-8"	5
8'-9" - 10'-1"	6
10'-2" - 11'-8"	7

Note: Cored Slab Structures Require 2 Fabric Layers.

Length of Bridge End Bent Inside Wingwalls
If Bridge Skew is Less Than or Equal to 90°: (Roadway Width + 7'-0") / Sin (Bridge Skew Angle) = Dis. Between Wingwalls
If Bridge Skew is Greater Than 90°: (Roadway Width + 7'-0") / Cos (Bridge Skew Angle - 90°) = Dis. Between Wingwalls



Cored Slab Bridge
Showing First Lift and Drains



Girder Bridge
Showing First Lift and Drains

Inset 'A'

NORTH CAROLINA PROFESSIONAL SEAL 19761 ENGINEER CYNTHIA B. PERRY

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

SEE PLATE FOR TITLE

ORIGINAL BY: 2002 STANDARDS DATE: 01-15-02
MODIFIED BY: E.E. WARD DATE: 11-04-04
CHECKED BY: DATE: 11-12-04
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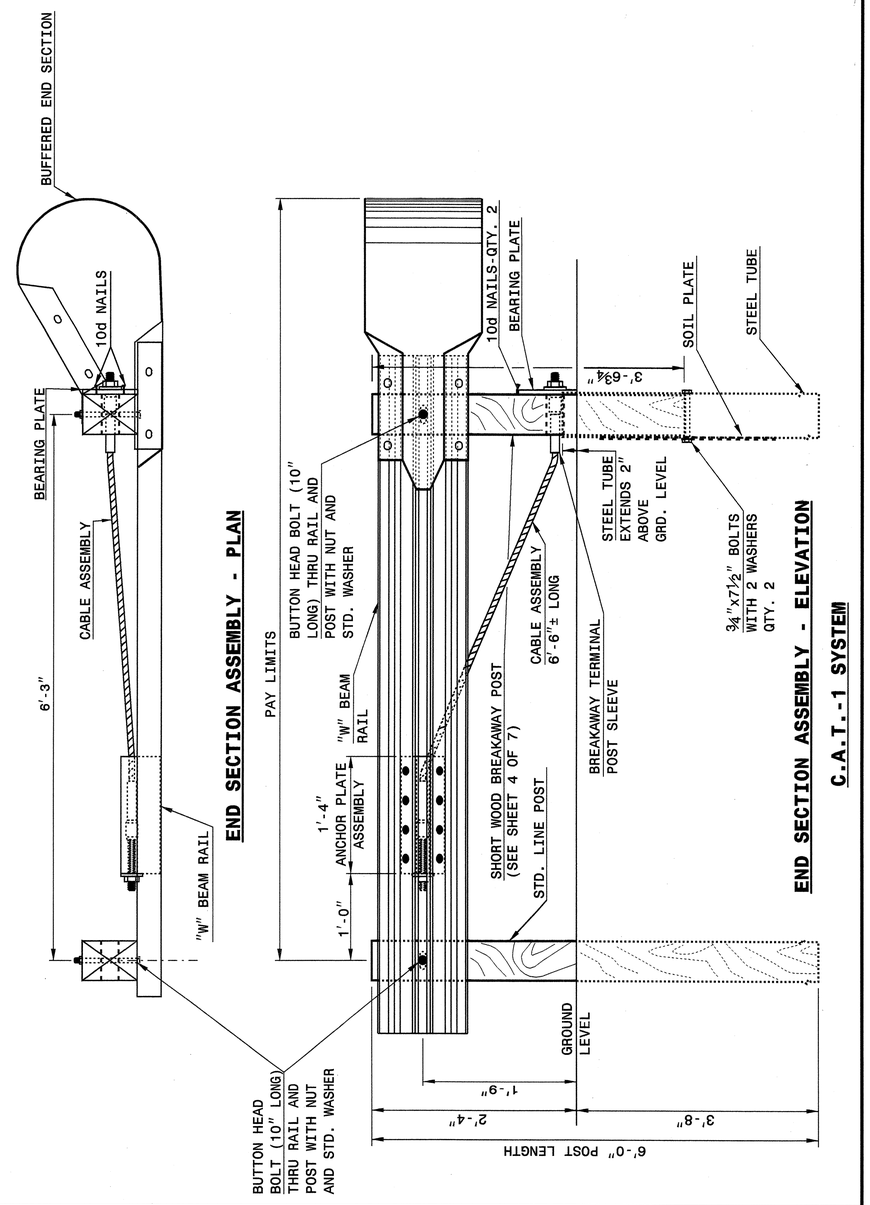
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-3453	2-D

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

ENGLISH DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

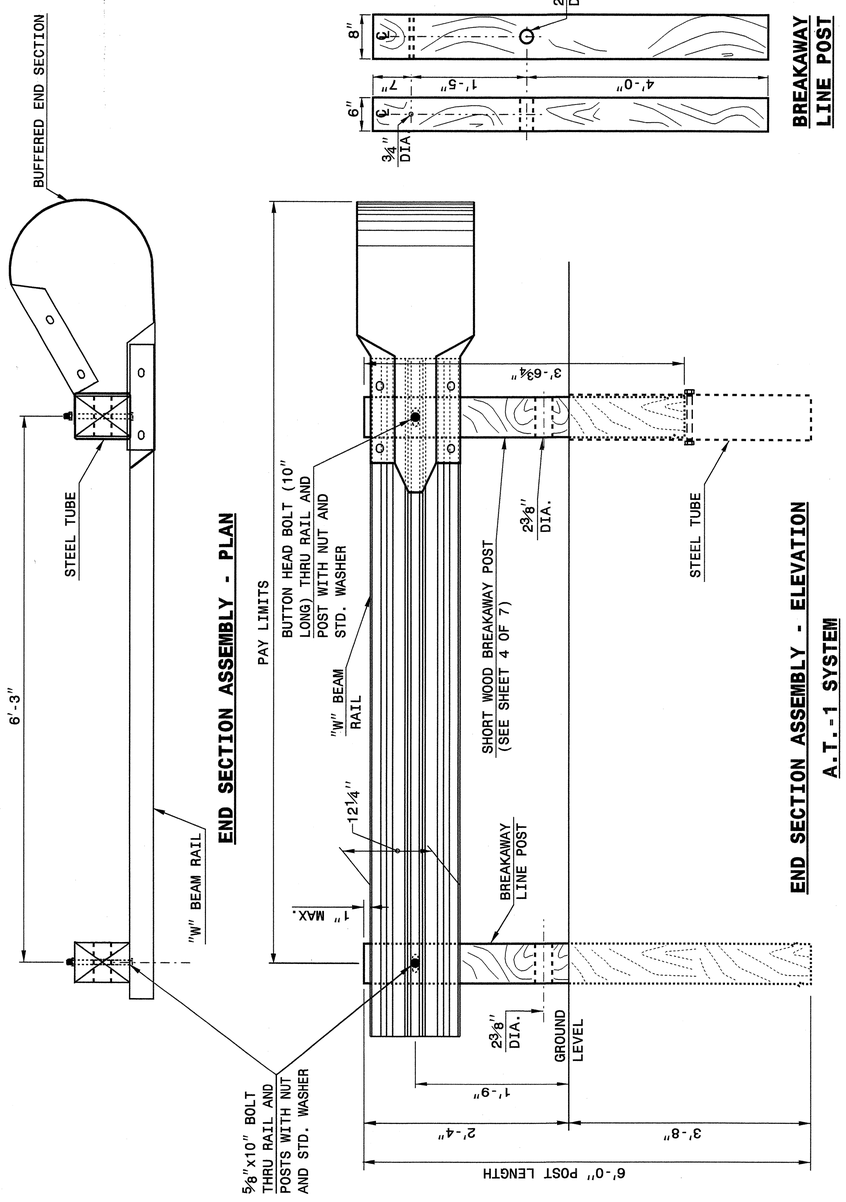
SHEET 1 OF 7
862D02



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

ENGLISH DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 2 OF 7
862D02



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

ENGLISH DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 1 OF 7
862D02

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

ENGLISH DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 2 OF 7
862D02

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

SEE PLATE FOR TITLE

ORIGINAL BY: 2002 STD.862.02 DATE:
MODIFIED BY: E.E. WARD DATE: 02-09-03
CHECKED BY: Gail S. Hurst DATE: 4-29-04
FILE SPEC.: /dsf/stds/02todetail/english/86202/862d02.dgn

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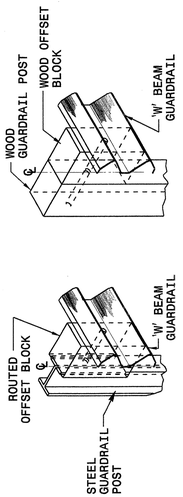
PROJECT REFERENCE NO.	SHEET NO.
B-3453	2-E

ISOMETRIC VIEWS



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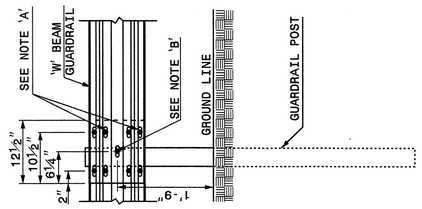
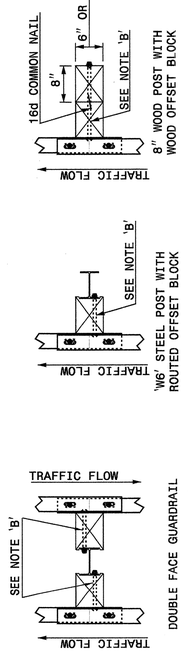


PLAN



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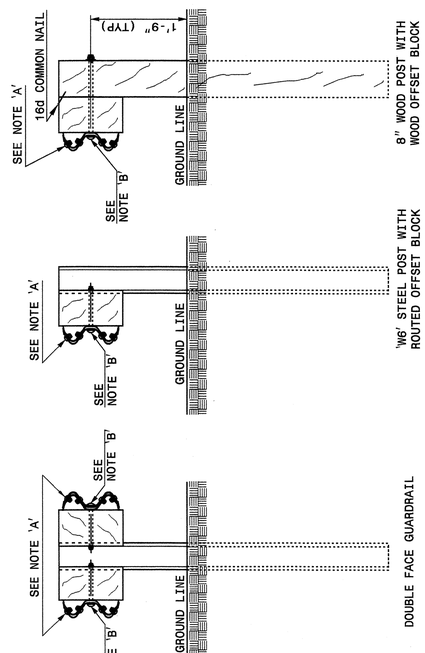
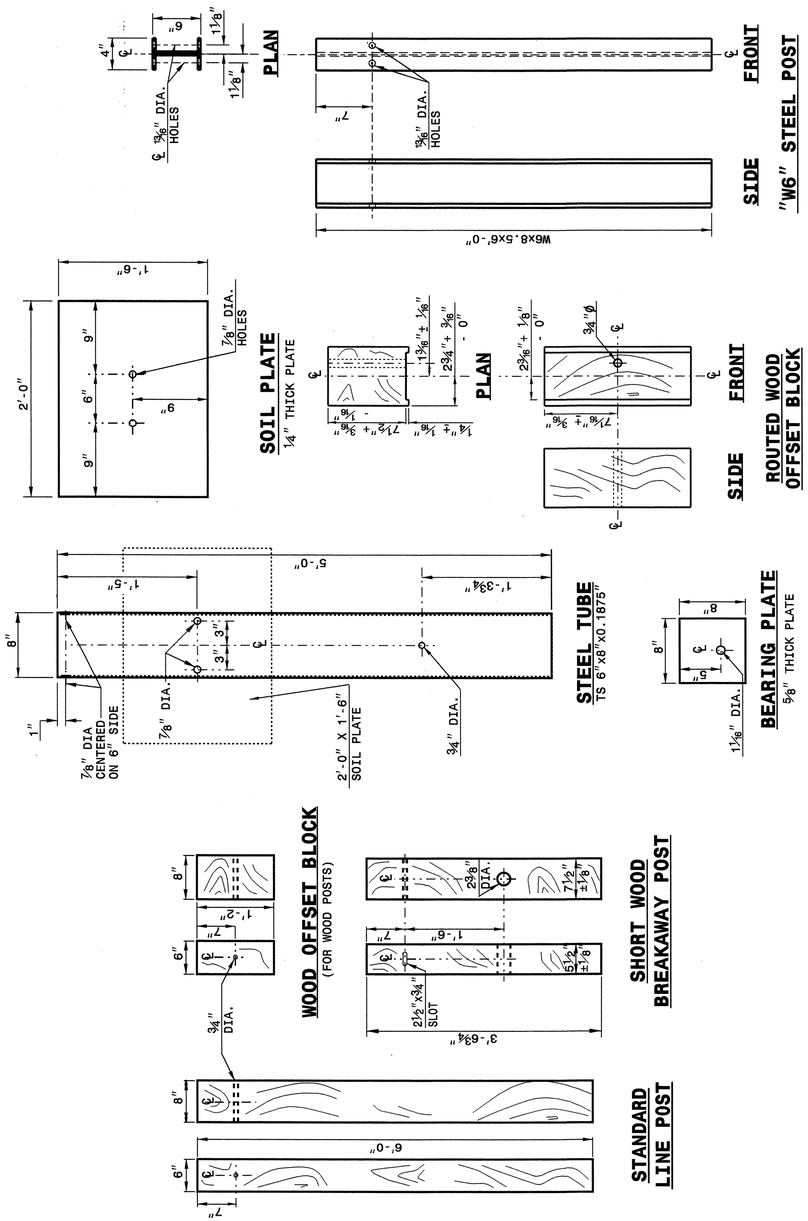


TYPICAL GUARDRAIL AND GUARDRAIL POST ALTERNATIVES

NOTES:
A - ⅝" DIA. BUTTON HEAD SPLICE BOLT 1¼" LONG (8 REQ. PER SPLICE JOINT).
B - ⅝" DIA. BUTTON HEAD BOLT 7½"/9" LONG WITH NUT FOR BOLTING 6"/8" ROUTED OFFSET BLOCK TO STEEL POSTS OR ⅝" DIA. BUTTON HEAD BOLT 18" LONG WITH STD. WASHER UNDER NUT FOR BOLTING TO WOOD POSTS (1 REQ. PER LOCATION)
C - FIELD PUNCHING OF HOLES INTO GUARDRAIL SHALL BE AS DIRECTED BY THE ENGINEER.

SYSTEM PARTS



NORTH CAROLINA PROFESSIONAL SEAL 19761 ENGINEER CYNTHIA B. PERRY 2/19/15

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

SEE PLATE FOR TITLE

ORIGINAL BY: 2002 STD.862.02 DATE:
MODIFIED BY: E.E. WARD DATE: 02-09-03
CHECKED BY: DATE: 4-29-04
FILE SPEC.: /usr/stds/02todetail/english/86202/862d02.dgn

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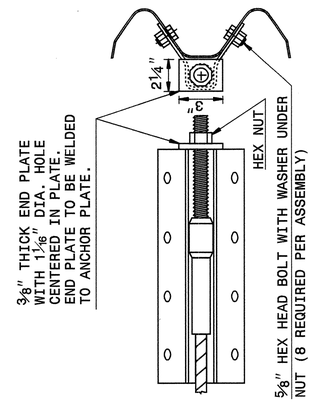
PROJECT REFERENCE NO.	SHEET NO.
B-3453	2-F

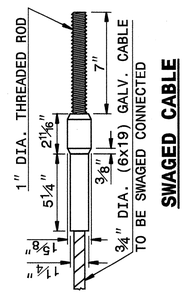
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR **GUARDRAIL INSTALLATION**

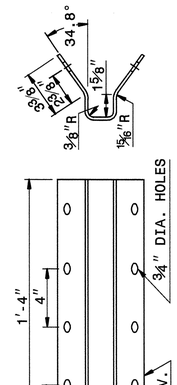
SHEET 5 OF 7 **862D02**



ANCHOR PLATE ASSEMBLY



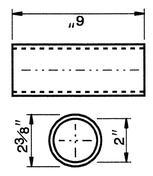
SWAGED CABLE



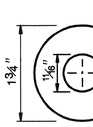
ANCHOR PLATE

CABLE ASSEMBLY

SYSTEM PARTS

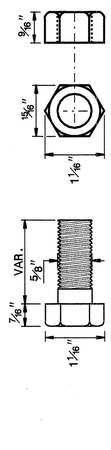


BREAKAWAY TERMINAL POST SLEEVE

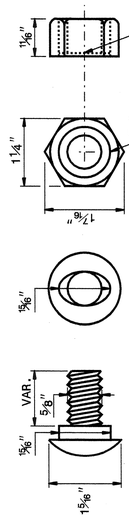


DETAIL OF STANDARD WASHER

STANDARD WASHER: TYPICAL USE UNDER NUT WITH WOOD POST



DETAIL OF STANDARD HEX BOLT AND NUT



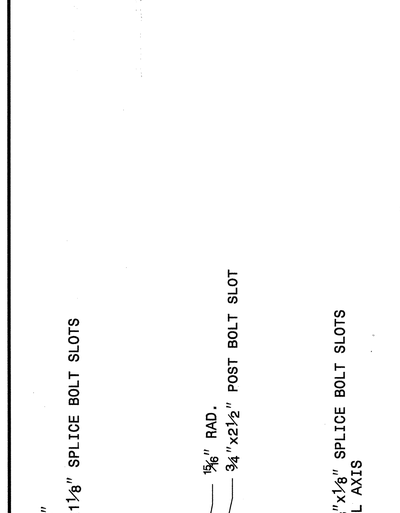
DETAIL OF BUTTON HEAD BOLT AND NUT

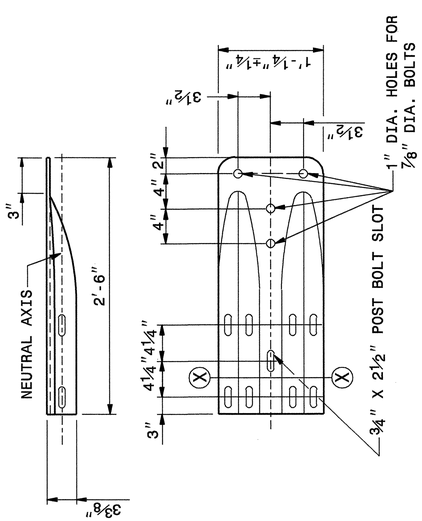
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR **GUARDRAIL INSTALLATION**	SHEET 5 OF 7 **862D02**

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

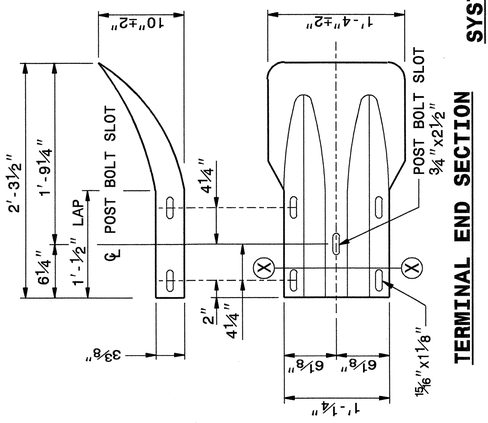
ENGLISH DETAIL DRAWING FOR **GUARDRAIL INSTALLATION**

SHEET 6 OF 7 **862D02**





TYPICAL END SHOE



TERMINAL END SECTION

SYSTEM PARTS - GENERAL USE

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR **GUARDRAIL INSTALLATION**	SHEET 6 OF 7 **862D02**

NORTH CAROLINA PROFESSIONAL SEAL 19761 ENGINEER CYNTHIA B. PERRY

2/18/05

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
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ORIGINAL BY: 2002 STD.862.02 DATE:
MODIFIED BY: E.E. WARD DATE: 02-09-03
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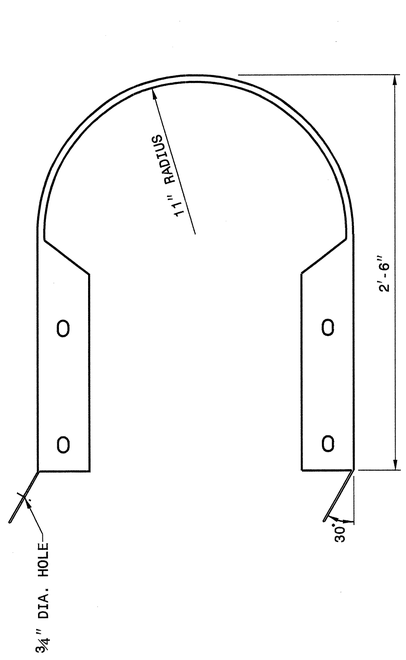
PROJECT REFERENCE NO.	SHEET NO.
B-3453	2-9

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

ENGLISH DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 7 OF 7
862D02



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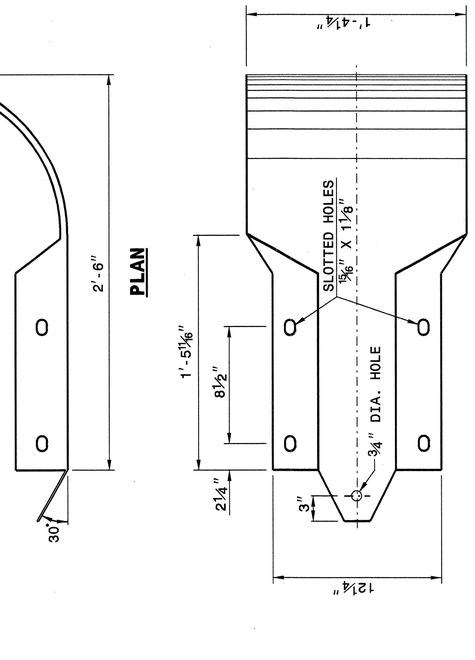


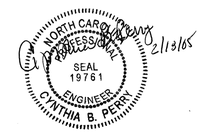
ELEVATION

BUFFERED END SECTION

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

ENGLISH DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 7 OF 7
862D02



DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
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ORIGINAL BY: 2002 STD. 862.02 DATE:
MODIFIED BY: E.E. WARD DATE: 02-09-03
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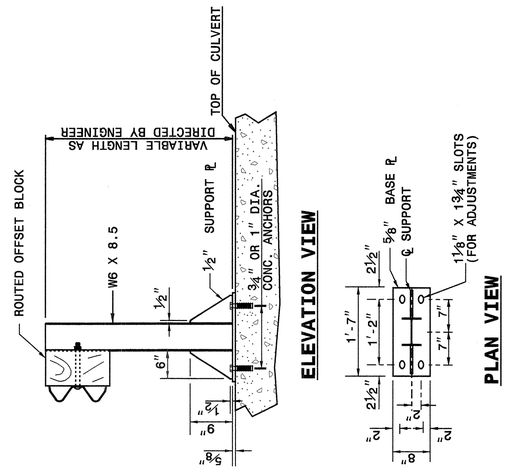
PROJECT REFERENCE NO.	SHEET NO.
B-3453	2-H

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

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
ANCHORAGE FOR GUARDRAIL POST ON BOX CULVERT

SHEET 1 OF 4 — 862D03

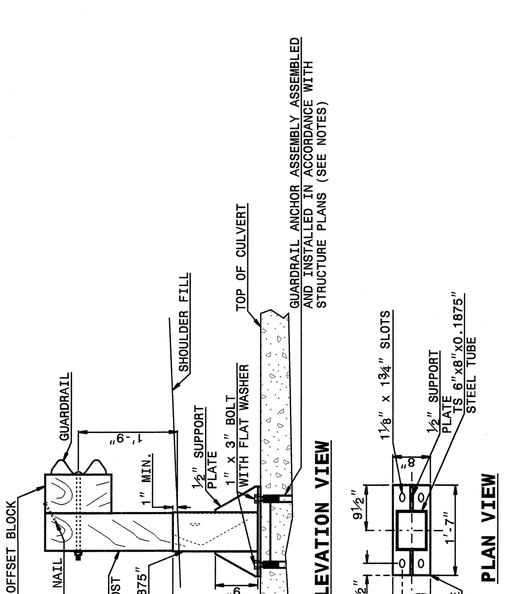


NOTES FOR:
GUARDRAIL POST ANCHORED TO STRUCTURE:
-USE FULL LENGTH ¼" BUTT WELDS AT ALL LOCATIONS OF CONTACT BETWEEN THE BASE PLATE, SUPPORT PLATES AND STEEL POST OR STEEL TUBE.
-USE POST AND POST BASE PLATES CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-36 AND GALVANIZED AFTER FABRICATION TO CONFORM TO A.S.T.M. A-123.
-USE WOOD POSTS WHICH FIT SNUGLY IN THE STEEL TUBE WITH A MAXIMUM OF ⅛" CLEARANCE BETWEEN TUBE WALL AND POST.

NEW STRUCTURES:
-ATTACH POST TO INSERT ASSEMBLY UNITS (USING ANCHOR BOLTS SUPPLIED WITH INSERTS) WHICH HAVE BEEN CAST INTO THE STRUCTURE DURING CONSTRUCTION.

EXISTING STRUCTURES:
-USE CONCRETE ANCHORS CONSISTING OF A STUD BOLT WITH NUT AND WASHER. USE STUDS THREADED ON ONE END AND HAVING AN EXPANDED WEDGE ASSEMBLY POSITIONED AROUND A TAPERED AREA AT THE OTHER END. USE ANCHORS WHICH PROVIDE A MINIMUM SAFE HOLDING POWER OF 2875 LBS. FOR A ¾" OR 1" DIAMETER BOLT. CALCULATE HOLDING POWER BASED ON ¼ THE ACTUAL HOLDING POWER OF THE ANCHOR IN 3500 PSI CONCRETE AS DETERMINED BY AN APPROVED COMMERCIAL TESTING LABORATORY.

-USE ANCHORS GALVANIZED IN ACCORDANCE WITH A.S.T.M. A-153. SIZE HOLES FOR THE CONCRETE ANCHORS IN ACCORDANCE WITH THE ANCHOR MANUFACTURER'S RECOMMENDATIONS. DRILL HOLES WITH A CARBIDE OR DIAMOND TIPPED MASONRY BIT POWERED BY A ROTARY OR ROTARY IMPACT DRILL. NO OTHER IMPACT TOOLS WILL BE PERMITTED. DRILL HOLES VERTICALLY. FURNISH DOCUMENTATION OF HOLE SIZE RECOMMENDED FOR THE SPECIFIED ANCHOR TO THE ENGINEER BEFORE DRILLING HOLES. THOROUGHLY CLEAN HOLES FOR ANCHORS OF ALL CONCRETE CHIPS, DUST, GREASE, OIL, ETC. BEFORE ANCHORS ARE INSTALLED. REPAIR ALL DAMAGE CAUSED BY THIS WORK TO THE SATISFACTION OF THE ENGINEER.

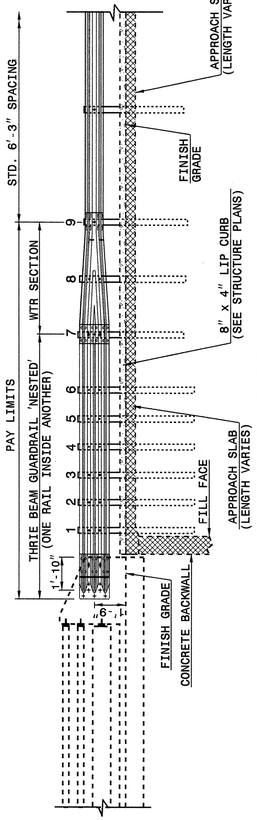


ANCHORAGE FOR GUARDRAIL POST ON BOX CULVERT

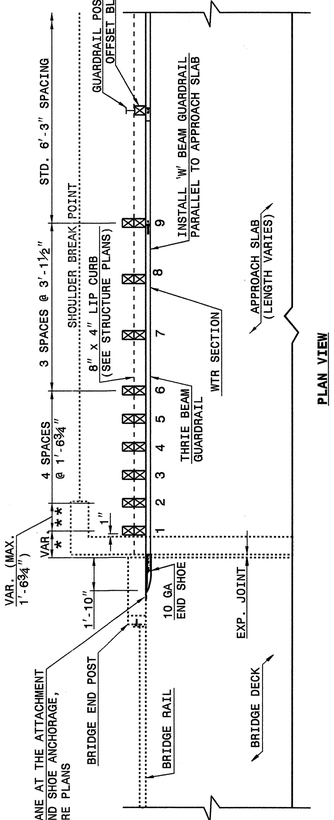
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 2 OF 4 — 862D03



NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED WITHIN THE PAY LIMITS IF THE ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-USE NO STEEL POSTS WITHIN THE GUARDRAIL ANCHOR UNIT LIMITS.
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 4 FOR POST SECTIONS 1 THRU 9.



GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

NORTH CAROLINA PROFESSIONAL SEAL 19761 ENGINEER CYNTHIA B. PERRY 2/19/04

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

SEE PLATE FOR TITLE

ORIGINAL BY: 2002 STANDARDS DATE: 01-15-02
MODIFIED BY: E.E. WARD DATE: 04-07-04
CHECKED BY: [signature] DATE: 10/21/04
FILE SPEC.: stds/02stdstodetails/english/862d03.dgn

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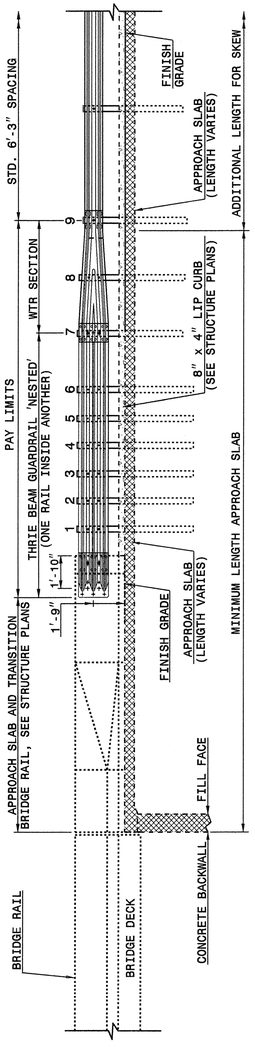
PROJECT REFERENCE NO.	SHEET NO.
B-3453	2-I

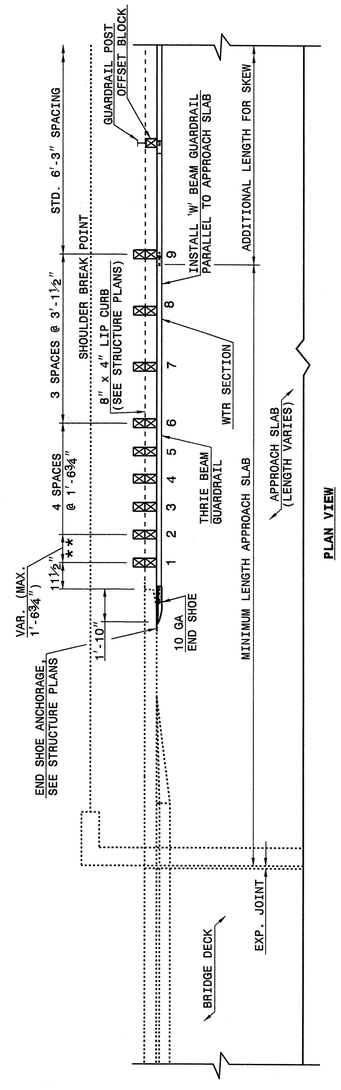
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON APPROACH SLAB

SHEET 3 OF 4 — 862D03



NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-USE NO STEEL POSTS WITHIN THE GUARDRAIL ANCHOR UNIT LIMITS.
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 4 FOR POST SECTIONS 1 THRU 9.

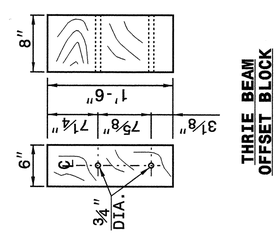


GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON APPROACH SLAB

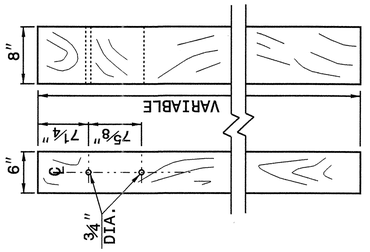
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III

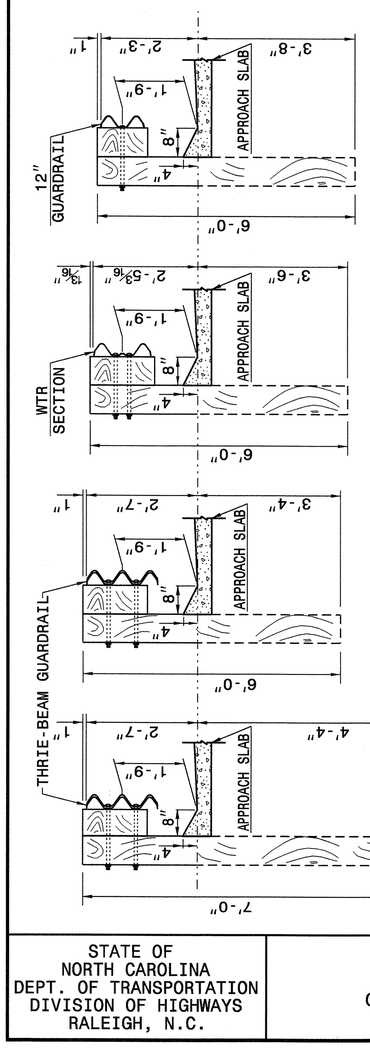
SHEET 4 OF 4 — 862D03



THRIE BEAM OFFSET BLOCK



THRIE BEAM LINE POST



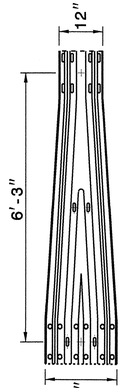
SECTION OF 'W' BEAM POST 9

SECTION OF WTR BEAM POST 8

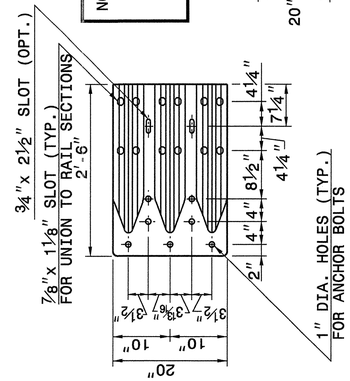
SECTION OF THRIE BEAM POST 7

SECTION OF THRIE BEAM POSTS 1 THRU 6

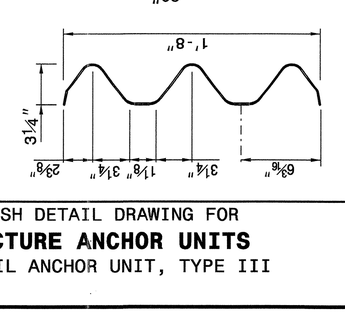
NOTE: THE MID POST AND OFFSET BLOCK OF THE WTR SECTION WILL REQUIRE SPECIAL BOLT HOLE DRILLING IN THE THRIE BEAM OFFSET BLOCK AND LINE POST.



WTR SECTION
ELEVATION VIEW



END SHOE



THRIE-BEAM SECTION

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

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III

SHEET 4 OF 4 — 862D03

NORTH CAROLINA PROFESSIONAL SEAL 19761 ENGINEER CYNTHIA B. PERRY — 10/19/05

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

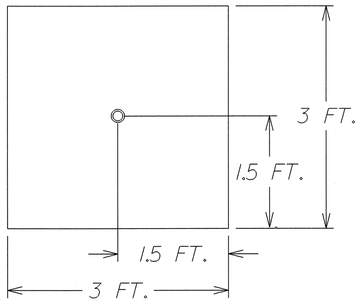
SEE PLATE FOR TITLE

ORIGINAL BY: 2002 STANDARDS DATE: 01-15-02
MODIFIED BY: E.E. WARD DATE: 04-07-04
CHECKED BY: [signature] DATE: 10/21/14
FILE SPEC.: stds/02stdstodetails/english/862d03.dgn

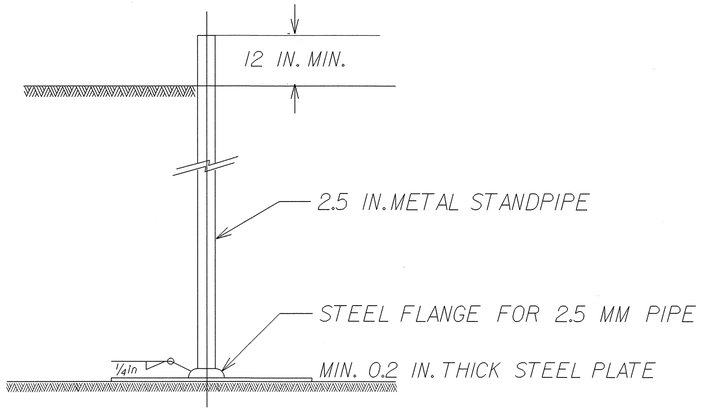
19-OCT-2004 11:42
W:\Special Details\ericward\stds\02 Stds to Special Details\english\862d03\862d03.dgn
ericward AT DS212260

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
B-3453	2-J	?
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
33073.1.1	BRSTP-301(10)	

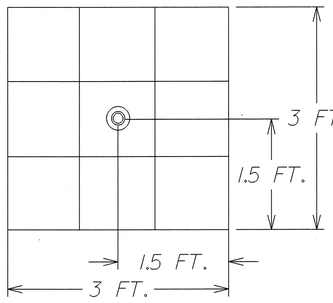
SETTLEMENT GAUGE DETAIL



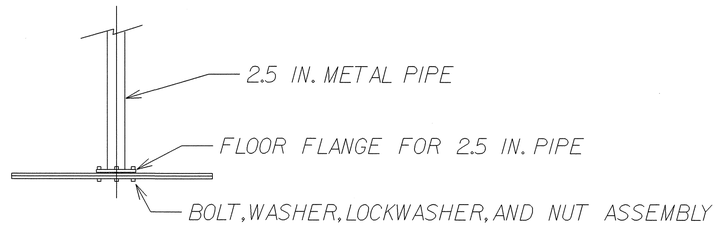
STEEL BASE



DETAIL OF STEEL BASE



WOOD BASE

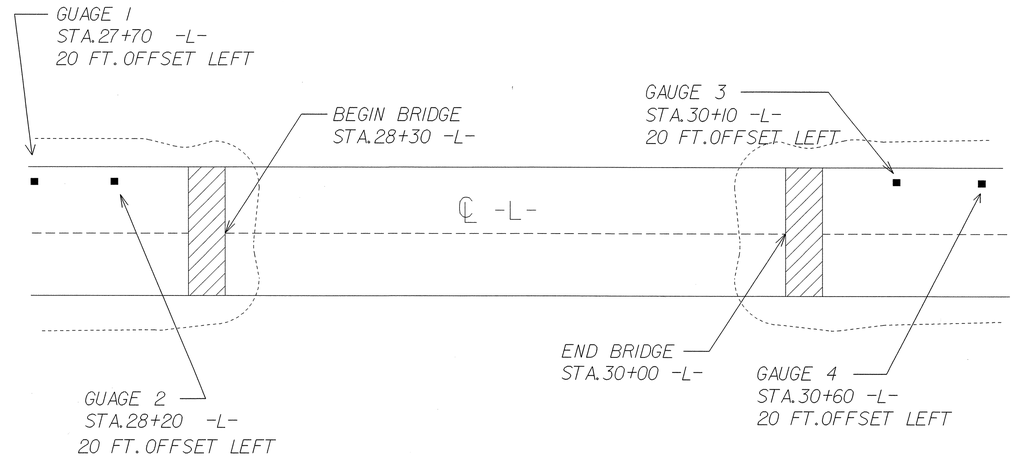


DETAIL OF WOOD BASE

SIX - 1 IN. X 1 FT. X 3 FT. PLANKS OF LUMBER OR TWO PIECES 1 IN. X 3 FT. X 3 FT. EXTERIOR GRADE PLYWOOD, SECURELY FASTENED AND THEN COATED WITH WOOD PRESERVATIVE

PLAN VIEW

N.T.S.



NOTES

1. THE USE OF EITHER THE WOOD BASE OR THE STEEL BASE SETTLEMENT GUAGE SHALL BE THE CONTRACTOR'S OPTION.
2. SETTLEMENT GUAGES SHALL BE INSTALLED BEFORE ANY FILL IS PLACED.
3. SETTLEMENT GUAGE ELEVATIONS ARE TO BE DETERMINED AND RECORDED WEEKLY BY THE RESIDENT ENGINEER. THE INITIAL ELEVATION OF THE SETTLEMENT GUAGE PLATE (AT TOP OF PLATE) SHALL BE DETERMINED AT THE TIME OF INSTALLATION ALONG WITH THE EMBANKMENT ELEVATION. WHEN NEW SECTIONS OF THE PIPE ARE ADDED, ELEVATIONS SHALL BE RECORDED AT THE TOP OF EXISTING PIPE AND AT THE TOP OF THE NEW PIPE. THIS IS TO TAKE INTO ACCOUNT INTERIM SETTLEMENT, VARIABLE PIPE LENGTHS, AND THREAD LENGTHS IN COUPLING. RESULTS OF SETTLEMENT GUAGE READINGS SHALL BE FORWARDED TO MR. K.J. KIM, EASTERN REGIONAL GEOTECHNICAL MANAGER, WITHIN THREE DAYS.

QUANTITIES

SETTLEMENT GAUGES..... 4 EACH

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TERGUE

DRAWN BY WDF DATE 12/04

CHECKED BY DLT DATE 12/04

PROJECT 33073.1.1 (B-3453)

HALIFAX-EDGECOMBE **COUNTY**

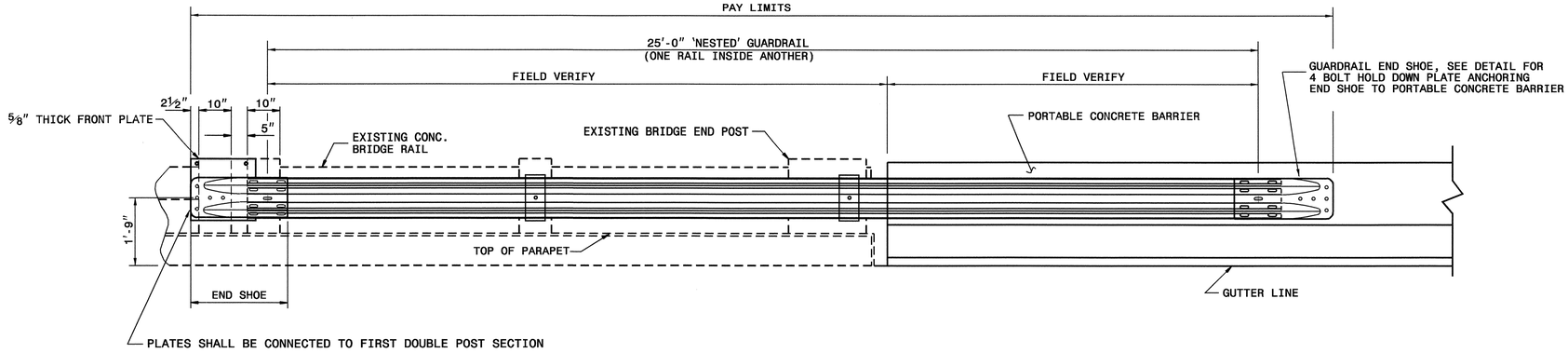
STATION AS SHOWN

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

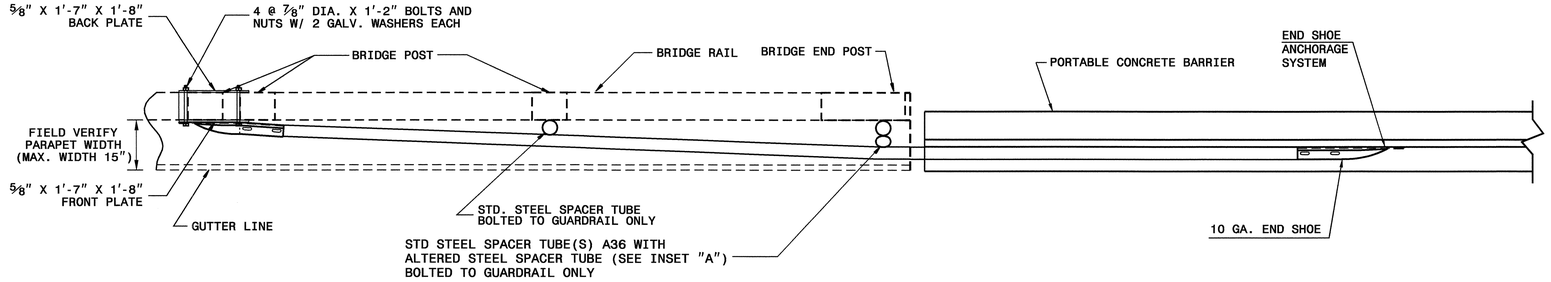
EMBANKMENT MONITORING

PS222297 Monday June 20 2005 b-3453 settlement gauge detail1 jrenn ds-dboce34

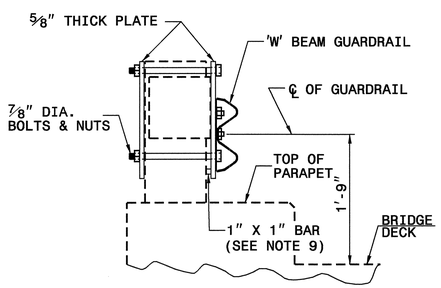
PROJECT REFERENCE NO.	SHEET NO.
B-3453	2-K



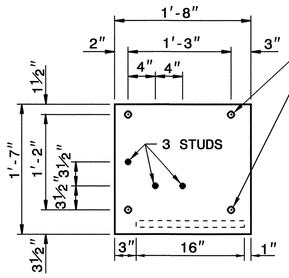
ELEVATION VIEW



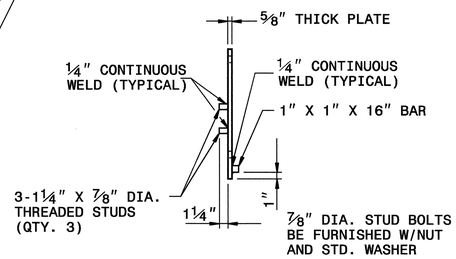
PLAN VIEW



SECTION VIEW

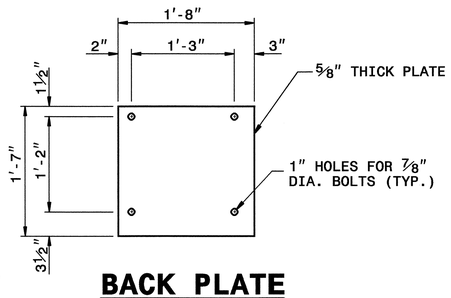


FRONT VIEW



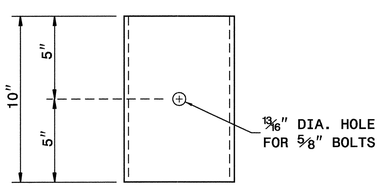
SIDE VIEW

STUDS MAY BE ADJUSTED TO MEET FIELD CONDITIONS

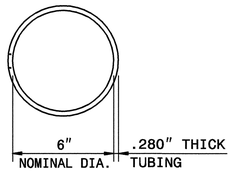


BACK PLATE

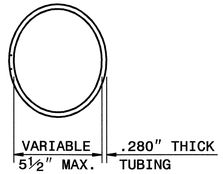
FRONT PLATE



FRONT VIEW



PLAN VIEW



PLAN VIEW INSET "A"

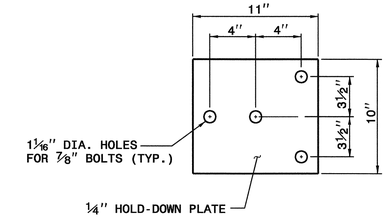
STEEL SPACER TUBE

NOTES FOR 4 BOLT HOLD DOWN PLATE

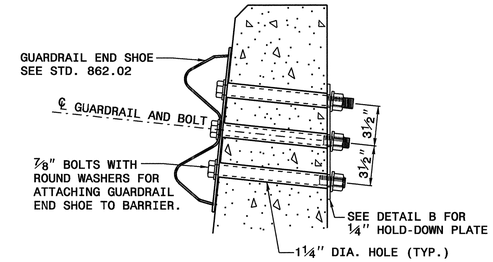
THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼" HOLD DOWN PLATE AND 4 - 7/8" DIA. BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL. THE 1¼" DIA. HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



4 BOLT HOLD DOWN PLATE

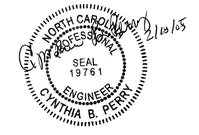


PART SECTION OF BARRIER OR RAIL

THRU END SHOE SECTION AND
4 BOLT HOLD DOWN PLATE

GENERAL NOTES:

1. USE NUTS, BOLTS, AND WASHERS CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-307 AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
2. TAP NUTS FOR THE 7/8" DIA. STUDS AND BOLTS AFTER GALVANIZING SEE A.S.T.M. A-563.
3. USE PLATES AND TUBES CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-36 AND GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
4. ADDITIONAL FIELD HOLES MAY BE DRILLED IN STEEL RAIL AS DIRECTED BY THE ENGINEER.
5. INSTALL FACE OF GUARDRAIL AS NEAR AS POSSIBLE TO PLUMB WITH THE PARAPET FACE AT BRIDGE END POST SPACER TUBE LOCATION BY USING STANDARD OR ALTERED SPACER TUBES OR A COMBINATION THEREOF OR AS DIRECTED BY THE ENGINEER. FOR VERY SMALL PARAPET WIDTHS, GUARDRAIL MAY BE INSTALLED AGAINST BRIDGE RAIL WITHOUT SPACER TUBES.
6. DO NOT DRILL BRIDGE RAIL IN ORDER TO INSTALL GUARDRAIL ANCHOR UNIT.
7. KEEP TOE OF PORTABLE CONCRETE BARRIER FLUSH WITH FACE OF PARAPET.
8. ATTACH 1" X 1" BAR AND THREADED STUDS TO PLATE WITH ¼" WELDS ALL AROUND.
9. 1" X 1" BAR MAY NOT BE NEEDED ON BRIDGE RAILS WHERE FACE OF RAIL DOES NOT PROJECT BEYOND FACE OF POST.



10/10/05

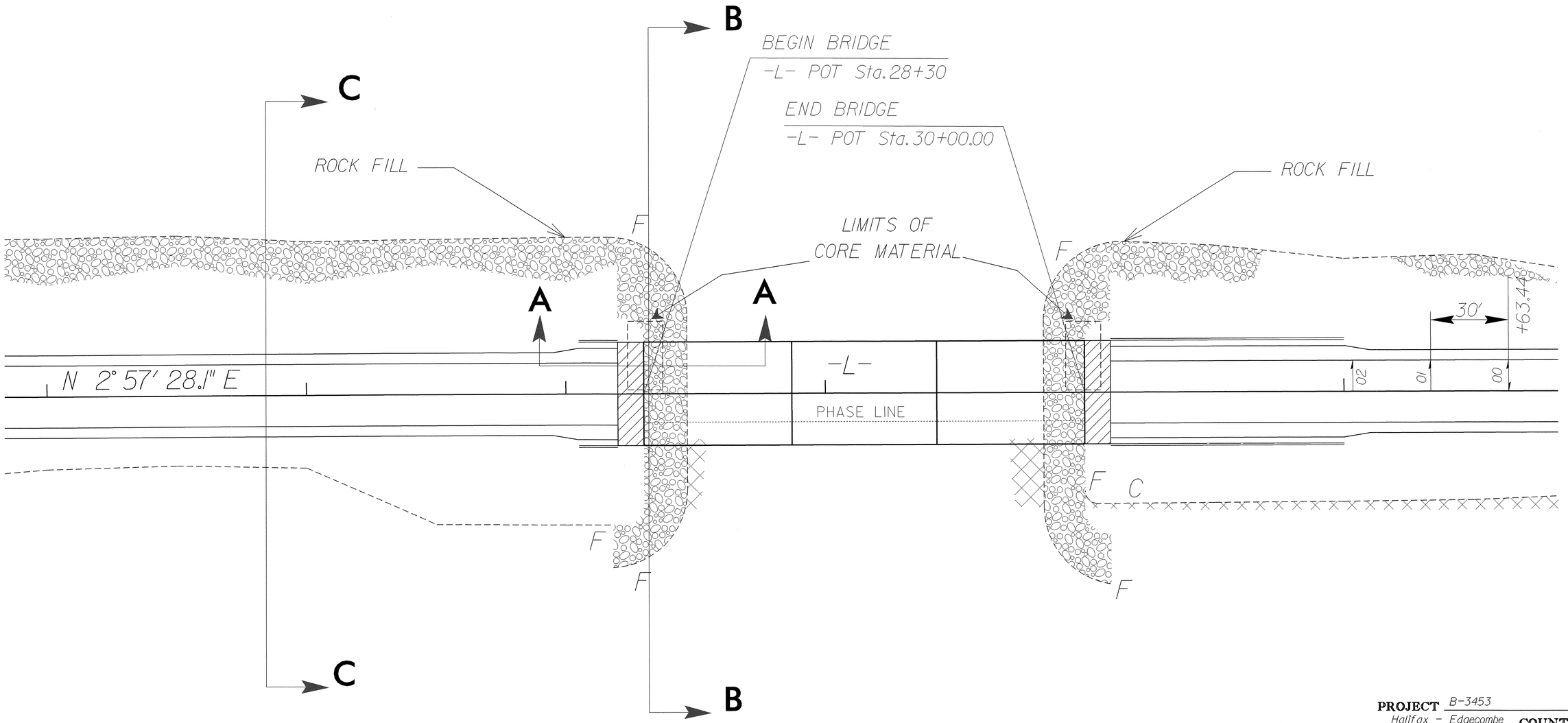
PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

TEMPORARY ANCHOR UNIT TYPE W-BEAM

ORIGINAL BY:	E.E. WARD	DATE:	4-03
MODIFIED BY:	E.E. WARD	DATE:	6-04
CHECKED BY:	[signature]	DATE:	1/10/05
FILE SPEC.:	\usr\details\stand\862stds\anc.dgn		

10-JAN-2005 09:33
W:\Special Details\ericward\usr\details\stand\862stds\anc.dgn
ericward AT FSU222193

PROJ. REFERENCE NO.		SHEET NO.
B-3453		2 – L
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION



PROJECT B-3453
Halifax - Edgecombe COUNTY
STATION
SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

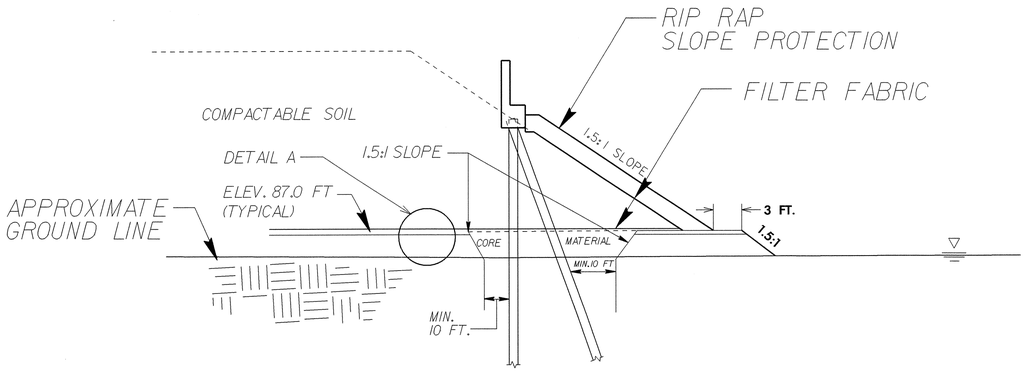
ROCK
EMBANKMENT
DETAIL

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE
David L. Teague 2/10/05

DRAWN BY WDF DATE 01/05
CHECKED BY DLT DATE 01/05

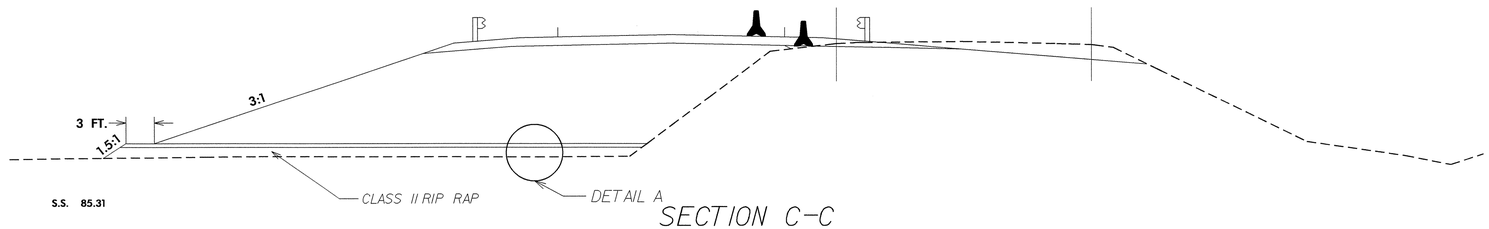
RD212417 Wednesday February 09 2005 b3453rockfill.m kvnoland rd-oce34

PROJ. REFERENCE NO.		SHEET NO.
B-3453		2 - M
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION



SECTION A-A

N.T.S.



SECTION C-C

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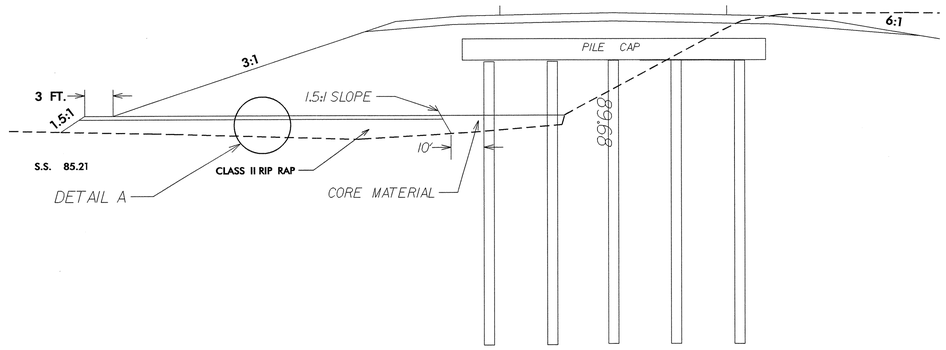

SECTION B-B

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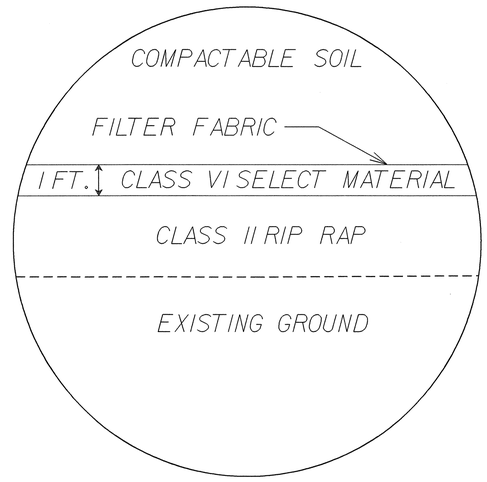


Detail A

NOTES

1. Class II Rip Rap shall be used for Rock Embankment.
2. For Filter Fabric, See Special Provisions.
3. Core Material shall be Class VI Select Material (#57 Stone).
4. Place Class II Rip Rap before placement of Core Material.

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE
2/14/05

DRAWN BY WDF DATE 01/05
CHECKED BY DLT DATE 01/05

PROJECT B-3453
Halifax - Edgecombe **COUNTY**
STATION
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ROCK
EMBANKMENT
DETAIL

RD212417 Thursday February 10 2005 b3453rockfill.m kvnoland rd-oce34

PROJECT REFERENCE NO.	SHEET
B-3453 33073.1.1	2-A

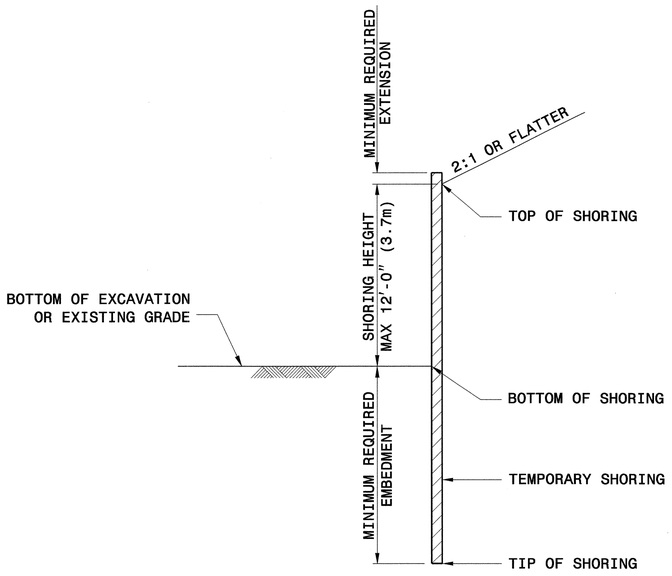
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

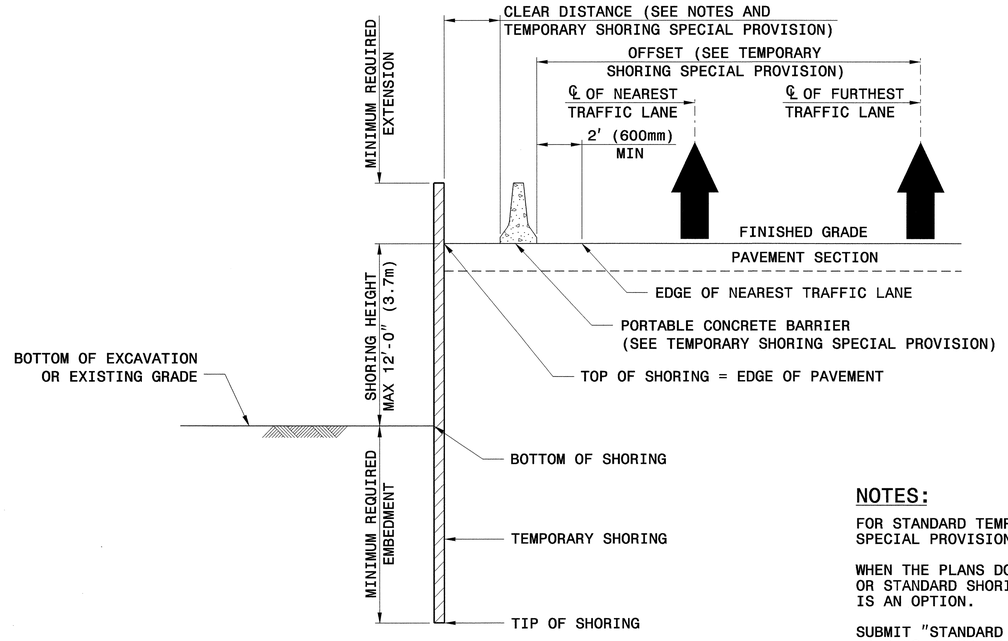
SIGNATURE 1/10/07 DATE

ENGINEER

SIGNATURE DATE



SLOPE CASE



SURCHARGE CASE

GROUNDWATER CONDITION	SHORING HEIGHT FT (m)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H PILES WITH TIMBER LAGGING			SHEET PILES		H PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT FT (m)	MINIMUM REQUIRED SECTION MODULUS IN^3/FT (cm^3/m)	MINIMUM REQUIRED EMBEDMENT FT (m)			MINIMUM REQUIRED EMBEDMENT FT (m)	MINIMUM REQUIRED SECTION MODULUS IN^3/FT (cm^3/m)	MINIMUM REQUIRED EMBEDMENT FT (m)		
				HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)			HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)
GROUNDWATER ELEVATION BELOW TIP OF SHORING	< 6 (1.8)	7.5 (2.3)	3.0 (161)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)	11.0 (3.4)	10.0 (538)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)
	7 (2.1)	8.5 (2.6)	4.5 (242)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)	12.0 (3.7)	12.0 (645)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)
	8 (2.4)	10.0 (3.0)	6.5 (349)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)	12.5 (3.8)	14.0 (753)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)
	9 (2.7)	11.0 (3.4)	9.5 (511)	--	12.0 (3.7)	12.0 (3.7)	13.5 (4.1)	16.5 (887)	--	12.5 (3.8)	12.5 (3.8)
	10 (3.0)	12.5 (3.8)	13.0 (699)	--	--	13.5 (4.1)	14.0 (4.3)	19.5 (1048)	--	13.5 (4.1)	13.5 (4.1)
	11 (3.4)	13.5 (4.1)	17.0 (914)	--	--	14.5 (4.4)	15.0 (4.6)	22.5 (1210)	--	--	14.5 (4.4)
	12 (3.7)	15.0 (4.6)	21.5 (1156)	--	--	16.0 (4.9)	16.0 (4.9)	25.5 (1371)	--	--	15.5 (4.7)
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND TIP OF SHORING	< 6 (1.8)	11.5 (3.5)	4.5 (242)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)	16.0 (4.9)	12.0 (645)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)
	7 (2.1)	13.0 (4.0)	7.0 (376)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)	17.0 (5.2)	14.5 (780)	14.5 (4.4)	14.5 (4.4)	14.5 (4.4)
	8 (2.4)	15.0 (4.6)	10.0 (538)	--	15.0 (4.6)	15.0 (4.6)	18.0 (5.5)	17.0 (914)	--	15.5 (4.7)	15.5 (4.7)
	9 (2.7)	17.0 (5.2)	14.0 (753)	--	17.0 (5.2)	17.0 (5.2)	19.0 (5.8)	20.0 (1075)	--	17.0 (5.2)	17.0 (5.2)
	10 (3.0)	18.5 (5.6)	19.5 (1048)	--	--	18.5 (5.6)	20.0 (6.1)	23.5 (1263)	--	--	18.5 (5.6)
	11 (3.4)	20.5 (6.3)	26.0 (1398)	--	--	--	21.0 (6.4)	28.0 (1505)	--	--	20.0 (6.1)
	12 (3.7)	22.5 (6.9)	33.0 (1774)	--	--	--	22.0 (6.7)	33.0 (1774)	--	--	21.5 (6.6)

NOTE: MINIMUM REQUIRED EXTENSION IS 6" (150mm) FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" (800 mm) FOR "SURCHARGE CASE WITH TRAFFFIC IMPACT".

NOTES:

FOR STANDARD TEMPORARY SHORING, SEE TEMPORARY SHORING SPECIAL PROVISION.

WHEN THE PLANS DO NOT PROHIBIT STANDARD TEMPORARY SHORING OR STANDARD SHORING, THE USE OF STANDARD TEMPORARY SHORING IS AN OPTION.

SUBMIT "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 14 DAYS BEFORE BEGINNING SHORING CONSTRUCTION. UP TO THREE LOCATIONS MAY BE INCLUDED ON EACH SELECTION FORM.

STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING CONDITIONS:
1) MAXIMUM SHORING HEIGHT IS 12'-0" (3.7m).
2) TRAFFIC SURCHARGE IS 240 PSF (11.5 KPA) MAXIMUM OR BACKSLOPE IS 2:1 (H:V) OR FLATTER.
3) BOTTOM OF EXCAVATION OR EXISTING GRADE IN FRONT OF SHORING IS 6:1 (H:V) SLOPE OR FLATTER.
4) H PILE SPACING IS 6'-0" (1.8m).
5) H PILE EMBEDMENT DEPTHS ARE FOR DRIVEN PILES.
6) TIMBER LAGGING IS A MINIMUM OF 3" (75mm) THICK.

THE STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED 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 SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT WITHIN THE EMBEDMENT DEPTH.

VERIFY GROUNDWATER ELEVATION BEFORE BEGINNING SHORING CONSTRUCTION.

IF THE CLEAR DISTANCE AVAILABLE IS LESS THAN THE MINIMUM REQUIRED IN ACCORDANCE WITH THE TEMPORARY SHORING SPECIAL PROVISION, USE THE "SURCHARGE CASE WITH TRAFFIC IMPACT" AND SET THE BARRIER AGAINST THE BACK OF THE SHORING.

AT THE CONTRACTOR'S OPTION, H PILE EMBEDMENT DEPTHS FOR PILES SET IN DRILLED HOLES MAY BE REDUCED BY 25%. FOR PILE EXCAVATION, SEE TEMPORARY SHORING SPECIAL PROVISION.

CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF THE SHORING. COLLECT AND DIRECT RUNOFF AWAY FROM SHORING.

CONTACT THE ENGINEER IF MINIMUM REQUIRED EMBEDMENT IS NOT ACHIEVED.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD TEMPORARY SHORING

SHEET 1 OF 1 DATE: 12/14/06

STANDARD TEMPORARY MSE WALL OPTIONS

PROJECT REFERENCE NO.	SHEET
B-3453 33073.1.1	2-0

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

SIGNATURE 1/10/07 DATE

ENGINEER

SIGNATURE DATE

TEMPORARY MSE WALL OPTION	VENDOR	CONTACT INFORMATION	REINFORCEMENT TYPE	SHEETS
TEMPORARY FABRIC WALL	N/A	N/A	POLYESTER OR POLYPROPYLENE FABRIC	4
HILFIKER TEMPORARY WALL	HILFIKER RETAINING WALLS	1902 HILFIKER LANE, EUREKA, CA 95503-5711 707-443-5093 WWW.HILFIKER.COM	WELDED WIRE MAT	5
SIERRASCAPE TEMPORARY WALL	TENSAR EARTH TECHNOLOGIES, INC	5883 GLENRIDGE DRIVE, SUITE 200 ATLANTA, GA 30328-5363 404-250-1290 WWW.TENSARCORP.COM	GEOGRID	6
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	7-9
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	10-12

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

WHEN THE PLANS DO NOT PROHIBIT A STANDARD TEMPORARY MSE WALL OR STANDARD SHORING, THE USE OF A TEMPORARY MSE WALL IS AN OPTION.

WHEN THE PLANS REQUIRE A TEMPORARY MSE WALL, USE ONE OF THE STANDARD TEMPORARY MSE WALL OPTIONS OR SUBMIT AN ALTERNATIVE TEMPORARY MSE WALL DESIGN FOR REVIEW AND ACCEPTANCE.

WHEN THE ALIGNMENT OF A STANDARD TEMPORARY MSE WALL 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).

THE 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 A STANDARD TEMPORARY MSE WALL WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.

DO NOT USE A STANDARD TEMPORARY MSE WALL WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE BOTTOM OF REINFORCED ZONE.

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 INCREMENT 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 THE FIRST REINFORCEMENT LAYER UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND CHECKING FOUNDATION MATERIAL FOR IN-SITU ASSUMED SOIL PARAMETERS.

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 THE LOCATIONS AND ELEVATIONS SHOWN ON THE STANDARD TEMPORARY MSE WALL DETAILS.

CONTACT THE ENGINEER WHEN EXISTING OR FUTURE STRUCTURES SUCH AS PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH THE REINFORCEMENT.

PLACE SHORING BACKFILL IN THE REINFORCED ZONE IN 8″ TO 10″ (200mm to 250mm) THICK LIFTS AND COMPACT BACKFILL 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 THE REINFORCEMENT UNTIL IT IS COVERED WITH AT LEAST 10″ (250mm) OF SHORING BACKFILL. DO NOT USE SHEEPSFOOT, GRID ROLLERS OR OTHER TYPES OF EQUIPMENT WITH FEET.

COVER REINFORCING AND RETENTION FABRIC WITH AT LEAST 3″ (75mm) OF SHORING BACKFILL.

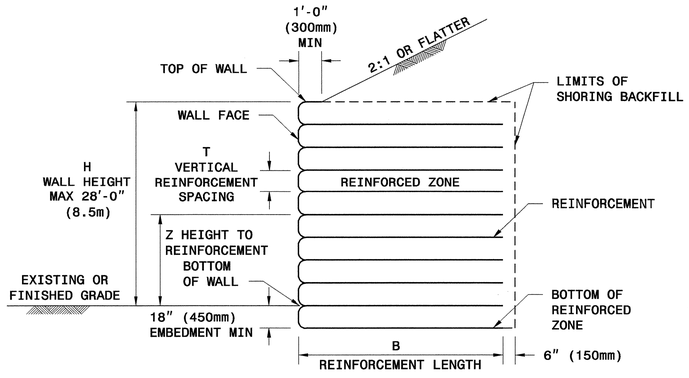
PLACE TOP REINFORCEMENT LAYER BETWEEN 4″ (100mm) AND 24″ (600mm) BELOW TOP OF WALL DEPENDING ON WALL OPTION.

BENCH STANDARD TEMPORARY MSE WALLS INTO THE SIDES OF THE EXCAVATIONS WHERE APPLICABLE AND AS DIRECTED BY THE ENGINEER.

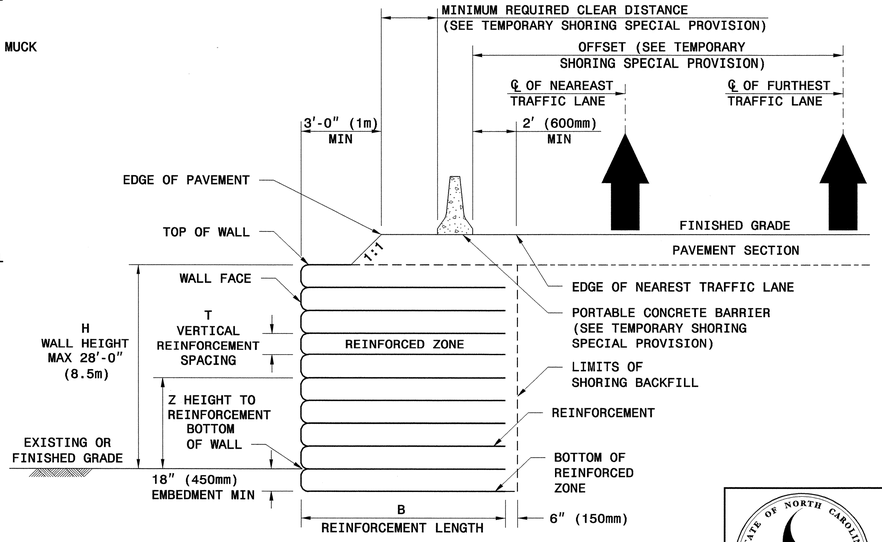
IF THE TOP OF WALL IS WITHIN 5′-0″ (1.5m) OF FINISHED GRADE, REMOVE TOP FORM OR FACING AND INCORPORATE THE TOP REINFORCEMENT LAYER INTO THE FILL WHEN PLACING FILL IN FRONT OF THE WALL.

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

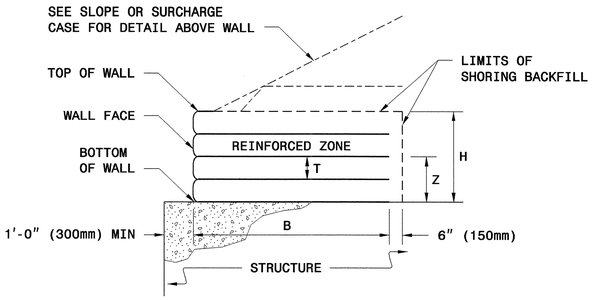
STANDARD TEMPORARY MSE WALLS REMAIN IN PLACE PERMANENTLY UNLESS DIRECTED OTHERWISE BY THE ENGINEER.



SLOPE CASE



SURCHARGE CASE



TEMPORARY MSE WALL ON STRUCTURE

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD TEMPORARY MECHANICALLY STABILIZED EARTH (MSE) WALLS

SHEET 1 OF 12 DATE: 12/14/06

GEJ221417 1/9/2007 06_12-19_standard temporary mse walls_eng & met jrmatula RD-Oce34

PROJECT REFERENCE NO.		SHEET
B-3453	33073.1.1	2-P

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

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 4 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-IN)
												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	14	15	15	16.5
						11	11	11	14	15	15	15	15
						11	11	11	15	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	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	16	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	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	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	16	6
			11	11	11	11	15	15	15	15	15	16	4.5
		11	11	11	11	14	14	15	15	15	16	16	3
	11	11	11	11	11	14	15	15	15	15	16	16	1.5
	11	11	11	11	11	14	15	15	15	16	16	16	0
	11	11	11	11	14	15	15	15	15	16	16	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	7.0	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	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	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

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-IN)
												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	3X2	16 -10
					3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	15 - 2
				3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	13 - 6
			3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	11 -10
		3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	10 - 2
	3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	8 - 6
	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	6 -10
3X1	3X2	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 TEMPORARY MSE WALL REINFORCEMENT TABLES - ENGLISH

SHEET 2 OF 12 DATE: 12/14/06

PROJECT REFERENCE NO.		SHEET
B-3453	33073.1.1	2-Q

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

SIGNATURE 1/10/07 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 4 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 (M)

(FOR ALL WALL OPTIONS)

WALL HEIGHT H (M)	<2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5
SLOPE CASE	2.4	3.4	4.0	4.3	4.9	5.5	6.1	6.7	7.3	7.6	8.2
SURCHARGE CASE	2.4	2.7	3.4	3.7	4.3	4.6	4.9	5.5	5.8	6.4	6.7

TERRATREL TEMPORARY WALL
(STRIPS PER LEVEL PER PANEL)

H (M)

< 1.2	1.2 TO 1.8	1.8 TO 2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5	Z (M)
												3	8.4
											3	3	8.2
											3	3	7.7
										3	3	3	7.2
									3	3	3	3	6.7
								4	3	3	3	3	6.1
							4	4	3	3	3	3	5.6
						4	4	4	3	3	3	3	5.1
						4	4	4	3	3	3	3	4.6
					5	4	4	4	3	3	3	3	4.1
				5	5	4	4	4	3	3	3	3	3.6
			5	5	5	4	4	4	3	3	3	3	3.1
		5	5	5	5	4	4	4	3	3	3	3	2.6
	5	5	5	5	5	4	4	4	3	3	3	3	2.1
	5	5	5	5	5	4	4	4	3	3	3	3	1.6
5	5	5	5	5	5	4	4	4	3	3	3	3	1.1
5	5	5	5	5	5	4	4	4	3	3	3	3	0.6
5	5	5	5	5	5	4	4	4	3	3	3	3	0.1
5	5	5	5	5	5	4	4	4	3	3	3	3	-0.2

SLOPE AND SURCHARGE CASES

SIERRASCAPE TEMPORARY WALL
(GEOGRID TYPE)

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

H (M)

< 1.2	1.2 TO 1.8	1.8 TO 2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5	Z (M)
												11	8.1
											11	11	7.8
											11	11	7.3
										11	11	11	6.9
									11	11	11	15	6.4
								11	11	11	14	15	5.9
							11	11	11	14	15	15	5.5
						11	11	11	14	15	15	15	5.0
					11	11	11	11	14	15	15	15	4.6
					11	11	11	15	15	15	15	15	4.1
					11	11	11	15	15	15	15	15	3.7
				11	11	11	11	15	15	15	15	16	3.2
			11	11	11	11	15	15	15	15	15	16	2.7
		11	11	11	11	14	15	15	15	15	16	16	2.3
		11	11	11	11	14	15	15	15	16	16	16	1.8
	11	11	11	11	15	15	15	15	15	16	16	17	1.4
11	11	11	11	14	15	15	15	15	16	16	16	17	0.9
11	11	11	11	14	15	15	15	16	16	16	17	17	0.5
11	11	11	14	15	15	15	16	16	16	17	17	17	0.0
11	11	11	14	15	15	15	15	16	16	17	17	17	-0.5

SLOPE CASE

H (M)

< 1.2	1.2 TO 1.8	1.8 TO 2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5	Z (M)
												11	8.1
												11	7.8
											11	11	7.3
											11	11	6.9
										11	11	11	6.4
									11	11	11	11	5.9
								11	11	11	11	15	5.5
							11	11	11	11	15	15	5.0
						11	11	11	11	11	15	15	4.6
						11	11	11	11	15	15	15	4.1
					11	11	11	11	15	15	15	15	3.7
					11	11	11	11	15	15	15	15	3.2
				11	11	11	11	15	15	15	15	15	2.7
			11	11	11	11	15	15	15	15	15	16	2.3
		11	11	11	11	11	15	15	15	15	15	16	1.8
	11	11	11	11	11	14	15	15	15	15	16	16	1.4
11	11	11	11	11	14	15	15	15	15	16	16	16	0.9
11	11	11	11	15	15	15	15	15	16	16	16	17	0.5
11	11	11	14	15	15	15	15	15	16	16	17	17	0.0
11	11	11	14	15	15	15	15	15	16	16	17	17	-0.5

SURCHARGE CASE

HILFIKER TEMPORARY WALL
(WELDED WIRE MAT TYPE)

29 = MW29 x MW23
45 = MW45 x MW23
61 = MW61 x MW26

H (M)

< 1.2	1.2 TO 1.8	1.8 TO 2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5	Z (M)
												29	7.9
											29	45	7.3
										29	45	45	6.7
									29	45	45	45	6.1
								29	45	45	45	45	5.5
							29	45	45	45	45	45	4.9
						29	45	45	45	45	45	61	4.3
					29	45	45	45	45	45	61	61	3.7
				29	45	45	45	45	45	61	61	61	3.0
			29	45	45	45	45	45	61	61	61	61	2.4
		29	45	45	45	45	45	61	61	61	61	61	1.8
	29	45	45	45	45	45	61	61	61	61	61	61	1.2
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	45	0.9
29	45	45	45	45	45	61	61	61	61	61	61	45	0.6
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	45	45	0.3
45	45	45	45	45	61	61	61	61	61	61	45	45	0.0
45	45	45	45	45	61	61	61	61	61	61	61	61	-0.5

SLOPE CASE

H (M)

< 1.2	1.2 TO 1.8	1.8 TO 2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5	Z (M)
												29	7.9
											29	45	7.3
										29	45	45	6.7
									29	45	45	45	6.1
								29	45	45	45	45	5.5
							29	45	45	45	45	45	4.9
						29	45	45	45	45	45	45	4.3
					29	45	45	45	45	45	45	61	3.7
				29	45	45	45	45	45	45	61	61	3.0
			29	45	45	45	45	45	45	61	61	61	2.4
		29	45	45	45	45	45	45	61	61	61	61	1.8
	29	45	45	45	45	45	45	61	61	61	61	61	1.2
29	45	45	45	45	45	45	61	61	61	61	61	61	0.6
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	45	0.3
45	45	45	45	45	45	61	61	61	61	61	61	45	0.0
45	45	45	45	45	45	61	61	61	61	61	61	61	-0.5

SURCHARGE CASE

RETAINED EARTH TEMPORARY WALL
(WELDED WIRE MESH TYPE)

3X1 = 3MW52 x MW52 x 305mm
3X2 = 3MW52 x MW52 x 610mm

H (M)

< 1.2	1.2 TO 1.8	1.8 TO 2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5	Z (M)
												3X1	8.4
												3X1	8.2
											3X1	3X2	7.7
										3X1	3X1	3X2	7.2
									3X1	3X1	3X2	3X2	6.7
								3X1	3X1	3X2	3X2	3X2	6.1
							3X1	3X1	3X2	3X2	3X2	3X2	5.6
							3X1	3X2	3X2	3X2	3X2	3X2	5.1
						3X1	3X2	3X2	3X2	3X2	3X2	3X2	4.6
					3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	4.1
				3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3.6
			3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3.1
		3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	2.6
		3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	2.1
	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	1.6
3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	1.1
3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	0.6
3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	0.1
3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	-0.5

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 0.3m LEVEL FOR SLOPE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 7.3m.
3) REINFORCEMENT IS NOT REQUIRED AT 0.9m LEVEL FOR SLOPE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 7.9m.
4) REINFORCEMENT IS NOT REQUIRED AT 0.3m LEVEL FOR SURCHARGE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 7.9m.

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STATE OF NORTH CAROLINA
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RALEIGH

STANDARD TEMPORARY MSE WALL REINFORCEMENT TABLES - METRIC

SHEET 3 OF 12 DATE: 12/14/06

PROJECT REFERENCE NO.		SHEET
B-3453	33073.1.1	2-R

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NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

SIGNATURE DATE 1/10/07

ENGINEER

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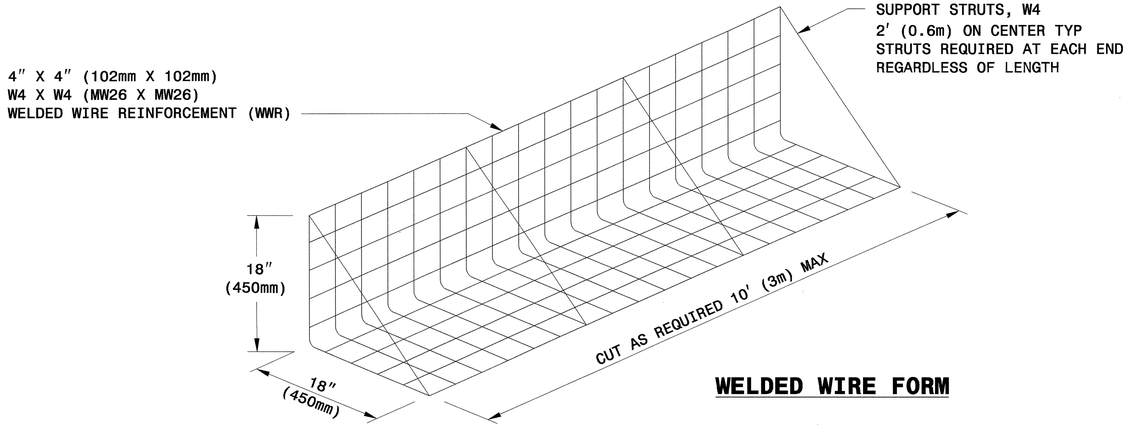
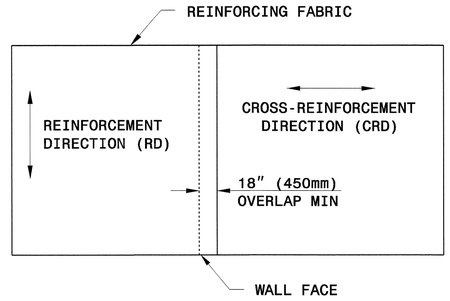
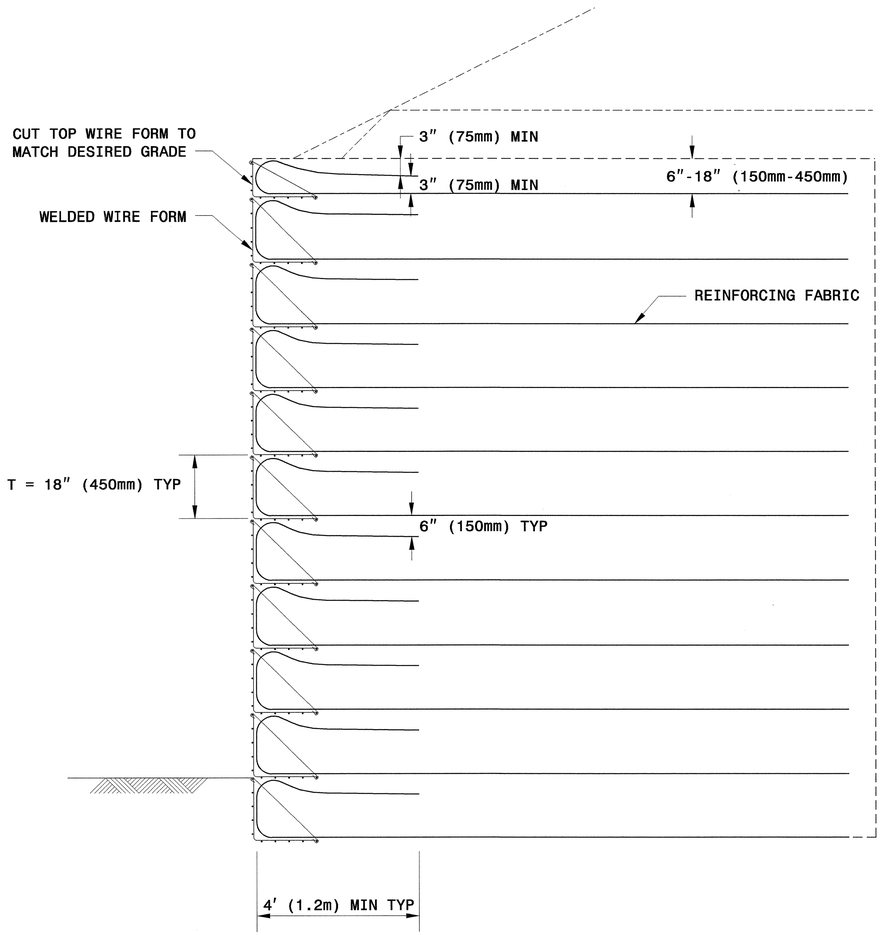


WELDED WIRE FORM



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

TEMPORARY
FABRIC WALL

DATE: 12/14/06

PROJECT REFERENCE NO.		SHEET
B-3453	33073.1.1	2-S

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

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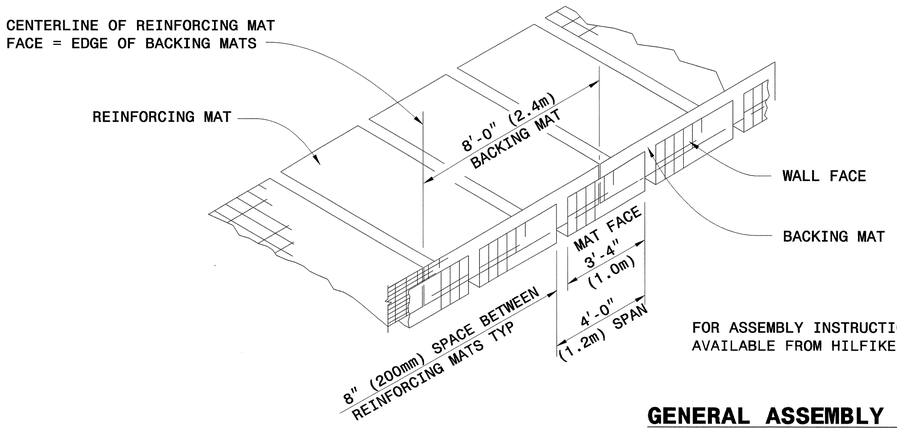
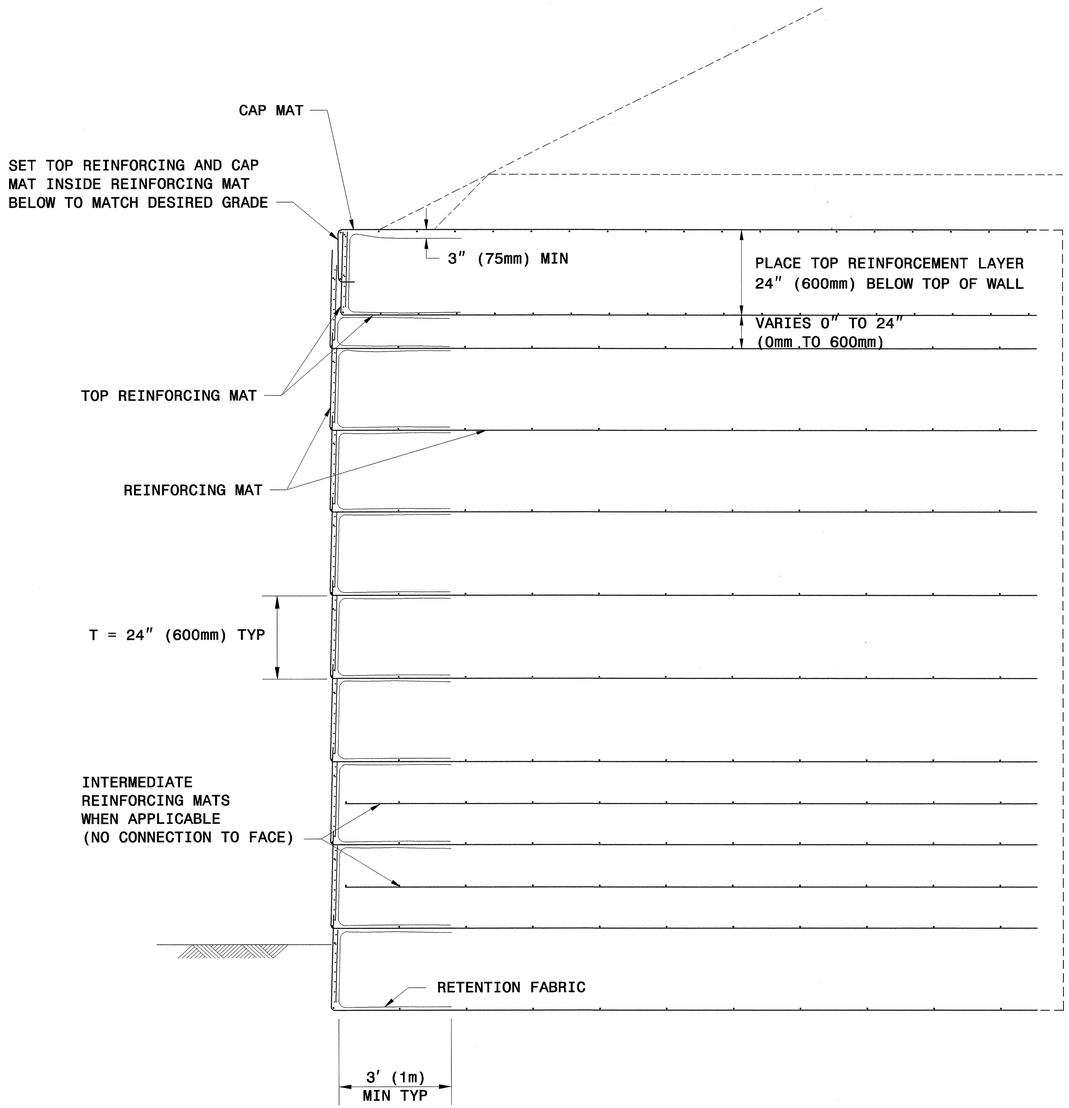


FOR ASSEMBLY INSTRUCTIONS, SEE WELDED WIRE WALL CONSTRUCTION GUIDE AVAILABLE FROM HILFIKER WEBSITE AT WWW.HILFIKER.COM/WWW

GENERAL ASSEMBLY DETAIL



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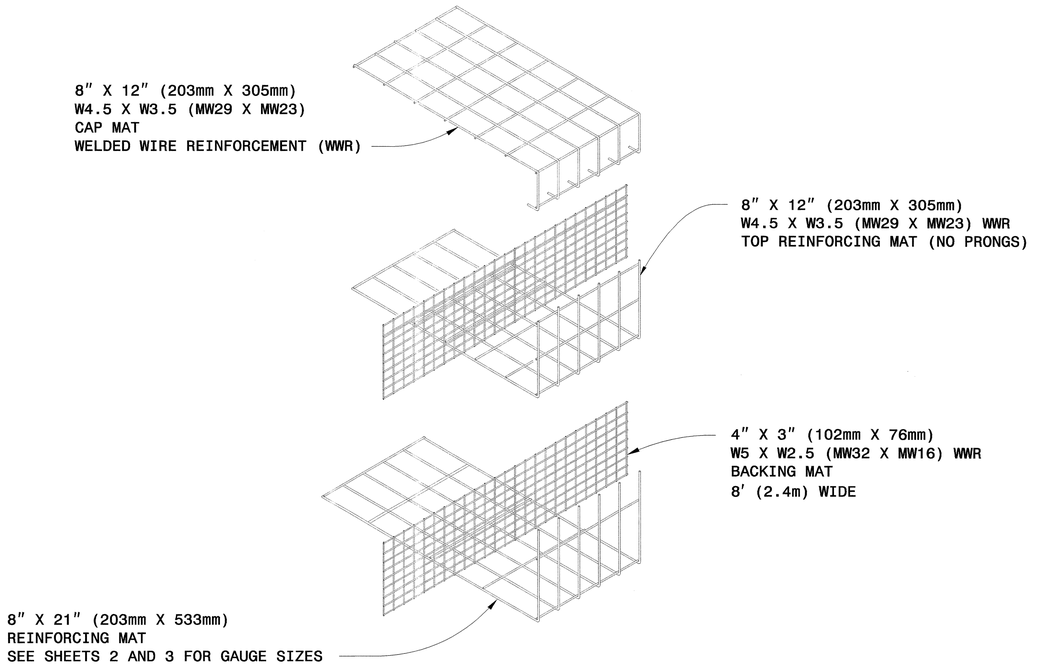

WALL COMPONENTS

HILFIKER RETAINING WALLS

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

HILFIKER TEMPORARY WALL

SHEET 5 OF 12 DATE: 12/14/06

PROJECT REFERENCE NO.		SHEET
B-3453	33073.1.1	2-T

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

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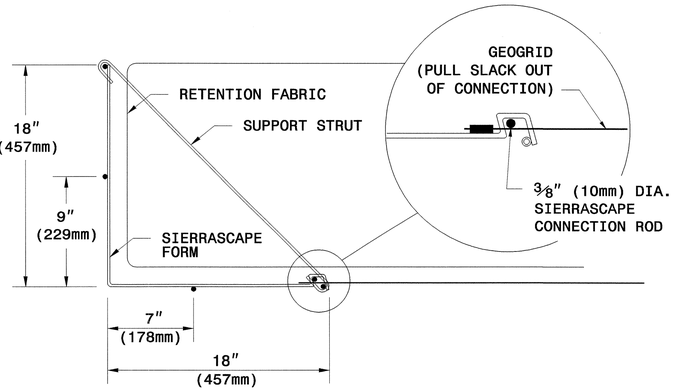
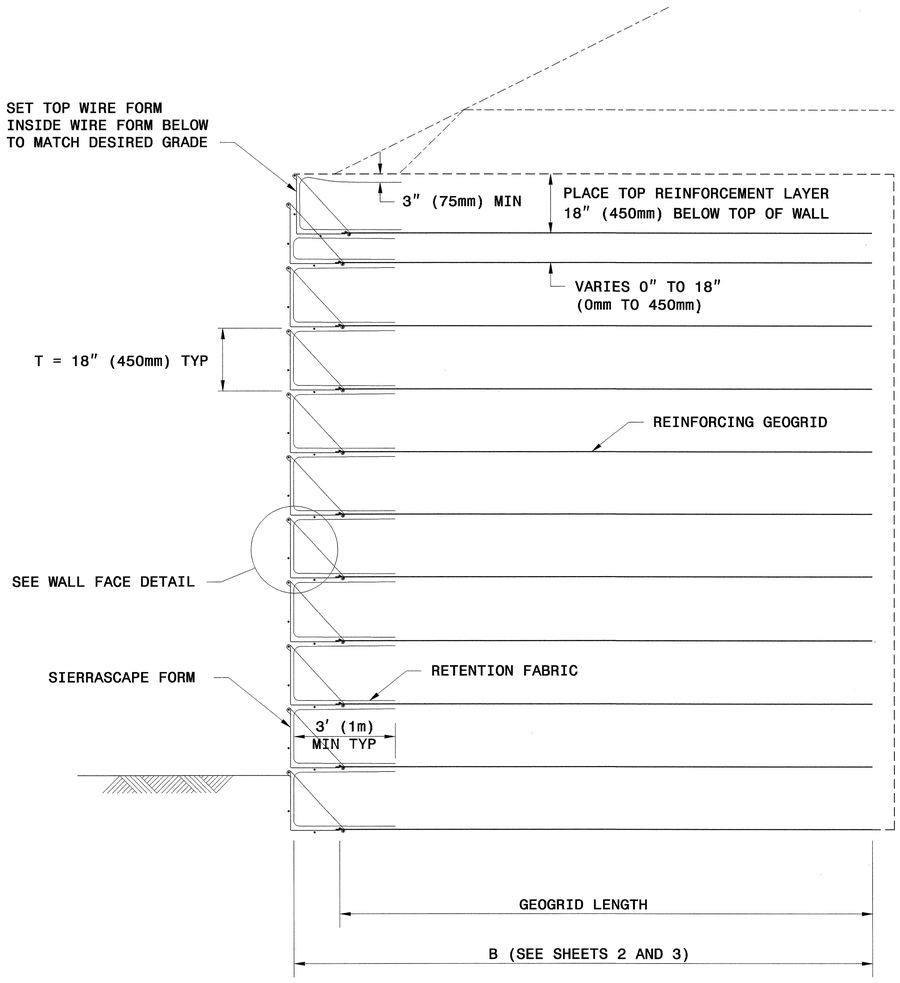
ENGINEER

SIGNATURE DATE



WALL FACE DETAIL



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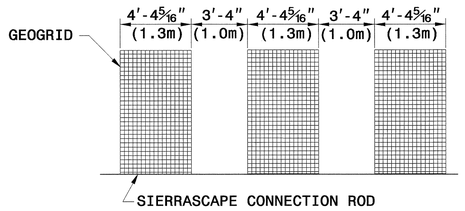
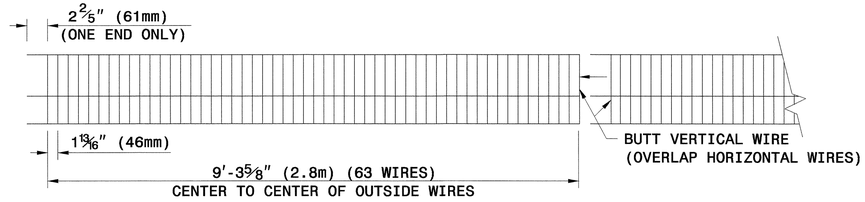
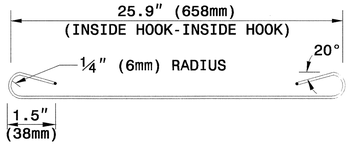


PLACE ALTERNATE LAYERS OF GEOGRID IN STAGGERED PATTERN SUCH THAT THE LAYER ABOVE IS CENTERED OVER SPACE BELOW

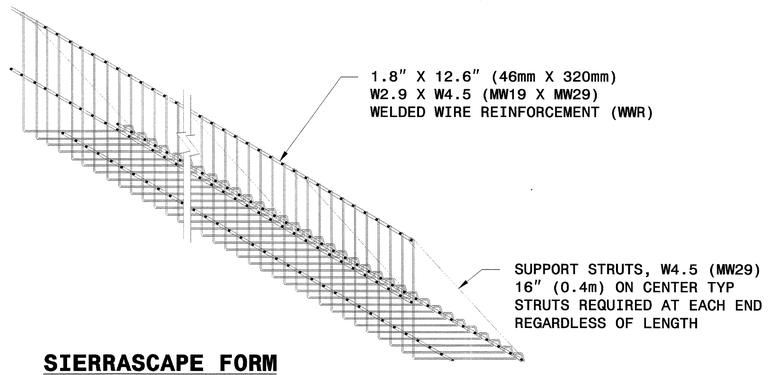
TYPICAL GEOGRID COVERAGE



ELEVATION VIEW



SUPPORT STRUT



SIERRASCAPE FORM

WALL COMPONENTS

TENSAR®
TENSAR EARTH TECHNOLOGIES, INC.

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SIERRASCAPE TEMPORARY WALL

SHEET 6 OF 12 DATE: 12/14/06

GEJ221417 1/9/2007 06_12-19_sierrascape temporary wall_eng & met jrmatula RD-Oce34

PROJECT REFERENCE NO.	SHEET
B-3453 33073.1.1	2-U

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

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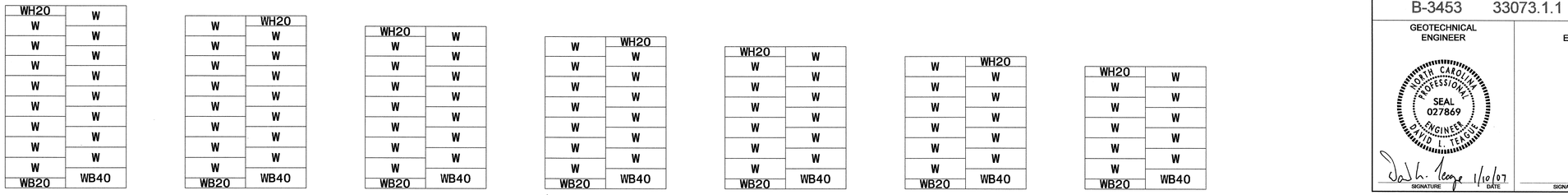
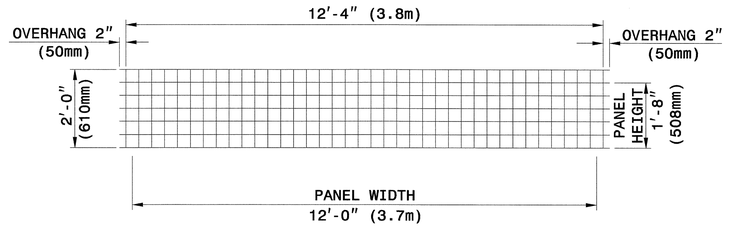
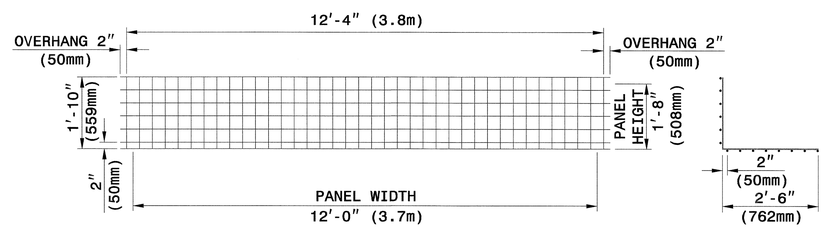
PANEL LAYOUTS

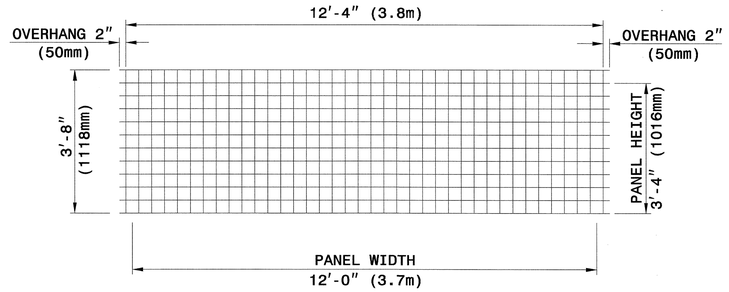




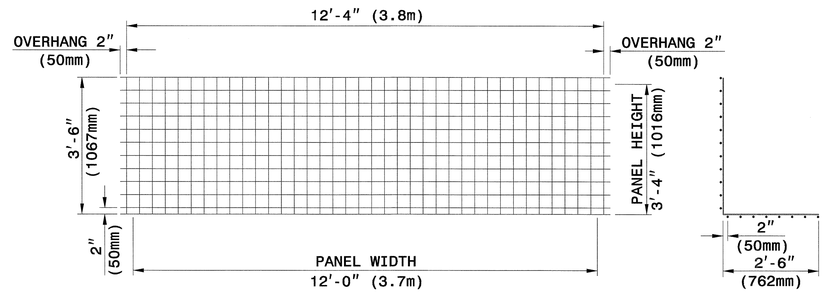
TYPE WH20



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

RETAINED EARTH TEMPORARY WALL

SHEET 7 OF 12 DATE: 12/14/06

GEJ221417 1/9/2007 06_12-19_retained earth temporary wall_eng & met jrmatula RD-Oce34

PROJECT REFERENCE NO.		SHEET
B-3453	33073.1.1	2-V

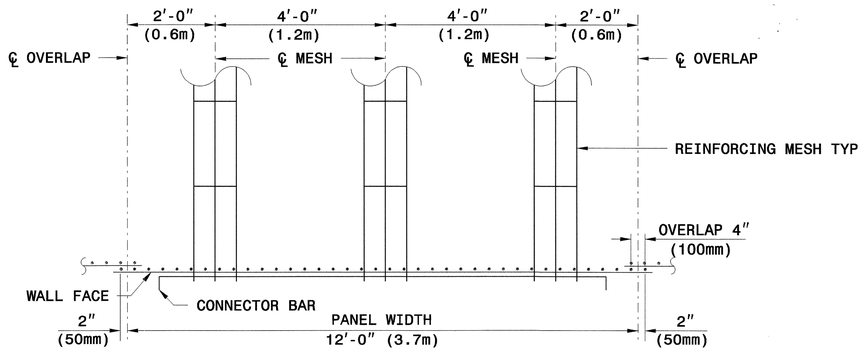
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

SIGNATURE DATE 1/10/07

ENGINEER

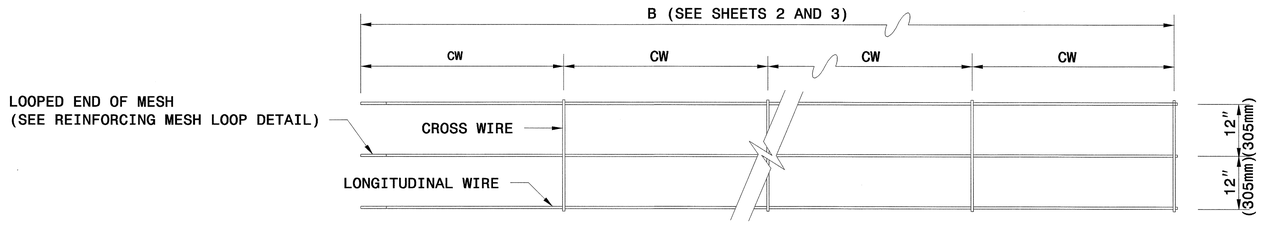
SIGNATURE DATE



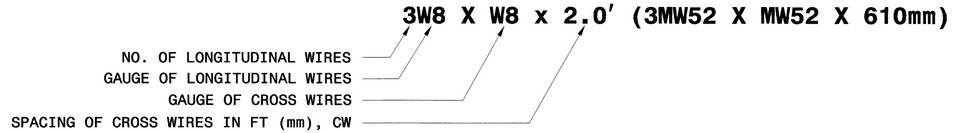
REINFORCING MESH PLACEMENT DETAIL
(PLAN VIEW)

½″ (13 mm) DIA. BAR

CONNECTOR BAR

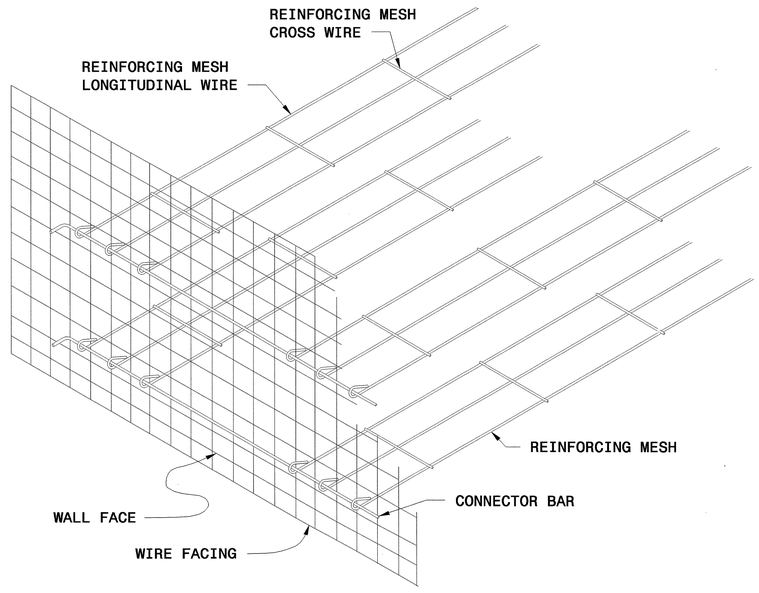


IF REINFORCEMENT LENGTH IS NOT AN INCREMENT OF 2′-0″ (610mm) MAKE CW EQUAL TO 12″ (305mm) AT THE END OF THE REINFORCING MESH OPPOSITE THE LOOPED END

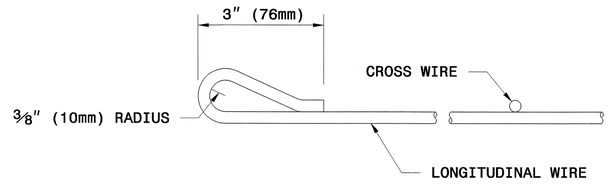


REINFORCING MESH DESIGNATION

REINFORCING MESH



GENERAL ASSEMBLY DETAIL



REINFORCING MESH LOOP DETAIL

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RETAINED EARTH TEMPORARY WALL

PROJECT REFERENCE NO.		SHEET
B-3453	33073.1.1	2-W

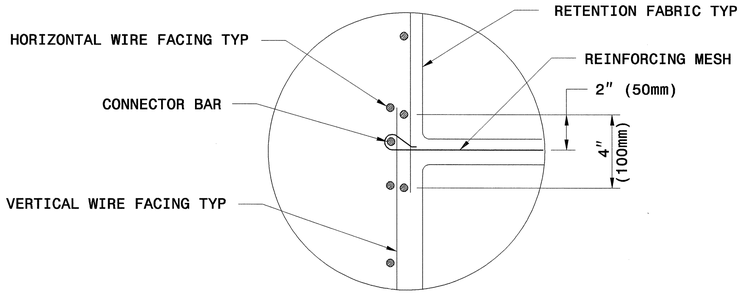
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

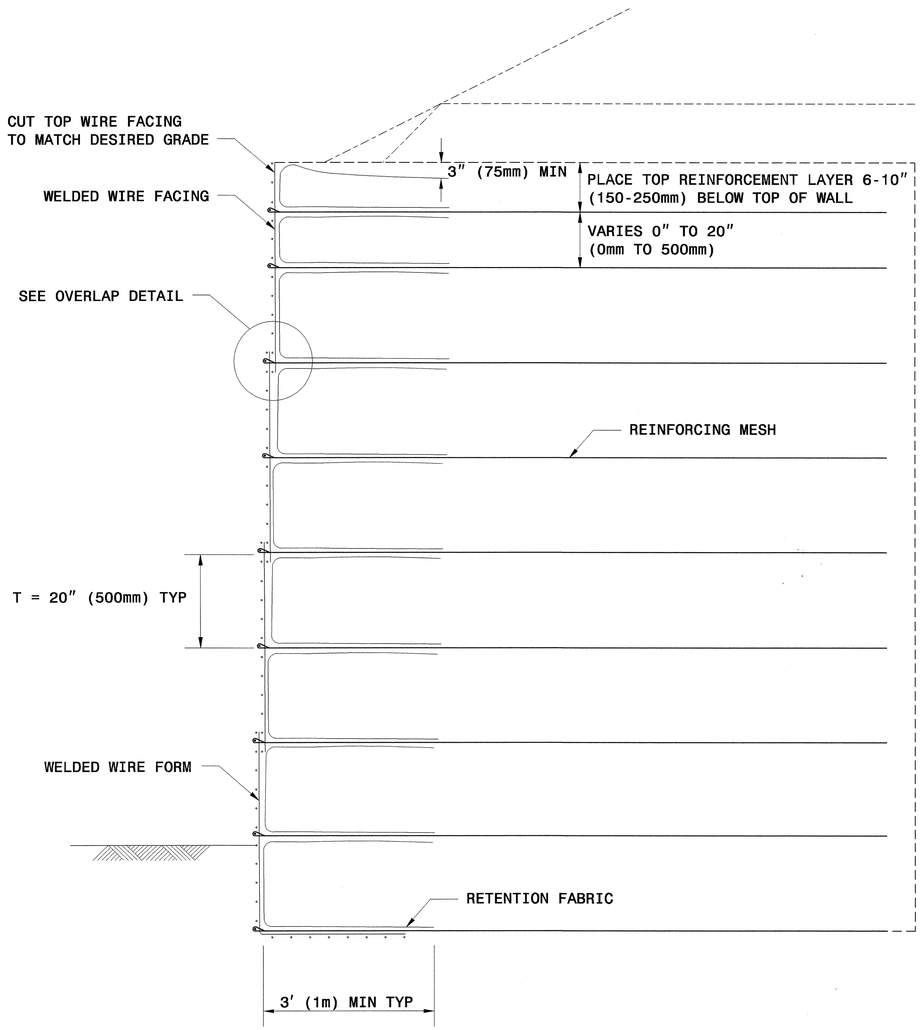
SIGNATURE 1/10/07 DATE

ENGINEER

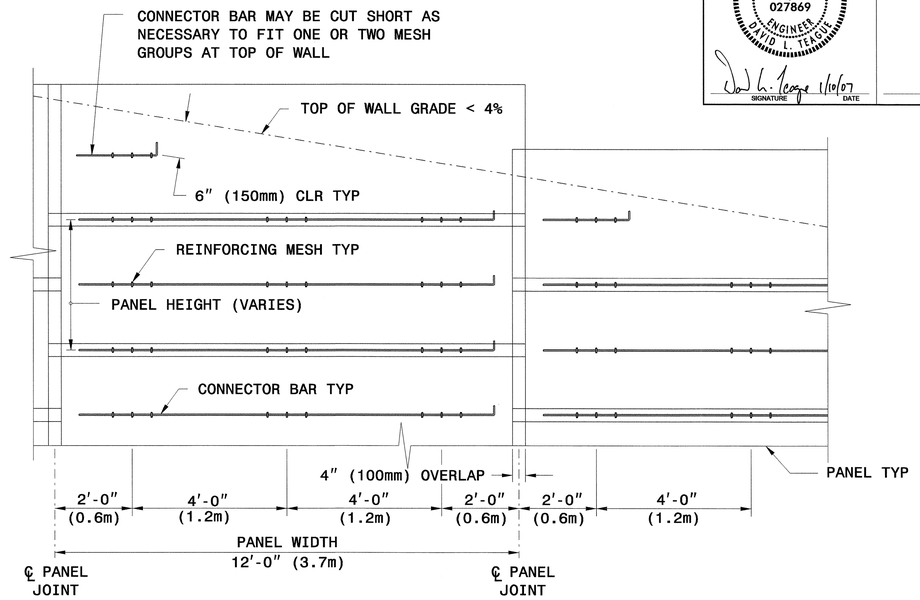
SIGNATURE DATE



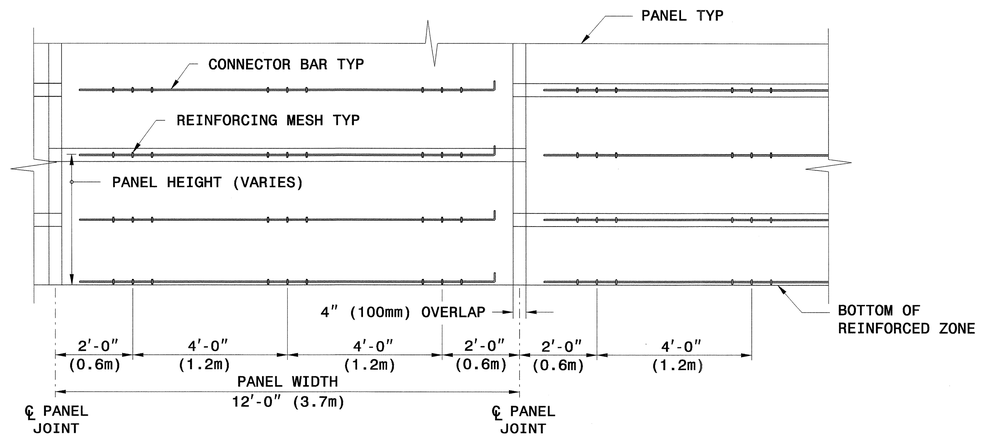
OVERLAP DETAIL



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

RETAINED EARTH
TEMPORARY WALL

SHEET 9 OF 12

DATE: 12/14/06

PROJECT REFERENCE NO.	SHEET
B-3453 33073.1.1	2-X

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

SIGNATURE 1/10/07 DATE

ENGINEER

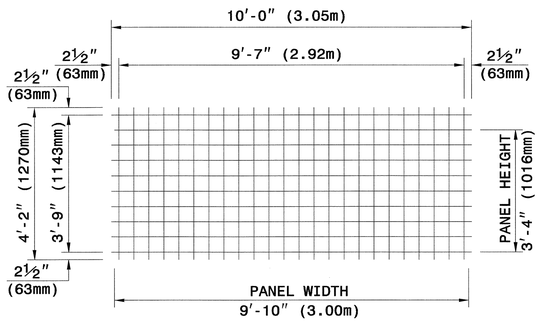
SIGNATURE DATE

PANEL LAYOUTS

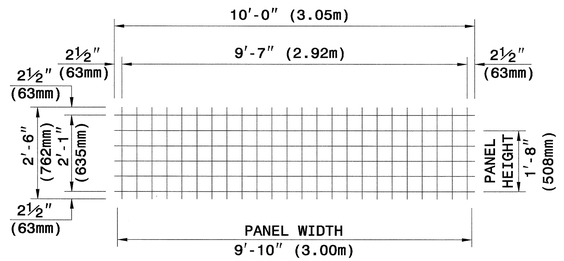
H - WALL HEIGHT

(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

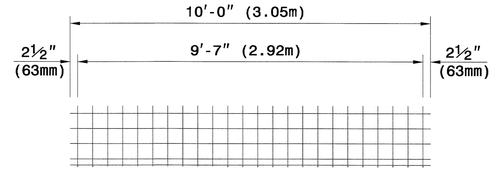
(FEET-INCHES)	< 17 - 8	< 16 - 0	< 14 - 4	< 12 - 8	< 11 - 0	< 9 - 4	< 7 - 8	< 6 - 0	< 4 - 4
(METER)	< 5.4	< 4.9	< 4.4	< 3.9	< 3.4	< 2.8	< 2.3	< 1.8	< 1.3



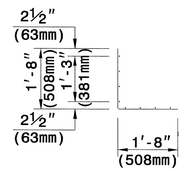
TYPE A



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

TERRATREL
TEMPORARY WALL

 DATE: 12/14/06

PROJECT REFERENCE NO.	SHEET
B-3453 33073.1.1	2-Y

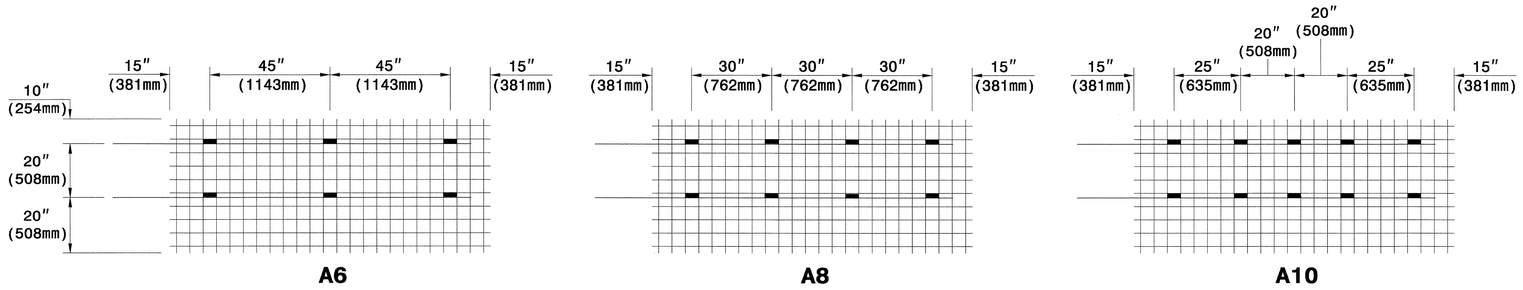
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

SIGNATURE DATE 1/10/07

ENGINEER

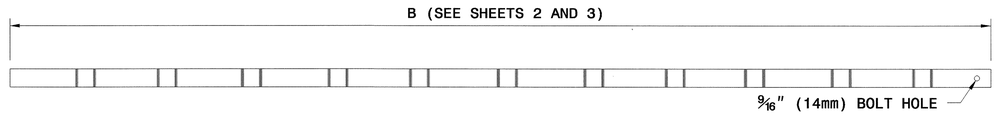
SIGNATURE DATE



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)

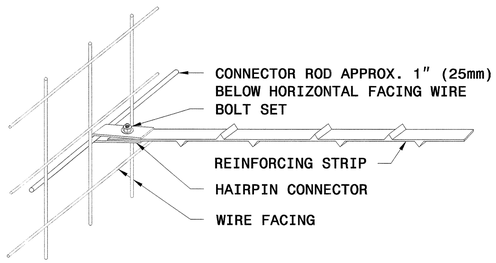
½" (13 mm) DIA. ROD

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

TERRATREL TEMPORARY WALL

SHEET 11 OF 12 DATE: 12/14/06

PROJECT REFERENCE NO.	SHEET
B-3453 33073.1.1	2-2

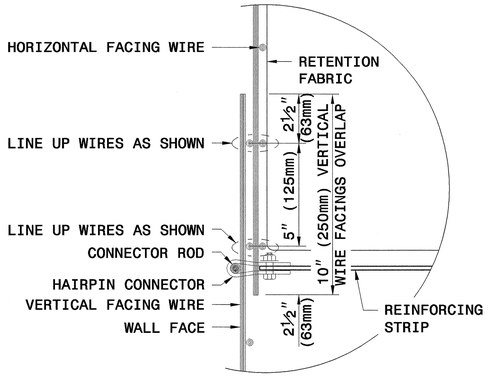
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGLE

SIGNATURE 1/10/07 DATE

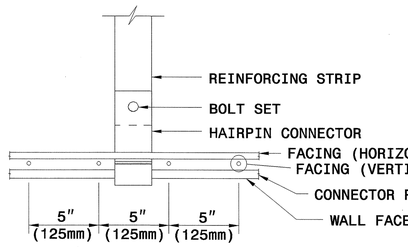
ENGINEER

SIGNATURE DATE

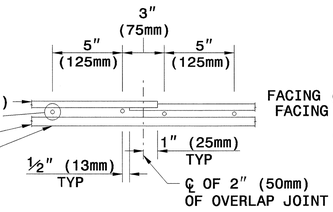


OVERLAP FACINGS VERTICALLY ONE FULL 5″ (125mm)
WIRE SQUARE DISREGARDING HALF SQUARES AT EDGES

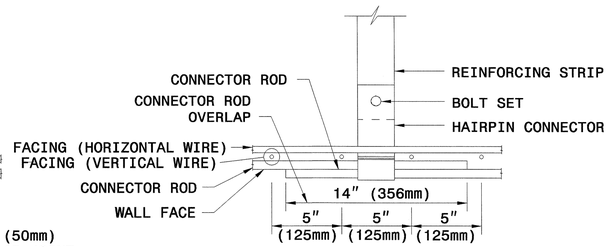
VERTICAL OVERLAP DETAIL



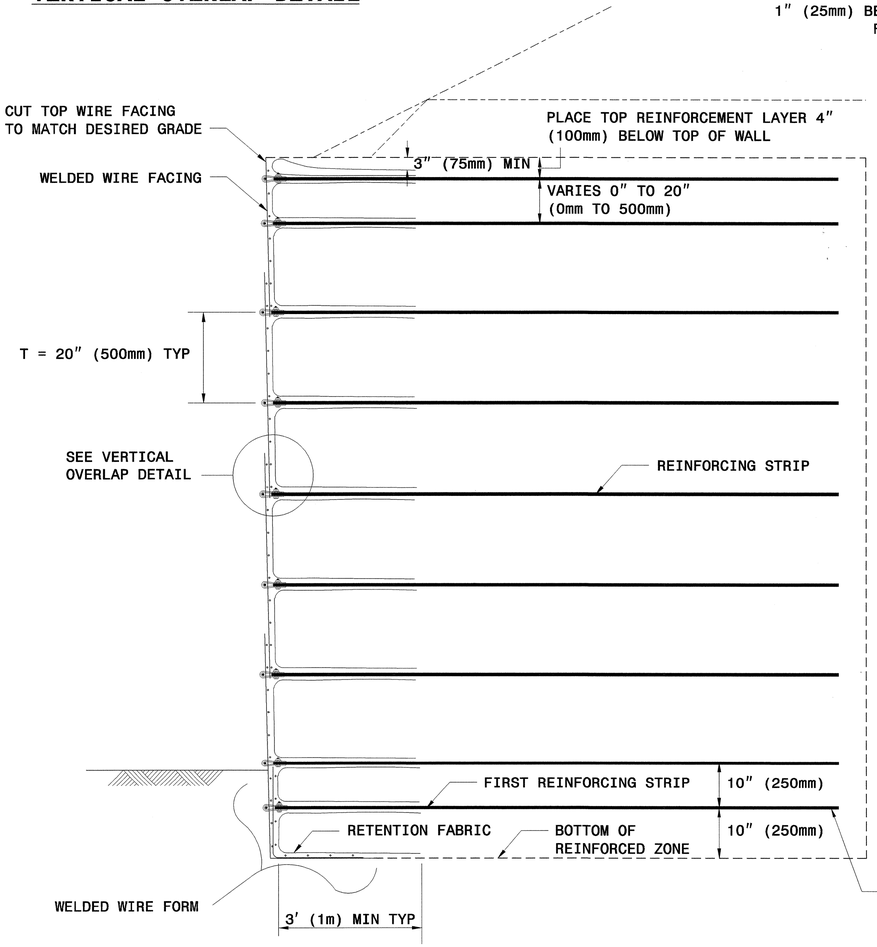
PLAN DETAIL 'A'
STRIP CONNECTION



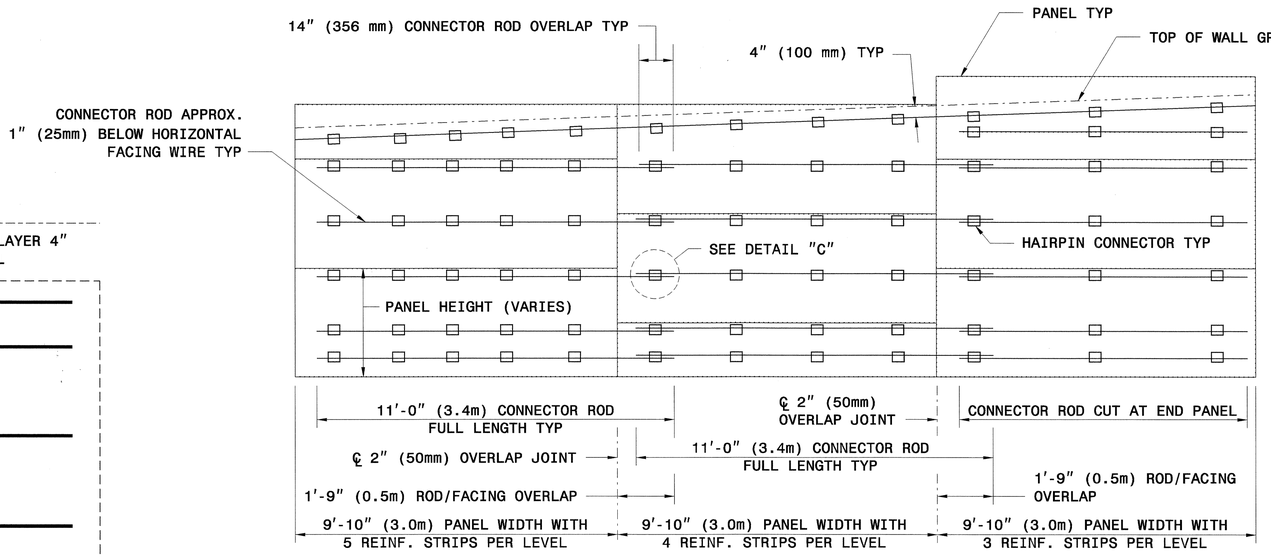
PLAN DETAIL 'B'
HORIZONTAL OVERLAP DETAIL



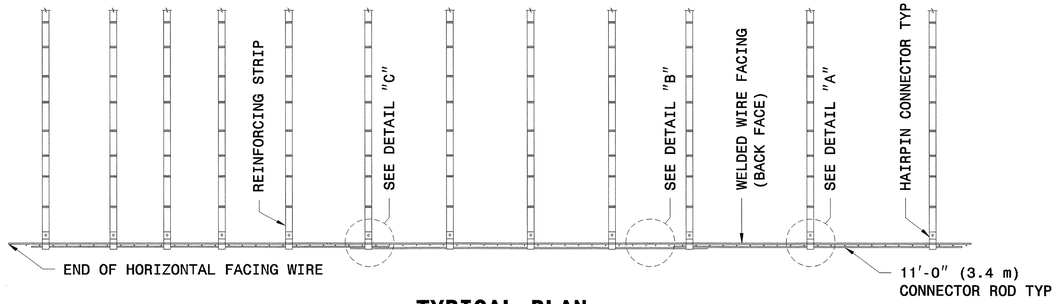
PLAN DETAIL 'C'
STRIP CONNECTION WITH HORIZONTAL OVERLAP DETAIL



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

TERRATREL
TEMPORARY WALL

SHEET 12 OF 12 DATE: 12/14/06

GEJ221417 1/9/2007 06_12-19_terratrel temporary wall_eng & met jrmatula RD-Oce34

COMPUTED BY: DMW	DATE: 12-19-02		
CHECKED BY: RWP	DATE: 12-20-02		

6/21/00

PROJECT REFERENCE NO.	SHEET NO.
B-3453	SHEET 3 (1 of 2)

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF QUANTITIES

SEE

SHEET 3 (2 of 2)

FOR

SUMMARY

OF

QUANTITIES

SUMMARY OF DRAINAGE DITCH EXCAVATION

LINE	LOCATION	STATION TO STATION	CY
-L-	LT.	STA. 14+50 TO 15+00	3.49
-L-	LT.	STA. 31+35 TO 32+60	173.21
		TOTAL	176.70
		SAY	180

SUMMARY OF PAVEMENT REMOVAL

IN SQUARE YARDS

LOCATION	ASPHALT REMOVAL	ASPHALT BREAK-UP	CONCRETE REMOVAL	CONCRETE BREAK-UP
-L- STA. 12+00 TO 15+00 RT.	293			
-L- STA. 15+00 TO 19+70 RT.	1240			
-L- STA. 21+04 TO 28+53 RT.	2278			
-L- STA. 29+71 TO 34+00 RT.	1347			
-L- STA. 34+00 TO 37+85 RT.	640			
-L- STA. 37+25 TO 41+35 LT.	1712			
GRAND TOTAL	7510			
SAY	7550			

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
PHASE I (LEFT SIDE)					
-L- 10+00.00 TO 19+50.00	117		11,135	11,018	
-L- 21+13.00 TO 28+50.00			17,642	17,642	
-L- 29+84.00 TO 42+00.00	252	3,500	12,745	12,493	3,500
-DRIVE- 10+50.00 TO 11+75.00	40		34		6
PHASE I SUBTOTAL	409	3,500	41,556	41,153	3,506
ESTIMATED SHOULDER MATERIAL			819	819	
ESTIMATED UNDERCUT (CONTINGENCY)		500	650	650	500
WASTE TO REPLACE BORROW				-6	-6
PHASE I TOTAL	409	4,000	43,025	42,616	4,000
PHASE II (RIGHT SIDE)					
-L- 10+00.00 TO 19+50.00	408		865	457	
-L- 21+13.00 TO 28+50.00	297		356	59	
-L- 29+84.00 TO 42+00.00	955		26		929
PHASE II SUBTOTAL	1,660		1,247	516	929
ESTIMATED SHOULDER MATERIAL			810	810	
WASTE TO REPLACE BORROW				-929	-929
PHASE II TOTAL	1,660		2,057	397	0
PROJECT SUBTOTAL (PHASE I + PHASE II)	2,069	4,000	45,082	43,013	4,000
SELECT MATERIAL TO REPLACE BORROW				-13,400	
PROJECT TOTAL (PHASE I + PHASE II)	2,069	4,000	45,082	29,613	4,000
ESTIMATE 5% TO REPLACE TOPSOIL ON BORROW PIT				1,481	
GRAND TOTAL (CUBIC YARDS)	2,069	4,000	45,082	31,094	4,000
SAY (CUBIC YARDS)	2,100			31,100	

-L- PAVEMENT STRUCTURE VOLUME = 505 CY

SELECT MATERIAL = 3,000 CY (CLASS II or III; USE WITH FABRIC STABILIZATION) *

SELECT MATERIAL = 10,400 CY (CLASS III; USE AS BACKFILL FOR UNDERCUT or BELOW WATER SURFACE) *

ROCK EMBANKMENT (CLASS II RIP RAP) = 2,300 TONS
CORE MATERIAL (SELECT MATERIAL, CLASS VI) = 1,200 TONS
(SEE DETAIL SHEETS 2-L THRU 2-M)

* (PER 'GEOTECHNICAL REPORT - DESIGN AND CONSTRUCTION RECOMMENDATIONS' LETTER DATED APRIL 8, 2003)

Quantities are approximately only. The Resident Engineer will recross-section the work accurately when the project is staked out. These cross-sections notes will be used in computing the final quantities for which the contractor will be paid.

02/15/2005
R:\Roadway\Proj\b3453_rdy_sum_3_3a.dgn
03:20:13 PM

STATE OF NORTH CAROLINA
SUMMARY OF QUANTITIES

PROJECT REFERENCE No.	SHEET No.
	SHEET 3 (2 of 2)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT [redacted] C201794

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0001000000-E	200	Lump Sum		CLEARING & GRUBBING .. ACRE(S)
0008000000-E	200	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0022000000-E	225	2,100	CY	UNCLASSIFIED EXCAVATION
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (20+32.50)
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (29+15.00)
0036000000-E	225	4,000	CY	UNDERCUT EXCAVATION
0106000000-E	230	31,100	CY	BORROW EXCAVATION
0127000000-N	SP	4	EA	EMBANKMENT SETTLEMENT GAUGES
0134000000-E	240	180	CY	DRAINAGE DITCH EXCAVATION
0156000000-E	250	7,550	SY	REMOVAL OF EXISTING ASPHALT PAVEMENT
0195000000-E	265	13,400	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	3,000	SY	FABRIC FOR SOIL STABILIZATION
0206000000-E	SP	3,000	SF	TEMPORARY SHORING - [redacted]
0314000000-E	SP	1,200	TON	SELECT MATERIAL, CLASS ***** (VI)
0318000000-E	300	62	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0344000000-E	310	140	LF	18" SIDE DRAIN PIPE
0366000000-E	310	72	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-E	310	64	LF	18" RC PIPE CULVERTS, CLASS III
0378000000-E	310	112	LF	24" RC PIPE CULVERTS, CLASS III
0708000000-E	310	190	LF	15" BIT COAT CS PIPE CULVERTS, TYPE B 0.064" THICK
0806000000-E	310	4	EA	15" BIT COAT CS PIPE ELBOWS, TYPE B 0.064" THICK
0980000000-E	SP	132	LF	**" WELDED STEEL PIPE, *****" THICK, GRADE B, INSTALLED BY BORING & JACKING (18", 0.500")
0995000000-E	340	156	LF	PIPE REMOVAL
0996000000-N	350	3	EA	PIPE CLEAN-OUT
1011000000-N	500	Lump Sum		FINE GRADING
1121000000-E	520	400	TON	AGGREGATE BASE COURSE
1220000000-E	545	200	TON	INCIDENTAL STONE BASE
1330000000-E	607	350	SY	INCIDENTAL MILLING
1491000000-E	610	1,790	TON	ASPHALT CONC BASE COURSE, TYPE B25.0C
1503000000-E	610	1,990	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C
1523000000-E	610	1,590	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5C
1560000000-E	620	171	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
1565000000-E	620	96	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 70-22
2000000000-N	806	23	EA	RIGHT OF WAY MARKERS
2022000000-E	815	45	CY	SUBDRAIN EXCAVATION
2033000000-E	815	34	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	200	LF	6" PERFORATED SUBDRAIN PIPE
2055000000-E	815	6	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)
2253000000-E	840	1.105	CY	PIPE COLLARS
2264000000-E	840	0.13	CY	PIPE PLUGS
2275000000-E	SP	55	CY	FLOWABLE FILL
2286000000-N	840	10	EA	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	1	LF	MASONRY DRAINAGE STRUCTURES
2354200000-N	840	1	EA	FRAME WITH GRATE, STD 840.24
2367000000-N	840	9	EA	FRAME WITH TWO GRATES, STD 840.29
2451000000-N	840	1	EA	CONCRETE APRON FOR DROP INLETS
2556000000-E	846	225	LF	SHOULDER BERM GUTTER
2905000000-N	859	1	EA	CONVERT EXISTING DROP INLET TO JUNCTION BOX
3030000000-E	862	2,150	LF	STEEL BM GUARDRAIL
3105000000-N	862	2	EA	STEEL BM GUARDRAIL TERMINAL SECTIONS
3150000000-N	862	10	EA	ADDITIONAL GUARDRAIL POSTS
3215000000-N	862	8	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	6	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3360000000-E	863	570	LF	REMOVE EXISTING GUARDRAIL
3635000000-E	876	2,300	TON	PLAIN RIP RAP, CLASS II
3649000000-E	876	13	TON	PLAIN RIP RAP, CLASS B
3656000000-E	876	4,071	SY	FILTER FABRIC FOR DRAINAGE
3659000000-N	SP	2	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON
4072000000-E	903	151	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4082000000-E	903	36	LF	SUPPORTS, WOOD
4096000000-N	904	5	EA	SIGN ERECTION, TYPE D
4102000000-N	904	2	EA	SIGN ERECTION, TYPE E
4110000000-N	904	1	EA	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)
4129000000-N	906	2	EA	RELOCATE SIGN, TYPE ***** (E)
4141000000-N	907	1	EA	DISPOSAL OF SUPPORT, WOOD
4155000000-N	907	18	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
4158000000-N	907	4	EA	DISPOSAL OF SIGN SYSTEM, WOOD
4192000000-N	907	1	EA	DISPOSAL OF SUPPORT, U-CHANNEL
4412000000-E	SP	104	SF	WORK ZONE SIGNS (STATIONARY)
4412100000-E	SP	192	SF	WORK ZONE SIGNS (PORTABLE)
4412200000-E	SP	20	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4425000000-N	1125	2	EA	WARNING FLAG SETS
4430000000-N	1130	129	EA	DRUMS
4435000000-N	1135	100	EA	CONES
4446100000-E	SP	48	LF	BARRICADES (TYPE III)
4450000000-N	1150	160	HR	FLAGGER
4465000000-N	1160	4	EA	TEMPORARY CRASH CUSHIONS
4470000000-N	1160	3	EA	RESET TEMPORARY CRASH CUSHIONS
4485000000-E	1170	246	LF	PORTABLE CONCRETE BARRIER
4490000000-E	1170	463	LF	PORTABLE CONCRETE BARRIER (ANCHORED)
4495000000-E	1170	1,606	LF	PORTABLE CONCRETE BARRIER (DRAINAGE)
4615000000-E	1205	1,852	LF	REMOVABLE TAPE PAVEMENT MARKING LINES (4")
4650000000-N	1251	194	EA	TEMPORARY RAISED PAVEMENT MARKERS
4685000000-E	1205	5,474	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	7,039	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4695000000-E	1205	76	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)
4725000000-E	1205	1	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
4810000000-E	1205	22,095	LF	PAINT PAVEMENT MARKING LINES (4")
4847000000-E	SP	1,852	LF	POLYUREA PAVEMENT MARKING LINES (4")
4900000000-N	1252	97	EA	PERMANENT RAISED PAVEMENT MARKERS
6000000000-E	1605	5,725	LF	TEMPORARY SILT FENCE
6006000000-E	1610	150	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	375	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	465	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	8	ACR	TEMPORARY MULCHING
6018000000-E	1620	300	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	1.25	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	50	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	2	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	4,000	LF	SAFETY FENCE
6030000000-E	1630	1,870	CY	SILT EXCAVATION
6036000000-E	1631	3,500	SY	MATTING FOR EROSION CONTROL
6042000000-E	1632	220	LF	1/4" HARDWARE CLOTH
6070000000-N	SP	12	EA	SPECIAL STILLING BASINS
6084000000-E	1660	9.5	ACR	SEEDING & MULCHING
6087000000-E	1660	5	ACR	MOWING
6090000000-E	1661	100	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	200	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	7.25	TON	FERTILIZER TOPDRESSING
6114000000-N	SP	5	HR	SPECIALIZED HAND MOWING
6132000000-N	SP	8	EA	GENERIC EROSION CONTROL ITEM RESPONSE FOR EROSION CONTROL

COMPUTED BY: DMW	DATE: 1-2-03
CHECKED BY: RWP	DATE: 1-7-03

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
B-3453	3-A

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

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

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) 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) * - WELDED STEEL PIPE, 0.50" THICK, GRADE B 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.
-L- 12+43	RT	1B					NO																		40			
-L- 15+22	LT	1A	EX		85.00	EX	NO				2@ 56																	
-L- 18+92	LT	1		99.49																								
		1	OUT		96.74	85.00	NO										50											
-L- 18+97	RT	2		99.51																								
		2	OUT		96.76	88.00	NO										54											
-L- 21+68	LT	3		99.73																								
		3	OUT		96.98	86.00	NO										44											
-L- 21+74	RT	4		99.71																								
		4	5		96.96	94.60	NO		16																			
-L 21+74	RT	5		97.35																								
		5	OUT		94.60	88.00	NO										42											
-L- 31+00	LT	6		96.93																								
		6	7		95.01	94.89	YES		40																			
-L- 31+00	RT	7		96.93																								
		7	OUT		94.89	94.57	NO		16																			
-L- 36+74	LT	8																							48			
-DRIVE- 11+07	CL	9																							52			
-L- 16+00**	RT	10		94.5** +/-																								
		10	OUT		91.7**	91.6**	YES											38*										
-L- 25+50**	RT	11		95.5** +/-																								
		11	OUT		92.8**	92.67**	YES											42*										
-L- 33+50	RT	12		95.0** +/-																								
		IN	12		90.22	89.00	NO			64																		
		12	OUT		89.00	88.00	NO											52*										
-L- 39+16	CL																											
-L- 39+41	LT																											
TOTALS									72	64	112						190	132*							140			

STATION	STRUCTURE NO. FROM	TO	QUANTITIES FOR DRAINAGE STRUCTURES * TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') PER EACH (0' THRU 5.0')	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	M.D.I. TYPE "A" STD. 840.17 OR 840.26	M.D.I. TYPE "B" STD. 840.18 OR 840.27	M.D.I. TYPE "D" STD. 840.19 OR 840.28	M.D.I. FRAME WITH GRATE STD. 840.22	M.D.I. FRAME WITH TWO GRATES STD. 840.22	M.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	M.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	M.D.I. FRAME WITH TWO GRATES STD. 840.20	M.D.I. FRAME WITH TWO GRATES STD. 840.29	T.B.D.I. STD. 840.35	CONV. EXIST. D.I. TO J.B.	CONC. APRON FOR D.I.	BIT. COAT. CORR. STEEL ELBOWS NO. & SIZE	FLOWABLE FILL MATERIAL (CY)	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
-L- 12+43	1B																														
-L- 15+22	1A	EX																										1.105			EXTEND EXISTING 2@24" RCP WITH COLLARS
-L- 18+92	1		1										1									1									
	1	OUT																								2@ 15"					
-L- 18+97	2		1										1									1									
	2	OUT																													
-L- 21+68	3		1										1									1									
	3	OUT																								2@ 15"					
-L- 21+74	4		1										1									1									
	4	5																													
-L 21+74	5		1										1					1							1						
	5	OUT																													
-L- 31+00	6		1											1								1									
	6	7																													
-L- 31+00	7		1											1								1									
	7	OUT																													
-L- 36+74	8																													38	REMOVE EX. DRIVEWAY PIPE @ -L- 36+74 LT
-DRIVE- 11+07	9																														
-L- 16+00**	10		1																			1	1								TEMPORARY T.B.D.I.
	10	OUT																												38	TEMPORARY (BORE & JACK WELDED STEEL PIPE)
-L- 25+50**	11		1																			1	1								TEMPORARY T.B.D.I.
	11	OUT																												42	TEMPORARY (BORE & JACK WELDED STEEL PIPE) NOTE: ADJUST TO AVOID 16" FSS
-L- 33+50	12		1	1																		1	1	1							CONVERT NEW TBDI TO JB DURING SHIFT TO PHASE TWO TRAFFIC PATTERN
	IN	12																													
	12	OUT																													(BORE & JACK WELDED STEEL PIPE) NOTE: AVOID 16" FSS
-L- 39+16																											5		0.130		PLUG EXIST 18" CSP & FILL W/FLOWABLE FILL
-L- 39+41																														38	
TOTALS			10	1									5	2			1					9	3	1	1	4@ 15"	5.0	1.105	0.130	156	

ABBREVIATIONS

- C.B. CATCH BASIN
- N.D.I. NARROW DROP INLET
- D.I. DROP INLET
- M.D.I. MEDIAN DROP INLET
- M.D.I. (N.S.) MEDIAN 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 JUCTION BOX

** LOCATIONS AND ELEVATIONS OF TEMPORARY DI'S NUMBERED 10, 11, & 12 SHOWN FOR INFORMATIONAL PURPOSES ONLY. FINAL PLACEMENT WILL BE ADJUSTED TO MEET FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.

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.

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

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH STRAIGHT	SHOP CURVED	DOUBLE FACED	WARRANT POINT APPROACH END	TRAILING END	"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH APPROACH END	TRAILING END	W APPROACH END	TRAILING END	ANCHORS XI MOD	III	GRAU 350	M-350	CAT-1	TERMINAL END SECTION	AT-1	IMPACT ATTENUATOR TYPE 350 EA	G	NG	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
-L-	13+66.92	19+23.17	LEFT	556.25				15+00 +/-	8.00	11.00		50.00		1.0		1	1											
-L-	16+16.92	19+23.17	RIGHT	306.25			19+23.17		8.00	11.00	50.00		1.0			1	1									140		
-L-	21+41.83	28+19.00	LEFT	687.50			21+41.83	28+19.00	8.00	11.00						2												ENDS OF BRIDGES AND FILL SLOPES WARRANT GUARDRAIL
-L-	21+41.83	22+85.58	RIGHT	143.75				21+41.83	8.00	11.00		50.00		1.0		1	1									150		
-L-	25+12.75	28+19.00	RIGHT	306.25			28+19.00		8.00	11.00	50.00		1.0			1	1									140		
-L-	30+11.00	34+42.25	LEFT	431.25			33+15 +/-		8.00	11.00		50.00		1.0		1	1											
-L-	30+11.00	31+54.75	RIGHT	143.75				30+11.00	8.00	11.00	50.00		1.0			1	1									140		
-L-	41+29.00		LEFT	25.00																2								GUARDRAIL BARRICADE ON ABANDONED DENNIS STREET
	SUBTOTALS			2600.00												8	6			2						570		
	LESS ANCHORS	GRAU-350	6 x 50.00' =	300.00																								
		TYPE III	8 x 18.75' =	150.00																								
	TOTAL			2150.00			ADDITIONAL GUARDRAIL POSTS 10 EACH									8	6			2						570		

6/21/00
02/15/2005
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MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
B-3453	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. 7-14-06

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19710 ENGINEER CHAD H. CRITCHER 7-14-06

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4134-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 874849.507(ft) EASTING: 2446551.521(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99999848
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4134-1" TO -L- STATION 10+00.00 IS N 89° 30' 27.0" W 60,679.515 FEET
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

DETAIL B — LATERAL 'V' DITCH (Not to Scale)
-L- STA. 14+50 TO 15+00 LT.

DETAIL C — SPECIAL LATERAL 'V' DITCH (Not to Scale)
-L- STA. 10+00 TO 14+50 LT.
-L- STA. 10+00 TO 13+00 RT.

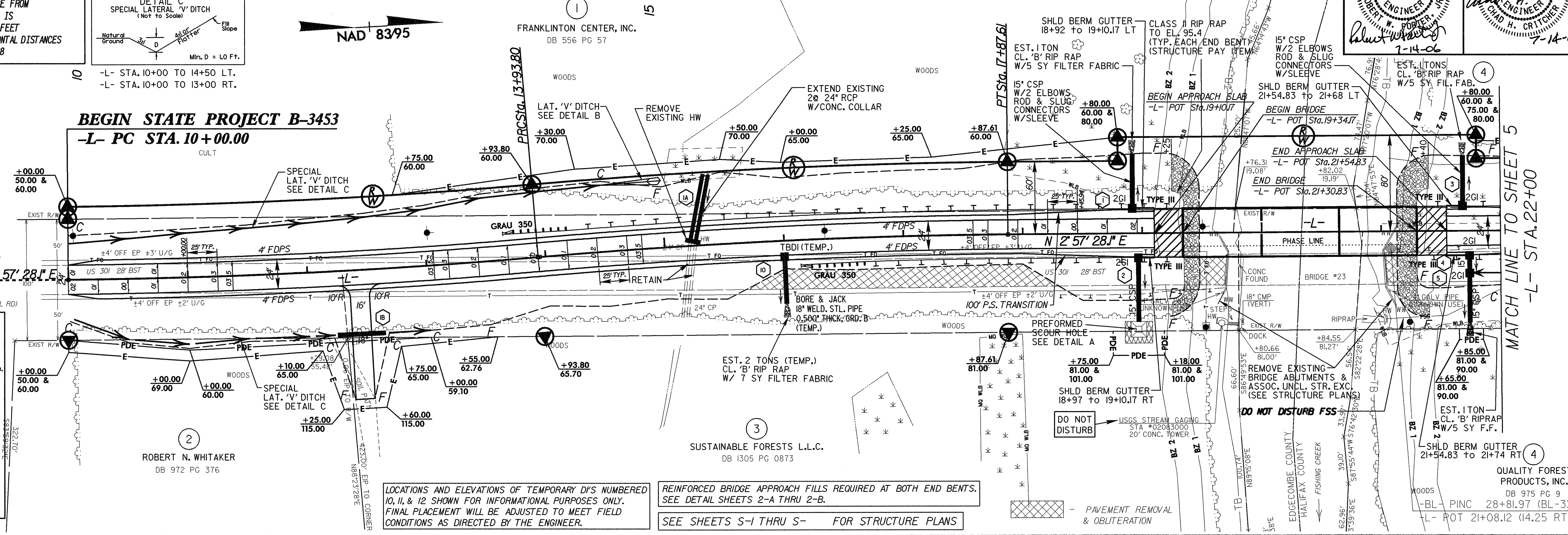
-L-

PI Sta 11+97.00	PI Sta 15+90.81
Δ = 4° 30' 45.6" (LT)	Δ = 4° 30' 45.6" (RT)
D = 1° 08' 45.3"	D = 1° 08' 45.3"
L = 393.80'	L = 393.80'
T = 197.00'	T = 197.00'
R = 5,000.00'	R = 5,000.00'
SE = 0.035	SE = 0.035
RO = 87.50'	RO = 87.50'

NAD 83/95

SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP

BEGIN STATE PROJECT B-3453
-L- PC STA. 10+00.00



DETAIL A — PREFORMED SCOUR HOLE (Not to Scale)
-L- STA. 18+97 RT. -L- STA. 33+50 RT.

LOCATIONS AND ELEVATIONS OF TEMPORARY DI'S NUMBERED 10, 11, & 12 SHOWN FOR INFORMATIONAL PURPOSES ONLY. FINAL PLACEMENT WILL BE ADJUSTED TO MEET FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.

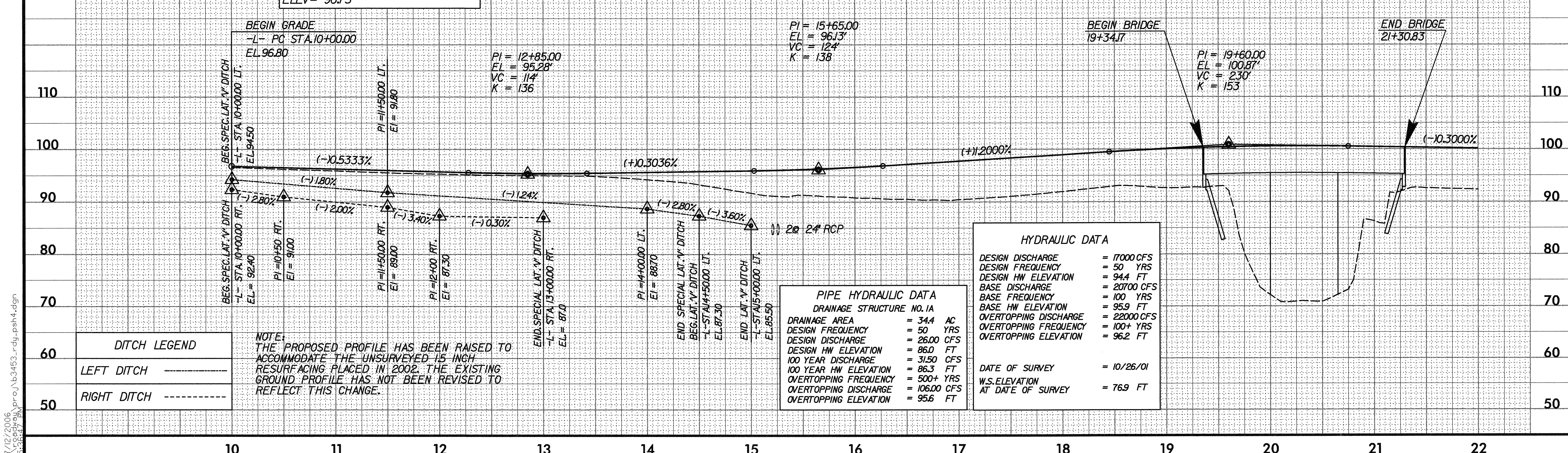
REINFORCED BRIDGE APPROACH FILLS REQUIRED AT BOTH END BENTS. SEE DETAIL SHEETS 2-A THRU 2-B.

SEE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

MATCH LINE TO SHEET 5 -L- STA. 22+00

BM #6
-BL- STA 15+77 (15.4' LT)
IRON PIN AND CAP SET +/- 0.70'
DEEP. STAMPED B-3453 BM 6
ELEV= 96.75'

BM #9
-L- STA 21+26.03 (350.76' RT)
RR SPIKE IN BASE OF 42" SWEET GUM TREE
ELEV= 90.59'



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1A

DRAINAGE AREA	= 34.4 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 26.00 CFS
DESIGN HW ELEVATION	= 86.0 FT
100 YEAR DISCHARGE	= 31.50 CFS
100 YEAR HW ELEVATION	= 86.3 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 106.00 CFS
OVERTOPPING ELEVATION	= 95.6 FT

HYDRAULIC DATA

DESIGN DISCHARGE	= 17000 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 94.4 FT
BASE DISCHARGE	= 20700 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 95.9 FT
OVERTOPPING DISCHARGE	= 22000 CFS
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING ELEVATION	= 96.2 FT
DATE OF SURVEY	= 10/26/01
W.S. ELEVATION AT DATE OF SURVEY	= 76.9 FT

DITCH LEGEND	
LEFT DITCH	————
RIGHT DITCH	- - - - - -

NOTE: THE PROPOSED PROFILE HAS BEEN RAISED TO ACCOMMODATE THE UNSURVEYED 1.5 INCH RESURFACING PLACED IN 2002. THE EXISTING GROUND PROFILE HAS NOT BEEN REVISED TO REFLECT THIS CHANGE.

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PROJECT REFERENCE NO.	SHEET NO.
B-3453	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19814 ROBERT W. PORTER, JR. 7-14-06

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19710 CHAD H. CRITCHER 7-14-06

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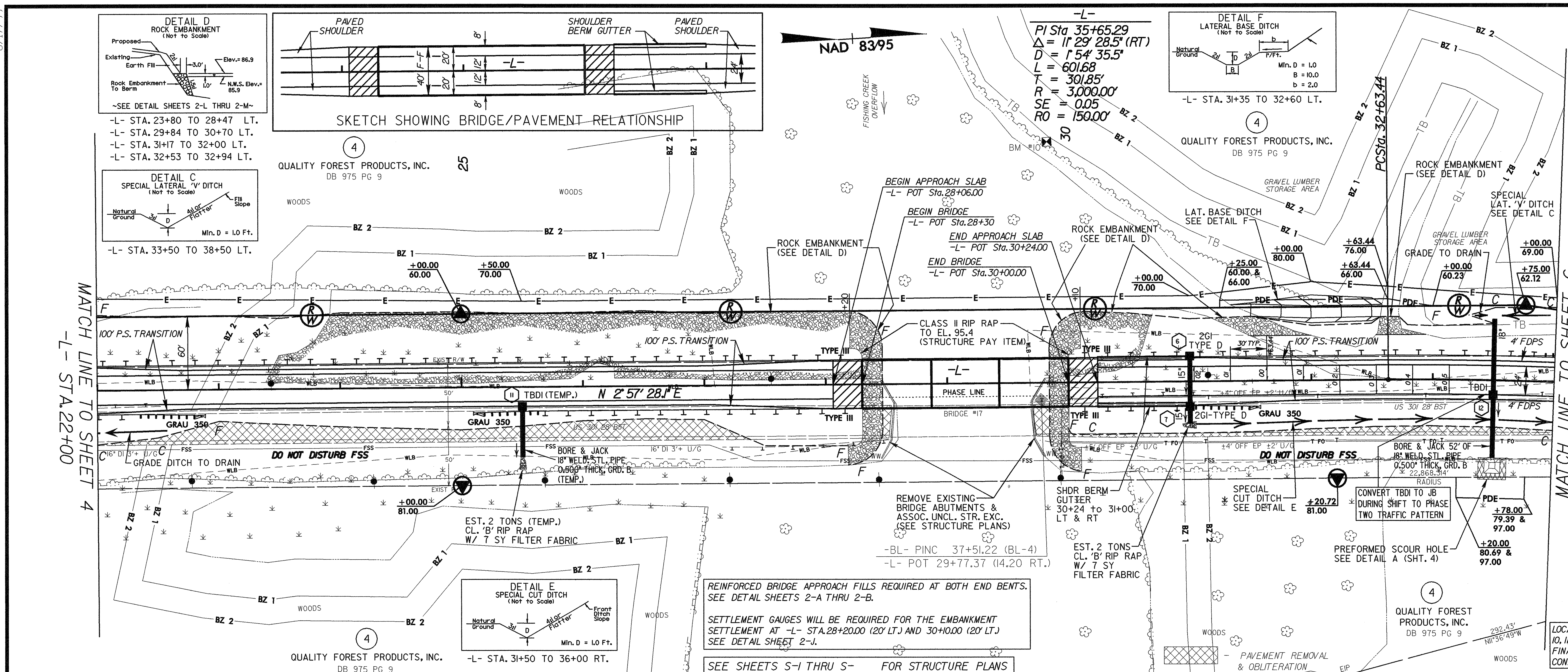
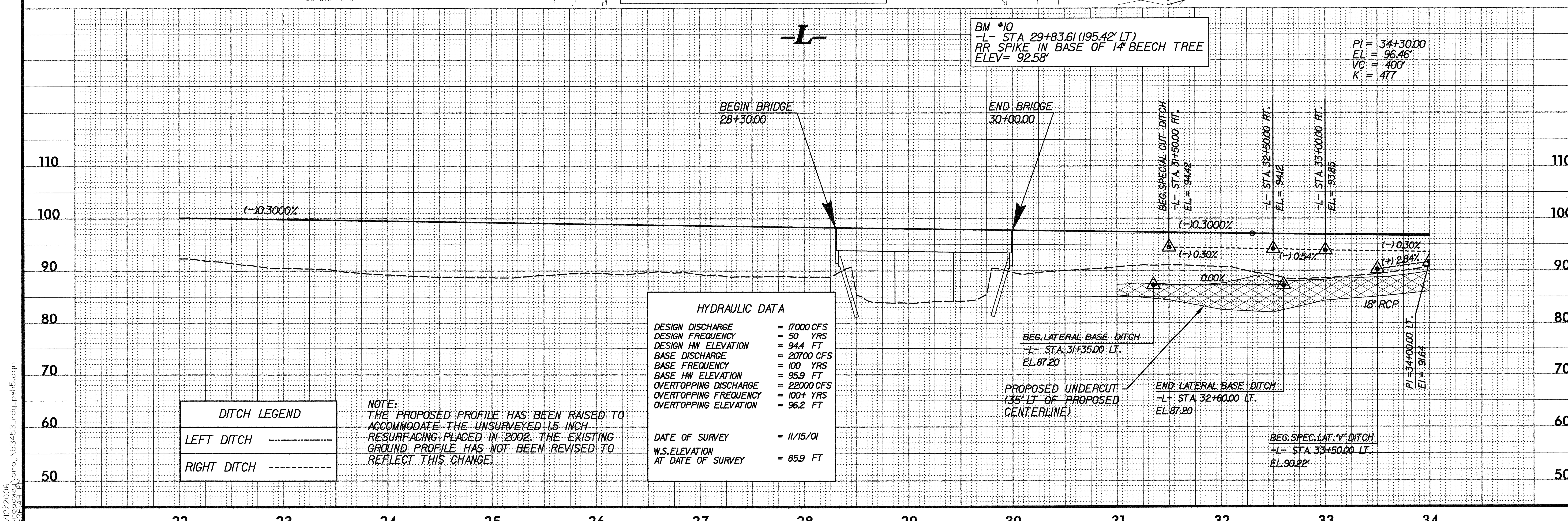

DETAIL D
ROCK EMBANKMENT
(Not to Scale)
~SEE DETAIL SHEETS 2-L THRU 2-M~
-L- STA. 23+80 TO 28+47 LT.
-L- STA. 29+84 TO 30+70 LT.
-L- STA. 31+17 TO 32+00 LT.
-L- STA. 32+53 TO 32+94 LT.
DETAIL C
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D = 1.0 Ft.
-L- STA. 33+50 TO 38+50 LT.
SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP
PAVED SHOULDER
SHOULDER BERM GUTTER
NAD 83/95
-L-
PI Sta 35+65.29
Δ = 11° 29' 28.5" (RT)
D = 1° 54' 35.5"
L = 601.68
T = 301.85'
R = 3,000.00'
SE = 0.05
RO = 150.00'
DETAIL F
LATERAL BASE DITCH
(Not to Scale)
Min. D = 1.0
B = 10.0
b = 2.0
-L- STA. 31+35 TO 32+60 LT.
QUALITY FOREST PRODUCTS, INC.
DB 975 PG 9
BEGIN APPROACH SLAB -L- POT Sta.28+06.00
BEGIN BRIDGE -L- POT Sta.28+30
END APPROACH SLAB -L- POT Sta.30+24.00
END BRIDGE -L- POT Sta.30+00.00
ROCK EMBANKMENT (SEE DETAIL D)
LAT. BASE DITCH SEE DETAIL F
SPECIAL LAT. 'V' DITCH SEE DETAIL C
GRADE TO DRAIN
MATCH LINE TO SHEET 4 -L- STA.22+00
MATCH LINE TO SHEET 6 -L- STA.34+00
100' P.S. TRANSITION
CLASS II RIP RAP TO EL. 95.4 (STRUCTURE PAY ITEM)
N 2° 57' 28.1" E
TBDI (TEMP.)
GRAU 350
DO NOT DISTURB FSS
BORE & JACK 18" WELD. STL. PIPE 0.500" THICK, GRD. B (TEMP.)
EST. 2 TONS (TEMP.) CL. 'B' RIP RAP W/ 7 SY FILTER FABRIC
REMOVE EXISTING BRIDGE ABUTMENTS & ASSOC. UNCL. STR. EXC. (SEE STRUCTURE PLANS)
SHDR BERM GUTTER 30+24 to 31+00 LT & RT
EST. 2 TONS CL. 'B' RIP RAP W/ 7 SY FILTER FABRIC
SPECIAL CUT DITCH SEE DETAIL E
BORE & JACK 52' OF 18" WELD. STL. PIPE 0.500" THICK, GRD. B
CONVERT TBDI TO JB DURING SHIFT TO PHASE TWO TRAFFIC PATTERN
PREFORMED SCOUR HOLE SEE DETAIL A (SHT. 4)
-BL- PINC 37+51.22 (BL-4)
-L- POT 29+77.37 (14.20 RT.)
DETAIL E
SPECIAL CUT DITCH
(Not to Scale)
Min. D = 1.0 Ft.
-L- STA. 31+50 TO 36+00 RT.
PAVEMENT REMOVAL & OBLITERATION
WOODS

REINFORCED BRIDGE APPROACH FILLS REQUIRED AT BOTH END BENTS. SEE DETAIL SHEETS 2-A THRU 2-B.

SETTLEMENT GAUGES WILL BE REQUIRED FOR THE EMBANKMENT SETTLEMENT AT -L- STA.28+20.00 (20' LT.) AND 30+10.00 (20' LT.) SEE DETAIL SHEET 2-J.

SEE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

LOCATIONS AND ELEVATIONS OF TEMPORARY DI'S NUMBERED 10, 11, & 12 SHOWN FOR INFORMATIONAL PURPOSES ONLY. FINAL PLACEMENT WILL BE ADJUSTED TO MEET FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.


-L-
BM #10
-L- STA 29+83.61 (195.42' LT.)
RR SPIKE IN BASE OF 14" BEECH TREE
ELEV= 92.58'
PI = 34+30.00
EL = 96.46'
VC = 400'
K = 477
BEGIN BRIDGE 28+30.00
END BRIDGE 30+00.00
(−)0.3000%
BEG. SPECIAL CUT DITCH -L- STA. 31+50.00 RT. EL. = 94.42
-L- STA. 32+50.00 RT. EL. = 94.12
-L- STA. 33+00.00 RT. EL. = 93.85
(−) 0.30%
(−) 0.54%
(+) 2.84%
0.00%
18" RCP
BEG. LATERAL BASE DITCH -L- STA. 31+35.00 LT. EL.87.20
PROPOSED UNDERCUT (35' LT OF PROPOSED CENTERLINE)
END LATERAL BASE DITCH -L- STA. 32+60.00 LT. EL.87.20
BEG. SPEC. LAT. 'V' DITCH -L- STA. 33+50.00 LT. EL.90.22'
PI=34+00.00 LT. El = 91.64
110
100
90
80
70
60
50
22
23
24
25
26
27
28
29
30
31
32
33
34

HYDRAULIC DATA

DESIGN DISCHARGE	= 17000 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 94.4 FT
BASE DISCHARGE	= 20700 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 95.9 FT
OVERTOPPING DISCHARGE	= 22000 CFS
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING ELEVATION	= 96.2 FT
DATE OF SURVEY	= 11/15/01
W.S. ELEVATION AT DATE OF SURVEY	= 85.9 FT

DITCH LEGEND	
LEFT DITCH	————
RIGHT DITCH	- - - - - -

NOTE:
THE PROPOSED PROFILE HAS BEEN RAISED TO ACCOMMODATE THE UNSURVEYED 1.5 INCH RESURFACING PLACED IN 2002. THE EXISTING GROUND PROFILE HAS NOT BEEN REVISED TO REFLECT THIS CHANGE.

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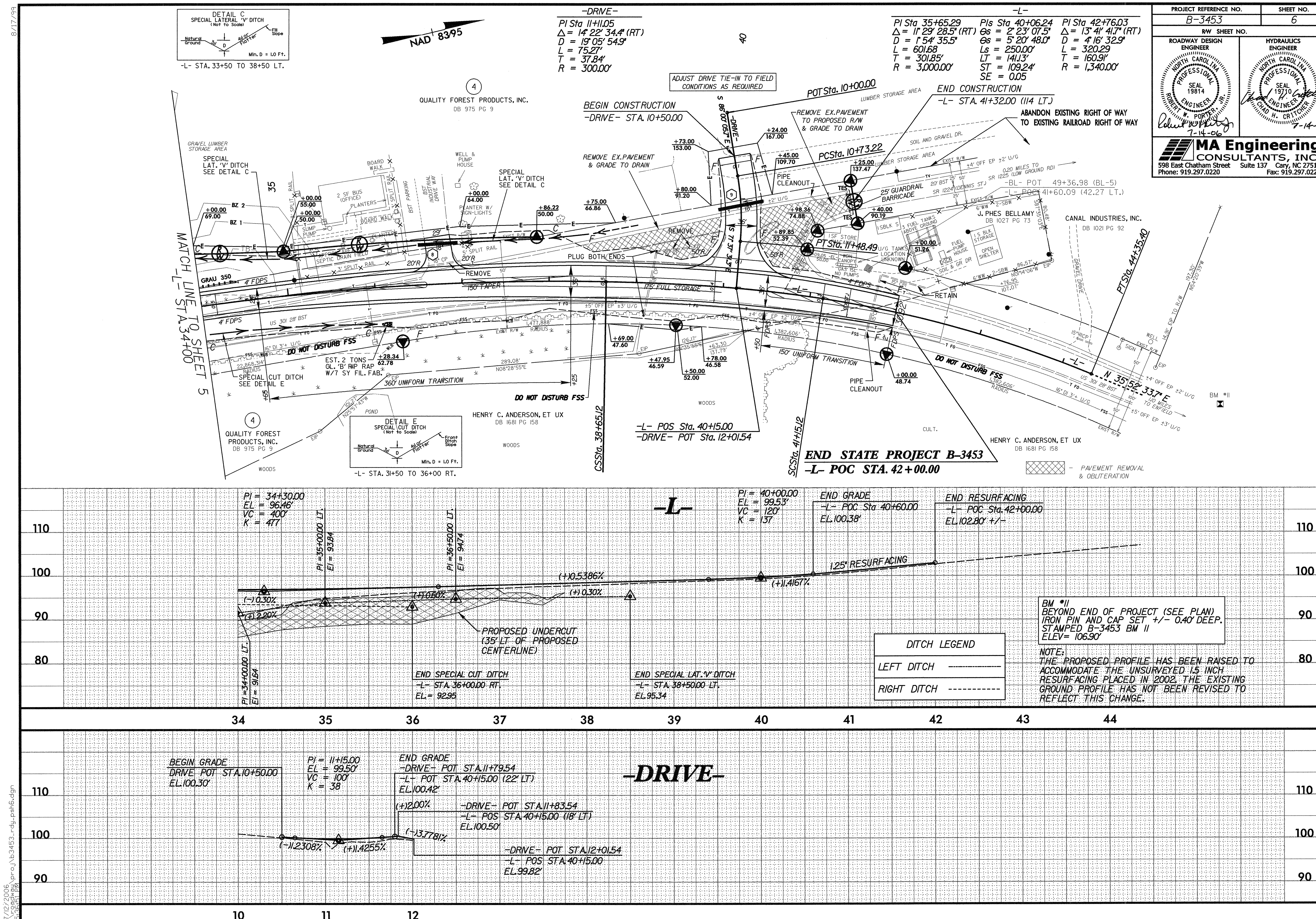

PROJECT REFERENCE NO. B-3453
SHEET NO. 6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
NORTH CAROLINA PROFESSIONAL SEAL 19710 ENGINEER CHAD H. CRITCHER
7-14-06
MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221
DETAIL C
SPECIAL LATERAL 'V' DITCH (Not to Scale)
Min. D = 1.0 Ft.
-L- STA. 33+50 TO 38+50 LT.
NAD 83/95
-DRIVE-
PI Sta 11+11.05
Δ = 14° 22' 34.4" (RT)
D = 19° 05' 54.9"
L = 75.27'
T = 37.84'
R = 300.00'
-L-
PI Sta 35+65.29
Δ = 11° 29' 28.5" (RT)
D = 1° 54' 35.5"
L = 601.68
T = 301.85'
R = 3,000.00'
PIs Sta 40+06.24
Θs = 2° 23' 07.5"
Θs = 5° 20' 48.0"
Ls = 250.00'
LT = 141.13'
ST = 109.24'
SE = 0.05
PI Sta 42+76.03
Δ = 13° 41' 41.7" (RT)
D = 4° 16' 32.9"
L = 320.29
T = 160.91'
R = 1,340.00'
ADJUST DRIVE TIE-IN TO FIELD CONDITIONS AS REQUIRED
QUALITY FOREST PRODUCTS, INC. DB 975 PG 9
BEGIN CONSTRUCTION -DRIVE- STA. 10+50.00
POT Sta. 10+00.00
REMOVE EX. PAVEMENT TO PROPOSED R/W & GRADE TO DRAIN
END CONSTRUCTION -L- STA. 41+32.00 (114 LT.)
ABANDON EXISTING RIGHT OF WAY TO EXISTING RAILROAD RIGHT OF WAY
PCSta. 10+73.22
PTSta. 11+48.49
REMOVE EX. PAVEMENT & GRADE TO DRAIN
SPECIAL LAT. 'V' DITCH SEE DETAIL C
PIPE CLEANOUT
25' GUARDRAIL BARRICADE
-BL- POT 49+36.98 (BL-5)
-L- POC 41+60.09 (42.27 LT.)
J. PHES BELLAMY DB 1027 PG 73
CANAL INDUSTRIES, INC. DB 1021 PG 92
MATCH LINE TO SHEET 5 -L- STA. 34+00
PLUG BOTH ENDS
REMOVE
150' TAPER
175' FULL STORAGE
RETAIN
DO NOT DISTURB FSS
EST. 2 TONS CL. 'B' RIP RAP W/T SY FIL. FAB.
SPECIAL CUT DITCH SEE DETAIL E
360' UNIFORM TRANSITION
150' UNIFORM TRANSITION
PIPE CLEANOUT
PTSta. 44+35.40
N 35°52' 33.7" E
DETAIL E
SPECIAL CUT DITCH (Not to Scale)
Min. D = 1.0 Ft.
-L- STA. 31+50 TO 36+00 RT.
QUALITY FOREST PRODUCTS, INC. DB 975 PG 9
HENRY C. ANDERSON, ET UX DB 1681 PG 158
CSSta. 38+65.12
-L- POS Sta. 40+15.00
-DRIVE- POT Sta. 12+01.54
SCSta. 41+15.12
END STATE PROJECT B-3453
-L- POC STA. 42+00.00
HENRY C. ANDERSON, ET UX DB 1681 PG 158
PAVEMENT REMOVAL & OBLITERATION
-L-
PI = 34+30.00
EL = 96.46'
VC = 400'
K = 477
PI = 40+00.00
EL = 99.53'
VC = 120'
K = 137
END GRADE -L- POC Sta 40+60.00 EL.100.38'
END RESURFACING -L- POC Sta.42+00.00 EL.102.80' +/-
1.25" RESURFACING
(+)0.5386%
(+)0.30%
(+)1.4167%
(-)0.30%
(-)2.20%
PROPOSED UNDERCUT (35' LT OF PROPOSED CENTERLINE)
END SPECIAL CUT DITCH -L- STA. 36+00.00 RT. EL.= 92.95
END SPECIAL LAT. 'V' DITCH -L- STA. 38+50.00 LT. EL.95.34
DITCH LEGEND
LEFT DITCH
RIGHT DITCH
BM #11
BEYOND END OF PROJECT (SEE PLAN) IRON PIN AND CAP SET +/- 0.40' DEEP. STAMPED B-3453 BM 11 ELEV= 106.90'
NOTE: THE PROPOSED PROFILE HAS BEEN RAISED TO ACCOMMODATE THE UNSURVEYED 1.5 INCH RESURFACING PLACED IN 2002. THE EXISTING GROUND PROFILE HAS NOT BEEN REVISED TO REFLECT THIS CHANGE.
34 35 36 37 38 39 40 41 42 43 44
-DRIVE-
BEGIN GRADE DRIVE POT STA.10+50.00 EL.100.30'
PI = 11+15.00
EL = 99.50'
VC = 100'
K = 38
END GRADE -DRIVE- POT STA.11+79.54 -L- POT STA.40+15.00 (22' LT) EL.100.42'
-DRIVE- POT STA.11+83.54 -L- POS STA.40+15.00 (18' LT) EL.100.50'
-DRIVE- POT STA.12+01.54 -L- POS STA.40+15.00 EL.99.82'
(-)1.2308%
(+)1.4255%
(+)2.00%
(-)13.7781%
10 11 12