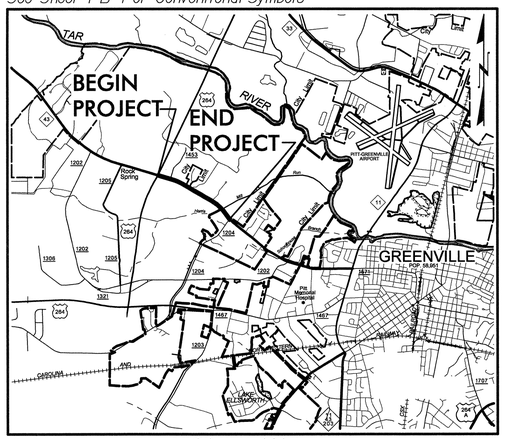
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5018A	1	

WBS NO.	F. A. PROJ. NO.	DESCRIPTION
41431.1.2		P.E.
41431.2.1		R/W
41431.3.2		CONST.

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



VICINITY MAP

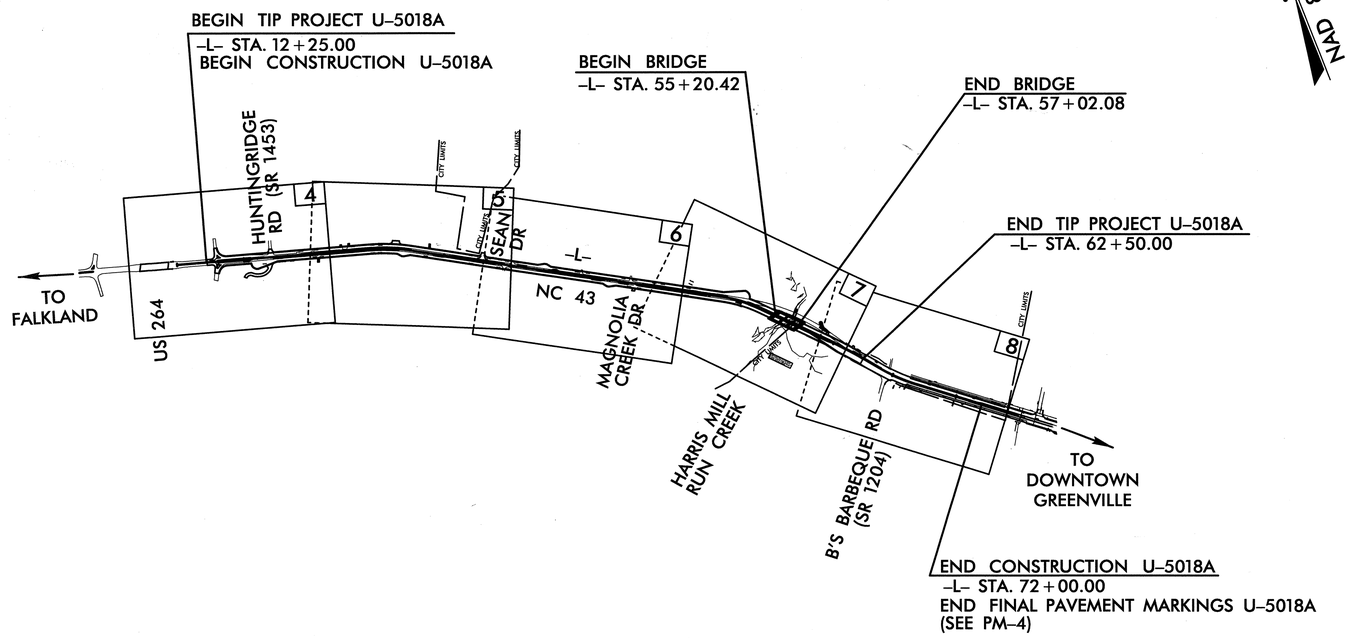
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PITT COUNTY

LOCATION: GREENVILLE – NC 43 FROM US 264 TO WEST OF SR 1204 (B'S BARBEQUE ROAD)

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

NAD 83



TIP PROJECT: U-5018A

CONTRACT: C202636

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 2010	=	22,550
ADT 2030	=	41,550
DHV	=	10 %
D	=	50 %
T	=	6 % *
V	=	50 MPH

(* TTST 2 % + DUAL 4 %)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5018A	=	0.918 MILES
LENGTH STRUCTURE TIP PROJECT U-5018A	=	0.034 MILES
TOTAL LENGTH TIP PROJECT U-5018A	=	0.952 MILES

Prepared In the Office of:
MULKEY
ENGINEERS & CONSULTANTS
FOR
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: N/A

LETTING DATE: NOV. 16, 2010

STEVE DRUM, PE
PROJECT ENGINEER

KEVIN B. ALFORD, PE
HYDRAULICS ENGINEER

NCDOT CONTACT: JOHN ROUSE, PE

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN B. ALFORD

6-3-10

SIGNATURE: K. B. Alford P.E.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 17265 ENGINEER STEVE ANTHONY DRUM

6/3/10

SIGNATURE: Steve A Drum P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

6/3/2010
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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 17265 ENGINEER STEVE ANTHONY DRUM 6/24/10

INDEX OF SHEETS

Sheet #	Description
1	Title Sheet
1-A	Index of Sheets, General Notes, and List of Standards
1-B	Conventional Symbols
1-C	Survey Control Sheet
2	Pavement Schedule and Typical Sections
2-A	Detail of Anchorage for Frames
2-B	Detail of Concrete Narrow Drop Inlet
2-C	Detail of Narrow Drop Inlet Frame and Grate and Method for Placement of Drop Inlets in Island
2-D	Detail of Dry Detention Basin, -L- Station 55+43.3
2-E	Detail of Dry Detention Basin, -L- Station 57+34.6
2-F	Detail for Dry Detention Basin Outlet Control Structure
2-G	Notes for Dry Detention Basins
2-H thru 2-I	Detail for Dry Detention Basin Underdrains
2-J	Detail for Dry Detention Basin Trash Racks
2-K thru 2-L	Method of Pipe Installation
2-M	Detail to Convert Existing Catch Basin or Junction Box to Drop Inlet
2-N	Geogrid Reinforced Slope Detail
3	Summary of Quantities
3-A	Summary of Earthwork in Cubic Yards, Guardrail Summary, Summary of Breaking of Pavement, Summary of Pavement Removal, & Subsurface Drain Summary
3-B thru 3-C	List of Pipe, Endwalls, Etc. (For Pipes 48" & Under)
3-D	Parcel Index Sheet
4 thru 8	Plans
9 thru 11	Profile
TCP-1 thru TCP-10	Traffic Control Plans
PM-1 thru PM-4	Pavement Marking Plans
EC-1 thru EC-14	Erosion Control Plans
RF-1 thru RF-3	Reforestation Plans
UC-4 thru UC-8	Utility Construction Plans
UO-1 thru UO-5	Utilities by Others Plans
X-1	Cross-Section Summary Sheet
X-2 thru X-25	Cross-Sections
S-1 thru S-52	Structure Plans

GENERAL NOTES: 2006 SPECIFICATIONS

EFFECTIVE: 07-18-06
REVISED: 07-18-06

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

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

UNDERDRAINS:

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

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3' RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS 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 WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE GUC (Electric), GUC (Gas), GUC (Water), SUDDENLINK, CENTURYLINK, PROGRESS ENERGY

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

RIGHT-OF-WAY MARKERS:

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

2006 ROADWAY ENGLISH STANDARD DRAWINGS

REV. 01-02-07

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

STD.NO.	TITLE
DIVISION 2 – EARTHWORK	
200.03	Method of Clearing – Method III
225.02	Guide for Grading Subgrade – Secondary and Local
225.04	Method of Obtaining Superelevation – Two Lane Pavement
DIVISION 3 – PIPE CULVERTS	
310.10	Driveway Pipe Construction
DIVISION 4 – MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 – SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction – High Side of Superelevated Curve – Method I
DIVISION 6 – ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 – INCIDENTALS	
815.03	Pipe Underdrain and Blind Drain
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin – 12" thru 54" Pipe
840.02	Concrete Catch Basin – 12" thru 54" Pipe
840.03	Frame, Grates and Hood – for Use on Standard Catch Basin
840.14	Concrete Drop Inlet – 12" thru 30" Pipe
840.15	Brick Drop Inlet – 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates – for use with Std. Dwg 840.14 and 840.15
840.18	Concrete Grated Drop Inlet Type 'B' – 12" thru 36" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.27	Brick Grated Drop Inlet Type 'B' – 12" thru 36" Pipe
840.29	Frames & Narrow Slot Flat Grates
840.31	Concrete Junction Box – 12" thru 66" Pipe
840.32	Brick Junction Box – 12" thru 66" Pipe
840.34	Traffic Bearing Junction Box – for Use with Pipes 42" and Under
840.35	Traffic Bearing Grate Drop Inlet – for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
846.02	Drop Inlet Installation in Expressway Gutter
848.02	Driveway Turnout – Radius Type
852.01	Concrete Islands
852.04	Method for Placement of Drop Inlets in Grassed Median – Using 1'-6" Curb and Gutter
852.06	Method for Placement of Drop Inlets in Concrete Islands
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail – B-77 and B-83 Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	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 Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY:

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

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
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

TIP PROJECT: U-5018A

CONTRACT: C201904

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

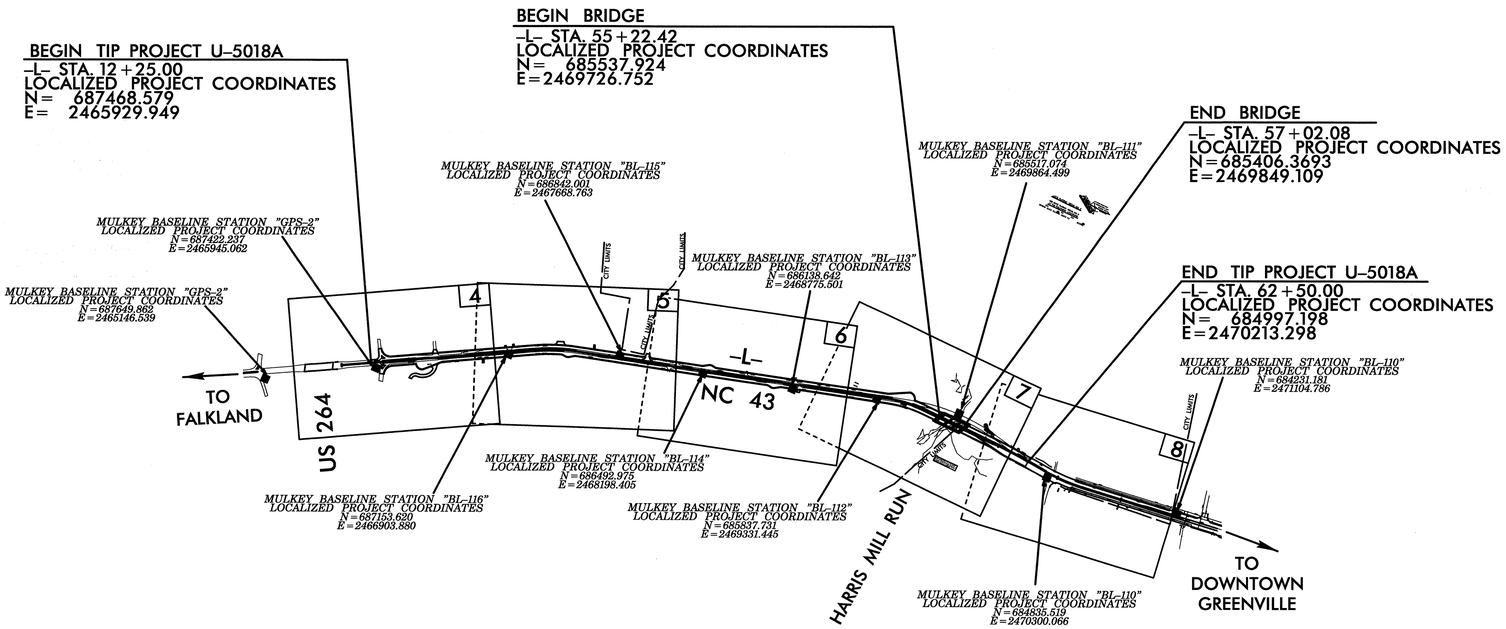
PITT COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5018A	1C	

WBS NO.	F.A. PROJ. NO.	DESCRIPTION
41431.1.2		P.E.
41431.2.1		R/W
41431.3.2		CONST.

LOCATION: GREENVILLE – NC 43 FROM US 264 TO WEST OF SR 1204 (B'S BARBEQUE ROAD)

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



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY OTHERS FOR MONUMENT "GPS-3" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 683709.837(ft) EASTING: 2471651.366(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99989593 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS-3" TO -L- STATION IS

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

- INDICATES CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY MULKEY ENGINEERS AND CONSULTANTS

PROJECT CONTROL ESTABLISHED UTILIZING CONVENTIONAL SURVEY

NOTE: DRAWING NOT TO SCALE

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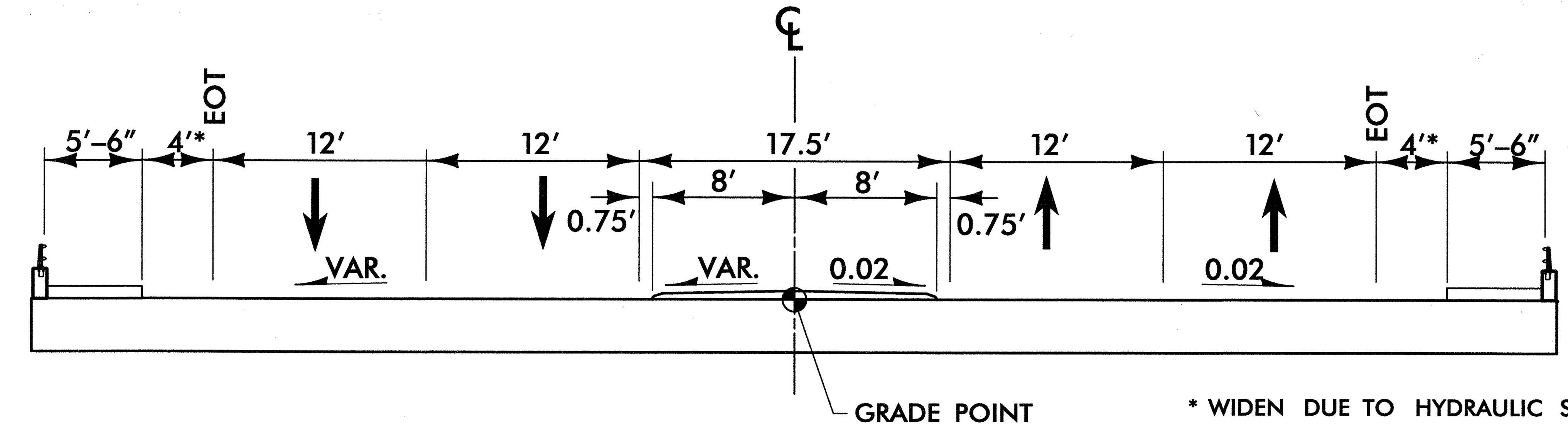
PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 17265 ENGINEER STEVE ANTHONY DRUM 6/3/10

PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER. 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 2".
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E1	PROP. APPROX. 7" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 399 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	1'-6" CONCRETE CURB AND GUTTER.
R3	CONCRETE EXPRESSWAY GUTTER.
R4	5" MONOLITHIC CONCRETE ISLAND (KEYED IN).
R5	MODIFIED MONOLITHIC CONCRETE ISLAND (KEYED IN). (SEE ISLAND DETAIL)
T	EARTH MATERIAL.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL)

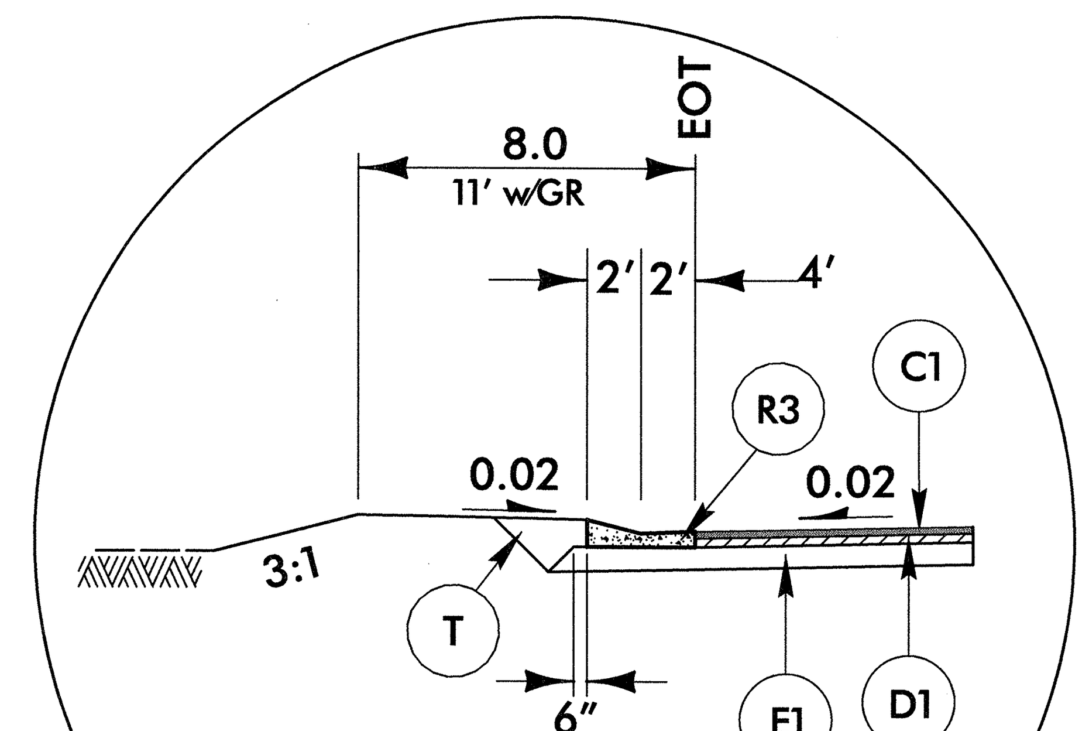
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



* WIDEN DUE TO HYDRAULIC SPREAD ON STRUCTURE.

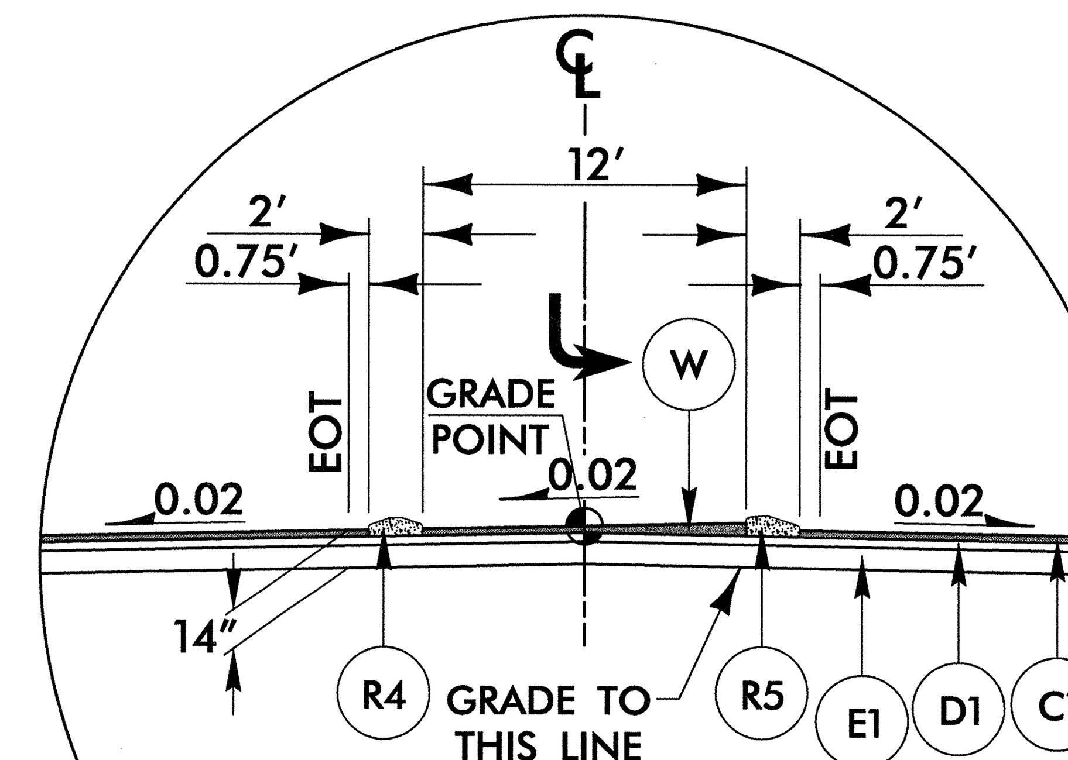
TYPICAL SECTION ON STRUCTURE

-L- STA. 55+20.42 TO STA. 57+02.08



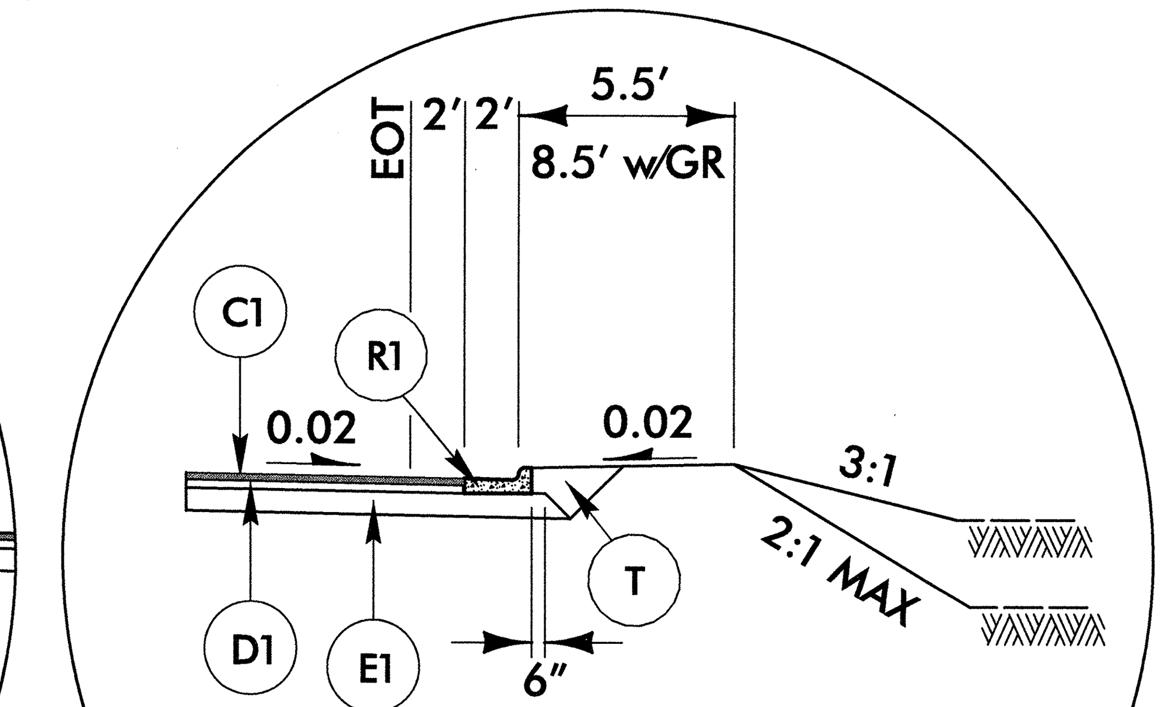
INSET A

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1
-L- STA. 17+50 TO STA. 22+20 LT



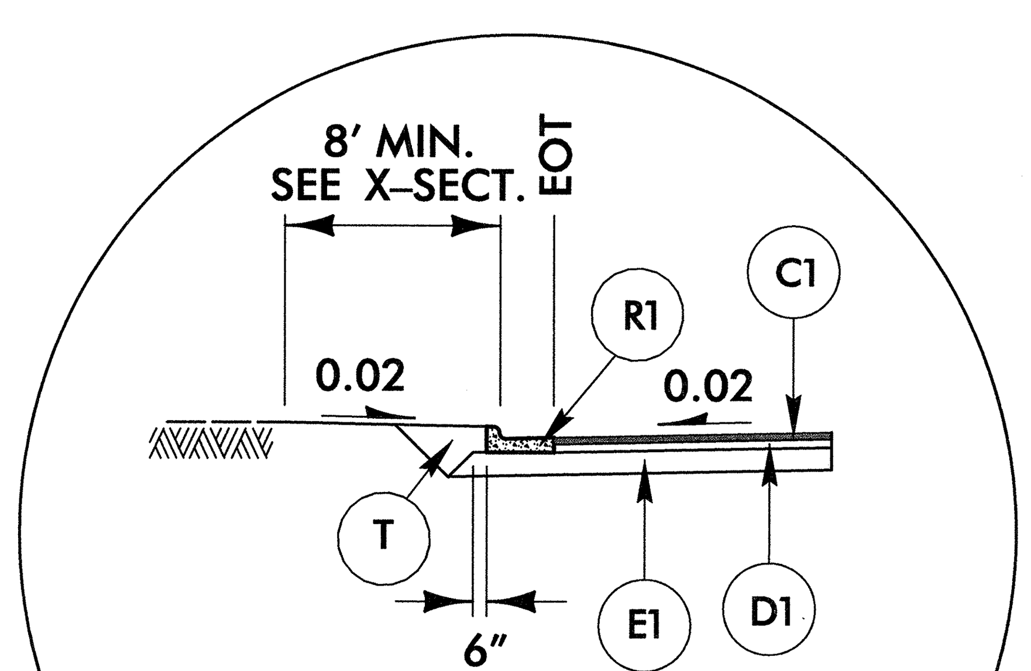
INSET B

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1
-L- STA. 16+00 TO 19+00 RT.
-L- STA. 27+00 TO 30+00 LT.
-L- STA. 34+50 TO 37+50 RT.
-L- STA. 42+50 TO 44+50 LT.
-L- STA. 50+50 TO 52+50 RT.



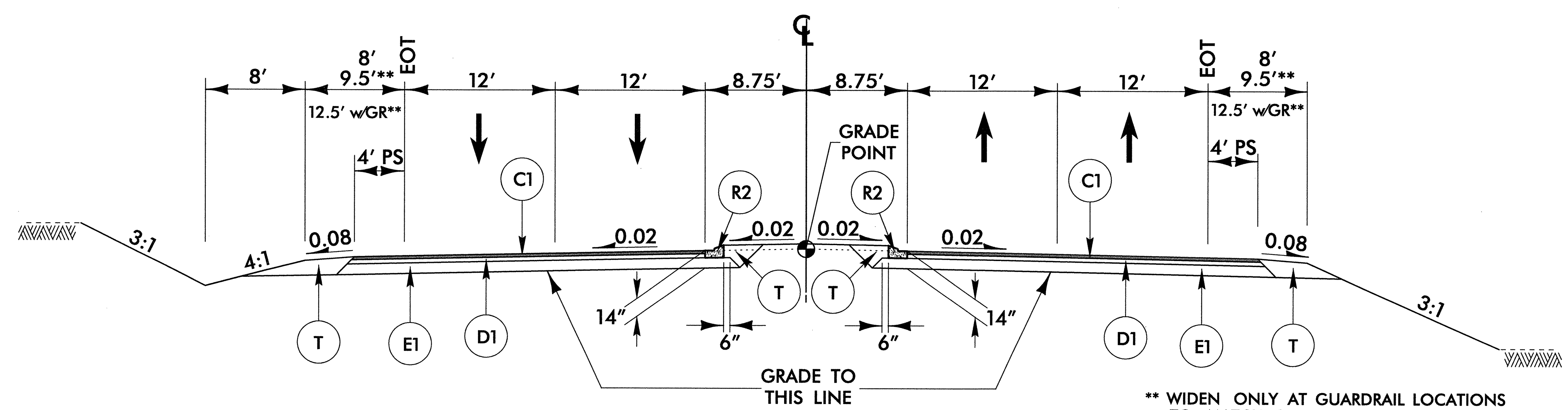
INSET C

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1
-L- STA. 52+54 TO APPROACH SLAB RT.
-L- STA. 53+70 TO APPROACH SLAB LT.
-L- APPROACH SLAB TO STA. 57+90 RT.
-L- APPROACH SLAB TO STA. 59+11 LT.



INSET D

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1
-L- STA. 60+97 TO STA. 62+50 LT



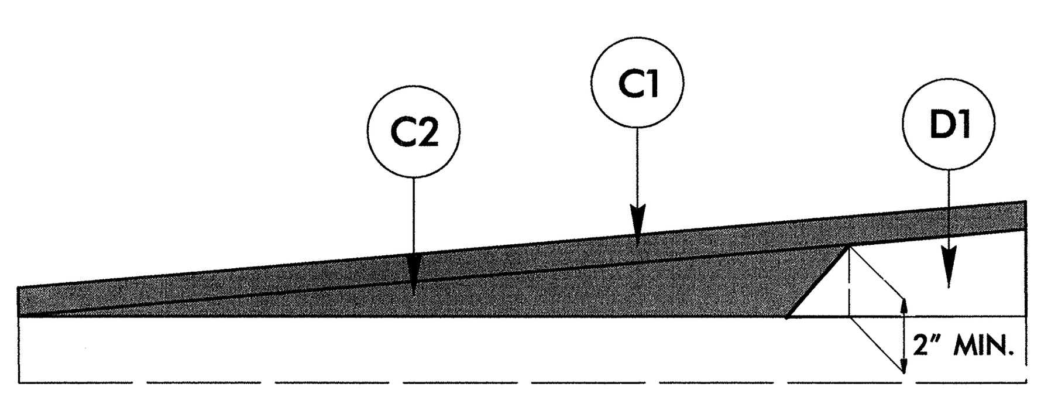
** WIDEN ONLY AT GUARDRAIL LOCATIONS TO MATCH STRUCTURE WIDTH.

TYPICAL SECTION NO. 1

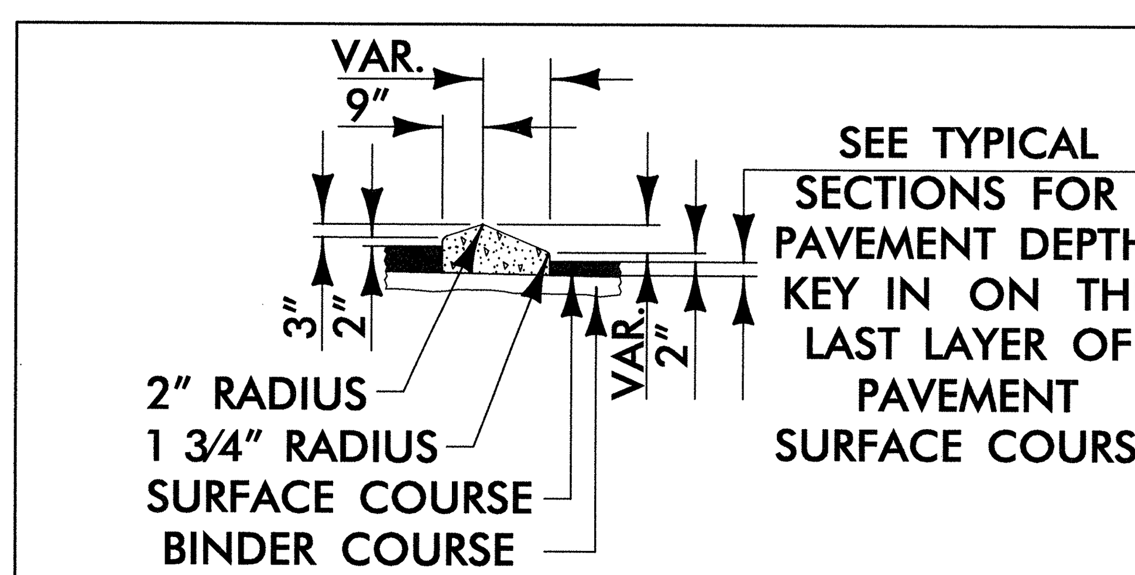
USE TYPICAL SECTION NO. 1
AT THE FOLLOWING LOCATIONS

-L- STA. 13+00.00 TO STA. 55+20.42 (BEGIN BRIDGE)
-L- STA. 57+02.08 (END BRIDGE) TO STA. 62+50.00

TRANSITION FROM EXISTING TO TYPICAL NO. 1
-L- STA. 12+25.00 TO STA. 13+00.00



WEDGING DETAIL



MODIFIED CONCRETE ISLAND DETAIL

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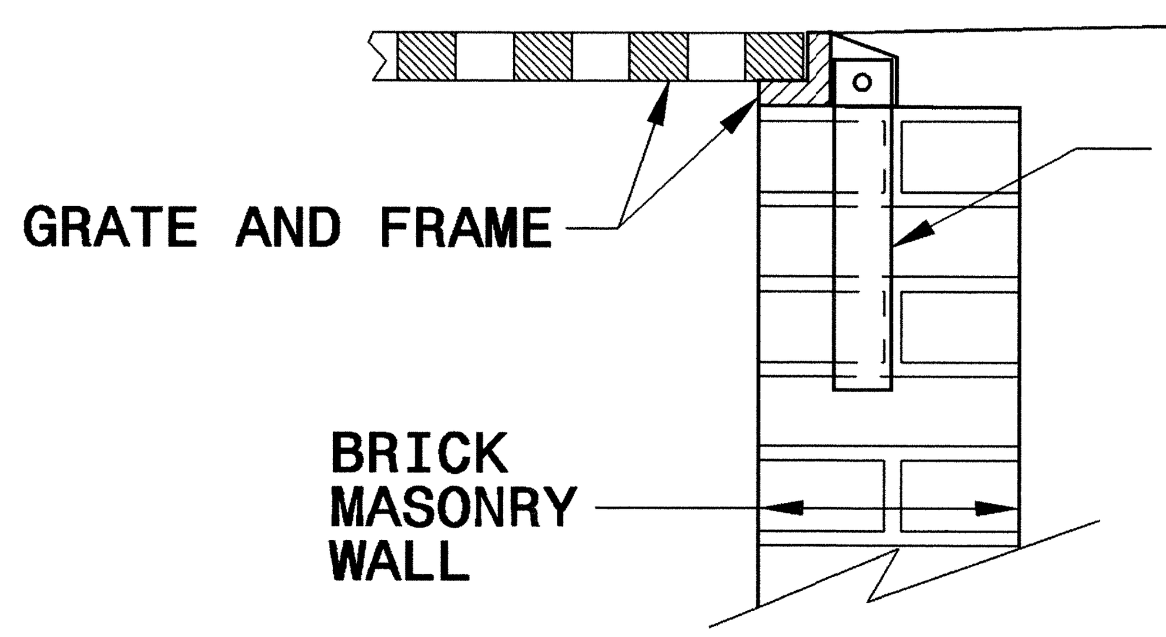
PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2-A

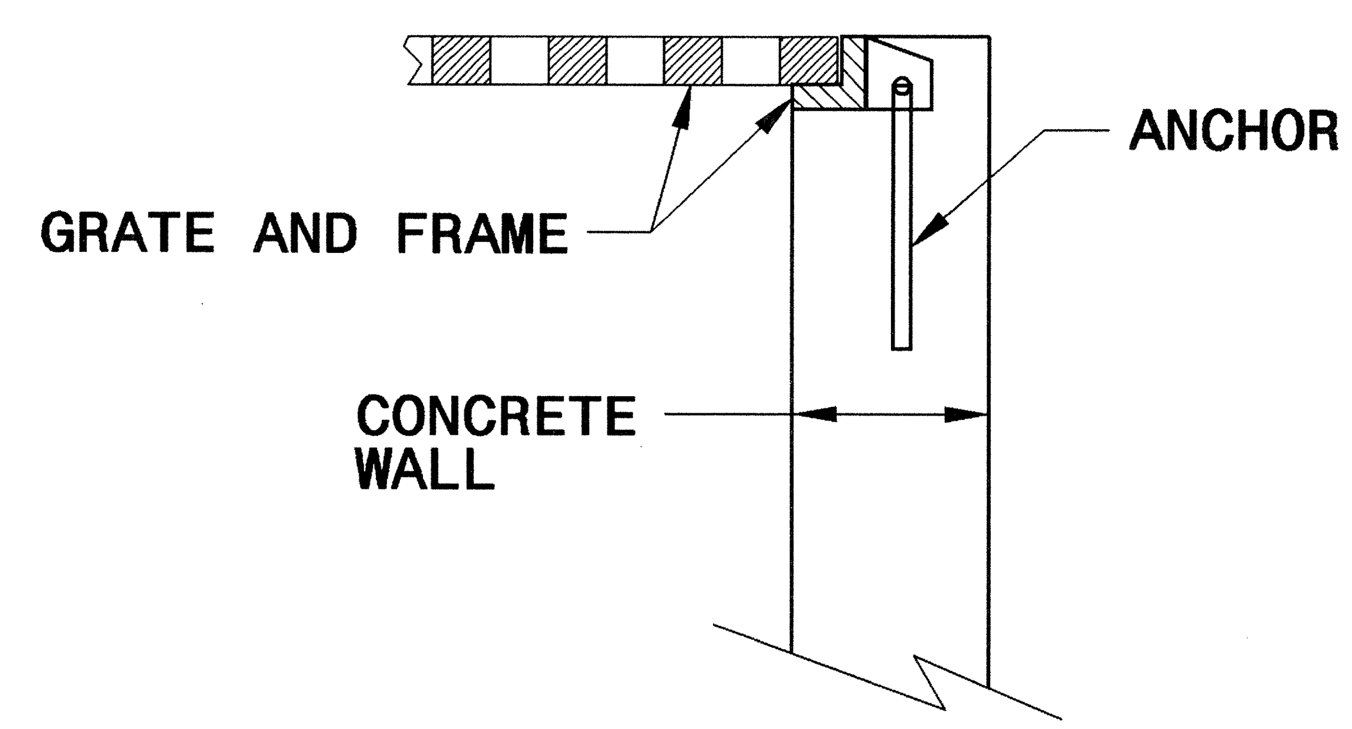
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

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

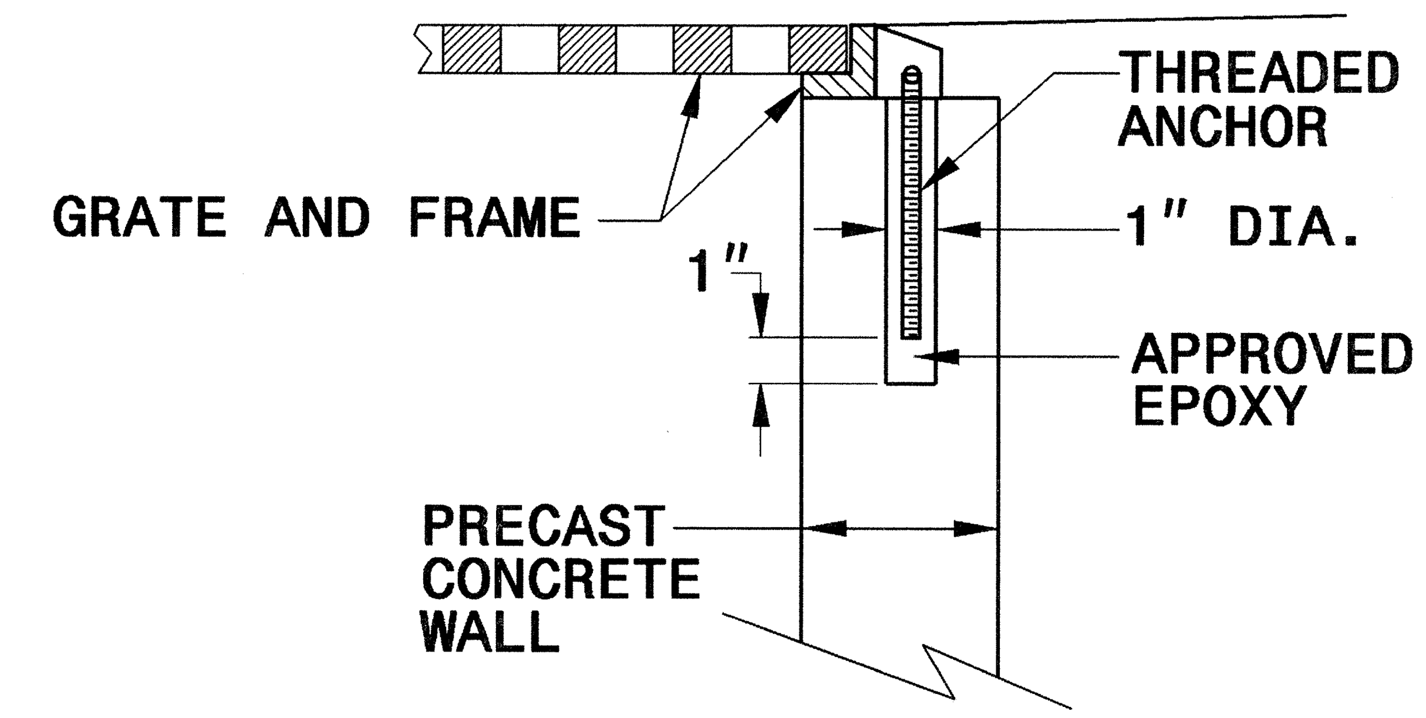
SHEET 1 OF 1
840D25



BRICK MASONRY CONSTRUCTION



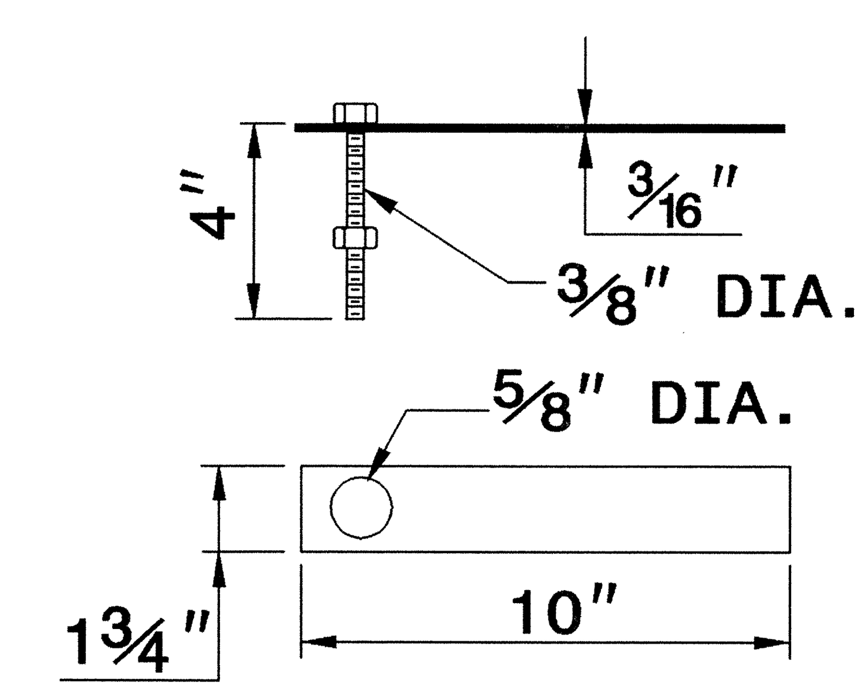
CONCRETE CONSTRUCTION



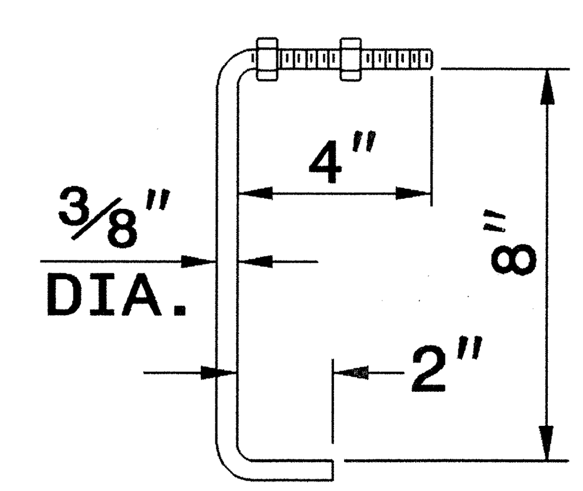
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

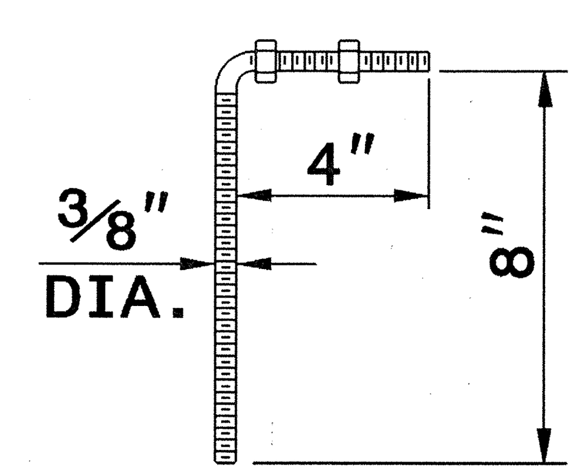
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



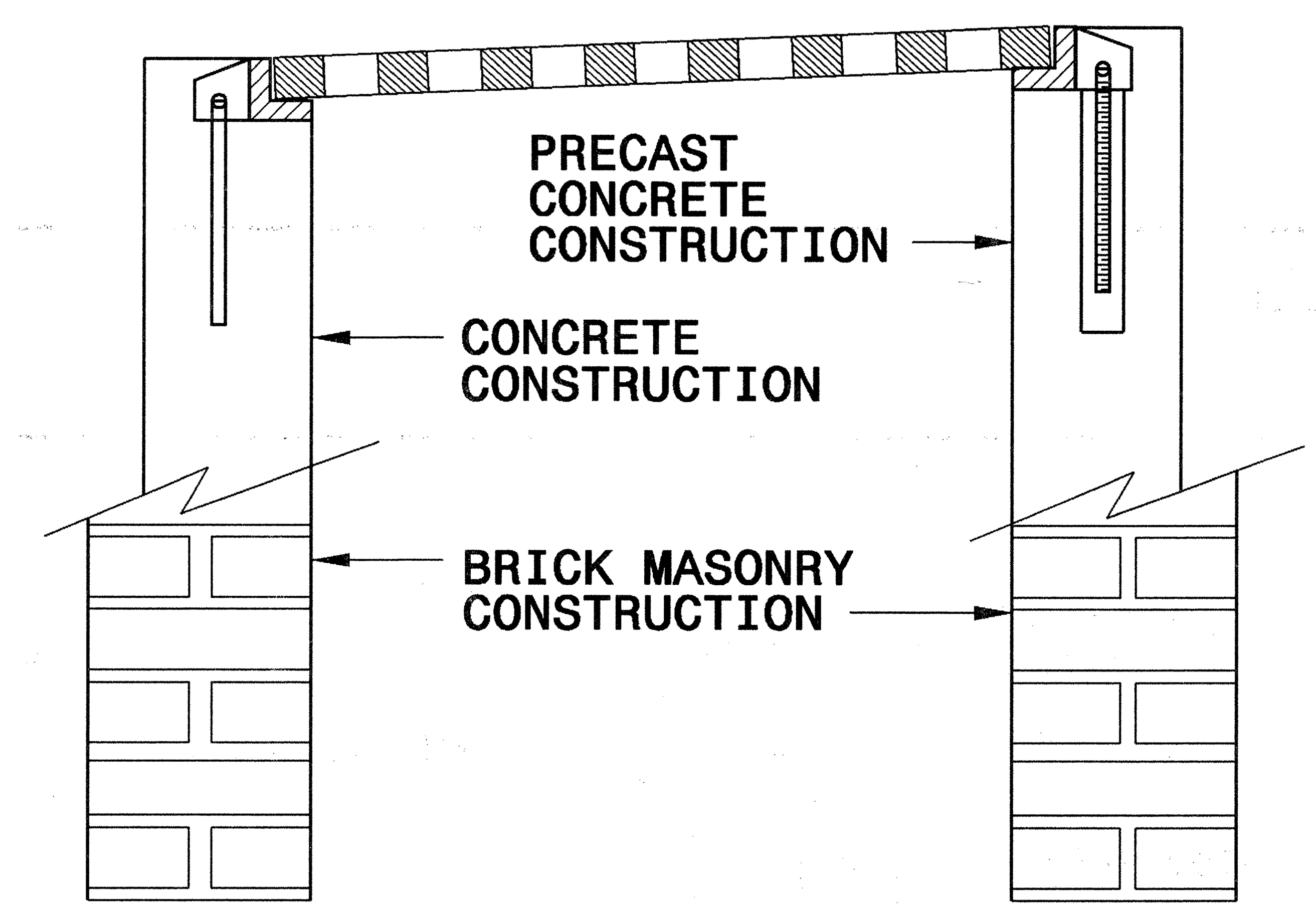
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



CONCRETE ANCHOR
3/8" DIA. BENT BAR



PRECAST CONCRETE ANCHOR
3/8" DIA. BENT BAR



FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS

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

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

SHEET 1 OF 1
840D25

NORTH CAROLINA PROFESSIONAL SEAL 19761 ENGINEER CYNTHIA B. PERRY
6/7/10

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

SEE PLATE FOR TITLE

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

27-SEP-2006 08:59
S:\Contracts\Contracts\Special Details\ericward\stds\06 Stds to Special Details\84025 Anchorage for Frames\0840d25.dgn
ericward AT PS22293

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2-B

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

1-98

ENGLISH STANDARD DRAWING FOR

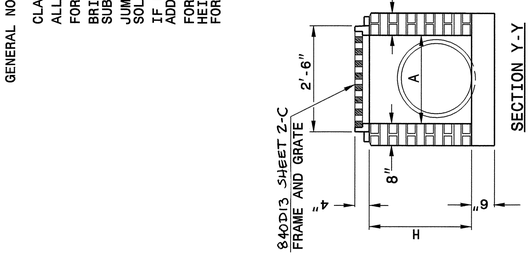
BRICK NARROW DROP INLET

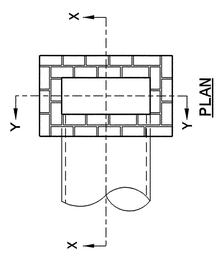
12" THRU 24" PIPE

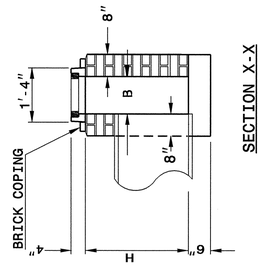
SHEET 1 OF 1 **840D12**

GENERAL NOTES:

CLASS 'B' CONCRETE TO BE USED.
ALL MORTAR JOINTS ARE ½" ± ⅛".
FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
BRICK MASONRY DROP INLET NOT TO BE USED IN LOCATIONS
SUBJECT TO TRAFFIC.
JUMBO BRICK WILL BE PERMITTED. CONCRETE BRICK OR 4"
SOLID CONCRETE BLOCKS MAY BE USED IN LIEU OF CLAY BRICK.
IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX,
ADD TO BASE AS SHOWN ON STANDARD 840.00.
FOR 8'-0" IN HEIGHT OR LESS USE 8" WALL. OVER 8'-0" IN
HEIGHT USE 12" WALL TO 6'-0" FROM TOP OF WALL AND 8" WALL
FOR THE REMAINING 6'-0". QUANTITIES TO BE ADJUSTED ACCORDINGLY.







DIMENSIONS AND QUANTITIES FOR DROP INLET

DIMENSIONS OF BOX & PIPE				CONC. IN BASE	TOTAL BRICK MASONRY			DEDUCTIONS FOR ONE PIPE	
PIPE	SPAN	WIDTH	HEIGHT	CY. YDS.	PER FT. HEIGHT	BRICK COPING	MIN. H	C.M.	R.C.
D	A	B	H (MIN.)						
12"	2'-0"	0'-10"	2'-8"	0.133	0.206	0.025	0.574	0.020	0.032
15"	2'-0"	0'-10"	3'-0"	0.133	0.206	0.025	0.643	0.031	0.047
18"	2'-0"	0'-10"	3'-5"	0.133	0.206	0.025	0.729	0.044	0.065
24"	2'-0"	0'-10"	4'-0"	0.133	0.206	0.025	0.849	0.078	0.113

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

1-98

ENGLISH STANDARD DRAWING FOR

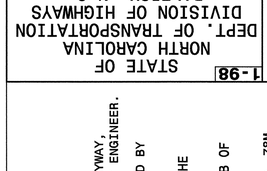
CONCRETE NARROW DROP INLET

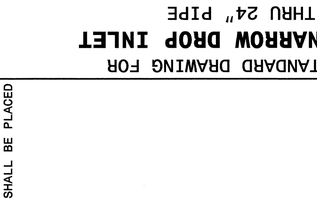
12" THRU 24" PIPE

SHEET 1 OF 1 **840D11**

GENERAL NOTES:

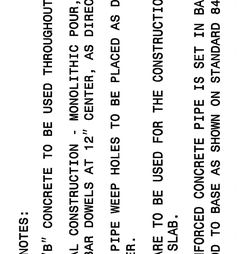
* CLASS "B" CONCRETE TO BE USED THROUGHOUT.
* OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTER, AS DIRECTED BY ENGINEER.
* TWO 2" PIPE WEEP HOLES TO BE PLACED AS DIRECTED BY ENGINEER.
* FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
* IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD 840.00.
* A STONE DRAIN CONSISTING OF 1 CUBIC FOOT OF NO. 78M STONE CONTAINED IN A BAG OF POROUS FABRIC SHALL BE PLACED AT EACH WEEP HOLE.

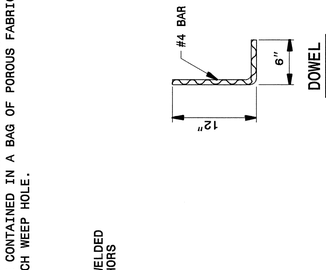




DIMENSIONS FOR CHANNELS

CHANNELS NO.	SIZE	LENGTH	TOTAL LIN. FT.
	3" X 4.1#	2'-6"	5'-0"
2	3" X 4.1#	1'-10"	3'-8"





DIMENSIONS AND QUANTITIES FOR DROP INLET

DIMENSIONS OF BOX & PIPE				CUBIC YARDS IN BOX		TOTAL QUAN. BOX & COVER	DEDUCTIONS FOR ONE PIPE CU. YDS.	
PIPE	SPAN	WIDTH	HEIGHT	FLOOR & COPING	WALL PER FT. H	CU. YDS. MIN. H	C.M.	R.C.
D	A	B	H					
12"	2'-0"	0'-10"	2'-8"	0.129	0.142	0.507	0.015	0.024
15"	2'-0"	0'-10"	3'-0"	0.129	0.142	0.555	0.023	0.036
18"	2'-0"	0'-10"	3'-5"	0.129	0.142	0.614	0.033	0.049
24"	2'-0"	0'-10"	4'-0"	0.129	0.142	0.697	0.059	0.085

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

1-98

ENGLISH STANDARD DRAWING FOR

CONCRETE NARROW DROP INLET

12" THRU 24" PIPE

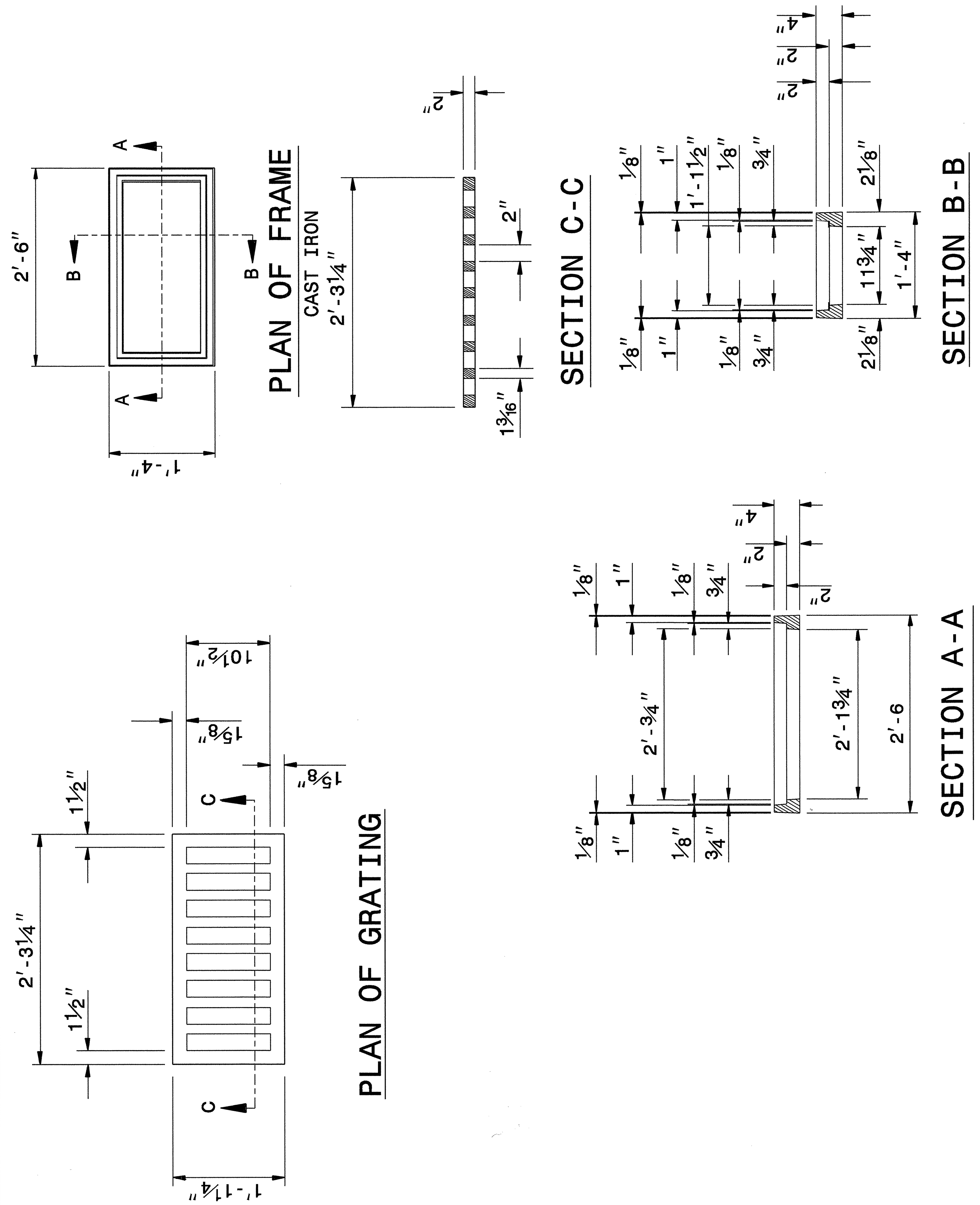
SHEET 1 OF 1 **840D11**

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

NARROW DROP INLET

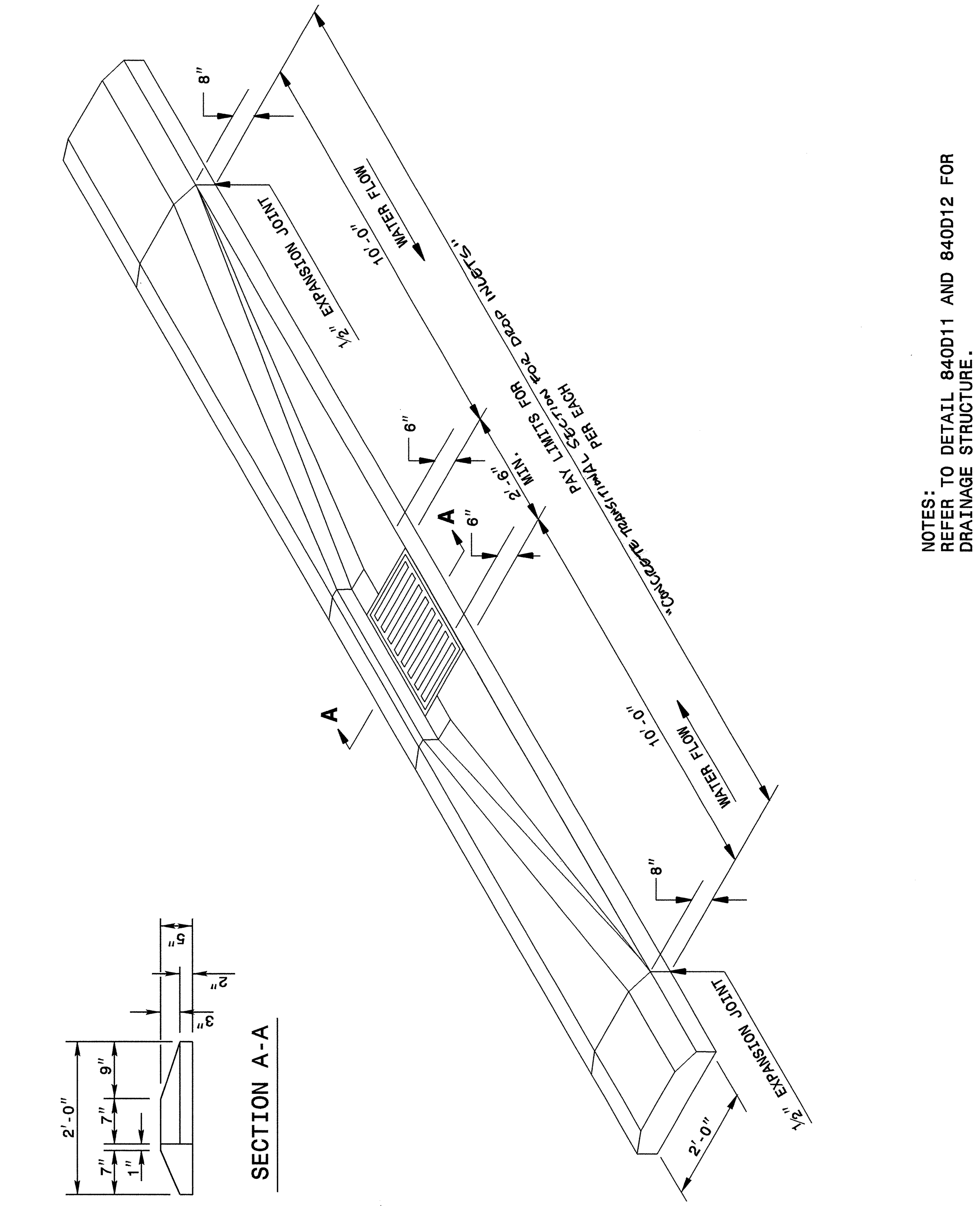
ORIGINAL BY: _____ DATE: _____
MODIFIED BY: nbritt DATE: 09-11-09
CHECKED BY: _____ DATE: 9/23/09
FILE SPEC.: details/nbritt/english/urban/u5018a.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2-C



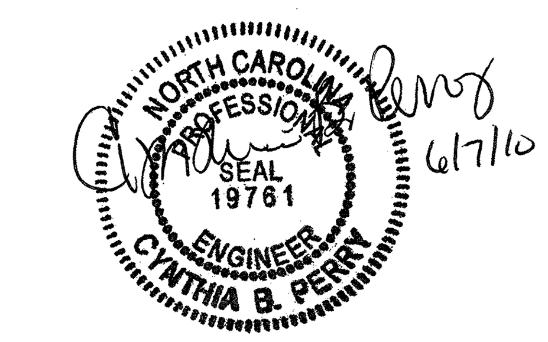
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ENGLISH DETAIL DRAWING FOR NARROW DROP INLET FRAME AND GRATE FOR USE WITH DETAIL 840D11 & 840D12
SHEET 1 OF 1 840D13

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR **NARROW DROP INLET FRAME AND GRATE** FOR USE WITH DETAIL 840D11 & 840D12	SHEET 1 OF 1 **840D13**



STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ENGLISH DETAIL DRAWING FOR METHOD FOR PLACEMENT OF DROP INLETS IN ISLANDS
SHEET 1 OF 1 852D03

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR **METHOD FOR PLACEMENT OF DROP INLETS IN ISLANDS**	SHEET 1 OF 1 **852D03**



DESIGN SERVICES UNIT
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SEE PLATE FOR TITLE

ORIGINAL BY: 1998 STDS DATE:
MODIFIED BY: cnbritt DATE: 9-11-09
CHECKED BY: [illegible] DATE: 9/2[illegible]/09
FILE SPEC.: details/nbritt/english/hydro/u5018a.dgn

11-SEP-2009 11:31
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$$$$USERNAME$$$$

5/14/99

MATERIALS

A	GEOTEXTILE FABRIC (SEE SHEET 2-H)
B	POLYPROPYLENE WOVEN MONOFILAMENT GEOTEXTILE FABRIC (SEE SHEET 2-H)
D	15" DRAINAGE PIPE (INLET)
E	15" DRAIANGE PIPE (OUTFALL)
F	TWO LINES OF 6" PERFORATED HDPE D/W (UNDERDRAIN PIPE) (SEE SHEET 2-I)
G	6" HDPE D/W SOLID CLEANOUT PIPE (SEE SHEET 2-H)
H	PRECAST DI BOX (SEE SHEET 2-F)
I	1' MIN. THICKNESS OF ENGINEERED SOIL (80%-85% SAND, 8%-12% FINES (SILT & CLAY), 3%-5% ORGANICS) (FILTER BED)
J	12" THICK, WASH STONE NO. 57 AS PER NCDOT SPEC. (UNDERDRAIN SYSTEM SEE SHEET 2-H & 2-I)

TABLE"A"

DIMENSIONS FOR UNDERDRAIN PIPE & FILTER BED			
BASIN	UNDERDRAIN PIPE DIM.	FILTER BED DIMENSIONS AT EL. 36.0	
	LENGTH	WIDTH	LENGTH
-L- 55+43.3	21.0'	4.5'	32.0'

NOTE:

ENGINEERED SOIL SURFACE AREA
AT ELEV. 36.0 = 118.0 SF.
BOTTOM OF BASIN SURFACE AREA
AT ELEV. 36.0 = 295.0 SF.
BOTTOM OF FOREBAY SURFACE AREA
AT ELEV. 36.0 = 15.4 SF.

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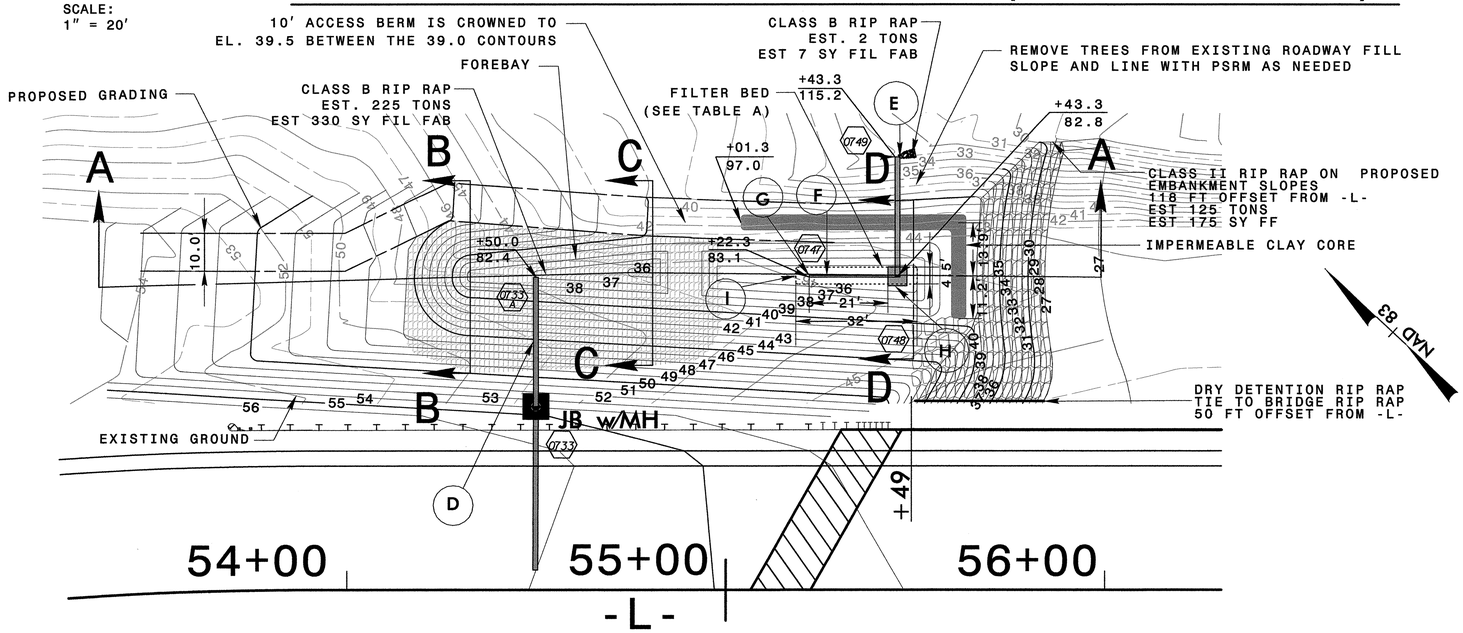
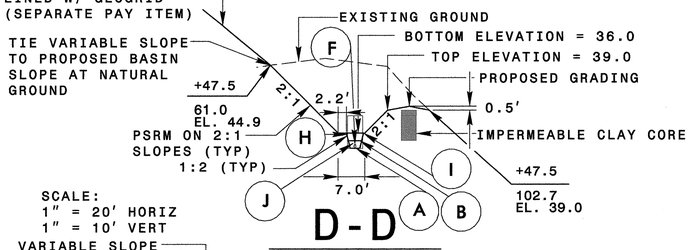
PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2-D
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN A. MEFFORD
6-7-10

DRY DETENTION DETAIL (-L-55+43.3)

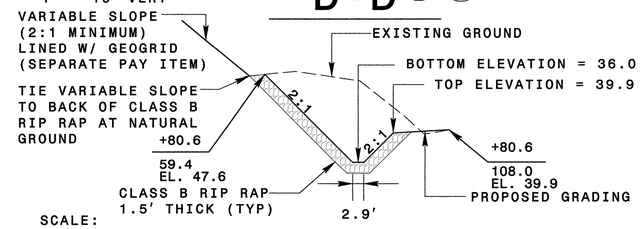
SCALE:
1" = 20'





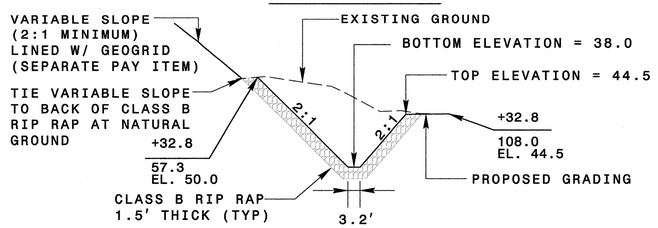
SCALE:
1" = 20' HORIZ
1" = 10' VERT

D-D



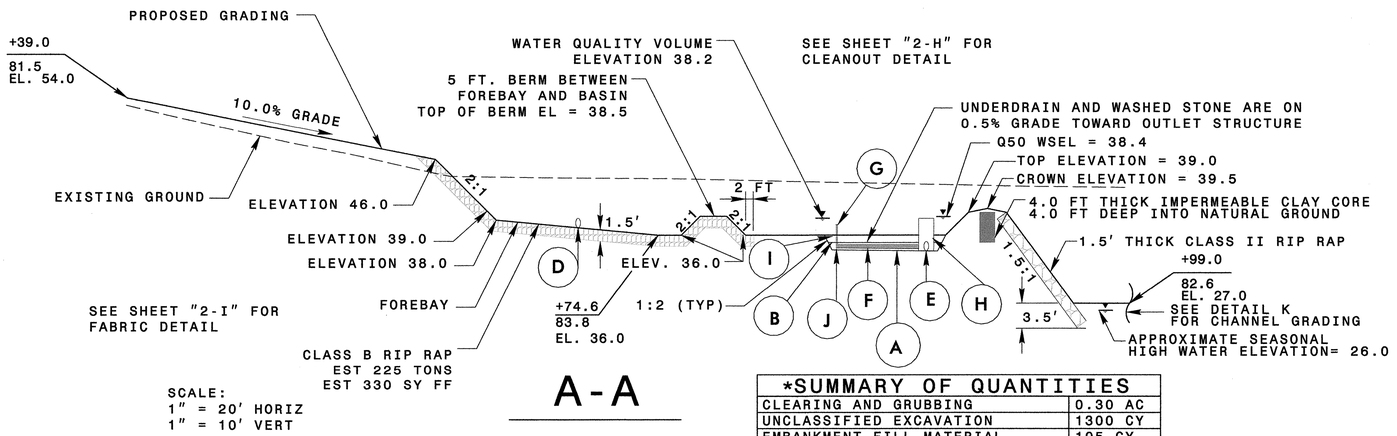
SCALE:
1" = 20' HORIZ
1" = 10' VERT

C-C



SCALE:
1" = 20' HORIZ
1" = 10' VERT

B-B



SCALE:
1" = 20' HORIZ
1" = 10' VERT

A-A

*SUMMARY OF QUANTITIES	
CLEARING AND GRUBBING	0.30 AC
UNCLASSIFIED EXCAVATION	1300 CY
EMBANKMENT FILL MATERIAL	105 CY
CLAY CORE MATERIAL	50 CY
WASHED 57 STONE	11 TONS
RIP RAP CLASS 'B'	227 TONS
RIP RAP CLASS 'II'	125 TONS
ENGINEERED SOIL	8 CY
SOD	20 SY
SEEDING AND MULCHING	0.20 AC
MOWING	0.20 AC
POLYPROPYLENE WOVEN MONOFILAMENT GEOTEXTILE FABRIC	25 SY
GEOTEXTILE FABRIC	25 SY
PSRM	220 SY

*NOTE: BOXES AND PIPES ARE QUANTIFIED ON DRAINAGE SUMMARY SHEET

NOTES

1. BASIN WILL BE SEEDED AND FERTILIZED WITH NATIVE GRASSES PER SECTION 16-60 OF NCDOT'S STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES
2. BASIN EXCAVATION ESTIMATED AT 1300 CY
3. BASIN FILL ESTIMATED AT 105 CY
4. PERMANENT SOIL REINFORCEMENT MATTING TO BE USED ON ALL 2:1 SLOPES AND GREATER THAT ARE NOT RIP RAPPED.

6/7/2010
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MATERIALS

A	GEOTEXTILE FABRIC (SEE SHEET 2-H)
B	POLYPROPYLENE WOVEN MONOFILAMENT GEOTEXTILE FABRIC (SEE SHEET 2-H)
D	15" DRAINAGE PIPE (INLET)
E	15" DRAINAGE PIPE (OUTFALL)
F	TWO LINES OF 6" PERFORATED HDPE D/W (UNDERDRAIN PIPE) (SEE SHEET 2-I)
G	6" HDPE D/W SOLID CLEANOUT PIPE (SEE SHEET 2-H)
H	PRECAST DI BOX (SEE SHEET 2-F)
I	1' MIN. THICKNESS OF ENGINEERED SOIL (80%-85% SAND, 8%-12% FINES (SILT & CLAY), 3%-5% ORGANICS) (FILTER BED)
J	12" THICK, WASH STONE NO. 57 AS PER NCDOT SPEC. (UNDERDRAIN SYSTEM SEE SHEET 2-H & 2-I)

DIMENSIONS FOR UNDERDRAIN PIPE & FILTER BED			
BASIN	UNDERDRAIN PIPE DIM.	FILTER BED DIMENSIONS AT EL. 36.0	
	LENGTH	WIDTH	LENGTH
-L- 57+34.6	15.0'	7.0'	22.0'

NOTE:

ENGINEERED SOIL SURFACE AREA
AT ELEV. 36.0 = 129.0 SF.
BOTTOM OF BASIN SURFACE AREA
AT ELEV. 36.0 = 611.5 SF.
BOTTOM OF FOREBAY SURFACE AREA
AT ELEV. 34.0 = 30.0 SF.

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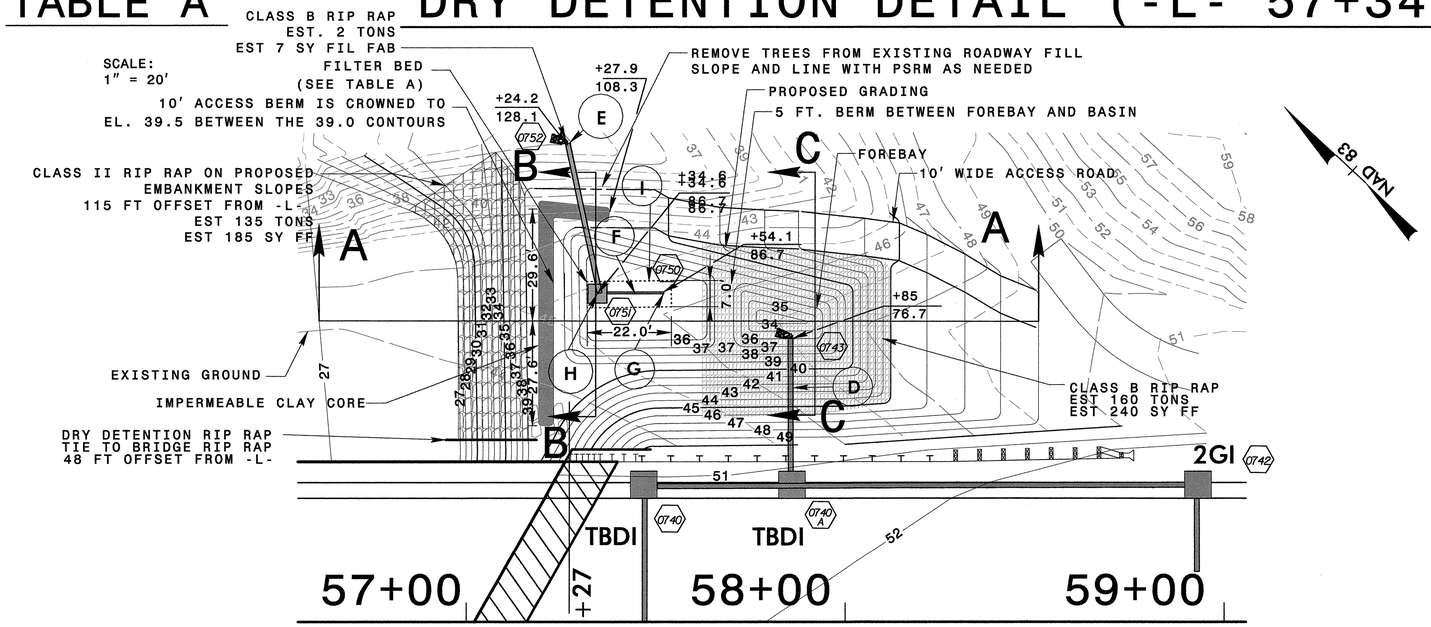
PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2-E

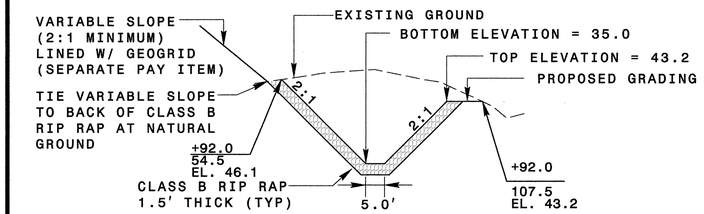
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

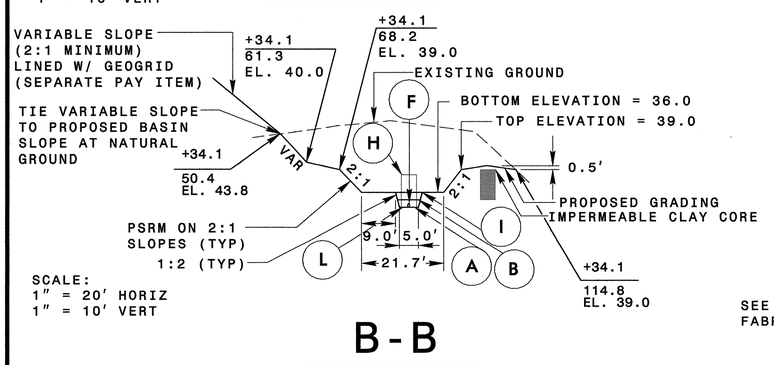
NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN B. ALFORD
6-7-10

TABLE"A" DRY DETENTION DETAIL (-L- 57+34.6)

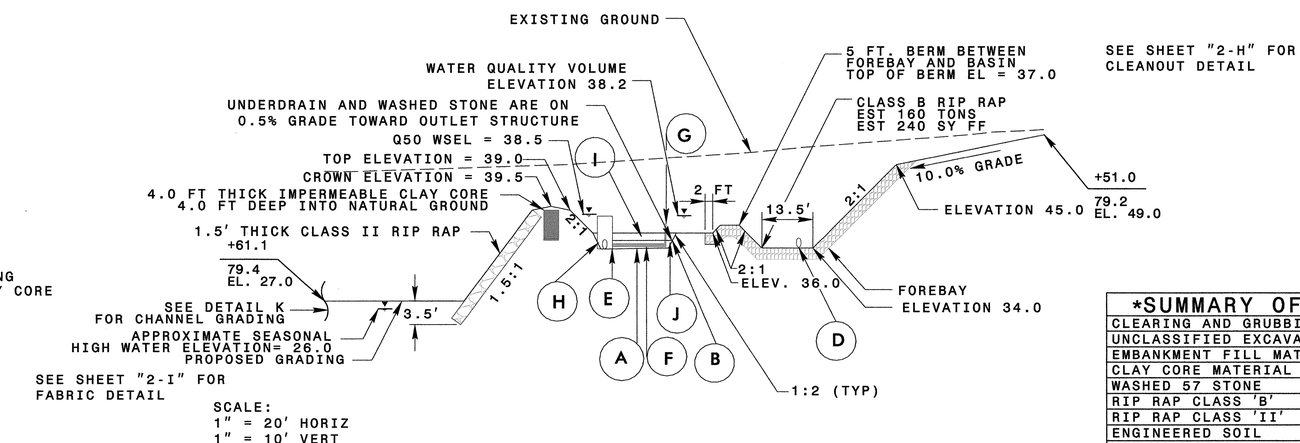




C-C



B-B



A-A

*SUMMARY OF QUANTITIES	
CLEARING AND GRUBBING	0.22 AC
UNCLASSIFIED EXCAVATION	1340 CY
EMBANKMENT FILL MATERIAL	95 CY
CLAY CORE MATERIAL	45 CY
WASHED 57 STONE	8 TONS
RIP RAP CLASS 'B'	162 TONS
RIP RAP CLASS 'II'	135 TONS
ENGINEERED SOIL	8 CY
SOD	20 SY
SEEDING AND MULCHING	0.14 AC
MOWING	0.14 AC
POLYPROPYLENE WOVEN MONOFILAMENT GEOTEXTILE FABRIC	20 SY
GEOTEXTILE FABRIC	20 SY
PSRM	200 SY

*NOTE: BOXES AND PIPES ARE QUANTIFIED ON DRAINAGE SUMMARY SHEET

NOTES

1. BASIN WILL BE SEEDED AND FERTILIZED WITH NATIVE GRASSES PER SECTION 16-60 OF NCDOT'S STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES
2. BASIN EXCAVATION ESTIMATED AT 1340 CY
3. BASIN FILL ESTIMATED AT 95 CY
4. PERMANENT SOIL REINFORCEMENT MATTING TO BE USED ON ALL 2:1 SLOPES AND GREATER THAT ARE NOT RIP RAPPED.

6/7/2010
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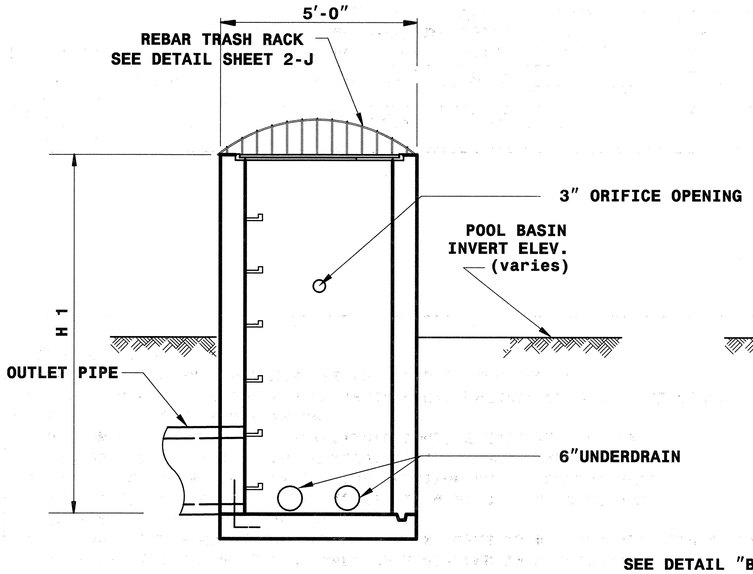
PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2-F

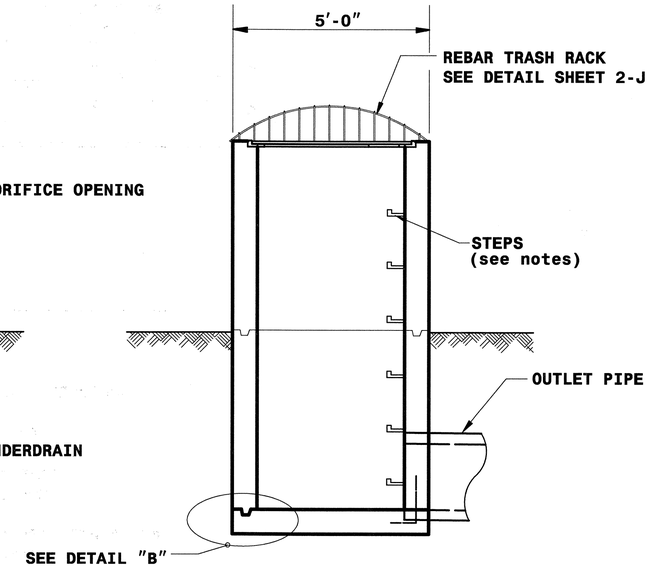
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

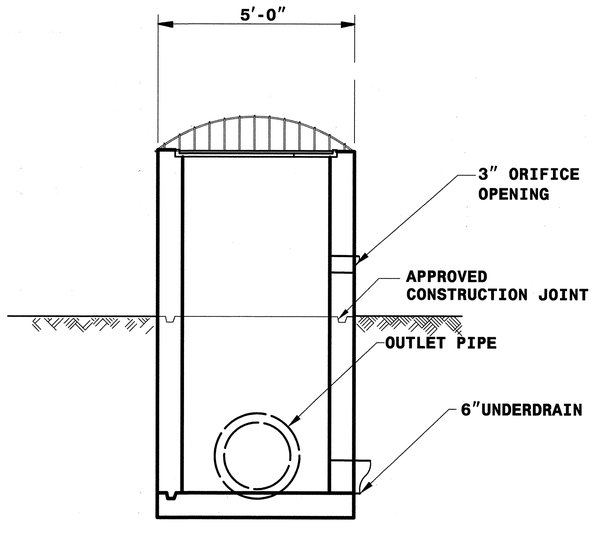
NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN B. ALFORD
6-3-10



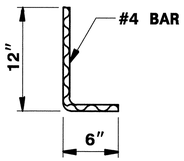
STRUCTURE SIDE 1



STRUCTURE SIDE 2



STRUCTURE FRONT



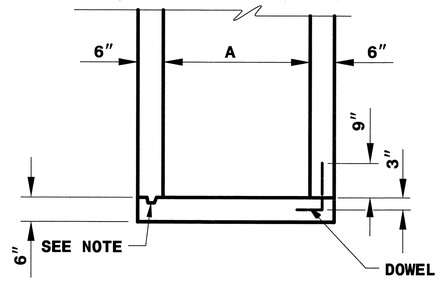
DOWEL

TABLE "A"

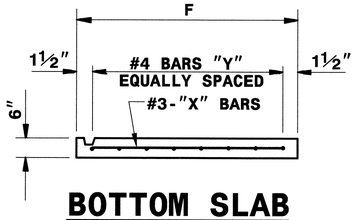
MINIMUM DIMENSIONS FOR OUTLET CONTROL STRUCTURE

BASIN	PIPE DIA.	OUTLET PIPE INVERT	BOX HEIGHT H1	TOP OF GRATE ELEV.	UNDER DRAIN INVERT	ORFICE PLATE OPENING INVERT	POOL BASIN ELEV. @ PAD ELEV.
Sta. 55+43.3 -L-	15"	33.8'	4.4'	38.2'	33.8'	37.0'	36.0'
(82.8 Lt)							
Sta. 57+34.6 -L-	15"	33.9'	4.3'	38.2'	33.9'	37.0'	36.0'
(86.7 Lt)							

GENERAL NOTES:
* CHANGES IN ELEVATIONS MUST BE APPROVED BY THE ENGINEER.
* CLASS 'B' CONCRETE TO BE USED THROUGHOUT. PRECAST CONCRETE STRUCTURES TO BE SUBMITTED FOR APPROVAL.
* OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2 INCH KEYWAY, OR #4 BAR DOWELS AT 12 INCH CENTERS, AS DIRECTED BY THE ENGINEER.
* FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
* IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD 840.00.
* ALL DRAWDOWN STRUCTURES OVER 3 FEET IN DEPTH TO BE PROVIDED WITH STEPS 12 INCH ON CENTERS. STEPS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD 840.66.
* WALL THICKNESS SHALL BE INACCORDANCE TO STD. # 840.31 AND # 840.32
* RETICULINE FRAME AND GRATE TO BE APPROVED BY THE ENGINEER.



DETAIL 'B'



BOTTOM SLAB

PRECAST DI BOX

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

PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2-G
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN B. ALFORD
6-3-10

DRY DETENTION BASIN NOTES

SEQUENCE OF CONSTRUCTION FOR DRY DETENTION BASIN

1. PUT IN ALL EROSION CONTROL MEASURES
   (AS NEEDED THROUGH CONSTRUCTION STAGES).
2. EXCAVATE THE BASIN.
   PREPARE THE BASIN FLOOR AT THE GIVEN GRADE.
3. CONSTRUCT BERM AROUND BASIN.
4. CONSTRUCT UNDERDRAIN SYSTEM
   (SEE DETAIL SHEETS 2-H AND 2-I)
5. FINE GRADE ELEVATIONS
6. CONSTRUCT AND INSTALL BOXES.
   CREATE OPENINGS IN BOXES
   AND CONNECT PIPES WITH BOXES.
7. ADD GRATES/TRASH RACK ON ALL BOXES.

GENERAL NOTES FOR DRY DETENTION BASIN

1. APPLY SEEDING OVER THE SIDE SLOPES OF BERM AND
   ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED
   AGAINST IMMEDIATE POTENTIAL STORM EVENT.
2. THE SURVEYOR SHALL VERIFY THE INVERTS AND ELEVATIONS
   AT THE FOLLOWING POINTS AT THE END OF EACH PHASE OF CONSTRUCTION:
   -INVERTS IN THE PIPE AND THE BOXES
   -INVERTS AT THE HIGH AND LOW POINTS OF THE ENGINEERED SOILS
3. ALL EMBANKMENTS AND FILL MATERIAL SHALL BE COMPACTED TO AT LEAST
   TO NCDOT STANDARD SPECIFICATION 2-35

MAINTENANCE RECOMMENDATIONS

1. REMOVE DEBRIS, TRASH AND SEDIMENT BUILDUP FROM THE BASIN
   AS NECESSARY TO MINIMIZE OUTLET CLOGGING AND IMPROVE AESTHETICS.
2. REPAIR AND REVEGETATE ERODED AREAS AS NEEDED.
3. CHECK INLETS AND OUTLETS FOR STRUCTURAL REPAIR TO CONFIRM THAT
   THEY ARE OPERATIONAL.
4. MOW AS NECESSARY TO LIMIT UNWANTED VEGETATION AND REMOVE
   CLIPPINGS AS PRACTICAL.
5. FOREBAY MUST RECIEVE REGULAR MAINTENANCE TO REMAIN EFFECTIVE

IMPERMEABLE CLAY LINER SPECIFICATION

THE IMPERMEABLE CLAY LAYER SHALL HAVE THE FOLLOWING PROPERTIES:

1. UNIFIED SOIL CLASSIFICATION "CL".
2. LIQUID LIMIT BETWEEN 25 AND 40.
3. PLASTICITY INDEX BETWEEN 20 AND 30.
4. IMPERVIOUS TO FLOW OF WATER WHEN A 12" THICK
LAYER IS COMPACTED TO 90% RELATIVE COMPACTION PER ASTM D-1557.

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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2-H

ROADWAY DESIGN ENGINEER

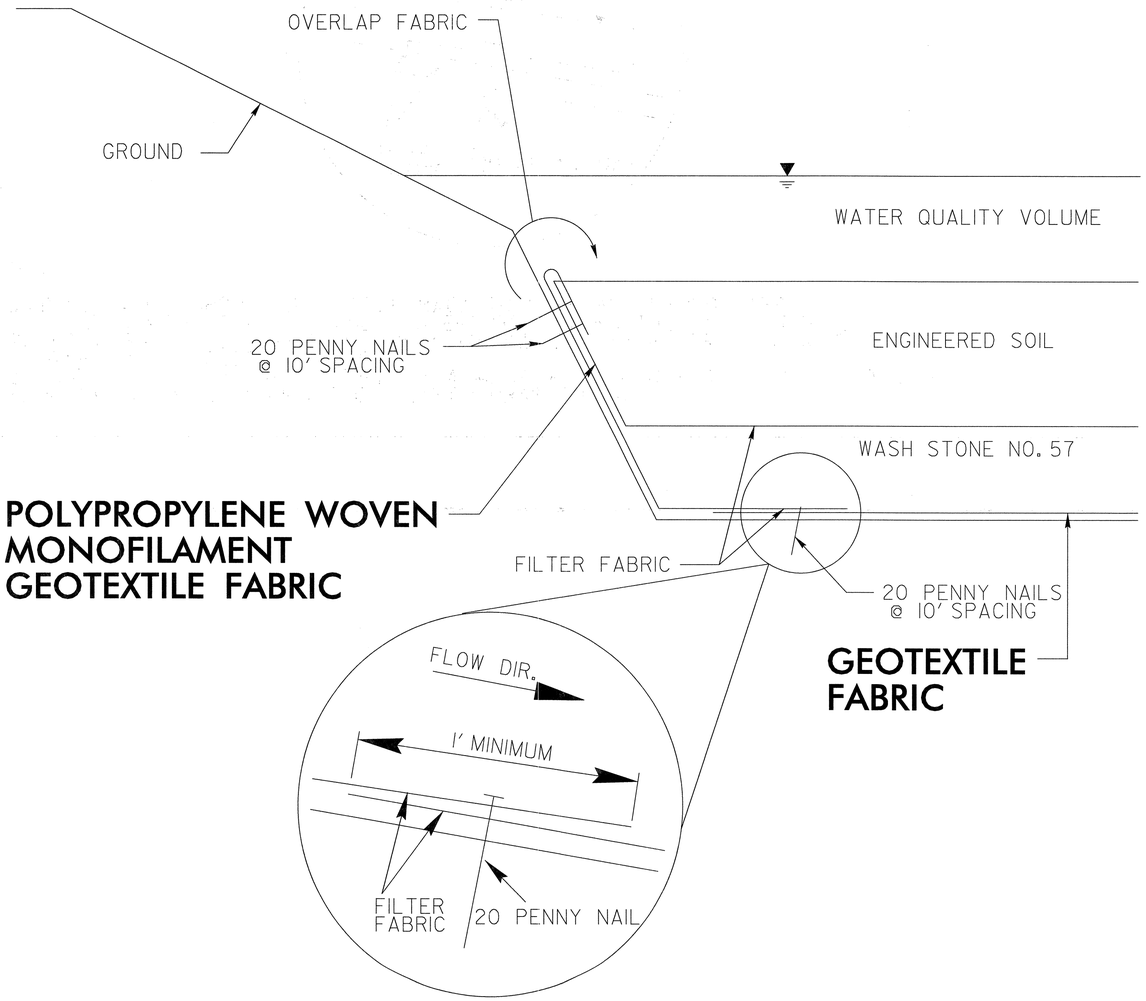
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER JOHN B. ALFORD

K B A 6-3-10

UNDERDRAIN FABRIC

***NOT TO SCALE**

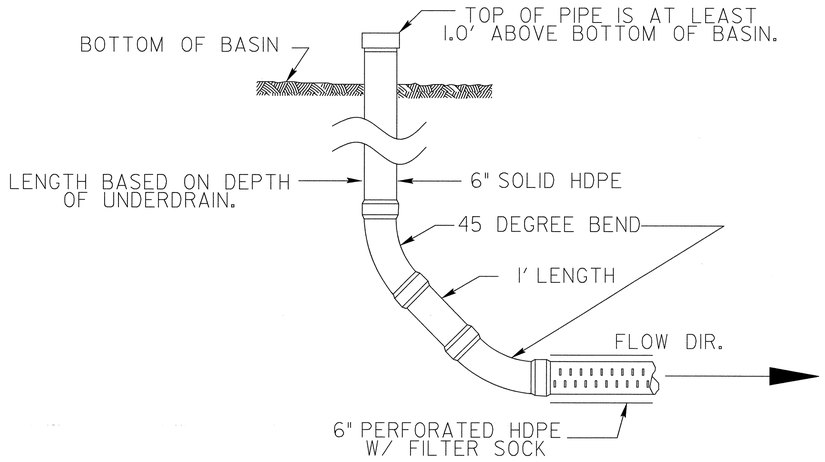


NOTES:

1. LINING FABRIC SHOULD BE FOLDED BACK TO OVERLAP DIVIDING FABRIC AND SECURED WITH 20 PENNY NAILS TO ENCURE SEALING THE STONE FROM SOIL.
2. FABRIC SHOULD BE LAYED IN A WAY TO PREVENT WATER FROM FLOWING BETWEEN OVERLAPPED PIECES. (SEE BLOWUP)
3. FABRIC SHOULD BE OVERLAPPED BY A MINIMUM OF 12 INCHES AND SECURED WITH NAILS.
4. NO OVERLAPPING SHOULD OCCUR UNDER DRAIN PIPES.

CLEANOUT

***NOT TO SCALE**



NOTE: ONLY UNDERDRAIN PIPE SHOULD BE PERFORATED

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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2-I
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN B. ALFORD
6-3-10

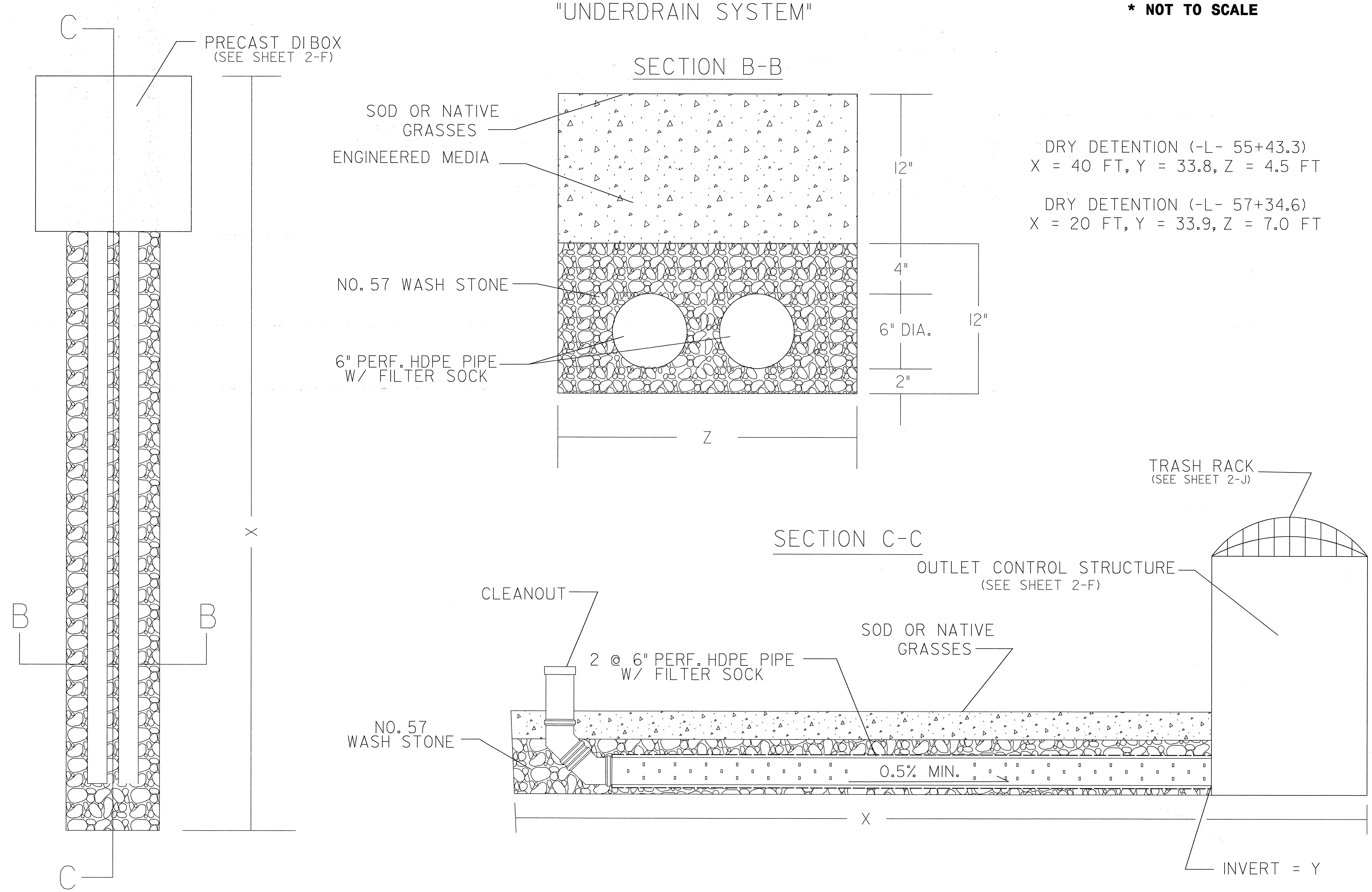
DRY DETENTION BASIN

"UNDERDRAIN SYSTEM"

*** NOT TO SCALE**

DRY DETENTION (-L- 55+43.3)
X = 40 FT, Y = 33.8, Z = 4.5 FT

DRY DETENTION (-L- 57+34.6)
X = 20 FT, Y = 33.9, Z = 7.0 FT



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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2-J

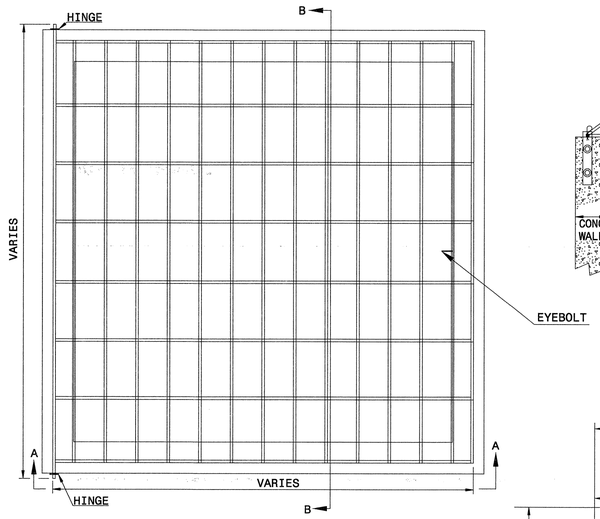
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

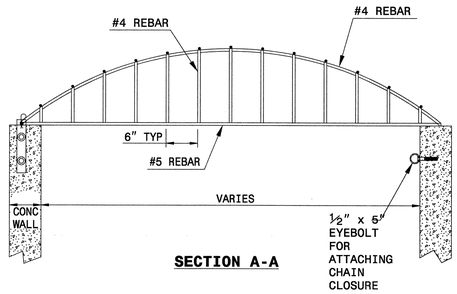
NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN B. ALFORD
K. B. Alford 6-3-10

DRY DETENTION BASIN
TRASH RACKS

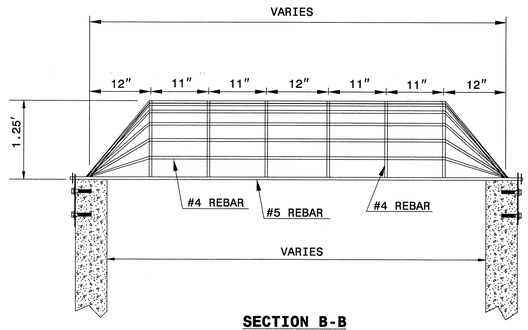
REBAR TRASH RACK



PLAN



SECTION A-A

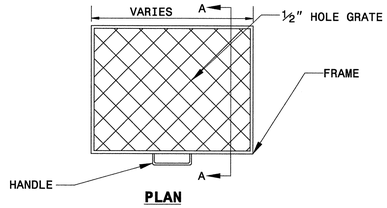


SECTION B-B

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK AND HARDWARE SHALL BE REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.

*** NOT TO SCALE**

REMOVEABLE ORIFICE TRASH RACK



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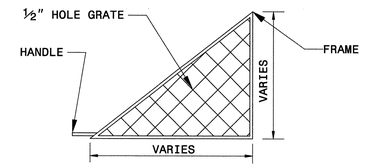

SECTION A-A

ORIFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. REMOVEABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM A-153.

DRY DETENTION BASIN
TRASH RACKS

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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2-K

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE

SHEET 1 OF 3 — 300D01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE

SHEET 2 OF 3 — 300D01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE

SHEET 1 OF 3 — 300D01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE

SHEET 2 OF 3 — 300D01

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
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SEE PLATE FOR TITLE

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

7-06

ENGLISH DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FILL HEIGHT TABLES

SHEET 3 OF 3

300D01

FLEXIBLE PIPE

Round Corrugated Steel Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	(Ga)	Maximum Height of Cover (feet) 16	14	12	10	8
12	12		204	256			
15	12		162	204			
18	12		135	169	239		
21	12		115	145	204		
24	12		100	126	178		
30	12		79	100	142		
36	12		65	83	117	152	
42	12		55	70	100	130	160
48	12		48	61	87	113	139
54	12			54	77	100	123
60	12				69	90	111
66	12					81	100
72	12					74	91
78	12						81
84	12						69

Round Corrugated Aluminum Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	(Ga)	Maximum Height of Cover (feet) 16	14	12	10	8
12	12		123	155	218	281	344
15	12		98	123	174	224	275
18	12		81	102	144	187	228
21	12		69	87	123	160	195
24	12		60	76	108	139	171
27	12			67	95	123	151
30	12			60	85	111	136
36	12			50	71	92	113
42	12				60	78	96
48	12				52	68	84
54	12				46	50	74
60	12					50	62
66	12						51
72	12						41

** FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

HDPE - * (Minimum fill) 2′ for pipe diameters ≥ 12″ and ≤ 60″
* (Maximum fill) 20′ for pipe diameters ≤ 24″
17′ for pipe diameters ≥ 30″ and ≤ 60″

PVC - * (Minimum fill) 2′ for pipe diameters ≥ 12″ and ≤ 36″
* (Maximum fill) 30′ for pipe diameters ≥ 12″ and ≤ 36″

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

CSP - AASHTO M36
CAAP - AASHTO M196
HDPE - AASHTO M294
PVC - ASTM F949 or AASHTO M304

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1′ MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

RIGID PIPE

RCP - * (Minimum fill) 1′ for Class IV & CLASS V
2′ for Class III & Class II

* (Maximum fill) 10′ - Class II pipe
20′ - Class III pipe
30′ - Class IV pipe
40′ - Class V pipe

(For fills > 40′ & < 80′ use LRFD Direct Design Method)

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

RCP - AASHTO M170

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1′ MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

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

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

PROJECT SERVICES UNIT
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ORIGINAL BY: KKempf DATE: 5-15-09
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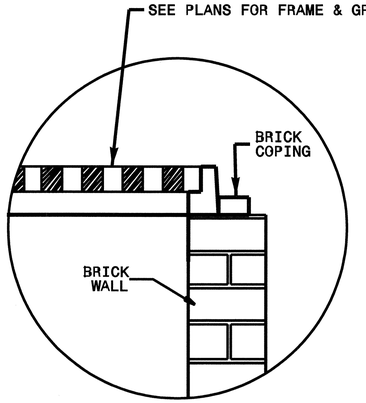
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19761 WILLIAM B. PERRY

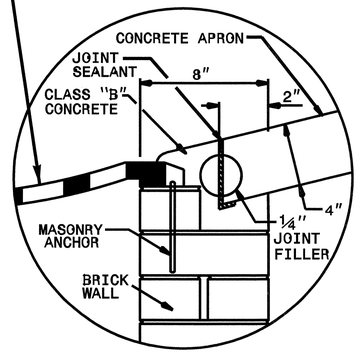
PROJECT REFERENCE NO. U-5018A
SHEET NO. 2-L

PROJECT REFERENCE NO.	SHEET NO.
U-5018A	2-M



GRATE PLACEMENT DETAIL

FOR DROP INLETS

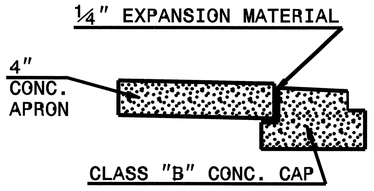


GRATE PLACEMENT DETAIL

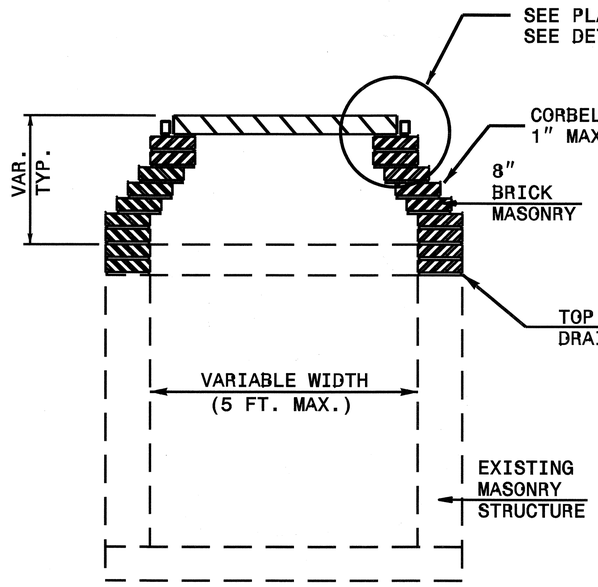
FOR GRATED DROP INLETS

GENERAL NOTES:

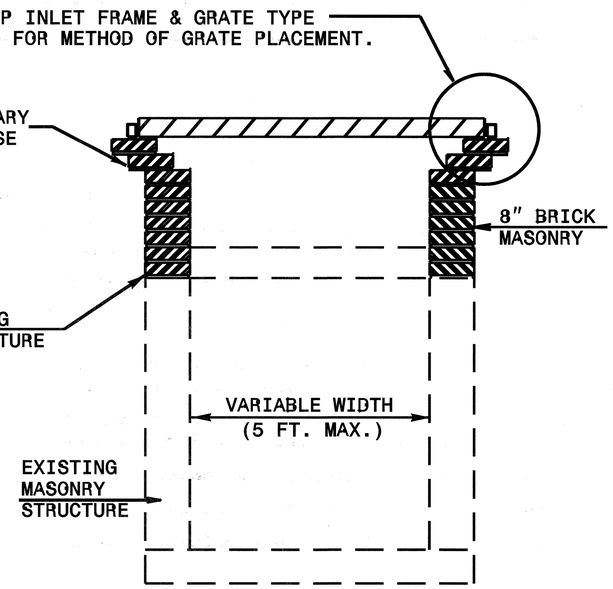
- -CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.
- -USE CLASS B CONCRETE.
- -THE DIMENSIONS FOR THE EXISTING BOXES ARE APPROXIMATE AND MAY VARY SLIGHTLY.
- -JUMBO CONCRETE BRICK WILL BE PERMITTED. 4" CONCRETE BRICK OR 8" SOLID CONCRETE BLOCK ARE REQUIRED FOR DRAINAGE STRUCTURE.
- -INCLUDE 18" CONCRETE APRON IN UNIT PRICE BID PER EACH, CONVERT EXISTING CATCH BASIN TO DROP INLET.
- -SPECIAL DESIGN IS REQUIRED FOR USE UNDER PAVEMENT.
- -CONFIRM DIMENSIONS ON EACH INDIVIDUAL FRAME & GRATE PROPOSAL.
- -SEE STD. DRAWING 840.25 FOR MASONRY ANCHORAGE.



EXPANSION JOINT DETAIL



TYPICAL SECTION



TYPICAL SECTION

PROJECT SERVICES UNIT
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DETAIL TO CONVERT EXISTING CATCH BASIN OR JUNCTION BOX TO DROP INLET

ORIGINAL BY:	T.E.S.	DATE: NOV.1997
MODIFIED BY:	T.E.S.	DATE: FEB.2000
CHECKED BY:		DATE:
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jhowerton AT PS237501

PROJECT REFERENCE NO.	SHEET
U-5018A	2-N

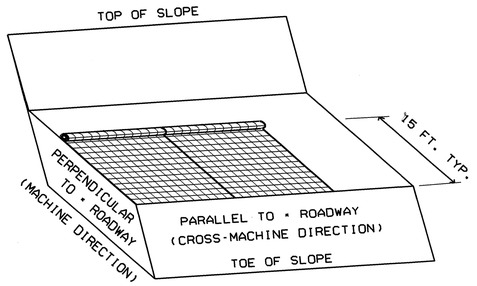
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 32177 ENGINEER JINYOUNG PARK

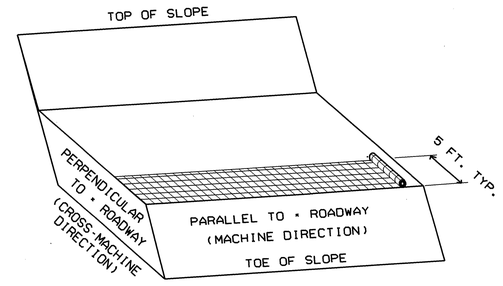
SIGNATURE DATE

ENGINEER

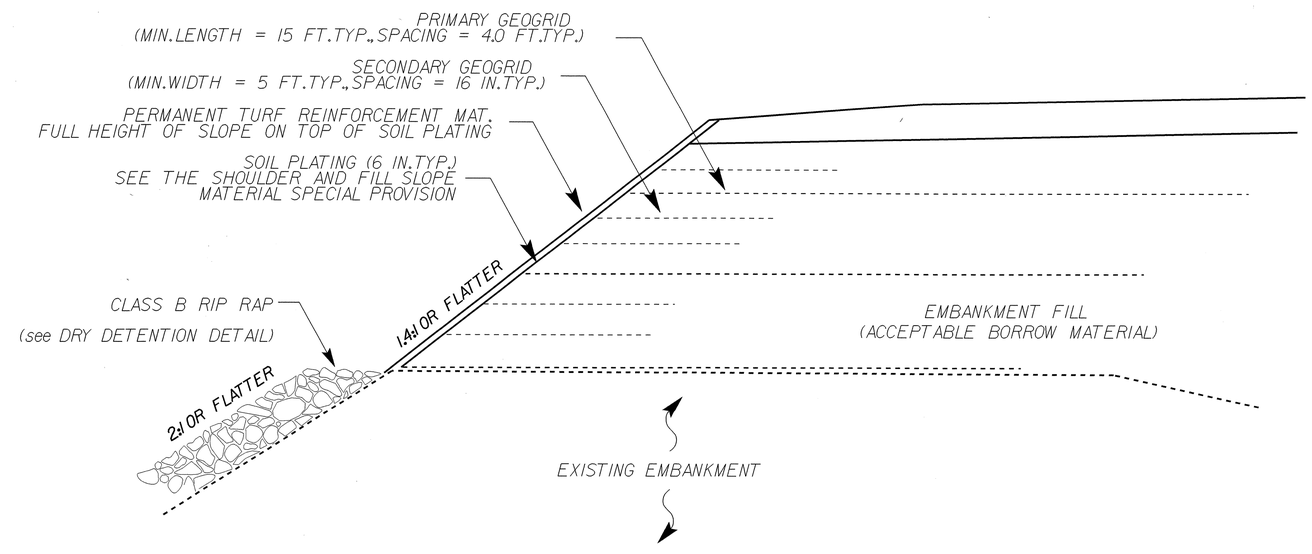
SIGNATURE DATE



15 FT. LONG (PRIMARY) GEOGRID REINFORCEMENT DETAIL



5 FT. WIDE (SECONDARY) GEOGRID REINFORCEMENT DETAIL



GEOGRID REINFORCED SLOPE TYPICAL SECTION

N.T.S

NOTES:

1. GEOGRID REINFORCEMENT SHALL BE PLACED AT THE LOCATIONS LISTED IN THE GEOGRID REINFORCED SLOPE TABLE WHERE SLOPES ARE STEEPER THAN 2.5:1 (H:V).
2. LAYERS OF REINFORCEMENT MAY NEED TO BE ADDED OR SUBTRACTED AT THE TOP OF SLOPE AS THE EMBANKMENT HEIGHT VARIES THROUGH THE STEEPENED SECTION.
3. THE TOP LAYER OF REINFORCEMENT MAY BE LOWERED SLIGHTLY IF NECESSARY TO PREVENT INTERFERENCE WITH THE SUBGRADE.
4. THE FIRST LAYER OF GEOGRID SHALL BE PLACED ON LEVEL GROUND NOT STEEPER THAN 5% GRADE.
5. SEE THE SPECIAL PROVISION FOR GEOGRID REINFORCEMENT FOR DETAILED REQUIREMENTS OF MATERIALS AND CONSTRUCTION.
6. PERMANENT TURF REINFORCEMENT MATTING SHALL BE PLACED AT THE LOCATIONS LISTED IN THE SLOPE TABLE WHERE SLOPES ARE STEEPER THAN 2.5:1 (H:V).
7. BACKFILL WITHIN THE REINFORCED VOLUME SHALL BE COASTAL PLAIN BORROW MATERIAL IN ACCORDANCE WITH SECTION 1018 OF THE STANDARD SPECIFICATIONS.
8. PLATE THE FACE OF THE SLOPE WITH 6 INCHES OF SOIL IN ACCORDANCE WITH THE SHOULDER AND FILL SLOPE MATERIAL SPECIAL PROVISION.
9. THE ENTIRE EMBANKMENT SHALL BE CONSTRUCTED SIMULATANEOUSLY WITH THE SLOPE REINFORCEMENT.

Geogrid Reinforced Slope Table			
Alignment	Begin Station	End Station	Location
-L-	53+75 +/-	55+44 +/-	Left
-L-	57+26 +/-	58+25 +/-	Left

REINFORCED SLOPE ESTIMATED QUANTITIES:

PRIMARY GEOGRID REINFORCEMENT: 1420 SQ. YD.
SECONDARY GEOGRID REINFORCEMENT: 520 SQ. YD.
PERMANENT TURF REINFORCEMENT MAT: 380 SQ. YD.

PREPARED BY: JYP	DATE: 08/2009
REVIEWED BY: JRB	DATE: 08/2009

GEOTECHNICAL ENGINEERING UNIT

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

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GEOGRID REINFORCED SLOPE DETAIL

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

GEJ248334 5/4/2010 U5018A_GEO_RDWY_RSlope_Detail jpark RD-Oce860-34

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-5018A	3

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202636

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (56+12.00 -L-)
0036000000-E	225	30,250	CY	UNDERCUT EXCAVATION
0038000000-E	SP	150	CY	SHALLOW UNDERCUT
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0063000000-N	SP	Lump Sum		GRADING
0080000000-E	SP	250	TON	CLASS IV SUBGRADE STABILIZATION
0134000000-E	240	5,205	CY	DRAINAGE DITCH EXCAVATION
0196000000-E	270	30,650	SY	FABRIC FOR SOIL STABILIZATION
0234000000-E	SP	46,950	CY	GENERIC GRADING ITEM BORROW EXCAVATION
0241000000-E	SP	380	SY	GENERIC GRADING ITEM PERMANENT TURF REINFORCEMENT MAT
0241000000-E	SP	1,420	SY	GENERIC GRADING ITEM PRIMARY GEOGRID REINFORCEMENT
0241000000-E	SP	520	SY	GENERIC GRADING ITEM SECONDARY GEOGRID REINFORCEMENT
0318000000-E	SP	310	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0320000000-E	SP	960	SY	FOUNDATION CONDITIONING FABRIC
0335200000-E	SP	464	LF	15" DRAINAGE PIPE
0335300000-E	SP	240	LF	18" DRAINAGE PIPE
0335400000-E	SP	8	LF	24" DRAINAGE PIPE
0335850000-E	SP	4	EA	** DRAINAGE PIPE ELBOWS (15")
0335850000-E	SP	2	EA	** DRAINAGE PIPE ELBOWS (18")
0343000000-E	SP	180	LF	15" SIDE DRAIN PIPE
0344000000-E	SP	128	LF	18" SIDE DRAIN PIPE
0448200000-E	SP	1,764	LF	15" RC PIPE CULVERTS, CLASS IV
0448400000-E	SP	96	LF	24" RC PIPE CULVERTS, CLASS IV
0986000000-E	SP	12	LF	GENERIC PIPE ITEM 6" HDPE PIPE
0986000000-E	SP	92	LF	GENERIC PIPE ITEM 6" PERFORATED HDPE PIPE
0992000000-E	SP	2	EA	GENERIC PIPE ITEM 6" HDPE CAPS
0992000000-E	SP	4	EA	GENERIC PIPE ITEM 6" HDPE ELBOWS
0995000000-E	340	523	LF	PIPE REMOVAL
1121000000-E	520	1,660	TON	AGGREGATE BASE COURSE
1220000000-E	545	1,000	TON	INCIDENTAL STONE BASE
1491000000-E	610	15,335	TON	ASPHALT CONC BASE COURSE, TYPE B25.0C
1503000000-E	610	8,310	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C
1523000000-E	610	6,100	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5C
1560000000-E	620	1,050	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
1565000000-E	620	366	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 70-22
1693000000-E	654	50	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
2022000000-E	SP	1,092	CY	SUBDRAIN EXCAVATION
2033000000-E	SP	546	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	SP	3,250	LF	6" PERFORATED SUBDRAIN PIPE
2070000000-N	SP	7	EA	SUBDRAIN PIPE OUTLETS
2077000000-E	SP	42	LF	6" OUTLET PIPE (SUBDRAINS)
2253000000-E	840	1.3	CY	PIPE COLLARS
2275000000-E	SP	3.5	CY	FLOWABLE FILL
2286000000-N	840	30	EA	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	6.6	LF	MASONRY DRAINAGE STRUCTURES
2364000000-N	840	8	EA	FRAME WITH TWO GRATES, STD 840.16
2366000000-N	840	5	EA	FRAME WITH TWO GRATES, STD 840.24
2367000000-N	840	3	EA	FRAME WITH TWO GRATES, STD 840.29
2374000000-N	840	2	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)
2374000000-N	840	3	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)
2396000000-N	840	2	EA	FRAME WITH COVER, STD 840.54
2451000000-N	852	14	EA	CONCRETE TRANSITIONAL SECTION FOR DROP INLETS
2473000000-N	SP	4	EA	GENERIC DRAINAGE ITEM NARROW DROP INLET FRAME AND GRATE
2474000000-N	SP	Lump Sum		GENERIC DRAINAGE ITEM DRY DETENTION BASIN STA 55+43.3
2474000000-N	SP	Lump Sum		GENERIC DRAINAGE ITEM DRY DETENTION BASIN STA 57+34.6
2542000000-E	846	6,000	LF	1'-6" CONCRETE CURB & GUTTER
2549000000-E	846	790	LF	2'-6" CONCRETE CURB & GUTTER
2577000000-E	846	475	LF	CONCRETE EXPRESSWAY GUTTER
2612000000-E	848	264	SY	6" CONCRETE DRIVEWAY
2647000000-E	852	70	SY	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)
2655000000-E	852	440	SY	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)
2739000000-E	852	280	SY	GENERIC PAVING ITEM 5" MONOLITHIC CONCRETE ISLAND (KEYED IN-MODIFIED)
2950000000-N	SP	2	EA	CONVERT EXISTING JUNCTION BOX TO DROP INLET
3030000000-E	862	425	LF	STEEL BM GUARDRAIL
3150000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS
3210000000-N	862	1	EA	GUARDRAIL ANCHOR UNITS, TYPE CAT-1
3215000000-N	862	3	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	2	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3628000000-E	876	105	TON	RIP RAP, CLASS I
3649000000-E	876	13	TON	RIP RAP, CLASS B
3656000000-E	876	192	SY	FILTER FABRIC FOR DRAINAGE
3659000000-N	SP	1	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON
4400000000-E	1110	354	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	192	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	100	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4430000000-N	1130	175	EA	DRUMS
4455000000-N	1150	540	MD	FLAGGER
4465000000-N	1160	2	EA	TEMPORARY CRASH CUSHIONS
4485000000-E	1170	500	LF	PORTABLE CONCRETE BARRIER
4650000000-N	1251	113	EA	TEMPORARY RAISED PAVEMENT MARKERS
4685000000-E	1205	9,560	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	5,474	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4710000000-E	1205	76	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
4721000000-E	1205	8	EA	THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS)
4725000000-E	1205	27	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
4770000000-E	1205	1,266	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)
4810000000-E	1205	67,025	LF	PAINT PAVEMENT MARKING LINES (4")
4820000000-E	1205	436	LF	PAINT PAVEMENT MARKING LINES (8")
4835000000-E	1205	80	LF	PAINT PAVEMENT MARKING LINES (24")
4845000000-N	1205	10	EA	PAINT PAVEMENT MARKING SYMBOL
4850000000-E	1205	805	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
4860000000-E	1205	1,038	LF	REMOVAL OF PAVEMENT MARKING LINES (8")
4875000000-N	1205	9	EA	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS
4900000000-N	1251	261	EA	PERMANENT RAISED PAVEMENT MARKERS
5325600000-E	1510	62	LF	6" WATER LINE
5326200000-E	1510	4,539	LF	12" WATER LINE
5538000000-E	1515	1	EA	4" VALVE
5540000000-E	1515	2	EA	6" VALVE
5546000000-E	1515	1	EA	8" VALVE
5552000000-E	1515	1	EA	10" VALVE
5558000000-E	1515	8	EA	12" VALVE
5571800000-E	1515	1	EA	8" TAPPING VALVE
5572200000-E	1515	1	EA	12" TAPPING VALVE
5588000000-E	1515	3	EA	** AIR RELEASE VALVE (10")
5666000000-E	1515	3	EA	FIRE HYDRANT
5672000000-N	1515	1	EA	RELOCATE FIRE HYDRANT
5709300000-E	1520	98	LF	6" FORCE MAIN SEWER
5709500000-E	1520	4,651	LF	10" FORCE MAIN SEWER
5776000000-E	1525	4	EA	5' DIA UTILITY MANHOLE
5798000000-E	1530	5,090	LF	ABANDON ** UTILITY PIPE (4")
5800000000-E	1530	3,988	LF	ABANDON 6" UTILITY PIPE
5801000000-E	1530	30	LF	ABANDON 8" UTILITY PIPE
5802000000-E	1530	4,675	LF	ABANDON 10" UTILITY PIPE
5804000000-E	1530	4,584	LF	ABANDON 12" UTILITY PIPE
5828000000-N	1530	2	EA	REMOVE UTILITY MANHOLE
5871400000-E	1550	400	LF	TRENCHLESS INSTALLATION OF 6" IN SOIL
5871700000-E	1550	400	LF	TRENCHLESS INSTALLATION OF 12" IN SOIL
5871800000-E	1550	400	LF	TRENCHLESS INSTALLATION OF 14" IN SOIL
5879200000-E	SP	106	LF	2" GAS LINE
5879400000-E	SP	137	LF	4" GAS LINE
5879600000-E	SP	4,931	LF	6" GAS LINE
5880400000-E	SP	1	EA	4" GAS VALVE
5880600000-E	SP	1	EA	6" GAS VALVE
5882000000-N	SP	1	EA	GENERIC UTILITY ITEM 6" SEWER FORCE MAIN CHECK VALVE
5882000000-N	SP	9	EA	GENERIC UTILITY ITEM RECONNECT 3/4" GAS SERVICE
5882000000-N	SP	17	EA	GENERIC UTILITY ITEM RELOCATE EXISTING WATER METER
6000000000-E	1605	3,480	LF	TEMPORARY SILT FENCE
6006000000-E	1610	50	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	190	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	190	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	2	ACR	TEMPORARY MULCHING
6018000000-E	1620	100	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	0.25	TON	FERTILIZER FOR TEMPORARY SEEDING
6029000000-E	SP	800	LF	SAFETY FENCE
6030000000-E	1630	645	CY	SILT EXCAVATION
6036000000-E	1631	15,890	SY	MATTING FOR EROSION CONTROL
6038000000-E	SP	1,470	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	580	LF	1/4" HARDWARE CLOTH
6045000000-E	SP	160	LF	**" TEMPORARY PIPE (18")
6070000000-N	SP	1	EA	SPECIAL STILLING BASINS
6084000000-E	1660	1.5	ACR	SEEDING & MULCHING
6087000000-E	1660	1	ACR	MOWING
6090000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	50	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	1.25	TON	FERTILIZER TOPDRESSING
6111000000-E	SP	100	LF	IMPERVIOUS DIKE
6114000000-N	SP	2	HR	SPECIALIZED HAND MOWING
6117000000-N	SP	8	EA	RESPONSE FOR EROSION CONTROL
6123000000-E	1670	0.5	ACR	REFORESTATION
6126000000-E	SP	0.5	ACR	STREAMBANK REFORESTATION

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8/17/99

COMPUTED BY: JTJ DATE: 4/3/09
CHECKED BY: PJJ DATE: 5/5/10

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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	3-A

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK
IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
–L– 12+25.00 TO 42+00.00	13367	19209	4038		28538
–L– 42+00.00 TO 55+20.42	7088	8516	14566	11311	12349
–L– 57+02.08 TO 62+50.00	3940	275	6849	3026	392
TOTAL	24395	28000	25453	14337	41279
WASTE TO REPLACE BORROW				–2179	–2179
EST. SHOULDER MATERIAL			3169	3169	
ADDITIONAL UNDERCUT		2400			2400
SHALLOW UNDERCUT PORTION		–150			–150
PROJECT TOTAL	24395	30250	28622	15327	41350
EST. 5% TO REPLACE BORROW				767	
EST. MATERIAL TO BACKFILL UNDERCUT				30650	
GRAND TOTAL	24395	30250		46744	
SAY	24700	30250		46950	

EST. DDE = 5205 CY
EST. FABRIC FOR SOIL STABILIZATION = 30,650 SY
CLASS IV SUBGRADE STABILIZATION = 250 TON
EST. SHALLOW UNDERCUT = 150 CY

EMBANKMENT DOES NOT INCLUDE BACKFILL FOR UNDERCUT.

UNDERCUT SHALL BE BACKFILLED WITH BORROW EXCAVATION MEETING THE REQUIREMENT FOR SELECT GRANULAR MATERIAL CLASS III.

NOTE: Approximate quantities only. Unclassified Excavation, Fine Grading, Clearing and Grubbing, Removal of Existing Pavement and Breaking of Existing Pavement will be paid for at the contract Lump Sum price for "Grading".

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	ASPHALT SY	CONCRETE SY
–L–	13+00	52+25	RT	2914	
–L–	13+00	52+25	LT	3245	
–L–	55+85	62+50	RT	488	
–L–	54+21	62+50	LT	548	
–L–	13+00	52+25	CL		6978
–L–	55+85	62+50	CL		1182
			TOTAL:	7195	8160
			SAY:	7340	8330

SUMMARY OF BREAKING OF PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	ASPHALT SY	CONCRETE SY
–L–	52+25	55+85	RT	277	
–L–	52+25	54+21	LT	133	
–L–	52+25	55+85	CL		640
			TOTAL:	410	640
			SAY:	420	660

UNDERDRAIN SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	UNDERDRAIN LF
–L–	41+00	53+50	LT	1250
–L–	41+00	53+50	RT	1250
		CONTINGENCY		750
			TOTAL:	3250

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH STRAIGHT	LENGTH SHOP CURVED	LENGTH DOUBLE FACED	WARRANT POINT APPROACH END	WARRANT POINT TRAILING END	"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH APPROACH END	FLARE LENGTH TRAILING END	W APPROACH END	W TRAILING END	ANCHORS GRAU 350	ANCHORS TYPE III	ANCHORS CAT-1	ANCHORS AT-1	ANCHORS B-77	IMPACT ATTENUATOR TYPE 350 EA	IMPACT ATTENUATOR TYPE 350 G	IMPACT ATTENUATOR TYPE 350 NG	SINGLE FACE CONCRETE BARRIER STD. 857.01	REMOVE EXISTING GUARDRAIL		REMARKS
–L–	52+71.44	54+96.44	RT	225'			54+96.44		9.5'	12.5'					1	1										
–L–	53+69.40	55+44.40	LT	175'			55+44.40	53+69.40	9.5'	12.5'						1	1									
–L–	57+26.06	59+01.06	LT	175'			57+26.06		9.5'	12.5'					1	1										END FOR DRIVE
PROJECT TOTAL				575.0'											2	3	1									
LESS ANCHOR DEDUCTIONS			GRAU-350 2 @ 50' =	– 100'																						
			CAT-1 1 @ 6.25' =	– 6.25'																						
			TYPE III 3 @ 18.75' =	– 56.25'																						
GRAND TOTAL				412.5'																						
SAY				425			(5 ADDITIONAL GUARDRAIL POSTS)								2	3	1									

4/04/06

COMPUTED BY: PJJ DATE: 4-29-10
CHECKED BY: KBA DATE: 4-30-10

NOTE: INVERT ELEVATIONS INDICATED ARE FOR BID PURPOSES ONLY AND SHALL NOT BE USED FOR PROJECT CONSTRUCTIONS STAKEOUT. SEE "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, SECTION 300-5."

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

PROJECT REFERENCE NO.	SHEET NO.
U-5018A	3-B

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
13+73 -L-	RT	0401			74.8					16									
17+00 -L-	RT	0402																	
17+50 -L-	LT	0403		79.4	75.3														
17+50 -L-	LT	0403	0404		75.3	70.0			32							X			X
17+50 -L-	LT	0403	0403A		75.3	75.8	X												
18+49 -L-	LT	0403A	0403B		75.8	76.2													
18+49 -L-	LT	0403A		79.0	75.8														
19+50 -L-	LT	0403B		79.4	76.2														
18+22 -L-	RT	0405																	
19+04 -L- 20+15 -L-	LT	0406																	
20+55 -L-	RT	0407																	
22+29 -L- 22+88 -L-	LT	0508																	
24+90 -L-	LT/RT	0509																	
25+50 -L-	CL	0510		75.7	73.5														
25+50 -L-	CL	0510	0511		73.5	72.7													
26+50 -L-	CL	0511		74.9	72.7														
26+50 -L-	CL	0511	0512		72.7	70.8	X												
27+46 -L-	CL	0512		74.1	70.8														
27+46 -L-	CL	0512	0513		70.8	70.1	X												
28+10 -L-	CL	0513		73.4	70.1														
28+10 -L-	CL	0513	0514		70.1	69.7													
32+15 -L-	LT	0515		71.6	67.2														
32+15 -L-	LT	0515	0516		67.2	67.1					8						X	X	
32+15 -L-	LT	0515	0517		67.2	67.4													
32+15 -L-	LT	0515	0619		67.9	69.0	X												
26+30 -L-	LT	0518																	
34+55 -L-	RT	0618																	
35+28 -L-	LT	0619		71.8	69.0														
40+33 -L-	LT	0620																	
44+03 -L-	LT	0621																	
44+34 -L-	RT	0622																	
46+12 -L-	LT	0623																	
48+66 -L-	LT	0724																	
50+50 -L-	RT	0725		61.2	56.2														
50+50 -L-	RT	0725	0730		56.2	53.2	X		188								X	X	
50+62 -L-	LT	0726																	
51+50 -L-	CL	0727		62.1	57.3														
51+50 -L-	CL	0727	0728		57.3	57.6													
51+50 -L-	CL	0727	0729		57.3	57.0	X												
51+50 -L-	LT	0728		60.3	57.6														
52+46 -L-	CL	0729		60.3	57.0														
SHEET TOTAL									220	16	8								

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	36" .079	42" .109	48" .109	R.C. PIPE (CLASS IV) 12"	15"	18"	24"	30"	36"	42"	48"	**" R. C. PIPE (CLASS V)	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET
13+73 -L-	0401																																
17+00 -L-	0402																						64											
17+50 -L-	0403																									1								
17+50 -L-	0403	0404																															
17+50 -L-	0403	0403A									96																						
18+49 -L-	0403A	0403B									96																						
18+49 -L-	0403A																									1								
19+50 -L-	0403B																									1								
18+22 -L-	0405																					20												
19+04 -L- 20+15 -L-	0406																																
20+55 -L-	0407																					20												
22+29 -L- 22+88 -L-	0508																																
24+90 -L-	0509																					20												
25+50 -L-	0510																									1								1
25+50 -L-	0510	0511									96																						
26+50 -L-	0511																									1								1
26+50 -L-	0511	0512									92																						
27+46 -L-	0512																									1								1
27+46 -L-	0512	0513									60																						
28+10 -L-	0513																									1								1
28+10 -L-	0513	0514									48																						
32+15 -L-	0515																									1								
32+15 -L-	0515	0516																															
32+15 -L-	0515	0517											96																				
32+15 -L-	0515	0619									308																						
26+30 -L-	0518										72																						
34+55 -L-	0618																						44											
35+28 -L-	0619																									1								
40+33 -L-	0620																					32												
44+03 -L-	0621																					28												
44+34 -L-	0622																					32												
46+12 -L-	0623																																
48+66 -L-	0724																						20											
50+50 -L-	0725																									1								
50+50 -L-	0725	0730																															
50+62 -L-	0726																					28												
51+50 -L-	0727																									1								1
51+50 -L-	0727	0728									48																						
51+50 -L-	0727	0729									92																						
51+50 -L-	0728																									1								
52+46 -L-	0729																									1								1
SHEET TOTAL											1008		96									180	128			13								6

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE STD. 840.16	J.B. STD. 840.31 OR 840.32	M.H. FRAME & COVER STD. 840.54	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. FRAME & GRATE STD. 840.24	G.D.I. FRAME & GRATE STD. 840.29	N.D.I. (SEE SHEET 2-B)	N.D.I. FRAME & GRATE (SEE SHEET 2-C)	TRAFFIC BEARING DROP INLET STD. 840.35	TRAFFIC BEARING JUNCTION BOX STD. 840.34	OUTLET CONTROL STRUCTURE (SEE DETAIL 2-F)	REBAR TRASH RACK (SEE DETAIL 2-J)	ORIFICE TRASH RACK (SEE DETAIL 2-J)	6" PERFORATED HDPE LIN FT.	6" HDPE ELBOWS	6" HDPE CAPS	6" HDPE LIN. FT.	CONV. EXIST. T.B.J.B. TO D.I. (SEE DETAIL 2-M)	FLOWABLE FILL, C.Y.	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	PIPE REMOVAL LIN.FT.	REMARKS
13+73 -L-	0401																							.4465		
17+00 -L-	0402																								70	
17+50 -L-	0403								1			1														
17+50 -L-	0403	0404																					2@15"			ROD & LUG CONNECTORS
17+50 -L-	0403	0403A																								
18+49 -L-	0403A	0403B																								
18+49 -L-	0403A								1			1														
19+50 -L-	0403B								1			1														
18+22 -L-	0405																								30	
19+04 -L- 20+15 -L-	0406																								42	2 PIPES INCLUDED IN REMOVAL
20+55 -L-	0407																								20	
22+29 -L- 22+88 -L-	0508																								42	2 PIPES INCLUDED IN REMOVAL
24+90 -L-	0509																								42	2 PIPES INCLUDED IN REMOVAL
25+50 -L-	0510		1	1																						
25+50 -L-	0510	0511																								
26+50 -L-	0511		1	1																						
26+50 -L-	0511	0512																								
27+46 -L-	0512									1	1															
27+46 -L-	0512	0513																								
28+10 -L-	0513									1	1															
28+10 -L-	0513	0514																							17	
32+15 -L-	0515				1	1																				
32+15 -L-	0515	0516																								
32+15 -L-	0515	0517																								REMOVE 55 LF OF 18" RCP
32+15 -L-	0515	0619																							115	3 PIPES INCLUDED IN REMOVAL
26+30 -L-	0518																									
34+55 -L-	0618																								31	
35+28 -L-	0619						1	1																		
40+33 -L-	0620																								24	
44+03 -L-	0621																								26	
44+34 -L-	0622																								26	
46+12 -L-	0623																								22	
48+66 -L-	0724																					3.5				REMOVE 21 LF OF 12" PLASTIC
50+50 -L-	0725						1	1																		
50+50 -L-	0725	0730																								
50+62 -L-	0726																									
51+50 -L-	0727									1	1															
51+50 -L-	0727	0728																								
51+50 -L-	0727	0729																								
51+50 -L-	0728						1	1																		
52+46 -L-	0729									1	1															
SHEET TOTAL			2	2	1	1	3	3	3	4	4	3										3.5	2@15"	.4465	507	

ABBREVIATIONS

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

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COMPUTED BY: PJJ DATE: 4-29-10
CHECKED BY: KBA DATE: 4-30-10

PROJECT REFERENCE NO.	SHEET NO.
U-5018A	3-C

NOTE: INVERT ELEVATIONS INDICATED ARE FOR BID PURPOSES ONLY AND SHALL NOT BE USED FOR PROJECT CONSTRUCTIONS STAKEOUT. SEE "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, SECTION 300-5."

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
SUB-REGIONAL & REGIONAL
LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
52+46 -L-	CL	0729	0731		57.0	56.1													
52+50 -L-	RT	0730		56.2	53.2														
52+50 -L-	RT	0730	0736		53.2	28.0				224						X			X
52+92 -L-	CL	0731		59.3	56.1														
52+92 -L-	CL	0731	0732		56.1	53.0													
54+00 -L-	CL	0732		57.0	53.0														
54+50 -L-	CL	0733		55.0	50.9														
54+00 -L-	CL	0732	0734		53.0	51.1													
54+50 -L-	CL	0734		56.0	51.1														
54+50 -L-	CL	0734	0733		51.1	50.9													
54+50 -L-	CL	0733	0733A		50.9	37			36							X			X
54+80 -L-	RT	0735		54.4	51.4														
54+80 -L-	RT	0735	0734		51.4	51.1	X		52										
56+81 -L-	RT	0737			SEE STRUCTURE PLANS														
56+81 -L-	RT	0737	0738		SEE STRUCTURE PLANS	48.1			24										
57+06 -L-	RT	0738		51.1	48.1														
57+06 -L-	RT	0738	0741		48.1	47.9	X												
57+22 -L-	LT	0739			SEE STRUCTURE PLANS														
57+22 -L-	LT	0739	0740		SEE STRUCTURE PLANS	47.7			24										
57+47 -L-	LT	0740		51.0	47.7														
57+47 -L-	LT	0740	0741		47.7	47.9	X												
57+85 -L-	LT	0740A		51.1	44.7														
57+47 -L-	LT	0740	0740A		47.7	44.7													
57+47 -L-	RT	0741		51.1	47.9														
57+85 -L-	LT	0740A	0743		44.7	36.0			36							X			X
58+93 -L-	LT	0742		53.4	45.3														
58+93 -L-	LT	0742	0740A		45.3	44.7													
58+93 -L-	LT	0742	0744		45.3	45.9													
58+93 -L-	CL	0744		53.0	45.9														
58+93 -L-	CL	0744	0745		45.9	46.2													
58+93 -L-	CL	0744	0746		45.9	51.9													
58+93 -L-	RT	0745		49.0	46.2														
59+50 -L-	CL	0746		54.1	51.9														
55+30 -L-	LT	0747	0748		34.0	33.8	X												
55+43 -L-	LT	0748		38.2	33.8														
55+43 -L-	LT	0748	0749		33.8	33.0			32										
55+30 -L-	LT	0750	0751		34.0	33.9	X												
55+43 -L-	LT	0751		38.2	33.9														
55+43 -L-	LT	0751	0752		33.9	34.0			40										
59+50 -L-	CL	0746	0847		51.9	55.2													
61+00 -L-	CL	0847		57.4	55.2														
63+15 -L-	CL	0848		58.3	56.0														
63+86 -L-	CL	0849		57.2	53.0														
SHEET TOTAL									244	224									
PROJECT TOTAL									464	240	8								
SAY																			

STATION	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	36" .079	42" .109	48" .109	R.C. PIPE (CLASS IV) 12"	15"	18"	24"	30"	36"	42"	48"	**" R. C. PIPE (CLASS V)	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL. 'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02
52+46 -L-									40																	
52+50 -L-																							1			
52+50 -L-																										
52+92 -L-																							1			
52+92 -L-									104																	
54+00 -L-																							1			
54+50 -L-																							1			
54+00 -L-									44																	
54+50 -L-																							1			
54+50 -L-									48																	
54+50 -L-																										
54+80 -L-																							1			1
54+80 -L-																										
56+81 -L-																										
56+81 -L-																										
57+06 -L-																							1			1
57+06 -L-									36																	
57+22 -L-																										
57+22 -L-																										
57+47 -L-																							1			1
57+47 -L-									68																	
57+85 -L-																							1	1.4		1
57+47 -L-									36																	
57+47 -L-																							1			1
57+85 -L-																										
58+93 -L-																							1	3.1		
58+93 -L-									108																	
58+93 -L-									24																	
58+93 -L-																							1	2.1		
58+93 -L-									52																	
58+93 -L-									52																	
58+93 -L-																							1			
59+50 -L-																							1			
55+30 -L-																										
55+43 -L-																							1			
55+43 -L-																										
55+30 -L-																										
55+43 -L-																							1			
55+43 -L-																										
59+50 -L-									144																	
61+00 -L-																							1			
63+15 -L-																										
63+86 -L-																										
SHEET TOTAL									756														17	6.6		5
PROJECT TOTAL									1764		96								180	128			30	6.6	0.0	5
SAY																								6.6 LF		

STATION	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE STD. 840.16	J.B. STD. 840.31 OR 840.32	M.H. FRAME & COVER STD. 840.54	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. FRAME & GRATE STD. 840.24	G.D.I. FRAME & GRATE STD. 840.29	N.D.I. (SEE SHEET 2-B)	N.D.I. FRAME & GRATE (SEE SHEET 2-C)	TRAFFIC BEARING DROP INLET STD. 840.35	TRAFFIC BEARING JUNCTION BOX STD. 840.34	OUTLET CONTROL STRUCTURE (SEE DETAIL 2-F)	REBAR TRASH RACK (SEE DETAIL 2-J)	ORIFICE TRASH RACK (SEE DETAIL 2-J)	6" PERFORATED HDPE LIN FT.	6" HDPE ELBOWS	6" HDPE CAPS	6" HDPE LIN. FT.	CONV. EXIST. T.B.J.B. TO D.I. (SEE DETAIL 2-M)	FLOWABLE FILL, C.Y.	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	PIPE REMOVAL LIN.FT.	REMARKS
52+46 -L-																													
52+50 -L-										1	1																		
52+50 -L-																										2@18"			ROD & LUG CONNECTORS
52+92 -L-					1	1	1																						
52+92 -L-																													
54+00 -L-					1	1	1																						
54+50 -L-								1	1																				
54+00 -L-																													
54+50 -L-					1	1	1																						
54+50 -L-																													
54+50 -L-																										2@15"			ROD & LUG CONNECTORS
54+80 -L-		1																											
54+80 -L-																													
56+81 -L-																											0.3990		
56+81 -L-																													
57+06 -L-		1																											
57+06 -L-																													
57+22 -L-																											0.3990		
57+22 -L-																													
57+47 -L-	1																												
57+47 -L-																													
57+85 -L-		1																											
57+47 -L-																													
57+47 -L-	1																												
57+85 -L-																													
58+93 -L-																1													
58+93 -L-																													
58+93 -L-																													
58+93 -L-					1	1	1																						
58+93 -L-																													
58+93 -L-																													
58+93 -L-										1	1																		
59+50 -L-					1	1	1																						
55+30 -L-																				60	2	1	6						2 LINES OF PIPE
55+43 -L-																	1	1	1										
55+43 -L-																													
55+30 -L-																				32	2	1	6						2 LINES OF PIPE
55+43 -L-																	1	1	1										
55+43 -L-																													
59+50 -L-																													
61+00 -L-					1	1	1																					16	
63+15 -L-					1																			1					
63+86 -L-					1																			1					
SHEET TOTAL	2	3			8	6	6	1	1	2	2					1	2	2	2	92	4	2	12	2		2@15" 2@18"	0.7980	16	
PROJECT TOTAL	2	3			14	8	8	2	2	5	5	3	4	4	3	1	2	2	2	92	4	2	12	2	3.5	4@15" 2@18"	1.2445	523	
SAY																											1.3		

ABBREVIATIONS

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

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6/7/2010
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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	3-D

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

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PARCEL INDEX SHEET

PARCEL NO.	SHEET NO.	PROPERTY OWNERS NAME
1	4	LIBERTY FREE WILL BAPTIST CHURCH
2	4	PAMELA T. FINCH
3	4	JOSEPH DANIEL JOYNER
4	4	KENNETH EARL VANDERBURG
5	4	ALICIA PASCASIO
6	5	KENNETH EARL VANDERBURG
7	5	LEDYARD ROSS
8	4	ALDINE K. GUTHRIE
9	4	FREDRICK DOUGLAS
10	4	FREDRICK DOUGLAS
11	4	MAE TUCKER
12	5	DOROTHY FOELL
13	5	RUEL S. STANCILL
14	5	BARNHILL CONTRACTING COMPANY
15	5	BARNHILL CONTRACTING COMPANY
16	4,5	KENNETH EARL VANDERBURG
17	5	TRACY T. LUPTON
18	5	N/F MELVIN RAY SUGG & R. GUY MAYO, JR.
19	5	N/F MELVIN RAY SUGG & R. GUY MAYO, JR.
20	5	HELEN M. WEAVER

PARCEL NO.	SHEET NO.	PROPERTY OWNERS NAME
21	5, 6	MILL RU HOMEOWNERS' ASSOCIATION
22	6	JANE C. ROSE
23	6	JULIAN W. RAWL
24	6	JULIAN W. RAWL
25	6	JULIAN W. RAWL
26	7	JULIAN W. RAWL
27	6,7	THOMAS ANDERSON
28	7	MARION ERNEST TAYLOR MOSIER
29	7	MARION ERNEST TAYLOR MOSIER
30	7	DOROTHY N. SATTERFIELD
32	6	FRANCES S. GOLD
33	8	FMM PARTNERSHIP
35	7,8	THE COVINGTON GROUP, LTD

5/28/99

5/28/2010
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5/28/99

REVISIONS

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
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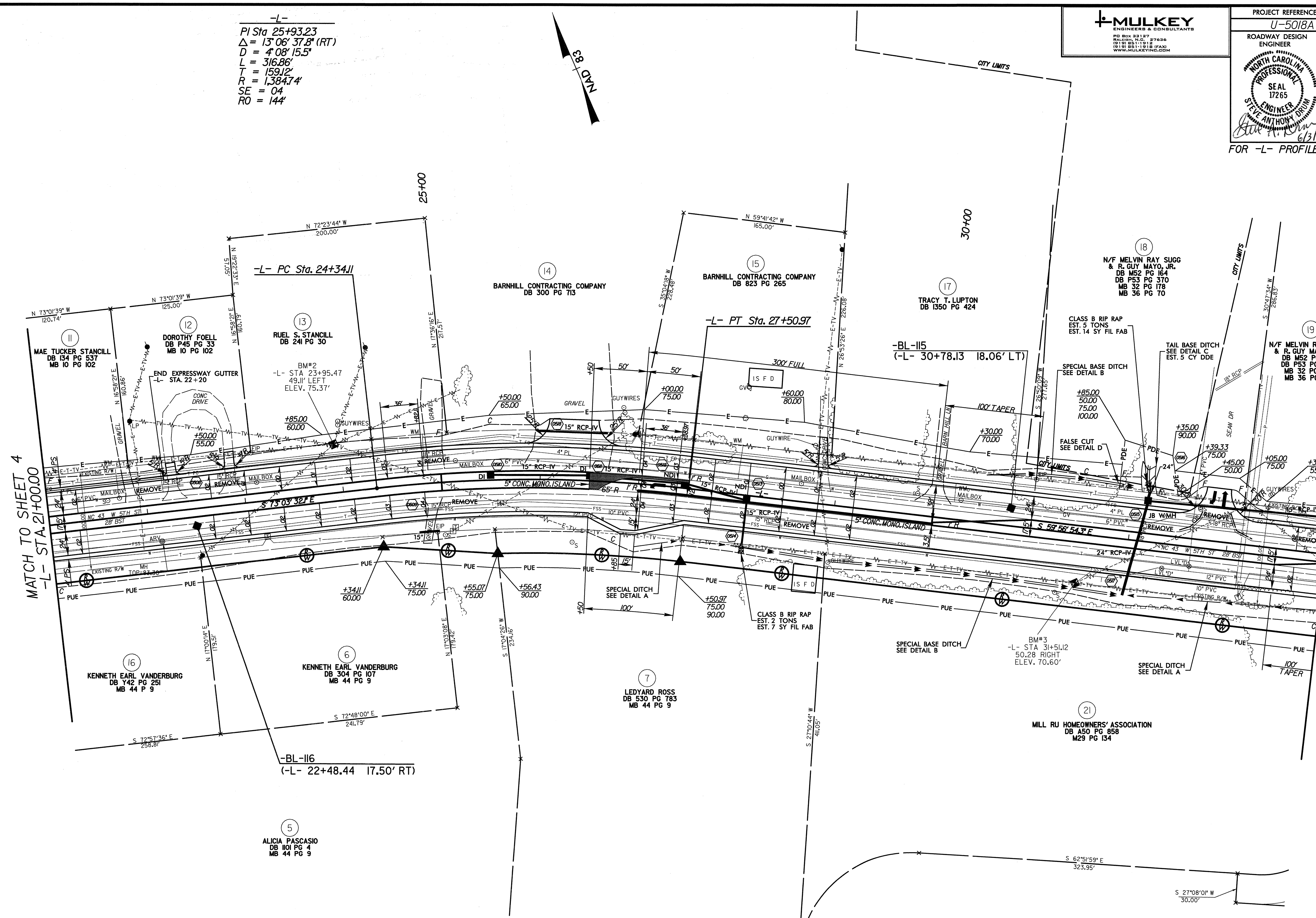
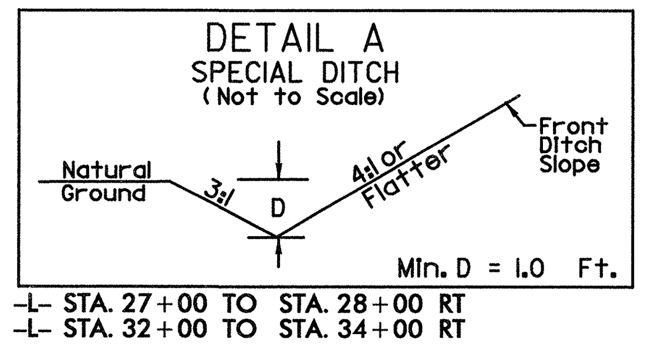
PROJECT REFERENCE NO.	SHEET NO.
U-5018A	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

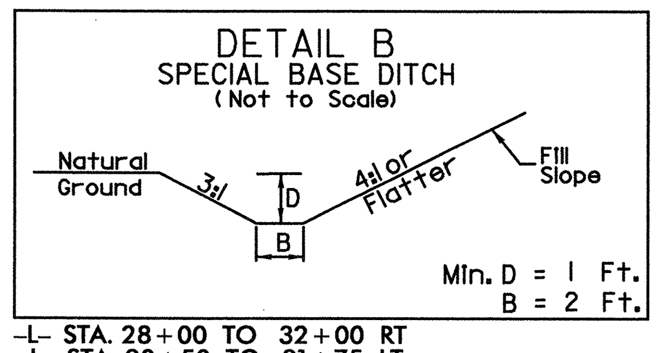
NORTH CAROLINA PROFESSIONAL SEAL 17265 ENGINEER STEVE ANTHONY DRUM 6/3/10

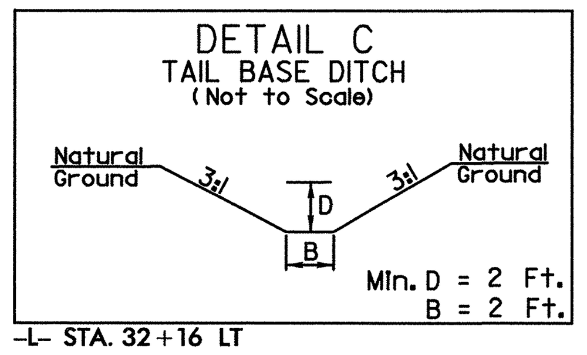
NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN B. ALFORD 6-3-10

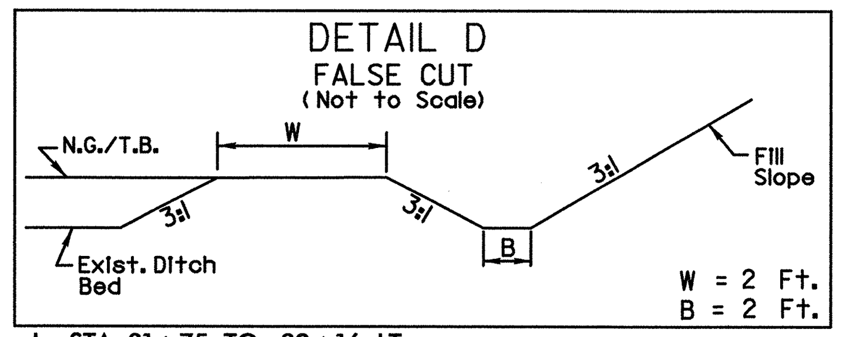
FOR -L- PROFILE SEE SHEET 9











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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

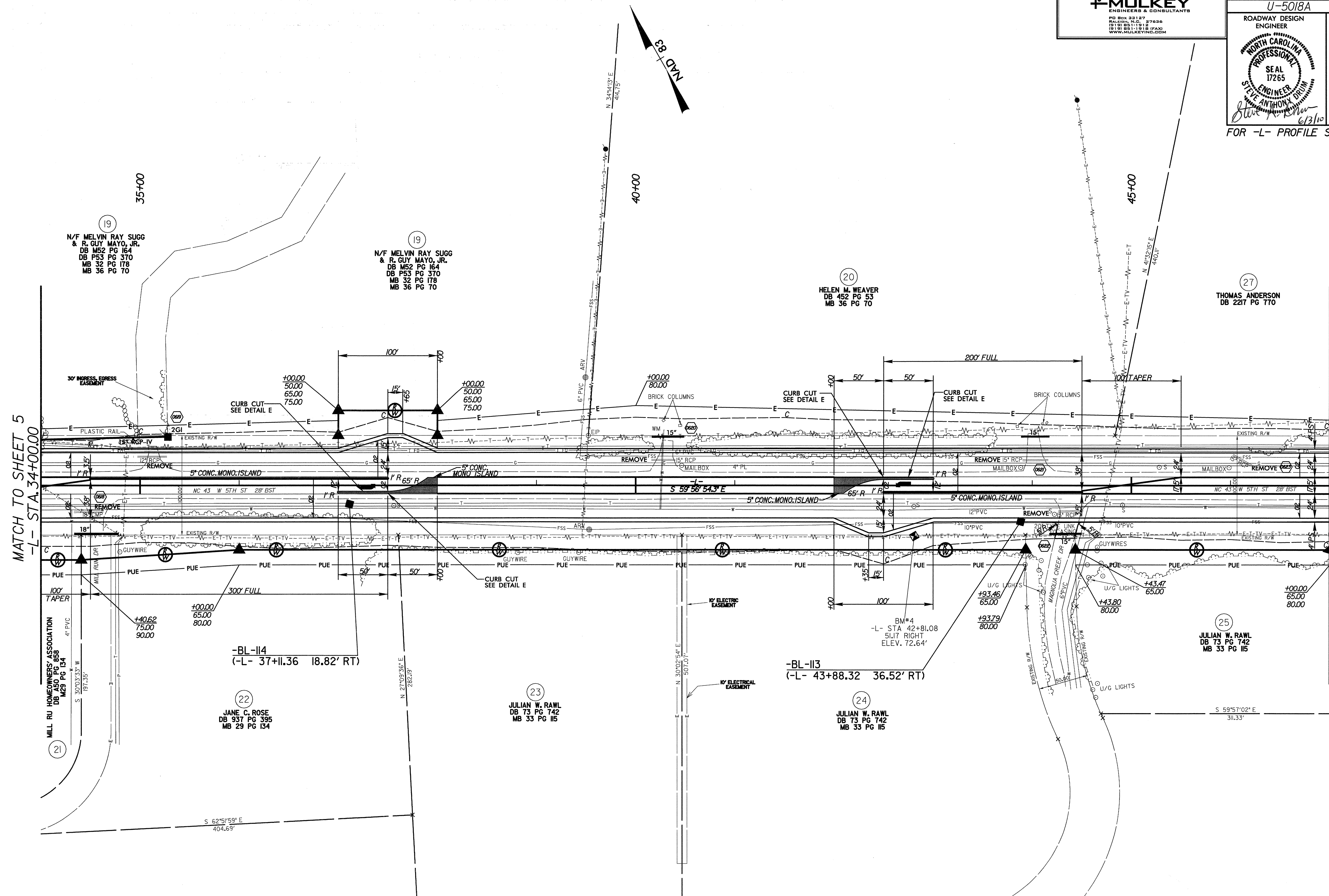
NORTH CAROLINA PROFESSIONAL SEAL 17265 ENGINEER STEVE ANTHONY DRUM 6/3/10

NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN B. ALFORD 6-3-10

FOR -L- PROFILE SEE SHEET 10

REVISIONS

5/28/99



DETAIL E
CURB CUT DETAIL (Not to Scale)
2' — 5" Conc. Mono. Island

-L- STA. 37+25
-L- STA. 37+50
-L- STA. 42+50
-L- STA. 42+75

SUBSURFACE DRAINS

LINE	STATION	LOCATION
-L-	41+00 to 53+50	LT/RT

5/27/2010
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MULKEY
ENGINEERS & CONSULTANTS
PO Box 33197
Raleigh, NC 27636
(919) 851-1919
(919) 851-1918 (FAX)
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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	7

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 17265 ENGINEER STEVE ANTHONY BRUNK
6/2/10

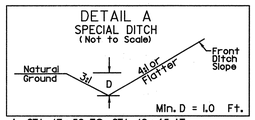
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEITH B. AFFORD
6-3-10

FOR -L- PROFILE SEE SHEET 10
FOR STRUCTURES SEE SHEET S-1 thru S-52

5/28/99

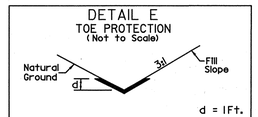
REVISIONS

DETAIL A
SPECIAL DITCH
(Not to Scale)



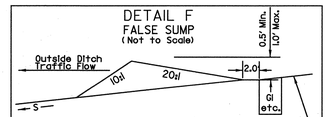
-L- STA. 47+50 TO STA. 48+65 LT
-L- STA. 51+00 TO STA. 51+50 LT
-L- STA. 58+00 TO STA. 59+50 RT

DETAIL E
TOE PROTECTION
(Not to Scale)



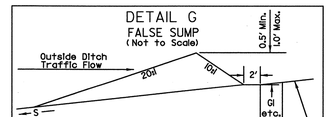
Type of Liner= PSRM
-L- STA. 51+50 TO 52+50 LT

DETAIL F
FALSE SUMP
(Not to Scale)



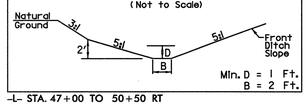
-L- STA. 50+50 RT
-L- STA. 52+50 RT

DETAIL G
FALSE SUMP
(Not to Scale)



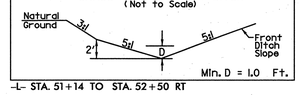
-L- STA. 51+50 LT

DETAIL H
GRASS TREATMENT BASE DITCH
(Not to Scale)



-L- STA. 47+00 TO 50+50 RT

DETAIL I
GRASS TREATMENT 'V' DITCH
(Not to Scale)



-L- STA. 51+14 TO STA. 52+50 RT

SUBSURFACE DRAINS		
LINE	STATION	LOCATION
-L-	41+00 to 53+50	LT/RT

-L-
PI Sta 52+50.83
Δ = 17° 01' 22.4" (RT)
D = 6° 01' 52.1"
L = 282.25'
T = 142.17'
R = 950.00'
SE = 04
RO = 144'

PI Sta 61+27.90
Δ = 5° 09' 00.9" (RT)
D = 1° 09' 35.4"
L = 444.05'
T = 222.17'
R = 4,940.00'
SE = 02
RO = 72'

-BL-III
(-L- 56+31.50 86.66' LT)

BEGIN BRIDGE
-L- Sta. 55+20.42

END BRIDGE
-L- Sta. 57+02.08

-L- PC Sta. 51+08.66
-L- PT Sta. 53+90.91
-L- PC Sta. 59+05.73

MATCH TO SHEET 6
-L- STA. 47+00.00

MATCH TO SHEET 8
-L- STA. 60+00.00

-BL-II2
(-L- 50+20.22 18.58' RT)

(27) THOMAS ANDERSON
DB 2217 PG 770

(28) MARION ERNEST TAYLOR MOSIER
DB 529 PG 147

(29) MARION ERNEST TAYLOR MOSIER
DB 503 PG 262

(30) DOROTHY N. SATTERFIELD
DB K39 PG 144
MB 3 PG 117

(25) JULIAN W. RAWL
DB 73 PG. 742
MB 33 PG 115

(26) JULIAN W. RAWL
DB 866 PG 707
MB 33 PG 115

(35) THE COVENGTON GROUP, LTD
DB 604 PG 33

NAD 83

BM#5
-L- STA 53+62.22
62.66 LEFT
ELEV. 55.51'

50' OFFSET FROM -L-
END BRIDGE RIP RAP
TIE TO DRY DETENTION BASIN RIP RAP
SEE DETAIL SHEET 2-D
FOR ADDITIONAL RIP RAP LIMITS

PROPOSED CHANNEL IMPROVEMENTS
SEE DETAIL K
EST. 400 SY PSRM (ON BANKS ONLY)
EST. 5200 CY DDE

REMOVE EXISTING CULVERT (STRUCTURE PAY ITEM)

GEOGRID REINFORCED SLOPE
SEE DETAIL SHEET 2-N

CLASS B RIP RAP
EST. 2 TONS
EST. 7 SY FIL FAB

OUTLET CONTROL STRUCTURE
SEE DETAIL 2-F

DETENTION BASIN
SEE DETAIL SHEET 2-E

48' OFFSET FROM -L-
END BRIDGE RIP RAP
TIE TO DRY DETENTION BASIN RIP RAP
SEE DETAIL SHEET 2-D
FOR ADDITIONAL RIP RAP LIMITS

END 2'-6" CONC. CURB & GUTTER
-L- STA. 59+11 LT.
6' OFFSET TO FACE

BEGIN 2'-6" CONC. CURB & GUTTER
-L- STA. 53+70 LT.

END 2'-6" CONC. CURB & GUTTER
-L- STA. 57+90 RT.

BEGIN 2'-6" CONC. CURB & GUTTER
-L- STA. 52+54 RT.

TOE PROTECTION
SEE DETAIL E
EST. 90 SY PSRM

SPECIAL DITCH
SEE DETAIL A

FALSE SUMP
SEE DETAIL G

FALSE SUMP
SEE DETAIL F

FALSE SUMP
SEE DETAIL E

PREFORMED SCOUR HOLE
SEE DETAIL J

TREATMENT DITCH
SEE DETAIL H

TREATMENT DITCH
SEE DETAIL I

150' TAPER
100' TAPER
200' FULL

5' CONC. MONO ISLAND
6' OFFSET TO FACE

18" CSP WELBOWS
ROD & LUG CONNECTORS

10' ELECTRIC EASEMENT

CLASS II RIP RAP
(STRUCTURE PAY ITEM)

CITY LIMITS

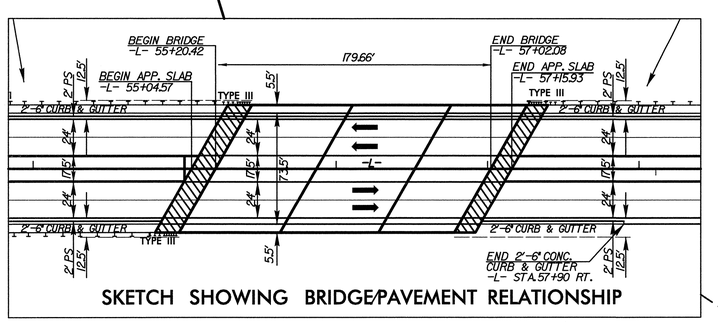
EXISTING R/W PURCHASED UNDER U-5018B PROJECT

PUE PURCHASED UNDER U-5018B PROJECT

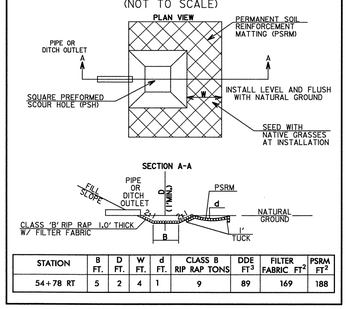
NOTE:
PROVIDE 4" CIRCULAR DECK DRAINS AT 6' O.C. ACROSS THE ENTIRE BRIDGE ON BOTH THE LT & RT SIDES. COLLECT DRAINAGE INTO A 15" U.V. PVC CLOSED SYSTEM. NO DIRECT DISCHARGE OVER STREAM.

NOTE:
A GEOGRID REINFORCED SLOPE SHALL BE PLACED BETWEEN STATION 53+75 +/- -L- TO STATION 55+44 +/- -L- (LEFT) AND STATION 57+26 +/- -L- TO STATION 58+25 +/- -L-, (LEFT). SEE GEOGRID REINFORCED SLOPE SPECIAL PROVISION.

SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP

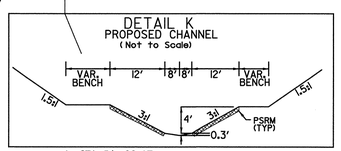


DETAIL J
PREFORMED SCOUR HOLE
(NOT TO SCALE)



STATION	B FT.	D FT.	W FT.	d FT.	CLASS B RIP RAP TONS	DDE FT³	FILTER FABRIC FT²	PSRM FT²
54+78 RT	5	2	4	1	9	89	169	188

DETAIL K
PROPOSED CHANNEL
(Not to Scale)



-L- STA. 56+22 LT

CULVERT EXCAVATION
GEOGRID REINFORCED SLOPE

6/3/2010
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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	8

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

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 17265 ENGINEER STEVE ANTHONY DRUM 6/3/10

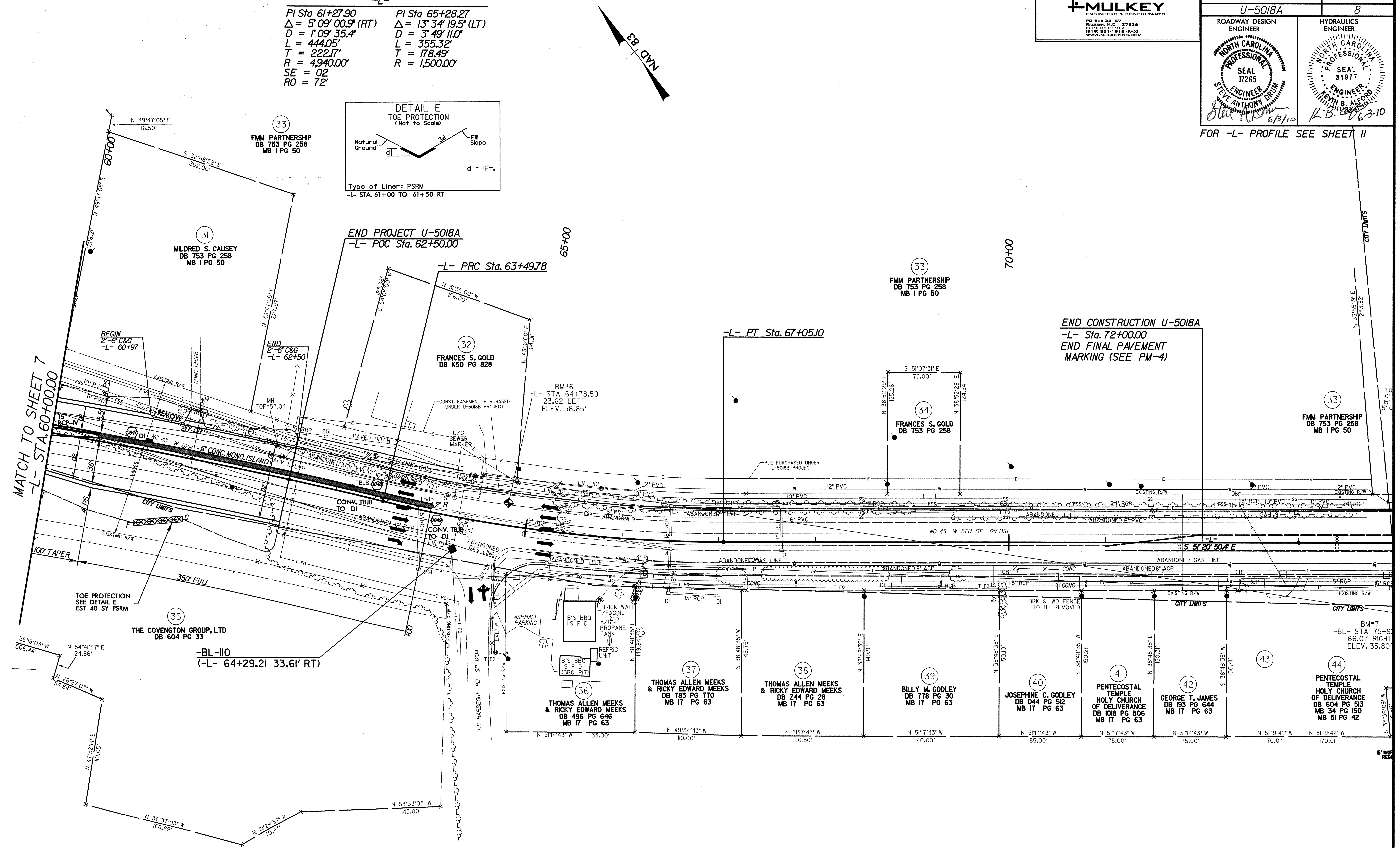
HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN B. ALFORD 6-3-10

FOR -L- PROFILE SEE SHEET 11

-L-

PI Sta 61+27.90	PI Sta 65+28.27
Δ = 5° 09' 00.9" (RT)	Δ = 13° 34' 19.5" (LT)
D = 1° 09' 35.4"	D = 3° 49' 11.0"
L = 444.05'	L = 355.32'
T = 222.17'	T = 178.49'
R = 4,940.00'	R = 1,500.00'
SE = 02	
RO = 72'	

DETAIL E
TOE PROTECTION
(Not to Scale)
Natural Ground — 3:1 — Fill Slope — d = 1Ft.
Type of Liner= PSRM
-L- STA. 61+00 TO 61+50 RT



NAD 83
MATCH TO SHEET 7
-L- STA.60+00.00
END PROJECT U-5018A
-L- POC Sta. 62+50.00
-L- PRC Sta. 63+49.78
-L- PT Sta. 67+05.10
END CONSTRUCTION U-5018A
-L- Sta. 72+00.00
END FINAL PAVEMENT
MARKING (SEE PM-4)
BEGIN 2'-6" C&G -L- 60+97
END 2'-6" C&G -L- 62+50
BM#6
-L- STA 64+78.59
23.62 LEFT
ELEV. 56.65'
BM#7
-BL- STA 75+9
66.07 RIGHT
ELEV. 35.80'
-BL-110
(-L- 64+29.21 33.61' RT)
TOE PROTECTION
SEE DETAIL E
EST. 40 SY PSRM
100' TAPER
350' FULL
NC 43 W 5TH ST 65' BST
S 51° 20' 50.4" E
5" CONC. MONO. ISLAND
CONV. TBJB TO DI
MH TOP=57.04
CONST. EASEMENT PURCHASED UNDER U-5018B PROJECT
PUE PURCHASED UNDER U-5018B PROJECT
BRK & WD FENCE TO BE REMOVED
ABANDONED GAS LINE
ABANDONED TELE
CITY LIMITS
EXISTING R/W
BS BARBEQUE RD SR 1204
ASPHALT PARKING
B'S BBQ 1 S F D
BRICK WALL /FACING
A/C PROPANE TANK
REFRIG UNIT
B'S BBQ 1 S F D (BBQ PIT)
33 FMM PARTNERSHIP DB 753 PG 258 MB 1 PG 50
31 MILDRED S. CAUSEY DB 753 PG 258 MB 1 PG 50
32 FRANCES S. GOLD DB K50 PG 828
34 FRANCES S. GOLD DB 753 PG 258
35 THE COVENGTON GROUP, LTD DB 604 PG 33
36 THOMAS ALLEN MEEKS & RICKY EDWARD MEEKS DB 496 PG 646 MB 17 PG 63
37 THOMAS ALLEN MEEKS & RICKY EDWARD MEEKS DB 783 PG 770 MB 17 PG 63
38 THOMAS ALLEN MEEKS & RICKY EDWARD MEEKS DB Z44 PG 28 MB 17 PG 63
39 BILLY M. GODLEY DB 778 PG 30 MB 17 PG 63
40 JOSEPHINE C. GODLEY DB 044 PG 512 MB 17 PG 63
41 PENTECOSTAL TEMPLE HOLY CHURCH OF DELIVERANCE DB 1018 PG 506 MB 17 PG 63
42 GEORGE T. JAMES DB 193 PG 644 MB 17 PG 63
43
44 PENTECOSTAL TEMPLE HOLY CHURCH OF DELIVERANCE DB 604 PG 513 MB 34 PG 150 MB 51 PG 42
60+00
65+00
70+00

REVISIONS

5/28/99

6/3/2010
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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	9

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 17265 ENGINEER STEVEN ANTHONY DRUM
6/3/10

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN B. ALFORD
6-3-10

BM-1
"BENCHLITE" NAIL SET IN POWER POLE
-L- 12+04.79 172.10' RT EL = 86.76'

-L-

BLEND TO EXISTING

BEGIN CONSTRUCTION
-L- STA. 12+25.00

BEGIN GRADE
-L- STA. 13+00.00
EL = 89.81'

PI = 13+75.00
EL = 88.30'
VC = 150'
K = 205

PI = 17+50.00
EL = 78.01'
VC = 480'
K = 124

(-)2.0136%
(-)2.7440%
(-)2.7440%
(-)0.3998%
(+)0.3000%

PLAN SUMMARY DATA

Drainage Area:	4.32 ac.
Design Freq.:	50 YR
Design Disch.:	10 cfs
Design H.W.Elev.:	77.9
Q100 Discharg.:	11 cfs
Q100 Elev.:	78.3
Overtopping Freq.:	500 YR+
Overtopping Disch.:	12 cfs
Overtopping Elev.:	78.7

18" RCP 13+70 -L-

BEGIN DITCH RT
-L- 13+70
EL = 75.91

END DITCH RT
-L- 20+00
EL = 77.80

BM-2
"BENCHLITE" NAIL SET IN POWER POLE
-L- 23+95.47 49.11' LT EL = 75.37'

-L-

BM-3
"BENCHLITE" NAIL SET IN POWER POLE
-L- 31+51.12 50.28' RT EL = 70.60'

PI = 21+75.00
EL = 82.85'
VC = 290'
K = 86

PI = 24+85.00
EL = 75.91'
VC = 200'
K = 134

PI = 30+80.00
EL = 71.45'
VC = 200'
K = 133

(+)11.1388%
(-)2.2387%
(-)2.2387%
(-)0.7496%
(-)0.7496%
(+)0.7497%
(-) 0.2091%
(-) 1.9000%
(-) 0.2000%
(-) 2.860%
(-) 0.1983%
(+) 1.7100%

BEGIN DITCH RT
-L- 27+00
EL = 69.91

PI DITCH RT
-L- 28+10
EL = 69.68

PI DITCH RT
-L- 29+00
EL = 67.91

BEGIN DITCH LT
-L- 30+50
EL = 68.80

PI DITCH LT
-L- 31+00
EL = 67.57

PI DITCH RT
-L- 32+00
EL = 67.37

END DITCH LT
-L- 32+16
EL = 67.14

END DITCH RT
-L- 34+00
EL = 70.79

5/5/2010
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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	10

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 17265 ENGINEER STEVE ANTHONY DRUM
6/3/10

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN B. ALFORD
6-3-10

BM-4
"BENCHLITE" NAIL SET IN POWER POLE
-L- 42+81.08 51.17' RT EL = 72.64'

-L-

PI = 38+95.00
EL = 77.56'
VC = 240'
K = 87

(+)0.7497%

(-)2.0024%

PI = 43+15.00
EL = 69.15'
VC = 200'
K = 217

(-)2.0024%

(-)1.0821%

(-)1.0821%

BM-5
"BENCHLITE" NAIL SET IN 15" OAK
-L- 53+62.22 64.66' LT EL = 55.51'

-L-

BRIDGE HYDRAULIC DATA

Design Discharge =	750 CFS
Design Frequency =	50 YR
Desing HW Elevation =	28.5
Base Discharge =	955 CFS
Base Frequency =	100 YR
Base HW Elevation =	29.1
Overtopping Discharge =	1500 CFS
Overtopping Frequency =	500 YR ++
Overtopping Elevation =	51.95
Date of Survey =	7/13/2007
W.S. Elevation at Date of Survey =	24.5

PI = 47+05.00
EL = 64.93'
VC = 200'
K = 260

(-)0.3127%

(-)0.6220%

(-)0.2000%

(-)0.9220%

(-)3.1538%

PI = 50+60.00
EL = 63.82'
VC = 200'
K = 117

(-)0.3127%

(-)2.0167%

(-)1.6780%

(-)0.3015%

BEGIN BRIDGE
-L- STA. 55+20.42

END BRIDGE
-L- STA. 57+02.08

PI = 57+80.00
EL = 49.30'
VC = 460'
K = 98

(-)2.0167%

(+)2.6833%

(-)0.3011%

(+)3.4131%

BEGIN DITCH RT
-L- 47+00
EL = 62.10

PI DITCH RT
-L- 47+50
EL = 61.79

BEGIN DITCH LT
-L- 47+50
EL = 61.79

PI DITCH LT
-L- 48+00
EL = 61.33

END DITCH LT
-L- 48+65
EL = 59.28

END DITCH RT
-L- 50+50
EL = 61.19

BEGIN DITCH LT
-L- 51+00
EL = 61.26

BEGIN DITCH RT
-L- 51+14
EL = 56.61

END DITCH LT
-L- 51+50
EL = 60.42

END DITCH RT
-L- 52+50
EL = 56.20

BEGIN DITCH RT
-L- 58+00
EL = 49.29

PI DITCH RT
-L- 58+93
EL = 49.01

END DITCH RT
-L- 59+50
EL = 50.99

5/5/2010
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BM-6
"BENCHLITE" NAIL SET IN POWER POLE
-L- 64+78.59 23.62' LT EL = 56.65'

-L-

END GRADE
-L- STA. 62+50.00
EL = 56.52

PI = 62+60.00
EL = 62.18'
VC = 500'
K = 85

(+)2.6833%

(-)3.2023%

60 61 62 63 64 65 66 67 68 69 70 71 72 73

0 10 20 30 40 50 60

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PROJECT REFERENCE NO.	SHEET NO.
U-5018A	11

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 17265 ENGINEER STEVEN ANTHONY DIXON
6/3/10

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 31977 ENGINEER KEVIN B. ALFORD
6-3-10

5/5/2010
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