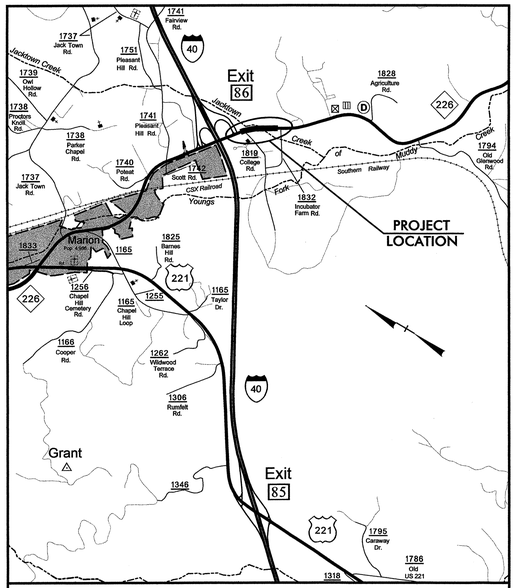
09/08/99

TIP PROJECT: B-4191

CONTRACT: C202169

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Symbology



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

McDOWELL COUNTY

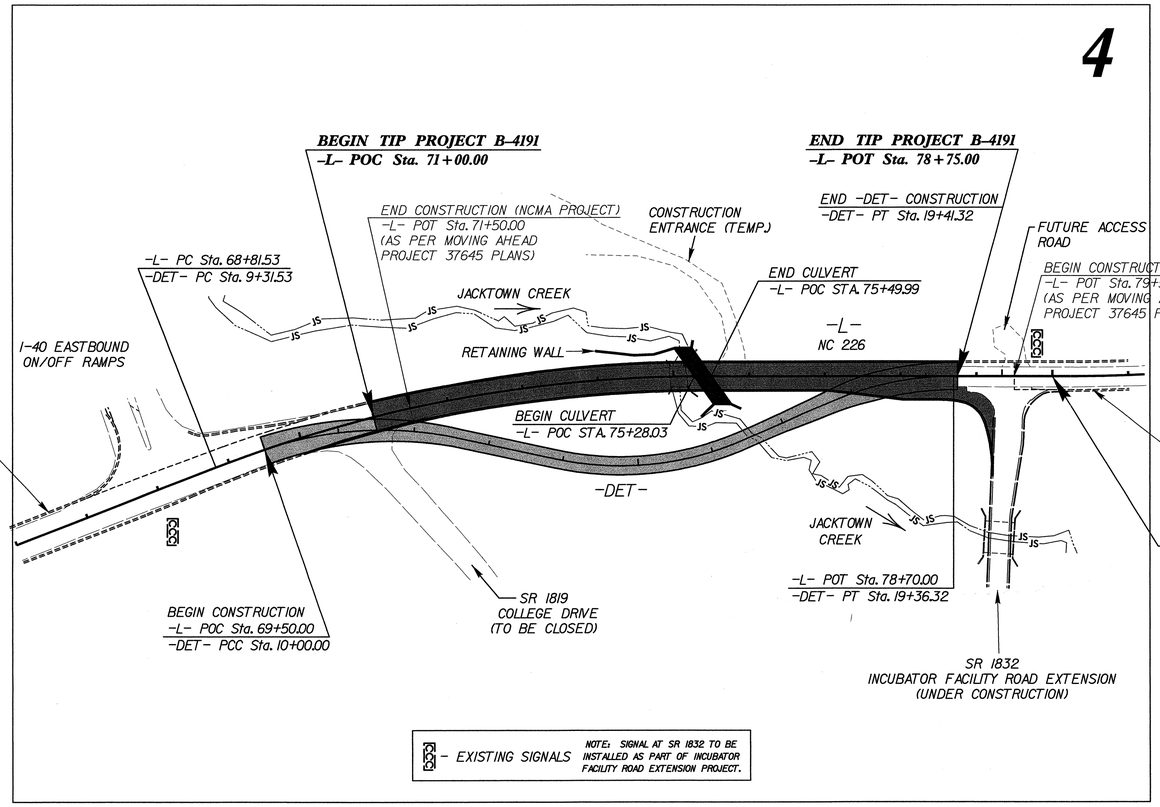
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4191	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33538.1.1	BRSTP-226 (10)	PE
33538.3.1	BRSTP-226 (10)	R/W, UTILITIES
33538.2.1	BRSTP-226 (10)	CONSTRUCTION

LOCATION: BRIDGE NO. 82 OVER JACKTOWN CREEK ON NC 226

TYPE OF WORK: GRADING, DRAINAGE, PAVING, CULVERT, & RETAINING WALL

NC GRID
NAD 83



NCDOT CONTACT:

MR. DOUG TAYLOR, PE – ENGINEERING COORDINATION – PROJECT ENGINEER – ROADWAY DESIGN UNIT

GRAPHIC SCALES

PLANS: 0 50 100

PROFILE (HORIZONTAL): 0 50 100

PROFILE (VERTICAL): 0 10 20

DESIGN DATA

ADT 2009 = 8,940
ADT 2029 = 12,765
DHV = 10 %
D = 60 %
T = 8 % *
V = 50 MPH
* (TTST 3% + DUAL 5%)
FUNC. CLASS = RURAL MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4191	=	*0.143 mile*
LENGTH STRUCTURE TIP PROJECT B-4191	=	*0.004 mile*
TOTAL LENGTH TIP PROJECT B-4191	=	*0.147 mile*

Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610
By:

M A Engineering Consultants, Inc.
598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 19, 2008

LETTING DATE: SEPTEMBER 15, 2009

ROBERT W. PORTER, JR PE
PROJECT ENGINEER

KEVIN S. HUTCHENS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WELDON

SIGNATURE: 6/1/09 P.E.

ROADWAY DESIGN ENGINEER

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

SIGNATURE: 6-17-09 P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY DESIGN ENGINEER P.E.

06/17/2009
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PROJECT REFERENCE NO.	SHEET NO.
B-4191	1-A

ROADWAY DESIGN ENGINEER

SEAL 19814

6-17-09

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

GENERAL NOTES: 2006 SPECIFICATIONS
EFFECTIVE: 07-18-06
REVISED: 07-30-08

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

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

UNDERDRAINS:

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

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.

STREET TURNOUT:

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

GUARDRAIL:

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

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

SUBSURFACE PLANS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE:
Town of Marion - Water & Sewer
Telephone - Verizon
Power - Duke Energy
Cable TV - Mediacom

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

RIGHT-OF-WAY MARKERS:

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

WHEELCHAIR RAMPS:

WHEELCHAIR RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. THE CONSTRUCTION OF ALL WHEELCHAIR RAMPS SHALL BE IN ACCORDANCE WITH STD. NO. 848.05

2006 ROADWAY ENGLISH STANDARD DRAWINGS
EFF. 07-18-06
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	
300.01	Method of Pipe Installation - Method 'A'
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.03	Pipe Underdrain and Blind Drain
816.04	Markers for Drainage Structure and Concrete Pad
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.04	Concrete Open Throat Catch Basin - 12" thru 48" Pipe
840.05	Brick Open Throat Catch Basin - 12" thru 48" Pipe
840.45	Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
848.02	Driveway Turnout - Radius Type
848.04	Street Turnout
848.05	Wheelchair Ramp - Curb Cut
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

INDEX OF SHEETS

8/17/99
06/17/2009
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3/15/96

PROJECT REFERENCE NO.	SHEET NO.
B-4191	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 Utility Easement — PUE

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

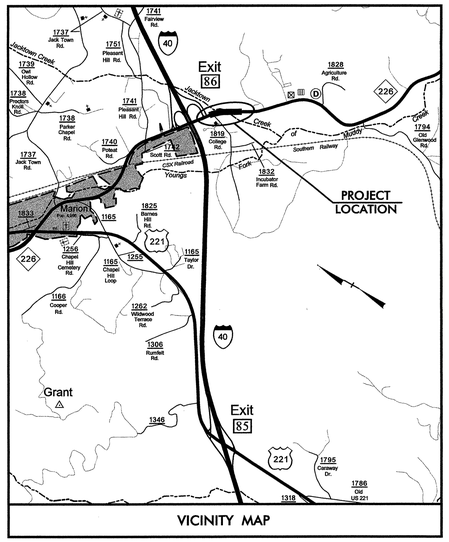
MISCELLANEOUS:

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

7622999

PROJECT REFERENCE NO.	SHEET NO.
B-4191	1-C
Location and Surveys	

SURVEY CONTROL SHEET B-4191



VICINITY MAP

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
5	BL-5	705873.7830	1121607.5300	1253.71	86+69.15	19.28 RT
4	BL-4	706270.3060	1121260.7500	1257.46	81+45.64	21.23 RT
3	BL-3	706727.1240	1120998.5010	1240.94	76+20.20	19.62 RT
2	BL-2	707148.9955	1120758.7569	1248.21	71+37.36	25.81 LT
23	BL-23	707478.6460	1120392.9440	1261.78	66+48.39	31.86 LT

BY

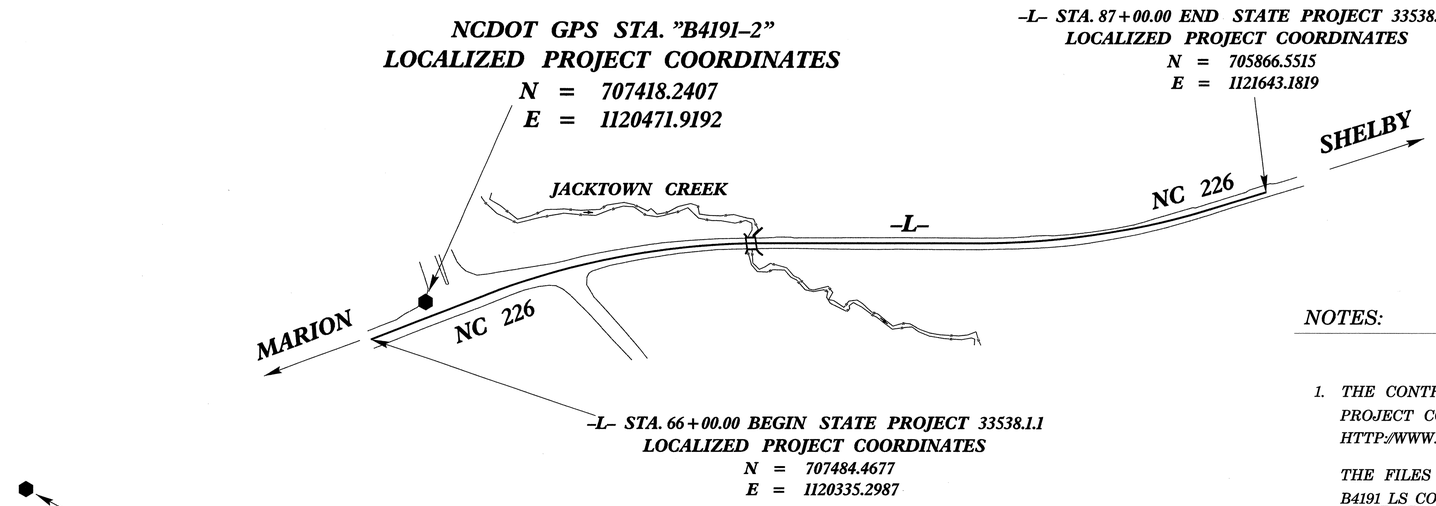
POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
24	BY-24	706867.3607	1120562.9572	1266.95	72+28.26	306.95 RT
BY2		707148.9955	1120758.7569	1248.21	71+37.36	25.81 LT

```
*****************************************
BM1       ELEVATION = 1248.94
N 706668      E 1121100
L STATION 6+43 555 RIGHT
RAILROAD SPIKE SET IN BASE 18" POPLAR
*****************************************
*****************************************
BM2       ELEVATION = 1242.03
N 706968      E 1120916
L STATION 7+84 232 RIGHT
RAILROAD SPIKE SET IN BASE 10" POPLAR
*****************************************
```

NC GRID NAD 83

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4191-2" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 707418.2407(ft) EASTING: 1120471.9192(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99984226 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4191-2" TO -L- STATION 66+00.00 IS N 64°08'17" W 151.83' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88



NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/*

   THE FILES TO BE FOUND ARE AS FOLLOWS: B4191_LS_CONTROL_080513.TXT

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

⬢ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT. NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)*

NOTE: DRAWING NOT TO SCALE

06/17/2009
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PROJECT REFERENCE NO.	SHEET NO.
B-4191	2
R/W SHEET NO.	

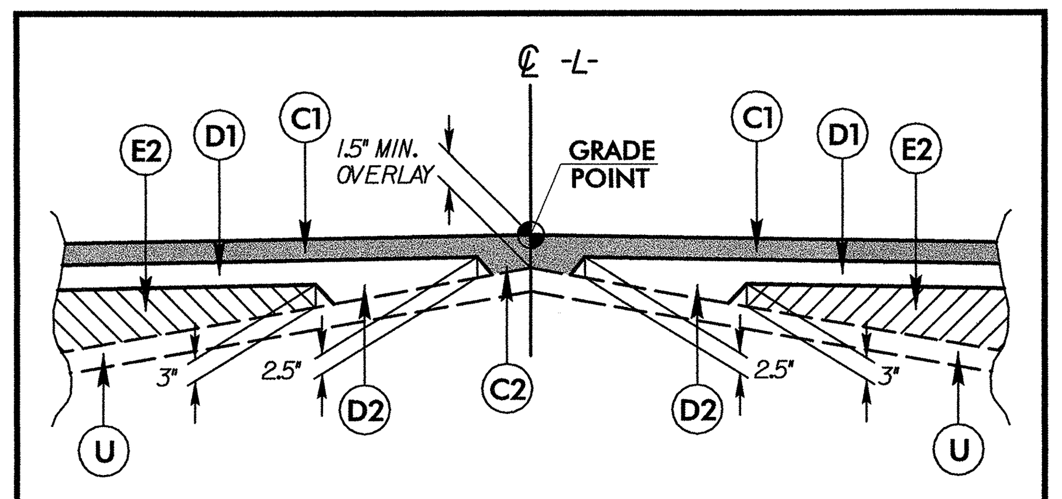
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 6-17-09	NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON — 6/22/09

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

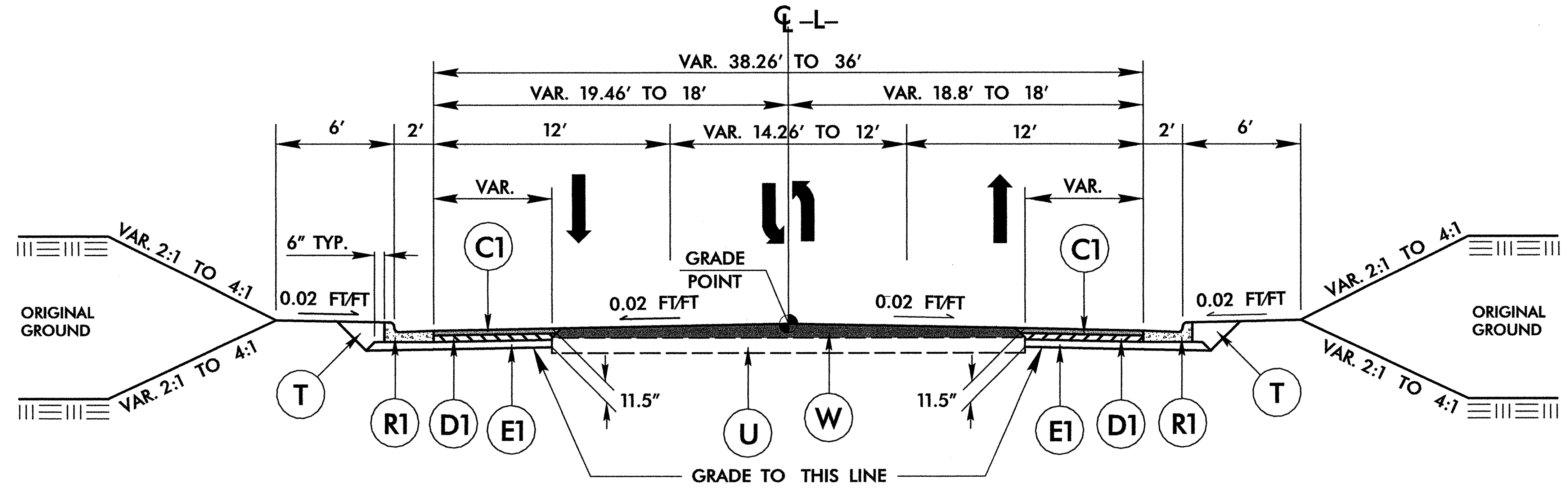
PAVEMENT SCHEDULE

C1	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 Lbs PER SQUARE YARD IN EACH OF TWO LAYERS.
C2	PROP. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1.5" OR GREATER THAN 2.0" IN DEPTH.
D1	PROP. APPROX. 4.0" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 Lbs. PER SQUARE YARD.
D2	PROP. VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.5" OR GREATER THAN 4.0" IN DEPTH.
E1	PROP. APPROX. 4.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 Lbs PER SQUARE YARD.
E2	PROP. VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3.0" OR GREATER THAN 5.5" IN DEPTH.
J	PROP. 10" AGGREGATE BASE COURSE
P	PRIME COAT (AT THE RATE OF 0.35 Gal. PER SQUARE YARD)
R1	2'-6" CONCRETE CURB AND GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL THIS SHEET)

PAVEMENT EDGE SLOPES AND TRENCH SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



DETAIL SHOWING METHOD OF WEDGING

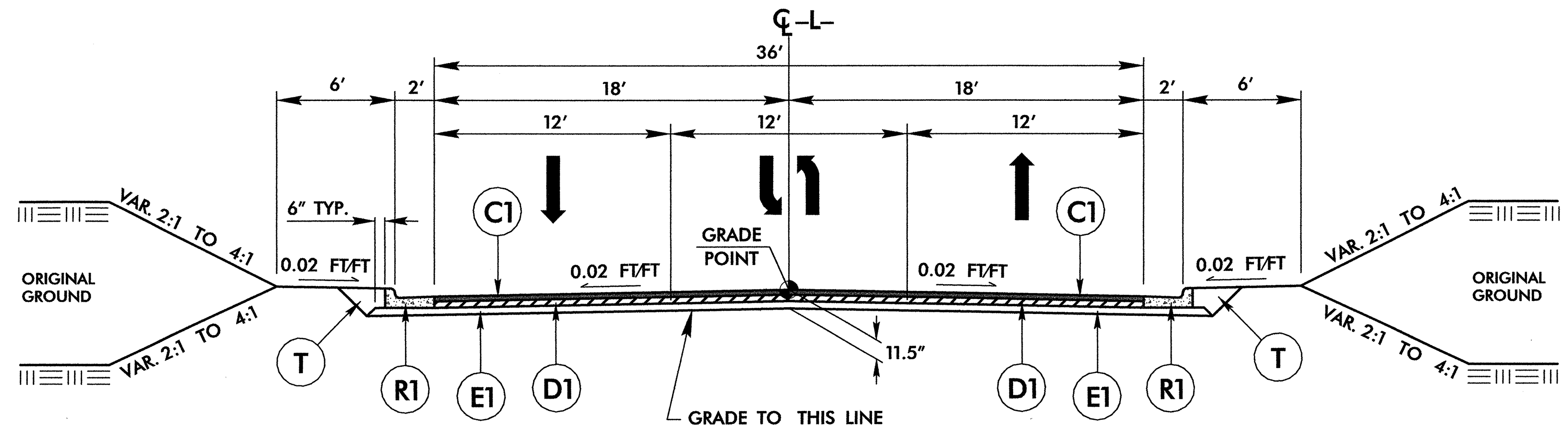


TYPICAL SECTION NO. 1

FROM -L- STA. 71+00.00 TO 74+75.00
FROM -L- STA. 76+00.00 TO STA. 78+75.00

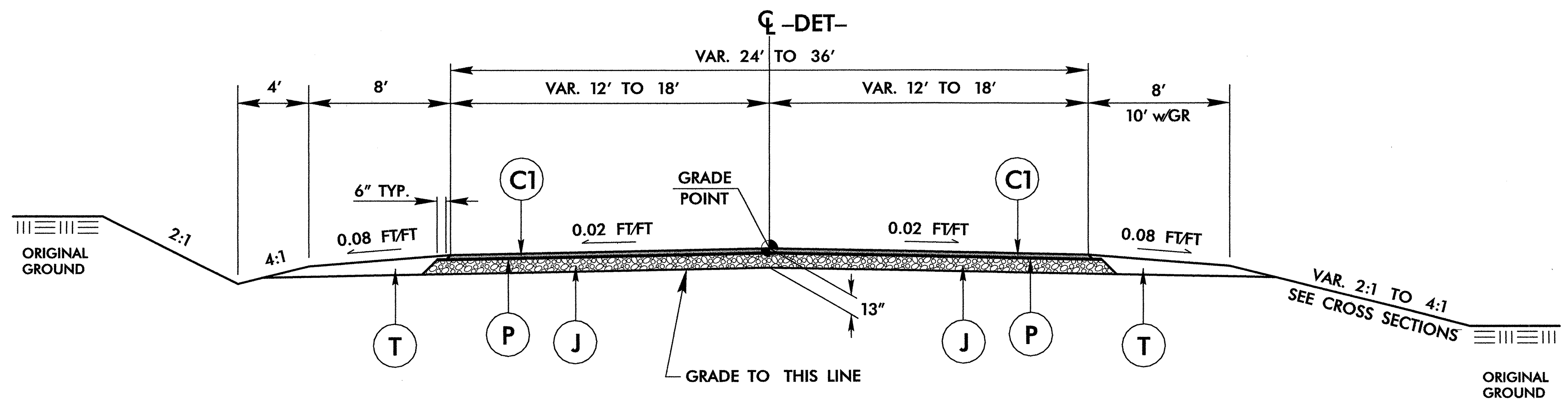
NOTES:

IN ORDER TO OBLITERATE DETOUR PAVEMENT MARKINGS, MILL EXISTING PAVEMENT 1.5" IN DEPTH FROM:
-L- STA. 69+50.00 TO 71+00.00
REPLACE MILLED PAVEMENT WITH 1.5" OF S9.5B DURING PLACEMENT OF FINAL PAVING LAYER.



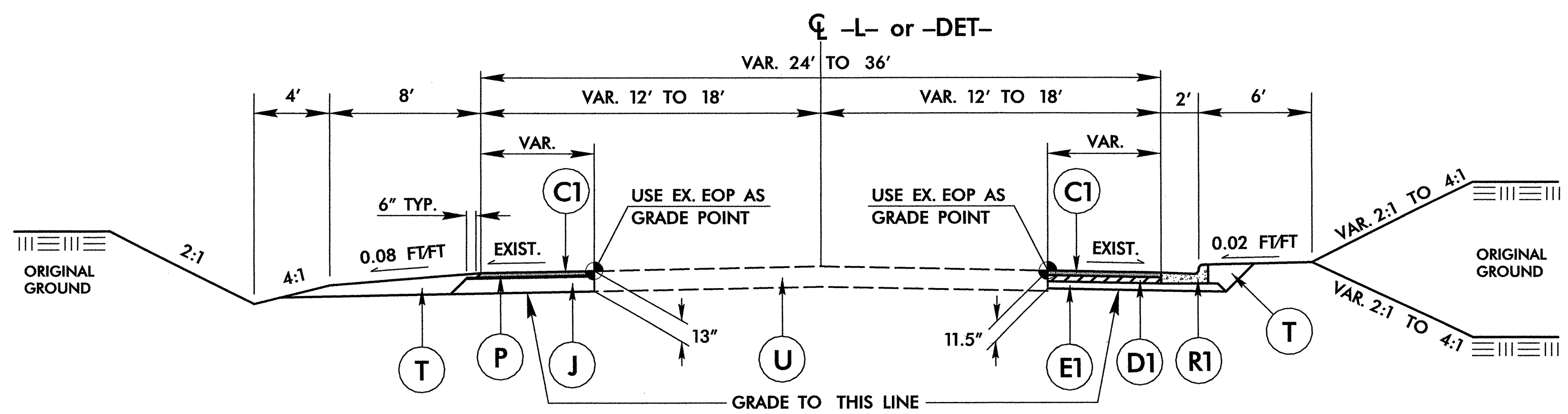
TYPICAL SECTION NO. 2

FROM -L- STA. 74+75.00 TO 76+00.00



TYPICAL SECTION NO. 3

FROM -DET- STA. 11+49.30 TO 18+31.17



NOTES:

MIRROR SHOULDER OR CURB & GUTTER SECTIONS AS REQUIRED FOR LEFT OR RIGHT SIDE CONSTRUCTION.

USE ALL ASPHALT PAVEMENT DESIGN FOR CONSTRUCTING DETOUR PAVEMENT IN LOCATIONS WHERE PROPOSED -L- LINE PAVEMENT AND DETOUR PAVEMENT OVERLAP:
FROM -DET- STA. 18+60+/- TO 19+41.32 RT.
FROM -DET- STA. 18+70+/- TO 19+41.32 LT.

TYPICAL SECTION NO. 4

FROM -DET- STA. 10+51.51 TO 11+49.30 RT. (SHOULDER TYPICAL)
FROM -DET- STA. 18+31.17 TO 19+41.32 RT. (SHOULDER TYPICAL)
FROM -DET- STA. 18+72.76 TO 19+41.32 LT. (SHOULDER TYPICAL)

FROM -L- STA. 70+00.00 TO 71+00.00 RT. (CURB & GUTTER TYPICAL)
(USE IN CONJUNCTION WITH NOTES SHOWN ABOVE WITH TYPICAL SECTION NO. 1)

8/2/99

06/17/2009
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PROJECT REFERENCE NO.	SHEET NO.
B-4191	2-A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 6-17-09

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON — 6/17/09

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

-DET-

PI Sta 9+65.77	PI Sta 11+32.51	PI Sta 15+20.16	PI Sta 18+56.15
Δ = 2° 13' 31.5" (RT)	Δ = 31° 10' 28.7" (RT)	Δ = 35° 24' 56.6" (LT)	Δ = 23° 17' 41.4" (RT)
D = 3° 15' 00.0"	D = 12° 03' 44.2"	D = 14° 19' 26.2"	D = 14° 19' 26.2"
L = 68.47'	L = 258.45'	L = 247.25'	L = 162.63'
T = 34.24'	T = 132.51'	T = 127.72'	T = 82.45'
R = 1,762.95'	R = 475.00'	R = 400.00'	R = 400.00'
SE = 0.04 ft/ft	SE = 0.06 ft/ft	SE = 0.04 ft/ft	SE = 0.04 ft/ft
RO = EXISTING	RO = 150'	RO = 100'	RO = 100'
V = 35 mph	V = 35 mph	V = 35 mph	V = 35 mph

DETAIL A
SPECIAL CUT DITCH (Not to Scale)

Natural Ground — 2d — D — 4:1 or Flatter — Front Ditch Slope — Min. D= 1.0 Ft.

-DET- STA. 14+98 TO STA. 15+84 RT
-DET- STA. 14+98 TO STA. 15+97 LT

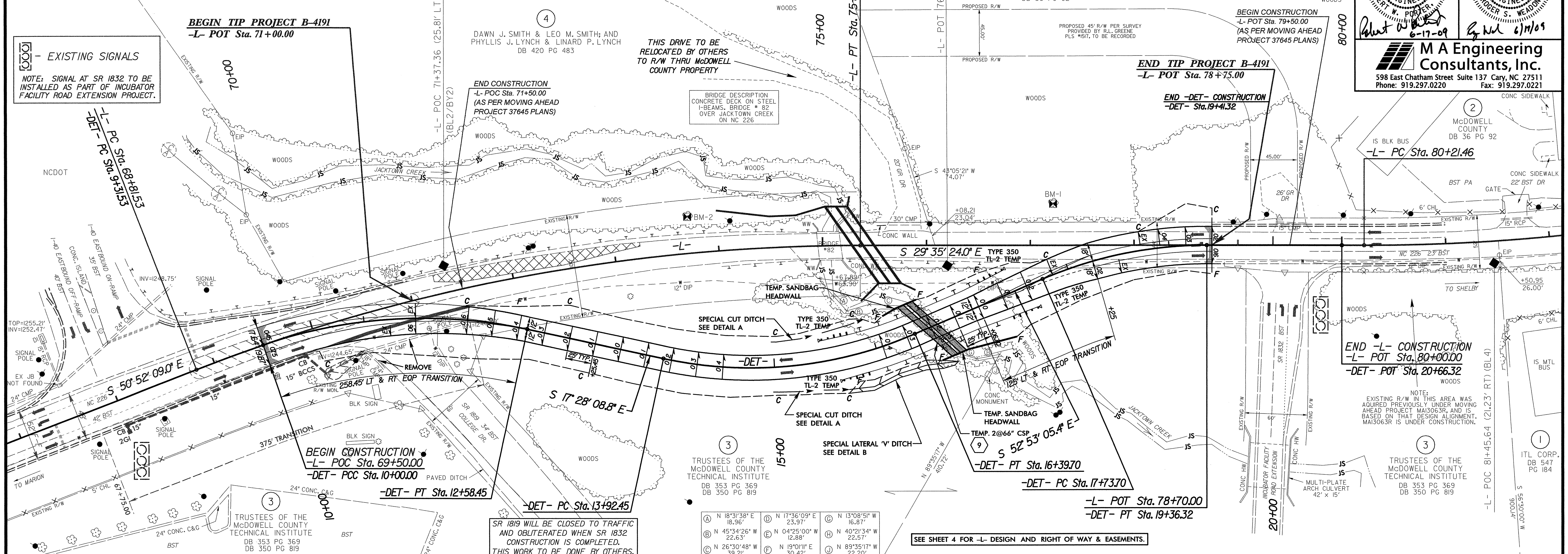
DETAIL B
SPECIAL LATERAL 'V' DITCH (Not to Scale)

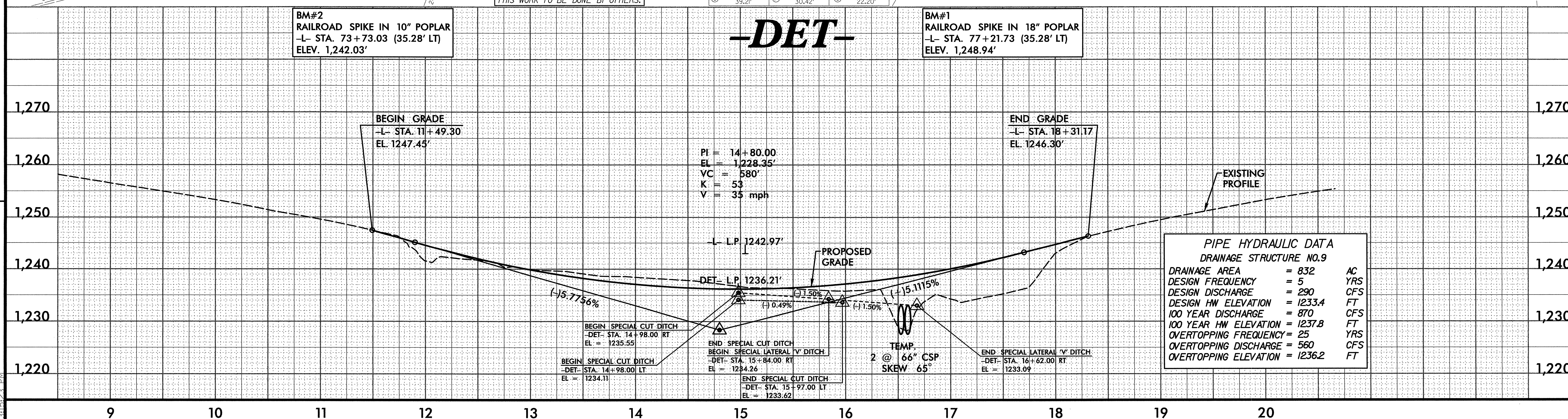
Natural Ground — 2d — D — 4:1 or Flatter — Fill Slope — Min. D= 1Ft.

-DET- STA. 15+84 TO STA. 16+62 RT

-L-

PI Sta 72+12.71	PI Sta 83+05.79
Δ = 21° 16' 45.0" (RT)	Δ = 16° 56' 08.0" (LT)
D = 3° 15' 00.0"	D = 3° 00' 00.0"
L = 654.74'	L = 564.52'
T = 331.19'	T = 284.33'
R = 1,762.95'	R = 1,909.86'
SE = 0.04 ft/ft	SE = 0.04 ft/ft
RO = 144'	RO = 130'
V = 50 mph	V = 50 mph


NAD 83
BEGIN TIP PROJECT B-4191
-L- POT Sta. 71+00.00
EXISTING SIGNALS
NOTE: SIGNAL AT SR 1832 TO BE INSTALLED AS PART OF INCUBATOR FACILITY ROAD EXTENSION PROJECT.
DAWN J. SMITH & LEO M. SMITH; AND PHYLLIS J. LYNCH & LINARD P. LYNCH
DB 420 PG 483
END CONSTRUCTION
-L- POC Sta. 71+50.00
(AS PER MOVING AHEAD PROJECT 37645 PLANS)
THIS DRIVE TO BE RELOCATED BY OTHERS TO R/W THRU McDOWELL COUNTY PROPERTY
BRIDGE DESCRIPTION
CONCRETE DECK ON STEEL I-BEAMS. BRIDGE # 82 OVER JACKTOWN CREEK ON NC 226
McDOWELL COUNTY
DB 36 PG 92
BEGIN CONSTRUCTION
-L- POT Sta. 79+50.00
(AS PER MOVING AHEAD PROJECT 37645 PLANS)
END TIP PROJECT B-4191
-L- POT Sta. 78+75.00
END -DET- CONSTRUCTION
-DET- Sta. 19+41.32
-L- PC Sta. 80+21.46
-L- PC Sta. 68+81.53
-DET- PC Sta. 9+31.53
S 50° 52' 09.0" E
S 17° 28' 08.8" E
S 29° 35' 24.0" E
S 52° 53' 05.4" E
SPECIAL CUT DITCH SEE DETAIL A
TEMP. SANDBAG HEADWALL
SPECIAL LATERAL 'V' DITCH SEE DETAIL B
TEMP. 2@66" CSP
END -L- CONSTRUCTION
-L- POT Sta. 80+00.00
-DET- POT Sta. 20+66.32
NOTE: EXISTING R/W IN THIS AREA WAS AQUIRED PREVIOUSLY UNDER MOVING AHEAD PROJECT MA13063R, AND IS BASED ON THAT DESIGN ALIGNMENT. MA13063R IS UNDER CONSTRUCTION.
BEGIN CONSTRUCTION
-L- POC Sta. 69+50.00
-DET- PCC Sta. 10+00.00
-DET- PT Sta. 12+58.45
-DET- PC Sta. 13+92.45
-DET- PT Sta. 16+39.70
-DET- PC Sta. 17+73.70
-L- POT Sta. 78+70.00
-DET- PT Sta. 19+36.32
SR 1819 WILL BE CLOSED TO TRAFFIC AND OBLITERATED WHEN SR 1832 CONSTRUCTION IS COMPLETED. THIS WORK TO BE DONE BY OTHERS.
TRUSTEES OF THE McDOWELL COUNTY TECHNICAL INSTITUTE
DB 353 PG 369
DB 350 PG 819
ITL CORP.
DB 547
PG 184
SEE SHEET 4 FOR -L- DESIGN AND RIGHT OF WAY & EASEMENTS.


BM#2
RAILROAD SPIKE IN 10" POPLAR
-L- STA. 73+73.03 (35.28' LT)
ELEV. 1,242.03'
-DET-
BM#1
RAILROAD SPIKE IN 18" POPLAR
-L- STA. 77+21.73 (35.28' LT)
ELEV. 1,248.94'
BEGIN GRADE
-L- STA. 11+49.30
EL. 1247.45'
END GRADE
-L- STA. 18+31.17
EL. 1246.30'
PI = 14+80.00
EL = 1,228.35'
VC = 580'
K = 53
V = 35 mph
EXISTING PROFILE
PROPOSED GRADE
-L- L.P. 1242.97'
-DET- L.P. 1236.21'
(-)5.7756%
(+)5.1115%
TEMP. 2 @ 66" CSP SKEW 65°
BEGIN SPECIAL CUT DITCH -DET- STA. 14+98.00 RT EL = 1235.55
BEGIN SPECIAL CUT DITCH -DET- STA. 14+98.00 LT EL = 1234.11
END SPECIAL CUT DITCH BEGIN SPECIAL LATERAL 'V' DITCH -DET- STA. 15+84.00 RT EL = 1234.26
END SPECIAL CUT DITCH -DET- STA. 15+97.00 LT EL = 1233.62
END SPECIAL LATERAL 'V' DITCH -DET- STA. 16+62.00 RT EL = 1233.09

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.9

DRAINAGE AREA	= 832	AC
DESIGN FREQUENCY	= 5	YRS
DESIGN DISCHARGE	= 290	CFS
DESIGN HW ELEVATION	= 1233.4	FT
100 YEAR DISCHARGE	= 870	CFS
100 YEAR HW ELEVATION	= 1237.8	FT
OVERTOPPING FREQUENCY	= 25	YRS
OVERTOPPING DISCHARGE	= 560	CFS
OVERTOPPING ELEVATION	= 1236.2	FT

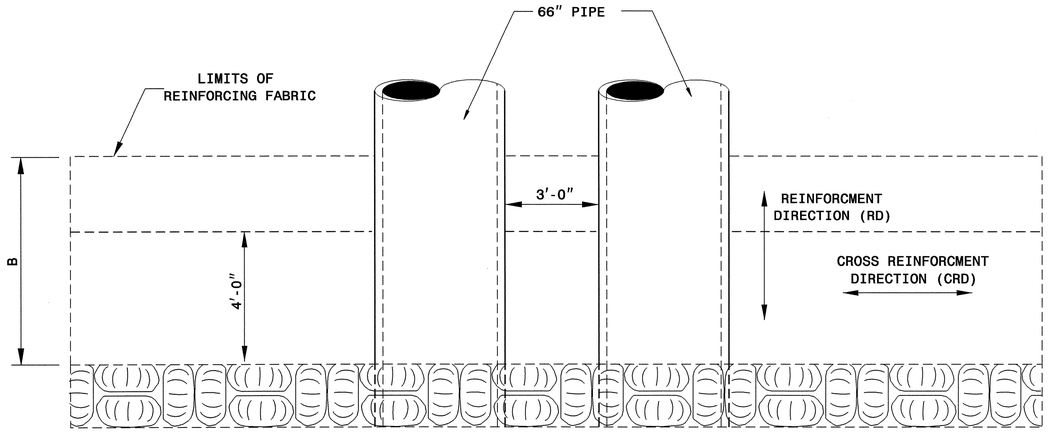
REVISIONS

8/17/99

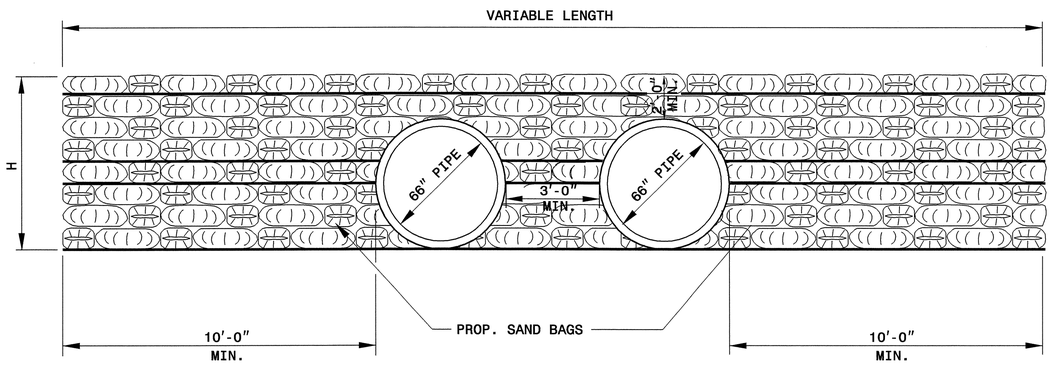
06/17/2009 B4191_rdy_psh2A.dgn

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-4191	2-B



PLAN



FRONT ELEVATION

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

INLET END SAND BAG HEADWALL AREA = 109 S.F.

OUTLET END SAND BAG HEADWALL AREA = 226 S.F.

NOTES:

1. REINFORCED SAND BAG HEADWALLS ARE BASED ON THE FOLLOWING ASSUMPTIONS:

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

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

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

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

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

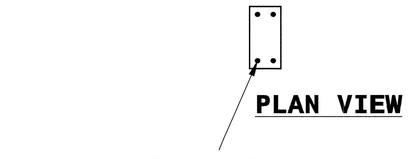
4. DO NOT SPLICE REINFORCEMENT IN THE REINFORCEMENT DIRECTION (RD). SEAMS ARE ALLOWED IN THE CROSS-REINFORCEMENT DIRECTION (CRD).

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

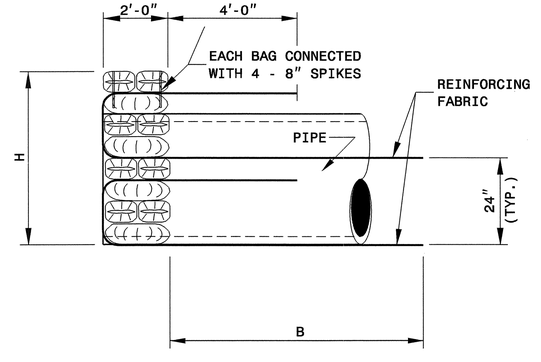
   DO NOT BACKFILL WITH ROCK, BROKEN PAVEMENT OR SIMILAR MATERIAL.
   DO NOT DAMAGE REINFORCEMENT WHEN PLACING AND COMPACTING BACKFILL.
   DO NOT USE SHEEPSFOOT, GRID ROLLERS OR OTHER TYPES OF COMPACTION EQUIPMENT WITH FEET.
   DO NOT OPERATE HEAVY EQUIPMENT ON REINFORCEMENT UNITL IT IS COVERED WITH AT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

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

7. HEADWALL DIMENSIONS MAY BE ADJUSTED FOR SINGLE, DOUBLE OR MORE PIPES AS SHOWN IN PLANS.



PLAN VIEW



SIDE ELEVATION

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

DETAIL OF REINFORCED SAND BAG HEADWALL

ORIGINAL BY:	rnbritt	DATE:	11-09-04
MODIFIED BY:	tspell	DATE:	6-10-08
CHECKED BY:		DATE:	6/9/09
FILE SPEC.:	s:details/howerton/sandbagheadwall.dgn		

5/28/99

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202169

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0043000000-N	226	Lump Sum		GRADING
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0057000000-E	226	25	CY	UNDERCUT EXCAVATION
0080000000-E	SP	100	TON	CLASS IV SUBGRADE STABILIZATION
0134000000-E	240	280	CY	DRAINAGE DITCH EXCAVATION
0195000000-E	265	100	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	100	SY	FABRIC FOR SOIL STABILIZATION
0318000000-E	300	90	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0366000000-E	310	544	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-E	310	28	LF	18" RC PIPE CULVERTS, CLASS III
0384000000-E	310	116	LF	30" RC PIPE CULVERTS, CLASS III
0576000000-E	310	144	LF	** CS PIPE CULVERTS, ***** THICK (66", 0.138")
0995000000-E	340	328	LF	PIPE REMOVAL
1121000000-E	520	1,267	TON	AGGREGATE BASE COURSE
1220000000-E	545	25	TON	INCIDENTAL STONE BASE
1275000000-E	600	750	GAL	PRIME COAT
1297000000-E	607	720	SY	MILLING ASPHALT PAVEMENT, *** DEPTH (1-1/2")
1489000000-E	610	956	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-E	610	679	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1519000000-E	610	995	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1560000000-E	620	133	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
1693000000-E	654	25	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
2000000000-N	806	11	EA	RIGHT OF WAY MARKERS
2022000000-E	815	180	CY	SUBDRAIN EXCAVATION
2033000000-E	815	135	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	800	LF	6" PERFORATED SUBDRAIN PIPE
2055000000-E	815	24	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS
2066000000-N	815	2	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET
2077000000-E	815	12	LF	6" OUTLET PIPE (SUBDRAINS)
2199000000-E	SP	340	SF	SANDBAG HEADWALL
2286000000-N	840	8	EA	MASONRY DRAINAGE STRUCTURES
2374000000-N	840	2	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)
2374000000-N	840	4	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)
2374000000-N	840	1	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)
2549000000-E	846	1,770	LF	2'-6" CONCRETE CURB & GUTTER
2605000000-N	848	1	EA	CONCRETE WHEELCHAIR RAMPS
3030000000-E	862	1,012.5	LF	STEEL BM GUARDRAIL
3150000000-N	862	10	EA	ADDITIONAL GUARDRAIL POSTS
3210000000-N	862	1	EA	GUARDRAIL ANCHOR UNITS, TYPE CAT-1
3270000000-N	SP	2	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3360000000-E	863	640	LF	REMOVE EXISTING GUARDRAIL
3380000000-E	862	287.5	LF	TEMPORARY STEEL BM GUARDRAIL
3389000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE ********** TEMPORARY (350 TL-2)
3628000000-E	876	30	TON	RIP RAP, CLASS I
3649000000-E	876	220	TON	RIP RAP, CLASS B
3656000000-E	876	1,500	SY	FILTER FABRIC FOR DRAINAGE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF QUANTITIES

ItemNumber	Sec #	Quantity	Unit	Description
3659000000-N	SP	1	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON
4400000000-E	1110	200	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	128	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	42	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4415000000-N	1115	1	EA	FLASHING ARROW PANELS, TYPE C
4430000000-N	1130	60	EA	DRUMS
4435000000-N	1135	48	EA	CONES
4445000000-E	1145	48	LF	BARRICADES (TYPE III)
4455000000-N	1150	120	MD	FLAGGER
4480000000-N	1165	1	EA	TMIA
4650000000-N	1251	156	EA	TEMPORARY RAISED PAVEMENT MARKERS
4686000000-E	1205	2,423	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4695000000-E	1205	45	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)
4710000000-E	1205	20	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
4725000000-E	1205	10	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
4810000000-E	1205	11,220	LF	PAINT PAVEMENT MARKING LINES (4")
4835000000-E	1205	102	LF	PAINT PAVEMENT MARKING LINES (24")
4845000000-N	1205	10	EA	PAINT PAVEMENT MARKING SYMBOL
4850000000-E	1205	1,400	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
4905000000-N	1253	30	EA	SNOWPLOWABLE PAVEMENT MARKERS
5672000000-N	1515	1	EA	RELOCATE FIRE HYDRANT
5888000000-E	SP	70	LF	GENERIC UTILITY ITEM 12" DI RESTRAINED JOINT WATER LINE
6000000000-E	1605	1,800	LF	TEMPORARY SILT FENCE
6006000000-E	1610	350	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	500	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	225	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	6	ACR	TEMPORARY MULCHING
6018000000-E	1620	200	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	2.75	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	475	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	4	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	1,150	LF	SAFETY FENCE
6030000000-E	1630	1,150	CY	SILT EXCAVATION
6036000000-E	1631	2,400	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	25	SY	COIR FIBER MAT
6038000000-E	SP	40	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	450	LF	1/4" HARDWARE CLOTH
6069000000-E	1638	100	CY	STILLING BASINS
6071010000-E	SP	120	LF	WATTLE
6071020000-E	SP	45	LB	POLYACRYLAMIDE (PAM)
6071030000-E	SP	325	LF	COIR FIBER BAFFLES
6071050000-E	SP	4	EA	*** SKIMMER (1-1/2")
6084000000-E	1660	5	ACR	SEEDING & MULCHING
6087000000-E	1660	2.5	ACR	MOWING
6090000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	100	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	3	TON	FERTILIZER TOPDRESSING
6111000000-E	SP	80	LF	IMPERVIOUS DIKE
6114000000-N	SP	5	HR	SPECIALIZED HAND MOWING
6117000000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL

ItemNumber	Sec #	Quantity	Unit	Description
6120000000-E	SP	35	CY	CULVERT DIVERSION CHANNEL
6123000000-E	1670	0.5	ACR	REFORESTATION

PROJECT REFERENCE NO.	SHEET NO.
B-4191	3

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

5/28/99

COMPUTED BY: RWP DATE: 03-11-09
CHECKED BY: KSH DATE: 03-19-09

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
B-4191	3-A

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
PHASE 1					
-DET- 10+51.51 TO 19+41.32	1,799		1,680		119
SUBTOTAL	1,799		1,680		119
EST. SHOULDER MATERIAL			650	650	
WASTE TO REPLACE BORROW				-119	-119
TOTAL (PHASE 1)	1,799		2,330	531	0
PHASE 2					
-L- (LT.) 71+00.00 TO 71+75.00 -L- (LT. & RT.) 71+75.00 TO 76+25.00 -L- (LT.) 76+25.00 TO 78+00.00	842		3,000	2,158	
TOTAL (PHASE 2)	842		3,000	2,158	0
PHASE 3					
-L- (LT.) 78+00.00 TO 78+75.00	148		53		95
-L- (RT.) 70+00.00 TO 72+75.00	4		304	300	
-L- (RT.) 76+25.00 TO 78+75.00	40		432	392	
-DET- REMOVAL 12+25+/- TO 18+40+/-	1,384		1,218		166
SUBTOTAL	1,576		2,007	692	261
WASTE TO REPLACE BORROW				-261	-261
TOTAL (PHASE 3)	1,576		2,007	431	0
TOTAL (ALL PHASES)	4,217		7,337	3,120	0
EST. LOSS DUE TO CLEARING AND GRUBBING	-90			90	
PROJECT TOTAL	4,127		7,337	3,210	0
EST. 5% TO REPLACE TOPSOIL ON BORROW PIT				161	
GRAND TOTAL	4,127		7,337	3,371	0
SAY	4,200			3,400	

SELECT GRANULAR MATERIAL (CL II or III) = 100 CY
CLASS IV SUBGRADE STABILIZATION = 100 TONS

(CONTINGENCY ITEMS PER 'GEOTECHNICAL REPORT - DESIGN AND CONSTRUCTION RECOMMENDATIONS' LETTER DATED JULY 7, 2008)

DRAINAGE DITCH EXCAVATION (DDE) = 280 CY

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

NOTE: Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

SUMMARY OF PAVEMENT REMOVAL

IN SQUARE YARDS

LOCATION	ASPHALT REMOVAL	ASPHALT BREAK-UP	CONCRETE REMOVAL	CONCRETE BREAK-UP
-L- STA. 71+25 TO 73+25	238			
-L- STA. 74+75 TO 74+95	55			
-L- STA. 75+17 TO 76+00	228			
-DET- STA. 10+46 TO 11+95	175			
-DET- STA. 11+95 TO 12+58	180			
-DET- STA. 12+58 TO 17+00	1177			
-DET- STA. 17+00 TO 17+70	213			
-DET- STA. 17+70 TO 18+40	110			
GRAND TOTAL	2,376			
SAY	2,380			

"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.

GUARDRAIL SUMMARY

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

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: CAT-1	ANCHORS:	ANCHORS: TYPE 350 TL-2 (TEMP.)	ANCHORS:	ANCHORS:	ANCHORS:	ANCHORS:	ANCHORS:	IMPACT ATTENUATOR TYPE 350: EA	IMPACT ATTENUATOR TYPE 350: G	IMPACT ATTENUATOR TYPE 350: NG			REMOVE EXISTING GUARDRAIL	REMARKS
-L-	72+15	77+00	RT	481.25			73+15	77+00	2' (C&G)	6' (BERM)	50.00		1.00		1	1														240'	
-L-	71+00	77+82	LT	637.50			76+50	TIE TO EXISTING	2' (C&G)	6' (BERM)	50.00		1.00		1															400'	
		SUBTOTAL		1,118.75																											
	LESS ANCHORS	GRAU-350	2 x 50.00' =	100.00									TOTAL ANCHORS (EA)		2	1											TOTAL (LF)		640'	
		CAT-1	1 x 6.25' =	6.25																											
		TOTAL GUARDRAIL (LF)		1,012.50			ADDITIONAL GUARDRAIL POSTS: 10 EACH																									
TEMPORARY GUARDRAIL																															
-DET-	15+63	17+59	RT	200.00			16+15	17+59	8'	10'	25.00	N/A	1.00	N/A				2												USE 25:1 FLARE FOR TYPE 350 TL-2 (TEMP) ON APPROACH ENDS. NO FLARE FOR TYPE 350 TL-2 (TEMP) ON TRAILING ENDS.
-DET-	15+49	17+41	LT	187.50			16+53	15+85	8'	10'	25.00	N/A	1.00	N/A				2													
		SUBTOTAL		387.50																											
	LESS ANCHORS	TYPE 350 TL-2 (TEMP.)	4 x 25.00' =	100.00									TOTAL TEMPORARY ANCHORS (EA)					4													
		TOTAL TEMPORARY GUARDRAIL (LF)		287.50																											

6/21/99

COMPUTED BY: RWP DATE: 06-12-09
CHECKED BY: RSW DATE: 07-15-09

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
B-4191	3-B

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

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

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHRWISE) 12" .064	15" .064	18" .064	24" .064	24"	30" .079	30"	36" .079	36"	42" .109	42"	48" .109	48"	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11, OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G		CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	C.B. STD. 840.04 OR 840.05						PREFORMED SCOUR HOLE (SEE DETAIL G ON SHT 4)	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
-L- 73+38	CL	1A			1235.8	1233.5						116																																																											122	REMOVE 3 PIPES @ OLD SR 1819 TURNOUT
-L- 73+50	RT	1		1243.0																																						1			1		1																											
	RT	1	2		1240.0	1238.9			100																																																																		
-L- 74+50	RT	2		1241.9																																						1			1	1																												
	RT	2	4		1238.9	1238.5			24																																																																		
-L- 74+50	LT	3		1243.6																																						1			1	1																												
	CL	3	2		1240.6	1238.9			40																																																																	
-L- 74+75	RT	4		1242.0																																						1			1			1																										
-L- 74+75	RT	4	OUT		1238.5	1235.0			24																																																												1					
-L- 75+50	RT	5		1236.1																																						1																				1											
-L- 75+24	RT	5	OUT		1232.4	1230.5				28																																																													32	
-L- 76+68	RT	6		1244.7																																						1			1		1																											
-L- 76+50	RT	6	OUT		1241.7	1240.1			24																																																																		
-L- 78+72	RT	7		1250.5																																						1			1		1																											
	RT	7	6		1247.5	1241.7			204																																																																			
-L- 80+00	RT	8		1253.3																																						1			1		1																											
	RT	8	7		1250.3	1247.5			128																																																																30	
TOTAL									544	28		116																														8			7	2	4	1														1						1				184	

ABBREVIATIONS

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

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

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 54"	60"	66"	72"	78"	84"			BITUMINOUS COATED C.S. PIPE TYPE B (* – UNCOATED C.S. PIPE) 54" .109	54" .138	54" .168	54" SHOP ELON-GATED .138	54" SHOP ELON-GATED .168	60" .138	60" .168	66" .138	66" .168	72" .138	72" .168		STRUCTURAL PLATE PIPE 60" 12	60" 10	60"	66" 12	66" 10	66"	72" 12	72" 10	72"				REINFORCED ENDWALLS WITH R.C. – C.Y.	WITH C.S. – C.Y.	MASONARY DRAINAGE STRUCTURES CUBIC YARDS	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													REINF. CONC. FLARED END SECTIONS NO. & SIZE	CORR. STEEL FLARED END SECTIONS NO. & SIZE	REINF. CONC. ELBOWS NO. & SIZE	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	PIPE REMOVAL LIN.FT.	REMARKS
-DET- 76+04	CL	9																					2@ 72*																																												144	TEMPORARY PIPES FOR DETOUR USE
TOTAL																							144*																																												144	

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

07/15/2009
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PROJECT REFERENCE NO.	SHEET NO.
B-4191	4

RW SHEET NO.

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19814 ROBERT W. PORTER, JR. 6-17-09

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21656 ROGER S. WEADON 6/17/09

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
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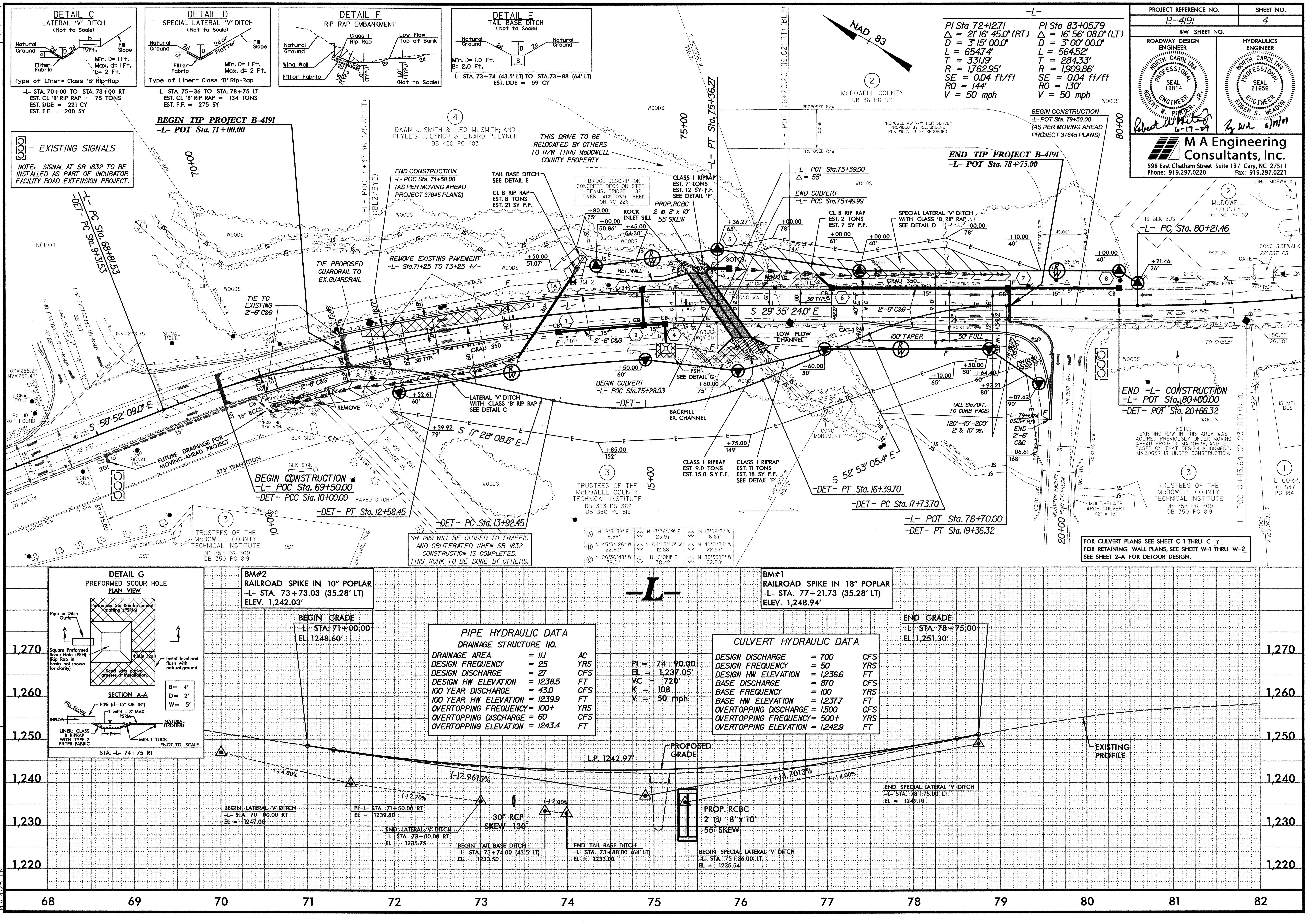

DETAIL C
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
Fill Slope
Filter Fabric
Min. D= 1 Ft.
Max. d= 1 Ft.
b= 2 Ft.
Type of Liner= Class 'B' Rip-Rap
-L- STA. 70+00 TO STA. 73+00 RT
EST. CL 'B' RIP RAP = 75 TONS
EST. DDE = 221 CY
EST. F.F. = 200 SY
DETAIL D
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D= 1 Ft.
Max. d= 2 Ft.
Type of Liner= Class 'B' Rip-Rap
-L- STA. 75+36 TO STA. 78+75 LT
EST. CL 'B' RIP RAP = 134 TONS
EST. F.F. = 275 SY
DETAIL F
RIP RAP EMBANKMENT
Class I Rip Rap
Low Flow Top of Bank
Natural Ground
Wing Wall
Filter Fabric
(Not to Scale)
DETAIL E
TAIL BASE DITCH
(Not to Scale)
Min. D= 1.0 Ft.
B= 2.0 Ft.
-L- STA. 73+74 (43.5' LT) TO STA.73+88 (64' LT)
EST. DDE = 59 CY
-L-
PI Sta 72+12.71
Δ = 21° 16' 45.0" (RT)
D = 3° 15' 00.0"
L = 654.74'
T = 331.19'
R = 1,762.95'
SE = 0.04 ft/ft
RO = 144'
V = 50 mph
PI Sta 83+05.79
Δ = 16° 56' 08.0" (LT)
D = 3° 00' 00.0"
L = 564.52'
T = 284.33'
R = 1,909.86'
SE = 0.04 ft/ft
RO = 130'
V = 50 mph
NAD 83
EXISTING SIGNALS
NOTE: SIGNAL AT SR 1832 TO BE INSTALLED AS PART OF INCUBATOR FACILITY ROAD EXTENSION PROJECT.
BEGIN TIP PROJECT B-4191
-L- POT Sta. 71+00.00
END TIP PROJECT B-4191
-L- POT Sta. 78+75.00
DAWN J. SMITH & LEO M. SMITH; AND PHYLLIS J. LYNCH & LINARD P. LYNCH
DB 420 PG 483
McDOWELL COUNTY
DB 36 PG 92
THIS DRIVE TO BE RELOCATED BY OTHERS TO R/W THRU McDOWELL COUNTY PROPERTY
BRIDGE DESCRIPTION
CONCRETE DECK ON STEEL I-BEAMS. BRIDGE # 82 OVER JACKTOWN CREEK ON NC 226
END CONSTRUCTION
-L- POC Sta. 71+50.00
(AS PER MOVING AHEAD PROJECT 37645 PLANS)
BEGIN CONSTRUCTION
-L- POT Sta. 79+50.00
(AS PER MOVING AHEAD PROJECT 37645 PLANS)
-L- PC Sta. 68+81.53
-DET- PC Sta. 9+31.53
-L- PC Sta. 80+21.46
TAIL BASE DITCH SEE DETAIL E
CL B RIP RAP EST. 8 TONS EST. 21 SY F.F.
CLASS I RIPRAP EST. 7 TONS EST. 12 SY F.F. SEE DETAIL 'F'
PROP. RCBC 2 @ 8' x 10' 55° SKEW
ROCK INLET SILL
-L- POT Sta.75+39.00
Δ = 55°
END CULVERT
-L- POC Sta.75+49.99
CL B RIP RAP EST. 2 TONS EST. 7 SY F.F.
SPECIAL LATERAL 'V' DITCH WITH CLASS 'B' RIP RAP SEE DETAIL D
TIE PROPOSED GUARDRAIL TO EX.GUARDRAIL
REMOVE EXISTING PAVEMENT
-L- Sta.71+25 TO 73+25 +/-
TIE TO EXISTING 2'-6" C&G
S 29° 35' 24.0" E
S 50° 52' 09.0" E
S 17° 28' 08.8" E
S 52° 53' 05.4" E
LOW FLOW CHANNEL
100' TAPER
50' FULL
BEGIN CULVERT
-L- POC Sta.75+28.03
PSH SEE DETAIL G
BACKFILL EX. CHANNEL
LATERAL 'V' DITCH WITH CLASS 'B' RIP RAP SEE DETAIL C
FUTURE DRAINAGE FOR MOVING-AHEAD PROJECT
BEGIN CONSTRUCTION
-L- POC Sta. 69+50.00
-DET- PCC Sta. 10+00.00
-DET- PT Sta. 12+58.45
-DET- PC Sta. 13+92.45
CLASS I RIPRAP EST. 9.0 TONS EST. 15.0 S.Y.F.F.
CLASS I RIPRAP EST. 11 TONS EST. 18 SY F.F. SEE DETAIL 'F'
-DET- PT Sta. 16+39.70
-DET- PC Sta. 17+73.70
-L- POT Sta. 78+70.00
-DET- PT Sta. 19+36.32
END -L- CONSTRUCTION
-L- POT Sta. 80+00.00
-DET- POT Sta. 20+66.32
NOTE: EXISTING R/W IN THIS AREA WAS AQUIRED PREVIOUSLY UNDER MOVING AHEAD PROJECT MA13063R, AND IS BASED ON THAT DESIGN ALIGNMENT. MA13063R IS UNDER CONSTRUCTION.
TRUSTEES OF THE McDOWELL COUNTY TECHNICAL INSTITUTE
DB 353 PG 369
DB 350 PG 819
ITL CORP. DB 547 PG 184
SR 1819 WILL BE CLOSED TO TRAFFIC AND OBLITERATED WHEN SR 1832 CONSTRUCTION IS COMPLETED. THIS WORK TO BE DONE BY OTHERS.
FOR CULVERT PLANS, SEE SHEET C-1 THRU C-7
FOR RETAINING WALL PLANS, SEE SHEET W-1 THRU W-2
SEE SHEET 2-A FOR DETOUR DESIGN.
DETAIL G
PREFORMED SCOUR HOLE
PLAN VIEW
SECTION A-A
B= 4'
D= 2'
W= 5'
STA. -L- 74+75 RT
BM#2
RAILROAD SPIKE IN 10" POPLAR
-L- STA. 73+73.03 (35.28' LT)
ELEV. 1,242.03'
BM#1
RAILROAD SPIKE IN 18" POPLAR
-L- STA. 77+21.73 (35.28' LT)
ELEV. 1,248.94'
-L-
BEGIN GRADE
-L- STA. 71+00.00
EL 1248.60'
END GRADE
-L- STA. 78+75.00
EL 1,251.30'
PI = 74+90.00
EL = 1,237.05'
VC = 720'
K = 108
V = 50 mph
L.P. 1242.97'
PROPOSED GRADE
EXISTING PROFILE
(-)2.9615%
(+)3.7013%
30" RCP SKEW 130°
PROP. RCBC 2 @ 8' x 10' 55° SKEW
BEGIN LATERAL 'V' DITCH -L- STA. 70+00.00 RT EL = 1247.00
PI -L- STA. 71+50.00 RT EL = 1239.80
END LATERAL 'V' DITCH -L- STA. 73+00.00 RT EL = 1235.75
BEGIN TAIL BASE DITCH -L- STA. 73+74.00 (43.5' LT) EL = 1233.50
END TAIL BASE DITCH -L- STA. 73+88.00 (64' LT) EL = 1233.00
BEGIN SPECIAL LATERAL 'V' DITCH -L- STA. 75+36.00 LT EL = 1235.54
END SPECIAL LATERAL 'V' DITCH -L- STA. 78+75.00 LT EL = 1249.10

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 1.1	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 27	CFS
DESIGN HW ELEVATION	= 1238.5	FT
100 YEAR DISCHARGE	= 43.0	CFS
100 YEAR HW ELEVATION	= 1239.9	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 60	CFS
OVERTOPPING ELEVATION	= 1243.4	FT

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 700	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 1,236.6	FT
BASE DISCHARGE	= 870	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1,237.7	FT
OVERTOPPING DISCHARGE	= 1,500	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 1,242.9	FT

REVISIONS

8/17/99

06/17/2009