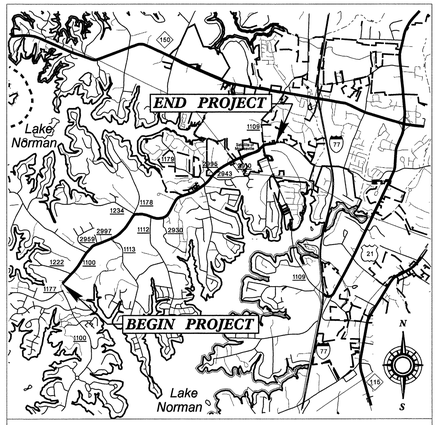
TIP PROJECT: R-3833A

CONTRACT: C201902

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

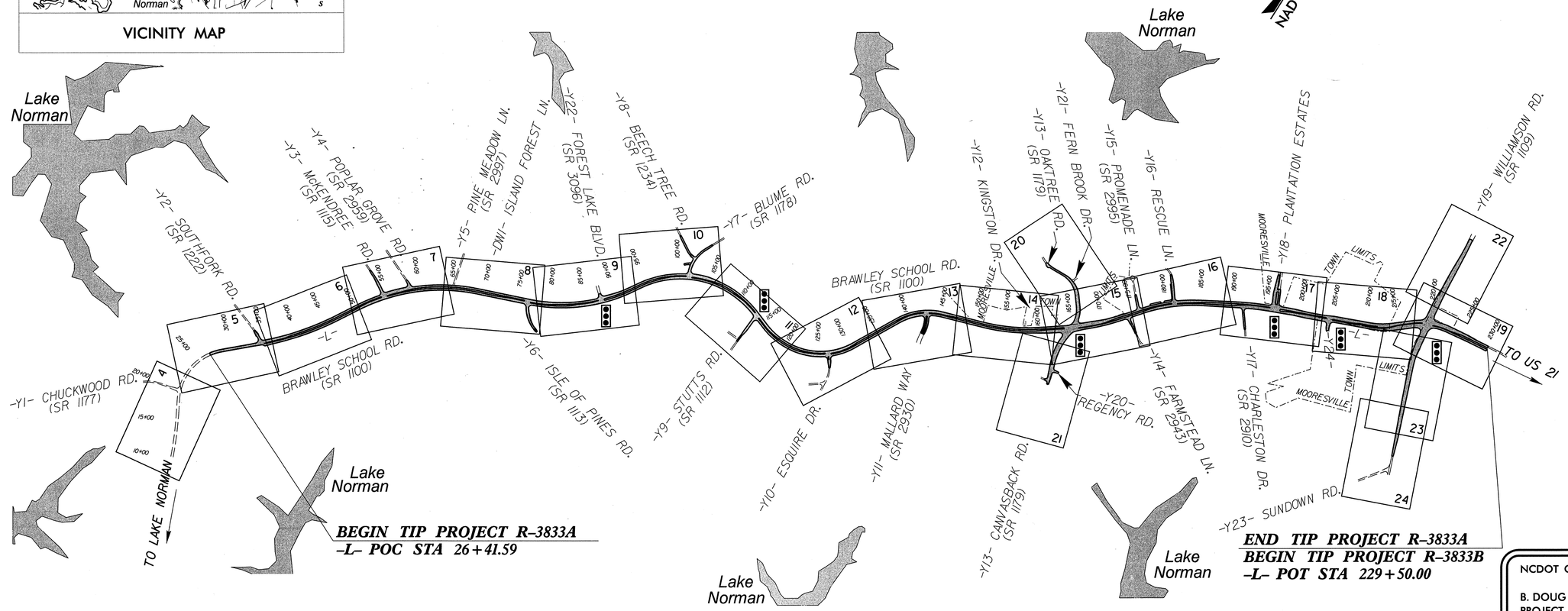
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3833A	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34554.1.1	STP-150(11)	PE
34554.2.2	STP-150(20)	R/W, UTILITIES
34554.3.1	STP-1100(22)	CONSTRUCTION

LOCATION: SR 1100 (BRAWLEY SCHOOL ROAD) FROM SOUTH OF SR 1222 (SOUTHFORK ROAD) TO EAST OF SR 1109 (WILLIAMSON ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, CURB & GUTTER, SIGNALS, AND SIGNING

NAD 83/95



NCDOT CONTACT:

B. DOUG TAYLOR, PE
PROJECT ENGINEER
ROADWAY DESIGN UNIT

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 31,900
ADT 2028 = 42,600
DHV = 10 %
D = 60 %
T = 6 % *
V = 50 MPH
* (TTST 2% + DUAL 4%)
FUNCTIONAL CLASSIFICATION = COLLECTOR

PROJECT LENGTH

LENGTH OF TIP PROJECT R-3833A = 3.846 mi.

TOTAL LENGTH OF TIP PROJECT R-3833A = 3.846 mi.

Prepared for:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., NC, 27610

Prepared by:
MA ENGINEERING CONSULTANTS, INC.
598 E. CHATHAM STREET, SUITE 137
CARY, NORTH CAROLINA 27511
(919) 297-0220

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 28, 2006

LETTING DATE:
SEPTEMBER 16, 2008

BURKE EVANS, PE
PROJECT ENGINEER

K. S. HUTCHENS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON

SIGNATURE: 6/27/08 P.E.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS

SIGNATURE: 6/27/08 P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

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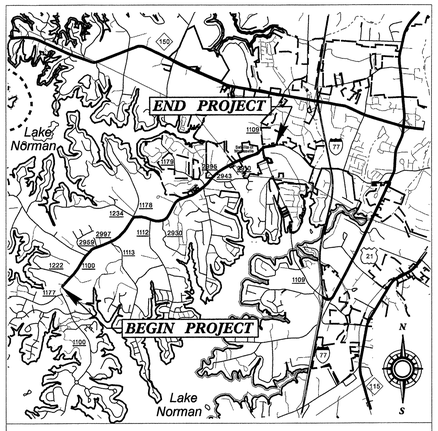
TIP PROJECT: R-3833A

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3833A	1	

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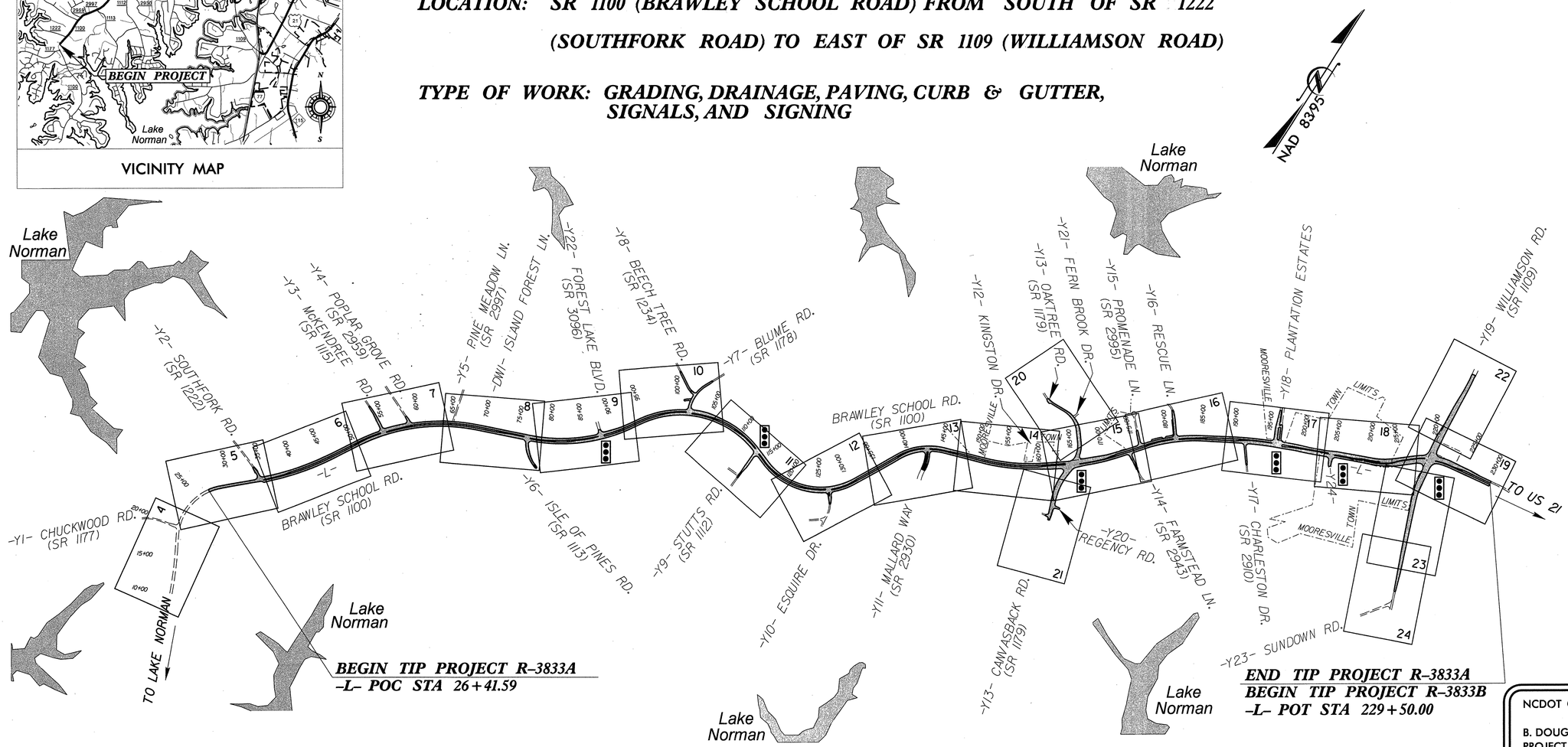

NCDOT CONTACT:

B. DOUG TAYLOR, PE
PROJECT ENGINEER
ROADWAY DESIGN UNIT

CONTRACT: C201902

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PART 1 OF 2

PROJECT REFERENCE NO.	SHEET NO.
R-3833A	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 6/4/08

NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEAVER 6/4/08

MA 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: 07-18-06

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.

BERM DITCHES:

BERM DITCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 240.01 AT LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

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. 848.03 AT LOCATIONS SHOWN ON 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.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE:

Mooresville (Water & Sewer)
Duke Energy
Windstream Communications
PSNC (Gas)
Time Warner Cable

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

RIGHT-OF-WAY MARKERS:

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

WHEELCHAIR RAMPS:

WHEELCHAIR RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. THE CONSTRUCTION OF ALL WHEELCHAIR RAMPS SHALL BE IN ACCORDANCE WITH DETAILS IN PLANS.

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
225.06	Method of Grading Sight Distance at Intersections
240.01	Guide for Berm Ditch Construction
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation - Method 'A'
310.10	Driveway Pipe Construction
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.03	Pipe Underdrain and Blind Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
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
840.19	Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.35	Traffic Bearing Grated 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
840.71	Concrete and Brick Pipe Plug
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
848.01	Concrete Sidewalk
848.03	Driveway Turnout - Drop Curb Type
848.04	Street Turnout
848.05	Wheelchair Ramp - Curb Cut
850.10	Guide for Berm Drainage Outlet - 15" and 18" Pipe
852.01	Concrete Islands
852.02	Concrete Mountable Median - for Use with Rigid or Flexible Pavement
852.04	Method for Placement of Drop Inlets in Grassed Median - Using 1'-6" Curb and Gutter
852.05	Median Curb for Catch Basin - for Use with 1'-6" Curb and Gutter
852.06	Method for Placement of Drop Inlets in Concrete Islands
862.01	Guardrail Placement
862.02	Guardrail Installation
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

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C THRU 1-E	SURVEY CONTROL SHEETS
2	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-A THRU 2-B	TYPICAL SECTIONS
2-C THRU 2-H	DETAIL OF TEMPORARY PAVEMENT LOCATIONS
2-I	DETAIL TO CONVERT EXISTING DROP INLET OR CATCH BASIN TO JUNCTION BOX (MANHOLE OPTIONAL)
2-J	DETAIL OF CONCRETE FLUME
2-K	DETAIL OF PEDESTRIAN SAFETY RAIL
2-L	DETAIL OF ANCHORAGE FOR FRAMES
2-M THRU 2-II	GRAVITY RETAINING WALL DESIGNS
3 (2 SHEETS)	SUMMARY OF QUANTITIES
3-A	SUMMARIES OF DRAINAGE DITCH EXCAVATION, PAVEMENT REMOVAL, AND GUARDRAIL
3-B	SUMMARY OF EARTHWORK
3-C THRU 3-S	SUMMARY OF DRAINAGE
3-T THRU 3-U	PARCEL INDEX SHEETS
4 THRU 24	PLAN SHEETS
25 THRU 39	PROFILE SHEETS
TCP-1 THRU TCP-31	TRAFFIC CONTROL PLANS
PM-1 THRU PM-17	PAVEMENT MARKING PLANS
EC-1 THRU EC-43	EROSION CONTROL PLANS
RF-1	REFORESTATION DETAIL
SIGN-1 THRU SIGN-11	SIGNING PLANS
SIG-1 THRU SIG-71	SIGNAL PLANS
UC-1 THRU UC-14	UTILITIY CONSTRUCTION PLANS (PART 1)
UC-1AA THRU UC 6AA	UTILITY CONSTRUCTION PLANS (PART 2)
UO-1 THRU UO-22	UTILITIES BY OTHERS PLANS
X-0	CROSS-SECTION INDEX
X-0(A) THRU X-0(C)	CROSS-SECTIONS
X-1 THRU X-134	CROSS-SECTIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	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
- Buffer Zone 2
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

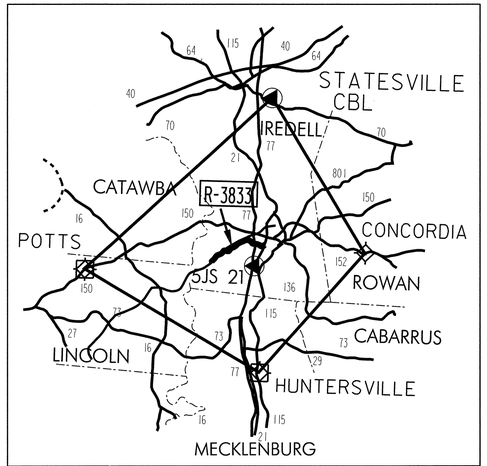
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

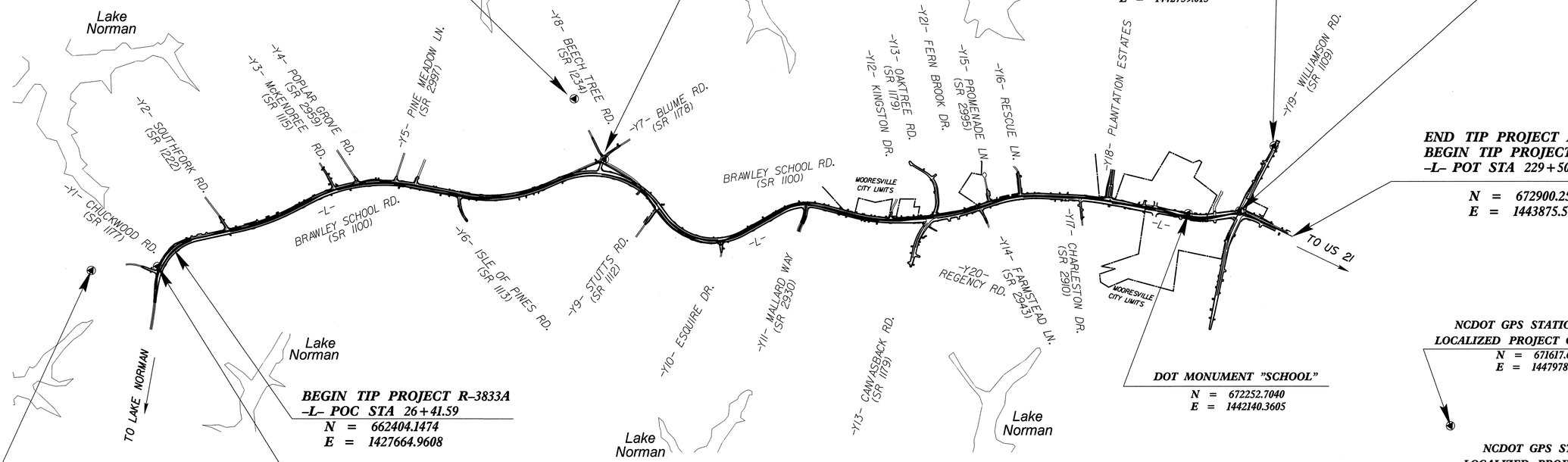
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
R-3833A	1C
Location and Surveys	

SURVEY CONTROL SHEET R-3833A



GPS NETWORK CONTROL



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "SCHOOL"
WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF
NORTHING: 672252.7040(ft) EASTING: 1442140.3605(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999851370
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "SCHOOL" TO -L- STATION 26+41.59 IS
S 55°46'12" W 17508.03'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.

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

THE FILES TO BE FOUND ARE AS FOLLOWS:
R3833A_LS_GPSCALIB_060214.HTML
R3833A_LS_WGS84_060214.TXT
R3833A_LS_LOCAL_060214.TXT
R3833A_LS_CONTROL_070926.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

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

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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	1 D
Location and Surveys	

SURVEY CONTROL SHEET R-3833A

GPS CALIBRATION REPORT

PROJECT : R3833RTK

TIP NUMBER

USER NAME	TBOVENDER	DATE & TIME	9:43:22 AM 10/20/2005
COORDINATE SYSTEM	US STATE PLANE 1983	ZONE	NORTH CAROLINA 3200
HORIZONTAL DATUM	NAD 1983 (CONUS)		
VERTICAL DATUM		GEOID MODEL	GEOID03 (CONUS) NC SUB GRID
COORDINATE UNITS	US SURVEY FEET		
DISTANCE UNITS	US SURVEY FEET		
HEIGHT UNITS	US SURVEY FEET		

LOCAL SITE INFORMATION
LOCALIZED AROUND

LATITUDE	35°34'57.49760"N
LONGITUDE	80°52'34.83502"W
SITE SCALE FACTOR	1.00014865
HEIGHT	867.570SFT

THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION USES A LOCALIZED COORDINATE SYSTEM WHICH IS VERY SIMILAR TO NORTH CAROLINA ZONE 3200 FROM WHICH IT IS DERIVED.
PLEASE TAKE CARE IN UTILIZING THESE COORDINATES TO ELIMINATE CONFUSION OF THE TWO SYSTEMS.
THIS FILE IS TO AID IN THE USE OF REAL TIME KINEMATIC (RTK) GPS DURING CONSTRUCTION LAYOUT.

DATUM TRANSFORMATION PARAMETERS

DATUM TRANSFORMATION COMPUTATION NOT REQUESTED

UPDATED DEFAULT PROJECTION (TRANSVERSE MERCATOR) DEFINITION

UPDATED DEFAULT PROJECTION NOT REQUESTED

HORIZONTAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ROTATION CENTER	667348.563SFT
EASTING COORDINATE OF ROTATION CENTER	1442208.222SFT
ROTATION ABOUT THE CENTER POINT	0°00'00"
TRANSLATION NORTH	-0.729SFT
TRANSLATION EAST	0.011SFT
SCALE FACTOR	1.00014872

VERTICAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ORIGIN POINT	661098.014SFT
EASTING COORDINATE OF ORIGIN POINT	1426587.503SFT
VERTICAL SEPARATION AT ORIGIN	0.031SFT
SLOPE NORTH	1.892PPM
SLOPE EAST	-1.548PPM

GEOID MODEL DEFINITION

GEOID03 (CONUS) NC SUB GRID

RESIDUAL DIFFERENCES BETWEEN GPS (WGS84) AND LOCAL COORDINATES

SUMMARY

	MAXIMUM ERROR	ROOT MEAN SQUARE ERROR	POINT
HORIZONTAL	0.003SFT	0.000	R3833-9 WGS84
VERTICAL	0.069SFT	0.007	5 JS 21 WGS84
THREE-DIMENSIONAL	0.069SFT	0.007	5 JS 21 WGS84

POINT RESIDUALS

WGS84 COORDINATES	CALCULATED POINT FOR DISPLAY ONLY	LOCAL COORDINATES
POINT R3833-1 WGS84	NORTHING 661098.014SFT	POINT R3833-1 LOCAL
LATITUDE 35°33'04.25735"N	EASTING 1426587.503SFT	NORTHING 661098.014SFT
LONGITUDE 80°55'40.45948"W	ELEVATION 838.928SFT	EASTING 1426587.503SFT
HEIGHT 735.911SFT	HORZ ERROR 0.001SFT	ELEVATION 838.939SFT
	VERT ERROR 0.011SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.011SFT	QUALITY SURVEY QUALITY
POINT R3833-2 WGS84	NORTHING 661778.872SFT	POINT R3833-2 LOCAL
LATITUDE 35°33'11.16854"N	EASTING 1427521.006SFT	NORTHING 661778.872SFT
LONGITUDE 80°55'29.32477"W	ELEVATION 835.605SFT	EASTING 1427521.006SFT
HEIGHT 732.584SFT	HORZ ERROR 0.000SFT	ELEVATION 835.616SFT
	VERT ERROR 0.011SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.011SFT	QUALITY SURVEY QUALITY
POINT R3833-3 WGS84	NORTHING 668158.121SFT	POINT R3833-3 LOCAL
LATITUDE 35°34'15.11015"N	EASTING 1432055.774SFT	NORTHING 668158.121SFT
LONGITUDE 80°54'35.94241"W	ELEVATION 839.839SFT	EASTING 1432055.775SFT
HEIGHT 736.713SFT	HORZ ERROR 0.001SFT	ELEVATION 839.831SFT
	VERT ERROR 0.008SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.008SFT	QUALITY SURVEY QUALITY
POINT R3833-4 WGS84	NORTHING 667556.014SFT	POINT R3833-4 LOCAL
LATITUDE 35°34'09.34916"N	EASTING 1433067.959SFT	NORTHING 667556.015SFT
LONGITUDE 80°54'23.55302"W	ELEVATION 850.881SFT	EASTING 1433067.958SFT
HEIGHT 747.787SFT	HORZ ERROR 0.001SFT	ELEVATION 850.875SFT
	VERT ERROR 0.006SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.007SFT	QUALITY SURVEY QUALITY
POINT R3833-5 WGS84	NORTHING 674049.749SFT	POINT R3833-5 LOCAL
LATITUDE 35°35'15.38167"N	EASTING 1442759.016SFT	NORTHING 674049.750SFT
LONGITUDE 80°52'27.75769"W	ELEVATION 863.645SFT	EASTING 1442759.015SFT
HEIGHT 760.506SFT	HORZ ERROR 0.001SFT	ELEVATION 863.627SFT
	VERT ERROR 0.018SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.018SFT	QUALITY SURVEY QUALITY
POINT R3833-6 WGS84	NORTHING 672775.265SFT	POINT R3833-6 LOCAL
LATITUDE 35°35'02.80060"N	EASTING 1442869.015SFT	NORTHING 672775.265SFT
LONGITUDE 80°52'26.13495"W	ELEVATION 860.186SFT	EASTING 1442869.014SFT
HEIGHT 757.085SFT	HORZ ERROR 0.001SFT	ELEVATION 860.176SFT
	VERT ERROR 0.010SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.010SFT	QUALITY SURVEY QUALITY
POINT R3833-7 WGS84	NORTHING 671617.614SFT	POINT R3833-7 LOCAL
LATITUDE 35°34'52.30361"N	EASTING 1447978.791SFT	NORTHING 671617.615SFT
LONGITUDE 80°51'24.02377"W	ELEVATION 807.532SFT	EASTING 1447978.793SFT
HEIGHT 704.525SFT	HORZ ERROR 0.002SFT	ELEVATION 807.532SFT
	VERT ERROR 0.000SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.002SFT	QUALITY SURVEY QUALITY
POINT R3833-8 WGS84	NORTHING 670468.775SFT	POINT R3833-8 LOCAL
LATITUDE 35°34'40.98571"N	EASTING 1448202.894SFT	NORTHING 670468.775SFT
LONGITUDE 80°51'21.05133"W	ELEVATION 817.818SFT	EASTING 1448202.894SFT
HEIGHT 714.847SFT	HORZ ERROR 0.000SFT	ELEVATION 817.824SFT
	VERT ERROR 0.006SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.006SFT	QUALITY SURVEY QUALITY
POINT R3833-9 WGS84	NORTHING 670705.209SFT	POINT R3833-9 LOCAL
LATITUDE 35°34'44.16643"N	EASTING 1452781.487SFT	NORTHING 670705.207SFT
LONGITUDE 80°50'25.68877"W	ELEVATION 847.000SFT	EASTING 1452781.485SFT
HEIGHT 744.077SFT	HORZ ERROR 0.003SFT	ELEVATION 847.010SFT
	VERT ERROR 0.010SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.010SFT	QUALITY SURVEY QUALITY
POINT R3833-10 WGS84	NORTHING 669877.153SFT	POINT R3833-10 LOCAL
LATITUDE 35°34'35.90939"N	EASTING 1452402.709SFT	NORTHING 669877.153SFT
LONGITUDE 80°50'30.08729"W	ELEVATION 839.437SFT	EASTING 1452402.709SFT
HEIGHT 736.534SFT	HORZ ERROR 0.000SFT	ELEVATION 839.451SFT
	VERT ERROR 0.014SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.014SFT	QUALITY SURVEY QUALITY
POINT EXIT33-3 WGS84	NORTHING 662759.145SFT	POINT EXIT33-3 LOCAL
LATITUDE 35°33'24.60094"N	EASTING 1447369.024SFT	NORTHING 662759.144SFT
LONGITUDE 80°51'29.39697"W	ELEVATION 816.771SFT	EASTING 1447369.025SFT
HEIGHT 714.023SFT	HORZ ERROR 0.001SFT	ELEVATION 816.803SFT
	VERT ERROR 0.032SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.032SFT	QUALITY SURVEY QUALITY
POINT EXIT33-4 WGS84	NORTHING 664031.208SFT	POINT EXIT33-4 LOCAL
LATITUDE 35°33'37.16007"N	EASTING 1447268.147SFT	NORTHING 664031.207SFT
LONGITUDE 80°51'30.90579"W	ELEVATION 798.285SFT	EASTING 1447268.147SFT
HEIGHT 695.494SFT	HORZ ERROR 0.001SFT	ELEVATION 798.313SFT
	VERT ERROR 0.028SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.028SFT	QUALITY SURVEY QUALITY
POINT 5 JS 21 WGS84	NORTHING 660646.707SFT	POINT 5 JS 21 LOCAL
LATITUDE 35°33'03.80154"N	EASTING 1447843.701SFT	NORTHING 660646.708SFT
LONGITUDE 80°51'23.17533"W	ELEVATION 867.640SFT	EASTING 1447843.701SFT
HEIGHT 764.965SFT	HORZ ERROR 0.001SFT	ELEVATION 867.571SFT
	VERT ERROR 0.069SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.069SFT	QUALITY SURVEY QUALITY

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "SCHOOL"
WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF
NORTHING: 672252.7040(ft) EASTING: 1442140.3605(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999851370
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "SCHOOL" TO -L- STATION 26+41.59 IS
S 55°46'12" W 17508.03'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 8395 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

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

THE FILES TO BE FOUND ARE AS FOLLOWS:
R3833A_LS_GPSCALIB_060214.HTML
R3833A_LS_WGS84_060214.TXT
R3833A_LS_LOCAL_060214.TXT
R3833A_LS_CONTROL_070926.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

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

PROJECT REFERENCE NO.	SHEET NO.
R-3833A	1 E
Location and Surveys	

SURVEY CONTROL SHEET R-3833A

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
11	BL-11	660828.4680	1428026.9180	829.78	9+23.36	22.90 RT
2	GPS-2	661778.8720	1427521.0060	835.70	19+93.71	28.35 LT
12	BL-12	662443.0480	1427661.4540	844.79	26+70.85	25.33 LT
13	BL-13	662975.9250	1428244.8960	842.03	34+57.18	6.65 LT
14	BL-14	663693.5330	1428854.0220	838.55	44+01.67	3.23 LT
15	BL-15	664552.1190	1429358.7440	857.90	53+93.80	38.28 LT
16	BL-16	665089.4590	1429853.8920	853.48	61+09.96	81.20 LT
17	BL-17	665335.6990	1430549.7840	853.97	68+34.79	45.14 RT
18	BL-18	665625.0360	1431251.3240	856.53	75+93.98	29.59 RT
19	BL-19	666156.4780	1432063.6870	859.10	85+66.40	7.31 LT
20	BL-20	666737.9180	1432542.1150	854.08	93+23.74	5.62 LT
4	GPS-4	667556.0150	1433067.9580	850.87	102+00.62	257.38 LT
21	BL-21	667533.7920	1433815.3950	857.63	108+56.88	71.13 LT
22	BL-22	667231.7760	1434525.1010	866.83	116+10.89	51.89 RT
23	BL-23	667252.6170	1435278.7080	857.54	123+42.91	55.29 RT
24	BL-24	667931.8560	1435813.7510	842.45	132+17.21	52.02 LT
25	BL-25	668484.3880	1436114.5640	842.38	138+45.51	44.84 LT
26	BL-26	668805.2120	1436491.7180	843.10	143+33.72	5.98 RT
27	BL-27	669123.3370	1437416.1420	860.00	153+13.03	22.85 RT
28	BL-28	669674.9190	1438364.0720	855.31	164+05.27	45.53 RT
29	BL-29	670398.0620	1438982.1900	863.33	173+54.19	41.87 LT
30	BL-30	670975.3090	1439536.6090	851.88	181+48.35	35.99 LT
31	BL-31	671591.6830	1440717.8380	852.50	194+78.74	24.46 RT
32	BL-32	672024.7750	1441653.9050	865.97	205+10.06	18.32 LT
33	BL-33	672254.9350	1442333.4320	867.79	212+21.92	36.23 RT
6	GPS-6	672775.2650	1442869.0140	860.17	219+49.75	61.85 LT
34	BL-34	672934.7790	1443780.2760	861.66	228+59.26	45.18 LT

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
101	R3833-1	661098.0140	1426587.5030	839.04	OUTSIDE PROJECT LIMITS	
50	BY1-50	661618.4730	1427301.4550	832.63	12+10.43	13.89 RT
102	R3833-2	661778.8720	1427521.0060	835.70	14+60.71	92.38 LT

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	Y2 STATION	OFFSET
51	BY2-51	663124.2590	1427828.7160	856.03	11+54.69	18.61 RT
93	BL-13	662975.9250	1428244.8960	842.03	15+96.58	12.23 LT

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	Y3 STATION	OFFSET
52	BY3-52	664749.7940	1429113.7150	860.71	10+99.43	15.75 LT
95	BL-15	664552.1190	1429358.7440	857.90	14+10.63	39.63 RT

BY4

POINT	DESC.	NORTH	EAST	ELEVATION	Y4 STATION	OFFSET
54	BY4-54	665095.2740	1429262.7650	838.98	10+17.21	15.43 LT
53	BY4-53	664920.9970	1429578.6030	852.63	13+76.62	15.32 RT
96	BL-16	665089.4590	1429853.8920	853.48	OUTSIDE PROJECT LIMITS	

BY5

POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
55	BY5-55	665320.4240	1430206.0770	852.85	11+60.80	14.94 LT
97	BL-17	665335.6990	1430549.7840	853.97	12+33.27	351.27 LT

BY6

POINT	DESC.	NORTH	EAST	ELEVATION	Y6 STATION	OFFSET
98	BL-18	665625.0360	1431251.3240	856.53	10+22.93	34.68 RT
56	BY6-56	665364.4990	1431574.1450	853.55	14+31.14	15.58 RT

BY7

POINT	DESC.	NORTH	EAST	ELEVATION	Y7 STATION	OFFSET
57	BY7-57	668006.9390	1433236.9770	856.22	OUTSIDE PROJECT LIMITS	
94	R3833-4	667556.0150	1433067.9580	850.87	15+65.23	2.89 LT

BY8

POINT	DESC.	NORTH	EAST	ELEVATION	Y8 STATION	OFFSET
103	R3833-3	668158.1210	1432055.7750	839.83	OUTSIDE PROJECT LIMITS	
58	BY8-58	667823.1570	1432612.8720	832.84	9+07.59	19.59 LT
104	R3833-4	667556.0150	1433067.9580	850.87	OUTSIDE PROJECT LIMITS	

BY9

POINT	DESC.	NORTH	EAST	ELEVATION	Y9 STATION	OFFSET
122	BL-22	667231.7760	1434525.1010	866.83	11+26.79	236.93 LT
59	BY9-59	667098.4690	1434265.4620	859.79	12+74.06	15.05 RT

BY10

POINT	DESC.	NORTH	EAST	ELEVATION	Y10 STATION	OFFSET
123	BL-23	667252.6170	1435278.7080	857.54	10+06.59	324.21 RT
60	BY10-60	667327.4440	1435649.5740	851.52	11+80.35	12.26 LT

BY11

POINT	DESC.	NORTH	EAST	ELEVATION	Y11 STATION	OFFSET
126	BL-26	668805.2120	1436491.7180	843.10	10+03.84	45.53 LT
61	BY11-61	668368.9840	1436617.8300	812.16	14+51.28	36.68 LT

BY12

POINT	DESC.	NORTH	EAST	ELEVATION	Y12 STATION	OFFSET
128	BL-28	669674.9190	1438364.0720	855.31	12+08.13	615.78 LT
62	BY12-62	669078.5540	1438474.5350	839.39	OUTSIDE PROJECT LIMITS	

BY13

POINT	DESC.	NORTH	EAST	ELEVATION	Y13 STATION	OFFSET
63	BY13-63	670012.6570	1438397.0870	858.64	22+22.16	3.42 LT
118	BL-28	669674.9190	1438364.0720	855.31	25+71.76	53.05 RT

BY14

POINT	DESC.	NORTH	EAST	ELEVATION	Y14 STATION	OFFSET
119	BL-29	670398.0620	1438982.1900	863.33	OUTSIDE PROJECT LIMITS	
64	BY14-64	670165.6650	1439407.1840	864.82	OUTSIDE PROJECT LIMITS	

BY15

POINT	DESC.	NORTH	EAST	ELEVATION	Y15 STATION	OFFSET
65	BY15-65	670651.0480	1439072.5110	858.82	13+30.41	34.33 LT
129	BL-29	670398.0620	1438982.1900	863.33	14+49.00	206.70 RT

BY16

POINT	DESC.	NORTH	EAST	ELEVATION	Y16 STATION	OFFSET
66	BY16-66	671238.3720	1439257.0380	844.28	11+16.91	11.92 RT
130	BL-30	670975.3090	1439536.6090	851.88	14+98.04	38.61 LT

BY17

POINT	DESC.	NORTH	EAST	ELEVATION	Y17 STATION	OFFSET
131	BL-31	671591.6830	1440717.8380	852.50	10+92.23	326.36 LT
67	BY17-67	671229.7810	1440566.6610	835.18	12+84.48	15.51 RT

BY18

POINT	DESC.	NORTH	EAST	ELEVATION	Y18 STATION	OFFSET
68	BY18-68	671915.2520	1440761.4930	859.83	12+48.04	12.87 LT
113	BL-31	671591.6830	1440717.8380	852.50	OUTSIDE PROJECT LIMITS	

BY19

POINT	DESC.	NORTH	EAST	ELEVATION	Y19 STATION	OFFSET
105	R3833-5	674049.7500	1442759.0150	863.58	12+52.89	29.85 RT
69	BY19-69	673475.4700	1442880.3920	862.52	18+36.62	36.12 LT
106	R3833-6	672775.2650	1442869.0140	860.17	25+31.20	53.75 RT
70	BY19-70	672140.3540	1442996.3290	862.41	31+73.30	29.85 RT
71	BY20-71	671342.3990	1443306.4610	839.97	40+27.53	17.82 RT

BM# 1 ELEVATION = 826.17'
N 660514 E 1428011
R/R SPIKE IN THE BASE OF 12" MAPLE TREE
OUTSIDE PROJECT LIMITS

BM# 2 ELEVATION = 849.34'
N 662394 E 1427469
R/R SPIKE IN ROOT OF 48" WHITE OAK TREE
IN THE CHURCH YARD
L STATION 25+65 214' LEFT

BM# 3 ELEVATION = 834.59'
N 663815 E 1429181
R/R SPIKE ROOT OF A 36" GUM TREE
L STATION 46+72 211' RIGHT

BM# 4 ELEVATION = 855.97'
N 665185 E 1430697
R/R SPIKE IN ROOT OF 72" WHITE OAK TREE
L STATION 69+18 239' RIGHT

BM# 5 ELEVATION = 855.77'
N 666592 E 1432578
R/R SPIKE IN ROOT OF A 36" WILLOW TREE
L STATION 92+21 104' RIGHT

BM# 6 ELEVATION = 850.96'
N 666949 E 1434276
R/R SPIKE IN ROOT OF A 24" WILLOW TREE
L STATION 114+78 403' RIGHT

BM# 7 ELEVATION = 805.55'
N 668208 E 1436661
R/R SPIKE IN ROOT OF A 15" WILLOW OAK TREE
L STATION 139+02 567' RIGHT

BM# 8 ELEVATION = 859.27'
N 669779 E 1438134
R/R SPIKE IN ROOT OF A 12" WHITE OAK TREE
L STATION 162+80 173' LEFT

BM# 9 ELEVATION = 837.75'
N 671236 E 1439068
R/R SPIKE IN ROOT OF A 18" BEECH TREE
L STATION 179+79 538' LEFT

BM#10 ELEVATION = 853.67'
N 671842 E 1441788
R/R SPIKE SET IN THE EDGE OF PAVEMENT
AND GUTTER AT ENTRANCE OF THE SPA FROM
STRIP MALL
L STATION 205+65 201' RIGHT

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "SCHOOL" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 672252.7040(ft) EASTING: 1442140.3605(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999851370 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "SCHOOL" TO -L- STATION 26+41.59 IS S 55°46'12" W 17508.03' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

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

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   R3833A_LS_GPSCALIB_060214.HTML
   R3833A_LS_WGS84_060214.TXT
   R3833A_LS_LOCAL_060214.TXT
   R3833A_LS_CONTROL_070926.TXT

   THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

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

PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS — 6/12/08

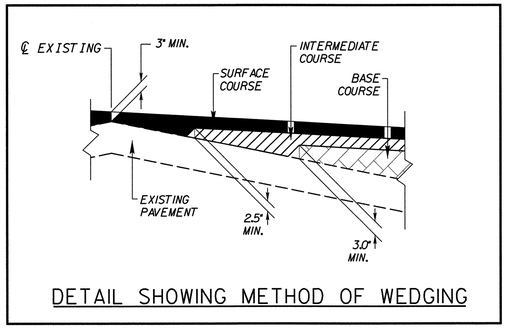
PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19068 ENGINEER DAVID-CHI CHEN — 6/12/08

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

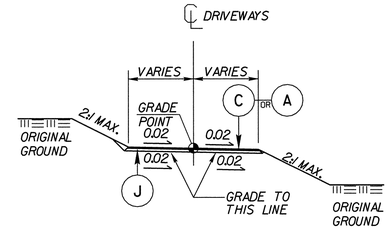
PAVEMENT SCHEDULE

C1	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 Lbs PER SQUARE YARD IN TWO LAYERS.
C2	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 Lbs PER SQUARE YARD IN TWO LAYERS.
C3	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 Lbs PER SQUARE YARD IN TWO LAYERS.
C4	PROP. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1.0" OR GREATER THAN 1.5" IN DEPTH.
C5	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.
C6	PROP. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1.5" OR GREATER THAN 2.0" IN DEPTH.
C7	PROP. APPROX. 2.0" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 Lbs PER SQUARE YARD IN TWO LAYERS.
D1	PROP. APPROX. 4.0" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 Lbs PER SQUARE YARD IN ONE LAYER.
D2	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 Lbs PER SQUARE YARD IN ONE LAYER.
D3	PROP. APPROX. 4.0" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 Lbs PER SQUARE YARD IN ONE LAYER.
D4	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.
D5	PROP. VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.5" OR GREATER THAN 4.0" IN DEPTH.
D6	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 Lbs PER SQUARE YARD IN ONE LAYER.
E1	PROP. APPROX. 6.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 370.5 Lbs PER SQUARE YARD IN TWO LAYERS.
E2	PROP. APPROX. 4.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 Lbs PER SQUARE YARD IN ONE LAYER.
E3	PROP. APPROX. 5.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 Lbs PER SQUARE YARD IN ONE LAYER.
E4	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 Lbs PER SQUARE YARD IN ONE LAYER.
E5	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 627 Lbs PER SQUARE YARD IN ONE LAYER.
E6	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.
E7	PROP. VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3.0" OR GREATER THAN 5.5" IN DEPTH.
J1	8" AGGREGATE BASE COURSE
J2	6" AGGREGATE BASE COURSE
K	BASE TO BE TREATED WITH LIME (SLURRY METHOD) TO A DEPTH OF 8", AT A RATE OF 20 Lbs. PER SQUARE YARD AS DIRECTED BY THE ENGINEER (60% OF THE PROJECT) OR BASE TO BE TREATED WITH CEMENT TO A DEPTH OF 7", AT A RATE OF 55 Lbs. PER SQUARE YARD AS DIRECTED BY THE ENGINEER (40% OF THE PROJECT)
P	PRIME COAT
R1	30" CONCRETE CURB AND GUTTER
R2	18" CONCRETE CURB AND GUTTER
R3	24" CURB & GUTTER
S	CONCRETE SIDEWALK
T	EARTH MATERIAL
T1	4" TOPSOIL W/COMMON BERMUDA GRASS
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL THIS SHEET)

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



DETAIL SHOWING METHOD OF WEDGING



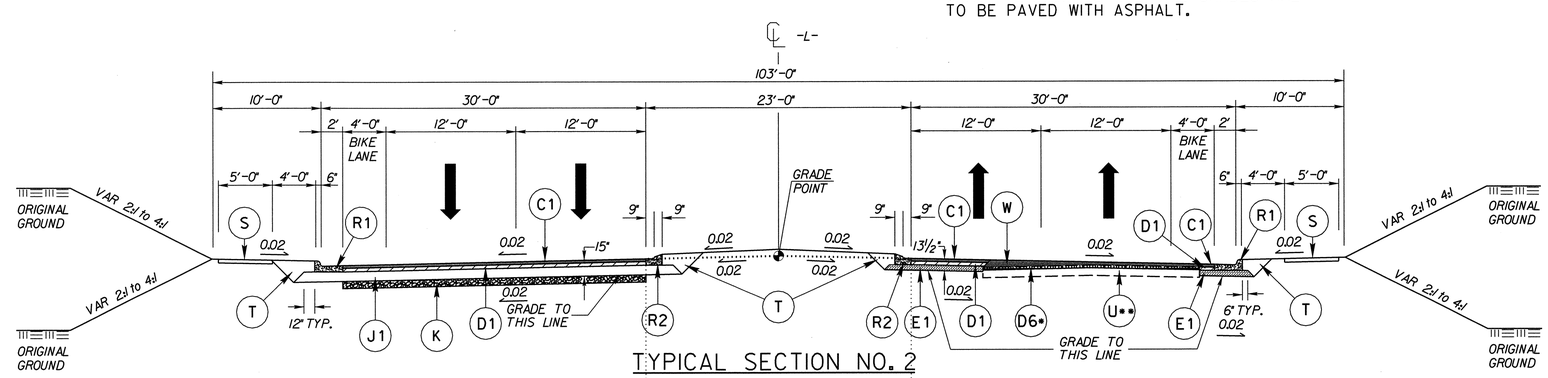
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1 FOR DRIVEWAYS

EX. DRIVEWAY TYPE	PROPOSED DRIVEWAY DESIGN C	J	A	PAVEMENT DEPTH
GRAVEL *	-	J2	-	6"
ASPHALT	C7	J2	-	8"
CONCRETE	-	-	A	6"

DRIVEWAY PAVEMENT TYPE TO BE REPLACED IN LIKE MATERIAL AS DIRECTED BY THE ENGINEER.

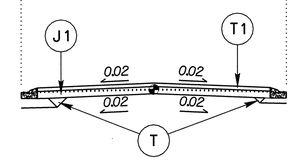
* GRAVEL DRIVEWAYS WITH >7% GRADES ARE TO BE PAVED WITH ASPHALT.



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2A IN CONJUNCTION WITH TYPICAL SECTION NO. 2

-L- STA. 58+00.00 TO STA. 59+25.00
-L- STA. 64+35.00 TO STA. 65+50.00
-L- STA. 67+90.00 TO STA. 69+00.00
-L- STA. 157+40.00 TO STA. 158+50.00
-L- STA. 173+15.00 TO STA. 174+30.00
-L- STA. 175+05.00 TO STA. 176+10.00
-L- STA. 190+95.00 TO STA. 191+96.00

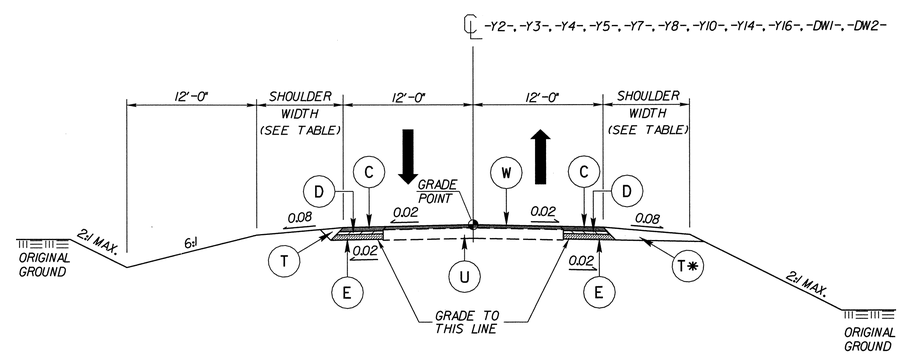


TYPICAL SECTION NO. 2A

USE TYPICAL SECTION NO. 2
-L- STA. 26+41.59 TO STA. 229+50.00

* MILL 2.5" FROM -L- STA. 26+41.59 TO STA. 229+50.00 AS DIRECTED BY THE ENGINEER, EXCLUDING EXISTING LEFT WIDENING FROM STA. 222+00.00 TO 226+00.00

** APPROX. 900 SY OF FULL-DEPTH ASPHALT REMOVAL IN VARIOUS LOCATIONS TO BE REPLACED WITH B25.0C TO EXISTING GRADE AS DIRECTED BY THE ENGINEER (E7)



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3
-Y2- STA. 13+72.17 TO STA. 15+57.37
-Y3- STA. 10+00.00 TO STA. 14+14.45
-Y4- STA. 13+50.00 TO STA. 14+80.07
-Y5- STA. 11+25.00 TO STA. 12+13.28
-Y7- STA. 12+00.00 TO STA. 17+80.88
-Y8- STA. 10+00.00 TO STA. 14+02.90
-Y10- STA. 10+39.50 TO STA. 12+15.00
-Y14- STA. 10+40.22 TO STA. 13+00.00
-Y16- STA. 10+90.00 TO STA. 14+95.45
-DW1- STA. 11+50.00 TO STA. 12+80.26
-DW2- STA. 11+00.00 TO STA. 12+26.32

ROADWAY	C	D	E	PAVEMENT DEPTH	SHOULDER WIDTH
-Y2-, -Y8-, -Y14-, -DW1-, -DW2-	C3	-	E2	7"	8' (11' W/GR)
-Y3-, -Y7-	C3	-	E4	8½"	8' (11' W/GR)
-Y16-	C3	-	E3	8"	6' (9' W/GR)
-Y4-, -Y5-, -Y10-	C1	D1	E1	13½"	8' (11' W/GR)

* FOR PAVEMENT DEPTH > 10" USE GRADED SECTION

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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS

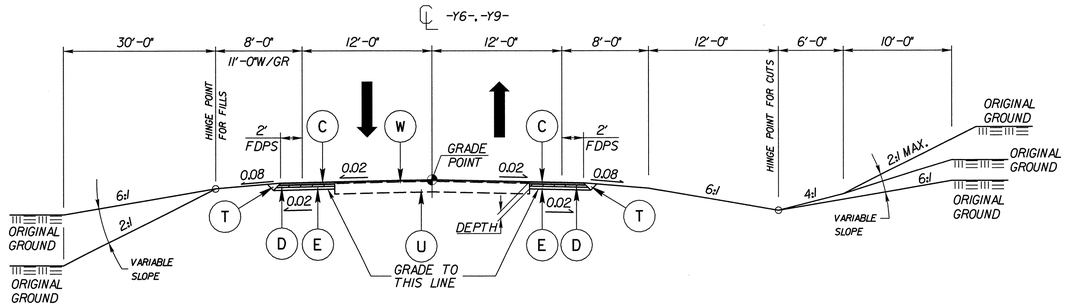
David Burke Evans 6/12/08

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 13868 ENGINEER CHI CHEN

Chi Chen 6/12/08

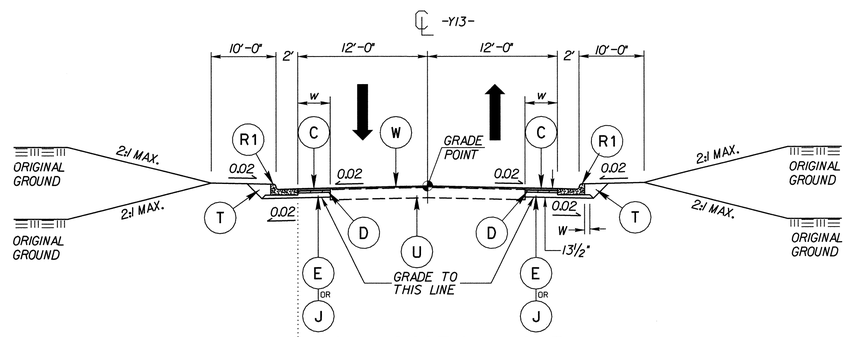
MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4
-Y6- STA. 10+40.37 TO STA. 14+95.00
-Y9- STA. 10+41.35 TO STA. 13+85.00
-Y9- STA. 13+85.00 TO STA. 15+00.00 (RESURFACE ONLY)

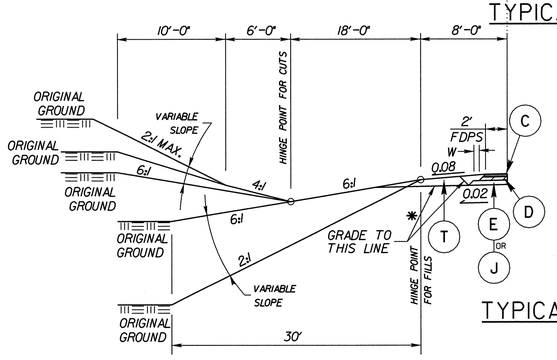
ROADWAY	C	D	E	PAVEMENT DEPTH
-Y6-	C3	-	E4	8½"
-Y9-	C2	D2	E2	9½"



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5
-Y13- STA. 25+15.89 TO STA. 32+00.00

ROADWAY	C	D	E	J	W	PAVEMENT DEPTH	WIDTH
-Y13-	C2	D2	-	J1	12"	13½"	w > 6'
-Y13-	C2	D2	E2	-	6"	9½"	w < 6'



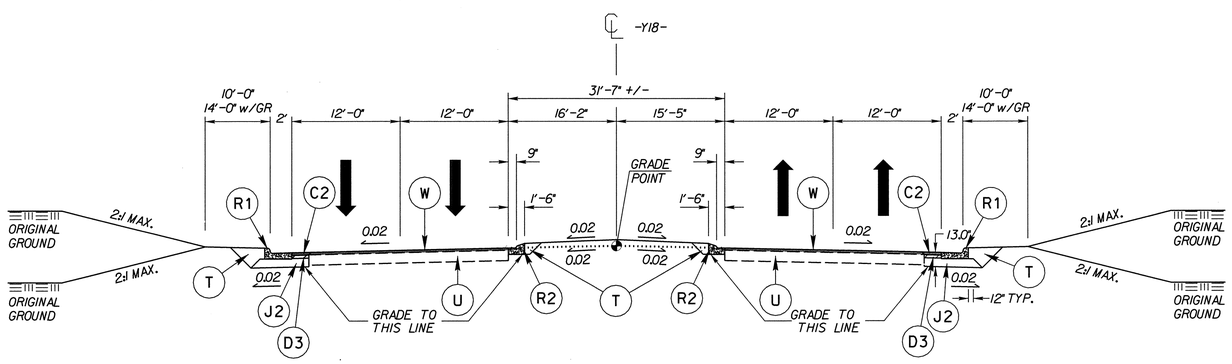
TYPICAL SECTION NO. 5A

USE TYPICAL SECTION NO. 5A IN CONJUNCTION WITH TYPICAL SECTION NO. 5
-Y13- STA. 12+25.00 TO STA. 23+98.79
-Y13- STA. 32+00.00 TO STA. 34+00.00

ROADWAY	C	D	E	J	W	PAVEMENT DEPTH	LOCATION
-Y13-	C2	D2	-	J1	12"	13½"	w > 6'
-Y13-	C2	D2	E2	-	-	9½"	w < 6'

* FOR PAVEMENT DEPTH > 10" USE GRADED SECTION

MILL 1½" FROM -Y13- STA. 12+30.00 TO STA. 13+00.00 +/- RT.
AS DIRECTED BY THE ENGINEER.
REPLACE WITH 1½" S9.5B



TYPICAL SECTION NO.6

USE TYPICAL SECTION NO. 6
-Y18- STA. 9+85.00 TO STA. 12+00.00 (WIDENING ONLY)
-Y18- STA. 12+00.00 TO STA. 14+51.24

MILL 1½" FROM -Y18- STA. 9+85.00 TO STA. 10+00.00 +/- RT.
AS DIRECTED BY THE ENGINEER.
REPLACE WITH 1½" S9.5B

MILL 1½" FROM -Y18- STA. 12+00.00 TO STA. 12+25.00 +/- LT.
AS DIRECTED BY THE ENGINEER.
REPLACE WITH 1½" S9.5B

PAVEMENT SCHEDULE

C1	3.0" S9.5C
C2	3.0" S9.5B
C3	3.0" SF9.5A
C4	VAR. SF9.5A
C5	VAR. S9.5B
C6	VAR. S9.5C
C7	2.0" SF9.5A
D1	4.0" I19.0C
D2	2.5" I19.0B
D3	4.0" I19.0B
D4	VAR I19.0B
D5	VAR. I19.0C
D6	2.5" I19.0C
E1	6.5" B25.0C
E2	4.0" B25.0B
E3	5.0" B25.0B
E4	5.5" B25.0B
E5	5.5" B25.0C
E6	VAR. B25.0B
E7	VAR. B25.0C
J1	8" AGGREGATE BASE COURSE
J2	6" AGGREGATE BASE COURSE
P	PRIME COAT
R1	30" CURB AND GUTTER
R2	18" CURB AND GUTTER
R3	24" CURB & GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE DETAIL, SHEET 2)

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

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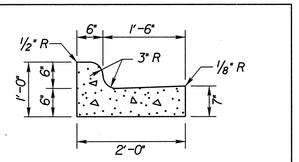
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2-B

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS

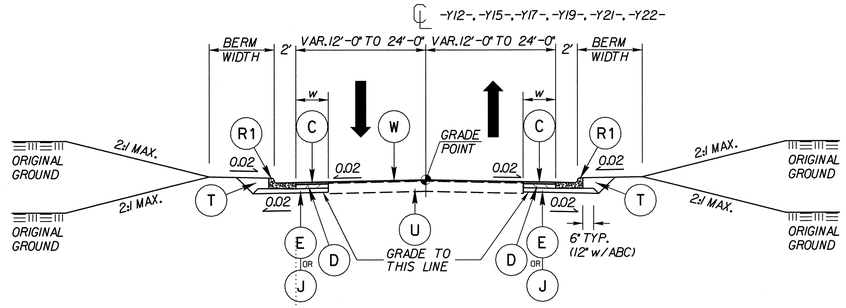
PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 13368 ENGINEER DION CHI CHEN — 6/13/08

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



2'-0" CURB AND GUTTER

SEE ST'D. 846.01 FOR GENERAL NOTES
USE ST'D. 852.05 FOR CATCH BASINS



TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7
-Y12- STA. 11+65.00 TO STA. 12+68.67
MILL 1 1/2" FROM -Y12- STA. 11+65.00 TO STA. 11+75.00 +/-
AS DIRECTED BY THE ENGINEER
REPLACE WITH 1.5" S9.5C

-Y15- STA. 12+00.00 TO STA. 14+26.91
-Y17- STA. 10+46.67 TO STA. 13+75.00
-Y19- STA. 11+42.81 TO STA. 25+23.70
-Y19- STA. 26+26.45 TO STA. 46+50.00
-Y21- STA. 10+12.00 TO STA. 10+98.00

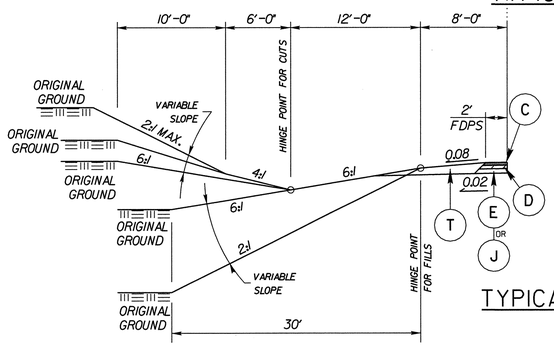
-Y22- STA. 10+76.74 TO STA. 11+24.74 (WIDEN & RESURFACE)
-Y22- STA. 11+24.74 TO STA. 11+76.85

MILL APPROX. 1 1/2" FROM -Y22- STA. 10+76.74 TO STA. 11+76.85
AS DIRECTED BY THE ENGINEER
REPLACE WITH 1.5" S9.5C

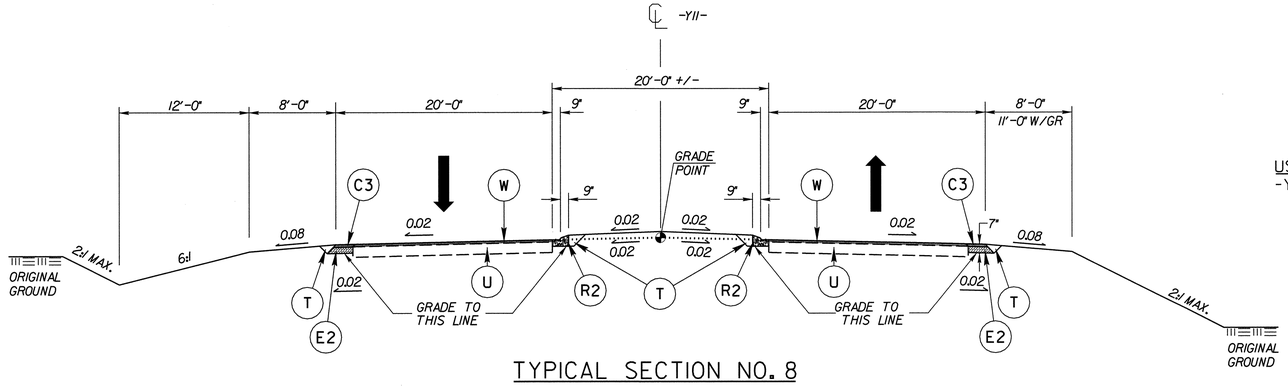
ROADWAY	C	D	E	J	PAVEMENT DEPTH	BERM WIDTH	WIDTH
-Y12-, -Y22-	C1	D1	E1	-	13 1/2"	10'	-
-Y15-, -Y17-	C3	-	E2	-	7"	10'	-
-Y21-	C2	D2	E2	-	9 1/2"	6'	-
-Y19-	C2	D3	-	J1	15"	10' (14' W/GR)	w > 6'
-Y19-	C2	D3	E2	-	11"	10' (14' W/GR)	w < 6'

FOR -Y21-, USE 24" CURB & GUTTER

USE TYPICAL SECTION NO. 7A IN CONJUNCTION WITH TYPICAL SECTION NO. 7
-Y19- STA. 43+50.00 TO STA. 46+50.00 (LT SIDE)
-Y19- STA. 40+50.00 TO STA. 46+50.00 (RT SIDE)



TYPICAL SECTION NO. 7A



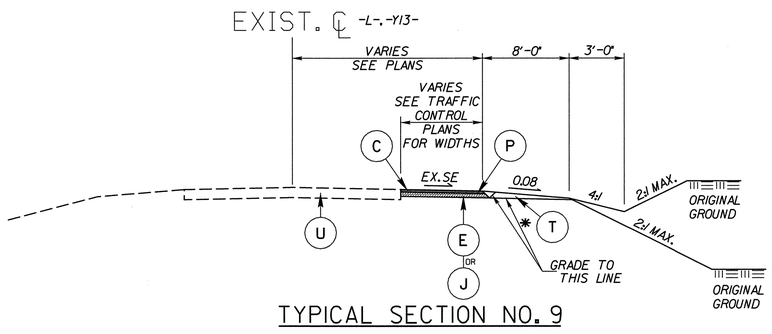
TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8
-Y11- STA. 10+39.61 TO STA. 13+27.00

PAVEMENT SCHEDULE

C1	3.0" S9.5C
C2	3.0" S9.5B
C3	3.0" SF9.5A
C4	VAR. SF9.5A
C5	VAR. S9.5B
C6	VAR. S9.5C
C7	2.0" SF9.5A
D1	4.0" I19.0C
D2	2.5" I19.0B
D3	4.0" I19.0B
D4	VAR I19.0B
D5	VAR. I19.0C
D6	2.5" I19.0C
E1	6.5" B25.0C
E2	4.0" B25.0B
E3	5.0" B25.0B
E4	5.5" B25.0B
E5	5.5" B25.0C
E6	VAR. B25.0B
E7	VAR. B25.0C
J1	8" AGGREGATE BASE COURSE
J2	6" AGGREGATE BASE COURSE
P	PRIME COAT
R1	30" CURB AND GUTTER
R2	18" CURB AND GUTTER
R3	24" CURB & GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE DETAIL, SHEET 2)

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



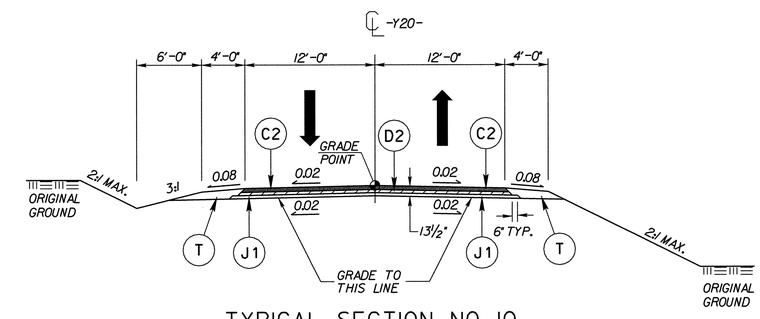
TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9
TEMPORARY PAVEMENT

(SEE SHEETS 2-C THRU 2-H AND TRAFFIC CONTROL PLANS FOR LOCATIONS)

ROADWAY	C	P	E	J	PAVEMENT DEPTH
-L-	C1	-	E5	-	8 1/2"
-Y13-	C2	P	-	J1	11"

* FOR PAVEMENT DEPTH > 10" USE GRADED SECTION



TYPICAL SECTION NO. 10

USE TYPICAL SECTION NO. 10
-Y20- STA. 10+36.48 TO STA. 11+20.00

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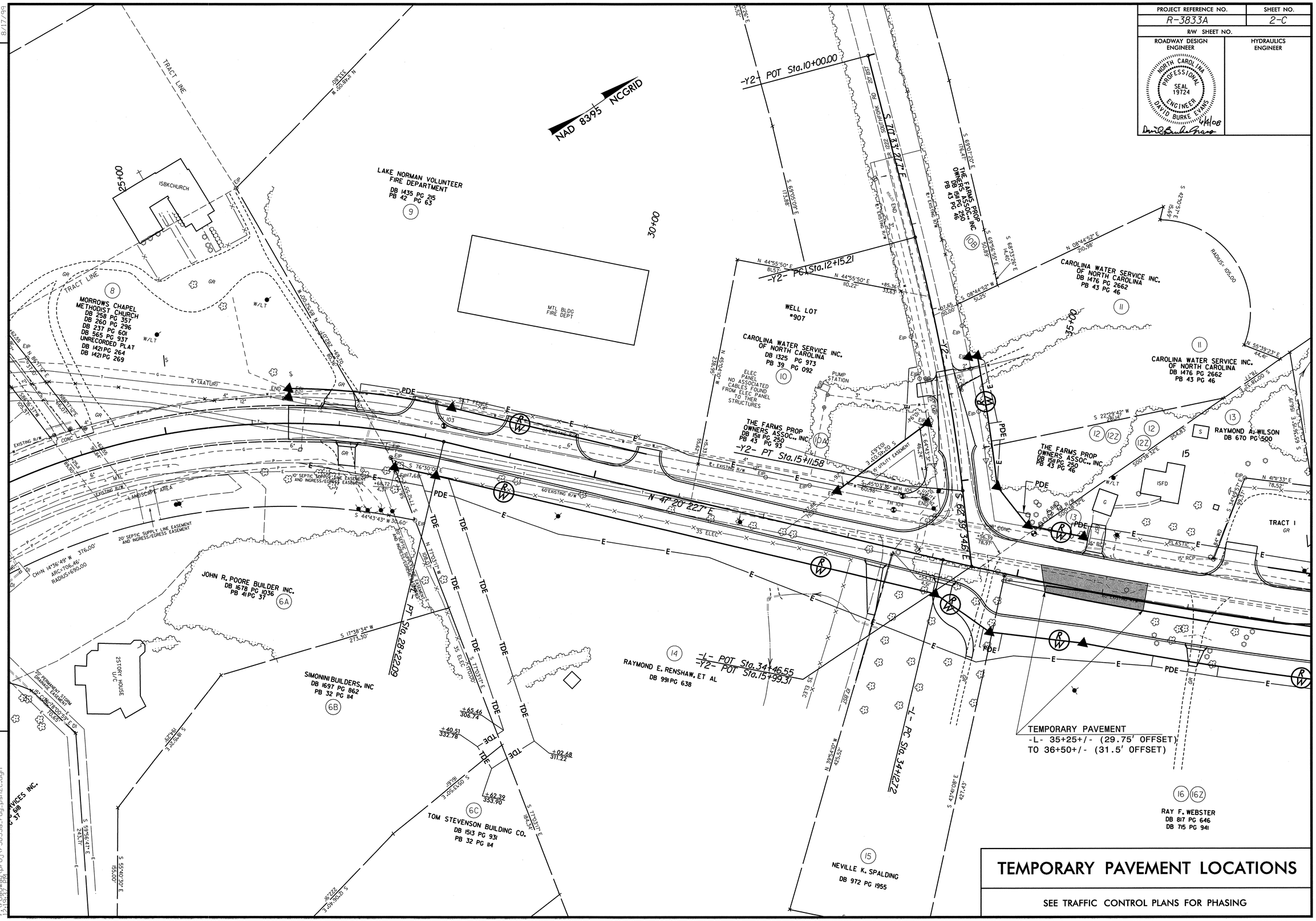
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
6/4/08



TEMPORARY PAVEMENT LOCATIONS

SEE TRAFFIC CONTROL PLANS FOR PHASING

REVISIONS

8/17/99

06/04/2008
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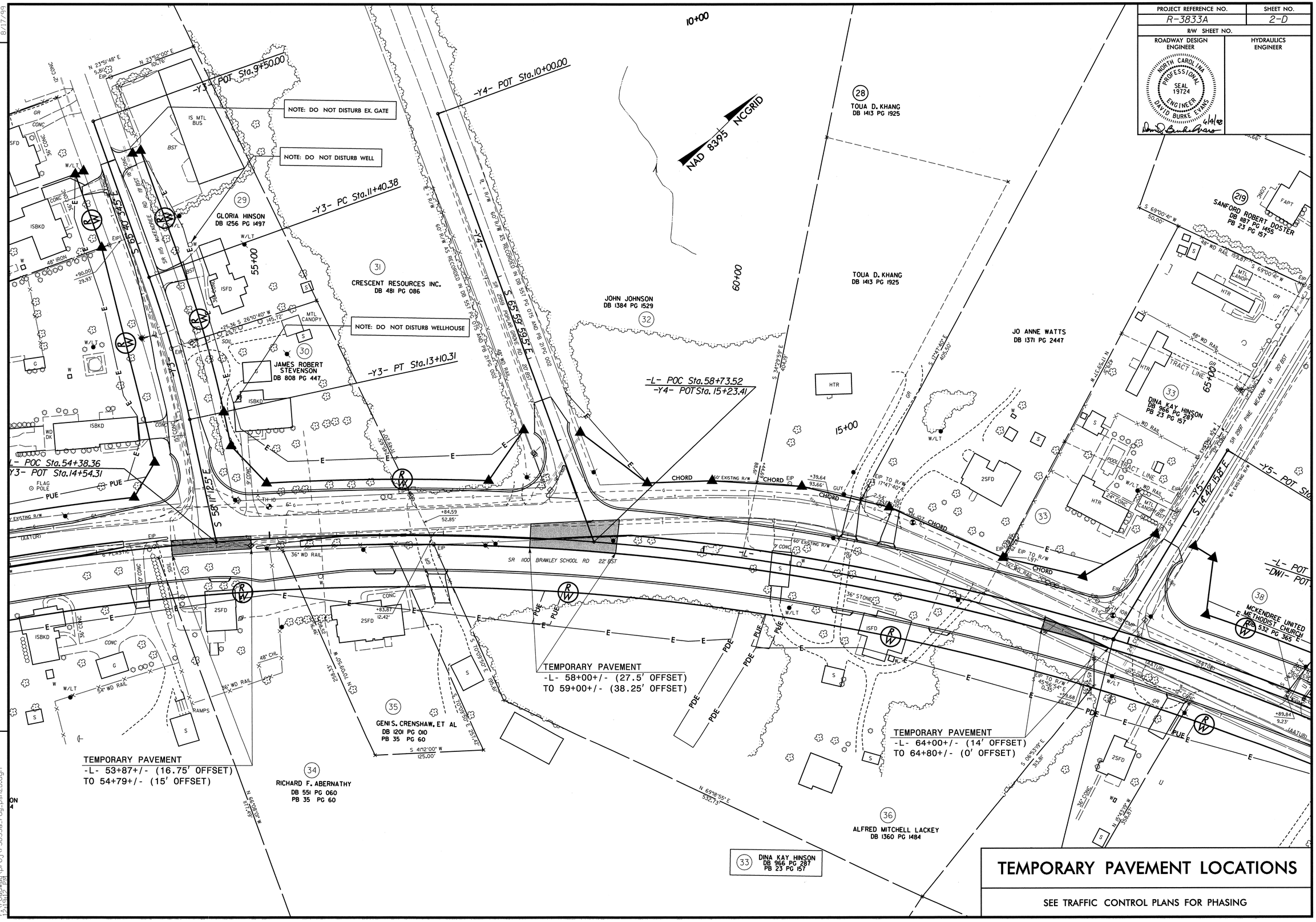
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 6/9/08



TEMPORARY PAVEMENT LOCATIONS

SEE TRAFFIC CONTROL PLANS FOR PHASING

REVISIONS

8/17/99

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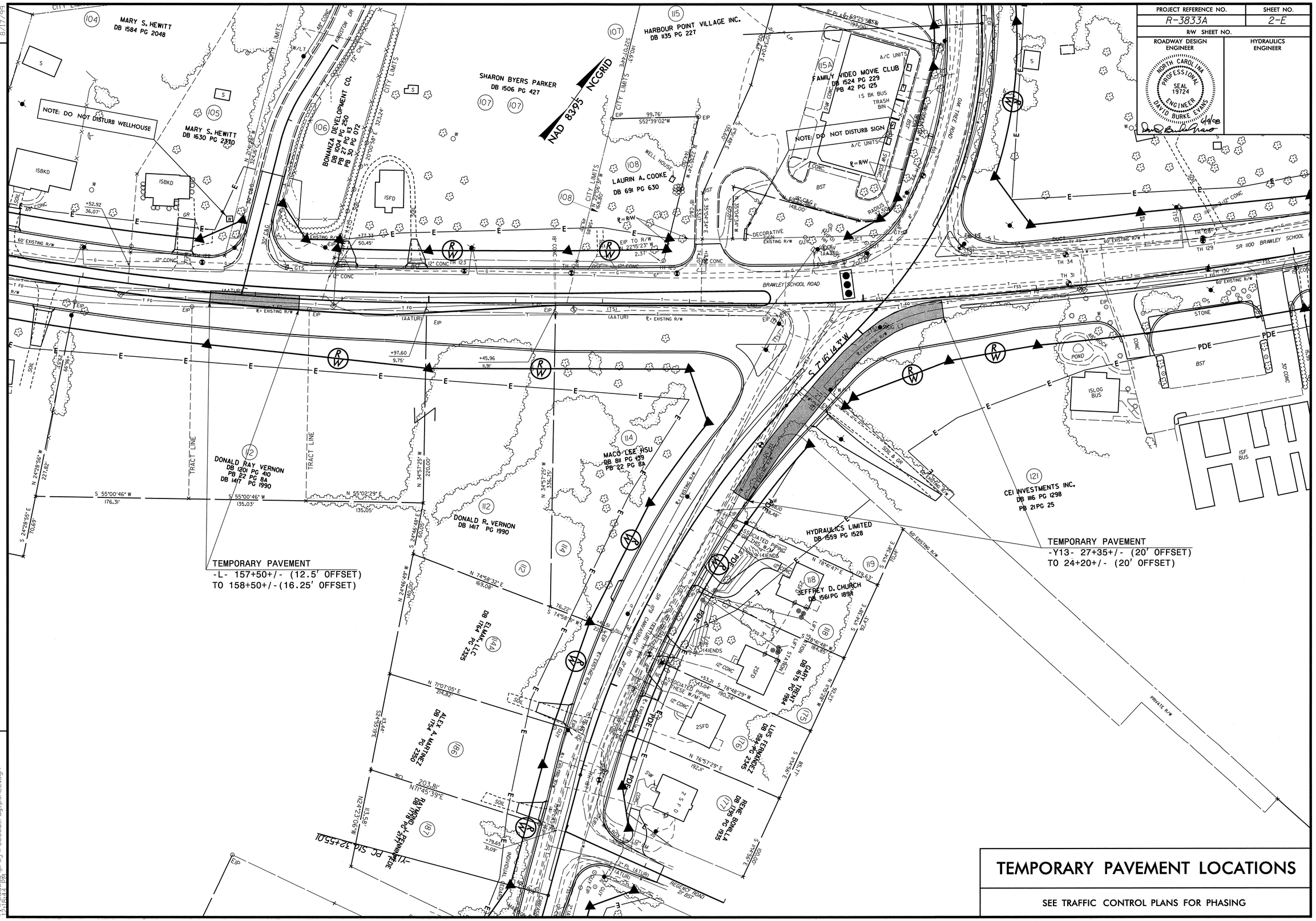
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 6/4/08



TEMPORARY PAVEMENT LOCATIONS

SEE TRAFFIC CONTROL PLANS FOR PHASING

REVISIONS

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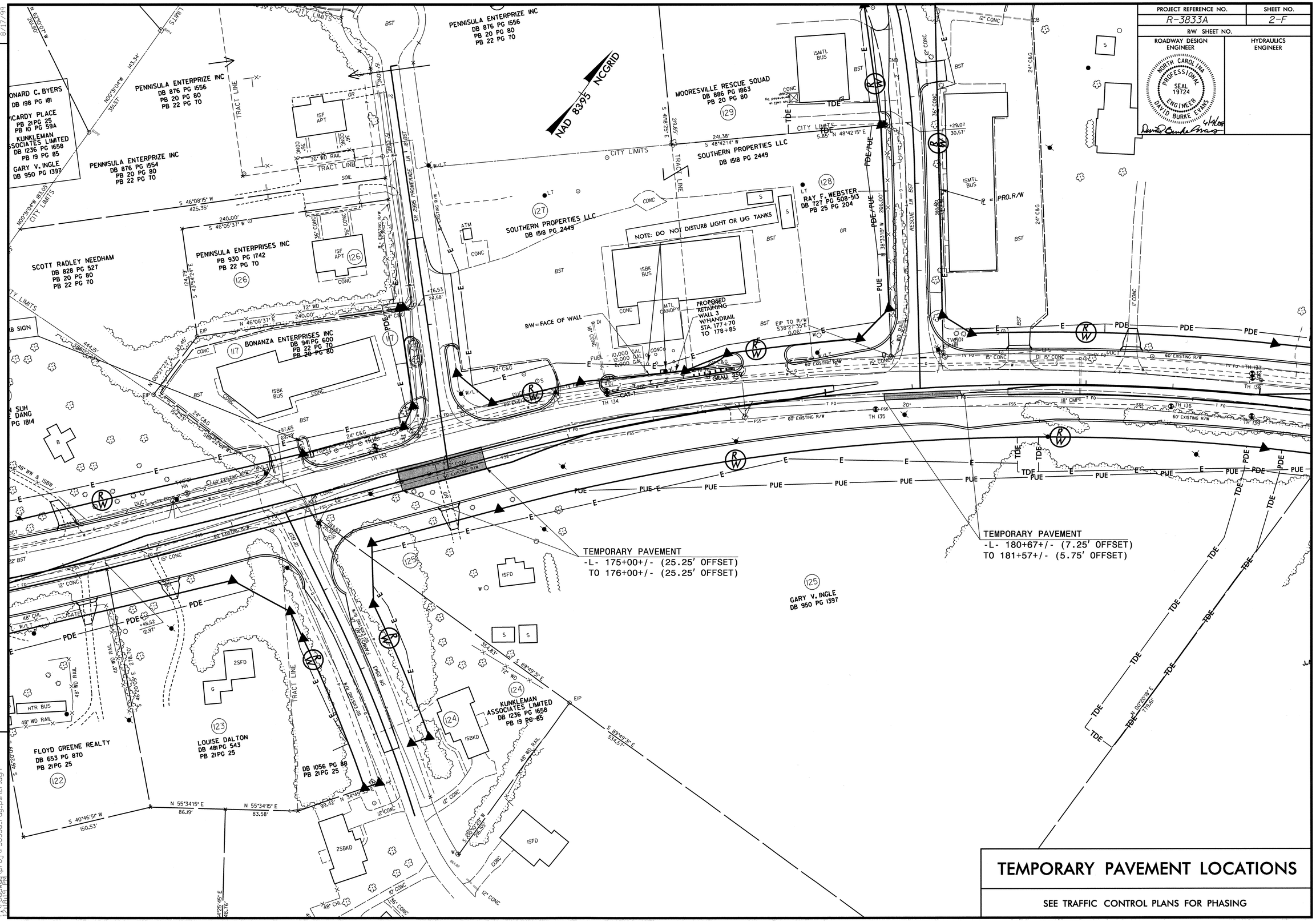
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2-F
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS

6/4/08



TEMPORARY PAVEMENT LOCATIONS

SEE TRAFFIC CONTROL PLANS FOR PHASING

REVISIONS

8/17/99

06/04/2008
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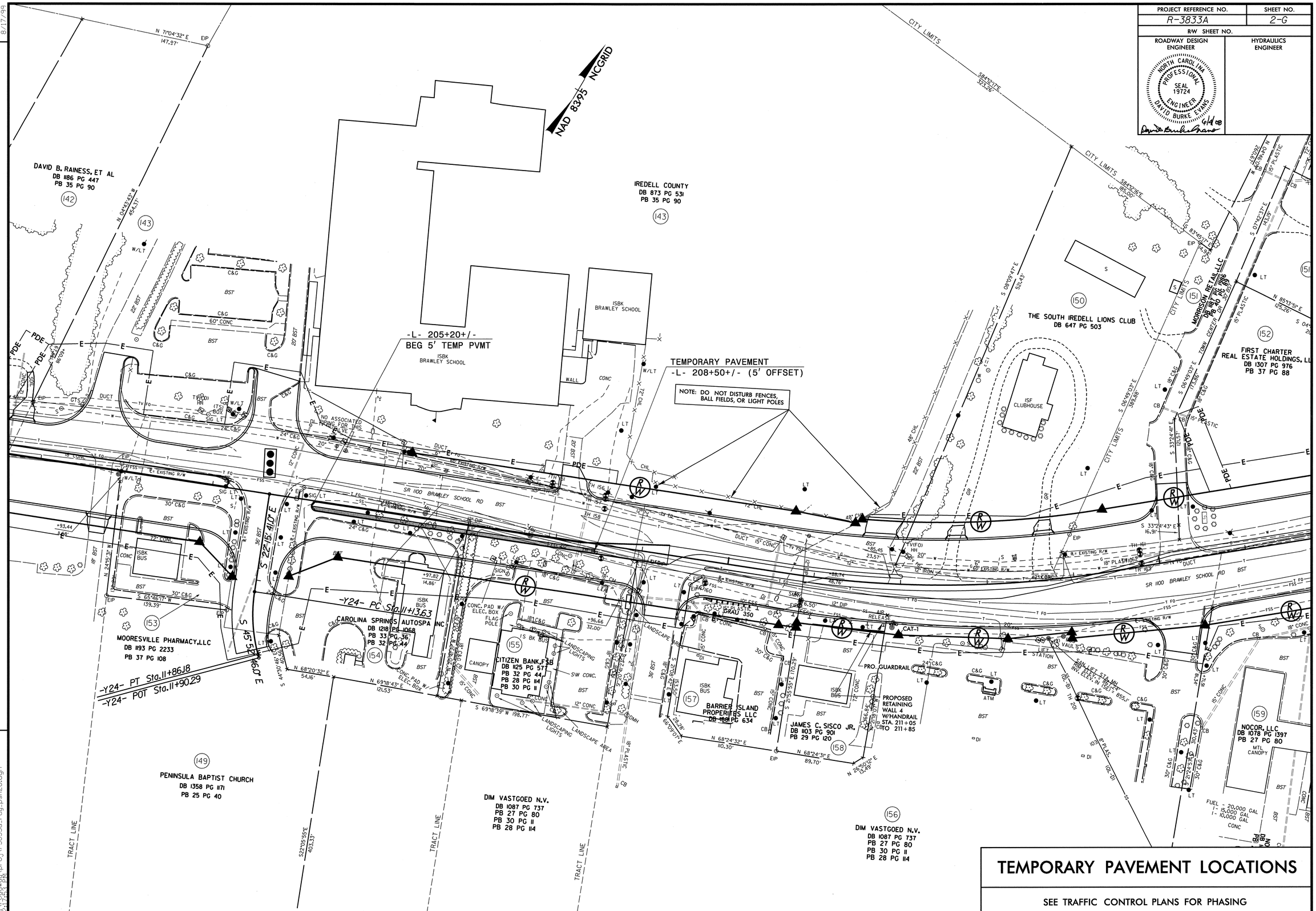
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2-G
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 6/4/08



TEMPORARY PAVEMENT LOCATIONS

SEE TRAFFIC CONTROL PLANS FOR PHASING

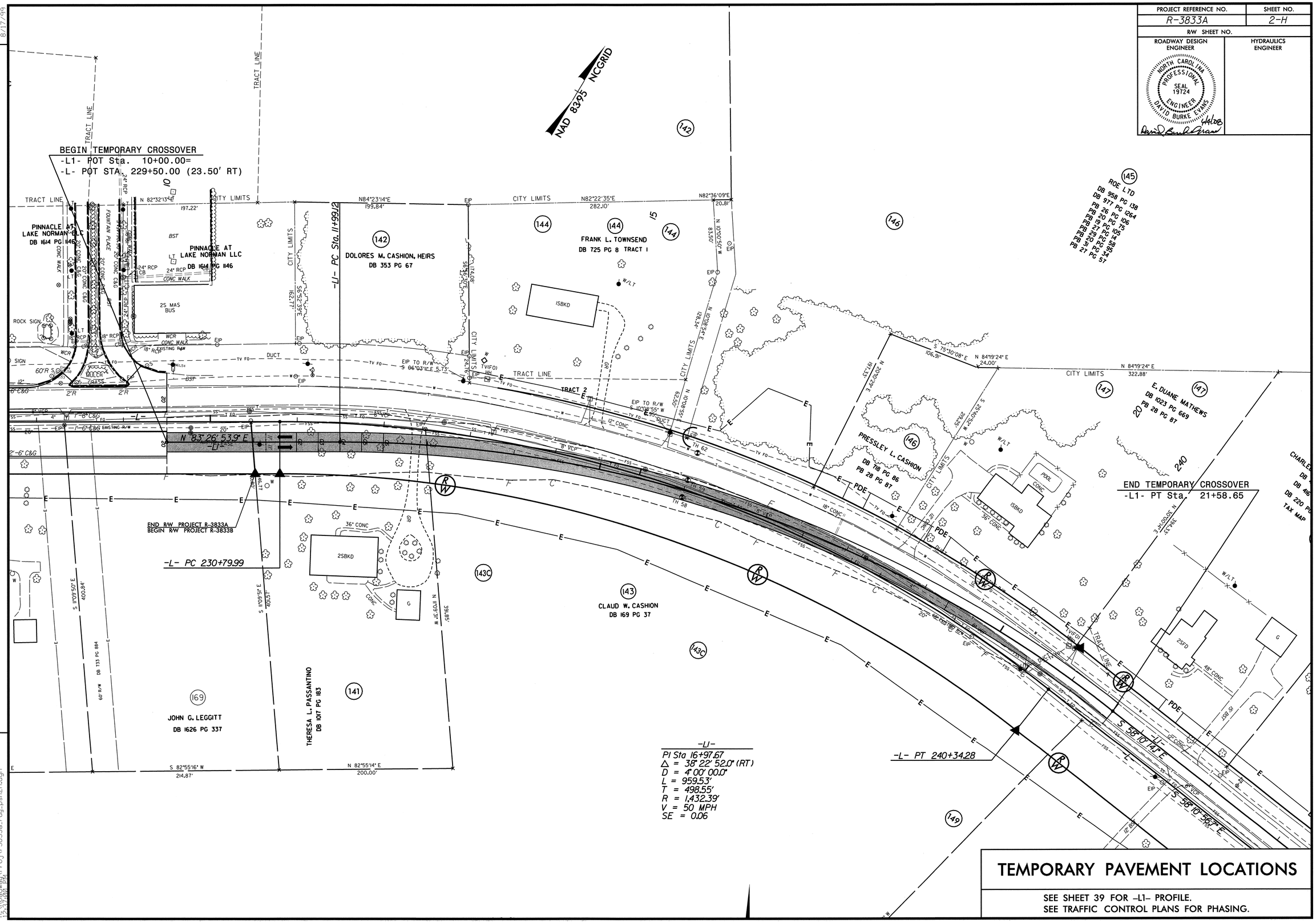
REVISIONS

8/17/99

06/04/2008
12:29:53 PM
proj\r-3833a_rdy_psh26.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2-H
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS



TEMPORARY PAVEMENT LOCATIONS

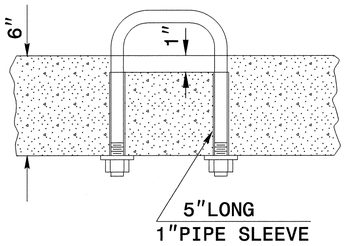
SEE SHEET 39 FOR -L1- PROFILE.
SEE TRAFFIC CONTROL PLANS FOR PHASING.

REVISIONS

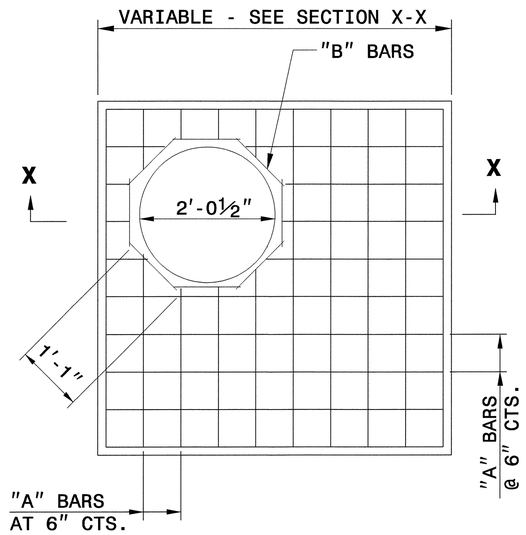
8/17/99

06/04/2008
R:\Roadway\Proj\r-3833a_rdy_psh2H.dgn
12:37:20 PM

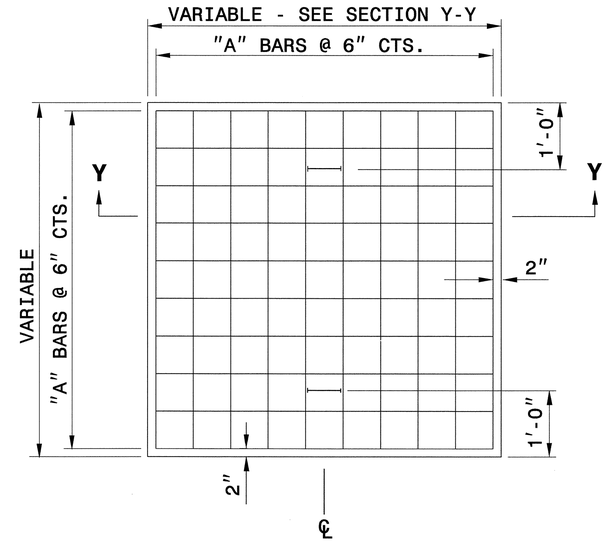
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2-I



PARTIAL SECTION



PLAN



PLAN

GENERAL NOTES:

CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

FIELD VERIFY THE DIMENSIONS FOR THE EXISTING BOXES

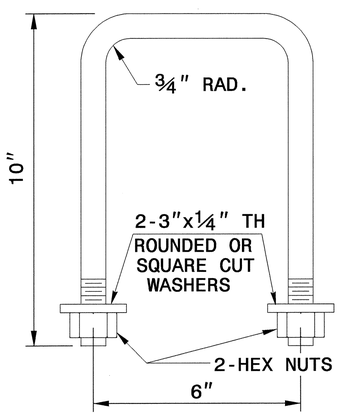
DETAIL INTENDED FOR NON-TRAFFIC BEARING DRAINAGE STRUCTURES.

BILL OF MATERIALS

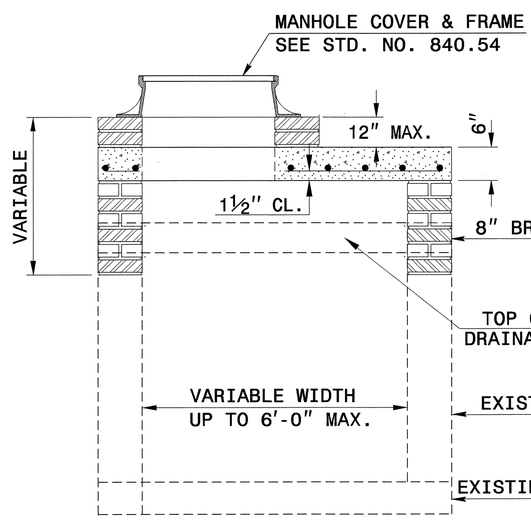
REINFORCING STEEL				
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
A	#4	20	4'-6"	60.12
B	#4	8	1'-1"	5.79
TOTAL				65.91 *

MASONRY	CU YDS
TOP SLAB CONCRETE CLASS "B"	.433 *
BRICK MASONRY PER FT HT (MIN)	.4111

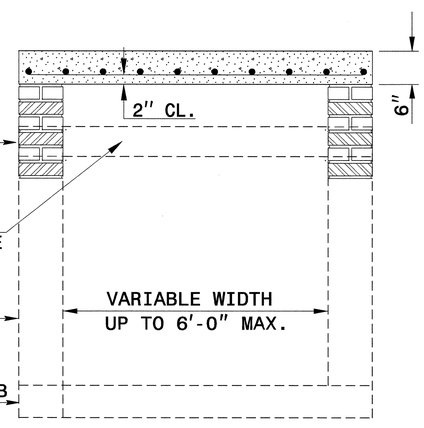
* NOTE:
QUANTITIES BASED ON 3'-6" X 3'-6" DRAINAGE STRUCTURE. ADJUST QUANTITIES FOR LARGER STRUCTURES AND MANHOLE CONSTRUCTION.



DETAIL OF HANDLE



SECTION X-X



SECTION Y-Y

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
6/10/08

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

DETAIL TO CONVERT EXISTING DROP INLET OR CATCH BASIN TO JUNCTION BOX (MANHOLE OPTIONAL)

ORIGINAL BY: T.S.S. DATE: NOV.1997
MODIFIED BY: E-E-W DATE: 8-28-02
CHECKED BY: DATE: 5/20/08
FILE SPEC.: usr/details/stand/boxtojbe!.dgn

$$$$$$SYSTIME$$$$$$
$$$$$$USERNAME$$$$$$

5/14/99

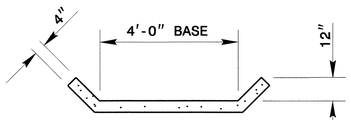
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2-J

GENERAL NOTES:

WIDTH AND SHAPE OF PROPOSED CONCRETE FLUME AND ETC. SHALL BE AS SHOWN OR AS DIRECTED BY THE ENGINEER.

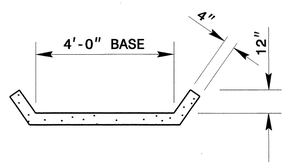
REINFORCING BARS ARE TO BE ASTM A615, GRADE 60.

THE FOLLOWING SHALL BE CONSTRUCTED IN ACCORDANCE WITH N.C. ROADWAY SPECIFICATIONS, CONCRETE CURB AND GUTTER-SECTION 846, CONCRETE FLUME COVER (TO BE CONSTRUCTED UNDER SIDEWALK SPECIFICATIONS) SECTION 848, CONCRETE PAVED DITCH- SECTION 850.



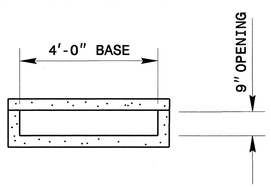
SECTION C-C

CONCRETE PAVED DITCH



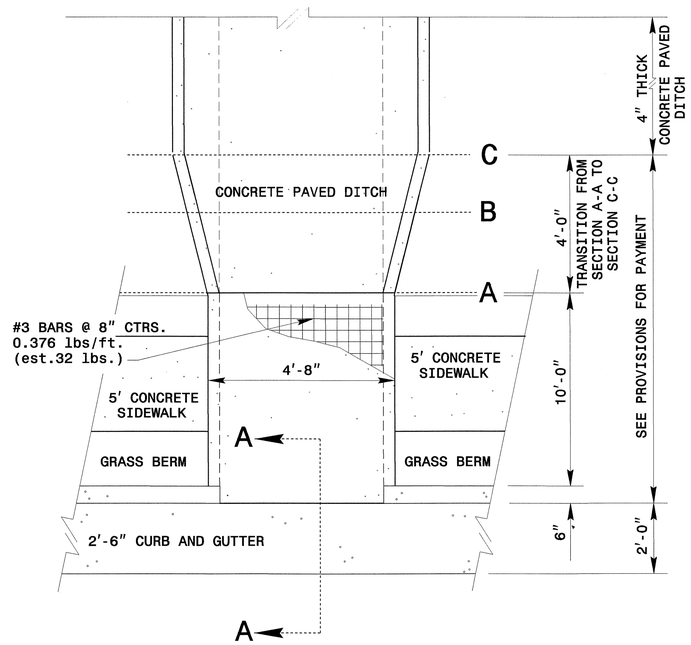
SECTION B-B

CONCRETE PAVED DITCH

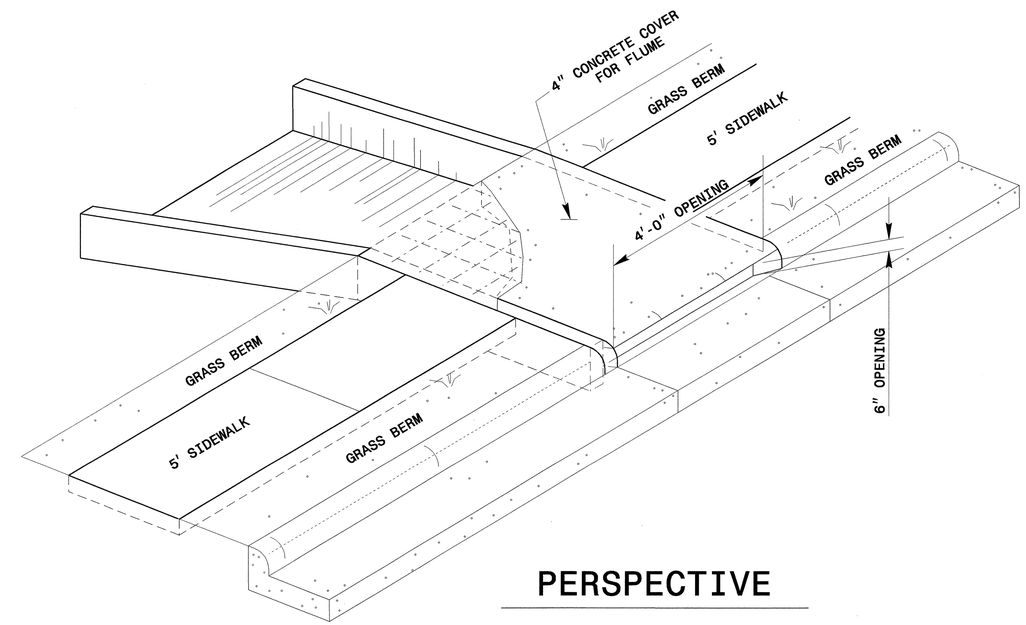


SECTION A-A

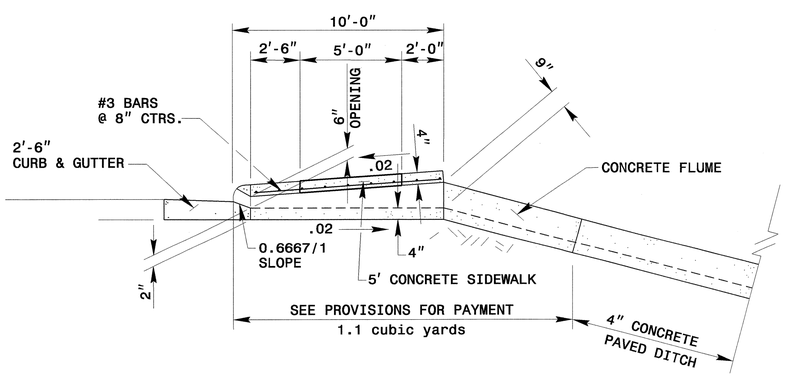
CONCRETE PAVED DITCH
CONCRETE FLUME



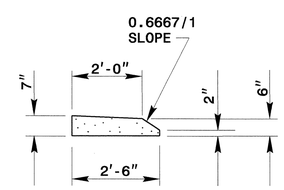
PLAN



PERSPECTIVE



ELEVATION



SECTION A-A

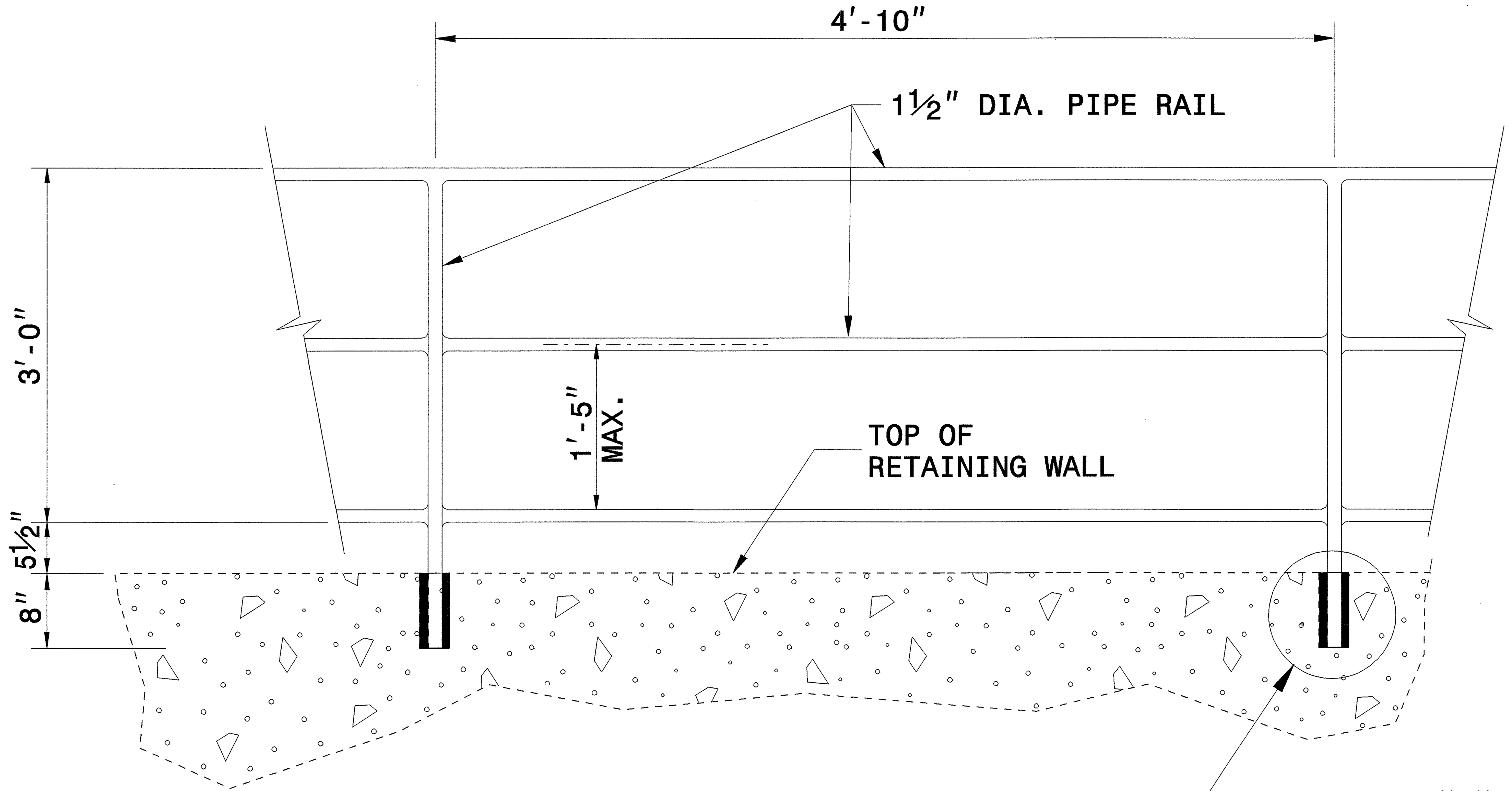
NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
6/10/08

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

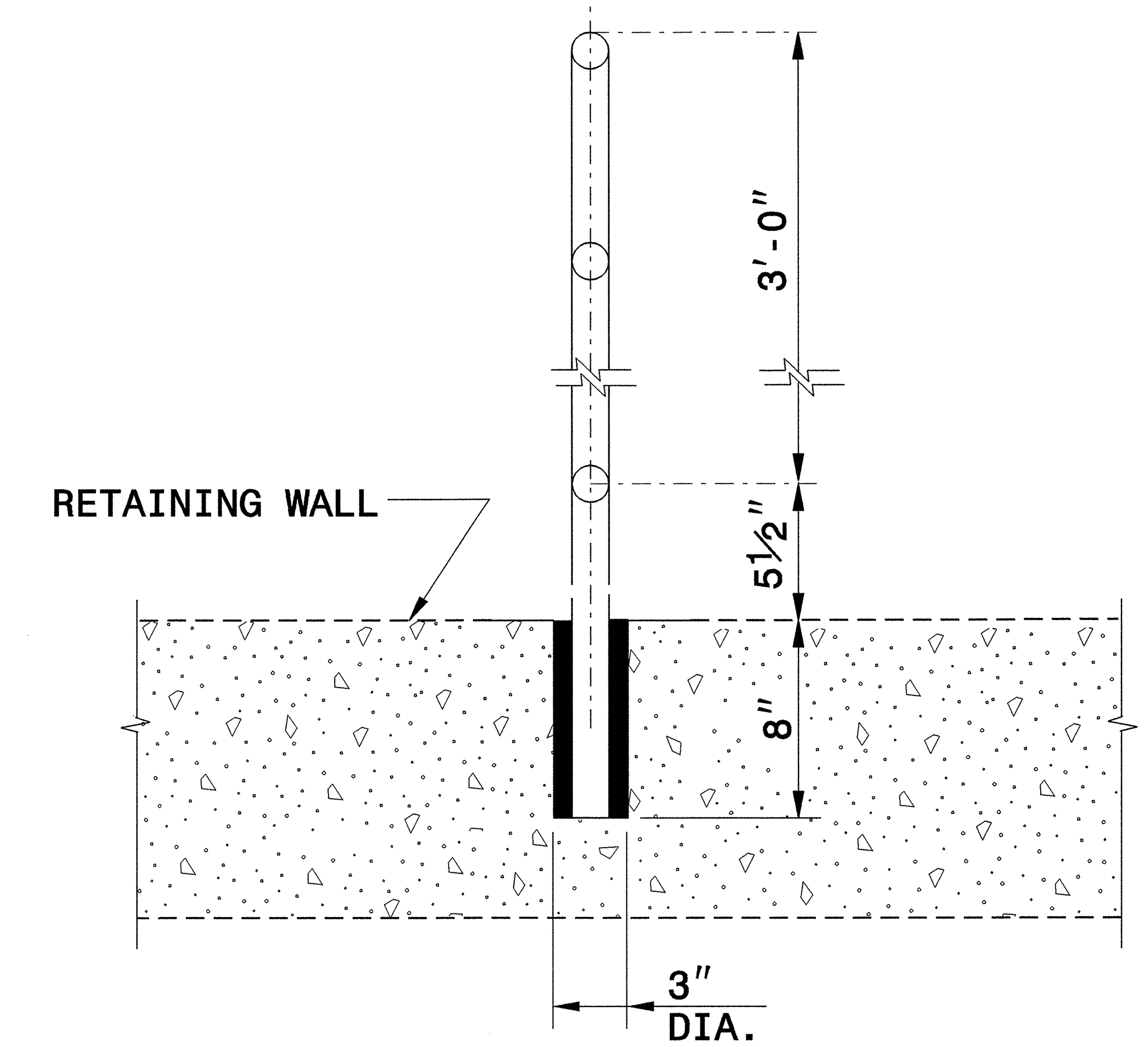
CONCRETE FLUME DETAIL

ORIGINAL BY: rnbritt DATE: 09-09-05
MODIFIED BY: DATE:
CHECKED BY: DATE: 4/18/08
FILE SPEC.: details/nbritt/english/urban/u3615aconcreteflume.dgn

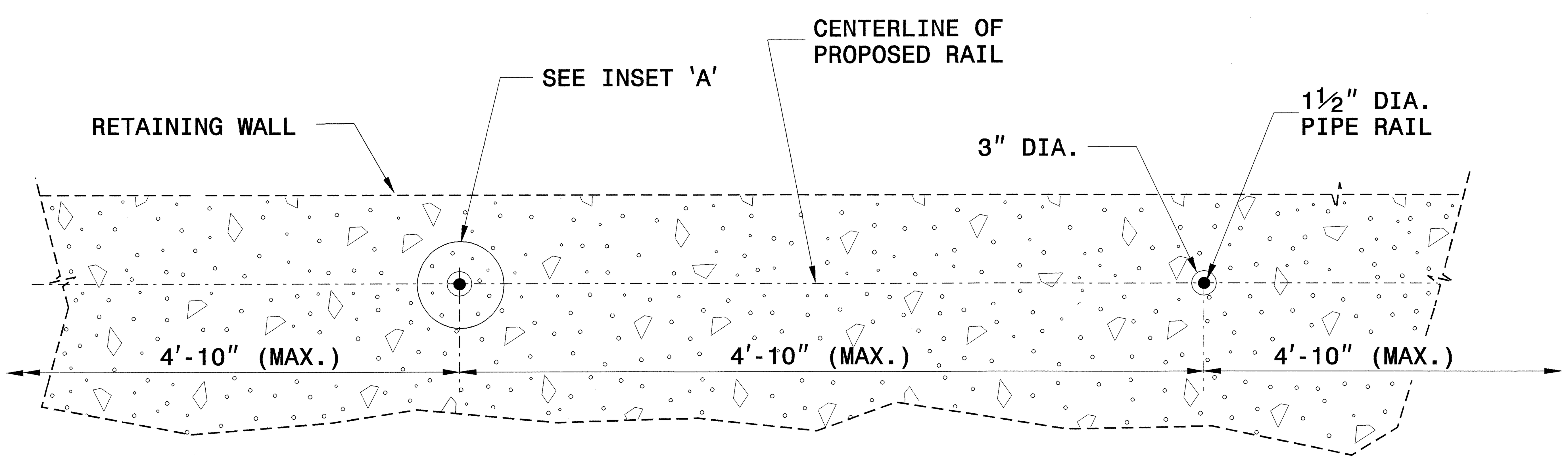
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2-K



ELEVATION OF PROPOSED PEDESTRIAN HANDRAIL



INSET 'A'



PLAN VIEW

NOTES:

CONSTRUCT PROPOSED STEEL PIPE RAIL OF 1½" DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.

REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.

PAINT, IF REQUIRED BY THE ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE STANDARD SPECIFICATIONS.

WELD IN ACCORDANCE WITH ARTICLE 1072-20 OF THE STANDARD SPECIFICATIONS.

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON 6/10/08

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

PROPOSED PEDESTRIAN SAFETY RAIL

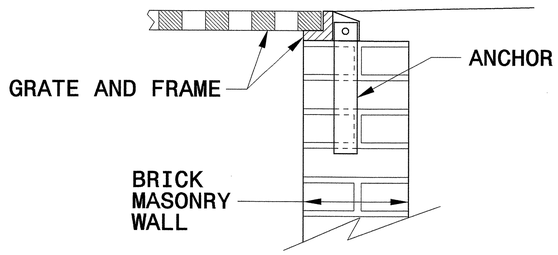
ORIGINAL BY: E.E.WARD DATE: 12-99
MODIFIED BY: T.S.Spell DATE: 1-4-05
CHECKED BY: [signature] DATE: 4/18/08
FILE SPEC.: w:details/stand/metric/0842d03.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-3833A	2-L

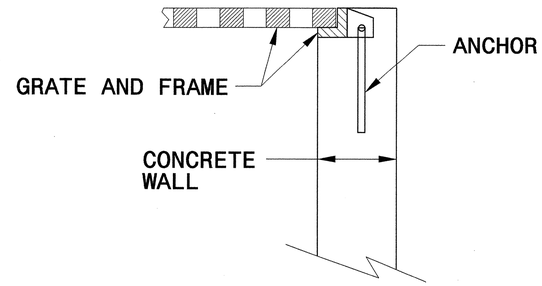
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

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

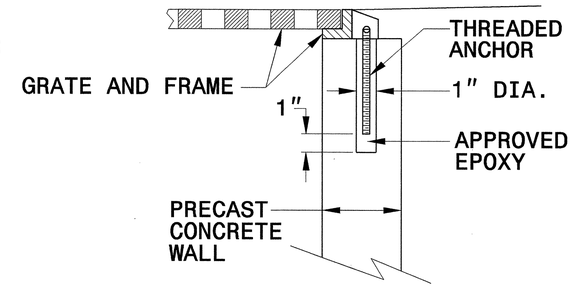
SHEET 1 OF 1
840D25



BRICK MASONRY CONSTRUCTION



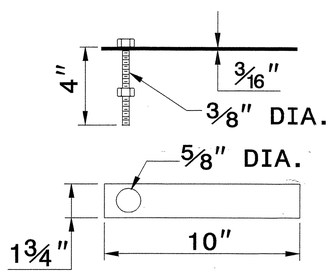
CONCRETE CONSTRUCTION



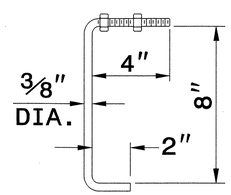
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

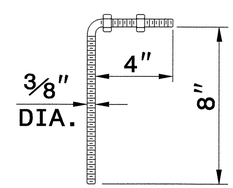
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



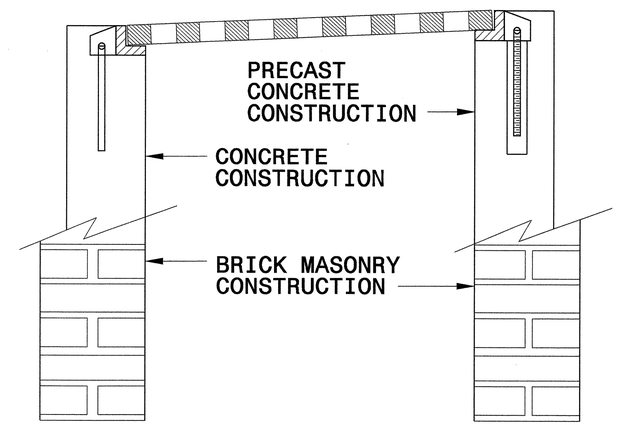
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



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 022966 ENGINEER JOEL S. HOWERTON
6/10/08

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

SEE PLATE FOR TITLE

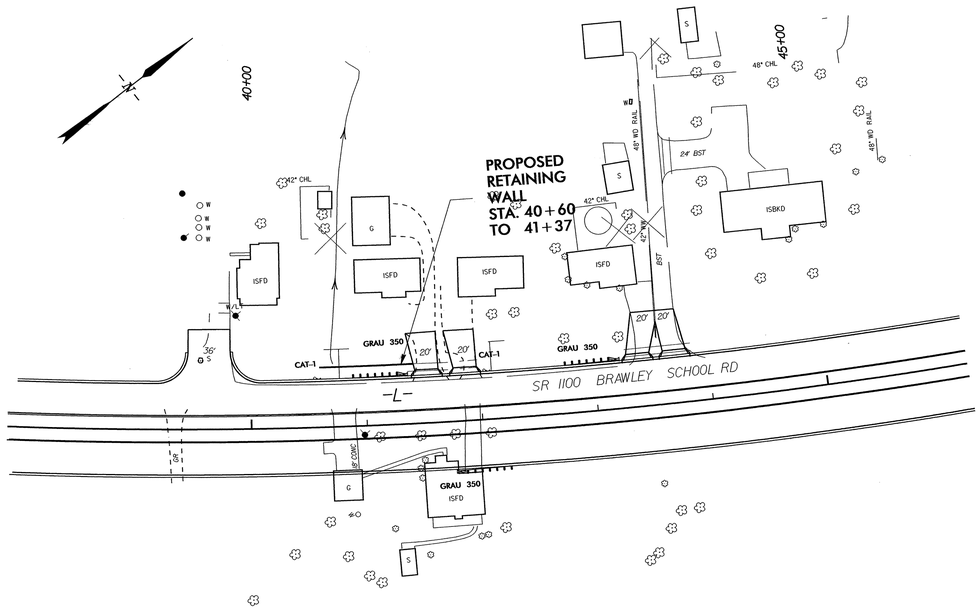
ORIGINAL BY:	2006 STD 840.25	DATE:	07/18/06
MODIFIED BY:	E.E. WARD	DATE:	9/25/06
CHECKED BY:		DATE:	
FILE SPEC.:			

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

R-3833A Z-M

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK	
S. Clark 6/30/08	
SIGNATURE DATE	SIGNATURE DATE

BM - 3 RR SPIKE IN ROOT OF 36" GUM TREE STA. 46+72.00 -L- 211.00' RT.
EL. = 834.59' N 663815 E 1429181



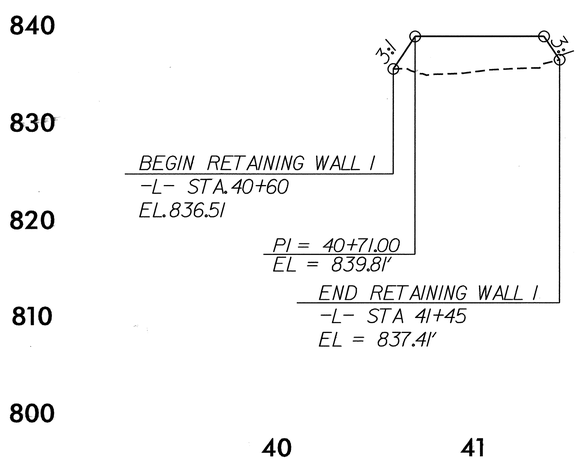
LOCATION SKETCH

GRAVITY RETAINING WALL ELEVATIONS					
-L- STA	OFFSET FROM ℄ (LEFT)	ELEV @ TOP OF WALL	* EXISTING GROUND	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
40+60	51.48	836.51	836.51	N/A	N/A
40+71.00	51.50	839.81	835.99	3.82	3.77
41+24.27	51.51	836.60	836.60	3.73	3.68
41+37.00	51.50	839.81	836.08	3.73	3.68
40+60	51.48	837.41	837.41	N/A	N/A

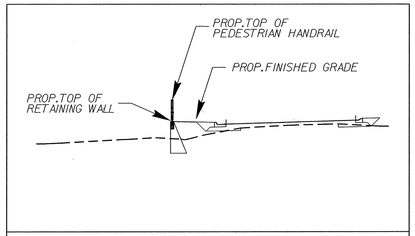
* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH

** FOR DESIGN WALL HEIGHT "H", SEE STANDARD DRAWING No. 453.01

-L-
SR 1100 BRAWLEY SCHOOL RD.
RETAINING WALL 1



TOTAL STRUCTURE QUANTITIES		
GRAVITY RETAINING WALLS	267	SQ. FT.
PEDESTRIAN HANDRAIL	62.79	LIN. FT.



SECTION A

NOTES

THE CONTRACTOR HAS THE CHOICE OF TWO GRAVITY RETAINING WALL TYPES FOR WALLS 1-5, THE NCDOT STANDARD WALL OR A SEGMENTAL GRAVITY WALL, SEE APPLICABLE STANDARDS OR PROVISIONS.

IF THE NCDOT STANDARD GARVITY WALL IS SELECTED, NO BRICK VENEER WILL BE REQUIRED.

ONLY ONE WALL TYPE WILL BE ALLOWED FOR THESE WALLS, UNLESS APPROVED BY THE ENGINEER.

THREE RAIL PEDESTIAN HANDRAIL REQUIRED

PROJECT NO.: R-3833A
IREDELL COUNTY
STATION: 40+60.00 -L- TO 41+37.00 -L-
SHEET 1 OF 4

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

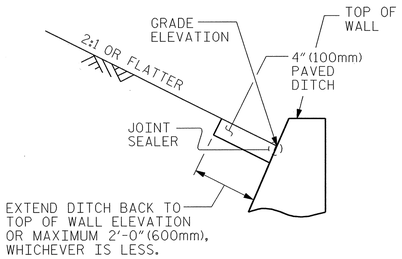
GRAVITY RETAINING WALL #1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

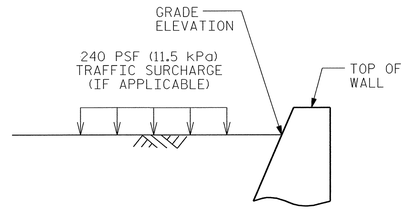
PREPARED BY:	J.T. WILLIAMS	DATE:	11/16/07
REVIEWED BY:	S.C. CLARK	DATE:	5/08

R-3833A 2-N

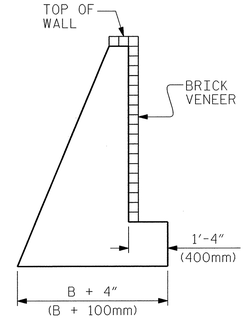
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK — SIGNATURE S. C. Clark DATE 6/30/16	SIGNATURE DATE



SLOPE CONDITION

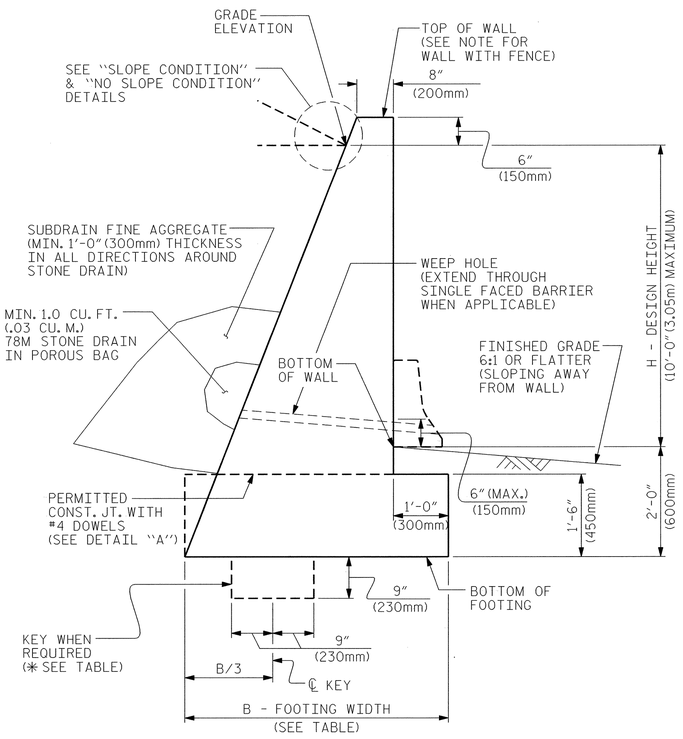


NO SLOPE CONDITION

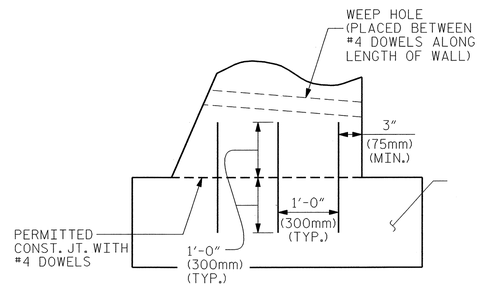


BRICK VENEER DETAIL

(WHEN APPLICABLE)



TYPICAL SECTION



DETAIL "A"

H + 2 (ft)	< 6	6 - 9	> 9 - 12
H + 0.6 (m)	< 1.83	1.83 - 2.74	> 2.74 - 3.65
NO SLOPE CONDITION WITHOUT TRAFFIC SURCHARGE	.60	.60	.60
NO SLOPE CONDITION WITH TRAFFIC SURCHARGE	.80	.75 *	.70 *
SLOPE CONDITION	.66	.70 *	.75 *

B/(H + 2) RATIO

* KEY IS REQUIRED FOR SLOPE CONDITION OR NO SLOPE CONDITION WITH TRAFFIC SURCHARGE WHEN H + 2ft (H + 0.6m) IS 6'-0"(1.83m) OR GREATER.

NOTES

FOR GRAVITY RETAINING WALLS, SEE SECTION 453 OF THE STANDARD SPECIFICATIONS.

THE STANDARD GRAVITY RETAINING WALL IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 kN/m³)
COHESION = 0 PSF (0 kPa)
FRICTION ANGLE = 35 DEGREES
(GROUNDWATER WITHIN 5'-0"(1.5m) OF BOTTOM OF FOOTING)
FRICTION ANGLE = 30 DEGREES
(GROUNDWATER MORE THAN 5'-0"(1.5m) BELOW BOTTOM OF FOOTING)

DO NOT USE A STANDARD GRAVITY RETAINING WALL IF THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF FOOTING.

DO NOT USE A STANDARD GRAVITY RETAINING WALL WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE WALL.

DO NOT PLACE CONCRETE UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND CHECKING FOUNDATION MATERIAL FOR IN-SITU ASSUMED SOIL PARAMETERS.

USE CLASS "A" CONCRETE AND PROVIDE CLASS I SURFACE FINISH FOR ALL EXPOSED SURFACES.

PROVIDE 3"(75mm) DIAMETER WEEP HOLES ON 10'-0"(3m) CENTERS ALONG WALL. SLOPE WEEP HOLES ON A 1"(25mm) PER FOOT (300mm) SLOPE THROUGH THE WALL SO THAT WATER DRAINS OUT OF THE FRONT OF THE WALL.

CONSTRUCT A HORIZONTAL DRAIN IN SUBDRAIN FINE AGGREGATE AT LEAST 1'-0"(300mm) TALL AND 1'-0"(300mm) WIDE TO CONNECT ALL STONE DRAINS.

PROVIDE GROOVED CONTRACTION JOINTS EVERY 10'-0"(3m) AND EXPANSION JOINTS EVERY 30'-0"(9m) ALONG THE WALL.

FOR WALL WITH SURFACE VENEER, SUBMIT VENEER SAMPLES TO THE ENGINEER FOR APPROVAL BEFORE BEGINNING CONSTRUCTION. ANCHOR SURFACE VENEER TO CONCRETE RETAINING WALL WITH APPROPRIATE CONCRETE TYPE ANCHORS ACCORDING TO MANUFACTURER'S SPECIFICATIONS WITH A MINIMUM VERTICAL SPACING OF 1'-4"(400mm) AND A MINIMUM HORIZONTAL SPACING OF 2'-8"(800mm) WITH EACH ROW STAGGERED 1'-4"(400mm) FROM THE ROW OF ANCHORS ABOVE AND BELOW.

DO NOT BACKFILL BEHIND WALL UNTIL CONCRETE DEVELOPS A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI (20.7 MPa). COMPACT BACKFILL IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. PLACE BACKFILL WITHIN 3'-0"(1m) OF THE BACK OF THE WALL WITH HAND OPERATED EQUIPMENT. DO NOT OPERATE HEAVY EARTH MOVING EQUIPMENT WITHIN 10'-0"(3m) OF THE BACK OF WALL.

WHEN A CONSTRUCTION JOINT IS LOCATED AT THE BASE OF THE WALL, IN SECTION, PROVIDE A MINIMUM OF 3-#4 DOWELS AT AN EQUAL SPACING. SPACE ALL DOWELS AT 1'-6"(460mm) CENTERS ALONG THE LENGTH OF THE WALL.

SEE PREVIOUS SHEET(S) FOR PLAN AND PROFILE VIEW (WALL ENVELOPE) AND PROPOSED ELEVATIONS FOR GRAVITY RETAINING WALL(S).

FOR WALL WITH HANDRAIL, USE SLEEVES IN ACCORDANCE WITH HANDRAIL DETAIL SHOWN IN ROADWAY PLANS

PROJECT NO.: R-3833A
IREDELL ***COUNTY***
STATION: 40+60.00 -L- TO 41+37.00 -L

SHEET 2 OF 4

GEOTECHNICAL ENGINEERING UNIT
☐ ***EASTERN REGIONAL OFFICE***
☒ ***WESTERN REGIONAL OFFICE***

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

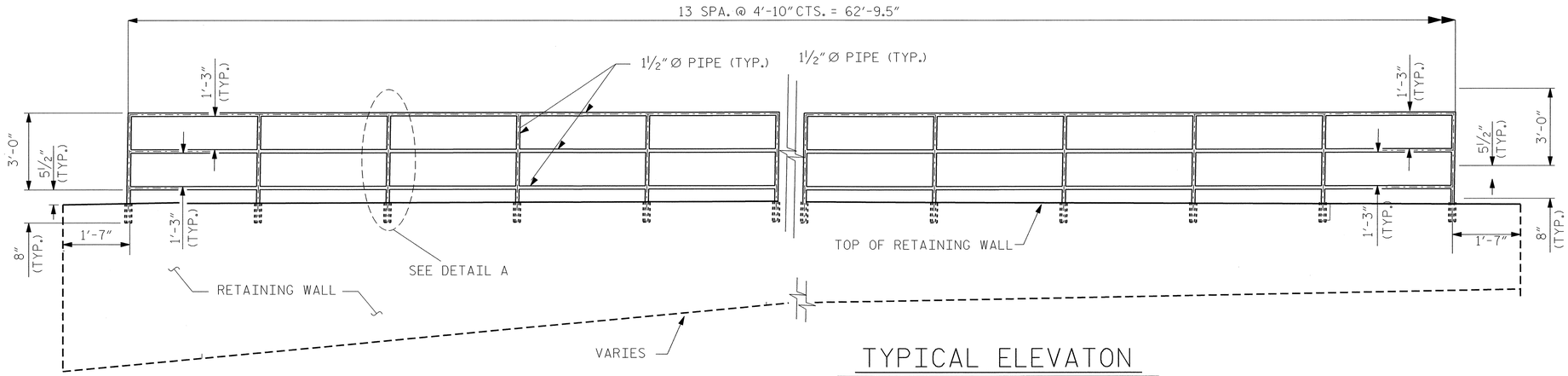
GRAVITY RETAINING WALL #1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

PREPARED BY:	J.T. WILLIAMS	DATE:	11/16/07
REVIEWED BY:	S.C. CLARK	DATE:	5/08

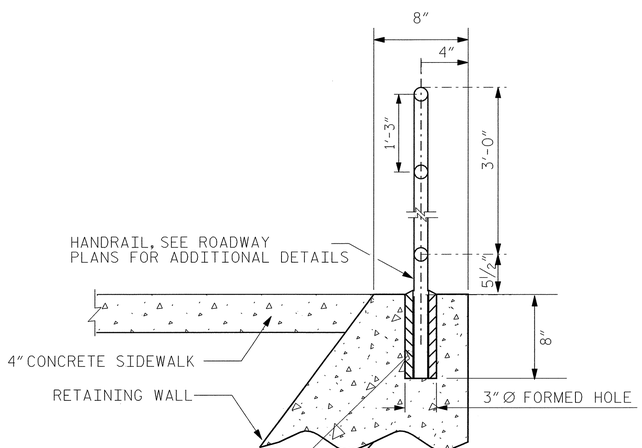
R-3833A 2-0

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK	
SIGNATURE: S.C. Clark DATE: 8/31/08	SIGNATURE DATE

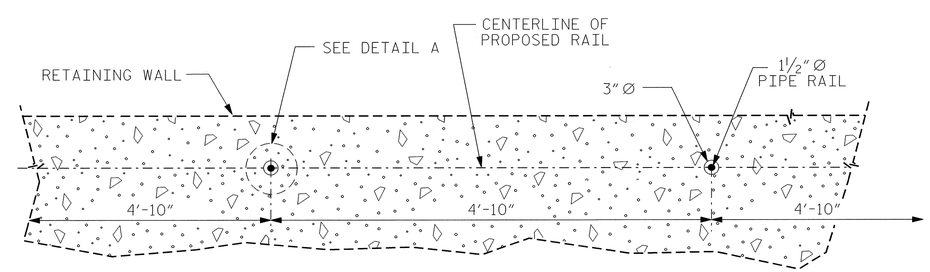


TYPICAL ELEVATON

NTS



DETAIL A



PLAN VIEW

PROJECT NO.: R-3833A

IREDELL **COUNTY**

STATION: 40+60.00 -L- TO 41+37.00 -L

SHEET 3 OF 4

GEOTECHNICAL ENGINEERING UNIT

☐ *EASTERN REGIONAL OFFICE*

☒ *WESTERN REGIONAL OFFICE*

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

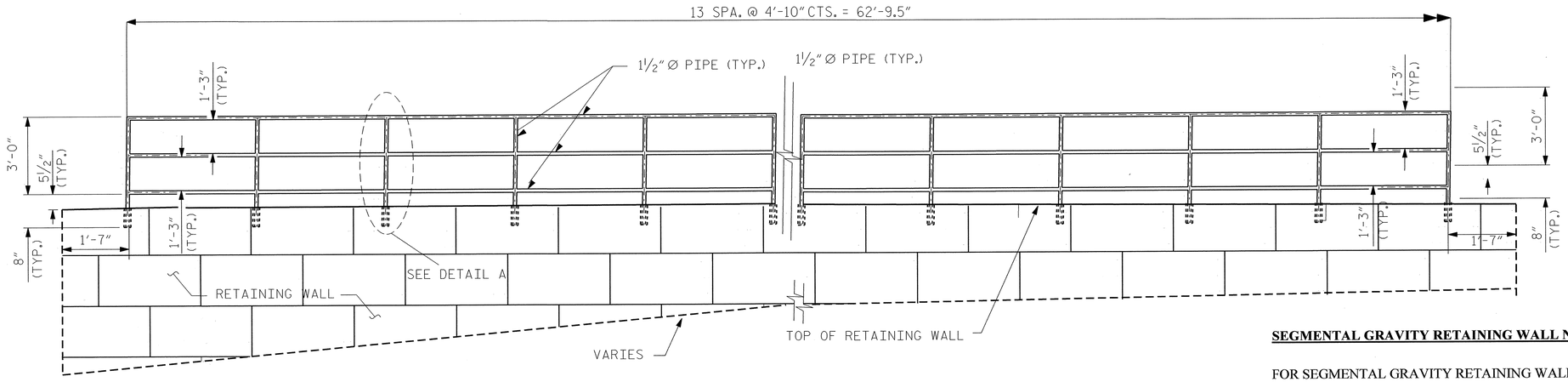
GRAVITY RETAINING WALL #1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

PREPARED BY:	J.T. WILLIAMS	DATE:	11/16/07
REVIEWED BY:	S.C. CLARK	DATE:	5/08

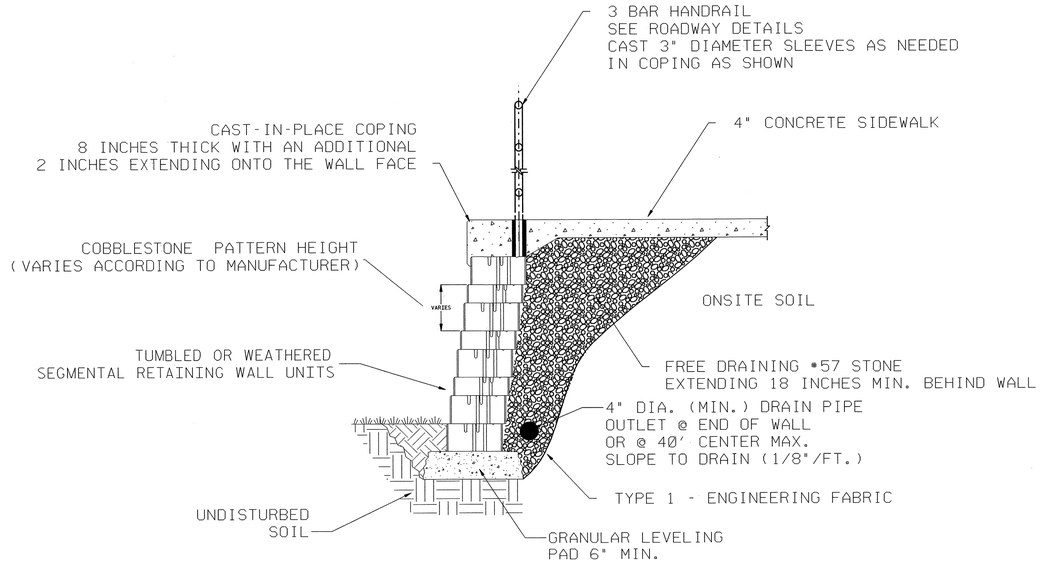
R-3833A 2-P

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK — SIGNATURE 6/30/08 DATE	SIGNATURE DATE



TYPICAL ELEVATON

NTS



TYPICAL WALL DETAIL

NTS

SEGMENTAL GRAVITY RETAINING WALL NOTES

FOR SEGMENTAL GRAVITY RETAINING WALLS, SEE SEGMENTAL GRAVITY RETAINING WALLS SPECIAL PROVISION.

CAST-IN-PLACE CONCRETE COPING IS REQUIRED. COPING AND SIDEWALK SHALL BE POURED AT THE SAME TIME. THE COPING SHALL BE REINFORCED AS NEEDED AND THE REINFORCEMENT SHALL EXTEND INTO THE SIDEWALK SLAB. CONTRACTOR IS RESPONSIBLE FOR SUBMITTING A DESIGN DETAIL WITH WALL DESIGN PACKAGE. SEE TYPICAL WALL DETAIL FOR ADDITIONAL INFORMATION.

A TUMBLED OR WEATHERED FINISH IS REQUIRED ON THE FRONT FACE OF SEGMENTAL RETAINING WALL UNITS. SUBMIT SAMPLES TO THE RESIDENT ENGINEER FOR APPORVAL PRIOR TO BEGINNING DESIGN OR ORDERING MATERIALS.

THE INDIVIDUAL SRW BLOCKS SHALL BE ASSEMBLED IN A COBBLESTONE PATTERN. SUBMIT SAMPLE PATTERN TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO BEGINNING DESIGN OR ORDERING MATERIALS

BEFORE BEGINNING WALL DESIGN FOR RETAINING WALL, SURVEY ALL EXISTING GROUND ELEVATIONS SHOWN ON THE PLANS AND SUBMIT A REVISED WALL ENVELOPE FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THIS ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL FOR A WALL HEIGHT EQUAL TO THE DESIGN HEIGHT (DIFFERENCE BETWEEN GRADE ELEVATION AND BOTTOM OF WALL ELEVATION) PLUS EMBEDMENT (DIFFERENCE BETWEEN BOTTOM OF WALL ELEVATION AND TOP OF LEVELING PAD ELEVATION).

DESIGN RETAINING WALL FOR THE FOLLOWING:
1) MINIMUM SERVICE LIFE = 75 YEARS
2) ALLOWABLE BEARING CAPACITY = 2000 PSF

IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF (kPa)
BACKFILL	110	32	0
FOUNDATION	110	30	0

DO NOT PLACE STONE BACKFILL FOR THE LEVELING PAD FOR RETAINING WALL UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

PROJECT NO.: R-3833A

IREDELL ***COUNTY***

STATION: 40+60.00 -L- TO 41+37.00 -L

SHEET 4 OF 4

PREPARED BY:	J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY:	S.C. CLARK	DATE: 5/08

GEOTECHNICAL ENGINEERING UNIT

☐ ***EASTERN REGIONAL OFFICE***

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SEGMENTAL GRAVITY RETAINING WALL #1

REVISIONS

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

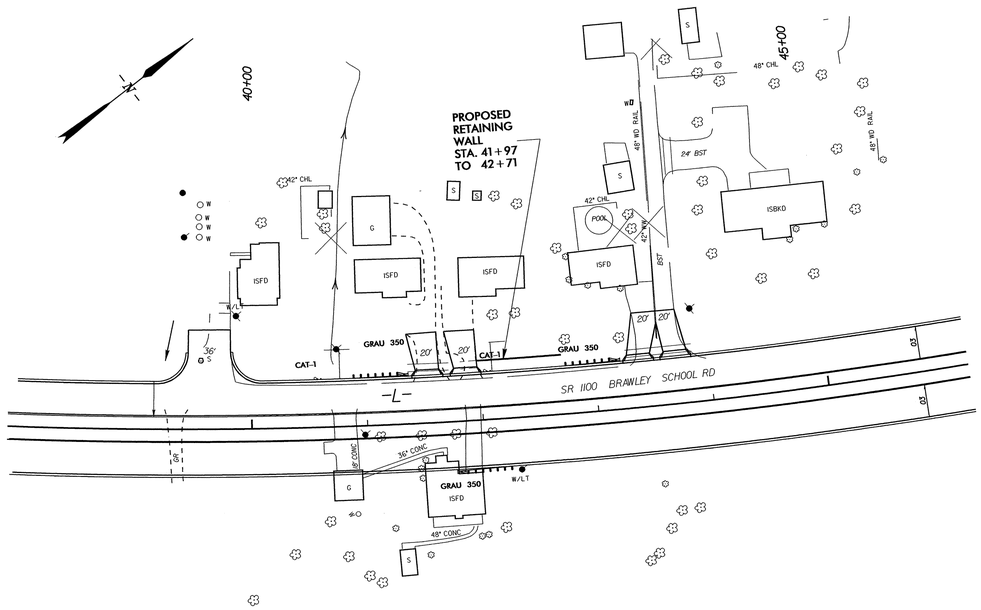
SHEET NO.

TOTAL SHEETS

R-3833A 2-Q

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK	
S. Clark 6/31/8	
SIGNATURE DATE	SIGNATURE DATE

BM - 3 RR SPIKE IN ROOT OF 36" GUM TREE STA. 46+72.00 -L- 211.00' RT.
EL. = 834.59' N 663815 E 1429181



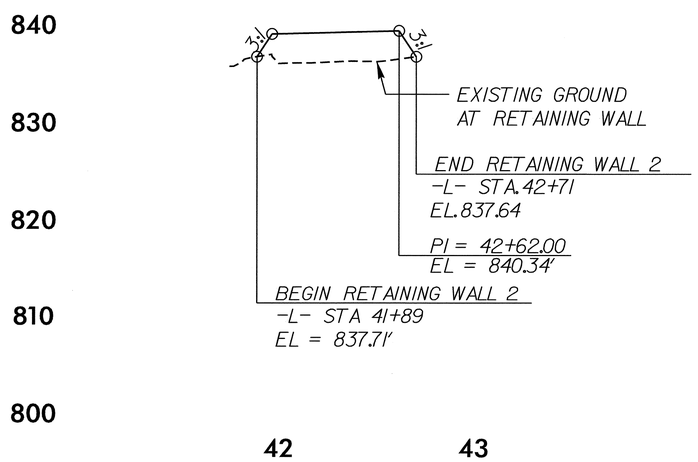
LOCATION SKETCH

GRAVITY RETAINING WALL ELEVATIONS					
-L- STA	OFFSET FROM ℄ (LEFT)	ELEV @ TOP OF WALL	* EXISTING GROUND	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
41+97	51.50	840.03	840.03	N/A	N/A
42+62.00	51.50	840.34	837.46	2.88	2.38
42+71.00	51.50	837.64	837.64	N/A	N/A

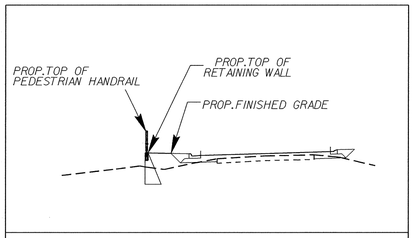
* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH

** FOR DESIGN WALL HEIGHT "H", SEE STANDARD DRAWING No. 453.01

-L-
SR 1100 BRAWLEY SCHOOL RD.
RETAINING WALL 2



TOTAL STRUCTURE QUANTITIES		
GRAVITY RETAINING WALLS	216	SQ. FT.
PEDESTRIAN HANDRAIL	62.79	LIN. FT.



SECTION A

NOTES

THE CONTRACTOR HAS THE CHOICE OF TWO GRAVITY RETAINING WALL TYPES FOR WALLS 1-5, THE NCDOT STANDARD WALL OR A SEGMENTAL GRAVITY WALL, SEE APPLICABLE STANDARDS OR PROVISIONS.

IF THE NCDOT STANDARD GARVITY WALL IS SELECTED, NO BRICK VENEER WILL BE REQUIRED.

ONLY ONE WALL TYPE WILL BE ALLOWED FOR THESE WALLS, UNLESS APPROVED BY THE ENGINEER.

THREE RAIL PEDESTIAN HANDRAIL REQUIRED

PROJECT NO.: R-3833A
IREDELL **COUNTY**
STATION: 41+97.00 -L- TO 42+71.00 -L-
SHEET 1 OF 4

PREPARED BY:	J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY:	S.C. CLARK	DATE: 5/08

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
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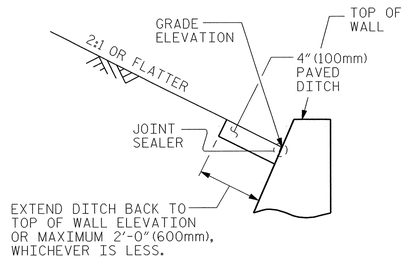
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

GRAVITY RETAINING WALL #2

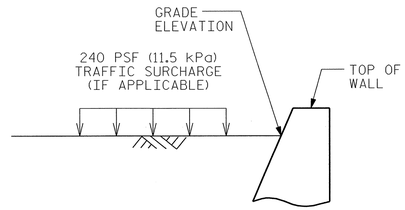
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

R-3833A 2-R

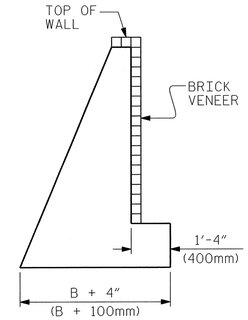
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK — SIGNATURE: S.C. Clark DATE: 6/30/08	SIGNATURE DATE



SLOPE CONDITION

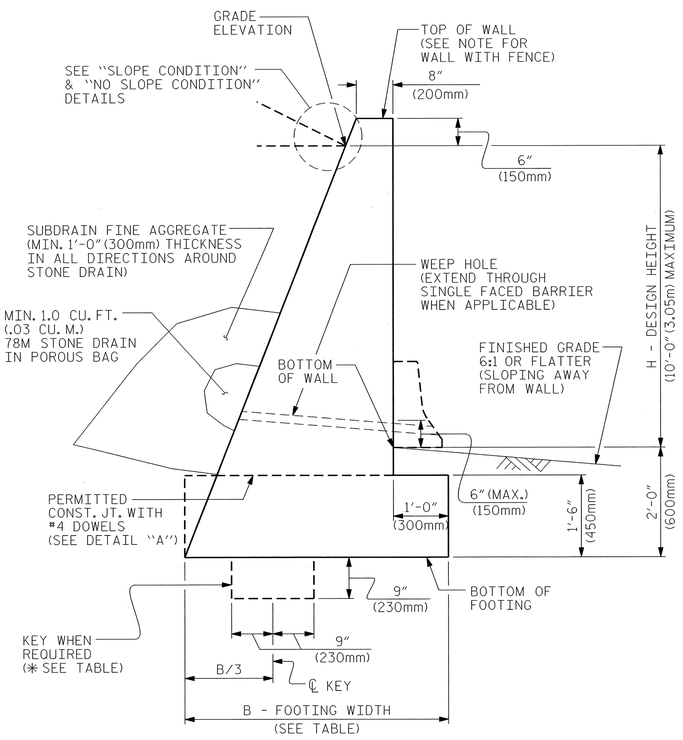


NO SLOPE CONDITION

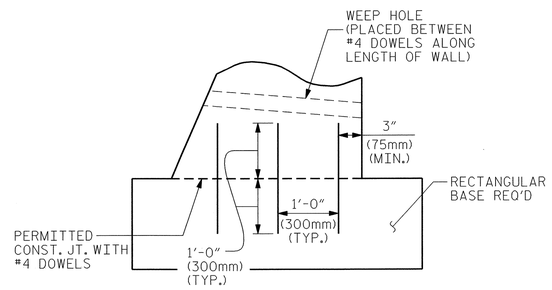


BRICK VENEER DETAIL

(WHEN APPLICABLE)



TYPICAL SECTION



DETAIL "A"

H + 2 (ft)	< 6	6 - 9	> 9 - 12
H + 0.6 (m)	< 1.83	1.83 - 2.74	> 2.74 - 3.65
NO SLOPE CONDITION WITHOUT TRAFFIC SURCHARGE	.60	.60	.60
NO SLOPE CONDITION WITH TRAFFIC SURCHARGE	.80	.75 *	.70 *
SLOPE CONDITION	.66	.70 *	.75 *

B/(H + 2) RATIO

* KEY IS REQUIRED FOR SLOPE CONDITION OR NO SLOPE CONDITION WITH TRAFFIC SURCHARGE WHEN H + 2ft (H + 0.6m) IS 6'-0" (1.83m) OR GREATER.

NOTES

FOR GRAVITY RETAINING WALLS, SEE SECTION 453 OF THE STANDARD SPECIFICATIONS.

THE STANDARD GRAVITY RETAINING WALL IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 kN/m3)
COHESION = 0 PSF (0 kPa)
FRICTION ANGLE = 35 DEGREES
(GROUNDWATER WITHIN 5'-0" (1.5m) OF BOTTOM OF FOOTING)
FRICTION ANGLE = 30 DEGREES
(GROUNDWATER MORE THAN 5'-0" (1.5m) BELOW BOTTOM OF FOOTING)

DO NOT USE A STANDARD GRAVITY RETAINING WALL IF THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF FOOTING.

DO NOT USE A STANDARD GRAVITY RETAINING WALL WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE WALL.

DO NOT PLACE CONCRETE UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND CHECKING FOUNDATION MATERIAL FOR IN-SITU ASSUMED SOIL PARAMETERS.

USE CLASS "A" CONCRETE AND PROVIDE CLASS I SURFACE FINISH FOR ALL EXPOSED SURFACES.

PROVIDE 3" (75mm) DIAMETER WEEP HOLES ON 10'-0" (3m) CENTERS ALONG WALL. SLOPE WEEP HOLES ON A 1" (25mm) PER FOOT (300mm) SLOPE THROUGH THE WALL SO THAT WATER DRAINS OUT OF THE FRONT OF THE WALL.

CONSTRUCT A HORIZONTAL DRAIN IN SUBDRAIN FINE AGGREGATE AT LEAST 1'-0" (300mm) TALL AND 1'-0" (300mm) WIDE TO CONNECT ALL STONE DRAINS.

PROVIDE GROOVED CONTRACTION JOINTS EVERY 10'-0" (3m) AND EXPANSION JOINTS EVERY 30'-0" (9m) ALONG THE WALL.

FOR WALL WITH SURFACE VENEER, SUBMIT VENEER SAMPLES TO THE ENGINEER FOR APPROVAL BEFORE BEGINNING CONSTRUCTION. ANCHOR SURFACE VENEER TO CONCRETE RETAINING WALL WITH APPROPRIATE CONCRETE TYPE ANCHOR ACCORDING TO MANUFACTURER'S SPECIFICATIONS WITH A MINIMUM VERTICAL SPACING OF 1'-4" (400mm) AND A MINIMUM HORIZONTAL SPACING OF 2'-8" (800mm) WITH EACH ROW STAGGERED 1'-4" (400mm) FROM THE ROW OF ANCHORS ABOVE AND BELOW.

DO NOT BACKFILL BEHIND WALL UNTIL CONCRETE DEVELOPS A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI (20.7 MPa). COMPACT BACKFILL IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. PLACE BACKFILL WITHIN 3'-0" (1m) OF THE BACK OF THE WALL WITH HAND OPERATED EQUIPMENT. DO NOT OPERATE HEAVY EARTH MOVING EQUIPMENT WITHIN 10'-0" (3m) OF THE BACK OF WALL.

WHEN A CONSTRUCTION JOINT IS LOCATED AT THE BASE OF THE WALL, IN SECTION, PROVIDE A MINIMUM OF 3-#4 DOWELS AT AN EQUAL SPACING. SPACE ALL DOWELS AT 1'-6" (460mm) CENTERS ALONG THE LENGTH OF THE WALL.

SEE PREVIOUS SHEET(S) FOR PLAN AND PROFILE VIEW (WALL ENVELOPE) AND PROPOSED ELEVATIONS FOR GRAVITY RETAINING WALL(S).

FOR WALL WITH HANDRAIL, USE SLEEVES IN ACCORDANCE WITH HANDRAIL DETAIL SHOWN IN ROADWAY PLANS

PROJECT NO.: R-3833A
IREDELL **COUNTY**
STATION: 41+97.00 -L- TO 42+71.00 -L-
SHEET 2 OF 4

PREPARED BY: J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY: S.C. CLARK	DATE: 5/08

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE

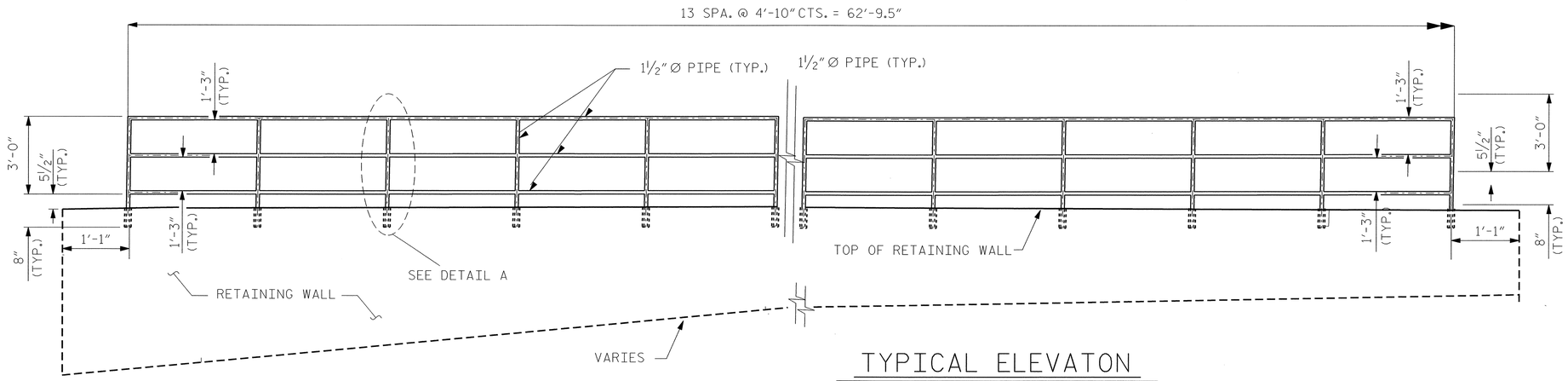
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

GRAVITY RETAINING WALL #2

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

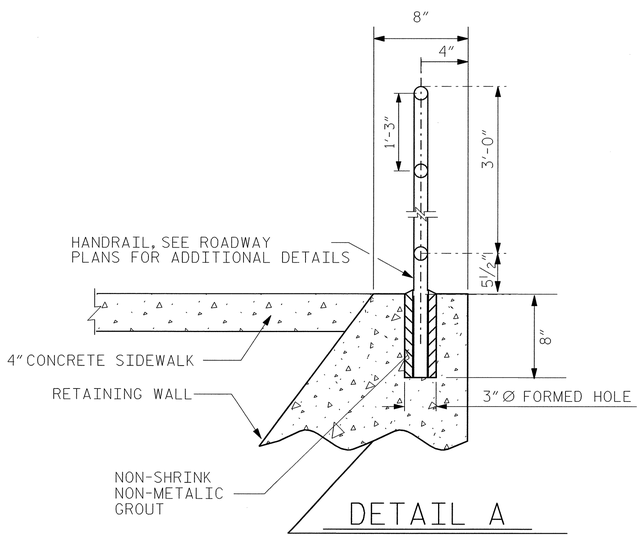
R-3833A 2-S

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK	
S. Clark 6/30/08	
SIGNATURE DATE	SIGNATURE DATE

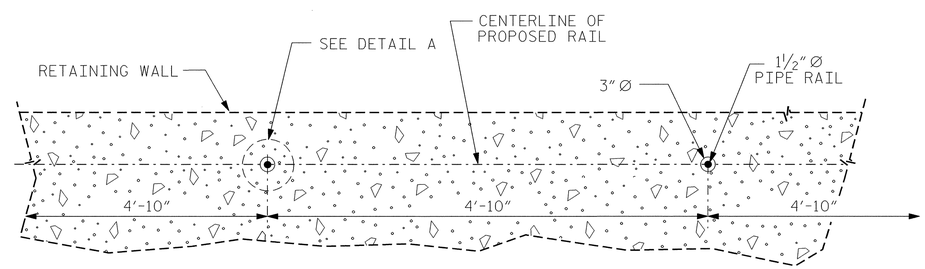


TYPICAL ELEVATON

NTS



DETAIL A



PLAN VIEW

PROJECT NO.: R-3833A

IREDELL ***COUNTY***

STATION: 41+97.00 -L- TO 42+71.00 -L-

SHEET 3 OF 4

GEOTECHNICAL ENGINEERING UNIT

☐ ***EASTERN REGIONAL OFFICE***

☒ ***WESTERN REGIONAL OFFICE***

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

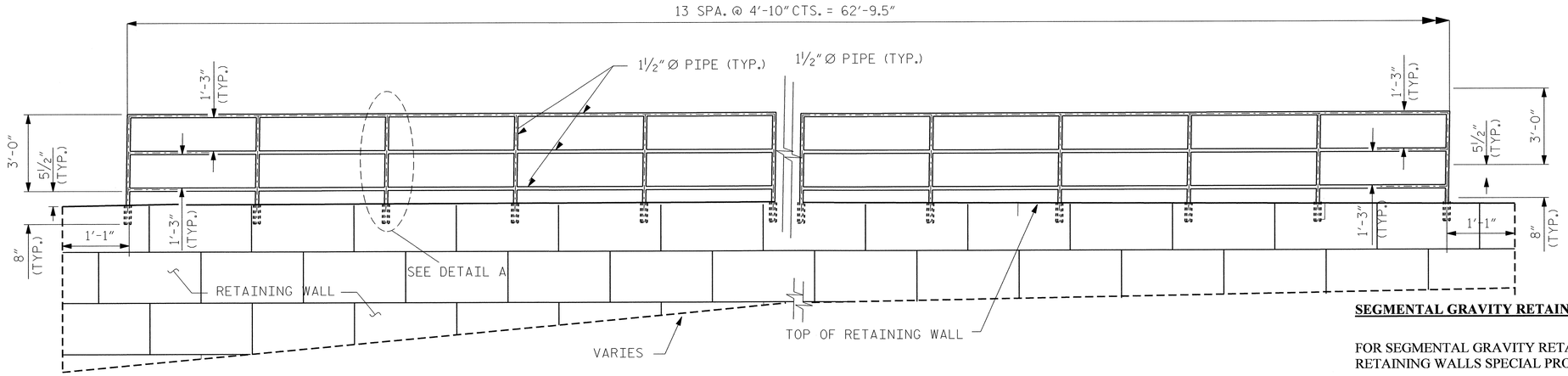
GRAVITY RETAINING WALL #2

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

PREPARED BY:	J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY:	S.C. CLARK	DATE: 5/08

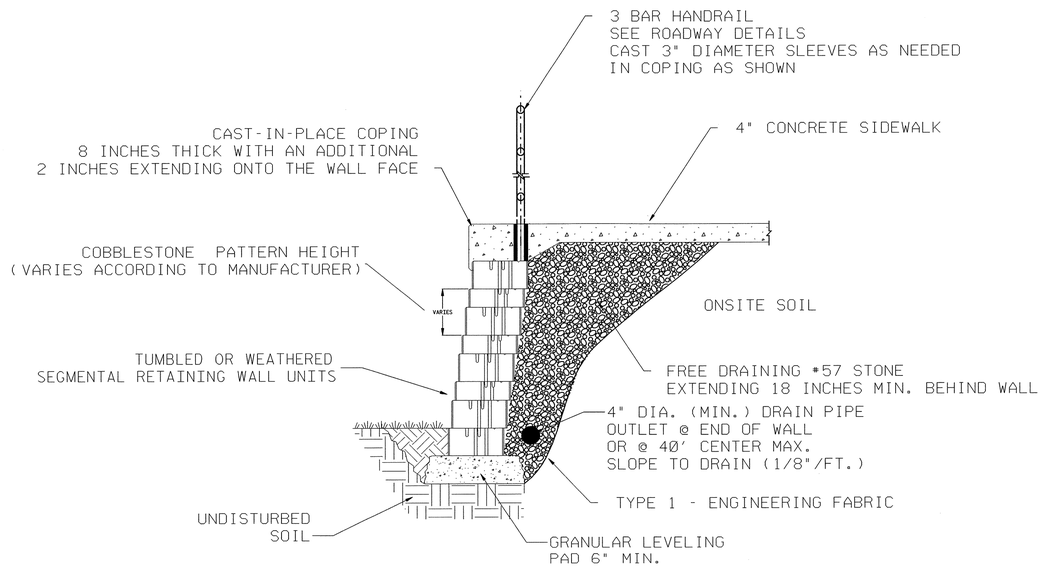
R-3833A 2-T

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK — SIGNATURE: S.C. Clark DATE: 6/3/08	SIGNATURE / DATE



TYPICAL ELEVATON

NTS



TYPICAL WALL DETAIL

NTS

SEGMENTAL GRAVITY RETAINING WALL NOTES

FOR SEGMENTAL GRAVITY RETAINING WALLS, SEE SEGMENTAL GRAVITY RETAINING WALLS SPECIAL PROVISION.

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DESIGN RETAINING WALL FOR A WALL HEIGHT EQUAL TO THE DESIGN HEIGHT (DIFFERENCE BETWEEN GRADE ELEVATION AND BOTTOM OF WALL ELEVATION) PLUS EMBEDMENT (DIFFERENCE BETWEEN BOTTOM OF WALL ELEVATION AND TOP OF LEVELING PAD ELEVATION).

DESIGN RETAINING WALL FOR THE FOLLOWING:
1) MINIMUM SERVICE LIFE = 75 YEARS
2) ALLOWABLE BEARING CAPACITY = 2000 PSF

IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF (kPa)
BACKFILL	110	32	0
FOUNDATION	110	30	0

DO NOT PLACE STONE BACKFILL FOR THE LEVELING PAD FOR RETAINING WALL UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

PROJECT NO.: R-3833A

IREDELL ***COUNTY***

STATION: 41+97.00 -L- TO 42+71.00 -L-

SHEET 4 OF 4

GEOTECHNICAL ENGINEERING UNIT

☐ *EASTERN REGIONAL OFFICE*

☒ *WESTERN REGIONAL OFFICE*

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SEGMENTAL GRAVITY RETAINING WALL #2

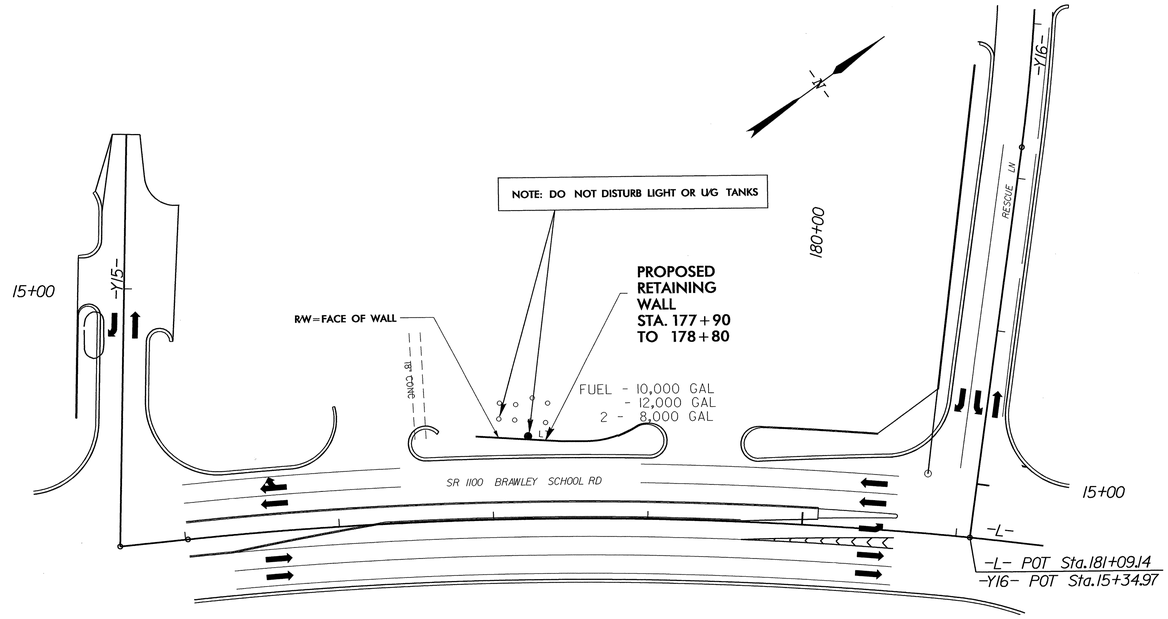
REVISIONS							SHEET NO.
NO.	BY	DATE	NO.	BY	DATE		
1	-	-	3	-	-		TOTAL SHEETS
2	-	-	4	-	-		

PREPARED BY:	J.T. WILLIAMS	DATE:	11/16/07
REVIEWED BY:	S.C. CLARK	DATE:	5/08

R-3833A 2-U

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK — SIGNATURE 6/30/16 DATE	SIGNATURE DATE

BM - 9 RR SPIKE IN ROOT OF 18" BEECH TREE STA. 179+79.00 -L- 538.00' LT.
EL. = 837.75' N 671236 E 1439068



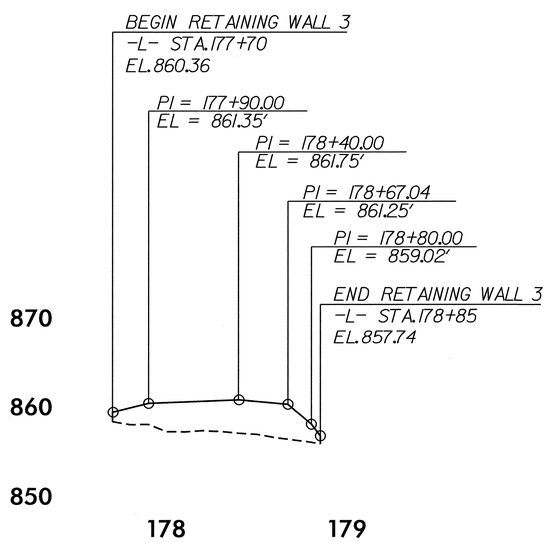
LOCATION SKETCH

GRAVITY RETAINING WALL ELEVATIONS					
-L- STA	OFFSET FROM ℄ (LEFT)	ELEV @ TOP OF WALL	* PROPOSED FINISHED GRADE	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
177+90.00	53.94	858.65	858.65	1.52	1.02
178+10.00	52.25	859.26	858.10	2.22	1.72
178+40.00	50.37	859.67	858.03	3.24	2.74
178+55.00	50.03	859.45	850.83	3.65	3.15
178+70.00	50.91	858.68	851.73	2.59	2.09
178+80.00	50.91	857.11	857.11	2.59	2.09

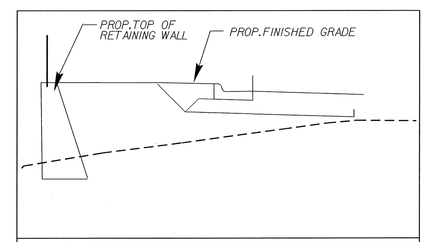
* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH

** FOR DESIGN WALL HEIGHT "H", SEE STANDARD DRAWING No. 453.01

-L-
SR 1100 BRAWLEY SCHOOL RD.
RETAINING WALL 3



TOTAL STRUCTURE QUANTITIES		
GRAVITY RETAINING WALLS	359	SQ. FT.
PEDESTRIAN HANDRAIL	111.16	LIN. FT.



SECTION A

NOTES

THE CONTRACTOR HAS THE CHOICE OF TWO GRAVITY RETAINING WALL TYPES FOR WALLS 1-5, THE NCDOT STANDARD WALL OR A SEGMENTAL GRAVITY WALL, SEE APPLICABLE STANDARDS OR PROVISIONS.

IF THE NCDOT STANDARD GARVITY WALL IS SELECTED, NO BRICK VENEER WILL BE REQUIRED.

ONLY ONE WALL TYPE WILL BE ALLOWED FOR THESE WALLS, UNLESS APPROVED BY THE ENGINEER.

THREE RAIL PEDESTIAN HANDRAIL REQUIRED

PROJECT NO.: R-3833A
IREDELL COUNTY
STATION: 177+90.00 -L- TO 178+80.00 -L-
SHEET 1 OF 4

PREPARED BY:	J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY:	S.C. CLARK	DATE: 5/08

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE

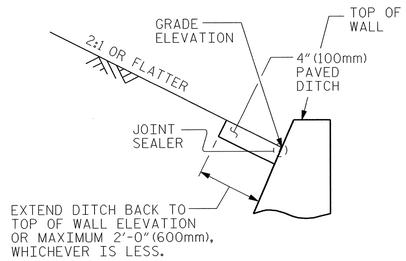
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GRAVITY RETAINING WALL #3

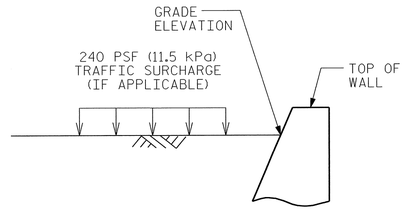
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

R-3833A 2-V

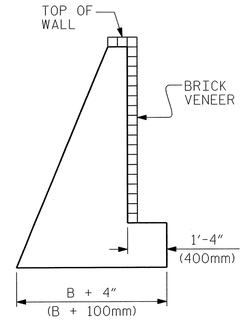
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK — SIGNATURE S. Clark DATE 6/5/16	SIGNATURE DATE



SLOPE CONDITION

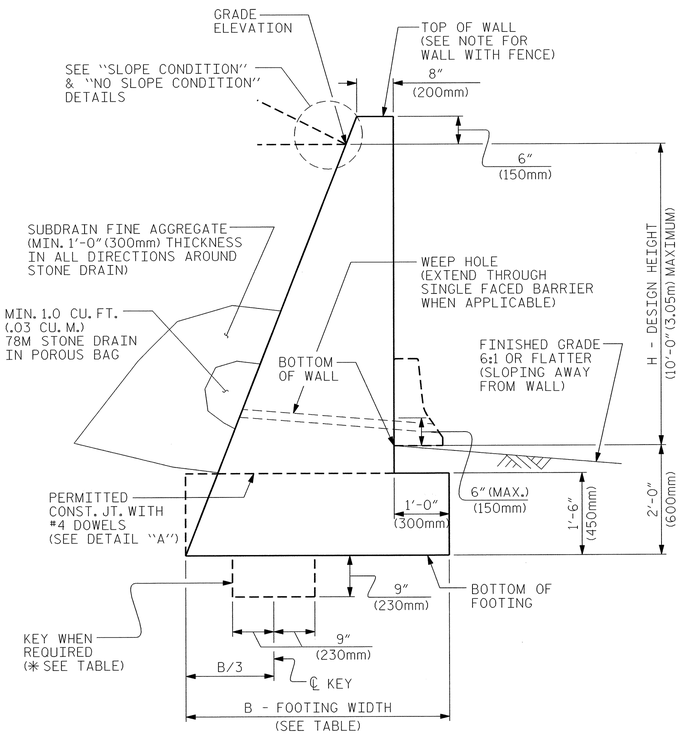


NO SLOPE CONDITION

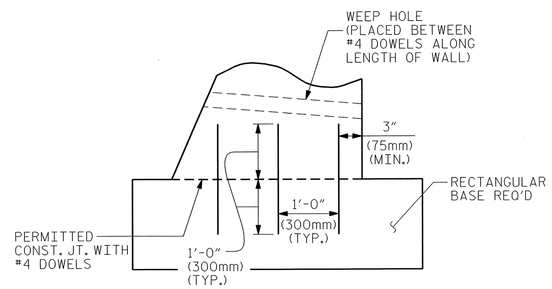


BRICK VENEER DETAIL

(WHEN APPLICABLE)



TYPICAL SECTION



DETAIL "A"

H + 2 (ft)	< 6	6 - 9	> 9 - 12
H + 0.6 (m)	< 1.83	1.83 - 2.74	> 2.74 - 3.65
NO SLOPE CONDITION WITHOUT TRAFFIC SURCHARGE	.60	.60	.60
NO SLOPE CONDITION WITH TRAFFIC SURCHARGE	.80	.75 *	.70 *
SLOPE CONDITION	.66	.70 *	.75 *

B/(H + 2) RATIO

* KEY IS REQUIRED FOR SLOPE CONDITION OR NO SLOPE CONDITION WITH TRAFFIC SURCHARGE WHEN H + 2ft (H + 0.6m) IS 6'-0" (1.83m) OR GREATER.

NOTES

FOR GRAVITY RETAINING WALLS, SEE SECTION 453 OF THE STANDARD SPECIFICATIONS.

THE STANDARD GRAVITY RETAINING WALL IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 kN/m³)
COHESION = 0 PSF (0 kPa)
FRICTION ANGLE = 35 DEGREES
(GROUNDWATER WITHIN 5'-0" (1.5m) OF BOTTOM OF FOOTING)
FRICTION ANGLE = 30 DEGREES
(GROUNDWATER MORE THAN 5'-0" (1.5m) BELOW BOTTOM OF FOOTING)

DO NOT USE A STANDARD GRAVITY RETAINING WALL IF THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF FOOTING.

DO NOT USE A STANDARD GRAVITY RETAINING WALL WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE WALL.

DO NOT PLACE CONCRETE UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND CHECKING FOUNDATION MATERIAL FOR IN-SITU ASSUMED SOIL PARAMETERS.

USE CLASS "A" CONCRETE AND PROVIDE CLASS I SURFACE FINISH FOR ALL EXPOSED SURFACES.

PROVIDE 3" (75mm) DIAMETER WEEP HOLES ON 10'-0" (3m) CENTERS ALONG WALL. SLOPE WEEP HOLES ON A 1" (25mm) PER FOOT (300mm) SLOPE THROUGH THE WALL SO THAT WATER DRAINS OUT OF THE FRONT OF THE WALL.

CONSTRUCT A HORIZONTAL DRAIN IN SUBDRAIN FINE AGGREGATE AT LEAST 1'-0" (300mm) TALL AND 1'-0" (300mm) WIDE TO CONNECT ALL STONE DRAINS.

PROVIDE GROOVED CONTRACTION JOINTS EVERY 10'-0" (3m) AND EXPANSION JOINTS EVERY 30'-0" (9m) ALONG THE WALL.

FOR WALL WITH SURFACE VENEER, SUBMIT VENEER SAMPLES TO THE ENGINEER FOR APPROVAL BEFORE BEGINNING CONSTRUCTION. ANCHOR SURFACE VENEER TO CONCRETE RETAINING WALL WITH APPROPRIATE CONCRETE TYPE ANCHORS ACCORDING TO MANUFACTURER'S SPECIFICATIONS WITH A MINIMUM VERTICAL SPACING OF 1'-4" (400mm) AND A MINIMUM HORIZONTAL SPACING OF 2'-8" (800mm) WITH EACH ROW STAGGERED 1'-4" (400mm) FROM THE ROW OF ANCHORS ABOVE AND BELOW.

DO NOT BACKFILL BEHIND WALL UNTIL CONCRETE DEVELOPS A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI (20.7 MPa). COMPACT BACKFILL IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. PLACE BACKFILL WITHIN 3'-0" (1m) OF THE BACK OF THE WALL WITH HAND OPERATED EQUIPMENT. DO NOT OPERATE HEAVY EARTH MOVING EQUIPMENT WITHIN 10'-0" (3m) OF THE BACK OF WALL.

WHEN A CONSTRUCTION JOINT IS LOCATED AT THE BASE OF THE WALL, IN SECTION, PROVIDE A MINIMUM OF 3-#4 DOWELS AT AN EQUAL SPACING. SPACE ALL DOWELS AT 1'-6" (460mm) CENTERS ALONG THE LENGTH OF THE WALL.

SEE PREVIOUS SHEET(S) FOR PLAN AND PROFILE VIEW (WALL ENVELOPE) AND PROPOSED ELEVATIONS FOR GRAVITY RETAINING WALL(S).

FOR WALL WITH FENCE, USE SLEEVES IN ACCORDANCE WITH SECTION 866 OF THE STANDARD SPECIFICATIONS FOR FENCE POSTS, OR SUBMIT FENCE POST ANCHOR PLATE DETAILS.

PROJECT NO.: R-3833A
IREDELL **COUNTY**
STATION: 177+90.00 -L- TO 178+80.00 -L-
SHEET 2 OF 4

PREPARED BY:	J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY:	S.C. CLARK	DATE: 5/08

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE

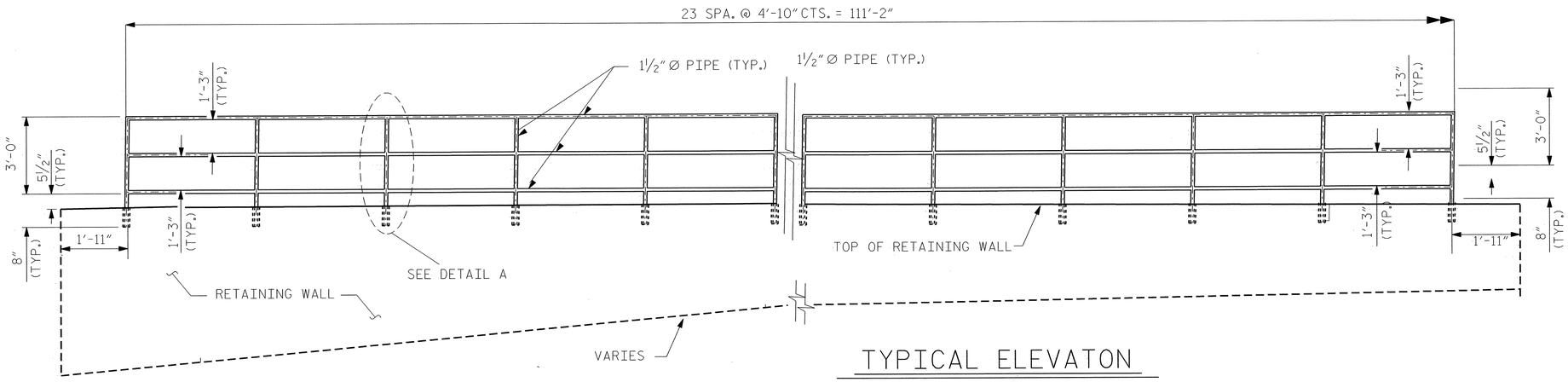
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

GRAVITY RETAINING WALL #3

REVISIONS							SHEET NO.
NO.	BY	DATE	NO.	BY	DATE		TOTAL SHEETS
1	-	-	3	-	-		
2	-	-	4	-	-		

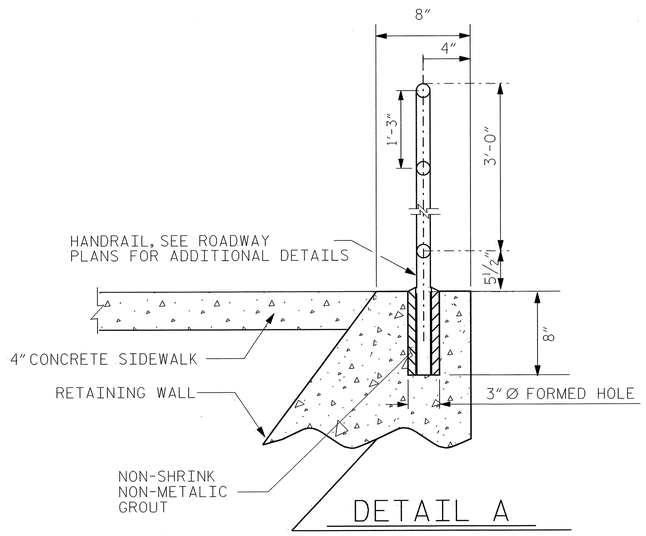
R-3833A 2-W

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK	
SIGNATURE DATE	SIGNATURE DATE

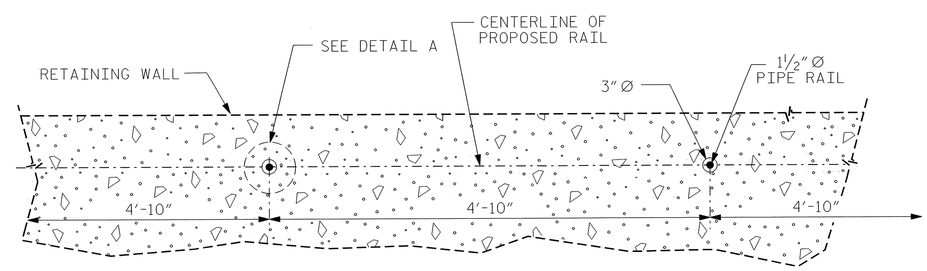


TYPICAL ELEVATON

NTS



DETAIL A



PLAN VIEW

PROJECT NO.: R-3833A

IREDELL **COUNTY**

STATION: 211+05.00 -L- TO 211+85.00 -L-

SHEET 3 OF 4

GEOTECHNICAL ENGINEERING UNIT

☐ EASTERN REGIONAL OFFICE

☒ WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

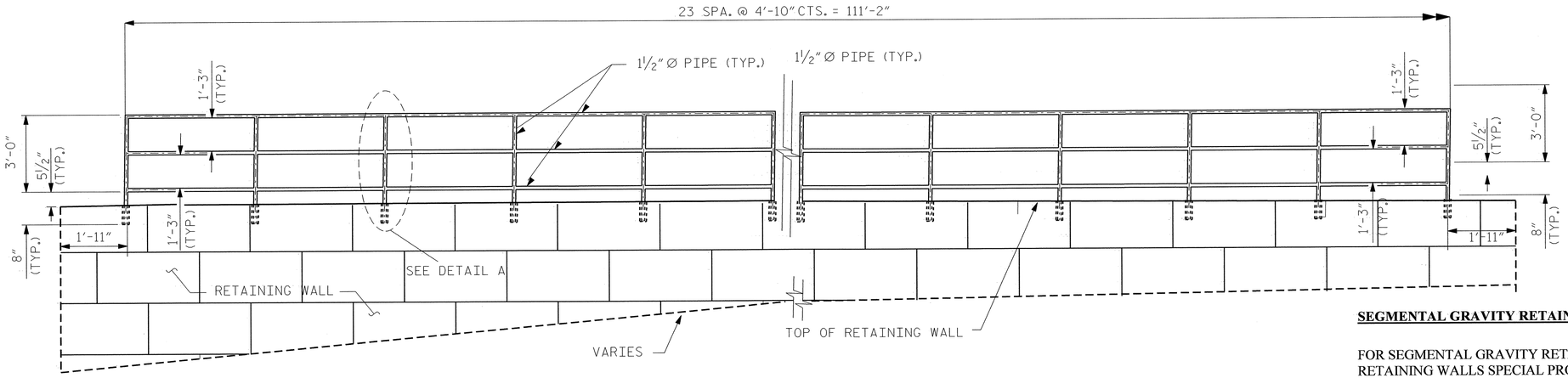
GRAVITY RETAINING WALL #3

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

PREPARED BY:	J.T. WILLIAMS	DATE:	11/16/07
REVIEWED BY:	S.C. CLARK	DATE:	5/08

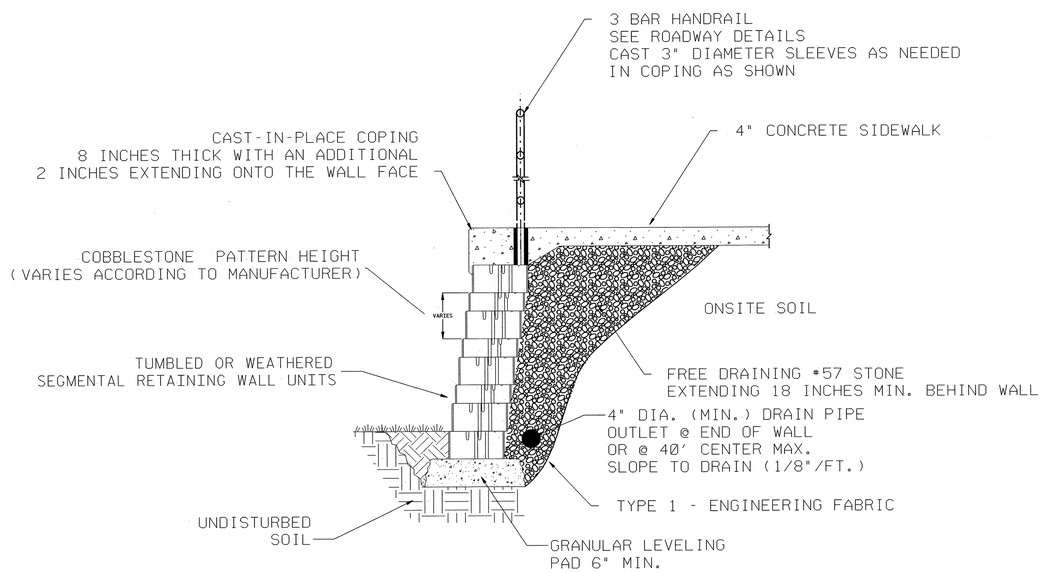
R-3833A 2-X

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK — SIGNATURE 6/2018 DATE	SIGNATURE DATE



TYPICAL ELEVATON

NTS



TYPICAL WALL DETAIL

NTS

SEGMENTAL GRAVITY RETAINING WALL NOTES

FOR SEGMENTAL GRAVITY RETAINING WALLS, SEE SEGMENTAL GRAVITY RETAINING WALLS SPECIAL PROVISION.

CAST-IN-PLACE CONCRETE COPING IS REQUIRED. COPING AND SIDEWALK SHALL BE POURED AT THE SAME TIME. THE COPING SHALL BE REINFORCED AS NEEDED AND THE REINFORCEMENT SHALL EXTEND INTO THE SIDEWALK SLAB. CONTRACTOR IS RESPONSIBLE FOR SUBMITTING A DESIGN DETAIL WITH WALL DESIGN PACKAGE. SEE TYPICAL WALL DETAIL FOR ADDITIONAL INFORMATION.

A TUMBLED OR WEATHERED FINISH IS REQUIRED ON THE FRONT FACE OF SEGMENTAL RETAINING WALL UNITS. SUBMIT SAMPLES TO THE RESIDENT ENGINEER FOR APPORVAL PRIOR TO BEGINNING DESIGN OR ORDERING MATERIALS.

THE INDIVIDUAL SRW BLOCKS SHALL BE ASSEMBLED IN A COBBLESTONE PATTERN. SUBMIT SAMPLE PATTERN TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO BEGINNING DESIGN OR ORDERING MATERIALS

BEFORE BEGINNING WALL DESIGN FOR RETAINING WALL, SURVEY ALL EXISTING GROUND ELEVATIONS SHOWN ON THE PLANS AND SUBMIT A REVISED WALL ENVELOPE FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THIS ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL FOR A WALL HEIGHT EQUAL TO THE DESIGN HEIGHT (DIFFERENCE BETWEEN GRADE ELEVATION AND BOTTOM OF WALL ELEVATION) PLUS EMBEDMENT (DIFFERENCE BETWEEN BOTTOM OF WALL ELEVATION AND TOP OF LEVELING PAD ELEVATION).

DESIGN RETAINING WALL FOR THE FOLLOWING:
1) MINIMUM SERVICE LIFE = 75 YEARS
2) ALLOWABLE BEARING CAPACITY = 2000 PSF

IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF (kPa)
BACKFILL	110	32	0
FOUNDATION	110	30	0

DO NOT PLACE STONE BACKFILL FOR THE LEVELING PAD FOR RETAINING WALL UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

PROJECT NO.: R-3833A
IREDELL ***COUNTY***
STATION: 211+05.00 -L- TO 211+85.00 -L-

SHEET 4 OF 4

PREPARED BY:	J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY:	S.C. CLARK	DATE: 5/08

GEOTECHNICAL ENGINEERING UNIT
☐ ***EASTERN REGIONAL OFFICE***
☒ ***WESTERN REGIONAL OFFICE***

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

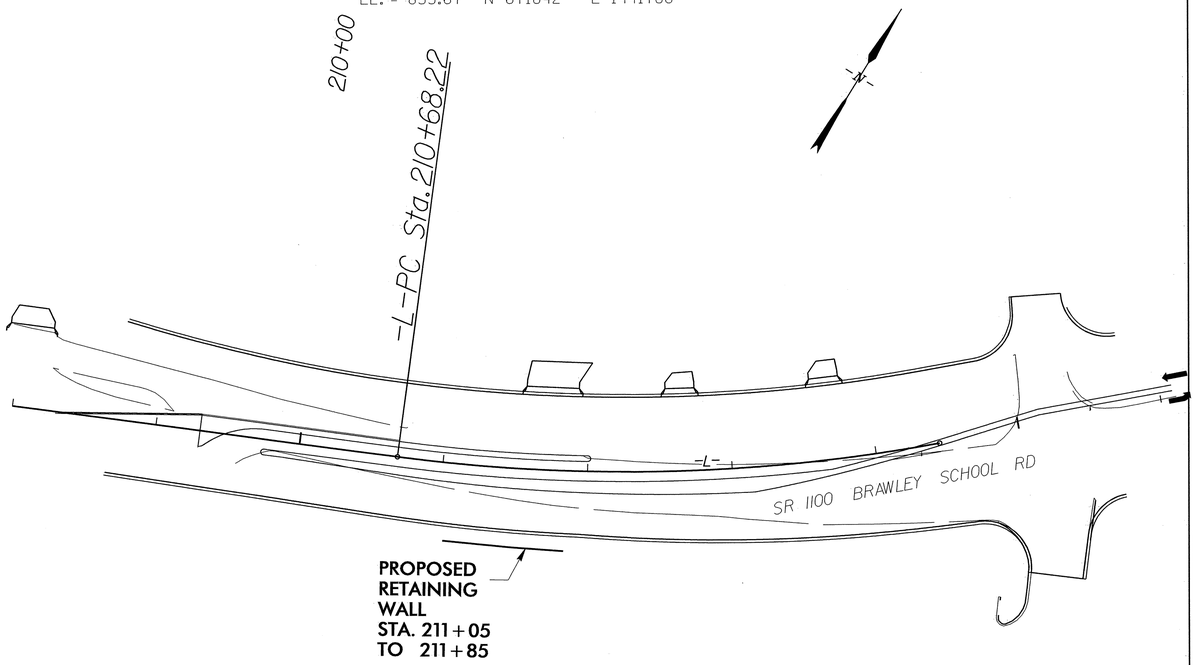
SEGMENTAL GRAVITY RETAINING WALL #3

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

R-3833A 2-Y

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK — SIGNATURE 6/30/08 DATE	SIGNATURE DATE

BM - 9 RR SPIKE SET IN EDGE OF PAVEMENT AND GUTTER AT ENTRANCE FO THE SPA FROM STRIP MALL STA. 205+65.00 -L- 201.00' RT.
EL. = 853.67' N 671842 E 1441788



LOCATION SKETCH

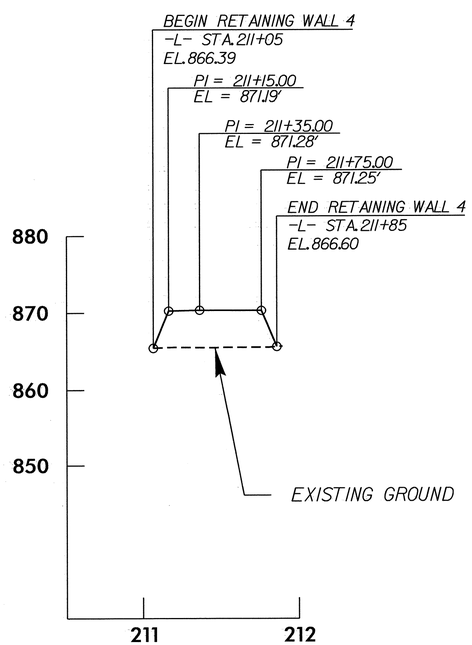
GRAVITY RETAINING WALL ELEVATIONS

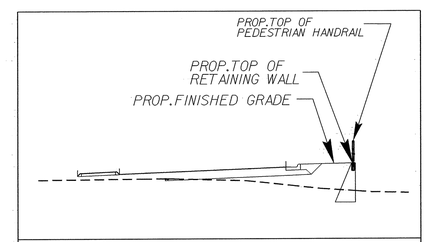
-L- STA	OFFSET FROM ℄ (RIGHT)	ELEV @ TOP OF WALL	* PROPOSED FINISHED GRADE	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
211+05.00	54.13	866.39	866.39	N/A	N/A
211+15.00	54.19	871.19	866.46	4.73	4.23
211+35.00	54.53	871.28	866.47	4.81	4.31
211+75.00	55.45	871.25	866.51	4.74	4.24
211+85.00	55.82	866.60	866.51	N/A	N/A

* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH

** FOR DESIGN WALL HEIGHT "H", SEE STANDARD DRAWING No. 453.01

-L- RETAINING WALL 4 ENVELOPE





SECTION A

TOTAL STRUCTURE QUANTITIES

GRAVITY RETAINING WALLS	333	SQ. FT.
PEDESTRIAN HANDRAIL	58	LIN. FT.

NOTES

THE CONTRACTOR HAS THE CHOICE OF TWO GRAVITY RETAINING WALL TYPES FOR WALLS 1-5, THE NCDOT STANDARD WALL OR A SEGMENTAL GRAVITY WALL, SEE APPLICABLE STANDARDS OR PROVISIONS.

IF THE NCDOT STANDARD GARVITY WALL IS SELECTED, NO BRICK VENEER WILL BE REQUIRED.

ONLY ONE WALL TYPE WILL BE ALLOWED FOR THESE WALLS, UNLESS APPROVED BY THE ENGINEER.

THREE RAIL PEDESTIAN HANDRAIL REQUIRED

PROJECT NO.: R-3833A
IREDELL COUNTY
STATION: 211+05.00 -L- TO 211+85.00 -L-
SHEET 1 OF 4

PREPARED BY:	J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY:	S.C. CLARK	DATE: 5/08

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE

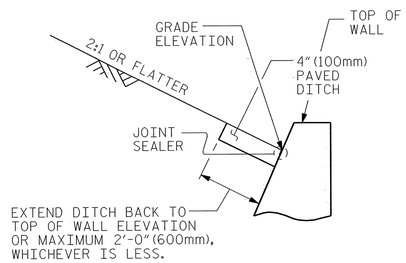
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

GRAVITY RETAINING WALL #4

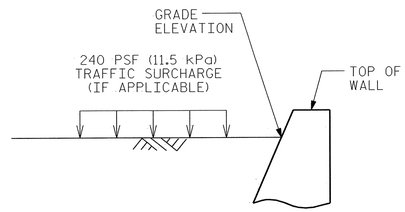
REVISIONS							SHEET NO.
NO.	BY	DATE	NO.	BY	DATE		
1	-	-	3	-	-		TOTAL SHEETS
2	-	-	4	-	-		

R-3833A 2-Z

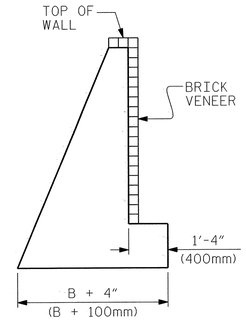
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK S. C. Clark 6/20/08 SIGNATURE DATE	SIGNATURE DATE



SLOPE CONDITION

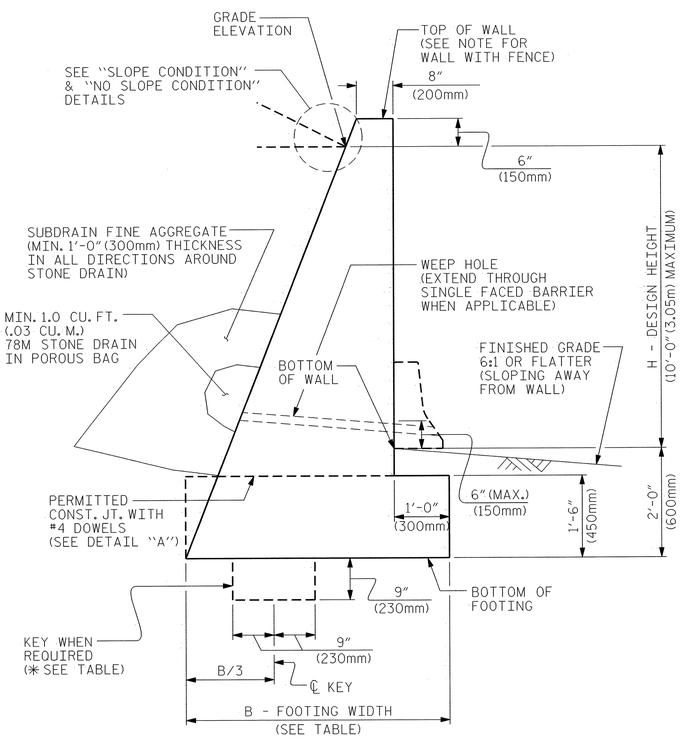


NO SLOPE CONDITION

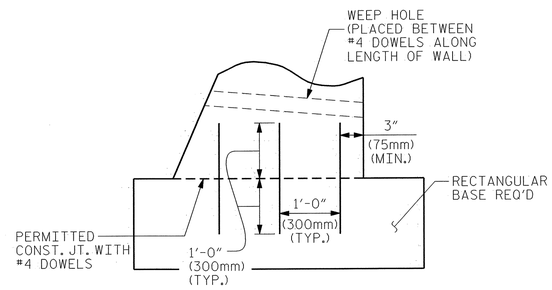


BRICK VENEER DETAIL

(WHEN APPLICABLE)



TYPICAL SECTION



DETAIL "A"

H + 2 (ft)	< 6	6 - 9	> 9 - 12
H + 0.6 (m)	< 1.83	1.83 - 2.74	> 2.74 - 3.65
NO SLOPE CONDITION WITHOUT TRAFFIC SURCHARGE	.60	.60	.60
NO SLOPE CONDITION WITH TRAFFIC SURCHARGE	.80	.75 *	.70 *
SLOPE CONDITION	.66	.70 *	.75 *

B/(H + 2) RATIO

* KEY IS REQUIRED FOR SLOPE CONDITION OR NO SLOPE CONDITION WITH TRAFFIC SURCHARGE WHEN H + 2ft (H + 0.6m) IS 6'-0" (1.83m) OR GREATER.

NOTES

FOR GRAVITY RETAINING WALLS, SEE SECTION 453 OF THE STANDARD SPECIFICATIONS.

THE STANDARD GRAVITY RETAINING WALL IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 kN/m³)
COHESION = 0 PSF (0 kPa)
FRICTION ANGLE = 35 DEGREES
(GROUNDWATER WITHIN 5'-0" (1.5m) OF BOTTOM OF FOOTING)
FRICTION ANGLE = 30 DEGREES
(GROUNDWATER MORE THAN 5'-0" (1.5m) BELOW BOTTOM OF FOOTING)

DO NOT USE A STANDARD GRAVITY RETAINING WALL IF THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF FOOTING.

DO NOT USE A STANDARD GRAVITY RETAINING WALL WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE WALL.

DO NOT PLACE CONCRETE UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND CHECKING FOUNDATION MATERIAL FOR IN-SITU ASSUMED SOIL PARAMETERS.

USE CLASS "A" CONCRETE AND PROVIDE CLASS I SURFACE FINISH FOR ALL EXPOSED SURFACES.

PROVIDE 3" (75mm) DIAMETER WEEP HOLES ON 10'-0" (3m) CENTERS ALONG WALL. SLOPE WEEP HOLES ON A 1" (25mm) PER FOOT (300mm) SLOPE THROUGH THE WALL SO THAT WATER DRAINS OUT OF THE FRONT OF THE WALL.

CONSTRUCT A HORIZONTAL DRAIN IN SUBDRAIN FINE AGGREGATE AT LEAST 1'-0" (300mm) TALL AND 1'-0" (300mm) WIDE TO CONNECT ALL STONE DRAINS.

PROVIDE GROOVED CONTRACTION JOINTS EVERY 10'-0" (3m) AND EXPANSION JOINTS EVERY 30'-0" (9m) ALONG THE WALL.

FOR WALL WITH SURFACE VENEER, SUBMIT VENEER SAMPLES TO THE ENGINEER FOR APPROVAL BEFORE BEGINNING CONSTRUCTION. ANCHOR SURFACE VENEER TO CONCRETE RETAINING WALL WITH APPROPRIATE CONCRETE TYPE ANCHORS ACCORDING TO MANUFACTURER'S SPECIFICATIONS WITH A MINIMUM VERTICAL SPACING OF 1'-4" (400mm) AND A MINIMUM HORIZONTAL SPACING OF 2'-8" (800mm) WITH EACH ROW STAGGERED 1'-4" (400mm) FROM THE ROW OF ANCHORS ABOVE AND BELOW.

DO NOT BACKFILL BEHIND WALL UNTIL CONCRETE DEVELOPS A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI (20.7 MPa). COMPACT BACKFILL IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. PLACE BACKFILL WITHIN 3'-0" (1m) OF THE BACK OF THE WALL WITH HAND OPERATED EQUIPMENT. DO NOT OPERATE HEAVY EARTH MOVING EQUIPMENT WITHIN 10'-0" (3m) OF THE BACK OF WALL.

WHEN A CONSTRUCTION JOINT IS LOCATED AT THE BASE OF THE WALL, IN SECTION, PROVIDE A MINIMUM OF 3-#4 DOWELS AT AN EQUAL SPACING. SPACE ALL DOWELS AT 1'-6" (460mm) CENTERS ALONG THE LENGTH OF THE WALL.

SEE PREVIOUS SHEET(S) FOR PLAN AND PROFILE VIEW (WALL ENVELOPE) AND PROPOSED ELEVATIONS FOR GRAVITY RETAINING WALL(S).

FOR WALL WITH HANDRAIL, USE SLEEVES IN ACCORDANCE WITH HANDRAIL DETAIL SHOWN IN ROADWAY PLANS

PROJECT NO.: R-3833A
IREDELL **COUNTY**
STATION: 211+05.00 -L- TO 211+85.00 -L-
SHEET 2 OF 4

PREPARED BY: J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY: S.C. CLARK	DATE: 5/08

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE

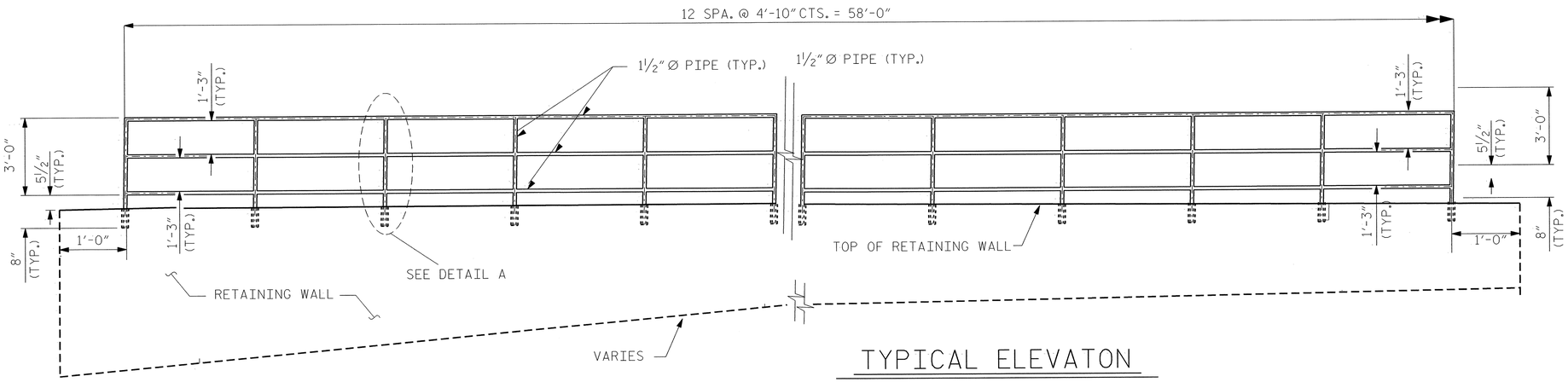
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

GRAVITY RETAINING WALL #4

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

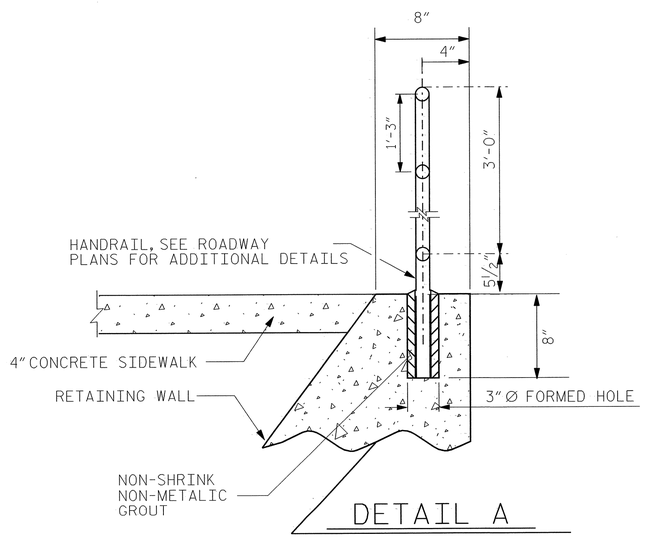
R-3833A 2-AA

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK — SIGNATURE 6/30/08 DATE	SIGNATURE DATE

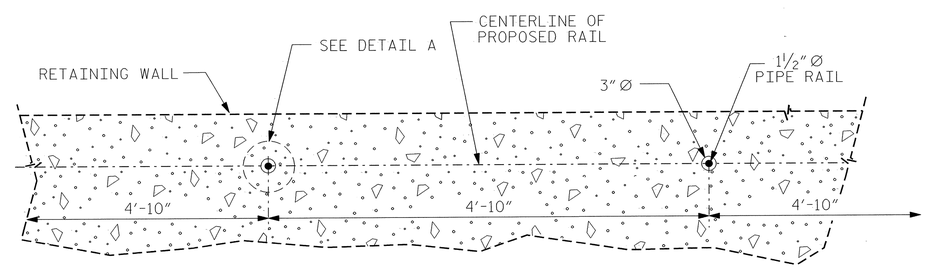


TYPICAL ELEVATON

NTS



DETAIL A



PLAN VIEW

PROJECT NO.: R-3833A

IREDELL *COUNTY*

STATION: 211+05.00 -L- TO 211+85.00 -L-

SHEET 3 OF 4

GEOTECHNICAL ENGINEERING UNIT

☐ *EASTERN REGIONAL OFFICE*

☒ *WESTERN REGIONAL OFFICE*

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

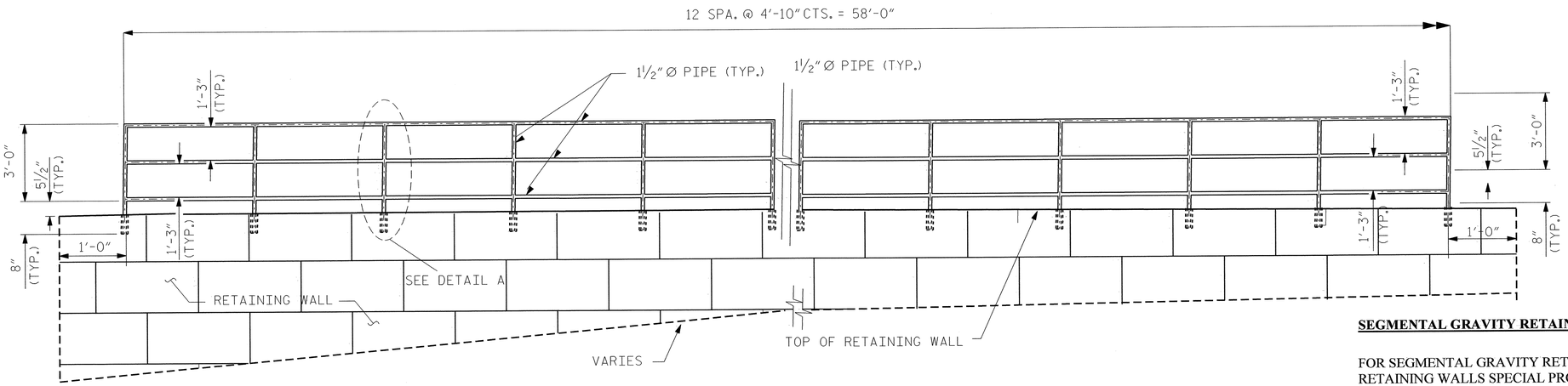
GRAVITY RETAINING WALL #4

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

PREPARED BY:	J.T. WILLIAMS	DATE:	11/16/07
REVIEWED BY:	S.C. CLARK	DATE:	5/08

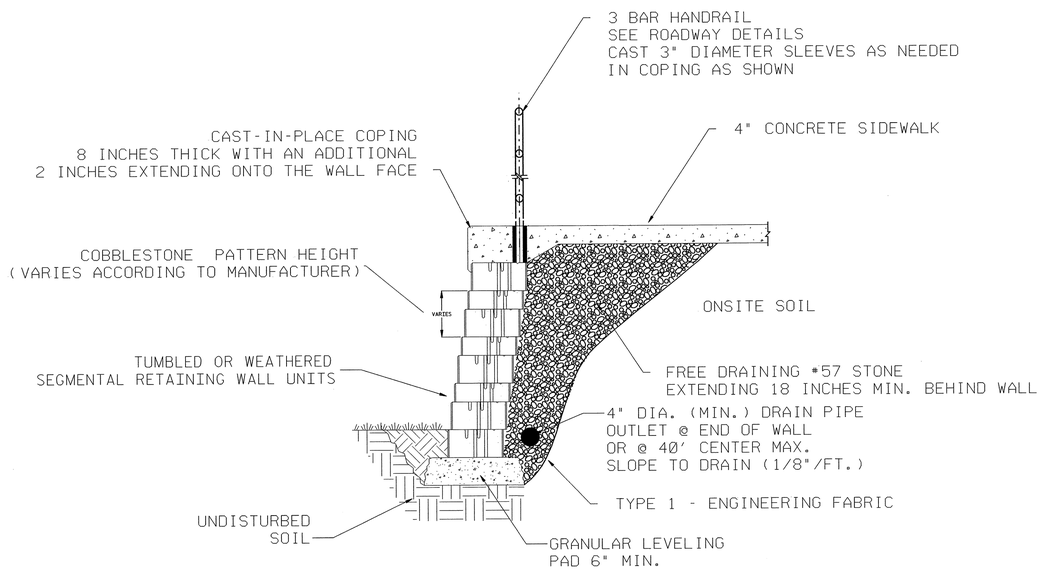
R-3833A 2-BB

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK — SIGNATURE 6/20/08 DATE	SIGNATURE DATE



TYPICAL ELEVATON

NTS



TYPICAL WALL DETAIL

NTS

SEGMENTAL GRAVITY RETAINING WALL NOTES

FOR SEGMENTAL GRAVITY RETAINING WALLS, SEE SEGMENTAL GRAVITY RETAINING WALLS SPECIAL PROVISION.

CAST-IN-PLACE CONCRETE COPING IS REQUIRED. COPING AND SIDEWALK SHALL BE POURED AT THE SAME TIME. THE COPING SHALL BE REINFORCED AS NEEDED AND THE REINFORCEMENT SHALL EXTEND INTO THE SIDEWALK SLAB. CONTRACTOR IS RESPONSIBLE FOR SUBMITTING A DESIGN DETAIL WITH WALL DESIGN PACKAGE. SEE TYPICAL WALL DETAIL FOR ADDITIONAL INFORMATION.

A TUMBLED OR WEATHERED FINISH IS REQUIRED ON THE FRONT FACE OF SEGMENTAL RETAINING WALL UNITS. SUBMIT SAMPLES TO THE RESIDENT ENGINEER FOR APPORVAL PRIOR TO BEGINNING DESIGN OR ORDERING MATERIALS.

THE INDIVIDUAL SRW BLOCKS SHALL BE ASSEMBLED IN A COBBLESTONE PATTERN. SUBMIT SAMPLE PATTERN TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO BEGINNING DESIGN OR ORDERING MATERIALS

BEFORE BEGINNING WALL DESIGN FOR RETAINING WALL, SURVEY ALL EXISTING GROUND ELEVATIONS SHOWN ON THE PLANS AND SUBMIT A REVISED WALL ENVELOPE FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THIS ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL FOR A WALL HEIGHT EQUAL TO THE DESIGN HEIGHT (DIFFERENCE BETWEEN GRADE ELEVATION AND BOTTOM OF WALL ELEVATION) PLUS EMBEDMENT (DIFFERENCE BETWEEN BOTTOM OF WALL ELEVATION AND TOP OF LEVELING PAD ELEVATION).

DESIGN RETAINING WALL FOR THE FOLLOWING:
1) MINIMUM SERVICE LIFE = 75 YEARS
2) ALLOWABLE BEARING CAPACITY = 2000 PSF

IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF (kPa)
BACKFILL	110	32	0
FOUNDATION	110	30	0

DO NOT PLACE STONE BACKFILL FOR THE LEVELING PAD FOR RETAINING WALL UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

PROJECT NO.: R-3833A
IREDELL ***COUNTY***
STATION: 211+05.00 -L- TO 211+85.00 -L-
SHEET 4 OF 4

PREPARED BY:	J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY:	S.C. CLARK	DATE: 5/08

GEOTECHNICAL ENGINEERING UNIT
☐ ***EASTERN REGIONAL OFFICE***
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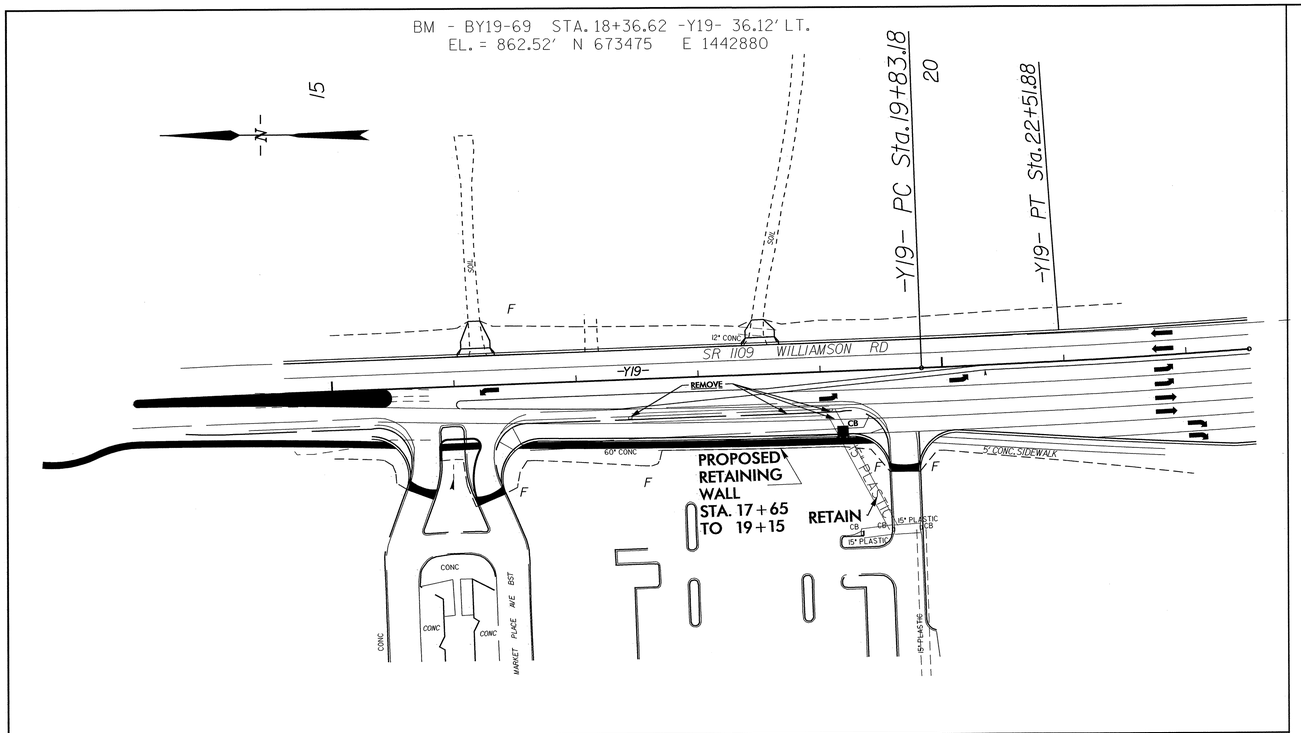
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SEGMENTAL GRAVITY RETAINING WALL #4

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

R-3833A 2-CC

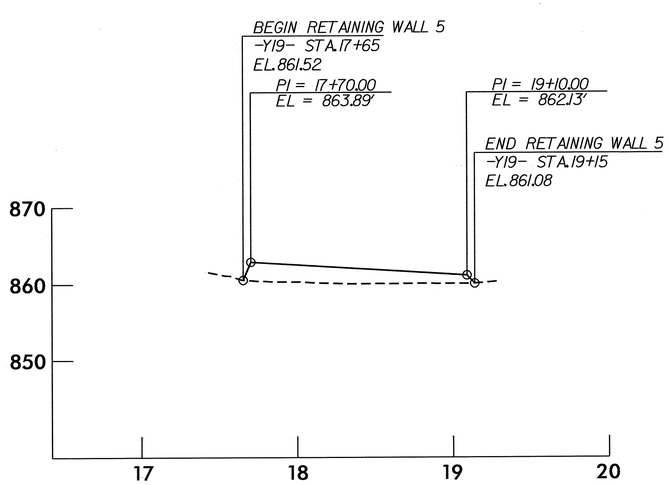
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK	
S. Clark 4/24/08	
SIGNATURE DATE	SIGNATURE DATE



LOCATION SKETCH

-Y19-

RETAINING WALL 5 ENVELOPE



GRAVITY RETAINING WALL ELEVATIONS

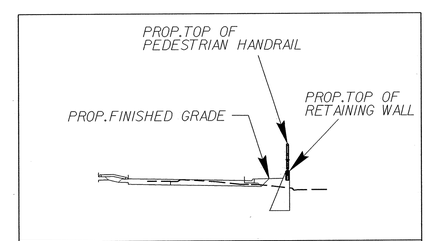
-Y19- STA	OFFSET FROM ℄ (RIGHT)	ELEV @ TOP OF WALL	* EXISTING GROUND	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
17+65	58.94	861.52	861.52	N/A	N/A
17+70.00	59.04	863.89	861.45	2.44	1.94
19+10.00	61.67	862.13	861.05	1.08	.58
19+15.00	61.74	861.08	861.08	N/A	N/A

* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH

** FOR DESIGN WALL HEIGHT "H", SEE STANDARD DRAWING No. 453.01

TOTAL STRUCTURE QUANTITIES

GRAVITY RETAINING WALLS	270	SQ. FT.
PEDESTRIAN HANDRAIL	135.34	LIN. FT.



SECTION A

NOTES

THE CONTRACTOR HAS THE CHOICE OF TWO GRAVITY RETAINING WALL TYPES FOR WALLS 1-5, THE NCDOT STANDARD WALL OR A SEGMENTAL GRAVITY WALL, SEE APPLICABLE STANDARDS OR PROVISIONS.

IF THE NCDOT STANDARD GARVITY WALL IS SELECTED, NO BRICK VENEER WILL BE REQUIRED.

ONLY ONE WALL TYPE WILL BE ALLOWED FOR THESE WALLS, UNLESS APPROVED BY THE ENGINEER.

THREE RAIL PEDESTIAN HANDRAIL REQUIRED

PROJECT NO.: R-3833A
IREDELL **COUNTY**
STATION: 17+65.00 -Y19- TO 19+15.00 -Y19-
SHEET 1 OF 4

PREPARED BY:	J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY:	S.C. CLARK	DATE: 5/08

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
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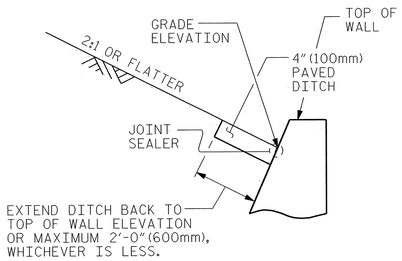
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

GRAVITY RETAINING WALL #5

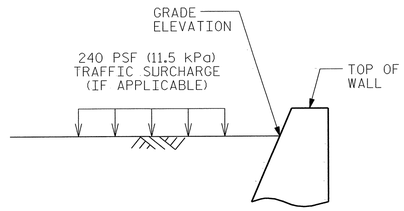
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

R-3833A 2-DD

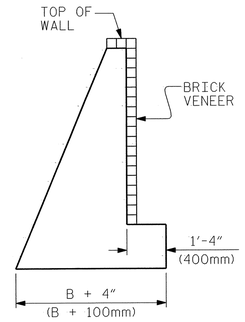
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK — SIGNATURE 6/3/08 DATE	SIGNATURE DATE



SLOPE CONDITION

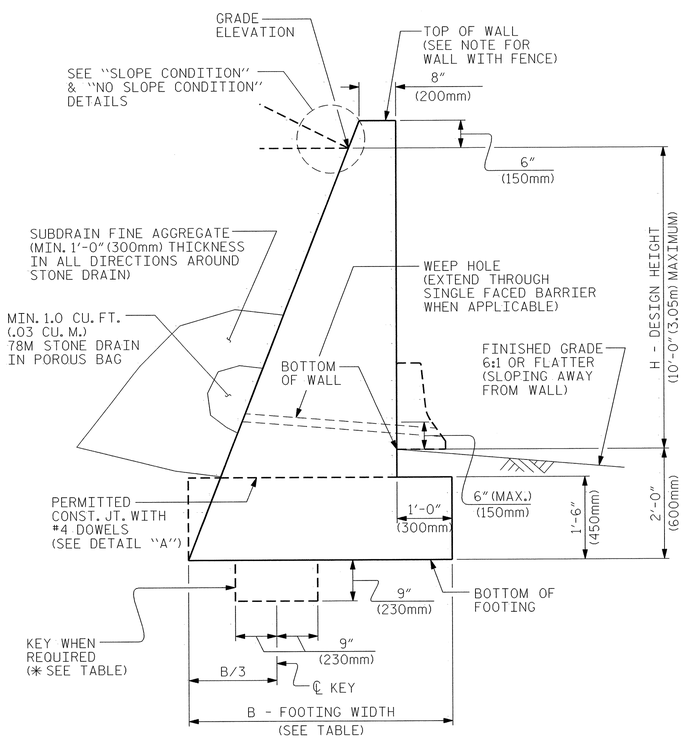


NO SLOPE CONDITION

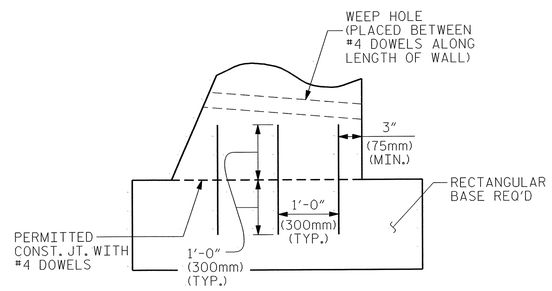


BRICK VENEER DETAIL

(WHEN APPLICABLE)



TYPICAL SECTION



DETAIL "A"

H + 2 (ft)	< 6	6 - 9	> 9 - 12
H + 0.6 (m)	< 1.83	1.83 - 2.74	> 2.74 - 3.65
NO SLOPE CONDITION WITHOUT TRAFFIC SURCHARGE	.60	.60	.60
NO SLOPE CONDITION WITH TRAFFIC SURCHARGE	.80	.75 *	.70 *
SLOPE CONDITION	.66	.70 *	.75 *

B/(H + 2) RATIO

* KEY IS REQUIRED FOR SLOPE CONDITION OR NO SLOPE CONDITION WITH TRAFFIC SURCHARGE WHEN H + 2ft (H + 0.6m) IS 6'-0" (1.83m) OR GREATER.

NOTES

FOR GRAVITY RETAINING WALLS, SEE SECTION 453 OF THE STANDARD SPECIFICATIONS.

THE STANDARD GRAVITY RETAINING WALL IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 kN/m3)
COHESION = 0 PSF (0 kPa)
FRICTION ANGLE = 35 DEGREES
(GROUNDWATER WITHIN 5'-0" (1.5m) OF BOTTOM OF FOOTING)
FRICTION ANGLE = 30 DEGREES
(GROUNDWATER MORE THAN 5'-0" (1.5m) BELOW BOTTOM OF FOOTING)

DO NOT USE A STANDARD GRAVITY RETAINING WALL IF THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF FOOTING.

DO NOT USE A STANDARD GRAVITY RETAINING WALL WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE WALL.

DO NOT PLACE CONCRETE UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND CHECKING FOUNDATION MATERIAL FOR IN-SITU ASSUMED SOIL PARAMETERS.

USE CLASS "A" CONCRETE AND PROVIDE CLASS I SURFACE FINISH FOR ALL EXPOSED SURFACES.

PROVIDE 3" (75mm) DIAMETER WEEP HOLES ON 10'-0" (3m) CENTERS ALONG WALL. SLOPE WEEP HOLES ON A 1" (25mm) PER FOOT (300mm) SLOPE THROUGH THE WALL SO THAT WATER DRAINS OUT OF THE FRONT OF THE WALL.

CONSTRUCT A HORIZONTAL DRAIN IN SUBDRAIN FINE AGGREGATE AT LEAST 1'-0" (300mm) TALL AND 1'-0" (300mm) WIDE TO CONNECT ALL STONE DRAINS.

PROVIDE GROOVED CONTRACTION JOINTS EVERY 10'-0" (3m) AND EXPANSION JOINTS EVERY 30'-0" (9m) ALONG THE WALL.

FOR WALL WITH SURFACE VENEER, SUBMIT VENEER SAMPLES TO THE ENGINEER FOR APPROVAL BEFORE BEGINNING CONSTRUCTION. ANCHOR SURFACE VENEER TO CONCRETE RETAINING WALL WITH APPROPRIATE CONCRETE TYPE ANCHORS ACCORDING TO MANUFACTURER'S SPECIFICATIONS WITH A MINIMUM VERTICAL SPACING OF 1'-4" (400mm) AND A MINIMUM HORIZONTAL SPACING OF 2'-8" (800mm) WITH EACH ROW STAGGERED 1'-4" (400mm) FROM THE ROW OF ANCHORS ABOVE AND BELOW.

DO NOT BACKFILL BEHIND WALL UNTIL CONCRETE DEVELOPS A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI (20.7 MPa). COMPACT BACKFILL IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. PLACE BACKFILL WITHIN 3'-0" (1m) OF THE BACK OF THE WALL WITH HAND OPERATED EQUIPMENT. DO NOT OPERATE HEAVY EARTH MOVING EQUIPMENT WITHIN 10'-0" (3m) OF THE BACK OF WALL.

WHEN A CONSTRUCTION JOINT IS LOCATED AT THE BASE OF THE WALL, IN SECTION, PROVIDE A MINIMUM OF 3-#4 DOWELS AT AN EQUAL SPACING. SPACE ALL DOWELS AT 1'-6" (460mm) CENTERS ALONG THE LENGTH OF THE WALL.

SEE PREVIOUS SHEET(S) FOR PLAN AND PROFILE VIEW (WALL ENVELOPE) AND PROPOSED ELEVATIONS FOR GRAVITY RETAINING WALL(S).

FOR WALL WITH HANDRAIL, USE SLEEVES IN ACCORDANCE WITH HANDRAIL DETAIL SHOWN IN ROADWAY PLANS

PROJECT NO.: R-3833A
IREDELL **COUNTY**
STATION: 17+65.00 -Y19- TO 19+15.00 -Y19-
SHEET 2 OF 4

PREPARED BY: J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY: S.C. CLARK	DATE: 5/08

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE

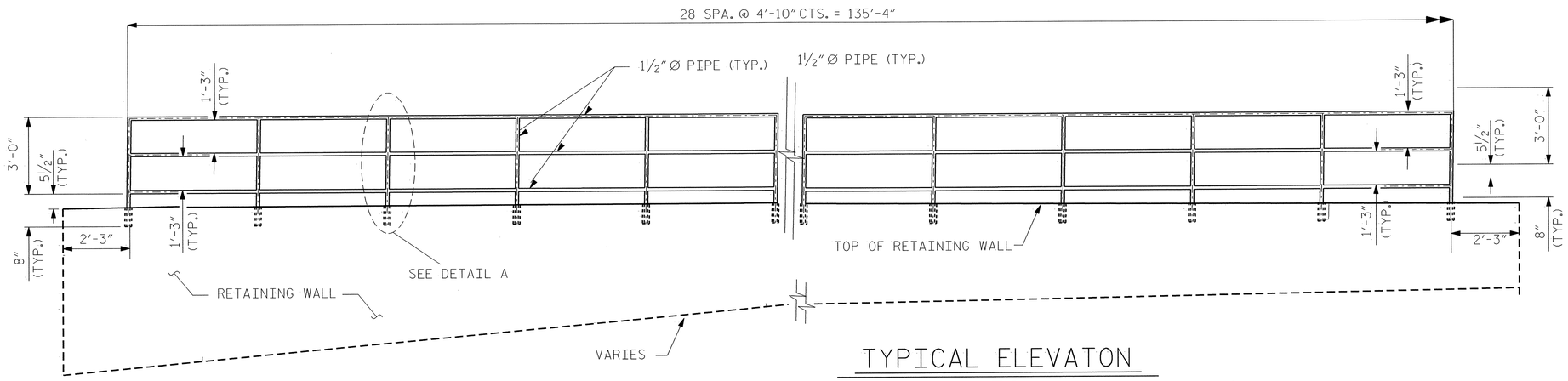
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

GRAVITY RETAINING WALL #5

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

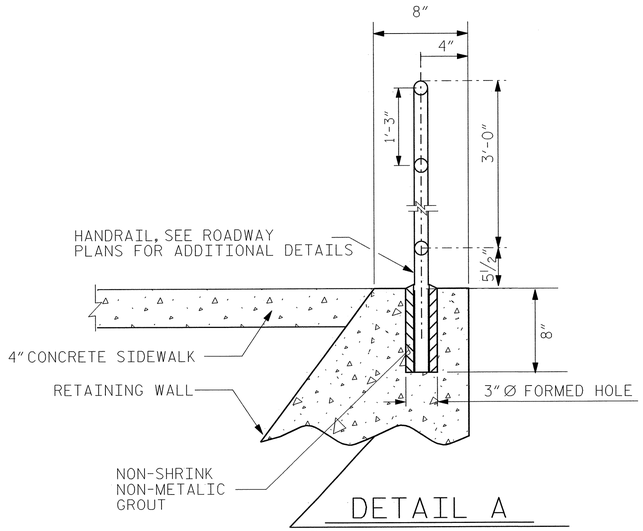
R-3833A 2-EE

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK — SIGNATURE 6/31/8 DATE	SIGNATURE DATE

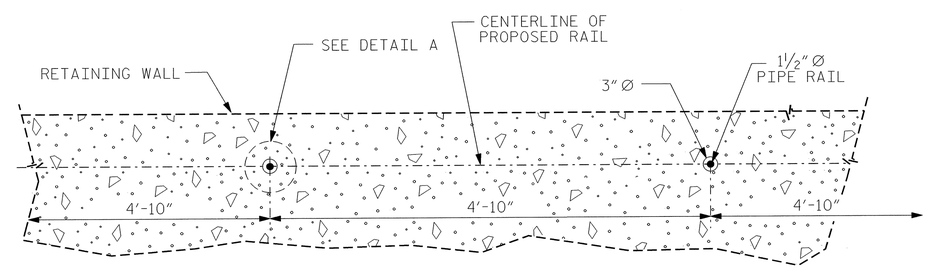


TYPICAL ELEVATON

NTS



DETAIL A



PLAN VIEW

PROJECT NO.: R-3833A

IREDELL **COUNTY**

STATION: 17+65.00 -Y19- TO 19+15.00 -Y19-

SHEET 3 OF 4

GEOTECHNICAL ENGINEERING UNIT

☐ EASTERN REGIONAL OFFICE

☒ WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

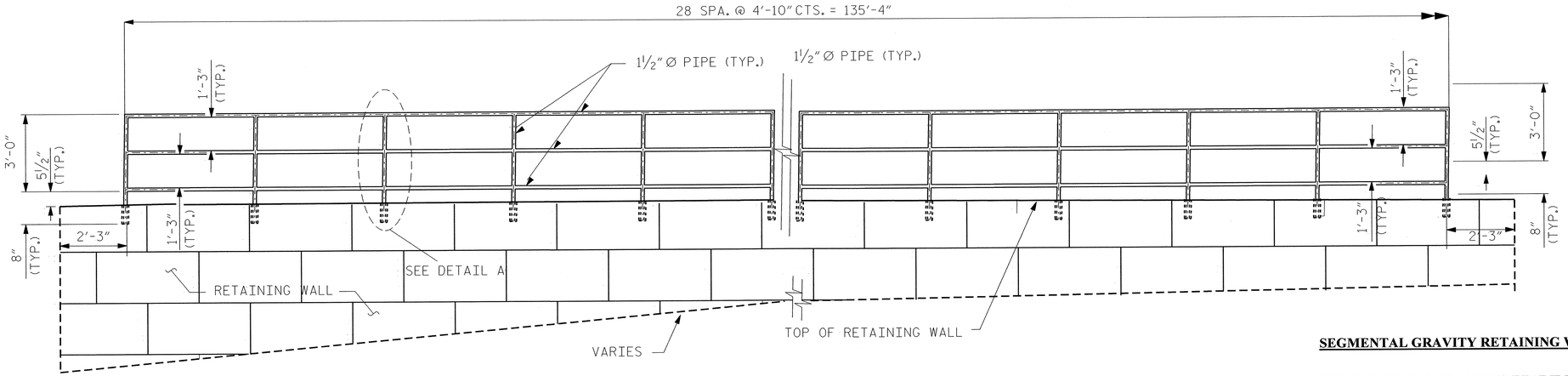
GRAVITY RETAINING WALL #5

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

PREPARED BY:	J.T. WILLIAMS	DATE:	11/16/07
REVIEWED BY:	S.C. CLARK	DATE:	5/08

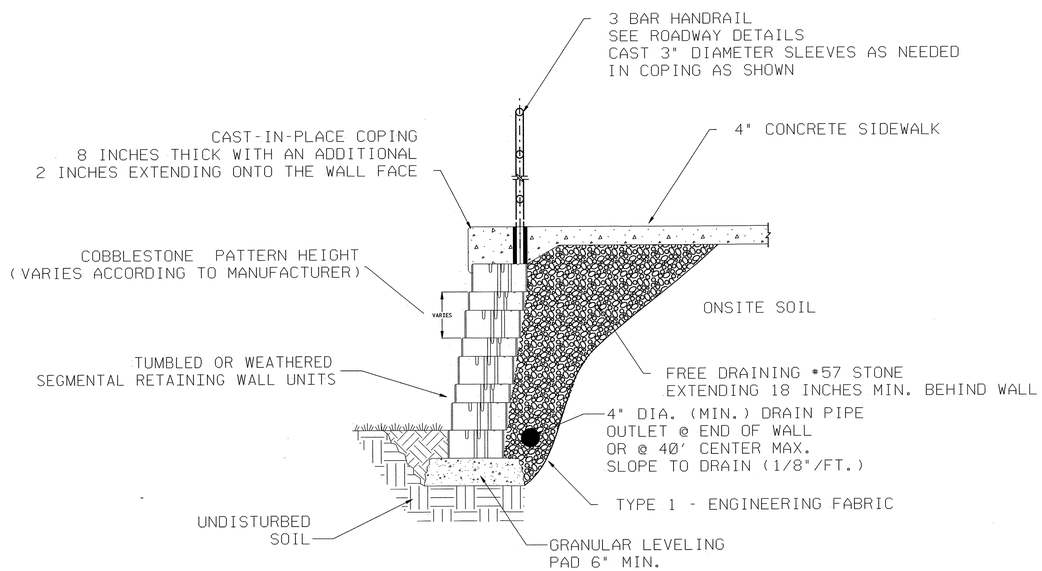
R-3833A 2-PF

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK — SIGNATURE 6/21/8 DATE	SIGNATURE DATE



TYPICAL ELEVATON

NTS



TYPICAL WALL DETAIL

NTS

SEGMENTAL GRAVITY RETAINING WALL NOTES

FOR SEGMENTAL GRAVITY RETAINING WALLS, SEE SEGMENTAL GRAVITY RETAINING WALLS SPECIAL PROVISION.

CAST-IN-PLACE CONCRETE COPING IS REQUIRED. COPING AND SIDEWALK SHALL BE POURED AT THE SAME TIME. THE COPING SHALL BE REINFORCED AS NEEDED AND THE REINFORCEMENT SHALL EXTEND INTO THE SIDEWALK SLAB. CONTRACTOR IS RESPONSIBLE FOR SUBMITTING A DESIGN DETAIL WITH WALL DESIGN PACKAGE. SEE TYPICAL WALL DETAIL FOR ADDITIONAL INFORMATION.

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DESIGN RETAINING WALL FOR A WALL HEIGHT EQUAL TO THE DESIGN HEIGHT (DIFFERENCE BETWEEN GRADE ELEVATION AND BOTTOM OF WALL ELEVATION) PLUS EMBEDMENT (DIFFERENCE BETWEEN BOTTOM OF WALL ELEVATION AND TOP OF LEVELING PAD ELEVATION).

DESIGN RETAINING WALL FOR THE FOLLOWING:
1) MINIMUM SERVICE LIFE = 75 YEARS
2) ALLOWABLE BEARING CAPACITY = 2000 PSF

IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF (kPa)
BACKFILL	110	32	0
FOUNDATION	110	30	0

DO NOT PLACE STONE BACKFILL FOR THE LEVELING PAD FOR RETAINING WALL UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

PROJECT NO.: R-3833A
IREDELL ***COUNTY***
STATION: 17+65.00 -Y19- TO 19+15.00 -Y19-
SHEET 4 OF 4

PREPARED BY:	J.T. WILLIAMS	DATE:	11/16/07
REVIEWED BY:	S.C. CLARK	DATE:	5/08

GEOTECHNICAL ENGINEERING UNIT
☐ ***EASTERN REGIONAL OFFICE***
☒ ***WESTERN REGIONAL OFFICE***

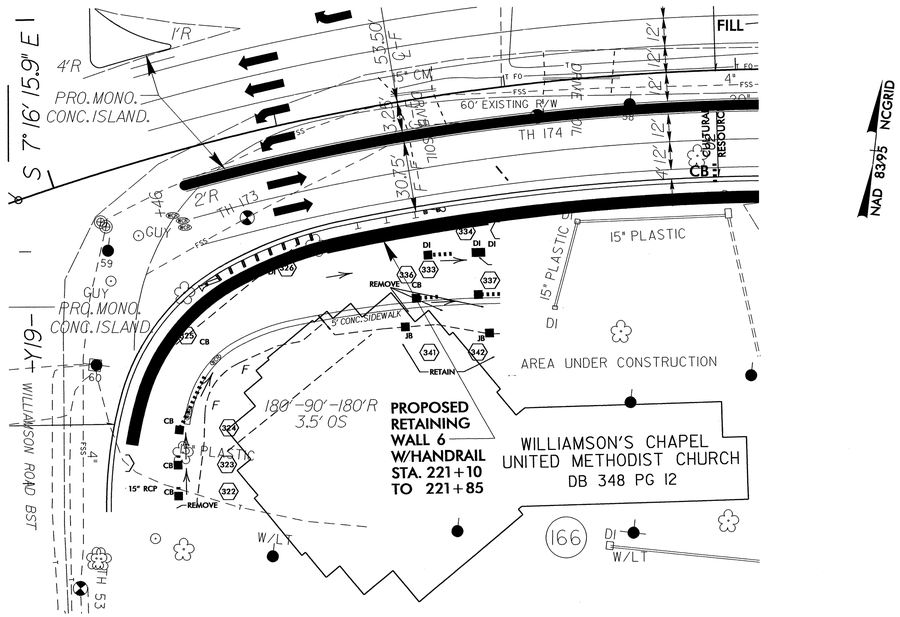
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SEGMENTAL GRAVITY RETAINING WALL #5

REVISIONS							SHEET NO.
NO.	BY	DATE	NO.	BY	DATE		
1	-	-	3	-	-		TOTAL SHEETS
2	-	-	4	-	-		

R-3833A 2-66

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK — SIGNATURE 6/24/8 DATE	SIGNATURE DATE



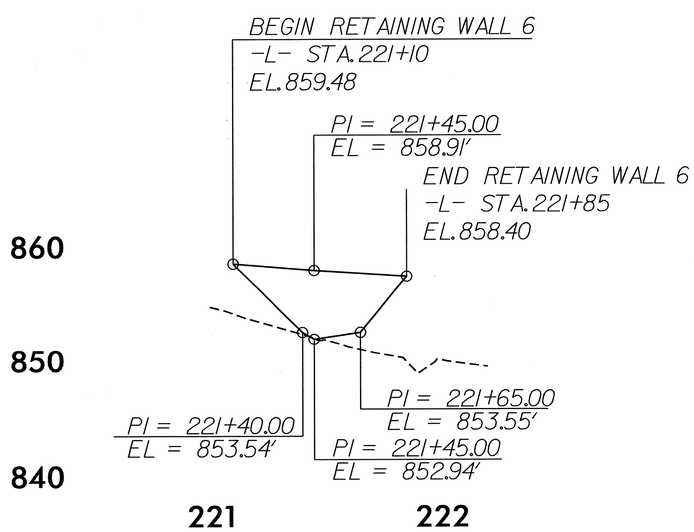
LOCATION SKETCH

GRAVITY RETAINING WALL ELEVATIONS					
-L- STA	OFFSET FROM ℄ (LEFT)	ELEV @ TOP OF WALL	* PROPOSED FINISHED GRADE	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
221+10.00	53.94	859.48	859.48	N/A	N/A
221+45.00	52.25	858.91	852.94	6.47	5.97
221+85	50.37	858.40	858.40	N/A	N/A

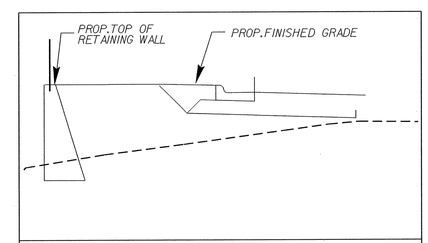
* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH

** FOR DESIGN WALL HEIGHT "H", SEE STANDARD DRAWING No. 453.01

-L-
SR 1100 BRAWLEY SCHOOL RD.
RETAINING WALL 6



TOTAL STRUCTURE QUANTITIES		
GRAVITY RETAINING WALLS	293	SQ. FT.
PEDESTRIAN HANDRAIL	72.5	LIN. FT.



SECTION A

NOTES

BRICK VENEER MATCHING THE ADJACENT CHURCH WILL BE REQUIRED ON GRAVITY WALL 6.

SUBMIT BRICK SAMPLES TO THE ENGINEER FOR APPROVAL PRIOR TO ORDERING MATERIALS.

PROJECT NO.: R-3833A
IREDELL COUNTY
STATION: 221+10.00 -L- TO 221+85.00 -L-
SHEET 1 OF 3

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

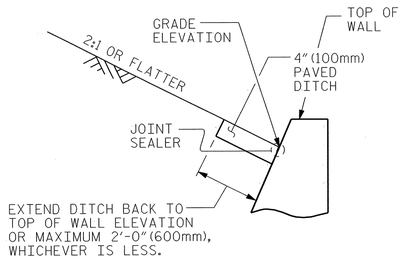
GRAVITY RETAINING WALL #6

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS
2			4			

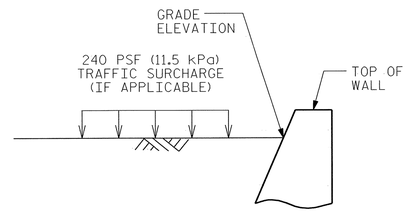
PREPARED BY:	J.T. WILLIAMS	DATE:	11/16/07
REVIEWED BY:	S.C. CLARK	DATE:	5/08

R-3833A Z-HH

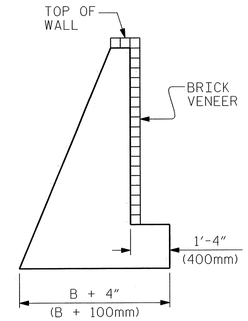
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK — SIGNATURE: S C Clark — DATE: 6/30/08	SIGNATURE — DATE



SLOPE CONDITION

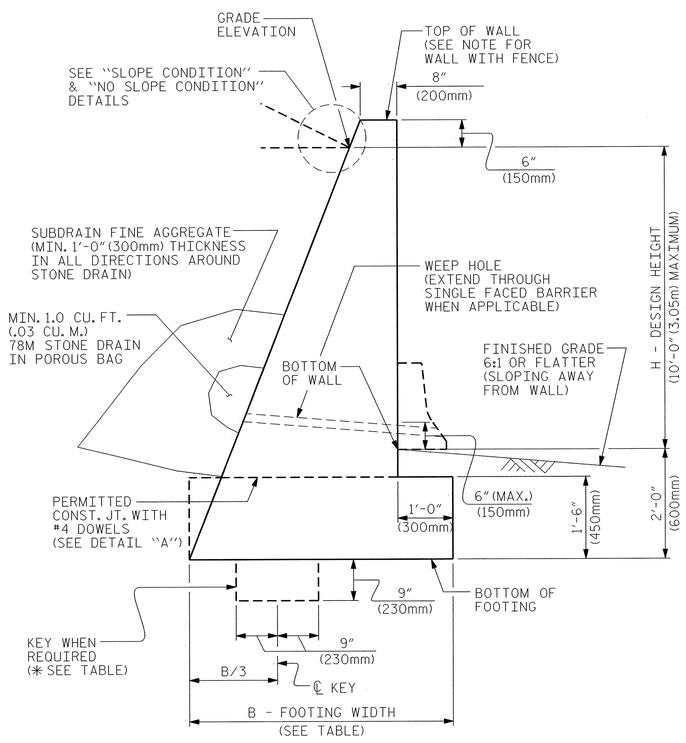


NO SLOPE CONDITION

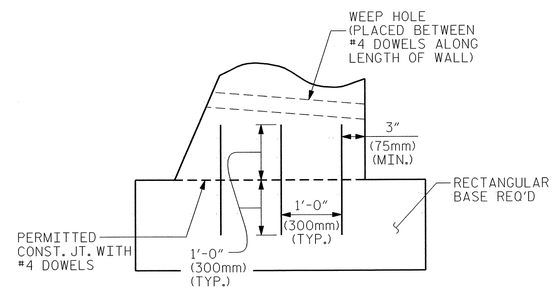


BRICK VENEER DETAIL

(WHEN APPLICABLE)



TYPICAL SECTION



DETAIL "A"

H + 2 (ft)	< 6	6 - 9	> 9 - 12
H + 0.6 (m)	< 1.83	1.83 - 2.74	> 2.74 - 3.65
NO SLOPE CONDITION WITHOUT TRAFFIC SURCHARGE	.60	.60	.60
NO SLOPE CONDITION WITH TRAFFIC SURCHARGE	.80	.75 *	.70 *
SLOPE CONDITION	.66	.70 *	.75 *

B/(H + 2) RATIO

* KEY IS REQUIRED FOR SLOPE CONDITION OR NO SLOPE CONDITION WITH TRAFFIC SURCHARGE WHEN H + 2ft (H + 0.6m) IS 6'-0" (1.83m) OR GREATER.

NOTES

FOR GRAVITY RETAINING WALLS, SEE SECTION 453 OF THE STANDARD SPECIFICATIONS.

THE STANDARD GRAVITY RETAINING WALL IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 kN/m3)
COHESION = 0 PSF (0 kPa)
FRICTION ANGLE = 35 DEGREES
(GROUNDWATER WITHIN 5'-0" (1.5m) OF BOTTOM OF FOOTING)
FRICTION ANGLE = 30 DEGREES
(GROUNDWATER MORE THAN 5'-0" (1.5m) BELOW BOTTOM OF FOOTING)

DO NOT USE A STANDARD GRAVITY RETAINING WALL IF THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF FOOTING.

DO NOT USE A STANDARD GRAVITY RETAINING WALL WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE WALL.

DO NOT PLACE CONCRETE UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND CHECKING FOUNDATION MATERIAL FOR IN-SITU ASSUMED SOIL PARAMETERS.

USE CLASS "A" CONCRETE AND PROVIDE CLASS I SURFACE FINISH FOR ALL EXPOSED SURFACES.

PROVIDE 3" (75mm) DIAMETER WEEP HOLES ON 10'-0" (3m) CENTERS ALONG WALL. SLOPE WEEP HOLES ON A 1" (25mm) PER FOOT (300mm) SLOPE THROUGH THE WALL SO THAT WATER DRAINS OUT OF THE FRONT OF THE WALL.

CONSTRUCT A HORIZONTAL DRAIN IN SUBDRAIN FINE AGGREGATE AT LEAST 1'-0" (300mm) TALL AND 1'-0" (300mm) WIDE TO CONNECT ALL STONE DRAINS.

PROVIDE GROOVED CONTRACTION JOINTS EVERY 10'-0" (3m) AND EXPANSION JOINTS EVERY 30'-0" (9m) ALONG THE WALL.

FOR WALL WITH SURFACE VENEER, SUBMIT VENEER SAMPLES TO THE ENGINEER FOR APPROVAL BEFORE BEGINNING CONSTRUCTION. ANCHOR SURFACE VENEER TO CONCRETE RETAINING WALL WITH APPROPRIATE CONCRETE TYPE ANCHORS ACCORDING TO MANUFACTURER'S SPECIFICATIONS WITH A MINIMUM VERTICAL SPACING OF 1'-4" (400mm) AND A MINIMUM HORIZONTAL SPACING OF 2'-8" (800mm) WITH EACH ROW STAGGERED 1'-4" (400mm) FROM THE ROW OF ANCHORS ABOVE AND BELOW.

DO NOT BACKFILL BEHIND WALL UNTIL CONCRETE DEVELOPS A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI (20.7 MPa). COMPACT BACKFILL IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. PLACE BACKFILL WITHIN 3'-0" (1m) OF THE BACK OF THE WALL WITH HAND OPERATED EQUIPMENT. DO NOT OPERATE HEAVY EARTH MOVING EQUIPMENT WITHIN 10'-0" (3m) OF THE BACK OF WALL.

WHEN A CONSTRUCTION JOINT IS LOCATED AT THE BASE OF THE WALL, IN SECTION, PROVIDE A MINIMUM OF 3-#4 DOWELS AT AN EQUAL SPACING. SPACE ALL DOWELS AT 1'-6" (460mm) CENTERS ALONG THE LENGTH OF THE WALL.

SEE PREVIOUS SHEET(S) FOR PLAN AND PROFILE VIEW (WALL ENVELOPE) AND PROPOSED ELEVATIONS FOR GRAVITY RETAINING WALL(S).

FOR WALL WITH FENCE, USE SLEEVES IN ACCORDANCE WITH SECTION 866 OF THE STANDARD SPECIFICATIONS FOR FENCE POSTS, OR SUBMIT FENCE POST ANCHOR PLATE DETAILS.

PROJECT NO.: R-3833A
IREDELL **COUNTY**
STATION: 221+10.00 -L- TO 221+85.00 -L-
SHEET 2 OF 3

PREPARED BY:	J.T. WILLIAMS	DATE: 11/16/07
REVIEWED BY:	S.C. CLARK	DATE: 5/08

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE

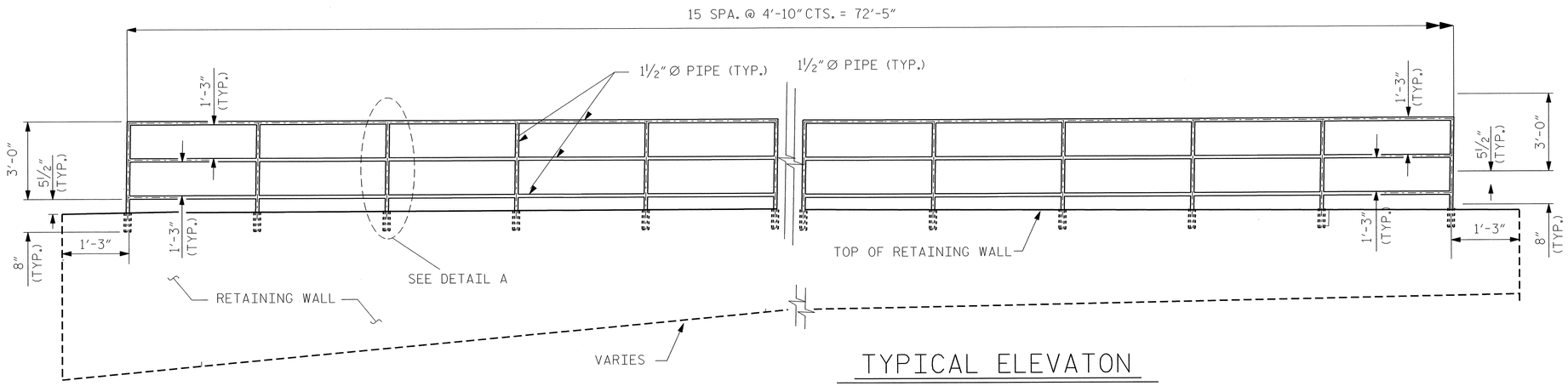
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

GRAVITY RETAINING WALL #6

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

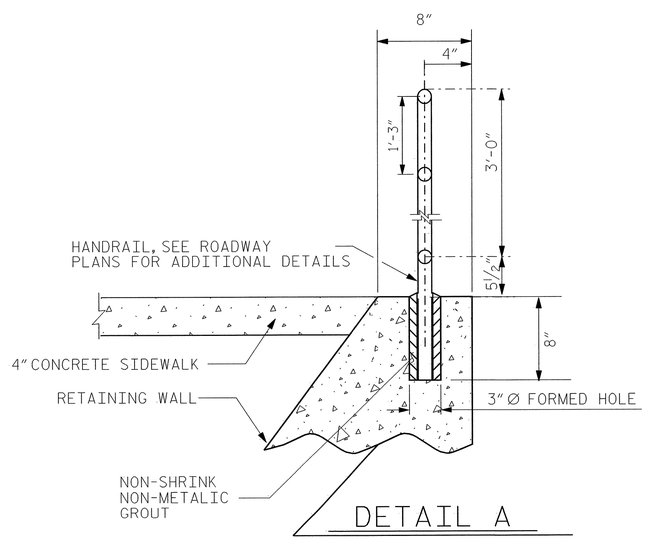
R-3833A 2-II

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK — SIGNATURE 6/30/08 DATE	SIGNATURE DATE

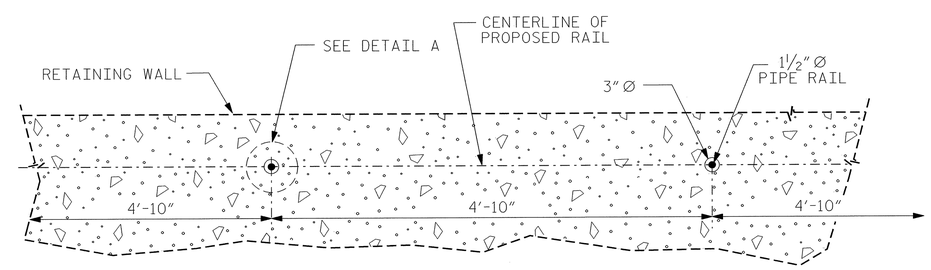


TYPICAL ELEVATON

NTS



DETAIL A



PLAN VIEW

PROJECT NO.: R-3833A

IREDELL **COUNTY**

STATION: 221+10.00 -L- TO 221+85.00 -L-

SHEET 3 OF 3

GEOTECHNICAL ENGINEERING UNIT

☐ *EASTERN REGIONAL OFFICE*

☒ *WESTERN REGIONAL OFFICE*

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GRAVITY RETAINING WALL #6

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	TOTAL SHEETS
2	-	-	4	-	-	

PREPARED BY:	J.T. WILLIAMS	DATE:	11/16/07
REVIEWED BY:	S.C. CLARK	DATE:	5/08

COMPUTED BY: DBE	DATE: 3/19/2008
CHECKED BY: KSH	DATE: 3/22/2008

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3833A	3(1of 2)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C201902

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
0001000000-E	200	Lump Sum		CLEARING & GRUBBING .. ACRE(S)
0008000000-E	200	1	ACR	SUPPLEMENTARY CLEARING & GRUB- BING
0015000000-N	205	5	EA	SEALING ABANDONED WELLS
0022000000-E	225	22,700	CY	UNCLASSIFIED EXCAVATION
0036000000-E	225	11,450	CY	UNDERCUT EXCAVATION
0080000000-E	SP	10,500	TON	CLASS IV SUBGRADE STABILIZA- TION
0106000000-E	230	200,000	CY	BORROW EXCAVATION
0134000000-E	240	750	CY	DRAINAGE DITCH EXCAVATION
0141000000-E	240	1,000	LF	BERM DITCH CONSTRUCTION
0156000000-E	250	16,340	SY	REMOVAL OF EXISTING ASPHALT PAVEMENT
0177000000-E	250	6,990	SY	BREAKING OF EXISTING ASPHALT PAVEMENT
0192000000-N	260	40	HR	PROOF ROLLING
0195000000-E	265	2,000	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	16,650	SY	FABRIC FOR SOIL STABILIZATION
0318000000-E	300	3,182	TON	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRS
0343000000-E	310	644	LF	15" SIDE DRAIN PIPE
0344000000-E	310	160	LF	18" SIDE DRAIN PIPE
0708000000-E	310	24	LF	15" BIT COAT CS PIPE CULVERTS, TYPE B 0.064" THICK
0720000000-E	310	100	LF	24" BIT COAT CS PIPE CULVERTS, TYPE B 0.064" THICK
0995000000-E	340	7,207	LF	PIPE REMOVAL
1011000000-N	500	Lump Sum		FINE GRADING
1044000000-E	501	56,810	SY	LIME TREATED SOIL (SLURRY METHOD)
1066000000-E	501	570	TON	LIME FOR LIME TREATED SOIL
1110000000-E	510	1,500	TON	STABILIZER AGGREGATE
1121000000-E	520	57,500	TON	AGGREGATE BASE COURSE
1176000000-E	542	37,870	SY	SOIL CEMENT BASE
1187000000-E	542	1,042	TON	PORTLAND CEMENT FOR SOIL CE- MENT BASE
1209000000-E	543	14,210	GAL	ASPHALT CURING SEAL
1220000000-E	545	2,000	TON	INCIDENTAL STONE BASE
1275000000-E	600	260	GAL	PRIME COAT
1297000000-E	607	610	SY	MILLING ASPHALT PAVEMENT, ***" DEPTH (1-1/2")
1297000000-E	607	44,560	SY	MILLING ASPHALT PAVEMENT, ***" DEPTH (2-1/2")
1489000000-E	610	7,120	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1491000000-E	610	24,540	TON	ASPHALT CONC BASE COURSE, TYPE B25.0C
1498000000-E	610	8,475	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1503000000-E	610	35,390	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C
1519000000-E	610	7,630	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1523000000-E	610	27,515	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5C
1525000000-E	610	2,975	TON	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A
1560000000-E	620	4,085	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
1565000000-E	620	1,655	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 70-22
1693000000-E	654	380	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
2022000000-E	815	336	CY	SUBDRAIN EXCAVATION
2033000000-E	815	168	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	1,000	LF	6" PERFORATED SUBDRAIN PIPE
2055000000-E	815	30	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)
2143000000-E	818	20	TON	BLOTTING SAND
2209000000-E	838	3.4	CY	ENDWALLS
2253000000-E	840	1	CY	PIPE COLLARS
2264000000-E	840	1	CY	PIPE PLUGS
2275000000-E	SP	25	CY	FLOWABLE FILL
2286000000-N	840	338	EA	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	131	LF	MASONRY DRAINAGE STRUCTURES
2364000000-N	840	68	EA	FRAME WITH TWO GRATES, STD 840.16
2366000000-N	840	28	EA	FRAME WITH TWO GRATES, STD 840.24
2367000000-N	840	7	EA	FRAME WITH TWO GRATES, STD 840.29
2374000000-N	840	42	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)
2374000000-N	840	72	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)
2374000000-N	840	120	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)
2396000000-N	840	3	EA	FRAME WITH COVER, STD 840.54
2535000000-E	846	1,240	LF	**"X **" CONCRETE CURB (8" x 18")
2538000000-E	846	370	LF	**'-**" CONCRETE CURB & GUTTER (2'-0")
2542000000-E	846	31,320	LF	1'-6" CONCRETE CURB & GUTTER
2549000000-E	846	60,700	LF	2'-6" CONCRETE CURB & GUTTER
2570000000-N	SP	4	EA	MODIFIED CONCRETE FLUME
2591000000-E	848	22,210	SY	4" CONCRETE SIDEWALK
2605000000-N	848	150	EA	CONCRETE WHEELCHAIR RAMPS
2612000000-E	848	3,290	SY	6" CONCRETE DRIVEWAY
2619000000-E	850	60	SY	4" CONCRETE PAVED DITCH
2655000000-E	852	4,550	SY	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)
2800000000-N	858	1	EA	ADJUSTMENT OF CATCH BASINS
2830000000-N	858	13	EA	ADJUSTMENT OF MANHOLES
2860000000-N	859	3	EA	CONVERT EXISTING CATCH BASIN TO JUNCTION BOX
2905000000-N	859	3	EA	CONVERT EXISTING DROP INLET TO JUNCTION BOX
3030000000-E	862	1,100	LF	STEEL BM GUARDRAIL
3105000000-N	862	2	EA	STEEL BM GUARDRAIL TERMINAL SECTIONS
3150000000-N	862	10	EA	ADDITIONAL GUARDRAIL POSTS
3210000000-N	862	7	EA	GUARDRAIL ANCHOR UNITS, TYPE CAT-1
3270000000-N	SP	7	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3628000000-E	876	650	TON	RIP RAP, CLASS I
3649000000-E	876	165	TON	RIP RAP, CLASS B
3656000000-E	876	3,490	SY	FILTER FABRIC FOR DRAINAGE
4072000000-E	903	4,086	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4102000000-N	904	271	EA	SIGN ERECTION, TYPE E
4116100000-N	904	5	EA	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (D)
4155000000-N	907	80	EA	DISPOSAL OF SIGN SYSTEM, U- CHANNEL
4400000000-E	1110	799	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	192	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	45	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4415000000-N	1115	1	EA	FLASHING ARROW PANELS, TYPE C
4420000000-N	1120	3	EA	CHANGEABLE MESSAGE SIGN
4422000000-N	1120	40	DAY	CHANGEABLE MESSAGE SIGN (SHORT TERM)
4430000000-N	1130	400	EA	DRUMS
4445000000-E	1145	1,325	LF	BARRICADES (TYPE III)
4455000000-N	1150	600	MD	FLAGGER
4480000000-N	1165	1	EA	TMIA
4507000000-E	SP	548	LF	WATER FILLED BARRIER
4510000000-N	SP	300	HR	POLICE
4650000000-N	1251	2,800	EA	TEMPORARY RAISED PAVEMENT MARKERS
4721000000-E	1205	29	EA	THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS)
4725000000-E	1205	306	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
4810000000-E	1205	556,950	LF	PAINT PAVEMENT MARKING LINES (4")
4820000000-E	1205	14,930	LF	PAINT PAVEMENT MARKING LINES (8")
4835000000-E	1205	4,600	LF	PAINT PAVEMENT MARKING LINES (24")
4840000000-N	1205	58	EA	PAINT PAVEMENT MARKING CHARAC- TER
4845000000-N	1205	612	EA	PAINT PAVEMENT MARKING SYMBOL
4847000000-E	1205	128,350	LF	POLYUREA PAVEMENT MARKING LINES (4", **********) (STANDARD GLASS BEADS)
4847110000-E	1205	7,265	LF	POLYUREA PAVEMENT MARKING LINES (8", **********) (STANDARD GLASS BEADS)
4847140000-E	1205	1,600	LF	POLYUREA PAVEMENT MARKING LINES (24", **********) (STANDARD GLASS BEADS)
4905000000-N	1253	703	EA	SNOWPLOWABLE PAVEMENT MARKERS
4915000000-E	1264	6	EA	7' U-CHANNEL POSTS
4955000000-N	1264	6	EA	OBJECT MARKERS (END OF ROAD)
5255000000-N	1413	Lump Sum		PORTABLE LIGHTING
5325200000-E	1510	250	LF	2" WATER LINE
5326200000-E	1510	203	LF	12" WATER LINE
5327000000-E	1510	35	LF	20" WATER LINE
5536000000-E	1515	1	EA	2" VALVE
5648000000-N	1515	12	EA	RELOCATE WATER METER
5649000000-N	1515	5	EA	RECONNECT WATER METER
5672000000-N	1515	1	EA	RELOCATE FIRE HYDRANT
5691300000-E	1520	16	LF	8" SANITARY GRAVITY SEWER
5775000000-E	1525	1	EA	4' DIA UTILITY MANHOLE
5781000000-E	1525	7	LF	UTILITY MANHOLE WALL, 4' DIA
5804000000-E	1530	190	LF	ABANDON 12" UTILITY PIPE
5812000000-E	1530	20	LF	ABANDON 20" UTILITY PIPE
5882000000-N	SP	1	EA	GENERIC UTILITY ITEM RELOCATE 1" RPZ BACKFLOW PREVENTION ASSEMBLY WITH NEW VAULT
5882000000-N	SP	4	EA	GENERIC UTILITY ITEM RELOCATE 1-1/2" WATER METER WITH NEW VAULT
5882000000-N	SP	3	EA	GENERIC UTILITY ITEM RELOCATE 2" RPZ BACKFLOW PREVENTION ASSEMBLY
5882000000-N	SP	1	EA	GENERIC UTILITY ITEM RELOCATE 2" RPZ BACKFLOW PREVENTION ASSEMBLY WITH NEW VAULT
5882000000-N	SP	9	EA	GENERIC UTILITY ITEM RELOCATE 2" WATER METER WITH NEW VAULT
5882000000-N	SP	3	EA	GENERIC UTILITY ITEM RELOCATE FIRE HYDRANT AND ADJU ST VALVE BOX TO PROPOSED FINISHED GRADE
5882000000-N	SP	10	EA	GENERIC UTILITY ITEM RELOCATE FIRE HYDRANT WITH NEW 6" GATE VALVE
5882000000-N	SP	1	EA	GENERIC UTILITY ITEM REMOVE EXISTING SANITARY SEWER PUMP STATION
6000000000-E	1605	12,290	LF	TEMPORARY SILT FENCE
6006000000-E	1610	2,525	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	5,680	TON	STONE FOR EROSION CONTROL, CLASS B

6/16/99

06/04/2008
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STATE OF NORTH CAROLINA
SUMMARY OF QUANTITIES

PROJECT REFERENCE No.	SHEET No.
R-3833A	3 (2 of 2)

ItemNumber	Sec #	Quantity	Unit	Description
6012000000-E	1610	6,640	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	87.5	ACR	TEMPORARY MULCHING
6018000000-E	1620	3,650	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	15.5	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	290	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	1	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	875	LF	SAFETY FENCE
6030000000-E	1630	27,570	CY	SILT EXCAVATION
6036000000-E	1631	31,000	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	160	SY	COIR FIBER MAT
6038000000-E	SP	2,765	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	6,390	LF	1/4" HARDWARE CLOTH
6071010000-E	SP	1,740	LF	WATTLE
6071020000-E	SP	1,088	LB	POLYACRYLAMIDE (PAM)
6071030000-E	SP	2,325	LF	COIR FIBER BAFFLES
6071050000-E	SP	12	EA	**" SKIMMER (1-1/2")
6071050000-E	SP	10	EA	**" SKIMMER (2")
6071050000-E	SP	1	EA	**" SKIMMER (2-1/2")
6071050000-E	SP	1	EA	**" SKIMMER (3")
6071050000-E	SP	2	EA	**" SKIMMER (4")
6084000000-E	1660	109.5	ACR	SEEDING & MULCHING
6087000000-E	1660	60	ACR	MOWING
6090000000-E	1661	750	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	2	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	2,400	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	71.75	TON	FERTILIZER TOPDRESSING
6114000000-N	SP	3.5	HR	SPECIALIZED HAND MOWING
6117000000-N	SP	54	EA	RESPONSE FOR EROSION CONTROL
6123000000-E	1670	0.75	ACR	REFORESTATION
7000000000-E	1705	30	EA	PEDESTRIAN SIGNAL HEAD (**", ** SECTION) (16", 1 SECTION W/COUNTDOWN)
7060000000-E	1705	21,460	LF	SIGNAL CABLE
7108000000-E	1705	4	EA	VEHICLE SIGNAL HEAD (12", 1 SECTION)
7120000000-E	1705	96	EA	VEHICLE SIGNAL HEAD (12", 3 SECTION)
7132000000-E	1705	7	EA	VEHICLE SIGNAL HEAD (12", 4 SECTION)
7144000000-E	1705	25	EA	VEHICLE SIGNAL HEAD (12", 5 SECTION)
7252000000-E	1710	20,100	LF	MESSENGER CABLE (1/4")
7264000000-E	1710	6,680	LF	MESSENGER CABLE (3/8")
7279000000-E	1715	150	LF	TRACER WIRE
7288000000-E	1715	500	LF	PAVED TRENCHING (**********) (1, 2")
7300000000-E	1715	4,560	LF	UNPAVED TRENCHING (**********) (1, 2")
7301000000-E	1715	40	LF	DIRECTIONAL DRILL (**********) (1, 2")
7324000000-N	1716	43	EA	JUNCTION BOX (STANDARD SIZE)
7348000000-N	1716	6	EA	JUNCTION BOX (OVER-SIZED, HEAVY DUTY)
7360000000-N	1720	23	EA	WOOD POLE
7372000000-N	1721	94	EA	GUY ASSEMBLY
7408000000-E	1722	6	EA	1" RISER WITH WEATHERHEAD
7420000000-E	1722	22	EA	2" RISER WITH WEATHERHEAD
7432000000-E	1722	6	EA	2" RISER WITH HEAT SHRINK TUBING
7444000000-E	1725	9,120	LF	INDUCTIVE LOOP SAWCUT
7456000000-E	1726	28,560	LF	LEAD-IN CABLE (**********) (14-2)
7481000000-N	SP	6	EA	SITE SURVEY
7481200000-N	SP	21	EA	LUMINAIRE ARM FOR VIDEO SYSTEM
7481240000-N	SP	21	EA	CAMERA WITHOUT INTERNAL LOOP EMULATOR PROCESSING UNIT
7481260000-N	SP	6	EA	EXTERNAL LOOP EMULATOR PROCESSING UNIT
7481280000-N	SP	7	EA	RELOCATE CAMERA SENSOR UNIT
7516000000-E	1730	22,820	LF	COMMUNICATIONS CABLE (**FIBER) (12)
7540000000-N	1731	1	EA	SPLICE ENCLOSURE
7552000000-N	1731	6	EA	INTERCONNECT CENTER
7564000000-N	1732	6	EA	FIBER-OPTIC TRANSCEIVER, DROP & REPEAT
7566000000-N	1733	6	EA	DELINEATOR MARKER
7568000000-N	SP	1	EA	FURNISH FIBER-OPTIC RESTORATION KIT
7570000000-N	SP	1	EA	FURNISH FIBER-OPTIC POWER METER
7572000000-N	SP	1	EA	FURNISH OPTICAL LIGHT GENERATOR
7574000000-N	SP	1	EA	FURNISH FIBER-OPTIC TRANSCEIVER
7576000000-N	SP	24	EA	METAL STRAIN SIGNAL POLE
7613000000-N	SP	24	EA	SOIL TEST
7614100000-E	SP	144	CY	DRILLED PIER FOUNDATION
7624000000-N	1743	15	EA	SIGNAL PEDESTAL WITH FOUNDATION
7636000000-N	1745	31	EA	SIGN FOR SIGNALS
7684000000-N	1750	5	EA	SIGNAL CABINET FOUNDATION
7688000000-N	1753	5	EA	CABINET BASE ADAPTER
7756000000-N	1751	5	EA	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)
7768000000-N	1751	1	EA	CONTROLLER WITH CABINET (TYPE 2070L, POLE MOUNTED)
7780000000-N	1751	82	EA	DETECTOR CARD (TYPE 2070L)
7912000000-N	1755	1	EA	BEACON CONTROLLER ASSEMBLY & CABINET (********) (TYPE F1)
7948000000-N	SP	1	EA	TRAFFIC SIGNAL REMOVAL
7980000000-N	SP	6	EA	GENERIC SIGNAL ITEM GPS UNIT
7980000000-N	SP	1	EA	GENERIC SIGNAL ITEM WOOD POLE (50')
8839000000-E	SP	550	LF	GENERIC RETAINING WALL ITEM STEEL PIPE HANDRAIL FOR RETAINING WALLS
8847000000-E	SP	293	SF	GENERIC RETAINING WALL ITEM GRAVITY RETAINING WALL FOR LOCATION #6
******* BEGIN SCHEDULE AA ******* ******* (3 ALTERNATES) *******				
0366000000-E AA1	310	16,002	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-E AA1	310	5,050	LF	18" RC PIPE CULVERTS, CLASS III
0378000000-E AA1	310	6,058	LF	24" RC PIPE CULVERTS, CLASS III
0384000000-E AA1	310	712	LF	30" RC PIPE CULVERTS, CLASS III
0390000000-E AA1	310	696	LF	36" RC PIPE CULVERTS, CLASS III
*** OR ***				
0366000000-E AA2	310	13,990	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-E AA2	310	4,190	LF	18" RC PIPE CULVERTS, CLASS III
0378000000-E AA2	310	4,326	LF	24" RC PIPE CULVERTS, CLASS III
0384000000-E AA2	310	568	LF	30" RC PIPE CULVERTS, CLASS III
0390000000-E AA2	310	408	LF	36" RC PIPE CULVERTS, CLASS III
0536000000-E AA2	SP	2,012	LF	***" HDPE PIPE CULVERTS (15")
0536000000-E AA2	SP	860	LF	***" HDPE PIPE CULVERTS (18")
0536000000-E AA2	SP	1,732	LF	***" HDPE PIPE CULVERTS (24")
0536000000-E AA2	SP	144	LF	***" HDPE PIPE CULVERTS (30")
0536000000-E AA2	SP	288	LF	***" HDPE PIPE CULVERTS (36")
*** OR ***				
0366000000-E AA3	310	13,990	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-E AA3	310	4,190	LF	18" RC PIPE CULVERTS, CLASS III
0378000000-E AA3	310	4,326	LF	24" RC PIPE CULVERTS, CLASS III
0384000000-E AA3	310	568	LF	30" RC PIPE CULVERTS, CLASS III
0390000000-E AA3	310	408	LF	36" RC PIPE CULVERTS, CLASS III
0540000000-E AA3	SP	2,012	LF	***" ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, ****" THICK (15", 0.064")
0540000000-E AA3	SP	860	LF	***" ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, ****" THICK (18", 0.064")
0540000000-E AA3	SP	1,732	LF	***" ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, ****" THICK (24", 0.064")
0540000000-E AA3	SP	144	LF	***" ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, ****" THICK (30", 0.079")
0540000000-E AA3	SP	288	LF	***" ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, ****" THICK (36", 0.079")
******* END SCHEDULE AA *******				
******* BEGIN SCHEDULE AB ******* ******* (2 ALTERNATES) *******				
8847000000-E AB1	SP	267	SF	GENERIC RETAINING WALL ITEM GRAVITY RETAINING WALL FOR LOCATION #1
*** OR ***				
8847000000-E AB2	SP	267	SF	GENERIC RETAINING WALL ITEM SEGMENTAL GRAVITY RETAINING WALL FOR LOCATION #1
******* END SCHEDULE AB *******				
******* BEGIN SCHEDULE AC ******* ******* (2 ALTERNATES) *******				
8847000000-E AC1	SP	216	SF	GENERIC RETAINING WALL ITEM GRAVITY RETAINING WALL FOR LOCATION #2
*** OR ***				
8847000000-E AC2	SP	216	SF	GENERIC RETAINING WALL ITEM SEGMENTAL GRAVITY RETAINING WALL FOR LOCATION #2
******* END SCHEDULE AC *******				
******* BEGIN SCHEDULE AD ******* ******* (2 ALTERNATES) *******				
8847000000-E AD1	SP	359	SF	GENERIC RETAINING WALL ITEM GRAVITY RETAINING WALL FOR LOCATION #3
*** OR ***				
8847000000-E AD2	SP	359	SF	GENERIC RETAINING WALL ITEM SEGMENTAL GRAVITY RETAINING WALL FOR LOCATION #3
******* END SCHEDULE AD *******				
******* BEGIN SCHEDULE AE ******* ******* (2 ALTERNATES) *******				
8847000000-E AE1	SP	333	SF	GENERIC RETAINING WALL ITEM GRAVITY RETAINING WALL FOR LOCATION #4
*** OR ***				
8847000000-E AE2	SP	333	SF	GENERIC RETAINING WALL ITEM SEGMENTAL GRAVITY RETAINING WALL FOR LOCATION #4
******* END SCHEDULE AE *******				
******* BEGIN SCHEDULE AF ******* ******* (2 ALTERNATES) *******				
8847000000-E AF1	SP	270	SF	GENERIC RETAINING WALL ITEM GRAVITY RETAINING WALL FOR LOCATION #5
*** OR ***				
8847000000-E AF2	SP	270	SF	GENERIC RETAINING WALL ITEM SEGMENTAL GRAVITY RETAINING WALL FOR LOCATION #5
******* END SCHEDULE AF *******				

COMPUTED BY: _____ DATE: _____
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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3833A	3-A

SUMMARY OF DRAINAGE DITCH EXCAVATION

LINE	LOCATION	STATION TO STATION	CY
-L-	RT	47+05 TO 49+75	97
-L-	RT	60+39 TO 60+12	14
-L-	RT	100+55 TO 100+25	25
-L-	RT	104+70 TO 104+37	15
-L-	LT	123+16 TO 123+30	60
-L-	RT	136+80 TO 139+55	48
-L-	RT	136+80 TO 136+99	30
-L-	RT	185+10 TO 183+42	70
-Y19-	RT	43+50 TO 48+82	389
		TOTAL	748
		SAY	750

SUMMARY OF PAVEMENT REMOVAL

IN SQUARE YARDS

LOCATION	ASPHALT REMOVAL	ASPHALT BREAK-UP	CONCRETE REMOVAL	CONCRETE BREAK-UP
-L- STA. 29+90 TO -L- STA. 33+87 LT	320			
-L- STA. 35+25 TO -L- STA. 39+36 LT	69			
-L- STA. 58+73 TO -L- STA. 67+12 LT	111			
-L- STA. 70+69 TO -L- STA. 71+88 MED	20			
-L- STA. 73+55 TO -L- STA. 75+30 MED	20			
-L- STA. 80+15 TO -L- STA. 84+42 MED	343			
-L- STA. 90+59 TO -L- STA. 91+97 LT	14			
-L- STA. 94+90 TO -L- STA. 98+09 LT	541			
-L- STA. 101+85 TO -L- STA. 110+50 LT	2480			
-L- STA. 112+65 TO -L- STA. 113+37 RT	14			
-L- STA. 114+66 TO -L- STA. 116+68 RT	43			
-L- STA. 114+70 TO -L- STA. 122+28 MED	735			
-L- STA. 127+55 TO -L- STA. 128+41 MED	63			
-L- STA. 129+70 TO -L- STA. 131+69 LT	41			
-L- STA. 139+65 TO -L- STA. 141+34 LT	26			
-L- STA. 144+30 TO -L- STA. 157+50 MED	2631			
-L- STA. 157+50 TO -L- STA. 163+50 MED		2395		
-L- STA. 166+00 TO -L- STA. 167+75 LT		802		
-L- STA. 167+75 TO -L- STA. 168+25 LT	222			
-L- STA. 170+32 TO -L- STA. 174+06 MED		248		
-L- STA. 177+84 TO -L- STA. 180+10 MED	163			
-L- STA. 182+10 TO -L- STA. 191+96 MED	1978			
-L- STA. 197+09 TO -L- STA. 200+15 MED		34		
-L- STA. 197+99 TO -L- STA. 199+09 LT	15			
-L- STA. 200+16 TO -L- STA. 206+95 LT	541			
-L- STA. 208+65 TO -L- STA. 209+31 MED	7			
-L- STA. 214+81 TO -L- STA. 226+00 LT/RT/MED		3509		
-Y20- STA. 10+04 TO -Y20- STA. 11+20	332			
REMOVAL OF TEMPORARY PAVEMENT	4704			
-L- MISC. AREAS PER PAVEMENT DESIGN RECOMMENDATIONS	900			
GRAND TOTAL	16,333	6988		
SAY	16,340	6990		

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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350						REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	TYPE 350	CAT-1							NO.	PERMITTED G	PERMITTED NG				
-L-	40+55.75	41+37	LT	81.25			40+60	41+42	2	10' BERM	50		1		1	1													
-L-	42+03.25	43+22	LT	118.75			41+97	42+71	2	10' BERM	50		1		1	1													
-L-	41+75	47+31.25	RT	556.25			42+75	47+25	2	10' BERM	50		1		1	1													
-L-	177+93.75	179+00.00	LT	106.25			178+80	177+90	2	10' BERM	50		1		1	1													
-L-	209+78.50	211+97.25	RT	218.75			211+14.42	211+76.33	2	10' BERM	50		1		1	1													
-L-	220+48.00	221+66.75	RT	118.75			221+47	221+47	2	10' BERM	50		1		1	1													
-DW2-	8+15.33	8+15.33	DEAD END	16.00																									2 TERMINAL END SECTIONS
-Y19-	16+65.00	19+21.25	RT	256.25			17+67.72	19+08.44	2	10' BERM	50		1		1	1													
	LESS ANCHOR DEDUCTIONS																												
	GRAU-350	7@ 50.00'	=	- 350.00																									
	CAT-1	7 @ 06.25'	=	- 43.75																									
TOTAL				1079																									
			SAY	1100																									
	(10 ADDITIONAL GUARDRAIL POSTS)																												

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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	3-B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

STATION TO STATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBANKMENT +%	BORROW	WASTE
PHASE I (EB SIDE OF EXISTING SR 1100)					
-L- 26+41.59 TO 56+00.00	2,914		20,712	17,798	0
SUBTOTAL	2,914	0	20,712	17,798	0
-L- 56+00.00 TO 76+00	657		12,152	11,495	0
SUBTOTAL	657	0	12,152	11,495	0
-L- 76+00.00 TO 95+50	918		5,532	4,614	0
-Y6- 10+40.37 TO 14+95.00	1,391		240	0	1,151
SUBTOTAL	2,309	0	5,772	4,614	1,151
-L- 95+50.00 TO 125+00	781		21,271	20,490	0
-Y9- 10+41.35 TO 13+85.00	1,486		60	0	1,426
SUBTOTAL	2,267	0	21,331	20,490	1,426
-L- 125+00.00 TO 145+00	686		5,890	5,204	0
-Y10- 10+39.50 TO 12+15.00	478		83	0	395
-Y11- 10+39.61 TO 13+27.00	853		282	0	571
SUBTOTAL	2,017	0	6,255	5,204	966
-L- 145+00.00 TO 165+00	324		19,160	18,836	0
-Y13- 25+15.89 TO 34+00	1,018		15,401	14,383	0
-Y20- 10+36.48 TO 11+20	227		0	0	227
SUBTOTAL	1,569	0	34,561	33,219	227
-L- 165+00.00 TO 195+00	4,436		23,344	18,908	0
-Y14- 10+40.22 TO 13+00	893		66	0	827
-Y17- 10+46.67 TO 13+75	61		787	726	0
SUBTOTAL	5,390	0	24,197	19,634	827
-L- 195+00.00 TO 219+50	985		10,249	9,264	0
-Y19- 26+26.45 TO 46+50 (SB SIDE OF EXISTING SR 1109)	3,149		1,123	0	2,026
-Y24- 10+51.50 TO 11+78	8		709	701	0
SUBTOTAL	4,142	0	12,081	9,965	2,026
-L- 219+50.00 TO 229+50	5		15,796	15,791	0
-Y19- 26+26.45 TO 46+50 (NB SIDE OF EXISTING SR 1109)	286		3,547	3,261	0
SUBTOTAL	291	0	19,343	19,052	0
PHASE I SUBTOTAL	21,556	0	156,404	141,471	6,623
WASTE TO REPLACE BORROW				-6,623	-6,623
PHASE I TOTAL	21,556	0	156,404	134,848	0

STATION TO STATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBANKMENT +%	BORROW	WASTE
PHASE II (WB SIDE OF EXISTING SR 1100)					
-L- 26+41.59 TO 56+00.00	433		3,110	2,677	0
-Y2- 13+72.17 TO 15+57.37	107		70	0	37
-Y3- 10+00.00 TO 14+14.45	2,103		37	0	2,066
SUBTOTAL	2,643	0	3,217	2,677	2,103
-L- 56+00.00 TO 76+00	1,481		2,086	605	0
-Y4- 13+50.00 TO 14+80.07	41		284	243	0
-Y5- 11+25.00 TO 12+13.28	24		121	97	0
-DW1- 11+50.00 TO 12+80.26	146		67	0	79
SUBTOTAL	1,692	0	2,558	945	79
-L- 76+00.00 TO 95+50	775		3,901	3,126	0
-Y22- 10+76.74 TO 11+26.74	29		37	8	0
SUBTOTAL	804	0	3,938	3,134	0
-L- 95+50.00 TO 125+00	3,695		3,989	294	0
-Y7- 12+00.00 TO 17+80.88	450		3,484	3,034	0
-Y8- 10+00.00 TO 14+02.90	154		1,826	1,672	0
SUBTOTAL	4,299	0	9,299	5,000	0
-L- 125+00.00 TO 145+00	330		4,526	4,196	0
SUBTOTAL	330	0	4,526	4,196	0
-L- 145+00.00 TO 165+00	587		3,362	2,775	0
-Y12- 11+65.00 TO 12+68.67	69		42	0	27
-Y13- 12+25.00 TO 23+98.79	850		2,628	1,778	0
-Y21- 10+12.00 TO 10+98.00	16		30	14	0
SUBTOTAL	1,522	0	6,062	4,567	27
-L- 165+00.00 TO 195+00	500		6,564	6,064	0
-Y15- 12+00.00 TO 14+26.91	12		246	234	0
-Y16- 10+90.00 TO 14+95.45	278		162	0	116
SUBTOTAL	790	0	6,972	6,298	116
-L- 195+00.00 TO 219+50	1,464		5,281	3,817	0
-Y19- 11+42.81 TO 25+36.29 (SB SIDE OF EXISTING SR 1109)	125		2,609	2,484	0
-Y18- 9+85.00 TO 14+51.24	890		482	0	408
SUBTOTAL	2,479	0	8,372	6,301	408
-L- 219+50.00 TO 229+50	95		3,187	3,092	0
-Y19- 11+42.81 TO 25+36.29 (NB SIDE OF EXISTING SR 1109)	711		7,349	6,638	0
SUBTOTAL	806	0	10,536	9,730	0
PHASE II SUBTOTAL	15,365	0	55,480	42,848	2,733
WASTE TO REPLACE BORROW				-2,733	-2,733
PHASE II TOTAL	15,365	0	55,480	40,115	0
PROJECT SUBTOTAL (PHASE I+II)	36,921	0	211,884	174,963	0
ESTIMATED LOSS DUE TO CLEARING & GRUBBING	-14,300			14,300	0
ESTIMATED SHOULDER MATERIAL			948	948	0
PROJECT TOTAL	22,621	0	212,832	190,211	0
ESTIMATE 5% TO REPLACE TOPSOIL ON BORROW PITS				9,511	
GRAND TOTAL (CUBIC YARDS)	22,621	0	212,832	199,722	0
SAY (CUBIC YARDS)	22,700	0	212,900	200,000	0

SELECT GRANULAR MATERIAL (CLASS II OR III) = 2,000 CY (CONTINGENCY PER 'GEOTECHNICAL REPORT - DESIGN AND CONSTRUCTION RECOMMENDATIONS' LETTER DATED FEBRUARY 13, 2006)
ESTIMATED UNDERCUT = 2,000 CY (CONTINGENCY PER 'GEOTECHNICAL REPORT - DESIGN AND CONSTRUCTION RECOMMENDATIONS' LETTER DATED FEBRUARY 13, 2006)
ESTIMATED GRADE POINT UNDERCUT = 3,950 CY (CONTINGENCY PER 'GEOTECHNICAL REPORT - DESIGN AND CONSTRUCTION RECOMMENDATIONS' LETTER DATED FEBRUARY 13, 2006)
ESTIMATED SHALLOW UNDERCUT = 5,500 CY (CONTINGENCY PER 'GEOTECHNICAL RECOMMENDATIONSFOR PAVEMENT DESIGN' LETTER DATED MAY 19, 2006)
-L- & -Y13- & -Y19- PAVEMENT STRUCTURE VOLUME = 17150 CY
ESTIMATED DDE = 750 CY

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PROJECT NO.	SHEET NO.
R-3833A	3-C

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE																.064	.064	.064	.064	.079	.079	.109	.109
27+34 LT		1		845.0	841.8																		
		1	2		841.8	841.3	Y		92														
28+22 LT		2		848.5	841.3																		
		2	4		841.3	834.4			56														
26+83 RT		3		842.9	838.9																		
		3	4		838.9	834.1			120														
28+08 RT		4		846.0	834.0																		
		4	5		834.0	833.8	Y																
28+25 RT		5		843.9	833.8																		
		5	6		833.8	803.1																	
29+56 RT		6		806.6	802.6																		
		6	OUT		802.6	798.2																	
31+81 RT		7		847.4	835.2																		
		7	4		835.2	834.0	Y				372												
32+93 RT		8		845.6	835.7																		
		8	7		835.7	835.2	Y				112												
34+60 RT		9		845.9	836.5																		
		9	8		836.5	835.7	Y			196													
34+96 RT		10		839.7	836.7																		
		10	9		836.7	836.5	Y																
30+45 LT		11																					
-Y2- 13+80 LT		12																					
-Y2- 13+85 RT		13																					
33+50 LT		14		845.0	839.2																		
		14	18		839.2	837.8	Y				140												
33+50 LT		15		842.0	839.3																		
		15	14		839.3	839.2	Y																
-Y2- 14+50 RT		16		845.9	842.4																		
		16	15		842.4	840.1																	
-Y2- 14+50 LT		17		845.9	843.2																		
		17	16		843.2	842.4	Y		76														
34+89 LT		18		843.2	837.8																		
		18	20		837.8	836.5					72												
34+87 LT		19		843.0	839.8																		
		19	18		839.8	838.6																	
35+65 LT		20		842.5	836.5																		
		20	22		836.5	834.0	Y				252												
35+60 LT		21		841.4	838.2																		
		21	20		838.2	837.2																	
38+19 LT		22		840.3	834.0																		
		22	23		834.0	831.4	Y				252												
40+74 LT		23		839.0	831.4																		
		23	24		831.4	830.1																	
40+72 LT		24		834.0	830.1																		
		24	OUT		830.1	818.0																	
40+94 LT		25		838.9	835.8																		
		25	23		835.8	832.2			16														
41+03 LT		26		838.9	835.9																		
		26	25		835.9	835.8			4														
43+02		27		839.8	836.8																		
SHEET TOTALS									364	196	1200												

STATION	FROM	TO	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, 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 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANITIES 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
27+34 LT	1															1						
	1	2																				
28+22 LT	2															1	2.2					
	2	4																				
26+83 RT	3															1			1			1
	3	4																				
28+08 RT	4															1	5	2	1			1
	4	5				32																
28+25 RT	5															1	5	0.1				
	5	6				304																
29+56 RT	6															1						
	6	OUT					32															
31+81 RT	7															1	5	2.15	1		1	
	7	4																				
32+93 RT	8															1	4.85		1		1	
	8	7																				
34+60 RT	9															1	4.35		1		1	
	9	8																				
34+96 RT	10															1						
	10	9			24																	
30+45 LT	11										60											
-Y2- 13+80 LT	12										28											
-Y2- 13+85 RT	13										28											
33+50 LT	14															1	0.8		1			1
	14	18																				
33+50 LT	15															1						
	15	14				24																
-Y2- 14+50 RT	16															1						
	16	15		76																		
-Y2- 14+50 LT	17															1						
	17	16																				
34+89 LT	18															1	0.36		1			1
	18	20																				
34+87 LT	19															1						
	19	18		16																		
35+65 LT	20															1	1.05		1			1
	20	22																				
35+60 LT	21															1						
	21	20		20																		
38+19 LT	22															1	1.39		1			1
	22	23																				
40+74 LT	23															1	2.52		1			1
	23	24				32																
40+72 LT	24															1						
	24	OUT				216																
40+94 LT	25															1			1	1		
	25	23																				
41+03 LT	26															1			1		1	
	26	25																				
43+02	27															1			1		1	
SHEET TOTALS				112	24	608	32				116					24	32.52	4.25	13	1	5	7

STATION	FROM	TO	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.)FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
27+34 LT	1		1	1																											42	
	1	2																														
28+22 LT	2		1	1																											87	
	2	4																														
26+83 RT	3																															PRECAST
	3	4																														
28+08 RT	4																														154	PRECAST
	4	5																														
28+25 RT	5		1	1																												
	5	6																														
29+56 RT	6					1			1																							
	6	OUT																														
31+81 RT	7																															
	7	4																														
32+93 RT	8																															
	8	7																														
34+60 RT	9																															
	9	8																														
34+96 RT	10					1			1																							
	10	9																														
30+45 LT	11																														69	
-Y2- 13+80 LT	12																														20	
-Y2- 13+85 RT	13																														43	
33+50 LT	14																															PRECAST
	14	18																														
33+50 LT	15						1		1																						132	
	15	14																														
-Y2- 14+50 RT	16					1			1																							
	16	15																														
-Y2- 14+50 LT	17					1			1																							
	17	16																														
34+89 LT	18																															PRECAST
	18	20																														
34+87 LT	19		1	1																												
	19	18																														
35+65 LT	20																															PRECAST
	20	22																														
35+60 LT	21		1	1																											25	
	21	20																														
38+19 LT	22																															PRECAST
	22	23																														
40+74 LT	23																															PRECAST
	23	24																														
40+72 LT	24		1	1																												
	24	OUT																														
40+94 LT	25																														35	PRECAST
	25	23																														
41+03 LT	26																														15	PRECAST
	26	25																														
43+02	27																														57	PRECAST
SHEET TOTALS			6	6		4	1		5																						679	

ABBREVIATIONS

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

COMPUTED BY:	KSH	DATE:	2/10/2008
CHECKED BY:	RSW	DATE:	3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-D

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) SIZE	THICKNESS OR GAUGE	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) SIZE	THICKNESS OR GAUGE	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, TYPE S OR D SIZE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	"TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL. 'B') LIN. FT. A: 5.0' THRU 10.0'	B: 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (M.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.)FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. - "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
		27	26		836.8	835.9	Y		196																																												
36+84 RT		28		843.1	839.7														1			1			1																										
		28	31		839.7	838.0	Y		260																																											
36+83 RT		29		843.0	840.0														1							1		1																								
		29	28		840.0	839.7	Y		48																																											
27+34 RT		30		842.9	840.2														1							1		1																								
		30	29		840.2	840.0	Y					52																																							
39+45 RT		31		841.0	838.0														1			1			1																										
		31	33		838.0	837.0	Y		100																																											
39+39 RT		32		841.5	839.6														1							1		1																								
		32	31		839.6	838.0			52																																											
40+47 RT		33		840.6	837.0														1			1			1																										
		33	34		837.0	836.5	Y		48																																											
40+95 RT		34		840.6	836.3														1			1	1																													154
		34	38		836.3	835.9	Y			32																																										
41+77 RT		35		840.7	837.7														1			1		1																											
		35	34		837.7	836.5	Y		80																																											
42+98 RT		36		841.3	838.3														1			1		1																											
		36	35		838.3	837.7	Y		120																																											
44+48 RT		37		842.7	839.7														1			1		1																											
		37	36		839.7	838.3	Y		148																																											
40+95 RT		38		841.4	835.9														1	0.5		1	1																													97
		38	38A		835.9	831.1						40																																								
41+11 RT		38A		834.5	831.1														1								1	1																								
		38A	39		831.1	812.6						136																																								
41+08 RT		39		816.0	812.1														1								1	1																								
		39	OUT		812.1	796.5										100																																				
47+13 LT		40		844.3	840.1														1			1		1																											PRECAST
		40	43		840.1	839.6	Y			52																																										
47+13 LT		41		844.0	840.8														1							1		1																								
		41	40		840.8	840.6						16																																								
47+99 LT		42		844.7	841.7														1							1		1																								40
		42	41		841.7	840.8	Y					84																																								
47+13 RT		43		845.9	839.6														1	1.35		1		1																											39
		43	44		839.6	839.5	Y			32																																										
47+13 RT		44		846.8	839.5														1	2.35		1			1																											
		44	OUT		839.5	833.0							44																																							
49+72 LT		45		849.9	846.9														1			1		1																											PRECAST
		45	46		846.9	845.6			52																																											
49+72 RT		46		849.1	845.3														1			1			1																											
		46	44		845.3	840.0				260																																										
49+92 RT		47		849.2	846.0														1			1			1																											
		47	46		846.0	845.6			20																																											
50+32 RT		48		849.6	846.6														1			1			1																											59
		48	47		846.6	846.0	Y		40																																											
50+32 LT		49		851.2	848.2														1			1		1																											PRECAST
SHEET TOTALS								1164	292	84		52	276	44	100				23	4.2		16	2	7	7	2	2		4	1		5																			389	

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

COMPUTED BY:	KSH	DATE:	2/10/2008
CHECKED BY:	RSW	DATE:	3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-E

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

SIZE / THICKNESS OR GAUGE

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"
		49	48		848.2	846.6			52						
48 +73 LT		50													
50 +54 LT		51													
Y3 13 +15 RT		52													
Y3 11 +45 LT		53													
Y3 10 +26 RT		54													
57+45 LT		55		855.2	852.2										
		55	56		852.2	850.9			40						
57+45 RT		56		853.9	850.9										
		56	57		850.9	848.2	Y		260						
60+07 RT		57		851.2	848.2										
		57	59		848.2	842.3			68						
60+07 LT		58		852.7	849.7										
		58	57		849.7	848.2			48						
60+75 RT		59		850.8	841.5										
		59	60		841.5	838.0									
60+68 RT		60		841.9	838.0										
		60	OUT		838.0	833.0									
62+24 LT		61		851.9	848.9										
		61	62		848.9	848.7			4						
62+32 LT		62		851.9	848.5										
		62	65		848.5	847.2				52					
62+40 LT		63		851.9	848.9										
		63	62		848.9	848.7			4						
62+32 LT		64		854.0	851.3										
		64	62		851.3	848.7			64						
62+32 RT		65		850.4	847.2										
		65	59		847.2	842.0				156					
64+74 LT		66		852.9	845.5										
		66	73		845.5	845.2	Y				52				
64+81 LT		67		853.5	845.7										
		67	66		845.7	845.5	Y				20				
64+60 LT		68		852.8	849.6										
		68	67		849.6	846.5									
Y5 11+25 RT		69		854.0	850.8										
		69	67		850.8	846.5			60						
65+21 LT		70		853.7	849.0										
		70	67		849.0	846.5			36						
65+45 LT		71		853.0	849.8										
		71	70		849.8	849.0									
Y5 11+24 LT		72		853.7	850.9										
		72	71		850.9	849.8									
64+79 RT		73		851.3	845.2										
		73	OUT		845.2	843.5									
67+42 LT		74		855.7	852.5										
SHEET TOTALS									636	208	72				

STATION	FROM	TO	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 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 C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, 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 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
	49	48																										
48 +73 LT	50																							24				
50 +54 LT	51																								68			
Y3 13 +15 RT	52																							36				
Y3 11 +45 LT	53																							24				
Y3 10 +26 RT	54																							52				
57+45 LT	55																											
	55	56																										
57+45 RT	56																											
	56	57																										
60+07 RT	57																											
	57	59																										
60+07 LT	58																											
	58	57																										
60+75 RT	59																											
	59	60																	40									
60+68 RT	60																											
	60	OUT																	64									
62+24 LT	61																											
	61	62																										
62+32 LT	62																											
	62	65																										
62+40 LT	63																											
	63	62																										
62+32 LT	64																											
	64	62																										
62+32 RT	65																											
	65	59																										
64+74 LT	66																											
	66	73																										
64+81 LT	67																											
	67	66																										
64+60 LT	68																											
	68	67																24										
Y5 11+25 RT	69																											
	69	67																										
65+21 LT	70																											
	70	67																										
65+45 LT	71																											
	71	70																24										
Y5 11+24 LT	72																											
	72	71																56										
64+79 RT	73																											
	73	OUT																	28									
67+42 LT	74																											
SHEET TOTALS																		104	132					136	68			

STATION	FROM	TO	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.)FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
	49	48																																					
48 +73 LT	50																																					22	
50 +54 LT	51																																					46	REMOVE 2 DW PIPES
Y3 13 +15 RT	52																																					43	
Y3 11 +45 LT	53																																						
Y3 10 +26 RT	54																																					17	
57+45 LT	55		1			1		1																														90	REMOVE 2 PIPES NEAR -L-/-Y4- INTERSECT/PRECAST
	55	56																																					
57+45 RT	56		1			1		1																														29	
	56	57																																					
60+07 RT	57		1			1		1																															
	57	59																																					
60+07 LT	58		1			1		1																															
	58	57																																					
60+75 RT	59		1	4.25		1		1																															
	59	60																																					
60+68 RT	60		1							1	1																												
	60	OUT																																					
62+24 LT	61		1			1		1																															
	61	62																																					
62+32 LT	62		1			1	1																																
	62	65																																					
62+40 LT	63		1			1			1																													24	
	63	62																																					
62+32 LT	64		1										1			1																							PRECAST
	64	62																																					
62+32 RT	65		1			1	1																																
	65	59																																					
64+74 LT	66		1	2.45		1			1																													43	PRECAST/TRAFFIC BEARING
	66	73																																					
64+81 LT	67		1	2.75		1	1																																
	67	66																																					
64+60 LT	68		1							1	1																												
	68	67																																					
Y5 11+25 RT	69		1										1			1																						24	
	69	67																																					
65+21 LT	70		1			1	1																																
	70	67																																					
65+45 LT	71		1							1	1																												
	71	70																																					
Y5 11+24 LT	72		1										1			1																							
	72	71																																					
64+79 RT	73		1	1.15		1			1																													76	REMOVE 2 DW PIPES AND 24" CONC PIPE
	73	OUT																																					
67+42 LT	74		1			1			1																													24	PRECAST
SHEET TOTALS			20	10.6		14	4	6	4	3	3		3			3																						438	

ABBREVIATIONS

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

COMPUTED BY:	KSH	DATE:	2/10/2008
CHECKED BY:	RSW	DATE:	3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-F

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"
		74	76		852.5	851.1			52																						
67+40 LT		75		856.0	852.8																										
		75	74		852.8	852.5	Y		40																						
67+44 RT		76		854.1	851.1																										
		76	73		851.1	845.9			300																						
68+88 LT		77		857.2	854.2																										
		77	74		854.2	852.5	Y		144																						
69+02 LT		78		858.0	855.3																										
		78	77		855.3	854.2			56																						
69+85 LT		79		857.1																											
		79	80		854.1	852.8	Y		200																						
71+85 LT		80		855.8																											
		80	81		852.8	850.7	Y		216																						
74+01 LT		81		854.5																											
		81	83		850.7	850.4	Y		32																						
74+02 LT		82		854.1																											
		82	81		851.9	850.7																					20						
74+32 LT		83		854.5																											
		83	85		850.2	845.1				84																					
73+99 RT		84		854.5																											
		84	85		845.5	845.3	Y		36																						
74+34 RT		85		854.5																											
		85	OUT		844.6	840.7																							248				
75+80 LT		86		854.9																											
		86	83		851.9	850.4	Y		144																						
76+93 RT		87		858.7																											
		87	89		855.9	855.0			52																						
77+42 RT		88		859.1																											
		88	87		856.1	855.9	Y		48																						
77+04 RT		89		859.4																											
		89	85		855.0	845.3			272																						
Y6 12+75 CL		90									80																				
81+10 LT		91		858.1																											
		91	92		853.4	847.9																							28				
81+10 LT		92		851.8																											
		92	OUT		847.9	845.0																							100				
82+03 LT		93		857.9																											
		93	91		853.9	853.4	Y				92																				
81+52 RT		94		859.6																											
		94	95		856.6	854.8			48																						
82+02 RT		95		859.5																											
		95	93		854.5	854.4	Y			52																					
82+09 RT		96		859.5																											
		96	95		855.6	854.8			8																						
82+01 RT		97		859.0																											
SHEET TOTALS									1648	136	172														20		376				

STATION	STRUCTURE NO. FROM	TO	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.)FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
67+40 LT	75							1							1	1																												
67+44 RT	76							1			1			1																													32	PRECAST
68+88 LT	77							1			1			1																													55	
69+02 LT	78							1										1			1																							
69+85 LT	79							1			1		1																															
71+85 LT	80							1			1			1																													45	REMOVE 2 DW PIPES
74+01 LT	81							1			1	1																																
74+02 LT	82							1							1	1																												
74+32 LT	83							1			1		1																															
73+99 RT	84							1	4.06		1	1																																
74+34 RT	85							1	4.95		1			1																													91	REMOVE 3 PIPES IN SYSTEM
75+80 LT	86							1			1		1																															
76+93 RT	87							1																1	1																		35	PRECAST
77+42 RT	88							1			1		1																														80	REMOVE 3 12" CONC. PIPES/PRECAST
77+04 RT	89							1							1	1																												
81+10 LT	91							1			1			1																														
81+10 LT	92							1							1	1																												
82+03 LT	93							1			1	1																																
81+52 RT	94							1			1			1																														PRECAST
82+02 RT	95							1			1	1																																PRECAST
82+09 RT	96							1			1	1																															49	PRECAST
82+01 RT	97							1										1			1																							
SHEET TOTALS								22	9.01		15	5	4	6	4	4		2			2			1	1																		387	

ABBREVIATIONS

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

COMPUTED BY: KSH DATE: 2/10/2008

CHECKED BY: RSW DATE: 3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-G

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE																.064	.064	.064	.064	.079	.079	.109	.109								
		97	95		856.3	854.8			52																						
83+50 RT		98		860.0																											
		98	99		857.0	855.5			56																						
83+51 LT		99		858.5																											
		99	93		855.5	854.6	Y		144																						
87+88 RT		100																													
89+28 RT		101																													
90+13 RT		102																													
88+29 LT		102A		859.4																											
		102A	103		856.4	855.5	Y		84																						
89+17 LT		103		858.5																											
		103	106		855.5	852.8	Y		248																						
89+17 LT		104		859.5																											
		104	103		856.3	855.5																					16						
89+15 RT		105		860.3																											
		105	107		857.3	854.3			256																						
91+74 LT		106		855.8																											
		106	108		852.8	851.5			72																						
91+75 RT		107		857.4																											
		107	109		854.3	853.4			72																						
92+46 LT		108		855.6																											
		108	110		851.5	851.0			32																						
92+45 RT		109		856.5																											
		109	109A		853.5	852.2			112																						
93+54 RT		109A		856.5																											
		109A	OUT		852.2	852.0			52																						
92+81 LT		110		855.6																											
		110	OUT		851.0	829.5																					188						
96+22 LT		111																													
96+00 LT		112		852.5																											
		112	113		849.5	847.5			48																						
96+00 RT		113		850.5																											
		113	114		847.5	839.2			348																						
99+60 RT		114		848.4																											
		114	115		838.9	838.1	Y			92																					
100+54 RT		115		848.4																											
		115	OUT		837.6	833.5																							60				
99+85 LT		116		850.4																											
		116	117		840.8	840.5	Y			68																					
100+55 LT		117		850.5																											
		117	115		840.5	838.4			52																						
100+67 LT		118		847.0																											
		118	117		844.8	840.5			68																						
102+02 RT		119		848.2																											
SHEET TOTALS									1696	160															204		60				

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S STD. 840.16	PIPE REMOVAL LIN. FT.	REMARKS
	97	95																
83+50 RT	98							1			1		1					PRECAST/TRAFFIC BEARING
	98	99																
83+51 LT	99							1			1		1					PRECAST
	99	93																
87+88 RT	100		28														27	
89+28 RT	101		28															
90+13 RT	102		28															
88+29 LT	102A							1			1			1			18	PRECAST
	102A	103																
89+17 LT	103							1			1			1			41	REMOVE 2 DW PIPES/PRECAST
	103	106																
89+17 LT	104							1							1	1		
	104	103																
89+15 RT	105							1			1			1			34	REMOVE 2 DW PIPES
	105	107																
91+74 LT	106							1			1			1			33	PRECAST
	106	108																
91+75 RT	107							1			1			1				
	107	109																
92+46 LT	108							1			1			1				PRECAST
	108	110																
92+45 RT	109							1			1			1				
	109	109A																
93+54 RT	109A							1			1			1				
	109A	OUT																
92+81 LT	110							1			1			1				PRECAST
	110	OUT																
96+22 LT	111		32														112	REMOVE 2 12" CMP
96+00 LT	112							1			1		1				32	REMOVE 2 DW PIPES
	112	113																
96+00 RT	113							1			1		1					
	113	114																
99+60 RT	114							1	4.47		1		1					
	114	115																
100+54 RT	115							1	5	0.75	1	1						
	115	OUT																
99+85 LT	116							1	4.65		1		1					
	116	117																
100+55 LT	117							1	5	0.1					1	1		
	117	115																
100+67 LT	118							1							1	1		
	118	117																
102+02 RT	119							1	0.35		1			1				
SHEET TOTALS			116					20	19.47	0.85	17	1	6	10	3	3	297	

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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.) FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71

ABBREVIATIONS

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

COMPUTED BY:	KSH	DATE:	2/10/2008
CHECKED BY:	RSW	DATE:	7/21/2008

PROJECT NO.	SHEET NO.
R-3833A	3-H

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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 OTHERWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"
		119	115		842.8	838.1				140																					
102+07 RT		120		850.2																											
		120	119		843.3	842.8	Y			48																					
102+19 LT		121		847.0																											
		121	120		844.3	843.5			100																						
102+56 RT		122		850.4																											
		122	120		847.4	843.5	Y		48																						
DW2 11+50 LT		123																													
Y7 15+03 CL		124									92																				
Y7 12+25 RT		125																													
104+60 LT		126		851.7																											
		126	127		848.7	844.8			40																						
104+61 RT		127		850.1																											
		127	OUT		843.0	842.7	Y																						80		
107+42 RT		128		852.8																											
		128	127		845.1	843.0	Y						272																		
107+42 LT		129		854.8																											
		129	128		851.1	846.1					52																				
111+01 RT		129A		858.6																											
		129A	128		854.3	845.6						344																			
107+43 LT		130		857.0																											
		130	129		853.5	851.1					80																				
111+00 LT		130A		860.7																											
		130A	129A		857.3	855.6			48																						
111+21 LT		131		860.8																											
		131	130A		857.6	857.3	Y		60																						
111+00 RT		132		860.0																											
		132	129A		856.4	855.6			16																						
111+36 RT		133		859.0																											
		133	129A		855.2	854.8	Y				36																				
112+28 RT		134		860.8																											
		134	133		857.1	855.2					96																				
112+87 RT		135		862.4																											
		135	134		858.8	857.6				64																					
Y9 11+04 RT		136		863.3																											
		136	135		859.6	858.8	Y			96																					
Y9 11+08 LT		137		863.5																											
		137	136		859.8	859.6	Y			44																					
114+50 RT		138		863.5																											
		138	137		860.1	859.8				40																					
115+24 RT		139		866.3																											
		139	138		862.2	860.3			112																						
115+07 LT		140		867.0																											
		140	139		864.0	862.2	Y		52																						
115+08 LT		141		869.0																											
		141	140		866.3	864.0																					24						
SHEET TOTALS									476	432	356	344	272												24				80		

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.) FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
	119	115																																										
102+07 RT	120							1	1.92															1	1																			
	120	119																																										
102+19 LT	121							1										1			1																							
	121	120																																										
102+56 RT	122							1			1			1																														
	122	120																																										
																																											21	
DW2 11+50 LT	123		40																																								78	REMOVE 2 PIPES
Y7 15+03 CL	124																																										36	
Y7 12+25 RT	125		52																																									
104+60 LT	126							1			1			1																														
	126	127																																										
104+61 RT	127							1	2.05		1			1																														
	127	OUT																																										
107+42 RT	128							1	2.65		1			1																														
	128	127																																										
107+42 LT	129							1			1			1																														
	129	128																																										
111+01 RT	129A							1			1			1																													26	
	129A	128																																										
107+43 LT	130							1										1			1																						37	PRECAST
	130	129																																										
111+00 LT	130A							1			1			1																														
	130A	129A																																										
111+21 LT	131							1							1	1																											20	
	131	130A																																										
111+00 RT	132							1			1	1																																
	132	129A																																										
111+36 RT	133							1			1	1																															76	
	133	129A																																										
112+28 RT	134							1			1	1																															63	PRECAST
	134	133																																										
112+87 RT	135							1			1			1																													112	PRECAST
	135	134																																										
Y9 11+04 RT	136							1			1		1																															PRECAST
	136	135																																										
Y9 11+08 LT	137							1			1			1																														
	137	136																																										
114+50 RT	138							1							1	1																												
	138	137																																										
115+24 RT	139							1			1		1																														19	PRECAST
	139	138																																										
115+07 LT	140							1			1		1																															
	140	139																																										
115+08 LT	141							1										1			1																							
	141	140																																										
SHEET TOTALS			92					21	6.62		15	3	3	9	2	2		3			3			1	1																		488	

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

COMPUTED BY: KSH DATE: 2/10/2008

CHECKED BY: DL DATE: 3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-I

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"
109+00 RT		142													
119+15 LT		143		863.4											
		143	144		860.4	857.5			160						
119+16 LT		143A		866.0											
		143A	143		866.0	860.4									
120+86 LT		144		860.5											
		144	147		857.3	852.7				212					
120+86 RT		145		862.6											
		145	144		859.6	857.5			48						
120+86 RT		146		864.0											
		146	145		861.3	859.6			44						
123+15 LT		147		855.9											
		147	OUT		852.2	849.5									
123+15 RT		148		857.7											
		148	147		854.7	852.9			44						
123+11 RT		149		858.2											
		149	148		855.5	854.7	Y		56						
125+05 RT		150													
125+49 LT		151		852.0											
		151	152		849.0	848.6			44						
125+98 LT		152		851.3											
		152	153		848.6	846.2			44						
126+07 LT		153		849.2											
		153	156		846.2	845.2	Y		132						
126+00 RT		154		851.0											
		154	155		848.3	847.7	Y		128						
127+16 RT		155		850.5											
		155	156		847.7	845.2			108						
127+45 LT		156		848.2											
		156	157		845.0	840.1									
127+46 LT		157		843.5											
		157	OUT		840.1	819.0									
131+07 RT		158		847.2											
		158	159		844.2	842.1			40						
131+48 RT		159		846.4											
		159	161		842.1	841.8	Y		48						
131+50 RT		160		845.5											
		160	159		842.8	842.1	Y		48						
131+48 LT		161		845.4											
		161	162		841.8	840.9	Y		80						
132+30 LT		162		843.9											
		162	OUT		840.9	840.0									
SHEET TOTALS									1024	212					

STATION	FROM	TO	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, 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 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
109+00 RT	142																		60				
119+15 LT	143																						
	143	144																					
119+16 LT	143A																						
	143A	143										16											
120+86 LT	144																						
	144	147																					
120+86 RT	145																						
	145	144																					
120+86 RT	146																						
	146	145																					
123+15 LT	147																						
	147	OUT												28									
123+15 RT	148																						
	148	147																					
123+11 RT	149																						
	149	148																					
125+05 RT	150																		16				
125+49 LT	151																						
	151	152																					
125+98 LT	152																						
	152	153																					
126+07 LT	153																						
	153	156																					
126+00 RT	154																						
	154	155																					
127+16 RT	155																						
	155	156																					
127+45 LT	156																						
	156	157											28										
127+46 LT	157																						
	157	OUT											268										
131+07 RT	158																						
	158	159																					
131+48 RT	159																						
	159	161																					
131+50 RT	160																						
	160	159																					
131+48 LT	161																						
	161	162																					
132+30 LT	162																						
	162	OUT										24											
SHEET TOTALS												40	296	28					76				

STATION	FROM	TO	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.)FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE
109+00 RT	142																																	
119+15 LT	143		1			1			1																									
	143	144																																
119+16 LT	143A																								1									
	143A	143																																
120+86 LT	144		1			1			1																									
	144	147																																
120+86 RT	145		1			1			1																									
	145	144																																
120+86 RT	146		1										1			1																		
	146	145																																
123+15 LT	147		1			1			1																									
	147	OUT																																
123+15 RT	148		1			1			1																									
	148	147																																
123+11 RT	149		1										1			1																		
	149	148																																
125+05 RT	150																																	
125+49 LT	151		1			1			1																									
	151	152																																
125+98 LT	152		1																1	1														
	152	153																																
126+07 LT	153		1			1			1																									
	153	156																																
126+00 RT	154		1										1			1																		
	154	155																																
127+16 RT	155		1							1	1																							
	155	156																																
127+45 LT	156		1			1			1																									
	156	157																																
127+46 LT	157		1							1	1																							
	157	OUT																																
131+07 RT	158		1			1			1																									
	158	159																																
131+48 RT	159		1			1			1																									
	159	161																																
131+50 RT	160		1										1			1																		
	160	159																																
131+48 LT	161		1			1			1																									
	161	162																																
132+30 LT	162		1			1			1																									
	162	OUT																																
SHEET TOTALS			19			12			12	2	2		4			4			1	1					1									

STATION	FROM	TO	FLOWABLE FILL MATERIAL (CU YDS)	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
109+00 RT	142						
119+15 LT	143					20	
	143	144					
119+16 LT	143A					20	
	143A	143					
120+86 LT	144						
	144	147					
120+86 RT	145					36	PRECAST/TRAFFIC BEARING
	145	144					
120+86 RT	146						
	146	145					
123+15 LT	147						
	147	OUT					
123+15 RT	148					35	PRECAST
	148	147					
123+11 RT	149						
	149	148					
125+05 RT	150						
125+49 LT	151					38	
	151	152					
125+98 LT	152						
	152	153					
126+07 LT	153						
	153	156					
126+00 RT	154					121	
	154	155					
127+16 RT	155					41	
	155	156					
127+45 LT	156						
	156	157					
127+46 LT	157						
	157	OUT					
131+07 RT	158						
	158	159					
131+48 RT	159						
	159	161					
131+50 RT	160						
	160	159					
131+48 LT	161					42	PRECAST
	161	162					
132+30 LT	162		2.5		0.065		PRECAST
	162	OUT					
SHEET TOTALS			2.5		0.065	353	

ABBREVIATIONS

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

COMPUTED BY: KSH DATE: 2/10/2008

CHECKED BY: DL DATE: 3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-J

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"
135+41 LT		163		840.2											
		163	164		837.2	837.2			4						
135+48 LT		164		840.2											
		164	165		837.2	836.9	Y		60						
136+09 LT		165		840.4											
		165	OUT		836.9	835.0									
135+41 RT		166		840.2											
		166	167		837.2	837.2			4						
135+48 RT		167		840.2											
		167	168		837.2	836.5	Y		128						
136+75 RT		168		840.7											
		168	OUT		836.2	835.0									
137+83 RT		169		841.2											
		169	168		837.3	836.5	Y		100						
137+83 LT		170		842.2											
		170	169		839.2	837.3			52						
138+19 LT		171		842.3											
		171	170		839.3	839.2	Y		36						
139+91 RT		172		841.3											
		172	169		838.3	837.3	Y		208						
139+91 LT		173		843.4											
		173	172		840.4	838.3			52						
137+50 LT		174													
141+65 LT		175													
Y11 11+93 LT		176		833.6											
		176	OUT		830.6	830.3	Y		44						
143+37 RT		177		844.7											
		177	179		841.5	840.1			48						
143+92 RT		178		844.9											
		178	177		841.9	841.5	Y		48						
143+71 RT		179		843.1											
		179	OUT		840.1	836.8									
146+50 RT		180		847.6											
		180	179		844.6	840.1	Y		276						
151+09 RT		181		857.2											
		181	180		853.7	844.6			456						
151+09 RT		182		856.9											
		182	181		853.9	853.7	Y		32						
151+50 RT		183		857.9											
		183	182		854.9	853.9			40						
SHEET TOTALS									1588						

BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE)												
SIZE	12"	15"	18"	24"		30"		36"		42"		48"
THICKNESS OR GAUGE	.064	.064	.064	.064		.079		.079		.109		.109

STATION	FROM	TO	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, 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 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANITIES 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
135+41 LT	163															1			1	1		
	163	164																				
135+48 LT	164															1			1	1		
	164	165																				
136+09 LT	165															1			1		1	
	165	OUT		32																		
135+41 RT	166															1			1	1		
	166	167																				
135+48 RT	167															1			1	1		
	167	168																				
136+75 RT	168															1			1			1
	168	OUT			28																	
137+83 RT	169															1			1			1
	169	168																				
137+83 LT	170															1			1			1
	170	169																				
138+19 LT	171															1			1			1
	171	170																				
139+91 RT	172															1			1			1
	172	169																				
139+91 LT	173															1			1			1
	173	172																				
137+50 LT	174										16											
141+65 LT	175										24											
Y11 11+93 LT	176															1			1			1
	176	OUT																				
143+37 RT	177															1						
	177	179																				
143+92 RT	178															1			1			1
	178	177																				
143+71 RT	179															1			1			1
	179	OUT		92																		
146+50 RT	180															1			1			1
	180	179																				
151+09 RT	181															1			1			1
	181	180																				
151+09 RT	182															1			1		1	
	182	181																				
151+50 RT	183															1			1		1	
	183	182																				
SHEET TOTALS				124	28						40					19			18	4	3	11

STATION	FROM	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.) FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE
143+37 RT	177										1	1														
SHEET TOTALS											1	1														

STATION	FROM	TO	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
135+41 LT	163					24	PRECAST
	163	164					
135+48 LT	164						PRECAST
	164	165					
136+09 LT	165						PRECAST
	165	OUT					
135+41 RT	166						
	166	167					
135+48 RT	167						
	167	168					
136+75 RT	168						
	168	OUT					
137+83 RT	169						
	169	168					
137+83 LT	170						PRECAST
	170	169					
138+19 LT	171						PRECAST
	171	170					
139+91 RT	172						
	172	169					
139+91 LT	173						PRECAST
	173	172					
137+50 LT	174					18	
141+65 LT	175					25	REMOVE 2 PIPES
Y11 11+93 LT	176						PRECAST
	176	OUT					
143+37 RT	177						PRECAST
	177	179					
143+92 RT	178						PRECAST
	178	177					
143+71 RT	179						
	179	OUT					
146+50 RT	180					14	
	180	179					
151+09 RT	181						
	181	180					
151+09 RT	182						PRECAST
	182	181					
151+50 RT	183					76	REMOVE 3 PIPES/PRECAST
	183	182					
SHEET TOTALS						157	

ABBREVIATIONS

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

COMPUTED BY:	KSH	DATE:	2/10/2008
CHECKED BY:	DL	DATE:	3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-K

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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 OTHERWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"
147+06 LT		184																													
149+07 LT		185																													
151+04 LT		186		855.9																											
		186	OUT		852.9	844.8																			32						
159+00 LT		187																													
159+80 LT		187A																													
157+35 RT		188		860.8																											
		188	189		857.8	856.2			52																						
157+35 LT		189		859.2																											
		189	190		856.2	854.5	Y		304																						
160+40 LT		190		857.5																											
		190	193		854.2	853.7	Y			116																					
160+00 RT		191		858.8																											
		191	192		855.8	855.4	Y		40																						
160+40 RT		192		858.4																											
		192	190		855.4	854.5			48																						
161+56 LT		193		856.9																											
		193	194		853.2	853.2					4																				
161+63 LT		194		856.9																											
		194	195		853.2	852.9	Y				100																				
161+63 RT		195		856.6																											
		195	198		852.9	852.1	Y				156																				
162+75 LT		196		857.4																											
		196	197		854.4	854.0	Y		64																						
163+20 RT		197		858.7																											
		197	198		854.0	852.9			56																						
163+20 RT		198		858.9																											
		198	199		852.1	851.7	Y				84																				
Y13 26+90 RT		199		857.6																											
		199	200		851.7	851.5	Y				28																				
Y13 26+90 LT		200		858.1																											
		200	201		851.5	851.3	Y				48																				
Y13 26+90 LT		201		858.4																											
		201	202		851.3	840.8					250																				
Y13 29+50 LT		202		844.6																											
		202	204		840.8	837.6					156																				
Y13 29+50 RT		203		845.7																											
		203	202		842.5	841.6			48																						
Y13 31+11 LT		204		841.3																											
		204	206		837.6	833.1					228																				
Y13 31+11 RT		205		842.1																											
		205	204		839.0	838.3	Y		40																						
Y13 33+36 LT		206		835.8																											
		206	207		833.1	826.2																					484				
Y13 38+14 LT		207		829.7																											
		207	208		825.2	810.4																							84		
SHEET TOTALS									652	116	1054														32		484		84		

STATION	FROM	TO	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.) FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54
147+06 LT	184																											
149+07 LT	185																											
151+04 LT	186							1			1		1															
	186	OUT																										
159+00 LT	187		20																									
159+80 LT	187A		24																									
157+35 RT	188							1			1			1														
	188	189																										
157+35 LT	189							1			1			1														
	189	190																										
160+40 LT	190							1			1			1														
	190	193																										
160+00 RT	191							1			1			1														
	191	192																										
160+40 RT	192							1			1			1														
	192	190																										
161+56 LT	193							1			1	1																
	193	194																										
161+63 LT	194							1			1	1																
	194	195																										
161+63 RT	195							1			1	1																
	195	198																										
162+75 LT	196							1			1		1															
	196	197																										
163+20 RT	197							1			1		1															
	197	198																										
163+20 RT	198							1	1.75		1			1														
	198	199																										
Y13 26+90 RT	199							1	0.95		1		1															
	199	200																										
Y13 26+90 LT	200							1	1.57						1	1												
	200	201																										
Y13 26+90 LT	201							1	2.15		1			1														
	201	202																										
Y13 29+50 LT	202							1			1			1														
	202	204																										
Y13 29+50 RT	203							1							1	1												
	203	202																										
Y13 31+11 LT	204							1			1			1														
	204	206																										
Y13 31+11 RT	205							1							1	1												
	205	204																										
Y13 33+36 LT	206							1											1		1							
	206	207																										
Y13 38+14 LT	207							1										1			1							
	207	208																										
SHEET TOTALS			44					21	6.42		16	3	4	9	3	3		1	1		2							

STATION	FROM	TO	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
147+06 LT	184				1												21	
149+07 LT	185				1													
151+04 LT	186																	
	186	OUT																
159+00 LT	187																20	
159+80 LT	187A																19	
157+35 RT	188																	PRECAST
	188	189																
157+35 LT	189																17	
	189	190																
160+40 LT	190																	PRECAST
	190	193																
160+00 RT	191																	PRECAST
	191	192																
160+40 RT	192																	PRECAST
	192	190																
161+56 LT	193																68	PRECAST
	193	194																
161+63 LT	194																30	PRECAST
	194	195																
161+63 RT	195																	
	195	198																
162+75 LT	196																73	PRECAST
	196	197																
163+20 RT	197																	PRECAST/TRAFFIC BEARING
	197	198																
163+20 RT	198																	
	198	199																
Y13 26+90 RT	199																	
	199	200																
Y13 26+90 LT	200																	PRECAST
	200	201																
Y13 26+90 LT	201																	
	201	202																
Y13 29+50 LT	202																20	
	202	204																
Y13 29+50 RT	203																	PRECAST
	203	202																
Y13 31+11 LT	204																168	REMOVE 2 PIPES
	204	206																
Y13 31+11 RT	205																46	REMOVE 2 PIPES/PRECAST
	205	204																
Y13 33+36 LT	206																38	REMOVE 2 PIPES
	206	207																
Y13 38+14 LT	207																	
	207	208																
SHEET TOTALS					2												520	

ABBREVIATIONS

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

COMPUTED BY: KSH DATE: 2/10/2008

CHECKED BY: DL DATE: 3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-L

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) SIZE	THICKNESS OR GAUGE	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) SIZE	THICKNESS OR GAUGE	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, TYPE S OR D SIZE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	LIN. FT. A 5.0' THRU 10.0'	LIN. FT. B 10.0' AND ABOVE	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. "A" + (1.3 X COL. "B")	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.) FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 650.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
Y13 38+14 LT		208		814.0														1																																	
		208	OUT		810.4	797.0									64																																			
Y13 33+15 RT		209												92																																			70	
Y13 32+88 RT		209A																																				1											
Y13 20+63 LT		210		855.0														1																1	1														PRECAST
		210	211		852.3	851.0		40																																									
Y13 20+63 RT		211		854.0														1				1			1																								
		211	212		851.0	846.1		198																																									
Y13 18+57 RT		212		849.1														1				1			1																								PRECAST
		212	213		845.9	845.4	Y		98																																								
Y13 17+49 RT		213		848.8														1				1			1																							21	PRECAST
		213	214		845.4	845.2	Y		28																																								
Y13 17+49 LT		214		850.2														1																1	1														51	PRECAST
		214	215		845.2	844.7	Y		52																																								
Y21 10+45 LT		215		847.9														1				1		1																									PRECAST
		215	216		844.7	834.5			120																																								
Y13 17+31 LT		216		837.7														1				1		1																									PRECAST
		216	217		834.5	824.8			96																																								
Y13 17+53 LT		217		828.0														1				1		1																									PRECAST
		217	EX		824.8	806.2			96																																								
Y13 15+10 LT		218												24																																			20	
Y13 14+54 RT		219		842.0														1				1			1																									PRECAST
		219	220		839.0	834.1		52																																									
Y13 14+00 RT		220		841.6														1	2.7			1			1																								PRECAST
		220	OUT		833.9	833.2			20																																								
Y13 14+10 LT		221			835.6	833.9			40																																					0.4			PIPE AND COLLAR ONLY
168+33 RT		222		859.5														1								1	1																						PRECAST
		222	223		856.3	848.9		68																																									
168+33 RT		223		851.9														1								1	1																						
		223	EX		847.6	845.7																																										55	
168+91 RT		224		859.2														1								1	1																						PRECAST
		224	225		856.1	855.0		4																																									
168+98 RT		225		859.2														1	5	0.3	1	1																											PRECAST
		225	228		848.9	848.6	Y		64																																								
168+98 LT		226		857.1														1			1	1																											
		226	225		852.9	848.9			64																																								
169+05 LT		227		857.1														1			1	1																										36	REMOVE 2 PIPES
		227	226		854.1	853.9		4																																									
168+99 RT		228		854.3														1	0.7							1	1																						
		228	223		848.6	848.1	Y			68																																								
SHEET TOTALS								366	678	68				24	92			18	8.4	0.3	11	3	3	5	4	4		1		1			2	2								1							0			0.4		253	

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

COMPUTED BY:	KSH	DATE:	2/10/2008
CHECKED BY:	DL	DATE:	3/20/2008

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
R-3833A	3-M

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"
169+96 RT		229		857.6											
		229	228		855.1	849.1				100					
170+23 RT		230		859.9											
		230	229		856.9	855.4			68						
171+39 RT		231		861.0											
		231	229		858.8	855.4									
172+24 RT		232		864.4											
		232	231		861.8	858.8									
173+02 RT		233		865.3											
		233	232		862.2	861.8	Y								
Y14 10+75 RT		234		867.1											
		234	233		862.4	862.2	Y								
Y14 11+25 RT		235		864.8											
		235	234		862.8	862.4	Y								
Y14 10+81 LT		236		868.5											
		236	234		862.7	862.4	Y		64						
Y14 11+25 LT		237		865.6											
		237	236		863.6	862.7									
174+82 RT		238		866.1											
		238	236		863.1	862.7	Y		80						
174+80 LT		239													
177+54 LT		241		861.7											
		241	242		858.7	856.5			44						
177+54 LT		242		860.0											
180+05 LT		243		855.8											
		243	244		852.8	851.6			44						
180+52 LT		244		854.3											
		244	245		851.6	849.7			52						
180+59 RT		245		852.7											
		245	246		849.5	845.0				168					
182+32 RT		246		849.3											
		246	OUT		845.0	842.0									
Y16 13+72 LT		244A		852.8											
		244A	244B		849.8	849.4	Y		36						
Y16 13+72 RT		244B		852.4											
		244B	244C		849.4	847.7									
Y16 12+79 RT		244C		851.0											
		244C	244D		847.7	845.1									
Y16 12+30 RT		244D		848.1											
		244D	OUT		845.1	843.1									
SHEET TOTALS									388	268					

STATION	FROM	TO	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, 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 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
169+96 RT	229																						
	229	228																					
170+23 RT	230																						
	230	229																					
171+39 RT	231																						
	231	229										144											
172+24 RT	232																						
	232	231										84											
173+02 RT	233																						
	233	232										80											
Y14 10+75 RT	234																						
	234	233										60											
Y14 11+25 RT	235																						
	235	234										52											
Y14 10+81 LT	236																						
	236	234																					
Y14 11+25 LT	237																						
	237	236										48											
174+82 RT	238																						
	238	236																					
174+80 LT	239																						
177+54 LT	241																						
	241	242																					
177+54 LT	242																						
180+05 LT	243																						
	243	244																					
180+52 LT	244																						
	244	245																					
180+59 RT	245																						
	245	246																					
182+32 RT	246																						
	246	OUT											40										
Y16 13+72 LT	244A																						
	244A	244B																					
Y16 13+72 RT	244B																						
	244B	244C										92											
Y16 12+79 RT	244C																						
	244C	244D										48											
Y16 12+30 RT	244D																						
	244D	OUT										100											
SHEET TOTALS												708	40										

STATION	FROM	TO	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.
169+96 RT	229		1							1	1						
	229	228															
170+23 RT	230		1			1		1									
	230	229															
171+39 RT	231		1							1	1						
	231	229															
172+24 RT	232		1							1	1						
	232	231															
173+02 RT	233		1							1	1						
	233	232															
Y14 10+75 RT	234		1			1			1								
	234	233															
Y14 11+25 RT	235		1											1		1	
	235	234															
Y14 10+81 LT	236		1	0.77						1	1						
	236	234															
Y14 11+25 LT	237		1											1		1	
	237	236															
174+82 RT	238		1			1			1								
	238	236															
174+80 LT	239																
177+54 LT	241		1			1		1									
	241	242															
177+54 LT	242																
180+05 LT	243		1			1		1									
	243	244															
180+52 LT	244		1														
	244	245															
180+59 RT	245		1			1		1									
	245	246															
182+32 RT	246		1			1		1									
	246	OUT															
Y16 13+72 LT	244A		1			1		1									
	244A	244B															
Y16 13+72 RT	244B		1			1			1								
	244B	244C															
Y16 12+79 RT	244C		1			1		1									
	244C	244D															
Y16 12+30 RT	244D		1			1			1								
	244D	OUT															
SHEET TOTALS			19	0.77		11		7	4	5	5			2		2	

STATION	FROM	TO	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.) FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
169+96 RT	229																							
	229	228																						
170+23 RT	230																						79	
	230	229																						
171+39 RT	231																						19	
	231	229																						
172+24 RT	232																						20	
	232	231																						
173+02 RT	233																							
	233	232																						
Y14 10+75 RT	234																							PRECAST
	234	233																						
Y14 11+25 RT	235																							
	235	234																						
Y14 10+81 LT	236																						56	
	236	234																						
Y14 11+25 LT	237																							
	237	236																						
174+82 RT	238																						18	
	238	236																						
174+80 LT	239										1													
177+54 LT	241																							PRECAST
	241	242																						
177+54 LT	242											1												
180+05 LT	243																							PRECAST/TRAFFIC BEARING
	243	244																						
180+52 LT	244			1	1																		260	REMOVE ALL PIPES IN SYSTEM/PRECAST/TRAFFIC BEARING
	244	245																						
180+59 RT	245																							
	245	246																						
182+32 RT	246																							
	246	OUT																						
Y16 13+72 LT	244A																							PRECAST
	244A	244B																						
Y16 13+72 RT	244B																							
	244B	244C																						
Y16 12+79 RT	244C																							
	244C	244D																						
Y16 12+30 RT	244D																							
	244D	OUT																						
SHEET TOTALS				1	1						1	1											452	

ABBREVIATIONS

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

COMPUTED BY:	KSH	DATE:	2/10/2008
CHECKED BY:	DL	DATE:	3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-N

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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"
183+38 LT		247		849.9											
		247	248		847.7	847.4	Y								
183+66 LT		248		849.6											
		248	249		847.4	845.5									
184+91 LT		249		849.2											
		249	252		844.7	844.3	Y			64					
183+96 LT		250		848.5											
		250	251		845.5	844.3			40						
183+96 RT		251		847.3											
		251	253		843.6	842.6					92				
184+91 LT		252		848.4											
		252	253		844.3	843.1				40					
184+91 RT		253		847.2											
		253	OUT		842.1	840.0									
186+02 LT		254		849.2											
		254	255		846.2	844.8	Y								
186+50 LT		255		848.1											
		255	257		844.8	844.1			88						
187+00 LT		256		848.0											
		256	255		845.0	844.8	Y		48						
186+50 RT		257		847.8											
		257	253		843.9	843.1	Y			156					
188+00 RT		258		848.2											
		258	257		844.8	844.1	Y		148						
189+91 RT		259		848.7											
		259	258		845.7	844.8	Y		188						
189+91 LT		260		849.8											
		260	259		846.8	845.7			56						
190+11 LT		261		849.9											
		261	260		846.9	846.8	Y		20						
192+24 LT		262		851.6											
		262	263		848.4	847.3			56						
192+24 RT		263		850.3											
		263	264		846.6	841.6					76				
Y17 11+08 LT		264		845.4											
		264	265		841.6	832.7					188				
Y17 12+95 LT		265		836.5											
		IN	265		833.5	833.2				20					
		265	266		832.7	832.1					32				
Y17 12+97 RT		266		836.4											
		266	OUT		832.1	830.9					28				
194+00 RT		267		853.3											
		267	263		850.1	847.1				176					
194+00 LT		268		854.6											
		268	267		851.5	850.3			56						
196+00 RT		269		856.8											
		269	267		853.6	850.1				200					
SHEET TOTALS									700	656	416				

STATION	FROM	TO	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, 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 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
183+38 LT	247																						
	247	248										28											
183+66 LT	248																						
	248	249										128											
184+91 LT	249																						
	249	252																					
183+96 LT	250																						
	250	251																					
183+96 RT	251																						
	251	253																					
184+91 LT	252																						
	252	253																					
184+91 RT	253																						
	253	OUT													36								
186+02 LT	254																						
	254	255										52											
186+50 LT	255																						
	255	257																					
187+00 LT	256																						
	256	255																					
186+50 RT	257																						
	257	253																					
188+00 RT	258																						
	258	257																					
189+91 RT	259																						
	259	258																					
189+91 LT	260																						
	260	259																					
190+11 LT	261																						
	261	260																					
192+24 LT	262																						
	262	263																					
192+24 RT	263																						
	263	264																					
Y17 11+08 LT	264																						
	264	265																					
Y17 12+95 LT	265																						
	IN	265																					
	265	266																					
Y17 12+97 RT	266																						
	266	OUT																					
194+00 RT	267																						
	267	263																					
194+00 LT	268																						
	268	267																					
196+00 RT	269																						
	269	267																					
SHEET TOTALS												208			36								

STATION	FROM	TO	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S STD. 840.16
183+38 LT	247		1							1	1
	247	248									
183+66 LT	248		1							1	1
	248	249									
184+91 LT	249		1							1	1
	249	252									
183+96 LT	250		1			1		1			
	250	251									
183+96 RT	251		1			1		1			
	251	253									
184+91 LT	252		1			1	1				
	252	253									
184+91 RT	253		1	0.15		1	1				
	253	OUT									
186+02 LT	254		1							1	1
	254	255									
186+50 LT	255		1			1		1			
	255	257									
187+00 LT	256		1			1		1			
	256	255									
186+50 RT	257		1			1			1		
	257	253									
188+00 RT	258		1			1			1		
	258	257									
189+91 RT	259		1			1			1		
	259	258									
189+91 LT	260		1			1			1		
	260	259									
190+11 LT	261		1			1			1		
	261	260									
192+24 LT	262		1							1	1
	262	263									
192+24 RT	263		1			1			1		
	263	264									
Y17 11+08 LT	264		1			1			1		
	264	265									
Y17 12+95 LT	265		1			1			1		
	IN	265									
	265	266									
Y17 12+97 RT	266		1			1		1			
	266	OUT									
194+00 RT	267		1			1			1		
	267	263									
194+00 LT	268		1							1	1
	268	267									
196+00 RT	269		1			1			1		
	269	267									
SHEET TOTALS			23	0.15		17	2	5	10	6	6

STATION	FROM	TO	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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.) FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE
183+38 LT	247																								
	247	248																							
183+66 LT	248																								
	248	249																							
184+91 LT	249																								
	249	252																							
183+96 LT	250																								
	250	251																							
183+96 RT	251																								
	251	253																							
184+91 LT	252																								
	252	253																							
184+91 RT	253																								
	253	OUT																							
186+02 LT	254																								
	254	255																							
186+50 LT	255																								
	255	257																							
187+00 LT	256																								
	256	255																							
186+50 RT	257																								
	257	253																							
188+00 RT	258																								
	258	257																							
189+91 RT	259																								
	259	258																							
189+91 LT	260																								
	260	259																							
190+11 LT	261																								
	261	260																							
192+24 LT	262																								
	262	263																							
192+24 RT	263																								
	263	264																							
Y17 11+08 LT	264																								
	264	265																							
Y17 12+95 LT	265																								
	IN	265																							
	265	266																							
Y17 12+97 RT	266																								
	266	OUT																							
194+00 RT	267																								
	267	263																							
194+00 LT	268																								
	268	267																							
196+00 RT	269																								
	269	267																							
SHEET TOTALS																									

STATION	FROM	TO	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
183+38 LT	247						
	247	248					
183+66 LT	248						
	248	249					
184+91 LT	249						
	249	252					
183+96 LT	250						PRECAST/TRAFFIC BEARING
	250	251					
183+96 RT	251						
	251	253					
184+91 LT	252						PRECAST/TRAFFIC BEARING
	252	253					
184+91 RT	253						
	253	OUT					
186+02 LT	254		3.2		0.065		
	254	255					
186+50 LT	255					23	
	255	257					
187+00 LT	256						
	256	255					
186+50 RT	257						
	257	253					
188+00 RT	258					51	
	258	257					
189+91 RT	259						
	259	258					
189+91 LT	260						PRECAST/TRAFFIC BEARING
	260	259					
190+11 LT	261						PRECAST/TRAFFIC BEARING
	261	260					
192+24 LT	262						PRECAST/TRAFFIC BEARING
	262	263					
192+24 RT	263						
	263	264					
Y17 11+08 LT	264						PRECAST
	264	265					
Y17 12+95 LT	265					61	REMOVE 2 PIPES/PRECAST
	IN	265					
	265	266					
Y17 12+97 RT	266					38	PRECAST
	266	OUT					
194+00 RT	267						
	267	263					
194+00 LT	268						PRECAST/TRAFFIC BEARING
	268	267					
196+00 RT	269						
	269	267					
SHEET TOTALS			3.2		0.065	173	

ABBREVIATIONS

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

COMPUTED BY: KSH DATE: 2/10/2008

CHECKED BY: DL DATE: 3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-O

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

Station	Location (LT, RT, or CL)	Structure No. From	Structure No. To	Top Elevation	Invert Elevation	Invert Elevation	Slope Critical	Class III R.C. Pipe (Unless Noted Otherwise) 12"	15"	18"	24"	30"	36"	42"	48"	Bituminous Coated C.S. Pipe Type B (Unless Noted Otherwise) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	Class III R.C. Pipe or C.S. Pipe, Type IR Aluminized or HDPE, Type S or D 12"	15"	18"	24"	30"	36"	42"	48"
197+24 RT		270		859.0																											
		270	269		856.0	853.8			124																						
197+24 LT		271		860.2																											
		271	270		857.0	856.0			56																						
199+03 RT		272		862.2																											
		272	270		858.1	856.0	Y		176																						
199+26 RT		273		861.4																											
		273	272		858.2	858.1	Y																		32						
199+62 RT		274		862.7																											
		274	273		860.5	858.2																			36						
194+72 LT		275		856.2																											
		275	OUT		852.8	851.0	Y																			176					
Y18 14+16 RT		276		858.3																											
Y18 14+10 RT		277		859.1																											
Y18 13+57 LT		278		859.1																											
		278	280		855.7	854.7			52																						
Y18 13+57 LT		279		859.0																											
		279	278		855.8	855.7	Y																		12						
Y18 14+10 LT		280		858.8																											
197+43 LT		281		860.0																											
		281	280		856.6	854.7			68																						
197+44 LT		282		860.9																											
		282	281		857.9	856.6			20																						
198+67 LT		283		861.6																											
		283	282		858.6	857.9	Y		120																						
201+15 RT		284		864.9																											
		284	285		861.9	861.6	Y		88																						
201+30 LT		285		865.3																											
		285	OUT		861.6	852.7																			84						
207+85 LT		286		866.5																											
		286	288		863.4	863.0	Y		60																						
207+85 LT		287		866.5																											
		287	286		863.5	863.4	Y																		20						
208+48 LT		288		866.3																											
		288	291		862.3	861.9	Y				96																				
208+49 LT		289		866.8																											
		289	288		863.1	862.8																				20					
209+00 LT		290		866.4																											
		290	288		863.4	863.0	Y		48																						
208+60 RT		291		866.6																											
		291	291A		861.9	857.5					44																				
209+08 RT		291A		866.8																											
208+48 RT		292		866.6																											
		292	291		863.6	862.7			12																						
SHEET TOTALS									824		140														184	196					

Station	From	To	15" Side Drain Pipe	18" Side Drain Pipe	24" Side Drain Pipe	Endwalls Std. 838.01 or Std. 838.11 (Unless Noted Otherwise) Cu. Yards R.C.P.	Endwalls 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'	Lin. Ft. B 10.0' and above	C.B. Std. 840.01 or Std. 840.02	Frame, Grates, and Hood Standard 840.03 Type of Grate E	F	G	D.I. Std. 840.14 or Std. 840.15	D.I. Frame with Two Grate S 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. 840.20	G.D.I. (N.S.) Frame with Two Grates Std. 840.24	G.D.I. (N.S.) Frame with Grate Std.	J.B. Std. 840.31 or 840.32	T.B.D.I. Std. 840.35	M.D.I (N.S.) Frame with Two Grates Std. 840.29	Manhole Std. 840.51	M.H. Std. 840.51 or 840.53	M.H. Frame and Cover Std. 840.54	T.B.J.B Std. 840.34	Berm Drain Outlet Std. 850.10	Special Concrete Flume (See Detail Sheet 2 - J)	Convert D.I. to J.B. W/ MH Access	Convert C.B. to J.B. W/ MH Access	Retain and Adjust Exist. C.B.	15" Ductile Iron Pipe (LF)	18" Ductile Iron Pipe (LF)	24" Ductile Iron Pipe (LF)	15" P.V.C. Pipe	30" P.V.C. Pipe	Flowable Fill Material (CU YDS)	Conc. Collars Cl. "B" C.Y. Std. 840.72	Conc. & Brick Pipe Plug, C.Y. Std. 840.71	Pipe Removal Lin. Ft.	Remarks
197+24 RT	270							1			1			1																															
197+24 LT	271							1							1	1																													PRECAST/TRAFFIC BEARING
199+03 RT	272							1			1			1																														48	
199+26 RT	273							1							1	1																													
199+62 RT	274							1							1	1																													
194+72 LT	275							1							1	1																												55	REMOVE 55' OF 18" CONC. PIPE
Y18 14+16 RT	276							1			1		1																																
Y18 14+10 RT	277																																	1												
Y18 13+57 LT	278							1			1			1																															PRECAST
Y18 13+57 LT	279							1							1	1																													
Y18 14+10 LT	280																																	1											41	
197+43 LT	281							1							1	1																													
197+44 LT	282							1			1		1																																PRECAST
198+67 LT	283							1			1		1																																PRECAST
201+15 RT	284							1			1			1																														35	
201+30 LT	285							1			1		1																															108	PRECAST/TRAFFIC BEARING
207+85 LT	286							1			1			1																															PRECAST/TRAFFIC BEARING
207+85 LT	287							1			1		1																																
208+48 LT	288							1			1	1																																88	PRECAST
208+49 LT	289							1			1	1																																	
209+00 LT	290							1			1		1																																PRECAST
208+60 RT	291							1			1	1																																83	
209+08 RT	291A																												1				1													
208+48 RT	292							1			1	1																																	
SHEET TOTALS								21			15	4	6	5	6	6													1				1	2										458	

ABBREVIATIONS

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

COMPUTED BY: KSH DATE: 2/10/2008

CHECKED BY: DL DATE: 3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-P

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, 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 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
209+86 RT		293		868.3																																
		293	294		864.9	858.9				48																										
209+65 RT		294		868.0																																
210+41 RT		295		868.8																																
		295	293		865.6	865.1	Y		52																											
213+90 RT		296		868.1																																
		296	297		864.9	863.6	Y		92																											
514+81 CL		297		867.3																																
		297	299		863.6	863.1	Y		52																											
215+10 LT		298		867.1																																
		298	297		863.9	863.6	Y		32																											
214+81 LT		299		866.1																																
		299	300		863.1	861.4	Y		104																											
215+85 LT		300		865.3																																
		300	301		861.4	856.2			112																											
215+59 LT		301																																		
216+37 LT		302		865.5																																
		302	300		861.8	861.4	Y		48																											
217+16 LT		303		866.0																																
		303	302		862.2	861.8	Y		80																											
217+15 LT		304		865.8																																
		304	303		862.6	862.2	Y		40																											
218+83 LT		305		864.5																																
		305	306		857.4	856.8	Y				104																									
Y19 25+03 RT		306		864.9																																
		306	307		856.8	856.4	Y				96																									
Y19 24+10 RT		307		864.1																																
		307	309		856.3	854.3					124																									
Y19 24+10 RT		308		863.5																																
		308	307		860.4	857.1			72																											
Y19 22+80 RT		309		861.1																																
		309	OUT		853.8	852.0																								40								
Y19 21+23 RT		310		859.3																																
		310	309		856.0	854.8	Y			156																										
Y19 21+16 RT		311		859.3																																
		311	310		856.3	856.3	Y		4																											
Y19 21+09 RT		312		859.3																																
		312	311		856.3	856.3	Y		4																											
Y19 20+66 LT		313		860.0																																
		313	313A		857.0	856.6			48																											
Y19 21+16 LT		313A		859.8																																
		313A	310		856.4	856.0	Y			92																										
Y19 21+71 LT		313B		860.0																																
		313B	313A		857.0	856.6			52																											
SHEET TOTALS									792	296	324																	40								

STATION	STRUCTURE NO. FROM	TO	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.) FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
209+86 RT	293		1							1	1																											84	PRECAST/TRAFFIC BEARING
209+65 RT	294																						1				1												
210+41 RT	295		1							1	1																								3.2		0.045		PRECAST/TRAFFIC BEARING
213+90 RT	296		1							1	1																											62	PRECAST/TRAFFIC BEARING
514+81 CL	297		1							1	1																												PRECAST/TRAFFIC BEARING
215+10 LT	298		1							1	1																											98	PRECAST/TRAFFIC BEARING
214+81 LT	299		1			1			1																														
215+85 LT	300		1			1			1																														
215+59 LT	301																												1										
216+37 LT	302		1			1			1																														
217+16 LT	303		1			1			1																														
217+15 LT	304		1							1	1																												PRECAST
218+83 LT	305		1	2.12						1	1																								5.9		0.065	41	PRECAST/TRAFFIC BEARING
Y19 25+03 RT	306		1	3.05		1			1																													50	
Y19 24+10 RT	307		1	2.75		1			1																													184	
Y19 24+10 RT	308		1							1	1																												PRECAST/TRAFFIC BEARING
Y19 22+80 RT	309		1	2.25		1			1																										4.5		0.065	234	REMOVE 4 PIPES AS SHOWN ON PLANS
Y19 21+23 RT	310		1			1	1																																
Y19 21+16 RT	311		1			1	1																																
Y19 21+09 RT	312		1			1	1																																
Y19 20+66 LT	313		1			1	1																																PRECAST
Y19 21+16 LT	313A		1			1	1																																
Y19 21+71 LT	313B		1			1	1																																PRECAST
SHEET TOTALS			21	10.17		13	6	0	7	8	8												1				1		1						14		0.175	753	

ABBREVIATIONS

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

COMPUTED BY:	KSH	DATE:	2/10/2008
CHECKED BY:	DL	DATE:	3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-Q

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"
Y19 19+20 RT		314		861.2											
Y19 17+90 LT		315A		863.9											
		315A	315		860.9	858.7			112						
Y19 19+02 LT		315		861.7											
		315	313		858.7	857.0	Y		164						
218+42 RT		316		862.8											
		316	305		857.9	857.4	Y				96				
Y19 27+28 RT		317		864.0											
		317	318		864.0	858.6									
218+47 RT		318		862.6											
		318	316		858.4	858.4	Y			4					
Y19 27+19 RT		319		862.1											
		319	318		859.0	858.6	Y		64						
Y19 27+24 RT		319A		862.1											
		319A	319		859.0	859.0			4						
Y19 27+80 RT		320		862.3											
		320	319A		859.2	859.0	Y		56						
Y19 28+75 RT		321		862.8											
		321	320		859.6	859.2	Y		92						
Y19 27+46 LT		322		860.7											
		322	323		857.7	857.5	Y		24						
Y19 27+20 LT		323		860.6											
		323	324		857.5	857.3	Y		28						
Y19 26+89 LT		324		860.6											
		324	325		857.3	857.0	Y		76						
220+45 RT		325		860.0											
		325	326		857.0	856.2	Y		72						
220+96 RT		326		859.8											
		326	333		856.2	854.8	Y		144						
221+70 LT		327		856.0											
		327	328		852.8	851.7			64						
222+30 LT		328		853.8											
		328	329		850.8	850.4	Y								
222+70 LT		329		853.4											
		329	330		850.4	849.8	Y		68						
223+35 LT		330		853.3											
		330	331		849.8	849.6	Y			40					
223+51 LT		331		858.6											
		331	339		849.6	848.3	Y				68				
		EX. CB	331		850.3	849.6	Y				32				
224+11 LT		332		858.2											
		332	331		855.2	854.0			60						
222+48 RT		333		858.0											
		333	334		854.6	854.1	Y			40					
222+90 RT		334		857.9											
		334	337		854.1	851.4				32					
222+95 RT		335		857.9											
		335	334		854.8	854.4			4						
222+33 RT		336		857.1											
		336	337		854.1	851.7			52						
SHEET TOTALS									1084	116	196				

STRUCTURE NO.	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 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 C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, 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 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
314																										
315A																										
315A–315																										
315																										
315–313																										
316																										
316–305																										
317																										
317–318		24																								
318																										
318–316																										
319																										
319–318																										
319A																										
319A–319																										
320																										
320–319A																										
321																										
321–320																										
322																										
322–323																										
323																										
323–324																										
324																										
324–325																										
325																										
325–326																										
326																										
326–333																										
327																										
327–328																										
328																										
328–329															48											
329																										
329–330																										
330																										
330–331																										
331																										
331–339																										
EX. CB–331																										
332																										
332–331																										
333																										
333–334																										
334																										
334–337																										
335																										
335–334																										
336																										
336–337																										
SHEET TOTALS		24													48											

STRUCTURE NO.	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.) FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE
314	1	0.16		1		1																										
315A	1			1			1																									
315A–315																																
315	1			1			1																									
315–313																																
316	1			1	1																											
316–305																																
317																							1									
317–318																																
318	1			1	1																											
318–316																																
319	1							1	1																							
319–318																																
319A	1							1	1																							
319A–319																																
320	1							1	1																							
320–319A																																
321	1							1	1																							
321–320																																
322	1			1		1																										
322–323																																
323	1			1	1																											
323–324																																
324	1			1			1																									
324–325																																
325	1			1		1																										
325–326																																
326	1							1	1																							
326–333																																
327	1							1	1																							
327–328																																
328	1			1			1																									
328–329																																
329	1			1			1																									
329–330																																
330	1			1			1																									
330–331																																
331	1	4.04		1		1																										
331–339																																
EX. CB–331																																
332	1			1		1																										
332–331																																
333	1							1	1																							
333–334																																
334	1							1	1																							
334–337																																
335	1							1	1																							
335–334																																
336	1			1		1																										
336–337																																
SHEET TOTALS	24	4.2		15	3	6	6	9	9														1									

STRUCTURE NO.	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
314				181	REMOVE 1 PIPE AND 19' OF SECOND PIPE
315A					PRECAST
315A–315					
315				33	PRECAST
315–313					
316					
316–305					
317					
317–318					
318				26	
318–316					
319					PRECAST
319–318					
319A					PRECAST
319A–319					
320					PRECAST
320–319A					
321				31	PRECAST
321–320					
322				30	
322–323					
323					
323–324					
324					
324–325					
325					
325–326					
326					TRAFFIC BEARING
326–333					
327				49	
327–328					
328				25	
328–329					
329				97	
329–330					
330				60	REMOVE 2 PIPES
330–331					
331	5.5		0.116		PRECAST
331–339					
EX. CB–331					
332			0.065		PRECAST
332–331					
333					TRAFFIC BEARING
333–334					
334					TRAFFIC BEARING
334–337					
335					TRAFFIC BEARING
335–334					
336				63	
336–337					
SHEET TOTALS	5.5		0.181	595	

ABBREVIATIONS

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

COMPUTED BY: KSH DATE: 2/10/2008

CHECKED BY: DL DATE: 3/20/2008

PROJECT NO.	SHEET NO.
R-3833A	3-R

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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"
222+90 RT		337		857.0											
		337	338		851.4	847.9				60					
223+47 RT		338		857.1											
		338	EX.		847.4	844.3									
223+40 RT		339		857.8											
		339	338		848.3	847.4					36				
224+22 RT		340		857.9											
		340	338		854.9	848.1			128						
222+11 RT		341													
		341	342												
222+99 RT		342													
Y19 12+30 RT		344		862.5											
Y19 14+15 RT		345		865.5											
Y19 13+35 LT		346		864.7											
		346	OUT		861.7	857.0			200						
Y19 32+80 RT		347		860.6											
		347	348		857.4	855.2			64						
Y19 33+44 RT		348		859.3											
		348	351		855.2	855.0	Y		40						
Y19 33+44 LT		349		858.4											
		349	348		855.4	855.2	Y		32						
Y19 33+20 RT		350		860.2											
		350	351		856.5	854.7				24					
Y19 33+44 RT		351		859.6											
		351	352		854.7	846.3				340					
Y19 36+86 RT		352		849.6											
		352	354		845.8	843.4					64				
Y19 36+86 RT		353		850.7											
		353	352		847.5	846.6									
Y19 37+52 RT		354		847.9											
		354	357		843.4	840.1					144				
Y19 37+24 LT		355		848.8											
		355	354		845.8	844.2			68						
Y19 37+52 RT		356		847.9											
		356	354		844.7	844.2									
Y19 38+96 RT		357		844.1											
		357	359		839.6	836.2						76			
Y19 38+96 RT		358		844.2											
		358	357		841.0	840.9	Y								
Y19 39+75 RT		359		842.0											
		359	OUT		836.2	835.9	Y					60			
Y19 39+75 LT		360		842.2											
		360	359		839.0	838.5	Y		56						
Y19 39+75 LT		361		841.0											
		361	360		839.1	839.0	Y								
SHEET TOTALS									588	424	244	136			

STRUCTURE	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 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 C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, 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 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
337																										
337-338																										
338																										
338-EX.																										
339																										
339-338																										
340																										
340-338																										
341																										
341-342															80											
342																										
344																										
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361																										
361-360															16											
SHEET TOTALS															152											

STRUCTURE	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.		J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.) FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54
337	1	0.55		1	1																	
337-338																						
338	1	4.75		1			1															
338-EX.																						
339	1	4.55		1			1															
339-338																						
340	1			1			1															
340-338																						
341																						
341-342																						
342	1																1					
344	1			1			1															
345																						1
346	1			1		1																
346-OUT																						
347	1							1	1													
347-348																						
348	1							1	1													
348-351																						
349	1			1			1															
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352	1			1		1																
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354	1			1		1																
354-357																						
355	1			1			1															
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356	1							1	1													
356-354																						
357	1			1		1																
357-359																						
358	1							1	1													
358-357																						
359	1	0.85		1		1																
359-OUT																						
360	1			1			1															
360-359																						
361	1											1		1								
361-360																						
SHEET TOTALS	22	10.7		15	1	7	7	5	5			1		1			1					1

STRUCTURE		T.B.J.B STD. 840.34		BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)		CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.		15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE			FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
337																						
337-338																						
338																						
338-EX.																						STR. 338 TIES TO EX. SYSTEM
339																					20	REMOVE 20' OF 24" CONC. PIPE
339-338																						
340																					20	REMOVE 12"CMP AT 227+20
340-338																						
341																						RETAIN EXISTING DI
341-342																						
342																						
344																						PRECAST
345								1														
346																					45	PRECAST
346-OUT																						
347																						PRECAST/TRAFFIC BEARING
347-348																						
348																					218	REMOVE 2 PIPES/PRECAST/TRAFFIC BEARING
348-351																						
349																					26	PRECAST
349-348																						
350																					16	REMOVE 16' OF 18"
350-351																						
351																						
351-352																						
352																					46	
352-354																						
353																						
353-352																						
354																					104	REMOVE 2 PIPES
354-357																						
355																					50	PRECAST
355-354																						
356																						
356-354																						
357																					42	
357-359																						
358																						
358-357																						
359																						
359-OUT																						
360																					46	PRECAST
360-359																						
361																						
361-360																						
SHEET TOTALS								1													633	

ABBREVIATIONS

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

COMPUTED BY: KSH DATE: 2/10/2008

CHECKED BY: DL DATE: 7/21/2008

PROJECT NO.	SHEET NO.
R-3833A	3-S

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"
Y19 42+85 RT		362			829.0	827.0						88			
Y19 43+19 LT		363		833.1											
		IN	363		830.0	828.3							32		
		363	OUT		828.3	827.0							104		
Y19 48+55 RT		364													
Y19 41+22 RT		365													
Y19 44+56 RT		366													
SHEET TOTALS												88	136		
PROJECT TOTALS									13990	4190	4326	568	408		
SAY															

STATION	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 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 C.S.PIPE, TYPE IR ALUMINIZED OR HDPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"
Y19 42+85 RT																					
Y19 43+19 LT																					
Y19 48+55 RT																			36		
Y19 41+22 RT																		36			
Y19 44+56 RT																			24		
SHEET TOTALS																		36	60		
PROJECT TOTALS		24		100											2012	860	1732	144	288		
SAY																					

STATION	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANITIES 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
Y19 42+85 RT												
Y19 43+19 LT						1			1			1
				3.4								
Y19 48+55 RT												
Y19 41+22 RT												
Y19 44+56 RT												
SHEET TOTALS				3.4		1			1			1
PROJECT TOTALS	644	160		3.4		338	123.23	5.4	234	42	72	120
SAY							131					

STATION	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATE S 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. 840.20	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD.	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.35	M.D.I (N.S.) FRAME WITH TWO GRATES STD. 840.29	MANHOLE STD. 840.51	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD. 840.54	T.B.J.B STD. 840.34	BERM DRAIN OUTLET STD. 850.10	SPECIAL CONCRETE FLUME (SEE DETAIL SHEET 2 - J)	CONVERT D.I. TO J.B. W/ MH ACCESS	CONVERT C.B. TO J.B. W/ MH ACCESS	RETAIN AND ADJUST EXIST. C.B.	15" DUCTILE IRON PIPE (LF)	18" DUCTILE IRON PIPE (LF)	24" DUCTILE IRON PIPE (LF)	15" P.V.C. PIPE	30" P.V.C. PIPE	FLOWABLE FILL MATERIAL (CU YDS)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
Y19 42+85 RT																													47	
Y19 43+19 LT																														
																													50	
Y19 48+55 RT																														
Y19 41+22 RT																													46	
Y19 44+56 RT																													39	
SHEET TOTALS																													182	
PROJECT TOTALS	68	68		21	7		28		1	7	7			3		2	4	3	3	1						25	0.4	0.486	7207	
SAY																											1	1		

ABBREVIATIONS

C.B. CATCH BASIN
N.D.I. NARROW DROP INLET
D.I. DROP INLET
G.D.I. GRATED DROP INLET
G.D.I.(N.S.) GRATED DROP INLET (NARROW SLOT)

J.B. JUNCTION BOX
M.H. MANHOLE
T.B.D.I. TRAFFIC BEARING DROP INLET
T.B.J.B. TRAFFIC BEARING JUNCTION BOX

COMPUTED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

PROJECT REFERENCE NO.	SHEET NO.
R-3833A	3-T

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME	PARCEL No.	SHEET No.	PROPERTY OWNER NAME	PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	THE POINT ON NORMAN, LLC	50	8	SUSAN ALEXANDER GORDON, ET AL	111	14	CYNTHIA T. BRANNEN
2	4	THE POINT OWNERS ASSOCIATION, INC	51	8	CRESCENT RESOURCES INC.	112	14,21	DONALD RAY VERNON
3	4	THOMAS E. BARNETT	52	8,9	LEONARD F. STEWART, SR.	114	14,21	MACO LEE HSU
4	4,5	FARMS PROPERTY OWNERS ASSOC.	53	8,9	RONNIE L. SMITH ET AL	114A	14,21	ELMAK, LLC
6	4	JOHN E. THOMPSON	54	9	UNKNOWN	115	15,20	HARBOUR POINT VILLAGE INC.
6A	4,5	JOHN R. POORE BUILDER INC.	55	9	DONNIE LEWIS ALEXANDER	115A	15	FAMILY VIDEO MOVIE CLUB
6B	5	SIMONINI BUILDERS, INC	56	9	GREGORY C. BOSTIC	116	15,20	LEE JUN SUH & KYUM AE DANG
6C	5	TOM STEVENSON BUILDING CO.	58	9	CRESENT RESOURCES, INC.	117	15,16	BONANZA ENTERPRISES INC
8	5	MORROWS CHAPEL METHODIST CHURCH	59	9,10	ROSS GENE ADAMS	118	15,21	JEFFREY D. CHURCH
9	5	LAKE NORMAN VOLUNTEER FIRE DEPARTMENT	60	9	PAUL CALLAWAY, ET. AL.	119	15	HYDRAULICS LIMITED
10	5	CAROLINA WATER SERVICE INC. OF NORTH CAROLINA	61	9	RONNIE W. CARVER	121	15	CEI INVESTMENTS INC,
10A	5	THE FARMS PROP OWNERS ASSOC., INC	62	9	SARAH GRACE WHITE	122	15	FLOYD GREENE REALTY
10B	5	THE FARMS PROP OWNERS ASSOC., INC	63	9	HARRY WAYNE THOMPSON	123	15	LOUISE DALTON
11	5,6	CAROLINA WATER SERVICE INC. OF NORTH CAROLINA	64	9,10	JEAN THOMPSON THOMAS	124	15,16	KUNKLEMAN ASSOCIATES LIMITED
12	5,6	THE FARMS PROP OWNERS ASSOC., INC	65	10	LAKE NORMAN VOL. FIRE DEPT.	125	15,16	GARY V. INGLE
12Z	5,6	THE FARMS PROP OWNERS ASSOC., INC	66	10	ROE LTD	126	15,16	PENINSULA ENTERPRISES INC
13	6	RAYMOND A. WILSON	67	10	JAMES T. BROWN	127	16	SOUTHERN PROPERTIES LLC
14	5	RAYMOND E. RENSHAW, ET AL	68	10	HELEN O. MISENHEIMER	128	16	RAY F. WEBSTER
15	5	NEVILLE K. SPALDING	69	10	JERRY W. WAUGH	129	16	MOORESVILLE RESCUE SQUAD
16	5,6	RAY F. WEBSTER	70	10,11	ELNORA M. McKAY ESTATE	130	16,17	RONNIE D. THOMPSON
16Z	5,6	RAY F. WEBSTER	71	10,11	RONNIE L. SMITH	131	16,17	RUBY H. DRYE
17	6	BRAWLEY OF N.C. LLC	73	10	KAREN MAYHEW JONES	132	16,17	CARLON C. DRYE JR.
18	6	UNKNOWN	74	10	HAROLD W. MAYHEW	133	16	J.A.B. INVESTMENTS INC.
18Z	6	UNKNOWN	75	10	KENDRICK KNIGHT ETAL.	135	16,17	DEAN & DIANE HABERL
19	6	ALAN B. CAMPI	76	10	MORRISON BROTHERS PROP INC.	136	17	J.C. FAW
20	6	WOODLAND AND WATERVIEW LLC	77	10	LAKE POINT AUTO SERVICE, LLC	138	17	MORRISON PLANTATION, LLC
21	6	WOODLAND AND WATERVIEW LLC	78	11	LEE C. ASHENFELTER, ET AL	140	17	DPH, LLC
22	6	RAY FRANKLIN WEBSTER	79	11	MAYBEL H. MAYHEW	141	17	PARKWAY PLAZA, LLC
22Z	6	RAY FRANKLIN WEBSTER	80	11,12	J.Q. McKNIGHT	142	17	DAVID B. RAINESS, ET AL
23	6	UNKNOWN	81	11	ALLTEL CAROLINA	143	17,18	IREDELL COUNTY
24	6,7	KENNETH E. CHRISTY	82	11	LAWTON & MARTIN INC.	144	17	TWO CHARLESTON PLAZA CONDO
24A	6	TIMOTHY M. KIERNAN	83	11	SPLASH-N-GO, LLC	145	17	JAMES E. HUSKINS
25	6	JAMES LAMONT THOMPSON	84	11,12	THE NEEL FAMILY LIMITED PARTNERSHIP	146	17	ANTHONY YOKAWONIS
26	6,7	W. W. THOMPSON	85	12	MANSOUR E. CHAABAN	147	17	WILLIAM J. GORDON
27	7	RANDY K. HINSON	86	12	ZIYAD M. ABUL-HUSN	148	17	DUKE POWER CO
28	7	RICHARD E. ANDERSON	87	12,13	BLYTHELAND MANAGEMENT LLC, ET AL	149	17,18	PENINSULA BAPTIST CHURCH
29	7	GLORIA HINSON	88	12	ARLENE DEAN HONEYCUTT	150	18	THE SOUTH IREDELL LIONS CLUB
30	7	JAMES ROBERT STEVENSON	90	12	DONALD W. FLOOD	151	18,19,22	MORRISON RETAIL,LLC
31	7	CRESCENT RESOURCES INC.	91	12	VIRGINIA S. SETTLEMYRE	151A	22	EFC CORPORATION
32	7	JOHN JOHNSON	92	12	VIOREL TUDUR	151B	19,22	MORRISON RETAIL,LLC
33	7,8	DINA KAY HINSON	93	12,13	APPALACHIAN ADVENT CHRISTIAN ASSOC. , INC	151C	18,19	MORRISON RETAIL,LLC
34	7	RICHARD F. ABERNATHY	94	13	JAMES YATES BUMGARNER	152	18,19	FIRST CHARTER REAL ESTATE HOLDINGS, LLC
35	7	GENI S. CRENSHAW, ET AL	95	13	RICHARD JOSEPH SKAFF	153	18	MOORESVILLE PHARMACY,LLC
36	7,8	ALFRED MITCHELL LACKEY	96	13	JAMES L. FIELDS	154	18	CAROLINA SPRINGS AUTOSPA INC
37	8	RONNIE L. SMITH	97	13	UNKNOWN	155	18	CITIZEN BANK,FSB
38	8	MCKENDREE UNITED METHODIST CHURCH	98	13,14	CAROLYN SETZER WILHELM	156	18,23	DIM VASTGOED N.V.
39	8	JESUS & BETTY LOPEZ, TRUST	99	13,14	SMC PROPERTIES, LLC	157	18	BARRIER ISLAND PROPERITES LLC
40	8	TINA LOPEZ KRUGER	100	13,14	PRUITT DEVELOPMENT CORP.	158	18	JAMES C. SISCO JR.
41	8	LARRY JESUS LOPEZ, TRUST	101	13,14	KAMCO INC.	159	18,19,23	NOCOR, LLC
42	8	JESUS & BETTY LOPEZ ,TRUST	102	14	JOYCE P. NEEDHAM LTD. PTR.	160	19,22	PINNACLE AT LAKE NORMAN LLC
42A	8	JUSTIN NICHOLAS KRUGER	103	14	JOYCE P. NEEDHAM LTD. PTR.	161	19	NORTH POINT DEVELOPMENT CO.
43	8		104	14	MARY S. HEWITT	162	19	TOP PROPERTIES, LLC
44	8,9	TERRENCE D. MORTON	105	14	MARY S. HEWITT	163	19	FFC LIMITED PARTNERSHIP
45	7,8	RONNIE L.SMITH, ET AL	106	14	BONANZA DEVELOPMENT CO.	164	19	PINNACLE AT LAKE NORMAN LLC
46	8	ARLENE DEAN HONEYCUTT	107	14,15	SHARON BYERS PARKER	166	19,23	WILLIAMSON'S CHAPEL UNITED METHODIST CHURCH
47	8	FRANCES T. THOMPSON	108	14,15	LAURIN A. COOKE	167	19	GEORGE ERVIN
48	8	DAWN P. PATRICK	109	14	GERICO VENTURES LLC.	169	19	JOHN G. LEGGITT
49	8	JACQUELINE E.TETER	110	14	BOB H. STILP	170	20	DYLAN C. & TRACI L. JONES

6/16/99
06/04/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	3-U

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME	PARCEL No.	SHEET No.	PROPERTY OWNER NAME	PARCEL No.	SHEET No.	PROPERTY OWNER NAME
						171	20	TERRY C. BYERS
						172	20	PAMELA GAIL BYERS
						173	20	RIGHARD D. AND FARA S. MALTSBARGER
						174	20	VILLAGES AT OAK TREE COMMUNITY
						175	21	GARY TRENT
						176	21	LUIS FERNANDEZ
						177	21	RENE BONILLA
						178	21	LORI A. KADER
						179	21	ISABEL JOYA AVELAR
						180	21	SHIRLEY J. BEAVER
						181	21	CARLTON RAMSEY
						182	21	DANNY BINFORD
						183	21	RANDY CAMPBELL
						184	21	EFC ASSOCIATES
						185	21	HOWARD H. NEEL
						186	21	ALEX A. MARTINEZ
						187	21	RAYMOND J. PENNINPEDE
						188	22	ALLAN BARWICK
						189	22	PINNACLE AT LAKE NORMAN LLC
						190	22	KENNETH S. CHARNOCK
						191	22	ESC MORRISON LLC
						192	22	ESC MORRISON LLC
						194	22	J.M. WALLACE LAND COMPANY
						194A	22	WALLACE INDEPENDENCE PROPERTIES, ET AL
						194B	22	TRIANGLE PROPERTIES ASSOCIATES,LLC, ET AL
						195	23	PHC/LNFP, LLC
						196	23	LAKE GATE SQUARE ASSOCIATION, INC
						197	23	MONTPIED COMPANY, LLC
						198	23,24	LAKESIDE FELLOWSHIP ASSOCIATE
						199	23	WACHOVIA BANK & TRUST CO
						200	23	RUNN'IN THE BEAN LLC
						201	23,24	SOUTHERN SUPPLY INC.
						205	24	JOAN P. AMMONS
						206	24	MOORESVILLE HOSPITAL MANAGEMENT
						207	24	GRIFFIN INSURANCE AGENCY INC
						208	24	GRIFFIN INSURANCE AGENCY INC
						209	24	DUKE POWER
						215	4	FORD E. MAYHEW
						216	7	DANIEL R. WEAVER
						225	11	RONNIE L. SMITH
						236	16	PENINSULA ENTERPRIZE INC.
						344	21	DEAN F. DAVIS
						380	21	RYON WEST DEVELOPERS
						381	21	MICHAEL SWEET
						384	21	JEFFREY FIRESTONE

06/04/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	4
R/W SHEET NO.	

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

SHEET 4 IS FOR INFORMATIONAL PURPOSES ONLY

SHEET 4 IS FOR INFORMATIONAL PURPOSES ONLY

NAD 83/95 NCGRID

REVISIONS

8/17/99

-Y1- POT Sta.10+00.00
-Y1- PC Sta.10+15.33
-Y1- PT Sta.11+87.13
-L- POC Sta.19+01.24
-Y1- POT Sta.14+94.12
-L- PC Sta.17+73.11
-L- PT Sta.15+66.24
-L- POT Sta.8+94.59
-L- PC Sta.8+93.31
MATCH LINE STA.22+00 -L- SEE SHEET NO.5

FORD E. MAYHEW
DB 186 PG 236
PB 24 PG 54

THOMAS E. BARNETT
DB 293 PG 280

FARMS PROPERTY OWNERS ASSCO.
DB 1511 PG 250
PB 43 PG 93

THE POINT ON NORMAN, LLC
DB 1088 PG 089
PB 35 PG 138

THE POINT OWNERS ASSOCIATION, INC
DB 1232 PG 2022
PB 32 PG 114

JOHN E. THOMPSON
DB 1719 PG 362
PB 32 PG 114

CAROLINA WATER SERVICES INC.
DB 1422 PG 618
PB 41 PG 37

THE POINT ON NORMAN, LLC
PB 30 PG 110

-L-	
PI Sta 12+30.82	PI Sta 23+91.89
Δ = 6° 53' 47.8" (LT)	Δ = 76° 18' 28.2" (RT)
D = 1° 01' 36.5"	D = 7° 16' 28.0"
L = 671.66'	L = 1,048.99'
T = 336.23'	T = 618.78'
R = 5,580.00'	R = 787.63'

-Y1-
PI Sta 11+01.87
Δ = 17° 07' 08.4" (RT)
D = 9° 57' 52.1"
L = 171.80'
T = 86.54'
R = 575.00'

SR 1100	-L-	CHUCKWOOD RD. -Y1- SR 1177	-L-
7600	200	1500	8900
9000	200	2100	10900
1700			2008 ADT
2300			2028 ADT

SEE SHEET 25 FOR -L- EXISTING PROFILE.
SEE SHEET 33 FOR -Y1- EXISTING PROFILE.

06/04/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS — 6/4/08

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON — 6/4/08

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

8/17/99

REVISIONS

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground — 2W — D — 4:1 or Flatter — Front Ditch Slope
Min. D= 1.5 Ft.
FROM -L- STA. 31+00 LT TO -L- STA. 33+50 LT

DETAIL B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground — 2W — D — 4:1 or Flatter — Fill Slope
Min. D= 1.0 Ft.
FROM STA. -L- 35+00 TO STA. -L- 36+50 RT

NAD 83/95 NCGRID

BEGIN TIP PROJECT R-3833A
-L- POC STA. 26+41.59

-Y2- POT Sta.10+00.00
S 70°33'27" E
-BY2- POT 5+00.00
-Y2- STA. 11+54.69 (18.6' RT)
-Y2- PC Sta.12+15.21
BEGIN CONSTRUCTION
-Y2- POC 13+72.17
-Y2- PT Sta.15+11.58
-L- POT Sta.34+46.55
-Y2- POT Sta.15+99.31
-L- PC Sta.34+12.72
-L- PT Sta.28+22.09
-BL- PINC 22+55.53
-L- STA. 26+70.85 (25.33' LT)
-BY2- POT 9+41.82
-BL- PINC 30+45.70
-Y2- STA. 15+96.58 (12.23' LT)
-L- STA. 34+57.18 (6.65' LT)
N 41° 20' 22.7" E
MATCH LINE STA. 36+00 -L- SEE SHEET NO.6
MATCH LINE STA. 22+00 -L- SEE SHEET NO.4
330' FULL STORAGE
275' UNIFORM TAPER
SEE SPECIAL CUT DITCH SEE DETAIL A
SPECIAL LATERAL V DITCH SEE DETAIL B
SEE SHEET 25 FOR -L- PROFILE.
SEE SHEET 33 FOR -Y2- PROFILE.

(8) MORROWS CHAPEL METHODIST CHURCH
DB 258 PG 357
DB 260 PG 296
DB 237 PG 601
DB 565 PG 937
UNRECORDED PLAT
DB 1421PG 264
DB 1421PG 269

(9) LAKE NORMAN VOLUNTEER FIRE DEPARTMENT
DB 1435 PG 215
PB 42 PG 63

APPROX. LOCATION LAKE NORMAN VFD U/C
MTL BLDG FIRE DEPT

(10) WELL LOT #907
CAROLINA WATER SERVICE INC. OF NORTH CAROLINA
DB 1325 PG 973
PB 39 PG 092

(10A) THE FARMS PROP OWNERS ASSOC., INC
DB 1511 PG 250
PB 43 PG 93

(10B) THE FARMS PROP OWNERS ASSOC., INC
DB 1511 PG 250
PB 43 PG 46

(11) CAROLINA WATER SERVICE INC. OF NORTH CAROLINA
DB 1476 PG 2662
PB 43 PG 46

(12) (12Z) THE FARMS PROP OWNERS ASSOC., INC
DB 1511 PG 250
PB 43 PG 46

(13) (13Z)

(14) RAYMOND E. RENSHAW, ET AL
DB 991PG 638

(15) NEVILLE K. SPALDING
DB 972 PG 1955

(16) (16Z) RAY F. WEBSTER
DB 817 PG 646
DB 715 PG 941

(6A) JOHN R. POORE BUILDER INC.
DB 1678 PG 1036
PB 41PG 37

(6B) SIMONINI BUILDERS, INC
DB 1697 PG 862
PB 32 PG 114

(6C) TOM STEVENSON BUILDING CO.
DB 1513 PG 931
PB 32 PG 114

-L-
PI Sta 23+91.89
Δ = 76° 18' 28.2" (RT)
D = 7° 16' 28.0"
L = 1,048.99'
T = 618.78'
R = 787.63'
SE = MATCH EXISTING
DS = 45 MPH

PI Sta 40+21.50
Δ = 16° 53' 29.1" (LT)
D = 1° 23' 50.8"
L = 1,208.73'
T = 608.78'
R = 4,100.00'
SE = 0.03
DS = 50 MPH

-Y2-
PI Sta 13+63.63
Δ = 7° 53' 53.1" (RT)
D = 2° 39' 53.7"
L = 296.37'
T = 148.42'
R = 2,150.00'
DS = 40 MPH

-Y2- SR 1222 SOUTHFORK RD.			2008 ADT / 2028 ADT
600 / 1500			
8900 / 10900	200 / 400	400 / 1100	9000 / 11600
SR 1100			-L-

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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 6/4/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON 6/4/08

MA Engineering CONSULTANTS, INC.
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REVISIONS

NAD 83/95 NCGRID

CAROLINA WATER SERVICE INC. OF NORTH CAROLINA DB 1476 PG 2662 PB 43 PG 46

BRAWLEY OF N.C. LLC DB 1464 PG 436

TRACT 2

RAYMOND A. WILSON DB 670 PG 500

ALAN B. CAMPI DB 1044 PG 1832

WOODLAND AND WATERVIEW LLC DB 1544 PG 441

WOODLAND AND WATERVIEW LLC DB 1586 PG 2377

RAY FRANKLIN WEBSTER DB 565 PG 509 DB 569 PG 447 DB 631 PG 337

KENNETH E. CHRISTY DB 739 PG 302 DB 1020 PG 1039

TIMOTHY M. KIERNAN DB 1722 PG 1658

RAY F. WEBSTER DB 817 PG 646 DB 715 PG 941

JAMES LAMONT THOMPSON DB 715 PG 947

W. W. THOMPSON DB 181 PG 244

330' FULL STORAGE

100' TAPER

BEG. 8X18 CURB STA. 37+65

END 8X18 CURB STA. 39+25

PROPOSED RETAINING WALL 1 W/HANDRAIL STA. 40+60 TO 41+45

PROPOSED RETAINING WALL 2 W/HANDRAIL STA. 41+89 TO 42+71

CLASS I RIP RAP EST. 7 TONS EST. 15 S.Y. F.F

CLASS I RIP RAP EST. 11 TONS EST. 22 S.Y. F.F

SPECIAL CUT DITCH SEE DETAIL A

SPECIAL LATERAL 'V' DITCH SEE DETAIL B

LATERAL BASE DITCH SEE DETAIL E

NOTE: DO NOT DISTURB WELL

MATCH LINE STA. 36+00 -L- SEE SHEET NO. 5

MATCH LINE STA. 50+00 -L- SEE SHEET NO. 7

-L- PT Sta. 46+21.44

-L- PC Sta. 49+19.61

-BL- PINC 39+86.97 -L- STA. 44+01.67 (3.23' LT)

BM3 -BL- STATION 42+57 OFFSET 220.54' RIGHT ELEV = 834.59'

N 30°26'53.6" E

N 49°50'30" W 773.78'

N 45°58'24" W 844.61'

DETAIL A
SPECIAL CUT DITCH (Not to Scale)

Natural Ground, 2:1, D, 4:1 or Flatter, Front Ditch Slope

Min. D= 1.0 Ft.

FROM -L- STA. 47+90 TO STA. 53+50 LT

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

Natural Ground, 2:1, D, 4:1 or Flatter, Fill Slope

Min. D= 1.0 Ft.

FROM STA. -L- 35+00 TO STA. -L- 36+50 RT

DETAIL E
LATERAL BASE DITCH (Not to Scale)

Natural Ground, 2:1, D, 2:1, b, 1'/Ft., B, Fill Slope

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

FROM -L- STA. 47+05 TO STA. 49+75, RT

-L-

PI Sta 40+21.50	PI Sta 59+64.90
Δ = 16° 53' 29.1" (LT)	Δ = 38° 19' 28.0" (RT)
D = 1° 23' 50.8"	D = 2° 02' 46.6"
L = 1,208.73'	L = 1,872.89'
T = 608.78'	T = 972.99'
R = 4,100.00'	R = 2,800.00'
SE = 0.03	SE = 0.03
DS = 50 MPH	DS = 50 MPH

SEE SHEET 26 FOR -L- PROFILE.

06/06/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 6/4/08

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON 6/4/08

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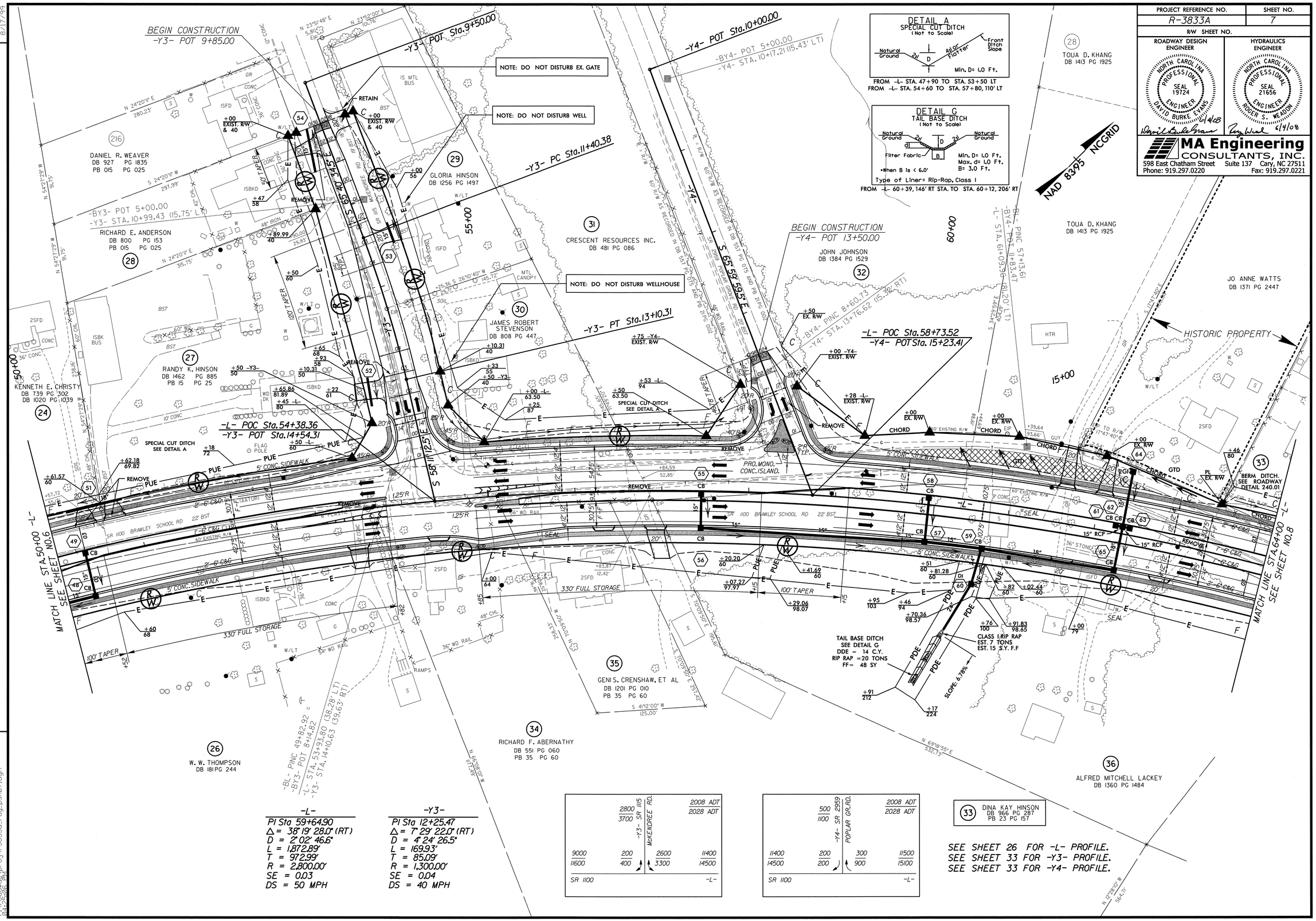
REVISIONS



DETAIL A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground — 2d — D — 4:1 or Flatter — Front Ditch Slope
Min. D= 1.0 Ft.
FROM -L- STA. 47+90 TO STA. 53+50 LT
FROM -L- STA. 54+60 TO STA. 57+80, 110' LT

DETAIL G
TAIL BASE DITCH
(Not to Scale)
Natural Ground — 2d — d — D — B — 2d — Natural Ground
Filter Fabric
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 3.0 Ft.
*When B is < 6.0'
Type of Liner= Rip-Rap, Class I
FROM -L- 60+39, 146' RT STA. TO STA. 60+12, 206' RT

-L-
PI Sta 59+64.90
Δ = 38° 19' 28.0" (RT)
D = 2° 02' 46.6"
L = 1,872.89'
T = 972.99'
R = 2,800.00'
SE = 0.03
DS = 50 MPH

-Y3-
PI Sta 12+25.47
Δ = 7° 29' 22.0" (RT)
D = 4° 24' 26.5"
L = 169.93'
T = 85.09'
R = 1,300.00'
SE = 0.04
DS = 40 MPH

	-Y3- SR 1115 McKENDREE RD.		2008 ADT / 2028 ADT
9000 / 11600	200 / 400	2600 / 3300	11400 / 14500
SR 1100			-L-

	-Y4- SR 2959 POPLAR GR.RD.		2008 ADT / 2028 ADT
11400 / 14500	200 / 200	300 / 900	11500 / 15100
SR 1100			-L-

SEE SHEET 26 FOR -L- PROFILE.
SEE SHEET 33 FOR -Y3- PROFILE.
SEE SHEET 33 FOR -Y4- PROFILE.

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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 6/4/08

NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON 6/4/08

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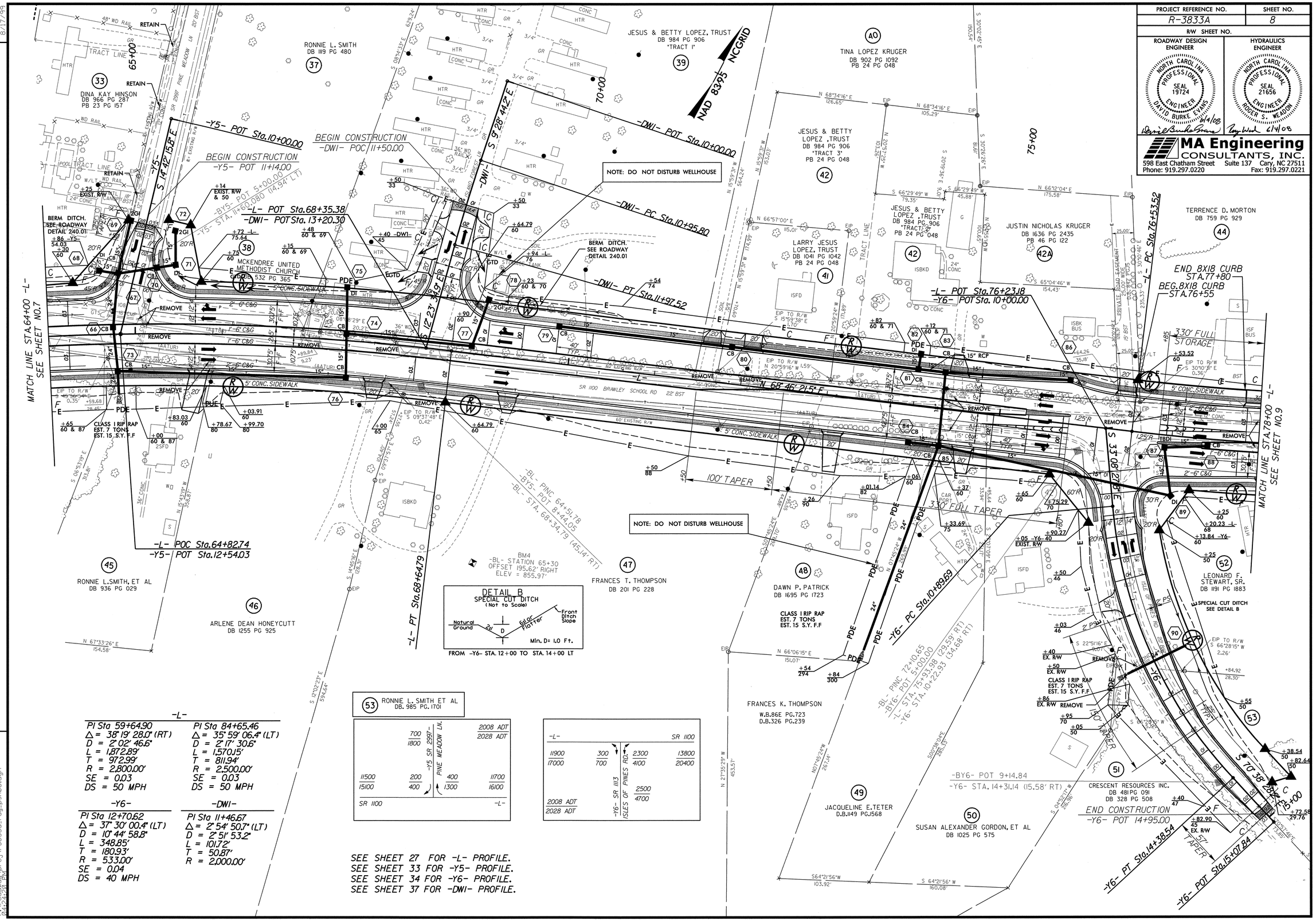

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
7/8/08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON
7/8/08

MA Engineering CONSULTANTS, INC.
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REVISIONS

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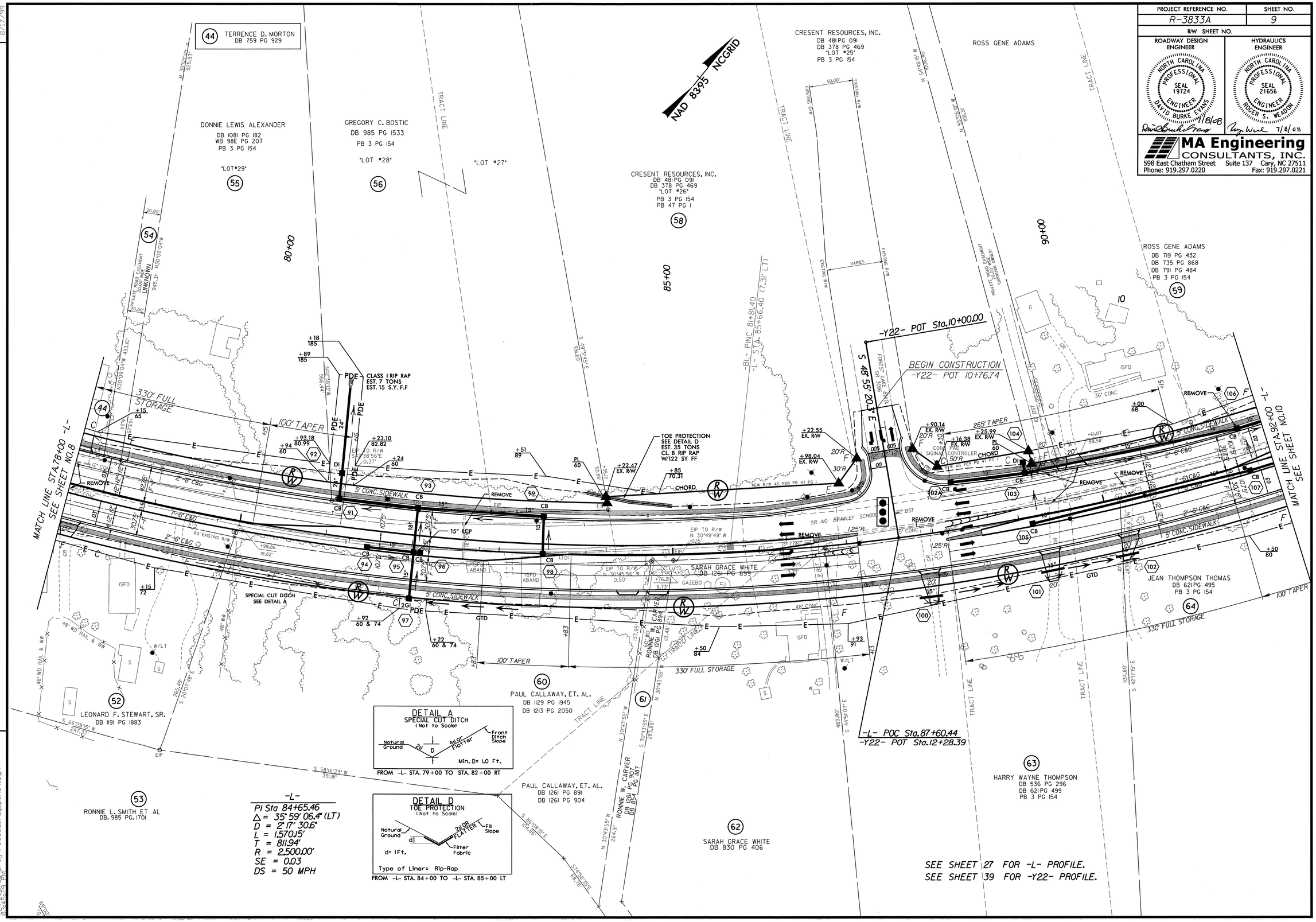

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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	10
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 7/8/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON 7/8/08

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8/17/99

REVISIONS

-L-

PI Sta 84+65.46
Δ = 35° 59' 06.4" (LT)
D = 2° 17' 30.6"
L = 1,570.15'
T = 811.94'
R = 2,500.00'
SE = 0.03
DS = 50 MPH

PI Sta 105+56.83
Δ = 17° 31' 51.9" (RT)
D = 4° 01' 14.7"
L = 1,928.27'
T = 1,144.32'
R = 1,425.00'
SE = 0.04
DS = 50 MPH

-DW2-

PI Sta 11+55.22
Δ = 29° 27' 30.6" (RT)
D = 14° 49' 45.7"
L = 198.65'
T = 101.57'
R = 386.37'

-Y7-

PI Sta 15+40.68
Δ = 44° 20' 28.3" (LT)
D = 10° 44' 58.8"
L = 412.49'
T = 217.19'
R = 533.00'
SE = 0.04
DS = 40 MPH

-Y8-

PI Sta 13+27.22
Δ = 28° 02' 19.0" (LT)
D = 19° 05' 54.9"
L = 146.81'
T = 74.91'
R = 300.00'
SE = 0.02
DS = STOP CONDITION

-BL- PINC 99+06.89
-BY7- POT 9+81.56
-BY8- POT 16+77.75
-L- STA. 102+00.62 (257.38' LT)
-Y7- STA. 15+65.23 (2.89' LT)

DETAIL E
LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 2d, D, 2d, B, b, Fill Slope, 1'/Ft.
Min. D= 1.0 Ft.
B= 2.0 Ft.
b= 2.0 Ft.
FROM -Y7- STA. 16+40 TO STA. 17+38, 70' LT

DETAIL G
TAIL BASE DITCH
(Not to Scale)
Natural Ground, 2d, D, 2d, Natural Ground, d, Filter Fabric, B
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 3.0 Ft.
Type of Liner= Rip-Rap, Class B
FROM -L- STA. 100+55, 105' RT TO STA. 100+25, 199' RT
FROM -L- STA. 104+70, 117' RT TO STA. 104+37, 180' RT

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground, 2d, D, Adjac. Flatter, Front Ditch Slope
Min. D= 1.0 Ft.
FROM -Y7- STA. 13+40 TO STA. 15+85 LT
FROM -Y7- STA. 12+50 TO STA. 15+00 RT
FROM -Y8- STA.12+50 TO STA. 13+80 LT
FROM -Y8- STA.10+00 TO STA. 13+75 RT

BEGIN CONSTRUCTION
-Y8- POT 10+00.00

BEGIN CONSTRUCTION
-DW2- POT 11+00.00

BEGIN CONSTRUCTION
-Y7- POT 12+00.00

-Y7- POC Sta.16+23.44
-DW2- PT Sta.12+52.29

-DW2- PC Sta.10+53.64

-DW2- POT Sta.8+00.00

-Y8- PC Sta.12+52.32

-Y8- PT Sta.13+99.13

-Y7- POT Sta.12+00.00

-Y7- PC Sta.13+23.49

-Y7- POC Sta.15+35.00 =
-Y8- POT Sta.14+26.90

-Y7- PT Sta.17+35.98

-L- PT Sta.92+23.67

-L- PC Sta.94+12.51

-L- POC Sta.101+40.06
-Y7- POT Sta.18+33.02

NAD 83/95 NCGRID

TRACT LINE

ROSS GENE ADAMS
DB 719 PG 432
DB 735 PG 868
DB 791 PG 484
PB 3 PG 154

LAKE NORMAN VOL. FIRE DEPT.
DB 427 PG 176
DB 791 PG 481
DB 627 PG 840
PB 3 PG 154

ROE LTD
DB 1162 PG 672
PB 3 PG 154

JAMES T. BROWN
DB 481 PG 329

JEROME RUTLEDGE McNINCH
DB 834 PG 145
DB 771 PG 239
PB 3 PG 154

HELEN O. MISENHEIMER
DB 619 PG 442

JERRY W. WAUGH
DB 753 PG 635

ELNORA M. McKAY ESTATE
DB 328 PG 331

RONNIE L. SMITH
DB 1039 PG 2177
PB 29 PG 24

MORRISON BROTHERS PROP INC.
DB 668 PG 233
PB 3 PG 154

KENDRICK KNIGHT ETAL.
DB 1533 PG 1046

LAKE POINT AUTO SERVICE, LLC
DB 1771 PG 2448
PB 29 PG 24

JEAN THOMPSON THOMAS
DB 621 PG 495
PB 3 PG 154

KAREN MAYHEW JONES
WB 000E PG 414
PB 3 PG 154

HAROLD W. MAYHEW
WB 000E PG 414
PB 3 PG 154

ISBK FIRE DEPARTMENT

BM5
-BL- STATION 88+45
OFFSET 120.65' RIGHT
ELEV = 855.77'

MATCH LINE STA.92+00 -L-
SEE SHEET NO.9

MATCH LINE STA.106+00 -L-
SEE SHEET NO.11

CLASS I RIP RAP
EST. 3 TONS
EST. 7 S.Y. F.F

CLASS I RIP RAP
EST. 7 TONS
EST. 15 S.Y. F.F

CLASS I RIP RAP
EST. 3 TONS
EST. 7 S.Y. F.F

CLASS B RIP RAP
EST. 5 TONS
EST. 14 S.Y. F.F

CLASS B RIP RAP
EST. 11 TONS
EST. 28 S.Y. F.F

TAIL BASE DITCH
SEE DETAIL G
DDE = 25 C.Y.
RIP RAP = 57 TONS
FF=75 SY
SLOPE = 3.30%

TAIL BASE DITCH
SEE DETAIL G
DDE = 15 C.Y.
RIP RAP = 36 TONS
FF = 54 SY
SLOPE = 4.06%

SPECIAL CUT DITCH
SEE DETAIL A

LATERAL BASE DITCH
SEE DETAIL E

PRO. GUARDRAIL
W/2 END SHOES

330' FULL STORAGE

100' TAPER

5' CONC. SIDEWALK

2008 ADT 2200
2028 ADT 3800
-Y7- SR 1178 BLUME RD.
200 400
-Y8- SR 1234 BEECH TR.RD.
500 900
300 500
2200 3800

2200 3800
2008 ADT 2200
2028 ADT 3800
-Y7- SR 1178 BLUME RD.
13800 20400
200 400
2000 3400
15600 23400
SR 1100 -L-

SEE SHEET 28 FOR -L- PROFILE.
SEE SHEET 34 FOR -Y7- PROFILE.
SEE SHEET 34 FOR -Y8- PROFILE.
SEE SHEET 37 FOR -DW2- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	11
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 7/21/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON 7/21/08

MA Engineering CONSULTANTS, INC.
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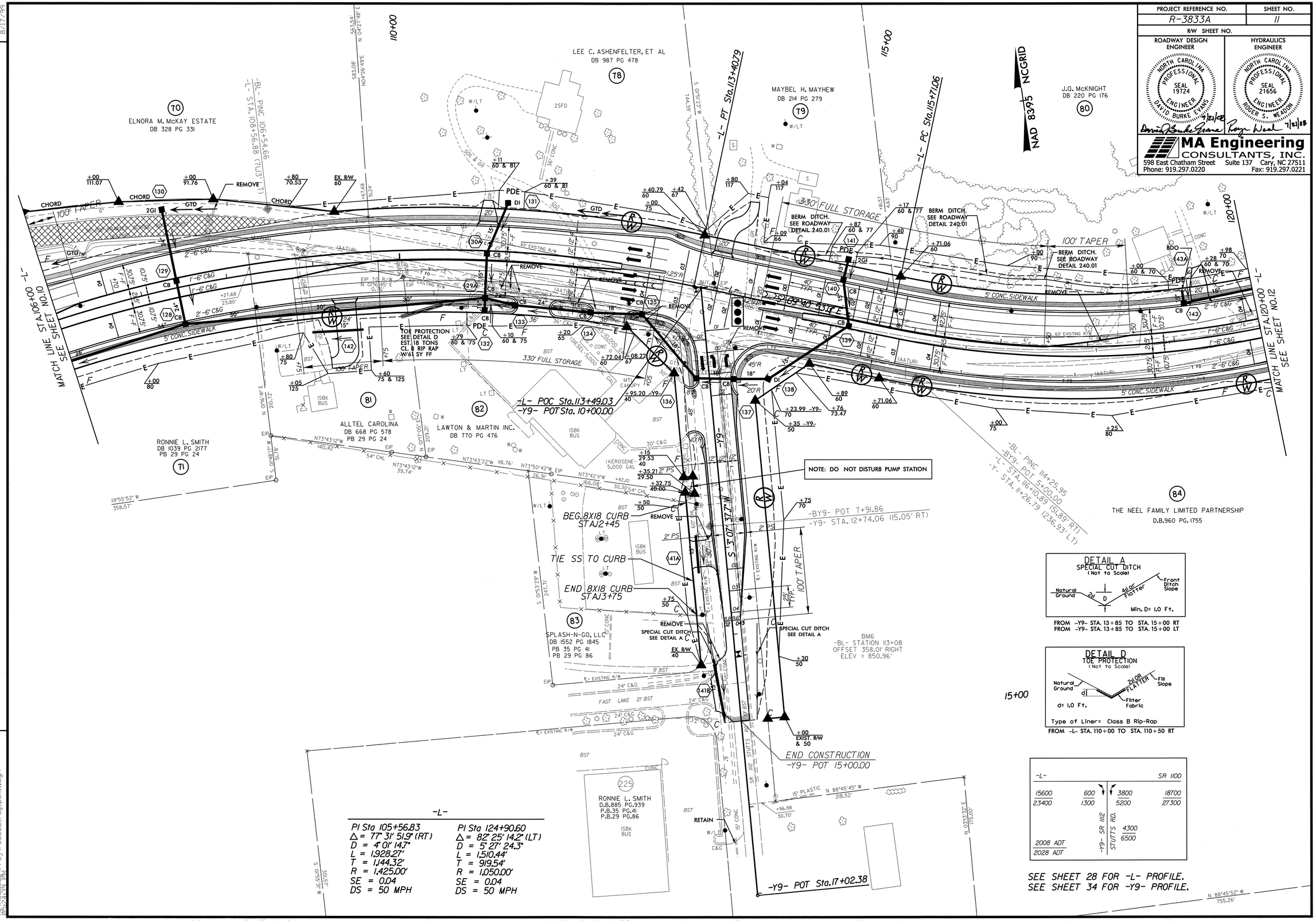

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground, 2:1, D, 4:1 or Flatter, Front Ditch Slope

Min. D= 1.0 Ft.

FROM -Y9- STA. 13+85 TO STA. 15+00 RT
FROM -Y9- STA. 13+85 TO STA. 15+00 LT

DETAIL D
TOE PROTECTION
(Not to Scale)

Natural Ground, d, 2:1 OR FLATTER, Fill Slope, Filter Fabric

d= 1.0 Ft.

Type of Liner= Class B Rip-Rap

FROM -L- STA. 110+00 TO STA. 110+50 RT

-L-			SR 1100
15600	600	3800	18700
23400	1300	5200	27300
2008 ADT	-Y9- SR 1112 STUTTS RD.	4300	
2028 ADT		6500	

-L-	
PI Sta 105+56.83	PI Sta 124+90.60
Δ = 77° 31' 51.9" (RT)	Δ = 82° 25' 14.2" (LT)
D = 4° 01' 14.7"	D = 5° 27' 24.3"
L = 1,928.27'	L = 1,510.44'
T = 1,144.32'	T = 919.54'
R = 1,425.00'	R = 1,050.00'
SE = 0.04	SE = 0.04
DS = 50 MPH	DS = 50 MPH

SEE SHEET 28 FOR -L- PROFILE.
SEE SHEET 34 FOR -Y9- PROFILE.

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS — 6/4/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON — 6/4/08

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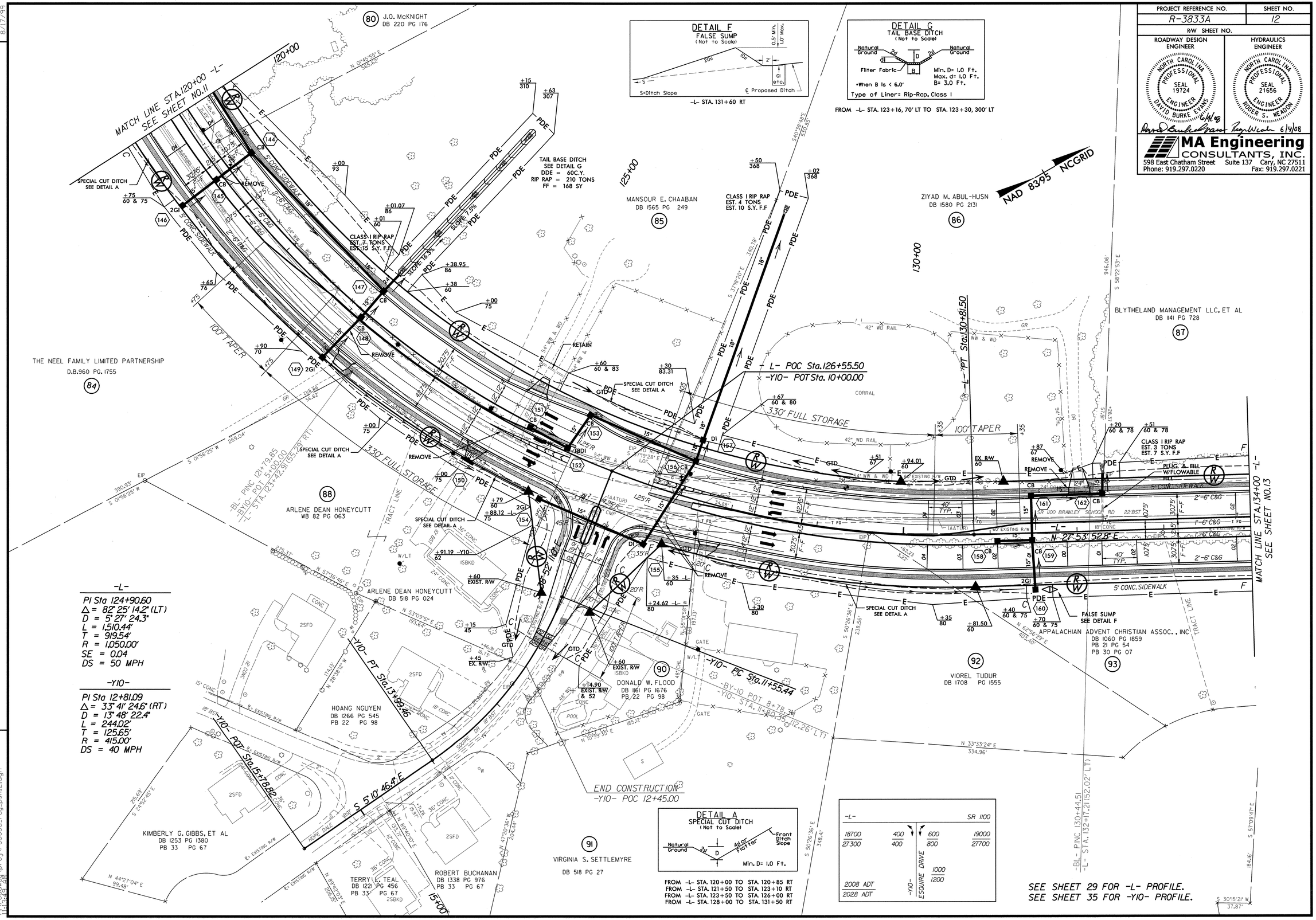

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	13
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 6/4/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON 6/4/08

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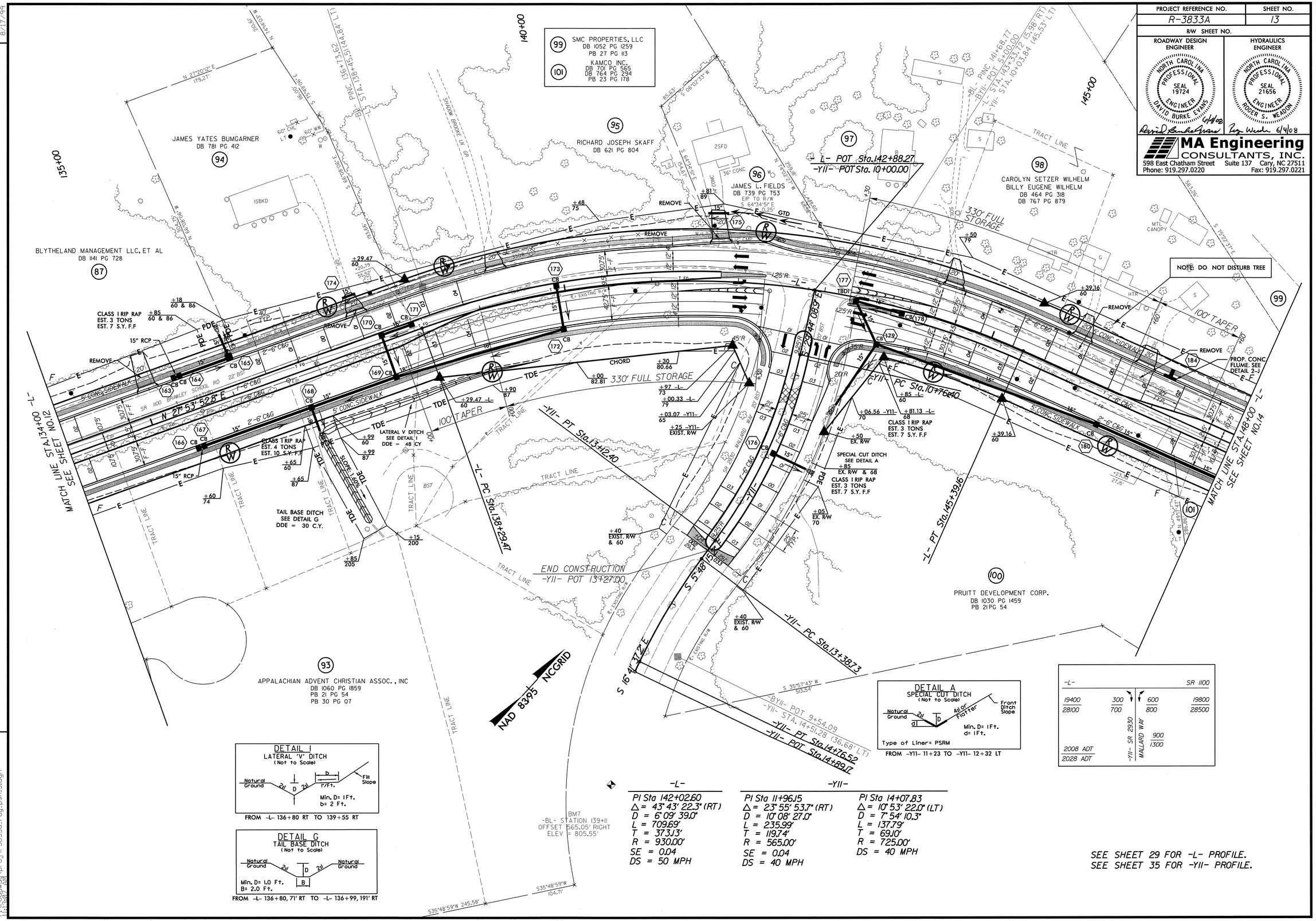


DETAIL I
LATERAL 'V' DITCH
(Not to Scale)

FROM -L- 136+80 RT TO 139+55 RT

DETAIL G
TAIL BASE DITCH
(Not to Scale)

FROM -L- 136+80, 71' RT TO -L- 136+99, 191' RT

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)

Type of Liner= PSRM

FROM -Y11- 11+23 TO -Y11- 12+32 LT

-L-			SR 1100
19400 / 28100	300 / 700	600 / 800	19800 / 28500
2008 ADT / 2028 ADT	-Y11- SR 2930 MALLARD WAY	900 / 1300	

-L-

PI Sta 142+02.60
Δ = 43° 43' 22.3" (RT)
D = 6° 09' 39.0"
L = 709.69'
T = 373.13'
R = 930.00'
SE = 0.04
DS = 50 MPH

-Y11-

PI Sta 11+96.15
Δ = 23° 55' 53.7" (RT)
D = 10° 08' 27.0"
L = 235.99'
T = 119.74'
R = 565.00'
SE = 0.04
DS = 40 MPH

PI Sta 14+07.83
Δ = 10° 53' 22.0" (LT)
D = 7° 54' 10.3"
L = 137.79'
T = 69.10'
R = 725.00'
DS = 40 MPH

SEE SHEET 29 FOR -L- PROFILE.
SEE SHEET 35 FOR -Y11- PROFILE.

REVISIONS

8/17/99

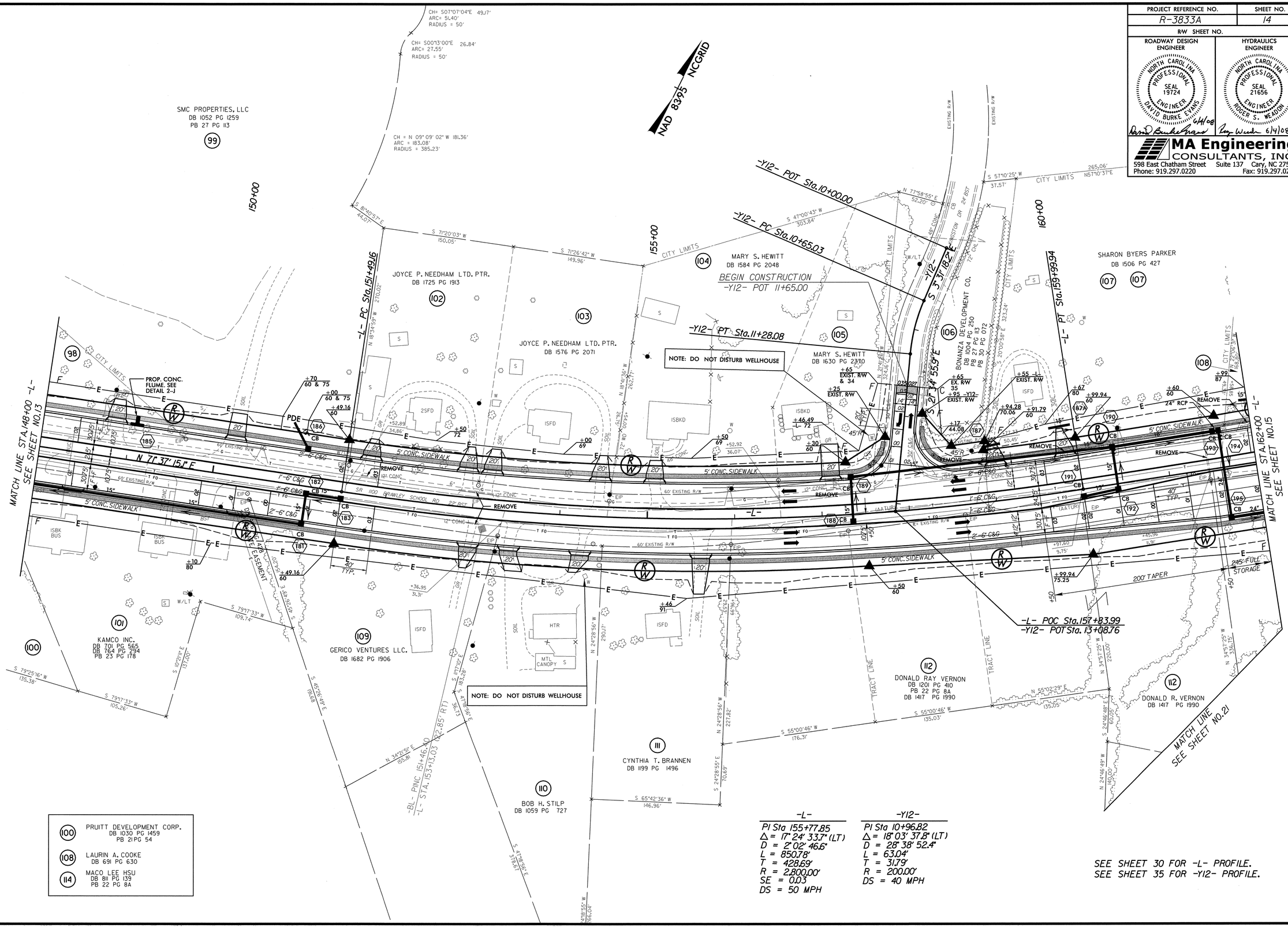
06/04/2008
rs:\roadway\proj\r-3833a_rdy_pshi3.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-3833A	14
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 6/4/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON 6/4/08

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



-L-	-Y12-
PI Sta 155+77.85	PI Sta 10+96.82
Δ = 17° 24' 33.7" (LT)	Δ = 18° 03' 37.8" (LT)
D = 2° 02' 46.6"	D = 28° 38' 52.4"
L = 850.78'	L = 63.04'
T = 428.69'	T = 31.79'
R = 2,800.00'	R = 200.00'
SE = 0.03	DS = 40 MPH
DS = 50 MPH	

(100) PRUITT DEVELOPMENT CORP. DB 1030 PG 1459 PB 21 PG 54

(108) LAURIN A. COOKE DB 691 PG 630

(114) MACO LEE HSU DB 811 PG 139 PB 22 PG 8A

SEE SHEET 30 FOR -L- PROFILE.
SEE SHEET 35 FOR -Y12- PROFILE.

REVISIONS

8/17/99

06/04/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	15

R/W SHEET NO.

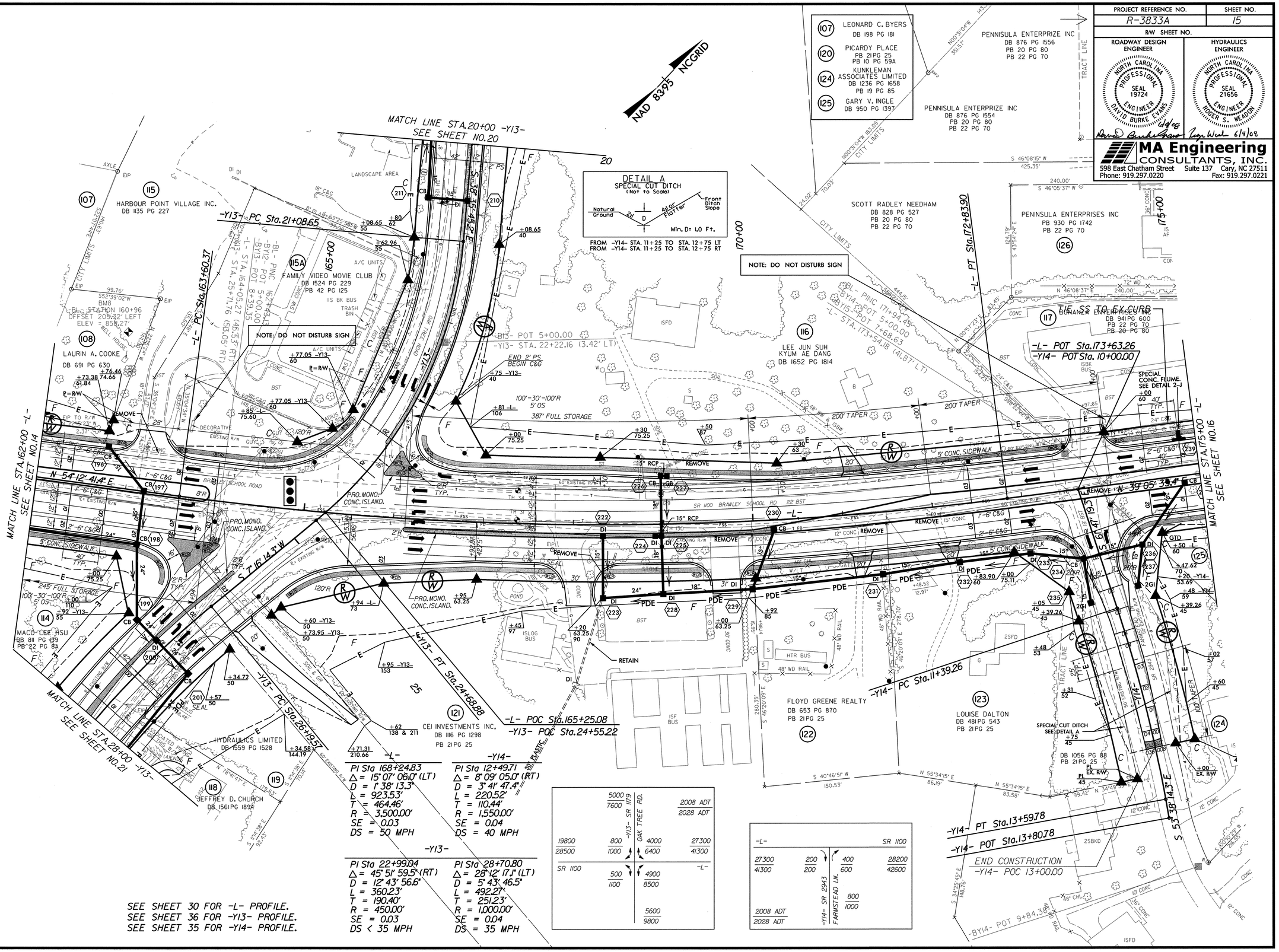
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS — 6/4/08

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEAD — 6/4/08

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

REVISIONS

8/17/99



06/04/2008
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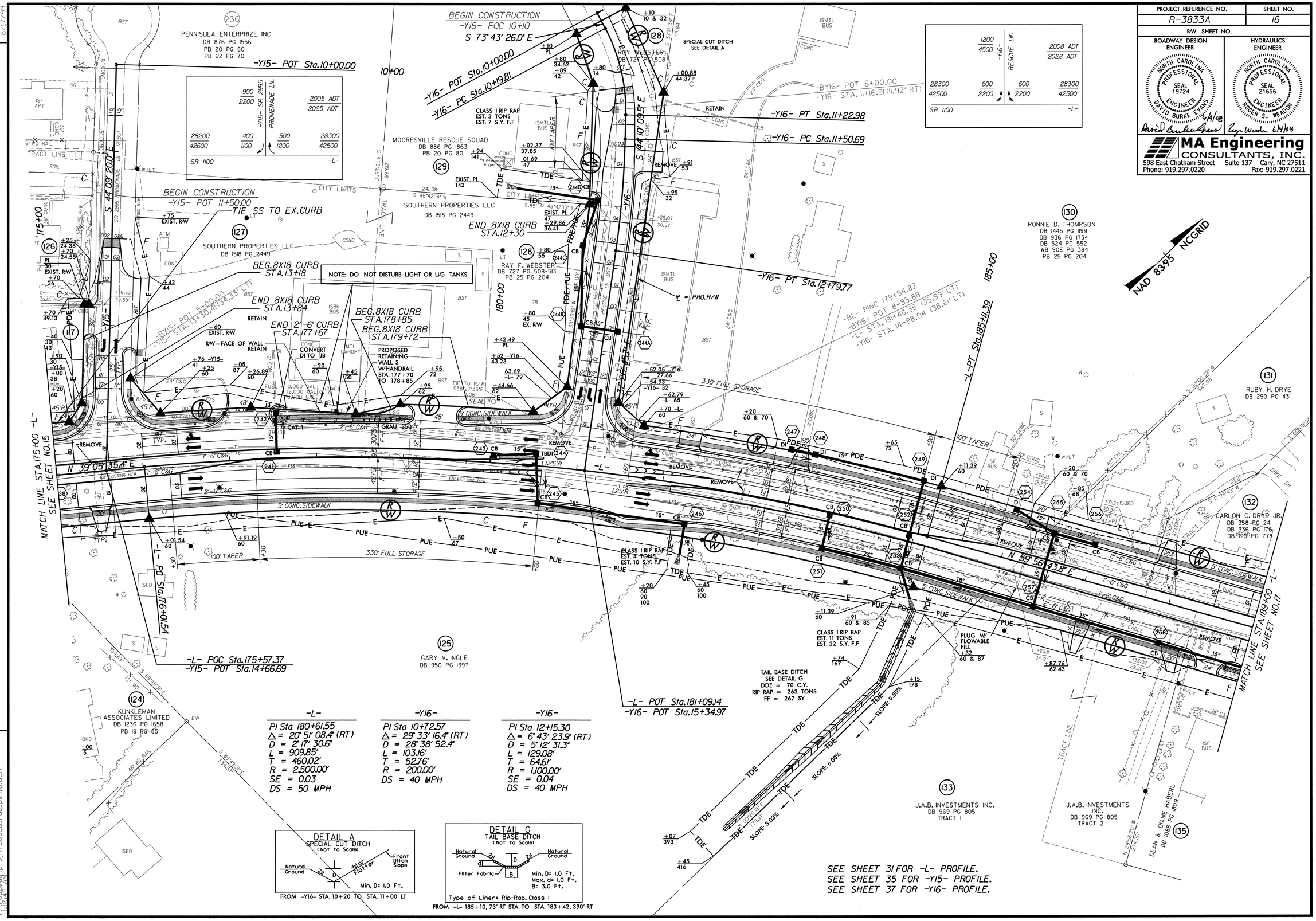
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	16
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 6/4/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WELDON 6/4/08

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



REVISIONS

8/17/09

06/04/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	17
R/W SHEET NO.	

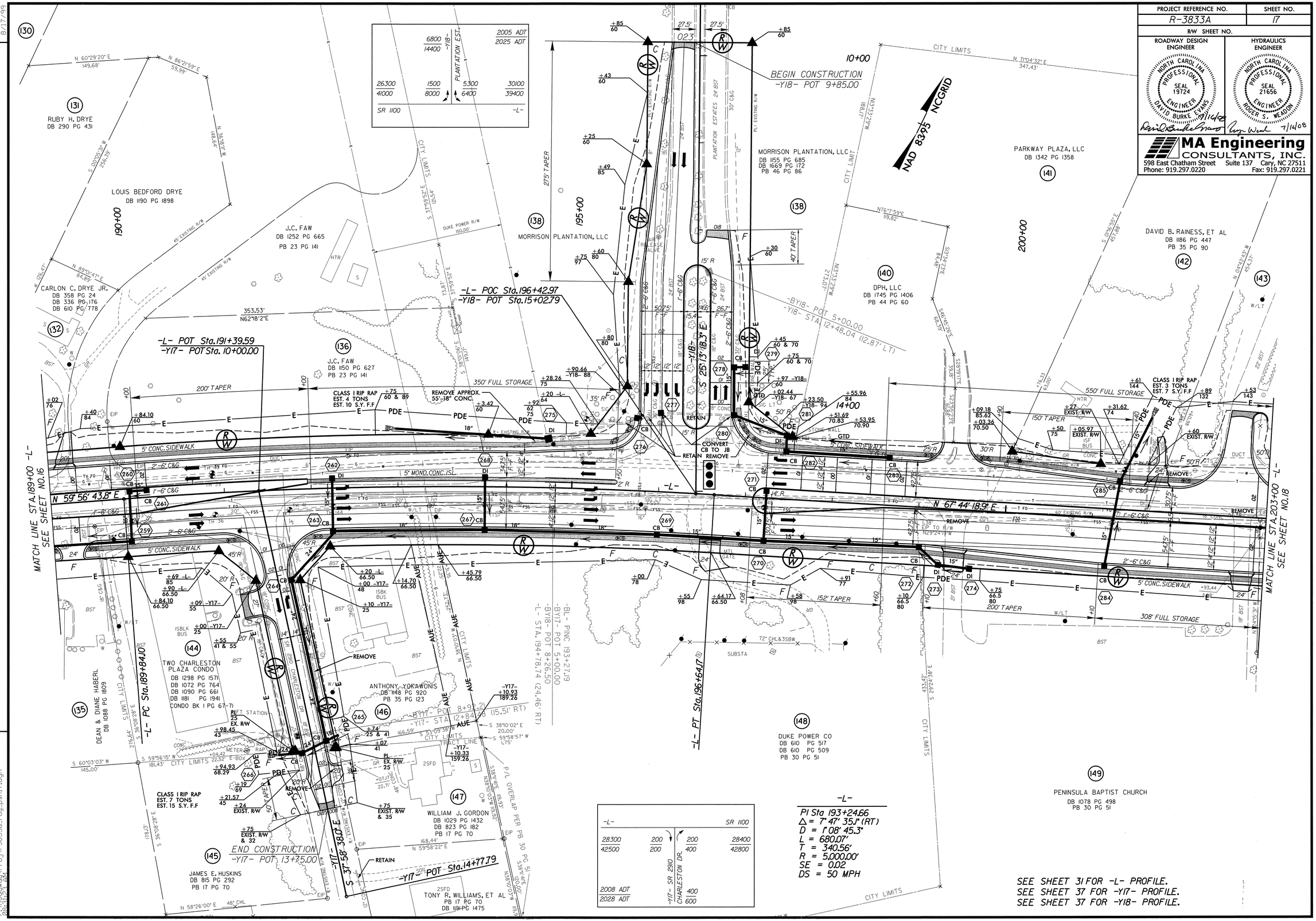
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 7/14/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON 7/14/08

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

REVISIONS

8/17/99



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pb_rdwy_pshl7 Proj\r-3833a-rdy_pshl7.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-3833A	18
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
6/4/08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON
6/4/08

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

REVISIONS

8/17/99

NAD 83/95 NCGRID

IREDELL COUNTY
DB 873 PG 531
PB 35 PG 90

ISBK BRAWLEY SCHOOL

THE SOUTH IREDELL LIONS CLUB
DB 647 PG 503

ISF CLUBHOUSE

MORRISON RETAIL LLC
DB 1187 PG 1986
PB 40 PG 89

FIRST CHARTER REAL ESTATE HOLDINGS, LLC
DB 1307 PG 976
PB 37 PG 88

MOORESVILLE PHARMACY, LLC
DB 1193 PG 2233
PB 37 PG 108

CAROLINA SPRINGS AUTOSPA INC
DB 1218 PG 1068
PB 33 PG 36
PB 32 PG 44

CITIZEN BANK, FSB
DB 1125 PG 577
PB 32 PG 44
PB 28 PG 114
PB 30 PG 11

BARRIER ISLAND PROPERTIES LLC
DB 1681 PG 634

JAMES C. SISCO JR.
DB 1103 PG 901
PB 29 PG 120

NOCOR, LLC
DB 1078 PG 1397
PB 27 PG 80

PENINSULA BAPTIST CHURCH
DB 1358 PG 1171
PB 25 PG 40

DIM VASTGOED N.V.
DB 1087 PG 737
PB 27 PG 80
PB 30 PG 11
PB 28 PG 114

DIM VASTGOED N.V.
DB 1087 PG 737
PB 27 PG 80
PB 30 PG 11
PB 28 PG 114

-L- POT Sta.204+66.22
-Y24- POT Sta.10+00.00

BEG. 8X18 CURB
STA. 206+21.52

-L- PC Sta.210+68.22

END 8X18 CURB
STA. 211+42

-L- PT Sta.214+44.43

-Y24- PC Sta.11+13.63

-Y24- PT Sta.11+86.18

-Y24- POT Sta.11+90.29

NOTE: DO NOT DISTURB FENCES, BALL FIELDS, OR LIGHT POLES

MATCH LINE STA.203+00 -L- SEE SHEET NO.17

MATCH LINE STA.217+00 -L- SEE SHEET NO.19

MATCH LINE SEE SHEET NO.23

-Y24-

PI Sta 11+50.42
Δ = 23° 37' 05.0" (LT)
D = 32° 33' 15.9"
L = 72.55'
T = 36.80'
R = 176.00'

-L-

PI Sta 212+57.88
Δ = 17° 57' 45.3" (LT)
D = 4° 46' 28.7"
L = 376.21'
T = 189.66'
R = 1,200.00'
SE = 0.04
DS = 50 MPH

SEE SHEET 32 FOR -L- PROFILE.
SEE SHEET 39 FOR -Y24- PROFILE.

06/04/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	19
R/W SHEET NO.	

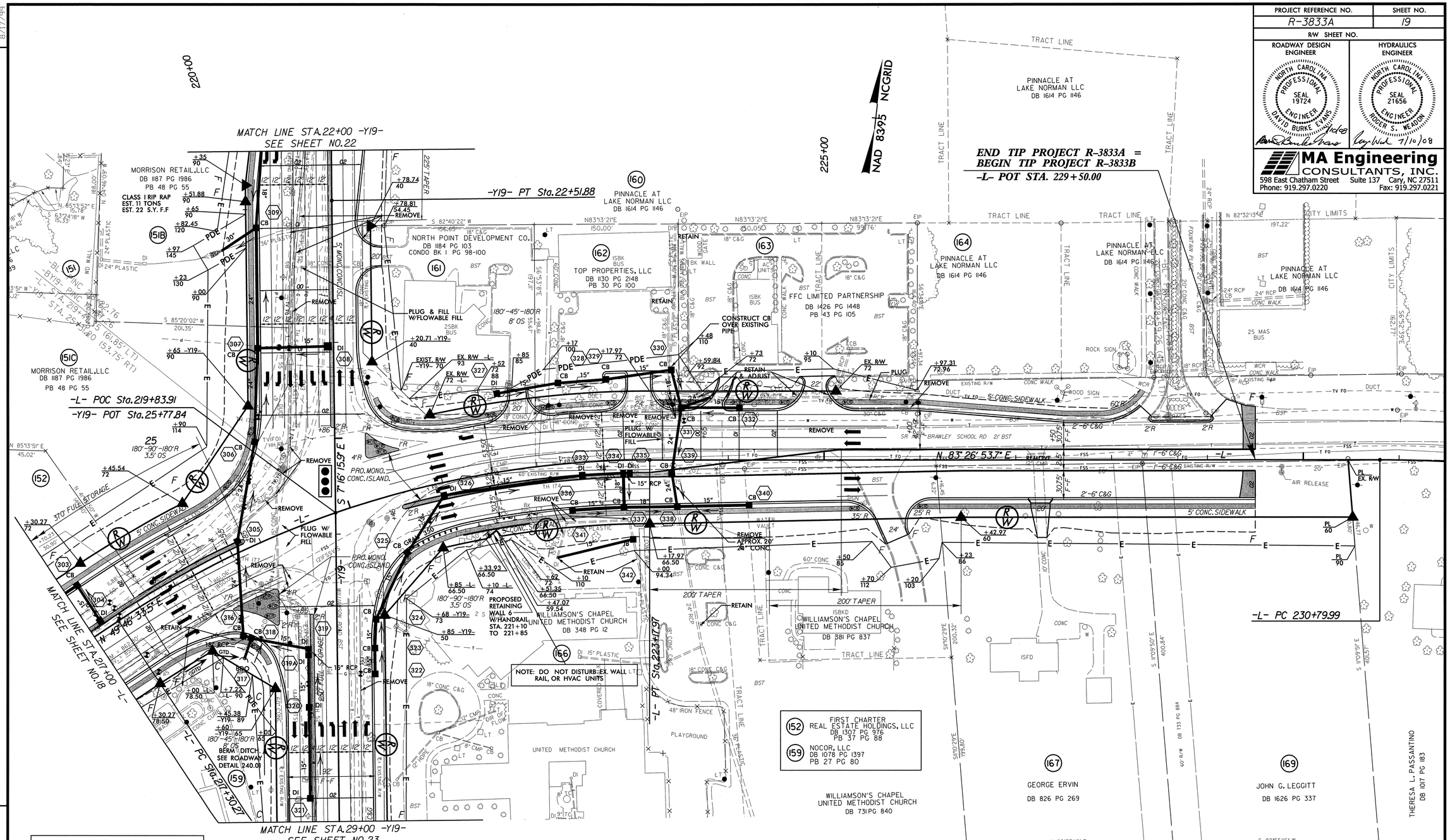
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 7/10/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON 7/10/08

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

8/17/99

REVISIONS



	2008 ADT / 2028 ADT
-Y19- SR 1109 / WILLIAMSON RD.	20000 / 28700
-Y19- SR 1109 / -L-	7400 / 10000
-Y19- SR 1109 / -L-	4400 / 7000
-Y19- SR 1109 / -L-	21800 / 31400
-Y19- SR 1109 / -L-	26100 / 34700
SR 1100 / -L-	4000 / 6400
SR 1100 / -L-	2100 / 4600
-L-	13800 / 19400

SEE SHEET 32 FOR -L- PROFILE.
SEE SHEET 38 FOR -Y19- PROFILE.

-L-	
PI Sta 220+32.88	PI Sta 235+75.80
Δ = 33° 40' 20.2" (RT)	Δ = 38° 22' 09.6" (RT)
D = 5° 43' 46.5"	D = 4° 01' 14.7"
L = 587.69'	L = 954.28'
T = 302.61'	T = 495.81'
R = 1,000.00'	R = 1,425.00'
SE = 0.02	SE = 0.04
DS = 50 MPH	DS = 50 MPH

-Y19-	
PI Sta 21+17.55	PI Sta 30+94.24
Δ = 2° 03' 09.7" (LT)	Δ = 13° 22' 09.3" (LT)
D = 0° 45' 50.2"	D = 3° 49' 11.0"
L = 268.70'	L = 350.01'
T = 134.36'	T = 175.80'
R = 7,500.00'	R = 1,500.00'
SE = NC	SE = 0.04
DS = 50 MPH	DS = 50 MPH

07/09/2008
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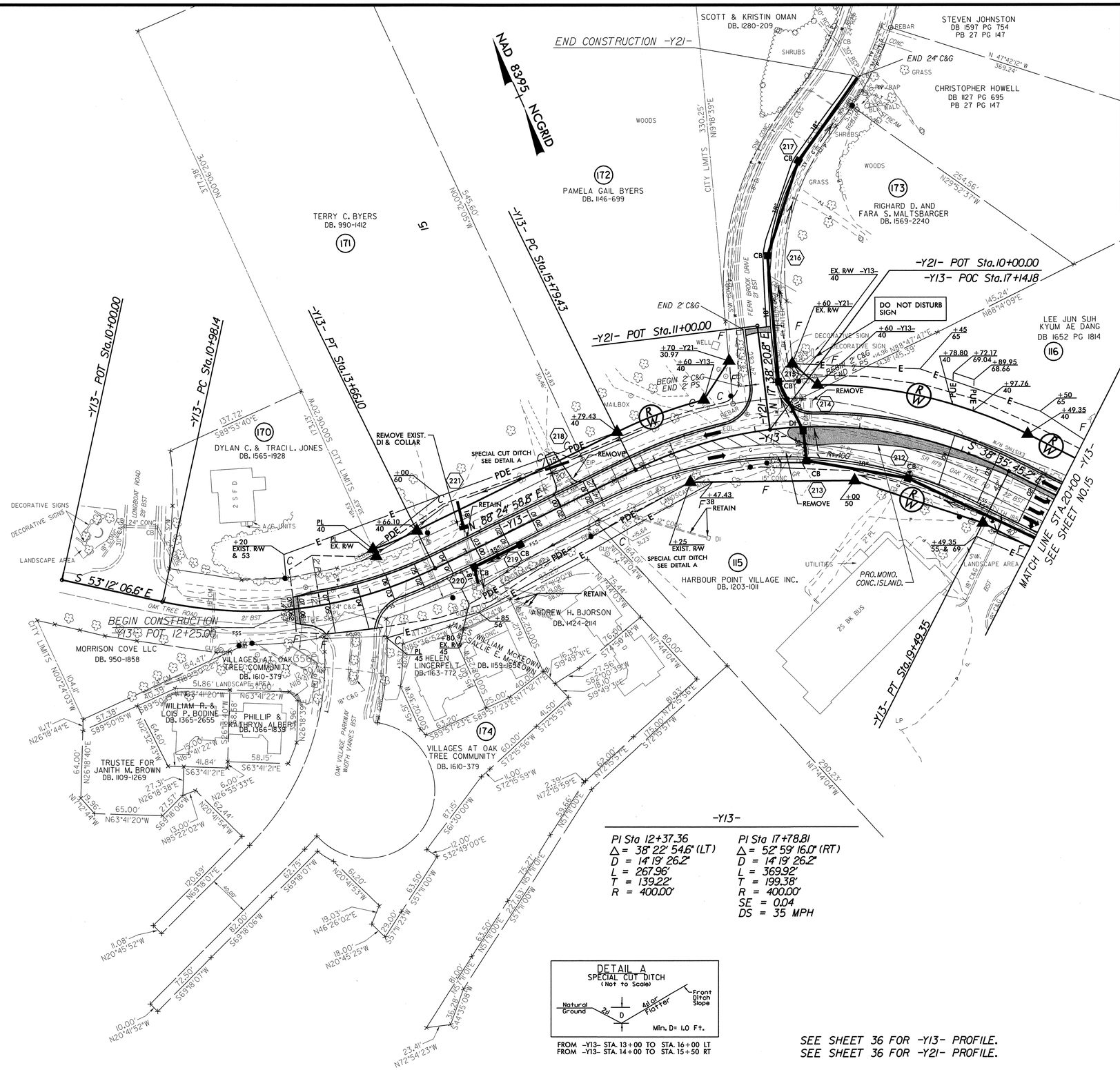
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	20
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
6/9/08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON
6/9/08

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



-Y13-

PI Sta 12+37.36	PI Sta 17+78.81
Δ = 38° 22' 54.6" (LT)	Δ = 52° 59' 16.0" (RT)
D = 14° 19' 26.2"	D = 14° 19' 26.2"
L = 267.96'	L = 369.92'
T = 139.22'	T = 199.38'
R = 400.00'	R = 400.00'
	SE = 0.04
	DS = 35 MPH

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)

FROM -Y13- STA. 13+00 TO STA. 16+00 LT
FROM -Y13- STA. 14+00 TO STA. 15+50 RT

SEE SHEET 36 FOR -Y13- PROFILE.
SEE SHEET 36 FOR -Y21- PROFILE.

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	21
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
6/27/08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON
6/27/08

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

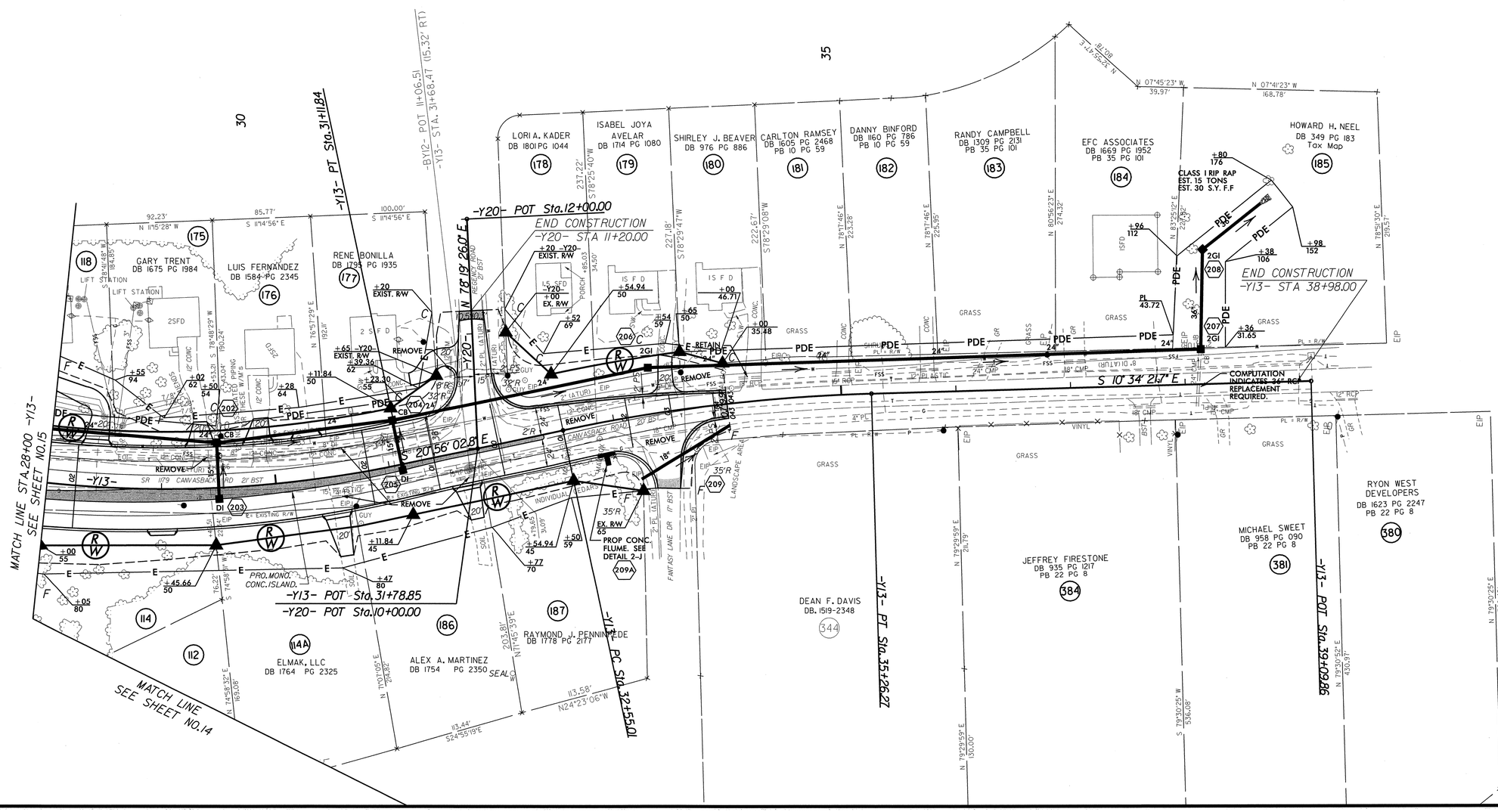
NAD 83/95 NCGRID

SEE SHEET 36 FOR -Y13- PROFILE.
SEE SHEET 36 FOR -Y20- PROFILE.

-Y13-

PI Sta 28+70.80
Δ = 28° 12' 17.1" (LT)
D = 5° 43' 46.5"
L = 492.27'
T = 251.23'
R = 1,000.00'
DS = 35 MPH

PI Sta 33+91.02
Δ = 10° 21' 41.1" (RT)
D = 3° 49' 11.0"
L = 271.26'
T = 136.00'
R = 1,500.00'



REVISIONS

8/17/99

06/26/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	22
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS

David Burke Evans 7/8/08

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON

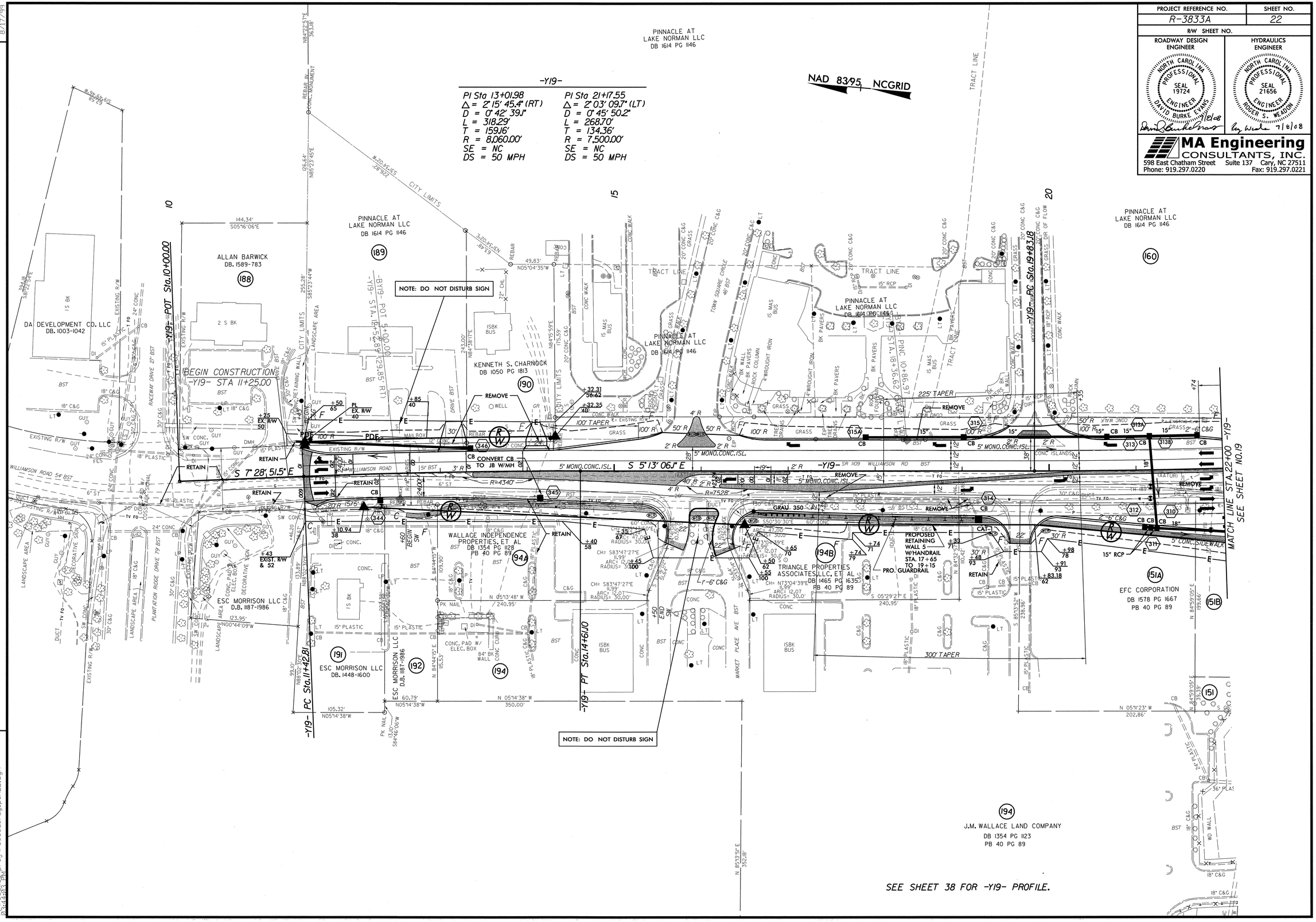
Roger S. Weadon 7/8/08

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

NAD 83/95 NCGRID

-Y19-

PI Sta 13+01.98	PI Sta 21+17.55
Δ = 2° 15' 45.4" (RT)	Δ = 2° 03' 09.7" (LT)
D = 0° 42' 39.1"	D = 0° 45' 50.2"
L = 318.29'	L = 268.70'
T = 159.16'	T = 134.36'
R = 8,060.00'	R = 7,500.00'
SE = NC	SE = NC
DS = 50 MPH	DS = 50 MPH



REVISIONS

8/17/99

07/08/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	23
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
6/4/08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON
6/4/08

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

NAD 83/95 NCGRID

-Y19-
PI Sta 30+94.24
Δ = 13° 22' 09.3" (LT)
D = 3° 49' 11.0"
L = 350.01'
T = 175.80'
R = 1,500.00'
SE = 0.04
DS = 50 MPH

WILLIAMSON'S CHAPEL UNITED METHODIST CHURCH DB 731 PG 840

WILLIAMSON'S CHAPEL UNITED METHODIST CHURCH DB 348 PG 12 (166)

ACADIAN HOLDING, LLC DB 1166 PG 179 PB 29 PG 59 PB 1 PG 88

PHC/LNFP, LLC DB 1127 PG 78 PB 28 PG 156 PB 29 PG 59 (195)

LAKE CITY SQUARE ASSOCIATION, INC DB 1085 PG 639 PB 1 PG 88 PB 29 PG 59 PB 28 PG 156 (196)

MONTPIED COMPANY, LLC DB 1080 PG 4 PB 29 PG 59 PB 1 PG 88 (197)

LAKESIDE FELLOWSHIP ASSOCIATE DB. 827-24 (198)

NOCOR, LLC DB 1078 PG 1397 PB 27 PG 80 (159)

WACHOVIA BANK & TRUST CO PB 38 PG 78 PB 27 PG 80 DB 801 PG 995 (199)

RUNNIN THE BEAN LLC DB 1605 PG 607 PB 27 PG 80 (200)

SOUTHERN SUPPLY INC. DB. 639-148 (201)

DIM VASTGOED N.V. DB 1087 PG 737 PB 27 PG 80 PB 30 PG 11 PB 28 PG 114 (156)

MATCH LINE STA.29+00 -Y19- SEE SHEET NO.19

MATCH LINE STA.41+00 -Y19- SEE SHEET NO.24

MATCH LINE SEE SHEET NO.18

-Y19- PC Sta.29+18.44

-Y19- PT Sta.32+68.45

-B19- PINC 24+34.81 -Y19- STA. 31+73.30 (29.85' RT)

-B19- PINC 32+90.92 -Y19- STA. 40+27.53 (17.83' RT)

NOTE: DO NOT DISTURB CODE BOX OR ELEC. ARM.

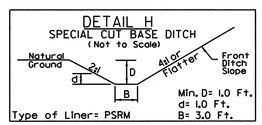
REMOVE 10' OF 18" RCP AND DI

REMOVE 5' MONO CONC. ISL.

CLASS I RIP RAP EST. 7 TONS EST. 15 S.Y. F.F

S 20°38'25.2" E

DETAIL H
SPECIAL CUT BASE DITCH
(Not to Scale)



Min. D= 1.0 Ft.
d= 1.0 Ft.
B= 3.0 Ft.
Type of Liner= PSRM
FROM -Y19- STA. 40+20 TO STA. 42+80 RT

SEE SHEETS 38 & 39 FOR -Y19- PROFILE.

REVISIONS

8/17/99

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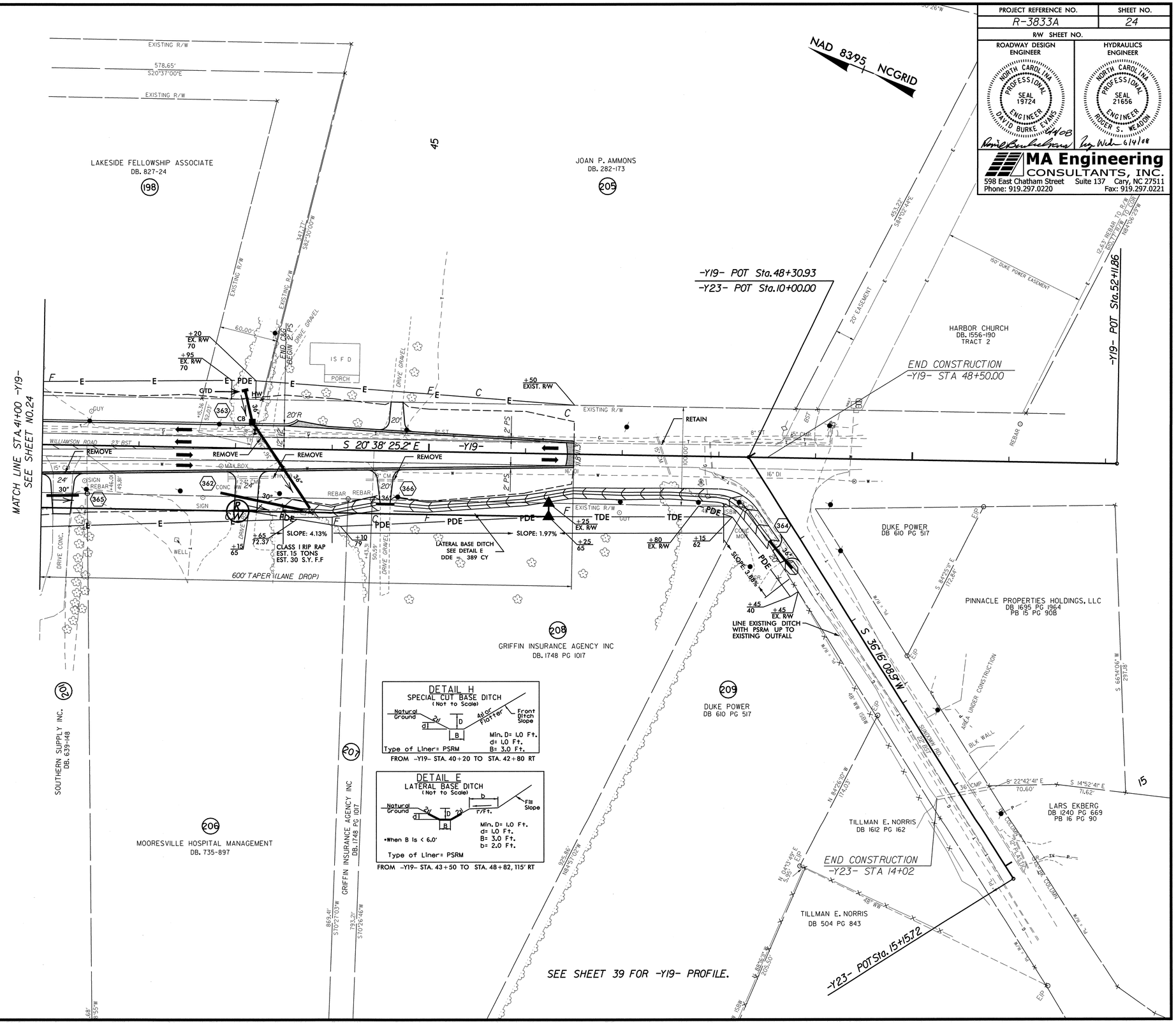
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	24
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
6/14/08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON
6/14/08

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



REVISIONS

8/17/99

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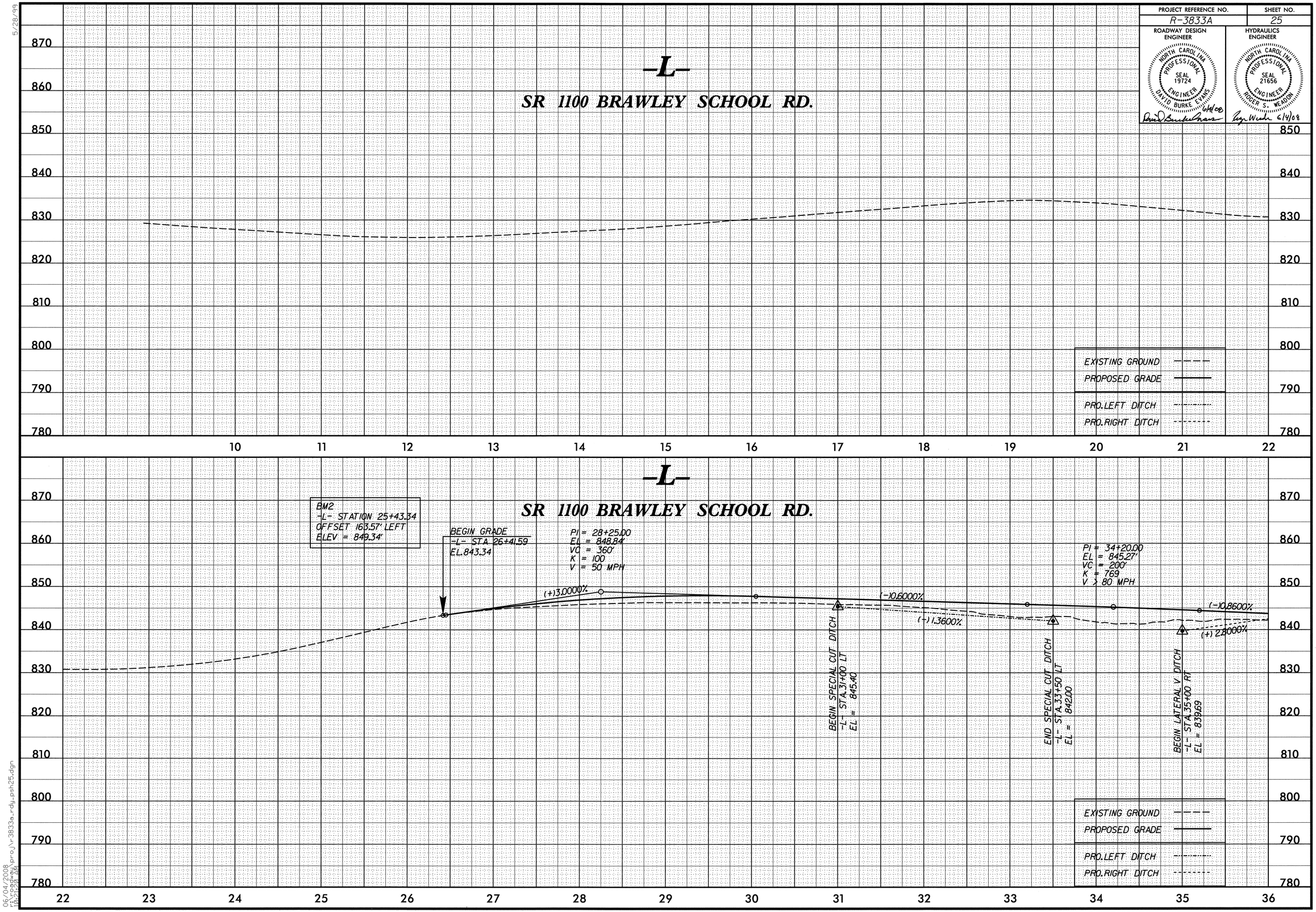
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	25

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS — David Burke Evans 6/4/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON — Roger Weadon 6/4/08



5/28/99

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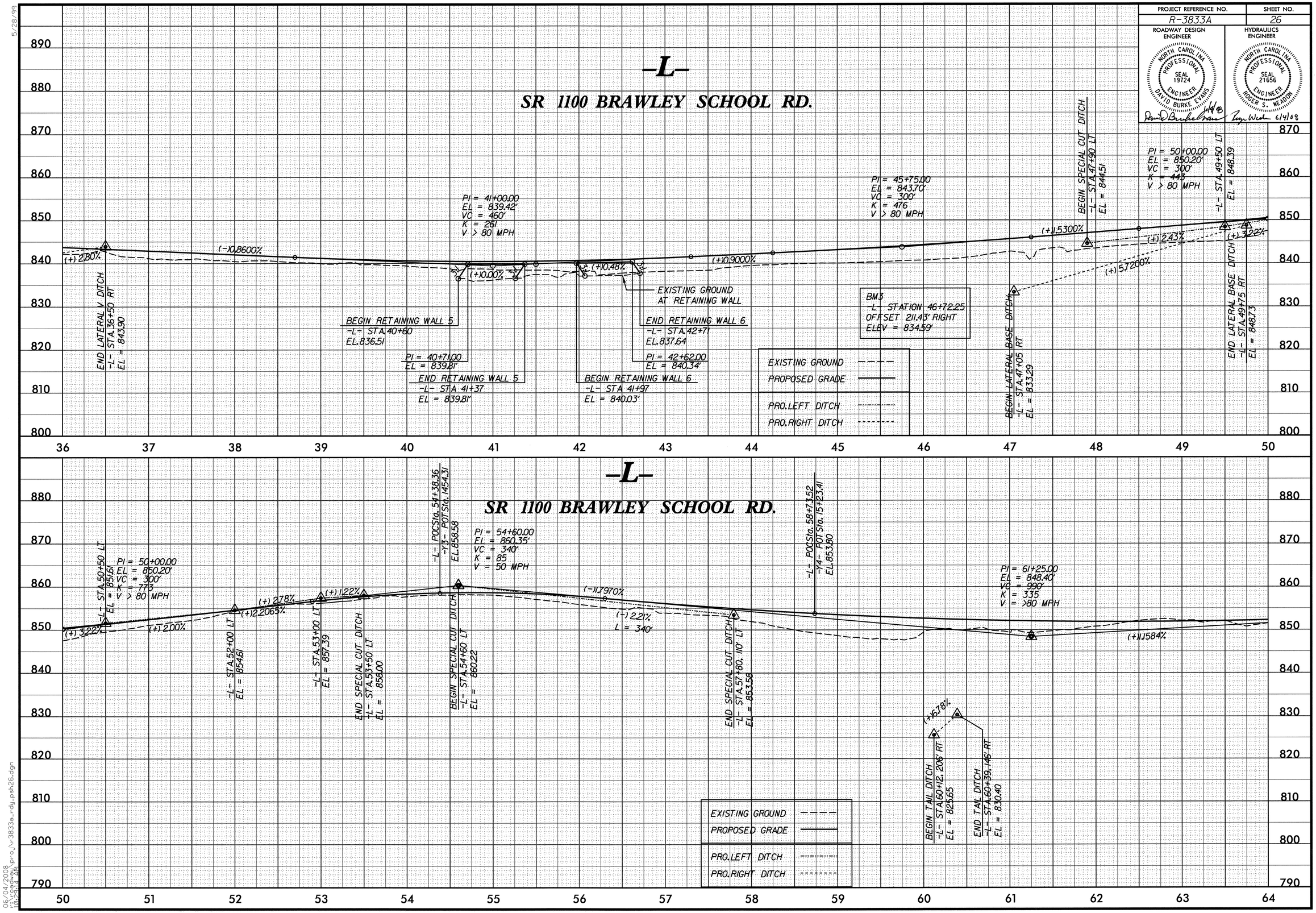
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	26

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS — 6/4/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON — 6/4/08



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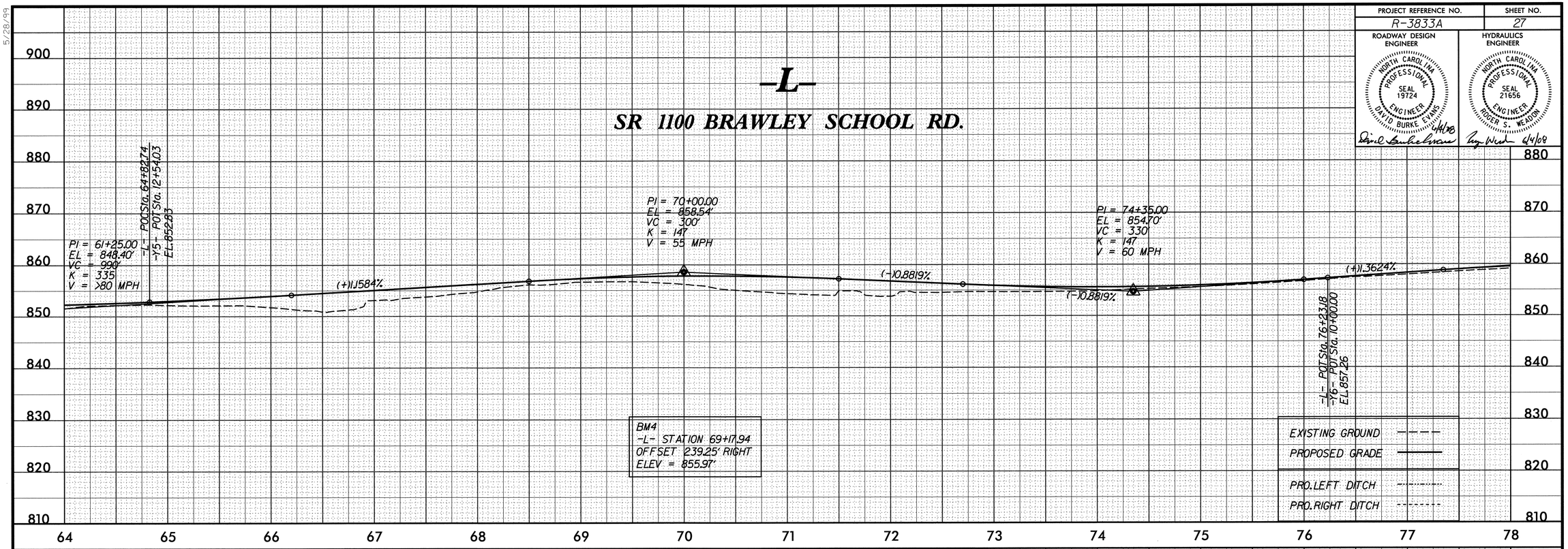
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	27

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
6/4/08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEAVER
6/4/08



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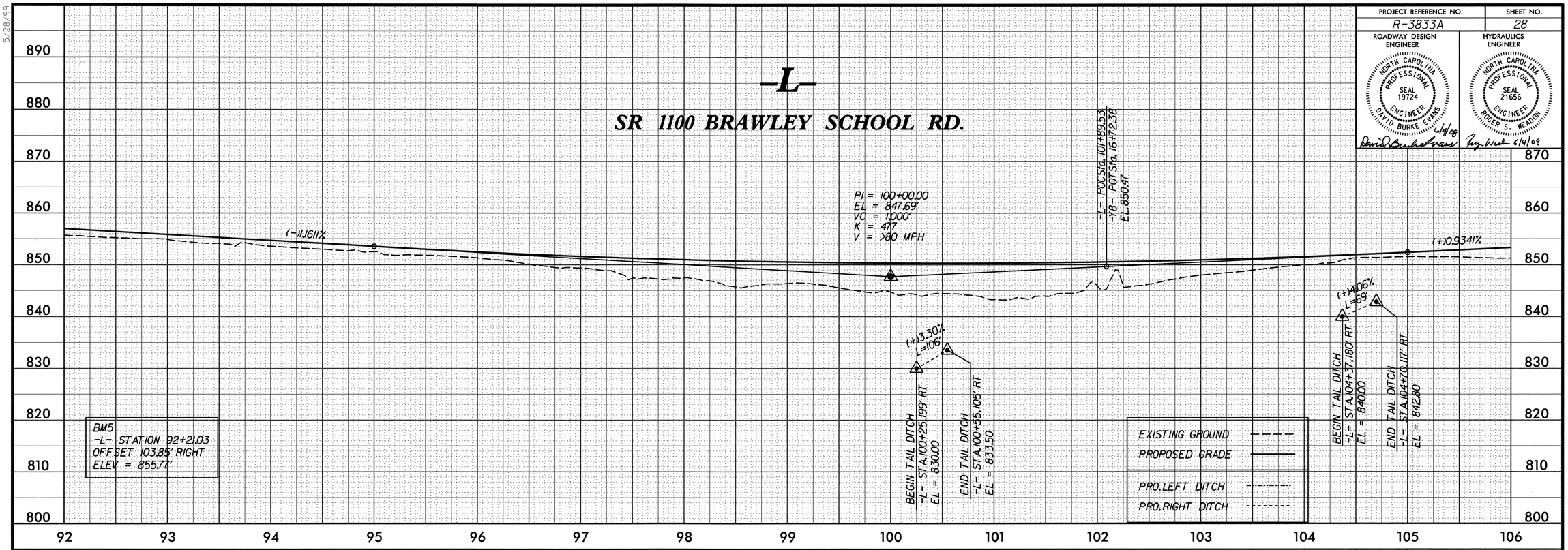
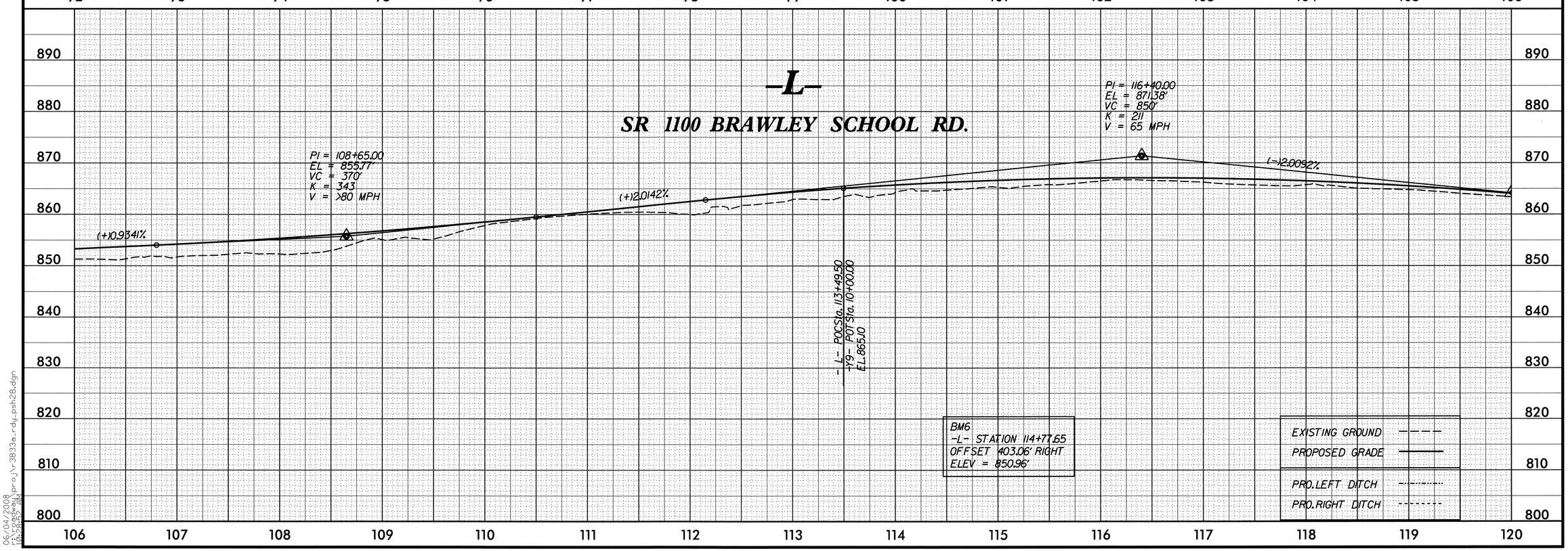
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	28

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
David Burke Evans 6/4/08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON
Roger Weadon 6/4/08





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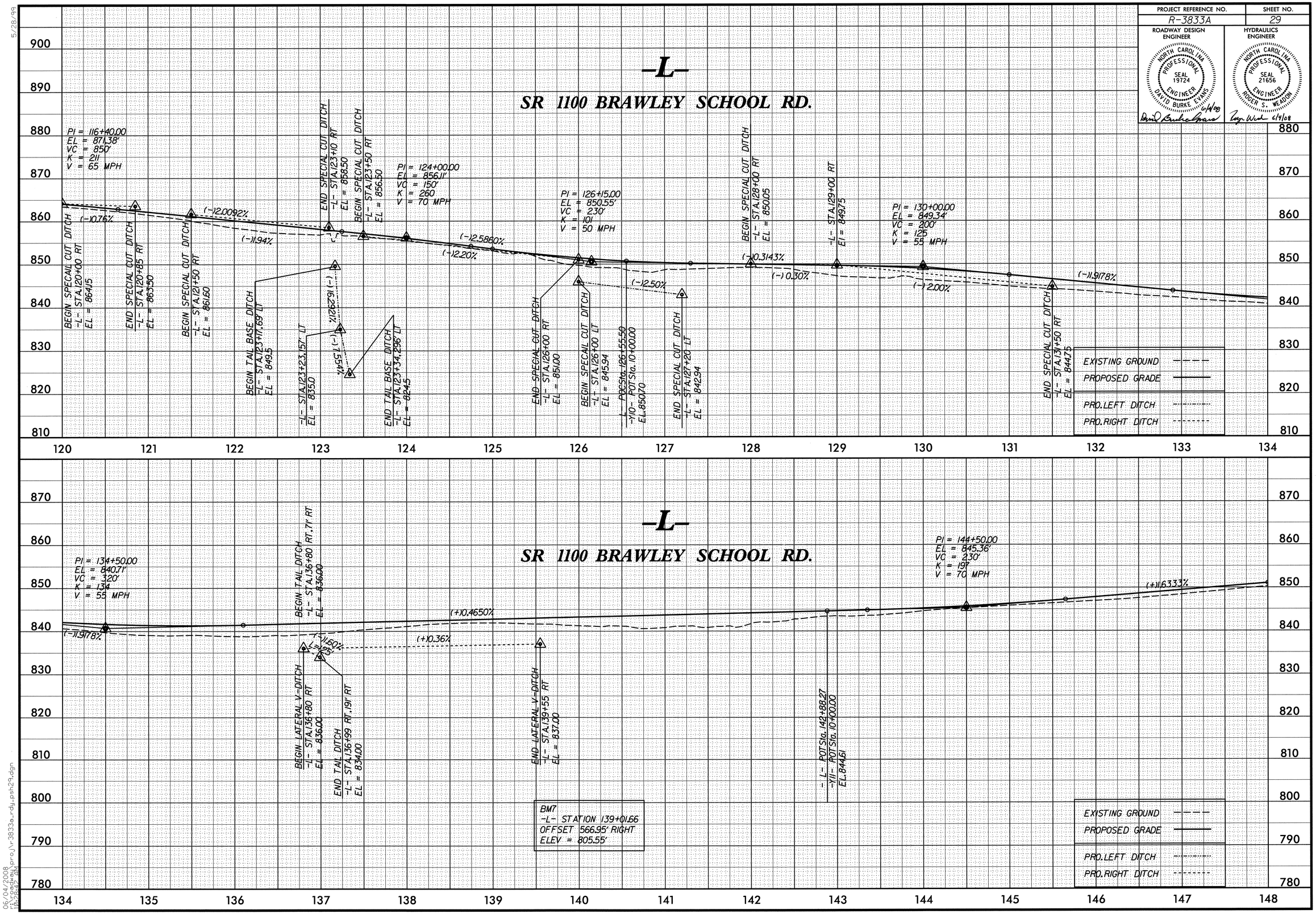
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-3833A	29

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
David Burke Evans 6/4/08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEAKLEY
Roger Weakley 6/4/08



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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	30

ROADWAY DESIGN ENGINEER

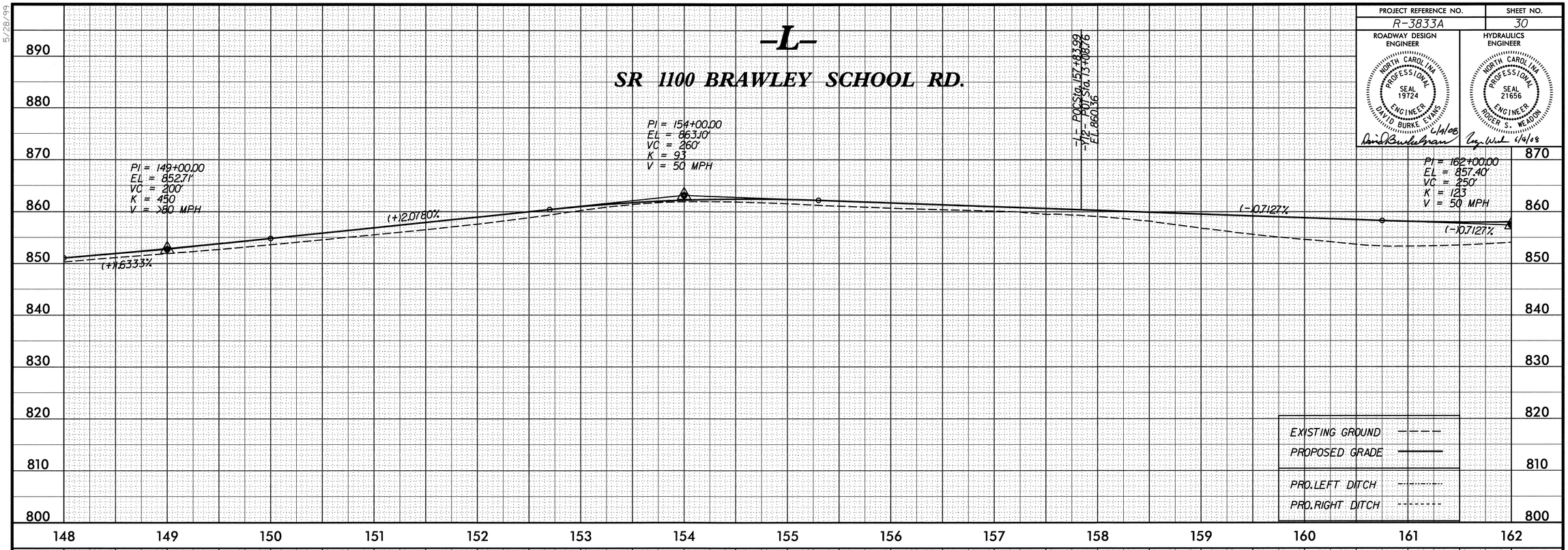
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS

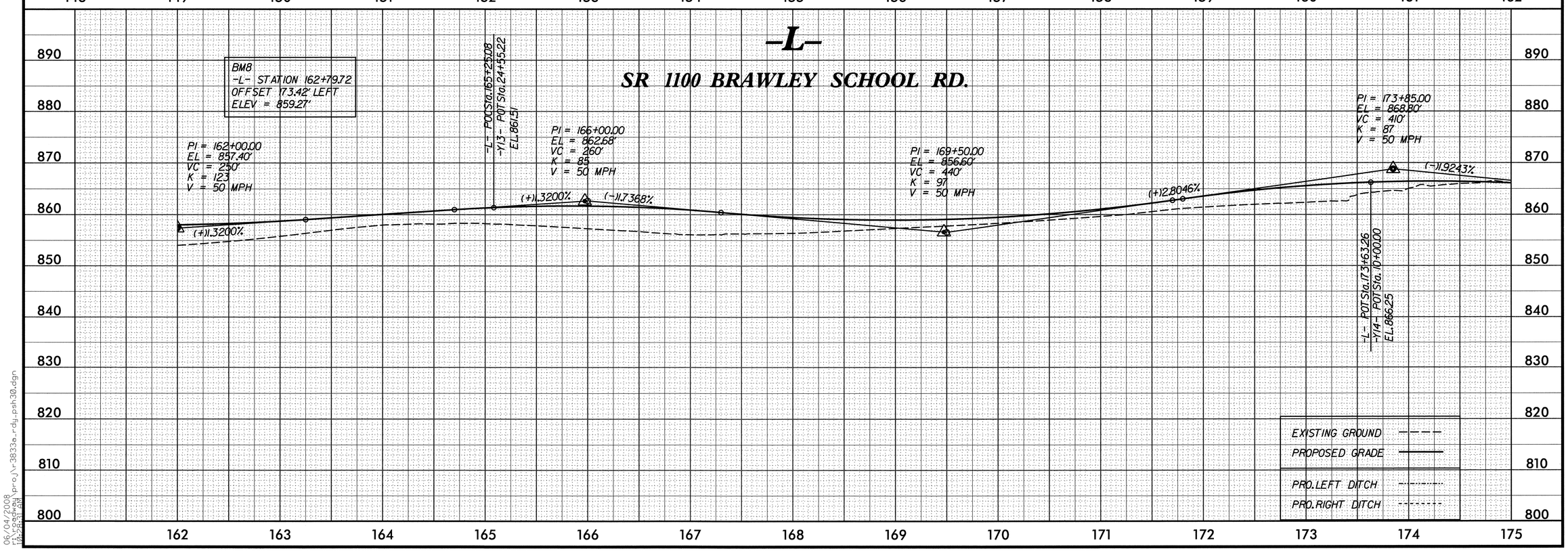
David Burke Evans 6/9/08

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON

Roger Weadon 6/9/08





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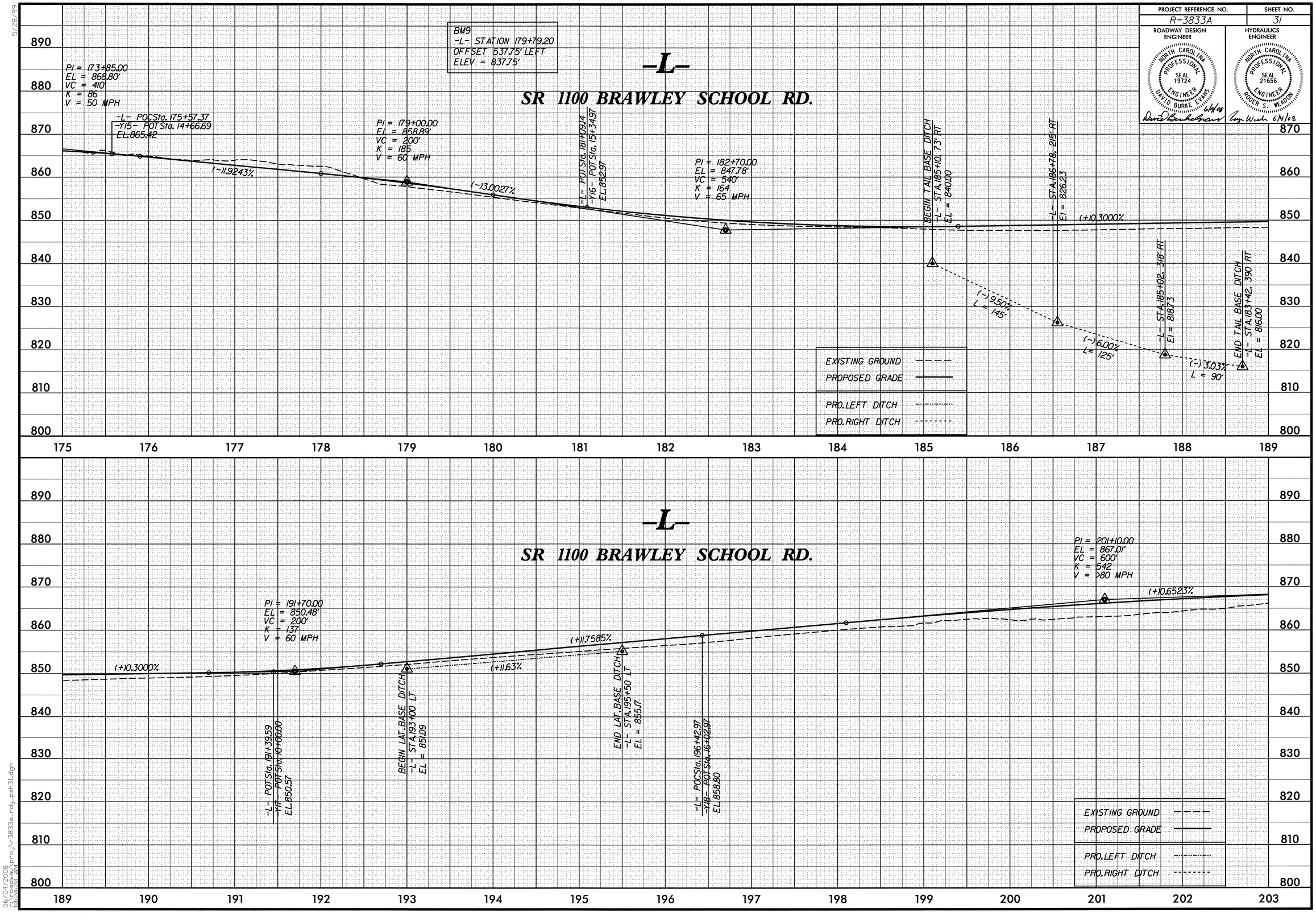
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	31

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 6/4/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON 6/4/08



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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	32

ROADWAY DESIGN ENGINEER

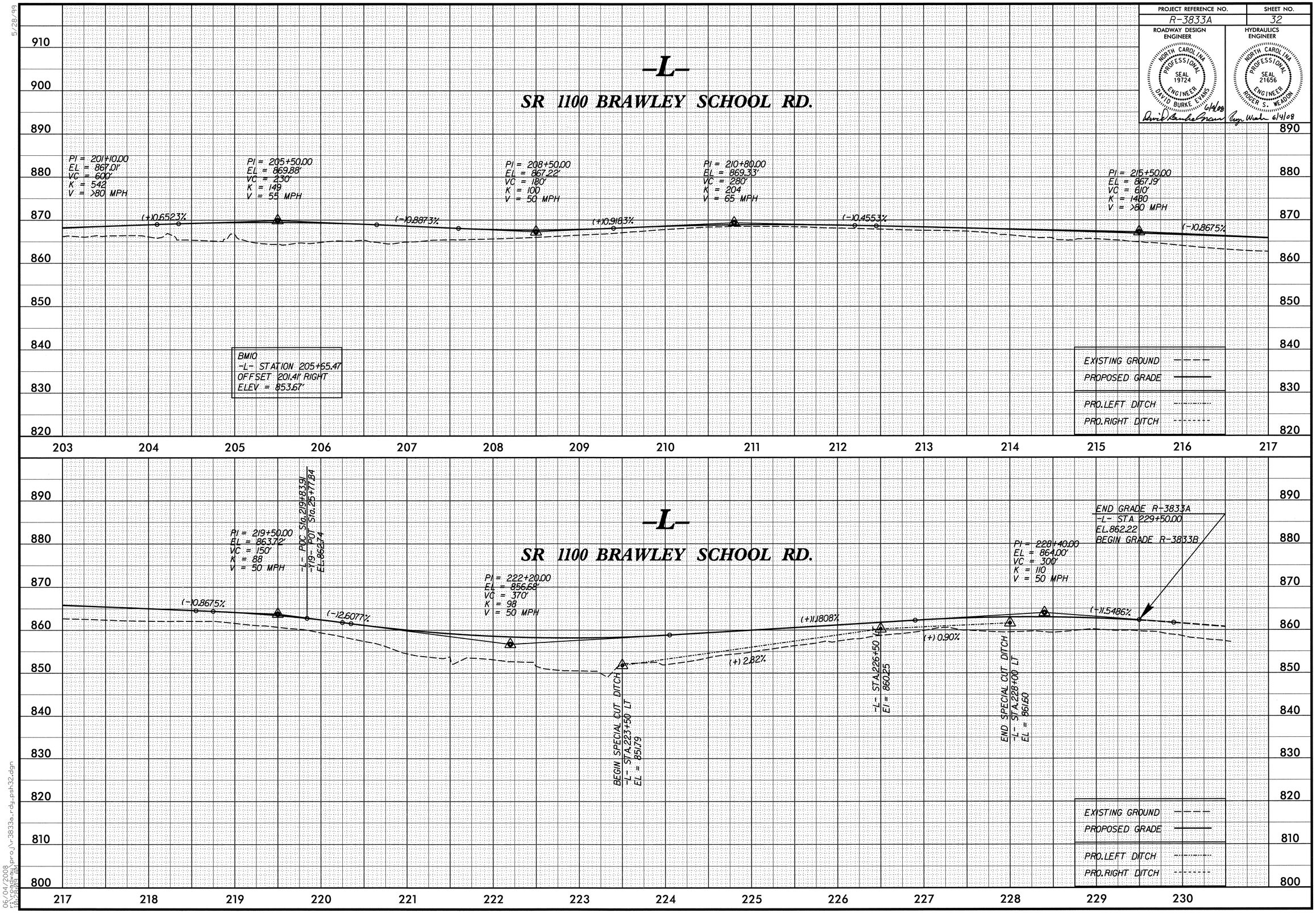
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS

David Burke Evans 6/4/08

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON

Roger Weadon 6/4/08



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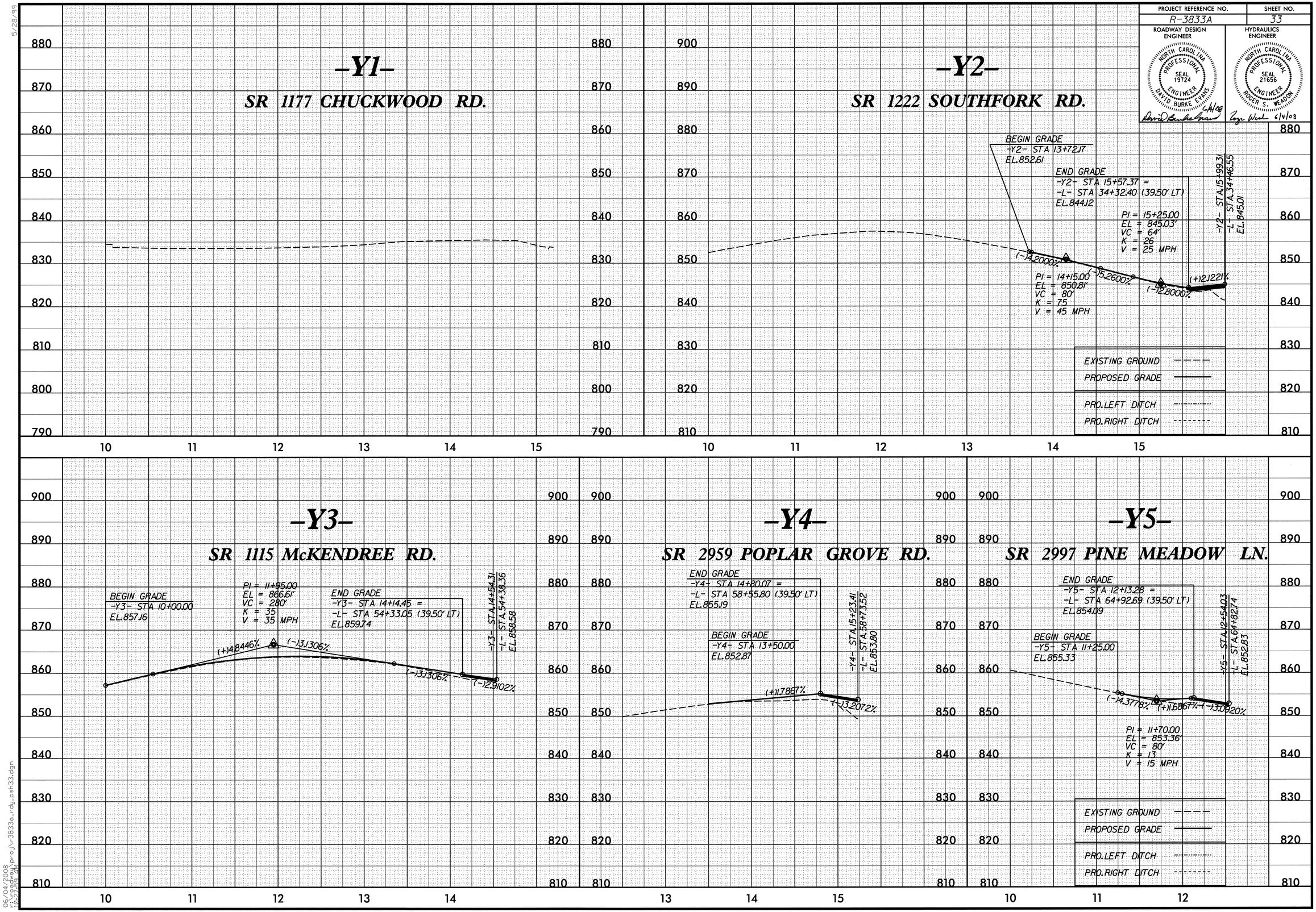
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	33

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
6/4/08
David Burke Evans

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON
6/4/08
Roger Weadon



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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	34

ROADWAY DESIGN ENGINEER

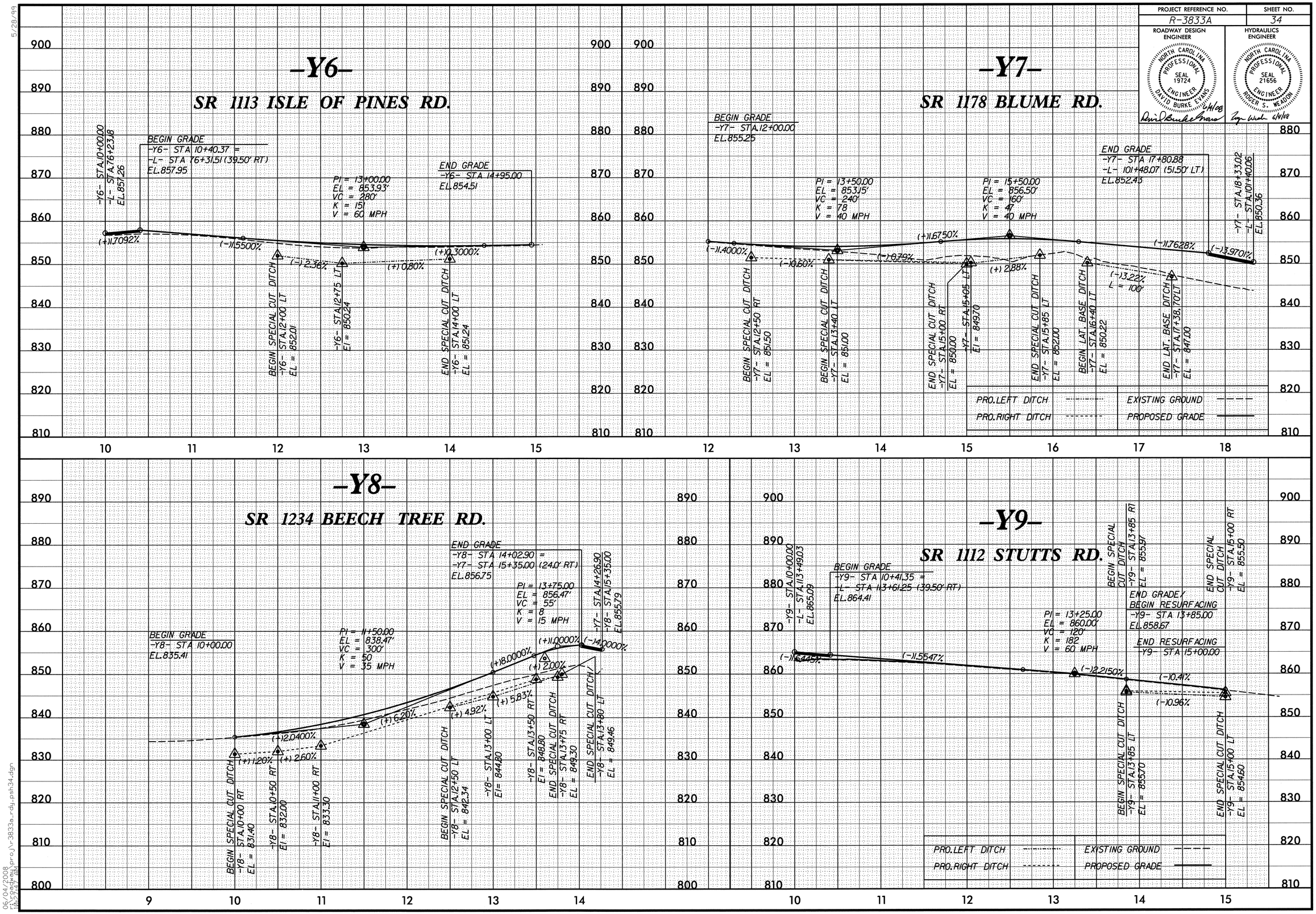
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS

6/4/08

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON

6/4/08



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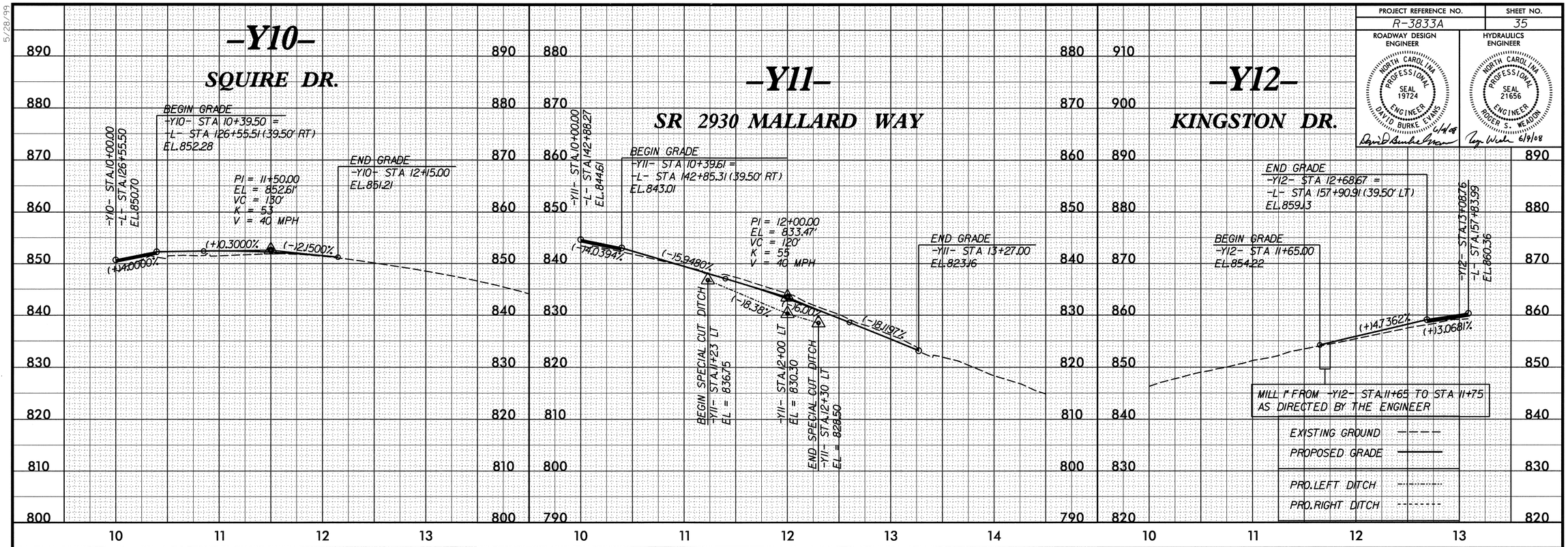
R-3833A	35

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS 6/4/08

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON 6/9/08



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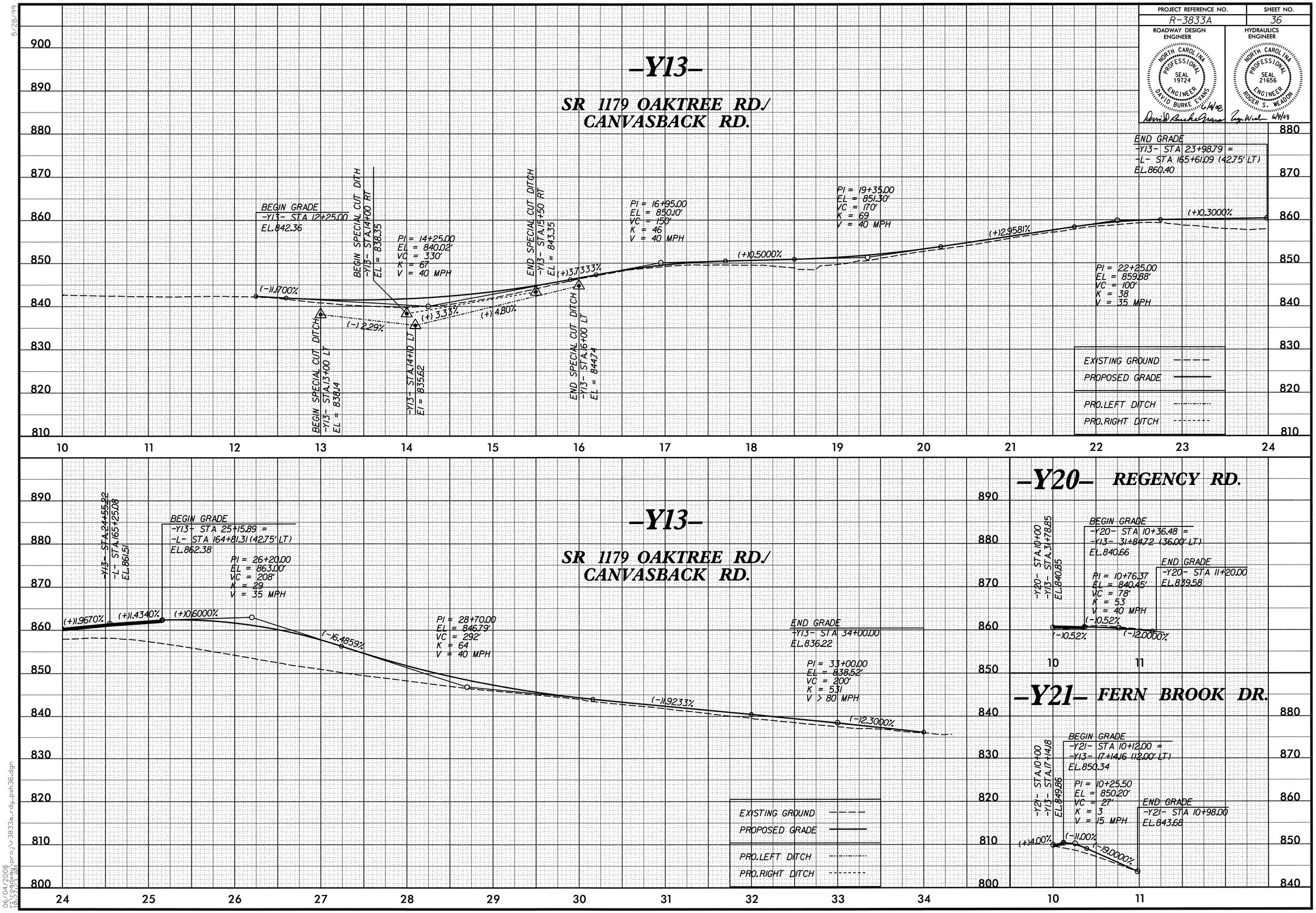
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	36

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
David B. Burke Evans 6/4/08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON
Roger Weadon 6/4/08



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PROJECT REFERENCE NO.	SHEET NO.
R-3833A	37

ROADWAY DESIGN ENGINEER

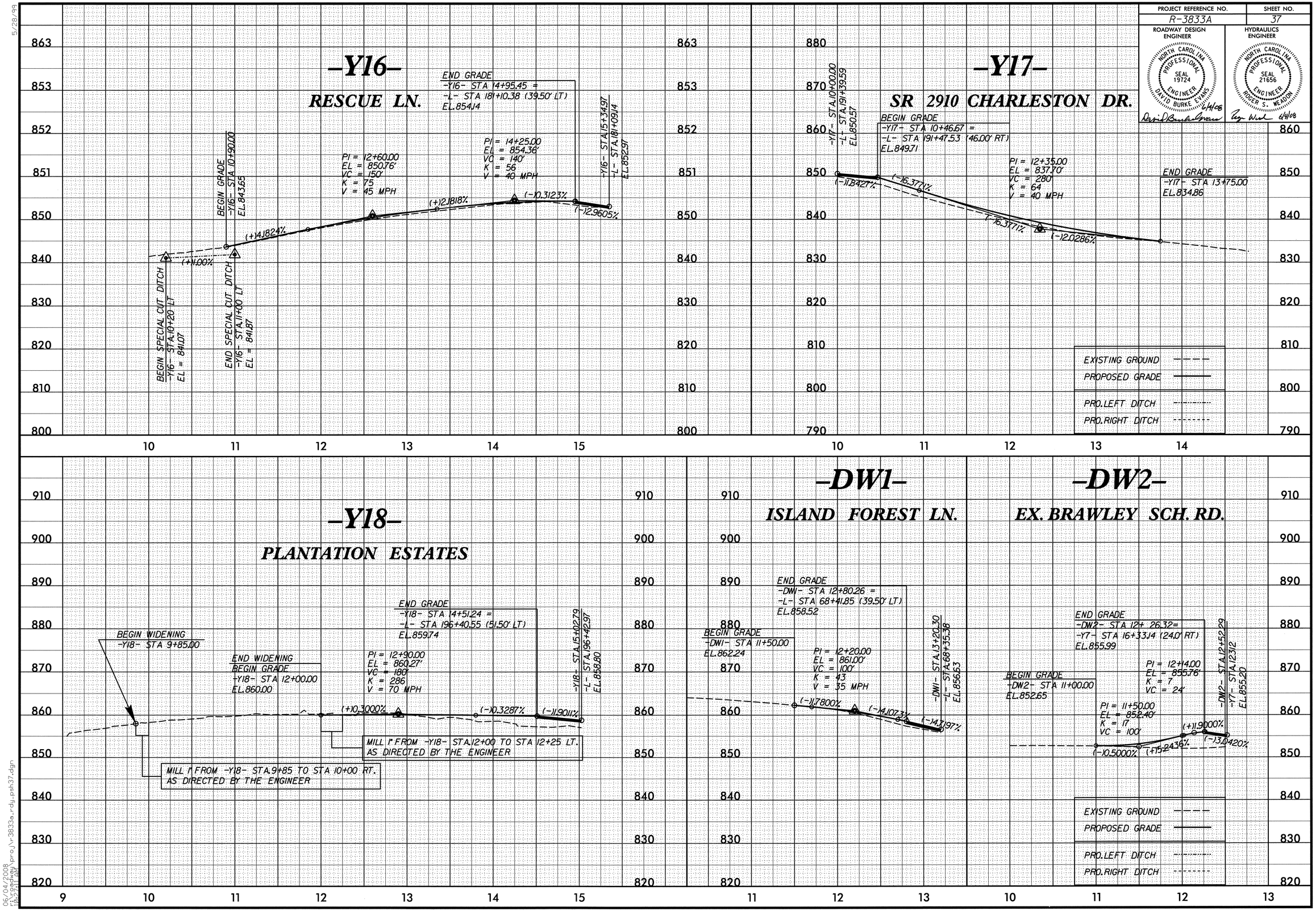
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS

6/4/08

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON

6/4/08



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PROJECT REFERENCE NO.	SHEET NO.
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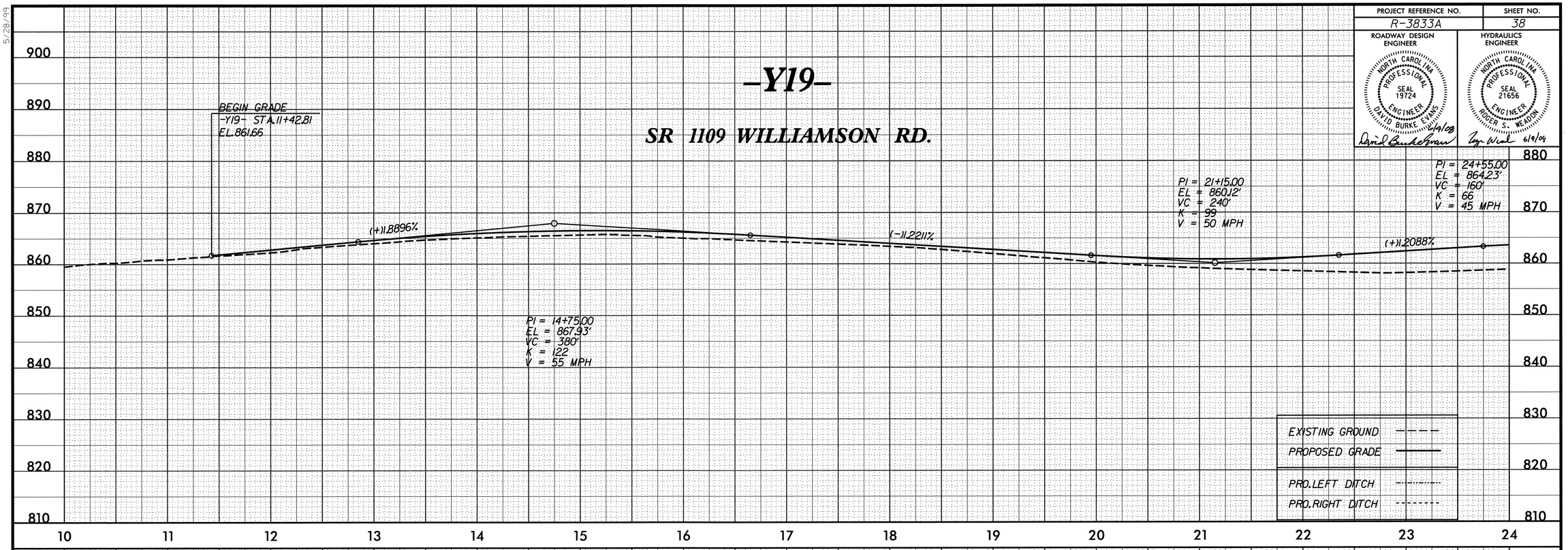
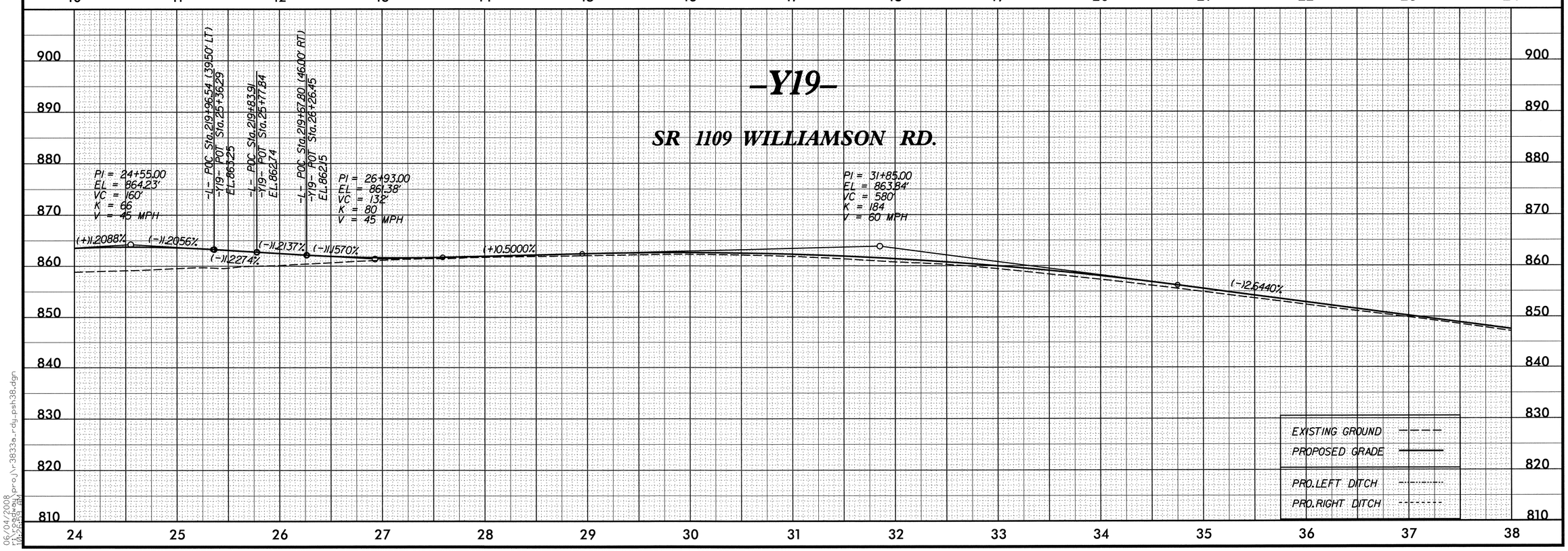
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
David Burke Evans 6/9/08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON
Roger Weadon 6/9/08





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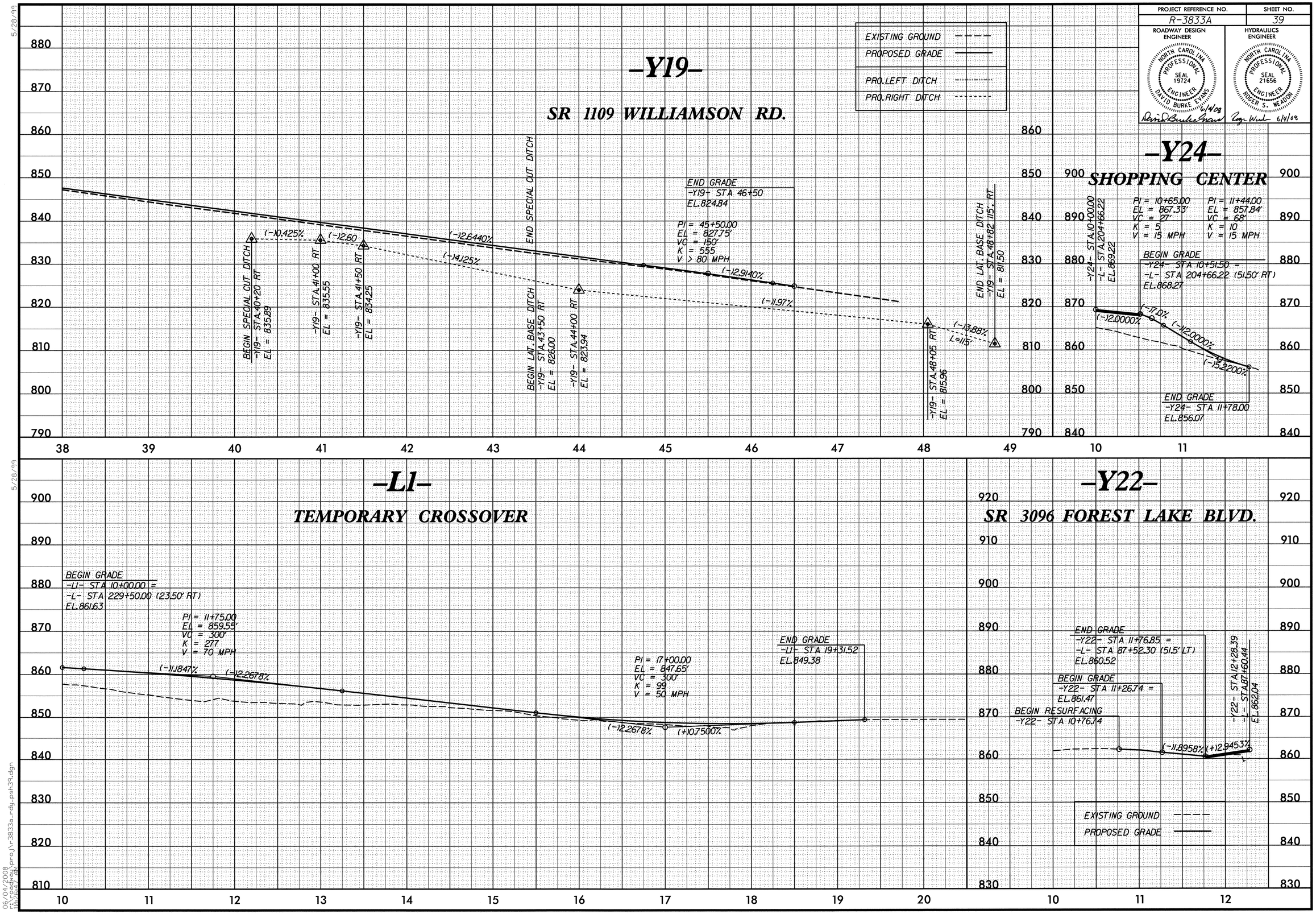
PROJECT REFERENCE NO.	SHEET NO.
R-3833A	39

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19724 ENGINEER DAVID BURKE EVANS
6/4/08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON
6/4/08

EXISTING GROUND
PROPOSED GRADE
PRO. LEFT DITCH
PRO. RIGHT DITCH



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