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09/08/99

TIP PROJECT: W-5212N

CONTRACT: C204262

See Sheet 1-A For Index of Sheets

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

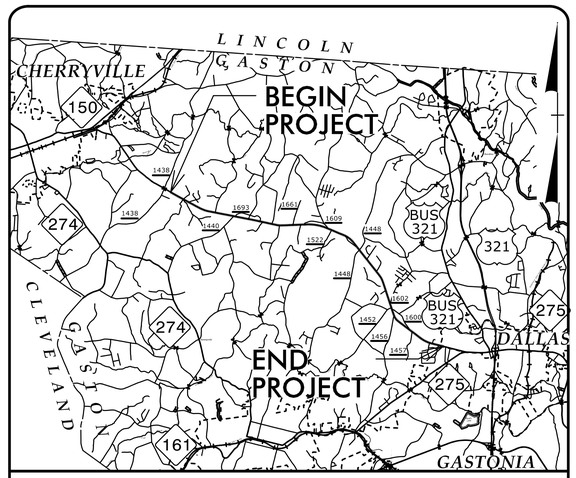
GASTON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	W-5212N	1	

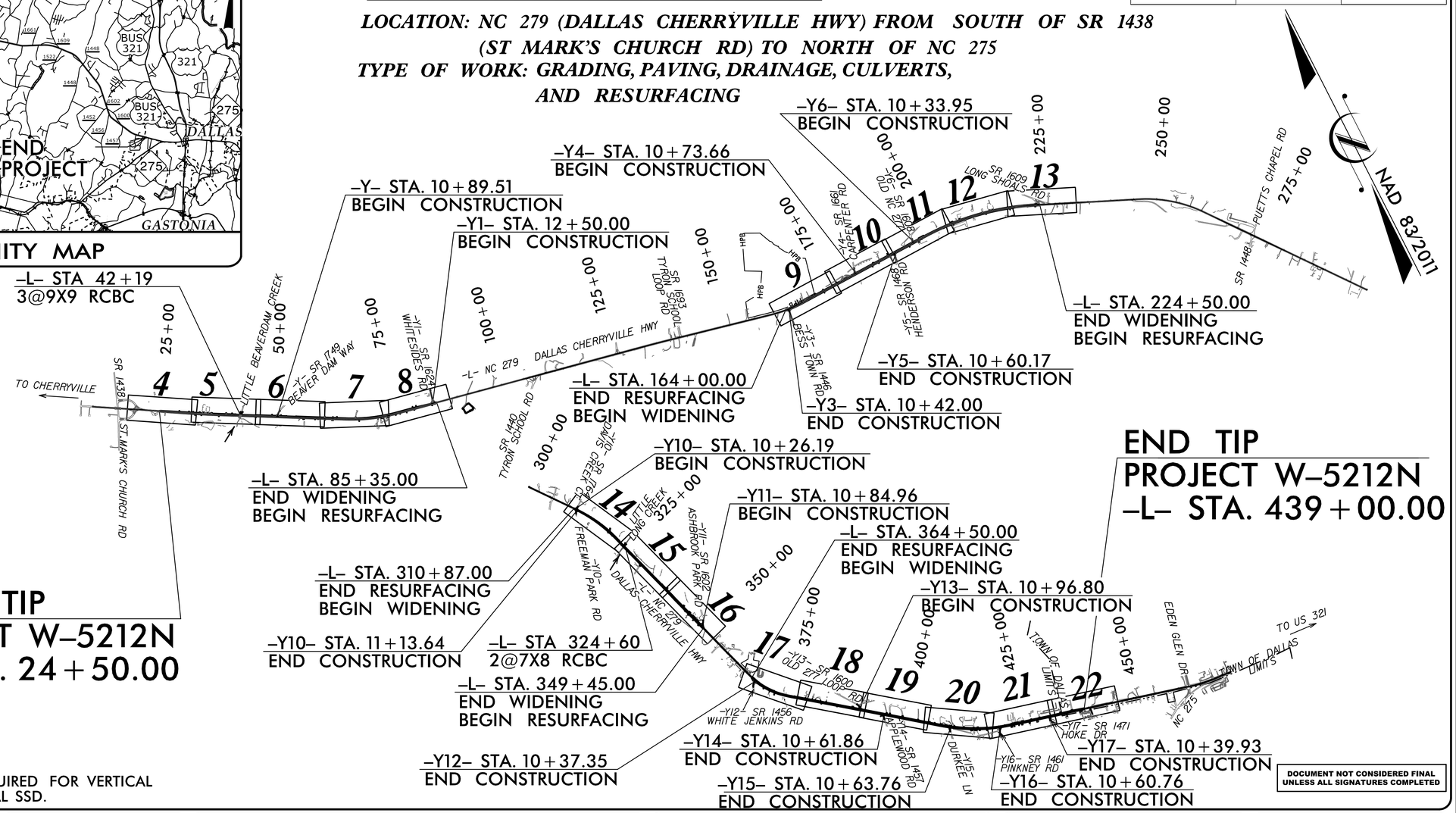
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
45342.1.FR14	HSIP-0279(10)	PE
45342.2.14	HSIP-0279(10)	ROW
45342.3.14	HSIP-0279(10)	CONST.

LOCATION: NC 279 (DALLAS CHERRYVILLE HWY) FROM SOUTH OF SR 1438 (ST MARK'S CHURCH RD) TO NORTH OF NC 275

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CULVERTS, AND RESURFACING



VICINITY MAP



DESIGN EXCEPTION REQUIRED FOR VERTICAL CURVATURE AND VERTICAL SSD.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 2018 = 11,600
ADT 2040 = 14,400
K = 9 %
D = 60 %
T = 4 % *
V = 60 MPH
* TTST =3% DUAL =1%
FUNC CLASS =
MINOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT W-5212N =	7.844 MILES
LENGTH STRUCTURE TIP PROJECT W-5212N=	0.006 MILES
TOTAL LENGTH TIP PROJECT W-5212N =	7.850 MILES

NCDOT CONTACT: BRYAN SOWELL, PE

PLANS PREPARED BY:
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 12
1710 E. MARION ST
Shelby, NC 28151

RIGHT OF WAY DATE:
SEPTEMBER 1, 2017

LETTING DATE:
NOVEMBER 20, 2018

2018 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

SANDRA G. MELVIN
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
9/18/2018 10:25:
DocuSigned by: Benjamin J. Henegar
B7229C137214DB...
P.E.
SIGNATURE:
NORTH CAROLINA PROFESSIONAL SEAL 044158 ENGINEER BENJAMIN J. HENEGAR

ROADWAY DESIGN ENGINEER
9/18/2018 10:18:16 AM PDT
DocuSigned by: Jimmy Terry
FD39F38882E94D0...
P.E.
SIGNATURE:
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

9/18/2018
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User:smelvin

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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	1A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY

9/18/2018 10:18:16 AM PDT

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
RW-01 THRU RW-22	SURVEY CONTROL, EXISTING CENTERLINES, RIGHT OF WAY, EASEMENTS AND PROPERTY TIES
2A-1 THRU 2A-2	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B-1	ROADWAY DETAIL - NC 279 RESURFACING LIMITS
2C-1	SPECIAL DETAIL - GUARDRAIL INSTALLATTION (W BEAM RAIL SECTION)
2C-2	SHOULDER WEDGE DETAIL
2C-3	GUARDRAIL AT-1 END UNIT DETAIL
2D-1	DRAINAGE DETAIL - PERFORMED SCOUR HOLE
2D-2	DRAINAGE DETAIL _ 3G-I TYPE "D"
2G-1 THRU 2G-2	GEOTECHNICAL DETAIL - STANDARD REINFORCED SOIL SLOPE (RSS) WITH HIGH GROUNDWATER
3B-1	EARTHWORK SUMMARY, ASPHALT PAVEMENT REMOVAL, SHOULDER BERM GUTTER SUMMARY, AND CONCRETE EXPRESSWAY GUTTER SUMMARY
3D-1 THRU 3D-7	DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
3P-1	PARCEL INDEX SHEET
4 THRU 22	PLAN AND PROFILE SHEETS
TMP-1 THRU TMP-13	TRANSPORTATION MANAGEMENT PLANS
PMP-1 THRU PMP-13	PAVEMENT MARKING PLANS
EC-1 THRU EC-43	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-9	SIGNING PLANS
UO-1 THRU UO-17	UTILITIES BY OTHERS
X-1A THRU X-1B	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-100	CROSS-SECTIONS
CULVERT PLAN TITLE	CULVERT PLANS - TITLE SHEET
C1-1 THRU C1-9	CULVERT PLANS - CULVERT AT -L- STA. 42+19+/-
C2-1 THRU C2-9	CULVERT PLANS - CULVERT AT -L- STA. 324+60
CULVERT PLAN NOTES	CULVERT PLANS - STANDARD NOTES

GENERAL NOTES

GENERAL NOTES:

2018 SPECIFICATIONS
EFFECTIVE: 01-16-2018
REVISED:

GRADE LINE:
GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED 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 II.

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.

SUBSURFACE DRAINS:

SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3 FOOT RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

STREET TURNOUT:

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

GUARDRAIL:

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

TEMPORARY SHORING:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE PSNC, REMC, AT&T, TWO RIVERS UTILITIES, TOWN OF DALLAS, CHARTER, AND TIME WARNER CABLE.

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

STANDARD DRAWINGS

EFF. 01-16-2018
REV.

2018 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
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
275.01	Rock Plating
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
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	
815.02	Subsurface 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
840.04	Concrete Open Throat Catch Basin - 12" thru 48" Pipe
840.05	Brick Open Throat Catch Basin - 12" thru 48" Pipe
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
840.25	Anchorage for Frames - Brick or Concrete or Precast
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
840.45	Precast Drainage Structure
840.66	Drainage Structure Steps
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.02	Driveway Turnout - Radius Type
848.04	Street Turnout
862.01	Guardrail Placement
862.02	Guardrail Installation (Special Detail for Sheet 6 of 8)
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

9/18/2018
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Usersimelvin

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12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

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

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Computed 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
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil — S
- Potential Contamination Area: Soil — S
- Known Contamination Area: Water — W
- Potential Contamination Area: Water — W
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Exist Permanent Easment Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line — RW
- New Right of Way Line with Pin and Cap — RW
- New Right of Way Line with Concrete or Granite R/W Marker — RW
- New Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- New Control of Access — CA
- Existing Easement Line — E
- New Temporary Construction Easement — E
- New Temporary Drainage Easement — TDE
- New Permanent Drainage Easement — PDE
- New Permanent Drainage / Utility Easement — DUE
- New Permanent Utility Easement — PUE
- New Temporary Utility Easement — TUE
- New Aerial Utility Easement — AUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- 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
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

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

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (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
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

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

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7/18/17

TIP PROJECT: W-5212N

CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

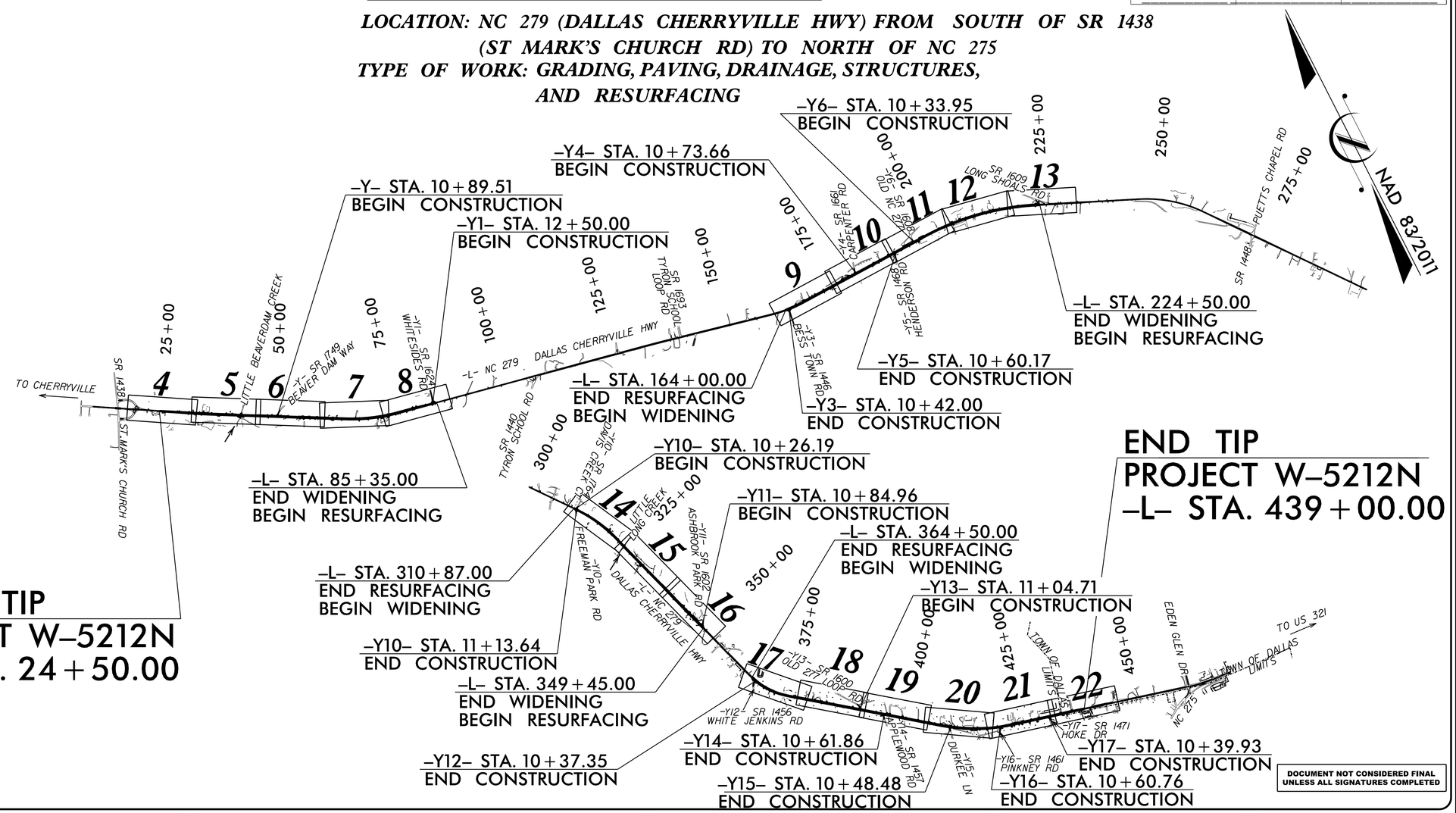
GASTON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	W-5212N	RW-1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
45342.1.FR14	HSIP-0279(10)	PE
45342.2.FR14	HSIP-0279(10)	ROW
45342.3.FR14	HSIP-0279(10)	CONST.

LOCATION: NC 279 (DALLAS CHERRYVILLE HWY) FROM SOUTH OF SR 1438 (ST MARK'S CHURCH RD) TO NORTH OF NC 275

TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURES, AND RESURFACING



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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 2018 = 11,600
ADT 2040 = 14,400
K = 9 %
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T = 4 % *
V = 60 MPH
* TTST =3% DUAL =1%
FUNC CLASS =
MINOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT W-5212N = 7.822 MILES
TOTAL LENGTH TIP PROJECT W-5212N = 7.822 MILES

NCDOT CONTACT: JACKIE McSWAIN

PLANS PREPARED BY:
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 12
1710 E. MARION ST
Shelby, NC 28151

RIGHT OF WAY DATE:
APRIL 2017

LETTING DATE:

2012 STANDARD SPECIFICATIONS

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

PROFESSIONAL LAND SURVEYOR

Matthew T. Cornwell

Digitally signed by Matthew T. Cornwell
DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:24:28 -04'00'

P.L.S.

SIGNATURE:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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

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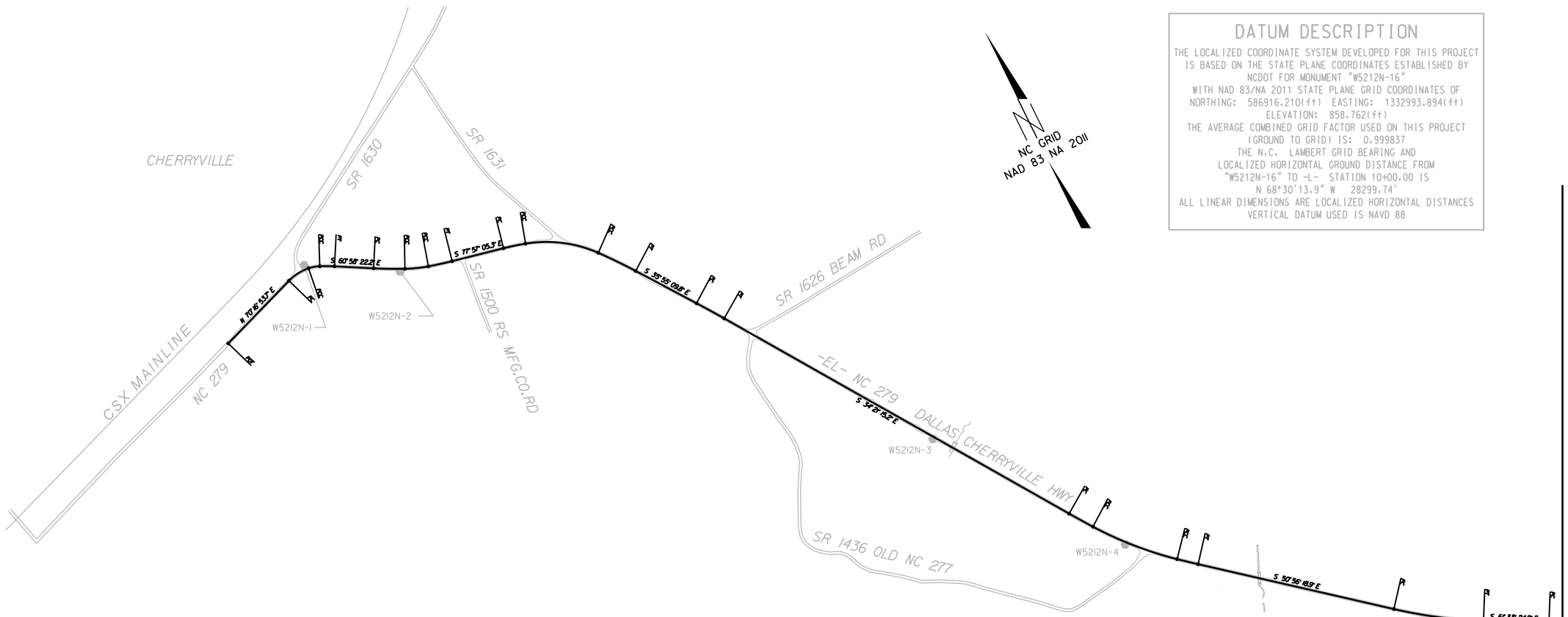
6/18/18

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW02C-1
Location and Surveys	

SURVEY CONTROL SHEET W-5212N



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "W5212N-16"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 586916.210(ft) EASTING: 1332993.894(ft)
ELEVATION: 858.762(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999837
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "W5212N-16" TO -L- STATION 10+00.00 IS
N 68°30'13.9" W 28299.74'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

MATCH TO SHEET NO 1C-2

BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
5	W5212N-5	596750.3990	1307507.0840	941.56	19+99.18	44.50 RT
6	W5212N-6	596371.7180	1308206.2560	909.06	27+94.21	20.84 RT
24	BL-24	595770.0513	1309285.0574	861.29	40+28.87	20.32 RT
25	BL-25	595296.3694	1310160.2300	885.46	50+24.00	24.85 RT
26	BL-26	594775.8340	1311134.8981	927.27	61+28.96	23.73 RT
7	VOLTAGE	594508.2940	1311655.5700	947.13	67+13.30	19.53 RT
8	DRIVE	594192.0260	1312599.2240	962.97	77+04.60	35.11 RT
27	BL-27	594005.8261	1313623.3473	971.48	87+45.43	21.55 RT
28	BETWEEN	593867.0191	1314570.9708	977.82	97+02.09	23.85 LT
29	BL-29	593665.5937	1315377.7809	976.56	105+32.55	19.20 RT
9	W5212N-9	593624.9640	1315890.1030	968.91	110+43.16	39.13 LT
10	W5212N-10	593192.0480	1317766.9370	962.79	129+68.17	26.02 RT
30	BL-30	593119.5573	1318397.9572	959.97	136+00.91	25.84 LT
31	BL-31	592863.9312	1319346.5597	918.50	145+82.08	23.63 RT
32	BL-32	592673.9515	1320462.8794	905.36	157+13.34	26.50 LT
11	GROCERY	592479.2820	1321622.7210	922.53	168+90.16	33.99 RT
12	W5212N-12	592576.3480	1322743.3340	914.41	180+13.69	19.62 LT
33	DEAD	592623.1648	1323820.2154	923.34	190+91.58	24.71 LT
34	BL-34	592647.6133	1324836.0619	913.34	201+06.97	15.98 LT
35	BL-35	592558.6137	1325831.7519	926.54	211+04.61	21.54 LT
36	BL-36	592255.7186	1326926.8473	944.91	222+37.14	33.79 LT
13	W5212N-13	591937.7320	1327532.8580	950.99	229+18.46	24.13 RT
14	W5212N-14	591557.2920	1328547.2050	959.42	240+00.87	20.84 LT
15	W5212N-15	588355.0470	1331860.7930	879.06	286+93.79	20.43 RT
37	BL-37	587456.9576	1332568.0575	863.09	298+36.93	23.01 RT
16	W5212N-16	586916.2100	1332993.8940	858.76	305+25.22	24.57 RT
38	BL-38	586037.1363	1333690.9634	841.97	316+45.70	23.85 LT
39	BL-39	585042.4987	1334007.7569	827.36	326+88.03	32.02 RT
40	BL-40	584028.1515	1334343.2684	831.86	337+56.43	30.26 RT
17	W5212N-17	583403.3330	1334605.4210	844.25	344+31.88	23.52 LT
18	COSTNER	582390.3590	1334863.2080	852.00	354+74.68	48.13 RT

NOTES:

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2. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
3. PROJECT CONTROL ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

MONUMENTS USED OR SET FOR PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT:

- ⬢ INDICATES GEODETIC CONTROL MONUMENTS FOR HORIZONTAL CONTROL
- ■ INDICATES BASELINE MONUMENTS FOR HORIZONTAL PROJECT CONTROL
- ⧗ INDICATES BENCHMARKS FOR VERTICAL CONTROL

NOTE: DRAWING NOT TO SCALE

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6/18/18

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW02C-2
Location and Surveys	

SURVEY CONTROL SHEET W-5212N

BM1 ELEVATION = 931.58
N 596581 E 1307711
L STATION 22+61.00 89 RIGHT
CHISELED X TOP OF BOLT IN CONC SIGN BASE

BM2 ELEVATION = 887.70
N 596202 E 1308787
L STATION 33+84.00 123 LEFT
CHISELED X ON CONC PAD

BM3 ELEVATION = 865.46
N 595413 E 1309779
L STATION 46+33.00 102 RIGHT
RR SPIKE IN BASE 22" RED OAK

BM4 ELEVATION = 909.09
N 594995 E 1310556
L STATION 55+15.00 104 RIGHT
RR SPIKE IN BASE 30" DBL POST OAK

BM5 ELEVATION = 931.60
N 594519 E 1311459
L STATION 65+35.00 97 RIGHT
RR SPIKE IN BASE 15" YELLOW PINE

BM6 ELEVATION = 961.99
N 594190 E 1312288
L STATION 74+06.00 105 RIGHT
CHISELED X TOP OF BOLT IN CONC LAMPPOLE BASE

BM7 ELEVATION = 970.35
N 594170 E 1313373
L STATION 84+68.00 92 LEFT
CHISELED SQUARE ON CONC CURB

BM8 ELEVATION = 988.61
N 593787 E 1314389
L STATION 95+39.00 89 RIGHT
RR SPIKE IN BASE 35" TRIPLE CHESTNUT OAK

BM9 ELEVATION = 914.76
N 592662 E 1319873
L STATION 151+39.00 109 RIGHT
RR SPIKE IN BASE 12" SWEET GUM

BM10 ELEVATION = 901.78
N 592432 E 1320309
L STATION 156+14.00 242 RIGHT
RR SPIKE IN BASE 34" TULIP POPLAR

BM11 ELEVATION = 916.70
N 592416 E 1321185
L STATION 164+61.00 100 RIGHT
RR SPIKE FLUSH IN PAVEMENT CTR SR 1447 BESS TOWN RD

BM12 ELEVATION = 913.99
N 592362 E 1322149
L STATION 174+12.00 171 RIGHT
RR SPIKE IN BASE 18" TULIP POPLAR

BM13 ELEVATION = 904.26
N 592488 E 1323027
L STATION 182+93.00 80 RIGHT
RR SPIKE IN BASE 18" SWEET GUM

BM14 ELEVATION = 923.74
N 592500 E 1323788
L STATION 190+55.00 97 RIGHT
RR SPIKE FLUSH IN PAVEMENT CTR SR 1468 HENDERSON RD

BM15 ELEVATION = 916.51
N 592525 E 1324464
L STATION 197+31.00 99 RIGHT
CHISELED SQUARE ON CONC LAMP BASE

BM16 ELEVATION = 919.40
N 592518 E 1325215
L STATION 204+94.00 98 RIGHT
RR SPIKE FLUSH IN PAVEMENT AT PRECISION DRIVE SYSTEMS

BM17 ELEVATION = 918.22
N 592171 E 1326053
L STATION 214+09.00 312 RIGHT
RR SPIKE IN BASE 18" SWEET GUM

BM18 ELEVATION = 948.97
N 592379 E 1326942
L STATION 222+07.00 154 LEFT
RR SPIKE IN BASE 24" SWEET GUM

BM19 ELEVATION = 949.84
N 591853 E 1327544
L STATION 229+62.00 98 RIGHT
RR SPIKE FLUSH IN PAVEMENT MOUNTAIN MEADOWS DRIVE

BM20 ELEVATION = 953.31
N 591725 E 1328315
L STATION 237+21.00 85 LEFT
RR SPIKE IN BASE 16" YELLOW PINE

BM21 ELEVATION = 870.19
N 587143 E 1332691
L STATION 301+59.00 122 RIGHT
RR SPIKE IN BASE 12" OAK

BM22 ELEVATION = 848.27
N 586509 E 1333474
L STATION 311+42.00 99 LEFT
RR SPIKE FLUSH IN PAVEMENT CTR SR 1764 DAVIS CREEK CT

BM23 ELEVATION = 836.95
N 585525 E 1333708
L STATION 321+34.00 166 RIGHT
RR SPIKE IN BASE 18" TULIP POPLAR

BM24 ELEVATION = 824.38
N 584379 E 1334128
L STATION 333+56.00 125 RIGHT
RR SPIKE IN BASE 20" SWEET GUM

BM25 ELEVATION = 839.73
N 583565 E 1334639
L STATION 342+89.00 106 LEFT
RR SPIKE IN BASE 16" DBL HICKORY

DDCBM1 ELEVATION = 806.00
N 577768 E 1340864
L STATION 433+45.00 47 RIGHT
DDC-BM1

DDCBM2 ELEVATION = 816.30
N 578056 E 1339492
L STATION 419+53.00 112 RIGHT
DDC-BM2

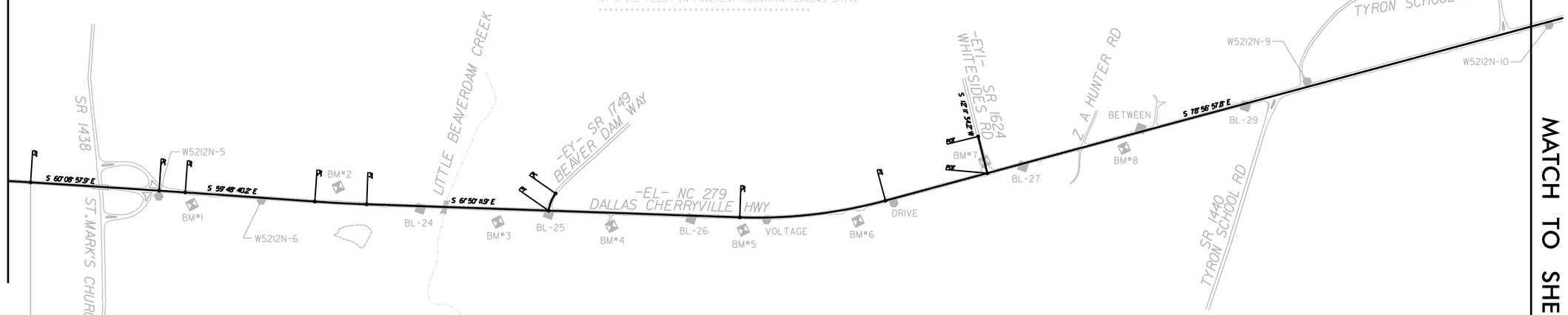
DDCBM3 ELEVATION = 825.10
N 578747 E 1338528
L STATION 407+84.00 53 LEFT
DDC-BM3

DDCBM4 ELEVATION = 833.94
N 579480 E 1337553
L STATION 395+63.00 49 LEFT
DDC-BM4

DDCBM5 ELEVATION = 845.44
N 580204 E 1336395
L STATION 382+02.00 73 RIGHT
DDC-BM5

DDCBM6 ELEVATION = 845.89
N 581083 E 1335399
L STATION 368+82.00 36 RIGHT
DDC-BM6

MATCH TO SHEET NO 1C-1



MATCH TO SHEET NO 1C-3

-L- STA. 10+00.00

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "W5212N-16"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 586916.210(ft) EASTING: 1332993.894(ft)
ELEVATION: 858.762(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999837
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "W5212N-16" TO -L- STATION 10+00.00 IS
N 68°30'13.9" W 28299.74'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NC GRID
NAD 83 NA 2011

NOTE: DRAWING NOT TO SCALE

NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/*
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MONUMENTS USED OR SET FOR PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT:

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- ■ *INDICATES BASELINE MONUMENTS FOR HORIZONTAL PROJECT CONTROL*
- ⧗ *INDICATES BENCHMARKS FOR VERTICAL CONTROL*

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jeffrowe@ncdot.gov

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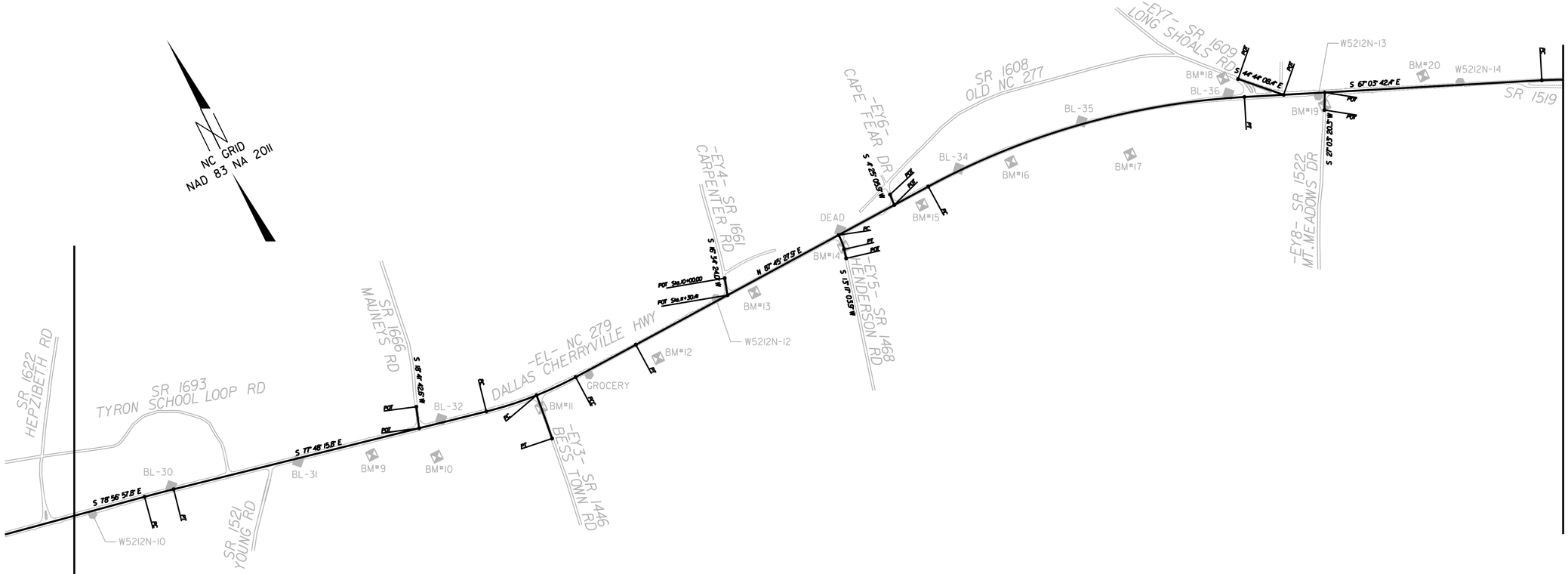
PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW02C-3
Location and Surveys	

SURVEY CONTROL SHEET W-5212N



DATUM DESCRIPTION

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VERTICAL DATUM USED IS NAVD 88

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NOTE: DRAWING NOT TO SCALE

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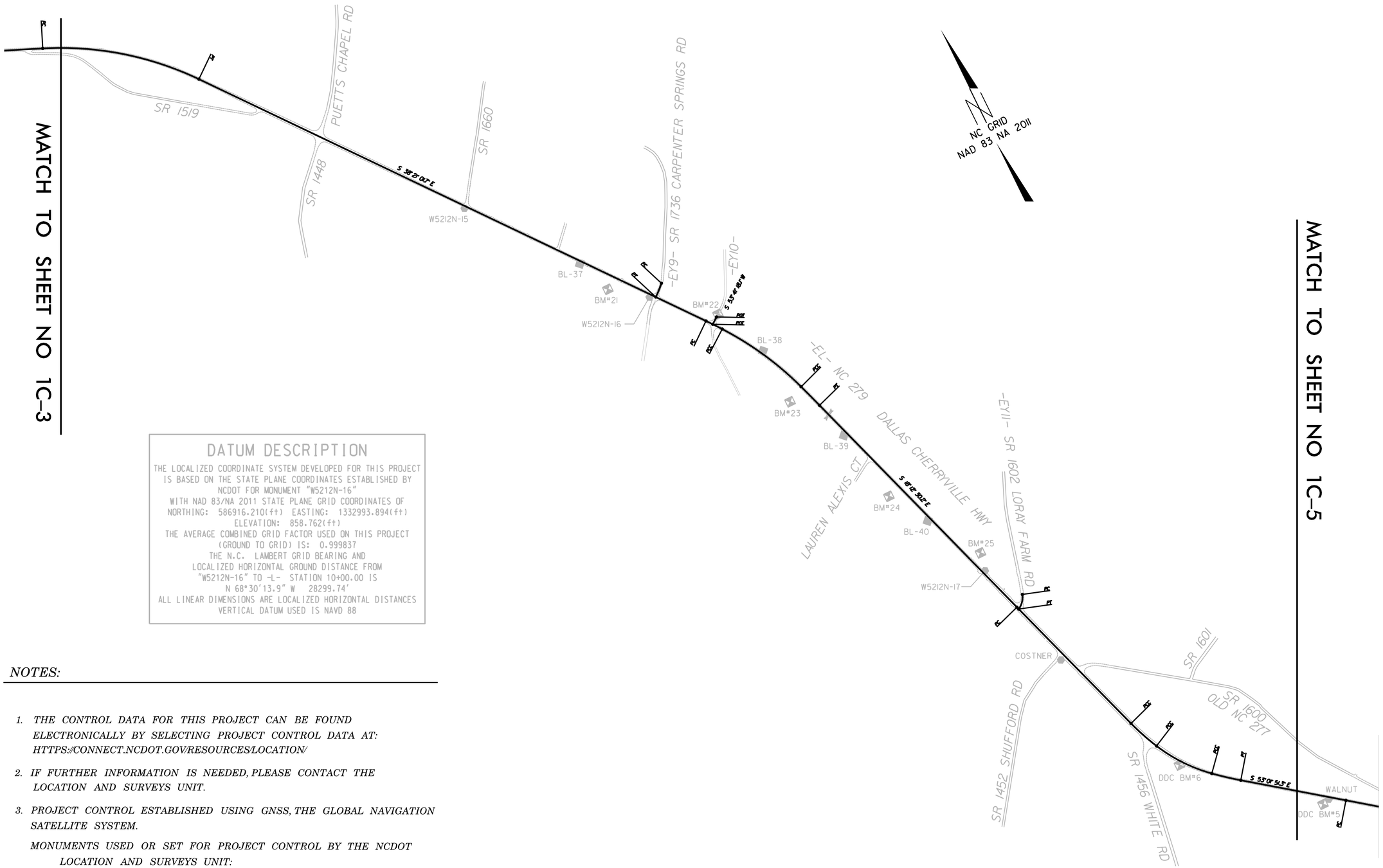
PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW02C-4
Location and Surveys	

SURVEY CONTROL SHEET W-5212N



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "W5212N-16"
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ELEVATION: 858.762(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999837
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N 68°30'13.9" W 28299.74'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

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NOTE: DRAWING NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW02C-5
Location and Surveys	

SURVEY CONTROL SHEET W-5212N

NC GRID
NAD 83 NA 2011

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "W5212N-16"
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NORTHING: 586916.210(ft) EASTING: 1332993.894(ft)
ELEVATION: 858.762(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999837
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "W5212N-16" TO -L- STATION 10+00.00 IS
N 68°30'13.9" W 28299.74'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

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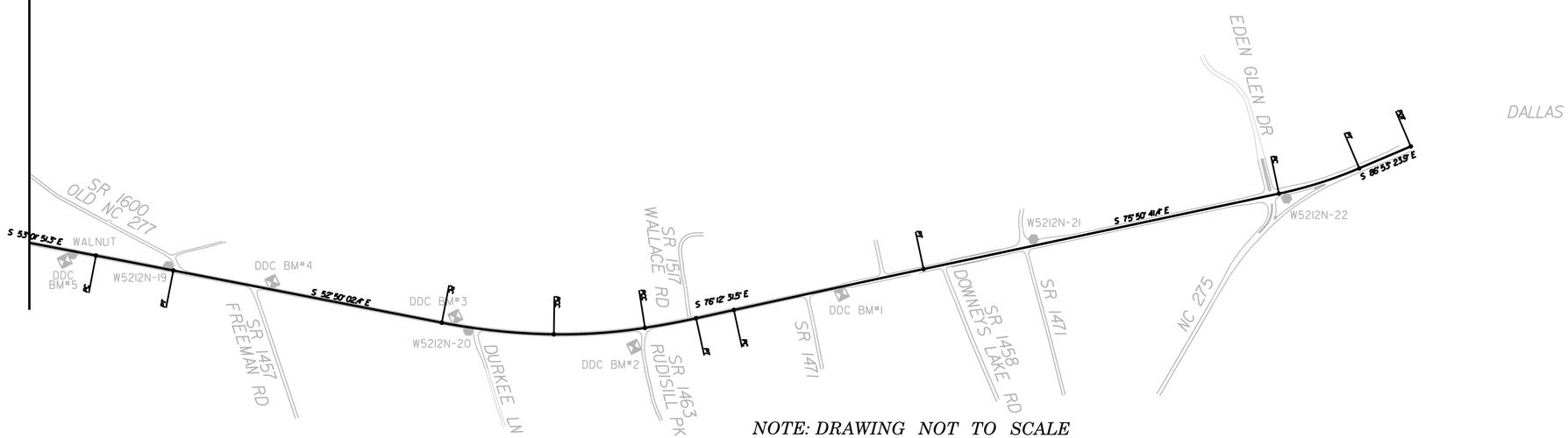
MATCH TO SHEET NO 1C-5
MATCH TO SHEET NO 1C-4



NOTE: DRAWING NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW02C-6
Location and Surveys	

ALIGNMENT CONTROL SHEET W-5212N

BEGINNING CHAIN EL DESCRIPTION

POINT 9001 N 603.940.4575 E 1.298.113.8271 STA 10+00.00

COURSE FROM 9001 TO PC EL-1 N 70° 16' 53.72" E DIST 681.7052

CURVE DATA

CURVE EL-1
P.I. STATION 17+74.87 N 604.201.8981 E 1.298.843.2639
DELTA 26° 52' 17.65" (RT)
DEGREE 14° 41' 28.41"
TANGENT 93.1686
LENGTH 182.9090
RADIUS 390.0000
EXTERNAL 10.9743
LONG CHORD 181.2372
MID. ORD. 10.6739
P.C. STATION 16+81.71 N 604.170.4633 E 1.298.755.5585
P.T. STATION 18+64.61 N 604.190.2966 E 1.298.935.7073
C.C. N 603.803.3320 E 1.298.887.1437
BACK N 70° 16' 53.72" E
AHEAD S 82° 50' 48.63" E
CHORD BEAR N 83° 43' 02.55" E

CURVE DATA

CURVE EL-2
P.I. STATION 19+09.75 N 604.184.6759 E 1.298.980.4939
DELTA 17° 06' 47.01" (RT)
DEGREE 19° 05' 54.94"
TANGENT 45.1379
LENGTH 89.6038
RADIUS 300.0000
EXTERNAL 3.3767
LONG CHORD 89.2711
MID. ORD. 3.3391
P.C. STATION 18+64.61 N 604.190.2966 E 1.298.935.7073
P.T. STATION 19+54.22 N 604.166.1253 E 1.299.021.6437
C.C. N 603.892.6315 E 1.298.898.3506
BACK S 82° 50' 48.63" E
AHEAD S 65° 44' 01.62" E
CHORD BEAR S 74° 17' 25.12" E

CURVE DATA

CURVE EL-3
P.I. STATION 20+12.00 N 604.142.3775 E 1.299.074.3219
DELTA 4° 45' 39.39" (RT)
DEGREE 4° 07' 19.19"
TANGENT 57.7837
LENGTH 115.5008
RADIUS 1,390.0000
EXTERNAL 1.2025
LONG CHORD 115.4676
MID. ORD. 1.1995
P.C. STATION 19+54.22 N 604.166.1253 E 1.299.021.6437
P.T. STATION 20+69.72 N 604.114.3395 E 1.299.124.8474
C.C. N 602.898.9377 E 1.298.450.3858
BACK S 65° 44' 01.62" E
AHEAD S 60° 58' 22.23" E
CHORD BEAR S 63° 21' 11.93" E

COURSE FROM PT EL-3 TO PC EL-4 S 60° 58' 22.21" E DIST 305.7584

CURVE DATA

CURVE EL-4
P.I. STATION 24+98.15 N 603.906.4552 E 1.299.499.4615
DELTA 3° 56' 49.37" (LT)
DEGREE 1° 36' 33.96"
TANGENT 122.6709
LENGTH 245.2447
RADIUS 3,560.0000
EXTERNAL 2.1129
LONG CHORD 245.1962
MID. ORD. 2.1116
P.C. STATION 23+75.48 N 603.965.9781 E 1.299.392.1994
P.T. STATION 26+20.72 N 603.854.4569 E 1.299.610.5665
C.C. N 607.078.8056 E 1.301.119.5977
BACK S 60° 58' 22.20" E
AHEAD S 64° 55' 11.57" E
CHORD BEAR S 62° 56' 46.89" E

CURVE DATA

CURVE EL-5
P.I. STATION 27+13.36 N 603.815.1875 E 1.299.694.4734
DELTA 9° 37' 41.28" (LT)
DEGREE 5° 12' 31.35"
TANGENT 92.6416
LENGTH 184.8469
RADIUS 1,100.0000
EXTERNAL 3.8942
LONG CHORD 184.6295
MID. ORD. 3.8805
P.C. STATION 26+20.72 N 603.854.4569 E 1.299.610.5665
P.T. STATION 28+05.57 N 603.790.5049 E 1.299.783.7664
C.C. N 604.850.7444 E 1.300.076.8402
BACK S 64° 55' 11.57" E
AHEAD S 74° 32' 52.86" E
CHORD BEAR S 69° 44' 02.22" E

CURVE DATA

CURVE EL-6
P.I. STATION 29+00.64 N 603.765.1754 E 1.299.875.4000
DELTA 3° 24' 12.39" (LT)
DEGREE 1° 47' 25.78"
TANGENT 95.0700
LENGTH 190.0841
RADIUS 3,200.0000
EXTERNAL 1.4119
LONG CHORD 190.0561
MID. ORD. 1.4113
P.C. STATION 28+05.57 N 603.790.5049 E 1.299.783.7664
P.T. STATION 29+95.65 N 603.745.3304 E 1.299.968.3757
C.C. N 606.874.8380 E 1.300.636.3447
BACK S 74° 32' 52.86" E
AHEAD S 77° 57' 05.25" E
CHORD BEAR S 76° 14' 59.05" E

COURSE FROM PT EL-6 TO PC EL-7 S 77° 57' 05.27" E DIST 414.3088

CURVE DATA

CURVE EL-7
P.I. STATION 34+97.79 N 603.640.5143 E 1.300.459.4509
DELTA 4° 38' 07.49" (RT)
DEGREE 2° 38' 25.29"
TANGENT 87.8279
LENGTH 175.5600
RADIUS 2,170.0000
EXTERNAL 1.7766
LONG CHORD 175.5121
MID. ORD. 1.7752
P.C. STATION 34+09.96 N 603.658.8475 E 1.300.373.5577
P.T. STATION 35+85.52 N 603.615.2996 E 1.300.543.5815
C.C. N 601.536.6502 E 1.299.920.5915
BACK S 77° 57' 05.27" E
AHEAD S 73° 18' 57.79" E
CHORD BEAR S 75° 38' 01.53" E

CURVE DATA

CURVE EL-8
P.I. STATION 38+84.80 N 603.529.3800 E 1.300.830.2581
DELTA 33° 19' 20.19" (RT)
DEGREE 5° 43' 46.48"
TANGENT 299.2752
LENGTH 581.5834
RADIUS 1,000.0000
EXTERNAL 43.8226
LONG CHORD 573.4216
MID. ORD. 41.9828
P.C. STATION 35+85.52 N 603.615.2996 E 1.300.543.5815
P.T. STATION 41+67.10 N 603.300.1010 E 1.301.022.6036
C.C. N 602.657.3966 E 1.300.256.4893
BACK S 73° 18' 57.79" E
AHEAD S 39° 59' 37.60" E
CHORD BEAR S 56° 39' 17.69" E

CURVE DATA

CURVE EL-9
P.I. STATION 43+29.66 N 603.175.5631 E 1.301.127.0803
DELTA 4° 04' 27.77" (RT)
DEGREE 1° 15' 13.45"
TANGENT 162.5579
LENGTH 324.9788
RADIUS 4,570.0000
EXTERNAL 2.8902
LONG CHORD 324.9104
MID. ORD. 2.8884
P.C. STATION 41+67.10 N 603.300.1010 E 1.301.022.6036
P.T. STATION 44+92.08 N 603.043.9167 E 1.301.222.4443
C.C. N 600.362.9419 E 1.297.521.4614
BACK S 39° 59' 37.60" E
AHEAD S 35° 55' 09.83" E
CHORD BEAR S 37° 57' 23.71" E

COURSE FROM PT EL-9 TO PC EL-10 S 35° 55' 09.82" E DIST 538.7955

CURVE DATA

CURVE EL-10
P.I. STATION 51+53.95 N 602.507.9082 E 1.301.610.7263
DELTA 1° 33' 54.57" (RT)
DEGREE 0° 38' 09.29"
TANGENT 123.0716
LENGTH 246.1278
RADIUS 9,010.0000
EXTERNAL 0.8405
LONG CHORD 246.1202
MID. ORD. 0.8404
P.C. STATION 50+30.88 N 602.607.5768 E 1.301.538.5268
P.T. STATION 52+77.01 N 602.406.3047 E 1.301.680.1765
C.C. N 597.321.8918 E 1.294.241.8404
BACK S 35° 55' 09.82" E
AHEAD S 34° 21' 15.24" E
CHORD BEAR S 35° 08' 12.53" E

COURSE FROM PT EL-10 TO PC EL-11 S 34° 21' 15.23" E DIST 3.098.7039

CURVE DATA

CURVE EL-11
P.I. STATION 84+81.80 N 599.760.5378 E 1.303.488.6682
DELTA 1° 27' 27.51" (LT)
DEGREE 0° 41' 13.20"
TANGENT 106.2933
LENGTH 212.1751
RADIUS 8,340.0000
EXTERNAL 0.6748
LONG CHORD 212.1694
MID. ORD. 0.6747
P.C. STATION 83+75.71 N 599.848.1246 E 1.303.428.7990
P.T. STATION 85+87.89 N 599.674.5022 E 1.303.550.7461
C.C. N 604.554.4508 E 1.310.314.2073
BACK S 34° 21' 15.23" E
AHEAD S 35° 48' 42.74" E
CHORD BEAR S 35° 04' 58.98" E

CURVE DATA

CURVE EL-12
P.I. STATION 89+43.12 N 599.386.4288 E 1.303.758.6020
DELTA 13° 58' 01.94" (LT)
DEGREE 1° 58' 32.58"
TANGENT 355.2328
LENGTH 706.9438
RADIUS 2,900.0000
EXTERNAL 21.6759
LONG CHORD 705.1947
MID. ORD. 21.5151
P.C. STATION 85+87.89 N 599.674.5022 E 1.303.550.7461
P.T. STATION 92+94.83 N 599.157.0420 E 1.304.029.8436
C.C. N 601.371.3668 E 1.305.902.4796
BACK S 35° 48' 42.74" E
AHEAD S 49° 46' 44.68" E
CHORD BEAR S 42° 47' 43.71" E

CURVE DATA

CURVE EL-13
P.I. STATION 93+79.22 N 599.102.5465 E 1.324.094.2827
DELTA 1° 09' 34.26" (LT)
DEGREE 0° 41' 13.22"
TANGENT 84.3928
LENGTH 168.7799
RADIUS 8,340.0000
EXTERNAL 0.4270
LONG CHORD 168.7770
MID. ORD. 0.4270
P.C. STATION 92+94.83 N 599.157.0420 E 1.304.029.8436
P.T. STATION 94+63.61 N 599.049.3661 E 1.324.159.8112
C.C. N 605.525.1348 E 1.329.415.2865
BACK S 49° 46' 44.68" E
AHEAD S 50° 56' 18.94" E
CHORD BEAR S 50° 21' 31.81" E

COURSE FROM PT EL-13 TO PC EL-14 S 50° 56' 18.94" E DIST 1.570.0189

CURVE DATA

CURVE EL-14
P.I. STATION 113+88.61 N 597.836.3190 E 1.325.654.5214
DELTA 10° 37' 05.82" (LT)
DEGREE 1° 29' 59.60"
TANGENT 354.9854
LENGTH 707.9376
RADIUS 3,820.0000
EXTERNAL 16.4586
LONG CHORD 706.9250
MID. ORD. 16.3880
P.C. STATION 110+33.63 N 598.060.0141 E 1.325.378.8855
P.T. STATION 117+41.57 N 597.667.2444 E 1.325.966.6566
C.C. N 601.026.1335 E 1.327.786.0696
BACK S 50° 56' 18.94" E
AHEAD S 61° 33' 24.76" E
CHORD BEAR S 56° 14' 51.85" E

COURSE FROM PT EL-14 TO PC EL-15 S 61° 33' 24.78" E DIST 511.8906

CURVE DATA

CURVE EL-15
P.I. STATION 123+94.22 N 597.356.3934 E 1.326.540.5309
DELTA 1° 24' 26.93" (RT)
DEGREE 0° 29' 59.87"
TANGENT 140.7655
LENGTH 281.5169
RADIUS 11,460.0000
EXTERNAL 0.8645
LONG CHORD 281.5098
MID. ORD. 0.8644
P.C. STATION 122+53.46 N 597.423.4380 E 1.326.416.7572
P.T. STATION 125+34.97 N 597.286.3287 E 1.326.662.6206
C.C. N 587.346.7700 E 1.320.958.5192
BACK S 61° 33' 24.78" E
AHEAD S 60° 08' 57.85" E
CHORD BEAR S 60° 51' 11.32" E

COURSE FROM PT EL-15 TO PC EL-16 S 60° 08' 57.87" E DIST 998.8280

CURVE DATA

CURVE EL-16
P.I. STATION 136+35.25 N 596.738.6770 E 1.327.616.9195
DELTA 0° 20' 17.65" (RT)
DEGREE 0° 10' 00.13"
TANGENT 101.4488
LENGTH 202.8969
RADIUS 34,370.0000
EXTERNAL 0.1497
LONG CHORD 202.8966
MID. ORD. 0.1497
P.C. STATION 135+33.80 N 596.789.1721 E 1.327.528.9303
P.T. STATION 137+36.70 N 596.687.6633 E 1.327.704.6091
C.C. N 566.979.1675 E 1.290.421.6066
BACK S 60° 08' 57.87" E
AHEAD S 59° 48' 40.22" E
CHORD BEAR S 59° 58' 49.05" E

COURSE FROM PT EL-16 TO PC EL-17 S 59° 48' 40.22" E DIST 1.006.6562

CURVE DATA

CURVE EL-17
P.I. STATION 149+44.88 N 596.080.1291 E 1.308.748.9258
DELTA 2° 01' 31.69" (LT)
DEGREE 0° 30' 09.34"
TANGENT 201.5224
LENGTH 403.0028
RADIUS 11,400.0000
EXTERNAL 1.7811
LONG CHORD 402.9819
MID. ORD. 1.7808
P.C. STATION 147+43.35 N 596.181.4649 E 1.308.574.7353
P.T. STATION 151+46.36 N 595.985.0131 E 1.308.926.5891
C.C. N 606.035.3157 E 1.314.307.2413
BACK S 59° 48' 40.22" E
AHEAD S 61° 50' 11.92" E
CHORD BEAR S 60° 49' 26.07" E

COURSE FROM PT EL-17 TO PC EL-18 S 61° 50' 11.92" E DIST 2.893.9692

CURVE DATA

CURVE EL-18
P.I. STATION 186+15.07 N 594.347.8245 E 1.311.984.6275
DELTA 17° 06' 45.91" (LT)
DEGREE 1° 29' 59.60"
TANGENT 574.7460
LENGTH 1,140.9342
RADIUS 3,820.0000
EXTERNAL 42.9953
LONG CHORD 1,136.6982
MID. ORD. 42.5168
P.C. STATION 180+40.33 N 594.619.0972 E 1.311.477.9283
P.T. STATION 191+81.26 N 594.237.6595 E 1.312.548.7168
C.C. N 597.986.8301 E 1.313.280.9187
BACK S 61° 50' 11.92" E
AHEAD S 78° 56' 57.82" E
CHORD BEAR S 70° 23' 34.87" E

COURSE FROM PT EL-18 TO PC EL-19 S 78° 56' 57.82" E DIST 5.738.0203

CURVE DATA

CURVE EL-19
P.I. STATION 250+33.79 N 593.115.8701 E 1.318.292.7328
DELTA 1° 08' 41.98" (RT)
DEGREE 0° 29' 59.87"
TANGENT 114.5118
LENGTH 229.0159
RADIUS 11,460.0000
EXTERNAL 0.5721
LONG CHORD 229.0121
MID. ORD. 0.5721
P.C. STATION 249+19.28 N 593.137.8193 E 1.318.180.3442
P.T. STATION 251+48.30 N 593.091.6795 E 1.318.404.6602
C.C. N 581.890.3074 E 1.315.983.7384
BACK S 78° 56' 57.83" E
AHEAD S 77° 48' 15.84" E
CHORD BEAR S 78° 22' 36.83" E

COURSE FROM PT EL-19 TO PC EL-20 S 77° 48' 15.84" E DIST 2.449.2595

CURVE DATA

CURVE EL-20
P.I. STATION 279+64.05 N 592.496.8529 E 1.321.156.8658
DELTA 14° 09' 49.12" (LT)
DEGREE 1° 56' 32.03"
TANGENT 366.4915
LENGTH 729.2466
RADIUS 2,950.0000
EXTERNAL 22.6783
LONG CHORD 727.3912
MID. ORD. 22.5053
P.C. STATION 275+97.56 N 592.574.2742 E 1.320.798.6452
P.T. STATION 283+26.80 N 592.509.4390 E 1.321.523.1411
C.C. N 595.457.6989 E 1.321.421.8319
BACK S 77° 48' 15.84" E
AHEAD N 88° 01' 55.04" E
CHORD BEAR S 84° 53' 10.40" E

NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/*
2. *IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.*
3. *PROJECT CONTROL ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.*

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "W5212N-16"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 586916.210(ft) EASTING: 1332993.894(ft)
ELEVATION: 858.762(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999837
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"W5212N-16" TO -L- STATION 10+00.00 IS
N 68°30'13.9" W 28299.74'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

18-JUN-2018 13:50
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6/18/18

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW02C-7
Location and Surveys	

ALIGNMENT CONTROL SHEET W-5212N

CURVE DATA

CURVE EL-21
P.I. STATION 285+86.70 N 592,518.3643 E 1,321,782.8824
DELTA - 0° 16' 27.15" (LT)
DEGREE - 0° 03' 09.91"
TANGENT - 259.8946
LENGTH - 519.7883
RADIUS - 108,609.9999
EXTERNAL - 0.3110
LONG CHORD - 519.7878
MID. ORD. - 0.3110
P.C. STATION 283+26.80 N 592,509.4390 E 1,321,523.1411
P.T. STATION 288+46.59 N 592,528.5326 E 1,322,042.5781
C.C. N 701,055.3738 E 1,317,793.2446
BACK - N 88° 01' 55.04" E
AHEAD - N 87° 45' 27.89" E
CHORD BEAR - N 87° 53' 41.46" E

COURSE FROM PT EL-21 TO PC EL-22 N 87° 45' 27.89" E DIST 2,527.3421

CURVE DATA

CURVE EL-22
P.I. STATION 326+53.72 N 592,677.4852 E 1,325,846.7864
DELTA - 25° 10' 49.68" (RT)
DEGREE - 0° 59' 59.73"
TANGENT - 1,279.7812
LENGTH - 2,518.2320
RADIUS - 5,730.0000
EXTERNAL - 141.1787
LONG CHORD - 2,498.0149
MID. ORD. - 137.7840
P.C. STATION 313+73.93 N 592,627.4141 E 1,324,567.9851
P.T. STATION 338+92.17 N 592,178.7055 E 1,327,025.3697
C.C. N 586,901.8014 E 1,324,792.1696
BACK - N 87° 45' 27.89" E
AHEAD - S 67° 03' 42.43" E
CHORD BEAR - S 79° 39' 07.27" E

COURSE FROM PT EL-22 TO PC EL-23 S 67° 03' 42.43" E DIST 2,264.3752

CURVE DATA

CURVE EL-23
P.I. STATION 368+89.78 N 591,010.4189 E 1,329,785.9538
DELTA - 28° 42' 40.67" (RT)
DEGREE - 1° 59' 59.47"
TANGENT - 733.2435
LENGTH - 1,435.6707
RADIUS - 2,865.0000
EXTERNAL - 92.3419
LONG CHORD - 1,420.6966
MID. ORD. - 89.4586
P.C. STATION 361+56.54 N 591,296.1919 E 1,329,110.6910
P.T. STATION 375+92.21 N 590,435.3873 E 1,330,240.9097
C.C. N 588,657.7398 E 1,327,994.0910
BACK - S 67° 03' 42.44" E
AHEAD - S 38° 21' 01.76" E
CHORD BEAR - S 52° 42' 22.10" E

COURSE FROM PT EL-23 TO PC EL-24 S 38° 21' 01.74" E DIST 5,014.7835

CURVE DATA

CURVE EL-24
P.I. STATION 426+88.02 N 586,439.1009 E 1,333,402.7078
DELTA - 1° 54' 44.13" (RT)
DEGREE - 1° 10' 48.50"
TANGENT - 81.0258
LENGTH - 162.0366
RADIUS - 4,855.0000
EXTERNAL - 0.6761
LONG CHORD - 162.0291
MID. ORD. - 0.6760
P.C. STATION 426+07.00 N 586,502.6438 E 1,333,352.4337
P.T. STATION 427+69.03 N 586,373.9158 E 1,333,450.8336
C.C. N 583,490.2607 E 1,329,544.9972
BACK - S 38° 21' 01.74" E
AHEAD - S 36° 26' 17.61" E
CHORD BEAR - S 37° 23' 39.68" E

CURVE DATA

CURVE EL-25
P.I. STATION 432+10.50 N 586,018.7567 E 1,333,713.0454
DELTA - 17° 31' 10.50" (RT)
DEGREE - 1° 59' 59.47"
TANGENT - 441.4669
LENGTH - 876.0437
RADIUS - 2,865.0000
EXTERNAL - 33.8132
LONG CHORD - 872.6348
MID. ORD. - 33.4188
P.C. STATION 427+69.03 N 586,373.9158 E 1,333,450.8336
P.T. STATION 436+45.08 N 585,601.1379 E 1,333,856.1801
C.C. N 584,672.2326 E 1,331,145.9477
BACK - S 36° 26' 17.61" E
AHEAD - S 18° 55' 07.11" E
CHORD BEAR - S 27° 40' 42.36" E

CURVE DATA

CURVE EL-26
P.I. STATION 437+61.60 N 585,490.9064 E 1,333,893.9609
DELTA - 0° 42' 36.91" (RT)
DEGREE - 0° 18' 17.15"
TANGENT - 116.5263
LENGTH - 233.0496
RADIUS - 18,800.0000
EXTERNAL - 0.3611
LONG CHORD - 233.0481
MID. ORD. - 0.3611
P.C. STATION 436+45.08 N 585,601.1379 E 1,333,856.1801
P.T. STATION 438+78.13 N 585,380.2150 E 1,333,930.3723
C.C. N 579,505.7034 E 1,316,071.7577
BACK - S 18° 55' 07.11" E
AHEAD - S 18° 12' 30.20" E
CHORD BEAR - S 18° 33' 48.66" E

COURSE FROM PT EL-26 TO PC EL-27 S 18° 12' 30.22" E DIST 2,520.2754

CURVE DATA

CURVE EL-27
P.I. STATION 471+25.41 N 582,295.5356 E 1,334,945.0641
DELTA - 0° 13' 15.52" (LT)
DEGREE - 0° 00' 54.71"
TANGENT - 727.0274
LENGTH - 1,454.0131
RADIUS - 377,000.0000
EXTERNAL - 0.7010
LONG CHORD - 1,454.0122
MID. ORD. - 0.7010
P.C. STATION 463+98.40 N 582,986.1391 E 1,334,717.8931
P.T. STATION 478+52.41 N 581,605.8134 E 1,335,174.8969
C.C. N 700,788.8665 E 1,692,840.1032
BACK - S 18° 12' 30.22" E
AHEAD - S 18° 25' 45.74" E
CHORD BEAR - S 18° 19' 07.98" E

CURVE DATA

CURVE EL-28
P.I. STATION 480+04.53 N 581,461.4953 E 1,335,222.9873
DELTA - 7° 54' 39.16" (LT)
DEGREE - 2° 36' 15.67"
TANGENT - 152.1197
LENGTH - 303.7560
RADIUS - 2,200.0000
EXTERNAL - 5.2529
LONG CHORD - 303.5147
MID. ORD. - 5.2404
P.C. STATION 478+52.41 N 581,605.8134 E 1,335,174.8969
P.T. STATION 481+56.17 N 581,325.1694 E 1,335,290.4829
C.C. N 582,301.3114 E 1,337,262.0678
BACK - S 18° 25' 45.74" E
AHEAD - S 26° 20' 24.90" E
CHORD BEAR - S 22° 23' 05.32" E

CURVE DATA

CURVE EL-29
P.I. STATION 484+37.07 N 581,073.4355 E 1,335,415.1177
DELTA - 22° 04' 33.40" (LT)
DEGREE - 3° 58' 43.94"
TANGENT - 280.8982
LENGTH - 554.8290
RADIUS - 1,440.0000
EXTERNAL - 27.1414
LONG CHORD - 551.4034
MID. ORD. - 26.6393
P.C. STATION 481+56.17 N 581,325.1694 E 1,335,290.4829
P.T. STATION 487+11.00 N 580,886.9993 E 1,335,625.2255
C.C. N 581,964.0987 E 1,336,580.9749
BACK - S 26° 20' 24.90" E
AHEAD - S 48° 24' 58.30" E
CHORD BEAR - S 37° 22' 41.60" E

CURVE DATA

CURVE EL-30
P.I. STATION 488+43.96 N 580,798.7476 E 1,335,724.6824
DELTA - 4° 36' 52.99" (LT)
DEGREE - 1° 44' 10.45"
TANGENT - 132.9662
LENGTH - 265.7987
RADIUS - 3,300.0000
EXTERNAL - 2.6777
LONG CHORD - 265.7169
MID. ORD. - 2.6755
P.C. STATION 487+11.00 N 580,886.9993 E 1,335,625.2255
P.T. STATION 489+76.79 N 580,718.7838 E 1,335,830.9171
C.C. N 583,355.3521 E 1,337,815.4845
BACK - S 48° 24' 58.30" E
AHEAD - S 53° 01' 51.28" E
CHORD BEAR - S 50° 43' 24.79" E

COURSE FROM PT EL-30 TO PC EL-31 S 53° 01' 51.28" E DIST 955.3410

CURVE DATA

CURVE EL-31
P.I. STATION 501+89.90 N 579,989.2377 E 1,336,800.1450
DELTA - 0° 11' 48.92" (RT)
DEGREE - 0° 02' 17.51"
TANGENT - 257.7708
LENGTH - 515.5412
RADIUS - 150,000.0002
EXTERNAL - 0.2215
LONG CHORD - 515.5409
MID. ORD. - 0.2215
P.C. STATION 499+32.13 N 580,144.2570 E 1,336,594.1964
P.T. STATION 504+47.67 N 579,833.5115 E 1,337,005.5596
C.C. N 460,300.2446 E 1,246,386.5872
BACK - S 53° 01' 51.28" E
AHEAD - S 52° 50' 02.36" E
CHORD BEAR - S 52° 55' 56.82" E

COURSE FROM PT EL-31 TO PC EL-32 S 52° 50' 02.36" E DIST 1,790.1050

CURVE DATA

CURVE EL-32
P.I. STATION 526+07.79 N 578,528.5251 E 1,338,726.9352
DELTA - 10° 09' 12.93" (LT)
DEGREE - 1° 22' 32.34"
TANGENT - 370.0161
LENGTH - 738.0946
RADIUS - 4,165.0000
EXTERNAL - 16.4037
LONG CHORD - 737.1291
MID. ORD. - 16.3394
P.C. STATION 522+37.77 N 578,752.0617 E 1,338,432.0736
P.T. STATION 529+75.87 N 578,360.4698 E 1,339,056.5856
C.C. N 582,071.1020 E 1,340,948.2605
BACK - S 52° 50' 02.36" E
AHEAD - S 62° 59' 15.29" E
CHORD BEAR - S 57° 54' 38.82" E

CURVE DATA

CURVE EL-33
P.I. STATION 532+76.00 N 578,224.1536 E 1,339,323.9780
DELTA - 9° 48' 09.23" (LT)
DEGREE - 1° 38' 13.28"
TANGENT - 300.1347
LENGTH - 598.8045
RADIUS - 3,500.0000
EXTERNAL - 12.8451
LONG CHORD - 598.0745
MID. ORD. - 12.7982
P.C. STATION 529+75.87 N 578,360.4698 E 1,339,056.5856
P.T. STATION 535+74.67 N 578,135.3520 E 1,339,610.6749
C.C. N 581,478.6481 E 1,340,646.2283
BACK - S 62° 59' 15.29" E
AHEAD - S 72° 47' 24.51" E
CHORD BEAR - S 67° 53' 19.90" E

CURVE DATA

CURVE EL-34
P.I. STATION 537+44.77 N 578,085.0246 E 1,339,773.1575
DELTA - 3° 25' 06.98" (LT)
DEGREE - 1° 00' 18.68"
TANGENT - 170.0983
LENGTH - 340.0957
RADIUS - 5,700.0000
EXTERNAL - 2.5375
LONG CHORD - 340.0453
MID. ORD. - 2.5363
P.C. STATION 535+74.67 N 578,135.3520 E 1,339,610.6749
P.T. STATION 539+14.77 N 578,044.4757 E 1,339,938.3520
C.C. N 583,580.1486 E 1,341,297.1476
BACK - S 72° 47' 24.51" E
AHEAD - S 76° 12' 31.49" E
CHORD BEAR - S 74° 29' 58.00" E

COURSE FROM PT EL-34 TO PC EL-35 S 76° 12' 31.49" E DIST 253.0975

CURVE DATA

CURVE EL-35
P.I. STATION 548+03.01 N 577,832.7312 E 1,340,800.9895
DELTA - 0° 21' 50.08" (RT)
DEGREE - 0° 01' 43.13"
TANGENT - 635.1475
LENGTH - 1,270.2906
RADIUS - 199,999.9997
EXTERNAL - 1.0085
LONG CHORD - 1,270.2885
MID. ORD. - 1.0085
P.C. STATION 541+67.87 N 577,984.1410 E 1,340,184.1529
P.T. STATION 554+38.16 N 577,677.4067 E 1,341,416.8520
C.C. N 383,750.0036 E 1,292,507.1170
BACK - S 76° 12' 31.49" E
AHEAD - S 75° 50' 41.41" E
CHORD BEAR - S 76° 01' 36.45" E

COURSE FROM PT EL-35 TO PC EL-36 S 75° 50' 41.41" E DIST 2,377.7076

CURVE DATA

CURVE EL-36
P.I. STATION 580+92.87 N 577,028.1998 E 1,343,990.9614
DELTA - 11° 02' 42.46" (LT)
DEGREE - 1° 59' 59.47"
TANGENT - 277.0069
LENGTH - 552.2970
RADIUS - 2,865.0000
EXTERNAL - 13.3603
LONG CHORD - 551.4422
MID. ORD. - 13.2983
P.C. STATION 578+15.87 N 577,095.9415 E 1,343,722.3653
P.T. STATION 583+68.16 N 577,013.1712 E 1,344,267.5603
C.C. N 579,873.9515 E 1,344,422.9973
BACK - S 75° 50' 41.41" E
AHEAD - S 86° 53' 23.86" E
CHORD BEAR - S 81° 22' 02.64" E

COURSE FROM PT EL-36 TO 9055 S 86° 53' 23.87" E DIST 366.2899

POINT 9055 N 576,993.2986 E 1,344,633.3107 STA 587+34.45

ENDING CHAIN EL DESCRIPTION

BEGINNING CHAIN EY DESCRIPTION

CURVE DATA

CURVE EY-1
P.I. STATION 10+73.95 N 595,379.4137 E 1,310,213.1685
DELTA - 25° 38' 08.96" (LT)
DEGREE - 17° 37' 46.09"
TANGENT - 73.9450
LENGTH - 145.4146
RADIUS - 325.0000
EXTERNAL - 8.3060
LONG CHORD - 144.2047
MID. ORD. - 8.0990
P.C. STATION 10+00.00 N 595,415.1743 E 1,310,277.8913
P.T. STATION 11+45.41 N 595,319.1710 E 1,310,170.2886
C.C. N 595,130.7073 E 1,310,435.2648
BACK - S 61° 04' 42.65" W
AHEAD - S 35° 26' 33.70" W
CHORD BEAR - S 48° 15' 38.18" W

ENDING CHAIN EY DESCRIPTION

BEGINNING CHAIN EY1 DESCRIPTION

POINT 9058 N 594,368.0341 E 1,313,413.5242 STA 10+00.00

COURSE FROM 9058 TO 9059 S 12° 11' 34.16" W DIST 293.7783

POINT 9059 N 594,080.8827 E 1,313,351.4775 STA 12+93.78

ENDING CHAIN EY1 DESCRIPTION

BEGINNING CHAIN EY2 DESCRIPTION

POINT 9060 N 592,841.3054 E 1,320,336.4552 STA 10+00.00

COURSE FROM 9060 TO 9061 S 18° 41' 42.57" W DIST 164.4242

POINT 9061 N 592,685.5566 E 1,320,283.7518 STA 11+64.42

ENDING CHAIN EY2 DESCRIPTION

BEGINNING CHAIN EY3 DESCRIPTION

CURVE DATA

CURVE EY3-1
P.I. STATION 11+74.43 N 592,342.6789 E 1,321,179.6680
DELTA - 2° 21' 04.64" (RT)
DEGREE - 0° 40' 26.64"
TANGENT - 174.4348
LENGTH - 348.8207
RADIUS - 8,500.0000
EXTERNAL - 1.7897
LONG CHORD - 348.7962
MID. ORD. - 1.7893
P.C. STATION 10+00.00 N 592,516.3959 E 1,321,195.4772
P.T. STATION 13+48.82 N 592,169.7569 E 1,321,156.7451
C.C. N 593,286.7618 E 1,312,730.4589
BACK - S 5° 11' 59.73" W
AHEAD - S 7° 33' 04.37" W
CHORD BEAR - S 6° 22' 32.05" W

ENDING CHAIN EY3 DESCRIPTION

NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/
2. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
3. PROJECT CONTROL ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "W5212N-16"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 586916.210(ft) EASTING: 1332993.894(ft)
ELEVATION: 858.762(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999837
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "W5212N-16" TO -L- STATION 10+00.00 IS
N 68°30'13.9" W 28299.74'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW02C-8
Location and Surveys	

ALIGNMENT CONTROL SHEET W-5212N

BEGINNING CHAIN EY4 DESCRIPTION

POINT 9064 N 592,684.5175 E 1,322,871.4068 STA 10+00.00

COURSE FROM 9064 TO 9065 S 16° 34' 24.04" W DIST 130.4064

POINT 9065 N 592,559.5287 E 1,322,834.2093 STA 11+30.41

ENDING CHAIN EY4 DESCRIPTION

BEGINNING CHAIN EY5 DESCRIPTION

CURVE DATA

CURVE EY5-1
P.I. STATION 10+58.72 N 592,538.4793 E 1,323,797.0630
DELTA 16° 42' 26.79" (RT)
DEGREE 14° 19' 26.20"
TANGENT 58.7170
LENGTH 116.6012
RADIUS 400.0000
EXTERNAL 4.2866
LONG CHORD 116.1888
MID. ORD. 4.2412
P.C. STATION 10+00.00 N 592,597.0919 E 1,323,793.5628
P.T. STATION 11+16.60 N 592,481.3336 E 1,323,783.5707
C.C. N 592,573.2476 E 1,323,394.2741
BACK S 3° 25' 02.91" E
AHEAD S 13° 17' 03.89" W
CHORD BEAR S 4° 56' 00.49" W

COURSE FROM PT EY5-1 TO 9068 S 13° 17' 03.89" W DIST 70.5785

POINT 9068 N 592,412.6436 E 1,323,767.3528 STA 11+87.18

ENDING CHAIN EY5 DESCRIPTION

BEGINNING CHAIN EY6 DESCRIPTION

POINT 9069 N 592,701.0661 E 1,324,280.4521 STA 10+00.00

COURSE FROM 9069 TO 9070 S 4° 25' 05.94" W DIST 85.4218

POINT 9070 N 592,615.8982 E 1,324,273.8714 STA 10+85.42

ENDING CHAIN EY6 DESCRIPTION

BEGINNING CHAIN EY7 DESCRIPTION

POINT 9071 N 592,322.7472 E 1,327,042.3176 STA 10+00.00

COURSE FROM 9071 TO 9072 S 44° 44' 08.44" E DIST 366.5835

POINT 9072 N 592,062.3405 E 1,327,300.3327 STA 13+66.58

ENDING CHAIN EY7 DESCRIPTION

BEGINNING CHAIN EY8 DESCRIPTION

POINT 9073 N 591,940.3643 E 1,327,588.5543 STA 10+00.00

COURSE FROM 9073 TO 9074 S 27° 03' 20.31" W DIST 133.2664

POINT 9074 N 591,821.6819 E 1,327,527.9373 STA 11+33.27

ENDING CHAIN EY8 DESCRIPTION

BEGINNING CHAIN EY9 DESCRIPTION

CURVE DATA

CURVE EY9-1
P.I. STATION 10+66.69 N 586,932.6859 E 1,333,097.2246
DELTA 8° 01' 52.04" (RT)
DEGREE 6° 01' 52.08"
TANGENT 66.6898
LENGTH 133.1611
RADIUS 950.0000
EXTERNAL 2.3379
LONG CHORD 133.0521
MID. ORD. 2.3322
P.C. STATION 10+00.00 N 586,980.4568 E 1,333,143.7592
P.T. STATION 11+33.16 N 586,891.8850 E 1,333,044.4723
C.C. N 587,643.3458 E 1,332,463.2608
BACK S 44° 14' 56.39" W
AHEAD S 52° 16' 48.43" W
CHORD BEAR S 48° 15' 52.41" W

ENDING CHAIN EY9 DESCRIPTION

BEGINNING CHAIN EY10 DESCRIPTION

POINT 9077 N 586,493.2431 E 1,333,453.1888 STA 10+00.00

COURSE FROM 9077 TO 9078 S 53° 41' 18.12" W DIST 73.6950

POINT 9078 N 586,449.6026 E 1,333,393.8048 STA 10+73.69

ENDING CHAIN EY10 DESCRIPTION

BEGINNING CHAIN EY11 DESCRIPTION

CURVE DATA

CURVE EY11-1
P.I. STATION 10+72.53 N 582,998.1934 E 1,334,789.1761
DELTA 43° 53' 26.45" (RT)
DEGREE 31° 49' 51.56"
TANGENT 72.5250
LENGTH 137.8866
RADIUS 180.0000
EXTERNAL 14.0615
LONG CHORD 134.5399
MID. ORD. 13.0427
P.C. STATION 10+00.00 N 583,067.1057 E 1,334,811.7810
P.T. STATION 11+37.89 N 582,964.2024 E 1,334,725.1098
C.C. N 583,123.2087 E 1,334,640.7475
BACK S 18° 09' 38.60" W
AHEAD S 62° 03' 05.04" W
CHORD BEAR S 40° 06' 21.82" W

ENDING CHAIN EY11 DESCRIPTION

NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/*
2. *IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.*
3. *PROJECT CONTROL ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.*

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "W5212N-16"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 586916.210(ft) EASTING: 1332993.894(ft)
ELEVATION: 858.762(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999837
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"W5212N-16" TO -L- STATION 10+00.00 IS
N 68°30'13.9" W 28299.74'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW02D-1
Location and Surveys	

ALIGNMENT CONTROL SHEET W-5212N

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	597286.3287	1306662.6206
PC	19+98.83	596789.1721	1307528.9303
PT	22+01.72	596687.6633	1307704.6091
PC	32+08.38	596181.4649	1308574.7354
PT	36+11.38	595985.0131	1308926.5891
PC	65+05.35	594619.0972	1311477.9283
PT	76+46.29	594237.6595	1312548.7168
PC	133+84.31	593137.8192	1318180.3443
PT	136+13.32	593091.6795	1318404.6602
PC	160+62.47	592574.2981	1320798.5342
PT	168+04.63	592509.9347	1321535.9355
PC	198+41.29	592627.5047	1324570.3233
PT	223+57.19	592178.7051	1327025.3708
PC	246+21.56	591296.1919	1329110.6910
PT	260+57.23	590435.3871	1330240.9099
PC	311+14.98	586468.9521	1333379.0901
PT	321+69.61	585544.9636	1333876.1790
PC	362+76.22	581643.9882	1335159.3877
PCC	364+70.92	581461.1410	1335226.1832
PCC	372+23.72	580854.9983	1335660.4533
PT	374+18.42	580732.9451	1335812.1034
PC	383+97.31	580144.2570	1336594.1964
PT	389+12.85	579833.5115	1337005.5597
PC	407+02.20	578752.5196	1338431.4695
PCC	414+42.20	578360.0628	1339057.6792
PCC	420+33.32	578137.4763	1339604.5341
PT	423+83.32	578043.6613	1339941.6695
PC	426+33.00	577984.1405	1340184.1546
PT	439+03.29	577677.4067	1341416.8520
PC	462+81.00	577095.9415	1343722.3654
PT	468+33.30	577013.1712	1344267.5604
POT	472+00.00	576993.2762	1344633.7227

Y

TYPE	STATION	NORTH	EAST
PC	10+00.00	595415.1743	1310277.8913
PT	11+45.41	595319.1710	1310170.2886

Y1

TYPE	STATION	NORTH	EAST
POT	10+00.00	594368.0341	1313413.5242
POT	12+93.78	594080.8827	1313351.4775

Y3

TYPE	STATION	NORTH	EAST
PC	10+00.00	592516.4112	1321195.4786
PT	13+48.82	592169.7721	1321156.7465

Y4

TYPE	STATION	NORTH	EAST
POT	10+00.00	592684.5175	1322871.4068
POT	11+29.66	592560.2458	1322834.4227

Y5

TYPE	STATION	NORTH	EAST
PC	10+00.00	592597.4077	1323793.5439
PT	11+16.60	592481.6494	1323783.5518
POT	11+87.60	592412.5493	1323767.2371

Y6

TYPE	STATION	NORTH	EAST
POT	10+00.00	592701.0661	1324280.4521
POT	10+85.30	592616.0188	1324273.8807

Y10

TYPE	STATION	NORTH	EAST
PC	10+00.00	586493.5412	1333453.5945
PT	11+68.53	586362.9655	1333350.2449

Y11

TYPE	STATION	NORTH	EAST
PC	10+00.00	583067.1057	1334811.7810
PT	11+37.89	582964.2021	1334725.1092

Y12

TYPE	STATION	NORTH	EAST
POT	10+00.00	581395.8119	1335254.2103
PC	10+50.43	581363.3402	1335215.6240
PT	11+55.85	581280.1975	1335152.2051

Y13

TYPE	STATION	NORTH	EAST
PC	10+00.00	579945.6904	1337014.5532
PT	11+01.55	579849.0899	1337038.3613
POT	11+39.13	579811.7307	1337034.2902

Y14

TYPE	STATION	NORTH	EAST
POT	10+00.00	579512.2575	1337429.3179
POT	11+26.62	579387.1147	1337410.0280

Y15

TYPE	STATION	NORTH	EAST
PC	10+00.00	578619.5892	1338617.1795
PT	10+67.46	578558.2757	1338589.8201
POT	11+07.46	578519.5297	1338579.8830

Y16

TYPE	STATION	NORTH	EAST
POT	10+00.00	578137.2296	1339605.3260
PC	10+77.63	578071.5423	1339563.9480
PT	11+87.47	577971.1796	1339520.3774

Y17

TYPE	STATION	NORTH	EAST
POT	10+00.00	577867.0278	1340658.7607
POT	10+95.25	577774.5803	1340635.8301

Y18

TYPE	STATION	NORTH	EAST
POT	10+00.00	577646.6998	1341538.6054
POT	11+45.11	577502.1681	1341525.6556

SEE SHEET 1C-1 FOR NOTES

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW03E-1
Location and Surveys	

PERMANENT EASEMENT CONTROL SHEET W-5212N

ROW MARKER PERMANENT EASEMENT

ALIGN	STATION	OFFSET	NORTH	EAST
L	40·06.78	-50.00	595842.4711	1309298.7726
L	40·50.00	50.00	595733.9117	1309289.6761
L	41·27.00	-105.00	595834.2176	1309430.7177
L	41·60.00	85.00	595651.1370	1309370.1332
L	42·50.00	50.00	595639.5143	1309465.9972
L	42·50.00	85.00	595608.6581	1309449.4777
L	42·92.00	-115.00	595765.1558	1309580.9025
L	44·12.00	-114.00	595707.6357	1309686.2232
L	47·40.00	-50.00	595496.4012	1309945.1826
L	51·66.69	50.00	595206.8504	1310274.1525
L	51·68.00	-50.00	595294.3908	1310322.5097
L	52·65.00	70.00	595142.8154	1310351.3870
L	53·21.00	-94.00	595260.9674	1310478.1628
L	53·75.00	63.00	595097.0680	1310451.6675
L	54·45.06	50.00	595075.4623	1310519.5671
L	56·14.00	-50.00	595083.8845	1310715.7058
L	64·50.00	-65.00	594702.5275	1311459.8078
L	64·50.00	-50.00	594689.3034	1311452.7280
L	68·86.00	-50.00	594502.6490	1311840.9945
L	179·75.00	50.76	592504.5270	1322707.3931
L	179·75.00	70.00	592485.3002	1322708.1381
L	180·01.81	70.00	592486.3383	1322734.9303
L	180·10.02	50.75	592505.8951	1322742.3863
L	182·10.00	50.66	592513.7193	1322942.2133
L	182·10.00	80.00	592484.4062	1322943.3491
L	182·40.00	80.00	592485.5677	1322973.3266
L	182·40.00	50.65	592514.8930	1322972.1903
L	196·19.00	50.09	592568.8460	1324350.1346
L	197·44.00	78.00	592545.7963	1324476.1215
L	198·58.00	-50.00	592678.0956	1324585.2268
L	201·23.00	-100.00	592731.4834	1324853.0157
L	201·50.00	108.00	592523.1559	1324877.3338
L	202·45.00	50.00	592578.9426	1324972.3565
L	203·24.00	-88.00	592713.7756	1325056.8871
L	204·78.00	-50.00	592666.6629	1325210.2274
L	217·65.00	50.00	592333.1257	1326454.4319
L	219·15.00	80.00	592259.3081	1326586.4999
L	219·35.00	-75.00	592399.8157	1326654.9265
L	219·35.00	-50.00	592376.1378	1326646.9043
L	219·45.00	80.00	592249.8403	1326614.5250
L	219·45.00	50.00	592278.2370	1326624.2012
L	222·90.14	-60.92	592260.8535	1326986.5615
L	319·58.00	-50.10	585762.4563	1333849.3968
L	319·80.00	50.01	585704.4948	1333764.8520
L	320·70.00	-80.00	585666.5633	1333918.6090
L	321·57.00	65.00	585536.3682	1333810.5527
L	323·14.00	-104.00	585440.3057	1334020.0879
L	323·84.00	92.00	585312.5659	1333855.7756
L	324·58.00	-102.00	585302.8913	1334063.1843
L	325·19.00	81.00	585187.7631	1333908.4087
L	325·73.00	-50.00	585177.4012	1334049.7227
L	325·83.00	50.00	585136.6545	1333957.8548
L	328·50.00	-50.00	584914.2716	1334136.2780
L	328·50.00	-80.00	584923.6458	1334164.7758
L	328·80.00	-80.00	584895.1480	1334174.1500

ROW MARKER PERMANENT EASEMENT

ALIGN	STATION	OFFSET	NORTH	EAST
L	331·00.00	-80.00	584686.1642	1334242.8943
L	331·00.00	-50.00	584676.7900	1334214.3965
L	331·24.00	50.00	584622.7444	1334126.9033
L	331·45.00	-80.00	584643.4176	1334256.9557
L	331·45.00	-50.00	584634.0433	1334228.4579
L	332·00.00	63.00	584546.4878	1334138.3023
L	333·00.00	-50.00	584486.8048	1334276.8914
L	333·00.00	-80.00	584496.1790	1334305.3891
L	334·94.00	-100.00	584318.1428	1334385.0076
L	335·28.00	63.00	584234.9120	1334240.7938
L	335·50.00	95.00	584204.0144	1334217.2706
L	336·86.00	-50.00	584120.1332	1334397.5063
L	337·14.00	50.00	584062.2879	1334311.2630
L	368·01.22	-49.04	581197.2449	1335421.3109
L	368·51.98	51.55	581098.0750	1335367.8348
L	370·53.00	-58.00	581012.7207	1335579.6265
L	371·17.00	82.00	580868.8454	1335524.4007
L	372·10.00	-100.00	580939.2463	1335715.9387
L	372·10.00	-76.00	580921.1847	1335700.1343
L	372·47.00	83.00	580776.5367	1335624.5423
L	372·50.00	-100.00	580914.3502	1335744.9805
L	372·70.00	95.00	580752.1173	1335634.9607
L	372·95.00	48.85	580771.3880	1335684.0899
L	372·95.00	95.00	580735.6892	1335654.8435
L	375·55.00	-49.34	580690.2332	1335950.8982
L	377·30.00	83.00	580479.2535	1336011.1267
L	377·30.00	50.76	580505.0120	1336030.5154
L	378·75.00	65.00	580406.4341	1336137.8008
L	379·16.00	51.04	580392.9318	1336178.9543
L	392·77.00	50.82	579573.0189	1337265.0405
L	399·15.00	110.00	579140.4297	1337737.7057
L	399·15.00	94.00	579153.1799	1337747.3718
L	399·65.00	110.00	579110.2234	1337777.5502
L	399·65.00	50.57	579157.5786	1337813.4505
L	404·92.00	50.77	578839.0515	1338233.2904
L	407·32.00	68.00	578680.1203	1338414.5899
L	410·50.00	-50.14	578596.5574	1338743.9269
L	410·50.00	-85.00	578625.9960	1338762.5960
L	410·97.00	81.00	578460.3771	1338714.3014
L	411·00.00	-85.00	578600.0137	1338804.1157
L	411·00.00	-50.25	578570.4418	1338785.8563
L	412·65.00	50.02	578400.2408	1338876.9607
L	415·66.00	49.75	578260.7458	1339147.9781
L	415·89.00	60.00	578241.6490	1339164.8936
L	419·00.00	-75.00	578250.2594	1339503.0629
L	419·00.00	-50.23	578226.9100	1339494.7982
L	419·12.23	59.76	578119.0944	1339469.8281
L	419·62.00	-75.00	578230.5226	1339560.4335
L	420·37.00	-50.46	578184.5707	1339623.0306
L	433·85.00	50.39	577754.6078	1340901.9352
L	433·85.00	85.00	577721.0305	1340893.5593
L	434·13.48	85.00	577714.1391	1340921.1768
L	434·14.99	50.41	577747.3293	1340931.0166

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y14	10·66.65	31.77	579451.2297	1337387.7670

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	395·18.08	73.92	579408.9716	1337443.2064
L	398·13.35	50.65	579249.1314	1337692.5530

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work Item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

I further certify that the data compiled came from available surveys/mapping performed by others and provided to me by NCDOT and do not certify to the accuracy or quality of the individual data sources.

I further certify that the right of way and permanent easement points shown herein and outlined in the tables shown hereon (localized coordinates, station/offset) have been checked and are accurate representations of the right of way and permanent easement points depicted on the corresponding highway plans. I also certify that the right of way and permanent easement points shown herein have been field monumented under my supervision from existing survey control provided by others; that the depicted property data shown herein were surveyed by others; and these monuments denote the right of way and easement boundaries at the time of staking which may be subject to change due to right of way revisions (See deeds for final determination).

Witness my original signature, registration number and seal this day 6/15/2018

Matthew T Cornwell

Digitally signed by Matthew T Cornwell
DN: C=US, O=TGS Engineers, CN=Matthew T Cornwell, E=mcornwell@tgsengineers.com
Reason: I am the author of this document
Location:
Date: 2018-06-18 13:19:03
Foxit PhantomPDF Version: 9.1.0

Professional Land Surveyor

L-4775
PLS #

SEAL
L-4775
MATTHEW T. CORNWELL

SEE SHEET 1C-1 FOR NOTES

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

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

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-4

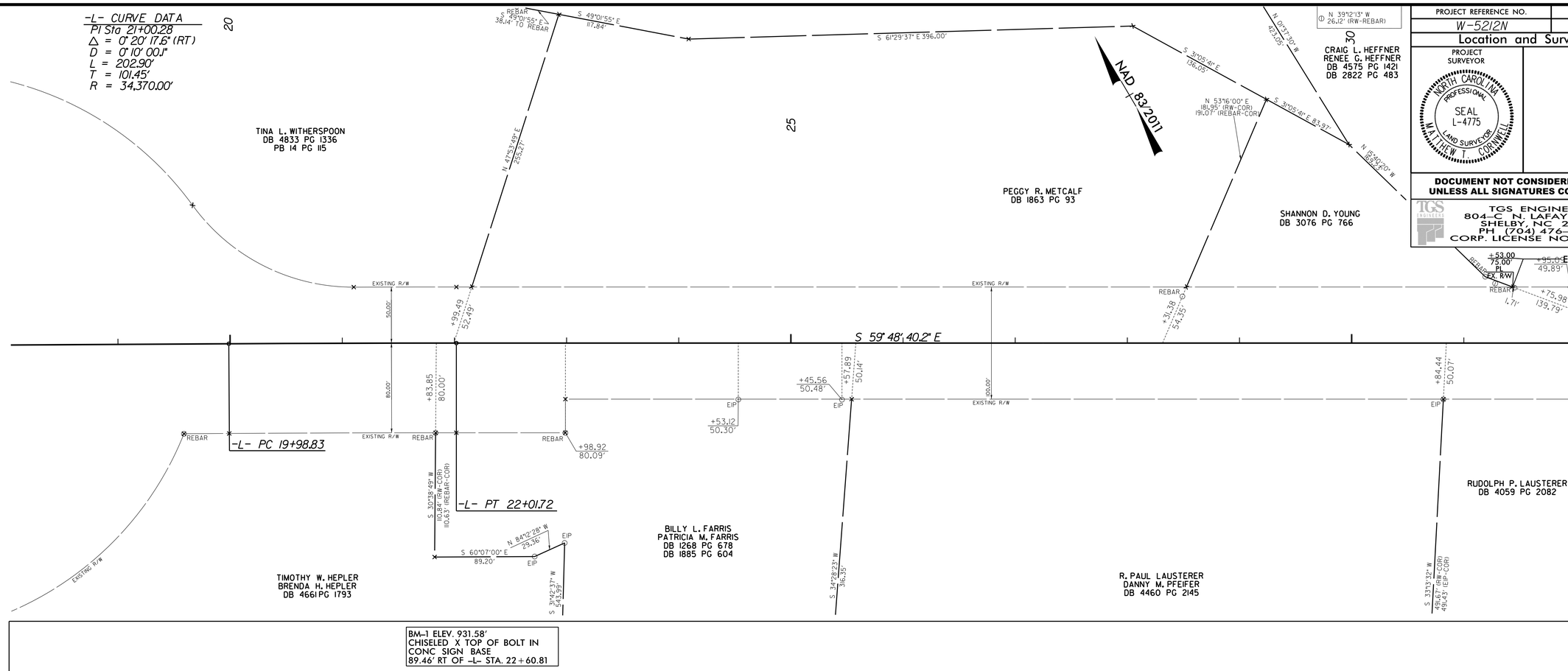
Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



BM-1 ELEV. 931.58'
CHISELED X TOP OF BOLT IN
CONC SIGN BASE
89.46' RT OF -L- STA. 22+60.81

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

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Witness my original signature, registration number and seal this day 8/31/2017

Matthew T. Cornwell

Digitally signed by Matthew T. Cornwell
DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:24:53 -04'00'

Professional Land Surveyor — PLS # L-4775

NOTES:

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REVISIONS

7/17/17

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

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-5

Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

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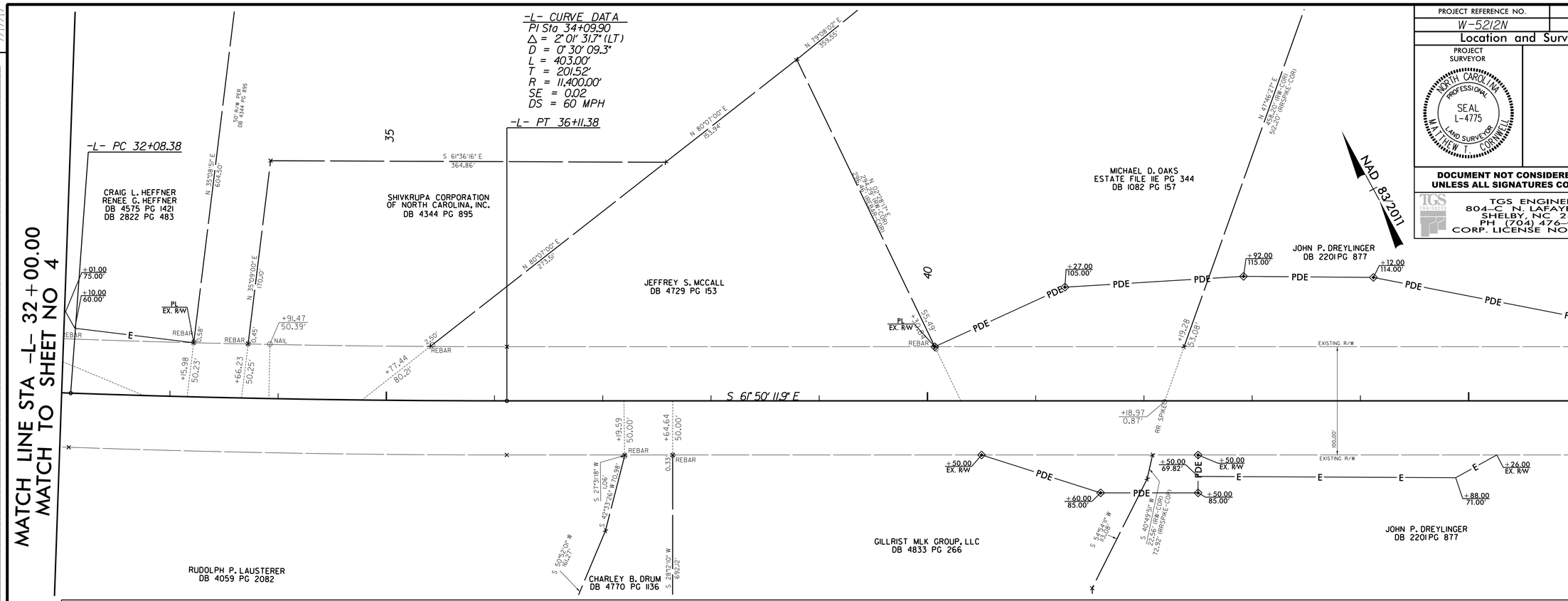
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



BM-2 ELEV. 887.70'
CHISELED X ON CONC PAD
123.35' LT OF -L- STA. 33+83.80

* DESIGN EXCEPTION REQUIRED FOR VERTICAL CURVE AND VERTICAL SSD

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Digitally signed by Matthew T. Cornwell
DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:25:18 -04'00'

Professional Land Surveyor — PLS # L-4775

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REVISIONS

7/17/17

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

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-6

Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

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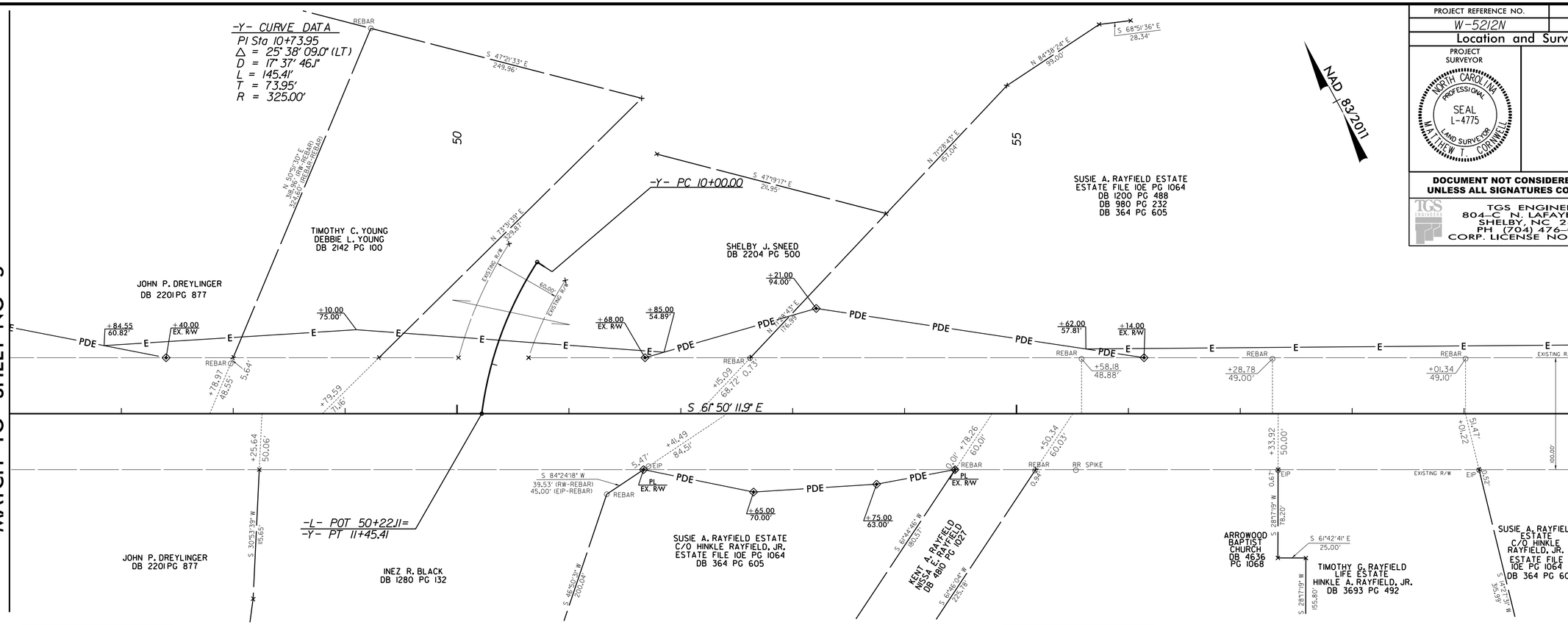
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



BM-3 ELEV. 865.46'
RR SPIKE IN BASE OF
22" RED OAK
101.57' RT OF -L- STA. 46+32.92

BM-4 ELEV. 909.09'
RR SPIKE IN BASE OF
30" DBL POST OAK
104.06' RT OF -L- STA. 55+14.81

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DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:25:49 -04'00'

L-4775

Professional Land Surveyor — PLS #

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REVISIONS

7/17/17

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

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7/17/17

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-7

Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

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TGS ENGINEERS
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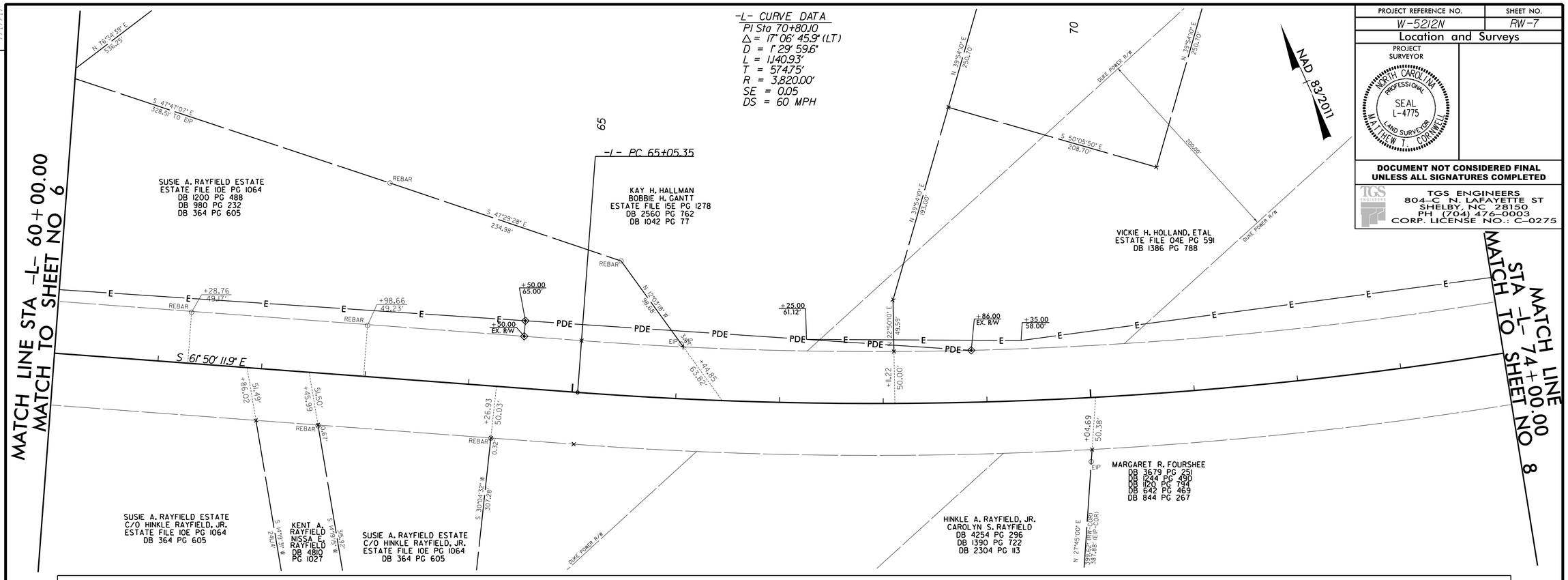
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



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Digitally signed by Matthew T. Cornwell
DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:26:16 -04'00'

Professional Land Surveyor

L-4775
PLS #

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

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-8

Location and Surveys

PROJECT SURVEYOR
NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

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TGS ENGINEERS
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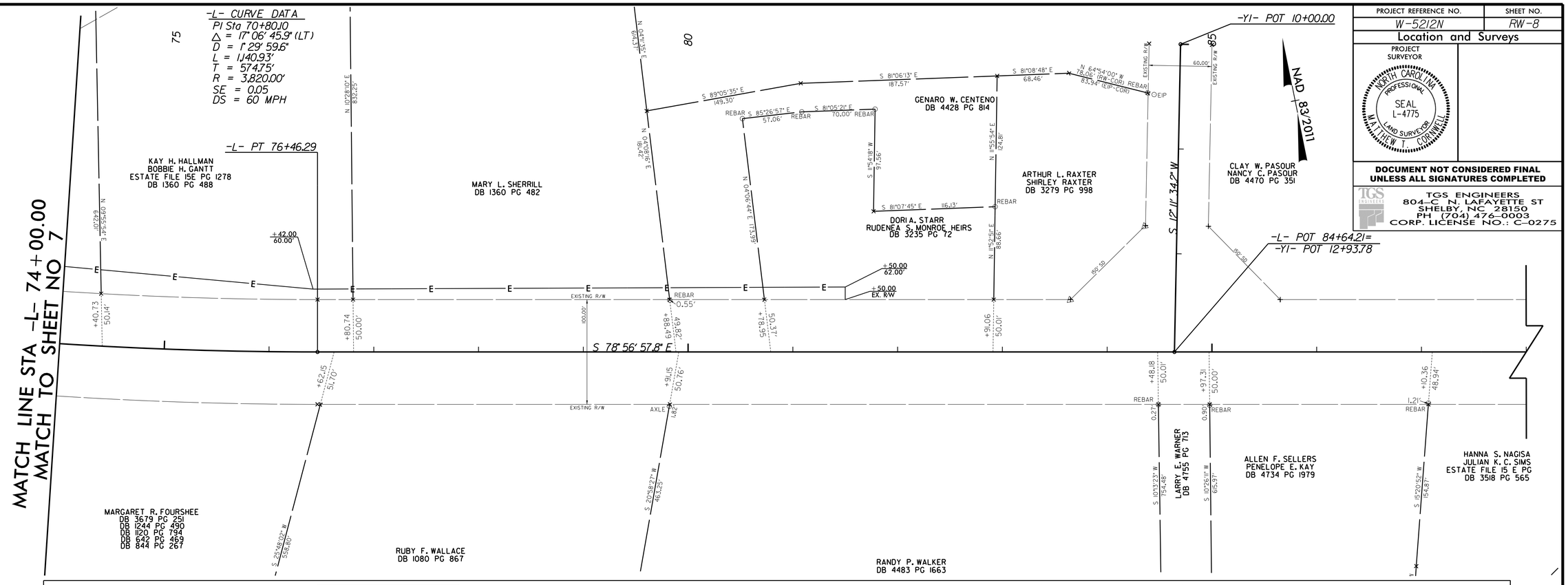
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



BM-6 ELEV. 961.99'
CHISELED X TOP OF BOLT
IN CONC LAMP POST BASE
104.58' RT OF -L- STA. 74+05.90

BM-7 ELEV. 970.35'
CHISELED SQUARE ON CONC
CURB
91.99' LT OF -L- STA. 84+67.80

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

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DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:26:49 -04'00'

Professional Land Surveyor — L-4775 PLS #

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REVISIONS

7/17/17

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

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-9

Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

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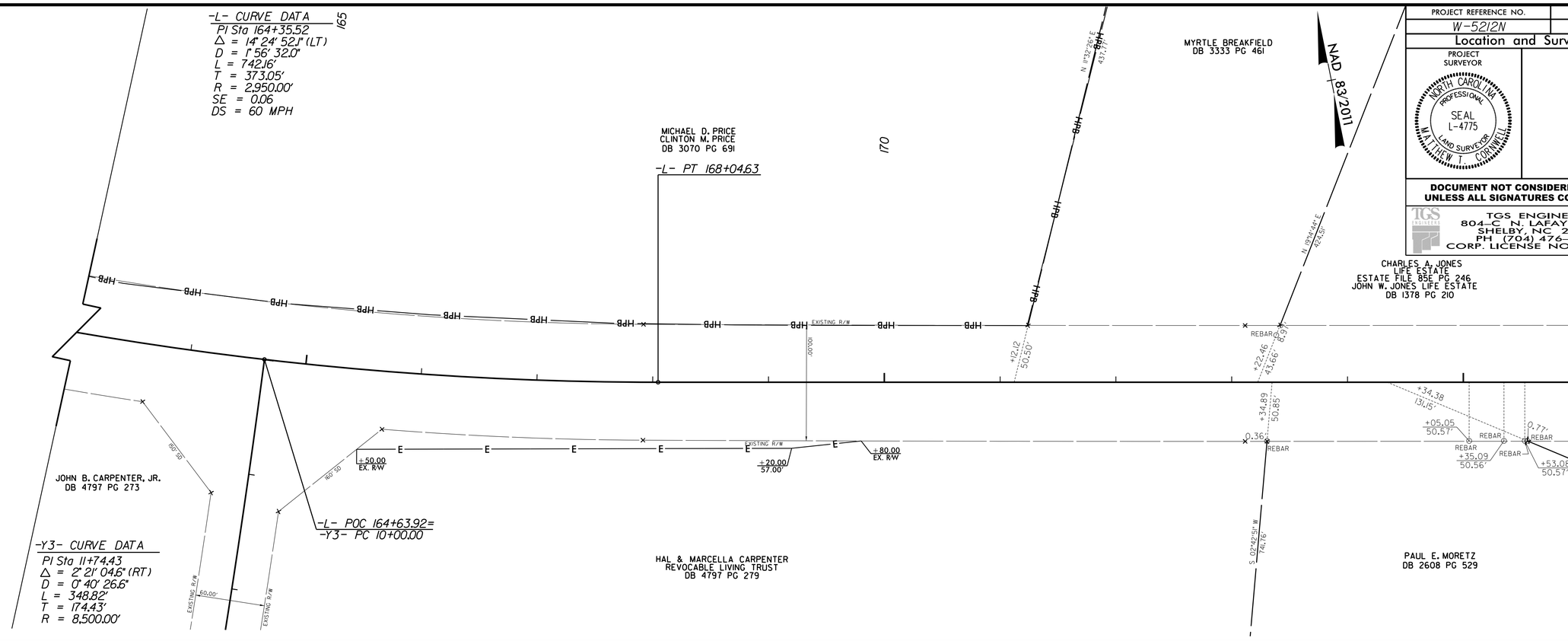
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



BM-11 ELEV. 916.70'
RR SPIKE FLUSH IN PAVEMENT
CTR SR 1446 BESS TOWN RD
100.46' RT OF -L- STA. 164+61.35

BM-12 ELEV. 913.99'
RR SPIKE IN BASE
18" TULIP POPLAR
171.36' RT OF -L- STA. 174+11.97

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Digitally signed by Matthew T. Cornwell
DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:27:20 -04'00'

Professional Land Surveyor

L-4775
PLS #

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REVISIONS

7/18/17

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

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-10

Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

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TGS ENGINEERS
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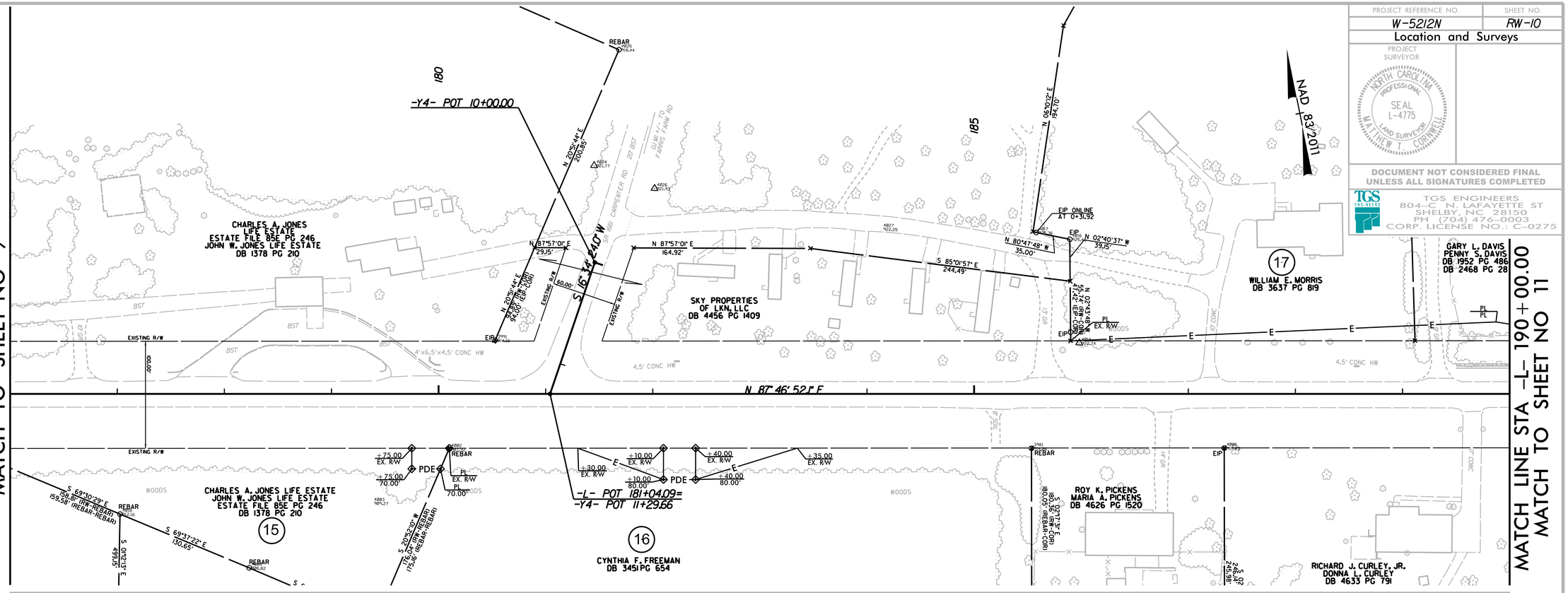

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Matthew T Cornwell

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DN: C=US, O=TGS Engineers, CN=Matthew T Cornwell, E=mcornwell@tgsengineers.com
Reason: I am the author of this document
Location:
Date: 2018-06-15 14:29:39
Foxit PhantomPDF Version: 9.1.0

Professional Land Surveyor — L-4775 PLS #

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REVISIONS

6/15/18

15-JUN-2018 14:28
C:\Users\mcornwell.TGSE\Desktop\W5212N REV15.dgn
$cfgroot\bin\MicroStation\WorkSpace\pw_ustn.cfg

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-11

Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

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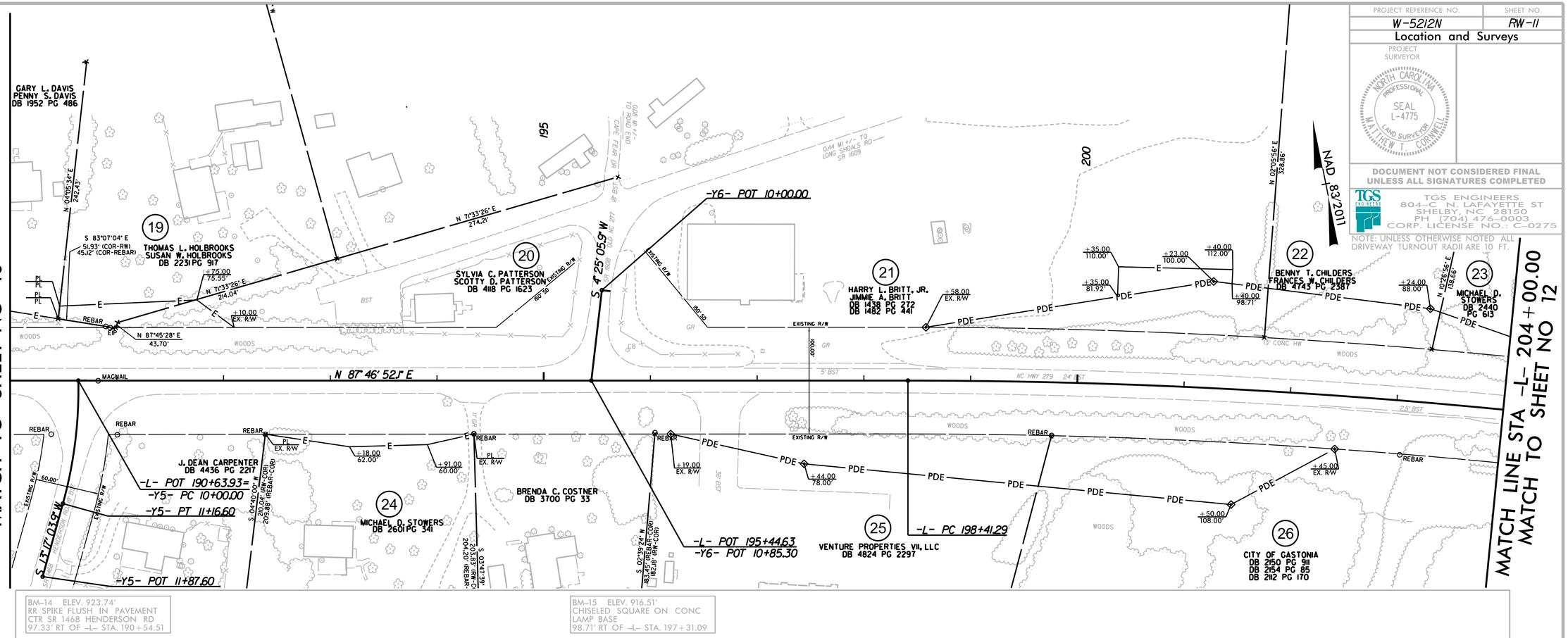
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.



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Reason: I am the author of this document
Location:
Date: 2018-06-15 14:34:55
Foxit PhantomPDF Version: 9.1.0

Professional Land Surveyor — L-4775 PLS #

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REVISIONS

6/15/18

15-JUN-2018 14:34
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$$$$USERNAME$$$$ 8.7" MrPhinney Large PDF

DocuSign Envelope ID: 6FCC88E1-8193-4A12-A9E6-F82194B913A7

7/18/17

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-12

Location and Surveys

PROJECT SURVEYOR

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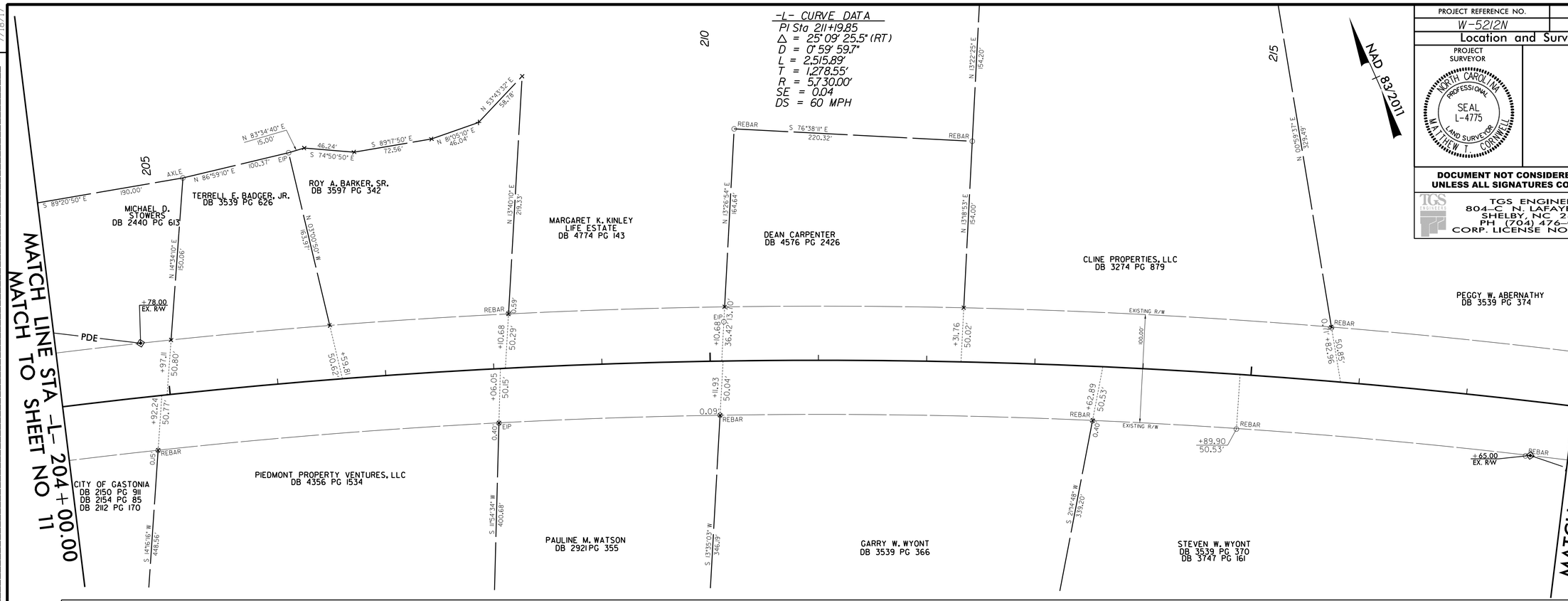

BM-16 ELEV. 919.40'
RR SPIKE FLUSH IN PAVEMENT
AT PRECISION SYST
98.33' RT OF -L- STA. 204+93.81

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

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DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:28:34 -04'00'

Professional Land Surveyor

L-4775
PLS #

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

DocuSign Envelope ID: 6FCC88E1-8193-4A12-A9E6-F82194B913A7

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-13

Location and Surveys

PROJECT SURVEYOR

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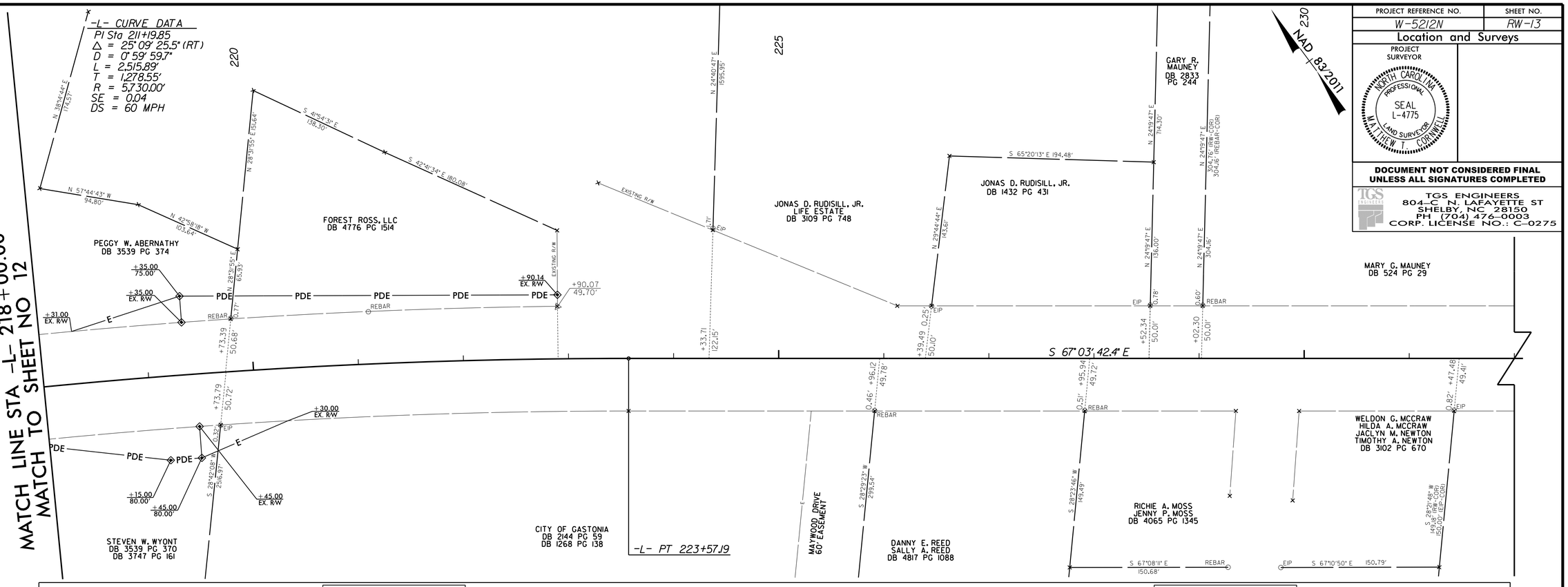
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



BM-18 ELEV. 948.97'
RR SPIKE IN BASE
24" SWEET GUM
153.69' LT OF -L- STA. 222+06.53

BM-19 ELEV. 949.84'
RR SPIKE FLUSH IN PAVEMENT
MOUNTAIN MEADOWS DRIVE
97.80' RT OF -L- STA. 229+61.63

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

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Witness my original signature, registration number and seal this day 8/31/2017

Matthew T. Cornwell

Digitally signed by Matthew T. Cornwell
DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:29:03 -04'00'

Professional Land Surveyor

L-4775
PLS #

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

REVISIONS

7/18/17

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

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-14

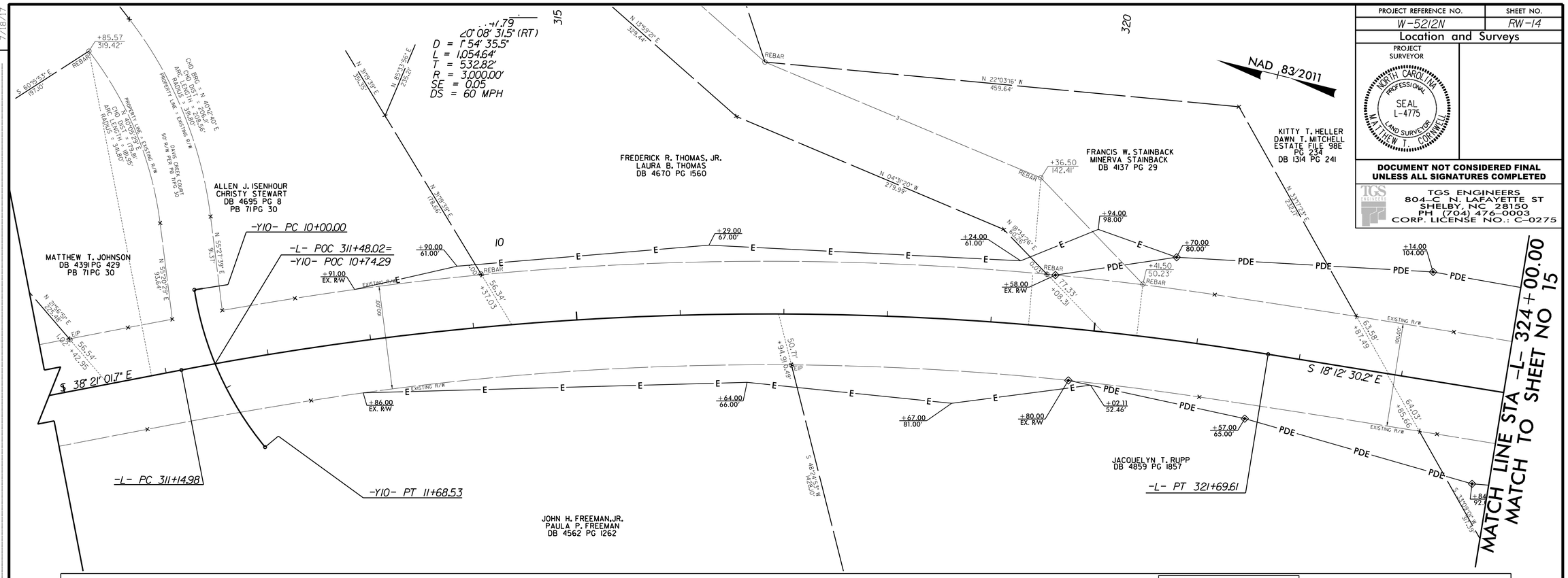
Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



BM-23 ELEV. 836.95'
RR SPIKE IN BASE
18" TULIP POPLAR
165.72' RT OF -L- STA. 321+34.21

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

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Witness my original signature, registration number and seal this day 8/31/2017

Matthew T. Cornwell

Digitally signed by Matthew T. Cornwell
DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:29:29 -04'00'

Professional Land Surveyor — L-4775 PLS #

NOTES:

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2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

REVISIONS

7/18/17

$$$$$SYTIME$$$$$
$$$$$USERNAME$$$$$DGN$$$$$

DocuSign Envelope ID: 6FCC88E1-8193-4A12-A9E6-F82194B913A7

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-15

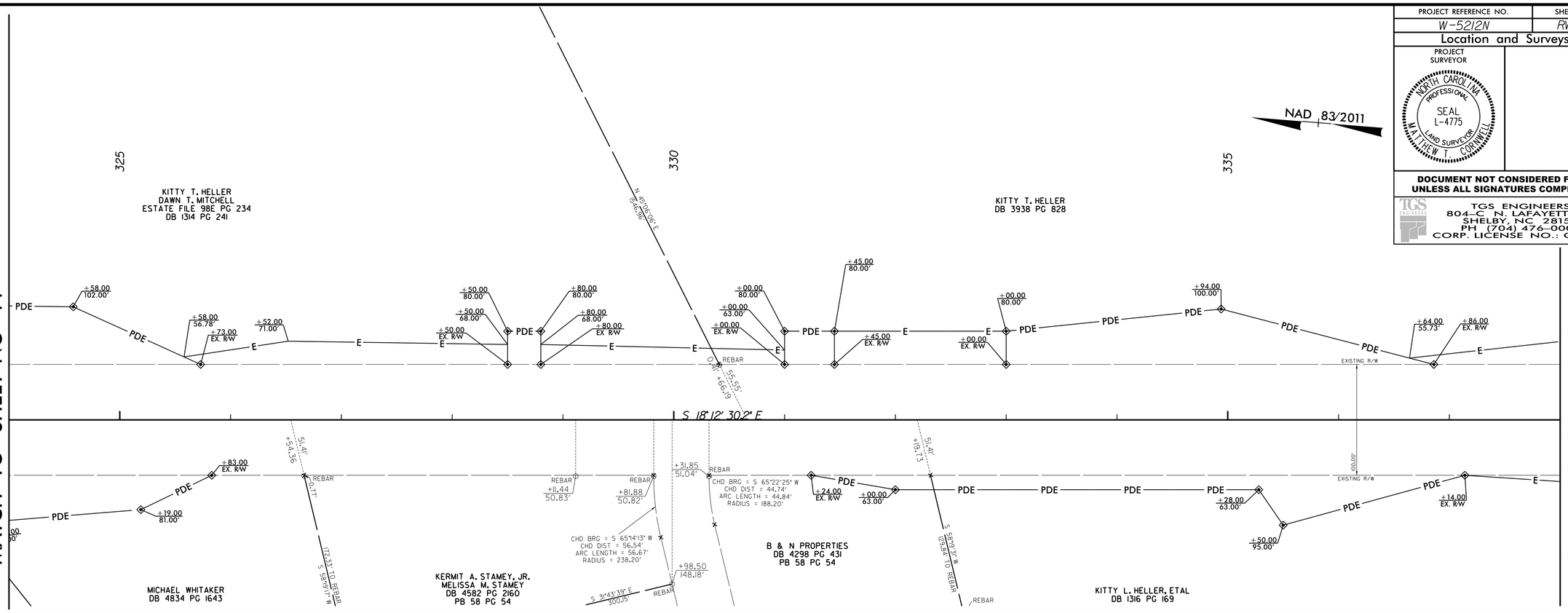
Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



BM-24 ELEV. 824.38'
RR SPIKE IN BASE
20" SWEET GUM
125.24' RT OF -L- STA. 333+56.31

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

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Matthew T. Cornwell

Digitally signed by Matthew T. Cornwell
DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:29:55 -04'00'

Professional Land Surveyor — L-4775 PLS #

NOTES:

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2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

REVISIONS

7/18/17

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

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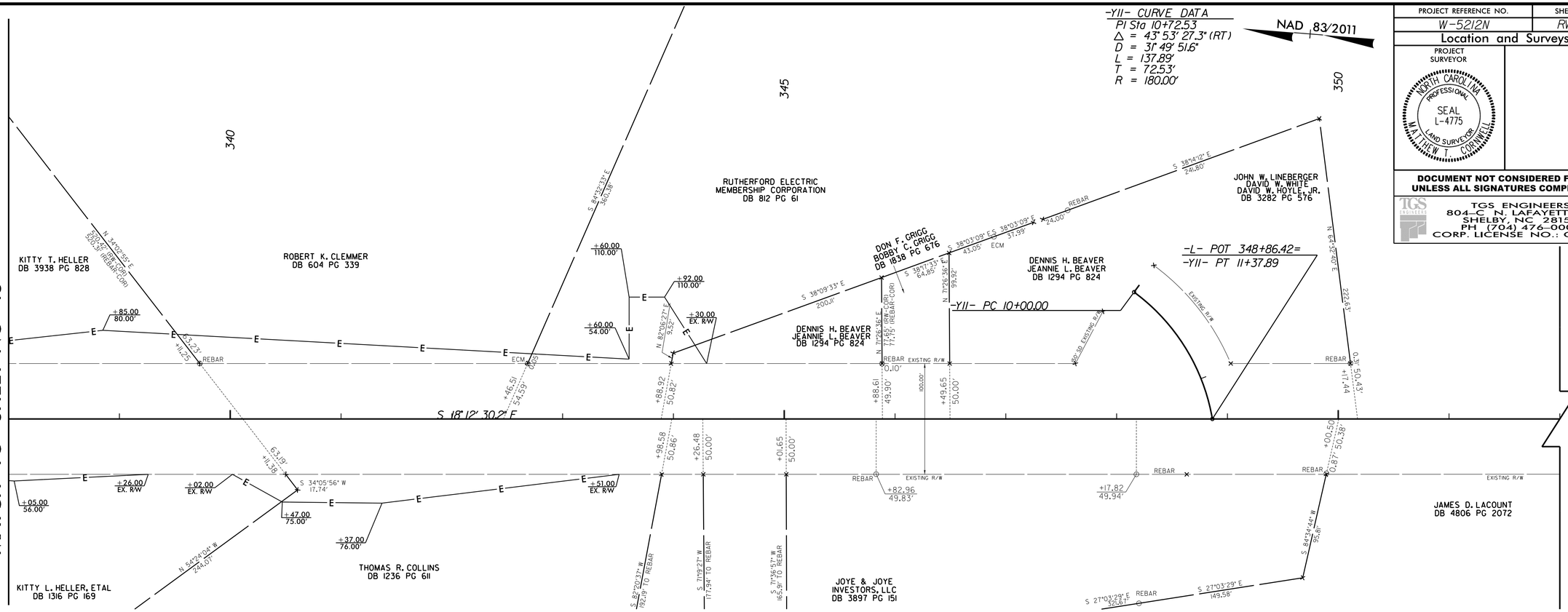
7/18/17

REVISIONS

MATCH LINE STA -L- 338+00.00
MATCH TO SHEET NO 15

-Y11- CURVE DATA
PI Sta 10+72.53
Δ = 43° 53' 27.3" (RT)
D = 31° 49' 51.6"
L = 137.89'
T = 72.53'
R = 180.00'

NAD 83/2011



BM-25 ELEV. 839.73'
RR SPIKE IN BASE
16" DBL HICKORY
106.09' LT OF -L- STA. 342+88.98

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-16

Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

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Witness my original signature, registration number and seal this day 8/31/2017

Matthew T. Cornwell

Digitally signed by Matthew T. Cornwell
DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:30:18 -04'00'

Professional Land Surveyor — PLS # L-4775

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

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

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7/18/17

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-17

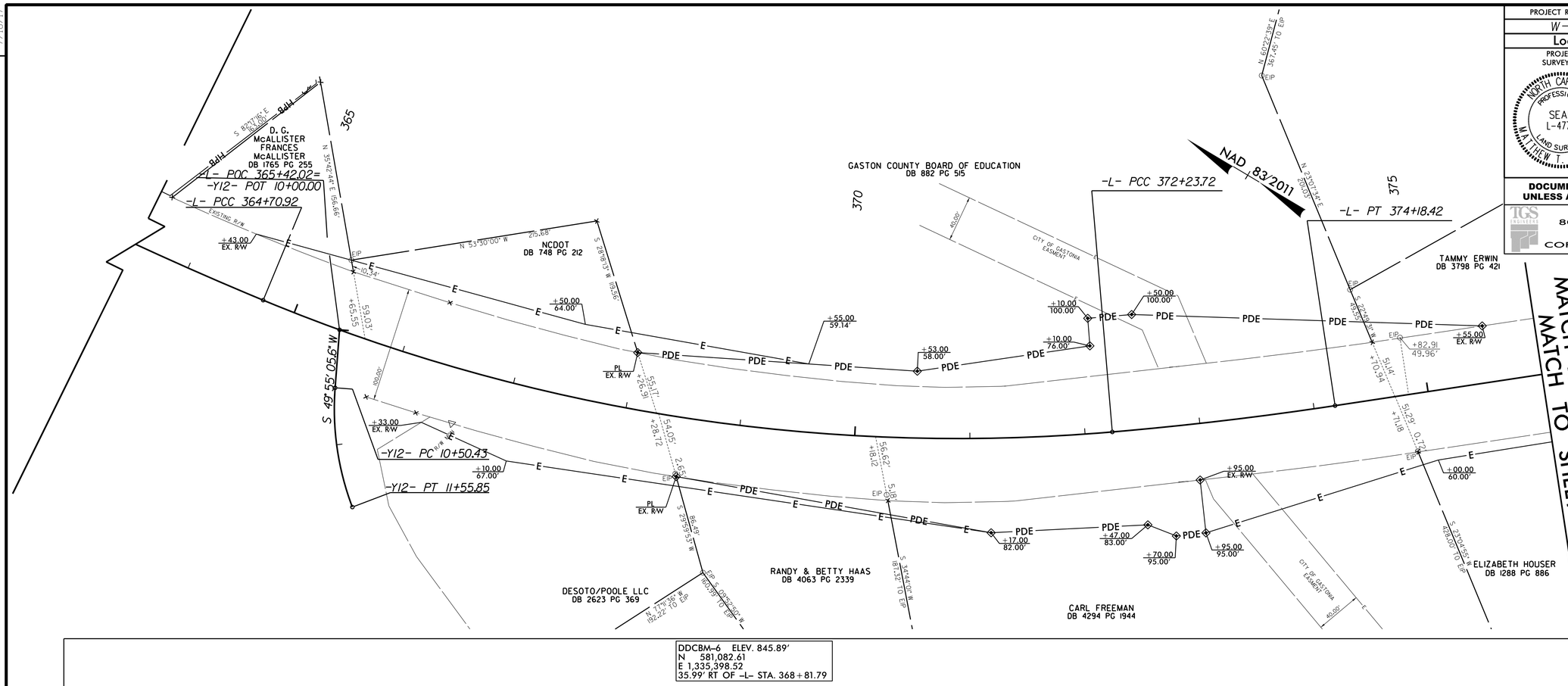
Location and Surveys

PROJECT SURVEYOR

SEAL L-4775 MATTHEW T. CORNWELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



DDCBM-6 ELEV. 845.89'
N 581,082.61
E 1,335,398.52
35.99' RT OF -L- STA. 368+81.79

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work Item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

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Witness my original signature, registration number and seal this day 8/31/2017

Matthew T. Cornwell

Digitally signed by Matthew T. Cornwell
DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:30:41 -04'00'

Professional Land Surveyor

L-4775
PLS #

NOTES:

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2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

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

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7/18/17

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-18

Location and Surveys

PROJECT SURVEYOR

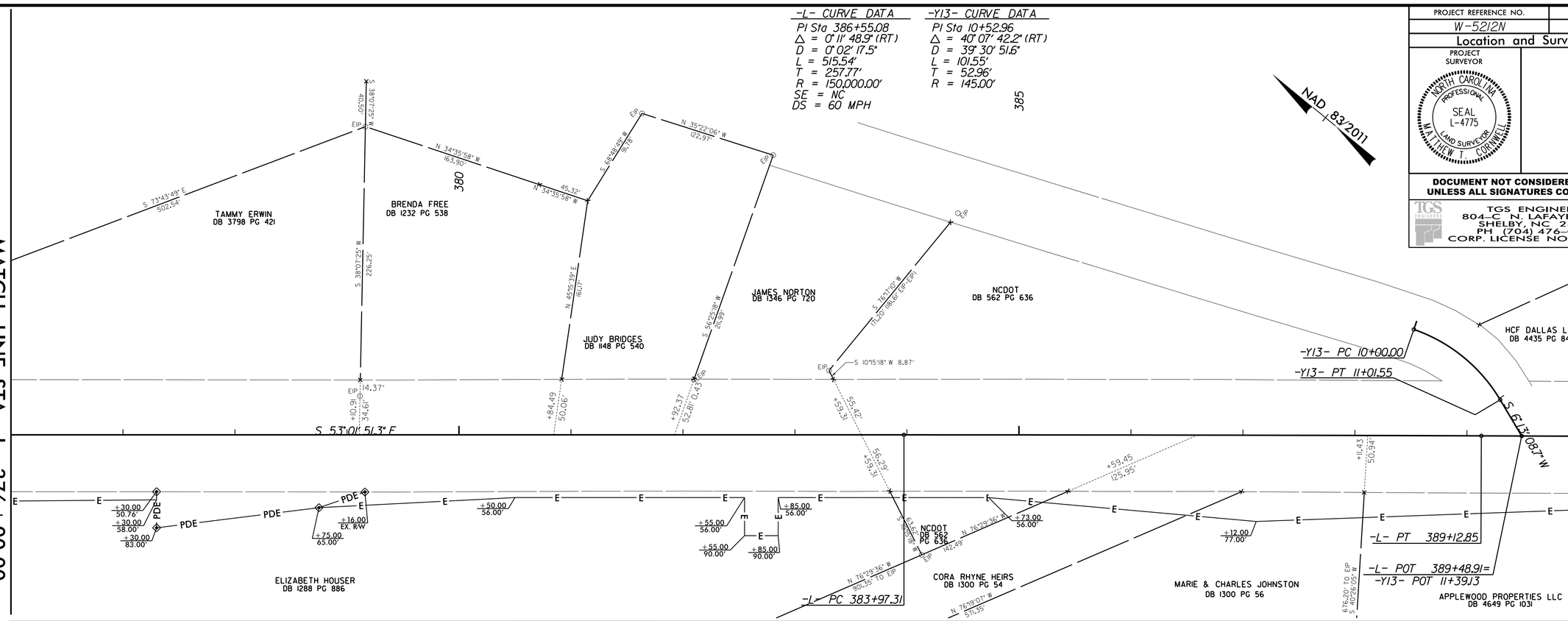
NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

MATCH LINE STA -L- 376+00.00
MATCH TO SHEET NO 17

MATCH LINE STA -L- 390+00.00
MATCH TO SHEET NO 19



DDCBM-5 ELEV. 845.44'
N 580,203.53
E 1,336,394.70
72.62' RT OF -L- STA. 382+02.28

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

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Witness my original signature, registration number and seal this day 8/31/2017

Matthew T. Cornwell

Digitally signed by Matthew T. Cornwell
DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:31:05 -04'00'

Professional Land Surveyor — L-4775 PLS #

NOTES:

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2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

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

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-19

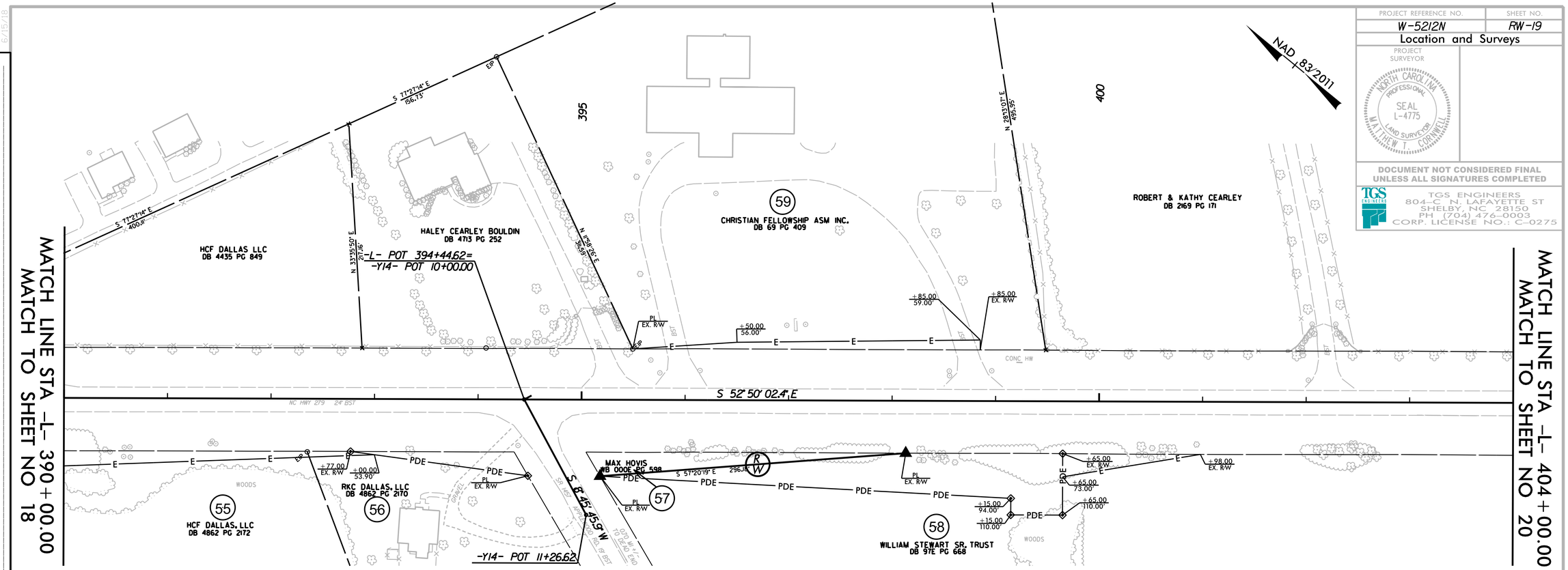
Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



DDCBM-4 ELEV. 833.94'
N 579,480.26
E 1,337,553.46
49.50' LT OF -L- STA. 395+62.88

REVISIONS

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

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Witness my original signature, registration number and seal this day 6/15/2018

Matthew T Cornwell

Digitally signed by Matthew T Cornwell
DN: C=US, O=TGS Engineers, CN=Matthew T Cornwell, E=mcornwell@tgsengineers.com
Reason: I am the author of this document
Location:
Date: 2018-06-15 14:39:29
Foxit PhantomPDF Version: 9.1.0

Professional Land Surveyor — L-4775 PLS #

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

6/15/18

15-JUN-2018 14:39
C:\Users\mcornwell.TGSEN\Desktop\W5212N REVISIONS\w5212n_le_rw19.dgn
$$$$USER ~ MATHEWTCORNWELL

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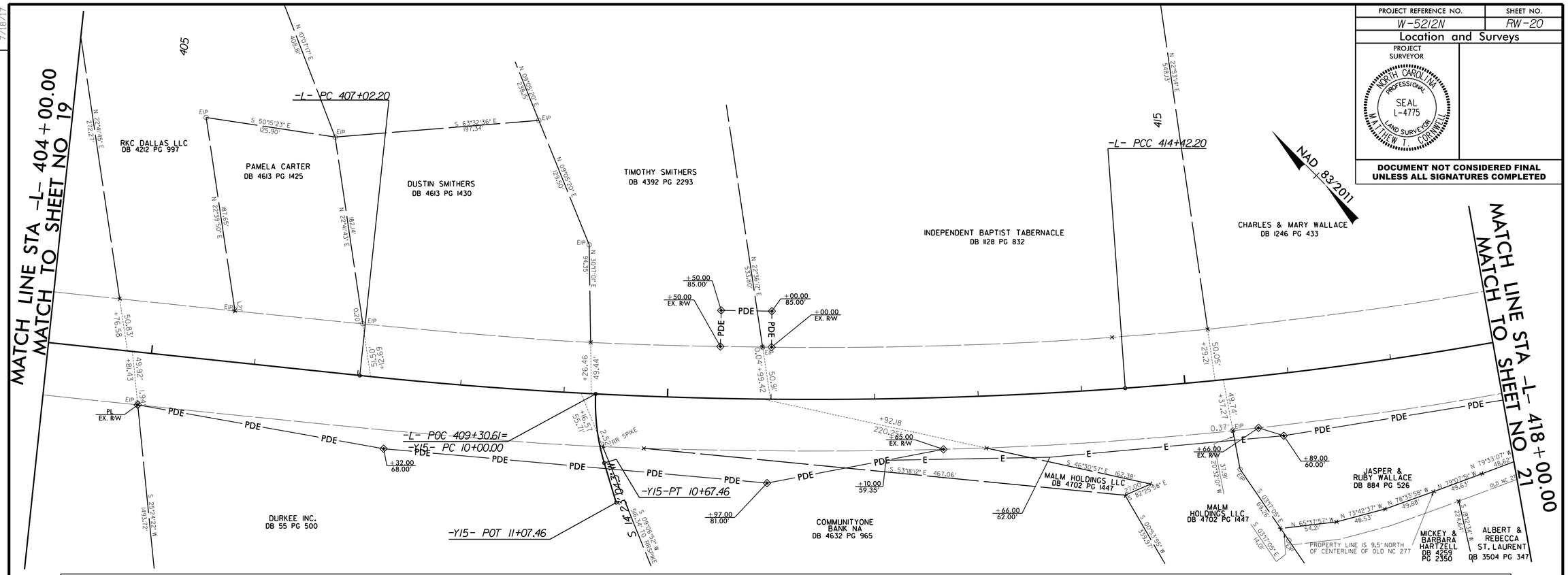
PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-20

Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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Witness my original signature, registration number and seal this day 8/31/2017

Matthew T. Cornwell

Digitally signed by Matthew T. Cornwell
DN: cn=Matthew T. Cornwell, o=TGS Engineers, ou=Location & Surveys, email=mcornwell@tgsengineers.com, c=US
Date: 2017.08.31 16:31:55 -04'00'

Professional Land Surveyor — L-4775 PLS #

NOTES:

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2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

REVISIONS

7/18/17

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

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-21

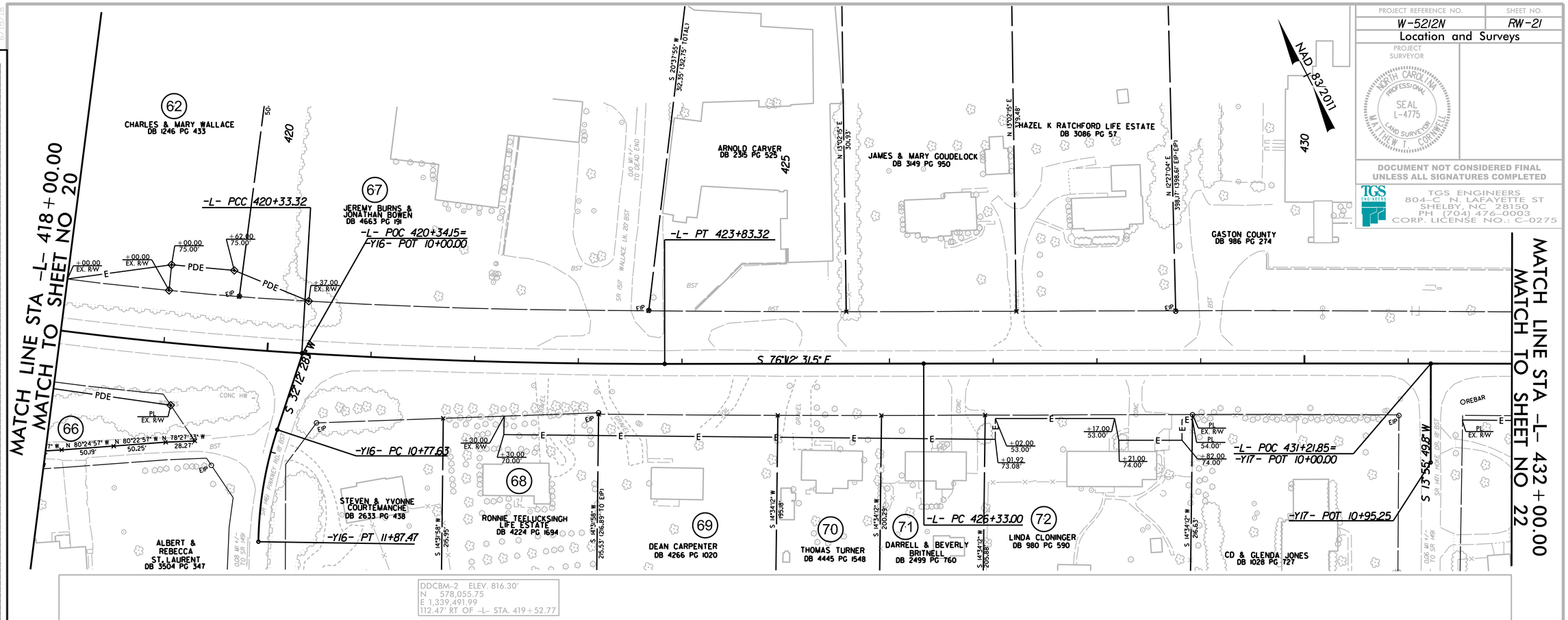
Location and Surveys

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



DDCBM-2 ELEV. 816.30'
N 578,055.75
E 1,339,491.99
112.47' RT OF -L- STA. 419+52.77

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

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Witness my original signature, registration number and seal this day 6/15/2018

Matthew Cornwell

Digitally signed by Matthew T Cornwell
DN: C=US, O=TGS Engineers, CN=Matthew T Cornwell, E=mcornwell@tgsengineers.com
Reason: I am the author of this document
Location:
Date: 2018-06-15 14:42:30
Foxit PhantomPDF Version: 9.1.0

Professional Land Surveyor — L-4775 PLS #

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

15-JUN-2018 14:42
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$$USER$$ 8.7" MicroWorld TrueDoc

DocuSign Envelope ID: 6FCC88E1-8193-4A12-A9E6-F82194B913A7

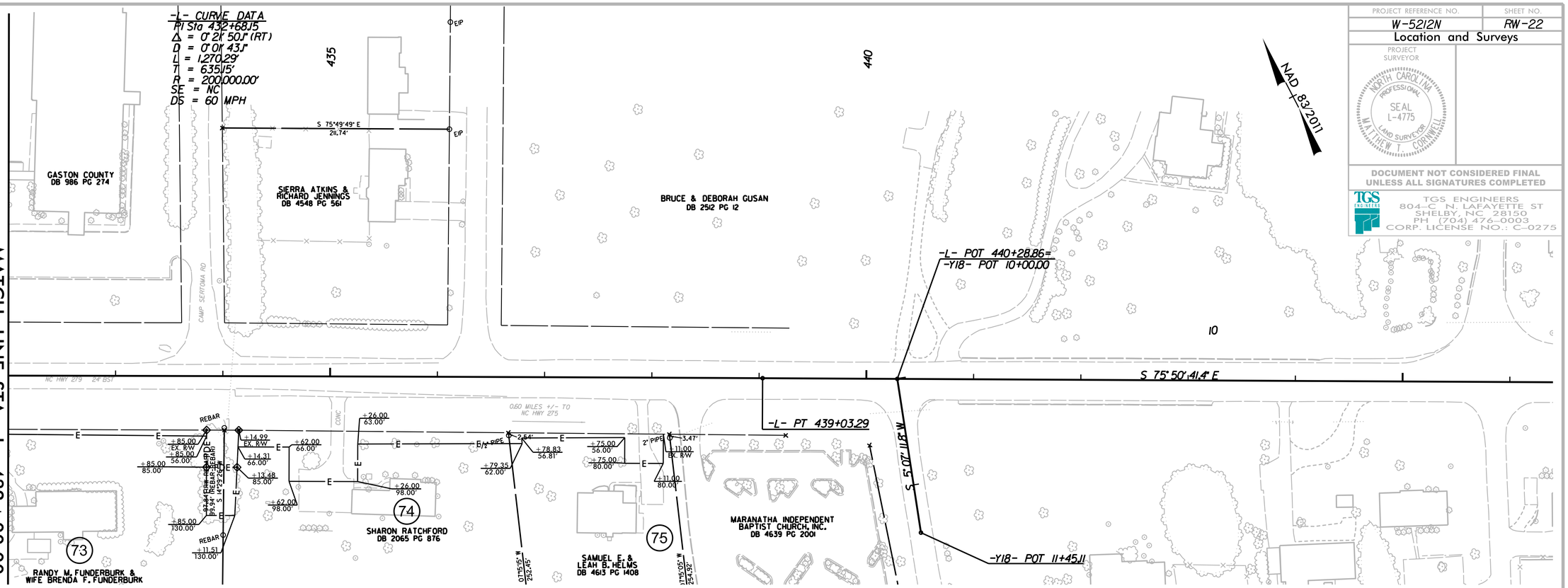
PROJECT REFERENCE NO.	SHEET NO.
W-5212N	RW-22
Location and Surveys	

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4775 LAND SURVEYOR MATTHEW T. CORNWELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



DDCBM-1 ELEV. 806.00'
N 577,767.93
E 1,340,863.97
46.66' RT OF -L- STA. 433+44.93

I, Matthew T. Cornwell, a Professional Land Surveyor in the state of North Carolina, herby certify to the best of my knowledge and belief that the following work item(s) (Base map compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

I further certify that the data compiled came from available surveys/mapping performed by others and provided to me by NCDOT and do not certify to the accuracy or quality of the individual data sources.

I further certify that the right of way and permanent easement points shown herein and outlined in the tables shown hereon (localized coordinates, station/offset) have been checked and are accurate representations of the right of way and permanent easement points depicted on the corresponding highway plans. I also certify that the right of way and permanent easement points shown herein have been field monumented under my supervision from existing survey control provided by others; that the depicted property data shown herein were surveyed by others; and these monuments denote the right of way and easement boundaries at the time of staking which may be subject to change due to right of way revisions (See deeds for final determination).

Witness my original signature, registration number and seal this day 8/31/2017

Matthew T Cornwell

Digitally signed by Matthew T Cornwell
DN: C=US, O=TGS Engineers, CN=Matthew T Cornwell, E=mcornwell@tgsengineers.com
Reason: I am the author of this document
Location:
Date: 2018-06-15 14:44:51
Foxit PhantomPDF Version: 9.1.0

Professional Land Surveyor — L-4775 — PLS #

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

REVISIONS

7/17/17

15-JUN-2018 14:44
C:\Users\mcornwell.TGSEN\Desktop\W5212N REVISIONS\w5212n_le_rw-22.dgn
$$$$USERNAME$$$$

DocuSign Envelope ID: F43262A9-93FD-424F-BEC7-AF7F5EF9EF0A

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	2A-1

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY — 10/1/2018 10:32:12 AM PDT

PAVEMENT DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 043888 ENGINEER DIVAN K.D. SOWELL — 10/1/2018 1:38:22 PM EDT

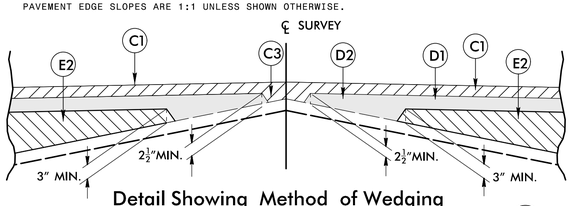
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

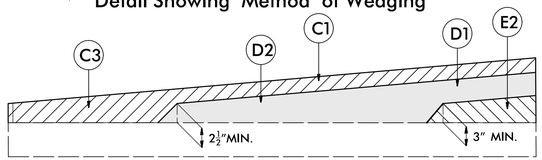
PAVEMENT SCHEDULE

C1	PROP. APPROX. 1 ½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1 1/2" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
L	CLASS IV SUBGRADE STABILIZATION
N1	GEOTEXTILE FOR SOIL STABILIZATION
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	SHOULDER BERM GUTTER
R3	EXPRESSWAY GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V	MILLING EXISTING PAVEMENT, SEE SHEET 2A-2 FOR DETAIL
W	WEDGING EXISTING PAVEMENT, SEE THIS SHEET FOR DETAILS

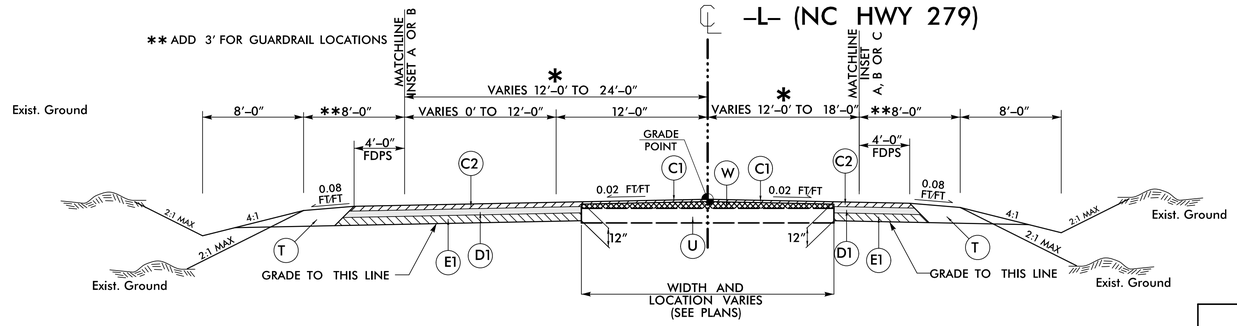
PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



Detail Showing Method of Wedging



Wedging Detail For Resurfacing



TYPICAL SECTION NO. 1

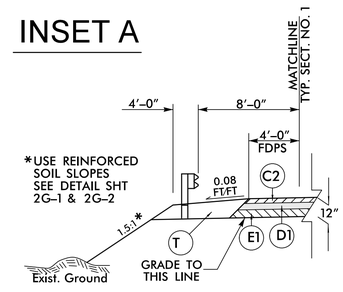
USE TYPICAL SECTION NO. 1

*	STA. TO STA.
EXIST. TO 12'-0"	-L- STA. 24+50.00 TO -L- STA. 25+00.00 RT -L- STA. 24+50.00 TO -L- STA. 25+22.46 LT -L- STA. 83+82.46 TO -L- STA. 85+35.00 LT -L- STA. 84+75.00 TO -L- STA. 85+35.00 RT -L- STA. 310+87.00 TO -L- STA. 312+07.43 RT -L- STA. 310+87.00 TO -L- STA. 311+95.23 LT
12'-0"	-L- STA. 25+00.00 TO -L- STA. 84+75.00 RT -L- STA. 312+07.43 TO -L- STA. 337+00.00 RT -L- STA. 311+95.23 TO -L- STA. 313+50.00 LT
12'-0" TO 24'-0"	-L- STA. 25+22.46 TO -L- STA. 32+42.46 LT -L- STA. 80+22.46 TO -L- STA. 83+82.46 LT -L- STA. 313+50.00 TO -L- STA. 320+70.00 LT
12'-0" TO 18'-0"	-L- STA. 337+00.00 TO -L- STA. 340+60.00 RT
24'-0" TO 18'-0"	-L- STA. 337+00.00 TO -L- STA. 340+60.00 LT
24'-0"	-L- STA. 32+42.46 TO -L- STA. 80+22.46 LT -L- STA. 320+70.00 TO -L- STA. 337+00.00 LT

USE TYPICAL SECTION NO. 1 (MIRRORED)

*	STA. TO STA.
EXIST. TO 12'-0"	-L- STA. 364+50.00 TO -L- STA. 366+90.00 LT
EXIST. TO 18'-0"	-L- STA. 437+50.00 TO -L- STA. 439+00.00
EXIST. TO 24'-0"	-L- STA. 364+50.00 TO -L- STA. 366+90.00 RT
12'-0"	-L- STA. 366+90.00 TO -L- STA. 432+33.79 LT
12'-0" TO 18'-0"	-L- STA. 432+33.79 TO -L- STA. 435+93.79 LT
24'-0" TO 18'-0"	-L- STA. 432+33.79 TO -L- STA. 435+93.79 RT
18'-0"	-L- STA. 435+93.79 TO -L- STA. 437+50.00
24'-0"	-L- STA. 366+90.00 TO -L- STA. 432+33.79 RT

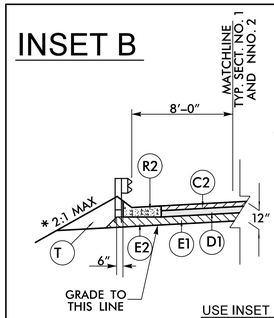
INSET A



USE INSET A

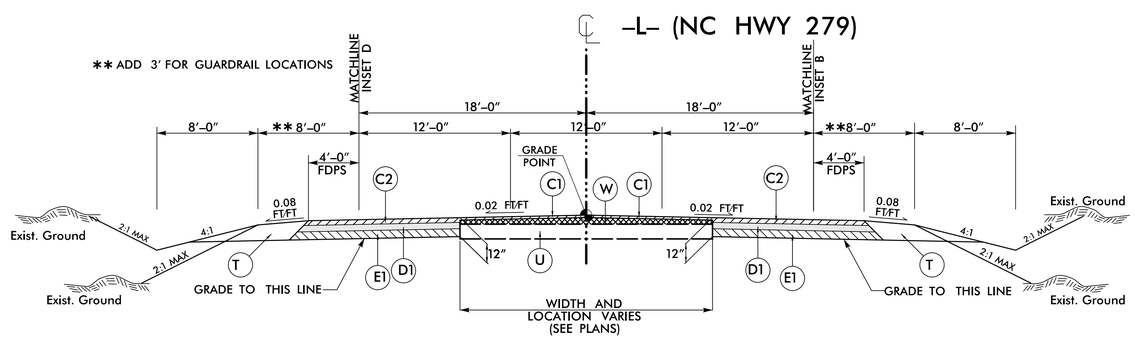
-L- STA. 372+00.00 TO -L- STA. 373+50.00 RT

INSET B



USE INSET B

-L- STA. 41+20.00 TO -L- STA. 45+75.00 LT
-L- STA. 52+25.00 TO -L- STA. 54+25.00 LT
-L- STA. 197+50.00 TO -L- STA. 202+75.00 RT
-L- STA. 218+75.00 TO -L- STA. 221+75.00 RT
-L- STA. 321+25.00 TO -L- STA. 323+82.95 RT
-L- STA. 323+02.95 TO -L- STA. 336+25.00 LT
-L- STA. 370+25.00 TO -L- STA. 374+75.00 LT
-L- STA. 417+25.00 TO -L- STA. 421+25.00 LT



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

-L- STA. 165+38.15 TO -L- STA. 223+30.00 RT
-L- STA. 165+20.00 TO -L- STA. 223+12.45 LT

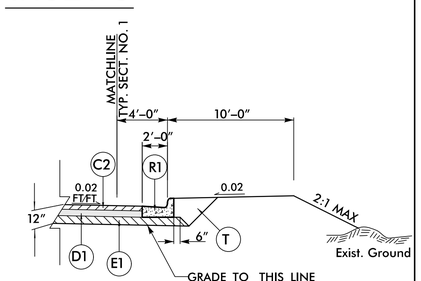
-L- STA. 340+60.00 TO -L- STA. 347+45.00 RT
-L- STA. 340+60.00 TO -L- STA. 348+17.40 LT

NOTE: TRANSITION BETWEEN EXISTING AND TYP. SECT. NO. 2 AS FOLLOWS:

-L- STA. 164+00.00 TO -L- STA. 165+38.15 RT
-L- STA. 164+00.00 TO -L- STA. 165+20.00 LT
-L- STA. 223+30.00 TO -L- STA. 224+50.00 RT
-L- STA. 223+12.45 TO -L- STA. 224+50.00 LT

-L- STA. 347+45.00 TO -L- STA. 349+45.00 RT
-L- STA. 348+17.40 TO -L- STA. 349+45.00 LT

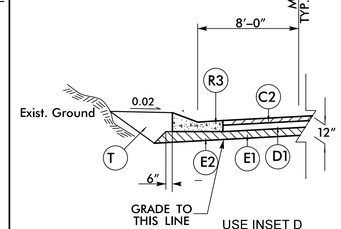
INSET C



USE INSET C

-Y16- STA. 10+47.63 LT TO -L- STA 420+77.97 RT
-L- STA. 420+77.97 TO -L- STA. 438+24.55 RT

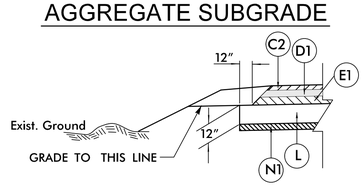
INSET D



USE INSET D

-L- STA. 189+50.00 TO -L- STA. 195+00.00 LT

AGGREGATE SUBGRADE



-L- STA. 25+75.00 TO -L- STA. 128+25.00
-L- STA. 164+25.00 TO -L- STA. 167+75.00
-L- STA. 180+25.00 TO -L- STA. 182+25.00
-L- STA. 342+75.00 TO -L- STA. 343+75.00
-L- STA. 344+75.00 TO -L- STA. 347+25.00
-L- STA. 388+25.00 TO -L- STA. 390+25.00

10/1/2018
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(Section1.vb)

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6/2/99

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	2A-2

ROADWAY DESIGN ENGINEER

DocuSigned by: JIMMY L. TERRY
9/18/2018 | 10:16 AM PDT

PAVEMENT DESIGN ENGINEER

DocuSigned by: BRYAN K.D. SOWELL
9/18/2018 | 1:13:37 PM EDT

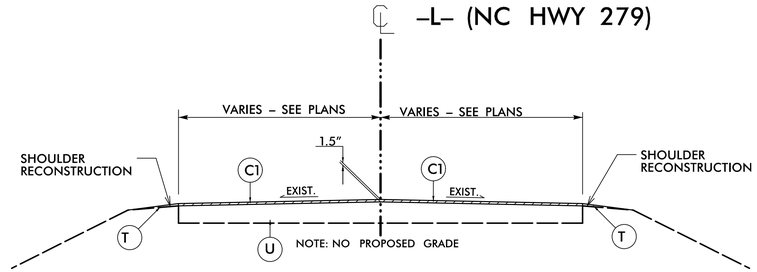
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PAVEMENT SCHEDULE

C1	PROP. APPROX. 1 ½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V	MILLING EXISTING PAVEMENT, SEE THIS SHEET FOR DETAIL
W	WEDGING EXISTING PAVEMENT, SEE SHEET 2A-1 FOR DETAILS

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

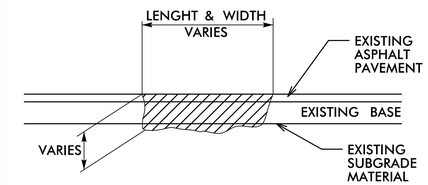


TYPICAL SECTION NO. 3

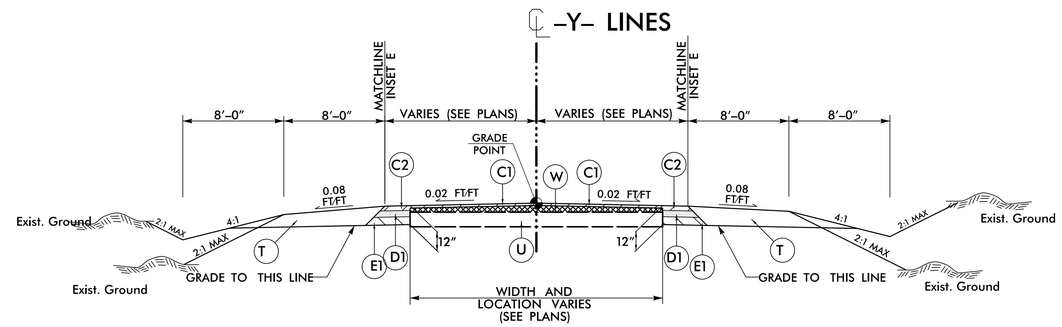
USE TYPICAL SECTION NO. 3

-L- STA. 85+35.00 TO -L- STA. 164+00.00
-L- STA. 224+50.00 TO -L- STA. 310+87.00
-L- STA. 349+45.00 TO -L- STA. 364+50.00

PATCH EXISTING PAVEMENT DETAIL



MILL EXISTING ASPHALT PAVEMENT AND REMOVE EXISTING LOOSE BASE AND/OR SUBGRADE MATERIAL AND REPLACE WITH ACIC TYPE I19.0X AND ASCE TYPE S9.5X AS DIRECTED BY THE ENGINEER



TYPICAL SECTION NO. 4

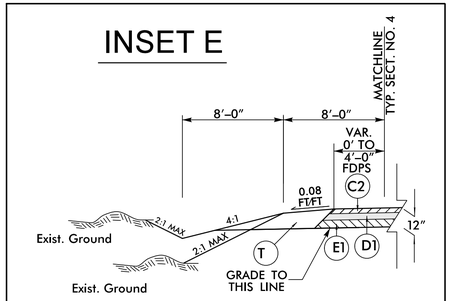
USE TYPICAL SECTION NO. 4

-Y- STA. 10+89.51 TO -Y- STA. 11+21.08
-Y1- STA. 12+50.00 TO -Y1- STA. 12+81.75
-Y3- STA. 10+17.01 TO -Y3- STA. 10+42.00
-Y4- STA. 10+73.66 TO -Y4- STA. 11+10.64
-Y5- STA. 10+18.00 TO -Y5- STA. 10+60.17

-Y6- STA. 10+33.95 TO -Y6- STA. 10+67.18
-Y10- STA. 10+26.19 TO -Y10- STA. 10+62.34
-Y10- STA. 10+86.84 TO -Y10- STA. 11+13.64
-Y11- STA. 10+84.96 TO -Y11- STA. 11+20.09
-Y12- STA. 10+22.45 TO -Y12- STA. 10+37.35

-Y13- STA. 10+96.80 TO -Y13- STA. 11+25.14
-Y14- STA. 10+27.28 TO -Y14- STA. 10+61.86
-Y15- STA. 10+24.07 TO -Y15- STA. 10+63.76
-Y16- STA. 10+24.83 TO -Y16- STA. 10+60.76
-Y17- STA. 10+24.00 TO -Y17- STA. 10+39.93

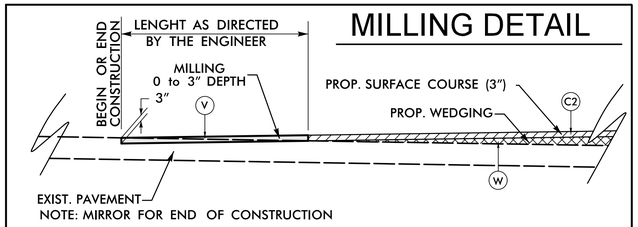
INSET E



USE INSET E

-Y3- STA. 10+17.01 TO -Y3- STA. 10+42.00
-Y11- STA. 10+84.96 TO -Y11- STA. 11+20.09

MILLING DETAIL



9/18/2018
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jsersame|vp

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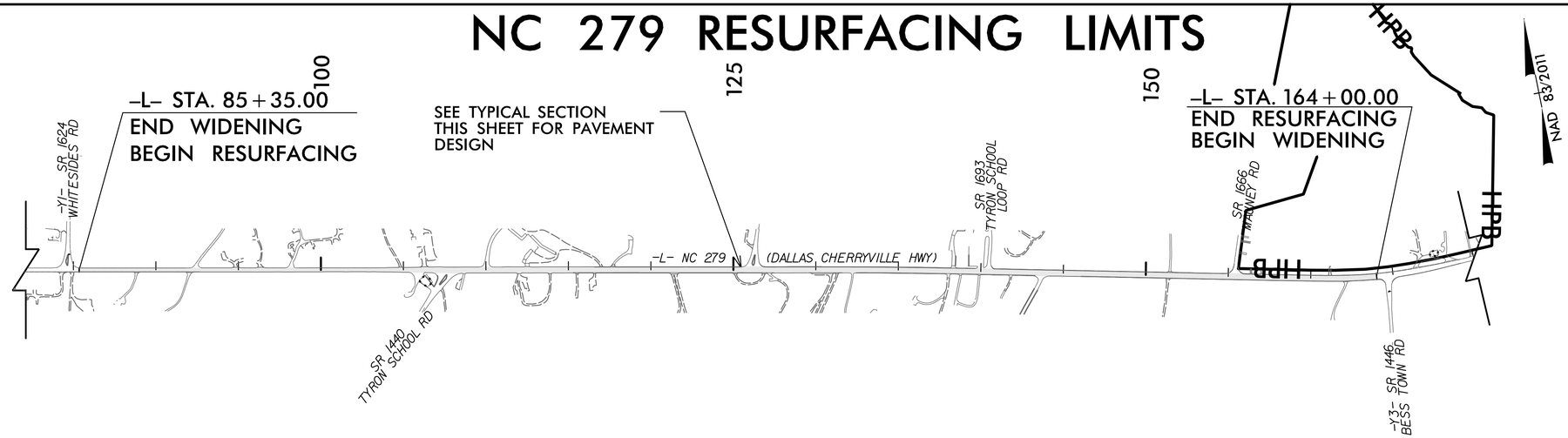
NC 279 RESURFACING LIMITS

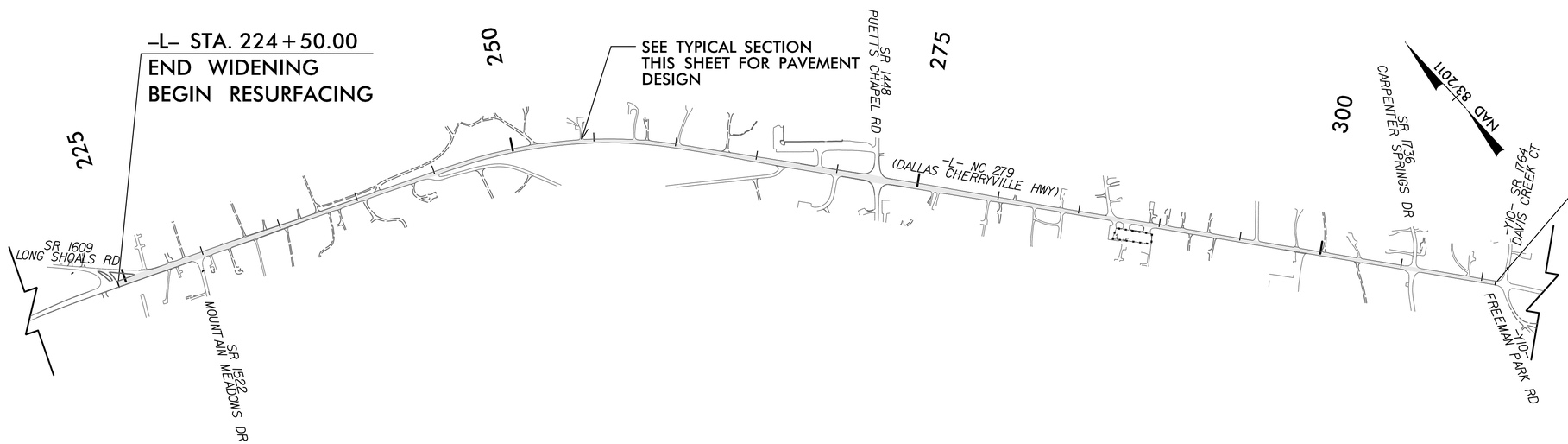
PROJECT REFERENCE NO.	SHEET NO.
W-5212N	2B-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY
9/13/2018 7:23:44 AM PDT

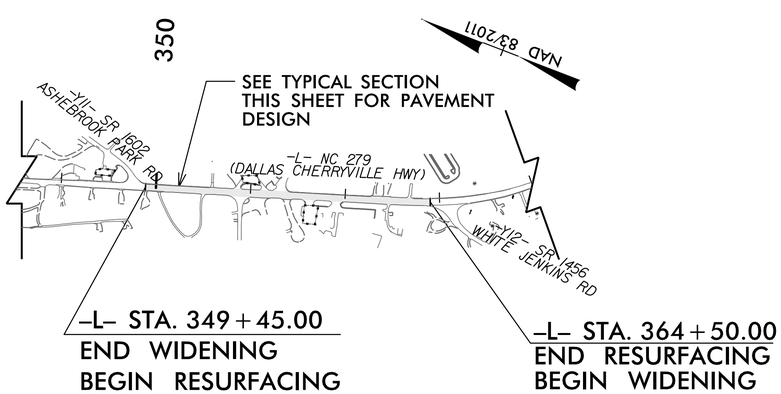
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

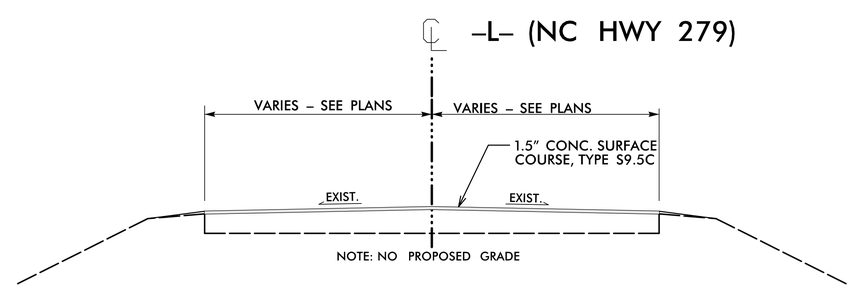
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275





NOTE:
ALL SIDE STREETS AND DRIVEWAYS SHALL BE RESURFACED TO PROVIDE TIE-IN AS DIRECTED BY THE ENGINEER.





REVISIONS

8/17/99

9/12/2018
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jlerstine\vin

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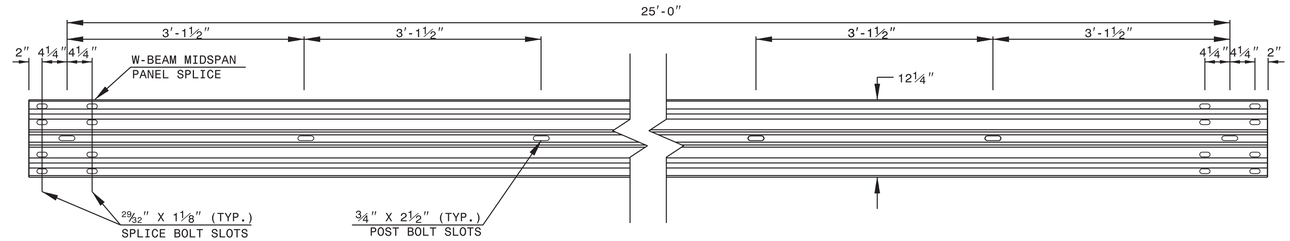
PROJECT REFERENCE NO.	SHEET NO.
W-5212N	2C-1

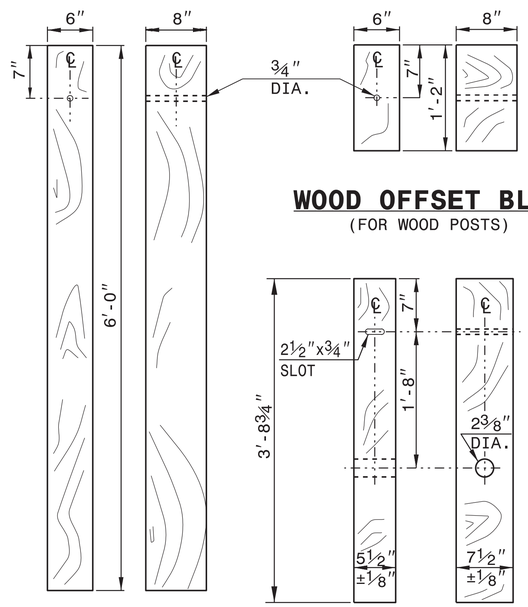
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION



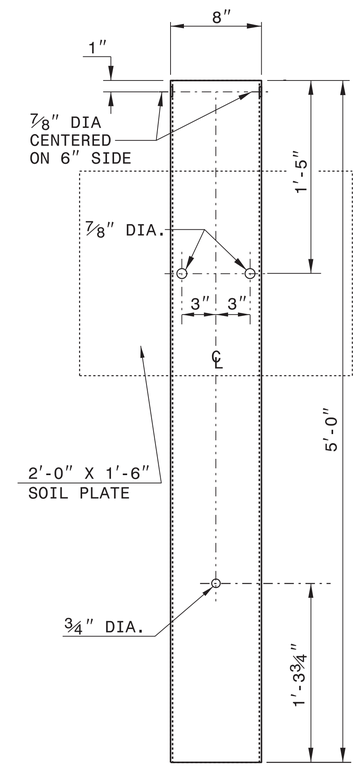
STANDARD W-BEAM GUARDRAIL



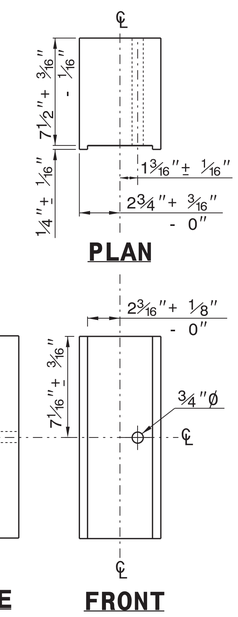
STANDARD LINE POST

WOOD OFFSET BLOCK
(FOR WOOD POSTS)

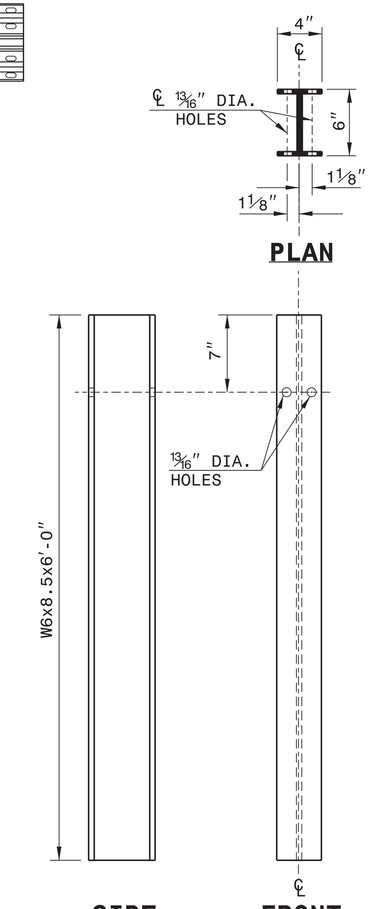
SHORT WOOD BREAKAWAY POST



STEEL TUBE
TS 6"x8"x0.1875"



ROUTED OFFSET BLOCK



"W6" STEEL POST

SYSTEM PARTS

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

SHEET 6 OF 8
862D02

9/13/2018 11:02:18 AM EDT

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

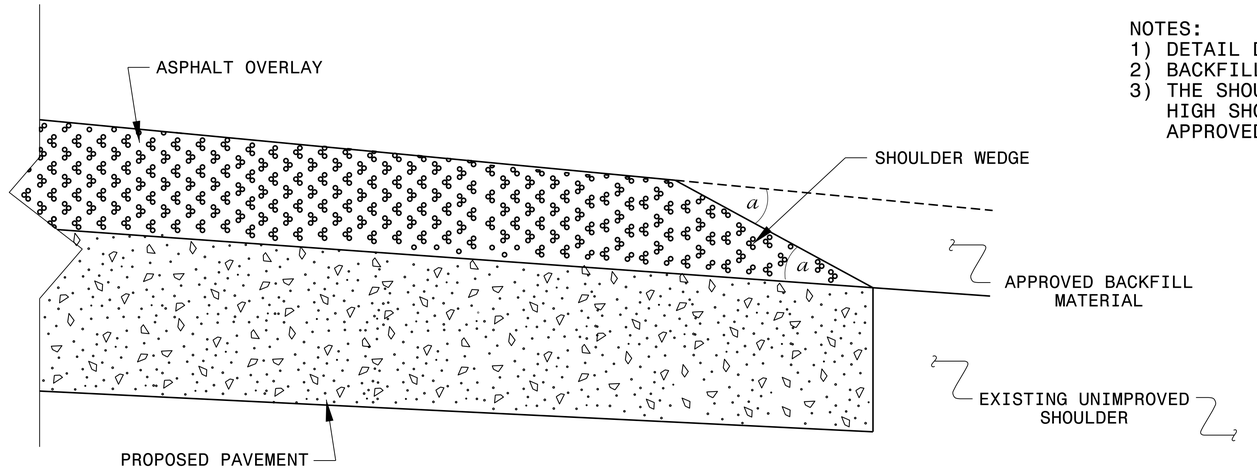
SEE TITLE BLOCK

ORIGINAL BY: J.HOWERTON DATE: 3-7-2018
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

DocuSign Envelope ID: 6FCC88E1-8193-4A12-A9E6-F82194B913A7

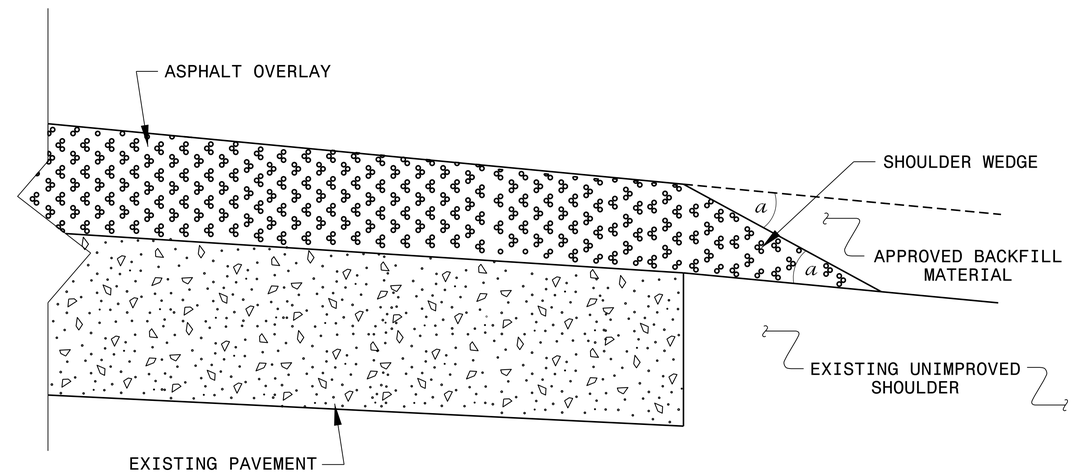
PROJECT REFERENCE NO.	SHEET NO.
W-5212N	2C-2

NOTES:
1) DETAIL DOES NOT APPLY TO OGAFC AND ULTRA-THIN BONDED WEARING COURSE.
2) BACKFILL SHOULDER WITH APPROVED MATERIAL.
3) THE SHOULDER WEDGE DEVICE MAY BE DISENGAGED AT PAVED DRIVEWAYS, SIDE STREETS, HIGH SHOULDERS, AND OTHER LOCATIONS NOT FEASIBLE TO CONSTRUCT AS APPROVED BY THE ENGINEER.



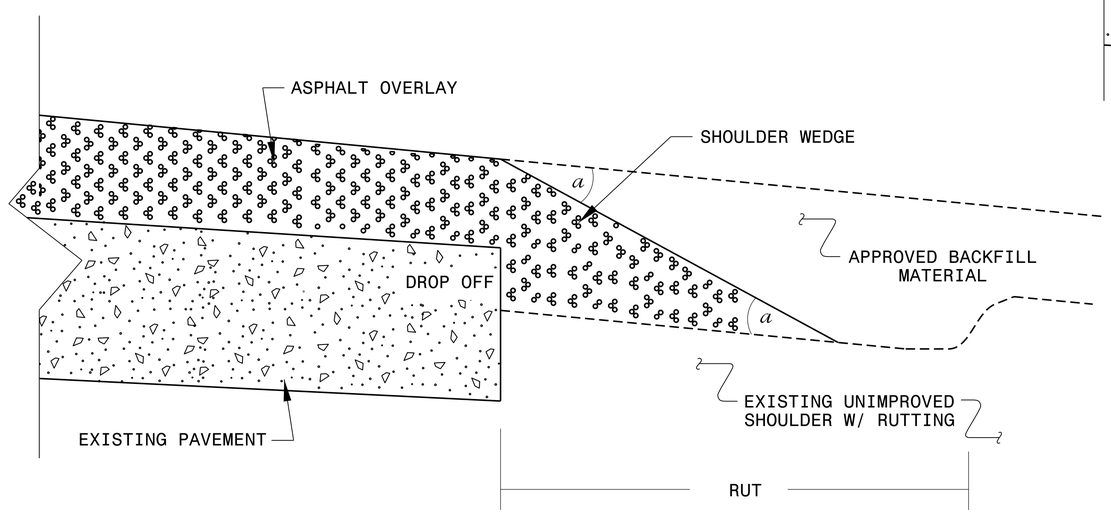
SHOULDER WEDGE DETAIL

(Resurfacing Projects w/ Widening or with Existing Paved Shoulder having no dropoffs)



SHOULDER WEDGE DETAIL

(Resurfacing Projects w/ NO Widening)



SHOULDER WEDGE DETAIL

(Resurfacing Adjacent to Rutted Shoulder)

- SHOULDER WEDGE ANGLE = 30°

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Jerel S. Howerton
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CONTRACT STANDARDS AND DEVELOPMENT UNIT
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SHOULDER WEDGE DETAILS

ORIGINAL BY:	T.SPELL	DATE:	7-19-11
MODIFIED BY:		DATE:	2/2/16
CHECKED BY:		DATE:	
FILE SPEC.:	s:usr/details/stand/shoulderwedgedetail.dgn		

12-SEP-2018 10:10
S:\Contracts\Resurfacing Projects\Shoulder Wedge Details\Revised Shoulder Wedge Detail.dgn
jhowerton AT CSD-292595

DocuSign Envelope ID: 6FCC88E1-8193-4A12-A9E6-F82194B913A7

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	2C-3

STATE OF
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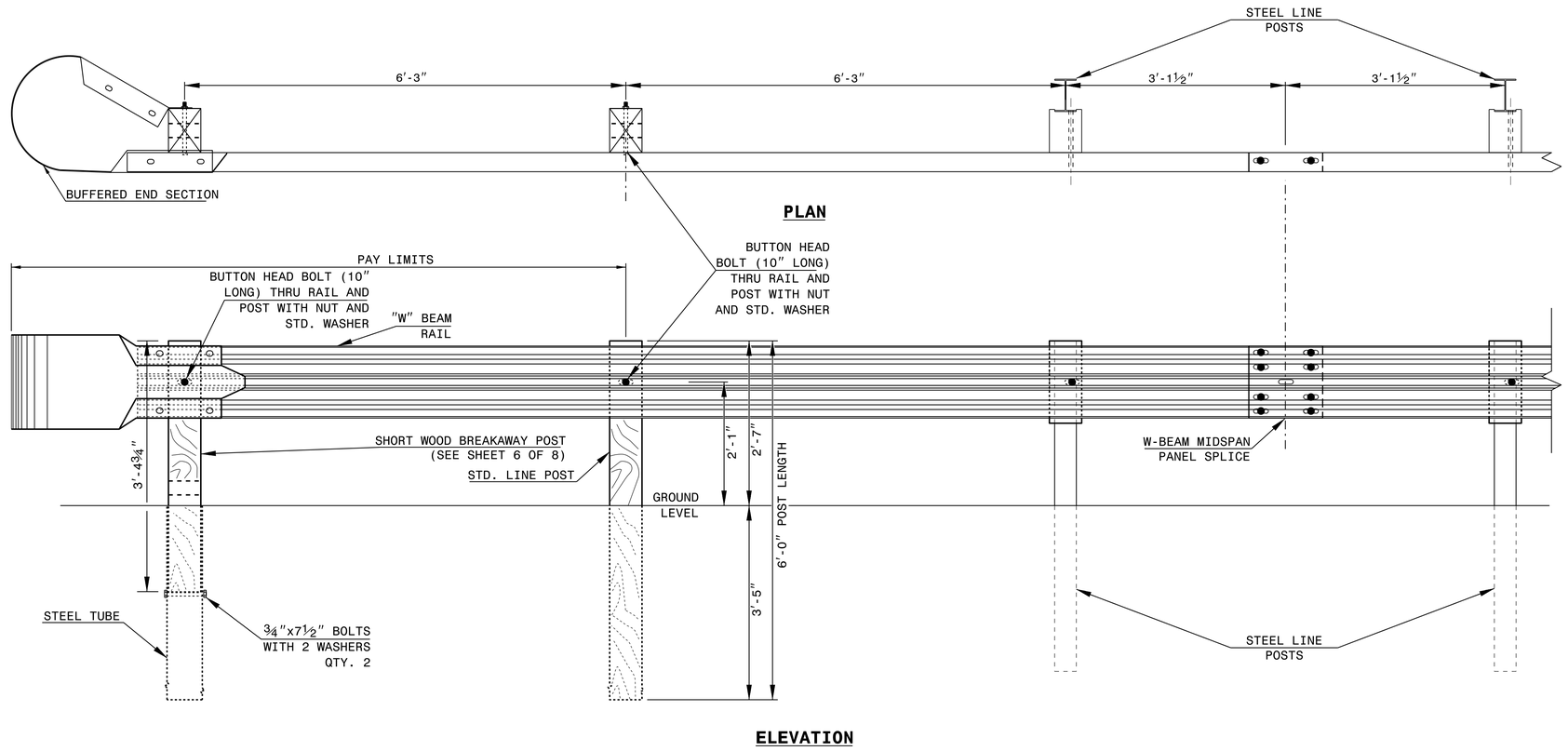
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET OF



TRAILING END UNIT ASSEMBLY

A.T.-1 SYSTEM

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET OF

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOHN S. HOWERTON

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A.T.-1 SYSTEM

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CHECKED BY: _____ DATE: _____
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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	2D-1
R/W SHEET NO.	

HYDRAULICS ENGINEER

SEAL 044158 ENGINEER BENJAMIN J. HENGEHOLD

9/13/2018 7:39:33 AM PDT

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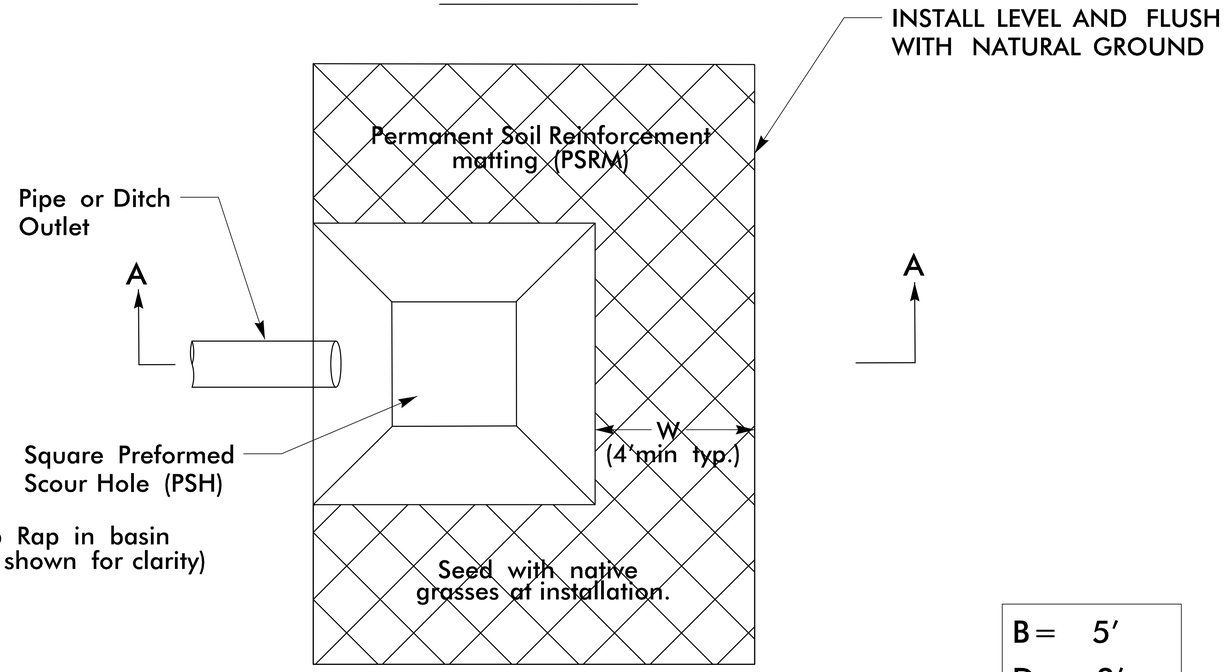
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PREFORMED SCOUR HOLE

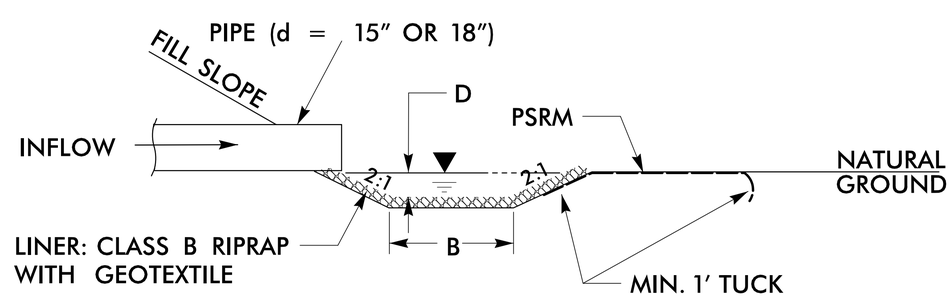
*NOT TO SCALE

PLAN VIEW



B =	5'
D =	2'
W =	4'

SECTION A–A



3/08

SEE PLAN VIEW FOR PREFORMED SCOUR HOLE LOCATIONS

REVISIONS

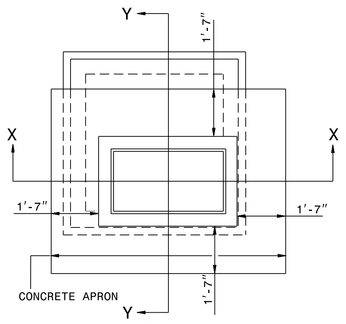
8/17/99

9/12/2018
X:\WCDOT\W-5212N\Roadway\Proj\W5212N_Rdy_Detail 2D-1 (Preformed Scour Hole).dgn
User:jmelvin

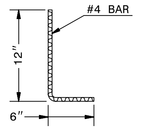
DocuSign Envelope ID: 6FCC88E1-8193-4412-A8E6-F82194891347

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

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE



PLAN



DOWEL-A

GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL GRATED DROP INLETS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

CONSTRUCT WITH PIPE CROWNS MATCHING.

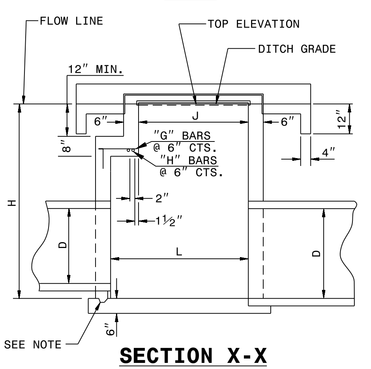
USE STANDARD FRAMES AND GRATES 840.22 (SHOWN), 840.24(SHOWN), 840.20 (NOT SHOWN) OR 840.29 (NOT SHOWN).

SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES.

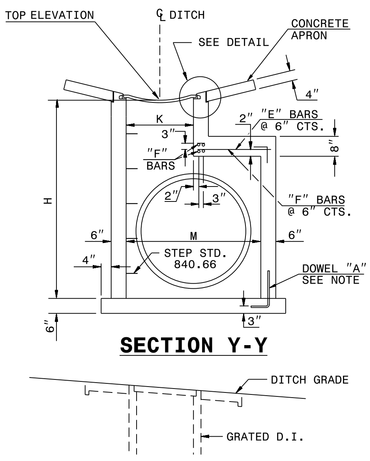
CHAMFER ALL EXPOSED CORNERS 1".

DRAWING NOT TO SCALE.

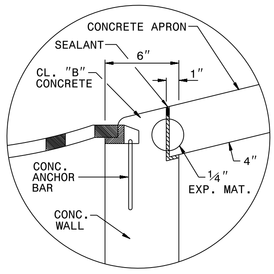
MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12 FEET.



SECTION X-X



SECTION Y-Y



DETAIL

(APRON SUPPORT NOTCH)

SHEET 1 OF 2
840d17

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

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE

SHEET 1 OF 2
840d17

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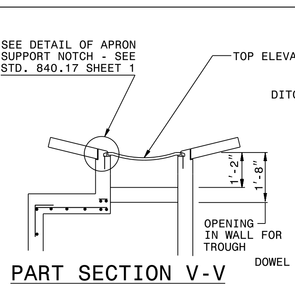
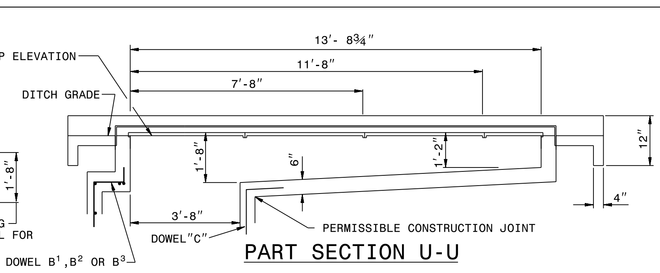
DIVISION OF HIGHWAYS
RALEIGH, N.C.

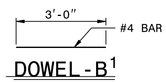
ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE



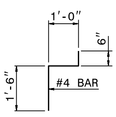
PART SECTION V-V



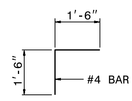
PART SECTION U-U



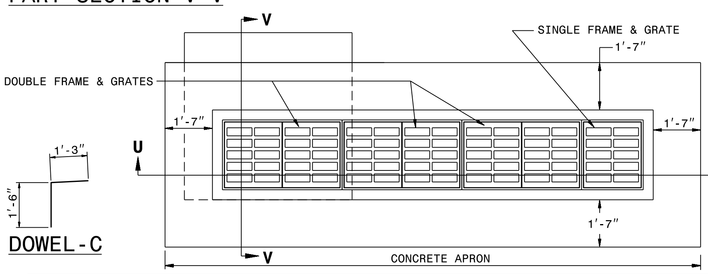
DOWEL-B¹
FOR 15" THRU 36" INLET



DOWEL-B²
FOR 42" INLET



DOWEL-B³



DOWEL-C

QUANTITY TO BE ADDED FOR EACH 2' INCREMENT INLET OPENING						
ADDITIONAL INLETS	2'-0"	4'-0"	6'-0"	8'-0"	10'-0"	12'-0"
CONCRETE CU. YDS.	0.191	0.417	0.665	0.897	1.145	1.380
CONCRETE APRON CU. YDS.	0.074	0.148	0.222	0.296	0.370	0.444

MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE GRATED DROP INLET(BASED ON MIN. HEIGHT, H)

DIMENSIONS OF BOX AND PIPE						REINFORCING STEEL - NO. 4 BARS									CU YDS CONC. IN BOX					DEDUCTIONS FOR ONE PIPE	
PIPE	SPAN	WIDTH	SPAN	WIDTH	HEIGHT	BARS E		BARS F		BARS G		BARS H		TOTAL	BOTTOM SLAB	H TOTAL	H PER FT HT	APRON	TOTAL		
D	J	K	L	M	H	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	LBS.						C.S.	R.C.
12"	3'-8"	2'-0"	3'-8"	2'-0"	2'-3"	—	—	—	—	—	—	—	—	—	0.362	0.926	0.247	0.395	1.683	0.015	0.024
15"	3'-8"	2'-0"	3'-8"	2'-0"	2'-5"	—	—	—	—	—	—	—	—	—	0.362	0.988	0.247	0.395	1.745	0.023	0.036
18"				2'-0"	2'-8"	—	—	—	—	—	—	—	—	—	0.362	1.050	0.247		1.807	0.033	0.049
24"				2'-10"	3'-3"	8	1'-5"	6	4'-9"	—	—	—	—	27	0.444	1.362	0.278		2.201	0.059	0.085
30"			3'-8"	3'-5"	3'-10"	8	2'-0"	7	4'-9"	—	—	—	—	33	0.502	1.644	0.288		2.541	0.092	0.127
36"			4'-0"	4'-0"	4'-4"	8	2'-5"	8	4'-11"	4	0'-9"	2	4'-11"	47	0.560	1.931	0.321		2.920	0.132	0.178
42"			4'-10"	4'-10"	5'-0"	10	3'-1"	9	5'-7"		1'-5"	3	5'-7"	67	0.704	2.500	0.370		3.677	0.180	0.243
48"			5'-4"	5'-4"	5'-6"	11	3'-7"	10	6'-1"		1'-11"	4	6'-1"	87	0.823	3.013	0.407		4.315	0.235	0.317
54"			6'-0"	6'-0"	6'-0"	12	4'-1"	11	6'-7"		2'-5"	5	6'-7"	107	0.951	3.589	0.444		5.072	0.297	0.401
60"			6'-6"	6'-6"	6'-7"	13	4'-9"	12	7'-3"		3'-1"	6	7'-3"	135	1.311	4.539	0.494		6.170	0.367	0.495
66"			7'-2"	7'-2"	7'-1"	14	5'-4"	14	7'-10"		3'-7"	7	7'-10"	168	1.136	5.061	0.537		6.901	0.444	0.599
72"	3'-8"	2'-0"	7'-8"	7'-8"	7'-8"	15	5'-11"	15	8'-5"	4	4'-3"	8	8'-5"	199	1.500	5.860	0.580	0.395	7.868	0.528	0.713

SHEET 2 OF 2
840d17

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

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE

SHEET 2 OF 2
840d17

SEE TITLE BLOCK

ORIGINAL BY: J. Howerton DATE: 1/22/14
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: jhowerton\minimum depth type A.dgn

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Office 919-707-6850 FAX 919-250-4119

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PROFESSIONAL ENGINEER SEAL 022966 JAMES E. HOWERTON
Digitally signed by James E. Howerton
9/13/2018 11:02:18 AM EDT

PROJECT REFERENCE NO. W-5212N
SHEET NO. 2D-2

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	2G-1

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER MATTHEW BREWER

DocuSigned by: D. Matthew Brewer 0EAF318632CF43A... 9/13/18

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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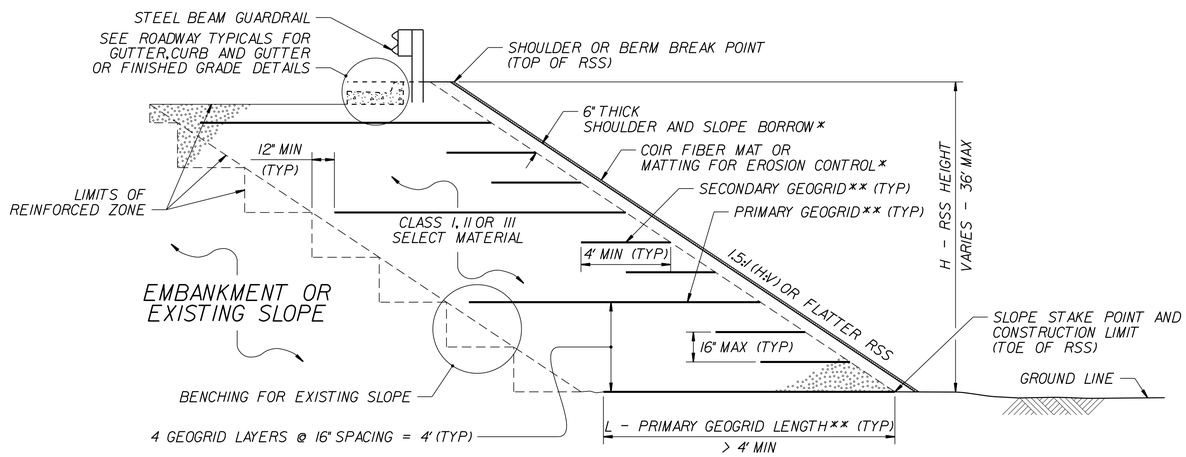
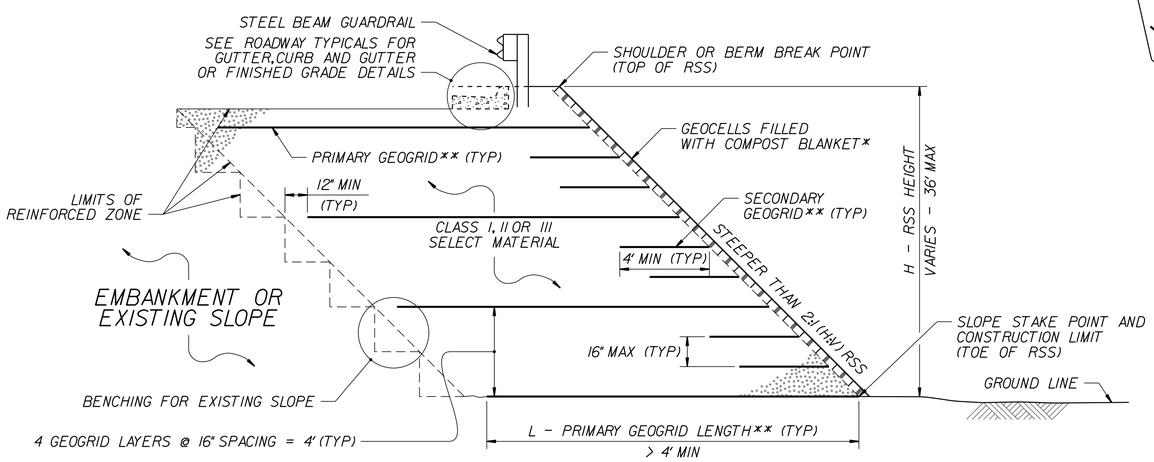


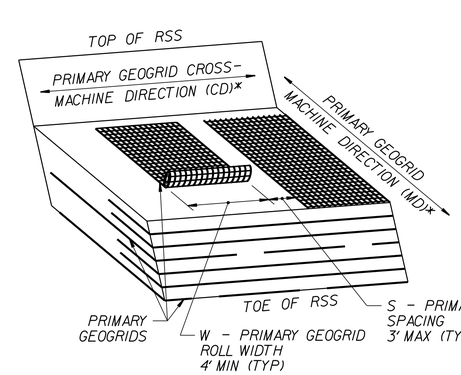
MATTING WITH SHOULDER AND SLOPE BORROW

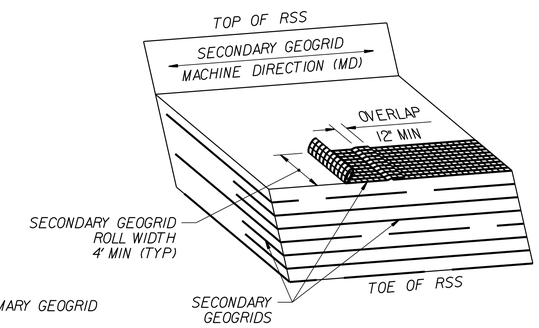
*SEE NOTES 3 AND 11 ON SHEET 2.



GEOCELLS WITH COMPOST BLANKET

*SEE NOTES 3 AND 11 ON SHEET 2.





GEOGRID PLACEMENT DETAILS

(% COVERAGE = $\frac{W}{W+S}$ x 100 $\geq$ 75%)

*SEE NOTES 8 AND 9 ON SHEET 2.

STANDARD REINFORCED SOIL SLOPE (RSS)

**SEE TABLES ON SHEET 2 AND GEOGRID PLACEMENT DETAILS.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1803.01

STANDARD REINFORCED SOIL SLOPE (RSS) WITH HIGH GROUNDWATER
SHEET 1 OF 2

DATE: 4-19-16

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	2G-2

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER MATTHEW BREWER

DocuSigned by: D. Matthew Brewer DEAF318632CF43A... 9/13/18

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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GEOGRID TYPE,DIRECTION	H (FT)	0 - < 12		12 - 24		> 24 - 36	
	SELECT MATERIAL CLASS	I	II OR III	I	II OR III	I	II OR III
PRIMARY GEOGRID,MD (SUBSTITUTE SECONDARY GEOGRID FOR PRIMARY GEOGRID FOR 2:1 (H:V) OR FLATTER RSS)	1:1 TO < 1.5:1 (H:V) RSS	900	500	1200	900	1800	1200
	1.5:1 TO 1.75:1 (H:V) RSS	500	500	900	500	1400	1000
	> 1.75:1 TO < 2:1 (H:V) RSS	500	500	600	500	1000	800
SECONDARY GEOGRID,CD	1:1 (H:V) OR FLATTER RSS	185					

LTDS – MINIMUM REQUIRED LONG-TERM DESIGN STRENGTH (LB/FT)

(LTDS IS BASED ON 100% COVERAGE FOR PRIMARY GEOGRID. SEE NOTE 9 FOR LESS THAN 100% COVERAGE.)

NOTES:

1. SEE EROSION CONTROL AND ROADWAY PLANS AND SUMMARY SHEETS FOR REINFORCED SOIL SLOPE (RSS) AND SLOPE EROSION CONTROL LOCATIONS.

2. FOR STANDARD REINFORCED SOIL SLOPES,SEE REINFORCED SOIL SLOPES PROVISION. FOR STEEL BEAM GUARDRAIL,SEE SECTION 862 OF THE STANDARD SPECIFICATIONS.

3. FOR SHOULDER AND SLOPE BORROW,SEE ARTICLE 1019-2 OF THE STANDARD SPECIFICATIONS. FOR GEOCELLS,SEE CELLULAR CONFINEMENT SYSTEMS PROVISION. FOR COIR FIBER MAT,MATTING FOR EROSION CONTROL AND COMPOST BLANKET,SEE EROSION CONTROL PROVISIONS,SECTION 1631 OF THE STANDARD SPECIFICATIONS AND ROADWAY STANDARD DRAWING NO.1633.01.

4. STANDARD RSS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT,γ = 120 LB/CF
   FRICTION ANGLE,ϕ = 30 DEGREES
   COHESION,c = 0 LB/SF

5. DO NOT USE STANDARD RSS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE TOE OF RSS.

6. DO NOT USE STANDARD RSS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW RSS.

7. GEOGRIDS ARE TYPICALLY APPROVED FOR ULTIMATE TENSILE STRENGTHS IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) OR LONG-TERM DESIGN STRENGTHS FOR A 75-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM:
   connect.ncdot.gov/resources/Materials/Pages/SoilsLaboratory.aspx
   DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SELECT MATERIAL AS FOLLOWS:

MATERIAL TYPE	SELECT MATERIAL
BORROW	CLASS I SELECT MATERIAL
FINE AGGREGATE	CLASS II OR III SELECT MATERIAL

   IF THE WEBSITE DOES NOT LIST A LONG-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID IN THE MD,DO NOT USE THE GEOGRID FOR PRIMARY GEOGRID. IF THE WEBSITE DOES NOT LIST A LONG-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID IN THE CD,USE A LONG-TERM DESIGN STRENGTH EQUAL TO THE ULTIMATE TENSILE STRENGTH DIVIDED BY 7 FOR THE SECONDARY GEOGRID.

8. DO NOT OVERLAP PRIMARY GEOGRIDS IN THE MD SO OVERLAPS ARE PARALLEL TO THE TOE OF RSS. POLYOLEFIN (e.g.,HDPE OR PP) GEOGRIDS MAY BE SPLICED ONCE PER PRIMARY GEOGRID LENGTH IN ACCORDANCE WITH THE GEOGRID MANUFACTURER'S INSTRUCTIONS. USE POLYOLEFIN GEOGRID PIECES AT LEAST 4' LONG. DO NOT SPLICE POLYESTER TYPE (PET) GEOGRIDS.

9. FOR PRIMARY GEOGRIDS WITH 100% COVERAGE,PLACE PRIMARY GEOGRIDS SO GEOGRIDS ARE ADJACENT TO EACH OTHER IN THE CD. FOR PRIMARY GEOGRIDS WITH 75% TO LESS THAN 100% COVERAGE,

   MINIMUM REQUIRED LONG-TERM DESIGN STRENGTH = LTDS BASED ON 100% COVERAGE x (W + S) / W

   SEE TABLE FOR LTDS BASED ON 100% COVERAGE AND GEOGRID PLACEMENT DETAILS FOR PRIMARY GEOGRID ROLL WIDTH (W) AND SPACING (S). FOR PRIMARY GEOGRIDS WITH LESS THAN 100% COVERAGE,STAGGER PRIMARY GEOGRIDS SO GEOGRIDS ARE CENTERED OVER GAPS IN THE PRIMARY GEOGRID LAYER BELOW. DO NOT USE LESS THAN 75% COVERAGE FOR PRIMARY GEOGRIDS.

10. DO NOT PLACE ANY GEOGRIDS UNTIL EXCAVATION DIMENSIONS AND IN-SITU MATERIAL ARE APPROVED.

11. FOR SLOPE EROSION CONTROL,USE GEOCELLS OR MATTING ON SLOPE FACES OF RSS AS FOLLOWS:

RSS ANGLE	SLOPE EROSION CONTROL
1:1 TO < 1.5:1 (H:V)	GEOCELLS WITH COMPOST BLANKET
1.5:1 TO < 2:1 (H:V)	GEOCELLS WITH COMPOST BLANKET OR COIR FIBER MAT WITH SHOULDER AND SLOPE BORROW*
2:1 (H:V) OR FLATTER	MATTING FOR EROSION CONTROL WITH SHOULDER AND SLOPE BORROW

*SEE REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL SUMMARY TABLE IN THE ROADWAY SUMMARY SHEETS FOR SLOPE EROSION CONTROL ON SLOPE FACES OF RSS 1.5:1 (H:V) TO STEEPER THAN 2:1.

H (FT)	0 - < 12		12 - 24		> 24 - 36	
SELECT MATERIAL CLASS	I	II OR III	I	II OR III	I	II OR III
1:1 TO < 1.5:1 (H:V) RSS	1.25	1.20	1.15	1.10	1.10	1.00
1.5:1 TO 1.75:1 (H:V) RSS	1.10	1.00	0.95	0.90	0.90	0.85
> 1.75:1 TO < 2:1 (H:V) RSS	1.00	0.85	0.80	0.75	0.75	0.70

L /H RATIO (L > 4' MIN)

(IF L ≤ 4', USE SECONDARY GEOGRID INSTEAD OF PRIMARY GEOGRID.)

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1803.01

STANDARD REINFORCED SOIL SLOPE (RSS) WITH HIGH GROUNDWATER SHEET 2 OF 2

DATE: 4-19-16

COMPUTED BY: SGM	DATE: 5/1/2018
CHECKED BY: JLT	DATE: 5/2/2018

PROJECT NO.	SHEET NO.
W-5212N	3B-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
-L- 24+50.00	-L- 50+00.00	1,952	7,871	5,919	
-L-50+00.00	-L-85+35.00	3,703	3,276		427
SUBTOTAL SECTION 1:		5,655	11,147	5,919	427
-L-164+00.00	-L-180+00.00	1,170	934		236
-L-180+00.00	-L- 194+50.00	1,526	822		704
-L- 194+50.00	-L-224+50.00	2,331	10,379	8,048	
SUBTOTAL SECTION 2:		5,027	12,135	8,048	940
-L-310+87.00	-L-330+00.00	3,853	12,023	9,413	1,243
-L- 330+00.00	-L- 349+45.00	4,738	6,043	2,548	1,243
SUBTOTAL SECTION 3:		8,591	18,066	11,961	2,486
-L-364+50.00	-L-390+00.00	4,770	8,013	3,913	670
-L-390+00.00	-L- 420+00.00	2,096	4,670	2,618	44
-L- 420+00.00	-L-439+00.00	575	3,345	2,770	
SUBTOTAL SECTION 4:		7,441	16,028	9,301	714
TOTALS:		26,714	57,376	35,229	4,567
MATERIAL FOR SHOULDER CONST.			8,660	8,660	
LOSS DUE TO CLEARING & GRUBBING		-2,500		2,500	
WASTE IN LIEU OF BORROW				-1,367	-1,367
PROJECT TOTALS:		24,214	66,036	45,022	3,200
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT				2,251	
GRAND TOTALS:		24,214	66,036	47,273	3,200
SAY:		**25,000**		**48,700**	

PAVEMENT STRUCTURE VOLUME = 5,250 CY

EST. DDE = 3,515 CUBIC YARDS

EST. SHALLOW UNDERCUT: 2,800 CY

EST.SHALLOW UNDERCUT BY STATIONS: 940 CY

TOTAL SHALLOW UNDERCUT: 3,740 CY

CLASS IV SUBGRADE STABILIZATION: 7,400 TONS

PER GEOTECH RECOMMENDATION, ESTIMATED 5,250 CUBIC YARDS OF UNDERCUT TO BE USED IN THE DISCRETION OF THE RESIDENT ENGINEER.

UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT IN THE TOP 3 FT OF EMBANKMENT = 6230 CY (-L- 31+75 TO 33+75; -L- 71+75 TO 74+25; -L- 191+75 TO 196+25, RT; -L- 205+25 TO 215+25; -L- 316+75 TO 319+75; -L- 321+75 TO 324+75; -L- 381+75 TO 392+25; -L- 409+75 TO 412+25,RT)

Approximate quantities only. Unclassified excavation, borrow excavation, fine grading, clearing and grubbing, and removal of existing pavement will be paid for at the lump sum price for "Grading".

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

Survey Line	Station	Station	Location LT/RT/CL	Asphalt Removal	Asphalt Breakup	Concrete Removal	Concrete Breakup
-L-	24+50	3246	**RT**	78.62			
-L-	33+81	64+95	RT	341.32			
-L-	66+57	68+65	RT	20.09			
-L-	69+36	74+10	RT	68.12			
-L-	74+83	82+75	RT	54.82			
-L-	83+31	85+35	RT	36.6			
-L-	164+00	166+26	LT	21.07			
-L-	166+62	167+43	LT	7.71			
-L-	164+91	166+10	RT	9.63			
-L-	221+79	224+50	RT	47.31			
-L-	312+51	313+97	LT	6.48			
-L-	345+92	348+46	LT	62.85			
-L-	311+92	312+60	RT	4.96			
-L-	316+49	327+42	RT	77.68			
-L-	330+51	333+68	RT	7.63			
-L-	364+50	375+02	LT	408.31			
-L-	415+58	431+24	LT	102.43			
-L-	434+17	435+41	LT	21.61			
		TOTAL		1,377.24			
		SAY		**1,380**			

SHOULDER BERM GUTTER SUMMARY

IN FEET

LINE	STATION	STATION	LENGTH
-L-,LT	41+20	45+75	455.00
-L-,LT	52+25	54+25	200.00
-L-,RT	197+50	202+75	525.00
-L-,RT	218+75	221+75	300.00
-L-,RT	321+25	328+82.95	257.95
-L-,LT	323+02.95	326+25	1,322.05
-L-,LT	370+25	374+75	450.00
-L-,LT	417+25	421+25	400.00
		TOTAL	3,910.00
		SAY	**3,910**

CONCRETE EXPRESSWAY GUTTER SUMMARY

IN FEET

LINE	STATION	STATION	LENGTH
-L-,LT	189+50.00	195+00.00	550.00
		TOTAL	550.00
		SAY	**550**

"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

IN FEET

LINE	BEG. STA.	END STA.	LOC.	LENGTH STRAIGHT	LENGTH SHOP CURVED	LENGTH DOUBLE FACED	WARRANT POINT APPR. END	WARRANT POINT TRAIL. END	"N" DIST. FROM E.O.L.	TOTAL SHLDR WIDTH	FLAIR LENGTH APPR. END	FLAIR LENGTH TRAIL. END	W APPR. END	W TRAIL. END	ANCHORS	ANCHORS GREU (TL3)	ANCHORS AT-1	ANCHORS	ANCHORS	IMP. ATTEN. TYPE 350 EA	IMP. ATTEN. TYPE 350 G	IMP. ATTEN. TYPE 350 NG	REMOVE EXISTING GUARDRAIL	EXTRA LENGTH POSTS	REMARKS
-L-	26+00.00	32+00.00	RT	600.00			27+25.00		8'	11'	50'	50'	1'	1'		2									
-L-	38+75.00	45+37.50	RT	662.50			40+00.00		8'	11'	50'	50'	1'	1'		2								15	Use Extra Depth Posts -L- 41+50 to 43+00
-L-	40+68.75	46+25.00	LT	556.25				45+00.00	8'		50'	50'	1'	1'		2									Shoulder Berm Gutter
-L-	49+75.00	54+00.00	RT	425.00			51+00.00		8'	11'	50'	50'	1'	1'		2									
-L-	51+75.00	54+75.00	LT	300.00				53+50.00	8'		50'	50'	1'	1'		2									Shoulder Berm Gutter
-L-	62+75.00	67+75.00	RT	500.00			64+00.00		8'	11'	50'	50'	1'	1'		2									
-L-	80+50.00	83+75.00	RT	325.00			81+75.00		8'	11'	50'	50'	1'	1'		2									
-L-	179+50.00	185+00.00	RT	550.00			180+75.00		8'	11'	50'	50'	1'	1'		2									
-L-	197+00.00	203+25.00	RT	625.00			198+25.00		8'		50'	50'	1'	1'		2									Shoulder Berm Gutter
-L-	198+50.00	204+25.00	LT	575.00				203+00.00	8'	11'	50'	50'	1'	1'		2									
-L-	217+75.00	221+25.00	LT	350.00				220+00.00	8'	11'	50'	50'	1'	1'		2									
-L-	218+25.00	222+25.00	RT	400.00			219+50.00		8'		50'	50'	1'	1'		2									Shoulder Berm Gutter
-L-	320+25.00	336+75.00	LT	1,650.00				335+50.00	8'		50'	50'	1'	1'		2									Shoulder Berm Gutter
-L-	320+75.00	326+25.00	RT	550.00			322+00.00		8'	11'	50'	50'	1'	1'		2								15	Use Extra Depth Posts -L- 324+55 to 324+80
-L-	331+75.00	337+25.00	RT	550.00			333+00.00		8'	11'	50'	50'	1'	1'		2									
-L-	369+75.00	375+25.00	LT	550.00				374+00.00	8'		50'	50'	1'	1'		2									Shoulder Berm Gutter
-L-	370+75.00	378+75.00	RT	800.00			372+00.00		8'	11'	50'	50'	1'	1'		2									
-L-	399+00.00	400+50.00	RT	150.00			400+25.00		8'	11'	50'	50'	1'	1'		2									
-L-	410+50.00	412+00.00	LT	150.00				410+75.00	8'	11'	50'	50'	1'	1'		2									
-L-	416+75.00	421+75.00	LT	500.00				420+50.00	8'		50'	50'	1'	1'		2									Shoulder Berm Gutter
-L-	417+75.00	-Y16- 10+60.76	RT	200.00	37.5		419+00.00		8'	11'	50'		1'			1	1								
		SUB-TOTALS		10,968.75	37.5											41	1							30	
	LESS ANCHOR DEDUCTIONS																								
	GREU, TL-3	41@50.00 ft		2,050.00																					
	AT-1	1@6.25 ft			6.25																				
	ANCHOR TOTALS			2,050.00	6.25																				
		GRAND-TOTALS		**8,918.75**	**31.25**											**41**	**1**							**30**	
		SAY		**8,950**	**37.50**											**41**	**1**							**30**	

ADDITIONAL GUARDRAIL POSTS = 15 EA

DocuSign Envelope ID: 6FCC88E1-8193-4A12-A9E6-F82194B913A7

TGSBEN-LAPTOP

COMPUTED BY:	BAC	DATE:	3/2/18
CHECKED BY:	BJH	DATE:	3/2/18

PROJECT NO.	SHEET NO.
W-5212N	3D-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION	OFFSET	STRUCTURE NUMBER		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC)								DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE								R. C. PIPE CLASS III								R. C. PIPE CLASS IV									15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE)	QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)			C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03				CONCRETE TRANSITIONAL SECTION		OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	G.D.I. SPECIAL DESIGN, SEE DETAIL SHEET 2D-2	15" C.S. ELBOW	PREFORMED SCOUR HOLE (PER EACH)		FLOWABLE FILL	CONCRETE COLLARS CL. "B" STD. 840.72	CONCRETE AND BRICK PIPE PLUG STD. 840.71	PIPE REMOVAL	REMARKS
SIZE		FROM	TO					12	15	18	24	30	36	42	48						12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48							A	B		GRATE TYPE				D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05																									
THICKNESS OR GAUGE				FT.	FT.	FT.	%														.064	.064	.064	.064	.079	.079	.109	.109																					CY	0' THRU 5' EACH	5' THRU 10' LIN. FT.	10' AND ABOVE LIN. FT.		E	F	G																								CY	CY	CY	LIN. FT.	
L 30+01	39 LT	0401																																																																																	
		0401	0402		897.9	897.5																								12																																																								
L 30+01	28 LT	0402																																																																														0.4465			
L 31+00	38 LT	0403																																													36																																					
L 31+72	39 LT	0404																																																																																	
		0404	0501		890.6	887.0	0.4																						36																																																								
L 32+08	39 LT	0501		891.5																																												1															1							1											
		0501	0502		887.0	886.7																										24																																																						
L 32+21	22 LT	0502																																																																														0.6560			
L 33+11	40 LT	0503																																																																																	
		0503	0504		886.9	881.3																							68																																																										
L 33+81	40 LT	0504		884.1																																												1															1							1											
		0504	0505		881.3	877.7																							88																																																										
L 34+70	40 LT	0505		880.5																																												1															1							1											
		0505	0506		877.7	874.7																							72																																																										
L 35+44	40 LT	0506		877.8																																												1																							1	1				1								3GI Special Design
		0506	0510		874.6	874.3	0.8																	12																																																														
L 37+46	33 RT	0507																																												32																																							
L 39+12	40 LT	0508																																												44																																							
L 40+60	54 LT	0509																																												88																																							
L 35+45	28 LT	0510																																																																														0.6560			
L 41+95	31 LT	0511		861.1																																												1															1									1									
		0511	0512		857.8	856.8																							104																																																										
L 43+00	31 LT	0512		861.7																																												1															1									1									
		0512	OUT		856.8	839.0															52																																																									2							Rod and Lug, Gaskets
L 53+04	50 LT	0601																																															3.400																																
		0601	0608		887.0	886.8																										8																																																							
Y 10+95	32 LT	0602																																																																																	
		0602	OUT		886.3	883.5																								68																																																								
L 49+07	40 LT	0603																																													40																																						
L 51+05	40 LT	0604																																												36																																							
L 52+74	48 RT	0605																																																																														0.7640			
		0605	OUT		881.4	881.2																											12																																																								
L 52+50	31 LT	0606		896.1																																												1															1									1									
		0606	OUT		891.6	889.4															20																																																									2							Rod and Lug, Gaskets
L 52+30	31 LT	0607		895.2																																												1															1									1									
		0607	0606		891.8	891.6																							20																																																										
L 53+01	43 LT	0608																																																																														0.7640			
L 55+96	27 RT	0609																																												60																																							
L 58+44	28 RT	0610																																												28																																							
L 60+56	42 LT	0701																																												24																																							
L 62+34	40 LT	0702																																												24																																							
L 63+20	44 LT	0703																																												28																																							
L 64+66	50 LT	0704																																																																																	
		0704	0706		932.6	931.7																									20																																																								
L 67+33	48 LT	0705																																													36																																						
L 64+66	33 LT	0706																																																																														0.5526			
L 74+99	44 LT	0801																																																																																	
		0801	0804		958.0	957.6																								20																																																									
L 76+11	29 RT	0802																																												36																																							
SHEET TOTALS																						72			12					352	136	20	24	20											400	112		3.400	8																7						1	4		4		1	4				3.8391			

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

TGSBEN-LAPTOP

COMPUTED BY:	BAC	DATE:	3/2/18
CHECKED BY:	BJH	DATE:	3/2/18

PROJECT NO.	SHEET NO.
W-5212N	3D-2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION SIZE THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 12 .064	15 .064	18 .064	24 .064	30 .079	36 .079	42 .109	48 .109	R. C. PIPE CLASS III 12	15	18	24	30	36	42	48	R. C. PIPE CLASS IV 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) CY	QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	G.D.I. SPECIAL DESIGN, SEE DETAIL SHEET 2D-2	15" C.S. ELBOW	PREFORMED SCOUR HOLE (PER EACH)		FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 80+83	48 LT	0803																																												24																																						
L 74+99	26 LT	0804																																																																																0.4465			
L 80+07	45 LT	0805																																												24																																						
Y3 10+41	53 LT	0901																																																																																		
		0901	OUT		913.7	912.8																									96																																																						
L 166+52	37 LT	0902																																												40																																						
L 168+47	37 LT	0903																																												56																																						
L 169+89	38 LT	0904																																												24																																						
L 170+60	37 LT	0905																																												28																																						
L 173+33	38 LT	0906																																												28																																						
L 173+24	41 RT	0907																																												28																																						
L 176+69	35 LT	1001																																												28																																						
L 178+06	37 LT	1002																																												56																																						
L 179+56	40 LT	1003																																												60																																						
L 180+00	40 LT	1004																																																																																		
		1004	1013		911.4	910.9																									16																																																						
L 182+23	42 LT	1005																																																																																		
		1005	1015		911.4	911.1																									12																																																						
L 185+68	34 LT	1006																																												48																																						
L 187+21	34 LT	1007																																												28																																						
L 188+58	38 LT	1008																																																																																		
		1008	1016		920.1	920.0																									16																																																						
L 189+53	25 LT	1009		924.5																																														1															1									1										
		1009	OUT		921.7	921.4																								52																																																								
L 188+57	27 RT	1010																																																																															0.4465			
		1010	OUT		919.5	919.4																									16																																																						
L 186+74	39 RT	1011																																													32																																					
L 185+17	41 RT	1012																																													28																																					
L 179+99	28 LT	1013																																																																																0.4465			
L 179+92	45 RT	1014																																																																																	0.4465			
		1014	OUT		907.2	907.0																									4																																																							
L 182+23	31 LT	1015																																																																																	0.4465			
L 188+58	26 LT	1016																																																																																		0.4465			
L 194+99	25 LT	1101		923.9																																														1															1									1										
		1101	1102		920.4	918.2																																		80																																																				
L 195+79	29 LT	1102		920.8																																														1																1						1														
L 201+71	60 LT	1103																																															6.000																																				
		1103	1113		893.9	893.7																															8																																																								
L 201+54	45 RT	1104																																																																																	1.0126			
		1104	OUT		891.1	890.5																															32																																																							
L 197+38	36 RT	1105		911.4																																														1																									1									JB w/ Slab Lid
		1105	OUT		906.5	906.4																									24																																																								
L 196+26	41 RT	1106																																																																																			
		1106	OUT		917.3	906.3															128																																																																				
L 194+34	36 RT	1107																																												36																																						
L 201+00	25 RT	1108		913.2																																														1															1									1										
		1108	OUT		908.6	890.7	0.8															52																																																								2							Rod and Lug, Gaskets
L 202+35	25 RT	1109		912.6																																														1															1									1										
		1109	1108		909.3	908.6																								132																																																							
L 193+00	25 LT	1110		925.9																																														1															1									1										
SHEET TOTALS																						52	128								184	184						40			80								508	60		6.000	7																	5	1						1		5	1		2				3.6916			

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

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TGSBEN-LAPTOP

COMPUTED BY:	BAC	DATE:	3/2/18
CHECKED BY:	BJH	DATE:	3/2/18

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
W-5212N	3D-3

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE / THICKNESS OR GAUGE: 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC
		1110	1111		923.1	922.3														
L 194+00	25 LT	1111		925.1																
		1111	1101		922.3	920.6														
L 190+65	25 LT	1112		925.6																
		1112	1009		922.8	921.7														
L 201+69	52 LT	1113																		
L 205+27	35 LT	1201		915.1																
		1201	OUT		912.8	907.1														
L 206+98	36 LT	1202		918.3																
		1202	1201		916.0	912.8														
L 211+28	38 LT	1203																		
		1203	1213		924.1	923.8														
L 211+93	42 LT	1204																		
L 213+50	36 LT	1205																		
L 214+19	34 LT	1206																		
L 212+59	34 RT	1207																		
L 211+26	26 RT	1208																		
		1208	OUT		922.3	921.8														
L 209+62	34 RT	1209																		
L 208+50	34 LT	1210		921.4																
		1210	1202		919.1	916.0														
L 207+85	34 RT	1211																		
L 205+08	34 RT	1212																		
L 211+28	26 LT	1213																		
L 219+49	56 LT	1301																		
		1301	1304		932.1	932.0														
L 219+36	42 RT	1302																		
		1302	OUT		929.2	928.6														
L 218+80	25 RT	1303		940.7																
		1303	OUT		937.4	929.6														
L 219+47	39 LT	1304																		
L 320+08	49 LT	1401																		
L 318+75	31 RT	1405																		
		1405	1402		835.7	831.7														
L 319+79	28 RT	1402		835.0																
		1402	OUT		831.7	831.3														
L 323+78	19 RT	1403		833.5																
		1403	OUT		830.3	814.2														
L 323+00	19 RT	1404		834.5																
		1404	1403		831.3	830.3														
L 328+63	33 RT	1501																		
		1501	1509		823.7	822.5														
L 333+78	44 RT	1502																		
		1502	1511		816.6	816.4														
L 335+38	47 RT	1503																		
		1503	1513		813.4	813.3														
L 327+00	31 LT	1504		829.0																
		1504	1505		825.7	822.9														
L 329+50	31 LT	1505		826.2																
		1505	1506		822.9	822.0														
					SHEET TOTALS															

STRUCTURE NUMBER FROM	C. S. PIPE 12	15	18	24	30	36	42	48	R. C. PIPE CLASS III 12	15	18	24	30	36	42	48	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48
	.064	.064	.064	.064	.079	.079	.109	.109																
1110																		96						
1111																								
1111																		96						
1112																								
1112																		112						
1113																								
1201																								
1201										128														
1202																								
1202										172														
1203																								
1203											12													
1204																								
1205																								
1206																								
1207																								
1208																								
1208											20													
1209																								
1210																								
1210										152														
1211																								
1212																								
1213																								
1301																								
1301											20													
1302																								
1302											16													
1303																								
1303	28																							
1304																								
1401																								
1405																								
1405											104													
1402																								
1402											72													
1403																								
1403	48																							
1404																								
1404										76														
1501																								
1501											8													
1502																								
1502											12													
1503																								
1503															12									
1504																								
1504										248														
1505																								
1505										172														
SHEET TOTALS	76									948	52	212			12		304							

STRUCTURE NUMBER FROM	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A: 5' THRU 10' LIN. FT.	B: 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G	CONCRETE TRANSITIONAL SECTION D.I. STD. 852.06 OR STD. 852.04	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	G.D.I. SPECIAL DESIGN, SEE DETAIL SHEET 2D-2	15" C.S. ELBOW	PREFORMED SCOUR HOLE (PER EACH)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
1110																																				
1111					1																						1									
1111																																				
1112					1																						1									
1112																																				
1113																																	1.0126			
1201					1														1	1																
1201																																				
1202					1														1	1																
1202																																				
1203																																				
1203																																				
1204		40																																		
1205		36																																		
1206		40																																		
1207		28																																		
1208																																	0.4465			
1208																																				
1209		36																																		
1210					1														1	1																
1210																																				
1211		36																																		
1212			48																																	
1213																																	0.4465			
1301																																				
1301																																				
1302																																	0.5526			
1302																																				
1303					1																						1									
1303																														2	1					Rod and Lug, Gaskets
1304																																	0.5526			
1401		92																																		
1405																																				
1405																																				
1402					1													1				1														2GI Special Design
1402																																				
1403					1																						1									
1403																														2						Rod and Lug, Gaskets
1404					1																						1									
1404																																				
1501																																				
1501																																				
1502																																				
1502																																				
1503				6.000																																
1503																																				
1504					1																						1									
1504																																				
1505					1																						1									
1505																																				
SHEET TOTALS	308	48		6.000	11										3	3		7						1		7		1	4	1			3.0108			

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

TGSBEN-LAPTOP

COMPUTED BY:	BAC	DATE:	3/2/18
CHECKED BY:	BJH	DATE:	3/2/18

PROJECT NO.	SHEET NO.
W-5212N	3D-4

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".**

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

LINE & STATION	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC)								DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE								R. C. PIPE CLASS III								R. C. PIPE CLASS IV							
SIZE								12	15	18	24	30	36	42	48						12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48
THICKNESS OR GAUGE				FT.	FT.	FT.	%														.064	.064	.064	.064	.079	.079	.109	.109																
L 331+23	31 LT	1506		825.6																																								
		1506	OUT		822.0	812.0	2.2															24																						
L 333+00	31 LT	1507		826.2																																								
		1507	1506		822.9	822.0																								176														
L 334+99	39 LT	1508																																										
		1508	OUT		811.1	810.2																															36								
L 328+63	25 RT	1509																																										
L 328+65	40 LT	1510																																										
		1510	OUT		813.4	810.5																									20													
L 333+72	33 RT	1511																																										
L 333+29	41 LT	1512																																										
		1512	OUT		809.5	808.0																									24													
L 335+35	40 RT	1513																																										
L 337+73	39 LT	1514																																										
L 332+25	42 RT	1515																																										
L 344+30	41 RT	1601																																										
		1601	1607		839.9	839.8																									16													
L 344+99	40 RT	1602																																										
L 346+59	41 RT	1603																																										
L 348+15	38 RT	1604																																										
L 345+15	34 LT	1605		844.6																																								
		1605	OUT		841.4	838.8																								108														
L 346+80	34 LT	1606		845.9																																						
		1606	1605		842.7	841.4																								164														
L 344+27	29 RT	1607																																										
L 372+31	62 LT	1701																																										
		1701	1707		823.2	822.9																											12											
L 372+64	52 RT	1702		824.6																																								
		1702	OUT		817.3	817.3																											24											
L 367+86	44 RT	1703																																										
L 369+29	50 RT	1704																																										
L 374+23	19 LT	1705		841.5																																								
		1705	OUT		838.8	832.4	0.6															32																						
L 370+25	54 RT	1706																																										
		1706	1702		838.4	818.5	0.6															244																						
L 372+35	51 LT	1707																																										
L 377+46	29 RT	1801																																										
		1801	OUT		835.9	835.5																									24													
L 378+85	29 LT	1802		842.2																																								
		1802	OUT		839.9	839.6	1.6																							36														
L 379+55	28 LT	1803		843.7																																								
		1803	1802		841.4	839.9	1.0																							68														
L 380+80	31 LT	1804																																										
		1804	1803		843.0	841.4	0.5																							124														
L 381+84	32 LT	1805																																										
L 387+75	30 LT	1806																																										
Y13 10+82	27 RT	1807																																										
		1807	OUT		839.9	839.0																									68													
L 395+28	37 LT	1901																																										
L 395+99	38 LT	1902																																										
SHEET TOTALS																						300								676	152		36			36								

LINE & 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)	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5'	A 5' THRU 10'	B 10' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	G.D.I. SPECIAL DESIGN, SEE DETAIL SHEET 2D-2	15" C.S. ELBOW	PREFORMED SCOUR HOLE (PER EACH)		FLOWABLE FILL	CONCRETE COLLARS CL. "B" STD. 840.72	CONCRETE AND BRICK PIPE PLUG STD. 840.71	PIPE REMOVAL	REMARKS
							CY	EACH	LIN. FT.	LIN. FT.																												CY	CY	CY	LIN. FT.	
L 331+23	1506							1															1									1										
	1506	OUT																																	2	1						Rod and Lug, Gaskets
L 333+00	1507							1															1									1										
	1507	1506																																								
L 334+99	1508																																						1.0126			
	1508	OUT																																								
L 328+63	1509																																						0.4465			
L 328+65	1510																																						0.4465			
	1510	OUT																																								
L 333+72	1511																																						0.4465			
L 333+29	1512																																						0.4465			
	1512	OUT																																								
L 335+35	1513																																						1.0126			
L 337+73	1514			44																																						
L 332+25	1515				52																																					
L 344+30	1601																																									
	1601	1607																																								
L 344+99	1602			36																																						
L 346+59	1603			32																																						
L 348+15	1604			36																																						
L 345+15	1605							1												1	1																					
	1605	OUT																																								
L 346+80	1606							1												1	1																					
	1606	1605																																								
L 344+27	1607																																						0.4465			
L 372+31	1701																																									
	1701	1707																																								
L 372+64	1702							1	2.3																								1									JB w/ Slab Lid
	1702	OUT																																								
L 367+86	1703			36																																						
L 369+29	1704			40																																						
L 374+23	1705							1															1									1										
	1705	OUT																																	2							Rod and Lug, Gaskets
L 370+25	1706																																									
	1706	1702																																								
L 372+35	1707																																						0.6560			
L 377+46	1801																																						0.4465			
	1801	OUT																																								
L 378+85	1802							1												1	1																					
	1802	OUT																																								
L 379+55	1803							1												1	1																					
	1803	1802																																								
L 380+80	1804																																									
	1804	1803																																								
L 381+84	1805			28																																						
L 387+75	1806				48																																					
Y13 10+82	1807																																									
	1807	OUT																																								
L 395+28	1901				48																																					
L 395+99	1902				44																																					
SHEET TOTALS				252	192			8	2.3											4	4		3									3	1		4	1			5.3602			

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

TGSBEN-LAPTOP

COMPUTED BY: BAC DATE: 3/2/18

CHECKED BY: BJH DATE: 3/2/18

PROJECT NO.	SHEET NO.
W-5212N	3D-5

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".**

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

LINE & STATION	OFFSET		STRUCTURE NUMBER		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC)								DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE								R. C. PIPE CLASS III								R. C. PIPE CLASS IV							
SIZE			FROM	TO	FT.	FT.	FT.	%	12	15	18	24	30	36	42	48						12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48
THICKNESS OR GAUGE																						.064	.064	.064	.064	.079	.079	.109	.109																
L 398+75	39	LT	1903																																										
L 399+33	63	RT	1904																																										
			1904	OUT		819.2	818.5																										16													
Y14 10+20	62	RT	1905																																										
			1905	OUT		831.6	829.3																									104														
L 410+93	30	RT	2001																																										
L 410+86	38	LT	2002		814.2																																								
			2002	OUT		808.0	807.0																									28														
Y15 10+46	28	RT	2003																																										
			2003	OUT		821.8	820.5																									60														
L 413+50	38	RT	2004		820.6																																								
			2004	2005		818.3	815.3	0.4																							120															
L 414+70	40	RT	2005		818.5																																								
			2005	2006		815.3	814.7	0.6																							96															
L 415+65	40	RT	2006		818.1																																								
			2006	2007		814.7	811.5	1.0																							152															
L 417+18	45	RT	2007		814.7																																								
			2007	2102		811.5	806.5	1.2																							276															
L 410+96	54	RT	2008																																										
			2008	2001		819.3	817.5																									28														
Y16 11+24	31	RT	2101		814.1																																								
			2101	2102		810.9	806.5	0.6																							64															
Y16 10+64	28	RT	2102		809.2																																								
			2102	2114		806.2	806.1	1.5																								8														
L 419+72	44	LT	2104																																										
			2104	OUT		799.1	798.1	1.5																								12														
L 419+25	19	LT	2105		814.4																																								
			2105	OUT		809.1	799.5	0.4														32																							
L 421+20	19	LT	2106		813.4																																								
			2106	2105		810.1	809.1																								192															
L 422+44	28	RT	2107		815.0																																								
			2107	2109		810.7	809.8																								192															
L 422+44	45	RT	2108		813.1																																								
			2108	2107		810.8	810.7																								16															
L 424+35	28	RT	2109		813.3																																								
			2109	2110		809.8	808.0																								180															
L 426+17	28	RT	2110		811.2																																								
			2110	2117		808.0	807.6																								72															
L 427+58	28	RT	2111		810.5																																								
			2111	2112		807.3	806.8																								108															
L 428+69	28	RT	2112		809.9																																								
			2112	2113		806.8	806.3																								112															
L 429+81	28	RT	2113		809.4																																								
			2113	2115		806.3	805.0																								100															
Y16 10+57	31	RT	2114																																										
L 430+80	28	RT	2115		808.9																																								
			2115	2201		804.7	804.1																									128														
L 430+80	42	RT	2116		807.5																																								
			2116	2115		805.2	805.0																								16															
L 426+90	28	RT	2117		810.8																																								
SHEET TOTALS																							32								1696	368	16												

LINE & 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) CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	G.D.I. SPECIAL DESIGN, SEE DETAIL SHEET 2D-2	15" C.S. ELBOW	PREFORMED SCOUR HOLE (PER EACH)		FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 398+75	1903				52																																					
L 399+33	1904																																						0.5526			
	1904	OUT																																								
Y14 10+20	1905																																									
	1905	OUT																																								
L 410+93	2001																																						0.4465			
L 410+86	2002							1	1.2																								1									JB w/ Slab Lid
	2002	OUT																																								
Y15 10+46	2003																																									
	2003	OUT																																								
L 413+50	2004							1												1	1																					
	2004	2005																																								
L 414+70	2005							1												1	1																					
	2005	2006																																								
L 415+65	2006							1												1	1																					
	2006	2007																																								
L 417+18	2007							1												1	1																					
	2007	2102																																								
L 410+96	2008																																									
	2008	2001																																								
Y16 11+24	2101							1												1	1																					
	2101	2102																																								
Y16 10+64	2102							1										1																								
	2102	2114																																								
L 419+72	2104																																						0.4465			
	2104	OUT																																								
L 419+25	2105							1	0.3														1									1										
	2105	OUT																																	2	1						Rod and Lug, Gaskets
L 421+20	2106							1															1									1										
	2106	2105																																								
L 422+44	2107							1			1		1																													
	2107	2109																																								
L 422+44	2108							1												1	1																					
	2108	2107																																								
L 424+35	2109							1			1		1																													
	2109	2110																																								
L 426+17	2110							1			1		1																													
	2110	2117																																								
L 427+58	2111							1			1		1																													
	2111	2112																																								
L 428+69	2112							1			1		1																													
	2112	2113																																								
L 429+81	2113							1			1		1																													
	2113	2115																																								
Y16 10+57	2114																																						0.4465			
L 430+80	2115							1			1		1																													
	2115	2201																																								
L 430+80	2116							1												1	1																					
	2116	2115																																								
L 426+90	2117							1			1		1																													
SHEET TOTALS					52			19	1.5		8		8					1		7	7		2									2	1		2	1			1.8921			

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

COMPUTED BY:	BAC	DATE:	3/2/18
CHECKED BY:	BJH	DATE:	3/2/18

PROJECT NO.	SHEET NO.
W-5212N	3D-6

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION	OFFSET	STRUCTURE NUMBER		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC)													C. S. PIPE								R. C. PIPE CLASS III								R. C. PIPE CLASS IV							
SIZE								12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48
THICKNESS OR GAUGE		FROM	TO	FT.	FT.	FT.	%														.064	.064	.064	.079	.079	.109	.109																	
		2117	2111		807.6	807.3																								68														
L 432+78	27 RT	2202		808.1																																								
		2202	2203		803.8	803.5																									56													
L 433+99	25 RT	2204		808.6																																								
		2204	OUT		803.2	803.1	0.4																								28													
L 435+51	23 RT	2205		809.9																																								
		2205	2204		805.0	803.5																								152														
L 437+03	22 RT	2206		811.1																																								
		2206	2205		806.5	805.0																								152														
L 432+09	28 RT	2201		808.2																																								
		2201	2202		804.1	803.8																									68													
L 433+36	26 RT	2203		808.2																																								
		2203	2204		803.5	803.2																									64													
L 195+51	29 LT																																											
L 31+06	25 LT																																											
L 31+84	27 LT																																											
L 34+26	26 LT																																											
L 35+07	27 LT																																											
L 39+08	25 LT																																											
L 40+36	29 LT																																											
L 37+51	27 RT																																											
L 58+46	25 RT																																											
L 55+95	25 RT																																											
L 50+26	26 LT																																											
L 48+99	27 LT																																											
L 50+95	25 LT																																											
L 60+51	26 LT																																											
L 62+32	24 LT																																											
L 63+16	26 LT																																											
L 67+28	34 LT																																											
L 76+11	29 RT																																											
L 80+07	36 LT																																											
L 80+83	39 LT																																											
L 166+47	27 LT																																											
L 168+52	25 LT																																											
L 169+88	26 LT																																											
L 173+27	26 LT																																											
L 173+26	27 RT																																											
L 164+68	38 RT																																											
L 176+66	26 LT																																											
L 177+93	27 LT																																											
L 179+62	30 LT																																											
L 185+68	26 LT																																											
L 187+20	28 LT																																											
L 186+76	25 RT																																											
L 185+20	40 RT																																											
L 189+34	26 LT																																											
L 194+33	27 RT																																											
L 196+75	38 RT																																											
L 204+78	26 LT																																											
SHEET TOTALS																														372	216													

LINE & STATION	OFFSET	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) CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	CONCRETE TRANSITIONAL SECTION C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	G.D.I. SPECIAL DESIGN, SEE DETAIL SHEET 2D-2	15" C.S. ELBOW	PREFORMED SCOUR HOLE (PER EACH)		FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
		2117	2111																																								
L 432+78	27 RT	2202							1			1	1																														
		2202	2203																																								
L 433+99	25 RT	2204							1	0.4		1			1																												
		2204	OUT																																								
L 435+51	23 RT	2205							1			1			1																												
		2205	2204																																								
L 437+03	22 RT	2206							1			1			1																												
		2206	2205																																								
L 432+09	28 RT	2201							1			1		1																													
		2201	2202																																								
L 433+36	26 RT	2203							1			1			1																												
		2203	2204																																								
L 195+51	29 LT																																									53	
L 31+06	25 LT																																									25	
L 31+84	27 LT																																									25	
L 34+26	26 LT																																									84	
L 35+07	27 LT																																									72	
L 39+08	25 LT																																									40	
L 40+36	29 LT																																									40	
L 37+51	27 RT																																									21	
L 58+46	25 RT																																									23	
L 55+95	25 RT																																									57	
L 50+26	26 LT																																									60	
L 48+99	27 LT																																									33	
L 50+95	25 LT																																									20	
L 60+51	26 LT																																									20	
L 62+32	24 LT																																									15	
L 63+16	26 LT																																									22	
L 67+28	34 LT																																									25	
L 76+11	29 RT																																									31	
L 80+07	36 LT																																									19	
L 80+83	39 LT																																									19	
L 166+47	27 LT																																									55	
L 168+52	25 LT																																									69	
L 169+88	26 LT																																									21	
L 173+27	26 LT																																									17	
L 173+26	27 RT																																									21	
L 164+68	38 RT																																									95	
L 176+66	26 LT																																									22	
L 177+93	27 LT																																									63	
L 179+62	30 LT																																									60	
L 185+68	26 LT																																									49	
L 187+20	28 LT																																									21	
L 186+76	25 RT																																									22	
L 185+20	40 RT																																									18	
L 189+34	26 LT																																									24	
L 194+33	27 RT																																									33	
L 196+75	38 RT																																									96	
L 204+78	26 LT																																									86	
SHEET TOTALS									6	0.4		6	1	1	4																											1476	

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

TGSBEN-LAPTOP

COMPUTED BY:	BAC	DATE:	3/2/18
CHECKED BY:	BJH	DATE:	3/2/18

PROJECT NO.	SHEET NO.
W-5212N	3D-7

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".**

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

LINE & STATION	OFFSET		PIPE REMOVAL (LIN. FT.)	REMARKS
L 205+08	28	RT	40	
L 201+54	47	RT	4	
L 207+88	27	RT	30	
L 208+31	25	RT	20	
L 209+69	26	RT	22	
L 211+91	27	LT	20	
L 212+60	26	RT	22	
L 213+51	24	LT	33	
L 214+22	22	LT	29	
L 320+03	27	RT	31	
L 337+69	27	LT	21	
L 345+03	31	RT	30	
L 348+17	26	RT	23	
L 346+62	28	RT	20	
L 369+31	31	RT	21	
L 367+84	27	RT	19	
L 368+57	27	RT	22	
L 389+30	26	LT	64	
L 384+39	26	RT	27	
L 381+82	26	LT	20	
L 380+11	26	LT	112	
L 379+08	28	LT	86	
L 395+25	30	LT	37	
L 395+99	32	LT	49	
L 394+52	28	RT	57	
L 398+76	39	LT	49	
L 409+34	27	RT	43	
L 410+86	45	LT	12	
L 414+03	24	RT	122	
L 415+08	24	RT	86	
L 415+87	24	RT	33	
L 417+50	33	RT	37	
L 422+66	25	RT	16	
L 423+22	23	RT	21	
L 424+53	24	RT	20	
L 425+16	24	RT	33	
L 426+68	25	RT	18	
L 428+36	26	RT	20	
L 431+21	27	RT	38	
L 206+73	23	LT	50	
L 365+30	54	LT	26	
L 365+17	44	LT	15	
L 391+97	27	LT	29	
L 419+84	86	RT	63	
SHEET TOTALS			1590	

Other columns of the form (SIZE; THICKNESS OR GAUGE; STRUCTURE NUMBER FROM / TO; TOP ELEVATION FT.; INVERT ELEVATION FT.; INVERT ELEVATION FT.; MINIMUM REQUIRED SLOPE %; Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12, 15, 18, 24, 30, 36, 42, 48; DO NOT USE RCP; DO NOT USE CSP; DO NOT USE CAAP; DO NOT USE HDPE; DO NOT USE PVC; C. S. PIPE 12 .064, 15 .064, 18 .064, 24 .079, 30 .079, 36 .109, 42 .109, 48; R. C. PIPE CLASS III 12–48; R. C. PIPE CLASS IV 12–48; 15" SIDE DRAIN PIPE; 18" SIDE DRAIN PIPE; 24" SIDE DRAIN PIPE; ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY; QUANTITIES FOR DRAINAGE STRUCTURES; C.B. STD. 840.01 OR STD. 840.02; FRAME, GRATES, AND HOOD STD. 840.03; etc.) are blank for each row.

PROJECT TOTALS	
C. S. PIPE 15 (.064)	532
C. S. PIPE 18 (.064)	128
C. S. PIPE 30 (.079)	12
R. C. PIPE CLASS III 15	4228
R. C. PIPE CLASS III 18	1108
R. C. PIPE CLASS III 24	248
R. C. PIPE CLASS III 30	60
R. C. PIPE CLASS III 36	20
R. C. PIPE CLASS III 48	88
R. C. PIPE CLASS IV 15	304
R. C. PIPE CLASS IV 18	80
15" SIDE DRAIN PIPE	1468
18" SIDE DRAIN PIPE	464
ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) (CY)	15.400
QUANTITIES FOR DRAINAGE STRUCTURES — NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) — A: 0' THRU 5' (EACH)	59
QUANTITIES FOR DRAINAGE STRUCTURES — B: 5' THRU 10' / 10' AND ABOVE (LIN. FT.)	4.2
C.B. STD. 840.01 OR STD. 840.02	14
FRAME, GRATES, AND HOOD STD. 840.03 — GRATE TYPE E	1
FRAME, GRATES, AND HOOD STD. 840.03 — GRATE TYPE F	9
FRAME, GRATES, AND HOOD STD. 840.03 — GRATE TYPE G	4
OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	1
D.I. STD. 840.14 OR STD. 840.15	14
D.I. FRAME AND GRATES STD. 840.16	14
G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	24
G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	1
G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	1
G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	6
G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	21
J.B. STD. 840.31 OR STD. 840.32	3
G.D.I. SPECIAL DESIGN, SEE DETAIL SHEET 2D-2	2
15" C.S. ELBOW	16
PREFORMED SCOUR HOLE (PER EACH)	3
CONCRETE COLLARS CL. "B" STD. 840.72 (CY)	17.7938
PIPE REMOVAL (LIN. FT.)	3066

Columns with no project total: D.I. STD. 852.04 OR STD. 852.06 and C.B. STD. 852.05 (CONCRETE TRANSITIONAL SECTION); CONCRETE BRIDGE APPROACH D.I. STD. 840.13; G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26; G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20; G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20; G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22; G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22; G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29; FLOWABLE FILL CY; CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY.

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

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COMPUTED BY: M. Brewer DATE: 6/8/18
CHECKED BY: M. Walko DATE: 6/8/18

(2-16-16)

PROJECT NO.	SHEET NO.
W-5212N	3G-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	3000
				TOTAL LF:	3000

SUMMARY OF ROCK PLATING

LINE	Beginning Slope (H:V)	Approx. Station	Ending Slope (H:V)	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* 1/2/B	Rock Plating SY
-L-	1.5:1	41+50	1.5:1	43+00	RT	3		450
-L-	1.5:1	324+55	1.5:1	324+80	RT	4		75
							TOTAL SY:	525

***Use Class 1, 2 or B riprap if riprap class is not shown for rock plating location.**

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
-L-	25+75	28+25	ASU	12	140	300	450		
-L-	164+25	167+75	ASU	12	190	410	630		
-L-	180+25	182+25	ASU	12	130	300	460		
-L-	342+75	343+75	ASU	12	80	140	210		
-L-	344+75	347+25	ASU	12	250	500	770		
-L-	388+25	390+25	ASU	12	150	300	460		
CONTINGENCY			ASU	12	2800	5450	8400		
			TOTAL CY/TONS/SY:		3740	7400	11380	0	0

***ASU = Aggregate Subgrade**

***AST = Aggregate Stabilization**

****Total square yards of "Geotextile for Soil Stabilization" is only the estimated quantity for ASU/AST and may only represent a portion of the geotextile quantity shown in the Item Sheets of the Proposal.**

SUMMARY OF REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL

LINE	Beginning Slope/ RSS (H:V)	Approx. Station	Ending Slope/ RSS (H:V)	Approx. Station	Location LT/RT	Reinforced Soil Slope (RSS) SY	Geocells SY	Coir Fiber Mat SY	Matting for Erosion Control SY
-L-	1.5:1	327+00	1.5:1	331+50	LT	1500		1500	
-L-	1.5:1	372+00	1.5:1	373+00	RT	500		500	
					TOTAL SY:	2000	0	2000*	0**

***Total square yards of "Coir Fiber Mat" is only the estimated quantity for slopes steeper than 2:1 (H:V) and may only represent a portion of the coir fiber mat quantity shown in the Item Sheets of the Proposal.**
****Total square yards of "Matting for Erosion Control" is only the estimated quantity for RSS and may only represent a portion of the matting quantity shown in the Item Sheets of the Proposal.**

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PROJ. REFERENCE NO.	SHEET NO.
W-5212N	3P-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4 & 5	CRAIG L. HEFFNER, RENEE G. HEFFNER
2	5	MICHAEL D. OAKS
3	5	GILLRIST MLK GROUP, LLC
4	5 & 6	JOHN P. DREYLINGER
5	6	TIMOTHY C. YOUNG, DEBBIE L. YOUNG
6	6	SHELBY J. SNEED
7	6 & 7	SUSIE A. RAYFIELD ESTATE
8	7	KAY H. HALLMANN, BOBBIE H. GANTT
9	7 & 8	VICKIE H. HOLLAND, etal
10	8	KAY H. HALLMAN, BOBBIE H. GANTT
11	8	MARY L. SHERRILL
12	8	GENARO W. CENTENO
13	8	DORIS STARR, RUDENEA S. MONROE HEIRS
14	9	HAL & MARCELLA CARPENTER
15	9 & 10	CHARLES A. JONES LIFE ESTATE, JOHN W. JONES LIFE ESTATE
16	10	CYNTHIA F. FREEMAN
17	10	WILLLIAM E. MORRIS
19	11	THOMAS L. HOLBROOKS, SUSAN W. HOLBROOKS
20	11	SYLVIA C. PATTERSON, SCOTTY D. PATTERSON
21	11	HARRY L. BRITT, JR., JIMMIE A. BRITT
22	11	BENNY T. CHILDERS, FRANCES W. CHILDERS
23	11 & 12	MICHAEL D. STOWERS
24	11	MICHAEL D. STOWERS
25	11	VENTURE PROPERTIES VII, LLC
26	11 & 12	CITY OF GASTONIA
27	12 & 13	STEVEN W. WYONT
28	12 & 13	PEGGY W. ABERNATHY
29	13	FOREST ROSS, LLC
30	13	CITY OF GASTONIA
31	14	ALLEN J. ISENHOUR, CHRISTY STEWART
32	14	FREDERICK R. THOMAS, JR., LAURA B. THOMAS
33	14	FRANCIS W. STAINBACK, MINERVA STAINBACK
34	14 & 15	KITTY T. HELLER, DAWN T. MITCHELL
35	14	JOHN H. FREEMAN,JR., PAULA P. FREEMAN
36	14	JACQUELYN T. RUPP
37	14 & 15	MICHAEL WHITAKER
38	15 & B16	KITTY T. HELLER
39	15	B & N PROPERTIES
40	15 & 16	KITTY L. HELLER, etal
41	16	ROBERT K. CLEMMER
42	16	RUTHERFORD ELECTRIC MEMERSHIP CORPORATION
43	16	DENNIS H. EAVER, JEANNIE L. BEAVER
44	16	THOMAS R. COLLINS
45	17	D.G. McALLISTER, FRANCES McALLISTER
46	17	NCDOT
47	17	GASTON COUNTY BOARD OF EDUCATION
48	17	TAMMY ERWIN
49	17	DESOTO/POOLE LLC
50	17	RANDY & BETTY HAAS
51	17	CARL FREEMAN

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
52	17 & 18	L & S PROPERTIES, LLC
53	18	NCDOT
54	18	CORA RHYNE HEIRS
55	18	HCF DALLAS, LLC
56	18 & 19	RKC DALLAS, LLC
57	19	MAX HOVIS
58	19&20	WILLIAM STEWART SR. TRUST
59	19	CHRISTIAN FELLOWSHIP ASM INC.
60	20	TIMOTHY SMITHERS
61	20	INDEPENDENT BAPTIST TABERNACLE
62	20 &21	CHARLES & MARY WALLACE
63	20	DURKEE INC.
64	20	MALM HOLDINGS, INC
66	20	JASPER & RUBY WALLACE
67	21	JEREMY BURNS & JONATHAN BOWEN
68	21	RONNIE TEELUCKSINGH LIFE ESTATE
69	21	DEAN CARPENTER
70	21	THOMAS TURNER
71	21	DARRELL & BEVERLY BRITNELL
72	21	LINDA CLONINGER
73	21 & 22	VICKY RAMSEY & OTHERS
74	22	SHARON RATCHFORD
75	22	SAMUEL E. & LEAH B. HELMS

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 35018	SEAL 044158
9/13/2018 7:23:44 AM PDT	9/13/2018 7:39:33 AM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

-L- CURVE DATA
PI Sta 21+00.28
Δ = 0° 20' 17.6" (RT)
D = 0° 10' 00.1"
L = 202.90'
T = 101.45'
R = 34,370.00'

DETAIL 1
TOE PROTECTION
(Not to Scale)
Natural Ground, d, 2:1 or Flatter Fill Slope, EC MATTING
d = 1.0 Ft.
Type of Liner = EC MATTING
FROM -L- STA. 28+50 TO STA. 29+50 LT

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 3:1 or Flatter, Fill Slope
Min. D = 1.0 Ft.
FROM -L- STA. 29+50 TO STA. 30+50 LT

DETAIL 3
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow, 4:1, 2:1, 2', 1.5', GI etc.
S = Ditch Slope ℄ Proposed Ditch
-L- STA. 30+15 LT

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

NAD 83/2011

BEGIN TIP PROJECT W-5212N
-L- STA 24+50.00

720' LANE DROP TAPER

S 59° 48' 40.2" E

-L- PC 19+98.83

-L- PT 22+01.72

REMOVE FENCE
SPECIAL LAT. V-DITCH SEE DETAIL 2
EC MATTING TOE PROTECTION SEE DETAIL 1 EST. 55 SY
PROP. 12' INCIDENTAL STONE DR
COLLAR AND EXTEND W/ 18" RCP
FALSE SUMP SEE DETAIL 3
PROP. CONCRETE DRIVE
REMOVE HW

MATCH LINE STA -L- 32+00.00
MATCH TO SHEET NO 5

TINA L. WITHERSPOON DB 4833 PG 1336 PB 14 PG 115
PEGGY R. METCALF DB 1863 PG 93
CRAIG L. HEFFNER RENEE C. HEFFNER DB 4575 PG 1421 DB 2822 PG 483
SHANNON D. YOUNG DB 3076 PG 766
TIMOTHY W. HEPLER BRENDA H. HEPLER DB 4661 PG 1793
BILLY L. FARRIS PATRICIA M. FARRIS DB 1268 PG 678 DB 1885 PG 604
R. PAUL LAUSTERER DANNY M. PFEIFER DB 4460 PG 2145
RUDOLPH P. LAUSTERER DB 4059 PG 2082

DITCH LEGEND
LEFT DITCH
RIGHT DITCH

BM-1 ELEV. 931.58'
CHISELED X TOP OF BOLT IN CONC SIGN BASE
89.46' RT OF -L- STA. 22+60.81

PIPE HYDRAULIC DATA
*0401 -L- Sta. 29+99

DRAINAGE AREA	=	6.4	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	22	CFS
DESIGN HW ELEVATION	=	N/A	FT
100 YEAR DISCHARGE	=	26	CFS
100 YEAR HW ELEVATION	=	N/A	FT
OVERTOPPING FREQUENCY	=	2	YRS
OVERTOPPING DISCHARGE	=	7	CFS
OVERTOPPING ELEVATION	=	899.4	FT

BEGIN GRADE
-L- STA 24+50.00
ELEV. 924.90

(-)4.0745%

BEGIN SPECIAL LAT. V-DITCH
-L- STA. 29+50.00 LT
EL=899.64

END SPECIAL LAT. V-DITCH
-L- STA. 30+50.00 LT
EL=897.64

(-) 3.4800% (-) 0.5200%

EXISTING 18" RCP

-L- STA. 30+00.00 LT
EL=897.90

960 950 940 930 920 910 900 890 880

18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

REVISIONS

8/17/99

9/13/2018
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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — SEAL 35018 — JIMMY L. TERRY — 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER — SEAL 044158 — BENJAMIN J. HENSLEY — 9/13/2018 7:39:33 AM

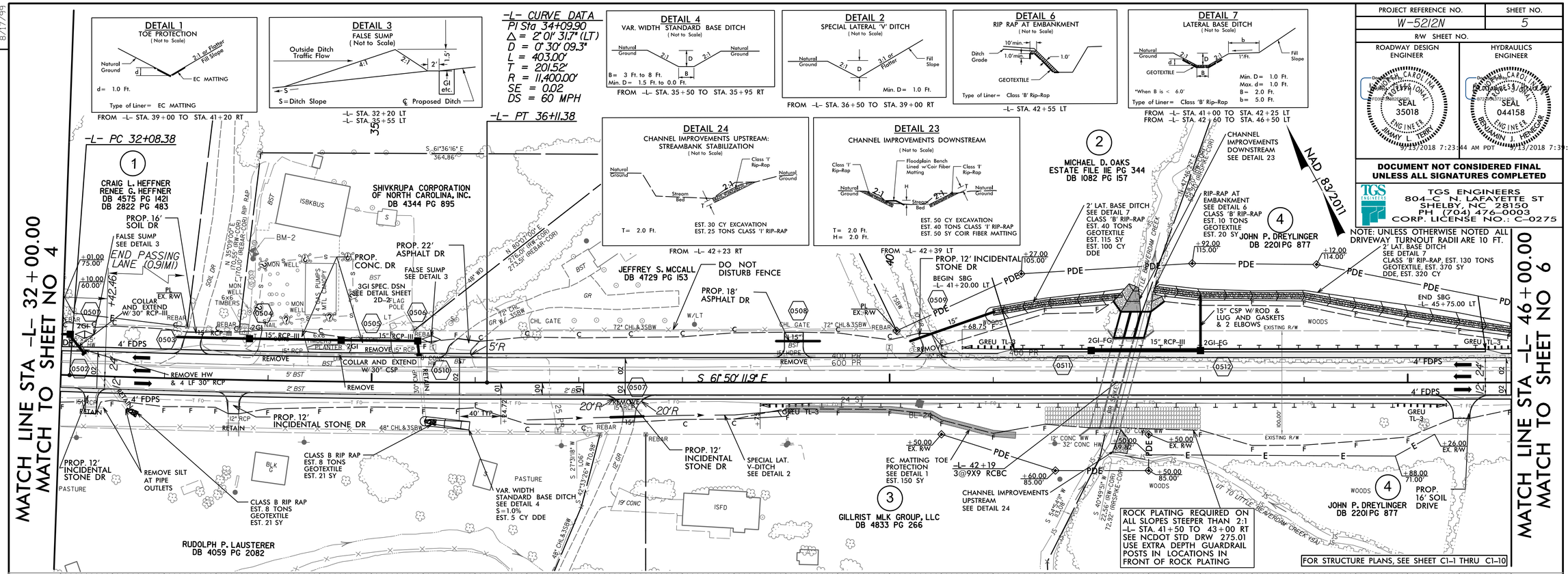
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

8/17/99

REVISIONS



BM-2 ELEV. 887.70'
CHISELED X ON CONC PAD
123.35' LT OF -L- STA. 33+83.80

PIPE HYDRAULIC DATA
*0506 -L- Sta. 35+48

DRAINAGE AREA	= 9.5	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 32	CFS
DESIGN HW ELEVATION	= 878.0	FT
100 YEAR DISCHARGE	= 37	CFS
100 YEAR HW ELEVATION	= N/A	FT
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 37	CFS
OVERTOPPING ELEVATION	= 879.3	FT

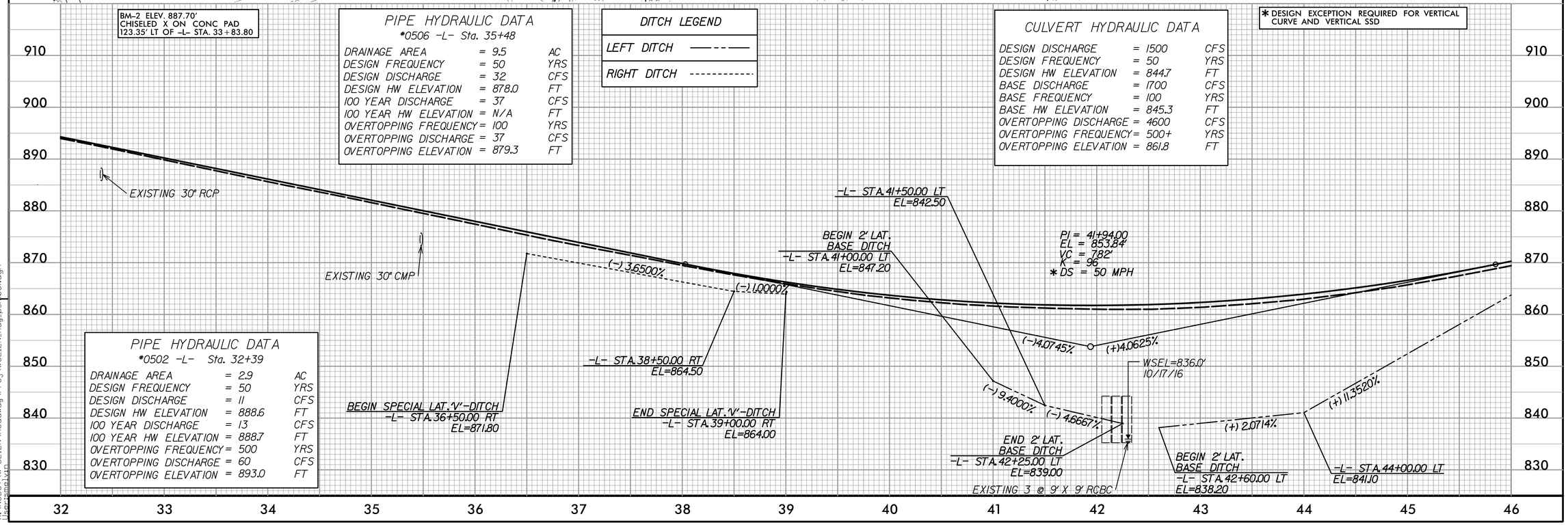
DITCH LEGEND

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

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1500	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 844.7	FT
BASE DISCHARGE	= 1700	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 845.3	FT
OVERTOPPING DISCHARGE	= 4600	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 861.8	FT

* DESIGN EXCEPTION REQUIRED FOR VERTICAL CURVE AND VERTICAL SSD



PIPE HYDRAULIC DATA
*0502 -L- Sta. 32+39

DRAINAGE AREA	= 2.9	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 11	CFS
DESIGN HW ELEVATION	= 888.6	FT
100 YEAR DISCHARGE	= 13	CFS
100 YEAR HW ELEVATION	= 888.7	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 60	CFS
OVERTOPPING ELEVATION	= 893.0	FT

9/13/2018
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bsemelvin

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: Digitally signed by CAROLYN JENNINGS TERRY, Date: 2018.09.13 07:23:44 -04'00' — SEAL 35018 — ENGINEER — JIMMY L. TERRY — 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER: Digitally signed by BENJAMIN J. HENSLEY, Date: 2018.09.13 07:39:33 -04'00' — SEAL 044158 — ENGINEER — BENJAMIN J. HENSLEY — 9/13/2018 7:39:33 AM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

NAD 83/2011

8/17/99

REVISIONS

DETAIL 1
TOE PROTECTION
(Not to Scale)
Natural Ground; 2:1 or Flatter Fill Slope; EC MATTING; d; d= 1.0 Ft.
Type of Liner= EC MATTING
FROM -L- STA. 46+15 TO STA. 49+20 RT
FROM -L- STA. 55+20 TO STA. 55+65 RT
FROM -L- STA. 59+20 TO STA. 60+50 RT

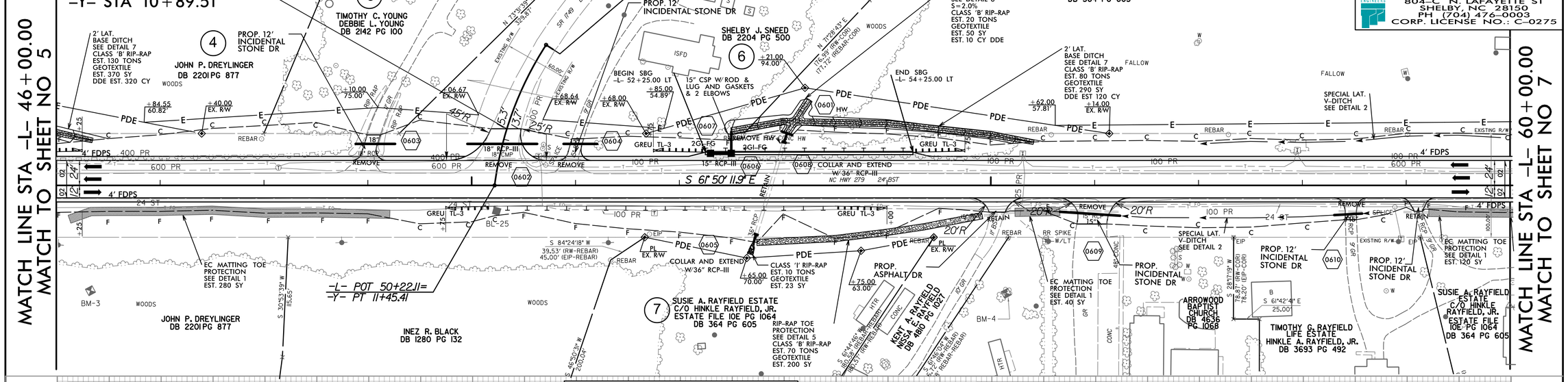
-Y- CURVE DATA
PI Sta 10+73.95
Δ = 25° 38' 09.0" (LT)
D = 17° 37' 46.1"
L = 145.41'
T = 73.95'
R = 325.00'

DETAIL 5
TOE PROTECTION
(Not to Scale)
Natural Ground; 2:1 or Flatter Fill Slope; Geotextile; b; d; d=1.5 Ft. b=3.0 Ft.
Type of Liner= Class 'B' Rip-Rap
FROM -L- STA. 52+75 TO STA. 54+95 RT

DETAIL 8
STANDARD BASE DITCH
(Not to Scale)
Natural Ground; 2:1; D; Geotextile; B; Min. D= 1.0 Ft. Max. d= 1.0 Ft. B= 3.0 Ft.
*When B is < 6.0'
Type of Liner= Class 'B' Rip-Rap
-L- STA. 53+15 LT

DETAIL 7
LATERAL BASE DITCH
(Not to Scale)
Natural Ground; 2:1; D; d; GEOTEXTILE; B; b; 1'Ft.; Fill Slope; Min. D= 1.0 Ft. Max. d= 1.0 Ft. B= 2.0 Ft. b= 5.0 Ft.
*When B is < 6.0'
Type of Liner= Class 'B' Rip-Rap
FROM -L- STA. 42+60 TO STA. 46+50 LT
FROM -L- STA. 52+50 TO STA. 55+50 LT

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground; 2:1; D; 3:1 or Flatter; Fill Slope; Min. D= 1.0 Ft.
FROM -L- STA. 55+50 TO STA. 58+75 RT
FROM -L- STA. 57+00 TO STA. 61+00 LT



BM-3 ELEV. 865.46'
RR SPIKE IN BASE OF
22" RED OAK
101.57' RT OF -L- STA. 46+32.92

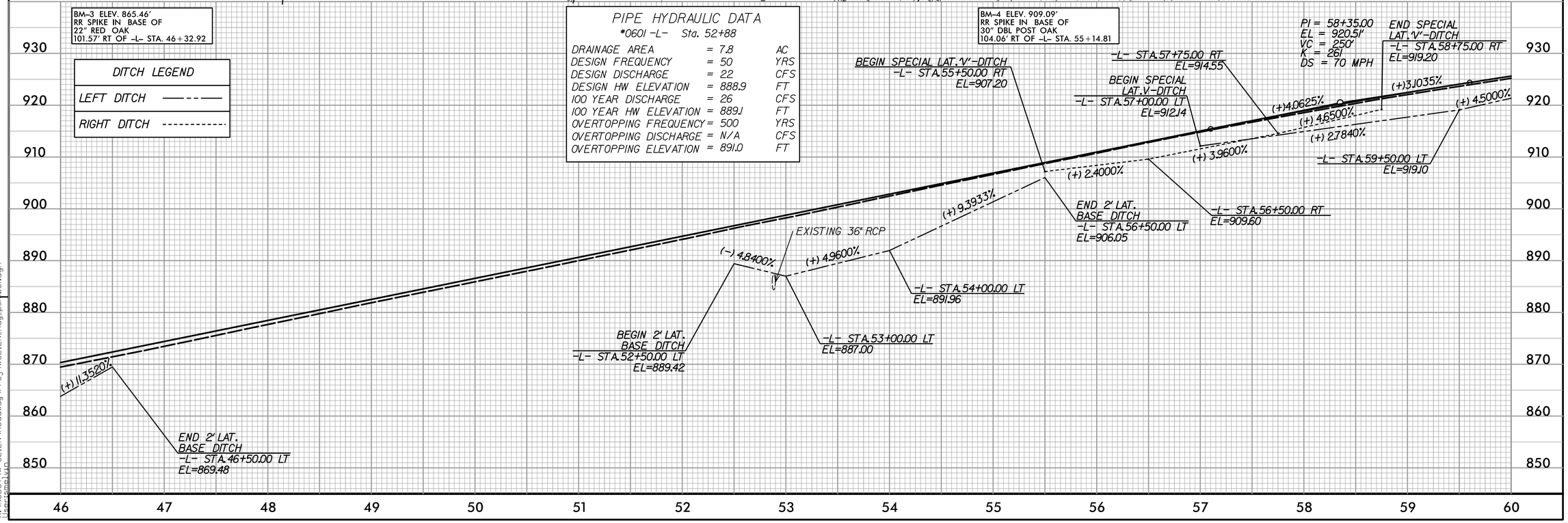
BM-4 ELEV. 909.09'
RR SPIKE IN BASE OF
30" DBL POST OAK
104.06' RT OF -L- STA. 55+14.81

DITCH LEGEND

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

PIPE HYDRAULIC DATA
*0601 -L- Sta. 52+88

DRAINAGE AREA	= 7.8	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 22	CFS
DESIGN HW ELEVATION	= 888.9	FT
100 YEAR DISCHARGE	= 26	CFS
100 YEAR HW ELEVATION	= 889.1	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING ELEVATION	= 891.0	FT



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jbernsen

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: Docusigned by: Jimmy L. Terry, Registered Professional Engineer, North Carolina, Registration Number 035018, SEAL 35018, ENGINEER, JIMMY L. TERRY, 9/13/2018 7:23:44 AM PDT

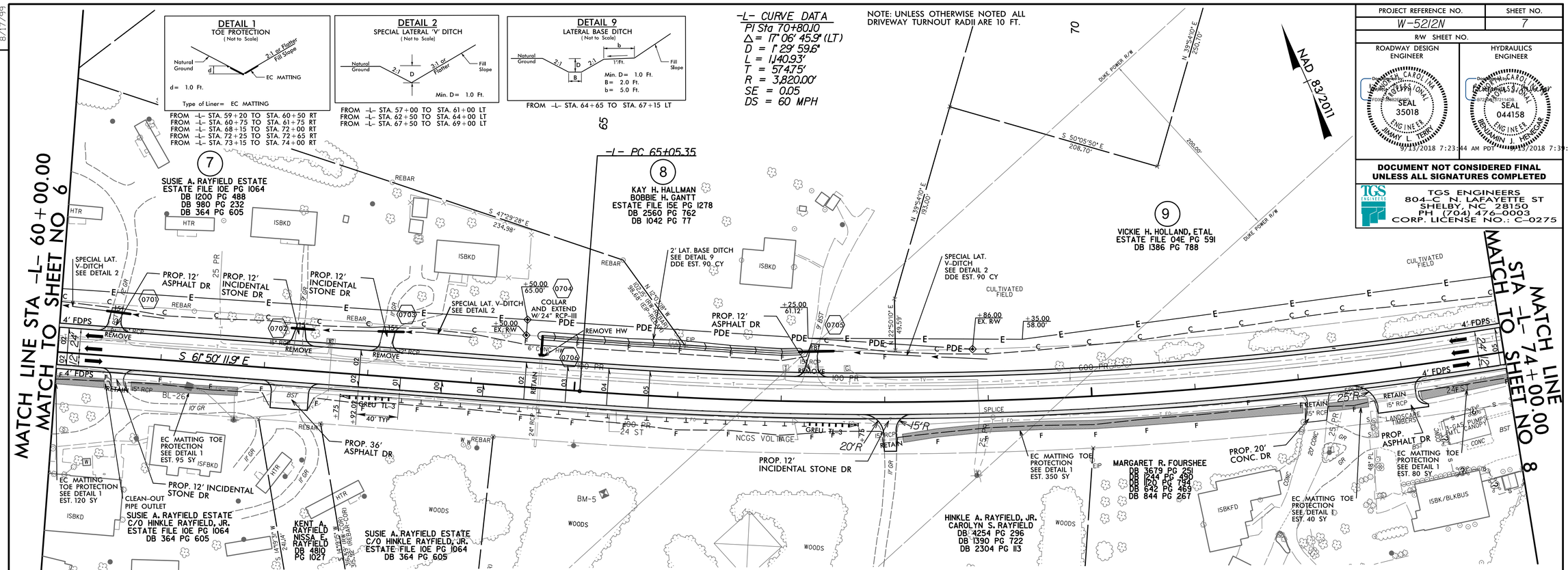
HYDRAULICS ENGINEER: Docusigned by: Benjamin J. Hensley, Registered Professional Engineer, North Carolina, Registration Number 044158, SEAL 044158, ENGINEER, BENJAMIN J. HENSLEY, 9/13/2018 7:39:33 AM PDT

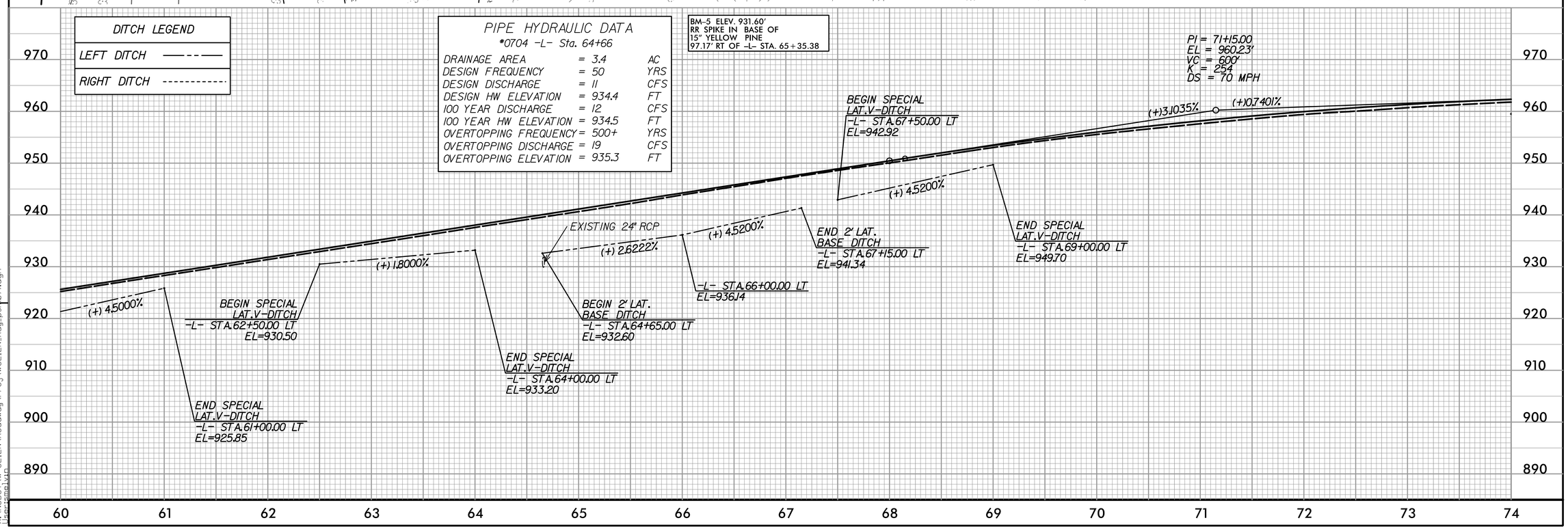
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

8/17/99

REVISIONS





9/13/2018
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User: melvin

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	8
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: DOUGLAS A. CAROLLO, PROFESSIONAL ENGINEER SEAL 35018, ENGINEER JIMMY L. TERRY, 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER: DOUGLAS A. CAROLLO, PROFESSIONAL ENGINEER SEAL 044158, ENGINEER BENJAMIN J. HEBEGER, 9/13/2018 7:39:33 AM

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TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 70+80.10
Δ = 17° 06' 45.9" (LT)
D = 1° 29' 59.6"
L = 1,140.93'
T = 574.75'
R = 3,820.00'
SE = 0.05
DS = 60 MPH

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 3:1 or Flatter, Fill Slope
Min. D = 1.0 Ft.
FROM -L- STA. 74+00 TO STA. 76+00 LT
FROM -L- STA. 79+00 TO STA. 81+00 LT

DETAIL 1
TOE PROTECTION
(Not to Scale)
Natural Ground, d, 2:1 or Flatter, Fill Slope, EC MATTING
d = 1.0 Ft.
Type of Liner = EC MATTING
FROM -L- STA. 75+00 TO STA. 75+95 RT
FROM -L- STA. 76+25 TO STA. 77+00 RT
FROM -L- STA. 77+15 TO STA. 77+60 RT

DETAIL 10
VAR. WIDTH SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, B, 3:1 or Flatter, Fill Slope
Min. D = 1.0 Ft. to 0.0 Ft.
B = 0.0 Ft. to 8.0 Ft.
FROM -L- STA. 81+00 TO STA. 81+35 LT

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

BEGIN CONSTRUCTION
-Y1- STA 12+50.00

-Y1- POT 10+00.00

-L- PT 76+46.29

MATCH LINE STA -L- 74+00.00
MATCH TO SHEET NO 7

-L- POT 84+64.21=
-Y1- POT 12+93.78
END WIDENING
BEGIN RESURFACING
(SEE DETAIL SHEET 2B-1)
-L- STA 85+35.00

BEGIN PASSING LANE (0.91MI)
360' TAPER

NAD 83/2011

KAY H. HALLMAN
BOBBIE H. GANTT
ESTATE FILE 15E PG 1278
DB 1360 PG 488

MARY L. SHERRILL
DB 1360 PG 482

GENARO W. CENTENO
DB 4428 PG 814

ARTHUR L. RAXTER
SHIRLEY RAXTER
DB 3279 PG 998

CLAY W. PASOUR
NANCY C. PASOUR
DB 4470 PG 351

PROP. 12' INCIDENTAL DAKOTA GLYN AYERS & WIFE
RAVEN TAYLOR PICKENS
DB 4936 PG 1284

MARGARET R. FOURSHEE
DB 3679 PG 251
DB 1244 PG 490
DB 1120 PG 794
DB 642 PG 469
DB 844 PG 267

RUBY F. WALLACE
DB 1080 PG 867

RANDY P. WALKER
DB 4483 PG 1663

LARRY E. WARNER
DB 4755 PG 713

ALLEN F. SELLERS
PENELOPE E. KAY
DB 4734 PG 1979

HANNA S. NAGISA
JULIAN K. C. SIMS
ESTATE FILE 15 E PG
DB 3518 PG 565

S 78° 56' 57.8" E
S 12° 11' 34.2" W
NC HWY 279 24' BST
NCGS DRIVE

PIPE HYDRAULIC DATA
*0801 -L- Sta. 74+99

DRAINAGE AREA	= 1.0	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 2.9	CFS
DESIGN HW ELEVATION	= 958.9	FT
100 YEAR DISCHARGE	= 3.1	CFS
100 YEAR HW ELEVATION	= 958.9	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 7	CFS
OVERTOPPING ELEVATION	= 959.5	FT

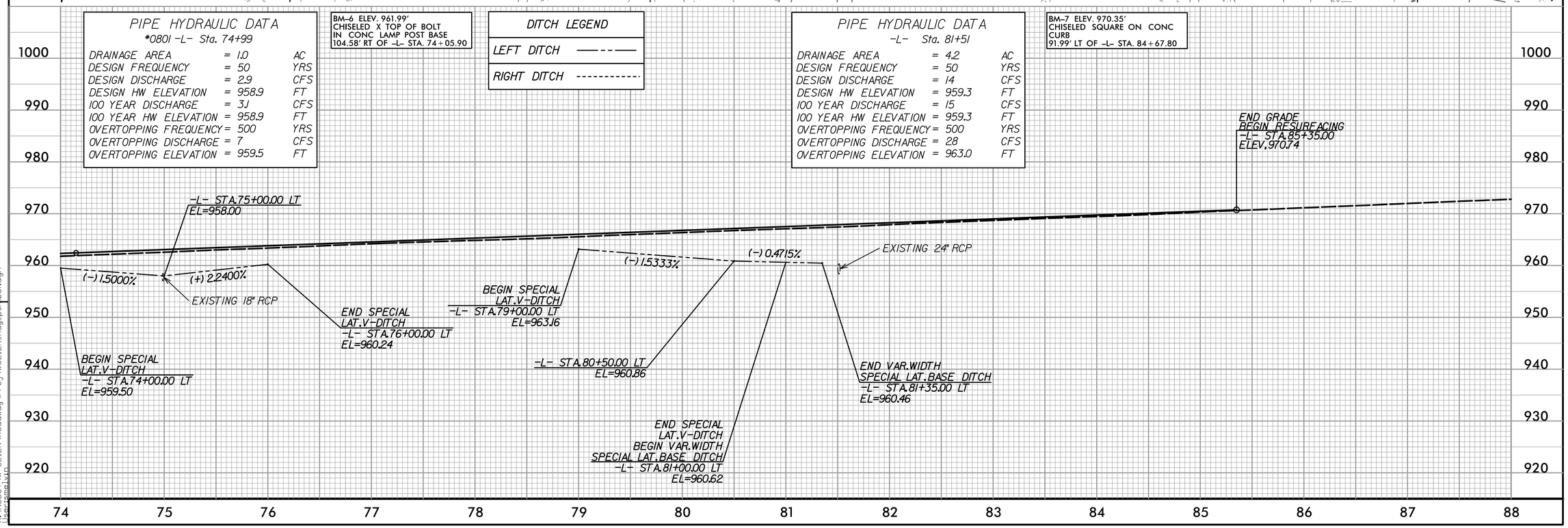
BM-6 ELEV. 961.99'
CHISELED X TOP OF BOLT
IN CONC LAMP POST BASE
104.58' RT OF -L- STA. 74+05.90

DITCH LEGEND
LEFT DITCH
RIGHT DITCH

PIPE HYDRAULIC DATA
-L- Sta. 81+51

DRAINAGE AREA	= 4.2	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 14	CFS
DESIGN HW ELEVATION	= 959.3	FT
100 YEAR DISCHARGE	= 15	CFS
100 YEAR HW ELEVATION	= 959.3	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 28	CFS
OVERTOPPING ELEVATION	= 963.0	FT

BM-7 ELEV. 970.35'
CHISELED SQUARE ON CONC
CURB
91.99' LT OF -L- STA. 84+67.80



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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY — 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 044158 ENGINEER BENJAMIN J. HERZICAK — 9/13/2018 7:39:33 AM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 164+35.52
Δ = 14° 24' 52.1" (LT)
D = 1° 56' 32.0"
L = 742.16'
T = 373.05'
R = 2,950.00'
SE = 0.06
DS = 60 MPH

END RESURFACING
(SEE DETAIL SHEET 2B-1)
BEGIN WIDENING
-L- STA 164+00.00

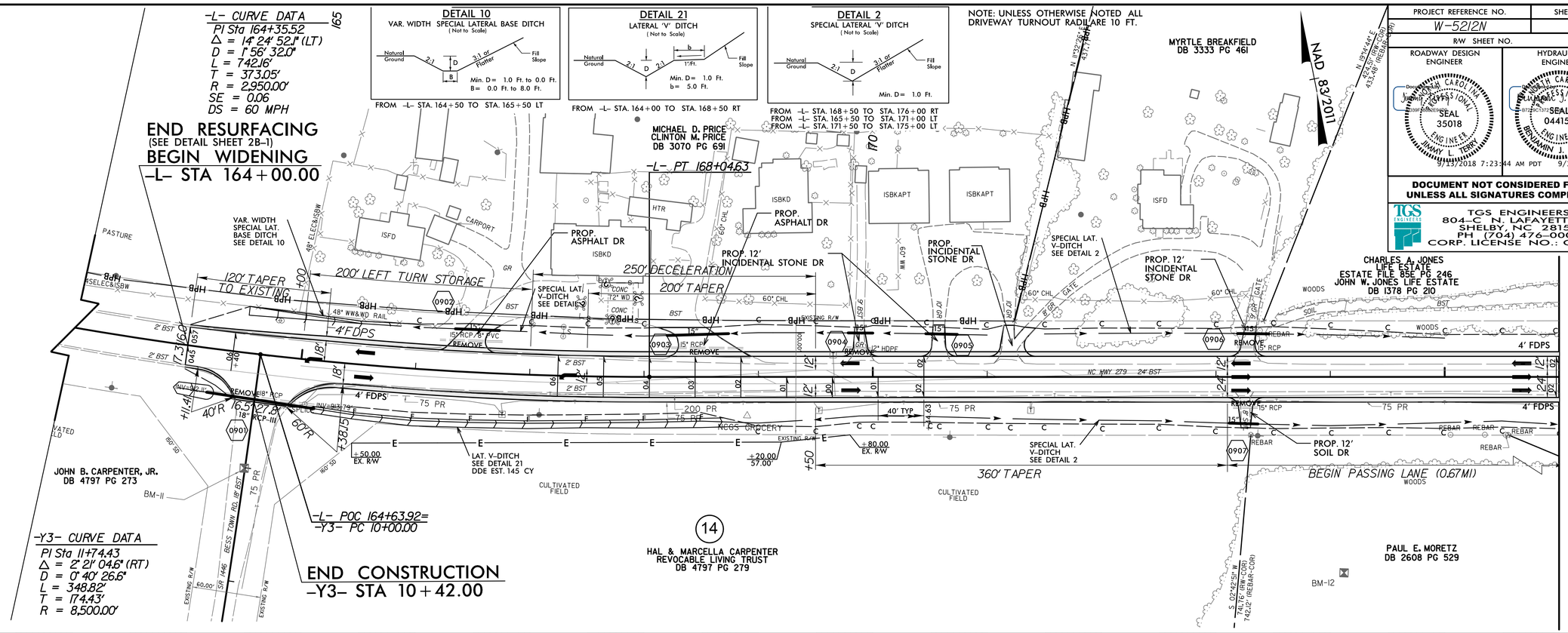
DETAIL 10
VAR. WIDTH SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, B, 3:1 or Flatter, Fill Slope
Min. D= 1.0 Ft. to 0.0 Ft.
B= 0.0 Ft. to 8.0 Ft.
FROM -L- STA. 164+50 TO STA. 165+50 LT

DETAIL 21
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, b, 1'/Ft., Fill Slope
Min. D= 1.0 Ft.
b= 5.0 Ft.
FROM -L- STA. 164+00 TO STA. 168+50 RT

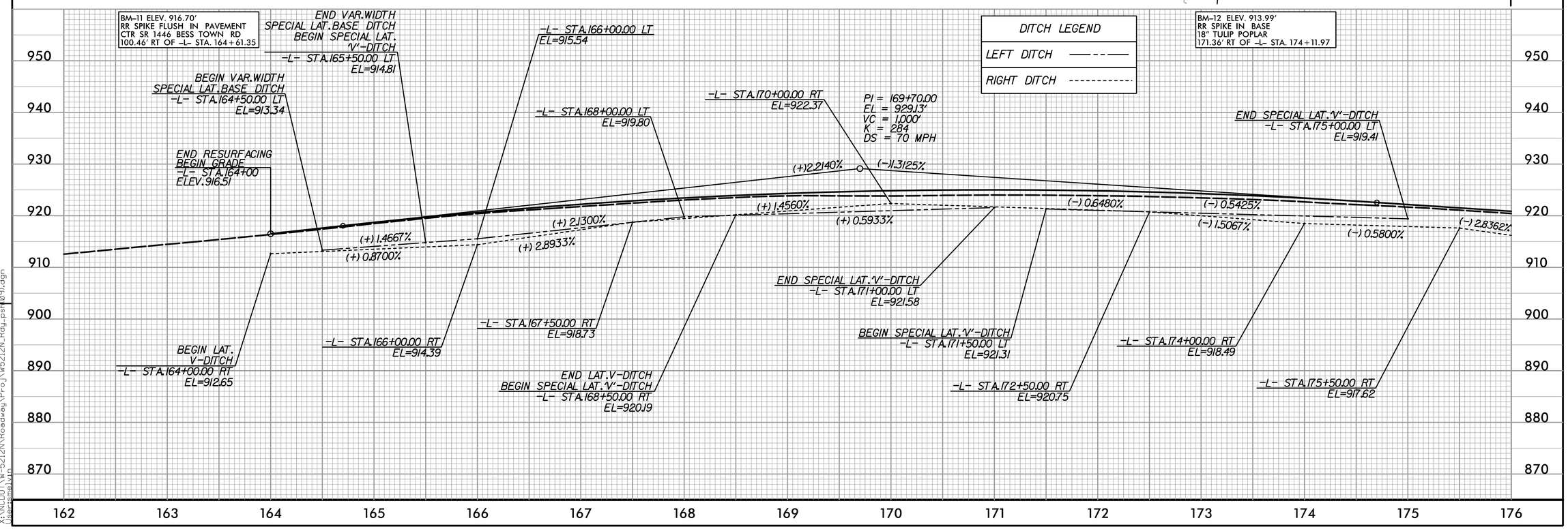
DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 3:1 or Flatter, Fill Slope
Min. D= 1.0 Ft.
FROM -L- STA. 168+50 TO STA. 176+00 RT
FROM -L- STA. 165+50 TO STA. 171+00 LT
FROM -L- STA. 171+50 TO STA. 175+00 LT

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

NAD 83/2011



-Y3- CURVE DATA
PI Sta 11+74.43
Δ = 2° 21' 04.6" (RT)
D = 0° 40' 26.6"
L = 348.82'
T = 174.43'
R = 8,500.00'



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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	10
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — SEAL 35018 — JIMMY L. TERRY — 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER — SEAL 044158 — BENJAMIN L. HENSON — 9/13/2018 7:39:33 AM PDT

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804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

NAD 83/2011

MATCH LINE STA -L- 176+00.00 MATCH TO SHEET NO 9

MATCH LINE STA -L- 190+00.00 MATCH TO SHEET NO 11

BEGIN CONSTRUCTION
-Y4- STA 10+73.66

-Y4- POT 10+00.00

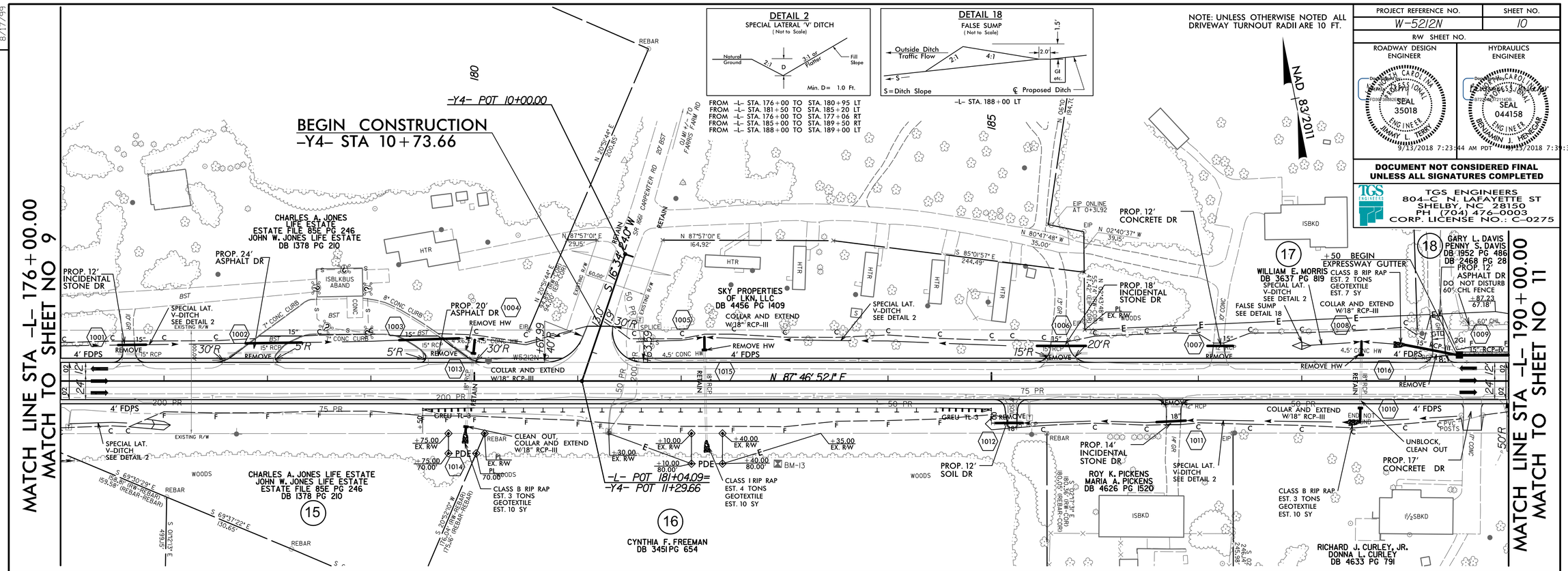
-L- POT 181+04.09=
-Y4- POT 11+29.66

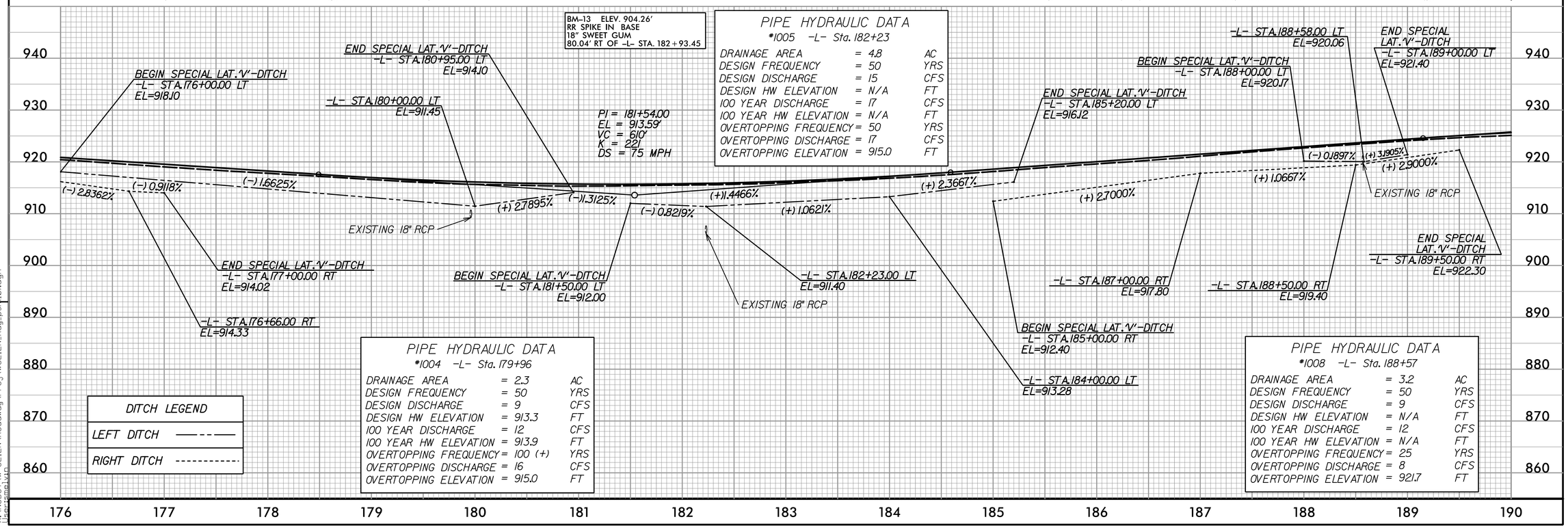
DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

FROM -L- STA. 176+00 TO STA. 180+95 LT
FROM -L- STA. 181+50 TO STA. 185+20 LT
FROM -L- STA. 176+00 TO STA. 177+06 RT
FROM -L- STA. 185+00 TO STA. 189+50 RT
FROM -L- STA. 188+00 TO STA. 189+00 LT

DETAIL 18
FALSE SUMP
(Not to Scale)

-L- STA. 188+00 LT





PIPE HYDRAULIC DATA
*1005 -L- Sta. 182+23

DRAINAGE AREA	= 4.8	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 15	CFS
DESIGN HW ELEVATION	= N/A	FT
100 YEAR DISCHARGE	= 17	CFS
100 YEAR HW ELEVATION	= N/A	FT
OVERTOPPING FREQUENCY	= 50	YRS
OVERTOPPING DISCHARGE	= 17	CFS
OVERTOPPING ELEVATION	= 915.0	FT

PIPE HYDRAULIC DATA
*1004 -L- Sta. 179+96

DRAINAGE AREA	= 2.3	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 9	CFS
DESIGN HW ELEVATION	= 913.3	FT
100 YEAR DISCHARGE	= 12	CFS
100 YEAR HW ELEVATION	= 913.9	FT
OVERTOPPING FREQUENCY	= 100 (+)	YRS
OVERTOPPING DISCHARGE	= 16	CFS
OVERTOPPING ELEVATION	= 915.0	FT

PIPE HYDRAULIC DATA
*1008 -L- Sta. 188+57

DRAINAGE AREA	= 3.2	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 9	CFS
DESIGN HW ELEVATION	= N/A	FT
100 YEAR DISCHARGE	= 12	CFS
100 YEAR HW ELEVATION	= N/A	FT
OVERTOPPING FREQUENCY	= 25	YRS
OVERTOPPING DISCHARGE	= 8	CFS
OVERTOPPING ELEVATION	= 921.7	FT

DITCH LEGEND
LEFT DITCH
RIGHT DITCH

REVISIONS

8/17/99

9/13/2018
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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	11
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: SEAL 35018, ENGINEER, JIMMY L. TERRY — 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER: SEAL 044158, ENGINEER, BENJAMIN J. HENKGAR — 9/13/2018 7:39:33 AM PDT

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TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

-Y5- CURVE DATA
PI Sta 10+58.72
Δ = 16° 42' 06.8" (RT)
D = 14° 19' 26.2"
L = 116.60'
T = 58.72'
R = 400.00'
GARY L. DAVIS
PENNY S. DAVIS
DB 1952 PG 486

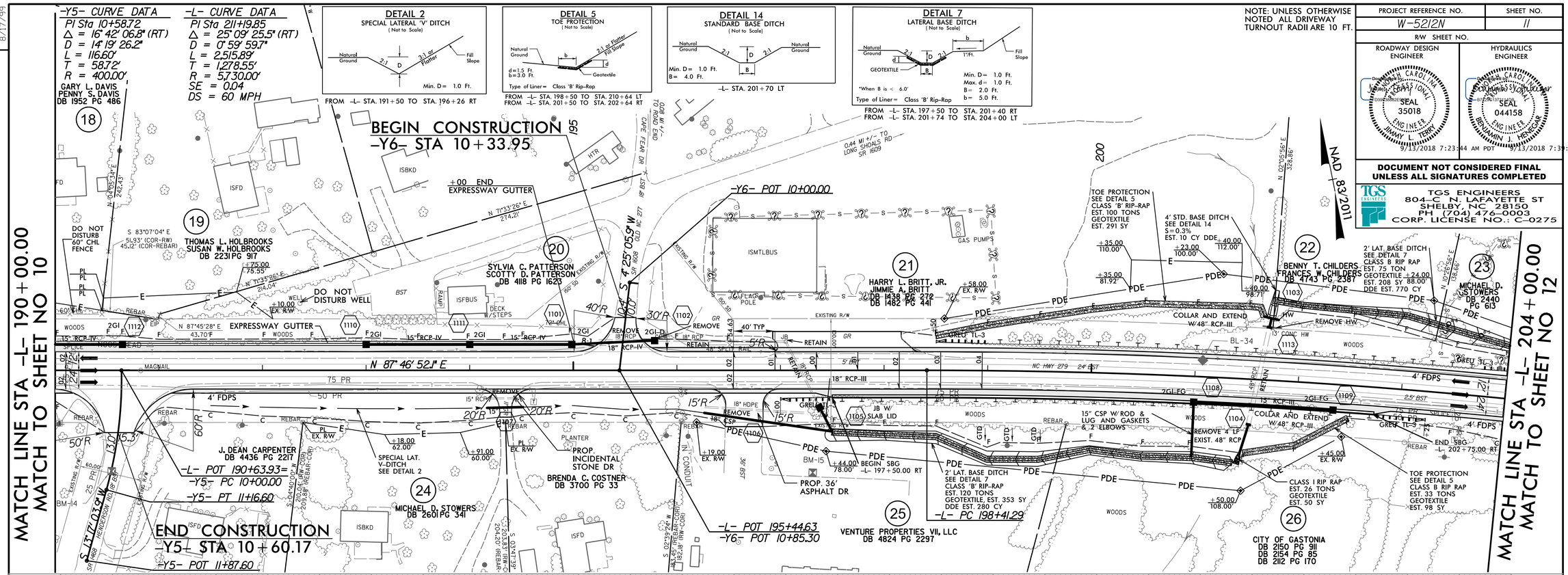
-L- CURVE DATA
PI Sta 211+19.85
Δ = 25° 09' 25.5" (RT)
D = 0° 59' 59.7"
L = 2,515.89'
T = 1,278.55'
R = 5,730.00'
SE = 0.04
DS = 60 MPH

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 3:1 or Flatter, Fill Slope
Min. D = 1.0 Ft.
FROM -L- STA. 191+50 TO STA. 196+26 RT

DETAIL 5
TOE PROTECTION
(Not to Scale)
Natural Ground, b, 2:1 or Flatter, Fill Slope, d, Geotextile
d=1.5 Ft.
b=3.0 Ft.
Type of Liner= Class 'B' Rip-Rap
FROM -L- STA. 198+50 TO STA. 210+64 LT
FROM -L- STA. 201+50 TO STA. 202+64 RT

DETAIL 14
STANDARD BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, Natural Ground, B
Min. D= 1.0 Ft.
B= 4.0 Ft.
-L- STA. 201+70 LT

DETAIL 7
LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 2:1, d, D, 2:1, b, 1'/Ft., Fill Slope, GEOTEXTILE, B
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
b= 5.0 Ft.
*When B is < 6.0'
Type of Liner= Class 'B' Rip-Rap
FROM -L- STA. 197+50 TO STA. 201+40 RT
FROM -L- STA. 201+74 TO STA. 204+00 LT



BM-14 ELEV. 923.74'
RR SPIKE FLUSH IN PAVEMENT
CTR SR 1468 HENDERSON RD
97.33' RT OF -L- STA. 190+54.51

DITCH LEGEND
LEFT DITCH
RIGHT DITCH

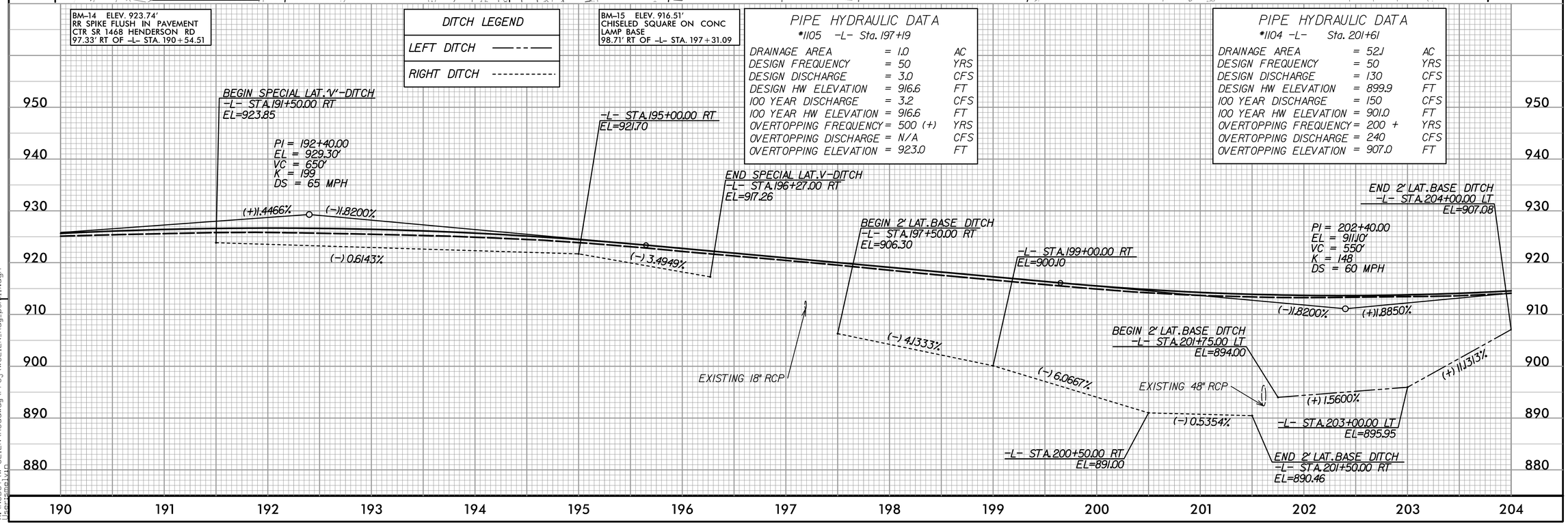
BM-15 ELEV. 916.51'
CHISELED SQUARE ON CONC LAMP BASE
98.71' RT OF -L- STA. 197+31.09

PIPE HYDRAULIC DATA
*1105 -L- Sta. 197+19

DRAINAGE AREA	= 1.0	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 3.0	CFS
DESIGN HW ELEVATION	= 916.6	FT
100 YEAR DISCHARGE	= 3.2	CFS
100 YEAR HW ELEVATION	= 916.6	FT
OVERTOPPING FREQUENCY	= 500 (+)	YRS
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING ELEVATION	= 923.0	FT

PIPE HYDRAULIC DATA
*1104 -L- Sta. 201+61

DRAINAGE AREA	= 52.1	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 130	CFS
DESIGN HW ELEVATION	= 899.9	FT
100 YEAR DISCHARGE	= 150	CFS
100 YEAR HW ELEVATION	= 901.0	FT
OVERTOPPING FREQUENCY	= 200 +	YRS
OVERTOPPING DISCHARGE	= 240	CFS
OVERTOPPING ELEVATION	= 907.0	FT



REVISIONS

9/13/2018
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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: JAMES C. DEPAY, SEAL 35018, ENGINEER, JIMMY L. TERRY — 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER: BENJAMIN J. HENSCHKE, SEAL 044158, ENGINEER — 9/13/2018 7:39:33 AM

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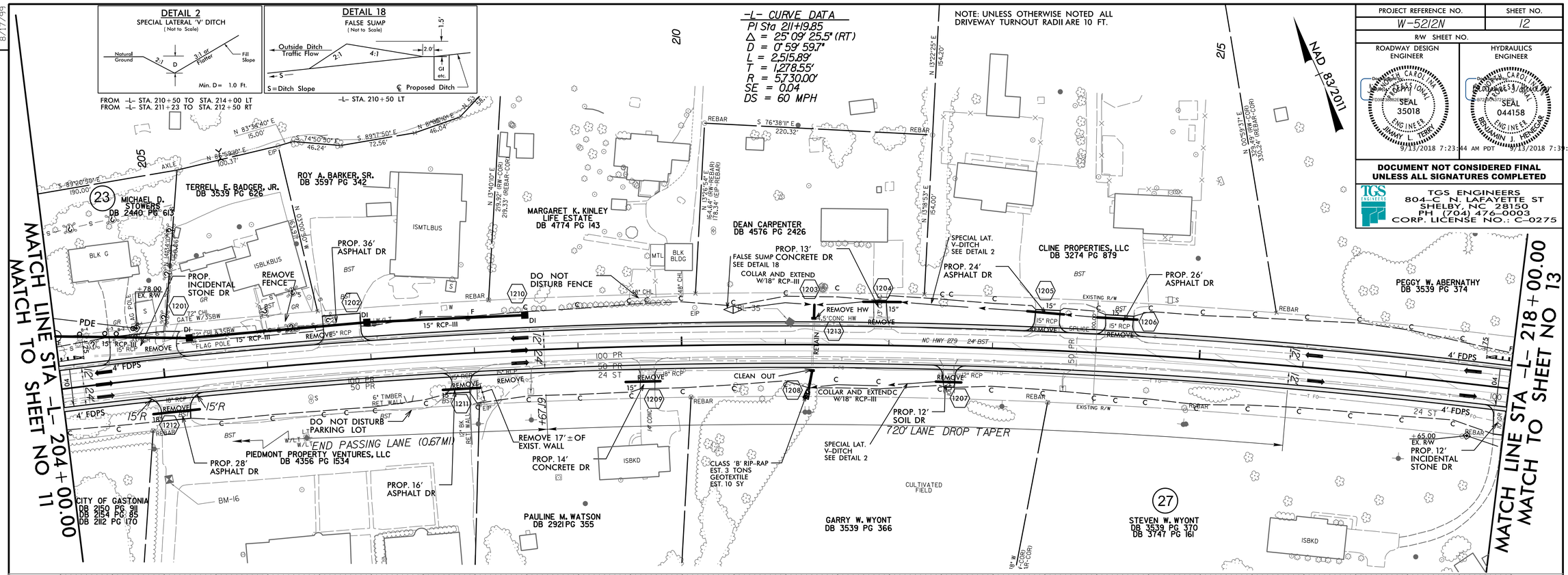
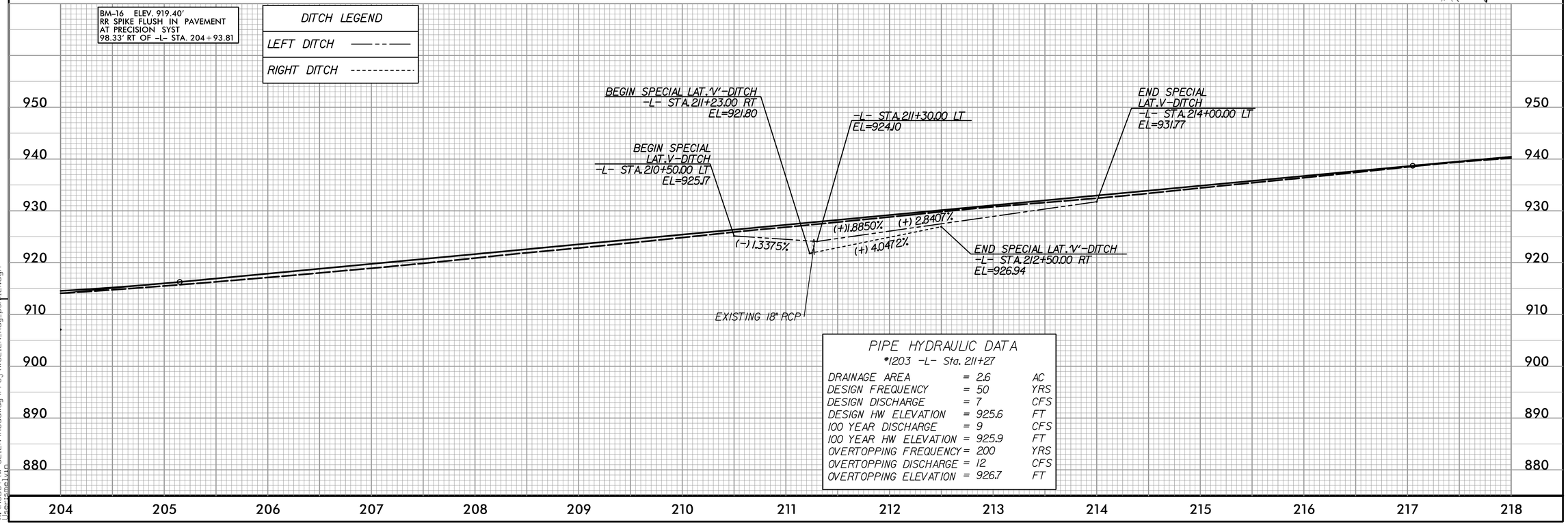
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



BM-16 ELEV. 919.40'
RR SPIKE FLUSH IN PAVEMENT
AT PRECISION SYST
98.33' RT OF -L- STA. 204+93.81

DITCH LEGEND

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



PIPE HYDRAULIC DATA
*1203 -L- Sta. 211+27

DRAINAGE AREA	= 2.6	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 7	CFS
DESIGN HW ELEVATION	= 925.6	FT
100 YEAR DISCHARGE	= 9	CFS
100 YEAR HW ELEVATION	= 925.9	FT
OVERTOPPING FREQUENCY	= 200	YRS
OVERTOPPING DISCHARGE	= 12	CFS
OVERTOPPING ELEVATION	= 926.7	FT

REVISIONS

8/17/99

9/13/2018
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bsersemelvin

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	13
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — SEAL 35018 — JIMMY L. TERRY — 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER — SEAL 044158 — BENJAMIN L. HENSLEY — 9/13/2018 7:39:33 AM

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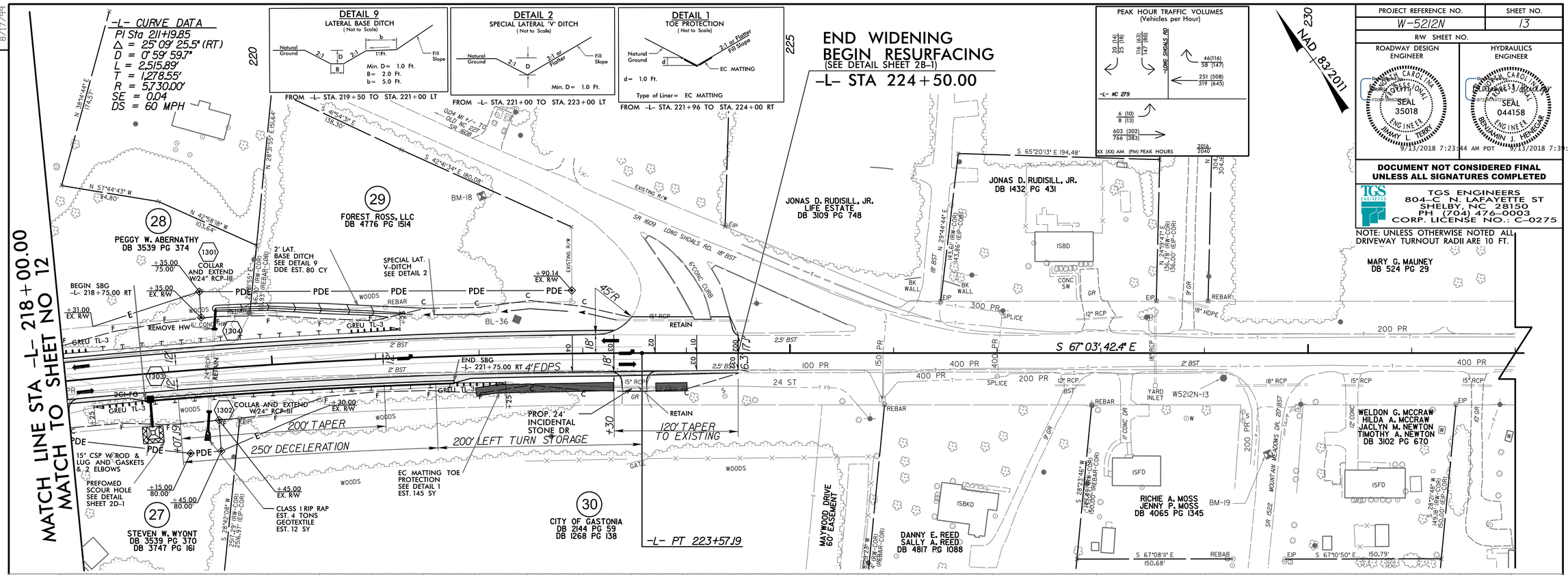
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.



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jbergsmelvin

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	14
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: JIMMY L. TERRY, SEAL 35018, 9/13/2018 7:23:44 AM PDT

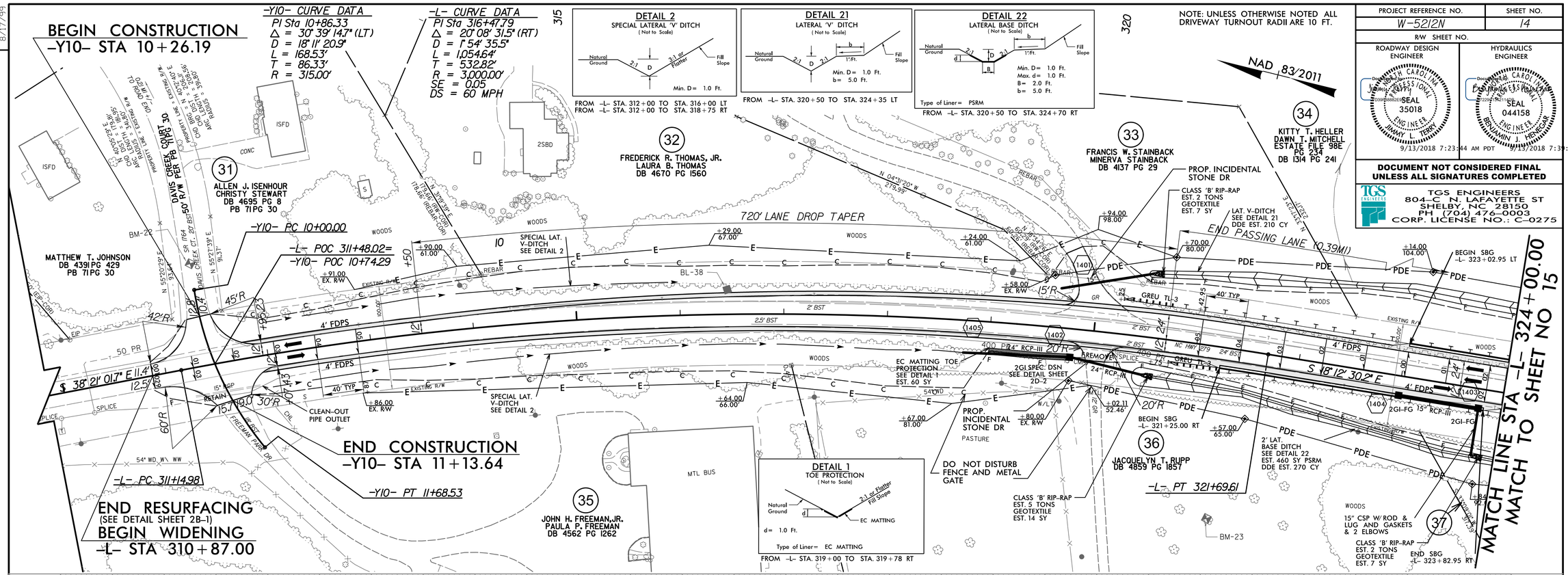
HYDRAULICS ENGINEER: BENJAMIN J. HENGEMIHLE, SEAL 044158, 9/13/2018 7:39:33 AM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

NAD 83/2011



REVISIONS

8/17/99

9/13/2018
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bsemelvin

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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	15
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — Donald W. Lynch, Jr. — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY — 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER — Benjamin J. Henson — NORTH CAROLINA PROFESSIONAL SEAL 044158 ENGINEER BENJAMIN J. HENSON — 9/13/2018 7:39:33 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

NAD 83/2011

DETAIL 5
TOE PROTECTION (Not to Scale)

Natural Ground; 2:1 or Flatter Fill Slope; b; d; d=1.5 Ft. b=3.0 Ft.; Geotextile

Type of Liner= Class 'B' Rip-Rap

FROM -L- STA. 333+80 TO STA. 335+30 RT

DETAIL 22
LATERAL BASE DITCH (Not to Scale)

Natural Ground; 2:1; D; d; B; b; 1'Ft.; Fill Slope

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

Type of Liner= PSRM

FROM -L- STA. 324+00 TO STA. 324+70 RT

DETAIL 21
LATERAL 'V' DITCH (Not to Scale)

Natural Ground; 2:1; D; b; 1'Ft.; Fill Slope

Min. D= 1.0 Ft. b= 5.0 Ft.

FROM -L- STA. 324+00 TO STA. 324+35 LT

DETAIL 2
SPECIAL LATERAL 'V' DITCH (Not to Scale)

Natural Ground; 2:1; D; 3:1 or Flatter; Fill Slope

Min. D= 1.0 Ft.

FROM -L- STA. 327+00 TO STA. 329+65 RT
FROM -L- STA. 330+60 TO STA. 332+00 RT
FROM -L- STA. 337+00 TO STA. 338+00 RT

DETAIL 9
LATERAL BASE DITCH (Not to Scale)

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

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

FROM -L- STA. 332+50 TO STA. 333+80 RT

DETAIL 7
LATERAL BASE DITCH (Not to Scale)

Natural Ground; 2:1; d; D; 2:1; b; 1'Ft.; Fill Slope; GEOTEXTILE; B

*When B is < 6.0'

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

Type of Liner= Class 'B' Rip-Rap

FROM -L- STA. 334+85 TO STA. 336+50 LT
FROM -L- STA. 335+50 TO STA. 337+00 RT

DETAIL 14
STANDARD BASE DITCH (Not to Scale)

Natural Ground; 2:1; D; 2:1; Natural Ground; B

Min. D= 1.0 Ft. B= 4.0 Ft.

-L- STA. 335+50 RT

DETAIL 25
CHANNEL IMPROVEMENTS UPSTREAM (Not to Scale)

Natural Ground; 2:1; Stream Bed; 2:1; Class 'I' Rip-Rap*; T; Natural Ground

EST. 70 CY EXCAVATION
EST. 95 TONS CLASS 'I' RIP-RAP

T= 2.0 Ft.
H= 1.5 Ft.

*CLASS 'I' RIP-RAP IS TO BE BACKFILLED WITH NATIVE MATERIAL TO REMOVE VOIDS

-L- STA. 324+70 RT

DETAIL 26
CHANNEL IMPROVEMENTS DOWNSTREAM (Not to Scale)

Natural Ground; 2:1; Stream Bed; 2:1; Class 'I' Rip-Rap*; T; Natural Ground

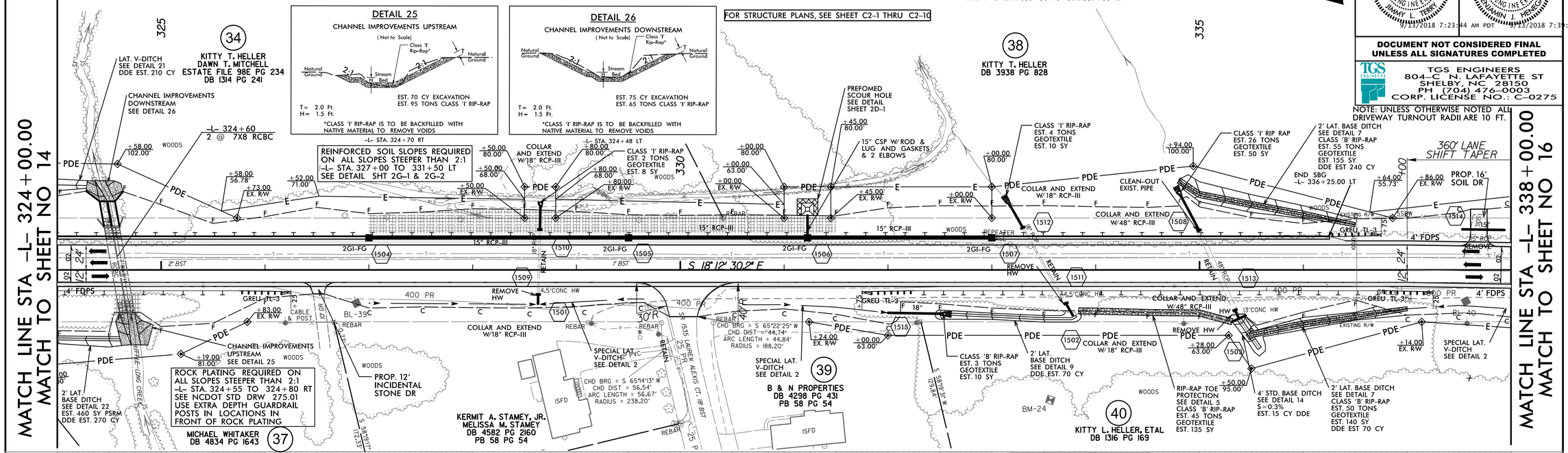
EST. 75 CY EXCAVATION
EST. 65 TONS CLASS 'I' RIP-RAP

T= 2.0 Ft.
H= 1.5 Ft.

*CLASS 'I' RIP-RAP IS TO BE BACKFILLED WITH NATIVE MATERIAL TO REMOVE VOIDS

-L- STA. 324+48 LT

FOR STRUCTURE PLANS, SEE SHEET C2-1 THRU C2-10



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

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 750	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 816.6	FT
BASE DISCHARGE	= 919	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 817.7	FT
OVERTOPPING DISCHARGE	= 2300	CFS
OVERTOPPING FREQUENCY	= 500 (+)	YRS
OVERTOPPING ELEVATION	= 828.5	FT

PIPE HYDRAULIC DATA
*1501 -L- Sta. 328+64

DRAINAGE AREA	= 1.5	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 8	CFS
DESIGN HW ELEVATION	= 825.3	FT
100 YEAR DISCHARGE	= 9	CFS
100 YEAR HW ELEVATION	= 825.5	FT
OVERTOPPING FREQUENCY	= >500 (+)	YRS
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING ELEVATION	= 827.3	FT

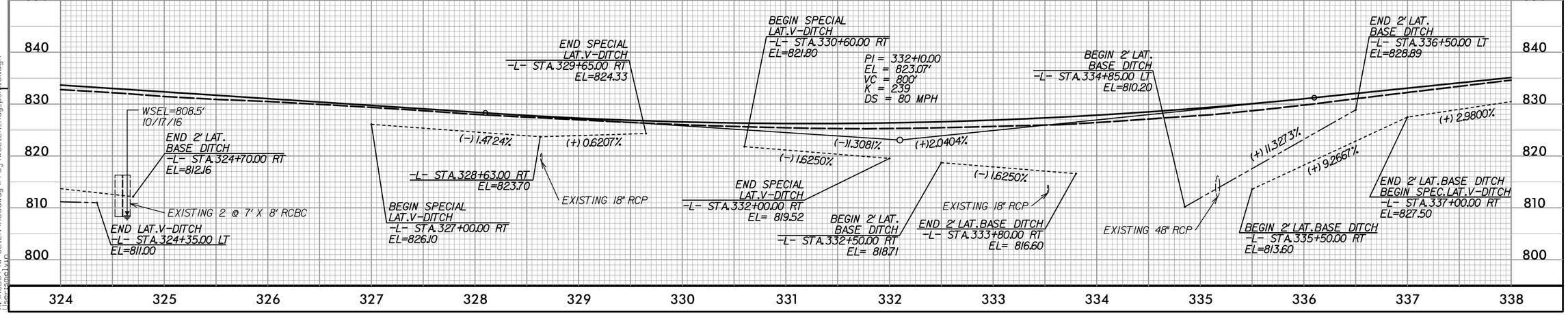
PIPE HYDRAULIC DATA
*1502 -L- Sta. 333+53

DRAINAGE AREA	= 4.7	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 13	CFS
DESIGN HW ELEVATION	= 819.3	FT
100 YEAR DISCHARGE	= 16	CFS
100 YEAR HW ELEVATION	= N/A	FT
OVERTOPPING FREQUENCY	= 50 (+)	YRS
OVERTOPPING DISCHARGE	= 14	CFS
OVERTOPPING ELEVATION	= 819.4	FT

BM-24 ELEV. 824.38'
RR SPIKE IN BASE
20" SWEET GUM
125.24' RT OF -L- STA. 333+56.31

PIPE HYDRAULIC DATA
*1503 -L- Sta. 335+17

DRAINAGE AREA	= 64	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 130	CFS
DESIGN HW ELEVATION	= 819.3	FT
100 YEAR DISCHARGE	= 150	CFS
100 YEAR HW ELEVATION	= N/A	FT
OVERTOPPING FREQUENCY	= 50+	YRS
OVERTOPPING DISCHARGE	= 125	CFS
OVERTOPPING ELEVATION	= 819.4	FT



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bsemelvin

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	16
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: Digitally signed by CAROLINA JOHNSON-CHASS TONY SEAL 35018 ENGINEER JIMMY L. TERRY 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER: Digitally signed by CAROLINA JOHNSON-CHASS TONY SEAL 044158 ENGINEER BENJAMIN J. HENGEBOER 9/13/2018 7:39:33 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

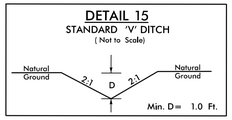
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

8/17/99

REVISIONS

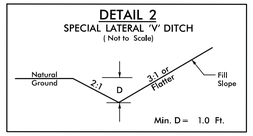
MATCH LINE STA -L- 338+00.00
MATCH TO SHEET NO 15

DETAIL 15
STANDARD 'V' DITCH
(Not to Scale)



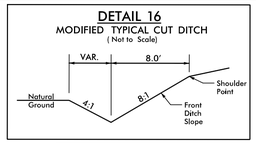
-L- STA. 344+05 LT

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



FROM -L- STA. 344+30 TO STA. 349+00 RT

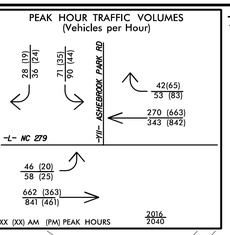
DETAIL 16
MODIFIED TYPICAL CUT DITCH
(Not to Scale)



FROM -L- STA. 345+05 TO STA. 347+10 LT

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

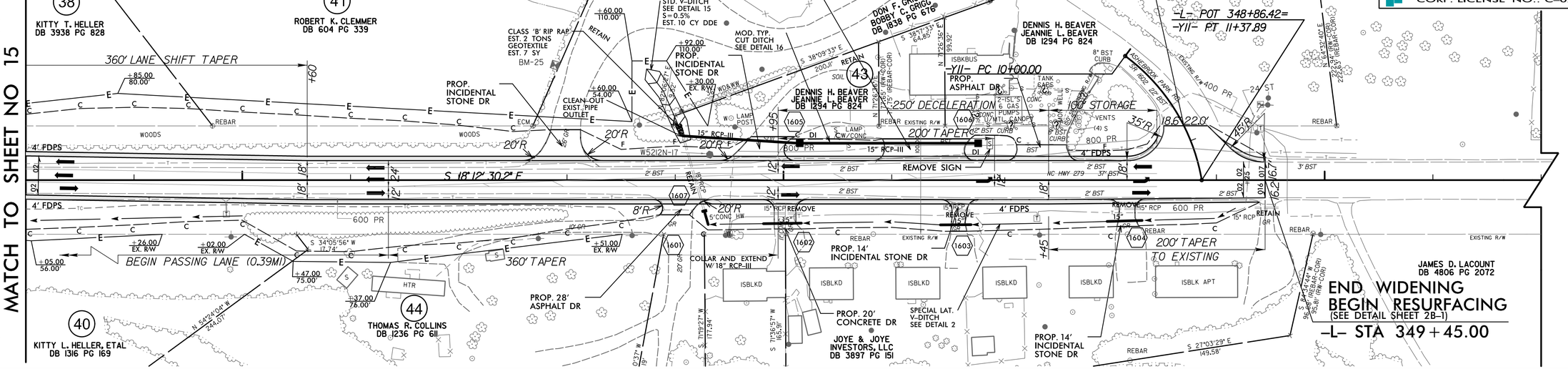
PEAK HOUR TRAFFIC VOLUMES
(Vehicles per Hour)



-Y11- CURVE DATA
PI Sta 10+72.53
Δ = 43° 53' 27.3" (RT)
D = 31° 49' 51.6"
L = 137.89'
T = 72.53'
R = 180.00'

NAD 83/2011

BEGIN CONSTRUCTION
-Y11- STA 10+84.96



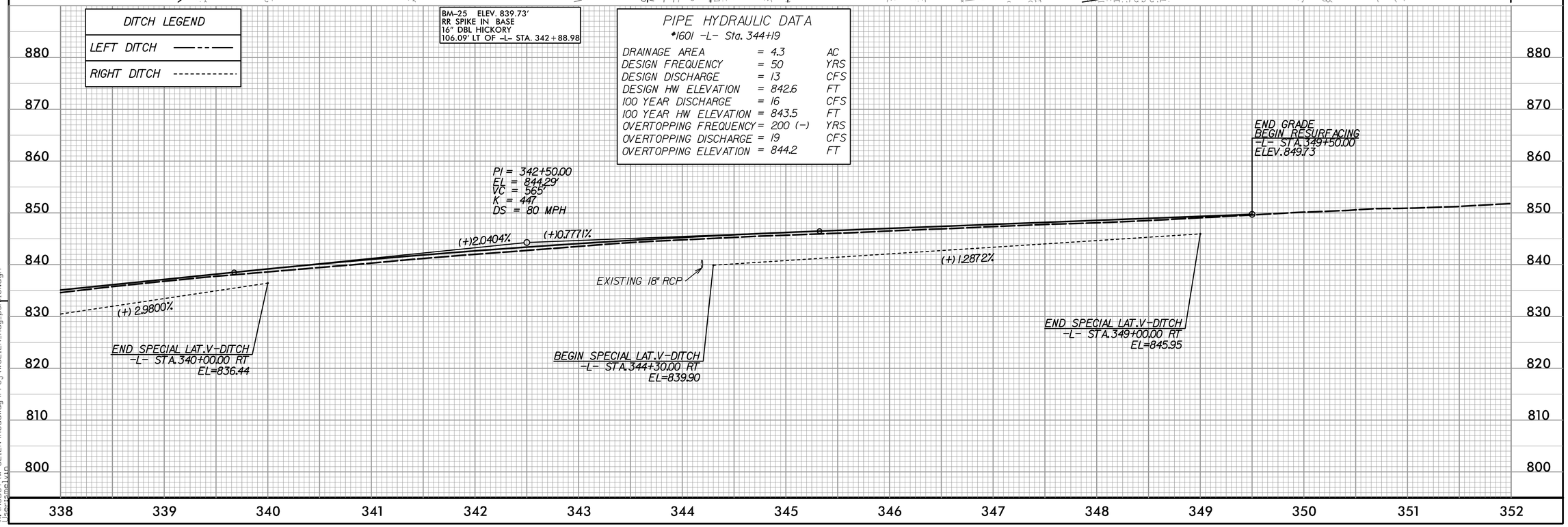
BM-25 ELEV. 839.73'
RR SPIKE IN BASE
16" DBL HICKORY
106.09' LT OF -L- STA. 342+88.98

DITCH LEGEND

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

PIPE HYDRAULIC DATA
*1601 -L- Sta. 344+19

DRAINAGE AREA	= 4.3	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 13	CFS
DESIGN HW ELEVATION	= 842.6	FT
100 YEAR DISCHARGE	= 16	CFS
100 YEAR HW ELEVATION	= 843.5	FT
OVERTOPPING FREQUENCY	= 200 (-)	YRS
OVERTOPPING DISCHARGE	= 19	CFS
OVERTOPPING ELEVATION	= 844.2	FT



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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	17
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — SEAL 35018 — JIMMY L. TERRY — 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER — SEAL 044158 — BENJAMIN J. HERSCHER — 9/13/2018 7:39:33 AM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

REVISIONS 8/17/99

PEAK HOUR TRAFFIC VOLUMES (Vehicles per Hour)

-L- NC 279: 230 (626) / 292 (795); 11 (12) / 14 (15); 558 (370) / 709 (470); 114 (70) / 145 (89)

-Y12- WHITE JENKINS RD: 53 (112) / 67 (142); 5 (10) / 6 (12)

XX (XX) AM (PM) PEAK HOURS — 2016 / 2040

-Y12- CURVE DATA
PI Sta 11+04.00
Δ = 25° 09' 56.8" (LT)
D = 23° 52' 23.7"
L = 105.41'
T = 53.57'
R = 240.00'

-L- CURVE DATA

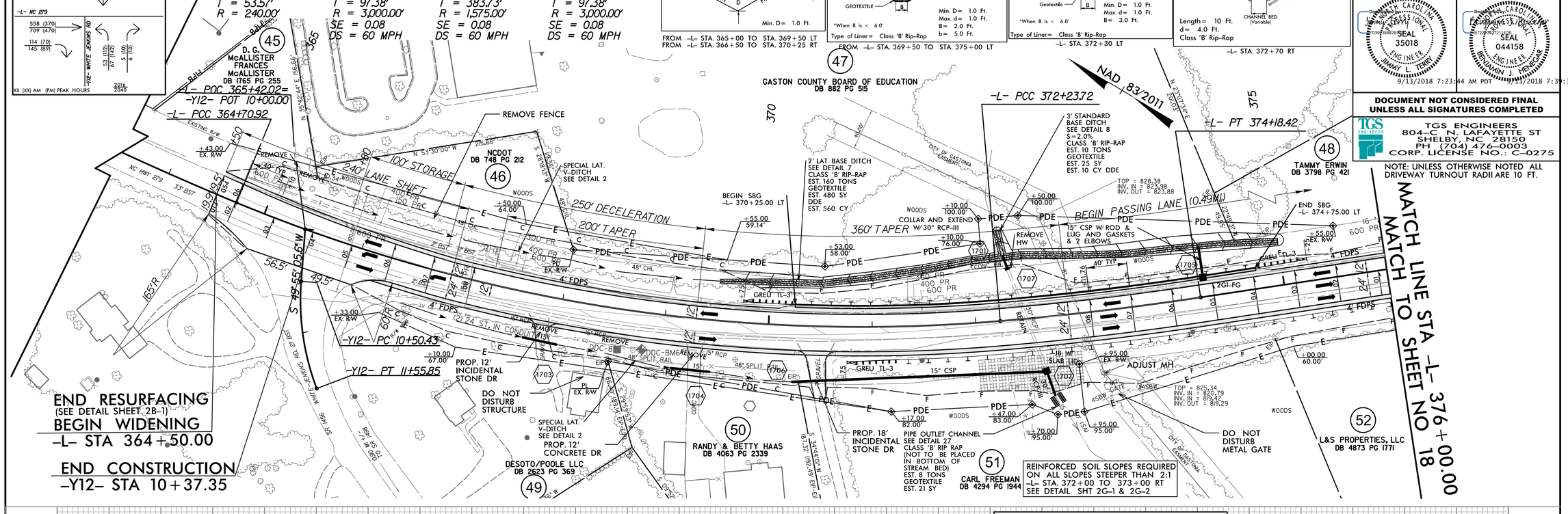
PI Sta 363+73.61	PI Sta 368+54.66	PI Sta 373+21.11
Δ = 3° 43' 06.6" (LT)	Δ = 27° 23' 07.9" (LT)	Δ = 3° 43' 06.6" (LT)
D = 1° 54' 35.5"	D = 3° 38' 16.2"	D = 1° 54' 35.5"
L = 194.70'	L = 752.80'	L = 194.70'
T = 97.38'	T = 383.73'	T = 97.38'
R = 3,000.00'	R = 1,575.00'	R = 3,000.00'
SE = 0.08	SE = 0.08	SE = 0.08
DS = 60 MPH	DS = 60 MPH	DS = 60 MPH

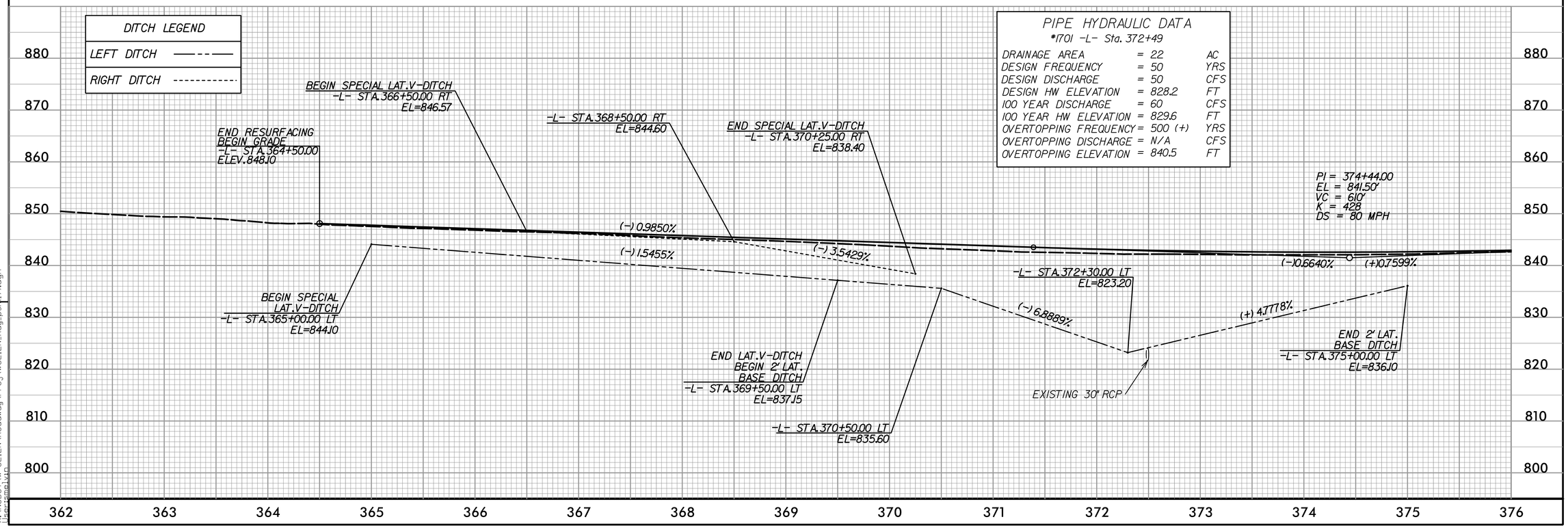
DETAIL 2 — SPECIAL LATERAL 'V' DITCH (Not to Scale)
Natural Ground; 2:1; D; 3:1 or Flatter; Fill Slope; Min. D = 1.0 Ft.
FROM -L- STA. 365+00 TO STA. 369+50 LT
FROM -L- STA. 366+50 TO STA. 370+25 RT

DETAIL 7 — LATERAL BASE DITCH (Not to Scale)
Natural Ground; 2:1; d; D; 2:1; b; 1'/ft.; Fill Slope; GEOTEXTILE; B
Min. D = 1.0 Ft. Max. d = 1.0 Ft. B = 2.0 Ft. b = 5.0 Ft.
*When B is < 6.0'
Type of Liner = Class 'B' Rip-Rap
FROM -L- STA. 369+50 TO STA. 375+00 LT

DETAIL 8 — STANDARD BASE DITCH (Not to Scale)
Natural Ground; 2:1; D; 2:1; Natural Ground; Geotextile; B
Min. D = 1.0 Ft. Max. d = 1.0 Ft. B = 3.0 Ft.
*When B is < 6.0'
Type of Liner = Class 'B' Rip-Rap
-L- STA. 372+30 LT

DETAIL 27 — PIPE OUTLET CHANNEL (Not to Scale)
Natural Ground; Existing Grade; Min. 1.5' to 1.0' Freeboard; Min. 1.5' to 1.0' Freeboard; Natural Ground; d; CHANNEL BED (Variable)
Length = 10 Ft.
d = 4.0 Ft.
Class 'B' Rip-Rap
-L- STA. 372+70 RT





PIPE HYDRAULIC DATA
*1701 -L- Sta. 372+49

DRAINAGE AREA	= 22	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 50	CFS
DESIGN HW ELEVATION	= 828.2	FT
100 YEAR DISCHARGE	= 60	CFS
100 YEAR HW ELEVATION	= 829.6	FT
OVERTOPPING FREQUENCY	= 500 (+)	YRS
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING ELEVATION	= 840.5	FT

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jscarmelo

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8/17/99

REVISIONS

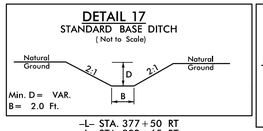
PROJECT REFERENCE NO.	SHEET NO.
W-5212N	18
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY — 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER — DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED — NORTH CAROLINA PROFESSIONAL SEAL 044158 ENGINEER BENJAMIN J. HENEGAR — 9/13/2018 7:39:33 AM

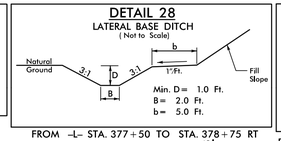
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

DETAIL 17
STANDARD BASE DITCH
(Not to Scale)



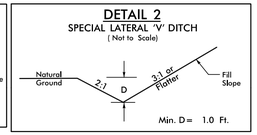
-L- STA. 377+50 RT
-L- STA. 382+65 RT

DETAIL 28
LATERAL BASE DITCH
(Not to Scale)



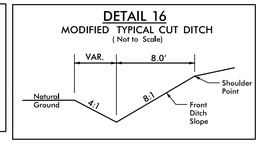
FROM -L- STA. 377+50 TO STA. 378+75 RT

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



FROM -L- STA. 377+80 TO STA. 378+50 LT
FROM -L- STA. 380+80 TO STA. 383+50 LT
FROM -L- STA. 386+00 TO STA. 390+00 LT

DETAIL 16
MODIFIED TYPICAL CUT DITCH
(Not to Scale)



FROM -L- STA. 379+50 TO STA. 380+50 LT

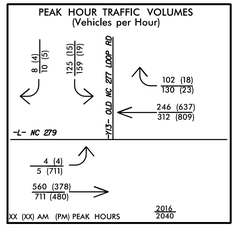
DETAIL 29
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

FROM -L- STA. 378+75 TO STA. 380+50 RT
FROM -L- STA. 381+00 TO STA. 384+00 RT

-L- CURVE DATA
PI Sta 386+55.08
Δ = 0° 11' 48.9" (RT)
D = 0° 02' 17.5"
L = 515.54'
T = 257.77'
R = 150,000.00'
SE = NC
DS = 60 MPH

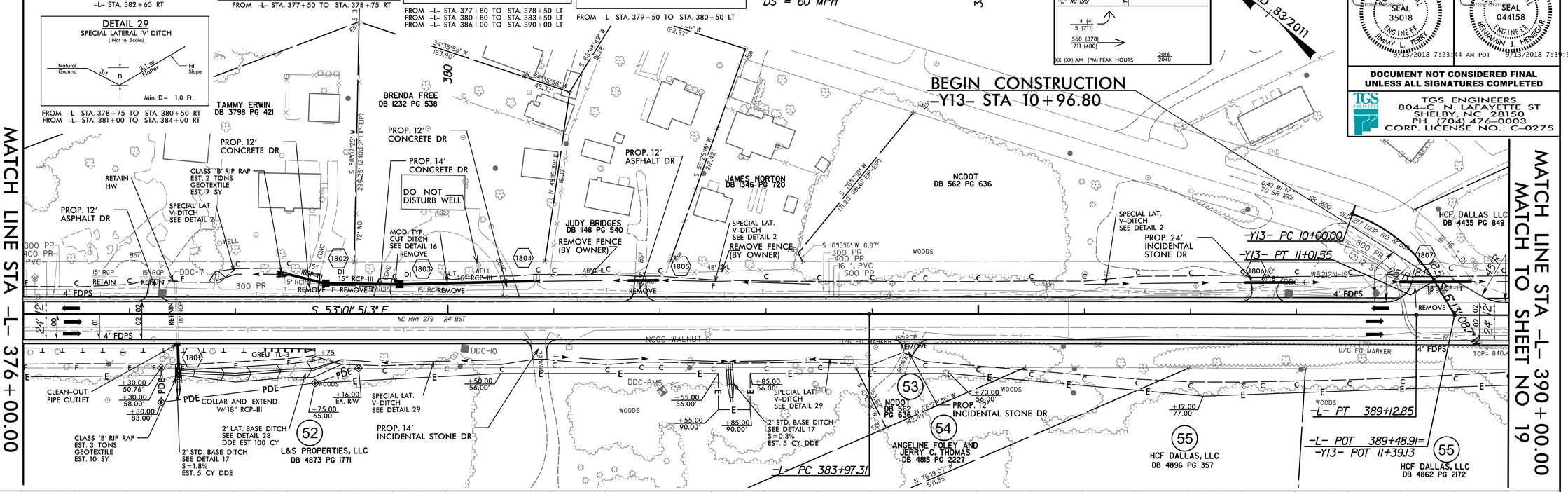
-Y13- CURVE DATA
PI Sta 10+52.96
Δ = 40° 07' 42.2" (RT)
D = 39° 30' 51.6"
L = 101.55'
T = 52.96'
R = 145.00'

PEAK HOUR TRAFFIC VOLUMES
(Vehicles per Hour)



NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

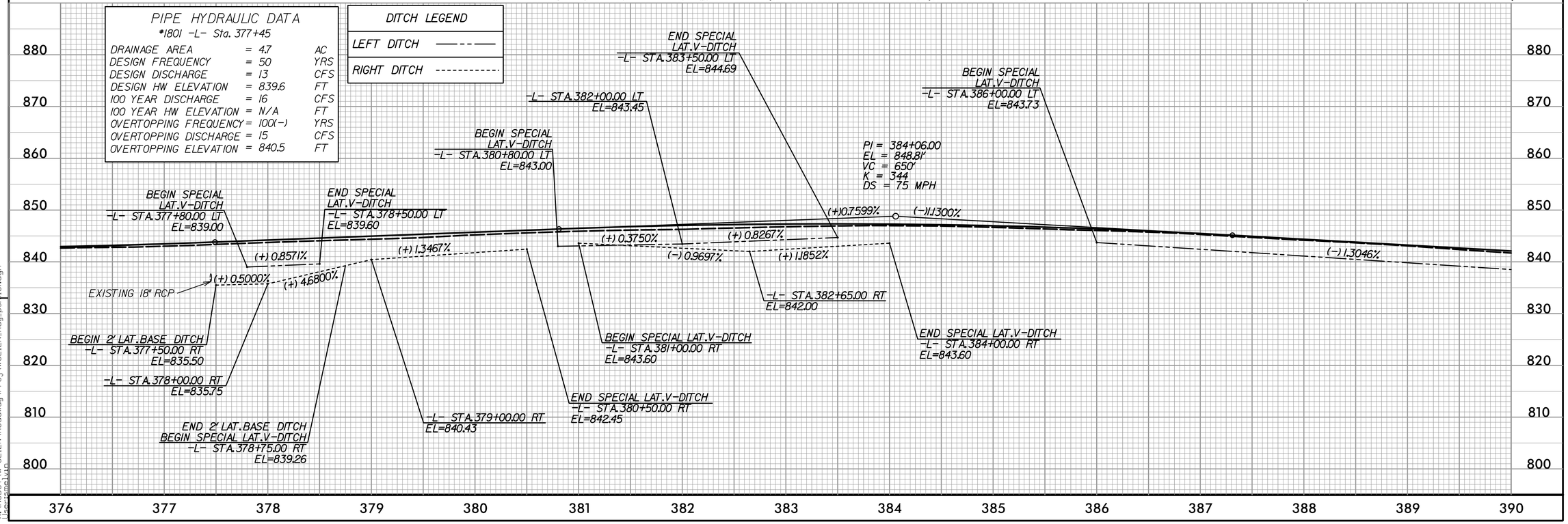
NAD 83/2011



PIPE HYDRAULIC DATA
*1801 -L- Sta. 377+45

DRAINAGE AREA	=	4.7	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	13	CFS
DESIGN HW ELEVATION	=	839.6	FT
100 YEAR DISCHARGE	=	16	CFS
100 YEAR HW ELEVATION	=	N/A	FT
OVERTOPPING FREQUENCY	=	100(-)	YRS
OVERTOPPING DISCHARGE	=	15	CFS
OVERTOPPING ELEVATION	=	840.5	FT

DITCH LEGEND
LEFT DITCH
RIGHT DITCH



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jbergsmelvin

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	19
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: JAMES L. TERRY, SEAL 35018, 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER: BENJAMIN J. HENEGAN, SEAL 044158, 9/13/2018 7:39:33 AM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

8/17/99

REVISIONS

PEAK HOUR TRAFFIC VOLUMES (Vehicles per Hour)
339 (651) / 430 (827)
6 (4) / 8 (5)
-L- NC 279
686 (387) / 871 (491)
4 (4) / 5 (5)
-Y14- APPLEWOOD RD
4 (4) / 5 (5)
4 (6) / 5 (8)
XX (XX) AM (PM) PEAK HOURS 2016 / 2040

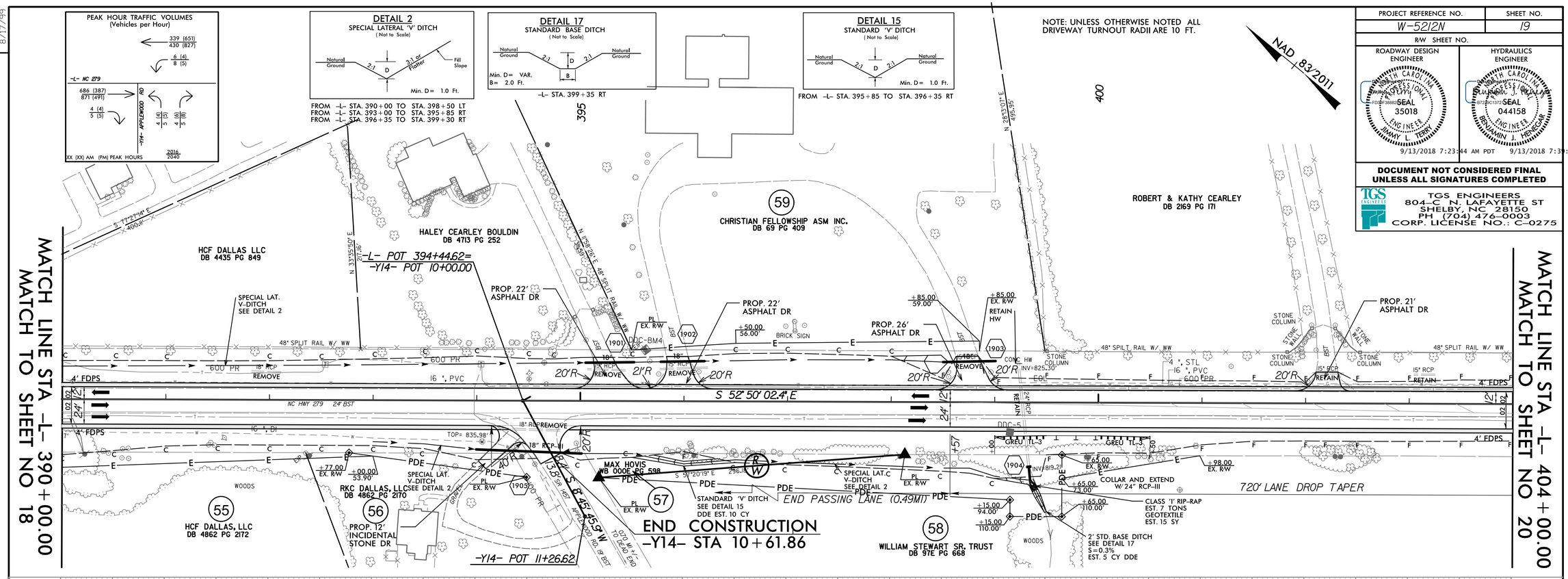
DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 3:1 or Flatter, Fill Slope
Min. D= 1.0 Ft.
FROM -L- STA. 390+00 TO STA. 398+50 LT
FROM -L- STA. 393+00 TO STA. 395+85 RT
FROM -L- STA. 396+35 TO STA. 399+30 RT

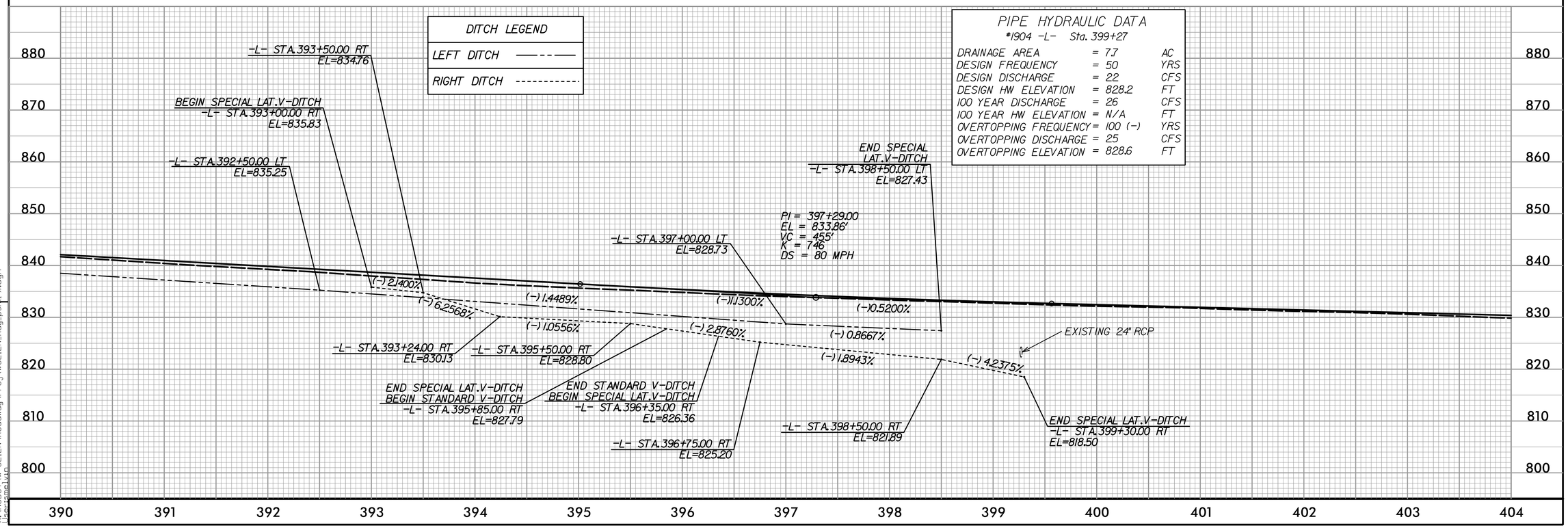
DETAIL 17
STANDARD BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, Natural Ground, B
Min. D= VAR.
B= 2.0 Ft.
-L- STA. 399+35 RT

DETAIL 15
STANDARD 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, Natural Ground
Min. D= 1.0 Ft.
FROM -L- STA. 395+85 TO STA. 396+35 RT

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

NAD 83/2011





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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 35018 ENGINEER JIMMY L. TERRY	SEAL 044158 ENGINEER BENJAMIN J. HERGER
9/13/2018 7:23:44 AM PDT	9/13/2018 7:39:33 AM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

-Y15- CURVE DATA
PI Sta 10+34.05
Δ = 19° 19' 33.2" (LT)
D = 28° 38' 52.4"
L = 67.46'
T = 34.05'
R = 200.00'

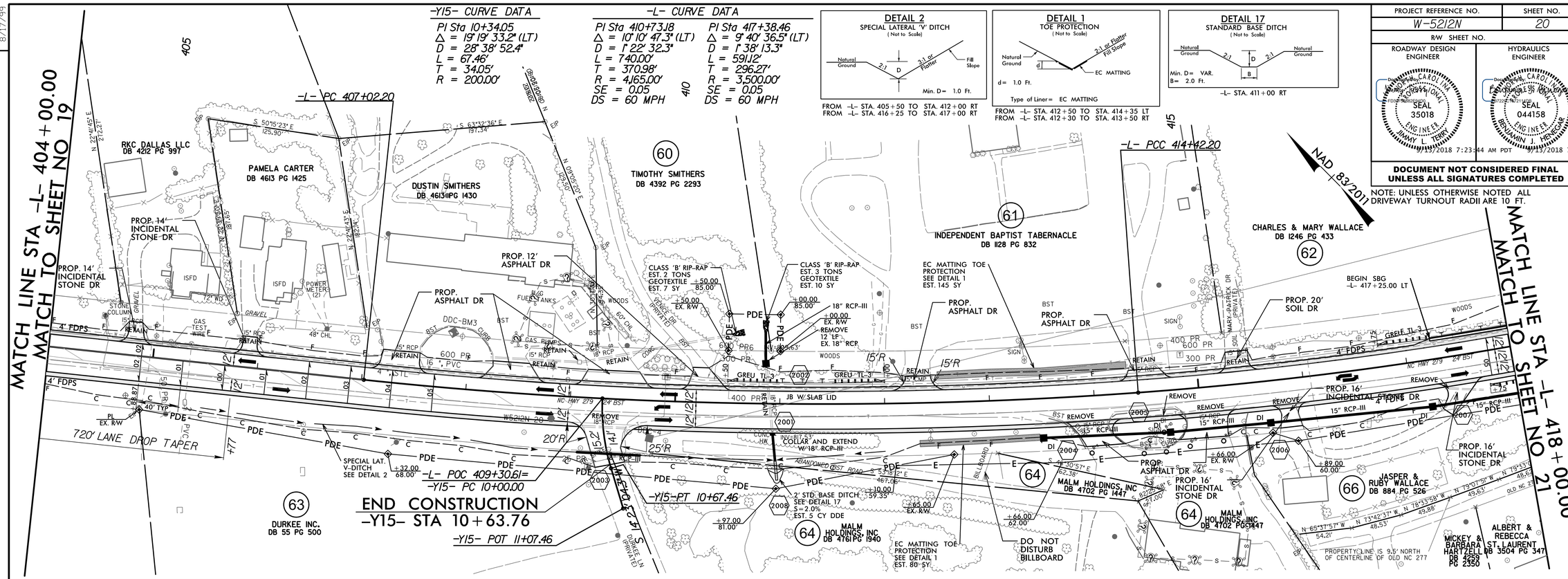
-L- CURVE DATA
PI Sta 410+73.18
Δ = 10° 10' 47.3" (LT)
D = 1° 22' 32.3"
L = 740.00'
T = 370.98'
R = 4,165.00'
SE = 0.05
DS = 60 MPH

PI Sta 417+38.46
Δ = 9° 40' 36.5" (LT)
D = 1° 38' 13.3"
L = 591.12'
T = 296.27'
R = 3,500.00'
SE = 0.05
DS = 60 MPH

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 3:1 or Flatter, Fill Slope
Min. D = 1.0 Ft.
FROM -L- STA. 405+50 TO STA. 412+00 RT
FROM -L- STA. 416+25 TO STA. 417+00 RT

DETAIL 1
TOE PROTECTION
(Not to Scale)
Natural Ground, d, 2:1 or Flatter Fill Slope, EC MATTING
d = 1.0 Ft.
Type of Liner = EC MATTING
FROM -L- STA. 412+50 TO STA. 414+35 LT
FROM -L- STA. 412+30 TO STA. 413+50 RT

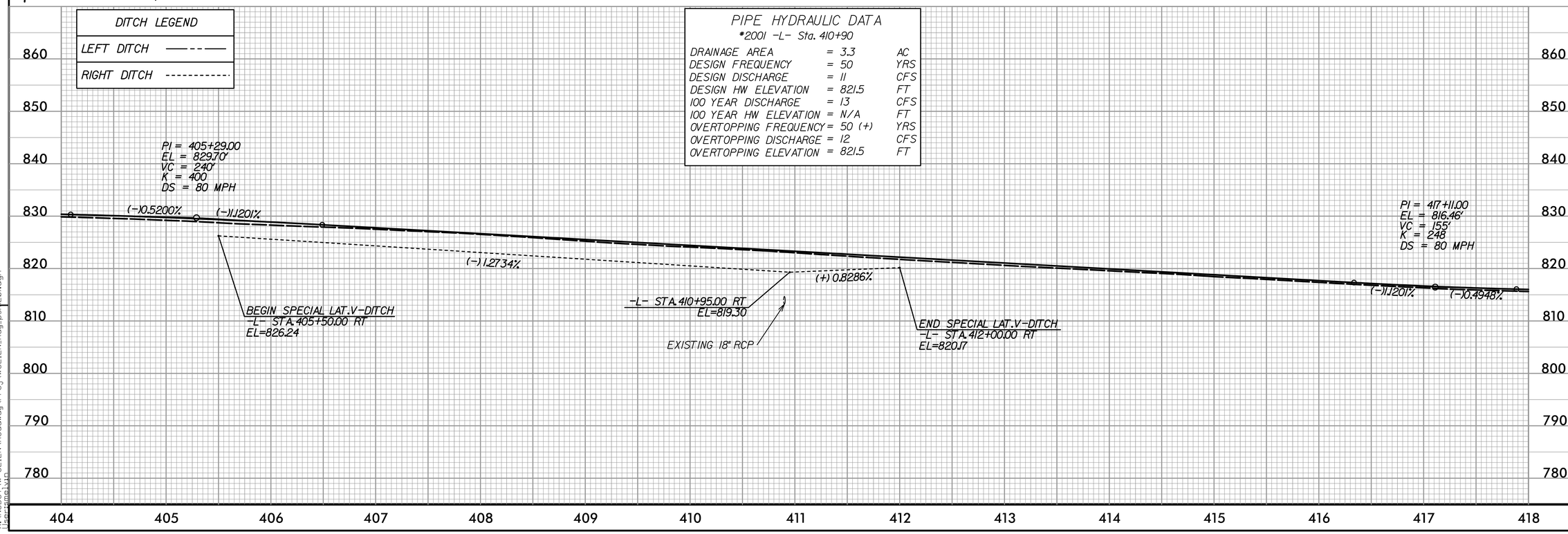
DETAIL 17
STANDARD BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, Natural Ground, B
Min. D = VAR.
B = 2.0 Ft.
-L- STA. 411+00 RT



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

PIPE HYDRAULIC DATA
*2001 -L- Sta. 410+90

DRAINAGE AREA	= 3.3	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 11	CFS
DESIGN HW ELEVATION	= 821.5	FT
100 YEAR DISCHARGE	= 13	CFS
100 YEAR HW ELEVATION	= N/A	FT
OVERTOPPING FREQUENCY	= 50 (+)	YRS
OVERTOPPING DISCHARGE	= 12	CFS
OVERTOPPING ELEVATION	= 821.5	FT



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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
W-5212N	21
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: SEAL 35018 ENGINEER JIMMY J. TERRY — 9/13/2018 7:23:44 AM PDT

HYDRAULICS ENGINEER: SEAL 044158 ENGINEER BENJAMIN J. HENEGAR — 9/13/2018 7:39:33 AM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

NAD 83/2011

-Y16- CURVE DATA
PI Sta 11+32.98
Δ = 17° 28' 52.5" (LT)
D = 15° 54' 55.8"
L = 109.84'
T = 55.35'
R = 360.00'

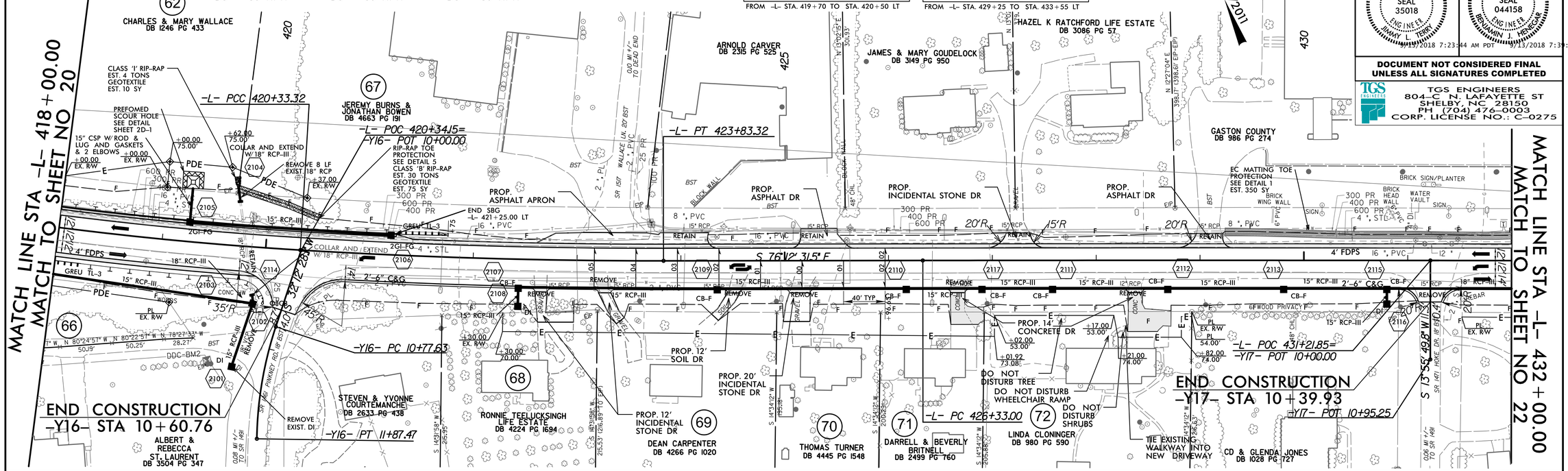
-L- CURVE DATA
PI Sta 417+38.46
Δ = 9° 40' 36.5" (LT)
D = 1° 38' 13.3"
L = 591.12'
T = 296.27'
R = 3,500.00'
SE = 0.05
DS = 60 MPH

PI Sta 422+08.38
Δ = 3° 31' 05.4" (LT)
D = 1° 00' 18.7"
L = 350.00'
T = 175.06'
R = 5,700.00'
SE = 0.05
DS = 60 MPH

PI Sta 432+68.15
Δ = 0° 21' 50.1" (RT)
D = 0° 01' 43.1"
L = 1,270.29'
T = 635.15'
R = 200,000.00'
SE = NC
DS = 60 MPH

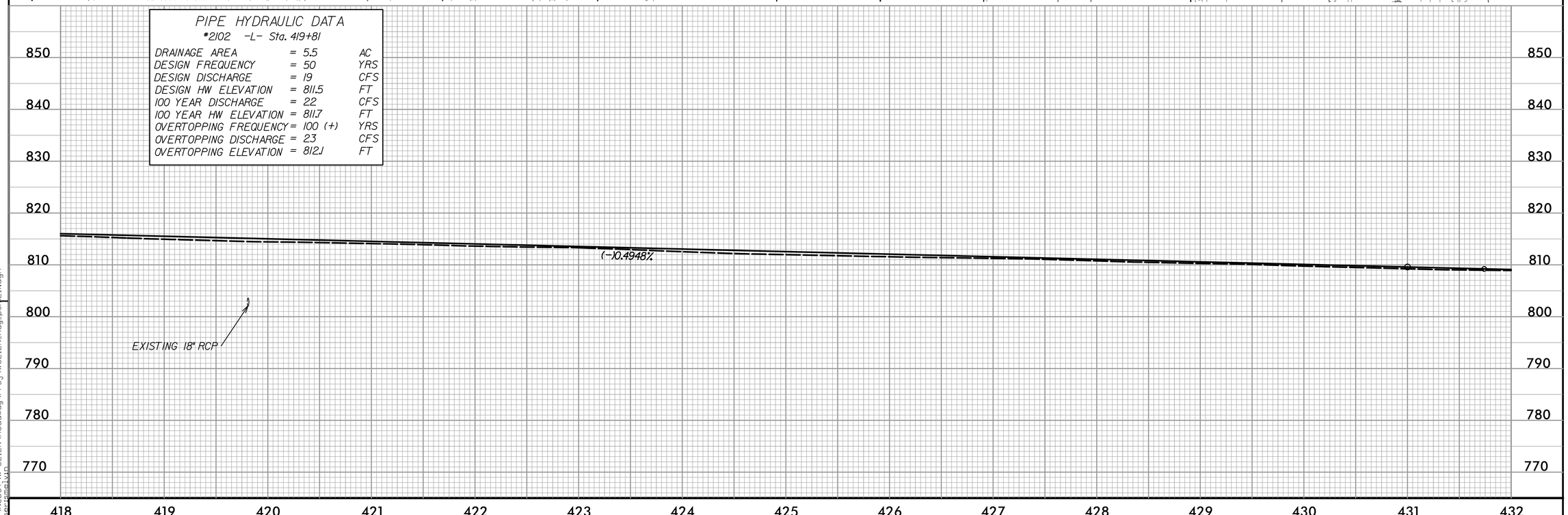
DETAIL 5
TOE PROTECTION
(Not to Scale)
Natural Ground; 2:1 or Flatter Fill Slope; b; d; Geotextile
d=1.5 Ft.
b=3.0 Ft.
Type of Liner= Class 'B' Rip-Rap
FROM -L- STA. 419+70 TO STA. 420+50 LT

DETAIL 1
TOE PROTECTION
(Not to Scale)
Natural Ground; 2:1 or Flatter Fill Slope; d; EC MATTING
d= 1.0 Ft.
Type of Liner= EC MATTING
FROM -L- STA. 429+25 TO STA. 433+55 LT



PIPE HYDRAULIC DATA
*2102 -L- Sta. 419+81

DRAINAGE AREA	= 5.5	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 19	CFS
DESIGN HW ELEVATION	= 811.5	FT
100 YEAR DISCHARGE	= 22	CFS
100 YEAR HW ELEVATION	= 811.7	FT
OVERTOPPING FREQUENCY	= 100 (+)	YRS
OVERTOPPING DISCHARGE	= 23	CFS
OVERTOPPING ELEVATION	= 812.1	FT



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User:benjamin.h

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PROJECT REFERENCE NO.	SHEET NO.
W-5212N	22
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: Digitally signed by JIMMY L. TERRY, Date: 2018.09.13 07:23:44 PDT, Email: jterry@tgsengineers.com, Company: TGS ENGINEERS, Title: PROFESSIONAL ENGINEER, SEAL 35018, NORTH CAROLINA PROFESSIONAL ENGINEER, JIMMY L. TERRY

HYDRAULICS ENGINEER: Digitally signed by BENJAMIN J. HENSLEY, Date: 2018.09.13 07:39:33 PDT, Email: bhensley@tgsengineers.com, Company: TGS ENGINEERS, Title: PROFESSIONAL ENGINEER, SEAL 044158, NORTH CAROLINA PROFESSIONAL ENGINEER, BENJAMIN J. HENSLEY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE: UNLESS OTHERWISE NOTED ALL DRIVEWAY TURNOUT RADII ARE 10 FT.

NAD 83/2011

-L- CURVE DATA
PI Sta 432+68.15
Δ = 0° 21' 50.1" (RT)
D = 0° 01' 43.1"
L = 1,270.29'
T = 635.15'
R = 200,000.00'
SE = NC
DS = 60 MPH

DETAIL 1
TOE PROTECTION
(Not to Scale)
Natural Ground, d, 2:1 or Flatter Fill Slope, EC MATTING
d = 1.0 Ft.
Type of Liner = EC MATTING
FROM -L- STA. 429+25 TO STA. 433+55 LT

DETAIL 17
STANDARD BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, Natural Ground, B
Min. D = VAR.
B = 2.0 Ft.
-L- STA. 434+00 RT

END TIP PROJECT W-5212N
-L- STA 439+00.00

MATCH LINE STA -L- 432+00.00
MATCH TO SHEET NO 21

GASTON COUNTY
DB 986 PG 274

SIERRA ATKINS & RICHARD JENNINGS
DB 4548 PG 561

BRUCE & DEBORAH GUSAN
DB 2512 PG 12

RANDY M. FUNDERBURK & WIFE BRENDA F. FUNDERBURK
DB 4844 PG 868

SHARON RATCHFORD
DB 2065 PG 876

SAMUEL E. & LEAH B. HELMS
DB 4613 PG 1408

MARANATHA INDEPENDENT BAPTIST CHURCH, INC.
DB 4639 PG 2001

-L- POT 440+28.86=
-Y18- POT 10+00.00

-L- PT 439+03.29

-Y18- POT 11+45.11

S 75°50'41.4" E

S 75°49'49" E 211.74'

150' TAPER TO EXISTING

360' LANE SHIFT TAPER

PROP. 22' ASPHALT DR

PROP. ASPHALT DR

PROP. 12' CONCRETE DR

EC MATTING TOE PROTECTION SEE DETAIL 1 EST. 350 SY

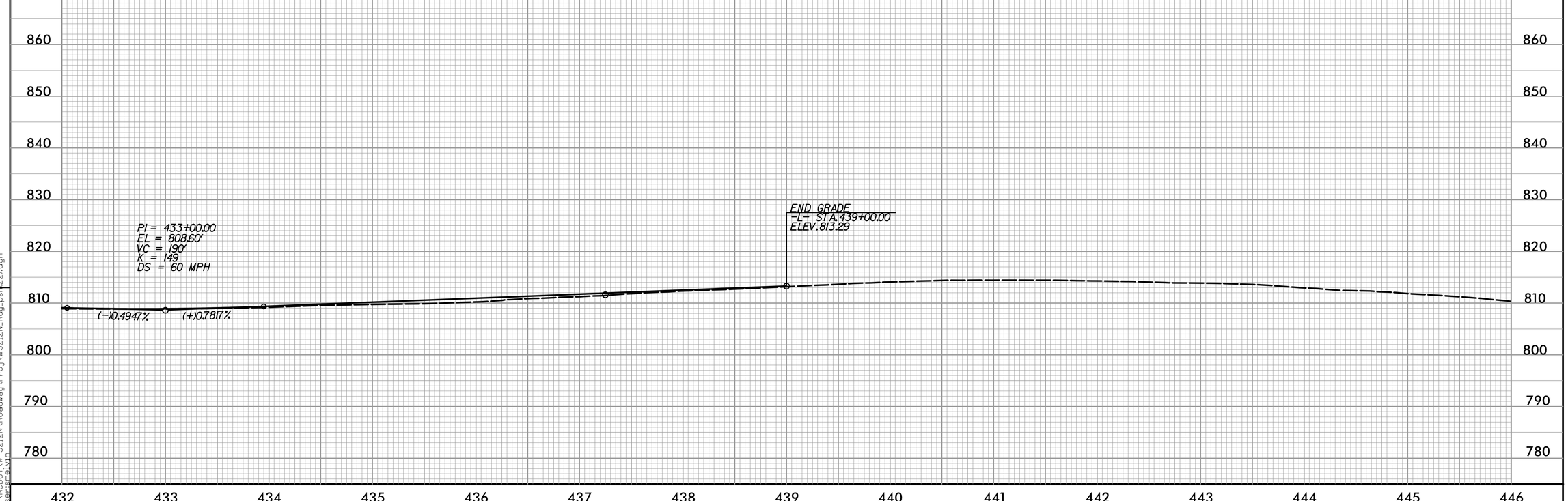
2' STD. BASE DITCH SEE DETAIL 17 S=1.0% EST. 25 CY DDE

CLASS 'B' RIP-RAP EST. 3 TONS GEOTEXTILE EST. 10 SY

DO NOT DISTURB TREES AND/OR FLOWER BEDS ON PARCEL 74 INSIDE THE PROPOSED TCE.

DO NOT DISTURB TREES

0.60 MILES +/- TO NC HWY 275



REVISIONS

8/17/99

9/13/2018
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jbernstein