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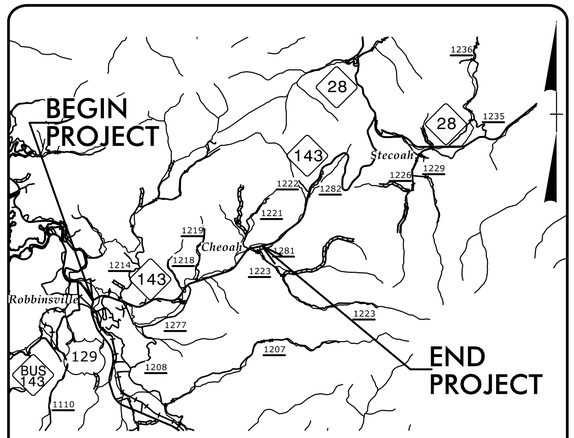
09/08/99

TIP PROJECT: A-0009CA

CONTRACT: C204731

See Sheet 1A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRAHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CA	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
32572.1.FS10	APD-0074(178)	PE
32572.2.13	0143012	ROW
32572.2.16	UNASSIGNED	UTIL.
32572.3.13	0129007	CONST.

LOCATION: UPGRADE US 129 FROM SOUTH OF SR 1275 (FIVE POINTS ROAD) TO NC 143 AND UPGRADE NC 143 FROM US 129 TO SR 1223 (BEECH CREEK ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CULVERTS, RETAINING WALLS, AND SIGNALS

NAD 83/2011

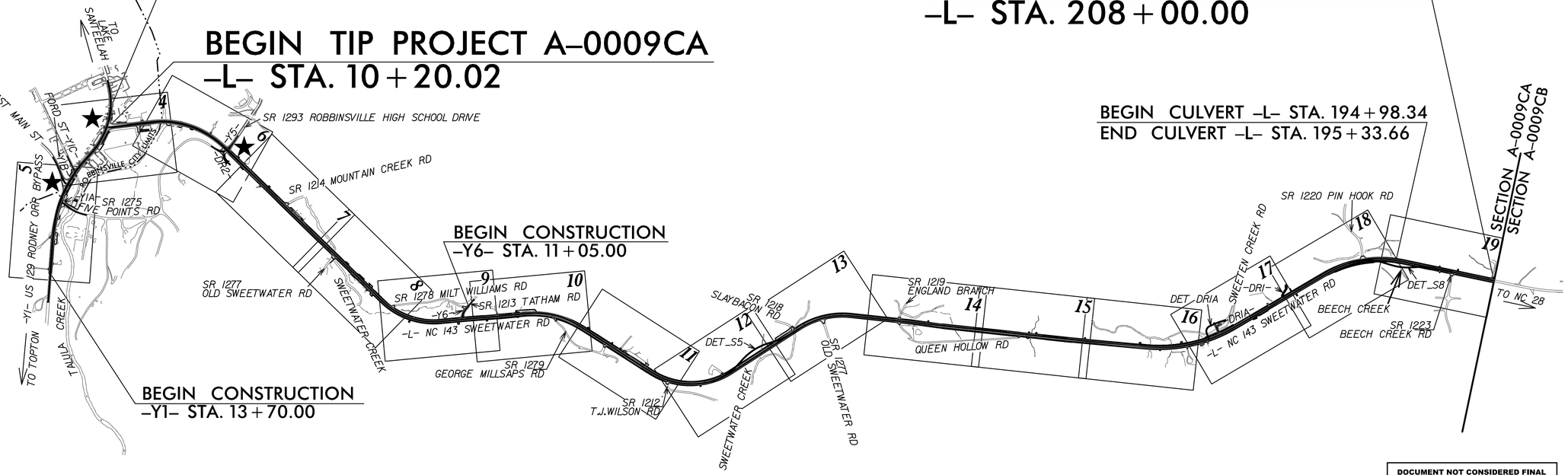
★ PROPOSED SIGNAL

END CONSTRUCTION
–Y1– STA. 37+20.00

BEGIN TIP PROJECT A-0009CA
–L– STA. 10+20.02

END TIP PROJECT A-0009CA
–L– STA. 208+00.00

BEGIN CULVERT –L– STA. 194+98.34
END CULVERT –L– STA. 195+33.66

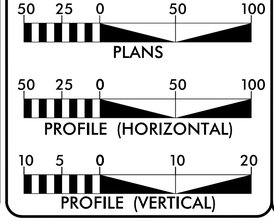


BEGIN CONSTRUCTION
–Y1– STA. 13+70.00

BEGIN CONSTRUCTION
–Y6– STA. 11+05.00

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2019 = 6300
ADT 2045 = 8800
K = 11 %
D = 57.5%
T = 7 % *

V = 50MPH – BEGIN PROJECT TO FIVE POINTS RD
60MPH – FIVE POINTS RD TO END OF PROJECT

* TTST = 2% DUAL = 5%
FUNC CLASS = RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT A-0009CA	=	3.720 MILES
LENGTH STRUCTURE TIP PROJECT A-0009CA	=	0.007 MILES
TOTAL LENGTH TIP PROJECT A-0009CA	=	3.727 MILES

NCDOT CONTACT: WANDA H. AUSTIN, PE

PLANS PREPARED BY:	PLANS PREPARED FOR:
TGS ENGINEERS 201 W. MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	NORTH CAROLINA DEPARTMENT OF TRANSPORATION DIVISION 14 252 Webster Rd Sylva, NC 28779

RIGHT OF WAY DATE: JULY 16, 2021

LETTING DATE: AUGUST 16, 2022

2018 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

AUSTIN TURNER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
7/13/2022
DocuSigned by: Benjamin J. Henegar
SIGNATURE: P.E.
NORTH CAROLINA PROFESSIONAL SEAL 044158 ENGINEER BENJAMIN J. HENEGAR

ROADWAY DESIGN ENGINEER
7/13/2022
DocuSigned by: Jimmy Terry
SIGNATURE: P.E.
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

7/13/2022
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User:smelvin

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	1A

ROADWAY DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST., STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY
DocuSigned by: Jimmy Terry FD39F38882E94D0...
5/31/2022

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1 THRU 2A-5	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B-1	ONSITE DETOUR DET_S5
2B-2	ONSITE DETOUR DET-DR1A
2B-3	ONSITE DETOUR DET_S8
2C-1 THRU 2C-3	SPECIAL DETAILS - CURB RAMP DETAILS
2C-4	SPECIAL DETAILS - GUARDRAIL INSTALLATION (W BEAM RAIL SECTION)
2C-5	SPECIAL DETAILS - 8'GUARDRAIL POST
2C-6	SPECIAL DETAILS - GUARDRAIL AT-1 END UNIT
2C-7	SPECIAL DETAILS - CHAIN LINK FENCE ON RETAINING WALL
2C-8	SPECIAL DETAILS - HANDRAIL ON WALL
2C-9	SPECIAL DETAILS - WOODRAIL IN BACK OF GUARDRAIL
2C-10	SPECIAL DETAILS - CURB RAMP DETAILS
2D-1	DRAINAGE DETAIL - CONC GRATED DROP INLET TYPE 'A' MIN. DEPTH
2D-2	DRAINAGE DETAIL - CONCRETE JUNCTION BOX
2D-3 THRU 2D-4	DRAINAGE DETAIL - CONCRETE HEADWALL
2D-5 THRU 2D-8	DRAINAGE DETAIL - DRY DETENTION BASIN #1
2D-9 THRU 2D-12	DRAINAGE DETAIL - DRY DETENTION BASIN #2
2D-13	DRAINAGE DETAIL - CONCRETE CATCH BASIN (3 OR 4 SIDE OPEN THROAT)
2G-1	GEOTECHNICAL DETAILS - ROCK PLATING
2G-2	GEOTECHNICAL DETAILS - TOE SHEAR KEY
2G-3 THRU 2G-5	GEOTECHNICAL DETAILS - GABION EROSION PROTECTION
2G-6	GEOTECHNICAL DETAILS - STANDARS TEMPORARY SHORING
2G-7 THRU 2G-9	GEOTECHNICAL DETAILS - STANDARD TEMPORARY WALL
3B-1	EARTHWORK SUMMARY & ASPHALT PAVEMENT REMOVAL SUMMARY
3B-2	GUARDRAIL SUMMARY
3D-1 THRU 3D-12	DRAINAGE SUMMARIES
3D-13	SUMMARY OF STORMWATER CONTROL MEASURES
3G-1	GEOTECHNICAL SUMMARIES
3P-1	PARCEL INDEX SHEET
4 THRU 19	PLAN SHEETS
20 THRU 28	PROFILE SHEETS
RW-01 THRU RW-19	SURVEY CONTROL SHEETS
TMP-1 THRU TMP-29	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-10	PAVEMENT MARKING PLANS
EC-1 THRU EC-38	EROSION CONTROL PLANS
RF-1	REFORESTATION DETAIL SHEET
SIGN-1 THRU SIGN-13	SIGNING PLANS
SIG-1.0 THRU SIG-4.10	SIGNAL PLANS
SIG-M1 THRU SIG-M8	STANDARD DRAWINGS FOR ALL METAL POLES
SCP-1 THRU SCP-5	SIGNAL COMMUNICATION PLANS
UC-1 THRU UC-13	UTILITIES CONSTRUCTION PLANS
UO-1 THRU UO-17	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION INDEX
X-1B THRU X-1C	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-151	CROSS-SECTIONS
STRUCTURE TITLE SHEET	
STRUCTURE - INDEX OF SHEETS	
C1-1 THRU C1-5	CULVERT PLANS - QUADRUPLE 12 FT X 12 FT RCBC, LT & RT HEADWALL/WING EXTENSION
C2-1 THRU C2-14	CULVERT PLANS - TRIPLE 12 FT X 9 FT RCBC LEFT & RIGHT EXTENSION
C3-1 THRU C3-6	CULVERT PLANS - SINGLE 7 FT X 8 FT RCBC
C4-1 THRU C4-8	CULVERT PLANS - TRIPLE 11 FT X 9.2 FT RCBC LEFT EXTENSION
C5-1 THRU C5-4	CULVERT PLANS - DBL 66" ALUMINUM PIPE WITH CONCRETE HEADWALLS
C6-1 THRU C6-7	CULVERT PLANS - DOUBLE 12 FT X 8 FT RCBC
C7-1 THRU C7-8	CULVERT PLANS - SINGLE 16 FT X 9 FT RCBC
W1/W2-1 THRU W1/W2/-2	RETAINING WALLS #1 & #2
W4-1 THRU W4-5	RETAINING WALL #4
W5-1 THRU W5-2	RETAINING WALL #5
W6-1 THRU W6-2	RETAINING WALL #6

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 AND 560.02

SIDE ROADS:

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

BERM DITCHES:

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

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 NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE DUKE ENERGY, FRONTIER, TOWN OF ROBBINSVILLE (WATER & SEWER), BALSAM WEST, AND ZITO MEDIA

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

RIGHT-OF-WAY MARKERS:

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

CURB RAMPS

CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. CONSTRUCT ALL CURB RAMPS ACCORDANCE WITH STD 848.05 and/or 848.06.

ROCK

ROCK IS ANTICIPATED BETWEEN -L- STA 187+76 TO 191+21. BLASTING MAY BE REQUIRED FOR EXCAVATION ON THE PROJECT. SEE SECTION 220 OF THE STANDARD SPECIFICATIONS AND IF APPLICABLE, ROCK BLASTING PROVISION.

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
225.03	Deceleration and Acceleration Lanes
225.04	Method of Obtaining Superelevation - Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
240.01	Guide for Berm Ditch Construction
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
560.02	Method of Shoulder Construction - High Side of Superelevated Curve - Method II
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
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
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.20	Frames and Wide Slot Flat Grates
840.22	Frames and Wide Slot Sag Grates
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 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
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.41	Spring Box - Concrete or Brick
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
846.02	Drop Inlet Installation in Expressway Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.01	Concrete Sidewalk
848.02	Driveway Turnout - Radius Type
848.04	Street Turnout
848.05	Curb Ramp - Proposed Curb & Gutter
850.01	Concrete Paved Ditches
850.10	Guide for Berm Drainage Outlet - 15" and 18" Pipe
850.11	Guide for Berm Drainage Outlet - 24" and 30" Pipe
852.01	Concrete Islands
852.06	Method for Placement of Drop Inlets in Concrete Islands
857.01	Precast Reinforced Concrete Barrier - 41" Single Faced
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
866.01	Chain Link Fence - 4', 5' and 6' High Fence
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

8/17/99
5/25/2022
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lsprewett

9/10/2021

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin (EIP) — EIP
- Computed Property Corner
- Existing Concrete Monument (ECM) — 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:

- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Secondary Horiz and Vert Control Point
- Vertical Benchmark
- Existing Right of Way Monument
- Proposed Right of Way Monument (Rebar and Cap)
- Proposed Right of Way Monument (Concrete)
- Existing Permanent Easement Monument
- Proposed Permanent Easement Monument (Rebar and Cap)
- Existing C/A Monument
- Proposed C/A Monument (Rebar and Cap)
- Proposed C/A Monument (Concrete)
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Existing Control of Access Line — CA
- Proposed Control of Access Line — CA
- Proposed ROW and CA Line — RW CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage/Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed 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 — Vlneyard

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:

** SUE – Subsurface Utility Engineering*
LOS – Level of Service – A,B,C or D (Accuracy)

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 Test Hole (SUE – LOS A)*
- U/G Power Line (SUE – LOS B)* — P
- U/G Power Line (SUE – LOS C)* — P
- U/G Power Line (SUE – LOS D)* — 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 Test Hole (SUE – LOS A)*
- U/G Telephone Cable (SUE – LOS B)* — T
- U/G Telephone Cable (SUE – LOS C)* — T
- U/G Telephone Cable (SUE – LOS D)* — T
- U/G Telephone Conduit (SUE – LOS B)* — TC
- U/G Telephone Conduit (SUE – LOS C)* — TC
- U/G Telephone Conduit (SUE – LOS D)* — TC
- U/G Fiber Optics Cable (SUE – LOS B)* — T FO
- U/G Fiber Optics Cable (SUE – LOS C)* — T FO
- U/G Fiber Optics Cable (SUE – LOS D)* — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line Test Hole (SUE – LOS A)*
- U/G Water Line (SUE – LOS B)* — W
- U/G Water Line (SUE – LOS C)* — W
- U/G Water Line (SUE – LOS D)* — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Test Hole (SUE – LOS A)*
- U/G TV Cable (SUE – LOS B)* — TV
- U/G TV Cable (SUE – LOS C)* — TV
- U/G TV Cable (SUE – LOS D)* — TV
- U/G Fiber Optic Cable (SUE – LOS B)* — TV FO
- U/G Fiber Optic Cable (SUE – LOS C)* — TV FO
- U/G Fiber Optic Cable (SUE – LOS D)* — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line Test Hole (SUE – LOS A)*
- U/G Gas Line (SUE – LOS B)* — G
- U/G Gas Line (SUE – LOS C)* — G
- U/G Gas Line (SUE – LOS D)* — 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 Force Main Line Test Hole (SUE – LOS A)*
- SS Force Main Line (SUE – LOS B)* — FSS
- SS Force Main Line (SUE – LOS C)* — FSS
- SS Force Main Line (SUE – LOS D)* — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line (SUE – LOS B)* — 2UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

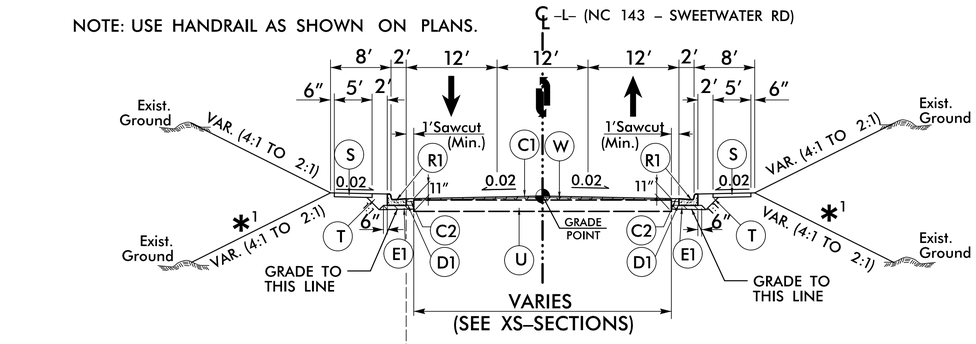
6/2/99

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" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1 ½" 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. APPROX. 2 ½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D3	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 LSSS THAN 2 ½" OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE 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" OR GREATER THAN 5 ½" IN DEPTH.
K	CLASS IV SUBGRADE STABILIZATION
J1	PROP. 6" AGGREGATE BASE COURSE.
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	EXPRESSWAY GUTTER
R3	8" X 12" CONCRETE CURB
R4	SHOULDER BERM GUTTER
S	CONCRETE SIDEWALK
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V1	MILLING, 0 TO 3" DEPTH, SEE THIS SHEET FOR DETAIL
W	WEDGING EXISTING PAVEMENT, SEE THIS SHEET FOR DETAILS

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

NOTE: USE HANDRAIL AS SHOWN ON PLANS.

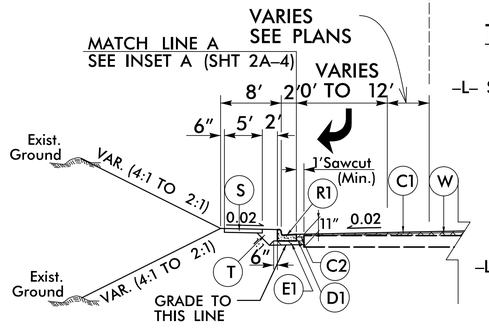


*1 NOTE:
USE 1.5:1 BACK SLOPES TO TIE TO EXISTING CULVERT:
–L– STA. 17+21± TO
–L– STA. 17+74±LT
–L– STA. 16+95± TO
–L– STA. 17+51±RT
(SEE XS–SECTIONS)

TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
–L– STA. 10+20.02 TO –L– STA. 26+75.00

MATCH LINE A
SEE INSET A (SHT 2A–4)



PART SECTION NO. 1A

USE PART SECTION NO. 1A
–L– STA. 10+20.02 TO –L– STA. 13+26.17, LT

PROJECT REFERENCE NO. A-0009CA | SHEET NO. 2A-1

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY ENGINEER
5/31/2022

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 041986 D. MATTHEW BREWER ENGINEER
5/31/2022

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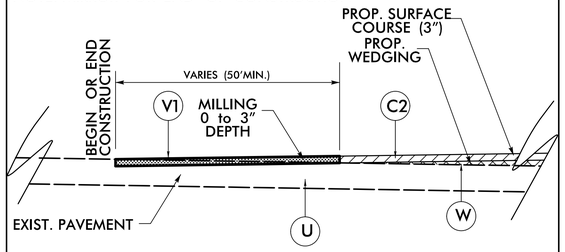
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

MILLING DETAIL AT TIE–IN LOCATIONS

NOTE: MIRROR FOR END OF CONSTRUCTION



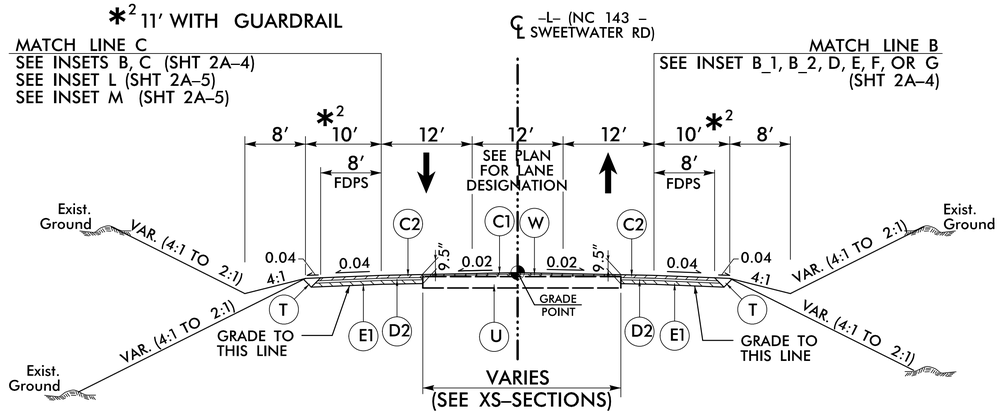
USE MIILLING DETAIL FOR TIE–IN LOCATIONS
–Y1– STA. 13+70.00 TO –Y1– STA. 14+70.00
–Y1– STA. 33+50.00 TO –Y1– STA. 37+20.00

NOTE:
ANYWHERE ALONG THE PROJECT IN WHICH LESS THAN 3" OF OVERLAY HAS BEEN CALLED FOR THE CONTRACTOR SHALL MILL EXISTING PAVEMENT AND PROVIDE A MINIMUM OF TWO FULL LAYERS OF S9.5C TO SATISFY RIDEABILITY REQUIREMENTS PER CONTRACT FOR –L– AND –Y1–.

*2 11′ WITH GUARDRAIL

MATCH LINE C
SEE INSETS B, C (SHT 2A–4)
SEE INSET L (SHT 2A–5)
SEE INSET M (SHT 2A–5)

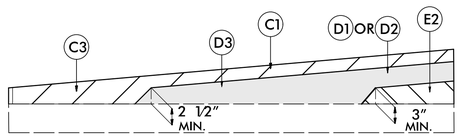
MATCH LINE B
SEE INSET B_1, B_2, D, E, F, OR G (SHT 2A–4)



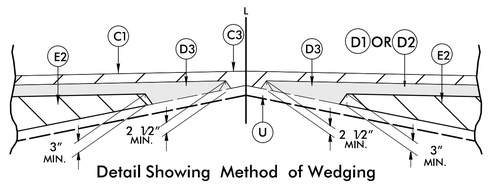
TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2
–L– STA. 26+75.00 TO –L– STA. 66+50.00
–L– STA. 167+00.00 TO –L– STA. 208+00.00

NOTE:
TRANSITION BETWEEN TYP. SECT. NO. 3 AND TYP. SECT. NO 2 AS FOLLOWS:
–L– STA. 159+80.00 TO –L– STA. 167+00.00



Wedging Detail For Resurfacing



Detail Showing Method of Wedging

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2A-2

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 ENGINEER JIMMY L. TERRY
3/31/2022

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 041986 ENGINEER MATTHEW BREWER
3/31/2022

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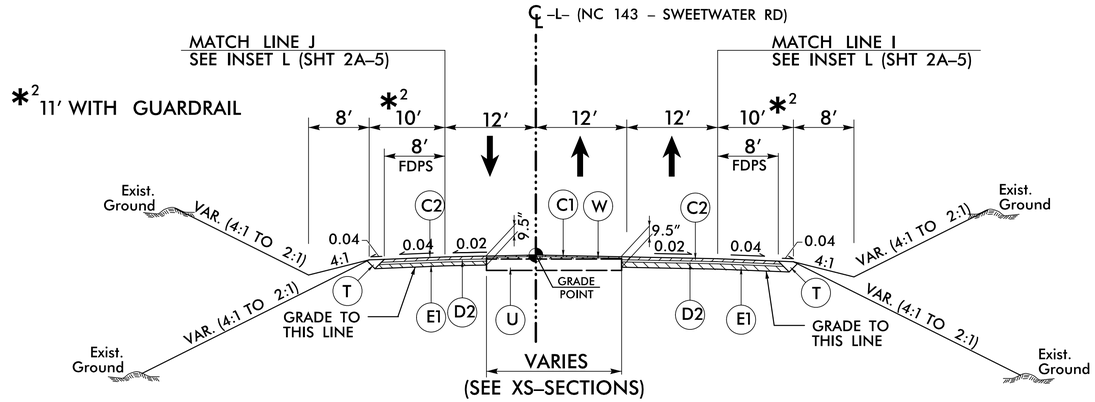
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PAVEMENT SCHEDULE	
C1	1.5″ S9.5C
C2	3″ S9.5C
D2	2 ½″ I19.0C
E1	4″ B25.0C
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.
SEE SHEET 2A-1 FOR DETAILED PAVEMENT SCHEDULE.

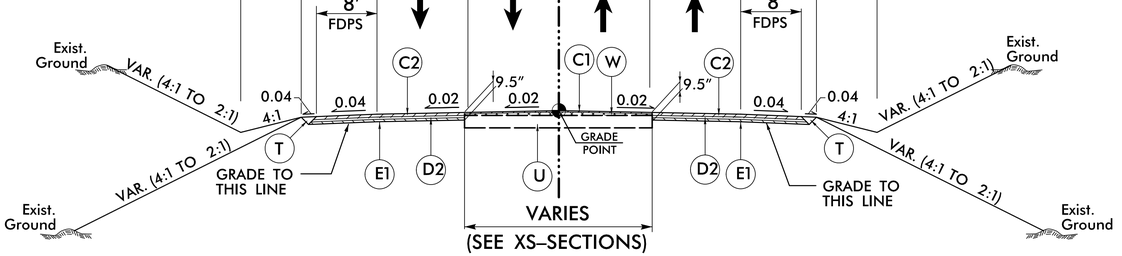


TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3
–L– STA. 70+10.00 TO –L– STA. 77+00.00
–L– STA. 132+60.00 TO –L– STA. 159+80.00

NOTE:
TRANSITION BETWEEN TYP. SECT. NO. 2 AND TYP. SECT. NO 3 AS FOLLOWS:
–L– STA. 66+50.00 TO –L– STA. 70+10.00

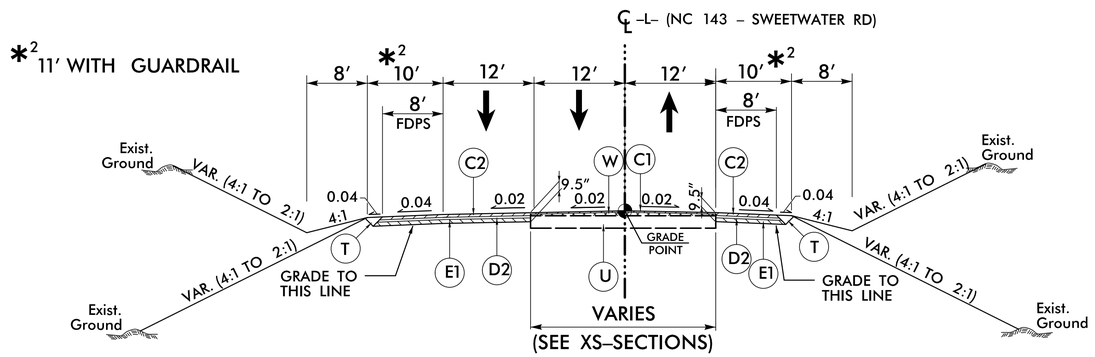
TRANSITION BETWEEN TYP. SECT. NO. 4 AND TYP. SECT. NO 3 AS FOLLOWS:
–L– STA. 129+00.00 TO –L– STA. 132+60.00



	WIDTH	STA TO STA
*3	0′ TO 12′	–L– STA. 77+00.00 TO –L– STA. 84+20.00
	12′	–L– STA. 84+20.00 TO –L– STA. 99+20.00
*4	12′	–L– STA. 77+00.00 TO –L– STA. 92+00.00
	12′ TO 0′	–L– STA. 92+00.00 TO –L– STA. 99+20.00

TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4
–L– STA. 77+00.00 TO –L– STA. 94+00.00



TYPICAL SECTION NO. 5

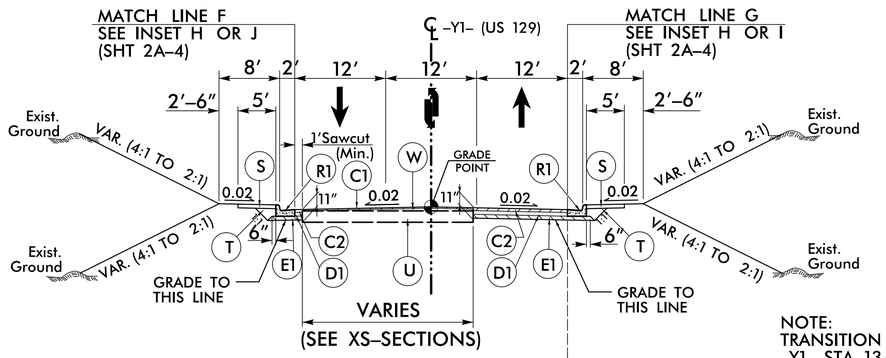
USE TYPICAL SECTION NO. 5
–L– STA. 99+20.00 TO –L– STA. 129+00.00

5/19/2022
K:\NCDOT\A-0009\Roadway\Proj\A-0009CA Plan Sheets\A-0009CA_Rdy_typ.dgn
USER: mlyn

6/2/99

PAVEMENT SCHEDULE			
C1	1.5″ S9.5C	R1	2′-6″ C&G
C2	3″ S9.5C	S	SIDEWALK
D1	4″ I19.0C	T	EARTH MATERIAL
D2	2 ½″ I19.0C	U	EXISTING PAVEMENT
E1	4″ B25.0C	W	WEDGING
J1	6″ ABC		

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.
SEE SHEET 2A-1 FOR DETAILED PAVEMENT SCHEDULE.



TYPICAL SECTION NO. 6

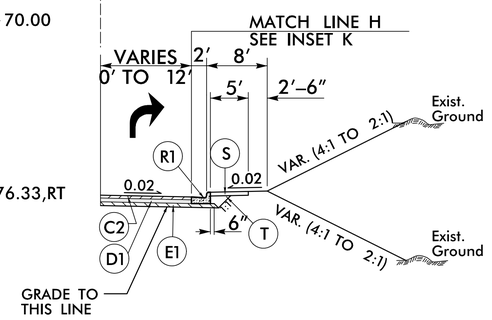
USE TYPICAL SECTION NO. 6
–Y1– STA. 14+70.00 TO –Y1– STA. 35+70.00

NOTE:
TRANSITION BETWEEN EXISTING AND TYP. SECT. NO 6 AS FOLLOWS:
–Y1– STA. 13+70.00 TO –Y1– STA. 14+70.00
–Y1– STA. 35+70.00 TO –Y1– STA. 36+70.00

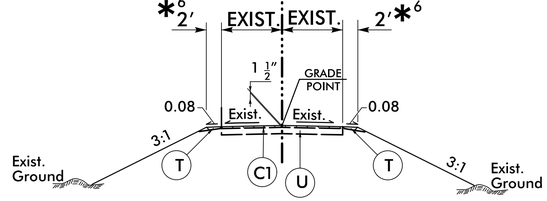
NOTE:
SEE PLANS FOR SIDEWALK LOCATION.

PART SECTION NO. 6A

USE PART SECTION NO. 6A
–Y1– STA. 32+50.00 TO –Y1– STA. 35+76.33,RT

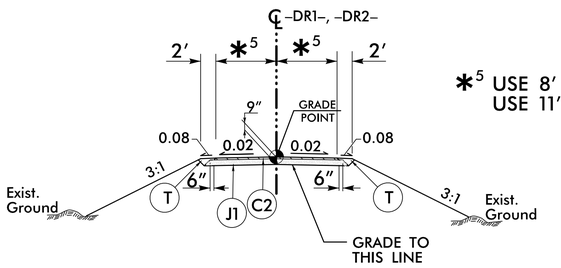


*6 FOR GUARDRAIL WIDEN 3′MIN BEHIND THE FACE OF GUARDRAIL OR USE EXTRA DEPTH POSTS



TYPICAL SECTION NO. 7

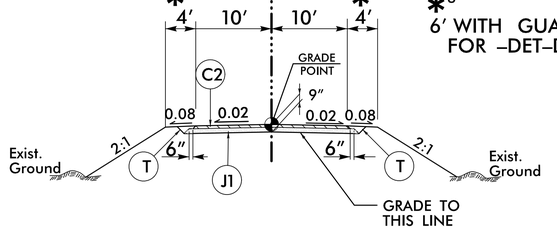
USE TYPICAL SECTION NO. 7
–Y6– STA. 11+05.00 TO –Y6– STA. 12+85.70



*5 USE 8′ FOR –DR1–
USE 11′ FOR –DR2–

TYPICAL SECTION NO. 8

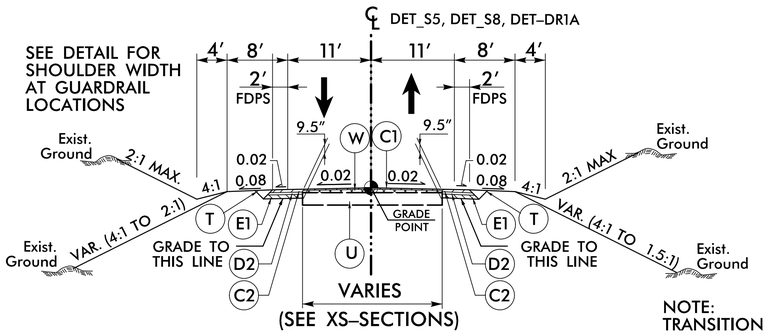
USE TYPICAL SECTION NO. 8
–DR1– STA. 10+20.00 TO –DR1– STA. 11+71.39
–DR2– STA. 10+26.60 TO –DR2– STA. 11+60.00



*8 6′ WITH GUARDRAIL FOR –DET–DR1A–

TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9
–DR1A– STA. 10+05.00 TO –DR1A– STA. 11+07.00
–DET–DR1A– STA. 10+00.00 TO –DET–DR1A– STA. 14+00.15

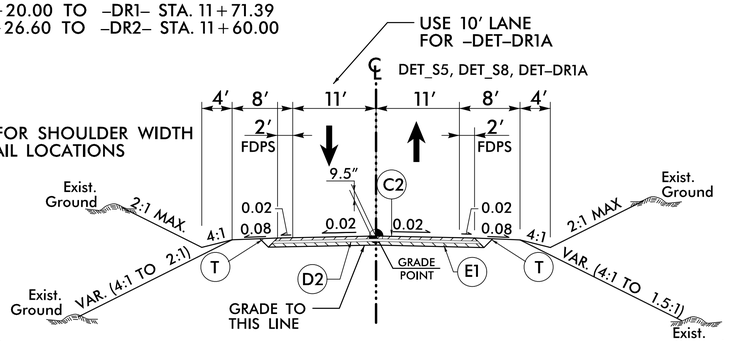


TYPICAL SECTION NO. 10

USE TYPICAL SECTION NO. 10

DET_S5 STA. 11+00.00 TO DET_S5 STA. 13+40.66
DET_S5 STA. 20+30.45 TO DET_S5 STA. 22+33.00
DET_S8 STA. 11+00.00 TO DET_S8 STA. 12+99.64
DET_S8 STA. 19+23.61 TO DET_S8 STA. 21+25.00

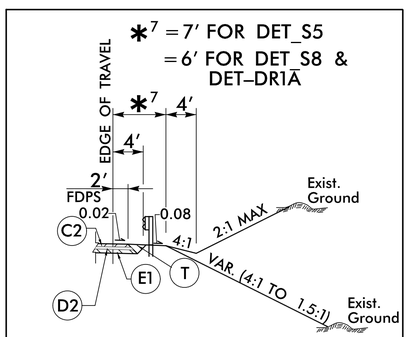
NOTE:
TRANSITION BETWEEN EXISTING AND TYP. SECT. NO 10 AS FOLLOWS:
DET_S5 STA. 10.00.00 TO DET_S5 STA. 11+00.00
DET_S5 STA. 22+33.00 TO DET_S5 STA. 23+33.00
DET_S8 STA. 10.00.00 TO DET_S8 STA. 11+00.00
DET_S8 STA. 21+25.00 TO DET_S8 STA. 22+25.00



TYPICAL SECTION NO. 11

USE TYPICAL SECTION NO. 11

DET S5 STA. 13+40.66 TO DET S5 STA. 20+30.45
DET S8 STA. 12+99.64 TO DET S8 STA. 19+23.61



DETAIL SHOWING SHOULDER WIDTH AT GUARDRAIL LOCATIONS FOR DET_S5, DET_S8 & DET–DR1A

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2A-3

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY ENGINEER
6/1/2022

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 041986 D. MATTHEW BREWER ENGINEER
6/1/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

6/4/2022
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User:timlyn

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2A-4

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY ENGINEER 5/31/2022

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 041986 MATTHEW BREWER ENGINEER 5/31/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

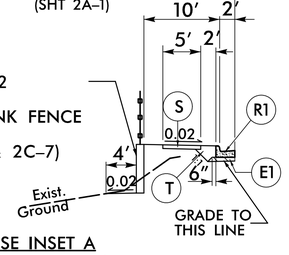
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PAVEMENT SCHEDULE	
C2	3″ S9.5C
D2	2 ½″ I19.0C
E1	4″ B25.0C
R1	2′-6″ C&G
R2	EXPRESSWAY GUTTER
R3	8″ X 12″ CURB
R4	SHOULDER BERM GUTTER
S	SIDEWALK
T	EARTH MATERIAL

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.
SEE SHEET 2A-1 FOR DETAILED PAVEMENT SCHEDULE.

INSET A:

MATCH LINE A
SEE PART SECT. NO. 1A (SHT 2A–1)

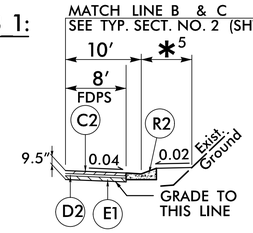


USE INSET A

–L– STA. 11+79± TO –L– STA. 12+59±,LT

INSET B_1:

MATCH LINE B & C
SEE TYP. SECT. NO. 2 (SHT 2A–1)

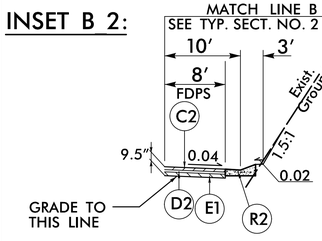


USE INSET B_1

–L– STA. 36+00.00 TO –L– STA. 38+50.00, RT
(*5 = 3′ TO 5′)
–L– STA. 39+50.00 TO –L– STA. 43+70.00, RT
(*5 = 3′ TO 6′)
–L– STA. 53+50.00 TO –L– STA. 55+50.00, LT
(*5 = 3′ TO 7′–5″)

INSET B_2:

MATCH LINE B & C
SEE TYP. SECT. NO. 2 (SHT 2A–1)

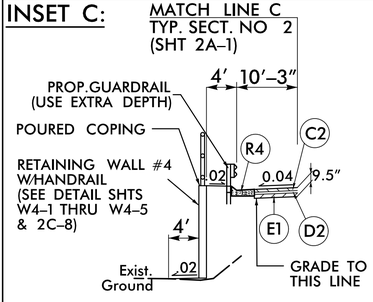


USE INSET B_2

–L– STA. 38+50.00 TO –L– STA. 39+50.00, RT

INSET C:

MATCH LINE C
TYP. SECT. NO 2 (SHT 2A–1)

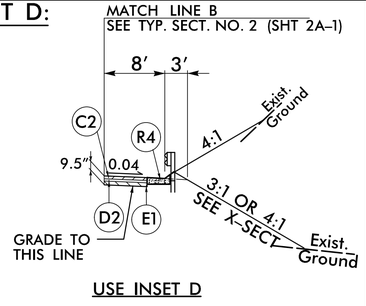


USE INSET C

–L– STA. 167+75± TO –L– STA. 169+43±, LT
–L– STA. 169+81± TO –L– STA. 171+75±, LT

INSET D:

MATCH LINE B
SEE TYP. SECT. NO. 2 (SHT 2A–1)

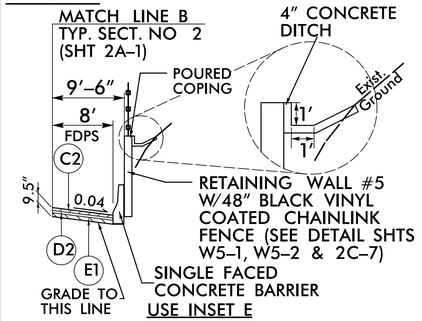


USE INSET D

–L– STA. 174+51± TO –L– STA. 175+35±, RT
–L– STA. 176+65± TO –L– STA. 178+00.00, RT

INSET E:

MATCH LINE B
TYP. SECT. NO 2 (SHT 2A–1)

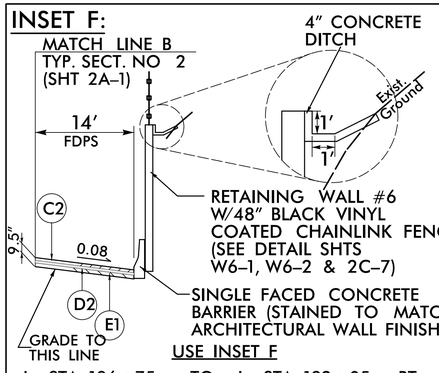


USE INSET E

–L– STA. 175+35± TO –L– STA. 176+65±, RT

INSET F:

MATCH LINE B
TYP. SECT. NO 2 (SHT 2A–1)

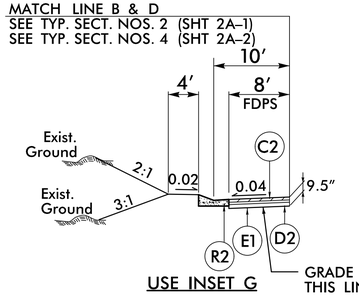


USE INSET F

–L– STA. 186+75± TO –L– STA. 192+05±, RT

INSET G:

MATCH LINE B & D
SEE TYP. SECT. NOS. 2 (SHT 2A–1)
SEE TYP. SECT. NOS. 4 (SHT 2A–2)

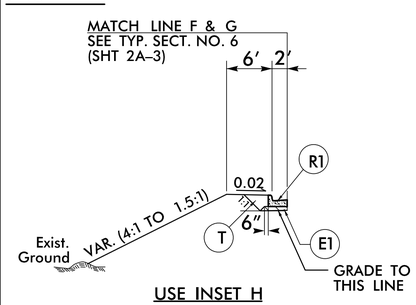


USE INSET G

–L– STA. 49+00.00 TO –L– STA. 52+33.00, RT
–L– STA. 53+25.00 TO –L– STA. 55+50.00, LT
–L– STA. 89+60.00 TO –L– STA. 91+60.00, LT

INSET H:

MATCH LINE F & G
SEE TYP. SECT. NO. 6 (SHT 2A–3)

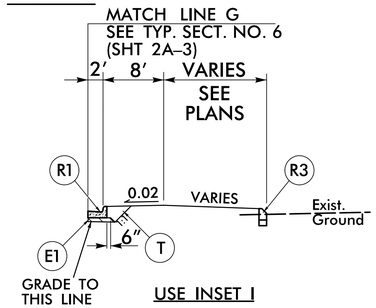


USE INSET H

–Y1– STA. 14+70.00 TO –Y1– STA. 23+20.33, RT
–Y1– STA. 14+70.00 TO –Y1– STA. 25+54.61, LT

INSET I:

MATCH LINE G
SEE TYP. SECT. NO. 6 (SHT 2A–3)

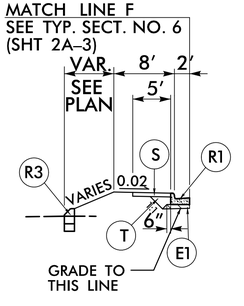


USE INSET I

–Y1– STA. 18+12± TO –Y1– STA. 18+72±, RT
–Y1– STA. 23+44± TO –Y1– STA. 24+19±, RT

INSET J:

MATCH LINE F
SEE TYP. SECT. NO. 6 (SHT 2A–3)

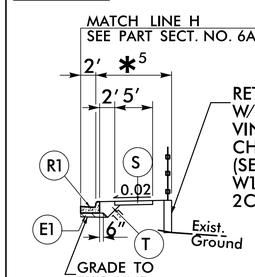


USE INSET J

–Y1– STA. 26+92± TO –Y1– STA. 27+34±, LT

INSET K:

MATCH LINE H
SEE PART SECT. NO. 6A (SHT 2A–3)



USE INSET K

–Y1– STA. 32+55± TO –Y1– STA. 33+00±, RT
(*5=20.6′ TO 10′)

–Y1– STA. 33+00± TO –Y1– STA. 33+96.11±, RT
(*5=10′)

–Y1– STA. 33+96.11± TO –Y1– STA. 34+16±, RT

(*5=10′ TO 21.1′)

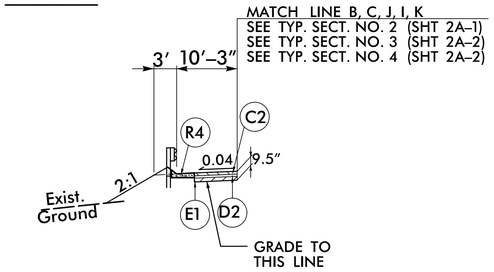
5/20/2022
X:\NCDOT\A-0009\Roadway\Proj\A-0009CA Plan Sheets\A-0009CA_Rdy_typ.dgn
User:jmlynn

6/2/99

PAVEMENT SCHEDULE	
C2	3″ S9.5C
D2	2 ½″ I19.0C
E1	4″ B25.0C
K	CL IV SUBGRADE STABILIZATION
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
R4	SHOULDER BERM GUTTER

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.
SEE SHEET 2A-1 FOR DETAILED PAVEMENT SCHEDULE.

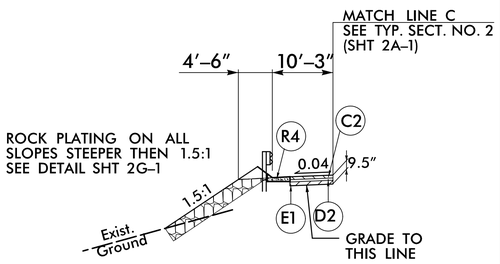
INSET L:



USE INSET L

–L– STA. 31+50±	TO	–L– STA. 33+30±,	LT
–L– STA. 34+70±	TO	–L– STA. 36+76±,	LT
–L– STA. 45+64±	TO	–L– STA 47+00±,	LT
–L– STA. 64+50±	TO	–L– STA. 65+50±,	LT
–L– STA. 66+70±	TO	–L– STA. 68+24±,	LT
–L– STA. 71+38±	TO	–L– STA. 72+50±,	LT
–L– STA. 71+38±	TO	–L– STA. 72+44±,	RT
–L– STA. 79+00±	TO	–L– STA. 81+40±,	RT
–L– STA. 88+50±	TO	–L– STA. 91+16±,	RT
–L– STA. 133+90±	TO	–L– STA. 142+00±,	RT
–L– STA. 137+25±	TO	–L– STA. 141+50±,	LT
–L– STA. 146+30±	TO	–L– STA. 149+50±,	LT
–L– STA. 147+40±	TO	–L– STA. 149+40±,	RT
–L– STA. 159+75±	TO	–L– STA. 163+85±,	LT
–L– STA. 165+15±	TO	–L– STA. 167+75±,	LT
–L– STA. 171+75±	TO	–L– STA. 173+90±,	LT
–L– STA. 194+00±	TO	–L– STA. 197+83±,	RT

INSET M:



USE INSET M

–L– STA. 42+00±	TO	–L– STA. 45+64±,	LT
–L– STA. 57+00±	TO	–L– STA. 59+50±,	LT

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2A-5

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY ENGINEER
5/31/2022

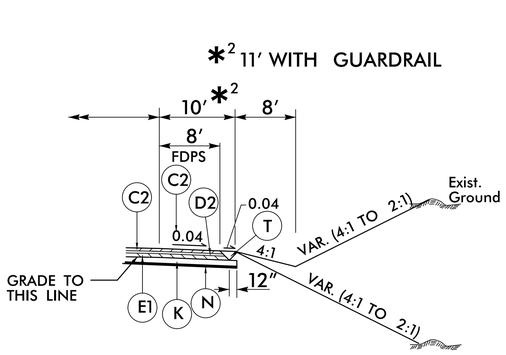
PAVEMENT DESIGN ENGINEER

NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER SEAL 041986 D. MATTHEW BREWER ENGINEER
5/31/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

GEOTEXTILE FOR PAVEMENT STABILIZATION DETAIL



USE GEOTEXTILE FOR PAVEMENT STABILIZATION DETAIL IN CONJUNCTION WITH APPROPRIATE TYPICAL SECTIONS AT LOCATIONS NOTED. GEOTEXTILE FOR SOIL STABILIZATION SHALL NOT BE USED IN LOCATIONS WHERE GEOTEXTILE FOR PAVEMENT STABILIZATION IS RECOMMENDED.

STA TO STA	LOC
–L– STA. 31+50 TO –L– STA. 33+50	LT
–L– STA. 34+50 TO –L– STA. 36+50	LT
–L– STA. 42+50 TO –L– STA. 46+00	LT & RT
–L– STA. 47+00 TO –L– STA. 47+50	LT
–L– STA. 55+00 TO –L– STA. 59+20	LT & RT
–L– STA. 64+50 TO –L– STA. 67+50	LT & RT
–L– STA. 72+00 TO –L– STA. 72+50	LT
–L– STA. 79+00 TO –L– STA. 80+50	RT
–L– STA. 108+50	LT
–L– STA. 114+00 TO –L– STA. 119+50	LT
–L– STA. 135+00 TO –L– STA. 140+00	RT
–L– STA. 150+50 TO –L– STA. 151+50	LT
–L– STA. 157+50 TO –L– STA. 158+00	LT
–L– STA. 162+00 TO –L– STA. 163+50	LT
–L– STA. 165+00 TO –L– STA. 167+50	LT
–L– STA. 172+00 TO –L– STA. 175+50	LT
–L– STA. 177+50 TO –L– STA. 178+50	LT
–L– STA. 180+00	LT
–L– STA. 182+00 TO –L– STA. 187+50	LT
–L– STA. 194+50 TO –L– STA. 195+00	LT

AREAS WILL BE INVESTIGATED DURING CONSTRUCTION

ONSITE DETOUR DET S5

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2B-1
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — SEAL 35018, JIMMY L. TERRY, 5/31/2022

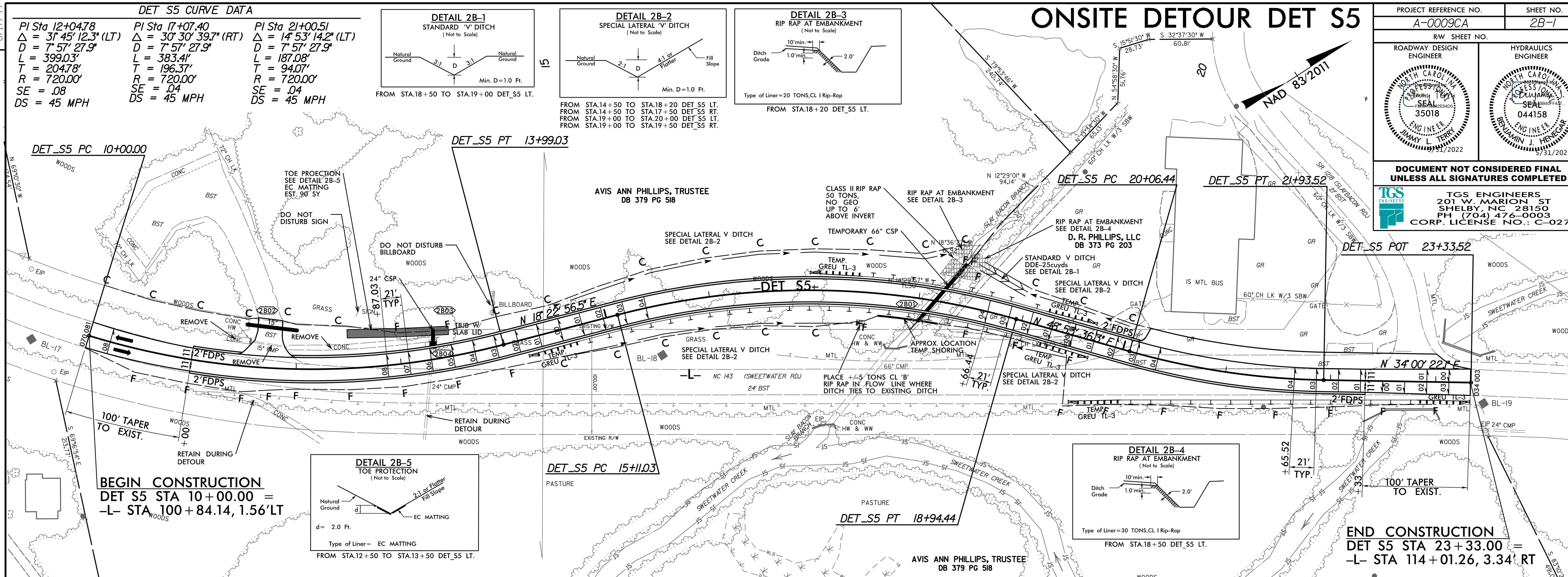
HYDRAULICS ENGINEER — SEAL 044158, BENJAMIN J. HENEGAR, 5/31/2022

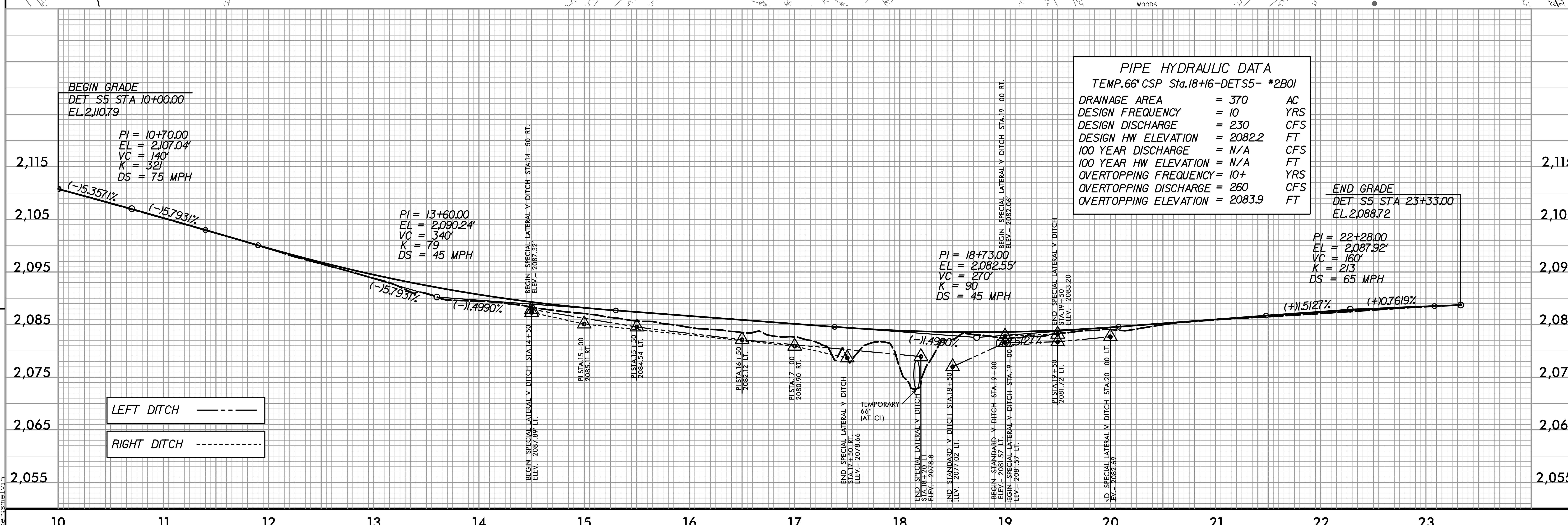
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DET S5 CURVE DATA

PI Sta 12+04.78	PI Sta 17+07.40	PI Sta 21+00.51
Δ = 31° 45' 12.3" (LT)	Δ = 30° 30' 39.7" (RT)	Δ = 14° 53' 14.2" (LT)
D = 7° 57' 27.9"	D = 7° 57' 27.9"	D = 7° 57' 27.9"
L = 399.03'	L = 383.41'	L = 187.08'
T = 204.78'	T = 196.37'	T = 94.07'
R = 720.00'	R = 720.00'	R = 720.00'
SE = .08	SE = .04	SE = .04
DS = 45 MPH	DS = 45 MPH	DS = 45 MPH





PIPE HYDRAULIC DATA
TEMP. 66" CSP Sta.18+16-DETS5- #2B01

DRAINAGE AREA	=	370	AC
DESIGN FREQUENCY	=	10	YRS
DESIGN DISCHARGE	=	230	CFS
DESIGN HW ELEVATION	=	2082.2	FT
100 YEAR DISCHARGE	=	N/A	CFS
100 YEAR HW ELEVATION	=	N/A	FT
OVERTOPPING FREQUENCY	=	10+	YRS
OVERTOPPING DISCHARGE	=	260	CFS
OVERTOPPING ELEVATION	=	2083.9	FT

REVISIONS

8/17/99

5/20/2022 X:\NCDOT\A-0009\Roadway\Proj\A-0009CA Plan Sheets\Detours\Site 5\A-0009CA_Rdy_Onsite Detour(Site 5)_Sht2B-1.dgn

8/17/99

REVISIONS

-DET-DRIA- CURVE DATA

PI Sta 11+00.44
△ = 6° 38' 24.6" (LT)
D = 11° 20' 44.5"
L = 58.53'
T = 29.30'
R = 505.00'
SE = SEE PLAN

PI Sta 12+87.26
△ = 86° 15' 11.8" (LT)
D = 81° 51' 04.0"
L = 105.38'
T = 65.57'
R = 70.00'
SE = SEE PLAN

1 -DET-DRIA- PC 10+71.14
2 -DET-DRIA- PT 11+29.67
3 -DET-DRIA- PC 12+21.69
4 -DET-DRIA- PT 13+27.07

-DET-DRIA- POT 10+00.00

CONSTRUCT SYSTEM WITH DETOUR DRAINAGE

CLASS II RIPRAP (KEYED-IN) 5 TONS, NO GEO

GLENDA ODOM, ET AL DB 372 PG 157

J. C. PAYNE DB 57 PG 123

NAD 83/2011

TIE TO GUARDRAIL

TIE TO GUARDRAIL

CLASS II RIPRAP (KEYED-IN) 5 TONS, NO GEO

-DET-DRIA- POT 14+10.66 = -L- POC 168+10.54

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2B-2
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L TERRY
5/31/2022

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044158 BENJAMIN J HENEGAR
5/31/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST., STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

ONSITE DETOUR DET-DR1A-

PIPE HYDRAULIC DATA
TEMP 1@96" CSP *2B05
DET -DRIA- Sta.13+32

DRAINAGE AREA	= 91	Sqml
DESIGN FREQUENCY	= 10	YRS
DESIGN DISCHARGE	= 1500	CFS
DESIGN HW ELEVATION	= 2153.4	FT
100 YEAR DISCHARGE	= 2980	CFS
100 YEAR HW ELEVATION	= 2154.3	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 3600	CFS
OVERTOPPING ELEVATION	= 2154.6	FT

END GRADE
DET-DRIA STA 14+00.15=
-L- STA 168+10.29, 10.5' LT
(EXISTING EOT)
EL. 2166.76'

BEGIN GRADE
DET-DRIA- STA 10+00.00
EL. 2153.52

PI = 11+55.00
EL = 2151.47'
VC = 285'
K = 38
DS = 30 MPH

(+)6.237%
(-)1.322%
TEMP 1@96" CSP

2,170
2,160
2,150
2,140

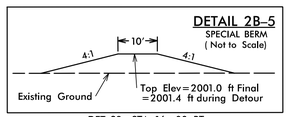
14 13 12 11 10

ONSITE DETOUR DET_S8

DET S8 CURVE DATA

PI Sta 12+29.03	PI Sta 16+82.39	PI Sta 20+12.50
Δ = 35° 17' 26.7" (RT)	Δ = 19° 59' 38.5" (LT)	Δ = 14° 50' 27.1" (RT)
D = 7° 57' 27.9"	D = 7° 57' 27.9"	D = 7° 57' 27.9"
L = 443.48'	L = 251.25'	L = 186.50'
T = 229.03'	T = 126.92'	T = 93.77'
R = 720.00'	R = 720.00'	R = 720.00'
SE = 0.08	SE = 0.04	SE = 0.04
DS = 45 MPH	DS = 45 MPH	DS = 45 MPH

DETAIL 2B-5
SPECIAL BERM
(Not to Scale)



–DET_S8– STA 16+00 RT

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2B-3
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 ENGINEER JIMMY TERRY
5/31/2022

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044158 ENGINEER BENJAMIN J. HENEGAR
5/31/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DET_S8 PC 10+00.00
BEGIN CONSTRUCTION
DET S8 STA. 10+00.00 =
–L– STA. 188+91.58, 9.03'LT

DET_S8 PC 15+55.48

DET_S8 PT 14+43.48

DET_S8 PC 19+18.73

DET_S8 PT 18+06.73

DET S8 PT 21+05.23

END CONSTRUCTION
–DET S8– STA. 22+25.00 =
–L– STA. 211+38.45, 0.38'LT

DELMAR HOLDER, ET AL
DB 222 PG 821

MELANIE O. CRUSE
DB 373 PG 105

TIE TO EXISTING GUARDRAIL

PROPOSED GUARDRAIL WILL REMOVE AND RESET FOR FINAL ALIGNMENT

100' TAPER TO EXIST.

21' TYP.

RETAINING WALL TO BE CONSTRUCTED PRIOR TO GRADING FOR DET_S8. (SEE PSH 18)

APPROX. LOCATION TEMP. SHORING

PROPOSED BERM TOP ELEV=2201.4' SEE DETAIL 2B-5

TEMP 12"

TEMPORARY 2@103"x71" CS PIPE-ARCH

BM#10 ELEV. 2200.60'
–BL– STA. 192+86.00 65' RT.
SPIKE NAIL SET IN BASE OF 14" DBL. POPLAR

CLASS II RIP RAP 65 TONS, NO GEO UP TO SHOULDER

SR 1223 (BEECH CREEK RD.)

N 82° 53' 41.4" E

N 62° 54' 02.9" E

N 77° 44' 30.0" E

2'FDPS

TEMP. GREU TL-3

F/O MARKER

WOODS

BST

GPS-9

EIP

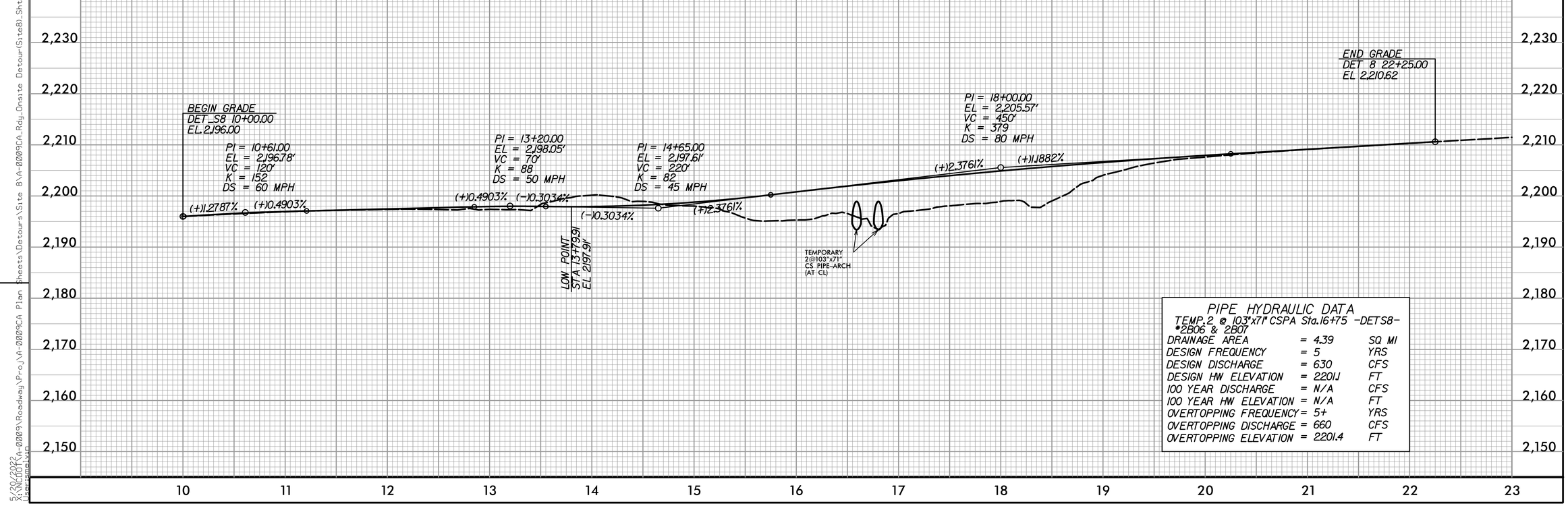
SIGN

WD SHED

ROCK SHED

1½S FD

CONC



PIPE HYDRAULIC DATA

TEMP.2 @ 103"x71" CSPA Sta.16+75 –DETS8–
•2B06 & 2B07

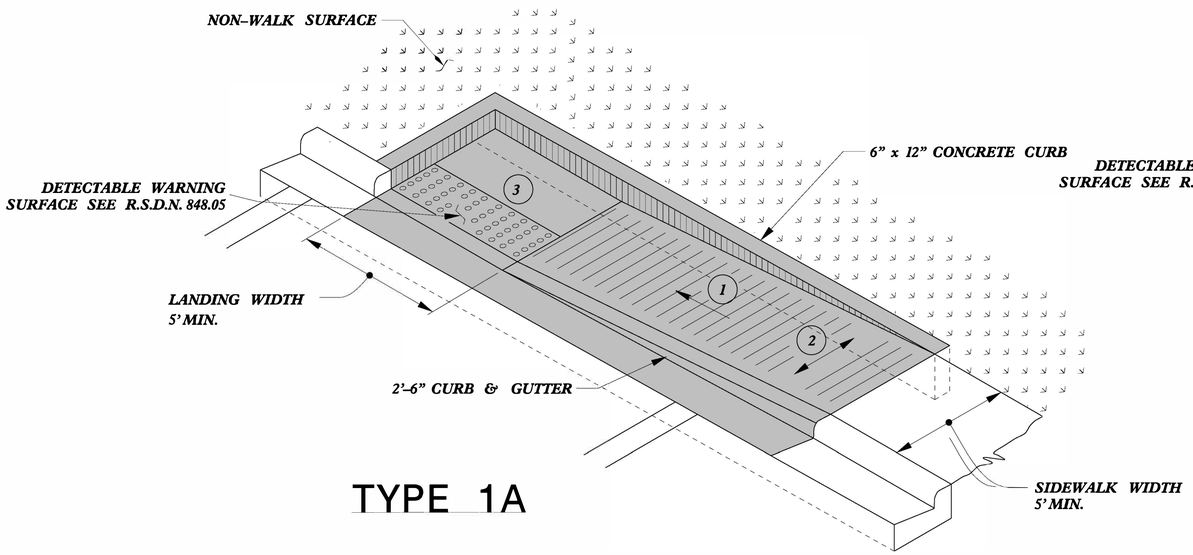
DRAINAGE AREA	= 4.39	SQ MI
DESIGN FREQUENCY	= 5	YRS
DESIGN DISCHARGE	= 630	CFS
DESIGN HW ELEVATION	= 2201.1	FT
100 YEAR DISCHARGE	= N/A	CFS
100 YEAR HW ELEVATION	= N/A	FT
OVERTOPPING FREQUENCY	= 5+	YRS
OVERTOPPING DISCHARGE	= 660	CFS
OVERTOPPING ELEVATION	= 2201.4	FT

REVISIONS 8/17/99

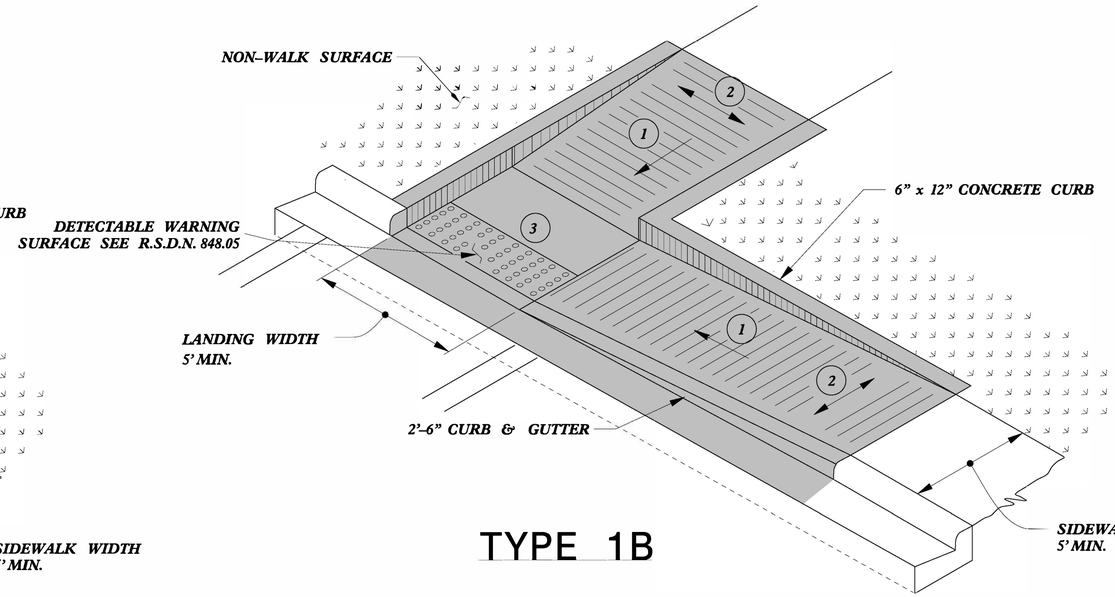
5/20/2022
X:\NCDOT\A-0009\Roadway\Proj\A-0009CA Plan Sheets\Detours\Site 8\A-0009CA_Rdy_Onsite Detour(Site8)_Sht2B-3.dgn
User:smelvin

5/14/99

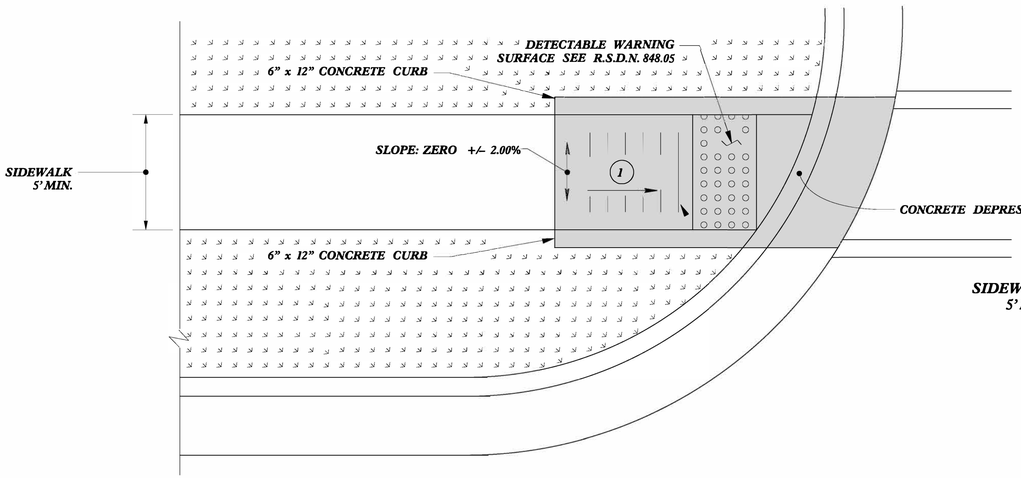
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2C-1



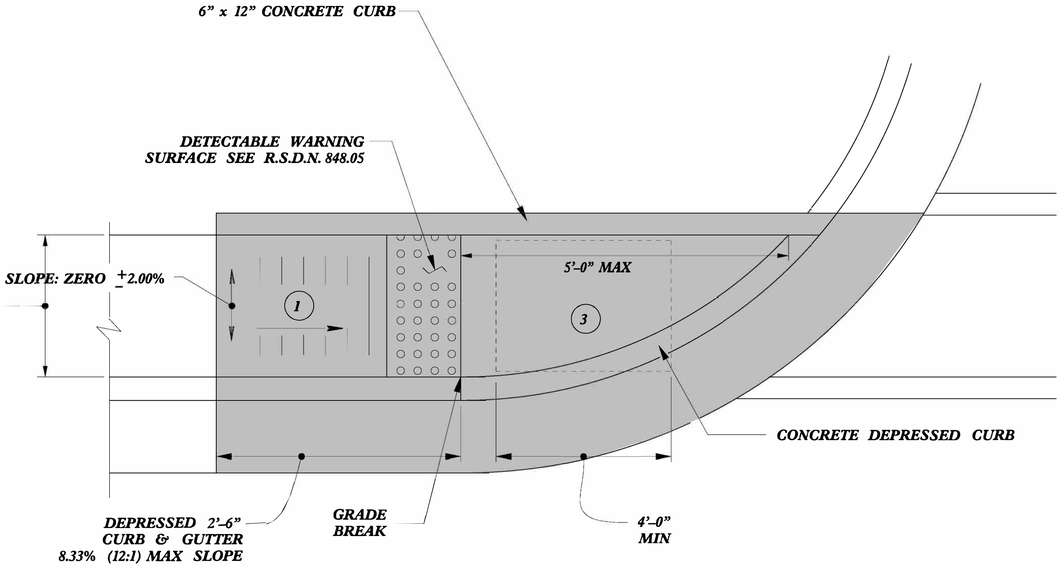
TYPE 1A



TYPE 1B



TYPE 1 Modified



TYPE 1

1. 8.33% (12:1) MAX RAMP SLOPE
2. CROSS SLOPE: 2.00%
3. CURB RAMPS REQUIRE A (4'–0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.

PAY LIMITS FOR 1 CURB RAMP

REFER TO ROADWAY STANDARD DRAWING NUMBER 848.05 SHEET 3 OF 3 FOR ALL RAMP NOTES

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022071 ROWLAND LAYTON DAVENPORT JR. 5/31/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

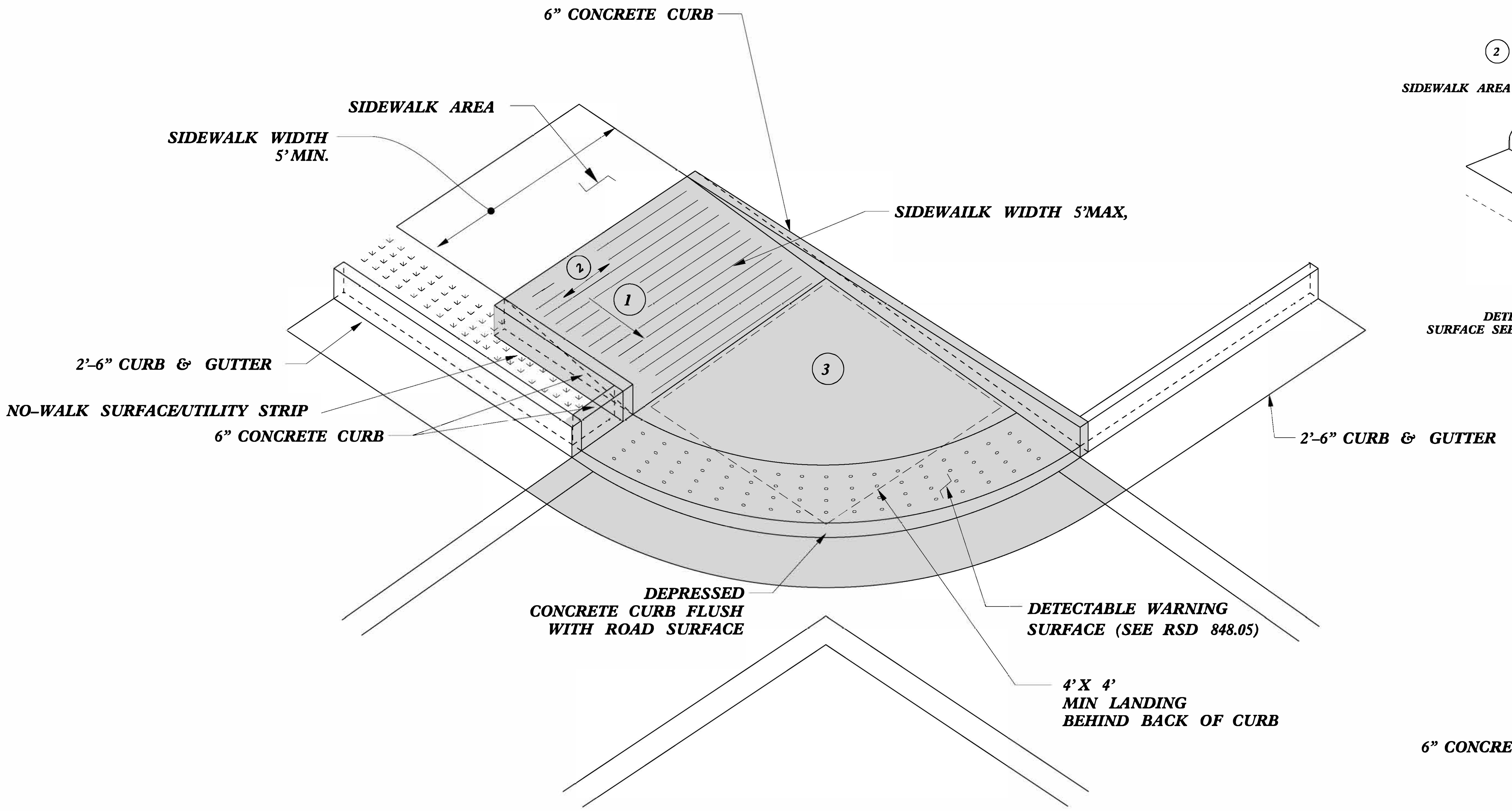
CURB RAMPS

Directional Ramps

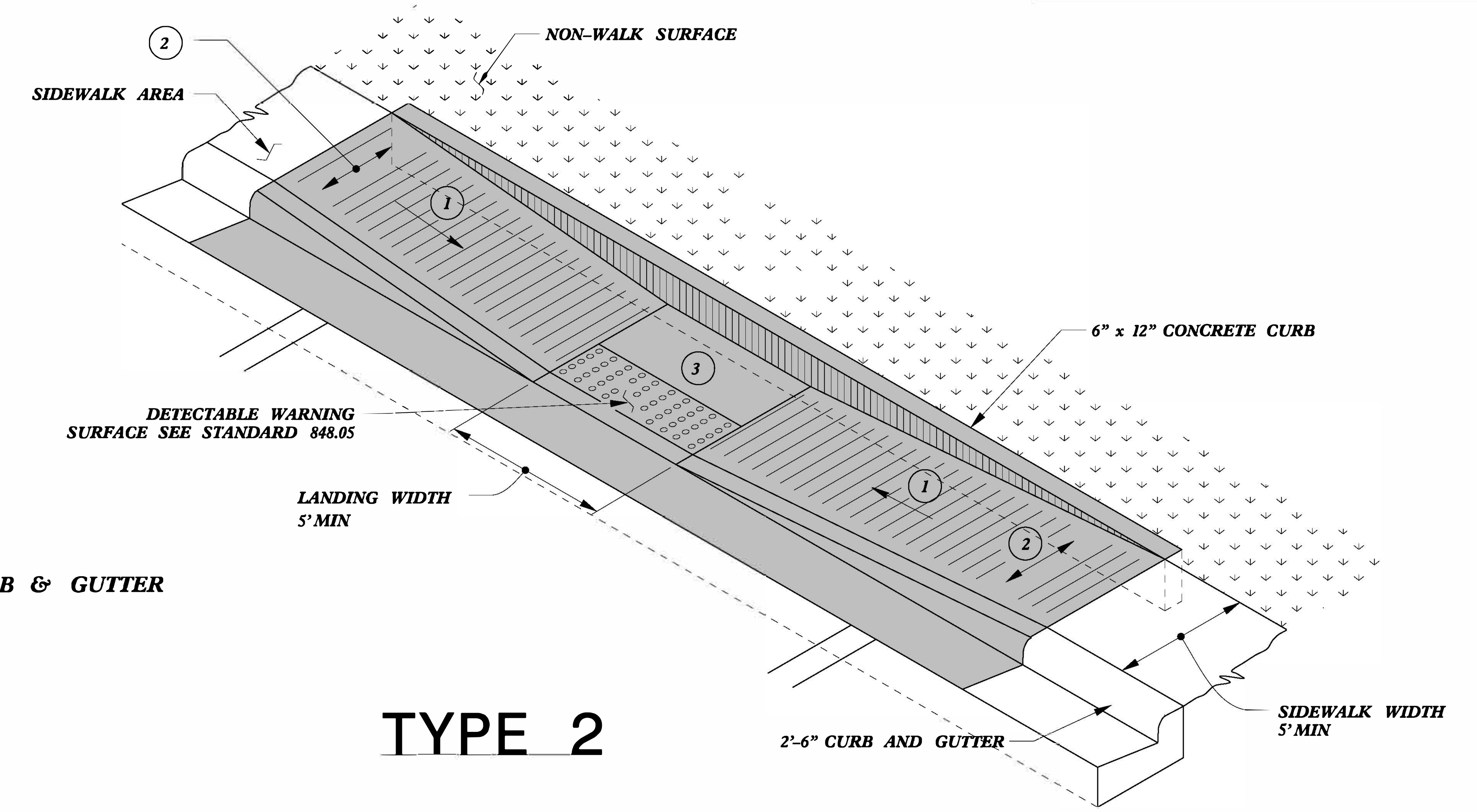
ORIGINAL BY: J.S. HOWERTON DATE: 7/7/11
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC. :stds/2012CurbRamp/CurbRampDetails.dgn

5/14/99

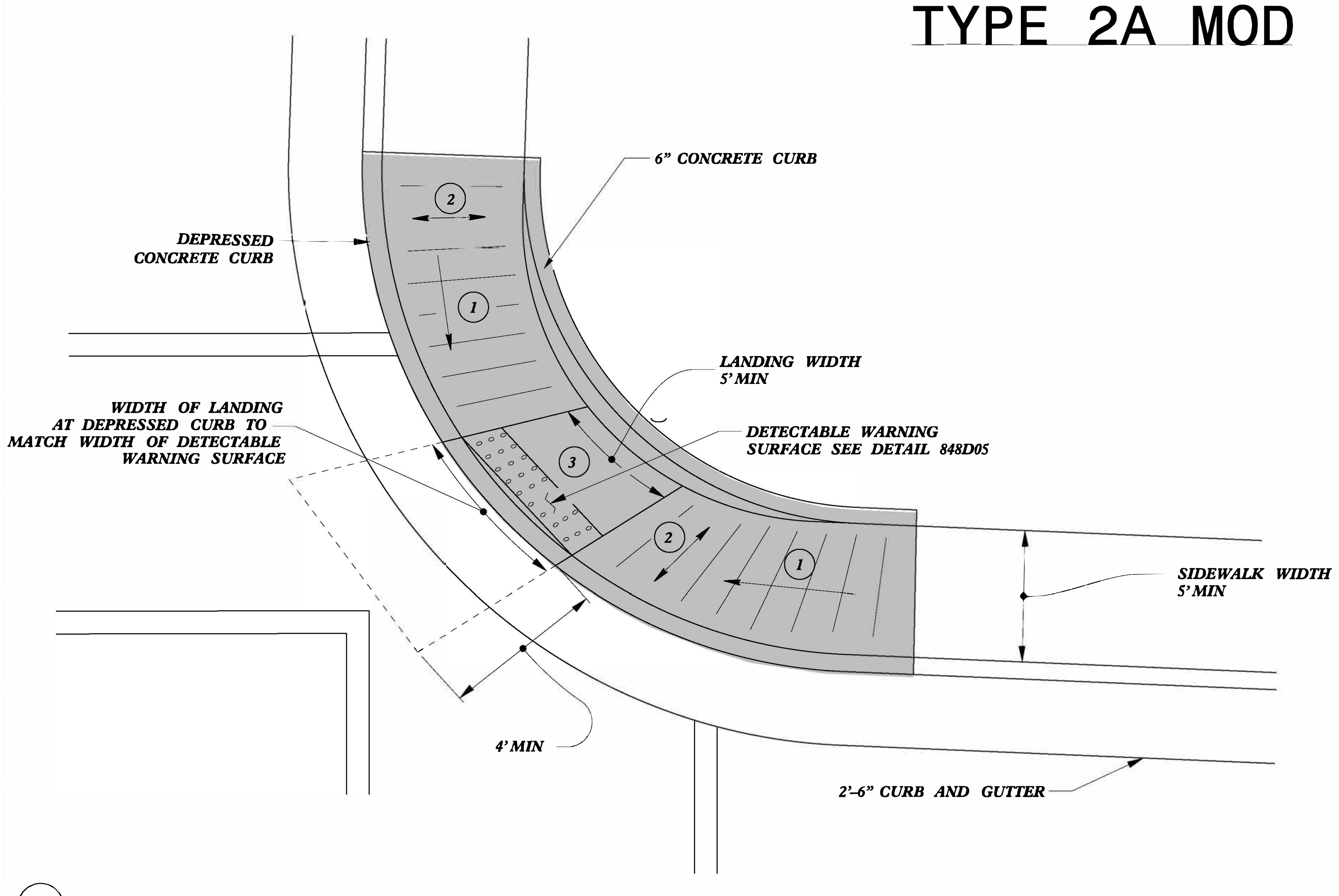
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2C-2



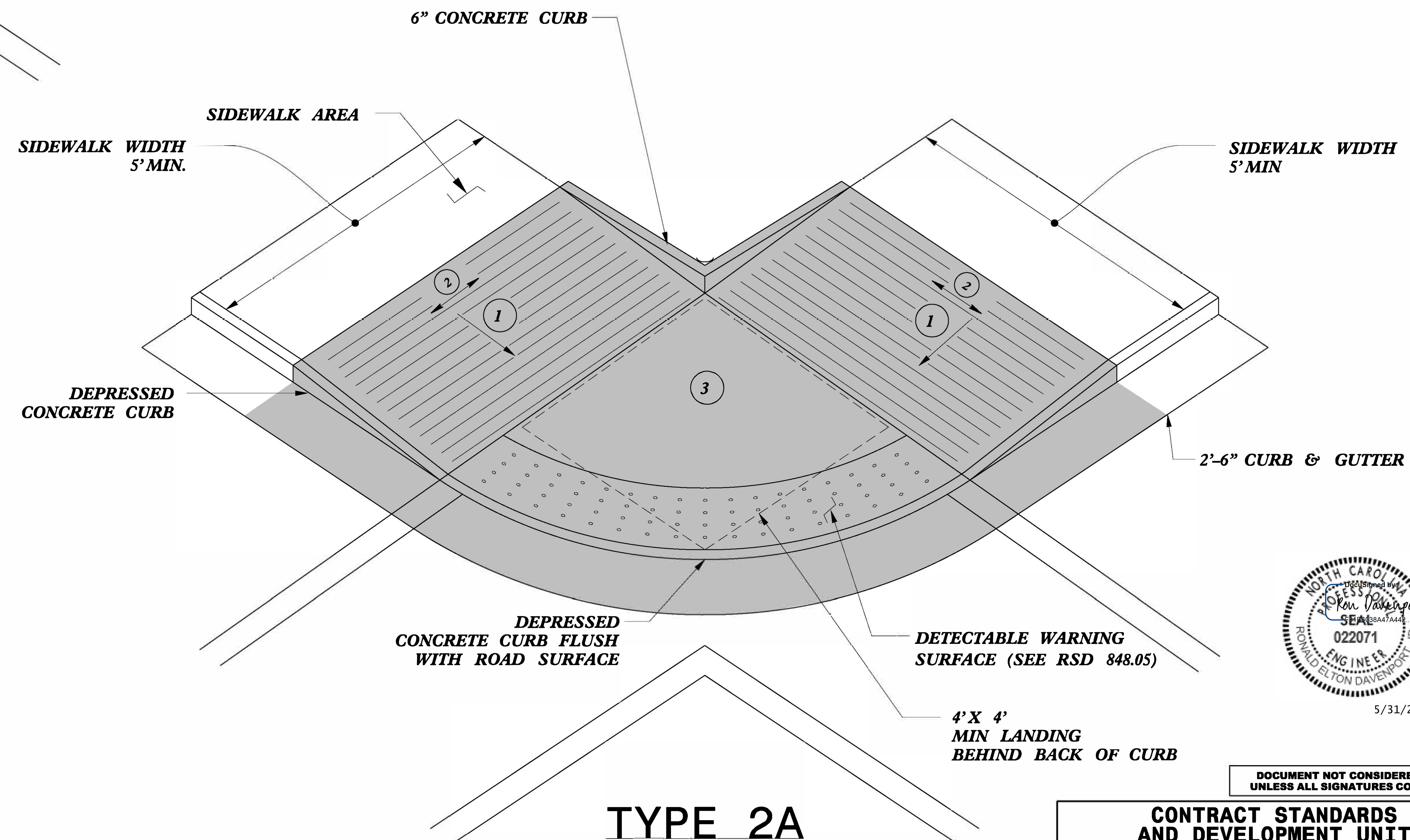
TYPE 2A MOD



TYPE 2



TYPE 2B



TYPE 2A

(1) *8.33% (12:1) MAX RAMP SLOPE*

(2) *CROSS SLOPE: 2.00%*

(3) *CURB RAMPS REQUIRE A (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.*

PAY LIMITS FOR 1 CURB RAMP

NORTH CAROLINA PROFESSIONAL SEAL 022071 ENGINEER RONALD ELTON DAVENPORT, JR.
DocuSigned by: Ron Davenport
5/31/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

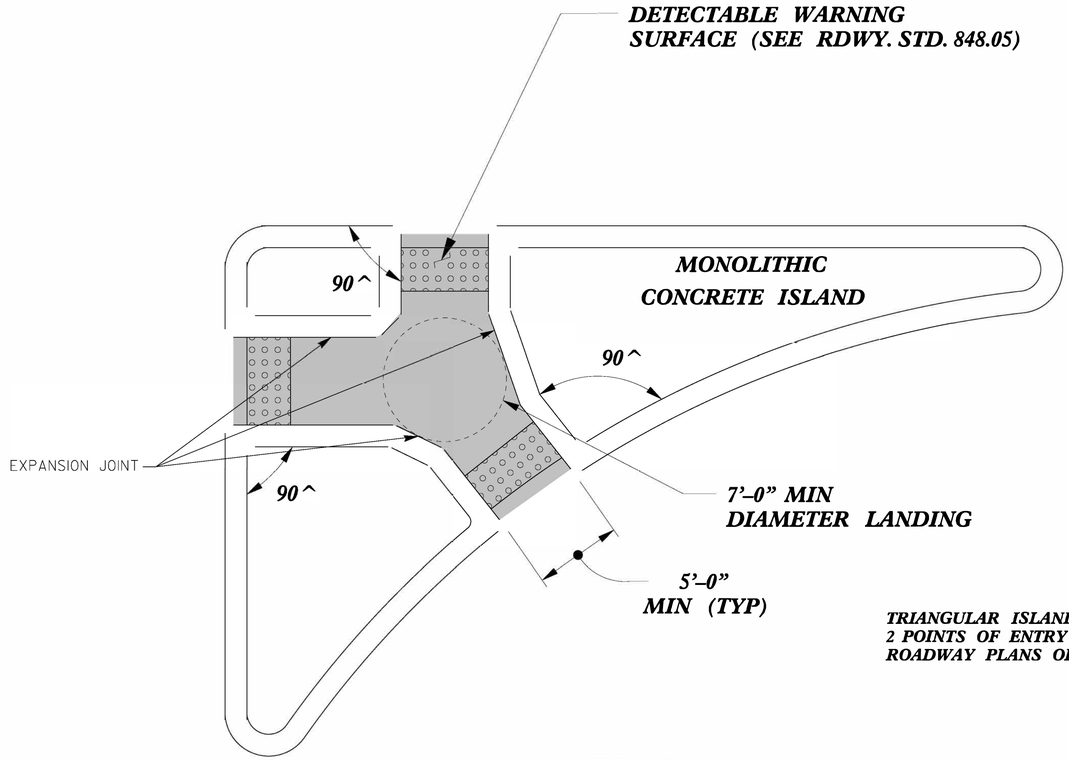
CURB RAMPS

ORIGINAL BY: J.S. HOWERTON DATE: 7/7/11
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: stds/2012CurbRamp/CurbRampDetails.dgn

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

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2C-3

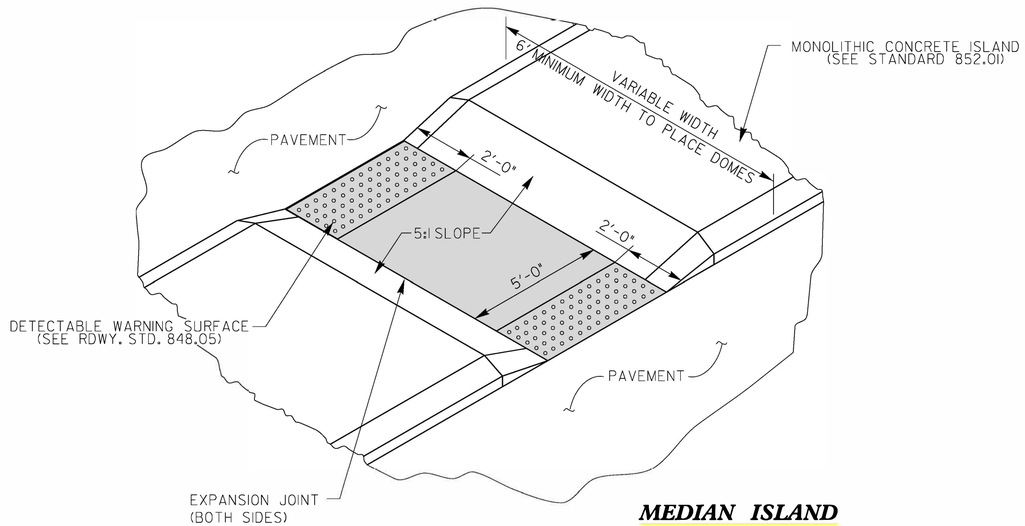


PAY LIMITS FOR 2 OR 3 CURB RAMPS (CALCULATE BASED ON NUMBER OF SETS OF TRUNCATED DOMES)

TRIANGULAR ISLANDS MAY BE CONSTRUCTED WITH ONLY 2 POINTS OF ENTRY AND EXIT AS SHOWN IN THE ROADWAY PLANS OR AS DIRECTED BY THE ENGINEER.

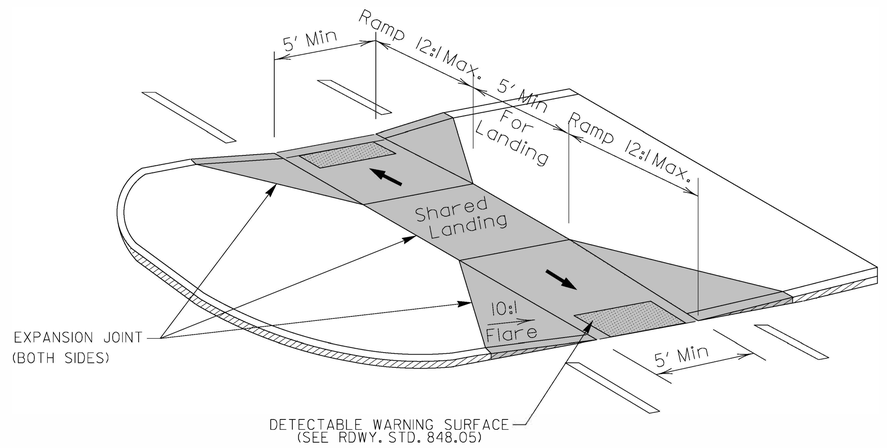
TRIANGULAR ISLAND WITH CUT THROUGH

TYPE 6



MEDIAN ISLAND WITH CUT THROUGH

TYPE 7



MEDIAN ISLAND CURB RAMPS

TYPE 8

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 022071 ENGINEER Ron Davenport JR. ROWLAND RON DAVENPORT
5/31/2022

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

CURB RAMPS

Median or Turn Lane Islands

ORIGINAL BY: J.S. HOWERTON DATE: 7/7/11
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC. stds/2012CurbRamp/CurbRampDetails.dgn

$$$$SYSTIME$$$$
$$$$USERNAME$$$$
$$$$CELLS$$$$

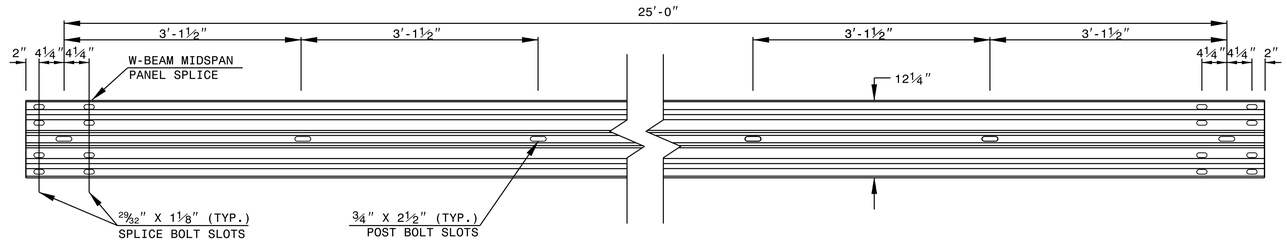
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2C-4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

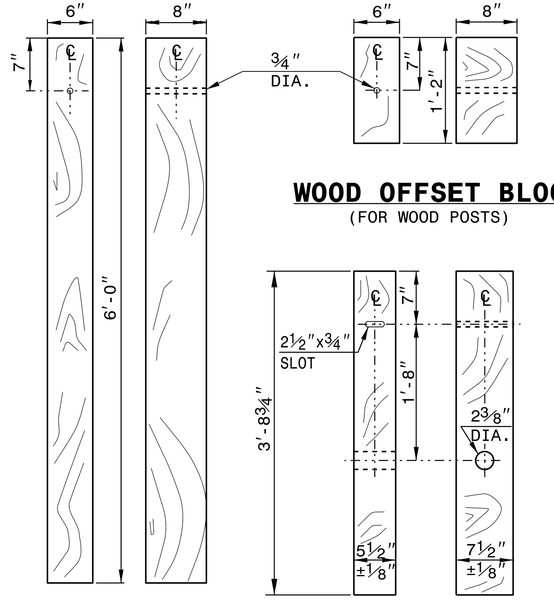
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02



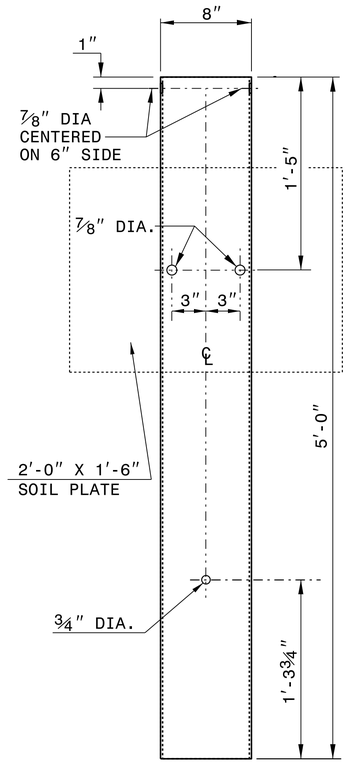
STANDARD W-BEAM GUARDRAIL



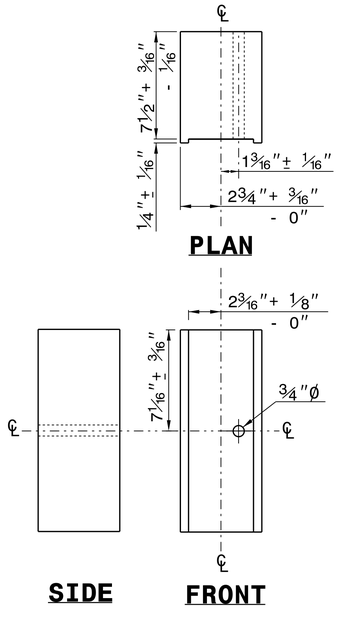
STANDARD LINE POST

SHORT WOOD BREAKAWAY POST

WOOD OFFSET BLOCK
(FOR WOOD POSTS)



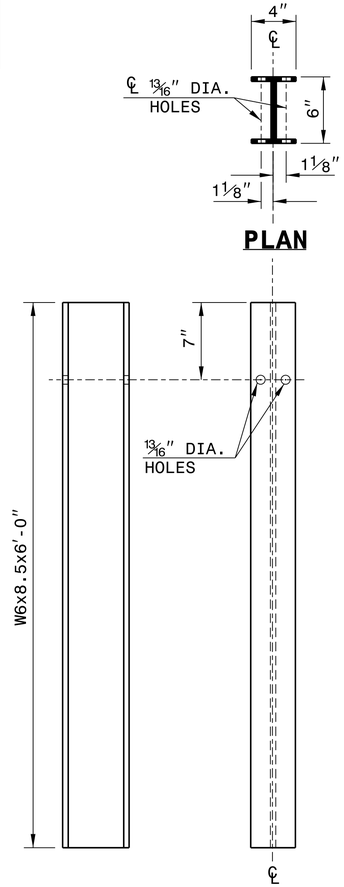
STEEL TUBE
TS 6"x8"x0.1875"



PLAN

SIDE **FRONT**

ROUTED OFFSET BLOCK



PLAN

SIDE **FRONT**

"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

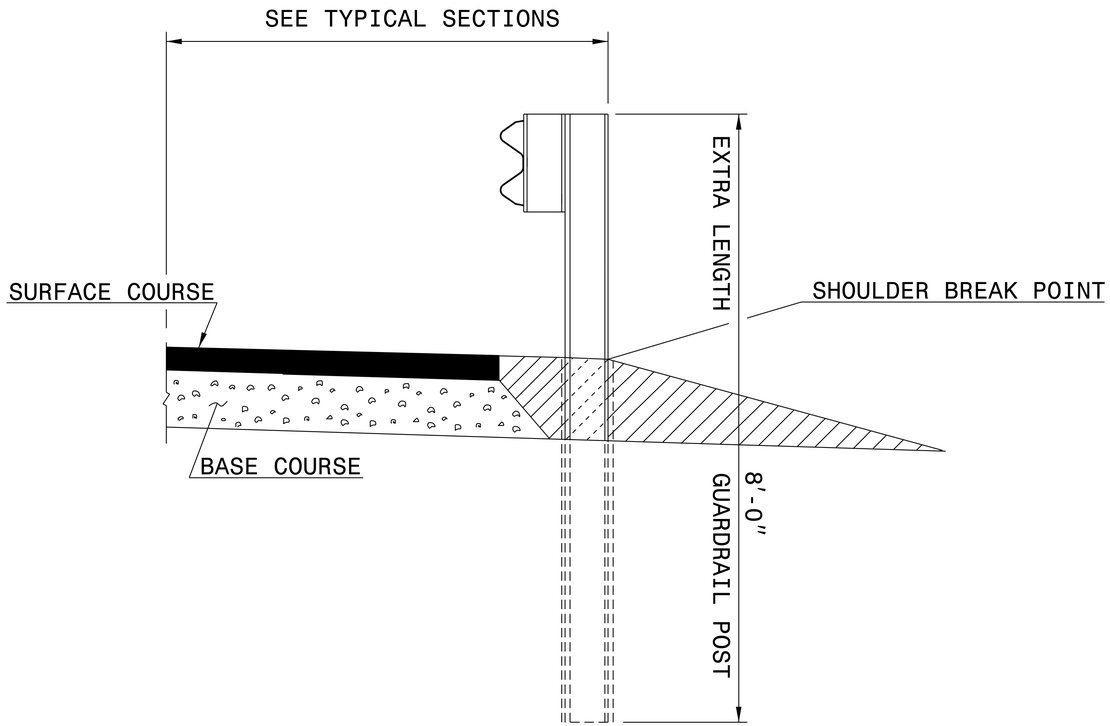
5/31/2022

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.:

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2C-5



NORTH CAROLINA
PROFESSIONAL
SEAL
022071
ENGINEER
RICHARD ELTON DAVENPORT JR.

5/31/2022

09-MAY-2018 14:21
S:\Contracts\Contracts\Special Details\jhowerton\7postguardrail.dgn
jhowerton AT CSD-242595

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

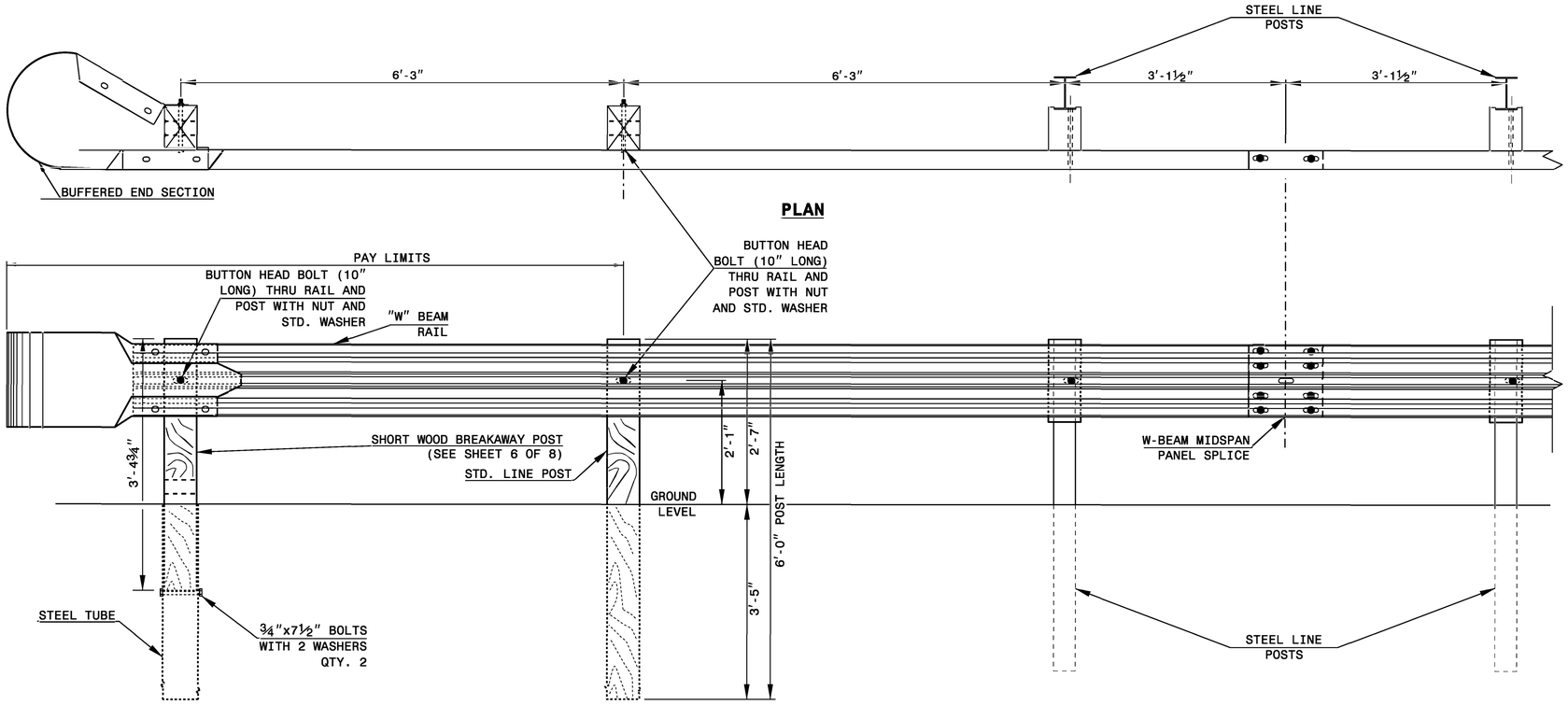
8′ GUARDRAIL POST

ORIGINAL BY: L. Robinson DATE: 1995
MODIFIED BY: L. Robinson DATE: Feb, 1996
CHECKED BY: DATE:
FILE SPEC.: s:7postguardrail.dgn

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2C-6

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION



TRAILING END UNIT ASSEMBLY

A.T.-1 SYSTEM

SHEET OF

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET OF

NORTH CAROLINA PROFESSIONAL SEAL 022071 ENGINEER RONALD ELTON DAVENPORT JR
5/31/2022

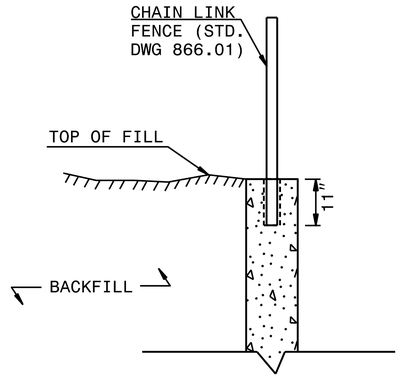
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

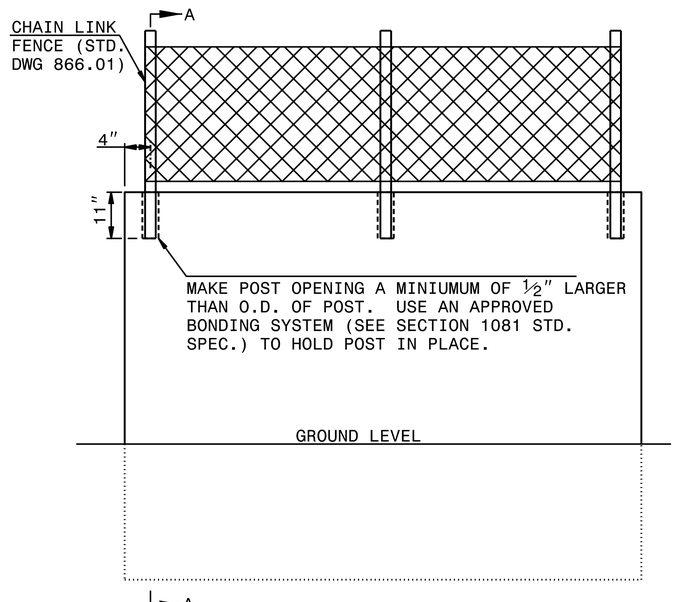
A.T.-1 SYSTEM

ORIGINAL BY:_____ DATE:_____
MODIFIED BY:_____ DATE:_____
CHECKED BY:_____ DATE:_____
FILE SPEC.:_____

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2C-7



SECTION A-A
RETAINING WALL



ELEVATION VIEW
OF RETAINING WALL

EMBED CHAIN LINK FENCE 11″ INTO PROPOSED WALL IN A SLEEVE OR BLOCKOUT WITH EPOXY OR CONCRETE GROUT ANCHORING SYSTEM. PRE-MEASURE AND CENTER THE PROPOSED FENCE ON TOP OF WALL FOR POST SPACINGS. IFF DRILLING THE HOLES FOR POSTS, USE A ROTARY DRILL TO DRILL HOLES IN THE CONCRETE. NO IMPACT DRILLS WILL BE ALLOWED, TO ELIMINATE ANY POSSIBILITY OF STRUCTURAL DAMAGES TO THE PROPOSED WALL.

5/31/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

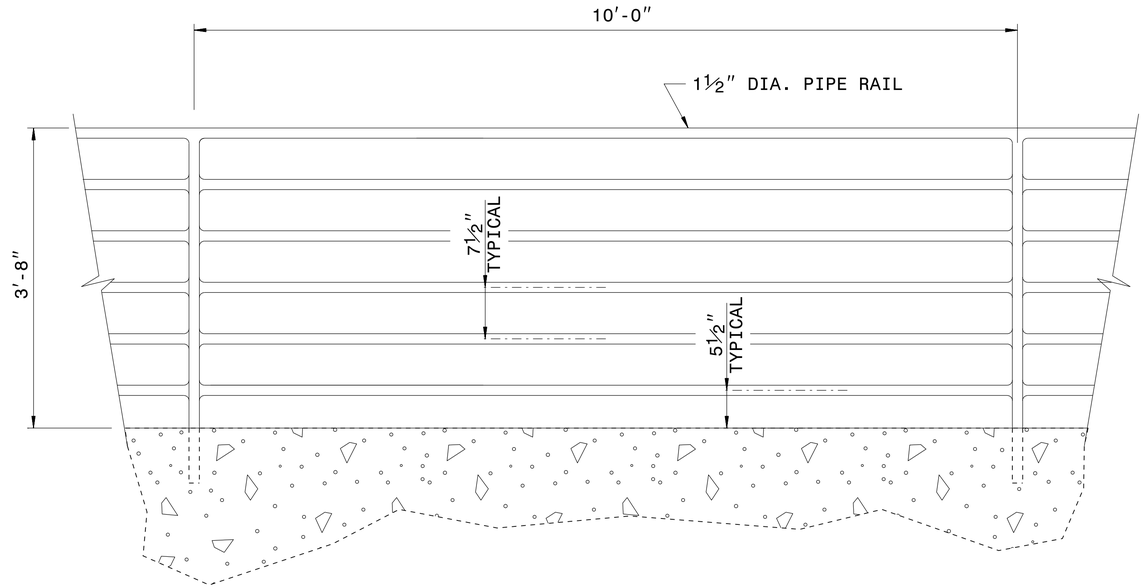
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

CHAIN LINK FENCE ON RETAINING WALL

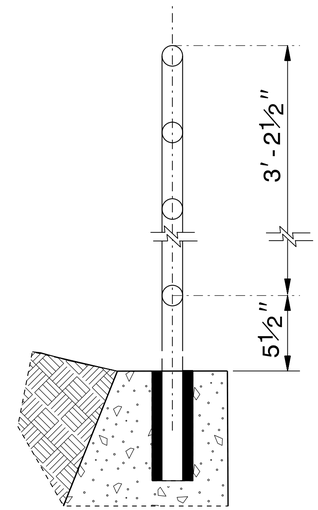
ORIGINAL BY: _____ DATE: _____
MODIFIED BY: K.A. KEMPF DATE: SEP. 2017
CHECKED BY: _____ DATE: _____
FILE SPEC.: usr/details/jhowerton/chain link on retaining wall.dgn

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

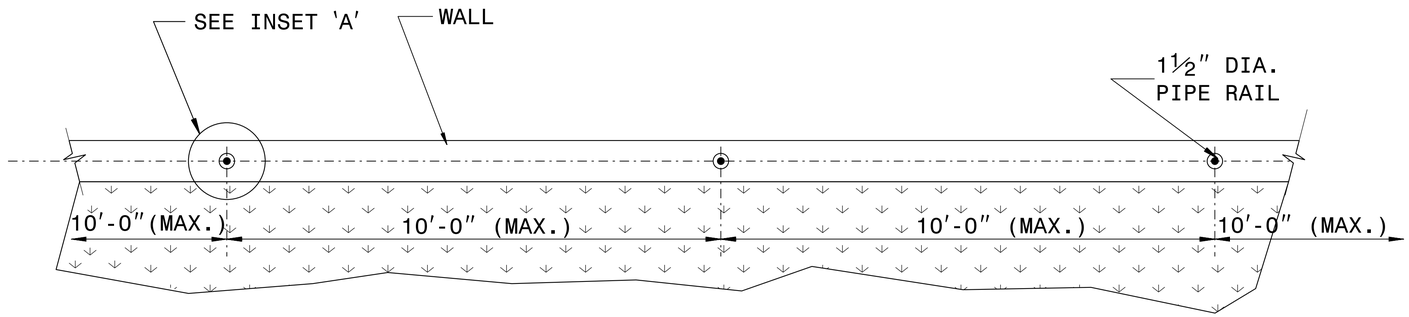
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2C-8



ELEVATION OF HANDRAIL



INSET 'A'



PLAN VIEW

NOTES:

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

EMBED PIPE RAIL INTO PROPOSED WALL WITH CHEMICAL OR CONCRETE GROUT ANCHORING SYSTEM PER THE WALL MANUFACTURER'S RECOMMENDATIONS.

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

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

CENTER THE PROPOSED RAILING ON TOP OF THE WALL WITH POST SPACING SYMMETRICAL ABOUT THE CENTER-LINE OF THE WALL.

WELD IN ACCORDANCE WITH ARTICLE 1072-18 OF THE STANDARD SPECIFICATIONS.

SUBMIT THE ATTACHMENT OF THE HANDRAIL TO THE RETAINING WALL TO THE CONTRACTS AND STANDARDS OFFICE FOR APPROVAL.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022071 ENGINEER — HOUSTON DIVERSION, INC.

5/31/2022

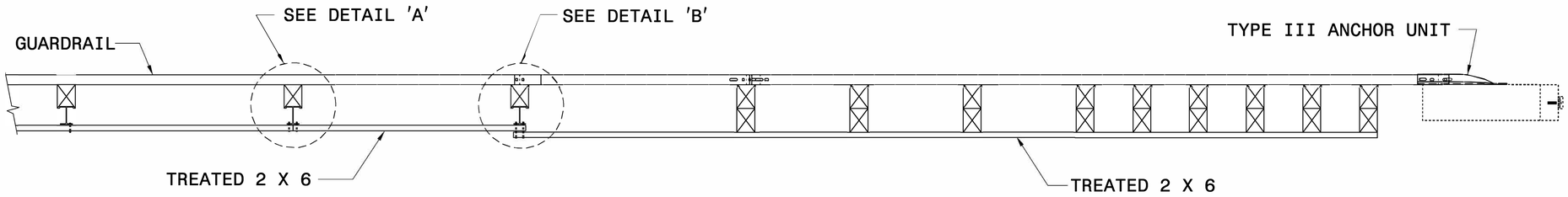
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

DETAIL OF PIPE HANDRAIL MOUNTED ON A WALL

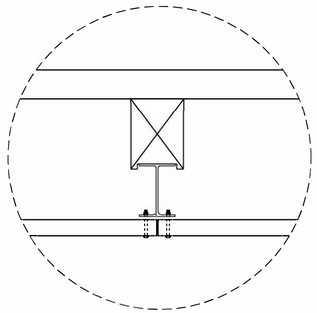
ORIGINAL BY: E.E. WARD DATE: 12-99
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: jhowerton/handrail on retaining wall.dgn

24-MAY-2018 14:10
S:\Contracts\Contracts\Special Details\jhowerton\Handrail on Retaining Wall.dgn
jhowerton AT CSD-292595

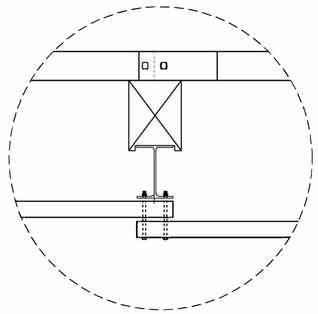
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2C-9



PLAN

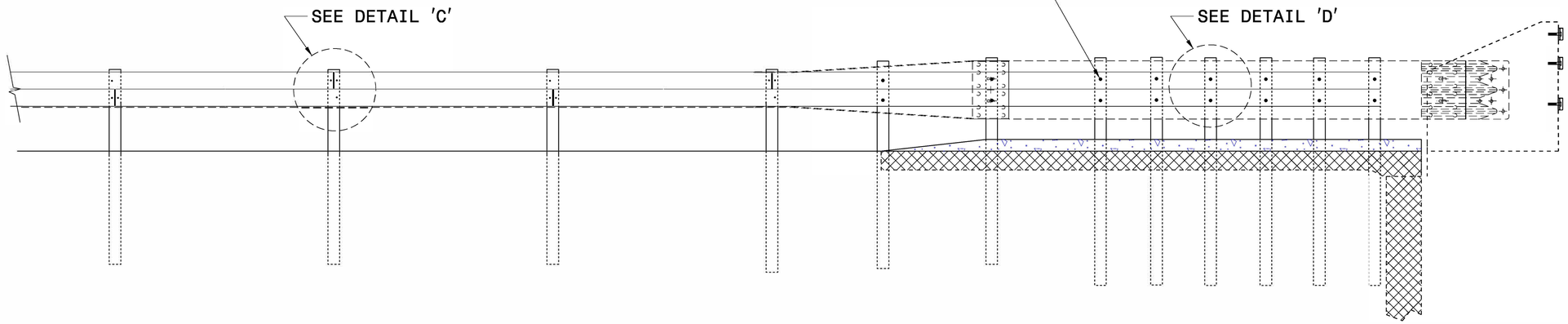


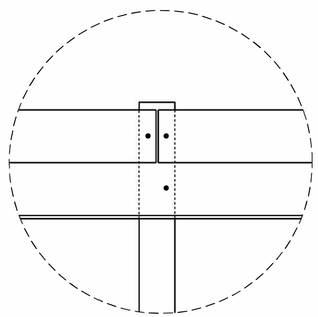
DETAIL 'A'



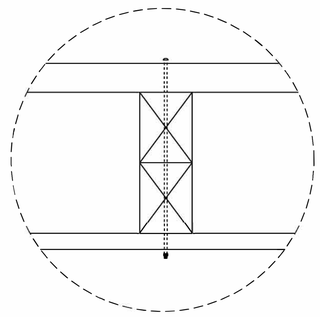
DETAIL 'B'

USE BOLTS AND NUTS FROM TYPE III ANCHOR UNIT TO FASTEN 2 X 6 WOOD RAILS TO THE WOOD POSTS - BOLTS MAY NEED TO BE LENGTHENED TO ACCOMMODATE FOR THE 2 X 6 WOOD RAILS.





DETAIL 'C'



DETAIL 'D'

ELEVATION

NOTES:

1. USE #2 SYP TREATED 2 X 6 FOR WOOD RAIL.
2. USE GUARDRAIL BOLTS TO FASTEN WOOD RAIL TO GUARDRAIL POSTS. SEE ROADWAY STD.NO.862.02.
3. THE MOUNTING HEIGHT OF THE WOOD RAIL TO BE DETERMINED IN THE FIELD.
4. PLACE THE TREATED 2 X 6 WOOD RAIL AS DIRECTED BY THE ENGINEER.
5. DO NOT PLACE WOOD RAIL WITHIN THE PAY LIMITS OF THE GREU TL-3 END UNIT.

5/31/2022

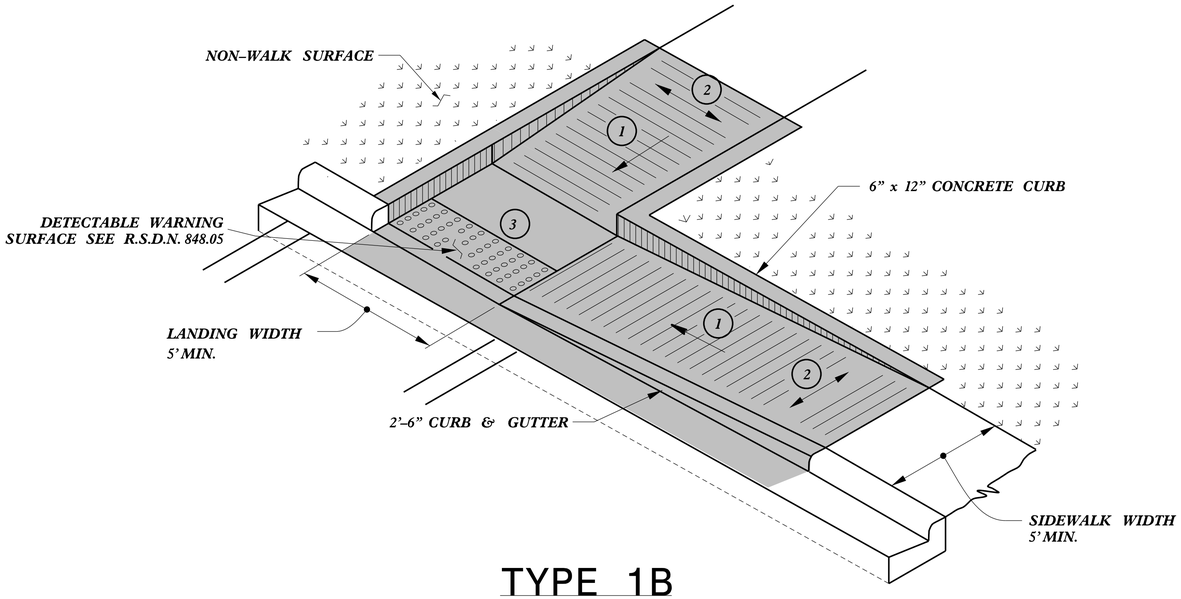
CONTRACT STANDARDS AND DEVELOPMENT UNIT
PLANS AND STANDARDS SECTION
Office 919-707-6950 FAX 919-250-4119

DETAIL OF WOOD RUB RAIL

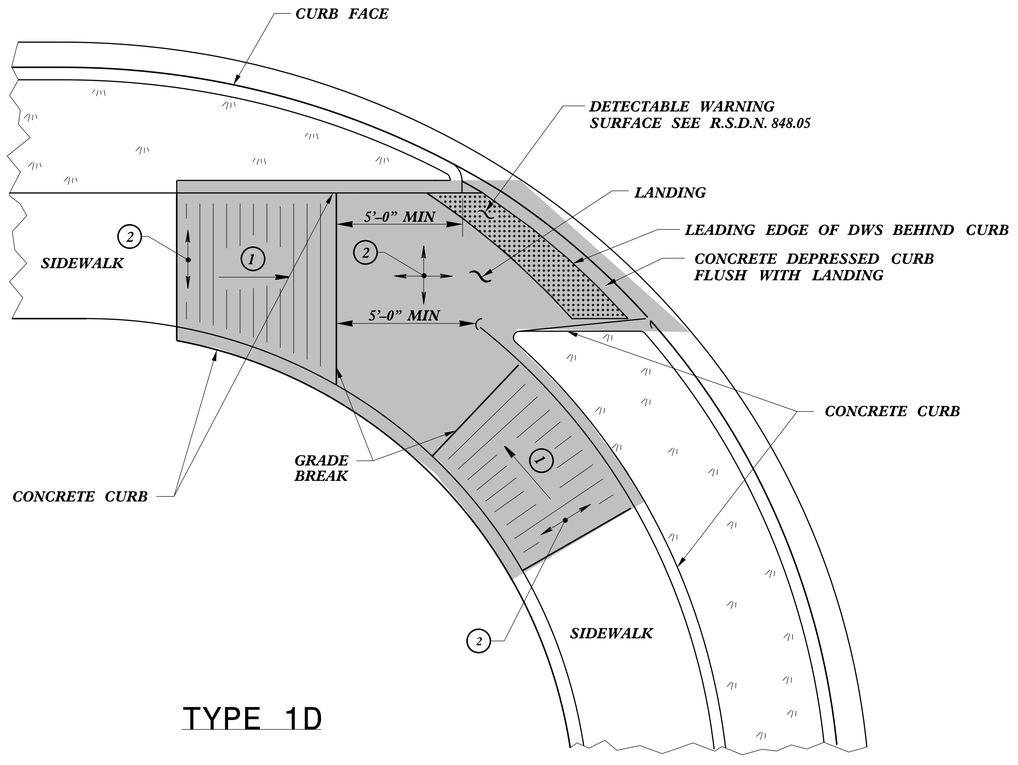
ORIGINAL BY:	STD.8.25	DATE:	1-25-12
MODIFIED BY:		DATE:	
CHECKED BY:		DATE:	
FILE SPEC.:	jhowerton/Wood Rail on Back of Guardrail		

5/14/99

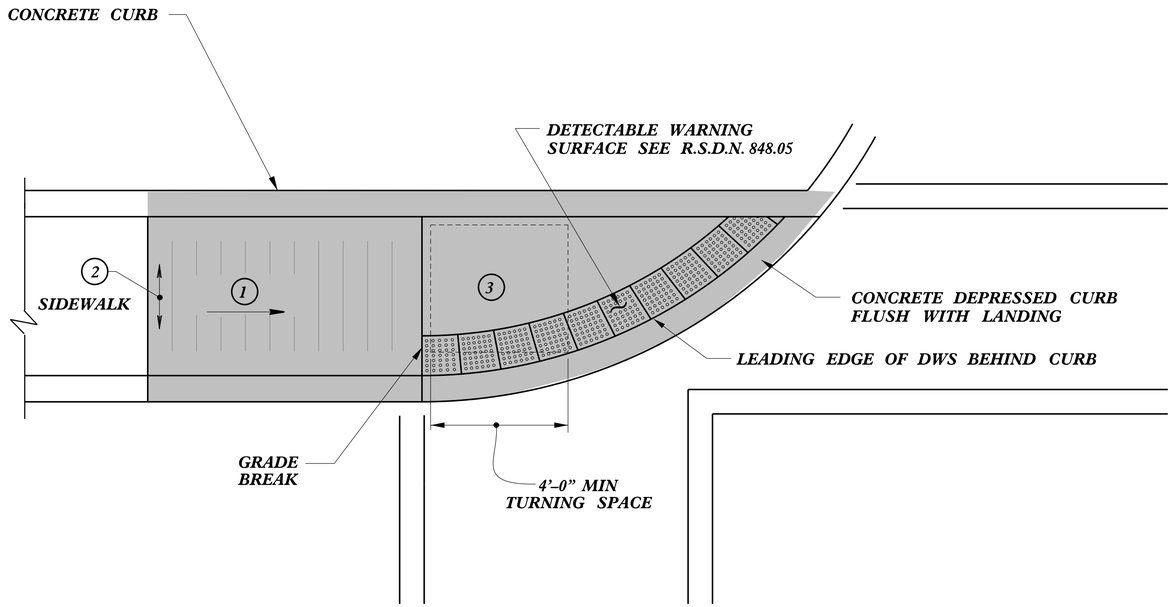
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2C-10



TYPE 1B



TYPE 1D



TYPE 1C

(1) *8.33% (12:1) MAX RAMP SLOPE*

(2) *CROSS SLOPE: 2.00%*

(3) *CURB RAMPS REQUIRE A (4'–0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.*

PAY LIMITS FOR 1 CURB RAMP

REFER TO ROADWAY STANDARD DRAWING NUMBER 848.05 SHEET 3 OF 3 FOR ALL RAMP NOTES

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022071 RONALD LEITON DAVENPORT JR

5/31/2022

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

CURB RAMPS

Directional Ramps

ORIGINAL BY: J.S. HOWERTON DATE: 7/7/11
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: stds/2012CurbRamp/CurbRampDetails.dgn

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-1

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. 840.01.

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.

DETAIL
(APRON SUPPORT NOTCH)

DOWEL-A

SECTION Y-Y

PLAN

SECTION X-X

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 1 OF 2 **840d17**

DOWEL-B¹
FOR 15" THRU 36" INLET

DOWEL-B²
FOR 42" INLET

DOWEL-B³

QUANTITY TO BE ADDED FOR EACH 2' INCREMENT INLET OPENING

	2'-0"	4'-0"	6'-0"	8'-0"	10'-0"	12'-0"
ADDITIONAL INLETS						
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

PART SECTION V-V

DOWEL-C

PART SECTION U-U

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

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**

5/31/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

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

11-SEP-2017 11:55
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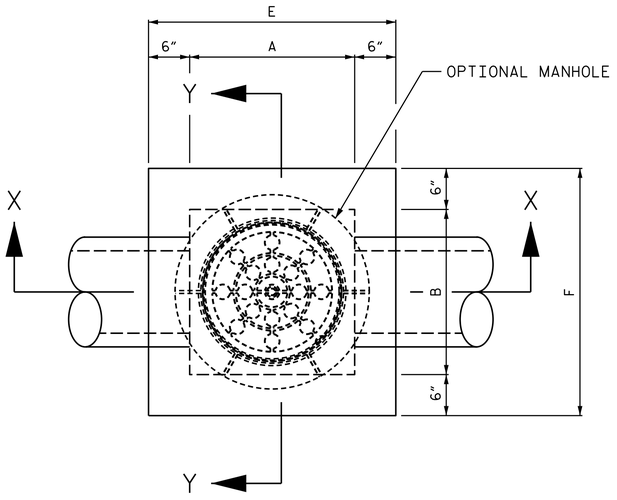
jhowerton
MI CSD 242075

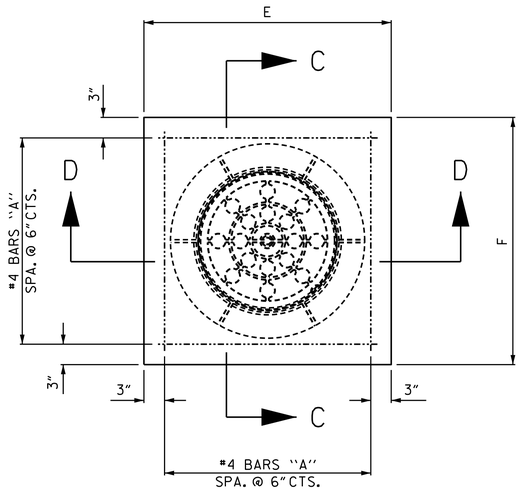
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-2

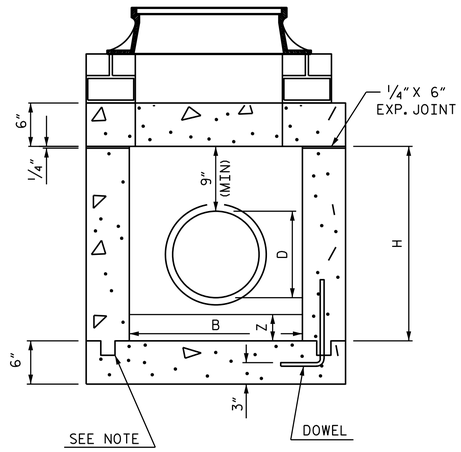
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

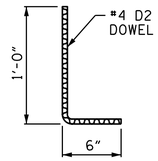


PLAN





SECTION Y-Y



DOWEL

GENERAL NOTES:

CHAMFER ALL EXPOSED CORNERS 1".

USE CLASS "B" CONCRETE THROUGHOUT.

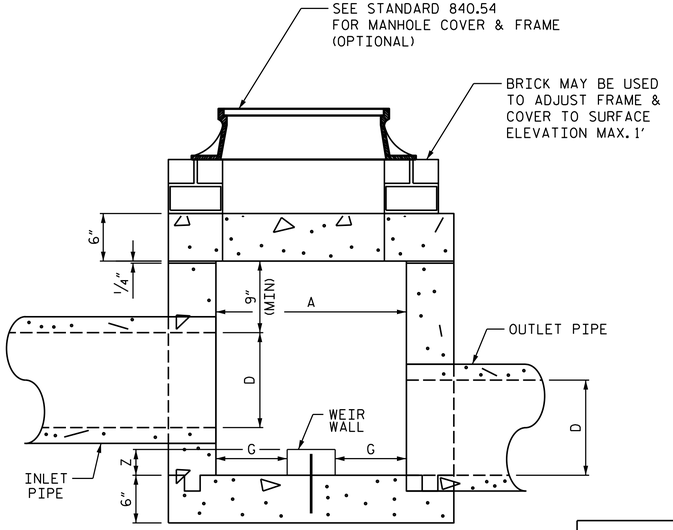
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2"KEYWAY, OR #4 BAR DOWELS AT 12"CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS TO CONSTRUCT THE BOTTOM SLAB.

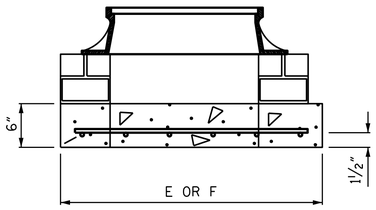
IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD NO. 840.00.

PROVIDE ALL JUNCTION BOXES OVER 3'-6" IN DEPTH WITH STEPS 12"ON CENTERS IN ACCORDANCE WITH STD. NO. 840.66.

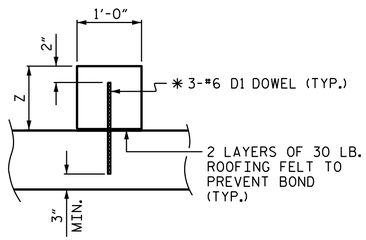
ADJUST THE STEEL, CONCRETE AND BRICK MASONRY QUANTITIES TO INCLUDE THE ADDITION OF THE MANHOLE (I.E. DIAGONAL BARS SHORTENED AROUND OPENING IN TOP SLAB, ADDITIONAL VARIABLE HEIGHT BRICK MASONRY, OPENING IN TOP SLAB.)



SECTION X-X

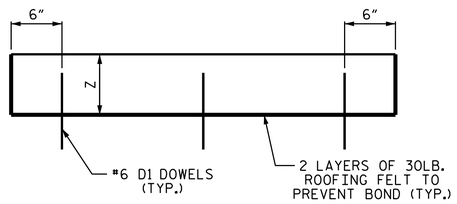


SECTION
C-C OR D-D



SECTION THROUGH WEIR WALL

* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.



WEIR WALL DETAIL

DIMENSIONS AND QUANTITIES FOR CONCRETE JUNCTION BOXES

DIMENSIONS OF BOX AND PIPE				WEIR WALL		REINFORCEMENT BARS "A"		TOP SLAB DIMENSIONS		CUBIC YARDS IN BOX				TOTAL QUANTITIES BOX AND SLABS		DEDUCTIONS FOR ONE PIPE (CU. YDS.)	
PIPE	SPAN	WIDTH	HEIGHT							TOP SLAB	BOTTOM SLAB	WALL/ FT. OF HT.	WEIR WALL	LBS. REINF	CU. YDS. (MIN. "H")	C.S.	R.C.
D	A	B	H	G	Z	NO.	LENGTH	E	F								
36"	4'-0"	4'-0"	10'-2"	1'-6"	1'-0"	20	4'-9"	5'-0"	5'-0"	0.463	0.463	0.333	0.148	68	4.460	0.132	0.178
48"	5'-4"	5'-4"	8'-0"	2'-2"	1'-0"	26	6'-1"	6'-4"	6'-4"	0.743	0.743	0.432	0.198	111	5.140	0.235	0.317
54"	5'-10"	5'-10"	6'-9"	2'-5"	6"	28	6'-7"	6'-10"	6'-10"	0.865	0.865	0.469	0.108	126	5.004	0.297	0.401
60"	6'-6"	6'-6"	8'-7"	2'-9"	1'-0"	30	7'-3"	7'-6"	7'-6"	1.042	1.042	0.519	0.241	150	6.780	0.367	0.495

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE JUNCTION BOX

(WITH OPTIONAL MANHOLE)

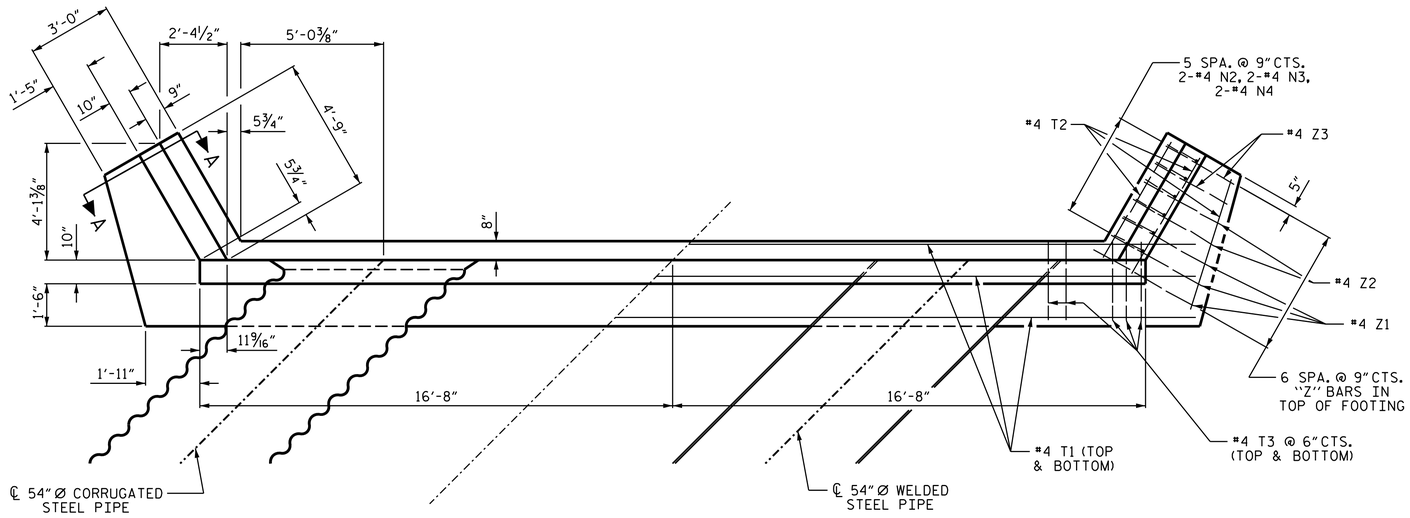
3/22/2022
X:\NCDOT\A-0009\Structures\A-0009CA\Junction Box\A-0009 JB_STM.dgn
User:smassinople

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-3

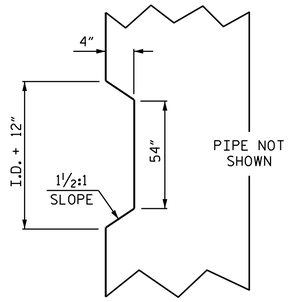
NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CREEK, JR.
Marshall G. Creek, Jr.
6/1/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

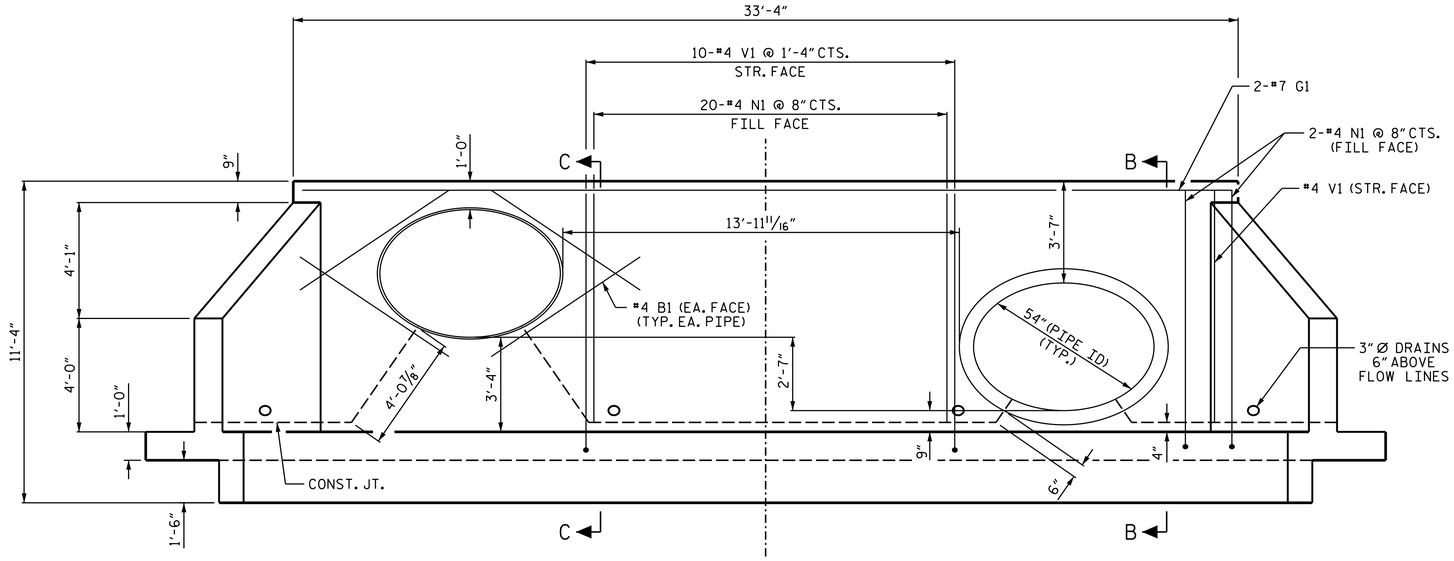


PLAN

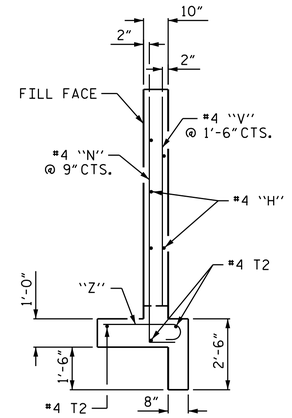


TAPER DETAIL

FOR 54" Ø CSP



ELEVATION



SECTION A-A

SEE STD. # 838.45 FOR GENERAL NOTES.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE HEADWALL

3/29/2022
X:\NCDOT\A-0009\Structures\A-0009CA\Headwall\A-0009 HW_STM.dgn
User:smassinople

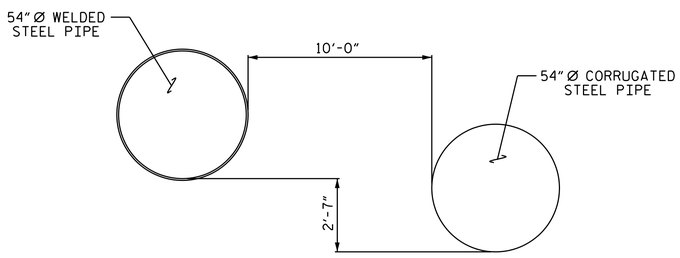
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-4

NORTH CAROLINA PROFESSIONAL Marshall G. Creek, Jr. SEAL 20125 ENGINEER MARSHALL G. CREEK, JR.

6/1/2022

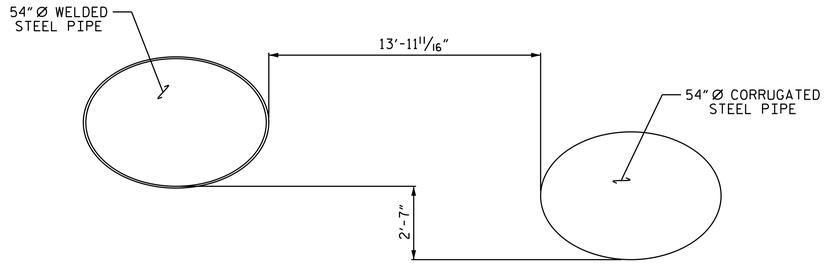
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275



LOOKING DOWNSTREAM

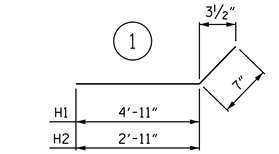
NORMAL TO PIPES

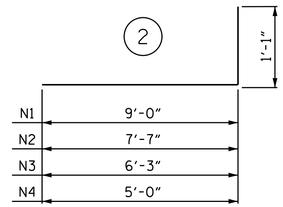


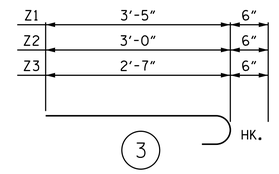
LOOKING DOWNSTREAM

NORMAL TO HEADWALL

BAR TYPES





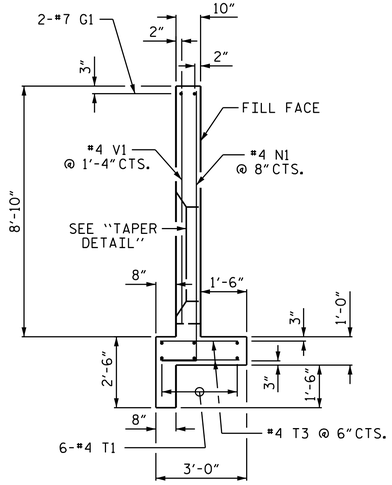


ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL FOR ONE HEADWALL

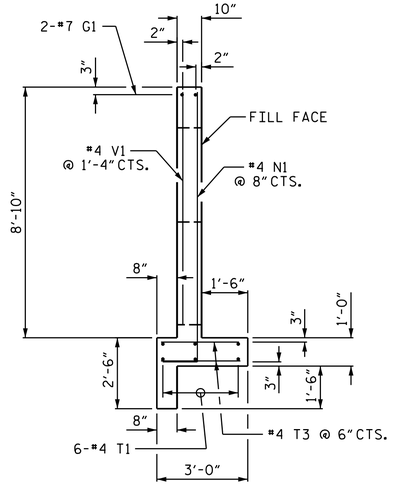
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#4	STR	6'-4"	68
G1	2	#7	STR	33'-0"	135
H1	14	#4	1	5'-6"	51
H2	4	#4	1	3'-6"	9
N1	24	#4	2	10'-1"	162
N2	4	#4	2	8'-8"	23
N3	4	#4	2	7'-4"	20
N4	4	#4	2	6'-1"	16
T1	6	#4	STR	36'-10"	148
T2	6	#4	STR	5'-0"	20
T3	132	#4	STR	2'-6"	220
V1	12	#4	STR	8'-0"	64
V2	2	#4	STR	6'-11"	9
V3	2	#4	STR	5'-6"	7
V4	2	#4	STR	4'-1"	5
Z1	6	#4	3	3'-11"	16
Z2	4	#4	3	3'-6"	9
Z3	4	#4	3	3'-1"	8

REINFORCING STEEL FOR ONE HEADWALL	990 LBS
CLASS A CONCRETE FOR ONE HEADWALL	18.2 CY



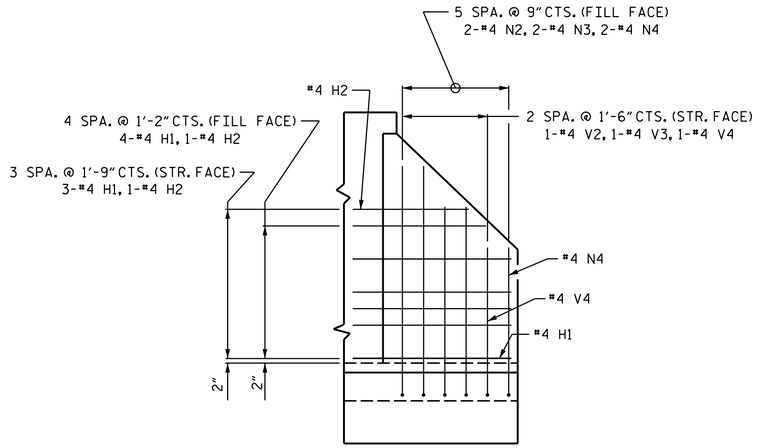
SECTION B-B

FOR 54" Ø CSP



SECTION C-C

FOR 54" Ø WSP



WING ELEVATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE HEADWALL

3/29/2022
X:\NCDOT\A-0009\Structures\A-0009CA\Headwall\A-0009 HW_STM.dgn
User:smassinople

8/17/99

DRY DETENTION BASIN#1

SHEET 1 OF 4

1″=10′

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-5
R/W SHEET NO.	

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044158 BENJAMIN J. HENEGAR

3/31/2022

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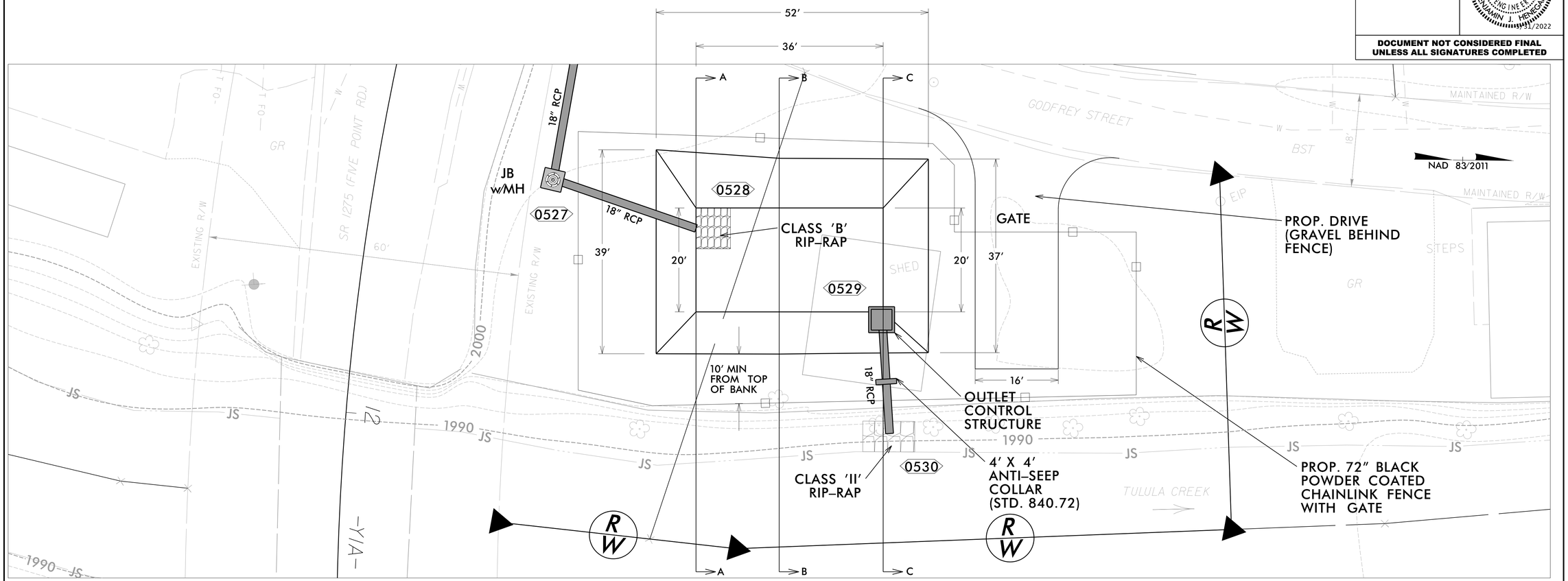
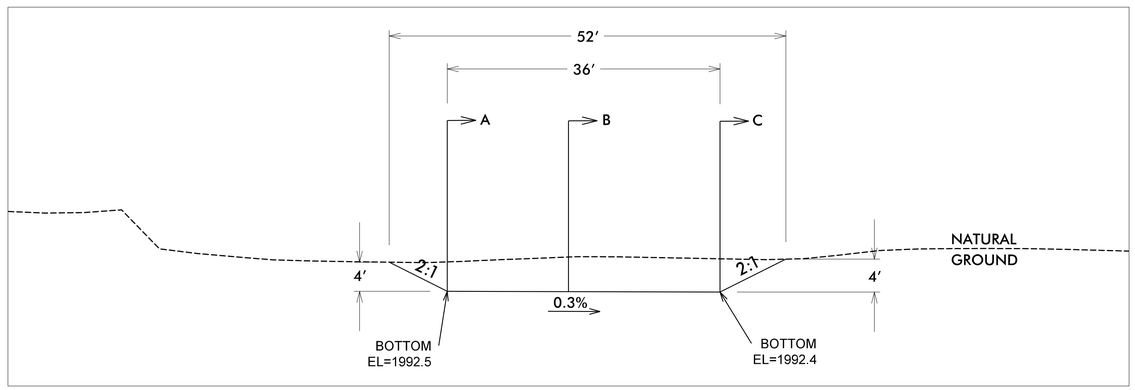


PLAN VIEW



PROFILE VIEW

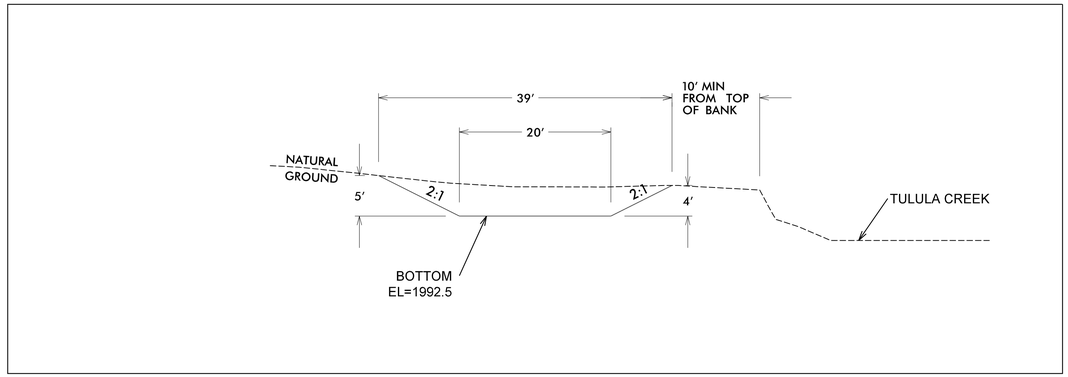
3/28/2022
X:\NCDOT\A-0009\Hydraulics\Dry Detention Basin\A-0009CA_DDB1_PSH.dgn
User:bhenegar

8/17/99

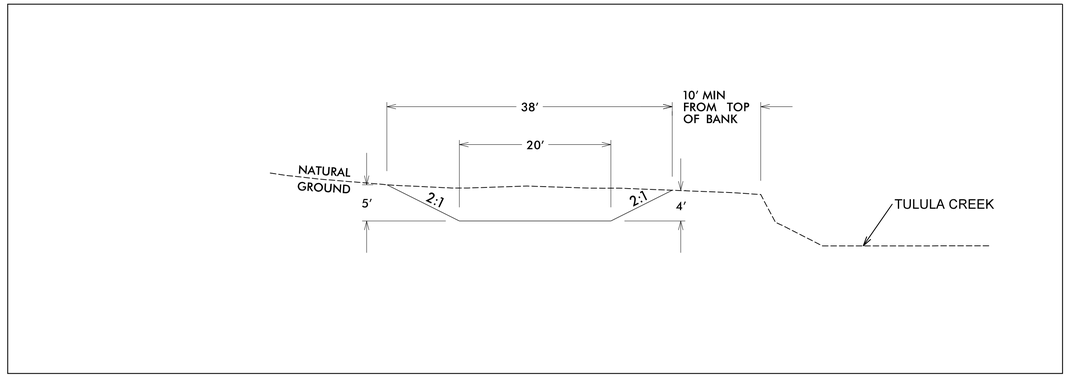
DRY DETENTION BASIN#1

SHEET 2 OF 4

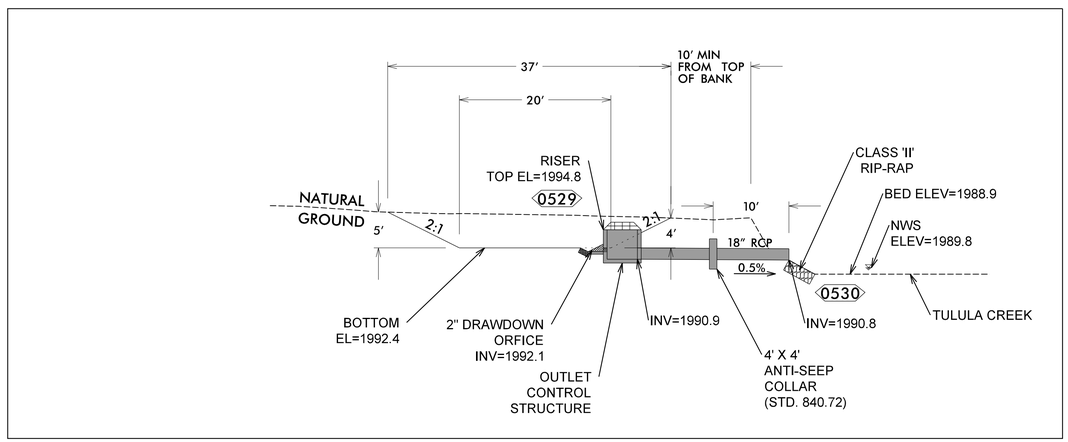
1″=10′



SECTION A–A



SECTION B–B



SECTION C–C

CROSS SECTIONS

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-6
R/W SHEET NO.	

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044158 BENJAMIN J. HENEGAR

3/31/2022

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3/29/2022
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User:bhenegar

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-7
R/W SHEET NO.	

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044158 BENJAMIN J. HENEGAR

5/31/2022

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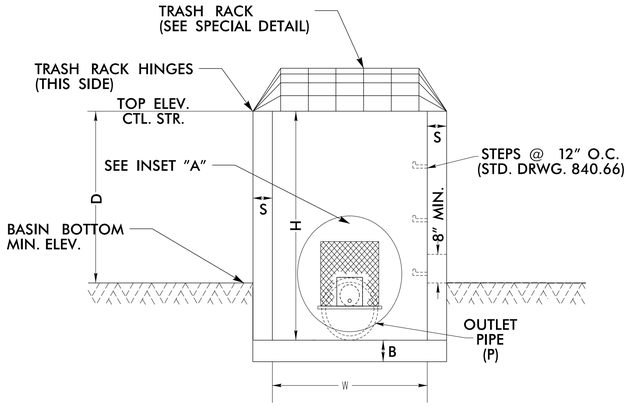
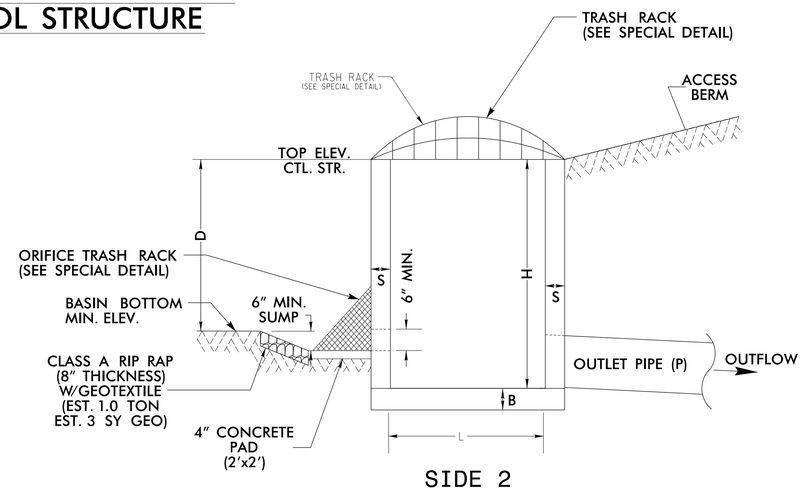
DRY DETENTION BASIN#1

SHEET 3 OF 4

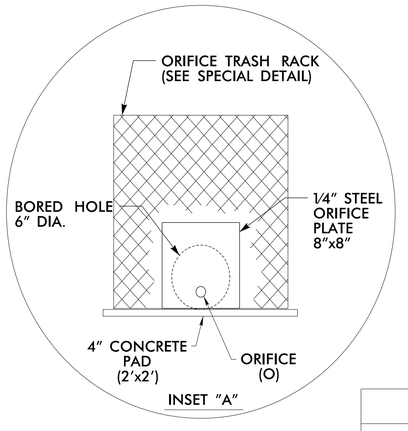
DRY DETENTION OUTLET CONTROL STRUCTURE



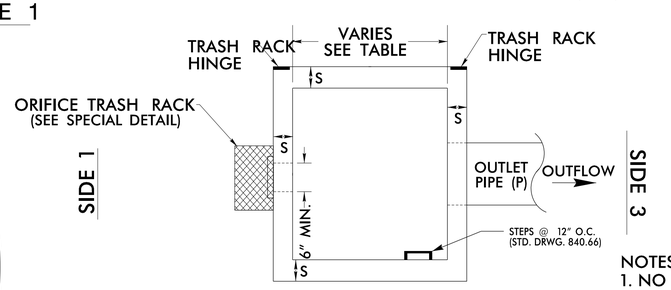
SIDE 1



SIDE 2



INSET "A"



SIDE 2

PLAN VIEW

TRASH RACK NOT SHOWN FOR CLARITY

NOTES:
1. NO BEDDING MATERIAL TO BE USED. THERFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.

2. PAYMENT OF THE TRASH RACKS & 4" CONCRETE PAD ARE INCIDENTAL TO BASIN OUTLET CONTROL STRUCTURE.

MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE

STATION	STRUCTURE NUMBER	S (INCHES)	B (INCHES)	TOP ELEVATION CONTROL STRUCTURE	CTL. STR. DIMENSIONS			ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE INV.	OUTLET PIPE DIAMETER(P) INCHES	OUTLET PIPE MATERIAL
					W	L	H					
–Y1A– 11+68 LT	0529	6"	6"	1994.8'	4.0'	4.0'	3.9'	2"	1992.1'	1990.9'	18"	RCP*

*USE CLASS 'III' RCP WITH SEALED JOINTS

NOT TO SCALE

8/17/99

DRY DETENTION BASIN#1

SHEET 4 OF 4

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-8
R/W SHEET NO.	

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044158 BENJAMIN J. HENEGAR

7/31/2022

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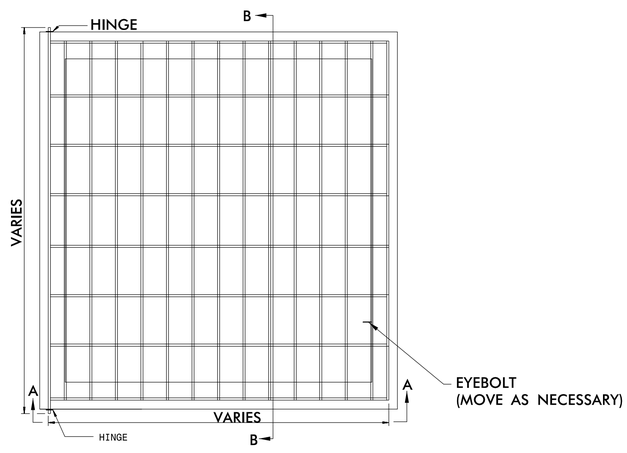
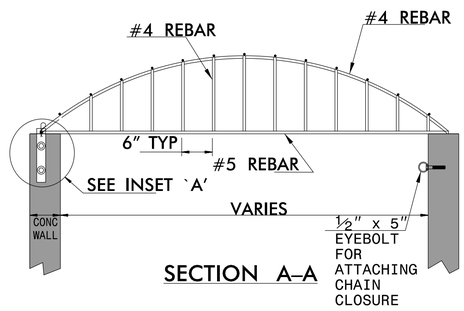
REBAR & ORIFICE TRASH RACKS
(N.T.S.)

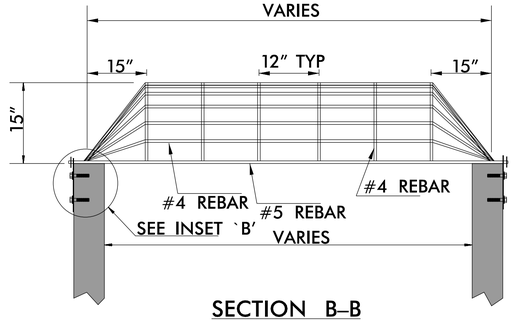
RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK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



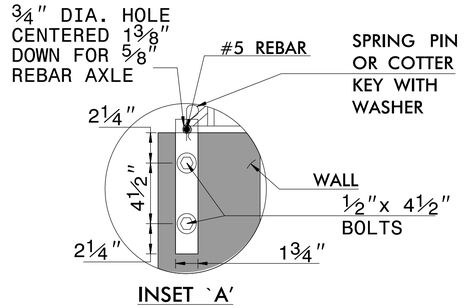
PLAN



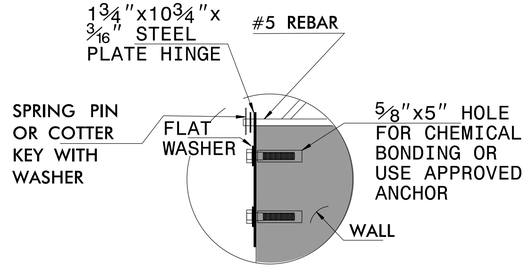
SECTION A-A



SECTION B-B

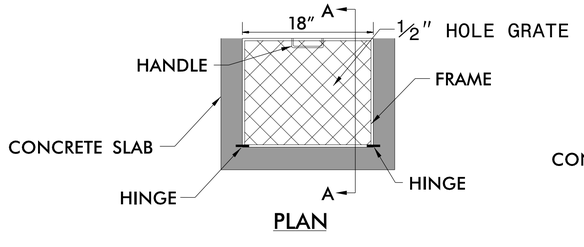


INSET `A'

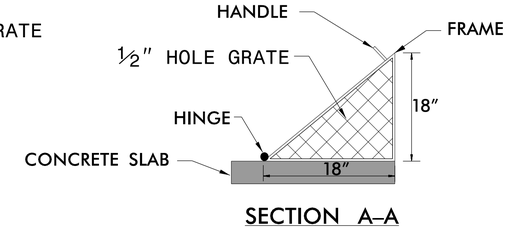


INSET `B'

REBAR TRASH RACK
NOT TO SCALE



PLAN



SECTION A-A

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

ORIFICE TRASH RACK
NOT TO SCALE

3/29/2022
X:\NCDOT\A-0009\Hydraulics\Dry Detention Basin\A-0009CA_DDB1_PSH.dgn
User:bhenegar

8/17/99

DRY DETENTION BASIN#2

SHEET 1 OF 4

1″=10′

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-9
R/W SHEET NO.	

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044158 ENGINEER BENJAMIN J. HENEGAR

Benjamin J. Henegar

8/1/2022

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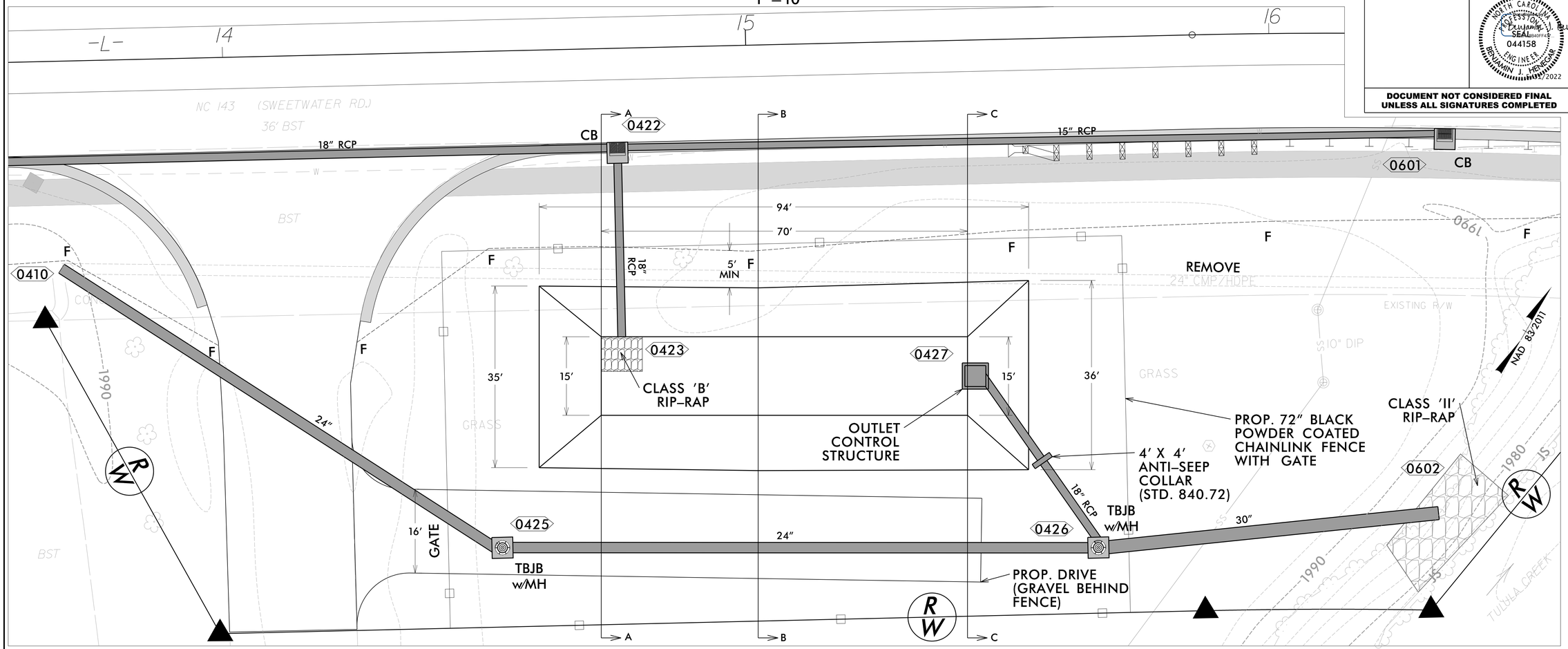
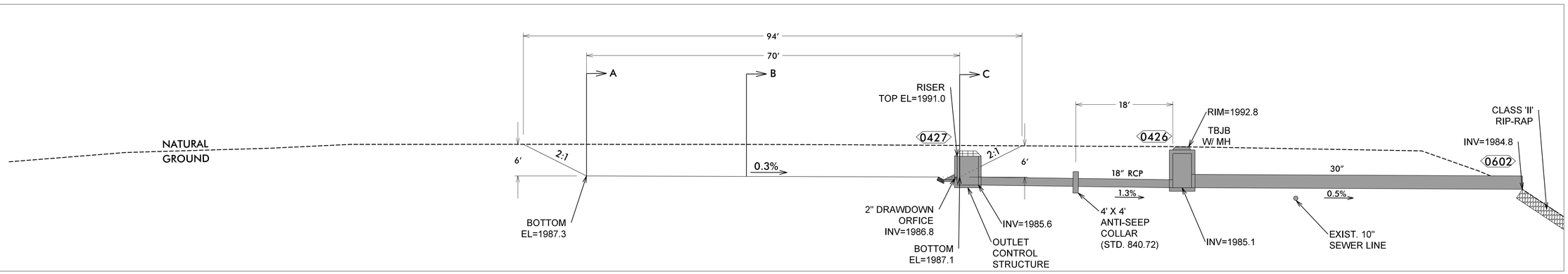


PLAN VIEW



PROFILE VIEW

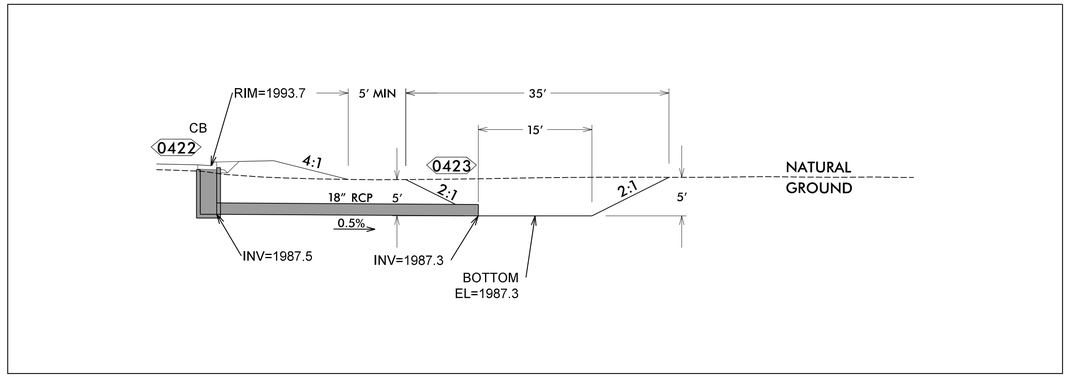
3/29/2022
X:\NCDOT\A-0009\Hydraulics\Dry Detention Basin\A-0009CA_DDB2_PSH.dgn
User:bhenegar

8/17/99

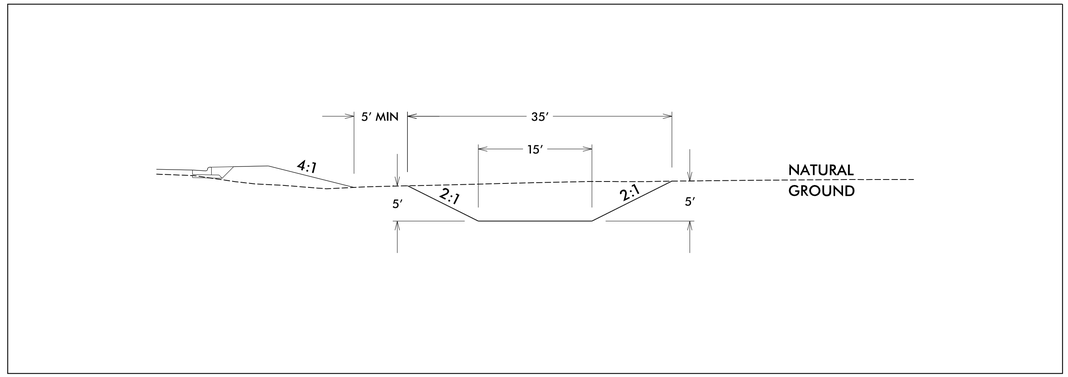
DRY DETENTION BASIN#2

SHEET 2 OF 4

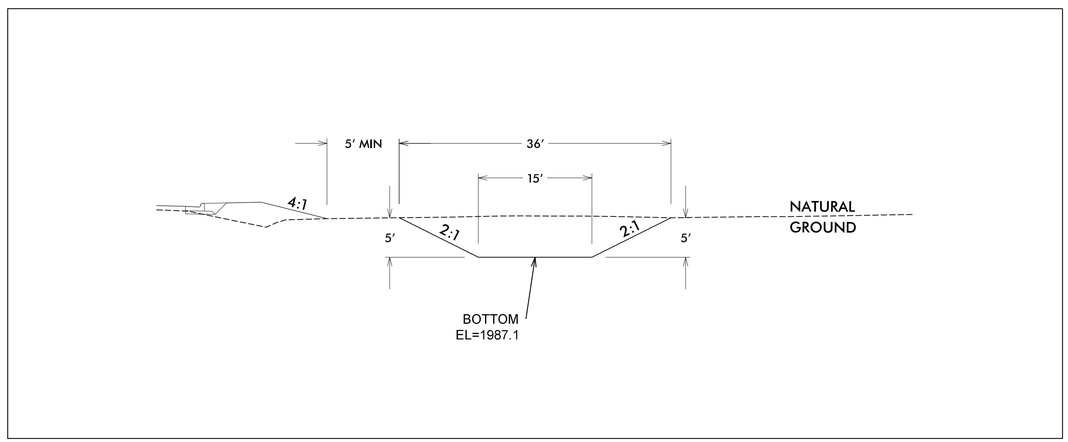
1″=10′



SECTION A–A



SECTION B–B



SECTION C–C

CROSS SECTIONS

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-10
R/W SHEET NO.	

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044158 BENJAMIN J. HENEGAR

Benjamin J. Henegar

3/31/2022

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8/17/99

DRY DETENTION BASIN#2

SHEET 3 OF 4

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-11
R/W SHEET NO.	

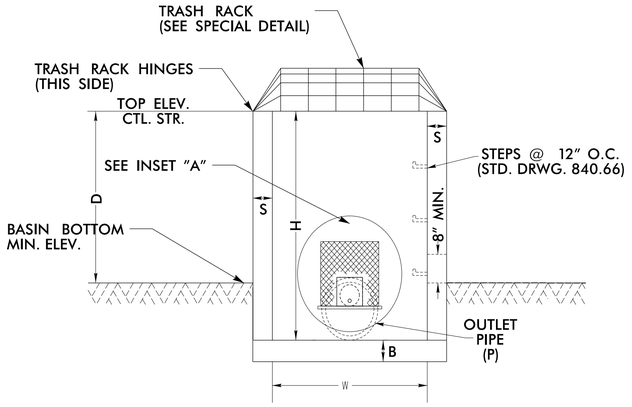
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044158 BENJAMIN J. HENEGAR

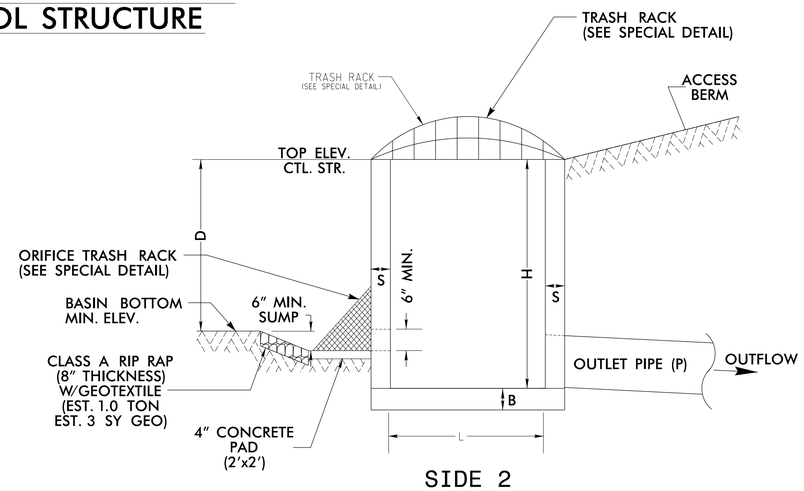
5/31/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

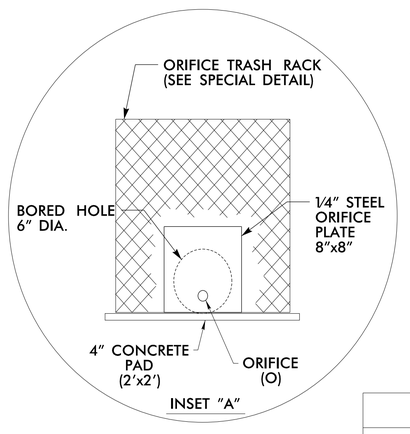
DRY DETENTION OUTLET CONTROL STRUCTURE



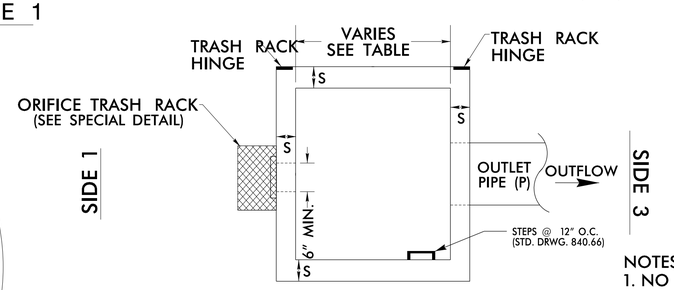
SIDE 1



SIDE 2



INSET "A"



SIDE 2

PLAN VIEW

TRASH RACK NOT SHOWN FOR CLARITY

NOTES:
1. NO BEDDING MATERIAL TO BE USED. THERFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.

2. PAYMENT OF THE TRASH RACKS & 4" CONCRETE PAD ARE INCIDENTAL TO BASIN OUTLET CONTROL STRUCTURE.

MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE

STATION	STRUCTURE NUMBER	S (INCHES)	B (INCHES)	TOP ELEVATION CONTROL STRUCTURE	CTL. STR. DIMENSIONS			ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE INV.	OUTLET PIPE DIAMETER(P) INCHES	OUTLET PIPE MATERIAL
					W	L	H					
–L– 15+42 RT	0427	6"	6"	1991.0'	4.0'	4.0'	5.4'	2"	1986.8'	1985.6'	18"	RCP*

*USE CLASS 'III' RCP WITH SEALED JOINTS

NOT TO SCALE

5/27/2022
X:\NCDOT\A-0009\Hydraulics\Dry Detention Basin\A-0009CA_DDB2_PSH.dgn
User:bhenegar

8/17/99

DRY DETENTION BASIN#2

SHEET 4 OF 4

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-12
R/W SHEET NO.	

HYDRAULICS ENGINEER

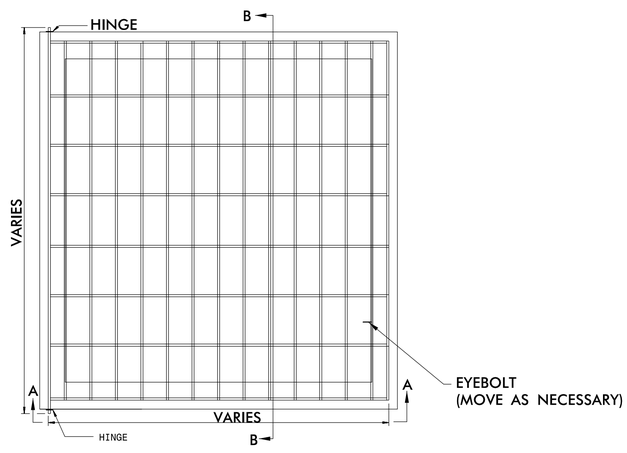
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044158 BENJAMIN J. HENEGAR

9/21/2022

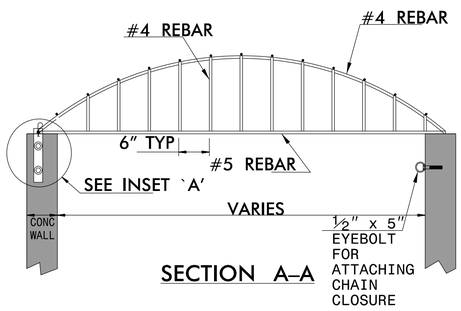
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REBAR & ORIFICE TRASH RACKS
(N.T.S.)

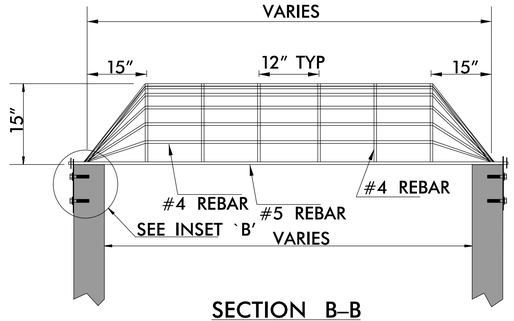
RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK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



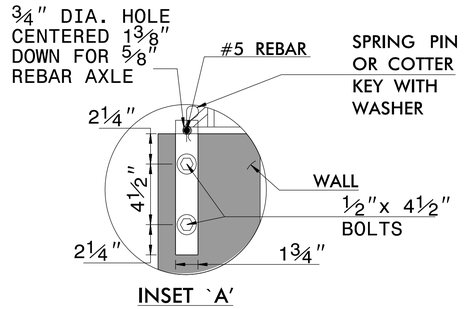
PLAN



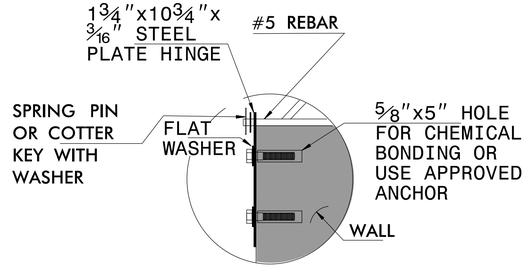
SECTION A–A



SECTION B–B

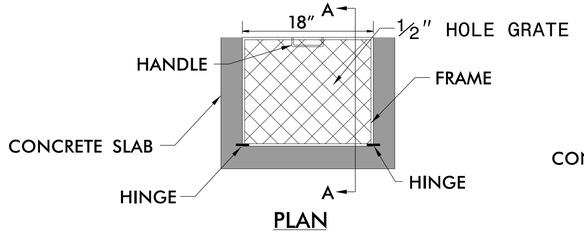


INSET `A'

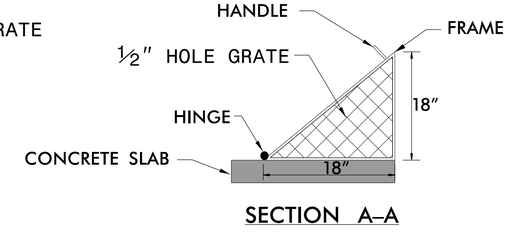


INSET `B'

REBAR TRASH RACK
NOT TO SCALE



PLAN



SECTION A–A

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

ORIFICE TRASH RACK
NOT TO SCALE

3/29/2022
X:\NCDOT\A-0009\Hydraulics\Dry Detention Basin\A-0009CA_DDB2_PSH.dgn
User:bhenegar

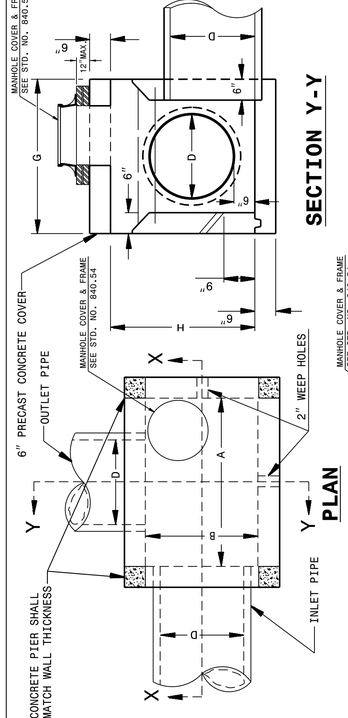
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-13

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

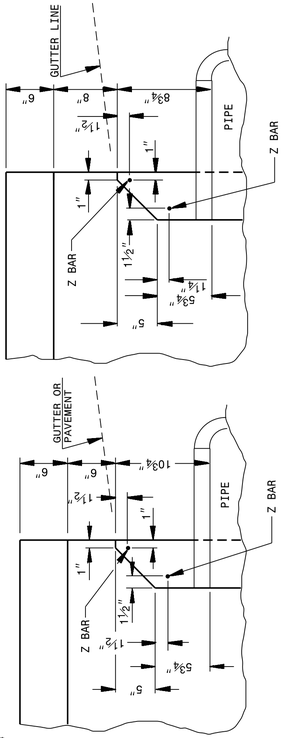
ENGLISH DETAIL DRAWING FOR
CONCRETE CATCH BASIN
(3 OR 4 SIDE OPEN THROAT)
(MANHOLE OPTIONAL)

SHEET 1 OF 2 — 840D04

GENERAL NOTES:
ALL CATCH BASINS OVER 3'-6" IN DEPTH TO BE PROVIDED WITH STEPS 12" ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. 840.66.
ALL EXPOSED CORNERS TO BE CHAMFERED 1".
CLASS "B" CONCRETE TO BE USED THROUGHOUT.
2" PIPE WEEPHOLES TO BE PLACED AS DIRECTED BY ENGINEER.
THE 6" OPENING SHOWN MAY BE INCREASED TO 8" MAXIMUM IF DEEMED TO BE NECESSARY BY THE ENGINEER.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #5 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STD. DWG. 840.00.
A STONE DRAIN CONSISTING OF 1 CUBIC FOOT OF NO. 78M STONE CONTAINED IN A BAG OF POROUS FABRIC SHALL BE PLACED AT EACH WEEP HOLE.
FOR 8' IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB.
OVER 8' IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. QUANTITIES TO BE ADJUSTED ACCORDINGLY.
DIMENSIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.



SECTION Y-Y



PART SECTION Y-Y
SHOWING METHOD OF CONSTRUCTION FOR 6" OPENING

SECTION X-X

DIM'S OF BOX & PIPE / *MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN (BASED ON MIN. HEIGHT, H)*

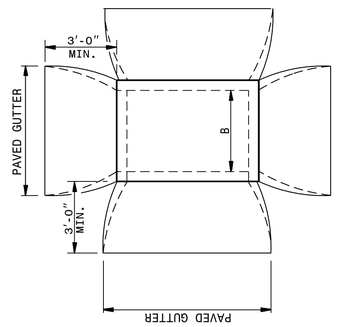
PIPE D	*SPAN* A	*WIDTH* B	*HEIGHT* H	*REINFORCING* *BARS – X* NO.	LENGTH	*BARS – Y* NO.	LENGTH	*TOP & BOT. SLAB DIMENSIONS* F	G	*CU. YDS. CONC. IN BOX* TOP SLAB	BOT. SLAB	WALL	FT.	*TOTAL QUANTITIES BOX & SLABS* LBS. REINF.	YD³	*DED. ONE (1) THROAT OPENING* *DEDUCTION ONE PIPE* C.S.	R.C.	YD³
12"	3'-6"	2'-3"	1'-10"	4	3'-0"	6	4'-3"	4'-6"	3'-3"	0.181	0.271	0.250	27	1.046	0.039	0.015	0.032	0.046
15"	3'-6"	2'-3"	2'-1"	4	3'-0"	6	4'-3"	4'-6"	3'-3"	0.181	0.271	0.250	27	1.108	0.041	0.023	0.036	0.046
18"	4'-0"	2'-8"	2'-4"	5	3'-5"	7	4'-9"	4'-9"	3'-8"	0.226	0.340	0.284	35	1.379	0.051	0.033	0.049	0.053
24"	4'-0"	2'-8"	2'-10"	5	3'-5"	7	4'-9"	5'-0"	3'-8"	0.226	0.340	0.284	35	1.521	0.056	0.059	0.085	0.053
30"	4'-0"	3'-6"	3'-4"	5	4'-3"	9	4'-9"	5'-6"	4'-6"	0.278	0.417	0.315	43	1.916	0.071	0.092	0.127	0.053
36"	4'-6"	4'-0"	3'-10"	5	4'-9"	10	5'-3"	5'-0"	4'-6"	0.340	0.510	0.352	51	2.390	0.089	0.132	0.178	0.059
42"	5'-0"	4'-6"	4'-4"	5	5'-3"	12	5'-9"	6'-0"	5'-6"	0.407	0.611	0.389	64	2.914	0.108	0.180	0.243	0.066
48"	5'-0"	5'-0"	4'-10"	5	5'-9"	13	5'-9"	6'-0"	6'-0"	0.444	0.666	0.407	68	3.298	0.122	0.235	0.317	0.066

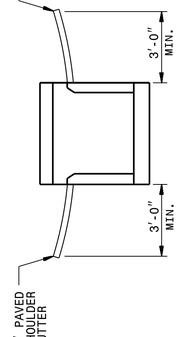
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE CATCH BASIN
(3 OR 4 SIDE OPEN THROAT)
(MANHOLE OPTIONAL)

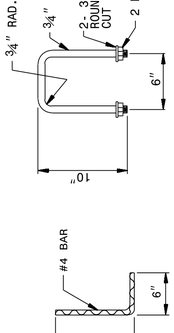
SHEET 2 OF 2 — 840D04

PLAN OF CATCH BASIN IN MEDIAN STRIP

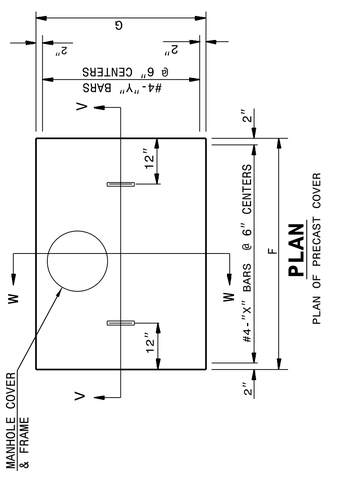


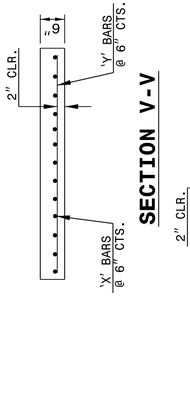


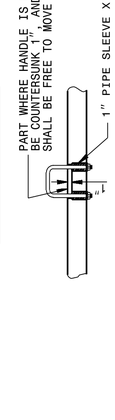
SECTION OF CATCH BASIN MEDIAN STRIP
DETAIL SHOWING METHOD OF PLACING CATCH BASIN AND PAVED SHOULDER GUTTER



DOWEL — DETAIL OF HANDLE







DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SEE PLATE FOR TITLE

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: rnbritt DATE: 07-03-2014
CHECKED BY: _____ DATE: _____
FILE SPEC.: details/nbritt/english/hydro/840d04.dgn

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2G-1

GEOTECHNICAL ENGINEER

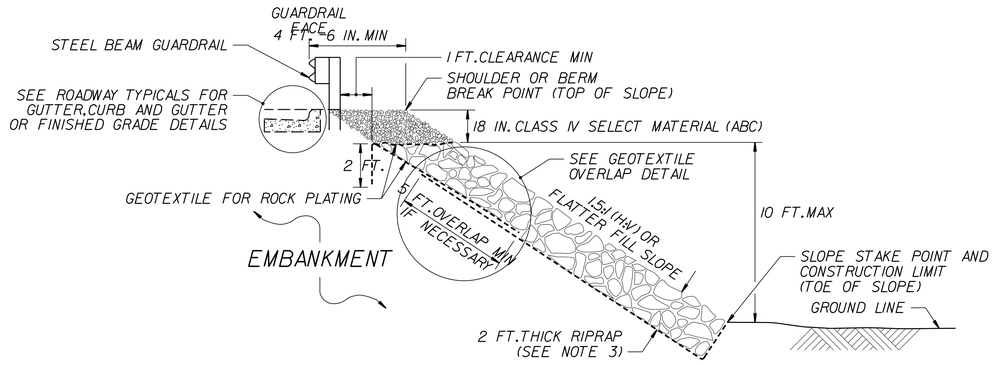
NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER MATTHEW BREWER

DocuSigned by: D. Matthew Brewer 4/28/2022
3B8129C0A4C1462...
SIGNATURE DATE

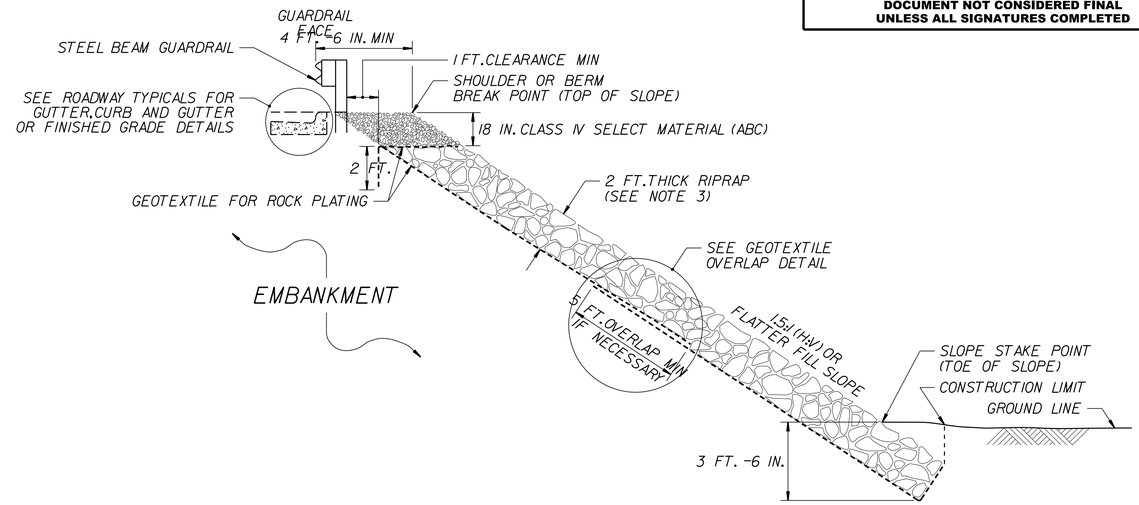
ENGINEER

SIGNATURE DATE

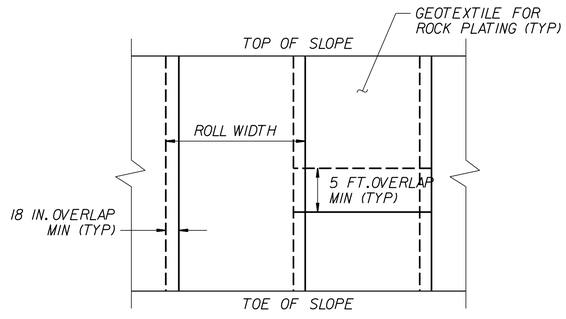
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



ROCK PLATING DETAIL NO. 1 – TYPICAL SECTION



ROCK PLATING DETAIL NO. 2 – TYPICAL SECTION



GEOTEXTILE OVERLAP DETAIL

ROCK PLATING

FOR ROCK PLATING, SEE SECTION 275 OF THE STANDARD SPECIFICATIONS
USE ROCK PLATING AT THE FOLLOWING LOCATIONS:

LINE	BEGINNING SLOPE	APPROX. STATION	ENDING SLOPE	APPROX. STATION	LOCATION LT/RT	ROCK PLATING DETAIL NO. 1/2	RIPRAP CLASS* 1/2/B	SY
–L–	1.5:1	42+00	1.5:1	45+64	LT	2	*	1430
–L–	1.5:1	44+50	1.5:1	45+00	RT	2	*	180
–L–	1.5:1	47+14	1.75:1	48+00	RT	2	*	410
–L–	1.5:1	56+00	1.5:1	58+00	RT	2	*	1110
–L–	1.5:1	57+00	1.5:1	59+50	LT	2	*	1110

*USE CLASS 1, 2 OR B RIPRAP UNLESS REQUIRED OTHERWISE IN THE ROADWAY SUMMARY SHEETS.

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 4/27/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 4/27/22

Prepared in the Office of:

CAROLINAS GEOTECHNICAL GROUP
2400 CROWNPOINT EXECUTIVE DRIVE
SUITE 800
CHARLOTTE, NC 28227
(980) 339-8684

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL CONSTRUCTION DETAILS - ROCK PLATING NOTES & DETAILS

REVISIONS

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2G-2

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER MATTHEW BREWER

DocuSigned by: D. Matthew Brewer 4/28/2022
3B8129C0A4C1462...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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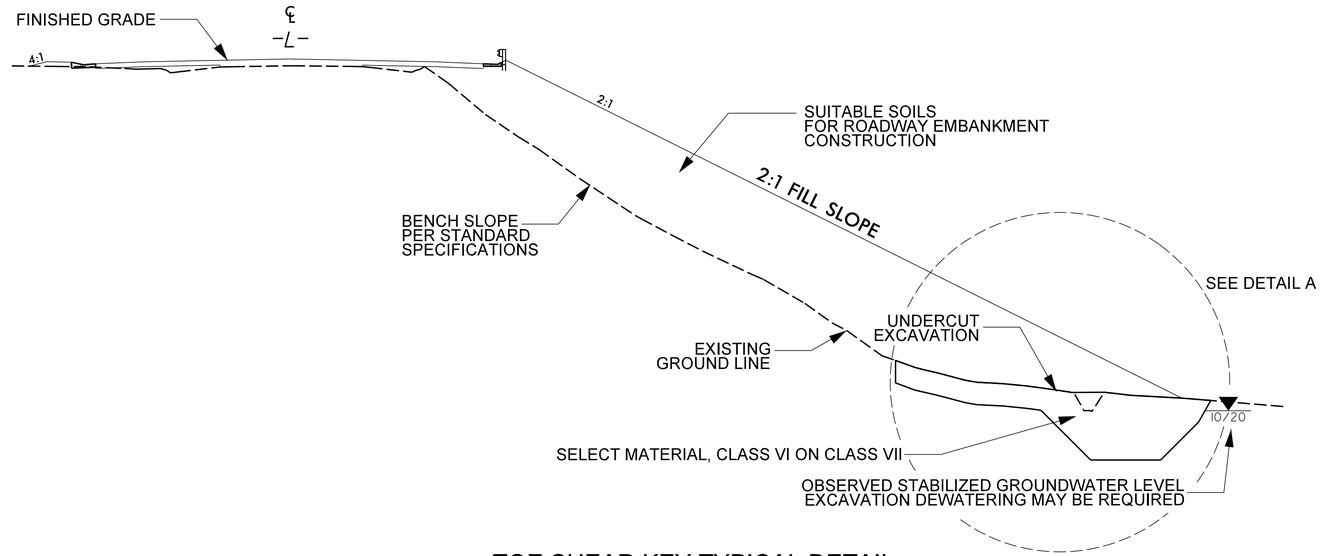
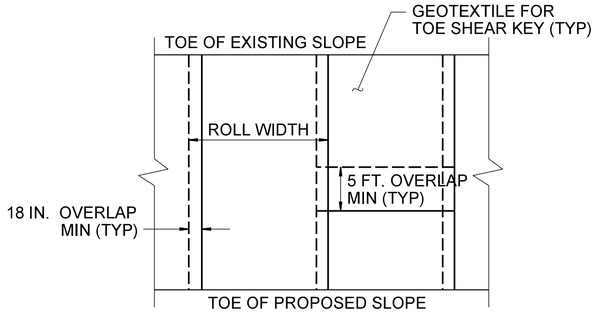
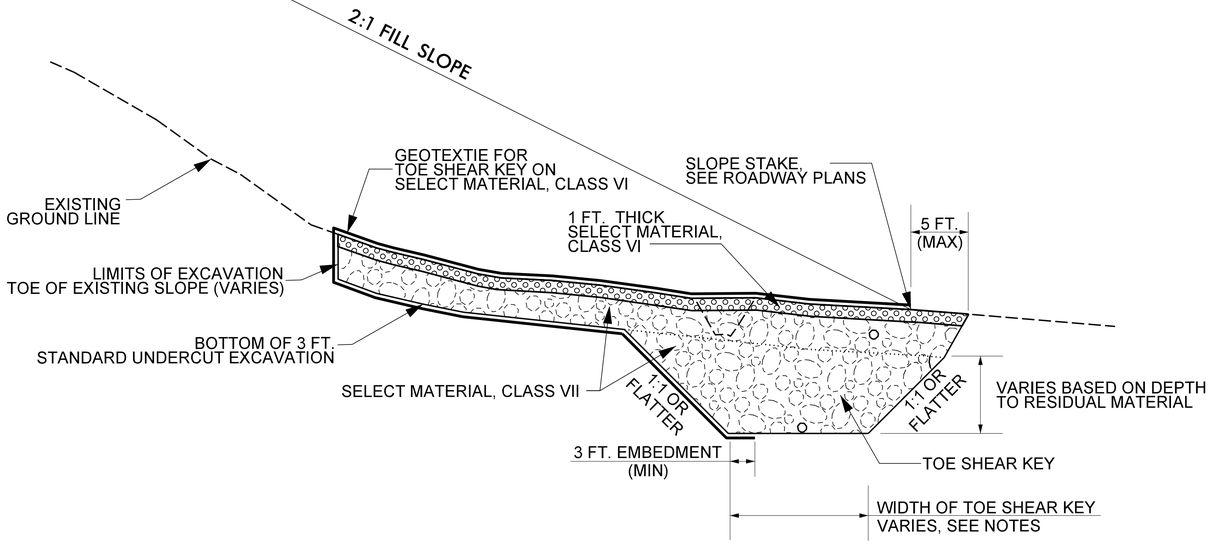


TOE SHEAR KEY TYPICAL DETAIL
NOT TO SCALE



GEOTEXTILE OVERLAP DETAIL



DETAIL A - TOE SHEAR KEY ADDITIONAL DETAILS AND DIMENSIONS
NOT TO SCALE

FOR USE IN THE FOLLOWING LOCATIONS, OR AS DIRECTED BY THE ENGINEER

STATION: -L-, 71+25 TO 72+75 LT & RT
-L-, 89+50 TO 91+00 RT

NOTES:

FOR TOE SHEAR KEY, SEE TOE SHEAR KEY SPECIAL PROVISION

PERFORM UNDERCUT EXCAVATION IN THE AREAS NOTED. UNDERCUT SHOULD EXTEND FROM TOE OF EXISTING SLOPE TO FIVE FEET BEYOND OF TOE OF PROPOSED SLOPE. UNDERCUT EXCAVATION SHOULD EXTEND TO A DEPTH OF 3 FEET BELOW EXISTING GRADE.

FOR SELECT MATERIAL, CLASS VII, SEE TOE SHEAR KEY SPECIAL PROVISION.

FOR SELECT MATERIAL, CLASS VI, SEE TOE SHEAR KEY SPECIAL PROVISION.

FOR GEOTEXTILE FOR TOE SHEAR KEY AND SELECT MATERIAL, CLASS VI, SEE TOE SHEAR KEY SPECIAL PROVISION

WIDTH OF TOE SHEAR KEY AT -L-, 71+25 TO 72+75 LT & RT IS 5 FT.

WIDTH OF TOE SHEAR KEY AT -L-, 89+50 TO 91+00 RT IS 10 FT.

ESTIMATED QUANTITIES
TOE SHEAR KEY

SELECT MATERIAL, CLASS VII	6,250 TON
SELECT MATERIAL, CLASS VI	900 TON
GEOTEXTILE	2,450 SY
UNDERCUT EXCAVATION	3,600 CY

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 4/27/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 4/27/22

Prepared in the Office of:

CAROLINAS GEOTECHNICAL GROUP
2400 CROWNPOINT EXECUTIVE DRIVE
SUITE 800
CHARLOTTE, NC 28227
(980) 339-8684

GEOTECHNICAL CONSTRUCTION DETAILS - TOE SHEAR KEY

REVISIONS

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2G-3

GEOTECHNICAL ENGINEER

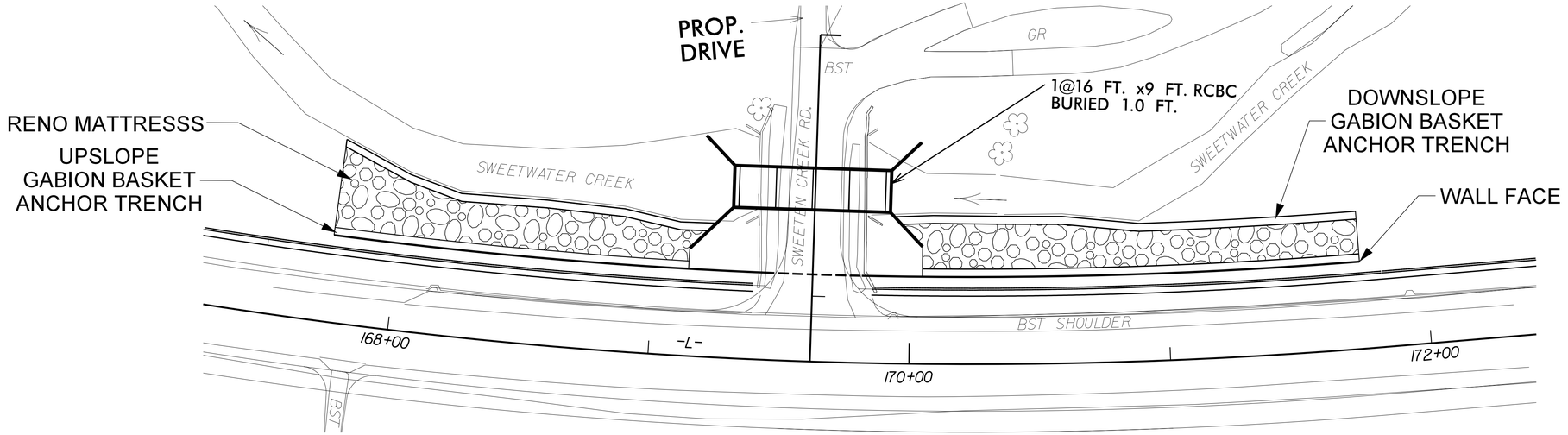
NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER MATTHEW BREWER

DocuSigned by: D. Matthew Brewer 4/28/2022
3B8129C0A4C1462...
SIGNATURE DATE

ENGINEER

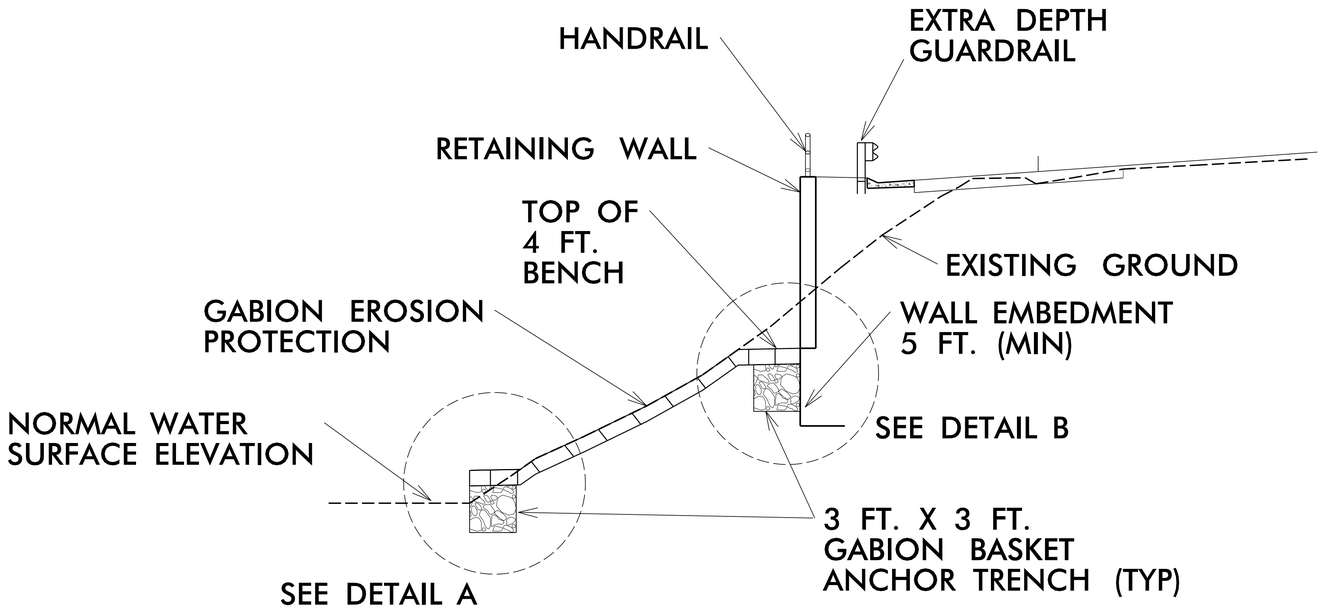
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



CONSTRUCT GABION EROSION PROTECTION IN FRONT OF RETAINING WALL #4
-L- STATION 168+75 TO 171+75, LT

GABION EROSION PROTECTION PLAN VIEW
NOT TO SCALE



GABION EROSION PROTECTION TYPICAL DETAIL
NOT TO SCALE

FOR USE IN THE FOLLOWING LOCATIONS, OR AS DIRECTED BY THE ENGINEER
STATION: -L-, 168+75 TO 171+75 LEFT.

ESTIMATED QUANTITIES
GABION EROSION PROTECTION

GABION BASKETS (FACE AREA)	2,400 SF
RENO MATTRESS (SLOPE AREA)	14,000 SF
RIP RAP, CLASS A OR CLASS B (8 IN. MAX SIZE)	1,700 TON
GEOTEXTILE, TYPE 2	1,600 SY

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 4/27/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 4/27/22

Prepared in the Office of:

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2400 CROWNPOINT EXECUTIVE DRIVE
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CHARLOTTE, NC 28227
(980) 339-8684

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL CONSTRUCTION DETAILS - GABION EROSION PROTECTION (SHEET 1 OF 3)

REVISIONS

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2G-4

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

DocuSigned by: D. Matthew Brewer 4/28/2022
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SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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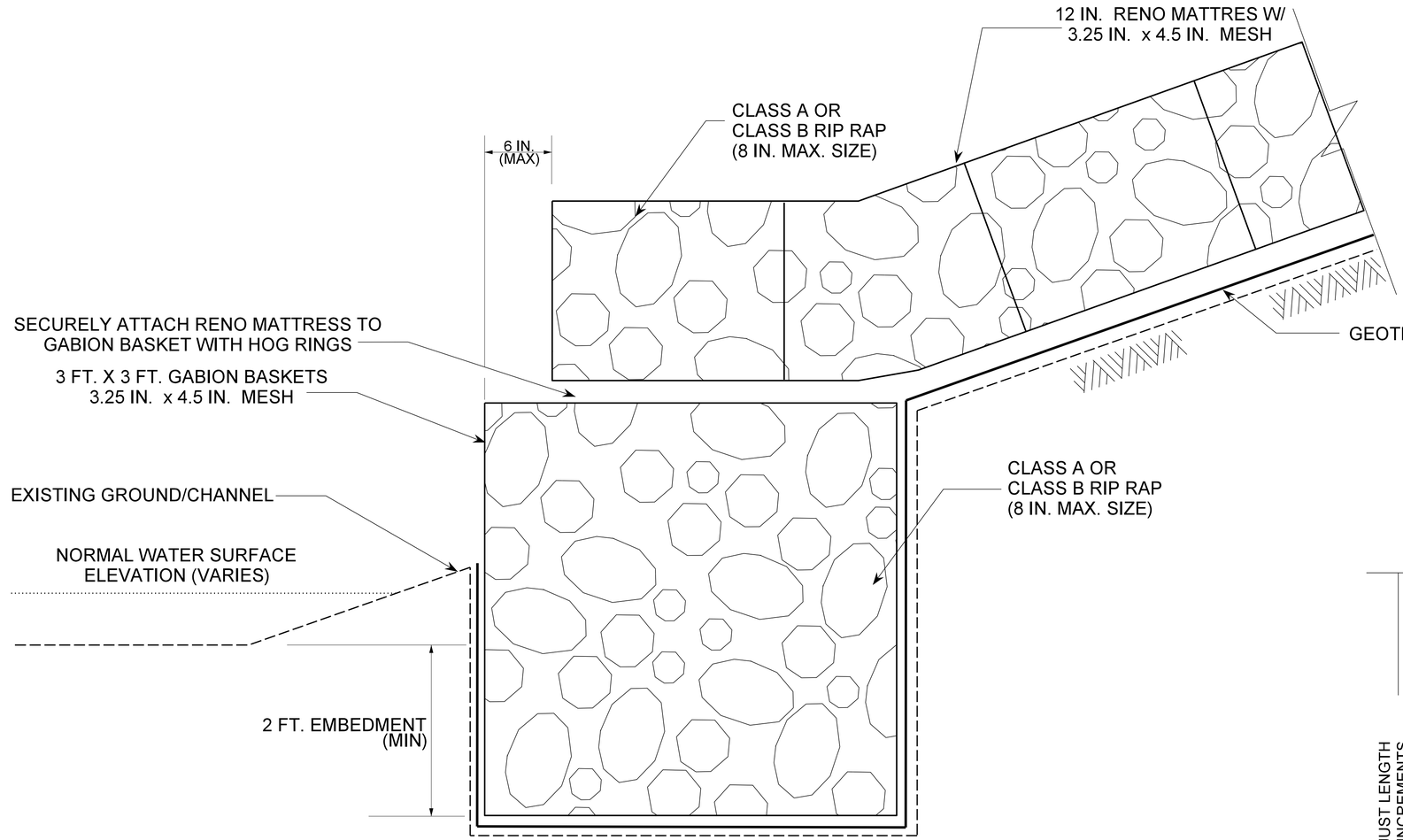
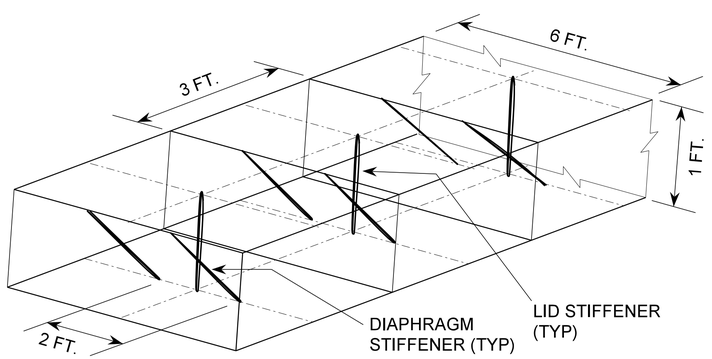


DETAIL A
NOT TO SCALE



STIFFENER DETAIL
NOT TO SCALE

PLAN VIEW - RENO MATTRESS
NOT TO SCALE

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 4/27/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 4/27/22

Prepared in the Office of:

CAROLINAS GEOTECHNICAL GROUP
2400 CROWNPOINT EXECUTIVE DRIVE
SUITE 800
CHARLOTTE, NC 28227
(980) 339-8684

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL CONSTRUCTION DETAILS - GABION EROSION PROTECTION (SHEET 2 OF 3)

REVISIONS

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2G-5

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER MATTHEW BREWER

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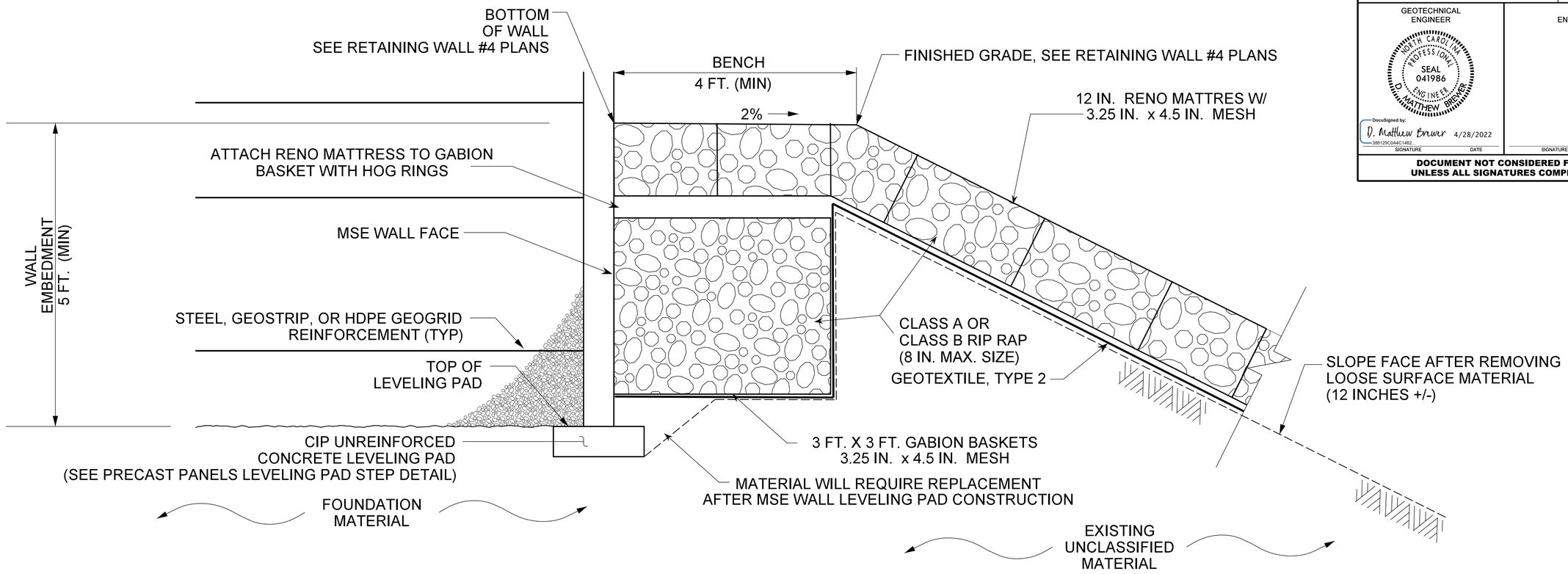

DETAIL B
NOT TO SCALE

NOTES:

FOR GABION EROSION PROTECTION, SEE SPECIAL PROVISION.

EXCAVATE A MINIMUM OF 2 FT. BELOW THE STREAM BED ELEVATION AND INSTALL 3 FT. X 3 FT. GABION BASKETS AND FILL WITH CLASS A OR CLASS B RIP RAP.

AT RETAINING WALL #4 FRONT BENCH, EXCAVATE 3 FT. DEEP AND 3 FT. IN FRONT OF WALL FACE TO INSTALL UPSLOPE GABION BASKET ANCHOR TRENCH. UPSLOPE GABION BASKET WILL BE FULLY EMBEDED BELOW GRADE IN FRONT OF RETAINING WALL #4.

CLEAN SLOPE OF LOOSE MATERIAL BEFORE INSTALLING GEOTEXTILE.

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 4/27/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 4/27/22

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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL CONSTRUCTION DETAILS - GABION EROSION PROTECTION (SHEET 3 OF 3)

REVISIONS

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2G-6

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER MATTHEW BREWER

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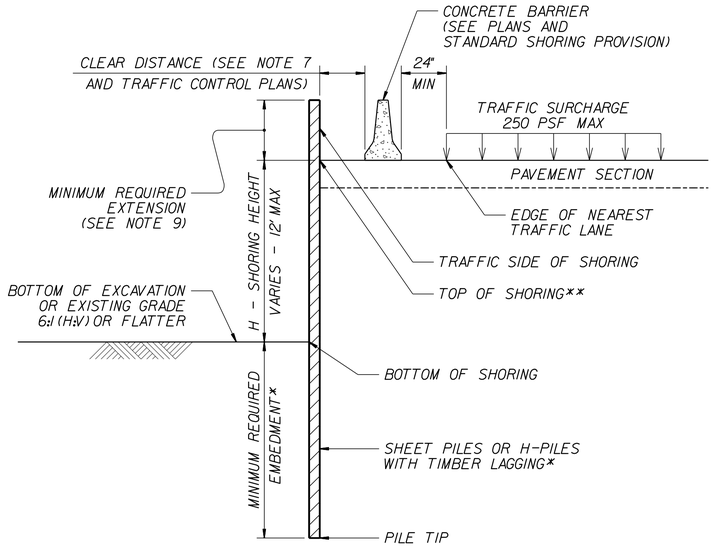
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

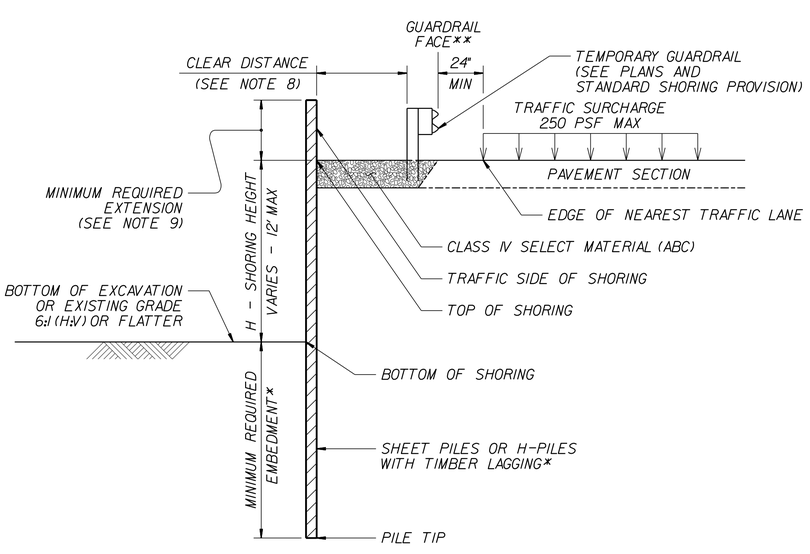
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 PCF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 PSF
4. DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
7. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
8. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
9. MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
10. MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
11. SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



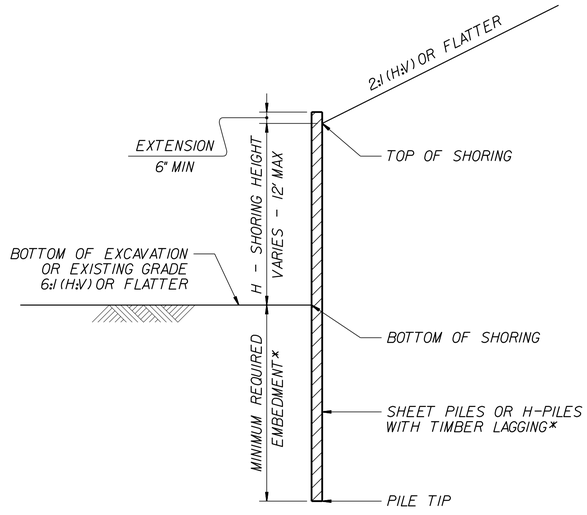
CONCRETE BARRIER

**TOP OF SHORING = EDGE OF PAVEMENT



TEMPORARY GUARDRAIL

**GUARDRAIL FACE = EDGE OF PAVEMENT



STANDARD TEMPORARY SHORING

(SLOPE CASE)
*SEE TABLE ABOVE.

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)
*SEE TABLE ABOVE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-19-13

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2G-7

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER MATTHEW BREWER

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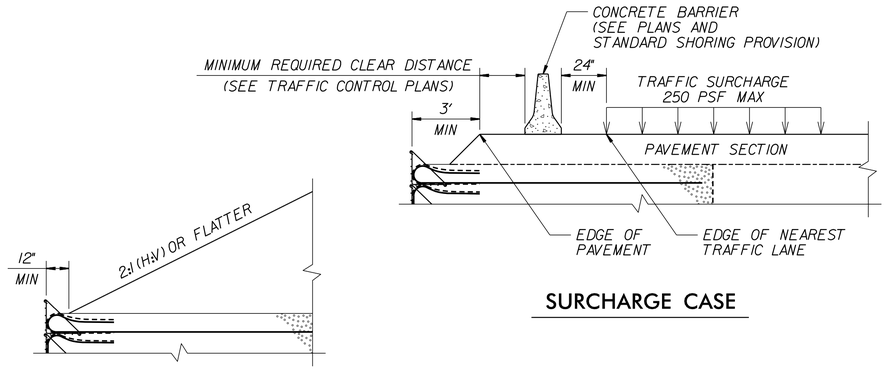
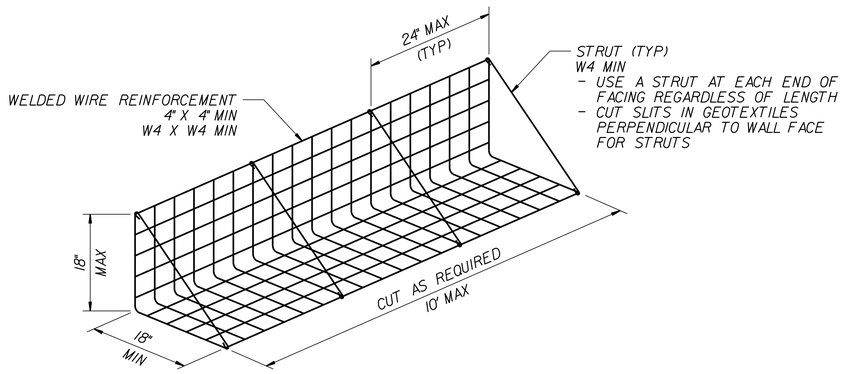
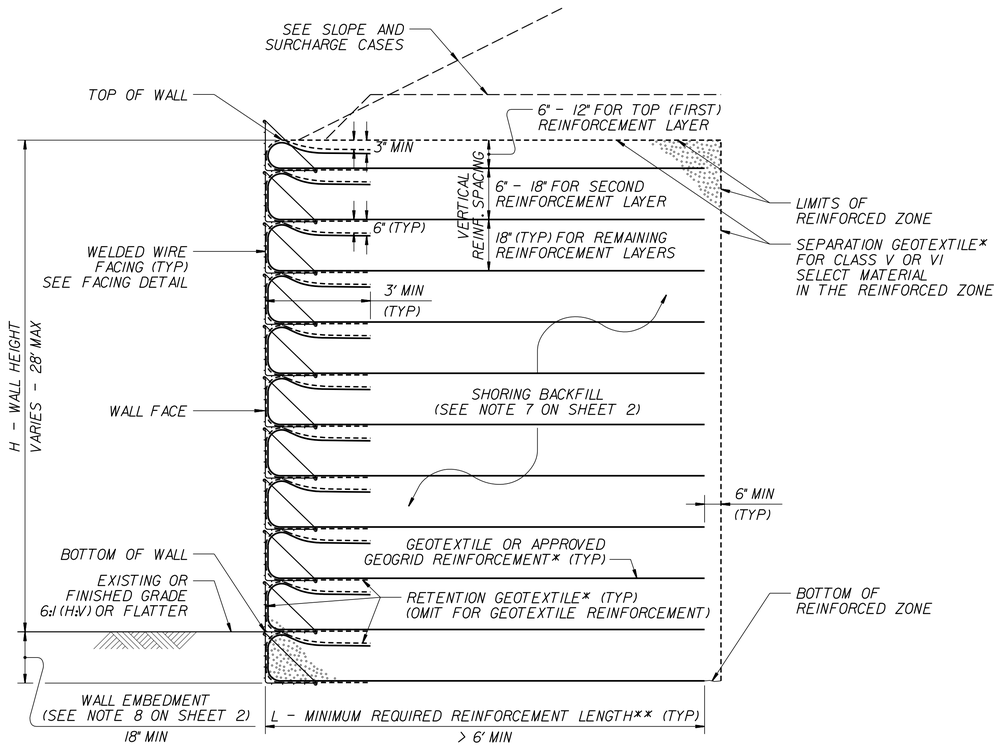


SURCHARGE CASE

SLOPE CASE

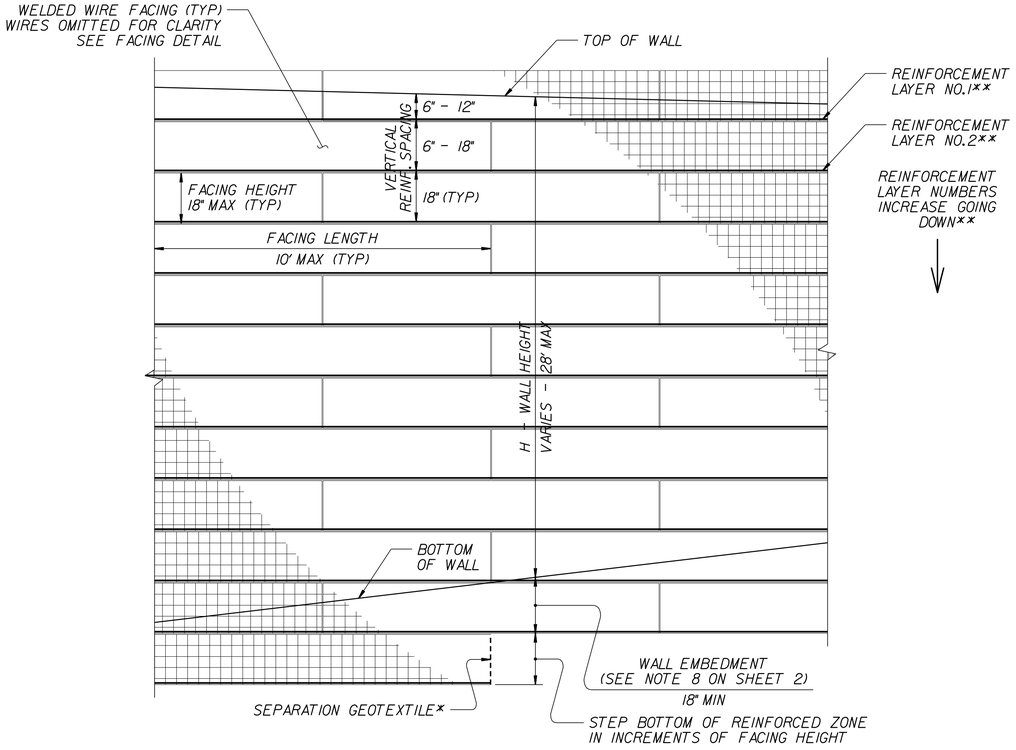


FACING DETAIL



STANDARD TEMPORARY WALL

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.



STANDARD TEMPORARY WALL – PARTIAL ELEVATION

*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 1 OF 3

DATE: 11-19-13

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2G-8

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER MATTHEW BREWER

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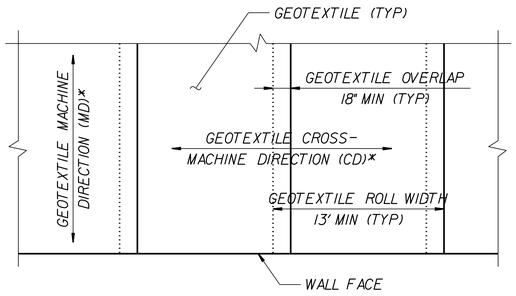
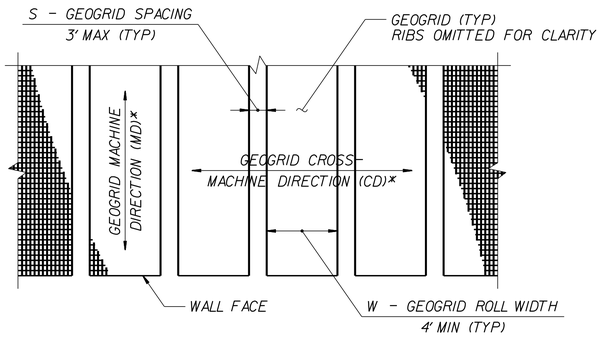


GEOTEXTILE PLACEMENT

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)

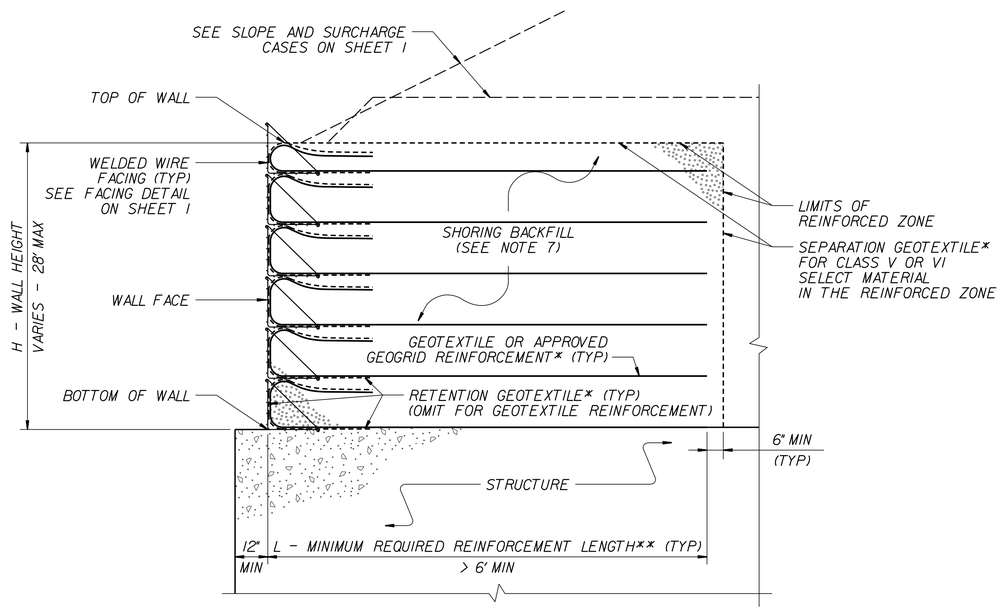


GEOGRID PLACEMENT

(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT – $\frac{W}{W+S}$ x 100 $\geq$ 80%, SEE NOTE 11)

GEOSYNTHETIC PLACEMENT DETAILS

(PLAN VIEW)
*SEE NOTE 12.



TEMPORARY WALL ON STRUCTURE DETAIL

*SEE GEOSYNTHETIC PLACEMENT DETAILS.
**SEE REINFORCEMENT TABLES ON SHEET 3.

NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 PCF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 PSF
4. DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER OR FLOOD ELEVATION IS ABOVE BOTTOM OF REINFORCED ZONE.
7. DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
8. WALL EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
9. DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
10. GEOGRIDS FOR GEOGRID REINFORCEMENT ARE APPROVED FOR SHORT TERM DESIGN STRENGTHS (3-YEAR DESIGN LIFE) IN THE MD AND CD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Products.aspx
    DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

11. FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
12. AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:
    - W (REINFORCEMENT ROLL WIDTH) $\geq$ (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
    - REINFORCEMENT STRENGTH IN CD $\geq$ MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
13. SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
14. DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
15. FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
16. DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
17. CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
18. FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
19. FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD TEMPORARY WALL
SHEET 2 OF 3

DATE: 10-19-21

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2G-9

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER MATTHEW BREWER

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SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H – WALL HEIGHT (FT)																									
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
SLOPE CASE	> 0	CLASS II,TYPE I, CLASS III,CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27
SURCHARGE CASE	> 0 TO 7 FOR H < 20′ > 0 TO 10 FOR H ≥ 20′	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22
	> 7 FOR H < 20′ > 10 FOR H ≥ 20′	A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21
		CLASS II,TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	14	15	15	16	16	17	17	18	18	19	20
		CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	17	18	19	19

L – MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)

(FOR ALL REINFORCEMENT TYPES)

WALL HEIGHT (H) + WALL EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 – 4	3
4 – 5.5	4
5.5 – 7	5
7 – 8.5	6
8.5 – 10	7
10 – 11.5	8
11.5 – 13	9
13 – 14.5	10
14.5 – 16	11
16 – 17.5	12
17.5 – 19	13
19 – 20.5	14
20.5 – 22	15
22 – 23.5	16
23.5 – 25	17
25 – 26.5	18
26.5 – 28	19
28 – 29.5	20

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

GEOTEXTILE REINFORCEMENT
ULTIMATE TENSILE STRENGTH (LB/FT)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

GEOGRID REINFORCEMENT
SHORT–TERM DESIGN STRENGTH (LB/FT)
(SEE NOTE 10 ON SHEET 2.)

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD

(SEE NOTE 9 ON SHEET 2.)
*SEE PARTIAL ELEVATION ON SHEET 1
FOR REINFORCEMENT LAYER NUMBERING.

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 3 OF 3

DATE: 11-19-13

COMPUTED BY: SGM DATE: 4/25/2022
CHECKED BY: JLT DATE: 4/29/2022

PROJECT NO.	SHEET NO.
A-0009CA	3B-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Undercut	Embank. +%	Borrow	Waste
Onsite Detour						
DET_S5 10+00.00	DET_S5 23+33.00	682		2,425	1,743	
DET_S8 10+00.00	DET_S8 22+25.00	4,047		3,663		384
DET_DR1A 10+00.00	DET_DR1A 14+00.15	92		4,939	4,847	
SUBTOTAL 1		**4,821**		**11,027**	**6,590**	**384**
Detour Removal						
Removal of Detour DET_S5		94		1,251	1,157	
Removal of Detour DET_S8		38		3,405	3,367	
Removal of Detour DET_DR1A		4,295		83		4,212
SUBTOTAL 2		**4,427**		**4,739**	**4,524**	**4,212**
-L- 10+20.02	-L- 40+00.00	2,560		5,801	3,241	
-L- 35+25.00	-L- 36+75.00		400			400
Dry Detention Basin #2		400				400
-Y1-13+70.00	-Y1- 36+70.00	629		2,132	1,503	
Dry Detention Basin #1		210				210
-DR2- 10+26.00	-DR2- 11+60.00	329		1		328
SUBTOTAL 3		**4,128**	**400**	**7,934**	**4,744**	**1,338**
-L- 40+00.00	-L- 70+50.00	8,572		13,231	4,659	
-L- 42+25.00	-L- 45+75.00		550			550
-L- 56+25.00	-L- 59+75.00		740			740
-Y6- 11+05.00	-Y6- 12+85.70	7		15	8	
SUBTOTAL 4		**8,579**	**1,290**	**13,246**	**4,667**	**1,290**
-L- 70+50.00	-L- 100+00.00	44,928		35,294		9,634
-L- 71+25.00	-L-72+75.00		690			690
SUBTOTAL 5		**44,928**	**690**	**35,294**		**10,324**
-L- 100+00.00	-L- 129+00.00	4,819		8,574	3,755	
-L- 108+25.00	-L- 108+75.00		140			140
-L- 113+75.00	-L- 119+25.00		1,460			1,460
SUBTOTAL 6		**4,819**	**1,600**	**8,574**	**3,755**	**1,600**
-L- 129+00.00	-L- 158+00.00	8,868		13,953	5,085	
-L- 133+25.00	-L- 139+25.00		1,870			1,870
-L- 149+25.00	-L- 150+75.00		250			250
SUBTOTAL 7		**8,868**	**2,120**	**13,953**	**5,085**	**2,120**
-L- 158+00.00	-L- 185+00.00	1,052		16,544	15,492	
-L- 157+25.00	-L- 160+75.00		560			560
-L- 162+75.00	-L- 164+75.00		380			380
-L- 171+75.00	-L- 175+25.00		970			970
-L- 179+25.00	-L- 185+00.00		1,454			1,454
-DR1A- 10+05.00	-DR1A- 11+07.00	13		851	838	
-DR1- 10+20.00	-DR1- 11+71.39	1		553	552	
SUBTOTAL 8		**1,066**	**3,364**	**17,948**	**16,882**	**3,364**
-L- 185+00.00	-L- 208+00.00	3734		6707	2,973	
-L- 185+00.00	-L- 187+75.00		696			696
-L- 205+25.00	-L- 208+00.00		490			490
SUBTOTAL 9		**3,734**	**1,186**	**6,707**	**2,973**	**1,186**
TOTALS:		**85,370**	**10,650**	**119,422**	**49,220**	**25,818**
LOSS DUE TO CLEARING & GRUBBING		-2,500			2,500	
ADDITIONAL UNDERCUT (EMBANKMENT & SUBGRADE STABILITY)			1,850			1,850
WASTE IN LIEU OF BORROW					-14,268	-14,268
PROJECT TOTALS:		**82,870**	**12,500**	**119,422**	**37,452**	**13,400**
EDT. 5% TO REPLACE TOP SOIL IN BORROW PIT					2,053	
GRAND TOTALS:		**82,870**	**12,500**	**119,422**	**39,505**	**13,400**
SAY		**84,000**	**12,500**		**44,000**	

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

EST. DDE = 1,370 CUBIC YARDS

SELECT GRANULAR MATERIAL, CLASS III = 13,500 CY

EST. SHALLOW UNDERCUT = 1000 CY

PER GEOTECH RECOMMENDATION, ESTIMATED 3,850 CUBIC YARDS OF UNDERCUT FOR TOE SHEAR KEY.

PAVEMENT STRUCTURE VOLUME = 1,103 CY

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

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-L-	10+70	23+62	LT	229.31			
-L-	10+53	16+78	RT	67.83			
-L-	21+88	26+12	RT	82.10			
-L-	27+11	29+35	RT	40.84			
-L-	30+32	32+29	RT	29.68			
-L-	56+98	56+67	LT	78.55			
-L-	75+81	80+39	LT	547.03			
-L-	98+72	116+94	RT	556.38			
-L-	131+99	151+95	LT	1,121.70			
-L-	180+34	186+35	RT	107.63			
-L-	188+28	190+43	LT	97.14			
-L-	190+89	194+15	LT	177.31			
-Y1-	15+00	17+12	LT	11.95			
-Y1-	19+70	24+90	LT	377.64			
-Y1-	27+83	29+33	LT	38.15			
-Y1-	31+00	33+67	LT	39.20			
DET_S5	13+62	20+15	CL	1,896.52			
DET_S8	13+44	19+44	CL	1,750.41			
DET-DR1A	10+00	13+82	CL	779.91			
		TOTAL:		8,029.28			
		SAY:		**8,030**			

COMPUTED BY: SGM DATE: 4/25/2022
CHECKED BY: JLT DATE: 4/29/2022

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	3B-2

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL

GUARDRAIL SUMMARY

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

SURVEY LINE	BEG. STA.	END STA.	LOC	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR		EXTRA LENGTH GUARDRAIL POSTS (8' STEEL)	REMOVE & RESET EXISTING GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	Type III	B-77	GREU, TL-3	GREU, TL-2	CAT-1	AT-1	Type III SC	B-77 SC		G	NG				
-L-	15+25.00	19+00.00	LT	375.00						8' BERM	50'	50'	1'	1'			2											204.2	GUARDRAIL ON FACE OF CURB
-L-	15+50.00	17+62.50	RT	212.50						8' BERM	50'	50'	1'	1'			2											140.3	GUARDRAIL ON FACE OF CURB
-L-	31+00.00	33+81.25	LT	281.25					10.3'	13.3'	50'	50'	1'	1'			2											302.8	SHOULDER BERM GUTTER INSTALLATION
-L-	34+20.00	37+42.00	LT	381.25	25				10.3	13.3'	25'	50'	0.5'	1'			1	1										413.3	SHOULDER BERM GUTTER INSTALLATION
-L-	41+50.00	47+50.00	LT	600.00					10.3'	13.3'	50'	50'	1'	1'			2											615.0	SHOULDER BERM GUTTER INSTALLATION
-L-	43+75.00	46+19.00	RT	243.75	50				10.3'	13.3'	50'	25'	1'	0.5'			1	1										264.1	SHOULDER BERM GUTTER INSTALLATION
-L-	46+60.00	48+75.00	RT	262.50	25				8'	11'	25'	50'	0.5'	1'			1	1										250.5	
-L-	53+50.00	59+00.00	RT	550.00					8'	11'	50'	50'	1'	1'			2											563.7	
-L-	56+98.00	60+77.00	LT	368.75	62.5				10.3'	13.3'	50'		1'				1			1								349.2	SHOULDER BERM GUTTER INSTALLATION
-L-	63+25.00	11+78 -Y6-	LT	318.75	87.5				10.3'	13.3'		50'		1'			1			1								309.7	SHOULDER BERM GUTTER INSTALLATION
-L-	64+15+/-	65+42+/-	RT																									131.8	
-L-	11+62 -Y6-	68+74.00	LT	237.50	81.25				10.3'	13.3'	50'	25'	1'	0.5'			1	1										287.0	SHOULDER BERM GUTTER INSTALLATION
-L-	70+75.00	73+00.00	RT	225.00					10.3'	13.3'	50'	50'	1'	1'			2											202.0	SHOULDER BERM GUTTER
-L	70+85.00	73+22.50	LT	237.50					10.3'	13.3'	50'	50'	1'	1'			2											227.5	SHOULDER BERM GUTTER INSTALLATION
-L-	76+00.00	82+00.00	LT	600.00					8'	11'	50'	50'	1'	1'			2											580.1	
-L-	78+50.00	82+00.00	RT	350.00					10.3'	13.3'	50'	50'	1'	1'			2											320.0	SHOULDER BERM GUTTER INSTALLATION
-L	86+00.00	94+94.00	RT	875.00	31.25				10.3'	13.3'	50'		1'				1			1								728.6	
-L-	88+51+/-	91+47+/-	LT																									300.1	
-L-	101+75.00	114+00.00	RT	1,225.00					8'	11'	50'	50'	1'	1'			2											1,017.3	
-L-	107+25.00	109+75.00	LT	250.00					8'	11'	50'	50'	1'	1'			2											214.2	
-L-	113+56.00	120+75.00	LT	750.00	31.25				8'	11'	25'	50'	0.5'	1'			1	1										707.2	
-L-	133+25.00	142+50.00	RT	925.00					10.3'	13.3'	50'	50'	1'	1'			2											923.2	SHOULDER BERM GUTTER INSTALLATION
-L-	133+25.00	143+25.00	LT	1,000.00					10.3'	13.3'	50'	50'	1'	1'			2											889.3	SHOULDER BERM GUTTER INSTALLATION
-L-	114+67+/-	145+19+/-	LT																									52.7	
-L-	145+60.00	151+74.00	LT	587.50	37.5				10.3'	13.3'		50'		1'			1			1								602.8	SHOULDER BERM GUTTER INSTALLATION
-L-	146+75.00	150+00.00	RT	325.00					10.3'	13.3'	50'	50'	1'	1'			2											314.4	SHOULDER BERM GUTTER INSTALLATION
-L-	155+98.75	158+80.00	LT	281.25					8'	11'	50'	50'	1'	1'			2											239.6	
-L-	159+20.00	164+32.50	LT	512.50					10.3'	13.3'	50'	50'	1'	1'			2											539.6	SHOULDER BERM GUTTER INSTALLATION
-L-	164+64.00	169+39.00	LT	475.00					10.3'	13.3'		50'		1'			2									26		489.0	SHOULDER BERM GUTTER INSTALLATION, DO NOT FLARE GREU TL-3 AT APPROACH, **USE EXTRA DEPTH GUARDRAIL POSTS: -L- 167+75 TO 169+39, LT @ 6.25 = 26.2; SAY 30 EA**
-L-	169+85.00	176+91.25	LT	706.25					10.3'	13.3'	50'			1'			2									46		589.5	SHOULDER BERM GUTTER INSTALLATION, DO NOT FLARE GREU TL-3 AT TRAILING END, **USE EXTRA DEPTH GUARDRAIL POSTS: -L- 168+85 TO 171+75 LT @ 6.25 = 46.4; SAY 50 EA**
-L-	169+00.00	171+50.00	RT	250.00					8'	11'	50'	50'	1'	1'			2												
-L-	174+53.75	175+35.00	RT	81.25					10.3'	13.3'						1	1												SHOULDER BERM GUTTER INSTALLATION, DO NOT FLARE GREU TL-3, TIE TO CONCRETE BARRIER
-L-	176+65.00	180+52.50	RT	387.50					10.3'	13.3'		50'		1'		1	1												SHOULDER BERM GUTTER INSTALLATION, TIE TO CONCRETE BARRIER
-L-	177+20.00	179+01.25	LT	181.25					8'	11'	50'	50'	1'	1'			2											154.9	
-L-	179+35.00	180+41.25	LT	106.25					8'	11'	50'	50'	1'	1'			2											114.5	
-L-	180+60.00	190+47.00	LT	956.25	56.25				8'	11'		50'		1'			1									262.5		1,009.4	TIE TO EXISTING GUARDRAIL, PLACE 262.5 FT OF PROP. GUARDRAIL DURING DET_S8 CONSTRUCTION, REMOVE AND RESET FOR FINAL ALIGNMENT
-L-	185+93.75	186+75.00	RT	81.25					14'	17'	50'		1'																TIE TO CONCRETE BARRIER
-L-	190+95.00	198+00.00	LT	650.00	75				8'	11'	50'		1'															617.9	TIE TO EXISTING GUARDRAIL
-L-	192+05.00	199+48.75	RT	743.75					10.3'	13.3'		50'		1'		1	1											363.3	SHOULDER BERM GUTTER INSTALLATION, TIE TO CONCRETE BARRIER
-L-																													
SUB-TOTALS				16,593.75	562.50											3	55	5		4					72	262.5	15,028.7	
LESS ANCHOR DEDUCTIONS																													
	TYPE B-77	3@22.875 FT		68.625																									
	TYPE TL-3	55 @ 50.00 FT		2,750.00																									
	TYPE TL-2	5@ 25.00 FT		125.00																									
	AT-1	4@ 6.25 FT			25.00																								
ANCHOR TOTAL				2,943.625	25.000																								
GRAND-TOTALS				13,650.13	537.50											3	55	5		4					72	262.50	15,028.70	
SAY				**13,675**	**550**											**3**	**55**	**5**		**4**					**80**	**262.5**	**15,030**	
ADDITIONAL GUARDRAIL POSTS =				**10 EA**																									

TEMPORARY GUARDRAIL

-DET_S5-	14+20.00	19+70.00	RT	550.00					4'	7'	50'	50'	1'	1'			2											TEMPORARY ANCHOR UNITS
-DET_S5-	16+95.00	19+70.00	LT	275.00					4'	7'	50'	50'	1'	1'			2											TEMPORARY ANCHOR UNITS
-DET_S5-	20+10.00		RT	50.00					4'	7'	50'		1'				1											TEMPORARY ANCHOR UNIT TIE TO PROP. GUARDRAIL
-DET_DR1A-	11+93.25	13+93.25	RT	62.50	175				4'	7'	25'		0.5'					1										TEMPORARY ANCHOR UNIT, TIE TO EXISTING GUARDRAIL
-DET_DR1A-	11+93.25	13+93.25	LT	68.75	125				4'	7'		25'		0.5'				1										TEMPORARY ANCHOR UNIT, TIE TO EXISTING GUARDRAIL
-DET_S8-	11+00.00	20+00.00	RT	900.00					4'	7'	50'	50'	1'	1'			2											TEMPORARY ANHOR UNITS
-DET_S8-	13+85.00	18+60.00	LT	475.00					4'	7'	50'	50'	1'	1'			2											TEMPORARY ANCHOR UNITS
SUB-TOTALS				2,381.25	300.00												9	2										
LESS ANCHOR DEDUCTIONS																												
	TEMP. TYPE TL-3	9 @ 50.00 FT		450.00																								
	TEMP. TYPE TL-2	2@ 25.00 FT		50.00																								
ANCHOR TOTAL				500.00																								
GRAND-TOTALS				1,881.25	300.00												9	2										
SAY				**1,900**	**312.5**												**9**	**2**										

TGSLTW1014

COMPUTED BY: BJH DATE: 03-15-22

CHECKED BY: REL DATE: 03-15-22

PROJECT NO.	SHEET NO.
A-0009CA	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)								C. S. PIPE						
SIZE									12	24	30						12	15	18	24	30	36	48
THICKNESS OR GAUGE			FROM	TO	FT.	FT.	FT.	%				DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	.064	.064	.064	.064	.079	.079	.109
Y1 29+47	20	RT	0401		1997.0																		
			0401	0402		1993.9	1993.2																
Y1 30+83	20	RT	0402		1996.7																		
			0402	0403		1993.2	1991.1																
Y1 32+47	20	RT	0403		1995.9																		
			0403	0405		1991.1	1990.8																
Y1 32+47	20	LT	0404		1994.4																		
			0404	0403		1991.3	1991.1																
Y1 33+02	32	RT	0405		1995.9																		
			0405	0406		1990.8	1990.3																
Y1 33+95	32	RT	0406		1995.2																		
			0406	0407		1990.3	1990.0	0.3															
L 10+35	33	RT	0407		1994.5																		
			0407	0408		1990.0	1989.7	0.3															
L 10+86	20	RT	0408		1993.9																		
			0408	0409		1989.7	1989.1	0.3															
L 11+97	20	RT	0409		1993.2																		
			0409	0411		1988.9	1988.1																
L 13+68	40	RT	0410																				
			0410	0425		1987.9	1987.3			100													
L 13+50	20	RT	0411		1993.6																		
			0411	0422		1988.1	1987.5																
L 13+00	22	LT	0412		1993.4																		
			0412	0413		1990.3	1990.0																
L 11+97	28	LT	0413		1993.0																		
			0413	0409		1990.0	1989.1																
L 11+35	33	LT	0414		1993.2																		
			0414	0413		1990.2	1990.0																
Y1 34+20	20	LT	0415		1993.1																		
			0415	0416		1990.0	1989.1																
Y1 35+44	20	LT	0416		1992.2																		
			0416	0417		1989.1	1988.7																
Y1 36+08	20	LT	0417		1991.7																		
			0417	0418		1988.7	1986.6																
Y1 36+82	19	LT	0418		1990.7																		
			0418	0420		1983.9	1983.2																
Y1 36+71	31	LT	0419																				
			0419	0418		1984.1	1983.9																
Y1 37+24	45	RT	0420		1990.7																		
L 14+75	20	RT	0422		1993.7																		
			0422	0423		1987.5	1987.3	0.4															
L 14+51	95	RT	0425		1992.5																		
			0425	0426		1987.3	1985.1			112													
L 15+65	97	RT	0426		1992.8																		
			0426	0602		1985.1	1984.8				64												
L 15+42	64	RT	0427		1991.0																		
			0427	0426		1985.6	1985.1	0.4															
Y1 27+42	37	LT	0428		1997.9																		
Y1 17+10	20	LT	0500		2008.9																		
			0500	0501		2005.9	2005.5																
SHEET TOTALS										212	64												

LINE & STATION	FROM	TO	R. C. PIPE CLASS III							R. C. PIPE CLASS IV							18" PIPE REHABILITAION CIPP LINER	24" WELDED STEEL PIPE 0.500" THICK, GRADE B IN SOIL	24" WELDED STEEL PIPE 0.500" THICK, GRADE B NOT IN SOIL	30" WELDED STEEL PIPE 0.500" THICK, GRADE B IN SOIL	30" WELDED STEEL PIPE 0.500" THICK, GRADE B NOT IN SOIL	36" WELDED STEEL PIPE 0.500" THICK, GRADE B IN SOIL	36" WELDED STEEL PIPE 0.500" THICK, GRADE B NOT IN SOIL	6" PVC PIPE (SPRING BOX)	6" DUCTILE IRON PIPE (SPRING BOX)	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE
			12	15	18	24	30	36	48	12	15	18	24	30	36	48												
Y1 29+47	0401																											
	0401	0402									136																	
Y1 30+83	0402																											
	0402	0403									168																	
Y1 32+47	0403																											
	0403	0405									56																	
Y1 32+47	0404																											
	0404	0403									40																	
Y1 33+02	0405																											
	0405	0406									96																	
Y1 33+95	0406																											
	0406	0407									52																	
L 10+35	0407																											
	0407	0408									52																	
L 10+86	0408																											
	0408	0409									108																	
L 11+97	0409																											
	0409	0411										152																
L 13+68	0410																											
	0410	0425																										
L 13+50	0411																											
	0411	0422										124																
L 13+00	0412																											
	0412	0413									104																	
L 11+97	0413																											
	0413	0409									48																	
L 11+35	0414																											
	0414	0413									60																	
Y1 34+20	0415																											
	0415	0416									120																	
Y1 35+44	0416																											
	0416	0417									60																	
Y1 36+08	0417																											
	0417	0418									72																	
Y1 36+82	0418																											
	0418	0420														76												
Y1 36+71	0419																											
	0419	0418														16												
Y1 37+24	0420																											
L 14+75	0422																											
	0422	0423										36																
L 14+51	0425																											
	0425	0426																										
L 15+65	0426																											
	0426	0602																										
L 15+42	0427																											
	0427	0426			40																							
Y1 27+42	0428																											
Y1 17+10	0500																											
	0500	0501									40																	
SHEET TOTALS					40						1212	312				92												

LINE & STATION	FROM	TO	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
Y1 29+47	0401			1			1		1			
	0401	0402										
Y1 30+83	0402			1			1	1				
	0402	0403										
Y1 32+47	0403			1			1		1			
	0403	0405										
Y1 32+47	0404			1			1			1		
	0404	0403										
Y1 33+02	0405			1	0.1		1		1			
	0405	0406										
Y1 33+95	0406			1			1		1			
	0406	0407										
L 10+35	0407			1			1		1			
	0407	0408										
L 10+86	0408			1			1		1			
	0408	0409										
L 11+97	0409			1			1	1				
	0409	0411										
L 13+68	0410											
	0410	0425										
L 13+50	0411			1	0.5		1			1		
	0411	0422										
L 13+00	0412			1			1		1			
	0412	0413										
L 11+97	0413			1			1	1				
	0413	0409										
L 11+35	0414			1			1			1		
	0414	0413										
Y1 34+20	0415			1			1			1		
	0415	0416										
Y1 35+44	0416			1			1			1		
	0416	0417										
Y1 36+08	0417			1			1			1		
	0417	0418										
Y1 36+82	0418			1	1.8		1			1		
	0418	0420										
Y1 36+71	0419		6.000									
	0419	0418										
Y1 37+24	0420			1	2.5							
L 14+75	0422			1	1.2		1			1		
	0422	0423										
L 14+51	0425			1	0.2							
	0425	0426										
L 15+65	0426			1	2.7							
	0426	0602										
L 15+42	0427			1	0.4							
	0427	0426										
Y1 27+42	0428											
Y1 17+10	0500			1			1			1		
	0500	0501										
SHEET TOTALS			6.000	23	9.4		19	3	7	9		

LINE & STATION	FROM	TO	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17, 840.26, OR 840.45	G.D.I. TYPE "B" STD. 840.18, 840.27, OR 840.45	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	SPRING BOX STD. 840.41	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO D.I.	15" C.S. ELBOW	18" C.S. ELBOW	24" C.S. ELBOW	30" C.S. ELBOW	4-SIDED OTCB, SEE DETAIL SHEET 2D-13	MIN. DEPTH 2GI-A, SEE SHEET DETAIL 2D-1	JB W/ WEIR WALL, SEE DEITAL SHEET 2D-2	DRY DET. OUTLET CTL. STR, SEE SHEET 2D-7	DRY DET. OUTLET CTL. STR, SEE SHEET 2D-11	BERM DRAINAGE OUTLET STD. 850.10 (SY)	BERM DRAINAGE OUTLET STD. 850.11 (SY)	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
Y1 29+47	0401																														
	0401	0402																													
Y1 30+83	0402																														
	0402	0403																													
Y1 32+47	0403																														
	0403	0405																													
Y1 32+47	0404																														
	0404	0403																													
Y1 33+02	0405																														
	0405	0406																													
Y1 33+95	0406																														
	0406	0407																													
L 10+35	0407																														
	0407	0408																													
L 10+86	0408																														
	0408	0409																													
L 11+97	0409																														
	0409	0411																													
L 13+68	0410																														
	0410	0425																													
L 13+50	0411																														
	0411	0422																													
L 13+00	0412																														
	0412	0413																													
L 11+97	0413																														
	0413	0409																													
L 11+35	0414																														
	0414	0413																													
Y1 34+20	0415																														
	0415	0416																													
Y1 35+44	0416																														
	0416	0417																													
Y1 36+08	0417																														
	0417	0418																													
Y1 36+82	0418																														
	0418	0420																													
Y1 36+71	0419																														HEADWALL
	0419	0418																													
Y1 37+24	0420									1			1																		TBJB W/ MH
L 14+75	0422																														
	0422	0423																													
L 14+51	0425									1			1																		TBJB W/ MH
	0425	0426																													
L 15+65	0426									1			1																		TBJB W/ MH
	0426	0602																													
L 15+42	0427																						1								DRY DETENTION BASIN #2 OUTLET STRUCTURE
	0427	0426																									0.4465				18" RCP-III W/ ANTI-SEEP COLLAR
Y1 27+42	0428		1												1																
Y1 17+10	0500																														
	0500	0501																													
SHEET TOTALS			1								3			3	1									1				0.4465			

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

TGSLTW1014

COMPUTED BY: BJH DATE: 03-15-22

CHECKED BY: REL DATE: 03-15-22

PROJECT NO.	SHEET NO.
A-0009CA	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	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 12	24	30	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC
									THICKNESS OR GAUGE							
Y1 17+10	20	RT	0501		2008.8											
			0501	0503		2005.5	2003.9									
Y1 18+45	20	RT	0503		2007.1											
			0503	0504		2003.9	2002.8									
Y1 19+47	20	RT	0504		2005.8											
			0504	0507		2002.8	2002.0									
Y1 20+64	20	RT	0507		2005.0											
			0507	0508		2002.0	1998.7									
Y1 21+58	20	RT	0508		2004.4											
			0508	0510		1998.7	1998.1	0.3								
Y1 21+58	47	RT	0509		2001.8											
			0509	0508		1999.0	1998.7									
Y1 22+18	20	RT	0510		2004.0											
			0510	0511		1998.1	1997.7	0.4								
Y1 22+57	37	RT	0511		2003.2											
			0511	0525		1997.7	1994.9	0.5								
Y1 23+00	43	LT	0512		2002.0											
			0512	0523		1999.2	1999.0	0.7								
Y1 24+92	46	LT	0514		2000.3											
			0514	0515		1997.1	1996.1									
Y1 26+06	55	LT	0515		2000.6											
			0515	0516		1996.1	1994.5	0.3								
Y1B 13+15	57	LT	0516		1998.6											
			0516	0521		1993.6	1992.8									
Y1 24+17	20	RT	0518		2001.9											
			0518	0525		1995.3	1994.9									
Y1 25+32	20	RT	0519		2000.6											
			0519	0518		1995.9	1995.3									
Y1 26+28	20	RT	0520		1999.7											
			0520	0519		1996.4	1995.9									
Y1 26+59	21	RT	0521		1999.6											
Y1 23+00	20	LT	0523		2004.5											
			0523	0524		1999.0	1997.8	0.7								
Y1 24+25	22	LT	0524		2003.0											
			0524	0514		1997.6	1997.1									
Y1 23+46	37	RT	0525		2002.8											
			0525	0526		1994.7	1994.4	0.5								
Y1A 10+80	31	LT	0526		2003.4											
			0526	0527		1994.4	1993.9	0.5								
Y1A 11+49	34	LT	0527		1998.0											
			0527	0528		1993.9	1992.5	0.5								
Y1A 11+68	100	LT	0529		1994.8											
			0529	0530		1990.9	1990.8	0.5								
Y1B 12+53	26	LT	0531		2007.0											
			0531	0516		1995.3	1993.6									
L 16+34	20	RT	0601		1992.9											
			0601	0422		1989.9	1987.7									
L 17+64	20	RT	0605		1993.6											
			0605	0604		1984.8	1984.4	0.4								
L 18+54	20	RT	0606		1994.7											
SHEET TOTALS																

C. S. PIPE SIZE 12	15	18	24	30	36	48	THICKNESS OR GAUGE .064	.064	.064	.064	.079	.079	.109

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COMPUTED BY: BJH DATE: 03-15-22

CHECKED BY: REL DATE: 03-15-22

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
A-0009CA	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 12	24	30	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC
		0606	0605		1990.3	1984.8	0.4								
L 19+31	20 RT	0607		1995.8											
		0607	0606		1991.5	1990.3	0.3								
L 19+32	48 RT	0608		1996.8											
		0608	0607		1994.0	1992.7									
L 20+05	47 RT	0609		1997.5											
		0609	0608		1994.7	1994.0									
L 20+27	20 RT	0610		1997.7											
		0610	0607		1993.4	1991.5									
L 22+00	33 RT	0611		2001.4											
		0611	0612		1998.6	1998.3									
L 22+00	20 RT	0612		2001.5											
		0612	0610		1997.1	1993.4									
L 24+00	34 RT	0613		2005.4											
		0613	0614		2002.6	2002.5									
L 24+00	20 RT	0614		2005.8											
		0614	0612		2001.8	1997.6	0.8								
L 26+00	20 RT	0615		2010.2											
		0615	0614		2005.4	2001.8	0.7								
L 26+19	46 RT	0616		2010.3											
		0616	0615		2005.7	2005.4	0.5								
L 26+54	88 RT	0617		2011.0											
		0617	0616		2006.2	2005.7	0.5								
L 27+00	56 RT	0618													
		0618	0617		2008.9	2006.2									
L 26+00	20 LT	0619		2011.6											
		0619	0615		2007.8	2006.9									
L 27+22	36 LT	0620													
		0620	0619		2011.2	2007.8									
L 28+48	36 LT	0621													
L 33+27	27 LT	0701		2013.6											
		0701	0702		2010.8	1997.5									
L 33+07	47 RT	0703													
L 34+73	27 LT	0705		2013.3											
		0705	0704		2008.2	1996.3	2.5								
L 36+03	27 LT	0706		2014.6											
		0706	0705		2010.7	2008.2	0.6								
L 36+03	27 RT	0707		2014.6											
		0707	0706		2011.2	2010.7	0.5								
L 36+50	27 RT	0708		2015.5											
		0708	0707		2012.7	2011.4	1.4								
L 37+00	27 RT	0709		2016.5											
		0709	0708		2013.7	2012.7	1.3								
L 38+00	27 RT	0710		2018.8											
		0710	0709		2016.0	2013.7	0.5								
L 39+00	27 RT	0711		2020.6											
		0711	0710		2017.8	2016.0									
L 40+00	27 RT	0712		2021.7											
		0712	0711		2018.9	2017.8									
L 32+68	37 RT	0713													
						SHEET TOTALS									

	C. S. PIPE 12	15	18	24	30	36	48	R. C. PIPE CLASS III 12	15	18	24	30	36	48	R. C. PIPE CLASS IV 12	15	18	24	30	36	48
	.064	.064	.064	.064	.079	.079	.109														
																			88		
L 19+31																					
																			76		
L 19+32																					
															28						
L 20+05																					
															68						
L 20+27																					
																			92		
L 22+00																					
															12						
L 22+00																					
																			168		
L 24+00																					
															12						
L 24+00																					
																		196			
L 26+00																					
																		196			
L 26+19																					
																		32			
L 26+54																					
																		52			
L 27+00																					
															56						
L 26+00																					
															40						
L 27+22																					
															124						
L 28+48																		32			
L 33+27																					
			36																		
L 33+07																		52			
L 34+73																					
				36																	
L 36+03																					
																128					
L 36+03																					
																56					
L 36+50																					
															44						
L 37+00																					
															48						
L 38+00																					
															96						
L 39+00																					
															96						
L 40+00																					
															100						
L 32+68																					
		36	36												724	184	476	424			

	18" PIPE REHABILITAION CIPP LINER	24" WELDED STEEL PIPE 0.500" THICK, GRADE B IN SOIL	24" WELDED STEEL PIPE 0.500" THICK, GRADE B NOT IN SOIL	30" WELDED STEEL PIPE 0.500" THICK, GRADE B IN SOIL	30" WELDED STEEL PIPE 0.500" THICK, GRADE B NOT IN SOIL	36" WELDED STEEL PIPE 0.500" THICK, GRADE B IN SOIL	36" WELDED STEEL PIPE 0.500" THICK, GRADE B NOT IN SOIL	6" PVC PIPE (SPRING BOX)	6" DUCTILE IRON PIPE (SPRING BOX)	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) A: 0' THRU 5' EACH	B: 5' THRU 10' LIN. FT.	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	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17, 840.26, OR 840.45	G.D.I. TYPE "B" STD. 840.18, 840.27, OR 840.45	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	J.B. STD. 840.31 OR STD. 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	SPRING BOX STD. 840.41	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO D.I.	15" C.S. ELBOW	18" C.S. ELBOW	24" C.S. ELBOW	30" C.S. ELBOW	4-SIDED OTCB, SEE DETAIL SHEET 2D-13	MIN. DEPTH 2GI-A, SEE SHEET DETAIL 2D-1	JB W/ WEIR WALL, SEE DEITAL SHEET 2D-2	DRY DET. OUTLET CTL. STR, SEE SHEET 2D-7	DRY DET. OUTLET CTL. STR, SEE SHEET 2D-11	BERM DRAINAGE OUTLET STD. 850.10 (SY)	BERM DRAINAGE OUTLET STD. 850.11 (SY)	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 19+31																1			1			1																										
L 19+32																1							1				1																				2GI W/O APRON
L 20+05																1							1				1																				2GI W/O APRON
L 20+27																1			1																													
L 22+00																1							1				1																				2GI W/O APRON
L 22+00																1			1																													
L 24+00																1							1				1																				2GI W/O APRON
L 24+00																1			1																													
L 26+00																1			1																													
L 26+19																1				1																												
L 26+54																1																																4-SIDED OTCB W/ MH
L 27+00																																															
L 26+00																1			1																													
L 27+22																																															
L 28+48																																															
L 33+27																1																																
L 33+07																																															
L 34+73																1	0.1																													
L 36+03																1																																
L 36+03																1																																
L 36+50																1																																
L 37+00																1																																
L 38+00																1																																
L 39+00																1																																
L 40+00																1																																
L 32+68															3.400																																HEADWALL
														3.400	21	0.1		7		2	5					13	9		4				1		2	2			1							

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