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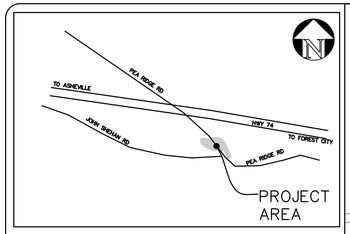
TIP PROJECT: R-5756

CONTRACT: DN00455




| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | R-5756 | 1 | |

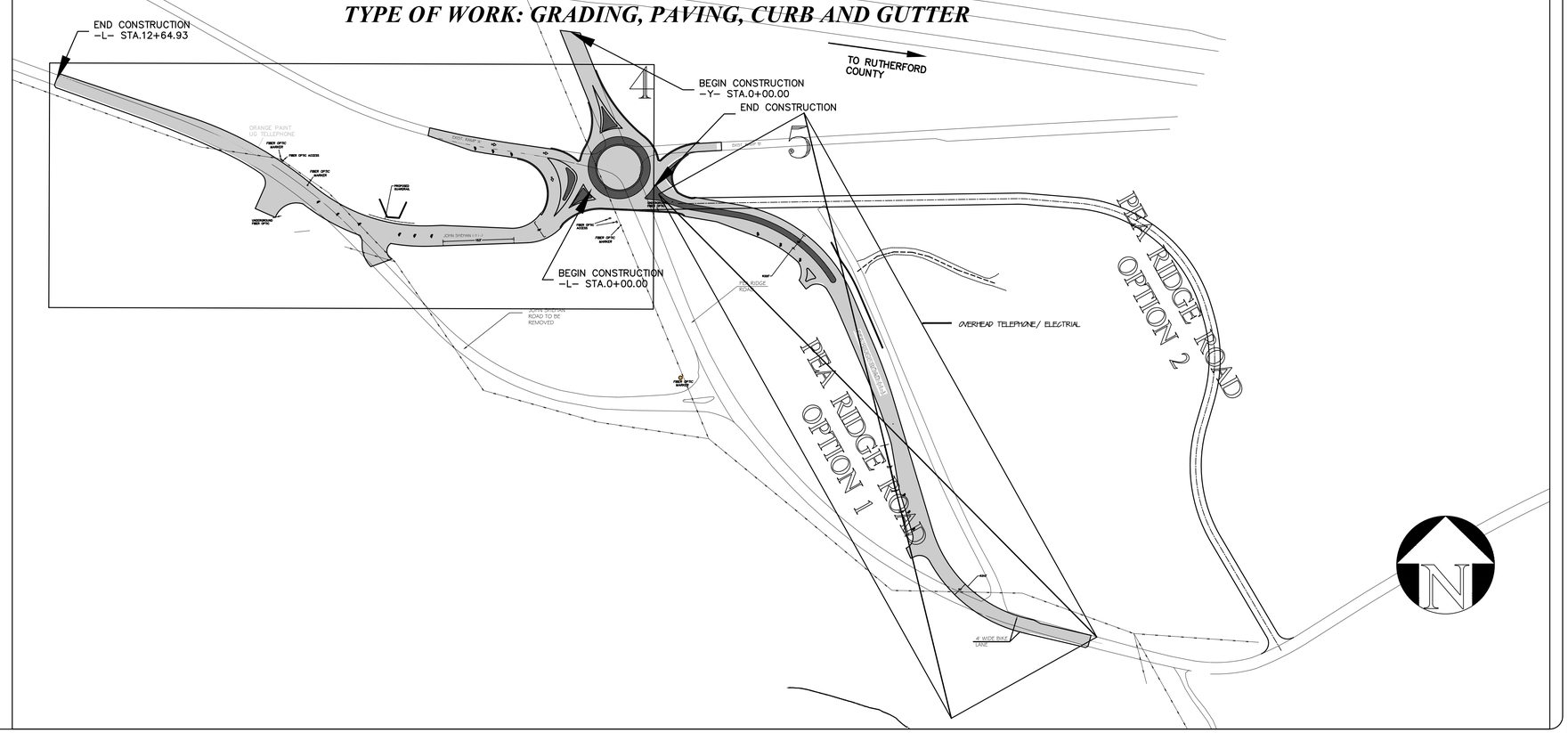
| STATE PROJ. NO. | F. A. PROJ. NO. | DESCRIPTION |
|---|---|---|
| 46441.1.1 | | PE |
| 46441.2.1 | | R/W |
| 46441.3.1 | | CONST. |

# STATE OF NORTH CAROLINA
# DIVISION OF HIGHWAYS

# POLK COUNTY

***LOCATION: ON/OFF RAMP AT THE INTERSECTION OF PEA RIDGE ROAD AND HWY 74***

***TYPE OF WORK: GRADING, PAVING, CURB AND GUTTER***




*GRAPHIC SCALES*

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

*PROJECT LENGTH*

*TOTAL LENGTH TIP PROJECT = 0.36 MI*

*Prepared in the Office of:*

***ODOM ENGINEERING, PLLC***

*152 EAST MAIN STREET, FOREST CITY, NC 28043*

2012 STANDARD SPECIFICATIONS

*RIGHT OF WAY DATE:*

*LETTING DATE:*

*DAVID ODOM, PE*
*PROJECT ENGINEER*

DAVID ODOM, PE
*PROJECT DESIGN ENGINEER*

*HYDRAULICS ENGINEER*

*SIGNATURE:* *P.E.*

NORTH CAROLINA PROFESSIONAL SEAL 21130 ENGINEER DAVID ODOM 2/23/16

*ROADWAY DESIGN ENGINEER*

*SIGNATURE:* *P.E.*

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

| 0 5 10 | PROJECT REFERENCE NO. | SHEET NO. |
|---|---|---|
| | R-5756 | 1A |

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21304 ENGINEER DAVID ODOM

# STATE OF NORTH CAROLINA
# DIVISION OF HIGHWAYS

*Note: Not to Scale*
**S.U.E. = Subsurface Utility Engineering*

## CONVENTIONAL PLAN SHEET SYMBOLS

### *BOUNDARIES AND PROPERTY:*

- Property Line
- Existing Iron Pin
- Property Monument
- Existing Chain Link Fence
- Proposed Super Silt Fence
- Proposed Chain Link Fence
- Benchmark
- Denuded Limits

### *BUILDINGS AND OTHER CULTURE:*

- Gas Pump Vent or U/G Tank Cap — V
- Sign — S
- Well — W
- Foundation
- Area Outline
- Building

### *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 — Z
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head ~~Ditch~~ — K
- False Sump — FLOW

### *RAILROADS:*

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

### *RIGHT OF WAY:*

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Monument
- Existing Right of Way Line
- Proposed Right of Way Line
- Proposed Right of Way Line with Iron Pin and Cap Marker
- Proposed Right of Way Line with Concrete or Granite R/W Marker
- Proposed Control of Access Line with Concrete C/A Marker
- Existing Control of Access
- Proposed Control of Access
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Perm. Drainage/Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

### *ROADS AND RELATED FEATURES:*

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

### *VEGETATION:*

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

### *EXISTING STRUCTURES:*

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

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

### *UTILITIES:*

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

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

WATER:
- Water Meter — WM
- Water Valve — GV
- Water Hydrant — Exist. Proposed
- Recorded U/G Water Line — W

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

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

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

MISCELLANEOUS:
- Utility Pole — O
- Utility Pole with Base — F
- Utility Located Object — S
- Utility Traffic Signal Box — 3
- Utility Unknown U/G Line — U/L
- 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.
- Cut Slope — C
- Fill Slope — F

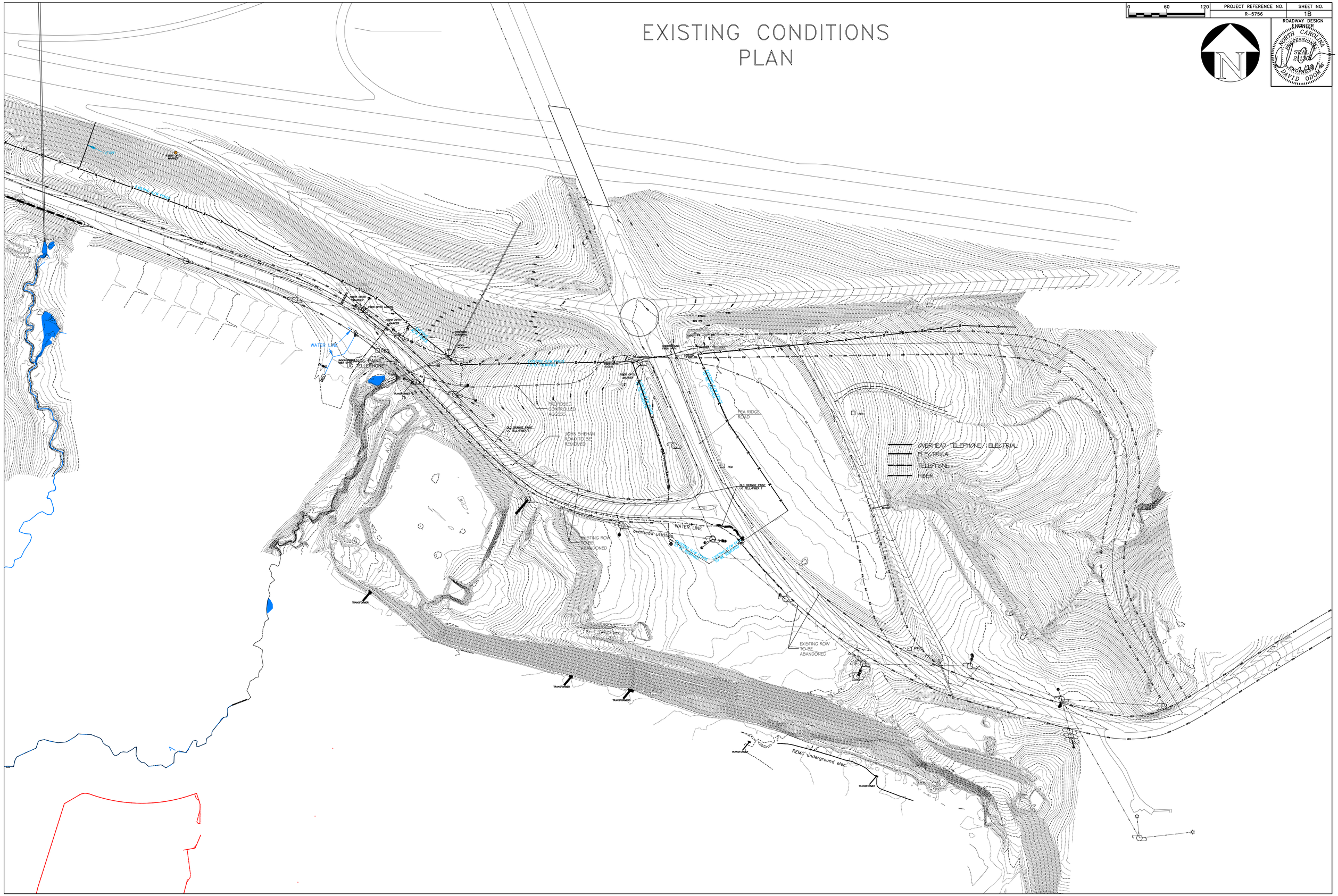
EROSION CONTROL:
- Temporary Silt Ditch — TSD
- Temporary Diversion Berm — <<TDB<<
- Silt Basin Type B

# EXISTING CONDITIONS PLAN

| 0 60 120 | PROJECT REFERENCE NO. | SHEET NO. |
|---|---|---|
| | R-5756 | 1B |

ROADWAY DESIGN ENGINEER

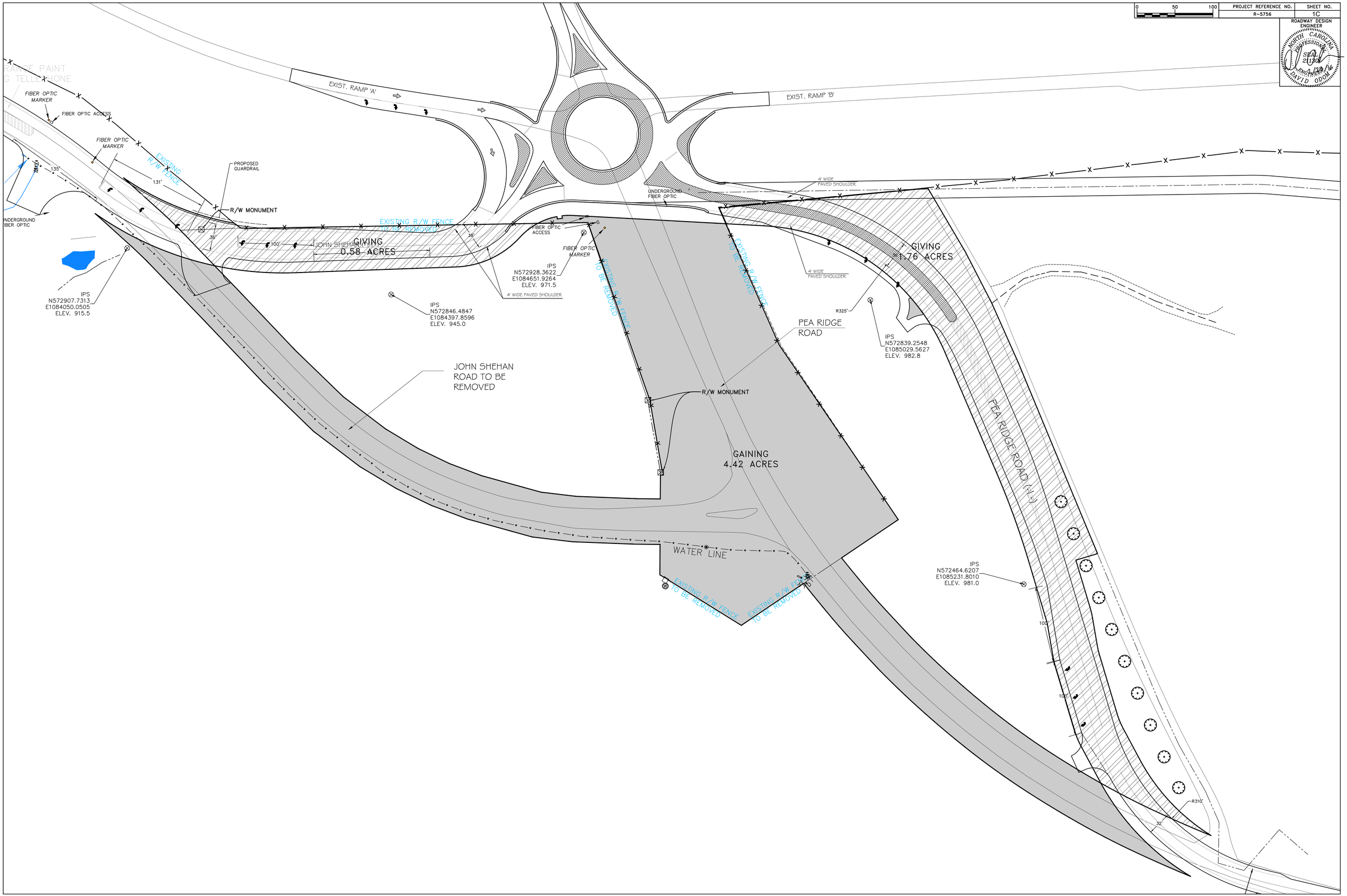
NORTH CAROLINA PROFESSIONAL SEAL 21324 ENGINEER DAVID ODOM



| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | 1C |

0 50 100

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21190 ENGINEER DAVID ODOM
4/22/16



| PROJECT REFERENCE NO. | SHEET NO. |
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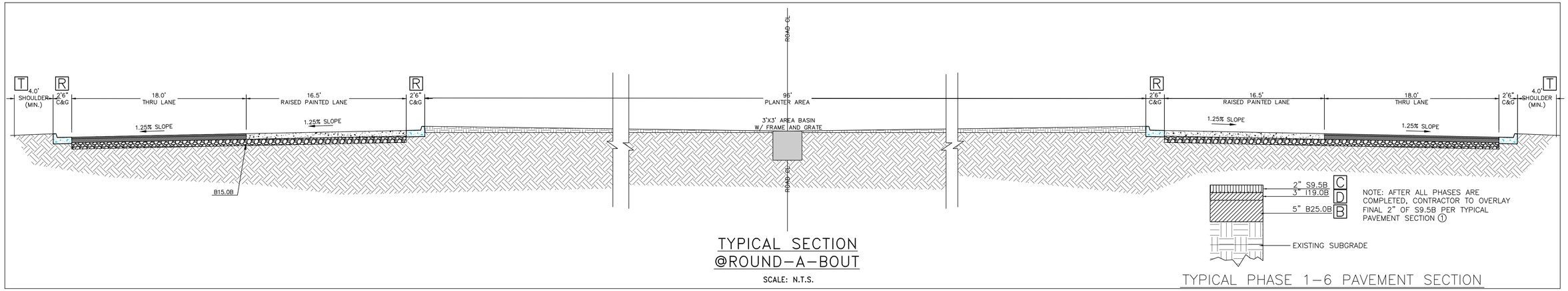
| R-5756 | 2 |

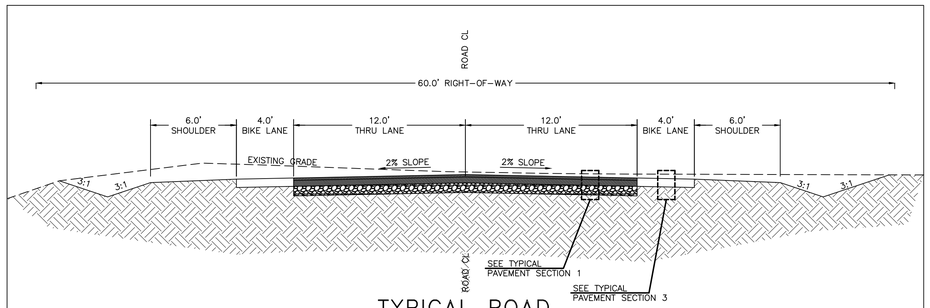
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21304 ENGINEER DAVID ODOM 02/24/16




TYPICAL SECTION @ROUND-A-BOUT

SCALE: N.T.S.

TYPICAL PHASE 1-6 PAVEMENT SECTION



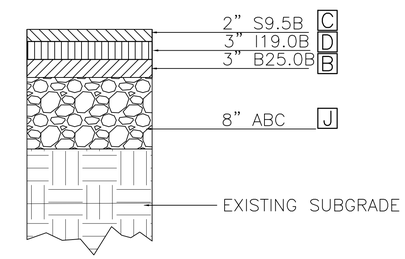

TYPICAL ROAD SECTION

SCALE: 1" = 5'

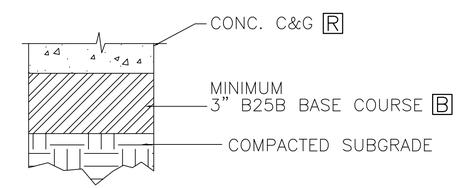
DIRT VOLUME CHARTS

| TYPICAL PAVEMENT SECTION ROUND-A-BOUT PAVEMENT SCHEDULE | |
|---|---|
| C | PROP APPROX. 2" ASPHALT CONCRETE SURFACE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS PER SQ. YD. PER INCH |
| D | PROP APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS PER SQ. YD. PER INCH |
| B | PROP APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS PER SQ. YD. PER INCH |

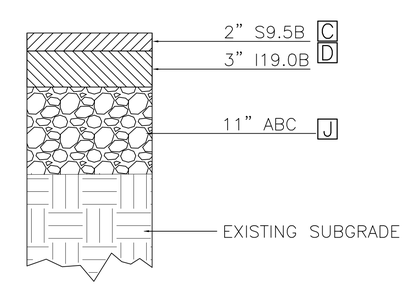
| TYPICAL PAVEMENT SECTION CURBING AND GUTTERING PAVEMENT SCHEDULE | |
|---|---|
| R | 2'-6" CONCRETE CURB AND GUTTER |
| B | PROP APPROX. 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS PER SQ. YD. PER INCH |




1 TYPICAL PAVEMENT SECTION




2 CURBING BASE SECTION




3 TYPICAL PAVEMENT SECTION

| TYPICAL PAVEMENT SECTION #1 PAVEMENT SCHEDULE | |
|---|---|
| C | PROP APPROX. 2" ASPHALT CONCRETE SURFACE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS PER SQ. YD. PER INCH |
| D | PROP APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS PER SQ. YD. PER INCH |
| B | PROP APPROX. 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS PER SQ. YD. PER INCH |
| J | PROP 8" AGGREGATE BASE COURSE |

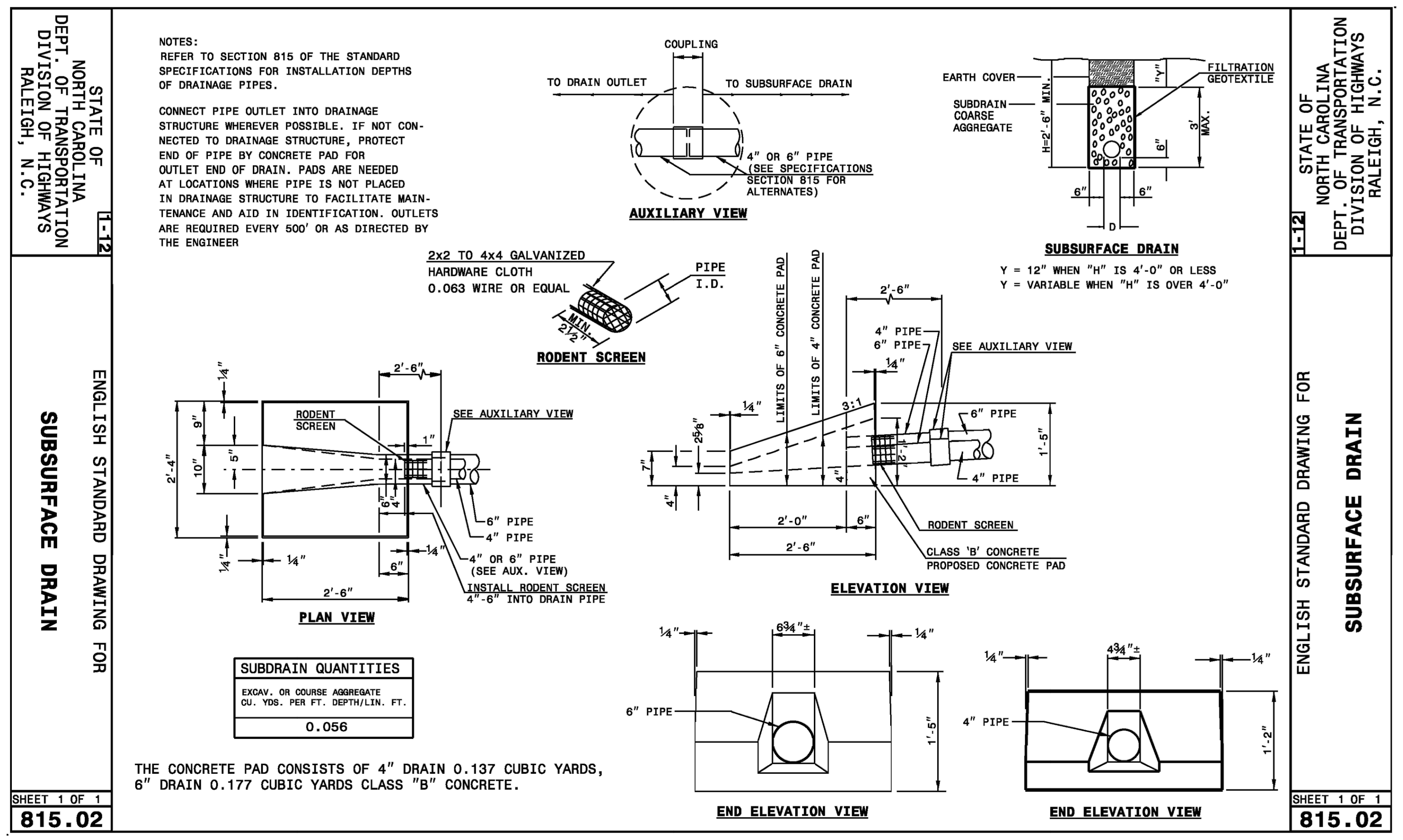
| TYPICAL PAVEMENT SECTION #3 PAVEMENT SCHEDULE | |
|---|---|
| C | PROP APPROX. 2" ASPHALT CONCRETE SURFACE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS PER SQ. YD. PER INCH |
| D | PROP APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS PER SQ. YD. PER INCH |
| J | PROP 11" AGGREGATE BASE COURSE |

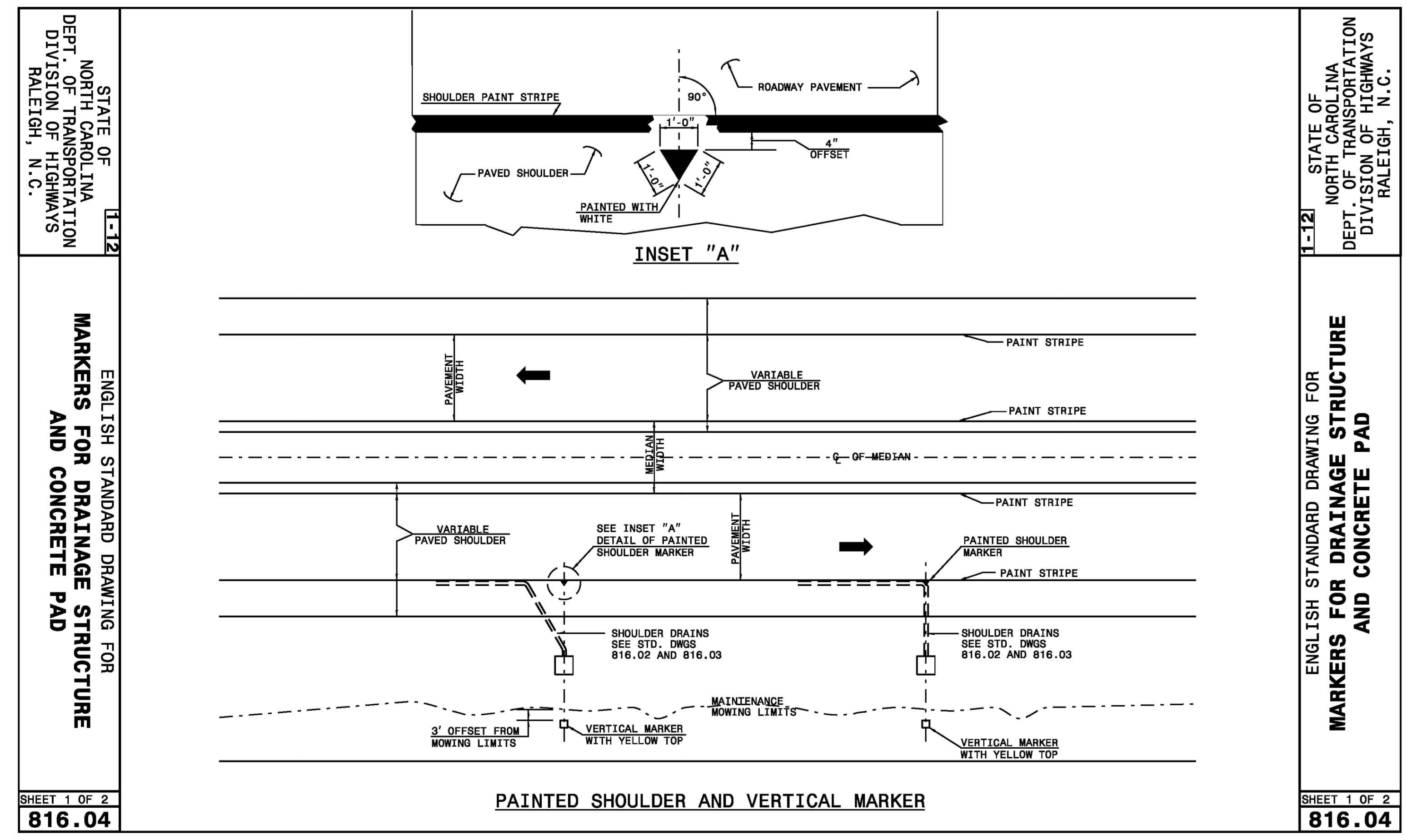
Drawing name: Z:\2014\14043 - TRYON RESORT ROAD REALIGNMENT\DWG\REVISED PER PRELIM REVIEW #1\14043-BASE-021916-REV.dwg Plotted on: Feb 24, 2016 - 11:05am

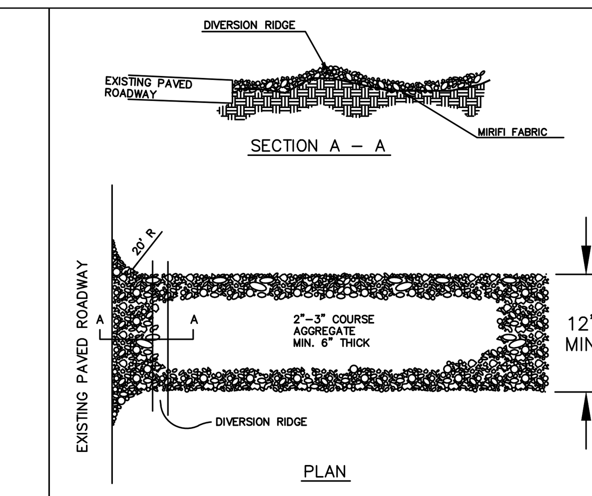
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | 2A |

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21130 ENGINEER DAVID ODOM 2/23/16




NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS- OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABLIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

CONSTRUCTION SPECIFICATIONS

1. Clear the entrance and exit area of all vegetation, roots, and other objectionable material and properly grade it.
2. Place the gravel to the specific grade and dimensions shown on the plans, and smooth it.
3. Provide drainage to carry water to the sediment trap.
4. Gravel to be placed on Geotextile cloth.

CONSTRUCTION SCHEDULE:
1. Obtain plan approval and other applicable permits.
2. Install sediment fencing and/or temporary berms for clearing and grubbing phase.
3. Install temporary sediment traps. Ensure access to traps throughout construction.
4. Grade site.
5. Slopes shall have ground cover established within 21 calendar days.
6. Install permanent vegetation on all disturbed areas within 15 working days or no more than 60 calendar days following completion of construction or development.
7. Remove temporary measures only after site is stabilized with vigorous and dense vegetative cover.
8. Estimated time to final stabilization 4 mos.
9. In fill situations contractor shall install a temporary berm above slope to divert any potential runoff that may occur overnight in lieu of inclimate weather.

GENERAL NOTES:
1. ONLY DISTURB CLEAR OR GRADE AREAS NECESSARY FOR CONSTRUCTION. FLAG OR OTHERWISE DELINEATE AREAS NOT TO BE DISTURBED. EXCLUDE VEHICLES AND CONSTRUCTION EQUIPMENT FROM THESE AREAS TO PRESERVE NATURAL VEGETATION.
2. CLEAR AND GRUB AREAS TO BE FILLED TO REMOVE TREES, VEGETATION, MUCK, ROOTS, OR OTHER OBJECTIONABLE MATERIAL THAT WOULD AFFECT THE PLANTED STABILITY OF THE FILL.
3. PLACE FILL IN LAYERS NOT TO EXCEED 6" IN THICKNESS AND COMPACT THE LAYERS AS REQUIRED TO TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, OR OTHER RELATED PROBLEMS.
4. KEEP DIVERSIONS AND CHANNELS AND OTHER WATER CONVEYANCE MEASURES FREE OF SEDIMENT AT ALL TIMES.
5. ROUGHEN THE SURFACE OF ALL SLOPES DURING THE CONSTRUCTION OPERATION TO RETAIN WATER, INCREASE INFILTRATION, AND FACILITATE VEGETATION ESTABLISHMENT.
6. PERMANENTLY STABILIZE ALL GRADED AREAS IMMEDIATELY AFTER FINAL GRADING IS COMPLETED ON EACH AREA. 2:1 OR STEEPER SLOPES MUST HAVE TEMPORARY GROUND COVER WITHIN 7 DAYS. 3:1 SLOPES OR FLATTER SLOPES MUST HAVE TEMPORARY GROUND COVER WITHIN 14 DAYS

PERMANENT SEEDING

GRASS–LINED CHANNELS

| | |
|---|---|
| Kentucky bluegrass | 20 lb/ac |
| Rye (grain) | 40 lb/ac |
| Lime | 4000 lb/ac |
| 10–10–10 fertilizer | 1200 lb/ac |
| straw | 4000 lb/ac |

ALL OTHER SURFACES

| | |
|---|---|
| Tall fescue | 100 lb/ac |
| Serica lespedeza (Scarified) | 30 lb/ac |
| Kobe lespedeza | 10 lb/ac |
| 10–10–10 fertilizer | 1000 lb/ac |
| straw | 4000 lb/ac |

TEMPORARY SEEDING

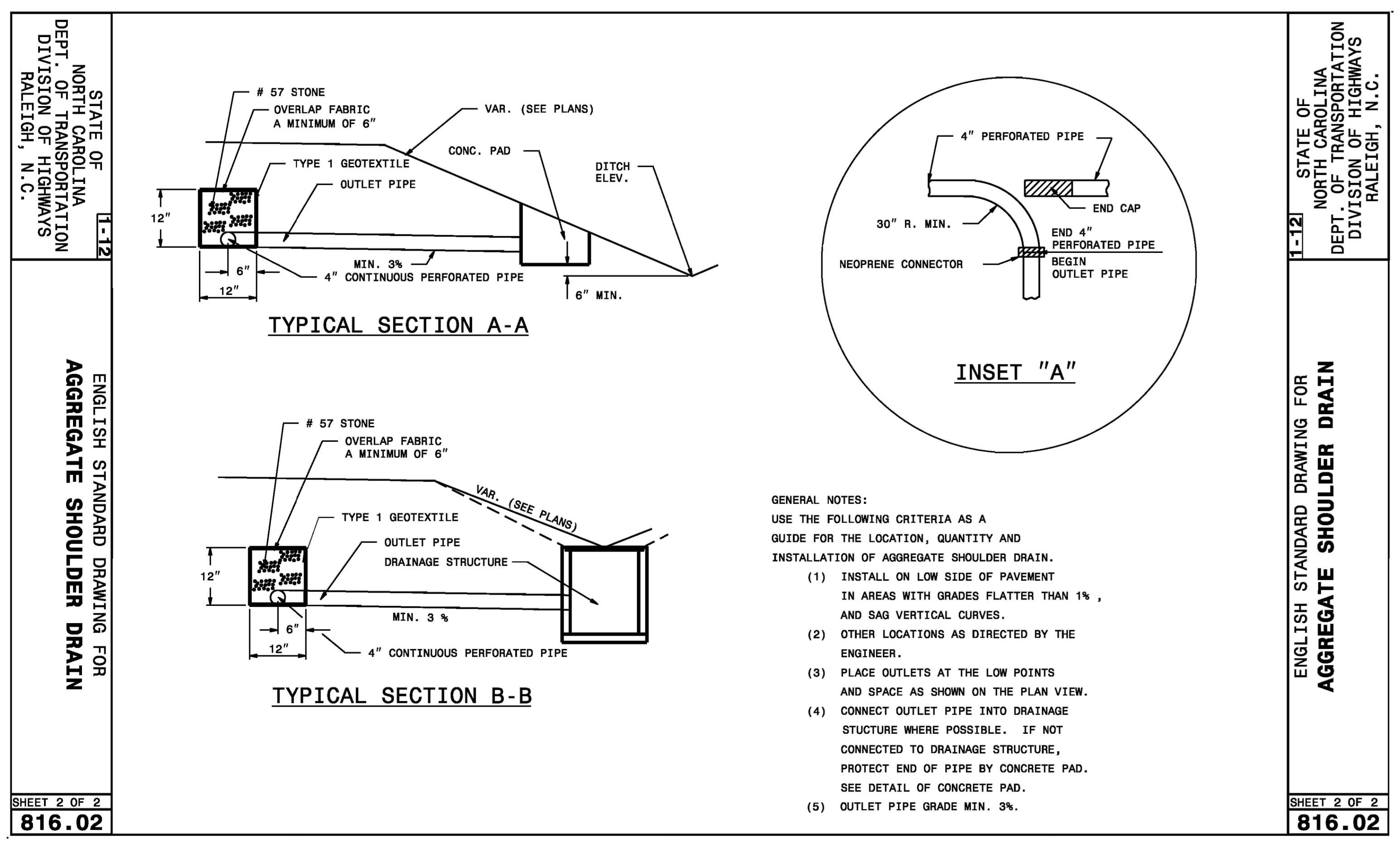
| | |
|---|---|
| SUMMER (May 15 – Aug 15) | |
| German millet | 40 lb/ac |
| FALL (Aug 15 – Dec 15) | |
| Rye (grain) | 120 lb/ac |
| WINTER/EARLY SPRING (Feb 1 – May 15) | |
| Rye (grain) | 120 lb/ac |
| Korean lespedeza | 50 lb/ac |
| Lime | 2000 lb/ac |
| 10–10–10 | 750 lb/ac |
| straw | 4000 lb/ac |

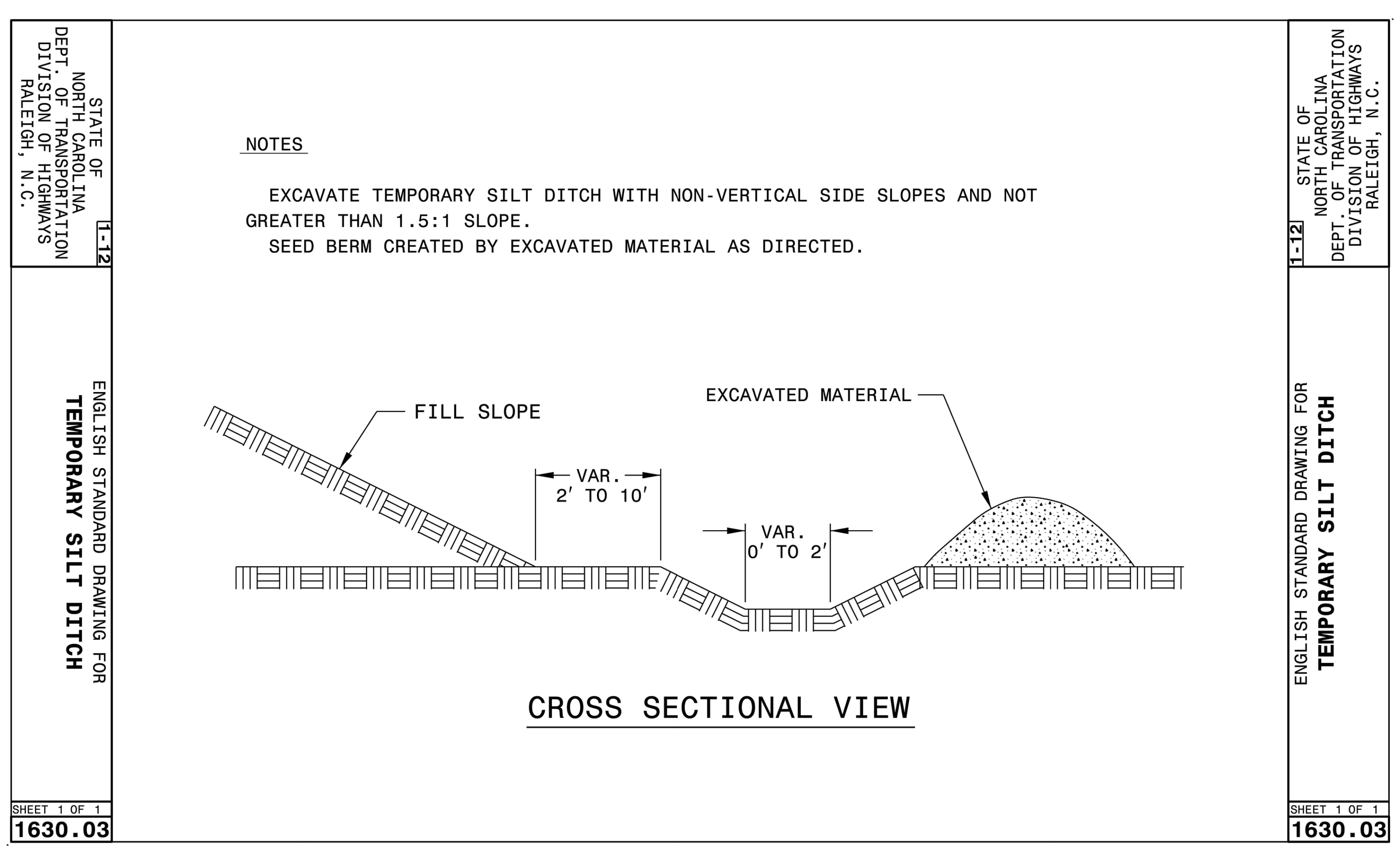
SEEDING PROCEDURES:
1. Apply seed, at the rates above, in two intersecting directions. Rake in lightly.
2. Do not seed areas in excess of that which can be mulched on same day.
3. Do not sow immediately following rain, when ground is too dry, or during windy periods.
4. Roll seeded area with roller not exceeding 112 lbs.
5. Immediately following seeding and compacting, apply mulch to a thickness of 1/8 inches. Maintain clear of shrubs and trees.
6. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

SEED PROTECTION:
1. Identify seeded areas with stakes and string around area periphery. Set string height to 6 inches.
2. Cover seeded slopes where grade is 4 inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.
3. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Provide 12 inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.
4. Secure outside edges and overlaps at 36 inch intervals with stakes.
5. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
6. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

MAINTENANCE PLAN

1. All erosion and sediment control practices will be checked for stability and operation following every runoff–producing rainfall but in no case less than once every week. Any needed repairs will be made immediately to maintain all practices as designed.
2. Sediment will be removed behind the sediment fence when it becomes about 0.5' deep at the fence. The sediment fence will be repaired as necessary to maintain a barrier.
3. Ensure temporary sediment trap is cleared once sediment reaches cleanout mark.
4. All seeded areas will be fertilized, reseeded as necessary according to specifications in the veg– etative plan to maintain a vigorous, dense, vegetative cover.




## Major Elements of DWQ Construction General Permit

This document contains the major elements of the recently-revised North Carolina Division of Water Quality (DWQ) Construction General Permit (NCG01) with emphasis placed on those elements that differ from the previous permit (expiration on August 2, 2011). Since the summary list below cannot contain details of every change, the complete Permit should be used to assure full implementation. See: http://portal.ncdenr.org/web/wq/ws/su/construction

### 1) Ground Stabilization*

| Site Area Description | Stabilization Time Frame | Stabilization Time Frame Exceptions |
|---|---|---|
| • Perimeter dikes, swales, ditches and slopes | 7 days | None |
| • High Quality Water (HQW) Zones | 7 days | None |
| • Slopes steeper than 3:1 | 7 days | If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed. |
| • Slopes 3:1 or flatter | 14 days | 7-days for slopes greater than 50 feet in length |
| • All other areas with slopes flatter than 4:1 | 14 days | None (except for perimeters and HQW Zones) |

* "Extensions of time may be approved by the permitting authority based on weather or other site-specific conditions that make compliance impracticable." (Section II.B(2)(b))

The major change in the Permit from the previous one is the shorter times to apply ground stabilization such as mulch, wheat straw, or grasses. The NC laws and rules relating to the Sediment Act require, in most places, ground stabilization within 21 days. Based on the new EPA requirements and 9-months' work with a permit advisory group, CTAG, the Division and EPA-developed permit, now contains requirements for ground cover within 14, and in some places, 7 days.

### 2) Building Wastes Handling

- No paint or liquid wastes in stream or storm drains
- Dedicated areas for demolition, construction and other wastes must be located 50' from storm drains and streams unless no reasonable alternatives available.
- Earthen-material stockpiles must be located 50' from storm drains and streams unless no reasonable alternatives available.
- Concrete materials must be controlled to avoid contact with surface waters, wetlands, or buffers.

### 3) Discharges to Federally-listed Waters

- Requirements are the same as in previous permit.
- The permit allows reduction from the 20 acre minimum if the Director of DWQ determines that other BMPs provide equivalent protection.



## Major Elements of DWQ Construction General Permit- Continued

### 4) Inspections

- Same weekly inspection requirements
- Same rain gauge & inspections after 0.5" rain event
- Inspections are only required during "normal business hours"
- Inspection reports must be available on-site during business hours unless a site-specific exemption is approved.
- Records must be kept for 3 years and available upon request.
- Electronically-available records may be substituted under certain conditions.

### 5) Implementation of New Permit Conditions

- Projects permitted under the previous permit can continue to follow the previously-permitted conditions.
- Complete applications received prior to August 3, 2011 can follow conditions of approved application.
- Applications received after August 2, 2011 must comply with new permit conditions.

### 6) Conditions in Erosion & Sedimentation Control Plans*

Designation on the plans where the 7 and 14-day ground stabilization requirements of the NPDES permit apply

Designation on the plans where basins that comply with the surface-withdrawal requirements of the NPDES permit are located.

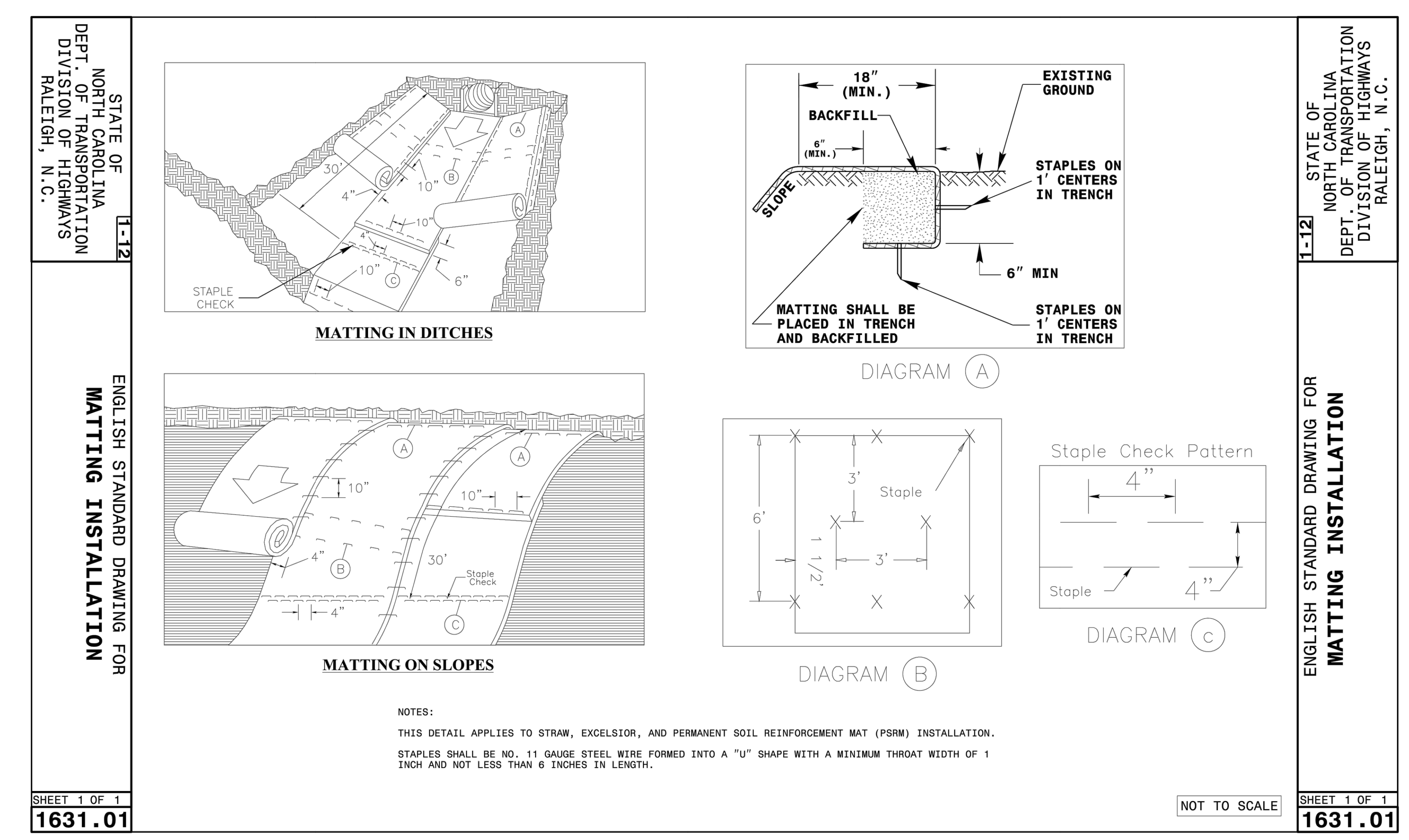
### 7) Building Wastes Handling

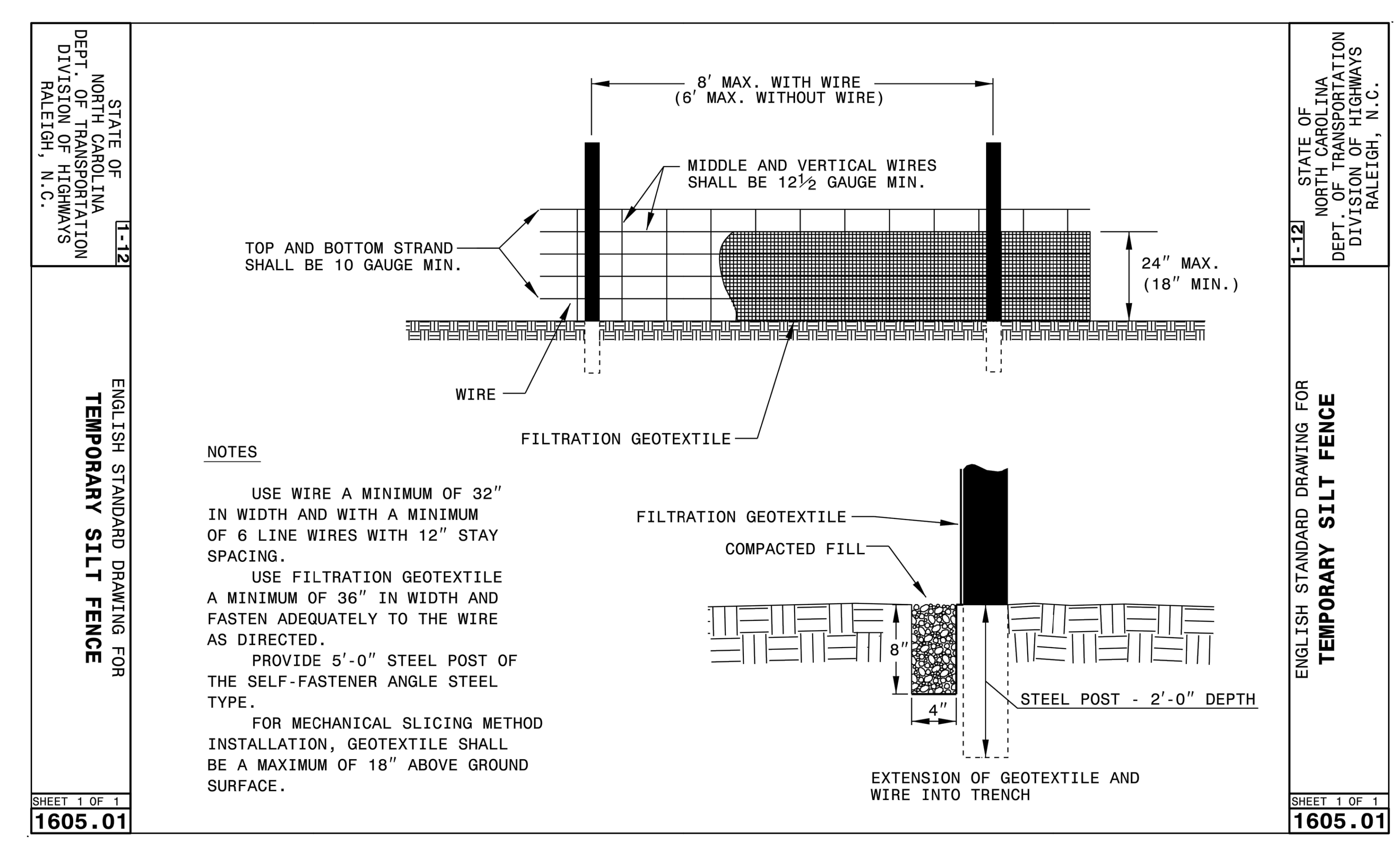
- No paint or liquid wastes in stream or storm drains
- Dedicated areas for demolition, construction and other wastes located 50' from storm drains and streams unless no reasonable alternatives are available.
- Earthen-material stockpiles located 50' from storm drains unless no reasonable alternatives available.
- Concrete materials must be controlled to avoid contact with surface waters, wetlands, or buffers.

### 8) Sediment Basins

- Outlet structures must withdraw from basin surface unless drainage area is less than 1 acre.
- Use only DWQ-approved flocculants.

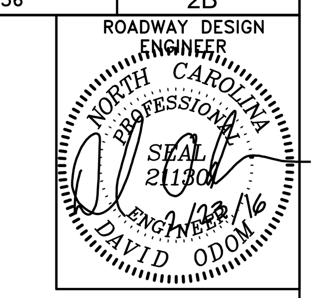
* In order for the E&SC Plan to satisfy the conditions of the Construction General permit, it must identify areas where the ground stabilization requirements apply and the location of the basins where the surface-withdrawal requirements apply.



| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | 2B |

ROADWAY DESIGN ENGINEER

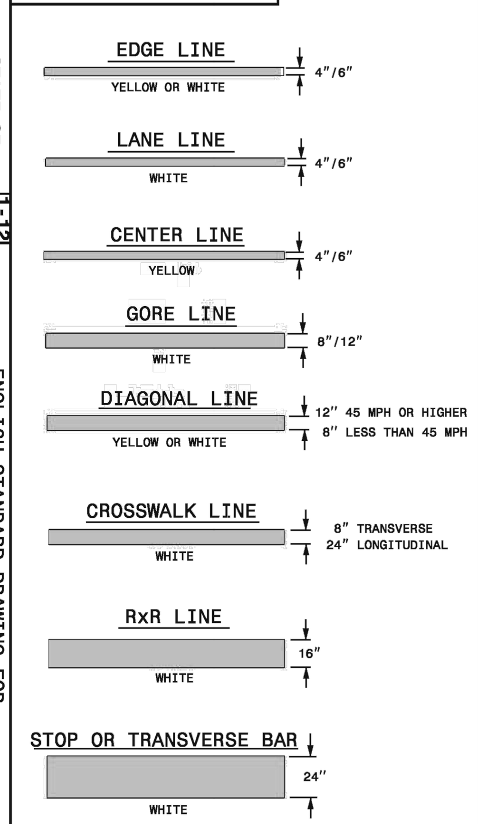



STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
**PAVEMENT MARKINGS**
LINE TYPES AND OFFSETS

## CONTINUOUS LINES




## 10'-30'/SP SKIP LINE

UNLESS OTHERWISED SHOWN, USE 10'-30'/SP SKIPS FOR SKIP LANE LINES AND SKIP CENTER LINES.

## 2'-6'/SP MINI-SKIP LINE

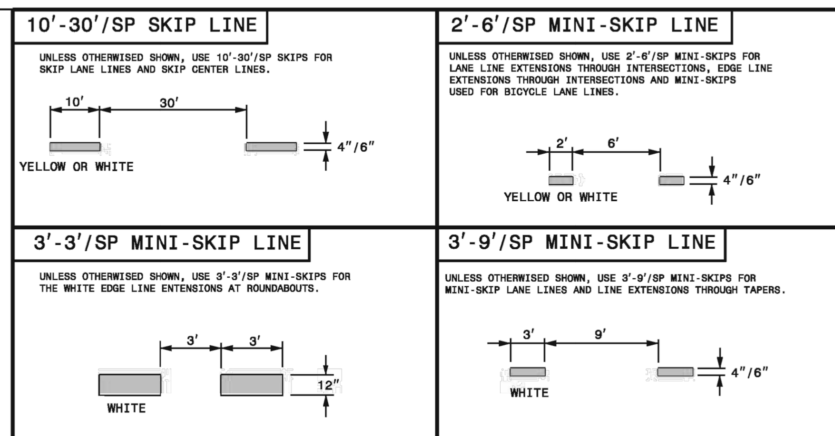
UNLESS OTHERWISED SHOWN, USE 2'-6'/SP MINI-SKIPS FOR LANE LINE EXTENSIONS THROUGH INTERSECTIONS, EDGE LINE EXTENSIONS THROUGH INTERSECTIONS AND MINI-SKIPS USED FOR BICYCLE LANE LINES.

## 3'-3'/SP MINI-SKIP LINE

UNLESS OTHERWISED SHOWN, USE 3'-3'/SP MINI-SKIPS FOR THE WHITE EDGE LINE ENTENSIONS AT ROUNDABOUTS.

## 3'-9'/SP MINI-SKIP LINE

UNLESS OTHERWISED SHOWN, USE 3'-9'/SP MINI-SKIPS FOR MINI-SKIP LANE LINES AND LINE EXTENSIONS THROUGH TAPERS.




GENERAL NOTES:

1- USE 6" LANE, EDGE, AND CENTER LINES ON ALL FULL CONTROL OF ACCESS FACILITIES AND OTHER ROUTES AS DIRECTED BY THE ENGINEER.

2- LANE LINES INDICATED AS "WIDE" ON THE ROADWAY STANDARD DRAWINGS SHALL BE AT LEAST TWICE THE WIDTH OF THE NORMAL LINE.

3- GORE LINES SHALL BE TWICE THE WIDTH OF THE NORMAL LINE.

SHEET 1 OF 2
1205.01


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
1-12
ENGLISH STANDARD DRAWING FOR PAVEMENT MARKINGS LINE TYPES AND OFFSETS
SHEET 1 OF 2
1205.01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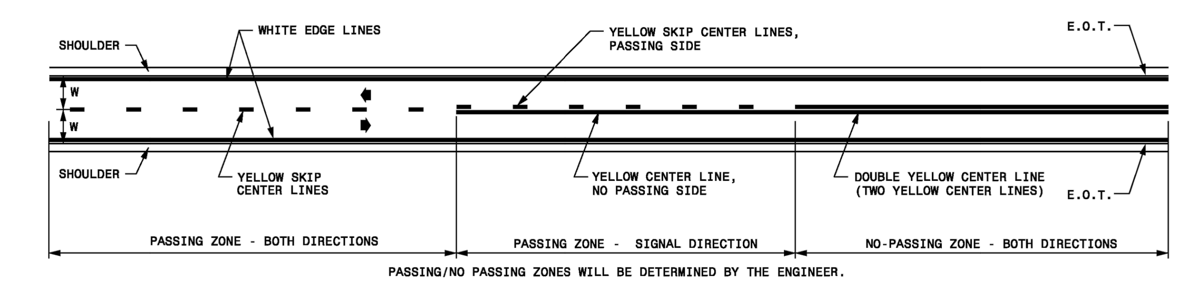
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

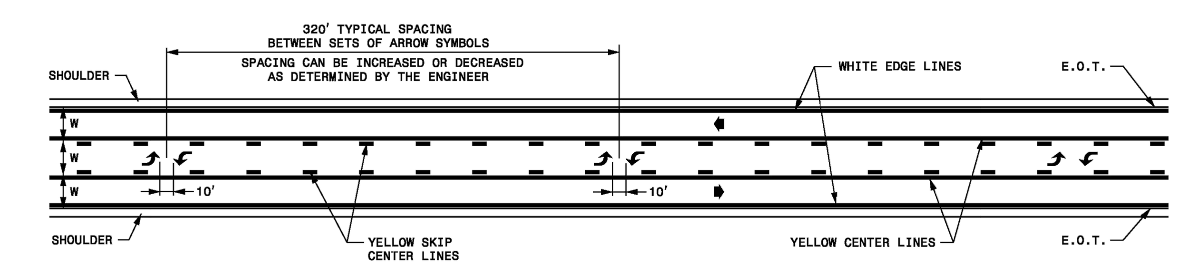
1-12

ENGLISH STANDARD DRAWING FOR
**PAVEMENT MARKINGS**
TWO-LANE AND MULTI-LANE ROADWAYS

## TWO-LANE, TWO-WAY ROADWAY




## TWO-LANE, TWO-WAY ROADWAY WITH TWO-WAY LEFT TURN LANE




GENERAL NOTES:

1- EDGE LINES ARE NOT REQUIRED ALONG CURB AND GUTTER LOCATIONS.

2- CONTINUE EDGE LINES THROUGH MINOR DRIVEWAYS. DO NOT CONTINUE EDGE LINES AT INTERSECTIONS AND MAJOR DRIVEWAYS, SEE ROADWAY STANDARD DRAWING 1205.05 FOR ADDITIONAL GUIDANCE.

3- REFER TO ROADWAY STANDARD DRAWINGS 1205.01 AND 1205.08 FOR ADDITIONAL PAVEMENT MARKING GUIDANCE.

**LEGEND**

W = WIDTH OF TRAVEL LANE
E.O.T.= EDGE OF TRAVEL
DIRECTION OF TRAFFIC FLOW
PAVEMENT MARKING SYMBOLS

SHEET 1 OF 2
1205.02


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
1-12
ENGLISH STANDARD DRAWING FOR PAVEMENT MARKINGS TWO-LANE AND MULTI-LANE ROADWAYS
SHEET 1 OF 2
1205.02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STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
**PAVEMENT MARKINGS**
LINE TYPES AND OFFSETS

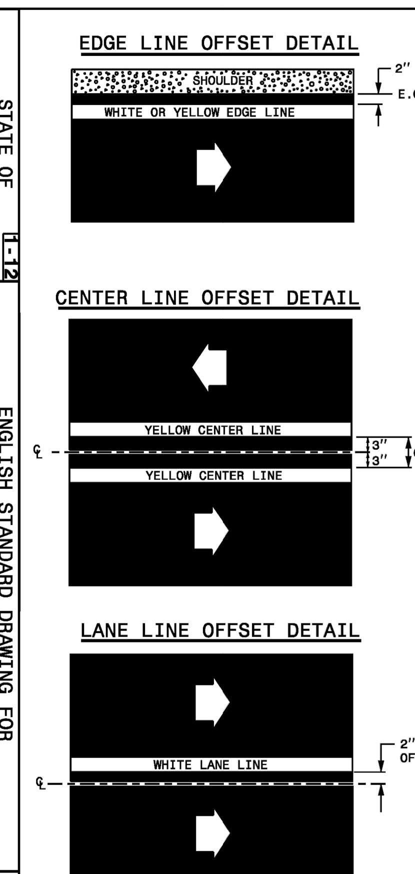


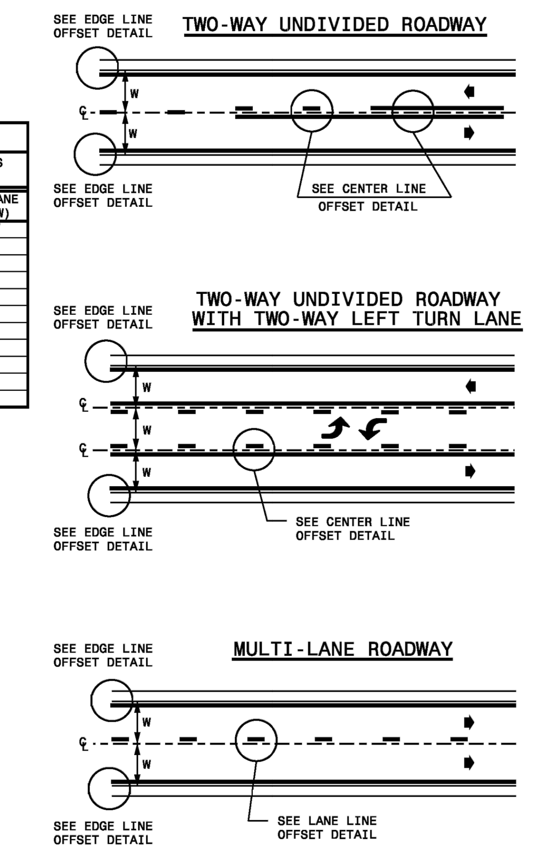

**TABLE 1**

EDGE LINE OFFSETS FOR 2-LANE, 2-WAY ROADWAYS WITH UN-PAVED SHOULDERS

| WIDTH (W) OF TRAVEL PAVEMENT | MAX. EDGE LINE OFFSET FROM E.O.T. | MINIMUM LANE WIDTH (W) |
|---|---|---|
| 16' - 18' | 2" | 8' - 9' |
| 19' | 4" | 9' |
| 20' | 6" | 9.5' |
| 21' | 8" | 10' |
| 22' | 10" | 10' |
| 23' | 10" | 10.5' |
| 24' | 1' | 11' |
| 26' | 2' | 11' |
| 28' | 2' | 12' |
| 30' | 3' | 12' |
| 32' | 4' | 12' |

**LEGEND**

W = WIDTH OF TRAVEL LANE
E.O.T.= EDGE OF TRAVEL
DIRECTION OF TRAFFIC FLOW




SHEET 2 OF 2
1205.01


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
1-12
ENGLISH STANDARD DRAWING FOR PAVEMENT MARKINGS LINE TYPES AND OFFSETS
SHEET 2 OF 2
1205.01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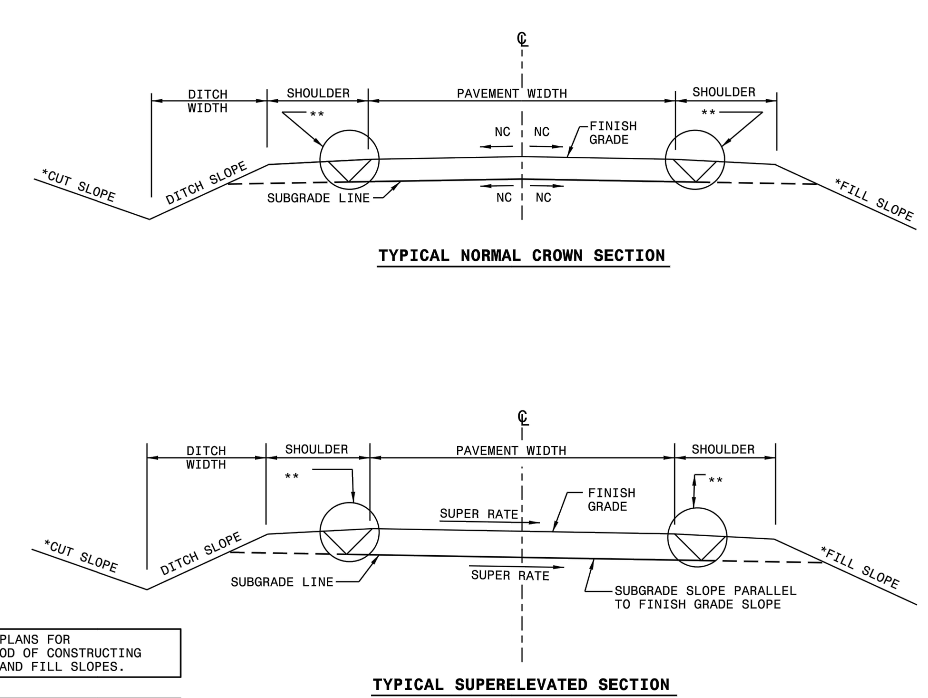
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
**GUIDE FOR GRADING SUBGRADE**
SECONDARY AND LOCAL




*SEE PLANS FOR METHOD OF CONSTRUCTING CUT AND FILL SLOPES.

** TRENCH OR GRADED SECTION. SEE PLANS.

SHEET 1 OF 1
225.02


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
1-12
ENGLISH STANDARD DRAWING FOR GUIDE FOR GRADING SUBGRADE SECONDARY AND LOCAL
SHEET 1 OF 1
225.02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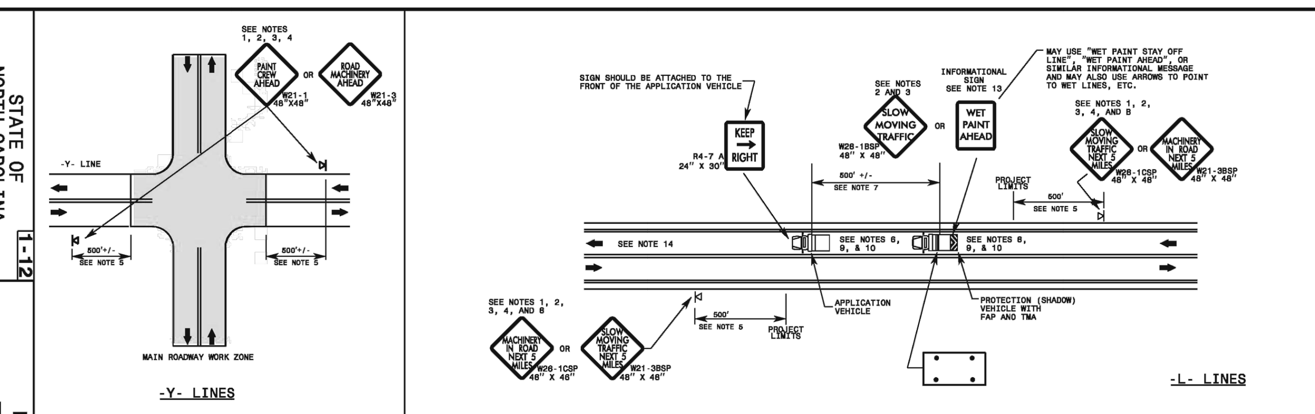
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
**TEMPORARY LANE CLOSURES**
MOVING OPERATION CARAVAN (OPERATIONS TRAVELING 3 MPH OR FASTER) PLACING PAVEMENT MARKING OR MARKERS ON TWO-LANE TWO-WAY ROADWAYS




**GENERAL NOTES**

1- THE FOLLOWING OPTIONS MAY BE USED FOR ADVANCE WARNING SIGNS:
A. TRUCK MOUNTED SIGNS
B. TRUCK MOUNTED CHANGEABLE MESSAGE SIGN (CMS)
C. GROUND MOUNTED ADVANCE WARNING SIGNS (MUST CIRCLE TO PICK UP SIGNS)
D. GROUND MOUNTED CHANGEABLE MESSAGE SIGN (CMS) (MUST CIRCLE TO PICK UP SIGNS)

2- ALL ADVANCE WARNING SIGNS MUST BE 48" X 48" WITH FLUORESCENT ORANGE TYPE VII OR HIGHER SHEETING. IF SPACE LIMITATIONS ON SHOULDER PROHIBIT A 48" X 48" SIGN, A SMALLER SIGN CAN BE USED WITH APPROVAL FROM ENGINEER.

3- SIGNS ON VEHICLES SHOULD BE MOUNTED A MINIMUM OF ONE (1) FOOT FROM THE GROUND AND SHOULD NOT BLOCK THE MOTORIST'S SIGHT OF THE FLASHING ARROW BOARD AND/OR LIGHTBAR.

4- GROUND MOUNTED ADVANCED WARNING SIGNS SHOULD BE MOUNTED A MINIMUM OF ONE (1) FOOT FROM THE GROUND TO BOTTOM OF SIGN.

5- SIGN SPACING SHOULD BE ADJUSTED FOR HORIZONTAL AND VERTICAL CURVES, ETC. TO IMPROVE SIGHT DISTANCES.

6- ADDITIONAL VEHICLES SHOULD BE USED IN WORK CARAVAN TO FACILITATE DRYING OF PAVEMENT MARKING MATERIAL (TMA'S ARE OPTIONAL ON THESE ADDITIONAL VEHICLES). HOWEVER, THE FIRST VEHICLE MOTORISTS SEE IN THE TRAVEL LANE SHALL HAVE A TMA.

7- ADJUST DISTANCE AS NEEDED TO PREVENT MOTORISTS FROM ENTERING SPACE BETWEEN THE APPLICATION AND PROTECTION VEHICLE. DISTANCE CAN BE LENGTHENED TO ACCOMODATE SIGHT DISTANCE NEEDS.

8- WORK ZONE SHOULD NOT EXCEED FIVE (5) MILES IN LENGTH. ROUND UP MILEAGE TO NEXT WHOLE MILE.

9- RADIO COMMUNICATION BETWEEN VEHICLES IS REQUIRED.

10- USE OF A LIGHT SYSTEM ON ALL VEHICLES IS REQUIRED (REFER TO ROADWAY STANDARD DRAWING 1165.01, SHEET 1 OF 1).

11- IF WORK IS PERFORMED AT NIGHT, THE WORK AREA MUST BE ILLUMINATED WITH MACHINE AND/OR TOWER LIGHTS AS APPROVED BY THE ENGINEER.

12- ALL TRAFFIC CONTROL DEVICES WILL BE CONSIDERED INCIDENTAL TO THE PAY ITEMS FOR PAVEMENT MARKING AND MARKERS.

13- INFORMATIONAL SIGNS SHOULD BE ACTIVITY SPECIFIC, i.e. "PAINT CREW IN ROAD". SIGNS MAY BE RECTANGULAR OR DIAMOND SHAPE. SIGN SIZE SHOULD BE BASED ON THE MOTORIST ABILITY TO RECOGNIZE SIGN WHEN TRAVELING FIVE (5) MILES ABOVE POSTED SPEED LIMIT.

14- IF A LEAD VEHICLE IS ADDED TO OPERATION, IT SHOULD HAVE THE SAME ADVANCE WARNING SIGNS AS THE APPLICATION VEHICLE SHOWN BELOW.

**LEGEND**

PORTABLE SIGN. SIGNS MUST BE NCHRP-350 AND NCDOT APPROVED.
DIRECTION OF TRAFFIC FLOW
APPLICATION VEHICLE WITH LIGHT BAR
PROTECTION VEHICLE WITH TRUCK MOUNTED ATTENUATOR (TMA) AND LIGHT BAR (SEE ROAOWAY STANDARD NO. 1165.01). TMA MUST BE NCHRP-350 TEST LEVEL 3 (60+MPH) APPROVED.
FLASHING ARROW BOARD, TYPE "C" (96"X48" MIN.), "CAUTION MODE"

SHEET 11 OF 15
1101.02


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
1-12
ENGLISH STANDARD DRAWING FOR TEMPORARY LANE CLOSURES MOVING OPERATION CARAVAN (OPERATIONS TRAVELING 3 MPH OR FASTER) PLACING PAVEMENT MARKING OR MARKERS ON TWO-LANE TWO-WAY ROADWAYS
SHEET 11 OF 15
1101.02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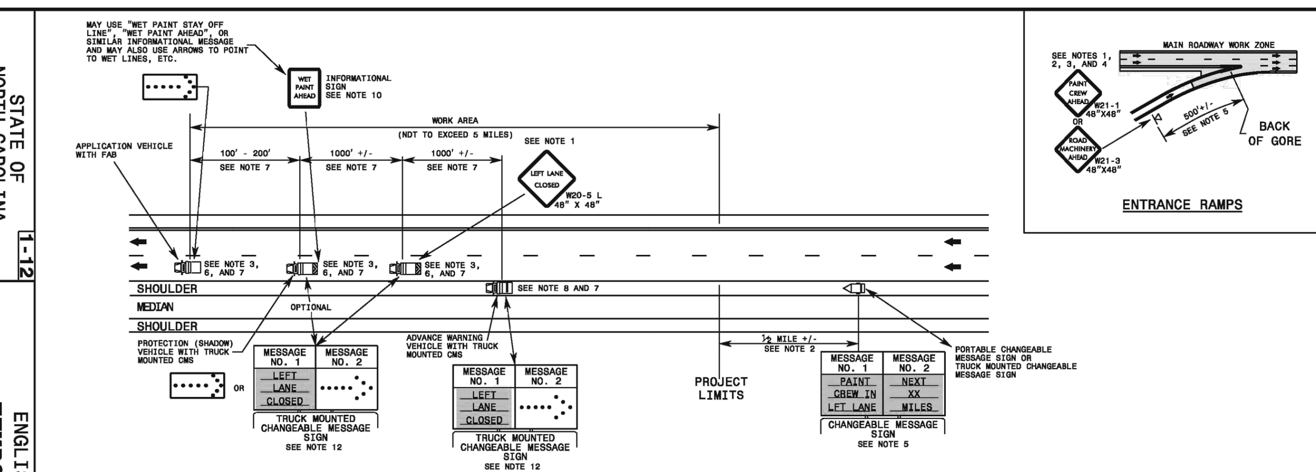
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
**TEMPORARY LANE CLOSURES**
MOVING OPERATION CARAVAN (OPERATIONS TRAVELING 3 MPH OR FASTER) PLACING PAVEMENT MARKING OR MARKERS ON MULTILANE ROADWAYS ≥ 60 MPH




**GENERAL NOTES**

1- SIGNS ON VEHICLES SHOULD BE MOUNTED A MINIMUM OF FIVE (5) FEET FROM THE GROUND AND SHOULD NOT BLOCK THE MOTORIST'S SIGHT OF THE FLASHING ARROW BOARD AND/OR LIGHTBAR.

2- CMS SIGN SPACING SHOULD BE ADJUSTED FOR HORIZONTAL AND VERTICAL CURVES, ETC. TO IMPROVE SIGHT DISTANCES.

3- ADDITIONAL VEHICLES SHOULD BE USED IN WORK CARAVAN TO FACILITATE DRYING OF PAVEMENT MARKING MATERIAL (TMA'S ARE OPTIONAL ON THESE ADDITIONAL VEHICLES). HOWEVER, THE FIRST VEHICLE MOTORISTS SEE IN THE TRAVEL LANE SHALL HAVE A TMA.

4- ADJUST DISTANCE AS NEEDED TO PREVENT MOTORISTS FROM ENTERING SPACE BETWEEN THE APPLICATION AND PROTECTION VEHICLE. DISTANCE CAN BE LENGTHENED TO ACCOMODATE SIGHT DISTANCE NEEDS.

5- WORK ZONE SHOULD NOT EXCEED FIVE (5) MILES IN LENGTH. ROUND UP MILEAGE TO NEXT WHOLE MILE. RELOCATE CHANGEABLE MESSAGE SIGN SUCH THAT WORK AREA DOES NOT EXCEED 5 MILES FROM BEGIN PROJECT LIMITS.

6- RADIO COMMUNICATION BETWEEN VEHICLES IS REQUIRED.

7- USE OF A LIGHT SYSTEM ON ALL VEHICLES IS REQUIRED (REFER TO ROADWAY STANDARD DRAWING 1165.01, SHEET 1 OF 1).

8- IF WORK IS PERFORMED AT NIGHT, THE WORK AREA MUST BE ILLUMINATED WITH MACHINE AND/OR TOWER LIGHTS AS APPROVED BY THE ENGINEER.

9- ALL TRAFFIC CONTROL DEVICES WILL BE CONSIDERED INCIDENTAL TO THE PAY ITEMS FOR PAVEMENT MARKING AND MARKERS.

10- INFORMATIONAL SIGNS SHOULD BE ACTIVITY SPECIFIC, i.e. "PAINT CREW IN ROAD". SIGNS MAY BE RECTANGULAR OR DIAMOND SHAPE. SIGN SIZE SHOULD BE BASED ON THE MOTORIST ABILITY TO RECOGNIZE SIGN WHEN TRAVELING FIVE (5) MILES PER HOUR ABOVE POSTED SPEED LIMIT.

11- THE CARAVAN IS TO MOVE AT 3 MPH OR GREATER TO OBTAIN THE DESIRED LEVEL OF SAFETY FOR THE MOVING OPERATION. IF AT ANYTIME AN VEHICLE STOPS DURING THE OPERATION, THE REMAINDER OF THE CARAVAN SHALL CONTINUE MOVING AND THE APPLICATION VEHICLE SHALL RESUME WORK OPERATIONS WITHIN 60 SECONDS. OTHERWISE, ALL VEHICLES ARE TO BE REMOVED FROM THE TRAVEL LANE AND THE OPERATION RESET.

12- THE MINIMUM DIMENSIONS OF TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS USED SHALL BE NO LESS THAN 4' x 8'.

**LEGEND**

PORTABLE SIGN
DIRECTION OF TRAFFIC FLOW
APPLICATION VEHICLE WITH LIGHT BAR
PROTECTION VEHICLE WITH TRUCK MOUNTED ATTENUATOR (TMA) AND LIGHT BAR
ADVANCE WARNING VEHICLE WITH TRUCK MOUNTED CHANGEABLE MESSAGE SIGN (CMS) AND LIGHT BAR.
FLASHING ARROW BOARD, TYPE "C" (96"X48" MIN.), APPROPRIATE DIRECTION INDICATED
CHANGEABLE MESSAGE SIGN

SHEET 13 OF 15
1101.02


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
1-12
ENGLISH STANDARD DRAWING FOR TEMPORARY LANE CLOSURES MOVING OPERATION CARAVAN (OPERATIONS TRAVELING 3 MPH OR FASTER) PLACING PAVEMENT MARKING OR MARKERS ON MULTILANE ROADWAYS ≥ 60 MPH
SHEET 13 OF 15
1101.02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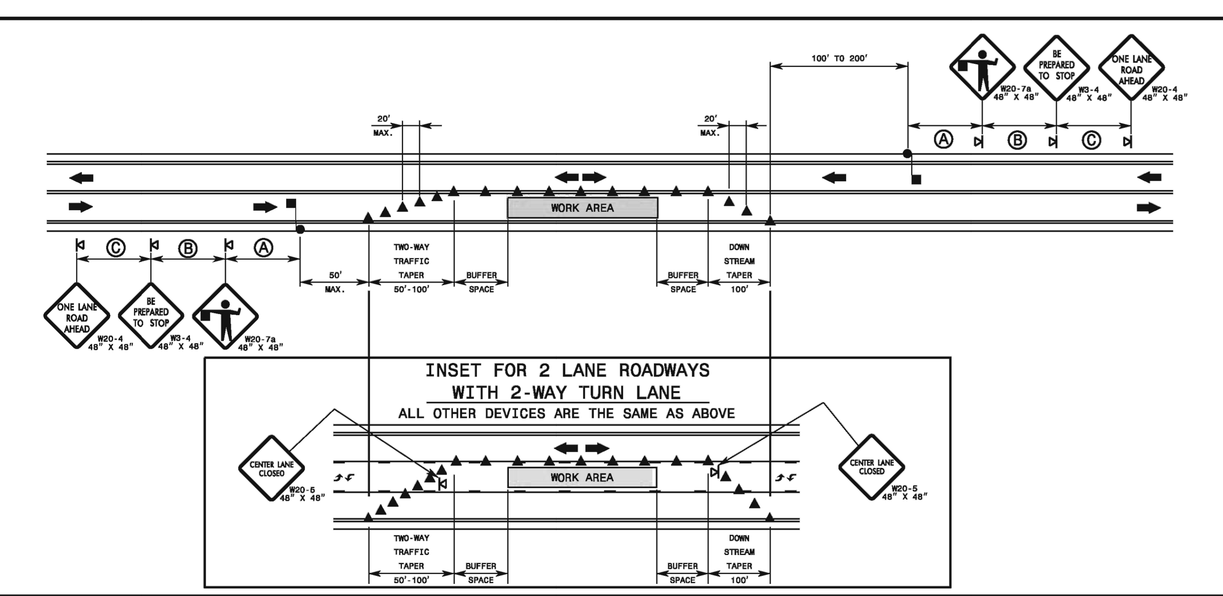
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
**TEMPORARY LANE CLOSURES**
2-LANE, 2-WAY ROADWAY-1 LANE CLOSED




**GENERAL NOTES FOR FLAGGER OPERATIONS**

1- REFER TO STD. 1101.11 SHEET 4 FOR SIGN SPACING.

2- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC.

3- REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.

4- PLACE CONES THRU THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.

5- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE FLAGGER (REFER TO STD. 1101.11 SHEET 2).

6- DO NOT STOP TRAFFIC IN ANY ONE DIRECTION FOR MORE THAN 5 MINUTES AT A TIME.

7- DRUMS OR SKINNY-DRUMS MAY BE USED IN LIEU OF CONES. REFER TO ROADWAY STANDARD DRAWING 1180.01 FOR SKINNY-DRUM REQUIREMENTS.

8- USE FLAGGERS TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE LANE CLOSURE. SUPPLEMENT FLAGGERS LOCATED AT INTERSECTIONS WITH FLAGGER AHEAD SIGNS (W20-7a) PLACED APPROXIMATELY 250 FT. IN ADVANCE OF THE FLAGGER. FOR SIGNALIZED INTERSECTIONS PLACE SIGNALS IN THE FLASH MODE AND RECOMMEND THE USE OF LAW ENFORCEMENT.

9- REFER TO 2009 MUTCD, CHAPTER 6, FOR FLAGGER CONTROL, REQUIREMENTS, AND PROCEDURES.

10- DO NOT EXCEED A 1 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.

**GENERAL NOTES FOR PILOT CAR OPERATIONS**

1- USE PILOT CARS WHEN DIRECTED BY THE ENGINEER.

2- IF ROADWAY WIDTH IS LESS THAN 22 FEET (EOP TO EOP), CONES MAY NOT BE REQUIRED ALONG WORK AREA, AND AT THE DISCRETION OF THE ENGINEER, CONES MAY BE OMITTED ALONG THE WORK AREA IF USING A PILOT CAR.

3- CONES ARE ALWAYS REQUIRED IN THE UPSTREAM AND DOWNSTREAM TAPERS.

4- MOUNT SIGN G20-4 "PILOT CAR FOLLOW ME" AT A CONSPICUOUS POSITION ON THE REAR OF THE PILOT VEHICLE.

5- DO NOT INSTALL MORE THAN ONE (1) MILE OF LANE CLOSURE, MEASURED FROM THE BEGINNING OF THE MERGE TAPER TO THE END OF THE LANE CLOSURE.

6- ADVISE RESIDENTS AND BUSINESSES WITHIN THE LANE CLOSURE LIMITS ABOUT METHODS OF SAFE EGRESS AND INGRESS FROM DRIVEWAYS DURING FLAGGING AND PILOT CAR OPERATIONS.

**LEGEND**

FLAGGER
CONE
PORTABLE SIGN
DIRECTION OF TRAFFIC FLOW

SHEET 1 OF 15
1101.02


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
1-12
ENGLISH STANDARD DRAWING FOR TEMPORARY LANE CLOSURES 2-LANE, 2-WAY ROADWAY-1 LANE CLOSED
SHEET 1 OF 15
1101.02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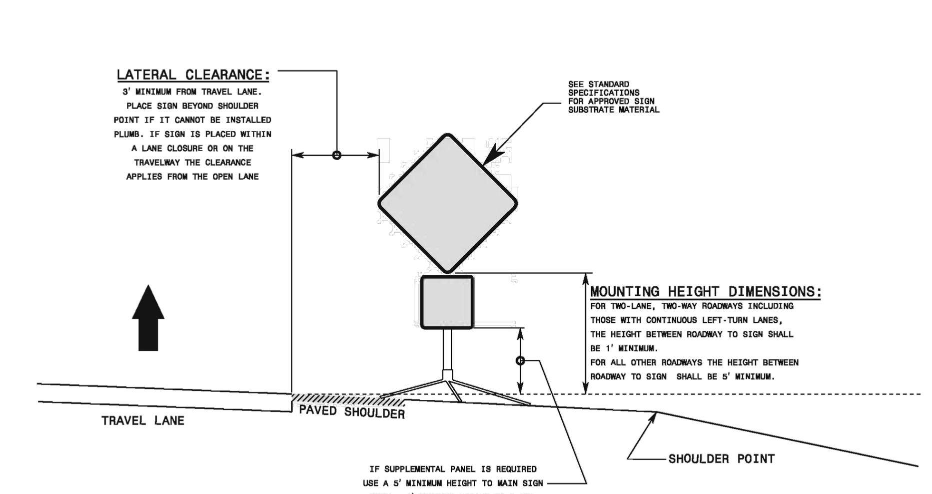
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
**PORTABLE WORK ZONE SIGNS**
MOUNTING HEIGHT & LATERAL CLEARANCE




**GENERAL NOTES**

1- DIMENSIONS SHOWN ARE MINIMUM VALUES. MOUNT SIGNS SO THEY WILL BE CLEARLY VISIBLE TO APPROACHING TRAFFIC EVEN WHEN SIGNS ARE MOUNTED BEHIND TRAFFIC CONTROL DEVICES SUCH AS DRUMS, BARRIER, OR OTHER OBJECTS.

2- ALL PORTABLE SIGNS AND STANDS MUST MEET OR EXCEED THE REQUIREMENTS OF NCHRP 350 FOR CATEGORY II DEVICES. USE PORTABLE WORK ZONE SIGNS AND STANDS SPECIFICALLY DESIGNED FOR ONE ANOTHER.

3- ALL PORTABLE WORK ZONE SIGNS AND STANDS MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST AT https://apps.dot.state.nc.us/vendor/approvedproducts.

SHEET 1 OF 1
1110.02


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
1-12
ENGLISH STANDARD DRAWING FOR PORTABLE WORK ZONE SIGNS MOUNTING HEIGHT & LATERAL CLEARANCE
SHEET 1 OF 1
1110.02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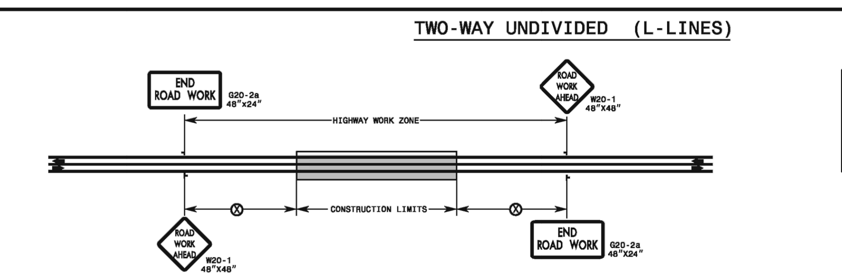
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

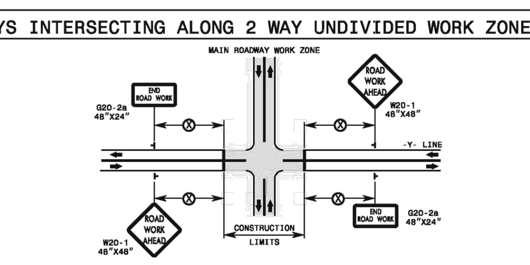
ENGLISH STANDARD DRAWING FOR
**DETAIL DRAWING FOR TWO-WAY UNDIVIDED WORK ZONE WARNING SIGNS**

## TWO-WAY UNDIVIDED (L-LINES)




| POSTED SPEED LIMIT (MPH) | RECOMMENDED MINIMUM SIGN SPACING ⊗ |
|---|---|
| ≤ 50 | 500' |
| 55 | 1000' |

## ROADWAYS INTERSECTING ALONG 2 WAY UNDIVIDED WORK ZONE (Y-LINES)




**GENERAL NOTES**

1- USE FLUORESCENT ORANGE SHEETING (TYPE VII OR HIGHER) ON ALL ADVANCED WORK ZONE SIGNS.

2- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK, UNLESS COVERED.

3- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT OVERNIGHT. FOR SHORT-TERM DAILY MAINTENANCE TYPE OPERATIONS, THIS SIGNING APPLICATION IS OPTIONAL; MAY USE ONLY APPLICABLE ROADWAY STANDARD DRAWINGS INSTEAD. HOWEVER, IF THIS SIGNING APPLICATION IS USED, SIGNS MAY BE PORTABLE MOUNTED.

4- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.

5- USE 3LB STEEL U-CHANNEL POST OR 4" X 4" WOOD POST FOR ALL WORK ZONE SIGNS. 3LB STEEL U-CHANNEL POSTS MUST MEET THE REQUIREMENTS OF STANDARD SPECIFICATION SECTION 1094-1(B), MAY BE GALVANIZED STEEL, OR MAY BE PAINTED GREEN BY THE POST MANUFACTURER. SQUARE STEEL TUBING POSTS HAVING EQUIVALENT STRENGTH OF THE 3 LB STEEL U-CHANNEL POST ARE ALSO ACCEPTABLE FOR USE. ERECT SIGNS PER ROADWAY STANDARD DRAWING 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATION "WORK ZONE SIGNS" SECTION 1110.

6- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1110.01.

7- DO NOT BACK BRACE SIGN SUPPORTS.

**LEGEND**

STATIONARY SIGN
DIRECTION OF TRAFFIC FLOW

SHEET 3 OF 3
1101.01


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
1-12
ENGLISH STANDARD DRAWING FOR DETAIL DRAWING FOR TWO-WAY UNDIVIDED WORK ZONE WARNING SIGNS
SHEET 3 OF 3
1101.01

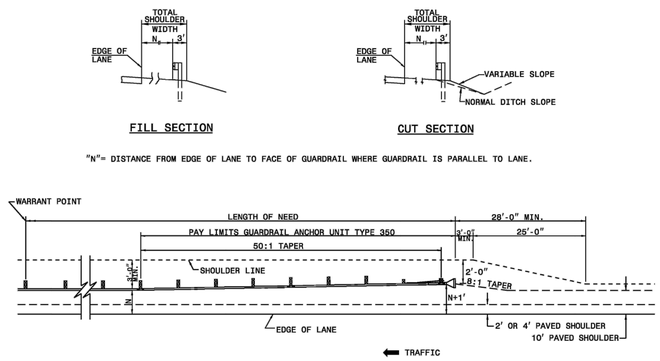
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | 2C |

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21001 ENGINEER DAVID ODOM

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

1-12

ENGLISH STANDARD DRAWING FOR **GUARDRAIL PLACEMENT**



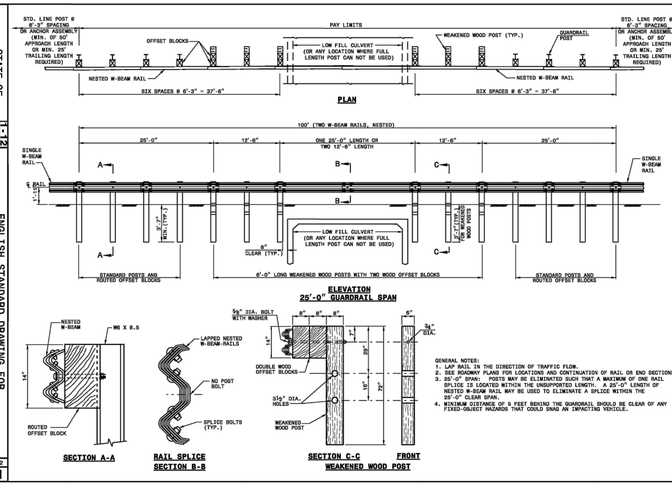

**DETAIL OF BEGINNING OF GUARDRAIL IN CUT OR FILL SECTION**

SHEET 6 OF 12
862.01

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

1-12

ENGLISH STANDARD DRAWING FOR **GUARDRAIL PLACEMENT** 25'-0" CLEAR SPAN (MEETING NCHRP 350 TL-3 CRITERIA)



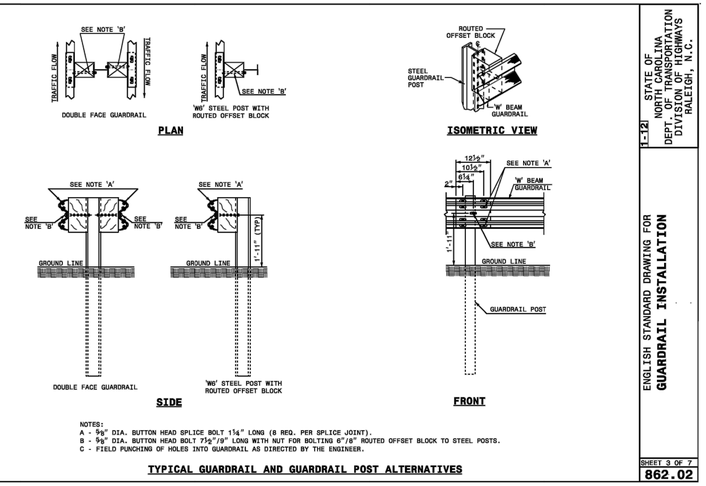

GENERAL NOTES:
1. LAP RAIL IN THE DIRECTION OF TRAFFIC FLOW.
2. SEE ROADWAY PLANS FOR LOCATIONS AND CONTINUATION OF RAIL OR END SECTIONS.
3. 25'-0" SPAN: POSTS MAY BE ELIMINATED SUCH THAT A MAXIMUM OF ONE RAIL SPLICE IS LOCATED WITHIN THE UNSUPPORTED LENGTH. A 25'-0" LENGTH OF NESTED W-BEAM RAIL MAY BE USED TO ELIMINATE A SPLICE WITHIN THE NESTED W-BEAM RAIL.
4. MINIMUM DISTANCE OF 8 FEET BEHIND THE GUARDRAIL SHOULD BE CLEAR OF ANY FIXED-OBJECT HAZARDS THAT COULD SNAG AN IMPACTING VEHICLE.

SHEET 10 OF 12
862.01

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

1-12

ENGLISH STANDARD DRAWING FOR **GUARDRAIL INSTALLATION**




NOTES:
A - ⅝" DIA. BUTTON HEAD SPLICE BOLT 1¼" LONG (8 REQ. PER SPLICE JOINT).
B - ⅝" DIA. BUTTON HEAD BOLT 7½"/9" LONG WITH NUT FOR BOLTING 6"/8" ROUTED OFFSET BLOCK TO STEEL POSTS.
C - FIELD PUNCHING OF HOLES INTO GUARDRAIL AS DIRECTED BY THE ENGINEER.

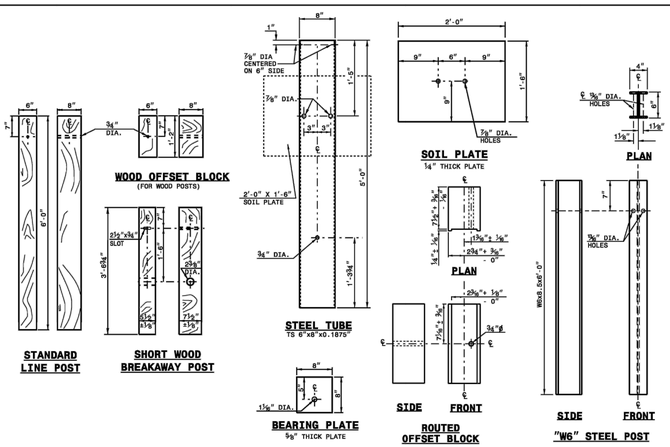
**TYPICAL GUARDRAIL AND GUARDRAIL POST ALTERNATIVES**

SHEET 3 OF 7
862.02

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

1-12

ENGLISH STANDARD DRAWING FOR **GUARDRAIL INSTALLATION**

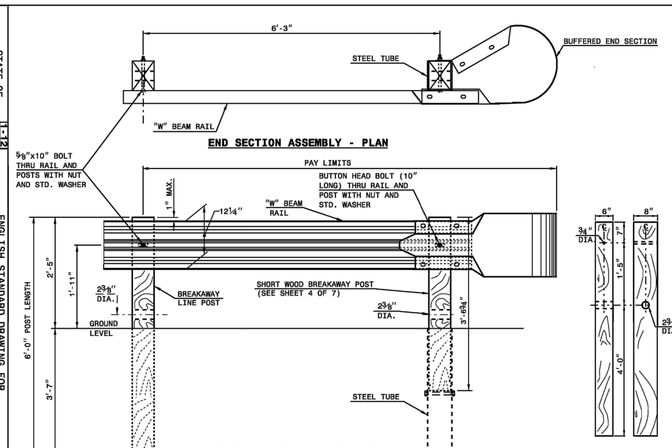



SHEET 4 OF 7
862.02

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

1-12

ENGLISH STANDARD DRAWING FOR **GUARDRAIL INSTALLATION**

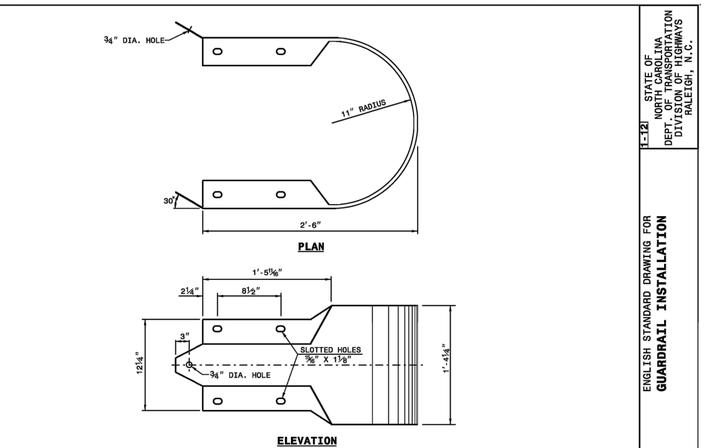



SHEET 2 OF 7
862.02

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

1-12

ENGLISH STANDARD DRAWING FOR **GUARDRAIL INSTALLATION**

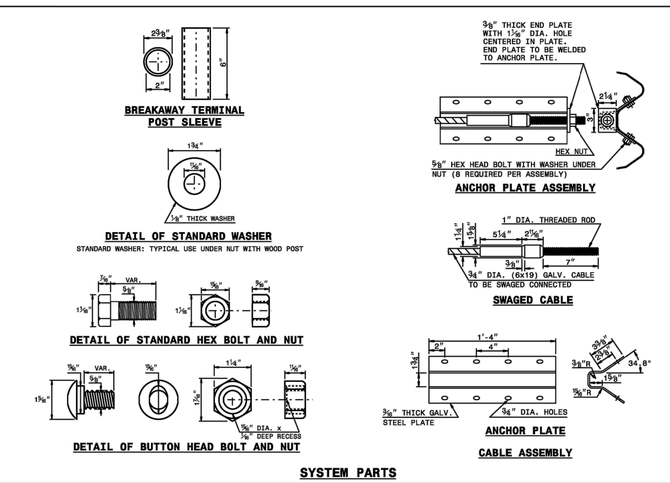



SHEET 7 OF 7
862.02

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

1-12

ENGLISH STANDARD DRAWING FOR **GUARDRAIL INSTALLATION**

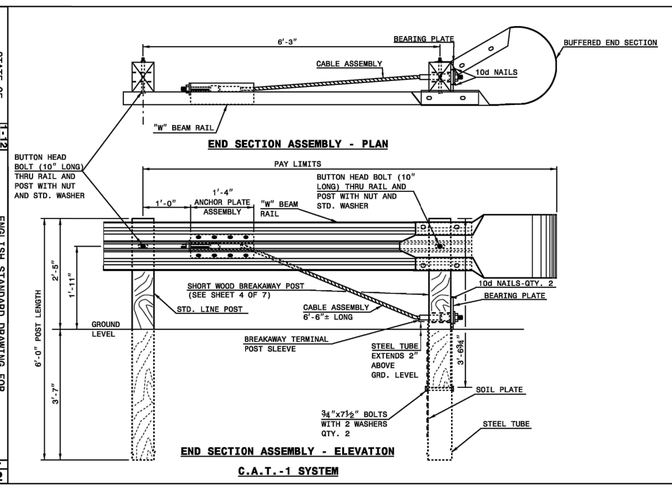



SHEET 5 OF 7
862.02

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

1-12

ENGLISH STANDARD DRAWING FOR **GUARDRAIL INSTALLATION**

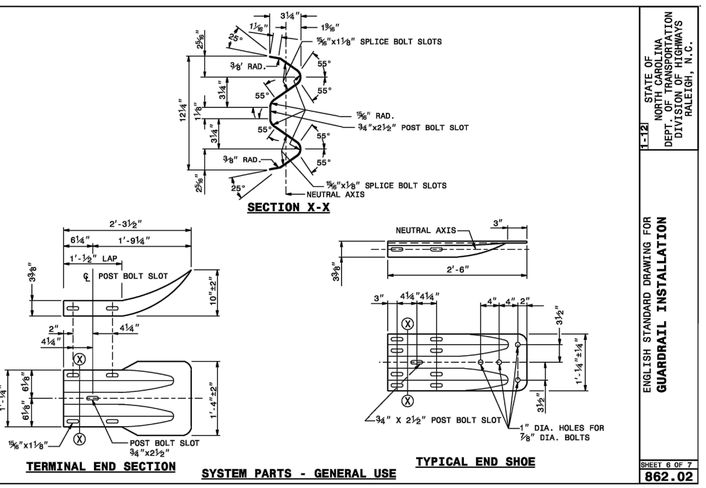



SHEET 1 OF 7
862.02

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

1-12

ENGLISH STANDARD DRAWING FOR **GUARDRAIL INSTALLATION**




SHEET 6 OF 7
862.02

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | OVERALL |

ROADWAY DESIGN ENGINEER

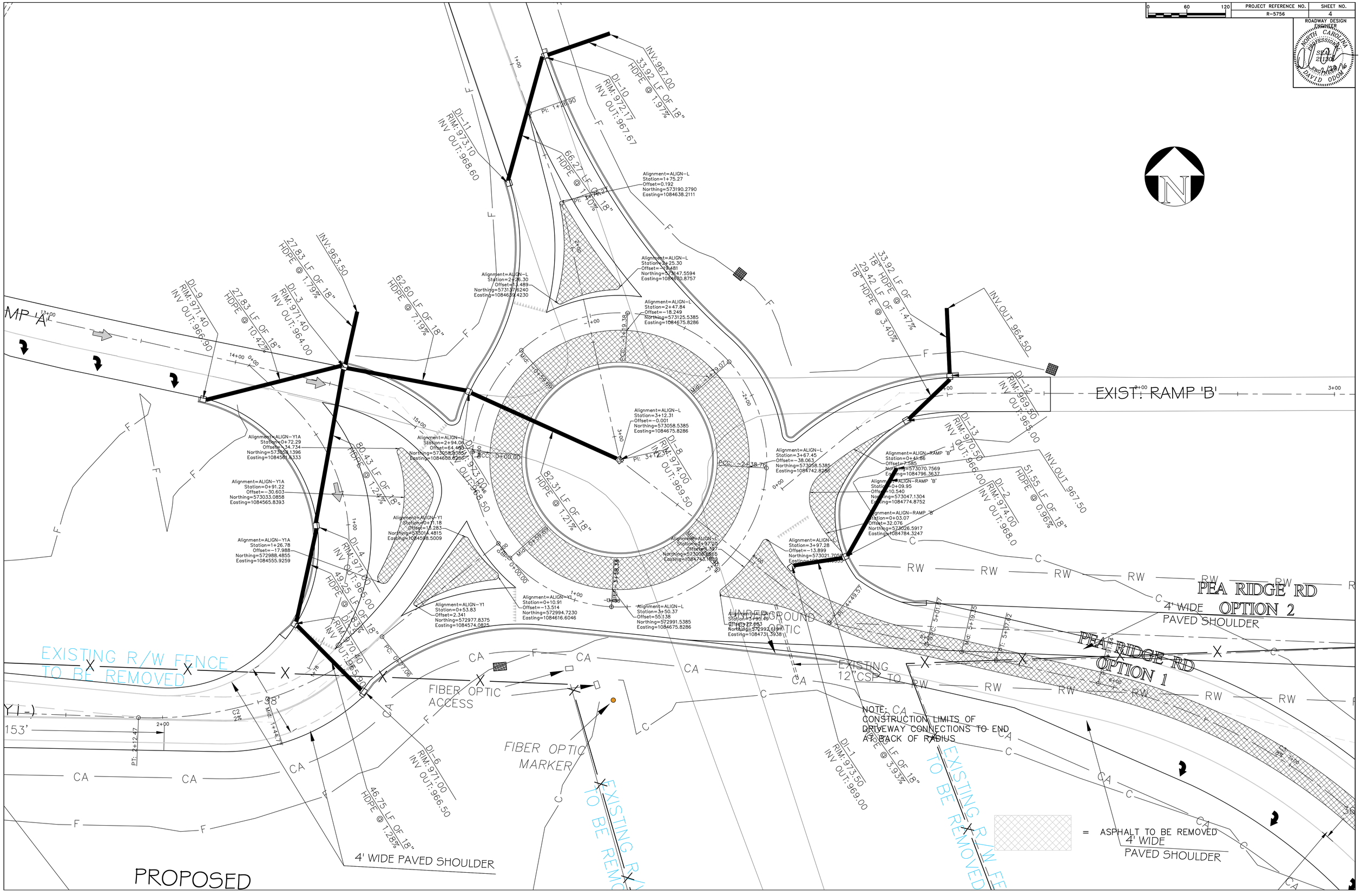
NORTH CAROLINA PROFESSIONAL SEAL 21130 ENGINEER DAVID ODOM 2/23/16

NOTE:
CONSTRUCTION LIMITS OF
DRIVEWAY CONNECTIONS TO END
AT BACK OF RADIUS

= ASPHALT TO BE REMOVED

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | 4 |

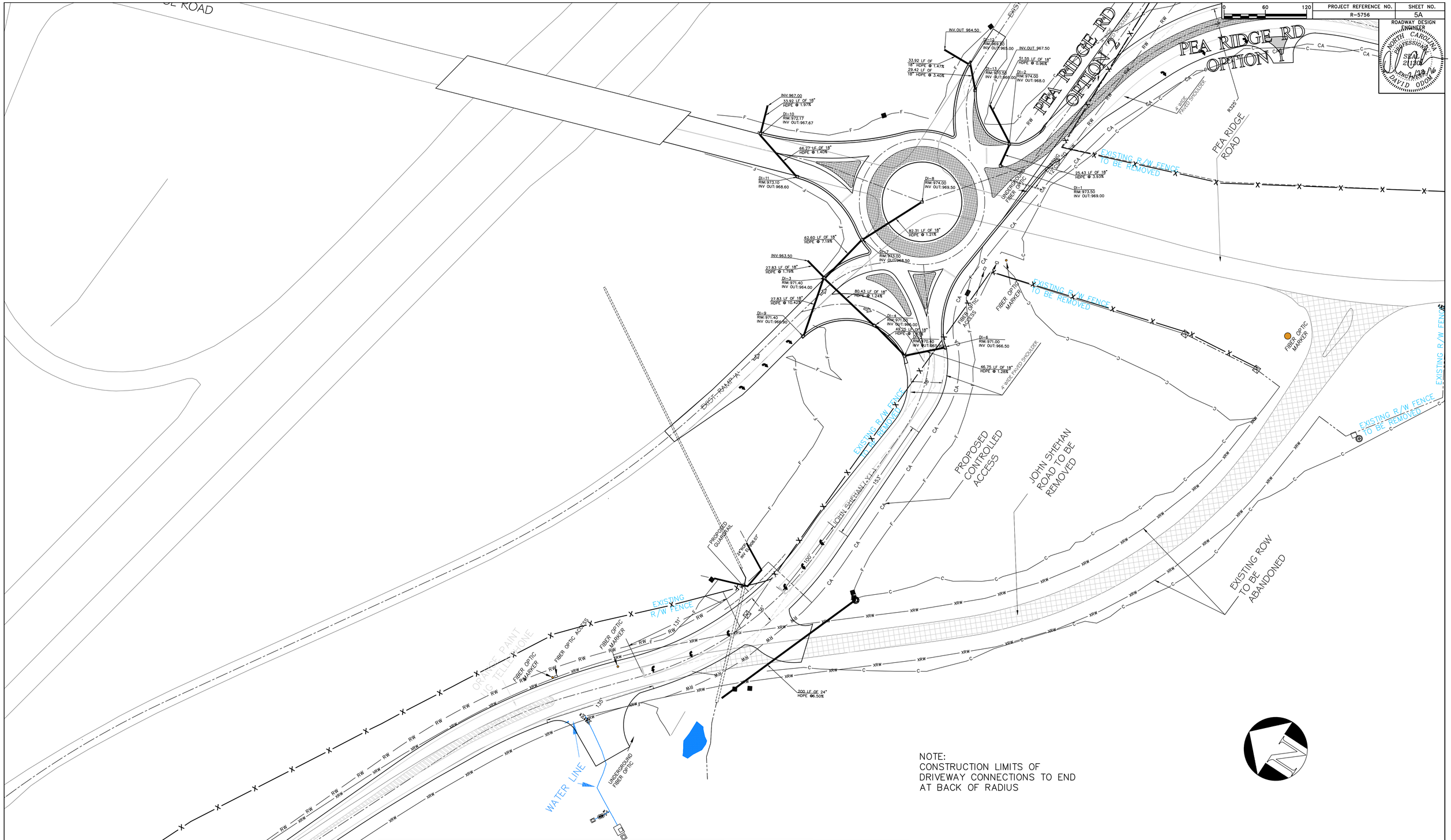
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21304 ENGINEER DAVID ODOM



| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | 5A |

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21130 ENGINEER DAVID ODOM 12/9/16




NOTE:
CONSTRUCTION LIMITS OF DRIVEWAY CONNECTIONS TO END AT BACK OF RADIUS

= ASPHALT TO BE REMOVED

Curve Table: Alignments

| Road Name | Curve # | Radius | Length | Chord Direction | PI Station Start | PI Station End | Delta | Degree | Length | Tangent Dist. | Radius | Design Speed | Super Elevation | Pavement Width w/o Bike Lane | Minimum Runout Length | Runout Length Provided |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -Y1- | C1 | 400.00 | 274.01 | N71° 28' 31.70"W | 3+85.32 | 6+59.33 | 39.2490 | 14.3239 | 274.01 | 268.68 | 400.00 | 35 MPH | 4% | 36' | 97' | 150' |
| -Y1- | C2 | 190.00 | 135.41 | S68° 28' 58.98"W | 0+77.06 | 2+12.47 | 40.8340 | 30.1557 | 135.41 | 132.56 | 190.00 | 30 MPH | 2% | 38' | 46' | 100' |
| -L- | C3 | 306.37 | 304.58 | S51° 40' 22.46"E | 5+91.84 | 8+96.42 | 56.9620 | 18.7016 | 304.58 | 292.19 | 306.37 | 30 MPH | 8% | 28' | 155' | 155' |
| -L- | C4 | 1089.95 | 124.29 | S19° 55' 30.17"E | 10+64.24 | 11+88.53 | 6.5337 | 5.2567 | 124.29 | 124.22 | 1089.95 | 30 MPH | 2% | 24' | 39' | 100' |
| -L- | C5 | 295.64 | 310.68 | S46° 45' 46.95"E | 14+28.97 | 17+39.65 | 60.2097 | 19.3801 | 310.68 | 296.58 | 295.64 | 30 MPH | 8% | 28' | 155' | 155' |

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | 5B |

NOTE:
CONSTRUCTION LIMITS OF
DRIVEWAY CONNECTIONS TO END
AT BACK OF RADIUS

= ASPHALT TO BE REMOVED

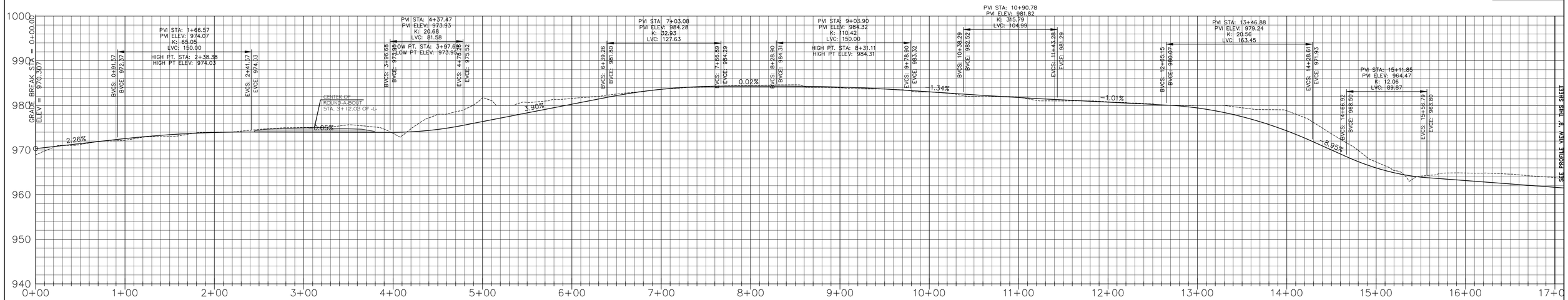
Curve Table: Alignments

| Road Name | Curve # | Radius | Length | Chord Direction | PI Station Start | PI Station End | Delta | Degree | Length | Tangent Dist. | Radius | Design Speed | Super Elevation | Pavement Width w/o Bike Lane | Minimum Runout Length | Runout Length Provided |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -Y1- | C1 | 400.00 | 274.01 | N71° 28' 31.70"W | 3+85.32 | 6+59.33 | 39.2490 | 14.3239 | 274.01 | 268.68 | 400.00 | 35 MPH | 4% | 36' | 97' | 150' |
| -Y1- | C2 | 190.00 | 135.41 | S68° 28' 58.98"W | 0+77.06 | 2+12.47 | 40.8340 | 30.1557 | 135.41 | 132.56 | 190.00 | 30 MPH | 2% | 38' | 46' | 100' |
| -L- | C3 | 306.37 | 304.58 | S51° 40' 22.46"E | 5+91.84 | 8+96.42 | 56.9620 | 18.7016 | 304.58 | 292.19 | 306.37 | 30 MPH | 8% | 28' | 155' | 155' |
| -L- | C4 | 1089.95 | 124.29 | S19° 55' 30.17"E | 10+64.24 | 11+88.53 | 6.5337 | 5.2567 | 124.29 | 124.22 | 1089.95 | 30 MPH | 2% | 24' | 39' | 100' |
| -L- | C5 | 295.64 | 310.68 | S46° 45' 46.95"E | 14+28.97 | 17+39.65 | 60.2097 | 19.3801 | 310.68 | 296.58 | 295.64 | 30 MPH | 8% | 28' | 155' | 155' |

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | 5C |

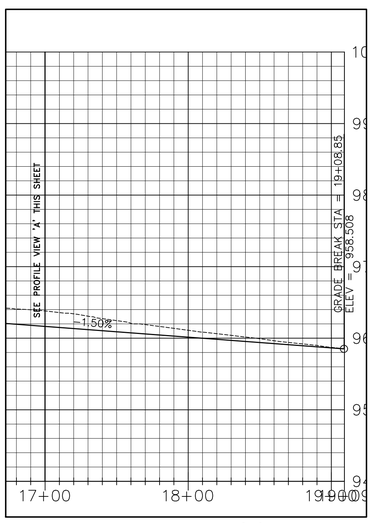
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21301 ENGINEER DAVID ODOM

# ALIGN-L PROFILE




PROFILE -L- VIEW 'A'

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



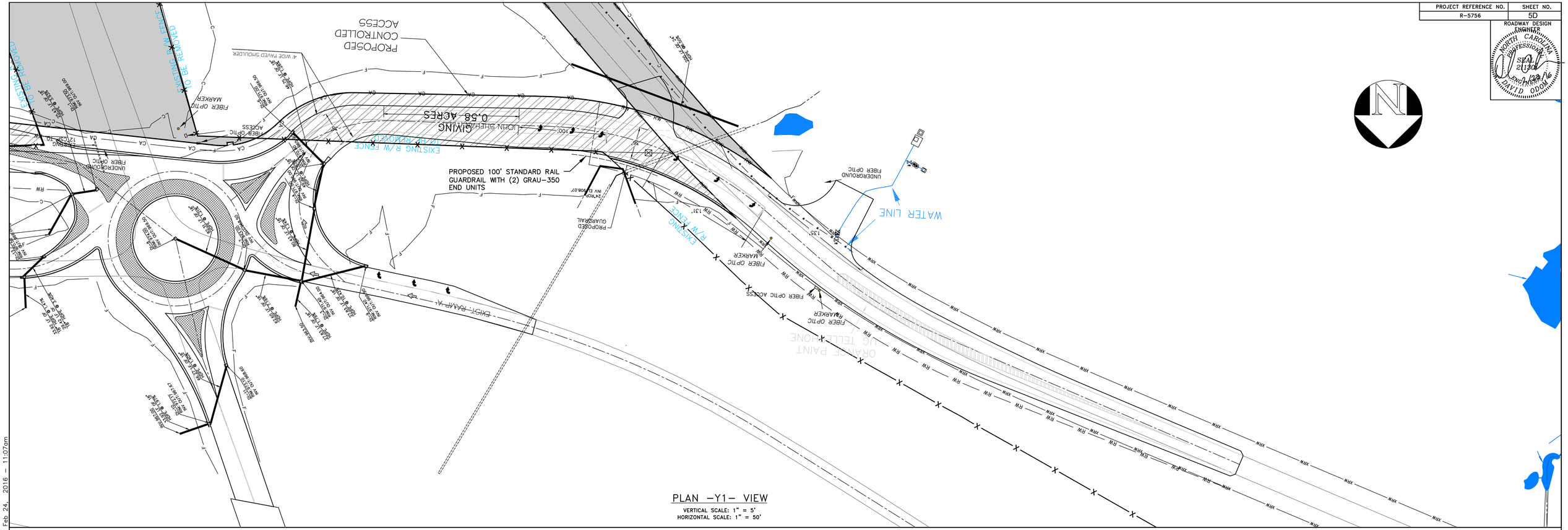

PROFILE -L- VIEW 'B'

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'

PEA RIDGE RD
OPTION 1

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | 5D |

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21201 ENGINEER DAVID ODOM
2/24/16




PLAN –Y1– VIEW

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'

ALIGN–Y1 PROFILE

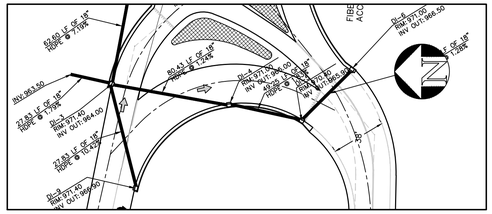
PROFILE –Y1– VIEW

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'

Drawing name: Z:\2014\14043 – TRYON RESORT ROAD REALIGNMENT\DWG\REVISED PER PRELIM REVIEW #1\14043-BASE-021916-REV.dwg Plotted on: Feb 24, 2016 – 11:07am

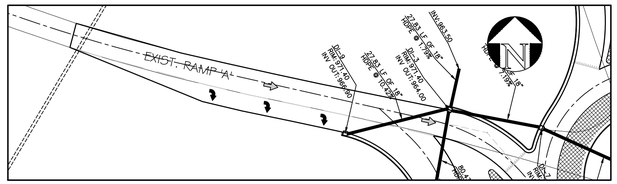
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | 5E |

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21301 ENGINEER DAVID ODOM
2/24/16



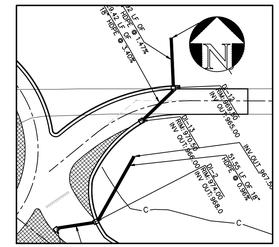
PLAN –Y1A– VIEW

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



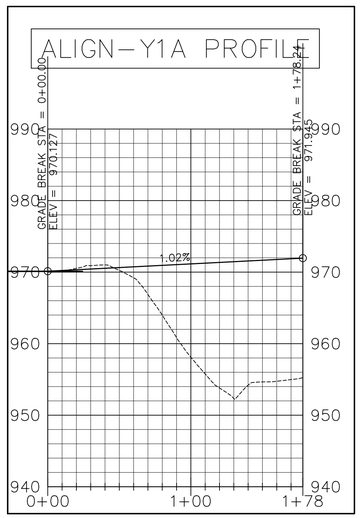

PLAN –RAMP 'A'– VIEW

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



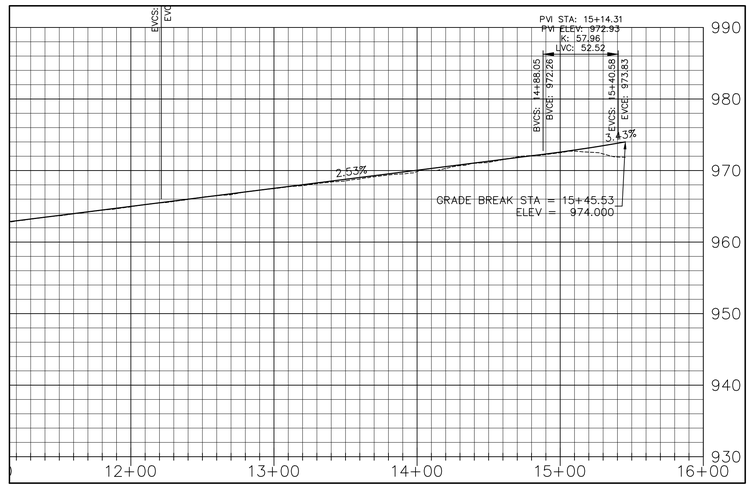
PLAN –RAMP 'B'– VIEW

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



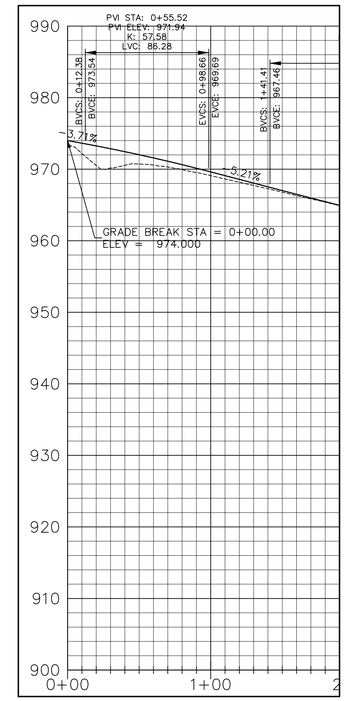

PROFILE –Y1A– VIEW

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'




PROFILE –RAMP 'A'– VIEW

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'




PROFILE –RAMP 'B'– VIEW

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | EC-1 |

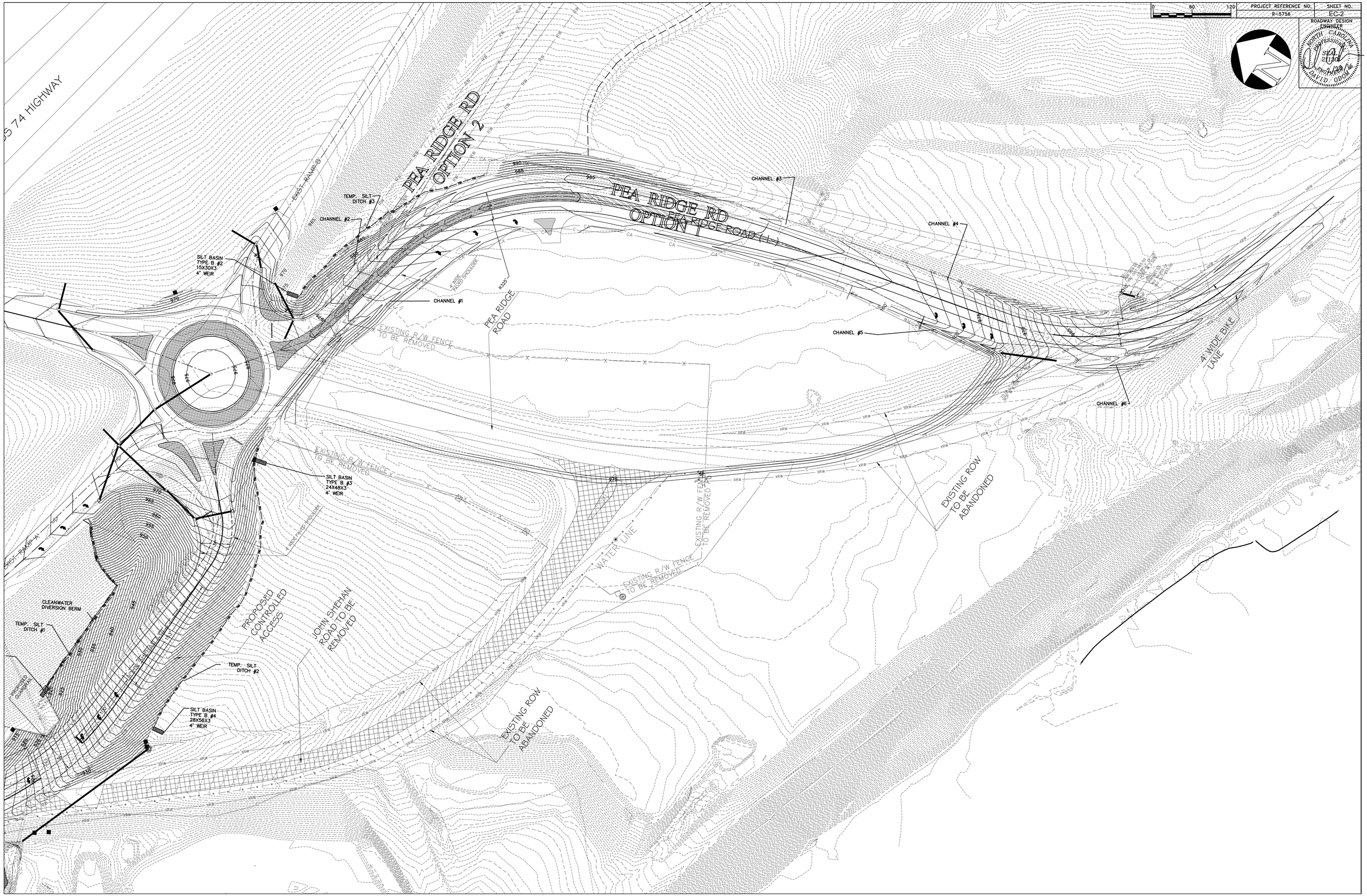
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21130 ENGINEER DAVID ODOM
2/13/16

0 60 120

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | EC-2 |

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21130 ENGINEER DAVID ODOM
12/19/16

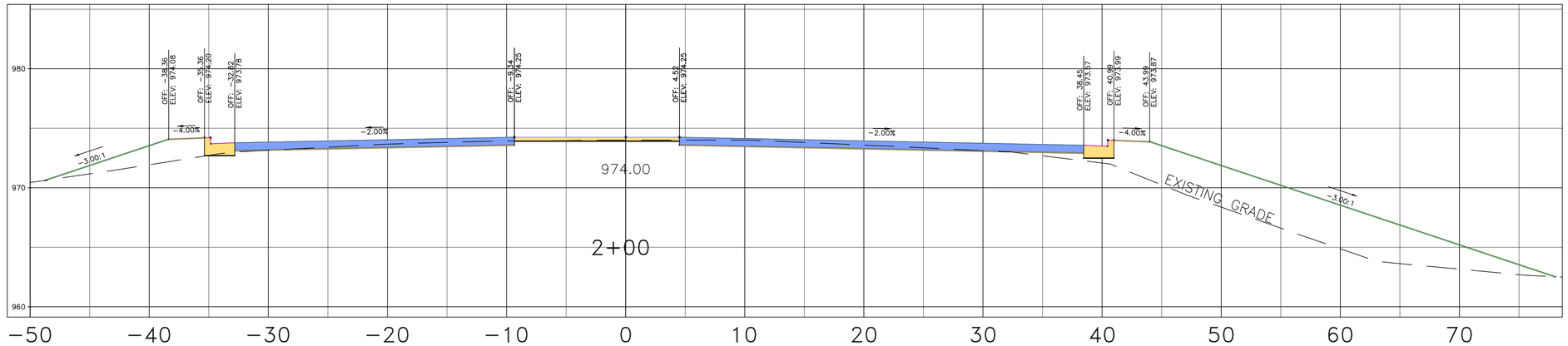
0 60 120

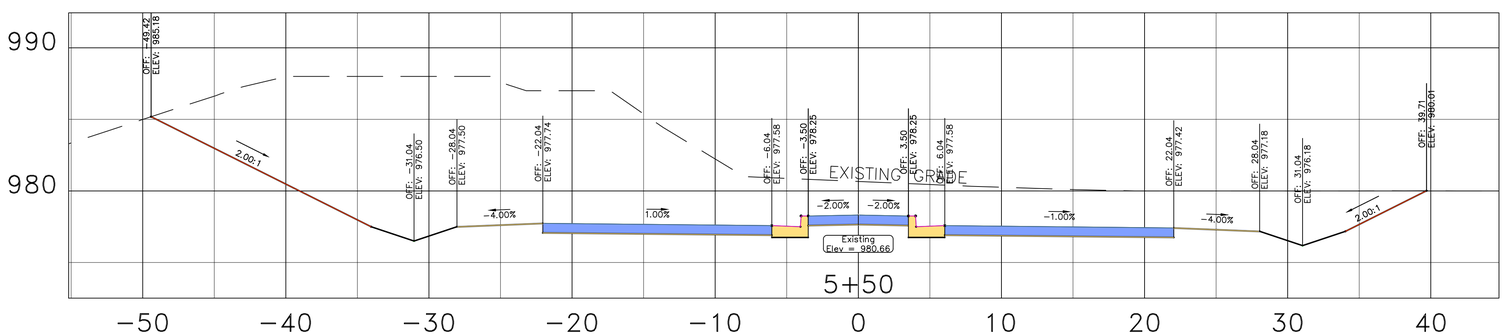


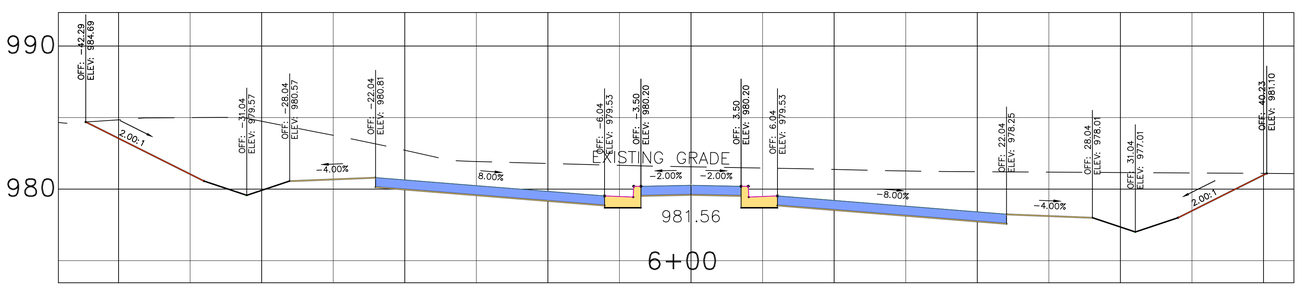
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-1 |

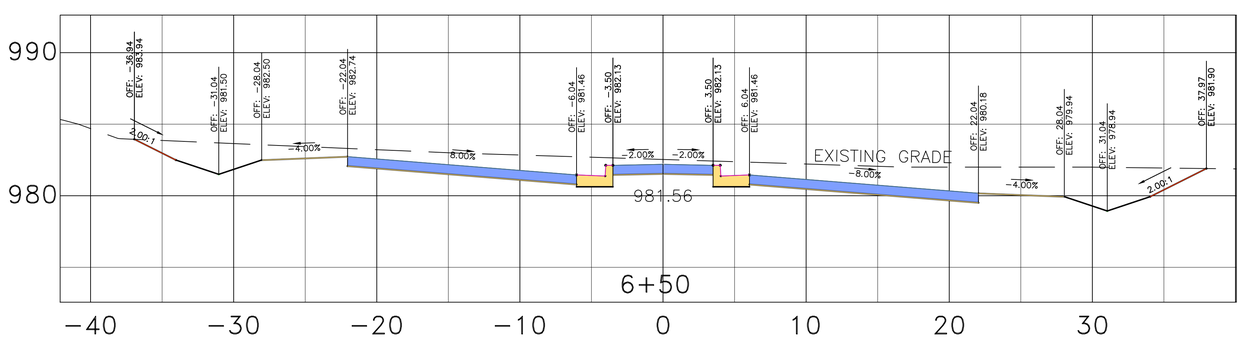
ROADWAY DESIGN ENGINEER

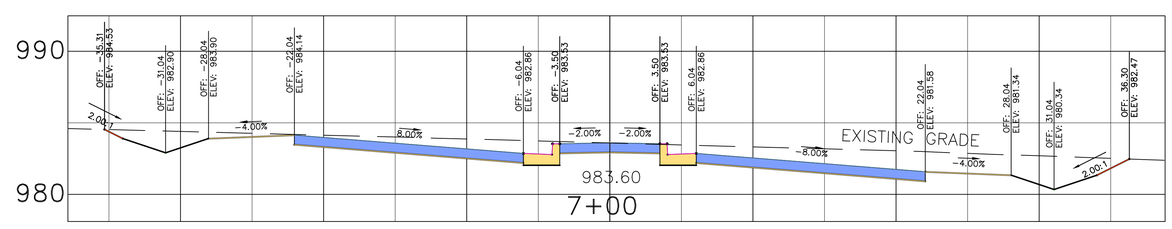
# -L- (PEA RIDGE-OPTION 1) ROAD SECTION VIEWS

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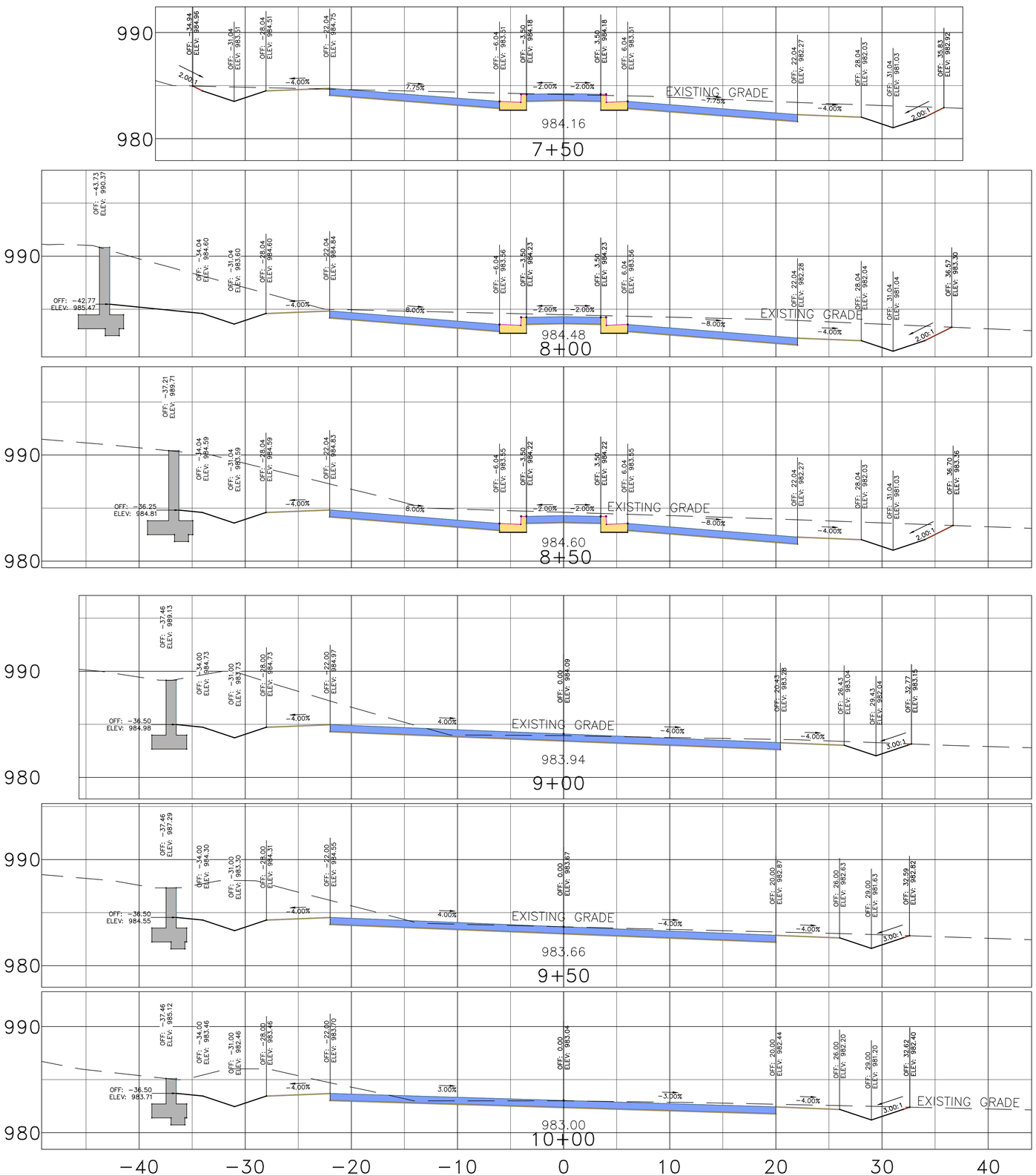
# -L- (PEA RIDGE-OPTION 1) ROAD SECTION VIEWS

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-2 |

ROADWAY DESIGN ENGINEER

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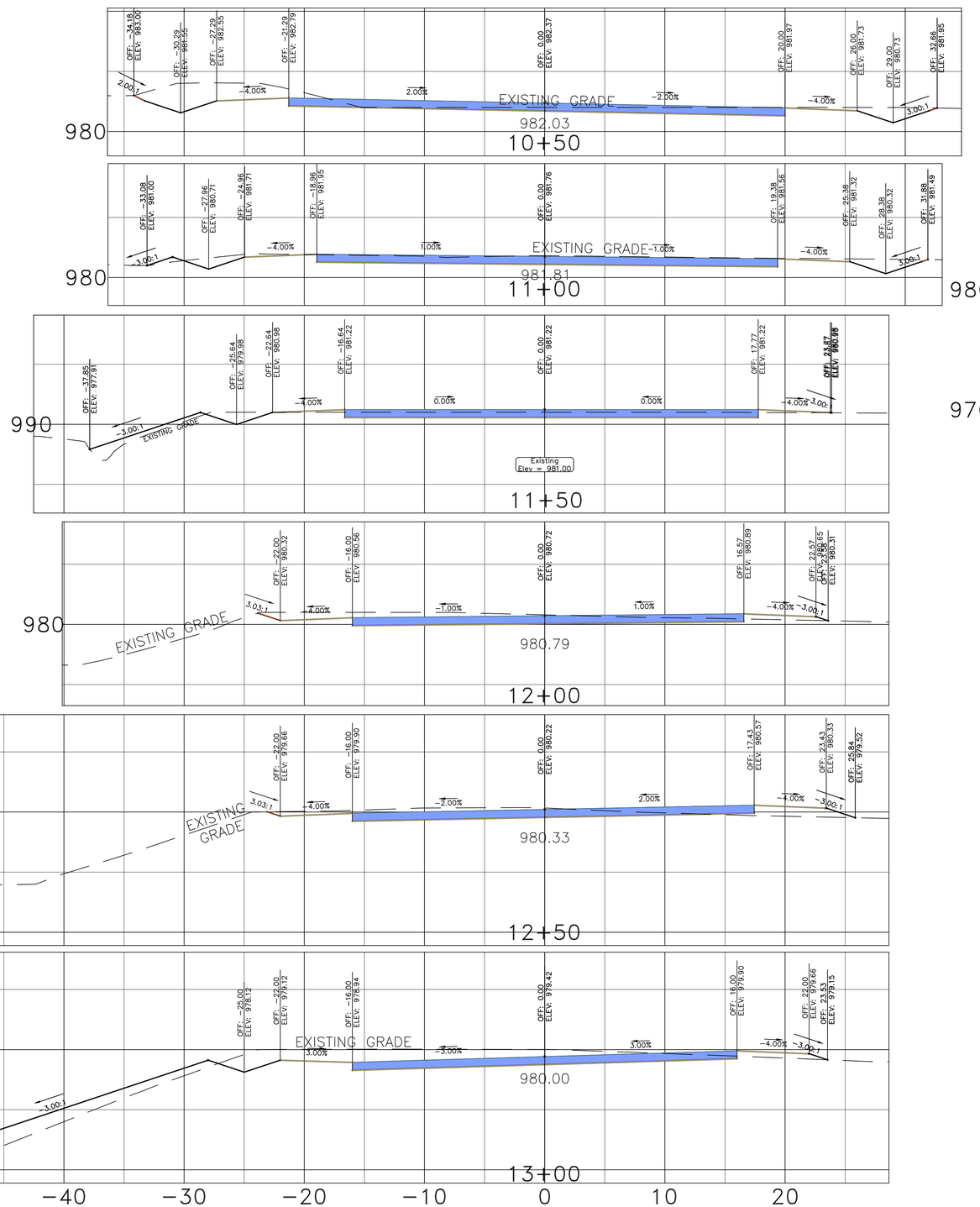
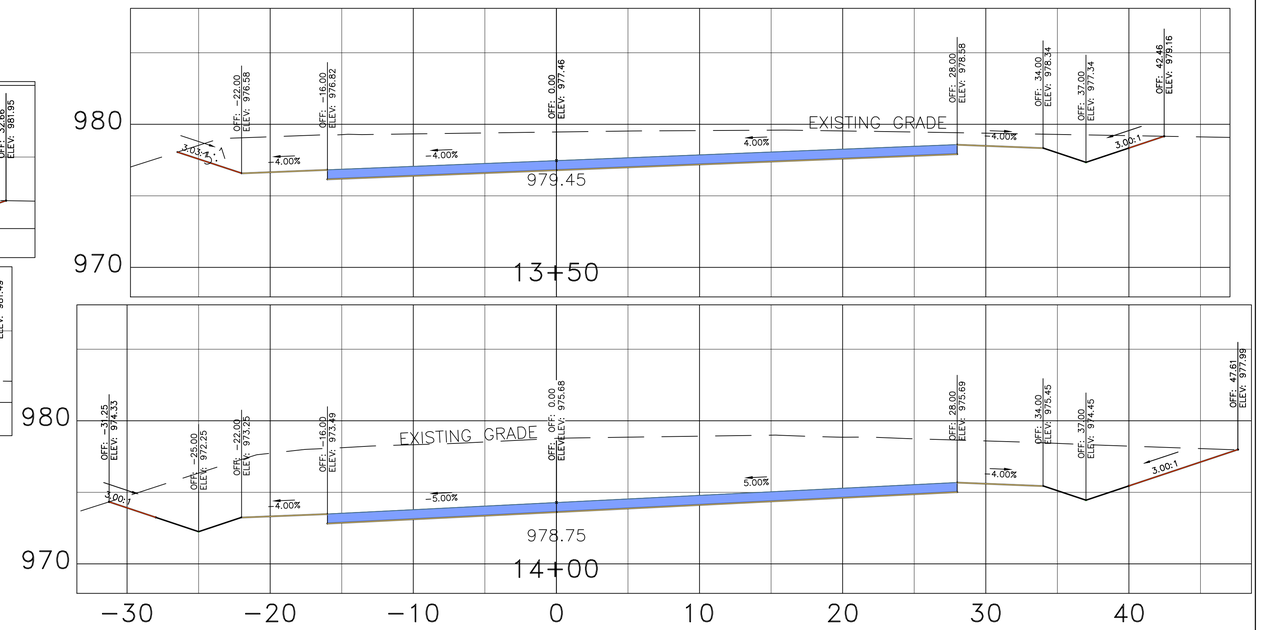
# -L- (PEA RIDGE-OPTION 1) ROAD SECTION VIEWS

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-3 |

ROADWAY DESIGN ENGINEER

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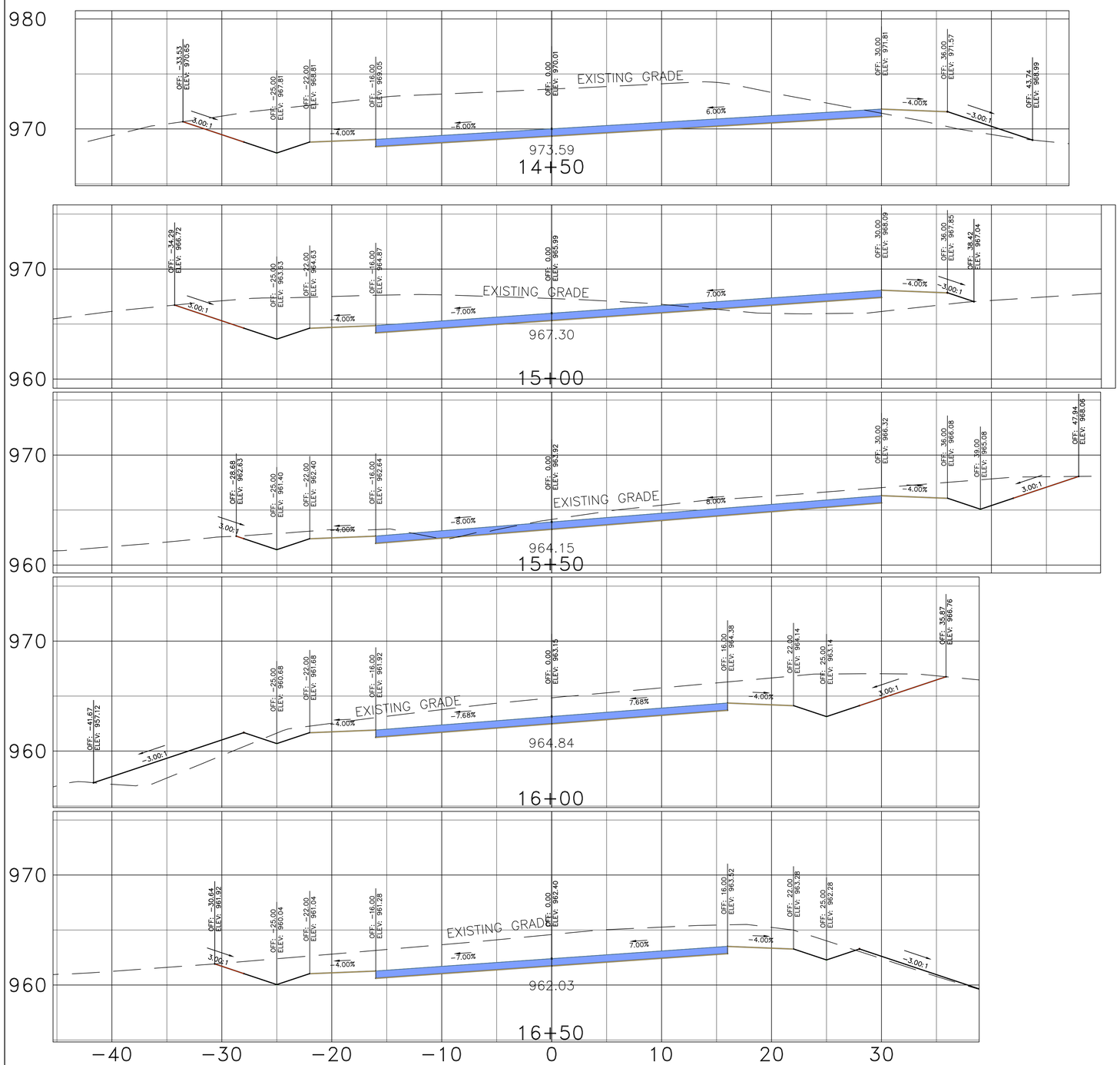
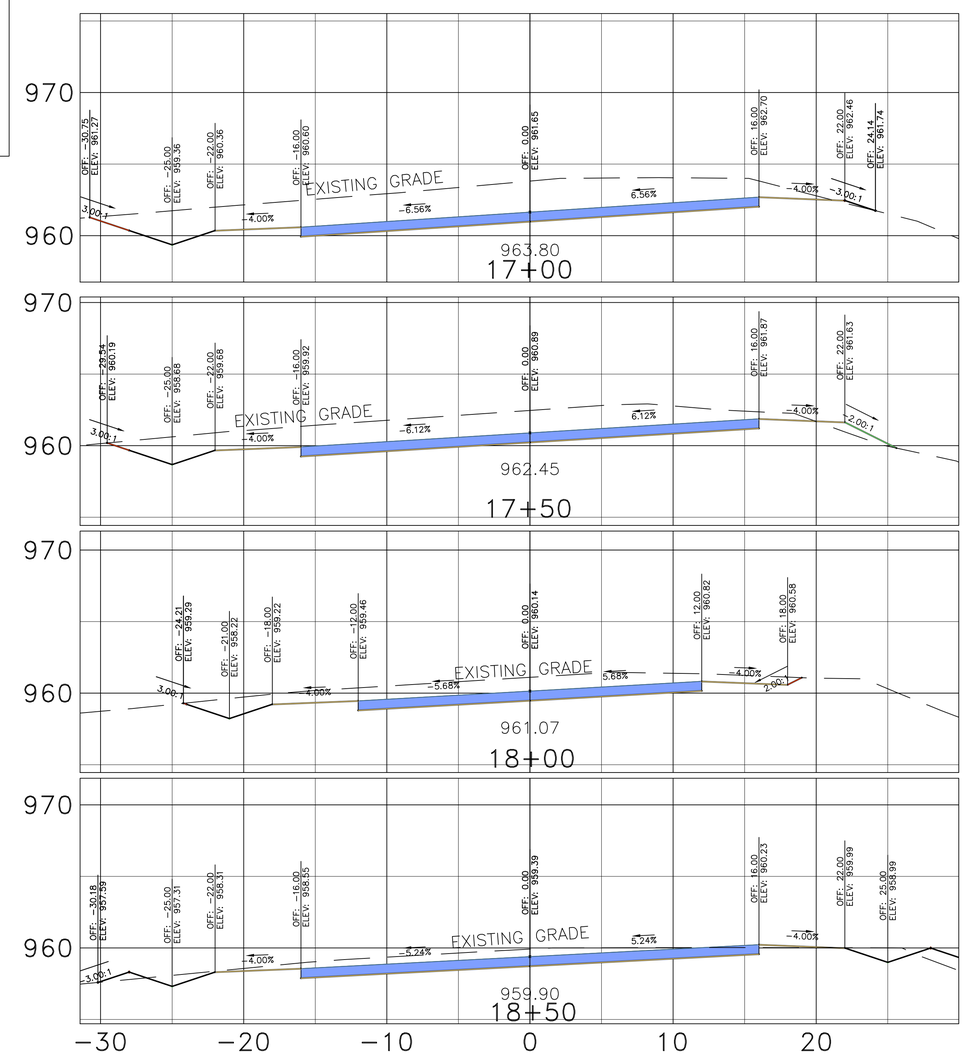
# -L- (PEA RIDGE-OPTION 1) ROAD SECTION VIEWS

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-4 |

ROADWAY DESIGN ENGINEER

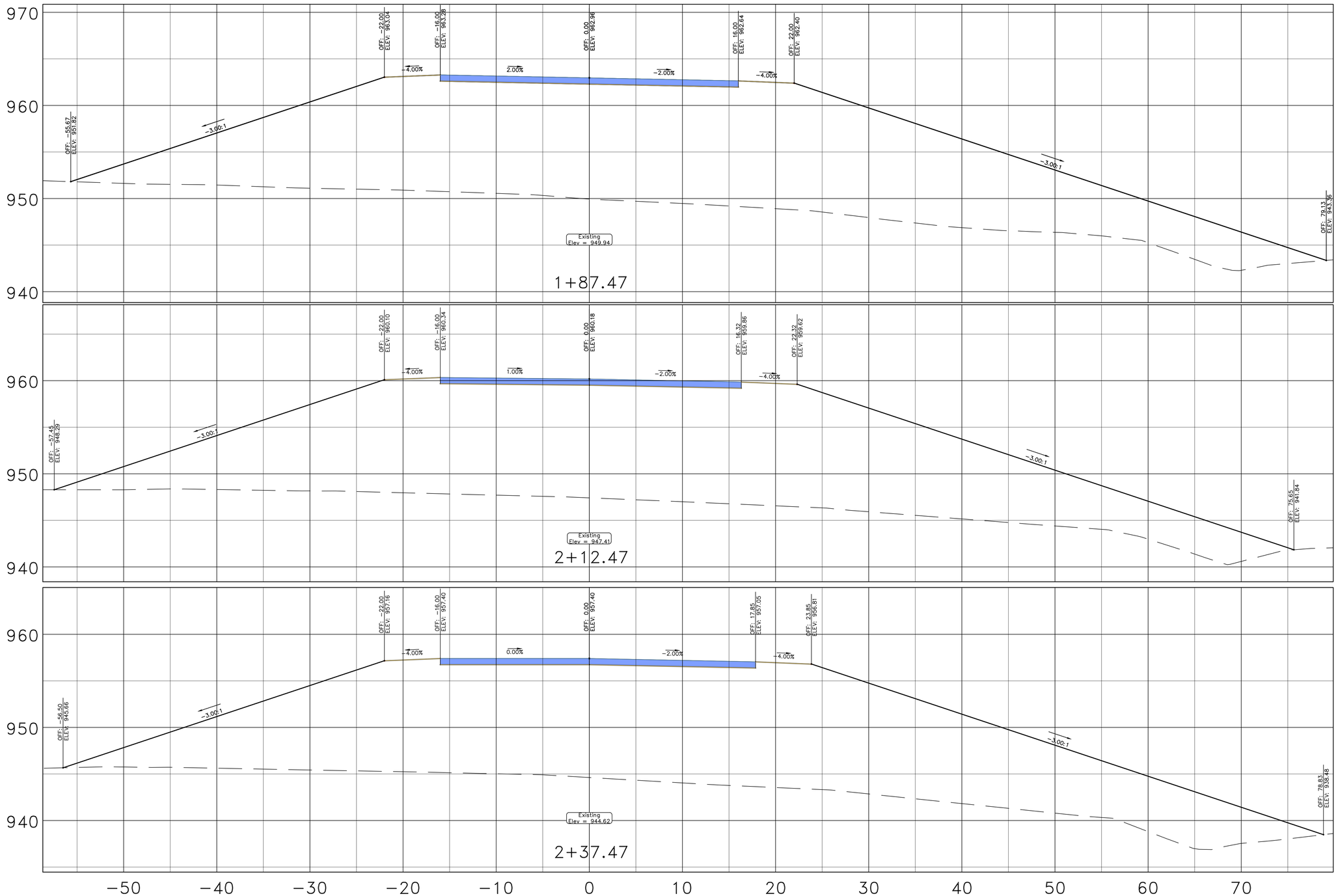


# JOHN SHEHAN ROAD SECTION VIEWS

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-5 |

ROADWAY DESIGN ENGINEER

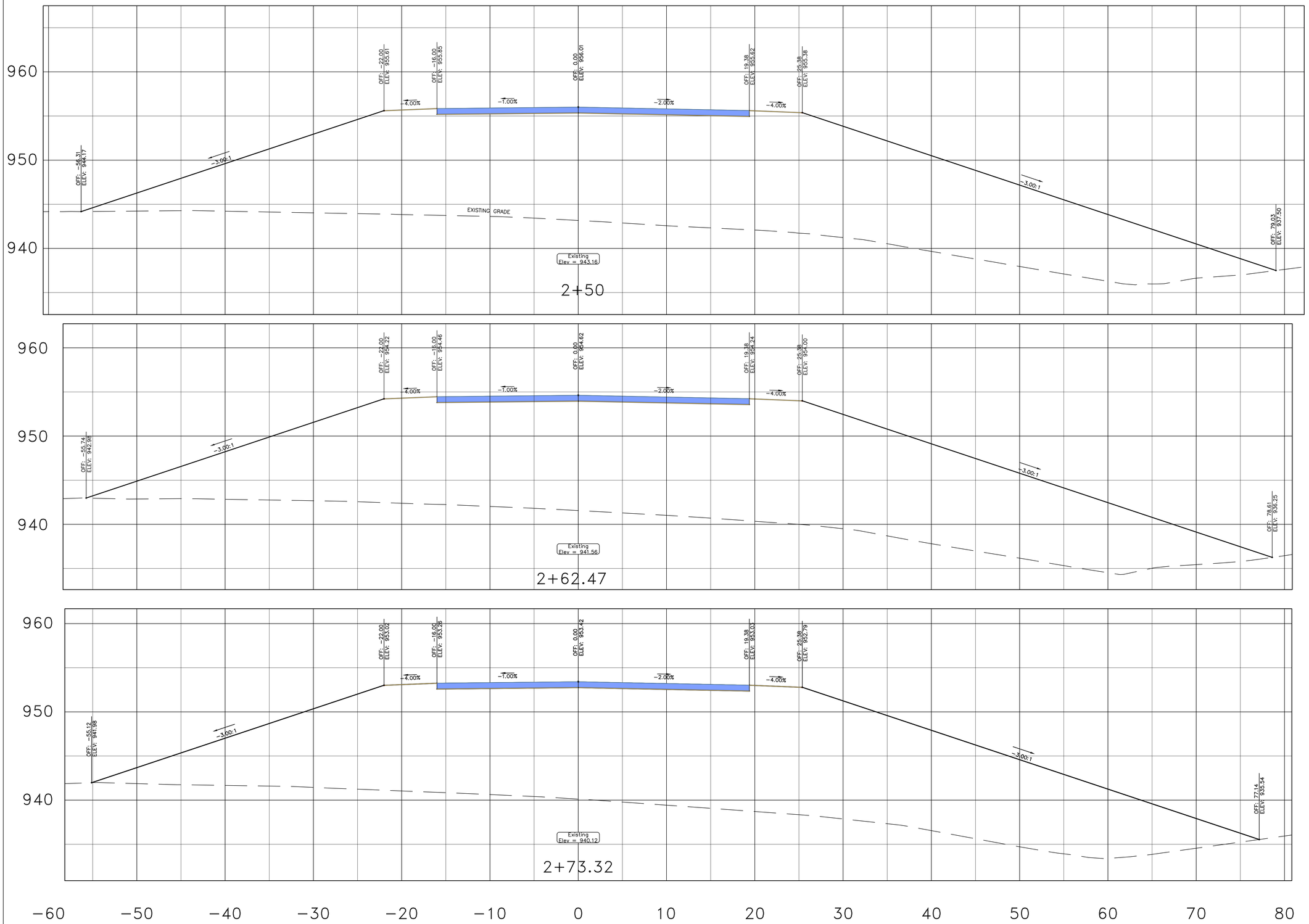


# JOHN SHEHAN ROAD SECTION VIEWS

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-6 |

ROADWAY DESIGN ENGINEER

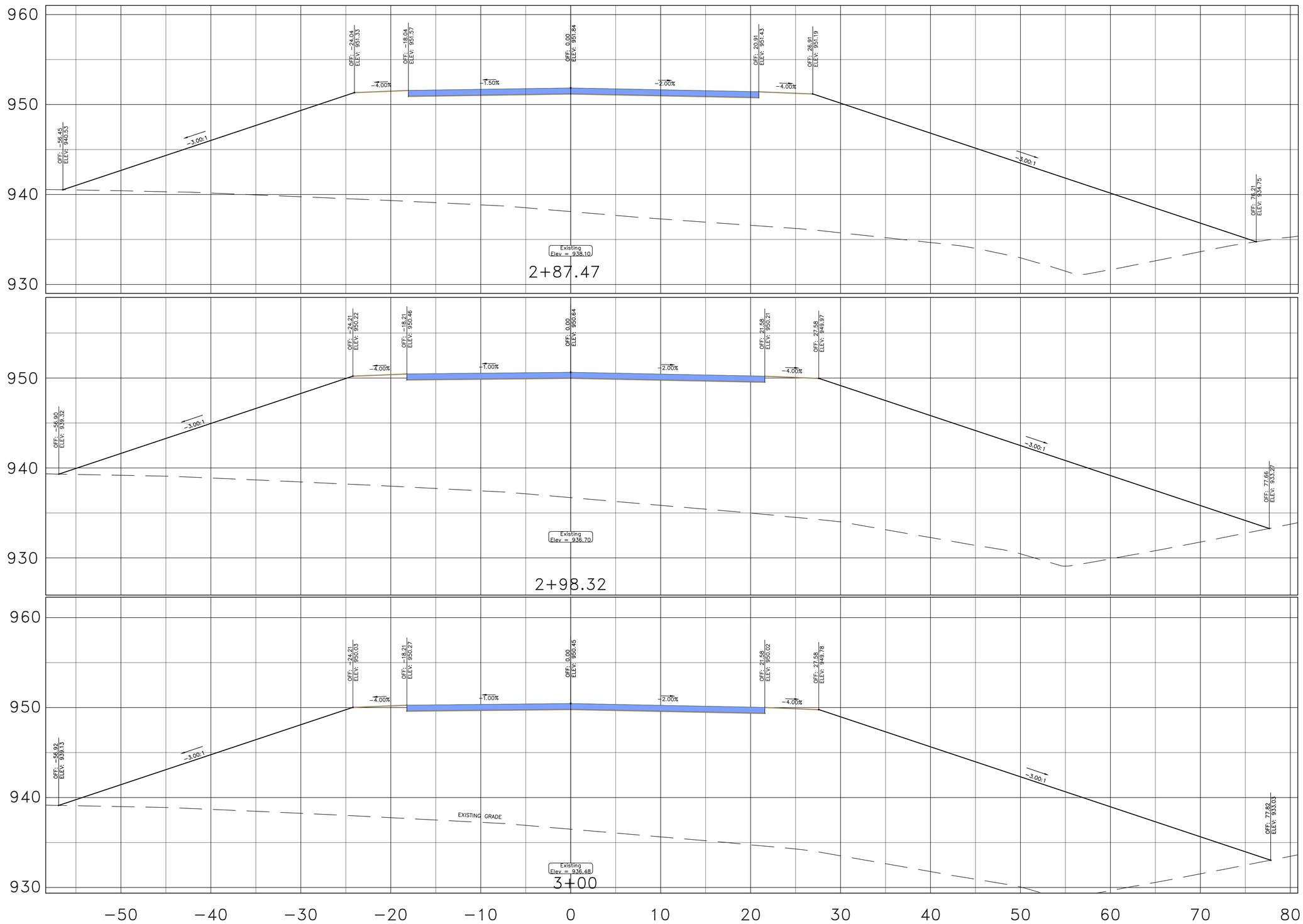
NORTH CAROLINA PROFESSIONAL SEAL 21104 ENGINEER DAVID ODOM



# JOHN SHEHAN ROAD SECTION VIEWS

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-7 |

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21104 ENGINEER DAVID ODOM
12/9/16

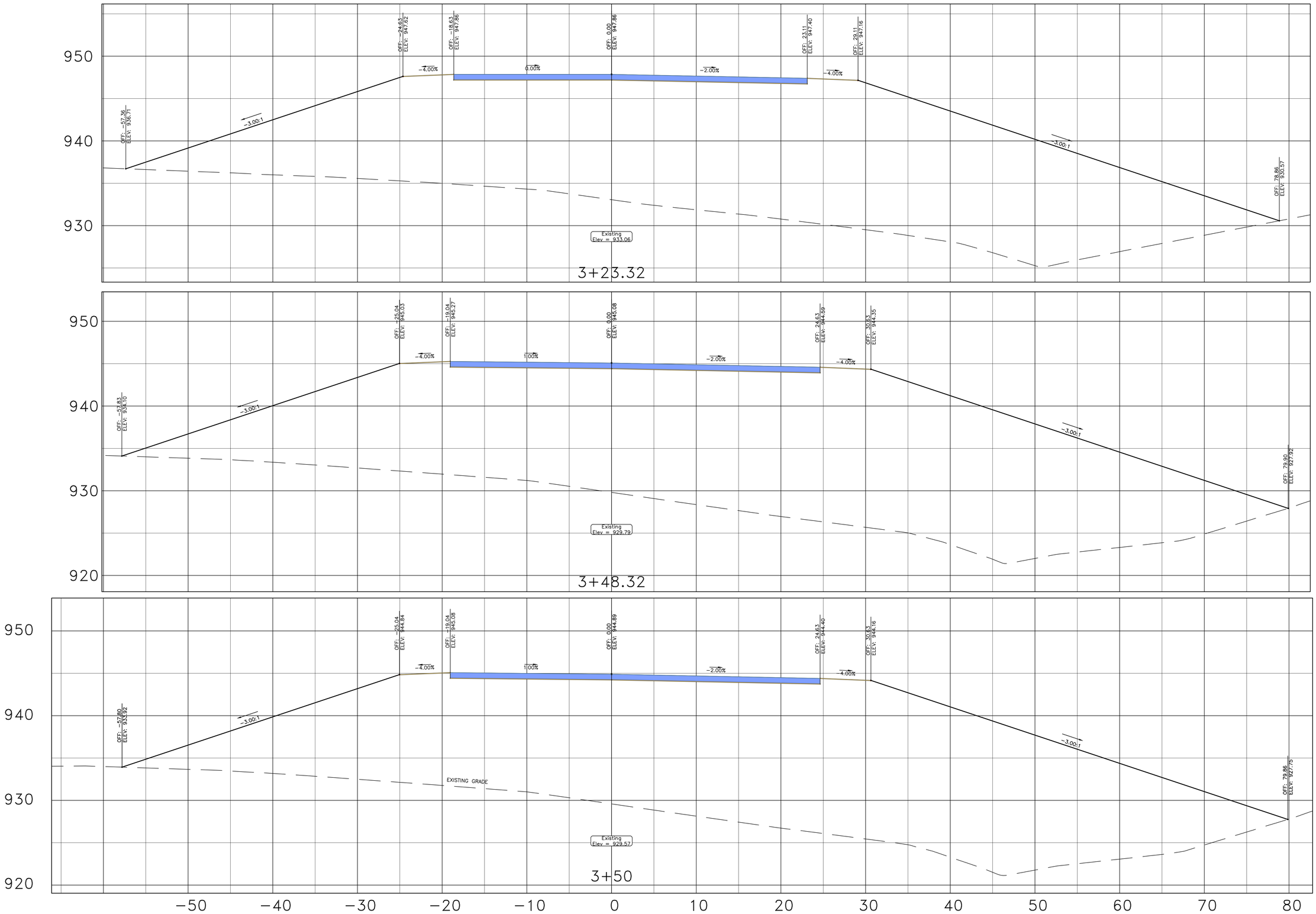


# JOHN SHEHAN ROAD SECTION VIEWS

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-8 |

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21104 ENGINEER DAVID ODOM

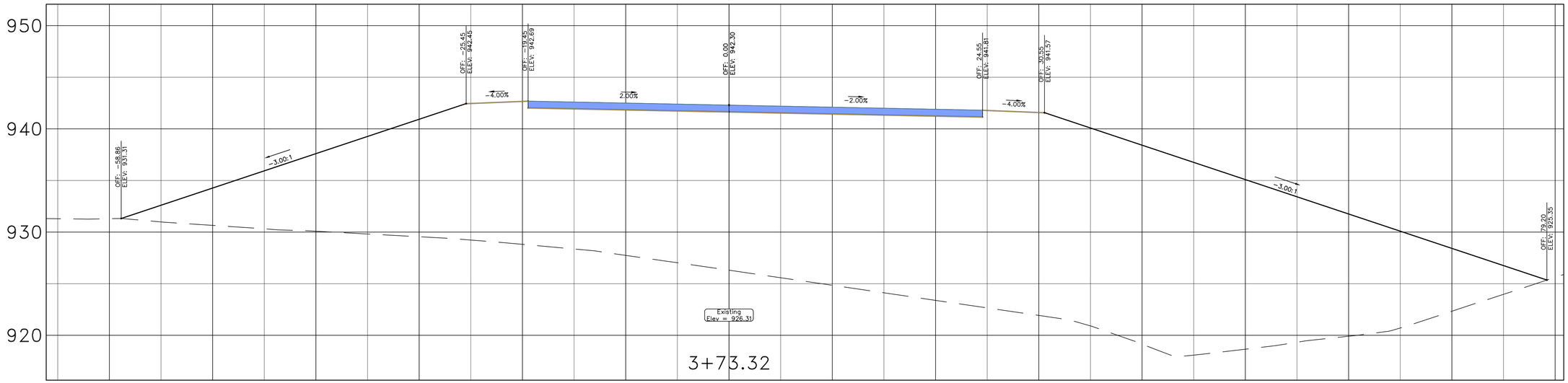


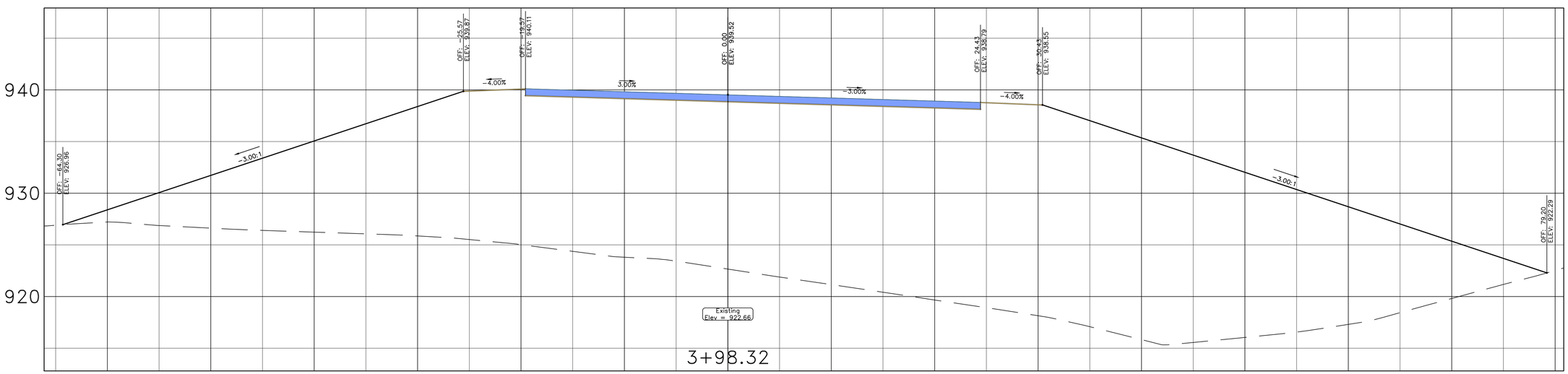
# JOHN SHEHAN ROAD SECTION VIEWS

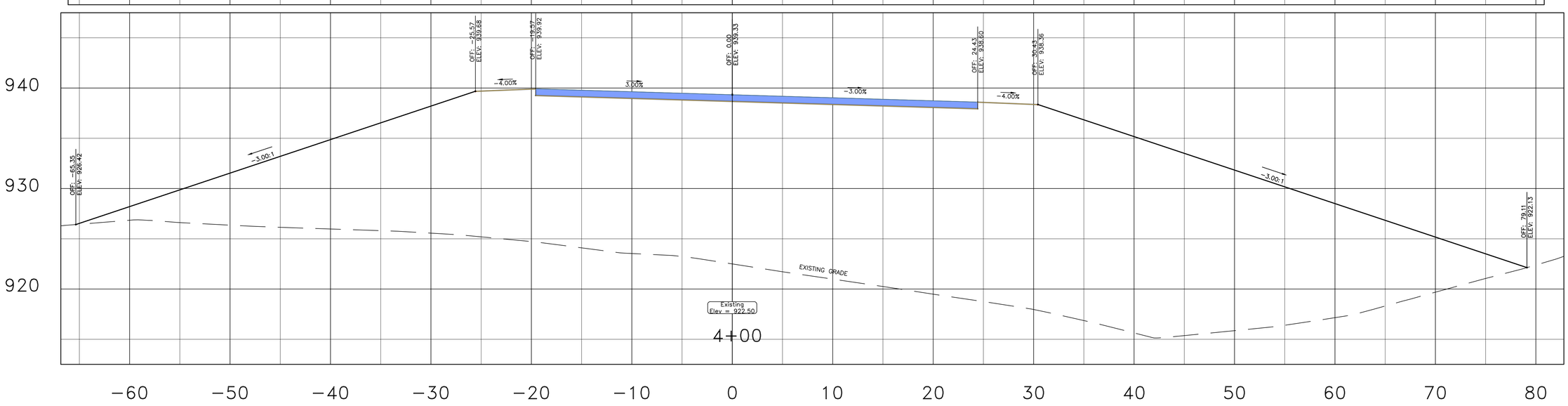
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-9 |

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21120 ENGINEER DAVID ODOM



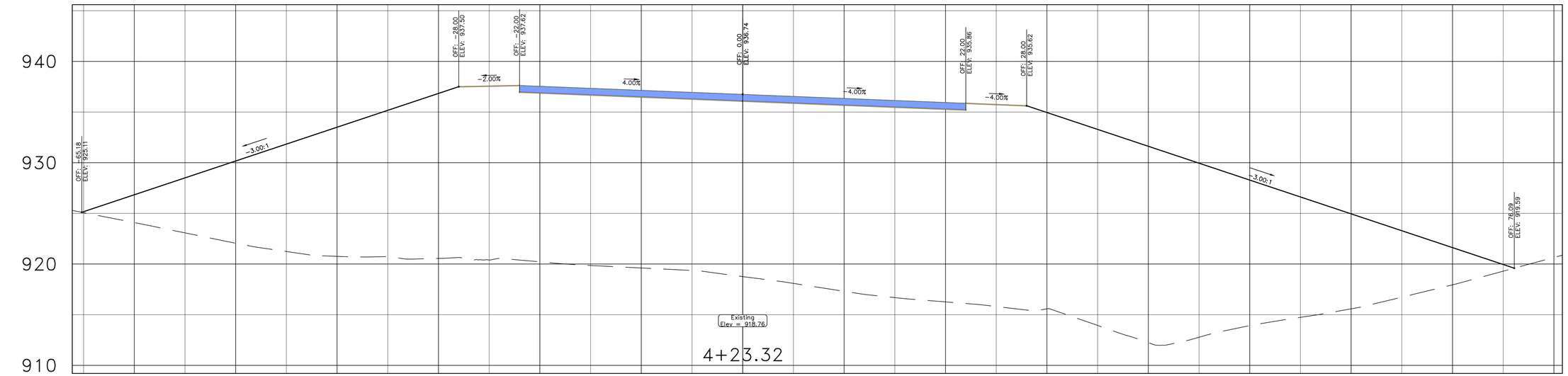



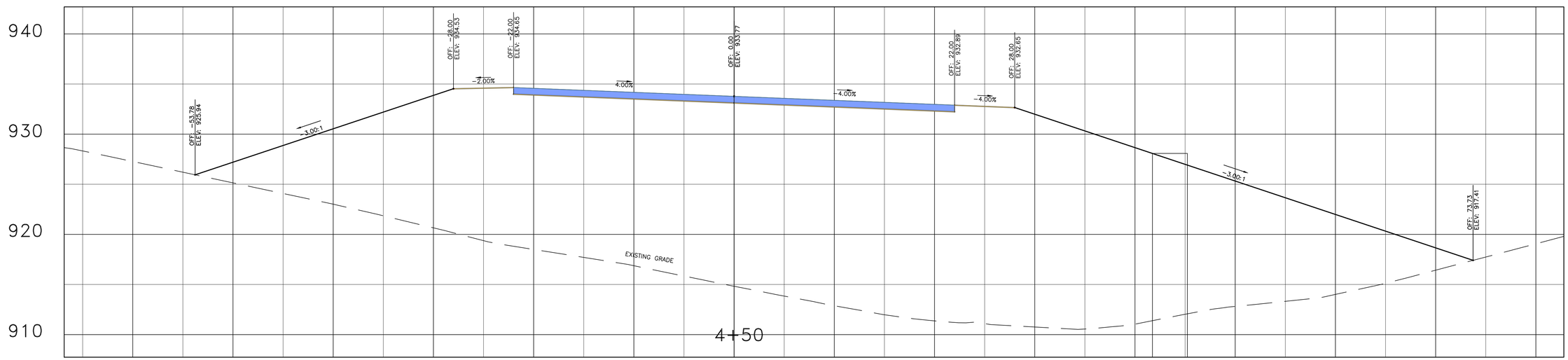
# JOHN SHEHAN ROAD SECTION VIEWS

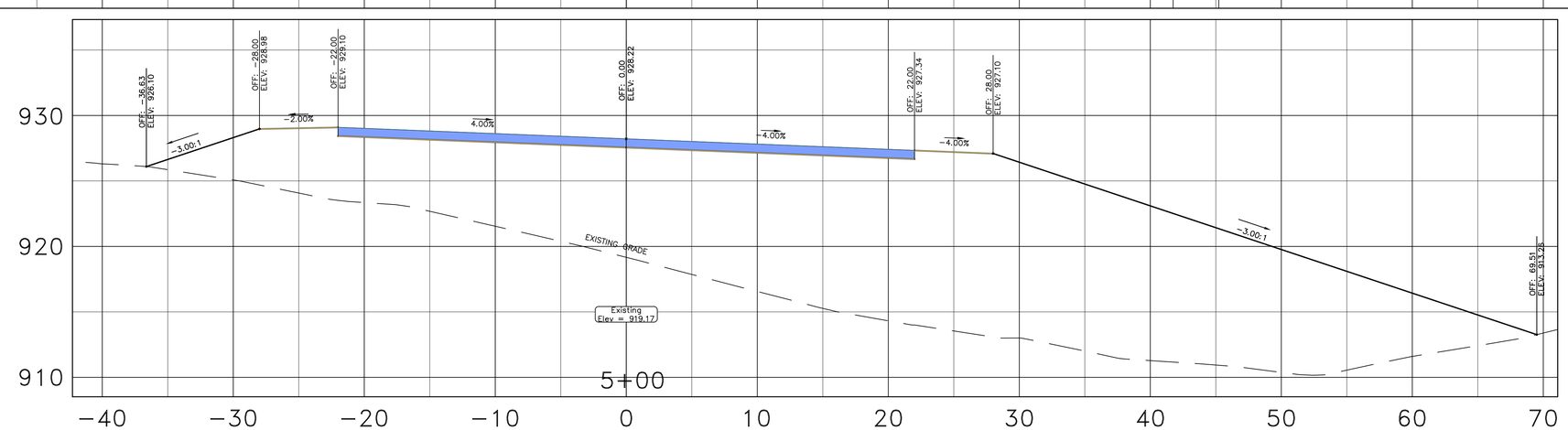
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-10 |

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21130 ENGINEER DAVID ODOM



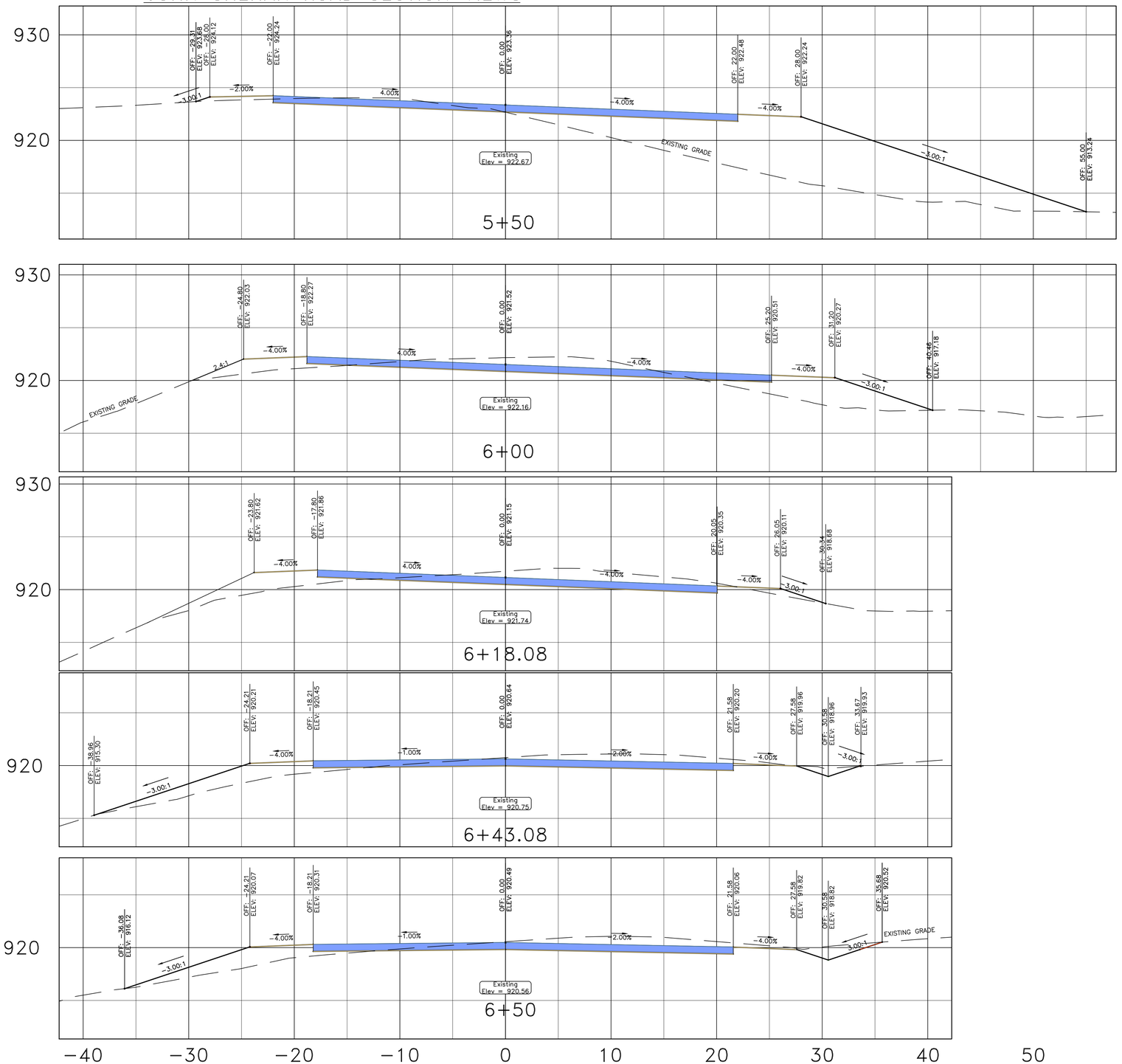



# JOHN SHEHAN ROAD SECTION VIEWS

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-11 |

ROADWAY DESIGN ENGINEER

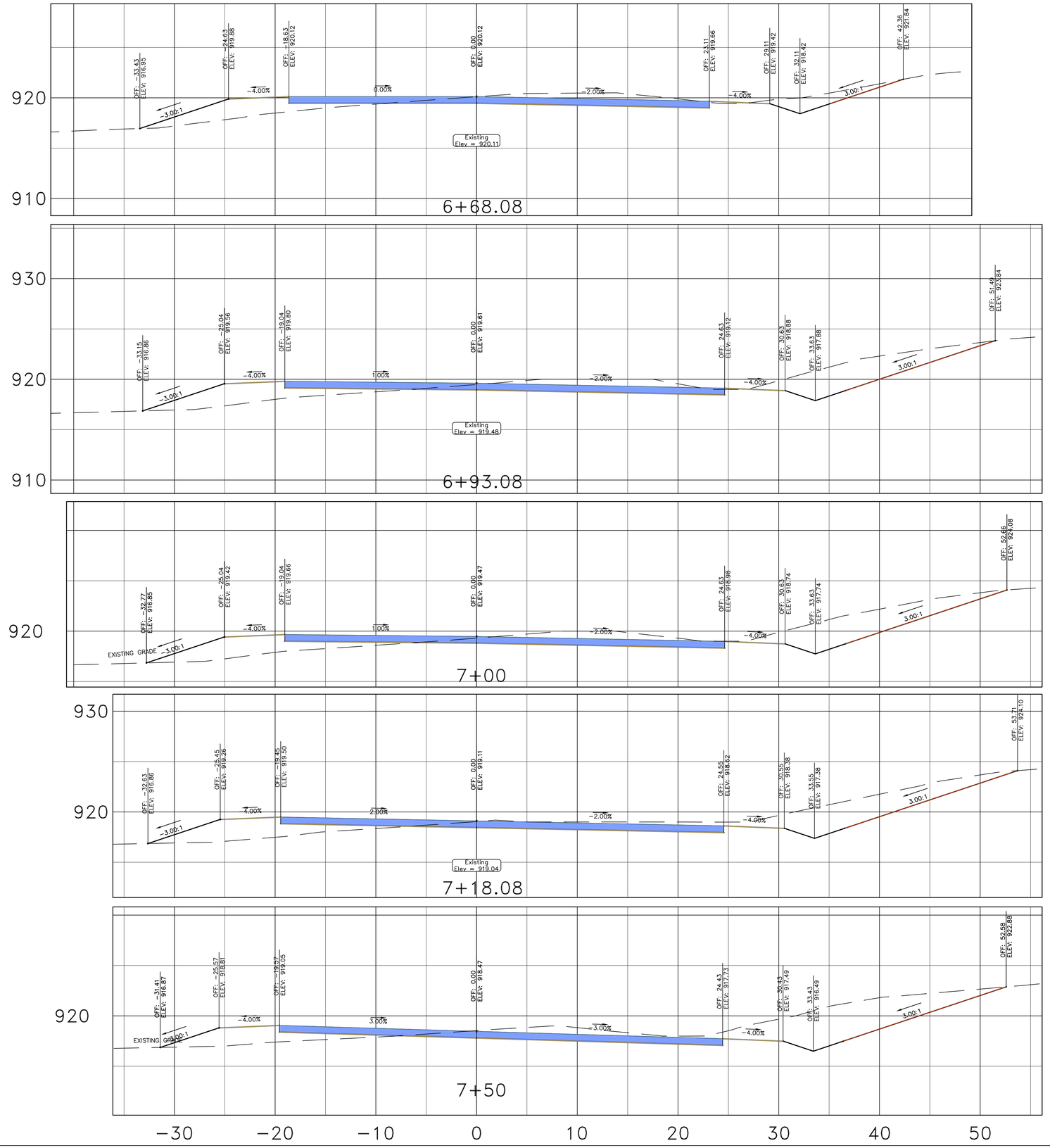


# JOHN SHEHAN ROAD SECTION VIEWS

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-12 |

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21104 ENGINEER DAVID ODOM

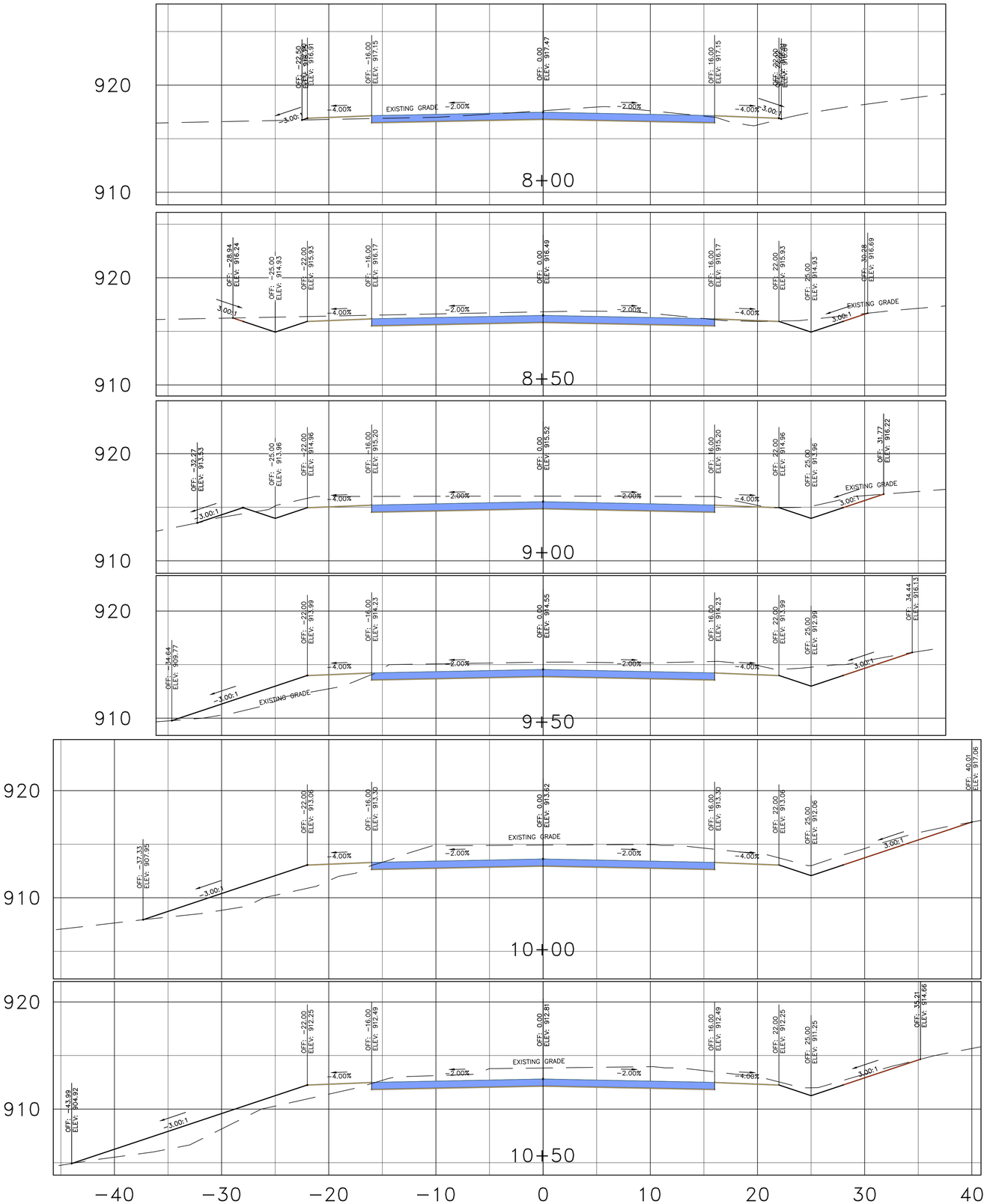


# JOHN SHEHAN ROAD SECTION VIEWS

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-13 |

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21104 ENGINEER DAVID ODOM

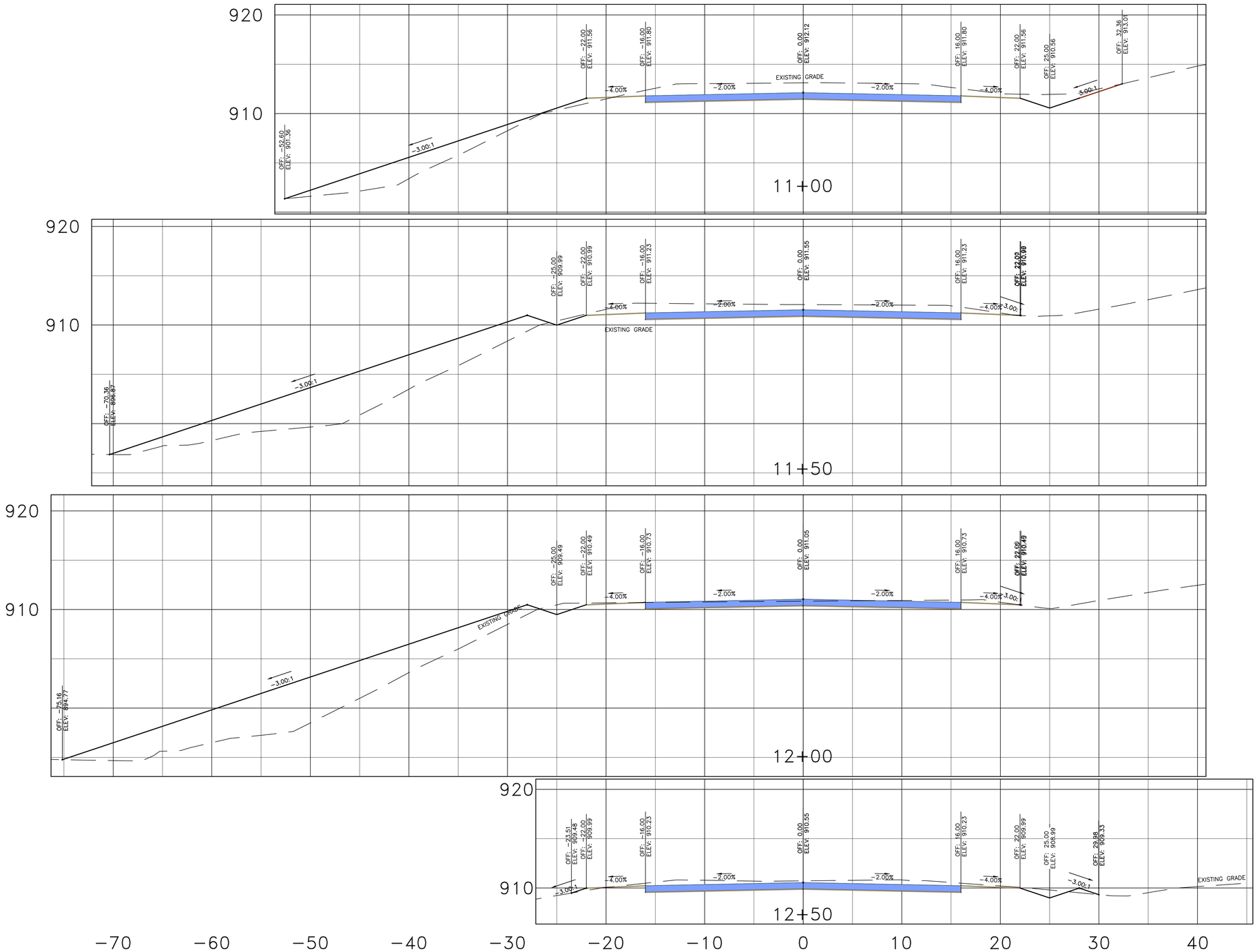


# JOHN SHEHAN ROAD SECTION VIEWS

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-14 |

ROADWAY DESIGN ENGINEER

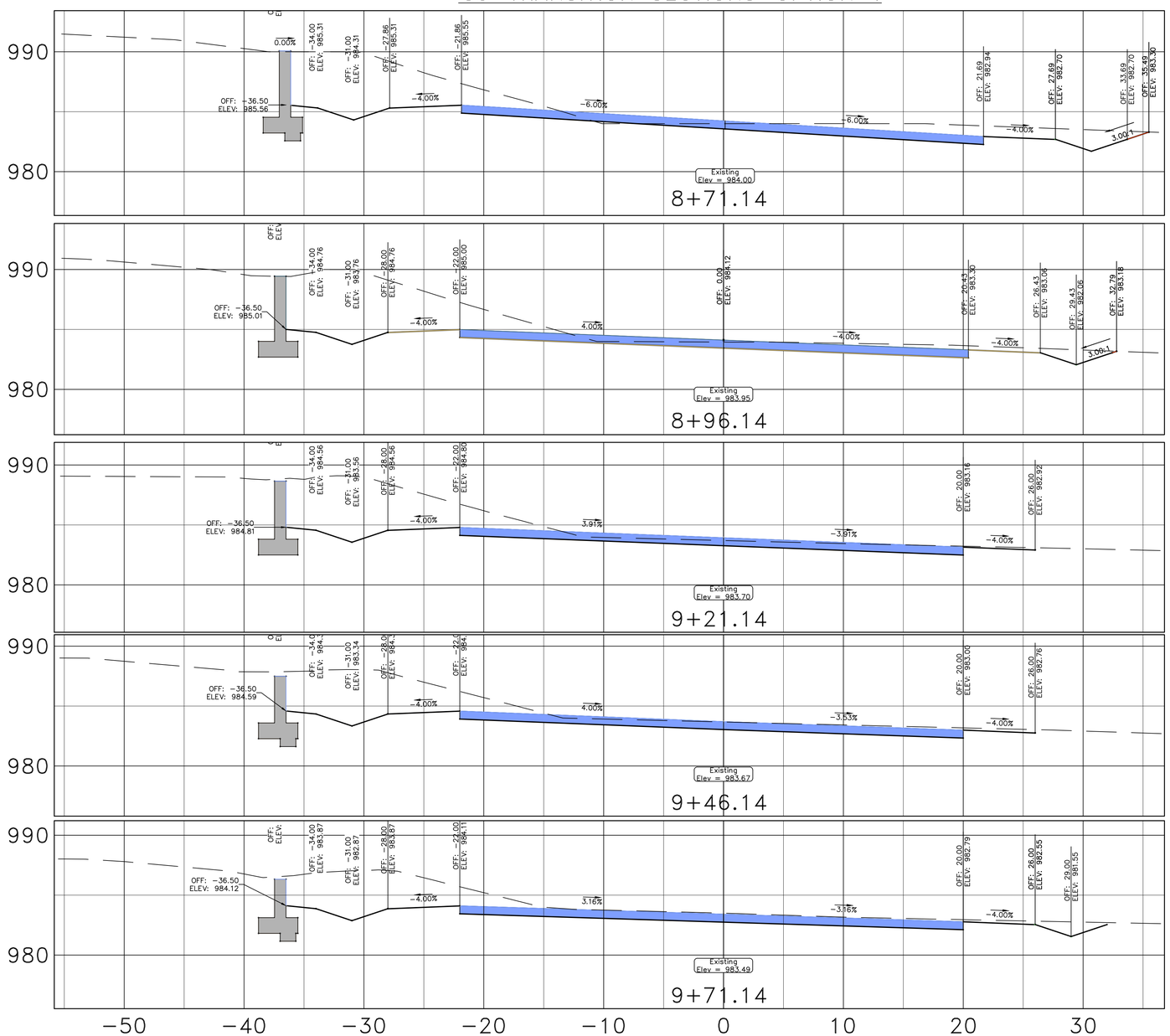
NORTH CAROLINA PROFESSIONAL SEAL 21120 ENGINEER DAVID ODOM



# C3–TRANSITION SECTIONS–OPTION 1

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-15 |

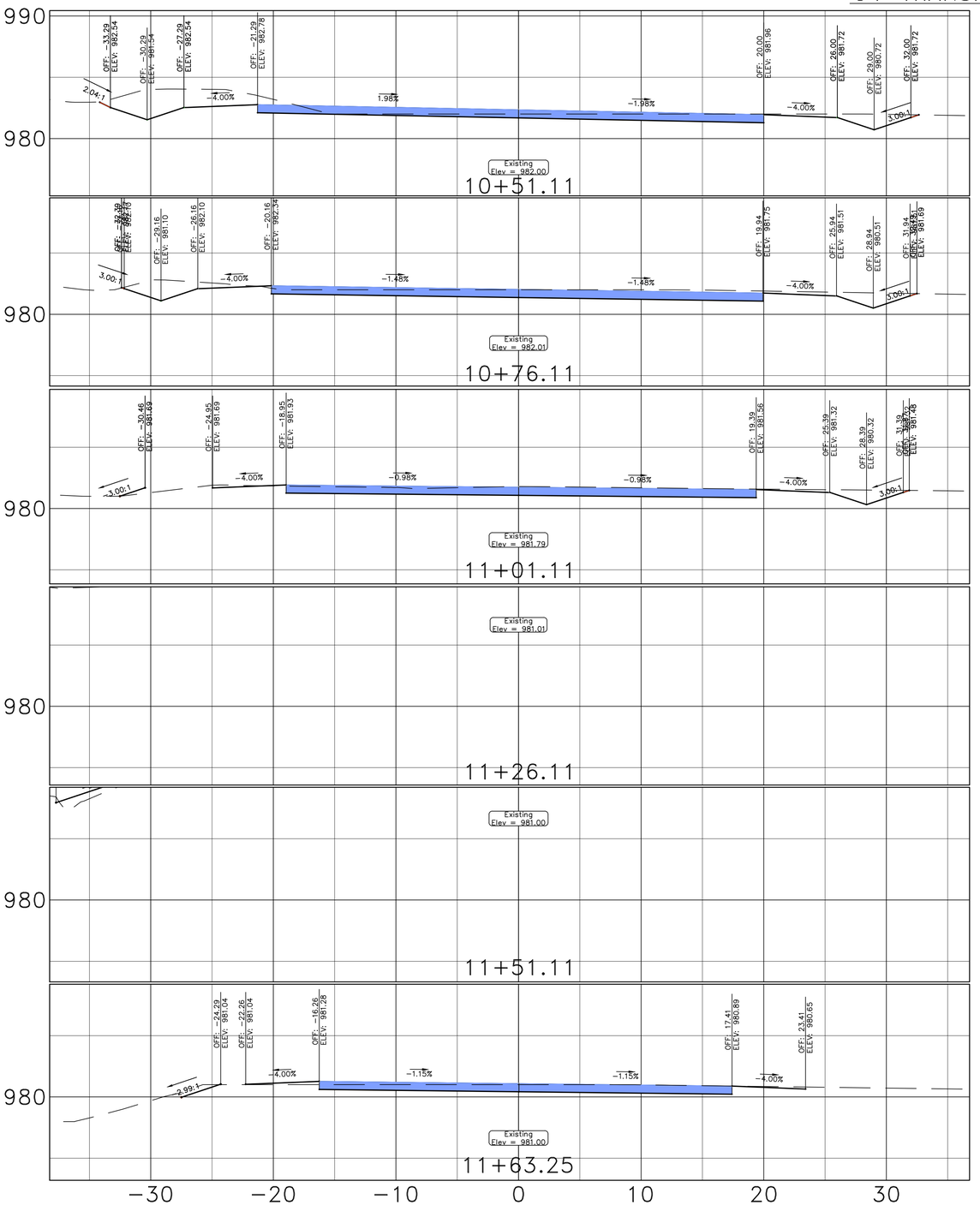
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21304 ENGINEER DAVID ODOM
12/8/16

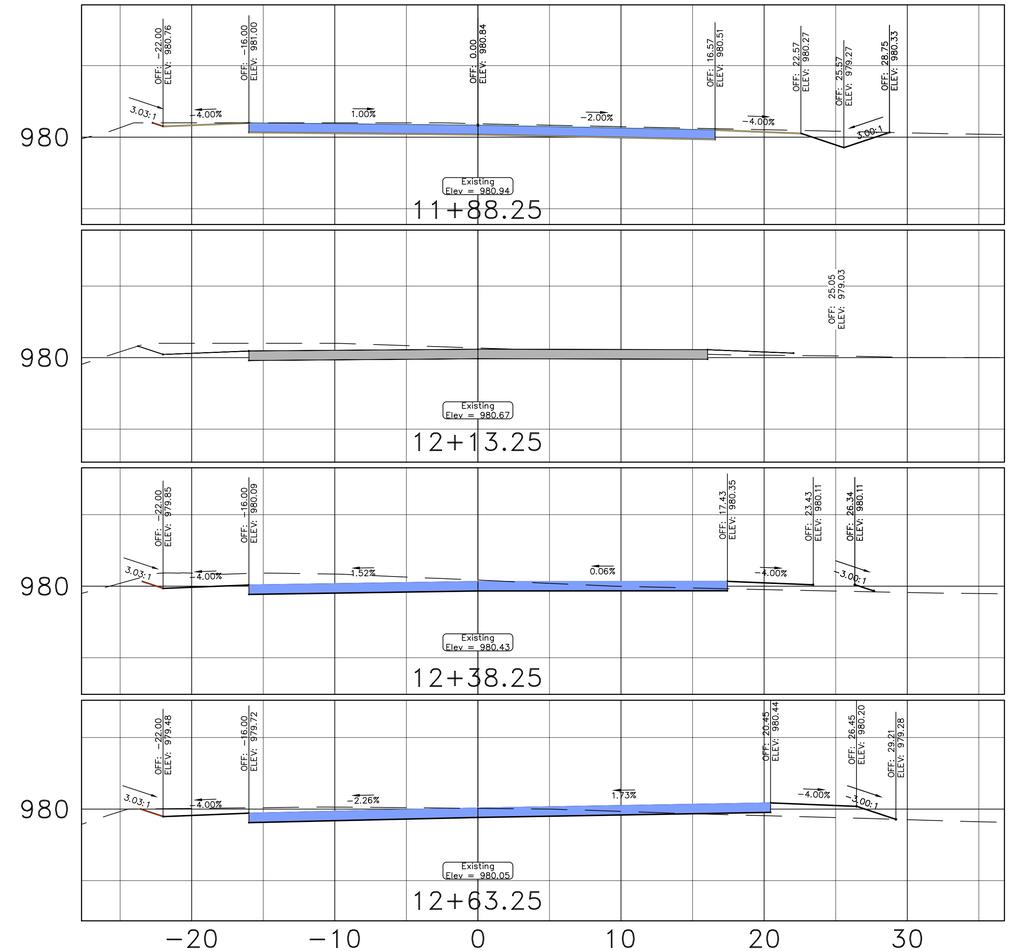


# C4-TRANSITION SECTIONS-OPTION 1

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-16 |

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21304 ENGINEER DAVID ODOM



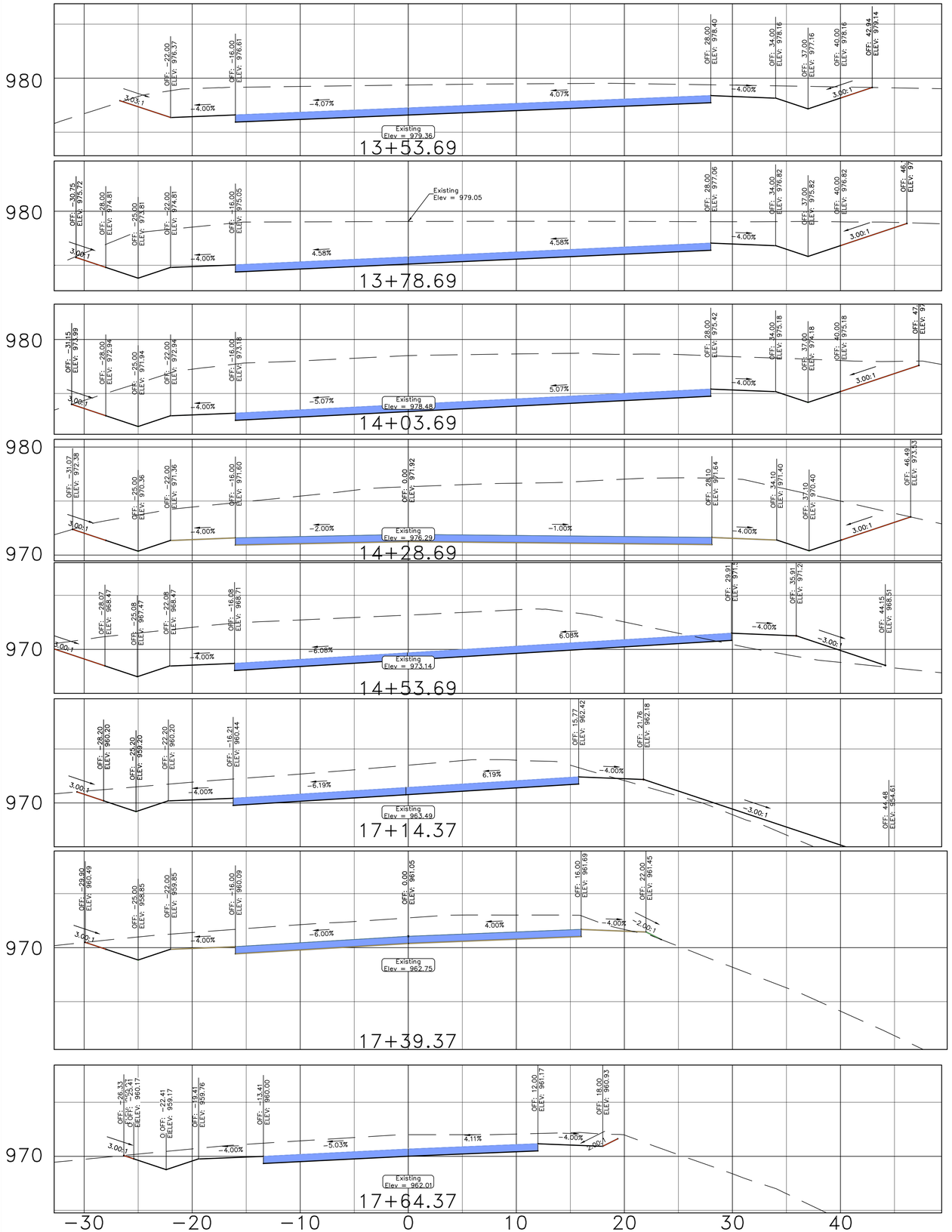



# C5-TRANSITION SECTIONS-OPTION 1

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | X-17 |

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21104 ENGINEER DAVID ODOM



# TRAFFIC CONTROL PLAN

Ⓐ FLAGMAN LOCATION

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | TMP-1 |

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21904 ENGINEER DAVID ODOM

## PHASE 1

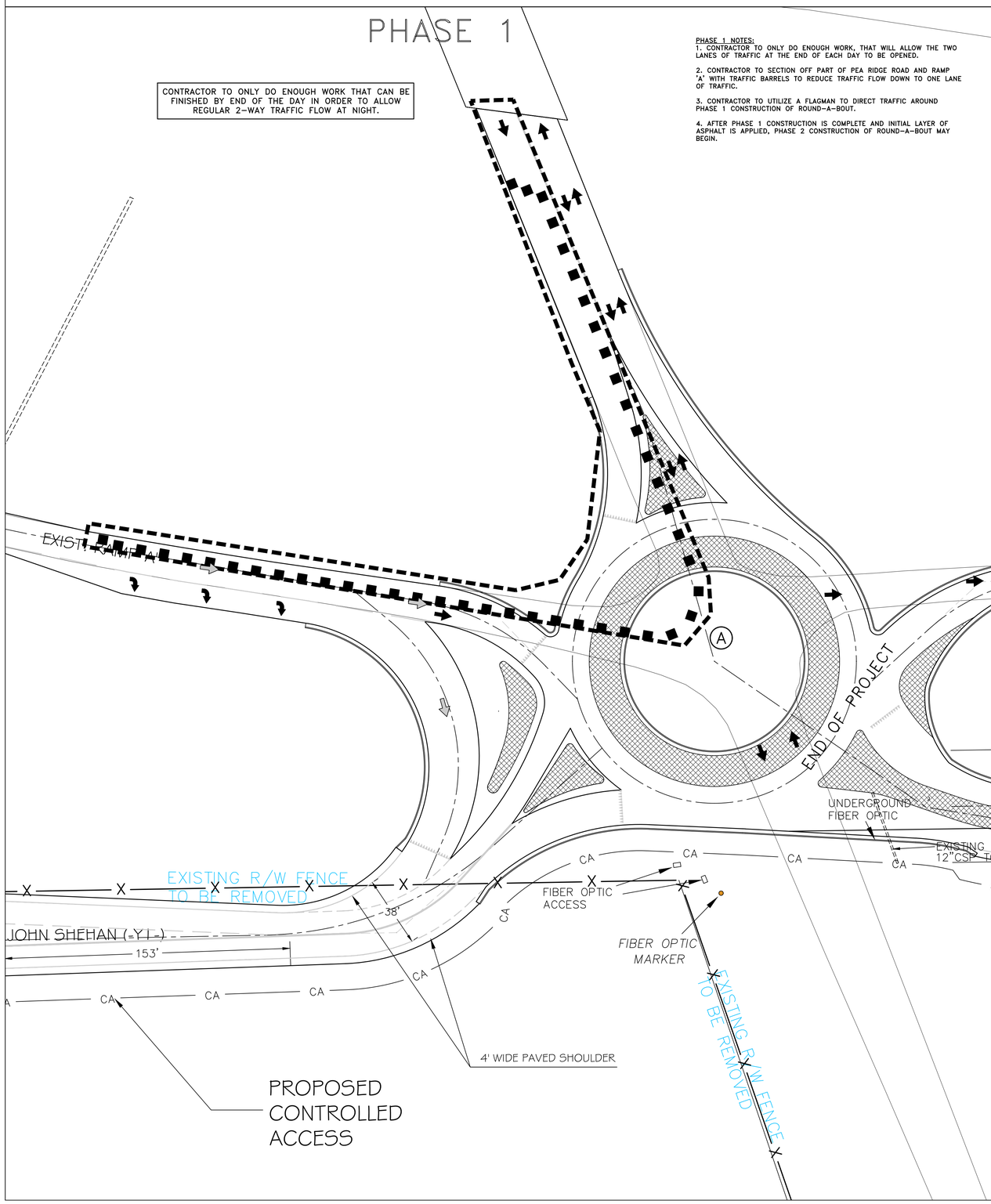
CONTRACTOR TO ONLY DO ENOUGH WORK THAT CAN BE FINISHED BY END OF THE DAY IN ORDER TO ALLOW REGULAR 2-WAY TRAFFIC FLOW AT NIGHT.

PHASE 1 NOTES:
1. CONTRACTOR TO ONLY DO ENOUGH WORK, THAT WILL ALLOW THE TWO LANES OF TRAFFIC AT THE END OF EACH DAY TO BE OPENED.

2. CONTRACTOR TO SECTION OFF PART OF PEA RIDGE ROAD AND RAMP 'A' WITH TRAFFIC BARRELS TO REDUCE TRAFFIC FLOW DOWN TO ONE LANE OF TRAFFIC.

3. CONTRACTOR TO UTILIZE A FLAGMAN TO DIRECT TRAFFIC AROUND PHASE 1 CONSTRUCTION OF ROUND-A-BOUT.

4. AFTER PHASE 1 CONSTRUCTION IS COMPLETE AND INITIAL LAYER OF ASPHALT IS APPLIED, PHASE 2 CONSTRUCTION OF ROUND-A-BOUT MAY BEGIN.



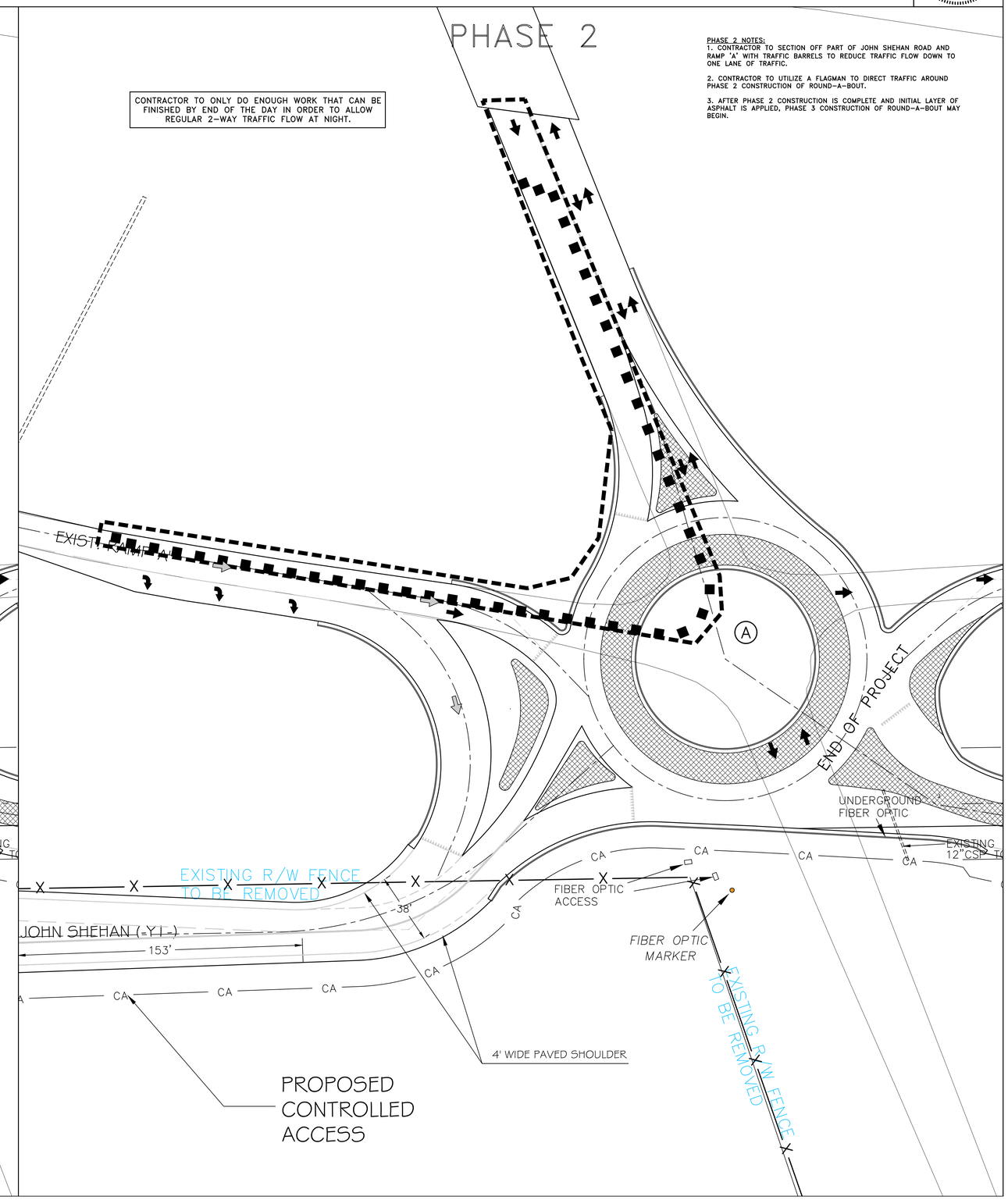

## PHASE 2

CONTRACTOR TO ONLY DO ENOUGH WORK THAT CAN BE FINISHED BY END OF THE DAY IN ORDER TO ALLOW REGULAR 2-WAY TRAFFIC FLOW AT NIGHT.

PHASE 2 NOTES:
1. CONTRACTOR TO SECTION OFF PART OF JOHN SHEHAN ROAD AND RAMP 'A' WITH TRAFFIC BARRELS TO REDUCE TRAFFIC FLOW DOWN TO ONE LANE OF TRAFFIC.

2. CONTRACTOR TO UTILIZE A FLAGMAN TO DIRECT TRAFFIC AROUND PHASE 2 CONSTRUCTION OF ROUND-A-BOUT.

3. AFTER PHASE 2 CONSTRUCTION IS COMPLETE AND INITIAL LAYER OF ASPHALT IS APPLIED, PHASE 3 CONSTRUCTION OF ROUND-A-BOUT MAY BEGIN.



| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | TMP-2 |

ROADWAY DESIGN ENGINEER

# TRAFFIC CONTROL PLAN

Ⓐ FLAGMAN LOCATION

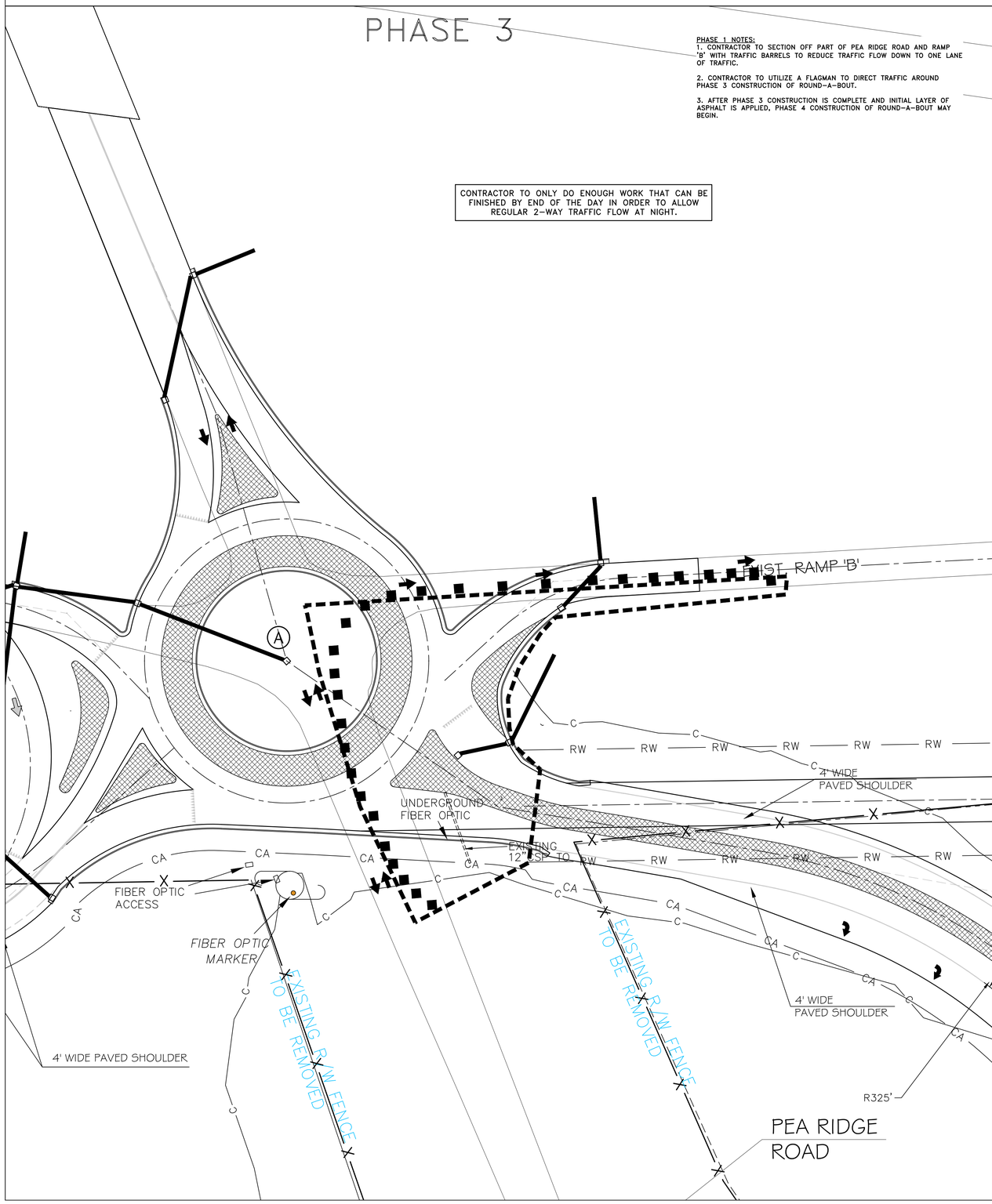
## PHASE 3

PHASE 1 NOTES:
1. CONTRACTOR TO SECTION OFF PART OF PEA RIDGE ROAD AND RAMP 'B' WITH TRAFFIC BARRELS TO REDUCE TRAFFIC FLOW DOWN TO ONE LANE OF TRAFFIC.

2. CONTRACTOR TO UTILIZE A FLAGMAN TO DIRECT TRAFFIC AROUND PHASE 3 CONSTRUCTION OF ROUND-A-BOUT.

3. AFTER PHASE 3 CONSTRUCTION IS COMPLETE AND INITIAL LAYER OF ASPHALT IS APPLIED, PHASE 4 CONSTRUCTION OF ROUND-A-BOUT MAY BEGIN.

CONTRACTOR TO ONLY DO ENOUGH WORK THAT CAN BE FINISHED BY END OF THE DAY IN ORDER TO ALLOW REGULAR 2-WAY TRAFFIC FLOW AT NIGHT.



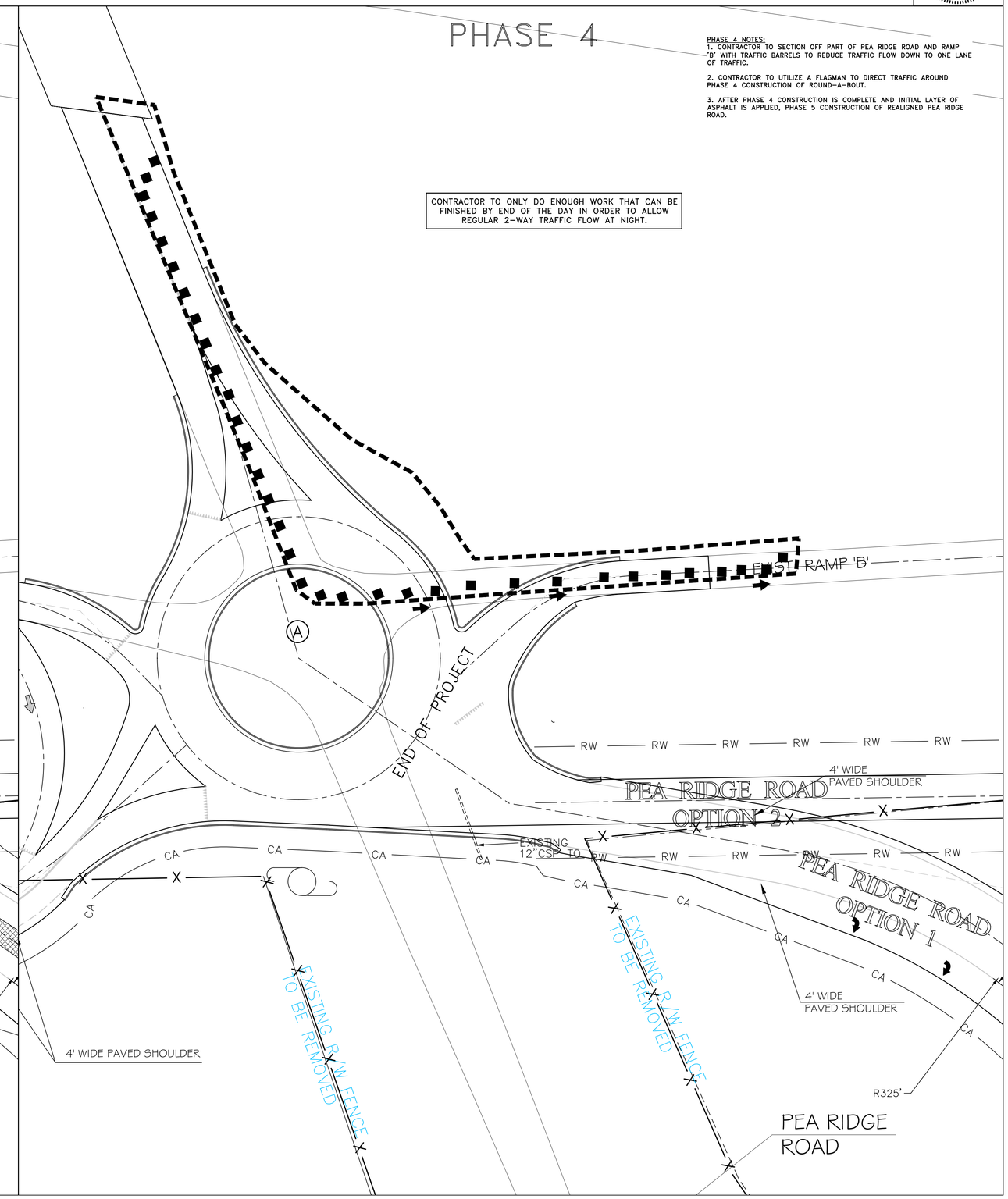

## PHASE 4

PHASE 4 NOTES:
1. CONTRACTOR TO SECTION OFF PART OF PEA RIDGE ROAD AND RAMP 'B' WITH TRAFFIC BARRELS TO REDUCE TRAFFIC FLOW DOWN TO ONE LANE OF TRAFFIC.

2. CONTRACTOR TO UTILIZE A FLAGMAN TO DIRECT TRAFFIC AROUND PHASE 4 CONSTRUCTION OF ROUND-A-BOUT.

3. AFTER PHASE 4 CONSTRUCTION IS COMPLETE AND INITIAL LAYER OF ASPHALT IS APPLIED, PHASE 5 CONSTRUCTION OF REALIGNED PEA RIDGE ROAD.

CONTRACTOR TO ONLY DO ENOUGH WORK THAT CAN BE FINISHED BY END OF THE DAY IN ORDER TO ALLOW REGULAR 2-WAY TRAFFIC FLOW AT NIGHT.



| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | TMP - 3 |

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21904 ENGINEER DAVID ODOM

# TRAFFIC CONTROL PLAN

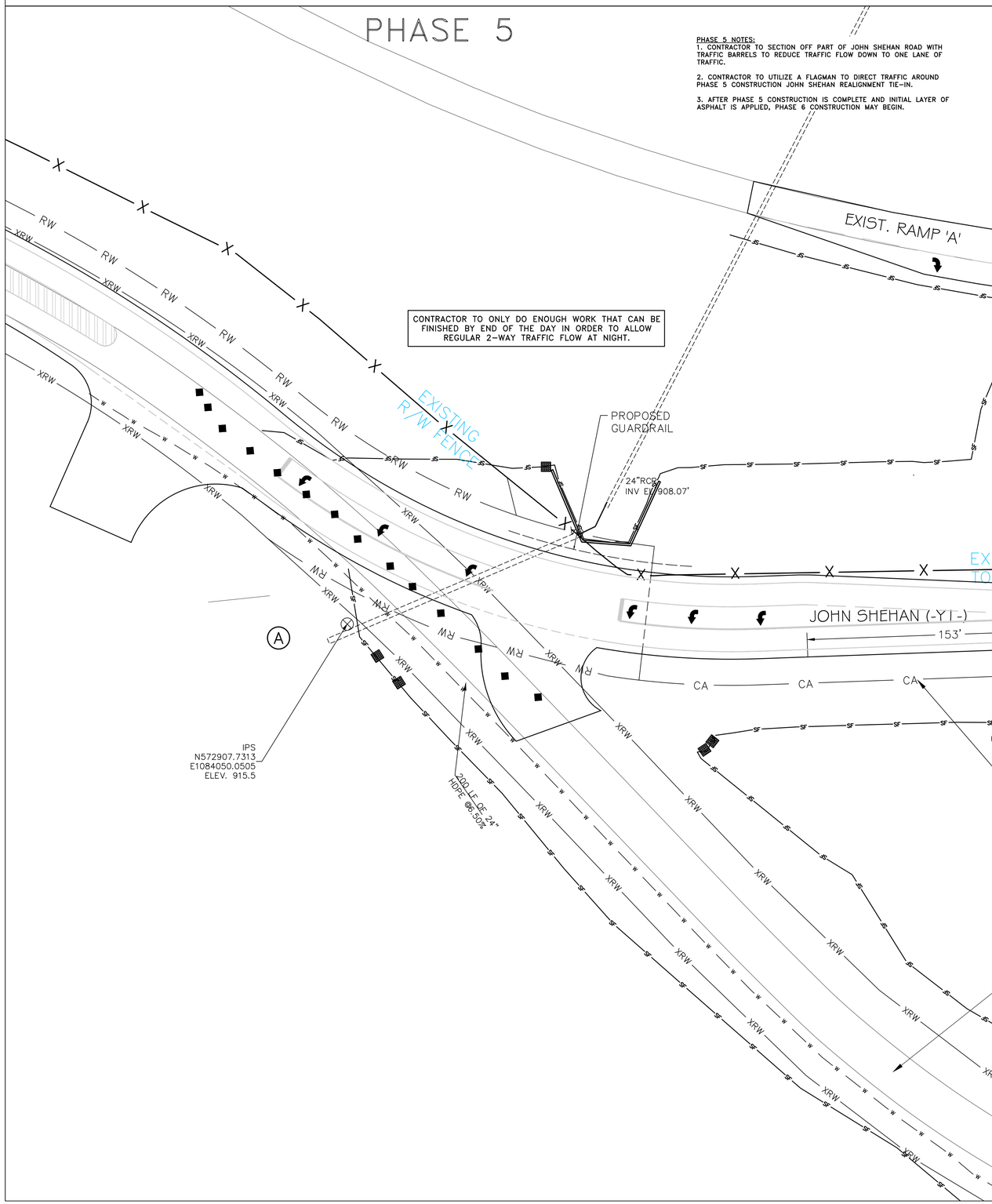
Ⓐ FLAGMAN LOCATION

## PHASE 5

**PHASE 5 NOTES:**
1. CONTRACTOR TO SECTION OFF PART OF JOHN SHEHAN ROAD WITH TRAFFIC BARRELS TO REDUCE TRAFFIC FLOW DOWN TO ONE LANE OF TRAFFIC.

2. CONTRACTOR TO UTILIZE A FLAGMAN TO DIRECT TRAFFIC AROUND PHASE 5 CONSTRUCTION JOHN SHEHAN REALIGNMENT TIE-IN.

3. AFTER PHASE 5 CONSTRUCTION IS COMPLETE AND INITIAL LAYER OF ASPHALT IS APPLIED, PHASE 6 CONSTRUCTION MAY BEGIN.

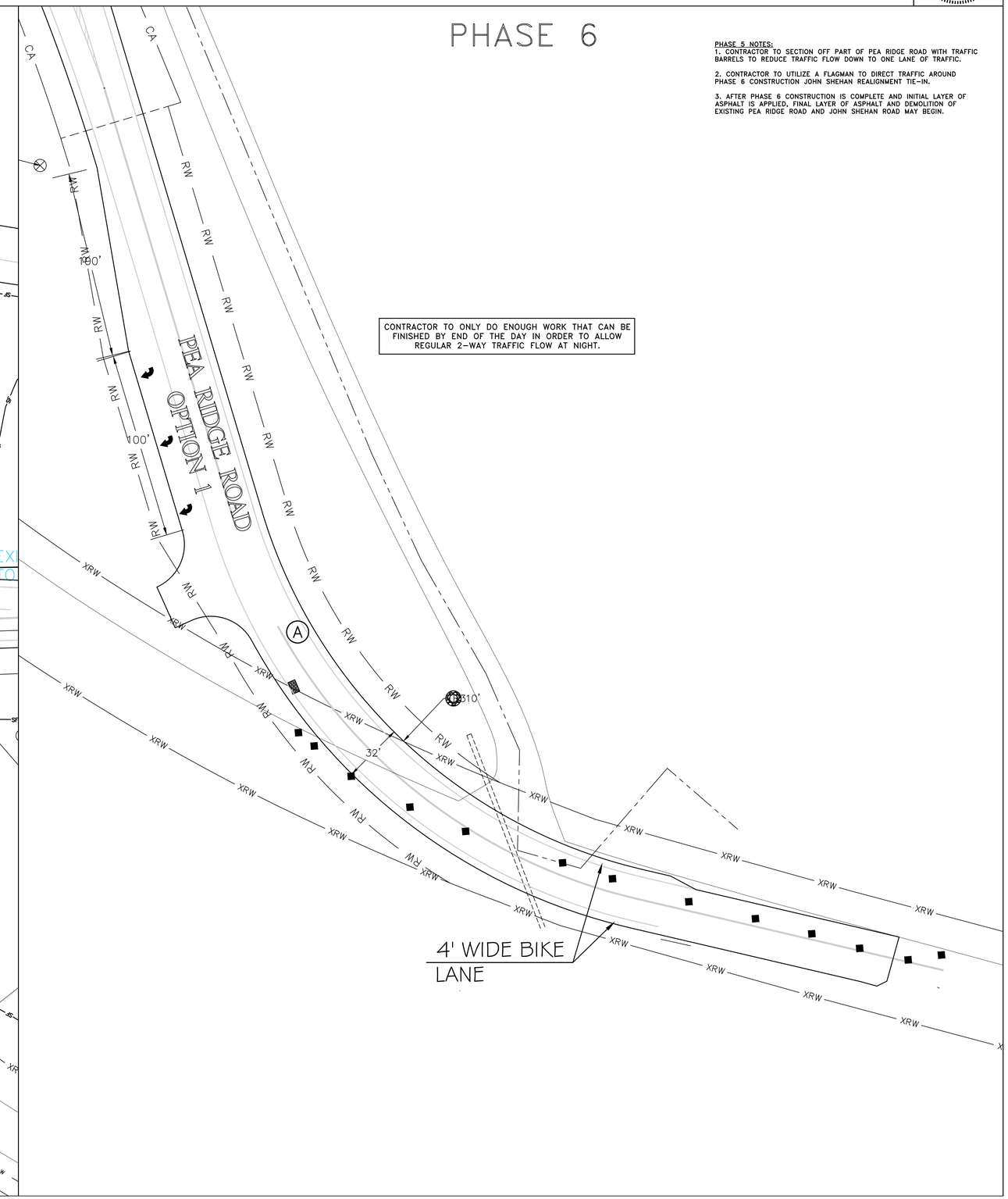



## PHASE 6

**PHASE 5 NOTES:**
1. CONTRACTOR TO SECTION OFF PART OF PEA RIDGE ROAD WITH TRAFFIC BARRELS TO REDUCE TRAFFIC FLOW DOWN TO ONE LANE OF TRAFFIC.

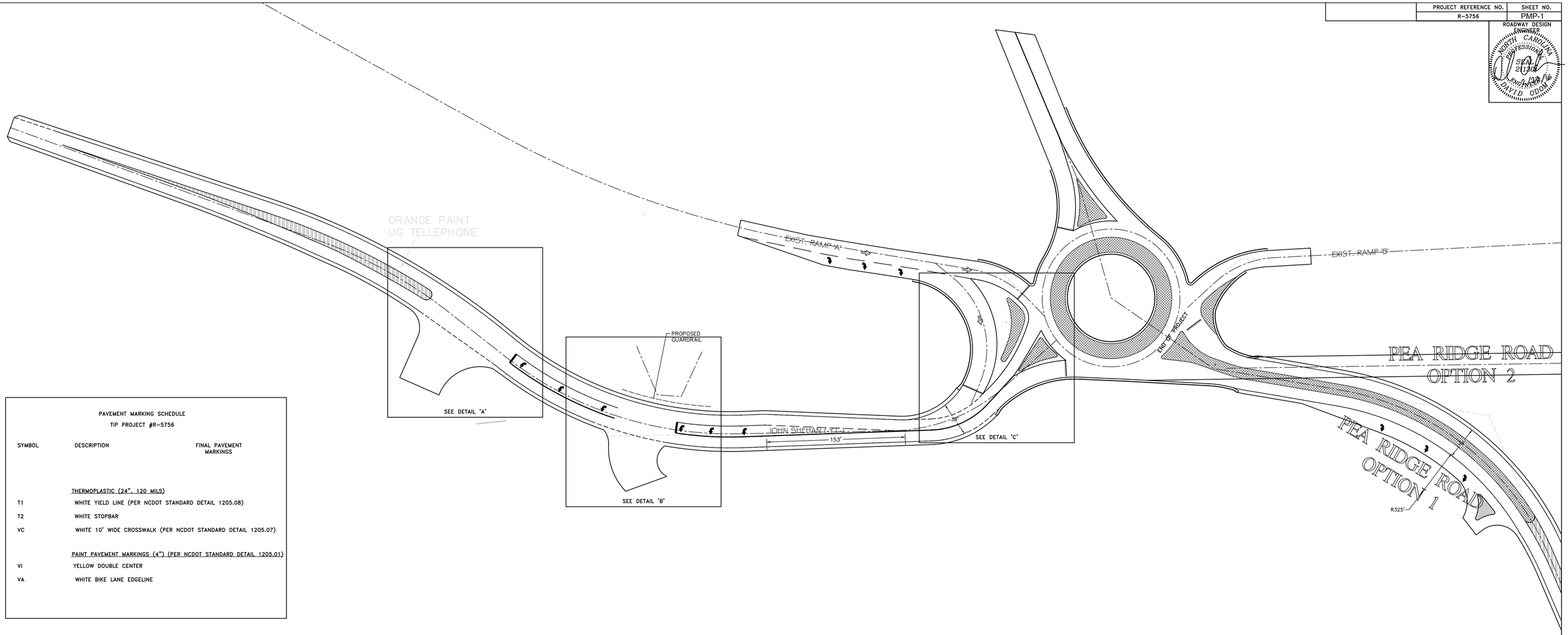
2. CONTRACTOR TO UTILIZE A FLAGMAN TO DIRECT TRAFFIC AROUND PHASE 6 CONSTRUCTION JOHN SHEHAN REALIGNMENT TIE-IN.

3. AFTER PHASE 6 CONSTRUCTION IS COMPLETE AND INITIAL LAYER OF ASPHALT IS APPLIED, FINAL LAYER OF ASPHALT AND DEMOLITION OF EXISTING PEA RIDGE ROAD AND JOHN SHEHAN ROAD MAY BEGIN.



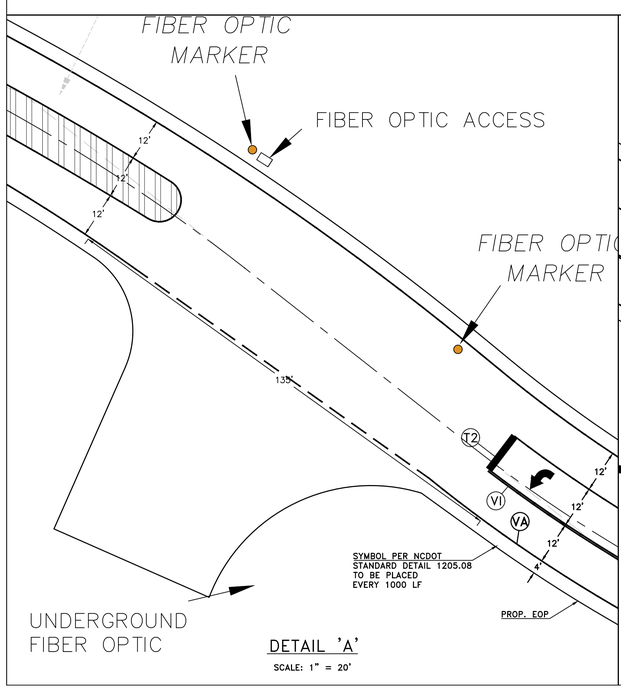
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | PMP-1 |

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21304 ENGINEER DAVID ODOM

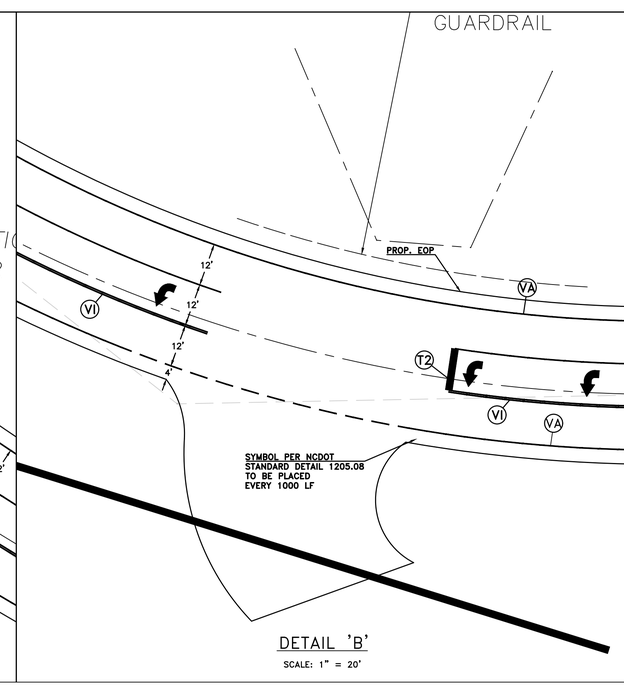



PAVEMENT MARKING SCHEDULE
TIP PROJECT #R-5756

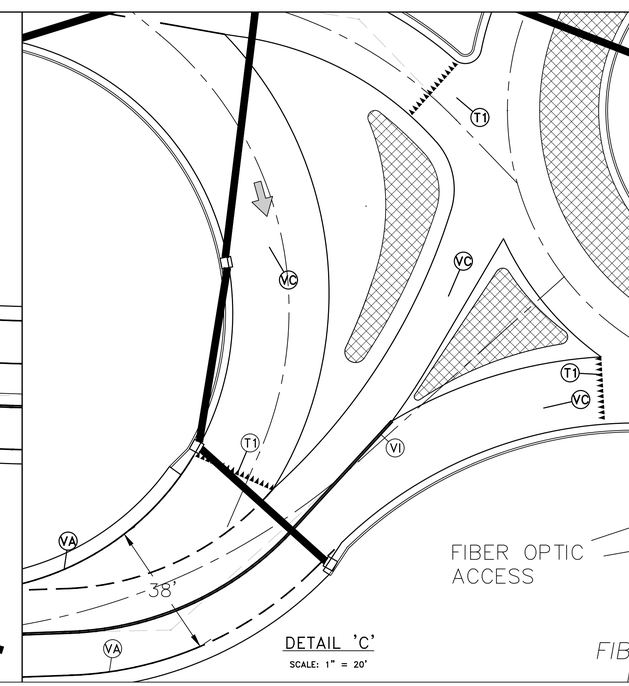
| SYMBOL | DESCRIPTION | FINAL PAVEMENT MARKINGS |
|---|---|---|
| | THERMOPLASTIC (24", 120 MILS) | |
| T1 | WHITE YIELD LINE (PER NCDOT STANDARD DETAIL 1205.08) | |
| T2 | WHITE STOPBAR | |
| VC | WHITE 10' WIDE CROSSWALK (PER NCDOT STANDARD DETAIL 1205.07) | |
| | PAINT PAVEMENT MARKINGS (4") (PER NCDOT STANDARD DETAIL 1205.01) | |
| VI | YELLOW DOUBLE CENTER | |
| VA | WHITE BIKE LANE EDGELINE | |




DETAIL 'A'
SCALE: 1" = 20'



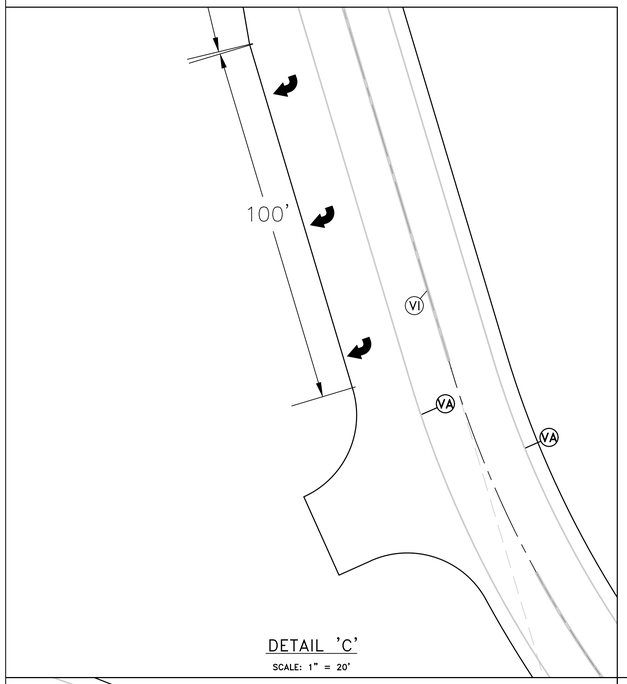

DETAIL 'B'
SCALE: 1" = 20'




DETAIL 'C'
SCALE: 1" = 20'

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| R-5756 | PMP-2 |

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21304 ENGINEER DAVID ODOM
2/13/20




DETAIL 'C'
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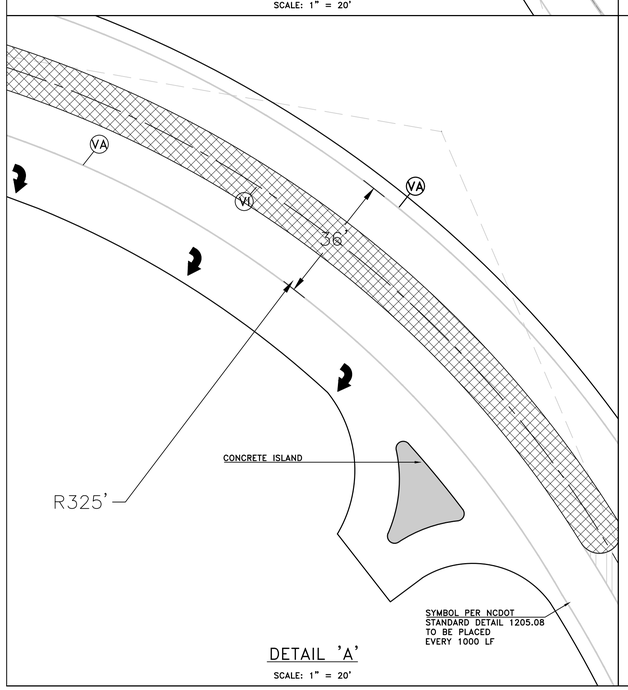
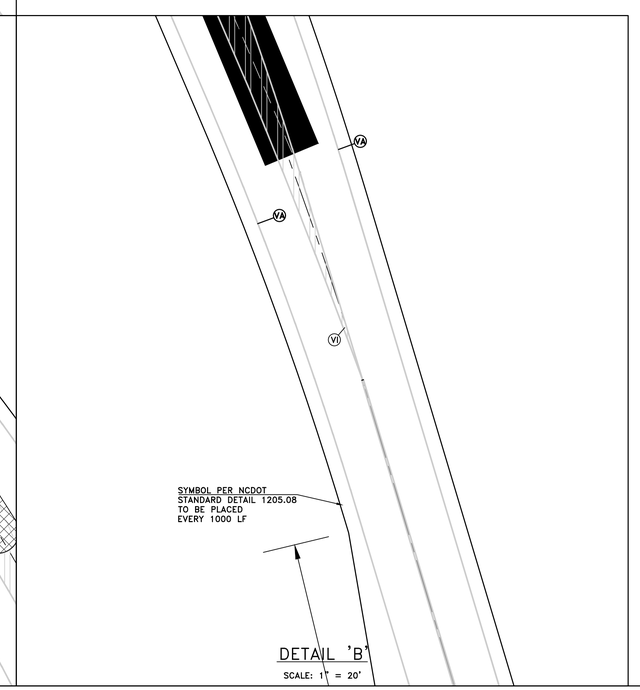



DETAIL 'A'
SCALE: 1" = 20'




DETAIL 'B'
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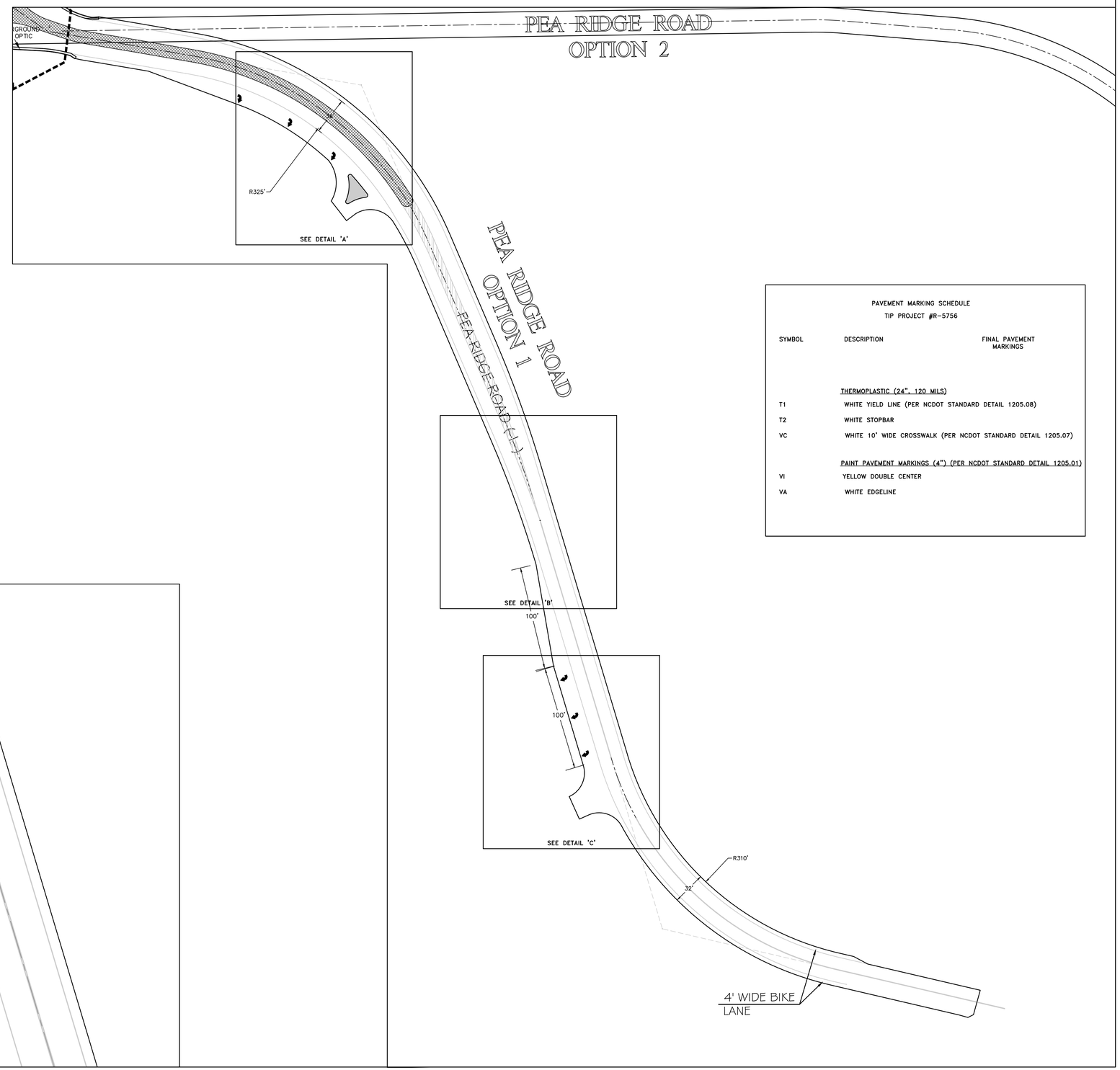


PAVEMENT MARKING SCHEDULE
TIP PROJECT #R-5756

| SYMBOL | DESCRIPTION | FINAL PAVEMENT MARKINGS |
|---|---|---|
| | THERMOPLASTIC (24", 120 MILS) | |
| T1 | WHITE YIELD LINE (PER NCDOT STANDARD DETAIL 1205.08) | |
| T2 | WHITE STOPBAR | |
| VC | WHITE 10' WIDE CROSSWALK (PER NCDOT STANDARD DETAIL 1205.07) | |
| | PAINT PAVEMENT MARKINGS (4") (PER NCDOT STANDARD DETAIL 1205.01) | |
| VI | YELLOW DOUBLE CENTER | |
| VA | WHITE EDGELINE | |