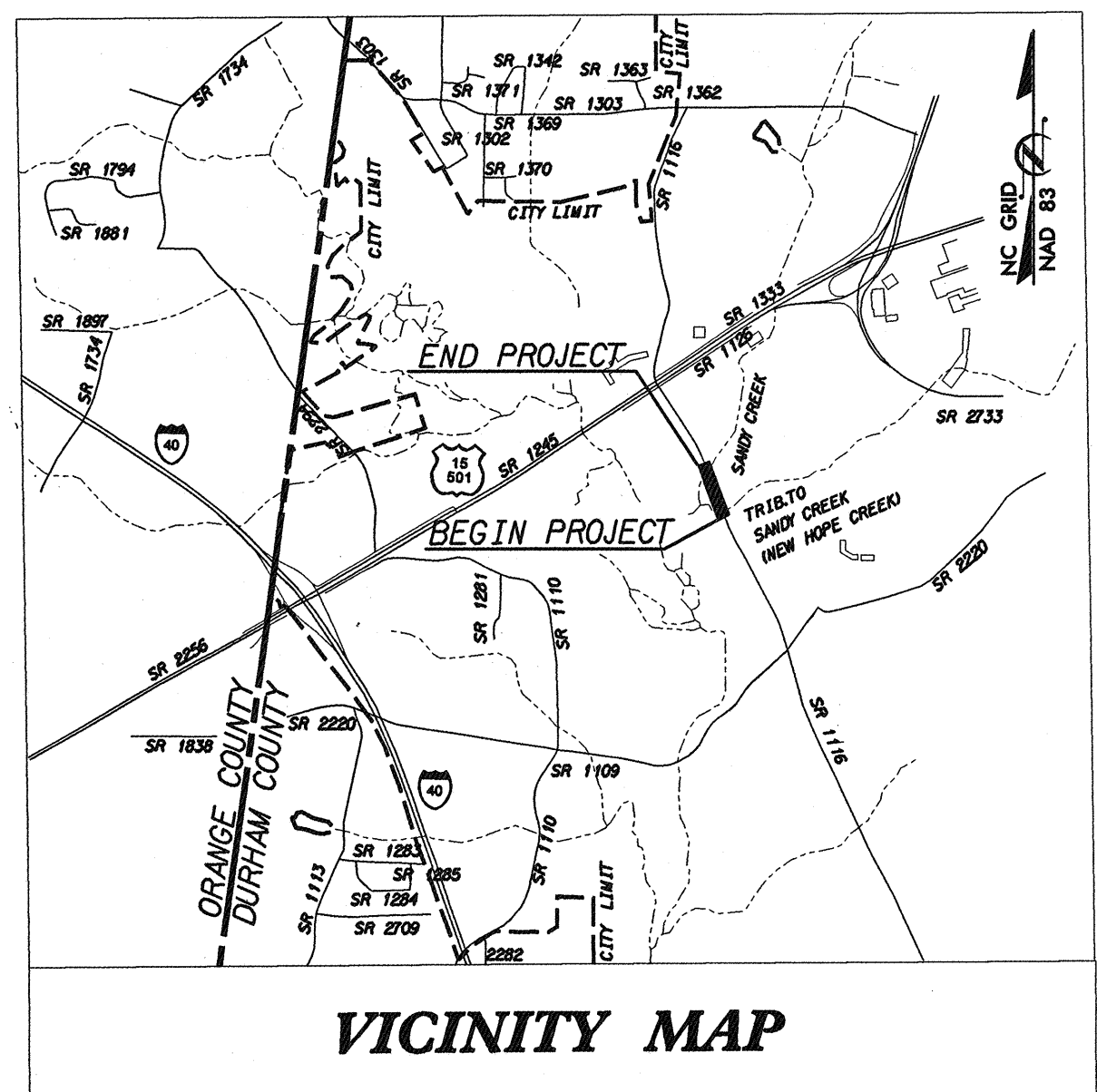


09/08/99

CONTRACT: C201487 TIP PROJECT: B-3450

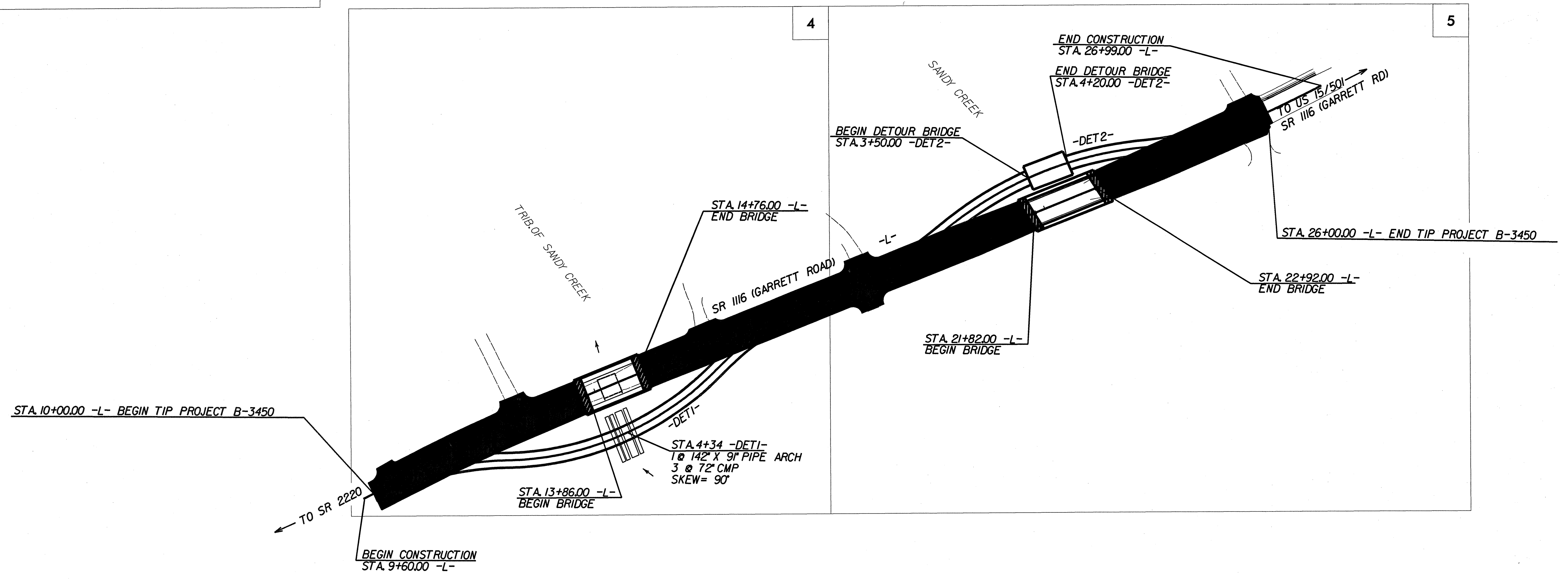
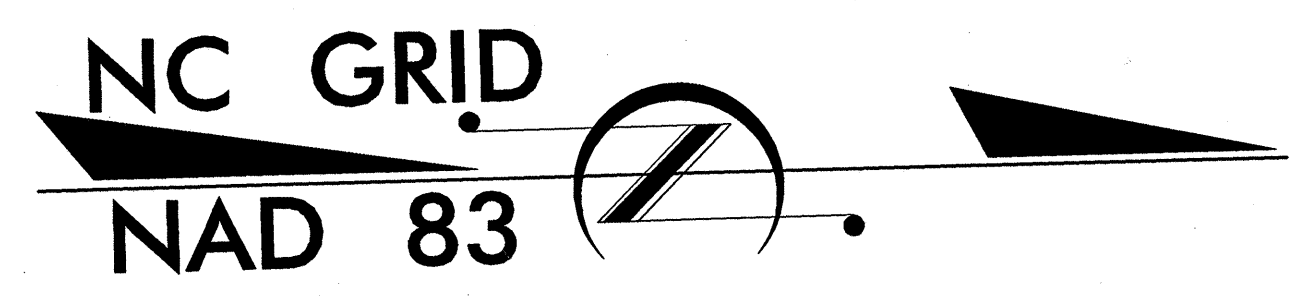
See Sheet 1-A For Index of Sheets  
See Sheet 1-B For Conventional Symbols



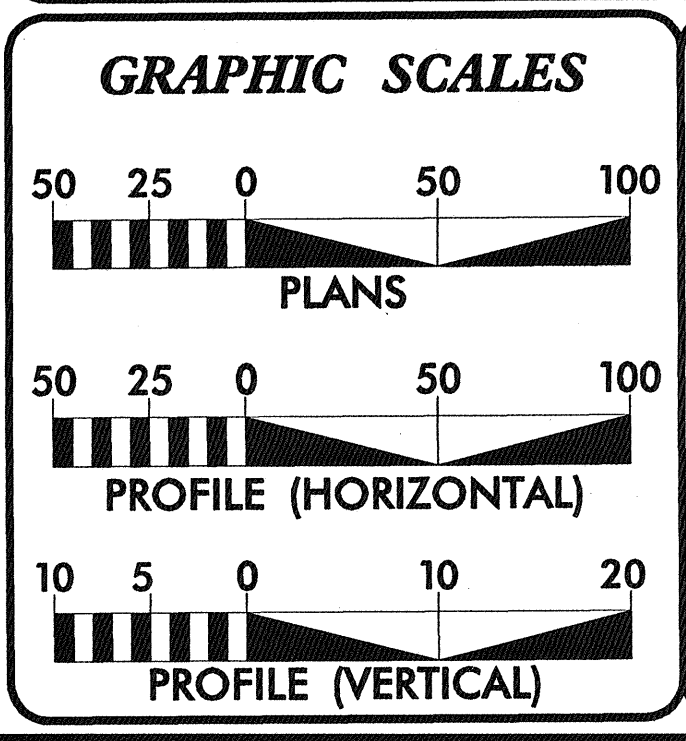
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**DURHAM COUNTY**

**LOCATION: BRIDGE NO. 217 OVER TRIBUTARY OF SANDY CREEK  
AND BRIDGE NO. 122 OVER SANDY CREEK  
AND APPROACHES ON SR 1116**  
**TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES**

|                 |                             |               |              |
|-----------------|-----------------------------|---------------|--------------|
| STATE           | STATE PROJECT REFERENCE NO. | SHEET NO.     | TOTAL SHEETS |
| N.C.            | B-3450                      | 1             |              |
| STATE PROJ. NO. | F.A. PROJ. NO.              | DESCRIPTION   |              |
| 33070.1.1       | BRSTP-1116 (4)              | PE            |              |
| 33070.2.2       | BRSTP-1116 (4)              | RW, UTILITIES |              |
| 33070.3.1       | BRSTP-1116 (6)              | CONST.        |              |



NCDOT CONTACT: MS. CATHY S. HOUSER, PE, PROJECT ENGINEER



**DESIGN DATA**

|            |              |
|------------|--------------|
| ADT 2007 = | 13,300 VPD   |
| ADT 2027 = | 20,400 VPD   |
| DHV =      | 10%          |
| D =        | 55%          |
| T =        | 7% *         |
| V =        | 45 MPH       |
| * TTST     | 3% + DUAL 4% |

**PROJECT LENGTH**

|                                       |            |
|---------------------------------------|------------|
| LENGTH ROADWAY TIP PROJECT B-3450 =   | 0.265 MILE |
| LENGTH STRUCTURE TIP PROJECT B-3450 = | 0.038 MILE |
| TOTAL LENGTH OF TIP PROJECT B-3450 =  | 0.303 MILE |

Prepared for NCDOT In the Office of:  
**KCI Associates of North Carolina, P.A.**  
RALEIGH OFFICE  
ENGINEERS • PLANNERS • ECOLOGISTS

2006 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:** MARCH 21, 2003

**LETTING DATE:** AUGUST 21, 2007

**MICHELLE R. BRAME, P.E.**  
PROJECT ENGINEER

**JENNIFER M. SPOHN**  
PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

**ROADWAY DESIGN ENGINEER**

Seals and signatures for both roles, dated 3/16/07.

**DIVISION OF HIGHWAYS**  
**STATE OF NORTH CAROLINA**

P.E. STATE HIGHWAY DESIGN ENGINEER

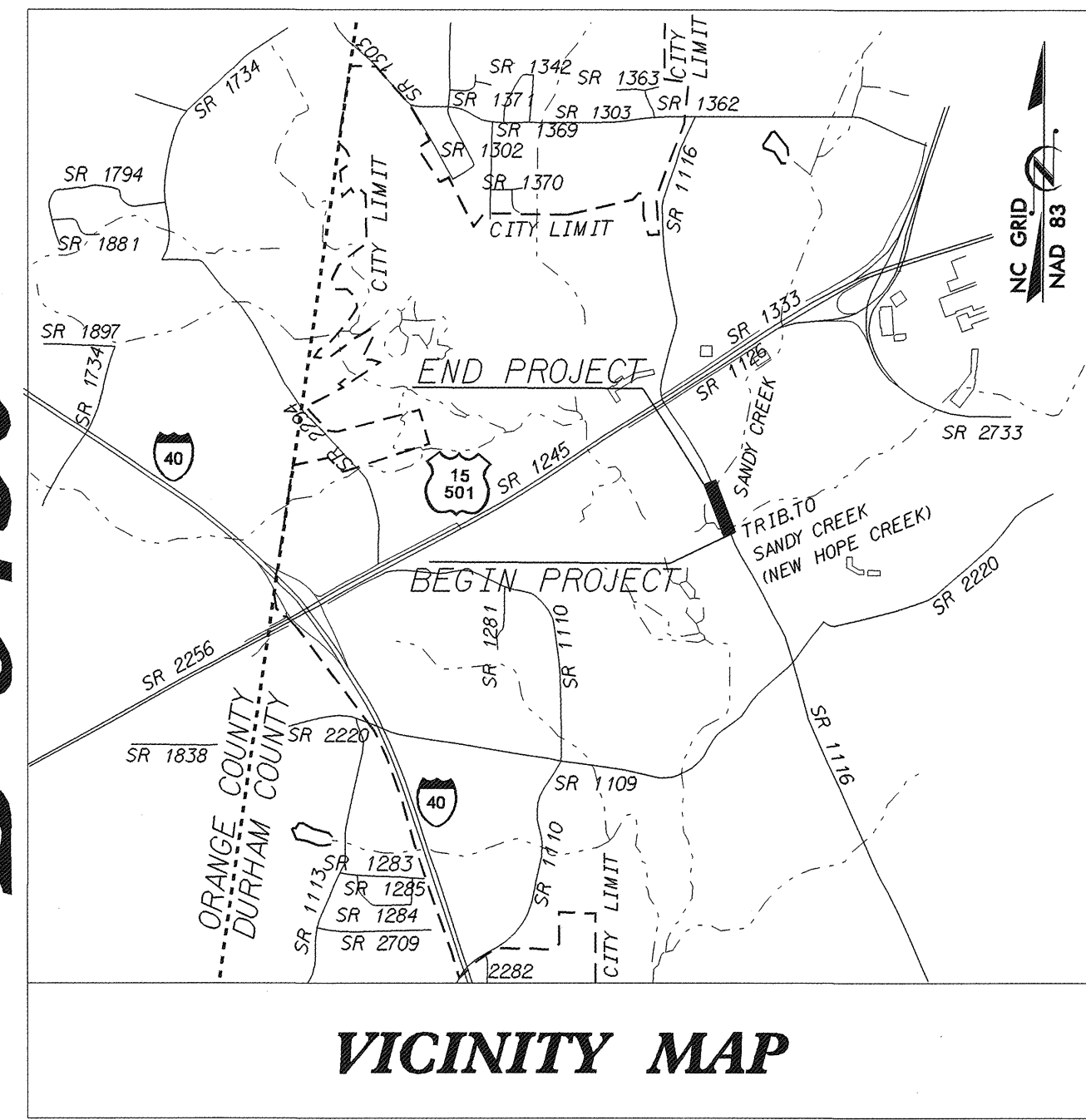
6/2/99

B-3450

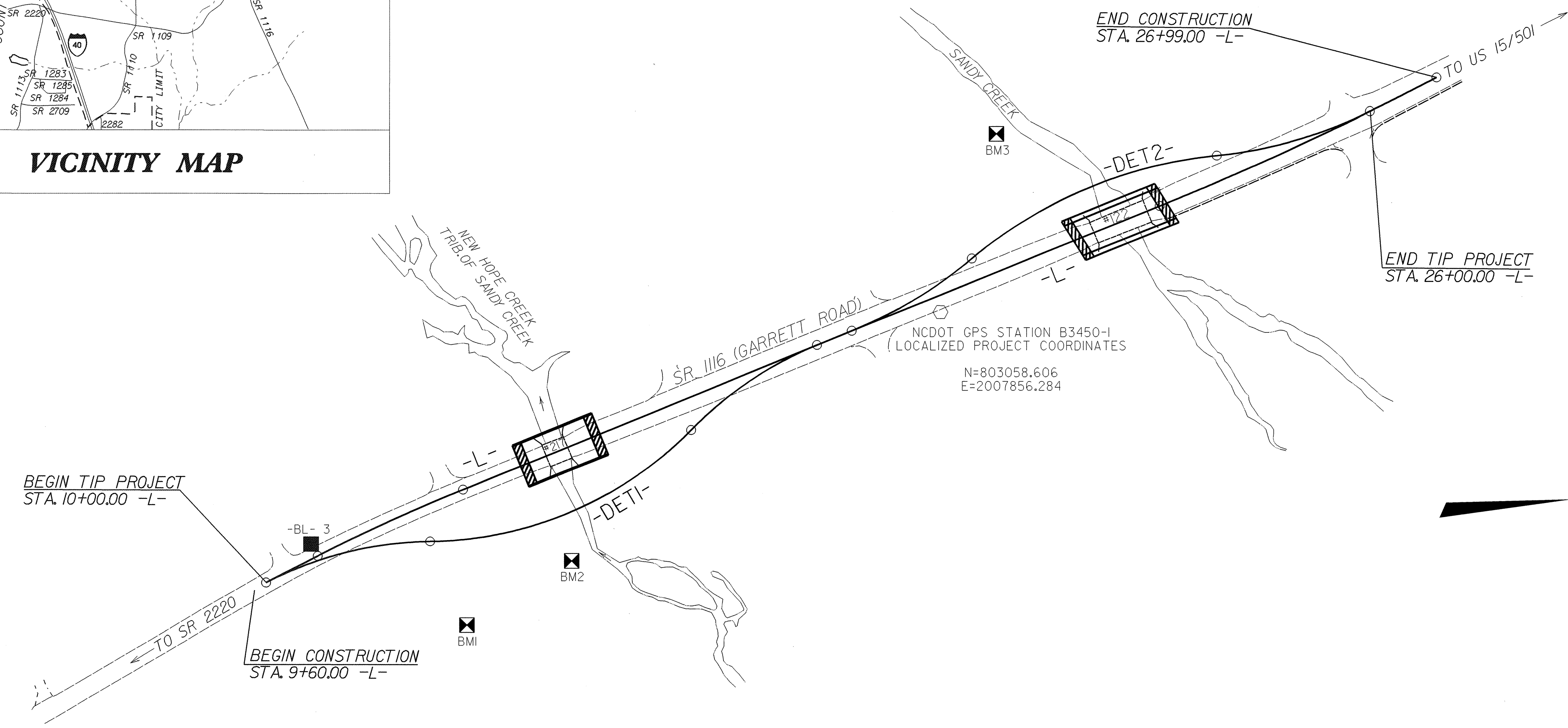
|                       |           |
|-----------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| B-3450                | 1C        |
| Location and Surveys  |           |

# SURVEY CONTROL SHEET B-3450 DURHAM COUNTY

**LOCATION: BRIDGE NO. 217 OVER TRIBUTARY OF SANDY CREEK  
AND BRIDGE NO. 122 OVER SANDY CREEK AND  
APPROACHES ON SR 1116 ( GARRETT ROAD )**



BM4  
NCDOT GPS STATION B3450-2  
LOCALIZED PROJECT COORDINATES  
N=804186.192  
E=2007324.474



**CONTROL DATA**

| BASELINE POINT | DESC.   | NORTH       | EAST         | ELEVATION | L STATION              | OFFSET   |
|----------------|---------|-------------|--------------|-----------|------------------------|----------|
| 3              | BL-3    | 802211.1690 | 2008141.0040 | 258.12    | 10+76.85               | 18.27 LT |
| 1              | B3450-1 | 803058.6060 | 2007856.2840 | 257.31    | 19+69.03               | 21.20 RT |
| 2              | B3450-2 | 804186.1920 | 2007324.4740 | 261.12    | OUTSIDE PROJECT LIMITS |          |

**BENCHMARK DATA**

|                               |                    |                                  |                    |
|-------------------------------|--------------------|----------------------------------|--------------------|
| BM1                           | ELEVATION = 252.49 | BM2                              | ELEVATION = 250.12 |
| N 802415                      | E 2008254          | N 802558                         | E 2008173          |
| L STATION 12+23 167 RIGHT     |                    | L STATION 13+89 142 RIGHT        |                    |
| RR SPIKE SET IN 16 INCH GUM   |                    | RR SPIKE SET IN 14 INCH TWIN GUM |                    |
| BM3                           | ELEVATION = 250.58 | BM4                              | ELEVATION = 262.14 |
| N 803140                      | E 2007621          | N 804247                         | E 2007281          |
| L STATION 21+28 171 LEFT      |                    | L STATION 26+99                  |                    |
| RR SPIKE SET IN 15 INCH BEECH |                    | N 28° 34' 02.3" W DIST 590.95    |                    |
|                               |                    | RR SPIKE SET IN POWER POLE       |                    |

**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3450-1" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 803058.606(ft) EASTING: 2007856.284(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99994845 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3450-1" TO -L- STATION 10+00.00 IS S 20°11'06.2" E 968.50' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD 29

**NOTE: DRAWING NOT TO SCALE**

**NOTES:**

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.doh.dot.state.nc.us/preconstruct/highway/location/project/)  
B3450\_LS\_CONTROL\_070312.txt

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.  
O INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.  
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

27-MAR-2007 09:57  
I:\PROJECTS\2007\B3450\_1s\_1c\_070312.dgn

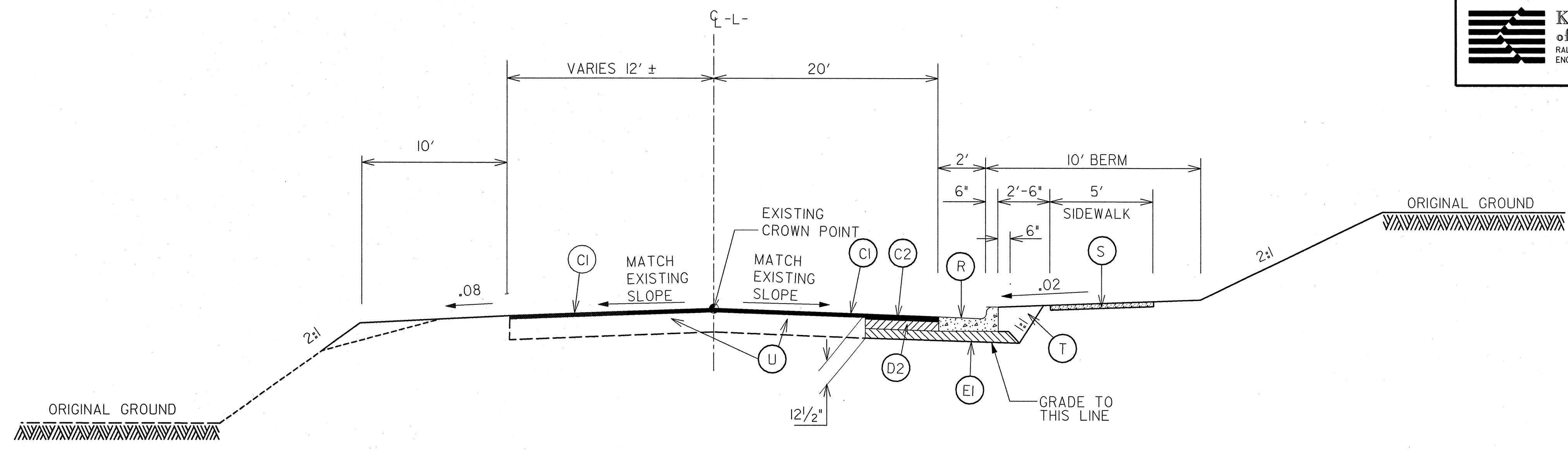




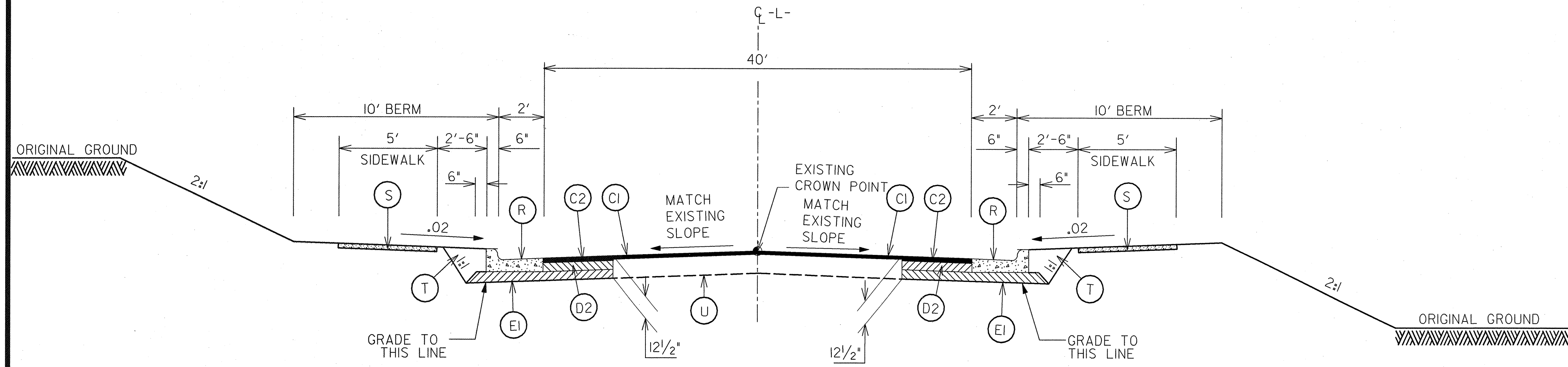
**KCI Associates**  
of North Carolina, P.A.  
RALEIGH OFFICE  
ENGINEERS • PLANNERS • ECOLOGISTS

SUITE 220, LANDMARK CENTER II  
4601 SIX FORKS RD.  
RALEIGH, N.C. 27609-5210  
(919) 783-9214

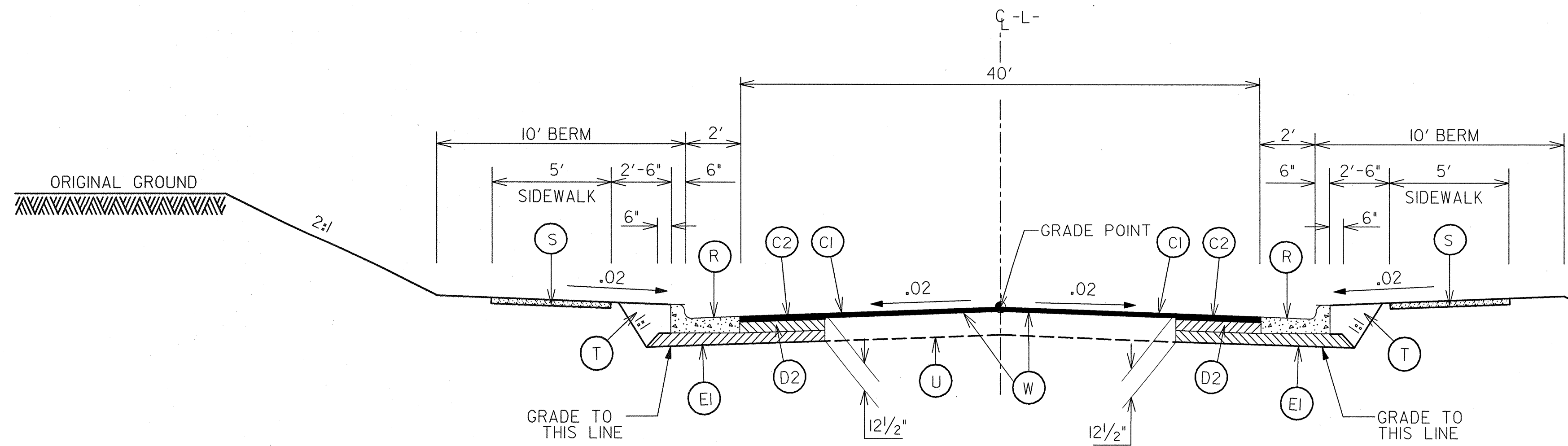
|  |  |
|--|--|
| PROJECT REFERENCE NO.<br>B-3450                                      | SHEET NO.<br>2   |
| RW SHEET NO.   |  |
| ROADWAY DESIGN ENGINEER<br>MICHAEL R. FOSTER<br>SEAL 22761<br>3/1/07 | PAVEMENT DESIGN ENGINEER<br>CLARK S. MORRISON<br>SEAL 22896<br>3-14-07 |



**TYPICAL SECTION NO.1**  
-L- STA. 10+00.00 TO STA. 10+42.00



**TYPICAL SECTION NO.2**  
-L- STA. 10+42.00 TO STA. 10+70.00

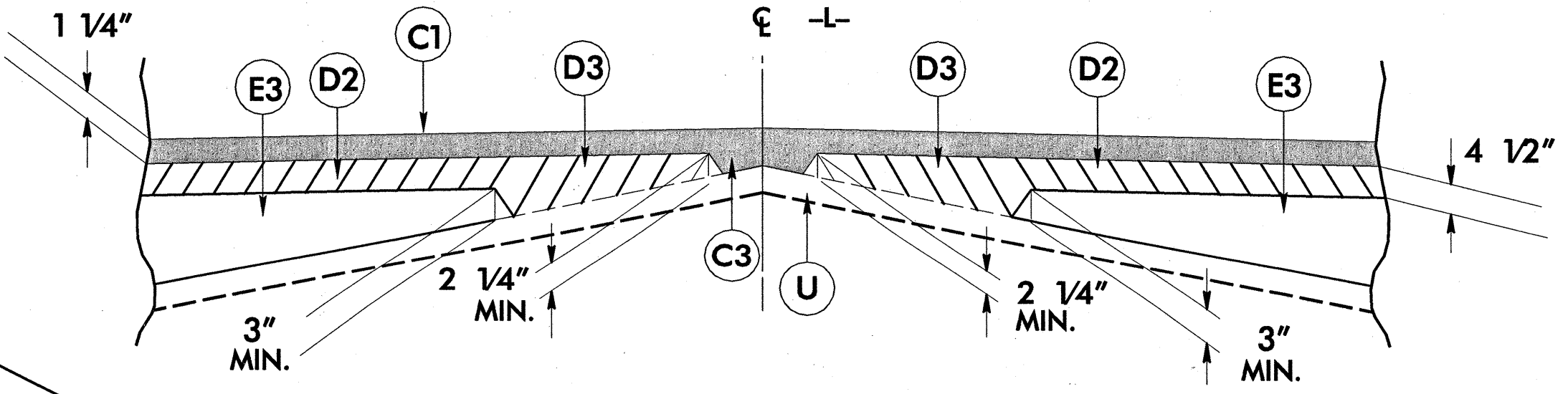


**TYPICAL SECTION NO.3**  
-L- STA. 10+70.00 TO STA. 13+00.00  
-L- STA. 15+50.00 TO STA. 20+50.00

**PAVEMENT SCHEDULE**

| CODE | DESCRIPTION  |
|------|--|
| (C1) | PROP. APPROX. 1 1/4" ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 140 LBS PER SQ. YARD.   |
| (C2) | PROP. APPROX. 2 1/2" ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 140 LBS PER SQ. YARD IN EACH OF TWO LAYERS.   |
| (C3) | PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS PER SQ. YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1 1/2" IN DEPTH.                                       |
| (D1) | PROP. APPROX. 2 1/2" ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS PER SQ. YARD.   |
| (D2) | PROP. APPROX. 4 1/2" ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 256.5 LBS PER SQ. YARD IN EACH OF TWO LAYERS.   |
| (D3) | PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/4" IN DEPTH OR GREATER THAN 4" IN DEPTH. |
| (E1) | PROP. APPROX. 5 1/2" ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS PER SQ. YARD.   |
| (E2) | PROP. APPROX. 3" ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS PER SQ. YARD.   |
| (E3) | PROP. VAR. DEPTH ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT GREATER THAN 5 1/2" IN DEPTH OR LESS THAN 3" IN DEPTH.            |
| (R)  | 2'-6" CONCRETE CURB AND GUTTER.  |
| (S)  | 4" CONCRETE SIDEWALK.  |
| (T)  | EARTH MATERIAL.  |
| (U)  | EXISTING PAVEMENT MATERIAL.  |
| (V)  | MILLING BITUMINOUS PAVEMENT, 1 1/4" DEPTH.   |
| (W)  | VAR. DEPTH ASPHALT PAVEMENT. (SEE WEDGING DETAIL)  |

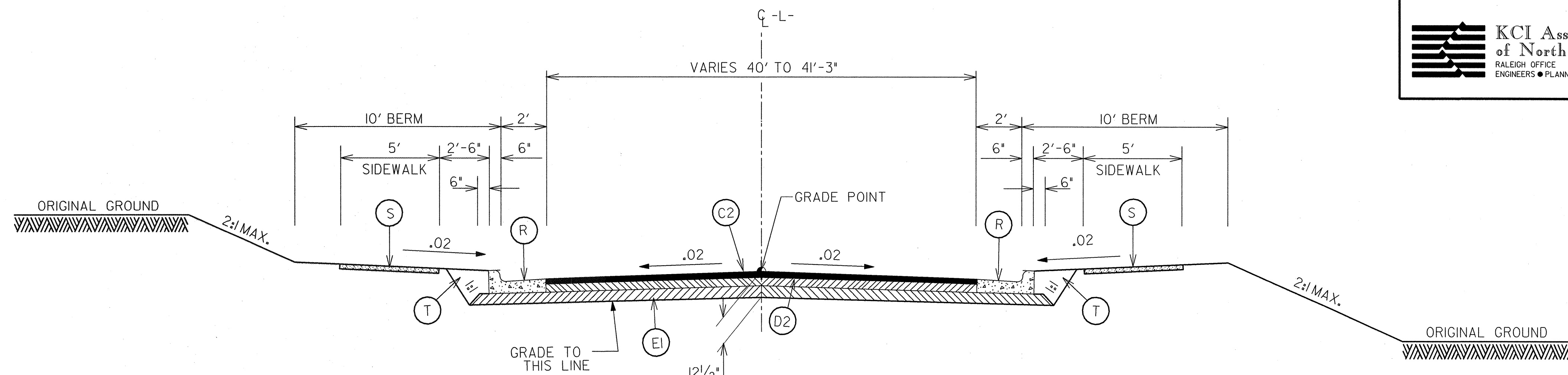
USE 1:1 PAVEMENT EDGE SLOPES UNLESS OTHERWISE NOTED



**WEDGING DETAIL**

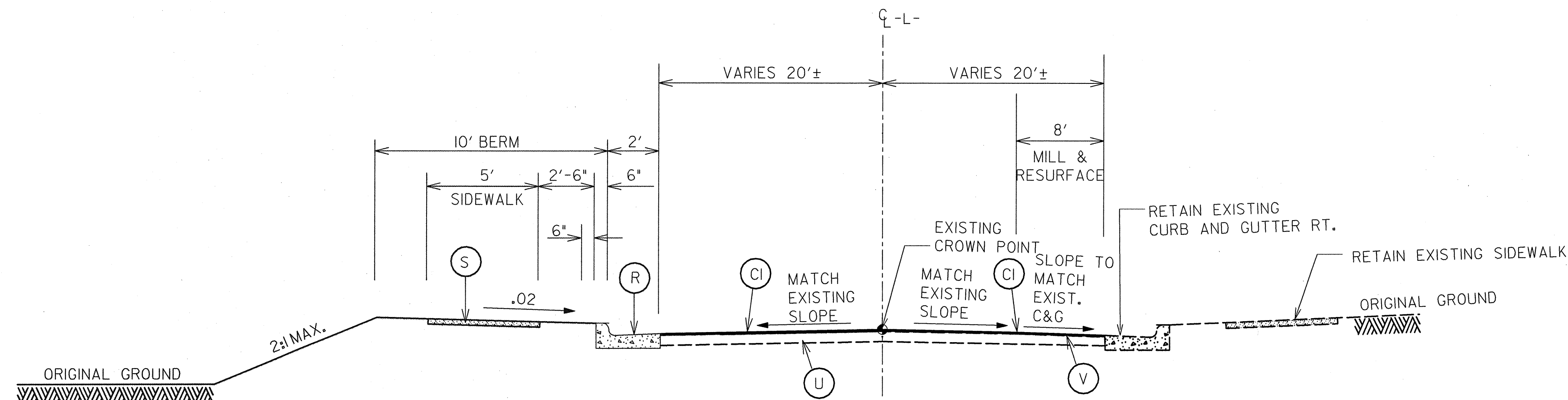
WEDGE AS REQUIRED TO ACHIEVE DESIRED CROSS SLOPE AS DIRECTED BY ENGINEER

REVISIONS



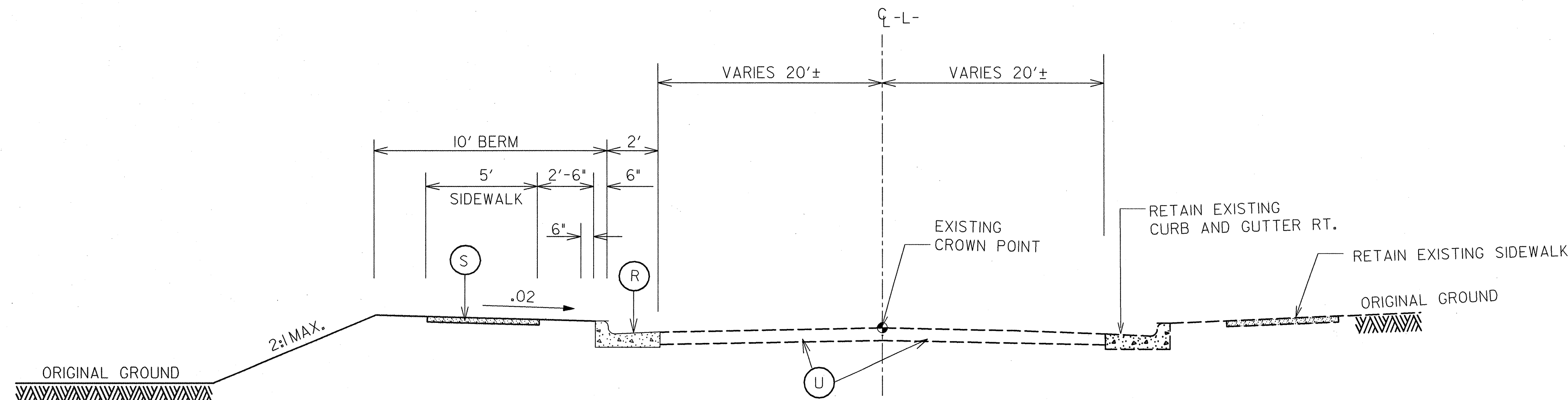
**TYPICAL SECTION NO. 4**

-L- STA. 13+00.00 TO STA. 13+86.00 (BEGIN BRIDGE)  
-L- STA. 14+76.00 (END BRIDGE) TO STA. 15+50.00  
-L- STA. 20+50.00 TO STA. 21+82.00 (BEGIN BRIDGE)  
-L- STA. 22+92.00 (END BRIDGE) TO STA. 24+00.00



**TYPICAL SECTION NO. 5**

-L- STA. 24+00.00 TO STA. 26+00.00



**TYPICAL SECTION NO. 6**

-L- STA. 26+00.00 TO STA. 26+99.00

**PAVEMENT SCHEDULE**

| CODE | DESCRIPTION   |
|------|---|
| (C1) | PROP. APPROX. 1 1/4" ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 140 LBS PER SQ. YARD.  |
| (C2) | PROP. APPROX. 2 1/2" ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 140 LBS PER SQ. YARD IN EACH OF TWO LAYERS.  |
| (C3) | PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS PER SQ. YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1 1/2" IN DEPTH.                                      |
| (D1) | PROP. APPROX. 2 1/2" ASPHALT CONC. INTERMEDIATE COURSE, TYPE I9.0B, AT AN AVERAGE RATE OF 285 LBS PER SQ. YARD.   |
| (D2) | PROP. APPROX. 4 1/2" ASPHALT CONC. INTERMEDIATE COURSE, TYPE I9.0B, AT AN AVERAGE RATE OF 256.5 LBS PER SQ. YARD IN EACH OF TWO LAYERS.   |
| (D3) | PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I9.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/4" IN DEPTH OR GREATER THAN 4" IN DEPTH. |
| (E1) | PROP. APPROX. 5 1/2" ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS PER SQ. YARD.  |
| (E2) | PROP. APPROX. 3" ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS PER SQ. YARD.  |
| (E3) | PROP. VAR. DEPTH ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS PER SQ. YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT GREATER THAN 5 1/2" IN DEPTH OR LESS THAN 3" IN DEPTH.           |
| (R)  | 2'-6" CONCRETE CURB AND GUTTER.   |
| (S)  | 4" CONCRETE SIDEWALK.   |
| (T)  | EARTH MATERIAL.   |
| (U)  | EXISTING PAVEMENT MATERIAL.   |
| (V)  | MILLING BITUMINOUS PAVEMENT, 1 1/4" DEPTH.  |
| (W)  | VAR. DEPTH ASPHALT PAVEMENT. (SEE WEDGING DETAIL)   |

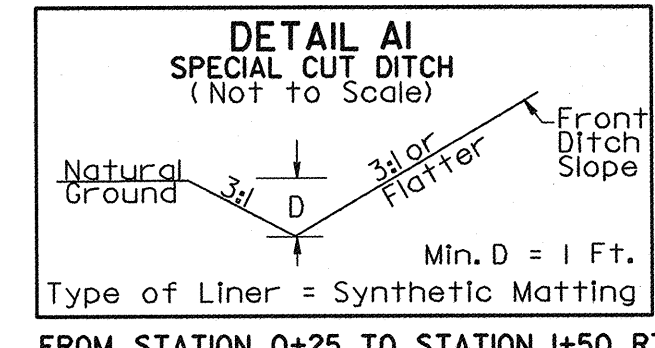
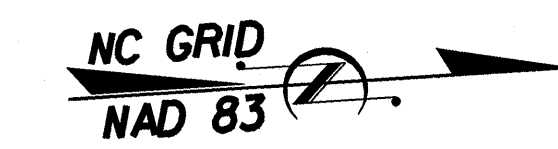
USE 1:1 PAVEMENT EDGE SLOPES UNLESS OTHERWISE NOTED

REVISIONS

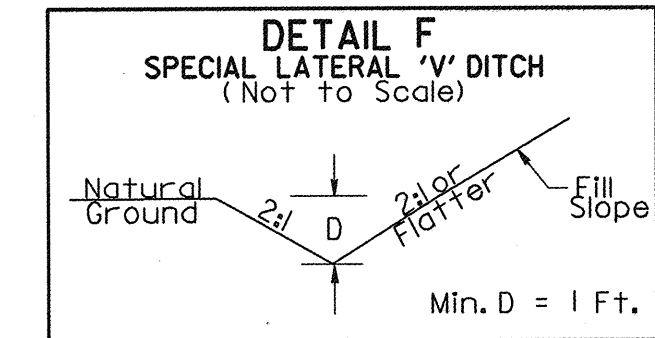




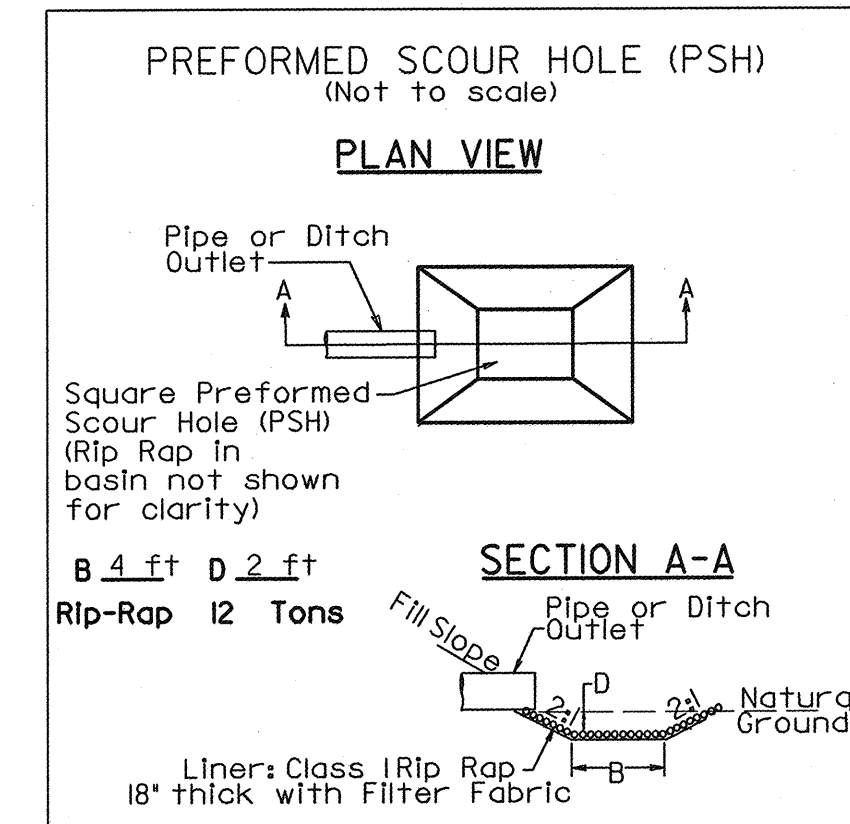
# DETOUR I



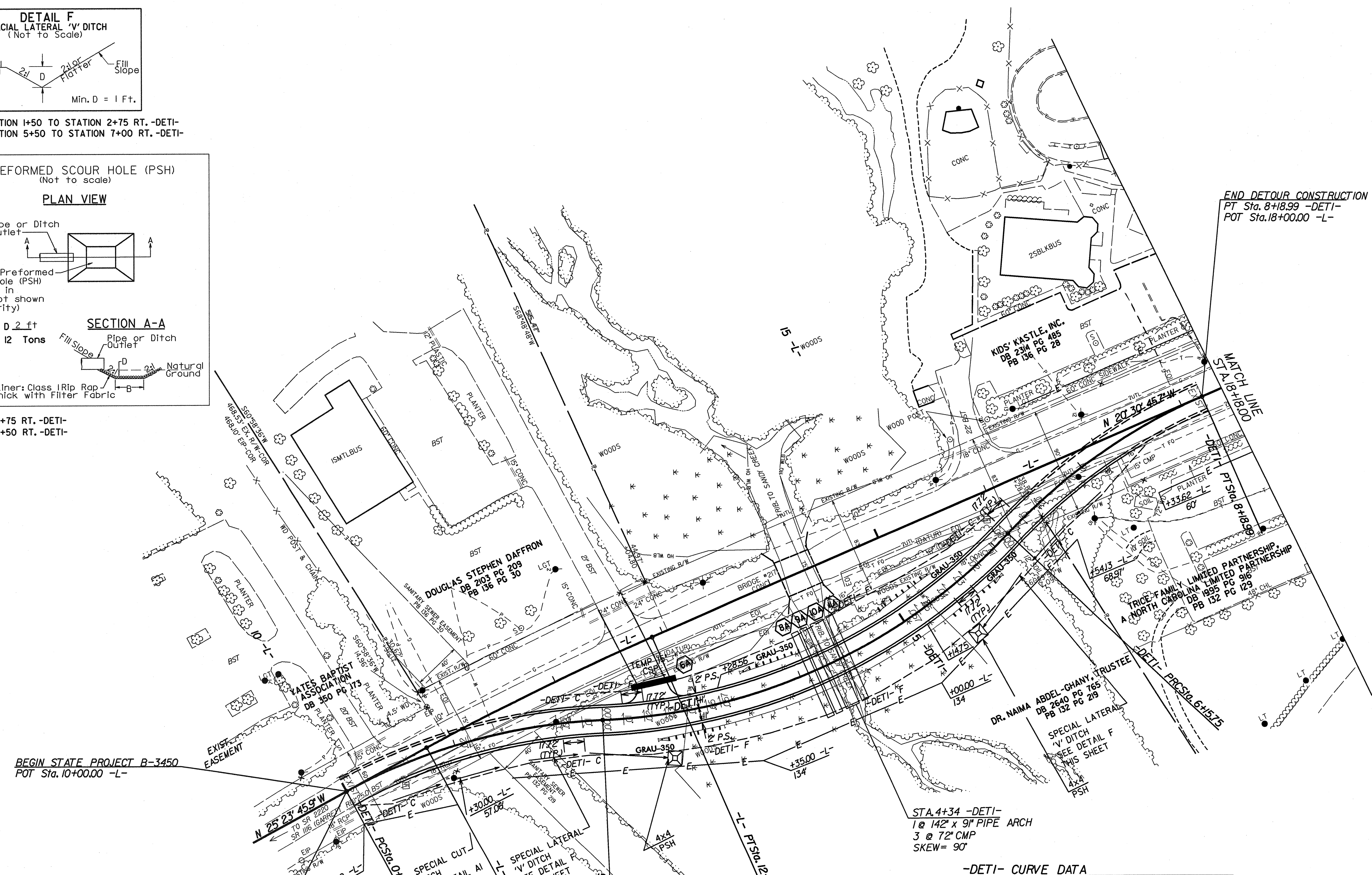
FROM STATION 0+25 TO STATION 1+50 RT. -DETI-



FROM STATION 1+50 TO STATION 2+75 RT. -DETI-  
FROM STATION 5+50 TO STATION 7+00 RT. -DETI-



STATION 2+75 RT. -DETI-  
STATION 5+50 RT. -DETI-



BEGIN STATE PROJECT B-3450  
POT Sta. 10+00.00 -L-

BEGIN DETOUR CONSTRUCTION  
POT Sta. 10+00.00 -L-  
PC Sta. 0+00.00 -DETI-

END DETOUR CONSTRUCTION  
PT Sta. 8+18.99 -DETI-  
POT Sta. 18+00.00 -L-

**-L- CURVE DATA**

|                 |                                      |                  |             |             |              |           |                    |            |
|-----------------|--------------------------------------|------------------|-------------|-------------|--------------|-----------|--------------------|------------|
| PI Sta 11+84.04 | $\Delta = 4^{\circ} 53' 00.2''$ (RT) | D = 2' 17' 30.6" | L = 213.08' | T = 106.60' | R = 2500.00' | SE = 0.03 | RUNOFF = SEE PLANS | V = 45 MPH |
|-----------------|--------------------------------------|------------------|-------------|-------------|--------------|-----------|--------------------|------------|

**-DETI- CURVE DATA**

|                |                                       |                   |             |             |             |                |                    |            |
|----------------|---------------------------------------|-------------------|-------------|-------------|-------------|----------------|--------------------|------------|
| PI Sta 1+15.79 | $\Delta = 26^{\circ} 04' 35.3''$ (RT) | D = 11' 27' 33.0" | L = 227.56' | T = 115.79' | R = 500.00' | SE = SEE PLANS | RUNOFF = SEE PLANS | V = 35 MPH |
| PI Sta 4+32.03 | $\Delta = 44^{\circ} 28' 59.1''$ (LT) | D = 11' 27' 33.0" | L = 388.19' | T = 204.47' | R = 500.00' | SE = 0.057     | RUNOFF = SEE PLANS | V = 35 MPH |
| PI Sta 7+18.79 | $\Delta = 23^{\circ} 17' 23.9''$ (RT) | D = 11' 27' 33.0" | L = 203.24' | T = 103.04' | R = 500.00' | SE = SEE PLANS | RUNOFF = SEE PLANS | V = 35 MPH |

**NOTES:**  
1. SEE SHEET 6 FOR -L- GRADE & PROFILE & SHEET 7 FOR -DETI- GRADE & PROFILE.  
2. ALL PROPOSED DRIVEWAY RADII 25 FT UNLESS OTHERWISE SHOWN.  
3. FLAT GRATES TO BE USED ON ENTIRE PROJECT.

REVISIONS

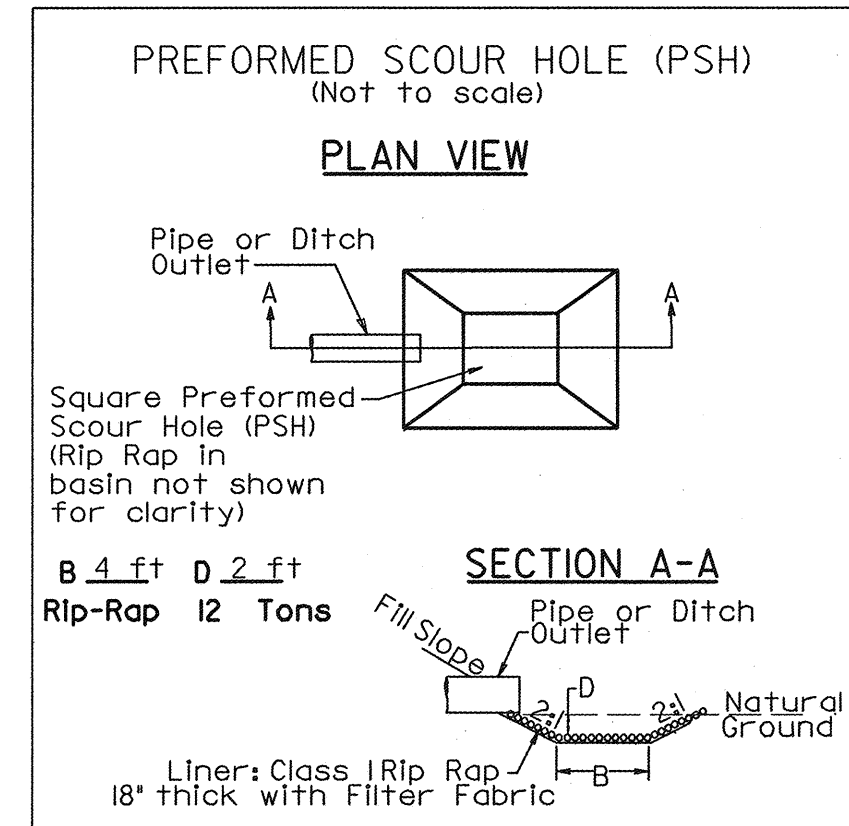
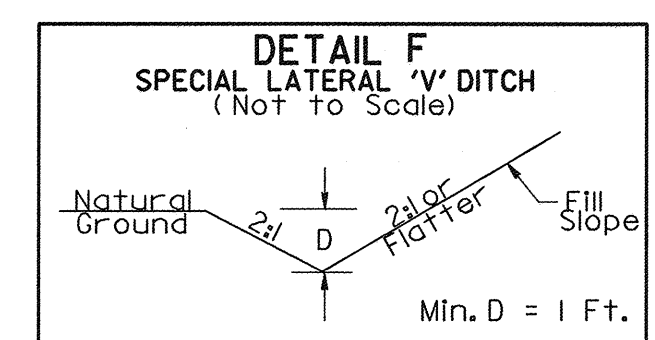
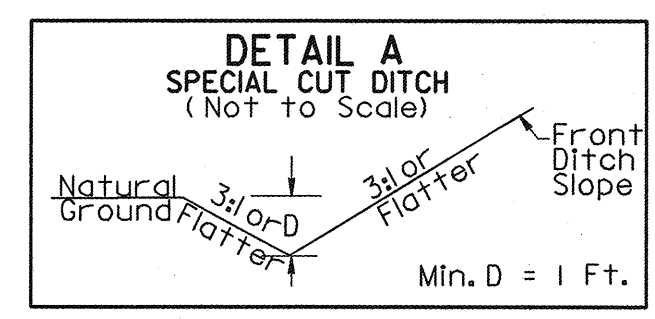


|  |  |
|--|--|
| PROJECT REFERENCE NO.<br>B-3450  | SHEET NO.<br>2-D   |
| RW SHEET NO.   |  |
| ROADWAY DESIGN<br>ENGINEER<br>NORTH CAROLINA<br>PROFESSIONAL<br>SEAL<br>227612<br>MICHELLE R. BRANN<br>3/16/07 | HYDRAULICS<br>ENGINEER<br>NORTH CAROLINA<br>PROFESSIONAL<br>SEAL<br>023090<br>AUREY B. BURNETTE<br>3/16/07 |

# DETOUR 2

**-DET2- CURVE DATA**

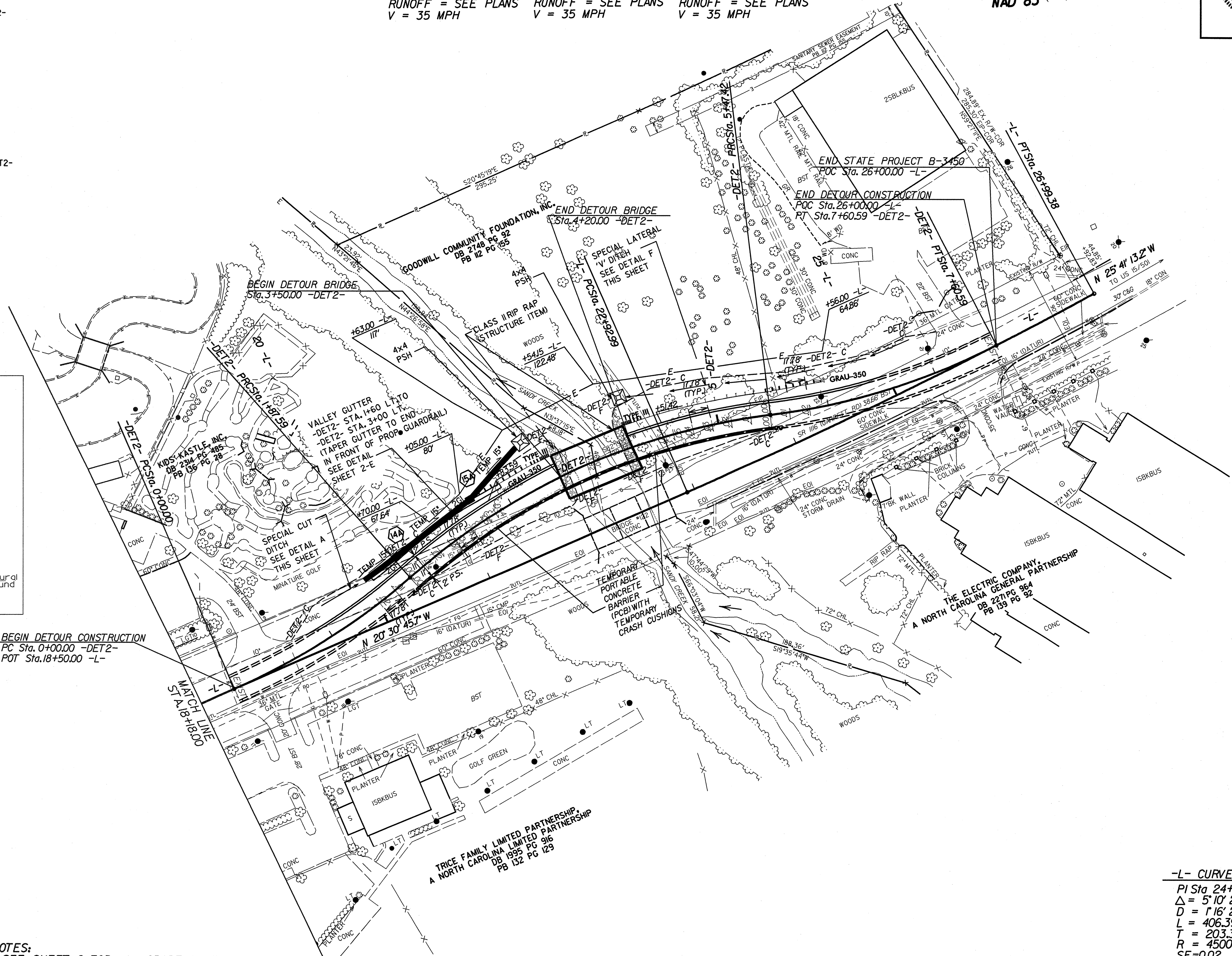
|  |   |   |
|--|---|---|
| PI Sta 0+94.57<br>Δ = 17° 54' 49.5" (LT)<br>D = 9' 32' 57.5"<br>L = 187.59'<br>T = 94.57'<br>R = 600.00'<br>SE = SEE PLANS<br>RUNOFF = SEE PLANS<br>V = 35 MPH | PI Sta 3+73.10<br>Δ = 34° 21' 39.3" (RT)<br>D = 9' 32' 57.5"<br>L = 359.83'<br>T = 185.51'<br>R = 600.00'<br>SE = 0.054<br>RUNOFF = SEE PLANS<br>V = 35 MPH | PI Sta 6+55.14<br>Δ = 20° 21' 22.0" (LT)<br>D = 9' 32' 57.5"<br>L = 213.71'<br>T = 107.72'<br>R = 600.00'<br>SE = SEE PLANS<br>RUNOFF = SEE PLANS<br>V = 35 MPH |
|--|---|---|



STATION 3+30 LT. -DET2-  
STATION 4+30 LT. -DET2-

BEGIN DETOUR CONSTRUCTION  
PC Sta. 0+00.00 -DET2-  
POT Sta. 18+50.00 -L-

**NOTES:**  
1. SEE SHEET 6 FOR -L- GRADE & PROFILE & SHEET 7 FOR -DET2- GRADE & PROFILE.  
2. ALL PROPOSED DRIVEWAY RADII 25 FT UNLESS OTHERWISE SHOWN.  
3. FLAT GRATES TO BE USED ON ENTIRE PROJECT.

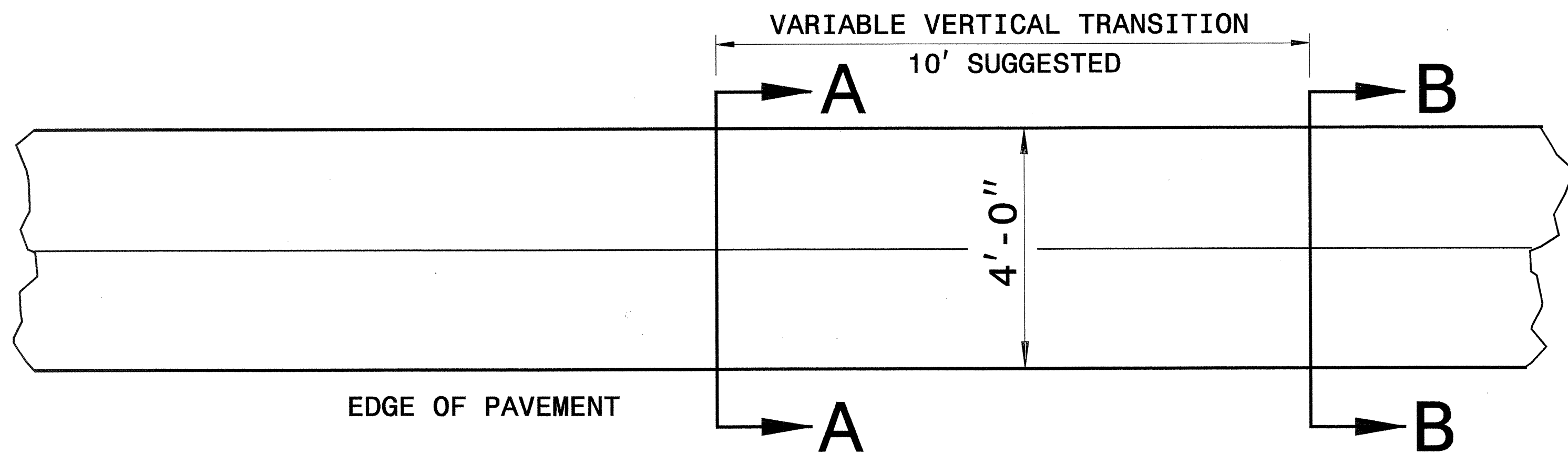


**-L- CURVE DATA**

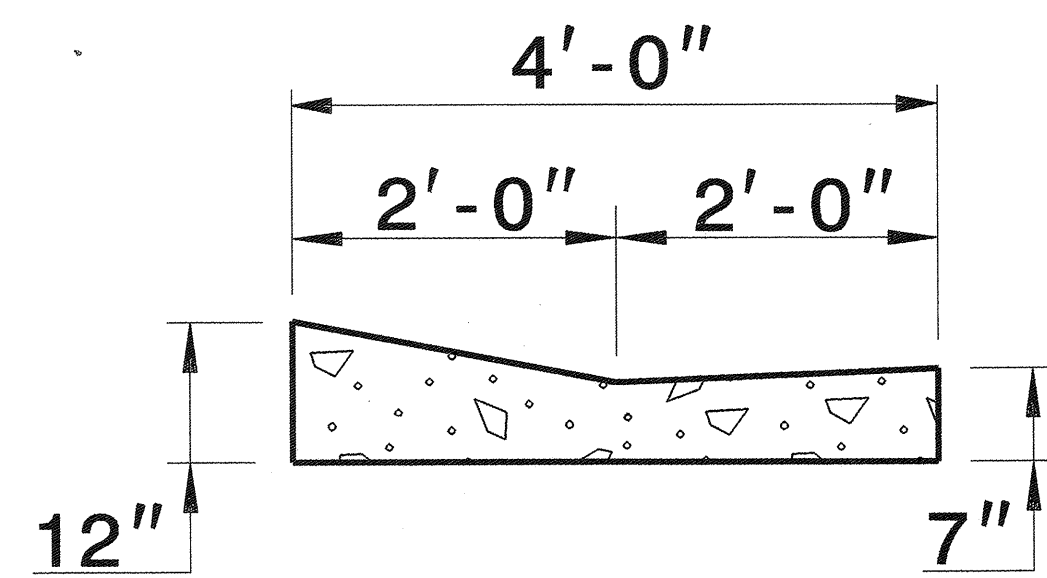
|   |
|---|
| PI Sta 24+96.32<br>Δ = 5° 10' 27.5" (LT)<br>D = 1' 16' 23.7"<br>L = 406.39'<br>T = 203.33'<br>R = 4500.00'<br>SE = 0.02<br>RUNOFF = SEE PLANS<br>V = 45 MPH |
|---|

REVISIONS

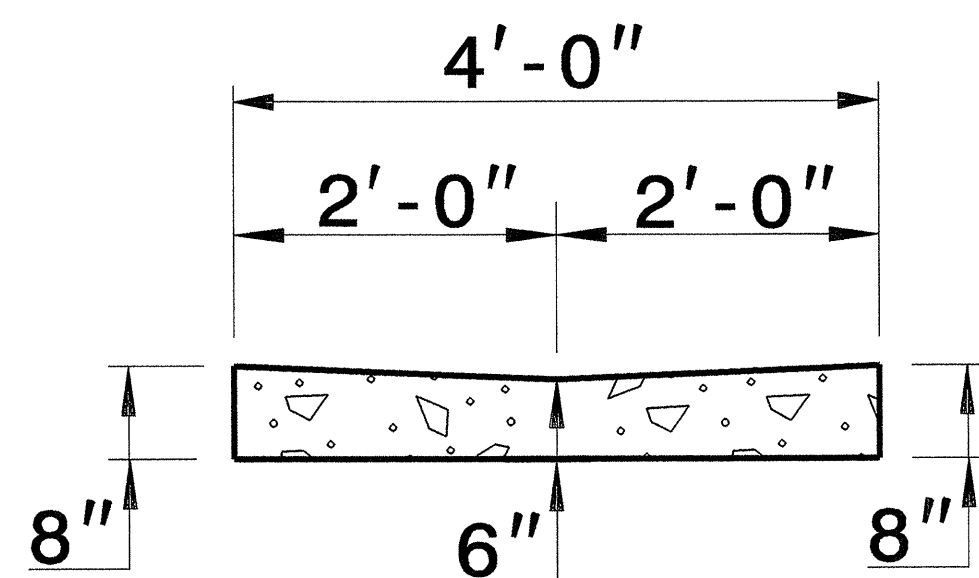
5/14/99



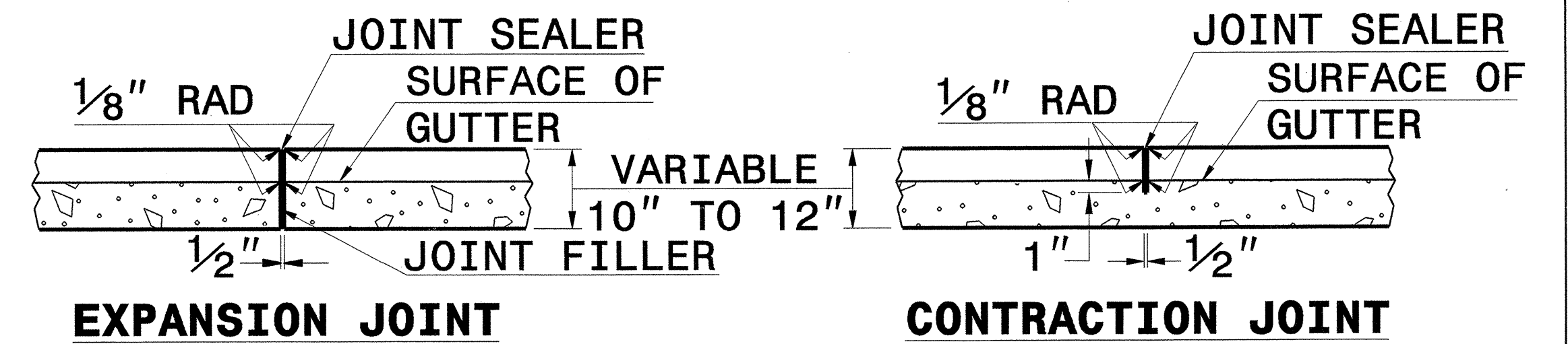
**PLAN VIEW**  
**EXPRESSWAY GUTTER TO VALLEY GUTTER**



**SECTION A-A**  
**EXPRESSWAY GUTTER**



**SECTION B-B**  
**VALLEY GUTTER**



- NOTES:**
- IN THE TRANSITION FROM 4'-0" CONCRETE EXPRESSWAY GUTTER TO 4'-0" CONCRETE VALLEY GUTTER IF REQUIRED, PLACE 1/2" EXPANSION JOINTS AT 25' INTERVALS.
  - PLACE GROOVE JOINTS 1" DEEP AT 12'-6" INTERVALS BETWEEN EXPANSION JOINTS.
  - FILL AND SEAL THE TOP 1/2" OF THE EXPANSION JOINTS AND 1/2" OF CONTRACTION JOINTS WITH APPROVED JOINT SEALING COMPOUND.
  - PAYMENT FOR ANY MODIFICATION OF EXPRESSWAY CONCRETE GUTTER IS TO BE PAID FOR PER SPECIAL PROVISION.

H. Schwab  
 3/2/04

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

**TRANSITION DETAIL FOR**  
**VALLEY GUTTER**

ORIGINAL BY: RN Britt DATE: Oct. 16, 2002  
 MODIFIED BY: H. Schwab DATE: Feb. 19, 2003  
 CHECKED BY: *[Signature]* DATE: 3-03  
 FILE SPEC.:

03-MAR-2003 10:31  
 W:\Special\_Details\hscchwab\CompletedProjects\B-3450\B3450expressgutter.dgn  
 rnbritt H:\DS188629

NBRITT - ENGLISH - EXPRESSWAY TO VALLEY GUTTER.DGN



**NOTES**

FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE SPECIAL PROVISIONS.

SELECT THE APPROPRIATE STANDARD SHORING DESIGN FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC IN LIEU OF SUBMITTING CONTRACTOR SHORING DESIGN. USE STANDARD SHORING DESIGN ONLY WHEN ALL OF THE FOLLOWING CRITERIA ARE MET:

- MAXIMUM HEIGHT OF SHORING EXCAVATION IS 11 FEET
- GROUNDWATER TABLE IS NOT ABOVE BOTTOM OF THE EXCAVATION
- BACKFILL SLOPE IS 2:1 OR FLATTER
- TRAFFIC SURCHARGE EQUAL TO 240 PSF
- SOLDIER PILE SPACING OF 6 FEET
- TIMBER LAGGING SHALL HAVE A MINIMUM THICKNESS OF 3 INCHES

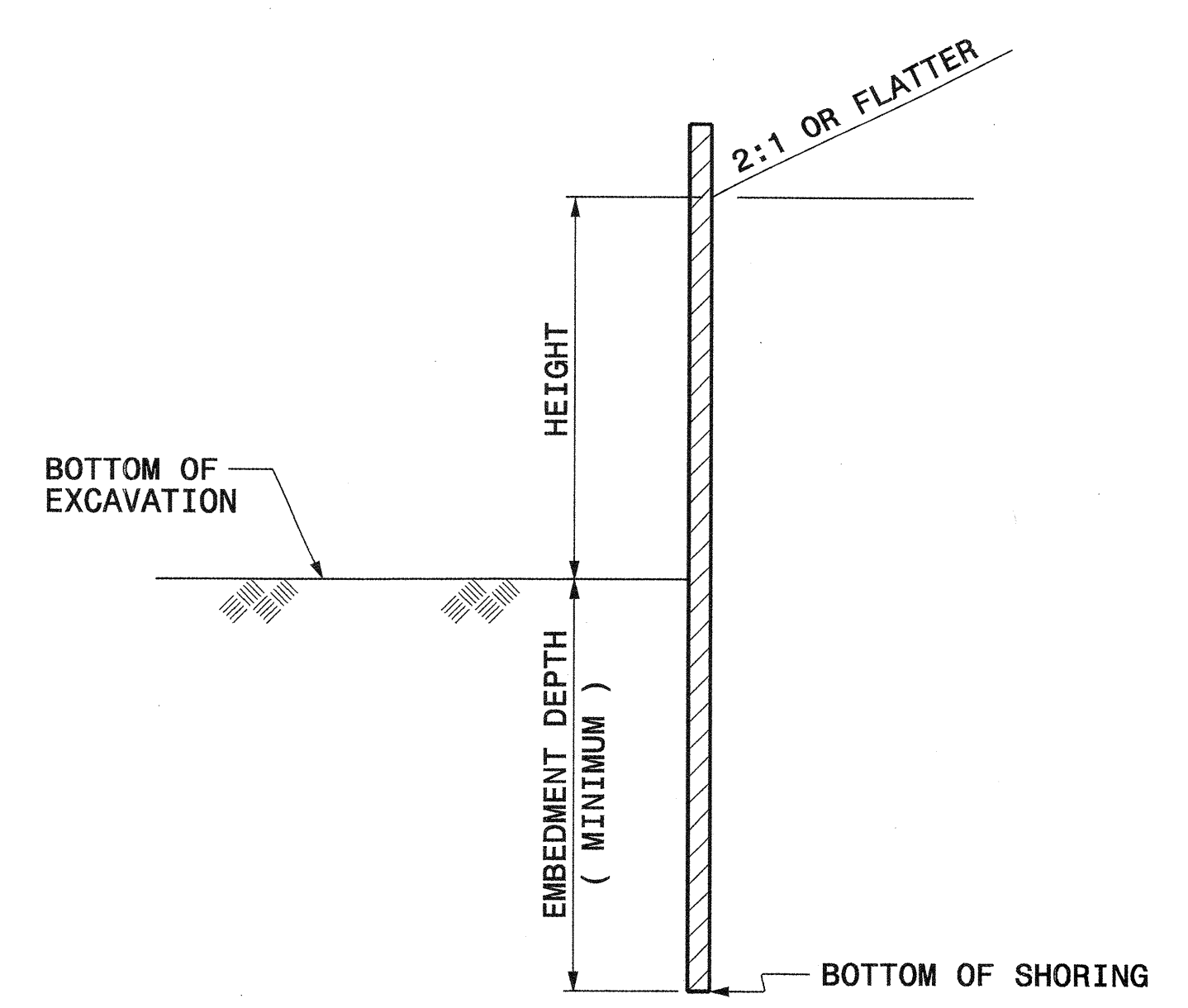
SUBMIT "STANDARD SHORING SELECTION" FORM TO ENGINEER PRIOR TO CONSTRUCTION OF SHORING.

DO NOT USE THE STANDARD SHORING DESIGNS WHEN VERY SOFT SOIL OR MUCK IS PRESENT WITHIN THE SHORING EMBEDMENT ZONE.

CONTRACTOR MUST VERIFY LOCATION OF GROUNDWATER TABLE PRIOR TO CONSTRUCTION OF SHORING.

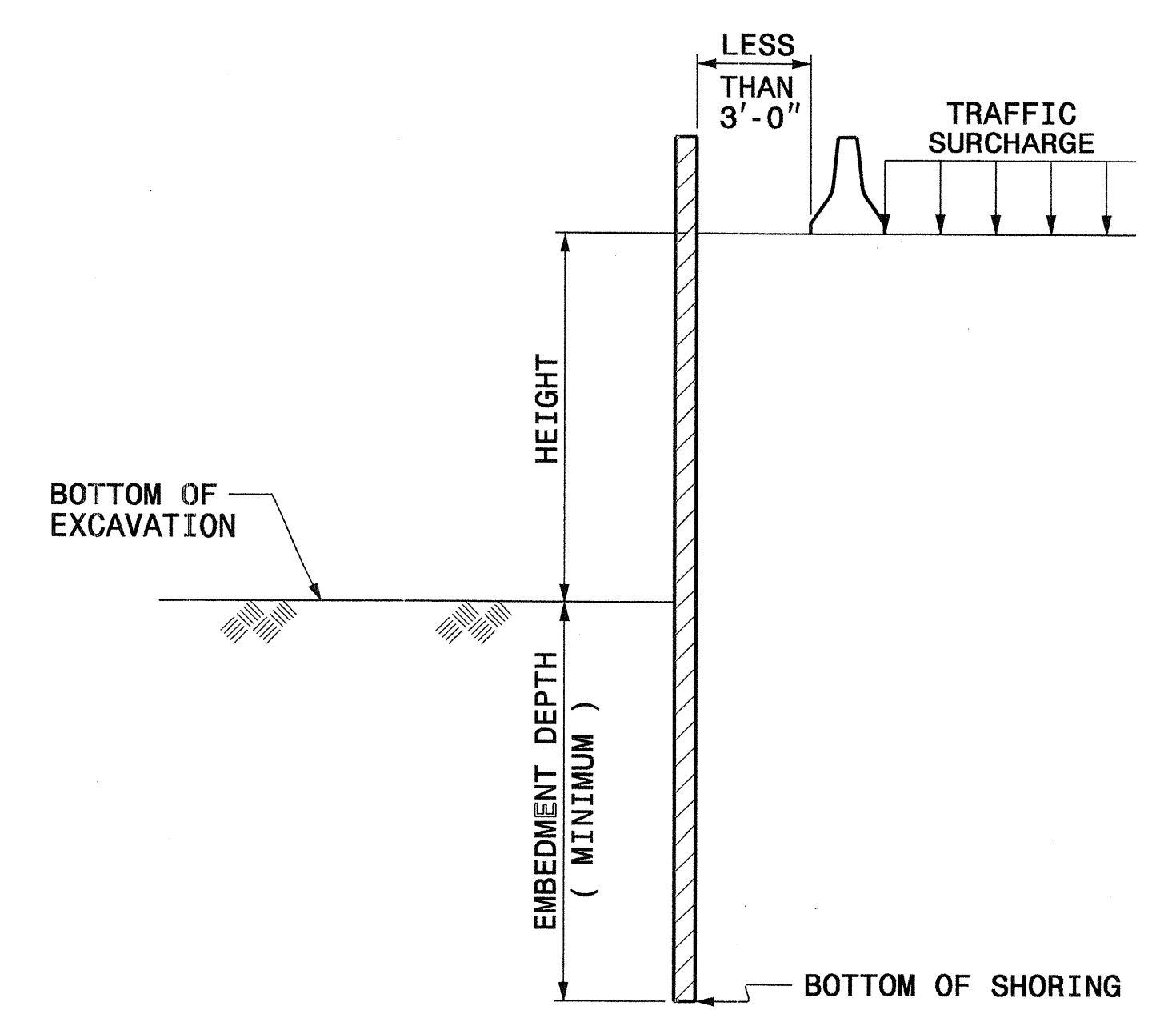
THE CONTRACTOR HAS THE OPTION OF USING SOLDIER PILES SET IN DRILLED HOLES WITH A SHORTENED LENGTH EQUAL TO 75% OF THE EMBEDMENT DEPTHS SHOWN IN THE TABLE. FOR DRILLING REQUIREMENTS, SEE TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC SPECIAL PROVISION.

IF DESIGN EMBEDMENT DEPTH IS NOT ACHIEVED, THEN NOTIFY THE ENGINEER IMMEDIATELY.



**TEMPORARY SHORING**

(SLOPING OR LEVEL WITH TRAFFIC SURCHARGE, NO BARRIER IMPACT)



**TEMPORARY SHORING - BARRIER SUPPORTED**

(LEVEL WITH TRAFFIC SURCHARGE, WITH BARRIER IMPACT)

GROUNDWATER TABLE CONDITIONS

- 1) WHEN WATER TABLE IS ABOVE THE BOTTOM OF EXCAVATION, SUBMIT CONTRACTOR SHORING DESIGN TO THE ENGINEER FOR APPROVAL.
- 2) WHEN WATER TABLE IS BELOW THE BOTTOM OF EXCAVATION AND ABOVE THE BOTTOM OF SHORING, USE "WATER TABLE" CASE.
- 3) WHEN WATER TABLE IS BELOW BOTTOM OF SHORING, USE "NO WATER TABLE" CASE.

| CASE             | HEIGHT (FT) | TEMPORARY SHORING            |  |                              |      |      | TEMPORARY SHORING - BARRIER SUPPORTED |  |                              |      |      |
|------------------|-------------|------------------------------|--|------------------------------|------|------|---------------------------------------|--|------------------------------|------|------|
|                  |             | CANTILEVER SHEETING          |  | DRIVEN SOLDIER PILE          |      |      | CANTILEVER SHEETING                   |  | DRIVEN SOLDIER PILE          |      |      |
|                  |             | MINIMUM EMBEDMENT DEPTH (FT) | MINIMUM SECTION MODULUS (IN <sup>3</sup> / FT OF WALL) | MINIMUM EMBEDMENT DEPTH (FT) |      |      | MINIMUM EMBEDMENT DEPTH (FT)          | MINIMUM SECTION MODULUS (IN <sup>3</sup> / FT OF WALL) | MINIMUM EMBEDMENT DEPTH (FT) |      |      |
|                  |             | HP 10x42                     | HP 12x53   | HP 14x73                     |      |      | HP 10x42                              | HP 12x53   | HP 14x73                     |      |      |
| "NO WATER TABLE" | < 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 |
| "WATER TABLE"    | < 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 |

22-OCT-2004 14:43 W:\Special\Detail\stand\tempshoring.dgn ericward AT 05212266



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

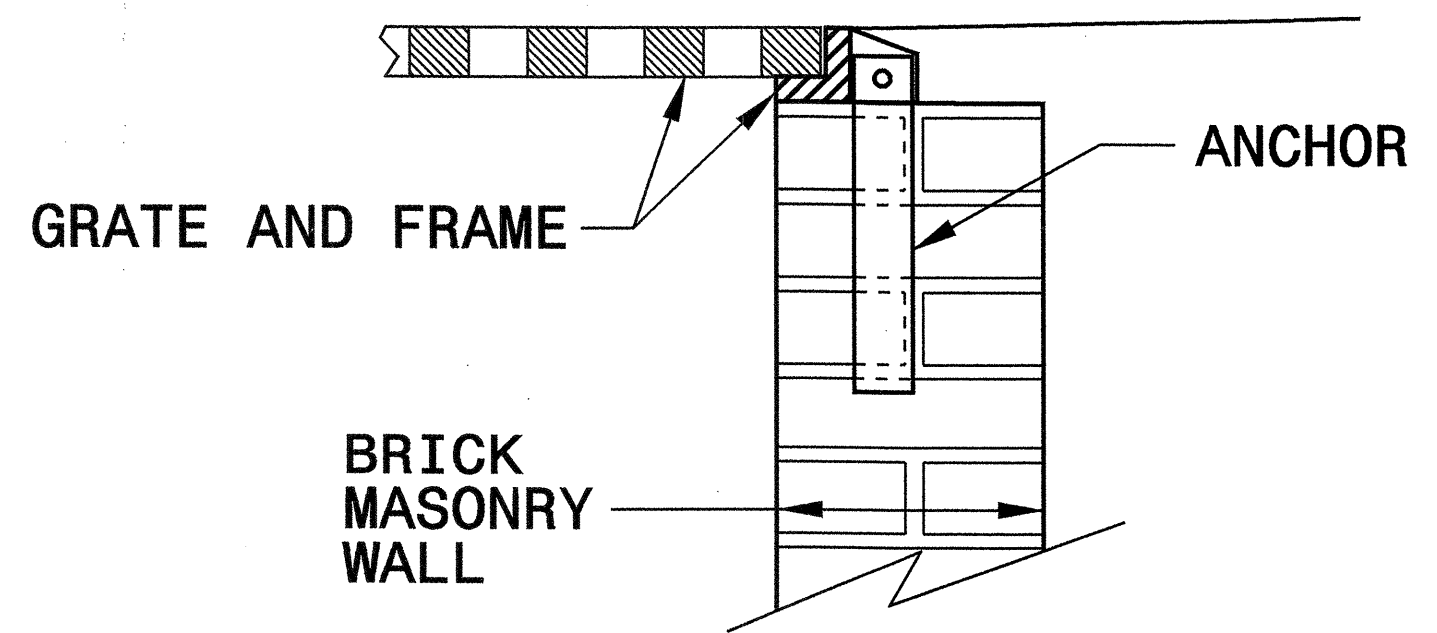
**STANDARD TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC**

ORIGINAL BY: SOILS & FOUNDATIONS DATE: 10-2001  
 MODIFIED BY: *Joe S. Hunt* DATE: *10/25/04*  
 CHECKED BY: *ericward* DATE: *10/25/04*  
 FILE SPEC.: *ericward/usr/details/stand/shoring detail.dgn*

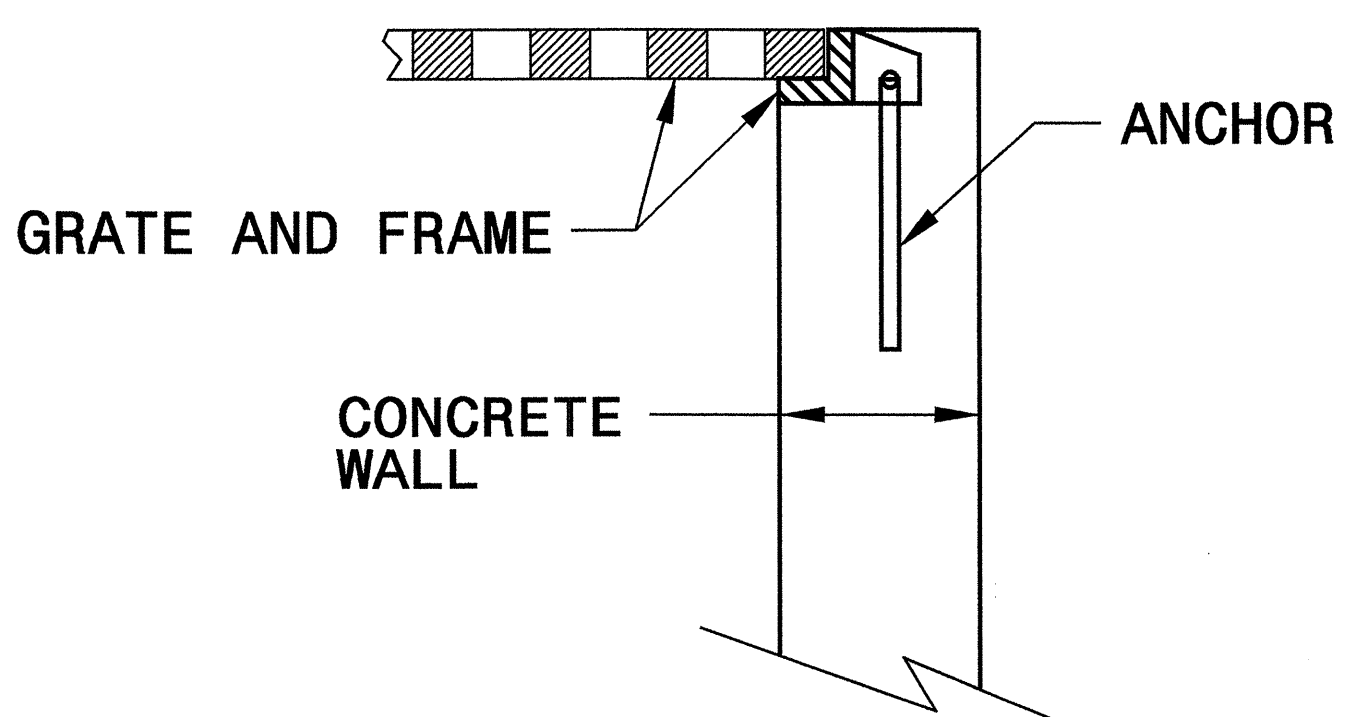
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

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

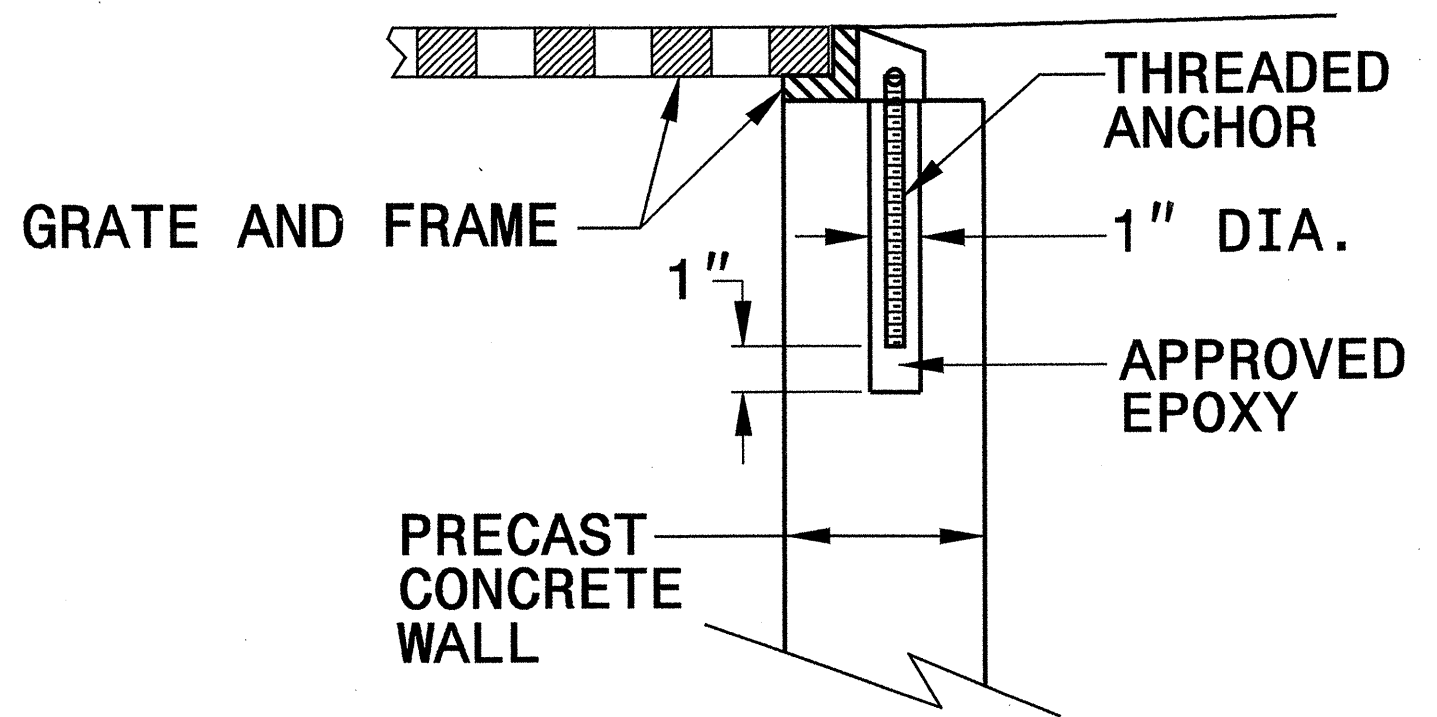
SHEET 1 OF 1  
**840D25**



**BRICK MASONRY CONSTRUCTION**



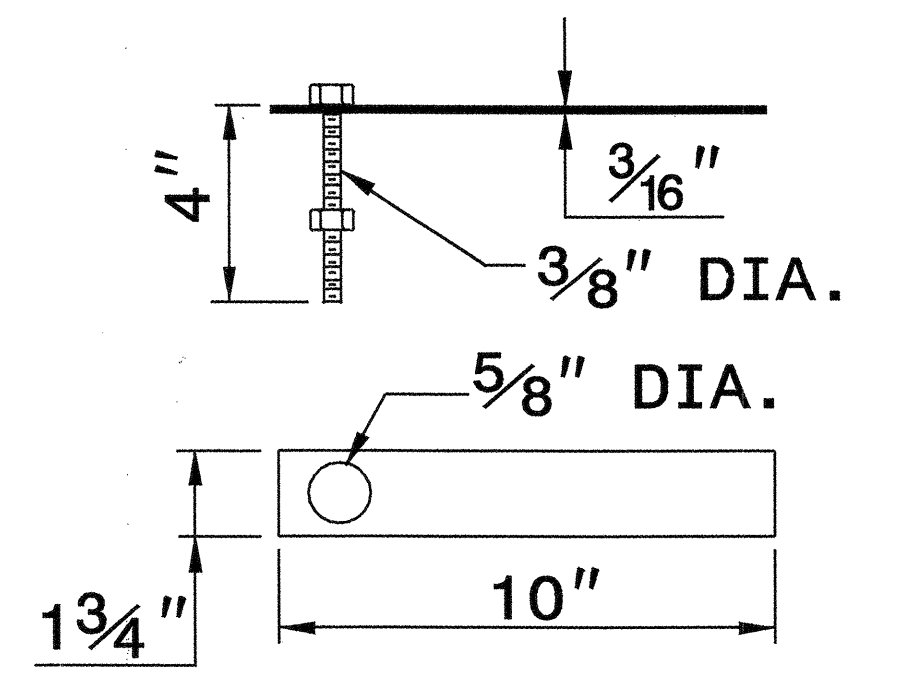
**CONCRETE CONSTRUCTION**



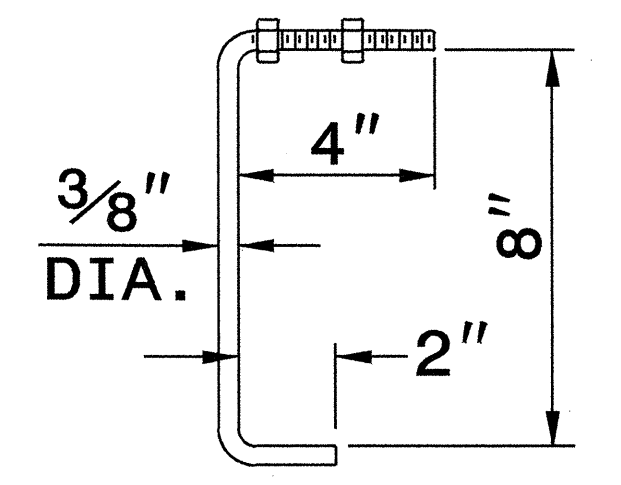
**PRECAST CONCRETE CONSTRUCTION**

**DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET**

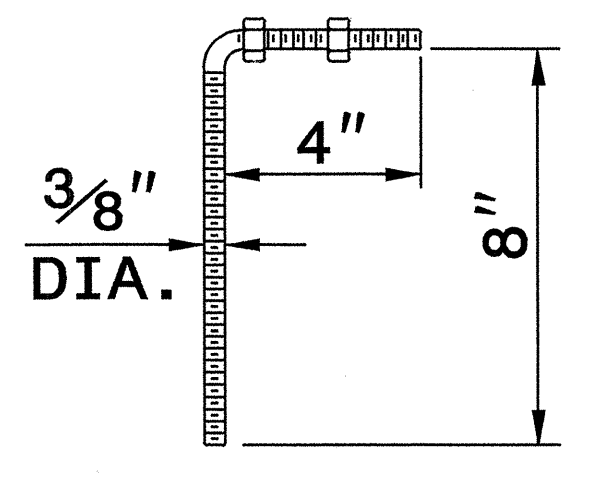
NOTE:  
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



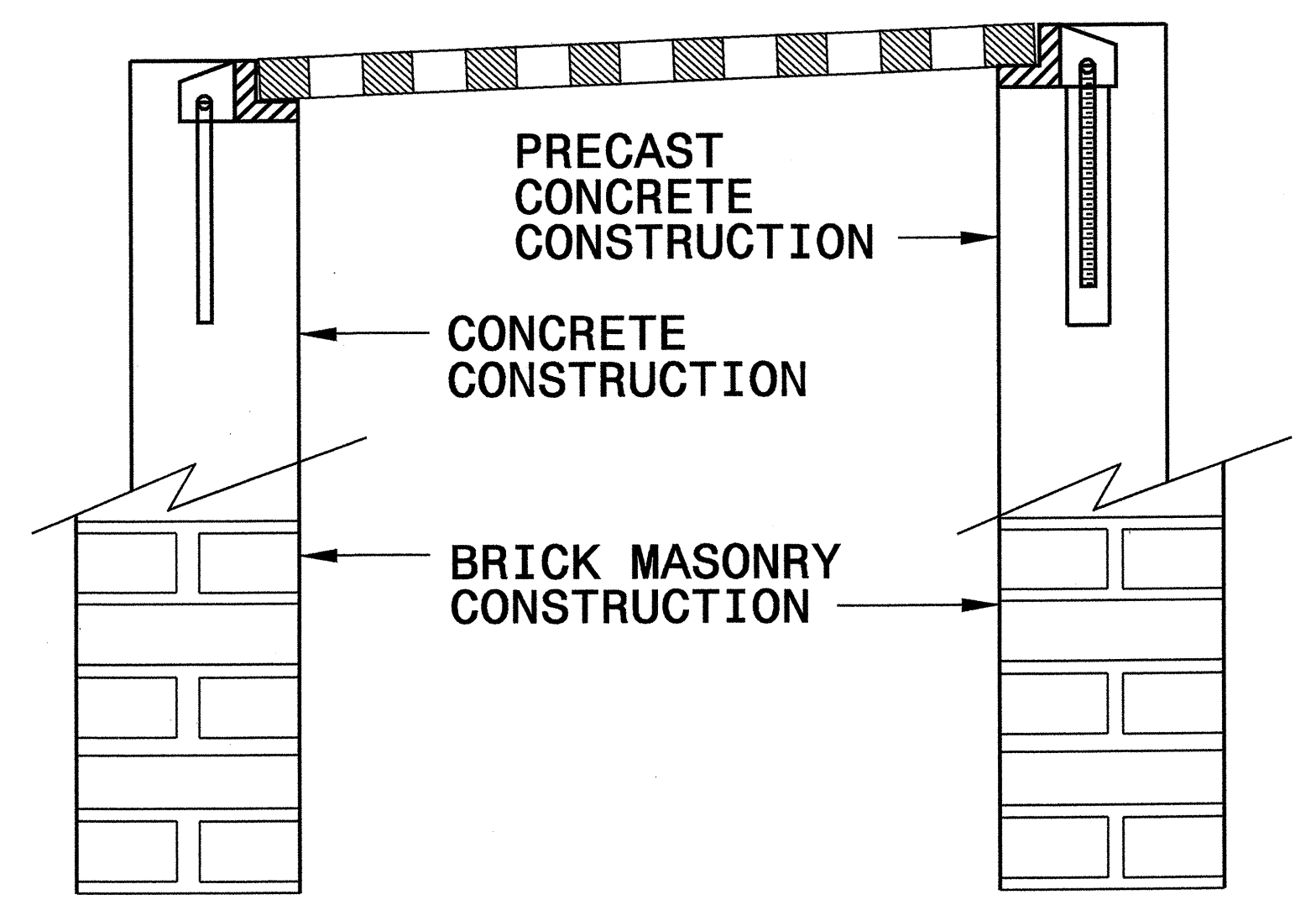
**MASONRY ANCHOR**  
3/8" DIA. BOLT WITH PLATE



**CONCRETE ANCHOR**  
3/8" DIA. BENT BAR



**PRECAST CONCRETE ANCHOR**  
3/8" DIA. BENT BAR



**FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS**

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

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

SHEET 1 OF 1  
**840D25**

01-MAR-2007 09:04 s:\contracts\840D25\special details\enr\enr-d\stds\06\stds to special details\840D25 anchorage for frames\0840d25.dgn jlowery



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

**SEE PLATE FOR TITLE**

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





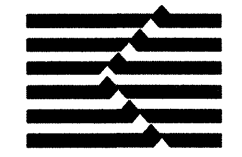








8/17/99

|   |                       |           |
|---|-----------------------|-----------|
|  <b>KCI Associates<br/>of North Carolina, P.A.</b><br><small>RALEIGH OFFICE<br/>ENGINEERS • PLANNERS • ECOLOGISTS</small> | PROJECT REFERENCE NO. | SHEET NO. |
|   | B-3450                | 3-D       |
|   | RW SHEET NO.          |           |
| ROADWAY DESIGN ENGINEER   |                       |           |

# SUMMARY OF EARTHWORK

## IN CUBIC YARDS

| LOCATION   | UNCLASSIFIED EXCAVATION | UNDERCUT | EMBT + %      | BORROW                     | WASTE       |
|--|-------------------------|----------|---------------|----------------------------|-------------|
| <b>SUMMARY 1</b>                                 |                         |          |               |                            |             |
| -DETI- LINE                                      |                         |          |               |                            |             |
| STA. 1+12.19 TO STA. 6+84.08                     | 78                      |          | 6584          | 6506                       | 0           |
| -DET2- LINE                                      |                         |          |               |                            |             |
| STA. 1+48.07 TO STA. 3+50.00 (BRIDGE)            | 49                      |          | 548           | 499                        | 0           |
| STA. 4+20.00 (BRIDGE) TO STA. 5+86.05            | 65                      |          | 2574          | 2509                       | 0           |
| <b>SUBTOTAL</b>                                  | <b>192</b>              |          | <b>9706</b>   | <b>9514</b>                | <b>0</b>    |
| WASTE TO BE USED IN LIEU OF BORROW               |                         |          |               |                            | 0           |
| <b>SUMMARY 1 TOTAL</b>                           | <b>192</b>              |          | <b>9706</b>   | <b>9514</b>                | <b>0</b>    |
| <b>SUMMARY 2</b>                                 |                         |          |               |                            |             |
| -L- LINE   |                         |          |               |                            |             |
| STA. 10+00.00 TO STA. 13+86.00 (BRIDGE)          | 87                      |          | 1310          | 1223                       | 0           |
| STA. 14+76.00 (BRIDGE) TO STA. 21+82.00 (BRIDGE) | 24                      |          | 3754          | 3730                       | 0           |
| STA. 22+92.00 (BRIDGE) TO STA. 26+00.00          | 174                     |          | 1045          | 871                        | 0           |
| <b>SUBTOTAL</b>                                  | <b>285</b>              |          | <b>6109</b>   | <b>5824</b>                | <b>0</b>    |
| WASTE TO BE USED IN LIEU OF BORROW               |                         |          |               |                            | 0           |
| <b>SUMMARY 2 TOTAL</b>                           | <b>285</b>              |          | <b>6109</b>   | <b>5824</b>                | <b>0</b>    |
| <b>SUMMARY 3</b>                                 |                         |          |               |                            |             |
| REMOVE -DETI- & REPLACE                          |                         |          |               |                            |             |
| STA. 1+12.19 TO STA. 6+84.08                     | 5659                    |          | 454           | 0                          | 5205        |
| REMOVE -DET2- & REPLACE                          |                         |          |               |                            |             |
| STA. 1+48.07 TO STA. 3+50.00 (BRIDGE)            | 699                     |          | 196           | 0                          | 503         |
| STA. 4+20.00 (BRIDGE) TO STA. 5+86.05            | 1004                    |          | 152           | 0                          | 852         |
| <b>SUBTOTAL</b>                                  | <b>7362</b>             |          | <b>802</b>    | <b>0</b>                   | <b>6560</b> |
| WASTE TO BE USED IN LIEU OF BORROW               |                         |          |               |                            | 0           |
| <b>SUMMARY 3 TOTAL</b>                           | <b>7362</b>             |          | <b>802</b>    | <b>0</b>                   | <b>6560</b> |
| <b>PROJECT SUBTOTAL</b>                          | <b>7839</b>             |          | <b>16,617</b> | <b>15,338</b>              | <b>6560</b> |
| LOSS DUE TO CLEARING & GRUBBING                  | -500                    |          |               | 500                        |             |
| ESTIMATE FOR SHOULDER MATERIAL                   |                         |          | 700           | 700                        |             |
| <b>PROJECT TOTAL</b>                             |                         |          |               |                            |             |
| EST. FOR REPL. TOPSOIL ON BORROW PITS            |                         |          |               | 827                        |             |
| <b>GRAND TOTAL</b>                               | <b>7339...SAY 7400</b>  |          | <b>17,317</b> | <b>17,365...SAY 17,400</b> | <b>6560</b> |

# SUMMARY OF PAVEMENT REMOVAL

| LOCATION                            | SY          |
|-------------------------------------|-------------|
| -L- LINE (LT. & RT.)                |             |
| STA. 13+00.00 TO STA. 14+10.00      | 323         |
| STA. 14+41.00 TO STA. 15+50.00      | 402         |
| STA. 20+50.00 TO STA. 21+99.00      | 568         |
| STA. 22+75.00 TO STA. 24+00.00      | 515         |
| DETOURS (LT. & RT.)                 |             |
| -DETI- STA. 1+12.00 TO STA. 6+84.00 | 1684        |
| -DET2- STA. 1+48.00 TO STA. 3+50.00 | 588         |
| -DET2- STA. 4+20.00 TO STA. 5+86.00 | 490         |
| <b>TOTAL</b>                        | <b>4570</b> |

ESTIMATED UNDERCUT EXCAVATION = 500 CY    -DETI- PAVEMENT STRUCTURE VOLUME = 18 CY    DDE = 170 CY  
 -L- PAVEMENT STRUCTURE VOLUME = 274 CY    -DET2- PAVEMENT STRUCTURE VOLUME = 32 CY

REVISIONS

18-JUN-2007 14:02  
 2:17:00 PM  
 18-JUN-2007 14:02  
 2:17:00 PM









|                                 |                     |
|---------------------------------|---------------------|
| PROJECT REFERENCE NO.<br>B-3450 | SHEET NO.<br>5      |
| RW SHEET NO.                    |                     |
| ROADWAY DESIGN ENGINEER         | HYDRAULICS ENGINEER |
|                                 |                     |

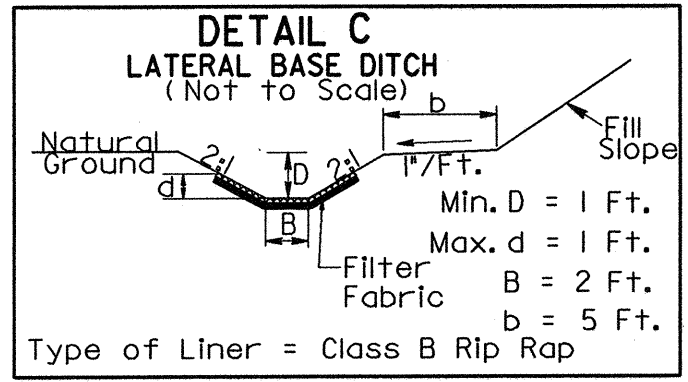
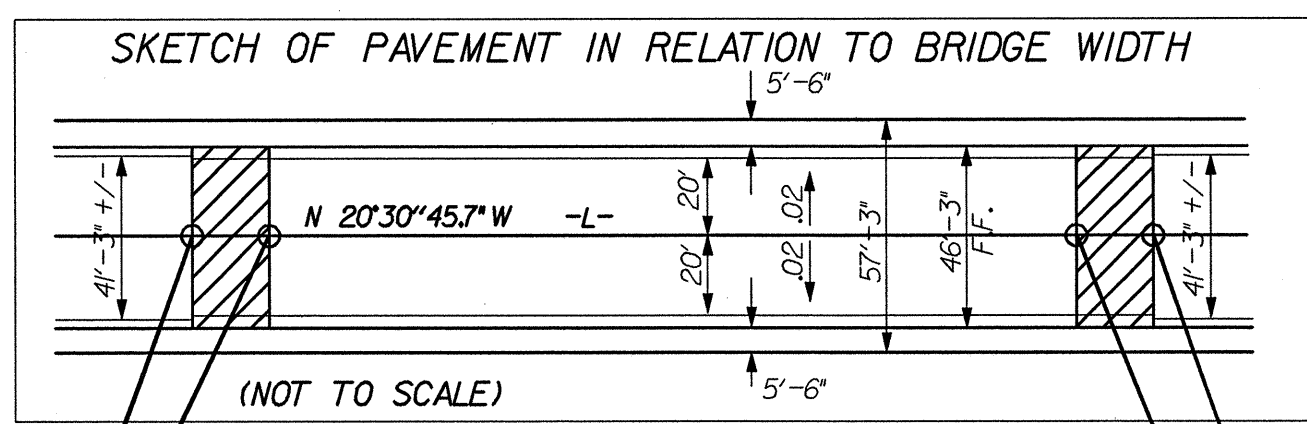
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4601 SIX FORKS RD.  
RALEIGH, N.C. 27609-5210  
(919) 783-9214

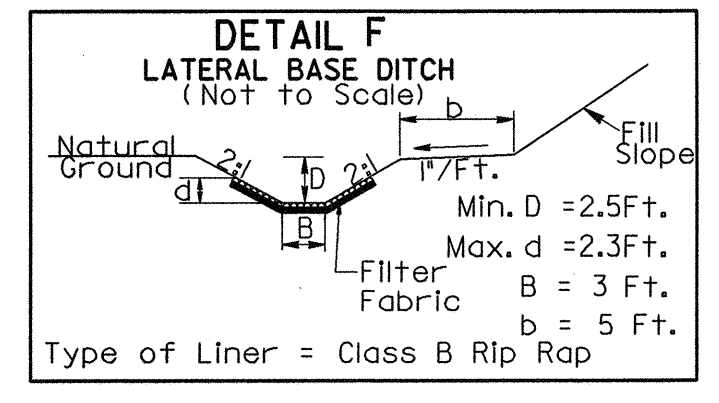


**-DET2- CURVE DATA**

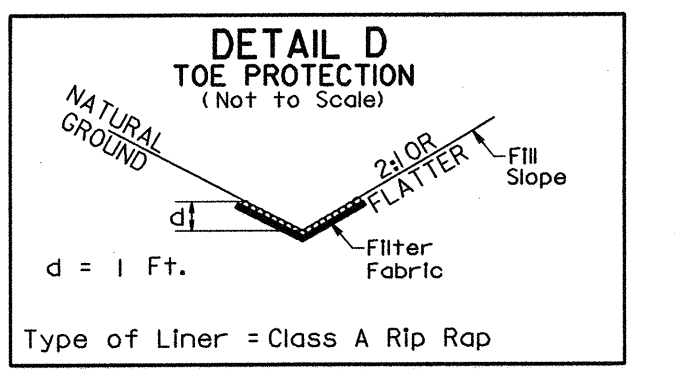
|   |   |  |
|---|---|--|
| PI Sta 0+98.98<br>Δ = 29° 12' 00.9" (LT)<br>D = 15' 04' 40.2"<br>L = 193.66'<br>T = 98.98'<br>R = 380.00'<br>SE = SEE PLANS<br>RUNOFF = SEE PLANS<br>V = 35 MPH | PI Sta 3+99.49<br>Δ = 56° 52' 59.8" (RT)<br>D = 15' 04' 40.2"<br>L = 377.26'<br>T = 205.82'<br>R = 380.00'<br>SE = 0.06<br>RUNOFF = SEE PLANS<br>V = 35 MPH | PI Sta 6+78.43<br>Δ = 31° 35' 31.1" (LT)<br>D = 15' 04' 40.2"<br>L = 209.53'<br>T = 107.50'<br>R = 380.00'<br>SE = SEE PLANS<br>RUNOFF = SEE PLANS<br>V = 35 MPH |
|---|---|--|



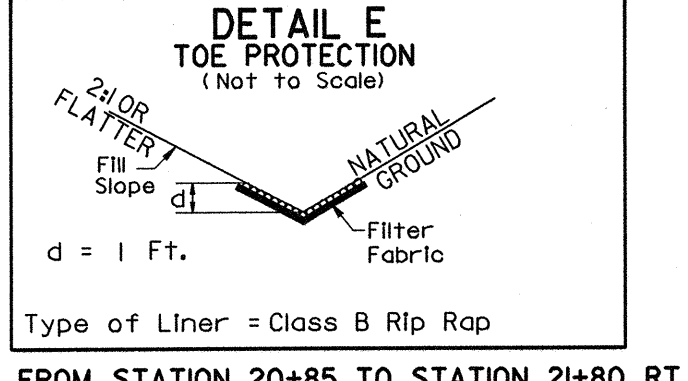
FROM STATION 21+00 TO STATION 21+50 LT.



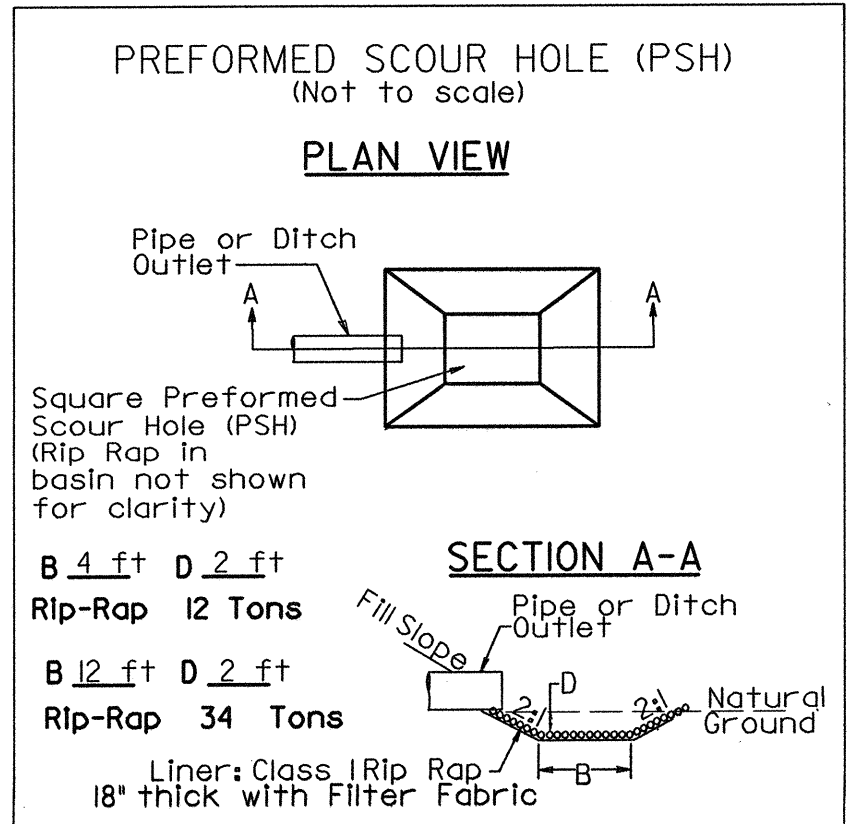
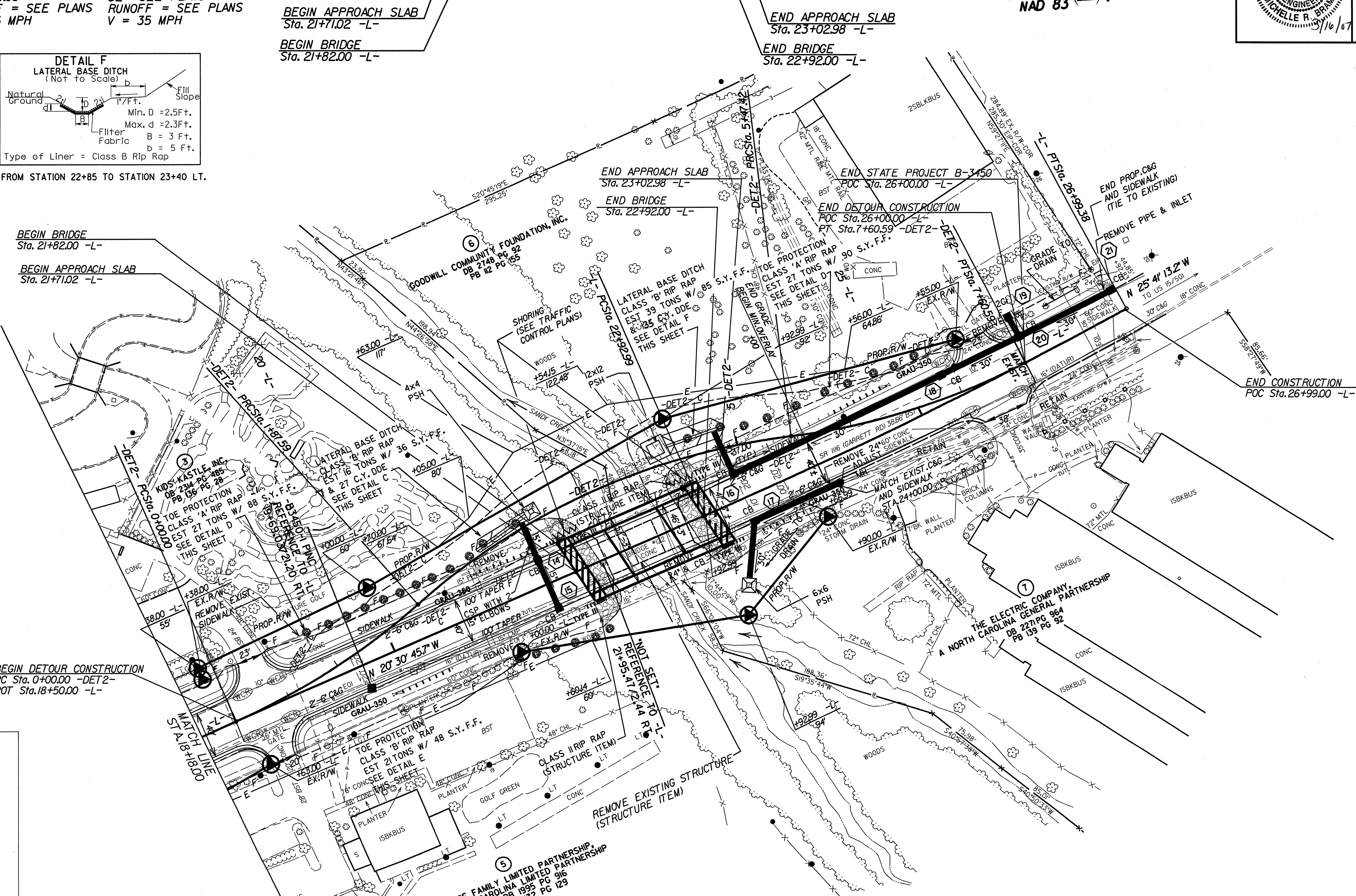
FROM STATION 22+85 TO STATION 23+40 LT.



FROM STATION 19+25 TO STATION 21+00 LT.  
FROM STATION 23+40 TO STATION 25+20 LT.

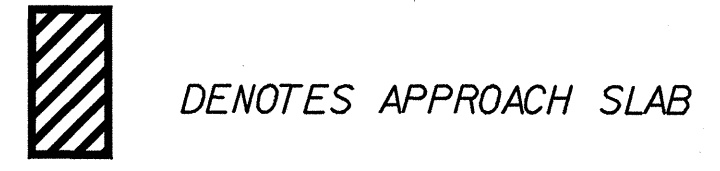


FROM STATION 20+85 TO STATION 21+80 RT.



STATION 21+50 LT.  
STATION 22+85 LT.  
STATION 23+05 RT.

- NOTES:**
- SEE SHEETS S-25 THRU S-52 FOR STRUCTURE PLANS.
  - SEE SHEET 6 FOR -L- GRADE & PROFILE & SHEET 7 FOR -DET2- GRADE & PROFILE.
  - ALL PROPOSED DRIVEWAY RADII 25 FT UNLESS OTHERWISE SHOWN.
  - FLAT GRATES TO BE USED ON ENTIRE PROJECT.
  - FOR ACCURATE APPROACH SLAB LOCATIONS SEE STRUCTURE PLAN SHEETS S-51 AND S-52.



**-L- CURVE DATA**

|                       |
|-----------------------|
| PI Sta 24+96.32       |
| Δ = 5° 10' 27.5" (LT) |
| D = 1' 16' 23.7"      |
| L = 406.39'           |
| T = 203.33'           |
| R = 4500.00'          |
| SE = 0.02             |
| RUNOFF = SEE PLANS    |
| V = 45 MPH            |

REVISIONS



5/28/99

BM\*2 = RR SPIKE SET IN 14" GUM 140.82' RT OF @ STA 8+18.5 ELEV.=250.12', N 803140.0 E 2008173J

BM\*3 = RR SPIKE SET IN 15" BEECH 178' LT OF @ STA 15+67.9 ELEV.=250.58', N 803140.0 E 2007621J

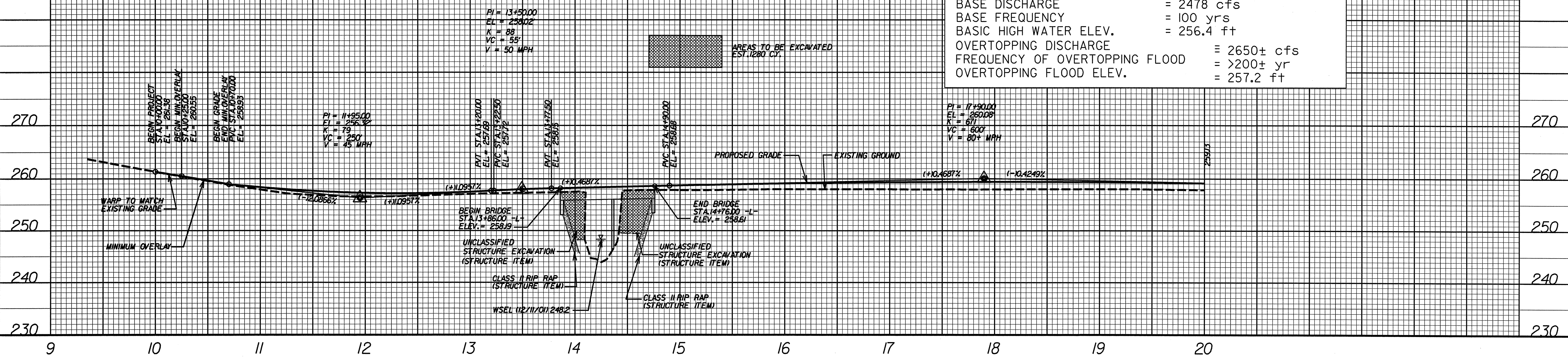
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SUITE 200, LANDMARK CENTER I 4601 SIX FORKS RD. RALEIGH, N.C. 27609-5210 (919) 783-9214

PROJECT REFERENCE NO. B-3450 SHEET NO. 6 ROADWAY DESIGN ENGINEER MICHELLE R. BRANNING HYDRAULICS ENGINEER AUDREY B. BURNETT

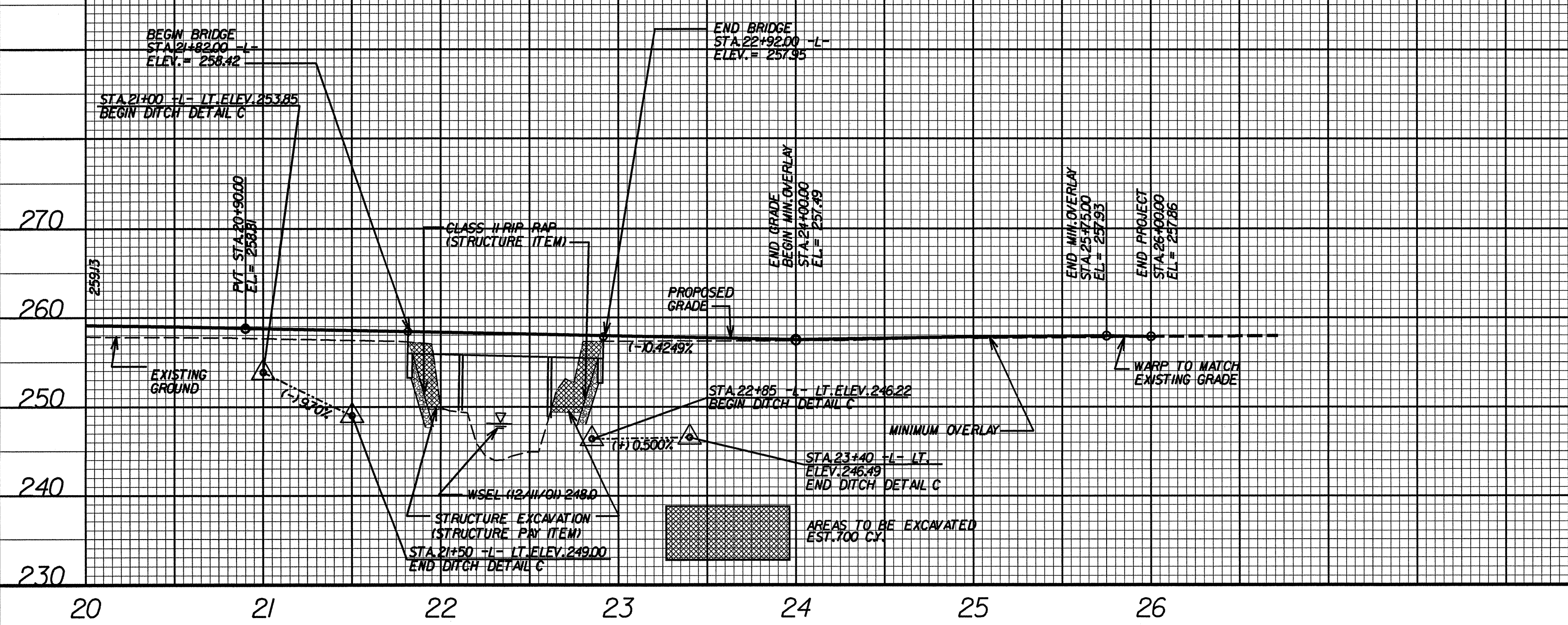
HYDRAULIC & OVERTOPPING DATA FOR BRIDGE #27

DESIGN DISCHARGE = 2167 cfs DESIGN FREQUENCY = 50 yrs. DESIGN HIGH WATER ELEV. = 256.3 ft BASE DISCHARGE = 2478 cfs BASE FREQUENCY = 100 yrs BASIC HIGH WATER ELEV. = 256.4 ft OVERTOPPING DISCHARGE = 2650± cfs FREQUENCY OF OVERTOPPING FLOOD = >200± yr OVERTOPPING FLOOD ELEV. = 257.2 ft



HYDRAULIC & OVERTOPPING DATA FOR BRIDGE #122

DESIGN DISCHARGE = 5019 cfs DESIGN FREQUENCY = 50 yrs. DESIGN HIGH WATER ELEV. = 256.7 ft BASE DISCHARGE = 5778 cfs BASE FREQUENCY = 100 yrs BASIC HIGH WATER ELEV. = 257.1 ft OVERTOPPING DISCHARGE = 6500± cfs FREQUENCY OF OVERTOPPING FLOOD = >200± yr OVERTOPPING FLOOD ELEV. = 257.5 ft



FOR -L- PLAN, SEE SHEETS 4 & 5

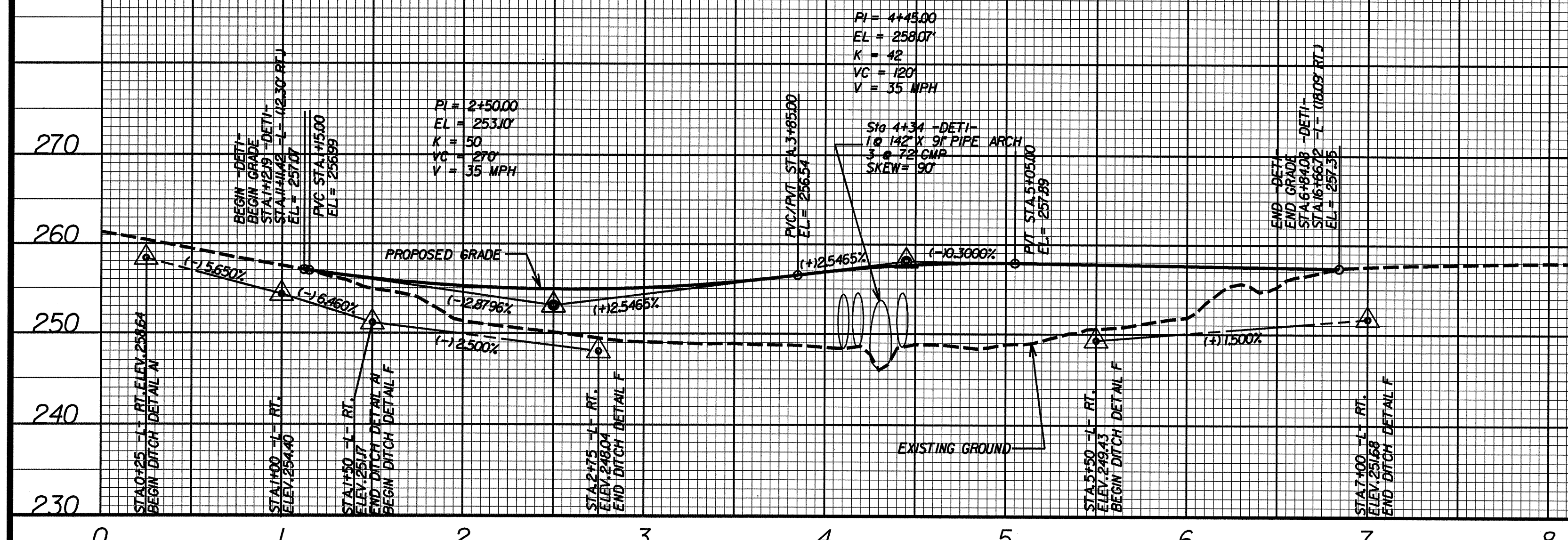
SEE SHEETS S-1 THRU S-52 FOR STRUCTURE PLANS

5/28/99



5/25/99

# -DET1-

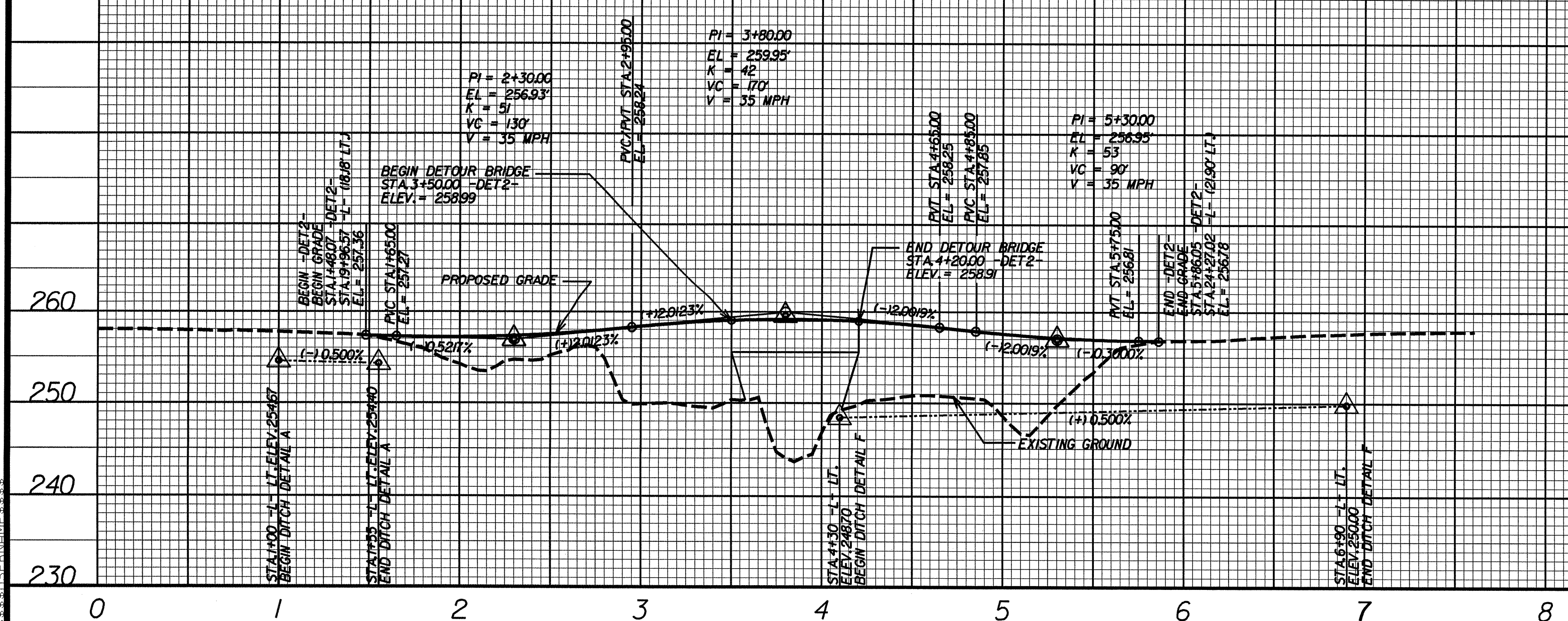


FOR -DET1- PLAN, SEE SHEET 2-C

HYDRAULIC & OVERTOPPING DATA

|                         |            |
|-------------------------|------------|
| DESIGN DISCHARGE        | = 1160 cfs |
| DESIGN FREQUENCY        | = 5 yrs.   |
| DESIGN HIGH WATER ELEV. | = 253.6 ft |

# -DET2-



FOR -DET2- PLAN, SEE SHEET 2-D

HYDRAULIC & OVERTOPPING DATA

|                         |            |
|-------------------------|------------|
| DESIGN DISCHARGE        | = 2560 cfs |
| DESIGN FREQUENCY        | = 5 yrs.   |
| DESIGN HIGH WATER ELEV. | = 253.8 ft |

SYTIME: 6/25/99 10:00 AM