



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE  
GOVERNOR

EUGENE A. CONTI, JR.  
SECRETARY

February 9, 2010

U. S. Army Corps of Engineers  
Regulatory Field Office  
151 Patton Avenue, Room 208  
Asheville, NC 28801-5006

ATTN: Mr. Dave Baker  
NCDOT Coordinator

Subject: **Application for Section 404 Nationwide Permits 12, 13, 14, and Section 401 Water Quality Certifications** for the proposed upgrade of SR 1546 (Lovelady Road) from SR 1545 (Laurel St.) to SR 1001 (Malcolm Blvd.) in Burke County, Federal Aid Project No. STP-1546(8); Division 13; **TIP No. R-2824**  
\$240.00 debit WBS 34510.1.1

Dear Sir:

The North Carolina Department of Transportation (NCDOT) proposes to upgrade SR 1546 (Lovelady Road), which includes the replacement of Bridge No. 110 over Hoyle Creek. There will be 113 feet of permanent surface water impacts, 28 feet of which is bank stabilization. Additionally, there will be 3 feet (<0.01 acre) of temporary utility impacts to the stream from trenching associated with the installation of a water line.

Please see enclosed copies of the Pre-Construction Notification (PCN) with Stormwater Management Plan (SMP), permit drawings, utility permit drawings, design plans, Rapanos Forms, and Biological Opinion (BO) for the above-referenced project. An Environmental Assessment (EA) was approved on September 23, 2002, and a Finding of No Significant Issues (FONSI) was approved on January 15, 2003. Copies of the EA and FONSI were distributed shortly thereafter. A Construction Consultation was completed on May 29, 2009. Additional copies are available upon request.

This project calls for a letting date of June 1, 2010 and a review date of April 13, 2010.

Comments from the North Carolina Wildlife Resources Commission (NCWRC) will be required prior to authorization by the Corps of Engineers. By copy of this letter and attachment, NCDOT hereby requests NCWRC review. NCDOT requests that NCWRC forward their comments to the Corps of Engineers and the NCDOT within 30 calendar days of receipt of this application.

A copy of this permit application will be posted on the NCDOT Website at: <http://www.ncdot.org/doh/preconstruct/pe/>. If you have any questions or need additional information, please call Bill Barrett at (919) 431-6688 or via e.mail at [wabarrett@ncdot.gov](mailto:wabarrett@ncdot.gov).

Sincerely,



Gregory J. Thorpe, Ph.D.  
Environmental Management Director, PDEA

w/attachment

Mr. Brian Wrenn, NCDWQ (5 Copies)  
Ms. Marella Buncick, USFWS  
Ms. Marla Chambers, NCWRC  
Ms. Kathy Matthews, USEPA-Whitter, NC

w/o attachment (see website for attachments)

Dr. David Chang, P.E., Hydraulics  
Mr. Victor Barbour, P.E., Project Services Unit  
Mr. Greg Perfetti, P.E., Structure Design  
Mr. Mark Staley, Roadside Environmental  
Mr. J.J. Swain, P.E., Division Engineer  
Mr. Roger Bryan, DEO  
Mr. Jay Bennett, P.E., Roadway Design  
Mr. Majed Alghandour, P. E., Programming and TIP  
Mr. Art McMillan, P.E., Highway Design  
Mr. Scott McLendon, USACE, Wilmington  
Mr. Ryan White, PDEA Project Planning Engineer



Office Use Only:  
 Corps action ID no. \_\_\_\_\_  
 DWQ project no. \_\_\_\_\_  
 Form Version 1.3 Dec 10 2008

## Pre-Construction Notification (PCN) Form

### A. Applicant Information

#### 1. Processing

|   |   |  |
|---|---|--|
| 1a. Type(s) of approval sought from the Corps:  | <input checked="" type="checkbox"/> Section 404 Permit  | <input type="checkbox"/> Section 10 Permit   |
| 1b. Specify Nationwide Permit (NWP) number: 12 13 14 or General Permit (GP) number:   |   |  |
| 1c. Has the NWP or GP number been verified by the Corps?  | <input type="checkbox"/> Yes  | <input checked="" type="checkbox"/> No   |
| 1d. Type(s) of approval sought from the DWQ (check all that apply):   |   |  |
| <input checked="" type="checkbox"/> 401 Water Quality Certification – Regular <span style="margin-left: 100px;"><input type="checkbox"/> Non-404 Jurisdictional General Permit</span><br><input type="checkbox"/> 401 Water Quality Certification – Express <span style="margin-left: 100px;"><input type="checkbox"/> Riparian Buffer Authorization</span> |   |  |
| 1e. Is this notification solely for the record because written approval is not required?  | For the record only for DWQ 401 Certification:<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | For the record only for Corps Permit:<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| 1f. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts? If so, attach the acceptance letter from mitigation bank or in-lieu fee program.   | <input type="checkbox"/> Yes  | <input checked="" type="checkbox"/> No   |
| 1g. Is the project located in any of NC's twenty coastal counties. If yes, answer 1h below.   | <input type="checkbox"/> Yes  | <input checked="" type="checkbox"/> No   |
| 1h. Is the project located within a NC DCM Area of Environmental Concern (AEC)?   | <input type="checkbox"/> Yes  | <input checked="" type="checkbox"/> No   |

#### 2. Project Information

|  |   |
|--|---|
| 2a. Name of project:                         | Upgrade of Existing Lovelady Road (SR 1546) from Laurel Street (SR 1545) in Valdese to Malcolm Boulevard (SR 1001) in Rutherford College. |
| 2b. County:                                  | Burke   |
| 2c. Nearest municipality / town:             | Rutherford College and Valdese  |
| 2d. Subdivision name:                        | <i>not applicable</i>   |
| 2e. NCDOT only, T.I.P. or state project no.: | R-2824  |

#### 3. Owner Information

|  |   |
|--|---|
| 3a. Name(s) on Recorded Deed:                  | North Carolina Department of Transportation |
| 3b. Deed Book and Page No.                     | <i>not applicable</i>                       |
| 3c. Responsible Party (for LLC if applicable): | <i>not applicable</i>                       |
| 3d. Street address:                            | 1598 Mail Service Center                    |
| 3e. City, state, zip:                          | Raleigh, NC 27699-1598                      |
| 3f. Telephone no.:                             | (919) 431-6688                              |
| 3g. Fax no.:                                   | (919) 431-2002                              |
| 3h. Email address:                             | wabarrett@ncdot.gov                         |

|   |   |
|---|---|
| <b>4. Applicant Information (if different from owner)</b> |   |
| 4a. Applicant is:   | <input type="checkbox"/> Agent <input type="checkbox"/> Other, specify: |
| 4b. Name:   | <i>not applicable</i>   |
| 4c. Business name (if applicable):                        |   |
| 4d. Street address:                                       |   |
| 4e. City, state, zip:                                     |   |
| 4f. Telephone no.:  |   |
| 4g. Fax no.:  |   |
| 4h. Email address:  |   |
| <b>5. Agent/Consultant Information (if applicable)</b>    |   |
| 5a. Name:   | <i>not applicable</i>   |
| 5b. Business name (if applicable):                        |   |
| 5c. Street address:                                       |   |
| 5d. City, state, zip:                                     |   |
| 5e. Telephone no.:  |   |
| 5f. Fax no.:  |   |
| 5g. Email address:  |   |

| <b>B. Project Information and Prior Project History</b>  |  |
|--|--|
| <b>1. Property Identification</b>  |  |
| 1a. Property identification no. (tax PIN or parcel ID):  | <i>not applicable</i>  |
| 1b. Site coordinates (in decimal degrees):   | Latitude: 35.76 Longitude: - 81.55<br>(DD.DDDDDD) (-DD.DDDDDD)                                       |
| 1c. Property size:   | 18.36 acres  |
| <b>2. Surface Waters</b>   |  |
| 2a. Name of nearest body of water (stream, river, etc.) to proposed project:   | Hoyle Creek  |
| 2b. Water Quality Classification of nearest receiving water:   | WS-IV  |
| 2c. River basin:   | Catawba  |
| <b>3. Project Description</b>  |  |
| 3a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application:<br>The general land use in the vicinity of the project is predominately wooded lands, with some residential and minor commercial use.  |  |
| 3b. List the total estimated acreage of all existing wetlands on the property:<br>0  |  |
| 3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property:<br>321  |  |
| 3d. Explain the purpose of the proposed project:<br>Upgrade of existing Lovelady Road (SR 1546), from Laurel Street (SR 1545) to Malcolm Blvd (SR 1001) to improve safety on Lovelady Road. The proposed project should reduce the potential for accidents as the travel lanes will be wider, paved shoulders installed, and turning lanes will be provided at major intersections with a roundabout constructed at the Carolina Mills Road / Kathy Road intersection with Lovelady Road to facilitate access to the new school that has been constructed. Traffic analysis determined that the roundabout will reduce roadway widening, provide a safer traffic design with fewer vehicle conflicts, help to maintain lower speeds in the school zone, and produce a higher LOS (LOS-B vs. LOS-F).  |  |
| 3e. Describe the overall project in detail, including the type of equipment to be used:<br>As part of the upgrade to existing Lovelady Road, Bridge No. 110 will be replaced with a new bridge. The existing bridge is 50 feet (15 meters) long and consists of a timber and steel superstructure supported by vertical mount masonry. The new bridge will be a single span steel girder bridge 79.2 feet (24.14 meters) in length with a clear deck width of 40 feet (12 meters). A temporary detour bridge 86.61 feet (26.4 meters) in length will be constructed to handle traffic flow during bridge construction. Three (3) base ditches will be constructed and discharge into Hoyle Creek. Riprap will be utilized for bank stabilization at the confluence of each ditch with Hoyle Creek. Eighty-five (85) feet of an unnamed tributary to Hoyle Creek will be filled as part of the project, with the flow directed to one of the ditches. |  |
| <b>4. Jurisdictional Determinations</b>  |  |
| 4a. Have jurisdictional wetland or stream determinations by the Corps or State been requested or obtained for this property / project (including all prior phases) in the past?<br>Comments: Mike Parker w/ DWQ made site visit to assess streams. No wetlands on project site. With this application, we are requesting an approved JD from the USACE.  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown |
| 4b. If the Corps made the jurisdictional determination, what type of determination was made?   | <input type="checkbox"/> Preliminary <input type="checkbox"/> Final                                  |
| 4c. If yes, who delineated the jurisdictional areas?<br>Name (if known): Bill Barrett  | Agency/Consultant Company: NCDOT<br>Other:   |
| 4d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attach documentation.<br>May 8, 2008   |  |

|   |  |
|---|--|
| <b>5. Project History</b>   |  |
| 5a. Have permits or certifications been requested or obtained for this project (including all prior phases) in the past?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown |
| 5b. If yes, explain in detail according to "help file" instructions.<br>NCDOT submitted application dated 8-20-04 for 404 (NW-14 & NW-33) & associated 401 WQCs. Received 401 WQCs dated 9-21-04 (DWQ Project No. 04-1398). NCDOT submitted Supplemental application dated 3-24-05 for NW-12 for utility impacts. Project was 'shelved' before 404 permit was issued and before the WQC for the NW-12 was issued. |  |
| <b>6. Future Project Plans</b>  |  |
| 6a. Is this a phased project?   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                  |
| 6b. If yes, explain.  |  |

**C. Proposed Impacts Inventory**

**1. Impacts Summary**

1a. Which sections were completed below for your project (check all that apply):

- Wetlands                       Streams - tributaries                       Buffers  
 Open Waters                       Pond Construction

**2. Wetland Impacts**

If there are wetland impacts proposed on the site, then complete this question for each wetland area impacted.

| 2a.<br>Wetland impact number – Permanent (P) or Temporary (T) | 2b.<br>Type of impact | 2c.<br>Type of wetland (if known) | 2d.<br>Forested   | 2e.<br>Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other) | 2f.<br>Area of impact (acres) |
|---|-----------------------|-----------------------------------|---|--|-------------------------------|
| Site 1 <input type="checkbox"/> P <input type="checkbox"/> T  |                       |                                   | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | <input type="checkbox"/> Corps<br><input type="checkbox"/> DWQ     |                               |
| Site 2 <input type="checkbox"/> P <input type="checkbox"/> T  |                       |                                   | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | <input type="checkbox"/> Corps<br><input type="checkbox"/> DWQ     |                               |
| Site 3 <input type="checkbox"/> P <input type="checkbox"/> T  |                       |                                   | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | <input type="checkbox"/> Corps<br><input type="checkbox"/> DWQ     |                               |
| Site 4 <input type="checkbox"/> P <input type="checkbox"/> T  |                       |                                   | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | <input type="checkbox"/> Corps<br><input type="checkbox"/> DWQ     |                               |
| Site 5 <input type="checkbox"/> P <input type="checkbox"/> T  |                       |                                   | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | <input type="checkbox"/> Corps<br><input type="checkbox"/> DWQ     |                               |
| Site 6 <input type="checkbox"/> P <input type="checkbox"/> T  |                       |                                   | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | <input type="checkbox"/> Corps<br><input type="checkbox"/> DWQ     |                               |
| <b>2g. Total wetland impacts</b>                              |                       |                                   |   |  | X Permanent<br>X Temporary    |

2h. Comments:

**3. Stream Impacts**

If there are perennial or intermittent stream impacts (including temporary impacts) proposed on the site, then complete this question for all stream sites impacted.

| 3a.<br>Stream impact number - Permanent (P) or Temporary (T)            | 3b.<br>Type of impact        | 3c.<br>Stream name | 3d.<br>Perennial (PER) or intermittent (INT)?                           | 3e.<br>Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)        | 3f.<br>Average stream width (feet) | 3g.<br>Impact length (linear feet) |
|---|------------------------------|--------------------|---|---|------------------------------------|------------------------------------|
| Site 1 <input checked="" type="checkbox"/> P <input type="checkbox"/> T | bank stabilization           | Hoyle Creek        | <input checked="" type="checkbox"/> PER<br><input type="checkbox"/> INT | <input checked="" type="checkbox"/> Corps<br><input type="checkbox"/> DWQ | 25                                 | 28                                 |
| Site 2 <input checked="" type="checkbox"/> P <input type="checkbox"/> T | fill                         | UT to Hoyle Ck     | <input type="checkbox"/> PER<br><input checked="" type="checkbox"/> INT | <input checked="" type="checkbox"/> Corps<br><input type="checkbox"/> DWQ | 2                                  | 85                                 |
| Site 3 <input type="checkbox"/> P <input checked="" type="checkbox"/> T | trenching (for utility line) | Hoyle Creek        | <input checked="" type="checkbox"/> PER<br><input type="checkbox"/> INT | <input checked="" type="checkbox"/> Corps<br><input type="checkbox"/> DWQ | 20                                 | 3                                  |
| Site 4 <input type="checkbox"/> P <input type="checkbox"/> T            |                              |                    | <input type="checkbox"/> PER<br><input type="checkbox"/> INT            | <input type="checkbox"/> Corps<br><input type="checkbox"/> DWQ            |                                    |                                    |
| Site 5 <input type="checkbox"/> P <input type="checkbox"/> T            |                              |                    | <input type="checkbox"/> PER<br><input type="checkbox"/> INT            | <input type="checkbox"/> Corps<br><input type="checkbox"/> DWQ            |                                    |                                    |
| Site 6 <input type="checkbox"/> P <input type="checkbox"/> T            |                              |                    | <input type="checkbox"/> PER<br><input type="checkbox"/> INT            | <input type="checkbox"/> Corps<br><input type="checkbox"/> DWQ            |                                    |                                    |
| <b>3h. Total stream and tributary impacts</b>                           |                              |                    |   |   |                                    | 113 LF Perm<br>3 LF Temp           |

3i. Comments: Site 1 includes three areas where riprap is to be installed as bank stabilization where ditches confluence with Hoyle Creek. All three sites noted as Site 1 on permit drawing.

**4. Open Water Impacts**

If there are proposed impacts to lakes, ponds, estuaries, tributaries, sounds, the Atlantic Ocean, or any other open water of the U.S. then individually list all open water impacts below.

| 4a.<br>Open water impact number – Permanent (P) or Temporary (T) | 4b.<br>Name of waterbody (if applicable) | 4c.<br>Type of impact | 4d.<br>Waterbody type | 4e.<br>Area of impact (acres) |
|--|--|-----------------------|-----------------------|-------------------------------|
| O1 <input type="checkbox"/> P <input type="checkbox"/> T         |  |                       |                       |                               |
| O2 <input type="checkbox"/> P <input type="checkbox"/> T         |  |                       |                       |                               |
| O3 <input type="checkbox"/> P <input type="checkbox"/> T         |  |                       |                       |                               |
| O4 <input type="checkbox"/> P <input type="checkbox"/> T         |  |                       |                       |                               |
| <b>4f. Total open water impacts</b>                              |  |                       |                       | X Permanent<br>X Temporary    |

4g. Comments:

**5. Pond or Lake Construction**

If pond or lake construction proposed, then complete the chart below.

| 5a.<br>Pond ID number | 5b.<br>Proposed use or purpose of pond | 5c.<br>Wetland Impacts (acres) |        |           | 5d.<br>Stream Impacts (feet) |        |           | 5e.<br>Upland (acres) |
|-----------------------|--|--------------------------------|--------|-----------|------------------------------|--------|-----------|-----------------------|
|                       |  | Flooded                        | Filled | Excavated | Flooded                      | Filled | Excavated | Flooded               |
| P1                    |  |                                |        |           |                              |        |           |                       |
| P2                    |  |                                |        |           |                              |        |           |                       |
| <b>5f. Total</b>      |  |                                |        |           |                              |        |           |                       |

5g. Comments:

|   |                              |                             |                       |
|---|------------------------------|-----------------------------|-----------------------|
| 5h. Is a dam high hazard permit required? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | If yes, permit ID no: |
| 5i. Expected pond surface area (acres):   |                              |                             |                       |
| 5j. Size of pond watershed (acres):       |                              |                             |                       |
| 5k. Method of construction:               |                              |                             |                       |

**6. Buffer Impacts (for DWQ)**

If project will impact a protected riparian buffer, then complete the chart below. If yes, then individually list all buffer impacts below. If any impacts require mitigation, then you **MUST** fill out Section D of this form.

|  |                          |  |   |  |                                    |                                 |  |
|--|--------------------------|--|---|--|------------------------------------|---------------------------------|--|
| 6a.<br>Project is in which protected basin?                  |                          | <input type="checkbox"/> Neuse<br><input type="checkbox"/> Catawba |   | <input type="checkbox"/> Tar-Pamlico<br><input type="checkbox"/> Randleman |                                    | <input type="checkbox"/> Other: |  |
| 6b.<br>Buffer impact number – Permanent (P) or Temporary (T) | 6c.<br>Reason for impact | 6d.<br>Stream name   | 6e.<br>Buffer mitigation required?                          | 6f.<br>Zone 1 impact (square feet)   | 6g.<br>Zone 2 impact (square feet) |                                 |  |
| B1 <input type="checkbox"/> P <input type="checkbox"/> T     |                          |  | <input type="checkbox"/> Yes<br><input type="checkbox"/> No |  |                                    |                                 |  |
| B2 <input type="checkbox"/> P <input type="checkbox"/> T     |                          |  | <input type="checkbox"/> Yes<br><input type="checkbox"/> No |  |                                    |                                 |  |
| B3 <input type="checkbox"/> P <input type="checkbox"/> T     |                          |  | <input type="checkbox"/> Yes<br><input type="checkbox"/> No |  |                                    |                                 |  |
| <b>6h. Total buffer impacts</b>                              |                          |  |   |  |                                    |                                 |  |
| 6i. Comments:  |                          |  |   |  |                                    |                                 |  |

**D. Impact Justification and Mitigation**

**1. Avoidance and Minimization**

1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing project.

The proposed bridge spans Hoyle Creek (i.e. no bents in water) and is 9.14 meters (~30 feet) longer than the existing bridge, and is at approximately the same grade as the existing structure. The temporary detour bridge also spans Hoyle Creek with no bents in the water. 3:1 fill slopes will be used where practicable.

Measures to avoid and minimize impacts to the dwarf flowered heartleaf populations include the following:

- Constructing a roundabout at the Lovelady Road/Kathy Drive/Carolina Mills Road. The roundabout requires less roadway widening and construction than another driveway entrance.
- Minimizing impacts to the occurrence at Site 9 by using expressway curb and gutter to decrease the construction footprint by about 15 feet.
- Limiting mechanized clearing and construction access to within 5 feet beyond the slope stake lines.
- Relocating an existing utility line to the other side of the road to minimize impacts during construction and reduce future recurring impacts of utility line maintenance.

1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques.

BMPs for Construction and Maintenance Activities and BMPs for Bridge Demolition to be employed. Additionally, construction fencing to be erected between the dwarf flowered heartleaf occurrences and the construction limits to protect them from activities during construction.

**2. Compensatory Mitigation for Impacts to Waters of the U.S. or Waters of the State**

2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?

Yes       No

If no, explain: The NCDOT does not propose mitigation for stream bank stabilization activities. Stabilizing the bank of a stream does not require fill in the stream bed and, therefore, under Section 404 of the Clean Water Act, does not constitute Loss of Waters of the U.S. and is not subject to compensatory mitigation. Furthermore, the proposed bank stabilization activities are necessary to prevent erosion and sedimentation, i.e. preventing bank destabilization, and minimizing impacts to the environment. In correspondence with DWQ and USACE, neither Agency will be seeking mitigation for impacts to the UT to Hoyle Creek.

2b. If yes, mitigation is required by (check all that apply):

DWQ       Corps

2c. If yes, which mitigation option will be used for this project?

- Mitigation bank
- Payment to in-lieu fee program
- Permittee Responsible Mitigation

**3. Complete if Using a Mitigation Bank**

3a. Name of Mitigation Bank: not applicable

3b. Credits Purchased (attach receipt and letter)

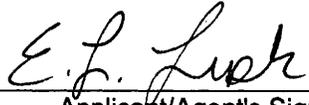
Type

Quantity

|   |                          |                                   |   |  |
|---|--------------------------|-----------------------------------|---|--|
| 3c. Comments:   |                          |                                   |   |  |
| <b>4. Complete if Making a Payment to In-lieu Fee Program</b>   |                          |                                   |   |  |
| 4a. Approval letter from in-lieu fee program is attached.   |                          |                                   | <input type="checkbox"/> Yes  |  |
| 4b. Stream mitigation requested:  |                          |                                   | linear feet   |  |
| 4c. If using stream mitigation, stream temperature:   |                          |                                   | <input type="checkbox"/> warm <input type="checkbox"/> cool <input type="checkbox"/> cold |  |
| 4d. Buffer mitigation requested (DWQ only):   |                          |                                   | square feet   |  |
| 4e. Riparian wetland mitigation requested:  |                          |                                   | acres   |  |
| 4f. Non-riparian wetland mitigation requested:  |                          |                                   | acres   |  |
| 4g. Coastal (tidal) wetland mitigation requested:   |                          |                                   | acres   |  |
| 4h. Comments:   |                          |                                   |   |  |
| <b>5. Complete if Using a Permittee Responsible Mitigation Plan</b>   |                          |                                   |   |  |
| 5a. If using a permittee responsible mitigation plan, provide a description of the proposed mitigation plan.  |                          |                                   |   |  |
| <b>6. Buffer Mitigation (State Regulated Riparian Buffer Rules) – required by DWQ</b>   |                          |                                   |   |  |
| 6a. Will the project result in an impact within a protected riparian buffer that requires buffer mitigation?  |                          |                                   | <input type="checkbox"/> Yes <input type="checkbox"/> No                                  |  |
| 6b. If yes, then identify the square feet of impact to each zone of the riparian buffer that requires mitigation. Calculate the amount of mitigation required.  |                          |                                   |   |  |
| Zone  | 6c.<br>Reason for impact | 6d.<br>Total impact (square feet) | Multiplier  | 6e.<br>Required mitigation (square feet) |
| Zone 1  |                          |                                   | 3 (2 for Catawba)   |  |
| Zone 2  |                          |                                   | 1.5   |  |
| <b>6f. Total buffer mitigation required:</b>  |                          |                                   |   |  |
| 6g. If buffer mitigation is required, discuss what type of mitigation is proposed (e.g., payment to private mitigation bank, permittee responsible riparian buffer restoration, payment into an approved in-lieu fee fund). |                          |                                   |   |  |
| 6h. Comments:   |                          |                                   |   |  |

| <b>E. Stormwater Management and Diffuse Flow Plan (required by DWQ)</b>  |   |
|--|---|
| <b>1. Diffuse Flow Plan</b>  |   |
| 1a. Does the project include or is it adjacent to protected riparian buffers identified within one of the NC Riparian Buffer Protection Rules?           | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| 1b. If yes, then is a diffuse flow plan included? If no, explain why.<br>Comments: if yes, see attached permit drawings.                                 | <input type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>2. Stormwater Management Plan</b>   |   |
| 2a. What is the overall percent imperviousness of this project?  | N/A   |
| 2b. Does this project require a Stormwater Management Plan?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| 2c. If this project DOES NOT require a Stormwater Management Plan, explain why:  |   |
| 2d. If this project DOES require a Stormwater Management Plan, then provide a brief, narrative description of the plan:<br>See attached permit drawings. |   |
| 2e. Who will be responsible for the review of the Stormwater Management Plan?  | <input type="checkbox"/> Certified Local Government<br><input type="checkbox"/> DWQ Stormwater Program<br><input type="checkbox"/> DWQ 401 Unit   |
| <b>3. Certified Local Government Stormwater Review</b>   |   |
| 3a. In which local government's jurisdiction is this project?  | not applicable  |
| 3b. Which of the following locally-implemented stormwater management programs apply (check all that apply):  | <input type="checkbox"/> Phase II<br><input type="checkbox"/> NSW<br><input type="checkbox"/> USMP<br><input type="checkbox"/> Water Supply Watershed<br><input type="checkbox"/> Other:      |
| 3c. Has the approved Stormwater Management Plan with proof of approval been attached?  | <input type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>4. DWQ Stormwater Program Review</b>  |   |
| 4a. Which of the following state-implemented stormwater management programs apply (check all that apply):  | <input type="checkbox"/> Coastal counties<br><input type="checkbox"/> HQW<br><input type="checkbox"/> ORW<br><input type="checkbox"/> Session Law 2006-246<br><input type="checkbox"/> Other: |
| 4b. Has the approved Stormwater Management Plan with proof of approval been attached?  | <input type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>5. DWQ 401 Unit Stormwater Review</b>   |   |
| 5a. Does the Stormwater Management Plan meet the appropriate requirements?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| 5b. Have all of the 401 Unit submittal requirements been met?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |

|   |  |
|---|--|
| <b>F. Supplementary Information</b>   |  |
| <b>1. Environmental Documentation (DWQ Requirement)</b>   |  |
| 1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No    |
| 1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No    |
| 1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.)<br><br>Comments:  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No    |
| <b>2. Violations (DWQ Requirement)</b>  |  |
| 2a. Is the site in violation of DWQ Wetland Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 2B .0200)?  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No    |
| 2b. Is this an after-the-fact permit application?   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No    |
| 2c. If you answered "yes" to one or both of the above questions, provide an explanation of the violation(s):  |  |
| <b>3. Cumulative Impacts (DWQ Requirement)</b>  |  |
| 3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality?   | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No |
| 3b. If you answered "yes" to the above, submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent DWQ policy. If you answered "no," provide a short narrative description.<br><br>The project involves widening the two existing lanes and adding paved shoulders for safety. No additional lanes are to be constructed. |  |
| <b>4. Sewage Disposal (DWQ Requirement)</b>   |  |
| 4a. Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility.<br><br>not applicable  |  |

|   |   |   |
|---|---|---|
| <b>5. Endangered Species and Designated Critical Habitat (Corps Requirement)</b>  |   |   |
| 5a. Will this project occur in or near an area with federally protected species or habitat?   | <input checked="" type="checkbox"/> Yes   | <input type="checkbox"/> No                   |
| 5b. Have you checked with the USFWS concerning Endangered Species Act impacts?  | <input checked="" type="checkbox"/> Yes   | <input type="checkbox"/> No                   |
| 5c. If yes, indicate the USFWS Field Office you have contacted.   | <input type="checkbox"/> Raleigh  | <input checked="" type="checkbox"/> Asheville |
| 5d. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat?<br><br>Two dwarf-flowered heartleaf ( <i>Hexastylis naniflora</i> ) populations have been identified and delineated on the project. A Biological Assessment was submitted to the USFWS (Cover Letter dated April 2, 2009), and NCDOT subsequently received a Biological Opinion (BO) from USFWS, dated November 13, 2010. The BO concluded that "it is our biological opinion that the project as proposed is not likely to jeopardize the continued existence of the dwarf-flowered heartleaf. No critical habitat has been designated for this species; therefore, none will be affected". |   |   |
| <b>6. Essential Fish Habitat (Corps Requirement)</b>  |   |   |
| 6a. Will this project occur in or near an area designated as essential fish habitat?  | <input type="checkbox"/> Yes  | <input checked="" type="checkbox"/> No        |
| 6b. What data sources did you use to determine whether your site would impact Essential Fish Habitat?<br>NMFS County Index  |   |   |
| <b>7. Historic or Prehistoric Cultural Resources (Corps Requirement)</b>  |   |   |
| 7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)?  | <input type="checkbox"/> Yes  | <input checked="" type="checkbox"/> No        |
| 7b. What data sources did you use to determine whether your site would impact historic or archeological resources?<br>NEPA Documentation  |   |   |
| <b>8. Flood Zone Designation (Corps Requirement)</b>  |   |   |
| 8a. Will this project occur in a FEMA-designated 100-year floodplain?   | <input type="checkbox"/> Yes  | <input checked="" type="checkbox"/> No        |
| 8b. If yes, explain how project meets FEMA requirements:  |   |   |
| 8c. What source(s) did you use to make the floodplain determination? FEMA maps  |   |   |
| Dr. Gregory J. Thorpe, Ph D<br>Applicant/Agent's Printed Name   | <br>Applicant/Agent's Signature<br>(Agent's signature is valid only if an authorization letter from the applicant is provided.) | 2-9-10<br>Date                                |

**APPROVED JURISDICTIONAL DETERMINATION FORM**  
**U.S. Army Corps of Engineers**

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

**SECTION I: BACKGROUND INFORMATION**

**A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):**

**B. DISTRICT OFFICE, FILE NAME, AND NUMBER:**

**C. PROJECT LOCATION AND BACKGROUND INFORMATION:**

State: NC County/parish/borough: Burke City: Rutherford College  
Center coordinates of site (lat/long in degree decimal format): Lat. 35.79° **N**, Long. -81.55° **W**.  
Universal Transverse Mercator:

Name of nearest waterbody: Hoyle Creek

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Catawba River (Lake Catawba)

Name of watershed or Hydrologic Unit Code (HUC): 03050101

- Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.  
 Check if other sites (e.g., offsite mitigation sites, disposal sites, etc...) are associated with this action and are recorded on a different JD form.

**D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**

- Office (Desk) Determination. Date:  
 Field Determination. Date(s):

**SECTION II: SUMMARY OF FINDINGS**

**A. RHA SECTION 10 DETERMINATION OF JURISDICTION.**

There **Are no** "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [Required]

- Waters subject to the ebb and flow of the tide.  
 Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.  
Explain:

**B. CWA SECTION 404 DETERMINATION OF JURISDICTION.**

There **Are** "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [Required]

**1. Waters of the U.S.**

**a. Indicate presence of waters of U.S. in review area (check all that apply):<sup>1</sup>**

- TNWs, including territorial seas  
 Wetlands adjacent to TNWs  
 Relatively permanent waters<sup>2</sup> (RPWs) that flow directly or indirectly into TNWs  
 Non-RPWs that flow directly or indirectly into TNWs  
 Wetlands directly abutting RPWs that flow directly or indirectly into TNWs  
 Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs  
 Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs  
 Impoundments of jurisdictional waters  
 Isolated (interstate or intrastate) waters, including isolated wetlands

**b. Identify (estimate) size of waters of the U.S. in the review area:**

Non-wetland waters: 321 linear feet: 2-25 width (ft) and/or 0.11 acres.  
Wetlands: 0 acres.

**c. Limits (boundaries) of jurisdiction based on: Not Applicable**

Elevation of established OHWM (if known):

**2. Non-regulated waters/wetlands (check if applicable):<sup>3</sup>**

- Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.  
Explain: **Mike Parker with DWQ conducted JD site visit on 5/8/08. Dave Baker \ USACE stated he would agree with DWQ findings. The UT to Hoyle Creek was determined to be Intermittent from point identified (~100 LF of stream) and ephemeral upgradient of that point.**

<sup>1</sup> Boxes checked below shall be supported by completing the appropriate sections in Section III below.

<sup>2</sup> For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

<sup>3</sup> Supporting documentation is presented in Section III.F.

### SECTION III: CWA ANALYSIS

#### A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**

Identify TNW:

Summarize rationale supporting determination:

2. **Wetland adjacent to TNW**

Summarize rationale supporting conclusion that wetland is "adjacent": N/A.

#### B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody<sup>4</sup> is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

(i) **General Area Conditions:**

Watershed size: **Pick List**

Drainage area: **Pick List**

Average annual rainfall: inches

Average annual snowfall: inches

(ii) **Physical Characteristics:**

(a) **Relationship with TNW:**

Tributary flows directly into TNW.

Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.

Project waters are **Pick List** river miles from RPW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Project waters are **Pick List** aerial (straight) miles from RPW.

Project waters cross or serve as state boundaries. Explain:

Identify flow route to TNW<sup>5</sup>:

Tributary stream order, if known:

<sup>4</sup> Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

<sup>5</sup> Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is:  Natural  
 Artificial (man-made). Explain:  
 Manipulated (man-altered). Explain:

**Tributary properties with respect to top of bank (estimate):**

Average width:            feet  
Average depth:           feet  
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

Silts                            Sands                            Concrete  
 Cobbles                        Gravel                        Muck  
 Bedrock                        Vegetation. Type/% cover:  
 Other. Explain:

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: relatively stable.

Presence of run/riffle/pool complexes. Explain: none present.

Tributary geometry: **Relatively straight**

Tributary gradient (approximate average slope): 5 %

(c) Flow:

Tributary provides for: **Intermittent but not seasonal flow**

Estimate average number of flow events in review area/year: **Pick List**

Describe flow regime:

Other information on duration and volume:

Surface flow is: **Overland sheetflow.** Characteristics:

Subsurface flow: **Pick List.** Explain findings:

Dye (or other) test performed:

Tributary has (check all that apply):

Bed and banks  
 OHWM<sup>6</sup> (check all indicators that apply):  
 clear, natural line impressed on the bank    the presence of litter and debris  
 changes in the character of soil            destruction of terrestrial vegetation  
 shelving                                        the presence of wrack line  
 vegetation matted down, bent, or absent    sediment sorting  
 leaf litter disturbed or washed away        scour  
 sediment deposition                        multiple observed or predicted flow events  
 water staining                                abrupt change in plant community  
 other (list):  
 Discontinuous OHWM.<sup>7</sup> Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

High Tide Line indicated by:            Mean High Water Mark indicated by:  
 oil or scum line along shore objects        survey to available datum;  
 fine shell or debris deposits (foreshore)    physical markings;  
 physical markings/characteristics        vegetation lines/changes in vegetation types.  
 tidal gauges  
 other (list):

(iii) **Chemical Characteristics:**

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain: water is clear with evidence of iron-oxidizing bacteria present.

Identify specific pollutants, if known:

<sup>6</sup>A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

<sup>7</sup>Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- Riparian corridor. Characteristics (type, average width):
- Wetland fringe. Characteristics:
- Habitat for:
  - Federally Listed species. Explain findings:
  - Fish/spawn areas. Explain findings:
  - Other environmentally-sensitive species. Explain findings:
  - Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size:        acres

Wetland type. Explain:

Wetland quality. Explain:

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain:

Surface flow is: **Pick List**

Characteristics:

Subsurface flow: **Pick List**. Explain findings:

Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

Directly abutting

Not directly abutting

Discrete wetland hydrologic connection. Explain:

Ecological connection. Explain:

Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List**.

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:

Identify specific pollutants, if known:

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- Riparian buffer. Characteristics (type, average width):
- Vegetation type/percent cover. Explain:
- Habitat for:
  - Federally Listed species. Explain findings:
  - Fish/spawn areas. Explain findings:
  - Other environmentally-sensitive species. Explain findings:
  - Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately (        ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)      Size (in acres)      Directly abuts? (Y/N)      Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

### C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

**Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:**

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: The RPW has intermittent flow and also carries stormwater to a TNW.
2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:
3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

### D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:  
 TNWs: linear feet      width (ft), Or,      acres.  
 Wetlands adjacent to TNWs: acres.
2. **RPWs that flow directly or indirectly into TNWs.**  
 Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: named stream (Hoyle Creek) on USGS topographic map (Drexel quad).  
 Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: Score of 27 on DWQ stream Form. Mike Parker w/ DWQ conducted JD site visit on 5/8/08 - determined UT to Hoyle Creek to be Intermittent from point identified (~100 LF of stream) and ephemeral upgradient of that point (see attached diagram).

Provide estimates for jurisdictional waters in the review area (check all that apply):

- Tributary waters: 321 linear feet 2-25 width (ft).  
 Other non-wetland waters:            acres.

Identify type(s) of waters:

3. **Non-RPWs<sup>8</sup> that flow directly or indirectly into TNWs.**

- Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):

- Tributary waters:            linear feet            width (ft).  
 Other non-wetland waters:            acres.

Identify type(s) of waters:

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**

- Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.  
 Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:  
  
 Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:

Provide acreage estimates for jurisdictional wetlands in the review area:            acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**

- Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area:            acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**

- Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area:            acres.

7. **Impoundments of jurisdictional waters.<sup>9</sup>**

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

- Demonstrate that impoundment was created from "waters of the U.S.," or  
 Demonstrate that water meets the criteria for one of the categories presented above (1-6), or  
 Demonstrate that water is isolated with a nexus to commerce (see E below).

E. **ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):<sup>10</sup>**

- which are or could be used by interstate or foreign travelers for recreational or other purposes.  
 from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.  
 which are or could be used for industrial purposes by industries in interstate commerce.  
 Interstate isolated waters. Explain:

<sup>8</sup>See Footnote # 3.

<sup>9</sup>To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

<sup>10</sup> Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.

Other factors. Explain:

**Identify water body and summarize rationale supporting determination:**

Provide estimates for jurisdictional waters in the review area (check all that apply):

Tributary waters: linear feet width (ft).

Other non-wetland waters: acres.

Identify type(s) of waters:

Wetlands: acres.

**F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):**

If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.

Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.

Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).

Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:

Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

Non-wetland waters (i.e., rivers, streams): linear feet width (ft).

Lakes/ponds: acres.

Other non-wetland waters: acres. List type of aquatic resource:

Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).

Lakes/ponds: acres.

Other non-wetland waters: acres. List type of aquatic resource:

Wetlands: acres.

**SECTION IV: DATA SOURCES.**

**A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):**

Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:

Data sheets prepared/submitted by or on behalf of the applicant/consultant.

Office concurs with data sheets/delineation report.

Office does not concur with data sheets/delineation report.

Data sheets prepared by the Corps:

Corps navigable waters' study:

U.S. Geological Survey Hydrologic Atlas:

USGS NHD data.

USGS 8 and 12 digit HUC maps.

U.S. Geological Survey map(s). Cite scale & quad name: Drexel quad.

USDA Natural Resources Conservation Service Soil Survey. Citation:

National wetlands inventory map(s). Cite name:

State/Local wetland inventory map(s):

FEMA/FIRM maps:

100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)

Photographs:  Aerial (Name & Date):

or  Other (Name & Date):

Previous determination(s). File no. and date of response letter:

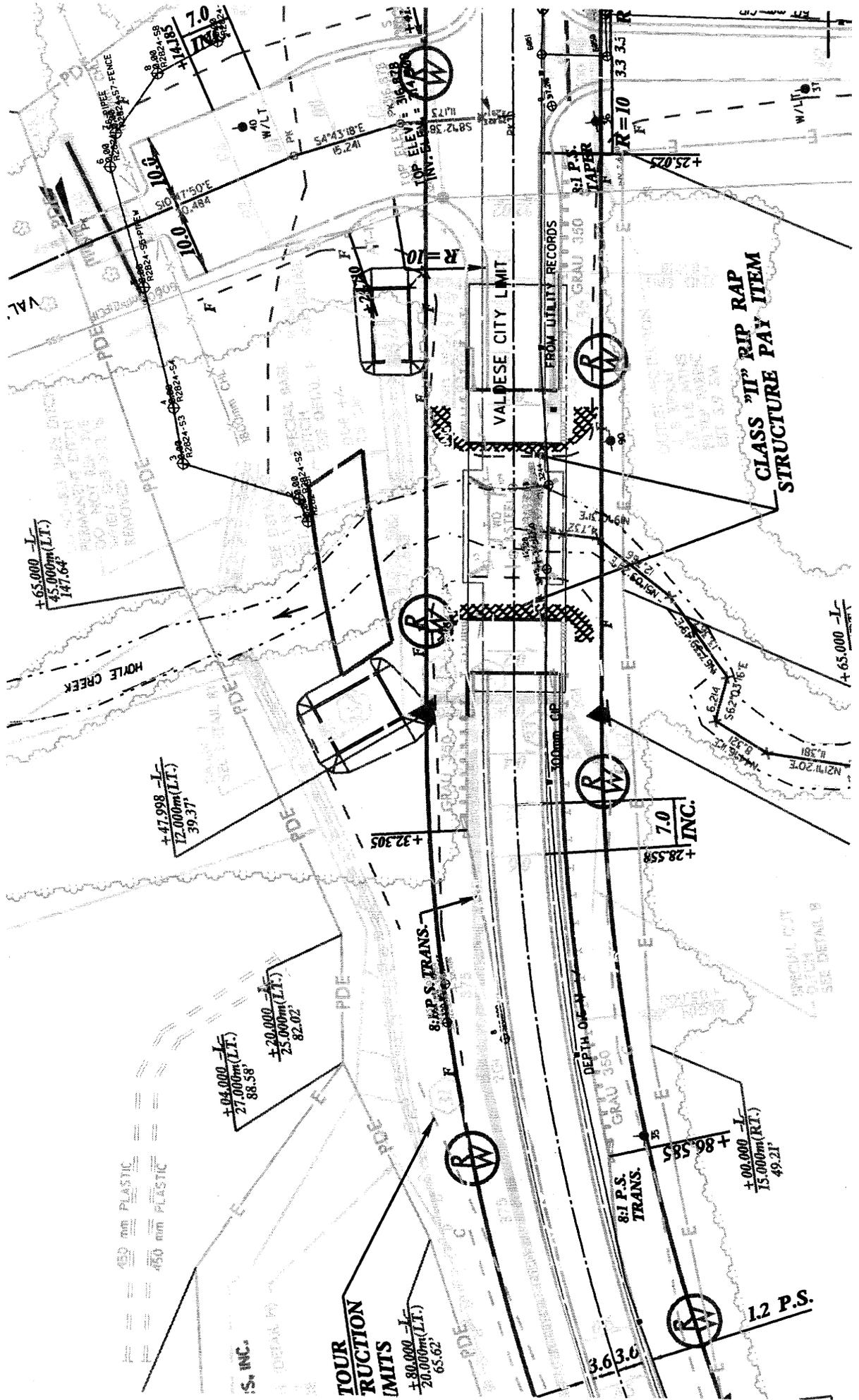
Applicable/supporting case law:

Applicable/supporting scientific literature:

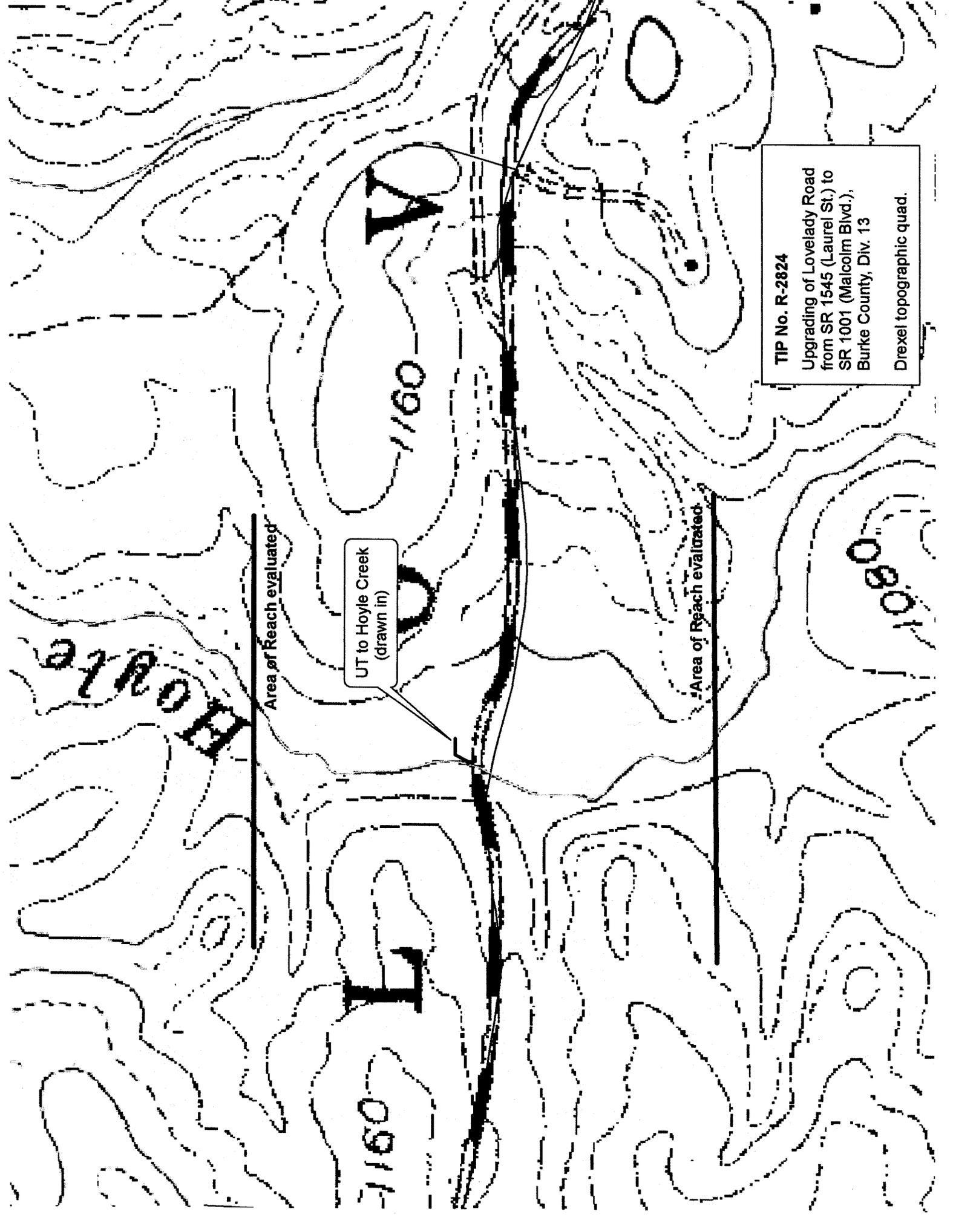
Other information (please specify):

**B. ADDITIONAL COMMENTS TO SUPPORT JD:** Mike Parker with DWQ conducted JD site visit on 5/8/08. Dave Baker \ USACE stated he would agree with DWQ findings. The UT to Hoyle Creek was determined to be Intermittent from point identified (~100 LF of stream) and ephemeral upstream of that point.

R-2824  
BURKE CO.



= Intermittent segment of UT to Hoyle Creek  
 = Ephemeral segment of UT to Hoyle Creek



TIP No. R-2824

Upgrading of Lovelady Road  
from SR 1545 (Laurel St.) to  
SR 1001 (Malcolm Blvd.),  
Burke County, Div. 13

Drexel topographic quad.

Area of Reach evaluated

UT to Hoyle Creek  
(drawn in)

Area of Reach evaluated

1160

1160

1080

1000

North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

|   |                    |                                 |
|---|--------------------|---------------------------------|
| Date: 4-16-08   | Project: R-2824    | Latitude:                       |
| Evaluator: B. BARRETT   | Site: East of pipe | Longitude:                      |
| <b>Total Points:</b><br>Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30$ 14.5 | County: BURKE      | Other<br>e.g. Quad Name: DREXEL |

A. Geomorphology (Subtotal = 6.5)

|  | Absent | Weak | Moderate | Strong |
|--|--------|------|----------|--------|
| 1 <sup>a</sup> . Continuous bed and bank   | 0      | 1    | 2        | 3      |
| 2. Sinuosity   | 0      | 1    | 2        | 3      |
| 3. In-channel structure: riffle-pool sequence  | 0      | 1    | 2        | 3      |
| 4. Soil texture or stream substrate sorting  | 0      | 1    | 2        | 3      |
| 5. Active/relic floodplain   | 0      | 1    | 2        | 3      |
| 6. Depositional bars or benches  | 0      | 1    | 2        | 3      |
| 7. Braided channel   | 0      | 1    | 2        | 3      |
| 8. Recent alluvial deposits  | 0      | 1    | 2        | 3      |
| 9 <sup>a</sup> . Natural levees  | 0      | 1    | 2        | 3      |
| 10. Headcuts   | 0      | 1    | 2        | 3      |
| 11. Grade controls   | 0      | 0.5  | 1        | 1.5    |
| 12. Natural valley or drainageway  | 0      | 0.5  | 1        | 1.5    |
| 13. Second or greater order channel on existing USGS or NRCS map or other documented evidence. | No = 0 |      | Yes = 3  |        |

<sup>a</sup> Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 3)

|  |        |     |           |     |
|--|--------|-----|-----------|-----|
| 14. Groundwater flow/discharge   | 0      | 1   | 2         | 3   |
| 15. Water in channel and > 48 hrs since rain, <u>or</u><br>Water in channel -- dry or growing season | 0      | 1   | 2         | 3   |
| 16. Leaf litter  | 1.5    | 1   | 0.5       | 0   |
| 17. Sediment on plants or debris   | 0      | 0.5 | 1         | 1.5 |
| 18. Organic debris lines or piles (Wrack lines)  | 0      | 0.5 | 1         | 1.5 |
| 19. Hydric soils (redoximorphic features) present?   | No = 0 |     | Yes = 1.5 |     |

C. Biology (Subtotal = 5)

|   |  |     |   |     |
|---|--|-----|---|-----|
| 20 <sup>b</sup> . Fibrous roots in channel            | 3  | 2   | 1 | 0   |
| 21 <sup>b</sup> . Rooted plants in channel            | 3  | 2   | 1 | 0   |
| 22. Crayfish  | 0  | 0.5 | 1 | 1.5 |
| 23. Bivalves  | 0  | 1   | 2 | 3   |
| 24. Fish  | 0  | 0.5 | 1 | 1.5 |
| 25. Amphibians  | 0  | 0.5 | 1 | 1.5 |
| 26. Macroinvertebrates (note diversity and abundance) | 0  | 0.5 | 1 | 1.5 |
| 27. Filamentous algae; periphyton                     | 0  | 1   | 2 | 3   |
| 28. Iron oxidizing bacteria/fungus.                   | 0  | 0.5 | 1 | 1.5 |
| 29 <sup>b</sup> . Wetland plants in streambed         | FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0 |     |   |     |

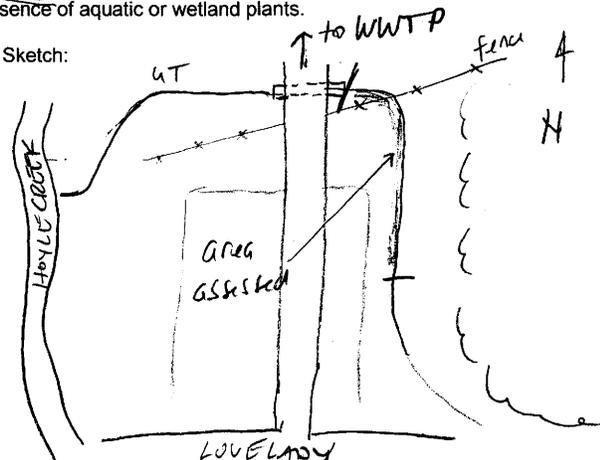
<sup>b</sup> Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

\* #15 light rain on 4-14, per property owner in area

\* #29 *Juncus effusus* (FACW+) ⇒ 1 pt.

Sketch:



North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

|   |                    |                                 |
|---|--------------------|---------------------------------|
| Date: 4-16-08   | Project: R-2824    | Latitude:                       |
| Evaluator: B. BARRETT   | Site: West of Pipe | Longitude:                      |
| Total Points:<br>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30<br>27 | County: RURKE      | Other<br>e.g. Quad Name: DREXEL |

A. Geomorphology (Subtotal = 11)

|  | Absent | Weak | Moderate | Strong |
|--|--------|------|----------|--------|
| 1 <sup>a</sup> . Continuous bed and bank   | 0      | 1    | 2        | 3      |
| 2. Sinuosity   | 0      | 1    | 2        | 3      |
| 3. In-channel structure: riffle-pool sequence  | 0      | 1    | 2        | 3      |
| 4. Soil texture or stream substrate sorting  | 0      | 1    | 2        | 3      |
| 5. Active/relic floodplain   | 0      | 1    | 2        | 3      |
| 6. Depositional bars or benches  | 0      | 1    | 2        | 3      |
| 7. Braided channel   | 0      | 1    | 2        | 3      |
| 8. Recent alluvial deposits  | 0      | 1    | 2        | 3      |
| 9 <sup>a</sup> Natural levees  | 0      | 1    | 2        | 3      |
| 10. Headcuts   | 0      | 1    | 2        | 3      |
| 11. Grade controls   | 0      | 0.5  | 1        | 1.5    |
| 12. Natural valley or drainageway  | 0      | 0.5  | 1        | 1.5    |
| 13. Second or greater order channel on existing USGS or NRCS map or other documented evidence. | No = 0 |      | Yes = 3  |        |

<sup>a</sup> Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8)

|  |        |     |           |     |
|--|--------|-----|-----------|-----|
| 14. Groundwater flow/discharge   | 0      | 1   | 2         | 3   |
| ★ 15. Water in channel and > 48 hrs since rain, <u>or</u><br>Water in channel -- dry or growing season | 0      | 1   | 2         | 3   |
| 16. Leaf litter  | 1.5    | 1   | 0.5       | 0   |
| 17. Sediment on plants or debris   | 0      | 0.5 | 1         | 1.5 |
| 18. Organic debris lines or piles (Wrack lines)  | 0      | 0.5 | 1         | 1.5 |
| 19. Hydric soils (redoximorphic features) present?   | No = 0 |     | Yes = 1.5 |     |

C. Biology (Subtotal = 8)

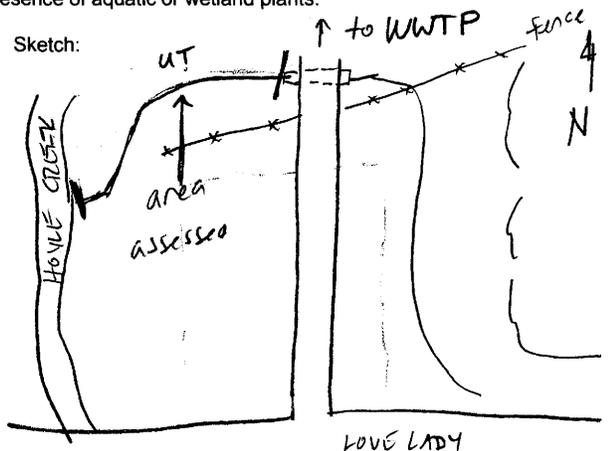
|   |  |     |   |     |
|---|--|-----|---|-----|
| 20 <sup>b</sup> . Fibrous roots in channel              | 3  | 2   | 1 | 0   |
| 21 <sup>b</sup> . Rooted plants in channel              | 3  | 2   | 1 | 0   |
| 22. Crayfish  | 0  | 0.5 | 1 | 1.5 |
| 23. Bivalves  | 0  | 1   | 2 | 3   |
| 24. Fish  | 0  | 0.5 | 1 | 1.5 |
| ★ 25. Amphibians  | 0  | 0.5 | 1 | 1.5 |
| ★ 26. Macroinvertebrates (note diversity and abundance) | 0  | 0.5 | 1 | 1.5 |
| 27. Filamentous algae; periphyton                       | 0  | 1   | 2 | 3   |
| 28. Iron oxidizing bacteria/fungus.                     | 0  | 0.5 | 1 | 1.5 |
| 29 <sup>b</sup> . Wetland plants in streambed           | FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0 |     |   |     |

<sup>b</sup> Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

★ 15 11 in rain 2 days prior (4/14/08), per nearby landowner

★ 26 only near confluence with Hoyle Creek





# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Asheville Field Office  
160 Zillicoa Street  
Asheville, North Carolina 28801

November 13, 2009

Mr. John F. Sullivan, III  
Division Administrator  
Federal Highway Administration  
310 New Bern Avenue, Suite 410  
Raleigh, North Carolina 27601

Dear Mr. Sullivan:

Subject: Proposed Upgrade of Lovelady Road, TIP No. R-2824, in Burke County, North Carolina, and Its Effects on the Federally Threatened Dwarf-Flowered Heartleaf

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion) based on our review of the North Carolina Department of Transportation's (NCDOT) Biological Assessment (BA) of the effects of the subject highway improvements on the federally threatened dwarf-flowered heartleaf (*Hexastylis naniflora*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) (Act). Your July 14, 2009, request for formal consultation was received on July 15, 2009.

This Opinion is based on information provided in the BA, other available literature, telephone conversations, e-mail, office files, published literature, field investigations, and other sources of information. A complete administrative record of this consultation is on file at this office.

## BIOLOGICAL OPINION

### CONSULTATION HISTORY

A consultation history of this project is provided in Appendix A.

### DESCRIPTION OF THE PROPOSED ACTION

The NCDOT proposes to upgrade about 1.9 miles of Lovelady Road in Burke County from Laurel Street to Malcolm Boulevard, TIP No. R-2824. The proposed upgrade includes widening the existing two-lane road to a standard two-lane road with 12-foot lanes, 4-foot paved shoulders,

| FHWA-NC DIVISION           |          |
|----------------------------|----------|
| REC'D                      | NOV 13 / |
| DIV ADMM                   |          |
| ASST DIV ADMM              |          |
| CIV ENGR                   |          |
| QUAL CONTROL               |          |
| SAFETY PROJ ENGR           |          |
| STRUCTURAL ENGR            |          |
| FINANCIAL MGR              |          |
| PLN SPEC                   |          |
| PRNG ASST                  |          |
| P & PD TEAM LEADER         |          |
| PL-1                       |          |
| PL-2                       |          |
| CONGRS                     |          |
| PRECONST & ENV TEAM LEADER |          |
| A-1                        |          |
| A-2                        |          |
| A-3                        |          |
| ENV PROJ SPEC              |          |
| OPS TEAM LEADER            |          |
| TE-1                       |          |
| TE-2                       |          |
| TE-3/SAFETY                |          |
| PM PROJ MGR                |          |
| FILE                       |          |

STP-1546(8)

and 8-foot usable shoulders. Bridge No. 110 over Hoyle Creek also will be replaced on the existing alignment. Stop signs will be installed at intersections along the project, except for a traffic signal at the Lovelady Road/Malcolm Boulevard intersection and a roundabout at the Lovelady Road/Kathy Drive/Carolina Mills Road intersection. Previously, the NCDOT proposed a much larger project with a new location section that would have potentially affected nine occurrences of the federally threatened dwarf-flowered heartleaf (*Hexastylis naniflora*). The current project limits will impact two of three occurrences along the revised corridor.

Surveys conducted along the proposed corridor relocated two previously known occurrences of the dwarf-flowered heartleaf and discovered one new occurrence (see map on page 3). Details for these three sites are as follows:

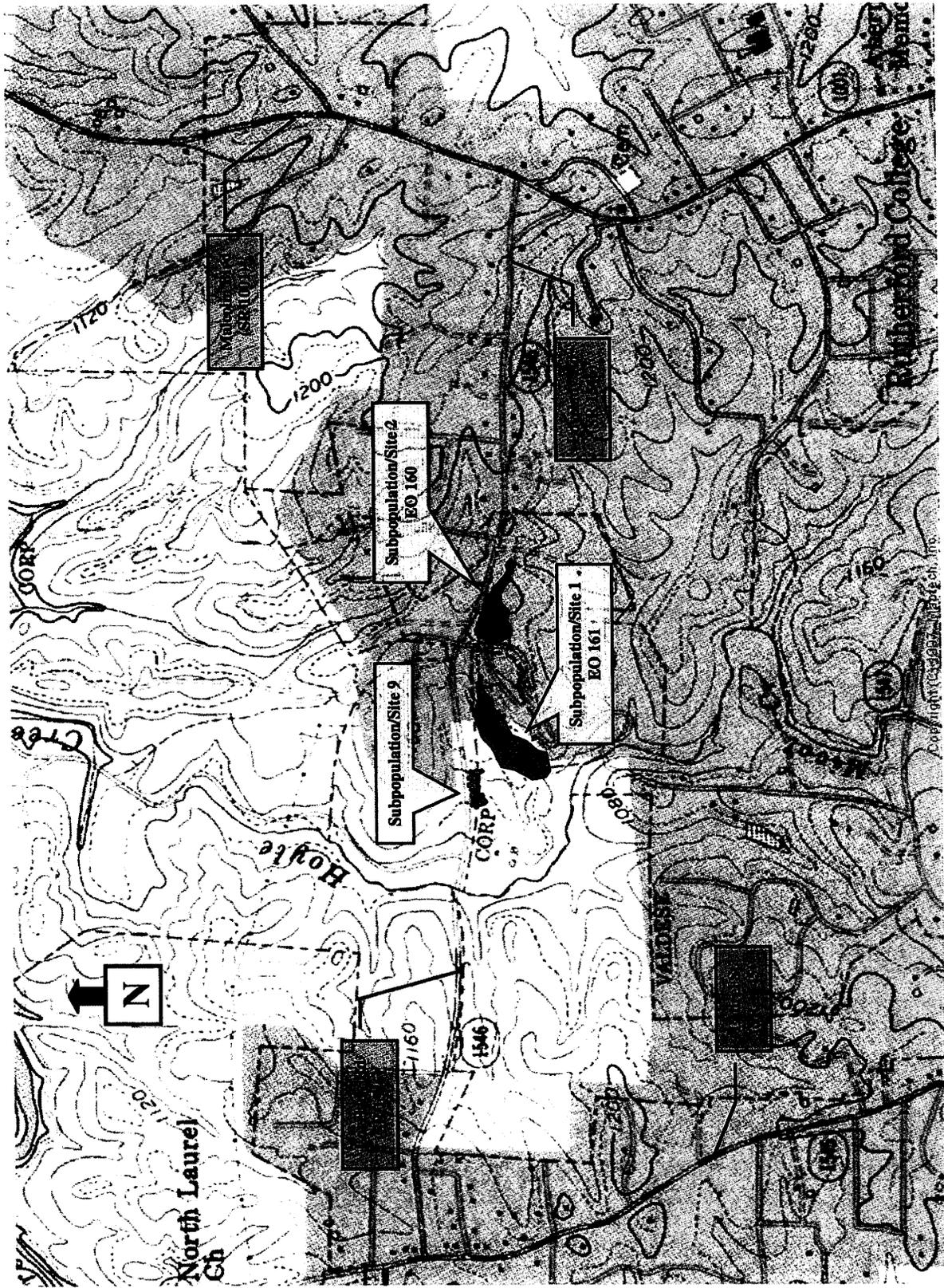
- Site 1 (EO #161) has a total of 2,754 plants;
- Site 2 (EO #160) has a total of 851 plants; and
- Site 9, the new occurrence, has a total of 126 plants.

There are 3,731 plants estimated in these three occurrences. About 191 plants will be directly affected by project construction at Sites 2 and 9, and another 175 plants will be indirectly affected by corridor construction and maintenance. Site 1 will not be affected by the construction of this project.

### **Conservation Measures**

Measures to avoid and minimize impacts to the dwarf-flowered heartleaf include the following:

- Constructing a roundabout at the Lovelady Road/Kathy Drive/Carolina Mills Road. The roundabout requires less roadway widening and construction than another driveway entrance.
- Minimizing impacts to the occurrence at Site 9 by using expressway curb and gutter to decrease the construction footprint by about 15 feet.
- Limiting mechanized clearing and construction access to within 5 feet beyond the slope stake lines.
- Relocating an existing utility line to the other side of the road to minimize impacts during construction and reduce future recurring impacts of utility line maintenance.
- Erecting construction fencing between the dwarf-flowered heartleaf occurrences and the construction limits to protect them from activities during construction.
- Conserving in perpetuity the unimpacted portion of Site 9 as part of the right-of-way (ROW) and transplanting the approximately 67 plants that will be directly impacted by project construction to the permanently protected area of the site.
- Assisting the Service in answering questions that arose during the recent 5-year status review for the species. Specifics of the agreement are included in Appendix B.



**Dwarf-Flowered Heartleaf Occurrences within the Project Action Area  
Burke County, North Carolina**

## Action Area

The action area should be determined based on consideration of all direct and indirect effects of the proposed action (50 CFR 402.2 and 402.14(h)(2)). The direct and indirect effects of the actions and activities must be considered in conjunction with the effects of other past and present federal, state, or private activities, as well as the cumulative effects of reasonably certain future state or private activities within the action area.

The action area for R-2824 is a linear corridor beginning at Laurel Street (SR 1545) and continuing for about 1.9 miles, terminating at Malcolm Boulevard (SR 1001) in Burke County, North Carolina. The width of the corridor is the existing roadway, including the current ROW and additional ROW up to 80 feet on either side of the corridor.

## STATUS OF THE SPECIES AND ITS CRITICAL HABITAT

### Species Description and Life History

The dwarf-flowered heartleaf is a low-growing herbaceous plant in the birthwort family (Aristolochiaceae). Blomquist (1957) described the species in his revision of the genus *Hexastylis*. The plant's heart-shaped dark green leaves are evergreen and leathery and are supported by long thin petioles from a subsurface rhizome. Maximum height rarely exceeds 15 centimeters (6 inches). The jug-shaped flowers are usually beige to dark brown in color and appear from mid-March to early June. The flowers are small and inconspicuous and are found near the base of the petioles. The fruit matures from mid-May to early July (Blomquist 1957; Gaddy 1980, 1981). The plant grows in acidic soils, usually along north-facing bluffs and adjacent slopes and in floodplains next to streams and creek heads in the upper Piedmont Region of North Carolina and South Carolina. It is most often found on Madison and Pacolet soils. Its small flower distinguishes this species from other members of the genus *Hexastylis*.

Thrips (sucking insects) and flies are the major pollinators of most plant species in the genus *Hexastylis*. As yet, the pollination method for the dwarf-flowered heartleaf is unproven, but biologists speculate that it may be pollinated by snails and/or slugs. With most *Hexastylis* species, the vectors--flies and thrips--spend most of their lives in the plant's flower tissues and feed on pollen grains or on portions of the plant's outer skin. Once the flowers have been fertilized, ants distribute the seeds. These ants eat the coating of the seeds and leave the seeds near the plant site or by the ant nest. Seed germination takes place in the spring, after the seeds have been exposed to cool temperatures.

### Status and Distribution

The dwarf-flowered heartleaf was listed as a threatened species on April 14, 1989 (54 FR 14964). No critical habitat has been designated. At the time of listing, threats to the species included residential and industrial development, conversion of its habitat to pasture or small ponds, timber-harvesting, and cattle-grazing. At that time, the species was distributed across 24 extant populations located in Burke, Catawba, Cleveland, Lincoln, and Rutherford Counties, North Carolina; and Cherokee, Greenville, and Spartanburg Counties, South Carolina. As of

2006, the combined databases of the North Carolina Natural Heritage Program (NCNHP) and the South Carolina Department of Natural Resources' Heritage Trust Program contain records of about 103 locations that are sufficiently geographically distinct as to be regarded as proxies for populations of the species (Service, Draft Five-Year Review for *Hexastylis Naniflora*, Asheville Field Office, September 2006). This is roughly four times the number of populations known when the species was federally listed as threatened in 1989. Of these populations, 76 occur in North Carolina, and 29 occur in South Carolina. The species' known range has since expanded to include Alexander, Caldwell, Iredell, and Polk Counties, North Carolina. Despite the relatively large number of known sites and many that have been located since its designation as threatened, threats identified at listing continue to affect the species; at least nine sites have been destroyed, including five that had been discovered since listing. Many more sites have been partially impacted or destroyed because of development, and fewer than ten sites have permanent legal protection from habitat loss or alteration. Further, fewer than 15 percent of all known populations have been reported to contain more than 1,000 rosettes (Service, Draft Five-Year Review for *Hexastylis Naniflora*, September 2006).

### **Analysis of the Species Likely to be Affected**

At a minimum, the action area contains about 3,731 dwarf-flowered heartleaf plants. Of the total, about 191 plants will be directly impacted by project construction, and another 175 plants could be indirectly affected by the effects of clearing and other alterations of the microclimate at the project edges and by the invasion of nonnative plants.

### **ENVIRONMENTAL BASELINE**

Under section 7(a)(2) of the Act, when considering the effects of an action on federally listed species, we are required to take into consideration the environmental baseline. The environmental baseline includes past and ongoing natural factors and past and present impacts from all federal, state, or private actions and other activities in the action area (50 CFR 402.02), including federal actions in the area that have already undergone section 7 consultation and the impacts from state or private actions that are contemporaneous with the consultation in progress. The discussion that follows is our evaluation of the factors and impacts from the activities within the action area that make up the environmental baseline.

### **Status of the Species Within the Action Area**

The action area contains about 3,731 dwarf-flowered heartleaf plants. About 191 plants will be directly affected by construction. Sixty-seven of these plants will be relocated to a protected area. Based on the survival of previously relocated dwarf-flowered heartleaf plants, mortality is not expected to exceed 50 percent. In addition to the direct impacts of the project, about 175 plants may be impacted indirectly.

The subject project may result in the loss of less than 1/10 of 1 percent of all known individual dwarf-flowered heartleaf plants and about 10 percent of the plants within the action area.

## **Factors Affecting the Species' Environment Within the Action Area**

Surveys for the dwarf-flowered heartleaf have been conducted across the entire action area. No other impacts are planned or expected beyond those described in this Opinion.

## **EFFECTS OF THE ACTION**

Under section 7(a)(2) of the Act, "effects of the action" refers to the direct and indirect effects of an action on the species or its critical habitat, together with the effects of other activities that are interrelated or interdependent with that action. Under section 7 of the Act, the federal agency is responsible for analyzing these effects. The effects of the proposed action are added to the environmental baseline to determine the future baseline, which serves as the basis for the determination in this Opinion. Should the effects of the federal action result in a situation that would jeopardize the continued existence of the species, we may propose reasonable and prudent alternatives that the federal agency can take to avoid violation of section 7(a)(2) of the Act. The discussion that follows is our evaluation of the expected direct and indirect effects of the construction of the subject project. Indirect effects are those caused by the proposed action that will occur later but that are still reasonably certain to occur (50 CFR 402.02). We have determined that there are no interrelated or interdependent actions apart from the action under consideration.

### **Factors to be Considered**

As previously stated, 191 of the estimated 3,731 dwarf-flowered heartleaf plants within the action area will be directly affected by the proposed highway widening. An estimated 175 additional plants are expected to be impacted indirectly because of habitat changes at the edges of the construction corridor. These areas may provide suitable habitat for the species in the future as the canopy closes in the unmaintained portions of the ROW.

The NCDOT has agreed to permanently protect a portion of one of the on-site occurrences. This will permanently protect over an acre of occupied habitat. They also have agreed to gather data on a number of other sites to assist in answering questions that arose during the 5-year review for the dwarf-flowered heartleaf.

The total number of dwarf-flowered heartleaf plants throughout its known range (estimated to be in excess of 100 populations) is not considered a limiting factor toward recovery of the species; rather, it is the protection of populations from continued developmental threats (such as the activities associated with this project) that is limiting the species' recovery.

### **Analyses of the Effects of the Action**

**Direct effects.** The proposed project will result in direct effects to 191 dwarf-flowered heartleaf plants and about 1/10 of an acre of habitat in the action area. Sixty-seven of these plants will be relocated to a permanently protected adjacent site.

**Indirect effects.** Indirect effects are anticipated to occur to about 175 dwarf-flowered heartleaf plants and about 1/100 of an acre of habitat. Impacts may result from the edge of the pavement out to the cleared ROW by allowing increased sunlight to the plants that occur adjacent to areas that are cleared. After the removal of trees, the additional sunlight would alter habitat conditions at the immediate edge of the tree line, making the area less hospitable to the dwarf-flowered heartleaf and potentially causing additional losses of individual plants. Although increased sunlight has been known to result in increased flowering of dwarf-flowered heartleaf rosettes just inside the new tree line, it is not known whether this increased flowering would result in increased seedling recruitment or long-term changes in the number of established plants in these locations. The removal of trees could also result in an influx of native and nonnative invasive species, and dense understories could form from the resultant increase in sunlight. If allowed to establish and spread into areas currently occupied by the dwarf-flowered heartleaf, these invasive species would ultimately result in the loss of additional dwarf-flowered heartleaf plants.

### **Species' Response to the Proposed Action**

The proposed construction activities will result in the removal of all vegetation within the impact area and the permanent conversion of suitable habitat to the roadway and maintained shoulders. The proposed project will result in direct impacts to an estimated 191 dwarf-flowered heartleaf plants out of the estimated 3,731 plants in the action area. The predicted impacts will not have appreciably negative effects on the recovery of the species.

### **CUMULATIVE EFFECTS**

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require a separate consultation pursuant to section 7 of the Act (Service and National Marine Fisheries Service 1998). There are no other state, tribal, local, or private actions reasonably certain to occur in the action area that would affect the dwarf-flowered heartleaf.

### **CONCLUSION**

After reviewing the current status of the dwarf-flowered heartleaf, the environmental baseline for the action area, the effects of the proposed project, the cumulative effects, and the proposed conservation measures, it is our biological opinion that the project as proposed is not likely to jeopardize the continued existence of the dwarf-flowered heartleaf. No critical habitat has been designated for this species; therefore, none will be affected.

### **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and federal regulations pursuant to section 4(d) of the Act prohibit the taking of endangered and threatened species without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential

behavioral patterns, such as breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not for the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act, provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, section 9(a)(2)(B) provides limited protection to listed plants from take to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage to such plants on areas under federal jurisdiction or the destruction of endangered plants on nonfederal areas in violation of state law or regulation or in the course of any violation of a state criminal trespass law. Therefore, for this Opinion, incidental take does not apply, and an incidental take statement is not necessary.

## CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to further minimize or avoid the adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We request that the NCDOT implement the following conservation recommendations:

1. Develop a management plan for the dwarf-flowered heartleaf conserved in the ROW. This plan, which would require our approval, should address the long-term conservation of all occurrences of the dwarf-flowered heartleaf on the property and should be in place before any construction begins. A draft plan should be submitted to us 6 months prior to the project letting date.
2. Provide general location, population, and condition information on the three dwarf-flowered heartleaf "sub-populations" located within this project's footprint to the NCNHP within 1 year of the date of this Opinion. Notify us when this information has been provided to the NCNHP.
3. Notify us when the dwarf-flowered heartleaf plants have been transplanted. This notification should occur no later than 2 weeks after transplanting.
4. Monitor (using a qualified botanist/biologist) the relocated dwarf-flowered heartleaf plants 1 year after they are relocated to determine survival.
5. Provide a written report summarizing the survival of the relocated dwarf-flowered heartleaf plants, as well as any seemingly significant threats or management issues, within 13 months of the completion of transplanting. This report should

be submitted to the NCNHP and us. The report should include maps and photographs sufficient to clearly convey the general vicinity and specific location of the conservation (transplant) area, the specific locations within the project area in which the dwarf-flowered heartleaf occurs and is monitored, and a condition assessment of the species and its habitat.

In order for us to be kept informed about actions that minimize or avoid adverse effects or that benefit listed species or their habitats, we request notification of the implementation of any conservation recommendations. This notification can be sent via e-mail to Ms. Marella Buncick (marella\_buncick@fws.gov), the lead biologist for this consultation, and Dr. Carolyn Wells (carolyn\_wells@fws.gov), the species recovery coordinator for the dwarf-flowered heartleaf.

### **REINITIATION/CLOSING STATEMENT**

This concludes formal consultation on the action outlined in your July 14, 2009, request for formal consultation. As provided in 50 CFR 402.16, the reinitiation of formal consultation is required where discretionary federal agency involvement or control over an action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion, (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion, or (4) a new species is listed or critical habitat is designated that may be affected by the action.

If you have any questions or concerns about this consultation or the consultation process in general, please feel free to contact Ms. Buncick at 828/258-3939, Ext. 237, or me, Ext. 223. In any future correspondence concerning this project, please reference our Log Number 4-2-09-367.

Sincerely,



Brian P. Cole  
Field Supervisor

cc:

Regional Director, FWS, Atlanta, GA (ES, Attention: Mr. Ken Graham)

Electronic copy:

Ms. Marla J. Chambers, Western NCDOT Permit Coordinator, North Carolina Wildlife Resources Commission, 12275 Swift Road, Oakboro, NC 28129

Mr. Brian Wrenn, North Carolina Division of Water Quality, Central Office, 2321 Crabtree Blvd., Suite 250, Raleigh, NC 27604

Mr. Chris Militscher, Environmental Protection Agency, 1313 Alderman Circle, Raleigh, NC 27603

### Literature Cited

Blomquist, H. L. 1957. A revision of the *Hexastylis* of North America. *Brittonia* 8:255-281.

Gaddy, L. L. 1980. Status report on *Hexastylis naniflora*. Prepared for the U.S. Fish and Wildlife Service. Unpublished report. 25 pp.

-----, 1981. The status of *Hexastylis naniflora* Blomquist in North Carolina. Unpublished report. 58 pp.

U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. Endangered Species Consultation Handbook - Procedures for Conducting Consultation and Conference Activities under Section 7 of the Endangered Species Act. Washington, D.C.

## Appendix A: Consultation History

Early consultation for segments of this project began as long ago as 1995. Initially, R-2824 was a much longer project with improvements to an existing segment and a new location segment. In 2002, largely because of public input, the project was shortened and the new location segment was dropped. The majority of the dwarf-flowered heartleaf plants occurred along the route of the new location segment. In 2002, the remaining project did not have direct impacts to the dwarf-flowered heartleaf.

03/1995 - Initial Scoping letter from NCDOT.

04/1995 - FWS sends comments to NCDOT.

1996-1999 - Various comments in writing and at meetings on minimal project changes.

2001 - Project officially changed to eliminate the new location section that would have direct impacts to dwarf-flowered heartleaf individuals.

12/2002 - FWS concurs with NLAA determination and informal consultation concludes.

2004 - Dwarf-flowered heartleaf resurvey maintains occurrences are doing well and past determination is still valid.

06/2008 - Dwarf-flowered heartleaf resurvey located a new occurrence of the plant, now referred to as Site 9.

07/2008 – Service participated in a field meeting to discuss possible avoidance and minimization for the plants at site 9.

04/2009 - NCDOT personnel resurvey Site 9 and determine that all individuals surveyed are dwarf-flowered heartleaf.

05/2009 – Service comments on draft BA and provides further informal consultation regarding conservation measures.

07/2009 - NCDOT/FHWA submit the BA and request formal consultation.

## **Appendix B: CONSERVATION MEASURES**

## 6.2.2 5-Year Review Assistance

On March 31, 2009, USFWS proposed that NCDOT assist in answering some of the questions and recommendations in the DFHL 5 –Year Review for sites and activities that NCDOT has direct influence or information about. The USFWS is of the opinion that delisting dwarf-flowered heartleaf is not warranted without additional information and steps taken to ensure the species' long term viability (USDOI-FWS 2009b). The NCDOT proposes to assist the agency by providing this information in the form of a data spreadsheet for nine NCDOT projects as well as USFWS-approved conservation management plans for those projects of this group in which either land ownership has been or will be transferred from NCDOT or an existing landowner has entered or will enter into a conservation easement with NCDOT. Occurrences of DFHL protected by NCDOT that are or will be situated within NCDOT right-of-way without a change in ownership or a conservation easement placed on the occurrence will not have a conservation management plan and will only be depicted in the spreadsheet. The NCDOT's TIP projects and their corresponding EO Nos. that will be documented in this data spreadsheet are depicted below, with an asterisk (\*) denoting projects that have or will have a conservation management plan and a dagger (†) denoting projects that will not have such a plan:

- R-2707 (Broad River Tract for US 74 Shelby Bypass) [EO Nos. 49, 50, 51, 73, 74, 149, 233, 238, 239, 240, and 241] \*
- B-2119 (Murray's Mill) [EO No. 184] \*
- R-2233 (US 221 Rutherfordton Bypass), pending a BO [EO No. 106] \*
- R-2707 (US 74 Shelby Bypass) onsite preservation areas, pending a revised BA/BO [all or portions of EO Nos. 191, 194, 199, 200, 202, 203, 205, 208, 209, and 213]  
\*/† pending any conservation easements that NCDOT may enter into
- B-3126 (Gunpowder Creek) [EO No. 77] †
- B-2923 (Little Gunpowder Creek) [EO No. 44] †
- R-2824 (Lovelady Road) onsite preservation, pending the BA/BO [undocumented EO as of April 17, 2009, also referred to as Lovelady Road Subpopulation/Site 9] †
- R-0085 (US 321) [EO Nos. 19 and 20] †
- U-2528AA (Longview) [EO No. 32] †

Note that NCDOT has two conservation management plans either in place or in draft form. The NCDOT completed a conservation management plan for R-2707 (Broad River Tract) offsite preservation associated with the US 74 Shelby Bypass. Monitoring efforts defined within this plan include resurveys conducted every three years beginning in 2009 for a total of nine years (NCDOT 2006). The resurveys will include direct plant counts on all DFHL occurrences within the Broad River Tract except those sampled with plots, where estimates will be used to enumerate DFHL plants. Direct plant counts are to be performed on all of EO Nos. 49, 50, 51, 74, 233, 238, 239, 240, and 241 and portions of EO Nos. 73 (Broad River Tract Sites A and B) and 149 (Broad River Tract Site M). Sample estimates are to be performed on the remaining portions of EO Nos. 73 (Broad

River Tract Sites II and L, which is comprised of L1 and L2) and 149 (Broad River Tract Site N). The NCDOT also prepared a draft conservation management plan for R-2233 that will be submitted to USFWS. The R-2233 draft management plan states that monitoring will occur at approximately one, three, and five years after transplanting DFHL (NCDOT 2009).

In addition to the aforementioned nine projects, five other NCDOT projects will be investigated to determine whether any DFHL plants occur within NCDOT right-of-way. If DFHL plants are found within right-of-way, then NCDOT will monitor these DFHL occurrences, the results of which will also be incorporated into the data spreadsheet. The five NCDOT projects with their associated EO Nos. are the following:

- U-2307C (Hickory Eastside Thoroughfare from US 70-321 to I-40) [EO No. 31]
- U-2414A (Tate Boulevard Extension) [EO No. 30]
- NCDOT Division 12 project (SR 1115 in Caldwell County) [EO No. 158]
- NCDOT Division 12 project (SR 1473 in Caldwell County) [EO No. 162]
- NCDOT Division 12 project (SR 1519 in Cleveland County) [EO No. 157]

The NCDOT constructed U-2307C and U-2414A, incurring adverse effects to DFHL in accordance with the provisions outlined in their respective BOs. In order to avoid adverse effects to DFHL, NCDOT either has not constructed or only repaved all or portions of the three Division 12 projects bulleted above. Construction let for U-2307C was September 1995, with a construction completion date of December 1997. March 2002 was the construction let date for U-2414A, with a construction completion date of October 2003 (NCDOT 2004b). The NCDOT has not, and as of the date of this BA, does not anticipate constructing the SR 1115 project. State Route 1473 was only repaved over existing roadbed. The NCDOT Division 12 changed the original scope of the SR 1519 project so that each end of the road was repaved, leaving the middle of the project adjacent to the DFHL occurrence unconstructed (personal communication on April 6, 2009 with Trish Simon, NCDOT Division 12).

Every two years for no more than a six year period, the NCDOT will monitor during the USFWS-recommended optimal survey window for DFHL all of its occurrences associated with each of the nine NCDOT projects depicted in the first list above as well as those TIP and/or NCDOT Division 12 projects depicted in the second list above where DFHL plants are found within NCDOT right-of-way. Environmental baseline data will be obtained from these occurrences before monitoring begins. Monitoring and environmental baseline data will include both quantitative and qualitative analyses of the occurrences. A quantitative analysis will include DFHL plant enumerations via direct plant counts and/or sample plot estimates, delineating changes to DFHL plant boundaries using GPS and GIS technologies, computing changes to acreages of occurrence areas, computing DFHL plant densities for each occurrence, and estimating changes to acreages of suitable habitat areas. Plant enumeration methodologies employed with each occurrence will remain consistent during the monitoring period, such that an occurrence directly counted will always be directly counted and an occurrence sampled with plot estimates will always be sampled in that manner. A qualitative

analysis will include estimating the population viability, phenology, and evidence of reproduction; identifying associate species; identifying invasive, exotic species and documenting their degree of threat; and assessing the topographic position, moisture regime, amount of sunlight reaching DFHL plants, as well as other natural and human threats to the species, including but not limited to stream bank erosion, all-terrain vehicles, effects from historical herbicide applications and the lack of such applications in the future, effects from drought or excessive precipitation, and land clearing and draining activities. For each occurrence, the NCDOT will prepare a North Carolina Natural Heritage Program – Endangered and Rare Plant Field Survey Form that incorporates both types of data. It is important to note that monitoring protocols specified within each conservation management plan may differ slightly on a case by case basis.

In addition to collecting data for the NCNHP data sheets, DFHL population trends will be analyzed as part of the monitoring efforts by comparing recent size estimates to data from previous years. The NCDOT will also submit to USFWS written documentation of the type of protection afforded to sites previously thought to be in protective ownership, for which such information is currently lacking. This documentation will include a map(s) depicting the parcel boundaries of the area(s) subject to protective ownership, a field assessment and analysis of the full extent of DFHL population at each location (including portions extending off of protected properties, if known), and a written description of the nature of protection afforded to the subject property (including any relevant terms and conditions). The NCDOT will make every effort to ensure that site and species protections will remain in effect in perpetuity, even after the recovery/de-listing of DFHL.

Population data will be gathered at DFHL transplant sites during species monitoring efforts so that survival rates can be compared across varying sites and transplant methods/conditions. In instances where DFHL transplants are interspersed with, or occur in close proximity to native DFHL plants, transplants will be enumerated separately to allow specific assessment of their numbers and survivorship. One transplant site currently exists at B-2923, with future transplant efforts to be conducted or proposed to occur at R-2233 and R-2824, and potentially at the R-2707 onsite preservation areas. In addition, the NCDOT will make a good faith effort to contact Dr. Gillian Newberry, Herbarium Curator at the University of South Carolina-Spartanburg, who transplanted DFHL plants from R-0085 into a site in South Carolina in order to obtain transplant survival rates of those plants.

The NCDOT will research and provide any existing known information to USFWS regarding NCDOT's landowner negotiations for the Lovelady Road subpopulations/sites within EO No. 29. This information will assist other conservation partners in securing long term protections for all or portions of this subpopulation/site.

The USFWS compiled information on DFHL sites that afford protection or have the potential to afford protection to DFHL in its draft 5-Year Review report (USDOI-FWS 2007). The NCDOT, as part of this BA, is assisting USFWS and NCNHP in

updating their lists and databases of DFHL occurrences and sites that afford protection or have the potential to afford protection to the species. This updated data is found in Tables 3, 4, and 5 of Appendix B, and represents the most accurate DFHL data that NCDOT has as of May 8, 2009. The NCDOT will continue to provide USFWS and NCNHP with new and/or updated information as it becomes available. Subsequent NCDOT projects moving through ESA §7 formal consultation will also update the species' distribution and population trend data, as required for the consultation process. Finally, NCDOT will continue to submit to NCNHP and USFWS completed NCNHP – Endangered and Rare Plant Field Survey Forms and updated GIS shape files of DFHL population boundaries for each DFHL occurrence visited in order to ensure that the respective agencies obtain the most current information of the species.

For those projects requiring conservation management plans, NCDOT will provide those plans to USFWS by no later than two years after the date that the R-2824 BO is rendered. Environmental baseline data, written description of the nature of protection afforded to the subject property (including any relevant terms and conditions), and map(s) depicting the parcel boundaries of the area(s) subject to protective ownership will also be provided to USFWS by no later than two years after the project's BO is rendered. In order to report progress on each of the tasks above, NCDOT will submit its first data spreadsheet to USFWS by January 1, 2010, with subsequent submittals each January 1 thereafter until the monitoring work is complete.

Resolution of the above actions will be used by NCDOT as part of its required measures to offset adverse effects to DFHL on R-2824. The NCDOT also requests that this information be used as a component of its required measures to offset adverse effects to DFHL on R-2707 (US 74 Shelby Bypass) under that project's revised BA - currently in preparation - and subsequent revised BO.

**Barrett, William A**

---

**From:** Marella\_Buncick@fws.gov  
**Sent:** Tuesday, February 09, 2010 1:33 PM  
**To:** Barrett, William A  
**Cc:** Marella\_Buncick@fws.gov  
**Subject:** R-2824 BO

Bill,

Re: Biological Opinion for R-2824, Improvements to Lovelady Rd. Burke Co., NC

It was brought to my attention that on page 6 of the Biological Opinion (11/13/2009) for project R-2824 and impacts to dwarf-flowered heartleaf (*Hexastylis naniflora*) there is an error in the acres of habitat to be protected. The acreage figure should read "more than 0.5 acres" rather than "more than 1.0 acres will be permanently protected". This error does not affect the determination of no jeopardy for the species, nor require any further action on your part. Please attach this note to the opinion and we will file a copy in the project file in this office.

If you have further questions or concerns, please contact me.

Marella Buncick

marella buncick  
USFWS  
160 Zillicoa St.  
Asheville, NC 28801  
828-258-3939 ext 237

People don't resist change, they resist being changed.

## STORMWATER MANAGEMENT PLAN

**TIP No. R-2824 (33693.1.1)**

**Burke County**

**April 2009**

### **Project Description**

This project consists of 1.86 miles of widening and the replacement of Bridge #110 over Hoyle Creek on SR 1546. The existing 2 lane facility has 11' lanes. The proposed facility will improve to 2 lanes w/ 12' lanes, 4' paved shoulders within 8' useable shoulders and a center turn lane. The existing 1 @ 36'-6" bridge will be replaced with a 1 @ 80' 54" steel girder bridge. The project is within 0.5 miles of a water supply, watershed critical area and will require hazardous spill basins.

### **Project Involvement**

The project will require widening of the existing road/fill with wider lanes and the addition of wider shoulders and guardrail. The drainage at the site consists of ephemeral drainage ditches and stormwater systems. Hoyle Creek is within 0.5 miles of a water supply, watershed critical area and will require hazardous spill basins.

### **Best Management Practices**

Best Management Practices (BMPs) utilized on the project are as follows:

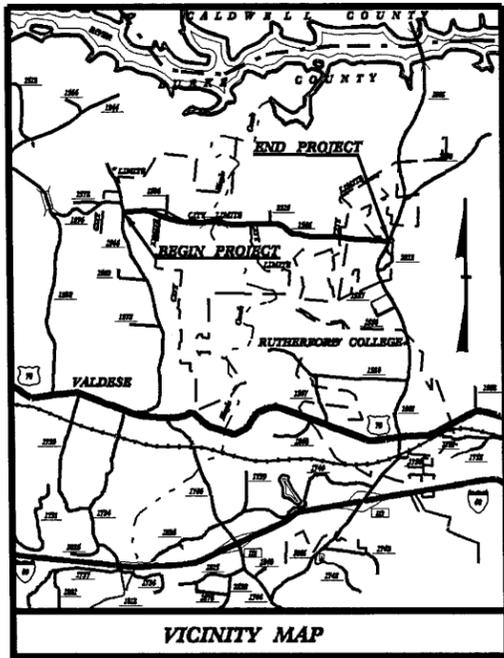
- Promotion of sheet flow and infiltration with grassed shoulders and grassed swales.
- No deck drains on bridge
- Two hazardous spill basins will be constructed adjacent to Hoyle Creek.

9/89/99

**TIP PROJECT: R-2824**

**CONTRACT:**

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



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**BURKE COUNTY**

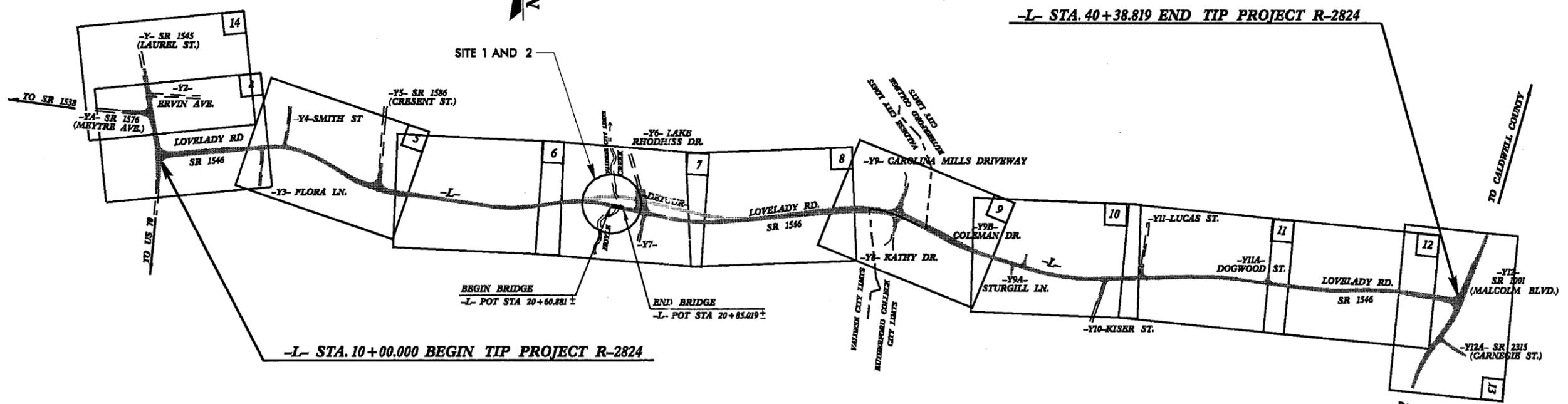
LOCATION: SR 1546 (LOVELADY ROAD) FROM SR 1545 (LAUREL ST.)  
TO SR 1001 (MALCOLM BLVD.)  
TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURE,  
AND SIGNALS

|  |                             |                |              |
|--|-----------------------------|----------------|--------------|
| <p>ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND OR MILLIMETERS UNLESS OTHERWISE SHOWN</p> | STATE PROJECT REFERENCE NO. | SHEET NO.      | TOTAL SHEETS |
|  | N.C. R-2824                 | 1              |              |
|  | STATE PROJ. NO.             | F.A. PROJ. NO. | DESCRIPTION  |
| 34510.1.J  | STP-1546(8)                 | P.E.           |              |
| 34510.3.J  | STP-1546(8)                 | R/W & UTIL.    |              |

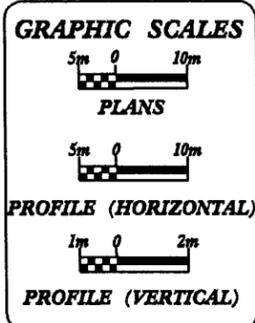
Permit Drawing Sheet **01** of **7**



**WETLAND/STREAM IMPACTS**



\*\* DESIGN EXCEPTION FOR VERTICAL ALIGNMENT, STOPPING SIGHT DISTANCE AND MAXIMUM GRADE.



**DESIGN DATA**

|                        |   |                 |
|------------------------|---|-----------------|
| ADT 2008               | = | 4,000 VPD       |
| ADT 2035               | = | 6,800 VPD       |
| DHV                    | = | 14 %            |
| D                      | = | 60 %            |
| * T                    | = | 10 %            |
| ** V                   | = | 65 km/h         |
| *(TTST 3 % + DUAL 7 %) |   |                 |
| FUNC. CLASS            | = | URBAN COLLECTOR |

**PROJECT LENGTH**

|                                     |   |          |
|-------------------------------------|---|----------|
| LENGTH ROADWAY TIP PROJECT R-2824   | = | 3.015 km |
| LENGTH STRUCTURE TIP PROJECT R-2824 | = | 0.024 km |
| TOTAL LENGTH TIP PROJECT R-2824     | = | 3.039 km |

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Dr., Raleigh, NC 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: **GLENN W. MUMFORD, P.E.**  
DECEMBER 23, 2003  
PROJECT ENGINEER

LETTING DATE: **JEFFREY L. TEAGUE, P.E.**  
JANUARY 20, 2009  
PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.  
ROADWAY DESIGN ENGINEER

SIGNATURE: \_\_\_\_\_ P.E.  
STATE HIGHWAY DESIGN ENGINEER

**DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA**

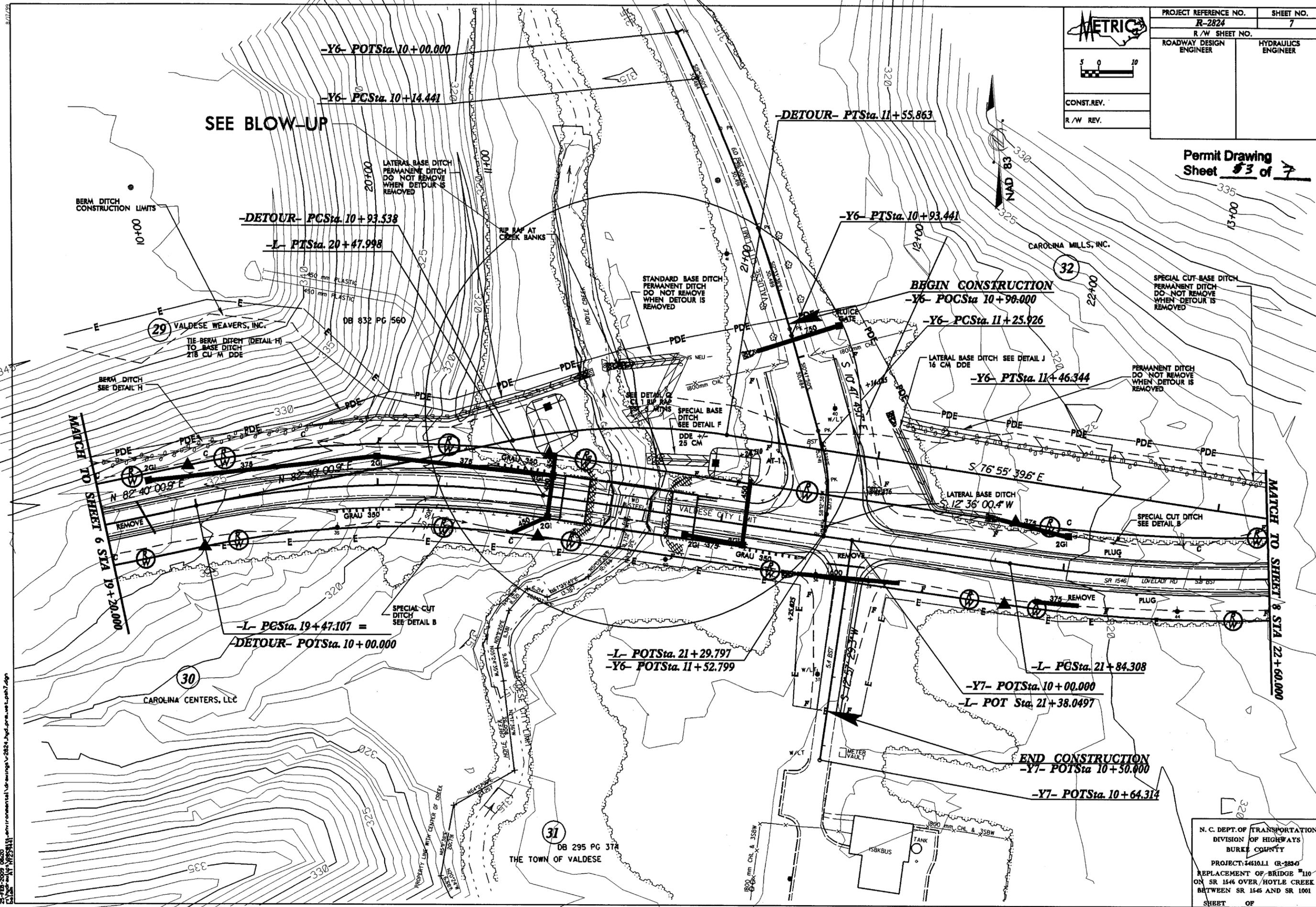
STATE HIGHWAY DESIGN ENGINEER

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|  |                       |                     |
|--|-----------------------|---------------------|
|  | PROJECT REFERENCE NO. | SHEET NO.           |
|  | R-2824                | 7                   |
| R/W SHEET NO.  |                       | HYDRAULICS ENGINEER |
| ROADWAY DESIGN ENGINEER  |                       |                     |
| CONST. REV.  |                       |                     |
| R/W REV.   |                       |                     |

Permit Drawing  
Sheet **53** of **7**



345

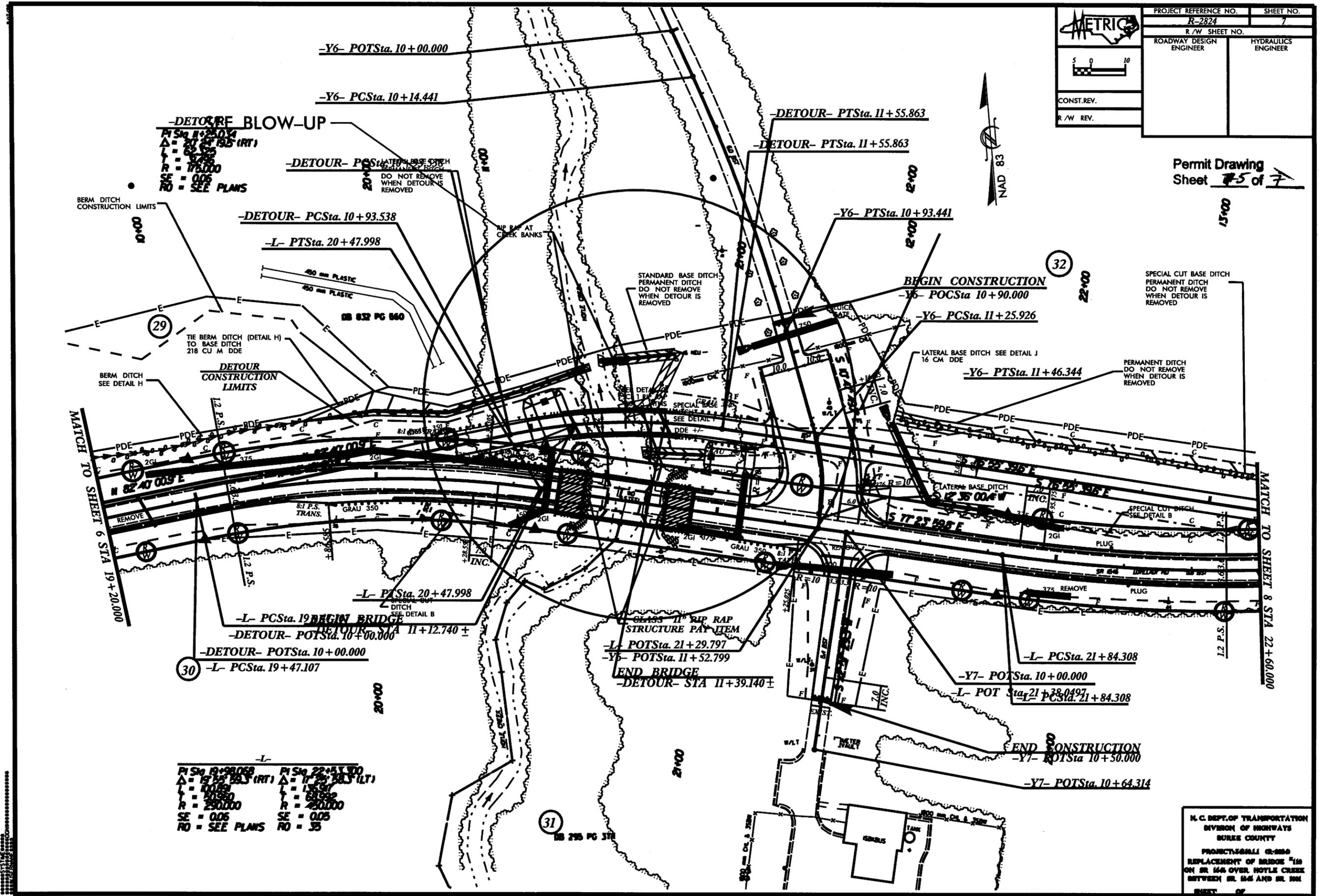
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 11001.dwg

N. C. DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 BURKE COUNTY  
 PROJECT: 44510.11 R-2824  
 REPLACEMENT OF BRIDGE #110  
 ON SR 1546 OVER HOYLE CREEK  
 BETWEEN SR 1546 AND SR 1001  
 SHEET OF



|   |                       |           |
|---|-----------------------|-----------|
|  | PROJECT REFERENCE NO. | SHEET NO. |
|   | R-2824                | 7         |
|   | R/W SHEET NO.         |           |
| ROADWAY DESIGN ENGINEER   | HYDRAULICS ENGINEER   |           |
| CONST. REV.   |                       |           |
| R/W REV.  |                       |           |

Permit Drawing Sheet **75** of **7**



**-DETOUR BLOW-UP**  
 PI Sta. 19+20.000  
 Δ = 17' 29" (RT)  
 L = 68.50  
 R = 175.00  
 SE = 0.05  
 RO = SEE PLANS

**-L- PI Sta. 19+20.000**  
 Δ = 17' 29" (RT)  
 L = 68.50  
 R = 175.00  
 SE = 0.05  
 RO = SEE PLANS

**-L- PI Sta. 22+51.700**  
 Δ = 17' 29" (LT)  
 L = 68.50  
 R = 175.00  
 SE = 0.05  
 RO = 35

N.C. DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 BURKE COUNTY

PROJECT: SR 168  
 REPLACEMENT OF BRIDGE #168  
 ON SR 168 OVER NOYLE CREEK  
 BETWEEN SR 168 AND SR 100



**PROPERTY OWNERS**  
**NAMES AND ADDRESSES**

| <b>PARCEL NO.</b> | <b>NAMES</b>                 | <b>ADDRESSES</b>                           |
|-------------------|------------------------------|--|
| 29                | <i>Valdese Weavers, Inc.</i> | <i>280 Crescent St NE,<br/>Valdese, NC</i> |
| 31                | <i>Town of Valdese</i>       | <i>121 Faet St SW,<br/>Valdese, NC</i>     |
| 32                | <i>Carolina Mill, Inc</i>    | <i>705 Lovelady Rd NE,<br/>Valdese, NC</i> |

Permit Drawing  
Sheet 3 of 7

**NCDOT**  
**DIVISION OF HIGHWAYS**  
**BURKE COUNTY**  
**PROJECT: 34810.11 (R-2820)**  
**SR 1646 (LOVELADY RD)**  
**FROM SR 1646 (LAUREL ST.)**  
**TO SR 1001 (MALCOM BLVD)**

**SHEET OF 6 / 28 / 08**

RECEIVED

JUL 28 2008

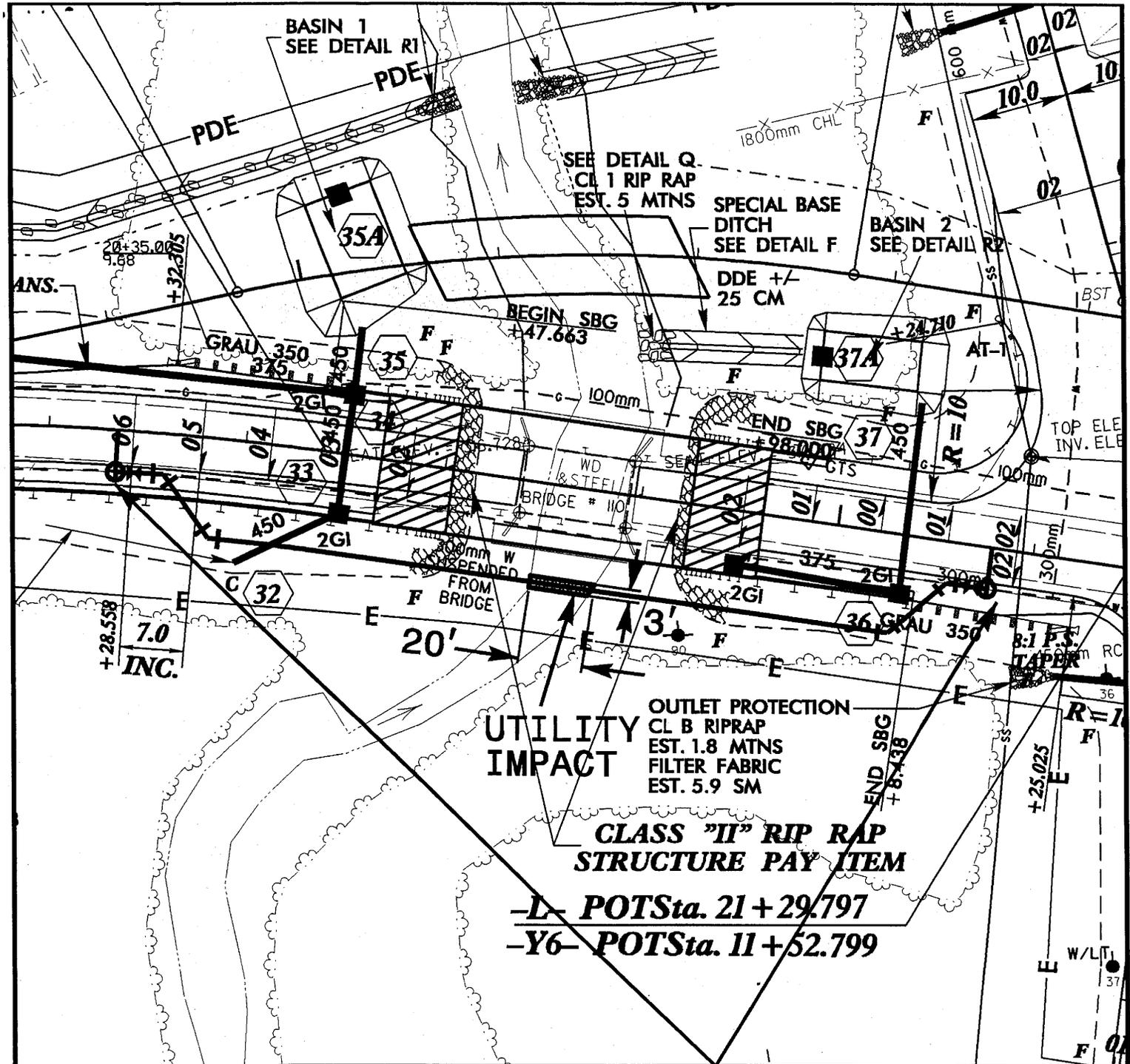
DIVISION OF HIGHWAYS  
PDEA-OFFICE OF NATURAL ENVIRONMENT

*Barnett*

R-2824 Utility Impact Summary

| Site | Station Number | Plan View Permit Drawing | Fill in Surface Water (Natural) Acre | Existing Stream Channel Impacted (Feet) Mitigation | Existing Stream Channel Impacted (Feet) No Mitigation | Temporary Channel Impact (Feet) | Relocated Stream Channel (Feet) | Proposed On-Site Stream Mitigation (Feet) | Stream Channel Loss After On-Site Mitigation | Proposed 2:1 Off-Site Compensatory Stream Mitigation (Feet) |
|------|----------------|--------------------------|--------------------------------------|--|---|---------------------------------|---------------------------------|---|--|---|
|      | -L-20+72       |                          | 0.001                                | -  | 3   |                                 | -                               | -   | -  | -   |

The stream impact due to water line installation involves excavation of the bottom of the stream to allow installation of a proposed 12" diameter ductile iron water line. Excavation will be approximately three feet wide and twenty feet in length. The excavated material will be placed back in the stream bed after the proposed water line is installed.



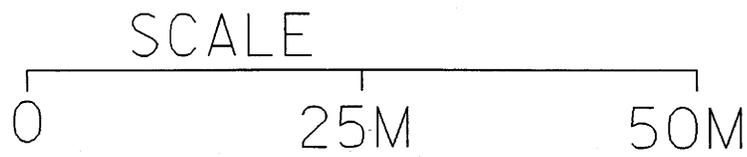
**UTILITY IMPACT**

OUTLET PROTECTION  
 CL B RIPRAP  
 EST. 1.8 MTNS  
 FILTER FABRIC  
 EST. 5.9 SM

**CLASS "II" RIP RAP  
 STRUCTURE PAY ITEM**

**-L- POT Sta. 21+29.797**  
**-Y6- POT Sta. 11+52.799**

**PROP. 94M-300MM WATER LINE,  
 DI PC 2.41 MPA  
 PROP. 2-300MM GATE & VALVE  
 BOX, 1.38 MPA WP  
 PROP. 89M-ABANDON 300MM UTILITY PIPE**



**N. C. DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS**

**BURKE COUNTY  
 WBS 34510.11  
 R-2824 UTILITY IMPACT**

**SR 1546 (LOVELADY RD) FROM SR 1545  
 (LAUREL ST) TO SR 1001 (MALCOLM BLVD)**

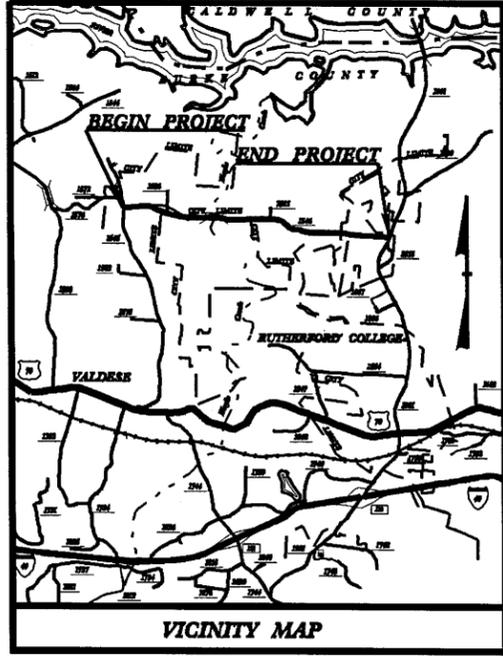
**UTILITY Permit Drawing**

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

9/09/09

**CONTRACT: C201242 TIP PROJECT: R-2824**

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

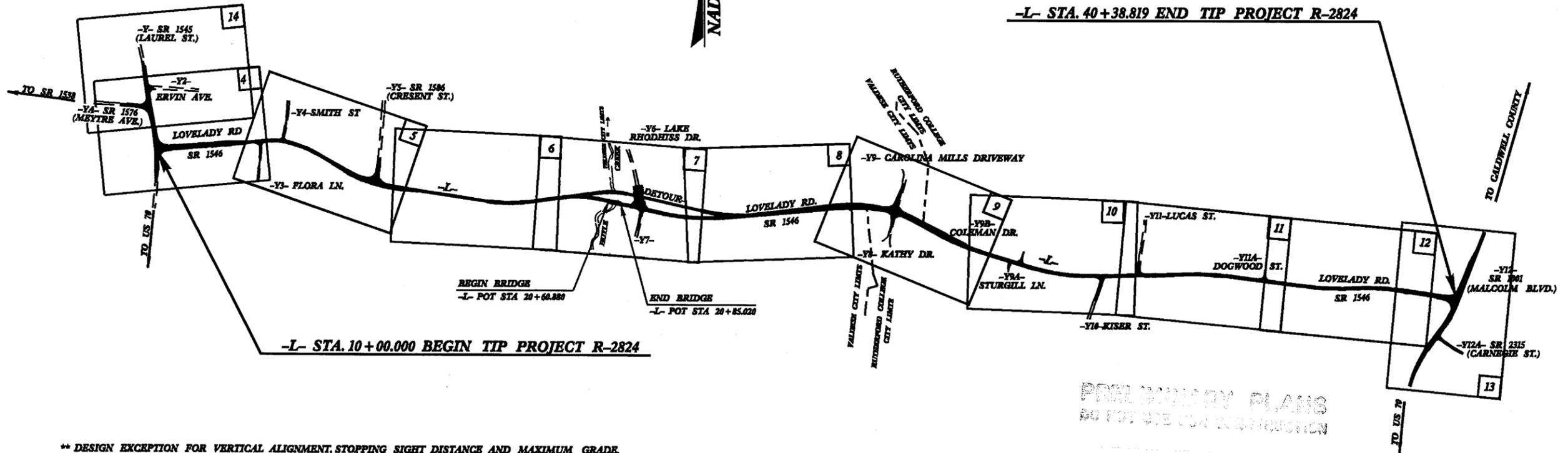


STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**BURKE COUNTY**

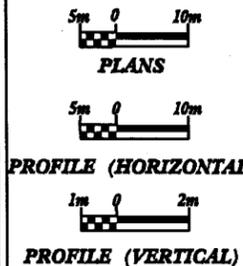
LOCATION: SR 1546 (LOVELADY ROAD) FROM SR 1545 (LAUREL ST.)  
TO SR 1001 (MALCOLM BLVD.)  
TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURE,  
AND SIGNALS

|  |                             |             |              |
|--|-----------------------------|-------------|--------------|
| <p>ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND OR MILLIMETERS UNLESS OTHERWISE SHOWN</p> | STATE PROJECT REFERENCE NO. | SHEET NO.   | TOTAL SHEETS |
|  | N.C. R-2824                 | 1           |              |
| STATE PROJ. NO.  | F.A. PROJ. NO.              | DESCRIPTION |              |
| 34510.1.1  | STP-1546(8)                 | P.E.        |              |
| 34510.3.1  | STP-1546(8)                 | R/W & UTIL. |              |
| 34510.2.2  | STP-1546(16)                | CONST.      |              |



\*\* DESIGN EXCEPTION FOR VERTICAL ALIGNMENT, STOPPING SIGHT DISTANCE AND MAXIMUM GRADE.

GRAPHIC SCALES



DESIGN DATA

ADT 2009 = 4,105 VPD  
ADT 2035 = 6,800 VPD  
DHV = 14 %  
D = 60 %  
\* T = 10 %  
\*\* V = 65 km/h  
\*(TTST 3 % + DUAL 7 %)  
FUNC. CLASS = URBAN COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2824 = 3.015 km  
LENGTH STRUCTURE TIP PROJECT R-2824 = 0.024 km  
TOTAL LENGTH TIP PROJECT R-2824 = 3.039 km

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Dr., Raleigh, NC 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: **GLENN W. MUMFORD, P.E.**  
DECEMBER 23, 2003  
PROJECT ENGINEER

LETTING DATE: **JEFFREY L. TEAGUE, P.E.**  
JANUARY 20, 2009  
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: \_\_\_\_\_  
ROADWAY DESIGN ENGINEER

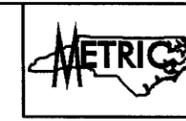
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STATE HIGHWAY DESIGN ENGINEER

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA



04-MAR-2009 07:02  
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STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS



PROJ. REFERENCE NO. R-2824  
SHEET NO. I - B

\*S.U.E = SUBSURFACE UTILITY ENGINEER

**ROADS & RELATED ITEMS**

|                                     |         |
|-------------------------------------|---------|
| Edge of Pavement                    | -----   |
| Curb                                | -----   |
| Prop. Slope Stakes Cut              | ----- C |
| Prop. Slope Stakes Fill             | ----- F |
| Detour Slope Stakes Cut             | ----- C |
| Detour Slope Stakes Fill            | ----- F |
| Prop. Woven Wire Fence              | -----   |
| Prop. Chain Link Fence              | -----   |
| Prop. Barbed Wire Fence             | -----   |
| Prop. Wheelchair Ramp               | -----   |
| Curb Cut For Future Wheelchair Ramp | -----   |
| Exist. Guardrail                    | -----   |
| Prop. Guardrail                     | -----   |
| Exist. Cable Guiderail              | -----   |
| Prop. Cable Guiderail               | -----   |
| Equality Symbol                     | -----   |
| Pavement Removal                    | -----   |

**RIGHT OF WAY**

|  |       |
|--|-------|
| Baseline Control Point   | ----- |
| Existing Right of Way Marker   | ----- |
| Exist. Right of Way Line wMarker                                       | ----- |
| Prop. Right of Way Line with Proposed RW marker (Iron Pin & Cap)       | ----- |
| Prop. Right of Way Line with Proposed (Concrete or Granite) R/W Marker | ----- |
| Exist. Control of Access Line  | ----- |
| Prop. Control of Access Line   | ----- |
| Exist. Easement Line   | ----- |
| Prop. Temp. Construction Easement Line                                 | ----- |
| Prop. Temp. Drainage Easement Line                                     | ----- |
| Prop. Perm. Drainage Easement Line                                     | ----- |

**HYDROLOGY**

|                                  |       |
|----------------------------------|-------|
| Stream or Body of Water          | ----- |
| Flow Arrow                       | ----- |
| Disappearing Stream              | ----- |
| Spring                           | ----- |
| Swamp Marsh                      | ----- |
| Shoreline                        | ----- |
| Falls, Rapids                    | ----- |
| Prop Lateral, Tail, Head Ditches | ----- |

**STRUCTURES**

|  |       |
|--|-------|
| MAJOR                                    |       |
| Bridge, Tunnel, or Box Culvert           | ----- |
| Bridge Wing Wall, Head Wall and End Wall | ----- |

**CONVENTIONAL SYMBOLS**

|                    |       |
|--------------------|-------|
| MINOR              |       |
| Head & End Wall    | ----- |
| Pipe Culvert       | ----- |
| Footbridge         | ----- |
| Drainage Boxes     | ----- |
| Paved Ditch Gutter | ----- |

**UTILITIES**

|   |       |
|---|-------|
| Exist. Pole   | ----- |
| Exist. Power Pole   | ----- |
| Prop. Power Pole  | ----- |
| Exist. Telephone Pole   | ----- |
| Prop. Telephone Pole  | ----- |
| Exist. Joint Use Pole   | ----- |
| Prop. Joint Use Pole  | ----- |
| Telephone Pedestal  | ----- |
| Cable TV Pedestal   | ----- |
| Hydrant   | ----- |
| Satellite Dish  | ----- |
| Exist. Water Valve  | ----- |
| Sewer Clean Out   | ----- |
| Power Manhole   | ----- |
| Telephone Booth   | ----- |
| Water Manhole   | ----- |
| Light Pole  | ----- |
| H-Frame Pole  | ----- |
| Power Line Tower  | ----- |
| Pole with Base  | ----- |
| Gas Valve   | ----- |
| Gas Meter   | ----- |
| Telephone Manhole   | ----- |
| Power Transformer   | ----- |
| Sanitary Sewer Manhole  | ----- |
| Storm Sewer Manhole   | ----- |
| Tank; Water, Gas, Oil   | ----- |
| Water Tank With Legs  | ----- |
| Traffic Signal Junction Box   | ----- |
| Fiber Optic Splice Box  | ----- |
| Television or Radio Tower   | ----- |
| Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement | ----- |

|   |       |
|---|-------|
| Recorded Water Line                           | ----- |
| Designated Water Line (S.U.E.*)               | ----- |
| Sanitary Sewer                                | ----- |
| Recorded Sanitary Sewer Force Main            | ----- |
| Designated Sanitary Sewer Force Main(S.U.E.*) | ----- |
| Recorded Gas Line                             | ----- |
| Designated Gas Line (S.U.E.*)                 | ----- |
| Storm Sewer                                   | ----- |
| Recorded Power Line                           | ----- |
| Designated Power Line (S.U.E.*)               | ----- |
| Recorded Telephone Cable                      | ----- |
| Designated Telephone Cable (S.U.E.*)          | ----- |
| Recorded U/G Telephone Conduit                | ----- |
| Designated U/G Telephone Conduit (S.U.E.*)    | ----- |
| Unknown Utility (S.U.E.*)                     | ----- |
| Recorded Television Cable                     | ----- |
| Designated Television Cable (S.U.E.*)         | ----- |
| Recorded Fiber Optics Cable                   | ----- |
| Designated Fiber Optics Cable (S.U.E.*)       | ----- |
| Exist. Water Meter                            | ----- |
| UG Test Hole (S.U.E.*)                        | ----- |
| Abandoned According to U/G Record             | ----- |
| End of Information                            | ----- |

**BOUNDARIES & PROPERTIES**

|                                       |       |
|---------------------------------------|-------|
| State Line                            | ----- |
| County Line                           | ----- |
| Township Line                         | ----- |
| City Line                             | ----- |
| Reservation Line                      | ----- |
| Property Line                         | ----- |
| Property Line Symbol                  | ----- |
| Exist. Iron Pin                       | ----- |
| Property Corner                       | ----- |
| Property Monument                     | ----- |
| Property Number                       | ----- |
| Parcel Number                         | ----- |
| Fence Line                            | ----- |
| Existing Wetland Boundaries           | ----- |
| Proposed Wetland Boundaries           | ----- |
| Existing Endangered Animal Boundaries | ----- |
| Existing Endangered Plant Boundaries  | ----- |

**BUILDINGS & OTHER CULTURE**

|                               |       |
|-------------------------------|-------|
| Buildings                     | ----- |
| Foundations                   | ----- |
| Area Outline                  | ----- |
| Gate                          | ----- |
| Gas Pump Vent or U/G Tank Cap | ----- |
| Church                        | ----- |
| School                        | ----- |
| Park                          | ----- |
| Cemetery                      | ----- |
| Dam                           | ----- |
| Sign                          | ----- |
| Well                          | ----- |
| Small Mine                    | ----- |
| Swimming Pool                 | ----- |

**TOPOGRAPHY**

|                        |       |
|------------------------|-------|
| Loose Surface          | ----- |
| Hard Surface           | ----- |
| Change in Road Surface | ----- |
| Curb                   | ----- |
| Right of Way Symbol    | R/W   |
| Guard Post             | O GP  |
| Paved Walk             | ----- |
| Bridge                 | ----- |
| Box Culvert or Tunnel  | ----- |
| Ferry                  | ----- |
| Culvert                | ----- |
| Footbridge             | ----- |
| Trail, Footpath        | ----- |
| Light House            | ----- |

**VEGETATION**

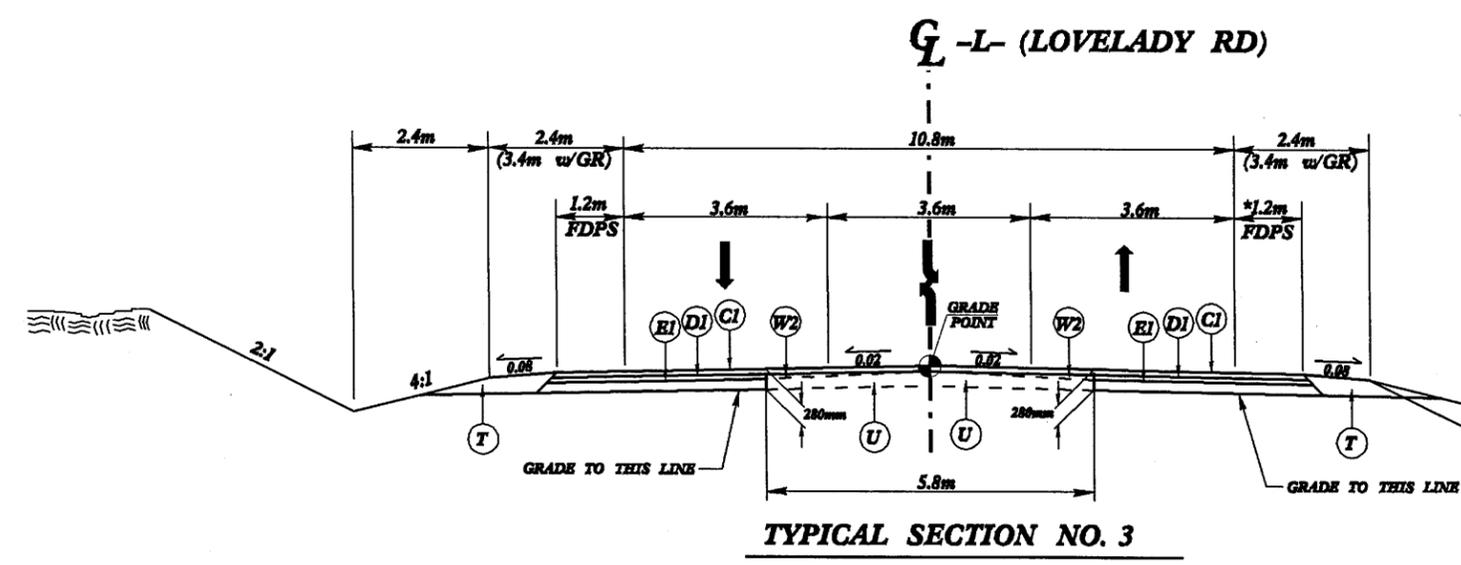
|              |       |
|--------------|-------|
| Single Tree  | ----- |
| Single Shrub | ----- |
| Hedge        | ----- |
| Woods Line   | ----- |
| Orchard      | ----- |
| Vineyard     | ----- |

**RAILROADS**

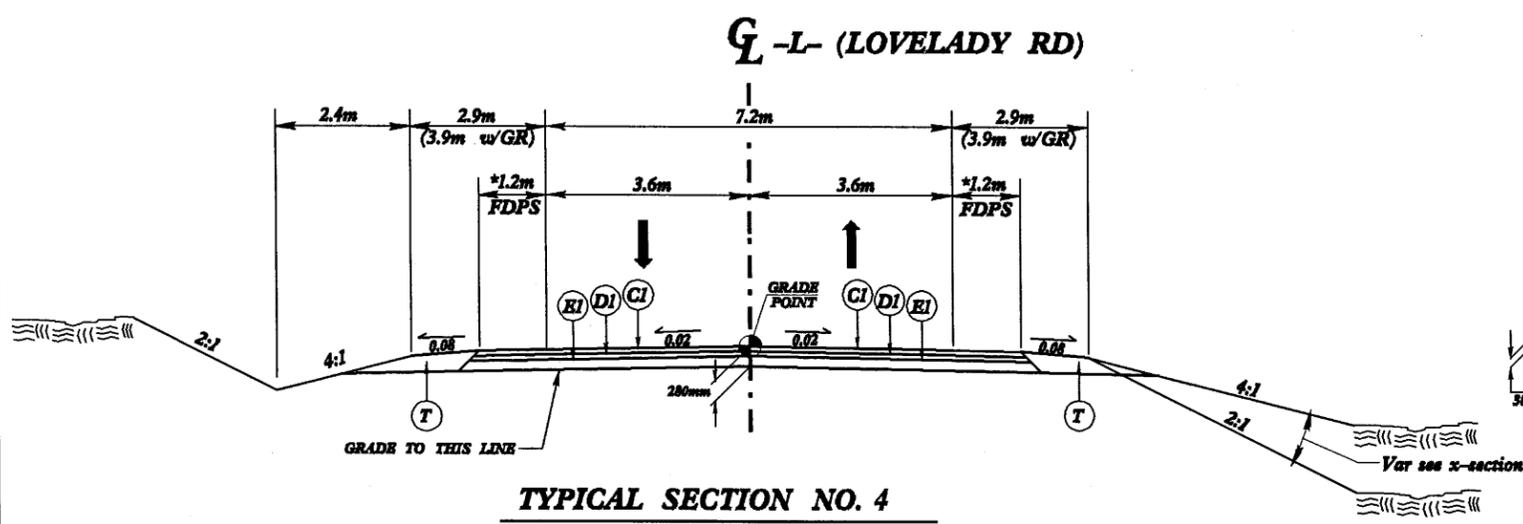
|                    |       |
|--------------------|-------|
| Standard Gauge     | ----- |
| RR Signal Milepost | ----- |
| Switch             | ----- |

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04-MAR-2008 07:42  
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REVISED 2/25/97

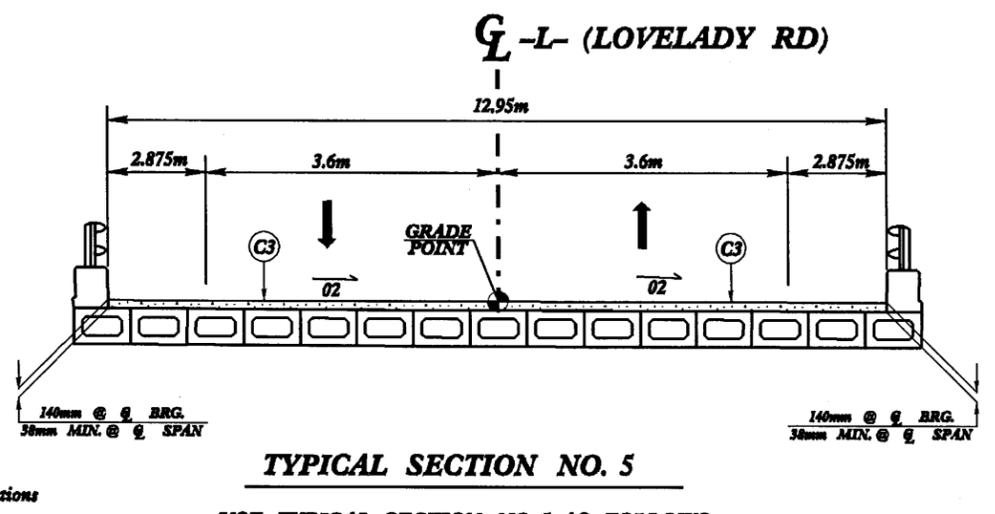




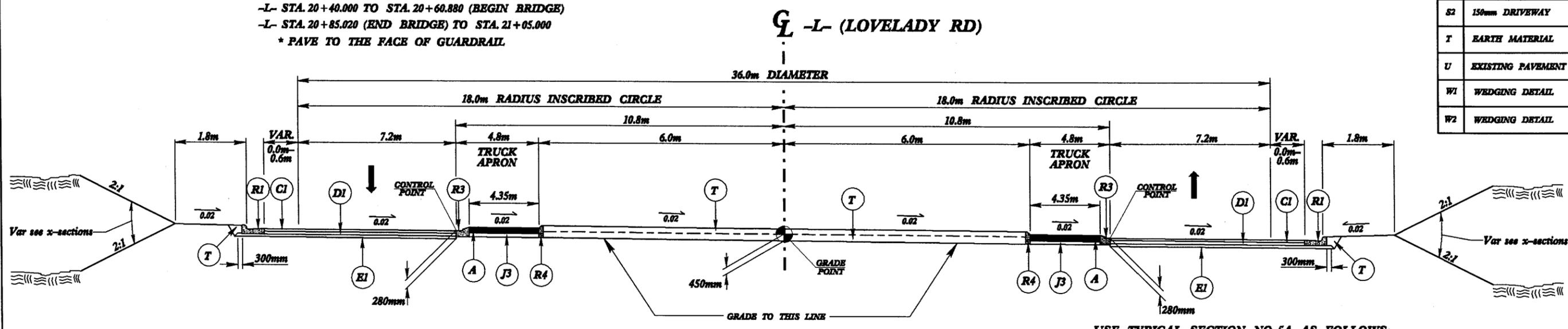
**USE TYPICAL SECTION NO. 3 AS FOLLOWS:**  
 -L- STA. 14+63.552 TO 15+71.615  
 -L- STA. 39+20.720 TO 40+27.465  
 \* PAVE TO THE FACE OF GUARDRAIL



**USE TYPICAL SECTION NO. 4 AS FOLLOWS:**  
 -L- STA. 20+40.000 TO STA. 20+60.880 (BEGIN BRIDGE)  
 -L- STA. 20+85.020 (END BRIDGE) TO STA. 21+05.000  
 \* PAVE TO THE FACE OF GUARDRAIL



**USE TYPICAL SECTION NO. 5 AS FOLLOWS:**  
 -L- STA. 20+60.880 (BEGIN BRIDGE) TO 20+85.020 (END BRIDGE)



**USE TYPICAL SECTION NO. 5A AS FOLLOWS:**  
 -L- STA. 27+00.415 TO STA. 27+36.420

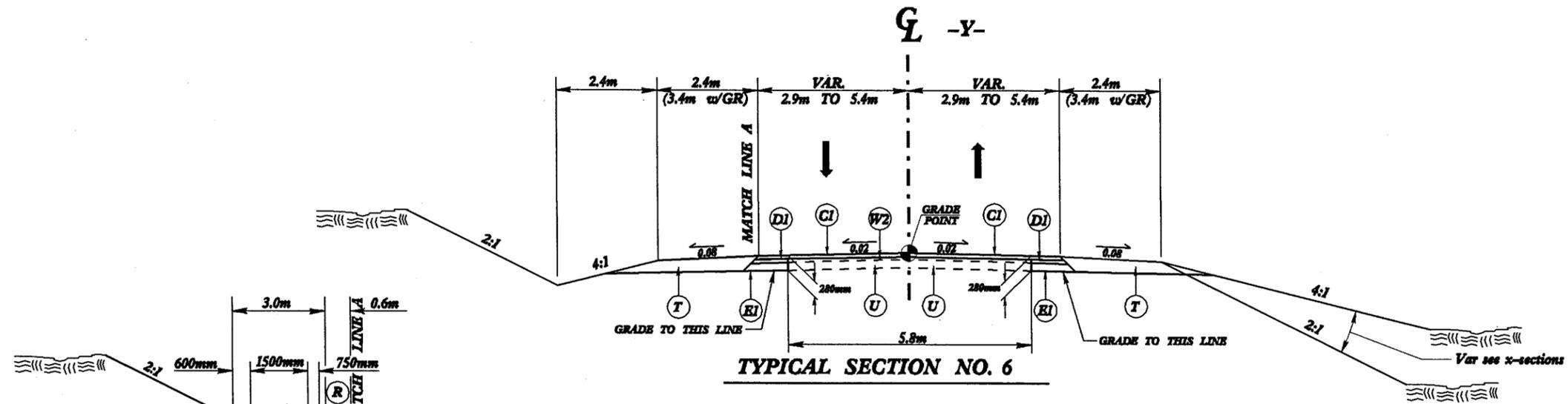
|    |                            |
|----|----------------------------|
| A  | 200mm CONCRETE             |
| CI | 80mm S9.5B                 |
| C2 | 50mm S9.5B                 |
| C3 | VAR. S9.5B                 |
| DI | 100mm I19.0B               |
| D2 | 80mm I19.0B                |
| D3 | VAR. I19.0B                |
| E1 | 100mm B25.0B               |
| E2 | 140mm B25.0B               |
| E3 | VAR. B25.0B                |
| J1 | 200mm ABC                  |
| J2 | 150mm ABC                  |
| J3 | 100mm ABC                  |
| J4 | VAR. ABC                   |
| P  | PRIME COAT                 |
| R1 | 750mm C&G                  |
| R2 | EXPRESSWAY GUTTER          |
| R3 | 450mm C&G (SEE DETAIL 2-J) |
| R4 | 200mm X 450mm CONC. CURB   |
| S1 | 1500mm SIDEWALK            |
| S2 | 150mm DRIVEWAY             |
| T  | EARTH MATERIAL             |
| U  | EXISTING PAVEMENT          |
| W1 | WEDGING DETAIL             |
| W2 | WEDGING DETAIL             |

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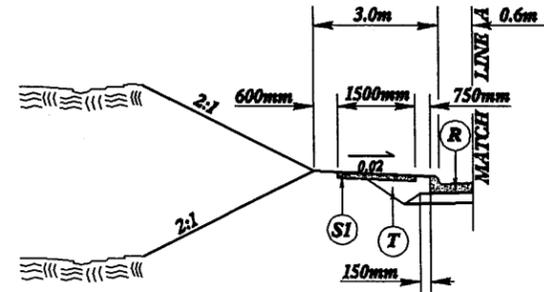
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| PROJECT REFERENCE NO.<br><b>R-2824</b> | SHEET NO.<br><b>2-B</b>  |
| ROADWAY DESIGN ENGINEER                | PAVEMENT DESIGN ENGINEER |

**PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION**

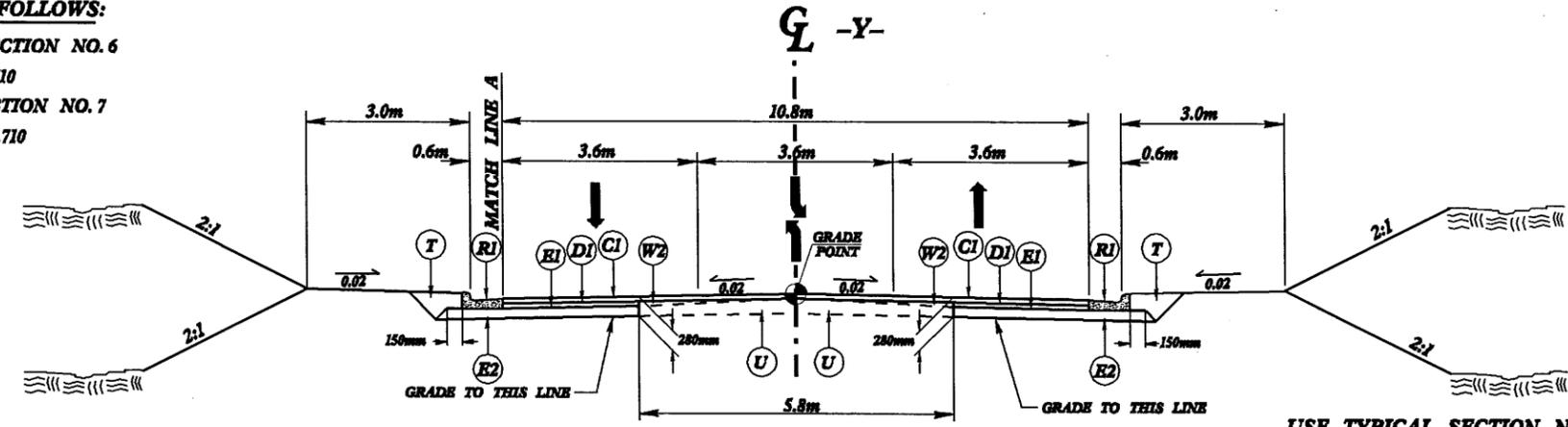


**TYPICAL SECTION NO. 6**

**USE TYPICAL SECTION NO. 6 AS FOLLOWS:**  
 -Y- STA. 10+20.000 TO STA. 10+70.000  
 -Y- STA. 12+86.710 TO STA. 13+36.710

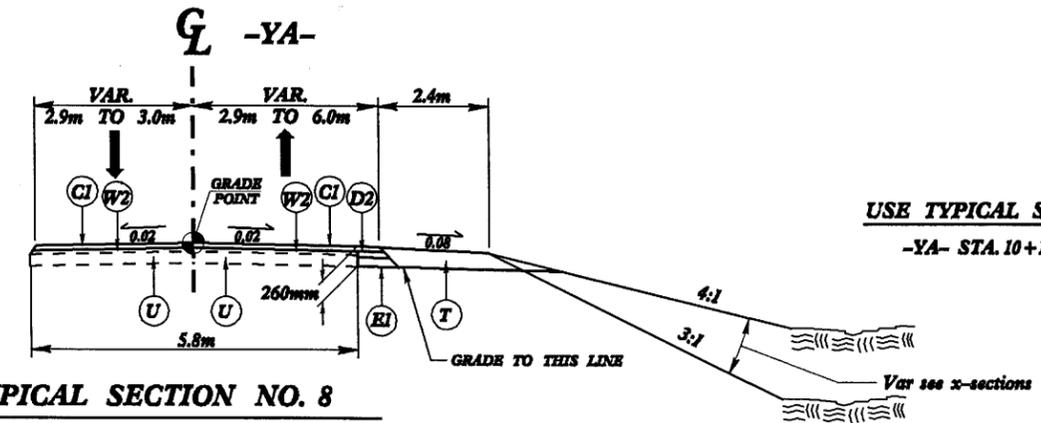


**USE TYPICAL SECTION NO. 6A AS FOLLOWS:**  
 USE IN CONJUNCTION WITH TYPICAL SECTION NO. 6  
 -Y- STA. 12+86.710 TO -Y- STA. 13+36.710  
 USE IN CONJUNCTION WITH TYPICAL SECTION NO. 7  
 -L- STA. 10+25.732 TO -Y- STA. 12+86.710



**TYPICAL SECTION NO. 7**

**USE TYPICAL SECTION NO. 7 AS FOLLOWS:**  
 -Y- STA. 10+70.000 TO -Y- STA. 12+86.710



**TYPICAL SECTION NO. 8**

**USE TYPICAL SECTION NO. 8 AS FOLLOWS:**  
 -YA- STA. 10+19.000 TO STA. 11+03.260

|    |                            |
|----|----------------------------|
| A  | 200mm CONCRETE             |
| C1 | 80mm S9.5B                 |
| C2 | 50mm S9.5B                 |
| C3 | VAR. S9.5B                 |
| D1 | 100mm I19.0B               |
| D2 | 80mm I19.0B                |
| D3 | VAR. I19.0B                |
| E1 | 100mm B25.0B               |
| E2 | 140mm B25.0B               |
| E3 | VAR. B25.0B                |
| J1 | 200mm ABC                  |
| J2 | 150mm ABC                  |
| J3 | 100mm ABC                  |
| J4 | VAR. ABC                   |
| P  | PRIME COAT                 |
| R1 | 750mm C&G                  |
| R2 | EXPRESSWAY GUTTER          |
| R3 | 450mm C&G (SEE DETAIL 2-J) |
| R4 | 200mm X 450mm CONC. CURB   |
| S1 | 1500mm SIDEWALK            |
| S2 | 150mm DRIVEWAY             |
| T  | EARTH MATERIAL             |
| U  | EXISTING PAVEMENT          |
| W1 | WEDGING DETAIL             |
| W2 | WEDGING DETAIL             |

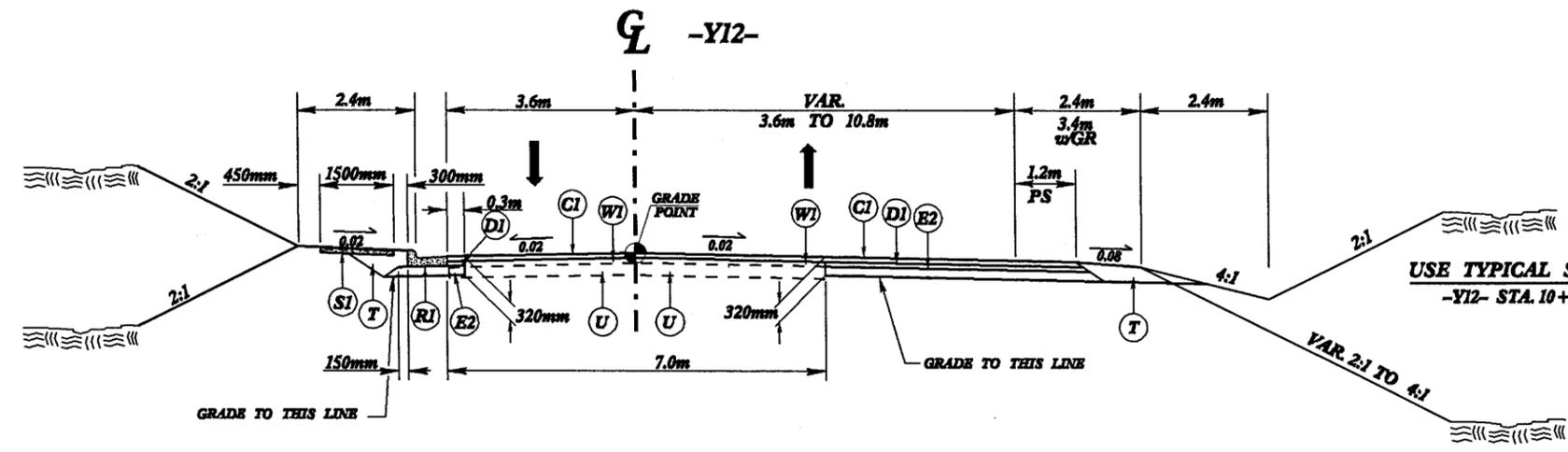
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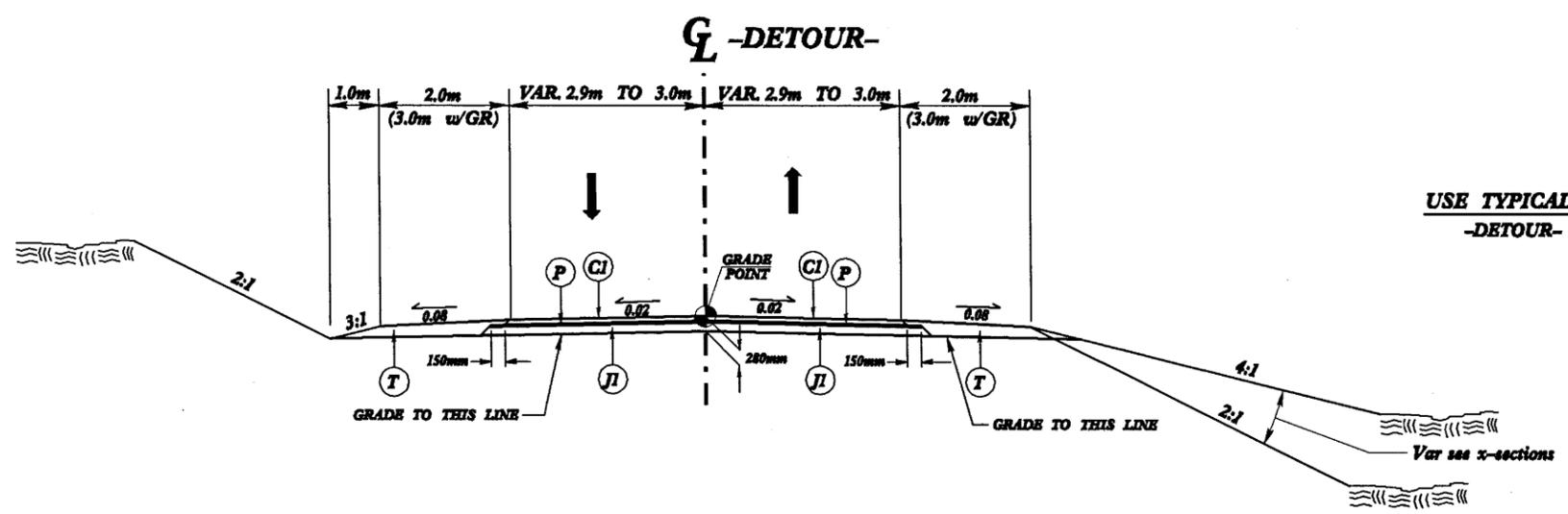
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|--|--------------------------|
| PROJECT REFERENCE NO.<br><b>R-2824</b> | SHEET NO.<br><b>2-D</b>  |
| ROADWAY DESIGN ENGINEER                | PAVEMENT DESIGN ENGINEER |

**PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION**



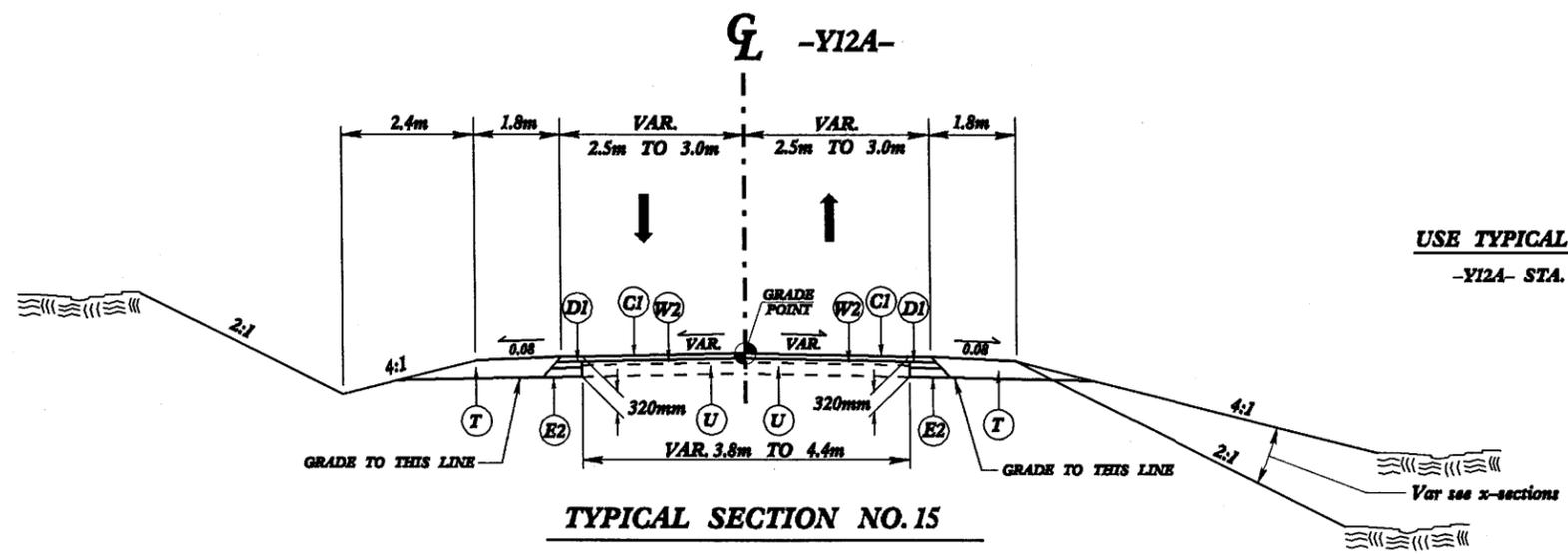
**TYPICAL SECTION NO. 13**

**USE TYPICAL SECTION NO. 13 AS FOLLOWS:  
-Y12- STA. 10+80.000 TO STA. 14+60.000**



**TYPICAL SECTION NO. 14**

**USE TYPICAL SECTION NO. 14 AS FOLLOWS:  
-DETOUR- STA. 10+43.190 TO STA. 14+01.620**



**TYPICAL SECTION NO. 15**

**USE TYPICAL SECTION NO. 15 AS FOLLOWS:  
-Y12A- STA. 10+42.488 TO STA. 10+71.961**

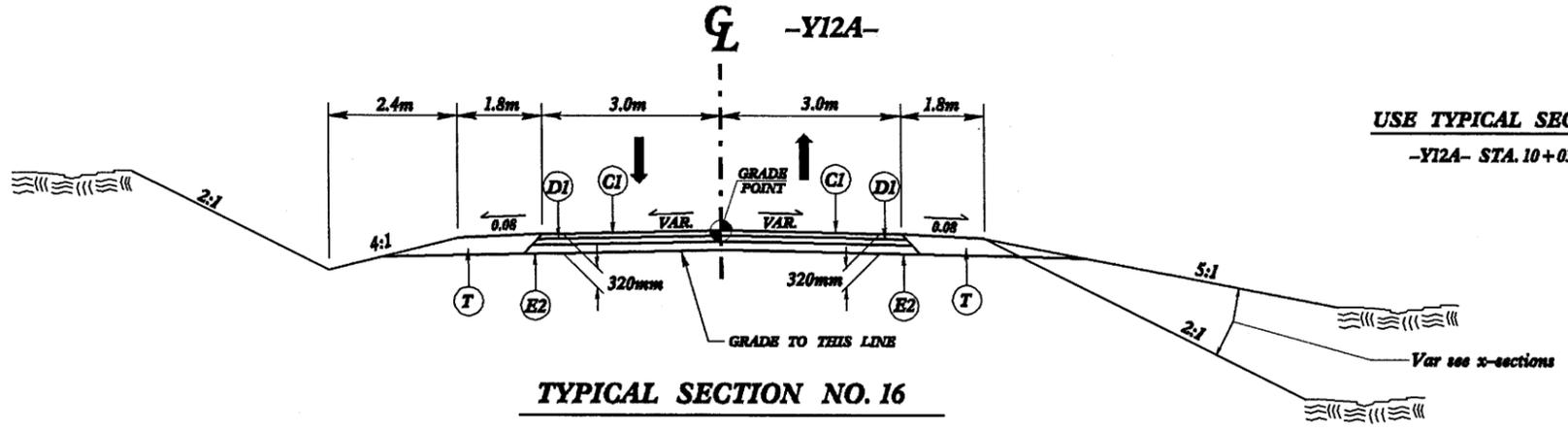
|    |                            |
|----|----------------------------|
| A  | 200mm CONCRETE             |
| CI | 80mm S9.5B                 |
| C2 | 50mm S9.5B                 |
| C3 | VAR. S9.5B                 |
| DI | 100mm I19.0B               |
| D2 | 80mm I19.0B                |
| D3 | VAR. I19.0B                |
| E1 | 100mm B25.0B               |
| E2 | 140mm B25.0B               |
| E3 | VAR. B25.0B                |
| J1 | 200mm ABC                  |
| J2 | 150mm ABC                  |
| J3 | 100mm ABC                  |
| J4 | VAR. ABC                   |
| P  | PRIME COAT                 |
| RI | 750mm C&G                  |
| R2 | EXPRESSWAY GUTTER          |
| R3 | 450mm C&G (SEE DETAIL 2-1) |
| R4 | 200mm X 450mm CONC. CURB   |
| S1 | 1500mm SIDEWALK            |
| S2 | 150mm DRIVEWAY             |
| T  | EARTH MATERIAL             |
| U  | EXISTING PAVEMENT          |
| W1 | WEDGING DETAIL             |
| W2 | WEDGING DETAIL             |

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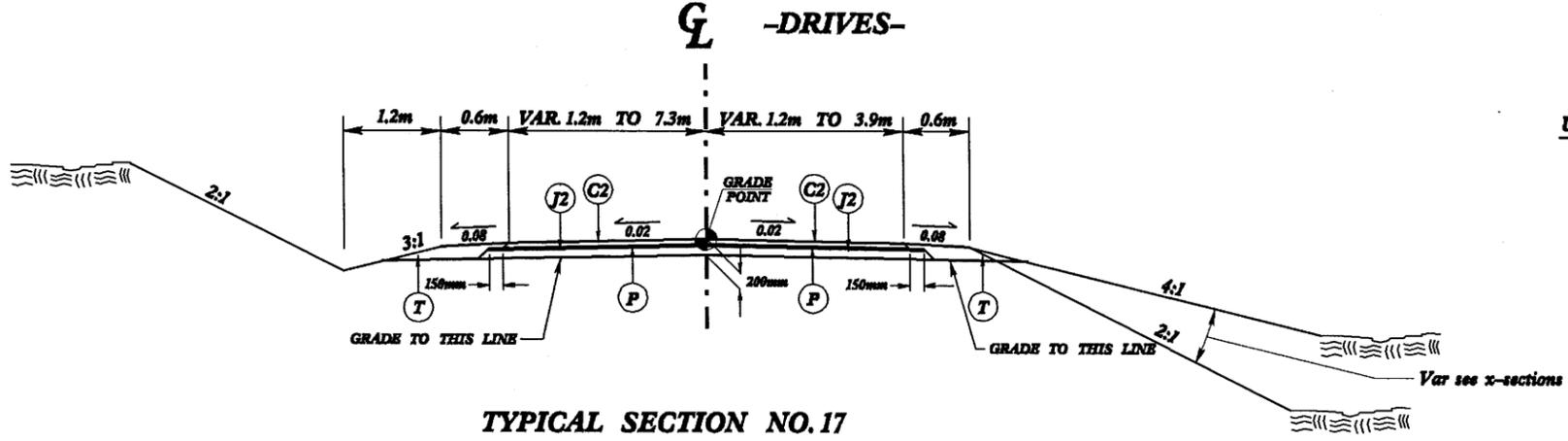


|                         |  |                          |  |
|-------------------------|--|--------------------------|--|
| PROJECT REFERENCE NO.   |  | SHEET NO.                |  |
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| ROADWAY DESIGN ENGINEER |  | PAVEMENT DESIGN ENGINEER |  |

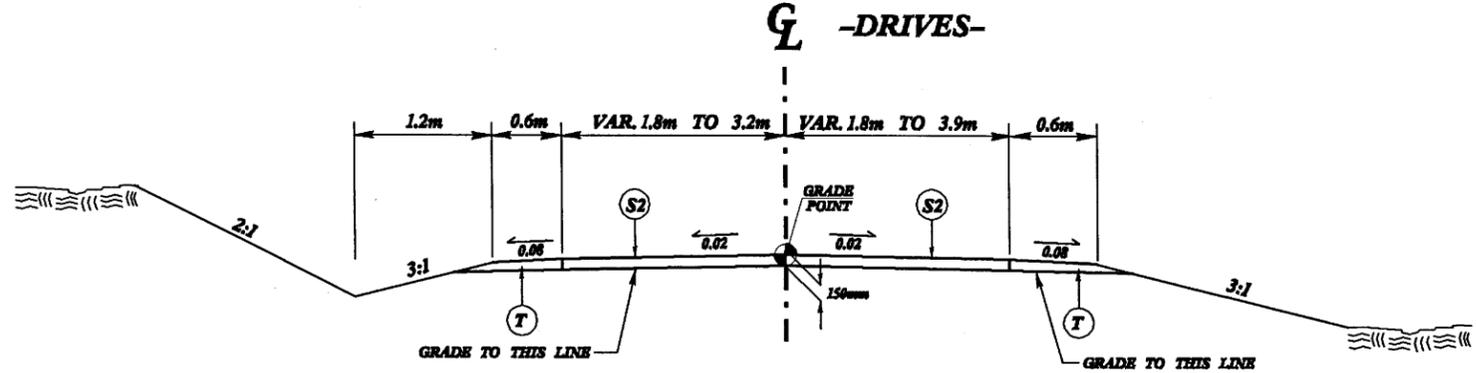
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION



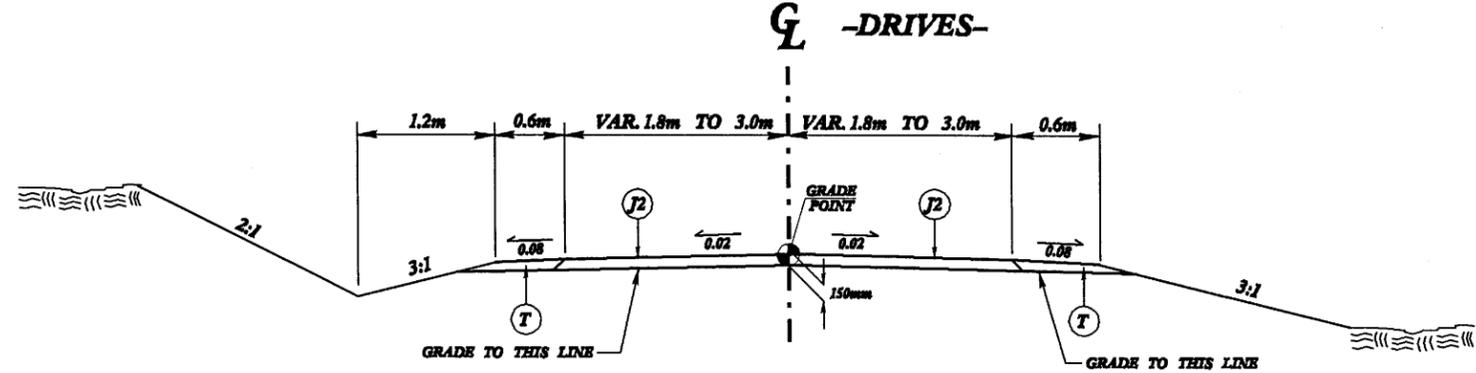
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**TYPICAL SECTION NO. 17**



**TYPICAL SECTION NO. 18**



**TYPICAL SECTION NO. 19**

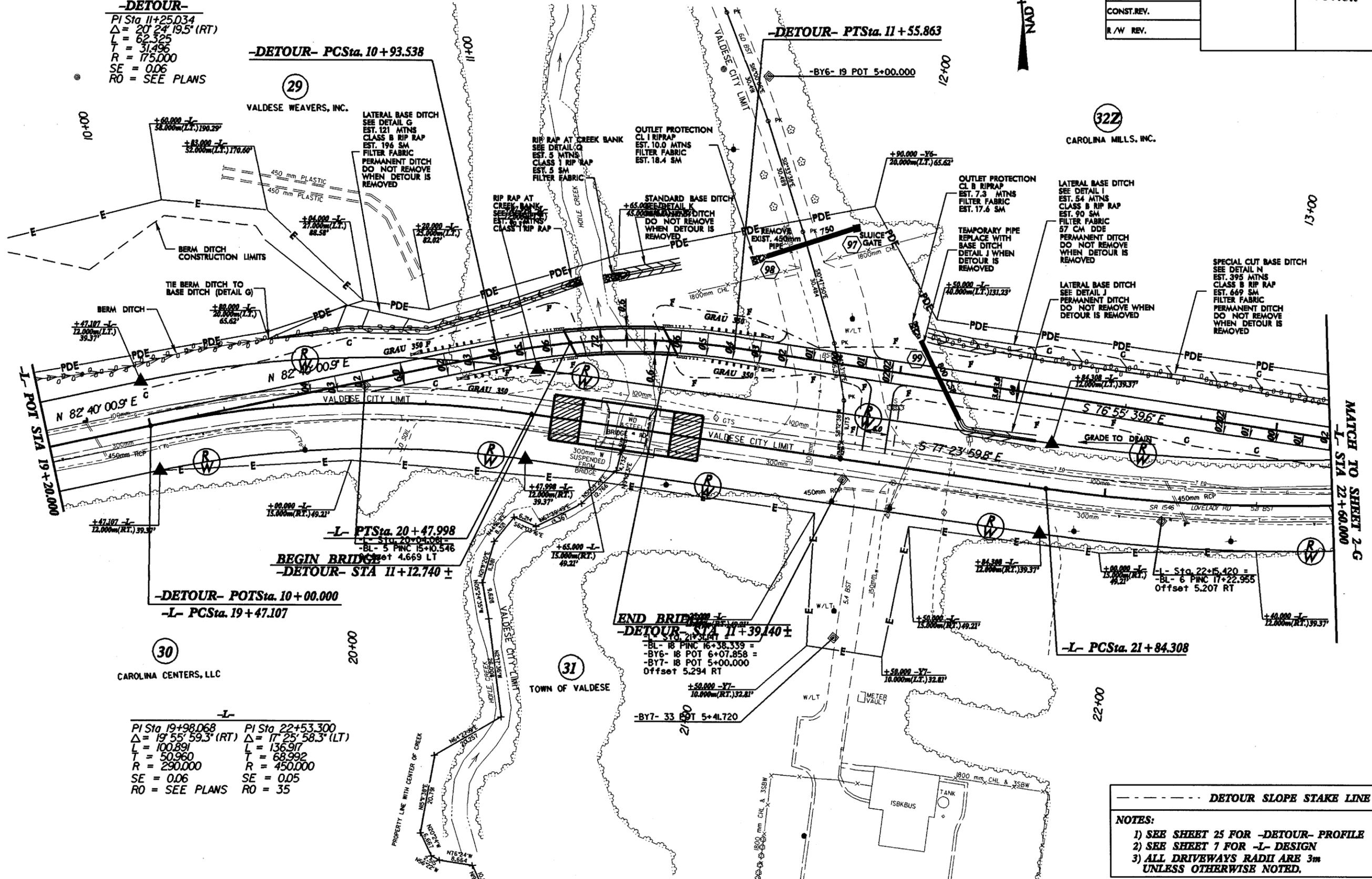
|    |                             |
|----|-----------------------------|
| A  | 200mm CONCRETE              |
| CI | 80mm S9.5B                  |
| C2 | 50mm S9.5B                  |
| C3 | VAR. S9.5B                  |
| DI | 100mm I19.0B                |
| D2 | 80mm I19.0B                 |
| D3 | VAR. I19.0B                 |
| E1 | 100mm B25.0B                |
| E2 | 140mm B25.0B                |
| E3 | VAR. B25.0B                 |
| J1 | 200mm ABC                   |
| J2 | 150mm ABC                   |
| J3 | 100mm ABC                   |
| J4 | VAR. ABC                    |
| P  | PRIME COAT                  |
| R1 | 750mm CB+G                  |
| R2 | EXPRESSWAY GUTTER           |
| R3 | 450mm CB+G (SEE DETAIL 2-J) |
| R4 | 200mm X 450mm CONC. CURB    |
| S1 | 1500mm SIDEWALK             |
| S2 | 150mm DRIVEWAY              |
| T  | EARTH MATERIAL              |
| U  | EXISTING PAVEMENT           |
| W1 | WEDGING DETAIL              |
| W2 | WEDGING DETAIL              |

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 6/16/99  
 04-MAR-2008 07:05 2824-1.ppt

# DETAIL OF ON-SITE DETOUR

|  |                         |                     |
|--|-------------------------|---------------------|
|  | PROJECT REFERENCE NO.   | SHEET NO.           |
|  | R-28244                 | 2-F                 |
|  | ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
|  | CONST. REV.             |                     |
|  | R/W REV.                |                     |

**-DETOUR-**  
 PI Sta 11+250.34  
 $\Delta = 20' 24' 19.5''$  (RT)  
 L = 62.325  
 T = 31.496  
 R = 175.000  
 SE = 0.06  
 RO = SEE PLANS



**-L- PTSta. 20+47.998**  
 -L- Sta. 20+04.081  
 -BL- 5 PINC 15+10.546  
 Offset 4.669 LT  
**BEGIN BRIDGE**  
**-DETOUR- STA 11+12.740 ±**  
**-DETOUR- POTSta. 10+00.000**  
**-L- PCSta. 19+47.107**

**END BRIDGE**  
**-DETOUR- STA 11+39.140 ±**  
 -BL- 18 PINC 16+38.339 =  
 -BY6- 18 POT 6+07.858 =  
 -BY7- 18 POT 5+00.000  
 Offset 5.294 RT  
**-L- PCSta. 21+84.308**  
**-L- Sta. 22+15.420 =**  
**-BL- 6 PINC 17+22.955**  
 Offset 5.207 RT

**30**  
 CAROLINA CENTERS, LLC

**-L-**  
 PI Sta 19+98.068 PI Sta 22+53.300  
 $\Delta = 19' 55' 59.3''$  (RT)  $\Delta = 17' 25' 58.3''$  (LT)  
 L = 100.891 L = 136.917  
 T = 50.960 T = 68.992  
 R = 290.000 R = 450.000  
 SE = 0.06 SE = 0.05  
 RO = SEE PLANS RO = 35

--- DETOUR SLOPE STAKE LINE

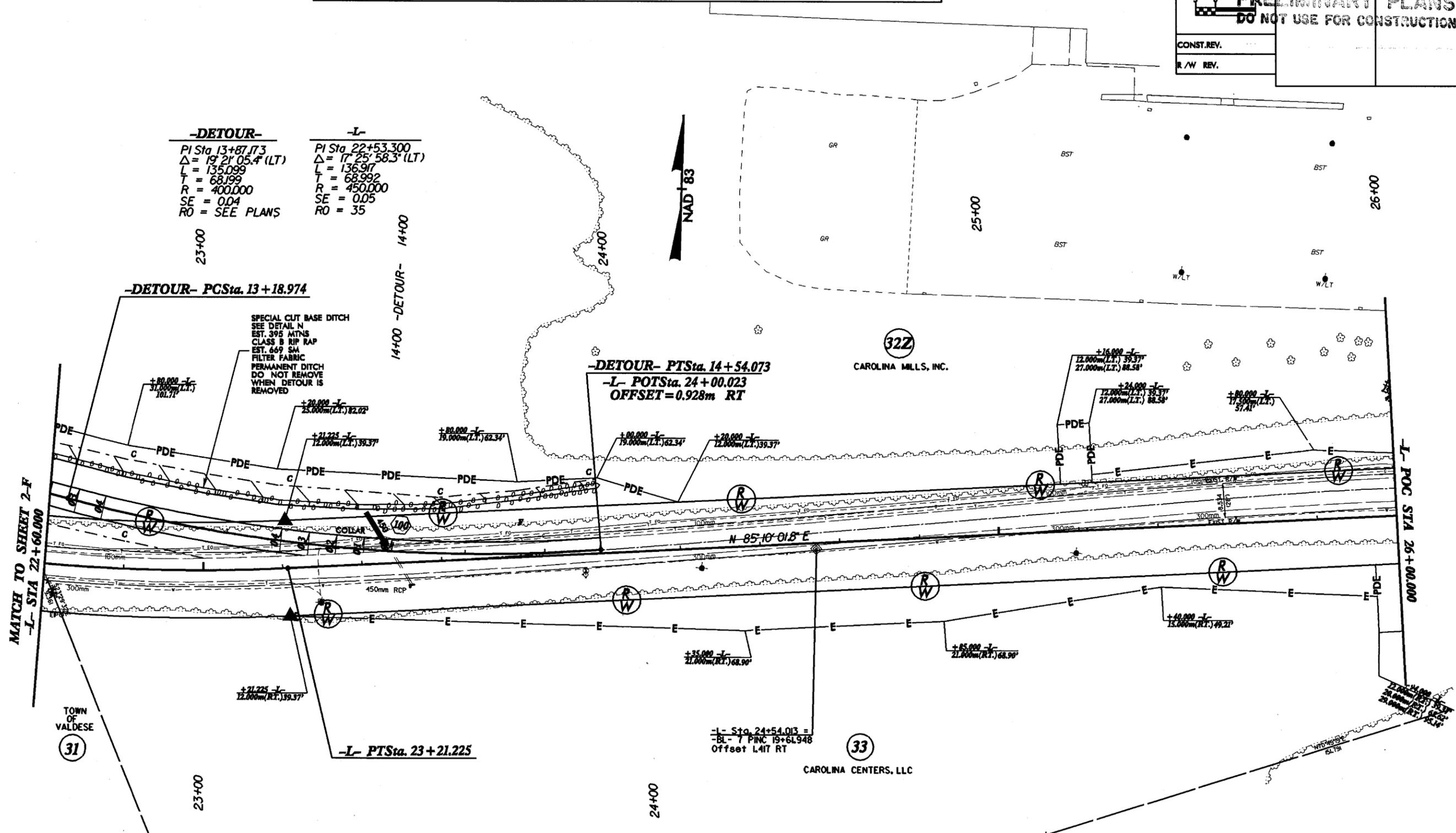
**NOTES:**  
 1) SEE SHEET 25 FOR -DETOUR- PROFILE  
 2) SEE SHEET 7 FOR -L- DESIGN  
 3) ALL DRIVEWAYS RADII ARE 3m  
 UNLESS OTHERWISE NOTED.

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 04-JAN-2008 07:27  
 25-000000-0000

# DETAIL OF ON-SITE DETOUR

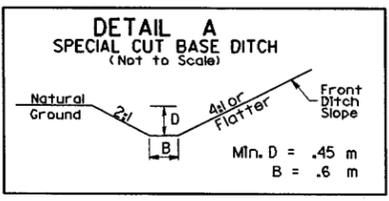
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|---|-----------------------|-----------|
|   | PROJECT REFERENCE NO. | SHEET NO. |
|   | R-28244               | 2-G       |
|   | R/W SHEET NO.         |           |
| ROADWAY DESIGN ENGINEER                                 | HYDRAULICS ENGINEER   |           |
|   |                       |           |
| <b>PRELIMINARY PLANS</b><br>DO NOT USE FOR CONSTRUCTION |                       |           |
| CONST. REV.   |                       |           |
| R/W REV.  |                       |           |

| -DETOUR-                      | -L-                           |
|-------------------------------|-------------------------------|
| PI Sta 13+87.173              | PI Sta 22+53.300              |
| $\Delta = 19' 21' 05.4" (LT)$ | $\Delta = 17' 25' 58.3" (LT)$ |
| L = 135.099                   | L = 136.917                   |
| T = 68.199                    | T = 68.992                    |
| R = 400.000                   | R = 450.000                   |
| SE = 0.04                     | SE = 0.05                     |
| RO = SEE PLANS                | RO = 35                       |

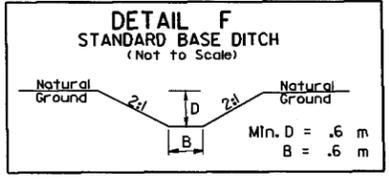


- DETOUR SLOPE STAKE LINE
- NOTES:**
- 1) SEE SHEET 25 FOR -DETOUR- PROFILE
  - 2) SEE SHEET 8 FOR -L- DESIGN
  - 3) ALL DRIVEWAY RADII ARE 3m UNLESS OTHERWISE NOTED.

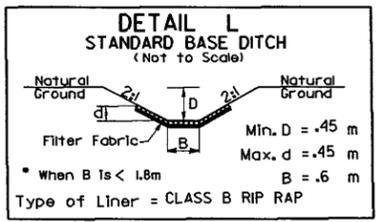
8/17/95  
 8/17/95  
 8/17/95



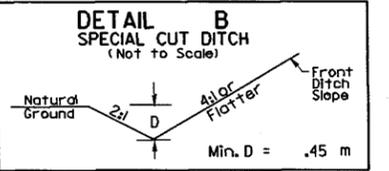
STA 12+60 TO STA 14+20 RT -L-



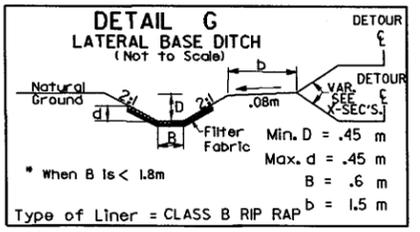
STA 12+55 RT -Y-  
STA 16+90 RT -L-  
STA 18+15 RT -L-  
STA 20+80 TO STA 20+95 LT -L-



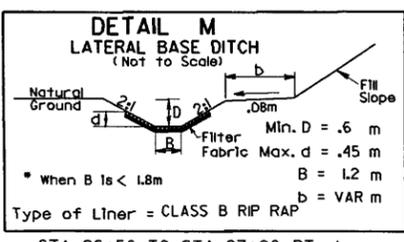
STA 26+00 RT -L-



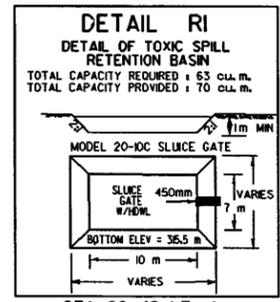
STA 11+73 TO STA 12+20 RT -L-  
STA 15+60 TO 15+80 LT -L-  
STA 20+20 TO 20+40 RT -L-  
STA 22+00 TO 22+20 LT -L-  
STA 29+20 TO 29+80 RT -L-  
STA 10+20 TO 10+40 LT -Y10-  
STA 32+80 TO 33+20 RT -L-  
STA 34+00 TO 34+80 LT -L-  
STA 11+40 TO 12+05 RT -Y12-  
STA 12+80 TO 13+40 RT -Y12-  
STA 39+60 TO 40+00 RT -L-  
STA 10+20 TO 10+60 RT -Y12A-  
STA 36+00 TO 37+00 LT -L-  
STA 37+80 TO 38+40 LT -L-



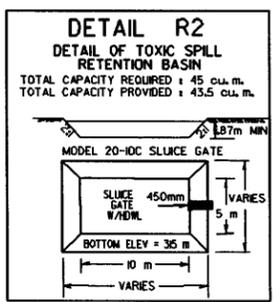
STA 10+40 TO STA 11+15 LT -DETOUR-



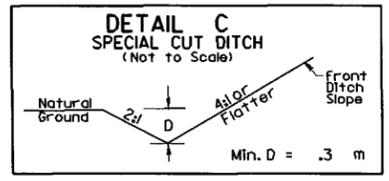
STA 26+56 TO STA 27+00 RT -L-



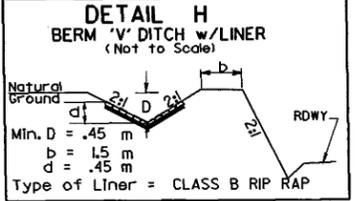
STA 20+48 LT -L-



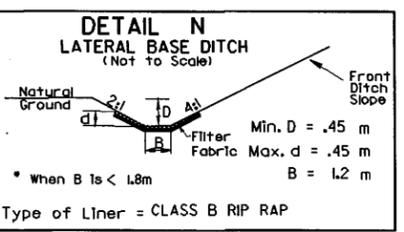
STA 21+01LT -L-



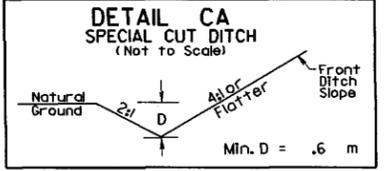
STA 10+50 TO STA 10+65 RT -L-



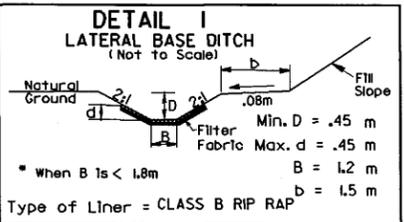
STA 17+60 TO STA 19+80 LT -L-



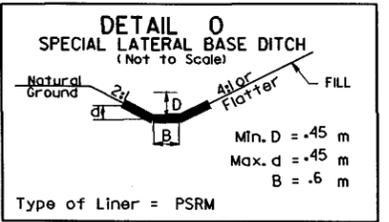
STA 12+26 TO STA 14+54 LT -DETOUR-



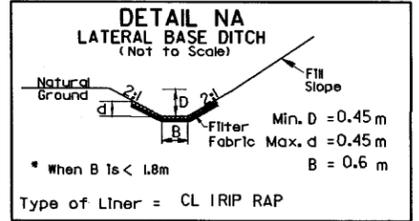
STA 10+40 TO STA 10+60 RT -Y-



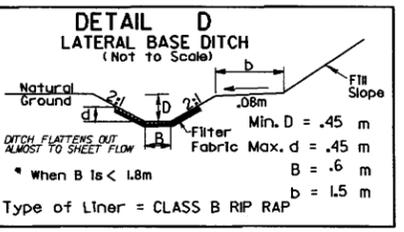
STA 11+98 TO STA 12+26 LT -DETOUR-



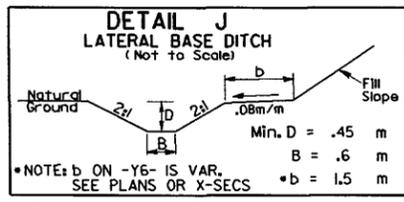
STA 27+44 TO 28+00 LT -L-



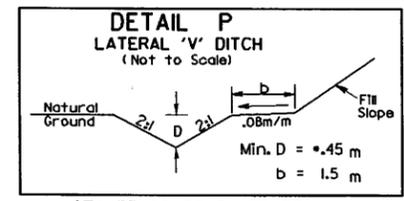
STA 27+40 -L- RT



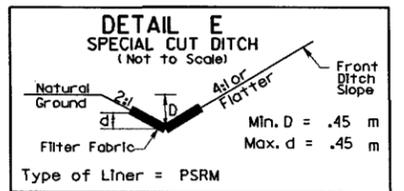
STA 10+25 TO STA 10+37 LT -DRI-



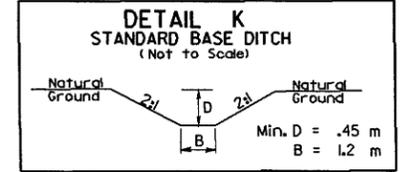
STA 11+25 LT -Y6- TO STA 21+80 LT -L-  
STA 39+89 TO STA 40+25 LT -L-



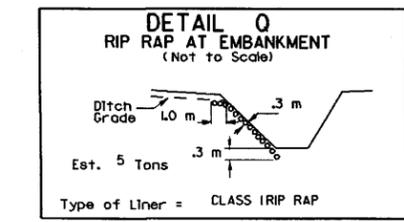
STA 33+80 TO 34+80 RT -L-  
DITCH DEPTH = 0 @ STA 34+40 RT -L-



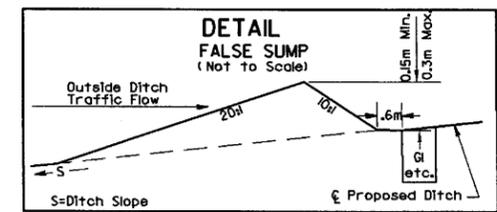
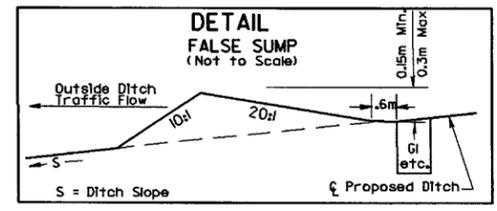
STA 10+05 TO 10+80 RT -Y3-  
STA 10+05 TO 10+80 LT -Y3-  
(NO CHANGE IN PROFILES)



STA 11+28 TO STA 11+40 LT -DETOUR-



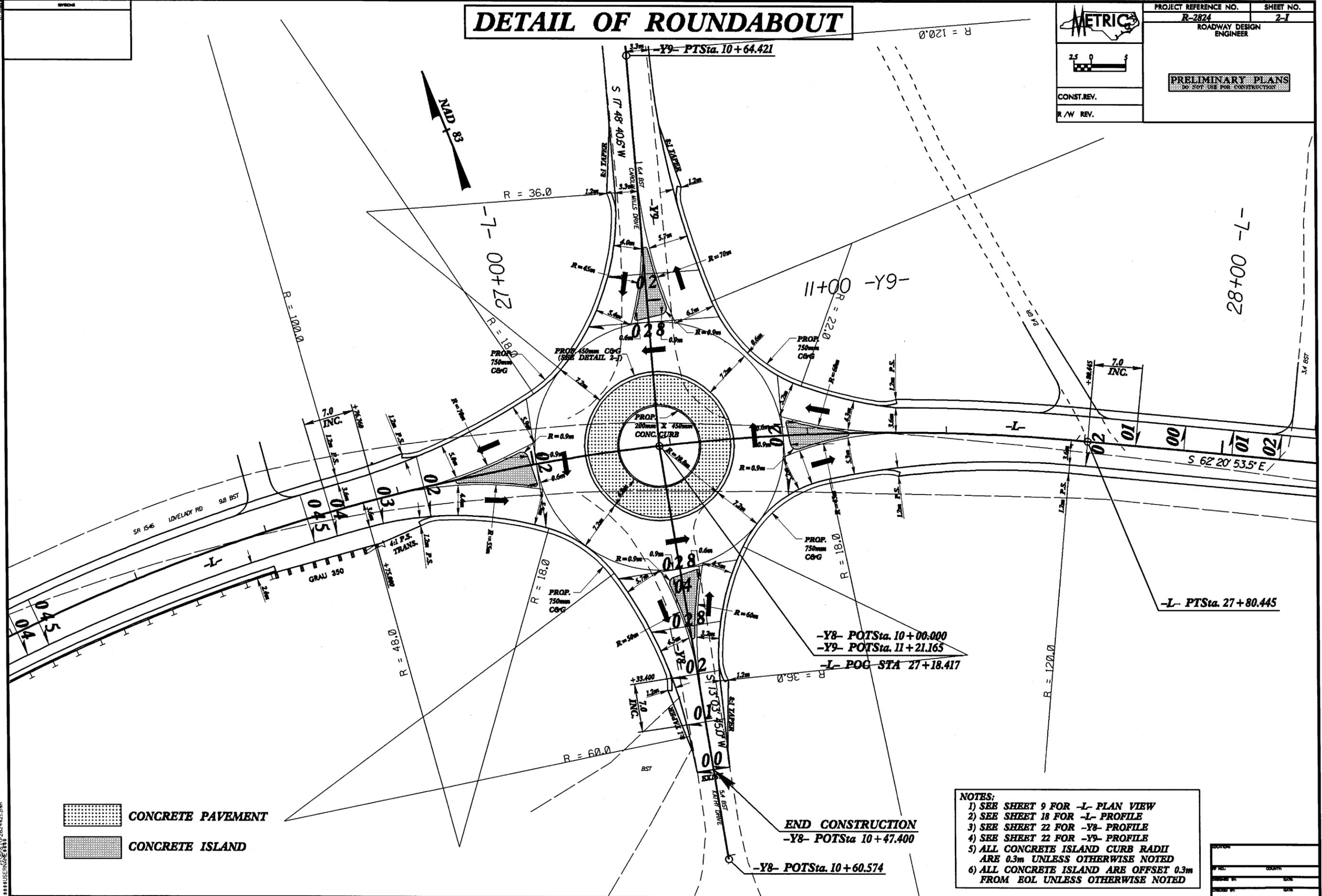
STA 11+17 LT -DETOUR-  
STA 11+24 LT -DETOUR-  
STA 20+80 LT -L-



8/17/99  
04-MAR-2009 07:00  
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# DETAIL OF ROUNDABOUT

|  |                       |           |
|--|-----------------------|-----------|
|  | PROJECT REFERENCE NO. | SHEET NO. |
|  | R-2824                | 2-1       |
| ROADWAY DESIGN ENGINEER  |                       |           |
| <b>PRELIMINARY PLANS</b><br><small>DO NOT USE FOR CONSTRUCTION</small> |                       |           |
| CONST. REV.  |                       |           |
| R/W REV.   |                       |           |



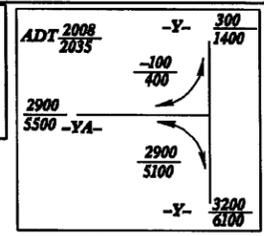
CONCRETE PAVEMENT  
 CONCRETE ISLAND

- NOTES:**
- 1) SEE SHEET 9 FOR -L- PLAN VIEW
  - 2) SEE SHEET 18 FOR -L- PROFILE
  - 3) SEE SHEET 22 FOR -Y8- PROFILE
  - 4) SEE SHEET 22 FOR -Y9- PROFILE
  - 5) ALL CONCRETE ISLAND CURB RADII ARE 0.3m UNLESS OTHERWISE NOTED
  - 6) ALL CONCRETE ISLAND ARE OFFSET 0.3m FROM EOL UNLESS OTHERWISE NOTED

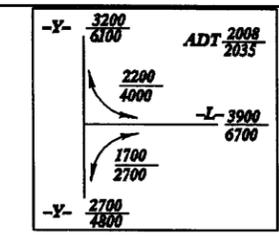
**END CONSTRUCTION**  
 -Y8- POTSta 10+47.400

04-MAR-2008 07:28  
 \*\*\*USER:RUC\*\*\*

NOTES:  
 1) SEE SHEET 15 FOR -L- PROFILE  
 2) SEE SHEET 21 FOR -Y- PROFILE  
 3) ALL DRIVEWAY RADII ARE 3m UNLESS OTHERWISE NOTED.  
 4) SEE SHEET 2-H FOR DITCH DETAILS  
 5) SEE SHEET 21 FOR YA PROFILE



| -DR1-   | -DR2-  | -DR3-   |
|---|--|---|
| PI Sta 10+15.947<br>Δ = 14° 25' 23.8" (LT)<br>L = 7.552<br>T = 3.796<br>R = 30.000<br>PCSta. 10+12.151<br>PTSta. 10+19.703<br>Ⓐ S 6' 14" 58.3" E<br>Ⓑ S 20' 40" 22.1" E | PI Sta 10+34.450<br>Δ = 16° 30' 23.0" (RT)<br>L = 8.643<br>T = 4.352<br>R = 30.000<br>PCSta. 10+30.099<br>PTSta. 10+38.741<br>Ⓒ S 4° 09' 59.1" E | PI Sta 10+05.382<br>Δ = 39° 28' 38.8" (RT)<br>L = 10.335<br>T = 5.382<br>R = 15.000<br>PCSta. 10+00.000<br>PTSta. 10+10.335<br>Ⓓ S 5' 11" 37.5" E |
| PI Sta 10+17.484<br>Δ = 44° 02' 01.1" (RT)<br>L = 15.371<br>T = 8.087<br>R = 20.000<br>PCSta. 10+09.397<br>PTSta. 10+24.768<br>Ⓔ S 4' 21' 24.5" E<br>Ⓕ S 3' 19' 22.2" E |  |   |



METRIC

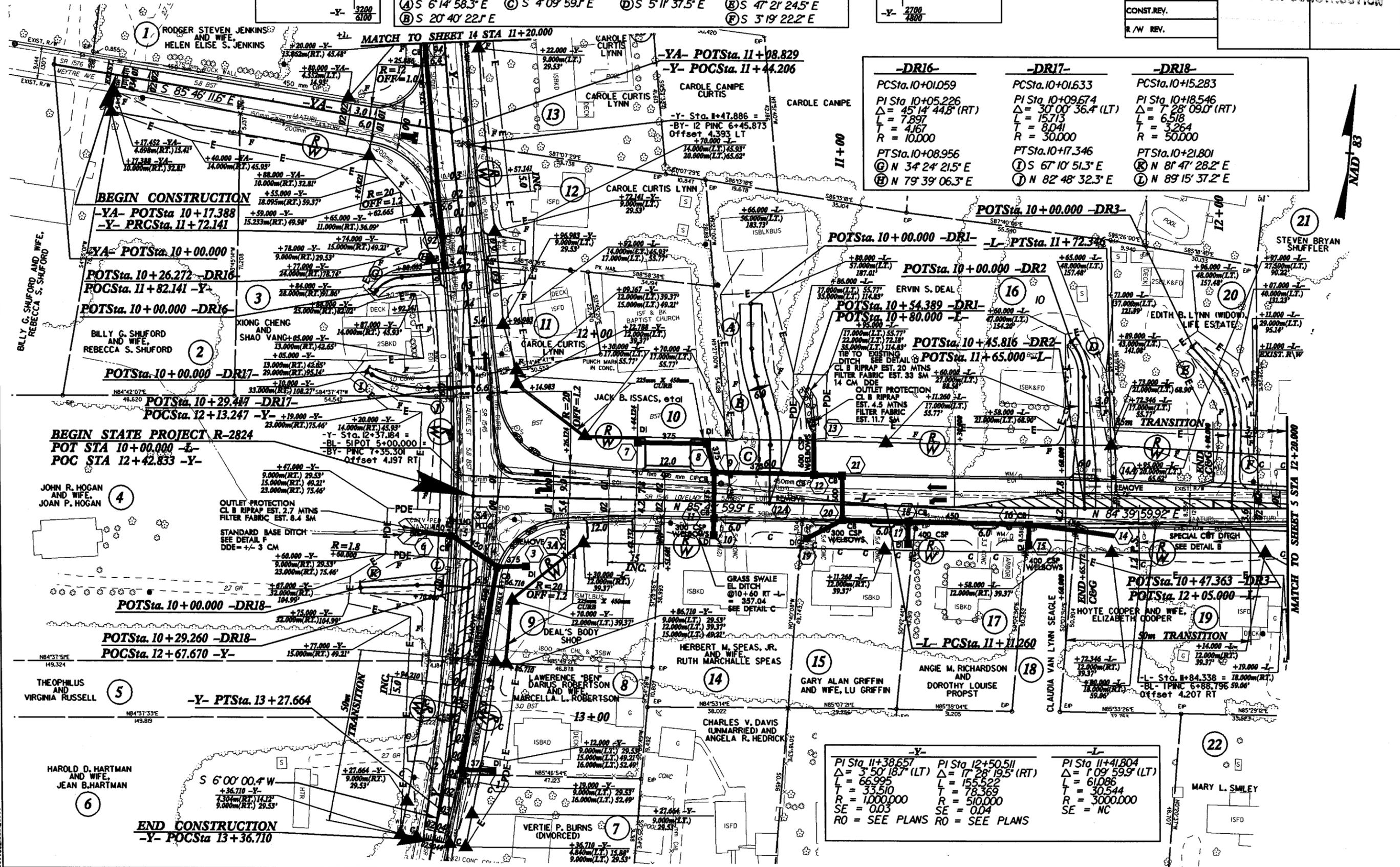
PROJECT REFERENCE NO. R-2824 SHEET NO. 4

R/W SHEET NO.

ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER

**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

CONST. REV.  
R/W REV.



| -DR16-  | -DR17-  | -DR18-  |
|---|---|---|
| PCSta. 10+01.059<br>PI Sta 10+05.226<br>Δ = 45° 14' 44.8" (RT)<br>L = 7.897<br>T = 4.167<br>R = 10.000<br>PTSta. 10+08.956<br>Ⓖ N 3° 24' 21.5" E<br>Ⓗ N 79° 39' 06.3" E | PCSta. 10+01.633<br>PI Sta 10+09.674<br>Δ = 30° 00' 36.4" (LT)<br>L = 15.713<br>T = 8.041<br>R = 30.000<br>PTSta. 10+17.346<br>Ⓖ S 67° 10' 51.3" E<br>Ⓖ N 82° 48' 32.3" E | PCSta. 10+15.283<br>PI Sta 10+18.546<br>Δ = 7° 28' 09.0" (RT)<br>L = 6.518<br>T = 3.264<br>R = 50.000<br>PTSta. 10+21.801<br>Ⓖ N 81° 47' 28.2" E<br>Ⓖ L 89° 15' 37.2" E |



END CONSTRUCTION  
 -Y- POCSta 13+36.710

| -Y-   | -L-   | -L-  |
|---|---|--|
| PI Sta 11+38.657<br>Δ = 3° 50' 18.7" (LT)<br>L = 66.995<br>T = 3.510<br>R = 1000.000<br>SE = 0.03<br>RO = SEE PLANS | PI Sta 12+50.511<br>Δ = 17° 28' 19.5" (RT)<br>L = 155.522<br>T = 78.369<br>R = 510.000<br>SE = 0.04<br>RO = SEE PLANS | PI Sta 11+41.804<br>Δ = 1° 09' 59.9" (LT)<br>L = 61.086<br>T = 30.544<br>R = 3000.000<br>SE = NC |

2-20-09 RIGHT OF WAY REVISIONS: TEMPORARY CONSTRUCTION EASEMENT HAS BEEN REDUCED AND PERMANENT UTILITY EASEMENT HAS BEEN ADDED ON PARCEL 25. PARCEL NUMBER 25 HAS BEEN CHANGED TO PARCEL NUMBER 25Z. JLI

1-11-05 FMM RIGHT OF WAY REVISIONS: PARCEL NUMBER 23A HAS BEEN ADDED. PROPERTY OWNER NAMES HAVE BEEN CHANGED ON PARCELS 21, 24, 23A, 25 AND 26. RW LABELS HAVE BEEN CHANGED ON PARCELS 23, 23A, 24, 25 AND 28. A PROPERTY LINE HAS BEEN ADDED ON PARCEL 29.

**METRIC**

PROJECT REFERENCE NO. **R-2824** SHEET NO. **5**

R/W SHEET NO.

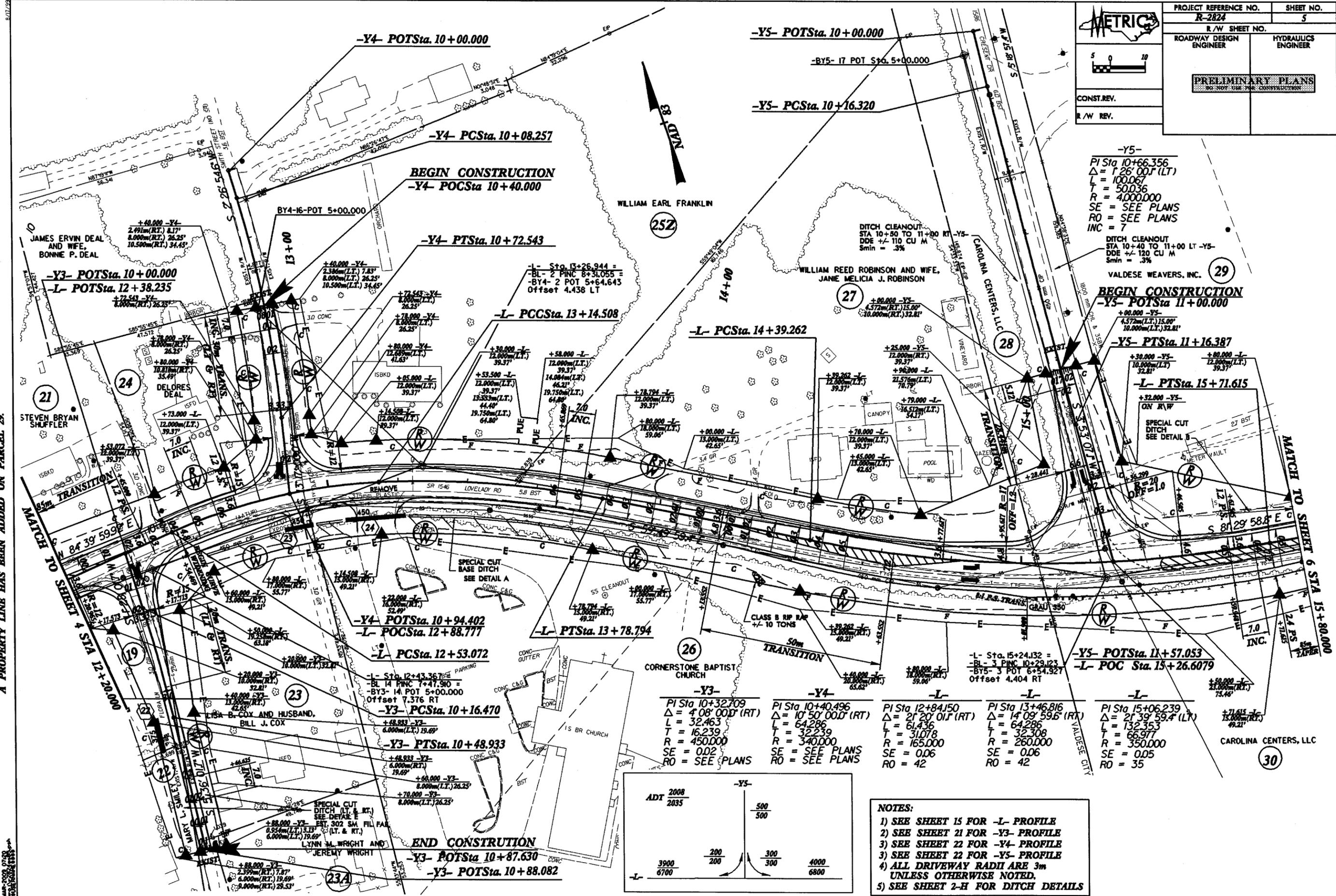
ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER

**PRELIMINARY PLANS**

CONST. REV. \_\_\_\_\_

R/W REV. \_\_\_\_\_

SCALE: 1" = 10'



**-Y5-**  
 PI Sta 10+66.356  
 $\Delta = 1' 26' 00''$  (LT)  
 $L = 100.067$   
 $T = 50.036$   
 $R = 4,000.000$   
 SE = SEE PLANS  
 RO = SEE PLANS  
 INC = 7

DITCH CLEANOUT  
 STA 10+50 TO 11+00 RT -Y5-  
 DDE +/- 120 CU M  
 $S_{min} = .3\%$

VALDESE WEAVERS, INC. **29**

**BEGIN CONSTRUCTION**  
**-Y5- POTSta 11+00.000**

**-Y5- PTSta. 11+16.387**

**-L- PTSta. 15+71.615**

**-Y5- POTSta. 11+16.387**  
 $\Delta = 1' 26' 00''$  (LT)  
 $L = 100.067$   
 $T = 50.036$   
 $R = 4,000.000$   
 SE = SEE PLANS  
 RO = SEE PLANS  
 INC = 7

**-Y5- POTSta. 11+57.053**  
**-L- POC Sta. 15+26.6079**

**-L- PTSta. 15+71.615**  
 $\Delta = 1' 26' 00''$  (LT)  
 $L = 100.067$   
 $T = 50.036$   
 $R = 4,000.000$   
 SE = SEE PLANS  
 RO = SEE PLANS  
 INC = 7

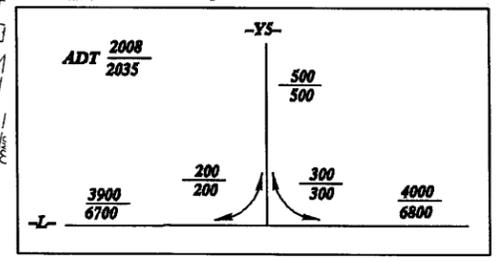
**-Y3-**  
 PI Sta 10+32.709  
 $\Delta = 4' 08' 00''$  (RT)  
 $L = 32.463$   
 $T = 16.239$   
 $R = 450.000$   
 SE = 0.02  
 RO = SEE PLANS

**-Y4-**  
 PI Sta 10+40.496  
 $\Delta = 10' 50' 00''$  (RT)  
 $L = 64.286$   
 $T = 32.239$   
 $R = 340.000$   
 SE = SEE PLANS  
 RO = SEE PLANS

**-L-**  
 PI Sta 12+84.150  
 $\Delta = 21' 20' 01''$  (RT)  
 $L = 61.436$   
 $T = 31.078$   
 $R = 165.000$   
 SE = 0.06  
 RO = 42

**-L-**  
 PI Sta 13+46.816  
 $\Delta = 14' 09' 59.6''$  (RT)  
 $L = 64.286$   
 $T = 32.308$   
 $R = 260.000$   
 SE = 0.06  
 RO = 42

**-L-**  
 PI Sta 15+06.239  
 $\Delta = 21' 39' 59.4''$  (LT)  
 $L = 132.353$   
 $T = 66.977$   
 $R = 350.000$   
 SE = 0.05  
 RO = 35



- NOTES:**
- 1) SEE SHEET 15 FOR -L- PROFILE
  - 2) SEE SHEET 21 FOR -Y3- PROFILE
  - 3) SEE SHEET 22 FOR -Y4- PROFILE
  - 4) ALL DRIVEWAY RADII ARE 3m UNLESS OTHERWISE NOTED.
  - 5) SEE SHEET 2-H FOR DITCH DETAILS

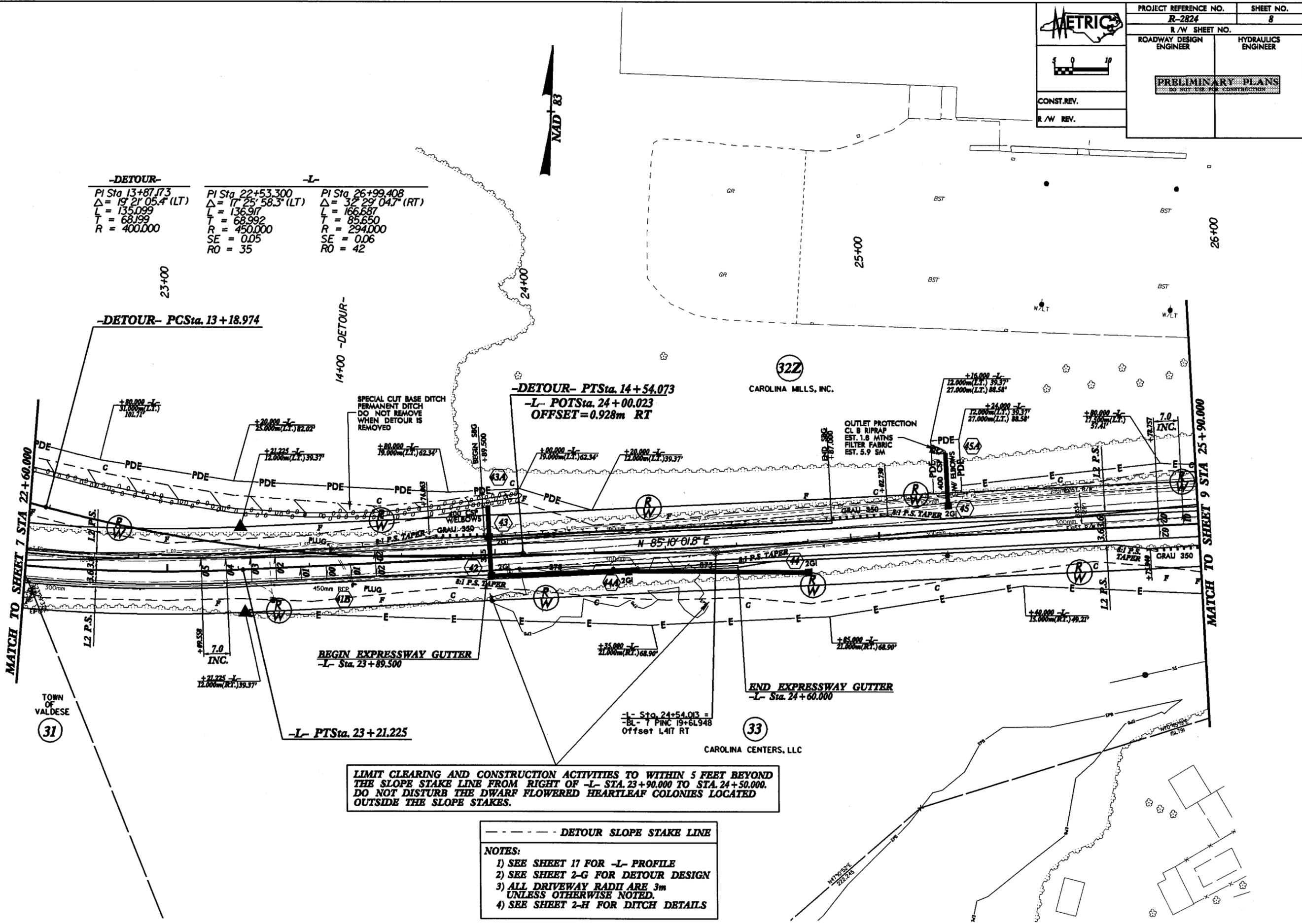
04-MAR-2009 07:20  
 11/11/09





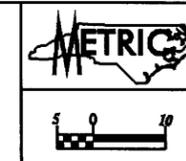
| -DETOUR-                           | -L-                                | -L-                                |
|------------------------------------|------------------------------------|------------------------------------|
| PI Sta 13+87.73                    | PI Sta 22+53.300                   | PI Sta 26+99.408                   |
| $\Delta = 19^\circ 21' 05.4" (LT)$ | $\Delta = 17^\circ 25' 58.3" (LT)$ | $\Delta = 32^\circ 29' 04.7" (RT)$ |
| L = 135.099                        | L = 136.917                        | L = 166.687                        |
| T = 68.199                         | T = 68.992                         | T = 85.650                         |
| R = 400.000                        | R = 450.000                        | R = 294.000                        |
|                                    | SE = 0.05                          | SE = 0.06                          |
|                                    | RO = 35                            | RO = 42                            |

2-20-09 RIGHT OF WAY REVISIONS: TEMPORARY CONSTRUCTION EASEMENT HAS BEEN INCREASED ON PARCEL 32. PARCEL NUMBER 32 HAS BEEN CHANGED TO PARCEL NUMBER 32Z. JLI



- DETOUR SLOPE STAKE LINE
- NOTES:
- 1) SEE SHEET 17 FOR -L- PROFILE
  - 2) SEE SHEET 2-G FOR DETOUR DESIGN
  - 3) ALL DRIVEWAY RADII ARE 3m UNLESS OTHERWISE NOTED.
  - 4) SEE SHEET 2-H FOR DITCH DETAILS

DATE: 04/11/09  
DRAWN BY: JLI  
CHECKED BY: JLI

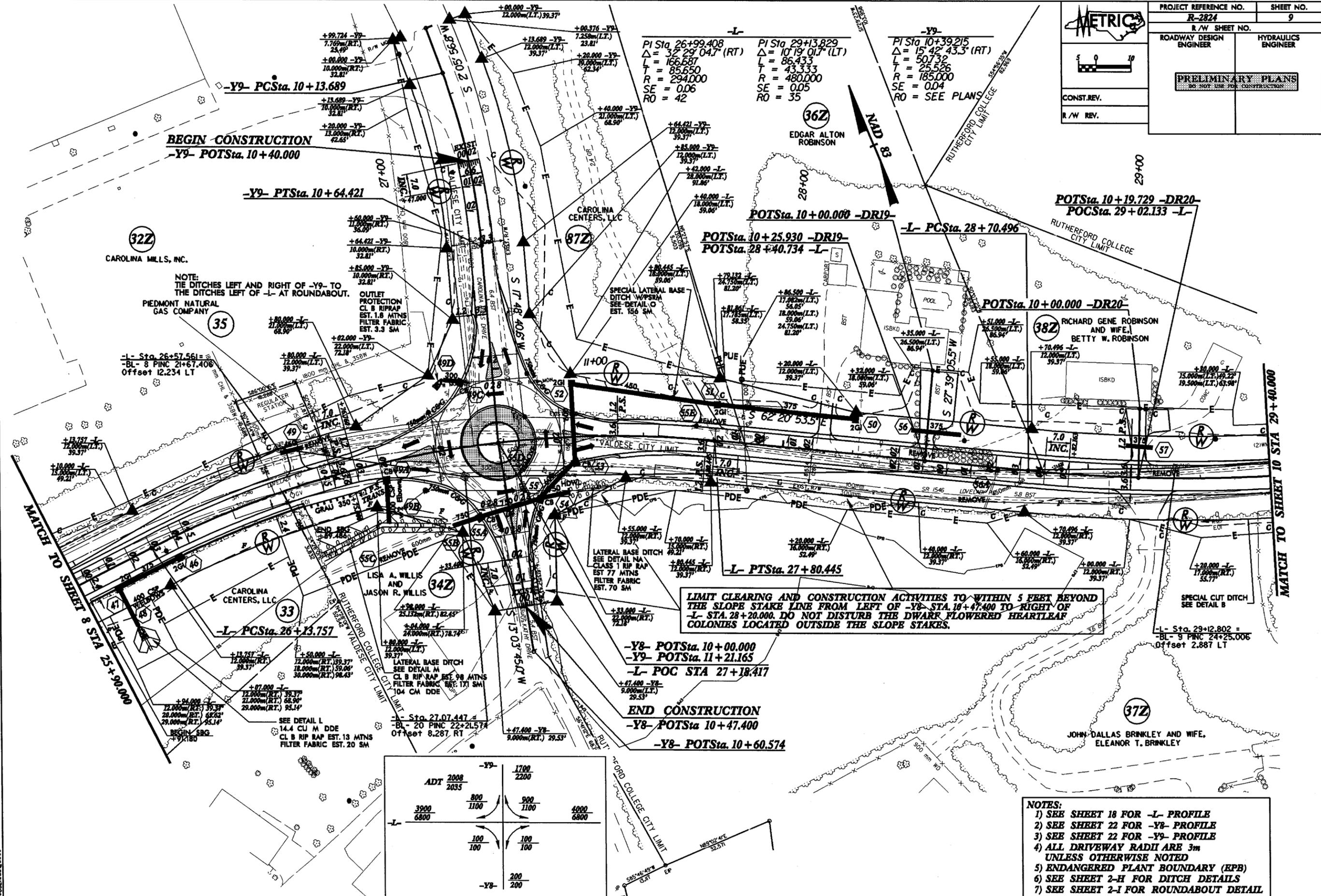


|  |                     |                       |  |
|--|---------------------|-----------------------|--|
| PROJECT REFERENCE NO.<br><b>R-2824</b> |                     | SHEET NO.<br><b>9</b> |  |
| R/W SHEET NO.                          |                     |                       |  |
| ROADWAY DESIGN ENGINEER                | HYDRAULICS ENGINEER |                       |  |
| <b>PRELIMINARY PLANS</b>               |                     |                       |  |
| DO NOT USE FOR CONSTRUCTION            |                     |                       |  |
| CONST. REV.                            |                     |                       |  |
| R/W REV.                               |                     |                       |  |

2-28-09 RIGHT OF WAY REVISIONS: TEMPORARY CONSTRUCTION EASEMENT HAS BEEN REDUCED AND PERMANENT UTILITY EASEMENT HAS BEEN ADDED ON PARCEL 36. TEMPORARY CONSTRUCTION AND EASEMENT HAS BEEN INCREASED ON PARCEL 32. TEMPORARY CONSTRUCTION EASEMENT AND PERMANENT DRAINAGE EASEMENT HAVE BEEN REDUCED ON PARCELS 34 AND 37. TEMPORARY CONSTRUCTION EASEMENT HAS BEEN REDUCED ON PARCELS 36 AND 37. ADDITIONAL TEMPORARY CONSTRUCTION EASEMENT HAS BEEN ADDED TO PARCEL 37. PERMANENT RIGHT OF WAY HAS BEEN INCREASED ON PARCELS 32, 34, 37 AND 38. PARCEL NUMBERS 32, 34, 36, 37, 38 AND 37 HAVE BEEN CHANGED TO PARCEL NUMBERS 32Z, 34Z, 36Z, 37Z, 38Z AND 37Z JLT

1-11-05 FMM RIGHT OF WAY REVISIONS:  
PROPERTY OWNER NAME HAS BEEN CHANGED ON PARCEL 36.  
RW LABELS HAVE BEEN CHANGED ON PARCELS 32 AND 37.

3-29-05 KMD RIGHT OF WAY REVISION:  
PROPERTY OWNER NAME HAS BEEN CHANGED ON PARCEL 34.



|          |      |      |      |
|----------|------|------|------|
|          | -Y9- | 1700 | 2200 |
| ADT 2008 | 800  | 900  | 4000 |
| ADT 2035 | 1100 | 1100 | 6800 |
|          | 100  | 100  |      |
|          | 100  | 100  |      |
|          | -Y8- | 200  | 200  |

- NOTES:**
- 1) SEE SHEET 18 FOR -L- PROFILE
  - 2) SEE SHEET 22 FOR -Y8- PROFILE
  - 3) SEE SHEET 22 FOR -Y9- PROFILE
  - 4) ALL DRIVEWAY RADII ARE 3m UNLESS OTHERWISE NOTED
  - 5) ENDANGERED PLANT BOUNDARY (EPB)
  - 6) SEE SHEET 2-H FOR DITCH DETAILS
  - 7) SEE SHEET 2-I FOR ROUNDABOUT DETAIL

2-20-09 RIGHT OF WAY REVISION: TEMPORARY CONSTRUCTION EASEMENT HAS BEEN REDUCED AND PERMANENT UTILITY EASEMENT HAS BEEN ADDED ON PARCELS 38 AND 39. PARCEL NUMBERS 38 AND 39 HAVE BEEN CHANGED TO PARCEL NUMBERS 38Z AND 39Z. JLT

1-11-05 FMM RIGHT OF WAY REVISIONS:  
 PARCEL NUMBER 48 HAS BEEN CHANGED TO PARCEL NUMBER 46.  
 TEMPORARY CONSTRUCTION EASEMENT HAS BEEN DELETED ON PARCEL 43.  
 TEMPORARY CONSTRUCTION EASEMENT BETWEEN STATIONS 10+60 AND 10+73 LEFT OF -Y10- ON PARCEL 50 HAS BEEN CHANGED TO PERMANENT DRAINAGE EASEMENT.  
 PROPERTY OWNER NAMES HAVE BEEN CHANGED ON PARCELS 39, 40, 42, 46, 49 AND 50.  
 R/W LABELS HAVE BEEN CHANGED ON PARCELS 47 AND 50.  
 PROPERTY LINES HAVE BEEN ADDED ON PARCELS 42 AND 44.  
 PARCEL NUMBER 44A HAS BEEN ADDED.

**-L-**  
 PI Sta. 29+13.829    PI Sta. 31+23.879  
 $\Delta = 10^{\circ} 19' 01.7" (LT)$      $\Delta = 18^{\circ} 35' 44.3" (LT)$   
 L = 86.433    L = 159.032  
 T = 43.333    T = 80.221  
 R = 480.000    R = 490.000  
 SE = 0.05    SE = 0.05  
 RO = 35    RO = 35

**-DR7-**  
 PI Sta. 10+10.544    PI Sta. 10+29.829  
 $\Delta = 5^{\circ} 12' 25.0" (RT)$      $\Delta = 8^{\circ} 57' 04.5" (LT)$   
 L = 4.544    L = 7.811  
 T = 2.274    T = 3.914  
 R = 50.000    R = 50.000  
 PCSta. 10+08.271    PCSta. 10+25.916  
 PTSta. 10+12.815    PTSta. 10+33.727

**-Y9A-**  
 PI Sta. 10+14.943  
 $\Delta = 9^{\circ} 59' 01.6" (RT)$   
 L = 8.712  
 T = 4.367  
 R = 50.000

**-DR4-**  
 PI Sta. 10+07.428  
 $\Delta = 89^{\circ} 38' 26.3" (LT)$   
 L = 6.258  
 T = 3.975  
 R = 4.000  
 PCSta. 10+03.453  
 PTSta. 10+09.711  
 (A) S 58° 09.7' W

(C) S 43° 35.3' W  
 (D) S 9° 56' 00.3' W  
 (E) S 0° 58' 55.7' W

**NOTES:**  
 1) SEE SHEET 19 FOR -L- PROFILE  
 2) SEE SHEET 23 FOR -Y10- PROFILE  
 3) ALL DRIVEWAY RADII ARE 3m UNLESS OTHERWISE NOTED.  
 4) SEE SHEET 2-H FOR DITCH DETAILS  
 5) SEE SHEET 23 FOR -Y9A- PROFILE  
 6) SEE SHEET 23 FOR -Y9B- PROFILE

**METRIC**

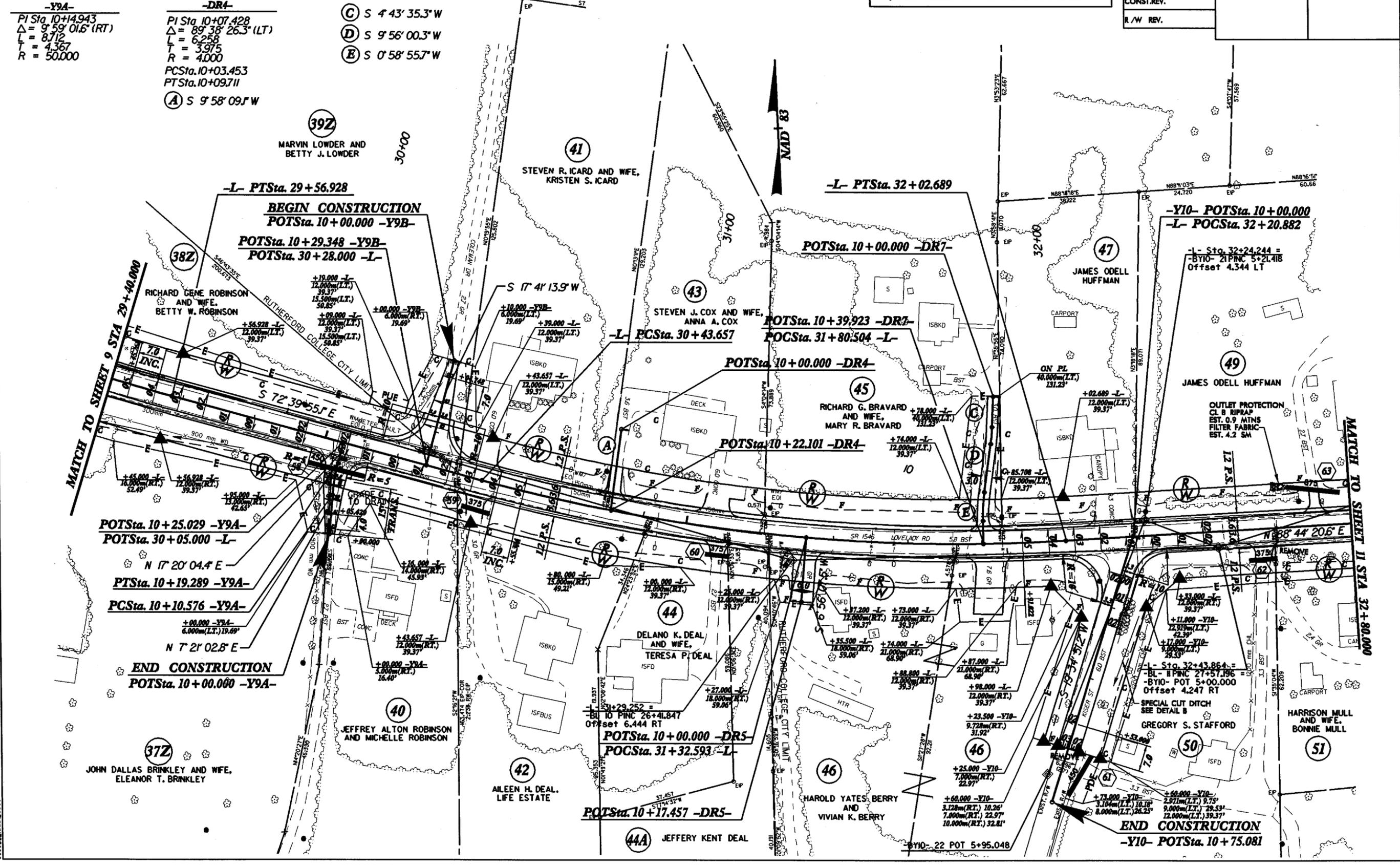
PROJECT REFERENCE NO. R-2824    SHEET NO. 10

R/W SHEET NO.

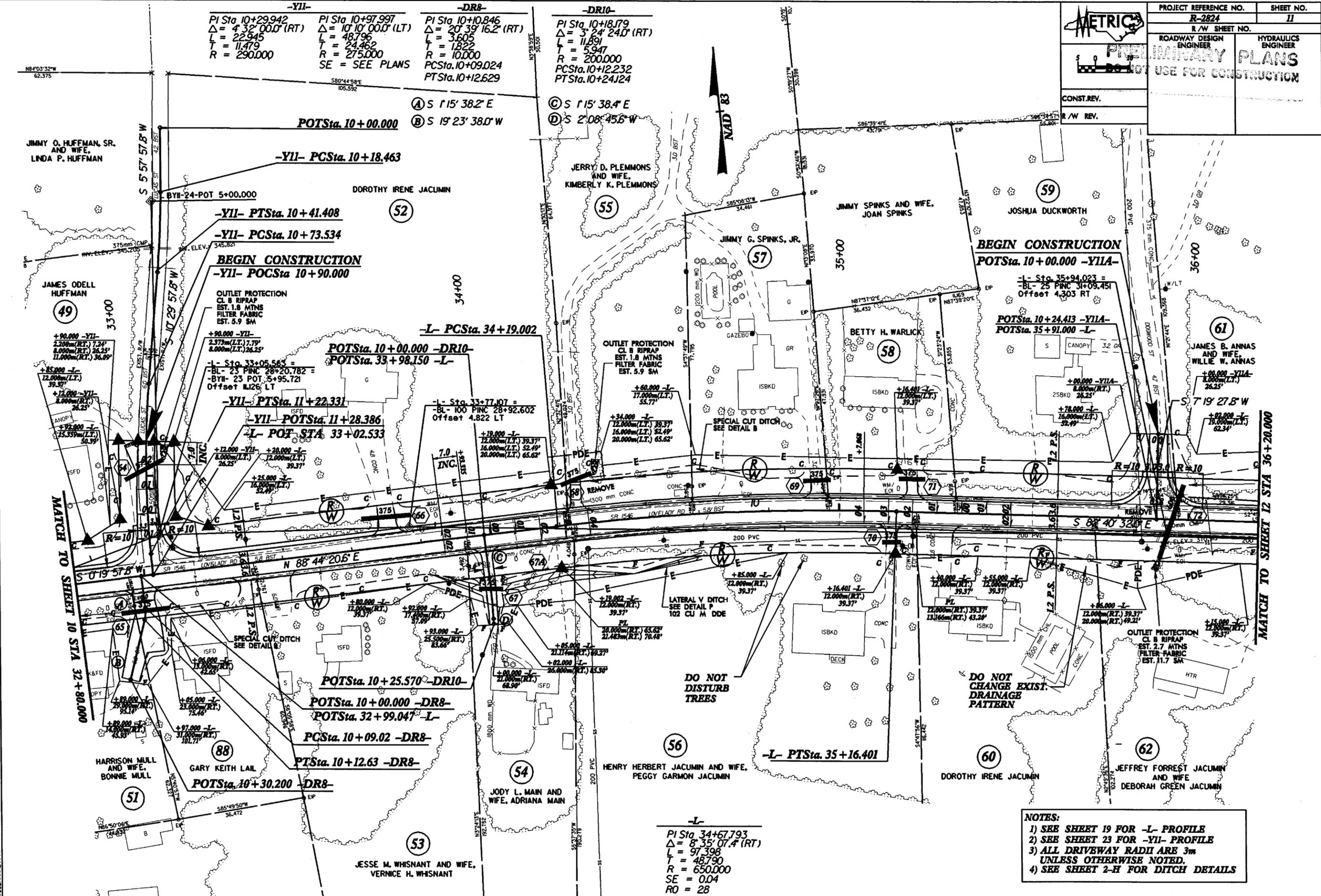
ROADWAY DESIGN ENGINEER    HYDRAULICS ENGINEER

**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

CONST. REV.    R/W REV.



**END CONSTRUCTION**  
 -Y10- POTSta. 10 + 75.081



**-YII-**  
 PI Sta 10+29.942  
 $\Delta = 43^\circ 00' 00''$  (RT)  
 $L = 22.945$   
 $T = 11.479$   
 $R = 290.000$

**-DR8-**  
 PI Sta 10+97.997  
 $\Delta = 10^\circ 10' 00''$  (LT)  
 $L = 48.796$   
 $T = 24.462$   
 $R = 275.000$   
 $SE = \text{SEE PLANS}$

**-DR10-**  
 PI Sta 10+10.846  
 $\Delta = 20^\circ 39' 16.2''$  (RT)  
 $L = 3.605$   
 $T = 1.822$   
 $R = 10.000$   
 PCSta. 10+09.024  
 PTSta. 10+12.629

**-DR10-**  
 PI Sta 10+18.179  
 $\Delta = 3^\circ 24' 24.0''$  (RT)  
 $L = 11.691$   
 $T = 5.947$   
 $R = 200.000$   
 PCSta. 10+12.232  
 PTSta. 10+24.124

**NOTES:**

- SEE SHEET 19 FOR -L- PROFILE
- SEE SHEET 23 FOR -YII- PROFILE
- ALL DRIVEWAY RADII ARE 3m UNLESS OTHERWISE NOTED.
- SEE SHEET 2-H FOR DITCH DETAILS

**-L-**  
 PI Sta 34+67.793  
 $\Delta = 8^\circ 35' 07.4''$  (RT)  
 $L = 97.398$   
 $T = 48.790$   
 $R = 650.000$   
 $SE = 0.04$   
 $RO = 28$

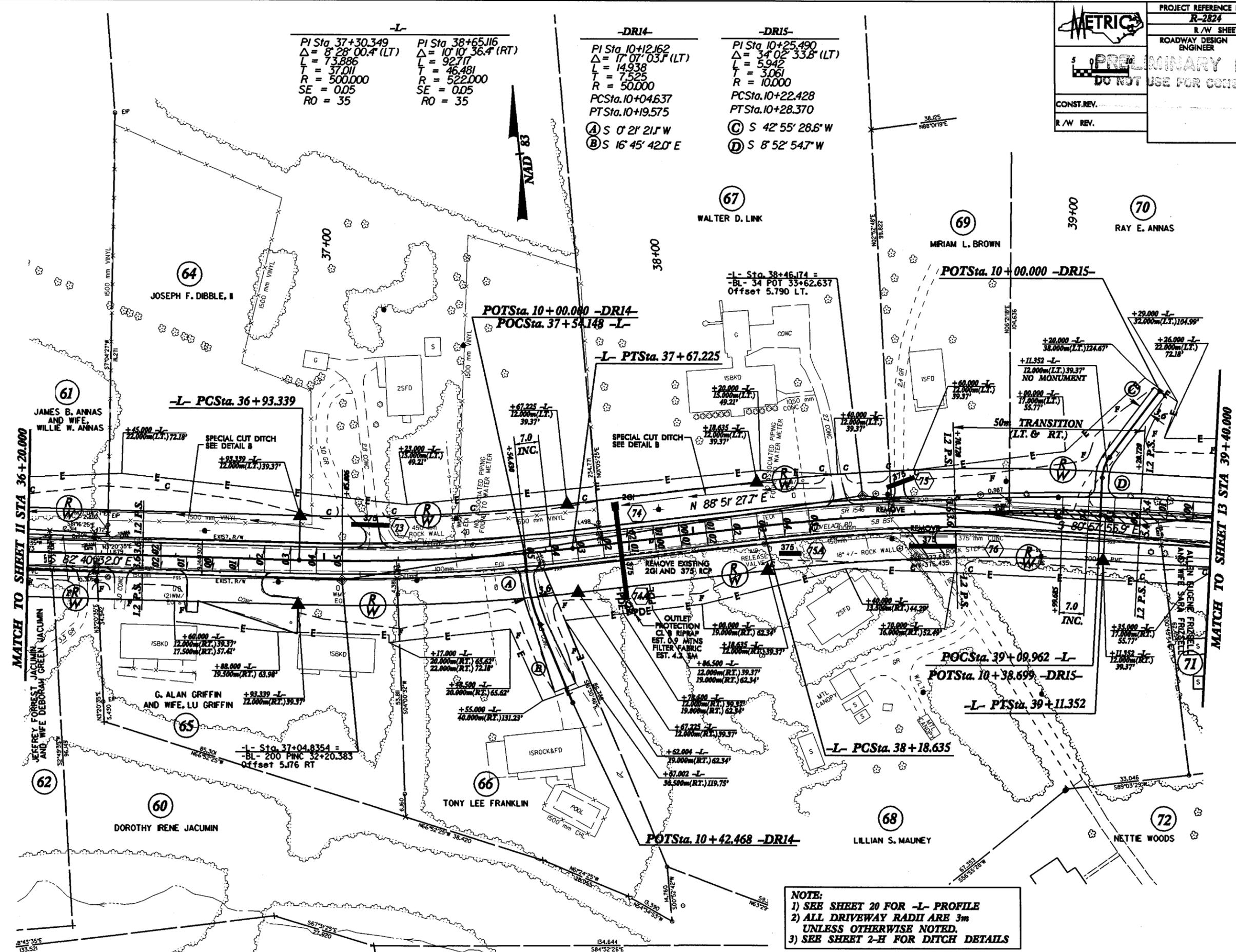
|  |                       |                     |
|--|-----------------------|---------------------|
|  | PROJECT REFERENCE NO. | SHEET NO.           |
|  | R-2824                | 12                  |
| ROADWAY DESIGN ENGINEER  |                       | HYDRAULICS ENGINEER |
| <b>PRELIMINARY PLANS</b><br>DO NOT USE FOR CONSTRUCTION                            |                       |                     |
| CONST. REV.  |                       |                     |
| R/W REV.   |                       |                     |

**-L-**

|  |   |
|--|---|
| PI Sta 37+30.349<br>Δ = 8° 28' 00.4" (LT)<br>L = 73.886<br>T = 37.011<br>R = 500.000<br>SE = 0.05<br>RO = 35 | PI Sta 38+65.116<br>Δ = 10° 10' 36.4" (RT)<br>L = 92.717<br>T = 46.481<br>R = 522.000<br>SE = 0.05<br>RO = 35 |
|--|---|

**-DR14-**

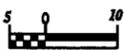
|   |   |
|---|---|
| PI Sta 10+12.162<br>Δ = 17° 07' 03.1" (LT)<br>L = 14.938<br>T = 7.525<br>R = 50.000<br>PCSta. 10+04.637<br>PTSta. 10+19.575 | <b>-DR15-</b>   |
| (A) S 0° 21' 21.1" W<br>(B) S 16° 45' 42.0" E   | PI Sta 10+25.490<br>Δ = 34° 02' 33.8" (LT)<br>L = 5.942<br>T = 3.061<br>R = 10.000<br>PCSta. 10+22.428<br>PTSta. 10+28.370<br>(C) S 42° 55' 28.6" W<br>(D) S 8° 52' 54.7" W |



**NOTE:**  
 1) SEE SHEET 20 FOR -L- PROFILE  
 2) ALL DRIVEWAY RADII ARE 3m UNLESS OTHERWISE NOTED.  
 3) SEE SHEET 2-H FOR DITCH DETAILS

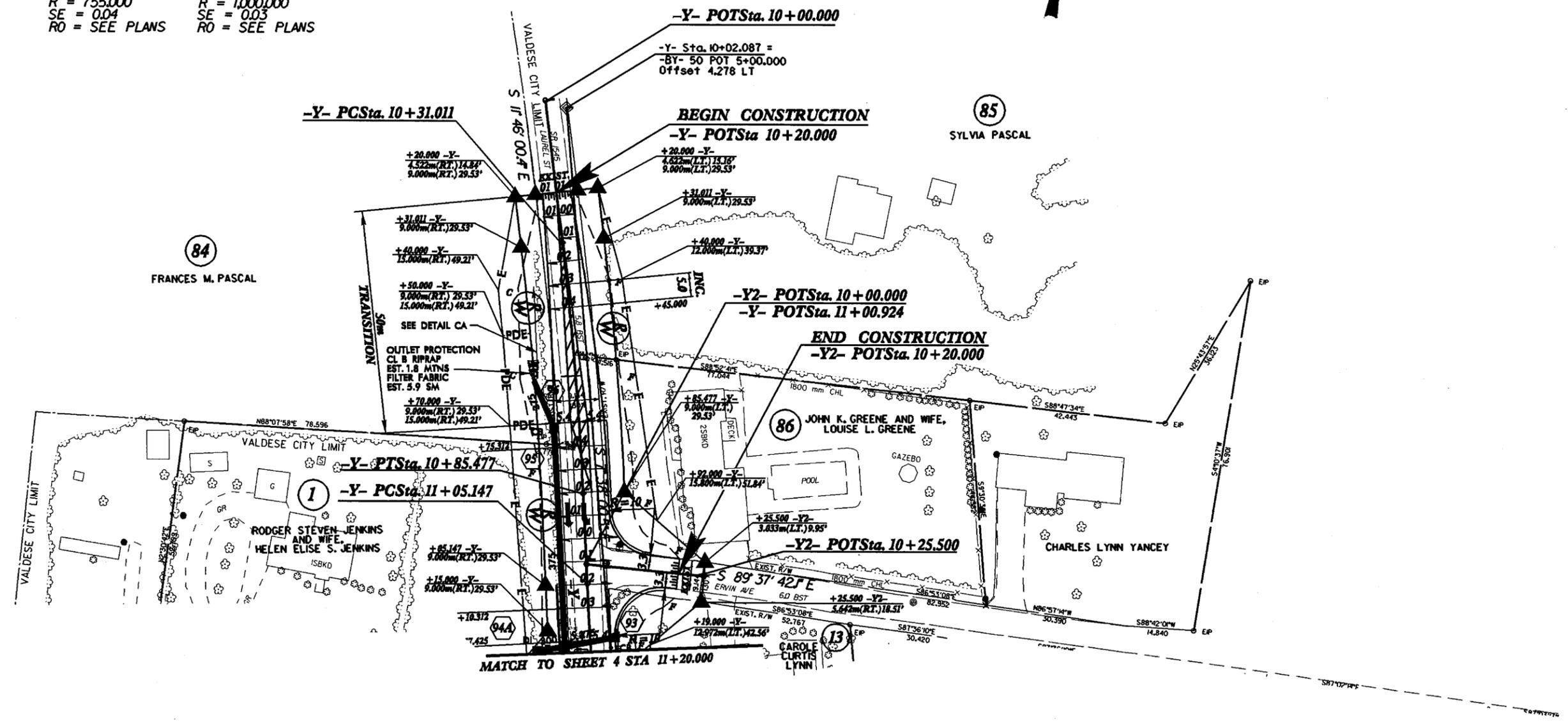
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|  |  |                        |
|--|--|------------------------|
| <br><br>CONST. REV.<br>R/W REV. | PROJECT REFERENCE NO.<br><b>R-2824</b> | SHEET NO.<br><b>14</b> |
|  | R/W SHEET NO.                          |                        |
| ROADWAY DESIGN ENGINEER  | HYDRAULICS ENGINEER                    |                        |
| <b>PRELIMINARY PLANS</b><br>DO NOT USE FOR CONSTRUCTION  |  |                        |

**-Y-**

|                                   |                                   |
|-----------------------------------|-----------------------------------|
| PI Sta 10+58.256                  | PI Sta 11+38.657                  |
| $\Delta = 4^{\circ}07'59.9"$ (RT) | $\Delta = 3^{\circ}50'18.7"$ (LT) |
| L = 54.466                        | L = 66.995                        |
| T = 27.245                        | T = 33.510                        |
| R = 755.000                       | R = 1,000.000                     |
| SE = 0.04                         | SE = 0.03                         |
| RO = SEE PLANS                    | RO = SEE PLANS                    |

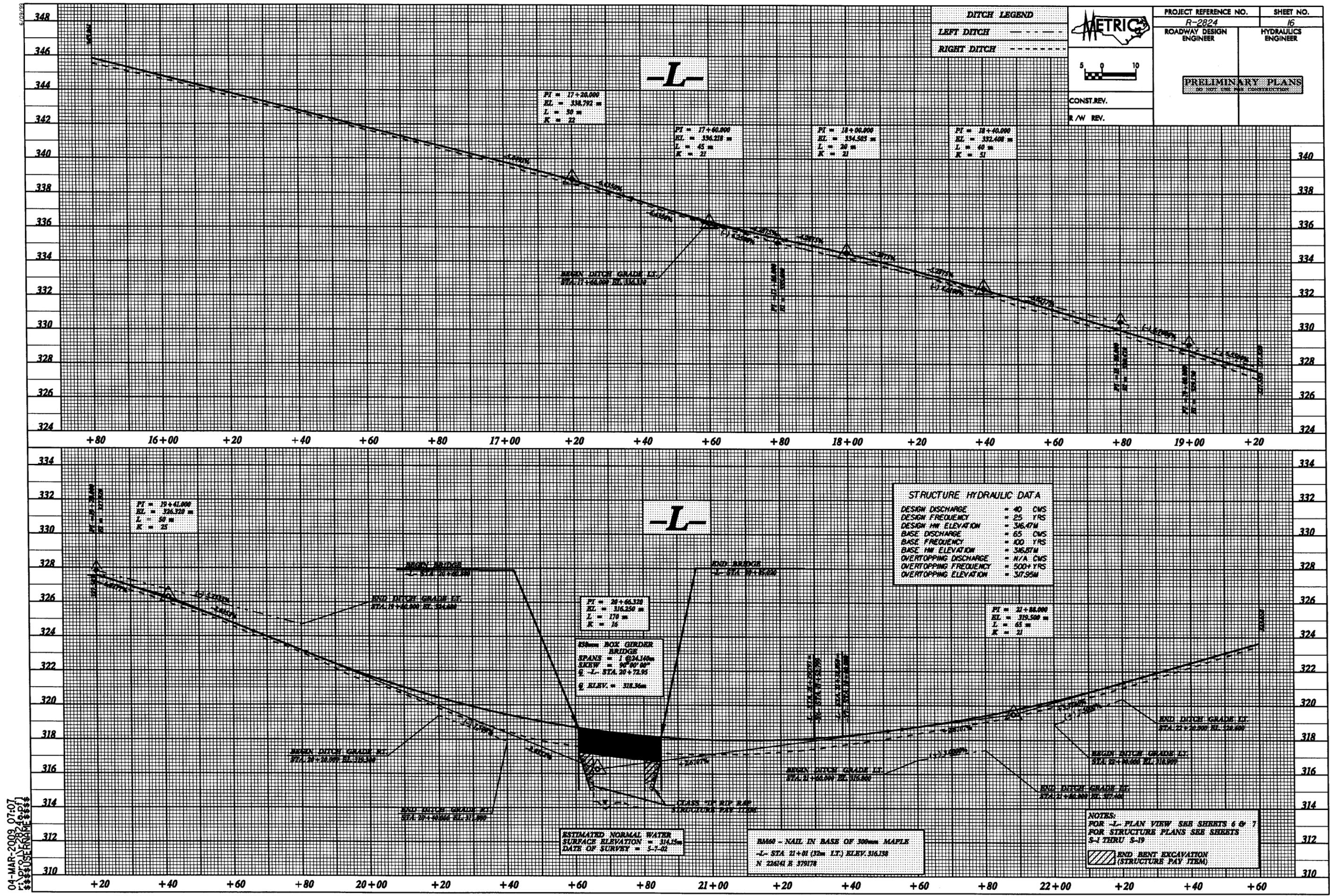


**NOTES:**

- 1) SEE SHEET 21 FOR -Y- PROFILE
- 2) SEE SHEET 21 FOR -YA- PROFILE
- 3) ALL DRIVEWAY RADII ARE 3m UNLESS OTHERWISE NOTED.
- 4) SEE SHEET 2-H FOR DITCH DETAILS

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 14-2824-14-14

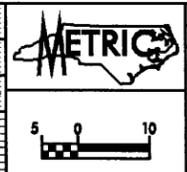




**DITCH LEGEND**

LEFT DITCH - - - - -

RIGHT DITCH - - - - -



|   |                     |
|---|---------------------|
| PROJECT REFERENCE NO.<br>R-2824                         | SHEET NO.<br>16     |
| ROADWAY DESIGN ENGINEER                                 | HYDRAULICS ENGINEER |
| <b>PRELIMINARY PLANS</b><br>DO NOT USE FOR CONSTRUCTION |                     |
| CONST. REV.   |                     |
| R/W REV.  |                     |

PI = 17+20.000  
 EL = 338.792 m  
 L = 30 m  
 K = 22

PI = 17+60.000  
 EL = 336.218 m  
 L = 45 m  
 K = 21

PI = 18+00.000  
 EL = 334.505 m  
 L = 20 m  
 K = 21

PI = 18+40.000  
 EL = 332.408 m  
 L = 40 m  
 K = 21

**STRUCTURE HYDRAULIC DATA**

|                       |            |
|-----------------------|------------|
| DESIGN DISCHARGE      | = 40 CMS   |
| DESIGN FREQUENCY      | = 25 YRS   |
| DESIGN HW ELEVATION   | = 316.47M  |
| BASE DISCHARGE        | = 65 CMS   |
| BASE FREQUENCY        | = 100 YRS  |
| BASE HW ELEVATION     | = 316.87M  |
| OVERTOPPING DISCHARGE | = N/A CMS  |
| OVERTOPPING FREQUENCY | = 500+ YRS |
| OVERTOPPING ELEVATION | = 317.95M  |

PI = 20+66.370  
 EL = 316.250 m  
 L = 170 m  
 K = 16

**850mm BOX GIRDER BRIDGE**  
 SPANS = 1 @ 24.340m  
 SKRW = 90° 00' 00"  
 Q - L- STA. 20+72.95  
 Q ELEV. = 318.56m

PI = 21+88.000  
 EL = 319.500 m  
 L = 65 m  
 K = 21

ESTIMATED NORMAL WATER SURFACE ELEVATION = 314.15m  
 DATE OF SURVEY = 5-1-02

RM60 - NAIL IN BASE OF 300mm MAPLE  
 -L- STA. 21+01 (32m LT.) ELEV. 316.138  
 N 226141 E 378178

NOTES:  
 FOR -L- PLAN VIEW SEE SHEETS 6 & 7  
 FOR STRUCTURE PLANS SEE SHEETS S-1 THRU S-19

END BENT EXCAVATION (STRUCTURE PAY ITEM)

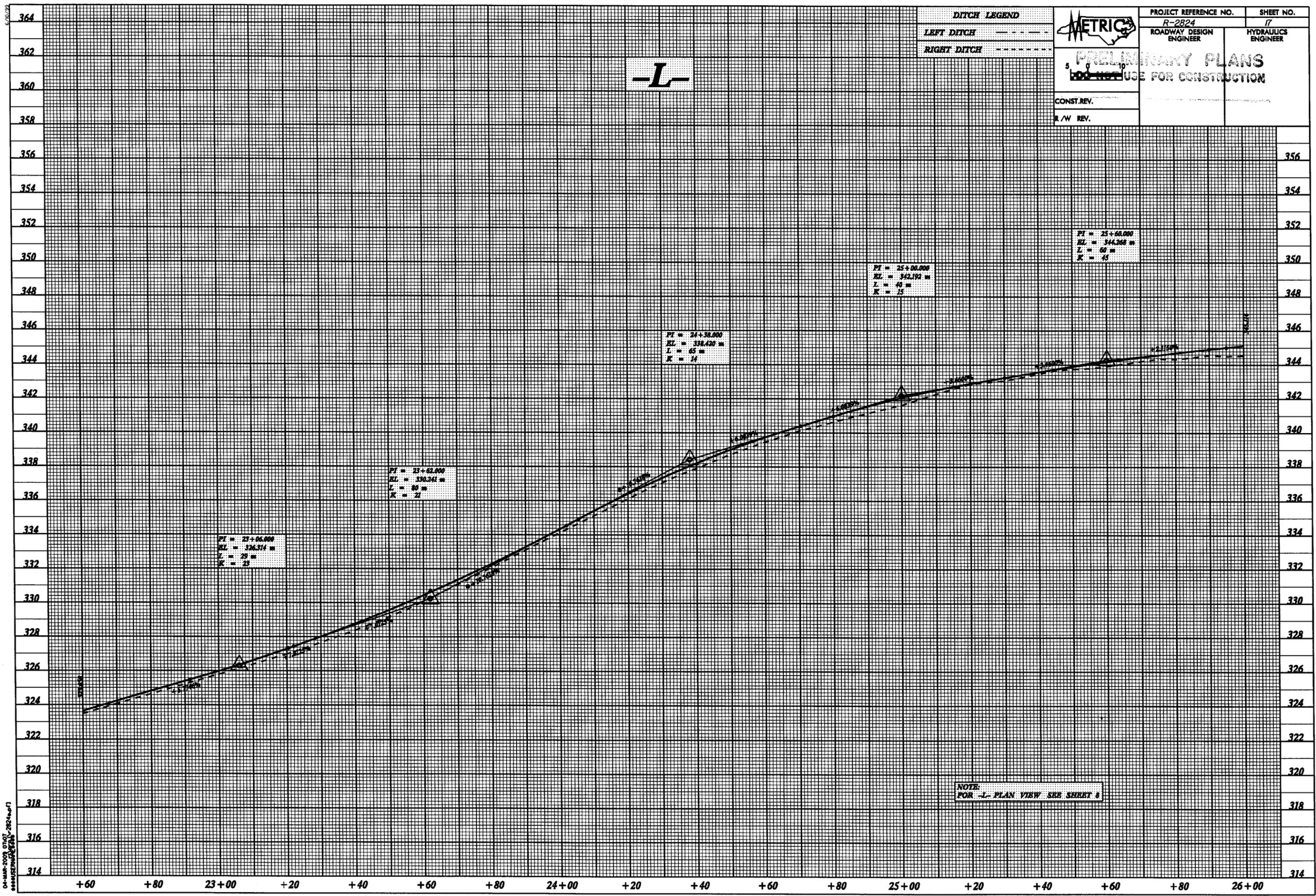
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|                                    |                     |
|------------------------------------|---------------------|
| PROJECT REFERENCE NO.<br>R-2824    | SHEET NO.<br>17     |
| ROADWAY DESIGN ENGINEER            | HYDRAULICS ENGINEER |
| <b>PRELIMINARY PLANS</b>           |                     |
| <b>DO NOT USE FOR CONSTRUCTION</b> |                     |
| CONST. REV.                        |                     |
| R/W REV.                           |                     |

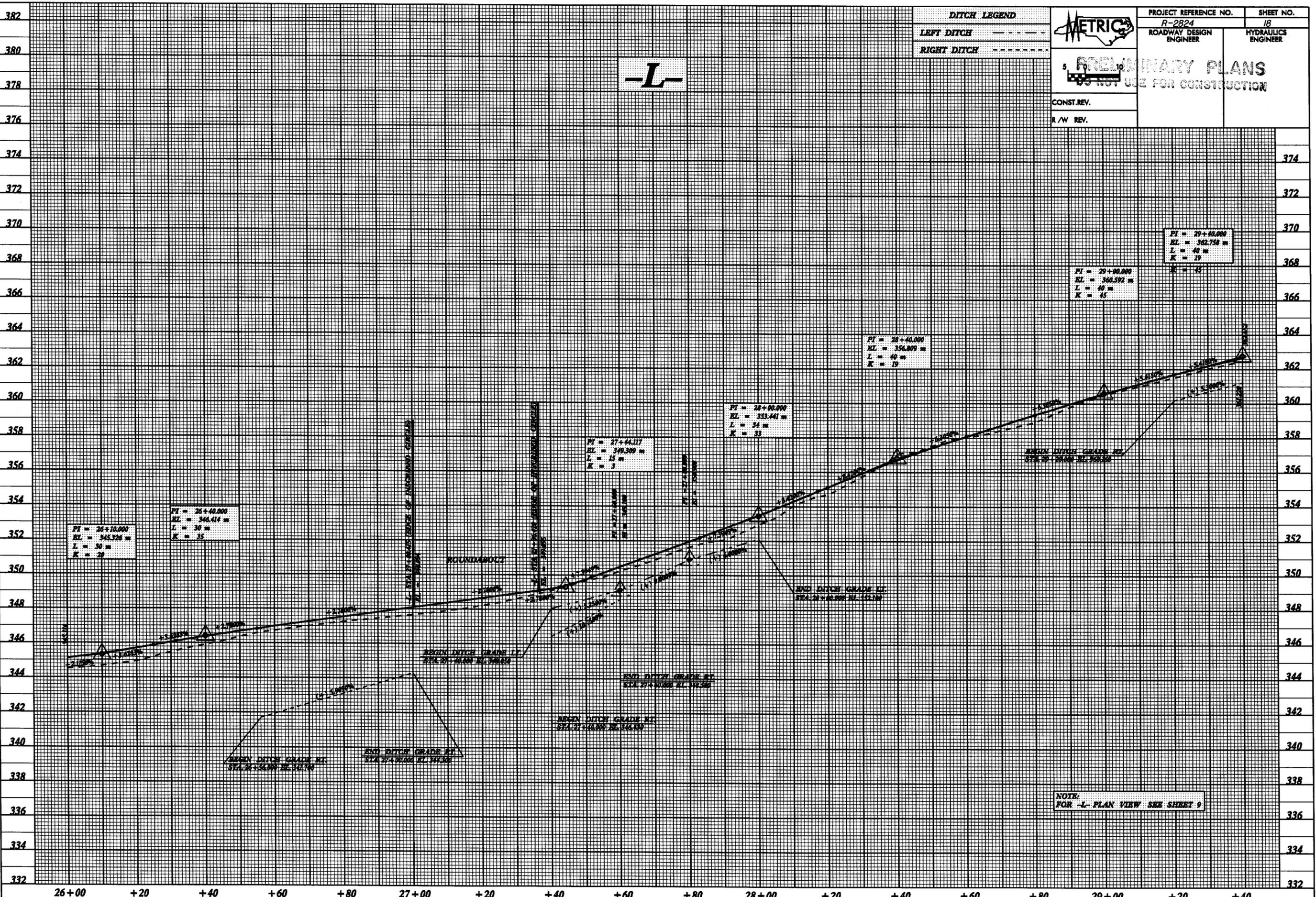
|                     |       |
|---------------------|-------|
| <b>DITCH LEGEND</b> |       |
| LEFT DITCH          | ----- |
| RIGHT DITCH         | ----- |

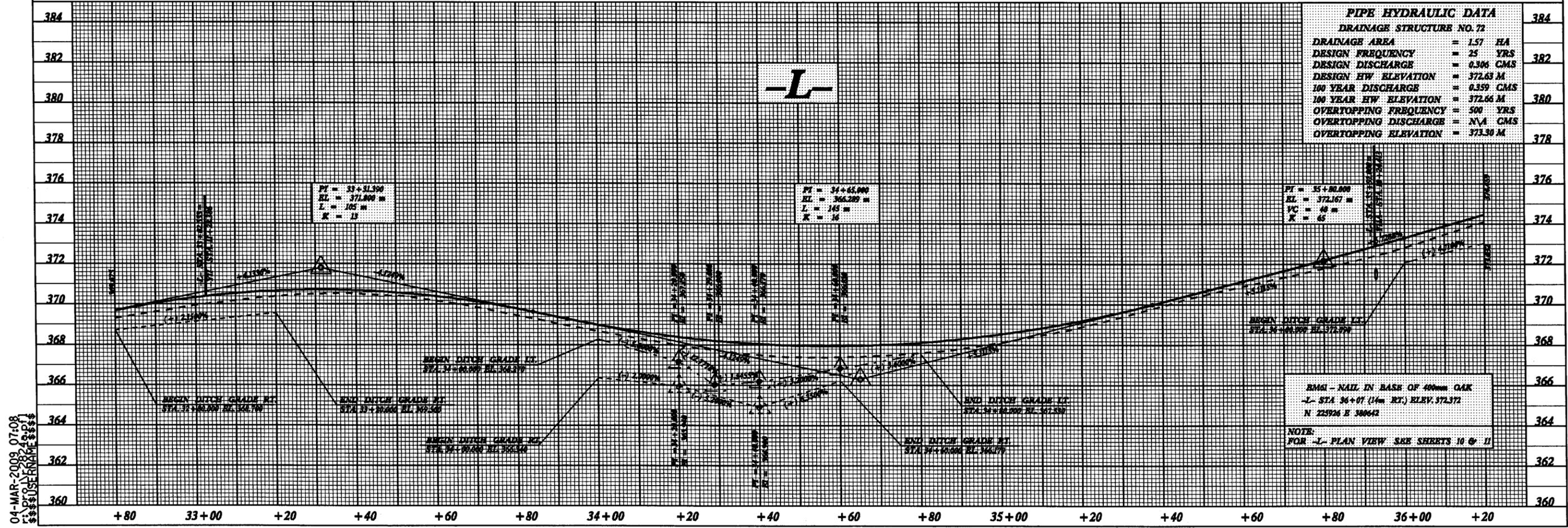
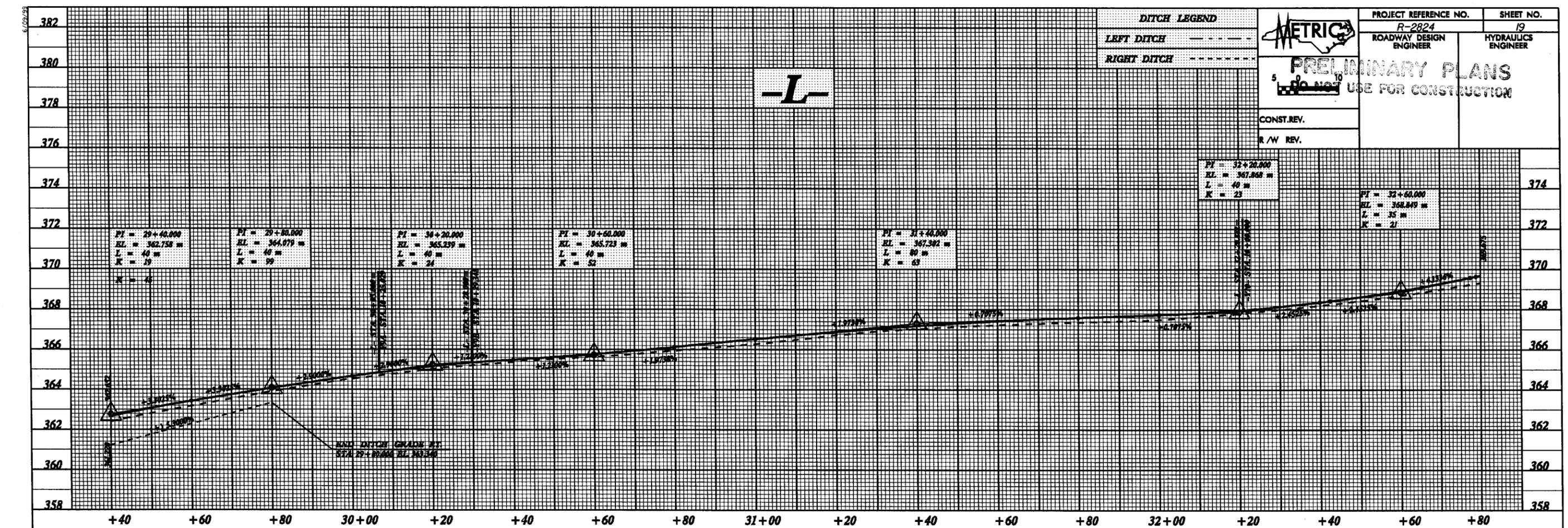
-L-



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R-2824-17.dwg

04-11-2009 07:07 2821.ppt



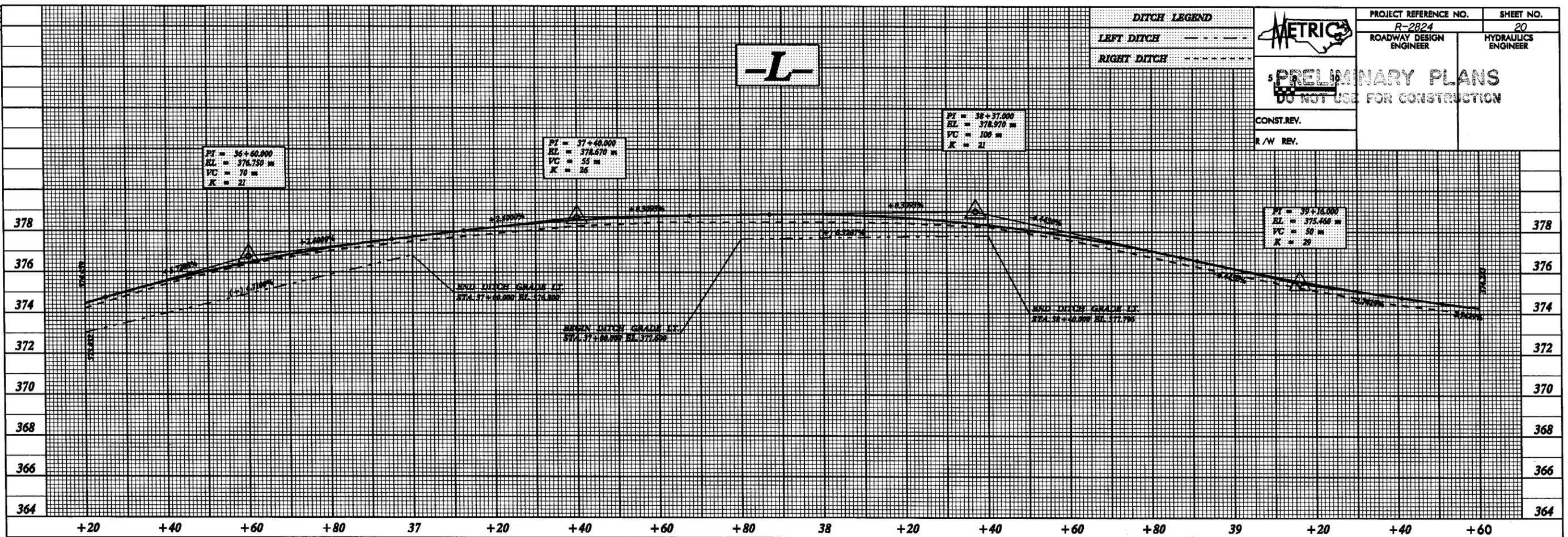




|   |                     |
|---|---------------------|
| PROJECT REFERENCE NO.<br>R-2824                         | SHEET NO.<br>20     |
| ROADWAY DESIGN ENGINEER                                 | HYDRAULICS ENGINEER |
| <b>PRELIMINARY PLANS</b><br>DO NOT USE FOR CONSTRUCTION |                     |
| CONST. REV.   |                     |
| R/W REV.  |                     |

| DITCH LEGEND |     |
|--------------|-----|
| LEFT DITCH   | --- |
| RIGHT DITCH  | --- |

**L**



**L**

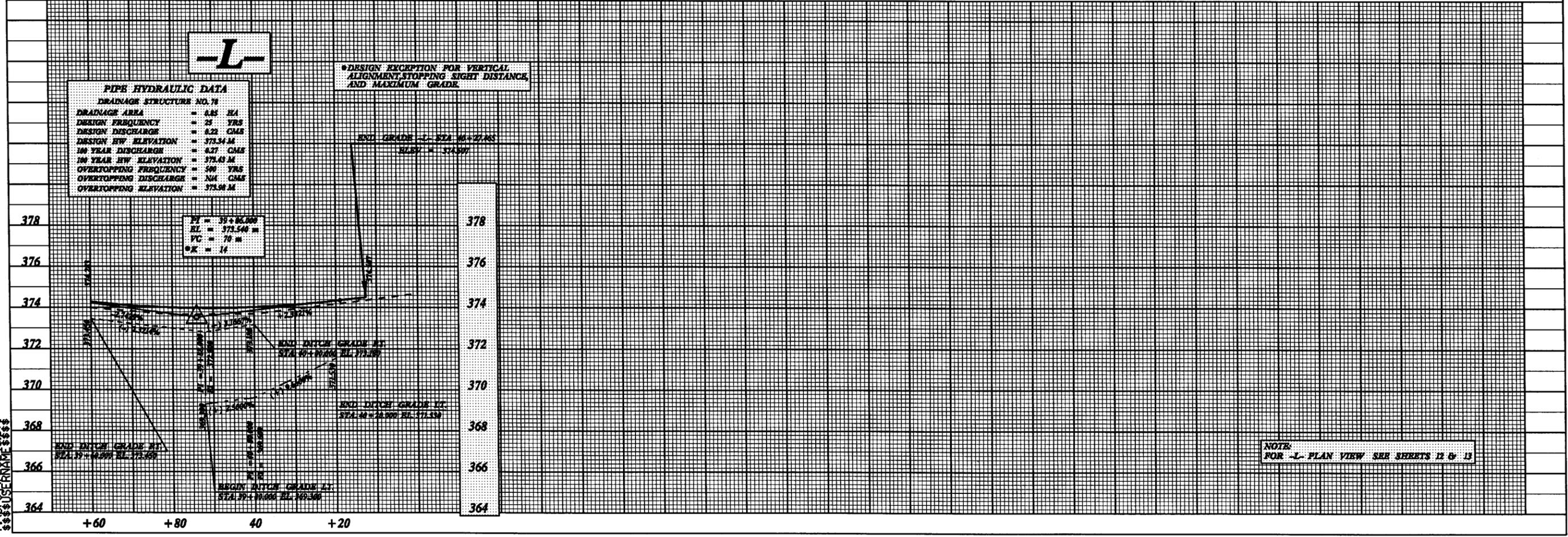
DESIGN EXCEPTION FOR VERTICAL ALIGNMENT, STOPPING SIGHT DISTANCE, AND MAXIMUM GRADE.

**PIPE HYDRAULIC DATA**

DRAINAGE STRUCTURE NO. 78

|                       |            |
|-----------------------|------------|
| DRAINAGE AREA         | = 4.85 HA  |
| DESIGN FREQUENCY      | = 25 YRS   |
| DESIGN DISCHARGE      | = 0.22 CMS |
| DESIGN HW ELEVATION   | = 373.34 M |
| 100 YEAR DISCHARGE    | = 0.27 CMS |
| 100 YEAR HW ELEVATION | = 373.43 M |
| OVERTOPPING FREQUENCY | = 500 YRS  |
| OVERTOPPING DISCHARGE | = NA CMS   |
| OVERTOPPING ELEVATION | = 373.98 M |

END GRADE -L- STA. 36+21.850  
EL. 374.500



NOTE: FOR -L- PLAN VIEW SEE SHEETS 12 & 13

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5/09/29

| DITCH LEGEND |     |
|--------------|-----|
| LEFT DITCH   | --- |
| RIGHT DITCH  | --- |



|                         |        |
|-------------------------|--------|
| PROJECT REFERENCE NO.   | R-2824 |
| ROADWAY DESIGN ENGINEER |        |
| HYDRAULICS ENGINEER     | 21     |

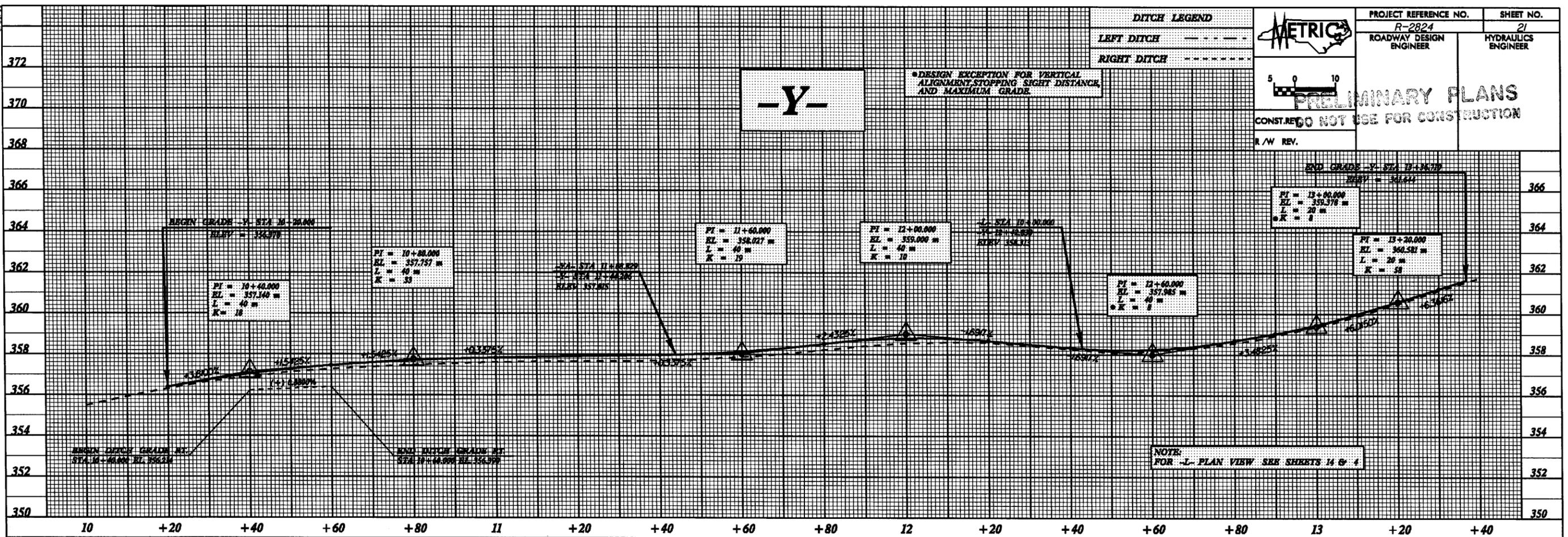


PRELIMINARY PLANS

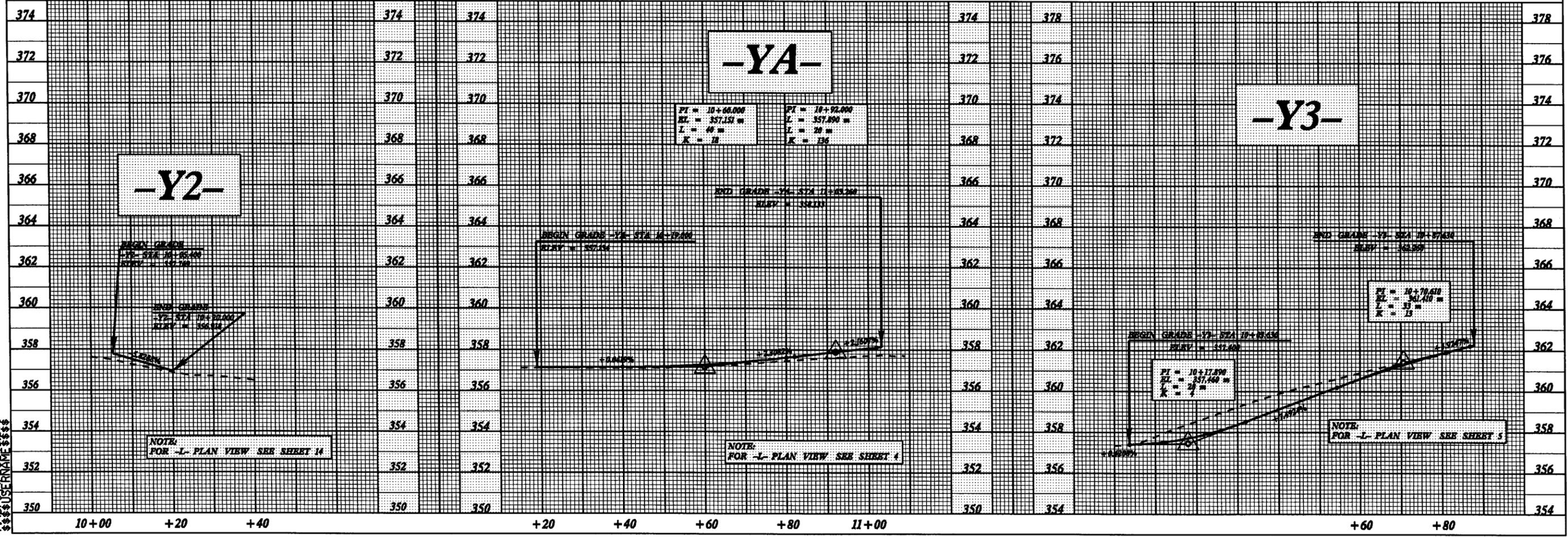
CONST. RE. DO NOT USE FOR CONSTRUCTION

R/W REV.

DESIGN EXCEPTION FOR VERTICAL ALIGNMENT STOPPING SIGHT DISTANCE AND MAXIMUM GRADE



NOTE: FOR -L- PLAN VIEW SEE SHEETS 14 & 4



**-Y2-**

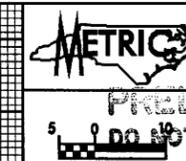
**-Y3-**

NOTE: FOR -L- PLAN VIEW SEE SHEET 14

NOTE: FOR -L- PLAN VIEW SEE SHEET 4

NOTE: FOR -L- PLAN VIEW SEE SHEET 5

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PROJECT REFERENCE NO. R-2824  
 SHEET NO. 22  
 ROADWAY DESIGN ENGINEER  
 HYDRAULICS ENGINEER  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

CONST. REV.  
 R/W REV.

**DITCH LEGEND**  
 LEFT DITCH  
 RIGHT DITCH

**PIPE HYDRAULIC DATA**  
 DRAINAGE STRUCTURE NO. 97  
 DRAINAGE AREA = 10 HA  
 DESIGN FREQUENCY = 10 YRS  
 DESIGN DISCHARGE = 0.79 CMS  
 DESIGN HW ELEVATION = 316.60 M  
 100 YEAR DISCHARGE = 1.7 CMS  
 100 YEAR HW ELEVATION = 317.65 M  
 OVERTOPPING FREQUENCY = 25 YRS  
 OVERTOPPING DISCHARGE = 2.26 CMS  
 OVERTOPPING ELEVATION = 317.46 M

PI = 10+61.230  
 EL = 355.842 m  
 L = 22 m  
 K = 6

PI = 10+81.720  
 EL = 356.867 m  
 L = 18 m  
 K = 5

PI = 11+10.000  
 EL = 348.145 m  
 L = 15 m  
 K = 5

PI = 11+29.460  
 EL = 348.359 m  
 L = 20 m  
 K = 10

PI = 11+46.000  
 EL = 348.210 m  
 L = 10 m  
 K = 11

PI = 11+20.833  
 EL = 317.452 m  
 L = 40 m  
 K = 17

NOTE:  
 FOR -L- PLAN VIEW SEE SHEET 5

NOTE:  
 FOR -L- PLAN VIEW SEE SHEET 5

NOTE:  
 FOR -L- PLAN VIEW SEE SHEET 7

**PIPE HYDRAULIC DATA**  
 DRAINAGE STRUCTURE NO. 49  
 DRAINAGE AREA = 14 HA  
 DESIGN FREQUENCY = 25 YRS  
 DESIGN DISCHARGE = 0.34 CMS  
 DESIGN HW ELEVATION = 317.47 M  
 100 YEAR DISCHARGE = 0.37 CMS  
 100 YEAR HW ELEVATION = 317.52 M  
 OVERTOPPING FREQUENCY = 200 YRS  
 OVERTOPPING DISCHARGE = 0.57 CMS  
 OVERTOPPING ELEVATION = 317.80 M

**PIPE HYDRAULIC DATA**  
 DRAINAGE STRUCTURE NO. 55  
 DRAINAGE AREA = 43 HA  
 DESIGN FREQUENCY = 25 YRS  
 DESIGN DISCHARGE = 0.79 CMS  
 DESIGN HW ELEVATION = 347.74 M  
 100 YEAR DISCHARGE = 0.88 CMS  
 100 YEAR HW ELEVATION = 347.94 M  
 OVERTOPPING FREQUENCY = 100 YRS  
 OVERTOPPING DISCHARGE = 1.85 CMS  
 OVERTOPPING ELEVATION = 348.19 M

PI = 10+29.250  
 EL = 317.436 m  
 L = 40 m  
 K = 9

PI = 10+34.000  
 EL = 347.938 m  
 L = 22 m  
 K = 3

PI = 10+56.000  
 EL = 358.695 m  
 L = 20 m  
 K = 10

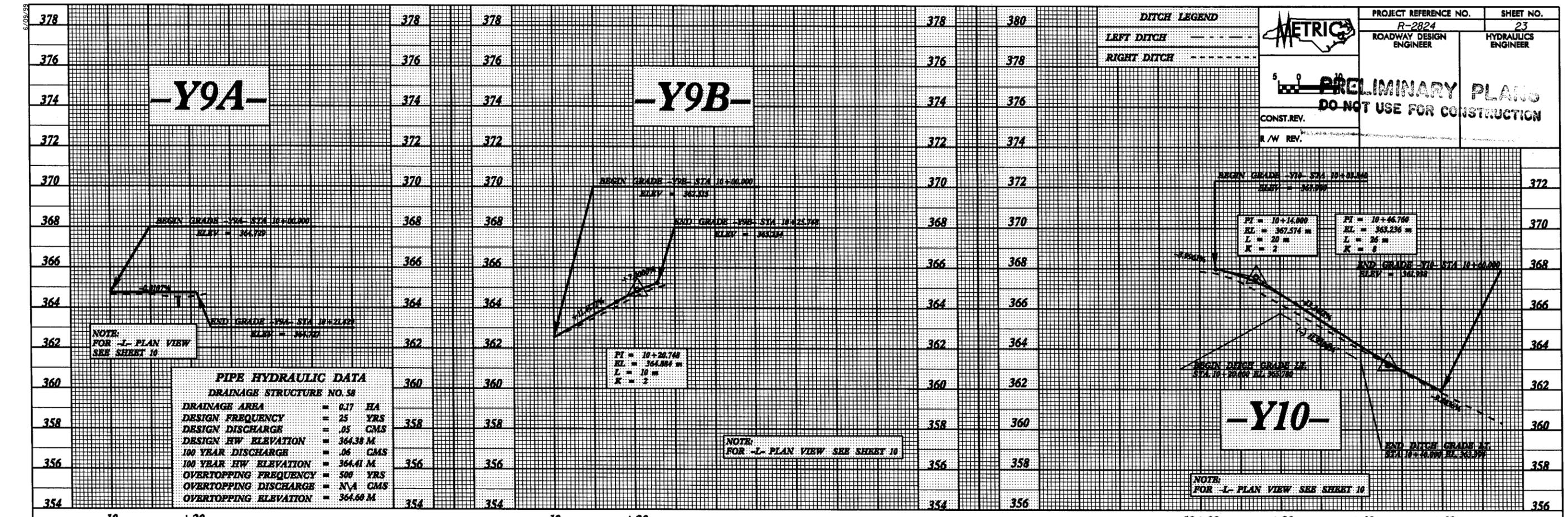
PI = 10+86.000  
 EL = 349.188 m  
 L = 32 m  
 K = 11

NOTE:  
 FOR -L- PLAN VIEW SEE SHEET 7

NOTE:  
 FOR -L- PLAN VIEW SEE SHEET 9

NOTE:  
 FOR -L- PLAN VIEW SEE SHEET 9

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**-Y9A-**

**-Y9B-**

**-Y10-**

NOTE:  
FOR -L- PLAN VIEW  
SEE SHEET 10

NOTE:  
FOR -L- PLAN VIEW SEE SHEET 10

NOTE:  
FOR -L- PLAN VIEW SEE SHEET 10

| PIPE HYDRAULIC DATA       |            |
|---------------------------|------------|
| DRAINAGE STRUCTURE NO. 58 |            |
| DRAINAGE AREA             | = 0.17 EA  |
| DESIGN FREQUENCY          | = 25 YRS   |
| DESIGN DISCHARGE          | = .05 CMS  |
| DESIGN HW ELEVATION       | = 364.38 M |
| 100 YEAR DISCHARGE        | = .06 CMS  |
| 100 YEAR HW ELEVATION     | = 364.41 M |
| OVERTOPPING FREQUENCY     | = 500 YRS  |
| OVERTOPPING DISCHARGE     | = N/A CMS  |
| OVERTOPPING ELEVATION     | = 364.60 M |

PI = 10+28.748  
EL = 364.884 m  
L = 10 m  
K = 2

PI = 10+14.000  
EL = 367.514 m  
L = 20 m  
K = 2

PI = 10+46.766  
EL = 363.236 m  
L = 26 m  
K = 8

| PIPE HYDRAULIC DATA       |            |
|---------------------------|------------|
| DRAINAGE STRUCTURE NO. 44 |            |
| DRAINAGE AREA             | = 0.04 EA  |
| DESIGN FREQUENCY          | = 25 YRS   |
| DESIGN DISCHARGE          | = 0.02 CMS |
| DESIGN HW ELEVATION       | = 369.30 M |
| 100 YEAR DISCHARGE        | = 0.02 CMS |
| 100 YEAR HW ELEVATION     | = 369.30 M |
| OVERTOPPING FREQUENCY     | = 500 YRS  |
| OVERTOPPING DISCHARGE     | = 0.08 CMS |
| OVERTOPPING ELEVATION     | = 369.60 M |

**-Y11A-**

**-Y11-**

PI = 11+06.190  
EL = 370.130 m  
L = 17 m  
K = 4

PI = 10+16.075  
EL = 372.561 m  
L = 10 m  
K = 2

NOTE:  
FOR -L- PLAN VIEW SEE SHEET 11

NOTE:  
FOR -L- PLAN VIEW SEE SHEET 11

| DITCH LEGEND |     |
|--------------|-----|
| LEFT DITCH   | --- |
| RIGHT DITCH  | --- |



| PROJECT REFERENCE NO.   | SHEET NO.           |
|-------------------------|---------------------|
| R-2824                  | 23                  |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

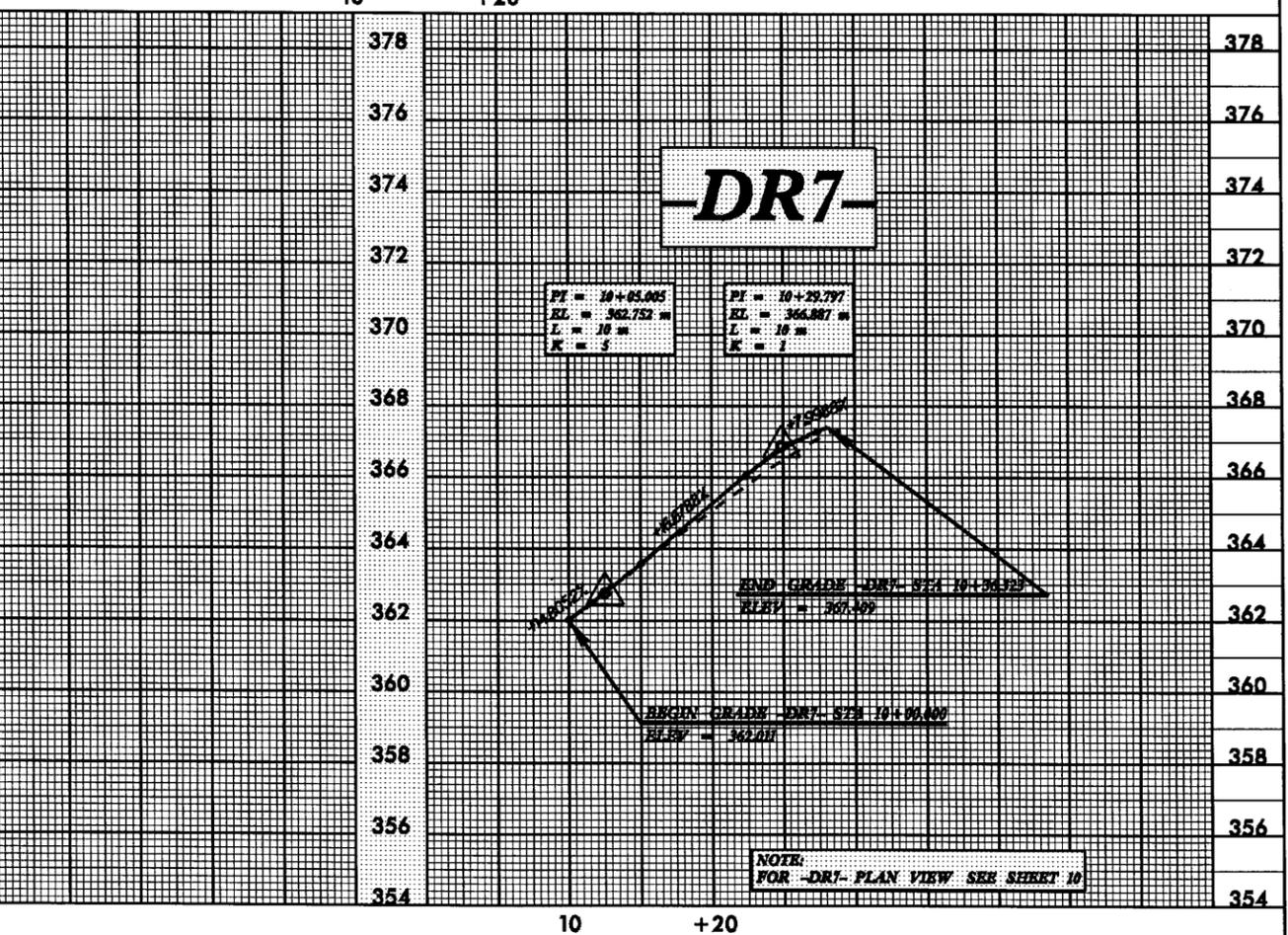
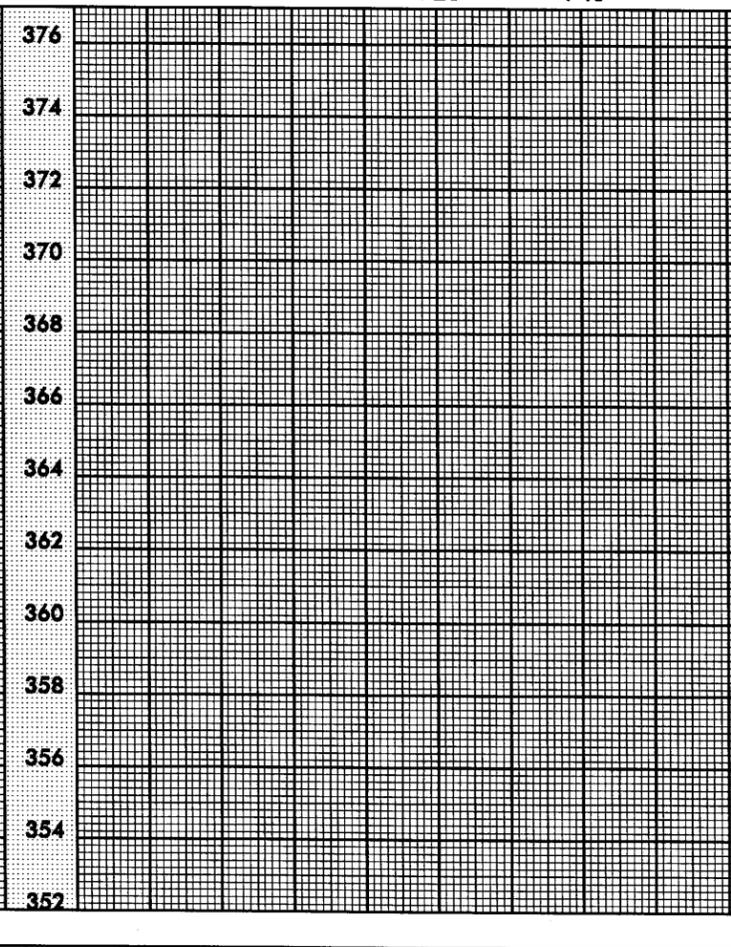
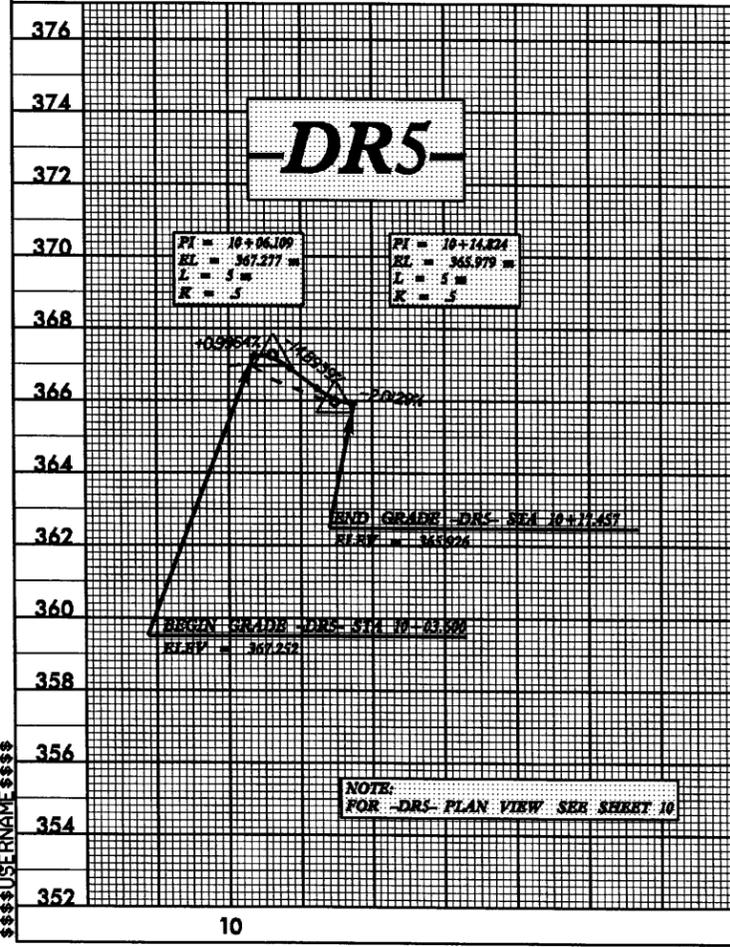
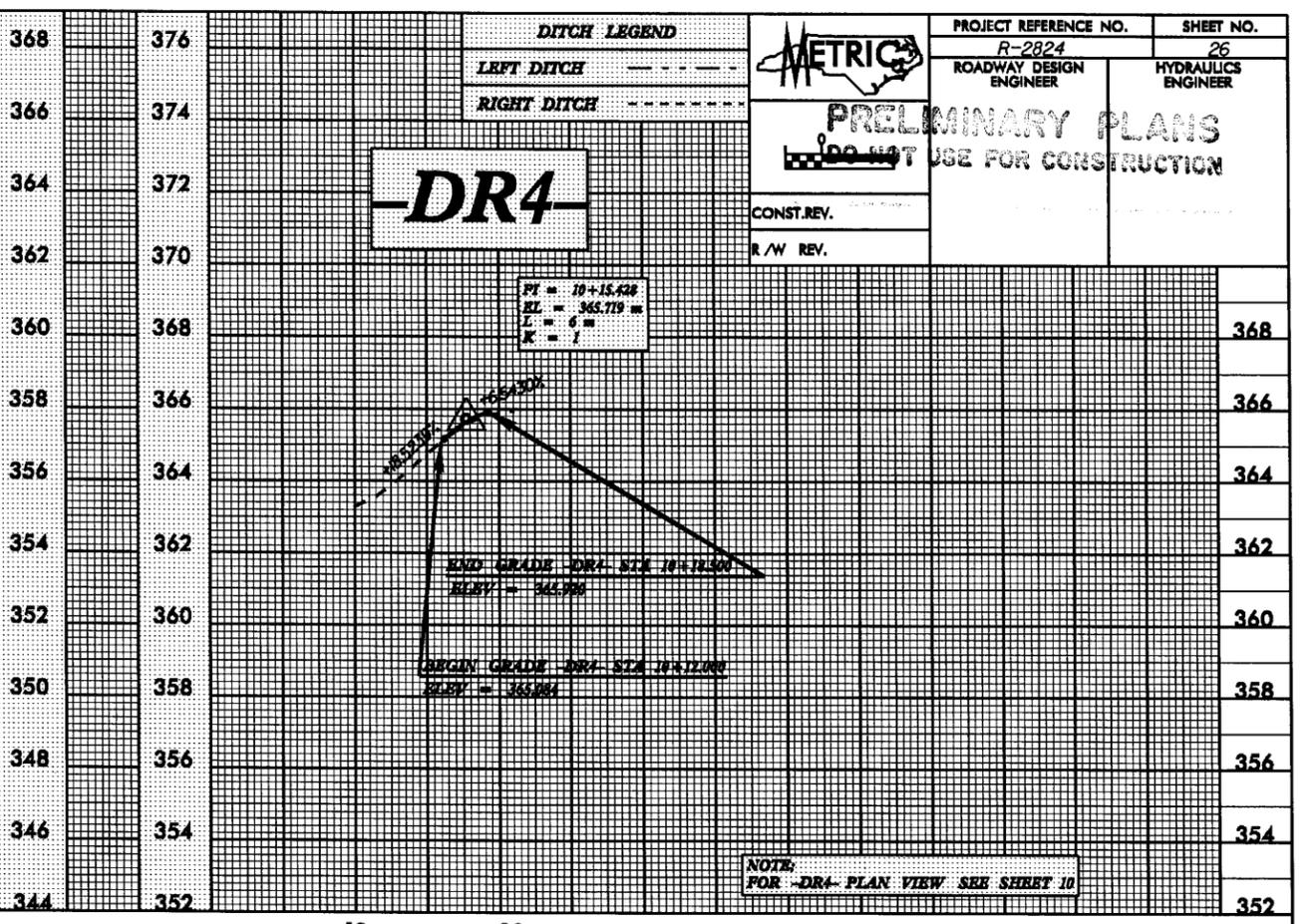
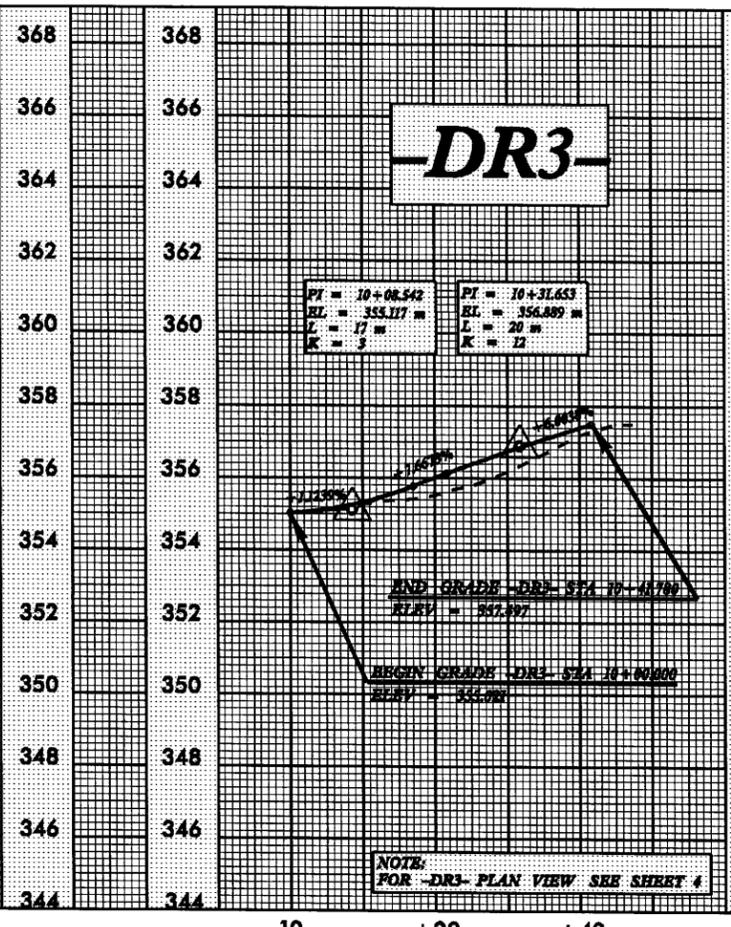
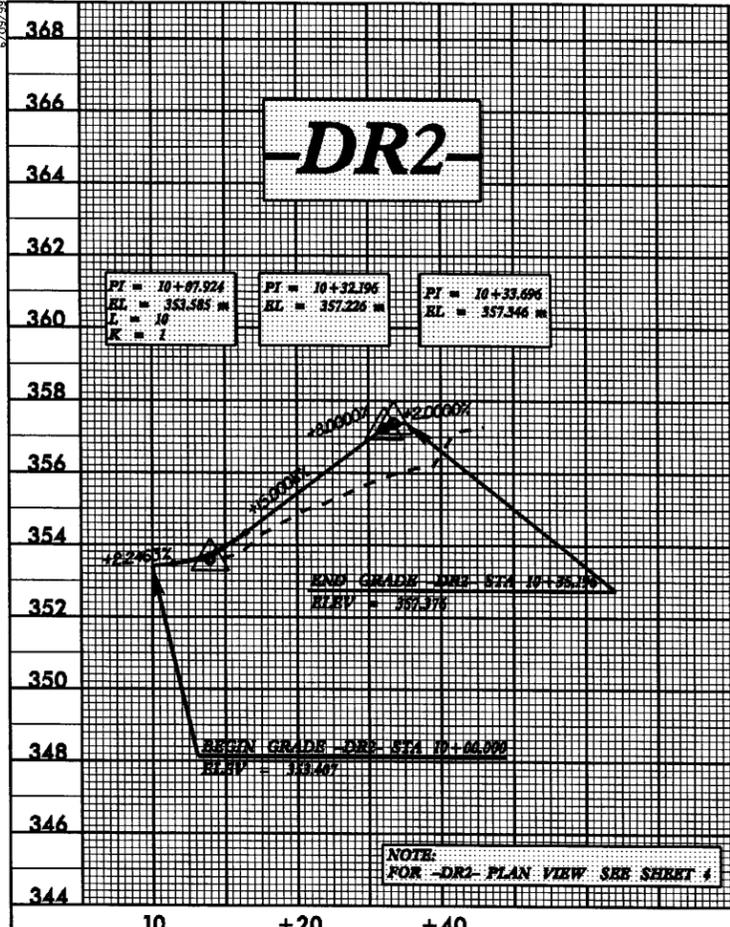
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

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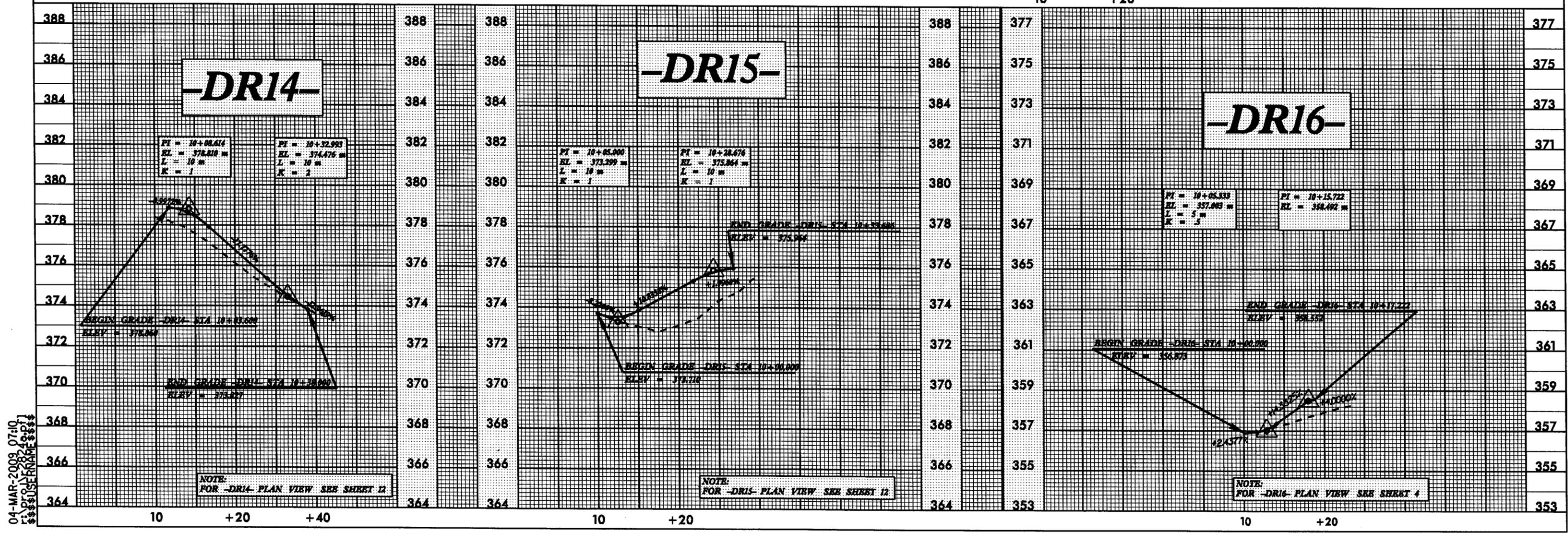
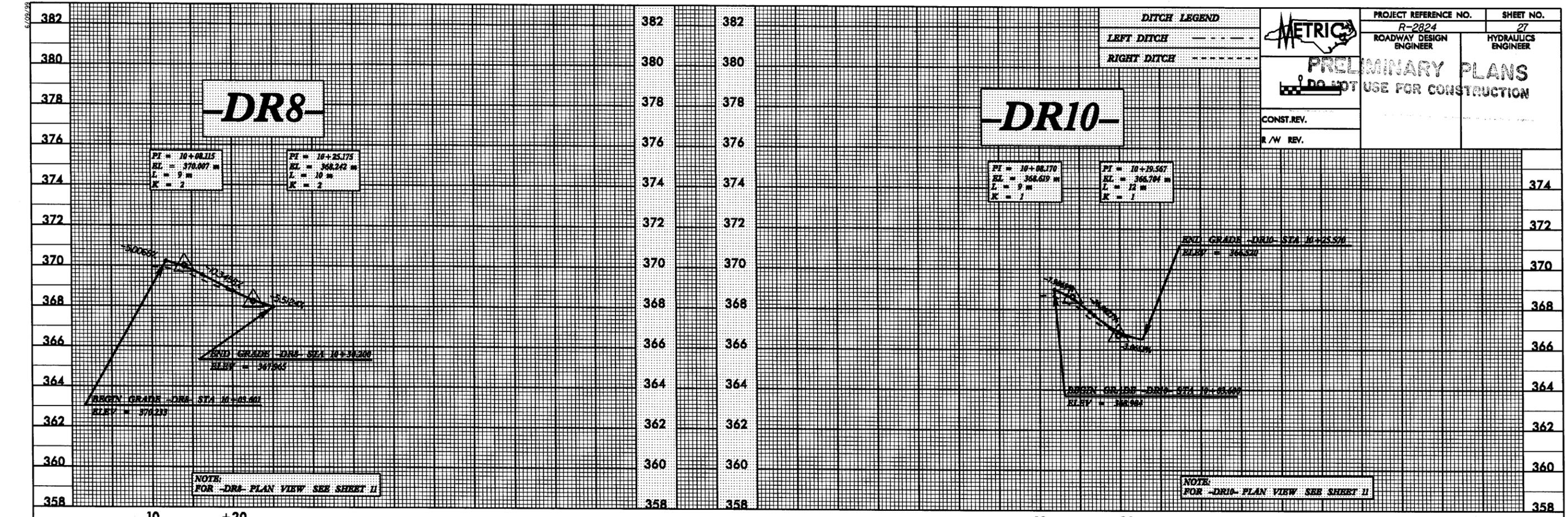




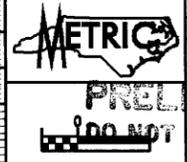
**DITCH LEGEND**  
 LEFT DITCH  
 RIGHT DITCH



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 \$\$\$USE GRADE \$\$\$



04-MAR-2009 07:10  
 1:30 PM  
 1:30 PM  
 1:30 PM



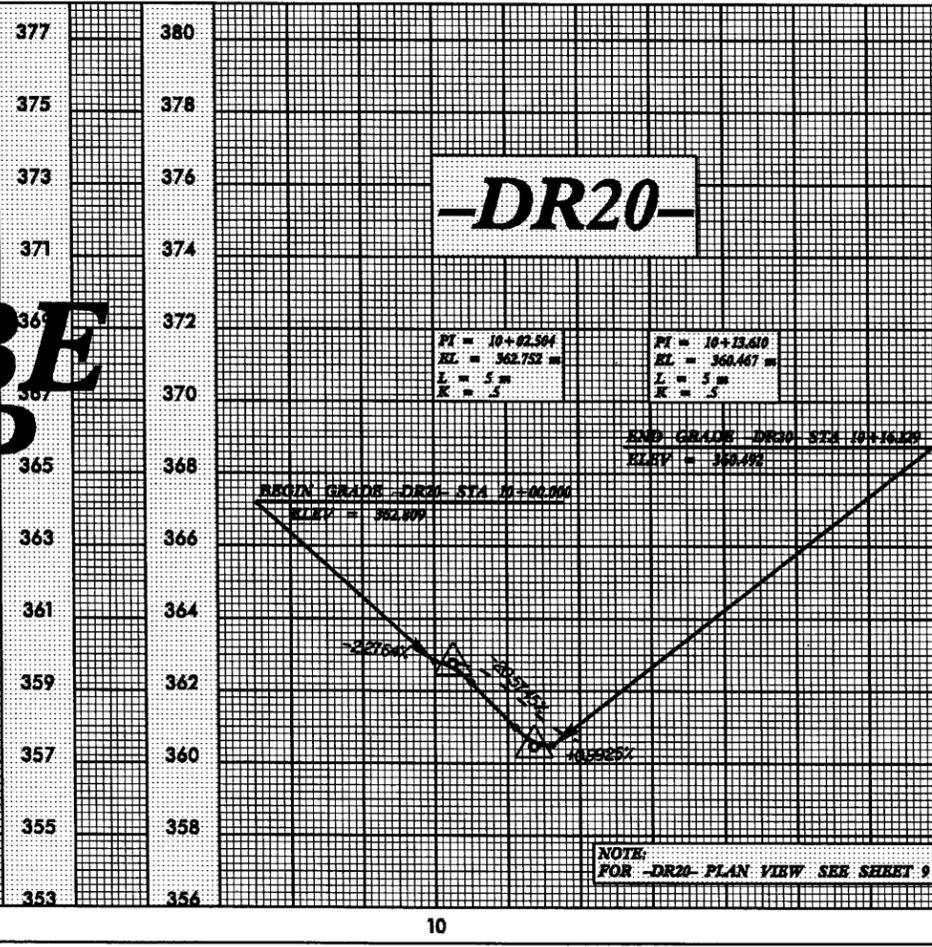
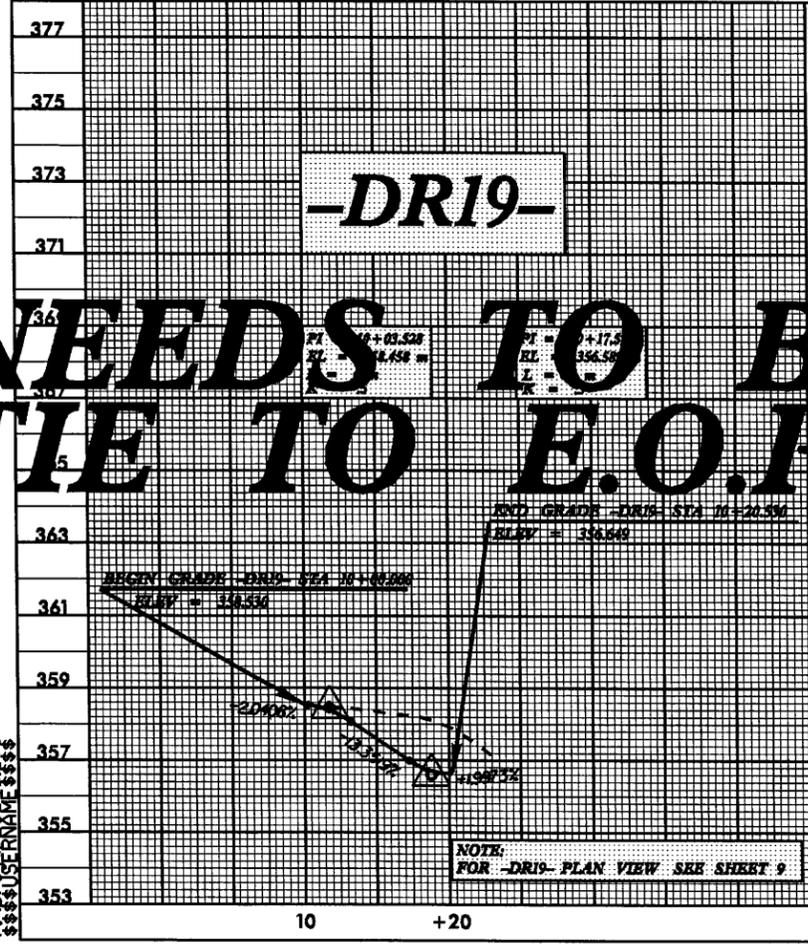
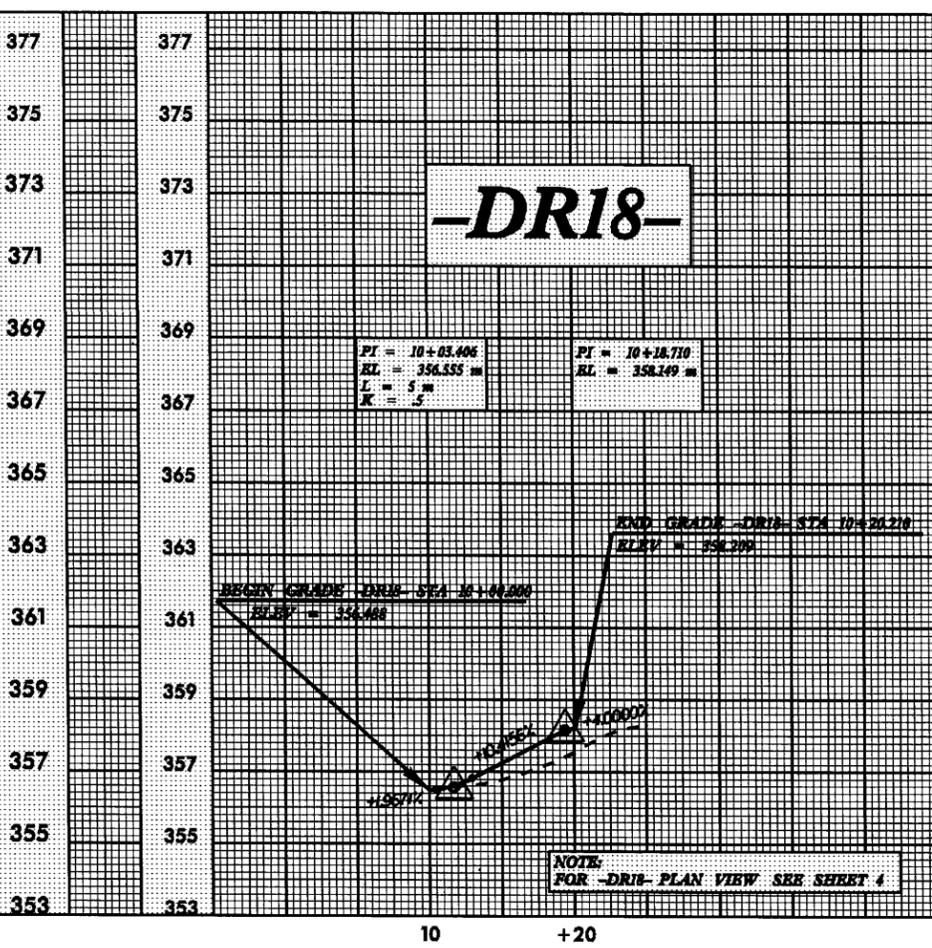
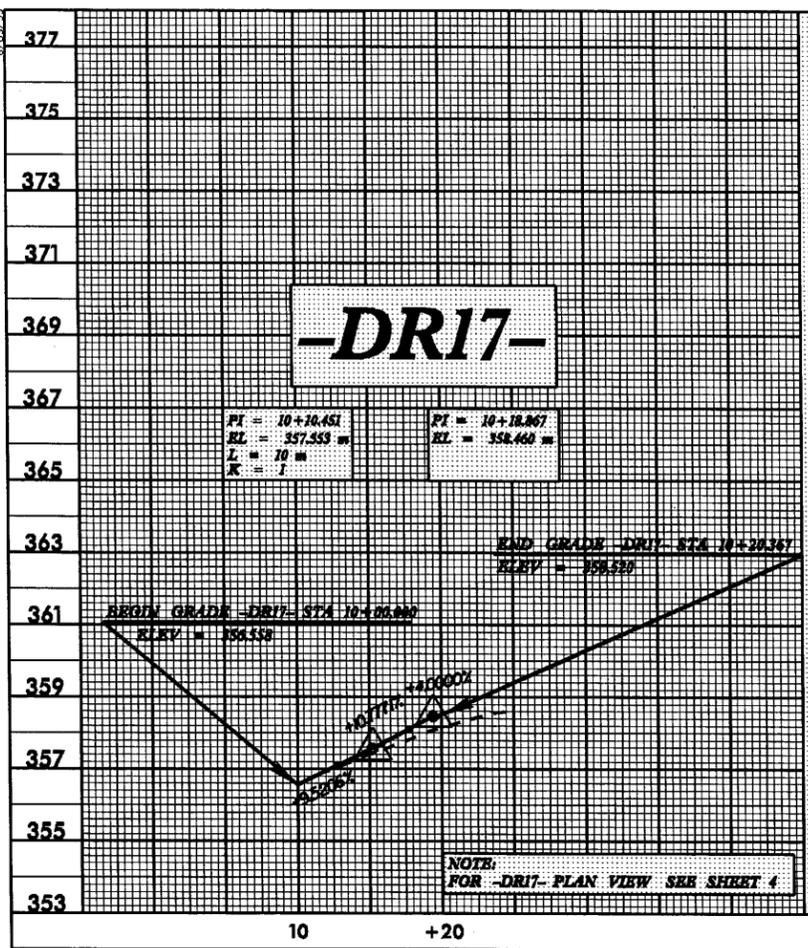
PROJECT REFERENCE NO. R-2824  
 ROADWAY DESIGN ENGINEER

SHEET NO. 28  
 HYDRAULICS ENGINEER

**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

CONST. REV.  
 R/W REV.

**DITCH LEGEND**  
 LEFT DITCH  
 RIGHT DITCH



**NEEDS TO BE TIE TO E.O.P**

04-MAR-2008 07:10  
 \$\$\$\$\$\$  
 \$\$\$USE PLOTTER\$\$\$\$