STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

July 31, 2008

US Army Corps of Engineers
Regional Field Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, NC 27587

ATTENTION: John Thomas
NCDOT Coordinator, Division 9

Dear Sir:

Subject: **Application for Section 404 Nationwide Permits 23, 33, and 13 and Section 401 Water Quality Certification** for the replacement of Bridge Nos. 221 and 222 over Muddy Creek on US 421, Forsyth County. Federal Aid Project Number BRZ-1844(1), WBS No. 34409.1.1, State Project No. 6.628001T, Division 9, T.I.P No. B-4507 (R-2247CC).

$240.00 Debit from WBS Element 34409.1.1.

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge Nos. 221 and 222 over Muddy Creek. The existing bridges are currently in poor condition (bridge sufficiency ratings of 48.6 and 64.4 out of a possible 100) and in need of replacement. The new bridges are intended to provide a safer bridge structure consistent with federal and state bridge standards.

Each proposed bridge is a three span prestressed concrete girder bridge on concrete caps and drilled piers. The overall length of each bridge will be 212 feet with a total bridge width of 80.25 feet. The spans for each bridge are approximately 85 feet, 85 feet, and 42 feet each. The project will replace the current bridges on their existing location and traffic will be maintained through on-site detour using the existing road during construction. Please see the enclosed copies of the permit drawings, design plans, and Pre-Construction Notification (PCN) for the above-referenced project. The Programmatic Categorical Exclusion (PCE) was completed for this project in June 2008 and distributed shortly thereafter. Additional copies of the PCE are available upon request.

This project is included in the scope of R-2247, the Western Section of the Winston-Salem Northern Beltway, and is covered in the 2007 Supplemental Final Environmental Impact Statement (SFEIS)/Final Environmental Impact Statement (FEIS) and 2008 Record of Decision (ROD) for the Western Section/Eastern Section of the Winston-Salem Northern Beltway (TIP Projects R-2247/U-2579 and U-2579A). This project phase, B-4507 (R-2247CC), which consists only of replacing the existing US 421 bridges over Muddy Creek on their existing alignment with phased construction, will be the first phase let of R-2247. The phased permit for R-2247 has not been issued yet, and B-4507 (R-2247CC) cannot be delayed until the R-2247 phased permit is complete, because the bridges are in poor shape and

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
NATURAL ENVIRONMENT UNIT
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-715-1334 or
919-715-1335

FAX: 919-715-5501

WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD. SUITE 240
RALEIGH NC 27604

need to be replaced soon. (All other phases of R-2247 are post-year in the Draft 2008-2015 STIP). Since there will not be a phased permit in place before B-4507's (R-2247CC's) letting, the Federal Highway Administration (FHWA), United States Army Corps of Engineers (USACE), North Carolina Division of Water Quality (NCDWQ), and NCDOT agreed that a PCE, that documents the impacts of B-4507 (R-2247CC) alone, should be produced in order to facilitate permit issuance for the bridge replacement. The PCE was completed and signed on June 9, 2008.

IMPACTS TO WATERS OF THE UNITED STATES

The project is located in the Yadkin River Basin (NCDWQ subbasin 03-07-04) and USGS hydrologic unit 03040201. Three jurisdictional perennial streams, Muddy Creek and two unnamed tributaries (UT) to Muddy Creek, are located in the project study area. They are currently classified by the NC Division of Water Quality (DWQ) as C waters. All are given a DWQ stream index number of 12-94-(0.5). No designated Outstanding Resource Waters (ORW), High Quality Waters (HQW), Water Supply I (WS-I), or Water Supply (WS-II), waters occur within 1.0 mile of the study corridor. Muddy Creek and its tributaries are listed on the North Carolina Division of Water Quality's (NCDWQ) 2006 Final 303(d) List of Impaired Waters due to impaired biological integrity. Potential sources include urban runoff including stormwater sewer and minor non-municipal discharges. A jurisdictional determination letter for all water resources within the R-2247 study area (including B-4507) was issued by the US Army Corps of Engineers on August 28, 2003.

Permanent Impacts

There will be 186 feet of surface water impacts (bank stabilization) to Muddy Creek from bridge construction (Site 2). The riprap will be installed on the banks to prevent bank erosion and scour. There will also be 47 feet of surface water impacts to one of the UTs to Muddy Creek from the reinforced concrete pipe (RCP) extension (Site 1) and 32 feet of surface water impacts to the other UT to Muddy Creek for riprap installation of the entire channel width (Sites 3 and 4). The permanent impacts at Sites 3 and 4 are necessary to prevent stream channel erosion from the extremely steep gradient from pipe outlets.

Temporary Impacts

There will be 80 feet (0.04 acre) of temporary impacts to Muddy Creek due to the construction of the temporary causeway for bridge construction (Site 2). These temporary impacts occur within the same reach of stream as the permanent impacts. There will also be 12 feet (0.01 acre) of temporary impacts to a UT to Muddy Creek downstream of the RCP extension (Site 1).

Utility Impacts

No utility impacts are anticipated from project construction.

Bridge Demolition

The existing bridges were constructed in 1958 and are 213 feet in length. They consist of five spans 42.5 feet each. The superstructure for each bridge consists of a reinforced concrete deck on I-beams. The existing substructure consists of reinforced concrete caps on prestressed concrete piles for bents #1 and #4 and reinforced post and beam for bents #2 and #3. The existing bridges will be removed without dropping components into Muddy Creek. Best Management Practices for Bridge Demolition and Removal will be implemented during the demolition of this bridge.

RESTORATION PLAN

Following construction of the bridge, all material used in the construction of the structure will be removed. The impact area associated with the culvert is expected to recover naturally, since the natural streambed and plant material will not be removed. NCDOT does not propose any additional planting in this area. Class II riprap and filter fabric will be used for bank stabilization. Pre-project elevations will be restored.

REMOVAL AND DISPOSAL PLAN

The contractor will be required to submit a reclamation plan for the removal of and disposal of all material off-site at an upland location. The contractor will use excavation equipment for removal of any earthen material. Heavy–duty trucks, dozers, cranes and various other pieces of mechanical equipment necessary for construction of roadways, bridges, and culverts will be used on site. All material placed in the stream will be removed from the stream at that time. The contractor will have the option of reusing any of the materials that the engineer deems suitable in the construction of project. After the erosion control devices are no longer needed, all temporary materials will become the property of the contractor.

FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered, and Proposed Threatened are protected under the provisions of the Endangered Species Act of 1973, as amended. As of January 31, 2008, the US Fish and Wildlife Service (USFWS) lists three federally protected species for Forsyth County (Table 1).

Table 1. Federally Protected Species in Forsyth County, NC

Common Name	Scientific Name	Federal Status	Biological Conclusion	Habitat Present
Bog turtle	*Glyptemys muhlenbergii*	T (S/A)*	Not Required	No
Red-cockaded woodpecker	*Picoides borealis*	Endangered	No Effect	No
Small-anthered bittercress	*Cardamine micranthera*	Endangered	No Effect	No

* Threatened due to Similarity of Appearance

No suitable habitat for the three listed species in Table 1 is found in the project study area. Therefore the biological conclusion is "No Effect" (not required for bog turtle) for these species. A review of the Natural Heritage Program database in July 2008 revealed no occurrences of these species within 1.0 mile of the project study area.

One species (bald eagle) was officially delisted from the federally protected species list on August 8, 2007 (CFR 50 Part 17). While never officially listed for Forsyth County, the bald eagle still remains protected under the Bald and Golden Eagle Protection Act. No suitable habitat for the bald eagle exists within or 1.0 mile of the project study area.

MITIGATION OPTIONS

Avoidance and Minimization and Compensatory Mitigation

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining,

unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were incorporated as part of the project design.

According to the Clean Water Act (CWA) §404(b)(1) guidelines, NCDOT must avoid, minimize, and mitigate, in sequential order, impacts to waters of the U.S. The following is a list of the project's jurisdictional stream avoidance/minimization activities proposed or completed by NCDOT:

Avoidance/Minimization

- Best Management Practices for Protection of Surface Waters will be implemented.
- The bridges will completely span Muddy Creek.
- The on-site detour will use existing road.
- Bridges will be replaced on existing alignment.
- A preformed scour hole will be implemented.

Compensatory Mitigation

No compensatory mitigation for permanent stream impacts is proposed due to the impacts being minimal. All permanent impacts to Muddy Creek (186 feet) are for bank stabilization underneath the bridges and do not constitute loss of waters of the U.S. Only 47 feet (RCP extension in Site 1) and 32 feet (riprap channel at Site 3 and 4) of permanent impacts will occur in two UTs to Muddy Creek.

SCHEDULE

The project calls for a letting of January 20, 2009 (review date of December 2, 2008) with a date of availability of February 24, 2009. It is expected that the contractor will choose to start construction in March 2009.

REGULATORY APPROVALS

Section 404 Permit: The project has been processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR 771.115(b). The NCDOT requests that 79 feet of stream impact be authorized by a Nationwide Permit 23 (72 FR 11092; March 19, 2007). We are also requesting the issuance of a Nationwide Permit 33 for the work associated with temporary impacts and a Nationwide Permit 13 for bank stabilization (186 feet).

Section 401 Certification: We anticipate 401 General Certification numbers 3701, 3688, and 3689 will apply to this project. This project will impact greater than 40 linear feet of stream, requiring written concurrence. In accordance with 15A NCAC 2H, Section .0500(a) and 15A NCAC 2B.0200 we are providing five copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their review. In compliance with Section 143-215.3D(e) of the NCAC we will provide $240.00 to act as payment for processing the Section 401 permit 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 Greg Price at 715-5533.

Sincerely,

E. L. Lusk

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

w/attachment

Mr. Brian Wrenn, NCDWQ (5 Copies)
Ms. Marla Chambers, NCWRC
Ms. Marella Buncick, USFWS

w/o attachment (see permits website for attachments)

Dr. David Chang, P.E., Hydraulics
Mr. Mark Staley, Roadside Environmental
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, P.E., Project Services Unit
Mr. S. P. Ivey, P.E., Division Engineer
Mr. Kent Boyer, DEO
Mr. Jay Bennett, P.E., Roadway Design
Mr. Art McMillan, P.E., Highway Design
Mr. Scott McLendon, USACE, Wilmington
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Ms. Missy Dickens, PDEA Project Planning Engineer

Office Use Only: Form Version March 05

USACE Action ID No. _____ **DWQ No.** _____

(If any particular item is not applicable to this project, please enter "Not Applicable" or "N/A".)

I. Processing

1. Check all of the approval(s) requested for this project:
   - ☒ Section 404 Permit
   - ☐ Section 10 Permit
   - ☒ 401 Water Quality Certification
   - ☐ Riparian or Watershed Buffer Rules
   - ☐ Isolated Wetland Permit from DWQ
   - ☐ Express 401 Water Quality Certification

2. Nationwide, Regional or General Permit Number(s) Requested: NW 23, 33, & 13

3. If this notification is solely a courtesy copy because written approval for the 401 Certification is not required, check here: ☐

4. If payment into the North Carolina Ecosystem Enhancement Program (NCEEP) is proposed for mitigation of impacts, attach the acceptance letter from NCEEP, complete section VIII, and check here: ☐

5. If your project is located in any of North Carolina's twenty coastal counties (listed on page 4), and the project is within a North Carolina Division of Coastal Management Area of Environmental Concern (see the top of page 2 for further details), check here: ☐

II. Applicant Information

1. Owner/Applicant Information
   Name: North Carolina Department of Transportation
   Mailing Address: Gregory J. Thorpe, Ph.D., Manager
   Project Development and Environmental Analysis Branch
   1598 Mail Service Center
   Raleigh, NC 27699-1598
   Telephone Number: 919-733-3141 Fax Number: 919-733-9794
   E-mail Address: gthorpe@dot.state.nc.us

2. Agent/Consultant Information (A signed and dated copy of the Agent Authorization letter must be attached if the Agent has signatory authority for the owner/applicant.)
   Name: _____
   Company Affiliation: _____
   Mailing Address: _____
   _____
   _____
   _____
   Telephone Number: _____ Fax Number: _____
   E-mail Address: _____

III. Project Information

Attach a **vicinity map** clearly showing the location of the property with respect to local landmarks such as towns, rivers, and roads. Also provide a detailed **site plan** showing property boundaries and development plans in relation to surrounding properties. Both the vicinity map and site plan must include a scale and north arrow. The specific footprints of all buildings, impervious surfaces, or other facilities must be included. If possible, the maps and plans should include the appropriate USGS Topographic Quad Map and NRCS Soil Survey with the property boundaries outlined. Plan drawings, or other maps may be included at the applicant's discretion, so long as the property is clearly defined. For administrative and distribution purposes, the USACE requires information to be submitted on sheets no larger than 11 by 17-inch format; however, DWQ may accept paperwork of any size. DWQ prefers full-size construction drawings rather than a sequential sheet version of the full-size plans. If full-size plans are reduced to a small scale such that the final version is illegible, the applicant will be informed that the project has been placed on hold until decipherable maps are provided.

1. Name of project: Replace Bridge Nos. 221 and 222 over Muddy Creek on US 421.

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-4507 (R-2247CC)

3. Property Identification Number (Tax PIN): N/A

4. Location
   County: Forsyth Nearest Town: Winston-Salem
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers/names, landmarks, etc.): Site is located on US 421 over Muddy Creek.

5. Site coordinates (For linear projects, such as a road or utility line, attach a sheet that separately lists the coordinates for each crossing of a distinct waterbody.)
   Decimal Degrees (6 digits minimum): 80.365307 °N 36.073776 °W

6. Property size (acres): Please refer to attached drawings.

7. Name of nearest receiving body of water: Muddy Creek and its UTs

8. River Basin: Yadkin
   (Note – this must be one of North Carolina's seventeen designated major river basins. The River Basin map is available at http://h2o.enr.state.nc.us/admin/maps/.)

9. Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: The local area surrounding the proposed project consists of gently rolling hills and land use is best described as residential development, agriculture and natural forest vegetation.

10. Describe the overall project in detail, including the type of equipment to be used: NCDOT proposes to replace Bridge Nos. 221 and 222 over Muddy Creek and extend a reinforced concrete pipe (RCP) on UT to Muddy Creek on US 421. Heavy construction equipment such as cranes, excavators and dump trucks will be utilized during construction.

11. Explain the purpose of the proposed work: The existing bridges were constructed in 1958 and received a sufficiency rating of 48.6 and 64.4 out of a possible 100 for a new structure during the last bridge inspection. Based on these ratings, the bridges are considered functionally obsolete and structurally deficient. The project proposes to replace the existing bridges, resulting in safer transportation.

IV. Prior Project History

If jurisdictional determinations and/or permits have been requested and/or obtained for this project (including all prior phases of the same subdivision) in the past, please explain. Include the USACE Action ID Number, DWQ Project Number, application date, and date permits and certifications were issued or withdrawn. Provide photocopies of previously issued permits, certifications or other useful information. Describe previously approved wetland, stream and buffer impacts, along with associated mitigation (where applicable). If this is a NCDOT project, list and describe permits issued for prior segments of the same T.I.P. project, along with construction schedules. A jurisdictional determination letter was issued for streams on this project by the USACE on August 28, 2003 (Action ID # 200320170).

V. Future Project Plans

Are any future permit requests anticipated for this project? If so, describe the anticipated work, and provide justification for the exclusion of this work from the current application.
N/A

VI. Proposed Impacts to Waters of the United States/Waters of the State

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to wetlands, open water, and stream channels associated with the project. Each impact must be listed separately in the tables below (e.g., culvert installation should be listed separately from riprap dissipater pads). Be sure to indicate if an impact is temporary. All proposed impacts, permanent and temporary, must be listed, and must be labeled and clearly identifiable on an accompanying site plan. All wetlands and waters, and all streams (intermittent and perennial) should be shown on a delineation map, whether or not impacts are proposed to these systems. Wetland and stream evaluation and delineation forms should be included as appropriate. Photographs may be included at the applicant's discretion. If this proposed impact is strictly for wetland or stream mitigation, list and describe the impact in Section VIII below. If additional space is needed for listing or description, please attach a separate sheet.

1. Provide a written description of the proposed impacts: Approximately 265 linear feet linear feet of warm perennial streams will be impacted resulting from bridge construction. Another 12 linear feet for UT to Muddy Creek will be temporarily impacted.

2. Individually list wetland impacts. Types of impacts include, but are not limited to mechanized clearing, grading, fill, excavation, flooding, ditching/drainage, etc. For dams, separately list impacts due to both structure and flooding.

Wetland Impact Site Number (indicate on map)	Type of Impact	Type of Wetland (e.g., forested, marsh, herbaceous, bog, etc.)	Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Area of Impact (acres)
Total Wetland Impact (acres)					

3. List the total acreage (estimated) of all existing wetlands on the property: N/A

4. Individually list all intermittent and perennial stream impacts. Be sure to identify temporary impacts. Stream impacts include, but are not limited to placement of fill or culverts, dam construction, flooding, relocation, stabilization activities (e.g., cement walls, rip-rap, crib walls, gabions, etc.), excavation, ditching/straightening, etc. If stream relocation is proposed, plans and profiles showing the linear footprint for both the original and relocated streams must be included. To calculate acreage, multiply length X width, then divide by 43,560.

Stream Impact Number (indicate on map)	Stream Name	Type of Impact	Perennial or Intermittent?	Average Stream Width Before Impact	Impact Length (linear feet)	Area of Impact (acres)
Site 1 (Perm)	UT to Muddy Creek	RCP extension	Perennial	3 feet	47	0.01
Site 1 (Temp)	UT to Muddy Creek	RCP extension	Perennial	3 feet	12	0.01
Site 2 (Perm)	Muddy Creek	Bank stabilization	Perennial	50 feet	186	0.01*
Site 2 (Temp)	Muddy Creek	Temp causeway for bridge construction	Perennial	50 feet	80**	0.04
Site 3 (Perm)	UT to Muddy Creek	Riprap fill in channel	Perennial	3 feet	10	0.01
Site 4 (Perm)	UT to Muddy Creek	Riprap fill in channel	Perennial	3 feet	22	0.01
Total Stream Impact (by length and acreage)					277	0.09

* Impacts do not cover entire width of channel.

** These temporary impacts are in same reach of stream as permanent impacts and therefore not calculated in total length.

5. Individually list all open water impacts (including lakes, ponds, estuaries, sounds, Atlantic Ocean and any other water of the U.S.). Open water impacts include, but are not limited to fill, excavation, dredging, flooding, drainage, bulkheads, etc.

Open Water Impact Site Number (indicate on map)	Name of Waterbody (if applicable)	Type of Impact	Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.)	Area of Impact (acres)
N/A				
Total Open Water Impact (acres)				0

6. List the cumulative impact to all Waters of the U.S. resulting from the project:

Stream Impact (acres):	0.09
Wetland Impact (acres):	NA
Open Water Impact (acres):	NA
Total Impact to Waters of the U.S. (acres)	0.09
Total Stream Impact (linear feet):	277

7. Isolated Waters
Do any isolated waters exist on the property? ☐ Yes ☒ No
Describe all impacts to isolated waters, and include the type of water (wetland or stream) and the size of the proposed impact (acres or linear feet). Please note that this section only applies to waters that have specifically been determined to be isolated by the USACE.
N/A

8. Pond Creation
If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.
Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands
Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.): N/A
Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.): N/A
Current land use in the vicinity of the pond: N/A
Size of watershed draining to pond: N/A Expected pond surface area: N/A

VII. Impact Justification (Avoidance and Minimization)

Specifically describe measures taken to avoid the proposed impacts. It may be useful to provide information related to site constraints such as topography, building ordinances, accessibility, and financial viability of the project. The applicant may attach drawings of alternative, lower-impact site layouts, and explain why these design options were not feasible. Also discuss how impacts were minimized once the desired site plan was developed. If applicable, discuss construction techniques to be followed during construction to reduce impacts.

See cover letter.

VIII. Mitigation

DWQ - In accordance with 15A NCAC 2H .0500, mitigation may be required by the NC Division of Water Quality for projects involving greater than or equal to one acre of impacts to freshwater wetlands or greater than or equal to 150 linear feet of total impacts to perennial streams.

USACE – In accordance with the Final Notice of Issuance and Modification of Nationwide Permits, published in the Federal Register on January 15, 2002, mitigation will be required when necessary to ensure that adverse effects to the aquatic environment are minimal. Factors including size and type of proposed impact and function and relative value of the impacted aquatic resource will be considered in determining acceptability of appropriate and practicable mitigation as proposed. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland and/or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferable in the same watershed.

If mitigation is required for this project, a copy of the mitigation plan must be attached in order for USACE or DWQ to consider the application complete for processing. Any application lacking a required mitigation plan or NCEEP concurrence shall be placed on hold as incomplete. An applicant may also choose to review the current guidelines for stream restoration in DWQ's Draft Technical Guide for Stream Work in North Carolina, available at http://h2o.enr.state.nc.us/ncwetlands/strmgide.html.

1. Provide a brief description of the proposed mitigation plan. The description should provide as much information as possible, including, but not limited to: site location (attach directions and/or map, if offsite), affected stream and river basin, type and amount (acreage/linear feet) of mitigation proposed (restoration, enhancement, creation, or preservation), a plan view, preservation mechanism (e.g., deed restrictions, conservation easement, etc.), and a description of the current site conditions and proposed method of construction. Please attach a separate sheet if more space is needed.
   Compensatory mitigation for permanent stream impacts is not proposed (see cover letter).

2. Mitigation may also be made by payment into the North Carolina Ecosystem Enhancement Program (NCEEP). Please note it is the applicant's responsibility to contact the NCEEP at (919) 715-0476 to determine availability, and written approval from the NCEEP indicating that they are will to accept payment for the mitigation must be attached to this form. For additional information regarding the application process for the NCEEP, check the NCEEP website at http://h2o.enr.state.nc.us/wrp/index.htm. If use of the NCEEP is proposed, please check the appropriate box on page five and provide the following information:
   Amount of stream mitigation requested (linear feet):_____
   Amount of buffer mitigation requested (square feet):_____

Amount of Riparian wetland mitigation requested (acres):_____
Amount of Non-riparian wetland mitigation requested (acres):_____
Amount of Coastal wetland mitigation requested (acres):_____

IX. Environmental Documentation (required by DWQ)

1. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land? Yes ☒ No ☐

2. If yes, does the project require preparation of an environmental document pursuant to the requirements of the National or North Carolina Environmental Policy Act (NEPA/SEPA)? Note: If you are not sure whether a NEPA/SEPA document is required, call the SEPA coordinator at (919) 733-5083 to review current thresholds for environmental documentation. Yes ☒ No ☐

3. If yes, has the document review been finalized by the State Clearinghouse? If so, please attach a copy of the NEPA or SEPA final approval letter. Yes ☒ No ☐

X. Proposed Impacts on Riparian and Watershed Buffers (required by DWQ)

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to required state and local buffers associated with the project. The applicant must also provide justification for these impacts in Section VII above. All proposed impacts must be listed herein, and must be clearly identifiable on the accompanying site plan. All buffers must be shown on a map, whether or not impacts are proposed to the buffers. Correspondence from the DWQ Regional Office may be included as appropriate. Photographs may also be included at the applicant's discretion.

1. Will the project impact protected riparian buffers identified within 15A NCAC 2B .0233 (Neuse), 15A NCAC 2B .0259 (Tar-Pamlico), 15A NCAC 02B .0243 (Catawba) 15A NCAC 2B .0250 (Randleman Rules and Water Supply Buffer Requirements), or other (please identify_____)? Yes ☐ No ☒

2. If "yes", identify the square feet and acreage of impact to each zone of the riparian buffers. If buffer mitigation is required calculate the required amount of mitigation by applying the buffer multipliers.

Zone*	Impact (square feet)	Multiplier	Required Mitigation
1		3	
2		1.5	
Total			

* Zone 1 extends out 30 feet perpendicular from the top of the near bank of channel; Zone 2 extends an additional 20 feet from the edge of Zone 1.

If buffer mitigation is required, please discuss what type of mitigation is proposed (i.e., Donation of Property, Riparian Buffer Restoration / Enhancement, or Payment into the Riparian Buffer

Restoration Fund). Please attach all appropriate information as identified within 15A NCAC 2B .0242 or .0244, or .0260.

XI. Stormwater (required by DWQ)

Describe impervious acreage (existing and proposed) versus total acreage on the site. Discuss stormwater controls proposed in order to protect surface waters and wetlands downstream from the property. If percent impervious surface exceeds 20%, please provide calculations demonstrating total proposed impervious level.

N/A

XII. Sewage Disposal (required by DWQ)

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.

N/A

XIII. Violations (required by DWQ)

Is this site in violation of DWQ Wetland Rules (15A NCAC 2H .0500) or any Buffer Rules?
Yes ☐ No ☒

Is this an after-the-fact permit application? Yes ☐ No ☒

XIV. Cumulative Impacts (required by DWQ)

Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality? Yes ☐ No ☒
If yes, please submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent North Carolina Division of Water Quality policy posted on our website at http://h2o.enr.state.nc.us/ncwetlands. If no, please provide a short narrative description:

N/A

XV. Other Circumstances (Optional):

It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on work schedules (e.g., draw-down schedules for lakes, dates associated with Endangered and Threatened Species, accessibility problems, or other issues outside of the applicant's control).

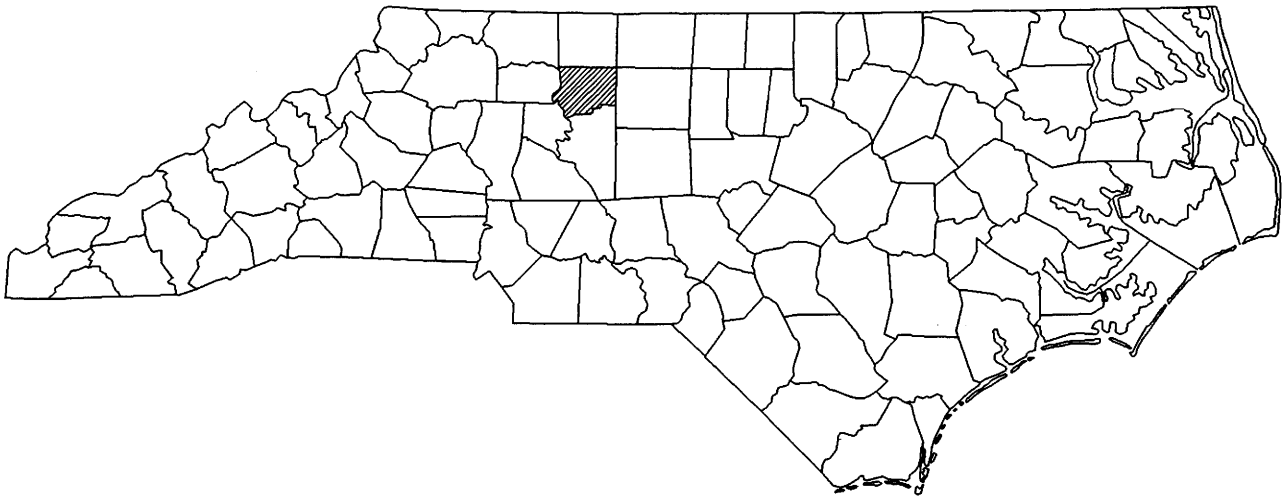
N/A

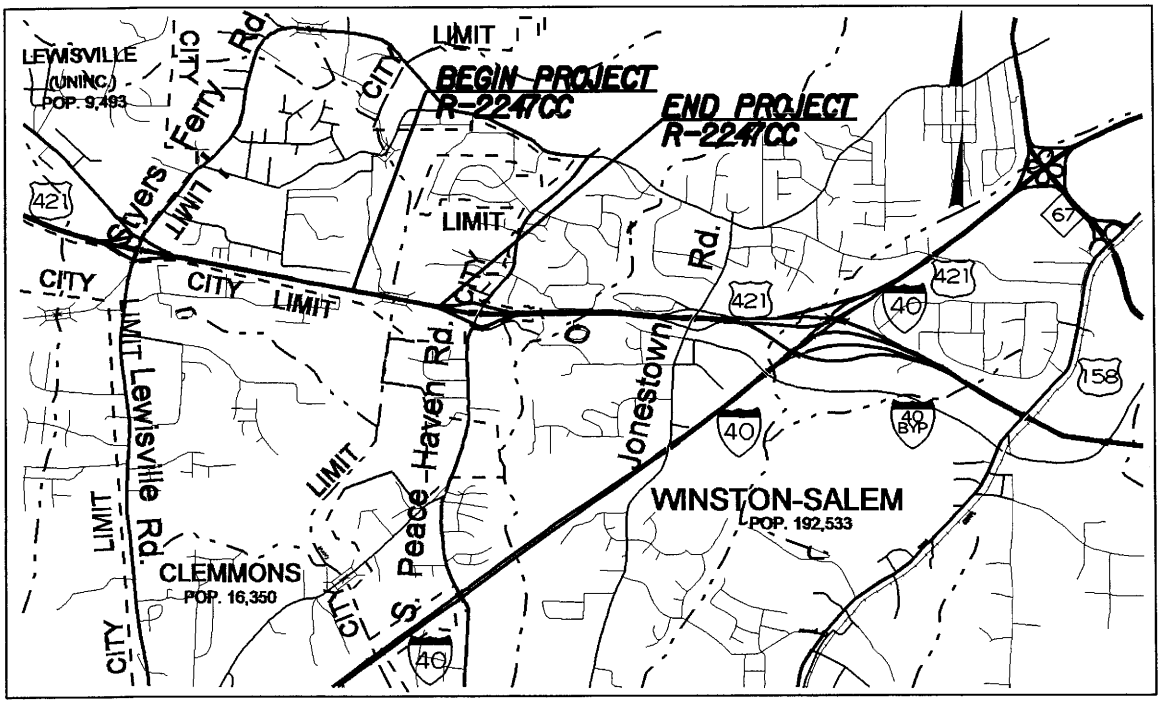
E. L. Lusk

Applicant/Agent's Signature **Date**

(Agent's signature is valid only if an authorization letter from the applicant is provided.)

NORTH CAROLINA





WETLAND & STREAMS

VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS

FORSYTH COUNTY

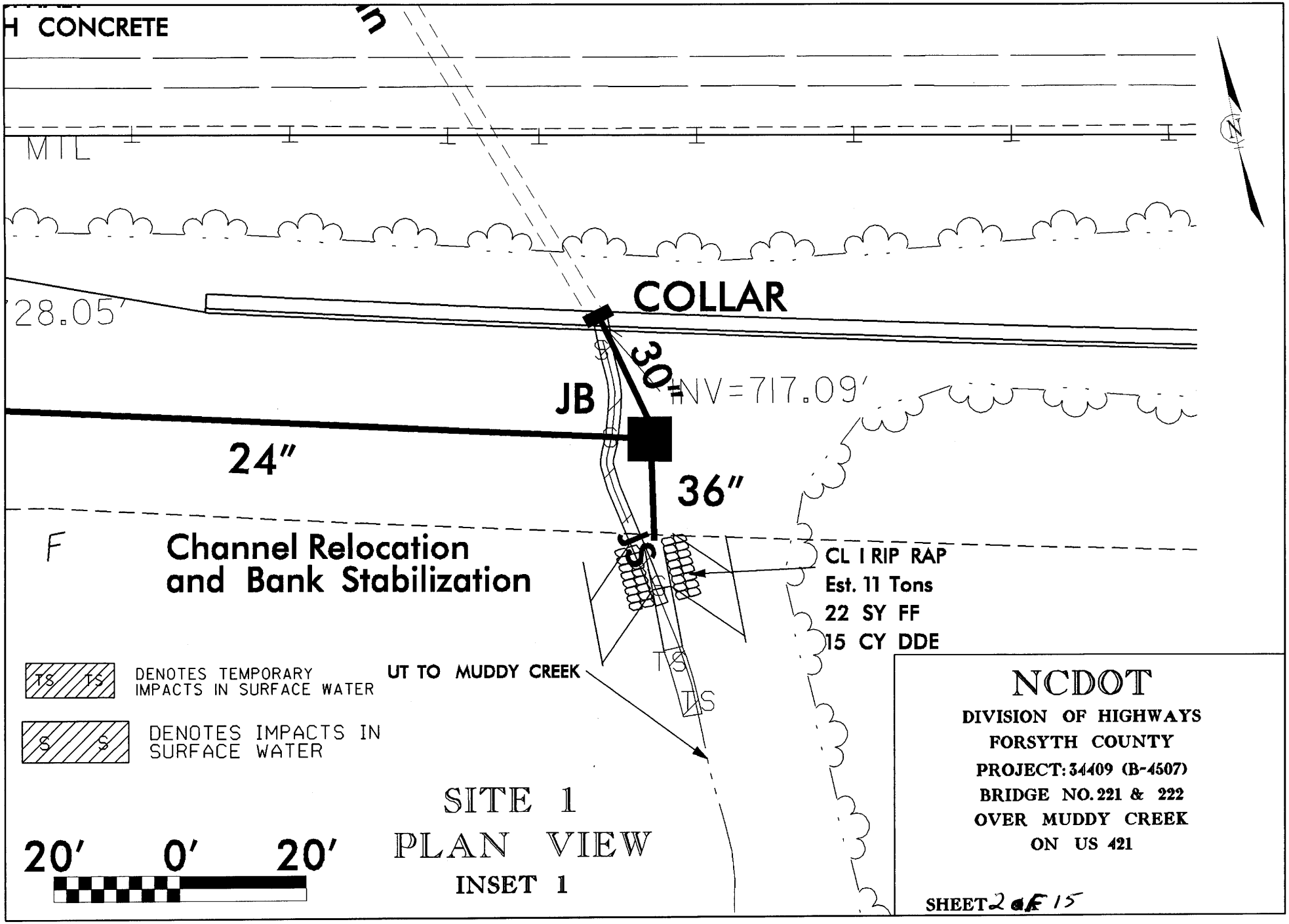
PROJECT: 34409 (B-4507)

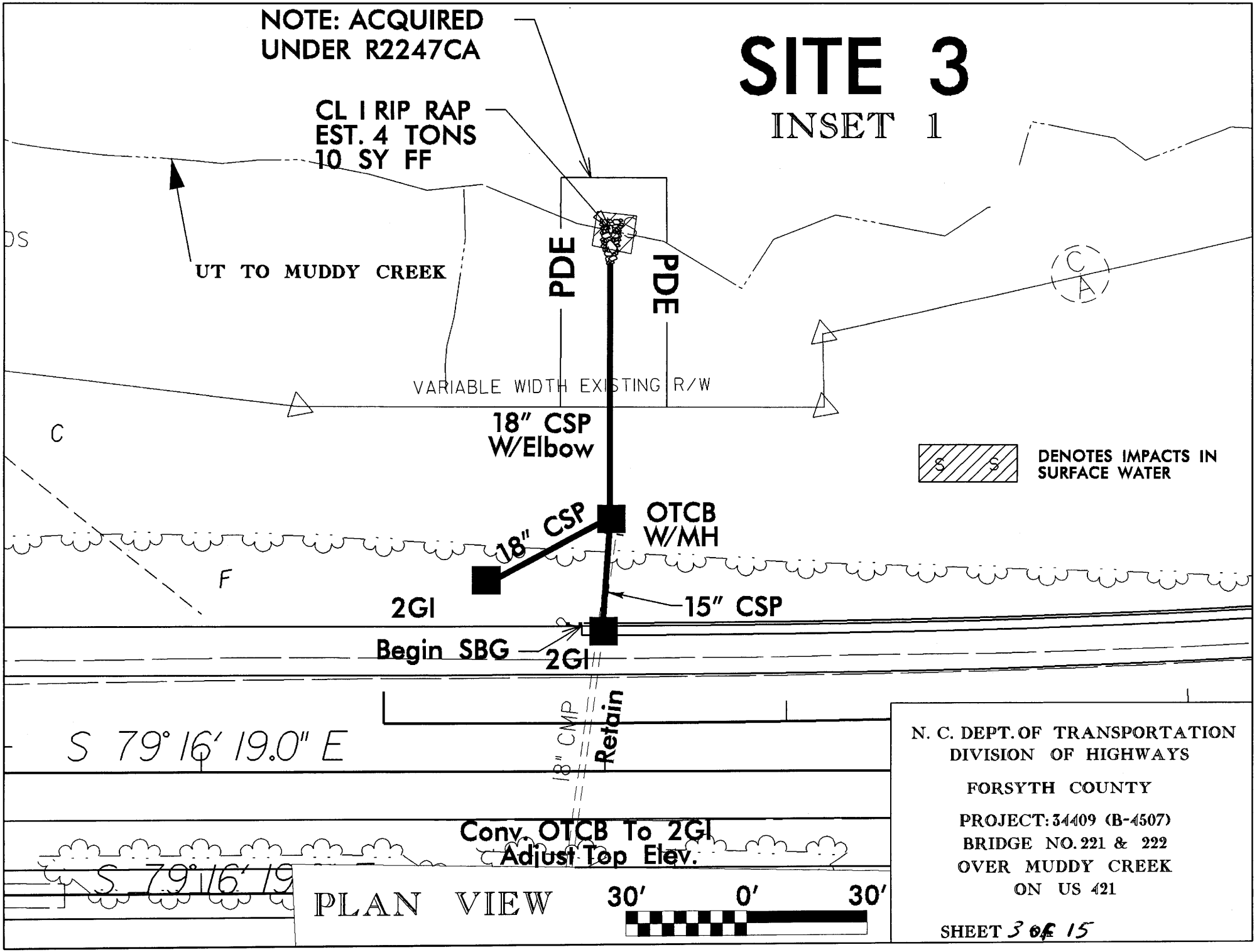
BRIDGE NO. 221 & 222

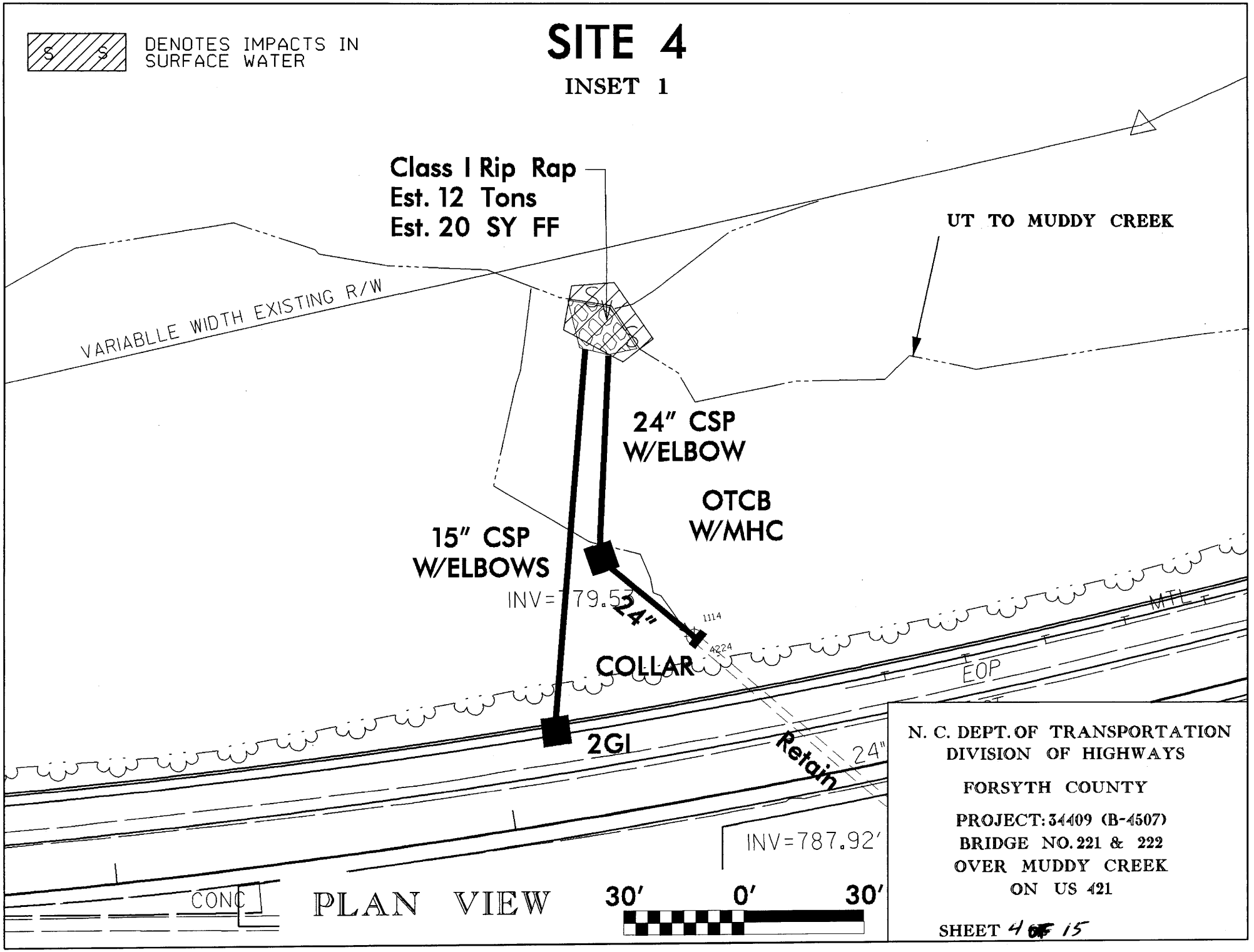
OVER MUDDY CREEK

ON US 421

SHEET 1 OF 15


H CONCRETE
MTL
28.05'
COLLAR
30"
INV=717.09'
JB
24"
36"
Channel Relocation
and Bank Stabilization
CL I RIP RAP
Est. 11 Tons
22 SY FF
15 CY DDE
UT TO MUDDY CREEK
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S DENOTES IMPACTS IN SURFACE WATER
20' 0' 20'
SITE 1
PLAN VIEW
INSET 1
NCDOT
DIVISION OF HIGHWAYS
FORSYTH COUNTY
PROJECT: 34409 (B-4507)
BRIDGE NO. 221 & 222
OVER MUDDY CREEK
ON US 421
SHEET 2 OF 15


NOTE: ACQUIRED UNDER R2247CA
SITE 3
INSET 1
CL I RIP RAP EST. 4 TONS 10 SY FF
UT TO MUDDY CREEK
PDE
PDE
VARIABLE WIDTH EXISTING R/W
18" CSP W/Elbow
DENOTES IMPACTS IN SURFACE WATER
18" CSP
OTCB W/MH
2GI
15" CSP
Begin SBG
2GI
18" CMP
Retain
S 79° 16' 19.0" E
Conv. OTCB To 2GI Adjust Top Elev.
PLAN VIEW
30' 0' 30'
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
FORSYTH COUNTY
PROJECT: 34409 (B-4507)
BRIDGE NO. 221 & 222
OVER MUDDY CREEK
ON US 421
SHEET 3 OF 15


DENOTES IMPACTS IN SURFACE WATER
SITE 4
INSET 1
Class I Rip Rap
Est. 12 Tons
Est. 20 SY FF
UT TO MUDDY CREEK
VARIABLLE WIDTH EXISTING R/W
24" CSP
W/ELBOW
OTCB
W/MHC
15" CSP
W/ELBOWS
INV=779.53
24"
1114
4224
COLLAR
EOP
2GI
Retain
24"
INV=787.92'
CONC
PLAN VIEW
30' 0' 30'
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
FORSYTH COUNTY
PROJECT: 34409 (B-4507)
BRIDGE NO. 221 & 222
OVER MUDDY CREEK
ON US 421
SHEET 4 OF 15

PROPERTY OWNER

PARCEL NO.	NAMES	ADDRESSES
1	TIMOTHY D. WELBORN MICHELLE WARREN WELBORN	114 MARSHALL ST. N. WINSTON SALEM NC 27101
2	RICHARD F. ALSPAUGH	5223 CEDARWOOD CREEK DR WINSTON SALEM NC 27104
3	REGENTS VILLAGE HOMEOWNERS ASSOCIATION	1045 BURKE ST. WINSTON SALEM NC 27102
4	IVEYSTONE HOMEOWNERS ASSOC. FC, INC.	4505 COUNTRY CLUB RD APT / UNIT 200 WINSTON SALEM NC 27104

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

PROJECT: 34409 (B-4507)

BRIDGE NO. 221 & 222
OVER MUDDY CREEK ON US421

SHEET 5 OF 15

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 20+0 Rt	36" RCP						0.01	0.01	47	12	
2	-L- 28+00 LT	TEMP. ROCK CAUSEWAY							0.02		40	
2	-L- 28+00 RT	TEMP. ROCK CAUSEWAY							0.02		40	
2	-L- 27+80 LT & RT	EMBANKMENT STABILIZATION						0.01		186		
3	-L- 38+01 LT	CLASS I RIP RAP						0.01		10		
4	-L- 41+65 LT	CLASS I RIP RAP						0.01		22		
TOTALS:								0.04	0.05	265	92	

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

FORSYTH COUNTY
WBS - 34409 (B-4507)

SHEET 6 of 15 5/7/2008

ATN Revised 3/31/05

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4507	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

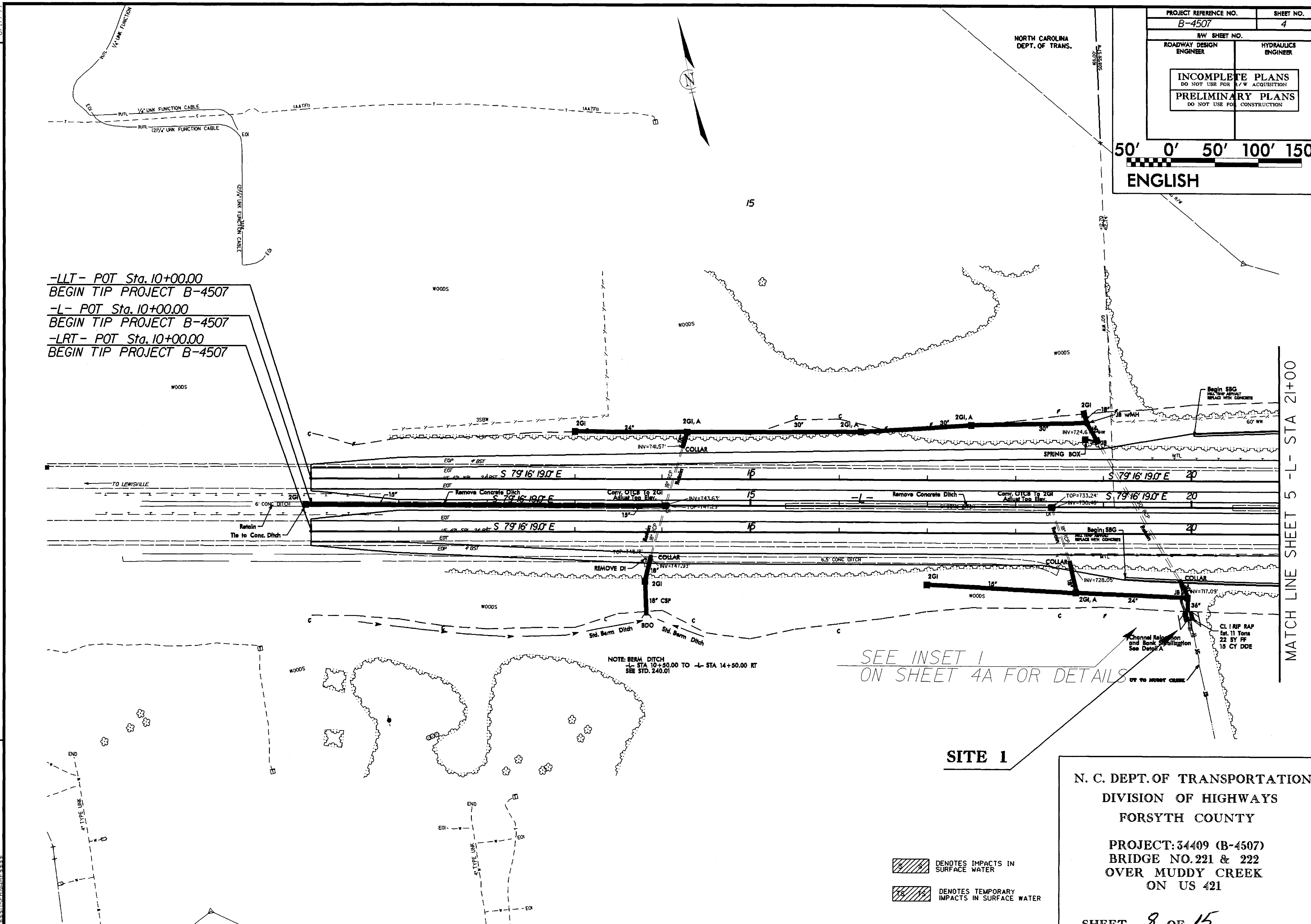
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

300′ 0′ 300′ 600′ 900′
ENGLISH

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

PROJECT: 34409 (B-4507)
BRIDGE NO. 221 & 222
OVER MUDDY CREEK
ON US 421

SHEET 7 OF 15



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

PROJECT: 34409 (B-4507)
BRIDGE NO. 221 & 222
OVER MUDDY CREEK
ON US 421

SHEET 8 OF 15

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4507	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

50' 0' 50' 100' 150'

ENGLISH

NORTH CAROLINA
DEPT. OF TRANS.

-LLT- POT Sta. 10+00.00
BEGIN TIP PROJECT B-4507
-L- POT Sta. 10+00.00
BEGIN TIP PROJECT B-4507
-LRT- POT Sta. 10+00.00
BEGIN TIP PROJECT B-4507

TO LEWISVILLE

S 79° 16' 19.0" E

Remove Concrete Ditch

Conv. OTCB To 2GI Adjust Top Elev.

Retain Tie to Conc. Ditch

6'-CONC DITCH

REMOVE DI

COLLAR

SPRING BOX

Begin SBG

Std. Berm Ditch

Std. Berm Ditch

NOTE: BERM DITCH
-L- STA 10+50.00 TO -L- STA 14+50.00 RT
SEE STD. 240.01

SEE INSET 1 ON SHEET 4A FOR DETAILS

CL I RIP RAP
Est. 11 Tons
22 SY FF
15 CY DDE

Channel Relocation and Bank Stabilization See Detail A

TO MUDDY CREEK

MATCH LINE SHEET 5 -L- STA 21+00

SITE 1

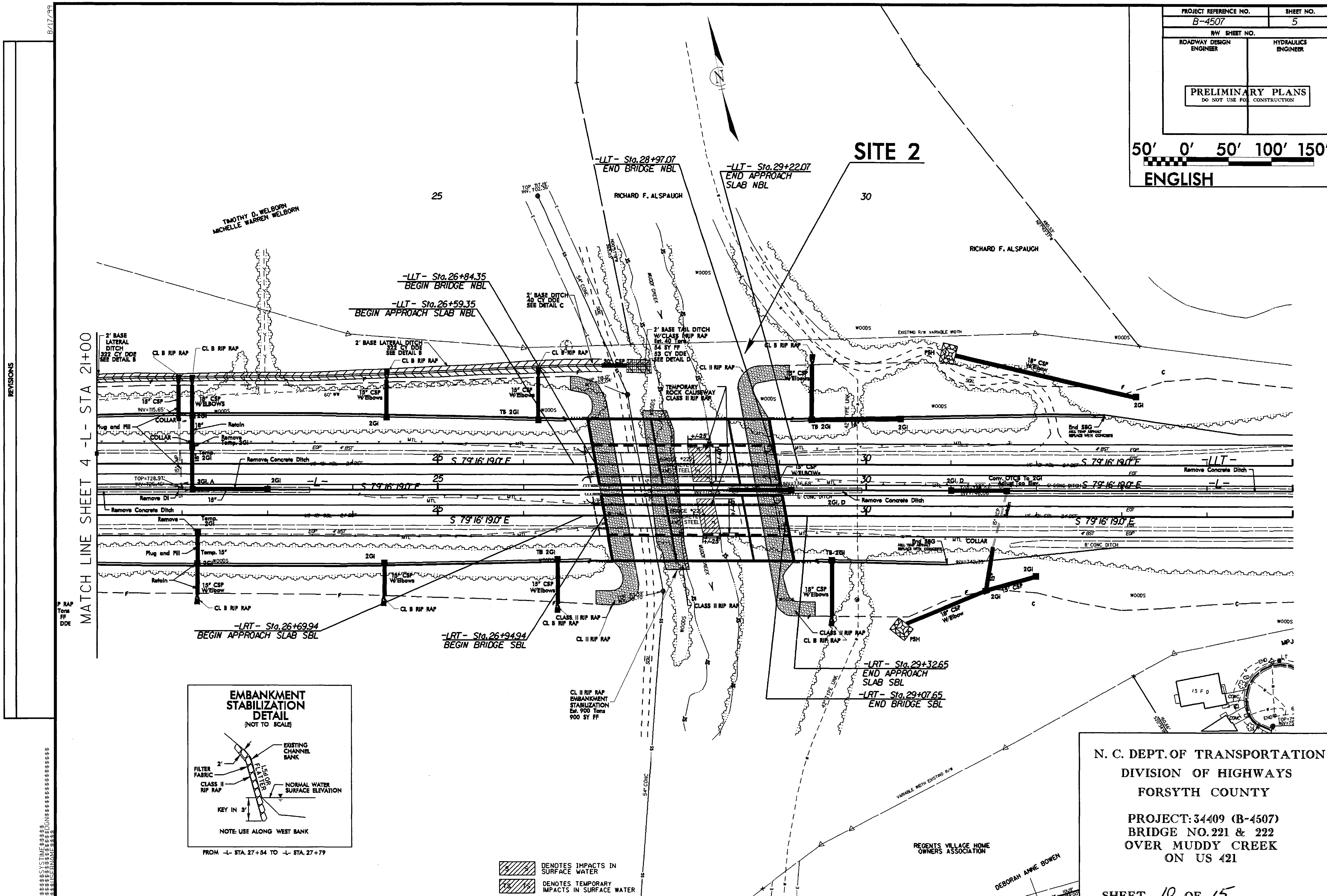
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

PROJECT: 34409 (B-4507)
BRIDGE NO. 221 & 222
OVER MUDDY CREEK
ON US 421

SHEET 9 OF 15



PROJECT REFERENCE NO. B-4507
SHEET NO. 5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
50' 0' 50' 100' 150'
ENGLISH
SITE 2
-LLT- Sta. 28+97.07 END BRIDGE NBL
-LLT- Sta. 29+22.07 END APPROACH SLAB NBL
-LLT- Sta. 26+84.35 BEGIN BRIDGE NBL
-LLT- Sta. 26+59.35 BEGIN APPROACH SLAB NBL
-LRT- Sta. 26+69.94 BEGIN APPROACH SLAB SBL
-LRT- Sta. 26+94.94 BEGIN BRIDGE SBL
-LRT- Sta. 29+32.65 END APPROACH SLAB SBL
-LRT- Sta. 29+07.65 END BRIDGE SBL
TIMOTHY D. WELBORN
MICHELLE WARREN WELBORN
RICHARD F. ALSPAUGH
REGENTS VILLAGE HOME OWNERS ASSOCIATION
DEBORAH ANNE BOWEN
MATCH LINE SHEET 4 -L- STA 21+00
2' BASE LATERAL DITCH 322 CY DDE SEE DETAIL B
2' BASE DITCH 40 CY DDE SEE DETAIL C
2' BASE TAIL DITCH W/CLASS II RIP RAP Est. 40 Tons 54 SY FF 53 CY DDE SEE DETAIL D
TEMPORARY ROCK CAUSEWAY CLASS II RIP RAP
CL II RIP RAP EMBANKMENT STABILIZATION Est. 900 Tons 900 SY FF
S 79°16'19.0" E
MUDDY CREEK
EMBANKMENT STABILIZATION DETAIL
(NOT TO SCALE)
EXISTING CHANNEL BANK
FILTER FABRIC
CLASS II RIP RAP
1.5:1 OR FLATTER
NORMAL WATER SURFACE ELEVATION
KEY IN 3'
NOTE: USE ALONG WEST BANK
FROM -L- STA. 27+54 TO -L- STA. 27+79
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
FORSYTH COUNTY
PROJECT: 34409 (B-4507)
BRIDGE NO. 221 & 222
OVER MUDDY CREEK
ON US 421
SHEET 10 OF 15

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4507	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

50' 0' 50' 100' 150'
ENGLISH

SITE 2

MATCH LINE SHEET 4 -L- STA 21+00

-LLT- Sta. 28+97.07
END BRIDGE NBL

-LLT- Sta. 29+22.07
END APPROACH SLAB NBL

-LLT- Sta. 26+84.35
BEGIN BRIDGE NBL

-LLT- Sta. 26+59.35
BEGIN APPROACH SLAB NBL

-LRT- Sta. 26+69.94
BEGIN APPROACH SLAB SBL

-LRT- Sta. 26+94.94
BEGIN BRIDGE SBL

-LRT- Sta. 29+32.65
END APPROACH SLAB SBL

-LRT- Sta. 29+07.65
END BRIDGE SBL

TIMOTHY D. WELBORN
MICHELLE WARREN WELBORN

RICHARD F. ALSPAUGH

RICHARD F. ALSPAUGH

TEMPORARY ROCK CAUSEWAY CLASS II RIP RAP

2' BASE LATERAL DITCH 322 CY DDE SEE DETAIL B

2' BASE DITCH 40 CY DDE SEE DETAIL C

2' BASE TAIL DITCH W/CLASS II RIP RAP Est. 40 Tons 54 SY FF 53 CY DDE SEE DETAIL D

CL B RIP RAP

CL II RIP RAP

CLASS II RIP RAP

CL II RIP RAP EMBANKMENT STABILIZATION Est. 900 Tons 900 SY FF

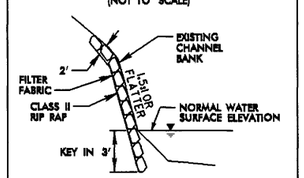
EXISTING R/W VARIABLE WIDTH

REGENTS VILLAGE HOME OWNERS ASSOCIATION

DEBORAH ANNE BOWEN

VARIABLE WIDTH EXISTING R/W

EMBANKMENT STABILIZATION DETAIL
(NOT TO SCALE)



NOTE: USE ALONG WEST BANK

FROM -L- STA. 27+54 TO -L- STA. 27+79

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

PROJECT: 34409 (B-4507)
BRIDGE NO. 221 & 222
OVER MUDDY CREEK
ON US 421

SHEET 11 OF 15

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4507	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DENOTES IMPACTS IN SURFACE WATER

SITE 3

SITE 4

INSET 1
SEE SHEET 6A

INSET 1
SEE SHEET 6B

-RAMPB- ST Sta. 10+00.00
POT Sta. 37+45.20 (42.00' LT)

-RAMPB- POS Sta. 18+00.00
END CONSTRUCTION

-RAMPB- CS Sta. 16+57.70

BEGIN RAMP PAVEMENT
-RAMPB- POC Sta. 14+50.00

-RAMPB- ST Sta. 18+73.70

-RAMPB- POT Sta. 19+47.04

-RAMPB- SC Sta. 12+16.00

IVEYSTONE HOMEOWNERS ASSOC. FC, INC.

UT TO MUDDY CREEK

NOTE: ACQUIRED UNDER R2247CA

CL I RIP RAP
EST. 4 TONS
10 SY FF

Class I Rip Rap
Est. 12 Tons
Est. 20 SY FF

24" CSP W/ELBOW

OTCB W/MHC

15" CSP W/ELBOWS
INV=779.92'

COLLAR

18" CSP W/Elbow

OTCB W/NH

15" CSP

2GI

Begin SBG

End SBG

N 80°53'40.5"E

-L- POC Sta. 45+50.00
END TIP PROJECT B-4507

-LLT- PC Sta. 44+20.22

-LLT- S 79°16'19.0" E

-L- S 79°16'19.0" E

Remove Concrete Ditch

Conv. DI to 2GI
Adjust Top Elev.

Conv. DI to JB W/MH

Remain

-LLT- PT Sta. 46+10.35

-L- PT Sta. 46+11.26

-LRT- PT Sta. 46+12.17

-L- PC Sta. 44+20.22

-LRT- PC Sta. 44+20.22

-RAMPC- ST Sta. 10+00.00

-L- POT Sta. 38+37.00 (42.00' RT)

-RAMPC- SC Sta. 12+16.00

BEGIN RAMP PAVEMENT
-RAMPC- POC Sta. 14+85.00

-RAMPC- ST Sta. 17+01.67

-RAMPC- CS Sta. 14+85.67

-RAMPC- POT Sta. 19+00.00
END CONSTRUCTION

S 64°13'49.9" E

NCDOT TRAFFIC CAMERA MOUNTED ON UTILITY POLE

ABANDONED NCDOT DYNAMIC TRAFFIC SIGN

RICHARD SCOTT WHEELING
ANDREW S. PATTON
JULIA B. PATTON

MPJ PROPERTIES, LLC

THOMAS MCKIERNAN AND WIFE ANNE MCKIERNAN

YOPP PROPERTIES LLC.

TILLAGE HOME ASSOCIATION

MARSHALL ELLETT TRUSTEE

CHARLOTTE COURT

CAMERON WAY COURT

TO WINSTON SALEM

MATCH LINE SHEET 5 -L- STA 35+00

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

PROJECT: 34409 (B-4507)
BRIDGE NO. 221 & 222
OVER MUDDY CREEK
ON US 421

SHEET 12 OF 15

$$$$$SYSTIME$$$$$
$$$$$USERNAME$$$$$
$$$$$DGNNAME$$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-4507	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

DENOTES IMPACTS IN SURFACE WATER

SITE 3

SITE 4

INSET 1
SEE SHEET 6A

INSET 1
SEE SHEET 6B

-RAMPB- STSta. 10+00.00
POTSta. 37+45.20 (42.00' LT)

-RAMPB- POSSta. 18+00.00
END CONSTRUCTION

-RAMPB- CSSta. 16+57.70

-RAMPB- STSta. 18+73.70

-RAMPB- POTSta. 19+47.04

BEGIN RAMP PAVEMENT
-RAMPB- POC Sta. 14+50.00

-RAMPB- SCSta. 12+16.00

-L- POC Sta. 45+50.00
END TIP PROJECT B-4507

-LLT- PCSta. 44+20.22

-LLT- PTSta. 46+10.35

-L- PTSta. 46+11.26

-LRT- PTSta. 46+12.17

-L- PCSta. 44+20.22

-LRT- PCSta. 44+20.22

-LLT- S 79°16'19.0" E

S 79°16'19.0" E

S 64°13'49.9" E

N 80°52'40.3" E

-RAMPC- STSta. 10+00.00
-L- POTSta. 383+37.00 142.00' RT

-RAMPC- SCSta. 12+16.00

BEGIN RAMP PAVEMENT
-RAMPC- POC Sta. 14+85.00

-RAMPC- CSSta. 14+85.67

-RAMPC- STSta. 17+01.67

-RAMPC- POTSta. 19+00.00
END CONSTRUCTION

MATCH LINE SHEET 5 -L- STA 35+00

UT TO MUDDY CREEK

IVEYSTONE HOMEOWNERS ASSOC. FC, INC.

NOTE: ACQUIRED UNDER R2247CA

CL I RIP RAP
EST. 4 TONS
10 SY FF

Class I Rip Rap
Est. 12 Tons
Est. 20 SY FF

Remove Concrete Ditch

Conv. DITCH To 2GI
Adjust Top Elev.

Conv. DITCH To 2GI

RICHARD SCOTT WHEELING
ANDREW S. PATTON
JULIA B. PATTON

MPJ PROPERTIES, LLC

THOMAS MCKIERNAN AND WIFE ANNE MCKIERNAN

YOPP PROPERTIES LLC.

VILLAGE HOME ASSOCIATION

CHARLOTTE COURT

CAMERON WAY COURT

MARSHALL ELLETT TRUSTEE

ABANDONED NCDOT DYNAMIC TRAFFIC SIGN

NCDOT TRAFFIC CAMERA MOUNTED ON UTILITY POLE

WOODS

TO WINSTON SALEM

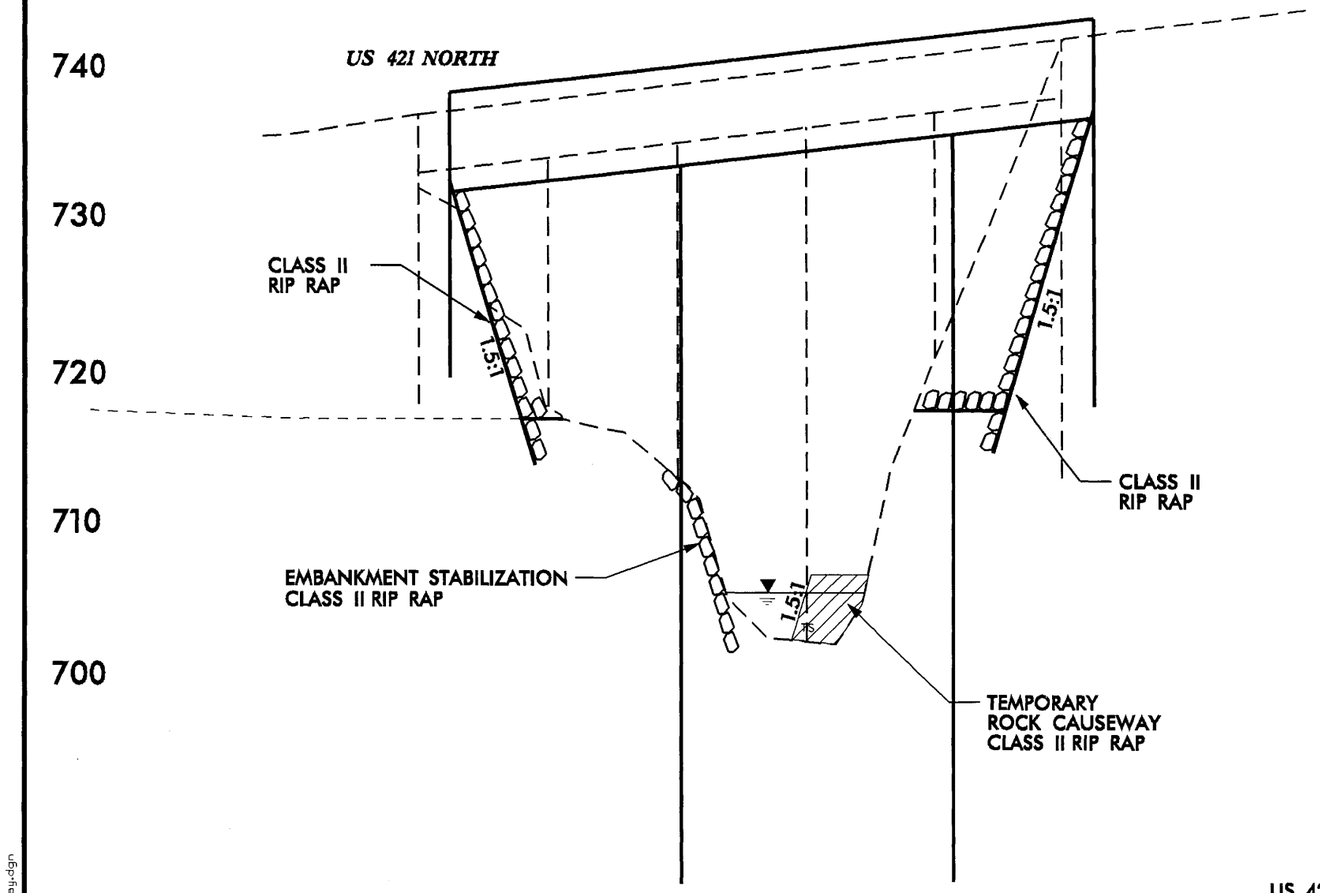
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
FORSYTH COUNTY

PROJECT: 34409 (B-4507)
BRIDGE NO. 221 & 222
OVER MUDDY CREEK
ON US 421

SHEET 13 OF 15

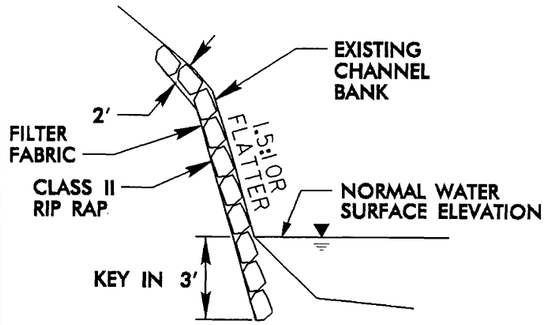
8/17/99

REVISIONS



EMBANKMENT STABILIZATION DETAIL

(NOT TO SCALE)



NOTE: USE ALONG WEST BANK

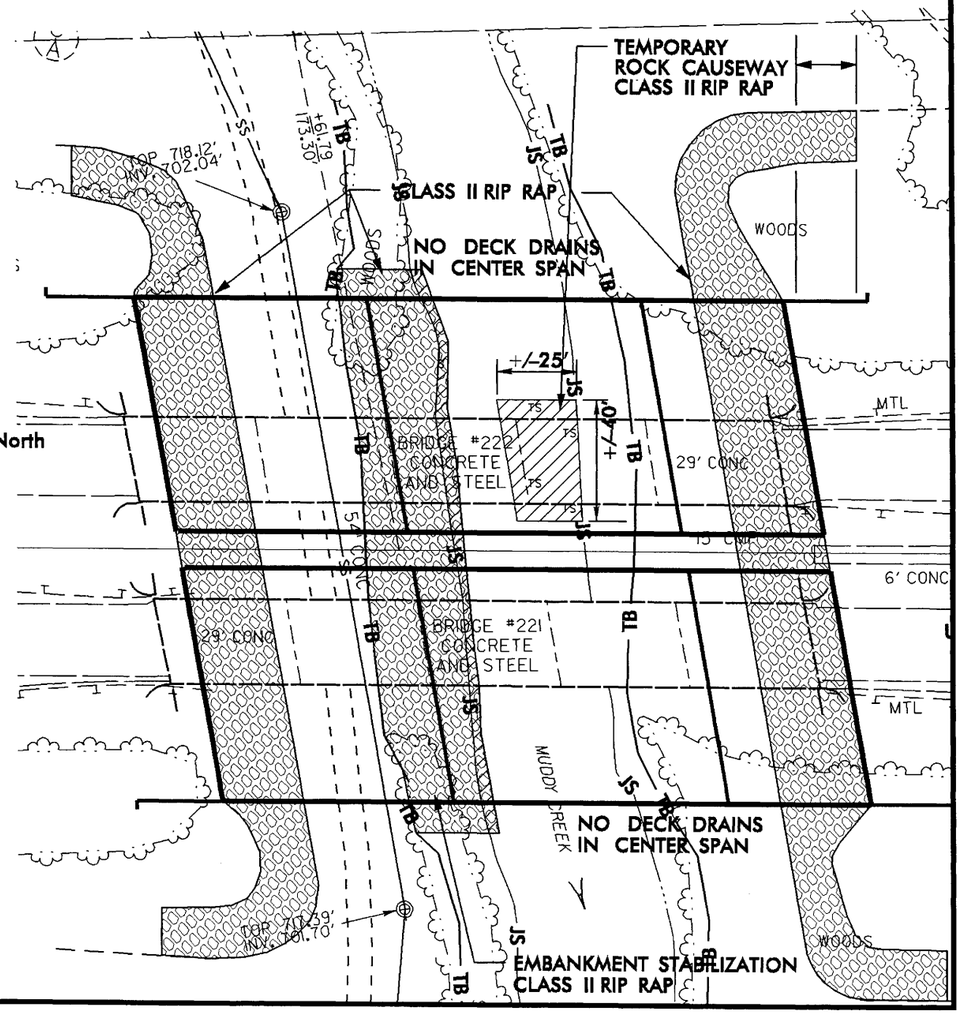
FROM -L- STA. 27+54 TO -L- STA. 27+79

PROJECT REFERENCE NO.	SHEET NO.
B-4507	
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

50' 0' 50' 100' 150'

ENGLISH



TEMPORARY ROCK CAUSEWAY CROSS SECTION

TO YADKINVILLE

SITE 2

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

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

PROJECT: 34409 (B-4507)
BRIDGE NO. 221 & 222
OVER MUDDY CREEK
ON US 421

SHEET 14 OF 15

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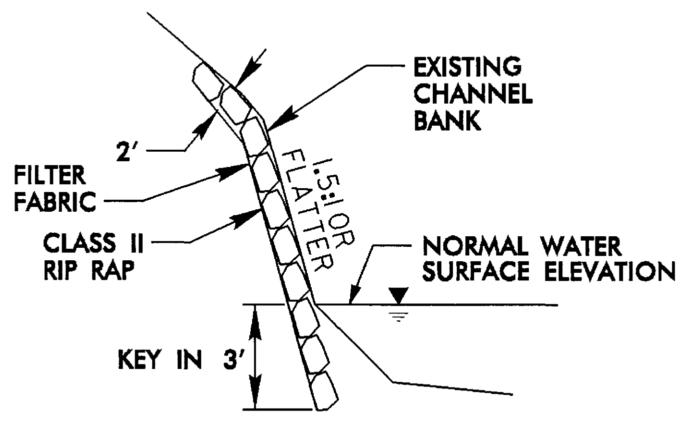
PROJECT REFERENCE NO.	SHEET NO.
B-4507	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

50′ 0′ 50′ 100′ 150′
ENGLISH

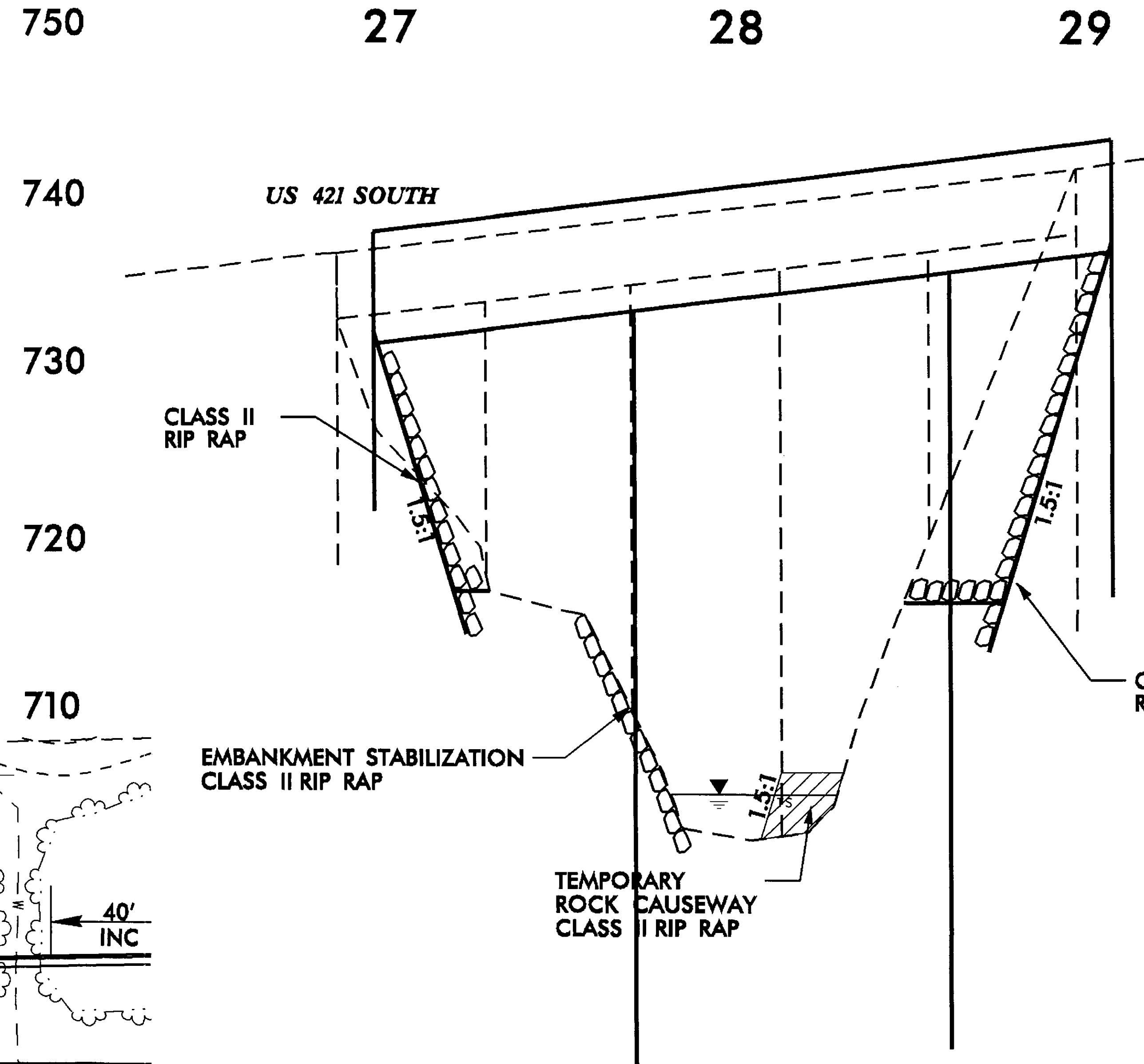
EMBANKMENT STABILIZATION DETAIL

(NOT TO SCALE)

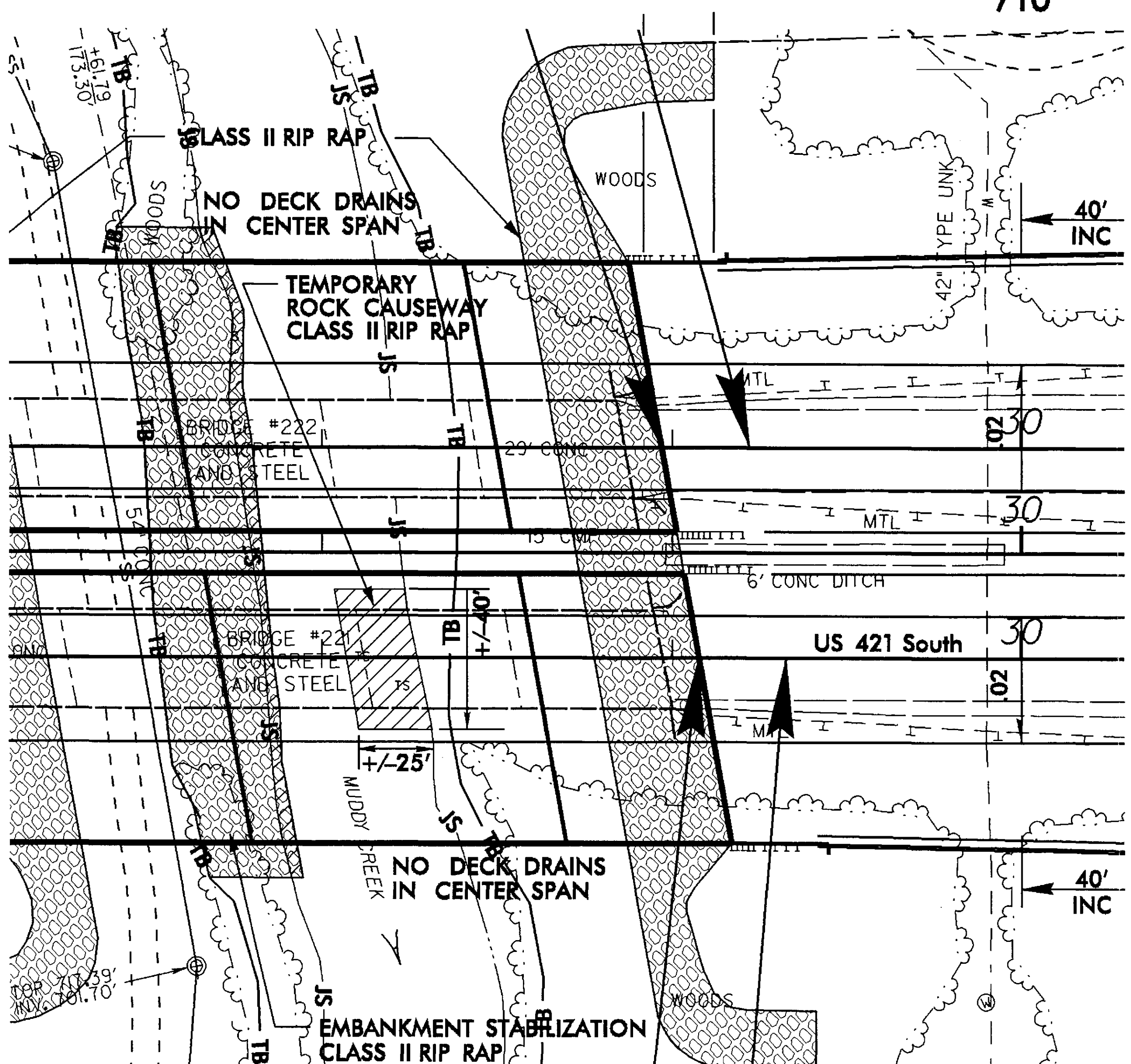


NOTE: USE ALONG WEST BANK

FROM -L- STA. 27+54 TO -L- STA. 27+79



TEMPORARY ROCK CAUSEWAY CROSS SECTION



SITE 2

TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S	DENOTES IMPACTS IN SURFACE WATER

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

PROJECT: 34409 (B-4507)
BRIDGE NO. 221 & 222
OVER MUDDY CREEK
ON US 421

SHEET 15 OF 15

REVISIONS

8/17/99

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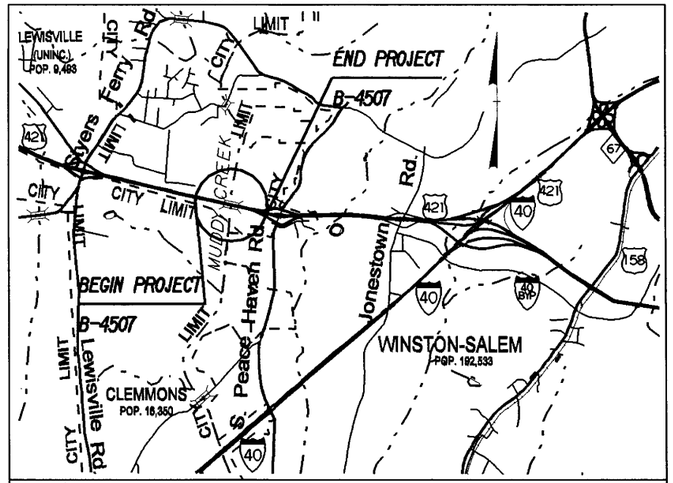
09/08/99

TIP PROJECT: B-4507

CONTRACT: C202041

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

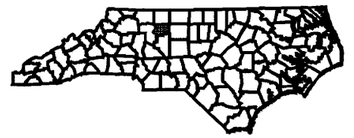
FORSYTH COUNTY

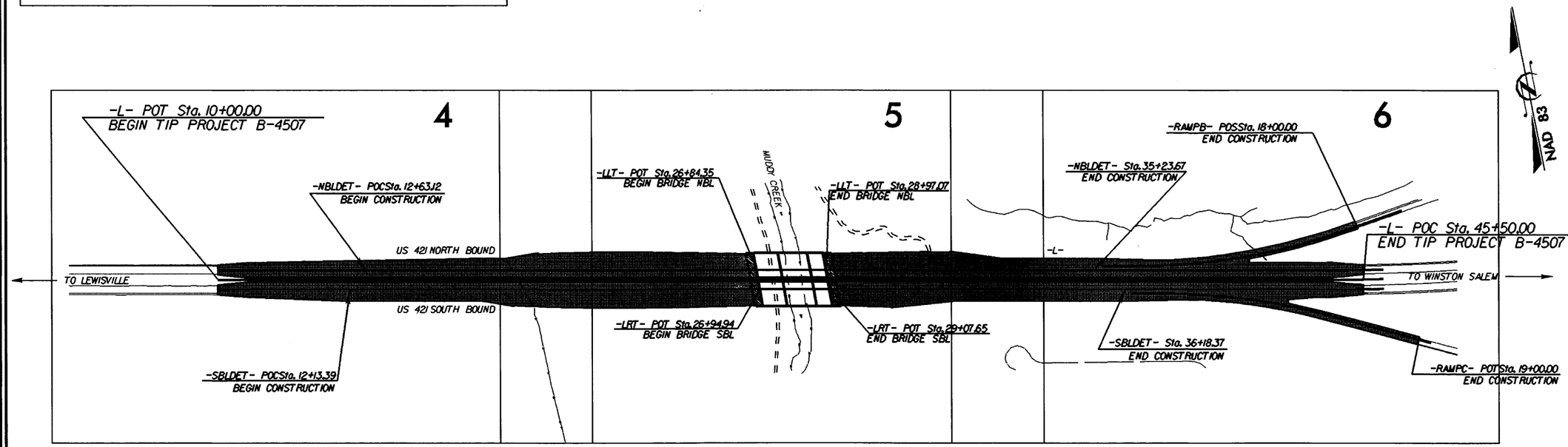
LOCATION: BRIDGES No. 221 AND No. 222 OVER MUDDY CREEK ON US 421

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4507	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34409.1.1	BRNHS-421(40)	P.E.
34409.2.20	BRNHS-421(40)	RW/UTL.





THERE IS CONTROL OF ACCESS ON THIS PROJECT.
THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF CLEMMONS AND WINSTON-SALEM.
CLEARING ON THIS PROJECT SHOULD BE PREFORMED TO THE LIMITS ESTABLISHED BY METHOD III.
***** DESIGN EXCEPTION REQUIRED FOR THE K VALUES OF THE SAG VERTICAL CURVES, THE K VALUES OF THE CREST VERTICAL CURVES, AND THE VERTICAL STOPPING SIGHT DISTANCE.***

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 100
PROFILE (VERTICAL)

DESIGN DATA

ADT 2009 = 46,056
ADT 2025 = 58,600
DHV = 10 %
D = 60 %
T = 10 % *
**V = 70 MPH
FUNC CLASS = FREEWAY
* TTST 7% DUAL 6%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4507 = 0.632 MILE
LENGTH STRUCTURE TIP PROJECT B-4507 = 0.040 MILE
TOTAL LENGTH TIP PROJECT B-4507 = 0.672 MILE

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: April 24, 2008

LETTING DATE: January 20, 2009

TONY HOUSER, PE
PROJECT ENGINEER

JASON TALLEY, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE:

ROADWAY DESIGN ENGINEER

SIGNATURE:

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER

3/15/06

PROJECT REFERENCE NO.	SHEET NO.
B-4507	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line
- Proposed Right of Way Line with Iron Pin and Cap Marker
- Proposed Right of Way Line with Concrete or Granite Marker
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

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

GAS:

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

SANITARY SEWER:

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

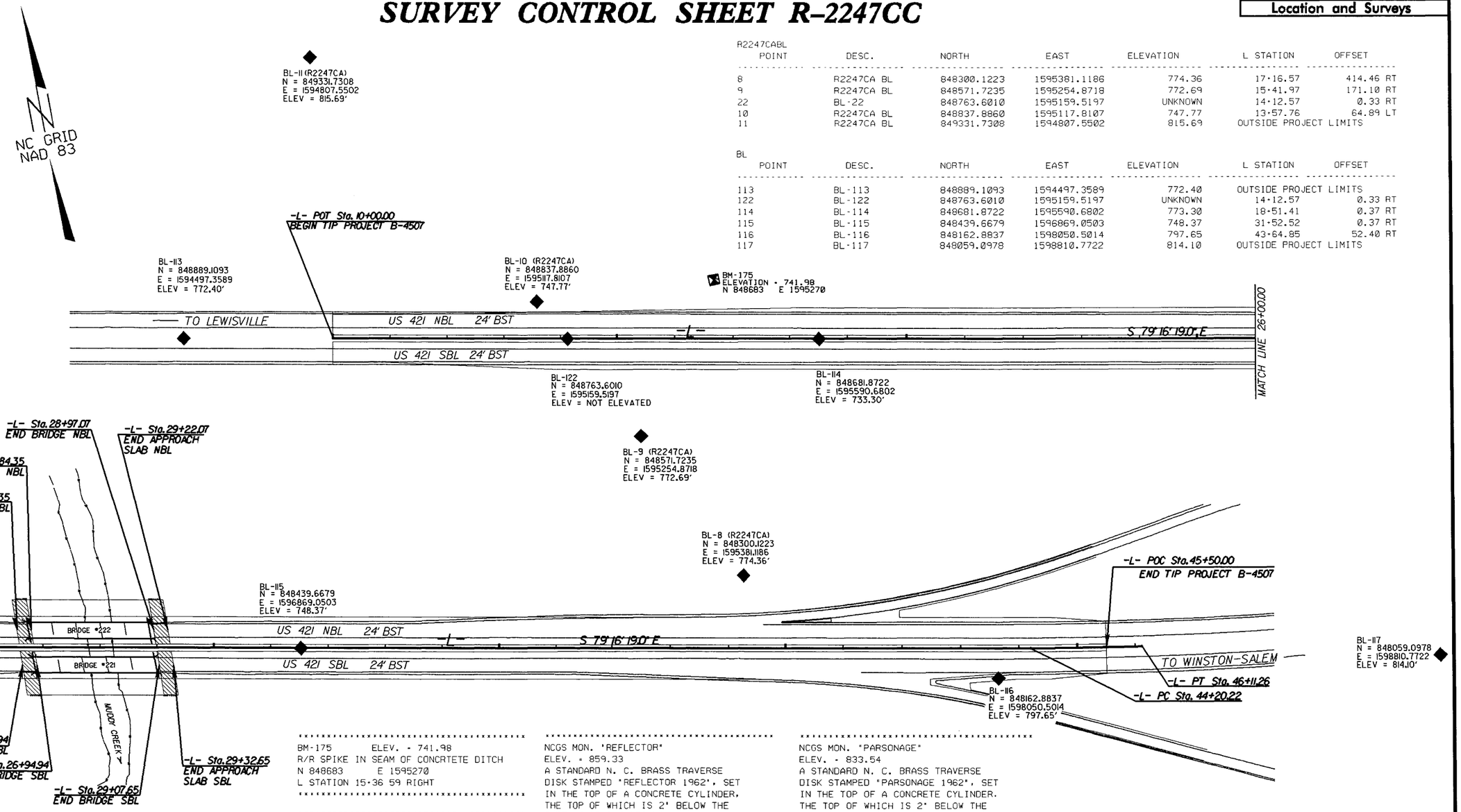
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?/UL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-4507	1C
Location and Surveys	

SURVEY CONTROL SHEET R-2247CC



R2247CABL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
8	R2247CA BL	848300.1223	1595381.1186	774.36	17+16.57	414.46 RT
9	R2247CA BL	848571.7235	1595254.8718	772.69	15+41.97	171.10 RT
22	BL-22	848763.6010	1595159.5197	UNKNOWN	14+12.57	0.33 RT
10	R2247CA BL	848837.8860	1595117.8107	747.77	13+57.76	64.89 LT
11	R2247CA BL	849331.7308	1594807.5502	815.69	OUTSIDE PROJECT LIMITS	

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
113	BL-113	848889.1093	1594497.3589	772.40	OUTSIDE PROJECT LIMITS	
122	BL-122	848763.6010	1595159.5197	UNKNOWN	14+12.57	0.33 RT
114	BL-114	848681.8722	1595590.6802	773.30	18+51.41	0.37 RT
115	BL-115	848439.6679	1596869.0503	748.37	31+52.52	0.37 RT
116	BL-116	848162.8837	1598050.5014	797.65	43+64.85	52.40 RT
117	BL-117	848059.0978	1598810.7722	814.10	OUTSIDE PROJECT LIMITS	

BM-175 ELEV. = 741.98
R/R SPIKE IN SEAM OF CONCRTETE DITCH
N 848683 E 1595270
L STATION 15+36.59 RIGHT

BM-176 ELEV. = 813.65
R/R SPIKE IN THE SEAM WHERE CONCRETE
MEETS ASPHALT SHOULDER ON THE SE
SIDE OF R2247CE Y-25 BRIDGE
N 848069 E 1598747
L STATION 46+11
S 77° 00' 48.7" E DIST 455.97

NCGS MON. 'REFLECTOR'
ELEV. = 859.33
A STANDARD N. C. BRASS TRAVERSE
DISK STAMPED 'REFLECTOR 1962', SET
IN THE TOP OF A CONCRETE CYLINDER,
THE TOP OF WHICH IS 2' BELOW THE
SURFACE OF THE GROUND.

NCGS MON. 'GOUGH'
ELEV. = 843.97
A STANDARD N. C. BRASS TRAVERSE
DISK STAMPED 'GOUGH 1970', SET IN
THE TOP OF A CONCRETE CYLINDER .
THE TOP OF WHICH IS 2' BELOW THE
SURFACE OF THE GROUND.

NCGS MON. 'PARSONAGE'
ELEV. = 833.54
A STANDARD N. C. BRASS TRAVERSE
DISK STAMPED 'PARSONAGE 1962', SET
IN THE TOP OF A CONCRETE CYLINDER.
THE TOP OF WHICH IS 2' BELOW THE
SURFACE OF THE GROUND.

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2247CA-1"
WITH NAD 83 STATE PLANE GRID COORDINATES OF
NORTHING: 845150.3566(ft) EASTING: 1590540.0463(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999946001
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2247CA-1" TO -L- STATION 10+00.00 IS
N 48°47'29" E 5601.61
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NOTE: DRAWING NOT TO SCALE

NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
   HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   R2247CC_LS_CONTROL_DATE.HTML

   SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

△ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING NCGS MONUMENTATION

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$$$$USERNAME$$$$

5/14/99

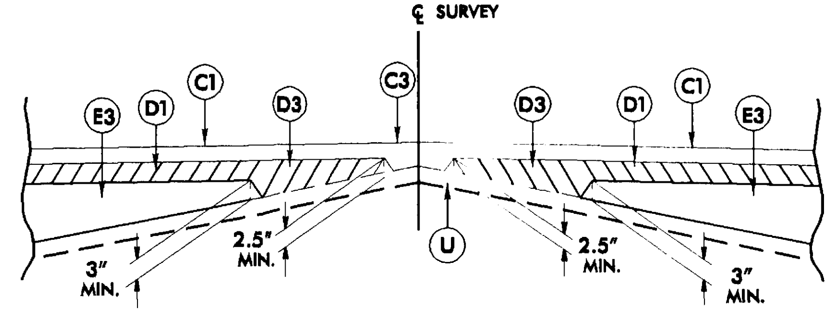
PROJECT REFERENCE NO.	SHEET NO.
B-4507	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

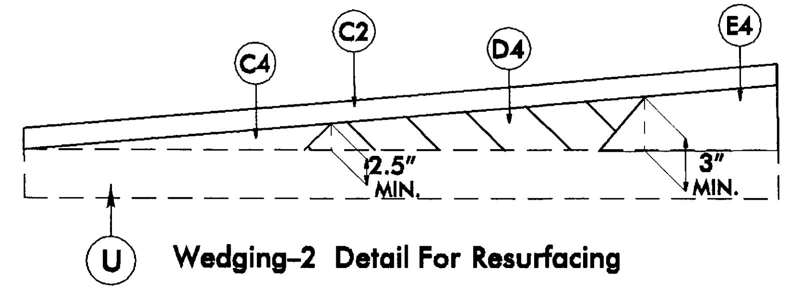
PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

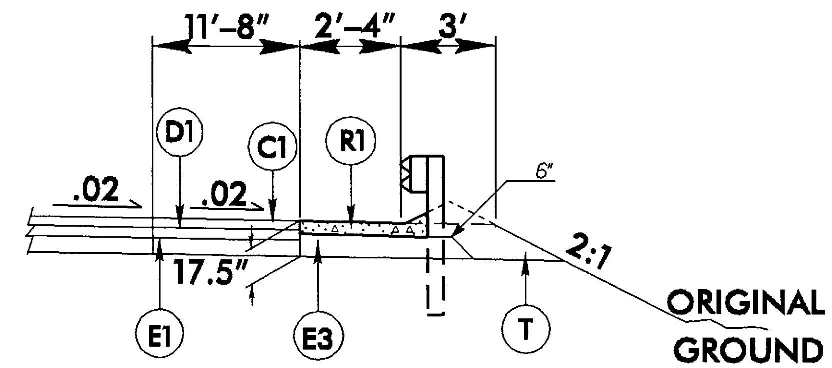
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1½" IN DEPTH OR GREATER THAN 2" IN DEPTH.
C4	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1½" IN DEPTH OR GREATER THAN 2" IN DEPTH.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
D4	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 10½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 599 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
E2	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
E4	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
R1	SHOULDER BERM GUTTER
R2	TEMPORARY ASPHALT SHOULDER BERM GUTTER (TO BE USED DURING DETOUR STAGE OF PROJECT AND THEN REMOVED AND REPLACED WITH CONCRETE SHOULDER BERM GUTTER-SEE PAVEMENT SCHEDULE SECTION R1)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILL ASPHALT PAVEMENT (VAR. DEPTH) *MILL OUT TEMPORARY ASPHALT SHOULDER BERM GUTTER DURING FINAL CONSTRUCTION PHASE.
W1	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING-1 DETAIL)
W2	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING-2 DETAIL)



Detail Showing Method of Wedging-1



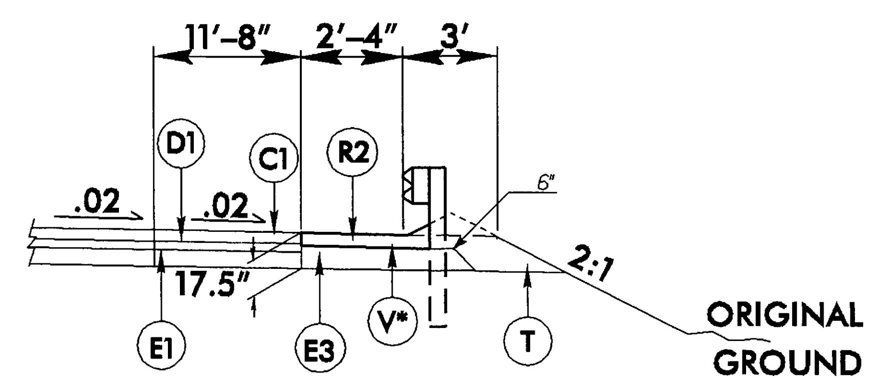
Wedging-2 Detail For Resurfacing



Detail Showing Paved Shoulder in Relation to Guardrail

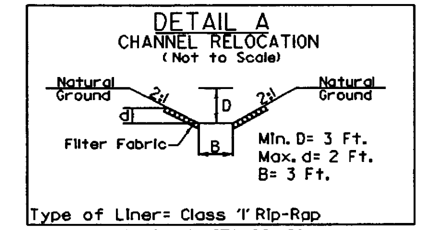
USE SHOULDER BERM GUTTER FOR THE FOLLOWING:

-L- STA 19+24.76 TO -L- STA 26+78.76 (RT.)
-L- STA 29+41.83 TO -L- STA 30+95.83 (RT.)
-L- STA 20+02.27 TO -L- STA 26+50.27 (LT.)
-L- STA 29+13.26 TO -L- STA 32+80.26 (LT.)
-RAMPB- STA 10+49.00 TO -RAMPB- STA 18+00.00 (LT.)

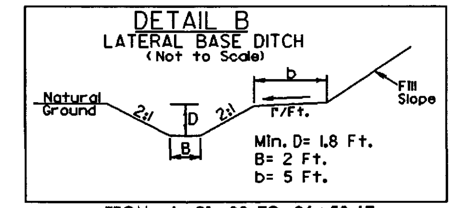


USE TEMPORARY ASPHALT SHOULDER BERM GUTTER FOR THE FOLLOWING:

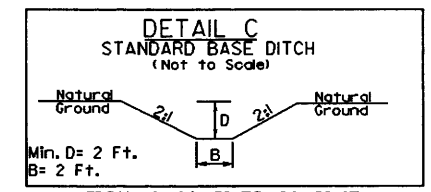
-SBLDET- STA 17+26.81 TO -SBLDET- STA 24+79.81
-SBLDET- STA 27+42.88 TO -SBLDET- STA 28+96.88
-NBLDET- STA 18+04.31 TO -NBLDET- STA 24+51.31
-NBLDET- STA 27+14.31 TO -NBLDET- STA 30+79.31



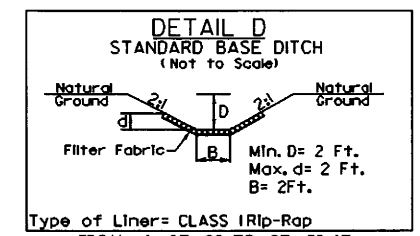
RT OF -L- STA 20+00



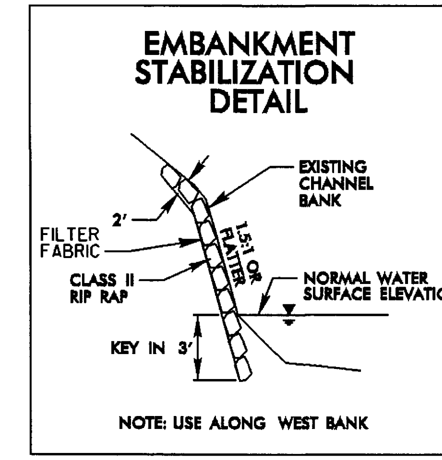
FROM -L- 21+00 TO 26+50 LT.



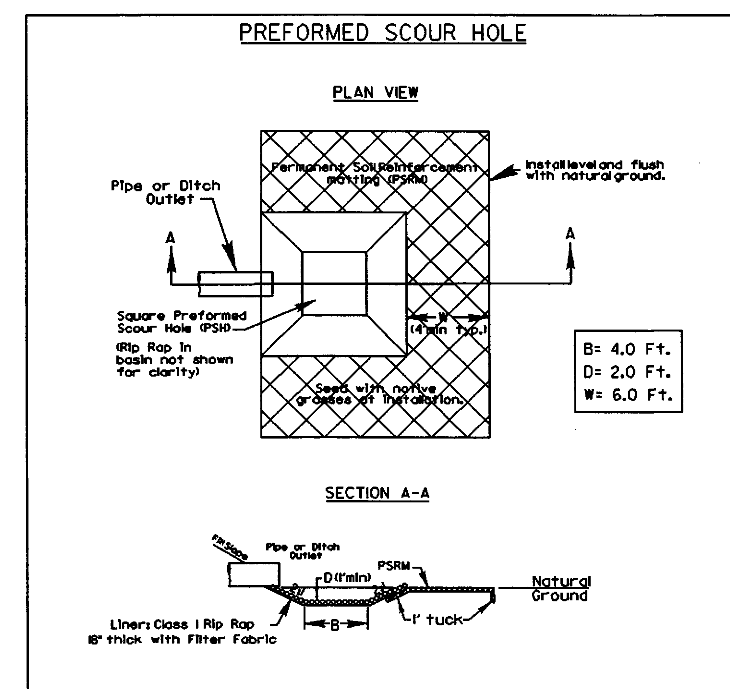
FROM -L- 26+50 TO 26+92 LT.



FROM -L- 27+22 TO 27+50 LT.



FROM -L- STA. 27+54 TO -L- STA. 27+79



RT. of -L- 30+43
LT. of -L- 31+00

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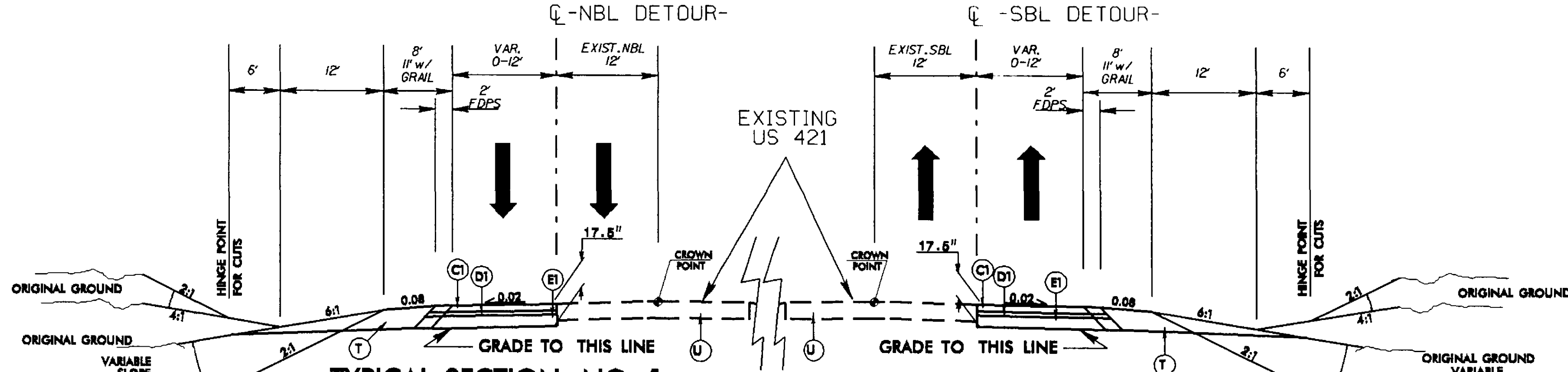
PROJECT REFERENCE NO.	SHEET NO.
B-4507	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

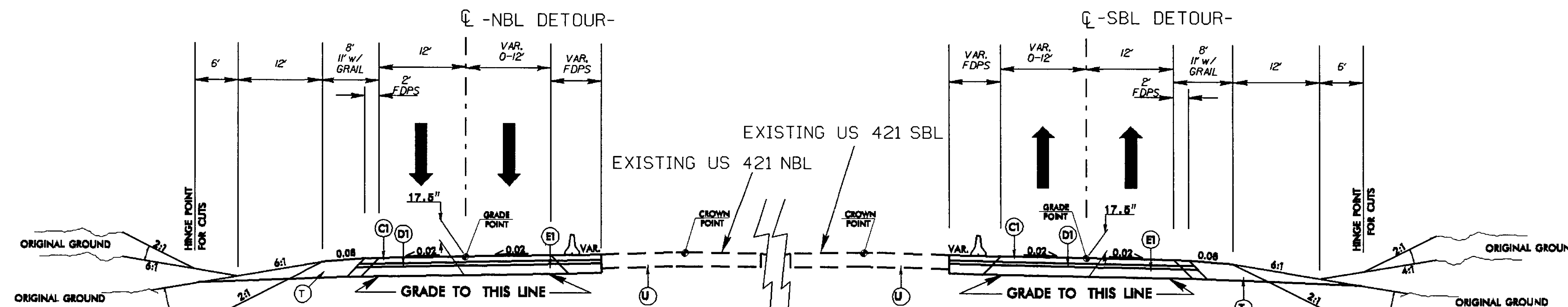


TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1 FOR:

-NBLDET- STA 12+63.12 TO STA 14+88.37
-SBLDET- STA 12+13.39 TO STA 14+22.03

-NBLDET- STA 32+47.74 TO STA 35+23.67
-SBLDET- STA 33+31.58 TO STA 36+18.37

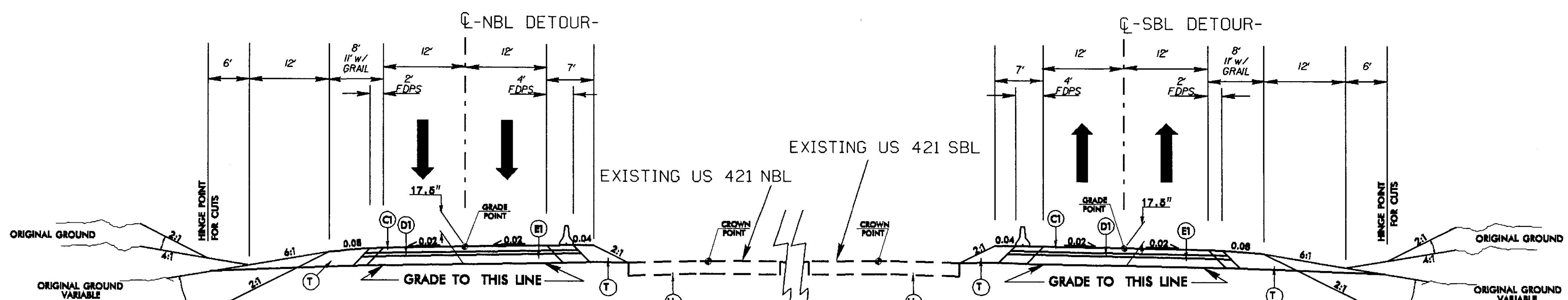


TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 FOR:

-NBLDET- STA 14+88.37 TO STA 19+00.96
-SBLDET- STA 14+22.03 TO STA 18+00.94

-NBLDET- STA 30+57.16 TO STA 32+47.74
-SBLDET- STA 29+51.01 TO STA 33+31.58



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3 FOR:

-NBLDET- STA 19+00.96 TO STA 24+78.53 (BEGIN BRIDGE)
-SBLDET- STA 18+00.94 TO STA 25+02.86 (BEGIN BRIDGE)

-NBLDET- STA 26+91.24 (END BRIDGE) TO STA 30+57.16
-SBLDET- STA 27+15.57 (END BRIDGE) TO STA 29+51.01

NOTE: SEE PHASES 1 & 2 OF THE STAGED CONSTRUCTION ON SHEET 2-E, FOR NBL & SBL DETOUR BRIDGE TYPICAL SECTIONS

SEE SHEET 2 FOR FULL PAVEMENT SCHEDULE WITH PLACEMENT INSTRUCTIONS

PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 3" ASPHALT SURFACE COURSE TYPE S9.5C
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C
E1	PROP. APPROX. 10½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C
T	EARTH MATERIAL
U	EXIST. PAVEMENT

5/14/99

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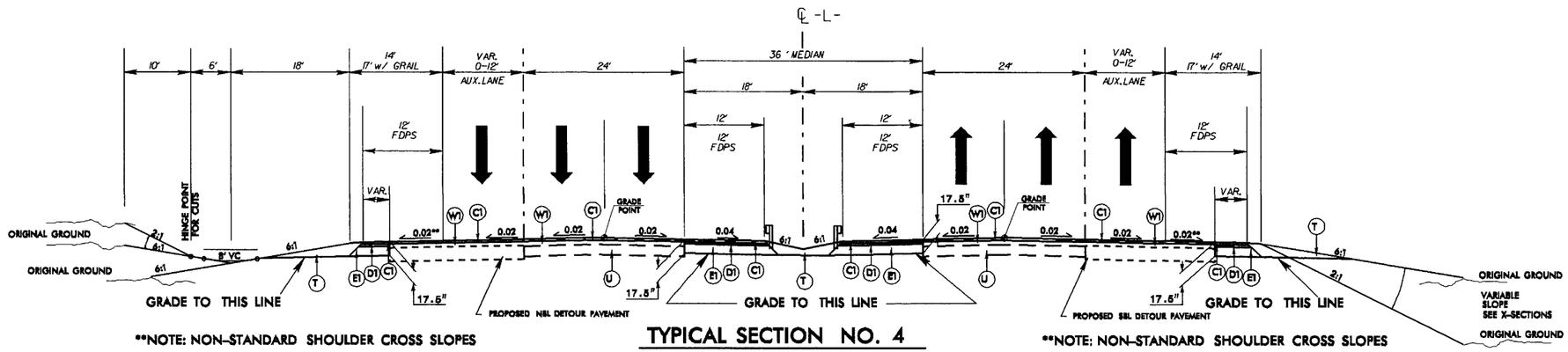
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-4507	2-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



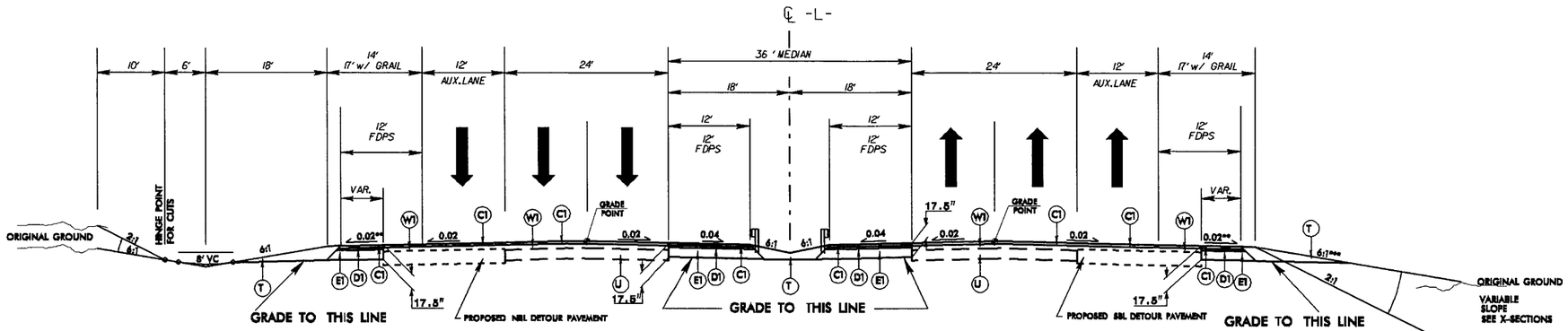
TYPICAL SECTION NO. 4

**NOTE: NON-STANDARD SHOULDER CROSS SLOPES

**NOTE: NON-STANDARD SHOULDER CROSS SLOPES

USE TYPICAL SECTION NO. 4 FOR:

L-LT: -L- STA. 10+00.00 TO STA. 18+20.00
L-RT: -L- STA. 10+00.00 TO STA. 14+00.00
L-LT: -L- STA. 39+60.00 TO STA. 45+50.00
L-RT: -L- STA. 40+50.00 TO STA. 45+50.00



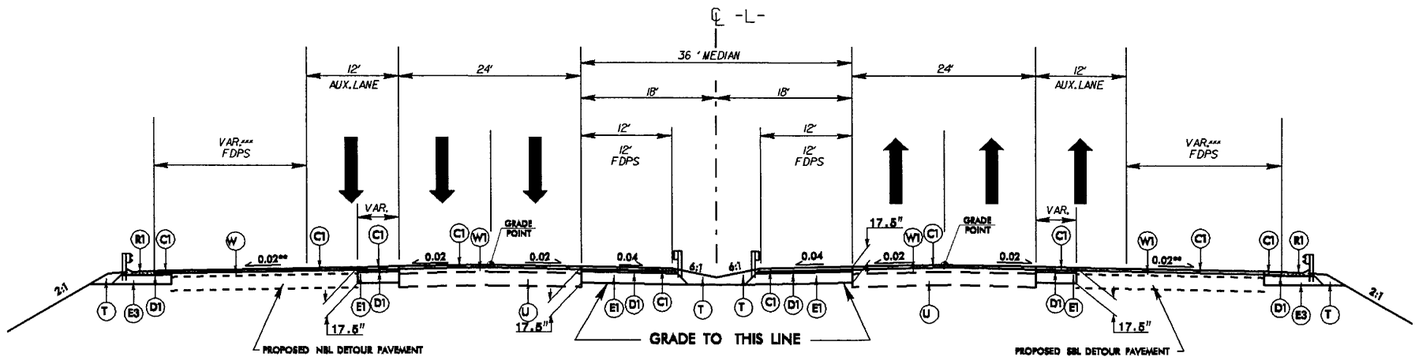
TYPICAL SECTION NO. 5

**NOTE: NON-STANDARD SHOULDER CROSS SLOPES

**NOTE: NON-STANDARD SHOULDER CROSS SLOPES
***NOTE: SLOPES MAY BE FLATTER THAN 6:1 WHEN GRADING TO EXISTING DETOUR EOP AND TO EXISTING SHOULDER BREAK POINTS.

USE TYPICAL SECTION NO. 5 FOR:

L-LT: -L- STA. 18+20.00 TO STA. 20+00.88
L-RT: -L- STA. 14+00.00 TO STA. 19+25.15
L-LT: -L- STA. 32+77.88 TO STA. 39+60.00
L-RT: -L- STA. 30+97.22 TO STA. 40+50.00



**NOTE: NON-STANDARD SHOULDER CROSS SLOPES
***NOTE: PAVED SHOULDER WIDTH VARIES IN BRIDGE TAPER AREA. (SEE DETAIL SHOWING RELATIONSHIP OF BRIDGE TO PAVEMENT-SHEET 2-D)

TYPICAL SECTION NO. 6

**NOTE: NON-STANDARD SHOULDER CROSS SLOPES
***NOTE: PAVED SHOULDER WIDTH VARIES IN BRIDGE TAPER AREA. (SEE DETAIL SHOWING RELATIONSHIP OF BRIDGE TO PAVEMENT-SHEET 2-D)

USE TYPICAL SECTION NO. 6 FOR:

L-LT : -L- STA. 20+00.88 TO STA. 25+29.24
L-RT: -L- STA. 19+25.15 TO STA. 25+38.76
L-LT: -L- STA. 30+50 TO STA. 32+77.88
L-RT: -L- STA. 30+55 TO STA. 30+97.22

SEE SHEET 2 FOR FULL PAVEMENT SCHEDULE WITH PLACEMENT INSTRUCTIONS

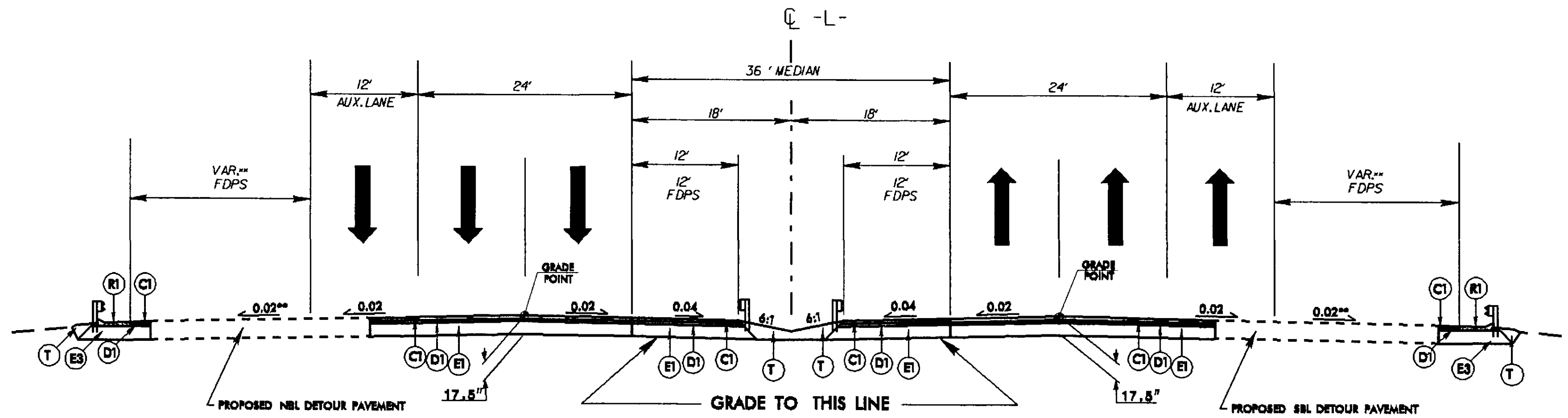
PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 3" ASPHALT SURFACE COURSE TYPE S9.5C
C3	PROP. VAR. DEPTH ASPHALT SURFACE COURSE TYPE S9.5C
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C
D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C
E1	PROP. APPROX. 10½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE TYPE B25.0C
R1	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W1	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING-1 DETAIL-SHT 2)

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-4507	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



**NOTE: NON-STANDARD SHOULDER CROSS SLOPES
**NOTE: PAVED SHOULDER WIDTH VARIES IN BRIDGE TAPER AREA.
(SEE DETAIL SHOWING RELATIONSHIP OF BRIDGE TO PAVEMENT-SHEET 2-D)

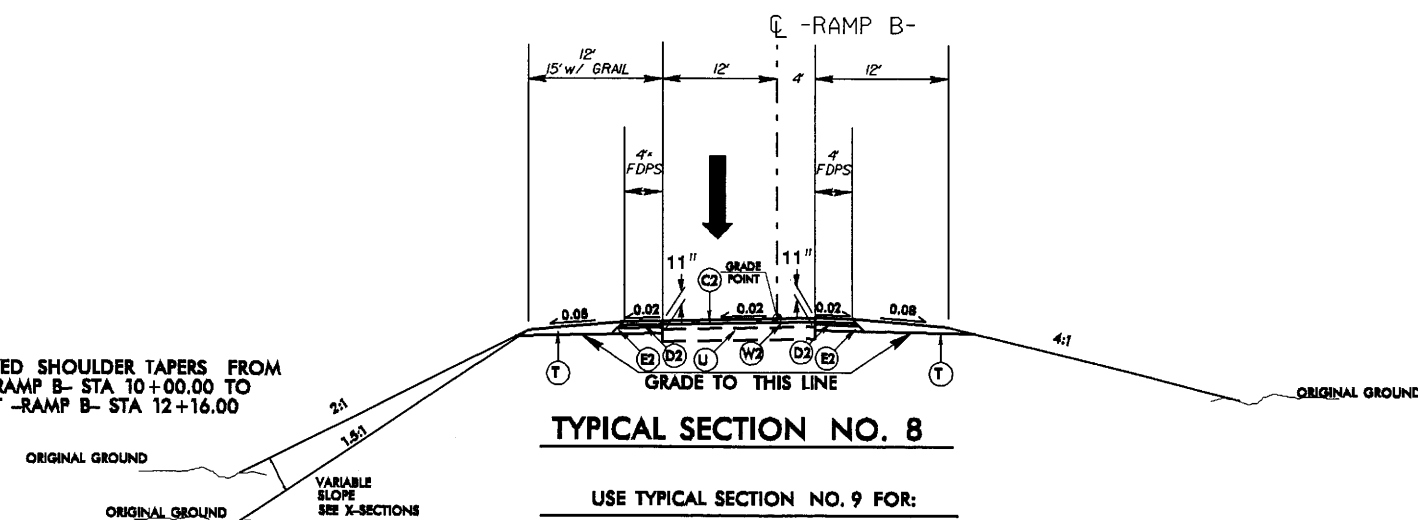
TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7 FOR:

L-LT : -L- STA. 25+29.24 TO STA. 26+84.35 (BEGIN BRIDGE)
L-RT: -L- STA. 25+38.76 TO STA. 26+94.94 (BEGIN BRIDGE)

L-LT: -L- STA. 28+97.07 (END BRIDGE) TO STA. 30+50
L-RT: -L- STA. 29+07.65 (END BRIDGE) TO STA. 30+55

**NOTE: NON-STANDARD SHOULDER CROSS SLOPES
**NOTE: PAVED SHOULDER WIDTH VARIES IN BRIDGE TAPER AREA.
(SEE DETAIL SHOWING RELATIONSHIP OF BRIDGE TO PAVEMENT-SHEET 2-D)

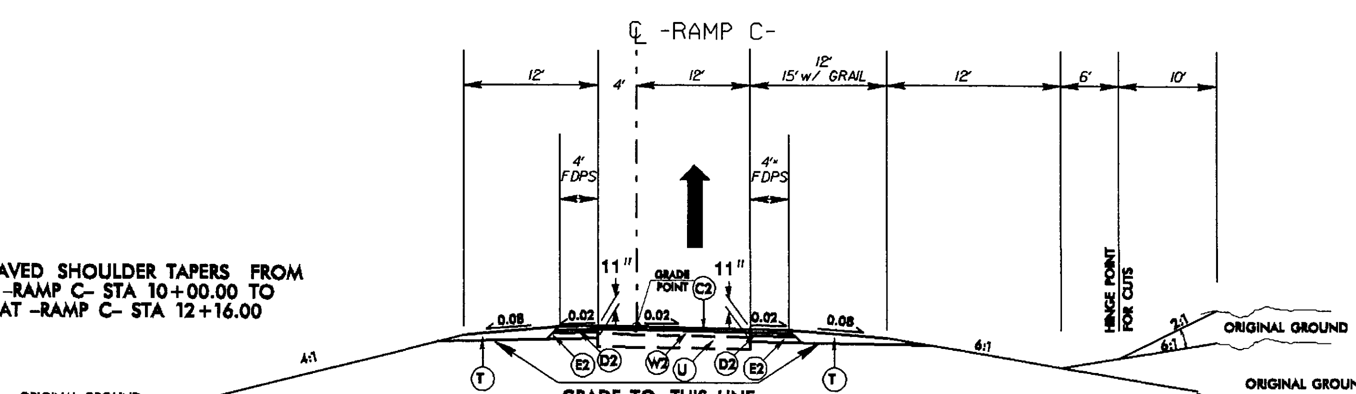


*NOTE: PAVED SHOULDER TAPERS FROM
12' AT -RAMP B- STA 10+00.00 TO
4' AT -RAMP B- STA 12+16.00

TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 9 FOR:

-RAMP B- STA. 14+50.00 TO STA. 18+00.00



*NOTE: PAVED SHOULDER TAPERS FROM
12' AT -RAMP C- STA 10+00.00 TO
4' AT -RAMP C- STA 12+16.00

TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 10 FOR:

-RAMP C- STA. 14+85.00 TO STA. 19+00.00

SEE SHEET 2 FOR FULL PAVEMENT SCHEDULE WITH PLACEMENT INSTRUCTIONS

PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 3" ASPHALT SURFACE COURSE TYPE S9.5C
C2	PROP. APPROX. 3" ASPHALT SURFACE COURSE TYPE S9.5B
C3	PROP. VAR. DEPTH ASPHALT SURFACE COURSE TYPE S9.5C
C4	PROP. VAR. DEPTH ASPHALT SURFACE COURSE TYPE S9.5B
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C
D2	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0B
D4	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0B
E1	PROP. APPROX. 10½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C
E2	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE TYPE B25.0C
E4	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE TYPE B25.0B
R1	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W2	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING-2 DETAIL-SHT 2)

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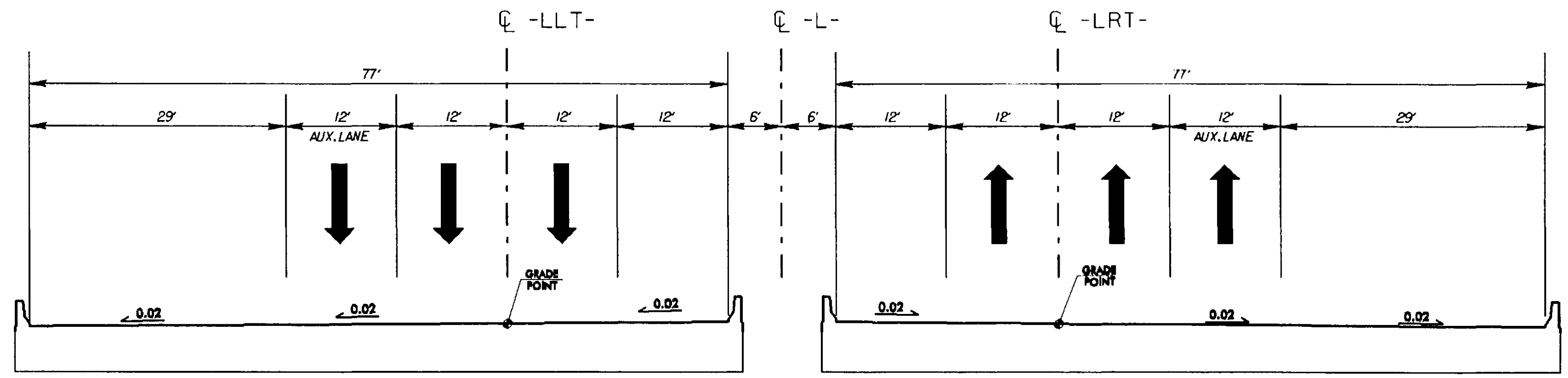
PROJECT REFERENCE NO.	SHEET NO.
B-4507	2-D

R/W SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

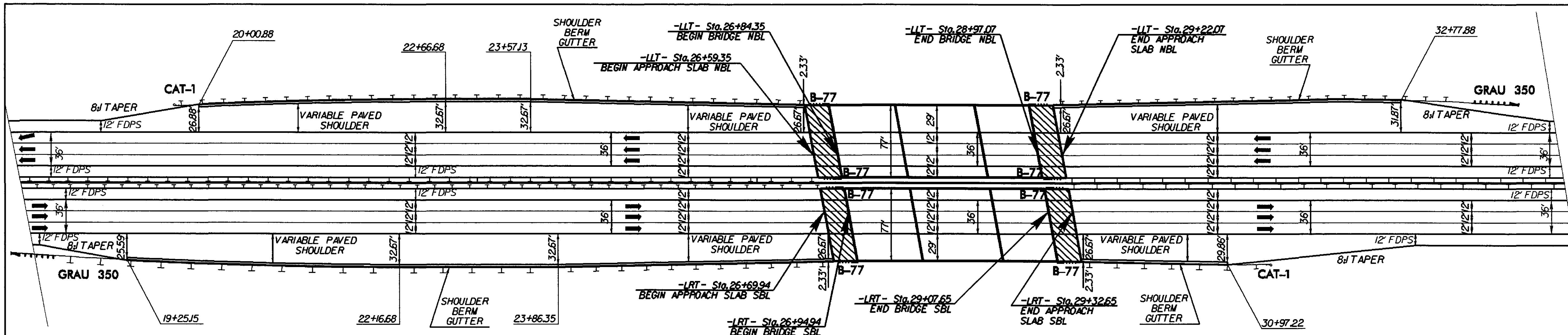


TYPICAL SECTION ON BRIDGE

TYPICAL SECTION NO. 10

USE TYPICAL SECTION ON BRIDGE FOR:

L-LT: -L- STA 26+84.35 TO STA 28+97.07
L-RT: -L- STA 26+94.94 TO STA 29+07.65



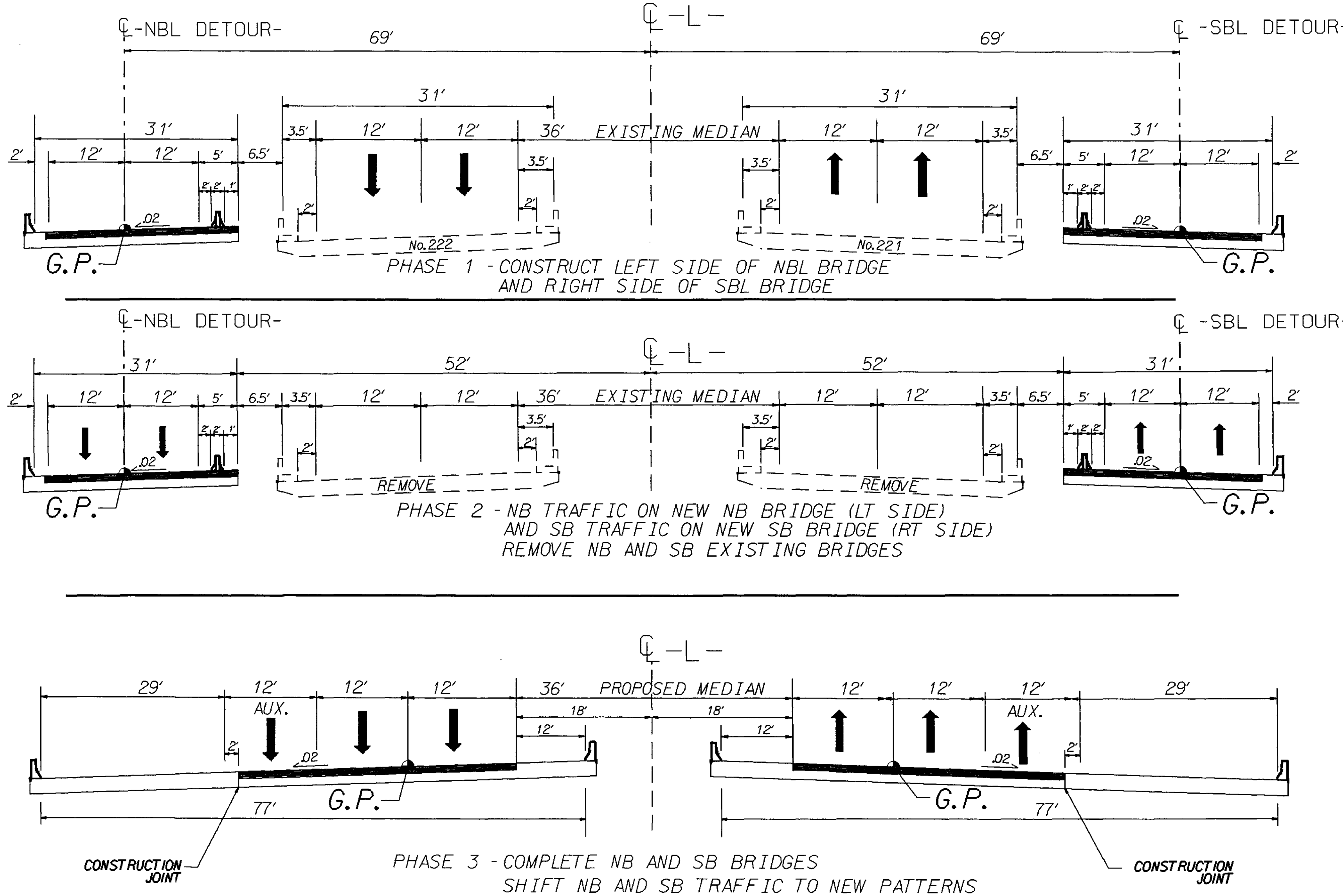
SKETCH SHOWING RELATIONSHIP OF BRIDGE TO PAVEMENT AND SHOULDERS

DETAIL OF PAVED SHOULDER AND SHOULDER BERM GUTTER

PROJECT REFERENCE NO.	SHEET NO.
B-4507	2-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TYPICAL SECTION AND CONSTRUCTION PHASING
FOR BRIDGES No.221 AND No.222 ON US421, OVER MUDDY CREEK



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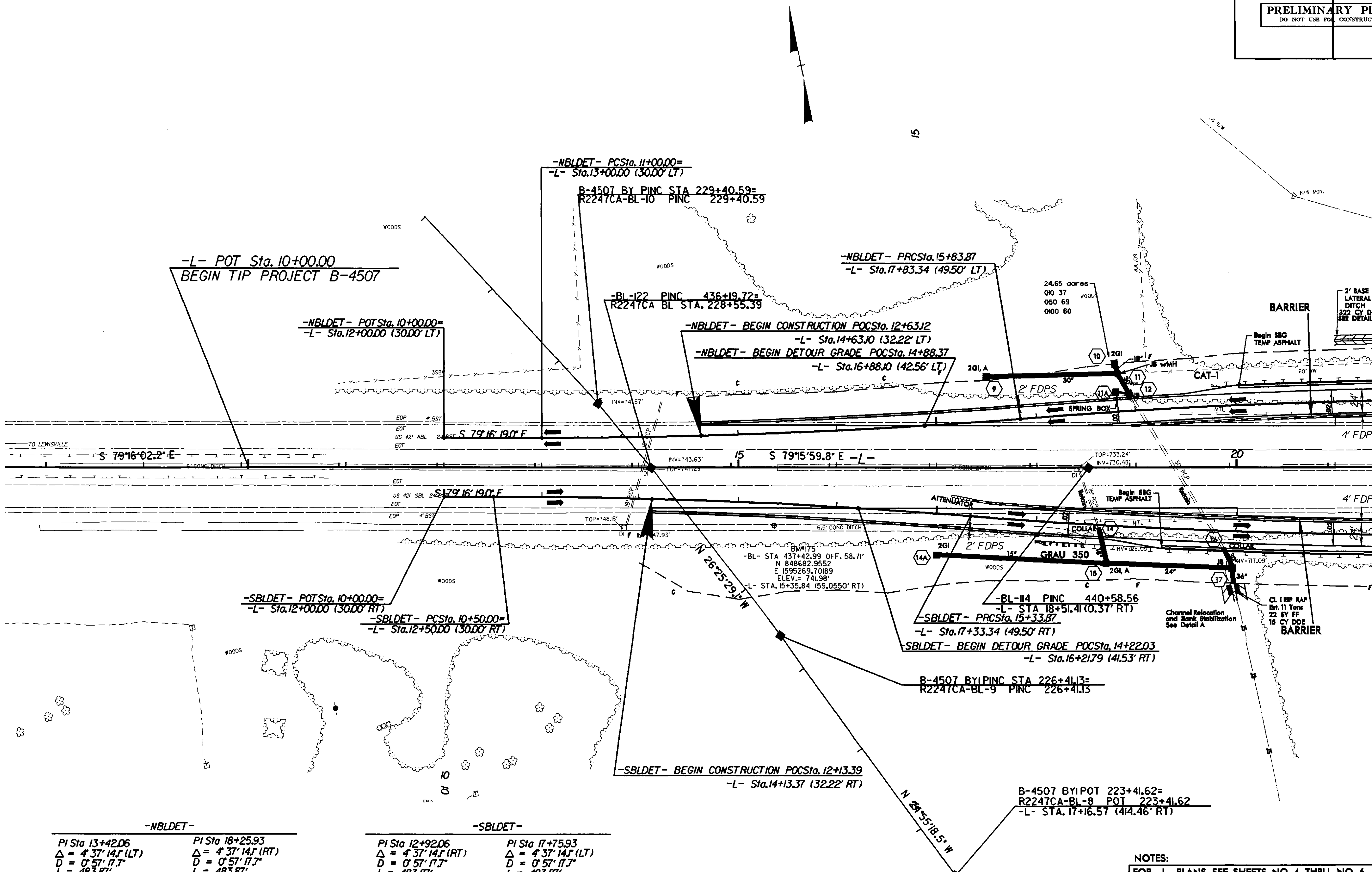
PROJECT REFERENCE NO.	SHEET NO.
B-4507	2-F
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

**DETAIL OF ON-SITE DETOURS



-NBLDET-

PI Sta 13+42.06	PI Sta 18+25.93
Δ = 4°37'14.5" (LT)	Δ = 4°37'14.5" (RT)
D = 0°57'17.7"	D = 0°57'17.7"
L = 483.87'	L = 483.87'
T = 242.06'	T = 242.06'
R = 6,000.00'	R = 6,000.00'
SE = .02	SE = .02 (REVERSED)

-SBLDET-

PI Sta 12+92.06	PI Sta 17+75.93
Δ = 4°37'14.5" (RT)	Δ = 4°37'14.5" (LT)
D = 0°57'17.7"	D = 0°57'17.7"
L = 483.87'	L = 483.87'
T = 242.06'	T = 242.06'
R = 6,000.00'	R = 6,000.00'
SE = .02	SE = .02 (REVERSED)

NOTES:

FOR -L- PLANS, SEE SHEETS NO. 4 THRU NO. 6
FOR DETOUR PROFILES, SEE SHEETS NO. 11 & NO. 12
FOR STRUCTURE PLANS, SEE SHEET S-1 THRU S-11

8/17/99

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8/17/99

REVISIONS

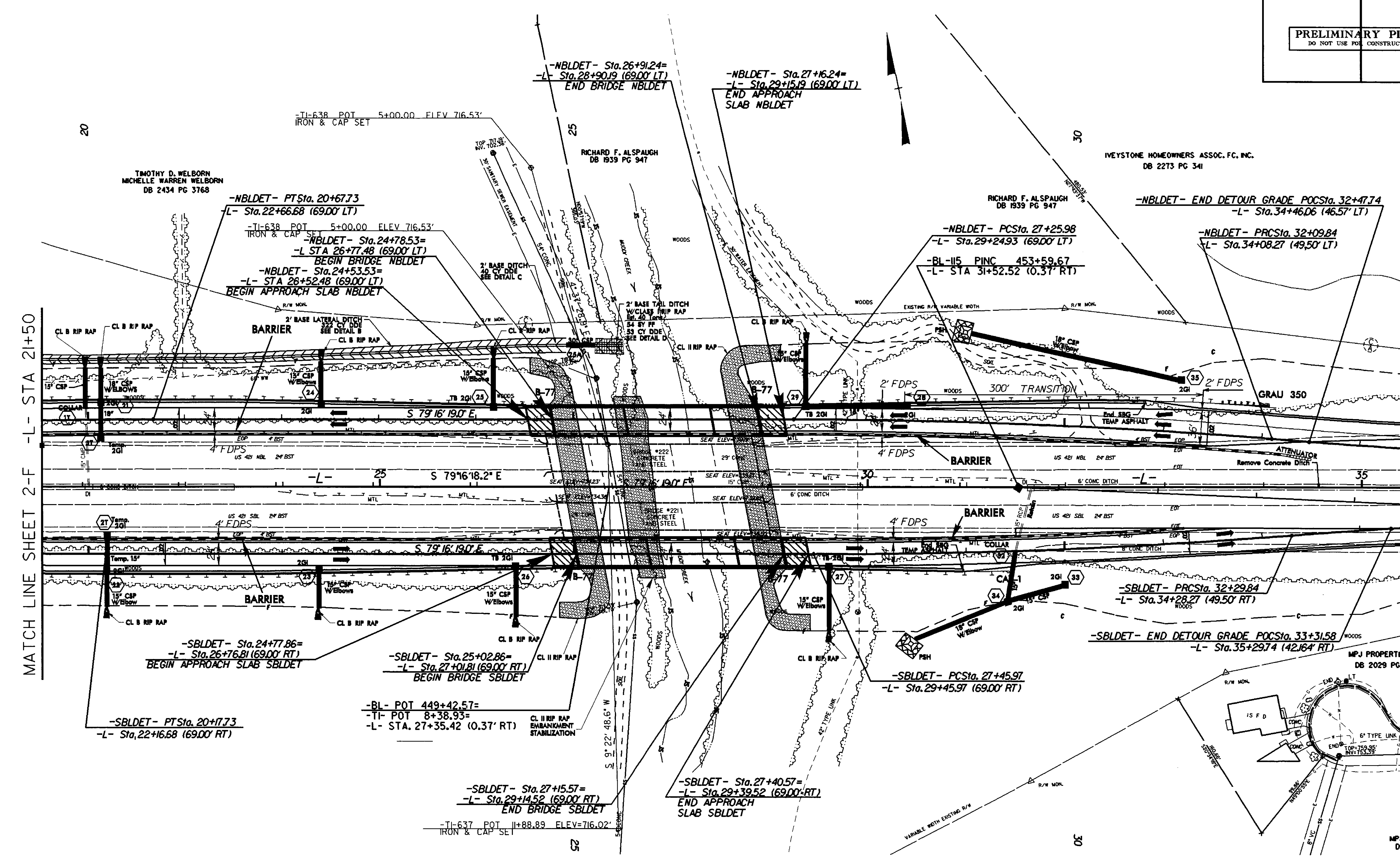
**DETAIL OF ON-SITE DETOURS

PROJECT REFERENCE NO.	SHEET NO.
B-4507	2-G

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-NBLDET-		
PI Sta 18+25.93	PI Sta 29+68.04	PI Sta 34+51.91
Δ = 4° 37' 14.5" (RT)	Δ = 4° 37' 14.5" (RT)	Δ = 4° 37' 14.5" (LT)
D = 0° 57' 17.7"	D = 0° 57' 17.7"	D = 0° 57' 17.7"
L = 483.87'	L = 483.87'	L = 483.87'
T = 242.06'	T = 242.06'	T = 242.06'
R = 6,000.00'	R = 6,000.00'	R = 6,000.00'
SE = .02 (REVERSE)	SE = .02 (REVERSE)	SE = .02

-SBLDET-		
PI Sta 17+75.93	PI Sta 29+88.04	PI Sta 34+71.91
Δ = 4° 37' 14.5" (LT)	Δ = 4° 37' 14.5" (LT)	Δ = 4° 37' 14.5" (RT)
D = 0° 57' 17.7"	D = 0° 57' 17.7"	D = 0° 57' 17.7"
L = 483.87'	L = 483.87'	L = 483.87'
T = 242.06'	T = 242.06'	T = 242.06'
R = 6,000.00'	R = 6,000.00'	R = 6,000.00'
SE = .02 (REVERSE)	SE = .02 (REVERSE)	SE = .02

NOTES:

- FOR -L- PLANS, SEE SHEETS NO. 4 THRU NO. 6
- FOR DETOUR PROFILES, SEE SHEETS NO. 11 & NO. 12
- BRIDGE APPROACH SLAB
- FOR STRUCTURE PLANS, SEE SHEET S-? THRU S-??
- SEE SHEET 2 FOR DITCH DETAILS

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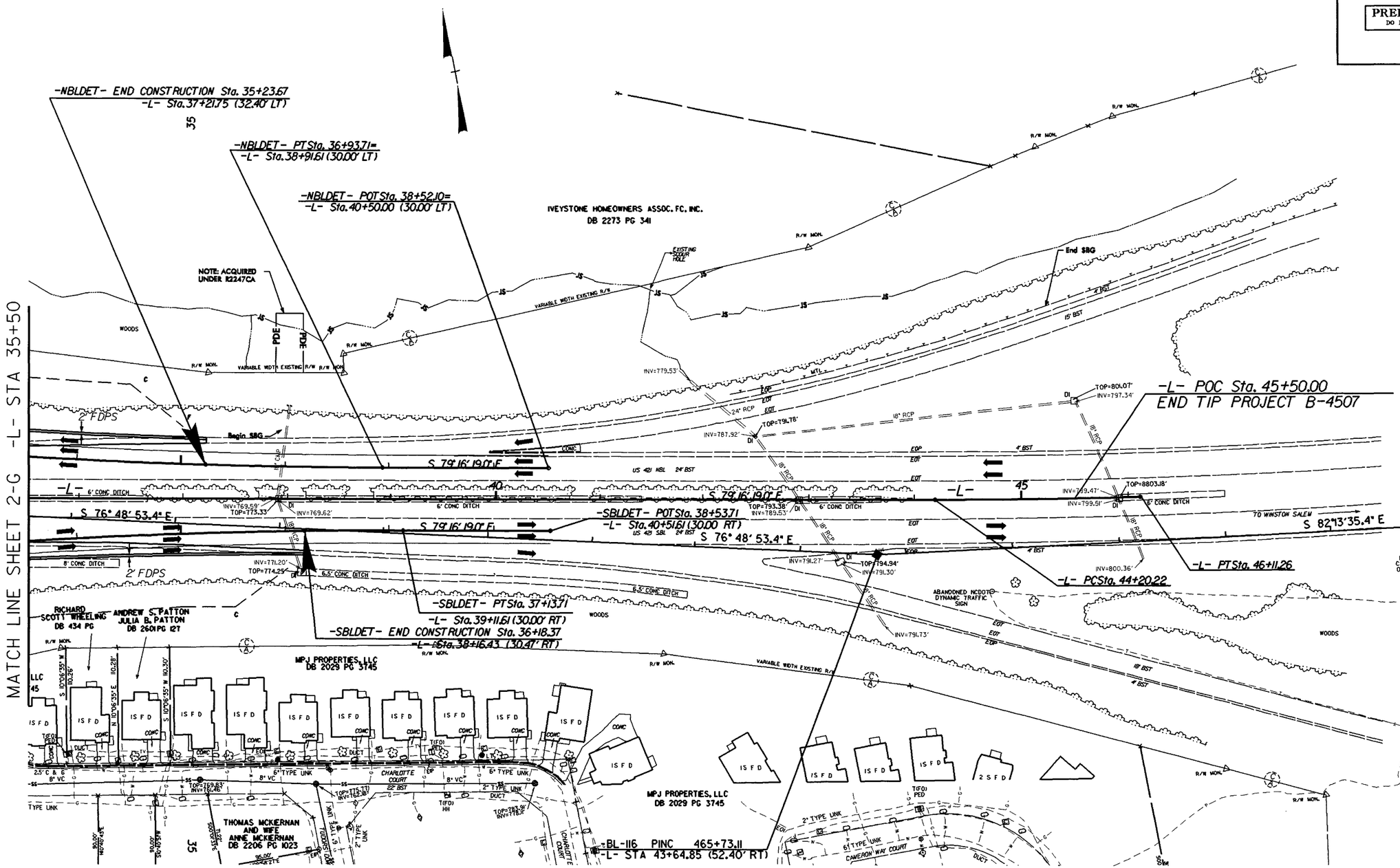
8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4507	2-H
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

**DETAIL OF ON-SITE DETOURS



-NBLDET-	-SBLDET-	-L-
PI Sta 34+51.91	PI Sta 34+71.91	PI Sta 45+15.74
Δ = 4° 37' 14.1" (LT)	Δ = 4° 37' 14.1" (RT)	Δ = 1° 44' 14.7" (LT)
D = 0° 57' 17.7"	D = 0° 57' 17.7"	D = 0° 54' 34.0"
L = 483.87'	L = 483.87'	L = 191.04'
T = 242.06'	T = 242.06'	T = 95.53'
R = 6,000.00'	R = 6,000.00'	R = 6,300.00'
SE = .02	SE = .02	SE = .02
		INC = 40'
		RO = 80'

NOTES:

FOR -L- PLANS, SEE SHEETS NO. 4 THRU NO. 6
FOR DETOUR PROFILES, SEE SHEETS NO. 11 & NO. 12
FOR STRUCTURE PLANS, SEE SHEET S-9 THRU S-9?

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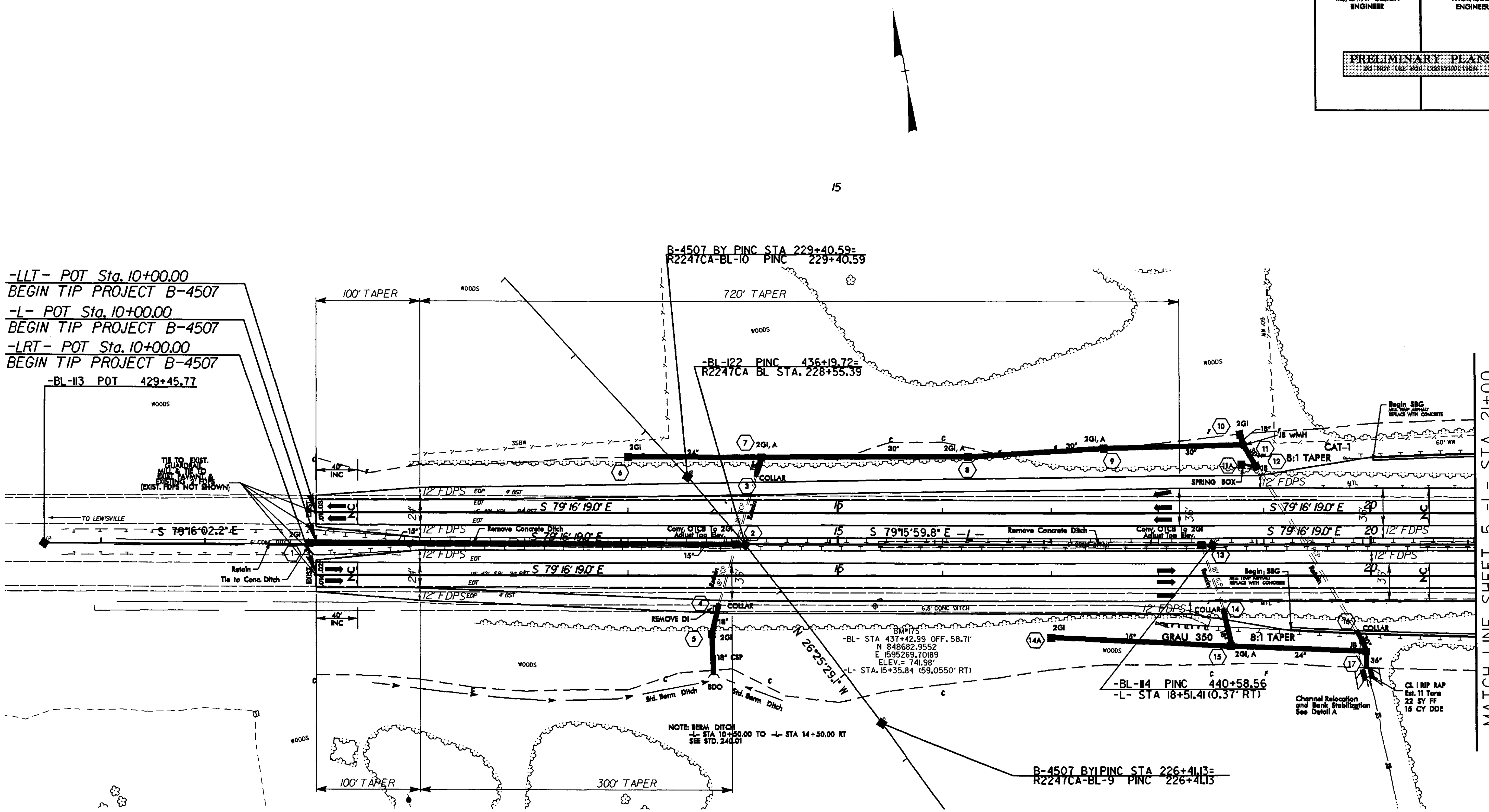
8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4507	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



NOTES:

FOR -L- PROFILE, SEE SHEETS NO. 7 TO NO. 9
FOR DETOUR PLAN, SEE SHEETS 2-F THRU 2-H
FOR DETOUR PROFILES, SEE SHEETS NO. 11 & NO. 12
FOR STRUCTURE PLANS, SEE SHEET S-? THRU S-??
SEE SHEET 2 FOR DITCH DETAILS

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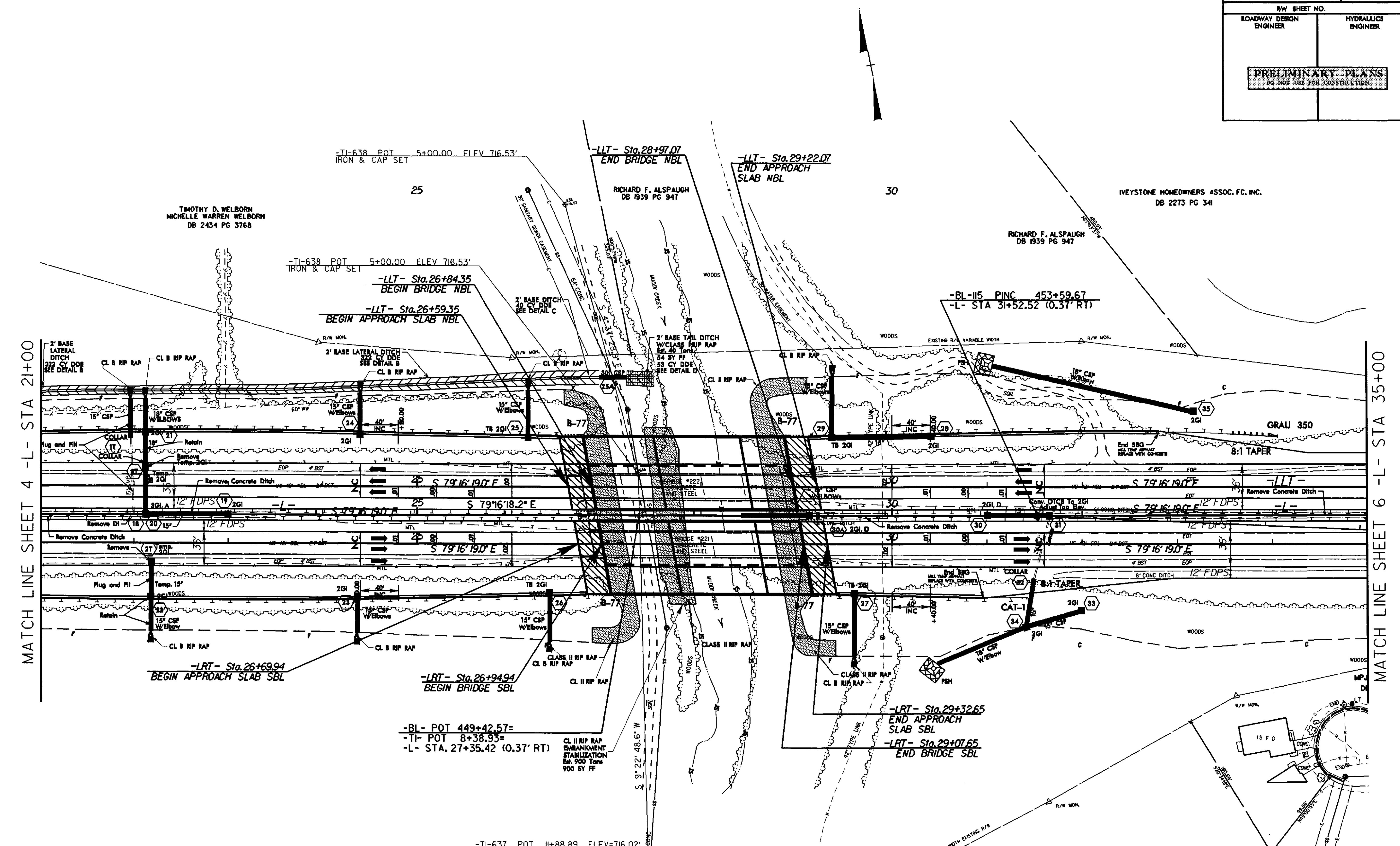
PROJECT REFERENCE NO.	SHEET NO.
B-4507	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS



NOTES:

FOR -L- PROFILE, SEE SHEETS NO. 7 TO NO. 9
FOR DETOUR PLANS, SEE SHEETS 2-F THRU 2-H
FOR DETOUR PROFILES, SEE SHEETS NO. 11 & NO. 12
BRIDGE APPROACH SLAB
SEE SHEET 2-D FOR BRIDGE SKETCH
SEE SHEET 2 FOR DITCH DETAILS
FOR STRUCTURE PLANS, SEE SHEET S-# THRU S-##

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PROJECT REFERENCE NO.	SHEET NO.
B-4507	6

R/W SHEET NO.

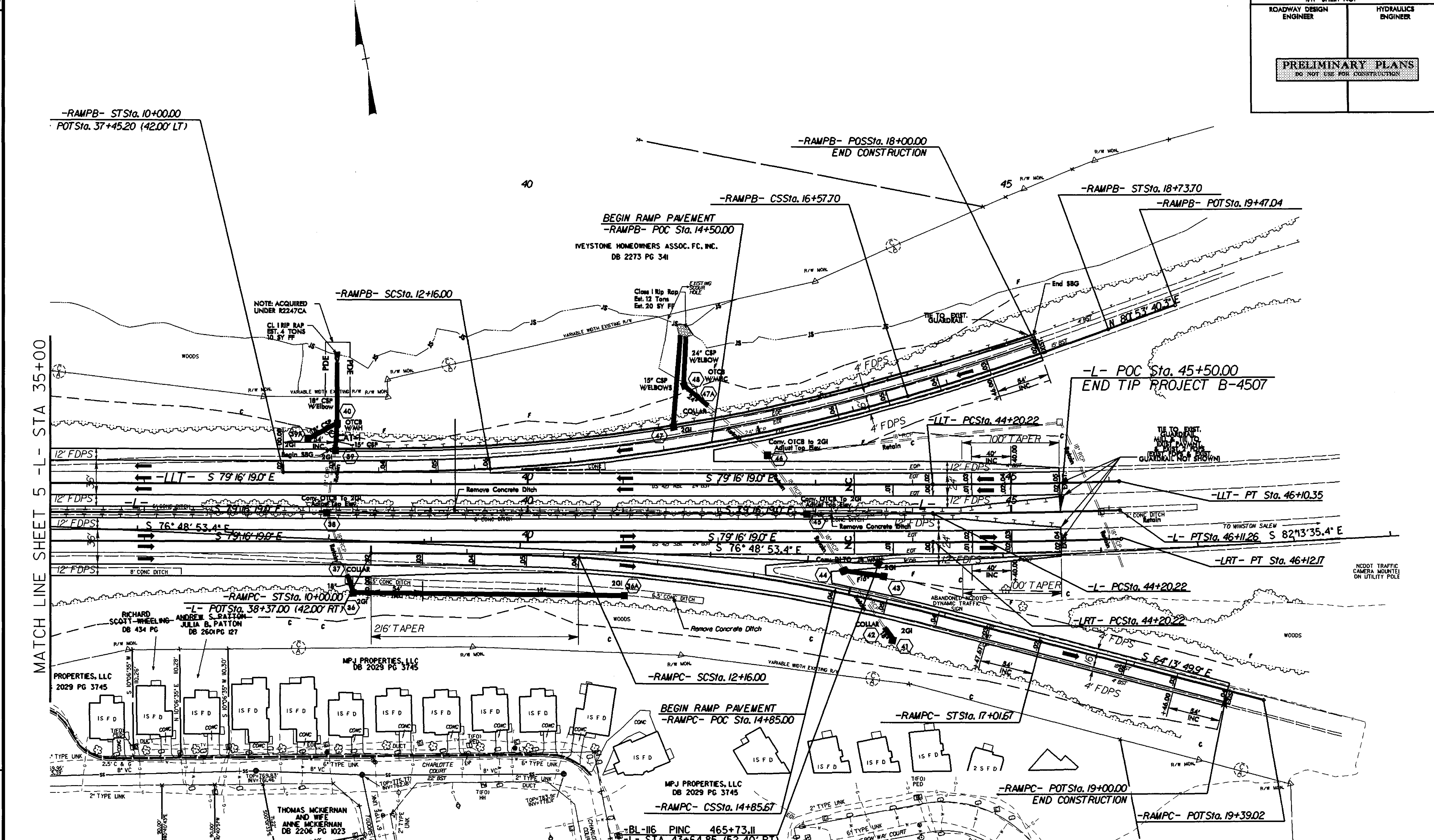
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS



MATCH LINE SHEET 5 -L- STA 35+00
-RAMPB- STSta. 10+00.00
POTSta. 37+45.20 (42.00' LT)
-RAMPB- SCSta. 12+16.00
BEGIN RAMP PAVEMENT
-RAMPB- POC Sta. 14+50.00
IVEYSTONE HOMEOWNERS ASSOC. FC. INC.
DB 2273 PG 341
-RAMPB- CSSta. 16+57.70
-RAMPB- POSSta. 18+00.00
END CONSTRUCTION
-RAMPB- STSta. 18+73.70
-RAMPB- POTSta. 19+47.04
N 80°53' 40.3" E
-L- POC Sta. 45+50.00
END TIP PROJECT B-4507
-LLT- PCSta. 44+20.22
-LLT- PT Sta. 46+10.35
-L- PTSta. 46+11.26
S 82°13'35.4" E
-LRT- PT Sta. 46+12.17
-L- PCSta. 44+20.22
-LRT- PCSta. 44+20.22
S 64°13' 49.9" E
-LLT- S 79°16' 19.0" E
S 76° 48' 53.4" E
100' TAPER
216' TAPER
12' FDPS
4' FDPS
Remove Concrete Ditch
TO WINSTON SALEM
NCDOT TRAFFIC CAMERA MOUNTED ON UTILITY POLE
WOODS
NOTE: ACQUIRED UNDER R2247CA
-RAMPC- STSta. 10+00.00
-L- POTSta. 38+37.00 (42.00' RT)
-RAMPC- SCSta. 12+16.00
BEGIN RAMP PAVEMENT
-RAMPC- POC Sta. 14+85.00
-RAMPC- STSta. 17+01.67
-RAMPC- CSSta. 14+85.67
-RAMPC- POTSta. 19+00.00
END CONSTRUCTION
-RAMPC- POTSta. 19+39.02
RICHARD SCOTT WHEELING
DB 434 PG
ANDREW S. PATTON
JULIA B. PATTON
DB 2601 PG 127
MPJ PROPERTIES, LLC
DB 2029 PG 3745
THOMAS MCKIERNAN AND WIFE ANNE MCKIERNAN
DB 2206 PG 1023
CHARLOTTE COURT
CAMERON WAY COURT
-BL-116 PINC 465+73.11
-L- STA 43+64.85 (52.40' RT)

-RAMPB-

PIs Sta 11+44.02	PI Sta 14+37.85	PIs Sta 17+29.73
θs = 3°15' 24.5"	Δ = 13°19' 11.6" (LT)	θs = 3°15' 24.5"
Ls = 216.00'	D = 3°00' 56.0"	Ls = 216.00'
LT = 144.02'	L = 441.70'	LT = 144.02'
ST = 72.02'	T = 221.85'	ST = 72.02'
SE = .06	R = 1,900.00'	SE = .06
INC = 54'		INC = 54'

-RAMPC-

PIs Sta 11+44.03	PI Sta 13+51.07	PIs Sta 15+57.69
θs = 3°20' 41.4"	Δ = 8°21' 06.3" (RT)	θs = 3°20' 41.4"
Ls = 216.00'	D = 3°05' 49.4"	Ls = 216.00'
LT = 144.03'	L = 269.67'	LT = 144.03'
ST = 72.02'	T = 135.07'	ST = 72.02'
SE = .06	R = 1,850.00'	SE = .06
INC = 54'		INC = 54'

-L-

PI Sta 45+15.74
Δ = 1°44' 14.7" (LT)
D = 0°54' 34.0"
L = 191.04'
T = 95.53'
R = 6,300.00'
SE = .02
INC = 40'
RO = 80'

-LLT-

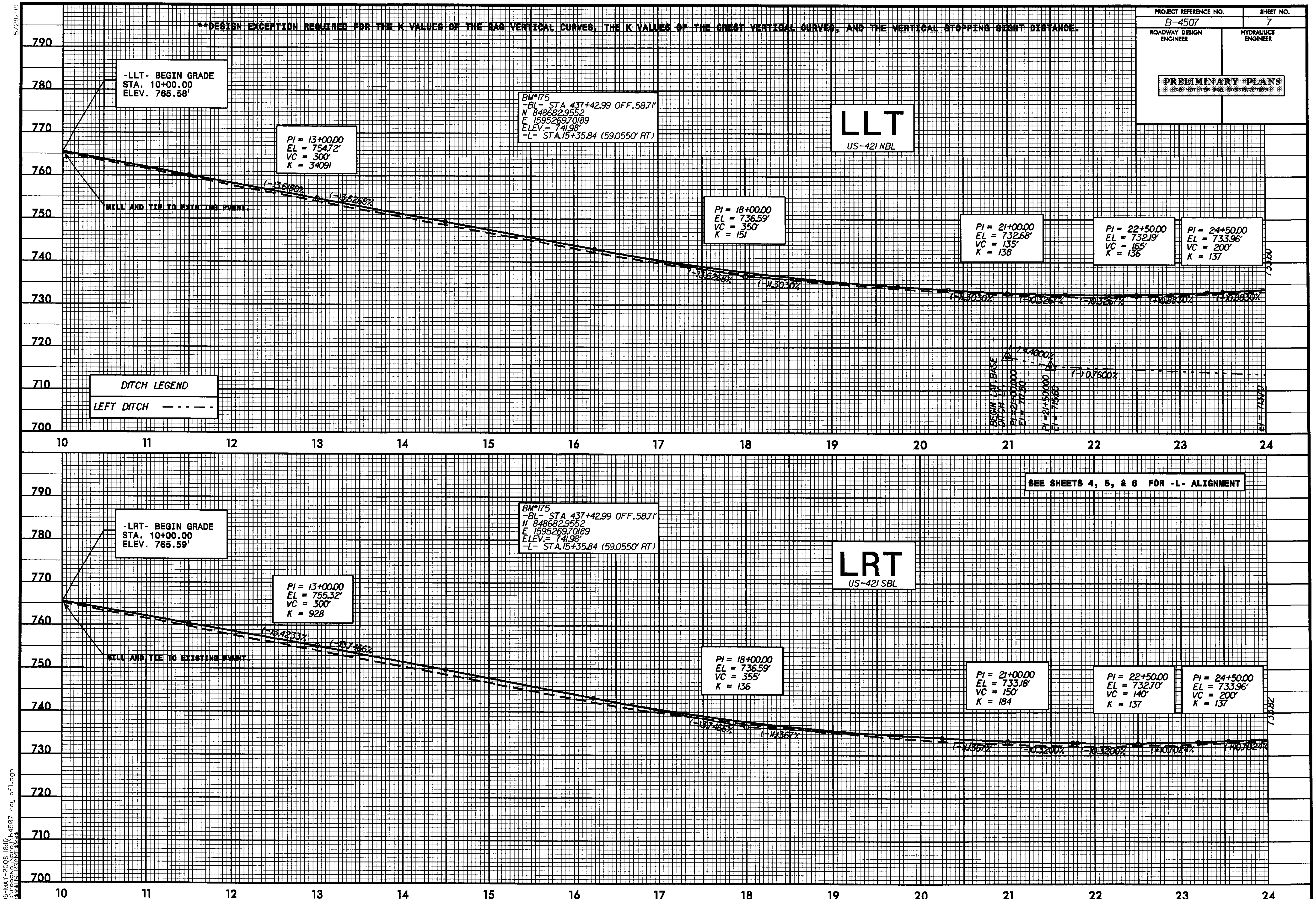
PI Sta 45+15.29
Δ = 1°44' 14.7" (LT)
D = 0°54' 49.7"
L = 190.13'
T = 95.07'
R = 6,270.00'
SE = .02
INC = 40'
RO = 80'

-LRT-

PI Sta 45+16.20
Δ = 1°44' 14.7" (LT)
D = 0°54' 18.5"
L = 191.95'
T = 95.98'
R = 6,330.00'
SE = .02
INC = 40'
RO = 80'

NOTES:

FOR -L- PROFILE, SEE SHEETS NO. 7 TO NO. 9
FOR DETOUR PLANS, SEE SHEETS 2-F THRU 2-H
FOR RAMP PROFILES, SEE SHEETS NO. 10
FOR DETOUR PROFILES, SEE SHEETS NO. 11 & NO. 12
FOR STRUCTURE PLANS, SEE SHEET S-? THRU S-??



PROJECT REFERENCE NO.
B-4507
SHEET NO.
7
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
5/28/99
**DESIGN EXCEPTION REQUIRED FOR THE K VALUES OF THE SAG VERTICAL CURVES, THE K VALUES OF THE CREST VERTICAL CURVES, AND THE VERTICAL STOPPING SIGHT DISTANCE.
-LLT- BEGIN GRADE
STA. 10+00.00
ELEV. 765.58'
MILL AND TIE TO EXISTING PVMNT.
BM#175
-BL- STA 437+42.99 OFF.58.71'
N 848682.9552
E 1595269.70189
ELEV.= 741.98'
-L- STA.15+35.84 (59.0550' RT)
LLT
US-421 NBL
PI = 13+00.00
EL = 754.72'
VC = 300'
K = 34091
PI = 18+00.00
EL = 736.59'
VC = 350'
K = 151
PI = 21+00.00
EL = 732.68'
VC = 135'
K = 138
PI = 22+50.00
EL = 732.19'
VC = 165'
K = 136
PI = 24+50.00
EL = 733.96'
VC = 200'
K = 137
(-)3.6180%
(-)3.6268%
(-)3.6268%
(-)1.3030%
(-)1.3030%
(-)0.3267%
(-)0.3267%
(+)0.8830%
(+)0.8830%
733.60
(-)4.4000%
(-)0.7600%
BEGIN LAT. BASE DITCH LT.
PI = 21+00.000
EL = 717.80
PI = 21+50.000
EL = 715.60
EL = 713.70
DITCH LEGEND
LEFT DITCH
SEE SHEETS 4, 5, & 6 FOR -L- ALIGNMENT
-LRT- BEGIN GRADE
STA. 10+00.00
ELEV. 765.59'
MILL AND TIE TO EXISTING PVMNT.
BM#175
-BL- STA 437+42.99 OFF.58.71'
N 848682.9552
E 1595269.70189
ELEV.= 741.98'
-L- STA.15+35.84 (59.0550' RT)
LRT
US-421 SBL
PI = 13+00.00
EL = 755.32'
VC = 300'
K = 928
PI = 18+00.00
EL = 736.59'
VC = 355'
K = 136
PI = 21+00.00
EL = 733.18'
VC = 150'
K = 184
PI = 22+50.00
EL = 732.70'
VC = 140'
K = 137
PI = 24+50.00
EL = 733.96'
VC = 200'
K = 137
(-)3.4233%
(-)3.7466%
(-)3.7466%
(-)1.1367%
(-)1.1367%
(-)0.3200%
(-)0.3200%
(+)0.7024%
(+)0.7024%
733.82
790
780
770
760
750
740
730
720
710
700
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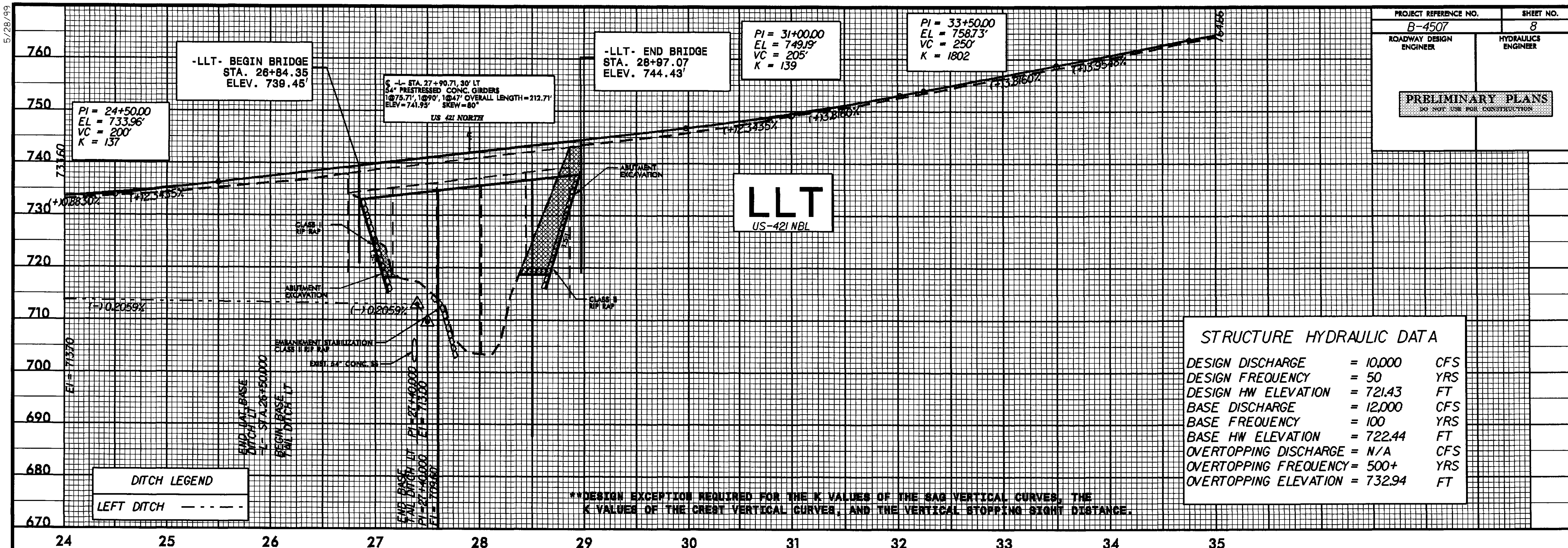
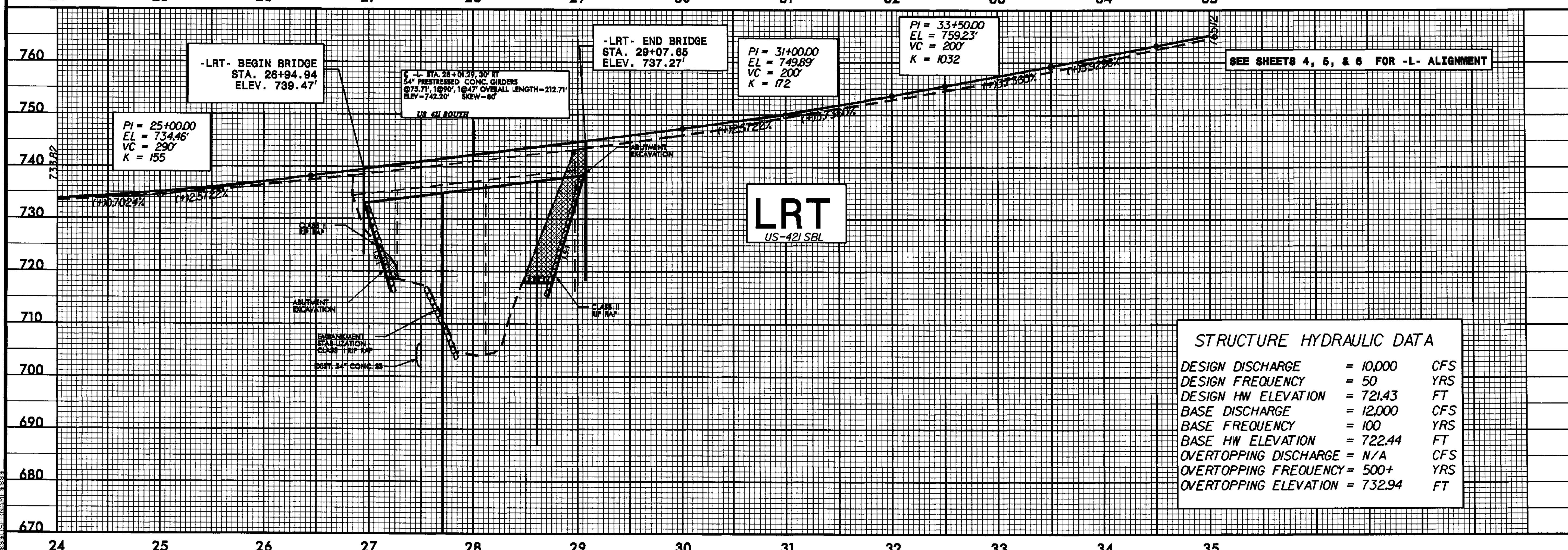
PROJECT REFERENCE NO.	SHEET NO.
B-4507	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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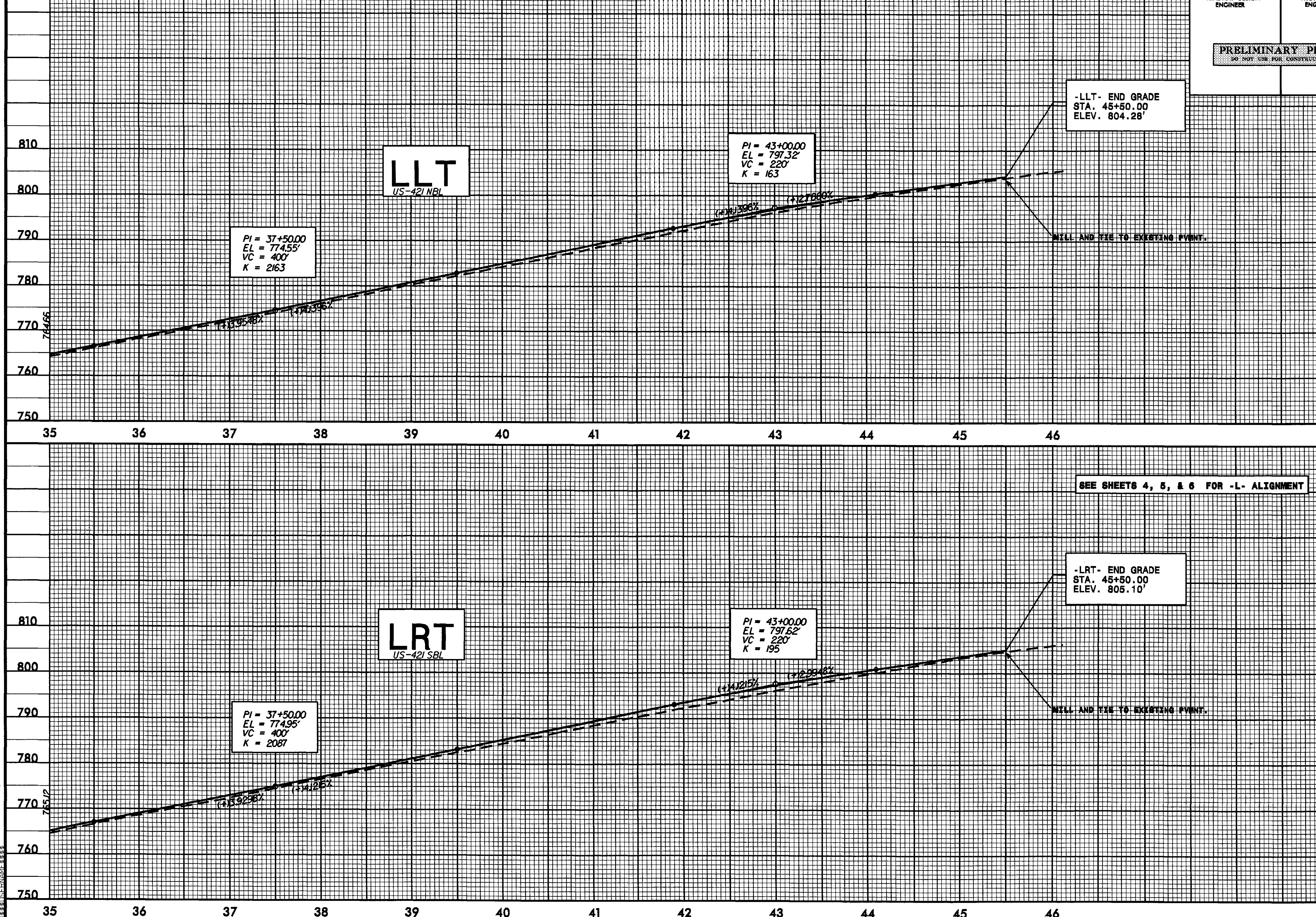
PROJECT REFERENCE NO.	SHEET NO.
B-4507	9

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

**DESIGN EXCEPTION REQUIRED FOR THE K VALUES OF THE SAG VERTICAL CURVES, THE K VALUES OF THE CREST VERTICAL CURVES, AND THE VERTICAL STOPPING SIGHT DISTANCE.



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PROJECT REFERENCE NO.	SHEET NO.
B-4507	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

RAMPB

-RAMPB- BEGIN GRADE
STA. 10+00.00
ELEV. 774.21'

PI = 11+50.00
EL = 780.28'
VC = 250'
K = 1822

PI = 13+90.00
EL = 789.67'
VC = 200'
K = 176

PI = 16+50.00
EL = 802.80'
VC = 200'
K = 1160

-RAMPB- END GRADE
STA. 18+00.00
ELEV. 810.63'

774.21'
(+)2.500%
(+)3.912%
(+)3.912%
(+)5.284%
(+)5.284%
(+)2.268%

820
810
800
790
780
770
760
10 11 12 13 14 15 16 17 18 19

RAMPC

-RAMPC- BEGIN GRADE
STA. 10+00.00
ELEV. 778.32'

PI = 11+75.00
EL = 785.45'
VC = 200'
K = 651

PI = 14+75.00
EL = 796.73'
VC = 200'
K = 228

PI = 17+55.00
EL = 809.72'
VC = 280'
K = 1266

-RAMPC- END GRADE
STA. 19+00.00
ELEV. 816.77'

(+)4.870%
(+)3.625%
(+)3.625%
(+)4.599%
(+)4.599%
(+)4.284%

820
810
800
790
780
770
760
10 11 12 13 14 15 16 17 18 19

SEE SHEET 6 FOR RAMP ALIGNMENTS

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PROJECT REFERENCE NO.	SHEET NO.
B-4507	11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NBLDET

BM#175
-BL- STA 437+42.99 OFF. 58.71'
N 848682.9552
E 1595269.70189
ELEV.= 741.98'
-L- STA 15+35.84 (59.0550' RT)

-NBLDET- BEGIN GRADE
STA. 14+88.37
ELEV. 739.63'

PI = 19+30.00
EL = 725.66'
VC = 835'
K = 152

-NBLDET- BEGIN BRIDGE
STA. 24+78.53
ELEV. 738.48'

-NBLDET- END BRIDGE
STA 26+91.24
ELEV. 743.46'

PI = 29+90.00
EL = 750.50'
VC = 510'
K = 263

-NBLDET- END GRADE
STA. 32+47.74
ELEV. 761.54'

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 10,000	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 721.43	FT
BASE DISCHARGE	= 12,000	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 722.44	FT
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 732.94	FT

SEE SHEETS 2-F, 2-G, & 2-H FOR -NBLDET- ALIGNMENT

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PROJECT REFERENCE NO.	SHEET NO.
B-4507	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SBLDET

BM#175
-BL- STA 437+42.99 OFF. 58.71'
N 848682.9552
E 1595269.70189
ELEV.= 741.98'
-L- STA 15+35.84 (59.0550' RT)

-SBLDET- BEGIN GRADE
STA. 14+22.03
ELEV. 741.91'

PI = 19+57.00
EL = 724.80'
VC = 940'
K = 163

-SBLDET- END GRADE
STA. 33+31.58
ELEV. 765.54'

-SBLDET- END BRIDGE
STA. 27+15.57
ELEV. 744.31'

-SBLDET- BEGIN BRIDGE
STA. 25+02.86
ELEV. 738.84'

PI = 30+42.00
EL = 752.70'
VC = 340'
K = 183

STRUCTURE HYDRAULIC DATA		
DESIGN DISCHARGE	= 10,000	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 721.43	FT
BASE DISCHARGE	= 12,000	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 722.44	FT
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 732.94	FT

SEE SHEETS 2-F, 2-G, & 2-H FOR -SBLDET- ALIGNMENT

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CATEGORICAL EXCLUSION ACTION CLASSIFICATION FORM

TIP Project No.	B-4507 (R-2247CC)
State Project No.	6.628001T
Federal Project No.	

A. Project Description: (Include project scope and location and refer to the attached project location map.)

Replace bridge nos. 221 and 222 on US 421 over Muddy Creek, Forsyth County

B. Purpose and Need:

Bridge Maintenance Unit records indicate the subject bridges have sufficiency ratings of 48.6 and 64.4, respectively, out of a possible 100 for a new structure. The existing Bridge no. 222 did at one point have a sufficiency rating less than 50, and is therefore eligible for Federal Bridge Replacement dollars. The bridges are considered functionally obsolete and structurally deficient. The replacement of these inadequate structures will result in safer and more efficient traffic operations.

C. Proposed Improvements:

Circle one or more of the following Type II improvements which apply to the project:

1. Modernization of a highway by resurfacing, restoration, rehabilitation, reconstruction, adding shoulders, or adding auxiliary lanes (e.g., parking, weaving, turning, climbing).

    a. Restoring, Resurfacing, Rehabilitating, and Reconstructing pavement (3R and 4R improvements)
    b. Widening roadway and shoulders without adding through lanes
    c. Modernizing gore treatments
    d. Constructing lane improvements (merge, auxiliary, and turn lanes)
    e. Adding shoulder drains
    f. Replacing and rehabilitating culverts, inlets, and drainage pipes, including safety treatments
    g. Providing driveway pipes
    h. Performing minor bridge widening (less than one through lane)
    i. Slide Stabilization
    j. Structural BMP's for water quality improvement

2. Highway safety or traffic operations improvement projects including the installation of ramp metering control devices and lighting.

    a. Installing ramp metering devices
    b. Installing lights
    c. Adding or upgrading guardrail

d. Installing safety barriers including Jersey type barriers and pier protection
e. Installing or replacing impact attenuators
f. Upgrading medians including adding or upgrading median barriers
g. Improving intersections including relocation and/or realignment
h. Making minor roadway realignment
i. Channelizing traffic
j. Performing clear zone safety improvements including removing hazards and flattening slopes
k. Implementing traffic aid systems, signals, and motorist aid
l. Installing bridge safety hardware including bridge rail retrofit

3. Bridge rehabilitation, reconstruction, or replacement or the construction of grade separation to replace existing at-grade railroad crossings.

a. Rehabilitating, reconstructing, or replacing bridge approach slabs
b. Rehabilitating or replacing bridge decks
c. Rehabilitating bridges including painting (no red lead paint), scour repair, fender systems, and minor structural improvements
d. Replacing a bridge (structure and/or fill)

4. Transportation corridor fringe parking facilities.

5. Construction of new truck weigh stations or rest areas.

6. Approvals for disposal of excess right-of-way or for joint or limited use of right-of-way, where the proposed use does not have significant adverse impacts.

7. Approvals for changes in access control.

8. Construction of new bus storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and located on or near a street with adequate capacity to handle anticipated bus and support vehicle traffic.

9. Rehabilitation or reconstruction of existing rail and bus buildings and ancillary facilities where only minor amounts of additional land are required and there is not a substantial increase in the number of users.

10. Construction of bus transfer facilities (an open area consisting of passenger shelters, boarding areas, kiosks and related street improvements) when located in a commercial area or other high activity center in which there is adequate street capacity for projected bus traffic.

11. Construction of rail storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and where there is no significant noise impact on the surrounding community.

12. Acquisition of land for hardship or protective purposes, advance land acquisition loans under section 3(b) of the UMT Act. Hardship and protective buying will be permitted only for a particular parcel or a limited number of parcels. These types of land acquisition qualify for a CE only

where the acquisition will not limit the evaluation of alternatives, including shifts in alignment for planned construction projects, which may be required in the NEPA process. No project development on such land may proceed until the NEPA process has been completed.

13. Acquisition and construction of wetland, stream and endangered species mitigation sites.

14. Remedial activities involving the removal, treatment or monitoring of soil or groundwater contamination pursuant to state or federal remediation guidelines.

D. Special Project Information: (Include Environmental Commitments and Permits Required.)

This project is included in the scope of R-2247, the Western Section of the Winston-Salem Northern Beltway, and is covered in the 2007 SFEIS/FEIS and 2008 ROD for the Western Section/Eastern Section of the Winston-Salem Northern Beltway (TIP Projects R-2247/U-2579 and U-2579A). This project phase, B-4507 (R-2247CC), which consists only of replacing the existing US 421 bridges over Muddy Creek on their existing alignment with phased construction, will be the first phase let of R-2247. The phased permit for R-2247 has not been issued yet, and B-4507 (R-2247CC) cannot be delayed until the R-2247 phased permit is complete, because the bridges are in poor shape and need to be replaced soon. (All other phases of R-2247 are post-year in the Draft 2008-2015 STIP). Since there will not be a phased permit in place before B-4507's (R-2247CC's) letting, the FHWA, USACE, NCDWQ, and NCDOT agreed that this PCE, that documents the impacts of B-4507 (R-2247CC) alone, should be produced in order to facilitate permit issuance for the bridge replacement. The information presented here in this PCE is an extraction from the 2007 SFEIS/FEIS for R-2247/U-2579, and relates to impacts to the bridge replacement project alone.

E. Threshold Criteria

The following evaluation of threshold criteria must be completed for Type II actions

ECOLOGICAL		YES	NO
(1)	Will the project have a substantial impact on any unique or important natural resource?		X
(2)	Does the project involve habitat where federally listed endangered or threatened species may occur?		X
(3)	Will the project affect anadromous fish?		X
(4)	If the project involves wetlands, is the amount of permanent and/or temporary wetland taking less than one-tenth (1/10) of an acre and have all practicable measures to avoid and minimize wetland takings been evaluated?	N/A	
(5)	Will the project require the use of U. S. Forest Service lands?		X
(6)	Will the quality of adjacent water resources be adversely impacted by proposed construction activities?		X
(7)	Does the project involve waters classified as Outstanding Water Resources (OWR) and/or High Quality Waters (HQW)?		X
(8)	Will the project require fill in waters of the United States in any of the designated mountain trout counties?		X
(9)	Does the project involve any known underground storage tanks (UST's) or hazardous materials sites?		X

PERMITS AND COORDINATION		YES	NO
(10)	If the project is located within a CAMA county, will the project significantly affect the coastal zone and/or any "Area of Environmental Concern" (AEC)?		N/A
(11)	Does the project involve Coastal Barrier Resources Act resources?		X
(12)	Will a U. S. Coast Guard permit be required?		X
(13)	Will the project result in the modification of any existing regulatory floodway?		X
(14)	Will the project require any stream relocations or channel changes?	X	

SOCIAL, ECONOMIC, AND CULTURAL RESOURCES		YES	NO
(15)	Will the project induce substantial impacts to planned growth or land use for the area?		X
(16)	Will the project require the relocation of any family or business?		X
(17)	Will the project have a disproportionately high and adverse human health and environmental effect on any minority or low-income population?		X
(18)	If the project involves the acquisition of right of way, is the amount of right of way acquisition considered minor?	X	
(19)	Will the project involve any changes in access control?		X
(20)	Will the project substantially alter the usefulness and/or land use of adjacent property?		X
(21)	Will the project have an adverse effect on permanent local traffic patterns or community cohesiveness?		X
(22)	Is the project included in an approved thoroughfare plan and/or Transportation Improvement Program (and is, therefore, in conformance with the Clean Air Act of 1990)?	X	
(23)	Is the project anticipated to cause an increase in traffic volumes?		X
(24)	Will traffic be maintained during construction using existing roads, staged construction, or on-site detours?	X	
(25)	If the project is a bridge replacement project, will the bridge be replaced at its existing location (along the existing facility) and will all construction proposed in association with the bridge replacement project be contained on the existing facility?	X	
(26)	Is there substantial controversy on social, economic, or environmental grounds concerning the project?		X
(27)	Is the project consistent with all Federal, State, and local laws relating to the environmental aspects of the project?	X	
(28)	Will the project have an "effect" on structures/properties eligible for or listed on the National Register of Historic Places?		X
(29)	Will the project affect any archaeological remains which are important to history or pre-history?		X

(30)	Will the project require the use of Section 4(f) resources (public parks, recreation lands, wildlife and waterfowl refuges, historic sites, or historic bridges, as defined in Section 4(f) of the U. S. Department of Transportation Act of 1966)?		X
(31)	Will the project result in any conversion of assisted public recreation sites or facilities to non-recreation uses, as defined by Section 6(f) of the Land and Water Conservation Act of 1965, as amended?		X
(32)	Will the project involve construction in, across, or adjacent to a river designated as a component of or proposed for inclusion in the National System of Wild and Scenic Rivers?		X

F. Additional Documentation Required for Unfavorable Responses in Part E
(Discussion regarding all unfavorable responses in Part E should be provided below. Additional supporting documentation may be attached, as necessary.)

(14) **A short section of unnamed tributary to Muddy Creek will be piped, resulting in approximately 60 feet of anticipated stream impact to that tributary. Approximately 200 feet of temporary impact to Muddy Creek are estimated to be caused by the construction of the causeway.**

G. CE Approval

TIP Project No. B-4507 (R-2247CC)
State Project No. 6.628001T
Federal-Aid Project No. _____

Project Description: (Include project scope and location. Attach location map.)

Replace bridge nos. 221 and 222 on US 421 over Muddy Creek, Forsyth County

Categorical Exclusion Action Classification: (Check one)

_____ TYPE II(A)
__X__ TYPE II(B)

Approved:

5/9/08 _____
Date
Unit Head Central Region
Project Development and Environmental Analysis Branch

5-9-08 _____
Date
Group Leader
Project Development and Environmental Analysis Branch

5-9-08 _____
Date
Project Planning Engineer
Project Development and Environmental Analysis Branch

For Type II(B) projects only:

6-9-08 for _____
Date
Division Administrator
Federal Highway Administration

Green Sheet

PROJECT COMMITMENTS

Replacement of Bridges No. 221 and 222 on US 421 over Muddy Creek
Part of Winston-Salem Northern Beltway
Forsyth County
Federal-Aid Project No.
State Project Nos. 6.628001T
TIP Project No. B-4507 (R-2247CC)

The replacement of Bridge Nos. 221 and 222 on US 421 over Muddy Creek are covered by the Winston-Salem Northern Beltway 2007 SFEIS/FEIS and 2008 Record of Decision. (The entire Northern Beltway extends from US 158 southwest of the City to US 52 north of the City (Western Section) and from US 52 north of the City to US 311 southeast of the City (Eastern Section and Eastern Section Extension), TIP Project Nos. R-2247, U-2579, and U-2579A.) Of the project commitments listed in the 2007 SFEIS/FEIS and 2008 ROD for the entire Northern Beltway, seven are pertinent to the replacement of the US 421 bridges over Muddy Creek.

Attached is the complete list of Project Commitments (Greensheets) for the Winston-Salem Northern Beltway. The seven commitments pertinent to the US 421 bridge replacement projects are showed in black font; all others, which are not pertinent to the bridge replacement projects, are grayed out.

PROJECT COMMITMENTS

Winston-Salem Northern Beltway
Forsyth County
Federal-Aid Project No. NHF-0918 (14)
State Project Nos. 6.628001T, 8.2625101
TIP Project Nos. R-2247, U-2579, and U-2579A

In addition to the Section 404 Conditions, Regional Conditions, State Consistency Conditions, the North Carolina Department of Transportation (NCDOT) Guidelines for Best Management Practices for the Protection of Surface Waters, General Certification Conditions, and Section 401 Conditions of Certification, the following special commitments have been agreed to by NCDOT:

Project Development and Environmental Analysis:

1. Archaeological site 31FY570**, a historic cemetery, will require avoidance or compliance with North Carolina General Statute, Chapter 70.

2. Temporary construction easements may be needed on the historic Clayton Family Farm property. It has been determined that these temporary easements do not constitute a use under Section 4(f). No permanent right of way will be acquired from the Clayton Family Farm property. All work will be contained in temporary easements, and the encroachment on the property will be minimal. The duration of the temporary encroachment on the Clayton Family Farm property will be shorter than the timeframe for the construction of the project. The land temporarily occupied from the Clayton Family Farm will be fully restored, that is, the Clayton Family Farm property will be returned to a condition that is at least as good as that which existed prior to the project.

3. Eligibility of Site 31FY64 is unknown because archaeologists were denied access to the property. If the site falls within the Preferred Alternative after final design, an assessment would be conducted prior to construction after it is acquired by NCDOT. Currently, the site is adjacent to non-preferred Detailed Study Alternative segment E3.

4. A design noise study will be prepared for the selected alternative. The date of public knowledge for noise abatement purposes is the date the Record of Decision (ROD) is signed.

5. The design noise study for the Project R-2247 portion of the Beltway will include an evaluation of Ronald Reagan High School.

*6. The NCDOT will develop Data Recovery Plans (DRP) for Sites 31FY888, 31FY893**, 31FY901, 31FY902**, 31FY903, 31FY910**, 31FY911**, 31FY912**, 31FY921, 31FY925**, 31FY944, 31FY1053/1053**, all of which will be affected by the subject project, in consultation with the North Carolina SHPO.

* Commitments marked by an asterisk (*) are taken from the Memorandum of Agreement between SHPO, NCDOT, and FHWA regarding addressing the Adverse Effects to historic resources (**Appendix D.1 of the SFEIS/FEIS**).

Project Commitments Pertinent to the Replacement of Bridge Nos. 221 and 222 on US 421 over Muddy Creek (TIP Project B-4705 (R-2247CC)) shown in black (as opposed to gray) font.

*7. The NCDOT will ensure that each DRP is implemented after Right-of-Way is acquired or once Right-of-Entry is secured from the property owners and prior to construction activities within the site location as shown in the DRP.

*8. As they are developed, each individual DRP will be forwarded for review by the SHPO.

*9. Upon completion of each Data Recovery effort, the NCDOT will prepare and forward a Management Summary to the SHPO detailing the results of the Data Recovery field investigations. The Management Summary will contain sufficient information to demonstrate that the field investigation portion of the DRP has been implemented.

*10. Upon receipt of the Management Summary, the SHPO will respond within ten (10) days to the recommendations contained within the document.

*11. Upon acceptance of the recommendations contained in the Management Summary, the SHPO will issue the NCDOT documentation that the Data Recovery field investigations have been completed.

*12. The analysis and report preparation, detailing Sites 31FY888, 31FY893**, 31FY901, 31FY902**, 31FY903, 31FY910**, 31FY911**, 31FY912**, 31FY921, 31FY925**, 31FY944, 31FY1053/1053** will be completed by the NCDOT, or their consultants, within twenty-four (24) months after completion of each site's fieldwork schedule.

*13. In consultation with SHPO, NCDOT will determine the extent of control-of-access fencing, as well as its type, material, and finish. NCDOT will purchase and then install the control-of-access fencing within the NCDOT right-of-way. NCDOT will maintain the control-of-access fencing.

Roadway Design:

1. NCDOT will continue to work with residents of affected communities to develop mitigation strategies for community impacts. The following options will be considered during final design to minimize impacts to communities/subdivisions: construction of noise abatement barriers landscaping or vegetative screens based on NCDOT policies and guidelines. These types of options already have been incorporated into the Project R-2247, Project U-2579, and Project U-2579A preliminary engineering designs where practicable, but will be further considered during final design.

2. **During final design for Projects R-2247, U-2579, and U-2579A, all utility providers and railroad operators would be coordinated with to ensure that the proposed design and construction of the project would not substantially disrupt service.**

* Commitments marked by an asterisk (*) are taken from the Memorandum of Agreement between SHPO, NCDOT, and FHWA regarding addressing the Adverse Effects to historic resources (**Appendix D.1 of the SFEIS/FEIS**).

Project Commitments Pertinent to the Replacement of Bridge Nos. 221 and 222 on US 421 over Muddy Creek (TIP Project B-4705 (R-2247CC)) shown in black (as opposed to gray) font.

3. The development of this project will be further coordinated with the City of Winston-Salem and Forsyth County Parks and Recreation Departments to minimize any conflicts with future parks and greenways planning. Provisions will be considered to maintain the future viability of any impacted proposed greenways.

4. NCDOT will coordinate with the Forsyth County Division of Environmental Health and Laboratory regarding the Reynolds Auto Junkyard and other solid waste sites along the selected alternatives for Projects R-2247, U-2579, and U-2579A. Impacted sites will be remediated as required.

5. **NCDOT will consider wildlife crossings where appropriate in the vicinity of stream crossings, which will allow animals to cross under the Beltway.**

6. NCDOT will coordinate with the Town of Kernersville regarding the compatibility of the Beltway design with the proposed Big Mill Farm Road interchange at US 421. This coordination will take place once all relevant design information has been obtained regarding the design of the Big Mill Farm Road interchange.

7. NCDOT intends to maintain a connection from Northampton Road to Old Walkertown Road. The final design will be developed based on design constraints and cost considerations.

*8. NCDOT will align the Alexander Hege House driveway opposite the new intersection ramp, so property access will be under full traffic control. This will allow NCDOT and the property owner full movement for equipment and trucks.

NCDOT Hydraulics Unit:

1. **All bridges and culverts located in designated FEMA flood zones will be designed such that an increase in flood elevation would not exceed the lesser of 0.5 foot for the 100-year flood event or the elevation needed to protect structures.**

2. **A conditional Letter of Map Revision will be prepared for any floodway modification, in coordination with Federal Emergency Management Agency.**

3. **NCDOT will avoid installing bridge bents in creeks to the maximum extent practicable.**

NCDOT Roadside Environmental:

1. During design and construction, efforts will be made to minimize the impact to existing vegetative buffers and natural areas. NCDOT will prepare a post construction landscape design/corridor plan to mitigate construction impacts and integrate enhancements, while remaining sensitive to the environment and to the safety of the traveling public.

* Commitments marked by an asterisk (*) are taken from the Memorandum of Agreement between SHPO, NCDOT, and FHWA regarding addressing the Adverse Effects to historic resources (**Appendix D.1 of the SFEIS/FEIS**).

2. **NCDOT will incorporate sediment and erosion control measures according to the Design Standards in Sensitive Watersheds for all construction in high quality water (HQW) zones in compliance with 15a NCAC 04B.0124.**

*3. NCDOT will provide tree protection measures along the National Register boundary lines adjoining project construction areas. NCDOT will exercise best management practices to minimize, as practicable, tree trimming and disturbance of existing plantings along the National Register boundary.

NCDOT Roadside Environmental and Hydraulics:

1. Generally, 2:1 slopes will be used where possible to minimize culvert length, and NCDOT will shorten culvert lengths where possible and daylight systems between culverts where possible in interchange areas.

NCDOT Right of Way Branch:

1. NCDOT will work with the property owner of Walker Mobile Home Park off of Bethania-Tobaccoville Road to determine the feasibility of relocating the homes to another area of the parcel.

2. NCDOT will contact the pastor of Mount Pleasant Holiness Church prior to the public hearing and will, if desired, meet with the pastor and members of the church to discuss the impact of Project U-2579 on the church, NCDOT relocation policies, and potential mitigation. *Action since the 2004 SFEIS/SDEIS: NCDOT and consultant staff met with the pastor and members of Mount Pleasant Holiness Church during the 2005 public hearings. The church representatives declined to attend an additional meeting regarding this project or impacts of the Northern Beltway on the church. Additional information is in* ***Section 6.2.2.3****.*

3. NCDOT will contact minority residents of North Oaks subdivision prior to the public hearing and will, if desired, meet with them to discuss the impacts of Project U-2579 on the community, NCDOT relocation policies, and potential mitigation. *Action since the 2004 SFEIS/SDEIS: NCDOT and consultant staff met the with North Oaks community on November 15, 2004. Additional information is in* ***Section 6.2.2.3****.*

NCDOT Division 9 and Construction:

1. A pre-construction survey will be done in areas of concern regarding possible blast-related structural damage to assess a pre-construction condition.

* Commitments marked by an asterisk (*) are taken from the Memorandum of Agreement between SHPO, NCDOT, and FHWA regarding addressing the Adverse Effects to historic resources (**Appendix D.1 of the SFEIS/FEIS**).

NCDOT Division 9:

1. During construction for Project U-2579A, NCDOT will coordinate with the Forsyth County School Board to ensure the safety of those students bicycling and/or walking to Sedge Garden Elementary School. If a portion of school property is needed for a temporary construction easement, that area will be fenced to keep school children out of the construction site. The school property will be restored following construction.

2. **NCDOT will coordinate with local media during the construction of the project to alert the public of traffic restrictions and construction related activities.**

3. NCDOT shall not approve any new driveway permits along the property of the historic John Henry Kapp Farm within the right of way for the Preferred Alternative. This condition shall be filed in the NCDOT Division office responsible for driveway permits.