



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

September 11, 2008

US Army Corps of Engineers
Raleigh Field Office
3331 Heritage Trade Dr., Suite 105
Wake Forest, NC 27587

ATTENTION: Eric Alsmeyer
NCDOT Coordinator

Dear Sir:

Subject: **Application for Section 404 Nationwide Permits 23 and 13, Section 401 Water Quality Certification, and Neuse Riparian Buffer Authorization** for the replacement of Bridge No. 336 over Terrible Creek on SR 1301 (Sunset Lake Road), Wake County. Federal Aid Project Number BRZ-1301(2), WBS No. 33639.1.1, State Project No. 8.2409601, Division 5, T.I.P No. B-4302.

Debit \$570.00 from WBS 33639.1.1.

The North Carolina Department of Transportation (NCDOT) proposes to replace the 37-foot, Bridge No. 336 over Terrible Creek. The project involves replacing the current bridge in its existing location, while using an on-site detour west of the bridge (Alternative C) to maintain traffic during construction, as stated in the Categorical Exclusion (CE). The existing bridge is currently in poor condition and in need of replacement.

The proposed structure 45 inch prestressed concrete girder approximately 184 feet in length with three spans at 59 feet, 62 feet, and 63 feet. The proposed substructure is not known at this time; however, no bents will be located in the water. The proposed bridge has 48 feet of clear roadway, two sidewalks of 5.5 feet, and an out to out width of 62 feet. The new roadway will consist of two 12-foot lanes at the beginning that transition to three 12 foot lanes across the bridge and to the end of the project. The shoulder is 8 foot with 4 foot full depth paved shoulder except for about 200-foot of curb and gutter before and after the bridge on the low side of the super (left side).

Please see the enclosed pre-construction notification, Approved Jurisdictional Determination Forms, U.S. Fish and Wildlife (USFWS) concurrence letter, Ecosystem Enhancement Program (EEP) acceptance letter, permit drawings, and design plans for the subject project. A CE was completed for this project in May 2007 and distributed shortly thereafter. Additional copies are available upon request.

IMPACTS TO WATERS OF THE UNITED STATES

The project is located in the Neuse River Basin (sub-basin 03-04-03). This area is part of Hydrologic Cataloging Unit 03020201 of the South Atlantic-Gulf Coast Region. Four riparian wetlands and two

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

jurisdictional streams, Terrible Creek and a perennial unnamed tributary to Terrible Creek (UT1), will be impacted by the proposed project. The wetland and stream delineations were reviewed by US Army Corp of Engineers (USACE) representative Eric Alsmeyer on June 8, 2004. No notice of jurisdictional determination was issued. Therefore, as required by USACE, the Approved Jurisdictional Determination Form was completed and has been included with the permit application.

The section of Terrible Creek crossed by the subject bridge has been assigned Stream Index Number 27-43-15-8-(1) by the N.C Division of Water Quality. Terrible Creek has a best usage classification of B NSW. UT1 does not have separate best usage classification and therefore share that of its receiving waters, Terrible Creek.

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. Terrible Creek is not listed on the Final 2006 303(d) list of impaired waters for the Neuse River Basin, nor does it drain into any 303(d) waters within 1-mile of the project area.

Permanent Impacts

There will be permanent impacts to 0.48 acre of riverine wetland and 215 linear feet of perennial stream.

There will be 0.26 acre of permanent riparian wetland impacts at Site 1 due to the construction of the bridge and the culvert for the on-site detour. Construction of the detour culvert will require 0.07 of excavations in wetlands at Site 1. Construction of the bridge will result in 0.08 acre of permanent fill in the wetlands, 0.06 acre of excavation of wetlands, and 0.05 acre of mechanized clearing due to construction of the southern bridge abutment at Site 1.

Construction of the approach roadways will result in 0.22 acre of permanent fill in riparian wetlands at Site 2.

Construction of the bridge will also result in 215 linear feet of permanent stream impacts to Terrible Creek resulting from the placement of rip rap on the channel bank for bank stabilization. The banks are currently unstable and the rip rap is necessary to prevent further erosion.

Temporary Impacts

Construction of the on-site detour and new bridge and approaches will result in temporary wetland and stream impacts. Construction of the temporary detour will utilize a culvert consisting of five 72-inch corrugated steel pipes. Construction of the culvert will result in 0.34 acre of temporary fill in wetlands and temporary stream impacts of 60 linear feet. The temporary roadway required for the detour will result in 0.18 acre of temporary fill in wetlands.

Hand Clearing

There will be 0.01 acre of hand clearing required to provide additional access to construction areas.

Utility Impacts

The proposed project will impact water, gas, cable television, power, and telephone utilities. Water, gas, and telephone utilities will be relocated via directional bore from outside the wetland boundaries. The aerial power and cable television lines will be relocated along the west side of the project. The poles will be placed inside the proposed fill slope of the project which is inside the proposed right of way and outside of the wetland boundaries. No additional trees will need to be cleared inside the wetland boundaries beyond what is being cleared for the project.

No additional impacts to jurisdictional resources will result from the removal or relocation of the impacted utilities.

Bridge Demolition

The existing Bridge No. 336 was built in 1950 and is 37-feet in length. It is a two span structure that consists of a reinforced concrete floor with an asphalt wearing surface on steel I-beams. The substructure is composed of reinforced concrete caps on timber piles and timber vertical abutments. There is one bent located in the water.

During the removal of the old bridge, the existing timber piles will be pulled out. In the event that the piles break off in this process, the contractor will cut off the piles flush with natural ground or natural stream bed level.

The existing bridge can be removed without dropping components into Waters of the United States during bridge removal. Best Management Practices for Bridge Demolition and Removal and Protection of Surface Waters will be followed.

IMPACTS TO NEUSE RIPARIAN BUFFER

Terrible Creek and UT1 are subject to the Neuse Riparian Buffer Rules. Construction of the detour culvert, new bridge, and approaches will result in impacts to the buffers of Terrible Creek and UT1. Buffer impacts are described in Table 1 below.

Table 1. Neuse River Buffer Impacts

	Bridge	Road Crossing*	Temporary Road Used for Bridge Construction	Impact Other Than Road Crossing
Zone 1 Impact (sq. ft)	6360	0	7669	1908
Zone 2 Impact (sq. ft)	3298	680	3480	7132
Mitigation requirements (exempt, allowable or allowable with mitigation)	Allowable	Allowable	Allowable	Allowable with Mitigation

* Impacts are less than 150 linear feet

Under the Neuse Buffer Rules, impacts to buffers resulting from the construction of bridges are allowable. Impacts resulting from construction of the approaches are allowable because the impacts do not exceed 150 linear feet or one-third of an acre. Impacts resulting from the construction of the temporary detour road are allowable provided that restoration activities are conducted immediately after construction.

Utility Impacts to Riparian Buffers

The proposed project will impact water, gas, cable television, power, and telephone utilities. Water, gas, and telephone utilities will be relocated via directional bored from outside the buffer boundaries. The aerial power and cable television lines will be relocated along the west side of the project. The poles will be placed inside the proposed fill slope of the project which is inside the proposed right of way and outside of the wetland boundaries. No additional trees will need to be cleared inside the buffer boundaries beyond what is being cleared for the project.

No additional impacts to riparian buffers will result from the removal or relocation of the impacted utilities.

Wetlands in Buffers

According to 15A NCAC 2B .0242, Section (3)(b)(iii), impacts to wetlands within Zones 1 and 2 of the riparian buffer that are subject to mitigation under 15A NCAC 2H .0506 shall comply with the mitigation ratios in 15A NCAC 2H .0506 only. Therefore, any wetland impacts that occur within either/both buffer zones will be subtracted from the mitigable buffer impacts and mitigated for as wetland impacts only. Wetland impacts overlap buffer impacts in all three (exempt, allowable, and allowable with mitigation) categories. Table 2 lists only the wetland impacts overlapping the allowable with mitigation buffer impacts along with the net total of mitigable buffer impacts.

Table 2. Wetlands in Buffers and Mitigable Tar-Pamlico River Buffer Impacts

Type of Impact	Impacts Other Than Road Crossings
Mitigation requirements	Allowable with Mitigation
Zone 1 Impacts (sq. ft)	1908
Wetlands In Buffer (WIB), Zone 1 (sq. ft)	17
Zone 2 Impacts (sq. ft)	7132
WIB, Zone 2 (sq. ft)	3465
Total Zone 1 Impacts, Minus WIB (sq. ft)	1891
Total Zone 2 Impacts, Minus WIB (sq. ft)	3667
Total [Zones 1 and 2, Minus WIB (sq. ft)]	5558

No Practical Alternative Analysis

The project area has been evaluated and there are no practical alternatives to replacing the bridge. This bridge has been determined to be structurally deficient and functionally obsolete. The replacement of this inadequate structure will result in safer and more efficient traffic operations. Because this bridge needs to be replaced, impacts to the riparian buffers are unavoidable.

All non-maintained riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the pre-construction contours and revegetated with native woody species.

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 US. The following is a list of the project’s jurisdictional stream and Neuse Buffer avoidance/minimization activities proposed or completed by NCDOT:

Avoidance/Minimization

- Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of stringent erosion control methods and use of Best Management Practices (BMPs).

- Design Standards in Sensitive Watersheds will be implemented.
- The proposed bridge will span Terrible Creek with no bents located in the channel.
- The proposed bridge will be 46-feet longer increasing the floodplain under the bridge.
- The bridge will be replaced in its existing location minimizing impacts to wetlands and buffers.
- All non-maintained riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the pre-construction contours and revegetated with native woody species.

Compensatory Mitigation

NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent possible as described above. Compensatory mitigation will be required for unavoidable impacts to 0.48 acre of riparian wetland, 1891 square feet of buffer zone 1, and 3667 square feet of buffer zone 2.

The stream banks within the project area are currently unstable. Bank stabilization is provided as remediation for eroding banks and will prevent further erosion and does not constitute loss of Waters of the U.S., and therefore no mitigation is proposed for impacts resulting from bank stabilization.

The EEP acceptance letter is attached.

FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. The United States Fish and Wildlife Service (USFWS) website (updated May 10, 2007) lists three species for Wake County. Table 2 lists the species and their federal status.

Table 2. Federally Protected Species in Wake County, NC

Common Name	Scientific Name	Federal Status*	Biological Conclusion	Habitat Present
Michaux's sumac	<i>Rhus michauxii</i>	E	No Effect	Yes
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	No Effect	No
Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	E	May affect, not likely to adversely affect	Yes

Biological conclusions of "No Effect" were given in the CE for red-cockaded woodpecker and Michaux's sumac. There is no suitable habitat for the red-cockaded woodpecker. There was suitable habitat for Michaux's sumac within disturbed areas and rights-of-way, however, no plants were observed during surveys performed June 1, 2004 and July 1, 2008 by NCDOT biologists.

A biological conclusion of "May affect, not likely to adversely affect" was given for the dwarf wedgemussel. A survey was conducted by NCDOT biologist on November 19, 2004. While Terrible Creek does have suitable habitat for the dwarf wedgemussel, it has never been observed within Terrible Creek and is unlikely to occur within the project area. USFWS concurred with the biological conclusion in a letter dated April 13, 2006. No further surveys are required.

SCHEDULE

The project calls for a letting of April 21, 2009 (review date of March 3, 2009) with a date of availability of June 2, 2009. It is expected that the contractor will choose to start construction in June.

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 the activities be authorized by a Nationwide Permit 23 for a combined 0.52 acre of temporary and permanent wetland impacts and a Nationwide 13 for 215 linear feet of bank stabilization (72 FR 11092-11198; March 12, 2007).

Section 401 Permit: We anticipate 401 General Certification numbers 3701 and 3689 will apply to this project. This project will require written concurrence. In accordance with 15A NCAC 2H, Section .0500(a) and 15A NCAC 2B.0200 we will provide \$570 to act as payment for processing the Section 401 permit. 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.

Buffer Certification: This project has been designed to comply with the Neuse Riparian Buffer Regulations (15A NCAC 2B.0259). NCDOT requests a Neuse Riparian Buffer Authorization from the Division of Water Quality.

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 Erica McLamb at 715-1521.

Sincerely,

for 

Gregory J. Thorpe, Ph.D.

Environmental Management Director, PDEA

w/attachment

Mr. Brian Wrenn, NCDWQ (5 Copies)
Mr. J. Wally Bowman, PE., Division Engineer
Mr. Chris Murray, DEO

w/o attachment (see 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. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Scott McLendon, USACE, Wilmington
Mr. Gary Jordan, USFWS
Mr. Travis Wilson, NCWRC
Ms. Anne Deaton, NCDMF
Ms. Theresa Ellerby, PDEA
Ms. Beth Harmon, EEP
Mr. Todd Jones, NCDOT External Audit Branch

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:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Section 404 Permit | <input checked="" type="checkbox"/> Riparian or Watershed Buffer Rules |
| <input type="checkbox"/> Section 10 Permit | <input type="checkbox"/> Isolated Wetland Permit from DWQ |
| <input checked="" type="checkbox"/> 401 Water Quality Certification | <input type="checkbox"/> Express 401 Water Quality Certification |

2. Nationwide, Regional or General Permit Number(s) Requested: NW23 and 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: Gregory J. Thorpe, Ph.D., Environmental Management Director
Mailing Address: 1598 Mail Service Center
Raleigh, NC 27699-1548

Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794
E-mail Address: _____

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: Replacement of Bridge No. 336 over Terrible Creek on SR 1301 (Sunset Lake Road)
2. T.I.P. Project Number or State Project Number (NCDOT Only): B-4302
3. Property Identification Number (Tax PIN): _____
4. Location
County: Wake Nearest Town: Raleigh
Subdivision name (include phase/lot number): _____
Directions to site (include road numbers/names, landmarks, etc.): US 401 to Sunset Lake Road.
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): 35.6073 °N 78.7740°W
6. Property size (acres): N/A
7. Name of nearest receiving body of water: Terrible Creek
8. River Basin: Neuse River
(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: This project is located in an urban area that consists mainly of residential property with some forested areas.

10. Describe the overall project in detail, including the type of equipment to be used: _____
Bridge No. 42 will be replaced on existing location with a offsite detour. Heavy duty excavation equipment will be used such as trucks, dozers, cranes and other various equipment necessary for roadway construction.

11. Explain the purpose of the proposed work: To replace a deteriorating bridge.

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. N/A

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: _____ Please refer to the attached cover letter

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)
Site 1	Mechanized clearing	Riparian	Yes	1	0.05
Site 1	Temporary Fill	Riparian	Yes	1	0.34
Site 1	Permanent Fill	Riparian	Yes	1	0.08
Site 1	Excavation	Riparian	Yes	1	0.13
Site 2	Permanent Fill	Riparian	Yes	50	0.22
Site 2	Temporary Fill	Riparian	Yes	25	0.33
Total Wetland Impact (acres)					1.15

3. List the total acreage (estimated) of all existing wetlands on the property: 1.15 acre

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	Terrible Creek	Temporary	Perennial	20 ft	60	0.05
Site 1	Terrible Creek	Bank Stabilization	Perennial	20 ft.	215	0.04
Total Stream Impact (by length and acreage)					275	0.09

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)
Total Open Water Impact (acres)				

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

Stream Impact (acres):	0.09
Wetland Impact (acres):	1.15
Open Water Impact (acres):	0
Total Impact to Waters of the U.S. (acres)	1.25
Total Stream Impact (linear feet):	275

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.

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.): _____

Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.): _____

Current land use in the vicinity of the pond: _____

Size of watershed draining to pond: _____ Expected pond surface area: _____

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. Please refer to the attached 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 (see DWQ website for most current version.).

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.

Mitigation will be provided by EEP (see enclosed acceptance 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://www.nceep.net/pages/inlieureplace.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): 0
Amount of buffer mitigation requested (square feet): 5558
Amount of Riparian wetland mitigation requested (acres): 0.48
Amount of Non-riparian wetland mitigation requested (acres): 0
Amount of Coastal wetland mitigation requested (acres): 0

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	15937	3 (2 for Catawba)	1891
2	14590	1.5	3667
Total	30527		5558

* 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.

3. 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. EEP
-
-

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. NA

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. NA

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: _____

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).
None.

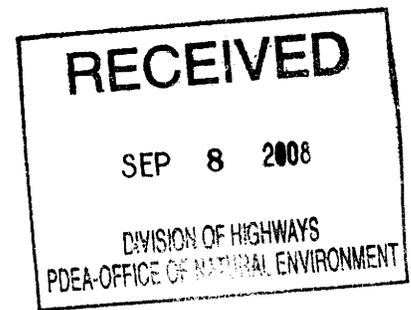
E. L. Lusk

9-11-08

Applicant/Agent's Signature

Date

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



September 4, 2008

Mr. Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

B-4302, Replace Bridge Number 336 over Terrible Creek on
SR1301 (Sunset Lake Road), Wake County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory riparian wetland mitigation and buffer mitigation for the subject project. Based on the information supplied by you on September 3, 2008, the impacts are located in CU 03020201 of the Neuse River Basin in the Central Piedmont (CP) Eco-Region, and are as follows:

Riparian Wetland:	0.48 acre
Buffer – Zone 1:	1,891 square feet
Buffer – Zone 2:	3,667 square feet

All buffer mitigation requests and approvals are administrated through the Riparian Restoration Buffer Fund. The NCDOT will be responsible to ensure that appropriate compensation for the buffer mitigation will be provided in the agreed upon method of fund transfer. Upon receipt of the NCDWQ's Buffer Authorization Certification, EEP will transfer funds from Tri-Party MOA Fund into the Riparian Restoration Buffer Fund. Upon completion of transfer payment, NCDOT will have completed its riparian buffer mitigation responsibility for TIP B-4302. Subsequently, EEP will conduct a review of current MOA mitigation projects in the river basin to determine if available buffer mitigation credits exist. If there are buffer mitigation credits

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North Carolina Ecosystem Enhancement Program, 1652 Mail Service Center, Raleigh, NC 27699-1652 / 919-715-0476 / www.nceep.net



available, then the Riparian Restoration Buffer Fund will purchase the appropriate amount of buffer mitigation credits from Tri-Party MOA Fund.

EEP commits to implementing sufficient riparian wetland mitigation credits to offset the impacts associated with this project by the end of the MOA Year in which this project is permitted, in accordance with Section X of the Amendment No. 2 to the Memorandum of Agreement between the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U. S. Army Corps of Engineers, fully executed on March 8, 2007. If the above referenced riparian wetland or buffer impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,

A handwritten signature in cursive script, appearing to read "William D. Gilmore".

William D. Gilmore, P.E.
EEP Director

cc: Mr. Eric Alsmeyer, USACE – Raleigh Regulatory Field Office
Mr. Brian Wrenn, Division of Water Quality, Wetlands/401 Unit
File: B-4302



September 4, 2008

Mr. Eric Alsmeyer
U. S. Army Corps of Engineers
Raleigh Regulatory Field Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587

Dear Mr. Alsmeyer:

Subject: EEP Mitigation Acceptance Letter:

B-4302, Replace Bridge Number 336 over Terrible Creek on SR1301 (Sunset Lake Road), Wake County; Neuse River Basin (Cataloging Unit 03020201); Central Piedmont (CP) Eco-Region

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory riparian wetland mitigation and the buffer mitigation for the unavoidable impact associated with the above referenced project. As indicated in the NCDOT's mitigation request dated September 3, 2008, riparian wetland mitigation from EEP is required for approximately 0.48 acre of riparian wetland impacts.

Also, this project will impact buffers located in CU 03020201 of the Neuse River Basin. The total buffer impacts are 1,891 square feet in Zone 1 and 3,667 square feet in Zone 2 with a total buffer mitigation requirement of 11,173.5 square feet. If the buffer impacts or the amount of mitigation required from EEP increases or decreases for this project, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required. All buffer mitigation requests and approvals are administered through the Riparian Restoration Buffer Fund (Fund 2982).

The NCDOT will be responsible to ensure that the appropriate compensation for the buffer mitigation will be provided in the agreed upon method of fund transfer. Upon receipt of the NCDWQ's Buffer Authorization Certification, EEP will transfer funds from Fund 2984 (Tri-Party MOA Account) into Fund 2982 and commit to provide the appropriate buffer mitigation to offset the impacts associated with this project.

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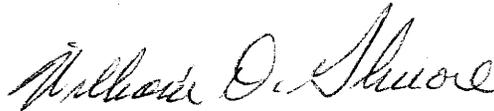
North Carolina Ecosystem Enhancement Program, 1452 Mail Service Center, Raleigh, NC 27609, 1-800-715-6477



Riparian wetland mitigation associated with this project will be provided in accordance with Section X of the Amendment No. 2 to the Memorandum of Agreement between the N. C. Department of Environment and Natural Resources, the N. C. Department of Transportation, and the U. S. Army Corps of Engineers fully executed on March 8, 2007 (Tri-Party MOA). EEP commits to implement sufficient riparian wetland mitigation up to 0.96 riparian wetland credits to offset the impacts associated with this project by the end of the MOA year in which this project is permitted. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,

A handwritten signature in cursive script, appearing to read "William D. Gilmore".

William D. Gilmore, P.E.
EEP Director

cc: Mr. Gregory J. Thorpe, Ph.D., NCDOT-PDEA
Mr. Brian Wrenn, Division of Water Quality, Wetlands/401 Unit
File: B-4302

Mc Lamb



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Raleigh Field Office

Post Office Box 33726

Raleigh, North Carolina 27636-3726

April 13, 2006

RECEIVED

APR 20 2006

DIVISION OF HIGHWAYS
PDEA-OFFICE OF NATURAL ENVIRONMENT

Gregory J. Thorpe, Ph.D.
North Carolina Department of Transportation
Project Development and Environmental Analysis
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

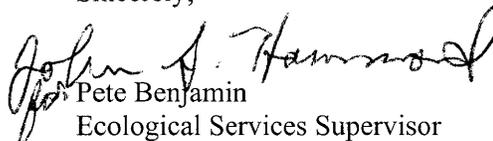
Dear Dr. Thorpe:

This letter is in response to your letter of April 5, 2006 which provided the U.S. Fish and Wildlife Service (Service) with the biological determination of the North Carolina Department of Transportation (NCDOT) that the replacement of Bridge No. 336 on SR 1301 over Terrible Creek in Wake County (TIP No. B-4302) may affect, but is not likely to adversely affect the federally endangered dwarf wedgemussel (*Alasmidonta heterodon*). In addition, NCDOT has determined that the project will have no effect on the federally protected bald eagle (*Haliaeetus leucocephalus*), red-cockaded woodpecker (*Picoides borealis*) and Michaux's sumac (*Rhus michauxii*). These comments are provided in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

According to information provided, a mussel survey was conducted at the project site on November 19, 2004. The survey extended 100 meters upstream and 400 meters downstream of SR 1301. No dwarf wedgemussels were found. Based on the information provided and other information available, the Service concurs with your determination that the proposed bridge replacement may affect, but is not likely to adversely affect the dwarf wedgemussel. Due to the lack of habitat, the Service concurs with your determination that the project will have no effect on the bald eagle and red-cockaded woodpecker. In addition, based on information provided to the Service in June 2004, the Service concurs that the project will have no effect on Michaux's sumac. We believe that the requirements of section 7(a)(2) of the ESA have been satisfied. We remind you that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered in this review; (2) this action is subsequently modified in a manner that was not considered in this review; or (3) a new species is listed or critical habitat determined that may be affected by this identified action.

The Service appreciates the opportunity to review this project. If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520 (Ext. 32).

Sincerely,


Pete Benjamin
Ecological Services Supervisor

cc: Eric Alsmeyer, USACE, Raleigh, NC
Nicole Thomson, NCDWQ, Raleigh, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Militscher, USEPA, Raleigh, NC
John Sullivan, FHWA, Raleigh, NC

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

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

SECTION I: BACKGROUND INFORMATION

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

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: NCDOT TIP# B-4302, Replace Bridge 336 over Terrible Creek on SR 1301 (Sunset Lake Rd)

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: NC County/parish/borough: Wake City: Fuquay-Varina
Center coordinates of site (lat/long in degree decimal format): Lat. 35.6073° N, Long. 78.7740° W
Universal Transverse Mercator: Zone 17 N

Name of nearest waterbody: Terrible Creek

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

Name of watershed or Hydrologic Unit Code (HUC): NEUSE 03020201

Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

Check if other sites (e.g., offsite mitigation sites, disposal sites, etc...) are associated with this action and are recorded on a different JD form.

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

Office (Desk) Determination. Date:

Field Determination. Date(s): 6/8/2004 by Eric Alsmeyer; DOT consultant field eval: 2/24/2004

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There ~~are~~ **are** "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [Required]

Waters subject to the ebb and flow of the tide.

Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

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

1. Waters of the U.S.

a. Indicate presence of waters of U.S. in review area (check all that apply):¹

- TNWs, including territorial seas
- Wetlands adjacent to TNWs
- Relatively permanent waters² (RPWs) that flow directly or indirectly into TNWs
- Non-RPWs that flow directly or indirectly into TNWs
- Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
- Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
- Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- Impoundments of jurisdictional waters
- Isolated (interstate or intrastate) waters, including isolated wetlands

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

Non-wetland waters: 1700 linear feet: 5-15 width (ft) and/or acres.

Wetlands: 4.0 acres.

c. Limits (boundaries) of jurisdiction based on: 1987 Delineation Manual

Elevation of established OHWM (if known):

2. Non-regulated waters/wetlands (check if applicable):³

Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.

Explain:

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

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

³ Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

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

1. TNW

Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW

Summarize rationale supporting conclusion that wetland is "adjacent": .

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

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

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

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

If the waterbody⁴ is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

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

(i) General Area Conditions:

Watershed size: **Pick List**

Drainage area: **Pick List**

Average annual rainfall: inches

Average annual snowfall: inches

(ii) Physical Characteristics:

(a) Relationship with TNW:

Tributary flows directly into TNW.

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

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

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

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

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

Project waters cross or serve as state boundaries. Explain: .

Identify flow route to TNW⁵: .

Tributary stream order, if known: .

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

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

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

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

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

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

Primary tributary substrate composition (check all that apply):

- | | | |
|--|--|-----------------------------------|
| <input type="checkbox"/> Silts | <input type="checkbox"/> Sands | <input type="checkbox"/> Concrete |
| <input type="checkbox"/> Cobbles | <input type="checkbox"/> Gravel | <input type="checkbox"/> Muck |
| <input type="checkbox"/> Bedrock | <input type="checkbox"/> Vegetation. Type/% cover: | |
| <input type="checkbox"/> Other. Explain: | | |

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

Presence of run/riffle/pool complexes. Explain:

Tributary geometry: **Pick List**

Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: **Pick List**

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

Describe flow regime:

Other information on duration and volume:

Surface flow is: **Pick List**. Characteristics:

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

- Dye (or other) test performed:

Tributary has (check all that apply):

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

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

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

(iii) Chemical Characteristics:

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

Explain:

Identify specific pollutants, if known:

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

⁷Ibid.

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

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

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

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain:

Wetland quality. Explain:

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

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

Surface flow is: **Pick List**

Characteristics:

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

Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

Directly abutting

Not directly abutting

Discrete wetland hydrologic connection. Explain:

Ecological connection. Explain:

Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

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

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

Flow is from: **Pick List**.

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

(ii) **Chemical Characteristics:**

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

Identify specific pollutants, if known:

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

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

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

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

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

For each wetland, specify the following:

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

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

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

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

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

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

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

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

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:

TNWs: linear feet width (ft), Or, acres.

Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**

Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: Terrible Creek and its UT both exhibit the geomorphological, hydrological, and biological characteristics typical of a perennial stream. The UT was also classified as a perennial stream according to the NCDWQ Stream ID Form, scoring 33.75 and 34.00 on two separate evaluations (=>30 is perennial).

Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

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

Tributary waters: 1700 linear feet 5-15 width (ft).

Other non-wetland waters: acres.

Identify type(s) of waters: **Terrible Creek (500 ft), UT to Terrible Creek (1200 ft).**

3. **Non-RPWs⁸ that flow directly or indirectly into TNWs.**

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

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

Tributary waters: linear feet width (ft).

Other non-wetland waters: acres.

Identify type(s) of waters: .

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

- Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
- Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **Wetlands exist on both sides of the streams immediately adjacent to the channels with no uplands or other barriers in between.**
- Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:

Provide acreage estimates for jurisdictional wetlands in the review area: **4.0** acres.

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

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

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

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

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

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

7. **Impoundments of jurisdictional waters.⁹**

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

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

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

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

⁸See Footnote # 3.

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

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

Other factors. Explain: .

Identify water body and summarize rationale supporting determination:

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

Tributary waters: linear feet width (ft).

Other non-wetland waters: acres.

Identify type(s) of waters: .

Wetlands: acres.

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

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

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

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

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

Other: (explain, if not covered above): .

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

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

Lakes/ponds: acres.

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

Wetlands: acres.

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

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

Lakes/ponds: acres.

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

Wetlands: acres.

SECTION IV: DATA SOURCES.

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

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

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

Office concurs with data sheets/delineation report.

Office does not concur with data sheets/delineation report.

Data sheets prepared by the Corps:

Corps navigable waters' study:

U.S. Geological Survey Hydrologic Atlas: .

USGS NHD data.

USGS 8 and 12 digit HUC maps.

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

USDA Natural Resources Conservation Service Soil Survey. Citation: .

National wetlands inventory map(s). Cite name: .

State/Local wetland inventory map(s): .

FEMA/FIRM maps: .

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

Photographs: Aerial (Name & Date): .

or Other (Name & Date): .

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

Applicable/supporting case law: .

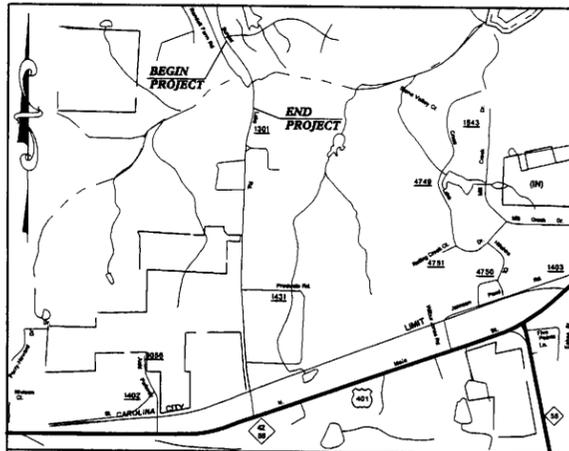
Applicable/supporting scientific literature: .

Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD:

09/05/99

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



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

**LOCATION: BRIDGE NO. 336 OVER TERRIBLE CREEK
ON SR 1301 (SUNSET LAKE ROAD)**

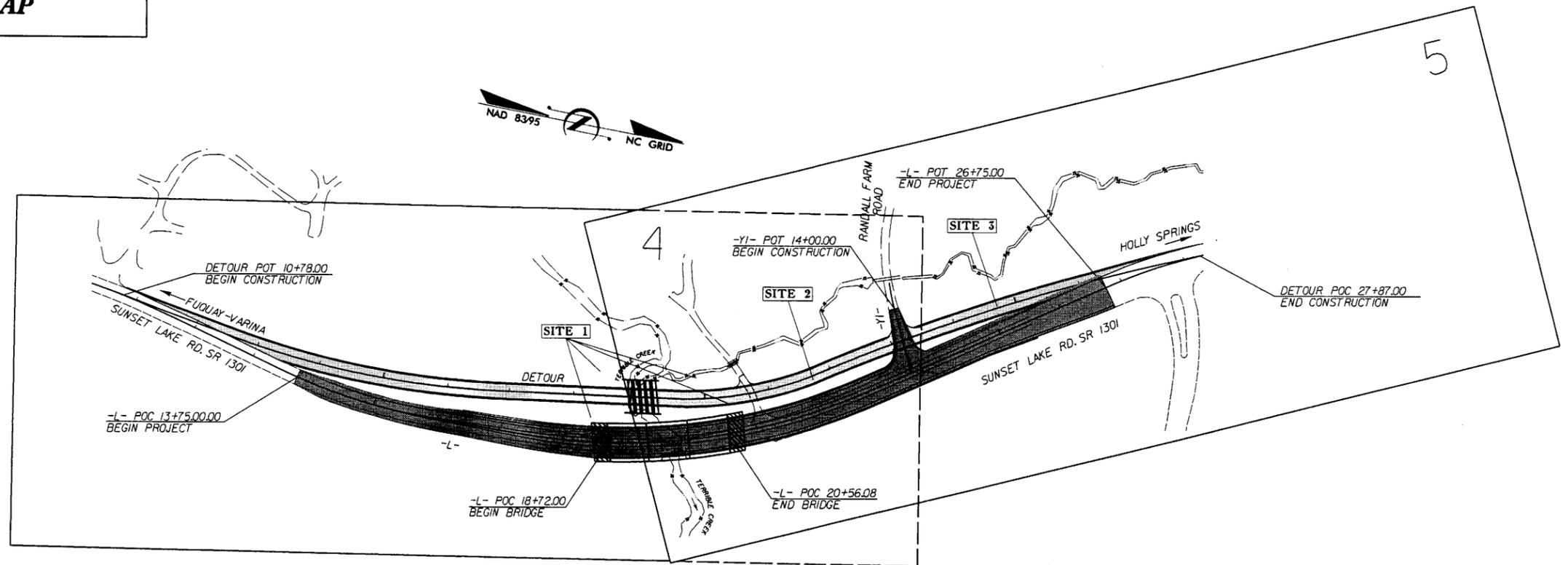
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

STREAM & WETLAND IMPACTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4302	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33639.1.1	BRZ-1301(2)	P.E.	
33639.2.1	BRZ-1301(2)	R /W, UTIL.	

Permit Drawing
Sheet 1 of 12

TIP PROJECT: B-4302



PO Box 33127
RALEIGH, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

NCDOT CONTACT : DOUG TAYLOR, PE
PROJECT ENGINEER - ROADWAY DESIGN

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

CLEARING ON THIS PROJECT SHALL BE PERFORMED
TO THE LIMITS ESTABLISHED BY METHOD III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES



DESIGN DATA

ADT 2008 = 14,100
ADT 2030 = 28,500
DHV = 10 %
D = 60 %
T = 4% % *
V = 50 MPH
* (TTST 1% + DUALS 3%)
FUNCTIONAL = MINOR COLLECTOR
CLASS.
** DESIGN EXCEPTION = STOPPING SIGHT DISTANCE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4302 = 0.211 MI
LENGTH STRUCTURE TIP PROJECT B-4302 = 0.035 MI
TOTAL LENGTH TIP PROJECT B-4302 = 0.246 MI

Prepared in the Office of:

MULKEY ENGINEERS & CONSULTANTS
FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 18, 2008

LETTING DATE:
APRIL 21, 2009

TIM S. HAYES, PE
PROJECT ENGINEER

JOHNNY R. BANKS
PROJECT MANAGER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN
ENGINEER

SIGNATURE: _____ P.E.

**DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA**



ART McMILLAN, P.E.
STATE HIGHWAY DESIGN ENGINEER

8/22/2008 8:34:31AM C:\projects\Permit\B4302_hyd_prm_wet_tsh.dgn

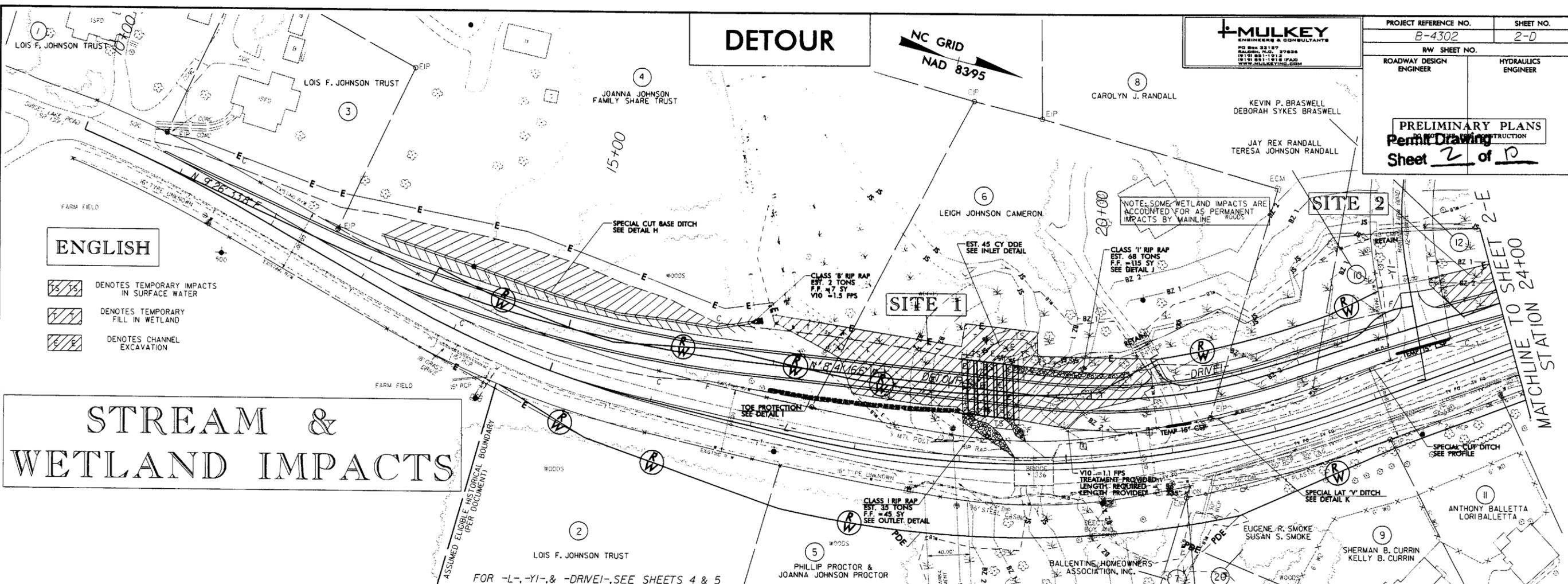
CONTRACT:

DETOUR

NC GRID
NAD 8395

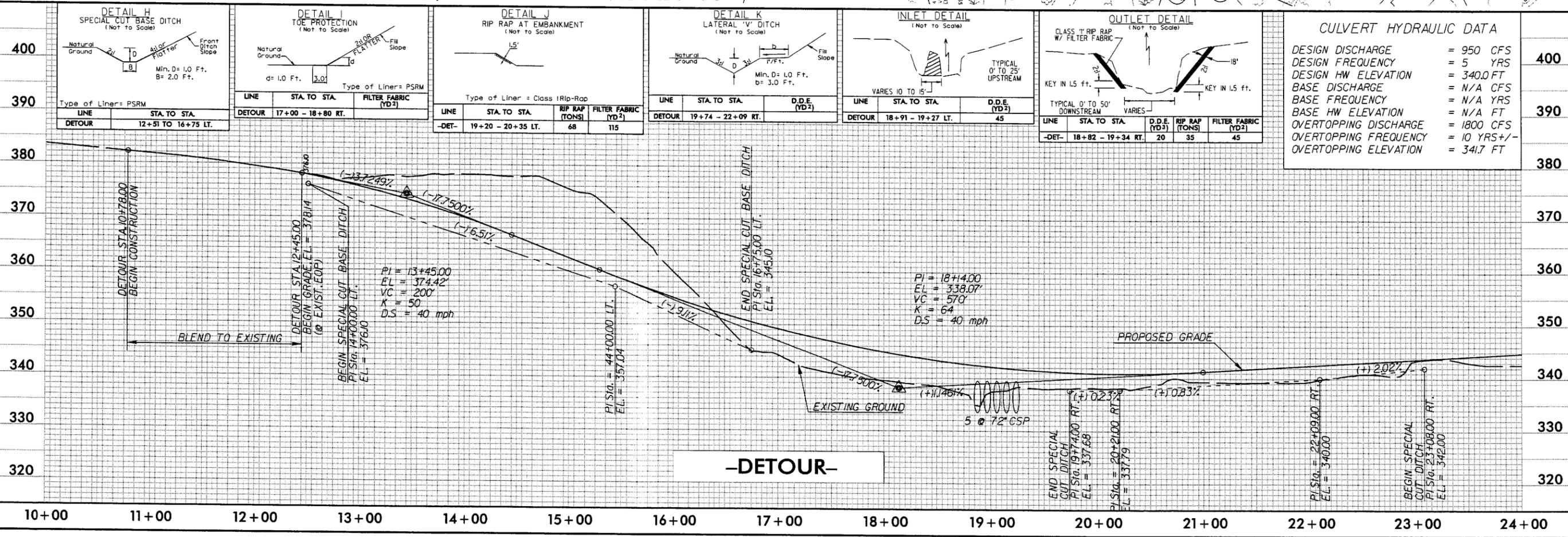


PROJECT REFERENCE NO. B-4302	SHEET NO. 2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS Permit Drawing Sheet 2 of 10	



STREAM & WETLAND IMPACTS

- ENGLISH**
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
 - DENOTES TEMPORARY FILL IN WETLAND
 - DENOTES CHANNEL EXCAVATION



REVISIONS
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DETOUR

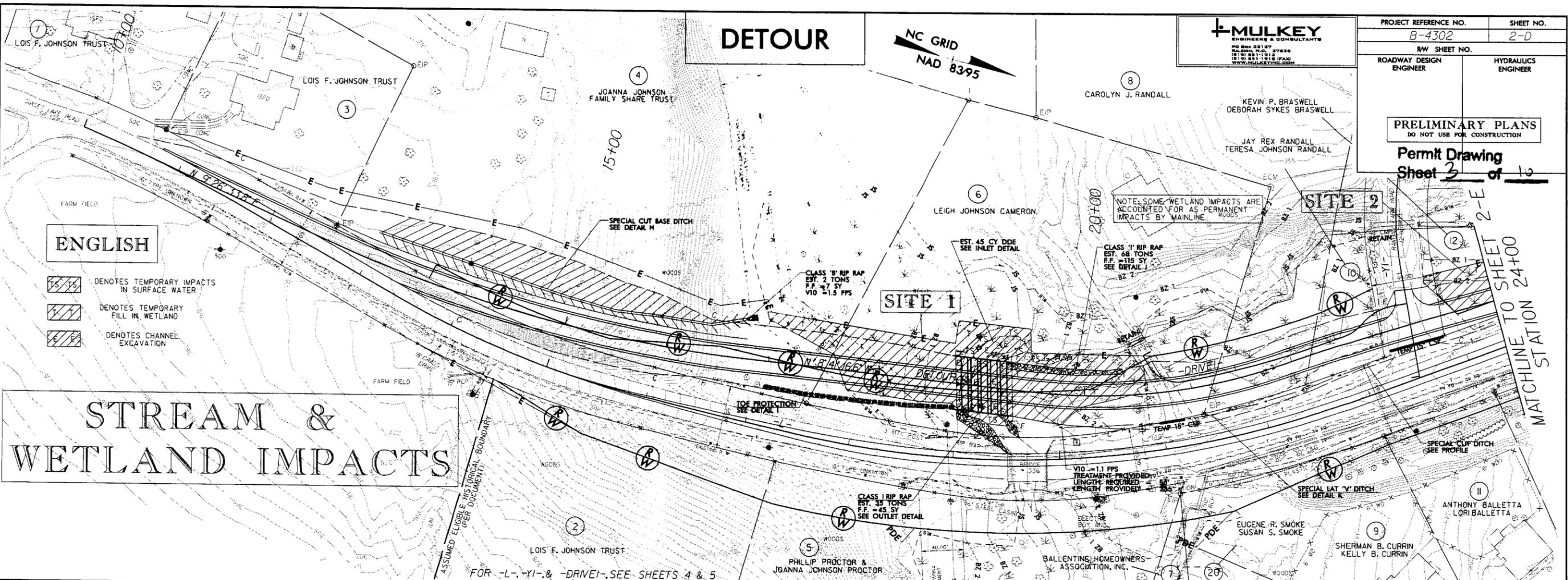
NC GRID
NAD 8395



PROJECT REFERENCE NO. B-4302	SHEET NO. 2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

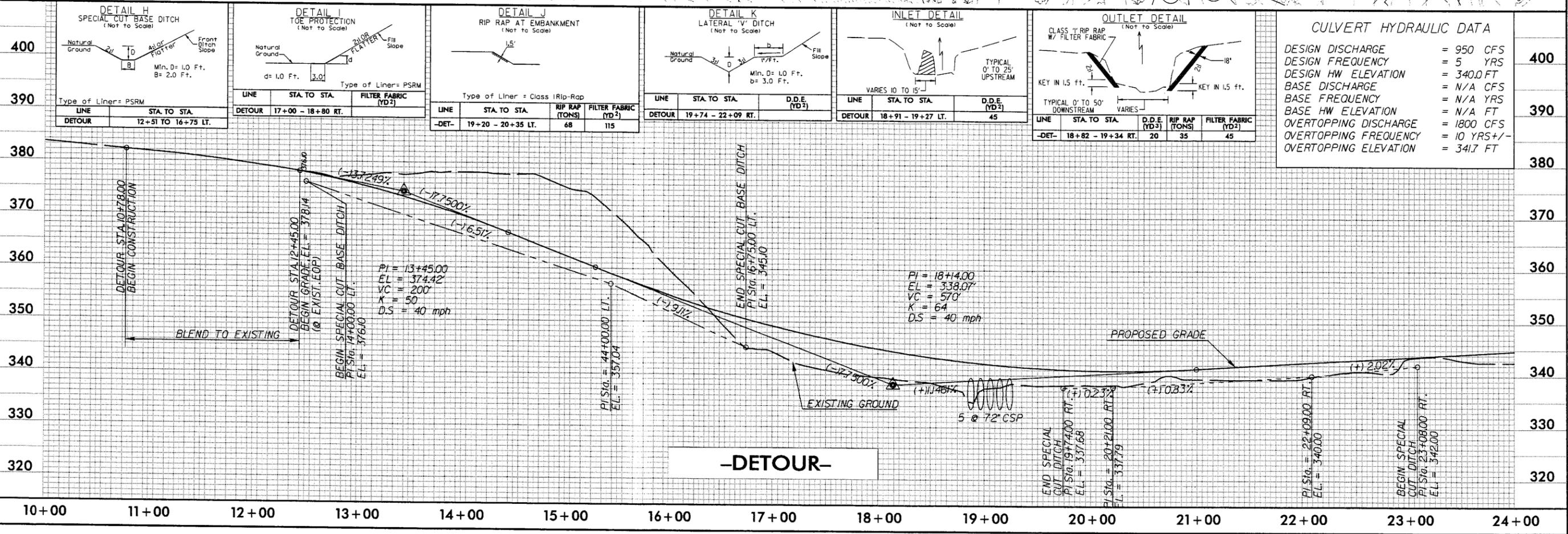
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 3 of 10



STREAM & WETLAND IMPACTS

- ENGLISH**
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
 - DENOTES TEMPORARY FILL IN WETLAND
 - DENOTES CHANNEL EXCAVATION



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DETOUR



PROJECT REFERENCE NO. B-4302	SHEET NO. 2-E
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

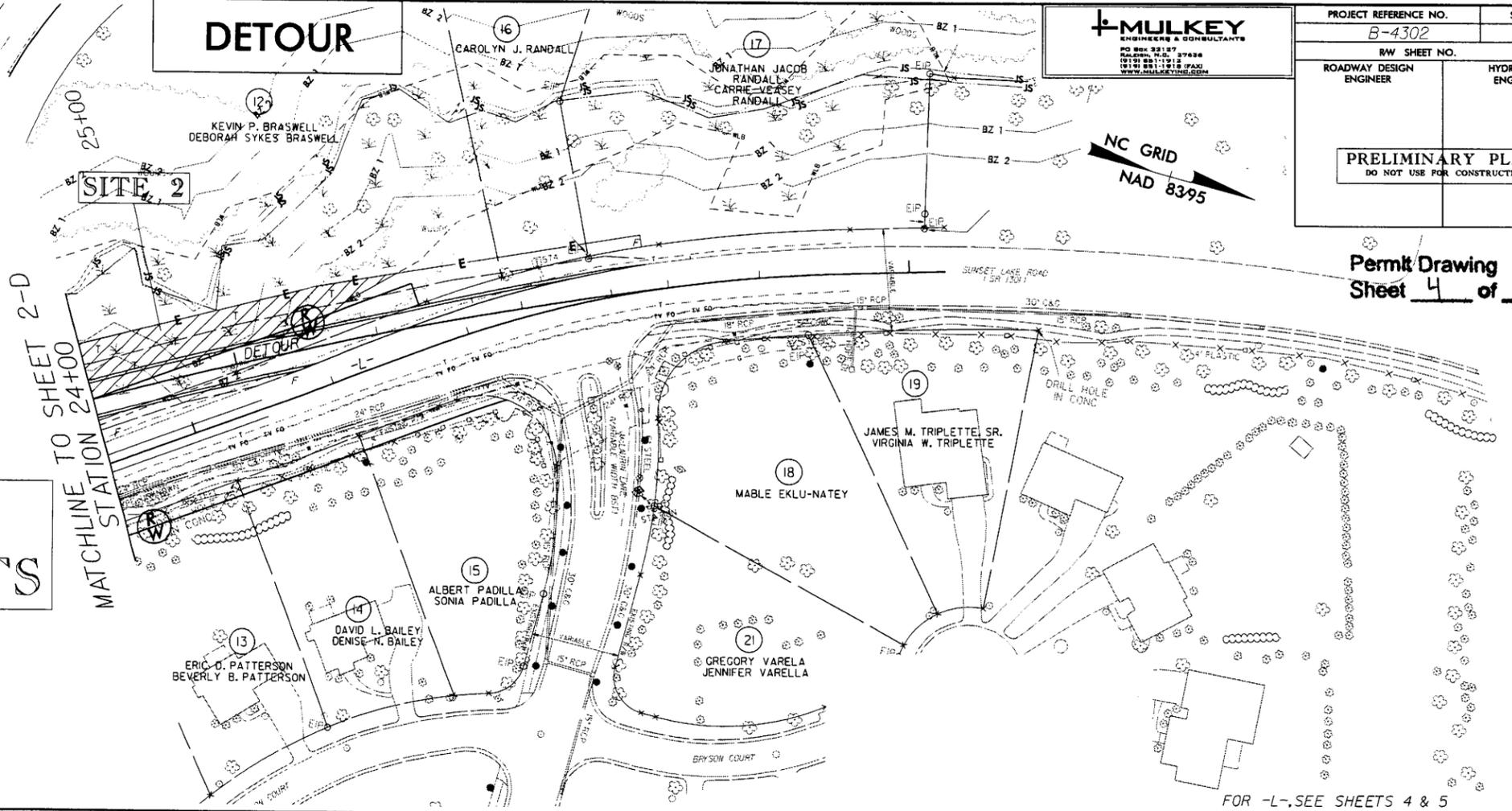
NOTE: SOME WETLAND IMPACTS ARE ACCOUNTED FOR AS PERMANENT IMPACTS BY MAINLINE

ENGLISH

DENOTES TEMPORARY FILL IN WETLAND

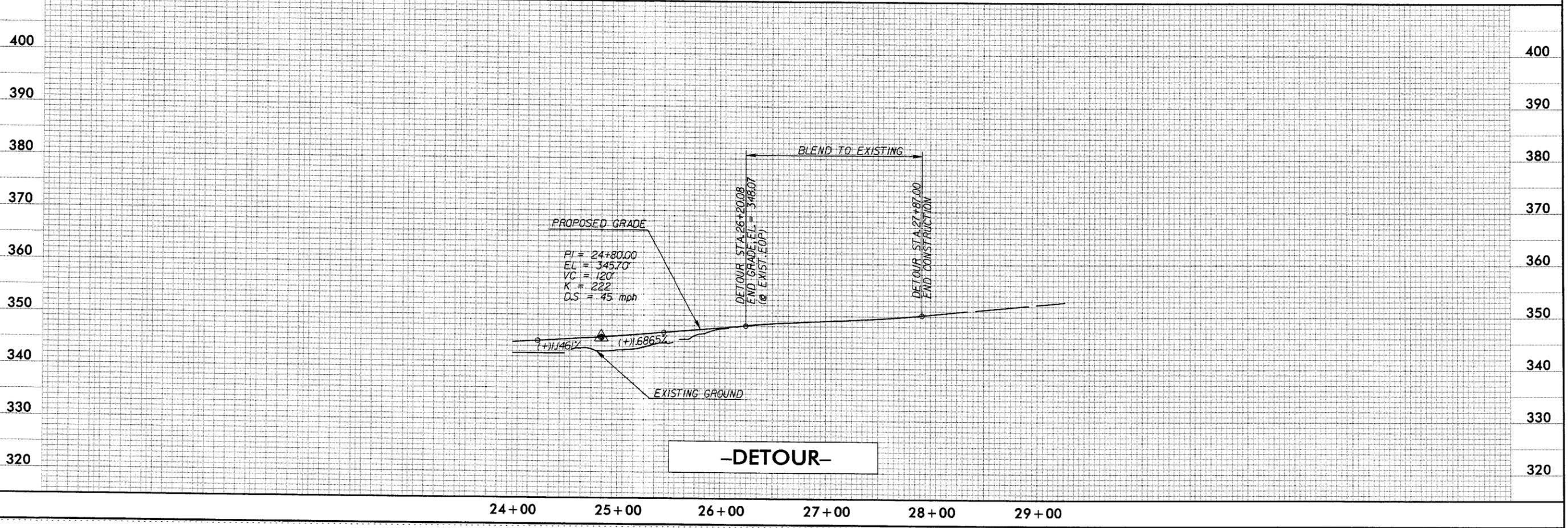
STREAM & WETLAND IMPACTS

MATCHLINE TO SHEET 2-D
STATION 24+00



Permit Drawing
Sheet 4 of 10

FOR -L-, SEE SHEETS 4 & 5



-DETOUR-

REVISIONS

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DETOUR



PROJECT REFERENCE NO. B-4302	SHEET NO. 2-E
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

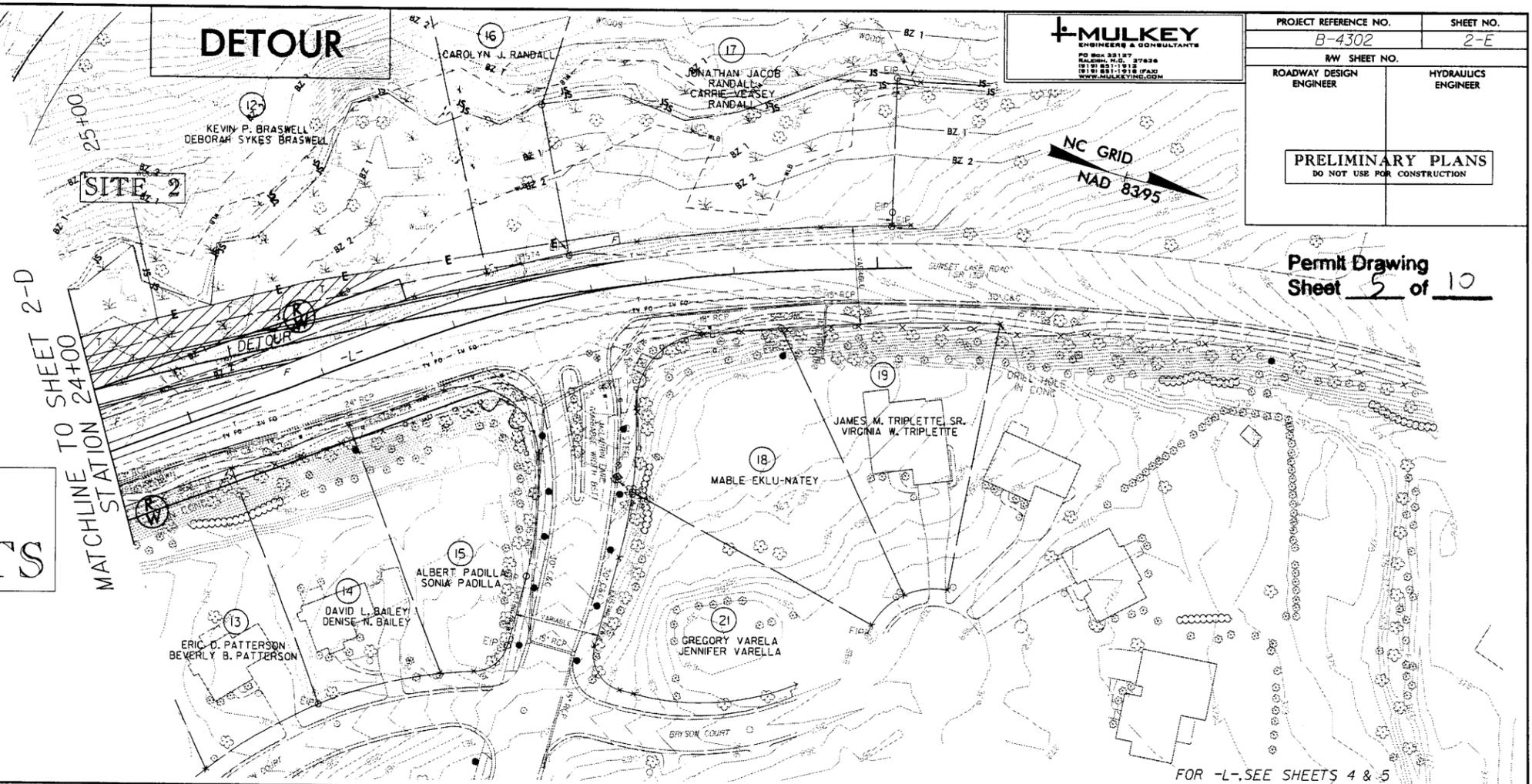
NOTE: SOME WETLAND IMPACTS ARE ACCOUNTED FOR AS PERMANENT IMPACTS BY MAINLINE

ENGLISH

DENOTES TEMPORARY FILL IN WETLAND

STREAM & WETLAND IMPACTS

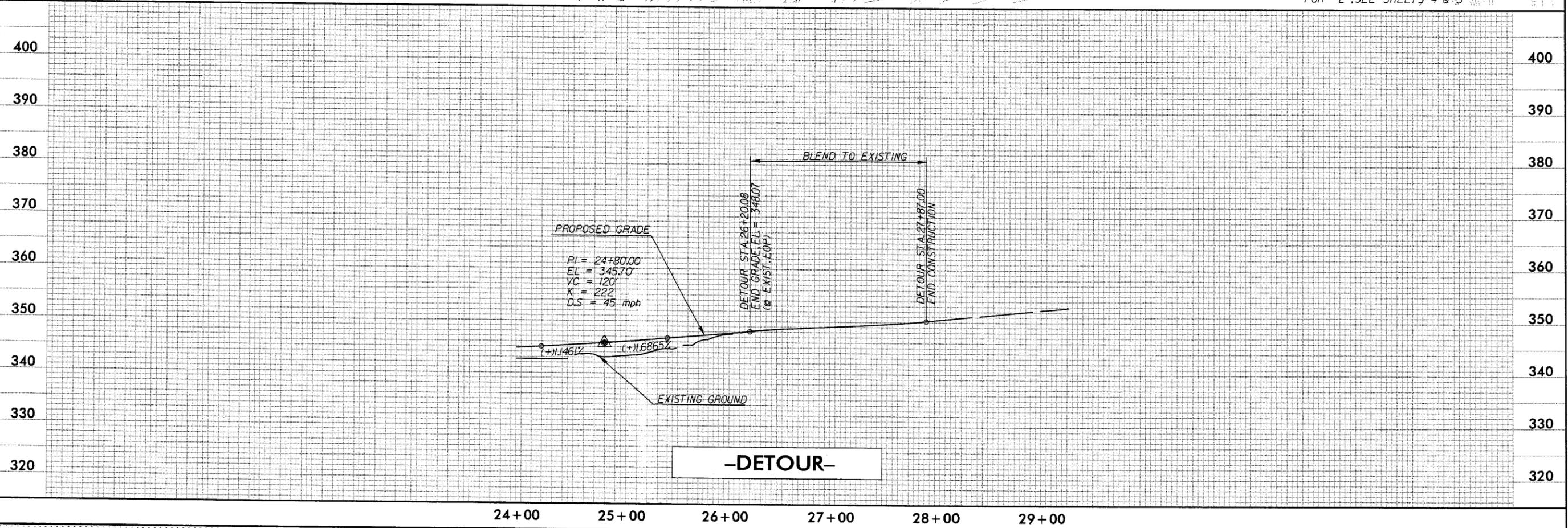
MATCHLINE TO SHEET 2-D
STATION 24+00



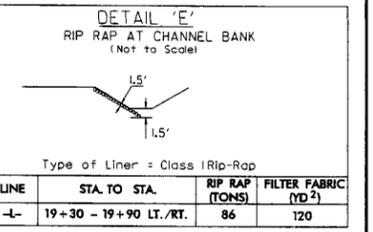
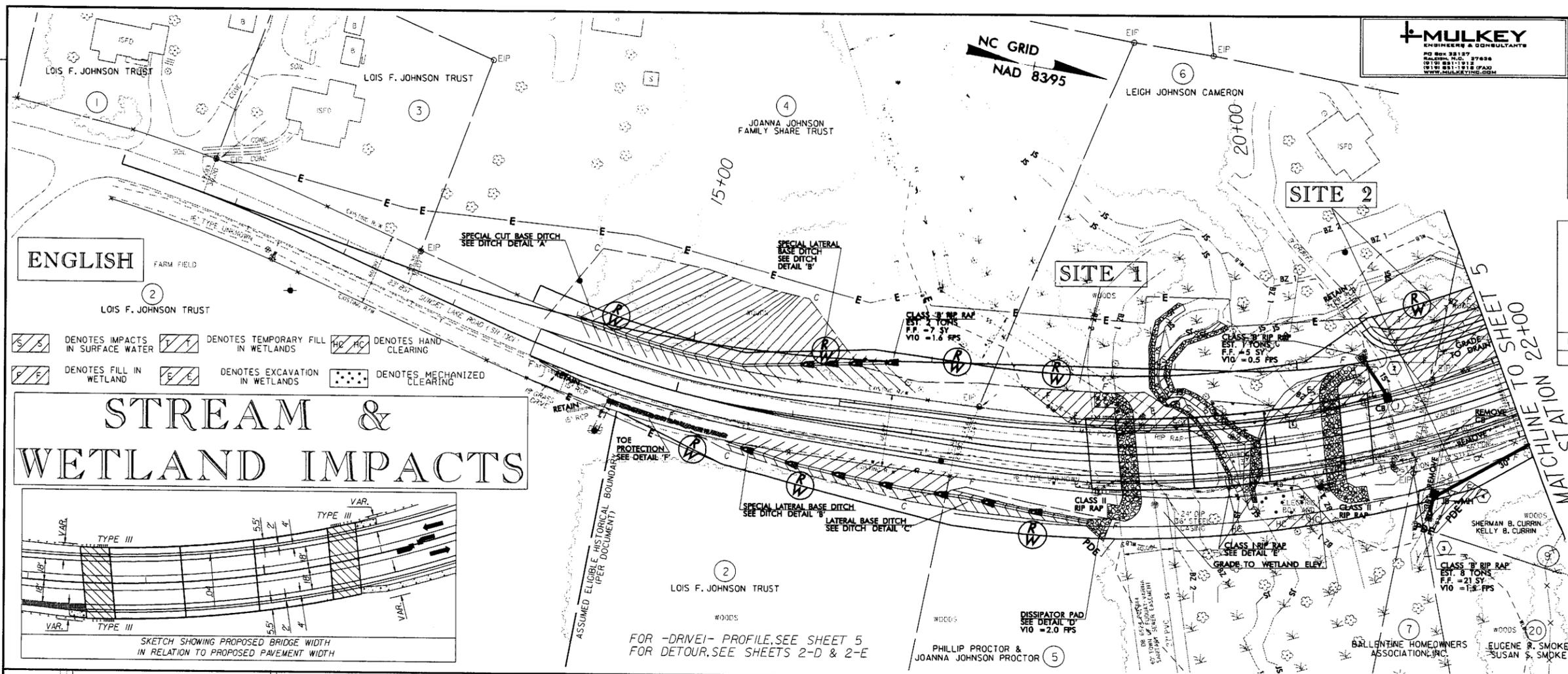
Permit Drawing
Sheet 5 of 10

FOR -L-, SEE SHEETS 4 & 5

REVISIONS

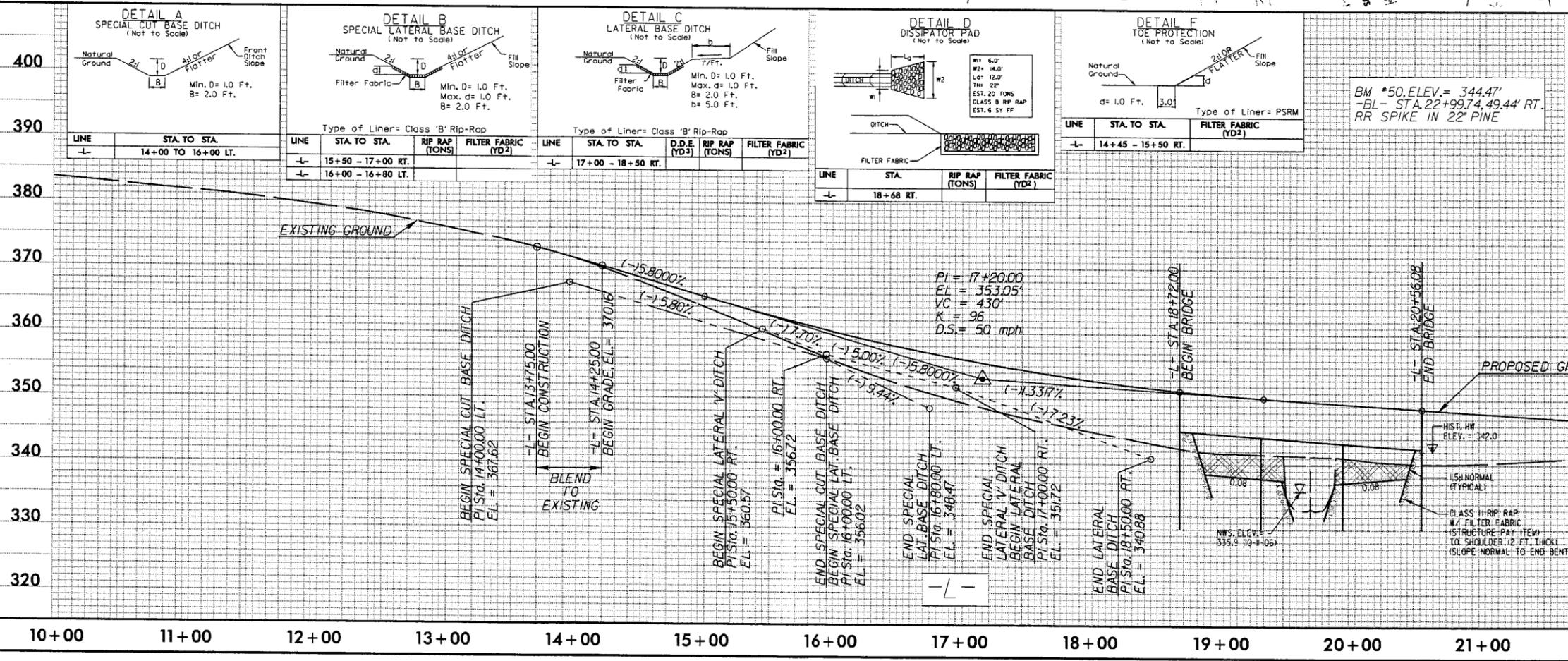
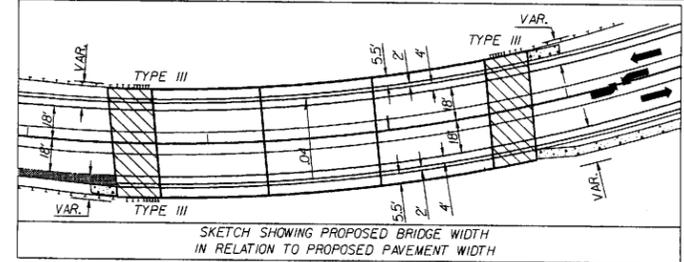


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Permit Drawing Sheet 6 of 10

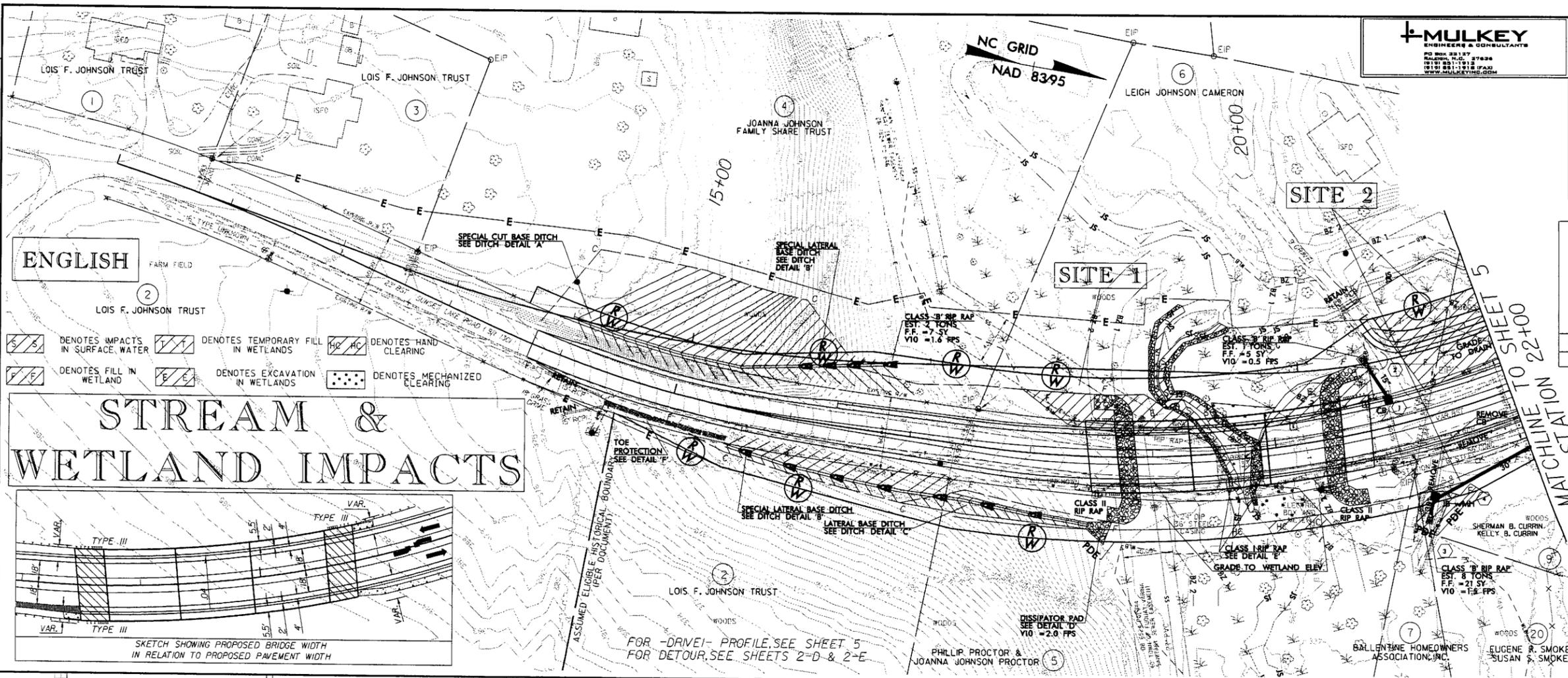
STREAM & WETLAND IMPACTS



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1900 CFS	400
DESIGN FREQUENCY	= 50 YRS	
DESIGN HW ELEVATION	= 342.0 FT	
BASE DISCHARGE	= 2200 CFS	
BASE FREQUENCY	= 100 YRS	390
BASE HW ELEVATION	= 342.4 FT	
OVERTOPPING DISCHARGE	= 10000 CFS	
OVERTOPPING FREQUENCY	= 500 YRS	
OVERTOPPING ELEVATION	= 345.1 FT	380
DATE OF SURVEY	= 10/11/07	
W.S. ELEVATION AT DATE OF SURVEY	= 335.9 FT	370

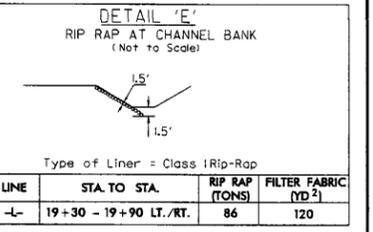
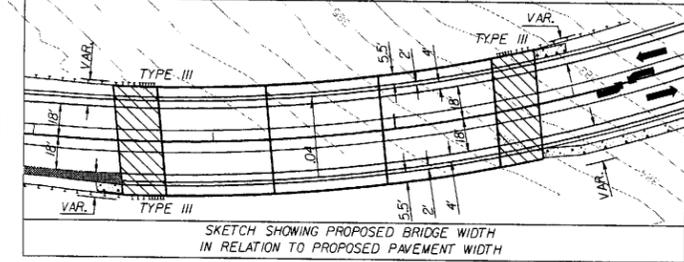
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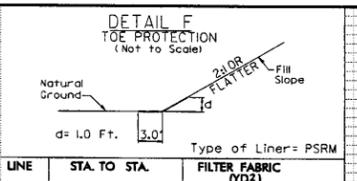
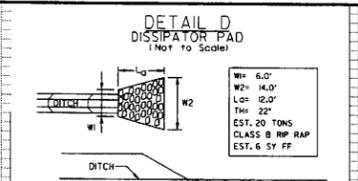
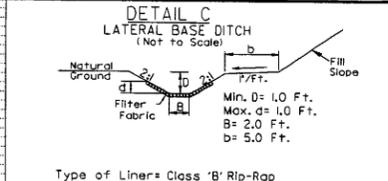
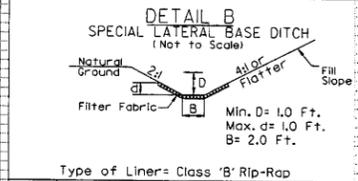
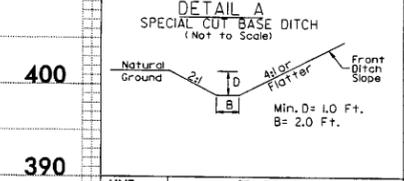
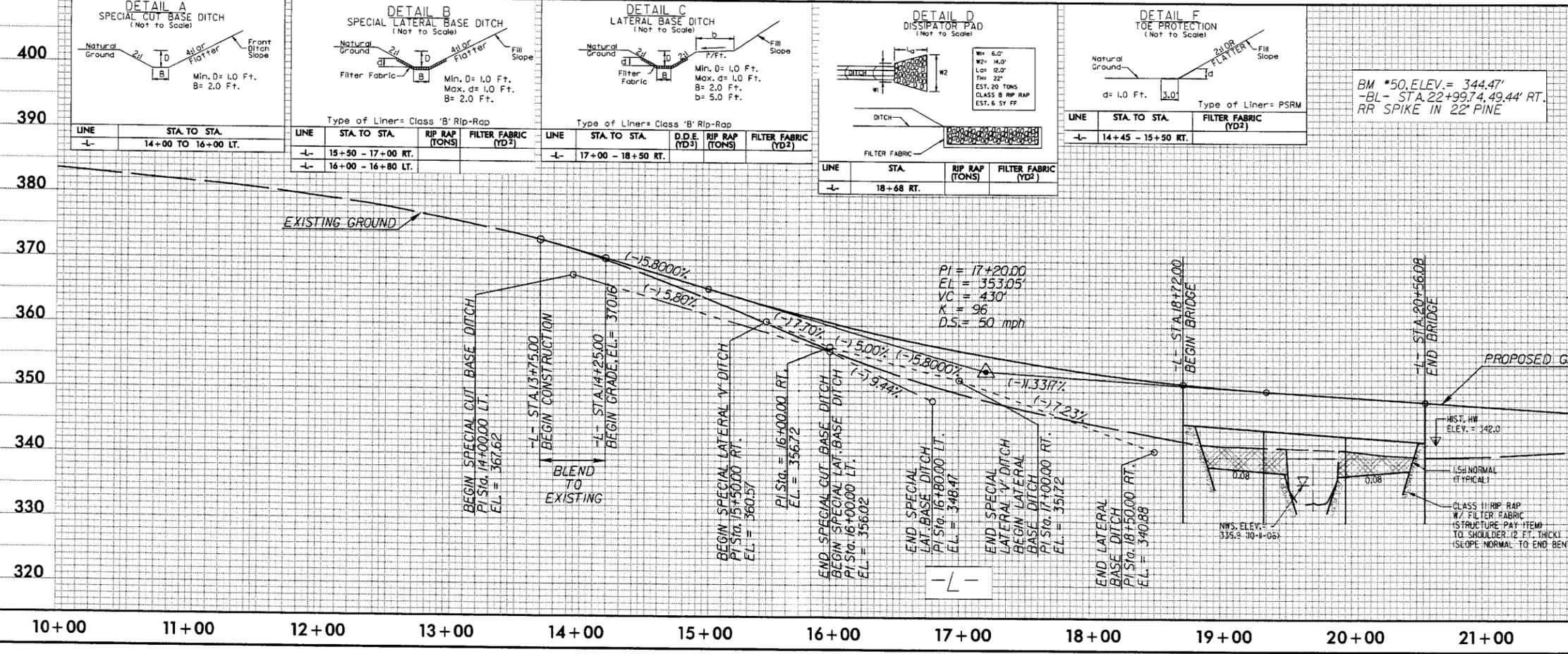
ENGLISH
FARM FIELD

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY FILL IN WETLANDS
- DENOTES HAND CLEARING
- DENOTES FILL IN WETLAND
- DENOTES EXCAVATION IN WETLANDS
- DENOTES MECHANIZED CLEARING

STREAM & WETLAND IMPACTS



Permit Drawing
Sheet 7 of 10



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1900 CFS	400
DESIGN FREQUENCY	= 50 YRS	
DESIGN HW ELEVATION	= 342.0 FT	
BASE DISCHARGE	= 2200 CFS	
BASE FREQUENCY	= 100 YRS	390
BASE HW ELEVATION	= 342.4 FT	
OVERTOPPING DISCHARGE	= 10000 CFS	
OVERTOPPING FREQUENCY	= 500 YRS	
OVERTOPPING ELEVATION	= 345.1 FT	380

DATE OF SURVEY = 10/11/07
 W.S. ELEVATION AT DATE OF SURVEY = 335.9 FT

BM *50, ELEV. = 344.47'
 -BL- STA 22+99.74, 49.44' RT.
 RR SPIKE IN 22' PINE

8/22/2008 B:\03 AM R\Hydro\adica\Permit\B4302\Hyd\p1.wet_psd04.dgn

Permit Drawing
Sheet 8 of 10

FOR DETOUR, SEE SHEETS 2-D & 2-E

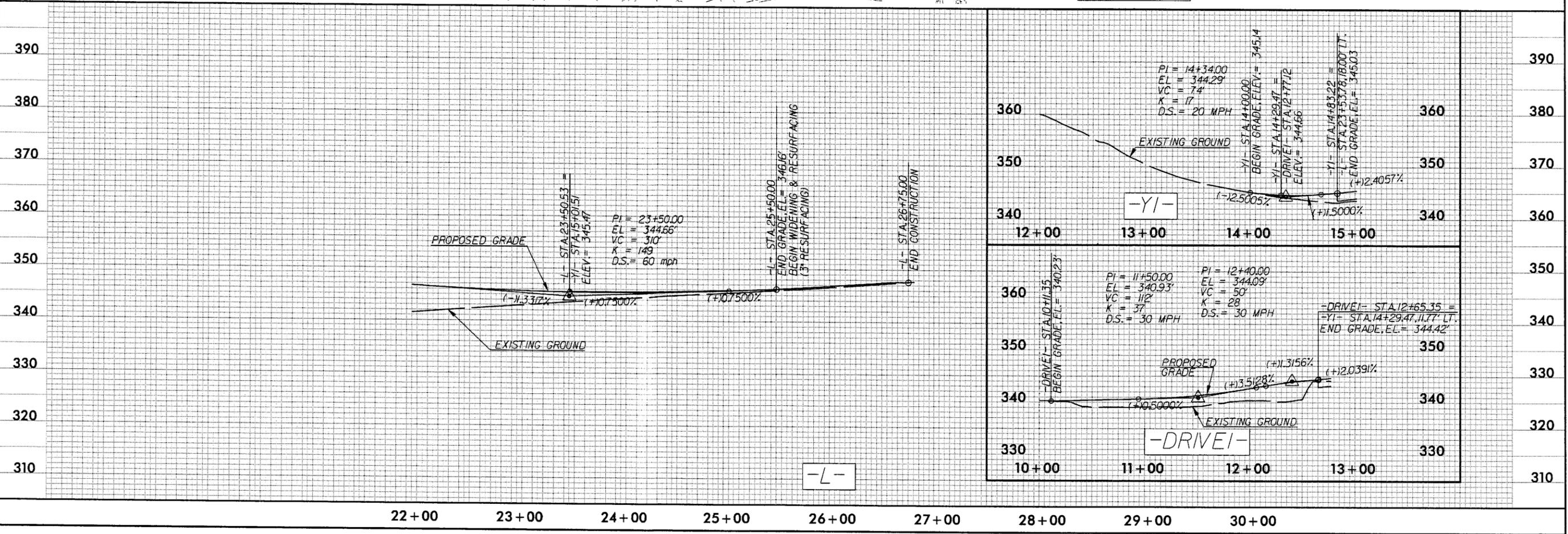
MATCHLINE TO SHEET 4
STATION 22+00

SITE 2

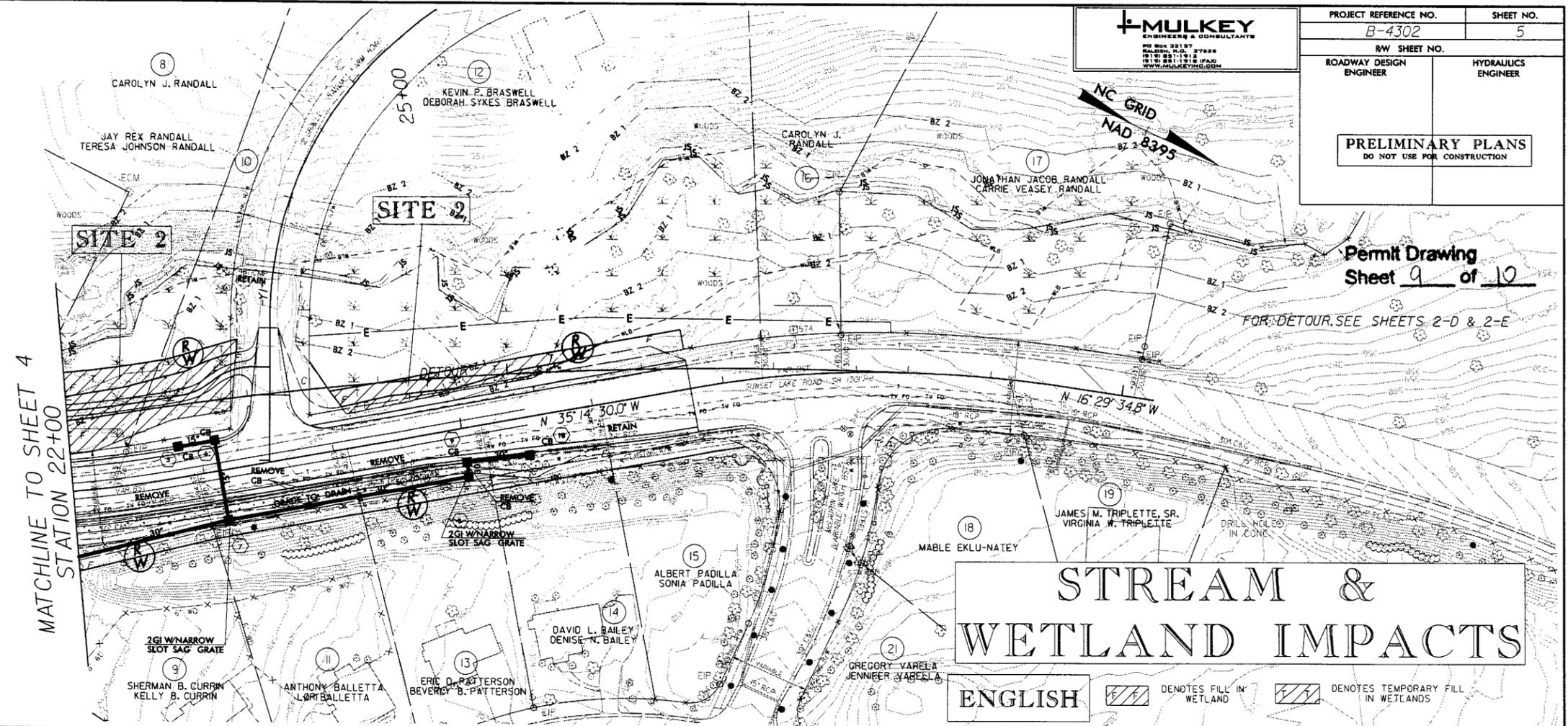
SITE 2

STREAM & WETLAND IMPACTS

ENGLISH  DENOTES FILL IN WETLAND  DENOTES TEMPORARY FILL IN WETLANDS



REVISIONS



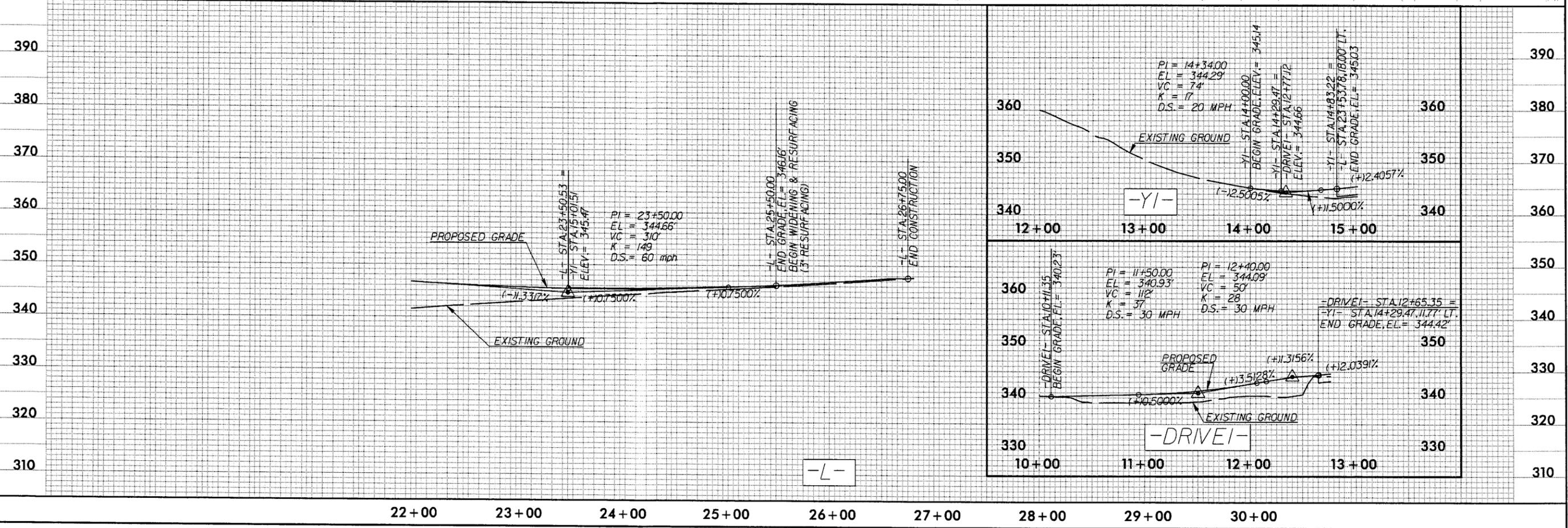
STREAM & WETLAND IMPACTS

ENGLISH

DENOTES FILL IN WETLAND
 DENOTES TEMPORARY FILL IN WETLANDS

REVISIONS

MATCHLINE TO SHEET 4
STATION 22+00



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WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS						SURFACE WATER IMPACTS					
			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	16+94 TO 20+58 -DET- LT/RT	DETOUR CULVERT		0.34	0.07						0.05			
1	17+80 TO 20+90 -L- LT	BRIDGE	0.08		0.06	0.05	0.01		0.04					
1	19+00 TO 19+90 -L- LT/RT	Bank Stabilization										215		
2	20+97 TO 23+42 -L- LT/RT	Mainline Roadway	0.20	0.10										
2	23+42 TO 26+22 -DET- LT	Detour Roadway		0.18										
2	24+05 TO 26+14 -L- LT	Mainline Roadway	0.02	0.05										
TOTALS:			0.30	0.67	0.13	0.05	0.01	0.04	0.05	215				

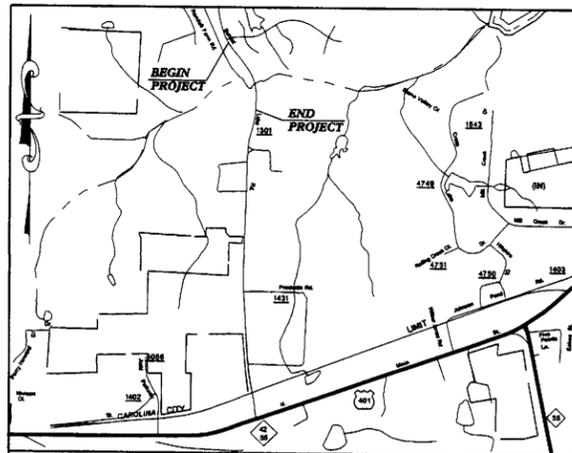
Detour culvert has 60' of temporary channel impacts. Length is accounted for in the 215' of permanent impact due to rip rap.

NC DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 Wake County
 Project: B-4302 (Bridge #336)

SHEET 10 of 10 8/25/2008

09/08/09

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



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

**LOCATION: BRIDGE NO. 336 OVER TERRIBLE CREEK
ON SR 1301 (SUNSET LAKE ROAD)**

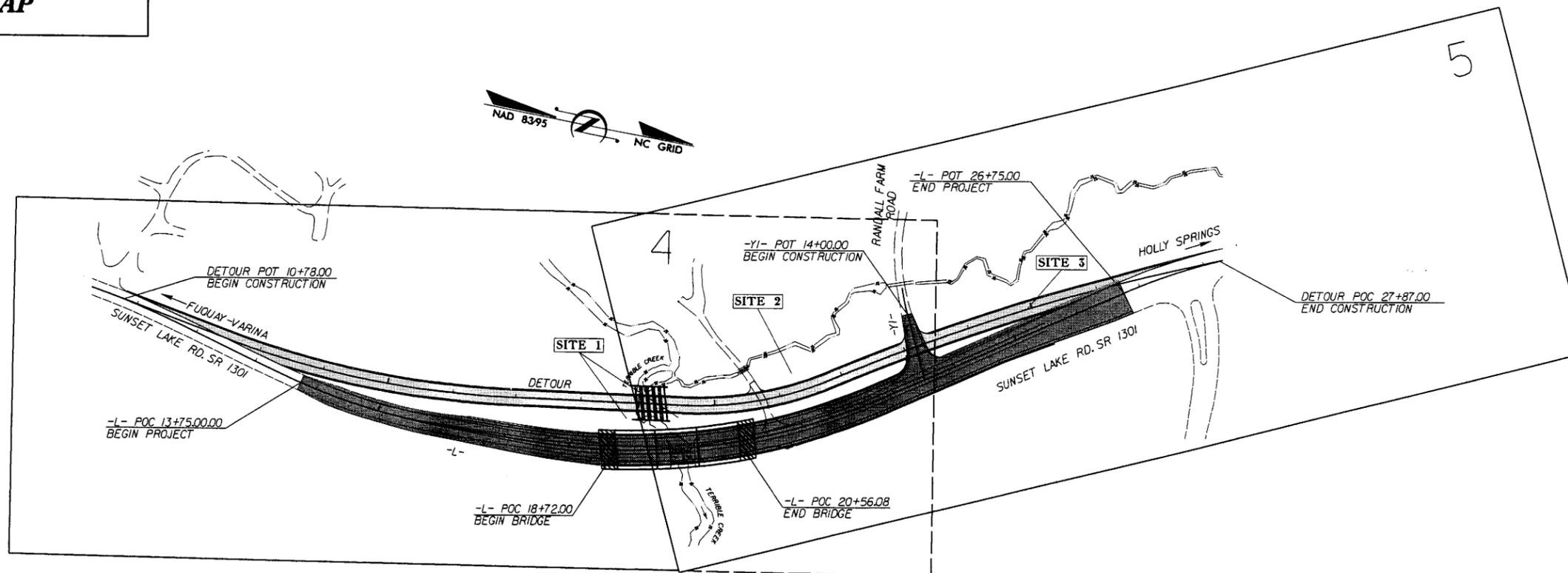
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

BUFFER IMPACTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4302	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33639.1.1	BRZ-1301(2)	P.E.	
33639.2.1	BRZ-1301(2)	R /W, UTIL	

Buffer Drawing
Sheet 1 of 7

TIP PROJECT: B-4302



PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYING.COM

NCDOT CONTACT : DOUG TAYLOR, PE
PROJECT ENGINEER - ROADWAY DESIGN

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

CLEARING ON THIS PROJECT SHALL BE PERFORMED
TO THE LIMITS ESTABLISHED BY METHOD III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES



DESIGN DATA

ADT 2008 = 14,100
ADT 2030 = 28,500
DHV = 10 %
D = 60 %
T = 4% % *
V = 50 MPH
* (TTST 1% + DUALS 3%)
FUNCTIONAL = MINOR
CLASS. COLLECTOR
** DESIGN EXCEPTION =
STOPPING SIGHT DISTANCE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4302 = 0.211 MI
LENGTH STRUCTURE TIP PROJECT B-4302 = 0.035 MI
TOTAL LENGTH TIP PROJECT B-4302 = 0.246 MI

Prepared in the Office of:

MULKEY ENGINEERS & CONSULTANTS
FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 18, 2008

LETTING DATE:
APRIL 21, 2009

TIM S. HAYES, PE
PROJECT ENGINEER

JOHNNY R. BANKS
PROJECT MANAGER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN
ENGINEER

SIGNATURE: _____ P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA



ART McMILLAN, P.E.
STATE HIGHWAY DESIGN ENGINEER

8/22/2008 8:46:32 AM R:\HYDRO\projects\B4302\hyd_prm_buf_tsh.dgn

CONTRACT:

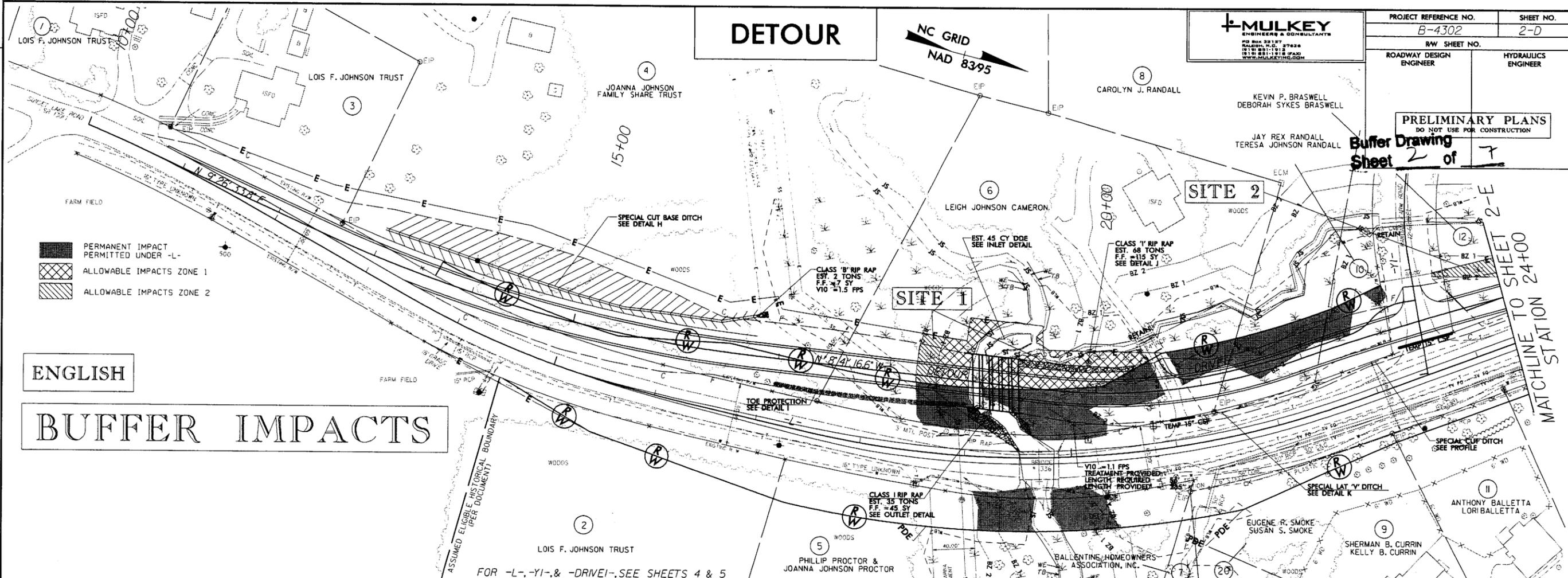
DETOUR

NC GRID
NAD 8395

MULKEY
ENGINEERS & CONSULTANTS
100 WEST 17TH
RALEIGH, N.C. 27603
(919) 881-9112
(919) 881-1818 FAX
WWW.MULKEYINC.COM

PROJECT REFERENCE NO. B-4302	SHEET NO. 2-D
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Buffer Drawing
Sheet 2 of 7

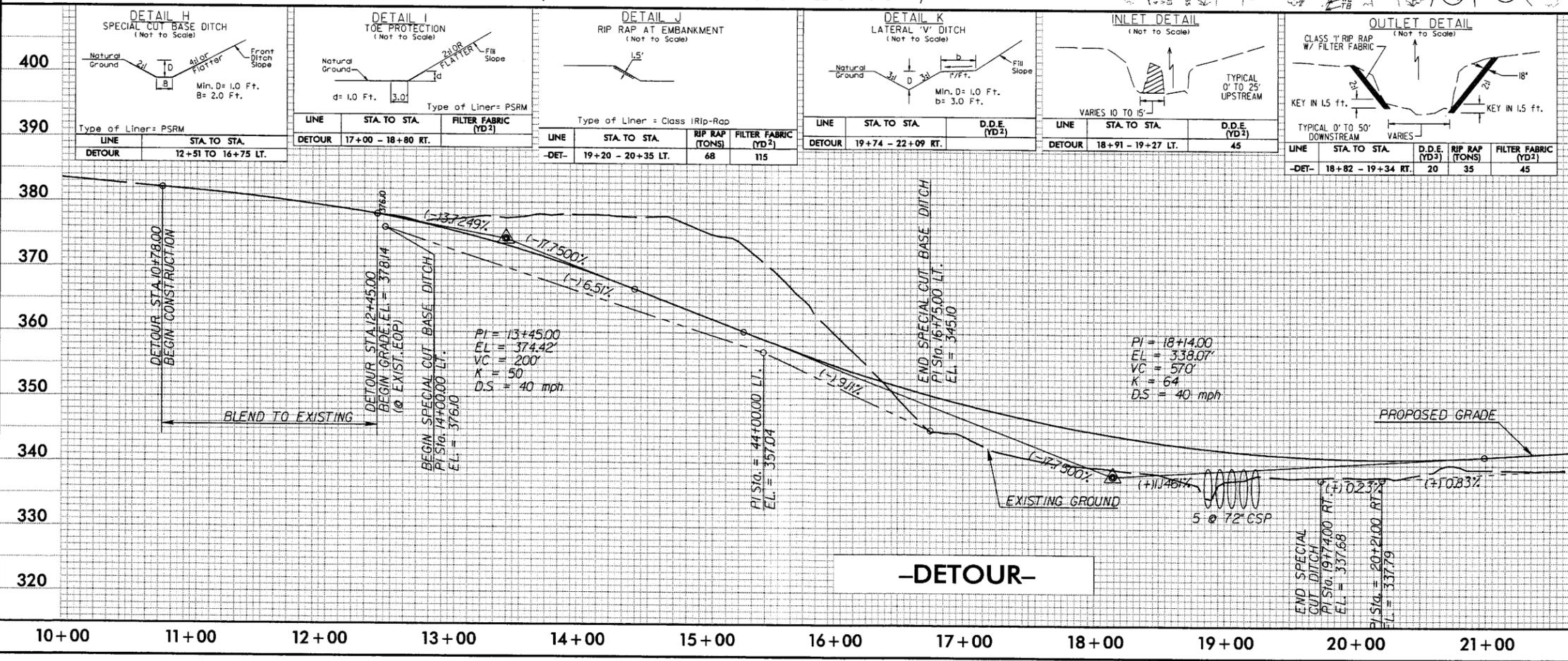


- PERMANENT IMPACT PERMITTED UNDER -L-
- ALLOWABLE IMPACTS ZONE 1
- ALLOWABLE IMPACTS ZONE 2

ENGLISH

BUFFER IMPACTS

REVISIONS



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 950 CFS	400
DESIGN FREQUENCY	= 5 YRS	
DESIGN HW ELEVATION	= 340.0 FT	
BASE DISCHARGE	= N/A CFS	
BASE FREQUENCY	= N/A YRS	390
BASE HW ELEVATION	= N/A FT	
OVERTOPPING DISCHARGE	= 1800 CFS	
OVERTOPPING FREQUENCY	= 10 YRS +/-	
OVERTOPPING ELEVATION	= 341.7 FT	380

DETAIL H
SPECIAL CUT BASE DITCH
(Not to Scale)

Min. D = 1.0 Ft.
B = 2.0 Ft.

LINE	STA. TO STA.
DETOUR	12+51 TO 16+75 LT.

DETAIL I
TOE PROTECTION
(Not to Scale)

d = 1.0 Ft.

LINE	STA. TO STA.	FILTER FABRIC (YD ²)
DETOUR	17+00 - 18+80 RT.	

DETAIL J
RIP RAP AT EMBANKMENT
(Not to Scale)

LINE	STA. TO STA.	RIP RAP (TONS)	FILTER FABRIC (YD ²)
DETOUR	19+20 - 20+35 LT.	68	115

DETAIL K
LATERAL 'V' DITCH
(Not to Scale)

Min. D = 1.0 Ft.
b = 3.0 Ft.

LINE	STA. TO STA.	D.D.E. (YD ²)
DETOUR	19+74 - 22+09 RT.	45

INLET DETAIL
(Not to Scale)

VARIABLES 10 TO 15'

LINE	STA. TO STA.	D.D.E. (YD ²)
DETOUR	18+91 - 19+27 LT.	45

OUTLET DETAIL
(Not to Scale)

LINE	STA. TO STA.	D.D.E. (YD ²)	RIP RAP (TONS)	FILTER FABRIC (YD ²)
DETOUR	18+82 - 19+34 RT.	20	35	45

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BUFFER IMPACTS

ENGLISH

-  PERMANENT IMPACT PERMITTED UNDER -L-
-  ALLOWABLE IMPACTS ZONE 1
-  ALLOWABLE IMPACTS ZONE 2

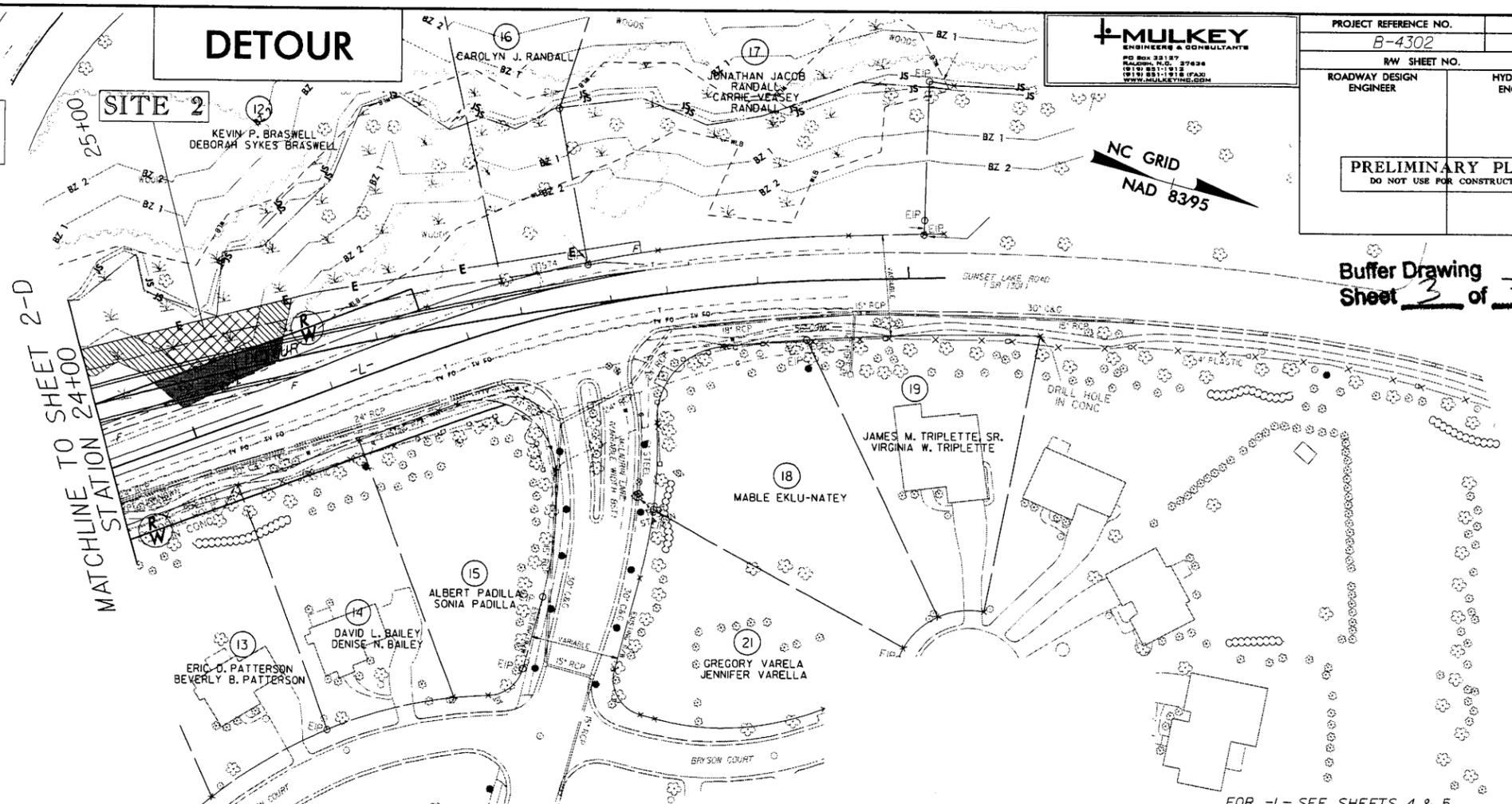
DETOUR

MULKEY
ENGINEERS & CONSULTANTS
P.O. BOX 22187
RALEIGH, N.C. 27628
(919) 881-1122
(919) 881-1178 (FAX)
WWW.MULKEYCONS.COM

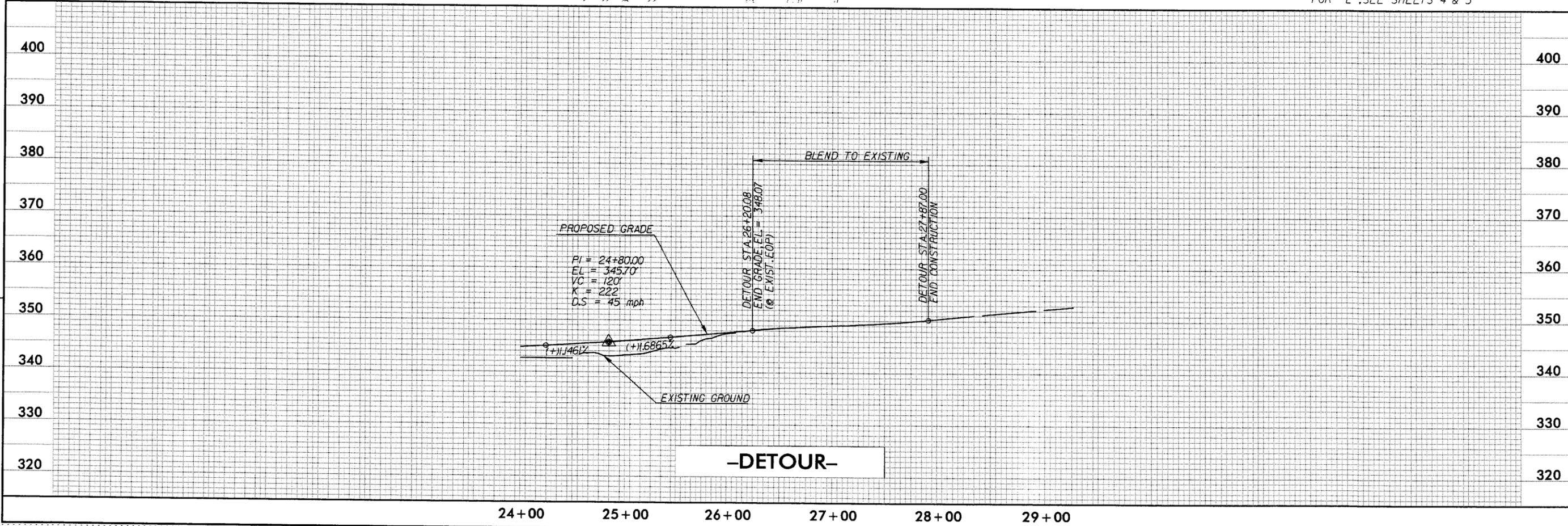
PROJECT REFERENCE NO. B-4302	SHEET NO. 2-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

NC GRID
NAD 8395

Buffer Drawing
Sheet 3 of 7



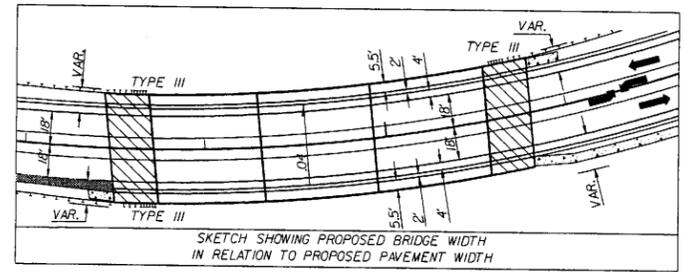
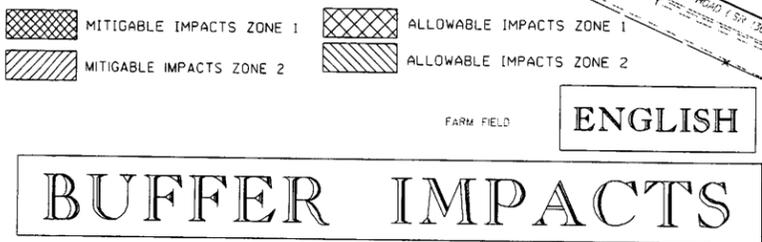
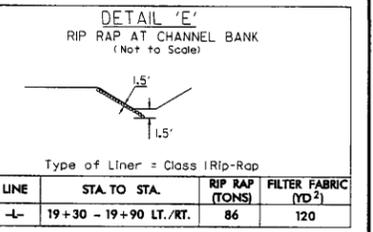
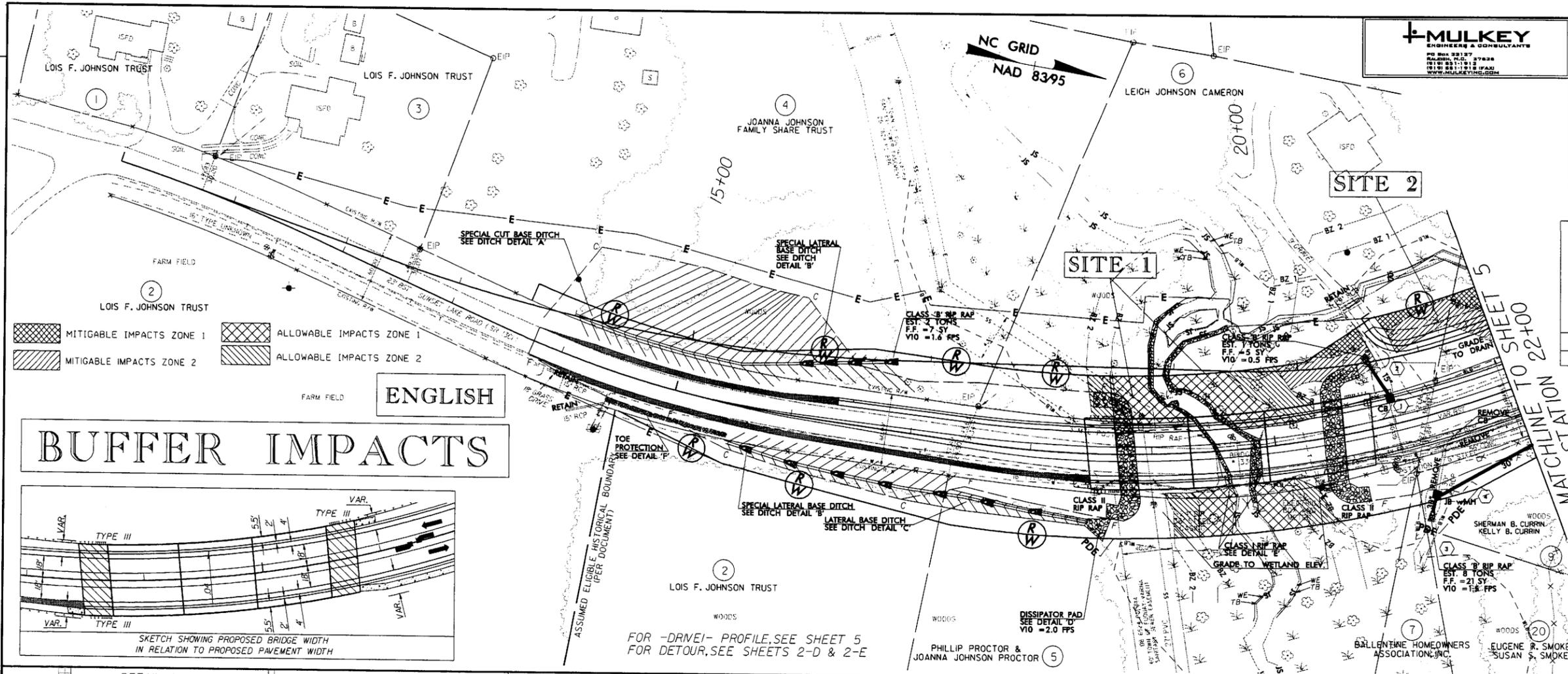
FOR -L-, SEE SHEETS 4 & 5



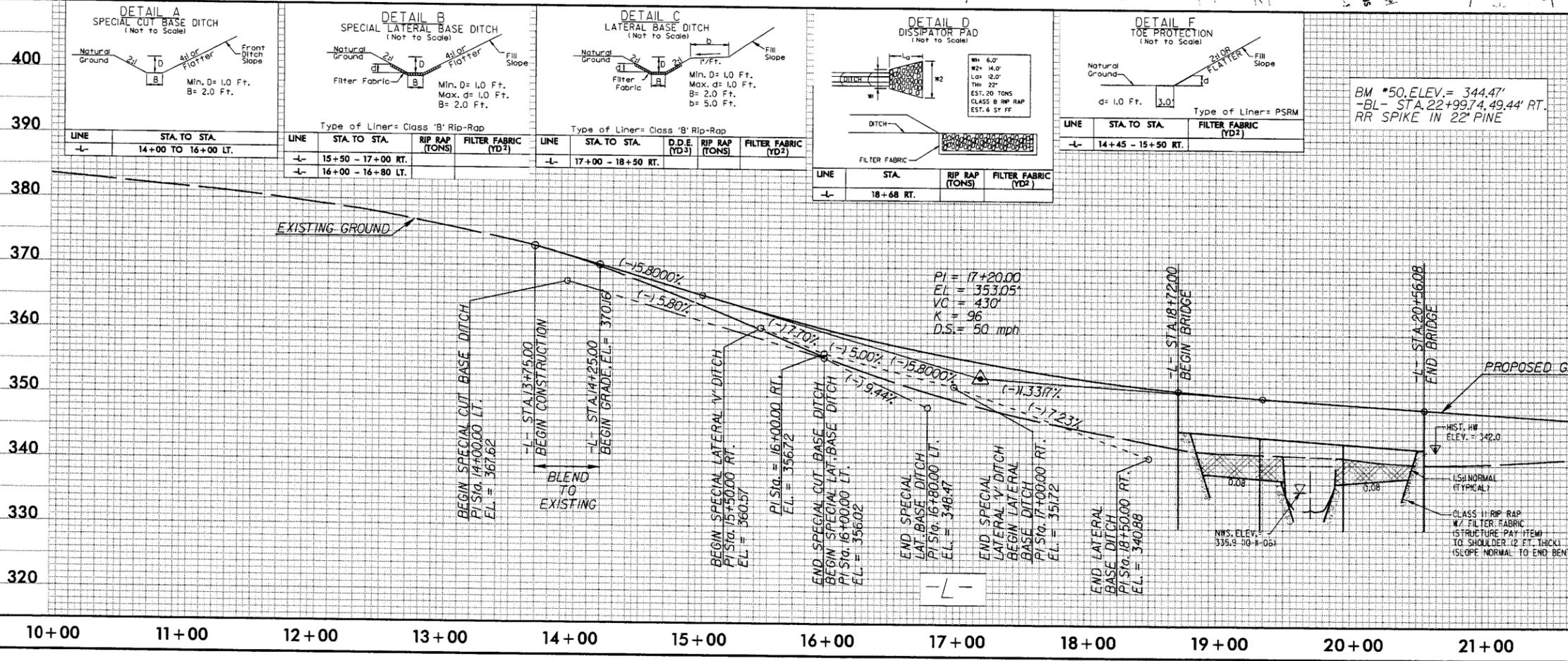
-DETOUR-

REVISIONS

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Buffer Drawing Sheet 4 of 7

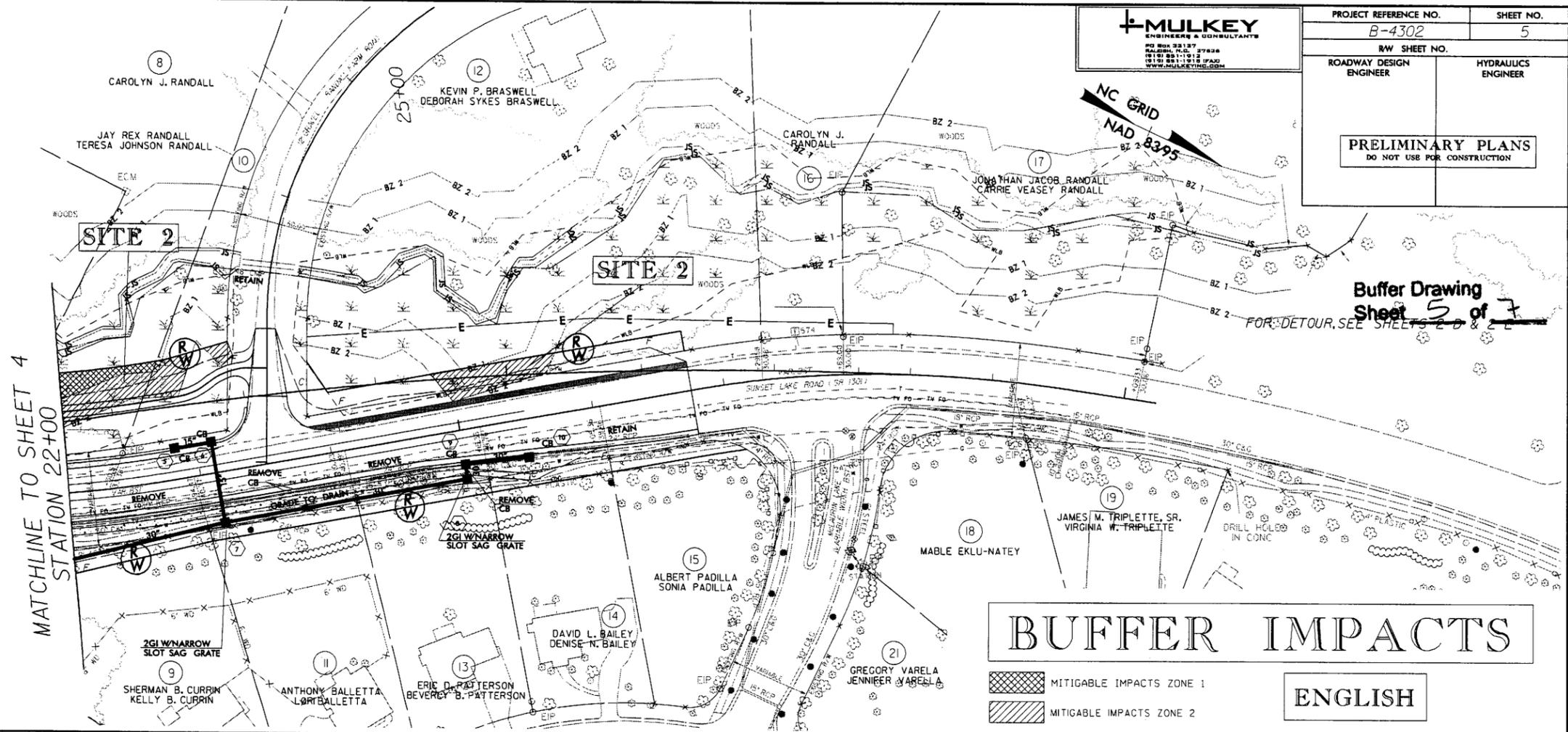


BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1900 CFS	400
DESIGN FREQUENCY	= 50 YRS	
DESIGN HW ELEVATION	= 342.0 FT	
BASE DISCHARGE	= 2200 CFS	
BASE FREQUENCY	= 100 YRS	390
BASE HW ELEVATION	= 342.4 FT	
OVERTOPPING DISCHARGE	= 10000 CFS	
OVERTOPPING FREQUENCY	= 500 YRS	
OVERTOPPING ELEVATION	= 345.1 FT	380
DATE OF SURVEY	= 10/11/07	
W.S. ELEVATION AT DATE OF SURVEY	= 335.9 FT	370

BM *50, ELEV. = 344.47'
-BL- STA. 22+99.74, 49.44' RT.
RR SPIKE IN 22' PINE

8/22/2008 8:51:39 AM R:\Hydraulics\Fermit\B4302_hyd.prf_bur.pst04.dgn

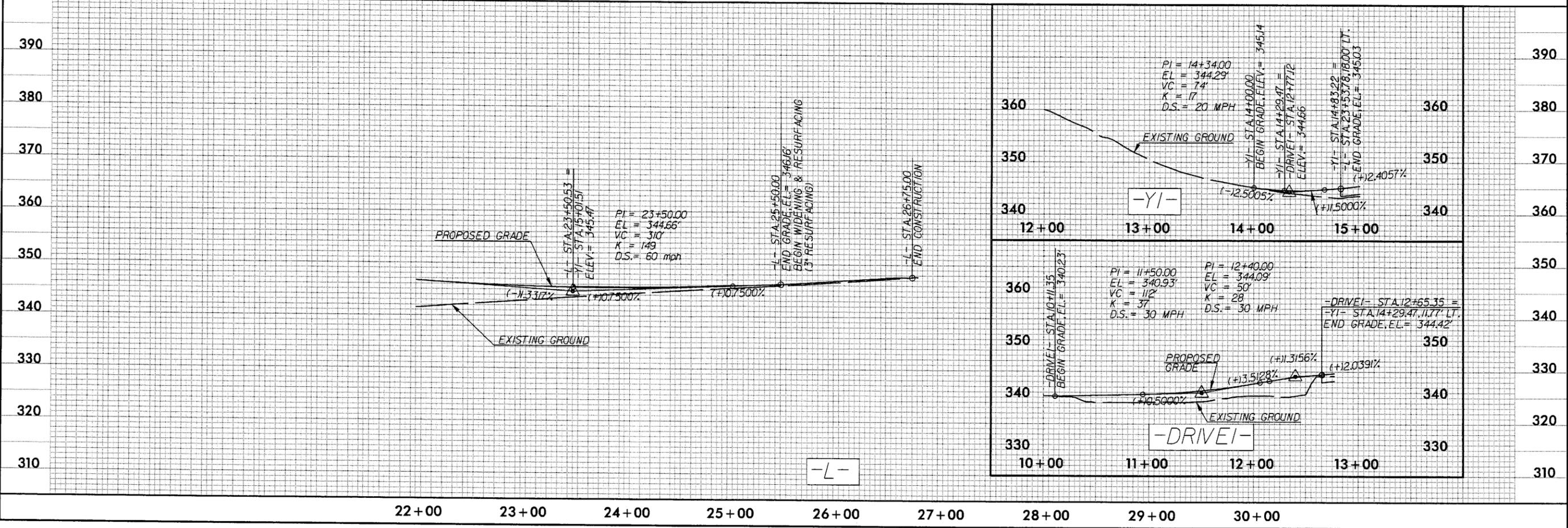


BUFFER IMPACTS

ENGLISH

- MITIGABLE IMPACTS ZONE 1
- MITIGABLE IMPACTS ZONE 2

REVISIONS



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BUFFER IMPACTS SUMMARY

SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	IMPACT										BUFFER REPLACEMENT				
			TYPE			ALLOWABLE			MITIGABLE				ZONE 1 (ft ²)	ZONE 2 (ft ²)			
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft ²)	ZONE 2 (ft ²)	TOTAL (ft ²)	ZONE 1 (ft ²)	ZONE 2 (ft ²)	TOTAL (ft ²)						
1	ROAD*	18+45 to 18+65 -L- LT	X				680	680									
1	BRIDGE	18+65 to 20+10 -L- LT/RT		X		6360	3298	9658									
2	ROAD	20+10 - 20+97 -L- LT			X					448	1486	1934					
1	ROAD	18+30 to 19+12 -DET- LT	X			1800	952	2752									
1	ROAD	18+93 - 20+50 -DET- LT	X			4015		4015									
2	ROAD	21+04 - 23+37 -L- LT			X					1460	4080	5540					
2	ROAD	24+85 - 25+80 -L- LT			X						1566	1566					
2	ROAD	23+52 - 25+47 -DET- LT	X			1854	2528	4382									
TOTAL:						14029	7458	21487		1908	7132	9040					

* Linear impacts along Terrible Creek are 39'.

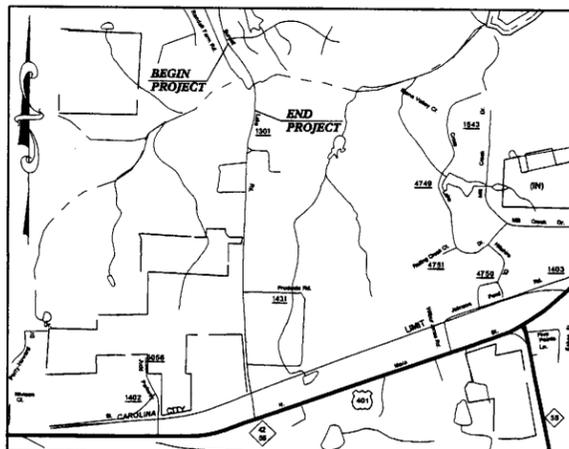
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: B-4302 (BRIDGE #336)

8/22/2008
SHEET 6 OF 7

09/08/09

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



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

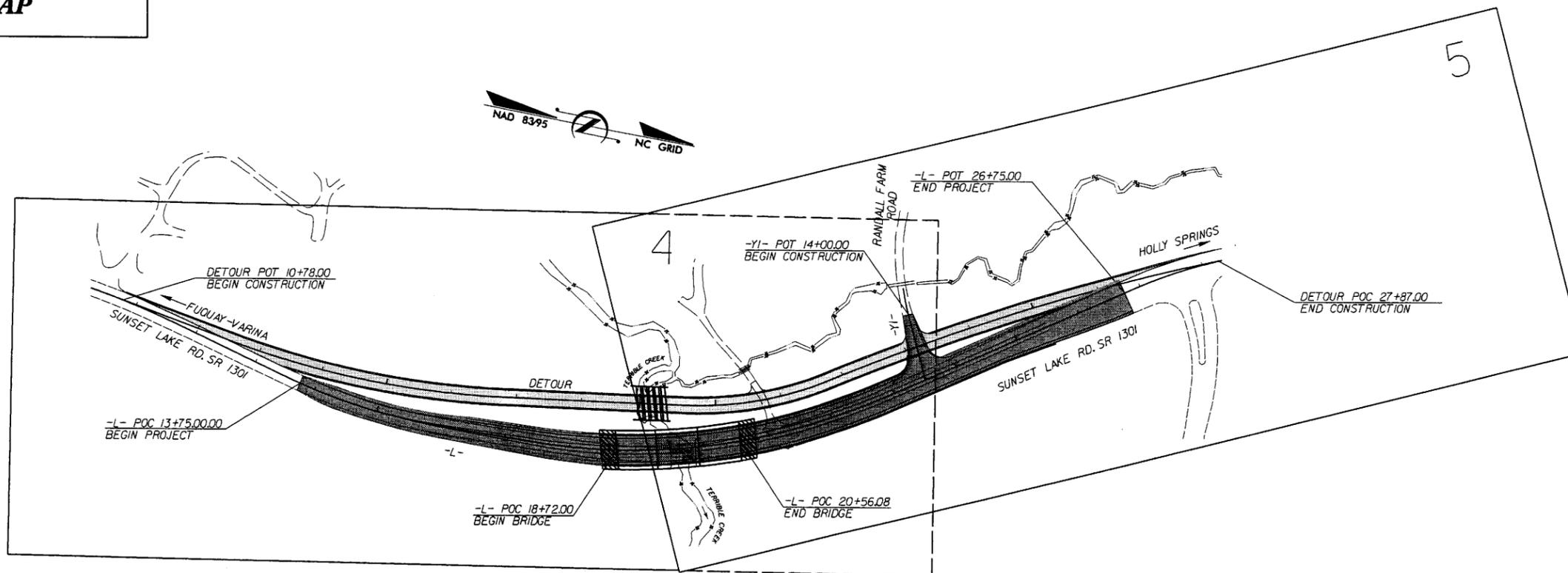
WAKE COUNTY

**LOCATION: BRIDGE NO. 336 OVER TERRIBLE CREEK
ON SR 1301 (SUNSET LAKE ROAD)**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4302	1	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
33639.1.1	BRZ-1301(2)	P.E.	
33639.2.1	BRZ-1301(2)	R /W, UTIL	

TIP PROJECT: B-4302



MULKEY
ENGINEERS & CONSULTANTS
PO BOX 33127
RALEIGH, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

NCDOT CONTACT : DOUG TAYLOR, PE
PROJECT ENGINEER - ROADWAY DESIGN

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

CLEARING ON THIS PROJECT SHALL BE PERFORMED
TO THE LIMITS ESTABLISHED BY METHOD III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES



DESIGN DATA

ADT 2008 = 14,100
ADT 2030 = 28,500
DHV = 10 %
D = 60 %
T = 4% % *
V = 50 MPH
* (TTST 1% + DUALS 3%)
FUNCTIONAL = MINOR
CLASS. COLLECTOR
** DESIGN EXCEPTION =
STOPPING SIGHT DISTANCE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4302 = 0.211 MI
LENGTH STRUCTURE TIP PROJECT B-4302 = 0.035 MI
TOTAL LENGTH TIP PROJECT B-4302 = 0.246 MI

Prepared In the Office of:
MULKEY ENGINEERS & CONSULTANTS
FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 18, 2008

LETTING DATE:
APRIL 21, 2009

TIM S. HAYES, PE
PROJECT ENGINEER

JOHNNY R. BANKS
PROJECT MANAGER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN
ENGINEER

SIGNATURE: _____ P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA



ART McMILLAN, P.E.
STATE HIGHWAY DESIGN ENGINEER

8/22/2008
C:\Roadway\Proj\4302_rdy_tsh.dgn
Sheet 10 - AM

CONTRACT:

Note: Not to Scale

*S.U.E. = Subsurface Utility Engineering

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS CONVENTIONAL SYMBOLS

MULKEY
ENGINEERS & CONSULTANTS
PO BOX 20127
RALEIGH, N.C. 27602
919 881-1010
WWW.MULKEYINC.COM

PROJECT REFERENCE NO. B-4302	SHEET NO. 1-B
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○
Property Corner	-----
Property Monument	□
Parcel/Sequence Number	(23)
Existing Fence Line	x-x-x
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	○
Well	○
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	-----
Buffer Zone 2	-----
Flow Arrow	←
Disappearing Stream	-----
Spring	○
Swamp Marsh	*
Proposed Lateral, Tail, Head Ditch	-----
False Sump	▽

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○
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	○
Proposed Control of Access	○
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
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	⊙
Storm Sewer	S

UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	⊙
Power Line Tower	⊗
Power Transformer	⊠
U/G Power Cable Hand Hole	PH
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	⊙
Telephone Booth	□
Telephone Pedestal	⊠
Telephone Cell Tower	⊗
U/G Telephone Cable Hand Hole	PH
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	⊙
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	⊠
TV Tower	⊗
U/G TV Cable Hand Hole	PH
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:

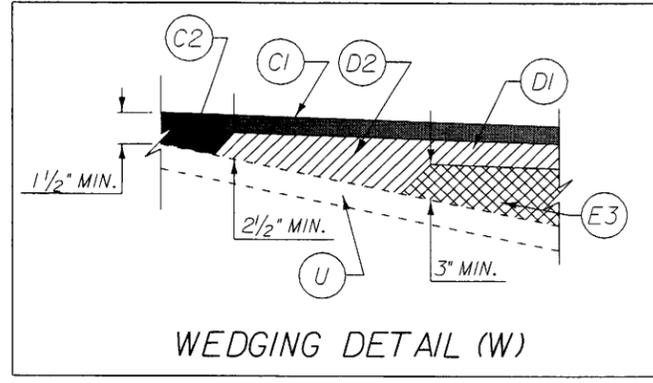
Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	⊠
Utility Unknown U/G Line	UTIL
U/G Tank; Water, Gas, Oil	□
A/G Tank; Water, Gas, Oil	□
U/G Test Hole (S.U.E.*)	⊕
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

REVISIONS

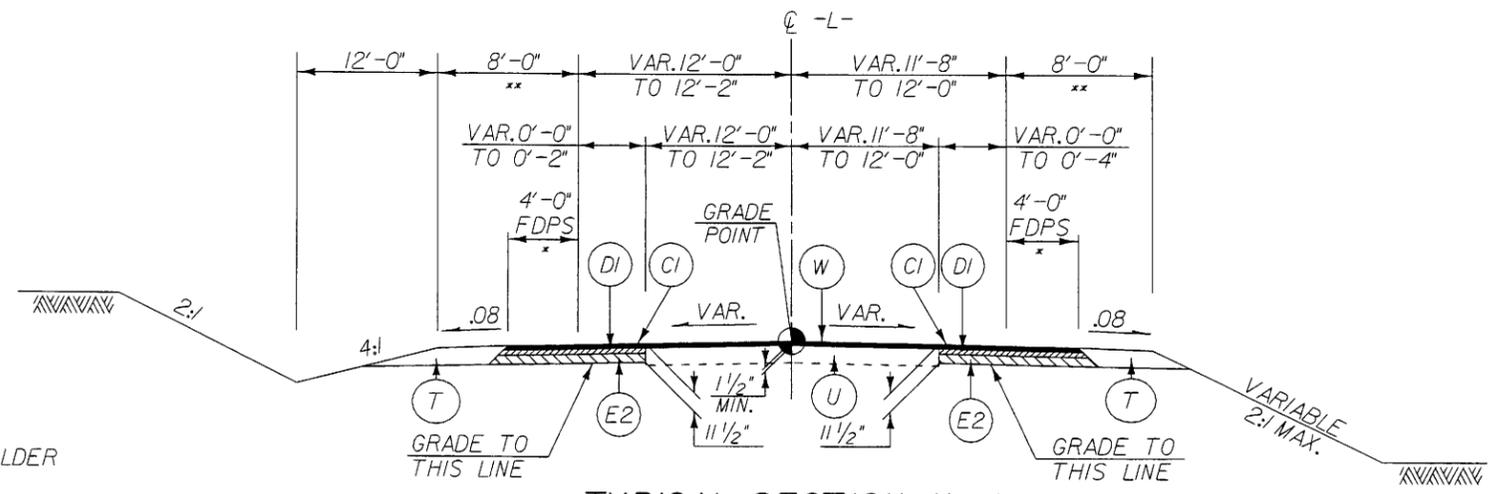
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PAVEMENT SCHEDULE

C1	PROPOSED APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YARD IN EACH OF TWO LAYERS.
C2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1 1/2" OR GREATER THAN 2" IN DEPTH.
D1	PROPOSED APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YARD
D2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" OR GREATER THAN 4" IN DEPTH.
E1	PROPOSED APPROXIMATE 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YARD.
E2	PROPOSED APPROXIMATE 4 1/2" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YARD.
E3	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" OR GREATER THAN 5 1/2" IN DEPTH.
J1	8" AGGREGATE BASE COURSE
P	PRIME COAT
RI	2'-6" CONCRETE CURB & GUTTER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING DETAIL



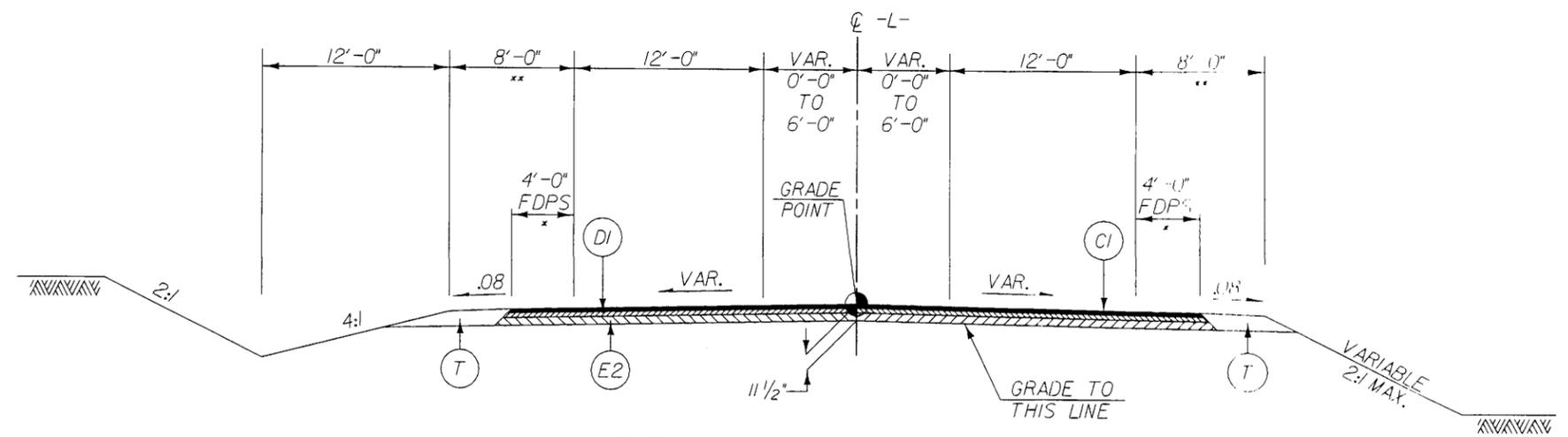
NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE SHOWN.



* FDPS = FULL DEPTH PAVED SHOULDER
 ** ADD 3'-0" FOR GUARDRAIL

TYPICAL SECTION No. 1
 USE TYPICAL SECTION No. 1 AS FOLLOWS:
 FROM -L- STA. 13+75.00 TO -L- STA. 15+14.00

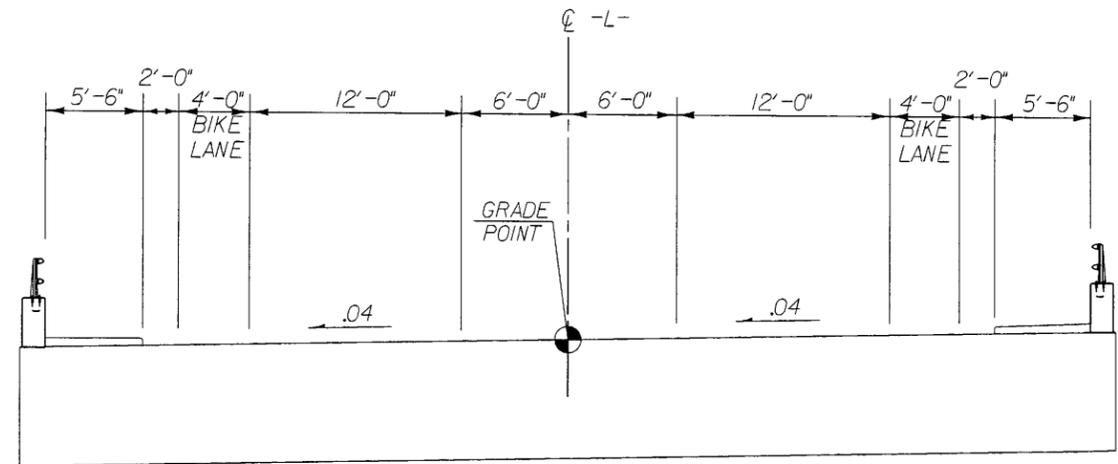
REVISIONS



* FDPS = FULL DEPTH PAVED SHOULDER
** ADD 3'-0" FOR GUARDRAIL

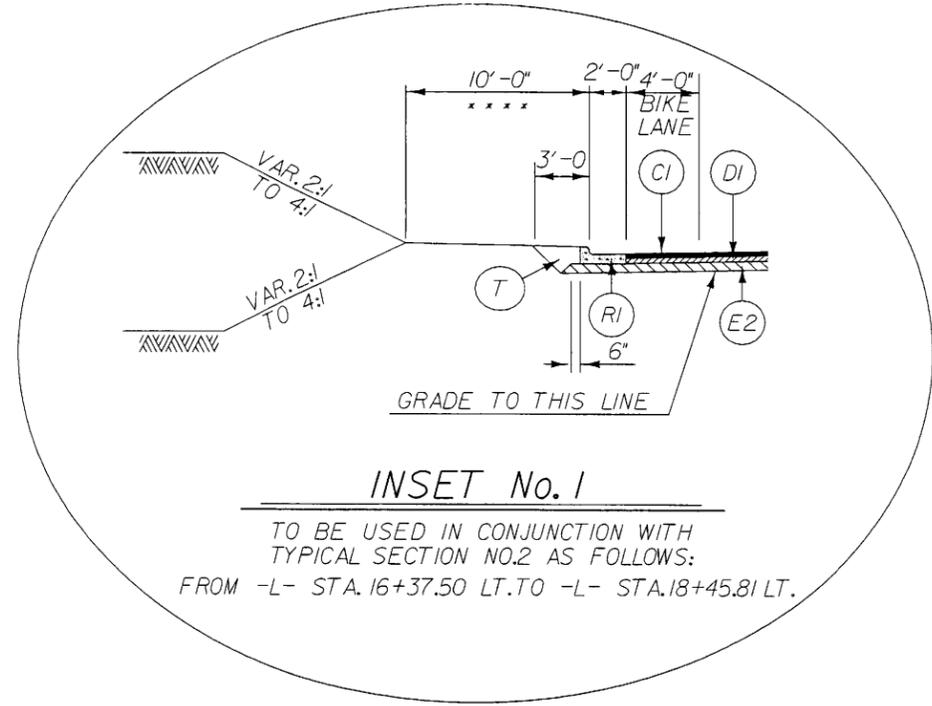
TYPICAL SECTION No. 2

USE TYPICAL SECTION No.2 AS FOLLOWS:
FROM -L- STA.15+4.00 TO -L- STA.18+72.00 (BEGIN BRIDGE)



TYPICAL SECTION No. 3

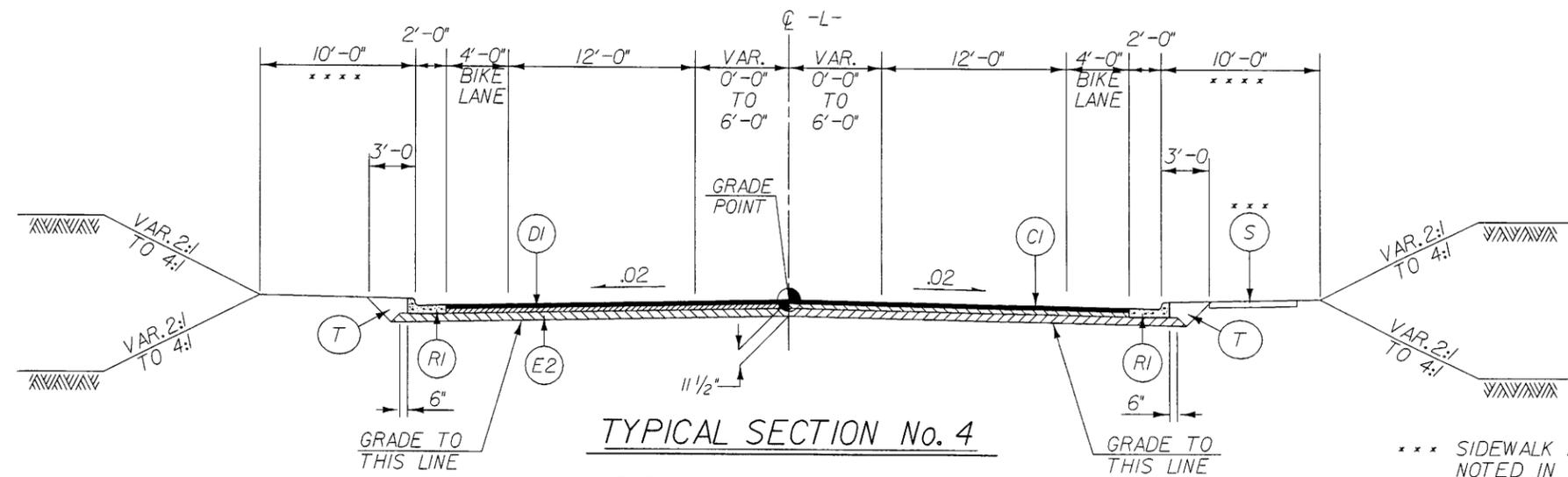
USE TYPICAL SECTION No.3 AS FOLLOWS:
FROM -L- STA.18+72.00 (BEGIN BRIDGE) TO -L- STA.20+56.08 (END BRIDGE)



INSET No. 1

TO BE USED IN CONJUNCTION WITH
TYPICAL SECTION NO.2 AS FOLLOWS:
FROM -L- STA.16+37.50 LT. TO -L- STA.18+45.81 LT.

CI	3" SF9.5B
C2	VAR. DEPTH SF9.5B
DI	4" 119.0B
D2	VAR. DEPTH 119.0B
E2	4 1/2" B25.0B
E3	VAR. DEPTH B25.0B
J1	8" ABC
P	PRIME COAT
RI	2'-6" C&G
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING



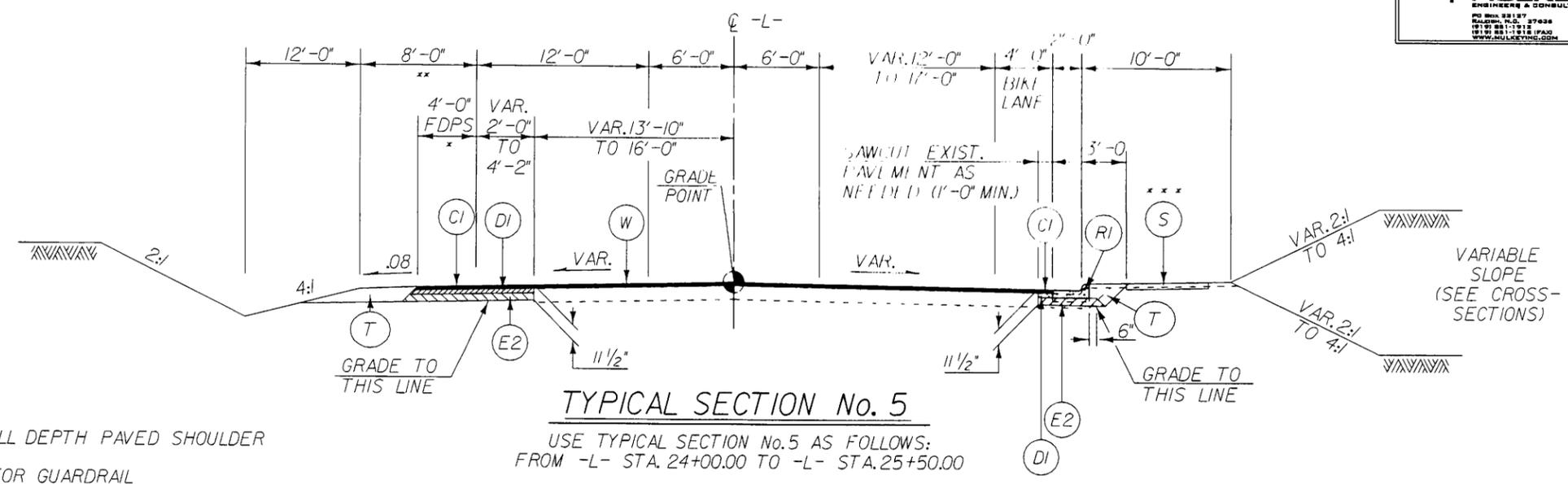
TYPICAL SECTION No. 4

USE TYPICAL SECTION No.4 AS FOLLOWS:
FROM -L- STA.20+56.08 (END BRIDGE) TO -L- STA.24+00.00

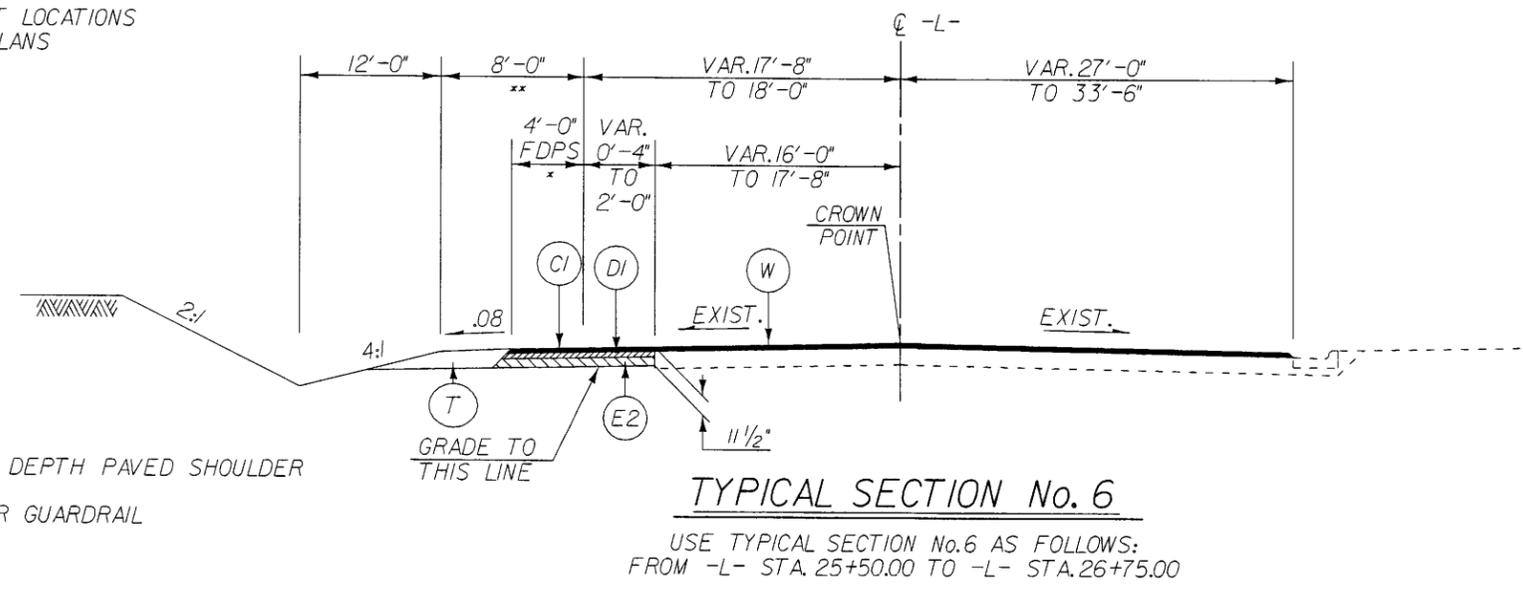
*** SIDEWALK AT LOCATIONS NOTED IN PLANS
**** ADD 4'-0" FOR GUARDRAIL

NOTE:
1. SEE SHEET 2 FOR DETAILED DESCRIPTION OF PAVEMENT SCHEDULE
2. ALL PAVEMENT EDGES ARE 1:1 UNLESS OTHERWISE NOTED

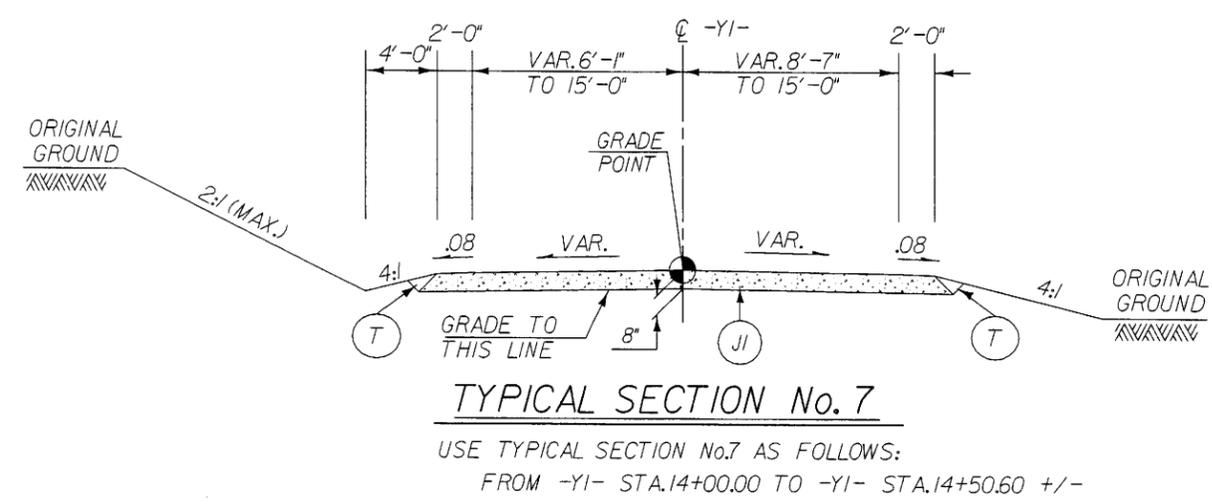
REVISIONS



- * FDPS = FULL DEPTH PAVED SHOULDER
- ** ADD 3'-0" FOR GUARDRAIL
- *** SIDEWALK AT LOCATIONS NOTED IN PLANS



- * FDPS = FULL DEPTH PAVED SHOULDER
- ** ADD 3'-0" FOR GUARDRAIL

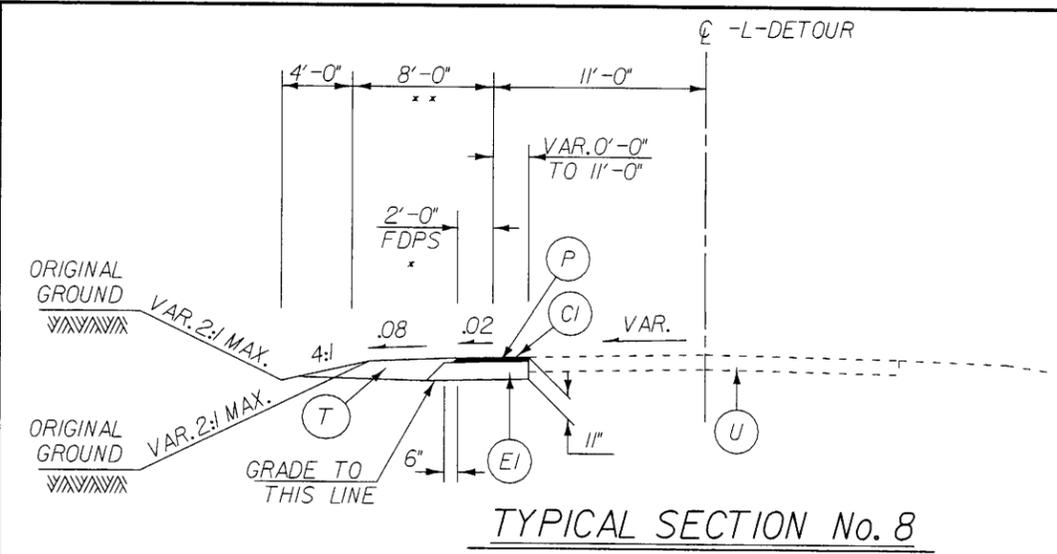


CI	3" SF9.5B
C2	VAR.DEPTH SF9.5B
DI	4" 119.0B
D2	VAR.DEPTH 119.0B
E2	4 1/2" B25.0B
E3	VAR.DEPTH B25.0B
J1	8" ABC
P	PRIME COAT
RI	2'-6" C&G
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXIST.PAVEMENT
W	WEDGING

NOTE:
1. SEE SHEET 2 FOR DETAILED DESCRIPTION OF PAVEMENT SCHEDULE
2. ALL PAVEMENT EDGES ARE 1:1 UNLESS OTHERWISE NOTED

REVISIONS

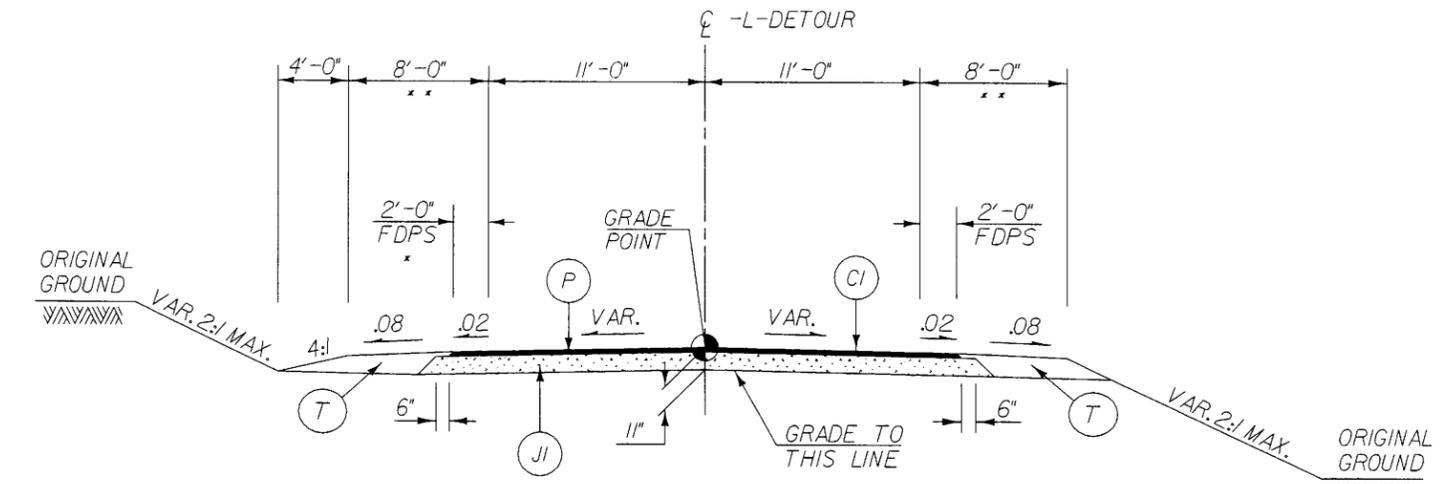
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TYPICAL SECTION No. 8

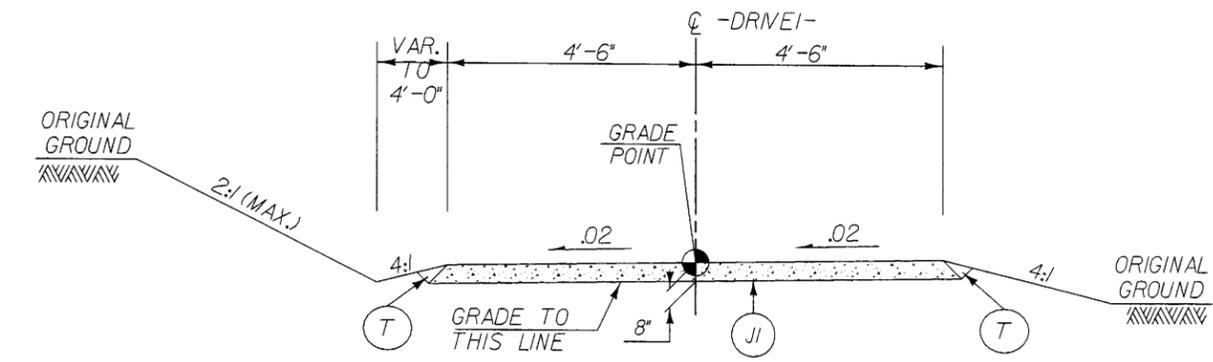
USE TYPICAL SECTION No.8 AS FOLLOWS:
FROM DETOUR STA.10+78.00 TO DETOUR STA.12+45.00
FROM DETOUR STA.26+20.00 TO DETOUR STA.27+87.00

* FDPS = FULL DEPTH PAVED SHOULDER
** ADD 2'-0" FOR GUARDRAIL



TYPICAL SECTION No. 9

USE TYPICAL SECTION No.9 AS FOLLOWS:
FROM DETOUR STA.12+45.00 TO DETOUR STA.26+20.00



TYPICAL SECTION No. 10

USE TYPICAL SECTION No.10 AS FOLLOWS:
FROM -DRIVEI- STA.10+11.35 TO -DRIVEI- STA.12+65.35

CI	3" SF9.5B
C2	VAR.DEPH SF9.5B
DI	4" 119.0B
D2	VAR.DEPH 119.0B
E1	4" B25.0B
E2	4 1/2" B25.0B
E3	VAR.DEPH B25.0B
J1	8" ABC
P	PRIME COAT
R1	2'-6" C&G
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXIST.PAVEMENT
W	WEDGING

NOTE:
1. SEE SHEET 2 FOR DETAILED DESCRIPTION OF PAVEMENT SCHEDULE
2. ALL PAVEMENT EDGES ARE 1:1 UNLESS OTHERWISE NOTED

REVISIONS

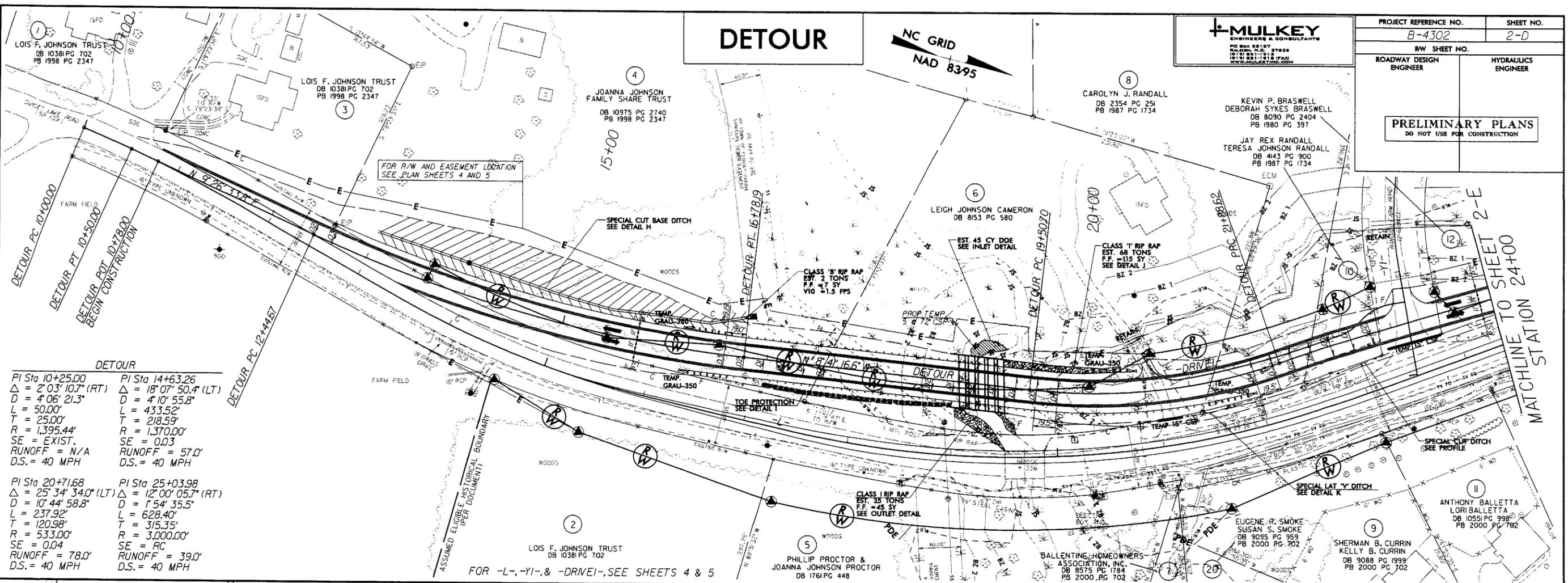
8/22/2008 8:15:52 AM R:\Roadway\Frcj\N4302_rdy_fyp.dwg

DETOUR

NC GRID
NAD 83/95



PROJECT REFERENCE NO. B-4302	SHEET NO. 2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



DETOUR

PI Sta 10+25.00 Δ = 2° 03' 10.7" (RT) D = 4' 06' 21.3" L = 50.00' T = 25.00' R = 1,395.44' SE = EXIST. RUNOFF = N/A D.S. = 40 MPH	PI Sta 14+63.26 Δ = 18° 07' 50.4" (LT) D = 4' 10' 55.8" L = 433.52' T = 218.59' R = 1,370.00' SE = 0.03 RUNOFF = 57.0' D.S. = 40 MPH
PI Sta 20+71.68 Δ = 25° 34' 34.0" (LT) D = 10' 44' 58.8" L = 237.92' T = 120.98' R = 533.00' SE = 0.04 RUNOFF = 78.0'	PI Sta 25+03.98 Δ = 12° 00' 05.7" (RT) D = 1' 54' 35.5" L = 628.40' T = 315.35' R = 3,000.00' SE = RC RUNOFF = 39.0' D.S. = 40 MPH

DETAIL H
SPECIAL CUT BASE DITCH
(Not to Scale)

Min. D = 1.0 Ft.
B = 2.0 Ft.

LINE	STA. TO STA.	Type of Liner = PSRM
DETOUR	12+51 TO 16+75 LT.	

DETAIL I
TOE PROTECTION
(Not to Scale)

d = 1.0 Ft.

LINE	STA. TO STA.	Type of Liner = PSRM	FILTER FABRIC (YD ²)
DETOUR	17+00 - 18+80 RT.		

DETAIL J
RIP RAP AT EMBANKMENT
(Not to Scale)

LINE	STA. TO STA.	Type of Liner = Class I Rip-Rap	RIP RAP (TONS)	FILTER FABRIC (YD ²)
DETOUR	19+20 - 20+35 LT.		68	115

DETAIL K
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

LINE	STA. TO STA.	D.D.E. (YD ³)
DETOUR	19+74 - 22+09 RT.	

INLET DETAIL
(Not to Scale)

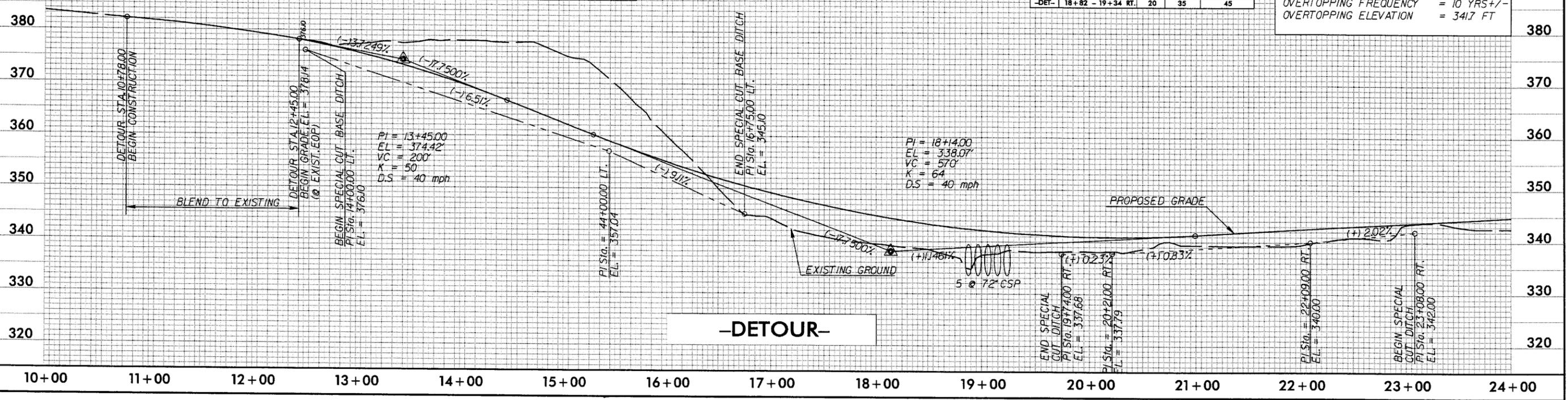
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DETOUR	18+91 - 19+27 LT.	45

OUTLET DETAIL
(Not to Scale)

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DETOUR	18+82 - 19+34 RT.	20	35	45

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 950 CFS	400
DESIGN FREQUENCY	= 5 YRS	
DESIGN HW ELEVATION	= 340.0 FT	
BASE DISCHARGE	= N/A CFS	
BASE FREQUENCY	= N/A YRS	390
BASE HW ELEVATION	= N/A FT	
OVERTOPPING DISCHARGE	= 1800 CFS	
OVERTOPPING FREQUENCY	= 10 YRS +/-	
OVERTOPPING ELEVATION	= 341.7 FT	380



-DETOUR-

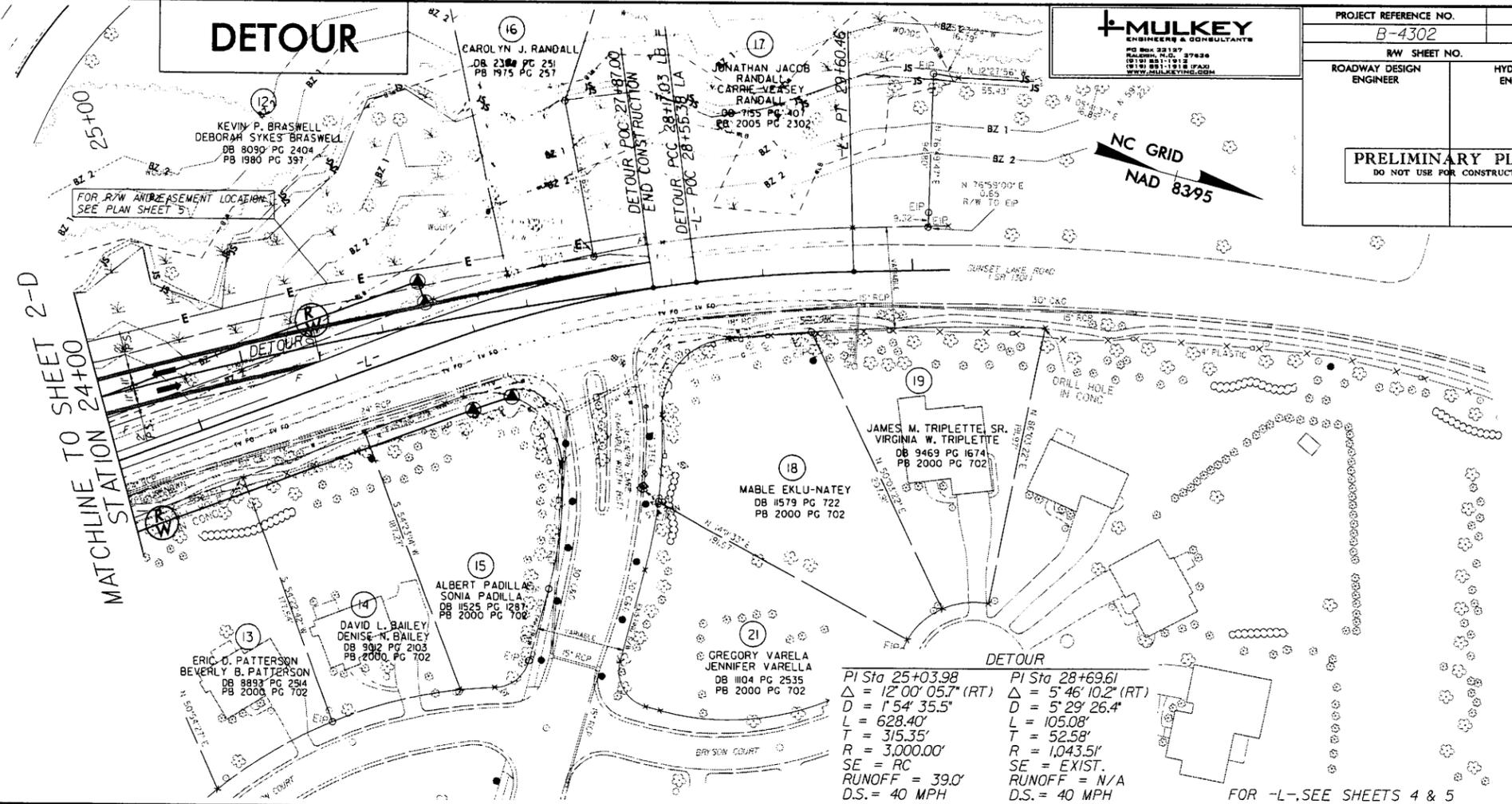
REVISIONS

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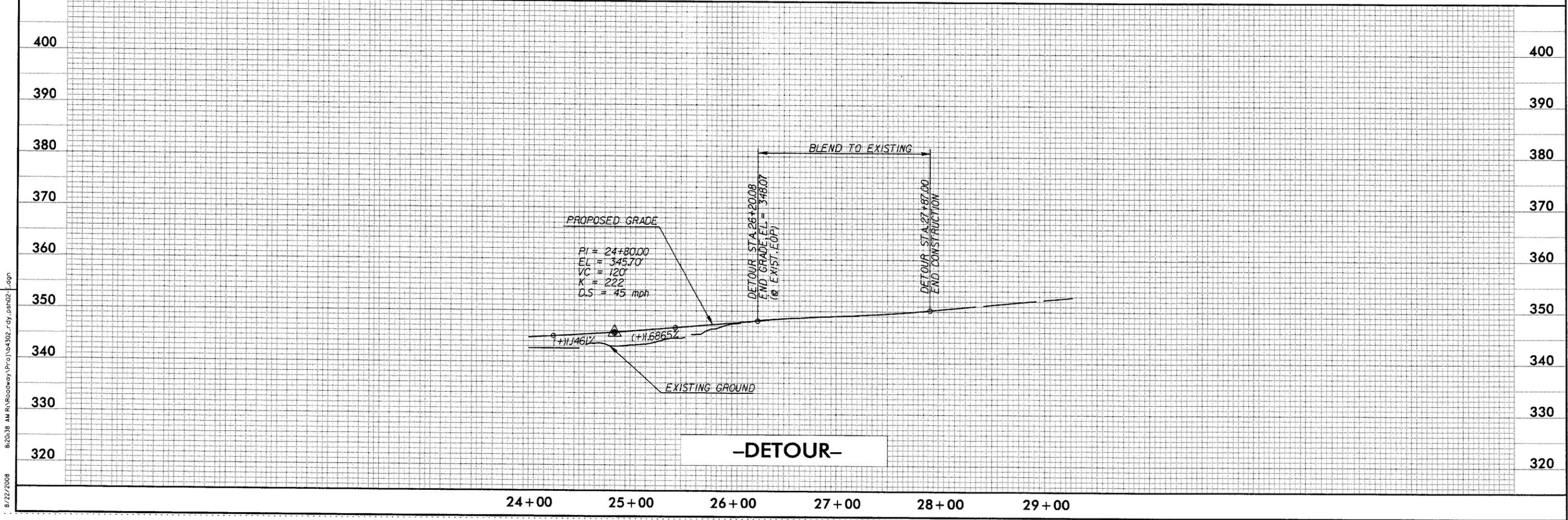
DETOUR



PROJECT REFERENCE NO. B-4302	SHEET NO. 2-E
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



REVISIONS



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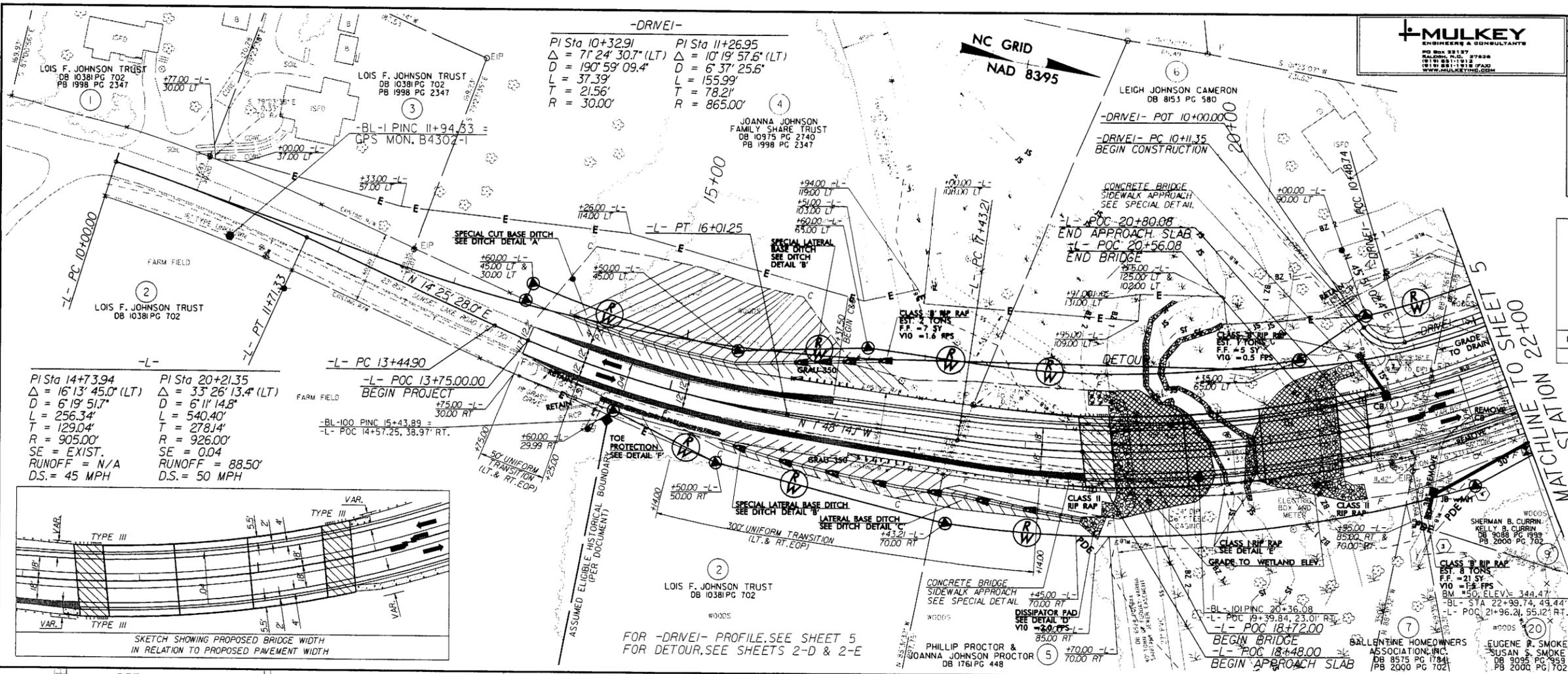
DETAIL 'E'
RIP RAP AT CHANNEL BANK
(Not to Scale)

Type of Liner = Class I Rip-Rap

LINE	STA. TO STA.	RIP RAP (TONS)	FILTER FABRIC (YD ²)
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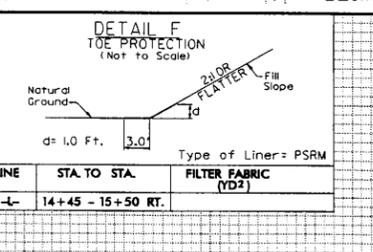
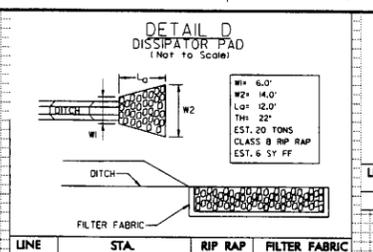
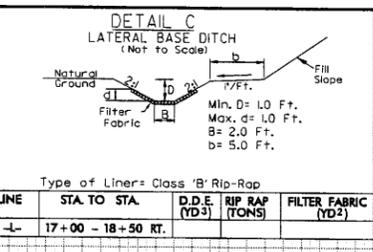
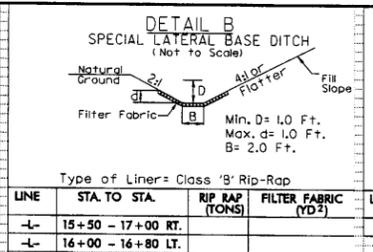
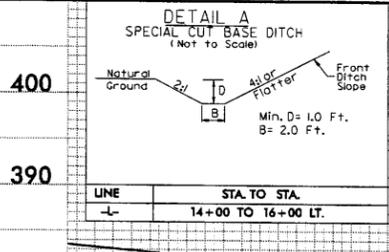
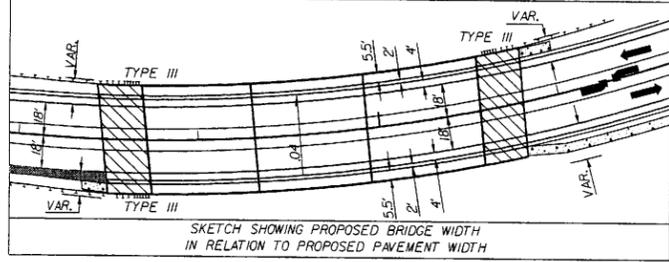
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DATE:

REVISIONS



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D = 6' 19" 51.7"
L = 256.34'
T = 129.04'
R = 905.00'
SE = EXIST.
RUNOFF = N/A
D.S. = 45 MPH

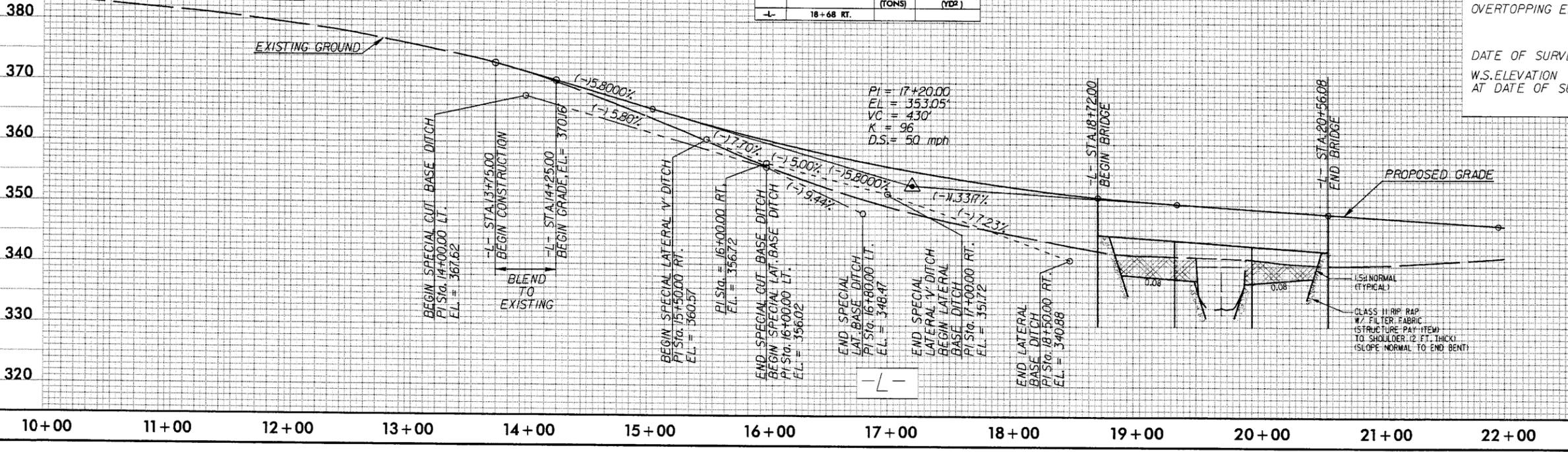
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SE = 0.04
RUNOFF = 88.50'
D.S. = 50 MPH



BRIDGE HYDRAULIC DATA

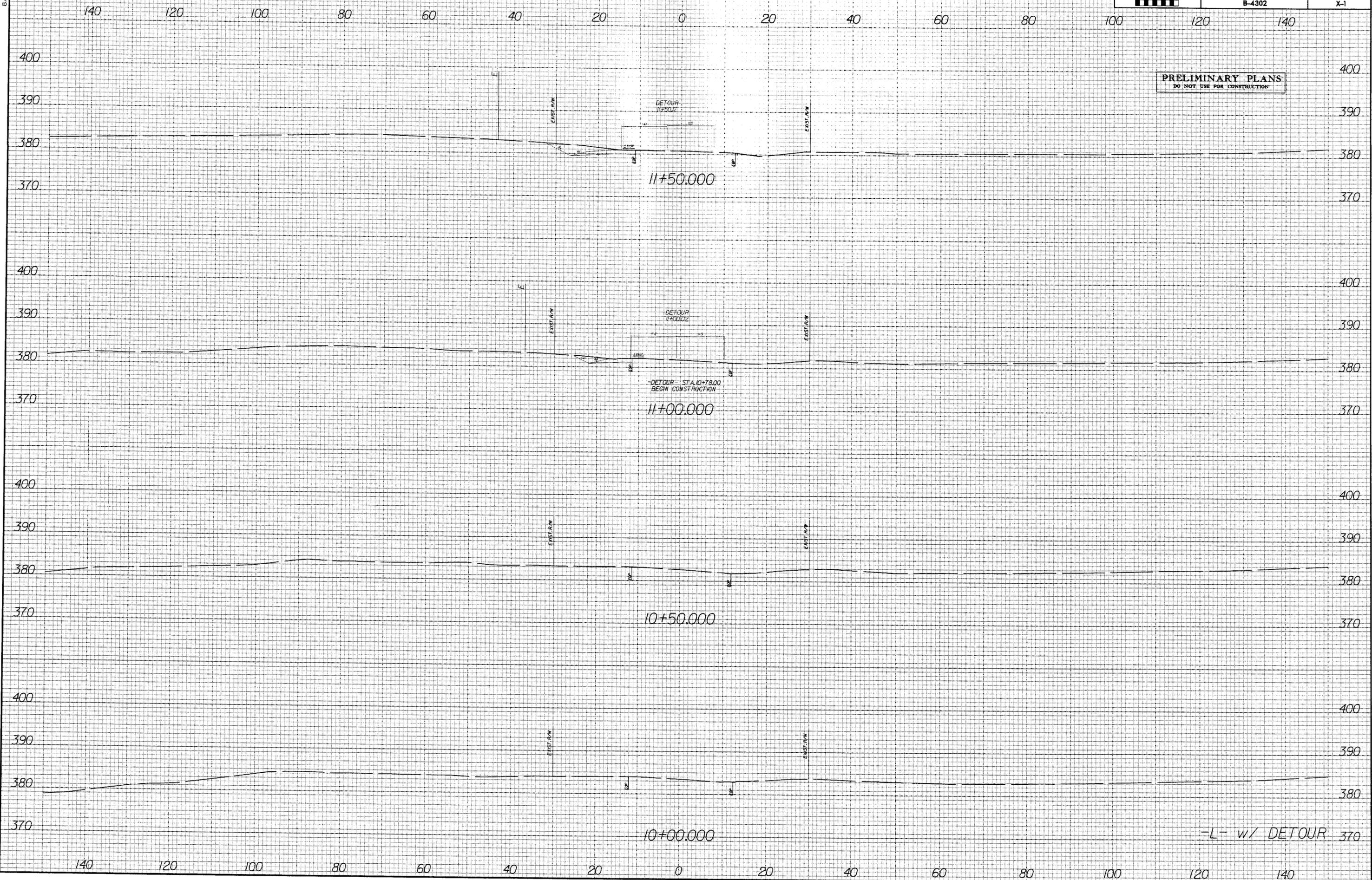
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DESIGN FREQUENCY	= 50 YRS	
DESIGN HW ELEVATION	= 342.0 FT	
BASE DISCHARGE	= 2200 CFS	
BASE FREQUENCY	= 100 YRS	390
BASE HW ELEVATION	= 342.4 FT	
OVERTOPPING DISCHARGE	= 10000 CFS	
OVERTOPPING FREQUENCY	= 500 YRS	380
OVERTOPPING ELEVATION	= 345.1 FT	

DATE OF SURVEY = 10/11/07
W.S. ELEVATION AT DATE OF SURVEY = 335.9 FT



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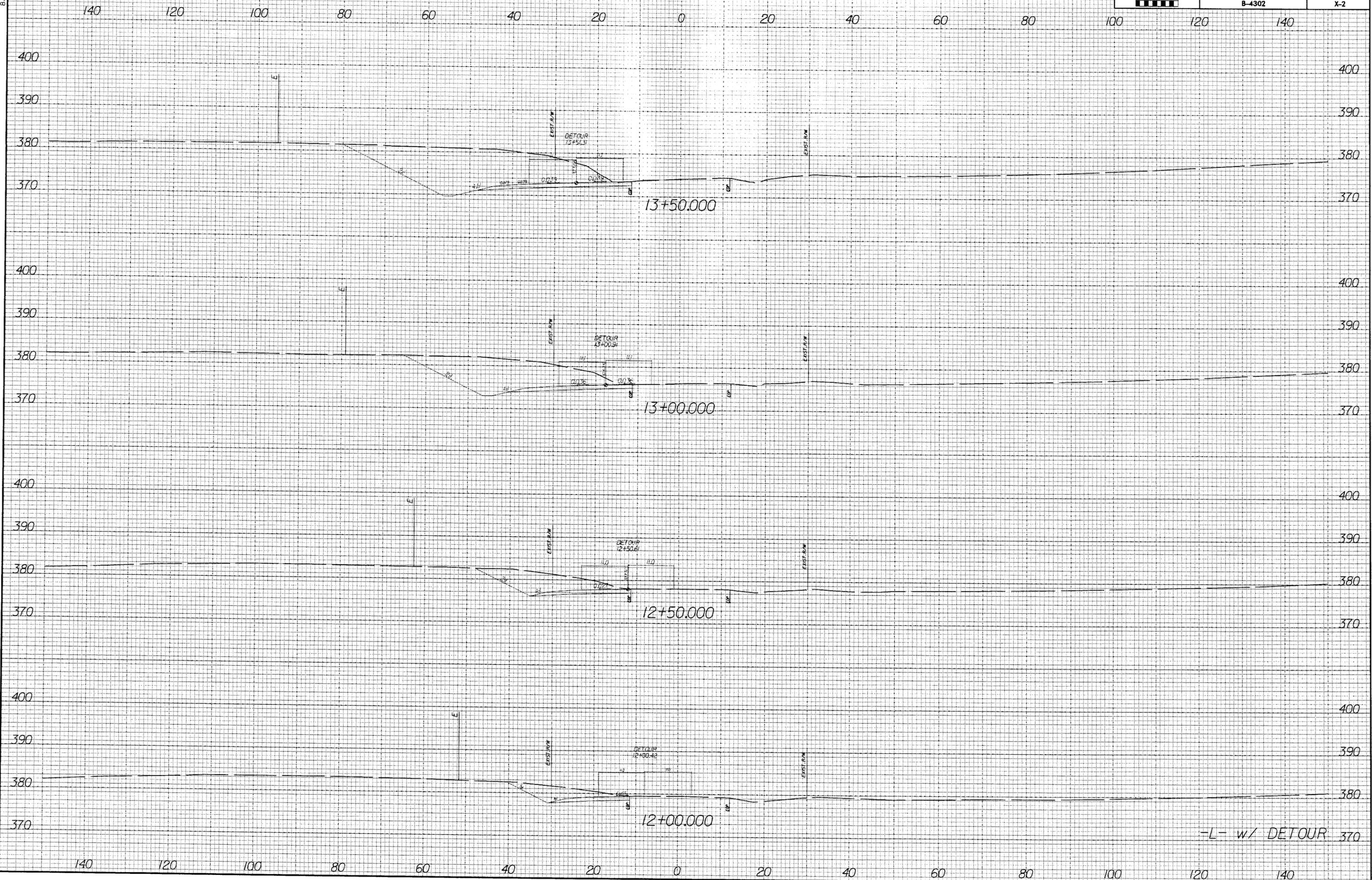
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PRELIMINARY PLANS
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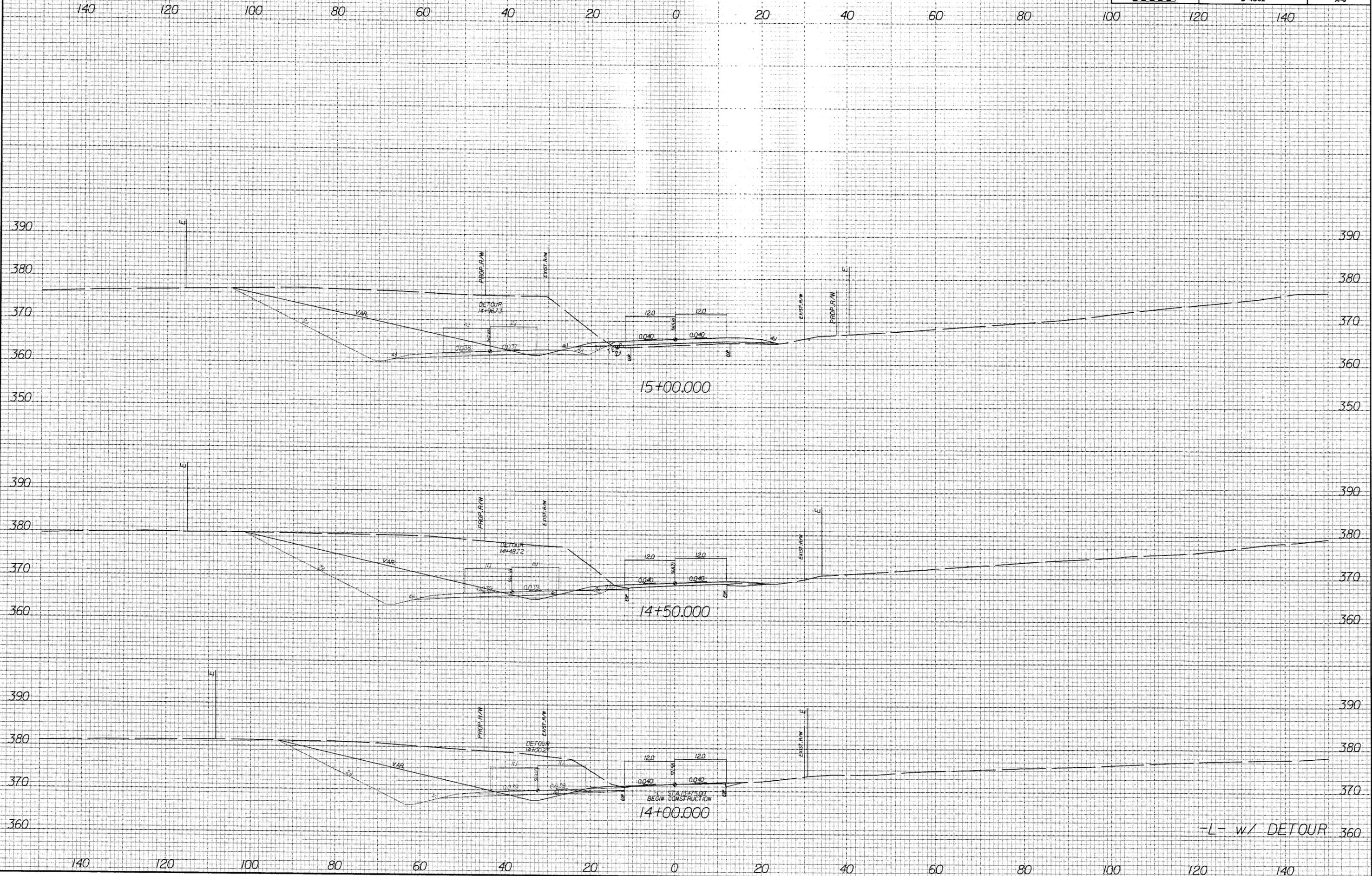
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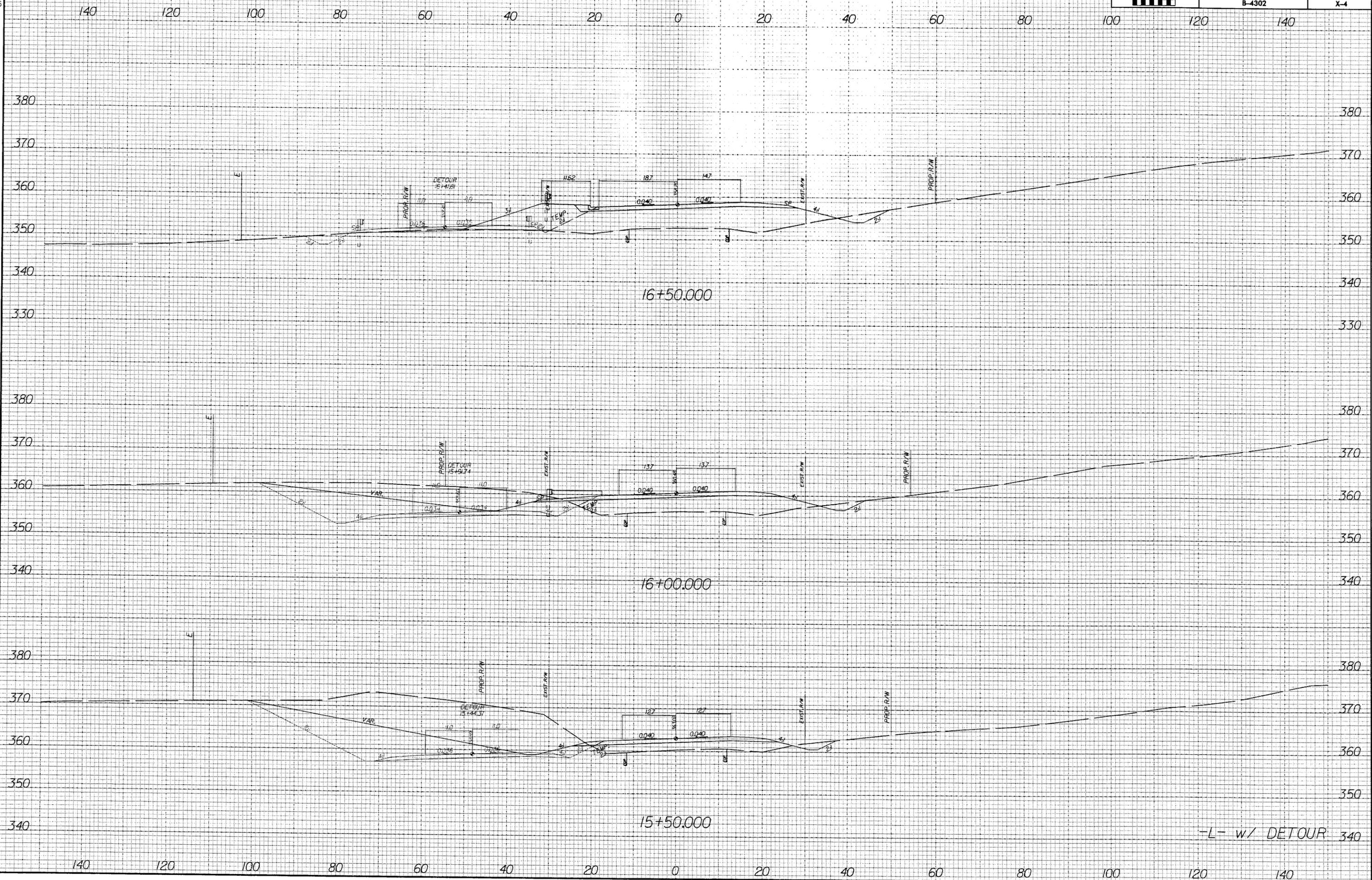
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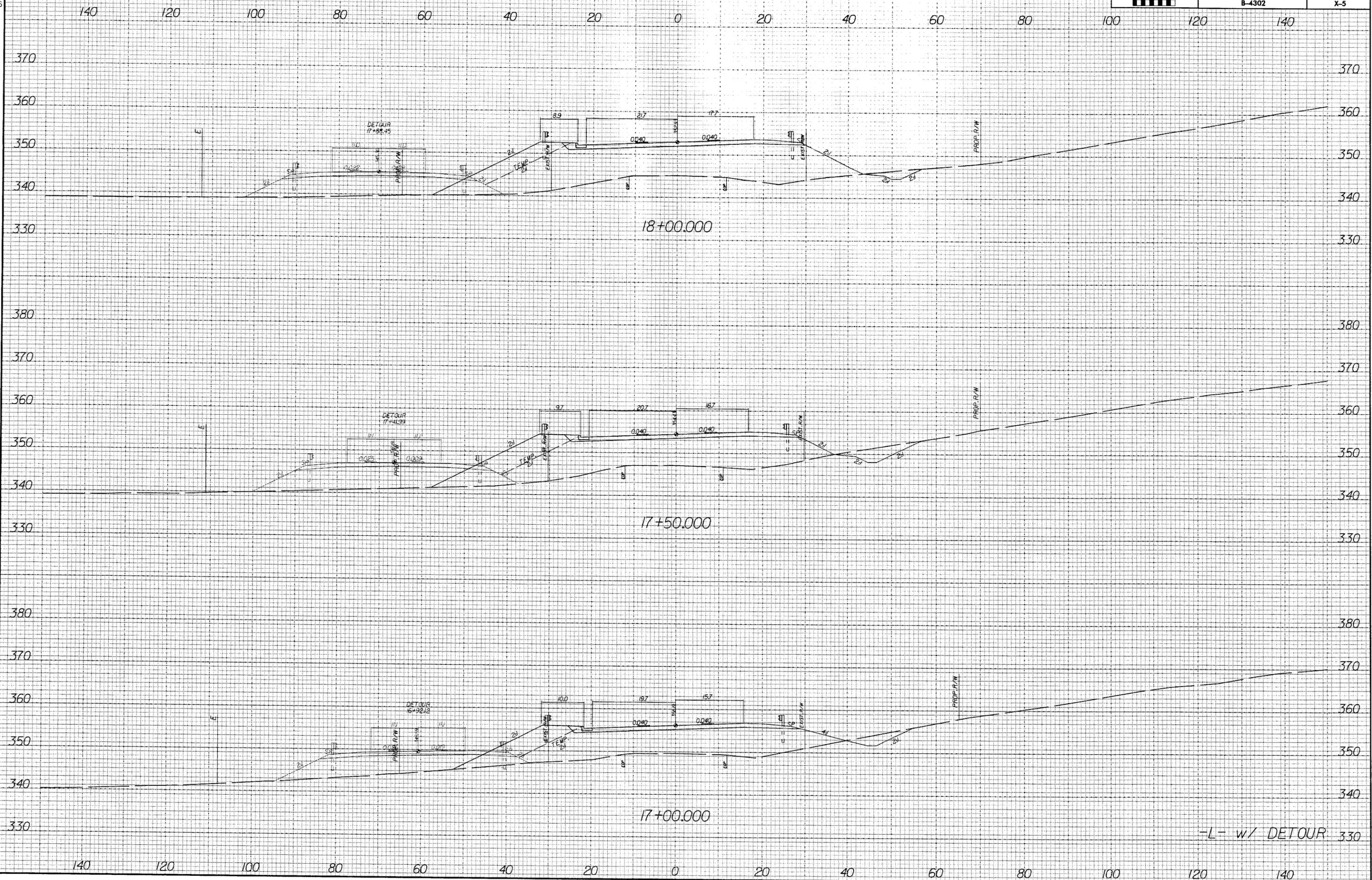
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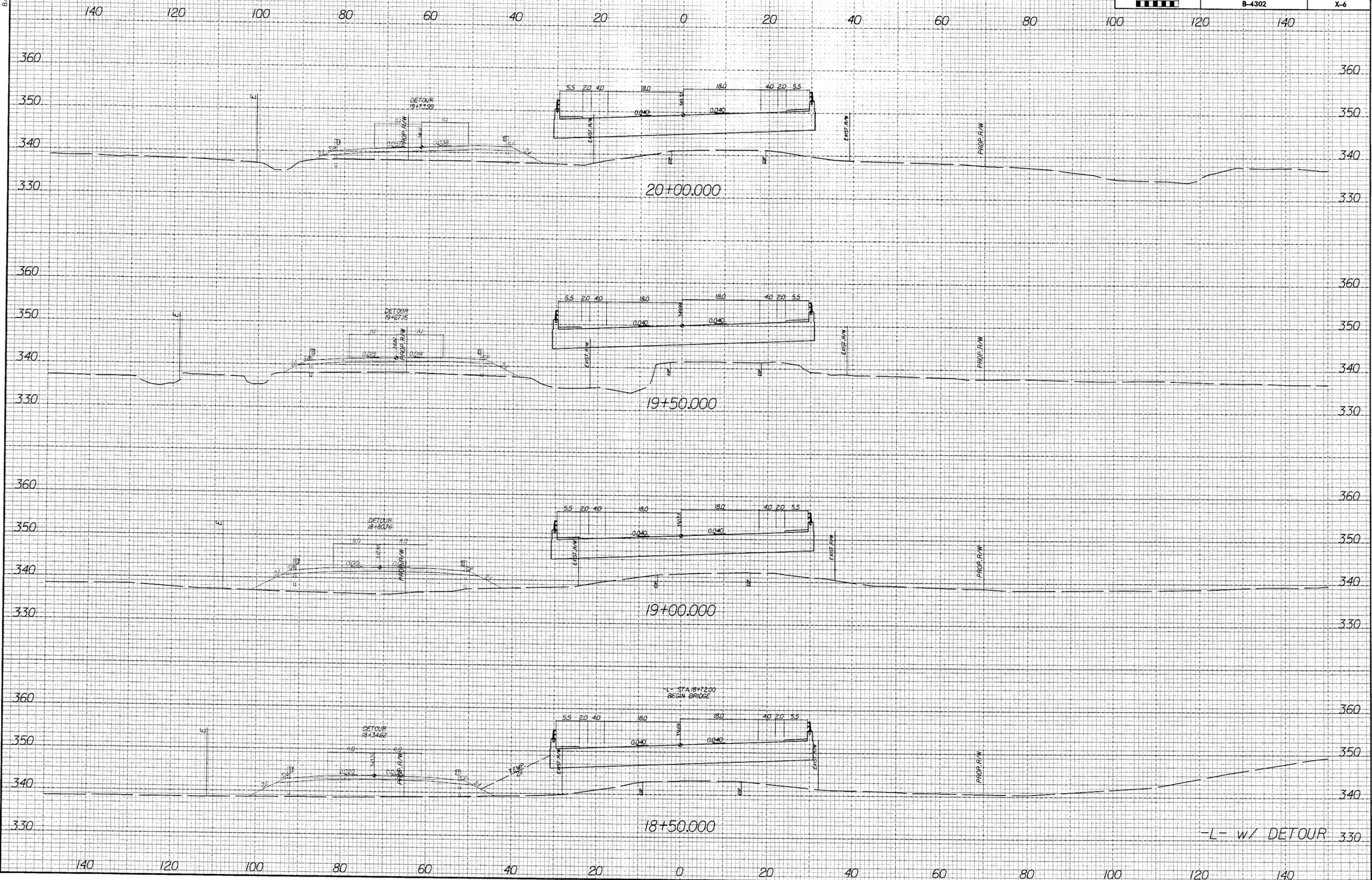
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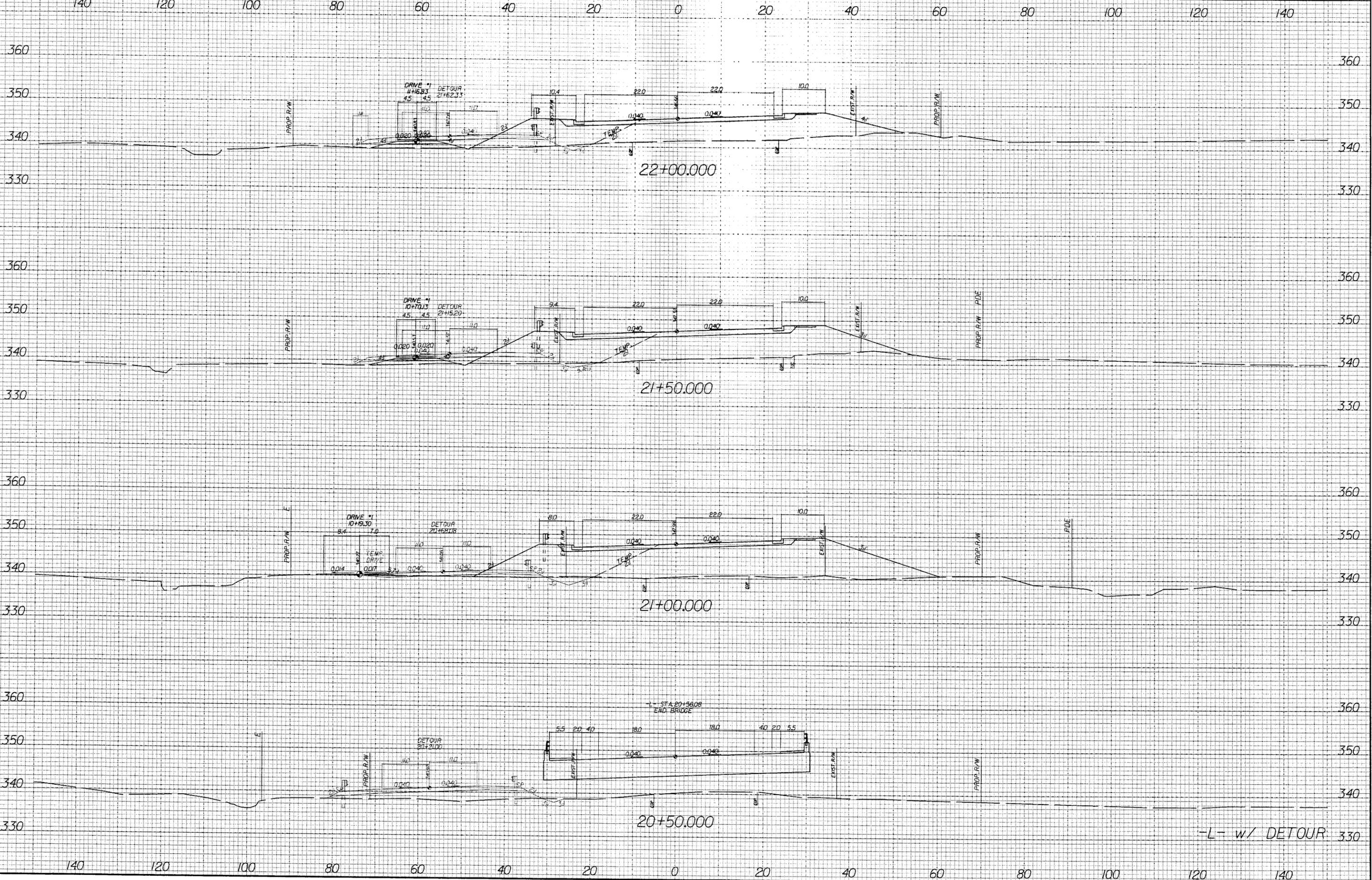
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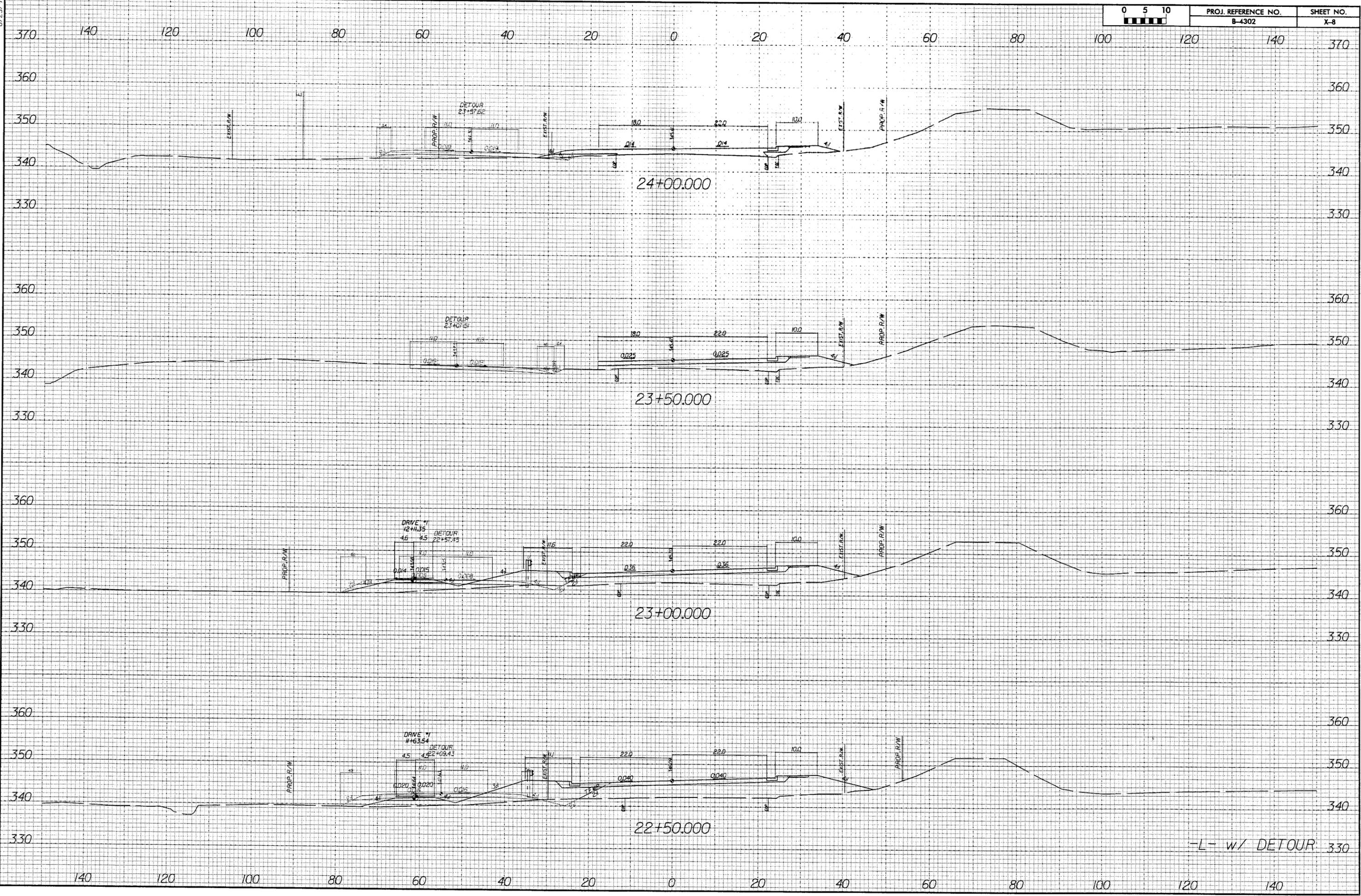
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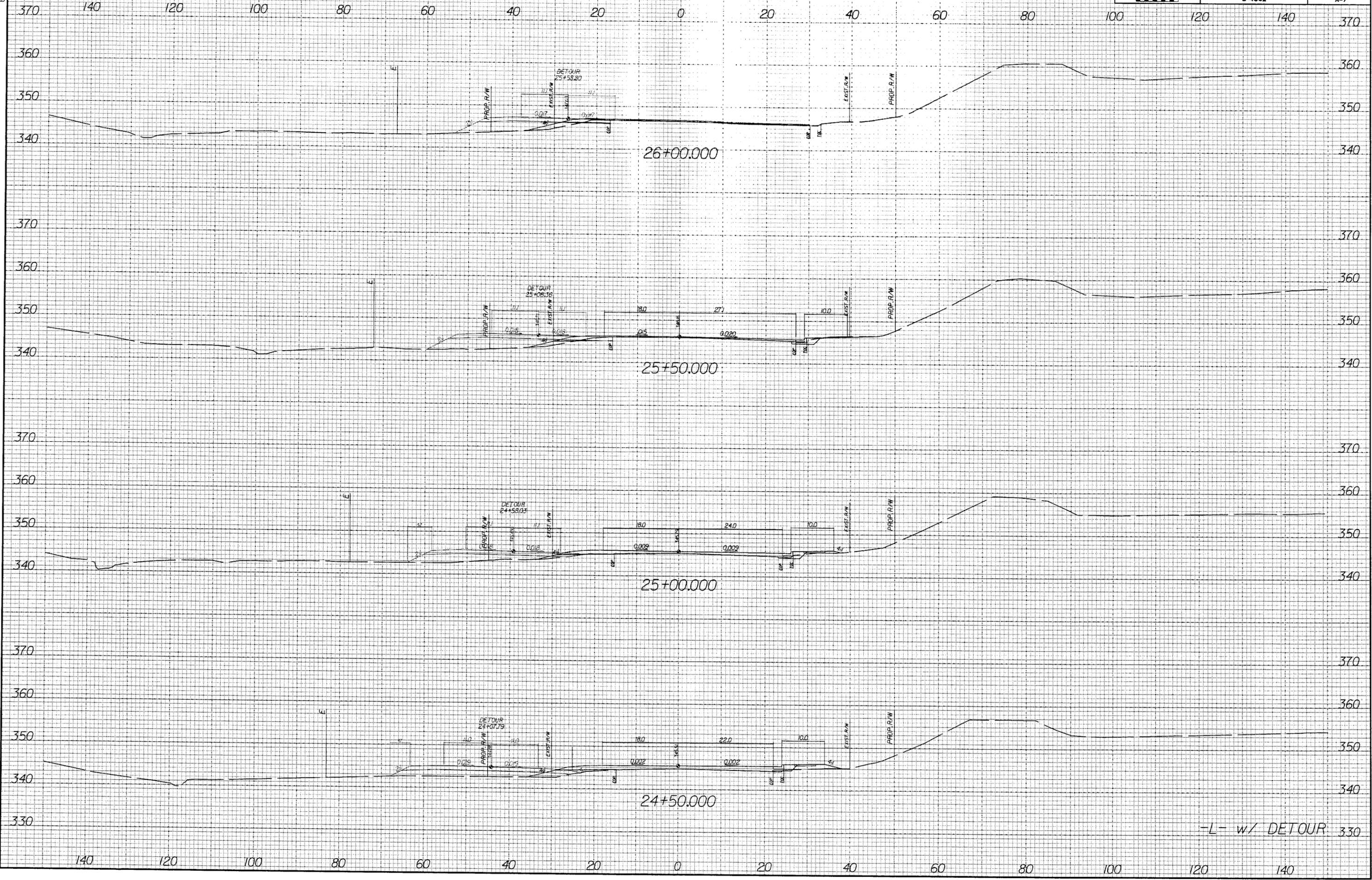
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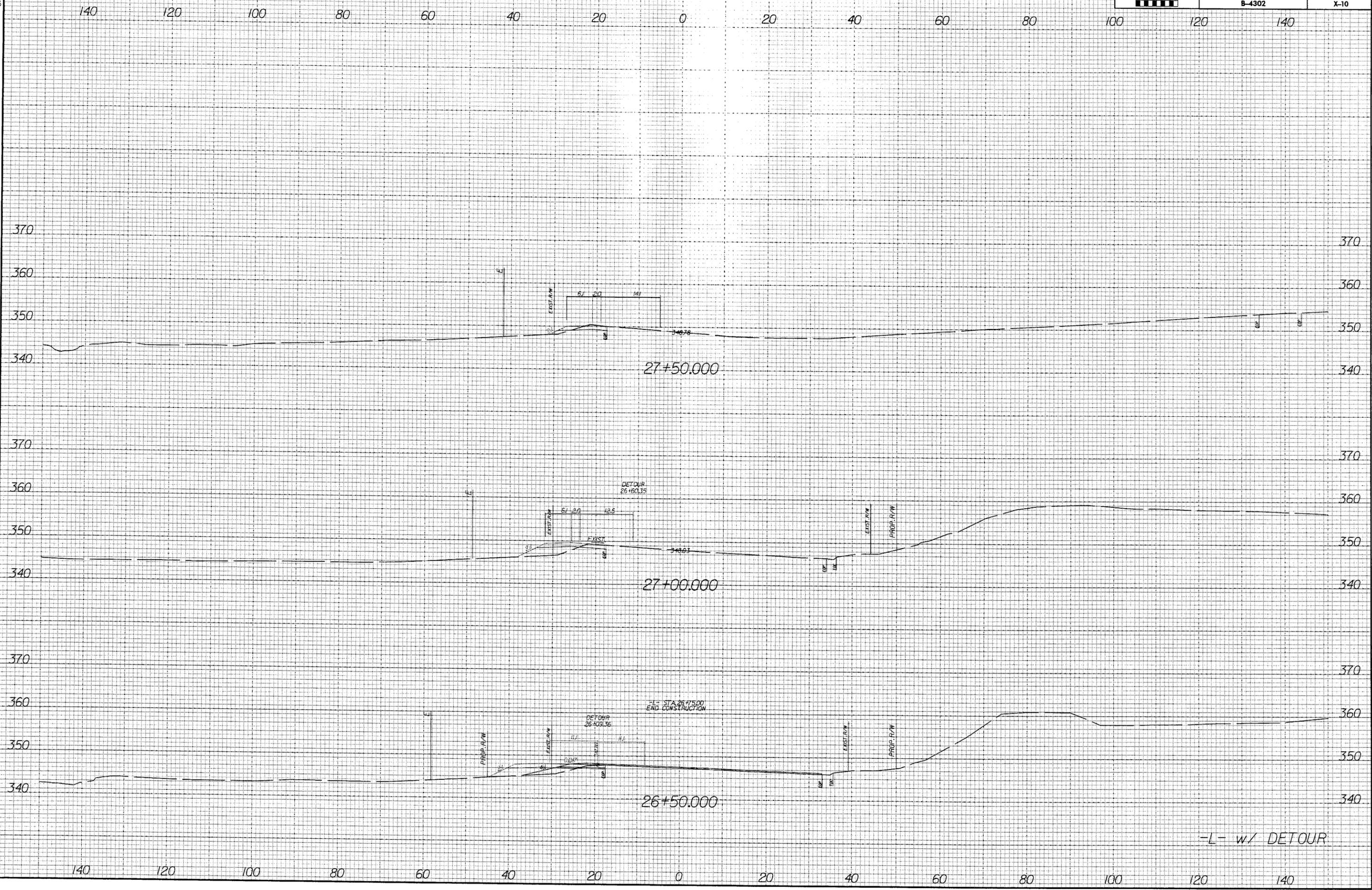
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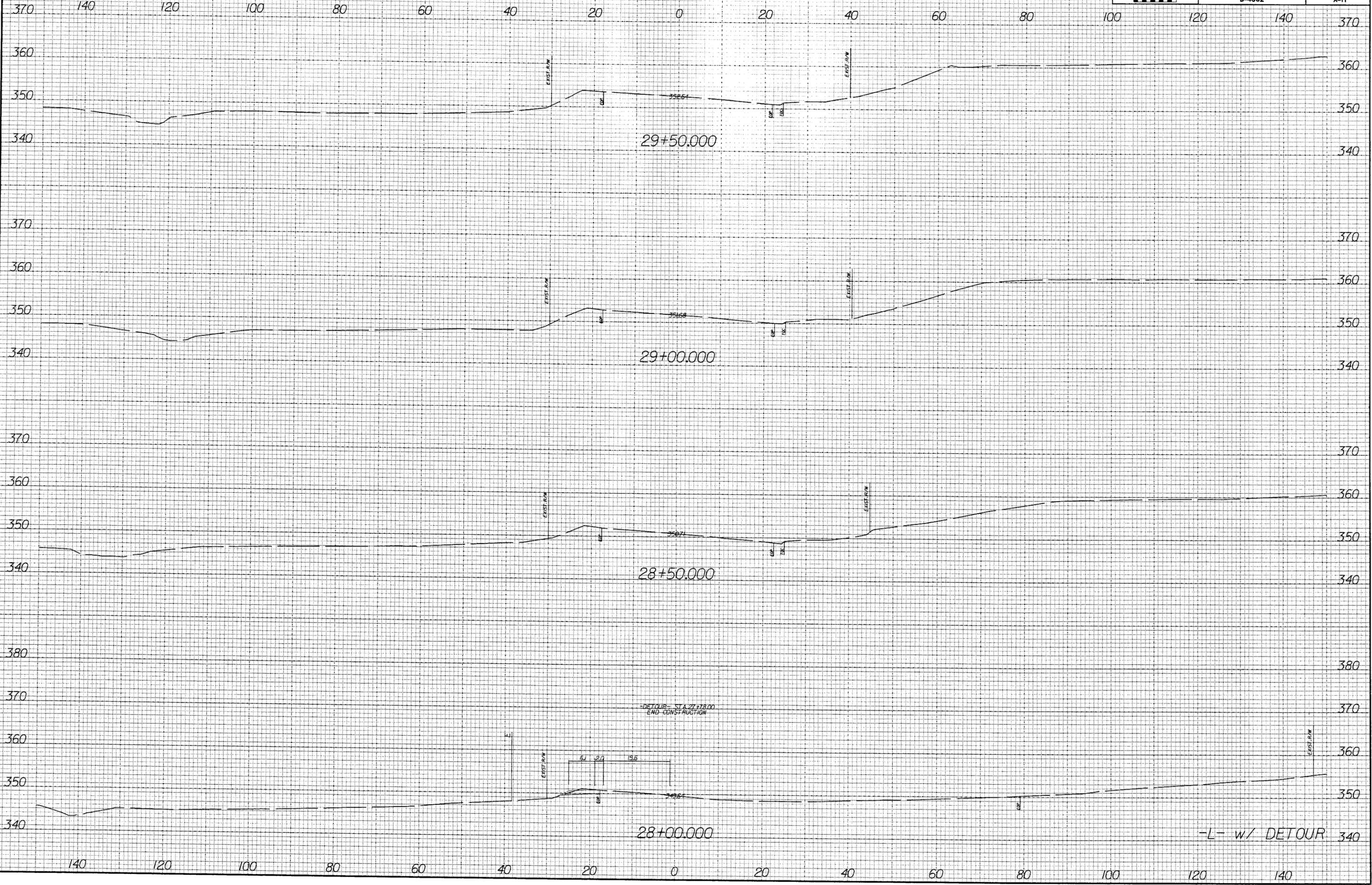
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WAKE COUNTY
BRIDGE NO. 336 ON SR 1301 (SUNSET LAKE ROAD)
OVER TERRIBLE CREEK
FEDERAL-AID PROJECT NO. BRZ-1301(2)
STATE PROJECT NO. 8.2409601
WBS No. 33639.1.1
T.I.P. No. B-4302

CATEGORICAL EXCLUSION

AND

PROGRAMMATIC SECTION 4(F) EVALUATION

UNITED STATES DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

AND

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

APPROVED:

02/27/07
Date

for Stacy Oshansen

Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development and Environmental Analysis Branch, NCDOT

03/12/2007
Date

for Thomas D. Riggall

John F. Sullivan, III, P.E.
Division Administrator
Federal Highway Administration

WAKE COUNTY
BRIDGE NO. 336 ON SR 1301 (SUNSET LAKE ROAD)
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WBS No. 33639.1.1
T.I.P. No. B-4302

CATEGORICAL EXCLUSION

AND

PROGRAMMATIC SECTION 4(F) EVALUATION

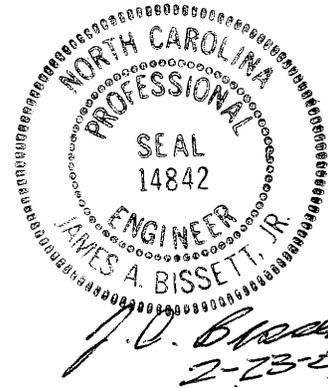
FEBRUARY 2007

DOCUMENT PREPARED BY:
MULKEY ENGINEERS & CONSULTANTS
CARY, NORTH CAROLINA

2-23-07

Date

J. A. Bissett, Jr.
A. Bissett, Jr., P.E.
Raleigh Branch Manager



2-23-2007

Date

Carl Furney
Carl Furney
Project Manager

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2/27/07

Date

Theresa J. Ellerby
Theresa Ellerby
Project Manager
Consultant Engineering Unit

PROJECT COMMITMENTS

**WAKE COUNTY
BRIDGE NO. 336 ON SR 1301 (SUNSET LAKE ROAD)
OVER TERRIBLE CREEK
FEDERAL-AID PROJECT NO. BRZ-1301(2)
STATE PROJECT NO. B.2409601
WBS NO. 33639.1.1
T.I.P. NO. B-4302**

In addition to the standard Nationwide Permit No. 23 Conditions, the General Nationwide Permit Conditions, Section 404 Only Conditions, Regional Conditions, State Consistency Conditions, NCDOT's Guidelines for Best Management Practices for the Protection of Surface Waters, Design Standards for Sensitive Watersheds, Erosion and Sediment Control Guidelines for Contract Construction, Best Management Practices for Bridge Demolition and Removal, General Certification Conditions, and Section 401 Conditions of Certification, the following special commitments have been agreed to by NCDOT:

STRUCTURES

AASHTO standard bicycle safe bridge railing will be provided, as applicable.

**WAKE COUNTY
BRIDGE NO. 336 ON SR 1301 (SUNSET LAKE ROAD)
OVER TERRIBLE CREEK
FEDERAL-AID PROJECT NO. BRZ-1301(2)
STATE PROJECT NO. 8.2409601
WBS No. 33639.1.1
T.I.P. No. B-4302**

INTRODUCTION: The replacement of Bridge No. 336 is included in the 2006-2012 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (T.I.P.) and in the Federal-Aid Bridge Replacement Program. The project location is shown in Figure 1. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion."

I. PURPOSE AND NEED STATEMENT

Bridge Maintenance Unit records indicate that Bridge No. 336 has a sufficiency rating of 4.0 out of a possible 100 for a new structure and is considered functionally obsolete and structurally deficient. The replacement of this inadequate structure will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

Bridge No. 336 is located on SR 1301 (Sunset Lake Road) in Wake County, in the Town of Fuquay-Varina. SR 1301 is classified as a Rural Minor Collector by the statewide functional classification system. It connects to US 401 approximately one mile south of Bridge No. 336. SR 1301 is identified as a Major Thoroughfare on the thoroughfare plan for the Town of Fuquay-Varina, which was adopted by the Capital Area Metropolitan Planning Organization and the NCDOT.

Land use in the project area is a mixture of agriculture, wooded areas, and single-family homes. New home construction is underway in the vicinity. Ballentine Elementary School is located north of the bridge. The Johnson Farm, located in the southeast quadrant of Bridge No. 336, is eligible for the National Register of Historic Places.

The 2006 estimated average daily traffic (ADT) volume is 12,800 vehicles per day (vpd). The projected 2030 ADT is 28,500 vpd. The percentages of truck traffic are three percent dual tired vehicles (DUALS) and one percent truck-tractor semi trailer (TTST). The posted speed limit on SR 1301 is 45 miles per hour (mph). A regulatory speed limit of 35 mph is posted in the vicinity of Bridge No. 336.

Bridge No. 336 was built in 1950. It is a tangent two-lane structure with a clear roadway width of 24.1 feet. The bridge has two spans and totals 37 feet in length. The deck consists of a reinforced concrete floor with an asphalt wearing surface on steel I-beams. The substructure is composed of reinforced concrete caps on timber piles and timber vertical abutments. The height from crown to streambed is 8 feet. Bridge No. 336 is posted at 17 tons for single vehicles and 24 tons for TTST (Figure 2).

Bridge No. 336 has a northern and southern horizontal approach curve with a radius of approximately 730 feet. The vertical sag curve south of Bridge No. 336 has a design speed of less than 25 mph. The approach roadway from the south has two 10-foot wide travel lanes with five-foot

shoulders, of which two feet are paved. The approach roadway from the north is a three-lane facility, with curb and gutter on the east side and six-foot shoulders on the west side. Bicycle lanes are striped on the north side of Bridge No. 336.

The Town of Fuquay-Varina has water and sewer in the vicinity of the bridge. A 27-inch sanitary sewer line crosses SR 1301 south of the existing bridge, and a 16-inch water line is located along the east side of SR 1301 at the bridge. Multiple utility pedestals are located near the bridge, indicating underground telephone utilities. Utility impacts are anticipated to be low.

There are approximately 52 daily school bus crossings on Bridge No. 336.

Two accidents were reported in the project area during the period from October 2002 to September 2005. There was one injury and no fatalities.

This section of SR 1301 is part of NC Bicycling Highway Route 5, Cape Fear Run. According to the *Town of Fuquay-Varina Transportation Plan*, SR 1301 (Sunset Lake Rd) is shown as having an existing bike lane north of Bridge No. 336 and a proposed bike lane from NC 42 to the northern town limits (see Appendix for figures).

III. ALTERNATIVES

A. PROJECT DESCRIPTION

Based on preliminary hydraulic analysis, the proposed replacement structure is a bridge with two 12-foot travel lanes, a 12-foot center turn lane, and four-foot bicycle lanes, two-foot gutters, and 5.5-foot sidewalks on each side (Figure 3). Standard bicycle safe bridge railing will be provided as applicable. A minimum 0.3 percent grade is recommended to facilitate deck drainage. The length of the new structure may be increased or decreased as necessary to accommodate peak flows as determined by a detailed hydrologic analysis during the final design phase.

The approach from the south will transition from two lanes to three lanes at the bridge and provide 12-foot lanes with 8-foot shoulders, including four-foot paved shoulders to accommodate bicyclists. The roadway north of the bridge will provide three 12-foot wide lanes with two-foot curb and gutter (Figure 3). A four-foot striped bicycle lane will be provided north of the bridge and tie to the existing four-foot striped bicycle lane. The proposed design speed is 50 mph.

B. BUILD ALTERNATIVES

Two build alternatives studied for this project are described below.

Alternative B (Figure 4A) replaces the bridge on new alignment west of the existing structure. During construction, traffic will be maintained on the existing bridge. The proposed bridge will have a constant 0.02 super elevation across the tangent bridge and horizontal curves with a radius of 835 feet north and south of the bridge. The proposed structure will be approximately 140 feet in length and 60 feet in width. The proposed design speed is 50 mph. Alternative B is not recommended because of higher permanent impacts to wetlands and Neuse River Riparian Buffers.

Alternative C – Preferred (Figure 4B) replaces the bridge at the existing location on a constant 0.04 super elevation across the bridge and on a horizontal curve with a radius of 835 feet. The proposed structure will be approximately 115 feet in length and a variable 59 feet to 63 feet in width. The grade will be raised approximately five feet for a proposed design speed of 50 mph.

During construction, traffic will be maintained with an on-site detour west of the existing bridge. The detour structure will be approximately 110 feet in length and provide for two 12-foot travel lanes with two-foot shoulders (Figure 3A). The detour approach roadway will provide two 12-foot travel lanes with eight-foot grass shoulders, and a design speed of 40 mph.

G. ALTERNATIVES ELIMINATED FROM FURTHER STUDY

An alternative with an off-site detour route (**Alternative A**) was evaluated. The detour would follow SR 1407 (Whitted Road), SR 1404 (Johnson Pond Road), and US 401 (North Main Street). The detour is approximately 3.5 miles in length and has a road user cost of approximately \$16,800 per day. This alternative is not considered feasible because of the high traffic volumes that would be detoured, the high road user cost associated with the off-site detour, emergency management vehicle delays, and the high number of school bus crossings each day.

Alternatives east of the existing bridge were not considered feasible because of not being able to maintain the desired design speed and insufficient site distance due to the curve needed.

Staged construction of the proposed bridge was evaluated, but complications associated with raising the grade and maintaining traffic on-site made this option unfeasible.

The “Do Nothing” alternative will eventually necessitate closure of the bridge. This is not desirable because of the traffic service provided by SR 1301 and Bridge No. 336.

Investigation of the existing structure by the NCDOT Bridge Maintenance Unit indicates that “rehabilitation” of this bridge is not feasible because of its age and deteriorated condition.

D. PREFERRED ALTERNATIVE

Alternative C, replacing the existing bridge in place with an on-site detour west of the existing structure, is the preferred alternative. Alternative C was selected because it has the estimated lowest permanent impact to wetlands and Neuse River Basin Riparian Buffers.

The Division Engineer concurs with Alternative C as the preferred alternative.

IV. ESTIMATED COST

Table 1 shows estimated costs based on current prices.

Table 1. Estimated Costs

	Alternative B	Alternative C (preferred)
Structure Removal (Existing)	\$ 18,900	\$ 18,900
Proposed Structure	\$ 714,000	\$ 610,200
Roadway Approaches	\$ 481,600	\$ 298,300
Temporary Detour Bridge	0	\$ 169,400
Detour Approaches	0	\$ 210,000
Miscellaneous and Mobilization	\$ 335,500	\$ 393,200
Engineering Contingencies	\$ 250,000	\$ 250,000
ROW/Const. Easements/Utilities	84,000	128,000
Total	\$1,884,000	\$2,078,000

The estimated cost of the project as shown in the 2006-2012 Transportation Improvement Program is \$1,700,000, including \$150,000 in prior years, \$100,000 for right-of-way and \$1,450,000 for construction.

V. NATURAL RESOURCES

A. METHODOLOGY

Field investigations within the project study area were conducted by qualified biologists on February 24, 2004. Field surveys were undertaken to determine natural resource conditions and to document natural communities, wildlife, and the presence of protected species or their habitats.

Published information regarding the project study area and region was derived from a number of resources including: United States Geological Survey (USGS) 7.5-minute topographical quadrangle maps (Fuquay-Varina, Apex, Angier, and Lake Wheeler, North Carolina), U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps, USGS aerial photomosaics of the project study area (1"=100'), and Natural Resources Conservation Service (NRCS) soil survey maps of Wake County. Water resources information was obtained from publications of the North Carolina Division of Water Quality (NCDWQ). Information concerning the potential occurrence of federal and state protected species within the project study area and project vicinity was obtained from the USFWS list of protected species (updated April 27, 2006) and the North Carolina Natural Heritage Program (NCNHP) database of rare species and unique habitats (updated August 11, 2006).

Dominant plant species were identified in each stratum for all natural communities encountered. Plant community descriptions are based on those classified in Schafale and Weakley (1990), where applicable. Names and descriptions of plant species generally follow Radford et al. (1968), unless more current information is available. Animal names and descriptions follow Bogan (2002), Conant and Collins (1998), Lee et al. (1980 et seq.), Martof et al. (1980), Stokes (1996), and Webster et al. (1985). Scientific names and common names (when applicable) are provided for each plant and animal species listed. Subsequent references to the same organism include the common name only.

During field surveys, wildlife identification involved a variety of observation techniques: active searching and capture, visual observations (both with and without the use of binoculars), and observing the characteristic signs of wildlife (sounds, scat, tracks, and burrows). Any organisms that may have been captured during these searches were identified and released without injury. Quantitative water sampling was not undertaken to support existing data.

Jurisdictional wetland determinations were performed using the three-parameter approach as prescribed in the 1987 *Corps of Engineers Wetlands Delineation Manual*. Supplementary technical literature describing the parameters of hydrophytic vegetation, hydric soils, and hydrological indicators were also utilized. Wetland functions were evaluated according to the NCDWQ's rating system, fourth version. Surface waters in the project study area were evaluated and classified based on a preponderance of perennial stream characteristics as defined in NCDWQ's *Stream Classification Method*, second version, as well as, the United States Army Corps of Engineers (USACE) Stream Quality Assessment Worksheet.

B. PHYSIOGRAPHY AND SOILS

The project study area is located in Wake County, approximately 1.5 miles northeast of the Town of Fuquay-Varina and 9.0 miles southwest of the Town of Garner. Wake County is situated in the central part of the state and the general geography consists predominantly of rolling hills, with steep areas following major streams. Narrow, nearly level floodplains exist along most of the streams. Most of the Wake County is within the Piedmont physiographic province; however, the extreme southern portion of the county is within the Coastal Plain physiographic province. Elevations in the project study area range from approximately 330 feet above mean sea level (msl) along Terrible Creek to approximately 370 feet above msl at the far southern end of the project.

The geology underlying the project study area consists of a formation of felsic mica gneiss within the Raleigh Belt. This formation is mapped as a long, thin area stretching continually from Fuquay-Varina to Henderson.

Soil mapping units within the study corridor include Appling gravelly sandy loam (*Typic Hapludults*), Georgeville silt loam (*Typic Hapludults*), Herndon silt loam (*Typic Hapludults*), Wagram loamy sand (*Arenic Paleudults*), and Wehadkee and Bibb soils (*Fluventic Haplaquepts and Typic Haplaquepts*).

Descriptions are provided below.

- **Appling gravelly sandy loam** soils are well drained with a moderate permeability and are strongly acidic. Cobblestones and gravel are common within the top 36 inches of the soil solum. The erosion hazard is severe due to the rapid surface runoff. This map unit typically

occurs along narrow side slopes and is found in the northeastern corner of the project study area within a residential area.

- **Georgeville silt loam** soils are well drained with a moderate permeability and formed from Carolina slate. The erosion hazard for this map unit is severe, and much of this map unit has been substantially eroded due to the fair infiltration and rapid surface runoff characteristics of this soil type. This map unit is located on side slopes and is mapped in the far northern end of the project study area.
- **Herndon silt loam** soils are well drained with a moderate permeability and low organic matter content. The erosion hazard for this map unit is severe due to fair infiltration, rapid surface runoff, and steep slopes (15 to 25 percent). This map unit usually occurs along upland side slopes bordering major drainageways, and is found on both sides of Terrible Creek immediately upslope of the floodplain within the project study area.
- **Wagram loamy sand** soils are somewhat excessively drained with a moderate permeability and a low available water capacity. These soils typically occur on broad, interstream divides and side slopes in uplands. Wagram soils are located on the far southern end of the project study area, where they have slopes ranging from 2 to 15 percent. The hazard of erosion is severe in the steeper areas due to the rapid surface runoff.
- **Wehadkee and Bibb** soils are poorly drained with infiltration rates varying from fair for the Wehadkee soil type to good for the Bibb soil type. These two soil types were mapped together due to their similar use and location within the landscape. They are found in large floodplains and depressions throughout the county. The seasonal high water table is at or above the surface and flooding events occur frequently causing ponding that can last indefinitely.

Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation. Soils referred to as “Hydric A” are completely hydric throughout the mapped soil unit. “Hydric B” soils are non-hydric soils that contain inclusions of hydric soils, usually in depressional areas or along the border with other soil units. One Hydric A soil map unit occurs in the project study area: Wehadkee and Bibb soils. The land immediately surrounding Terrible Creek and an unnamed tributary (UT) to Terrible Creek is mapped as Wehadkee and Bibb soils. Hydric soils were confirmed within these areas mapped by the Wake County NRCS, and were determined to be jurisdictional wetlands.

C. WATER RESOURCES

1. Waters Impacted

Streams, creeks, and tributaries within the project vicinity are completely within the Neuse River Basin. Terrible Creek is a perennial stream generally flowing in an easterly direction, emptying into Middle Creek approximately 4.5 miles east of the project study area. It is located within Neuse River

Subbasin 03-04-03. The DWQ stream index number for Terrible Creek is 27-43-15-8-(1) and the USGS 8-digit hydrologic unit is 03020201.

2. Water Resource Characteristics

The NCDWQ classifies surface waters of the state based on their intended best uses. Terrible Creek and a UT to Terrible Creek are Class “B NSW” waters. The “B” designation denotes waters protected for uses such as aquatic life propagation and survival, fishing, wildlife, primary recreation, and agriculture. Terrible Creek is also considered Nutrient Sensitive Waters (NSW). This is a supplemental surface water classification intended for waters needing additional nutrient management. No Outstanding Resource Waters (ORW), High Quality Waters (HQW), Sensitive Water Supply Watershed (WS-I or WS-II), or Section 303(d) waters occur within a three-mile radius of the project study area.

The Ambient Monitoring System (AMS) is a network of stream, lake, and estuarine water-quality monitoring stations strategically located for the collection of physical and chemical water-quality data. The nearest AMS site is located along Middle Creek (near the confluence with Terrible Creek), approximately 5.0 miles east and downstream of the project study area. Middle Creek at this AMS station has a use support rating of “Fully Supporting.” Terrible Creek is not rated for use support within the project study area.

The North Carolina Index of Biotic Integrity (NCIBI) is used to assess the biological integrity of streams by examining the structure and health of the fish community. No sites are located within this subbasin.

Bioclassification criteria have been developed that are based on the number and type of benthic macroinvertebrates (primarily Orders: Ephemeroptera, Plecoptera, and Trichoptera) present in streams and rivers because they are very sensitive to the effects of water pollution. No benthic macroinvertebrate sampling has been conducted by NCDWQ within the Terrible Creek watershed. The nearest downstream benthic macroinvertebrate sampling site is located on Middle Creek at NC 50 approximately 10.75 miles southeast of the project study area. This site was sampled in 1995 and 2000 and was given a bioclassification rating of “Good-Fair” at both sampling events.

Point source dischargers throughout North Carolina are regulated through the National Pollutant Discharge Elimination System (NPDES) program. Dischargers are required by law to register for a permit. There are 16 permitted dischargers within the 03-04-03 subbasin. The Cary South Waste Water Treatment Plant (WWTP) is noted as the only major discharger in the subbasin. According to NCDWQ, the Cary South WWTP has had violations in the past, and as a result Upper Middle Creek is currently rated as “Impaired.” There is one permitted discharger along Terrible Creek: Terrible Creek WWTP operated by the Town of Fuquay-Varina. This minor domestic waste discharger is located approximately 2.25 miles east and upstream of the project study area, and is permitted to release 0.5 million gallons per day (MGD). The Terrible Creek WWTP has had past aquatic toxicity failures; however, the town is working with NCDWQ to correct these problems.

A classification system for stream channels based on fluvial geomorphologic principles and landscape position was used for stream analysis. Based on this classification method and field observations, both Terrible Creek and the UT to Terrible Creek appear to be C6 type channels

within the project study area. Terrible Creek and the UT to Terrible Creek have a moderate flow over a substrate of silt, sand, and woody debris. Approximate dimensions are provided in Table 2.

Table 2. Approximate Stream Dimensions

	Terrible Creek	UT to Terrible Creek
Bankfull width	10 to 15 feet	5 feet
Channel width	10 to 15 feet	8 feet
Bank height	2 to 3 feet	1 to 2 feet
Water depth		
- Riffles	3 to 9 inches	2 to 6 inches
- Pools	1 to 2 feet	9 to 18 inches

3. Anticipated Impacts to Water Resources

a. General Impacts

Short-term impacts to water quality from construction-related activities include increased sedimentation and turbidity. Long-term construction related impacts to water resources include substrate destabilization, bank erosion, increased turbidity, altered flow rates, and possible temperature fluctuations within the channel due to removal of streamside vegetation. Precautions should be taken to minimize impacts to water resources from runoff and erosion in the project study area.

4. Impacts Related to Bridge Demolition and Removal

The rails of Bridge No. 336 will be removed without dropping any components into Waters of the U. S. There is potential for components of the deck and substructure to be dropped into Waters of the U. S. during demolition. The resulting temporary fill associated with the concrete deck and caps is approximately 18 cubic yards.

D. BIOTIC RESOURCES

1. Plant Communities

The field survey team observed three plant communities in the project study area: Piedmont/Low Mountain Alluvial Forest, mixed pine/hardwood forest, and urban/disturbed community. Descriptions are provided below.

a. Piedmont/Low Mountain Alluvial Forest

The Piedmont/Low Mountain Alluvial Forest community occurs along river and stream floodplains in the piedmont and lower elevation mountain valleys. It is best classified as a variation of Schafale and Weakley's (1990) Piedmont/Low Mountain Alluvial Forest type. This community is situated

immediately adjacent to Terrible Creek and the UT to Terrible Creek, and includes wetlands. The canopy and understory are somewhat open throughout.

Dominant tree species observed in the canopy and understory layers include sweet gum (*Liquidambar styraciflua*), sweetbay (*Magnolia virginiana*), water oak (*Quercus nigra*), black willow (*Salix nigra*), river birch (*Betula nigra*), sycamore (*Platanus occidentalis*), red maple (*Acer rubrum*), slippery elm (*Ulmus rubra*), musclewood (*Carpinus caroliniana*) and yellow poplar (*Liriodendron tulipifera*). Shrubs and vines include privet (*Ligustrum sinense*), American holly (*Ilex opaca*), silky dogwood (*Cornus amomum*), greenbrier (*Smilax rotundifolia*), Japanese honeysuckle (*Lonicera japonica*), and poison ivy (*Toxicodendron radicans*). The herbaceous community is diverse, with dominant species including sedges (*Carex* spp.), flat sedge (*Cyperus* spp.), smart-weed (*Polygonum* spp.), broomstraw (*Andropogon virginicus*), blackberry (*Rubus* spp.), cinnamon fern (*Osmunda cinnamomea*), giant cane (*Arundinaria gigantea*), goldenrod (*Solidago* spp.), rushes (*Juncus coriaceus* and *J. effusus*), and creeping grass (*Microstegium vimineum*).

b. Mixed Pine/Hardwood Forest

The mixed pine/hardwood forest community is located immediately upslope of the alluvial forest. This community appears to be a variation of the Mesic Mixed Hardwood Forest (Piedmont Subtype) identified by Schafale and Weakley (1990), with increased amounts of pine. These communities occur on acidic soils in lower slopes, steep north-facing slopes, ravines, and occasionally well-drained small stream bottoms.

In the project study area, dominant canopy and subcanopy species include black cherry (*Prunus serotina*), red maple, loblolly pine (*Pinus taeda*), yellow poplar, water oak, northern red oak (*Quercus rubra*), white oak (*Q. alba*), black oak (*Q. velutina*), American beech (*Fagus grandifolia*), sourwood (*Oxydendrum arboreum*), and sweet gum. Small trees and shrubs include horse sugar (*Symplocos tinctoria*), eastern red cedar (*Juniperus virginiana*), flowering dogwood (*Cornus florida*), winterberry (*Ilex verticillata*), possum haw (*I. decidua*), and highbush blueberry (*Vaccinium corymbosum*). Vines present within the project study area include poison ivy, greenbrier, muscadine grape (*Vitis rotundifolia*), and Japanese honeysuckle. The herbaceous vegetation includes partridge berry (*Mitchella repens*) and mock strawberry (*Duchesnea indica*).

c. Urban/Disturbed Community

The urban/disturbed community consists of areas that are periodically maintained by human influences, such as roadside and power line rights-of-way, regularly mowed lawns, and open areas. This is the dominant community within the project study area. It includes a residential development in the far northeastern corner, a small farm house in the far southwestern corner, and an agricultural field in the far southeastern corner. A sewer line easement is present that parallels Terrible Creek approximately 100 feet south of the stream. Species include microstegium, goatsbeard (*Aruncus dioicus*), dog fennel (*Eupatorium capillifolium*), English plantain (*Plantago lanceolata*), broomsedge, lespedeza (*Lespedeza* spp.), panic grass (*Panicum* spp.), fescue (*Festuca* spp.), paspalum (*Paspalum* spp.), and horse nettle (*Solanum carolinense*). The sewer line easement contains more hydrophytic species such as rushes, sedges, flatsedge, ironweed (*Vernonia* spp.), smartweed, and bishop-weed (*Ptilimnium capillaceum*). Trees and small shrubs associated with the residences include flowering magnolia (*Magnolia grandiflora*), wax-myrtle (*Myrica cerifera*), white oak, and flowering dogwood.

2. Wildlife

The terrestrial communities in the project area offer moderate diversity of foraging, nesting, and cover habitat for many species of amphibians, reptiles, birds, and mammals. Species that may be associated with these types of communities are described below. An asterisk (*) indicates the species that were directly observed or for which evidence was noted during field reconnaissance.

Reptile species associated with the project study area may include snakes such as the rough green snake (*Opheodrys aestivus*), eastern milk snake (*Lampropeltis triangulum triangulum*), and mole kingsnake (*L. calligaster rhombomaculata*). These animals inhabit fields, woodlands, river bottoms, and stream edges of the upper Coastal Plain and Piedmont in North Carolina. No reptiles were observed during the site visit.

Many bird species may inhabit or migrate through the project study area. Inhabitants may include red-bellied woodpecker (*Melanerpes carolinus*), hairy woodpecker (*Picoides villosus*), downy woodpecker (*P. pubescens*), blue jay (*Cyanocitta cristata*), Carolina chickadee (*Parus carolinensis*), tufted titmouse* (*P. bicolor*), white-breasted nuthatch (*Sitta carolinensis*), American robin* (*Turdus migratorius*), northern cardinal* (*Cardinalis cardinalis*), northern mockingbird* (*Mimus polyglottos*), house finch (*Carpodacus mexicanus*), Carolina wren (*Thryothorus ludovicianus*), dark-eyed junco (*Junco hyemalis*), American goldfinch (*Carduelis tristis*), and brown-headed cowbird (*Molothrus ater*). Predatory species may include red-tailed hawk (*Buteo jamaicensis*), eastern screech owl (*Otus asio*), and barred owl (*Strix varia*).

A wide variety of mammals are expected to inhabit the project study area and surrounding landscape. Virginia opossum (*Didelphis virginiana*), woodchuck (*Marmota monax*), gray squirrel* (*Sciurus carolinensis*), eastern harvest mouse (*Reithrodontomys humulis*), raccoon (*Procyon lotor*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), eastern spotted skunk (*Spilogale putorius*), and white-tailed deer (*Odocoileus virginianus*) are species mostly likely to be found. In addition, bats such as the little brown myotis (*Myotis lucifugus*), Eastern red (*Lasiurus borealis*), and big brown bat (*Eptesicus fuscus*) may also be present in the project study area.

3. Aquatic Communities

Terrible Creek is a perennial stream that flows in an easterly direction towards Middle Creek. The UT to Terrible Creek is intermittent and parallels Sunset Lake Road in the northwestern corner of the project study area. Very minor bank erosion was observed along both Terrible Creek and the UT to Terrible Creek. The substantial areas of wetlands surrounding the streams are likely slowing the water coming off of hillsides prior to entering the streams, thereby reducing the erosive forces. A visual survey of the streams found many mayflies (Order: Ephemeroptera) and caddisflies (Order: Trichoptera) at a large riffle.

The project study area likely has a limited amphibian population which may include salamanders and frogs. Spring peepers (*Hyla crucifer*) and pickerel frogs (*Rana palustris*) may also be present.

Reptiles that spend the vast majority of their lives in aquatic communities and are somewhat common throughout this portion of North Carolina include the snapping turtle (*Chelydra serpentina*), eastern musk turtle (*Sternotherus odoratus*), yellowbelly slider (*Chrysemys scripta*), and northern water snake (*Nerodia sipedon*).

Fish that are likely to utilize Terrible Creek include yellow bullhead (*Ameiurus natalis*), largemouth bass (*Micropterus salmoides*), American eel (*Anguilla rostrata*), rosyside dace (*Clinostomus funduloides*), and creek chub (*Semotilus atromaculatus*).

4. Anticipated Impacts to Biotic Communities

a. Terrestrial Communities

Table 3 depicts permanent impacts to terrestrial biotic communities that have been estimated based upon the approximate construction limits of the two alternatives.

Table 3. Estimated Impacts for Proposed Alternatives

Vegetative Community	Alternative B	Alternative C (preferred)
Piedmont/Low Mountain Alluvial Forest	0.86 acre	1.16 acres
Mixed Pine/Hardwood Forest	0.67 acre	0.78 acre
Urban/Disturbed Land	0.48 acre	0.36 acre

Temporary fluctuation in populations of animal species which utilize terrestrial areas is anticipated during the course of construction. Slow-moving, burrowing, and subterranean organisms will be directly impacted by construction activities, while mobile organisms will be displaced to adjacent communities. Habitat reduction may also occur when an ecosystem is disturbed and can lead to creation of smaller or isolated biotic communities. Competitive forces in the adapted communities will result in a redefinition of population equilibria.

b. Wetland Communities

Three areas of jurisdictional wetlands were identified and delineated within the project study area. These wetlands are located within the floodplains of Terrible Creek and the UT to Terrible Creek. Details and potential impacts are discussed in Section E.1.

c. Aquatic Communities

Impacts usually associated with in-stream construction include increased channelization and scouring of the streambed. In-stream construction alters the substrate and impacts adjacent stream-side vegetation. Such disturbances within the substrate lead to increased siltation, which can clog the gills and feeding mechanisms of benthic organisms, fish, and amphibian species.

Appropriate measures must be taken to avoid spillage and control runoff. Such measures will include an erosion and sedimentation control plan, provisions for disposal and handling of waste materials and storage, stormwater management measures, and appropriate road maintenance measures. NCDOT's *Best Management Practices for Protection of Surface Waters* (BMPs - PSW) and Sedimentation Control guidelines will be enforced during the construction stages of the project.

The removal of streamside vegetation and placement of fill material during construction contributes to erosion and possible sedimentation. Quick revegetation of these areas helps to reduce the impacts by supporting the underlying soils. Erosion and sedimentation may carry soils, toxic compounds, trash, and other materials into the aquatic communities at the construction site. As a result, sand bars may be formed both at the site and downstream.

E. SPECIAL TOPICS

1. “Waters of the United States:” Jurisdictional Issues

Surface waters and wetlands within the project area are subject to jurisdictional consideration under Section 404 of the Clean Water Act (CWA) as “Waters of the United States.” The USACE has the responsibility for implementation, permitting, and enforcement of the provisions of the CWA. The USACE regulatory program is defined in 33 CFR 320-330.

Section 401 of the CWA grants authority to individual States for regulation of discharges into waters of the United States. Under North Carolina General Statutes, 113A “Pollution Control and Environment” and codified in North Carolina Administrative Code (NCAC) 15A, the NCDWQ has the responsibility for implementation, permitting, and enforcement of the provisions of the CWA.

Both perennial and intermittent streams are jurisdictional under state and federal regulations. Terrible Creek (perennial) and the UT to Terrible Creek (intermittent) are the jurisdictional surface waters located within the project boundaries. Alternatives B and C are not anticipated to generate permanent impacts to perennial or intermittent streams

Three areas of jurisdictional wetlands (WA, WB, and WC) were identified and delineated within the project study area. These wetlands are located within the floodplains to Terrible Creek and the UT to Terrible Creek. Wetland WA occupies approximately 1.6 acres, wetland WB is approximately 0.5 acre, and wetland WC is approximately 1.3 acres. Wetlands WA and WB are classified by the United States Fish and Wildlife Service as a Palustrine-Forested Temporarily Flooded wetland system (PFO1/4A). Wetland WC is classified as a Palustrine-Scrub/Shrub Temporarily Flooded wetland system (PSS1A). USACE data forms and NCDWQ rating forms associated with these jurisdictional wetlands are included in the Appendix. The delineated boundaries of the wetlands were reviewed and confirmed during a field meeting with a USACE regulatory agent on June 8, 2004.

Table 4 depicts the estimated impacts to Waters of the United States for the proposed alternatives.

Table 4. Estimated Impacts to Waters of the United States

Proposed Alternatives	Permanent Wetland Impacts	Temporary Wetland Impacts	Total Wetland Impacts
Alternative B	0.47 acre	0.00 acre	0.47 acre
Alternative C (preferred)*	0.23 acre	0.42 acre	0.65 acre

* Includes temporary detour bridge

2. Permits

Permits may be required for roadway encroachment into jurisdictional wetlands and surface waters. The USACE issues Section 404 Nationwide 23 permits for activities that are categorically excluded from environmental documentation because they are included within a category of actions that do not have a significant effect on the environment. Regional conditions also require compliance with General Condition 13 concerning notification and coordination with the USACE for permit applications for projects with greater than 150 total linear feet of impacts.

The USACE issues Nationwide Permit (NWP) 33 when construction activities necessitate the use of temporary structures such as cofferdams, placement of access fill material, or dewatering of the construction site. In addition to the requirements for NWP 23, any work below the ordinary high water mark must be permanently stabilized at the earliest practicable date and a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources must be submitted.

A Section 401 General Water Quality Certification is necessary for projects that require Section 404 permits. The state has General Certifications which will match the permit type authorized by the USACE. The NCDWQ must issue the 401 Certification before the USACE will issue the 404 Permit. Written concurrence from the NCDWQ is not required if all conditions of the Section 401 Certification are met.

The North Carolina Division of Land Resources (NCDLR) requires a sediment and erosion control permit for land disturbing activities. All sediment and erosion control plans must control surface water run-off, limit the size of the area exposed at any one time, avoid increases in velocities of storm water discharge, and identify on-site areas subject to severe erosion, as well as those adjacent or nearby off-site areas that are especially vulnerable to damage from erosion and sedimentation. The NCDWQ requires that extended detention wetlands, bio-retention areas, and ponds followed by forested filter strips be constructed as part of the stormwater management plan when work occurs in watersheds within one mile and draining to 303(d) listed waters.

3. Buffer Rules

The Neuse River Riparian Buffer Rule applies to 50-foot wide riparian buffers directly adjacent to perennial and intermittent surface waters in the Neuse River Basin. This rule does not apply to portions of the riparian buffer where a use is existing and ongoing. Any change in land use within the riparian buffer is characterized as an impact. The Nutrient Sensitive Waters Management Strategy for the Protection and Maintenance of Riparian Buffers (15 A NCAC 2B .0233) provides a designation for uses that cause impacts to riparian buffers within the Neuse Basin. Neuse River Buffers are divided into two zones. Zone 1 includes the first 30 feet out from the water and essentially must remain undisturbed. Zone 2 consists of the landward 20 feet which must be vegetated, but allows for certain land uses. Grading and replanting in Zone 2 is allowed provided that the health of the vegetation in Zone 1 is not compromised.

Simple perpendicular bridge crossings are designated Allowable within the riparian buffer. The Allowable designation means that the intended uses may proceed within the riparian buffer provided that there are no practical alternates. Allowable with Mitigation buffer impacts for bridge replacement projects are addressed when parallel impacts to jurisdictional waters occur. Allowable

and Allowable with Mitigation buffer impacts require written authorization from the Division of Water Quality prior to project development. The improvement of roadway approaches associated with bridge replacement projects are categorized as Road Crossings and allowable when impacts are equal to or less than 150 linear feet or one-third of an acre.

Both proposed alternatives are expected to have both Allowable buffer impacts and Allowable with Mitigation buffer impacts. Riparian areas impacted within the buffer limits of the UT to Terrible Creek are considered Allowable with Mitigation because the design will result in parallel encroachment into buffers.

Table 5 describes the anticipated Neuse River Riparian Buffer impacts for this bridge replacement project, and Tables 6 and 7 depict the anticipated Neuse River Riparian Buffer Impacts by zone for Terrible Creek and the Terrible Creek UT.

Table 5. Estimated Neuse River Riparian Buffer Impacts (ft²)

Proposed Alternatives	Buffer Impacts Allowable	Buffer Impacts Allowable with Mitigation	Total Neuse River Buffer Impacts
Alternative B	7,257	10,097	17,354
Alternative C (preferred)*	10,745	6,468	17,213

* Includes temporary detour bridge

Table 6. Estimated Terrible Creek Buffer Impacts by Zone (ft²)

Proposed Alternatives	Buffer Impacts Allowable			Buffer Impacts Allowable with Mitigation		
	Zone 1	Zone 2	Total	Zone 1	Zone 2	Total
Alternative B	5,982	3,061	7,257	0	0	0
Alternative C (preferred)*	6,568	4,177	10,745	0	0	0

* Includes temporary detour bridge

Table 7. Estimated Terrible Creek UT Buffer Impacts by Zone (ft²)

Proposed Alternatives	Buffer Impacts Allowable			Buffer Impacts Allowable with Mitigation		
	Zone 1	Zone 2	Total	Zone 1	Zone 2	Total
Alternative B	0	0	0	5,568	4,529	10,097
Alternative C (preferred)*	0	0	0	288	6,180	6,468

* Includes temporary detour bridge

4. Mitigation

Mitigation of wetland impacts has been defined by the Council on Environmental Quality to include avoidance, minimization, and compensation. These activities must be considered in sequential order.

Avoidance examines all appropriate and practicable possibilities of averting impacts to Waters of the U.S. It is not feasible for this roadway to completely avoid Terrible Creek and still meet the purpose and need of the project.

Minimization includes the examination of appropriate and practicable steps to reduce adverse impacts to waters of the U.S. All of the alternatives are minimizing the amount of in-stream impacts by replacing the existing bridge with another bridge and not a culvert or pipe. Both of the alternatives propose bridges that are longer than the existing bridge, minimizing wetland and floodplain impacts.

Compensatory mitigation includes restoration, enhancement, creation, or preservation of wetland and stream functions and values that are lost when these systems are converted to other uses. The USACE usually requires compensatory mitigation for activities authorized under Section 404 of the Clean Water Act when unavoidable impacts total more than 0.10 acre of wetlands or 150 linear feet of perennial or intermittent streams. The NCDWQ may require compensatory mitigation for activities authorized under Section 401 of the Clean Water Act for unavoidable impacts to more than 1.0 acre of wetlands or more than 150 linear feet of perennial streams. Final mitigation determination rests with the USACE.

Compensatory mitigation for permanent impacts to wetlands will likely be required for both alternatives. No compensatory stream mitigation is anticipated. Buffer mitigation will be required by NCDWQ in accordance with Neuse River Buffer Rules. A small amount of on-site wetland mitigation may become available when the existing bridge is removed and the riparian area along Terrible Creek is exposed. This area should be graded to a similar elevation as the surrounding land, whether it is upland or wetland.

F. RARE AND PROTECTED SPECIES

Federal law (under the provisions of Section 7 of the Endangered Species Act [ESA] of 1973, as amended) requires that any action likely to adversely affect a species classified as federally-protected be subject to review by the USFWS. Prohibited actions which may affect any species protected under the ESA are outlined in Section 9 of the Act. Other species may receive additional protection under separate laws.

The April 27, 2006 Wake County species list, compiled from the USFWS species list and the August 2006 NCNHP list, included one Federally Threatened (T), and three Federally Endangered (E) species. Section F.1 provides a detailed description of each federally threatened and federally endangered species listed for Wake County.

1. Federally Protected Species

Natural Heritage Program (NCNHP) maps were reviewed in February 2004, March 2005, and August 2006 to determine if any protected species have been identified near the project study area. These map reviews confirmed that no species identified as Endangered or Threatened by the USFWS have been identified within a two-mile radius of the project study area.

Species which are listed, or are proposed for listing, as Endangered or Threatened are recorded in Section 4 of the ESA. Table 8 summarizes the status of each Threatened or Endangered species, and species descriptions follow.

Table 8. Threatened & Endangered Species Listed for Wake County, North Carolina

Common Name (Scientific Name)	Federal Listing	State Listing	Biological Conclusion
Bald eagle <i>Haliaeetus leucocephalus</i>	Threatened (Proposed for delisting)	Threatened	No Effect
Red-cockaded woodpecker <i>Picoides borealis</i>	Endangered	Endangered	No Effect
Dwarf wedgemussel <i>Alasmidonta heterodon</i>	Endangered	Endangered	May Affect, Not Likely to Adversely Affect
Michaux's sumac <i>Rhus michauxii</i>	Endangered	Endangered-Special Concern	No Effect

Bald eagle (*Haliaeetus leucocephalus*)

Federal Status: Threatened (Proposed for delisting)

State Status: Threatened

The bald eagle is a very large bird of prey that ranges in size from 32 to 43 inches tall and has a wingspan of more than six feet. Adult body plumage is dark brown to chocolate-brown with a white head and tail, while immature birds are brown and irregularly marked with white until their fourth year. They are primarily associated with large bodies of water where food is plentiful. Eagle nests are found in close proximity to water (usually within one-half mile) with a clear flight path to the water. Nests are often made in the largest living tree within the area, with an open view of the surrounding land. Human disturbance can cause nest abandonment. Nests can be as large as six feet across and are made of sticks and vegetation. These platform nests may be used by the same breeding pair for many years. Breeding begins in December or January and the young remain in the nest at least 10 weeks after hatching. Bald eagles eat mostly fish robbed from ospreys or picked up dead along shorelines. They may also capture small mammals such as rabbits, some birds, wounded ducks, and carrion.

Biological Conclusion: *No Effect*

Suitable habitat for bald eagles consisting of areas of open water does not exist in the project study area or within a 1-mile radius of Bridge No. 336. Proposed project construction is not expected to impact this species.

Red-cockaded woodpecker (*Picoides borealis*)

Federal Status: Endangered

State Status: Endangered

This bird is a small, 7 to 8-inch tall woodpecker with a black and white barred back and a conspicuous large white cheek surrounded by a black cap, nape, and throat. Males have a very small red mark at the upper edge of the white cheek and just behind the eye. The red-cockaded woodpecker (RCW) is found in open pine forests in the southeastern United States. The RCW uses open old growth stands of southern pines, particularly longleaf pine, for foraging and nesting habitat. A forested stand optimally should contain at least 50 percent pine and lack a thick understory. The RCW is unique among woodpeckers because it nests almost exclusively in living pine trees. These birds excavate nests in pines greater than 60 years old that are contiguous with pine dominated, foraging habitat. The foraging range of the RCW may extend 500 acres and must be contiguous (separated by no more than 330 linear feet) with suitable nesting sites.

Living pines infected with red-heart disease (*Formes pini*) are often selected for cavity excavation because the inner heartwood is usually weakened. Cavities are located from 12 to 100 feet above ground level and below live branches. These trees can be identified by “candles,” a large encrustation of running sap that surrounds the tree. Colonies consist of one to many of these candle trees. The RCW lays its eggs in April, May, and June; the eggs hatch approximately 10 to 12 days later.

Biological Conclusion: *No Effect*

Suitable habitat for the RCW consisting of open, mature stands of southern pines does not exist within the project study area. The pines that are present in the project study area are present in hardwood dominated forests, are young (<30 years old), and the forests contain a thick understory. Proposed project construction is not expected to impact this species.

Dwarf wedgemussel (*Alasmidonta heterodon*)

Federal Status: Endangered

State Status: Endangered

The dwarf wedgemussel is relatively small, rarely exceeding 1.5 inches in length. The shell's outer surface is usually brown or yellowish brown in color, with faint green rays that are most noticeable in young specimens. Unlike some mussel species, the male and female shells differ slightly, with the female being wider to allow greater space for egg development. A distinguishing characteristic of this mussel is its dentition pattern: the right valve possesses two lateral teeth, while the left valve has only one. This trait is opposite of all other North American species having lateral teeth. This mussel inhabits creeks and rivers that have a slow to moderate current with a sand, gravel, or muddy bed. These streams must be nearly silt free in order to support dwarf wedgemussels.

The dwarf wedgemussel is considered to be a long-term brooder, with gravid females reportedly observed in fall months. Like other freshwater mussels, this species' eggs are fertilized in the female by sperm that are taken in through their siphons as they respire. The eggs develop within the female's gills into larvae (glochidia). The females later release these glochidia, which then attach to the gills or fins of specific host fish species. Based on anecdotal evidence, such as dates when gravid females are present or absent, it appears that release of glochidia occurs primarily in April in North Carolina. While the USFWS notes that the host fish species is unknown, evidence indicates that an anadromous fish which migrates from ocean waters to fresh waters for spawning may be the likely host species. However, recent research has confirmed at least three potential fish host species for the dwarf wedgemussel in North Carolina: the tessellated darter, Johnny darter, and mottled sculpin. These fish species are found in Atlantic coast drainages of North Carolina.

Biological Conclusion: *May Affect, Not Likely to Adversely Affect*

Suitable habitat for the dwarf wedgemussel consisting of nearly silt-free streams, with slow to moderate currents is present within the project study area. No mussel species were observed during the natural resource assessment on February 24, 2004. A screening was conducted for the presence of suitable habitat for the dwarf wedgemussel at the bridge site. Suitable habitat for the dwarf wedgemussel was confirmed; however, the only mussel species observed during the initial screening were of the *Elliptio* genus.

A survey was conducted by qualified biologists on November 19, 2004. Terrible Creek was surveyed from a point approximately 1,300 feet downstream of the project crossing to a point approximately 350 feet upstream. Visual and tactile methods were used. A total of 549 *Elliptio* spp. were found within the surveyed reach. The majority were found in the upstream portion of the project area. No specimens of dwarf wedgemussel were located. Given these results, it is unlikely that the dwarf wedgemussel occurs within the surveyed reach of stream. Project construction is not likely to adversely affect this species. In a letter dated April 13, 2006, the USFWS concurred that the biological conclusion for this project is "may affect, not likely to adversely affect". A copy of the USFWS concurrence letter is included in the Appendix.

Michaux's sumac (*Rhus michauxii*)

Federal Status: Endangered

State Status: Endangered – Special Concern

Michaux's sumac is a rhizomatous, densely hairy shrub, with erect stems from one to three feet in height. The compound leaves contain evenly serrated, oblong to lanceolate, acuminate leaflets. Most plants are unisexual; however, more recent observations have revealed plants with both male and female flowers on one plant. The flowers are small, borne in a terminal, erect, dense cluster, and colored greenish yellow to white. Flowering usually occurs from June to July; while the fruit, a red drupe, is produced through the months of August to October. Only 36 extant populations are known, with 31 in North Carolina, three in Virginia, and two populations in Georgia.

Michaux's sumac grows in sandy or rocky open woods in association with basic soils. It spreads by producing cloning shoots from the roots of mature plants. Apparently, this plant survives best in areas where some form of periodic disturbance provides open areas. At least twelve of the plant's populations in North Carolina are on highway rights-of way, roadsides, or on the edges of artificially maintained clearings.

Biological Conclusion: *No Effect*

Suitable habitat for Michaux's sumac consisting of sandy or rocky open woods is present in the southern portion of the project study area. A plant-by-plant survey for Michaux's sumac was conducted within the project study area on June 1, 2004 and an additional survey was conducted on June 9, 2006. No individuals were observed in either survey.

2. Federal Species of Concern

The USFWS lists 12 Federal Species of Concern (FSC) that are known to occur in Wake County. Federal Species of Concern (FSC) are not legally protected under the Endangered Species Act and are not subject to any of its provisions, including Section 7. Species designated as FSC are defined as taxa which may or may not be listed in the future. These species were formerly Candidate 2 (C2) species or species under consideration for listing for which there is insufficient information to support listing.

Species identified as Endangered, Threatened, or Special Concern (SC) by the state of North Carolina are afforded state protection under the State Endangered Species Act and the North Carolina Plant Protection and Conservation Act of 1979. Wake County FSCs per the August 2006 NCNHP database, their state status, and the existence of suitable habitat within the project study area are shown in Table 9.

Table 9. Federal Species of Concern, State Status, and Potential Habitat

Common Name	Scientific Name	State Status	Potential Habitat
Southeastern myotis	<i>Myotis austroriparius</i>	SC	Yes
Bachman's sparrow	<i>Aimophila aestivalis</i>	SC	No
Roanoke bass	<i>Ambloplites cavifrons</i>	SR	No
Southern hognose snake*	<i>Heterodon simus</i>	SC	No
Atlantic pigtoe	<i>Fusconaia masoni</i>	E	Yes
Green floater	<i>Lasmigona subviridis</i>	E	Yes
Yellow lance	<i>Elliptio lanceolata</i>	E	Yes
Bog spicebush	<i>Lindera subcoriacea</i>	T	No
Virginia least trillium	<i>Trillium pusillum</i> var. <i>virginianum</i>	E	No
Sweet pinesap	<i>Monotropsis odorata</i>	SR-T	No
Grassleaf arrowhead	<i>Sagittaria weatherbiana</i>	SR-T	Yes
Carolina madtom	<i>Noturus furiosus</i>	SC (PT)	Yes

Notes:

SC-Special Concern, PT-Proposed Threatened, SR-Significantly Rare, E-Endangered, -T-Throughout, *-Historic Record, T-Threatened

On occasion, NCNHP records differ from USFWS records. Sometimes a species may be listed by one agency and not the other, or there may be discrepancies in whether the species record is considered Historic or Obscure. The USFWS listing is deferred to in this report for species spellings and listings as FSCs.

3. Summary of Anticipated Impacts

The primary environmental constraints are the wetlands throughout the central and northwestern portions of the project study area, and an intermittent stream northwest of Bridge No. 336.

Alternative B proposes to impact jurisdictional wetlands with a bridge on new location approximately 20 feet upstream of the existing Bridge No. 336. The bridge associated with Alternative B is approximately 25 feet longer than the bridge proposed for Alternative C. The wetland impacts are not minor and would require compensatory mitigation. Additionally, approximately 10,097 ft² of the total Neuse River Riparian Buffer impacts (17,354 ft²) will require mitigation due to the parallel impacts associated with the UT to Terrible Creek. Wetland mitigation may be a feasible option with this alternative once the existing bridge is removed.

Alternative C proposes to impact jurisdictional wetlands with the replacement of Bridge No. 336 at existing location, and the construction of a temporary on-site detour approximately 40 feet upstream (west) of the existing Bridge No. 336. The permanent bridge end bents are proposed to be reconstructed approximately 30 feet away from the stream on the southern side of Terrible Creek and approximately 10 feet away from the stream on the northern side of Terrible Creek. The impacts to wetlands from the construction of the on-site detour are substantial and compensatory

mitigation will be required. In addition, approximately 6,468 ft² of the total Neuse River Riparian Buffer impacts (17,213 ft²) will require mitigation due to the parallel impacts associated with the UT to Terrible Creek. Restoration of the wetland impacts associated with the temporary detour bridge will be required; however, the amount and ratios of wetland mitigation will need to be determined.

VI. CULTURAL RESOURCES

A. COMPLIANCE GUIDELINES

This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and implemented by the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified at 36 CFR Part 800. Section 106 requires federal agencies to take into account the effect of their undertakings (federally funded, licensed, or permitted) on properties listed in or eligible for the National Register of Historic Places, and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings.

B. HISTORIC ARCHITECTURE

A field survey of the Area of Potential Effects (APE) was conducted by the NCDOT Historic Architecture Group in January 2004. All properties over fifty years of age were identified and evaluated according to the National Register of Historic Places criteria for eligibility. A Historic Architectural Resources Survey Report was prepared for the project and submitted to the State Historic Preservation Office (HPO) on March 26, 2004. In that report, NCDOT determined that the Jones-Johnson-Ballentine Historic District (listed on the National Register in 1989) is no longer eligible as a district because a loss of integrity. Instead, NCDOT recommended that the Jones-Johnson Farm (once a part of the district) is eligible by itself with significance in agriculture and architecture. On July 12, 2004, the HPO concurred with this finding and also agreed that Bridge No. 336 is not eligible for the National Register. A copy of this memo is provided in the Appendix. Additionally, the Jones-Johnson Farm is a logically-designated Historic Landmark according to the Wake County Historic Properties Commission.

Architectural historians from NCDOT met with FHWA and HPO on August 30, 2004 to discuss the effects of the proposed project on the Jones-Johnson Farm. At that meeting, all parties concurred that Alternatives A, B, and C would result in a No Adverse Effect on the Jones-Johnson Farm. However, Alternative B would require a Certificate of Appropriateness from the Wake County Historic Properties Commission. A copy of this form is in the Appendix.

C. ARCHAEOLOGY

The HPO, in a memorandum dated March 4, 2004, recommended that "no archaeological investigation be conducted in connection with this project." A copy of the HPO memorandum is included in the Appendix.

VII. ENVIRONMENTAL EFFECTS

The project is expected to have an overall positive impact. Replacement of the functionally obsolete bridge and structurally deficient bridge will result in safer traffic operations.

The project is a Federal “Categorical Exclusion” because of its limited scope and lack of substantial environmental consequences.

The bridge replacement will not have an adverse effect on the quality of the human or natural environment with the use of current NCDOT standards and specifications.

The project is not in conflict with any plan, existing land use, or zoning regulation. No substantial change in land use is expected to result from construction of the project.

No adverse impact on families or communities is anticipated. Right-of-way acquisition will be limited. No relocations of residents or businesses are expected with implementation of the preferred alternative.

In compliance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) a review was conducted to determine whether minority or low-income populations were receiving disproportionately high and adverse human health or environmental impacts as a result of this project. The investigation determined the project would not disproportionately impact any minority or low-income populations.

No adverse effect on public facilities or services is anticipated. The project is not expected to adversely affect social, economic, or religious opportunities in the area.

There are no publicly owned recreational facilities, or wildlife and waterfowl refuges of national, state, or local significance in the vicinity of the project.

The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impacts to prime and important farmland soils by all land acquisition and construction projects. Prime and important farmland soils are defined by the Natural Resources Conservation Service (NRCS). Since the proposed bridge will be replaced at the existing location the Farmland Protection Policy does not apply.

The purpose of this project is to replace Bridge No. 336 by constructing a new structure. This project will not result in any meaningful changes in traffic volumes, vehicle mix, location of the existing facility, or any other factor that would cause an increase in emissions impacts relative to the no-build alternative. As such, FHWA has determined that this project will generate minimal air quality impacts for Clean Air Act criteria pollutants and has not been linked with any special MSAT concerns. Consequently, this effort is exempt from analysis for MSATs.

EPA regulations for vehicle engines and fuels will cause overall MSATs to decline significantly over the next 20 years. FHWA predicts MSATs will decline in the range of 57 percent to 87 percent, from 2000 to 2020, based on regulations now in effect, even with a projected 64 percent increase in vehicle miles traveled (VMT). Therefore, both the background level of MSATs and the possibility of even minor MSAT emissions from this project will be reduced.

The project is located in Wake County, which is within the Raleigh-Durham-Chapel Hill non-attainment area for ozone (O₃) and the Raleigh Durham nonattainment area for carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated these areas as moderate nonattainment area for CO. However, due to improved monitoring data, these areas were redesignated as maintenance for CO₃ on September 18, 1995. The area was designated nonattainment for O₃ under the eight-hour ozone standard effective June 15, 2004. Section 176(c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Wake County. The Capital Area Metropolitan Planning Organization **2030** Long Range Transportation Improvement Program (LRTP) and the **2006-2012** Metropolitan Transportation Improvement Program (MTIP) conform to the intent of the SIP. The USDOT made a conformity determination on the LRTP on 6/15/05 and the MTIP on 11/14/05. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There are no significant changes in the project's design concept or scope, as used in the conformity analysis.

The traffic volumes will not increase or decrease because of this project. There are no receptors located in the immediate project area. The project's impact on noise and air quality will not be substantial.

Noise levels could increase during construction but will be temporary. This evaluation completes the assessment requirements for highway traffic noise (23 CFR Part 772) and for air quality (1990 CAAA and NEPA) and no additional reports are required.

An examination of records at the North Carolina Department of Environment and Natural Resources, Division of Water Quality, Groundwater Section and the North Carolina Division of Solid Waste Management revealed no hazardous waste sites in the project area. A field reconnaissance survey was performed and no underground storage tank (UST) sites were found within the project area. If any unregulated USTs or any potential source of contamination is discovered during right-of-way initial contacts with impacted property owners, then an assessment will be conducted to determine the extent of any contamination at that time.

The drainage area of Terrible Creek at the proposed crossings is 3.18 square miles. Wake County is currently participating in the National Flood Insurance Program. This crossing of Terrible Creek is located in FEMA Special Flood Hazard Zone AE. This reach of stream is in a detailed study with a published floodway. A flood insurance rate map is provided in Figure 5. The published 100-year base flood appears to overtop the existing roadway. Proposed encroachments in the floodplain and floodway could result in a Floodway Modification if a "No Impact" certification can not be obtained. The likelihood of obtaining a "No Impact" certification would be greatly increased if the proposed roadway grade closely matches that of the existing roadway overtopping grade. Further detailed analysis during final design will be required to adequately address all the impacts associated with the floodplain.

On the basis of the above discussion, it is concluded that no substantial adverse environmental effects will result from implementation of the project.

VIII. PUBLIC INVOLVEMENT

Efforts were undertaken early in the planning process to contact local officials to involve them in the project development with scoping letters. Scoping letters were also sent to various agencies.

A Citizens Informational Workshop was held on August 16, 2004 in the media center of Ballentine Elementary School. This workshop was an open-house format where citizens dropped in to ask questions and voice their concerns. A display of Alternatives A, B, and C and other project related handouts were available for viewing. Four citizens attended the workshop and two comments sheets were received. Comments received included:

1. Alternative B was the preferred alternative.
2. Improve the grade on the bridge and approach.
3. Do not close the roadway at anytime.
4. A left turn lane is need onto Randall Farm Road.
5. Detour route on N. Main and Johnson Pond Road would be very dangerous.
6. Road has flooded several times at bridge since Hurricane Fran.

An informational newsletter was sent to area residents and appropriate officials in February 2007 identifying Alternative C as the preferred alternative.

IX. AGENCY COMMENTS

The NC Wildlife Resource Commission, in a standardized letter, stated that they prefer the bridge be replaced with a bridge.

Response: The preferred alternative is a bridge.

The Town of Fuquay-Varina Board of Commissioners, in a September 7, 2004 meeting, recommended Alternative B for the following reasons:

1. Due to the amount of traffic that travels on Sunset Lake Road, the Town does not favor a detour using other streets and thoroughfares. Sunset Lake Road is a major thoroughfare for north and south bound traffic and to funnel traffic onto Broad Street (NC 55), Stewart Street or Johnson Pond Road will create major traffic congestion on these roads that already experience traffic problems and delays. With the exception of Broad Street, which is being improved, Stewart Street and Johnson Road are not adequately designed to handle the additional traffic that would result from the closing of the bridge on Sunset Lake Road. In addition, NCDOT is also planning to replace the Wake Chapel Road and bridge across the railroad tracks, which will require an off-site traffic detour. The Town would not want both bridges closed with off-site detours at the same time. This situation would instantly create a traffic 'bottleneck'. The Town request that the bridge replacement on Sunset Lake Road be constructed on a schedule that will not conflict with the Wake Chapel Road bridge replacement.

Response: The off-site detour (Alternative A) was removed from further consideration. The Wake Chapel Road bridge has been completed.

2. Emergency service response time is a concern for fire and police with the Ballentine Elementary School on the north side of Terrible Creek. If the bridge is closed completely the response time would be greatly increased for emergency services to address any emergency in a timely manner.

Response: The off-site detour (Alternative A) was removed from further consideration.

3. An important factor for the Town is the ability to have a safe approach to and from the bridge. The alignment of Sunset Lake Road on either side of the bridge is not the best for traffic movement crossing the bridge. With the replacement of the bridge a better alignment and raising the bridge several feet would improve the safety of traffic crossing the bridge.

Response: The grade for Alternative C (preferred) will be raised approximately five feet for a proposed design speed of 50 mph. The approach from the south will transition from two lanes to three lanes at the bridge and provide 12-foot lanes with 8-foot shoulders, including four-foot paved shoulders. The roadway north of the bridge will provide three 12-foot wide lanes with two-foot curb and gutter.

All other agency comments were addressed elsewhere in this document. Letters are included in the Appendix.

X. SECTION 4(F) OF THE DEPARTMENT OF TRANSPORTATION ACT OF 1966

Part 23 CFR 771.135 Section 4(f) (49 U.S.C. 303) states that “The Administrator may not approve the use of land from a significant publicly owned public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that:

- (i) There is no feasible and prudent alternative to the use of land from the property; and
- (ii) The action includes all possible planning to minimize harm to the property resulting from such use.”

Two build alternatives were studied for this project. They are described below.

Alternative B replaces the bridge on new alignment west of the existing structure. During construction, traffic will be maintained on the existing bridge. Alternative B is not recommended because of higher permanent impacts to wetlands and Neuse River Riparian Buffers.

Alternative C (preferred) replaces the bridge at the existing location. During construction, traffic will be maintained with an on-site detour west of the existing bridge. Alternative C was selected because it has the estimated lowest permanent impact to wetlands and Neuse River Basin Riparian Buffers.

Additional alternatives that were not considered feasible include the following:

- The “Do Nothing” alternative will eventually necessitate closure of the bridge. This is not desirable because of the traffic service provided by SR 1301 and Bridge No. 336.
- An alternative with an off-site detour route (**Alternative A**). The detour would follow SR 1407 (Whitted Road), SR 1404 (Johnson Pond Road), and US 401 (North Main Street). This alternative is not considered feasible because of the high traffic volumes that would be detoured, the high road user cost associated with the off-site detour, emergency management vehicle delays, and the high number of bus crossings each day.
- Investigation of the existing structure by the Bridge Maintenance Unit indicates that “rehabilitation” of this bridge is not feasible because of its age and deteriorated condition.
- Alternatives east of the existing bridge were not considered feasible because of not being able to maintain the desired design speed and insufficient site distance due to the curve needed.
- Staged construction of the proposed bridge was evaluated, but complications associated with raising the grade and maintaining traffic on-site made this option unfeasible.

In accordance with the criteria set forth in the Federal Register December 23, 1986, the following Programmatic Section 4(f) for Minor Involvements with Historic Sites evaluation was prepared:

In a memorandum dated July 12, 2004, the HPO concurred that the Jones-Johnson Farm, on the east side of SR 1301 and south of Terrible Creek, is eligible for the National Register under Criteria A: Agriculture and Commerce, and C: Architecture as an intact farm complex.

The farm is comprised of 80 acres and has been in continuous use as a farm since the eighteenth century.

The HPO concurred that the Jones-Johnson-Ballentine Historic District, is listed in the National Register but is no longer eligible as a district for this status because of loss of integrity. The HPO also concurred that Bridge No. 336 is not eligible for listing in the National Register.

Since the project meets the criteria set forth in the Federal Register (December 23, 1986), a programmatic Section 4(f) evaluation satisfies the requirements of Section 4(f).

The following alternatives, which avoid use of the historic site, have been fully evaluated: (1) no-build; (2) rehabilitation of the existing bridge. These alternatives were not found to be feasible and prudent.

All possible planning to minimize harm to the historic site has been performed as an integral part of this project. In a concurrence form dated August 30, 2004, the HPO concurred that there is an effect on the National Register-eligible property if Alternative B is constructed. The HPO concurred that there will be no effect on the National Register-eligible property for Alternative C. The approved Final Nationwide Section 4(f) Evaluation and Approval for Federally-Aided Highway Projects with Minor Involvement with Historic Sites as follows.

NORTH CAROLINA DIVISION
FINAL NATIONWIDE SECTION 4(f) EVALUATION AND APPROVAL
FOR FEDERALLY-AIDED HIGHWAY PROJECTS WITH MINOR INVOLVEMENTS WITH
HISTORIC SITES

F. A. Project BRZ-1301(2)
 State Project 8.2409601
 T. I. P. No. B-4302

DESCRIPTION:

Replace Bridge No. 336 on SR 1301 (Sunset Lake Road) over Terrible Creek in Wake County.

	<u>YES</u>	<u>NO</u>
1. Is the proposed project designed to improve the operational characteristics, safety, and/or physical condition of the existing highway facility on essentially the same alignment?	<u>X</u>	<input type="checkbox"/>
2. Is the project on new location?	<input type="checkbox"/>	<u>X</u>
3. Is the historic site adjacent to the existing highway?	<u>X</u>	<input type="checkbox"/>
4. Does the project require the removal or alteration of historic buildings, structures, or objects?	<input type="checkbox"/>	<u>X</u>
5. Does the project disturb or remove archaeological resources which are important to preserve in place rather than to recover for archaeological research?	<input type="checkbox"/>	<u>X</u>
6. a. Is the impact on the Section 4(f) site considered minor (i.e. no effect, no adverse effect)?	<u>X</u>	<input type="checkbox"/>
b. If the project is determined to have "no adverse effect" on the historic site, does the Advisory Council on Historic Preservation object to the determination of "no adverse effect"?	<input type="checkbox"/>	<u>X</u>
7. Has the SHPO agreed, in writing, with the assessment of impacts and the proposed mitigation?	<u>X</u>	<input type="checkbox"/>

8. Does the project require the preparation of an EIS? X

ALTERNATIVES CONSIDERED AND FOUND NOT TO BE FEASIBLE AND PRUDENT

The following alternatives were evaluated and found not to be feasible and prudent:

- | | <u>YES</u> | <u>NO</u> |
|---|--------------------------|--------------------------|
| 1. <u>Do nothing</u> | | |
| Does the "no build" alternative: | | |
| (a) correct capacity deficiencies? | <input type="checkbox"/> | <u>X</u> |
| or (b) correct existing safety hazards? | <input type="checkbox"/> | <u>X</u> |
| or (c) correct deteriorated conditions? | <input type="checkbox"/> | <u>X</u> |
| and (d) create a cost or impact of extraordinary measure | <input type="checkbox"/> | <u>X</u> |
| 2. <u>Improve the highway without using the adjacent historic site.</u> | | |
| (a) Have minor alignment shifts, changes in standards, use of retaining walls, etc., or traffic management measures been evaluated? | <u>X</u> | <input type="checkbox"/> |
| (b) The items in 2(a) would result in:
(circle, as appropriate) | | |
| or (i) substantial adverse environmental impacts | | |
| or (ii) substantial increased costs | | |
| or (iii) unique engineering, transportation, maintenance, or safety problems | | |
| or (iv) substantial social, environmental, or economic impacts | | |
| or (v) a project which does not meet the need | | |
| or (vi) impacts, costs, or problems which are of extraordinary magnitude | | |

- | | <u>Yes</u> | <u>No</u> |
|---|------------|--------------------------|
| 3. <u>Build an improved facility on new location without using the historic site.</u> | <u>X</u> | <input type="checkbox"/> |
| (a) An alternate on new location would result in:
(circle, as appropriate) | | |
| (i) a project which does not solve the existing problems | | |
| or (ii) substantial social, environmental, or economic impacts | | |
| or (iii) a substantial increase in project cost or engineering difficulties | | |
| and (iv) such impacts, costs, or difficulties of truly unusual or unique or extraordinary magnitude | | |

MINIMIZATION OF HARM

- | | <u>Yes</u> | <u>No</u> |
|--|------------|--------------------------|
| 1. The project includes all possible planning to minimize harm necessary to preserve the historic integrity of the site. | <u>X</u> | <input type="checkbox"/> |
| 2. Measures to minimize harm have been agreed to, in accordance with 36 CFR Part 800, by the FHWA, the SHPO, and as appropriate, the ACHP. | <u>X</u> | <input type="checkbox"/> |
| 3. Specific measures to minimize harm are described as follows:

Replacing the bridge on new alignment north of the existing bridge while maintaining traffic on the existing structure. | | |

Note: Any response in a box requires additional information prior to approval. Consult Nationwide 4(f) evaluation.

COORDINATION

The proposed project has been coordinated with the following (attach correspondence):

- a. State Historic Preservation Officer X
- b. Advisory Council on Historic Preservation
- c. Property owner X
- d. Local/State/Federal Agencies X
- e. US Coast Guard
 (for bridges requiring bridge permits)

SUMMARY AND APPROVAL

The project meets all criteria included in the programmatic 4(f) evaluation approved on December 23, 1986.

All required alternatives have been evaluated and the findings made are clearly applicable to this project. There are no feasible and prudent alternatives to the use of the historic site.

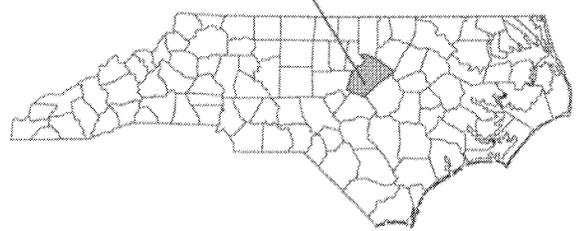
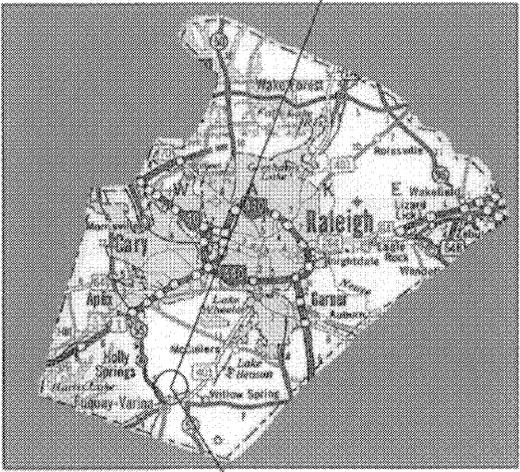
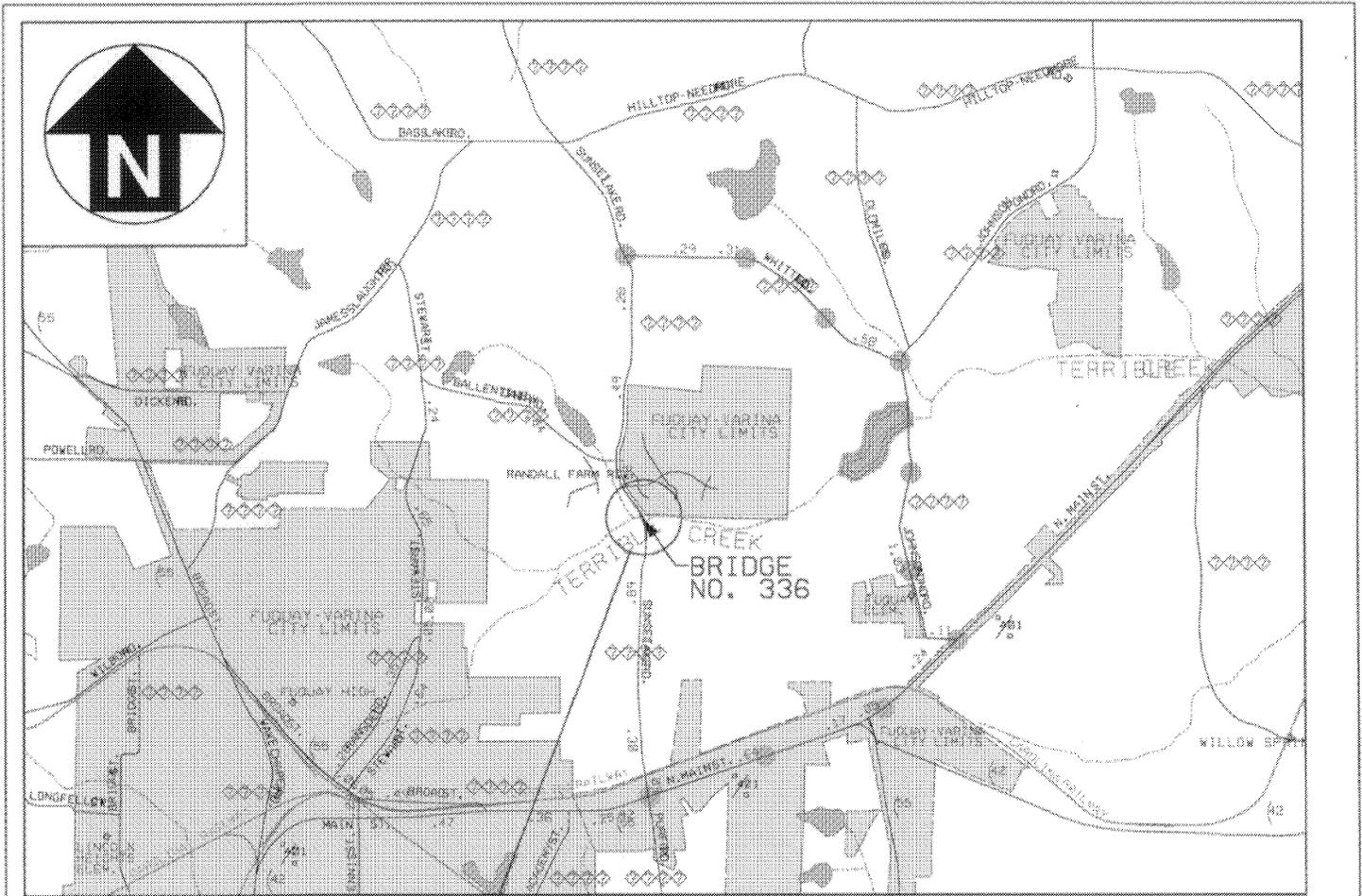
The project includes all possible planning to minimize harm, and the measures to minimize harm will be incorporated in the project.

All appropriate coordination has been successfully completed with local and state agencies.

Approved:

2/27/07
Date *for* Stacy Oberhaus
Environmental Management Director
Project Development and Environmental Analysis Branch, NCDOT

03/12/2007
Date *for* Thomas D. Riggs
Division Administrator
FHWA



● — ● — ● DETOUR ROUTE



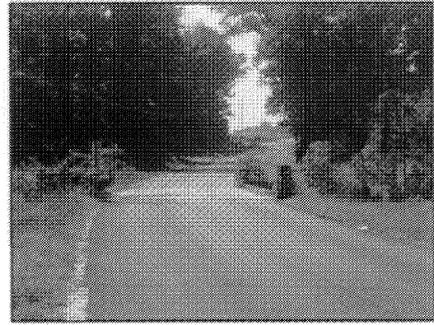
North Carolina Department of Transportation
Project Development & Environmental Analysis

WAKE COUNTY
BRIDGE NO. 336 ON SR 1301
OVER TERRIBLE CREEK
B-4302

FIGURE 1



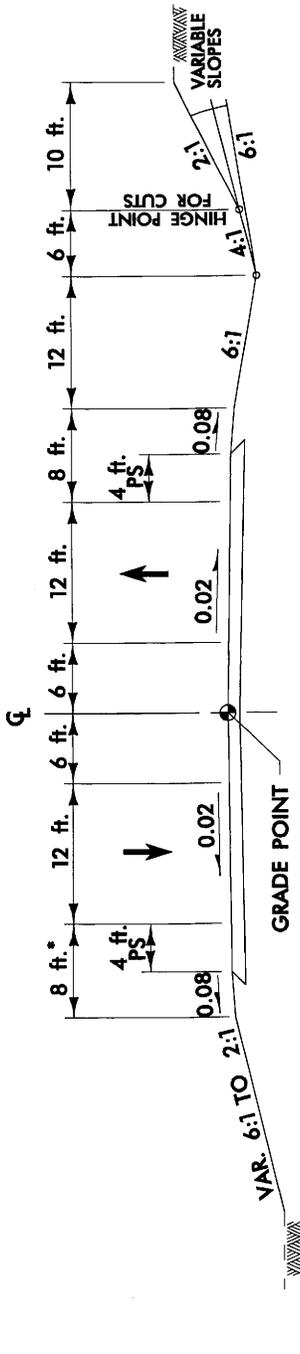
View of south approach from Bridge No. 336.



View of north approach from Bridge No. 336.

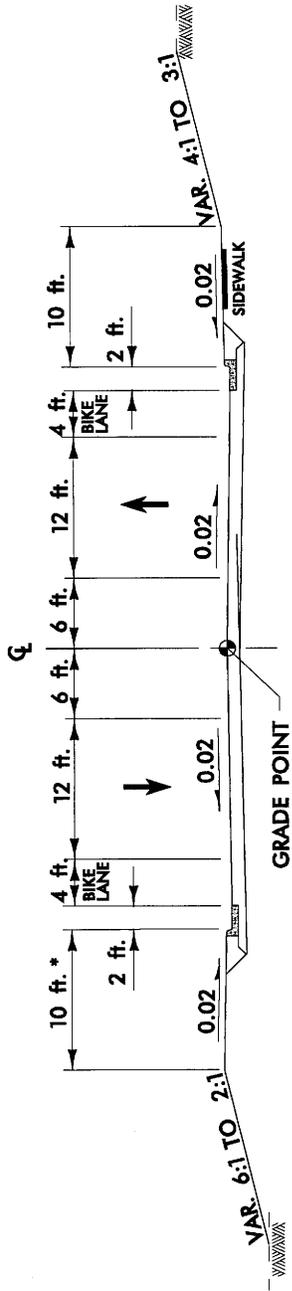


West side of Bridge No. 336.



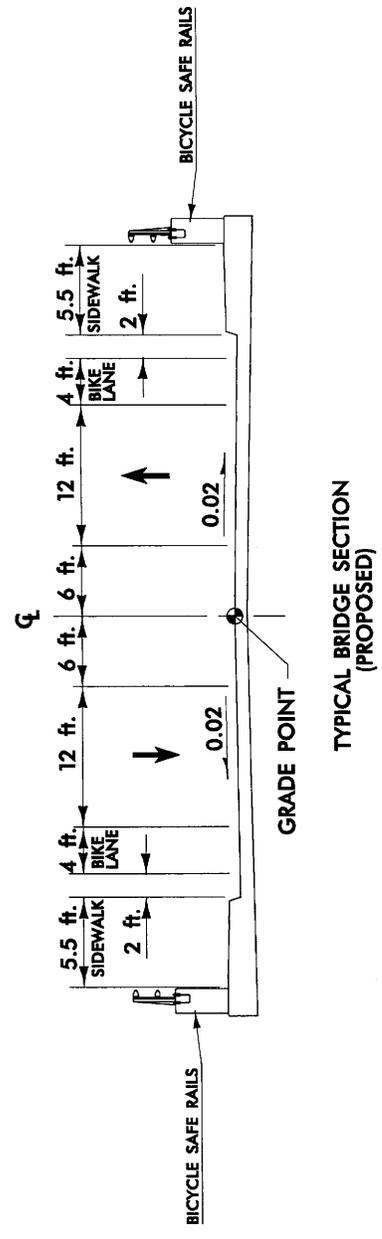
TYPICAL APPROACH SECTION
(PROPOSED PAVED SHOULDER)

11 ft. WITH GUARDRAIL IS WARRANTED



TYPICAL TRAILING SECTION
(PROPOSED CURB & GUTTER)

15 ft. WITH GUARDRAIL IS WARRANTED



TYPICAL BRIDGE SECTION
(PROPOSED)

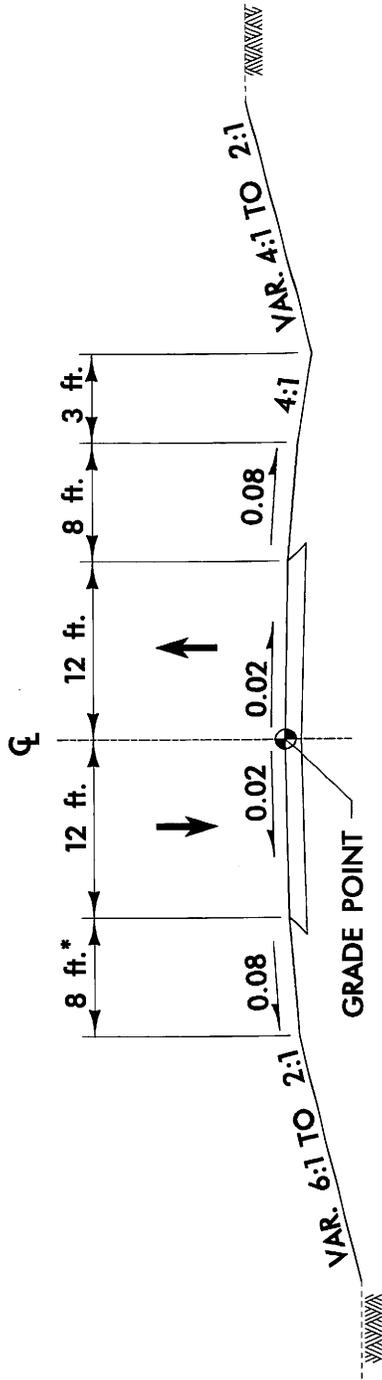
TRAFFIC DATA
 (CONST. YR.) 2006 ADT = 12,800
 (DESIGN YR.) 2030 ADT = 28,500
 DUAL 3%
 TTST 1%
 EXISTING BRIDGE LENGTH = 37 ft.
 FUNCTIONAL CLASSIFICATION :
 MINOR COLLECTOR - RURAL



North Carolina Department
 Of Transportation
 Project Development &
 Environmental Analysis

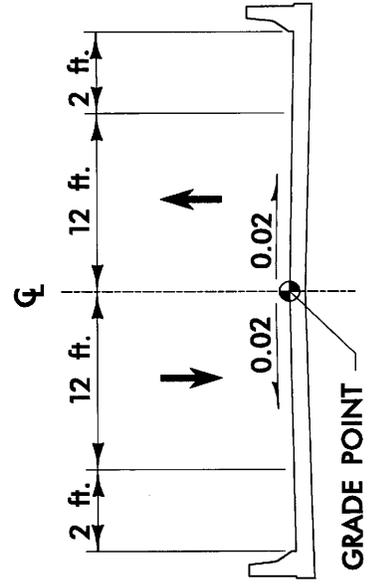
WAKE COUNTY
 BRIDGE NO. 336 ON SR 1301
 (SUNSET LAKE RD) OVER TERRIBLE CREEK
 TIP NO: B-4302

FIGURE 3



TYPICAL APPROACH SECTION
(DETOUR)

* 10 ft. WITH GUARDRAIL IS WARRANTED



TYPICAL BRIDGE SECTION
(DETOUR)

TRAFFIC DATA

(CONST. YR.)	2006 ADT =	12,800
(DESIGN YR.)	2030 ADT =	28,500
DUAL		3%
TTST		1%

FUNCTIONAL CLASSIFICATION :
MINOR COLLECTOR - RURAL



North Carolina Department
Of Transportation
Project Development &
Environmental Analysis

WAKE COUNTY
BRIDGE NO. 336 ON SR 1301
(SUNSET LAKE RD) OVER TERRIBLE CREEK
TIP NO: B-4302

FIGURE 3A

B-4302 ALTERNATIVE B
REPLACE ON NEW ALIGNMENT
WAKE COUNTY
BRIDGE NO. 336 ON SR 1301
OVER TERRIBLE CREEK

NAD 83

TERRIBLE CREEK

140'

END PROJECT

North Carolina Department
Of Transportation
Project Development &
Environmental Analysis

WAKE COUNTY
BRIDGE NO. 336 ON SR 1301
(SUNSET LAKE RD) OVER TERRIBLE CREEK
TIP NO: B-4302

ALTERNATIVE B

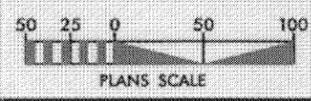


FIGURE 4A

PROPERTY BOUNDARY

FUQUAY VARIANA CITY LIMITS

TERRIBLE CREEK

FUQUAY

B-4302 ALTERNATIVE C
 REPLACE IN PLACE
 WITH ON SITE DETOUR
 WAKE COUNTY
 BRIDGE NO. 336 ON SR 1301
 OVER TERRIBLE CREEK

NAD 83

BEGIN PROJECT

END PROJECT

TERRIBLE CREEK

TERRIBLE CREEK

FUQUAY YARMA CITY LIMITS



North Carolina Department
 Of Transportation
 Project Development &
 Environmental Analysis

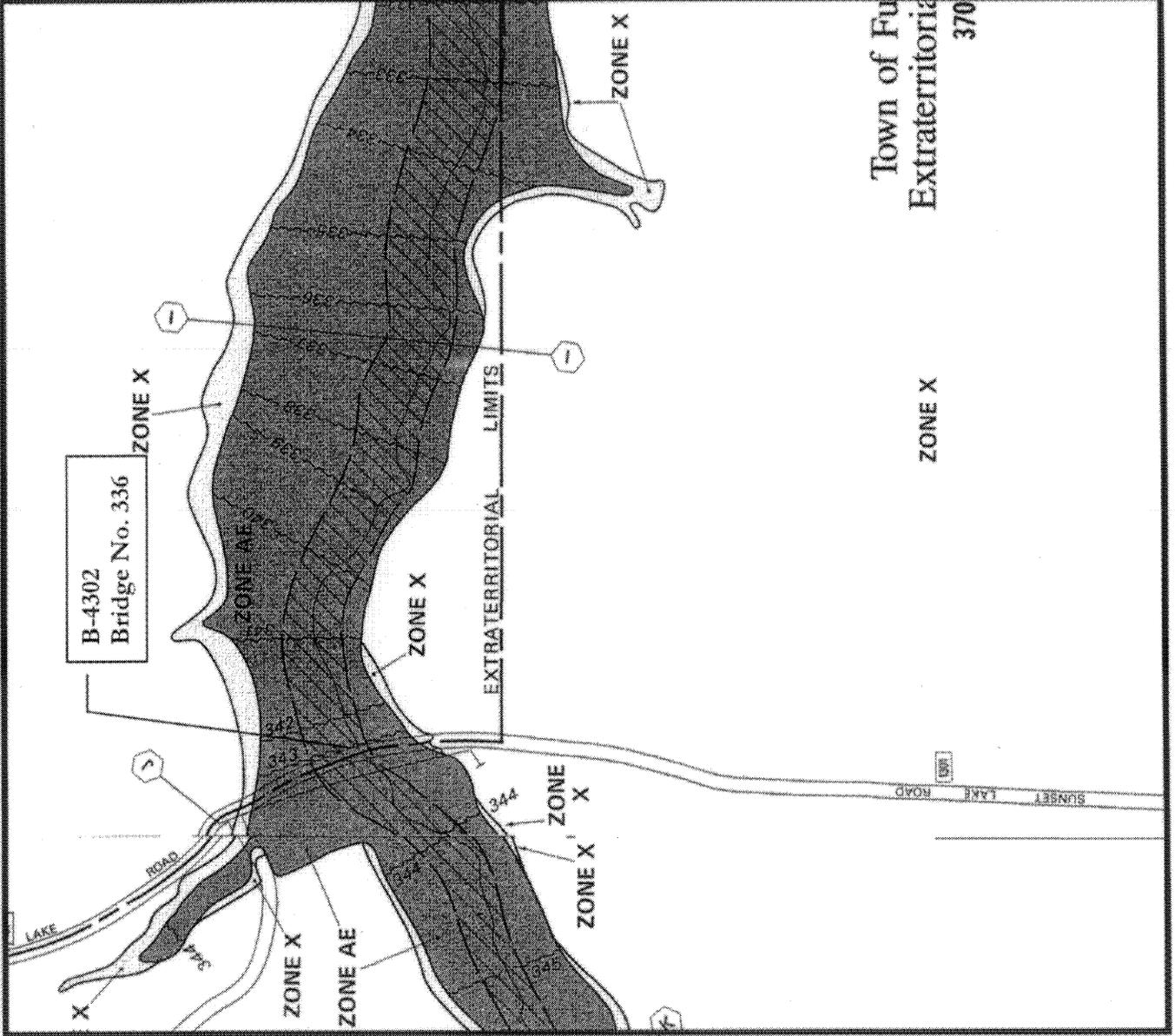
WAKE COUNTY
 BRIDGE NO. 336 ON SR 1301
 (SUNSET LAKE RD) OVER TERRIBLE CREEK
 TIP NO: B-4302

ALTERNATIVE C

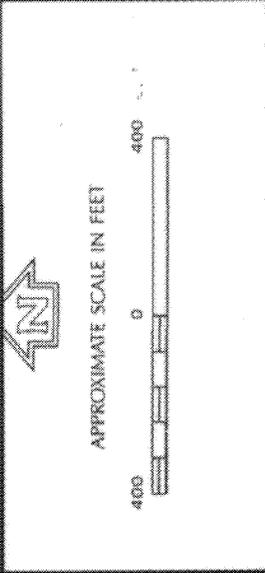


FIGURE 4B

APPENDIX



Town of Fu
Extraterritorial
370



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

WAKE COUNTY,
NORTH CAROLINA AND
INCORPORATED AREAS

PANEL 687 OF 810
SEE MAP INDEX FOR PANELS NOT PRINTED

COMMUNITY	NUMBER	PANEL	SUFFIX
FRODOY MARINA, TOWN OF	370239	0687	E
UNINCORPORATED AREAS	370388	0687	E

CONTRIBUTOR:
FEDERAL EMERGENCY MANAGEMENT AGENCY

MAP NUMBER: 37183C0687 E
EFFECTIVE DATE: MARCH 3, 1992

PANEL LOCATION

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to this date on the site book. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Figure 5



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

June 17, 2004

Harold Brady
Mulkey Engineers & Consultants
P.O. Box 33127
Raleigh, NC 27636

Dear Mr. Brady:

This letter is in response to your letter of June 7, 2004 which provided the U.S. Fish and Wildlife Service (Service) with the biological determination of the North Carolina Department of Transportation that the replacement of Bridge No. 336 on SR 1301 over Terrible Creek in Wake County (TIP No. B-4302) may affect, but is not likely to adversely affect the federally endangered Michaux's sumac (*Rhus michauxii*). These comments are provided in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

According to the information you submitted, a plant survey was conducted at the project site on June 1, 2004. No specimens of Michaux's sumac were observed. Based on the information provided and other information available, the Service concurs with your determination that the proposed bridge replacement may affect, but is not likely to adversely affect Michaux's sumac. We believe that the requirements of section 7(a)(2) of the ESA have been satisfied for this species. We remind you that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered in this review; (2) this action is subsequently modified in a manner that was not considered in this review; or (3) a new species is listed or critical habitat determined that may be affected by this identified action.

The Service appreciates the opportunity to review this project. If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520 (Ext. 32).

Sincerely,

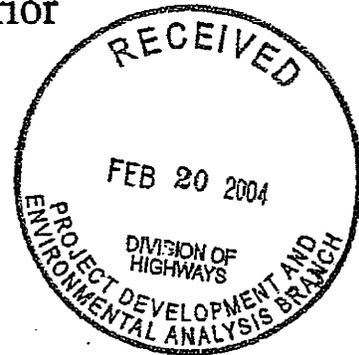
Garland B. Pardue, Ph.D.
Ecological Services Supervisor

cc: Eric Alsmeyer, USACE, Raleigh, NC
Nicole Thomson, NCDWQ, Raleigh, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Militscher, USEPA, Raleigh, NC



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726



February 18, 2004

Gregory J. Thorpe, Ph.D.
North Carolina Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Dr. Thorpe:

This letter is in response to your request for comments from the U.S. Fish and Wildlife Service (Service) on the potential environmental impacts of the proposed replacement of the following ten bridges:

- B-4002, Alamance County, Bridge No. 96 on SR 2116 over Meadow Creek
- B-4063, Chatham County, Bridge No. 20 on NC 902 over Sandy Branch
- B-4109, Durham County, Bridge No. 120 on SR 1303 over Mud Creek
- B-4216, Orange County, Bridge No. 66 on SR 1002 over Strouds Creek
- B-4300, Wake County, Bridge No. 29 on SR 1007 over Clarks Creek
- B-4301, Wake County, Bridge No. 229 on SR 1007 over Poplar Creek
- B-4302, Wake County, Bridge No. 336 on SR 1301 over Terrible Creek
- B-4303, Wake County, Bridge No. 102 on SR 1844 over Lower Bartons Creek
- B-4304, Wake County, Bridge No. 143 on SR 2217 over Beaver Dam Creek
- B-4592, Orange County, Bridge No. 64 on SR 1561 over Eno River

These comments provide scoping information in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661-667d) and section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

For bridge replacement projects, the Service recommends the following general conservation measures to avoid or minimize environmental impacts to fish and wildlife resources:

1. Wetland, forest and designated riparian buffer impacts should be avoided and minimized to the maximum extent practical;
2. If unavoidable wetland impacts are proposed, every effort should be made to identify compensatory mitigation sites in advance. Project planning should include a detailed compensatory mitigation plan for offsetting unavoidable wetland impacts. Opportunities

to protect mitigation areas in perpetuity via conservation easements, land trusts or by other means should be explored at the outset;

3. Off-site detours should be used rather than construction of temporary, on-site bridges. For projects requiring an on-site detour in wetlands or open water, such detours should be aligned along the side of the existing structure which has the least and/or least quality of fish and wildlife habitat. At the completion of construction, the detour area should be entirely removed and the impacted areas be planted with appropriate vegetation, including trees if necessary;
4. Wherever appropriate, construction in sensitive areas should occur outside fish spawning and migratory bird nesting seasons. In waterways that may serve as travel corridors for fish, in-water work should be avoided during moratorium periods associated with migration, spawning and sensitive pre-adult life stages. The general moratorium period for anadromous fish is February 15 - June 30;
5. New bridges should be long enough to allow for sufficient wildlife passage along stream corridors;
6. Best Management Practices (BMP) for Protection of Surface Waters should be implemented;
7. Bridge designs should include provisions for roadbed and deck drainage to flow through a vegetated buffer prior to reaching the affected stream. This buffer should be large enough to alleviate any potential effects from run-off of storm water and pollutants;
8. The bridge designs should not alter the natural stream and stream-bank morphology or impede fish passage. To the extent possible, piers and bents should be placed outside the bank-full width of the stream;
9. Bridges and approaches should be designed to avoid any fill that will result in damming or constriction of the channel or flood plain. If spanning the flood plain is not feasible, culverts should be installed in the flood plain portion of the approach to restore some of the hydrological functions of the flood plain and reduce high velocities of flood waters within the affected area.

A list of federally protected species for each county in North Carolina can be found at <http://nc-es.fws.gov/es/countyfr.html>. Additional information about the habitats in which each species is often found can also be found at <http://endangered.fws.gov>. Please note, the use of the North Carolina Natural Heritage Program data should not be substituted for actual field surveys if suitable habitat occurs near the project site. If suitable habitat exists in the project area, we recommend that biological surveys for the listed species be conducted and submitted to us for review. All survey documentation must include survey methodologies and results.

We reserve the right to review any federal permits that may be required for these projects, at the public notice stage. Therefore, it is important that resource agency coordination occur early in

the planning process in order to resolve any conflicts that may arise and minimize delays in project implementation. In addition to the above guidance, we recommend that the environmental documentation for these projects include the following in sufficient detail to facilitate a thorough review of the action:

1. A clearly defined and detailed purpose and need for the proposed project;
2. A description of the proposed action with an analysis of all alternatives being considered, including the "no action" alternative;
3. A description of the fish and wildlife resources, and their habitats, within the project impact area that may be directly or indirectly affected;
4. The extent and acreage of waters of the U.S., including wetlands, that are to be impacted by filling, dredging, clearing, ditching, or draining. Acres of wetland impact should be differentiated by habitat type based on the wetland classification scheme of the National Wetlands Inventory (NWI). Wetland boundaries should be determined by using the 1987 Corps of Engineers Wetlands Delineation Manual and verified by the U.S. Army Corps of Engineers;
5. The anticipated environmental impacts, both temporary and permanent, that would be likely to occur as a direct result of the proposed project. The assessment should also include the extent to which the proposed project would result in secondary impacts to natural resources, and how this and similar projects contribute to cumulative adverse effects;
6. Design features and construction techniques which would be employed to avoid or minimize the fragmentation or direct loss of wildlife habitat and waters of the US;
7. If unavoidable wetland impacts are proposed, project planning should include a detailed compensatory mitigation plan for offsetting the unavoidable impacts.

The Service appreciates the opportunity to comment on these projects. Please continue to advise us during the progression of the planning process, including your official determination of the impacts of this project. If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520, ext. 32.

Sincerely,



for

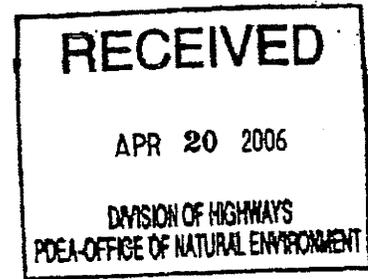
Garland B. Pardue, Ph.D.
Ecological Services Supervisor

cc: Eric Alsmeyer, USACE, Raleigh, NC
John Thomas, USACE, Raleigh, NC
Richard Spencer, USACE, Wilmington, NC
John Hennessy, NCDWQ, Raleigh, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Militscher, USEPA, Raleigh, NC



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726
April 13, 2006



Gregory J. Thorpe, Ph.D.
North Carolina Department of Transportation
Project Development and Environmental Analysis
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

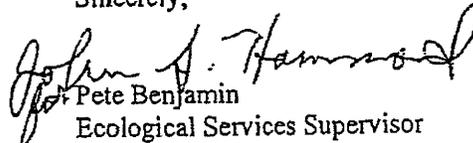
Dear Dr. Thorpe:

This letter is in response to your letter of April 5, 2006 which provided the U.S. Fish and Wildlife Service (Service) with the biological determination of the North Carolina Department of Transportation (NCDOT) that the replacement of Bridge No. 336 on SR 1301 over Terrible Creek in Wake County (TIP No. B-4302) may affect, but is not likely to adversely affect the federally endangered dwarf wedgemussel (*Alasmidonta heterodon*). In addition, NCDOT has determined that the project will have no effect on the federally protected bald eagle (*Haliaeetus leucocephalus*), red-cockaded woodpecker (*Picoides borealis*) and Michaux's sumac (*Rhus michauxii*). These comments are provided in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

According to information provided, a mussel survey was conducted at the project site on November 19, 2004. The survey extended 100 meters upstream and 400 meters downstream of SR 1301. No dwarf wedgemussels were found. Based on the information provided and other information available, the Service concurs with your determination that the proposed bridge replacement may affect, but is not likely to adversely affect the dwarf wedgemussel. Due to the lack of habitat, the Service concurs with your determination that the project will have no effect on the bald eagle and red-cockaded woodpecker. In addition, based on information provided to the Service in June 2004, the Service concurs that the project will have no effect on Michaux's sumac. We believe that the requirements of section 7(a)(2) of the ESA have been satisfied. We remind you that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered in this review; (2) this action is subsequently modified in a manner that was not considered in this review; or (3) a new species is listed or critical habitat determined that may be affected by this identified action.

The Service appreciates the opportunity to review this project. If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520 (Ext. 32).

Sincerely,


Pete Benjamin
Ecological Services Supervisor

cc: Eric Alsmeyer, USACE, Raleigh, NC
Nicole Thomson, NCDWQ, Raleigh, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Militscher, USEPA, Raleigh, NC
John Sullivan, FHWA, Raleigh, NC



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

April 5, 2006

Pete Benjamin
US Fish and Wildlife Service
PO Box 33726
Raleigh, NC 27636-3726

Subject: Biological Concurrence Request for the proposed replacement of Bridge No. 336 over Terrible Creek on SR 1301, Wake County; Federal Aid Project No. BRZ-1301 (1), State Project No. 8.2409601, WBS Element 33639.1.1, Division 5, TIP No. B-4302

Dear Sir:

The purpose of this letter is to summarize federally protected species surveys to date and to request concurrence from the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 of the Endangered Species Act, as amended (16 U.S.C. 1531 *et seq.*) (ESA).

The Natural Resource Technical Report (NRTR) for this project was completed in September 2004. The USFWS website (updated March 14, 2006) and the March 8, 2006 list of endangered and threatened species for Wake County consists of the bald eagle (*Haliaeetus leucocephalus*), red-cockaded woodpecker (RCW) (*Picoides borealis*), Michaux's sumac (*Rhus michauxii*), and the dwarf wedgemussel (*Alasmidonta heterodon*).

Biological conclusions of "No Effect" were found for both the red-cockaded woodpecker and the bald eagle. There is no suitable habitat for the RCW within the project area. The North Carolina Natural Heritage Program (NCNHP) database confirmed that no RCWs have been identified within a 2-mile radius. There is no suitable habitat within 1-mile of the project area for the bald eagle. The NCNHP database confirmed that no bald eagles have been identified within 1-mile of the project study area.

USFWS issued a letter of concurrence for the biological conclusion of "May affect, not likely to adversely affect" for Michaux's sumac on June 17, 2004. However, due to a change in

terminology, the biological conclusion for Michaux's sumac has been changed to "No Effect."

The most recent survey completed for Michaux's sumac was June 1, 2004. The project area does have suitable habitat for the Michaux's sumac, however, no species were found during the site

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:
PARKER LINCOLN BUILDING
2728 CAPITAL BLVD, SUITE 240
RALEIGH NC 27604

visit. Additional surveys will be performed during the appropriate survey window (May-October) prior to the project let date.

Surveys for the dwarf wedgemussel were performed within the project area on November 19, 2004 by biologists from the Cantena Group and NCDOT. No dwarf wedgemussels were found and a biological conclusion of "May affect, not likely to adversely affect" was issued (see attached report). The project crossing is located between a pond, located 2-miles upstream, and an impounded beaver area of the creek. The upstream portion habitat consisted of patches of coarse sand and gravel. However, beaver dams constructed in the downstream portion created a slack-water habitat dominated by silt and muck substrates.

A total of 9 person hours of survey time were spent actively surveying for freshwater mussels from a point approximately 400-meters downstream and 100-meters upstream using visual and tactile methods. Terrible Creek does support freshwater mussels, a total of 549 elliptio mussels (*Elliptio* spp.) were found within the survey area. The majority of those were found in the upstream portion of the project area and the number of mussels steadily decreased as the habitat declined the further one surveyed below the bridge.

Dwarf wedgemussels have never been found in Terrible Creek. One was found 15 years ago, 15 miles downstream of the proposed bridge, in Middle Creek (to which Terrible Cr. flows). According to NCNHP and North Carolina Wildlife Resource records, no dwarf wedgemussels have been identified within 1-mile of the project study area. While Terrible Creek does support freshwater mussels, considering the habitat conditions and the survey results it is unlikely that the dwarf wedgemussel occurs within the surveyed portion of Terrible Creek. Therefore, a biological conclusion of "May affect, not likely to adversely affect," has been given.

The USFWS listing of protected species and current Biological Conclusions are listed in the following table.

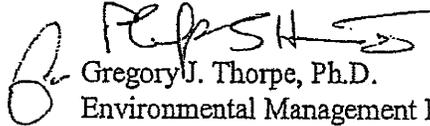
Federally Protected Species for Randolph County

Common Name	Scientific Name	Status	Habitat	Biological Conclusion
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	No	No Effect
Red-cockaded woodpecker	<i>Picoides borealis</i>	Endangered	No	No Effect
Michaux's sumac	<i>Rhus michauxii</i>	Endangered	Yes	No Effect
Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	Endangered	Yes	May affect, not likely to adversely affect

Based on our surveys, the project area does not contain any federally listed species known to occur in Wake County. The NCDOT concludes that the project will have biological conclusions of "May Affect, Not Likely to Adversely Affect" for the dwarf wedgemussel and a "No Effect" for the bald eagle, red-cockaded woodpecker, and Michaux's sumac. NCDOT believes that the requirements of Section 7 (a)(2) of the ESA have been satisfied and hereby request your concurrence.

Thank you for your time. Please contact Erica McLamb at (919) 715-1521 if you have any questions concerning this request.

Sincerely,



Gregory J. Thorpe, Ph.D.

Environmental Management Director, PDEA

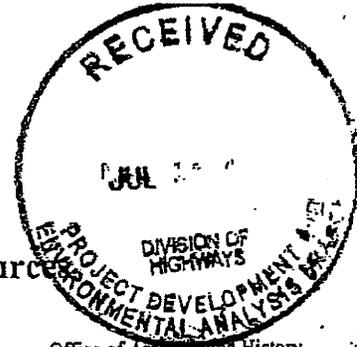
cc: without attachments

Eric Alsmeyer, USACE

✓Theresa Ellerby, PDEA Project Engineer

Logan Williams, NCDOT Natural Environment Unit

File-B-4302



North Carolina Department of Cultural Resources
 State Historic Preservation Office
 David L.S. Brook, Administrator

Michael F. Easley, Governor
 Lisbeth C. Evans, Secretary
 Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
 Division of Historical Resources

July 12, 2004

MEMORANDUM

TO: Greg Thorpe, PhD
 Project Development & Environmental Analysis

FROM: David Brook *David Brook*

SUBJECT: Historic Architectural Resources Survey Report, Replace Bridge No. 336 on SR 1301 Over Terrible Creek, B-4302, Wake County, ER04-0395

Thank you for your letter of May 20, 2004, concerning the above project.

For purposes of compliance with Section 106 of the National Historic Preservation Act, we concur that the following property is eligible for listing in the National Register of Historic Places under the criterion cited:

The Johnson Farm, east side of SR 1301 and south of Terrible Creek, Fuquay-Varina vicinity, is eligible for the National Register under Criteria A: Agriculture and Commerce and C. Architecture, as an intact farm complex. Comprised of eighty acres, the land has been in continuous use as a farm since the eighteenth century. It includes fields, woodlands, and well-preserved houses and outbuildings, illustrating traditional building types and popular designs. The structures include:

- The Etheldred Jones House
- The William Wesley Johnson House
- The Log Cabin
- Smokehouse
- Well
- Ice House
- Shop/Standard Homes Plan Office
- Barn
- Print Shop (non-contributing)
- Spring
- Late 18th-century roadbed
- Cemetery
- Modern House (non-contributing)

	Location	Mailing Address	Telephone/Fax
ADMINISTRATION	507 N. Blount Street, Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-4763/733-8653
RESTORATION	515 N. Blount Street, Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4613	(919)733-6547/715-4801
SURVEY & PLANNING	515 N. Blount Street, Raleigh, NC	4617 Mail Service Center, Raleigh NC 27699-4618	(919)733-6545/715-4801

We concur with the proposed National Register boundary as described and delineated in the survey report.

For purposes of compliance with Section 106 of the National Historic Preservation Act, we concur that the following district is listed in the National Register of Historic Places but is no longer eligible for this status because of a loss of integrity:

Jones-Johnson-Ballentine Historic District, SR 1301 at Terrible Creek, Fuquay-Varina vicinity.

However, the individual properties within the district may still be eligible for listing in the National Register and should be re-evaluated, if they will be affected.

For purposes of compliance with Section 106 of the National Historic Preservation Act, we concur that the following property is not eligible for listing in the National Register of Historic Places:

Bridge No. 336 on SR 1301 over Terrible Creek.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation. If you have questions concerning this request, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future communication concerning this project, please refer to the above tracking number.

cc: Mary Pope Furr

CONCURRENCE FORM FOR ASSESSMENT OF EFFECTS

Project Description: Replace Bridge No. 336 on SR 1301 over Terrible Creek

On August 30, 2004, representatives of the

- North Carolina Department of Transportation (NCDOT)
- Federal Highway Administration (FHWA)
- North Carolina State Historic Preservation Office (HPO)
- Other

Reviewed the subject project and agreed

- There are no effects on the National Register-listed property/properties located within the project's area of potential effect and listed on the reverse.
- There are no effects on the National Register-eligible property/properties located within the project's area of potential effect and listed on the reverse.
- There is an effect on the National Register-listed property/properties located within the project's area of potential effect. The property/properties and the effect(s) are listed on the reverse.
- There is an effect on the National Register-eligible property/properties located within the project's area of potential effect. The property/properties and effect(s) are listed on the reverse.

Signed:

Renne Sandbeck *Aug. 30, 2004*
 Representative, NCDOT Date

[Signature] *8/30/04*
 FHWA, for the Division Administrator, or other Federal Agency Date

Evin O. Kane *8/30/04*
 Representative, HPO Date

Renee Medkiff-Easley *8/30/04*
 State Historic Preservation Officer Date

Federal Aid #BRZ-1301(2)

TIP # B-4302

County: Wake

Properties within the area of potential effect for which there is no effect. Indicate if property is National Register-listed (NR) or determined eligible (DE).

Properties within the area of potential effect for which there is an effect. Indicate property status (NR or DE) and describe the effect.

N.B.: Alternative B, if chosen, will require a Certificate of Appropriateness. No adverse effect for Alternatives A & C.

→ Jones-Johnson - Bulkentine (NRHD)
Jones-Johnson Farm (LD)

Reason(s) why the effect is not adverse (if applicable).

Initialed:

NCDOT JPSS

FHWA BVA

HPO EOK



North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

February 27, 2004



Dr. Gregory J. Thorpe
N.C. Department of Transportation
Project Development and Environmental Analysis
1548 MSC
Raleigh, NC 27699-1548

Subject: Replacement of Bridges in Alamance, Chatham, Durham, Orange, and Wake counties

Dear Dr. Thorpe:

The Natural Heritage Program has no record of rare species, significant natural communities, or priority natural areas at the site nor within a mile of the project area, for the projects listed below:

- B-4002, Alamance County, Bridge No. 96 over Meadow Creek on SR 2116 (Preacher Holmes Road)
- B-4063, Chatham County, Bridge No. 20 over Sandy Branch on NC 902
- B-4109, Durham County, Bridge No. 120 over Mud Creek on SR 1303 (Pickett Road)
- B-4300, Wake County, Bridge No. 29 over Clarks Creek on SR 1007 (Poole Road)
- B-4301, Wake County, Bridge No. 229 over Poplar Creek on SR 1007 (Poole Road)
- B-4302, Wake County, Bridge No. 336 over Terrible Creek on SR 1301 (Sunset Lake Road).

Our Program does have records of rare species, significant natural communities, or priority natural areas at the site or within a mile of the project area, for the projects listed below:

- B-4216, Orange County, Bridge No. 66 over Strouds Creek on SR 1002 (St. Marys Road). This site lies just upstream of the Eno River, where there are numerous rare aquatic animal species. Species recorded at the confluence of Strouds Creek and the river (at Lawrence Road) are –
 - yellow lampmussel (*Lampsilis cariosa*), State Endangered and Federal Species of Concern
 - eastern lampmussel (*Lampsilis radiata radiata*), State Threatened
 - notched rainbow (*Villosa constricta*), State Special Concern
 - Neuse River waterdog (*Necturus lewisi*), State Special Concern

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 | FAX: 919-715-3060 | Internet: www.enr.state.nc.us/ENR/

One
North Carolina
Naturally

B-4303, Wake County, Bridge No. 102 over Lower Bartons Creek on SR 1844 (Mt. Vernon Church Road). The Lower Barton Creek Ultramafic Slopes natural area lies on the south side of the road; this is an unprotected site of Local significance. Just downstream of the bridge is the following –

Carolina ladle crayfish (*Cambarus davidi*), State Significantly Rare

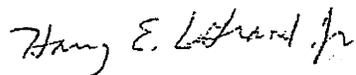
B-4304, Wake County, Bridge No. 143 over Beaver Dam Creek on SR 2217 (Old Milburnie Road). There is a vague, historic record of the following, just downstream –
veined skullcap (*Scutellaria nervosa*), State Significantly Rare

B-4592, Orange County, Bridge No. 64 over the Eno River on SR 1561 (Lawrence Road). See comments for project B-4216. This site is a few miles above Eno River State Park. Also, a tract just upstream of the bridge has been recently acquired, or is in the process of being acquired. In addition, the section of the Eno River from Hillsborough to the confluence with the Neuse River is a Nationally significant aquatic habitat, for many additional rare species than those listed above.

Our program recommends that NC DOT enact strong sedimentation controls to ensure that populations of these rare species, and particularly the water quality of the Eno River, not be impacted during the bridge replacements. The use of Natural Heritage Program data should not be substituted for actual field surveys, particularly if the project area contains suitable habitat for rare species, significant natural communities, or priority natural areas.

You may wish to check the Natural Heritage Program database website at www.ncsparks.net/nhp/search.html for a listing of rare plants and animals and significant natural communities in the county and on the topographic quad map. Please do not hesitate to contact me at 919-715-8697 if you have questions or need further information.

Sincerely,



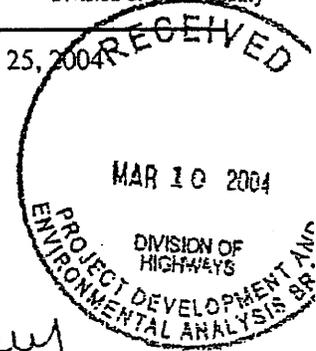
Harry E. LeGrand, Jr., Zoologist
Natural Heritage Program

HEL/hel

cc: Brian Strong, Division of Parks and Recreation, Resource Management Program
David Cook, Superintendent, Eno River State Park



February 25, 2004



MEMORANDUM

TO: Gregory J. Thorpe, PhD, Director
NCDOT Project Development and Environmental Analysis Branch

FROM: Robert Ridings, Env. Tech., DWQ 401 Unit *Robert Ridings*

THROUGH: John Hennessy, Supervisor, DWQ 401 Transportation Unit *John Hennessy*

SUBJECT: Scoping Review of NCDOT's proposed bridge replacement projects: B-4002, B-4109, B-4063, B-4216, B-4300, B-4301, B-4302, B-4303, B-4304, B-4592, and B-3528

In reply to your correspondence dated February 5, 2004 (received February 11, 2004) to John Hennessy, in which you requested comments for the referenced projects, the NC Division of Water Quality has the following comments:

1. General Comments Regarding Bridge Replacement Projects

1. If corrugated metal pipe arches, reinforced concrete pipes, or concrete box culverts are used to replace the bridge, then DWQ recommends the use of Nationwide Permit No. 14 rather than Nationwide Permit 23.
2. Bridge demolition should be performed using Best Management Practices developed by NCDOT.
3. DWQ prefers spanning structures. Spanning structures usually do not require work within the stream and do not require stream channel realignment. The horizontal and vertical clearances provided by bridges allows for human and wildlife passage beneath the structure, does not block fish passage, and does not block navigation by canoeists and boaters.
4. Bridge deck drains should not discharge directly into the stream; stormwater should be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to NCDOT Best Management Practices for the Protection of Surface Waters
5. Live concrete should not be allowed to contact the water in or entering into the stream. Concrete is mostly made up of lime (calcium carbonate) and when in a dry or wet state (not hardened) calcium carbonate is very soluble in water and has a pH of approximately 12. In an unhardened state concrete or cement will change the pH of fresh water to very basic and will cause fish and other macroinvertebrate kills.
6. If possible, bridge supports (bents) should not be placed in the stream.
7. If temporary access roads or detours are constructed, they should be removed back to original ground elevations immediately upon the completion of the project. Disturbed areas should be seeded or mulched to stabilize the soil and native tree species should be planted with a spacing of not more than 10'x10'. If possible, when using temporary structures the area should be cleared but not grubbed. Clearing the area with chain saws, mowers, bush-hogs, or other mechanized equipment and leaving the stumps and root mat intact, allows the area to re-vegetate naturally and minimizes disturbed soil.



8. A clear bank (rip rap-free) area of at least 10 feet should remain on each side of the stream underneath the bridge.
9. Sedimentation and erosion control measures sufficient to protect water resources must be implemented prior to any ground disturbing activities. Structures should be *maintained regularly*, especially following rainfall events.
10. Bare soil should be stabilized through vegetation or other means as quickly as feasible to prevent sedimentation of water resources.
11. All work in or adjacent to stream waters should be conducted in a dry work area. Sandbags, rock berms, cofferdams, or other diversion structures should be used where possible to prevent excavation in flowing water.
12. Heavy equipment should be operated from the bank rather than in stream channels in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into streams. This equipment should be inspected daily and maintained to prevent contamination of surface waters from leaking fuels, lubricants, hydraulic fluids, or other toxic materials.

II. General Comments if Replacing the Bridge with a Culvert

1. The culvert must be designed to allow for aquatic life and fish passage. Generally, the culvert or pipe invert should be buried at least 1 foot below the natural streambed (measured from the natural thalweg depth). If multiple barrels are required, barrels other than the base flow barrel(s) should be placed on or near stream bankfull or floodplain bench elevation (similar to Lyonsfield design). These should be reconnected to floodplain benches as appropriate. This may be accomplished by utilizing sills on the upstream end to restrict or divert flow to the base flow barrel(s). Silled barrels should be filled with sediment so as not to cause noxious or mosquito breeding conditions. Sufficient water depth should be provided in the base flow barrel during low flows to accommodate fish movement. If culverts are longer than 40-50 linear feet, alternating or notched baffles should be installed in a manner that mimics existing stream pattern. This should enhance aquatic life passage: 1) by depositing sediments in the barrel, 2) by maintaining channel depth and flow regimes, and 3) by providing resting places for fish and other aquatic organisms. In essence, the base flow barrel(s) should provide a continuum of water depth and channel width without substantial modifications of velocity.
2. If multiple pipes or cells are used, at least one pipe or box should be designed to remain dry during normal flows to allow for wildlife passage.
3. Culverts or pipes should be situated along the existing channel alignment whenever possible to avoid channel realignment. Widening the stream channel must be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.
4. Riprap should not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be professionally designed, sized, and installed.

In most cases, we prefer the replacement of the existing structure at the same location with road closure. If road closure is not feasible, a temporary detour should be designed and located to avoid wetland impacts, minimize the need for clearing and to avoid destabilizing stream banks. If the structure will be on a new alignment, the old structure should be removed and the approach fills removed from the 100-year floodplain. Approach fills should be removed down to the natural ground elevation. The area should be stabilized with grass and planted with native tree species. Tall fescue should not be used in riparian areas. If the area that is reclaimed was previously wetlands, NCDOT should restore the area to wetlands. If successful, the site may be used as wetland mitigation for the subject project or other projects in the watershed.

III. Project-Specific Comments

B-4002, Bridge 96, Varnals Creek, Alamance County

Varnals Creek is classified as C NSW and is in the Cape Fear River Basin. DWQ does not have any special concerns. Please refer to general recommendations listed above.

B-4109, Bridge 120, Mud Creek, Durham County

Mud Creek is classified as C NSW and is in the Cape Fear River Basin. DWQ does not have any special concerns. Please refer to general recommendations listed above.

B-4063, Bridge 20, Sandy Branch, Chatham County

Sandy Branch is classified as C and is in the Cape Fear River Basin. DWQ does not have any special concerns. Please refer to general recommendations listed above.

B-4216, Bridge 66, Strouds Creek, Orange County

Strouds Creek is classified as C NSW and is in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

B-4300, Bridge 29, Clark's Creek, Wake County

Clark's Creek is not in DWQ records. Mango Creek, upstream of this project, and Poplar Creek, downstream from this project, are both classified as C NSW. This project is in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

B-4301, Bridge 229, Poplar Creek, Wake County

Poplar Creek is classified as C NSW and is in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

B-4302, Bridge 336, Terrible Creek, Wake County

Terrible Creek is classified as B NSW and is in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

B-4303, Bridge 102, Lower Bartons Creek, Wake County

Lower Bartons Creek is classified as WS-IV NSW. There are 30-foot vegetated buffer requirements in WS waters in addition to the requirements to minimize storm water runoff and maximize use of BMPs. Refer to 15A NCAC 2B .0216(3)(b)(i)(F) and (G). This project is also in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

B-4304, Bridge 143, Beaverdam Creek, Wake County

Beaverdam Creek is classified as C NSW and is in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules. This creek is also on the 303(d) waters list. NCDOT shall maximize the use of Best Management Practices for all work crossing or draining to the Critical Area of the Water Supply Watershed and 303(d)-listed waters. In addition, NCDOT shall strictly adhere to "Design Standards in Sensitive Watersheds" (15A NCAC 04B .0124).

B-4592, Bridge 64, Eno River, Orange County

Eno River is classified as WS-IV/B, NSW. There are 30-foot vegetated buffer requirements in WS waters in addition to the requirements to minimize storm water runoff and maximize use of BMPs. Refer to 15A NCAC 2B .0216(3)(b)(i)(F) and (G). This project is also in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

B-3528, Bridge 429, Sycamore Creek, Wake/Durham Counties

Sycamore Creek is classified as B NSW and is in the Neuse River Basin. Please follow guidelines for avoid and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

Thank you for requesting our input at this time. The DOT is reminded that issuance of a 401 Water Quality Certification requires that appropriate measures be instituted to ensure that water quality standards are met and designated uses are not degraded or lost. If you have any questions or require additional information, please contact Robert Ridings at (919) 733-9817 or John Hennessy at (919) 733-5694.

cc: USACE Raleigh Field Office
File Copy



North Carolina Department of Cultural Resources
State Historic Preservation Office

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary
Office of Archives and History

Division of Historical Resources
David L. S. Brook, Director

March 4, 2004

MEMORANDUM

TO: Stacey Baldwin
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: David Brook *David Brook*

SUBJECT: Request for comments on Bridge Replacement projects
B-4002, Alamance County
B-4063, Chatham County
B-4109, Durham County
B-4216, Orange County
B-4300, Wake County
B-4301, Wake County
B-4302, Wake County
B-4303, Wake County
B-4304, Wake County
B-4592, Orange County
ER03-0389 through ER03-0398

Thank you for your letters of February 5, 2004, concerning the above projects.

We are unable to comment on the potential effect of these projects on historic resources until we receive further information.

Please forward a labeled 7.5 minute USGS quadrangle map for each of the above projects clearly indicating the project vicinity, location, and termini. In addition, please include the name of the quadrangle map.

There are no known archaeological sites within the proposed project area. Based on our knowledge of the area, it is unlikely that any archaeological resources that may be eligible for conclusion in the National Register of Historic Places will be affected by the project. We, therefore, recommend that no archaeological investigation be conducted in connection with this project.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

www.hpo.dcr.state.nc.us

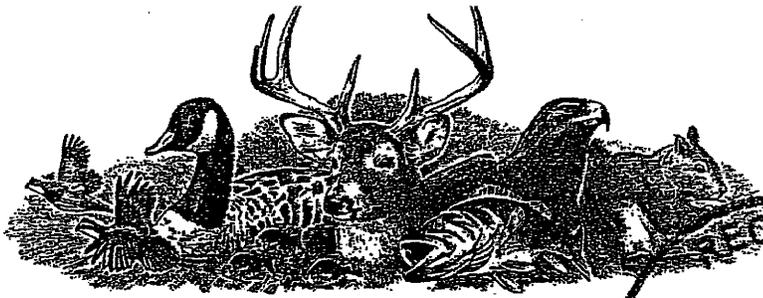
	Location	Mailing Address	Telephone/Fax
ADMINISTRATION	507 N. Blount St, Raleigh, NC	4617 Mail Service Center, Raleigh, NC 27699-4617	(919) 733-4763 • 733-8653
RESTORATION	515 N. Blount St, Raleigh, NC	4617 Mail Service Center, Raleigh, NC 27699-4617	(919) 733-6547 • 715-4801
STUDY & PLANNING	515 N. Blount St, Raleigh, NC	4617 Mail Service Center, Raleigh, NC 27699-4617	(919) 733-4763 • 715-4801

March 4, 2004

Page 2

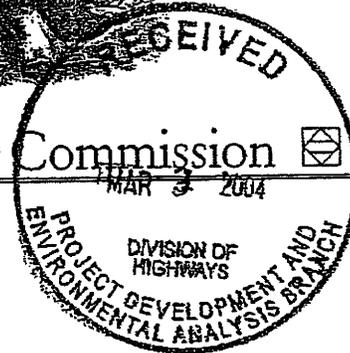
Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future communication concerning this project, please cite the above-referenced tracking number.

cc: Mary Pope Furr, NCDOT
Matt Wilkerson, NCDOT



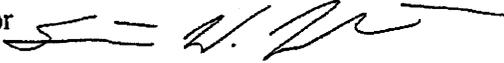
☒ North Carolina Wildlife Resources Commission ☒

Charles R. Fullwood, Executive Director



MEMORANDUM

TO: Gregory J. Thorpe
Environmental Management Director, PDEA

FROM: Travis Wilson, Highway Project Coordinator
Habitat Conservation Program 

DATE: February 27, 2004

SUBJECT: NCDOT Bridge Replacements in Alamance, Chatham, Durham, Orange, and Wake counties. TIP Nos. B-4002, B-4063, B-4109, B-4216, B-4300, B-4301, B-4302, B-4303, B-4304, and B-4592.

Biologists with the N. C. Wildlife Resources Commission (NCWRC) have reviewed the information provided and have the following preliminary comments on the subject project. Our comments are provided in accordance with provisions of the National Environmental Policy Act (42 U.S.C. 4332(2)(c)) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

Our standard recommendations for bridge replacement projects of this scope are as follows:

1. We generally prefer spanning structures. Spanning structures usually do not require work within the stream and do not require stream channel realignment. The horizontal and vertical clearances provided by bridges allows for human and wildlife passage beneath the structure, does not block fish passage, and does not block navigation by canoeists and boaters.
2. Bridge deck drains should not discharge directly into the stream.
3. Live concrete should not be allowed to contact the water in or entering into the stream.
4. If possible, bridge supports (bents) should not be placed in the stream.

5. If temporary access roads or detours are constructed, they should be removed back to original ground elevations immediately upon the completion of the project. Disturbed areas should be seeded or mulched to stabilize the soil and native tree species should be planted with a spacing of not more than 10'x10'. If possible, when using temporary structures the area should be cleared but not grubbed. Clearing the area with chain saws, mowers, bush-hogs, or other mechanized equipment and leaving the stumps and root mat intact, allows the area to revegetate naturally and minimizes disturbed soil.
6. A clear bank (riprap free) area of at least 10 feet should remain on each side of the stream underneath the bridge.
7. In trout waters, the N.C. Wildlife Resources Commission reviews all U.S. Army Corps of Engineers nationwide and general '404' permits. We have the option of requesting additional measures to protect trout and trout habitat and we can recommend that the project require an individual '404' permit.
8. In streams that contain threatened or endangered species, NCDOT biologist Mr. Hal Bain should be notified. Special measures to protect these sensitive species may be required. NCDOT should also contact the U.S. Fish and Wildlife Service for information on requirements of the Endangered Species Act as it relates to the project.
9. In streams that are used by anadromous fish, the NCDOT official policy entitled "Stream Crossing Guidelines for Anadromous Fish Passage (May 12, 1997)" should be followed.
10. In areas with significant fisheries for sunfish, seasonal exclusions may also be recommended.
11. Sedimentation and erosion control measures sufficient to protect aquatic resources must be implemented prior to any ground disturbing activities. Structures should be maintained regularly, especially following rainfall events.
12. Temporary or permanent herbaceous vegetation should be planted on all bare soil within 15 days of ground disturbing activities to provide long-term erosion control.
13. All work in or adjacent to stream waters should be conducted in a dry work area. Sandbags, rock berms, cofferdams, or other diversion structures should be used where possible to prevent excavation in flowing water.
14. Heavy equipment should be operated from the bank rather than in stream channels in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into streams.
15. Only clean, sediment-free rock should be used as temporary fill (causeways), and should be removed without excessive disturbance of the natural stream bottom when construction is completed.
16. During subsurface investigations, equipment should be inspected daily and maintained to prevent contamination of surface waters from leaking fuels, lubricants, hydraulic fluids, or other toxic materials.

If corrugated metal pipe arches, reinforced concrete pipes, or concrete box culverts are used:

1. The culvert must be designed to allow for aquatic life and fish passage. Generally, the culvert or pipe invert should be buried at least 1 foot below the natural streambed (measured from the natural thalweg depth). If multiple barrels are required, barrels other than the base flow barrel(s) should be placed on or near stream bankfull or floodplain bench elevation (similar to Lyonsfield design). These should be reconnected to floodplain benches as appropriate. This may be accomplished by utilizing sills on the upstream and downstream ends to restrict or divert flow to the base flow barrel(s). Silled barrels should be filled with sediment so as not to cause noxious or mosquito breeding conditions. Sufficient water depth should be provided in the base flow barrel(s) during low flows to accommodate fish movement. If culverts are longer than 40-50 linear feet, alternating or notched baffles should be installed in a manner that mimics existing stream pattern. This should enhance aquatic life passage: 1) by depositing sediments in the barrel, 2) by maintaining channel depth and flow regimes, and 3) by providing resting places for fish and other aquatic organisms. In essence, base flow barrel(s) should provide a continuum of water depth and channel width without substantial modifications of velocity.
2. If multiple pipes or cells are used, at least one pipe or box should be designed to remain dry during normal flows to allow for wildlife passage.
3. Culverts or pipes should be situated along the existing channel alignment whenever possible to avoid channel realignment. Widening the stream channel must be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.
4. Riprap should not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be professionally designed, sized, and installed.

In most cases, we prefer the replacement of the existing structure at the same location with road closure. If road closure is not feasible, a temporary detour should be designed and located to avoid wetland impacts, minimize the need for clearing and to avoid destabilizing stream banks. If the structure will be on a new alignment, the old structure should be removed and the approach fills removed from the 100-year floodplain. Approach fills should be removed down to the natural ground elevation. The area should be stabilized with grass and planted with native tree species. If the area reclaimed was previously wetlands, NCDOT should restore the area to wetlands. If successful, the site may be utilized as mitigation for the subject project or other projects in the watershed.

Project specific comments:

1. B-4002, Alamance County, Bridge No. 96 over Meadow Creek on SR 2116. We recommend replacing this bridge with a bridge. Standard recommendations apply.
2. B-4063, Chatham County, Bridge No. 20 over Sandy Branch on NC 902. We recommend replacing this bridge with a bridge. Standard recommendations apply.
3. B-4109, Durham County, Bridge No. 120 over Mud Creek on SR 1303. We recommend replacing this bridge with a bridge. Standard recommendations apply.

4. B-4216, Orange County, Bridge No. 66 over Strouds Creek on SR 1002. We recommend replacing this bridge with a bridge. Due to the close proximity of the Eno River we request conducting a survey for the following state endangered and federal species of concern mussels: Yellow lampmussel and Atlantic pigtoe. Also, a significant fishery for sunfish exists at this site, therefore we request an in-water work moratorium for sunfish from April 1 to June 30. Standard recommendations apply.
5. B-4300, Wake County, Bridge No. 29 over Clarks Creek on SR 1007. We recommend replacing this bridge with a bridge. NCDOT should follow all stream crossing guidelines for anadromous fish passage, including an in-water work moratorium from February 15 to June 30. Standard recommendations apply.
6. B-4301, Wake County, Bridge No. 229 over Poplar Creek on SR 1007. We recommend replacing this bridge with a bridge. NCDOT should follow all stream crossing guidelines for anadromous fish passage, including an in-water work moratorium from February 15 to June 30. Standard recommendations apply.
7. B-4302, Wake County, Bridge No. 336 over Terrible Creek on SR 1301. We recommend replacing this bridge with a bridge. Standard recommendations apply.
8. B-4303, Wake County, Bridge No. 102 over Lower Bartons Creek on SR 1844. We recommend replacing this bridge with a bridge. Standard recommendations apply.
9. B-4304, Wake County, Bridge No. 143 over Beaver Dam Creek on SR 2217. We recommend replacing this bridge with a bridge. Standard recommendations apply.
10. B-4592, Orange County, Bridge No. 64 over the Eno River on SR 1561. We recommend replacing this bridge with a bridge. We request conducting a survey for the following state endangered and federal species of concern mussels: Yellow lampmussel and Atlantic pigtoe. Also, a significant fishery for sunfish exists at this site, therefore we request an in-water work moratorium for sunfish from April 1 to June 30. Standard recommendations apply.

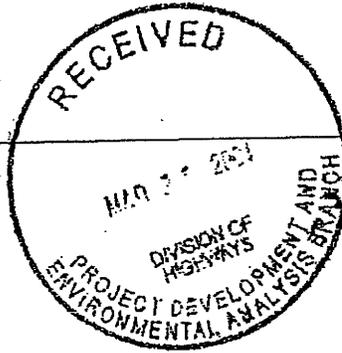
NCDOT should routinely minimize adverse impacts to fish and wildlife resources in the vicinity of bridge replacements. Restoring previously disturbed floodplain benches should narrow and deepen streams previously widened and shallowed during initial bridge installation. NCDOT should install and maintain sedimentation control measures throughout the life of the project and prevent wet concrete from contacting water in or entering into these streams. Replacement of bridges with spanning structures of some type, as opposed to pipe or box culverts, is recommended in most cases. Spanning structures allow wildlife passage along streambanks and reduce habitat fragmentation.

If you need further assistance or information on NCWRC concerns regarding bridge replacements, please contact me at (919) 528-9886. Thank you for the opportunity to review and comment on these projects.

Cc: Gary Jordan, U.S. Fish and Wildlife Service, Raleigh



WAKE COUNTY
PUBLIC SCHOOL SYSTEM



TRANSPORTATION DEPARTMENT

1551 ROCK QUARRY ROAD
RALEIGH, NORTH CAROLINA 27610
PHONE: 919.856.8050
FAX: 919.856.7773

March 3, 2004

Gregory Thorpe
North Carolina Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Mr. Thorpe:

Outlined below are school bus bridge crossings and projected impact Bridge Replacement Projects will have on our ability to transport children to required destinations.

B-4300 to replace Bridge#29: 46 daily school bus crossings which will severely impact school bus routing.

B- 4301 to replace Bridge#229: 46 daily school bus crossings which will severely impact school bus routing.

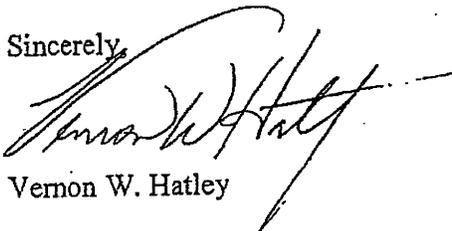
B-4302 to replace Bridge #336: 52 daily school bus crossings which will severely impact school bus routing.

B-4303 to replace Bridge #102: 16 daily school bus crossing which will moderately impact school bus routing.

B-3528 to replace Bridge #429: 6 daily school bus crossings which will minimally impact school bus routing.

Thanks you for soliciting our input.

Sincerely,



Vernon W. Hatley

VWH/as

From: Mike Sorensen [msorensen@fuquay-varina.org]
Sent: Wednesday, September 08, 2004 5:06 PM
To: tellerby@dot.state.nc.us
Cc: Pam Williams
Subject: Replacement of a Bridge No.336 (Sunset Lake Road) over Terrible Creek
Theresa,

I received copies of the proposed alternates to replace the bridge on Sunset Lake Road over Terrible Creek from Pamela Williams with Mulkey Engineering & Consultants and I presented these alternates to the Fuquay-Varina Town Board of Commissioners at their September 7, 2004 meeting. Upon review of the three (3) alternatives the Town Board supports alternate 'B' for the following reasons:

- Due to the amount of traffic that travels on Sunset Lake Road, the Town does not favor a detour using other streets and thoroughfares. Sunset Lake Road is a major thoroughfare for north and south bound traffic and to funnel traffic onto Broad Street (NC 55), Stewart Street or Johnson Pond Road will create major traffic congestion on these roads that already experience traffic problems and delays. With the exception of Broad Street, which is being improved, Stewart Street and Johnson Road are not adequately designed to handle the additional traffic that would result from the closing of the bridge on Sunset Lake Road. In addition, NCDOT is also planning to replace the Wake Chapel Road and bridge across the railroad tracks, which will require an off-site traffic detour. The Town would not want both bridges closed with off-site detours at the same time. This situation would instantly create a traffic 'bottleneck'. The Town request that the bridge replacement on Sunset Lake Road be constructed on a schedule that will not conflict with the Wake Chapel Road bridge replacement.
- Emergency service response time is a concern for fire and police with the Ballentine Elementary School on the north side of Terrible Creek. If the bridge is closed completely the response time would be greatly increased for emergency services to address any emergency in a timely manner.
- An important factor for the Town is the ability to have a safe approach to and from the bridge. The alignment of Sunset Lake Road on either side of the bridge is not the best for traffic movement crossing the bridge. With the replacement of the bridge a better alignment and raising the bridge several feet would improve the safety of traffic crossing the bridge.

Alternate 'B' appears to address all of the concerns above, with an on-site detour to allow reasonable traffic movement and preserve emergency response times for the area and provides an alignment that would be safer for traffic than is currently existing.

If you have any questions or comments regarding the Town's recommendation or need additional information please contact me at your convenience (552-1409)

Michael Sorensen
Planning Director
Town of Fuquay-Varina

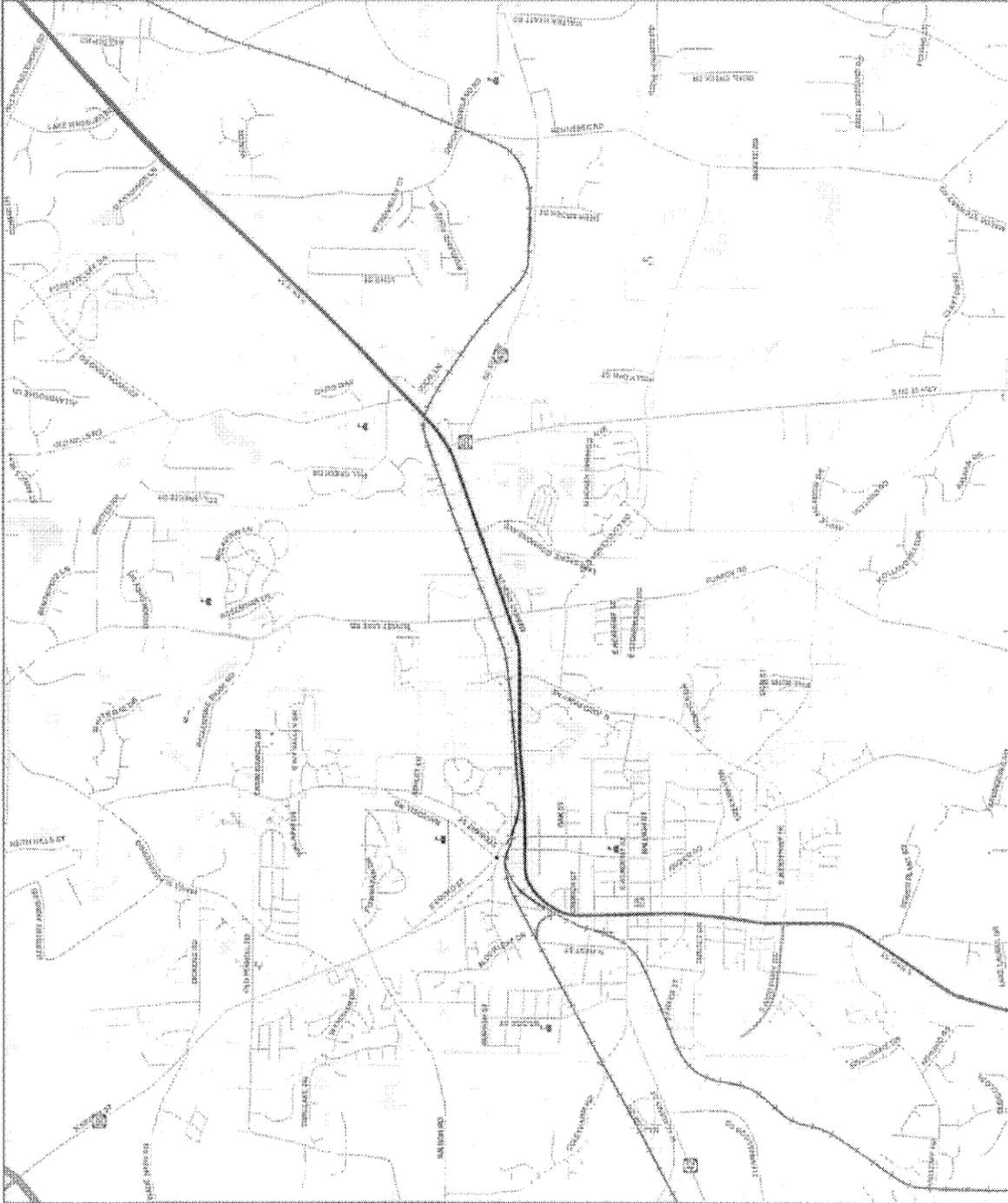
FIGURE 6.2

Existing Bicycle Facilities

- Study Area
- Town of Fuquay-Varina
- County Boundary
- Bodies of Water
- FieldWorkData
- Blue Lanes
- Bicycle Lane on One Side
- Bicycle Lanes on Both Sides of Road
- Existing School
- Future School
- Library



Fuquay-Varina
Community
Transportation Plan



Proposed Bicycle Facilities

-  Study Area
 -  County Boundary
 -  Town of Fuquay-Varina
 -  Historic District
 -  Parks and Open Space
 -  Existing School
 -  Future School
 -  Library
- Bike Facilities**
-  Proposed Paved Shoulder
 -  Proposed Bike Lane on New Location
 -  Proposed Bike Lane
 -  Proposed Outside Lane on New Location
 -  Proposed Outside Lane
 -  Proposed Greenway
 -  NC State Bike Route 5

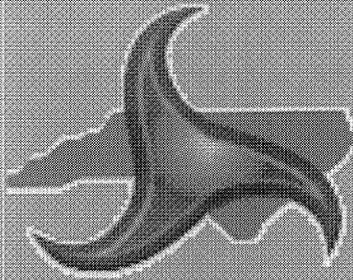


Fuquay-Varina Community Transportation Plan



0 0.4 0.8 1.6 2.4 3.2





Citizens Informational Workshop

Bridge No. 336 on SR 1301 (Sunset Lake Road)
over Terrible Creek

North Carolina Department of Transportation

Workshop Handout

August 16, 2004

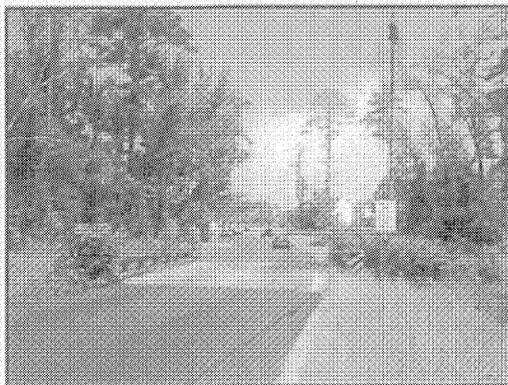
TIP No. B-4302

Welcome to the Citizens Informational Workshop for the replacement of Bridge No. 336 on Sunset Lake Road over Terrible Creek in Wake County.

Around the room you will find maps showing the limits of the proposed project. North Carolina Department of Transportation (NCDOT) representatives are available to answer questions that you might have.

What is the purpose of this meeting?

Your input is a vital part of the project development process. We are here to answer questions, hear your concerns, and to receive comments about the alternatives to replace Bridge No. 336.



What alternatives are proposed for the replacement of Bridge No. 336?

There are three alternatives proposed for replacing the existing structure. The proposed structure is based on a preliminary hydraulic analysis. The length of the new structure may be increased or decreased as necessary to accommodate peak flows as determined by a detailed hydrologic analysis during the final design phase. The structure and the approach roadway from the north will provide three lanes with curb and gutter to tie to the existing three lane section. The approach roadway from the south will taper from three lanes at the structure to the existing two lanes. The approach roadway on the southern approach will provide 8-foot shoulders including 4-foot paved shoulders.

Alternative A replaces the structure on existing alignment. During construction, traffic will be maintained with an off-site detour approximately 3.4 miles in length. The detour will follow US 401 (North Main Street), SR 1404 (Johnson Pond Road), and SR 1407 (Whitted Road). The estimated construction cost is \$1,050,000.

Alternative B replaces the structure on new alignment west of the existing structure. During construction, traffic will be maintained on the existing bridge. The estimated construction cost is \$1,350,000.

Alternative C replaces the structure on existing alignment. During construction, traffic will be maintained with an on-site detour west of the existing bridge. The estimated construction cost is \$1,450,000.

Why is the project needed?

Bridge No. 336 was built in 1950. It is a two-lane facility with a clear roadway width of 24.1 feet. The bridge has two spans and totals 37 feet in length. The deck consists of a reinforced concrete floor on I-beams with concrete railing. The substructure is composed of reinforced concrete caps on timber piles. The bridge is considered functionally obsolete and structurally deficient. The replacement of this inadequate structure will result in safer and more efficient traffic operations.

What is the status?

The preparation of a Categorical Exclusion (CE) document is underway. As part of the development of the CE, the NCDOT is obtaining public input, gathering environmental data, and has developed alternative functional designs.

What is the project schedule?

Right-of-way acquisition is anticipated in fiscal year 2006.

The NCDOT will begin construction in fiscal year 2007.

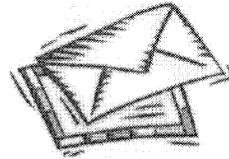
Did you receive a project newsletter?

Please sign in so that you will receive future mailings.



Where should your comments be sent?

A comment form is attached to this sheet. If you would like to submit comments, please complete the form and place it in the comment box or mail it to one of the addresses shown below.



Theresa Ellerby
Project Manager
NCDOT-PDEA
1548 Mail Service Center
Raleigh, NC 27699-1548
Telephone -- (919) 733-7844, Ext. 266
Email: tellerby@dot.state.nc.us

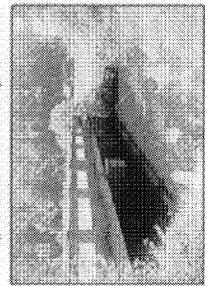
Pamela Williams
Project Manager
Mulkey Engineers and Consultants
P.O. Box 33127
Raleigh, NC 27636-3127
Telephone -- (919) 858-1908
Email: pwilliams@mulkeyinc.com

If you have transportation questions on other projects, call our
Customer Service Center
toll-free number
1-877-DOT-4YOU,
or
visit the NCDOT website at
www.ncdot.org.

Project Introduction

The North Carolina Department of Transportation (NCDOT) is proposing to replace Bridge No. 336 on SR 1301 (Sunset Lake Road) over Terrible Creek. The new bridge will provide safer, more efficient traffic operations.

A Citizens Informational Workshop was held for the project on August 16, 2004 at Ballentine



Elementary School.

The purpose of the workshop was to introduce citizens to the project, provide information on proposed alternatives, and solicit comments. Three alternatives were presented for the bridge replacement. The preferred alternative has now been selected.

Proposed Replacement Structure

The NCDOT proposes to replace Bridge No. 336 with a new structure comprised of two 12-foot travel lanes; a 12-foot center turn lane; and four-foot bicycle lanes, two-foot gutters, and 5.5-foot sidewalks on each side. Standard bicycle safe bridge railing will be provided.

Preferred Alternative

Three build alternatives were studied.

Alternative A replaces the bridge at the existing location. During construction, traffic will be maintained with an off-site detour.

Alternative B replaces the bridge on new alignment west of the existing structure. During construction, traffic will be maintained on the existing bridge.

Alternative C (preferred) replaces the bridge at its existing location. During construction, traffic will be maintained with an on-site detour west of the existing bridge.

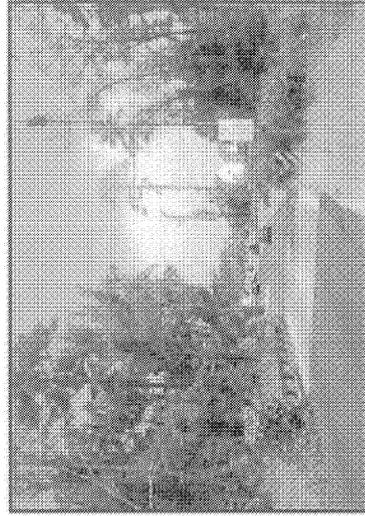
Alternative C was selected as the preferred alternative for the following reasons:

- Lowest amount of permanent impacts to wetlands and Neuse River Basin Riparian Buffers.

Additional Information

Public involvement is an important part of the planning process. The NCDOT encourages citizen involvement on transportation projects, and will consider your suggestions and address all concerns. Please send your comments to one of the contacts listed in this newsletter. Your opinions are important to us!

If you have transportation questions on other projects, call our Customer Service Center toll-free at 1-877-DOT-4YOU, or visit the NCDOT website at www.ncdot.org.



Project Development Process

Step 1

Data Collection

Step 2

Alternatives Development

Step 3

Environmental Analysis

Step 4

Citizens Informational Workshop

Step 5

Selection of Preferred Alternative

Step 6



Complete Environmental Document

Construction & Right-of-Way Cost

Preliminary Cost Estimate

\$1,580,000

Schedule

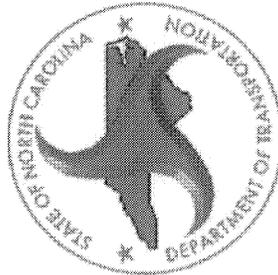
Right-of-Way Acquisition in Fiscal Year 2008

Construction in Fiscal Year 2009



Informational Newsletter

**NCDOT Proposes Replacement
of Bridge No. 336 on
SR 1301 (Sunset Lake Road)
over Terrible Creek,
Wake County, NC
TIP No. B-4302**



February 2007



Ms. Theresa Ellerby
North Carolina Department of Transportation
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, North Carolina 27699-1548



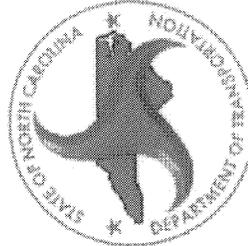
Citizen Name
Address
City

Contact Information

If you have questions or comments regarding this project, please call, write, or e-mail one of the contacts provided below.

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We're on the Web!

www.ncdot.org