MITCHELL COUNTY
BRIDGE NOS. 109 & 110 ON SR 1002 (CRABTREE CREEK ROAD)
OVER CRABTREE CREEK

FEDERAL-AID PROJECT NO. BRZ-1002(9)
STATE PROJECT NO. 8.2880701
TIP NO. B-4202

CATEGORICAL EXCLUSION

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
AND
N.C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

APPROVED:

6/23/04
DATE

for Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development & Environmental Analysis Branch
North Carolina Department of Transportation

6/25/04
DATE

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

MITCHELL COUNTY
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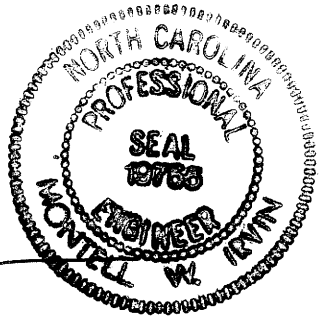

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Ramey Kemp & Associates, Inc.

6-2-4
Date

For the North Carolina Department of Transportation

Vincent J. Rhea, P.E., Project Development Engineer
Project Development and Environmental Analysis Branch

PROJECT COMMITMENTS

MITCHELL COUNTY
BRIDGE NOS. 109 & 110 ON SR 1002 (CRABTREE CREEK ROAD)
OVER CRABTREE CREEK

FEDERAL-AID PROJECT NO. BRZ-1002(9)
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In addition to the standard Nationwide Permit #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, NCDOT's Guidelines for 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:

Division Construction
The NCDOT will observe a moratorium on in-water work between May 1 to July 15 to protect fish spawning.

MITCHELL COUNTY
BRIDGE NOS. 109 & 110 ON SR 1002 (CRABTREE CREEK ROAD)
OVER CRABTREE CREEK

FEDERAL-AID PROJECT NO. BRZ-1002(9)
STATE PROJECT NO. 8.2880701
T.I.P. NO. B-4202

INTRODUCTION

The replacement of Bridge Nos. 109 & 110 located on SR 1002 (Crabtree Creek Road) over Crabtree Creek are included in the North Carolina Department of Transportation (NCDOT) 2004-2010 Transportation Improvement Program (TIP) and in the Federal-Aid Bridge Replacement Program (BRZ-1002(9)). The location is shown in Figure 1.

No substantial impacts are anticipated. The project is classified as a Federal "Categorical Exclusion".

I. PURPOSE AND NEED

The NCDOT Bridge Maintenance Unit records indicate Bridge Nos. 109 & 110 have sufficiency ratings of 45.6 and 25.9, respectively, out of a possible 100 for a new structure. The bridges are considered structurally deficient and functionally obsolete. The replacement of these inadequate structures will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

Bridge Nos. 109 and 110 are located on SR 1002 (Crabtree Creek Road) in rural Mitchell County. Refer to Figure 1 for the project location and Figures 2 and 3 for photos of the existing project study area.

Bridge No. 109 was constructed in 1952. The bridge is currently posted to restrict weight limits to 15 tons for single vehicles (SV) and 18 tons for truck-tractor semi-trailers (TTST). The overall length of the single-span structure is 41 ft. It has a clear roadway width of 19.3 ft that includes two travel lanes over the bridge. The superstructure consists of a timber deck on I-beams. The substructure consists of abutments made of yount masonry. The height from crown to streambed is 9 ft.

Bridge No. 110 was constructed in 1952. The bridge is currently posted to restrict weight limits to 11 tons for single vehicles (SV) and 15 tons for truck-tractor semi-trailers (TTST). The overall length of the single-span structure is 42 ft. It has a clear roadway width of 19.2 ft that includes two travel lanes over the bridge. The superstructure consists of a timber deck on I-beams. The substructure consists of abutments made of yount masonry. The height from crown to streambed is 9 ft.

SR 1002 is classified as a rural local in the Statewide Functional Classification System. The 2001 average daily traffic volume (ADT) is estimated to be 300 vehicles per day (vpd). The percentages of truck traffic are 1 percent TTST vehicles and 2 percent dual-tired vehicles. The projected 2025 ADT is 600 vpd.

The two-lane facility measures approximately 16 ft in width and has 2 ft grassed shoulders on each side of the roadway in the vicinity of the bridges. The horizontal alignment of SR 1002 is poor adjacent to the bridges. There are numerous curves on either side of the bridges. The vertical alignment is generally flat within the project study area. There is no posted speed limit in the immediate vicinity of the bridges. Therefore, the statutory speed limit is 55 miles per hour (mph). Existing right-of-way is approximately 60 ft in width.

There are aerial electrical and telephone services in the vicinity of the bridges. There are no utilities attached to either bridge. Utility impacts are expected to be minimal.

This section of SR 1002 is not part of a designated bicycle route nor is it listed in the Transportation Improvement Program as needing incidental bicycle accommodations. There is no indication that an unusual number of bicyclists use this roadway.

Land use within the project area is a mixture of undeveloped land, rural residential properties, and forest land. There is a large commercial gem mining operation at the intersection of SR 1002 and SR 1100 about one mile south of the project.

According to Mitchell County school officials, two buses cross these bridges in the morning and three buses cross them in the afternoon for a total of five trips per day.

Crash records maintained by the NCDOT indicate there have been no crashes reported in the vicinity of Bridge Nos. 109 and 110 during a recent three year period.

III. ALTERNATIVES

A. Project Description

Based upon the preliminary hydraulic reports, the proposed replacement structures for Bridge Nos. 109 and 110 will consist of a 75 ft bridge and an 80 ft bridge, respectively. The structures will provide two 11 ft travel lanes with 3 ft of lateral clearance on each side of the bridge.

The length and opening size of the proposed structures may increase or decrease as necessary to accommodate peak flows, as determined by a more detailed hydraulic analysis to be performed during the final design phase of the project.

The roadway approaches will provide two 11 ft travel lanes with 5 ft grassed shoulders. The grade will be approximately the same as the existing roadway. The design speed will vary for each alternative.

B. Build Alternatives

Two (2) build alternatives studied for replacing the existing bridges are described below:

Alternative A

Alternative A consists of replacing the bridges in-place with new bridges. During construction, traffic will be maintained by on-site detours east of the existing bridges. The total length of roadway approach work for this alternative is approximately 760 ft. Refer to Figures 4 thru 6 for illustration of this alternative.

The on-site detours will be located 30 to 50 ft east of the proposed bridges. The temporary structures will consist of two 84 inch CMP's for Bridge No. 110 and three 84 inch CMP's for Bridge No. 109. The detour roadway approaches for Bridge No. 110 will provide one 14 ft signalized travel lane and 3 ft wide shoulders on each side. The detour roadway approaches for Bridge No. 109 will provide two 9 ft travel lanes and 3 ft wide shoulders on each side. The length of the temporary detours will be approximately 260 ft for Bridge No. 110 and 428 ft for Bridge No 109.

Alternative B

Alternative B consists of replacing the bridges with new bridges on new alignment east of SR 1002. During construction, the existing bridges will be used to maintain traffic. The total length of roadway approach work for this alternative is approximately 1665 ft. Refer to Figures 7 and 8 for illustration of the alternative.

Alternative B was not selected as the preferred alternative because of the higher environmental impacts associated with the new location alignment.

C. Alternatives Eliminated From Further Consideration

The "Do-Nothing" alternative will eventually necessitate closure of the bridges due to their poor condition. This is not desirable due to the traffic service provided by SR 1002.

Investigation of the existing structures by the NCDOT Bridge Maintenance Unit indicates that rehabilitation of the old bridges is not feasible due to their deteriorated condition.

D. Preferred Alternative (Alternative A)

Alternative A consists of replacing the bridges in-place with new bridges. Alternative A was selected as the preferred because it has the least environmental impacts and the lowest construction costs.

The Division Engineer concurs with Alternative A as the Preferred Alternative.

E. Anticipated Design Exception

The speed limit is not posted on SR 1002; therefore, a statutory speed limit of 55 mph applies. Due to the existing road conditions a design exception will be required for the horizontal alignment for Alternative A.

IV. ESTIMATED COSTS

The estimated costs for each alternative, based on current dollars, are shown below:

Table 1
Estimated Project Costs

	Alternative A (Preferred)	Alternative B
Structure Removal (existing)	$16,400	$16,400
Structure Proposed	$347,200	$347,200
Detour Structure and Approaches	$166,618	$0
Roadway Approaches	$87,477	$470,766
Miscellaneous and Mobilization	$169,305	$266,634
Engineering and Contingencies	$113,000	$199,000
Right-of-Way/Easement and Utilities	$92,000	$113,000
Total Project Cost	**$992,000**	**$1,300,000**

The estimated cost of the project, as shown in the 2004-2010 NCDOT Transportation Improvement Program is $760,000 including $100,000 spent in prior years, $60,000 for right-of-way and $600,000 for construction.

V. NATURAL RESOURCES

Natural resources within the project study area were evaluated to provide: 1) an assessment of existing vegetation, wildlife, protected species, streams, wetlands, and water quality; 2) an evaluation of probable impacts resulting from construction; and 3) a preliminary determination of permit needs.

A. Methodology

Research was conducted prior to the field investigations. Published resource information pertaining to the project area was collected and reviewed. Resources utilized in this preliminary investigation of the project area include:

- U.S. Geological Survey (USGS) Celo and Little Switzerland 7.5-minute quadrangle maps.
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map for Celo and Little Switzerland 7.5-minute quadrangles.
- North Carolina Department of Transportation (NCDOT) aerial photographs of the project study area (Scale: 1:1200 scale).
- U.S. Department of Agriculture, Natural Resource Conservation Service (formerly the Soil Conservation Service) provisional Soil Survey of Mitchell County, North Carolina (unpublished).
- U.S. Environmental Protection Agency Water Discharges and RCRA Map accessed via EPA's EnviroMapper Program (September 2001).

Water research information was obtained from publications of the North Carolina Department of Environment, and Natural Resources (NCDENR, 2000a, 2000b, 2001). Information concerning the occurrence of federal and state protected species in the project study area was obtained from the U.S. Fish and Wildlife Service list of protected and candidate species (March 3, 2001) and from the North Carolina Natural Heritage Program

(NCNHP) database of rare species and unique habitats (NCNHP, 2001). NCNHP files were reviewed for documented occurrences of state and federally listed species. USFWS Recovery Plans for federal listed species were reviewed, where applicable.

A field investigation of natural resources within the project study area was conducted on July 25, 2001. Water resources were identified and categorized, and their physical characteristics were documented while in the field. Plant communities and their associated wildlife were also identified and documented. The *Classification of Natural Communities of North Carolina, Third Approximation* (Schafale and Weakley, 1990) was used to classify plant communities, where possible. Plant taxonomy was based primarily upon the *Manual of the Vascular Flora of the Carolinas* (Radford, et al., 1968). Animal taxonomy was based primarily upon *Amphibians and Reptiles of the Carolinas and Virginia* (Martof, et al., 1980), *Freshwater Fishes of the Carolinas, Virginia, Maryland, and Delaware* (Rohde, et al., 1994), *Birds of the Carolinas* (Potter, et al., 1980), and *Mammals of the Carolinas, Virginia, and Maryland* (Webster, et al., 1985).

Approximate boundaries of major vegetation communities were mapped while in the field utilizing aerial photography of the project study area. Wildlife identification involved active searching of known or suspected species, incidental visual observations, incidental auditory indicators (such as birdsong and other sounds), and secondary indicators of species presence or site utilization (such as scat, tracks, and burrows). Predictions regarding wildlife community composition were supplemented utilizing a general qualitative habitat assessment based on existing vegetation communities and aquatic habitat.

Wetlands subject to regulation by the Corps of Engineers under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 were identified and delineated according to methods prescribed in the 1987 *Corps of Engineers Wetlands Delineation Manual* (Technical Report Y-87-1) and the Corps' March 6, 1992 guidance document titled *Clarification and Interpretation of the 1987 Manual.* Values of wetlands delineated were assessed utilizing the *Guidance for Rating the Values of Wetlands in North Carolina* (NCDEHNR, 1995). Wetland types were classified based on the U.S. Fish and Wildlife Service *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, et al., 1979). Wetland boundaries were surveyed and recorded in the field using Global Positioning Satellite (GPS) survey methods.

B. Physiography and Soils

Mitchell County lies in the Blue Ridge (Southern Appalachian) Mountains Physiographic Province of western North Carolina. The county encompasses 220 square miles and is primarily rural. The county ranges in elevation from approximately 1,900 ft mean sea level (msl) where the Nolichucky River flows into Tennessee to over 5,800 ft in the Roan Mountain area msl. Elevations within the project study area range from approximately 2,940 to 3,000 ft msl, with the stream bed near the bridge lying at approximately 2,940 ft msl.

The portion of Mitchell County within the project study area (NRCS map panels I-11) has been mapped by NRCS under the current provisional soil survey. Official soil series descriptions were also obtained by the NRCS (USDA: http://www.statlab.iastate.edu/soils/osd). A brief description of soil types mapped by NRCS and/or observed during field investigation is as follows:

- Sandy cobbly fluvaquents along the stream bed (unmapped by NRCS but observed during field investigation).

- Bandana sandy loam, 0 to 3 percent slopes, occasionally flooded. This soil unit consists of very deep, somewhat poorly drained sandy loams that are found on floodplains of small streams in the Southern Appalachian Mountains. The A horizon of Bandana sandy loams typically consists of up to 8.0 inches of yellowish brown (10YR5/4) dry, friable, slightly acidic sandy loam. Permeability is moderately rapid and runoff is negligible to very low. Bandana sandy loams underlie the East Fork Big Crabtree Creek floodplain in the northern portion of the project study area. This soil is classified as non-hydric (USDA, 1996).

- Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded. This map unit is comprised of 50 to 60 percent Dellwood soils and 40 to 50 percent Reddies soils. These soils are moderately well-drained and occur on floodplains. The surface layer typically consists of a thick, dark colored, loamy to sandy layer. Permeability is moderately rapid in the surface layer and rapid in the subsoil. The seasonal high water table ranges from 2.0 to 4.0 ft below the surface. These soils underlie the East Fork Big Crabtree Creek floodplain in the southern portion of the project study area. These soils are classified as non-hydric (USDA, 1996).

- Saunook-Thunder complex, 15 to 30 percent slopes, stony. This map unit is comprised of 50 to 60 percent Saunook soils and 40 to 50 percent Thunder soils. These soils are very deep and well-drained and occur on benches, fans, and toe slopes in coves. The surface layer is typically a thick, dark loamy layer. Numerous stones are scattered across the surface, especially along drainageways. Permeability is moderate in Saunook soils and is moderate to moderately rapid in Thunder soils. The seasonal high water table is greater than 6.0 ft below the surface. Seeps and springs are common. These soils underlie moderately sloping land surfaces west of the East Fork Big Crabtree Creek floodplain in the southwestern portion of the project study area. These soils are classified as non-hydric (USDA, 1996).

- Chandler-Micaville complex, 30 to 50 percent slopes, stony. This map unit is comprised of Chandler loams and Micaville sandy loams. These soils are very deep and somewhat excessively drained. They occur on upland ridges and side slopes. The surface layer is loamy and numerous stones are scattered across the surface. Permeability is moderately rapid. The seasonal high water table is greater than 6.0 ft below the surface. These soils underlie moderately to steeply sloping land surfaces east of the East Fork Big Crabtree Creek floodplain in the southeastern portion of the project study area. These soils are classified as non-hydric (USDA, 1996).

C. Water Resources

C.1. Waters Impacted

A perennial stream, Crabtree Creek, comprises the single water resource within the project study area. Crabtree Creek is located within the Nolichucky River subbasin of the French Broad River Drainage Basin. The French Broad River Basin is the ninth largest watershed in North Carolina, encompassing 2,842 square miles. Crabtree Creek is approximately 15 ft wide within the project study area. The average stream depth observed at the time of the field investigation was 0.5 to 2.5 ft. The field investigation occurred during a rain event and, as a result, surface waters were turbid. Water levels appeared to be slightly above the ordinarily high water level at the time of the field investigation.

C.2. Waters Resource Characteristics

The substrate of Crabtree Creek in the project study area is comprised of sediments ranging in size from sand to boulders. The stream within the project study area is relatively straight and exhibits a relatively simple trapezoidal cross-section. No sand bars or channel meanders were observed.

The stream banks are confined by vertical retaining walls beneath and adjacent to the existing bridge. A portion of the left stream bank upstream of the bridge has been armored with riprap to protect the road embankment. The left stream bank downstream of the bridge is well vegetated with a 40 to 60 ft wide zone of healthy trees, shrubs, and grass with good root systems. The left stream bank upstream of the bridge parallels the right-of-way of SR 1002 and, as a result, is less densely vegetated. The right stream bank throughout the project study area is vegetated with a zone of few small trees and shrubs that is less than 20 ft wide and which appears generally healthy. The stream banks are comprised of unconsolidated poorly sorted sediments of alluvial and colluvial origin, with several intervening riprap segments.

Under the federal system for cataloging drainage basins, the drainage basin containing the project study area is designated as USGS hydrologic unit 06010108 (the Nolichucky River drainage basin). Under the North Carolina DWQ system for cataloging drainage basins, the drainage basin containing the project study area is designated as Subbasin 04-03-06 (the North and South Toe Rivers and Nolichucky River subbasin). Crabtree Creek has been assigned Stream Index Number 7-2-48-2.

Crabtree Creek has been assigned a best usage classification of **C Tr**. The **C** designation indicates waters that are protected for secondary recreation, fishing, wildlife, fish and aquatic life propagation and survival, agriculture, and other uses found suitable for Class "**C**" waters. Secondary recreation is any activity involving human body contact with water on an infrequent or incidental basis. The surface water classification **Tr** is a supplemental classification intended to protect freshwaters for natural trout propagation and survival of stocked trout. As stated in the standards, this designation affects wastewater quality but not the type of discharges, and there are no watershed development restrictions except stream buffer zone requirements of the North Carolina Division of Land Resources.

No surface waters classified as High Quality Water (**HQW**), Water Supplies (**WS-I** or **WS-II**), or Outstanding Resource Waters (**ORW**) occur within 0.6 mile of the project study area.

Crabtree Creek does not appear on the Department of Environment and Natural Resources 303d list of waters not meeting water quality standards or which have impaired uses.

One method used by DWQ to monitor water quality is through long-term monitoring of macroinvertebrates. There are no benthic monitoring stations on Crabtree Creek within the project study area.

Discharges that enter surface waters through a pipe, ditch or other well-defined point of discharge are broadly referred to as "point sources". No registered point source discharges are located within the Crabtree Creek watershed or the project study area (EPA, 2001).

C.3. Anticipated Impacts to Water Resources

Impacts to water resources in the project study area are likely to result from activities associated with project construction. Activities likely to result in impacts consist of clearing and grubbing along stream banks, removal of

riparian canopy, instream construction, use of fertilizers and pesticides as part of revegetation operations, and installation of pavement. The following impacts to surface water resources are likely to result from the aforementioned construction activities:

- Short-term increases in sedimentation and siltation downstream of the crossing associated with increased erosion potential in the project study area during and immediately following construction.
- Short-term changes in incident light levels and turbidity due to increased sedimentation rates and vegetation removal.
- Short-term alteration of water levels and flows due to interruptions and/or additions of surface water and groundwater during construction.
- Short-term increases in nutrient loading during construction via runoff from temporarily exposed land surfaces.
- A short-term increase in the potential for the release of toxic compounds (such as petroleum products) from construction equipment and other vehicles.
- Changes in and possible destabilization of water temperature regimes due to removal of vegetation within or overhanging the watercourse.
- Increased concentrations of pollutants typically associated within roadway runoff.

To minimize potential impacts to water resources in and downstream of the project study area, NCDOT's *Best Management Practices for the Protection of Surface Waters* (NCDOT, 1997) will be strictly enforced during the construction phase of the project. Impacts will be minimized to the fullest degree practicable by limiting instream activities and by revegetating stream banks immediately following the completion of grading.

C.4. Impacts Related to Bridge Demolition and Removal

In order to protect the water quality and aquatic life in the area affected by this project, the NCDOT and all contractors will follow appropriate guidelines for bridge demolition and removal. These guidelines are presented in three NCDOT documents entitled: *Pre-Construction Guidelines for Bridge Demolition and Removal*, *Policy: Bridge Demolition* and *Removal in Water of the United States*, and *Best Management Practices for Bridge Demolition and Removal.*

The superstructure for Bridge Nos. 109 and 110 are composed of a timber deck on steel I-beams. The substructure is composed of yount masonry abutments. Neither the superstructure nor the substructure will create any temporary fill in the creek. However, the removal of the substructure may create some disturbance of the streambed. If removal of the substructure will create disturbance in the streambed, a turbidity curtain should be used due to sediment concerns.

The North Carolina Wildlife Resources Commission (NCWRC) requests a moratorium on in-water work between May 1 and July 15 to prevent off-site sedimentation from impacting fish eggs and fry downstream of the site. Because a moratorium applies and Crabtree Creek has been assigned a best usage classification of **C Tr**, this project falls under Case 2 (allowing no in-water work during moratorium periods) of the *Best Management Practices for Bridge Demolition and Removal.*

D. Biotic Resources

Living systems described in the following sections include communities of associated plants and animals observed within the project study area. These descriptions refer to the flora and fauna in each community and the relationship of these biotic components. Biotic resources assessed as part of this investigation include discernable terrestrial and aquatic communities. The composition and distribution of biotic communities within the project study area are a function of topography, soils, hydrology, and past and present land uses.

Terrestrial systems are discussed primarily from the perspective of dominant plant communities and are classified in accordance with the *Classification of Natural Communities of North Carolina: Third Approximation* (Schafale and Weakley, 1990) where applicable. Representative animal species likely to inhabit or utilize biotic communities of the project study area (based on published range distributions) are also discussed. Species observed during field investigation are listed.

D.1. Plant Communities

Boundaries between contiguous biotic communities are gradational in certain portions of the project study area, making boundaries sometimes difficult to delineate. Five discernable terrestrial communities are located within the project study area. Of these communities, four have been altered to the extent that they cannot be classified as a natural vegetation community under the *Classification of Natural Communities of North Carolina*. These altered communities consist of: (1) altered right-of-way communities, (2) landscaped areas, (3) fallow pastureland, and (4) cropland. The remaining community within the project study area retains enough of its natural characteristics to be classified under the *Classification of Natural Communities of North Carolina*. This natural community consists of Piedmont/Mountain Bottomland Forest. In addition to the aforementioned terrestrial components, the aquatic community associated with East Fork Big Crabtree Creek was assessed within the project study area.

Altered Right-of-Way Communities -- These communities are located along the right-of-way bordering on SR 1002. Vegetation within these areas has been maintained in an early succession through mechanical and possibly chemical vegetation management practices.

No mature woody were observed at the time of site investigation within altered rights-of-way of the project study area; however, saplings and seedlings observed include red maple (Acer rubrum), tulip tree (Liriodendron tulipifera), black cherry (Prunus serotina), black locust (Robinia pseudo-acacia), witch-hazel (Hamamelis virginiana), mountain laurel (Kalmia latifolia), yellow buckeye (Aesculus flava), river birch (Betula nigra), tag alder (Alnus serrulata), flowering dogwood (Cornus florida), southern arrowwood (Viburnum dentatum), and multiflora rose (Rosa multiflora). Dominant herbaceous species observed at the time of site investigation include orange jewelweed (Impatiens capensis), red clover (Trifolium pratense), Queen Anne's lace (Daucus carota), jack-in-the-pulpit (Arisaema triphyllum), creeping grass (Microsteguim vimineum), common plantain (Plantago major), turk's cap lily (Lilium superbum), Christmas fern (Polystichum acrostichoides), Curtis' goldenrod (Solidago curtisii), joint head (Arthraxon hispidus), goldenrod (Solidago sp.), thimbleweed (Anemone riparia), bee balm (Monarda didyma), ginseng (Panax quinquefolium), wood sorrel (Oxalis sp.), and Joe-pye-weed (Eupatorium fistulosum). Dominant vine species observed at the time of site investigation include tick-trefoil (Desmodium nudiflorum), poison ivy (Toxicodendron radicans), Japanese honeysuckle (Lonicera japonica), common greenbrier (Smilax rotundifolia), trumpet creeper (Campsis radicans), and riverside grape (Vitis riparia).

Landscaped Areas -- This community consists of cleared, landscaped, and vegetatively managed areas around several nearby residential dwellings.

Dominant plant species observed at the time of site investigation include assorted cultivars, crab grass (Digitaria sanguinalis), common plantain (Plantago major), white clover (Trifolium repens), dandelion (Taraxacum officinale), common chickweed (Stellaria media), and unidentified grasses (Poaceae).

Fallow Pastureland -- This community is dominated by pioneer and opportunistic plant species and is located in the northern portion of the project study area. The slopes within this community are gently sloping to nearly level. The successional nature of the vegetation community suggests that the area was cleared of native vegetation and that the vegetation has been managed for several or more growing seasons.

No mature trees or shrubs have yet become established within the fallow pastureland. Dominant woody species observed at the time of site investigation include witch-hazel (Hamamelis virginiana), mountain laurel (Kalmia latifolia), yellow buckeye (Aesculus flava), river birch (Betula nigra), tag alder (Alnus serrulata), flowering dogwood (Cornus florida), and multiflora rose (Rosa multiflora). Dominant herbaceous species observed at the time of site investigation include jewelweed (Impatiens capensis), red clover (Trifolium pratense), Queen Anne's lace (Daucus carota), jack-in-the-pulpit (Arisaema triphyllum), creeping grass (Microsteguim vimineum), common plantain (Plantago major), Christmas fern (Polystichum acrostichoides), Curtis' goldenrod (Solidago curtisii), joint head (Arthraxon hispidus), goldenrod (Solidago sp.), thimbleweed (Anemone riparia), bee balm (Monarda didyma), ginseng (Panax quinquefolium), wood sorrel (Oxalis sp.), Joe-pye-weed (Eupatorium fistulosum), and unidentified grasses (Poaceae). Dominant vine species observed at the time of site investigation include tick-trefoil (Desmodium nudiflorum), poison ivy (Toxicodendron radicans), Japanese honeysuckle (Lonicera japonica), common greenbrier (Smilax rotundifolia), trumpet creeper (Campsis radicans), riverside grape (Vitis riparia), and Virginia creeper (Parthenocissus quinquefolia).

Cropland -- This community consists of recently cultivated cropland located in the northernmost portion of the project area. This community is located on gently sloping land surfaces adjacent to SR 1002 and the Piedmont/Mountain Bottomland Forest, which separates the cropland from Crabtree Creek.

Piedmont/Mountain Bottomland Forest -- This community type occurs along the banks of East Fork Big Crabtree Creek in all quadrants of the project study area. The Piedmont/Mountain Bottomland Forest occurs upon a nearly level to gently sloping floodplain terrace perched approximately 3.5 to 4.5 ft above the stream bed. The terrace is largely underlain by moderately well-drained fluvaquents exhibiting relatively high chromas but, where poorly drained conditions prevail, hydric soil inclusions are observed.

Dominant tree species observed within the Piedmont/Mountain Bottomland Forest at the time of site investigation include red maple (Acer rubrum), sycamore (Platanus occidentalis), black gum (Nyssa sylvatica), tulip tree (Liriodendron tulipifera), Fraser magnolia (Magnolia fraseri), black cherry (Prunus serotina), black locust (Robinia pseudo-acacia), green ash (Fraxinus pennsylvanica), eastern hemlock (Tsuga canadensis), and white pine (Pinus strobus). Dominant sapling and shrub species observed at the time of site investigation include witch-hazel (Hamamelis virginiana), mountain laurel (Kalmia latifolia), yellow buckeye saplings (Aesculus flava), river birch (Betula nigra), tag alder (Alnus serrulata), flowering dogwood (Cornus florida), southern arrowwood (Viburnum dentatum), and multiflora rose (Rosa multiflora). Dominant herbaceous species observed at the time of site investigation include orange jewelweed (Impatiens capensis), red clover (Trifolium pratense), Queen

Anne's lace (Daucus carota), jack-in-the-pulpit (Arisaema triphyllum), creeping grass (Microsteguim vimineum), common plantain (Plantago major), New York fern (Thelypteris noveboracensis), turks cap lily (Lilium superbum), Christmas fern (Polystichum acrostichoides), Curtis' goldenrod (Solidago curtisii), joint head (Arthraxon hispidus), goldenrod (Solidago sp.), thimbleweed (Anemone riparia), bee balm (Monarda didyma), ginseng (Panax quinquefolium), wood sorrel (Oxalis sp.), and Joe-pye-weed (Eupatorium fistulosum). Dominant vine species observed at the time of site investigation include tick-trefoil (Desmodium nudiflorum), poison ivy (Toxicodendron radicans), Japanese honeysuckle (Lonicera japonica), common greenbrier (Smilax rotundifolia), trumpet creeper (Campsis radicans), riverside grape (Vitis riparia), and Virginia creeper (Parthenocissus quinquefolia).

D.2. Wildlife

All of the communities within the project study area have been significantly altered or affected by man's activities. Due to forest tract fragmentation common to the project region, species that require large contiguous tracts of forests are not likely to utilize the site on a normal basis. Certain opportunistic wildlife species, such as white-tailed deer (Odocoileus virginianus), woodchuck (Marmota monax), and eastern cottontail rabbit (Sylvilagus floridanus) can be expected to periodically utilize edge habitat present within the project study area. Due to the relatively small size of the project study area and the fact that many wildlife species are capable of moving between and/or utilizing adjoining communities, no distinct terrestrial wildlife habitat can be assigned to any one terrestrial plant community within the project study area.

No mammals were observed in the project study area at the time of field investigation. Although not observed, mammals common to the project region which can be expected to periodically utilize habitat of the project study area include: Virginia opossum (Didelphis virginiana), shrews and moles (Insectivora), beaver (Castor canadensis), gray squirrel (Sciurus carolinensis), eastern harvest mouse (Reithrodontomys humulis), white-footed mouse (Peromyscus leucopus), golden mouse (Ochrotomys nuttalli), hispid cotton rat (Sigmodon hispidus), eastern woodrat (Neotoma floridana), meadow vole (Microtus pennsylvanicus), woodland vole (Microtus pinetorum), muskrat (Ondatra zibethicus), black rat (Rattus rattus), Norway rat (Rattus norvegicus), house mouse (Mus musculus), meadow jumping mouse (Zapus hudsonius), woodland jumping mouse (Napaeozapus insignis), raccoon (Procyon lotor), red fox (Vulpes vulpes), black bear (Ursus americanus), long-tailed weasel (Mustela frenata), eastern spotted skunk (Spilogale putorius), striped skunk (Mephitis mephitis), and bobcat (Felis rufus).

The open fields and shrub stands on the project study area provide suitable forage areas for a variety of birds. A wide variety of resident and migratory songbirds can be expected to periodically utilize habitat present in the project study area. The open fields on and near the project study area provide probable hunting grounds for birds of prey, such as hawks and owls.

No reptiles or amphibians were observed in the project study area at the time of field investigation. A variety of reptile and amphibian species may use the communities located in the project study area. These animals include the rat snake (Elaphe obsoleta), eastern box turtle (Terrapene carolina), five-lined skink (Eumeces fasciatus), two-lined salamander (Eurycea bislineata), pickerel frog (Rana palustris), and American toad (Bufo americanus).

D.3. Aquatic Communities

No aquatic or water-dependent vertebrates were observed within the project study area at the time of field investigation. Aquatic or water-dependent invertebrates observed within the project study area at the time of field investigation include crayfish (Cambaridae), gilled snails (Pleuroceridae), mayfly larva (Heptageniidae), aquatic

beetle larvae (Psephenidae), case-making caddisfly larvae (Trichoptera), net-spinning caddisfly larvae (Hydropsychidae), and water striders (Gerridae).

D.4. Anticipated Impacts to Biotic Communities

D.4.a. Terrestrial Communities Impacts

Potential impacts to plant communities are estimated based on the approximate area of each plant community present within both the proposed right-of-way and the temporary construction limits of any on-site detour or easement that falls outside the estimated permanent right-of-way limit. A summary of potential plant community impacts is presented in Table 2. All plant community impacts are based on aerial photograph base mapping. A portion of the permanent plant community impact amount will consist of proposed right-of-way for the road after the bridge replacement is complete. Impervious surface and open water areas are not included in this analysis.

Table 2
Potential Impacts to Plant Communities

PLANT COMMUNITY	POTENTIAL IMPACTS acres		
	ALT A (Preferred)		ALT B
	Impacts	Temp. Impacts*	Impacts
Altered Right-of-Way Communities	0.00	0.00	0.00
Landscaped Areas	0.00	0.38	0.38
Fallow Pastureland	0.00	0.16	0.41
Cropland	0.00	0.25	0.06
Piedmont/Mountain Bottomland Forest	0.00	1.46	2.27
Total (acre)	0.00	2.25	3.12
TOTAL FOR ALT (acre)	**2.25**		**3.12**

* Note: Temporary construction impacts are based on the portion of the impacts that fall outside the estimated right-of-way limit or impacts of temporary on-site detours.

The highest amount of permanent plant community impacts result from Alternative B, which calls for bridge replacement on new location. The plant community with the largest amount of potential permanent and temporary impacts for all proposed alternatives is the Piedmont/Mountain Bottomland Forest community.

D.4.b. Aquatic Communities Impacts

The replacement of Bridge Nos. 109 and 110 over Crabtree Creek will result in certain unavoidable impacts to the aquatic community. Probable impacts will be associated with the physical disturbance of the benthic habitat and water column disturbances resulting from changes in water quantity and quality. Significant disturbance of stream segments can have an adverse effect on aquatic community composition by reducing species diversity and the overall quality of aquatic habitats. Physical alterations to aquatic habitats can result in the following impacts to aquatic communities:

- Inhibition of plant growth.
- Resuspension of organic detritus and removal of aquatic vegetation that can lead to increased nutrient

loading. Nutrient loading can, in turn, lead to algal blooms and ensuing depletion of dissolved oxygen levels.

- Increases in suspended and settleable solids that can, in turn, lead to clogging of feeding structures of filter-feeding organisms and the gills of fish.
- Loss of benthic macroinvertebrates through increased scouring and sediment loading.
- Loss of fish shelter through removal of overhanging stream banks and snags.
- Increases in seasonal water temperatures resulting from removal of riparian canopy.
- Burial of benthic organisms and associated habitat.

Unavoidable impacts to aquatic communities within and immediately downstream of the project area will be minimized to the fullest degree practicable through strict adherence to NCDOT's *Best Management Practices for the Protection of Surface Waters* (NCDOT, 1997) and other applicable guidelines pertaining to best management practices. Means to minimize impacts will include (1) utilizing construction methods that will limit instream activities as much as practicable, (2) restoring the stream bed as needed, and (3) revegetating stream banks immediately following the completion of grading.

E. Special Topics

E.1. "Waters of the United States": Jurisdictional Issues

Surface waters within the embankments of the Crabtree Creek are subject to jurisdictional consideration under Section 404 of the Clean Water Act as "Waters of the United States" (33 CFR 328.3). Wetlands subject to review under Section 404 of the Clean Water Act (33 U.S.C. 1344) are defined by the presence of three primary criteria: hydric soils, hydrophytic vegetation, and evidence of hydrology within 12 inches of the soil surface for a portion (12.5 percent) of the growing season (DOA 1987). No wetlands have been mapped within the project study area under the National Wetlands Inventory (NWI) program.

The surface waters within Crabtree Creek exhibit characteristics of a permanently flooded, upper perennial, riverine habitat with an unconsolidated bottom (R3UBH). Crabtree Creek is a jurisdictional surface water.

E.2. Anticipated Impacts to Waters of the United States

Temporary and permanent impacts to surface waters and wetlands are estimated based on the amount of each jurisdictional area within the project limits. Temporary impacts include those impacts that will result from temporary construction activities outside of permanent right-of-way and/or those associated with temporary on-site detours. Temporary impact areas will be restored to their original condition after the project has been completed. Permanent impacts are those areas that will be in the construction limits and/or the right-of-way of the new structure and approaches. Portions of those areas that are considered temporary impact areas often end up being within the final right-of-way. Potential wetland and surface water impacts are included in Table 3.

Table 3
Anticipated Impacts to Surface Waters

JURISDICTIONAL AREAS	ALT A (Preferred)		ALT B
	Impacts	Temp. Impacts*	Impacts
Perennial Stream Channel Impacts ft	0.0	100	0.0
TOTAL FOR ALT ft	**100**		**0.0**

*Note: Temporary construction impacts are based on the portion of the impacts not included in the construction limits for the permanent structure.
No jurisdictional wetlands were found within the project study area. The preferred alternative, Alternative A, may temporarily impact 100 ft of perennial stream channel while the detour structures are in place.

E.2. Permits

Section 404 of the Clean Water Act - In accordance with Section 404 of the Clean Water Act (33 U.S.C. 1344), a permit is required from the USACE for projects of this type for the discharge of dredge or fill material in "Waters of the United States." The USACE issues two types of permits for these activities. A general permit may be issued on a nationwide or regional basis for a category, or categories, of activities when: those activities are substantially similar in nature and cause only minimal individual or cumulative environmental impacts, or when the general permit would result in avoiding unnecessary duplication of regulatory control exercised by another Federal, state, or local agency provided that the environmental consequences of the action are individually and cumulatively minimal. If a general permit is not appropriate for a particular activity, then an individual permit must be utilized. Individual permits are authorized on a case-by-case evaluation of a specific project involving the proposed discharges.

It is anticipated that this project will fall under Nationwide Permit 23, which is a type of general permit. Nationwide Permit 23 is relevant to approved Categorical Exclusions. This permit authorizes any activities, work, and discharges undertaken, assisted, authorized, regulated, funded, or financed, in whole or in part, by another federal agency and that the activity is "categorically excluded" from environmental documentation because it is included within a category of actions which neither individually nor cumulatively have a significant effect on the environment. Activities authorized under nationwide permits must satisfy all terms and conditions of the particular permit. However, final permit decisions are left to the discretionary authority of the USACE. Since the proposed project is located in a designated "Trout" county, the authorization of a nationwide permit by the USACE is conditioned upon the concurrence of the NCWRC.

Section 401 Water Quality Certification - A 401 Water Quality Certification, administered through the DWQ, will also be required. This certification is issued for any activity which may result in a discharge into waters for which a federal permit is required. According to the DWQ, one condition of the permit is that the appropriate sediment and erosion control practices must be utilized to prevent exceedences of the appropriate turbidity water quality standard.

Tennessee Valley Authority (TVA) - The proposed project is located in the Tennessee Valley Authority's (TVA) Land Management District. A permit pursuant to Section 26a of the TVA Act is also required for all construction or development involving streams or floodplains in the Tennessee River drainage basin.

E.3. Mitigation

The USACE has adopted, through the Council on Environmental Quality (CEQ), a wetland mitigation policy which embraces the concept of "no net loss of wetlands" and sequencing. The purpose of this policy is to restore and maintain the chemical, biological, and physical integrity of the waters of the United States, specifically wetlands. Mitigation of wetland impacts has been defined by the CEQ to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts (40 CFR 1508.20). Each of these three aspects (avoidance, minimization, and compensatory mitigation) must be considered sequentially.

Avoidance – Mitigation by avoidance examines appropriate and practicable measures for averting impact to waters of the United States. A 1990 Memorandum of Agreement between the Environmental Protection Agency (EPA) and the USACE, states that in determining appropriate and practicable measures to offset unavoidable impacts; such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes.

The project purpose necessitates traversing Crabtree Creek; therefore, totally avoiding surface water impacts is impossible.

Minimization – Minimization of adverse impact to waters of the United States includes examination of appropriate and practicable measures to reduce such impacts. Implementation of these steps will be required through project modifications and permit conditions. Adverse impacts are typically minimized by decreasing the proposed project footprint through reduction of median widths, right-of-way widths, and/or fill slopes.

Other practical mechanisms to minimize impacts to waters of the United States include strict enforcement of sedimentation control BMPs for protection of surface waters during the entire life of the project; reduction of clearing and grubbing activity; reduction/elimination of direct discharge into streams; reduction of runoff velocity; reestablishment of vegetation on exposed areas, with judicious pesticide and herbicide management; minimization of instream activity; and litter/debris control.

No measures are proposed for this project because there are no jurisdictional wetlands within the project study area.

Compensatory Mitigation – Compensatory mitigation, including restoration, creation and enhancement of waters of the United States, is typically not considered unless anticipated impacts to waters of the United States have been avoided and minimized to the maximum extent practicable. Further, it is recognized that "no net loss of wetlands" may not be achievable in every permit action. Therefore, compensatory mitigation is required for unavoidable adverse impacts which remain after all appropriate and practicable minimization measures have been required.

Compensatory mitigation is not expected to be required for this project. A final determination regarding mitigation requirements rest with the USACE.

F. Protected Species

F.1. Federally Protected Species

Species with the federal classification of Endangered (E) or Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Table 4 lists the federal protected species for Mitchell County (USFWS list dated February 24, 2003):

Table 4
Federally Protected Species Listed for Mitchell County

Common Name	Scientific Name	Status	Biological Conclusion
Carolina Northern Flying Squirrel	*Glaucomys sabrinus coloratus*	E	No Effect
Indiana Bat	*Myotis sodalist*	E	No Effect
Appalachian Elktoe	*Alasmidonta raveneliana*	E	No Effect
Spruce-Fir Moss Spider	*Microhexura montivaga*	E	No Effect
Spreading Avens	*Geum radiatum*	E	No Effect
Heller's Blazing Star	*Liatris helleri*	T	No Effect
Blue Ridge Goldenrod	*Solidago spithamaea*	T	No Effect
Virginia Spiraea	*Spiraea virginiana*	T	No Effect
Rock Gnome Lichen	*Gymnoderma lineare*	E	No Effect

Endangered - any native or once-native species in danger of extinction throughout all or a significant portion of its range.
Threatened - any native or once-native species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Carolina Northern Flying Squirrel - The northern flying squirrel is a small nocturnal gliding mammal some 10 to 12 inches in total length and 3 to 5 ounces in weight. It possesses a long, broad, flattened tail (80 percent of head and body length), prominent eyes, and dense, silky fur. The broad tail and folds of skin between the wrist and ankle form the aerodynamic surface used for gliding. Adults are gray with a brownish, tan, or reddish wash on the back, and grayish white or buffy white ventrally. Juveniles have uniform dark, slate-gray backs, and off-white undersides. The northern flying squirrel can be distinguished from the southern flying squirrel by its larger size; the gray base of its ventral hairs as opposed to a white base in the southern species; the relatively longer upper tooth row; and the short, stout baculum (penis bone) of the males.

According to Professor Peter D. Weigl of Wake Forest University (1977, and pers. comm., March 2, 1984), the northern flying squirrel occurs primarily in the ecotone, or vegetation transition zone, between the coniferous and northern hardwood forests. Both forest types are used in the search for food, while the hardwood areas are needed for nesting sites. Because of the flying squirrel's small size, the climatic severity of its habitat, and the abundance of avian and mammalian predators, nesting sites represent critical resources. During the cooler months, squirrels commonly occupy tree cavities and woodpecker holes (Jackson, 1961; Baker, 1983), but may also construct and use leaf nests - especially in the summer (Weigl and Osgood, 1974). The interior of both types of nests is lined with lichens, moss, or finely chewed bark. Preliminary results from a study presently underway in West Virginia indicate that these squirrels sometimes enter burrows in the ground, although the extent of their use is not yet known (Urban, pers. comm.).

The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project study area was investigated on July 27, 2001. No individual organisms, populations, or suitable habitat were observed within the project study area.

BIOLOGICAL CONCLUSION: NO EFFECT

Indiana Bat - The Indiana bat is a medium-sized myotis, closely resembling the little brown bay (Myotis lucifugus), but differing in coloration. Its fur is a dull grayfish chestnut rather than bronze, with the basal portion of the hairs of the back dull lead colored. This bat's underparts are pinkish to cinnamon and its hind feet smaller and more delicate than in M. lucifugus. The calcar (heel of the foot) is strongly keeled.

Little is known of this bat's diet beyond the fact that it consists of insects. Females and juveniles forage in the airspace near the foliage of riparian and floodplain trees. Males forage the densely wooded area at tree top height (LaVal et al., 1976, 1977).

This bat has a definite breeding period that usually occurs during the first ten days of October. Mating takes place at night on the ceilings of large rooms near cave entrances. Limited mating may also occur in the spring before the hibernating colonies disperse.

Hibernating colonies disperse in late March and most of the bats migrate to more northern habitat for the summer. However, some males remain in the hibernating area during this period and form active bands, which wander from cave to cave.

Limited observations indicate that birth and development occur in very small, widely scattered colonies consisting of 25 or so females and their young. Birth usually takes place during June with each female bearing a single offspring. About 25 to 37 days are required for development to the flying stage and the beginning of independent feeding.

Migration to the wintering caves usually begins in August. Fat reserves depleted during migration are replenished largely during the month of September. Feeding continues at a diminishing rate until by late November the population has entered a definite state of hibernation.

The hibernating bats characteristically form large, tight, compact clusters. Each individual hangs by its feet from the ceiling. Every eight to ten days hibernating individuals awaken to spend an hour or more flying about or to join a small cluster of active bats elsewhere in the cave before returning to hibernation.

Limestone caves are used for winter hibernation. The preferred caves have a temperature averaging 37 to 43 degrees Fahrenheit in midwinter, and a relative humidity averaging 87 percent. Summer records are rather scarce. A few individuals have been found under bridges and in old buildings, and several maternity colonies have been found under loose bark and in the hollows of trees. Summer foraging by females and juveniles is limited to riparian and floodplain areas. Creeks are apparently not used if riparian trees have been removed. Males forage over floodplain ridges and hillside forests and usually roost in caves. Foraging areas average 11.2 acres per animal in midsummer.

The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project study area was investigated on July 25, 2001. No individual organisms, populations, or suitable habitat were observed within the project study area. The USFWS has determined that a survey for Myotis sodalist is not required.

BIOLOGICAL CONCLUSION: NO EFFECT

Appalachian Elktoe - The Appalachian elktoe has a thin, but not fragile, kidney-shaped shell, reaching up to about 3.2 inches in length, 1.4 inches in height, and 1.0 inch in width (Clarke, 1981). Juveniles generally have a yellowish-brown periostracum (outer shell surface) while the periostracum of the adults is usually dark brown to greenish-black in color. Although rays are prominent on some shells, particularly in the posterior portion of the shell, many individuals have only obscure greenish rays. The shell nacre (inside shell surface) is shiny, often white to bluish-white, changing to a salmon, pinkish, or brownish color in the central and beak cavity portions of the shell; some specimens may be marked with irregular brownish blotches (adapted from Clarke, 1981). A detailed description of the species' shell, with illustrations, is contained in Clarke (1981). Ortmann (1921) discussed soft parts.

The species has been reported from relatively shallow, medium-sized creeks and rivers with cool, clean, well-oxygenated, moderate- to fast-flowing water. The species is most often found in riffles, runs, and shallow flowing pools with stable, relatively silt-free, coarse sand and gravel substrate associated with cobble, boulders, and/or bedrock. Stability of the substrate appears to be critical to the Appalachian elktoe, and the species is seldom found in stream reaches with accumulations of silt or shifting sand, gravel, or cobble. Individuals that have been encountered in these areas are believed to have been scoured out of upstream areas during periods of heavy rain, and have not been found on subsequent surveys (C. McGrath, personal communication, 1996; J.A. Fridell, personal observation, 1995, 1996, 1999).

The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity; however, populations have been reported in the South Toe River Basin. Suitable habitat for the species was observed within portions of the project study area during the initial field investigation. The project study area was visited on August 19, 2002 by NCDOT biologists for habitat evaluation. Crabtree Creek is a high gradient stream which is not typical habitat of the Appalachian elktoe. A mussel survey at this project is not required.

BIOLOGICAL CONCLUSION: NO EFFECT

Spruce-fir Moss Spider - The spruce-fir moss spider was originally described by Crosby and Bishop (1925) based on collections made from a mountain peak in western North Carolina in 1923 (Coyle 1981). It is one of the smallest members of the primitive suborder of spiders that are often popularly referred to as "tarantulas" (Harp 1991, 1992). Adults of this species measure only 0.10 to 0.15 of an inch (about the size of a BB) (Coyle 1981). Coloration of the spruce-fir moss spider ranges from light brown to yellow-brown to a darker reddish brown, and there are no markings on its abdomen (Harp, 1991, 1992). The most reliable field identification characteristics for the spruce-fir moss spider are chelicerae that project forward well beyond the anterior edge of the carapace, a pair of very long posterior spinnerets, and the presence of a second pair of book lungs, which appear as light patches posterior to the genital furrow (Harp, 1992).

The spruce-fir moss spider is known only from Fraser fir and red spruce forest communities of the highest elevations of the southern Appalachian Mountains in western North Carolina and eastern Tennessee (Coyle, 1981, 1997, 1999; Harp, 1991, 1992). The typical habitat of this spider is found in damp, but well drained, moss mats growing on rock outcrops and boulders in well-shaded situations within these forests (Coyle, 1981, 1997, 1999; Harp, 1992). The moss mats cannot be too dry (the species is very sensitive to desiccation) or too wet (large drops of water can also pose a threat to the spider). The spider constructs tube-shaped webs in the interface between the moss mat and rock surface. There is no record of prey having been found in the webs of the spruce-fir moss spider, nor has the species been observed taking prey in the wild, but the abundant springtails (collembolans) in the moss mats provide the most likely source of food for the spider (Coyle, 1981; Harp, 1992).

The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project study area was investigated on July 27, 2001. No individual organisms, populations, or suitable habitat were observed within the project study area. Elevations within the project study area range from approximately 2,940 to 3,000 ft. All known populations occur at elevations at and above 5,400 ft in elevation.

BIOLOGICAL CONCLUSION: NO EFFECT

Spreading Avens - Spreading avens is a perennial herb. Spreading avens is topped with an indefinite cyme of large, bright yellow flowers. Its leaves are mostly basal with large terminal lobes and small laterals, and they arise from horizontal rhizomes. Plant stems grow 7.9 to 19.7 inches tall. Flowering occurs from June through September, and the fruits (achenes) are produced from August through October.

The species inhabits high elevation cliffs, outcrops, and steep slopes that are exposed to full sun. The adjacent spruce/fir forests are dominated by red spruce (*Picea rubens*) and a federal candidate species, Fraser fir (*Abies fraseri*). Heller's blazing star (*Liatris helleri*) and/or Blue Ridge goldenrod (*Solidago spithamaea*), both federally-listed as threatened species, are also present at some sites. The substrate at all the population sites is composed of various igneous, metamorphic, and metasedimentary rocks (Massey, et al., 1980; Morgan, 1980; Kral, 1983; Department of the Interior, 1990).

The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project study area was investigated on July 27, 2001. No individual organisms, populations, or suitable habitat were observed within the project study area. Elevations within the project study area range from 2,850 to 2,880 ft msl. These elevations are below the range of 4,200 to 6,300 ft for known populations.

BIOLOGICAL CONCLUSION: NO EFFECT

Heller's Blazing Star - Heller's blazing star is a perennial herb that has one or more erect or arching stems arising from a tuft of narrow pale green basal leaves. Its stems reach up to 1.3 ft in height and are topped by a showy spike of lavender flowers, which are 2.8 to 7.9 inches long (Porter, 1891). Its flowering season lasts from July through September, and its fruits are present from September through October (Kral, 1983; Radford et al., 1964). This plant is differentiated from other similar high altitude Liatris species by a much shorter pappus, ciliate

petioles, internally pilose corolla tubes, and a lower, stockier habit (Cronquist, 1980; Gaiser, 1946). Work is being conducted on populations in two locations, which may result in their being reclassified as a new taxon (Sutter, in preparation). If so, these plants will remain protected under the Endangered Species Act.

The plant exists on high elevation ledges of rock outcrops in shallow, acid soils, which are exposed to full sunlight.

The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project study area was investigated on July 25, 2001. No individual organisms, populations, or suitable habitat were observed within the project study area. Elevations within the project study area range from approximately 2,940 to 3,000 ft msl. These elevations are below the range of 3,500 to 6,000 ft for known populations. Consequently, the biological conclusion for Liatris helleri is "No Effect".

BIOLOGICAL CONCLUSION: NO EFFECT

Blue Ridge Goldenrod - An erect perennial herb with stems 4 to 16 inches tall arising from a short, stout rhizome. The yellow flowers are borne in heads arranged into a corymbiform inflorescence. Flowering occurs during July and August.

Blue Ridge goldenrod habitat is found at elevations above 4,600 ft. The plant is considered an early pioneer species and is found growing in full sun in the crevices of granite outcrops.

The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project study area was investigated on July 25, 2001. No individual organisms, populations, or suitable habitat were observed within the project study area. Elevations within the project study area range from approximately 2,940 to 3,000 ft msl. Blue Ridge goldenrod habitat is found at elevations above 4,600 ft. Consequently, the biological conclusion for Solidago spithamaea is "No Effect".

BIOLOGICAL CONCLUSION: NO EFFECT

Virginia Spiraea - Virginia spiraea bears cream-colored flowers on branched and flat-topped axles. This shrubby plant grows from 2.0 to 10.0 ft tall and has arching, upright stems. Its alternative leaves are of different sizes and shapes. Spiraea spreads clonally and forms dense clumps, which spread in rock crevices and around boulders. Flowering occurs in June and July.

Virginia spiraea is unique because it occurs along rocky, flood-scoured riverbanks in gorges or canyons. Although it is an unusual requirement, flood scouring is essential to this plant's survival because it eliminates taller woody competitors and creates riverwash deposits and early successional habitats. These conditions are apparently essential for this plant's colonization of new sites (Rawinski, 1988). Spiraea is found in thickets. Common woody vine associates include fox grape; summer grape; riverbank grape; winter grape; graybark or pigeon grape; possum grape; sand grape; and muscadine or scuppernong. Other plant associates include royal fern, yellow ironweed or wing-stem; ninebark; smooth alder or brookside alder; silky cornel or kinnikinnik; and shrubby yellow root (Parkin, U.S. Fish and Wildlife, personal communication, 1990). The bedrock surrounding

spiraea habitat is primarily sandstone and soils are acidic and moist. Spiraea grows best in full sun, but it can tolerate some shade (Technical Bulletin, 1990). One population in West Virginia inhabits a disturbed wetland habitat near a road (Rawinski, 1988).

The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project study area was investigated on July 27, 2001 and June 12, 2003. No individual organisms, populations, or suitable habitat were observed within the project study area.

BIOLOGICAL CONCLUSION: NO EFFECT

Rock Gnome Lichen - Rock gnome lichen is a squamulose lichen in the reindeer moss family. This species is the only member of its genus occurring in North America. It occurs in rather dense colonies of narrow straps (squamules). The only similar lichens are the squamulose lichens of the genus *Cladonia*. Rock gnome lichen has terminal portions of the strap like individual lobes that are blue-gray on the upper surface and generally shiny-white on the lower surface; near the base they grade to black (unlike squmulose *Cladonia*, which are never blackened toward the base). The squamules are about 0.04 inch across near the tip, tapering to the blackened base, sparingly and subdichotomously branched, and generally about 0.4 to 0.8 inch long, although they can vary somewhat in length, depending upon environmental factors.

The squamules are nearly parallel to the rock surface, but the tips curl away from the rock, approaching or reaching a perpendicular orientation to the rock surface. The fruiting bodies (apothecia) are borne at the tips of the squamules and are black (contrasting to the brown or red apothecia of *Cladonia* species). The apothecia are borne singly or in clusters, usually at the tips of the squamules but occasionally along the sides; these have been found from July through September. The apothecia are either sessile or borne on short podetia 0.04 to 0.08 inch with most being much smaller. The apothecia are cylindrical in shape and radial in symmetry. The primary means of propagation of this lichen appears to be asexual, with colonies spreading clonally.

Rock gnome lichen occurs only in areas of high humidity, either at high elevations, where it is frequently bathed in fog, or in deep river gorges at lower elevations. It is primarily limited to vertical rock faces where seepage water from forest soils above the cliffs flows at (and only at) very wet times. Most populations occur above an elevation of 5,000 ft.

The North Carolina Natural Heritage Program's database of rare species and unique habitats was reviewed in September of 2001. No populations of the species have been recorded in the project vicinity. The project study area was investigated on July 27, 2001. No individual organisms, populations, or suitable habitat were observed within the project study area. Elevations within the project study area range from 2,850 to 2,880 ft msl. Most known populations are above 5,000 ft.

BIOLOGICAL CONCLUSION: NO EFFECT

F.2. Federal Species of Concern

Federal Species of Concern (FSC) are not afforded federal protection under the Endangered Species Act and are not subject to any of the provisions included in Section 7 until they are formally proposed or listed as Threatened or Endangered. In addition to the federal program, organisms that are listed as Endangered (E), Threatened (T),

or Special Concern (SC) by the North Carolina Natural Heritage Program (NCNHP) on its list of Rare Plants and Animal Species are afforded state protection under the N.C. State Endangered Species Act and the N.C. Plant Protection and Conservation Act of 1979. Table 5 lists Federal Species of Concern for Mitchell County, the state status of these species, and the potential for suitable habitat in the project study area. The NCNHP database shows no occurrences of FSC within 0.6 mile of the project study area as of January 2001.

Table 5
Federal Species of Concern (FSC) for Mitchell County

Common Name	Scientific Name	Potential Habitat	State Status
Allegheny Woodrat	*Neotoma magister*	No	SC
Appalachian Cottontail	*Sylvilagus obscurus*	Yes	---
Blotched Chub	*Erimystax insignis*	Yes	SR
Southern Appalachian Saw-whet Owl	*Aegolius acadicus*	No	SC
Olive-sided Flycatcher	*Contopus borealis*	No	SC
Sharphead Darter	*Etheostoma acuticeps*	Yes	T
Southern Appalachian Red Crossbill	*Loxia curvirostra*	No	SR
S. Appalachian Black-capped Ckickadee	*Parus atricapullus practicus*	Yes	SC
S. Appalachian Yellow-bellied Sapsucker	*Sphyrapicus varius appalaciensis*	Yes	SR
Olive Darter	*Percina squamata*	Yes	SC
Roan Supercoil	*Paravitrea varidens*	Yes	T
Diana Fritillary Butterfly	*Speyeria diana*	Yes	SR
Fraser Fir	*Abies fraseri*	No	---
Roan's False Goat's Beard	*Astilbe crenatiloba*	Yes	C
Mountain Bittercress	*Cardamine clematitis*	No	SR
Piratebush	*Buckleya distichophylla*	Yes	E
Roan Sedge	*Carex roanensis*	Yes	C
Tall Larkspur	*Delphinium exaltatum*	No	E-SC
Glade spurge	*Euphorbia purpurea*	Yes	C
Bent Avens	*Geum geniculatum*	Yes	T
Butternut	*Juglans cinerea*	Yes	---
Gray's Lily	*Lilium grayi*	No	T-SC
Canby's Mountain Lover (=cliff green)	*Paxistima canbyi*	No	---
A Liverwort	*Plagiochila sullivantii* var. *sullivantii*	No	C
A Liverwort	*Sphenolobopsis pearsonii*	No	PE

Endangered (E) – any native or once-native species in danger of extinction throughout all or a significant portion of its range.
Threatened (T) - any native or once-native species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
Special Concern (SC) – any species which requires monitoring but which may be collected and sold under specific regulations.
Candidate(C) – a species for which USUSFWS has enough information on file to support proposals for listing as endangered or threatened.
Significantly Rare(SR) – species which are very rare, generally with 1-20 populations in the state, and generally reduced in numbers by habitat destruction.
Proposed Endangered (PE) – a species which has been formally proposed for listing as endangered, but has not yet completed the legally mandated listing process.

F.3. Summary of Anticipated Impacts

The proposed project is not anticipated to impact any threatened or endangered species.

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, 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 inclusion in the National Register of Historic Places and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. This project has been coordinated with the North Carolina State Historic Preservation Officer (SHPO) in accordance with the Advisory Council's regulations and FHWA procedures.

B. Historic Architecture

A field survey of the Area of Potential Effect (APE) was conducted on November 13, 2002. All structures within the APE were photographed, and later reviewed by the State Historic Preservation Office (HPO). In a concurrence form dated March 18, 2003, the SHPO concurred that there are no historic architectural resources either listed in or eligible for listing in the National Register of Historic Places within the APE. A copy of the concurrence form is included in the Appendix.

C. Archaeology

The SHPO, in a memorandum dated January 29, 2002, recommended that "no archaeological investigation be conducted in connection with this project." A copy of the SHPO memorandum is included in the Appendix.

VII. ENVIRONMENTAL EFFECTS

The project is expected to have an overall positive impact. Replacement of the inadequate bridges will result in safer traffic operations.

The project is considered a Federal "Categorical Exclusion" due to its limited scope and lack of substantial environmental consequences.

Replacement of Bridge Nos. 109 and 110 will not have an adverse effect on the quality of the human or natural environment with the use of the current North Carolina Department of Transportation standards and specifications.

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

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

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

In compliance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations) the project would not disproportionately impact any minority or low-income populations.

The studied route does not contain any bicycle accommodations, nor is it a designated bicycle route; therefore, no bicycle accommodations have been included as part of this project.

This project has been coordinated with the United States Department of Agriculture, Natural Resources Conservation Service. The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impact to prime farmland for all land acquisition and construction projects. The proposed project involves replacing the bridges in their existing locations; therefore, no impacts to prime or locally important farmland are anticipated.

No publicly owned parks or recreational facilities, wildlife and waterfowl refuges, or historic sites of national, state or local significance in the immediate vicinity of the project will be impacted.

The proposed project will not require right-of-way acquisition or easement from any land protected under Section 4(f) of the Department of Transportation Act of 1966.

No adverse effects to air quality are anticipated from this project. This project is an air quality "neutral" project, so it is not required to be included in the regional emissions analysis and a project level CO analysis is not required. Since the project is located in an attainment area, 40 CFR Part 51 is not applicable. If vegetation or wood debris is disposed of by open burning, it shall be done in accordance with applicable local laws and regulations of the North Carolina State Implementation Plan (SIP) for air quality in compliance with 15 NCAC 2D.0520 and 1990 Clean Air Act Amendments and the National Environmental Policy Act. This evaluation completes the assessment requirements for air quality, and no additional reports are required.

Ambient noise levels may increase during the construction of this project; however this increase will be only temporary and usually confined to daylight hours. There should be no notable change in traffic volumes after this project is complete. Therefore, this project will have no adverse effect on existing noise levels. Noise receptors in the project area will not be impacted by this project. This evaluation completes the assessment requirements for highway noise set forth in 23 CFR Part 772. No additional reports are required.

The NCDOT Geotechnical Unit determined that no underground storage tanks or areas of other contamination were present at or near the project study area.

Mitchell County is a participant in the Federal Flood Insurance Regular Program. The project is not located within an Approximate or Detailed Study Area. Since the proposed structures will be similar in waterway opening size, it is not anticipated that they will have any significant adverse impact on the existing floodplain and floodway. The approximate 100-year floodplain in the project study area is shown in Figure 9.
Geotechnical borings for the bridge foundation will be necessary.

Based on the above discussion, it is concluded that no substantial adverse environmental impacts will result from the replacement of Bridge Nos. 109 and 110.

VIII. PUBLIC INVOLVEMENT

Due to the isolated nature of this bridge replacement project, no formal public involvement program was initiated. Efforts were undertaken early in the planning process to contact local officials to involve them in the project development with a scoping letter.

IX. AGENCY COMMENTS

Agency comments are summarized below. Letters from the commenting agencies are included in the appendix.

North Carolina Wildlife Resources Commission (NCWRC): Potential for fish spawning moratorium for May 1 through July 15 to prevent off-site sedimentation from impacting fish eggs and fry downstream of the site.

> **Response:** The NCDOT will observe a moratorium on in-water work between May 1 to July 15 to protect fish spawning.

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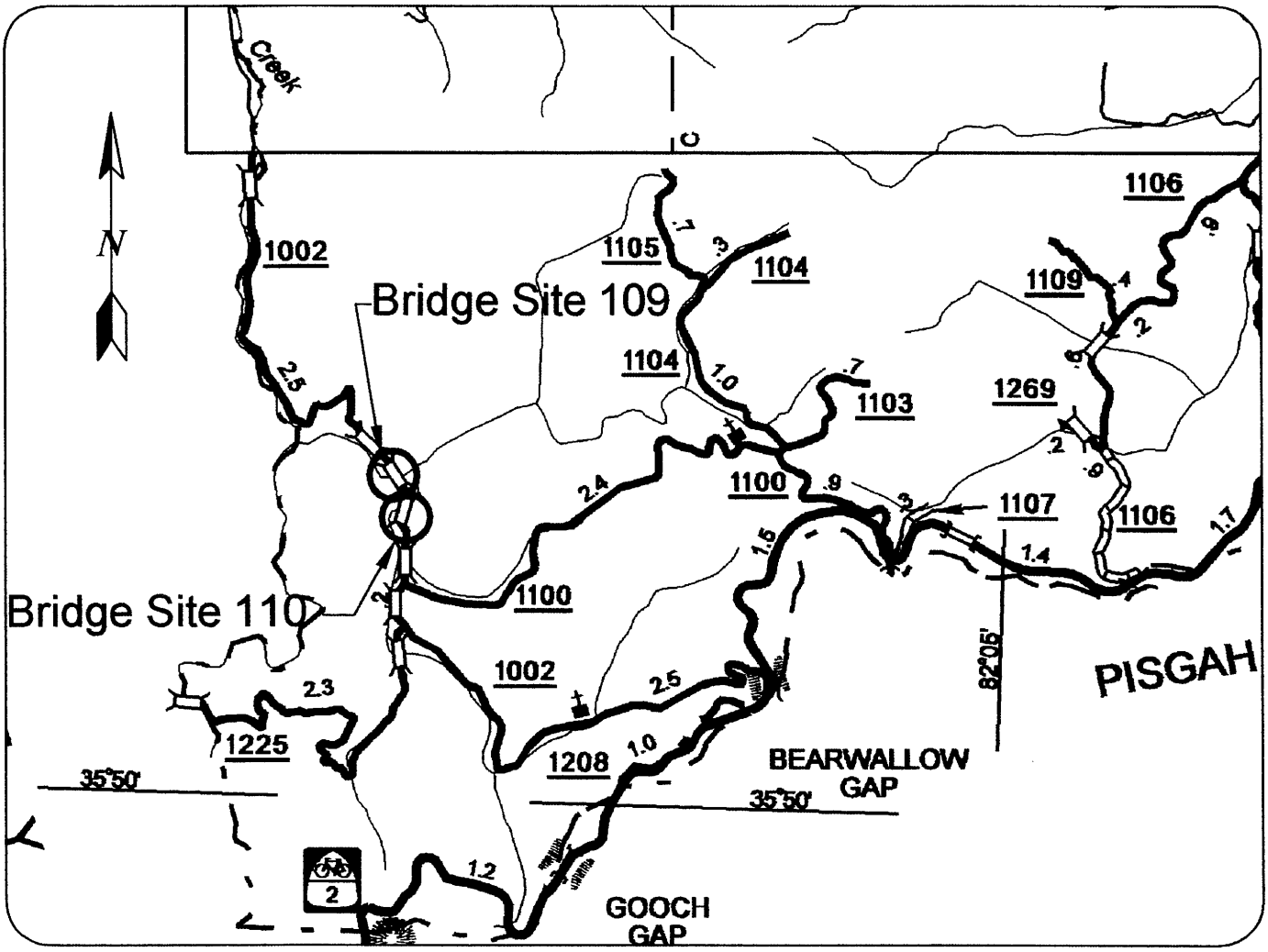
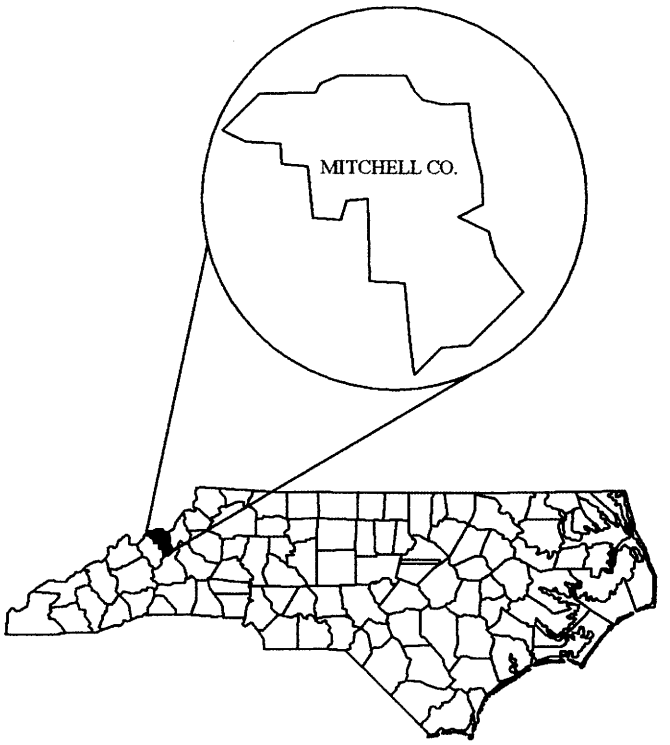
FIGURES





NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

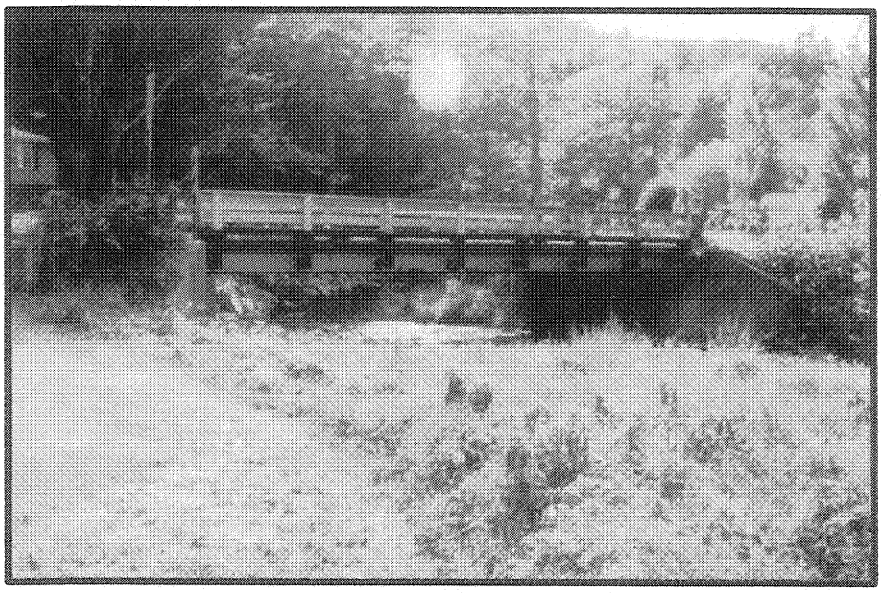
SR 1002
Replace Bridge Nos. 109 & 110
over Crabtree Creek
Mitchell County, North Carolina

TIP NO. B-4202
PROJECT VICINITY MAP

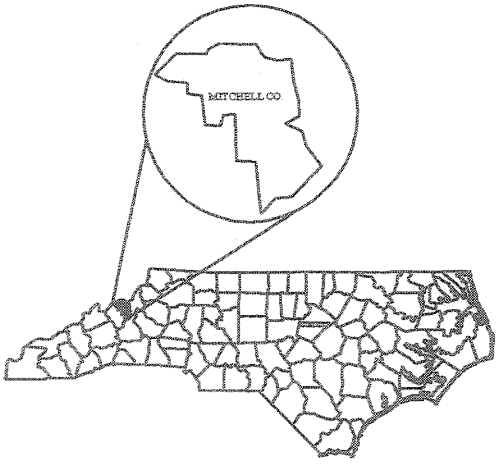
Not to Scale

FIGURE 1

Looking South across Bridge No. 109



Looking West at Bridge No. 109



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SR 1002
Replace Bridge Nos. 109 & 110
over Crabtree Creek
Mitchell County, North Carolina

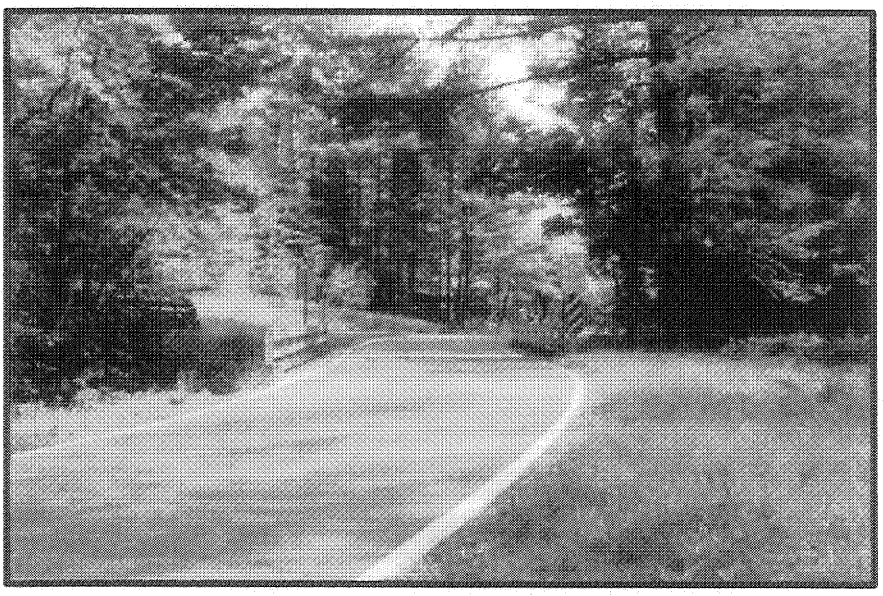
TIP NO. B-4202

PROJECT VICINITY MAP

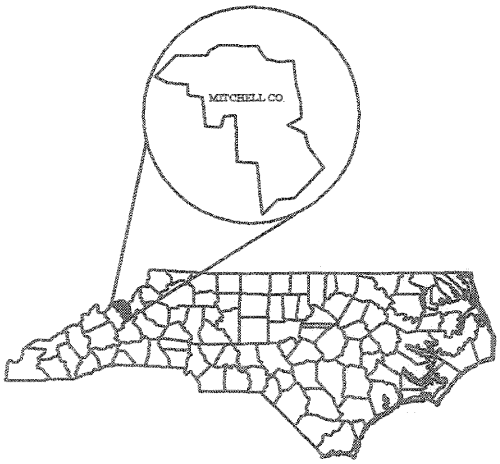
Not to Scale

FIGURE 2

Looking North across Bridge No. 110



Looking South across Bridge No. 110



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SR 1002
Replace Bridge Nos. 109 & 110
over Crabtree Creek
Mitchell County, North Carolina

TIP NO. B-4202

PROJECT VICINITY MAP

Not to Scale

FIGURE 3

PROJECT REFERENCE NO.	SHEET NO.
B-4202	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

(ALTERNATIVE A)
IN-PLACE WITH ON-SITE DETOUR
PREFERRED ALTERNATIVE

DESIGN DATA

DESIGN SPEED	60 mph *
POSTED SPEED	55 mph
CURRENT YEAR ADT (2001)	300 vpd
DESIGN YEAR ADT (2025)	600 vpd
% TTST ,% DUALS	1% ,2%
FUNCTIONAL CLASSIFICATION	Rural Local
TERRAIN	Mountainous
MAX RADIUS	1205 ft
MAXIMUM GRADE	10%
SUPERELEVATION RATE	Se = 0.08

* DESIGN EXCEPTION REQUIRED

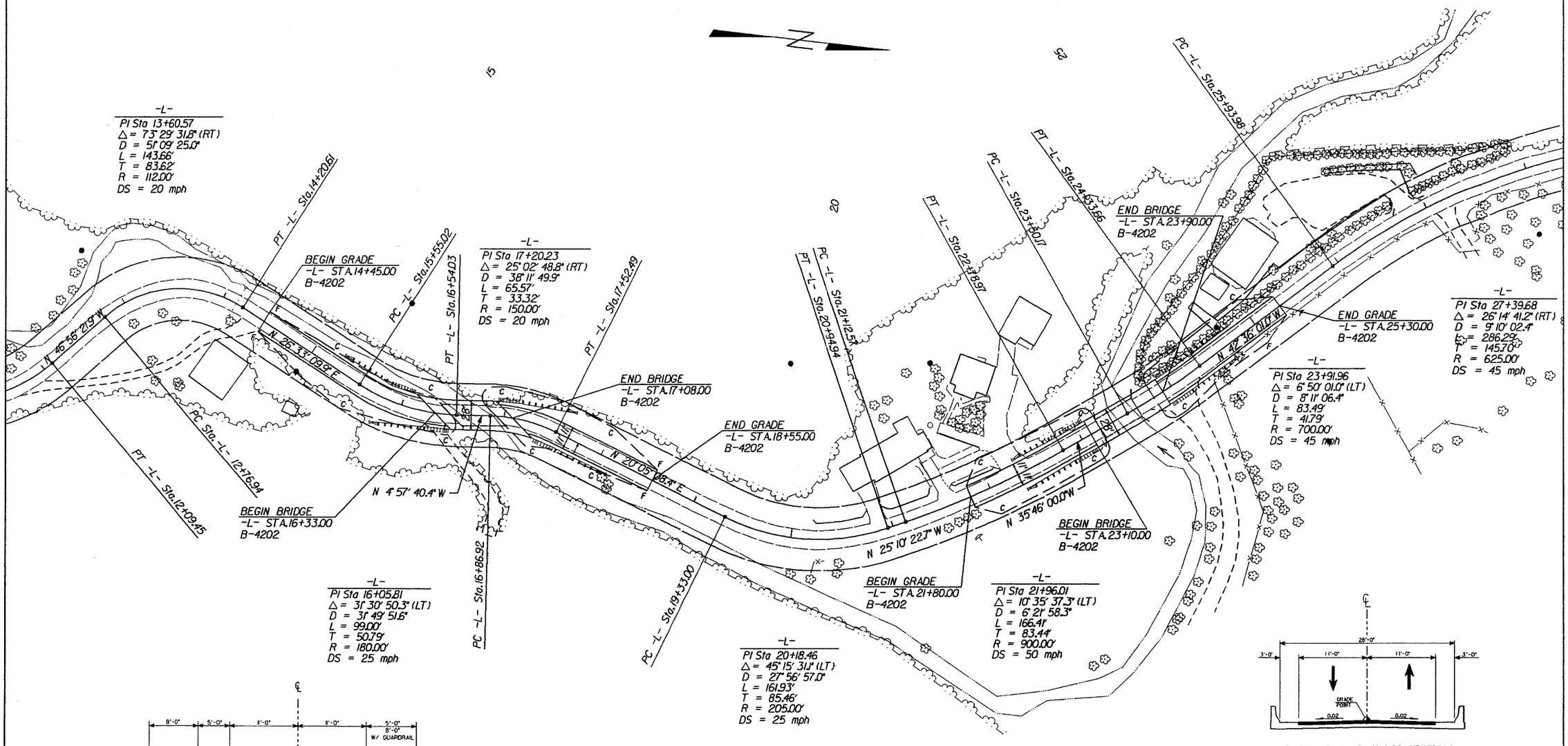


FIGURE 4

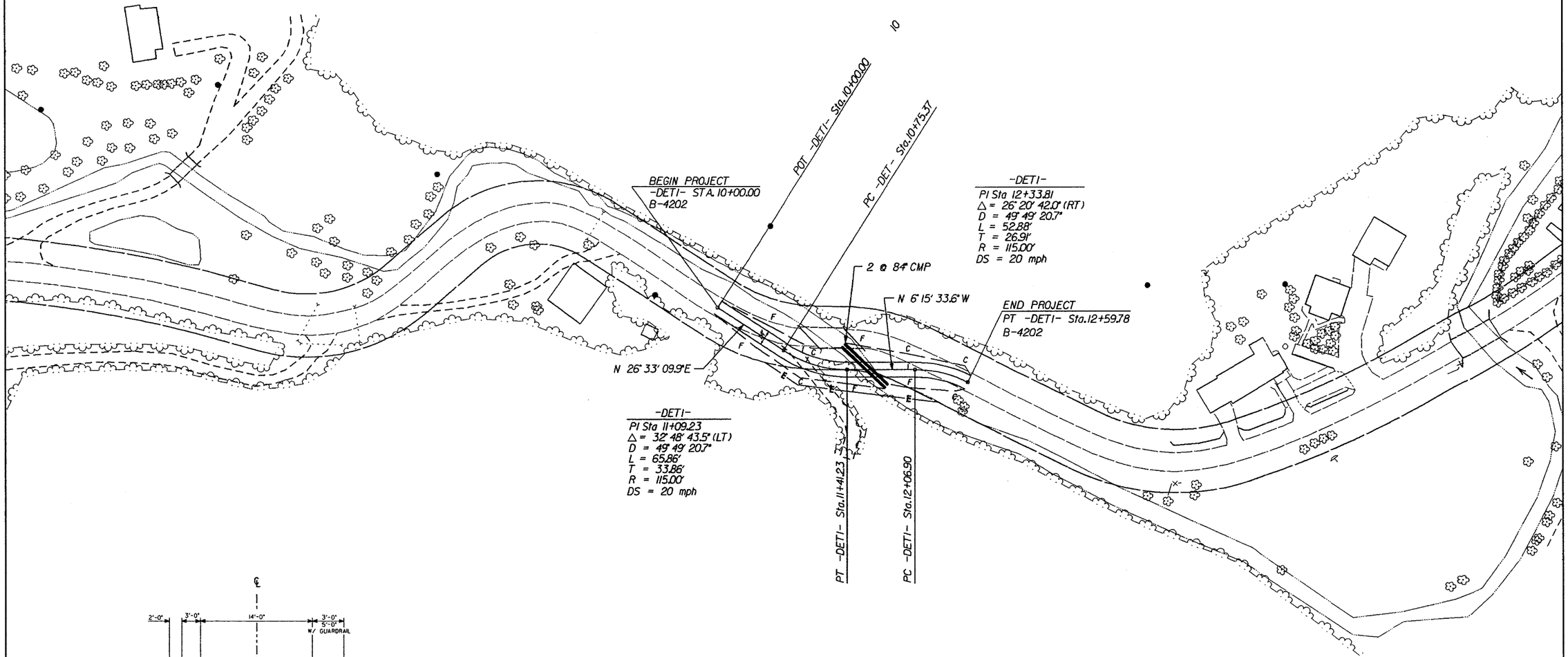
PROJECT REFERENCE NO.	SHEET NO.
B-4202	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

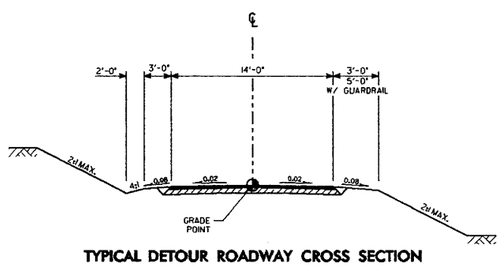
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

(ALTERNATIVE A)
IN-PLACE WITH ON-SITE DETOUR
BRIDGE NO. 110
PREFERRED ALTERNATIVE

DETOUR DESIGN DATA	
DESIGN SPEED	20 mph
MIN. RADIUS	115 ft.
MAXIMUM GRADE	8%
SUPERELEVATION RATE	Se = 0.06





TYPICAL DETOUR ROADWAY CROSS SECTION

FIGURE 5

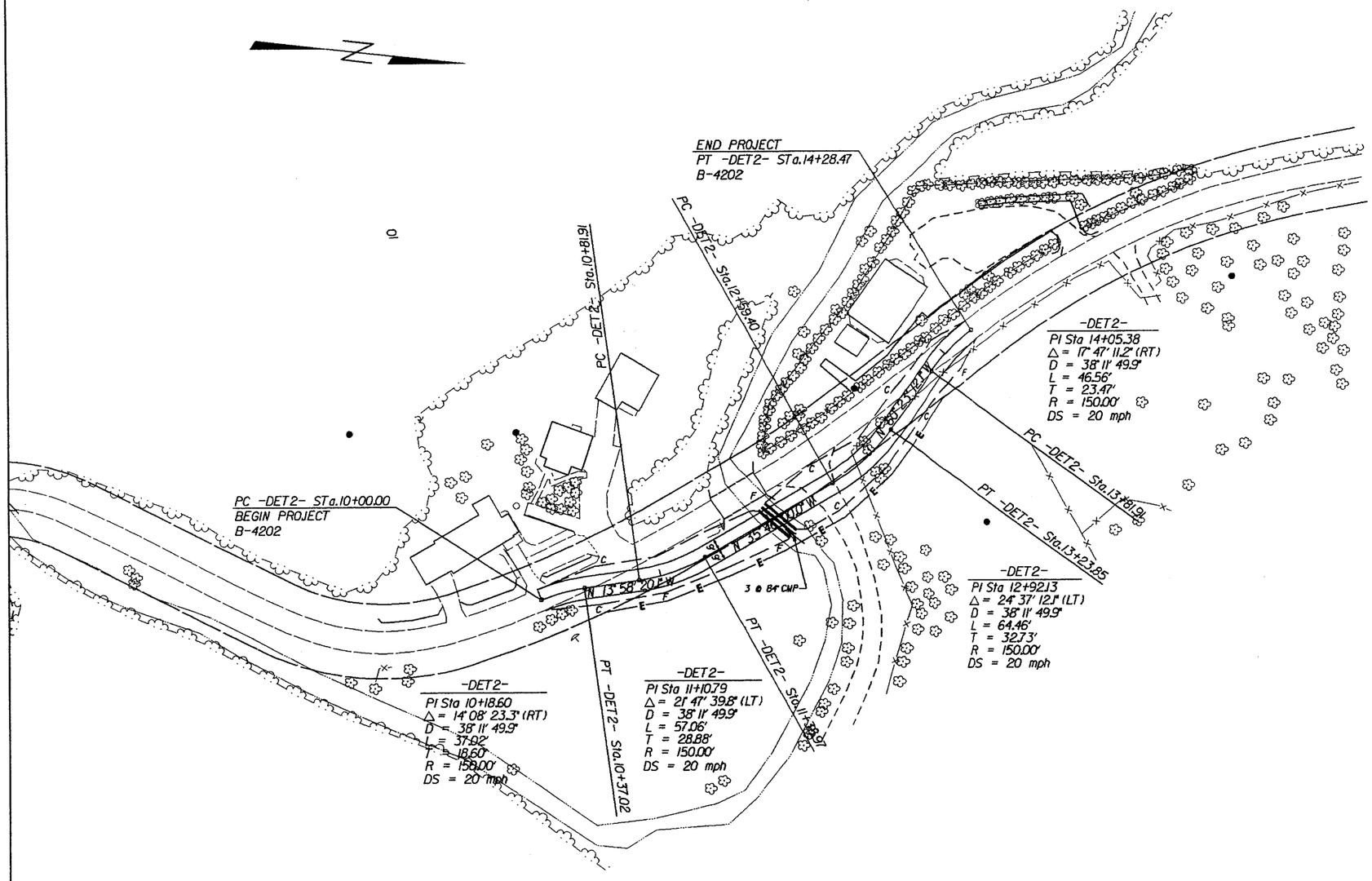
PROJECT REFERENCE NO.	SHEET NO.
B-4202	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

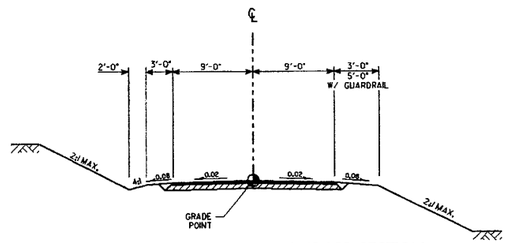
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

(ALTERNATIVE A)
IN-PLACE WITH ON-SITE DETOUR
BRIDGE NO. 109
PREFERRED ALTERNATIVE

DETOUR DESIGN DATA	
DESIGN SPEED	20 mph
MIN. RADIUS	115 ft.
MAXIMUM GRADE	8%
SUPERELEVATION RATE	Se = 0.06





TYPICAL DETOUR ROADWAY CROSS SECTION

SCALE
50 0 50 100

FIGURE 6

PROJECT REFERENCE NO.	SHEET NO.
B-4202	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

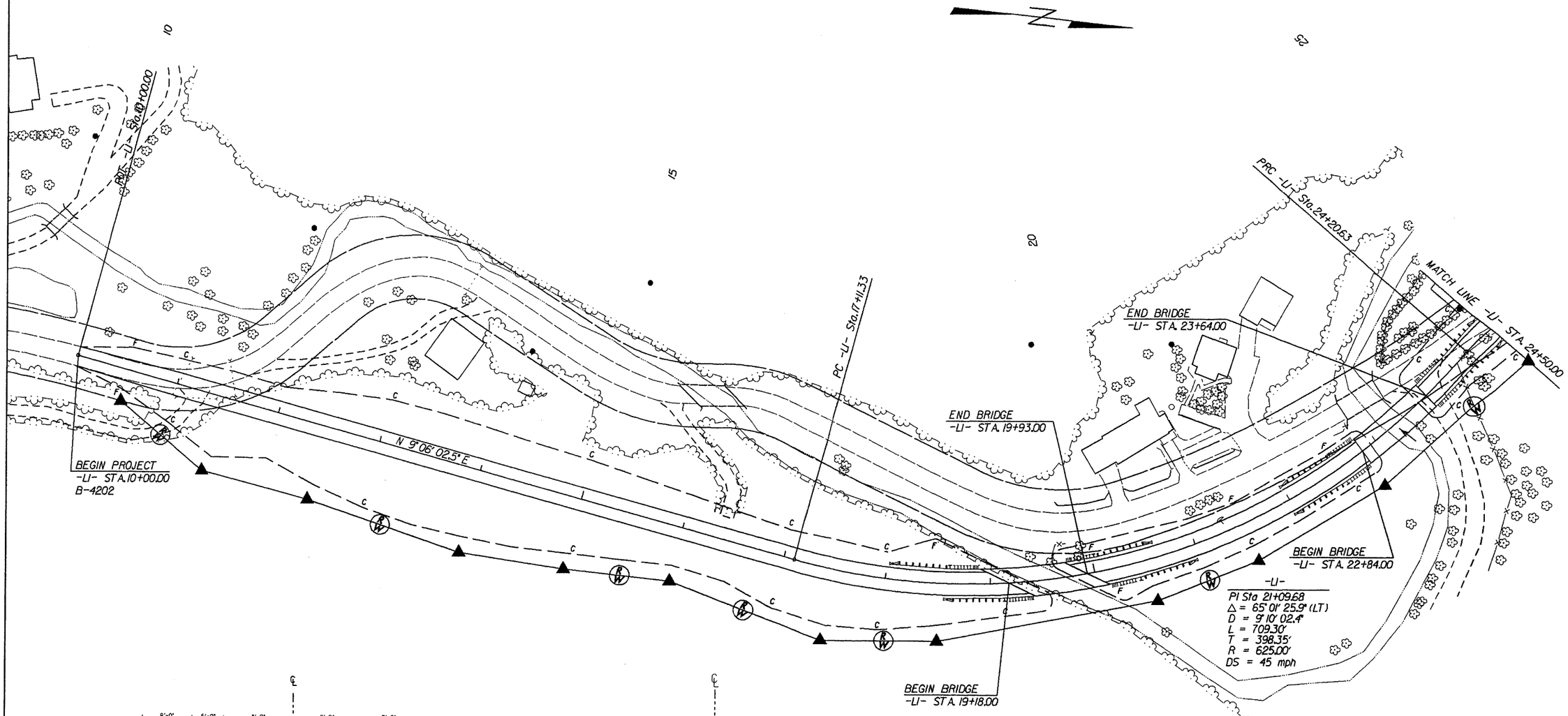
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

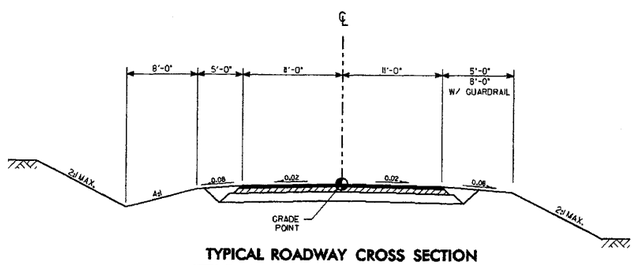
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DESIGN DATA	
DESIGN SPEED	60 mph *
POSTED SPEED	55 mph
CURRENT YEAR ADT (2001)	300 vpd
DESIGN YEAR ADT (2025)	600 vpd
% TTST ,% DUALS	1% ,2%
FUNCTIONAL CLASSIFICATION	Rural Local
TERRAIN	Mountainous
MAX RADIUS	465 ft
MAXIMUM GRADE	10%
SUPERELEVATION RATE	Se = 0.08

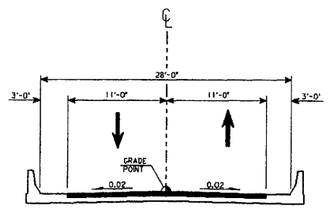
* DESIGN EXCEPTION REQUIRED

(ALTERNATIVE B)
(NEW LOCATION – EAST SIDE)





TYPICAL ROADWAY CROSS SECTION



TYPICAL BRIDGE CROSS SECTION

SCALE
50 0 50 100

FIGURE 7

PROJECT REFERENCE NO.	SHEET NO.
B-4202	4A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

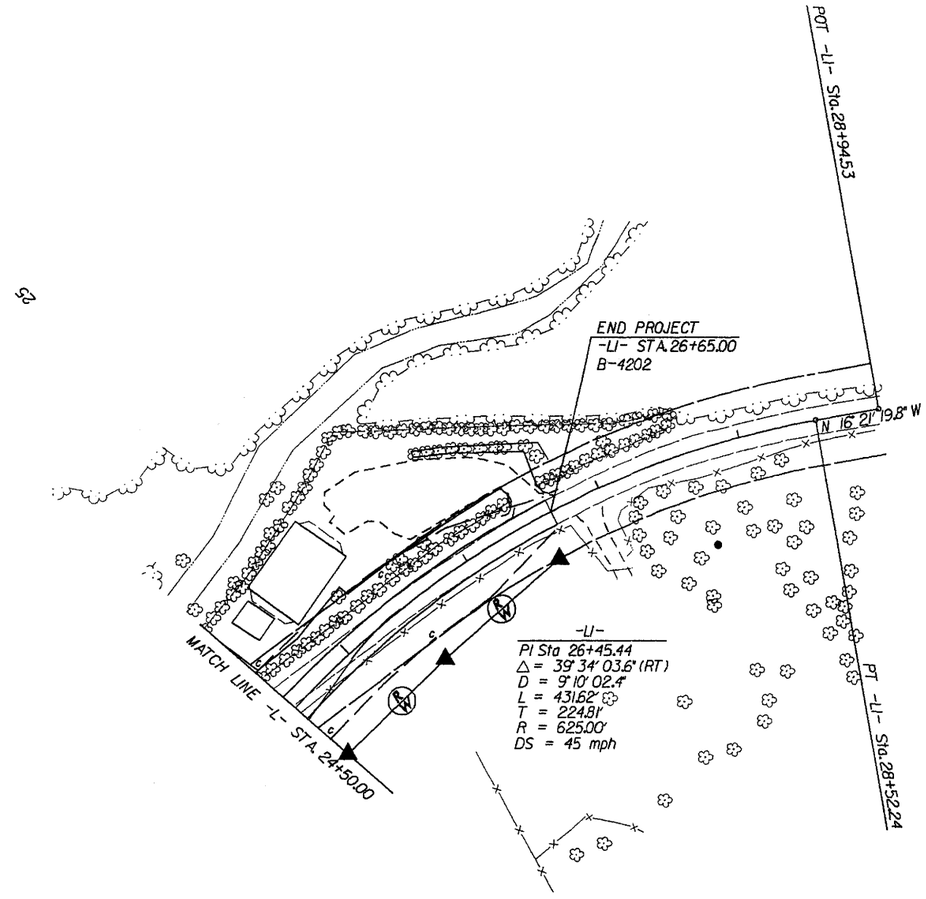
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

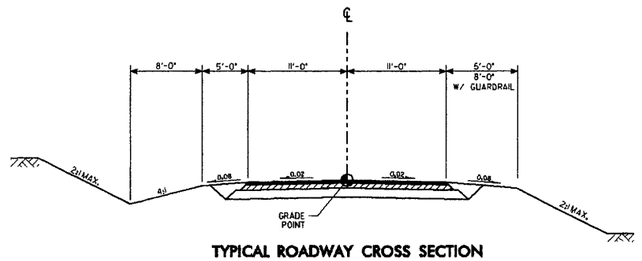
(ALTERNATIVE B)
(NEW LOCATION – EAST SIDE)

DESIGN DATA

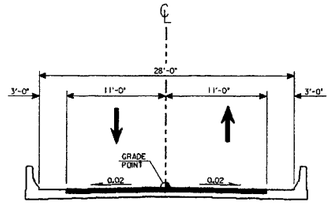
DESIGN SPEED	40 mph
POSTED SPEED	35 mph
CURRENT YEAR ADT (2001)	300 vpd
DESIGN YEAR ADT (2025)	600 vpd
% TTST ,% DUALS	1%, 2%
FUNCTIONAL CLASSIFICATION	Rural Local
TERRAIN	Mountainous
MAX RADIUS	465 ft
MAXIMUM GRADE	10%
SUPERELEVATION RATE	Se = 0.08

* DESIGN EXCEPTION REQUIRED



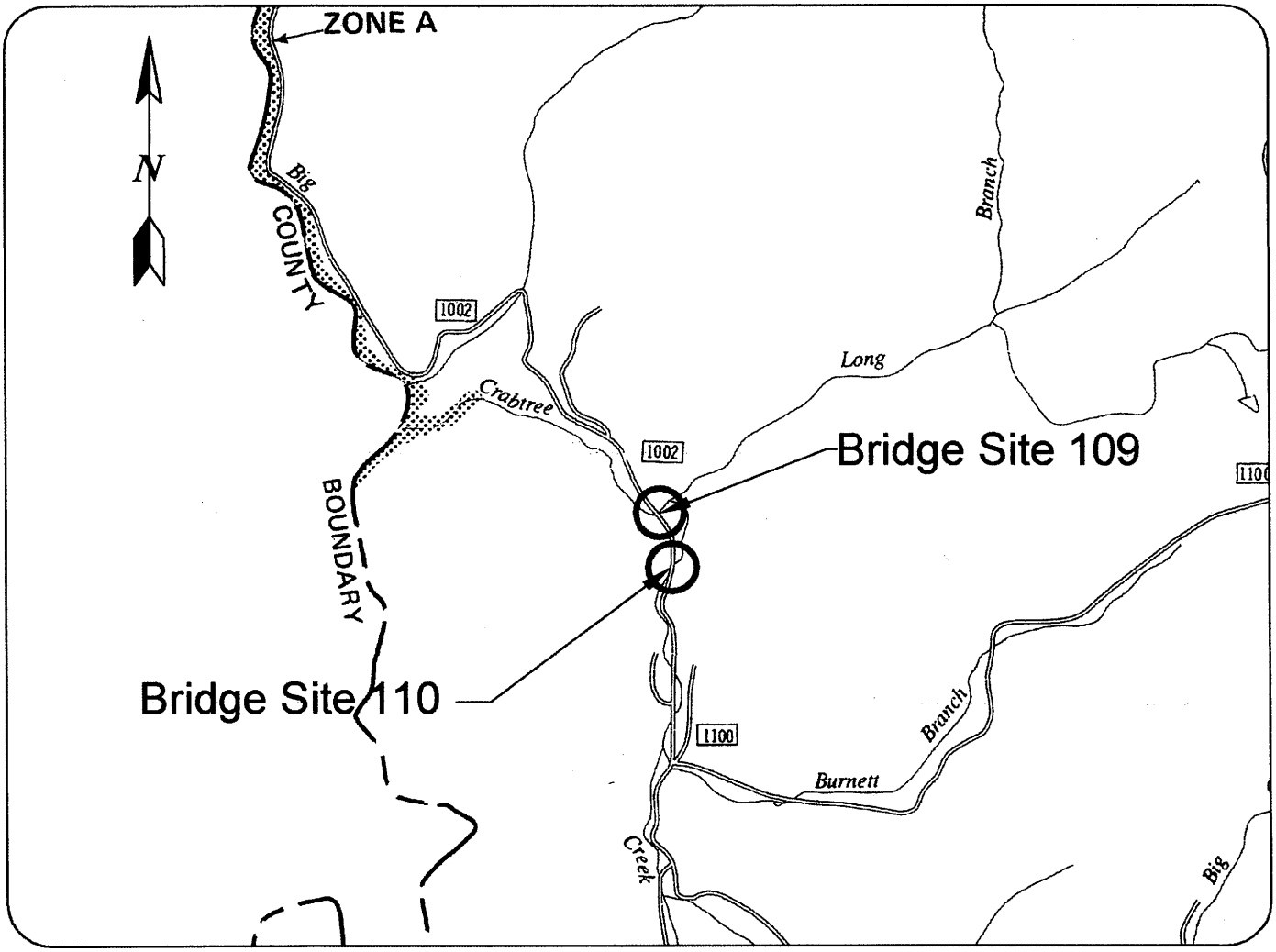


TYPICAL ROADWAY CROSS SECTION



TYPICAL BRIDGE CROSS SECTION

FIGURE 8



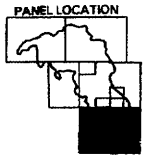
MITCHELL COUNTY, NORTH CAROLINA AND INCORPORATED AREAS

PANEL 125 OF 125

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
UNINCORPORATED AREAS	370161	0125	C

PANEL LOCATION



MAP NUMBER:
37121C0125 C

EFFECTIVE DATE:
SEPTEMBER 2, 1988

Federal Emergency Management Agency

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SR 1002
Replace Bridge No. 109 & 110
over Crabtree Creek
Mitchell County, North Carolina

TIP NO. B-4202
FEMA 100-YEAR FLOOD PLAIN MAP

Not to Scale

FIGURE 9

APPENDIX

US Fish and Wildlife Service

160 Zillicoa Street
Asheville, NC 28801
Phone 828-258-3939 Ext 237, Fax 828-258-5330

MEMO FOR: William T. Goodwin, P.E. **DATE:** June 27, 2002

FROM: Marella Buncick

SUBJECT: Review of NCDOT 2005 Bridge Program

I have completed initial review of the approximately 70 proposed bridge replacements for NCDOT Divisions 9-14 for the year 2005. I would like to commend NCDOT for obtaining the natural resource information up front and allowing the agencies to review the proposals and provide comments so early in the process. It was a large volume of work for everyone involved but I feel that the input will be much more meaningful at this early planning stage.

Attached is a spreadsheet with specific comments for each project reviewed. All of the projects have been assigned a Green, Yellow, or Red ranking depending on the resources affected and the need for future consultation. As you will note, the majority of the projects received a Yellow ranking. This is due in large part to the fact that there are unresolved issues related to listed species. Many of these projects likely will become Green projects after further field review. However, obligations under Section 7 of the Act 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, (2) actions are subsequently modified in a manner that was not considered in this review, or (3) a new species is listed or critical habitat is determined that may be affected by the identified action.

I also have general comments regarding the process and reports. My general comments follow.

Report Content and Organization

1. The reports would be more easily handled if they were not spiral or otherwise bound.
2. Maps need to be much better. Without a significant landmark-- highway, larger town, other feature – it sometimes took a long time to figure out the location of the project within a county.
3. The reports were organized somewhat similarly, but more consistency would aid in the review process. Perhaps a table that has the significant features ---stream width, depth, DWQ class, etc.--also would help.

4. For listed species, it often was difficult to tell whether field surveys had been conducted or whether the information was limited to a database search.
5. In the future, I would appreciate having the Rosgen stream classification included as part of the information.

Listed Species Surveys

Projects currently ranked as Yellow will need to be reviewed in the future after the stated issues are resolved. For those reports with unresolved issues related to listed species, I would recommend that NCDOT wait until closer to implementation time to conduct final surveys. In general, after three to five years we need updated information regarding the project and listed species. Additionally, when aquatic species are involved (particularly mussels) several surveys may be required to adequately determine presence or absence.

The three projects receiving a Red ranking will need to be followed very closely to determine future consultation requirements. These include B-4287 (actually 2 bridge replacements), B-4286, and B-4282. These projects were ranked as Red because of the significance of the number of listed resources potentially affected and the river (either main stem or tributary) involved.

I would encourage NCDOT to require consultants to at least assess habitat for the bog turtle. While the bog turtle technically does not require Section 7 consultation, it is a species of concern and NCDOT is actively managing mitigation sites or parts of sites for this species. Additionally, the Wildlife Resources Commission considers this animal rare in NC and participates actively in surveys and conservation efforts on its behalf.

Bridge Design and Construction Practices

I am assuming that FWS comments/recommendations in the past regarding bridge design, demolition, and construction practices will be folded into each of these projects. Since NCDOT is also working on a BMP manual that covers these practices, I think it would be redundant to state them again. However, if any questions arise, please let me know. I would like to emphasize that we prefer off-site detours wherever possible, to minimize effects to resources.

Each of these projects has been assigned a log number. Please refer to these numbers in future requests regarding the subject projects. Thank you again for the opportunity to provide these comments. If you have questions, please let me know.

PDE	TIP	County	Rank	Reason for Rank	FWS Log Number
SH	B-2988	Haywood	Y	unresolved for listed species, FWS requests review of bridge design	4-2-02-391
MD	B-4011	Ashe	Y	FWS requests resurvey for spiraea, assessment for bog turtle and green floater, review bridge plans	4-2-02-405
MD	B-4012	Ashe	Y	FWS requests resurvey for spiraea and habitat assessment for bog turtle	4-2-02-404
MD	B-4013	Ashe	Y	FWS requests resurvey for spiraea and habitat assessment for bog turtle, review bridge design	4-2-02-403
MD	B-4015	Ashe	Y	FWS requests resurvey for spiraea and habitat assessment for bog turtle, review bridge design	4-2-02-402
MD	B-4016	Ashe	Y	FWS requests resurvey for spiraea and habitat assessment for bog turtle, review bridge design	4-2-02-401
SH	B-4032	Buncombe	G	FWS requests review of bridge design	4-2-02-387
SH	B-4036	Buncombe	Y	unresolved for mussels, FWS requests review of bridge design	4-2-02-395
SH	B-4037	Buncombe	Y	unresolved for mussels, FWS requests review of bridge design	4-2-02-396
DW	B-4038	Burke	Y	unresolved for listed species, be careful of downstream effects	4-2-02-379
DW	B-4039	Burke	Y	unresolved for heartleaf	4-2-02-380
RY	B-4040	Burke	Y	FWS requests resurvey for heartleaf	4-2-02-381
DW	B-4041	Burke	Y	FWS requests resurvey for heartleaf	4-2-02-382
RY	B-4043	Burke	Y	FWS requests mussel survey, requests bridge to bridge and review of bridge design	4-2-02-383
RY	B-4044	Burke	Y	FWS requests resurvey for heartleaf and pogonia, bridge to bridge	4-2-02-384
RY	B-4045	Burke	Y	FWS requests resurvey for heartleaf, new occurrence w/in 1 mile	4-2-02-385
RY	B-4046	Burke	Y	unresolved for pogonia, FWS requests resurvey for heartleaf, request bridge for high quality stream	4-2-02-408
RY	B-4047	Burke	Y	unresolved for heartleaf	4-2-02-386
MD	B-4052	Caldwell	Y	unresolved for heartleaf, be careful of the USGS gaging station at this location	4-2-02-407
JJ	B-4059	Cawtaba	Y	Need survey for heartleaf--habitat assessment inadequate	4-2-02-409
DW	B-4060	Cawtaba	Y	Need survey for heartleaf--habitat assessment inadequate	4-2-02-410
RY	B-4067	Cherokee	Y	unresolved for listed species, close coordination w/USFS, high quality stream	4-2-02-394
DW	B-4070	Cherokee	Y	all listed species unresolved, FWS requests special consideration here for sicklefin redhorse	4-2-02-371
JJ	B-4076	Cleveland	Y	Need survey for heartleaf--habitat assessment inadequate	4-2-02-413
SH	B-4103	Davidson	Y	FWS requests mussel survey, requests bridge to bridge because of stream quality	4-2-02-370
JJ	B-4116	Gaston	Y	Need resurvey for heartleaf	4-2-02-416
DW	B-4123	Graham	Y	unresolved for listed species, Indiana Bat, close coordination w/USFS, high quality stream	4-2-02-393
SH	B-4144	Haywood	Y	unresolved for listed species, FWS requests review of bridge design	4-2-02-392
DP	B-4155	Iredell	G	FWS requests survey for bog turtle	4-2-02-412
DP	B-4158	Iredell	G	FWS requests survey for bog turtle, contractor suggested survey for heartleaf, FWS requests bridge	4-2-02-411
DW	B-4161	Jackson	Y	unresolved for listed species, FWS requests review of bridge design	4-2-02-388
JJ	B-4177	Lincoln	Y	Need resurvey for heartleaf	4-2-02-414
DW	B-4178	Lincoln	Y	Need resurvey for heartleaf	4-2-02-415
DW	B-4179	Macon	Y	unresolved for listed species, FWS requests review of bridge design	4-2-02-389
RY	B-4180	Macon	Y	unresolved for listed species, FWS requests bridge to bridge, consideration for green salamander	4-2-02-390
RY	B-4183	Madison	**These 2 bridge replacements are part of R-2518 and 2519 merger process, review by merger team**		

PDE	TIP	County	Rank	Reason for Rank	FWS Log Number
DW	B-4192	McDowell	Y	Need to assess pogonia	4-2-02-418
JJ	B-4194	McDowell	Y	Need to assess pogonia	4-2-02-419
JJ	B-4195	McDowell	Y	Need to assess pogonia	4-2-02-420
JJ	B-4196	McDowell	Y	Need to assess pogonia	4-2-02-421
DW	B-4197	McDowell	Y	Need to assess pogonia, FWS requests mussel surveys, bridge to bridge for high quality stream	4-2-02-422
JJ	B-4198	McDowell	Y	Need to assess pogonia	4-2-02-423
DW	B-4199	McDowell	Y	Need to assess pogonia	4-2-02-424
DW	B-4202	Mitchell	Y	Unresolved for Elktoe, FWS requests bridge to bridge, **NO SURVEY NEEDED FOR INDIANA BAT**	4-2-02-417
DW	B-4239	Polk	Y	unresolved for small-whorled pogonia and heartleaf	4-2-02-369
DW	B-4240	Polk	Y	unresolved for small-whorled pogonia and heartleaf	4-2-02-361
SH	B-4255	Rowan	G	may need resurvey for Schweinitz's sunflower	4-2-02-375
SH	B-4258	Rutherford	Y	unresolved for small-whorled pogonia	4-2-02-362
RY	B-4259	Rutherford	Y	unresolved for small-whorled pogonia, FWS requests another heartleaf survey	4-2-02-363
RY	B-4260	Rutherford	Y	unresolved for small-whorled pogonia	4-2-02-364
SH	B-4261	Rutherford	Y	unresolved for small-whorled pogonia and heartleaf	4-2-02-365
RY	B-4264	Rutherford	Y	unresolved for small-whorled pogonia, FWS requests another survey for heartleaf	4-2-02-368
RY	B-4265	Rutherford	Y	unresolved for small-whorled pogonia, FWS requests another survey for heartleaf and irisette	4-2-02-366
RY	B-4266	Rutherford	Y	unresolved for small-whorled pogonia, FWS requests another survey for heartleaf	4-2-02-367
	note for Rutherford Co projects--No survey is required for Indiana bat because the record is a winter record.				
SH	B-4282	Stokes	R	unresolved for cardamine and James spiny mussel, FWS concerned about bridge design	4-2-02-376
DP	B-4284	Surry	Y	unresolved for pogonia, FWS requests assessment for bog turtle and brook floater, bridge to bridge	4-2-02-426
DP	B-4285	Surry	Y	unresolved for pogonia, FWS requests assessment for bog turtle and brook floater	4-2-02-425
RY	B-4286	Swain	R	unresolved for listed species, esp. Indiana bat, FWS concerned with bridge design	4-2-02-378
DW	B-4287	Swain	R	unresolved for listed species, esp. Indiana bat, FWS concerned with bridge design	4-2-02-377
RY	B-4288	Transylvania	Y	unresolved for listed species, FWS requests survey for bunched arrowhead	4-2-02-374
SH	B-4290	Transylvania	Y	unresolved for listed species	4-2-02-373
SH	B-4291	Transylvania	Y	need mussel surveys	4-2-02-372
MD	B-4316	Watauga	Y	FWS requests bridge to bridge for high quality stream, FWS requests survey for green floater	4-2-02-398
JJ	B-4317	Watauga	G	FWS requests bridge to bridge for high quality stream	4-2-02-399
MD	B-4318	Watauga	G	FWS requests bridge to bridge for high quality stream, FWS requests survey for green floater	4-2-02-400
MD	B-4322	Wilkes	G	FWS requests bridge to bridge for high quality stream, assessment for bog turtle	4-2-02-406
DW	B-4330	Yancey	Y	unresolved for elktoe, FWS requests resurvey for Spiraea, be careful of downstream effects	4-2-02-397

DW

State of North Carolina
Department of Environment
and Natural Resources
Division of Water Quality

Michael Easley, Governor
Bill Ross, Secretary
Alan Klimek, Director

NCDENR
NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

June 18, 2002

Memorandum To: William T. Goodwin, Jr., PE, Unit Head
Bridge Replacement Planning Unit
Project Development and Environmental Analysis Branch

Through: John Dorney
NC Division of Water Quality, 401 Unit

From: Robert Ridings
NC Division of Water Quality, 401 Unit

Subject: Review of Natural Systems Technical Reports for bridge replacement projects scheduled for construction in CFY 2005: "Yellow Light" Projects: B-4037, B-4076, B-4116, B-4016, B-4052, B-4015, B-4013, B-4012, B-4011, B-4202, B-4199, B-4196, B-4195, B-4322, B-4317, B-4316, B-4285, & B-4028.

On all projects, use of proper sediment and erosion control will be needed. Sediment and erosion control measures should not be placed in wetlands. Sediment should be removed from any water pumped from behind a cofferdam before the water is returned to the stream. Sedimentation and Erosion Control Guidelines for Sensitive Watersheds (15A NCAC 4B .0024) must be implemented prior to any ground-disturbing activities to minimize impacts to downstream aquatic resources. Temporary or permanent herbaceous vegetation must be planted on all bare soil *within 10 days* of ground-disturbing activities to provide long term erosion control.

This office would prefer bridges to be replaced with new bridges. However if the bridge must be replaced by a culvert and 150 linear feet or more of stream is impacted, a stream mitigation plan will be needed prior to the issuance of a 401 Water Quality Certification. While the NCDWQ realizes that this may not always be practical, it should be noted that for projects requiring mitigation, appropriate mitigation plans will be required prior to issuance of a 401 Water Quality Certification.

Any proposed culverts shall be installed in such a manner that the original stream profile is not altered (i.e. the depth of the channel must not be reduced by a widening of the streambed). Existing stream dimensions are to be maintained above and below locations of culvert extensions.

For permitting, any project that falls under the Corps of Engineers' Nationwide Permits 23 or 33 do not require written concurrence by the NC Division of Water Quality. Notification and courtesy copies of materials sent to the Corps, including mitigation plans, are required. For projects that fall under the Corps of Engineers Nationwide Permit 14 or Regional General Bridge Permit 31, the formal 401 application process will be required including appropriate fees and mitigation plans.

Do not use any machinery in the stream channels unless absolutely necessary. Additionally, vegetation should not be removed from the stream bank unless it is absolutely necessary. NCDOT should especially avoid removing large trees and undercut banks. If large, undercut trees must be removed, then the trunks should be cut and the stumps and root systems left in place to minimize damage to stream banks.

Use of rip-rap for bank stabilization must be minimized; rather, native vegetation should be planted when practical. If necessary, rip-rap must be limited to the stream bank below the high water mark, and vegetation must be used for stabilization above high water.

Rules regarding stormwater as described in (15A NCAC 2b.0216 (3) (G)) shall be followed for these projects. These activities shall minimize built-upon surface area, divert runoff away from surface waters and maximize utilization of BMPs. Existing vegetated buffers shall not be mowed in order to allow it to be most effectively utilized for storm water sheet flow.

Special Note on projects B-4037 and B-4076: these waters are classified as 303(d) waters. Special measures for sediment control will be needed.

Also note that projects B-4037, B-4052, B-4015,B-4013, B-4012, B-4011, B-4202, B-4196, B-4322, B-4317, and B-4316 occur in Trout waters. Any trout-specific conditions that would be determined by the North Carolina Wildlife Resources Commission, to protect the egg and fry stages of trout from sedimentation during construction, would be required on any 401 certifications.

Streams classified as "+" signify a stream draining into another stream that is ORW or HQW. Projects that occur in "+" streams are: B-4016, B-4012, B-4011, and B-4317.

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.

JW

North Carolina Wildlife Resources Commission

512 N. Salisbury Street, Raleigh, North Carolina 27604-1188, 919-733-3391
Charles R. Fullwood, Executive Director

TO: William T. Goodwin, Jr., PE, Unit Head
Bridge Replacement & Environmental Analysis Branch

FROM: Ron Linville, Habitat Conservation Coordinator
Habitat Conservation Program

DATE: May 7, 2002

SUBJECT: NCDOT Bridge Replacements:
Mitchell County – Bridge No. 110, SR1002, East Fork Crabtree Creek, B-4202
Burke County – Bridge No. 175, SR1901, White Oak Creek, B-4046

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 steam 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. Tim Savidge 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. Mitchell County – Bridge No. 110, SR1002, East Fork Crabtree Creek, B-4202 YELLOW LIGHT. Warmwater fishery, Tributary to Henry River, Listed species? Sunfish and rock bass are important species. Potential for fish spawning moratorium for May 1 through July 15 to prevent off-site sedimentation from impacting fish eggs and fry downstream of the site.

2. Burke County – Bridge No. 175, SR1901, White Oak Creek, B-4046
YELLOW LIGHT. Warmwater fishery, Tributary to Jacobs Fork River, Listed species? Sunfish and rock bass are important species. Potential for fish spawning moratorium for May 1 through July 15 to prevent off-site sedimentation from impacting fish eggs and fry downstream of the site.

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 (336) 769-9453. Thank you for the opportunity to review and comment on these projects.

Cc: David Cox, WRC

Federal Aid # BRZ-1002(9) *TIP* # B-4202 *County*: Mitchell

CONCURRENCE FORM FOR PROPERTIES NOT ELIGIBLE FOR THE NATIONAL REGISTER OF HISTORIC PLACES

Project Description: Replace Bridge No. 110 on SR 1002 over Crabtree Creek

On 03/18/03, representatives of the

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

Reviewed the subject project at

- [ ] Scoping meeting
- [x] Historic architectural resources photograph review session/consultation
- [ ] Other

All parties present agreed

- [ ] There are no properties over fifty years old within the project's area of potential effects.
- [x] There are no properties less than fifty years old which are considered to meet Criteria Consideration G within the project's area of potential effects.
- [x] There are properties over fifty years old within the project's Area of Potential Effects (APE), but based on the historical information available and the photographs of each property, the property identified as 1-10 is considered not eligible for the National Register and no further evaluation of it is necessary.
- [x] There are no National Register-listed or Study Listed properties within the project's area of potential effects.
- [x] All properties greater than 50 years of age located in the APE have been considered at this consultation, and based upon the above concurrence, all compliance for historic architecture with Section 106 of the National Historic Preservation Act and GS 121-12(a) has been completed for this project.
- [x] There are no historic properties affected by this project. (Attach any relevant documentation.)

Signed:

Mary Pope Furr — 3-18-2003
Representative, NCDOT — Date

Michael C. Dawson — 3/18/03
Representative, FHWA — Date

Clara N. Swallow — 3/18/03
Representative, HPO — Date

David Brook pgz — 3/21/03
State Historic Preservation Officer — Date

If a survey report is prepared, a final copy of this form and the attached list will be included.

ILR active

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
David J. Olson, Director

January 29, 2002

MEMORANDUM

TO: William D. Gilmore, Manager
NCDOT, Division of Highways

FROM: David Brook

not included in TIP

SUBJECT: Replace Bridge 110 on SR 1002 over Crabtree Creek, ~~Replace Bridge 109 on SR 1002 over Crabtree Creek,~~ TIP B-4202, Mitchell County, ER 02-8525

Thank you for your letter of September 25, 2001, regarding the above project.

There are no known archaeological sites within the 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.

We have conducted a search of our maps and files and did not locate any structures of historical or architectural importance within the general area of the project. However, a survey of the area of potential effect has never been done. An architectural historian for the Department of Transportation should inventory and evaluate this property and any others, that are fifty years old or older and located within the area of potential effect.

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 and consideration. If you have questions concerning the above comment, 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

	Location	Mailing Address	Telephone/Fax
Administration	507 N. Blount St, Raleigh, NC	4617 Mail Service Center, Raleigh 27699-4617	(919) 733-4763 •733-8653
Restoration	515 N. Blount St, Raleigh , NC	4613 Mail Service Center, Raleigh 27699-4613	(919) 733-6547 •715-4801
Survey & Planning	515 N. Blount St, Raleigh, NC	4618 Mail Service Center, Raleigh 27699-4618	(919) 733-4763 •715-4801

North Carolina Department of Transportation
PROJECT ENVIRONMENTAL CONSULTATION FORM
I.D. No. B-4202

I. GENERAL INFORMATION

a.	Consultation Phase:	Construction	
b.	Project Description	Mitchell County, Bridges Number 109 & 110 on SR 1002 over East Fork Big Crabtree Creek	
c.	State Project: Federal Project:	8. 2880701 BRZ-1002 (9)	
d.	Document Type:	CE	June 25, 2004 Date

II. REFERENCE: Categorical Exclusion approved June 25, 2004.

The following memorandum provides information to assist in the preparation of a FHWA Right of Way Consultation for the proposed project. It addresses water resources and federally protected species potentially impacted by the project and serves to update the referenced Categorical Exclusion (CE).

III. CHANGES IN PROPOSED ACTION AND ENVIRONMENTAL CONSEQUENCES

DESIGN CHANGES

After the document was finished it was discovered that a design change would be necessary for bridge No. 110 to make the bridge more perpendicular to the stream. The NRTR was reviewed with the proposed changes and it was determined that the revised slope limits would not result in prohibited impacts to the natural or human environments.

WATER RESOURCES

Water resource classifications have not changed since the CE was completed. However, the CE erroneously refers to East Fork Big Crabtree Creek as simply Crabtree Creek. East Fork Big Crabtree Creek [Index # 7-2-48-2], is classified as "C Tr" by the North Carolina Division of Water Quality (NCDWQ) and is located in the French Broad River Basin, Subbasin 04-03-06 of Hydrological Cataloguing Unit 06010108. Neither High Quality Waters (HQW), Water Supplies (WS-I: undeveloped watersheds or WS-II:

predominately undeveloped watersheds), nor Outstanding Resource Waters (ORW) occur within 1.0 mile of project study area. East Fork Big Crabtree Creek is not designated as a North Carolina Natural or Scenic River, or as a national Wild and Scenic River. East Fork Big Crabtree Creek is not listed as a 2006 303(d) impaired water nor are any listed within one mile of the project area. A 2004 letter from the North Carolina Wildlife Resource Commission (NCWRC) listed no trout moratoriums for this project.

PROTECTED SPECIES

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), Proposed Threatened (PT), are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of May 10, 2007, the United States Fish and Wildlife Service (USFWS) lists eleven federally protected species for Mitchell County (Table 1). A description of the species and biological conclusion is provided in the referenced CE document. As noted in the CE document, the Biological Conclusion for each species is "No Effect", due to lack of suitable habitat. The Bog Turtle and Roan Mountain Bluet were added to the Mitchell County list since the publication of the CE document. The biological conclusion for both is "No Effect" due to lack of suitable habitat.

Table 1. Federally protected species of Mitchell County.

Scientific Name	Common Name	**Federal Status**	Habitat	**Biological Conclusion**
IV. *Clemmys muhlenbergii*	Bog Turtle	T (S/A)	No	Not Required
Glaucomys sabrinus coloratus	Carolina northern flying squirrel	E	No	No Effect
Myotis sodalis	Indiana bat	E	No	No Effect
Alasmidonta raveneliana	Appalachian elktoe	E	No	No Effect
Microhexura montivaga	Spruce-fir moss spider	E	No	No Effect
Geum radiatum	Spreading avens	E	No	No Effect
Liatris helleri	Heller's blazing star	T	No	No Effect
Solidago spithamaea	Blue Ridge goldenrod	T	No	No Effect
Spiraea virginiana	Virginia spiraea	T	No	No Effect
Gymnoderma lineare	Rock gnome lichen	E	No	No Effect
Hedyotis purpurea var. *montana*	Roan Mountain Bluet	E	No	No Effect

The NC Natural Heritage database of rare species and unique habitats was reviewed on August 15, 2007. There is no documentation of federal or state threatened or endangered species found within 1 mile of the project study area.

IV. LIST OF ENVIRONMENTAL COMMITMENTS

A list of the special project commitments for this project is attached.

V. COORDINATION

Project Development and Environmental Analysis Branch personnel have discussed current project proposals with others as follows:

Design Engineer:	Wayne Best	8/21/07 Date
Permits Section:	Jeffrey Hemphill	8/21/07 Date
FHWA Area Engineer:	Donnie Brew	8/21/07 Date

VI. NCDOT CONCURRENCE

Project Development Engineer — Date 9/4/07

PROJECT COMMITMENTS

Mitchell County
Bridge Nos. 109 & 110 on SR 1002 (Crabtree Creek Road)
Over Crabtree Creek
Federal Aid Project No. BRZ-1002 (9)
State Project No. 8.2880701
T.I.P Project No. B-4202

~~Except for the standard Nationwide Permit #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, NCDOT 's Guidelines for Best Management Practices for Bridge Demolition and Removal, General Certification Conditions, and Section 401 Conditions of Certification, no special commitments have been agreed to by NCDOT.~~

Commitments Developed Through Project Development

There are no special commitments associated with the proposed replacement of Bridges No. 109 & 110.

~~***Division Construction***~~

~~The NCDOT will observe a moratorium on in-water work between May 1 to July 15 to protect fish spawning.~~

The moratorium from the North Carolina Wildlife Resource Commission for in-water work between May 1 and July 15 will not be adhered to by NCDOT since it is not for any federally protected species. This commitment will be removed during the permitting process.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 26, 2007

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

ATTENTION: Mr. Dave Baker
NCDOT Coordinator

SUBJECT: **Nationwide Permit 23 and 33 Applications** for the proposed Replacement of Bridges 109 & 110 over East Fork Big Crabtree Creek On SR 1002 (Crabtree Creek Rd. in Mitchell County. Federal Project No BRZ-1002(9), State Project No. 8.2880701, TIP No. B-4202.

Dear Sir:

Please find enclosed a copy of the Pre-Construction Notification, permit drawings, and1/2 size plans for the above referenced project. A Categorical Exclusion was completed for the project on June 25, 2004. A Construction Consultation was completed on September 11, 2007 and distributed shortly thereafter. Additional copies are available upon request. The North Carolina Department of Transportation (NCDOT) proposes to replace Bridges No. 109 and No. 110 on the same alignments with new 75 and 80 feet long single span bridges, respectively. There will be 80 linear feet of permanent impacts to surface waters. Traffic will be maintained via two onsite temporary detours to the east of the existing bridges.

IMPACTS TO WATERS OF THE UNITED STATES

General Description: The water resource impacted for project B-4202 is East Fork Big Crabtree Creek [Index # 7-2-48-2], and is classified as "**C Tr**" by the North Carolina Division of Water Quality (NCDWQ). The project is located in the French Broad River Basin, Hydrological Cataloguing Unit 06010108. Neither High Quality Waters (HQW), Water Supplies (WS-I: undeveloped watersheds or WS-II: predominately undeveloped

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1548 MAIL SERVICE CENTER
RALEIGH NC 27699-1548

TELEPHONE: 919-733-3141
FAX: 919-733-9794

WEBSITE: WWW.NCDOT.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

watersheds), nor Outstanding Resource Waters (ORW) occur within 1.0 mile of project study area. East Fork Big Crabtree Creek is not designated as a North Carolina Natural or Scenic River, or as a national Wild and Scenic River. East Fork Big Crabtree Creek is not listed as a 2006 303(d) impaired water nor are any listed within one mile of the project area.

Permanent Impacts: The construction of the new bridges will result in 45 linear feet of impacts to surface waters for the replacement of Bridge No. 110 (Site 1) and 20 linear feet of impacts to surface waters for the replacement of Bridge No. 109 (Site 3) for bank stabilization. Outfall protection for a drainage ditch entering East Fork Big Crabtree Creek between the two bridges will result in 15 linear feet of fill in surface waters (Site 2).

Temporary Impacts: Temporary impervious dikes will be utilized for the removal of existing vertical abutments and installation of new abutments resulting in <0.02 acre of temporary impacts to surface waters for the replacement of Bridge No. 110 (Site 1) and <0.01 acre of temporary impacts to surface waters for the replacement of Bridge No. 109 (Site 3).

Utilities: There are no impacts to jurisdictional resources due to utilities for this project.

Bridge Demolition: Bridge No. 109 is a single span structure with an overall length of 41 feet, and a clear roadway width of 19.3 feet. Bridge No. 110 is a single span structure with an overall length of 42 feet, and a clear roadway width of 19.2 feet. Both bridges were constructed in 1952 and consist of a timber deck with an asphalt surface on a steel I-beams. Bridge Nos. 109 and 110 are structurally deficient and according to federal guidelines are considered to be functionally obsolete. Best Management Practices for Bridge Demolition and Removal will be implemented; however, there is potential for bridge components to drop into Waters of the United States during demolition. Any bridge components that fall into the water during demolition will be removed according to Best Management Practices.

FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), Proposed Threatened (PT), are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of May 10, 2007, the United States Fish and Wildlife Service (USFWS) lists eleven federally protected species for Mitchell County (Table 1). The Bog Turtle and Roan Mountain Bluet were added to the Mitchell County list since the publication of the CE document. The biological conclusion for both is "No Effect" due to lack of suitable habitat.

Table 1. Federally Protected Species of Mitchell County.

Scientific Name	**Common Name**	**Federal Status**	**Habitat**	**Biological Conclusion**
Clemmys muhlenbergii	Bog Turtle	T (S/A)	No	Not Required
Glaucomys sabrinus coloratus	Carolina northern flying squirrel	E	No	No Effect
Myotis sodalis	Indiana bat	E	No	No Effect

Alasmidonta raveneliana	Appalachian elktoe	E	No	No Effect
Microhexura montivaga	Spruce-fir moss spider	E	No	No Effect
Geum radiatum	Spreading avens	E	No	No Effect
Liatris helleri	Heller's blazing star	T	No	No Effect
Solidago spithamaea	Blue Ridge goldenrod	T	No	No Effect
Spiraea virginiana	Virginia spiraea	T	No	No Effect
Gymnoderma lineare	Rock gnome lichen	E	No	No Effect
Hedyotis purpurea var. *montana*	Roan Mountain Bluet	E	No	No Effect

MITIGATION

Avoidance and Minimization: NCDOT has minimized impacts to the fullest extent possible.

- The proposed bridge replacements will mostly span East Fork Big Crabtree Creek
- The proposed bridge replacements will use the existing footers from the vertical abutments; therefore, avoiding new permanent surface water impacts from the bridge construction.

A September 28, 2007 correspondence from the North Carolina Wildlife Resource Commission (NCWRC) listed a trout moratorium for this project from January 1 to April 15. The Greensheet from the Categorical Exclusion (CE) document stated that there is a Sunfish and Rock Bass Moratorium from May 1 to July 15. Neither of these species is offered federal protection in North Carolina, nor will the inwater construction of the proposed project significantly affect the sunfish and bass. Conversely, imposing an unwarranted moratorium for these species could result in a longer overall construction period. Therefore, NCDOT will only honor the trout moratorium.

Compensatory Mitigation: Construction for this project will impose temporary impacts and minimal permanent impacts to jurisdictional waters. There are no HQWs on the project and no loss of Waters of the US from bank stabilization therefore, no mitigation is proposed for this project.

PROJECT SCHEDULE

The project is currently scheduled for review on April 29, 2008 and to Let on June 17, 2008 with construction scheduled to begin shortly thereafter.

REGULATORY APPROVALS

Section 404 Permit: It is anticipated that the temporary dewatering of East Fork Big Crabtree Creek be authorized under Section 404 Nationwide Permit 33 (Temporary Construction Access and Dewatering). We are, therefore, requesting the issuance of a Nationwide Permit 33 authorizing the temporary dewatering of East Fork Big Crabtree Creek. All other aspects of this project are being processed by the Federal Highway Administration as a "Categorical Exclusion". The NCDOT requests that these activities be authorized by a Nationwide Permit 23.

Section 401 Permit: We anticipate 401 General Certification numbers 3403 and 3366 will apply to this project. The NCDOT will adhere to all Water Quality Certification general conditions, therefore, we are not requesting written concurrence. We are providing two copies of this application to the North Carolina Department of Environmental and Natural Resources, Division of Water Quality, for their records.

We anticipate that comments from the NCWRC will be requested prior to authorization by the US Army Corps of Engineers (USACE). By copy of this letter and attachment, NCDOT hereby requests NCWRC review. NCDOT requests that NCWRC forward their comments to the USACE and NCDOT within 30 days of receipt of this application.

Thank you for your assistance with this project. A copy of this permit application will be posted on the NCDOT Website at http://207.4.62.65/PDEA/PermApps/. If you have any questions or need additional information, please contact Jeff Hemphill at (919) 715-1458.

Sincerely,

for E. L. Fuller

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

Cc

W/attachment

Mr. John Hennessy, NCDWQ **(2 Copies)**
Ms. Marella Buncick, USFWS
Ms. Marla Chambers, NCWRC
Mr. Harold Draper, TVA
Dr. David Chang, P.E., Hydraulics
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Greg Perfetti, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Mr. J.J. Swain, P.E., Division Engineer
Mr. Roger Bryan, DEO

W/o attachment

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. Vincent Rhea, P.E., PDEA Planning Engineer

Office Use Only: Form Version March 05

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

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

I. Processing

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

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

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 27699-1598
   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 Bridges No. 9 & No. 10 on SR 1002 (Crabtree Creek Rd) over East Fork Big Crabtree Creek

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-4202

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

4. Location
   County: Mitchell Nearest Town: Little Switzerland
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers/names, landmarks, etc.): Take I-40 west to Exit 86 in Marion and turn right on NC 226. Proceed north on NC 226 for approximately seventeen miles to the Blue Ridge Parkway. Head west on the Parkway for three and a half miles to SR 1002 (Crabtree Road) and turn right. Proceed approximately two and a half miles to the bridge sites.

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): 36° 8.55' °N 82° 1.33' °W

6. Property size (acres): N/A

7. Name of nearest receiving body of water: East Fork Big Crabtree Creek

8. River Basin: French Broad 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: The site is located in a rural section of Mitchell County. The

site is primarily surrounded by mixed hardwoods, bottomland forest and by maintained/ disturbed land.

10. Describe the overall project in detail, including the type of equipment to be used:
NCDOT proposes to replace Bridges No. 109 (41 feet long) and No. 110 (42 feet long) on the same alignments with new 75 and 80 feet long single span bridges, respectively. Outfall protection for a drainage ditch entering East Fork Big Crabtree Creek between the two bridges will result in permanent impacts to surface water. Traffic will be maintained via two onsite temporary detours to the east of the existing bridges. Construction equipment will consist of heavy trucks, earth moving equipment, cranes, etc.

11. Explain the purpose of the proposed work: The existing bridges are structurally deficient and according to federal guidelines are considered functionally obsolete. The replacement of these bridges will result in safer traffic operations.

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.

Provide a written description of the proposed impacts: There will be 65 linear feet of permanent impacts to surface waters resulting from bank stabilization at both bridges and 15 linear feet for outfall protection at a drainage ditch entering East Fork Big Crabtree Creek between the two bridges. Temporary impervious dikes will be utilized for the removal of existing vertical abutments and installation of new abutments on the existing footers resulting in <0.03 acre of temporary construction impacts.

1. 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)
N/A					
Total Wetland Impact (acres)					

2. List the total acreage (estimated) of all existing wetlands on the property: 0 acre

3. 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)
Bridge 109	E. Fk. Big Crabtree Cr.	Permanent	Perennial	27 feet	45	<0.03
Bridge 109	E. Fk. Big Crabtree Cr.	Temporary	Perennial	27 feet	110	<0.02
Between Bridges	E. Fk. Big Crabtree Cr.	Permanent	Perennial	27 feet	15	<0.01
Bridge 110	E. Fk. Big Crabtree Cr.	Permanent	Perennial	27 feet	20	<0.01
Bridge 110	E. Fk. Big Crabtree Cr.	Temporary	Perennial	27 feet	30	<0.01
Total Stream Impact (by length and acreage)					220	<0.08

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

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

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

Stream Impact (acres):	<0.05
Wetland Impact (acres):	0
Open Water Impact (acres):	0
Total Impact to Waters of the U.S. (acres)	<0.05
Total Stream Impact (linear feet):	80

6. 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.

_____

_____

7. 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. See Permit Application Cover Letter

VIII. Mitigation

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

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

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

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

2. Mitigation may also be made by payment into the North Carolina Ecosystem Enhancement Program (NCEEP). Please note it is the applicant's responsibility to contact the NCEEP at (919) 715-0476 to determine availability, and written approval from the NCEEP indicating that they are will to accept payment for the mitigation must be attached to this form. For

additional information regarding the application process for the NCEEP, check the NCEEP website at http://h2o.enr.state.nc.us/wrp/index.htm. If use of the NCEEP is proposed, please check the appropriate box on page five and provide the following information:

Amount of stream mitigation requested (linear feet): N/A
Amount of buffer mitigation requested (square feet): N/A
Amount of Riparian wetland mitigation requested (acres): N/A
Amount of Non-riparian wetland mitigation requested (acres): N/A
Amount of Coastal wetland mitigation requested (acres): N/A

IX. Environmental Documentation (required by DWQ)

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

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

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

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

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

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

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

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

Total			

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

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. N/A

XI. Stormwater (required by DWQ)

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

XII. Sewage Disposal (required by DWQ)

Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility.
N/A

XIII. Violations (required by DWQ)

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

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

XIV. Cumulative Impacts (required by DWQ)

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

XV. Other Circumstances (Optional):

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

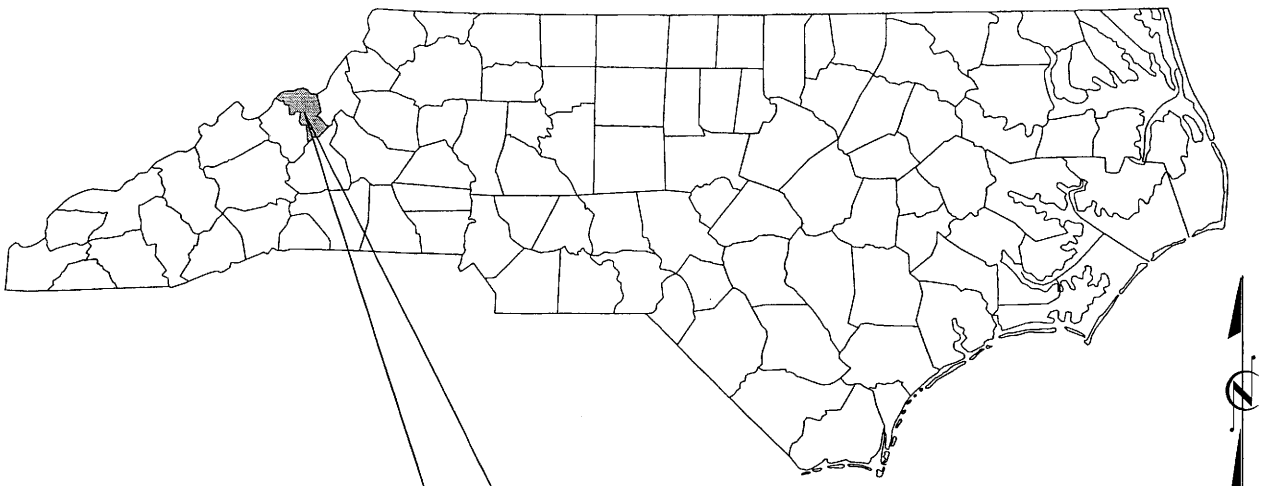
N/A

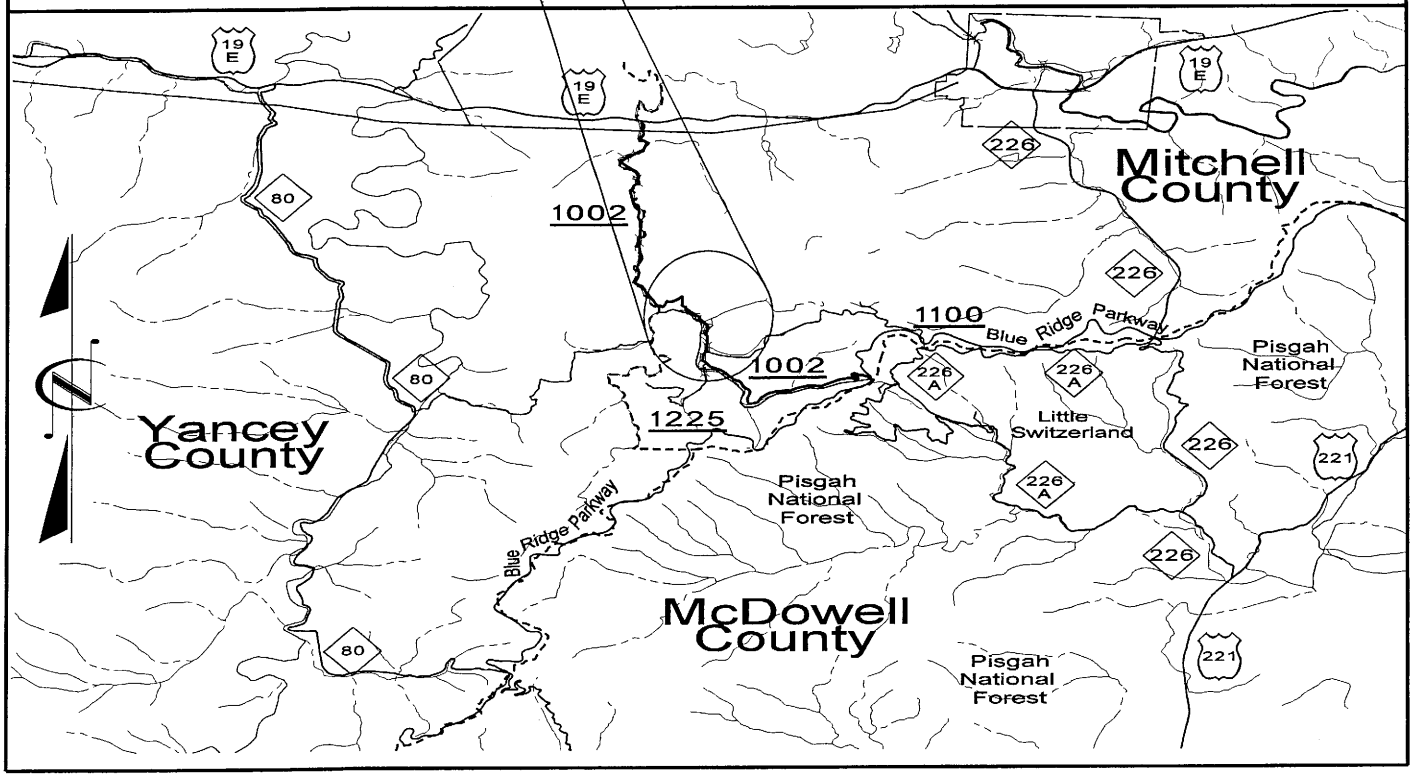
E. L. Lust 10.26.07

Applicant/Agent's Signature **Date**

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

NORTH CAROLINA





WETLAND PERMIT DRAWING
VICINITY MAP
B–4202

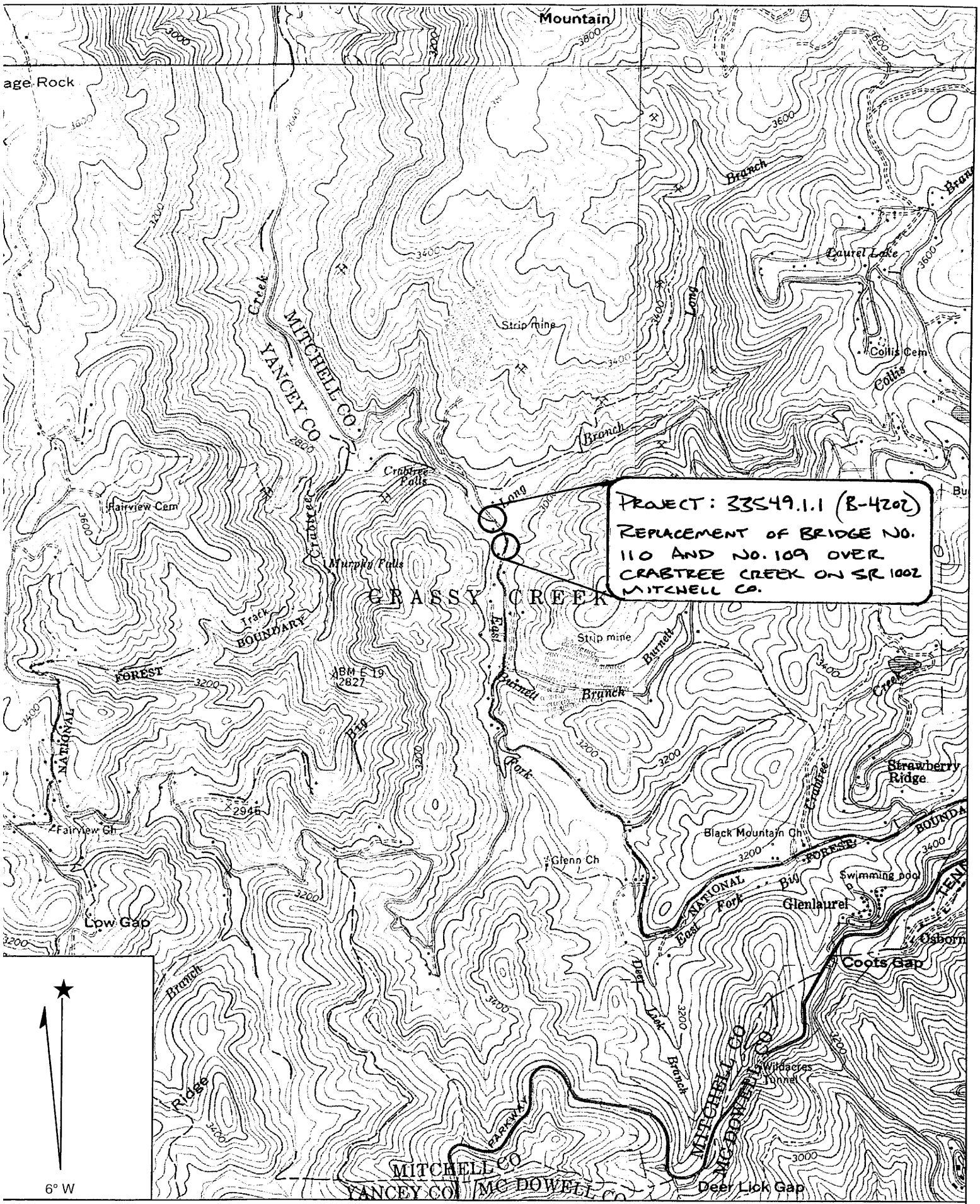
DIVISION OF HIGHWAYS
MITCHELL COUNTY

PROJECT: 33549.1.1 (B–4202)
REPLACEMENT OF BRIDGE NO.109 AND NO. 110 OVER CRABTREE CREEK ON SR 1002

8/9/2007

8/9/2007 R:\01056072\Permits\V8_Wetland vicinity map.dgn

Permit Drawing



Name: CELO
Date: 12/13/2006
Scale: 1 inch equals 2000 feet

Location: 035° 51' 02.0" N 082° 08' 03.0" W
Caption: Project: 33549.1.1 (B-4202)
Replacement of Bridge No. 109
and No. 110 over Crabtree Creek on SR 1002

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- STA 12+91	Dike 1							<0.01		60	
1	-L- STA 13+02	Dike 2							<0.01		50	
3	-L- STA 19+94	Dike 4							<0.01		30	
1	-L- Sta 12+59 LT	Rip Rap at Embankment						<0.01		15		
1	-L- Sta 12+94 LT	Rip Rap at Embankment						<0.01		15		
1	-L- Sta 12+94 RT	Rip Rap at Embankment						<0.01		15		
3	-L- Sta 20+05 LT	Rip Rap at Embankment						<0.01		20		
2	-L- Sta 15+75 RT	Rip Rap Outfall Protection						<0.01		15		
TOTALS:								<0.05	<0.03	80	140	

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

MITCHELL COUNTY
PROJECT: 33549.1.1 (B-4202)

9/18/2007

ATN Revised 3/31/05

Permit Drawing Sheet 3 of 12

	OWNER'S NAME	ADDRESS
(3)	Emerald Village, Inc.	PO Box 361 Little Switzerland, NC 28749
(4)	Robert D. Armstrong	VI PO Box 25200 Gallows Bay, Virgin Islands
(6)	Lillian Sparks	3129 Crabtree Road Spruce Pine, NC 28777
(7)	Marel Enterprises Limited Enterprises	5292 Boca Marina Circle South Boca Raton, FL 33487
(8)	Marsha L. Styles	3209 Crabtree Road Spruce Pine, NC 28777
(9)	Francis Boyd	3304 Crabtree Road Spruce Pine, NC 28777

PROPERTY OWNER NAME AND ADDRESS B-4202

DIVISION OF HIGHWAYS
MITCHELL COUNTY

PROJECT: 33549.1.1 (B-4202)
REPLACEMENT OF BRIDGE NO. 109 AND NO. 110 OVER CRABTREE CREEK ON SR 1002

8/27/2007

Permit Drawing

8/27/2007 R:\01\056072\Permits\V8_Wetland Property Owners.dgn

8/17/99

R/W REVISION: REVISED PROPERTY OWNERS NAMES FOR PARCELS 3,4,9, AND 10. REVISED R/W AND TCE OFFSET DISTANCES. REVISED TCE TO PARCEL 6 DUE TO ADDITION OF DRIVEWAY.
REVISED R/W AND ADDED TCE TO PARCEL 3 DUE TO REVISION OF PROP. DRIVEWAY. WTB 4/2/07

PROJECT REFERENCE NO.	SHEET NO.
B-4202	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

-L-

PI Sta 10+06.92
Δ = 9° 44′ 09.5″ (RT)
D = 70° 32′ 00.3″
L = 13.80′
T = 6.92′
R = 81.23′

PI Sta 11+85.56
Δ = 65° 03′ 06.7″ (LT)
D = 47° 44′ 47.3″
L = 136.24′
T = 76.52′
R = 120.00′

PI Sta 16+16.06
Δ = 45° 52′ 10.3″ (LT)
D = 41° 13′ 11.9″
L = 111.28′
T = 58.82′
R = 139.00′

PI Sta 17+08.61
Δ = 17° 39′ 03.9″ (LT)
D = 22° 25′ 44.9″
L = 78.70′
T = 39.66′
R = 255.45′

PI Sta 22+35.55
Δ = 11° 01′ 28.3″ (RT)
D = 6° 46′ 15.1″
L = 162.82′
T = 81.66′
R = 846.21′

PI Sta 10+64.54
Δ = 22° 48′ 38.4″ (RT)
D = 47° 44′ 47.3″
L = 47.77′
T = 24.21′
R = 120.00′

PI Sta 14+23.95
Δ = 52° 34′ 55.9″ (RT)
D = 47° 44′ 47.3″
L = 110.13′
T = 59.28′
R = 120.00′

PI Sta 18+44.66
Δ = 9° 49′ 59.0″ (LT)
D = 5° 04′ 48.2″
L = 193.56′
T = 97.02′
R = 1,127.86′

PI Sta 20+96.00
Δ = 10° 50′ 12.9″ (LT)
D = 9° 32′ 57.5″
L = 113.48′
T = 56.91′
R = 600.00′

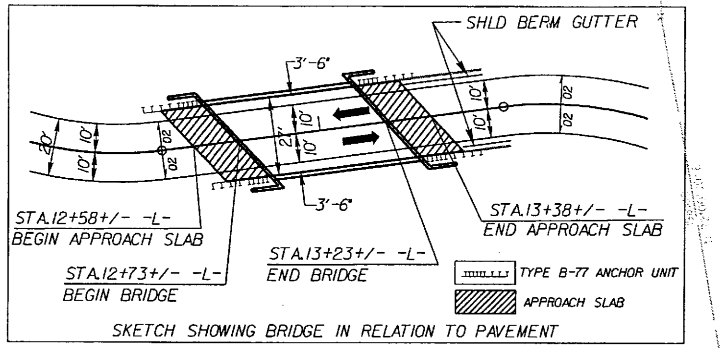
PI Sta 11+24.75
Δ = 53° 02′ 03.9″ (RT)
D = 38° 11′ 49.9″
L = 138.84′
T = 74.84′
R = 150.00′

-DRIVE-

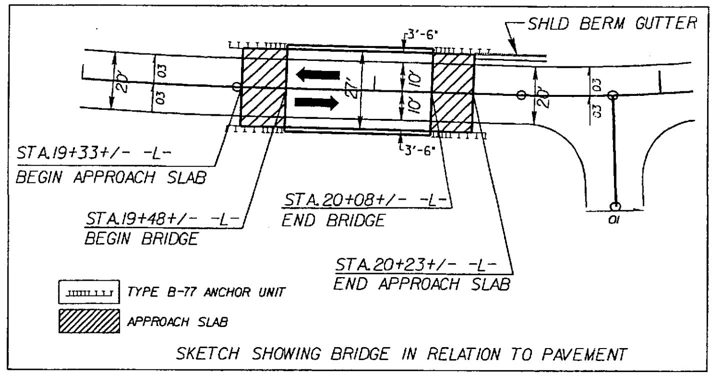
PI Sta 10+36.21
Δ = 99° 30′ 29.6″ (LT)
D = 229° 10′ 59.2″
L = 43.42′
T = 29.54′
R = 25.00′

PI Sta 11+32.57
Δ = 57° 01′ 28.8″ (RT)
D = 190° 59′ 09.4″
L = 29.86′
T = 16.30′
R = 30.00′

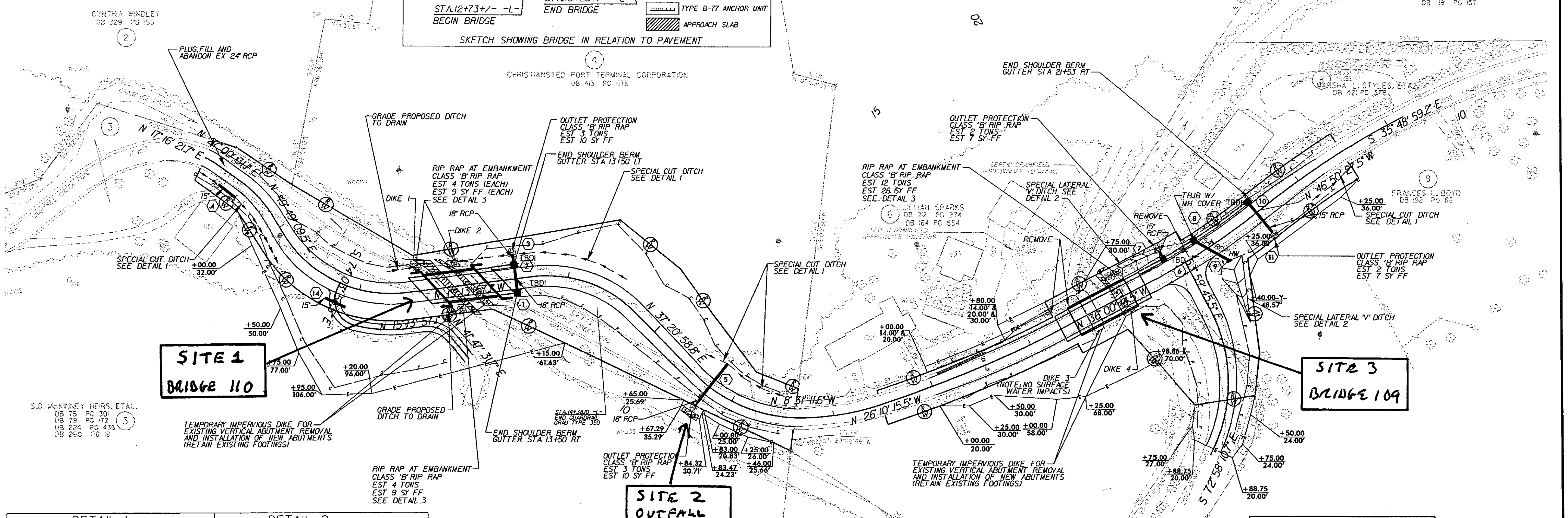
PI Sta 10+75.92
Δ = 21° 39′ 31.0″ (LT)
D = 42° 26′ 28.7″
L = 51.03′
T = 25.82′
R = 135.00′



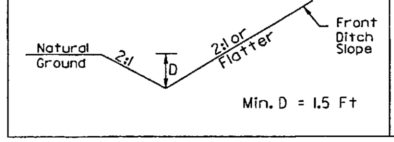
SKETCH SHOWING BRIDGE IN RELATION TO PAVEMENT



SKETCH SHOWING BRIDGE IN RELATION TO PAVEMENT



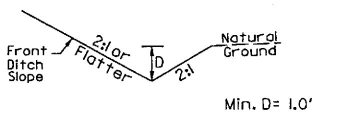
DETAIL I
SPECIAL CUT DITCH
(Not to Scale)



Min. D = 1.5 Ft

-L- STA. 10+00 TO STA. 11+25 (RT)
-L- STA. 12+91 TO STA. 14+50 (LT)
-L- STA. 15+75 TO STA. 16+50 (LT)
-L- STA. 15+50 TO STA. 15+75 (LT)
-L- STA. 21+75 TO STA. 22+50 (RT)

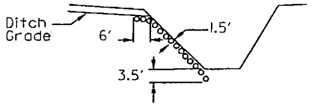
DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D = 1.0′

-Y- STA. 10+25 TO STA. 10+75 (LT)
-L- STA. 20+08 TO STA. 20+50 (LT)

DETAIL 3
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

-L- STA 12+59 (LT)
-L- STA 12+94 (RT)
-L- STA 12+94 (LT)
-L- STA 20+05 (LT)

PIPE HYDRAULIC DATA
⑤ 18″ RCP

DRAINAGE AREA	=	0.85 AC
DESIGN FREQUENCY	=	25 YRS
DESIGN DISCHARGE	=	1.3 CFS
DESIGN HW ELEVATION	=	2936.11 FT
100 YEAR DISCHARGE	=	1.5 CFS
100 YEAR HW ELEVATION	=	2936.16 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

PIPE HYDRAULIC DATA
⑨ 54″ RCP

DRAINAGE AREA	=	2.00 AC
DESIGN FREQUENCY	=	25 YRS
DESIGN DISCHARGE	=	5.3 CFS
DESIGN HW ELEVATION	=	2925.11 FT
100 YEAR DISCHARGE	=	6.5 CFS
100 YEAR HW ELEVATION	=	2925.21 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

WETLAND PERMIT SITE 1

▨ TS	DENOTES TEMPORARY SURFACE WATER IMPACTS
▤ S	DENOTES PERMANENT SURFACE WATER IMPACTS

50 0 100

Permit Drawing
Sheet 5 of 12

$$$$SYSTIME$$$$ $$$$DGN$$$$ $$$$USERNAME$$$$

8/17/9

R/W REVISION: REVISED PROPERTY OWNERS NAMES FOR PARCELS 3,4,9,AND 10. REVISED R/W AND TCE OFFSET DISTANCES. REVISED TCE TO PARCEL 6 DUE TO ADDITION OF DRIVEWAY.
REVISED R/W AND ADDED TCE TO PARCEL 3 DUE TO REVISION OF PROP. DRIVEWAY. WTB 4/2/07

$$$$$$$$$$TIME$$$$$$$$$$
$$$$$$$$$$LEVEL$$$$$$$$$$
$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-4202	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-

PI Sta 10+06.92
Δ = 9° 44' 09.5" (RT)
D = 70° 32' 00.3"
L = 13.80'
T = 6.92'
R = 81.23'

PI Sta 11+85.56
Δ = 65° 03' 06.7" (LT)
D = 41° 44' 47.3"
L = 136.24'
T = 76.52'
R = 120.00'

PI Sta 16+16.06
Δ = 45° 52' 10.3" (LT)
D = 41° 13' 11.9"
L = 111.28'
T = 58.82'
R = 139.00'

PI Sta 17+08.61
Δ = 17° 39' 03.9" (LT)
D = 22° 25' 44.9"
L = 78.70'
T = 39.66'
R = 255.45'

PI Sta 22+35.55
Δ = 11° 01' 28.3" (RT)
D = 6° 46' 15.1"
L = 162.82'
T = 81.66'
R = 846.21'

PI Sta 10+64.54
Δ = 22° 48' 38.4" (RT)
D = 41° 44' 47.3"
L = 47.77'
T = 24.21'
R = 120.00'

PI Sta 14+23.95
Δ = 52° 34' 55.9" (RT)
D = 41° 44' 47.3"
L = 110.13'
T = 59.28'
R = 120.00'

PI Sta 18+44.66
Δ = 9° 49' 59.0" (LT)
D = 5° 04' 48.2"
L = 193.56'
T = 97.02'
R = 1127.86'

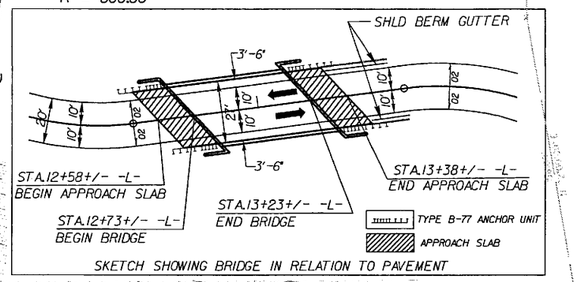
PI Sta 20+96.00
Δ = 10° 50' 12.9" (LT)
D = 9° 32' 57.5"
L = 113.48'
T = 56.91'
R = 600.00'

-DRIVE-

PI Sta 10+36.21
Δ = 99° 30' 29.6" (LT)
D = 229° 10' 59.2"
L = 43.42'
T = 29.54'
R = 25.00'

PI Sta 11+32.57
Δ = 57° 01' 28.8" (RT)
D = 190° 59' 09.4"
L = 29.86'
T = 16.30'
R = 30.00'

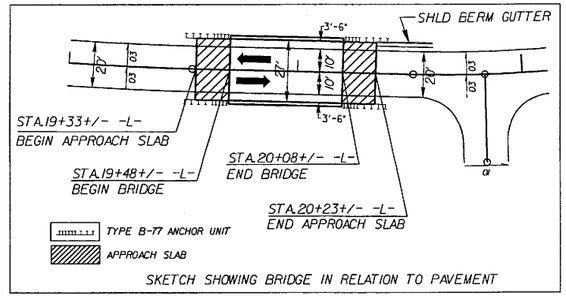
PI Sta 10+75.92
Δ = 21° 39' 31.0" (LT)
D = 42° 26' 28.7"
L = 51.03'
T = 25.82'
R = 135.00'



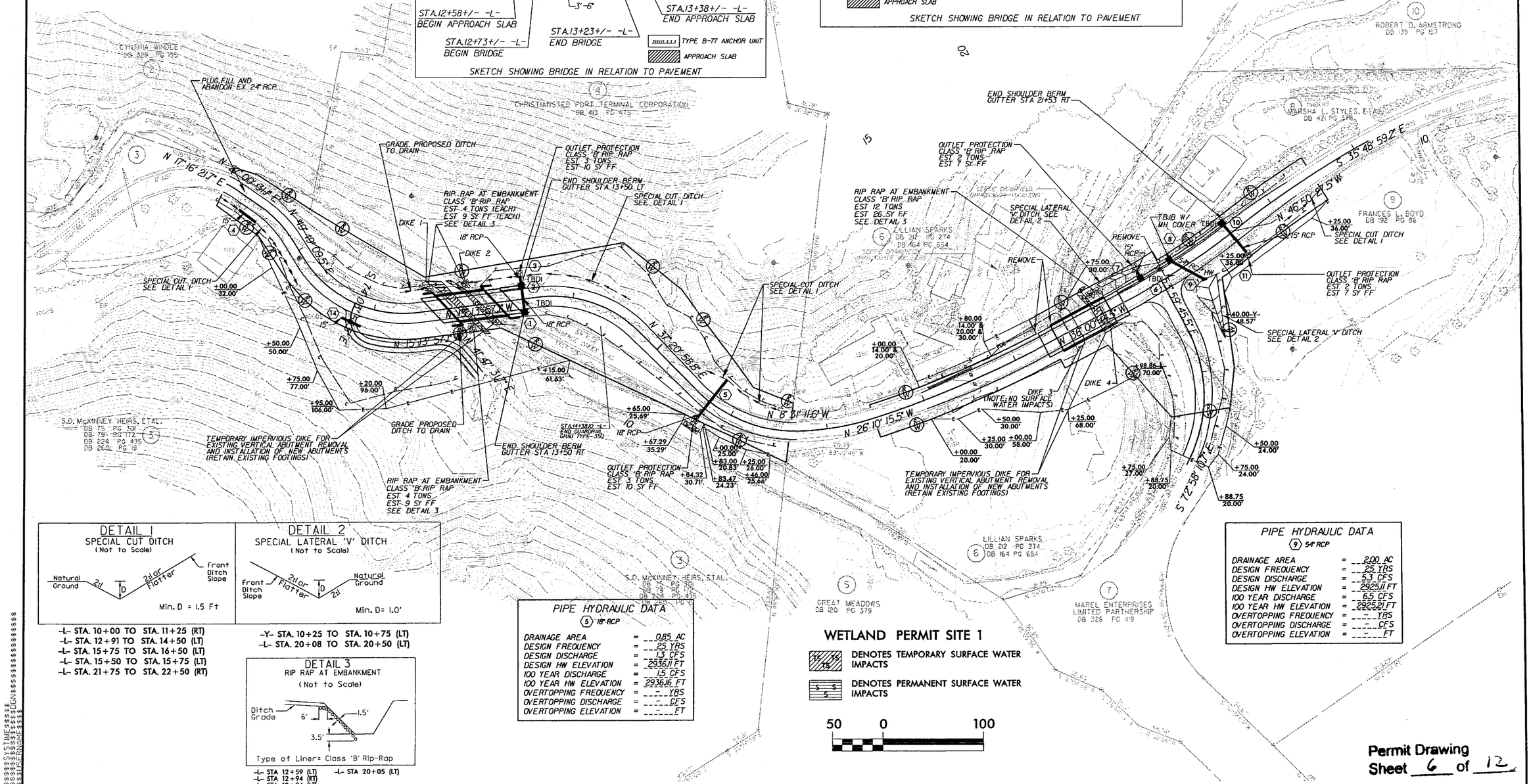
SKETCH SHOWING BRIDGE IN RELATION TO PAVEMENT

NAD 83

PI Sta 11+24.75
Δ = 53° 02' 03.9" (RT)
D = 38° 11' 49.9"
L = 138.84'
T = 74.84'
R = 150.00'



SKETCH SHOWING BRIDGE IN RELATION TO PAVEMENT



DETAIL 1
SPECIAL CUT DITCH
(Not to Scale)

Min. D = 1.5 Ft

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Min. D= 1.0'

-L- STA. 10+00 TO STA. 11+25 (RT)
-L- STA. 12+91 TO STA. 14+50 (LT)
-L- STA. 15+75 TO STA. 16+50 (LT)
-L- STA. 15+50 TO STA. 15+75 (LT)
-L- STA. 21+75 TO STA. 22+50 (RT)

-Y- STA. 10+25 TO STA. 10+75 (LT)
-L- STA. 20+08 TO STA. 20+50 (LT)

DETAIL 3
RIP RAP AT EMBANKMENT
(Not to Scale)

Type of Liner= Class 'B' Rip-Rap

-L- STA 12+59 (LT)
-L- STA 12+94 (RT)
-L- STA 12+94 (LT)
-L- STA 20+05 (LT)

PIPE HYDRAULIC DATA
(5) 18" RCP

DRAINAGE AREA	=	0.85 AC
DESIGN FREQUENCY	=	25 YRS
DESIGN DISCHARGE	=	1.3 CFS
DESIGN HW ELEVATION	=	2936.11 FT
100 YEAR DISCHARGE	=	1.5 CFS
100 YEAR HW ELEVATION	=	2936.16 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

PIPE HYDRAULIC DATA
(9) 54" RCP

DRAINAGE AREA	=	2.00 AC
DESIGN FREQUENCY	=	25 YRS
DESIGN DISCHARGE	=	5.3 CFS
DESIGN HW ELEVATION	=	2925.11 FT
100 YEAR DISCHARGE	=	6.5 CFS
100 YEAR HW ELEVATION	=	2925.21 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

WETLAND PERMIT SITE 1

DENOTES TEMPORARY SURFACE WATER IMPACTS

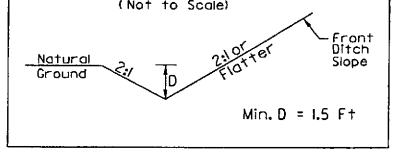
DENOTES PERMANENT SURFACE WATER IMPACTS

50 0 100

Permit Drawing
Sheet 6 of 12

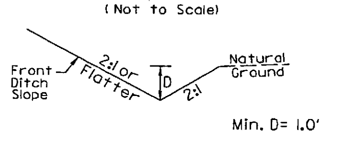
8/17/9

DETAIL 1
SPECIAL CUT DITCH
(Not to Scale)



-DET 'A'- STA. 10+24 TO STA. 12+75 (RT)
-DET 'A'- STA 11+29 TO STA. 12+53 (LT)

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



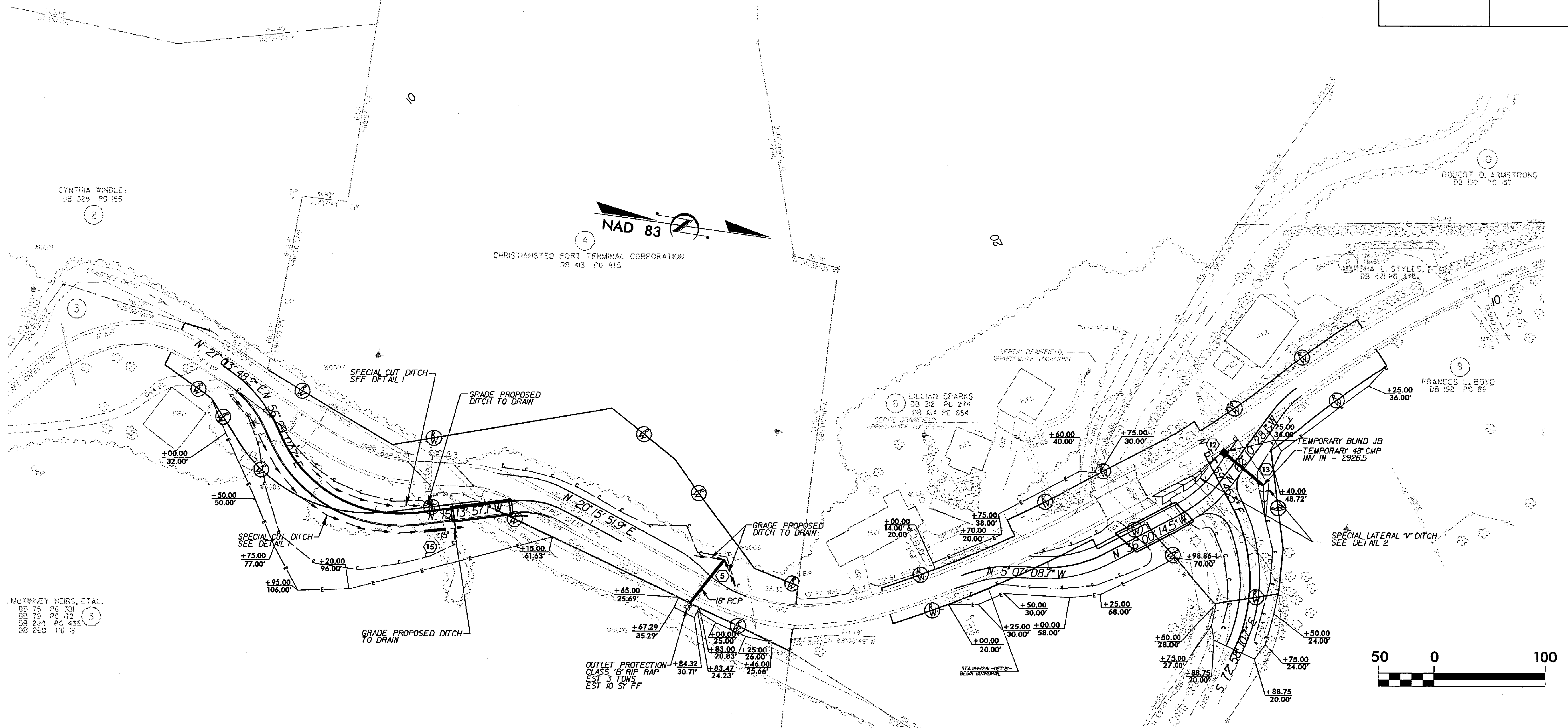
-DET 'B'- STA. 20+19 TO STA. 20+94 (LT)
-Y- STA. 10+44 TO STA. 10+75 (LT)

-Y-

PI Sta 11+24.75
Δ = 53° 02' 03.9" (RT)
D = 38° 11' 49.9"
L = 138.84'
T = 74.84'
R = 150.00'

PROJECT REFERENCE NO.	SHEET NO.
B-4202	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



LILLIAN SPARKS
DB 212 PG 274
DB 164 PG 654

S.D. McKINNEY HEIRS, ETAL.
DB 75 PG 301
DB 79 PG 172
DB 224 PG 435
DB 260 PG 15

GREAT MEADOWS
DB 120 PG 379

MAREL ENTERPRISES
LIMITED PARTNERSHIP
DB 326 PG 419

-DETOUR 'A'-

PI Sta 10+43.85
Δ = 29° 25' 19.5" (RT)
D = 47° 44' 47.3"
L = 61.62'
T = 31.51'
R = 120.00'

PI Sta 11+74.44
Δ = 71° 43' 04.8" (LT)
D = 47° 44' 47.3"
L = 150.21'
T = 86.73'
R = 120.00'

PI Sta 13+50.27
Δ = 35° 29' 49.0" (RT)
D = 76° 23' 39.7"
L = 46.47'
T = 24.01'
R = 75.00'

-DETOUR 'B'-

PI Sta 18+46.58
Δ = 24° 44' 28.0" (RT)
D = 47° 44' 47.3"
L = 51.82'
T = 26.32'
R = 120.00'

PI Sta 19+24.97
Δ = 30° 53' 05.9" (LT)
D = 47° 44' 47.3"
L = 64.69'
T = 33.15'
R = 120.00'

PI Sta 20+60.26
Δ = 26° 10' 13.6" (LT)
D = 57° 17' 44.8"
L = 45.68'
T = 23.24'
R = 100.00'

PI Sta 21+72.14
Δ = 19° 04' 39.9" (RT)
D = 57° 17' 44.8"
L = 33.30'
T = 16.80'
R = 100.00'

PIPE HYDRAULIC DATA
⑤ 18" RCP

DRAINAGE AREA = 0.85 AC
DESIGN FREQUENCY = 25 YRS
DESIGN DISCHARGE = 1.3 CFS
DESIGN HW ELEVATION = 2936.11 FT
100 YEAR DISCHARGE = 1.5 CFS
100 YEAR HW ELEVATION = 2936.16 FT
OVERTOPPING FREQUENCY = - YRS
OVERTOPPING DISCHARGE = - CFS
OVERTOPPING ELEVATION = - FT

PIPE HYDRAULIC DATA
⑬ TEMPORARY 48" RCP

DRAINAGE AREA = 2.00 AC
DESIGN FREQUENCY = 25 YRS
DESIGN DISCHARGE = 5.3 CFS
DESIGN HW ELEVATION = 2925.11 FT
100 YEAR DISCHARGE = 6.5 CFS
100 YEAR HW ELEVATION = 2925.21 FT
OVERTOPPING FREQUENCY = - YRS
OVERTOPPING DISCHARGE = - CFS
OVERTOPPING ELEVATION = - FT

Permit Drawing
Sheet 7 of 12

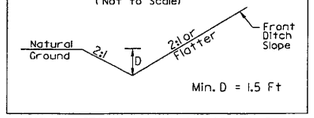
$$$$SYSTIME$$$$ $$$$DGN$$$$ $$$$USERNAME$$$$

8/17/95

PROJECT REFERENCE NO.	SHEET NO.
B-4202	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

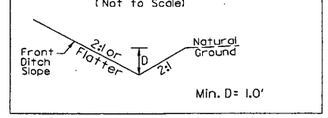
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL 1
SPECIAL CUT DITCH
(Not to Scale)



–DET 'A'– STA. 10+24 TO STA. 12+75 (RT)
–DET 'A'– STA 11+29 TO STA. 12+53 (LT)

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



–DET 'B'– STA. 20+19 TO STA. 20+94 (LT)
–Y– STA. 10+44 TO STA. 10+75 (LT)

–Y–
PI Sta 11+24.75
Δ = 53° 02' 03.9" (RT)
D = 38° 11' 49.9"
L = 138.84'
T = 74.84'
R = 150.00'

NAD 83

CYNTHIA WINDLEY
DB 308 PG 155

CHRISTIANSTED PORT TERMINAL CORPORATION
DB 413 PG 475

ROBERT D. ARMSTRONG
DB 139 PG 157

MARSHA L. STYLES, ET AL
DB 421 PG 326

FRANCES L. BOYD
DB 192 PG 98

LILLIAN SPARKS
DB 212 PG 274
DB 164 PG 654

KEITH A. CRAWFORD

MCKINNEY HEIRS, ET AL.
DB 75 PG 301
DB 79 PG 172
DB 224 PG 435
DB 260 PG 19

S.D. MCKINNEY HEIRS, ET AL.
DB 75 PG 301
DB 79 PG 172
DB 224 PG 435
DB 260 PG 19

GREAT MEADOWS
DB 120 PG 379

MAREL ENTERPRISES LIMITED PARTNERSHIP
DB 326 PG 419

N 27° 03' 48.2" W 56.00'

N 15° 13' 57.1" W

N 20° 15' 51.9" E

N 36° 00' 14.5" W

N 5° 02' 08.7" W

S 72° 39' 07.2" E

SPECIAL CUT DITCH SEE DETAIL 1

GRADE PROPOSED DITCH TO DRAIN

18" RCP

OUTLET PROTECTION CLASS 'B' RIP RAP EST 3 TONS EST 10 SY FF

TEMPORARY BLIND JB

TEMPORARY 48" CMP
INV IN = 2926.5

SPECIAL LATERAL 'V' DITCH SEE DETAIL 2

STA 19+62.61 – DET 'B' – BEGIN GUARDRAIL

50 0 100

-DETOUR 'A'-

PI Sta 10+43.85
Δ = 29° 25' 19.5" (RT)
D = 47° 44' 47.3"
L = 61.62'
T = 31.51'
R = 120.00'

PI Sta 11+74.44
Δ = 71° 43' 04.8" (LT)
D = 47° 44' 47.3"
L = 150.21'
T = 86.73'
R = 120.00'

PI Sta 13+50.27
Δ = 35° 29' 49.0" (RT)
D = 76° 23' 39.7"
L = 46.47'
T = 24.01'
R = 75.00'

-DETOUR 'B'-

PI Sta 18+46.58
Δ = 24° 44' 28.0" (RT)
D = 47° 44' 47.3"
L = 51.82'
T = 26.32'
R = 120.00'

PI Sta 19+24.97
Δ = 30° 53' 05.9" (LT)
D = 47° 44' 47.3"
L = 64.69'
T = 33.15'
R = 120.00'

PI Sta 20+60.26
Δ = 26° 10' 13.6" (LT)
D = 57° 17' 44.8"
L = 45.68'
T = 23.24'
R = 100.00'

PI Sta 21+72.14
Δ = 19° 04' 39.9" (RT)
D = 57° 17' 44.8"
L = 33.30'
T = 16.80'
R = 100.00'

PIPE HYDRAULIC DATA
(5) 18" RCP

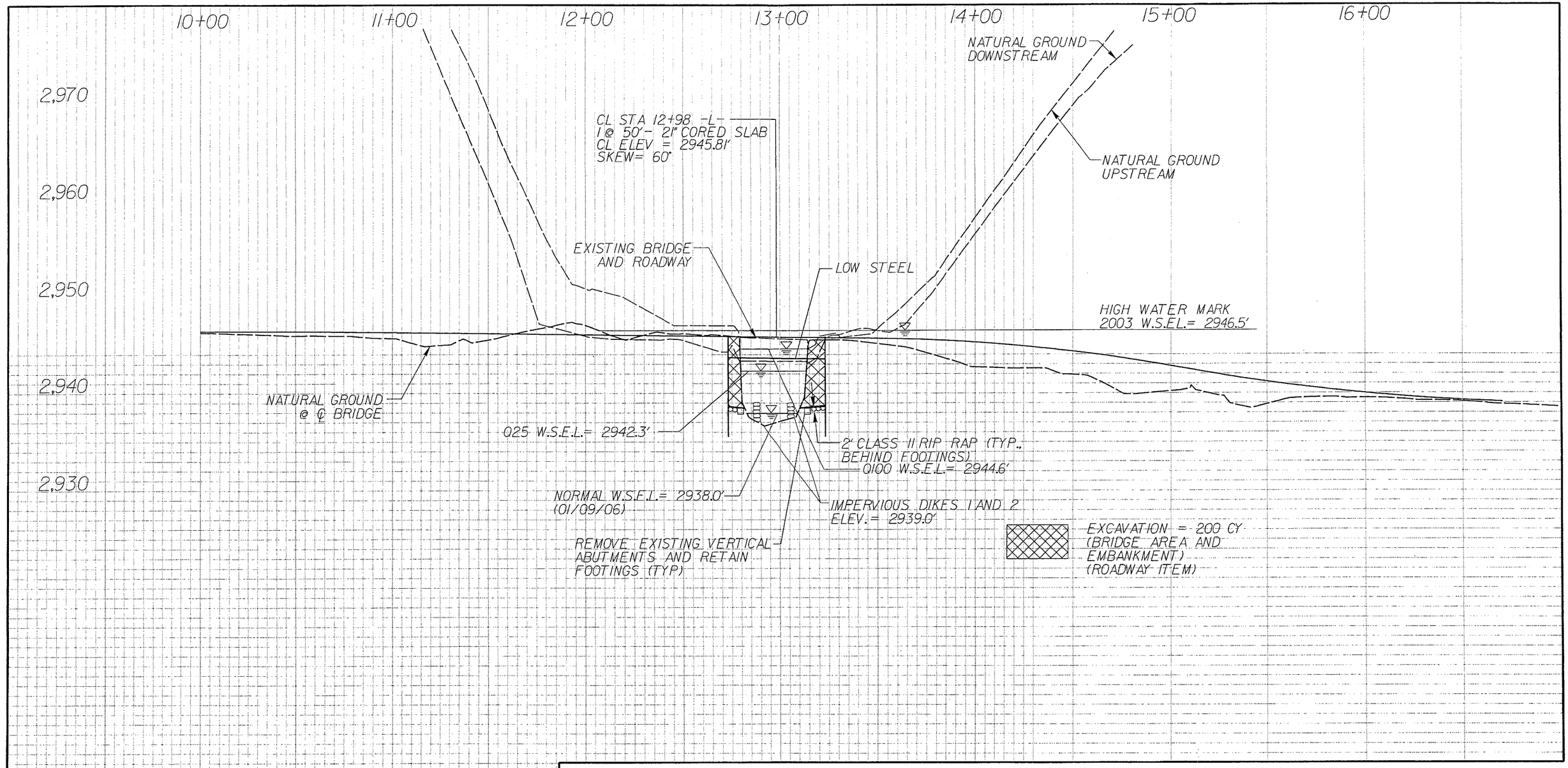
DRAINAGE AREA	= 0.85 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 1.3 CFS
DESIGN HW ELEVATION	= 2936.11 FT
100 YEAR DISCHARGE	= 1.5 CFS
100 YEAR HW ELEVATION	= 2936.16 FT
OVERTOPPING FREQUENCY	= -- YRS
OVERTOPPING DISCHARGE	= -- CFS
OVERTOPPING ELEVATION	= -- FT

PIPE HYDRAULIC DATA
(13) TEMPORARY 48" RCP

DRAINAGE AREA	= 2.00 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 5.3 CFS
DESIGN HW ELEVATION	= 2925.11 FT
100 YEAR DISCHARGE	= 6.5 CFS
100 YEAR HW ELEVATION	= 2925.21 FT
OVERTOPPING FREQUENCY	= -- YRS
OVERTOPPING DISCHARGE	= -- CFS
OVERTOPPING ELEVATION	= -- FT

Permit Drawing
Sheet 5 of 12

$$$$$$$$SYSTIME$$$$$
$$$$$$$$USERNAME$$$$
$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$

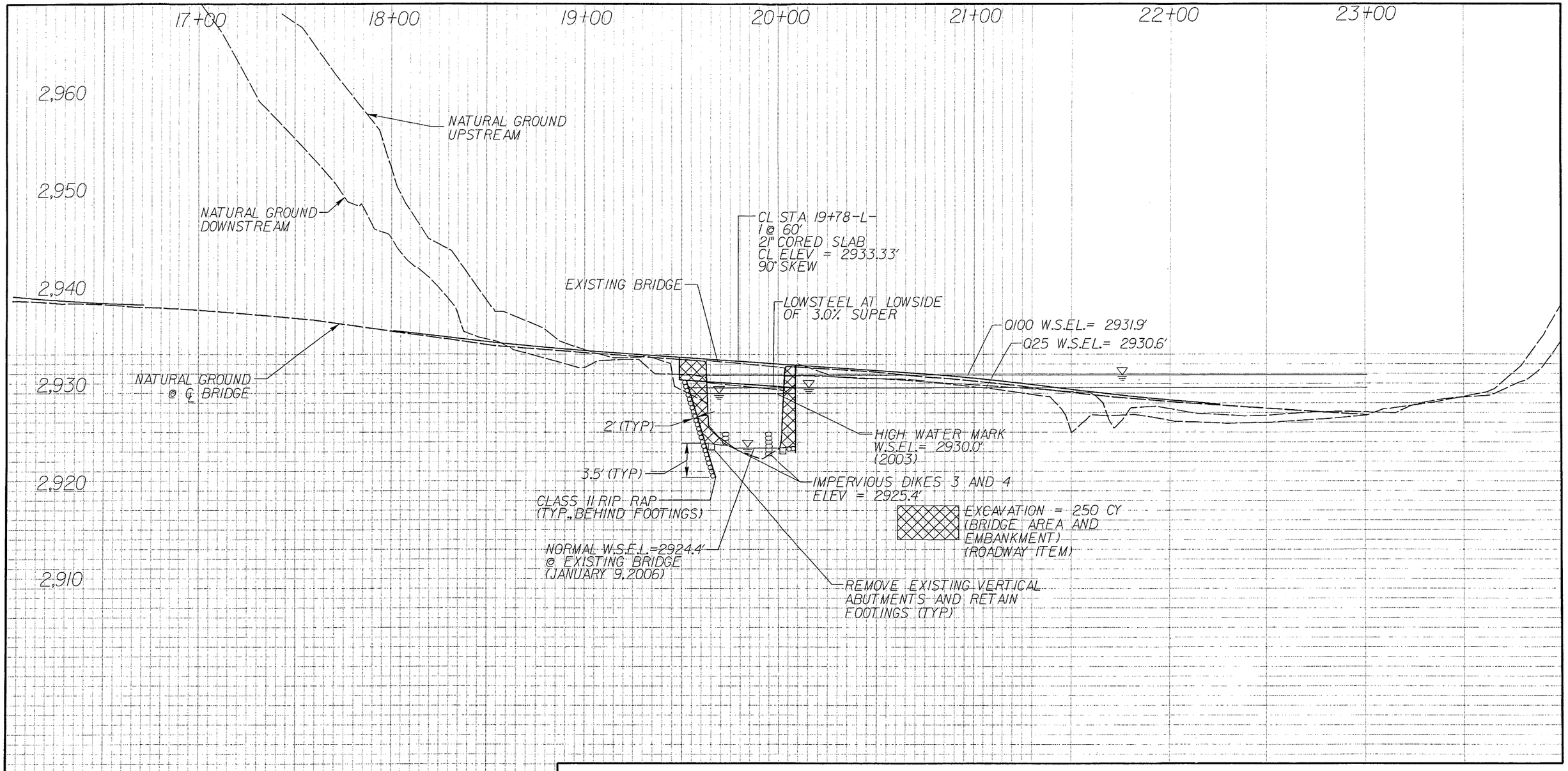


WETLAND PERMIT DRAWING
BSR PROFILE @ STA 12+73 -L-
B-4202

NCDOT
DIVISION OF HIGHWAYS
MITCHELL COUNTY
PROJECT 33549.1.1 (B-4202)
REPLACEMENT OF BRIDGE NO.109 AND NO. 110 OVER CRABTREE CREEK ON SR 1002

Permit Drawing
8/9/2007 Sheet 9 of 12

R:\01105607.2\Permits\V8_Wetland-profile2.dgn
8/9/2007



WETLAND PERMIT DRAWING
BSR PROFILE @ STA 19+45 -L-
B-4202

NCDOT
DIVISION OF HIGHWAYS
MITCHELL COUNTY
PROJECT 33549.1.1 (B-4202)
REPLACEMENT OF BRIDGE NO.109 AND NO. 110 OVER CRABTREE CREEK ON SR 1002

8/9/2007

Permit Drawing Sheet 10 of 12

R:\01105672\Permits\V8_Wetland-profile.dgn

8/9/2007

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-4202	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BM#1 -BL- 16+15
RR SPIKE LOCATED 30' RT.
IN BASE OF 24" OAK
ELEV. 2951.19
N 779509 E 1071957

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1000 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 2942.3 FT
BASE DISCHARGE	= 1600 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 2944.6 FT
OVERTOPPING DISCHARGE	= 2400 CFS
OVERTOPPING FREQUENCY	= 500 YRS
OVERTOPPING ELEVATION	= 2945.5 FT
DATE OF SURVEY	= 01/09/2006
W.S. ELEVATION AT DATE OF SURVEY	= 2938.0 FT

BM#2 -BL- STA. 21+35
RR SPIKE LOCATED 18' RT.
IN BASE OF 36" POPLAR
ELEV. 2943.33
N 780004 E 1071980

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 5 18" PIPE

DRAINAGE AREA	= 0.85 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 1.3 CFS
DESIGN HW ELEVATION	= 2936.11 FT
100 YEAR DISCHARGE	= 1.5 CFS
100 YEAR HW ELEVATION	= 2936.16 FT
OVERTOPPING FREQUENCY	= ____ YRS
OVERTOPPING DISCHARGE	= ____ CFS
OVERTOPPING ELEVATION	= ____ FT

BM#3 -BL- 23+60
RR SPIKE LOCATED 62' RT.
IN BASE OF 36" OAK
ELEV. 2938.84
N 780220 E 1072056

BM#4 -BL- 25+87
RR SPIKE LOCATE 20' LT.
IN BASE OF 48" HEMLOCK
ELEV. 2935.91
N 780411 E 1071896

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 9 54" PIPE

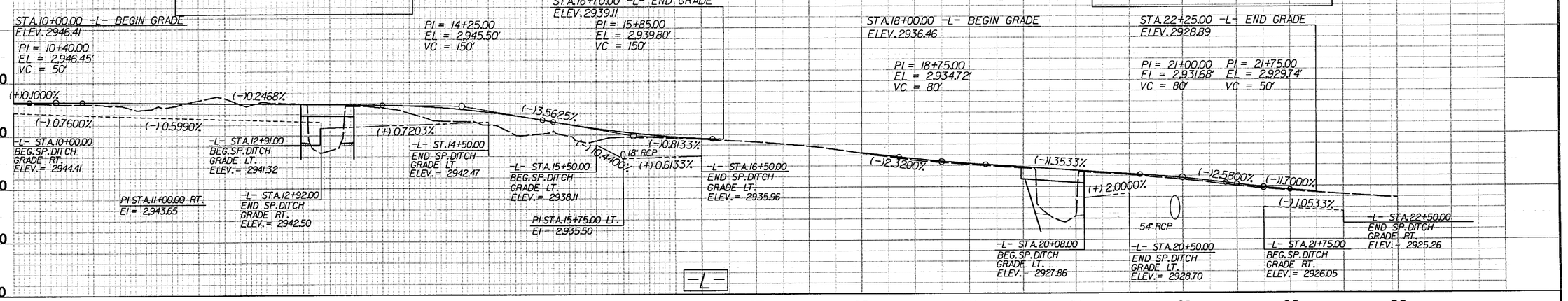
DRAINAGE AREA	= 2.00 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 5.3 CFS
DESIGN HW ELEVATION	= 2925.11 FT
100 YEAR DISCHARGE	= 6.5 CFS
100 YEAR HW ELEVATION	= 2925.2 FT
OVERTOPPING FREQUENCY	= ____ YRS
OVERTOPPING DISCHARGE	= ____ CFS
OVERTOPPING ELEVATION	= ____ ET

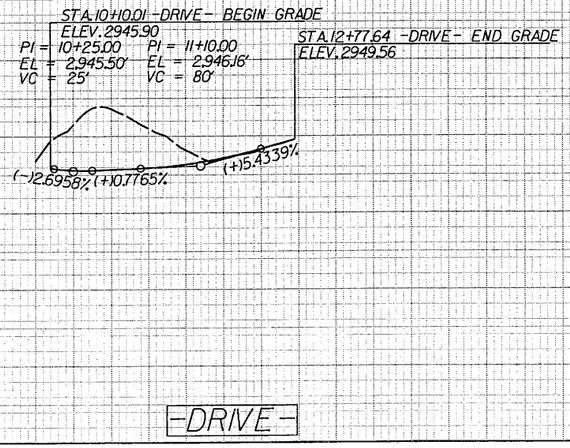
BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1500 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 2930.6 FT
BASE DISCHARGE	= 2300 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 2931.9 FT
OVERTOPPING DISCHARGE	= <1100 CFS
OVERTOPPING FREQUENCY	= <10 YRS
OVERTOPPING ELEVATION	= 2927.0* FT

*OVERTOPPING OCCURS AT EXISTING LOWPOINT 250' UP STATION OF PROPOSED BRIDGE FT

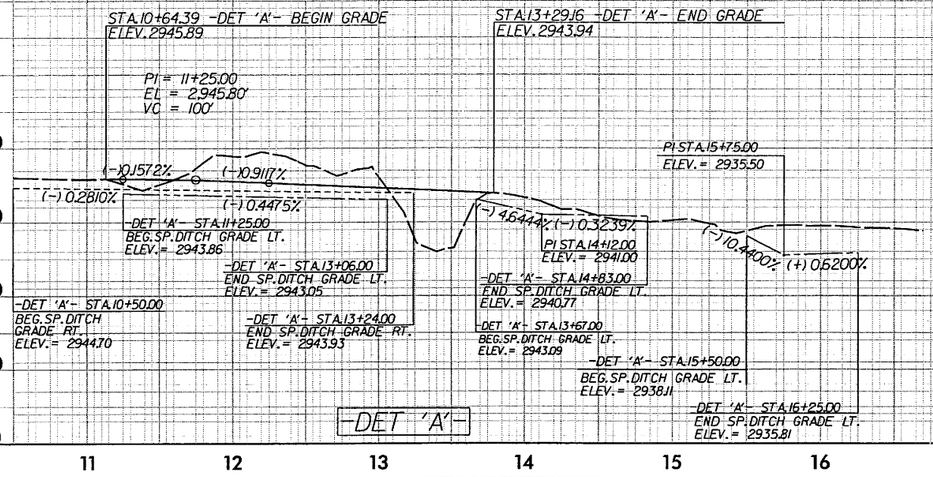
DATE OF SURVEY	= 01/09/2006
W.S. ELEVATION AT DATE OF SURVEY	= 2924.4 FT

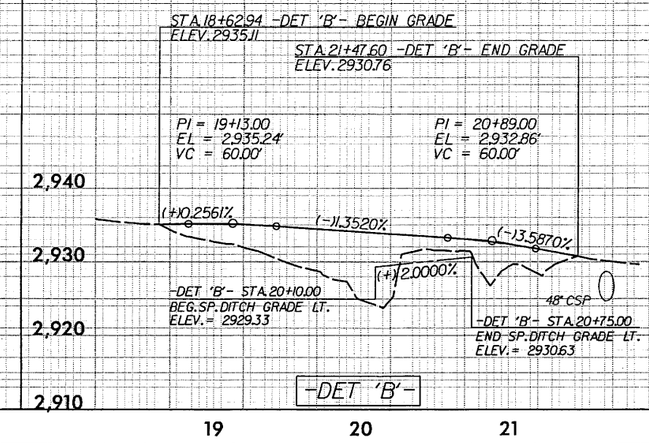


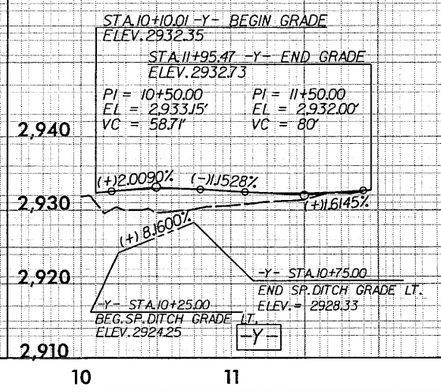


Permit Drawing
Sheet 11 of 12

$$$$$$SYSTIME$$$$$$
$$$$$$LEVEL$$$$$$DGN$$$$$$$$$$$$$$$$$$$$







5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-4202	7

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DITCH LEGEND

LEFT DITCH — — — —

RIGHT DITCH - - - - - - - -

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 13 48" PIPE
DRAINAGE AREA = 2.00 AC
DESIGN FREQUENCY = 25 YRS
DESIGN DISCHARGE = 5.3 CFS
DESIGN HW ELEVATION = 2925.11 FT
100 YEAR DISCHARGE = 6.5 CFS
100 YEAR HW ELEVATION = 2925.21 FT
OVERTOPPING FREQUENCY = _____ YRS
OVERTOPPING DISCHARGE = _____ CFS
OVERTOPPING ELEVATION = _____ FT

$$$$$$$$SYSTIME$$$$$$$$
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$$$USERNAME$$$$

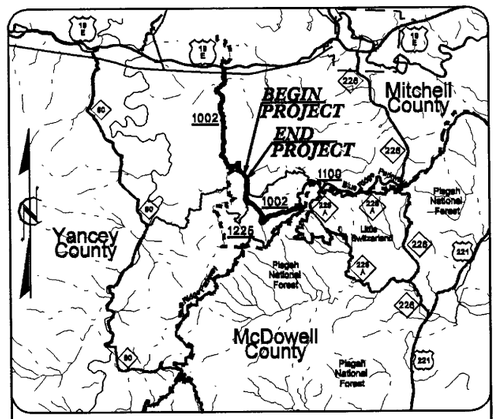
Permit Drawing
Sheet 12 **of** 12

09/08/99

TIP PROJECT: B-4202

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP SHOWING LOCATION OF PROJECT B-4202

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MITCHELL COUNTY

LOCATION: *REPLACEMENT OF BRIDGE NO. 109 AND BRIDGE NO. 110 ON SR 1002 (CRABTREE CREEK ROAD) OVER CRABTREE CREEK*

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4202	1	

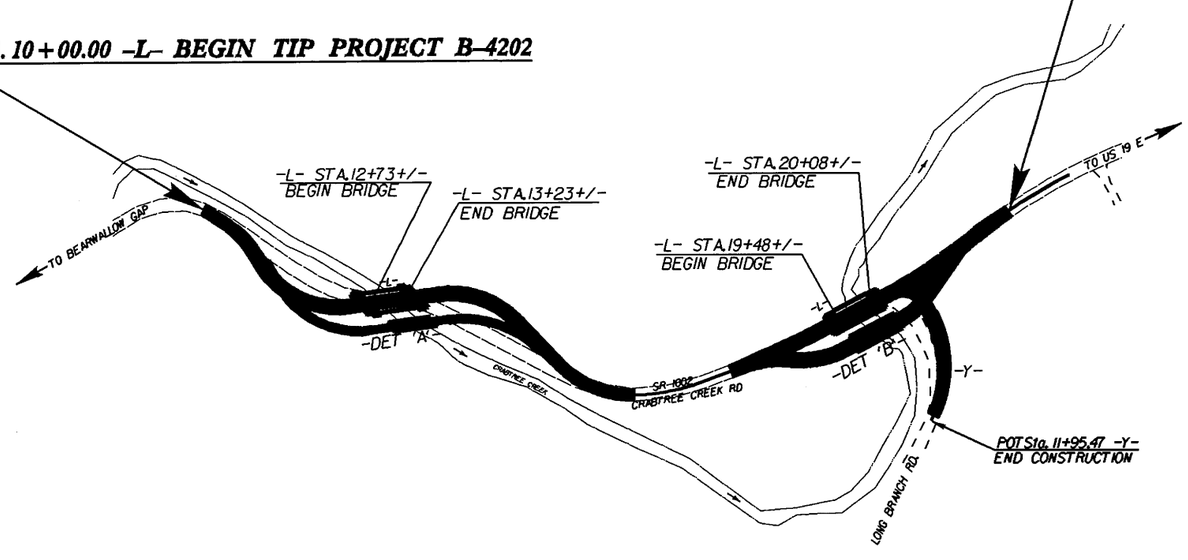
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33549.1.1	BRZ-1002(9)	PE
33549.2.1	BRZ-1002(9)	R/W, UTIL.

NAD 83

4

STA. 22+50.00 -L- END TIP PROJECT B-4202

STA. 10+00.00 -L- BEGIN TIP PROJECT B-4202



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

** DESIGN SPEED EXCEPTION WILL BE REQUIRED
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2005 = 350
ADT 2025 = 600
DHV = 12 %
D = 65 %
T = 3 % *
**V = 20 MPH
* (TTST 1% + DUAL 2%)

FUNC.CLASS. = RURAL LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4202 = 0.216 MI
LENGTH STRUCTURES TIP PROJECT B-4202 = 0.021 MI
TOTAL LENGTH TIP PROJECT B-4202 = 0.237 MI

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 30, 2006

LETTING DATE: JUNE 17, 2008

G. E. BREW, PE
PROJECT ENGINEER

W. T. BEST
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER *P.E.*

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

29-AUG-2007 14:31
c:\roadway\pro\b4202_rdy_tsh.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-4202	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- River Basin Buffer
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- 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 — Vineyard

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

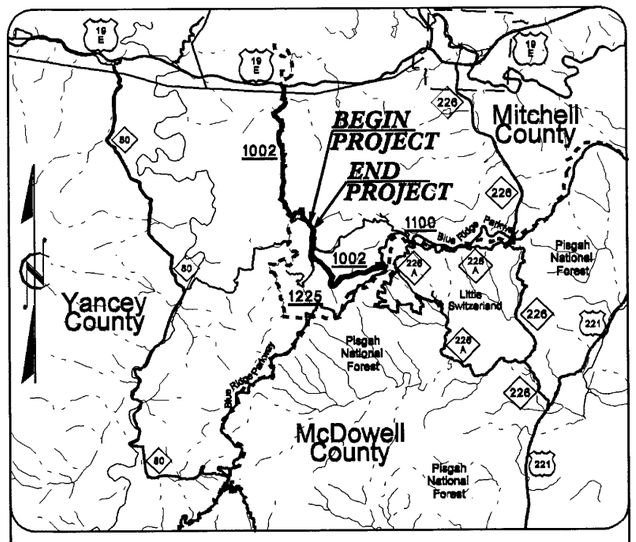
MISCELLANEOUS:

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

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
33549.1.1	1 C
Location and Surveys	

SURVEY CONTROL SHEET B-4202



VICINITY MAP SHOWING LOCATION OF PROJECT B-4202

NOTE: DRAWING NOT TO SCALE

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
GPS1	B4202-1	778473.7859	1071871.6768	2966.17	23+16.71	2286.25 RT
3	BL-3	778755.5569	1071947.4228	2961.48	23+16.71	2015.53 RT
GPS2	B4202-2	779110.9221	1071858.0777	2961.99	23+16.71	1651.37 RT
4	BL-4	779184.3754	1071972.8485	2954.66	23+16.71	1597.34 RT
5	BL-5	779481.7373	1071933.0101	2949.25	23+16.71	1298.16 RT
6	BL-6	779667.5303	1071883.2324	2946.05	10+56.43	7.33 RT
7	BL-7	779955.4799	1071954.4813	2943.43	13+64.17	34.12 RT
8	BL-8	780302.4169	1072005.3301	2937.75	17+48.09	11.32 RT
9	BL-9	780566.1775	1071801.0527	2930.77	20+81.59	14.08 LT
10	BL-10	780801.7328	1071606.6101	2927.36	23+16.71	70.85 LT
11	BL-11	781127.9374	1071506.7339	2930.25	23+16.71	406.14 RT

BM1 ELEVATION = 2951.19
N 779509 E 1071957
L STATION 23+17 1277 LEFT
RR SPIKE IN 24" OAK

BM2 ELEVATION = 2943.33
N 780004 E 1071980
L STATION 14+47 58 RIGHT
RR SPIKE IN 36" POPLAR

BM3 ELEVATION = 2938.84
N 780220 E 1072056
L STATION 16+63 37 RIGHT
RR SPIKE IN 36" OAK

BM4 ELEVATION = 2935.91
N 780411 E 1071896
L STATION 18+99 29 LEFT
RR SPIKE IN 48" HEMLOCK

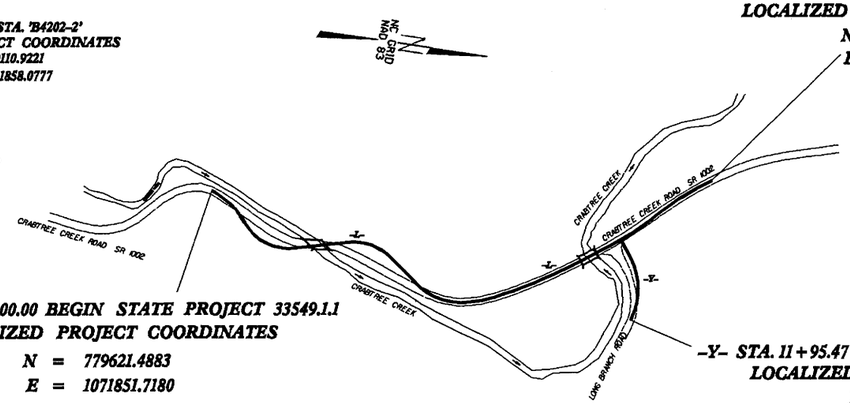
BM5 ELEVATION = 2925.94
N 780943 E 1071527
L STATION 23+17 232 LEFT
RR SPIKE IN 14" MAPLE

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4202-1" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 778473.7859(ft) EASTING: 1071871.6768(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99980016 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4202-1" TO -L- STATION 10+00.00 IS S 0°59'47" E 1147.88' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

NCDOT GPS STA. 'B4202-1'
LOCALIZED PROJECT COORDINATES
N = 778473.7859
E = 1071871.6768

NCDOT GPS STA. 'B4202-2'
LOCALIZED PROJECT COORDINATES
N = 779110.9221
E = 1071858.0777



-L- STA. 23+16.71 END STATE PROJECT 33549.1.1
LOCALIZED PROJECT COORDINATES
N = 780749.7187
E = 1071851.7180

-L- STA. 10+00.00 BEGIN STATE PROJECT 33549.1.1
LOCALIZED PROJECT COORDINATES
N = 779621.4883
E = 1071851.7180

-Y- STA. 11+95.47 END STATE PROJECT 33549.1.1
LOCALIZED PROJECT COORDINATES
N = 780613.7895
E = 1071999.6818

NOTES:

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

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   B4202_LS_CONTROL_060221.TXT

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

- *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
  PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

6/2/99

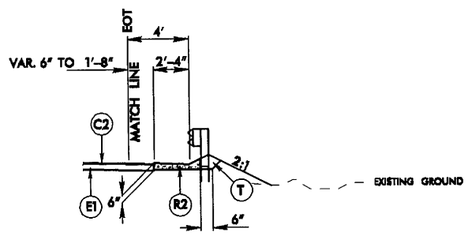
PROJECT REFERENCE NO.	SHEET NO.
B-4202	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 1" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD.	J1	PROP. 6" AGGREGATE BASE COURSE
C2	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. IN EACH OF TWO LAYERS	R1	CONCRETE VALLEY GUTTER
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2½" IN DEPTH	R2	CONCRETE SHOULDER BERM GUTTER
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	T	EARTH MATERIAL
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH	U	EXISTING PAVEMENT
		W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL SHT 2-B)

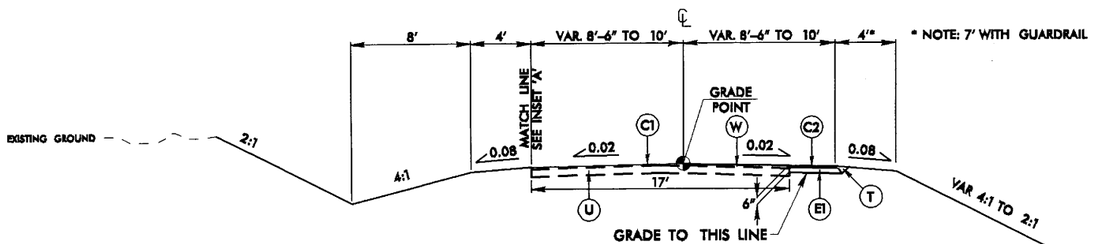
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



INSET 'A'

USE INSET 'A' IN CONJUNCTION WITH TYPICAL SECTION NO. 1 AND TYPICAL SECTION NO. 2

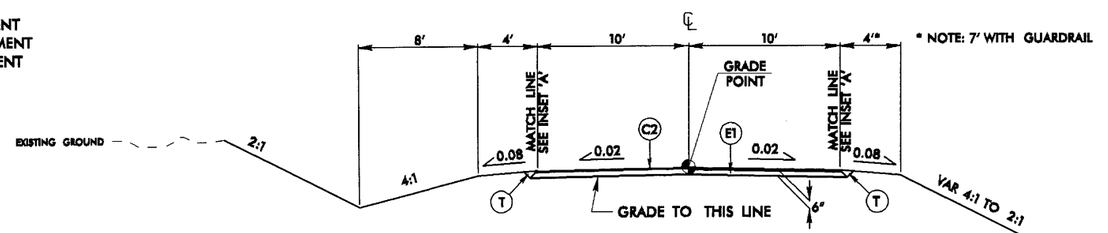
-L- FROM STA. 13+28.08 TO STA. 13+54.75 ON LEFT EDGE OF PAVEMENT
-L- FROM STA. 13+45.78 TO STA. 13+54.75 ON RIGHT EDGE OF PAVEMENT
-L- FROM STA. 20+23.00 TO STA. 21+54.78 ON LEFT EDGE OF PAVEMENT



TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1

-L- FROM STA. 10+00.00 TO STA. 11+02.82
-L- FROM STA. 20+33.00 TO STA. 21+75.00
-L- FROM STA. 21+75.00 TO STA. 22+25.00, TRANSITION FROM TYP. SECT. NO. 1 TO EXISTING



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

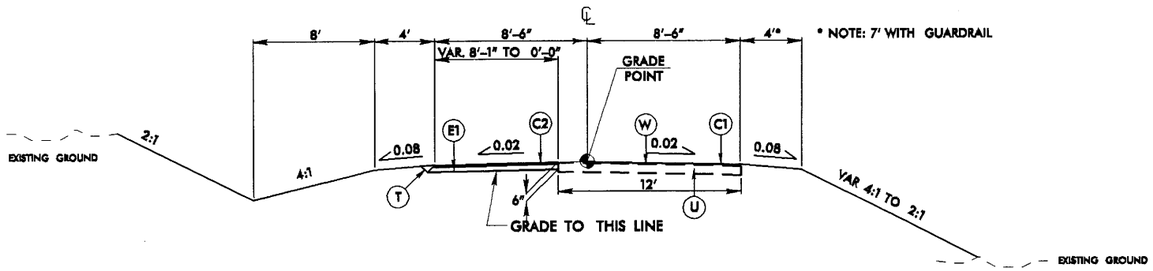
-L- FROM STA. 11+02.82 TO STA. 12+73.00+/- (BEGIN BRIDGE)
-L- FROM STA. 13+23.00+/- (END BRIDGE) TO STA. 15+33.19
-L- FROM STA. 19+33.00 TO STA. 19+48.00+/- (BEGIN BRIDGE)
-L- FROM STA. 20+08.00+/- (END BRIDGE) TO STA. 20+33.00
-Y- FROM STA. 10+30.67 TO STA. 10+49.91
-Y- FROM STA. 10+49.91 TO STA. 11+88.75, TRANSITION FROM TYP. SECT. NO. 2 TO EXISTING

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-4202	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

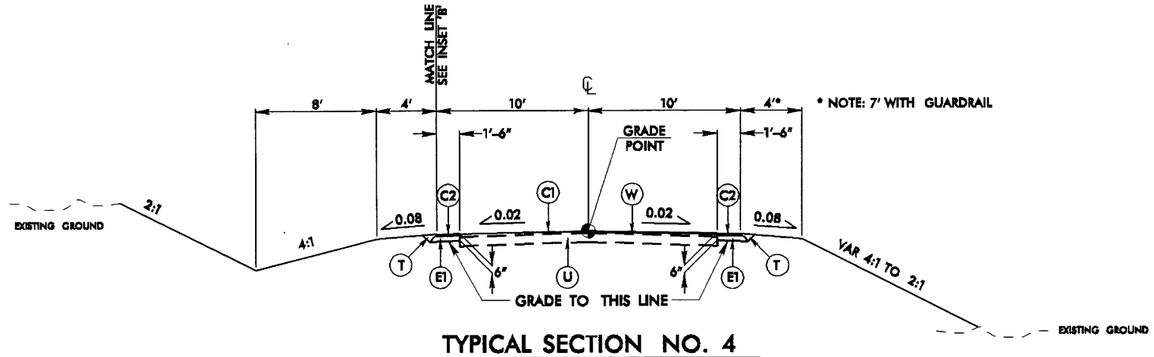
FINAL PAVEMENT DESIGN	
C1	PROP. APPROX. 1" , TYPE SF9.5A
C2	PROP. APPROX. 2", TYPE SF9.5A
E1	PROP. APPROX. 4", TYPE B25.0B
R1	CONCRETE VALLEY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VAIRABLE DEPTH ASPHALT PAVEMENT



* NOTE: 7' WITH GUARDRAIL

TYPICAL SECTION NO. 3

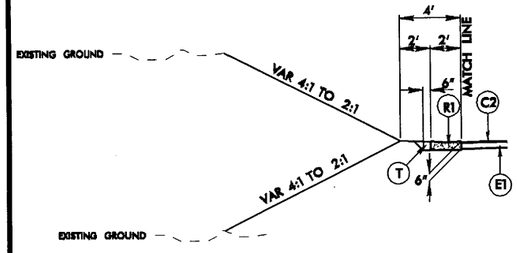
USE TYPICAL SECTION NO. 3
-L- FROM STA. 15+33.19 TO STA. 16+68.52



* NOTE: 7' WITH GUARDRAIL

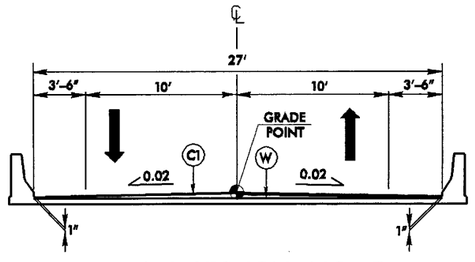
TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4
-L- FROM STA. 18+00.00 TO STA. 18+50.00, TRANSITION FROM EXISTING TO TYP. SECT. NO. 4
-L- FROM STA. 18+50.00 TO STA. 19+48.00



INSET 'B'

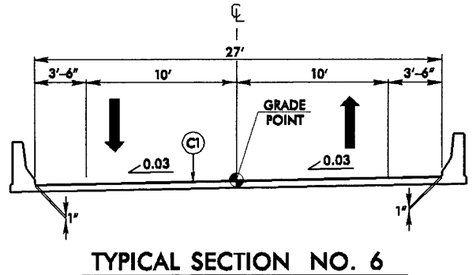
USE INSET 'B' IN CONJUNCTION WITH TYPICAL SECTION NO. 4
-L- FROM STA. 18+08.22 TO STA. 18+57.42 ON LEFT EDGE OF PAVEMENT



TYPICAL SECTION NO. 5

ON STRUCTURE

USE TYPICAL SECTION NO. 5
-L- FROM STA. 12+73.00+/- TO STA. 13+23.00+/-



TYPICAL SECTION NO. 6

ON STRUCTURE

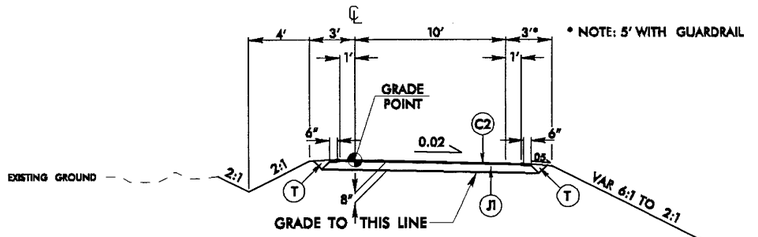
USE TYPICAL SECTION NO. 6
-L- FROM STA. 19+48.00+/- TO STA. 20+08.00+/-

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-4202	2-B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FINAL PAVEMENT DESIGN	
C1	PROP. APPROX. 1" , TYPE SF9.5A
C2	PROP. APPROX. 2", TYPE SF9.5A
C3	PROP. VAR. DEPTH, TYPE SF9.5A
E2	PROP. VAR. DEPTH, TYPE B25.0B
J1	PROP. 6" AGGREGATE BASE COURSE
T	EARTH MATERIAL
U	EXISTING PAVEMENT

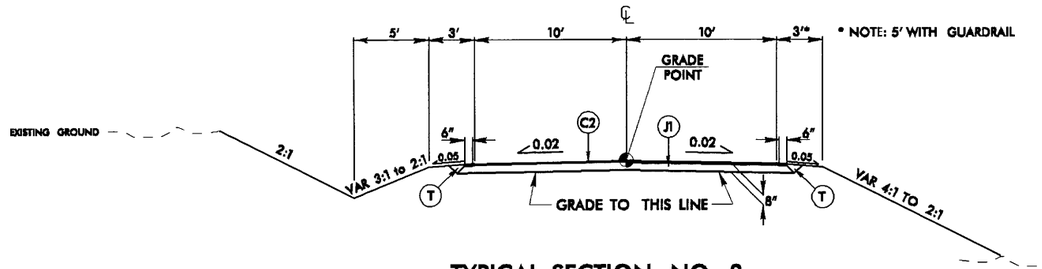


* NOTE: 5' WITH GUARDRAIL

TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7

-DET 'A'- FROM STA. 10+50.00 TO STA. 11+15.27, TRANSITION FROM EXISTING TO TYP. SECT. NO. 6
-DET 'A'- FROM STA. 11+15.27 TO STA. 13+10.00+/- (BEGIN BRIDGE)
-DET 'A'- FROM STA. 13+80.00+/- (END BRIDGE) TO STA. 15+27.46
-DET 'A'- FROM 15+27.46 TO 15+65.88, TRANSITION FROM TYP. SECT. NO. 7 TO EXISTING

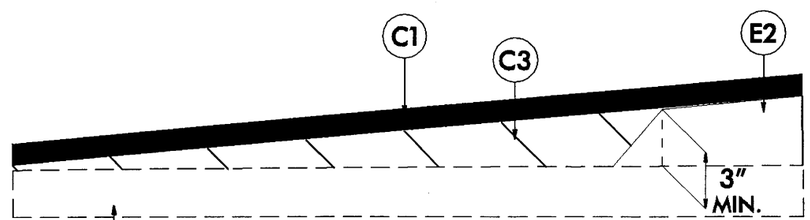


* NOTE: 5' WITH GUARDRAIL

TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8

-DET 'B'- FROM STA. 18+20.26 TO STA. 18+82.66, TRANSITION FROM EXISTING TO TYP. SECT. NO. 8
-DET 'B'- FROM STA. 18+82.66 TO STA. 19+75.00+/- (BEGIN BRIDGE)
-DET 'B'- FROM STA. 20+35.00+/- (END BRIDGE) TO STA. 21+19.33
-DET 'B'- FROM STA. 21+19.33 TO STA. 21+87.16, TRANSITION FROM TYP. SECT. NO. 8 TO EXISTING



Wedging Detail For Resurfacing

29-AUG-2007 14:32
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PROJECT REFERENCE NO.	SHEET NO.
B-4202	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

REVISED RIGHT OF WAY, PERMANENT AND TEMPORARY CONSTRUCTION EASEMENT ON PARCEL 6. JPM 8/14/07

-L-

PI Sta 10+06.92
Δ = 9° 44′ 09.5″ (RT)
D = 70° 32′ 00.3″
L = 13.80′
T = 6.92′
R = 81.23′

PI Sta 11+85.56
Δ = 65° 03′ 06.7″ (LT)
D = 47° 44′ 47.3″
L = 136.24′
T = 76.52′
R = 120.00′

PI Sta 16+16.06
Δ = 45° 52′ 10.3″ (LT)
D = 41° 13′ 11.9″
L = 111.28′
T = 58.82′
R = 139.00′

PI Sta 17+08.61
Δ = 17° 39′ 03.9″ (LT)
D = 22° 25′ 44.9″
L = 78.70′
T = 39.66′
R = 255.45′

PI Sta 22+35.55
Δ = 11° 01′ 28.3″ (RT)
D = 6° 46′ 15.1″
L = 162.82′
T = 81.66′
R = 846.21′

PI Sta 10+64.54
Δ = 22° 48′ 38.4″ (RT)
D = 47° 44′ 47.3″
L = 47.77′
T = 24.21′
R = 120.00′

PI Sta 14+23.95
Δ = 52° 34′ 55.9″ (RT)
D = 47° 44′ 47.3″
L = 110.13′
T = 59.28′
R = 120.00′

PI Sta 18+44.66
Δ = 9° 49′ 59.0″ (LT)
D = 5° 04′ 48.2″
L = 193.56′
T = 97.02′
R = 1,127.86′

PI Sta 20+96.00
Δ = 10° 50′ 12.9″ (LT)
D = 9° 32′ 57.5″
L = 113.48′
T = 56.91′
R = 600.00′

-DRIVE-

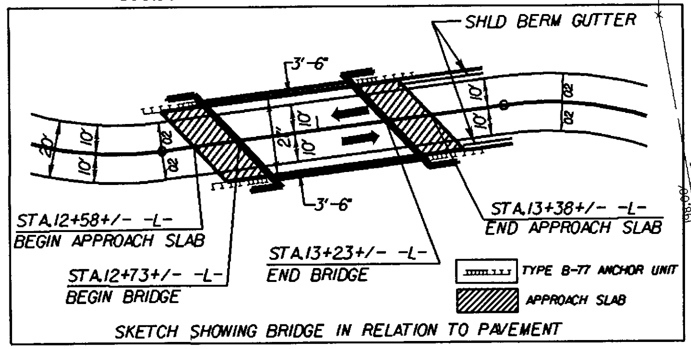
PI Sta 10+36.21
Δ = 99° 30′ 29.6″ (LT)
D = 229° 10′ 59.2″
L = 43.42′
T = 29.54′
R = 25.00′

PI Sta 11+32.57
Δ = 57° 01′ 28.8″ (RT)
D = 190° 59′ 09.4″
L = 29.86′
T = 16.30′
R = 30.00′

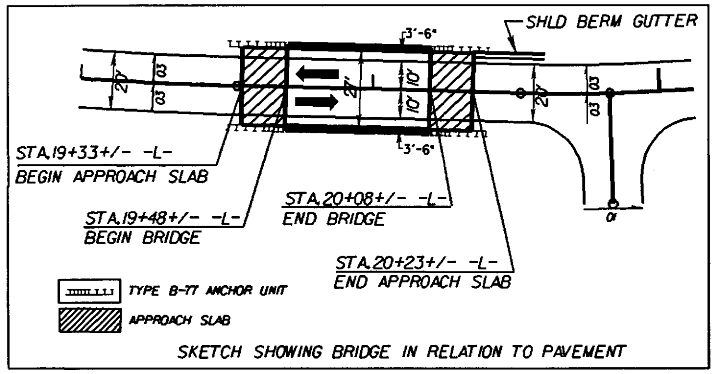
PI Sta 10+75.92
Δ = 21° 39′ 31.0″ (LT)
D = 42° 26′ 28.7″
L = 51.03′
T = 25.82′
R = 135.00′

PI Sta 11+24.75
Δ = 53° 02′ 03.9″ (RT)
D = 38° 11′ 49.9″
L = 138.84′
T = 74.84′
R = 150.00′

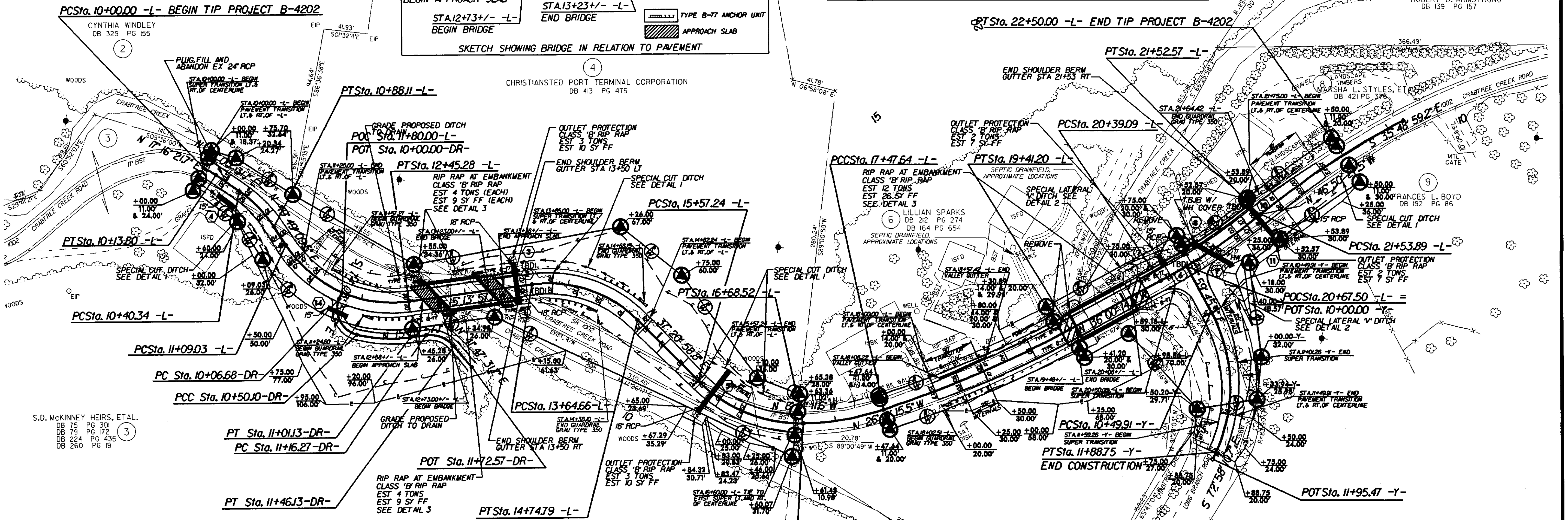
NAD 83



SKETCH SHOWING BRIDGE IN RELATION TO PAVEMENT



SKETCH SHOWING BRIDGE IN RELATION TO PAVEMENT



PT Sta. 11+46.13 -DR-

RIP RAP AT EMBANKMENT
CLASS 'B' RIP RAP
EST 4 TONS
EST 9 SY FF
SEE DETAIL 3

3

S.D. McKINNEY HEIRS, ETAL.
DB 75 PG 301
DB 79 PG 172
DB 224 PG 435
DB 260 PG 19

5

GREAT MEADOWS
DB 120 PG 379

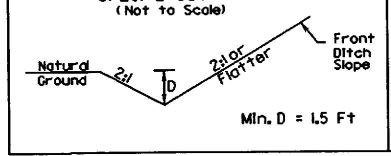
6

LILLIAN SPARKS
DB 212 PG 274
DB 164 PG 654

7

MAREL ENTERPRISES
LIMITED PARTNERSHIP
DB 326 PG 419

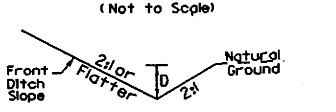
DETAIL I
SPECIAL CUT DITCH
(Not to Scale)



Min. D = 1.5 Ft

-L- STA. 10+00 TO STA. 11+25 (RT)
-L- STA. 12+91 TO STA. 14+50 (LT)
-L- STA. 15+75 TO STA. 16+50 (LT)
-L- STA. 15+50 TO STA. 15+75 (LT)
-L- STA. 21+75 TO STA. 22+50 (RT)

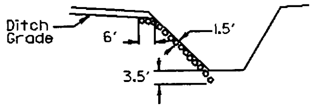
DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.0′

-Y- STA. 10+25 TO STA. 10+75 (LT)
-L- STA. 20+08 TO STA. 20+50 (LT)

DETAIL 3
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

-L- STA 12+59 (LT)
-L- STA 12+94 (RT)
-L- STA 12+94 (LT)
-L- STA 20+05 (LT)

9-AUG-2007 14:32
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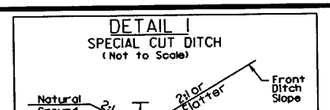
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-4202	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

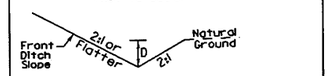
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL 1
SPECIAL CUT DITCH
(Not to Scale)



-DET 'A'- STA. 10+24 TO STA. 12+75 (RT)
-DET 'A'- STA 11+29 TO STA. 12+53 (LT)

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



-DET 'B'- STA. 20+19 TO STA. 20+94 (LT)
-Y- STA. 10+44 TO STA. 10+75 (LT)

-Y-
PI Sta 11+24.75
Δ = 53° 02' 03.9" (RT)
D = 38° 11' 49.9"
L = 138.84'
T = 74.84'
R = 150.00'

NAD 83

PAVEMENT REMOVAL
STRUCTURE REMOVAL

POT Sta. 10+00.00 -DET'A-
PCSta. 10+12.35 -DET'A-
PTSta. 10+73.97 -DET'A-
PCSta. 10+87.70 -DET'A-
PTSta. 12+37.91 -DET'A-
PCSta. 13+26.26 -DET'A-
POT Sta. 14+32.73 -DET'A-
PTSta. 13+72.73 -DET'A-
PCSta. 18+91.82 -DET'B-
PCSta. 20+37.01 -DET'B-
PCSta. 10+49.91 -Y-
PTSta. 19+56.51 -DET'B-
PTSta. 18+72.08 -DET'B-
PCSta. 18+20.26 -L- =
PCSta. 18+20.26 -DET'B-
POT Sta. 11+95.47 -Y-
PTSta. 11+88.75 -Y-
END CONSTRUCTION
POT Sta. 10+29.67 -Y-
PTSta. 20+77.28 -DET'B- =
PCSta. 20+67.50 -L- =
POT Sta. 10+00.00
PTSta. 20+82.69 -DET'B-
PCSta. 21+55.34 -DET'B-
POCSta. 21+70.47 -L- =
PTSta. 21+88.64 -DET'B-

CYNTHIA WINDLEY
DB 329 PG 155 (2)

CHRISTIANSTED PORT TERMINAL CORPORATION
DB 413 PG 475 (4)

ROBERT D. ARMSTRONG
DB 139 PG 157 (10)

MARSHA L. STYLES, ET
DB 421 PG 375 (8)

FRANCES L. BOYD
DB 192 PG 86 (9)

LILLIAN SPARKS
DB 212 PG 274
DB 164 PG 654 (6)

S.D. McKINNEY HEIRS, ETAL.
DB 15 PG 304
DB 79 PG 172
DB 224 PG 435
DB 260 PG 19 (3)

GREAT MEADOWS
DB 120 PG 379 (5)

MAREL ENTERPRISES LIMITED PARTNERSHIP
DB 326 PG 489 (7)

TEMPORARY BLIND JB
TEMPORARY 48" CMP
INV IN = 2928.5

-DETOUR 'A'-

PI Sta 10+43.85	PI Sta 11+74.44	PI Sta 13+50.27
Δ = 29° 25' 19.5" (RT)	Δ = 71° 43' 04.8" (LT)	Δ = 35° 29' 49.0" (RT)
D = 47° 44' 47.3"	D = 47° 44' 47.3"	D = 76° 23' 39.7"
L = 61.62'	L = 150.21'	L = 46.41'
T = 31.51'	T = 86.73'	T = 24.01'
R = 120.00'	R = 120.00'	R = 75.00'

-DETOUR 'B'-

PI Sta 18+46.58	PI Sta 19+24.97	PI Sta 20+60.26	PI Sta 21+72.14
Δ = 24° 44' 28.0" (RT)	Δ = 30° 53' 05.9" (LT)	Δ = 26° 10' 13.6" (LT)	Δ = 19° 04' 39.9" (RT)
D = 47° 44' 47.3"	D = 47° 44' 47.3"	D = 57° 17' 44.8"	D = 57° 17' 44.8"
L = 51.82'	L = 64.69'	L = 45.68'	L = 33.30'
T = 26.32'	T = 33.15'	T = 23.24'	T = 16.80'
R = 120.00'	R = 120.00'	R = 100.00'	R = 100.00'

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-4202	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1000 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 2942.3FT
BASE DISCHARGE	= 1600 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 2944.6FT
OVERTOPPING DISCHARGE	= 2400 CFS
OVERTOPPING FREQUENCY	= 500 YRS
OVERTOPPING ELEVATION	= 2945.5FT
DATE OF SURVEY	= 01/09/2006
W.S. ELEVATION AT DATE OF SURVEY	= 2938.0FT

BM#1 -BL- 116+15
RR SPIKE LOCATED 30' RT.
IN BASE OF 24" OAK
ELEV. 2951.19
N 779509 E 1071857

BM#2 -BL- STA. 121+35
RR SPIKE LOCATED 18' RT.
IN BASE OF 36" POPLAR
ELEV. 2943.33
N 780004 E 1071980

BM#3 -BL- 131+60
RR SPIKE LOCATED 62' RT.
IN BASE OF 36" OAK
ELEV. 2938.84
N 780220 E 1072056

BM#4 -BL- 251+87
RR SPIKE LOCATE 20' LT.
IN BASE OF 48" HEMLOCK
ELEV. 2935.91
N 780411 E 1071896

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.5 18" PIPE

DRAINAGE AREA	= 0.85 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 1.3 CFS
DESIGN HW ELEVATION	= 2936.11 FT
100 YEAR DISCHARGE	= 1.5 CFS
100 YEAR HW ELEVATION	= 2936.16FT
OVERTOPPING FREQUENCY	= YRS
OVERTOPPING DISCHARGE	= CFS
OVERTOPPING ELEVATION	= FT

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.9 54" PIPE

DRAINAGE AREA	= 2.00 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 5.3 CFS
DESIGN HW ELEVATION	= 2925.11 FT
100 YEAR DISCHARGE	= 6.5 CFS
100 YEAR HW ELEVATION	= 2925.2FT
OVERTOPPING FREQUENCY	= YRS
OVERTOPPING DISCHARGE	= CFS
OVERTOPPING ELEVATION	= FT

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1500 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 2930.6FT
BASE DISCHARGE	= 2300 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 2931.9FT
OVERTOPPING DISCHARGE	= <1100 CFS
OVERTOPPING FREQUENCY	= <10 YRS
OVERTOPPING ELEVATION	= 2927.0*FT
*OVERTOPPING OCCURS AT EXISTING LOWPOINT 250' UP STATION OF PROPOSED BRIDGE	FT
DATE OF SURVEY	= 01/09/2006
W.S. ELEVATION AT DATE OF SURVEY	= 2924.4FT

STA. 10+00.00 -L- BEGIN GRADE
ELEV. 2946.41
PI = 10+40.00
EL = 2946.45
VC = 50'
(+)0.1000%
(-)0.7600%
(-)0.5990%
(-)0.2468%
-L- STA. 10+00.00
BEG. SP. DITCH
GRADE RT.
ELEV. = 2944.41

PI STA. 11+40.00 RT.
EL = 2943.65

-L- STA. 12+19.00
BEG. SP. DITCH
GRADE LT.
ELEV. = 2941.32

-L- STA. 12+92.00
END SP. DITCH
GRADE RT.
ELEV. = 2942.50

PI = 14+25.00
EL = 2945.50
VC = 150'

STA. 14+50.00 -L- END GRADE
ELEV. 2942.41

(+)0.7203%

-L- STA. 14+50.00
END SP. DITCH
GRADE LT.
ELEV. = 2942.41

STA. 16+10.00 -L- END GRADE
ELEV. 2939.11
PI = 15+85.00
EL = 2939.80'
VC = 150'

(-)3.5629%
(-)1.4280%
(+)0.0533%

-L- STA. 15+50.00
BEG. SP. DITCH
GRADE LT.
ELEV. = 2938.11

PI STA. 15+75.00 LT.
EL = 2935.50

-L- STA. 16+50.00
END SP. DITCH
GRADE LT.
ELEV. = 2935.96

(-)0.1333%

STA. 18+00.00 -L- BEGIN GRADE
ELEV. 2936.46

PI = 18+75.00
EL = 2934.72
VC = 80'

(-)2.2200%

-L- STA. 20+08.00
BEG. SP. DITCH
GRADE LT.
ELEV. = 2927.86

(-)1.3633%
(+)2.0000%
(-)2.5800%
(-)1.7000%
(-)0.1053%

-L- STA. 20+50.00
END SP. DITCH
GRADE LT.
ELEV. = 2928.70

-L- STA. 21+75.00
BEG. SP. DITCH
GRADE RT.
ELEV. = 2928.05

STA. 22+25.00 -L- END GRADE
ELEV. 2928.89

PI = 21+00.00
EL = 2931.68
VC = 80'

PI = 21+75.00
EL = 2929.74
VC = 50'

-L- STA. 22+50.00
END SP. DITCH
GRADE RT.
ELEV. = 2925.26

-L-

STA. 10+10.01 -DRIVE- BEGIN GRADE
ELEV. 2945.90
PI = 10+25.00
EL = 2945.90
VC = 25'

PI = 11+10.00
EL = 2946.16'
VC = 80'

STA. 12+17.64 -DRIVE- END GRADE
ELEV. 2949.56

(-)2.6956%
(+)0.7765%
(+)5.4339%

-DRIVE-

10 11 12 13 14 15 16 17 18 19 20 21 22 23

2,960 2,950 2,940 2,930 2,920 2,910

10 11 12

2,960 2,950 2,940 2,930 2,920 2,910

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USER:GRAHAM
$$$$

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-4202	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DITCH LEGEND

LEFT DITCH — - - — -

RIGHT DITCH - - - - - - -

STA.10+64.39 -DET 'A'- BEGIN GRADE
ELEV.2945.89

STA.13+29.16 -DET 'A'- END GRADE
ELEV.2943.94

PI = 11+25.00
EL = 2945.80
VC = 100'

PI STA.6+75.40
ELEV.= 2935.50

(-)10.9172%

(-)10.2560%

(-)0.4475%

(-)10.4627%

(-)10.5239%

(-)10.4200%

(-)0.6200%

DET 'A'- STA.11+25.00
BEG.SP.DITCH GRADE LT.
ELEV.= 2943.86

DET 'A'- STA.13+06.00
END SP.DITCH GRADE LT.
ELEV.= 2944.05

DET 'A'- STA.13+94.00
END SP.DITCH GRADE RT.
ELEV.= 2944.93

DET 'A'- STA.10+50.00
BEG.SP.DITCH
GRADE RT.
ELEV.= 2944.70

DET 'A'- STA.14+83.00
END SP.DITCH GRADE LT.
ELEV.= 2944.77

DET 'A'- STA.13+47.00
BEG.SP.DITCH GRADE LT.
ELEV.= 2943.68

DET 'A'- STA.15+50.00
BEG.SP.DITCH GRADE LT.
ELEV.= 2938.11

DET 'A'- STA.16+25.00
END SP.DITCH GRADE LT.
ELEV.= 2935.81

-DET 'A'-

STA.16+62.94 -DET 'B'- BEGIN GRADE
ELEV.2935.11

STA.21+47.60 -DET 'B'- END GRADE
ELEV.2930.76

PI = 19+15.00
EL = 2935.24
VC = 60.00'

PI = 20+89.00
EL = 2932.86
VC = 60.00'

(+)0.2561%

(-)1.3520%

(-)13.5870%

(+)1.2000%

DET 'B'- STA.20+10.00
BEG.SP.DITCH GRADE LT.
ELEV.= 2933.33

DET 'B'- STA.20+17.00
END SP.DITCH GRADE LT.
ELEV.= 2930.63

-DET 'B'-

STA.10+00.00 -Y- BEGIN GRADE
ELEV.2932.35

STA.11+95.47 -Y- END GRADE
ELEV.2932.73

PI = 10+50.00
EL = 2933.15'
VC = 56.77'

PI = 11+50.00
EL = 2932.00'
VC = 60'

(+)2.0090%

(+)1.0600%

(-)1.1528%

(+)1.6145%

Y- STA.10+75.00
END SP.DITCH GRADE RT.
ELEV.= 2930.28

-Y- STA.10+75.00
END SP.DITCH GRADE LT.
ELEV.= 2928.33

Y- STA.10+25.00
BEG.SP.DITCH GRADE RT.
ELEV.= 2930.98

-Y- STA.10+25.00
BEG.SP.DITCH GRADE LT.
ELEV.= 2928.25

-Y-

2,950
2,940
2,930
2,920
2,910

11 12 13 14 15 16 19 20 21 10 11

9-AUG-2007 14:32
C:\projects\b4202_rdy_pf1_1.dgn
$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-1

-DETOUR A-
10+0L85

2945.97

2944.03

10+50.00

2946.15

2944.22

10+25.00

2946.26

2944.41

10+00.00

—/—

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-2

-DETOUR A-
10+78.61

S.S. 2946.27

0.023

S.S. 2945.54

2943.85 2944.98 2944.28 2943.59

11+25.00

-DETOUR A-
10+54.94

2945.68 2944.54 2943.65

2944.226

11+00.00

-DETOUR A-
10+28.61

2945.94 2944.83 2943.84

10+75.00

—/—

9-AUG-2007 14:36
i:\Roadway\XSC\B4202_Rdy_xpl1.dgn
$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-3

-DETOUR A-
11+30.19

0.002

2944.41
2946.63
2943.38
2943.20
2943.72

11+75.00

-DETOUR A-
11+03.47

0.012

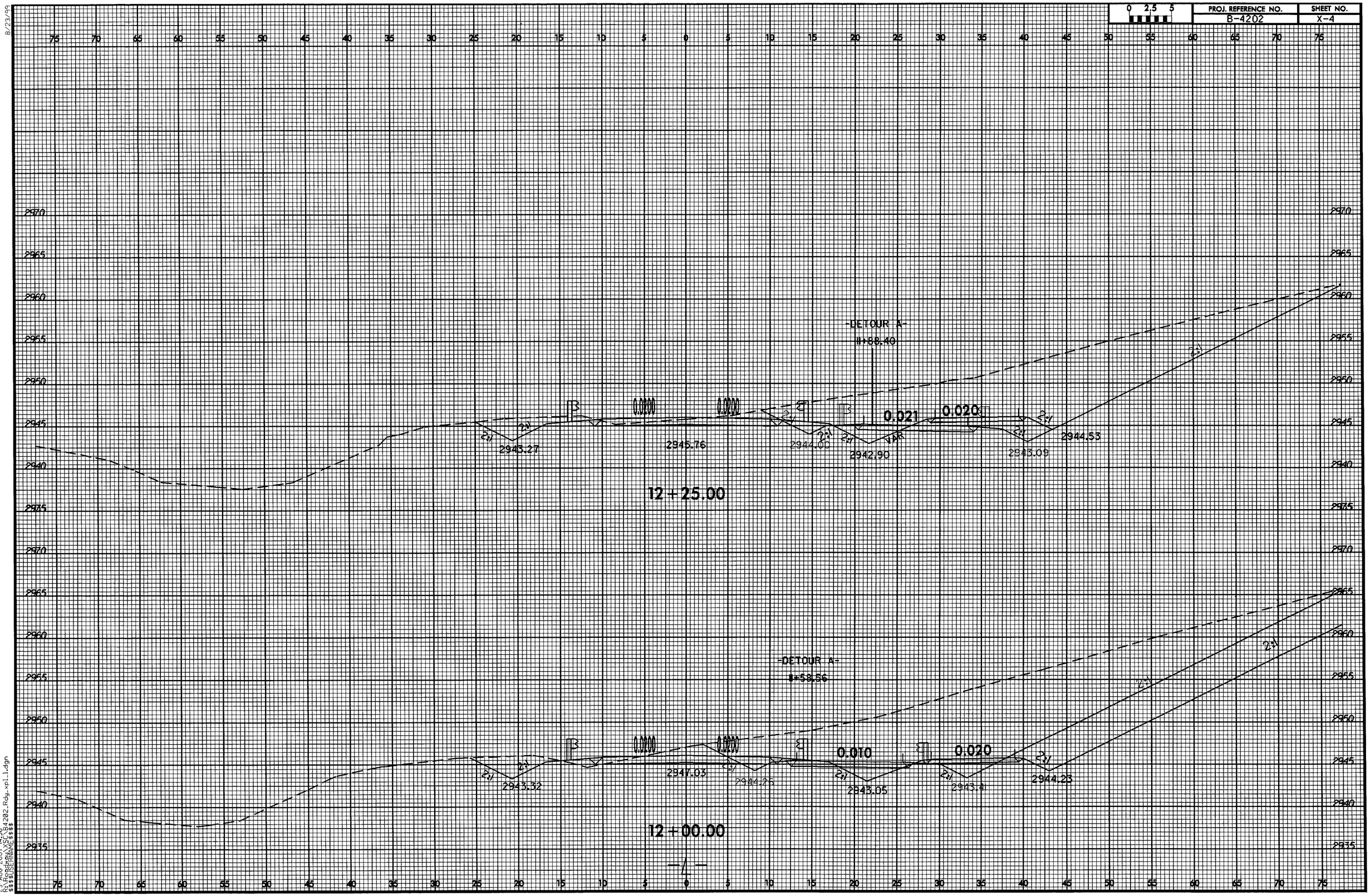
2945.52
2943.66
2944.01
2943.58

11+50.00

—/—

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-4



8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-5

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2960 2955 2950 2945 2940 2935

-DETOUR A-
12+68.41

0.030

5.0%

2.0%

2.0%

2942.22

2941.38

2937.12
13+00.00

-DETOUR A-
12+43.41

0.016 0.023

0.030

5.0%

2.0%

2.0%

2.0%

2.0%

2943.62

2942.88

2946.30

2942.49

12+75.00

-DETOUR A-
12+18.32

0.013 0.013

0.031

5.0%

2.0%

2.0%

2.0%

2.0%

2943.82

2943.19

2946.17

2942.96

2944.64

2942.76

12+50.00

—/—

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-6

2965 2960 2955 2950 2945 2940 2935 2930

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2944.20

2943.20

2941.93

13+75.00

-DETOUR A-
12+47.09

0.030

2941.05
2945.14

2941.74

13+50.00

-DETOUR A-
12+22.09

0.030

2945.54

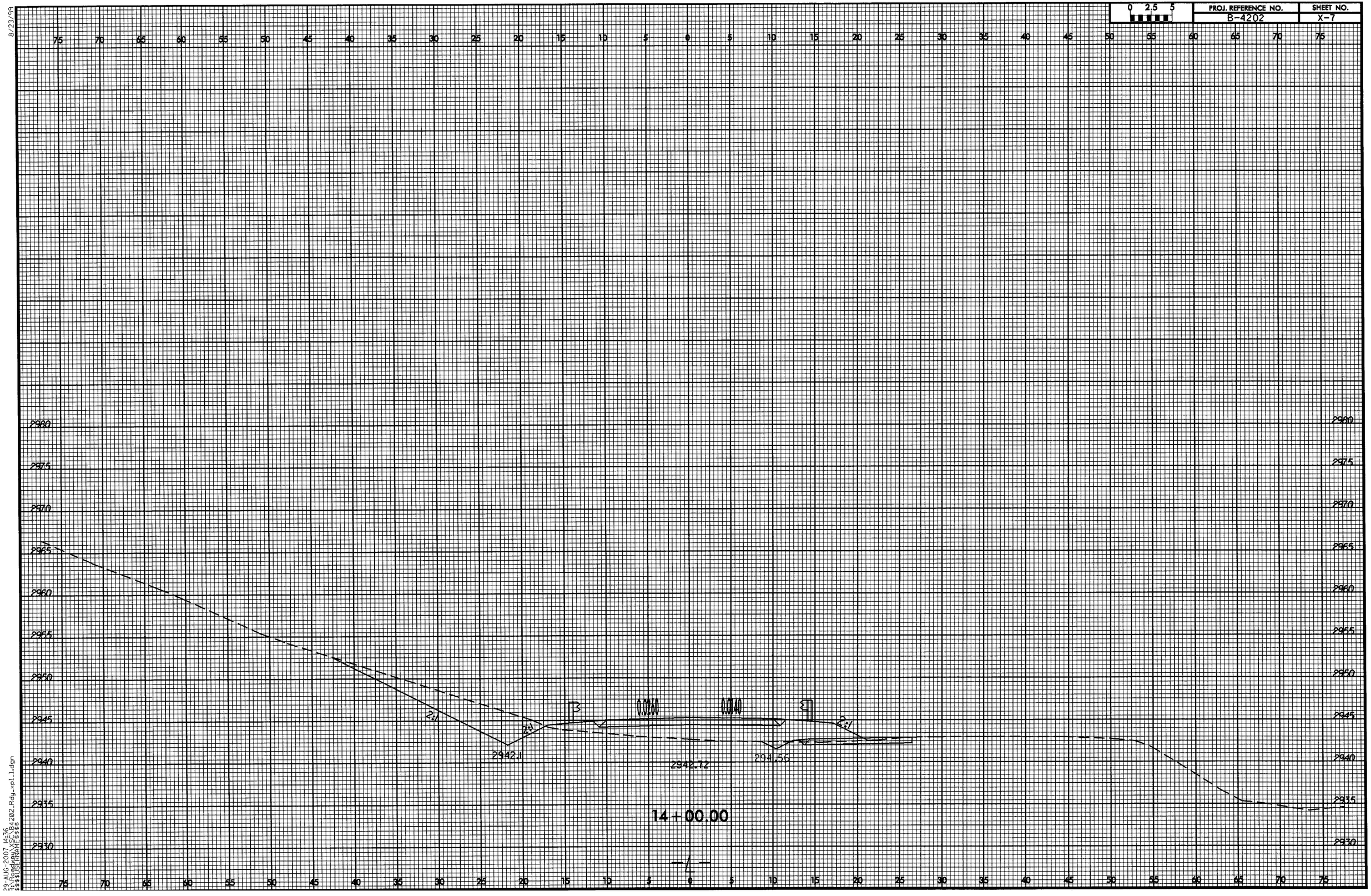
2941.56

13+25.00

—/—

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-7



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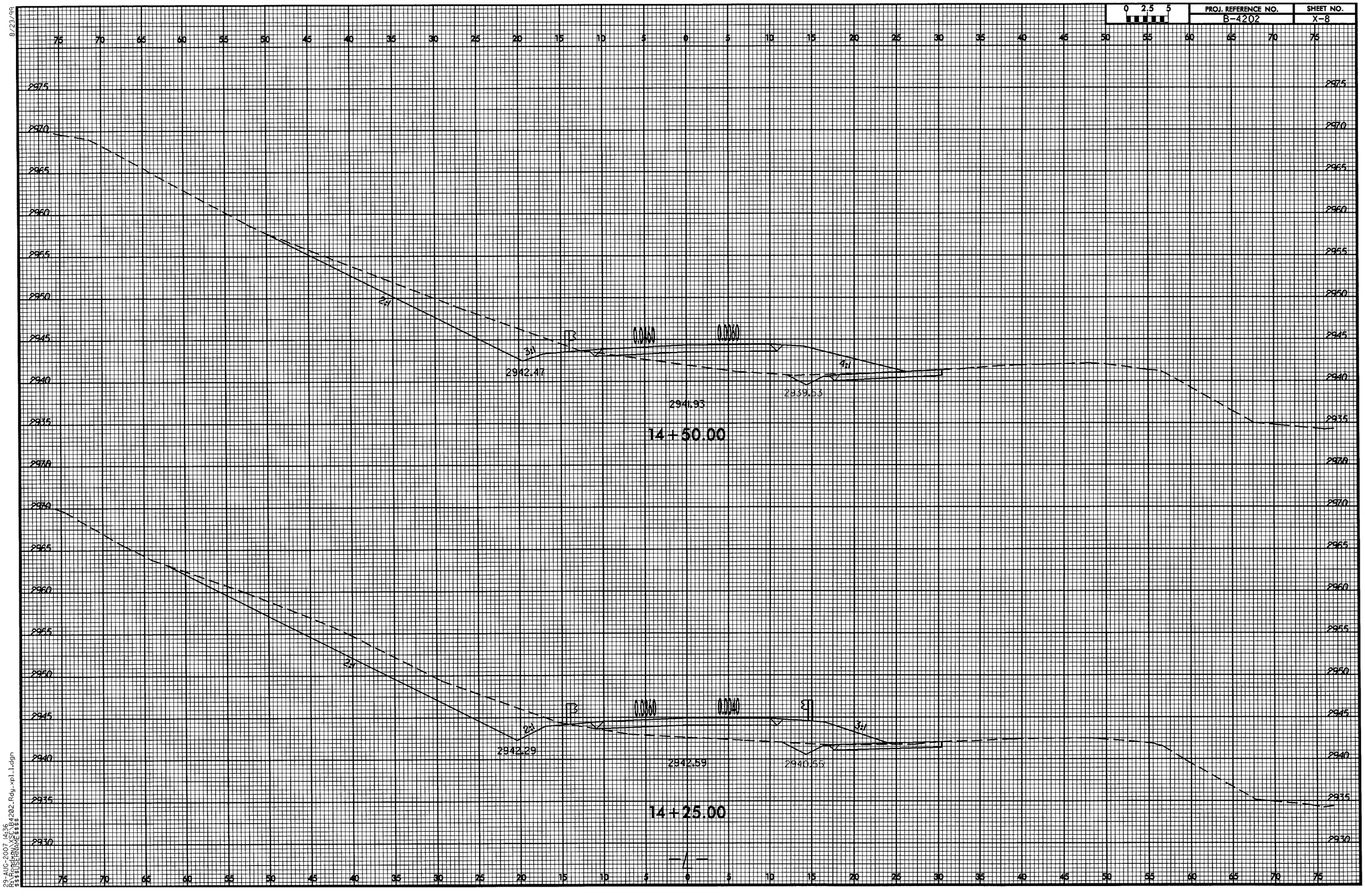
8/23/09

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-8



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C:\Projects\B-4202\Roadway\B4202_Rdy_xpl_1.dgn
$$USER$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-9

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2965 2960 2955 2950 2945 2940 2935 2930

2%

4%

2939.87

0.060

0.060

2938.55

4%

2940.22

15+00.00

2%

4%

2940.80

0.060

0.060

2939.13

4%

2940.03

14+75.00

—/—

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2965 2960 2955 2950 2945 2940 2935 2930

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$$$$DGNFILE$$$$ B4202_Rdy_xpl1.dgn

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-10

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2960 2955 2950 2945 2940 2935 2930

2:1 4:1 4:1

2938.11 2938.02 2937.46 2938.85

15+50.00

2:1 4:1 4:1

2938.94 2937.89 2939.75

15+25.00

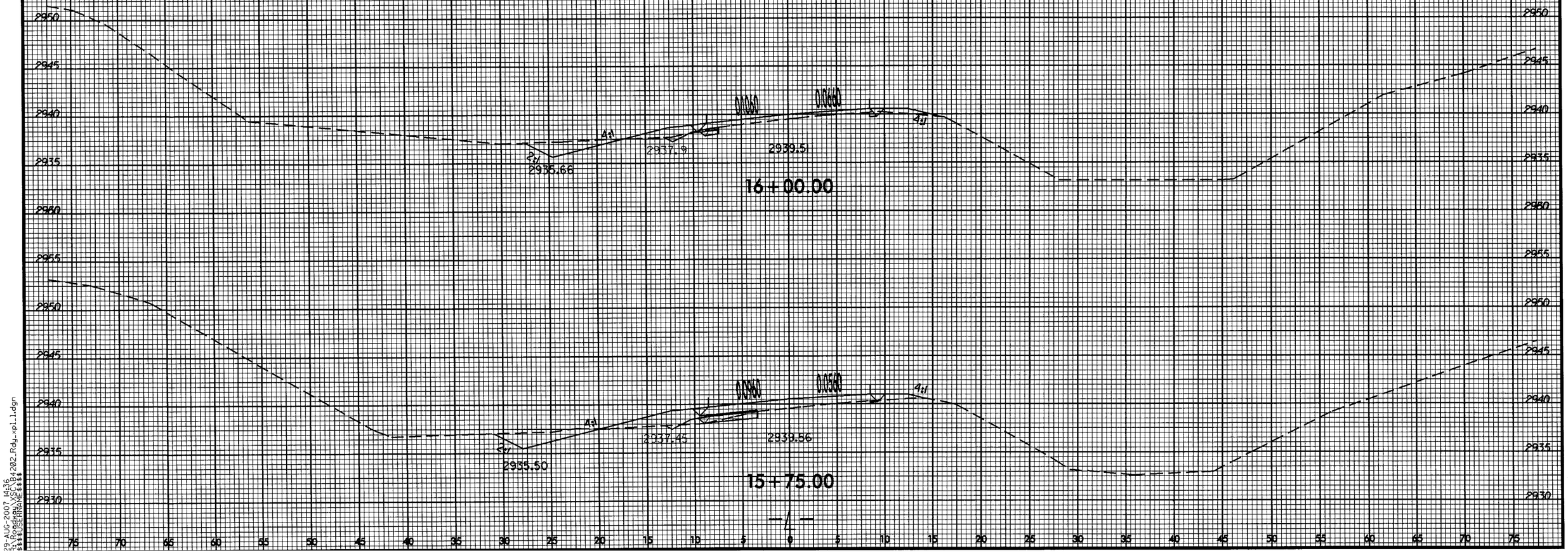
—/—

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-11

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2960
2955
2950
2945
2940
2935
2930



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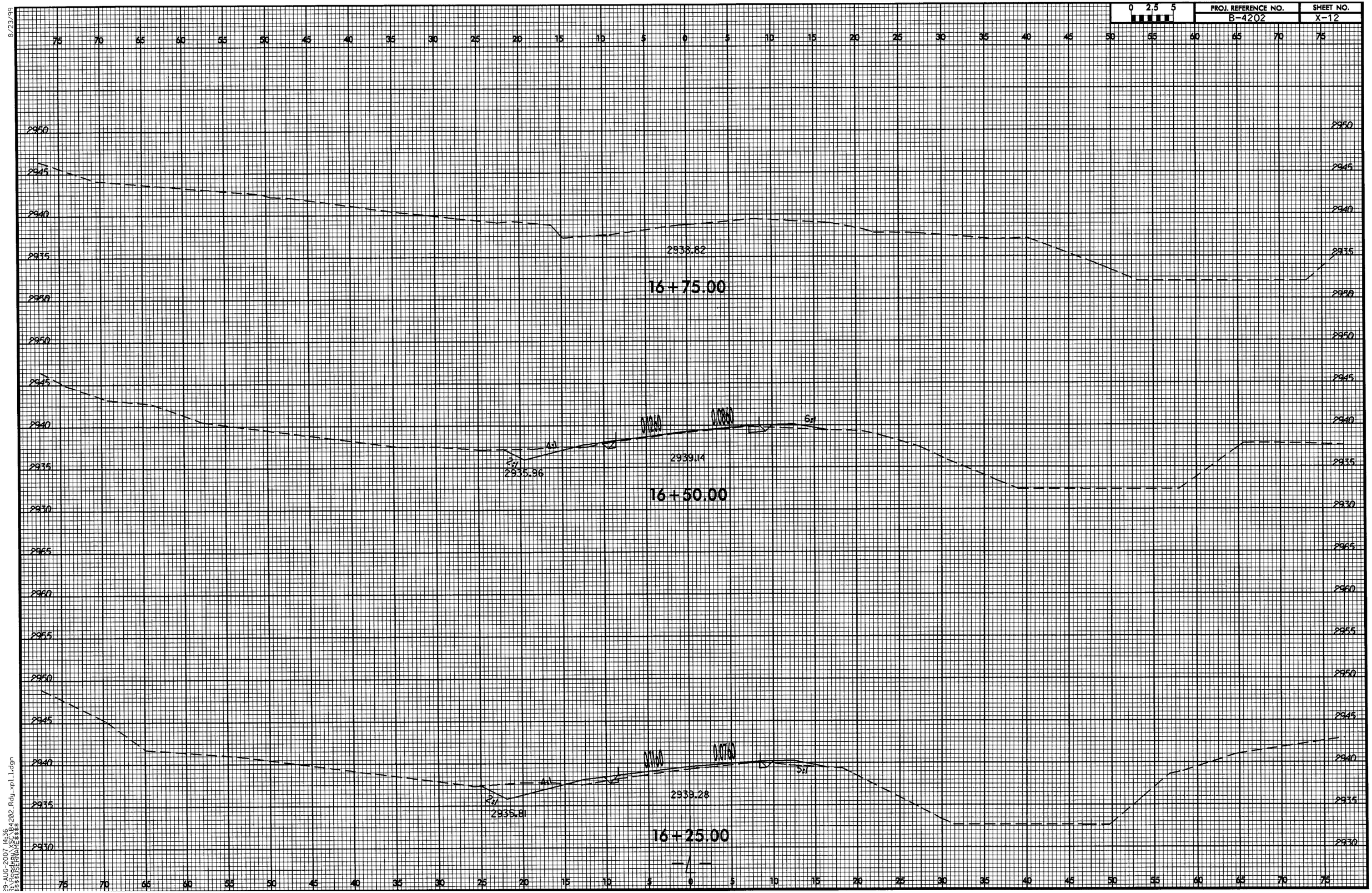
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-12



9/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-13

2936.36
18+00.00

2937.09
17+75.00

2937.71
17+50.00

2938.47
17+25.00

2938.55
17+00.00

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-14

-DETOUR B-
19+06.27

0.0000 0.0800 0.0372 0.0355 0.0331

4" 4:1 2" 2" 2"

2933.04

S.S. 2933.80

S.S. 2932.35

2934.17

19+00.00

-DETOUR B-
18+71.81

0.0000 0.0800

2" 2" 2"

S.S. 2933.10

2934.57

18+75.00

-DETOUR B-
18+50.42

VAR 0.0000 0.0800

2" 2" 2.27%

S.S. 2934.77

2935.00

18+50.00

-DETOUR B-
18+26.00

VAR 0.0000 0.0800

2" 2" 3"

S.S. 2934.29

2935.69

18+25.00

8/23/99

29-AUG-2007 14:36
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$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-15

-DETOUR B-
19+83.72

2924.56
19+75.00

-DETOUR B-
19+58.72

2931.27 | 2933.48 | S.S. 2926.47
19+50.00

-DETOUR B-
19+33.07

2932.68 | 2933.63 | S.S. 2932.26
19+25.00

29-AUG-2007 14:36
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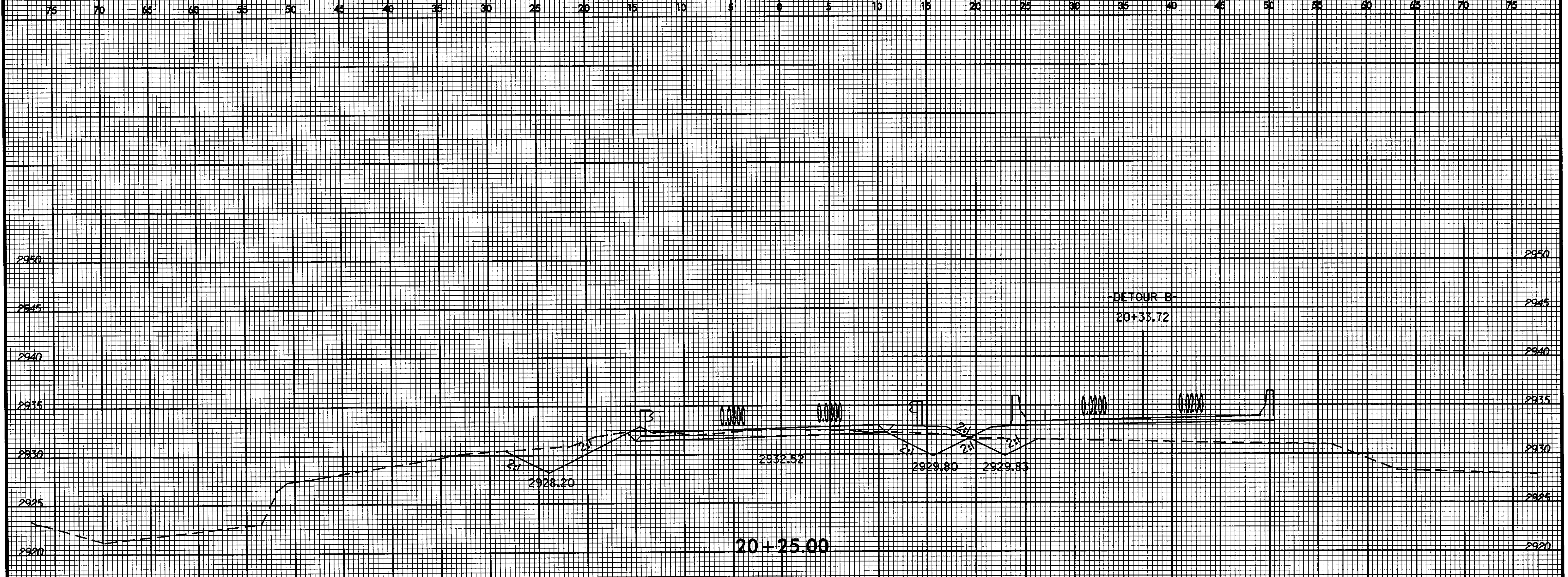
MASTERNAME\cadd

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-16



8/23/99

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$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-17

-DETOUR B-
21+15.09

0.0000 0.0000 0.0043 0.0154

2931.25

21+00.00

S.S. 2929.42

2926.5

-DETOUR B-
20+87.28

0.0000 0.0000 0.0429 0.0393

S.S. 2930.83

2931.69

20+75.00

-DETOUR B-
20+59.53

0.0000 0.0000 S.S. 2931.77 0.0270 0.0247

2928.70

2932.18

2930.32

20+50.00

—/—

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X:\projects\B4202_Rdy_xpl1.dgn
31\projects\B4202_Rdy_xpl1.dgn

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-18

VAR 0.000 0.000

2928.78

22+25.00

3:1 2:1

2925.52

VAR 0.000 0.000

2929.14

22+00.00

3:1 2:1

2925.78

2:1 0.000 0.000

2929.55

21+75.00

3:1 2:1

2926.05

-DETOUR B-

21+68.09

VAR B 0.000 0.000

2930.09

21+50.00

3:1 3:1 2:1

S.S. 2927.95

2926.80

-DETOUR B-

21+42.05

2:1 B 0.000 0.000

2930.71

21+25.00

3:1 3:1 2:1

S.S. 2929.30

2927.68

—//—

29-AUG-2007 14:36
R:\Projects\DIVISION 04\B4202_Rdy.xpl1.dgn
$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-19

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2930

2925

2920

2928.46

2925.26

22+50.00

— / —

2930

2925

2920

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

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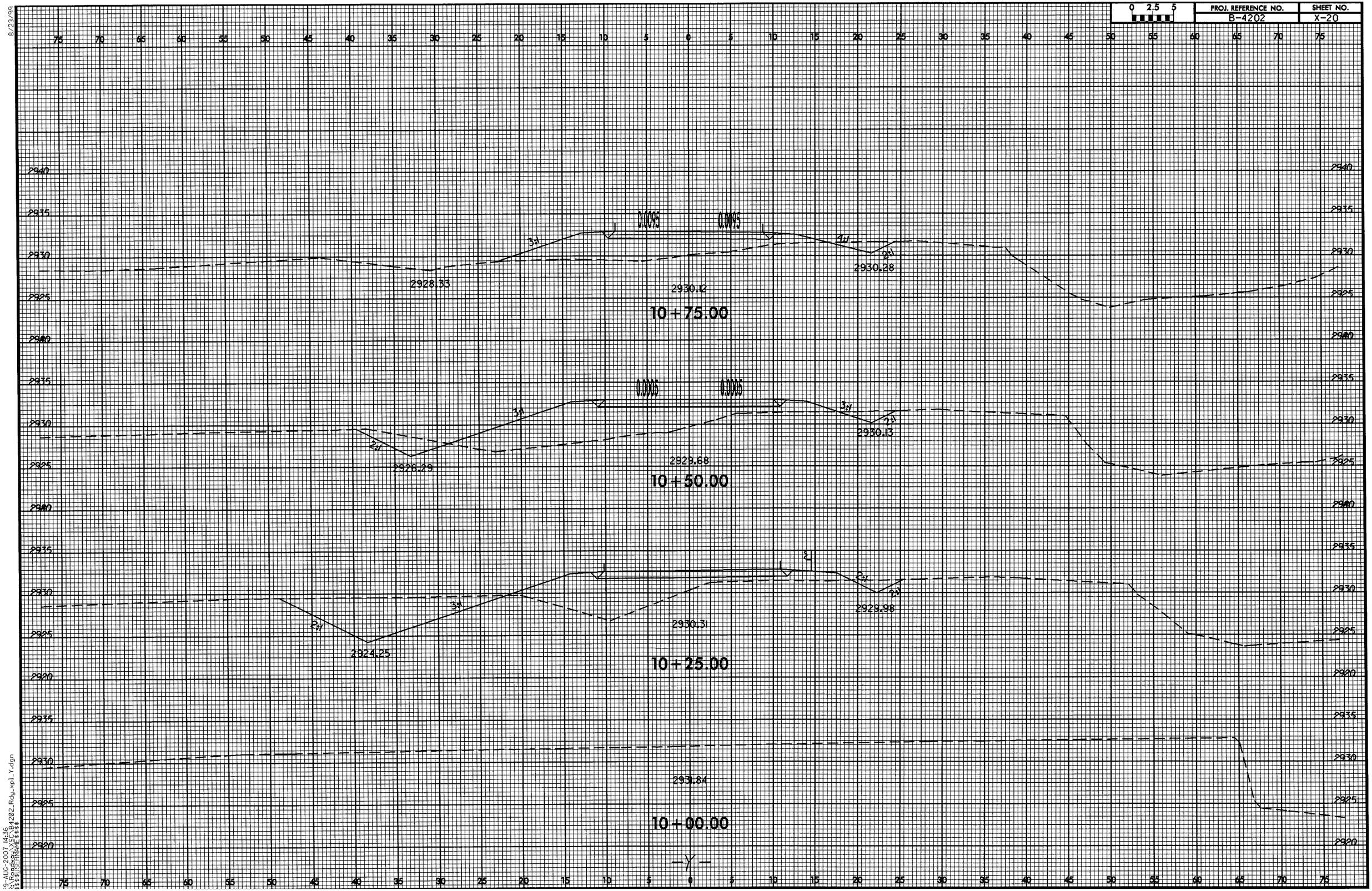
8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-20



8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4202	X-21

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2940
2935
2930
2925

0.0116 0.0116
5.0%
4.0%
2.0%
2932.27
2931.02
11+75.00

0.0200 0.0200
4.0%
4.0%
2.0%
2931.43
2930.81
11+50.00

0.0200 0.0200
3.0%
4.0%
2.0%
2931.13
2930.58
11+25.00

0.0195 0.0195
3.0%
4.0%
2.0%
2930.61
2930.43
11+00.00

—Y—

JG-2007 14:36
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