



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

September 12, 2006

Stormwater Section
Division of Water Quality
943 Washington Square Mall
Washington, NC 27889

Attention: Ms. Amy Franklin

Dear Madam:

Subject: **Stormwater Permit Application** for the proposed replacement of Bridge No. 22 over Northwest Prong of Newport River on SR 1124 in Carteret County. Federal Aid Project No. BRSTP-1124(4), State Project No. 8.2161201, TIP No. B-4055, Debit WBS Element 33420.1.1 \$420.

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 22 over Northwest Prong of Newport River on SR 1124 in Carteret County. Carteret County falls under the jurisdiction of the Coastal Area Management Act (CAMA). The NCDOT will be applying for a Clean Water Act (CWA) §404 USACE Nationwide Permit, and a North Carolina CWA §401 Water Quality Certification.

Please find enclosed a stormwater permit application form, stormwater management plan, one copy of the project plans, Bridge Survey Report, and the authority to debit \$420.00 for the permit application fee. Please review this project for authorization by your section of NCDWQ.

If you have any questions regarding this project or need additional information, please feel free to contact Mr. Galen Cail, P.E. of the NCDOT Hydraulics Unit at (919) 250-4100, or Mr. Chris Manley of NCDOT Project Development and Environmental Analysis Branch at (919) 715-1487.

Sincerely,

E. L. Thorpe
for

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

Cc: w/o attachments

Dr. David Chang, P.E., Hydraulics
Mr. William Wescott, USACE
Mr. Brian Wrenn, NCDWQ

Mr. Steve Sollod, NCDOT
Mr. Wade Kirby, PDEA
File: B-4055

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

TELEPHONE: 919-715-1334
FAX: 919-715-5501
WEBSITE: WWW.NCDOT.ORG

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

OFFICE USE ONLY

Date Received	Fee Paid	Permit Number

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

STORMWATER MANAGEMENT PERMIT APPLICATION FORM

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
LINEAR ROADWAY PROJECT**

This form may be photocopied for use as an original.

DWQ Stormwater Management Plan Review:

A complete stormwater management plan submittal includes this application form, a supplement form for each BMP proposed (see Section V), design calculations, and plans and specifications showing all road and BMP details.

I. PROJECT INFORMATION

NCDOT Project Number: B-4055 _____ County: Carteret _____

Project Name: Replacement of Bridge #22 _____

Project Location: SR 1124 _____

Contact Person: Marshall Clawson, PE _____ Phone: (919) 250-4100 _____ Fax: (919) 250-4108 _____

Receiving Stream Name: NW Prong Newport River River Basin: White Oak _____ Class: "C" _____

Proposed linear feet of project: 1069' _____

Proposed Structural BMP and Road Station *(attach a list of station and BMP type if more room is needed):*

Grass Swales _____

Type of proposed project: *(check all that apply):*

- New
 Widening
 2 lane*
 4 lane*
 Curb and Gutter
 Bridge Replacement
 Other *(Describe)* _____

**2 lane and 4 lane imply that roadside ditches are used unless Curb and Gutter is also checked.*

II. REQUIRED ITEMS CHECKLIST

Initial in the space provided below to indicate the following design requirements have been met and supporting documentation is attached. Supporting documentation shall, at a minimum, consist of a brief narrative description including (1) the scope of the project, (2) how the items below are met, (3) how the proposed best management practices minimize water quality impacts, and (4) any significant constraints and/or justification for not meeting a, b, c and d to the maximum extent practicable.

Designer's Initials

- WHW a. The amount of impervious surface has been minimized as much as possible.
 WHW b. The runoff from the impervious areas has been diverted away from surface waters as much as possible.
 WHW c. Best Management Practices are employed which minimize water quality impacts.
 WHW d. Vegetated roadside ditches are 3:1 slope or flatter.

III. OPERATION AND MAINTENANCE AGREEMENT

I acknowledge and agree by my initials below that the North Carolina Department of Transportation is responsible for the implementation of the four maintenance items listed. I agree to notify DWQ of any operational problems with the BMP's that would impact water quality or prior to making any changes to the system or responsible party.

Maintenance Engineer's Initials

- JWR a. BMP's shall be inspected and maintained in good working order.
JWR b. Eroded areas shall be repaired and reseeded as needed.
JWR c. Stormwater collection systems, including piping, inlets, and outlets, shall be maintained to insure proper functioning.

Maintenance Engineer's Name: John W. Rouse Jr.
Title: Division 2 Maintenance Engineer

IV. APPLICATION CERTIFICATION

I, (print or type name) Elizabeth L. Lusk of Project Development + Analysis ^{Environmental} Branch, certify that the information included on this permit application form is, to the best of my knowledge, correct and that the project will be constructed in conformance with the approved plans and that the proposed project complies with the requirements of 15A NCAC 2H .1000.

Title: Environmental Supervisor
Address: Raleigh, NC
Signature: E. L. Lusk Date: 9-12-06

V. SUPPLEMENT FORMS

The applicable state stormwater management permit supplement form(s) listed below must be submitted for each BMP specified for this project. Contact the Stormwater and General Permits Unit at (919) 733-5083 for the status and availability of these forms.

- Form SWU-102 Wet Detention Basin Supplement
- Form SWU-103 Infiltration Basin Supplement
- Form SWU-104 Low Density Supplement
- Form SWU-105 Curb Outlet System Supplement
- Form SWU-106 Off-Site System Supplement
- Form SWU-107 Underground Infiltration Trench Supplement
- Form SWU-108 Neuse River Basin Supplement
- Form SWU-109 Innovative Best Management Practice Supplement
- Form SWU-110 Extended Dry Detention Basin Supplement

Stormwater Management Plan

B-4055 – Carteret County, NC

This stormwater management plan is for B-4055 in Carteret County. The project consists of replacing bridge number 22 over Northwest Prong Newport River and approaches on SR 1124.

The proposed bridge will not have deck drains over open water or wetlands. Discharge of stormwater from the bridge will be adjacent to the bridge in the wetland. In order to discharge outside the wetland boundary, a pipe system approximately 450 feet long would have to be constructed. Treatment for discharge from the roadway will be provided in the form of grass swales.

Stormwater from the west approaches to the bridge will be conveyed in grass swales at 2-year velocities less than 2 feet per second. Stormwater from the east approaches sheet flow over the shoulder and fill slopes to natural ground.

Carteret County
Bridge No. 22 on SR 1124 Over Branch of Newport River
Federal-Aid Project No. BRSTP-1124(4)
State Project No. 33420.1.1
T.I.P. Project No. B-4055

INTRODUCTION: The replacement of Bridge No. 22 is included in the 2006-2012 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (TIP) and the Federal-Aid Bridge Replacement Program. The location is shown in Figure 1. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion."

I. PURPOSE AND NEED

Bridge Maintenance Unit records indicated the bridge has a sufficiency rating of 9.3 out of a possible 100 for a new structure. The bridge is considered functionally obsolete and structurally deficient. The existing bridge does not meet NCDOT Bridge Policy standards for clear deck width. The replacement of an inadequate structure will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

SR 1124 (Nine Foot Road) is classified as a rural major collector. Land use in the project area is predominantly woodlands. Undeveloped woodlands are adjacent on the north and south sides of the study area. The Croatan State Game Lands are adjacent to the project on both sides.

Bridge No. 22 was constructed in 1964. The existing structure is 91 feet in length, consisting of three spans with the maximum span at approximately 31 feet. The clear roadway width is 24.1 feet, providing two 11.5-foot travel lanes with 0.5-foot gutters. The superstructure consists of prestressed concrete channels. The substructure consists of prestressed concrete caps on timber piles. The bed to crown height is 14 feet and the normal depth of flow is 2 feet. The posted weight limit is 20 tons for single vehicles (SV) and 23 tons for truck-tractors semi-trailers (TTST).

The existing bridge on SR 1124 is in an 8,000-foot radius horizontal curve. The southwest approach and the northeast approach are on tangent. SR 1124 consists of two nine-foot lanes with approximately six-foot grass shoulders.

The estimated 2004 average daily traffic volume is 3,300 vehicles per day (vpd). The projected traffic volume is expected to increase to 7,000 vpd by the design year 2030. The volumes include one percent TTST and two percent dual tired vehicles.

The speed limit in the vicinity of the bridge is not posted and therefore a statutory 55 miles per hour (mph) is assumed. There is an 45 mph advisory sign for the horizontal curve on the east side of the existing bridge. This horizontal curve is outside of the project limits.

There is an aerial telephone line on the north side of the existing bridge. Utility impacts are anticipated to be low.

There were two accidents reported for the three-year period of May 1, 2001 to April 30, 2004.

Four school buses cross this bridge twice daily.

III. ALTERNATIVES

A. Project Description

The proposed structure will provide a 35-foot 10 inch clear deck width to allow for two 12-foot travel lanes with five feet 11 inches each side from edge of travel lane to face of bridge rail.

The proposed approach roadway will consist of a 24-foot travel way providing for two 12-foot travel lanes with eight-foot shoulders including two foot paved shoulders. The design speed will be 60 mph.

Based on a preliminary hydraulic analysis, Bridge No. 22 will be replaced with a 140-foot long bridge. The grade of the roadway will match the elevation of the existing roadway. The minimum deck grade will be 0.3%. The length of the proposed bridge and the recommended roadway elevation may be adjusted (increased or decreased) to accommodate design floods as determined in the final hydrologic study and hydraulic design.

B. Build Alternatives

Two (2) build alternatives studied for replacing the existing bridge are described below.

Alternate A (Preferred) replaces the bridge at the existing location. During construction, traffic will be maintained by an off-site detour route along SR 1124 (Nine Foot Road), SR 1140 (Roberts Road), and US 70 approximately 5.8 miles in length. The length of approach work will be approximately 452 feet on the west side of the proposed bridge and approximately 433 feet on the east side of the proposed bridge. The proposed right-of-way width is variable from 80 feet to 95 feet.

Alternate B replaces the bridge on existing alignment. During construction, traffic will be maintained by an on-site temporary detour structure located southeast of the existing bridge. The length of approach work will be approximately 448 feet on the northwest side of the bridge and approximately 447 feet on the southeast side of the bridge. The proposed right-of-way width is variable from 80 feet to 95 feet. The length of the temporary detour structure will be 90 feet. Alternate B was not chosen because it has comparatively higher natural environment impacts and construction cost.

C. Alternatives Eliminated From Further Study

The "Do-Nothing" Alternative will eventually necessitate removal of the bridge and closing of the road. This is not desirable due to the traffic service provided by SR 1124.

An alternate with a temporary on-site detour located to the northwest is not desirable due to the anticipated natural environment impacts.

Investigation of the existing structure by the Bridge Maintenance Unit indicates the rehabilitation of the old bridge is not feasible due to its age and deteriorated condition.

D. Preferred Alternative

Alternate A, replacing the existing bridge at the existing location, while maintaining traffic by an off-site detour route is the preferred alternate. Alternate A was selected because of the comparatively lower construction cost, lower environmental impacts, and lesser construction time associated with it.

The Division Engineer concurs with Alternate A as the preferred alternative.

Alternate A is estimated to cost \$1,174,000. A breakdown of the estimated cost is shown in Item V (Table 1).

IV. DESIGN EXCEPTIONS ANTICIPATED

No design exceptions will be required.

V. ESTIMATED COSTS

The estimated costs, based on current 2005 prices, are as follows:

Table 1 – Estimated Costs

	Alternate A (Preferred)	Alternate B
Structure Removal (existing)	\$ 30,700	\$ 30,700
Structure (proposed)	464,100	464,100
Detour Structure and Approaches	0	232,200
Roadway Approaches	288,300	288,300
Miscellaneous and Mobilization	216,900	284,700
Engineering and Contingencies	150,000	200,000
ROW/Const. Easements/Utilities:	24,000	29,000
	-----	-----
TOTAL	\$ 1,174,000	\$ 1,529,000

The estimated cost of the project, as shown in the 2006-2012 Transportation Improvement Program, is \$1,180,000 including \$30,000 for right-of-way, \$1,000,000 for construction, and \$150,000 for prior year costs.

VI. NATURAL RESOURCES

A. Methodology

Materials and literature supporting this investigation have been derived from a number of sources including U.S. Geological Survey (USGS) topographic mapping (Masontown, NC 7.5-minute quadrangle), U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping (Masontown, NC 7.5-minute quadrangle), Natural Resources Conservation Service (NRCS; formerly the Soils Conservation Service) soils mapping (NRCS 1997), N.C. Wildlife Resources Commission

BRIDGES AND CULVERTS

Attach this form to Joint Application for CAMA Major Permit, Form DCM-MP-1. Be sure to complete all other sections of the Joint Application that relate to this proposed project.

(4) Will all, or a part of, the existing culvert be removed? (Explain) NA

1. BRIDGES

g. Length of proposed bridge 140'

h. Width of proposed bridge 33'

i. Height of proposed bridge above wetlands 0.0'

j. Will the proposed bridge affect existing water flow? Yes No
If yes, explain _____

k. Navigation clearance underneath proposed bridge 11.4'

l. Will the proposed bridge affect navigation by reducing or increasing the existing navigable opening? Yes No
If yes, explain _____

m. Will the proposed bridge cross wetlands containing no navigable waters? Yes No
If yes, explain _____

n. Have you contacted the U.S. Coast Guard concerning their approval? Yes No
If yes, please provide record of their action.

a. Public Private _____

b. Type of bridge (construction material) 2 @ 70' REINFORCED CONCRETE BOX BEAM

c. Water body to be crossed by bridge NORTHWEST PRONG NEWPORT RIVER

d. Water depth at the proposed crossing at MLW or NWL 3.4' (EL. 2.9 FT)

e. Will proposed bridge replace an existing bridge? Yes No

- If yes,
- (1) Length of existing bridge 90'
 - (2) Width of existing bridge 26.3'
 - (3) Navigation clearance underneath existing bridge 10.8'
 - (4) Will all, or a part of, the existing bridge be removed? (Explain) ALL OF THE EXISTING BRIDGE WILL BE REMOVED

f. Will proposed bridge replace an existing culvert(s)? Yes No

- If yes,
- (1) Length of existing culvert NA
 - (2) Width of existing culvert NA
 - (3) Height of the top of the existing culvert above the MHW or NWL NA

2. CULVERTS

- a. Water body in which culvert is to be placed
NA
- b. Number of culverts proposed NA
- c. Type of culvert (construction material, style)
NA
- d. Will proposed culvert replace an existing bridge?
 Yes No
If yes,
(1) Length of existing bridge _____
(2) Width of existing bridge _____
(3) Navigation clearance underneath existing bridge _____
(4) Will all, or a part of, the existing bridge be removed? (Explain) _____
- e. Will proposed culvert replace an existing culvert?
 Yes No
If yes,
(1) Length of existing culvert _____
(2) Width of existing culvert _____
(3) Height of the top of the existing culvert above the MHW or NWL _____
(4) Will all, or a part of, the existing culvert be removed? (Explain) _____
- f. Length of proposed culvert _____
- g. Width of proposed culvert _____
- h. Height of the top of the proposed culvert above the MHW or NWL _____
- i. Will the proposed culvert affect existing water flow?
 Yes No
If yes, explain _____

- j. Will the proposed culvert affect existing navigation potential? Yes No
If yes, explain _____

3. EXCAVATION AND FILL

- a. Will the placement of the proposed bridge or culvert require any excavation below the MHW or NWL?
 Yes No
If yes,
(1) Length of area to be excavated NA
(2) Width of area to be excavated NA
(3) Depth of area to be excavated NA
(4) Amount of material to be excavated in cubic yards NA
- b. Will the placement of the proposed bridge or culvert require any excavation within:
 Coastal Wetlands SAVs Other Wetlands
If yes,
(1) Length of area to be excavated ~~28'~~ NA
(2) Width of area to be excavated ~~45'~~ NA
(3) Amount of material to be excavated in cubic yards ~~205~~ NA
- c. Will the placement of the proposed bridge or culvert require any highground excavation?
 Yes No
If yes,
(1) Length of area to be excavated 28'
(2) Width of area to be excavated 45'
(3) Amount of material to be excavated in cubic yards 205
- d. If the placement of the bridge or culvert involves any excavation, please complete the following:
(1) Location of the spoil disposal area

(2) Dimensions of spoil disposal area

(3) Do you claim title to the disposal area?
 Yes No
If no, attach a letter granting permission from the owner.

(4) Will the disposal area be available for future maintenance? Yes No

(5) Does the disposal area include any coastal wetlands (marsh), SAVs, or other wetlands? Yes No

If yes, give dimensions if different from (2) above. _____

(6) Does the disposal area include any area below the MHW or NWL? Yes No

If yes, give dimension if different from No. 2 above. _____

e. Will the placement of the proposed bridge or culvert result in any fill (other than excavated material described in Item d. above) to be placed below MHW or NWL? Yes No

If yes,

(1) Length of area to be filled _____

(2) Width of area to be filled _____

(3) Purpose of fill _____

f. Will the placement of the proposed bridge or culvert result in any fill (other than excavated material described in Item d. above) to be placed within:

Coastal Wetlands SAVs Other Wetlands

If yes,

(1) Length of area to be filled ~ 450 FT

(2) Width of area to be filled ~ 22 FT

(3) Purpose of fill _____

ROADWAY EMBANKMENT FILL FOR SHOULDER WIDENING.

g. Will the placement of the proposed bridge or culvert result in any fill (other than excavated material described in Item d. above) to be placed on highground? Yes No

If yes,

(1) Length of area to be filled _____

(2) Width of area to be filled _____

(3) Purpose of fill _____

b. Will the proposed project require the relocation of any existing utility lines? Yes No
If yes, explain in detail _____

POSSIBLE CABLE TV, PHONE, AND FIBER OPTIC RELOCATIONS.

c. Will the proposed project require the construction of any temporary detour structures? Yes No

If yes, explain in detail _____

d. Will the proposed project require any work channels? Yes No

If yes, complete Form DCM-MP-2

e. How will excavated or fill material be kept on site and erosion controlled? BEST MANAGEMENT PRACTICES WILL BE STRICTLY ADHERED TO.

f. What type of construction equipment will be used (for example, dragline, backhoe or hydraulic dredge)? _____

g. Will wetlands be crossed in transporting equipment to project site? Yes No

If yes, explain steps that will be taken to lessen environmental impacts. _____

h. Will the placement of the proposed bridge or culvert require any shoreline stabilization? Yes No

If yes, explain in detail _____

4. GENERAL

a. Will the proposed project involve any mitigation? Yes No

If yes, explain in detail _____

Applicant or Project Name _____

Signature _____

Date _____

BRIDGE SURVEY & HYDRAULIC DESIGN REPORT

N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
HYDRAULICS UNIT
RALEIGH, N. C.

I.D. No. 33420.1.1..... Project No. B-4055..... Proj. Station 16±72 -L-.....
 County CARTERET..... Bridge Over NORTHWEST PRONG NEWPORT RIVER Bridge Inv. No. 22.....
 On Highway SR 1124..... Between SR 1125..... and SR 1206.....
 Recommended Structure 2@70' BOX BEAM.....
 Recommended Width of Roadway 33'..... Skew 110°.....
 Recommended Location Is (Up, At, Down) Stream from Existing Crossing. AT.....
 Nearest Shipping Point NEWPORT..... On EAST CAROLINA..... R.R., 3.2 Miles From Bridge
 Bench Mark Is BM 1-RR SPIKE IN 30" PINE -BL- STA 12+34.139 LEFT.....
 Elev. 9.37..... Datum: NAVD 88.....
 Temporary Crossing NOT REQUIRED - OFF SITE DETOUR.....

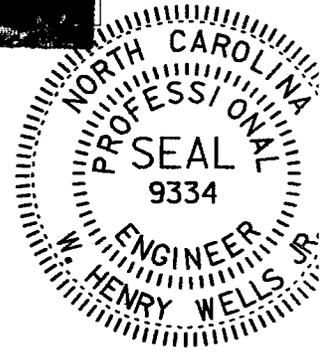
NORTHWEST PRONG Stream NEWPORT RIVER... Bridge Inv. No. 22..... I.D. No. 33420.1.1..... Project No. B-4055



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 Rev 9/7/05
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 to 200, 200
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 1.87' 0.00'

Designed by: SUNGATE DESIGN GROUP, P.A......
 Assisted by: RHK, WHW, JRH.....
 Project Engineer: W. HENRY WELLS JR. P.E......
 Reviewed by: Jalen Cail.....

Date 8/18/05



SITE DATA

Drainage Area 9.53 SQ. MI. Source DA@SELECTED SITES Character RURAL
 Stream Classification (Such as Trout, High Quality Water, etc.) "C"
 Data on Existing Structure 3@30' CONCRETE DECK CHANNELS, CONCRETE END BENTS, CONCRETE CAPS ON
TIMBER PILES Waterway Opening 548 SF
 Debris Potential: Low..... Moderate X High

Data on Structures Up and Down Stream UPSTREAM-NONE
DOWNSTREAM-CONFLUENCE WITH SOUTHWEST PRONG NEWPORT RIVER
 Design Control Elev. MATCH OR REDUCE EXISTING 100 YR
 Gage Station No. NONE Period of Records

Max. Discharge c.f.s. Date Frequency

Historical Flood Information:

Date <u>1999</u>	Elev. <u>7.5</u>	Est. Freq.	Source <u>MIKE WOODY</u>	Period of Knowledge <u>20 YR+</u>
Date	Elev.	Est. Freq.	Source	Period of Knowledge
Date	Elev.	Est. Freq.	Source	Period of Knowledge

Historical Scour Info. : General 2 FT. Contraction..... Local

Channel Slope 0.09% Source FEMA STUDY AND FIELD RECONN Normal Water Surface Elev. 2.9'
 Manning's n : Left 0.B. .17 Channel .06 Right 0.B. .17 Source FIELD RECONN AND FIS
 Flood Study / Status DETAILED STUDY Floodway Established? YES
 Flood Study 100 yr. Discharge 3530 c.f.s.; W.S. Elev. : With Floodway 13.5 Without Floodway 12.9

DESIGN DATA

Hydrological Method USGS REG AND FEMA
 Hydraulic Design Method HEC-RAS 3.1.2

Floods Evaluated:	Freq.	Q	*Elev.	PROP VS NAT	EXTG waterways VS NAT	Bridge Opening	Velocity
10 YR	1350	9.6	0.6	1.0	3.3		
25 YR	1990	10.9	0.8	1.0	3.7		
100 YR	3530	12.7	0.8	1.5	5.5		
500 YR	6010	14.7	0.5	0.4	5.1		

* FROM SECTION 126402.5

Waterway Opening Provided Below: Design W.S. Elev. 533 SF 100yr W.S. Elev. 637
 Average Channel Velocity (Design) 1.8 Average Overbank Velocity (Design) 0.4
 Computed Scour : General NONE Contraction 7.6' Local 7.5'
 Is a Floodway Revision Required? NO. BASE FLOOD ELEVATION IS LOWERED 0.2 FEET AND AFFECTED
PROPERTY IS CROATAN NATIONAL FOREST

INFORMATION TO BE SHOWN ON PLANS

Design:	Discharge 1990.....	c.f.s.	Frequency 25.YR.....	Elev. 10.6.....
Base Flood:	Discharge 3530.....	c.f.s.	Frequency 100 yr.....	Elev. 12.5.....
Overtopping:	Discharge 4450.....	c.f.s.	Frequency 200.YR.....	Elev. 13.10.....
				SAG 19+67.23

ADDITIONAL INFORMATION AND COMPUTATIONS

WHITE OAK RIVER BASIN DA=9.53 SQ. MI.....

	SAY.....	FEMA FLOWS.....
$Q_{\frac{2}{2}} = 64.7DA^{0.673} = 295$ CFS.....	295 CFS.....	
$Q_{\frac{5}{5}} = 129DA^{0.635} = 540$ CFS.....	540 CFS.....	
$Q_{\frac{10}{10}} = 188DA^{0.615} = 752$ CFS.....	750 CFS.....	1350 CFS.....
$Q_{\frac{25}{25}} = 281DA^{0.593} = 1070$ CFS.....	1070 CFS.....	1990 CFS.....
$Q_{\frac{50}{50}} = 367DA^{0.579} = 1354$ CFS.....	1350 CFS.....	2730 CFS.....
$Q_{\frac{100}{100}} = 468DA^{0.566} = 1677$ CFS.....	1675 CFS.....	3530 CFS.....
$Q_{\frac{200}{200}} = 586DA^{0.554} = 2043$ CFS.....	2045 CFS.....	
$Q_{\frac{500}{500}} = 773DA^{0.539} = 2606$ CFS.....	2605 CFS.....	6010 CFS.....

∴ USE FEMA FLOWS

SCOUR COMPUTATIONS.....

500.YR.OVERTOPPING.....

CONTRACTION SCOUR.....

$$Y_1 = \text{AREA} / \text{TOP WIDTH} = 390.0 / 31 = 12.6 \text{ FT}$$

$$Y_S = Y_1 \left[\left(\frac{Q_{BC}}{Q_{NC}} \right)^{0.67} - 1 \right] = 12.6 \left[\left(\frac{2383}{1373} \right)^{0.67} - 1 \right] = 7.6$$

LOCAL SCOUR BENT #1.....

$$Y_1 = 14.30 - 0.30 = 14 \text{ FT}$$

$$Fr = \frac{V}{\sqrt{32.2 * Y_1}} = \frac{0.67(32.2 * 3.7)^{0.5}}{\sqrt{32.2 * 14}} = 0.06$$

$$V = 8.10 \text{ FTS}$$

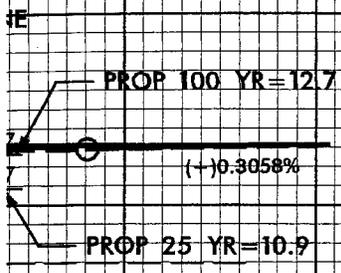
$$Y_S = Y_1 \left[2.0(k_1)(k_2)(k_3) \left(\frac{0.65}{Fr} \right)^{0.43} - 1 \right]$$

$$Y_S = 14 \left[2.0(1)(1)(1.1)(3 / 14) \left(\frac{0.65}{0.38} \right)^{0.43} - 1 \right] = 7.5 \text{ FT}$$

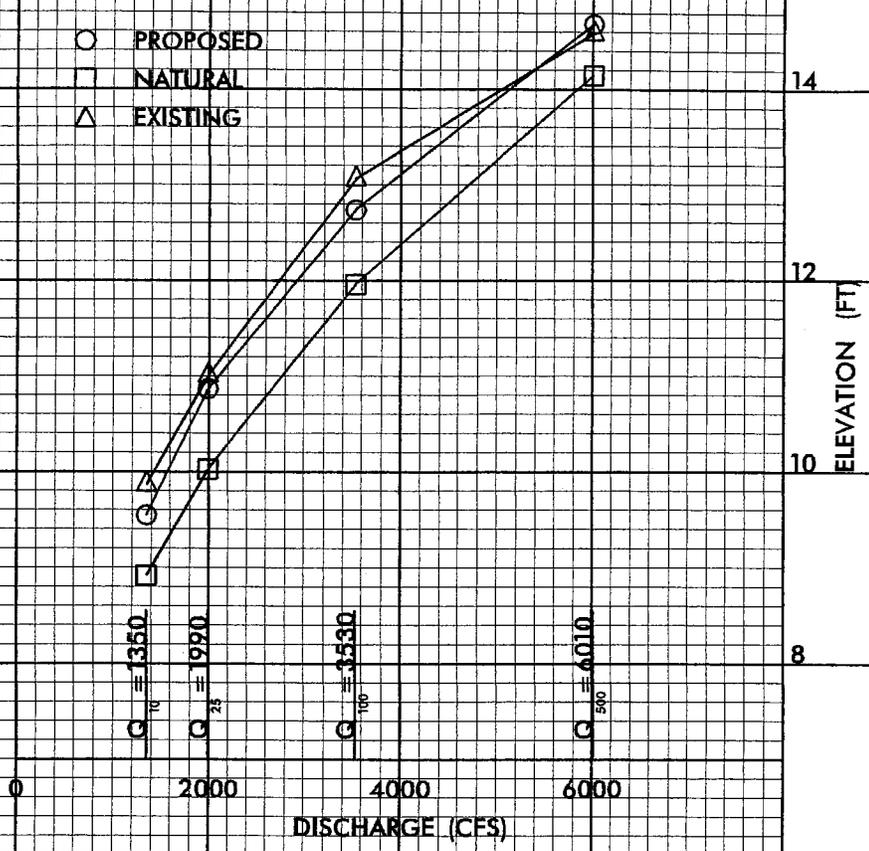
20-00

PERFORMANCE CURVE

19+40.53
 12.91'
 240
 200'
 60 mph



- PROPOSED
- NATURAL
- △ EXISTING



THERE WERE NO DWELLINGS OR OTHER STRUCTURES OBSERVED TO BE IN THE 100 YR FLOOD PLAIN

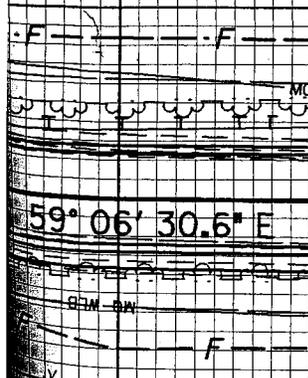
S: SILT, SAND
 TIAL: MODERATE
 DRAINAGE ON BRIDGE
 BE MIN. 5' WIDE TO ACCOMMODATE SPREAD

SPREAD COMPS.
 DA = 0.08 AC
 Q = 0.3 CFS
 SPR = 5.2'

SLOPE PROTECTION
 $Z = (1 - V/V^2)L$
 $= 1 - 1.2/3.7(140)$
 $= 95'$

3.7 FPS IS NOT CONSIDERED TO BE A SCOURABLE VELOCITY AND THEREFORE NO SLOPE PROTECTION IS RECOMMENDED.

WOODS



00

16+00

17+00

18+00

19+00

STA 16+72.1
2@ 70' BOX BEAM
ON 110° SKEW
CR GR EL=14.391

PROPOSED PROFILE

EXTG BRIDGE
TO BE REMOVED

EXTG CENTER
GRADE

(1)0.5283

NG RT

3'

CL RIP RAP
TO TOP OF BERM

1.5:1 NORMAL
1.6:1 SKEWED
CL RIP RAP
TO TOP OF BERM

NG LT

EXCAVATE EXISTING
ROAD BED MATERIALS
DDE=205 CY

BED MATERIAL
DEBRIS PO
NO DECK
SHOULDER

500 YR CONTRACTIONAL SCOUR

WSE ON 3-2-05
2.9

LOCAL SCOUR

TB WE
NORTHWEST PRONG
NEWPORT RIVER

WE TB

WE TB

NO WLB

CL RIP RAP
TO TOP OF BERM

CL RIP RAP
TO TOP OF BERM

SHOULDER BERM GUTTER

MO WLB

TYPE III

MO WLB

TYPE III

15"

TBD1

TYPE III

GRAU 350

1 TON CLASS "B" RIP RAP W/FF
WOODS

SHOULDER BERM GUTTER

EXCAVATE EXISTING
ROAD BED MATERIAL

EXTG BRIDGE
TO BE REMOVED

14 + 00

PI = 13 + 56.48
EL = 16.00'
K = 1528
VC = 200'
DS = 60 mph

20

EXTG 100 YR =

(-)0.5283%

NG RT

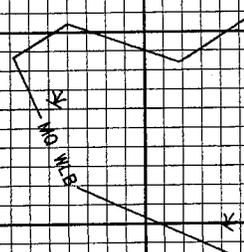
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NG LT

EXTG 25 YR =

0

-10



TO SR 1125

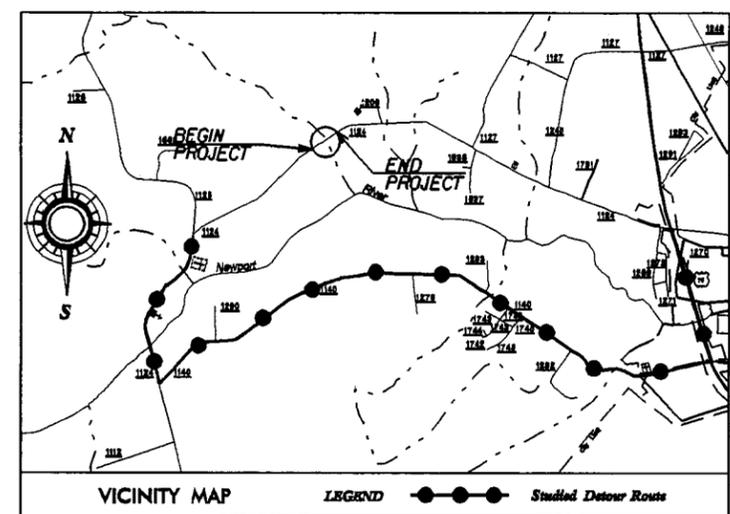


09/08/99

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CONTRACT: TIP PROJECT: B-4055

See Sheet 1-A For Index of Sheets



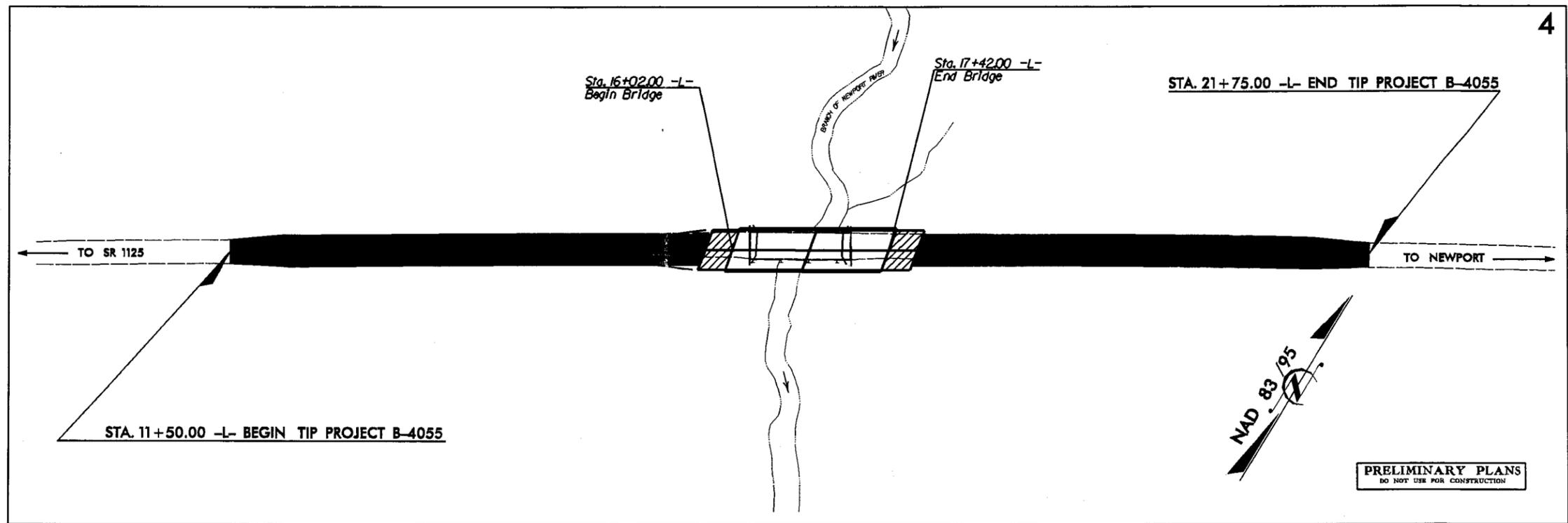
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CARTERET COUNTY

LOCATION: BRIDGE NO. 22 OVER BRANCH OF NEWPORT RIVER
ON SR 1124

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

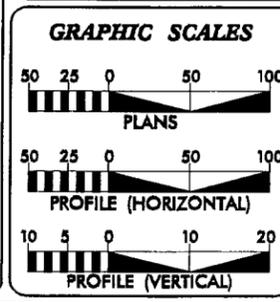
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N.C.	B-4055	1	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
33420.1.1	BRSTP-1124(4)	P.E.	



THIS PROJECT IS NOT WITHIN MUNICIPAL BOUNDARIES.

NCDOT CONTACT: CATHY HOUSER, P.E., PROJECT ENGINEER - ROADWAY DESIGN

"CLEARING ON THIS PROJECT SHALL BE ESTABLISHED BY METHOD III"



DESIGN DATA

ADT 2007 = 3750
ADT 2030 = 7000
DHV = 10 %
D = 60 %
T = 3 % *
V = 60 MPH
FUNC. CLASS =
RURAL MAJOR COLLECTOR
* TTST 1 % DUAL 2 %

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4055 = 0.167 mi.
LENGTH STRUCTURE TIP PROJECT B-4055 = 0.027 mi.
TOTAL LENGTH TIP PROJECT B-4055 = 0.194 mi.

Prepared in the Office of:
WANG ENGINEERING COMPANY, INC.
CARY, N.C.
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

FOR STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: GREG S. PURVIS, P.E.
July 21, 2006
PROJECT ENGINEER

LETTING DATE: SCOTT L. KENNEDY
November 20, 2007
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

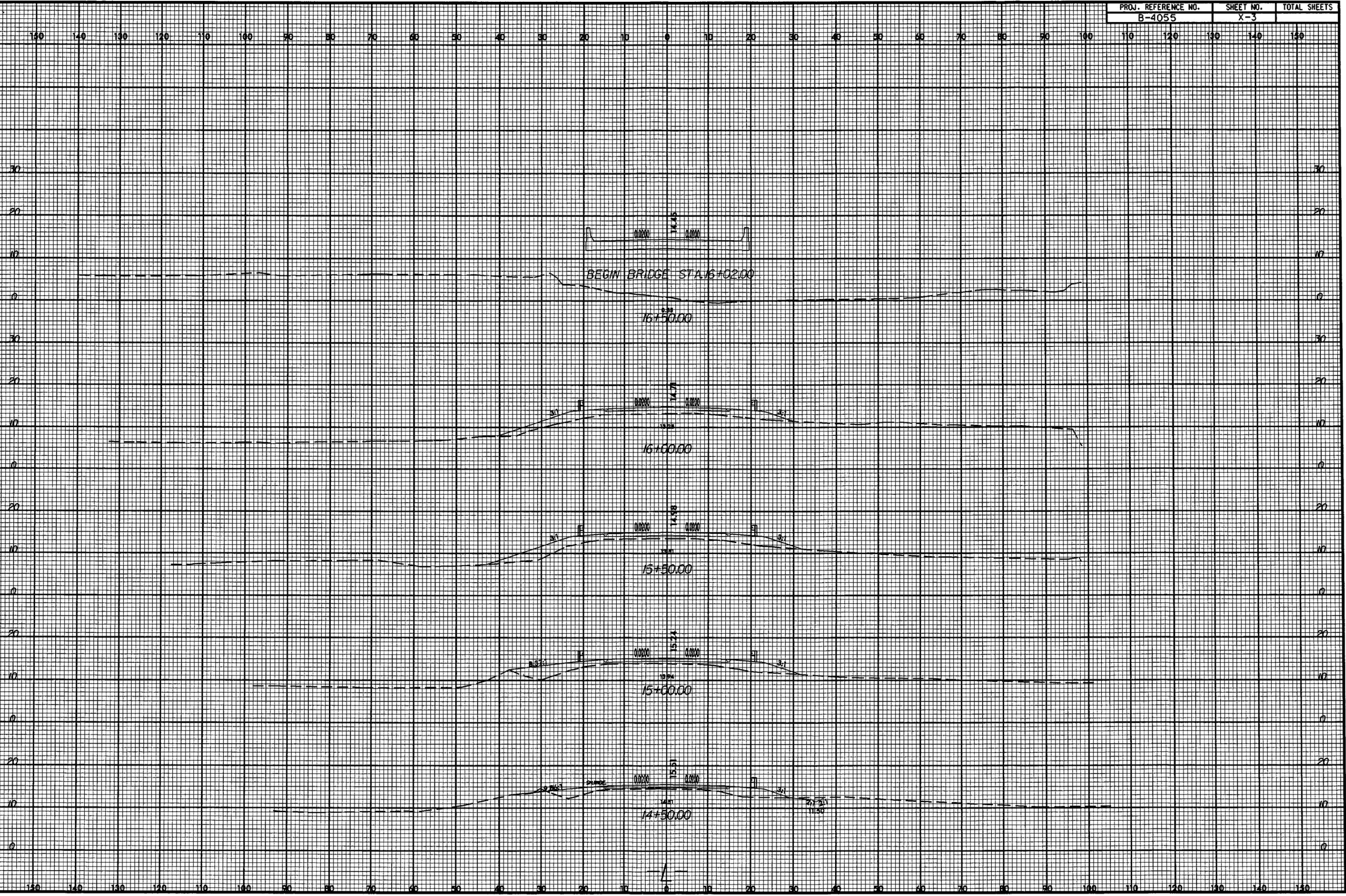
**DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA**

STATE DESIGN ENGINEER _____ P.E.

**DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION**

APPROVED _____ DATE _____
DIVISION ADMINISTRATOR

02/03/98

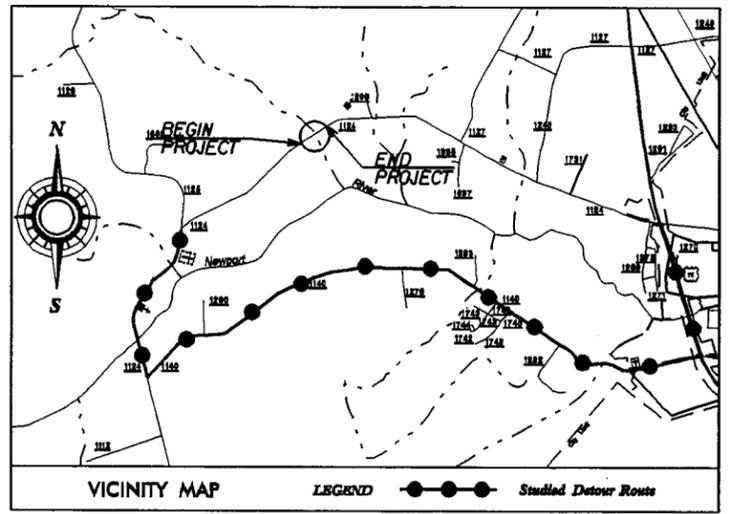


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 gcb

05/08/05

CONTRACT: TIP PROJECT: B-4055

See Sheet 1-A For Index of Sheets



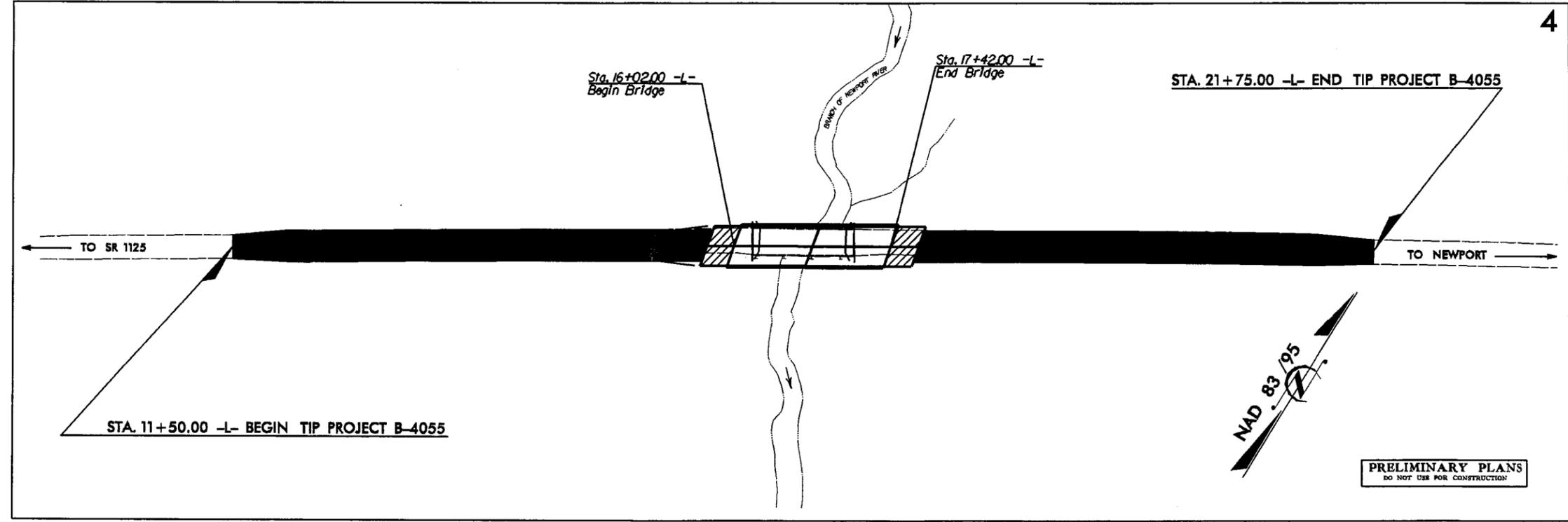
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CARTERET COUNTY

LOCATION: BRIDGE NO. 22 OVER BRANCH OF NEWPORT RIVER
ON SR 1124

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

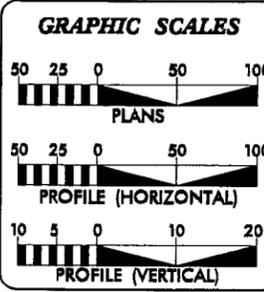
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4055	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33420.1.1	BR5TP-1124(4)	P.E.	



THIS PROJECT IS NOT WITHIN MUNICIPAL BOUNDARIES.

NCDOT CONTACT: CATHY HOUSER, P.E., PROJECT ENGINEER - ROADWAY DESIGN

CLEARING ON THIS PROJECT SHALL BE ESTABLISHED BY METHOD III



DESIGN DATA

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Prepared in the Office of:
WANG ENGINEERING COMPANY, INC.
CARY, N.C.
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: July 21, 2006
LETTING DATE: November 20, 2007

GREG S. PURVIS, P.E.
PROJECT ENGINEER

SCOTT L. KENNEDY
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

**DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA**

STATE DESIGN ENGINEER

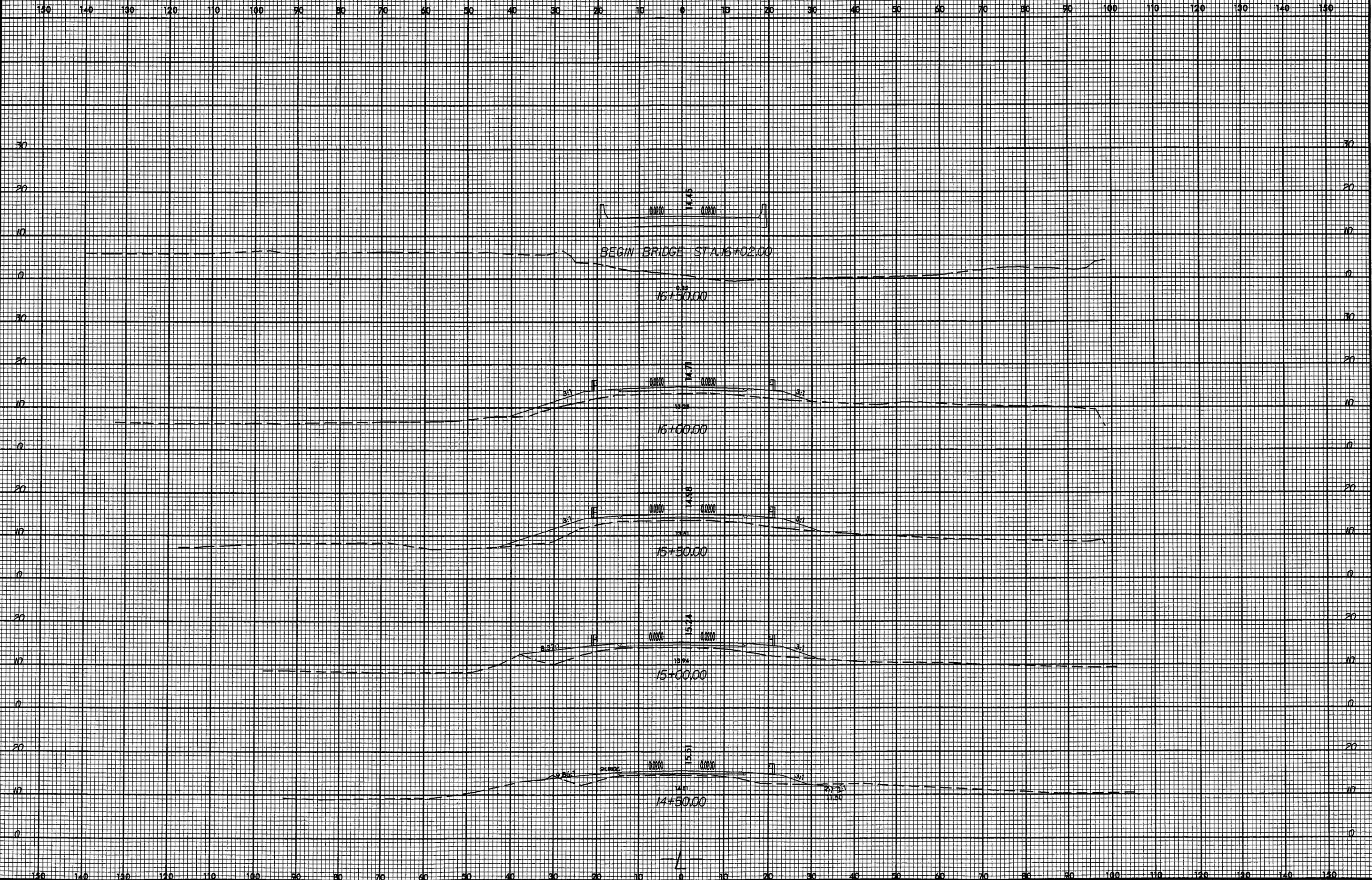
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED: _____ DATE: _____
DIVISION ADMINISTRATOR

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Sheet 11 of 12

02.03.09

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
B-4055	X-3	



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