STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

November 5, 2009

U. S. Army Corps of Engineers
69 Darlington Ave.
Wilmington, NC 28403

ATTN: Ms. Kimberly Garvey
NCDOT Coordinator

Subject: **Application for Section 404 Nationwide Permits 13 and 33** for the proposed replacement of Bridge No. 56 over Buckhorn Creek on NC 42 in Chatham County, Federal Aid Project No. BRSTP-0042(12); Division 8; TIP No. B-4459

Dear Ma'am:

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 56 over Buckhorn Creek on NC 42. There will be 36 linear feet of temporary surface water impacts, and 60 linear feet of bank stabilization.

Please see enclosed copies of the Pre-Construction Notification (PCN), permit drawings, design plans, and stormwater management plan for the above referenced project. The Categorical Exclusion (PCE) was completed December 12, 2008. The document was distributed shortly thereafter. Additional copies are available upon request.

Please note that this project is an accelerated bridge project on NCDOT's Maintenance of Effort list. The NCDOT Administration has deemed these projects highest priority. This project calls for a letting date of June 10, 2010 and a review date of April 22, 2010; however, the let date may advance as additional funding becomes available.

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

TELEPHONE: 919-715-1500
FAX: 919-715-1501

WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD
PLB SUITE 168
RALEIGH NC 27604

A copy of this permit application will be posted on the NCDOT Website at: http://www.ncdot.org/doh/preconstruct/pe/. If you have any questions or need additional information, please call James Pflaum at (919) 715-7217.

Sincerely,

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

Cc:

Mr. Brian Wrenn, NCDWQ (2 Copies)

W/o attachment (see website for attachments)

Dr. David Chang, P.E., Hydraulics
Mr. Mark Staley, Roadside Environmental
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Tim Johnson, P.E., Division 8 Engineer
Mr. Art King, Division 8 Environmental Officer
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. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Mrs. Chirsty Wright, PDEA

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

Pre-Construction Notification (PCN) Form

A. Applicant Information

1. Processing

1a. Type(s) of approval sought from the Corps:	☒ Section 404 Permit	☐ Section 10 Permit
1b. Specify Nationwide Permit (NWP) number: 13, 33 or General Permit (GP) number:		
1c. Has the NWP or GP number been verified by the Corps?	☐ Yes	☒ No

1d. Type(s) of approval sought from the DWQ (check all that apply):

☐ 401 Water Quality Certification – Regular ☐ Non-404 Jurisdictional General Permit

☐ 401 Water Quality Certification – Express ☐ Riparian Buffer Authorization

1e. Is this notification solely for the record because written approval is not required?	For the record only for DWQ 401 Certification: ☒ Yes ☐ No	For the record only for Corps Permit: ☐ Yes ☒ No
1f. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts? If so, attach the acceptance letter from mitigation bank or in-lieu fee program.		☐ Yes ☒ No
1g. Is the project located in any of NC's twenty coastal counties. If yes, answer 1h below.		☐ Yes ☒ No
1h. Is the project located within a NC DCM Area of Environmental Concern (AEC)?		☐ Yes ☒ No

2. Project Information

2a. Name of project:	Replacement of Bridge No. 56 over Buckhorn Creek on NC 42
2b. County:	Chatham
2c. Nearest municipality / town:	Corinth
2d. Subdivision name:	*not applicable*
2e. NCDOT only, T.I.P. or state project no:	B-4459

3. Owner Information

3a. Name(s) on Recorded Deed:	North Carolina Department of Transportation
3b. Deed Book and Page No.	*not applicable*
3c. Responsible Party (for LLC if applicable):	*not applicable*
3d. Street address:	4701 Atlantic Ave, Suite 116
3e. City, state, zip:	Raleigh, NC 27604
3f. Telephone no.:	(919) 431-6527
3g. Fax no.:	(919) 431-2002
3h. Email address:	jrpflaum@ncdot.gov

4. Applicant Information (if different from owner)	
4a. Applicant is:	☐ Agent ☐ Other, specify:
4b. Name:	*not applicable*
4c. Business name (if applicable):	
4d. Street address:	
4e. City, state, zip:	
4f. Telephone no.:	
4g. Fax no.:	
4h. Email address:	
5. Agent/Consultant Information (if applicable)	
5a. Name:	*not applicable*
5b. Business name (if applicable):	
5c. Street address:	
5d. City, state, zip:	
5e. Telephone no.:	
5f. Fax no.:	
5g. Email address:	

B. Project Information and Prior Project History

1. Property Identification

1a. Property identification no. (tax PIN or parcel ID):	*not applicable*
1b. Site coordinates (in decimal degrees):	Latitude: 35.559734 (DD.DDDDDD) Longitude: -78.973184 (-DD.DDDDDD)
1c. Property size:	32 acres

2. Surface Waters

2a. Name of nearest body of water (stream, river, etc.) to proposed project:	Buckhorn Creek
2b. Water Quality Classification of nearest receiving water:	C
2c. River basin:	Cape Fear

3. Project Description

3a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application:

Forested area with rural residential housing and silviculture.

3b. List the total estimated acreage of all existing wetlands on the property:

0

3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property:

1640

3d. Explain the purpose of the proposed project:

To replace a structurally deficient bridge.

3e. Describe the overall project in detail, including the type of equipment to be used:

The project involves replacing a 6 span bridge with a single span bridge. The proposed bridge will be constructed approximately 100 feet east on new alignment while traffic will be maintained on the existing bridge. A temporary work bridge will used to facilitate construction of the proposed bridge. Standard road building equipment, such as trucks, dozers, and cranes will be used.

4. Jurisdictional Determinations

4a. Have jurisdictional wetland or stream determinations by the Corps or State been requested or obtained for this property / project (including all prior phases) in the past? Comments: All perennial streams, No wetlands in project area	☐ Yes ☒ No ☐ Unknown
4b. If the Corps made the jurisdictional determination, what type of determination was made?	☐ Preliminary ☐ Final
4c. If yes, who delineated the jurisdictional areas? Name (if known):	Agency/Consultant Company: Other:

4d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attach documentation.

5. Project History

5a. Have permits or certifications been requested or obtained for this project (including all prior phases) in the past?	☐ Yes ☒ No ☐ Unknown

5b. If yes, explain in detail according to "help file" instructions.

6. Future Project Plans

6a. Is this a phased project?	☐ Yes ☒ No

6b. If yes, explain.

C. Proposed Impacts Inventory

1. Impacts Summary

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

☐ Wetlands ☒ Streams - tributaries ☐ Buffers

☐ Open Waters ☐ Pond Construction

2. Wetland Impacts

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

2a. Wetland impact number – Permanent (P) or Temporary (T)	2b. Type of impact	2c. Type of wetland (if known)	2d. Forested	2e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	2f. Area of impact (acres)
W1 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W2 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W3 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W4 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W5 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W6 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
				2g. **Total wetland impacts**	

2h. Comments:

3. Stream Impacts

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

3a. Stream impact number - Permanent (P) or Temporary (T)	3b. Type of impact	3c. Stream name	3d. Perennial (PER) or intermittent (INT)?	3e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	3f. Average stream width (feet)	3g. Impact length (linear feet)
S1 ☒ P ☐ T	Bank Stabilization	Buckhorn Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	35	60
S2 ☐ P ☒ T	Fill	Buckhorn Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	35	36
S3 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
S4 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
S5 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
S6 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
					3h. **Total stream and tributary impacts**	60 Perm 36 Temp

3i. Comments:

4. Open Water Impacts

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

4a. Open water impact number – Permanent (P) or Temporary (T)	4b. Name of waterbody (if applicable)	4c. Type of impact	4d. Waterbody type	4e. Area of impact (acres)
O1 ☐ P ☐ T				
O2 ☐ P ☐ T				
O3 ☐ P ☐ T				
O4 ☐ P ☐ T				
			4f. Total open water impacts	

4g. Comments:

5. Pond or Lake Construction

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

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

5g. Comments:

5h. Is a dam high hazard permit required?	☐ Yes ☐ No If yes, permit ID no:
5i. Expected pond surface area (acres):	
5j. Size of pond watershed (acres):	
5k. Method of construction:	

6. Buffer Impacts (for DWQ)

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

6a. Project is in which protected basin?	☐ Neuse ☐ Catawba	☐ Tar-Pamlico ☐ Randleman	☐ Other:

6b. Buffer impact number – Permanent (P) or Temporary (T)	6c. Reason for impact	6d. Stream name	6e. Buffer mitigation required?	6f. Zone 1 impact (square feet)	6g. Zone 2 impact (square feet)
B1 ☐ P ☐ T			☐ Yes ☐ No		
B2 ☐ P ☐ T			☐ Yes ☐ No		
B3 ☐ P ☐ T			☐ Yes ☐ No		
		6h. **Total buffer impacts**			

6i. Comments:

D. Impact Justification and Mitigation

1. Avoidance and Minimization

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

The proposed bridge completely spans Buckhorn Creek; proposed bridge is approximately 30 feet longer than existing bridge; proposed bridge will be approximately at the same elevation and grade as existing structure; no bents will be placed in the water; 3 bents will be removed from the water; fill used for abutment construction will not be placed in Buckhorn Creek.

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

NCDOT will implement Best Management practices (BMP's) for bridge demolition and removal.

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

2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?	☐ Yes ☒ No Minimal impacts, stream is not a high quality resource.
2b. If yes, mitigation is required by (check all that apply):	☐ DWQ ☐ Corps
2c. If yes, which mitigation option will be used for this project?	☐ Mitigation bank ☐ Payment to in-lieu fee program ☐ Permittee Responsible Mitigation

3. Complete if Using a Mitigation Bank

3a. Name of Mitigation Bank: not applicable

3b. Credits Purchased (attach receipt and letter)	Type	Quantity

3c. Comments:

4. Complete if Making a Payment to In-lieu Fee Program

4a. Approval letter from in-lieu fee program is attached.	☐ Yes
4b. Stream mitigation requested:	linear feet
4c. If using stream mitigation, stream temperature:	☐ warm ☐ cool ☐ cold
4d. Buffer mitigation requested (DWQ only):	square feet
4e. Riparian wetland mitigation requested:	acres
4f. Non-riparian wetland mitigation requested:	acres
4g. Coastal (tidal) wetland mitigation requested:	acres

4h. Comments:

5. Complete if Using a Permittee Responsible Mitigation Plan

5a. If using a permittee responsible mitigation plan, provide a description of the proposed mitigation plan.

6. **Buffer Mitigation (State Regulated Riparian Buffer Rules) – required by DWQ**				
6a. Will the project result in an impact within a protected riparian buffer that requires buffer mitigation?			☐ Yes ☒ No	
6b. If yes, then identify the square feet of impact to each zone of the riparian buffer that requires mitigation. Calculate the amount of mitigation required.				
Zone	6c. Reason for impact	6d. Total impact (square feet)	Multiplier	6e. Required mitigation (square feet)
Zone 1			3 (2 for Catawba)	
Zone 2			1.5	
	6f. **Total buffer mitigation required:**			
6g. If buffer mitigation is required, discuss what type of mitigation is proposed (e.g., payment to private mitigation bank, permittee responsible riparian buffer restoration, payment into an approved in-lieu fee fund).				
6h. Comments:				

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

F. Supplementary Information		
1. Environmental Documentation (DWQ Requirement)		
1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land?	☒ Yes	☐ No
1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)?	☒ Yes	☐ No
1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.) Comments:	☒ Yes	☐ No
2. Violations (DWQ Requirement)		
2a. Is the site in violation of DWQ Wetland Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 2B .0200)?	☐ Yes	☒ No
2b. Is this an after-the-fact permit application?	☐ Yes	☒ No
2c. If you answered "yes" to one or both of the above questions, provide an explanation of the violation(s):		
3. Cumulative Impacts (DWQ Requirement)		
3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality?	☐ Yes	☒ No
3b. If you answered "yes" to the above, submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent DWQ policy. If you answered "no," provide a short narrative description. Due to the minimal transportation impact resulting from this bridge replacement, this project will neither influence nearby land uses nor stimulate growth. Therefore, a detailed indirect or cumulative effects study will not be necessary.		
4. Sewage Disposal (DWQ Requirement)		
4a. Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility. not applicable		

5. Endangered Species and Designated Critical Habitat (Corps Requirement)		
5a. Will this project occur in or near an area with federally protected species or habitat?	☒ Yes	☐ No
5b. Have you checked with the USFWS concerning Endangered Species Act impacts?	☒ Yes	☐ No
5c. If yes, indicate the USFWS Field Office you have contacted.	☒ Raleigh ☐ Asheville	

5d. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat?

As of January 31, 2008 the USFWS lists three protected species in Chatham County, Harparella, Cape Fear Shiner, and the Red-cockaded Woodpecker. Marginal habitat for Harparella is present in the project area. Surveys were conducted on August 4, 2009 by NCDOT biologists for Harparella, no specimens were found. No suitable nesting trees were observed within the project area for the Red-cockaded woodpecker. Surveys were conducted on May 8 and 13, 2008, no specimens were found. Poor habitat was observed for the Cape Fear Shiner. Surveys for the Cape Fear Shiner were conducted by NCDOT biologists on April 24, 2008, no individuals were observed. A review of NCNHP records, updated July 2009, for Harparella, Cape Fear Shiner, and the Red cockaded-Woodpecker indicated no known occurrences within 1.0 mile of the project area. This project will have No Effect on Harparella, Cape Fear Shiner, or the Red-cockaded woodpecker.

Suitable foraging habitat for the Bald eagle is not present in the study area or within 660 feet of the study area.

6. Essential Fish Habitat (Corps Requirement)		
6a. Will this project occur in or near an area designated as essential fish habitat?	☐ Yes	☒ No

6b. What data sources did you use to determine whether your site would impact Essential Fish Habitat?

NMFS County Index

7. Historic or Prehistoric Cultural Resources (Corps Requirement)		
7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)?	☐ Yes	☒ No

7b. What data sources did you use to determine whether your site would impact historic or archeological resources?

Categorical Exclusion B-4459 completed December 11, 2008

8. Flood Zone Designation (Corps Requirement)		
8a. Will this project occur in a FEMA-designated 100-year floodplain?	☒ Yes	☐ No

8b. If yes, explain how project meets FEMA requirements: Hydraulics Unit coordinating with FEMA

8c. What source(s) did you use to make the floodplain determination? FEMA maps

Gregory J. Thorpe, Ph D Applicant/Agent's Printed Name	E. L. Luck Applicant/Agent's Signature (Agent's signature is valid only if an authorization letter from the applicant is provided.)	11.5.09 Date

STORMWATER MANAGEMENT PLAN

TIP No. B-4459
Project: 33710.1.1
Chatham County

WHT 11/4/09

Hydraulics Project Manager: W. Herbert Turner, Jr., PE Ko & Associates, PC
Marshall Clawson, P.E. (NCDOT Hydraulics Unit)

ROADWAY DESCRIPTION

The purpose of this project is to replace Chatham County Bridge No. 56 on NC 42 over Buckhorn Creek. The overall length of the project is approximately 0.35 miles. For maintenance of traffic, the proposed roadway is relocated east of the existing roadway. The approaches will maintain the two 12-foot lanes. Eight-foot shoulders, consisting of 2-foot paved and 6-foot grassed, will be provided on each side. The increase in impervious area is typically the 2-feet of paved shoulders on each side. Where guardrail is required, the shoulder will be widened an additional 3 feet. The project drainage design consists of cross pipe, grated inlets with associated pipe systems, and head, tail, roadside and lateral ditches.

ENVIROMENTAL DESCRIPTION

The project is located over Buckhorn Creek in the Cape Fear River Basin. Buckhorn Creek in the project area is classified C, which is the minimum classification and is not identified as impaired according to the current NCDWQ's 303(d) Impaired Waters List.

BEST MANAGEMENT PRACTICES (BMP's)

The primary goal of Best Management Practices (BMP) is to prevent degradation of the state's surface waters through the location, construction and operation of the highway system. BMP's are activities, practices and procedures undertaken to prevent or reduce stormwater pollution. Non-structural BMPs for this project include grass shoulder filtration, minimization of proposed impervious areas, deck drain layout to eliminate direct discharge to the jurisdictional surface waters, and riprap at embankment at outlets.

Bridge on -L- 19+72 to 21+22:

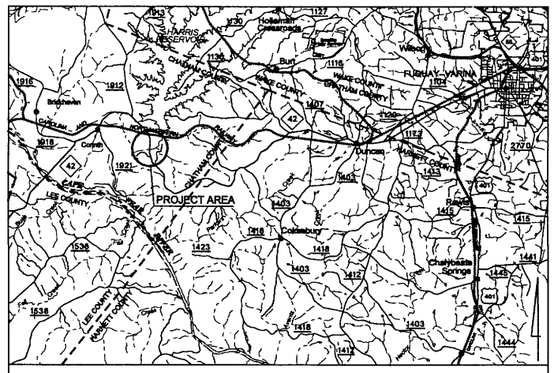
To avoid stream impacts, a single-span steel bridge is proposed to replace the existing 6-span bridge. Deck drains have been spaced to eliminate direct discharge to the jurisdictional surface waters. Concentrated bridge and roadway runoff will be collected through grated inlets and storm system and be drained to a lateral ditch approximately 150 feet from the stream. Three existing cross pipes are retained and extended on their inlet side. The riprap for outlet protection is been placed at each outlet. Existing outfalls have been maintained, as much as practical. As a result of the steep terrain, roadside ditches are stabilized with grass and permanent soil reinforcement matting. Lateral ditches are stabilized with riprap liner. Stream banks have been stabilized with riprap at embankment where lateral ditches tie to stream.

09/08/09

TIP PROJECT: B-4459

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

R/W PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CHATHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4459	1	

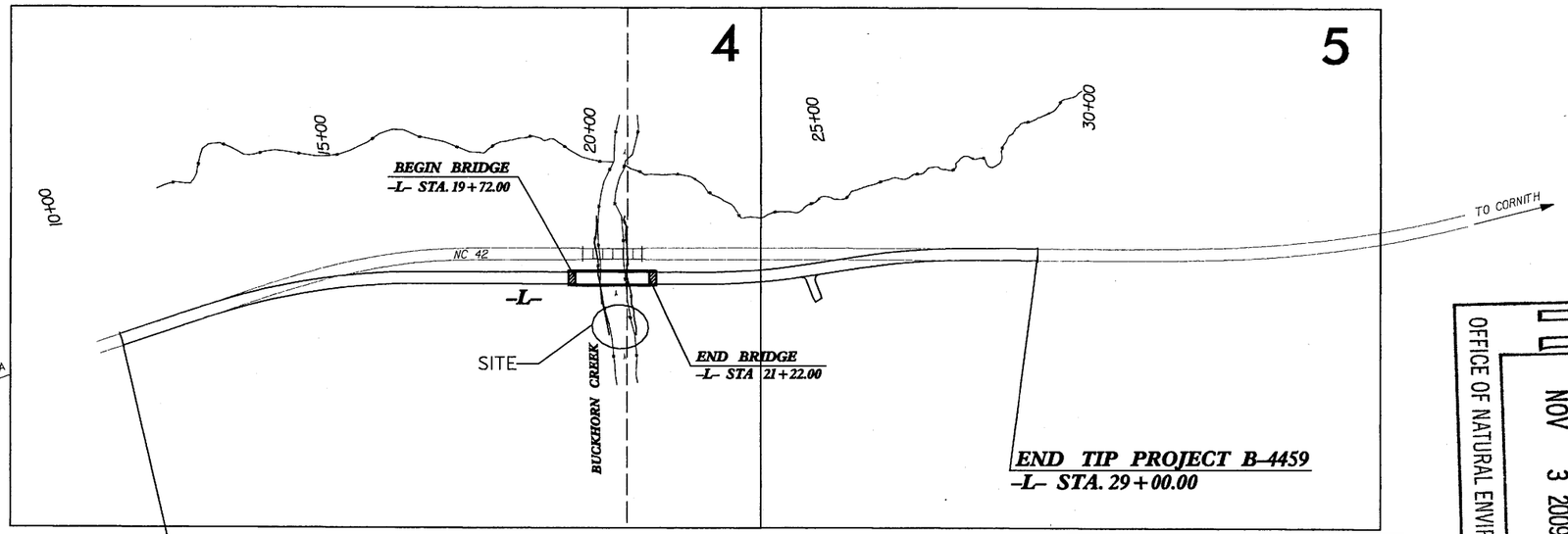
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33710.1.1	BRSTP-0042(12)	P.E.
33710.2.1	BRSTP-0042(12)	R/W

LOCATION: BRIDGE NO. 56 ON NC 42 OVER BUCKHORN CREEK

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

WETLAND & STREAM IMPACTS

NAD 83
(CORS 96)



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

** DESIGN EXCEPTION REQUIRED FOR VERTICAL DESIGN.

NCDOT CONTACT: MR. DOUG TAYLOR, P.E.
ROADWAY DESIGN – ENGINEERING COORDINATION

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

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

PROJECT: 33710.1.1 (B4459)

BRIDGE NO. 56 ON NC 42
OVER BUCKHORN CREEK

SHEET 1 OF 6

RECEIVED
NOV 3 2009
OFFICE OF NATURAL ENVIRONMENT

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2011 = 2,200
ADT 2031 = 4,515
DHV = 10 %
D = 60 %
T = 6 % *
V = 50 MPH
*(TTST 2% + DUAL 4%)
FUNC. CLASS = MAJOR COLL.

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT	*B-4459*	=	*0.322 mi*
LENGTH STRUCTURE TIP PROJECT	*B-4459*	=	*0.028 mi*
TOTAL LENGTH OF TIP PROJECT	*B-4459*	=	*0.350 mi.*

Prepared In the Office of:
for North Carolina Department of Transportation

KO & ASSOCIATES, P.C.
Consulting Engineers
A Florence & Hutcheson, Inc. Company
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6866

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: NOVEMBER 2, 2009

LETTING DATE: MAY 18, 2010

BRIAN A. WILES, P.E.
PROJECT ENGINEER

YVETTE T. MARIOTTE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

10/30/2009
R:\Hydraulics\PERMITS_Environmental\Drawings\B4459_Hyd_tsh.dgn
Ko & Associates, P.C.

KO & ASSOCIATES, P.C.
Consulting Engineers
A Florence & Hutcheson, Inc. Company
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066

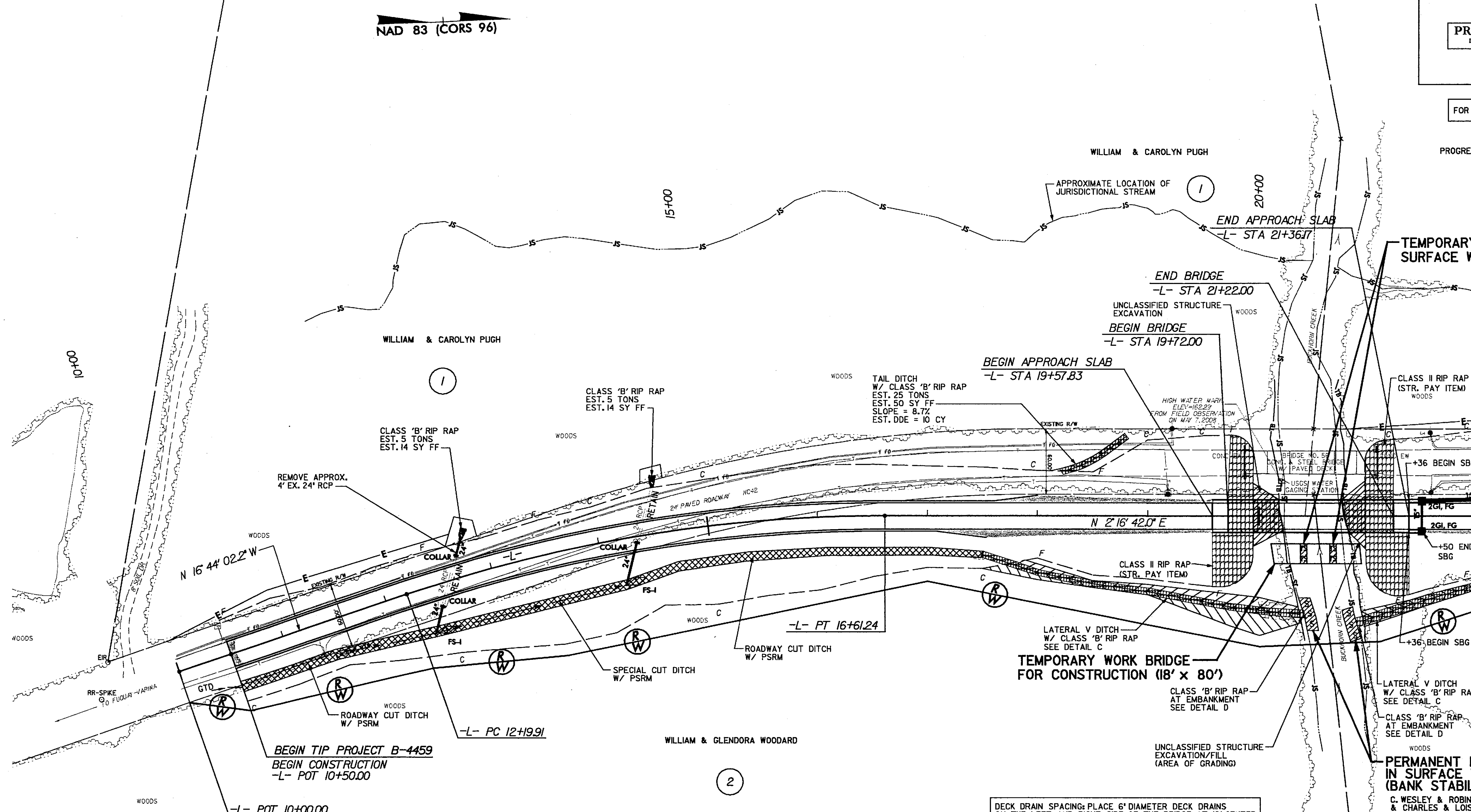
PROJECT REFERENCE NO.	SHEET NO.
B-4459	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE, SEE SHEET 6

8/17/99

REVISIONS

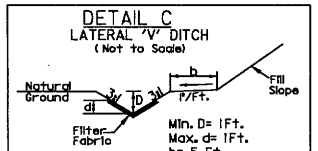


NAD 83 (CORS 96)
WILLIAM & CAROLYN PUGH
PROGRESS ENERGY CAROLINAS
APPROXIMATE LOCATION OF JURISDICTIONAL STREAM
15+00
20+00
10+00
END APPROACH SLAB -L- STA 21+36.17
END BRIDGE -L- STA 21+22.00
BEGIN BRIDGE -L- STA 19+72.00
BEGIN APPROACH SLAB -L- STA 19+57.83
UNCLASSIFIED STRUCTURE EXCAVATION
TEMPORARY IMPACTS IN SURFACE WATER
TAIL DITCH W/ CLASS 'B' RIP RAP EST. 25 TONS EST. 50 SY FF SLOPE = 8.7% EST. DDE = 10 CY
CLASS 'B' RIP RAP EST. 5 TONS EST. 14 SY FF
CLASS 'B' RIP RAP EST. 5 TONS EST. 14 SY FF
REMOVE APPROX. 4' EX. 24" RCP
CLASS II RIP RAP (STR. PAY ITEM)
+36 BEGIN SBG
2GI, FG
+50 END SBG
N 2°16' 42.0" E
N 16°44' 02.2" W
24' PAVED ROADWAY NC42
COLLAR
CLASS II RIP RAP (STR. PAY ITEM)
LATERAL V DITCH W/ CLASS 'B' RIP RAP SEE DETAIL C
TEMPORARY WORK BRIDGE FOR CONSTRUCTION (18' x 80')
-L- PT 16+61.24
ROADWAY CUT DITCH W/ PSRM
SPECIAL CUT DITCH W/ PSRM
ROADWAY CUT DITCH W/ PSRM
-L- PC 12+19.91
BEGIN TIP PROJECT B-4459
BEGIN CONSTRUCTION -L- POT 10+50.00
-L- POT 10+00.00
RR-SPIKE
GTD
WOODS
WILLIAM & GLENDORA WOODARD
CLASS 'B' RIP RAP AT EMBANKMENT SEE DETAIL D
LATERAL V DITCH W/ CLASS 'B' RIP RAP SEE DETAIL C
CLASS 'B' RIP RAP AT EMBANKMENT SEE DETAIL D
UNCLASSIFIED STRUCTURE EXCAVATION/FILL (AREA OF GRADING)
PERMANENT IMPACTS IN SURFACE WATER (BANK STABILIZATION)
C. WESLEY & ROBIN TUTOR & CHARLES & LOIS JONES
BUCKHORN CREEK
1
2
3
4
MATCHLINE -L- STA. 22+00.00 SEE SHEET NO. 5

DECK DRAIN SPACING: PLACE 6" DIAMETER DECK DRAINS ON THE LEFT AND RIGHT SIDE OF THE BRIDGE AT 12' CENTER FROM STA. 19+84 TO STA. 20+08 -L- AND FROM STA. 20+92 TO STA. 21+16 -L-.

SITE PLAN VIEW

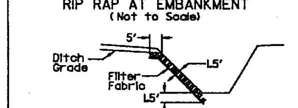
DETAIL C
LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

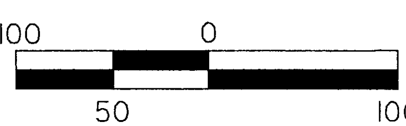
FROM STA. 17+50 TO STA. 20+35 -L- RT
FROM STA. 20+94 TO STA. 22+00 -L- RT

DETAIL D
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner = CL 'B' Rip-Rap

STA. 20+35 -L- RT; 5 TONS CL 'B', 40 SY FF
STA. 20+94 -L- RT; 5 TONS CL 'B', 55 SY FF



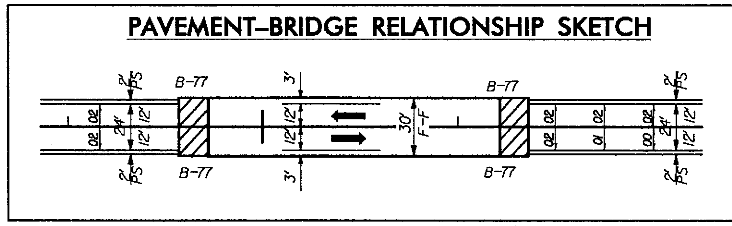
SCALE: 1"= 100' HORIZ.

LEGEND

DENOTES PERMANENT IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PAVEMENT-BRIDGE RELATIONSHIP SKETCH



ENGLISH

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 33710.1.1 (B-4459)
BRIDGE NO. 56 ON NC 42
OVER BUCKHORN CREEK

SHEET 2 OF 6

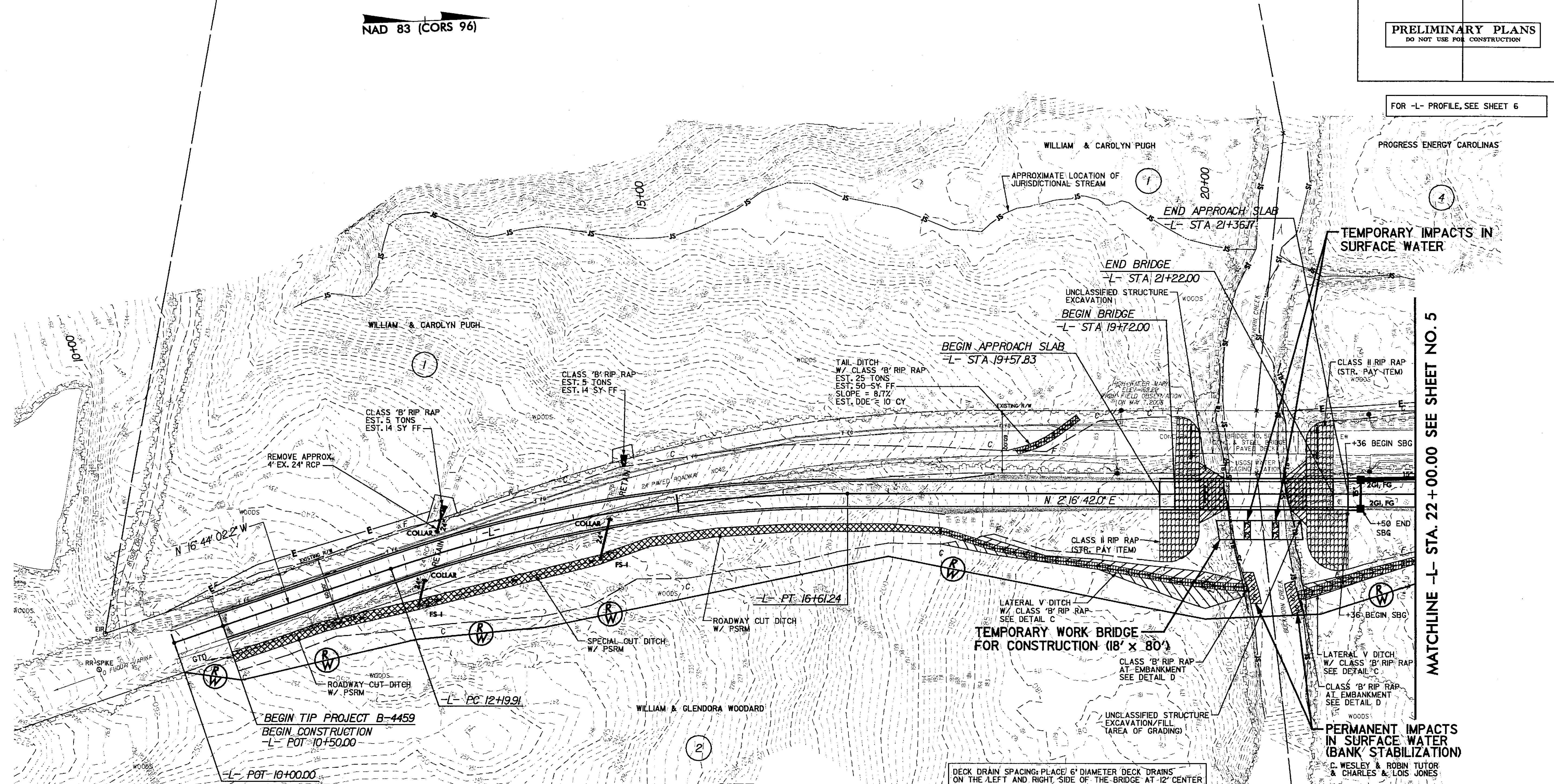
10/30/2009
R:\Hydraulics\PERMITS_Environmental\Drawings\B4459_Hyd_prm_wet_psh4.dgn

KO & ASSOCIATES, P.C.
Consulting Engineers
A Florence & Hutcheson, Inc. Company
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066

PROJECT REFERENCE NO.	SHEET NO.
B-4459	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE, SEE SHEET 6



NAD 83 (CORS 96)
WILLIAM & CAROLYN PUGH
PROGRESS ENERGY CAROLINAS
APPROXIMATE LOCATION OF JURISDICTIONAL STREAM
END APPROACH SLAB -L- STA 21+36.17
TEMPORARY IMPACTS IN SURFACE WATER
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UNCLASSIFIED STRUCTURE EXCAVATION
BEGIN BRIDGE -L- STA 19+72.00
BEGIN APPROACH SLAB -L- STA 19+57.83
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CLASS 'B' RIP RAP EST. 5 TONS EST. 14 SY FF
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CLASS II RIP RAP (STR. PAY ITEM)
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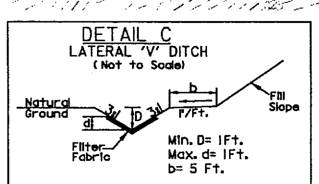
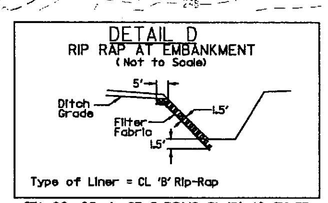
+50 END SBG
N 2°16' 42.0" E
N 16°44' 02.2" W
CLASS II RIP RAP (STR. PAY ITEM)
-L- PT 16+61.24
LATERAL V DITCH W/ CLASS 'B' RIP RAP SEE DETAIL C
TEMPORARY WORK BRIDGE FOR CONSTRUCTION (18' × 80')
ROADWAY CUT DITCH W/ PSRM
SPECIAL CUT DITCH W/ PSRM
ROADWAY CUT DITCH W/ PSRM
-L- PC 12+19.91
BEGIN TIP PROJECT B-4459
BEGIN CONSTRUCTION -L- POT 10+50.00
-L- POT 10+00.00
WILLIAM & GLENDORA WOODARD
CLASS 'B' RIP RAP AT EMBANKMENT SEE DETAIL D
UNCLASSIFIED STRUCTURE EXCAVATION/FILL (AREA OF GRADING)
+36 BEGIN SBG
LATERAL V DITCH W/ CLASS 'B' RIP RAP SEE DETAIL C
CLASS 'B' RIP RAP AT EMBANKMENT SEE DETAIL D
PERMANENT IMPACTS IN SURFACE WATER (BANK STABILIZATION)
C. WESLEY & ROBIN TUTOR & CHARLES & LOIS JONES
MATCHLINE -L- STA. 22+00.00 SEE SHEET NO. 5
DECK DRAIN SPACING: PLACE 6" DIAMETER DECK DRAINS ON THE LEFT AND RIGHT SIDE OF THE BRIDGE AT 12' CENTER FROM STA. 19+84 TO STA. 20+08 -L- AND FROM STA. 20+92 TO STA. 21+16 -L-.
SITE PLAN VIEW



FROM STA. 17+50 TO STA. 20+35 -L- RT
FROM STA. 20+94 TO STA. 22+00 -L- RT



STA. 20+35 -L- RT; 5 TONS CL 'B', 40 SY FF
STA. 20+94 -L- RT; 5 TONS CL 'B', 55 SY FF

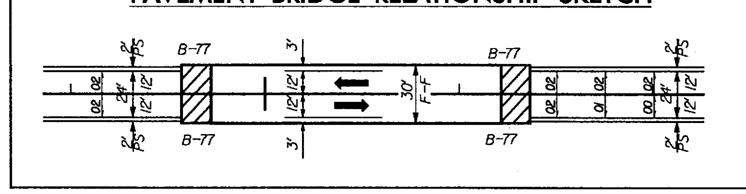
100 0 50 100
SCALE: 1"= 100' HORIZ.

LEGEND

DENOTES PERMANENT IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PAVEMENT-BRIDGE RELATIONSHIP SKETCH



ENGLISH

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 33710.1.1 (B-4459)
BRIDGE NO. 56 ON NC 42
OVER BUCKHORN CREEK

SHEET 3 OF 6

REVISIONS

8/17/99

10/30/2009
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5/14/99

BM#1
RR SPIKE BASE OF 14" PINE
BL STA 5+00.00 56.86' RT
-L- STA 9+99.03 41.25' RT
ELEV = 258.33'

PIPE HYDRAULIC DATA
STA. -L- 12+60

DRAINAGE AREA	=	1.13	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	4	CFS
DESIGN HW ELEVATION	=	237.17	FT
100 YEAR DISCHARGE	=	5	CFS
100 YEAR HW ELEVATION	=	237.24	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	27	CFS
OVERTOPPING ELEVATION	=	239.89	FT

PIPE HYDRAULIC DATA
STA. -L- 14+37

DRAINAGE AREA	=	0.64	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	2	CFS
DESIGN HW ELEVATION	=	222.28	FT
100 YEAR DISCHARGE	=	3	CFS
100 YEAR HW ELEVATION	=	222.35	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	27	CFS
OVERTOPPING ELEVATION	=	225.23	FT

-L-
FOR PLAN, SEE SHEET NO. 4

KO & ASSOCIATES, P.C.
Consulting Engineers
A Florence & Hutcheson, Inc. Company
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066

PROJECT REFERENCE NO.	SHEET NO.
B-4459	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BM#2
RR SPIKE BASE OF 30" BEECH TREE
BL STA 14+85 7.4' RT
-L- STA 19+78.92 38.78' RT
ELEV = 172.78'

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	4200	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	168.2	FT
BASE DISCHARGE	=	5300	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	169.6	FT
OVERTOPPING DISCHARGE	=	8500+	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	182.5	FT
DATE OF SURVEY	=	01/09/2009	
W.S. ELEVATION AT DATE OF SURVEY	=	155.8	FT

BEGIN GRADE -L- STA. 10+50.00 ELEV. 252.60
PVC STA. 11+85.00 EL = 244.01'
PI = 13+35.00 EL = 234.46' VC = 300' K = 91 DS = 51 mph
(-) 8.7%
(-) 6.364%
(-) 19.67.96%
(-) 1.96%
BEGIN DITCH STA. 11+50 - RT ELEV. 243.48
STA. 12+33 - RT ELEV. 238.20
RETAIN AND EXTEND 24" RCP
PVT STA. 14+85.00 EL = 219.94'
PVC STA. 16+40.00 EL = 210.94'
RETAIN AND EXTEND 24" RCP
END DITCH STA. 14+17 - RT ELEV. 221.56
PROPOSED GRADE
PI = 18+00.00 EL = 189.45' VC = 320' * K = 41 DS = 32 mph
* DESIGN EXCEPTION REQUIRED
℄ STATION 20+47 -L- SINGLE SPAN PLATE GIRDER SKEW = 150', SKEW 90°
PVT STA. 19+60.00 EL = 186.53'
(-) 11.8250%
(-) 15.59%
BEGIN DITCH STA. 17+50 - RT ELEV. 182.78
EXISTING GROUND
PVC STA. 21+35.00 EL = 183.34'
REMOVE EXISTING BRIDGE AND BENTS
(-) 8.75%
(+) 9.54%
STA. 18+50 - RT ELEV. 177.19
PROPOSED UNDERCUT
UNCLASSIFIED STRUCTURE EXCAVATION
NORMAL WS ELEV = 155.8'
END DITCH STA. 20+35 - RT ELEV. 161.00
BEGIN DITCH STA. 20+94 - RT ELEV. 160.00
STA. 22+00 - RT ELEV. 169.90
ESTIMATED FILL FOR RIGHT BENCH
TEMPORARY WORK BRIDGE FOR CONSTRUCTION (MIN LOW CHORD = 158.0)

260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100
10 11 12 13 14 15 16 17 18 19 20 21

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

PROJECT: 33710.1.1 (B-4459)

BRIDGE NO. 56 ON NC 42
OVER BUCKHORN CREEK

SHEET 4 OF 6

10/30/2009
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KO & Associates, P.C.

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	WETLAND IMPACTS: Temp. Fill In Wetlands (ac)	WETLAND IMPACTS: Excavation in Wetlands (ac)	WETLAND IMPACTS: Mechanized Clearing in Wetlands (ac)	WETLAND IMPACTS: Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	SURFACE WATER IMPACTS: Temp. SW impacts (ac)	SURFACE WATER IMPACTS: Existing Channel Impacts Permanent (ft)	SURFACE WATER IMPACTS: Existing Channel Impacts Temp. (ft)	SURFACE WATER IMPACTS: Natural Stream Design (ft)
1	-L- 20+35 & 20+94 RT	Bank Stabilization	---	---	---	---	---	0.01		60		
		with CL. B RipRap										
1	-L- 20+10 to 20+90 RT	Temporary Work	---	---	---	---	---		< 0.01		36	
		Bridge, L=80'										
TOTALS:								0.01	< 0.01	60	36	

SHT 5 OF 5

ATN Revised 3/31/05

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CHATHAM COUNTY
WBS 33710.1.1 (B-4459)

SHEET 5 OF 6 10/30/2009

WETLAND IMPACTS
SUMMARY OF AFFECTED PROPERTY OWNERS

TRACT NO.	PROPERTY OWNER	ADDRESS	SITE NO.
(2)	WILLIAM & GLENDORA WOODARD	1167-A CHISENHALL ROAD ANGIER, NC 27501	1
(3)	C. WESLEY & ROBIN TUTOR & CHARLES & LOIS JONES	7424 HAWKINS DRIVE HANOVER, MD 21076	1

NCDOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 33710.1.1 (B4459)

BRIDGE NO. 56 ON NC 42
OVER BUCKHORN CREEK

SHEET 6 OF 6

10/30/2009
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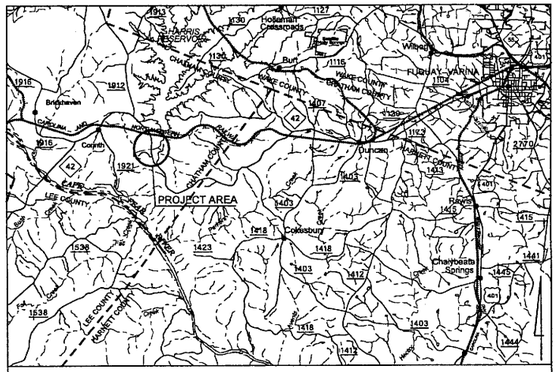
09/08/99

TIP PROJECT: B-4459

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

R/W PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CHATHAM COUNTY

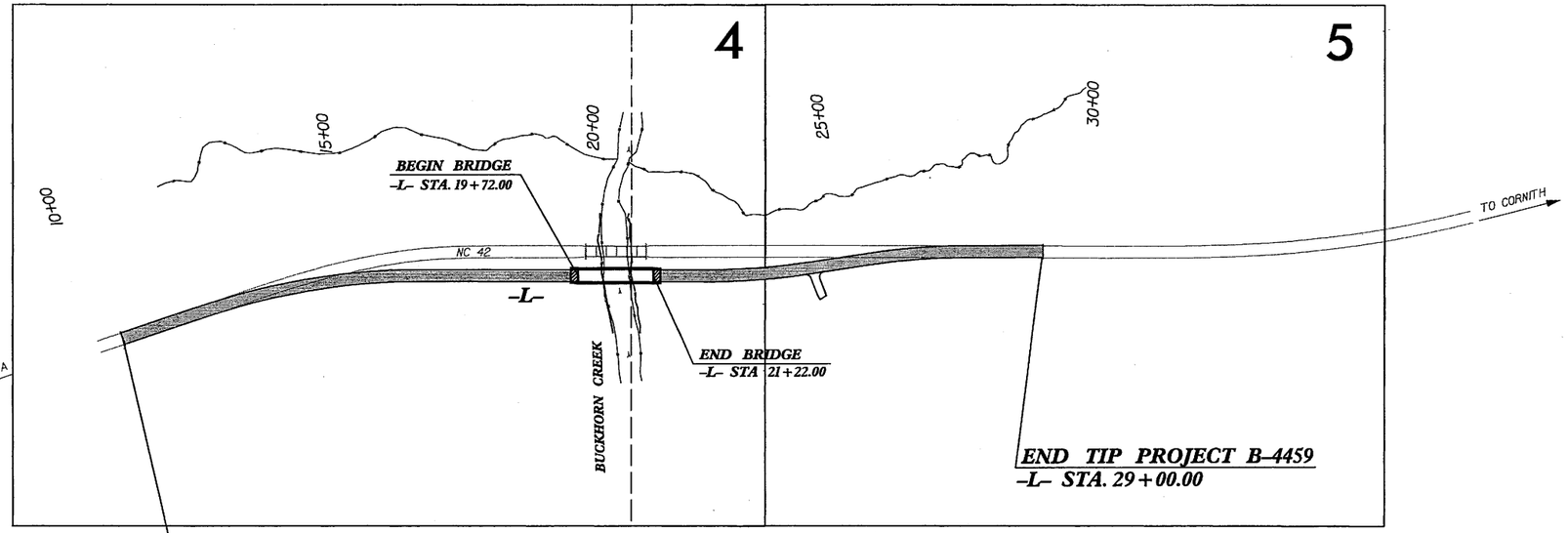
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4459	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33710.1.1	BRSTP-0042(12)	P.E.
33710.2.1	BRSTP-0042(12)	R/W

LOCATION: BRIDGE NO. 56 ON NC 42 OVER BUCKHORN CREEK

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

NAD 83
(CORS 96)



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

** DESIGN EXCEPTION REQUIRED FOR VERTICAL DESIGN.

NCDOT CONTACT: MR. DOUG TAYLOR, P.E.
ROADWAY DESIGN – ENGINEERING COORDINATION

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2011 = 2,200
ADT 2031 = 4,515
DHV = 10 %
D = 60 %
T = 6 % *
V = 50 MPH
*(TTST 2% + DUAL 4%)
FUNC. CLASS = MAJOR COLL.

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT	*B-4459*	=	*0.322 mi*
LENGTH STRUCTURE TIP PROJECT	*B-4459*	=	*0.028 mi*
TOTAL LENGTH OF TIP PROJECT	*B-4459*	=	*0.350 mi.*

Prepared In the Office of:
for North Carolina Department of Transportation

KO & ASSOCIATES, P.C.
Consulting Engineers
A Florence & Hutcheson, Inc. Company
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066

*2006 STANDARD SPECIFICATIONS**

RIGHT OF WAY DATE:
NOVEMBER 2, 2009

LETTING DATE:
MAY 18, 2010

BRIAN A. WILES, P.E.
PROJECT ENGINEER

YVETTE T. MARIOTTE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER *P.E.*

10/30/2009
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KO & Associates, P.C.

3/15/06

PROJECT REFERENCE NO.	SHEET NO.
B-4459	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch
- 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
- Proposed Temporary Utility Easement — TUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

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
- 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 — ?U/L
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-4459	2

KO & ASSOCIATES, P.C.
Consulting Engineers
A Florence & Hutcheson, Inc. Company
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066

ROADWAY DESIGN ENGINEER

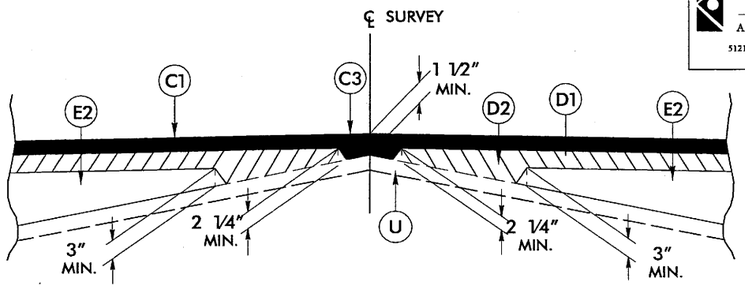
PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

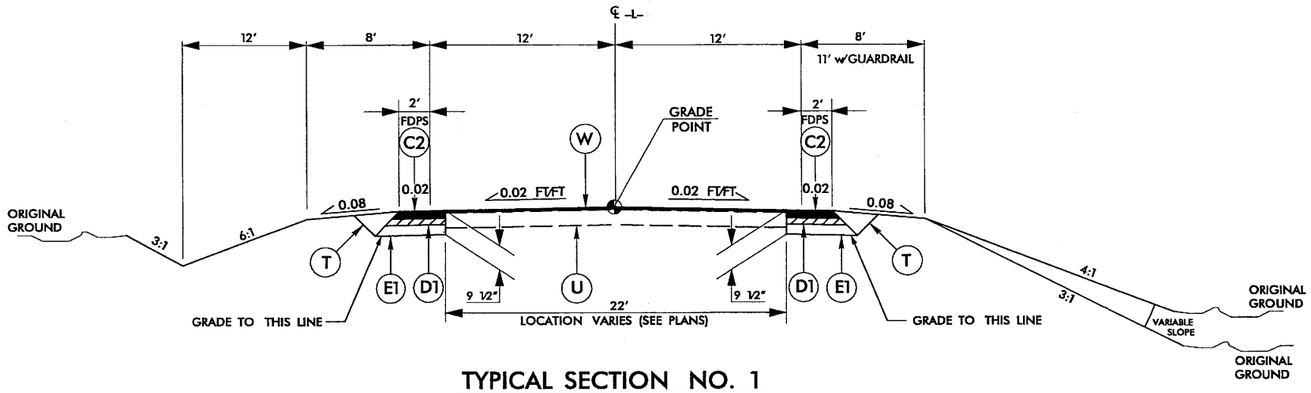
PAVEMENT SCHEDULE

C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
D1	PROP. APPROX. 2½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2¼" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
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.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL THIS SHEET.)

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

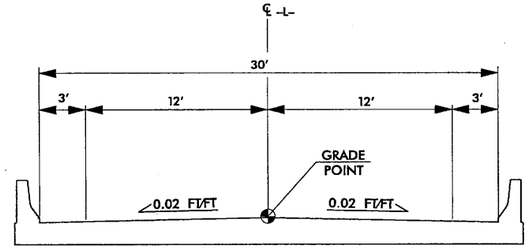


Detail Showing Method of Wedging (W)



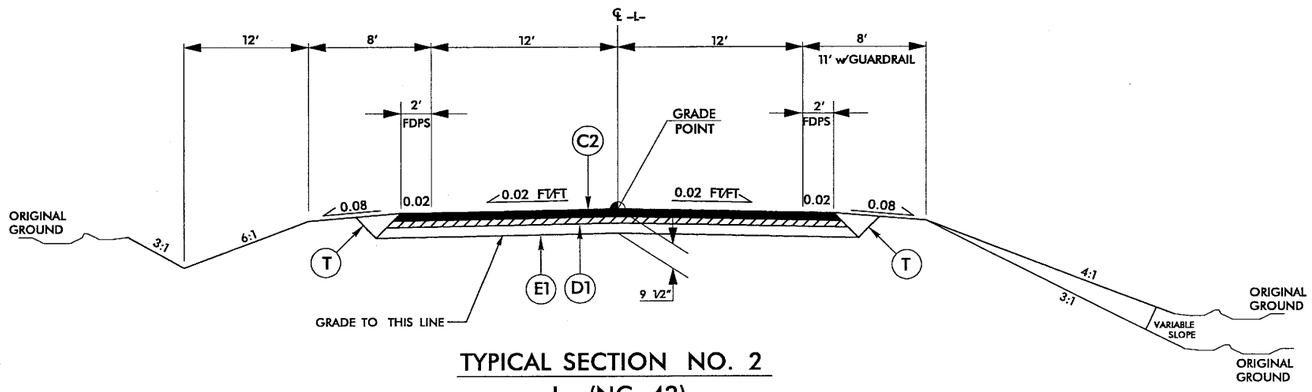
TYPICAL SECTION NO. 1
–L– (NC 42)

STA 10+50.00 TO STA 14+50.00
STA 26+00.00 TO STA 29+00.00



TYPICAL SECTION NO. 3
–L– (NC 42)

STA 19+72.00 (BEGIN BRIDGE) TO STA 21+22.00 (END BRIDGE)



TYPICAL SECTION NO. 2
–L– (NC 42)

STA 14+50.00 TO STA 19+72.00 (BEGIN BRIDGE)
STA 21+22.00 (END BRIDGE) TO STA 26+00.00

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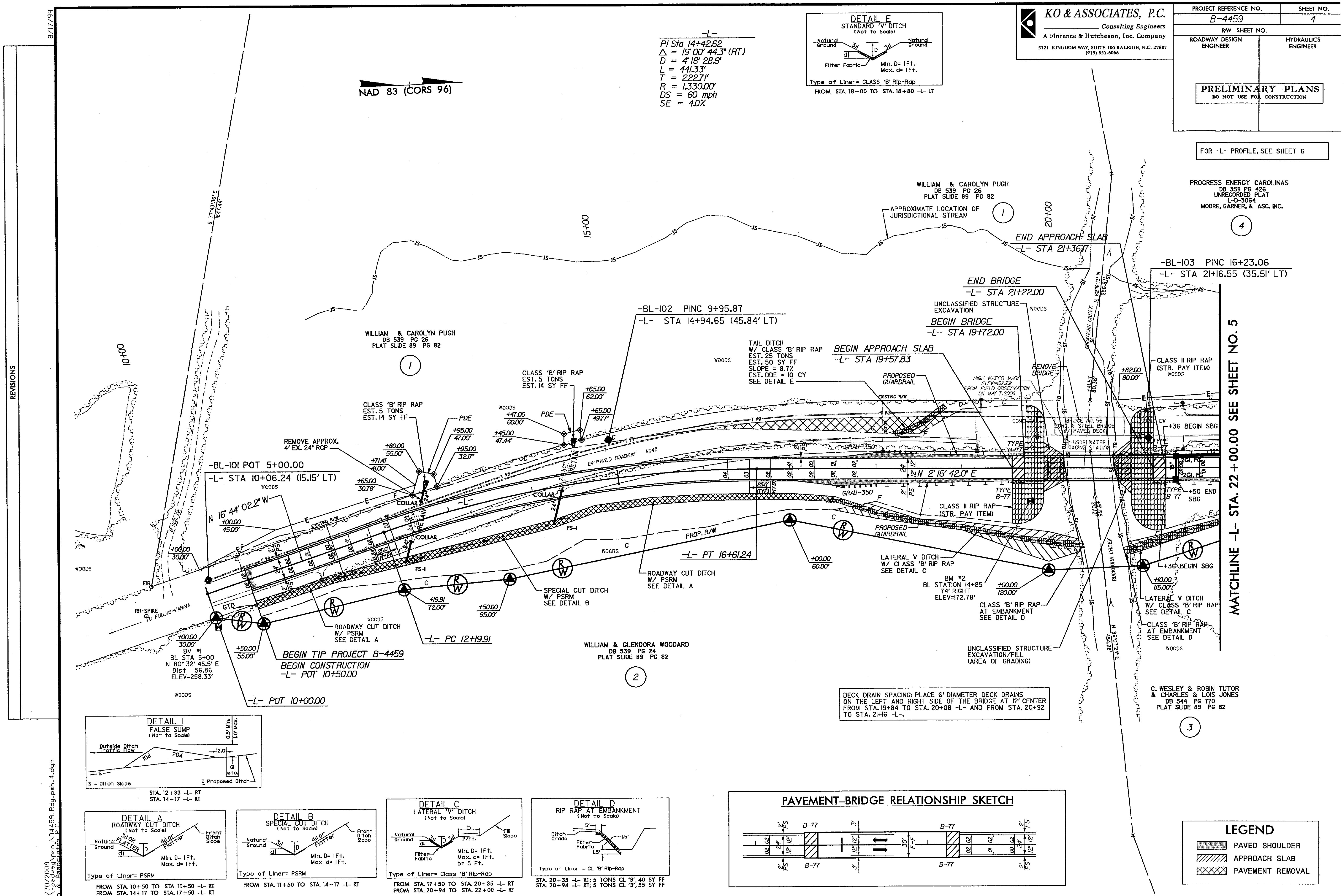
PROJECT REFERENCE NO.	SHEET NO.
B-4459	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE, SEE SHEET 6



REVISIONS
8/17/99
NAD 83 (CORS 96)
-L-
PI Sta 14+42.62
Δ = 19° 00' 44.3" (RT)
D = 4° 18' 28.6"
L = 441.33'
T = 222.71'
R = 1,330.00'
DS = 60 mph
SE = 4.0%
DETAIL E
STANDARD 'V' DITCH
(Not to Scale)
Natural Ground
Filter Fabric
Min. D= 1 Ft.
Max. d= 1 Ft.
Type of Liner= CLASS 'B' Rip-Rap
FROM STA. 18+00 TO STA. 18+80 -L- LT
WILLIAM & CAROLYN PUGH
DB 539 PG 26
PLAT SLIDE 89 PG 82
APPROXIMATE LOCATION OF JURISDICTIONAL STREAM
PROGRESS ENERGY CAROLINAS
DB 359 PG 426
UNRECORDED PLAT
L-D-3064
MOORE, GARNER, & ASC. INC.
END APPROACH SLAB
-L- STA 21+36.17
-BL-103 PINC 16+23.06
-L- STA 21+16.55 (35.51' LT)
END BRIDGE
-L- STA 21+22.00
UNCLASSIFIED STRUCTURE EXCAVATION
BEGIN BRIDGE
-L- STA 19+72.00
-BL-102 PINC 9+95.87
-L- STA 14+94.65 (45.84' LT)
TAIL DITCH
W/ CLASS 'B' RIP RAP
EST. 25 TONS
EST. 50 SY FF
SLOPE = 8.7%
EST. DDE = 10 CY
SEE DETAIL E
BEGIN APPROACH SLAB
-L- STA 19+57.83
PROPOSED GUARDRAIL
CLASS II RIP RAP
(STR. PAY ITEM)
CLASS 'B' RIP RAP
EST. 5 TONS
EST. 14 SY FF
REMOVE APPROX. 4' EX. 24" RCP
PDE
-BL-101 POT 5+00.00
-L- STA 10+06.24 (15.15' LT)
N 16° 44' 02.2" W
N 2° 16' 42.0" E
+36 BEGIN SBG
+50 END SBG
TYPE B-77
BRIDGE NO. 56
USGS WATER GAGING STATION
-L- PT 16+61.24
LATERAL V DITCH
W/ CLASS 'B' RIP RAP
SEE DETAIL C
BM #2
BL STATION 14+85
74' RIGHT
ELEV=172.78'
CLASS 'B' RIP RAP AT EMBANKMENT
SEE DETAIL D
ROADWAY CUT DITCH
W/ PSRM
SEE DETAIL A
SPECIAL CUT DITCH
W/ PSRM
SEE DETAIL B
-L- PC 12+19.91
BEGIN TIP PROJECT B-4459
BEGIN CONSTRUCTION
-L- POT 10+50.00
-L- POT 10+00.00
BM #1
BL STA 5+00
N 80° 32' 45.5" E
Dist 56.86
ELEV=258.33'
RR-SPIKE
WILLIAM & GLENDORA WOODARD
DB 539 PG 24
PLAT SLIDE 89 PG 82
UNCLASSIFIED STRUCTURE EXCAVATION/FILL
(AREA OF GRADING)
C. WESLEY & ROBIN TUTOR
& CHARLES & LOIS JONES
DB 544 PG 770
PLAT SLIDE 89 PG 82
MATCHLINE -L- STA. 22+00.00 SEE SHEET NO. 5
WOODS

DECK DRAIN SPACING: PLACE 6" DIAMETER DECK DRAINS ON THE LEFT AND RIGHT SIDE OF THE BRIDGE AT 12' CENTER FROM STA. 19+84 TO STA. 20+08 -L- AND FROM STA. 20+92 TO STA. 21+16 -L-.

DETAIL I
FALSE SUMP
(Not to Scale)
S = Ditch Slope
STA. 12+33 -L- RT
STA. 14+17 -L- RT

DETAIL A
ROADWAY CUT DITCH
(Not to Scale)
Min. D= 1 Ft.
Max. d= 1 Ft.
Type of Liner= PSRM
FROM STA. 10+50 TO STA. 11+50 -L- RT
FROM STA. 14+17 TO STA. 17+50 -L- RT

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)
Min. D= 1 Ft.
Max d= 1 Ft.
Type of Liner= PSRM
FROM STA. 11+50 TO STA. 14+17 -L- RT

DETAIL C
LATERAL 'V' DITCH
(Not to Scale)
Min. D= 1 Ft.
Max. d= 1 Ft.
b= 5 Ft.
Type of Liner= Class 'B' Rip-Rap
FROM STA. 17+50 TO STA. 20+35 -L- RT
FROM STA. 20+94 TO STA. 22+00 -L- RT

DETAIL D
RIP RAP AT EMBANKMENT
(Not to Scale)
Type of Liner = CL 'B' Rip-Rap
STA. 20+35 -L- RT; 5 TONS CL 'B', 40 SY FF
STA. 20+94 -L- RT; 5 TONS CL 'B', 55 SY FF

PAVEMENT-BRIDGE RELATIONSHIP SKETCH

LEGEND
PAVED SHOULDER
APPROACH SLAB
PAVEMENT REMOVAL

10/30/2009
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8/17/99

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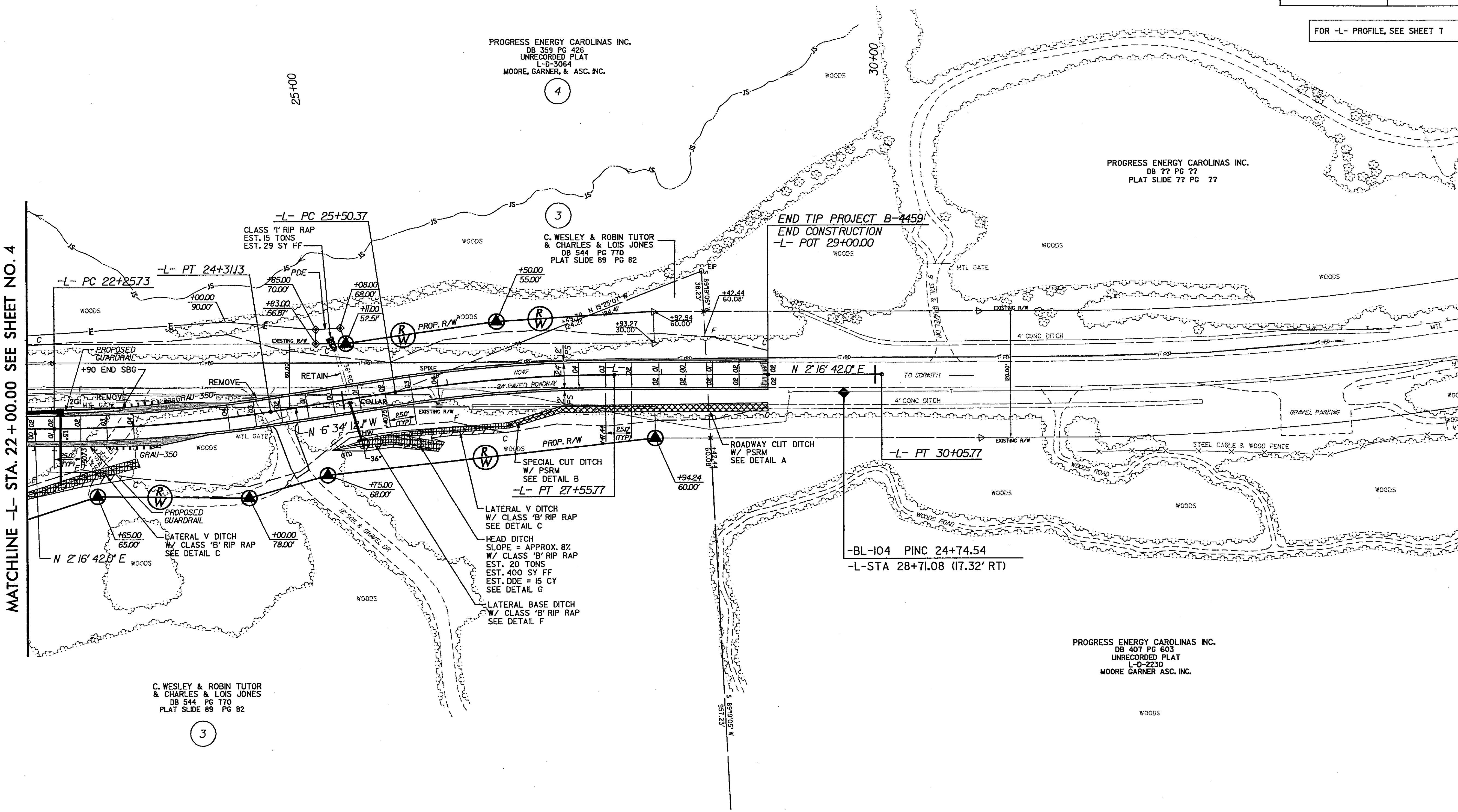
PROJECT REFERENCE NO.	SHEET NO.
B-4459	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

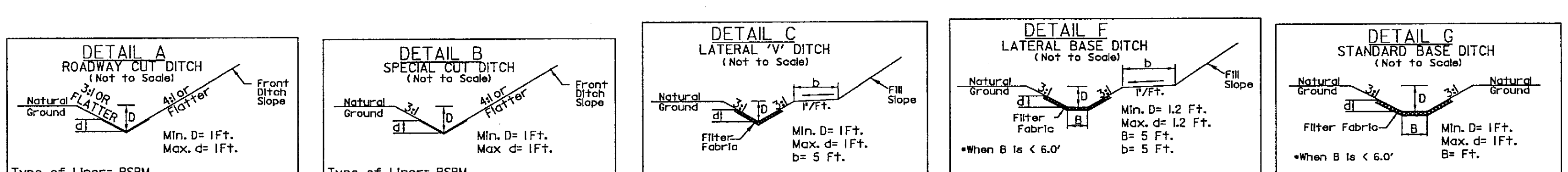
FOR -L- PROFILE, SEE SHEET 7

NAD 83 (CORS 96)

-L-	-L-
PI Sta 23+28.63	PI Sta 26+53.28
Δ = 8° 50' 54.1" (LT)	Δ = 8° 50' 54.1" (RT)
D = 4° 18' 28.6"	D = 4° 18' 28.6"
L = 205.40'	L = 205.40'
T = 102.90'	T = 102.90'
R = 1,330.00'	R = 1,330.00'
DS = 60 mph	DS = 60 mph
SE = 4.0%	SE = 4.0%



PROGRESS ENERGY CAROLINAS INC.
DB 359 PG 426
UNRECORDED PLAT
L-D-3064
MOORE, GARNER, & ASC. INC.
4
25+00
30+00
MATCHLINE -L- STA. 22+00.00 SEE SHEET NO. 4
-L- PC 25+50.37
CLASS 'I' RIP RAP
EST. 15 TONS
EST. 29 SY FF
-L- PT 24+31.13
-L- PC 22+25.73
C. WESLEY & ROBIN TUTOR
& CHARLES & LOIS JONES
DB 544 PG 770
PLAT SLIDE 89 PG 82
3
END TIP PROJECT B-4459
END CONSTRUCTION
-L- POT 29+00.00
PROPOSED GUARDRAIL
+90 END SBG
REMOVE
RETAIN
GRAU-350
PROP. R/W
N 2° 16' 42.0" E
N 6° 34' 12.1" W
MTL GATE
WOODS
TO CORINTH
4' CONC DITCH
GRAVEL PARKING
STEEL CABLE & WOOD FENCE
WOODS ROAD
-L- PT 30+05.77
ROADWAY CUT DITCH
W/ PSRM
SEE DETAIL A
SPECIAL CUT DITCH
W/ PSRM
SEE DETAIL B
-L- PT 27+55.77
LATERAL V DITCH
W/ CLASS 'B' RIP RAP
SEE DETAIL C
HEAD DITCH
SLOPE = APPROX. 8%
W/ CLASS 'B' RIP RAP
EST. 20 TONS
EST. 400 SY FF
EST. DDE = 15 CY
SEE DETAIL G
LATERAL BASE DITCH
W/ CLASS 'B' RIP RAP
SEE DETAIL F
LATERAL V DITCH
W/ CLASS 'B' RIP RAP
SEE DETAIL C
PROPOSED GUARDRAIL
-BL-104 PINC 24+74.54
-L-STA 28+71.08 (17.32' RT)
PROGRESS ENERGY CAROLINAS INC.
DB ?? PG ??
PLAT SLIDE ?? PG ??
PROGRESS ENERGY CAROLINAS INC.
DB 407 PG 603
UNRECORDED PLAT
L-D-2230
MOORE GARNER ASC. INC.
C. WESLEY & ROBIN TUTOR
& CHARLES & LOIS JONES
DB 544 PG 770
PLAT SLIDE 89 PG 82
3



DETAIL A
ROADWAY CUT DITCH
(Not to Scale)
Min. D= 1Ft.
Max. d= 1Ft.
Type of Liner= PSRM
DETAIL B
SPECIAL CUT DITCH
(Not to Scale)
Min. D= 1Ft.
Max. d= 1Ft.
Type of Liner= PSRM
DETAIL C
LATERAL 'V' DITCH
(Not to Scale)
Min. D= 1Ft.
Max. d= 1Ft.
b= 5 Ft.
Type of Liner= Class 'B' Rip-Rap
DETAIL F
LATERAL BASE DITCH
(Not to Scale)
Min. D= 1.2 Ft.
Max. d= 1.2 Ft.
B= 5 Ft.
b= 5 Ft.
Type of Liner= CLASS 'B' Rip-Rap
DETAIL G
STANDARD BASE DITCH
(Not to Scale)
Min. D= 1Ft.
Max. d= 1Ft.
B= Ft.
Type of Liner= CLASS 'B' Rip-Rap

FROM STA. 27+00 TO STA. 29+00 -L- RT

FROM STA. 26+50 TO STA. 27+00-L- RT

FROM STA. 22+00 TO STA. 23+00 -L- RT
FROM STA. 25+40 TO STA. 26+50 -L- RT

FROM STA. 25+11 TO STA. 25+40 -L- RT

FROM STA. 25+40 TO STA. 25+85 -L- RT

LEGEND

PAVED SHOULDER
PAVEMENT REMOVAL

REVISIONS

10/30/2009
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PROJECT REFERENCE NO.	SHEET NO.
B-4459	6

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5/14/99

BM#1
RR SPIKE BASE OF 14" PINE
BL STA 5+00.00 56.86' RT
-L- STA 9+99.03 41.25' RT
ELEV = 258.33'

BM#2
RR SPIKE BASE OF 30" BEECH TREE
BL STA 14+85 74' RT
-L- STA 19+78.92 38.78' RT
ELEV = 172.78'

-L-
FOR PLAN SEE SHEET NO. 4

PIPE HYDRAULIC DATA
STA. -L- 12+60

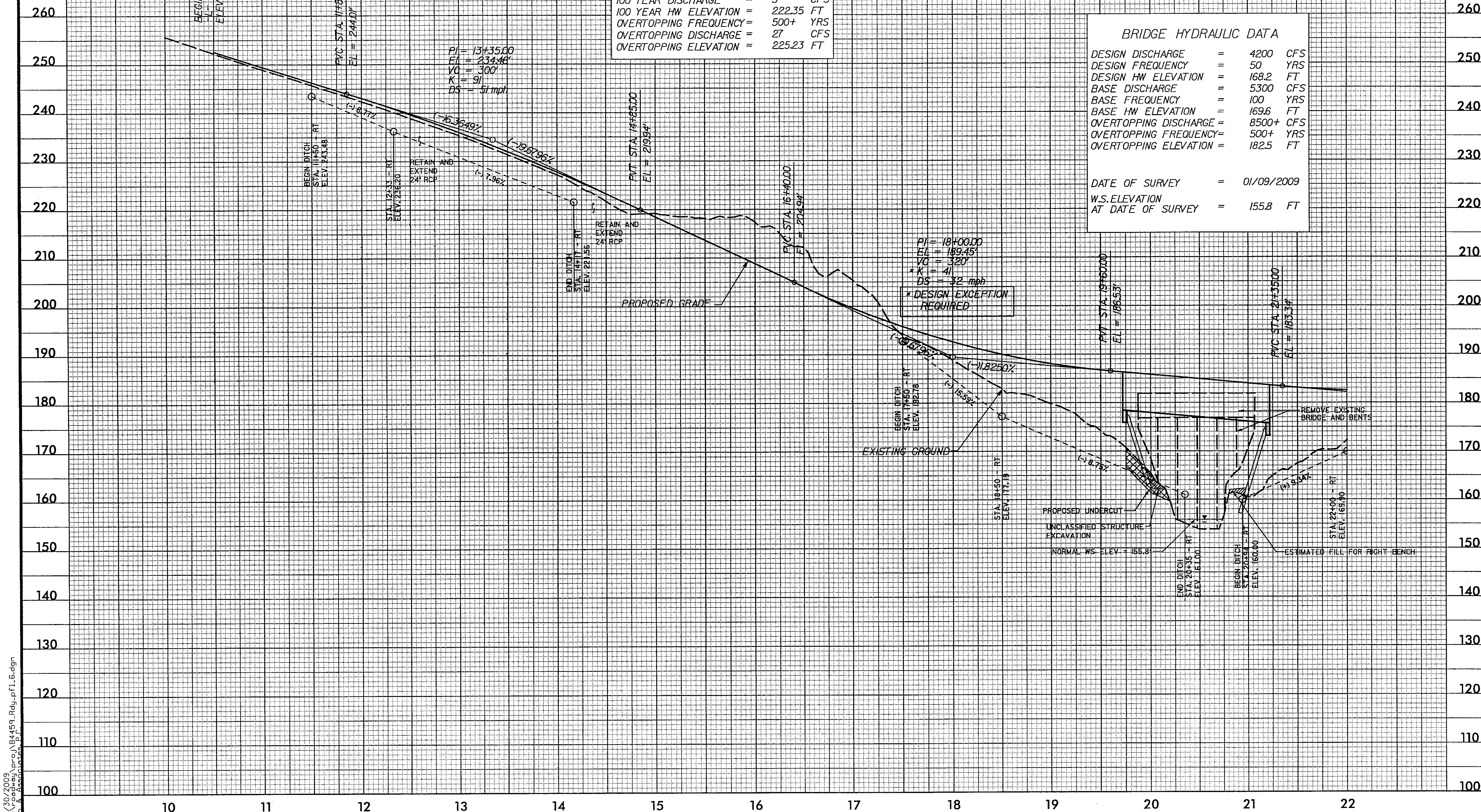
DRAINAGE AREA	=	1.13	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	4	CFS
DESIGN HW ELEVATION	=	237.17	FT
100 YEAR DISCHARGE	=	5	CFS
100 YEAR HW ELEVATION	=	237.24	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	27	CFS
OVERTOPPING ELEVATION	=	239.89	FT

PIPE HYDRAULIC DATA
STA. -L- 14+37

DRAINAGE AREA	=	0.64	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	2	CFS
DESIGN HW ELEVATION	=	222.28	FT
100 YEAR DISCHARGE	=	3	CFS
100 YEAR HW ELEVATION	=	222.35	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	27	CFS
OVERTOPPING ELEVATION	=	225.23	FT

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	4200	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	168.2	FT
BASE DISCHARGE	=	5300	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	169.6	FT
OVERTOPPING DISCHARGE	=	8500+	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	182.5	FT
DATE OF SURVEY	=	01/09/2009	
W.S. ELEVATION AT DATE OF SURVEY	=	155.8	FT



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PROJECT REFERENCE NO.	SHEET NO.
B-4459	7

ROADWAY DESIGN ENGINEER

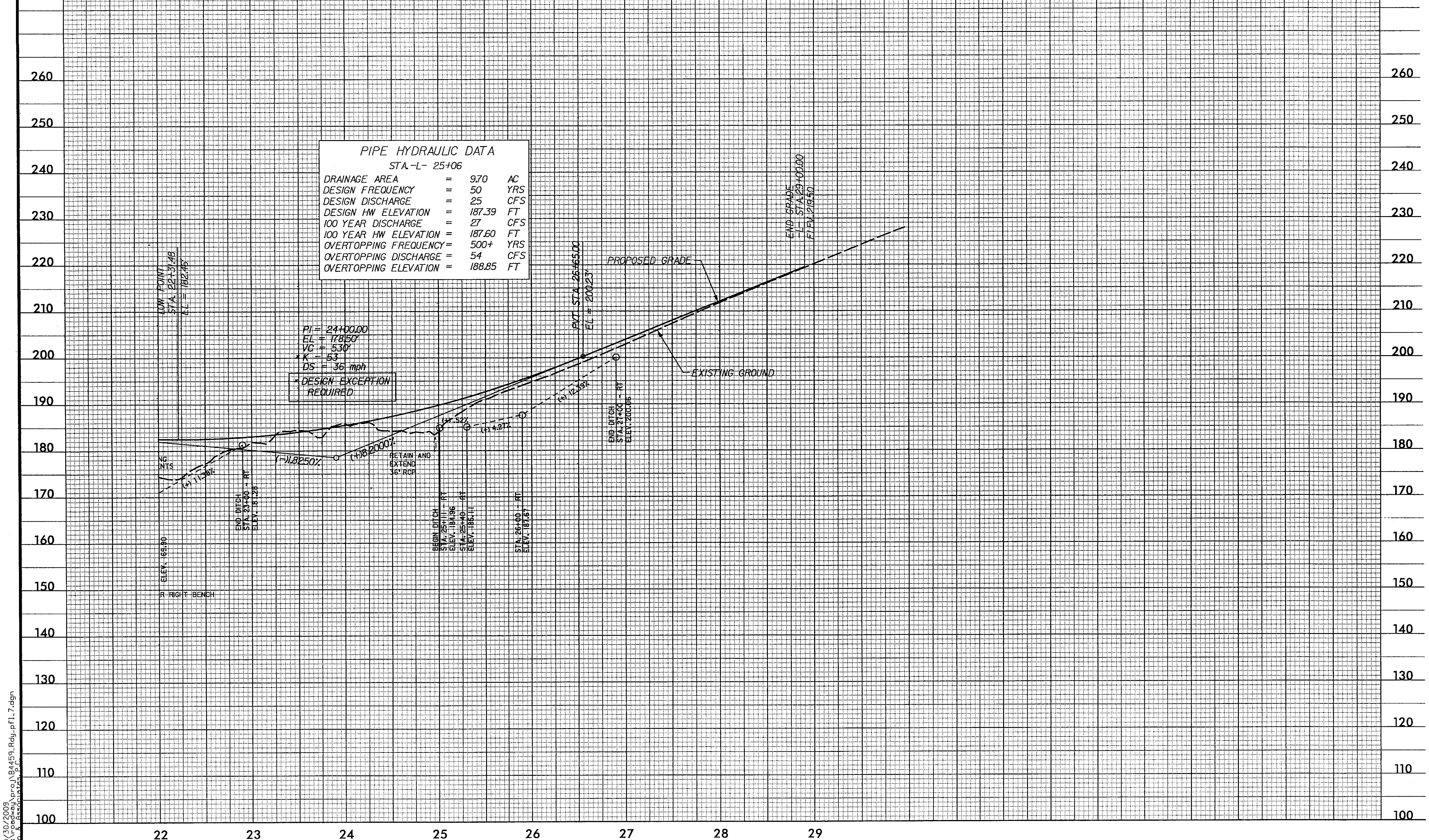
HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5/14/99

-L-

FOR PLAN, SEE SHEET NO. 5



PIPE HYDRAULIC DATA
STA. -L- 25+06

DRAINAGE AREA	=	9.70	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	25	CFS
DESIGN HW ELEVATION	=	187.39	FT
100 YEAR DISCHARGE	=	27	CFS
100 YEAR HW ELEVATION	=	187.60	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	54	CFS
OVERTOPPING ELEVATION	=	188.85	FT

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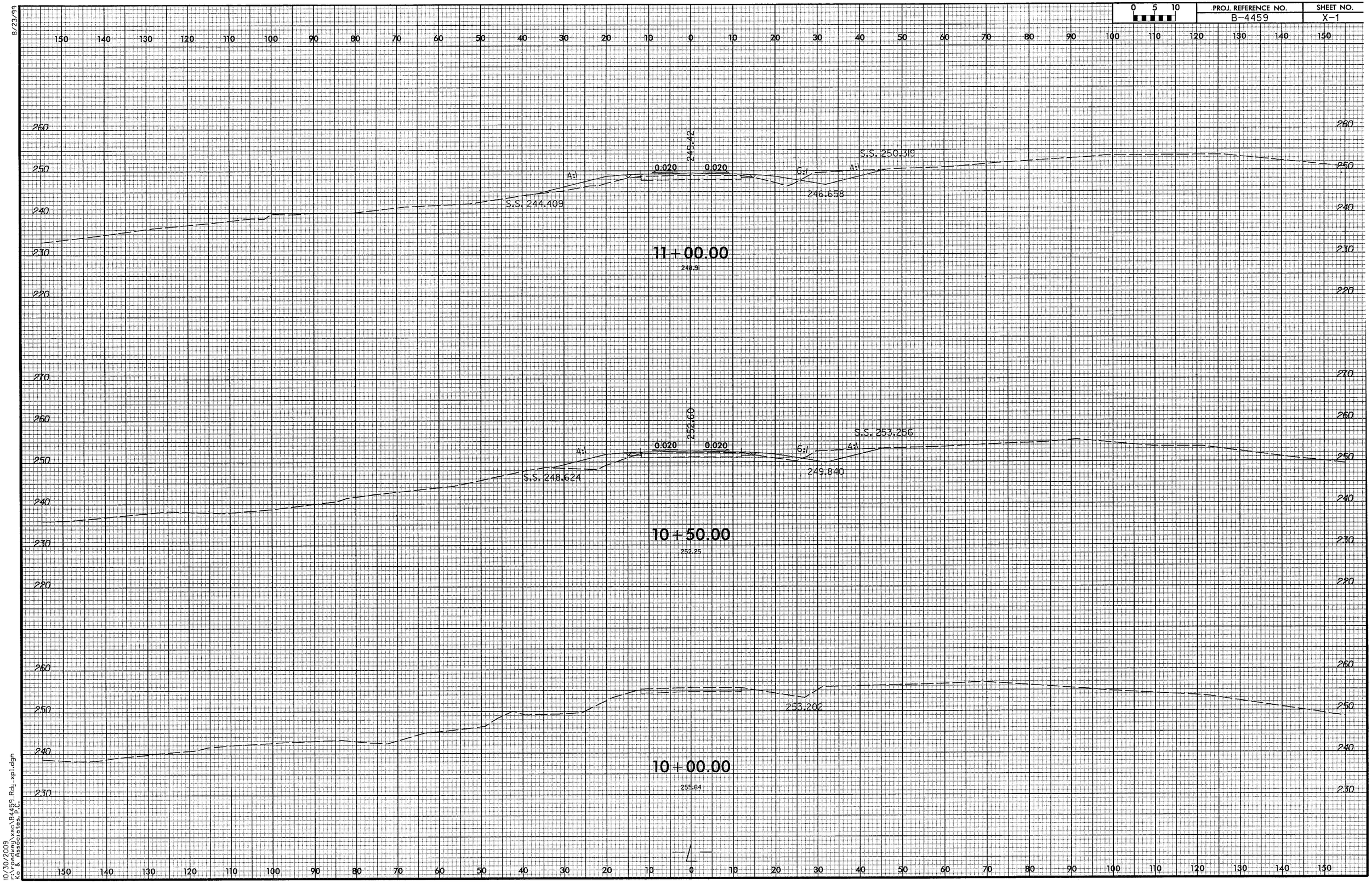

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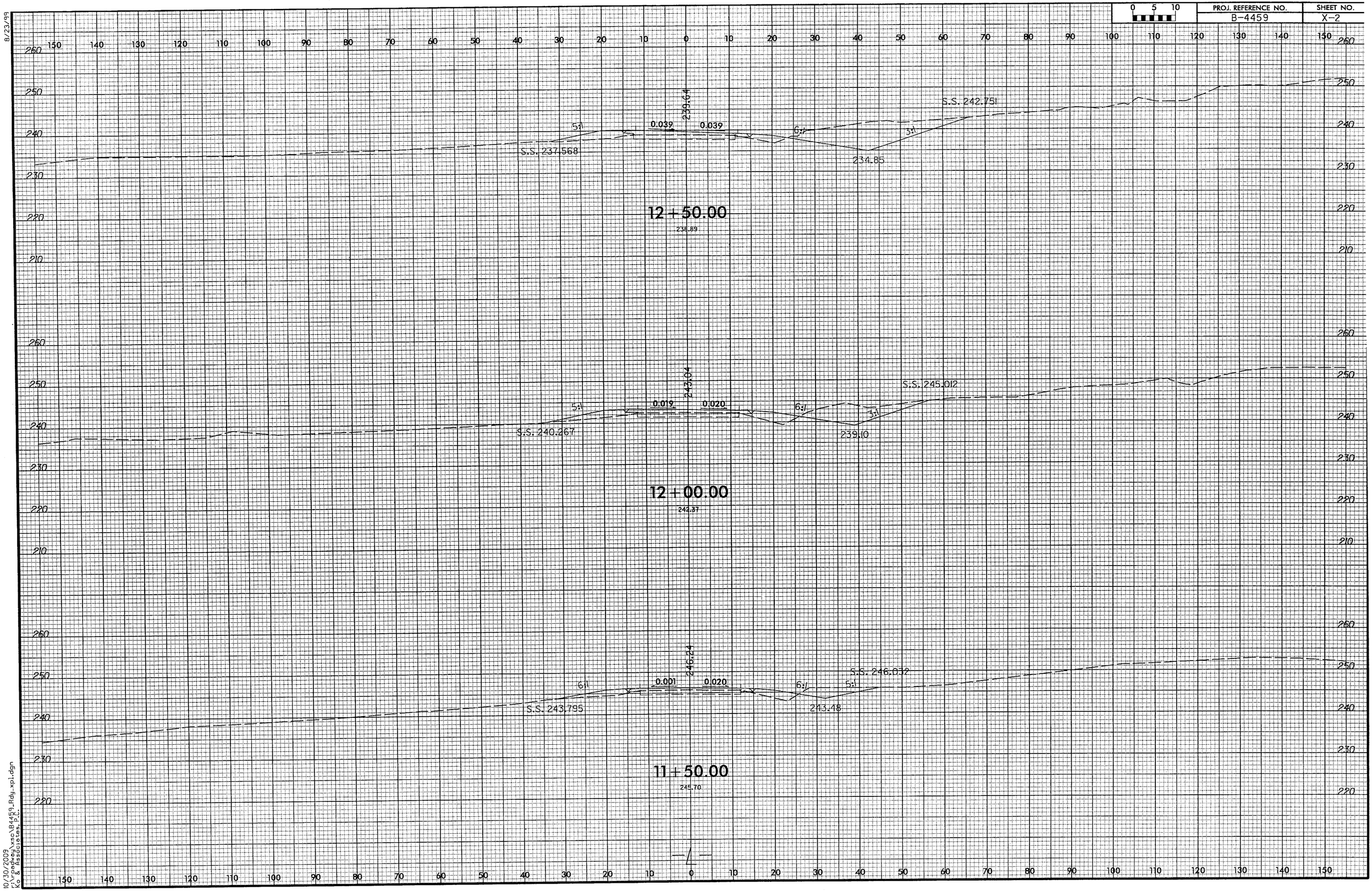
PROJ. REFERENCE NO.	SHEET NO.
B-4459	X-2



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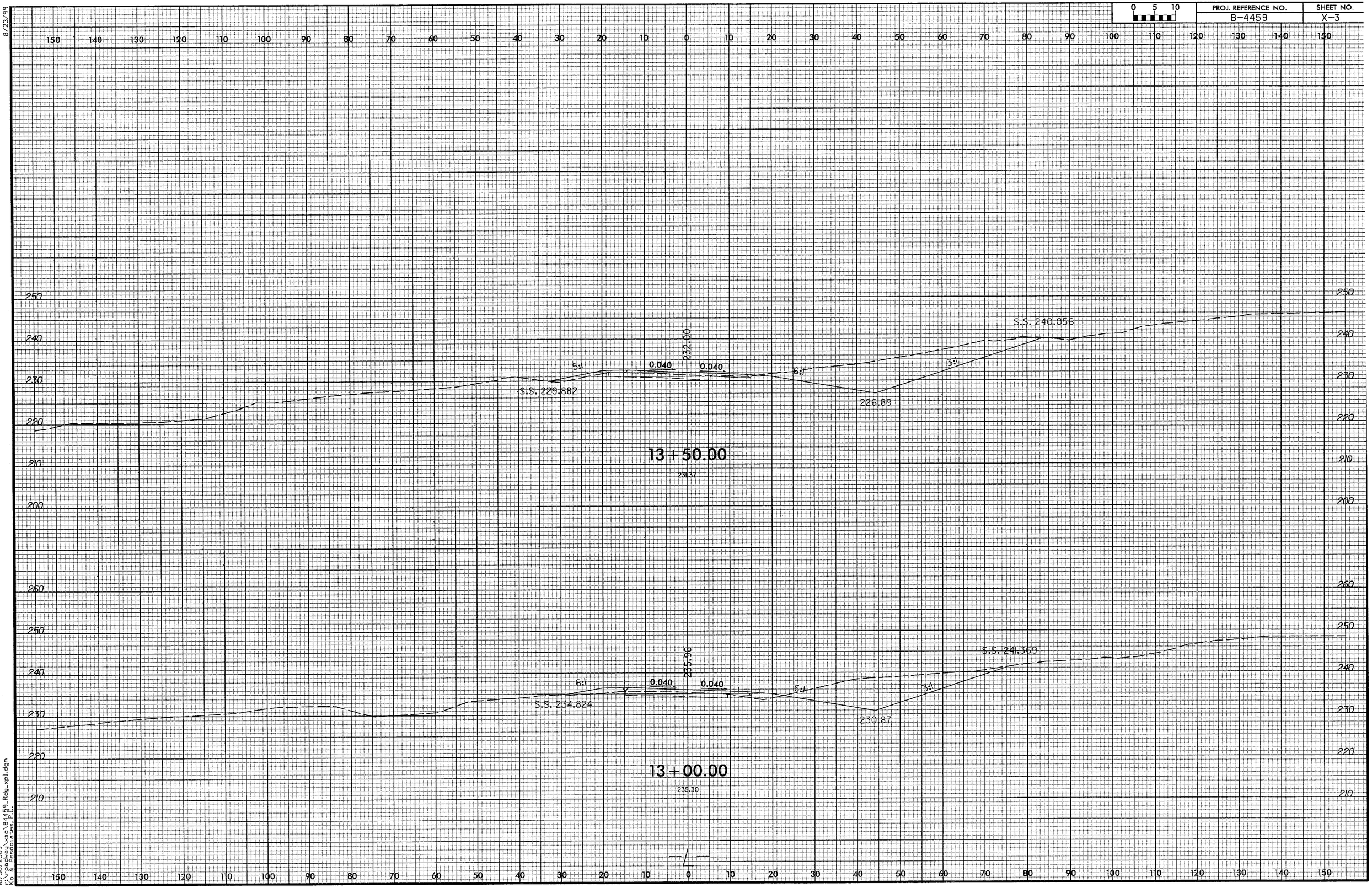
PROJ. REFERENCE NO.	SHEET NO.
B-4459	X-3



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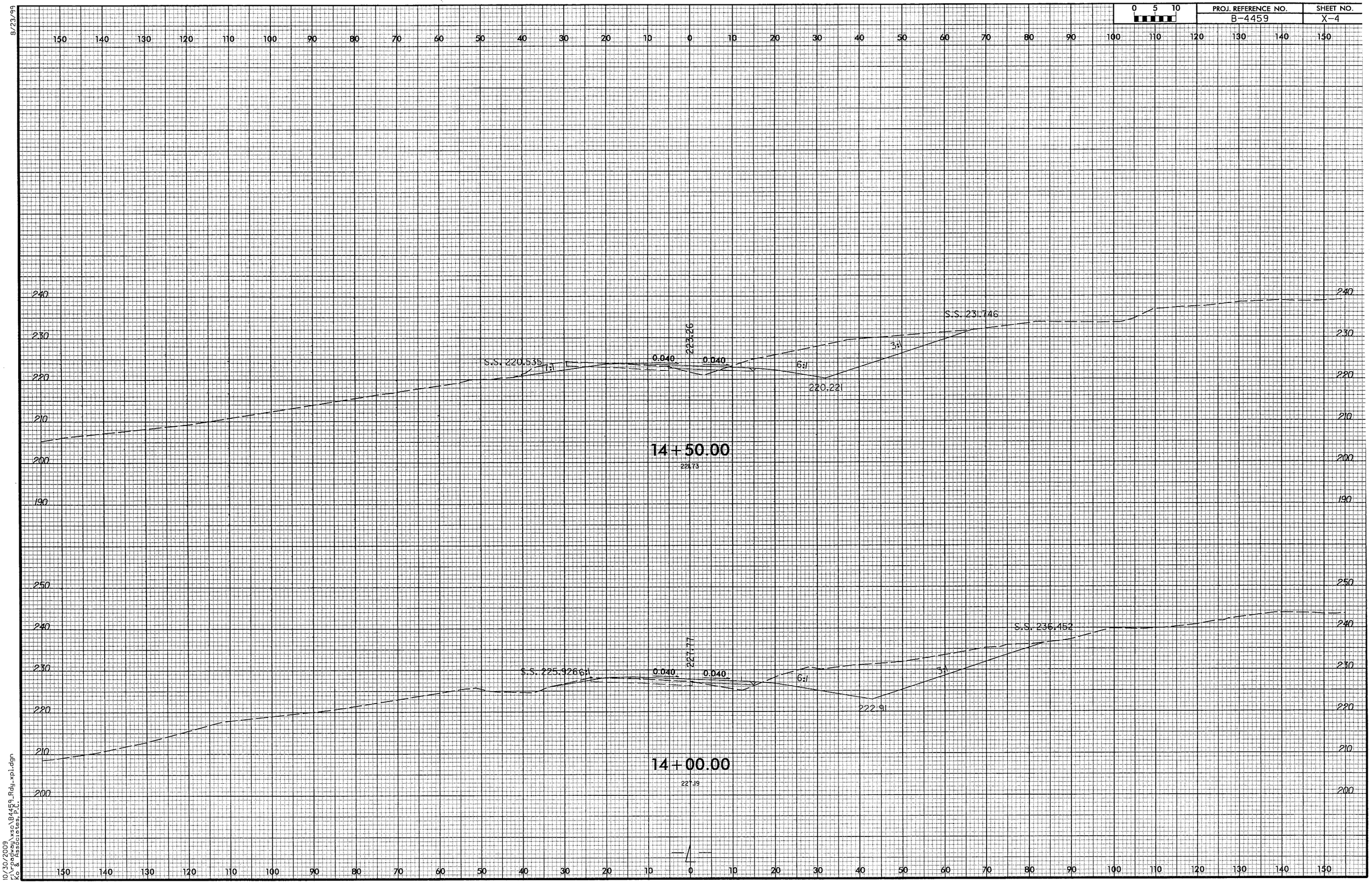

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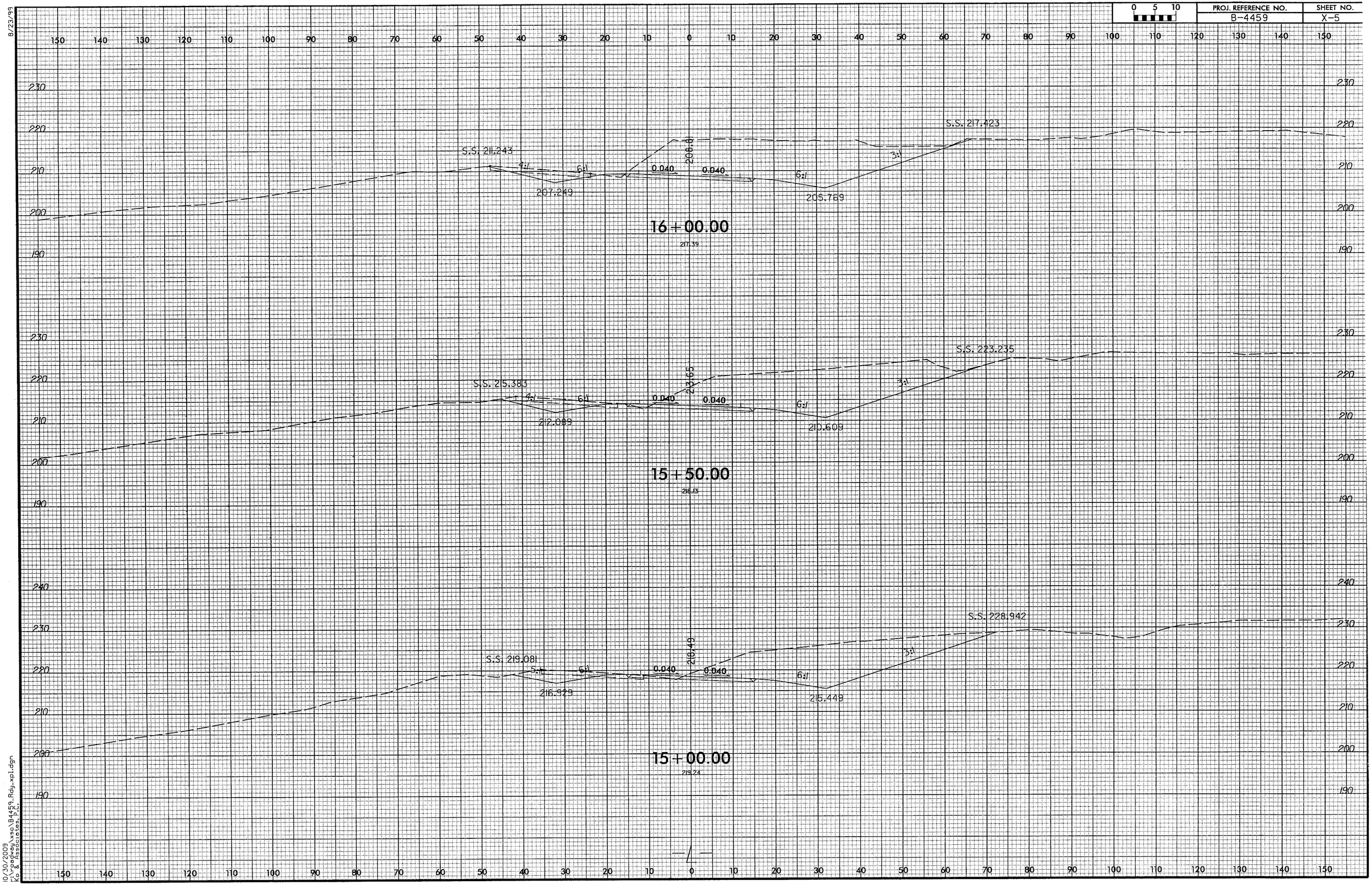

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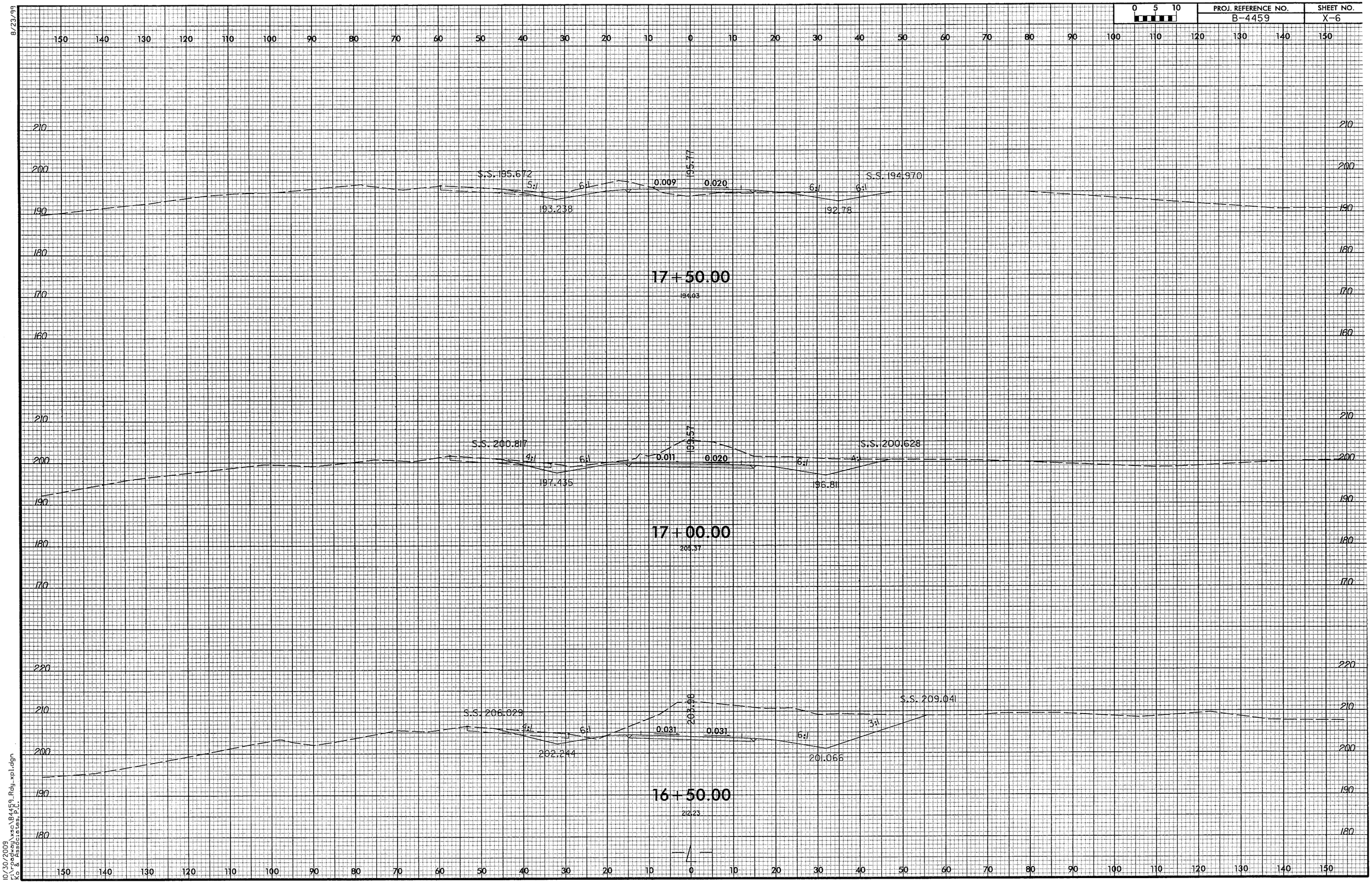
	B-4459	X-6



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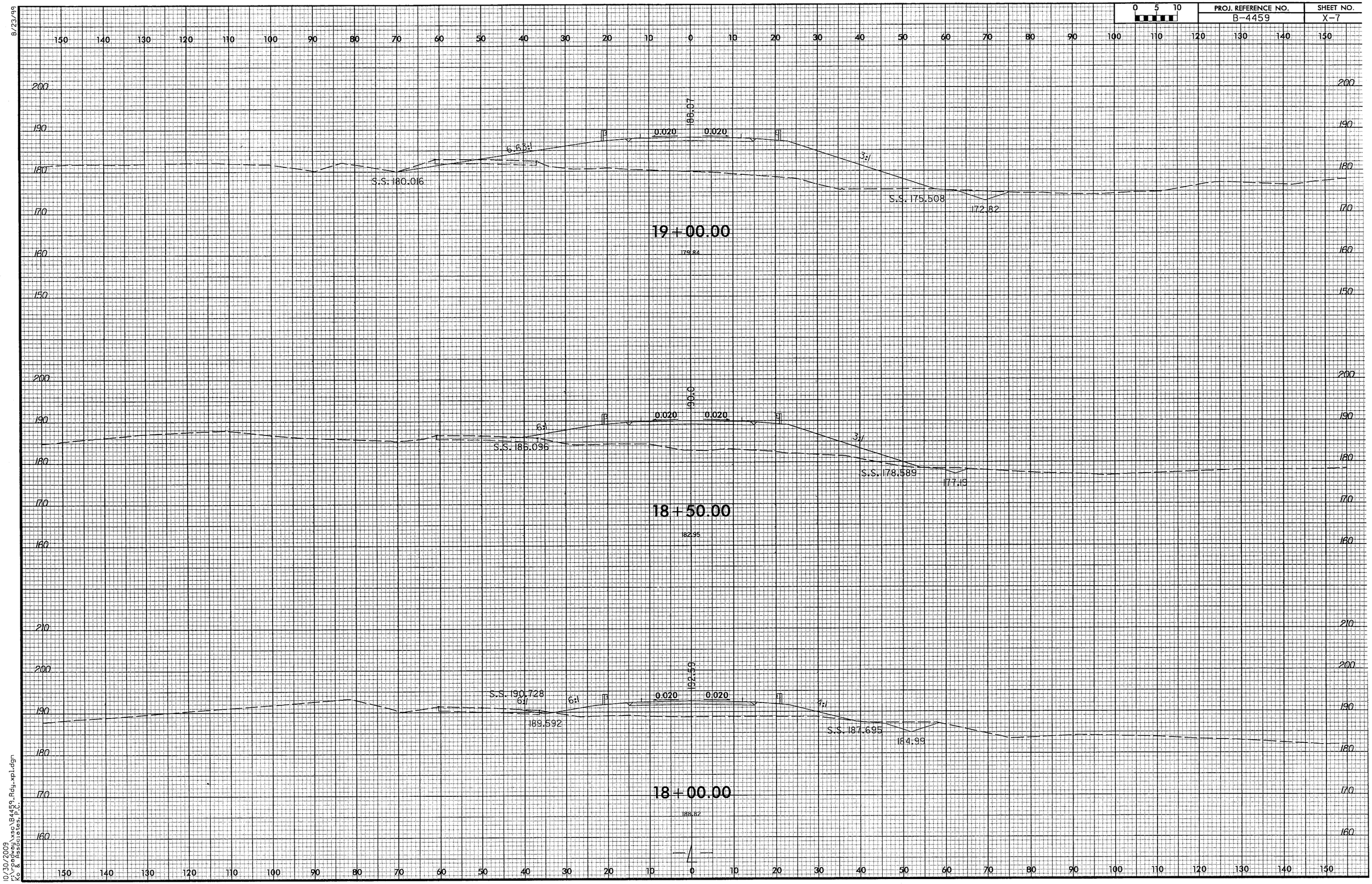
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4459	X-7



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8/23/99

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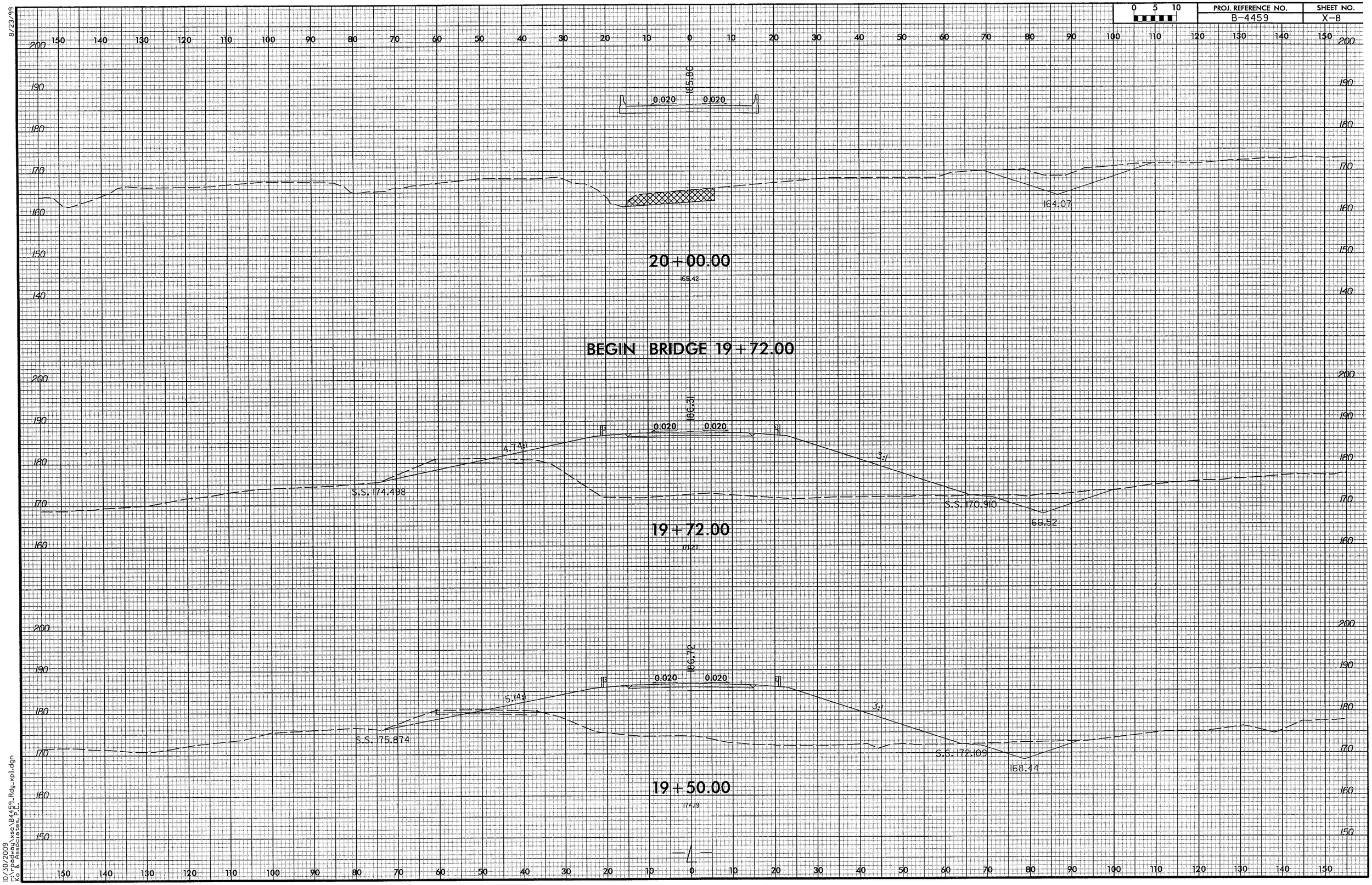
	B-4459	X-8



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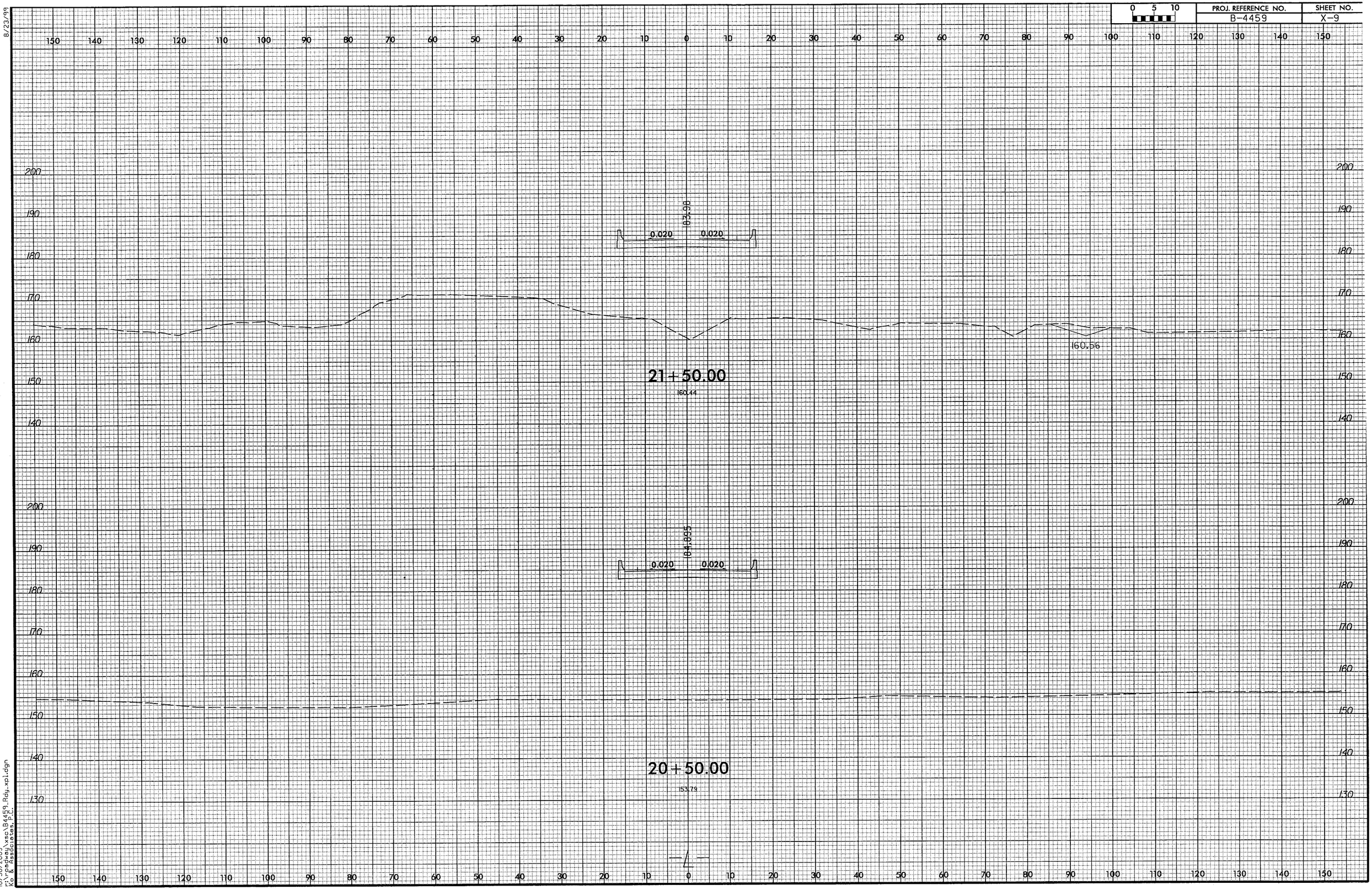
	B-4459	X-9



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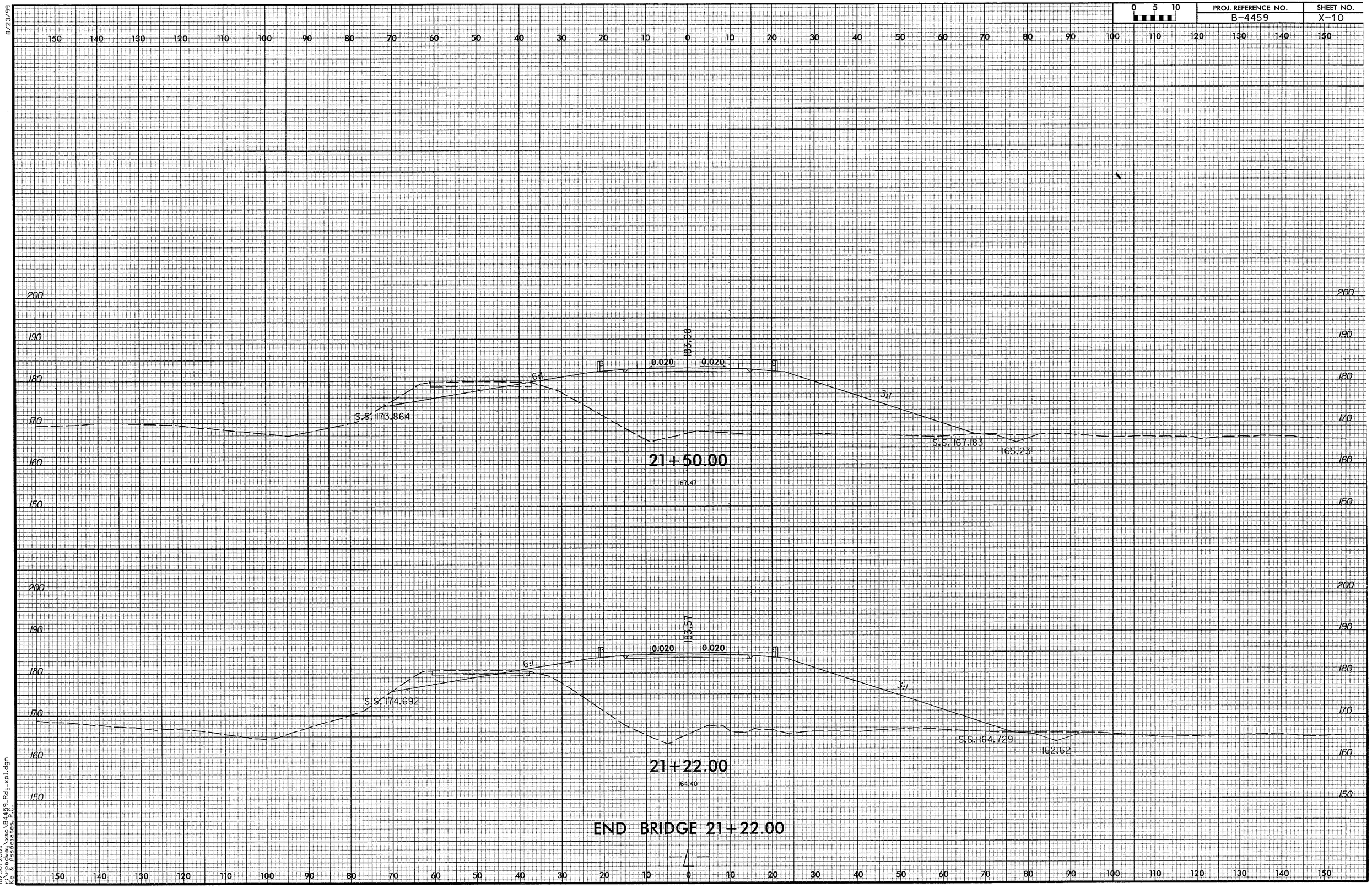
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4459	X-10



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Ko & Associates, P.C.

8/23/99

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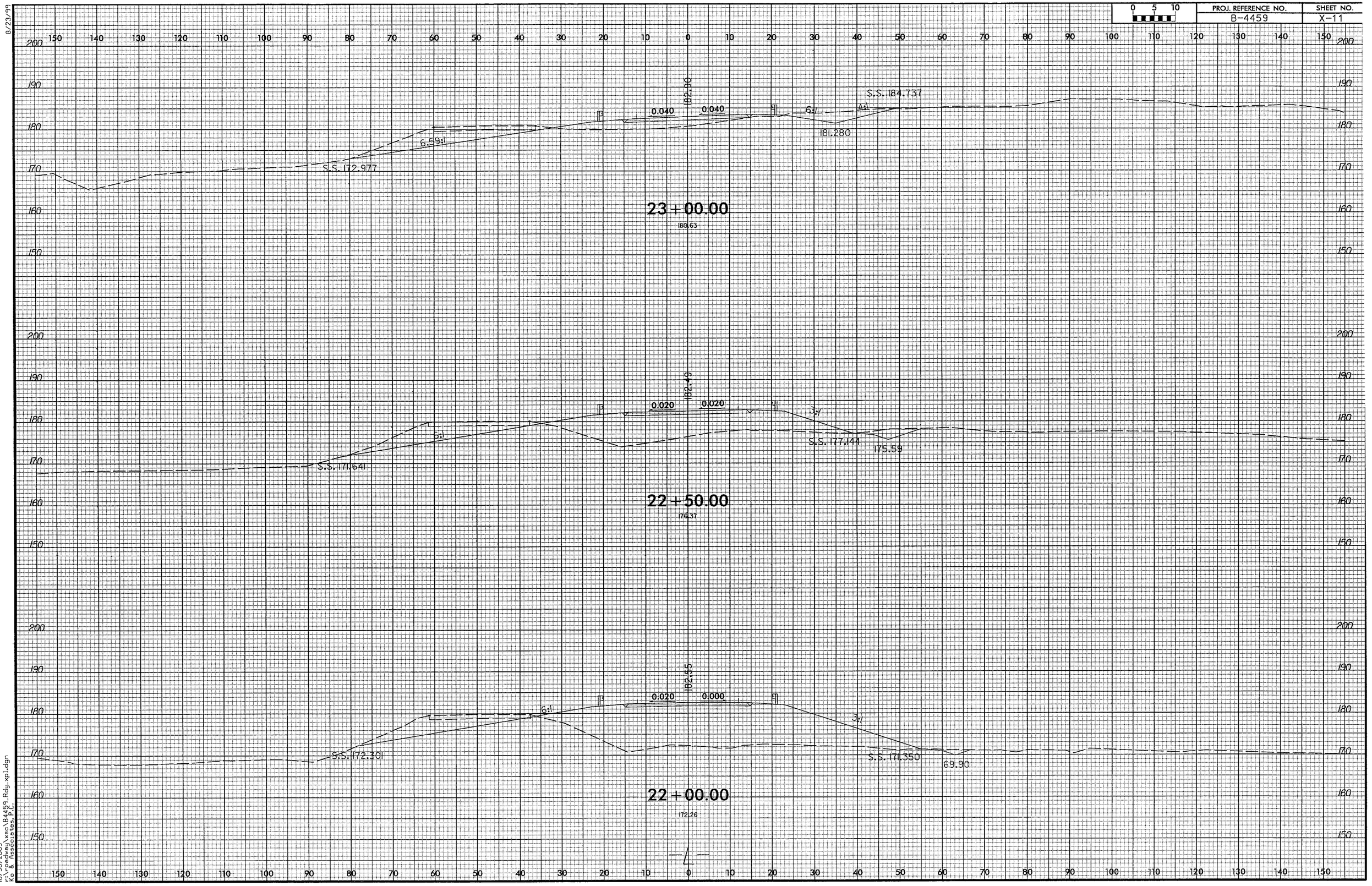

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Ko & Associates, P.C.

8/23/99

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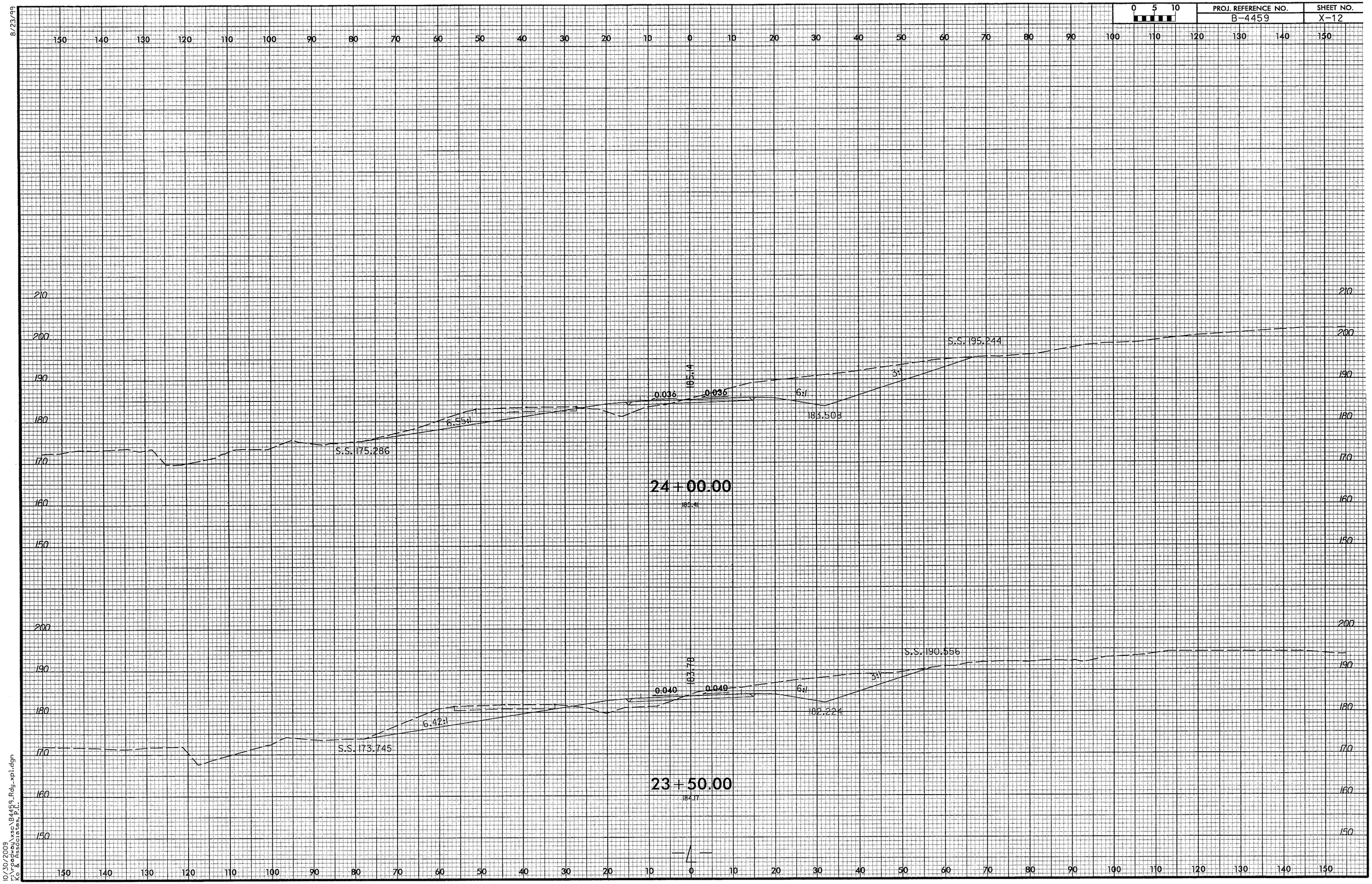

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Ko & Associates, P.C.

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4459	X-13

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

220 210 200 190 180 170 160

S.S. 185.364

6:1

0.004

0.004

86.27

S:1

S.S. 186.594

25+00.00

184.16

6:1

0.016

0.016

86.97

6:1

S:1

S.S. 194.388

S.S. 180.232

184.938

24+50.00

184.28

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

10/30/2009
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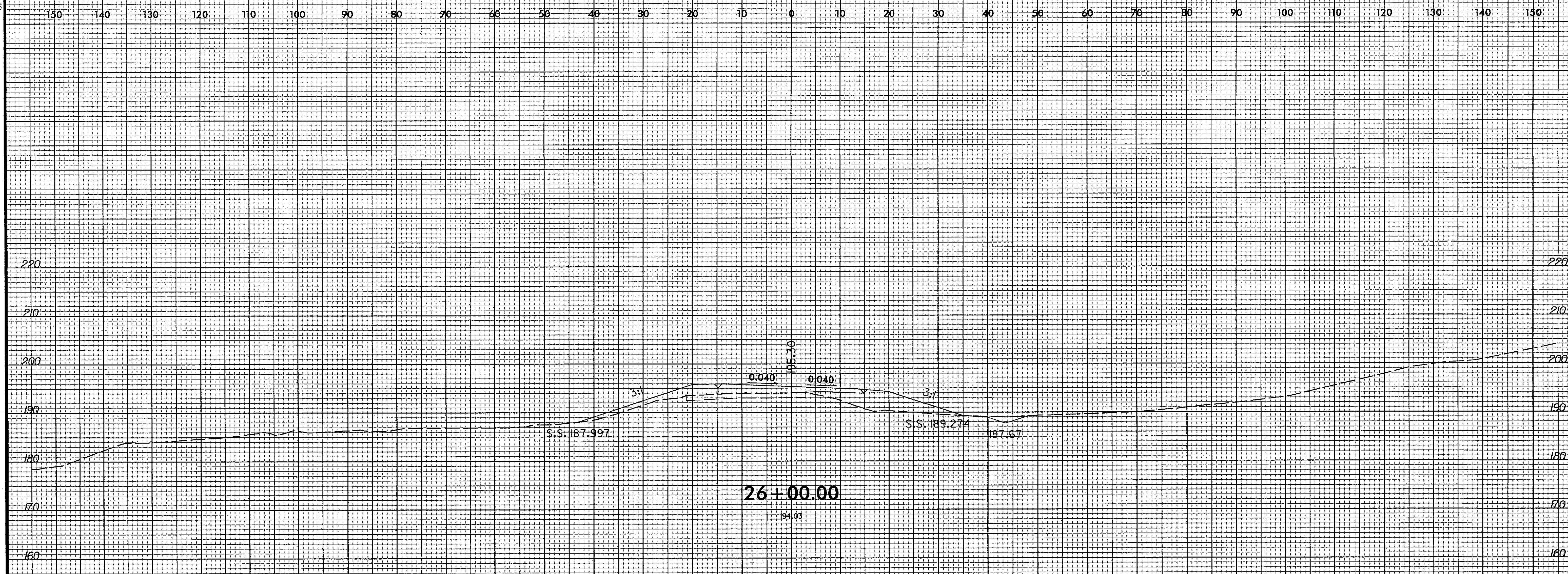
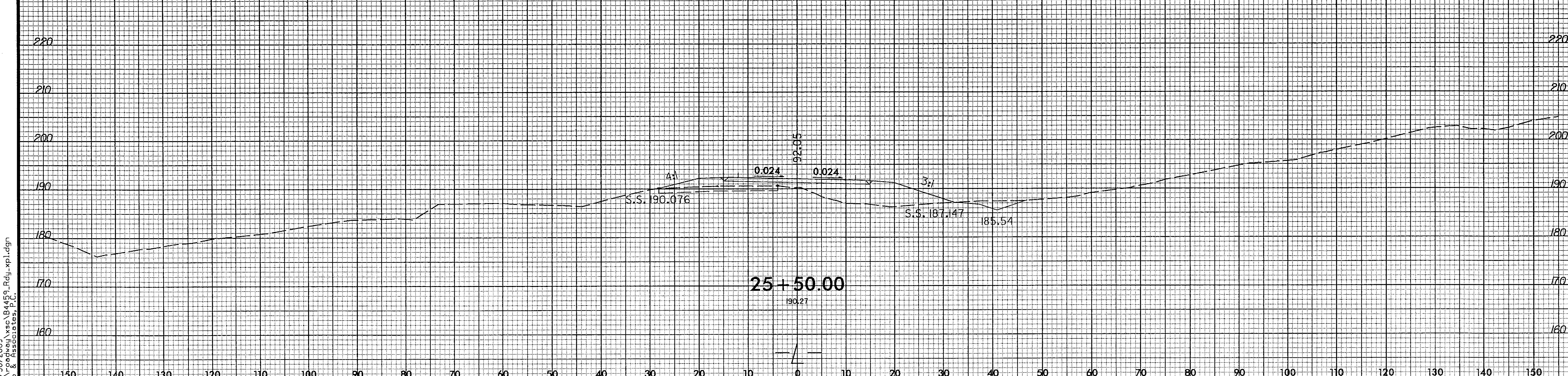
Ko & Associates, P.C.

PROJ. REFERENCE NO.	SHEET NO.
B-4459	X-14

8/23/99





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Ko & Associates, P.C.

8/23/99

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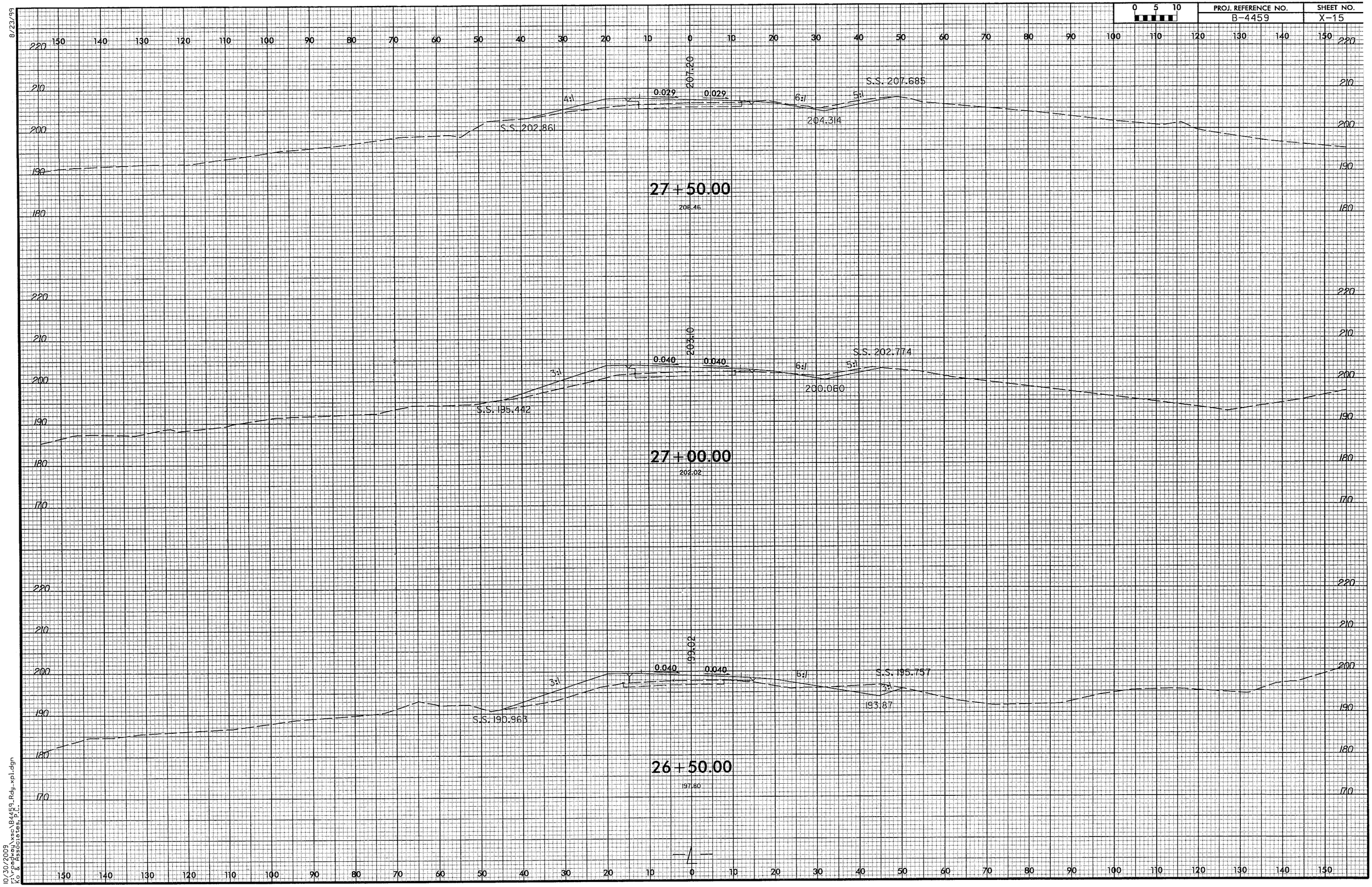
	B-4459	X-15



8/23/99

0 5 10

PROJ. REFERENCE NO.	SHEET NO.
B-4459	X-16

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

230 220 210 200 190

S.S. 218.519

0.020

29.50

0.020

S.S. 217.281

217.281

29+00.00

219.35

230 220 210 200 190

25.40

0.011

0.020

S:1

6:1

5:1

S.S. 214.700

S.S. 211.287

212.640

28+50.00

215.20

180 220 210 200 190 180

21.30

0.009

0.020

4:1

6:1

5:1

S.S. 210.762

S.S. 206.213

208.540

28+00.00

210.94

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

10/30/2009
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Ko & Associates, P.C.