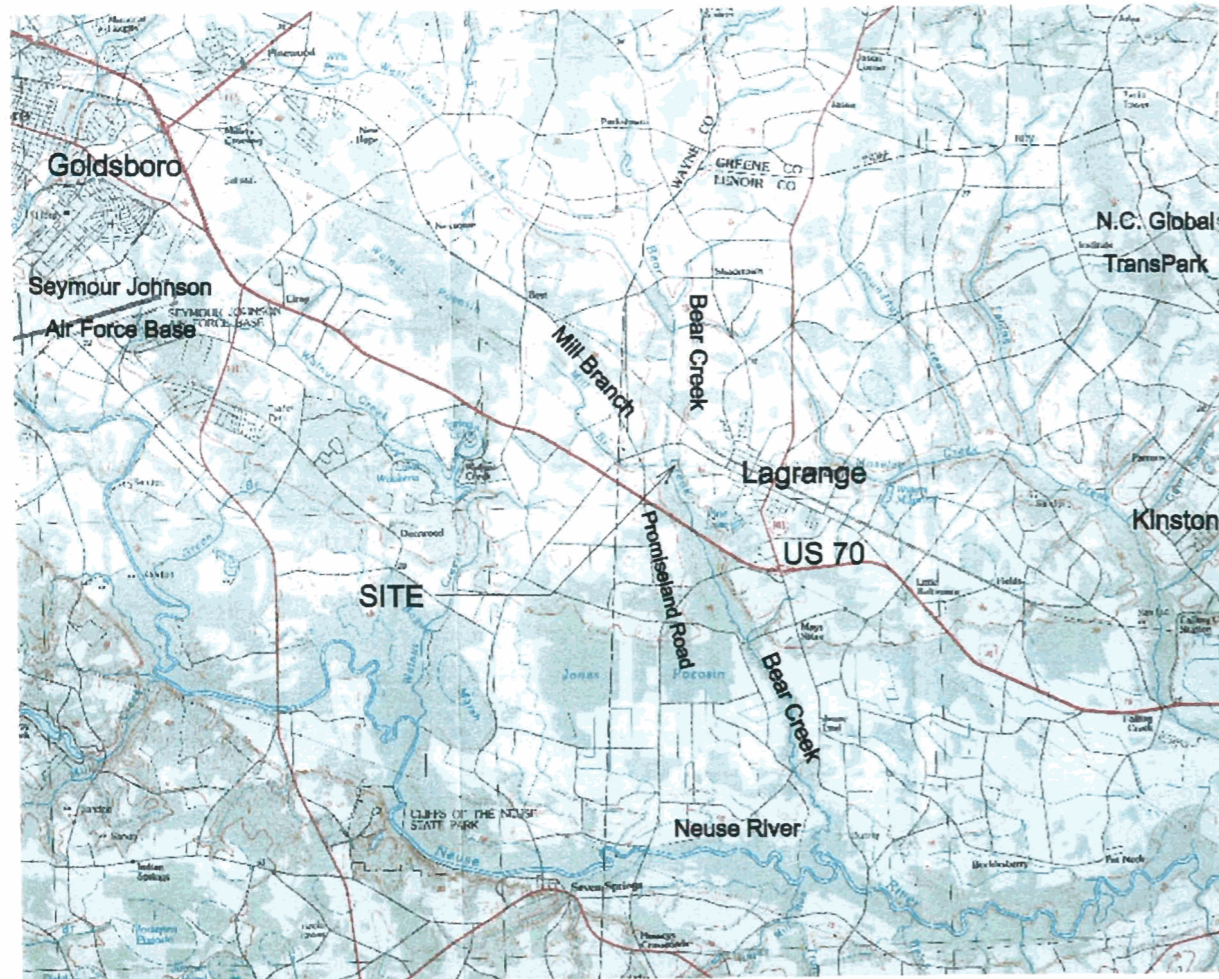


# AS-BUILT CONSTRUCTION DRAWINGS

## Bear Creek - Mill Branch Mitigation Bank Lenoir County, North Carolina

### SITE LOCATION



### PROJECT DESCRIPTION

The Bear Creek - Mill Branch Mitigation Bank is located at the confluence of Mill Branch and Bear Creek, immediately north of US 70, in western Lenoir County. Eighty eight acres of wetlands were lost within the Bank in the 1950s because Bear Creek (54 square mile watershed) was dredged, straightened, and confined behind constructed levees. In addition, Mill Branch and two unnamed tributaries (3.5 square mile watershed) were dredged and diverted into canals with direct connectivity to Bear Creek and the Neuse River. Construction activities re-exposed historic river floodplains to overbank floods from Bear Creek. In addition, Mill Branch was diverted into historic stream channels that existed prior to dredging and wetland losses. Subsequently, canals were backfilled and embankments constructed to provide surface and groundwater hydrodynamics needed for wetland restoration on organic soil floodplains. Crop land surfaces were ripped to restore surface microtopography and sixty six thousand tree seedlings were planted. Primary construction activities were performed over a 4-month period, from September through December 2001.

### INDEX OF SHEETS

#### General

Sheet T-1: Title / Index of Sheets

#### Plan Views

Sheet P-2: Embankment Construction

Sheet P-3: Levee Removal, Embankment / Levee Outlets,  
Drainageway Repair / Construction

Sheet P-4: Ditch / Canal Backfilling, Ditch / Canal Plugs,  
Deep Soil Ripping

Sheet P-5: Tree Planting, Monitoring Installation

#### Details

Sheet D-1: Embankment Construction, Embankment Outlet

Sheet D-2: Levee Outlet

Sheet D-3: Levee Removal

Sheet D-4: Drainageway Construction

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#### NOTES/REVISIONS

Project:

**BEAR CREEK  
MILL BRANCH  
MITIGATION BANK**

**LENOIR COUNTY  
NORTH CAROLINA**

Title:

**TITLE  
INDEX OF SHEETS**

Scale:  
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Date:  
January 2002

Project No.:  
01-2232

SHEET NO.

**T-1**

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NOTES/REVISIONS

Project:

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 MITIGATION BANK**

**LENOIR COUNTY  
 NORTH CAROLINA**

Title:

**Embankment  
 Construction**

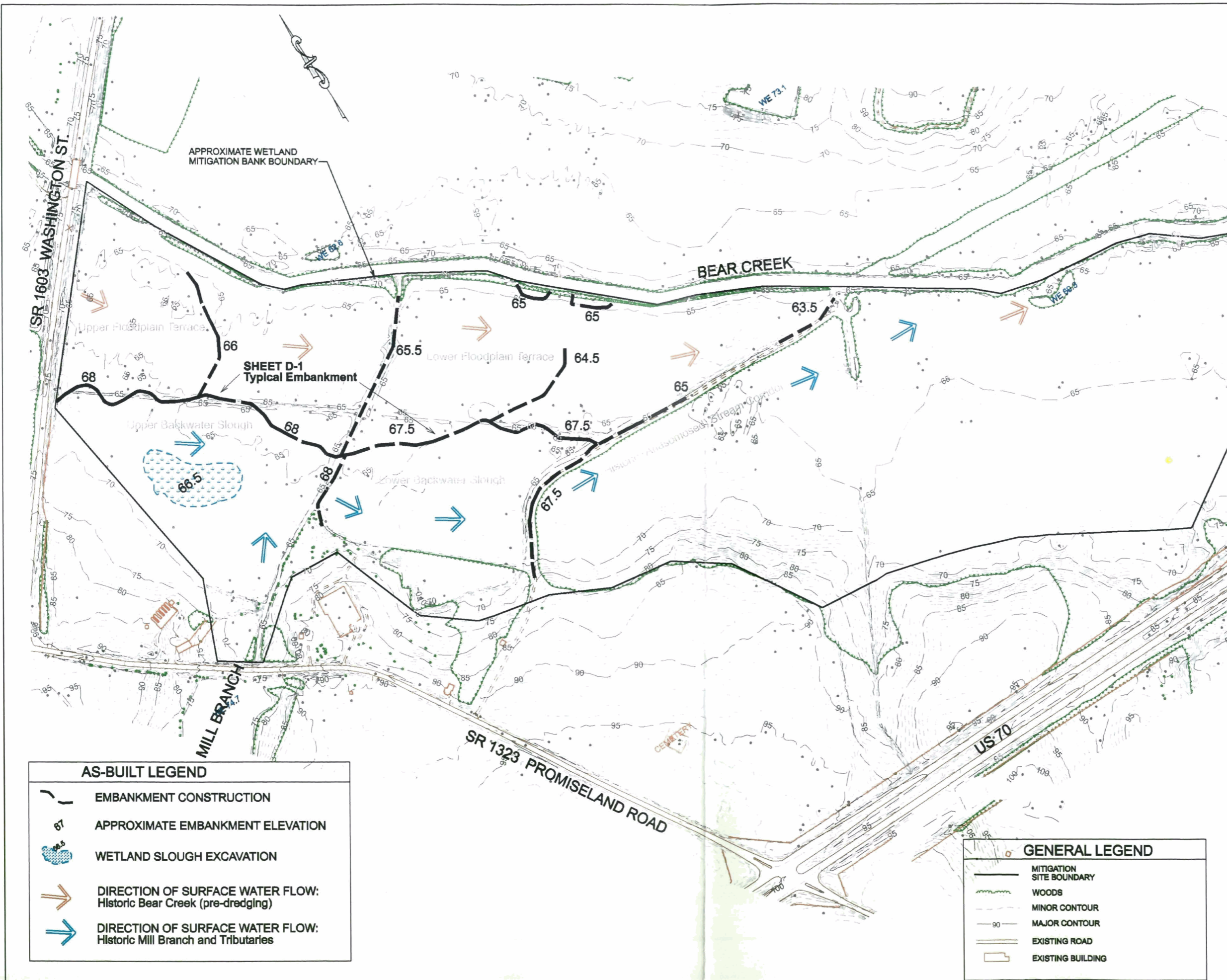
Scale:  
 1 Inch = 400 feet

Date:  
 January 2002






Project No.:  
 01-2232

SHEET NO.

**P-2**

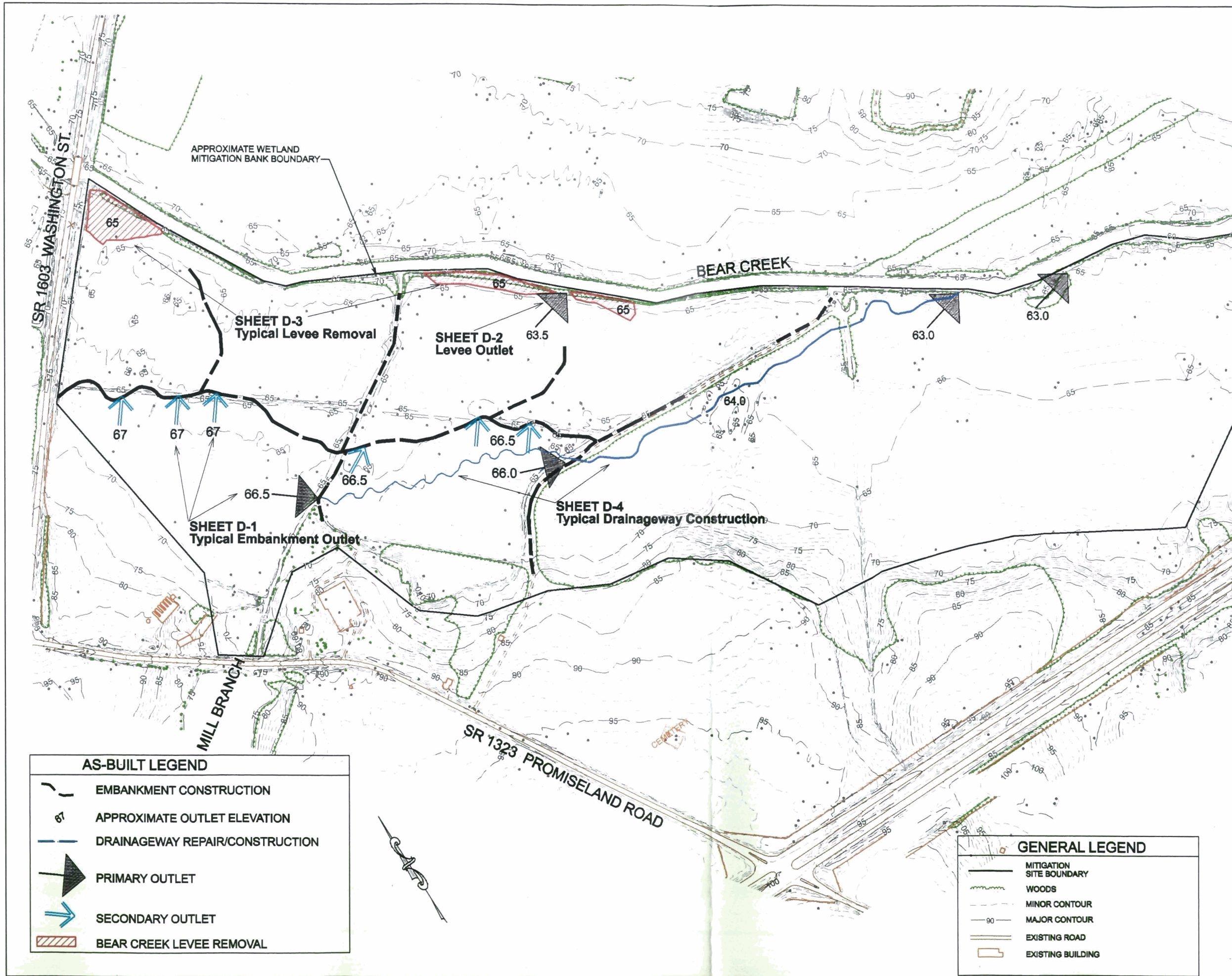


AS-BUILT LEGEND

-  EMBANKMENT CONSTRUCTION
-  APPROXIMATE EMBANKMENT ELEVATION
-  WETLAND SLOUGH EXCAVATION
-  DIRECTION OF SURFACE WATER FLOW: Historic Bear Creek (pre-dredging)
-  DIRECTION OF SURFACE WATER FLOW: Historic Mill Branch and Tributaries

GENERAL LEGEND

-  MITIGATION SITE BOUNDARY
-  WOODS
-  MINOR CONTOUR
-  MAJOR CONTOUR
-  EXISTING ROAD
-  EXISTING BUILDING



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NOTES/REVISIONS

Project:  
**BEAR CREEK  
 MILL BRANCH  
 MITIGATION BANK**  
  
**LENOIR COUNTY  
 NORTH CAROLINA**

Title:  
**Levee Removal  
 Embankment/Levee Outlets  
 Drainageway Repair/Construction**

Scale:  
 1 Inch = 400 feet  
 Date:  
 January 2002  
 Project No.:  
 01-2232

SHEET NO.  
**P-3**

AS-BUILT LEGEND	
	EMBANKMENT CONSTRUCTION
	APPROXIMATE OUTLET ELEVATION
	DRAINAGEWAY REPAIR/CONSTRUCTION
	PRIMARY OUTLET
	SECONDARY OUTLET
	BEAR CREEK LEVEE REMOVAL

GENERAL LEGEND	
	MITIGATION SITE BOUNDARY
	WOODS
	MINOR CONTOUR
	MAJOR CONTOUR
	EXISTING ROAD
	EXISTING BUILDING

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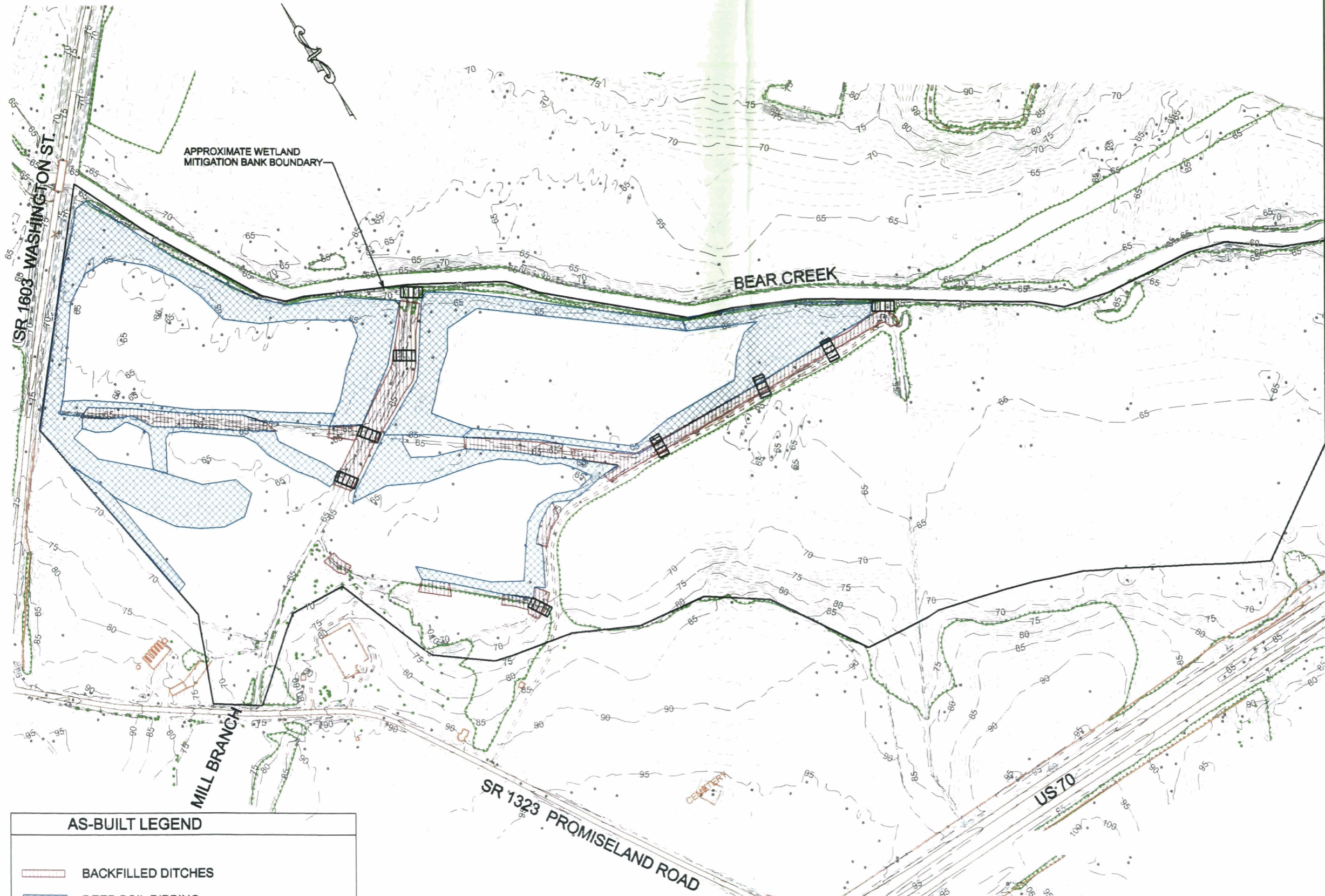
NOTES/REVISIONS

Project:  
**BEAR CREEK  
 MILL BRANCH  
 MITIGATION BANK**  
  
**LENOIR COUNTY  
 NORTH CAROLINA**

Title:  
 Ditch/Canal Backfilling  
 Canal Outlet Plugs  
 Deep Soil Ripping

Scale:  
 1 Inch = 400 feet  
 Date:  
 January 2002  
 Project No.:  
 01-2232

SHEET NO.  
**P-4**



AS-BUILT LEGEND	
	BACKFILLED DITCHES
	DEEP SOIL RIPPING
	DITCH/CANAL PLUGS (9)

Soil ripping performed by D7 bulldozer with rock ripper attachment. Nominal ripping to 21 inches in depth and perpendicular to land slope.

Ditches backfilled and compacted by mechanized equipment in nominal 4-foot lifts. Backfill face elevated to 1 foot above existing grade.

Canal Plugs keyed in to stable canal bed and banks, minimum 5-foot vertical and horizontal key. Compactable, sandy clay to clayey sand material compacted by mechanized equipment in nominal, 2-foot lifts. Plug face elevated 2 feet above existing grade, minimum 10-foot top width, and covered with 1-foot of organic topsoil.

GENERAL LEGEND	
	MITIGATION SITE BOUNDARY
	WOODS
	MINOR CONTOUR
	MAJOR CONTOUR
	EXISTING ROAD
	EXISTING BUILDING

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NOTES/REVISIONS

Project:

BEAR CREEK  
MILL BRANCH  
MITIGATION BANK

LENOIR COUNTY  
NORTH CAROLINA

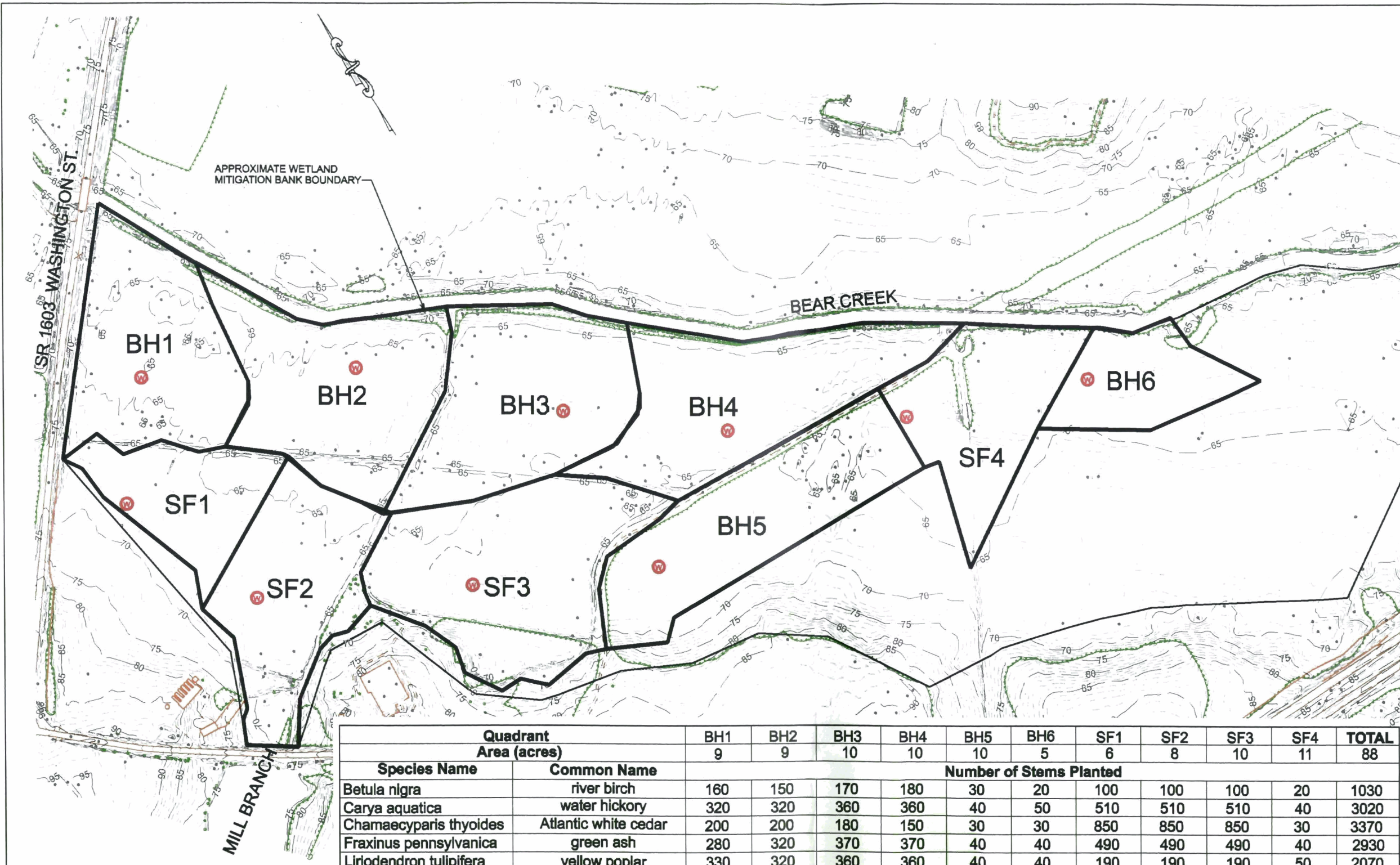
Title:

Tree Planting  
Monitoring Installation

Scale:  
1 inch = 400 feet  
Date:  
January 2002  
Project No.:  
01-2232

SHEET NO.

P-5

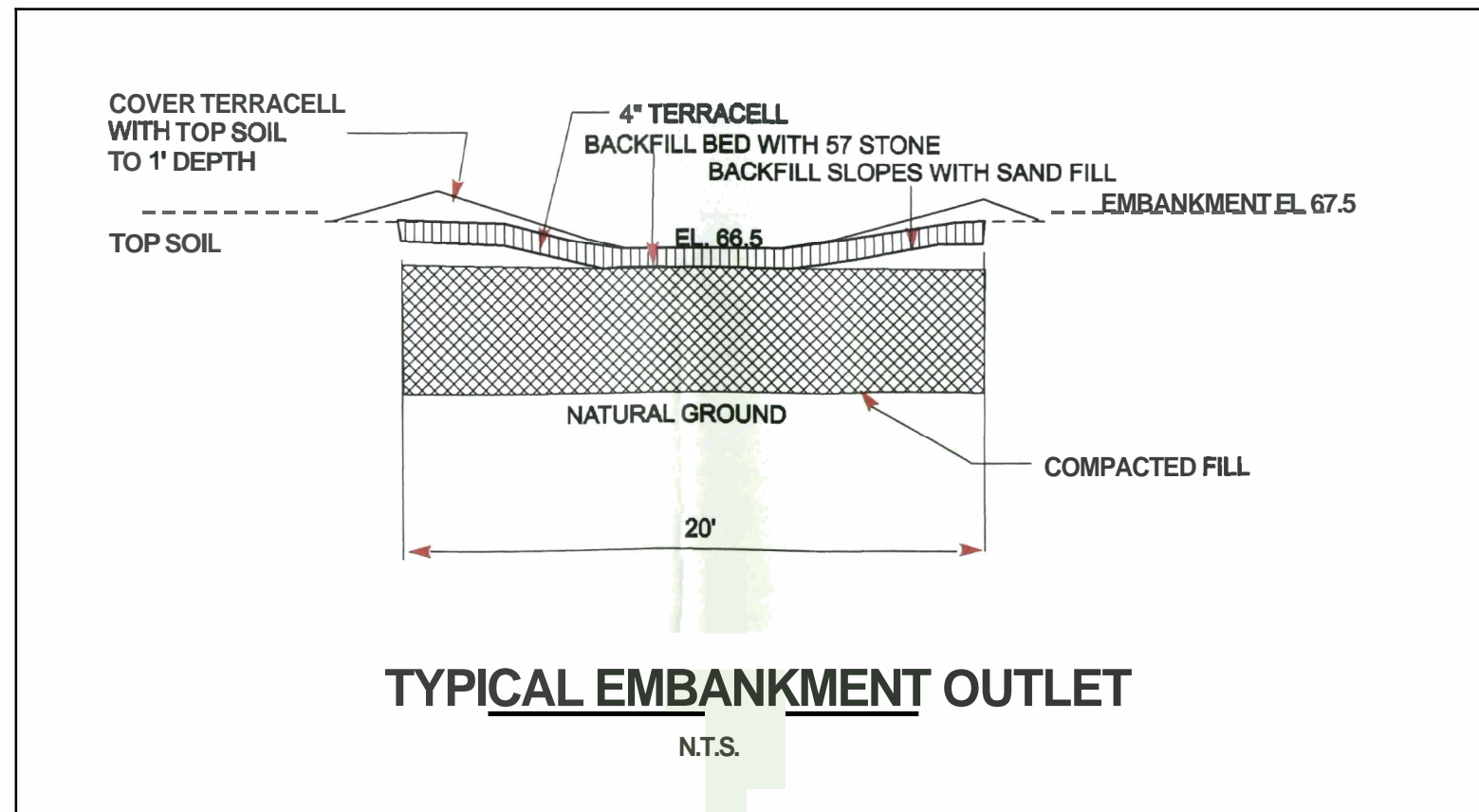
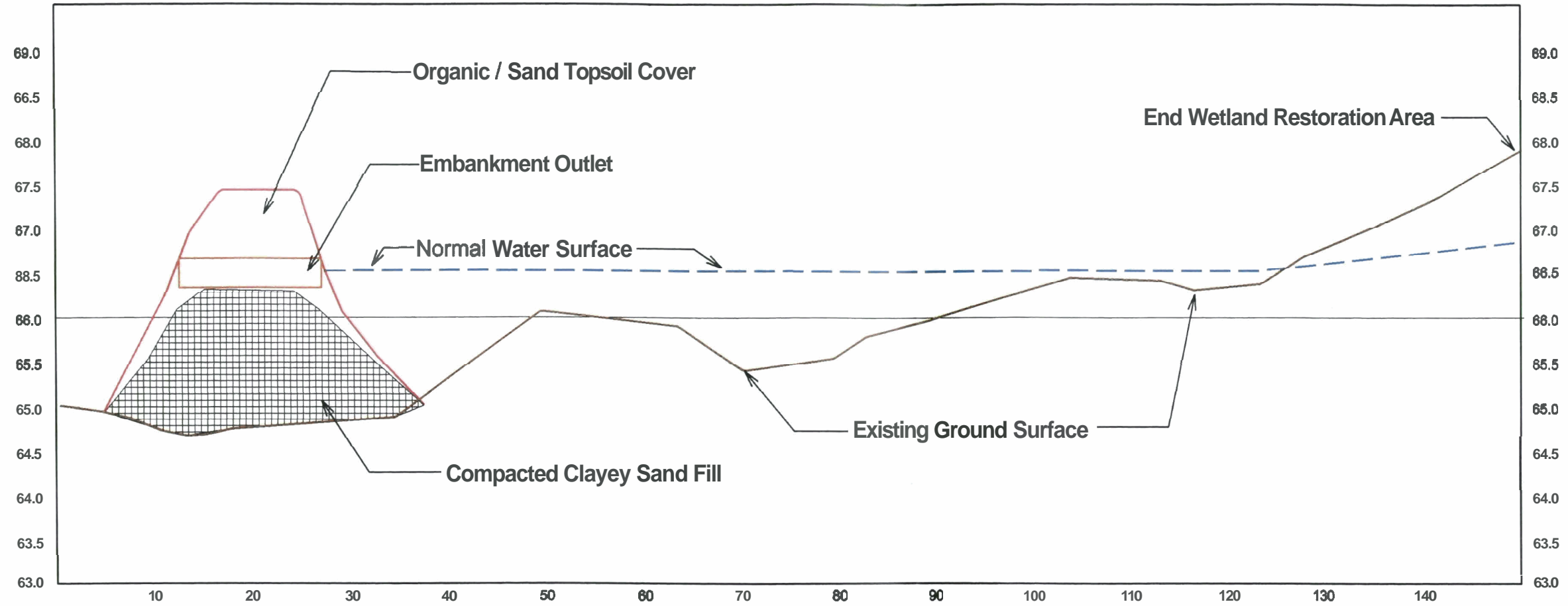


**○ Surface / Groundwater Gauge Locations**  
Infinity continuous monitoring gauges installed in accordance with specifications in U.S. Army Corps of Engineers', Installing Monitoring Wells/Piezometers in Wetlands (WRP Technical Note HY-IA-3.1, August 1993). Screens are set to a depth of approximately 18 inches. The gauges are programmed to record at 12-hour intervals. Daily rainfall is correlated from data obtained at Seymour Johnson Air Force Base (WBAN 13713).

**BH1 Vegetation / Hydrology Monitoring Quadrant**  
Planted vegetation consists of bare-root seedlings planted to specified densities within each monitoring quadrant.

Quadrant	BH1	BH2	BH3	BH4	BH5	BH6	SF1	SF2	SF3	SF4	TOTAL
Area (acres)	9	9	10	10	10	5	6	8	10	11	88
Species Name	Number of Stems Planted										
Betula nigra	160	150	170	180	30	20	100	100	100	20	1030
Carya aquatica	320	320	360	360	40	50	510	510	510	40	3020
Chamaecyparis thyoides	200	200	180	150	30	30	850	850	850	30	3370
Fraxinus pennsylvanica	280	320	370	370	40	40	490	490	490	40	2930
Liriodendron tulipifera	330	320	360	360	40	40	190	190	190	50	2070
Nyssa aquatica	10	10	10	10			1440	1440	1440		4360
Nyssa biflora	440	420	490	490	70	70	1940	1940	1940	70	7870
Platanus occidentalis	90	120	110	120	20	20	390	380	380	20	1650
Quercus laurofolia	1020	990	1140	1140	170	170	660	660	660	170	6780
Quercus lyrata	980	940	1100	1100	170	170	940	940	940	170	7450
Quercus michauxii	890	820	950	950	140	140	60	60	60	140	4210
Quercus nigra	610	570	670	670	100	100	70	70	70	100	3030
Quercus pagoda	890	870	1000	1000	150	150	60	60	60	150	4390
Quercus phellos	940	910	1050	1050	160	160	70	70	70	160	4640
Taxodium distichum	520	500	570	570	80	80	2550	2550	2550	80	10050
<b>TOTAL</b>	<b>7680</b>	<b>7460</b>	<b>8530</b>	<b>8520</b>	<b>1240</b>	<b>1240</b>	<b>10320</b>	<b>10320</b>	<b>10320</b>	<b>1240</b>	<b>66850</b>
<b>STEMS/ACRE</b>	<b>853</b>	<b>829</b>	<b>853</b>	<b>852</b>	<b>124</b>	<b>248</b>	<b>1720</b>	<b>1289</b>	<b>1031</b>	<b>113</b>	<b>760</b>
<b>AVERAGE SPACING (ft)</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>19</b>	<b>13</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>20</b>	<b>8</b>

# TYPICAL EMBANKMENT



# TYPICAL EMBANKMENT OUTLET

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### NOTES/REVISIONS

Project:

**BEAR CREEK  
MILL BRANCH  
MITIGATION BANK**

**LENOIR COUNTY  
NORTH CAROLINA**

Title:

**EMBANKMENT CONSTRUCTION  
EMBANKMENT OUTLETS**

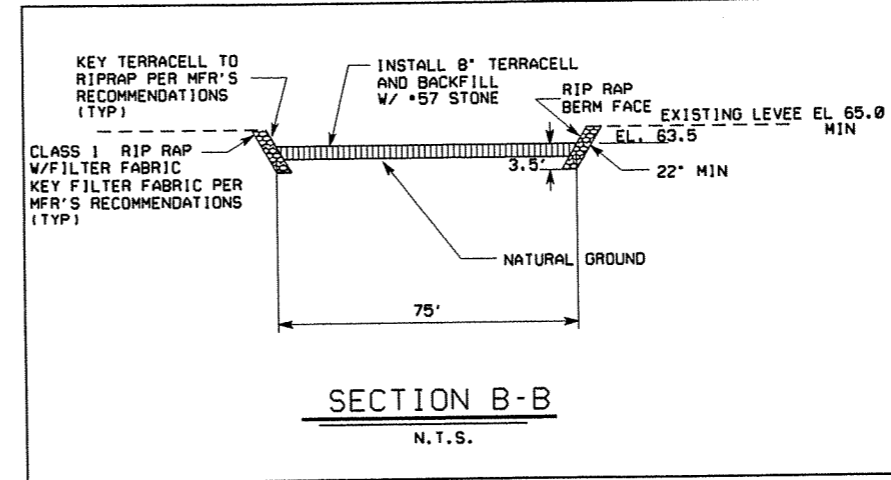
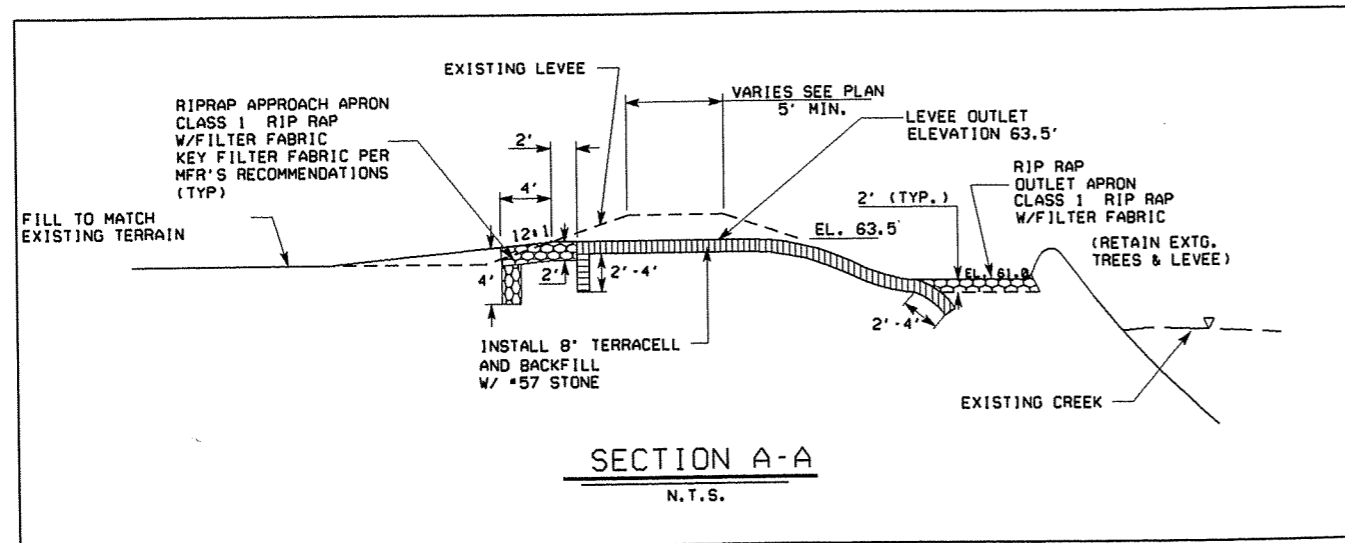
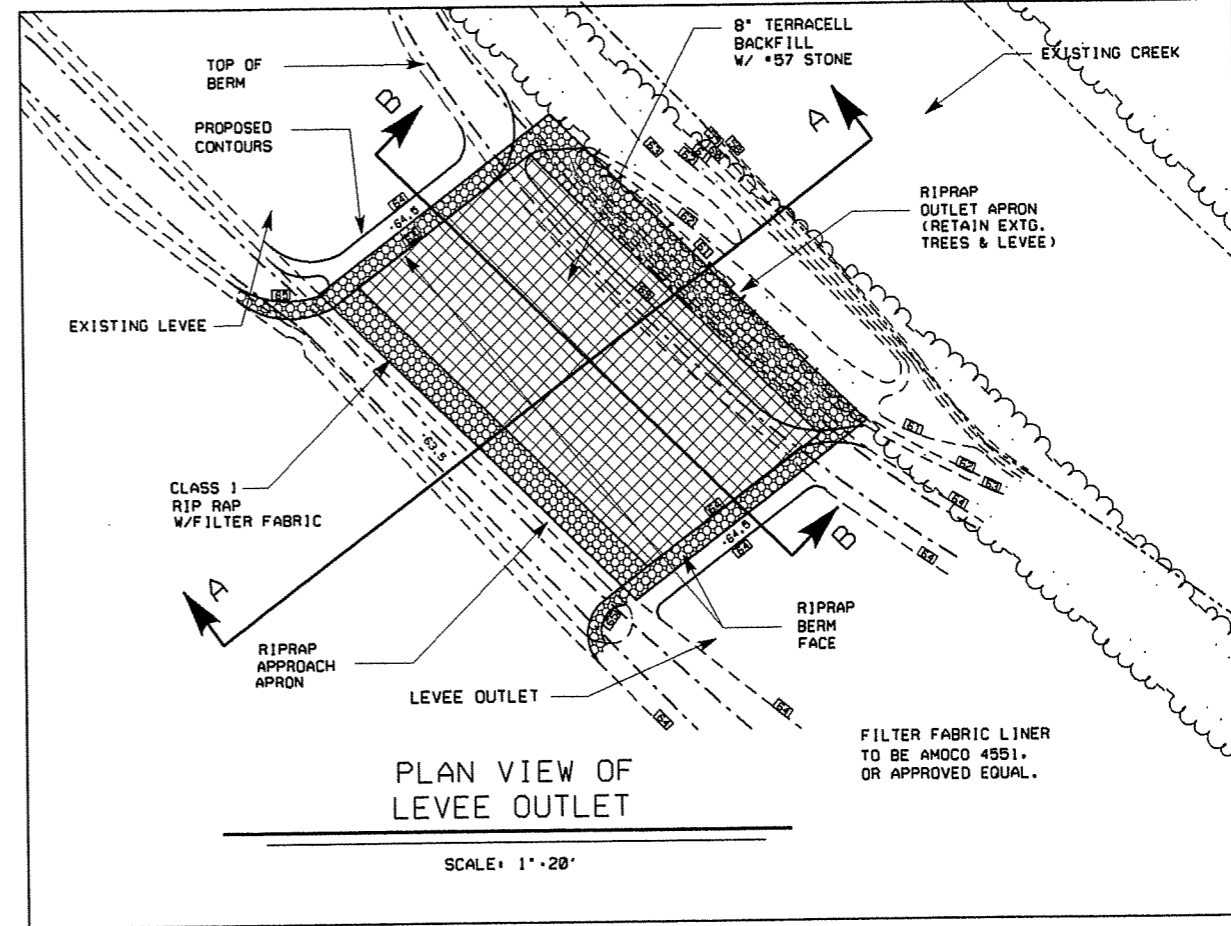
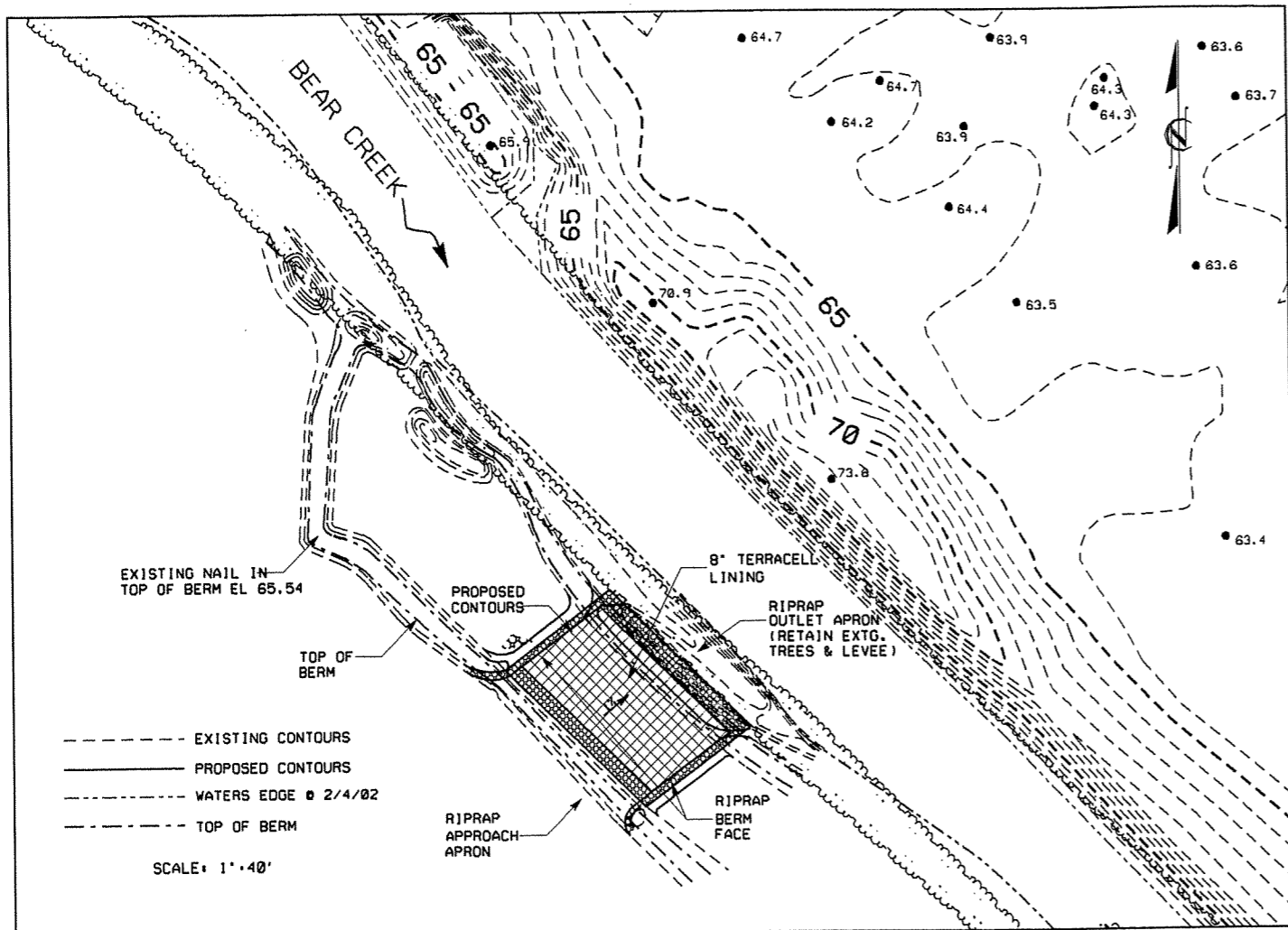
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**D-1**



SUNGATE DESIGN GROUP, P.A.  
 1154-02017  
 DRAWING NAME  
 LEVEE OUTLET  
 DATE  
 3/7/02  
 REVISIONS  
 SHEET NO.  
 D-2  
 OF 1

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MILL BRANCH  
 MILL BRANCH WETLAND RESTORATION  
 PROPOSED

NORTH CAROLINA PROFESSIONAL SEAL  
 9334  
 ENGINEER  
 AND  
 SURVEYOR

FILE: JONES, FRANKLIN ROAD  
 RALEIGH, NORTH CAROLINA 27602  
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NOTES/REVISIONS

Project:

**BEAR CREEK  
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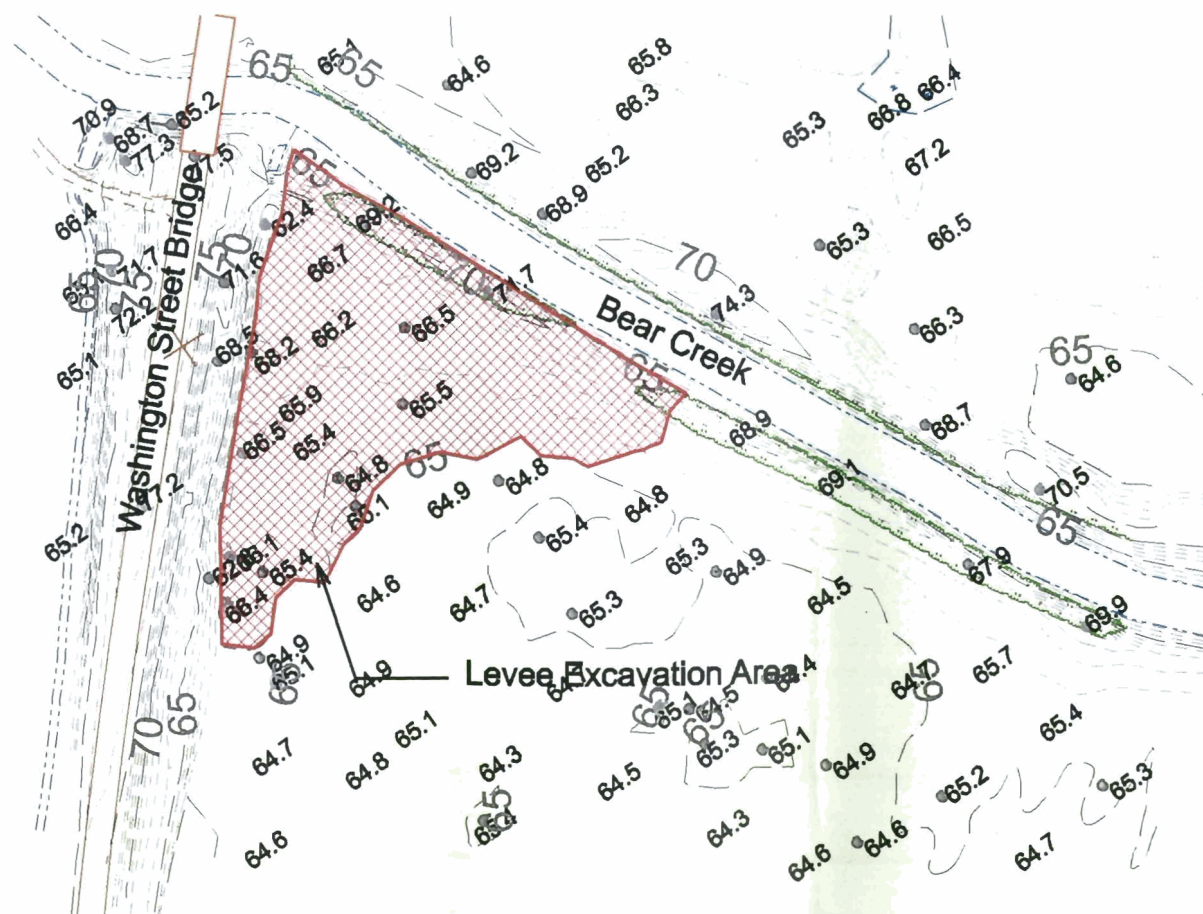
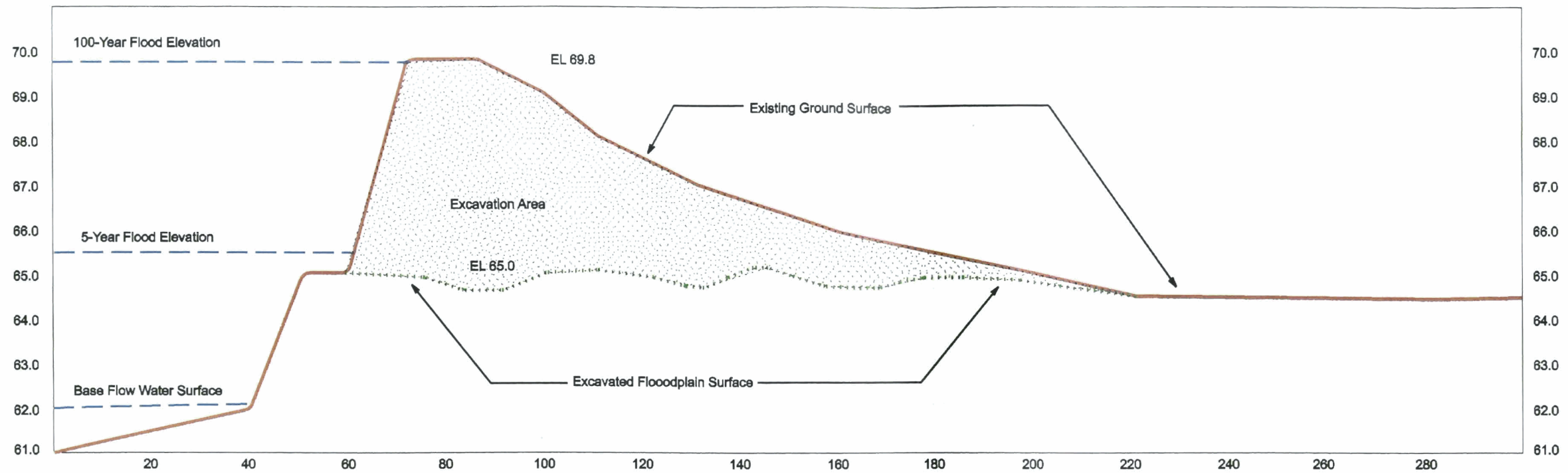
**LENOIR COUNTY  
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Title:

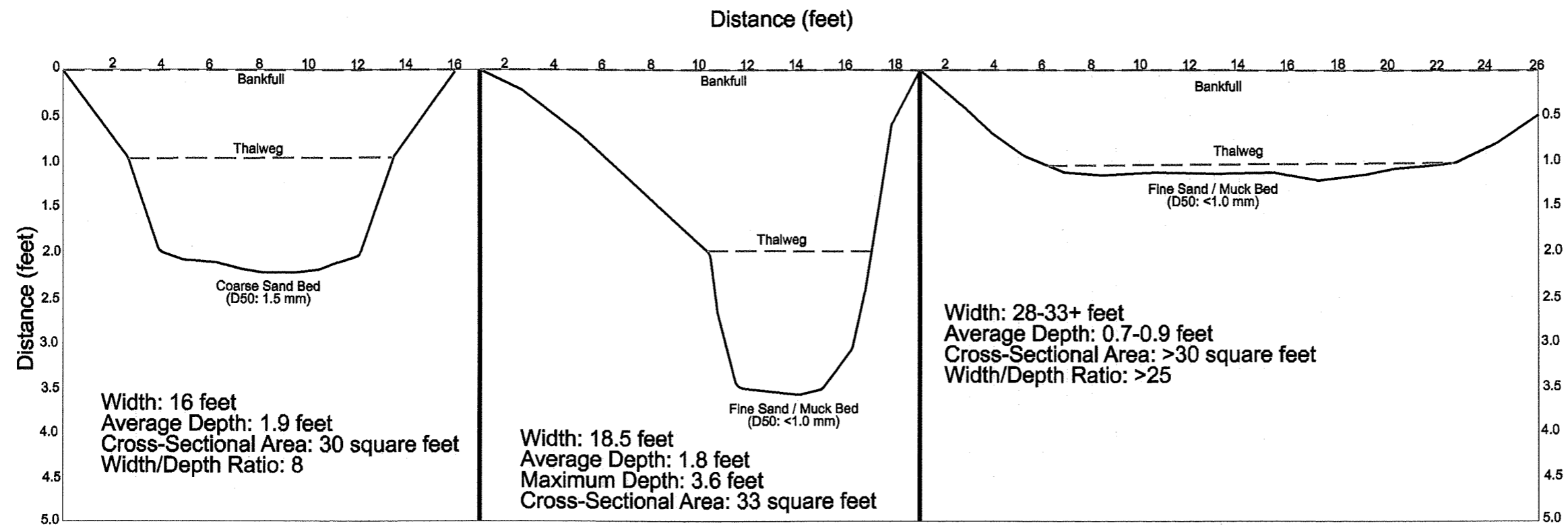
**LEEVE REMOVAL**

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SHEET NO.  
**D-3**



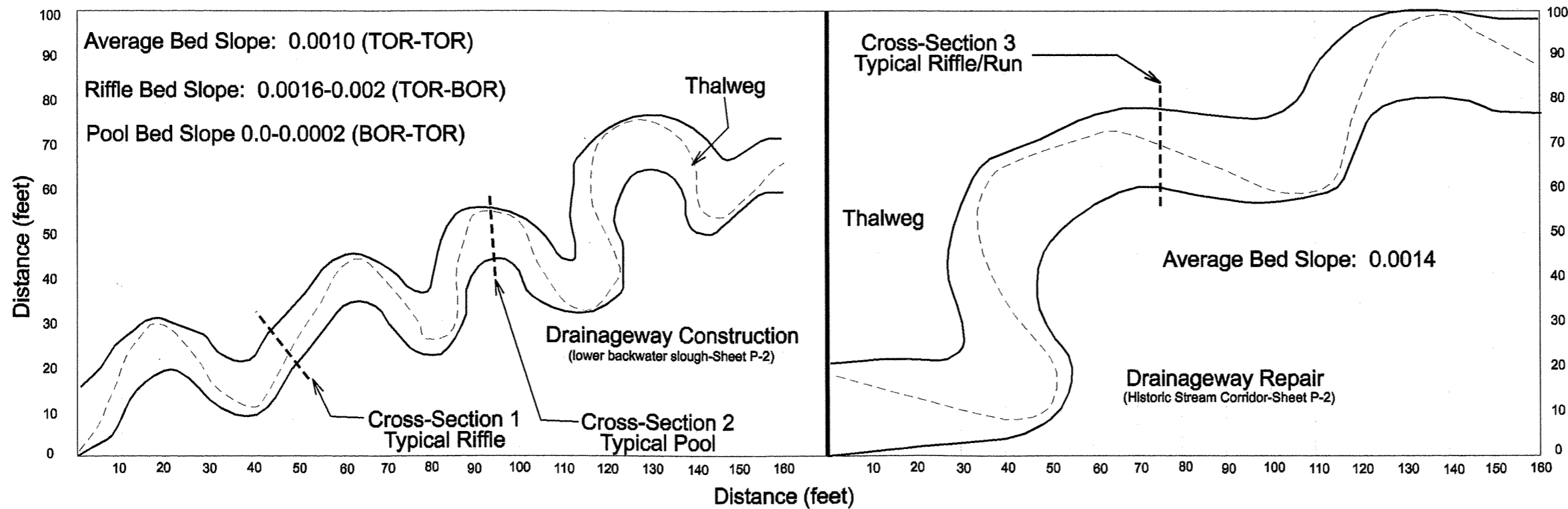




Cross-Section 1  
 Typical Riffle  
 Drainageway Reconstruction

Cross-Section 2  
 Typical Pool  
 Drainageway Reconstruction

Cross-Section 3  
 Typical Riffle / Run  
 Drainageway Repair



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NOTES/REVISIONS

Project:

**BEAR CREEK  
 MILL BRANCH  
 MITIGATION BANK**

**LENOIR COUNTY  
 NORTH CAROLINA**

Title:

**DRAINAGEWAY CONSTRUCTION**

Scale:  
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SHEET NO.

**D-4**