

R-0513WM

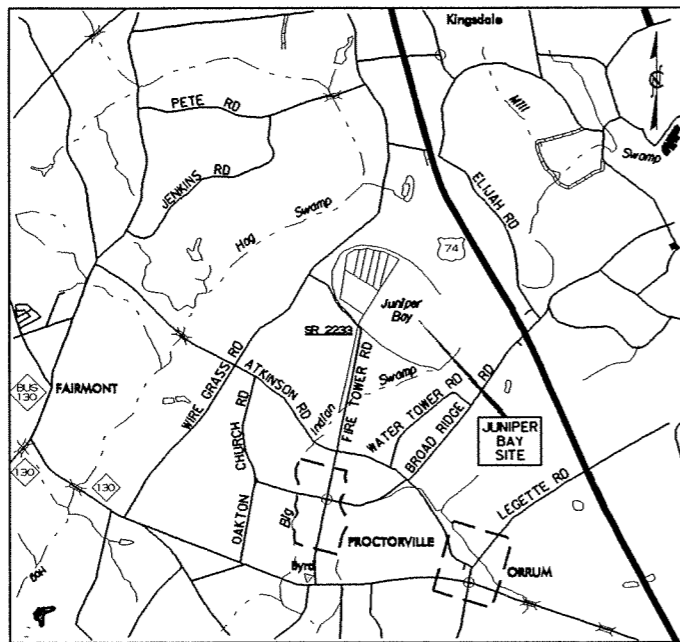
PROJECT: 6.439004T

WETLAND MITIGATION DESIGN

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ROBESON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-0513WM	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
6.39004T			



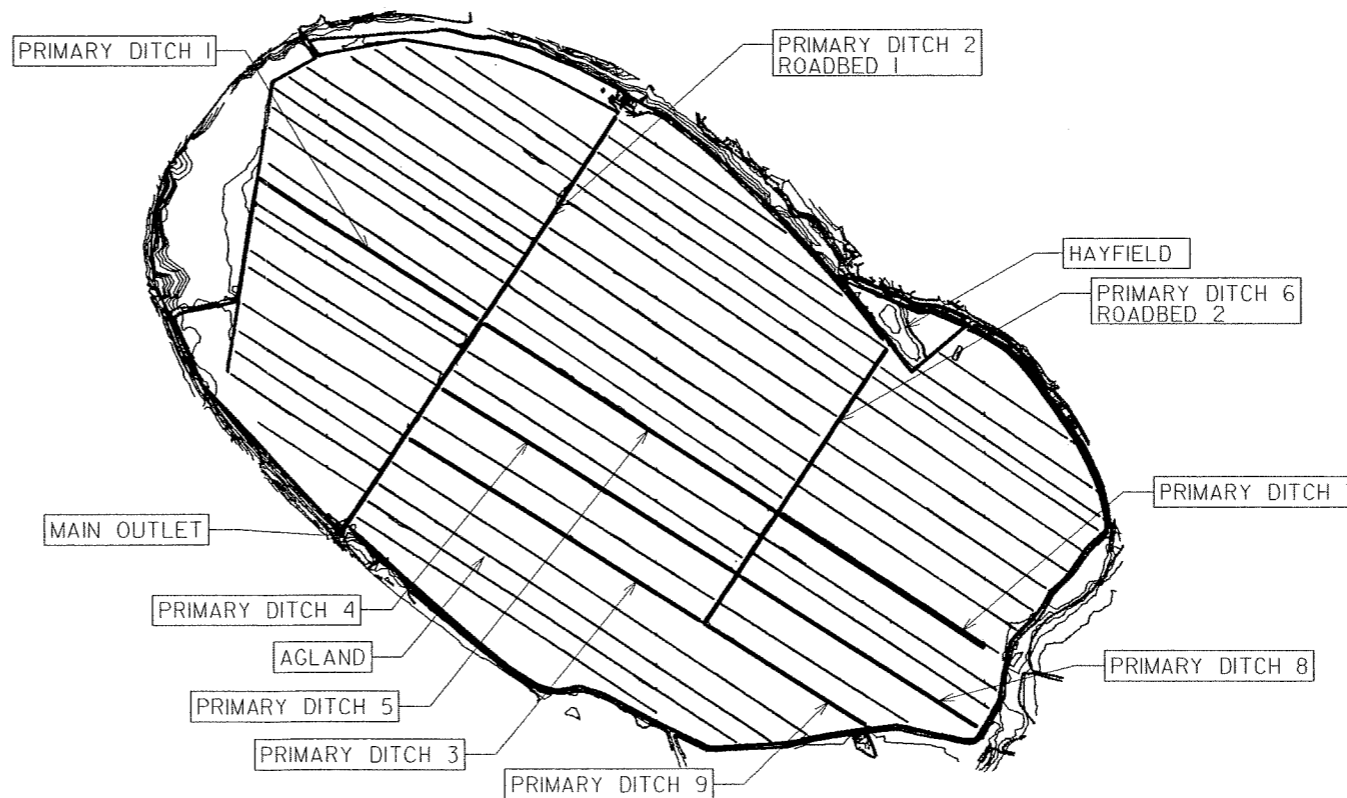
VICINITY MAP
NOT TO SCALE

LOCATION: JUNIPER CREEK

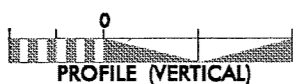
TYPE OF WORK: WETLAND RESTORATION

- * DISKING
- * GRADING
- * RIPPING
- * DITCH BACKFILLING
- * DITCH PLUGS
- * TREE PLANTING

** As-Built Plans **



GRAPHIC SCALES



PROJECT DIMENSIONS

Property Area = 728 Acres

Prepared in the Office of:



C & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
 801 Corporate Center Drive, Suite 300
 Raleigh, NC 27607-5073
 Tel: 919/854-1282 Fax: 919/854-5448

for the
DIVISION OF HIGHWAYS

No.	Revisions	Date

PROJECT MANAGER

DWN. BY: R. Blanchard CKD. BY:

DATE:

SIGNATURE: _____

SIGNATURE: _____

SIGNATURE: _____

INDEX OF SHEETS / GENERAL NOTES

PROJECT REFERENCE NO.	SHEET NO.
R-0513WM	I-A
NW SHEET NO.	

INDEX OF SHEETS

- 1: TITLE SHEET
- 1-A: INDEX OF SHEETS, GENERAL NOTES
- 2: DITCH GRADING DETAIL SHEET
- 2-A: DITCH PLUG DETAIL SHEET
- 3: ESTIMATE OF QUANTITIES
- 3-A: EARTHWORK QUANTITIES
- 4: GENERAL EXISTING CONDITIONS SHEET
- 5: DISKING SHEET
- 6: DELETED
- 7: GENERAL GRADING SHEET
- 8: DITCH PLUG LOCATION
- 8A: PHASE I DITCH PLUG LOCATIONS
- 9: RIPPING SHEET
- 10-A: PRIMARY DITCH 2 / ROADBED 1 PROFILE
- 10-B: PRIMARY DITCH 2 / ROADBED 1 PROFILE CONT'D
- 10-C: PRIMARY DITCH 6 / ROADBED 2 PROFILE
- 10-D: PRIMARY DITCH 6 / ROADBED 2 PROFILE CONT'D
- 11: MONITORING GAUGE LOCATION SHEET
- 12: VEGETATION PLOT LOCATIONS
- 13: PHASE I PLANTING PLAN
- 14: PHASE II PLANTING PLAN
- EC-1: EROSION CONTROL PLAN SHEET
- RF-1: PHASE I REFORESTATION DETAIL SHEET
- RF-2: PHASE II REFORESTATION DETAIL SHEET

GENERAL NOTES

Schematics are designed to provide internal information for DOT use, including a depiction of conceptual design, estimates of earthwork quantities, and general implementation guidelines.

ADJACENT LANDOWNER
CONTACT INFORMATION

WETLAND MITIGATION DESIGN SCHEMATICS

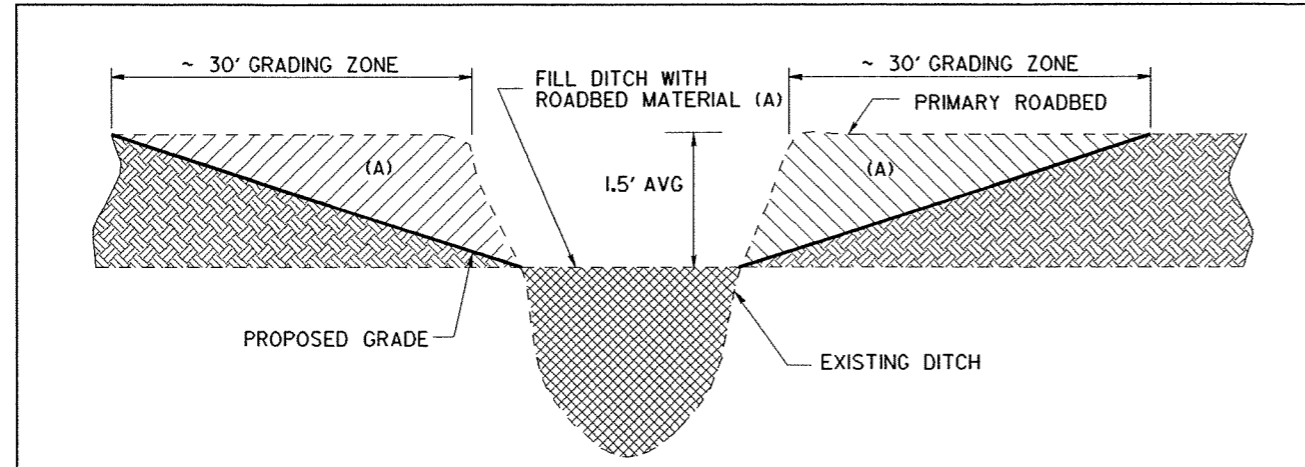
**JUNIPER BAY
WETLAND MITIGATION**

ROBESON COUNTY, NORTH CAROLINA

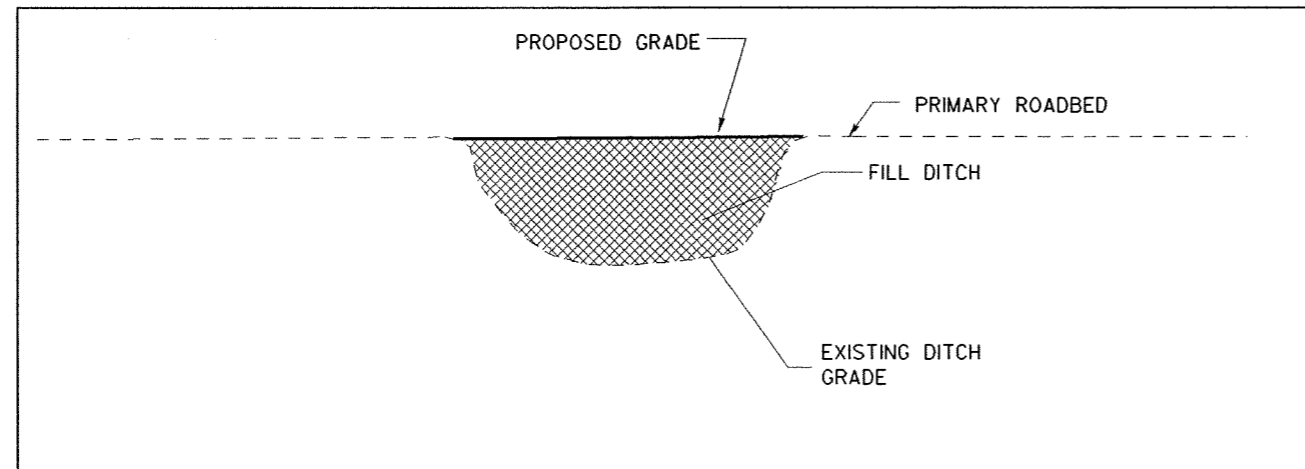
DITCH GRADING / BACKFILL DETAIL

PROJECT REFERENCE NO.	SHEET NO.
R-0513WM	2
RW SHEET NO.	

OPTION 1

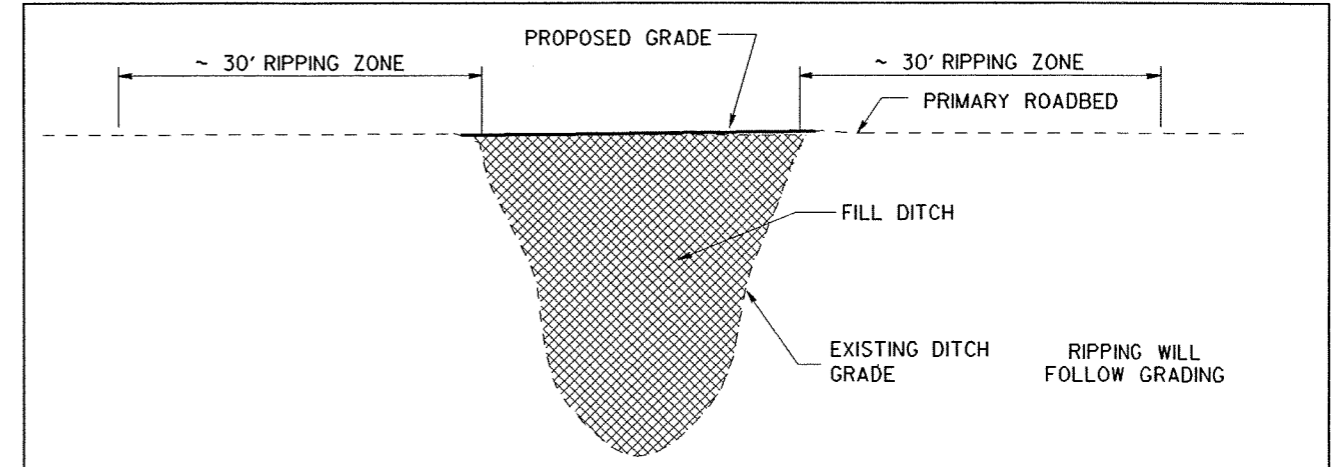


PRIMARY DITCH 2&6

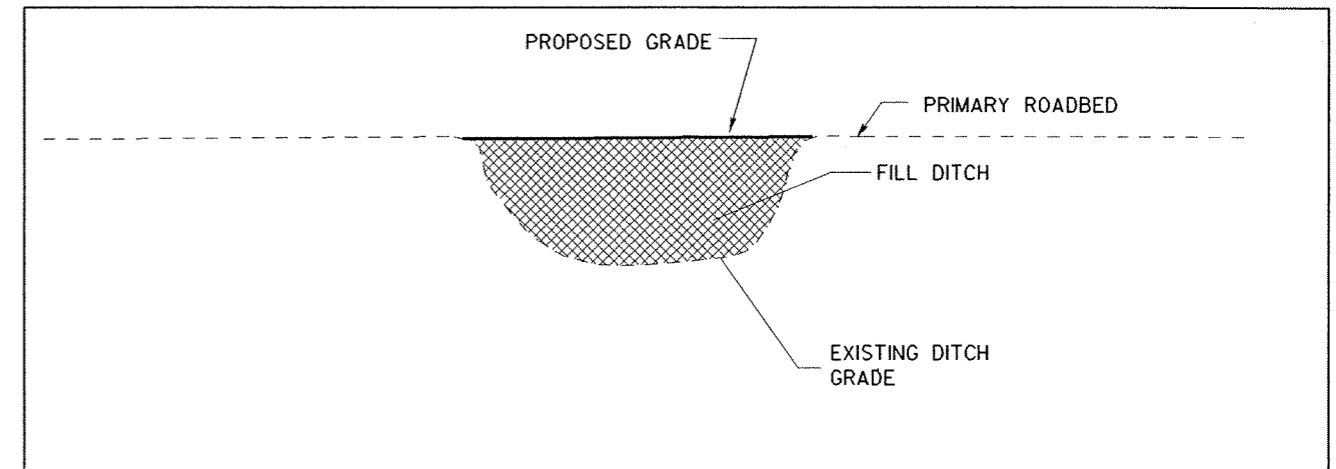


PRIMARY DITCH 1, 3-5, 7-9

OPTION 2



PRIMARY DITCH 2&6



PRIMARY DITCH 1, 3-5, 7-9

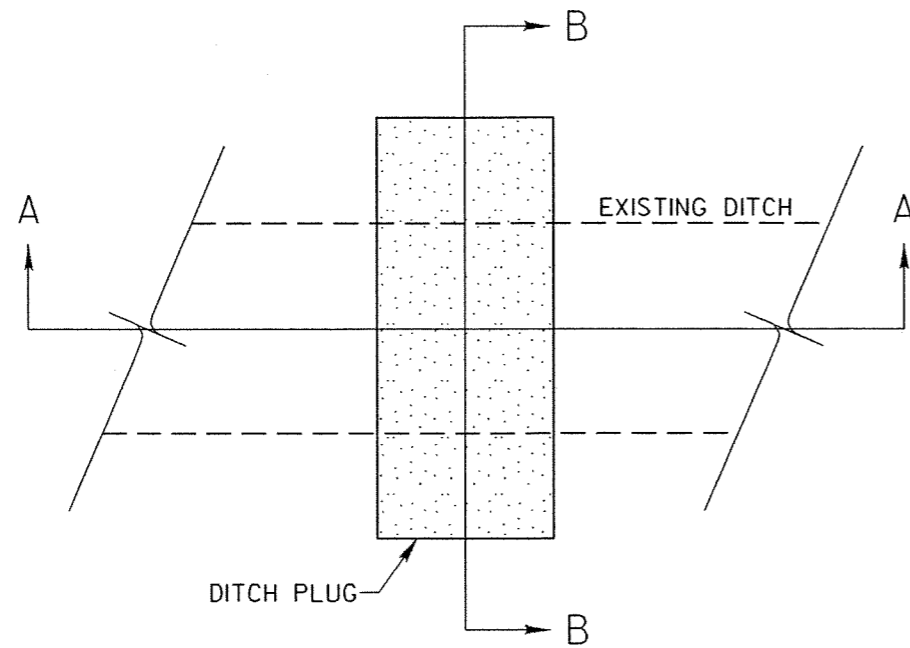
WETLAND MITIGATION DESIGN SCHEMATICS

JUNIPER BAY
WETLAND MITIGATION

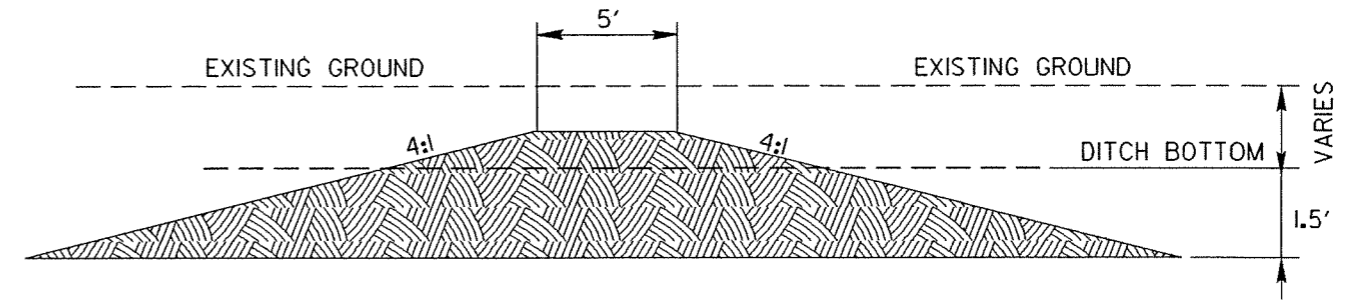
ROBESON COUNTY, NORTH CAROLINA

DITCH PLUG DETAIL

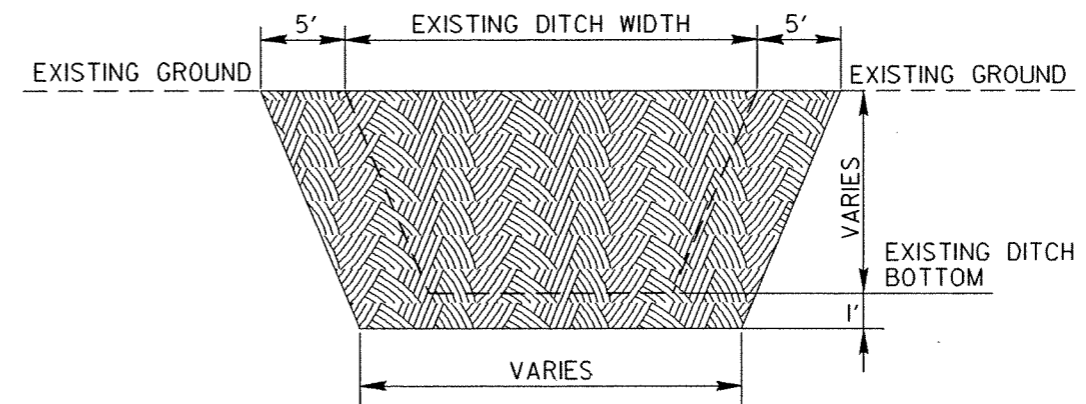
PROJECT REFERENCE NO.	SHEET NO.
R-0513WM	2-A
R/W SHEET NO.	



PLAN VIEW OF EXISTING
DITCH WITH DITCH PLUG
SCALE: NO SCALE



SECTION A-A
SCALE: NO SCALE



SECTION B-B - PRIMARY PLUG
SCALE: NO SCALE

WETLAND MITIGATION DESIGN SCHEMATICS

**JUNIPER BAY
WETLAND MITIGATION**

ROBESON COUNTY, NORTH CAROLINA

ESTIMATE OF QUANTITIES

ESTIMATE OF QUANTITIES

<u>NO.</u>	<u>DESCRIPTION</u>	<u>Units</u>	<u>Option 1</u>	<u>Option 2</u>
1.	Grading - Excavation	Cubic Yards	49,894	69,324
2.	Ditch/Depression Backfilling	Cubic Yards	37,573	64,040
3.	Ditch Plugs	Number	5	5
4.	Road Grading	Acres	22.20	22.20
5.	Disking	Acres	520.12	520.12
6.	Planting Area (Phase I)	Acres	nn.nn	nn.nn
7.	Planting Area (Phase II)	Acres	nn.nn	nn.nn
8.	Temporary Silt Fence	Linear Feet	n	n
9.	Stone for Erosion Control, Class A	Tons	n	n
10.	Stone for Erosion Control, Class B	Tons	n	n
11.	Sediment Control Stone	Tons	n	n
12.	Seed for Temporary Seeding	Pounds	n	n
13.	Fertilizer for Temporary Seeding	Tons	n	n
14.	Silt Excavation	Cubic Yards	n	n
15.	Seeding and Mulching	Acres	n	n

NOTE: Quantities are general estimates for bid purposes only.

WETLAND MITIGATION DESIGN SCHEMATICS

**JUNIPER BAY
WETLAND MITIGATION**

ROBESON COUNTY, NORTH CAROLINA

EARTHWORK SUMMARY

PROJECT REFERENCE NO. <i>R-0513WM</i>	SHEET NO. 3-A
RW SHEET NO.	

OPTION 1

REGRADE DITCHES 2&6, COMPLETELY FILL DITCHES 1,3-5,7-9

IN CUBIC YARDS

LOCATION	EXCAVATION	FILL+15%	BORROW	WASTE
PRIMARY DITCH 1	17	5,191	5,174	0
PRIMARY DITCH 2	8,729	10,541	1,812	0
PRIMARY DITCH 3	8	5,811	5,803	0
PRIMARY DITCH 4	9	6,424	6,415	0
PRIMARY DITCH 5	4	8,174	8,170	0
PRIMARY DITCH 6	3,086	4,362	1,276	0
PRIMARY DITCH 7	32	1,573	1,541	0
PRIMARY DITCH 8	7	4,205	4,198	0
PRIMARY DITCH 9	4	3,188	3,184	0
HAYFIELD (EL. =118.0)	37,998	0	0	37,998
SUB TOTAL	49,894	49,469	37,573	37,998
WASTE TO BE USED IN LIEU OF BORROW			-37,998	
TOTAL	49,894		-425	
SAY	50,000			400

OPTION 2

FILL IN ALL DITCHES TO TOP OF BANK

IN CUBIC YARDS

LOCATION	EXCAVATION	FILL+15%	BORROW	WASTE
PRIMARY DITCH 1	17	5,191	5,174	0
PRIMARY DITCH 2	36	22,175	1,812	0
PRIMARY DITCH 3	8	5,811	5,803	0
PRIMARY DITCH 4	9	6,424	6,415	0
PRIMARY DITCH 5	4	8,174	8,170	0
PRIMARY DITCH 6	16	7,432	1,276	0
PRIMARY DITCH 7	32	1,573	1,541	0
PRIMARY DITCH 8	7	4,205	4,198	0
PRIMARY DITCH 9	4	3,188	3,184	0
HAYFIELD (EL. =118.0)	37,998	0	0	37,998
AGLAND (EL. =118.0)	31,193	0	0	31,193
SUB TOTAL	69,324	64,173	64,040	69,191
WASTE TO BE USED IN LIEU OF BORROW			-69,191	
TOTAL	69,324		-5,151	
SAY	70,000			5,000

NOTES: (APPLY TO ALL OPTIONS)

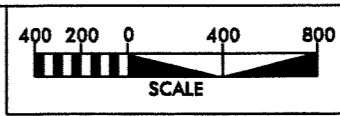
1. APPROXIMATE QUANTITIES ONLY.
2. DITCH PLUG 1 SHALL BE 875 C.Y. CLAY SOIL BROUGHT FROM OFF-SITE.
3. DITCH PLUGS 2-6 SHALL BE 530 C.Y. CLAY SOIL BROUGHT FROM OFF SITE.
4. HAYFIELD EXCAVATED TO EL. 119.0 YIELDS 29015 C.Y. WASTE

WETLAND MITIGATION DESIGN SCHEMATICS

JUNIPER BAY WETLAND MITIGATION

ROBESON COUNTY, NORTH CAROLINA

GENERAL EXISTING CONDITIONS



PROJECT REFERENCE NO. R-0513WM	SHEET NO. 4
RW SHEET NO.	

PRIMARY DITCH 1

PRIMARY DITCH 2
ROADBED 1

HAYFIELD

PRIMARY DITCH 6
ROADBED 2

PRIMARY DITCH 7

MAIN OUTLET

PRIMARY DITCH 4

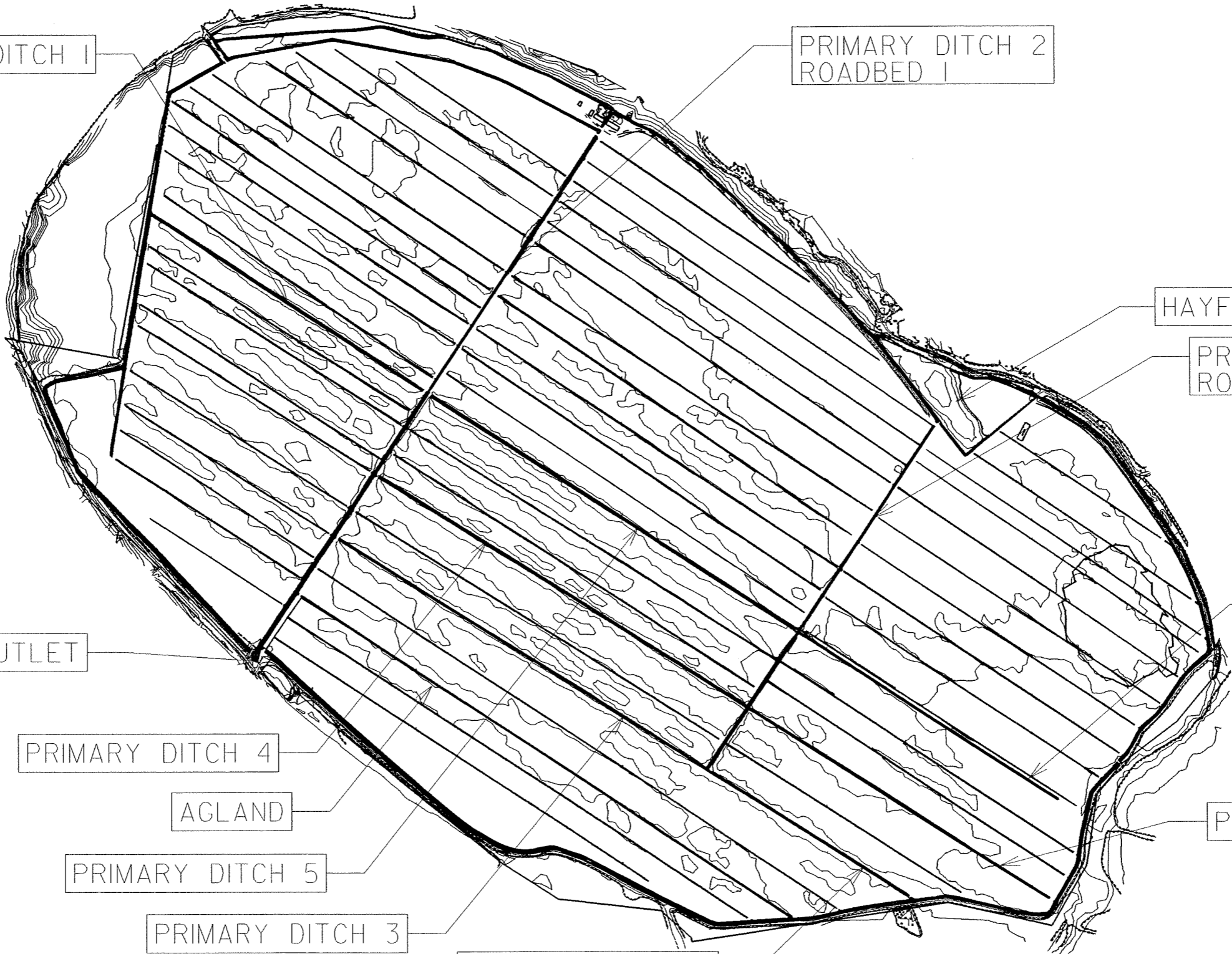
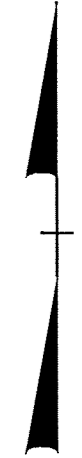
AGLAND

PRIMARY DITCH 5

PRIMARY DITCH 3

PRIMARY DITCH 9

PRIMARY DITCH 8



WETLAND MITIGATION DESIGN SCHEMATICS

JUNIPER BAY

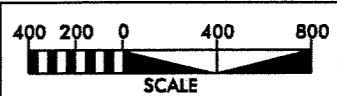
WETLAND MITIGATION

ROBESON COUNTY, NORTH CAROLINA

ARCADIS O&M
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Time: \$TIME\$

DISKING



PROJECT REFERENCE NO. <i>R-0513WM</i>	SHEET NO. 5
RW SHEET NO.	

PRIMARY DITCH 1

PRIMARY DITCH 2
ROADBED 1

HAYFIELD

PRIMARY DITCH 6
ROADBED 2

PRIMARY DITCH 7

MAIN OUTLET

PRIMARY DITCH 4

AGLAND


PRIMARY DITCH 8


PRIMARY DITCH 5


PRIMARY DITCH 3

PRIMARY DITCH 9

NON-DISKING ZONES

 LONG LEAF PINE
60.10 ACRES

 DISKING ZONES
520.12 ACRES

 PRIMARY DITCHES
68.45 ACRES

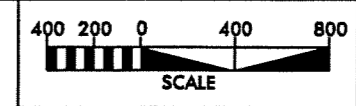
WETLAND MITIGATION DESIGN SCHEMATICS

**JUNIPER BAY
WETLAND MITIGATION**

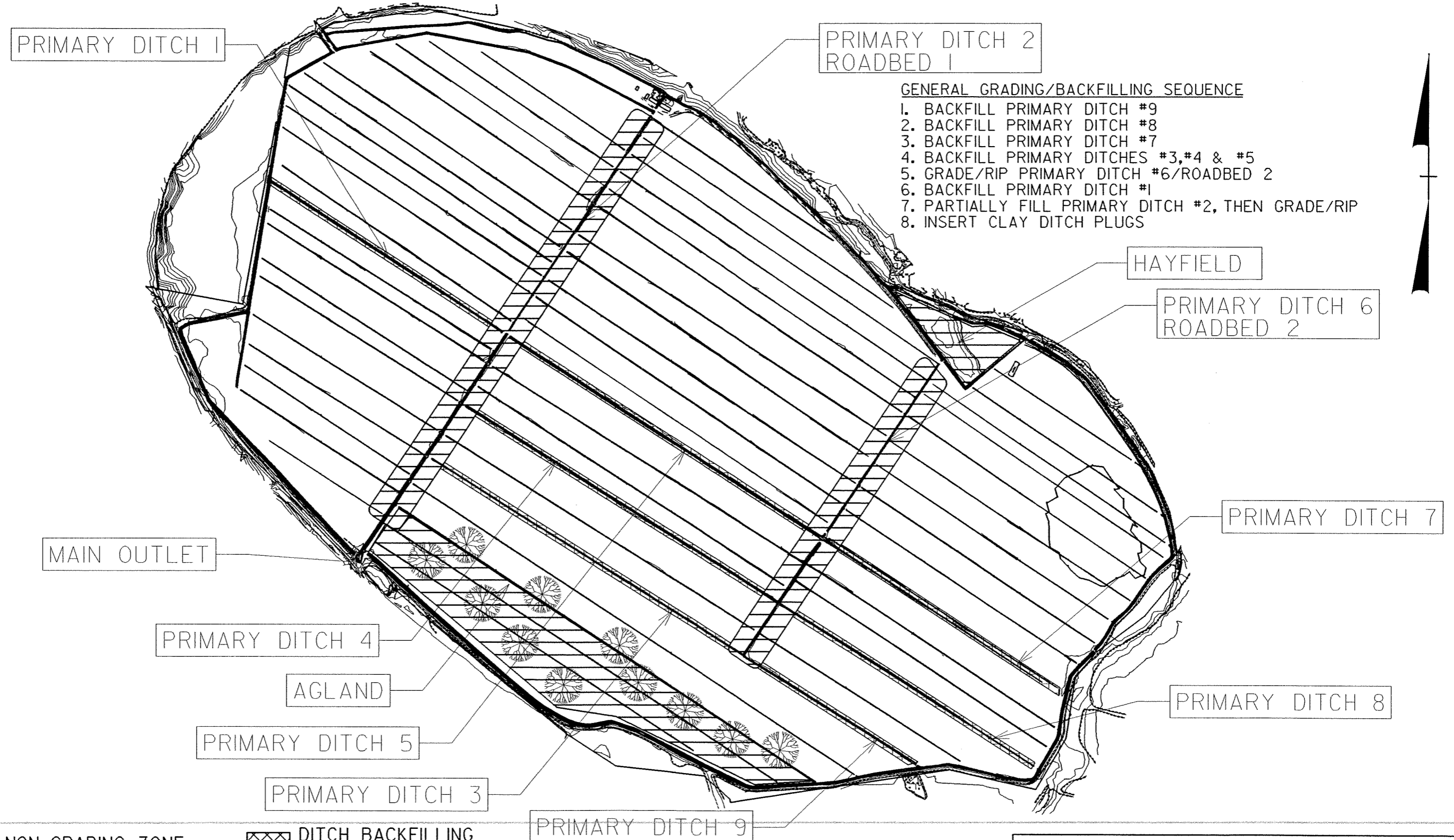
ROBESON COUNTY, NORTH CAROLINA

ASCADIS, CAN
DATA
FILES

GENERAL GRADING / DITCH BACKFILLING



PROJECT REFERENCE NO. R-0513WM	SHEET NO. 7
MW SHEET NO.	



- GENERAL GRADING/BACKFILLING SEQUENCE**
1. BACKFILL PRIMARY DITCH #9
 2. BACKFILL PRIMARY DITCH #8
 3. BACKFILL PRIMARY DITCH #7
 4. BACKFILL PRIMARY DITCHES #3, #4 & #5
 5. GRADE/RIP PRIMARY DITCH #6/ROADBED 2
 6. BACKFILL PRIMARY DITCH #1
 7. PARTIALLY FILL PRIMARY DITCH #2, THEN GRADE/RIP
 8. INSERT CLAY DITCH PLUGS

- NON-GRADING ZONE
- LONG LEAF PINE
60.10 ACRES
(OPTION 1 ONLY)
- DITCH BACKFILLING
22.20 ACRES
- GRADING AREA
52.27 ACRES (OPTION 1)
91.75 ACRES (OPTION 2)

WETLAND MITIGATION DESIGN SCHEMATICS

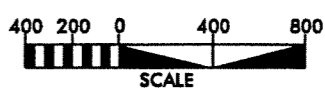
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WETLAND MITIGATION

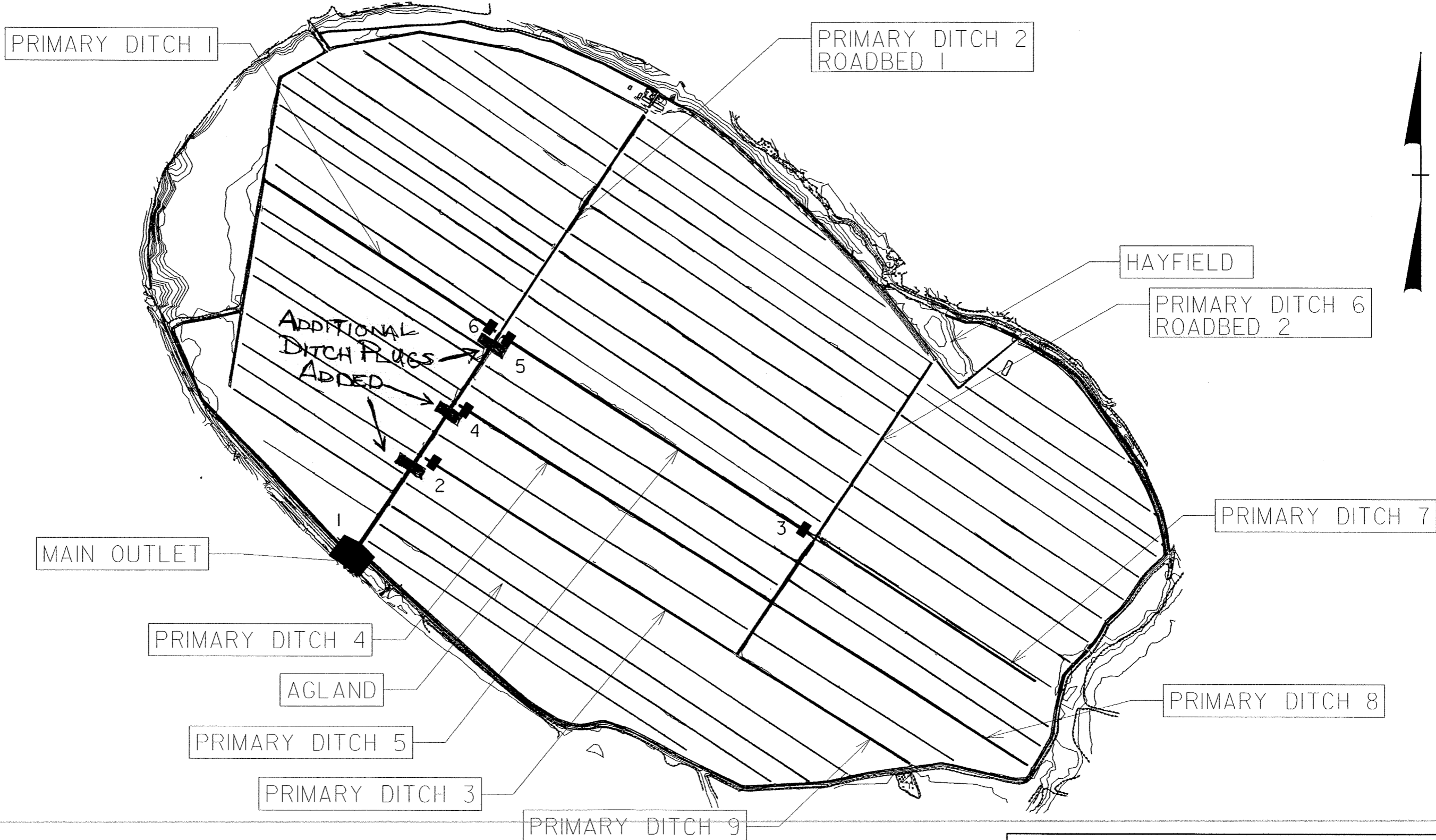
ROBESON COUNTY, NORTH CAROLINA

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 DATE: 04/24/08
 FILENAME: JFILE

DITCH PLUG LOCATION



PROJECT REFERENCE NO. <i>R-0513WM</i>	SHEET NO. 8
RW SHEET NO.	



- DITCH PLUG
530 C.Y. CLAY SOIL
- DITCH PLUG
875 C.Y. CLAY SOIL

WETLAND MITIGATION DESIGN SCHEMATICS

JUNIPER BAY

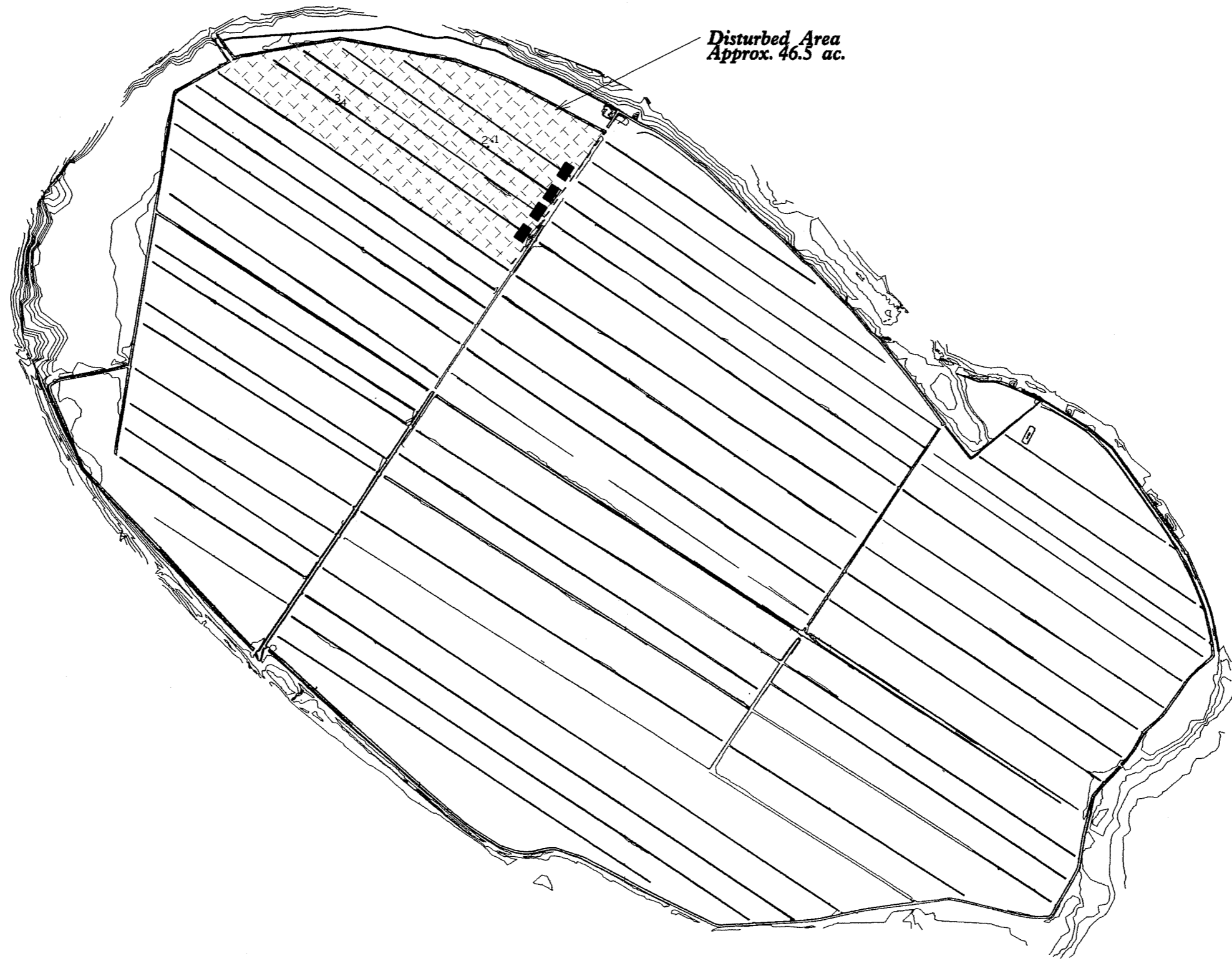
WETLAND MITIGATION

ROBESON COUNTY, NORTH CAROLINA

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 FILENAME: 0513WM

Phase I Ditch Construction

400 200 0 400 800	PROJECT REFERENCE NO.	SHEET NO.
SCALE	R-0513WM	8A
	R/W SHEET NO.	



Disturbed Area
Approx. 46.5 ac.

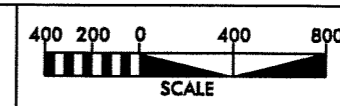
■ DITCH PLUG
530 C.Y. CLAY SOIL

WETLAND MITIGATION DESIGN SCHEMATICS

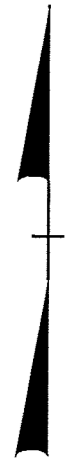
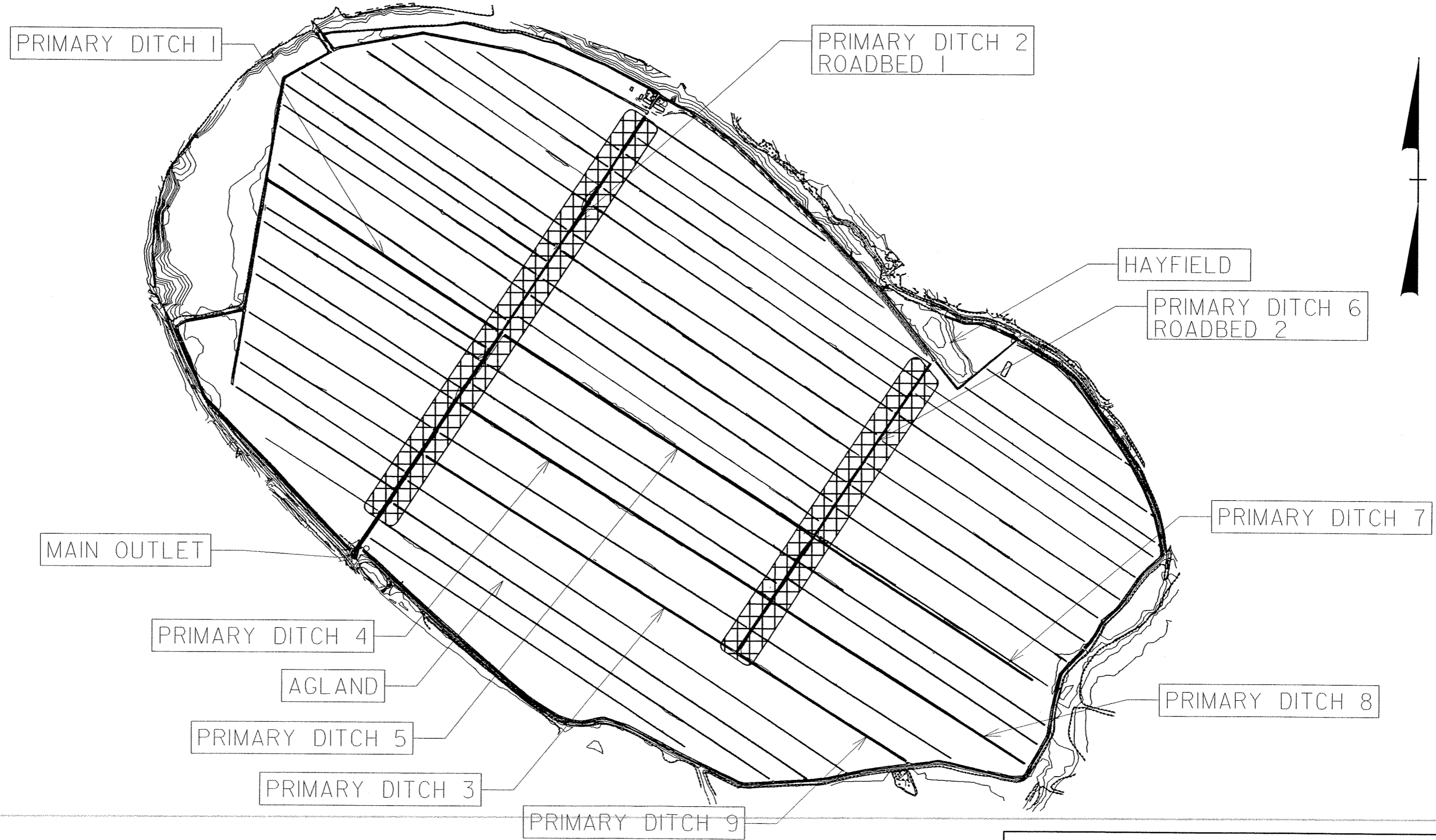
**JUNIPER BAY
WETLAND MITIGATION**

ROBESON COUNTY, NORTH CAROLINA


RIPPING



PROJECT REFERENCE NO.	SHEET NO.
R-0513WM	9
RW SHEET NO.	



NOTE:
OPTION 1 INCLUDES RIPPING AND GRADING
OPTION 2 IS RIPPING ONLY

 RIPPING ZONES
22.20 ACRES

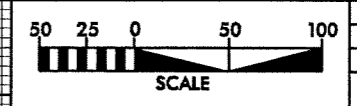
WETLAND MITIGATION DESIGN SCHEMATICS

JUNIPER BAY
WETLAND MITIGATION

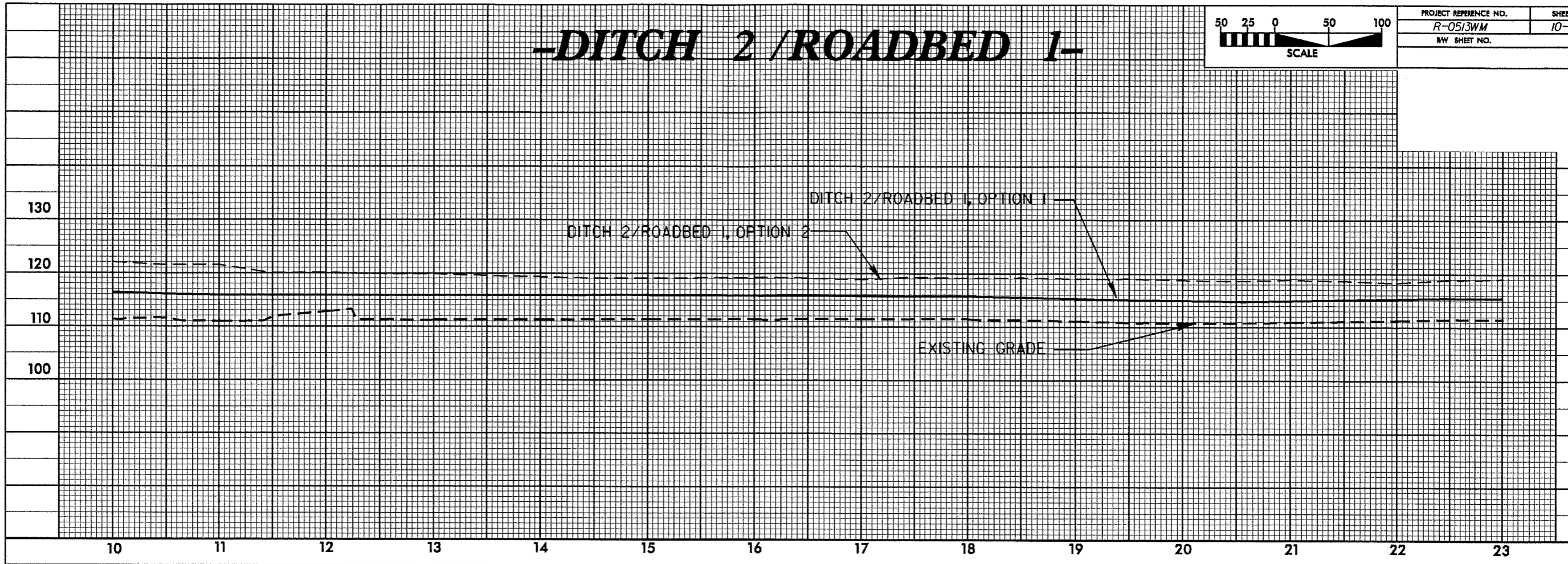
ROBESON COUNTY, NORTH CAROLINA

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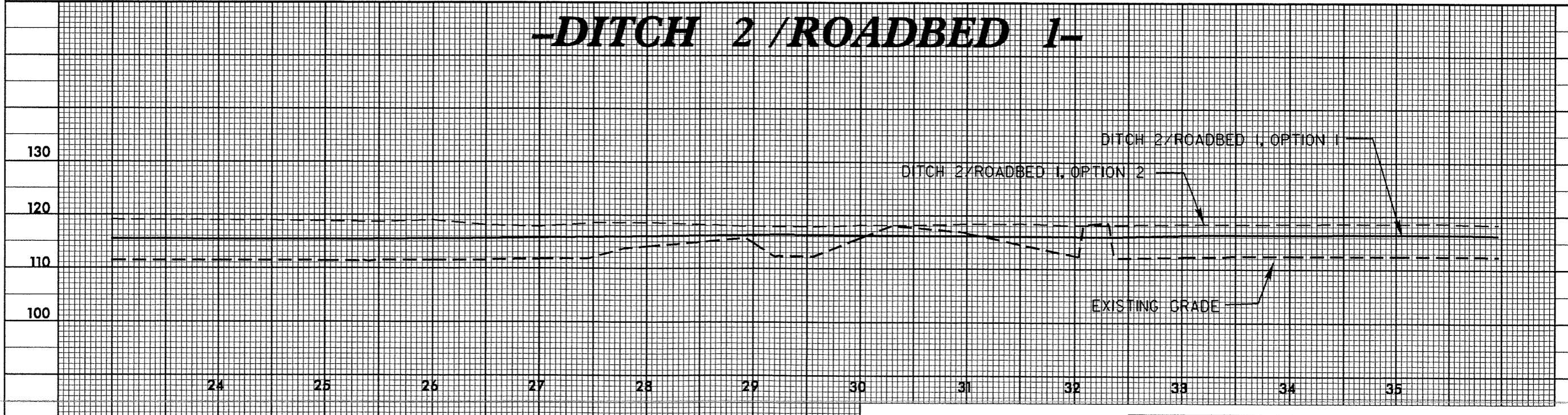
-DITCH 2 / ROADBED 1-



PROJECT REFERENCE NO. R-0513WM	SHEET NO. 10-A
RW SHEET NO.	



-DITCH 2 / ROADBED 1-



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DATE: 04/24/13
TIME: 11:00 AM
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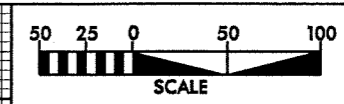
WETLAND MITIGATION DESIGN SCHEMATICS

JUNIPER BAY

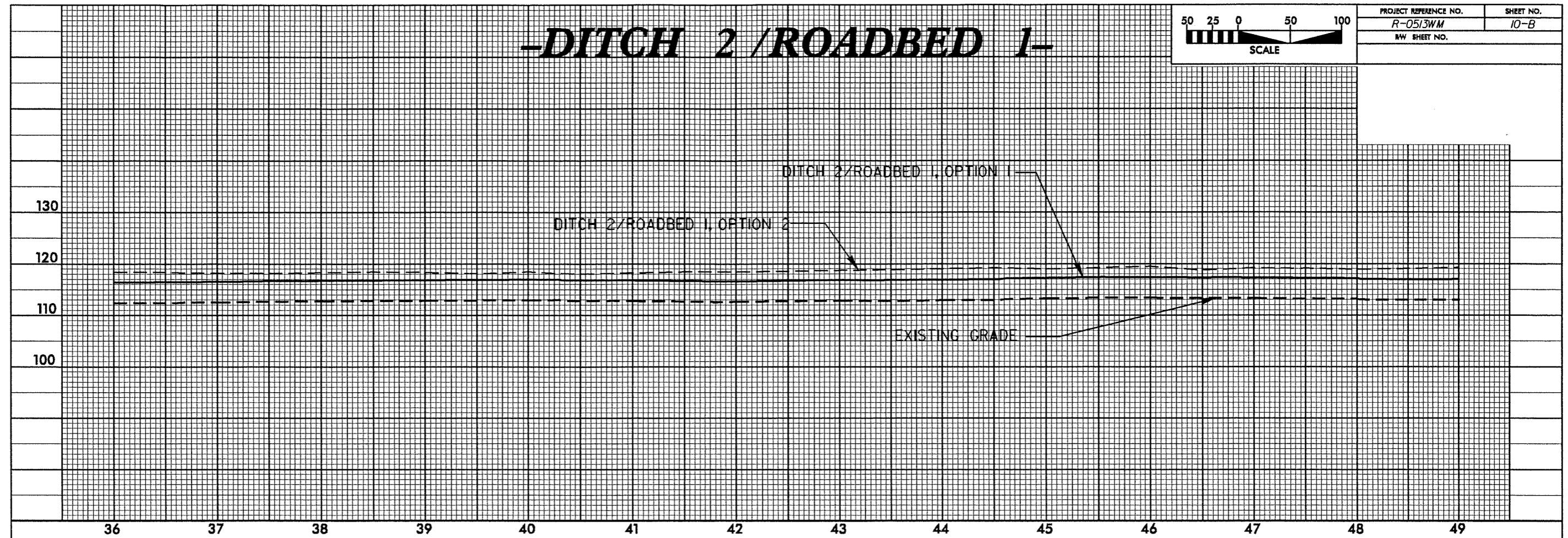
WETLAND MITIGATION

ROBESON COUNTY, NORTH CAROLINA

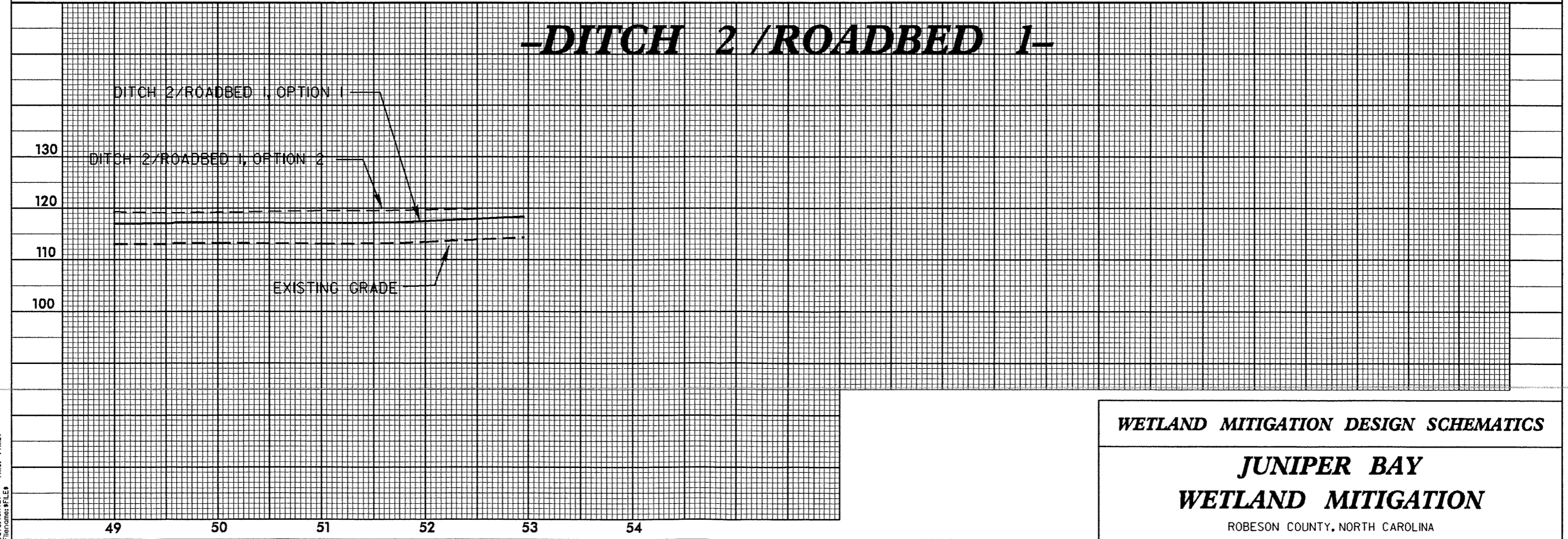
-DITCH 2 / ROADBED 1-



PROJECT REFERENCE NO. R-0513WM	SHEET NO. 10-B
MW SHEET NO.	



-DITCH 2 / ROADBED 1-



WETLAND MITIGATION DESIGN SCHEMATICS

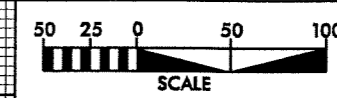
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WETLAND MITIGATION

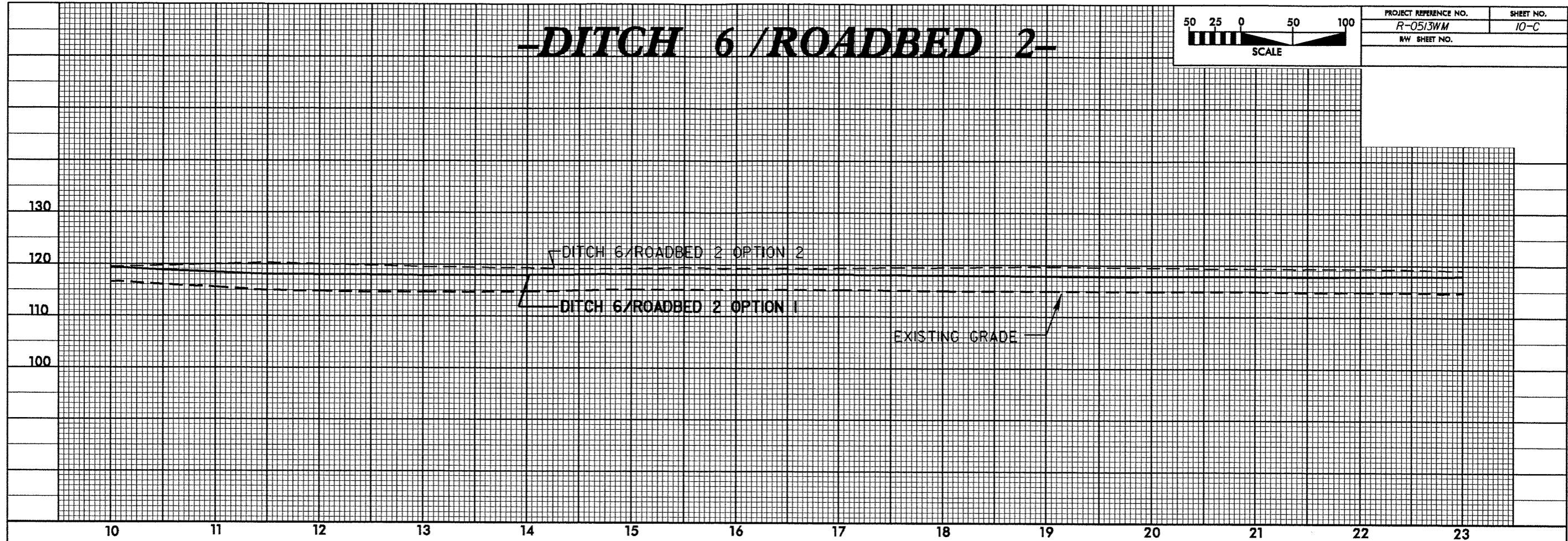
ROBESON COUNTY, NORTH CAROLINA

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PROJECT NO. 10-01-001
DATE: 08/11/10

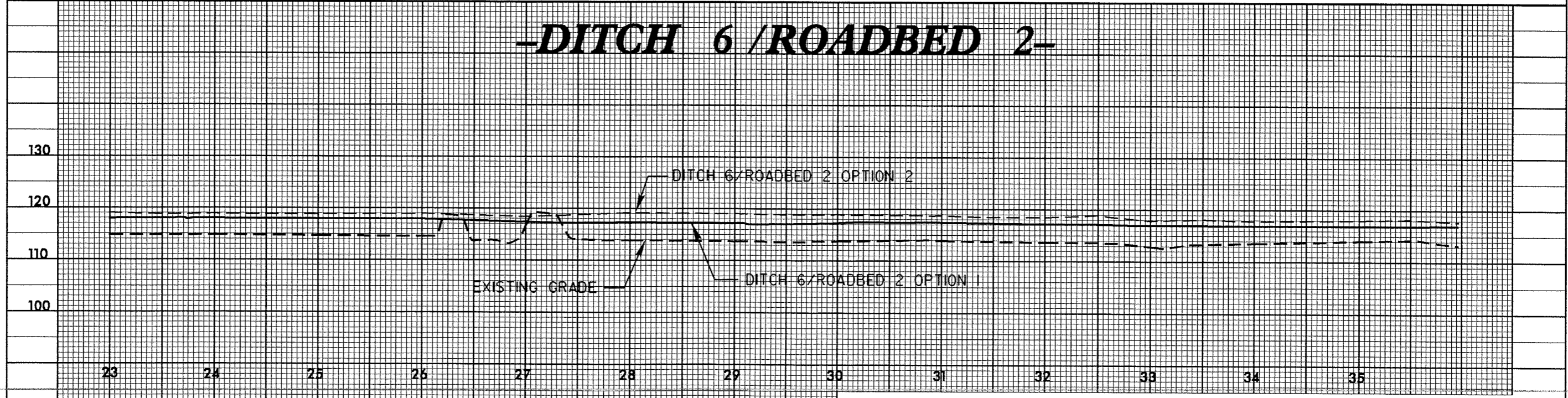
-DITCH 6 / ROADBED 2-



PROJECT REFERENCE NO.	SHEET NO.
R-0513WM	10-C
RW SHEET NO.	



-DITCH 6 / ROADBED 2-



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Date: 04/15/11
Filename: 10-C

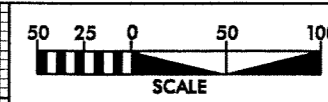
WETLAND MITIGATION DESIGN SCHEMATICS

JUNIPER BAY

WETLAND MITIGATION

ROBESON COUNTY, NORTH CAROLINA

-DITCH 6 / ROADBED 2-



PROJECT REFERENCE NO. <i>R-0513WM</i>	SHEET NO. <i>10-D</i>
MW SHEET NO.	



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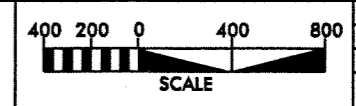
WETLAND MITIGATION DESIGN SCHEMATICS

JUNIPER BAY

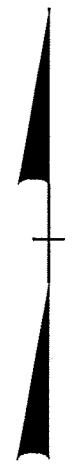
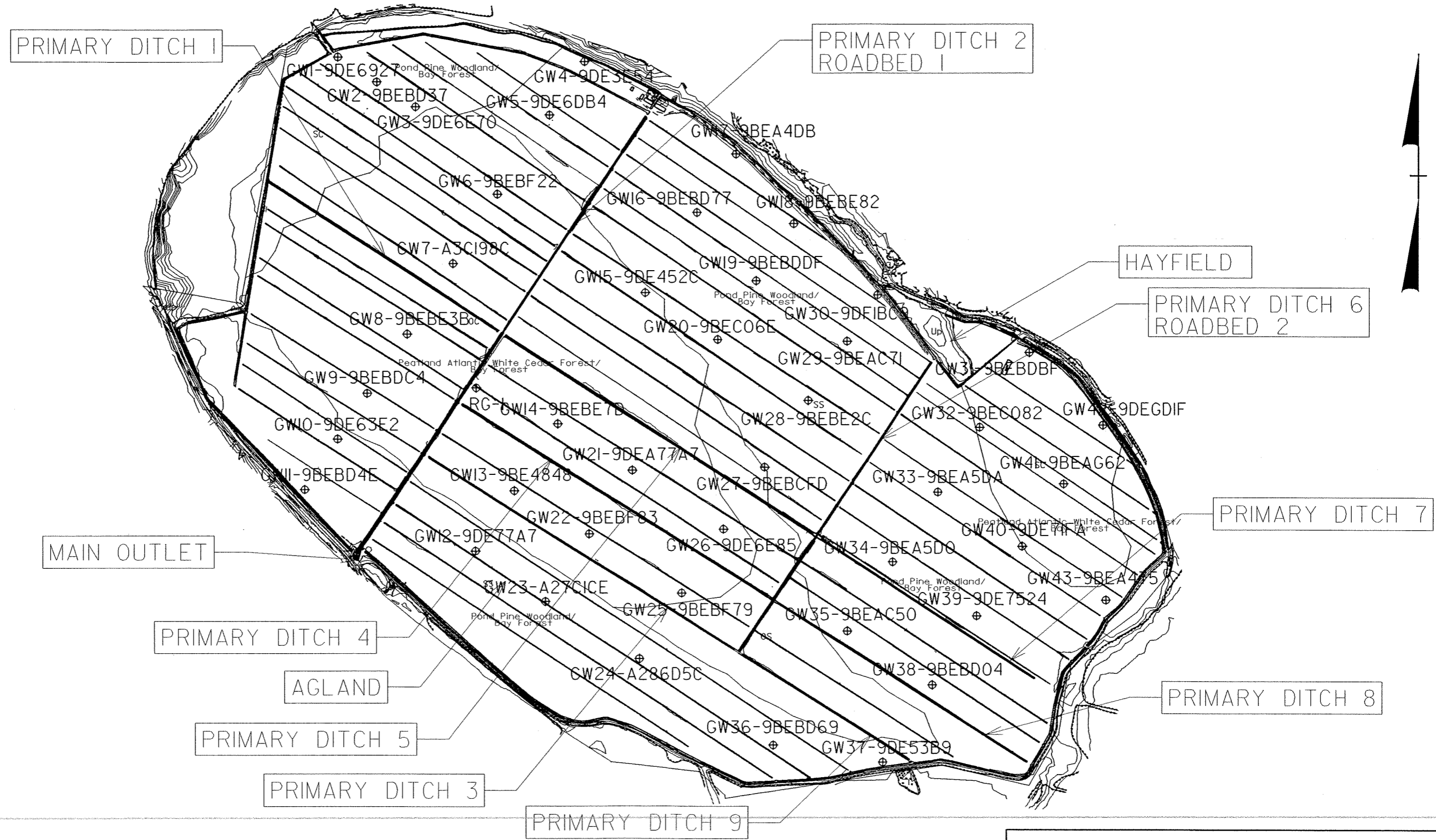
WETLAND MITIGATION

ROBESON COUNTY, NORTH CAROLINA

MONITORING GAUGE LOCATIONS



PROJECT REFERENCE NO.	SHEET NO.
R-0513WM	11
R/W SHEET NO.	



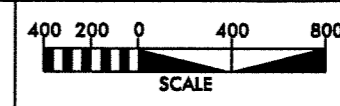
WETLAND MITIGATION DESIGN SCHEMATICS

JUNIPER BAY

WETLAND MITIGATION

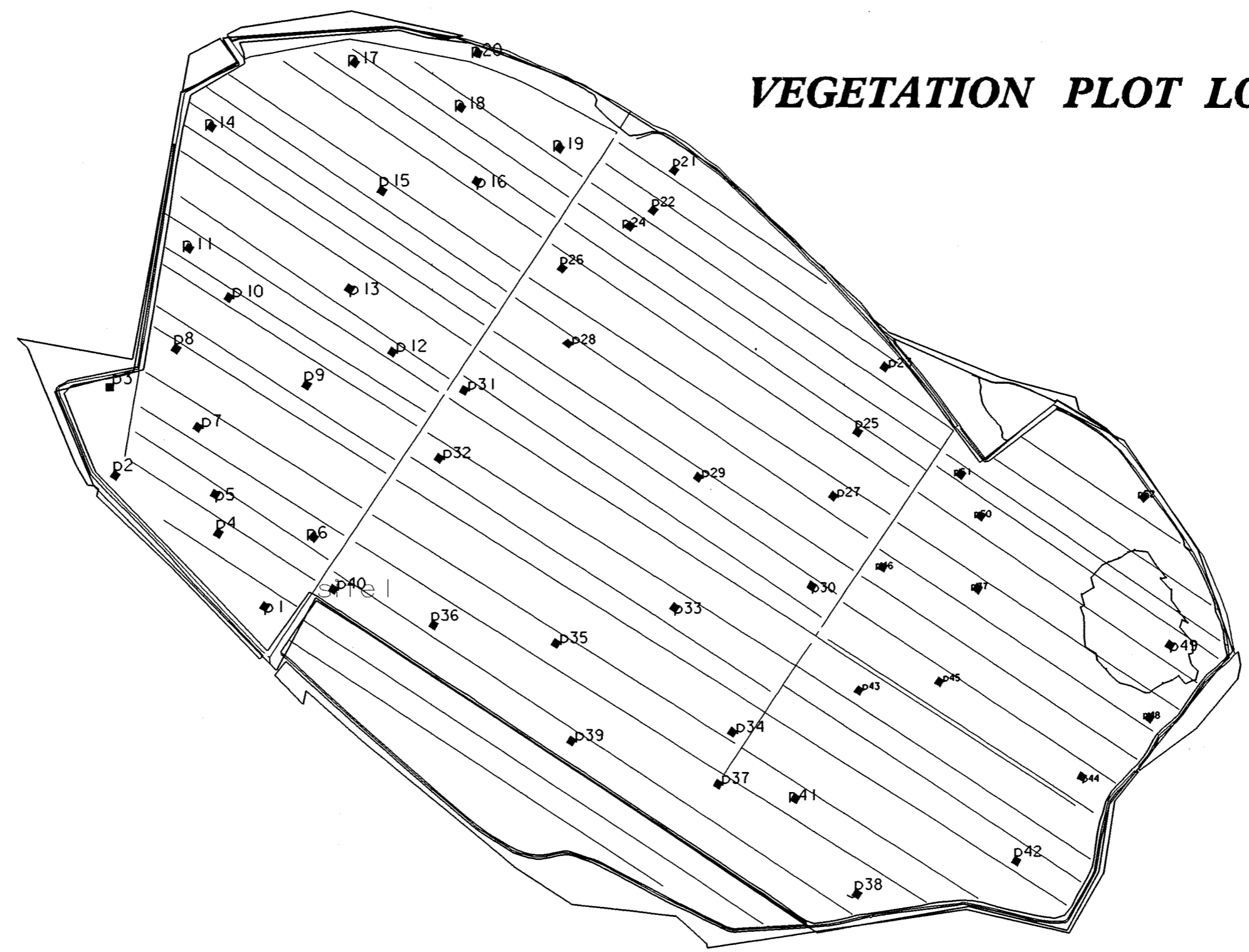
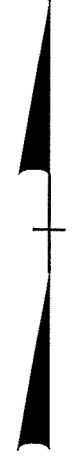
ROBESON COUNTY, NORTH CAROLINA

ARCADIS G&M
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PROJECT REFERENCE NO.	SHEET NO.
R-0513WM	12
RW SHEET NO.	

VEGETATION PLOT LOCATIONS



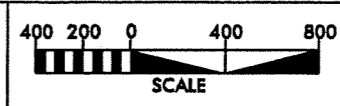
WETLAND MITIGATION DESIGN SCHEMATICS

JUNIPER BAY

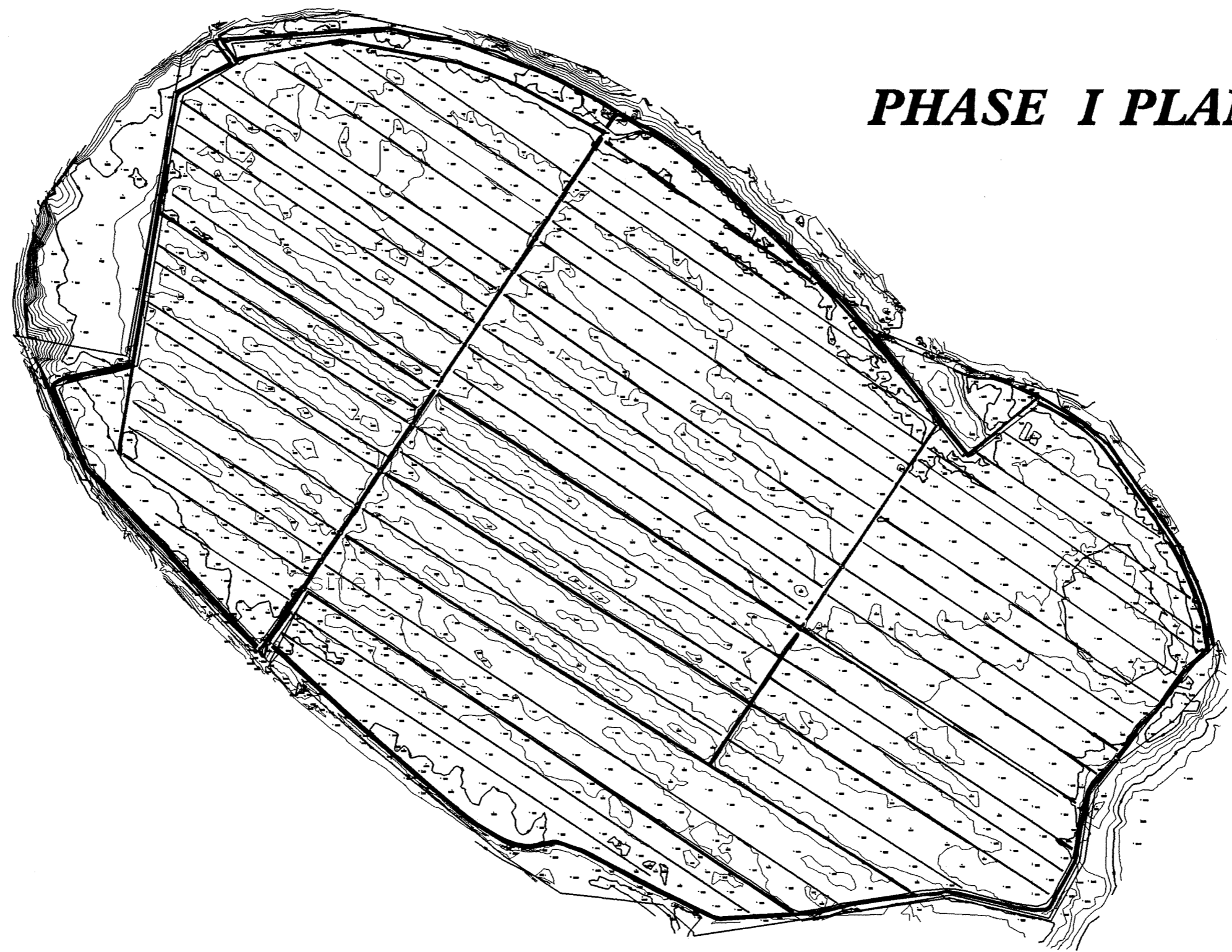
WETLAND MITIGATION

ROBESON COUNTY, NORTH CAROLINA

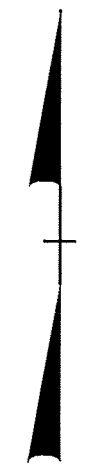
ARCADIS O&M
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Filename: FILE



PROJECT REFERENCE NO.	SHEET NO.
R-0513WM	13
RW SHEET NO.	



PHASE I PLANTING



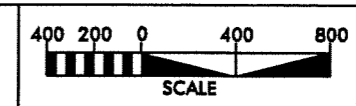
PHASE I WETLAND PLANTING INCLUDES 656 ACRES; SEE RF-1 FOR PLANTING DETAILS

WETLAND MITIGATION DESIGN SCHEMATICS

**JUNIPER BAY
WETLAND MITIGATION**

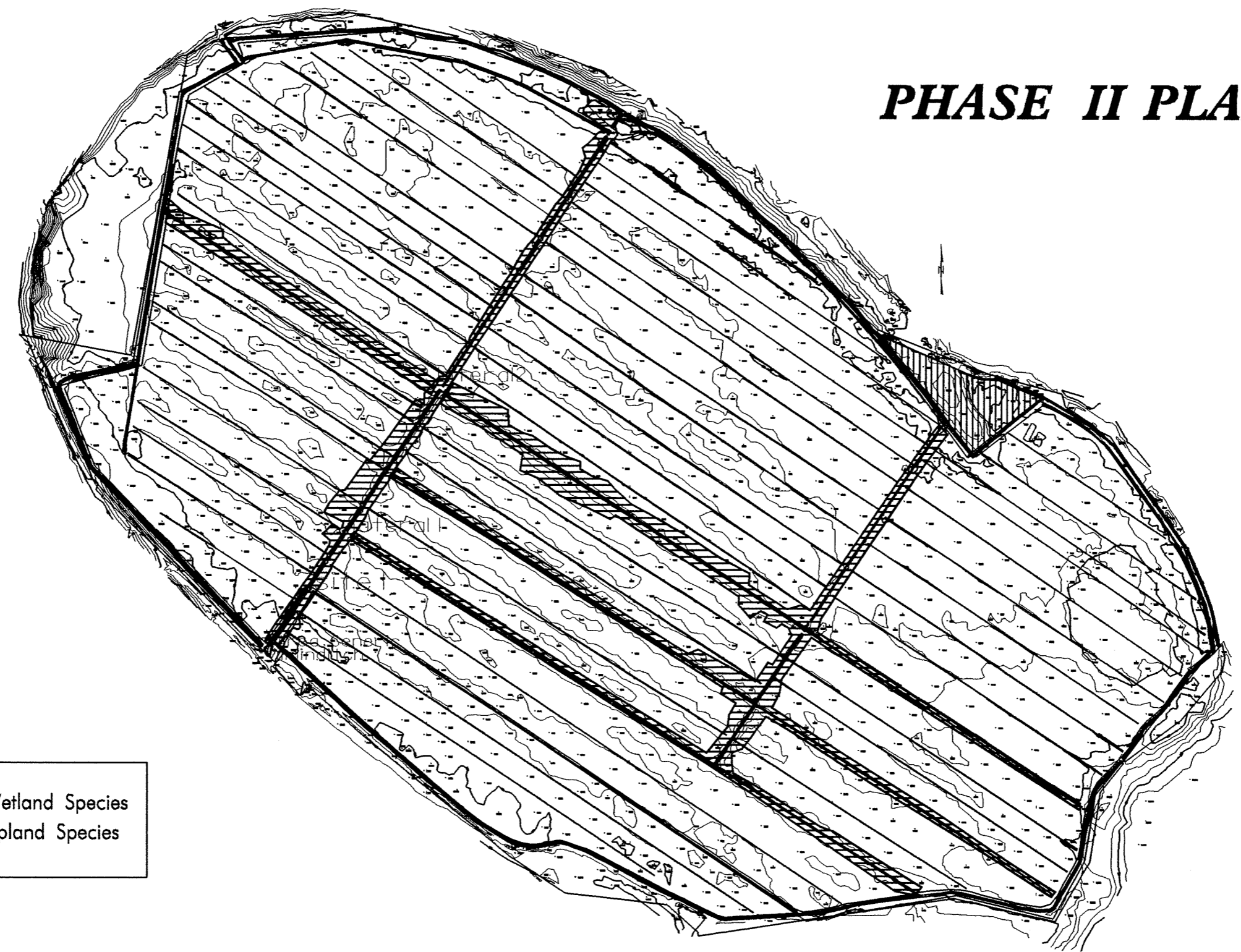
ROBESON COUNTY, NORTH CAROLINA

ARCADIS C&M
DATE: 04/15/13
DRAWN BY: JLE



PROJECT REFERENCE NO.	SHEET NO.
R-0513WM	14
MW SHEET NO.	

PHASE II PLANTING



- Wetland Species
- Upland Species

PHASE II WETLAND PLANTING INCLUDES 67.1 ACRES; SEE RF-2 FOR PLANTING DETAILS.

WETLAND MITIGATION DESIGN SCHEMATICS

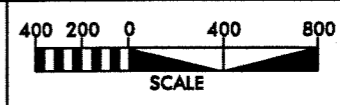
JUNIPER BAY

WETLAND MITIGATION

ROBESON COUNTY, NORTH CAROLINA

ARCADIS O&M
 Date: 04/25/05
 Filename: JLE

EROSION CONTROL



PROJECT REFERENCE NO. R-0513WM	SHEET NO. EC-1
RW SHEET NO.	

PRIMARY DITCH 1

PRIMARY DITCH 2
ROADBED 1

GENERAL GRADING/BACKFILLING SEQUENCE

1. BACKFILL PRIMARY DITCH #9
2. BACKFILL PRIMARY DITCH #8
3. BACKFILL PRIMARY DITCH #7
4. BACKFILL PRIMARY DITCHES #3, #4 & #5
5. GRADE/RIP PRIMARY DITCH #6/ROADBED 2
6. BACKFILL PRIMARY DITCH #1
7. PARTIALLY FILL PRIMARY DITCH #2, THEN GRADE/RIP
8. INSERT CLAY DITCH PLUGS

HAYFIELD

PRIMARY DITCH 6
ROADBED 2

PRIMARY DITCH 7

MAIN OUTLET

PRIMARY DITCH 4

AGLAND


PRIMARY DITCH 5

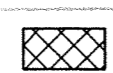
PRIMARY DITCH 3

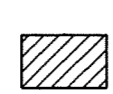
PRIMARY DITCH 9

PRIMARY DITCH 8

NON-GRADING ZONE

 LONG LEAF PINE
60.10 ACRES
(OPTION 1 ONLY)

 DITCH BACKFILLING
22.20 ACRES

 GRADING AREA
52.27 ACRES (OPTION 1)
91.75 ACRES (OPTION 2)

WETLAND MITIGATION DESIGN SCHEMATICS

**JUNIPER BAY
WETLAND MITIGATION**

ROBESON COUNTY, NORTH CAROLINA

ARCADIS G&M
 Date: 04/15/09
 File: 0513WM_EC-1.dwg

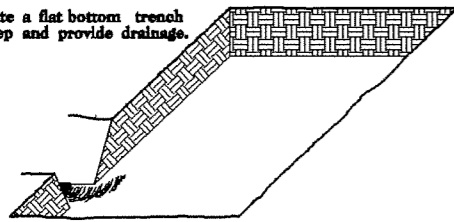
PLANTING DETAILS

SEEDLING / LINER BAREROOT PLANTING DETAIL

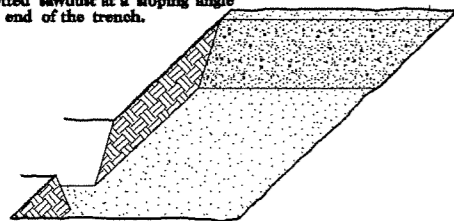
HEALING IN

1. Locate a healing-in site in a shady, well protected area.

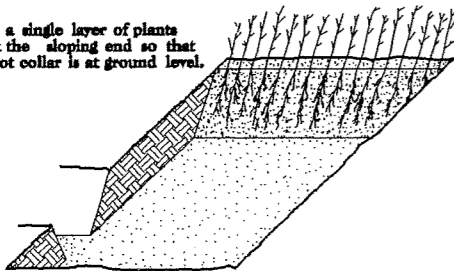
2. Excavate a flat bottom trench 12" deep and provide drainage.



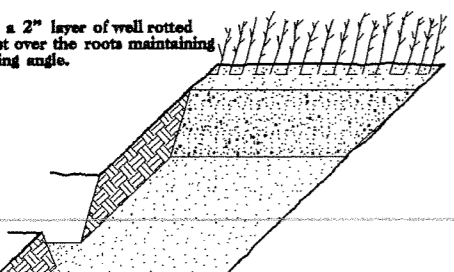
3. Backfill the trench with 2" well rotted sawdust. Place a 2" layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

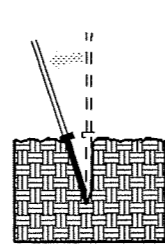


5. Place a 2" layer of well rotted sawdust over the roots maintaining a sloping angle.

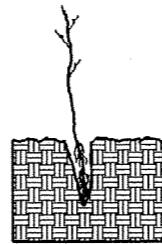


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

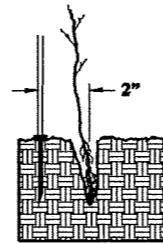
DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



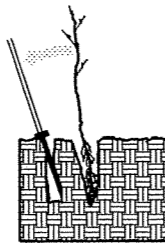
1. Insert planting bar as shown and pull handle toward planter.



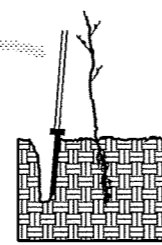
2. Remove planting bar and place seedling at correct depth.



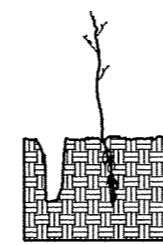
3. Insert planting bar 2" toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.



5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.



KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12" long, 4" wide and 1" thick at center.



ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches (10") below the root collar.

JUNIPER BAY WETLAND PLANTING

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-513WM	RF-1	
STATE PROJ. NO.	F.L.P. PROJ. NO.	DESCRIPTION	

WETLAND TREE REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

CHAMAECYPARIS THYOIDES
TAXODIUM DISTICHUM
PINUS SEROTINA
NYSSA AQUATICA
GORDONIA LASIANTHUS
MAGNOLIA VIRGINIANA
PERSEA PALUSTRIS
PINUS TAEDA

ATLANTIC WHITE CEDAR
BALDCYPRESS
POND PINE
WATER TUPELO
LOBLOLLY BAY
SWEET BAY
SWAMP RED BAY
LOBLOLLY PINE

BAREROOT SEEDLING
BAREROOT SEEDLING
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TREE REFORESTATION SHALL BE PLANTED 6' TO 10' ON CENTER, RANDOM SPACING, AVERAGING 8' ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

SEE PLAN SHEETS FOR AREAS TO BE PLANTED

WETLAND REFORESTATION DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

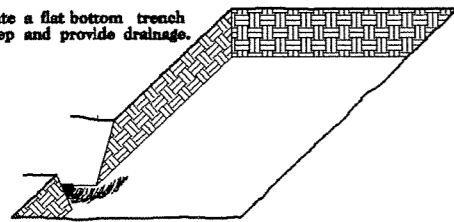
PLANTING DETAILS

SEEDLING / LINER BAREROOT PLANTING DETAIL

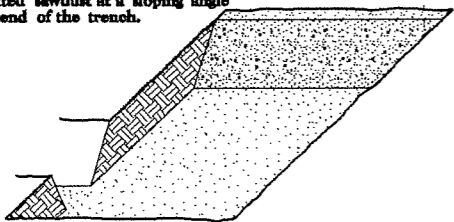
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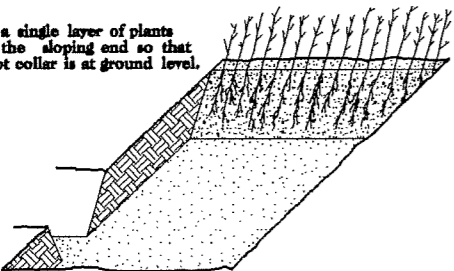
2. Excavate a flat bottom trench 12" deep and provide drainage.



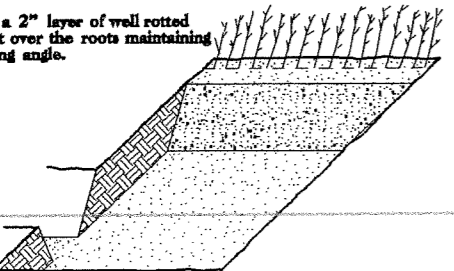
3. Backfill the trench with 2" well rotted sawdust. Place a 2" layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

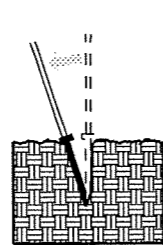


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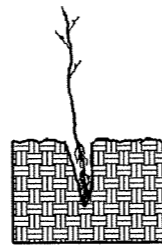


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

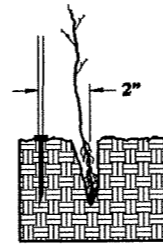
DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



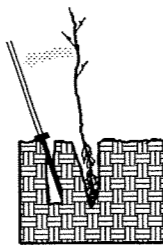
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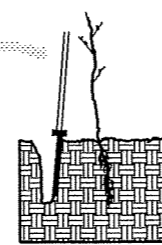
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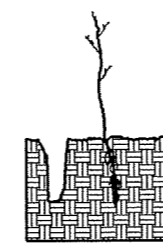
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JUNIPER BAY WETLAND PLANTING

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-513WM	RF-2	
STATE PROGRAM	F.L. PROGRAM	DESCRIPTION	

WETLAND TREE REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

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TAXODIUM DISTICHUM
PINUS SEROTINA
NYSSA AQUATICA
MAGNOLIA VIRGINIANA
PERSEA PALUSTRIS
PINUS TAEDA

ATLANTIC WHITE CEDAR
BALDCYPRESS
POND PINE
WATER TUPELO
SWEET BAY
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WETLAND REFORESTATION DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT