US Army Corps
of Engineers®

CLARENCE CANNON NATIONAL WILDLIFE REFUGE

HABITAT REHABILITATION AND ENHANCEMENT PROJECT
UPPER MISSISSIPPI RIVER RESTORATION ENVIRONMENTAL MANAGEMENT PROGRAM
PIKE COUNTY, MISSOURI

JUNE 2013

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
ST. LOUIS DISTRICT
ST. LOUIS, MISSOURI

DESIGNED BY: K. HANNAH
DWN BY: K. HANNAH
CKD BY: J. OSTERHAGE
SUBMITTED BY: GARY J. LEE, P.E.
PLOT SCALE: 1:1
PLOT DATE: No
SIZE: ANSI D
FILE NAME: CCNWR_G-1COV.dgn
DATE:
SOLICITATION NO.:
CONTRACT NO.:
FILE NUMBER:

CLARENCE CANNON NATIONAL WILDLIFE REFUGE
HABITAT REHABILITATION & ENHANCEMENT PROJECT
PIKE COUNTY
ANNADA, MISSOURI
TENTATIVELY SELECTED PLAN
COVER SHEET

SHEET IDENTIFICATION
PLATE G-1

INDEX OF DRAWINGS

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C-2	NORTH UNIT - PLAN
C-3	SOUTH UNIT - PLAN
C-4	RIVERSIDE UNIT - PLAN
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	STRUCTURAL
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S-2	WATER CONTROL STRUCTURE - MULTIPLE BARRELS
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FILE NUMBER:

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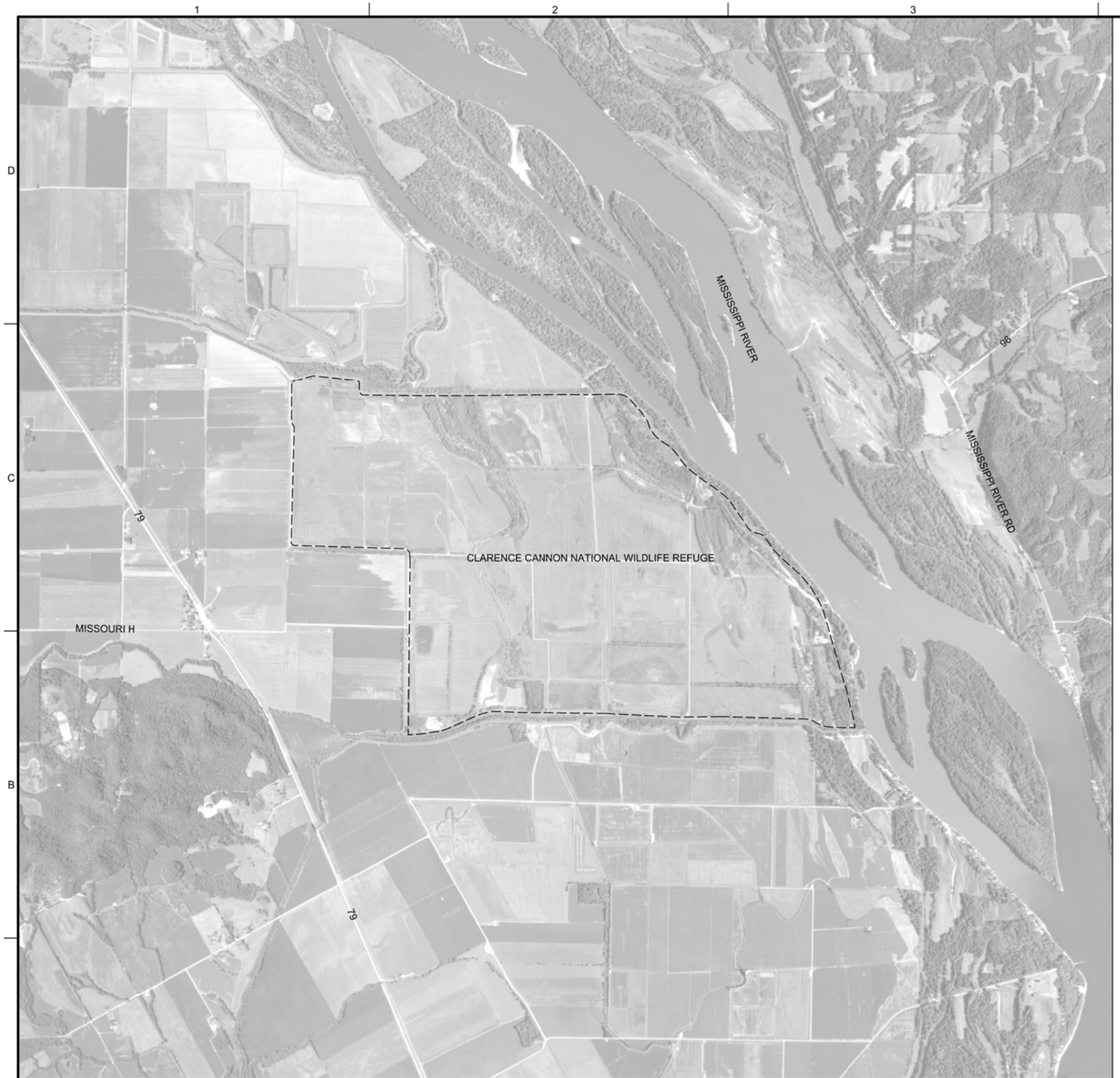
HABITAT REHABILITATION & ENHANCEMENT PROJECT
PIKE COUNTY
ANNADA, MISSOURI

TENTATIVELY SELECTED PLAN
INDEX OF DRAWINGS

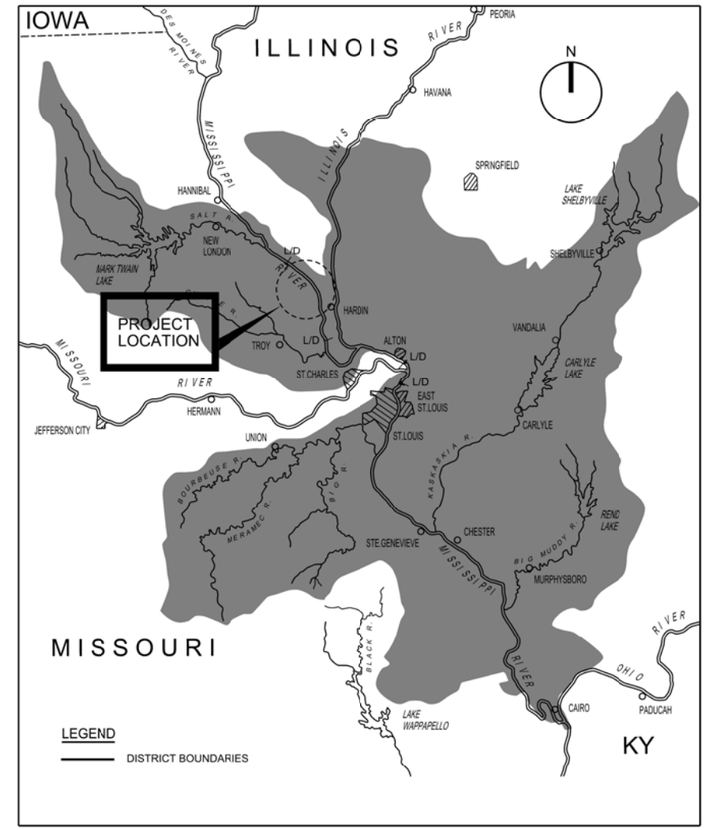
SHEET IDENTIFICATION
PLATE G-2



PROJECT LOCATION MAP

0' 1000' 2000' 4000'

SCALE: 1"= 2000'



VICINITY MAP

APPROX. SCALE IN MILES

35 0 35 70

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SIZE: ANSI D
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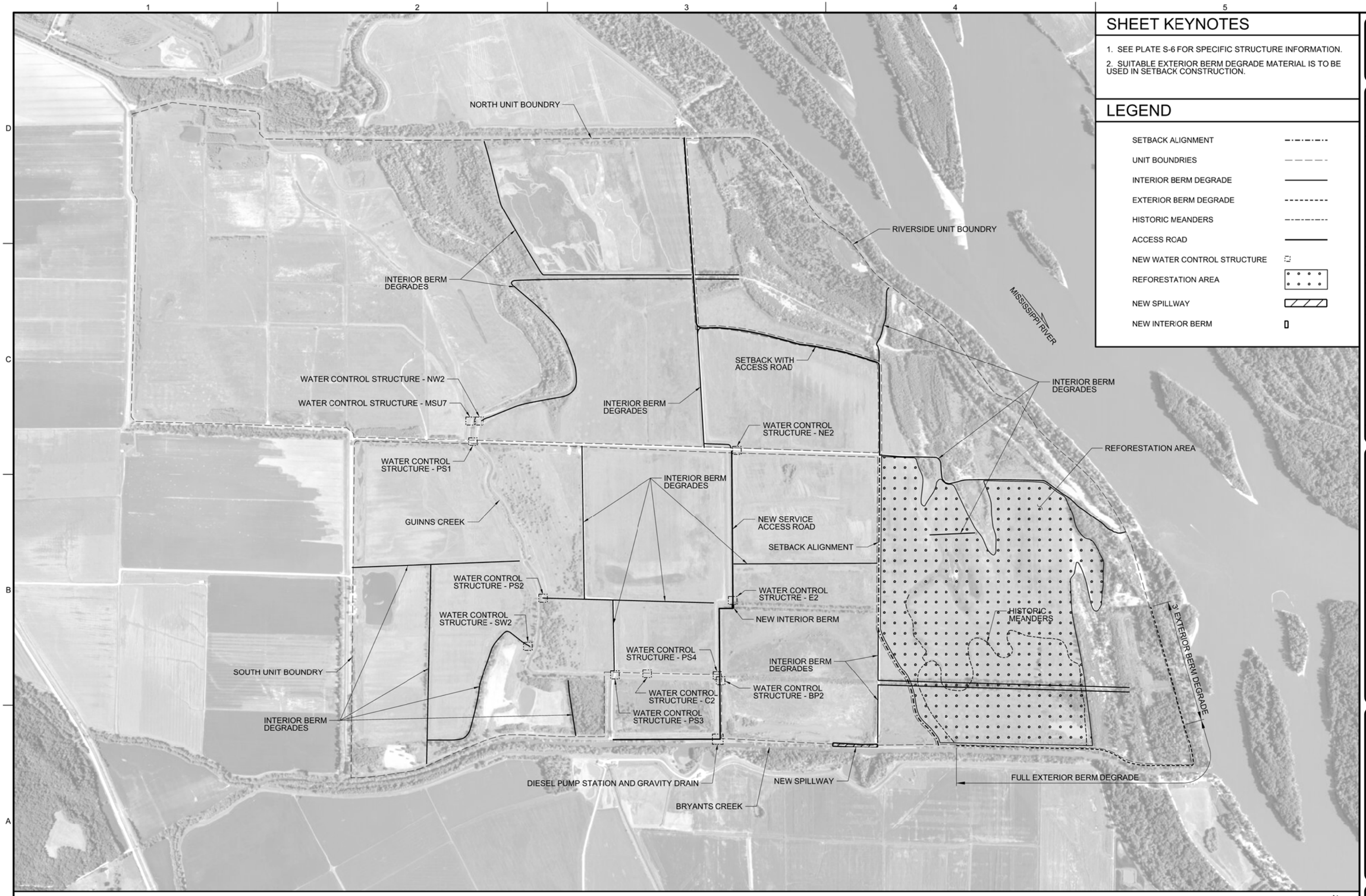
FILE NUMBER:

CLARENCE CANNON NATIONAL WILDLIFE REFUGE
HABITAT REHABILITATION & ENHANCEMENT PROJECT
PIKE COUNTY
ANNADA, MISSOURI

TENTATIVELY SELECTED PLAN
LOCATION AND VICINITY MAPS

SHEET IDENTIFICATION
PLATE G-3



OVERALL SITE PLAN

SCALE: 1" = 800'

0 800' 1600'

SHEET KEYNOTES

1. SEE PLATE S-6 FOR SPECIFIC STRUCTURE INFORMATION.
2. SUITABLE EXTERIOR BERM DEGRADE MATERIAL IS TO BE USED IN SETBACK CONSTRUCTION.

LEGEND

- SETBACK ALIGNMENT
- UNIT BOUNDRIES
- INTERIOR BERM DEGRADE
- EXTERIOR BERM DEGRADE
- HISTORIC MEANDERS
- ACCESS ROAD
- NEW WATER CONTROL STRUCTURE
- REFORESTATION AREA
- NEW SPILLWAY
- NEW INTERIOR BERM

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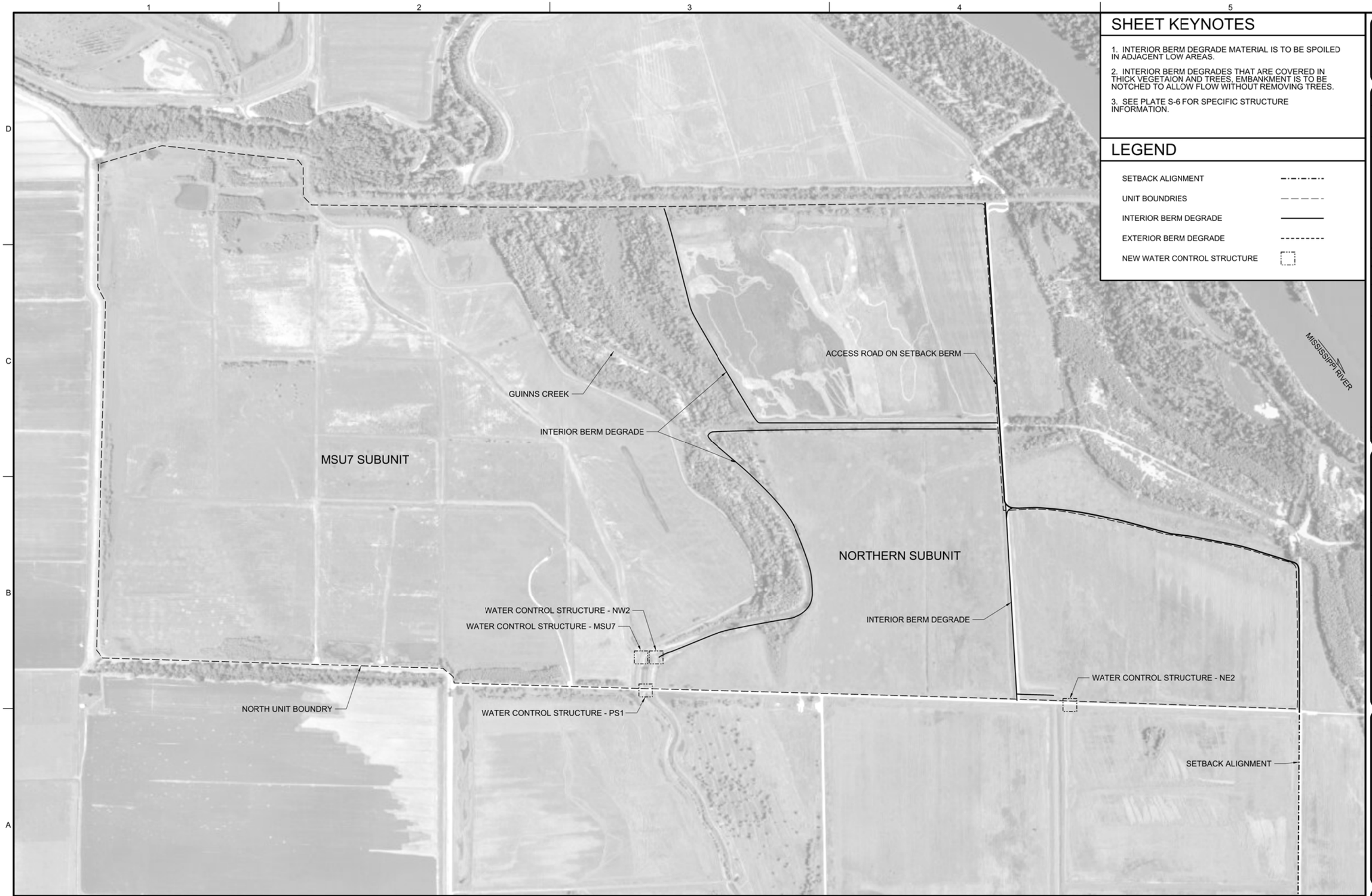
CLARENCE CANNON NATIONAL WILDLIFE REFUGE
HABITAT REHABILITATION & ENHANCEMENT PROJECT
PIKE COUNTY
ANNADA, MISSOURI
TENTATIVELY SELECTED PLAN
OVERALL SITE PLAN

SHEET IDENTIFICATION
PLATE C-1



NORTH UNIT

SCALE: 1" = 500'

0 500' 1000'

SHEET KEYNOTES

1. INTERIOR BERM DEGRADE MATERIAL IS TO BE SPOILED IN ADJACENT LOW AREAS.
2. INTERIOR BERM DEGRADES THAT ARE COVERED IN THICK VEGETAION AND TREES, EMBANKMENT IS TO BE NOTCHED TO ALLOW FLOW WITHOUT REMOVING TREES.
3. SEE PLATE S-6 FOR SPECIFIC STRUCTURE INFORMATION.

LEGEND

- SETBACK ALIGNMENT
- UNIT BOUNDRIES
- INTERIOR BERM DEGRADE
- EXTERIOR BERM DEGRADE
- NEW WATER CONTROL STRUCTURE

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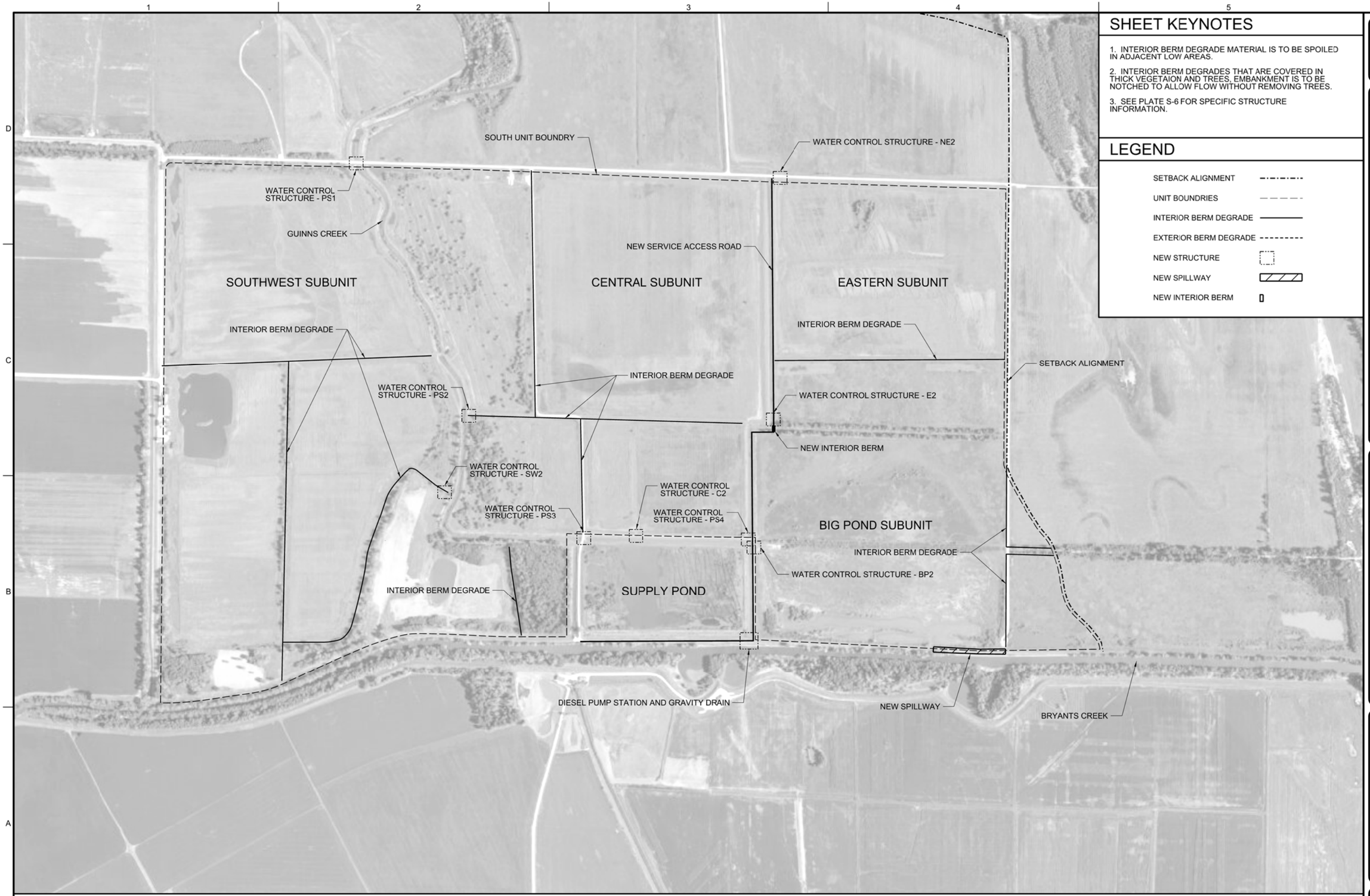
PIKE COUNTY
ANNADA, MISSOURI

TENTATIVELY SELECTED PLAN
NORTH UNIT
PLAN

SHEET IDENTIFICATION
PLATE C-2



SHEET KEYNOTES

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3. SEE PLATE S-6 FOR SPECIFIC STRUCTURE INFORMATION.

LEGEND

- SETBACK ALIGNMENT
- UNIT BOUNDRIES
- INTERIOR BERM DEGRADE
- EXTERIOR BERM DEGRADE
- NEW STRUCTURE
- NEW SPILLWAY
- NEW INTERIOR BERM

SOUTH UNIT

SCALE: 1" = 500'

0 500' 1000'

N

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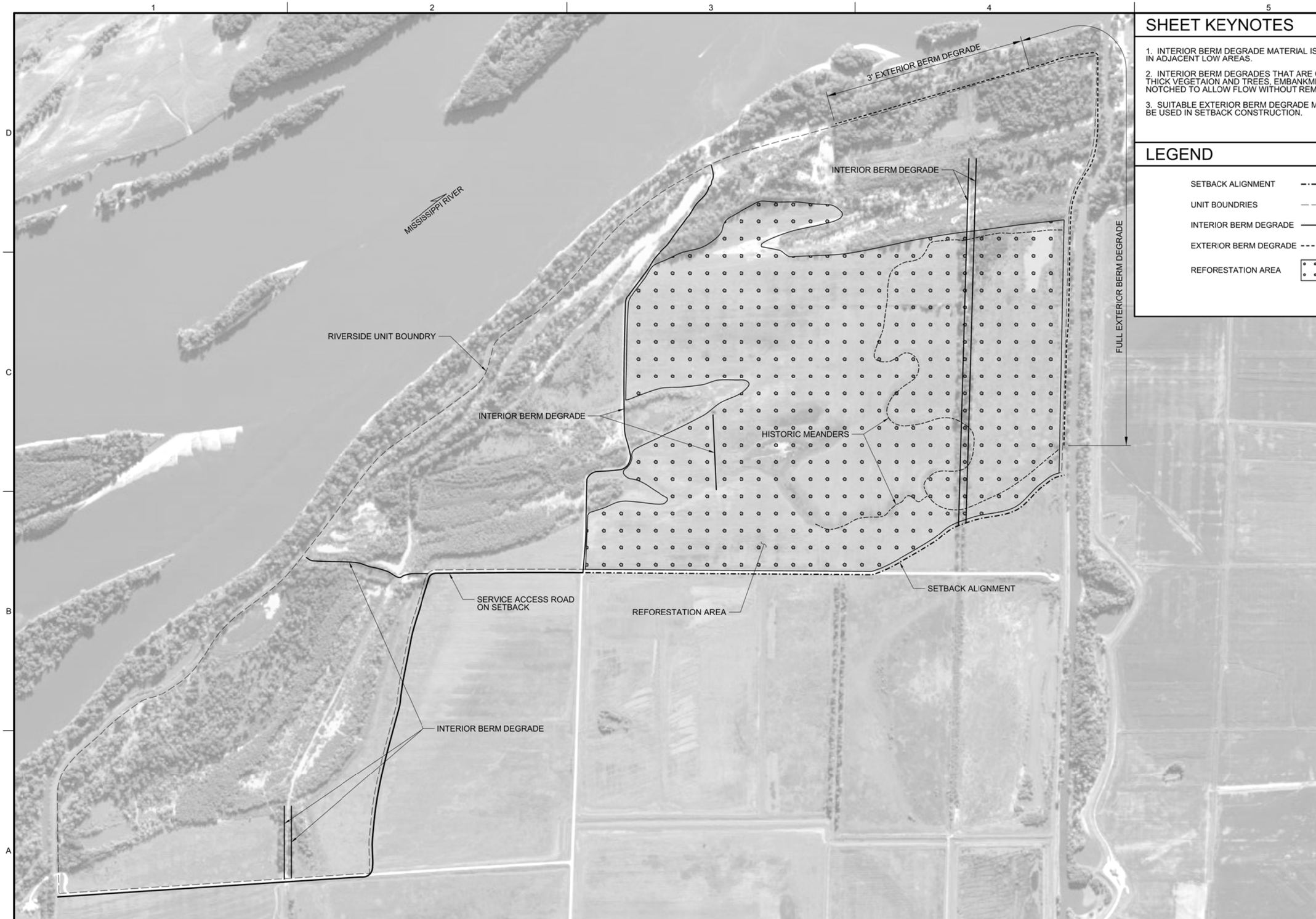
CLARENCE CANNON NATIONAL WILDLIFE REFUGE
HABITAT REHABILITATION & ENHANCEMENT PROJECT
PIKE COUNTY
ANNADA, MISSOURI

TENTATIVELY SELECTED PLAN
SOUTH UNIT
PLAN

SHEET IDENTIFICATION
PLATE C-3



SHEET KEYNOTES

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2. INTERIOR BERM DEGRADES THAT ARE COVERED IN THICK VEGETAION AND TREES, EMBANKMENT IS TO BE NOTCHED TO ALLOW FLOW WITHOUT REMOVING TREES.
3. SUITABLE EXTERIOR BERM DEGRADE MATERIAL IS TO BE USED IN SETBACK CONSTRUCTION.

LEGEND

- SETBACK ALIGNMENT
- UNIT BOUNDRIES
- INTERIOR BERM DEGRADE
- EXTERIOR BERM DEGRADE
- REFORESTATION AREA

RIVERSIDE UNIT

SCALE: 1" = 500'

0 500' 1000'

N

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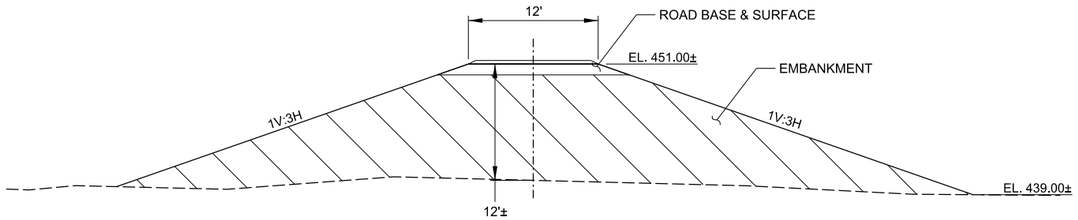
PLOT DATE:
FILE NUMBER:
SIZE: ANSI D
FILE NAME: CCNWR_C-4PLN.dgn

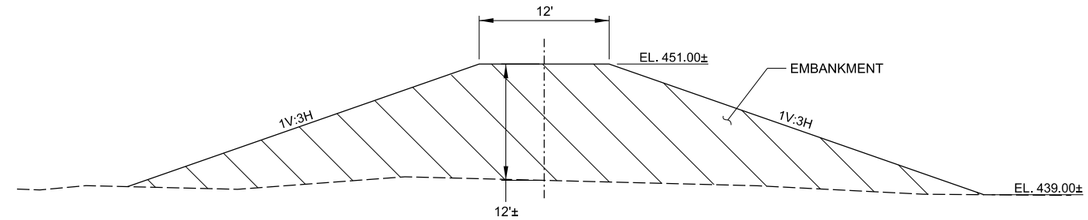
CLARENCE CANNON NATIONAL WILDLIFE REFUGE
HABITAT REHABILITATION & ENHANCEMENT PROJECT
PIKE COUNTY
ANNADA, MISSOURI

TENTATIVELY SELECTED PLAN
RIVERSIDE UNIT
PLAN

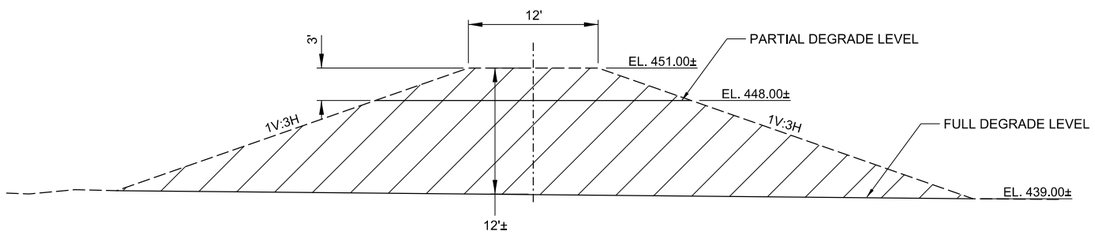
SHEET IDENTIFICATION
PLATE C-4



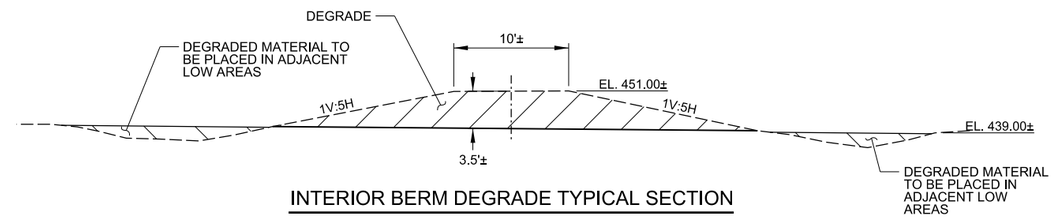
SETBACK BERM WITH ACCESS ROAD TYPICAL SECTION



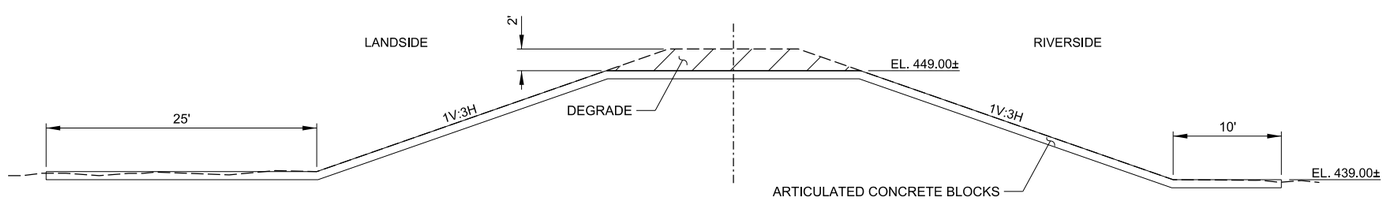
SETBACK BERM TYPICAL SECTION



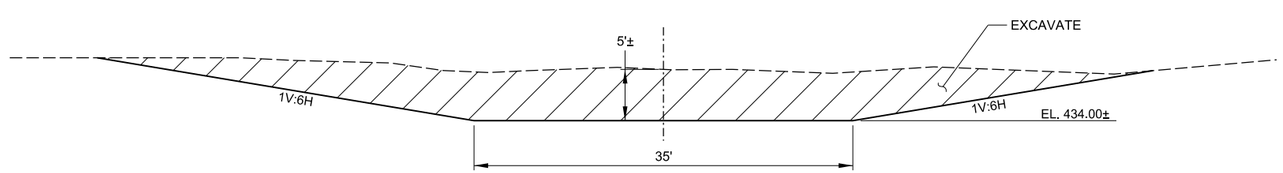
EXTERIOR BERM DEGRADE TYPICAL SECTION



INTERIOR BERM DEGRADE TYPICAL SECTION



SPILLWAY TYPICAL SECTION



HISTORIC MEANDER TYPICAL SECTION

SHEET LEGEND

EMBANKMENT FILL

DEGRADE

TYPICAL SECTIONS

NOT TO SCALE

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SUBMITTED BY: GARY J. LEE, P.E. | CONTRACT NO.:
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SIZE: ANSI D | FILE NAME: CCNWR_C-5SEC.dgn

CLARENCE CANNON NATIONAL WILDLIFE REFUGE
HABITAT REHABILITATION & ENHANCEMENT PROJECT
PIKE COUNTY
ANNADA, MISSOURI

TENTATIVELY SELECTED PLAN
TYPICAL SECTIONS

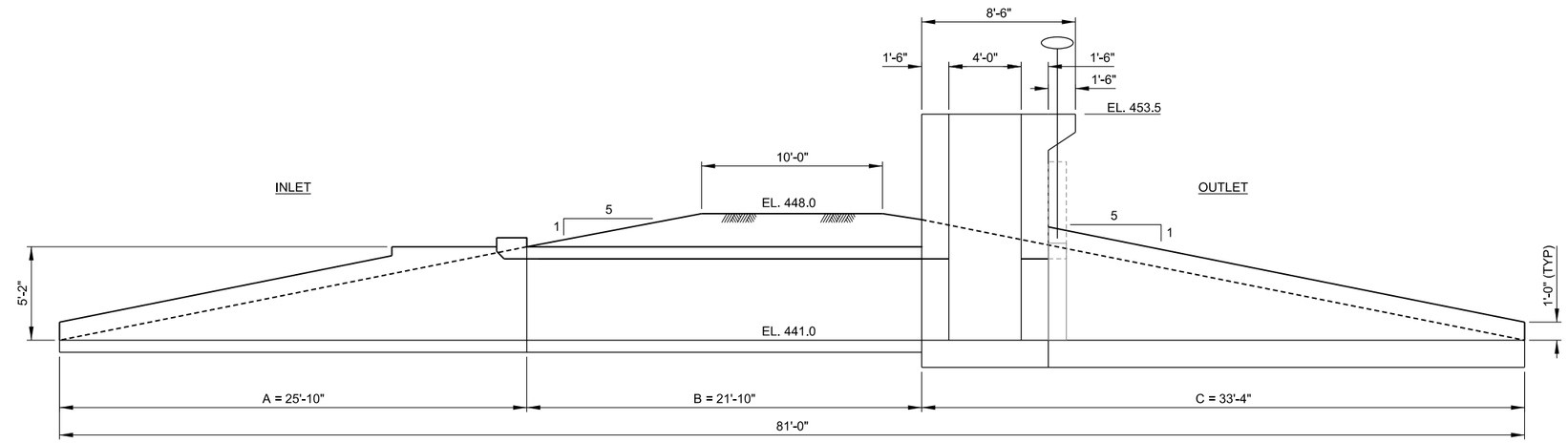
SHEET IDENTIFICATION
PLATE C-5

GENERAL SHEET NOTES

1. LADDERS TO BE PROVIDED TO TOP OF HEADWALL FROM BOTTOM OF GATEWELL AND BERM.
2. NE2 STRUCTURE SHOWN AS AN EXAMPLE. FOR DETAILS OF ALL STRUCTURES SEE PLATE S-6.
3. GUARDRAIL AND GRATING NOT SHOWN.

SHEET KEYNOTES

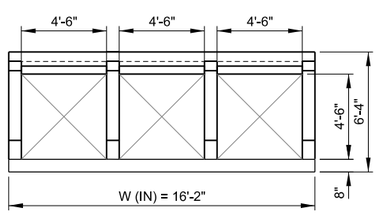
1. DOUBLE BARREL STRUCTURE TO HAVE SIMILAR LAYOUT.



TRIPLE 4'-0"x4'-0" OPENINGS - NE2

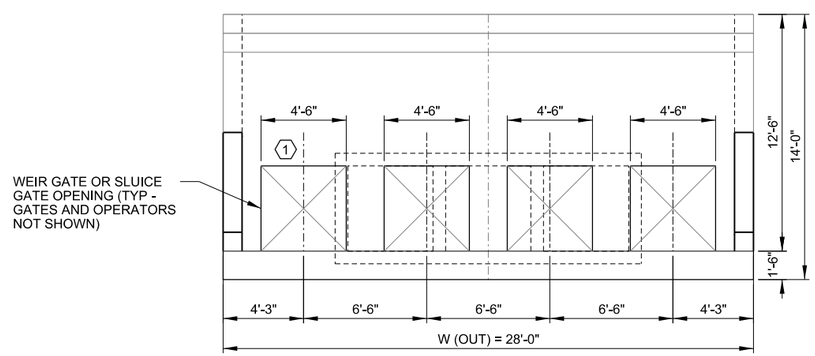
C1 SECTION THROUGH BARREL

SCALE ¼" = 1'-0"



B1 INLET ELEVATION

SCALE ¼" = 1'-0"



B3 OUTLET ELEVATION

SCALE ¼" = 1'-0"

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DESIGNED BY: ANTOINETTE SERENA, P.E.
DATE: MARCH 2013
DWN BY: BMM
CKD BY:
SOLICITATION NO.:
SUBMITTED BY: STEPHEN G. FARKAS, P.E.
CONTRACT NO.:
PLOT SCALE: As Noted
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FILE NUMBER:
SIZE: ANSI D
FILE NAME: CCNWR_S-2SEC.dgn

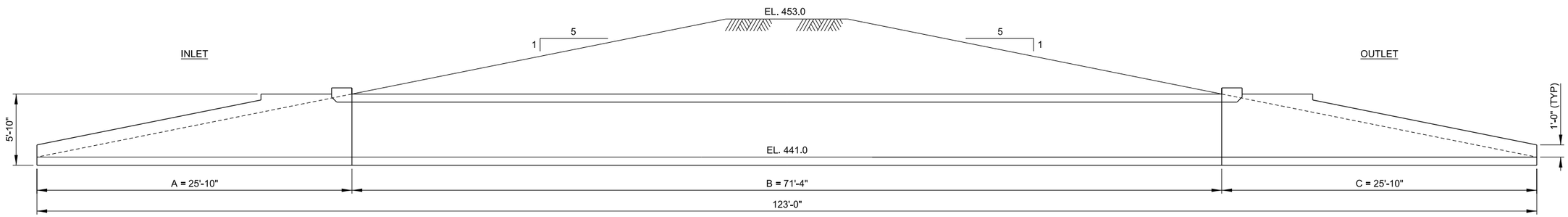
CLARENCE CANNON NATIONAL WILDLIFE REFUGE
HABITAT REHABILITATION & ENHANCEMENT PROJECT
PIKE COUNTY
ANNADA, MISSOURI

TENTATIVELY SELECTED PLAN
WATER CONTROL STRUCTURE
SECTION AND ELEVATIONS

SHEET IDENTIFICATION
PLATE S-2

GENERAL SHEET NOTES

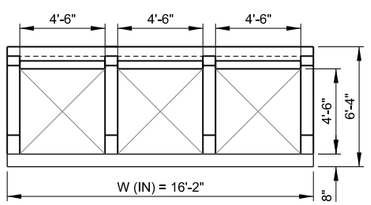
1. FOR ADDITIONAL DIMENSIONS SEE PLATE S-6.



TRIPLE 4'-6"x4'-6" OPENINGS - PS1 - NON-FISH FRIENDLY STRUCTURE

C1 SECTION THROUGH BARREL

SCALE: NTS



B1 INLET AND OUTLET ELEVATION

SCALE ¼" = 1'-0"

0 2' 4' 8'

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PIKE COUNTY
ANNADA, MISSOURI

WATER CONTROL STRUCTURE
TRIPLE BARREL UNCONTROLLED
SECTION AND ELEVATION

SHEET IDENTIFICATION
PLATE S-3

CCNWR
WATER CONTROL STRUCTURES

LOCATION	TYPICAL DETAILS ON PLATE	LEVEE ELEVATION	EMBANKMENT AT STRUCTURE	EMBANKMENT SLOPE	CHANNEL ELEVATION	FISH-FRIENDLY	WEIR GATE	L (FT)	A (FT)	B (FT)	C (FT)	W (IN) W (BARRELS) (FT)	W (OUT) (FT)	OPERATOR ACCESS ELEVATION
MSU7 (MSU7)														
2 STRUCTURES 4.5'x4.5' TRIPLE BOX	S-2	444.5	444.5	1V:5H	434.6	NO	YES	109.00	25.83	49.83	33.33	16.17	28.00	447.1
NORTHERN SUBUNIT - WEST (NW2)														
1 STRUCTURE 4.5'x4.5' TRIPLE BOX	S-2	443.3	443.3	1V:5H	435	NO	YES	93.00	25.83	33.83	33.33	16.17	28.00	447.5
NORTHERN SUBUNIT - EAST (NE2)														
1 STRUCTURE 4.5'x4.5' TRIPLE BOX	S-2	445.1	445.1	1V:5H	438	NO	YES	81.00	25.83	21.83	33.33	16.17	28.00	450.5
EASTERN SUBUNIT (E2)														
1 STRUCTURE 4.5'x4.5' TRIPLE BOX	S-2	445.2	445.2	1V:5H	436.5	NO	YES	97.00	25.83	37.83	33.33	16.17	28.00	449
BIG POND SUBUNIT (BP2)														
1 STRUCTURE 4.5'x4.5' TRIPLE BOX	S-2	445.2	445.2	1V:5H	436.5	NO	YES	97.00	25.83	37.83	33.33	16.17	28.00	449
CENTRAL SUBUNIT (C2)														
1 STRUCTURE 4.5'x4.5' TRIPLE BOX	S-2	445.7	445.7	1V:5H	438.3	NO	YES	84.00	25.83	24.83	33.33	16.17	28.00	450.8
SOUTHWEST SUBUNIT (SW2)														
1 STRUCTURE 4.5'x4.5' TRIPLE BOX	S-2	445.3	445.3	1V:5H	437.8	NO	YES	85.00	25.83	25.83	33.33	16.17	28.00	450.3
SOUTH DITCH (PS4)														
1 STRUCTURE 4.5'x4.5' TRIPLE BOX	S-2	445.6	445.6	1V:5H	433.5	NO	NO	131.00	25.83	71.83	33.33	16.17	28.00	446
CENTRAL DITCH (PS3)														
1 STRUCTURE 4.5'x4.5' TRIPLE BOX	S-2	445.3	445.3	1V:5H	435	NO	NO	113.00	25.83	53.83	33.33	16.17	28.00	447.5
PUMP STATION GRAVITY DRAINS														
1 STRUCTURE 6'x6' TRIPLE BOX	S-2	451	451	1V:5H	437.3	NO	NO	147.00	33.33	72.83	40.83	20.67	27.50	452.55
1 STRUCTURE 6'x6' DOUBLE BOX	S-2	451	451	1V:5H	437.3	NO	NO	147.00	33.33	72.83	40.83	14.00	19.00	452.55
GUINNS CREEK (PS1)*														
1 STRUCTURE 4.5'x4.5' TRIPLE BOX	S-3	445.3	445.3	1V:5H	434	NO	NO	123.00	25.83	71.33	25.83	16.17	16.17	N/A

* THIS STRUCTURE IS AN UNCONTROLLED BOX CULVERT FOR WATER CONVEYANCE BETWEEN THE NORTHERN UNIT AND THE PUMP STATION CHANNEL.

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SIZE: ANSI D
FILE NAME: CCNWR_S-6SCH.dgn
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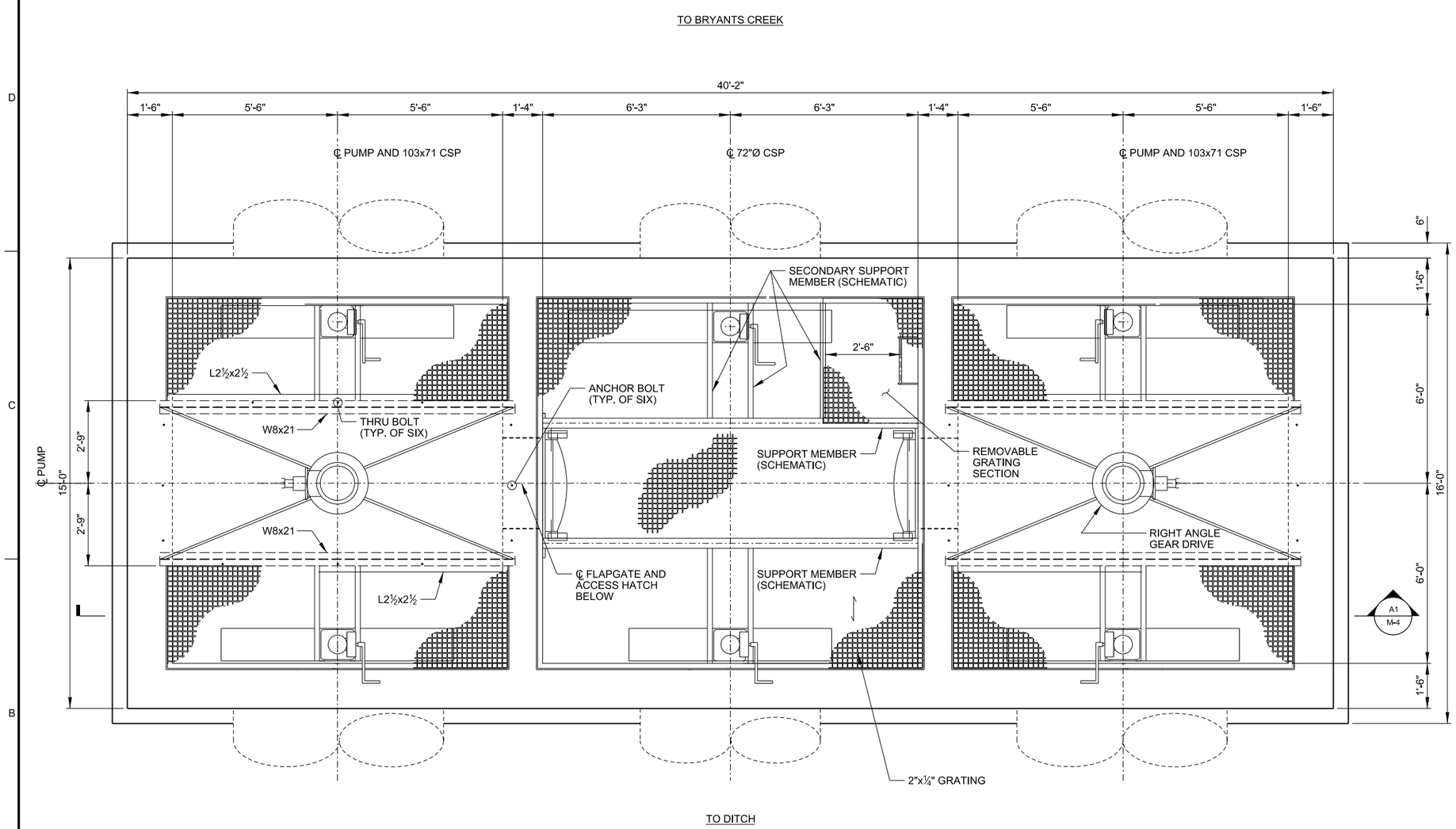
PIKE COUNTY
ANNADA, MISSOURI

TENTATIVELY SELECTED PLAN
WATER CONTROL STRUCTURES
DIMENSIONS

SHEET IDENTIFICATION
PLATE S-6



B1 60,000 GPM DIESEL POWERED PUMP STATION - PLAN

SCALE ½" = 1'-0"

0 1' 2' 4'

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

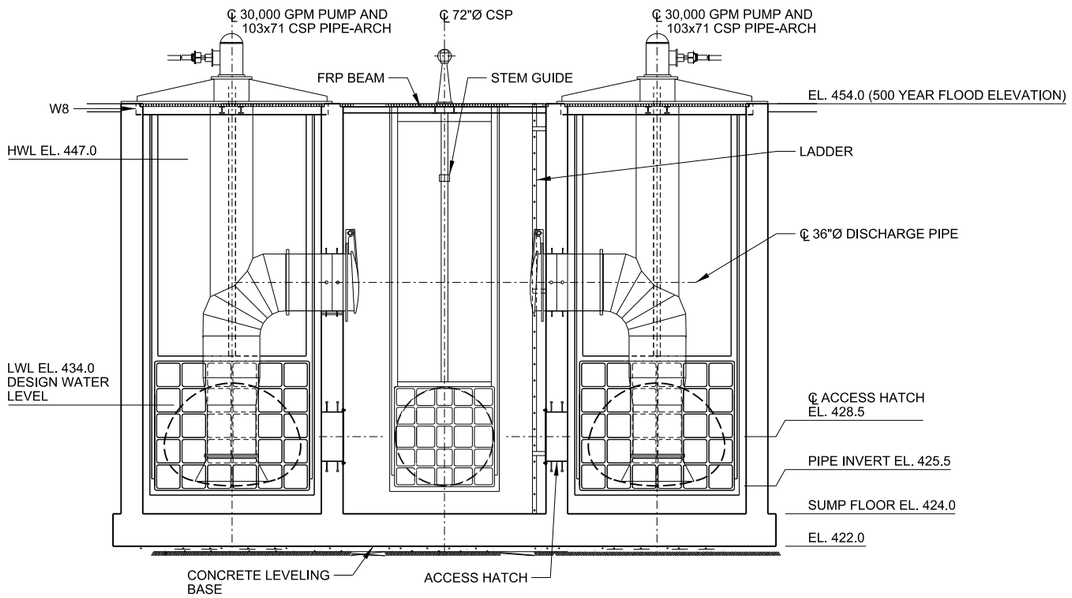
U.S. ARMY CORPS OF ENGINEERS
ST. LOUIS DISTRICT
ST. LOUIS, MISSOURI

DESIGNED BY: ANTONIETTE SIERENA, P.E.
DATE: MARCH 2013
DWN BY: BMM
CKD BY:
SOLICITATION NO.:
SUBMITTED BY: STEPHEN G. FARKAS, P.E.
CONTRACT NO.:
PLOT SCALE: 1:1
PLOT DATE:
FILE NUMBER:
SIZE: ANSI D
FILE NAME: CDWR_M-3-PLN.dgn

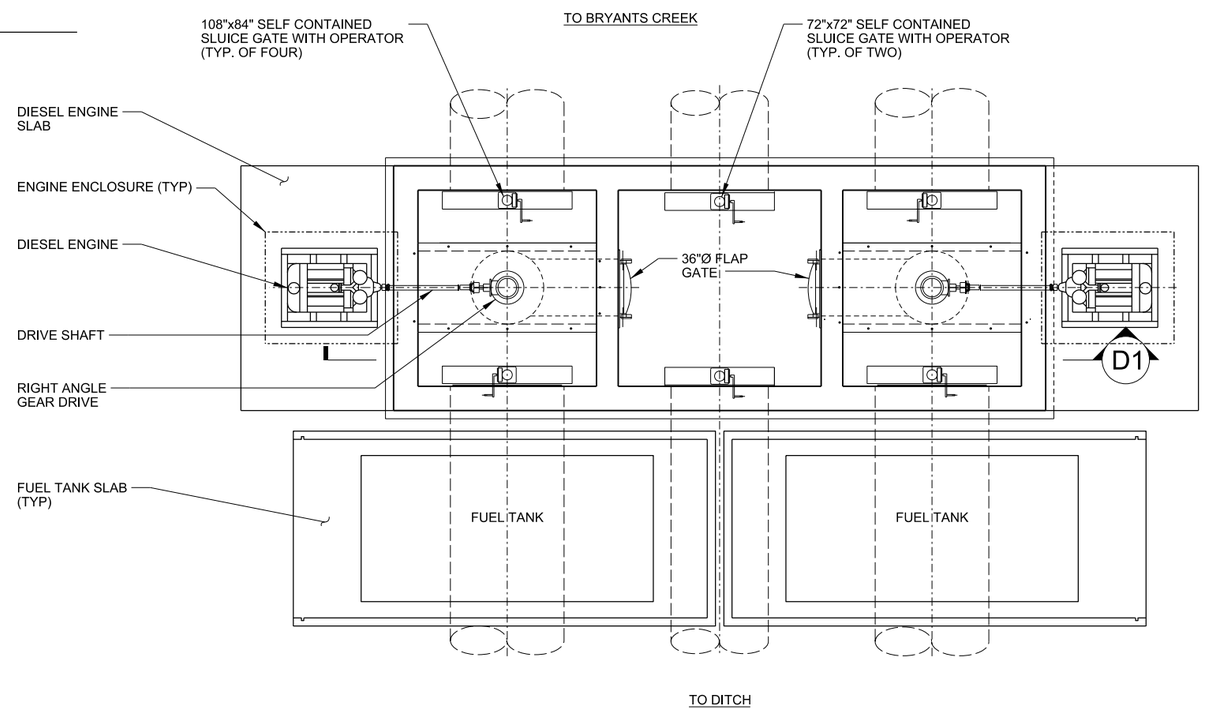
CLARENCE CANNON NATIONAL WILDLIFE REFUGE
HABITAT REHABILITATION & ENHANCEMENT PROJECT
PIKE COUNTY
ANNADA, MISSOURI

TENTATIVELY SELECTED PLAN
DIESEL POWERED PUMP STATION
PLAN

SHEET IDENTIFICATION
PLATE M-3



D1 SECTION
SCALE: NTS



A4 60,000 GPM PUMP STATION - PLAN
SCALE: NTS

PUMPING ELEVATIONS

FILLING (PUMPING FROM RIVER)

	HIGH WATER LEVEL (HWL)	LOW WATER LEVEL (LWL)
BRYANTS CREEK	443	434
INTERIOR	447	435

EMPTYING (PUMPING TO RIVER)

	HIGH WATER LEVEL (HWL)	LOW WATER LEVEL (LWL)
BRYANTS CREEK	451	434
INTERIOR	447	435

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
ST. LOUIS DISTRICT
ST. LOUIS, MISSOURI

DESIGNED BY: ANTIONETTE SERENA, P.E.
DWN BY: BMM
CKD BY:
SUBMITTED BY: STEPHEN G. PARKAS, P.E.
PLOT SCALE: 1:1
PLOT DATE:
SIZE: ANSI D
FILE NAME: CCNWR_M-4-PLN.dgn
DATE: MARCH 2013
SOLICITATION NO.:
CONTRACT NO.:
FILE NUMBER:

CLARENCE CANNON NATIONAL WILDLIFE REFUGE
HABITAT REHABILITATION & ENHANCEMENT PROJECT
PIKE COUNTY
ANNADA, MISSOURI

TENTATIVELY SELECTED PLAN
DIESEL POWERED PUMP STATION_ALT
PLAN & SECTION

SHEET IDENTIFICATION
PLATE M-4