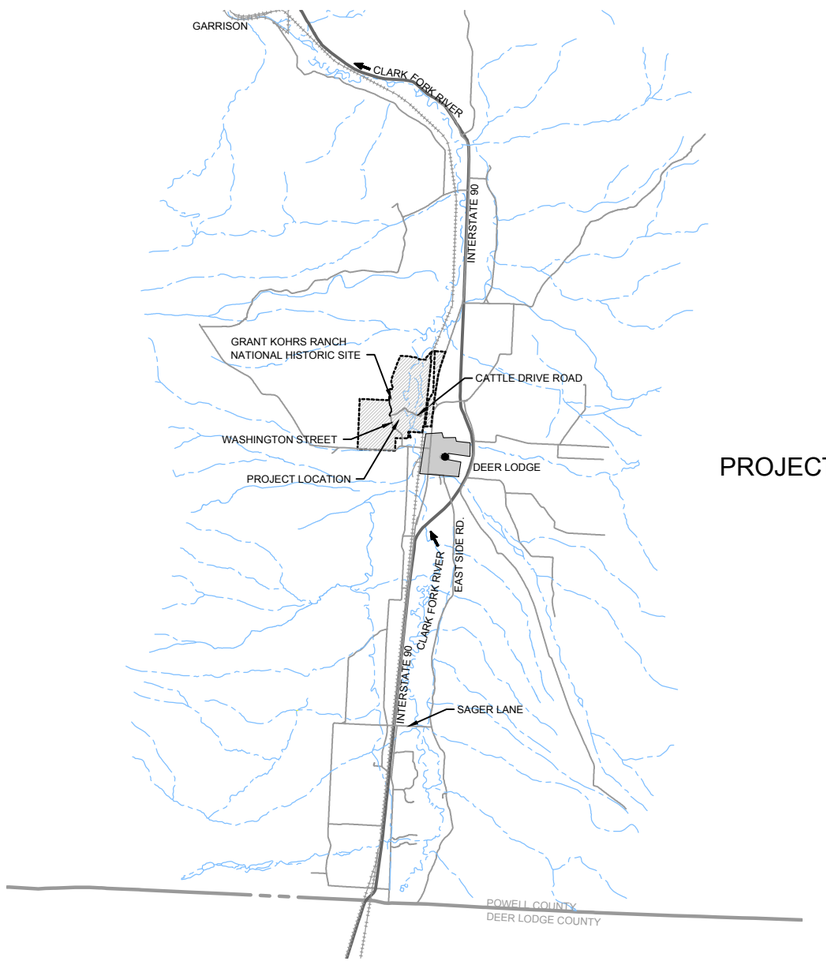
CLARK FORK RIVER
FINAL REACH A, PHASES 15 AND 16 REMEDIAL ACTION PROJECT
REMEDIAL ACTION WORK PLAN
MILLTOWN RESERVOIR/CLARK FORK RIVER NPL SITE
POWELL COUNTY, MONTANA

DEQ CONTRACT NO. 419001
JULY 2018



PREPARED FOR:

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
WASTE MANAGEMENT AND RECLAMATION DIVISION

NATIONAL PARK SERVICE
GRANT-KOHRS RANCH NATIONAL HISTORIC SITE

PROJECT AREA

SHEET INDEX

G1	COVER
G2	GENERAL LEGEND AND NOTES
G3	GENERAL SITE PLAN
G4-G6	WORK THIS CONTRACT
C1-C3	EXISTING CONDITIONS AND TEST PIT LOCATIONS
C4-C6	DEWATERING PLAN
C7-C9	IMPACTED FLOODPLAIN MATERIAL EXCAVATION PLAN
C10-C12	NON-IMPACTED MATERIAL EXCAVATION PLAN
C13-C15	SUBGRADE PLAN
C16-C18	FINAL GRADING PLAN
C19-C21	MICROTOPOGRAPHY, WOOD AND BRUSH PLACEMENT
C22-C24	STREAMBANK TREATMENT PLAN
C25	NEW CHANNEL CONSTRUCTION PLAN
C26	CHANNEL DIVERSION AND CONSTRUCTION SEQUENCE
C27	CATTLE DRIVE BRIDGE AREA PLAN AND DETAILS
C28	BECK BORROW AREA DEVELOPMENT PLAN AND CROSS-SECTIONS
C29	JOHNSON BORROW AREA DEVELOPMENT PLAN AND CROSS-SECTIONS
C30	JOHNSON BORROW AREA RECLAMATION PLAN AND CROSS-SECTIONS
C31	TRANSPORTATION PLAN
C32	TRAFFIC CONTROL PLAN
C33	PRIMARY ACCESS HAUL ROAD PLAN AND PROFILE
C34	RAILROAD CROSSING PLAN
C35-C37	FENCE PLAN
C38	REPOSITORY PLAN B2.12 CELL AT OPPORTUNITY PONDS
C39	NATIONAL PARK SERVICE SCENIC TRAIL PLAN
C40	NATIONAL PARK SERVICE SCENIC TRAIL CONSTRUCTION PLAN AND PROFILE
XS1-XS4	FLOODPLAIN CROSS-SECTIONS
XS5	NEW CHANNEL CROSS-SECTIONS AND PROFILE
XS6	TEMPORARY CHANNEL COFFER DAM CROSS-SECTIONS
D1	HAUL ROAD DETAILS
D2-D3	DEWATERING DETAILS
D4-D8	STREAMBANK TREATMENT DETAILS
D9	MICROTOPOGRAPHY, WOOD AND BRUSH PLACEMENT DETAILS
D10	EROSION CONTROL DETAILS
D11-D13	FENCING DETAILS

ISSUED FOR CONSTRUCTION

PREPARED BY:

TETRA TECH
825 West Custer Avenue, Helena, MT 59602 (406) 443-5210

Geum Environmental Consulting, Inc.

Applied Geomorphology, Inc.

MONTANA LARRY D. CAWLFIELD No. 7402 PE 7/9/18 LICENSED PROFESSIONAL ENGINEER

MONTANA MICHAEL HATTEN No. 16272 PE 7/10/18 LICENSED PROFESSIONAL ENGINEER

LEGEND

EXISTING

- 5210 — MAJOR CONTOUR & ELEVATION LABEL
- MINOR CONTOUR
- PROPERTY BOUNDARY
- FENCE
- EDGE OF ROAD (PAVED)
- EDGE OF ROAD (UNPAVED)
- BRIDGE
- CULVERT
- BUILDING OR STRUCTURE FOOTPRINT
- SHRUBBERY OR TREE
- TESTPIT LOCATION
- CULTURAL FEATURES

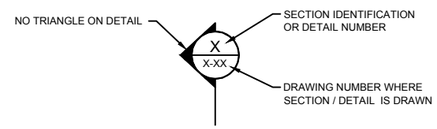
TEST PIT

24	BASE OF TAILINGS DEPTH
4496.457	BASE OF TAILINGS ELEVATION

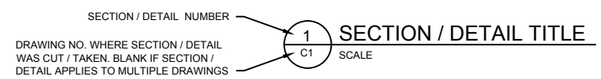
PROPOSED

- DISTURBANCE BOUNDARY
- WORK AREA BOUNDARY
- REMOVAL BOUNDARY
- REGRADING BOUNDARY
- PRIMARY HAUL ROAD
- SECONDARY HAUL ROAD
- 5210 — BASE OF EXCAVATION MAJOR CONTOUR & ELEVATION LABEL
- BASE OF EXCAVATION MINOR CONTOUR
- 5210 — SUBGRADE MAJOR CONTOUR & ELEVATION LABEL
- SUBGRADE MINOR CONTOUR
- 5210 — FINAL GROUND MAJOR CONTOUR & ELEVATION LABEL
- FINAL GROUND MINOR CONTOUR
- CLEAR & GRUB VEGETATION
- PRESERVE VEGETATION
- 1.5 / 1.5 (− +) — GRADING CUT/FILL-TICK
- GENERAL GROUNDWATER DEWATERING SEDIMENT POND LOCATION
- GROUNDWATER DEWATERING TRENCH
- GROUNDWATER DEWATERING TRENCH DISCHARGE PIPE
- xx — TEMPORARY CONSTRUCTION FENCE
- WILDLIFE FENCE
- x — x — RECONSTRUCTED 5-STRAND WIRE FENCE
- RECONSTRUCTED WOOD POST FENCE
- RECONSTRUCTED JACK LEG FENCE

SECTION AND DETAIL DESIGNATION



SECTION CUT / DETAIL CALLOUT SYMBOL



TITLE FOR SECTION CUT / DETAIL

GENERAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF CURRENT CONDITIONS AND LOCATIONS OF ALL EXISTING ITEMS WITHIN OR ADJACENT TO THE WORK, OR THAT MAY BE DISTURBED BY THE WORK.
2. THE LOCATIONS OF ALL SUBSURFACE CONDITIONS ARE BASED ON THE BEST AVAILABLE INFORMATION AND SHOWN LOCATIONS MAY NOT BE REPRESENTATIVE.
3. CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING SURFACE FEATURES AND OTHER EXISTING ITEMS.
4. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL SURFACE AND SUBSURFACE UTILITIES PRIOR TO DISTURBING SUBSURFACE.
5. DRAWINGS SHALL BE PLOTTED IN COLOR FOR REALIZATION OF ALL DESIGN FEATURES.

ABBREVIATIONS

#	NUMBER
&	AND
Ø	DIAMETER
%	PERCENT
Δ	DEFLECTION ANGLE
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
CF	CUBIC FEET
CY	CUBIC YARD
CMP	CORRUGATED METAL PIPE
CMPA	CORRUGATED METAL PIPE ARCH
DI	DUCTILE IRON
DIA	DIAMETER
DWG	DRAWING
E	EAST
EG	EXISTING GROUND
EPA	US ENVIRONMENTAL PROTECTION AGENCY
FG	FINAL GROUND
FO	FIBER OPTIC
G	GAS LINE
MAX.	MAXIMUM
MIN.	MINIMUM
LF	LINEAR FEET
MDEQ	MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
MISC	MISCELLANEOUS
MH	MANHOLE
MPWSS	MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS
N	NORTH
NTS	NOT TO SCALE
OE	OVERHEAD ELECTRIC
PVC	POLYVINYL CHLORIDE
PW	POTABLE WATER
QTY	QUANTITY
RD	ROAD
RR	RAILROAD
ROW	RIGHT OF WAY
S	SOUTH
STA	STATION
SS	SANITARY SEWER
STD	STANDARD
SF	SQUARE FEET
SY	SQUARE YARD
TYP	TYPICAL
UP	UTILITY POLE
UG	UNDERGROUND
UW	UNTREATED WATER
W	WEST
YH	YARD HYDRANT

MAPPING SOURCES

SURVEY CONTROL:	D J & A, MISSOULA, MT
LiDAR DATA ACQUISITION:	FUGRO EARTHDATA, INC., RAPID CITY, SD, AUGUST 2011
LiDAR PROCESSING:	D J & A, MISSOULA, MT
LOCAL SURVEY DATA:	BROWN & ASSOCIATES, INC.

SURVEY CONTROL

NUMBER / NAME	NORTHING	EASTING	ELEVATION
NGS CONTROL D 508	820612.59	1156643.19	4446.52
NGS CONTROL R 448	807939.65	1153727.03	4516.26
SET-AC 2" DJ&A Control Point Marked '604' Photo Target	805062.36	1156475.83	4556.78
NGS CONTROL M 313	798874.04	1151930.48	4523.59
NGS CONTROL E 508	785565.19	1150655.77	4569.82
ALABAMA ST.	799349.33	1150719.33	4540.37
CFR P15-16 CP1	811177.57	1154916.43	4494.79
CFR P15-16 CP2	808854.74	1154133.24	4502.37
CFR P15-16 CP4	805302.34	1153412.54	4520.06
CFR P15-16 CP6	801667.35	1152055.78	4520.01
CFR P15-16 CP7	803503.50	1148566.81	4533.41
CFR P15-16 CP8	806568.09	1148916.19	4529.15
CFR P15-16 CP9	809610.28	1149900.42	4519.99
free347t	815299.13	1158539.84	4482.65

MAPPING DATUM

HORIZONTAL DATUM (UNITS):	MONTANA STATE PLANE COORDINATES, NAD 83 (INTERNATIONAL FEET)
VERTICAL DATUM (UNITS):	NAVD88 (US SURVEY FEET)

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www.tetratech.com
825 West Custer Avenue
Helena, Montana 59602
PHONE: 406-443-5210 FAX: 406-442-7182

DEQ Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY
0	7/20/18	ISSUED FOR CONSTRUCTION	SEF

Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

GENERAL LEGEND AND NOTES

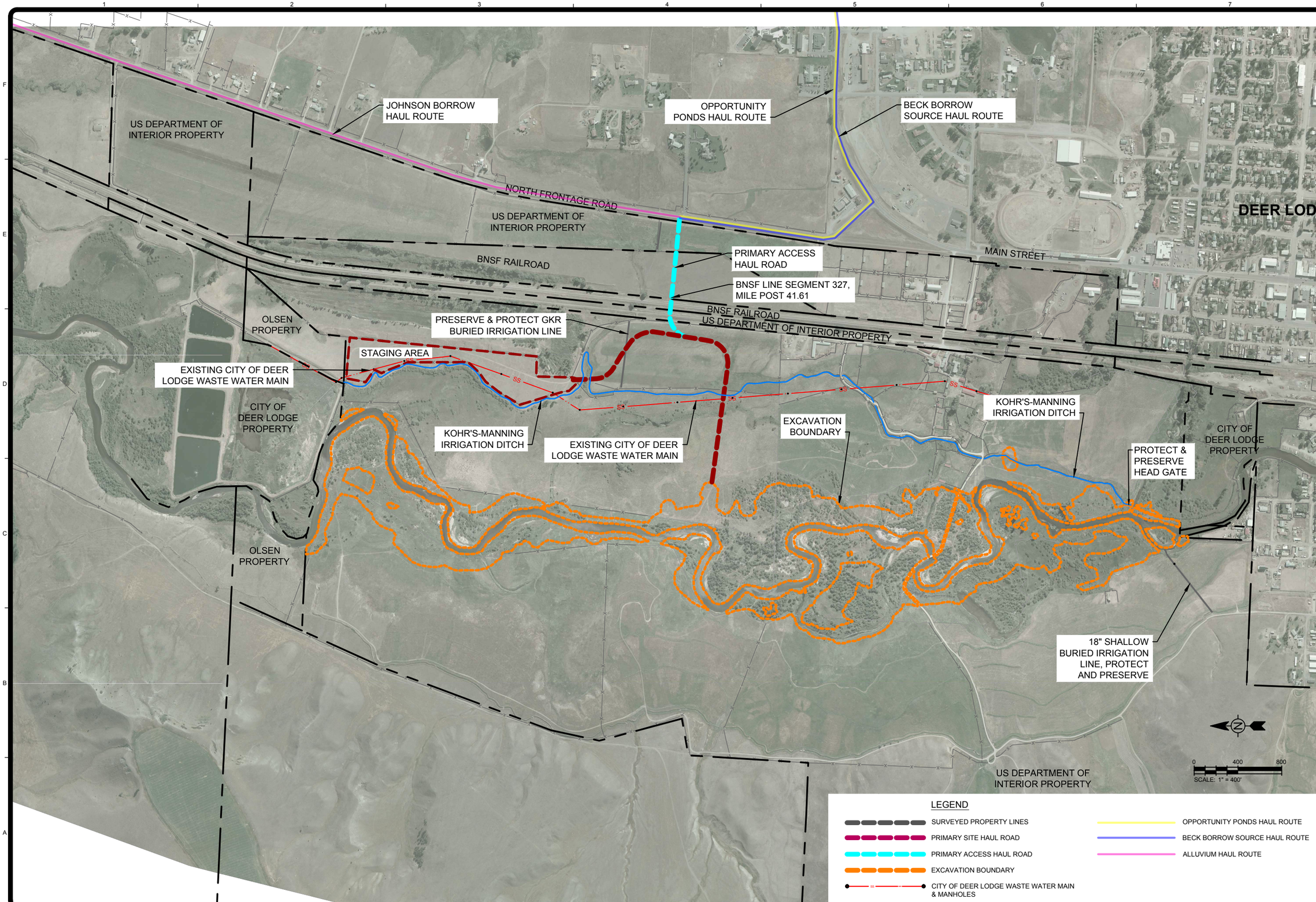
Project No.:	114-560584
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

G2

Copyright Tetra Tech

Bar Measures 1 inch

7/19/2018 10:58:55 AM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560584 - TO 38 CFR PHASE 15&16 CM\110-2D CADD\SHEETFILES\G-02-GENERAL LEGEND AND NOTES.DWG - FIELD, STEVE



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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

GENERAL SITE PLAN

Project No.:	114-560584
Designed By:	MLH
Drawn By:	SPK
Checked By:	MLH

G3

Copyright: Tetra Tech

Bar Measures 1 inch

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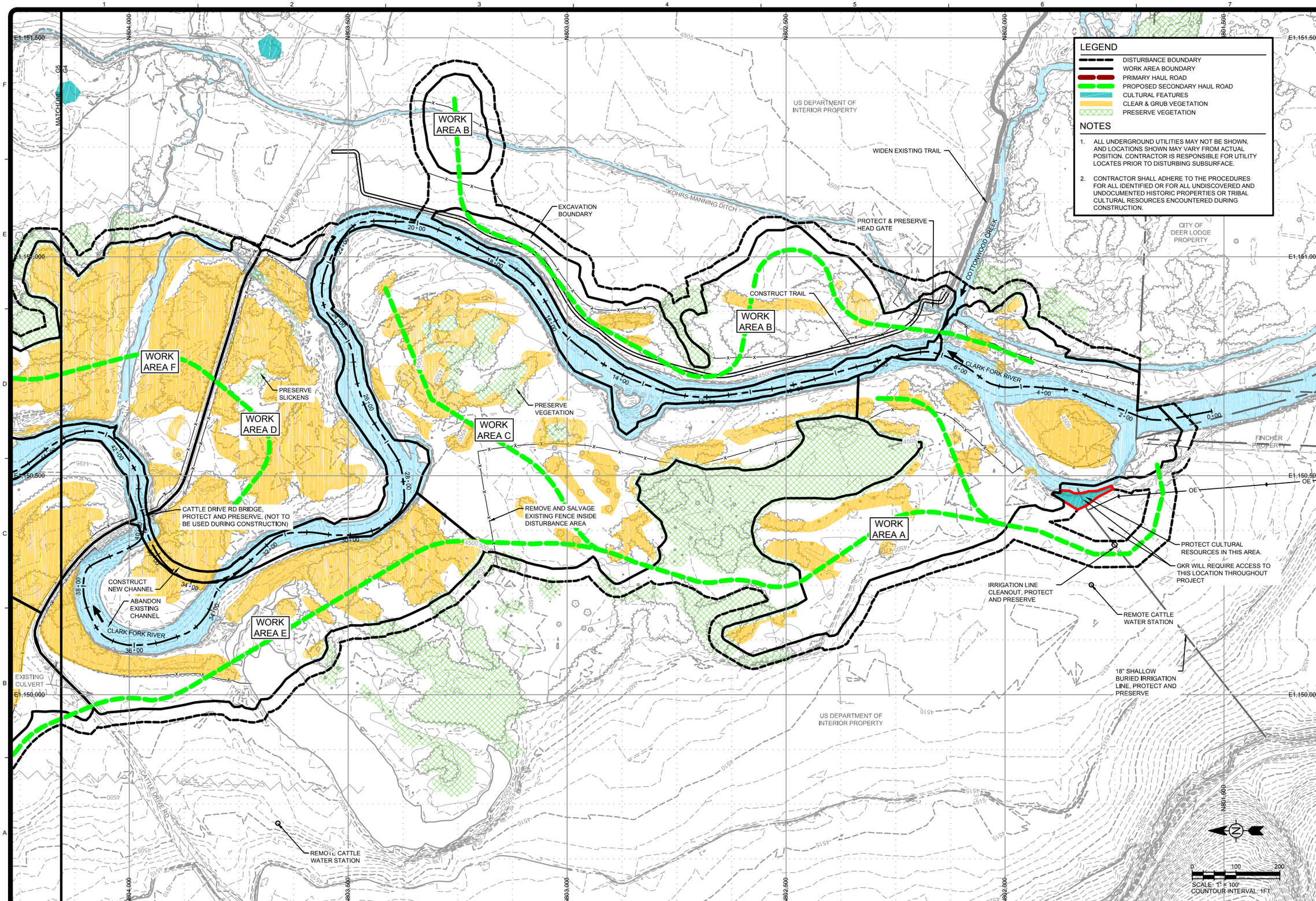

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASE 15 AND 16
CLARK FORK SITE

WORK THIS CONTRACT

Project No.:	114-560584
Designed By:	MLH
Drawn By:	SPK
Checked By:	MLH

G4

Bar Measures 1 inch

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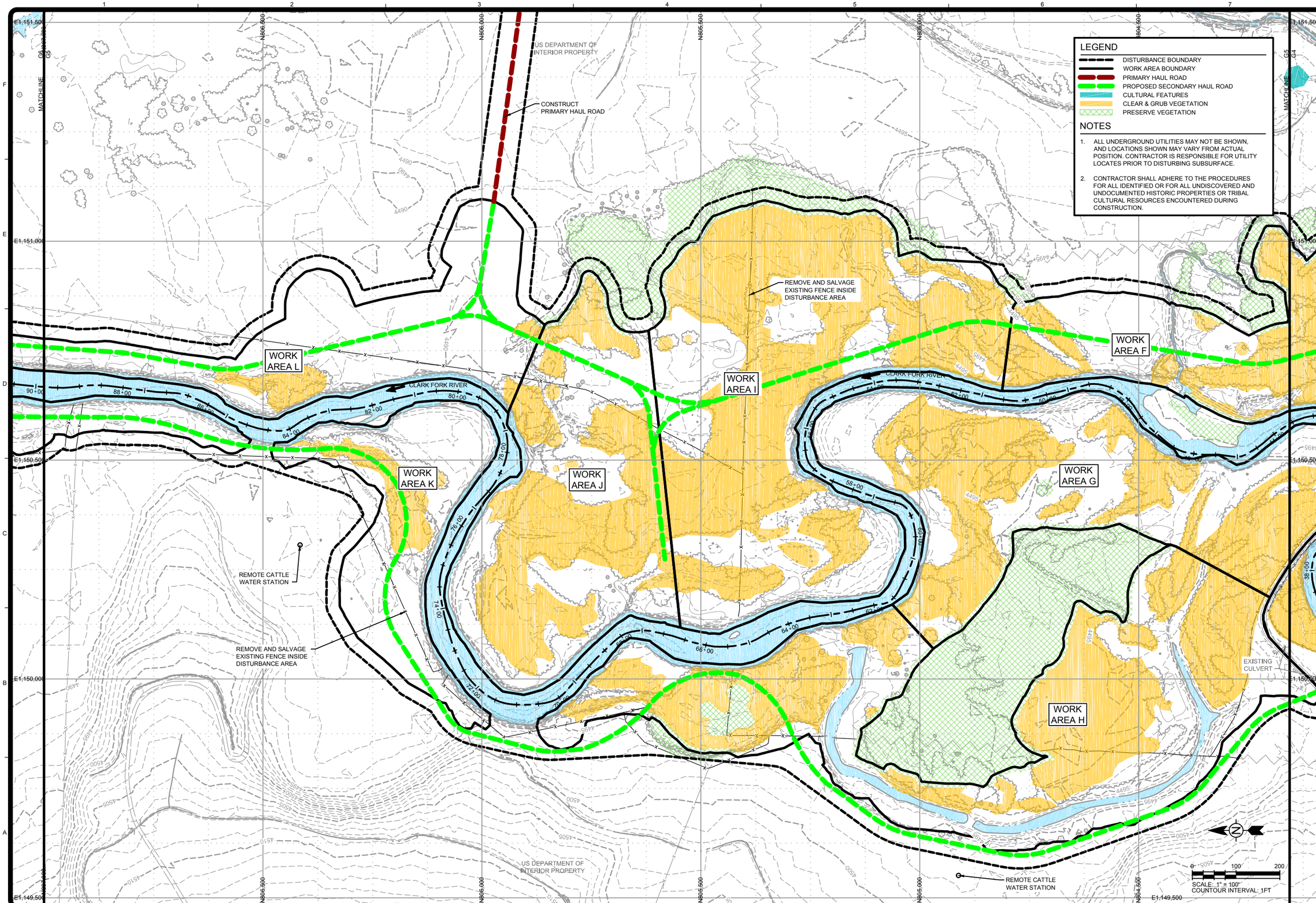

LEGEND

- DISTURBANCE BOUNDARY
- WORK AREA BOUNDARY
- PRIMARY HAUL ROAD
- PROPOSED SECONDARY HAUL ROAD
- CULTURAL FEATURES
- CLEAR & GRUB VEGETATION
- PRESERVE VEGETATION

NOTES

1. ALL UNDERGROUND UTILITIES MAY NOT BE SHOWN, AND LOCATIONS SHOWN MAY VARY FROM ACTUAL POSITION. CONTRACTOR IS RESPONSIBLE FOR UTILITY LOCATES PRIOR TO DISTURBING SUBSURFACE.
2. CONTRACTOR SHALL ADHERE TO THE PROCEDURES FOR ALL IDENTIFIED OR FOR ALL UNDISCOVERED AND UNDOCUMENTED HISTORIC PROPERTIES OR TRIBAL CULTURAL RESOURCES ENCOUNTERED DURING CONSTRUCTION.

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DEQ Montana Department of Environmental Quality

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASE 15 AND 16
CLARK FORK SITE

WORK THIS CONTRACT

Project No.:	114-560584
Designed By:	MEH
Drawn By:	SPK
Checked By:	MEH

G5

Bar Measures 1 inch

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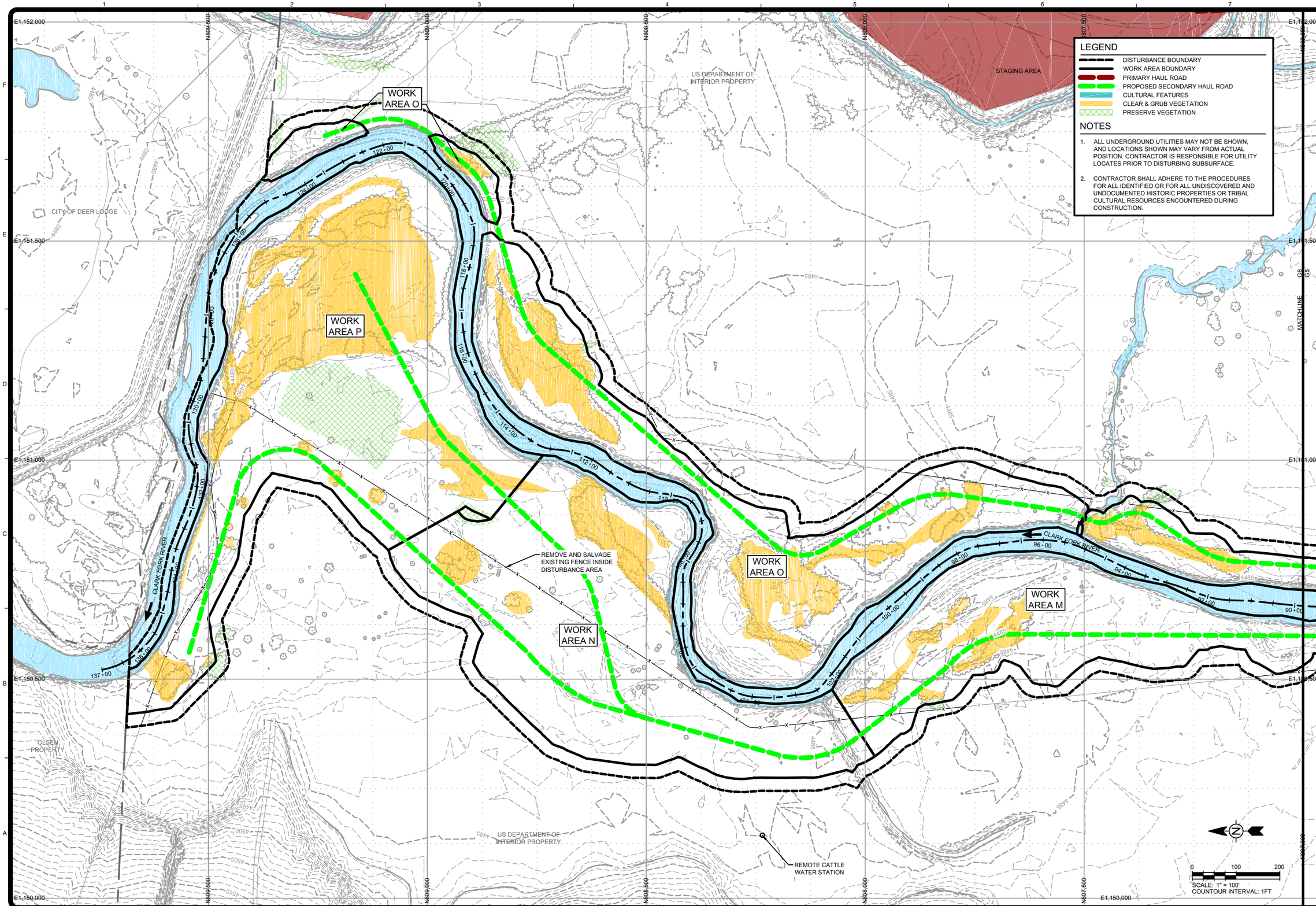

LEGEND

- DISTURBANCE BOUNDARY
- WORK AREA BOUNDARY
- PRIMARY HAUL ROAD
- PROPOSED SECONDARY HAUL ROAD
- CULTURAL FEATURES
- CLEAR & GRUB VEGETATION
- PRESERVE VEGETATION

NOTES

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASE 15 AND 16
CLARK FORK SITE

WORK THIS CONTRACT

Project No.:	114-560584
Designed By:	MLH
Drawn By:	SPK
Checked By:	MLH

G6

Bar Measures 1 inch

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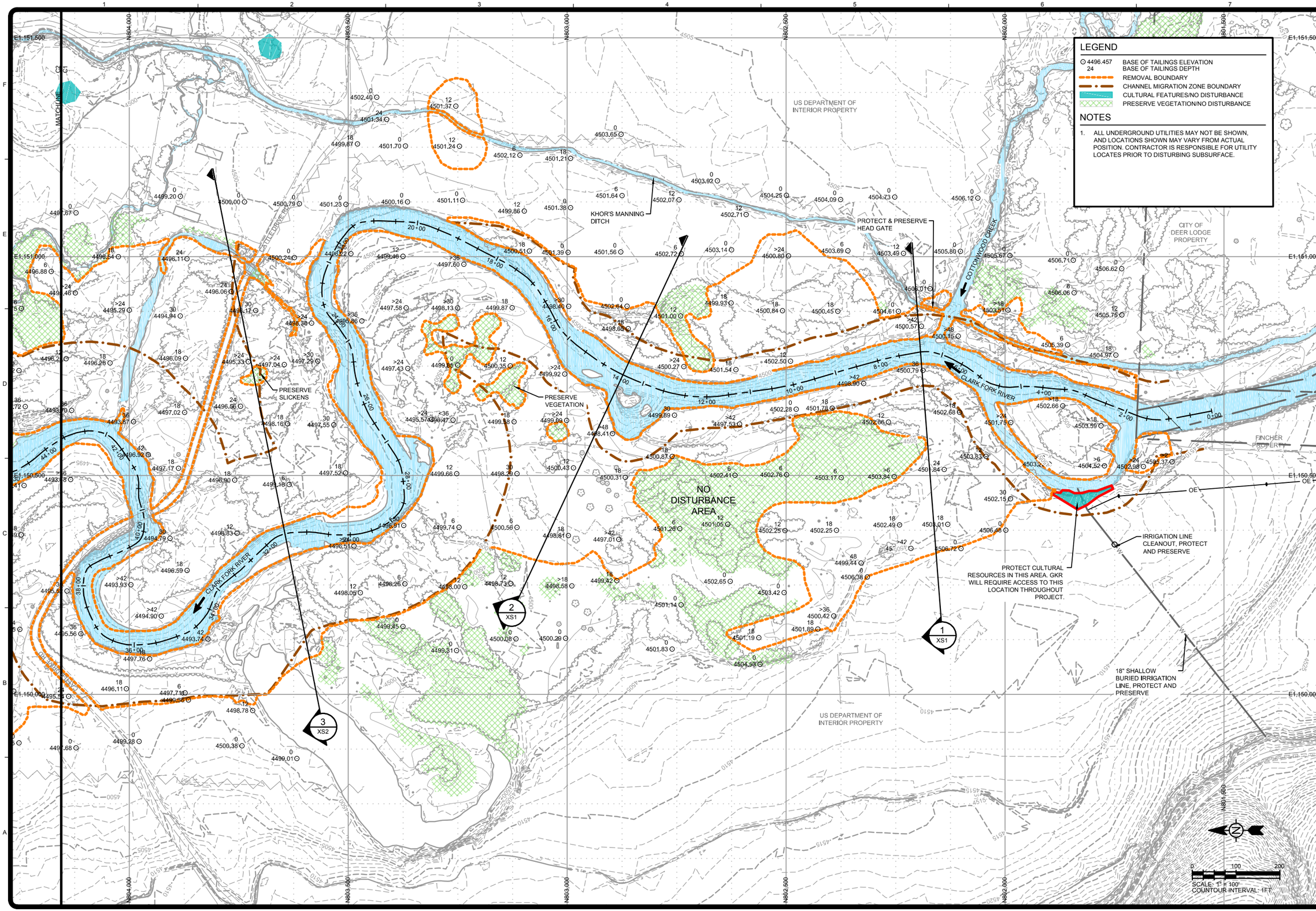

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

EXISTING CONDITIONS AND TEST PIT LOCATIONS

Project No.:	114-560584
Designed By:	MLH
Drawn By:	SEF
Checked By:	MLH

C1

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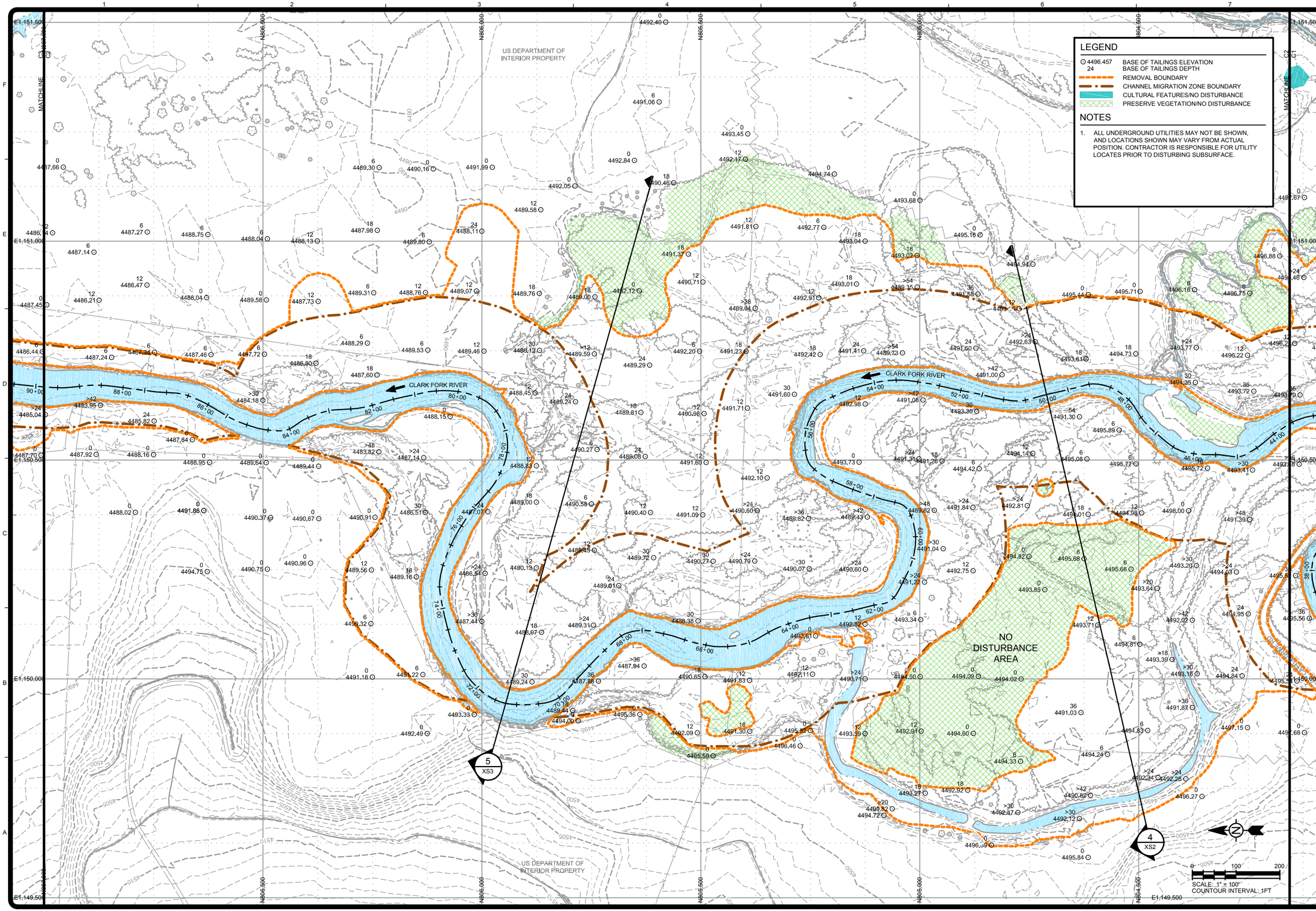

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DEQ Montana Department of Environmental Quality

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA
CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

EXISTING CONDITIONS AND TEST PIT LOCATIONS

Project No.:	114-560584
Designed By:	MEH
Drawn By:	SEF
Checked By:	MEH

C2

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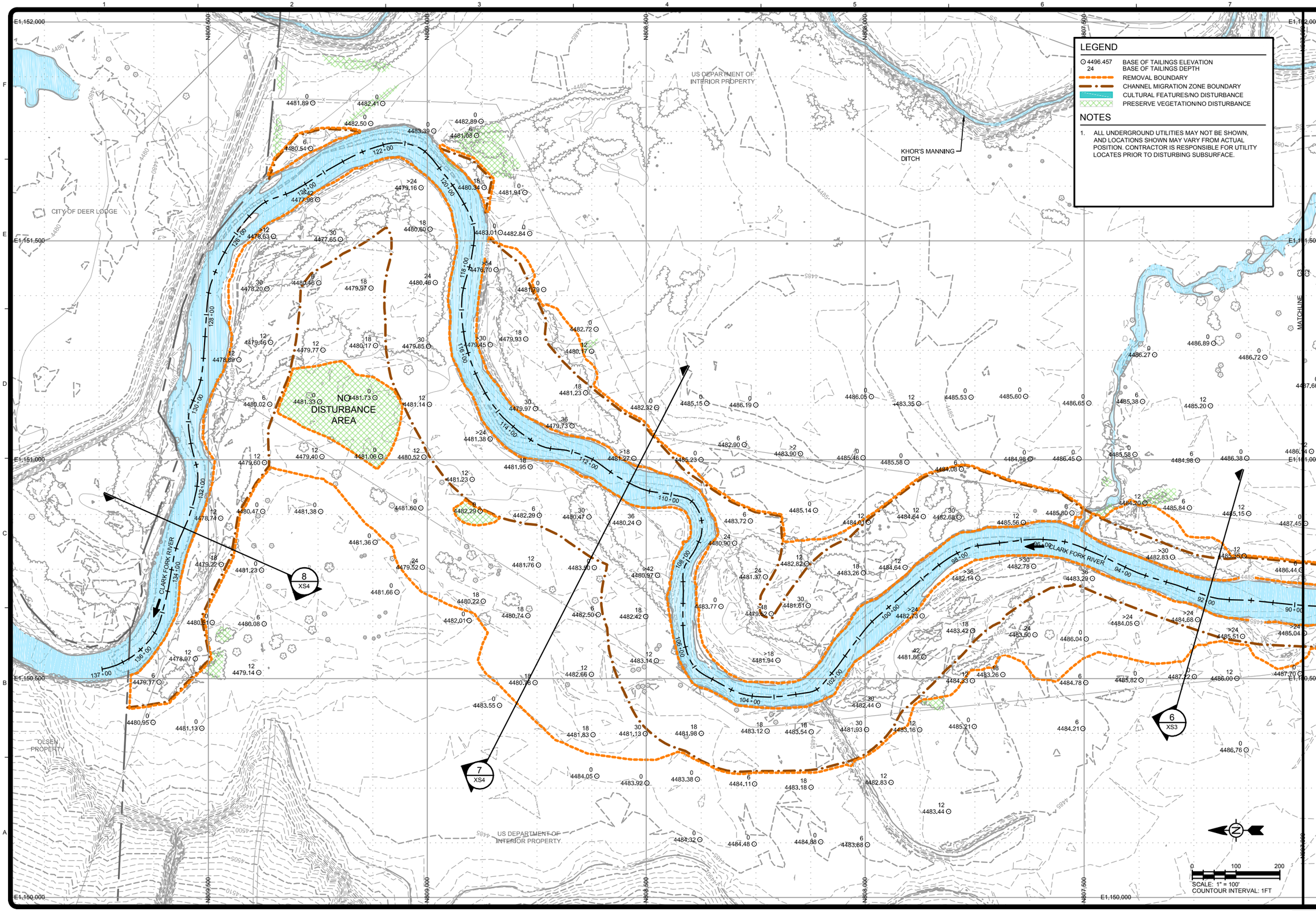

LEGEND

- 4496.457 / 24 — BASE OF TAILINGS ELEVATION / BASE OF TAILINGS DEPTH
- REMOVAL BOUNDARY
- CHANNEL MIGRATION ZONE BOUNDARY
- CULTURAL FEATURES/NO DISTURBANCE
- PRESERVE VEGETATION/NO DISTURBANCE

NOTES

1. ALL UNDERGROUND UTILITIES MAY NOT BE SHOWN, AND LOCATIONS SHOWN MAY VARY FROM ACTUAL POSITION. CONTRACTOR IS RESPONSIBLE FOR UTILITY LOCATES PRIOR TO DISTURBING SUBSURFACE.

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DEQ Montana Department of Environmental Quality

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA
CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

EXISTING CONDITIONS AND TEST PIT LOCATIONS

Project No.:	114-560584
Designed By:	MLH
Drawn By:	SEF
Checked By:	MLH

C3

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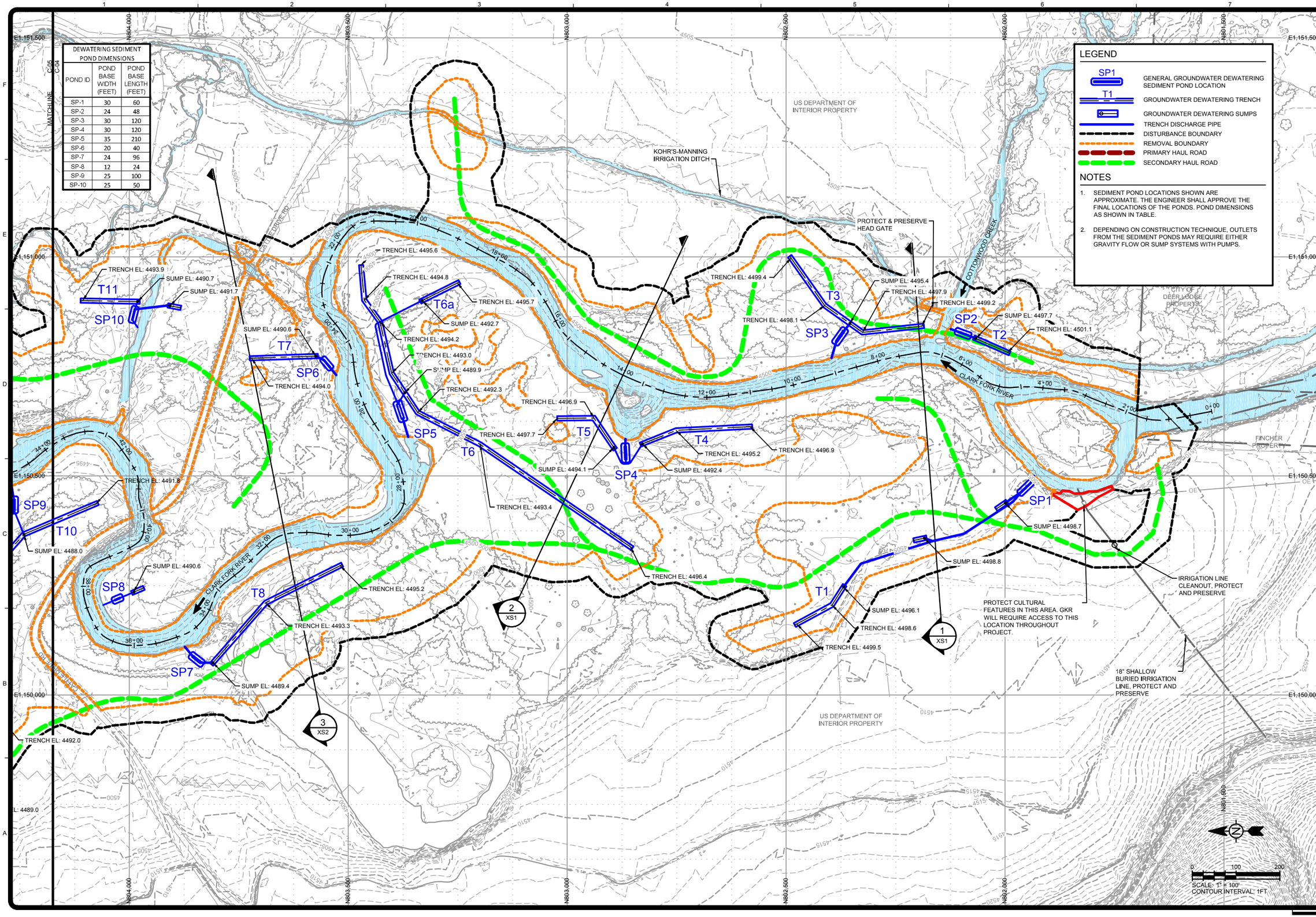
DEWATERING SEDIMENT POND DIMENSIONS		
POND ID	POND BASE WIDTH (FEET)	POND BASE LENGTH (FEET)
SP-1	30	60
SP-2	24	48
SP-3	30	120
SP-4	30	120
SP-5	35	210
SP-6	20	40
SP-7	24	96
SP-8	12	24
SP-9	25	100
SP-10	25	50

LEGEND

- SP1 — GENERAL GROUNDWATER DEWATERING SEDIMENT POND LOCATION
- T1 — GROUNDWATER DEWATERING TRENCH
- GROUNDWATER DEWATERING SUMPS
- TRENCH DISCHARGE PIPE
- DISTURBANCE BOUNDARY
- REMOVAL BOUNDARY
- PRIMARY HAUL ROAD
- SECONDARY HAUL ROAD

NOTES

1. SEDIMENT POND LOCATIONS SHOWN ARE APPROXIMATE. THE ENGINEER SHALL APPROVE THE FINAL LOCATIONS OF THE PONDS. POND DIMENSIONS AS SHOWN IN TABLE.
2. DEPENDING ON CONSTRUCTION TECHNIQUE, OUTLETS FROM THE SEDIMENT PONDS MAY REQUIRE EITHER GRAVITY FLOW OR SUMP SYSTEMS WITH PUMPS.



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DEQ Montana Department of Environmental Quality

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA
CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

DEWATERING PLAN

Project No.:	114-560584
Designed By:	SEF
Drawn By:	SPK
Checked By:	MLH

C4

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Bar Measures 1 inch

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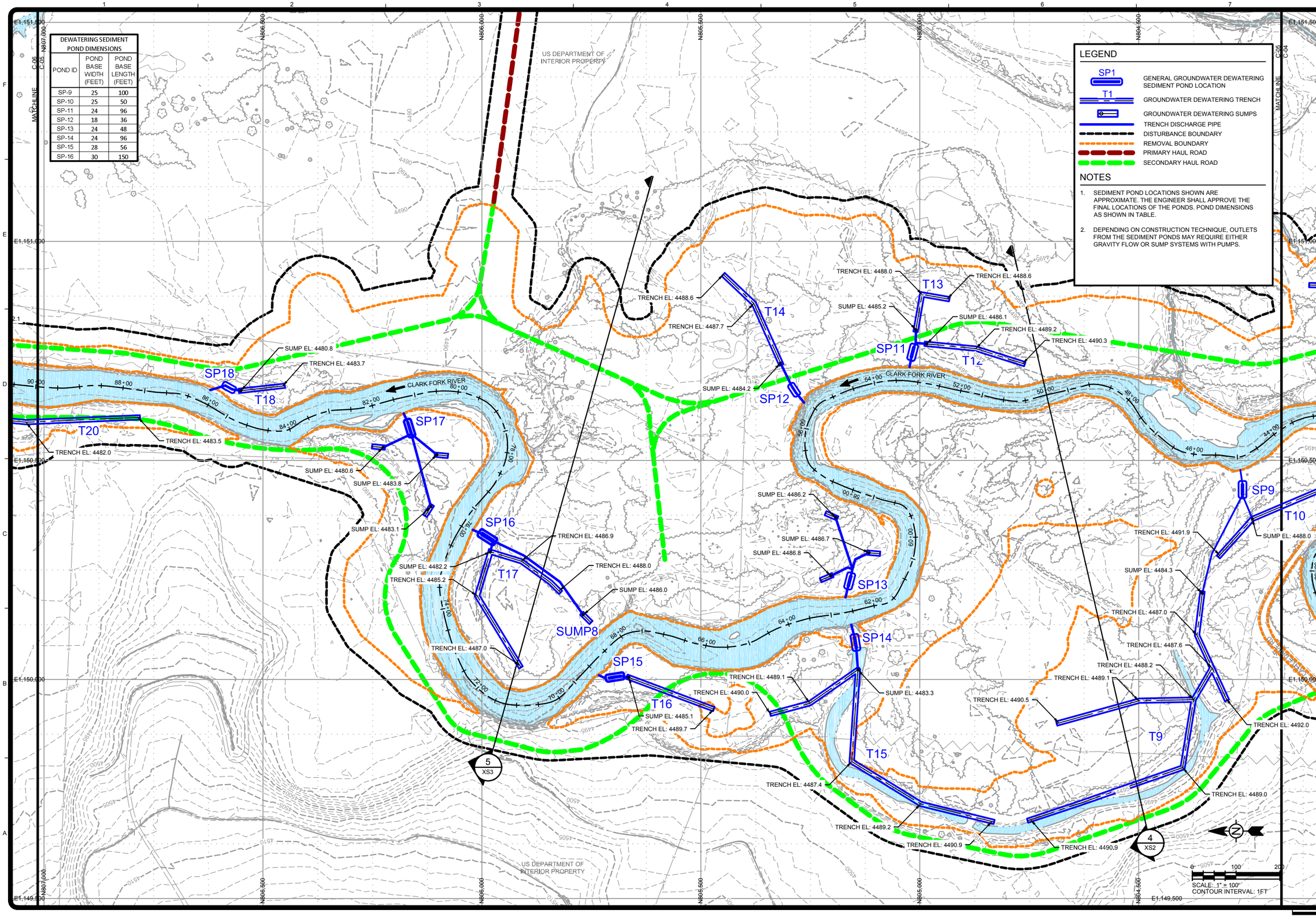
DEWATERING SEDIMENT POND DIMENSIONS		
POND ID	POND BASE WIDTH (FEET)	POND BASE LENGTH (FEET)
SP-9	25	100
SP-10	25	50
SP-11	24	96
SP-12	18	36
SP-13	24	48
SP-14	24	96
SP-15	28	56
SP-16	30	150



LEGEND

- SP1 — GENERAL GROUNDWATER DEWATERING SEDIMENT POND LOCATION
- T1 — GROUNDWATER DEWATERING TRENCH
- GROUNDWATER DEWATERING SUMPS
- TRENCH DISCHARGE PIPE
- DISTURBANCE BOUNDARY
- REMOVAL BOUNDARY
- PRIMARY HAUL ROAD
- SECONDARY HAUL ROAD

NOTES

1. SEDIMENT POND LOCATIONS SHOWN ARE APPROXIMATE. THE ENGINEER SHALL APPROVE THE FINAL LOCATIONS OF THE PONDS. POND DIMENSIONS AS SHOWN IN TABLE.
2. DEPENDING ON CONSTRUCTION TECHNIQUE, OUTLETS FROM THE SEDIMENT PONDS MAY REQUIRE EITHER GRAVITY FLOW OR SUMP SYSTEMS WITH PUMPS.

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CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

DEWATERING PLAN

Project No.:	114-560584
Designed By:	SEF
Drawn By:	SPK
Checked By:	MLH

C5

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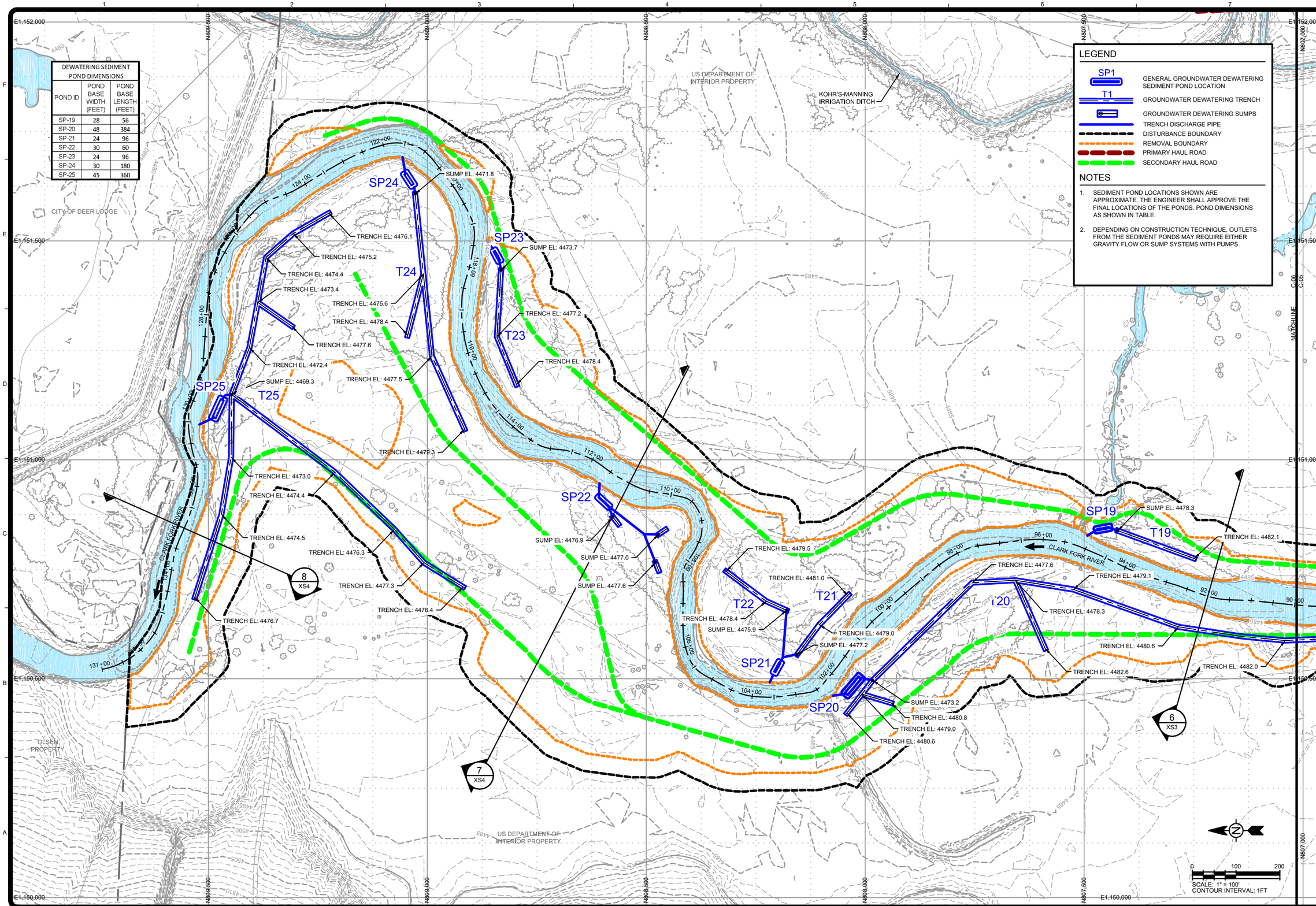
Bar Measures 1 inch

7/17/2018 3:33:56 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560584 - TO 38 CFR PHASE 15&16 CM\110-2D CADD\SHEETFILES\C-04-05-06-DEWATERING PLAN.DWG - FIELD, STEVE

DEWATERING SEDIMENT POND DIMENSIONS		
POND ID	POND BASE WIDTH (FEET)	POND BASE LENGTH (FEET)
SP-19	28	56
SP-20	48	384
SP-21	24	96
SP-22	30	60
SP-23	24	96
SP-24	30	180
SP-25	45	360



LEGEND

- SP1 — GENERAL GROUNDWATER DEWATERING SEDIMENT POND LOCATION
- T1 — GROUNDWATER DEWATERING TRENCH
- GROUNDWATER DEWATERING SUMPS
- TRENCH DISCHARGE PIPE
- DISTURBANCE BOUNDARY
- REMOVAL BOUNDARY
- PRIMARY HAUL ROAD
- SECONDARY HAUL ROAD

NOTES

1. SEDIMENT POND LOCATIONS SHOWN ARE APPROXIMATE. THE ENGINEER SHALL APPROVE THE FINAL LOCATIONS OF THE PONDS. POND DIMENSIONS AS SHOWN IN TABLE.
2. DEPENDING ON CONSTRUCTION TECHNIQUE, OUTLETS FROM THE SEDIMENT PONDS MAY REQUIRE EITHER GRAVITY FLOW OR SUMP SYSTEMS WITH PUMPS.

TETRA TECH
www.tetratech.com
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Helena, Montana 59602
PHONE: 406-443-5210 FAX: 406-442-7182

DEQ Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY
0	7/20/18	ISSUED FOR CONSTRUCTION	SEF

Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA
CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

DEWATERING PLAN

Project No.:	114-560584
Designed By:	SEF
Drawn By:	SPK
Checked By:	MLH

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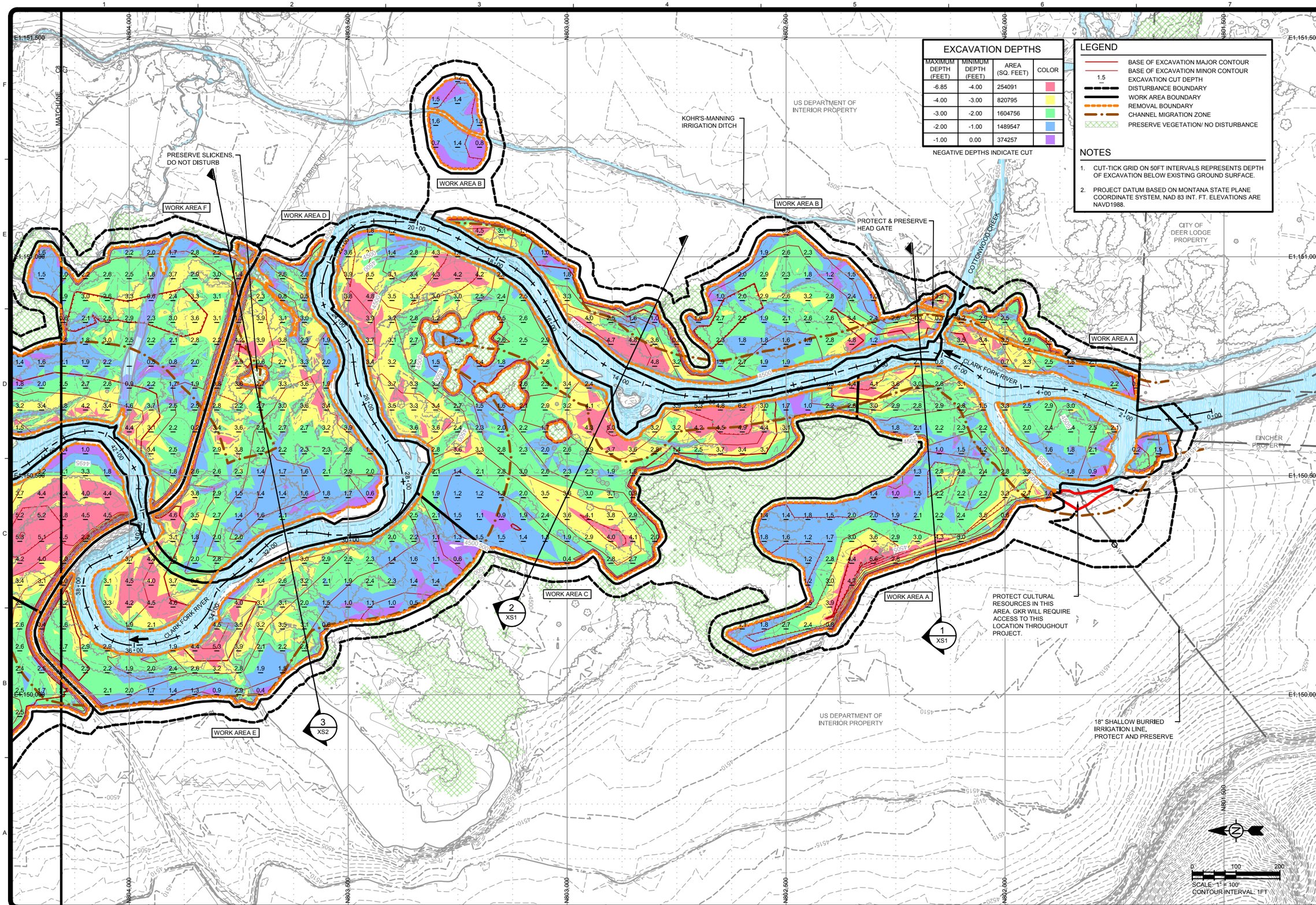

EXCAVATION DEPTHS

MAXIMUM DEPTH (FEET)	MINIMUM DEPTH (FEET)	AREA (SQ. FEET)	COLOR
-6.85	-4.00	254091	
-4.00	-3.00	820795	
-3.00	-2.00	1604756	
-2.00	-1.00	1489547	
-1.00	0.00	374257	

NEGATIVE DEPTHS INDICATE CUT

LEGEND

- BASE OF EXCAVATION MAJOR CONTOUR
- BASE OF EXCAVATION MINOR CONTOUR
- 1.5 EXCAVATION CUT DEPTH
- DISTURBANCE BOUNDARY
- WORK AREA BOUNDARY
- REMOVAL BOUNDARY
- CHANNEL MIGRATION ZONE
- PRESERVE VEGETATION/ NO DISTURBANCE

NOTES

1. CUT-TICK GRID ON 50FT INTERVALS REPRESENTS DEPTH OF EXCAVATION BELOW EXISTING GROUND SURFACE.
2. PROJECT DATUM BASED ON MONTANA STATE PLANE COORDINATE SYSTEM, NAD 83 INT. FT. ELEVATIONS ARE NAVD1988.

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Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

IMPACTED FLOODPLAIN MATERIAL EXCAVATION PLAN

Project No.:	114-560584
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

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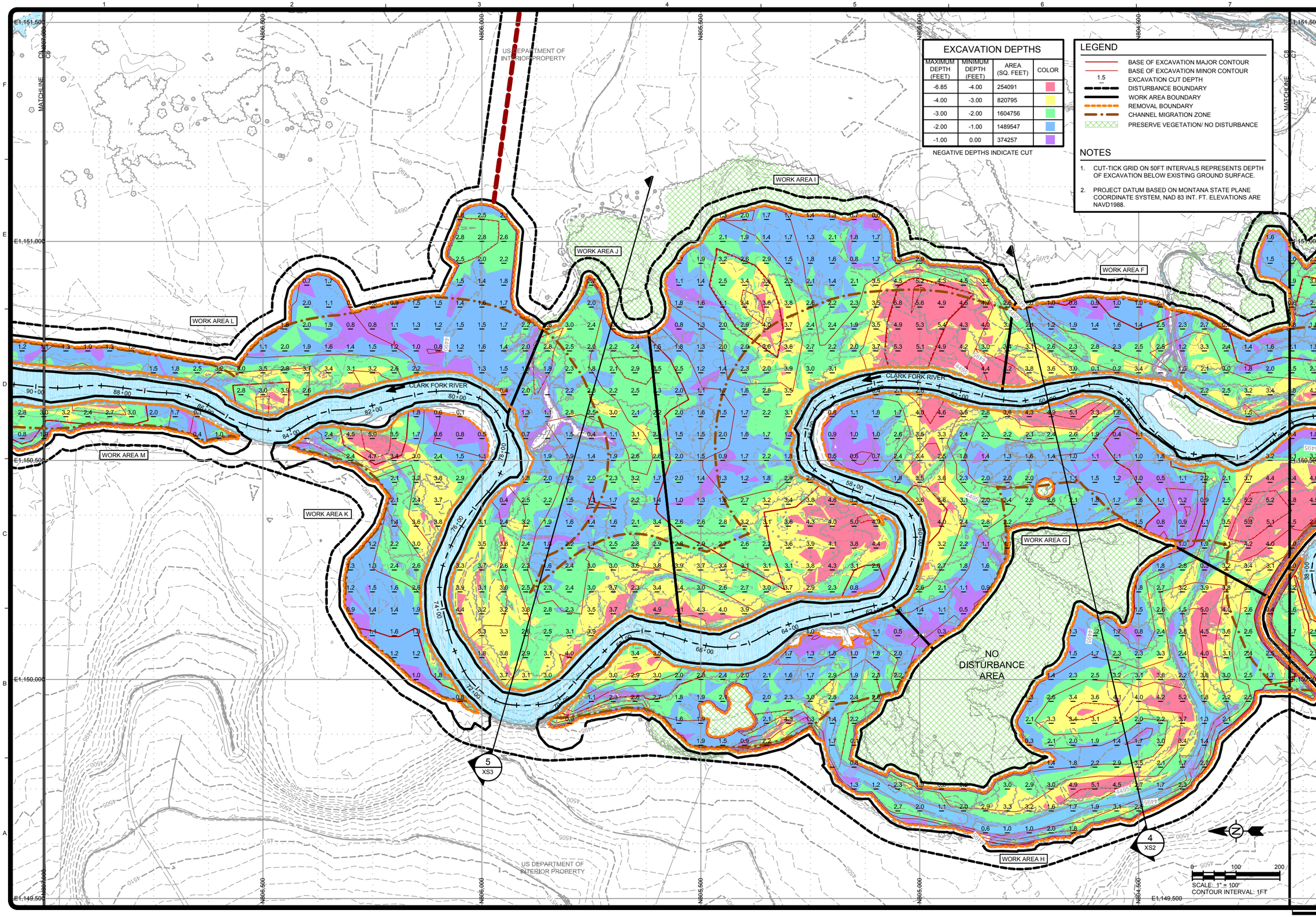

EXCAVATION DEPTHS

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-4.00	-3.00	820795	
-3.00	-2.00	1604756	
-2.00	-1.00	1489547	
-1.00	0.00	374257	

NEGATIVE DEPTHS INDICATE CUT

LEGEND

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- BASE OF EXCAVATION MINOR CONTOUR
- 1.5 EXCAVATION CUT DEPTH
- DISTURBANCE BOUNDARY
- WORK AREA BOUNDARY
- REMOVAL BOUNDARY
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NOTES

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CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

IMPACTED FLOODPLAIN MATERIAL EXCAVATION PLAN

Project No.:	114-560584
Designed By:	SEF
Drawn By:	SEF
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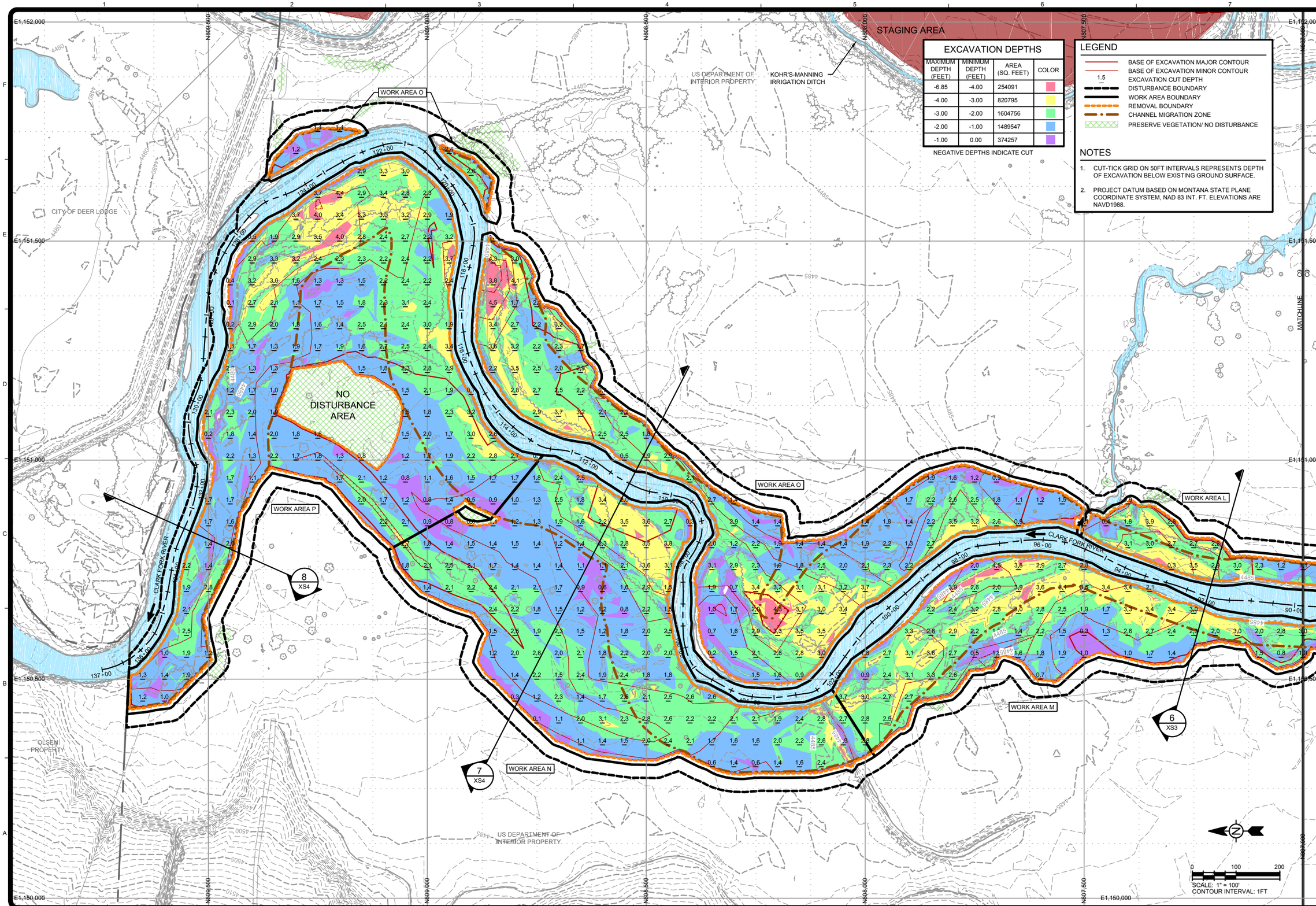

EXCAVATION DEPTHS

MAXIMUM DEPTH (FEET)	MINIMUM DEPTH (FEET)	AREA (SQ. FEET)	COLOR
-6.85	-4.00	254091	
-4.00	-3.00	820795	
-3.00	-2.00	1604756	
-2.00	-1.00	1489547	
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NEGATIVE DEPTHS INDICATE CUT

LEGEND

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- BASE OF EXCAVATION MINOR CONTOUR
- 1.5 EXCAVATION CUT DEPTH
- DISTURBANCE BOUNDARY
- WORK AREA BOUNDARY
- REMOVAL BOUNDARY
- CHANNEL MIGRATION ZONE
- PRESERVE VEGETATION/ NO DISTURBANCE

NOTES

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CLARK FORK SITE

IMPACTED FLOODPLAIN MATERIAL EXCAVATION PLAN

Project No.:	114-560584
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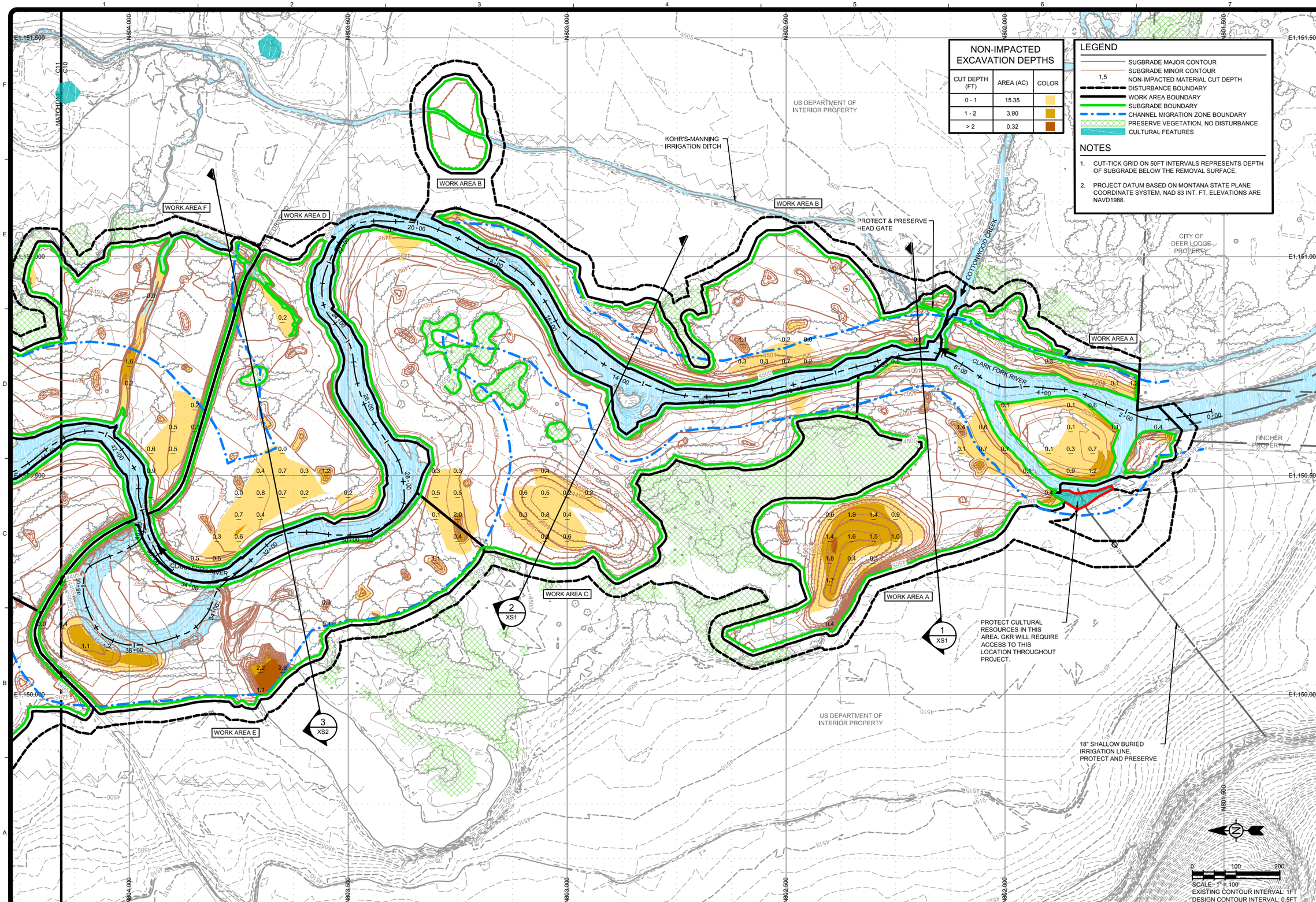

NON-IMPACTED EXCAVATION DEPTHS

CUT DEPTH (FT)	AREA (AC)	COLOR
0 - 1	15.35	
1 - 2	3.90	
> 2	0.32	

LEGEND

- SUGBRADE MAJOR CONTOUR
- SUBGRADE MINOR CONTOUR
- 1.5 NON-IMPACTED MATERIAL CUT DEPTH
- DISTURBANCE BOUNDARY
- WORK AREA BOUNDARY
- SUBGRADE BOUNDARY
- CHANNEL MIGRATION ZONE BOUNDARY
- PRESERVE VEGETATION, NO DISTURBANCE
- CULTURAL FEATURES

NOTES

1. CUT-TICK GRID ON 50FT INTERVALS REPRESENTS DEPTH OF SUBGRADE BELOW THE REMOVAL SURFACE.
2. PROJECT DATUM BASED ON MONTANA STATE PLANE COORDINATE SYSTEM, NAD 83 INT. FT. ELEVATIONS ARE NAVD1988.

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Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

NON-IMPACTED MATERIAL EXCAVATION PLAN

Project No.:	114-560584
Designed By:	SEF
Drawn By:	SEF
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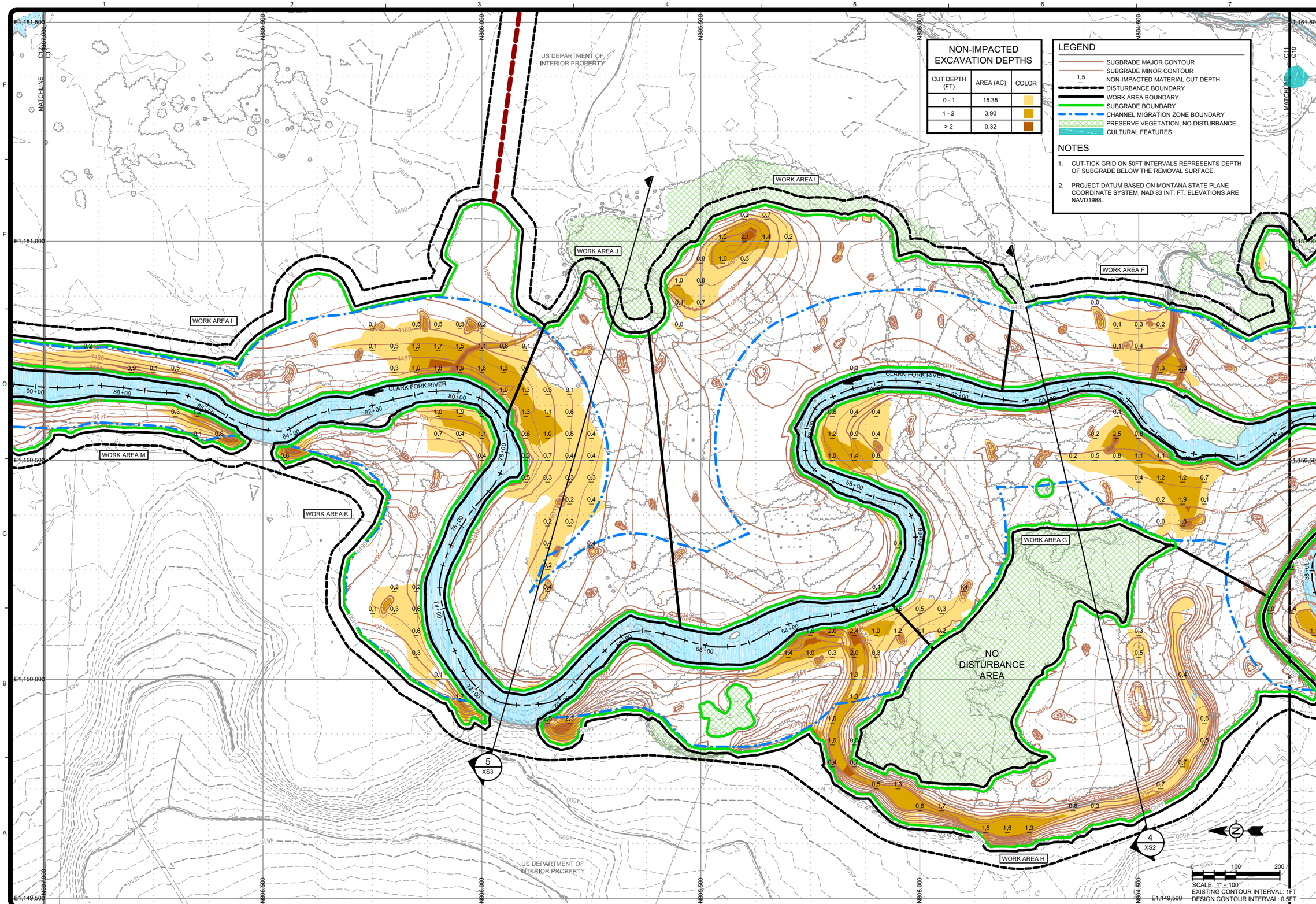

NON-IMPACTED EXCAVATION DEPTHS

CUT DEPTH (FT)	AREA (AC)	COLOR
0 - 1	15.35	
1 - 2	3.90	
> 2	0.32	

LEGEND

- SUGBRADE MAJOR CONTOUR
- SUBGRADE MINOR CONTOUR
- 1.5 NON-IMPACTED MATERIAL CUT DEPTH
- DISTURBANCE BOUNDARY
- WORK AREA BOUNDARY
- SUBGRADE BOUNDARY
- CHANNEL MIGRATION ZONE BOUNDARY
- PRESERVE VEGETATION, NO DISTURBANCE
- CULTURAL FEATURES

NOTES

1. CUT-TICK GRID ON 50FT INTERVALS REPRESENTS DEPTH OF SUBGRADE BELOW THE REMOVAL SURFACE.
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Proj. Loc.: DEER LODGE, MONTANA
CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

NON-IMPACTED MATERIAL EXCAVATION PLAN

Project No.:	114-560584
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Drawn By:	SEF
Checked By:	MLH

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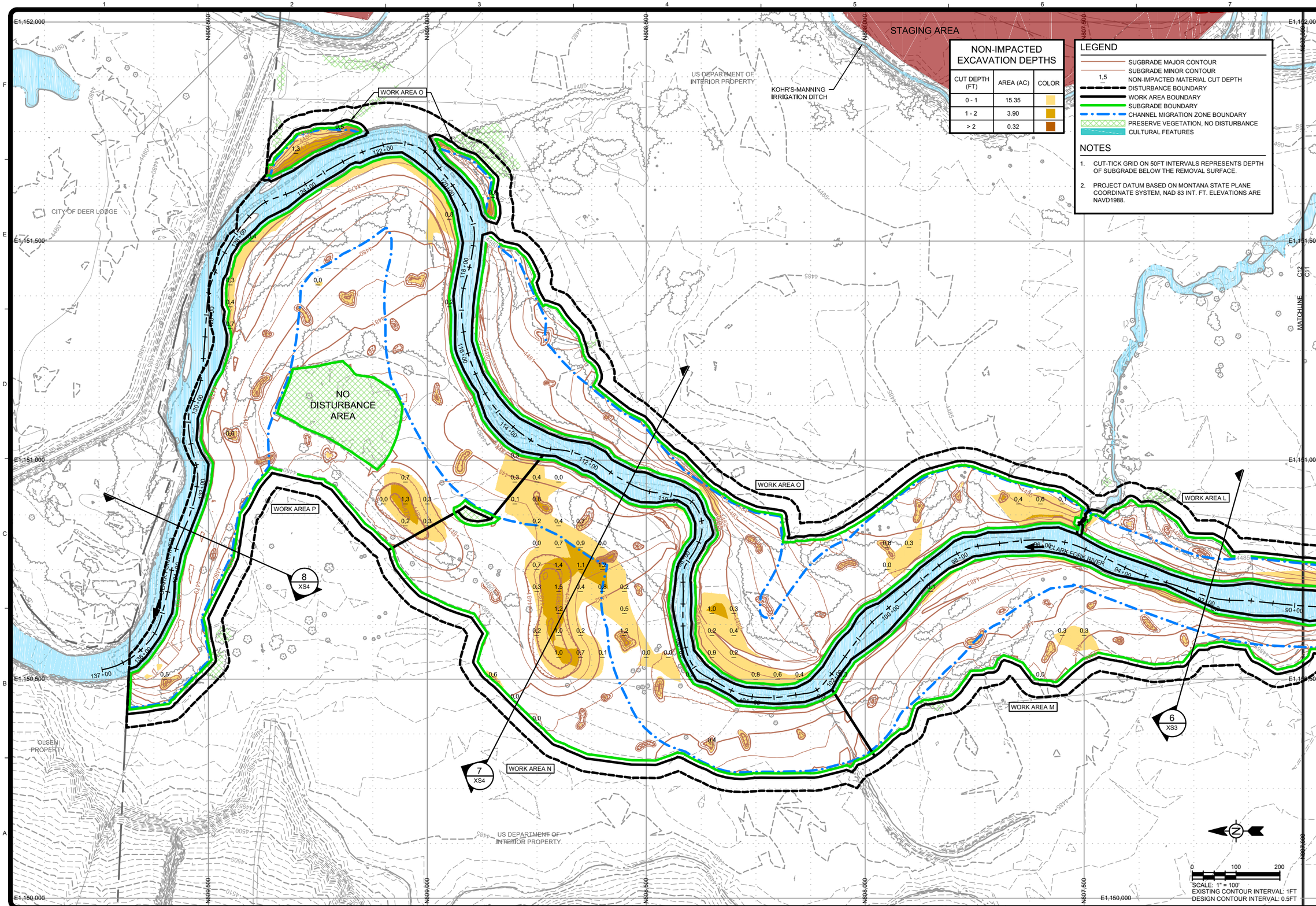

NON-IMPACTED EXCAVATION DEPTHS

CUT DEPTH (FT)	AREA (AC)	COLOR
0 - 1	15.35	
1 - 2	3.90	
> 2	0.32	

LEGEND

- SUGBRADE MAJOR CONTOUR
- SUBGRADE MINOR CONTOUR
- 1.5 NON-IMPACTED MATERIAL CUT DEPTH
- DISTURBANCE BOUNDARY
- WORK AREA BOUNDARY
- SUBGRADE BOUNDARY
- CHANNEL MIGRATION ZONE BOUNDARY
- PRESERVE VEGETATION, NO DISTURBANCE
- CULTURAL FEATURES

NOTES

1. CUT-TICK GRID ON 50FT INTERVALS REPRESENTS DEPTH OF SUBGRADE BELOW THE REMOVAL SURFACE.
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Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

NON-IMPACTED MATERIAL EXCAVATION PLAN

Project No.:	114-560584
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Drawn By:	SEF
Checked By:	MLH

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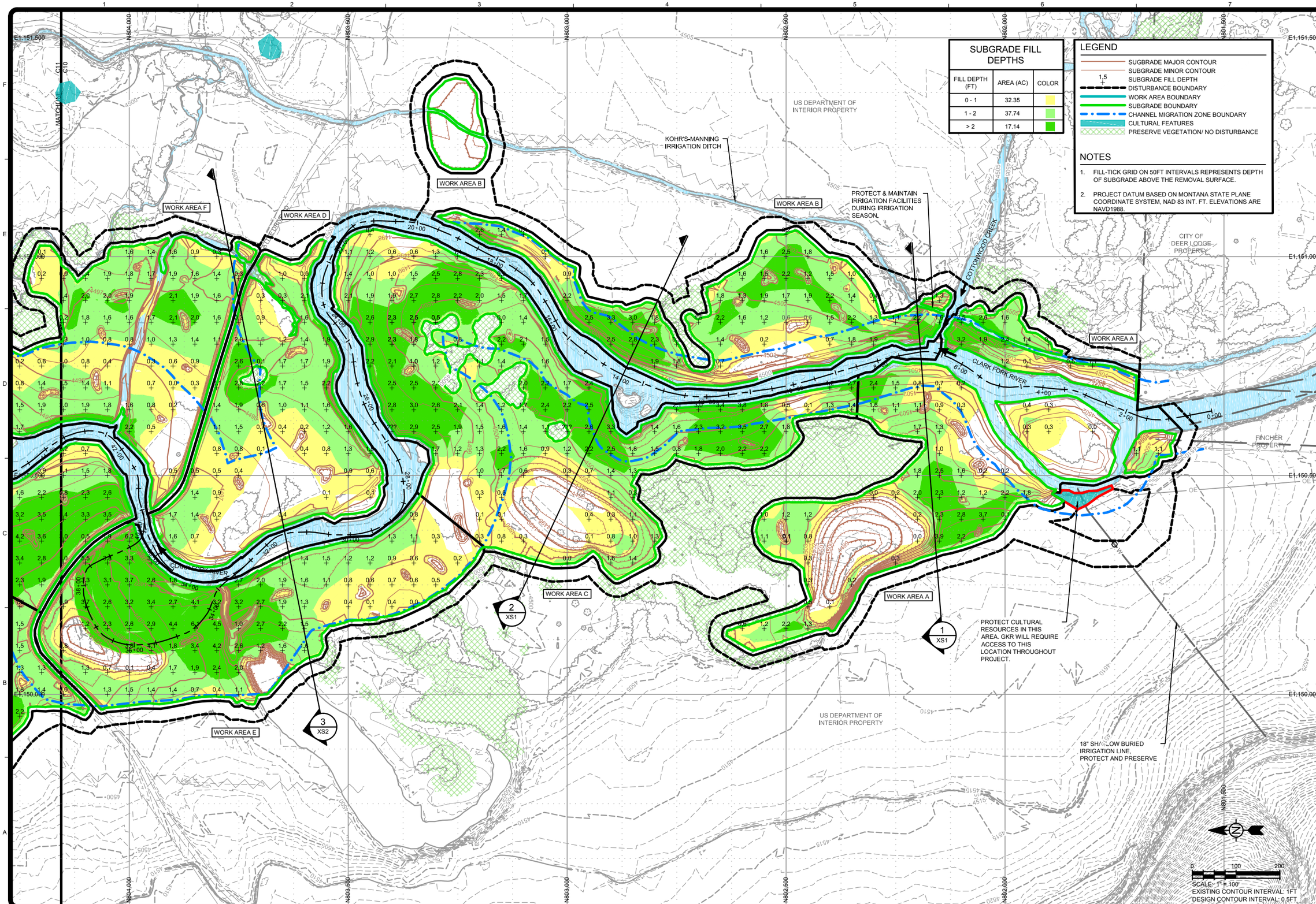

SUBGRADE FILL DEPTHS

FILL DEPTH (FT)	AREA (AC)	COLOR
0 - 1	32.35	
1 - 2	37.74	
> 2	17.14	

LEGEND

- SUGBRADE MAJOR CONTOUR
- SUBGRADE MINOR CONTOUR
- SUBGRADE FILL DEPTH
- DISTURBANCE BOUNDARY
- WORK AREA BOUNDARY
- SUBGRADE BOUNDARY
- CHANNEL MIGRATION ZONE BOUNDARY
- CULTURAL FEATURES
- PRESERVE VEGETATION/ NO DISTURBANCE

NOTES

1. FILL-TICK GRID ON 50FT INTERVALS REPRESENTS DEPTH OF SUBGRADE ABOVE THE REMOVAL SURFACE.
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Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

SUBGRADE PLAN

Project No.:	114-560584
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Checked By:	MLH

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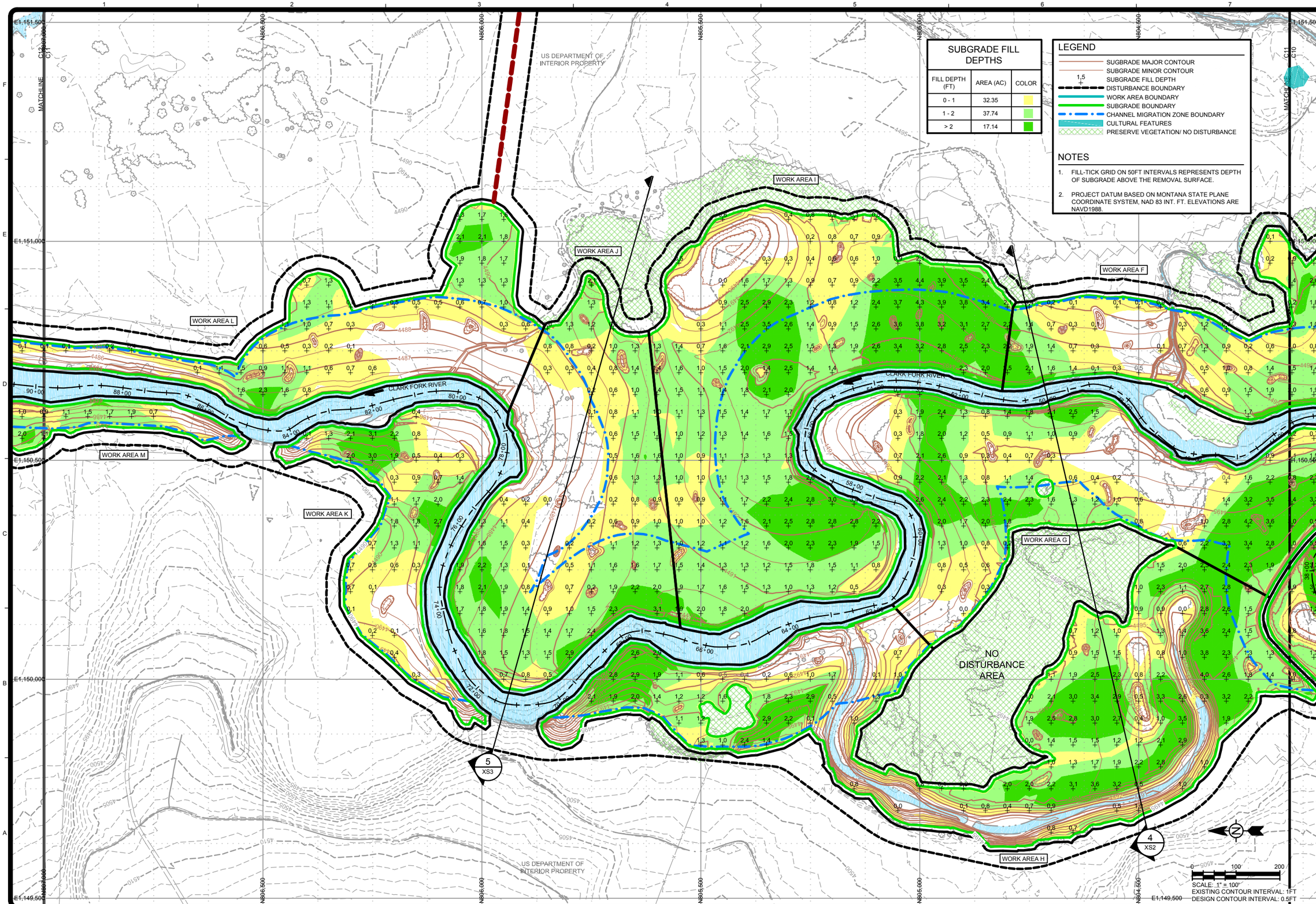

SUBGRADE FILL DEPTHS

FILL DEPTH (FT)	AREA (AC)	COLOR
0 - 1	32.35	
1 - 2	37.74	
> 2	17.14	

LEGEND

- SUGBRADE MAJOR CONTOUR
- SUBGRADE MINOR CONTOUR
- 1.5 SUBGRADE FILL DEPTH
- DISTURBANCE BOUNDARY
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- SUBGRADE BOUNDARY
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- CULTURAL FEATURES
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NOTES

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CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

SUBGRADE PLAN

Project No.:	114-560584
Designed By:	SEF
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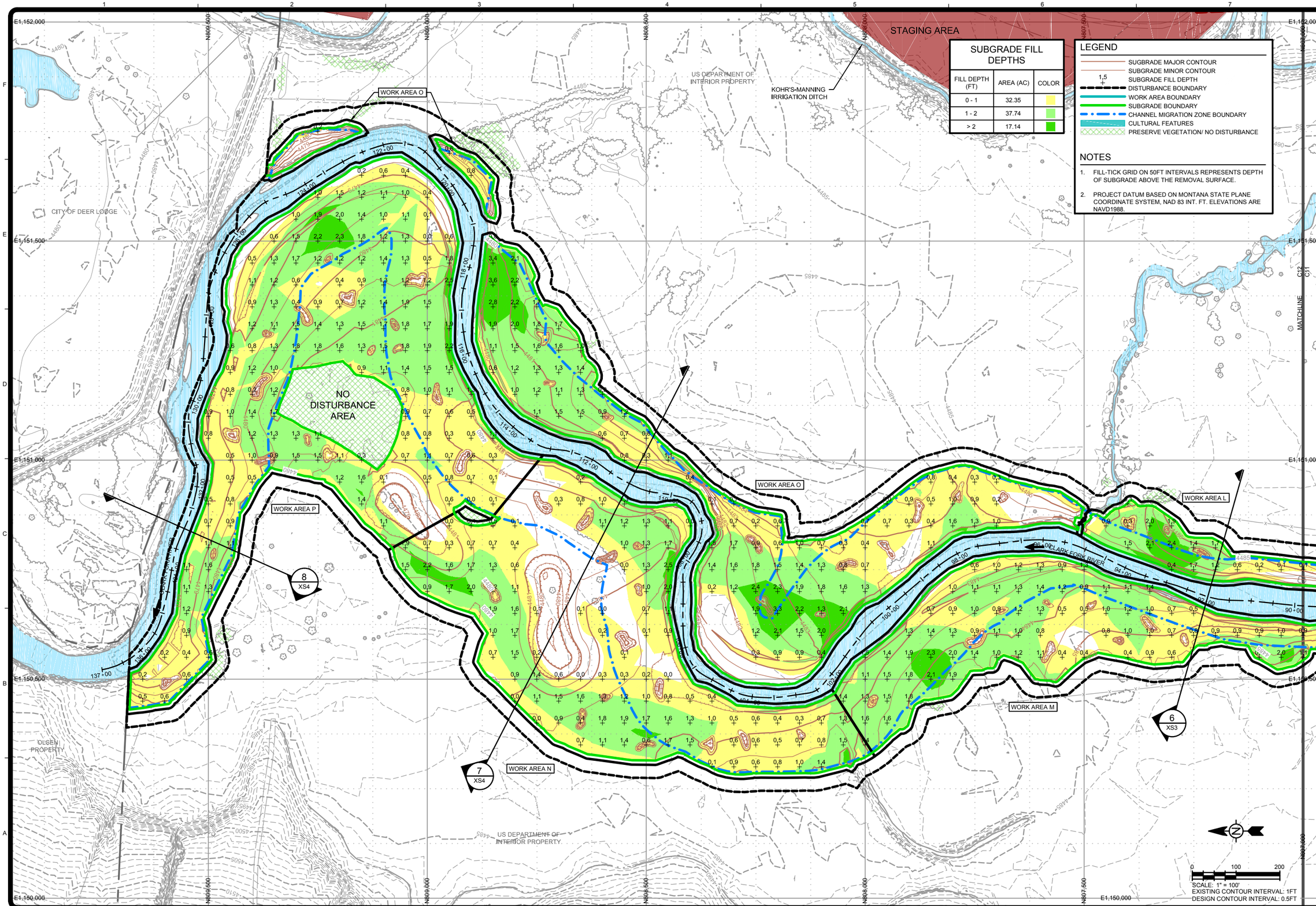

SUBGRADE FILL DEPTHS

FILL DEPTH (FT)	AREA (AC)	COLOR
0 - 1	32.35	
1 - 2	37.74	
> 2	17.14	

LEGEND

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CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

SUBGRADE PLAN

Project No.:	114-560584
Designed By:	SEF
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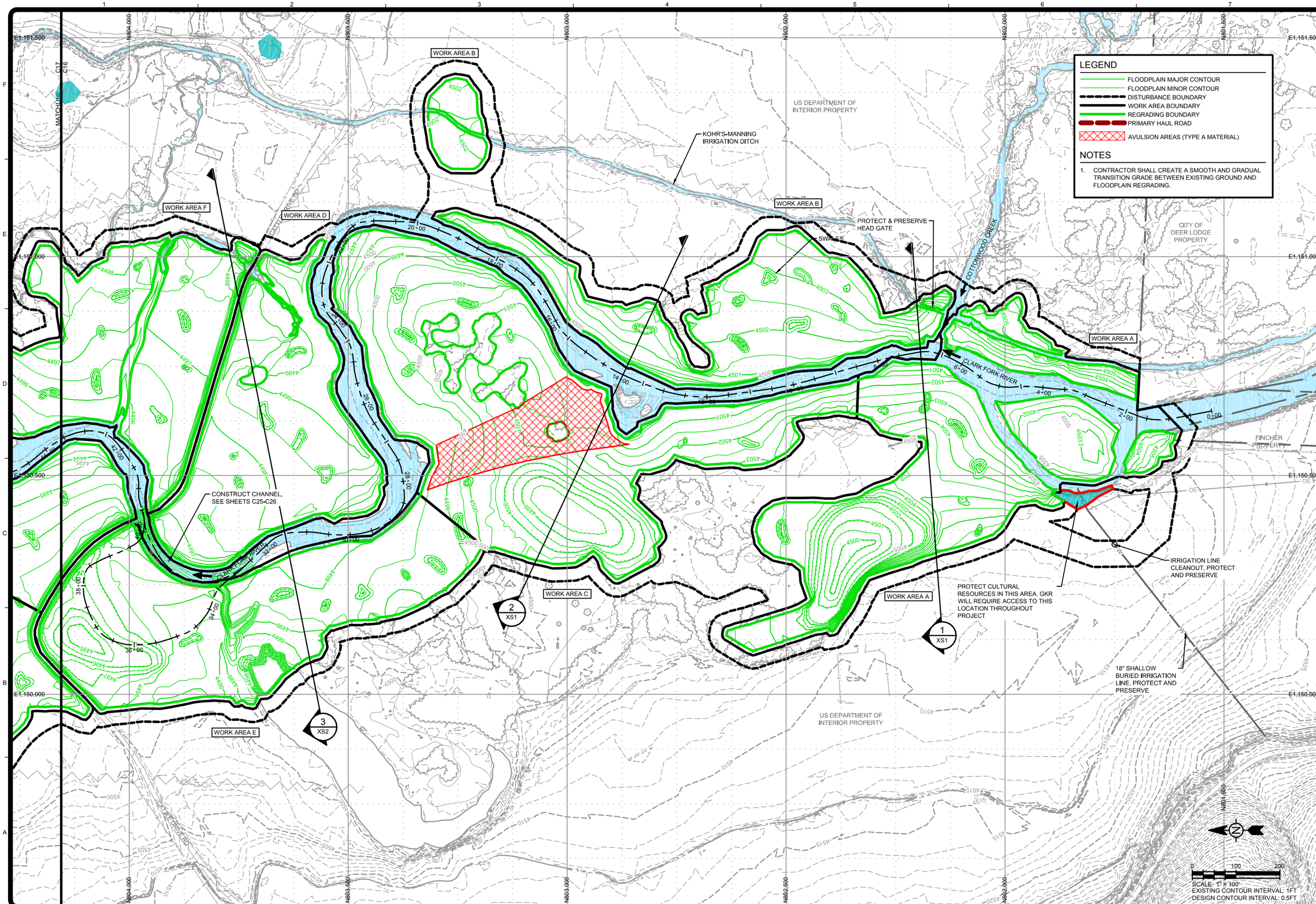

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Montana Department of Environmental Quality

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

FINAL GRADING PLAN

Project No.:	114-560584
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C16

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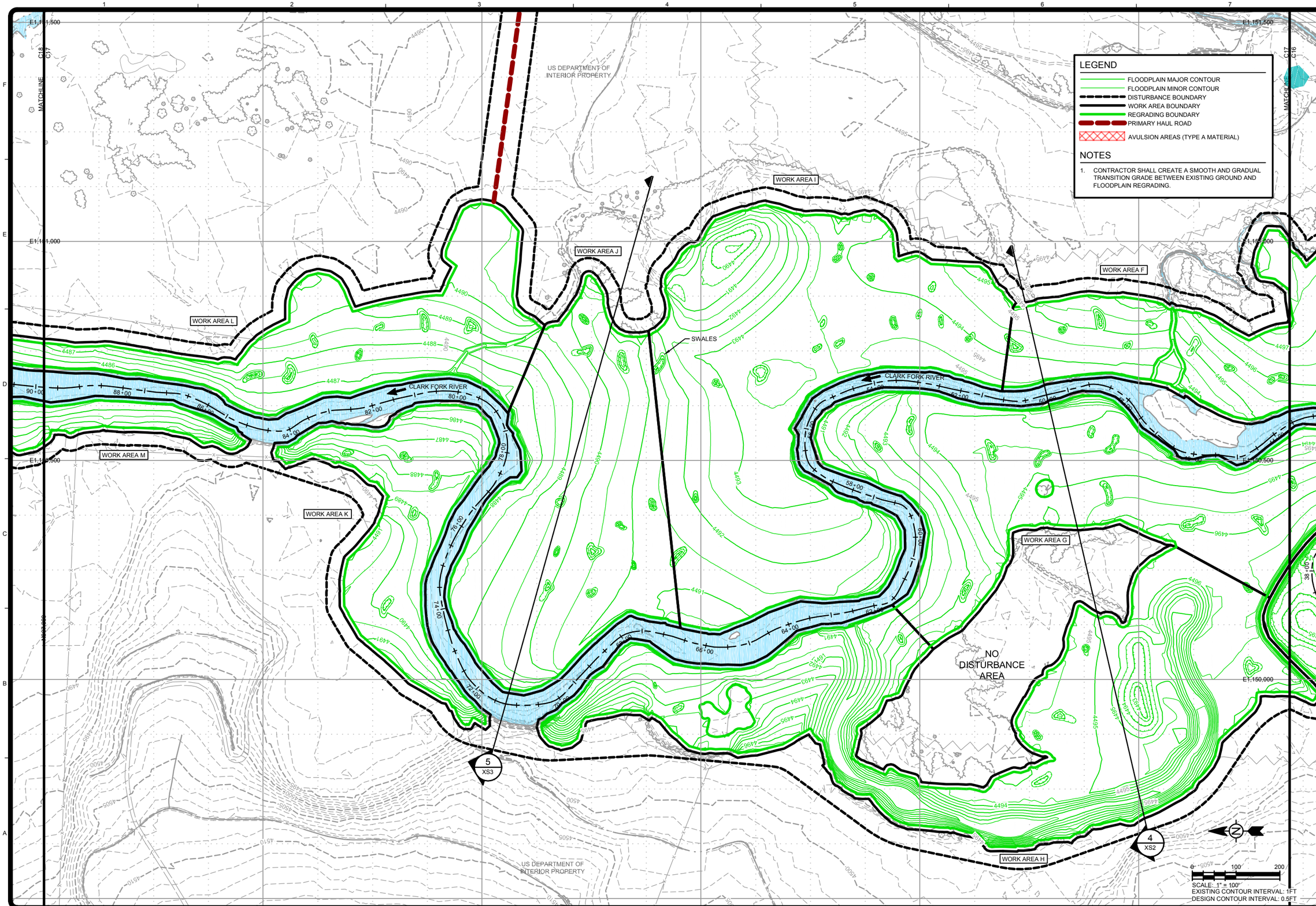

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CLARK FORK SITE

FINAL GRADING PLAN

Project No.:	114-560584
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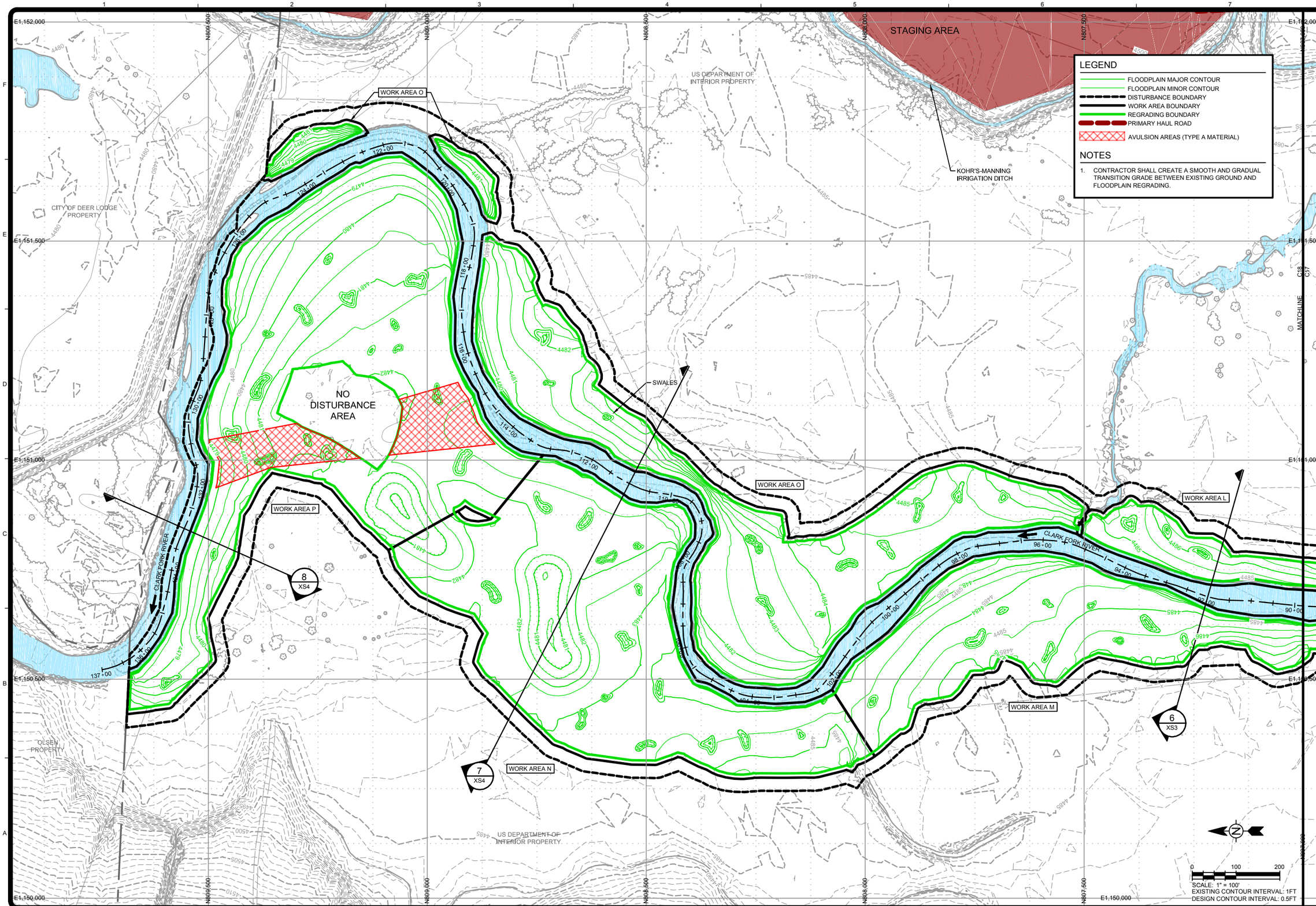

LEGEND

- FLOODPLAIN MAJOR CONTOUR
- FLOODPLAIN MINOR CONTOUR
- DISTURBANCE BOUNDARY
- WORK AREA BOUNDARY
- REGRADING BOUNDARY
- PRIMARY HAUL ROAD
- AVULSION AREAS (TYPE A MATERIAL)

NOTES

1. CONTRACTOR SHALL CREATE A SMOOTH AND GRADUAL TRANSITION GRADE BETWEEN EXISTING GROUND AND FLOODPLAIN REGRADING.

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DEQ Montana Department of Environmental Quality

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

FINAL GRADING PLAN

Project No.:	114-560584
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C18

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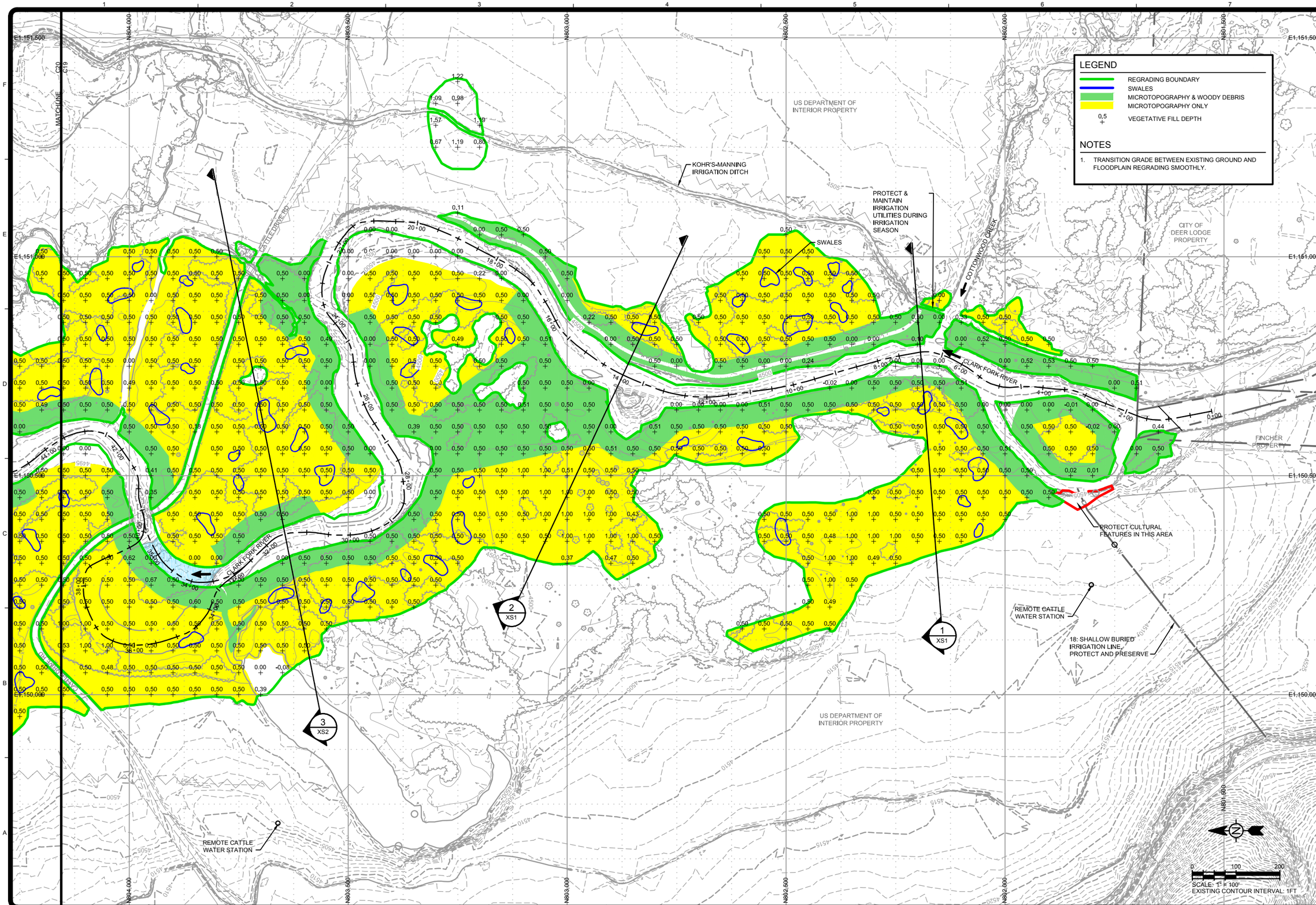

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CFR REACH A, PHASE 15 & 16
CLARK FORK SITE

MICROTOPOGRAPHY, WOOD & BRUSH PLACEMENT

Project No.:	114-560584
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C19

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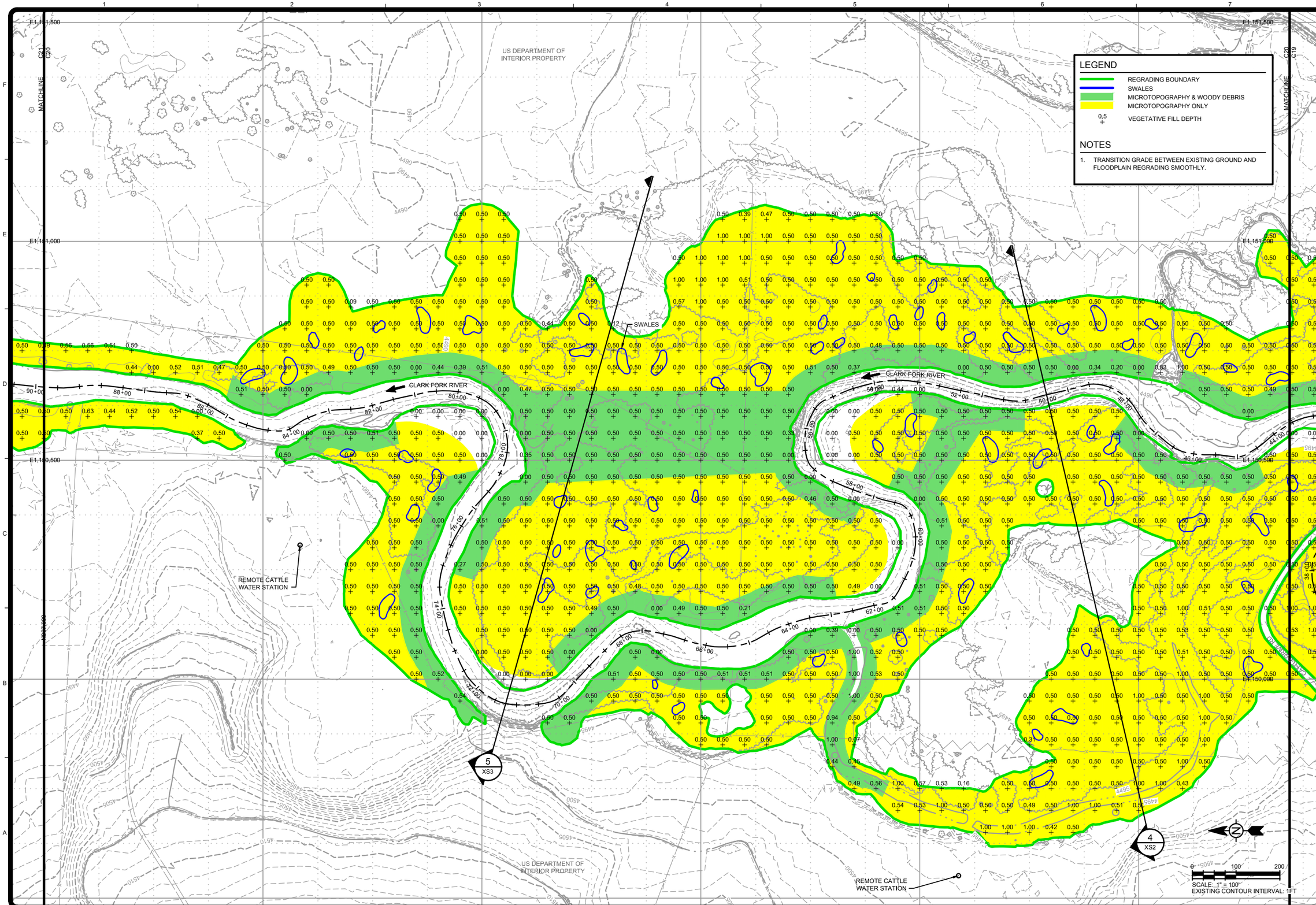

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASE 15 & 16
CLARK FORK SITE

MICROTOPOGRAPHY, WOOD & BRUSH PLACEMENT

Project No.:	114-560584
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Drawn By:	SEF
Checked By:	MLH

C20

Bar Measures 1 inch

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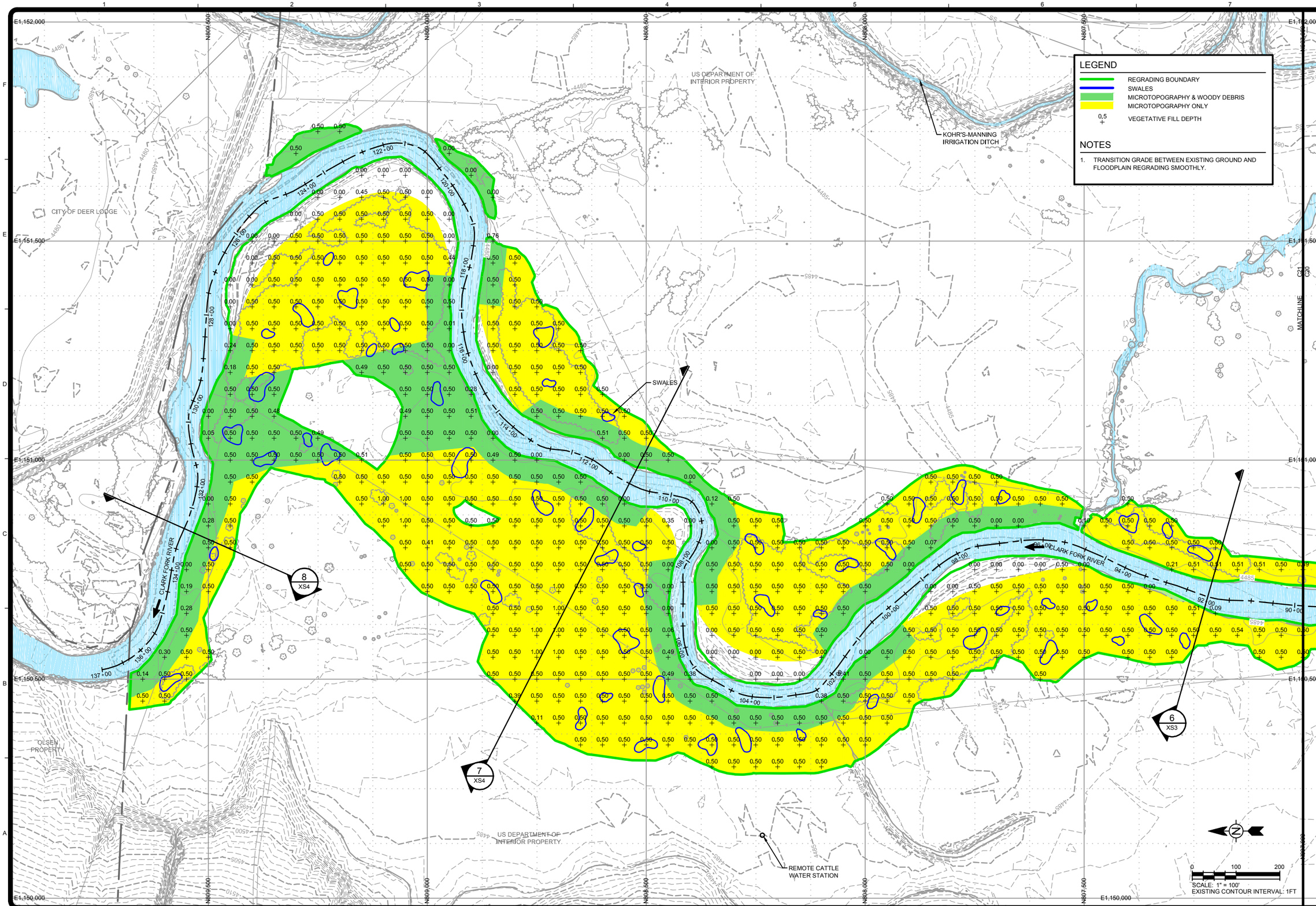

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Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASE 15 & 16
CLARK FORK SITE

MICROTOPOGRAPHY, WOOD & BRUSH PLACEMENT

Project No.:	114-560584
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Drawn By:	SEF
Checked By:	MLH

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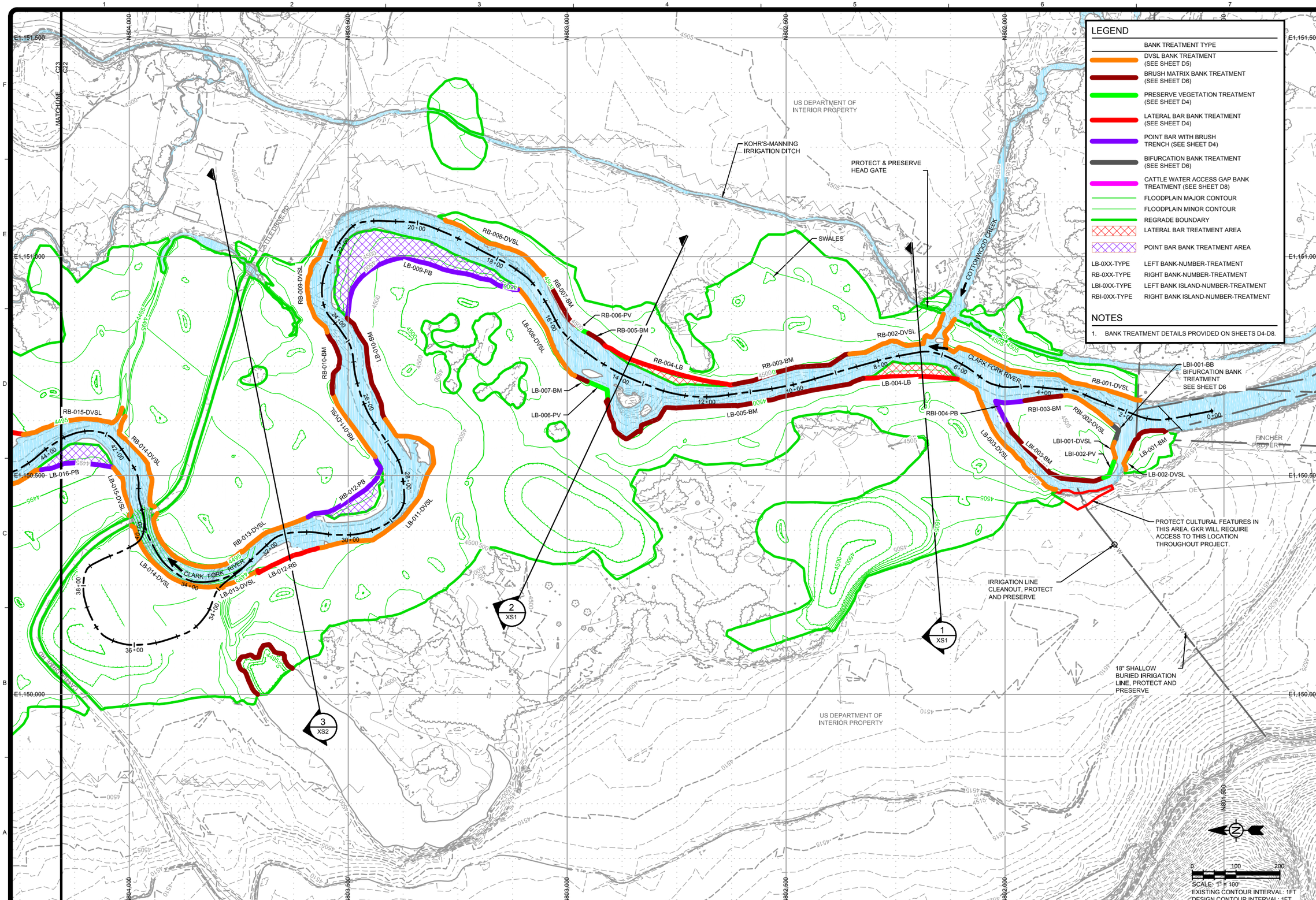

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

STREAMBANK TREATEMENT PLAN

Project No.:	114-560584
Designed By:	SEF
Drawn By:	MEB
Checked By:	LDC

C22

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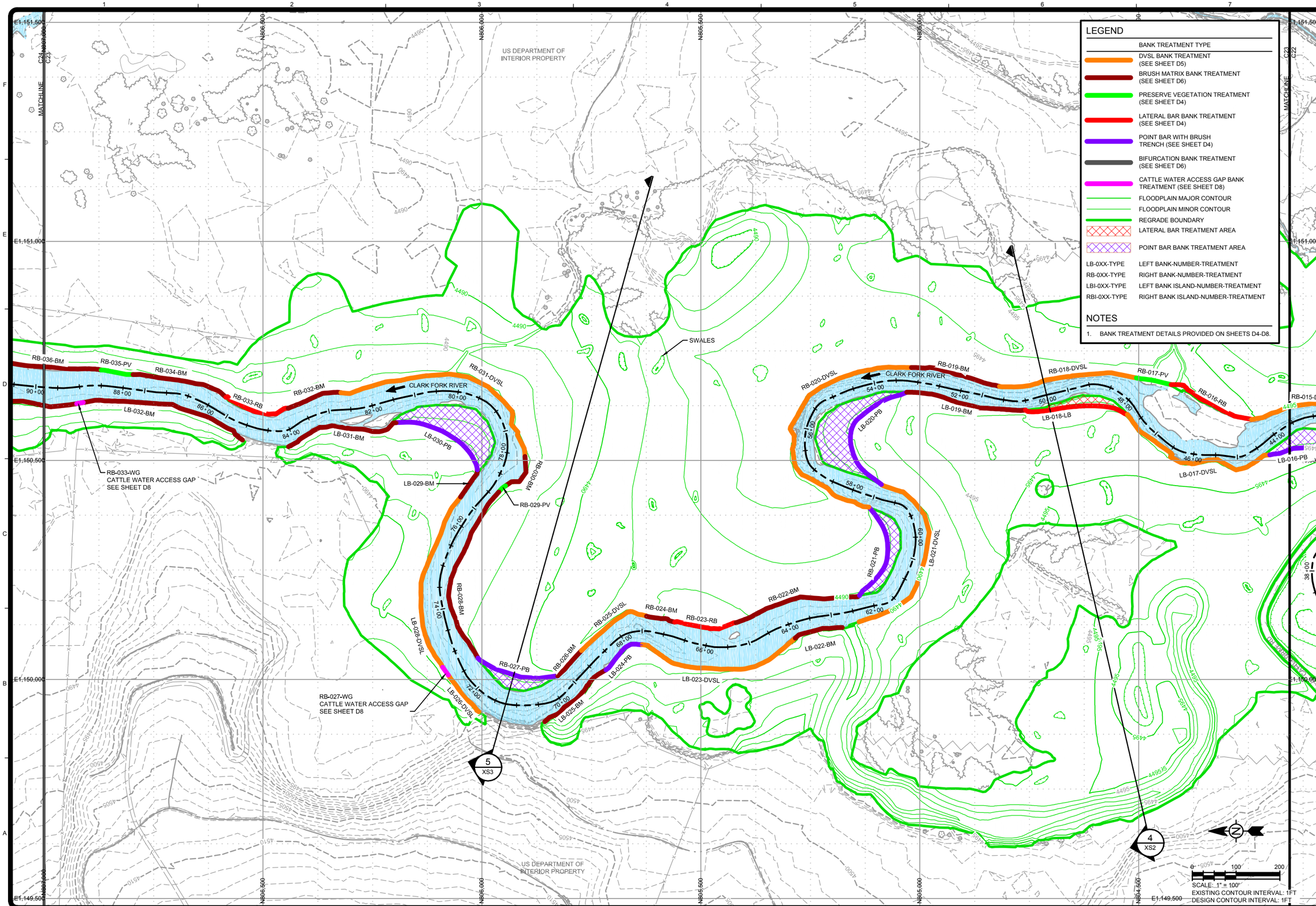

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Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

STREAMBANK TREATEMENT PLAN

Project No.:	114-560584
Designed By:	SEF
Drawn By:	MEB
Checked By:	LDC

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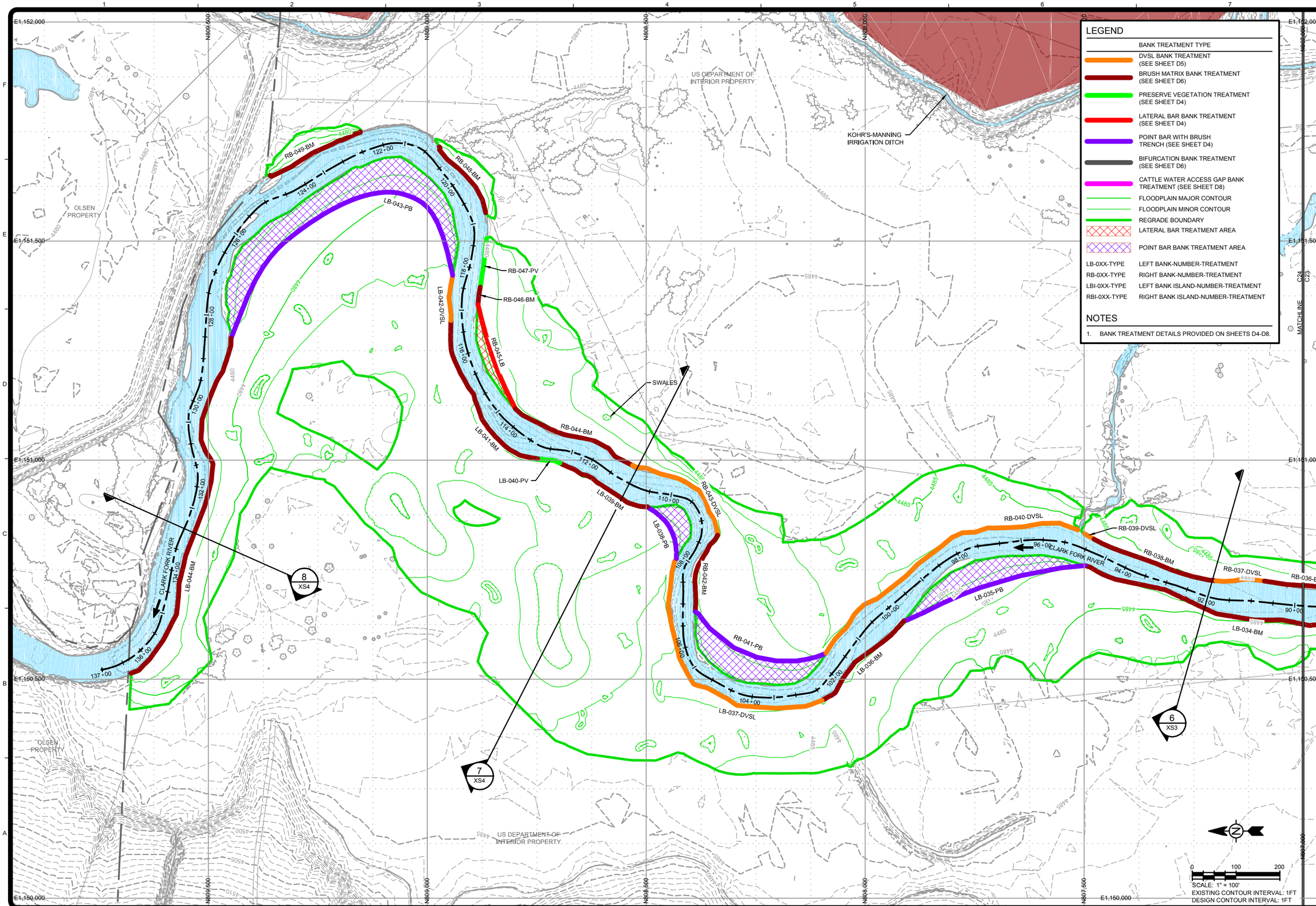

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CFR REACH A, PHASES 15 AND 16
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STREAMBANK TREATEMENT PLAN

Project No.:	114-560584
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Checked By:	LDC

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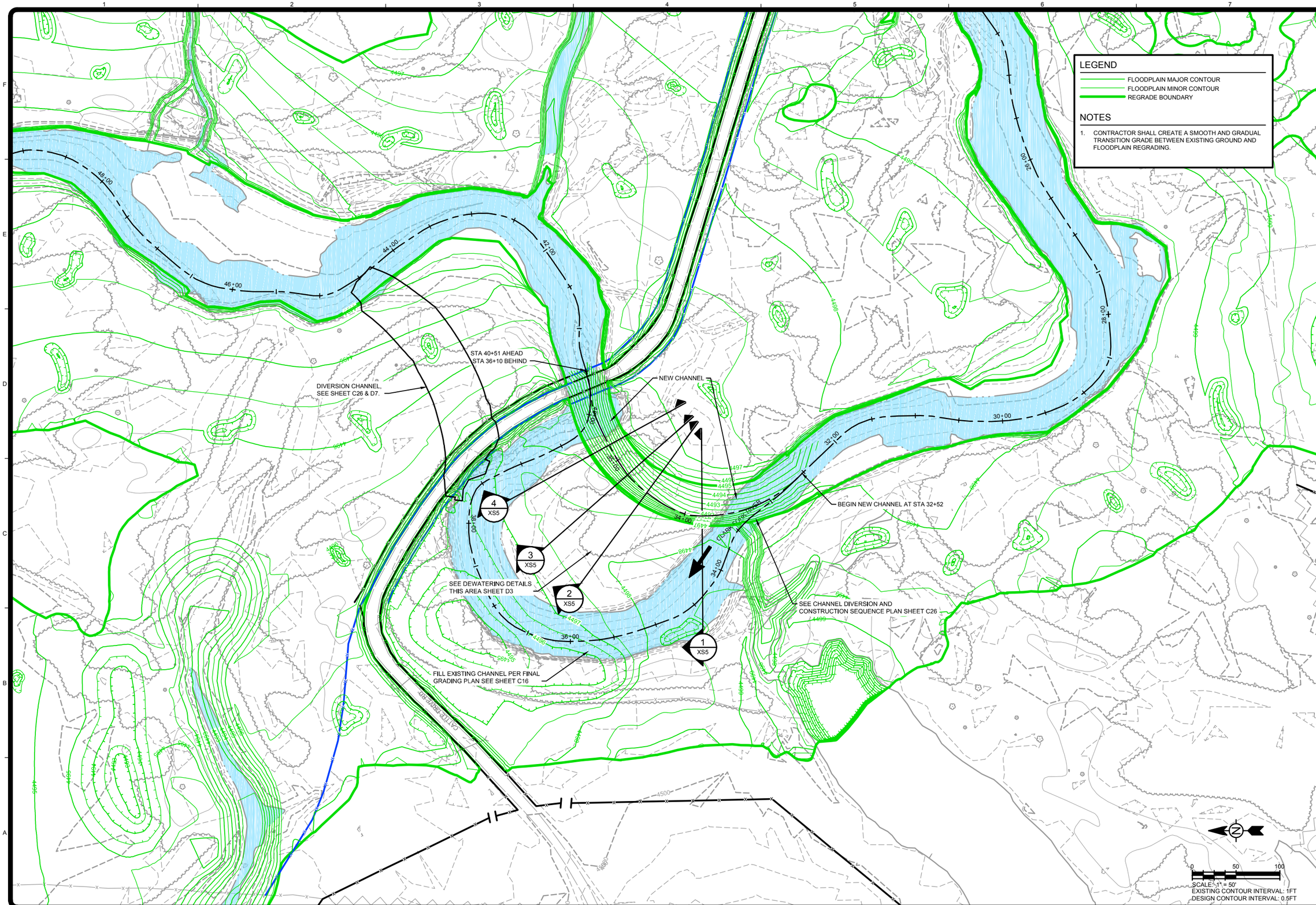

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA
CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

NEW CHANNEL CONSTRUCTION PLAN

Project No.:	114-560584
Designed By:	LC
Drawn By:	SEF/MEB
Checked By:	LDC

C25

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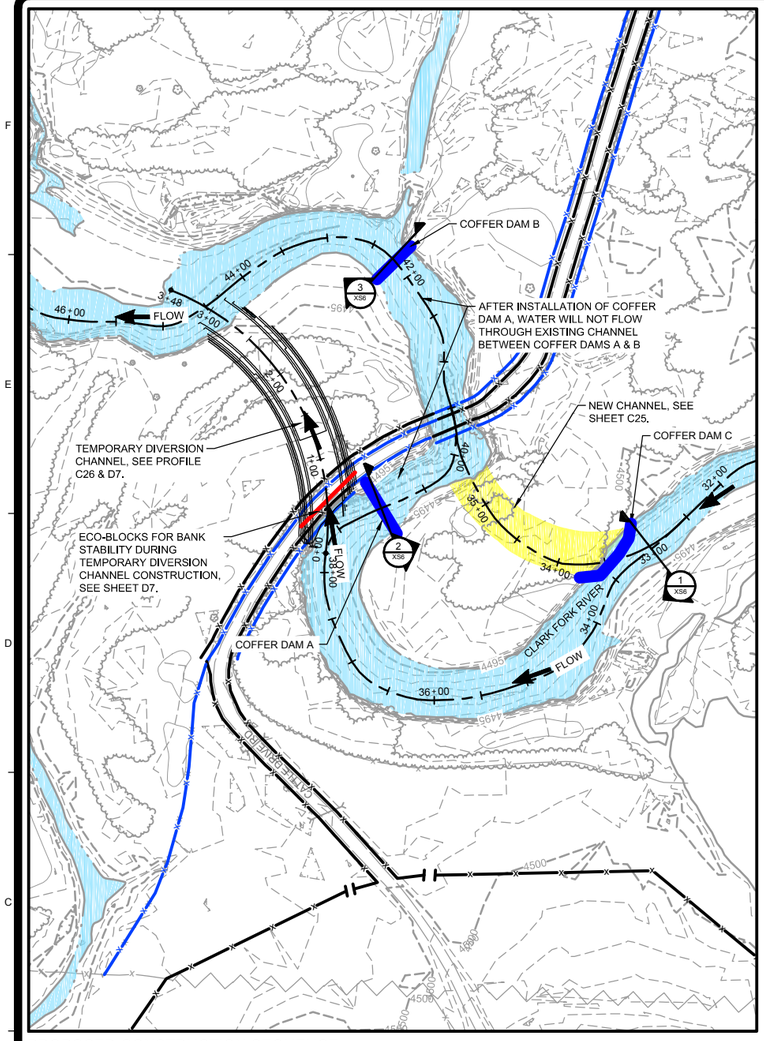


PROPOSED CONSTRUCTION SEQUENCE:

STEP 1. EXCAVATE TAILINGS/IMPACTED SOILS FROM FOOTPRINT OF TEMPORARY DIVERSION CHANNEL, +10 FT. EITHER SIDE.

STEP 2. INSTALL GROUND WATER DEWATERING, AS NECESSARY.

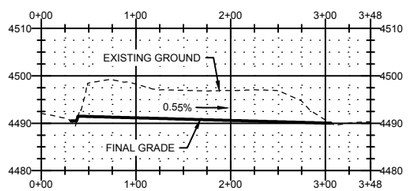
STEP 3. CONSTRUCT TEMPORARY DIVERSION CHANNEL AND INSTALL ECO-BLOCKS

STEP 4. CONSTRUCT DIVERSION CHANNEL INLET CONTROL STRUCTURE.

STEP 5. REMOVE SOIL WEDGE BETWEEN ECO-BLOCKS AND RIVER.

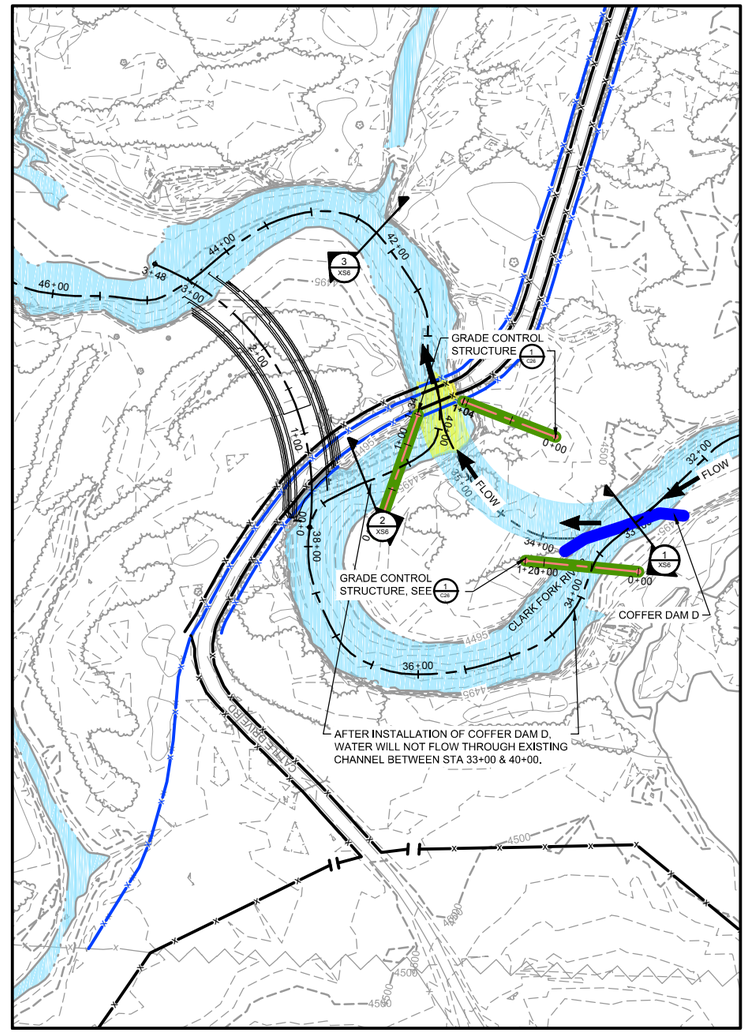
STEP 6. PLACE COFFER DAM A & COFFER DAM B. COFFER DAM B MAY NOT BE NECESSARY.

STEP 7. PLACE COFFER DAM C.



TEMPORARY DIVERSION CHANNEL PROFILE

HORIZ. SCALE: 1"=80', VERT. SCALE: 1"=16'



PROPOSED CONSTRUCTION SEQUENCE:

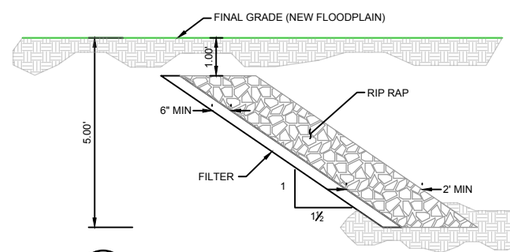
STEP 8. INSTALL BRIDGE REVETMENT, SEE SHEET C27, & CONSTRUCT NEW CHANNEL, SEE SHEET C25.

STEP 9. REMOVE COFFER DAM A, B & C.

STEP 10. INSTALL COFFER DAM D.

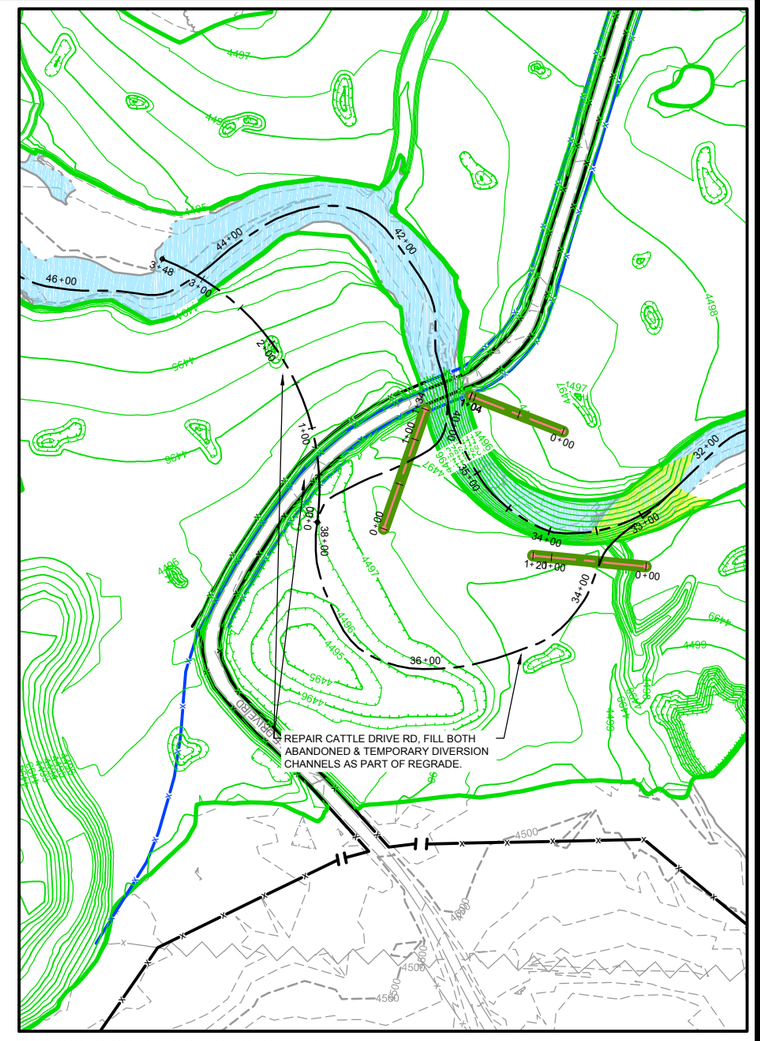
STEP 11. CONSTRUCT STREAMBANKS BEHIND COFFER DAM D.

STEP 12. CONSTRUCT GRADE CONTROL STRUCTURES



1 / C26 GRADE CONTROL STRUCTURE SECTION

NTS



PROPOSED CONSTRUCTION SEQUENCE:

STEP 13. REMOVE COFFER DAM A & D.

STEP 14. REGRADE FLOODPLAIN INCLUDING FILL OF TEMPORARY DIVERSION CHANNEL & ABANDONED CHANNEL.

LEGEND

- FLOODPLAIN MAJOR CONTOUR
- FLOODPLAIN MINOR CONTOUR
- REMOVAL BOUNDARY

NOTES

1. CONTRACTOR SHALL CREATE A SMOOTH AND GRADUAL TRANSITION GRADE BETWEEN EXISTING GROUND AND FLOODPLAIN REGRADING.

0 80 160

SCALE: 1" = 80'
EXISTING CONTOUR INTERVAL: 1FT
DESIGN CONTOUR INTERVAL: 0.5FT

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Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: BEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

CHANNEL DIVERSION AND CONSTRUCTION SEQUENCE

Project No.:	114-560584
Designed By:	LC
Drawn By:	SEF/MEB
Checked By:	LDC

C26

Bar Measures 1 inch

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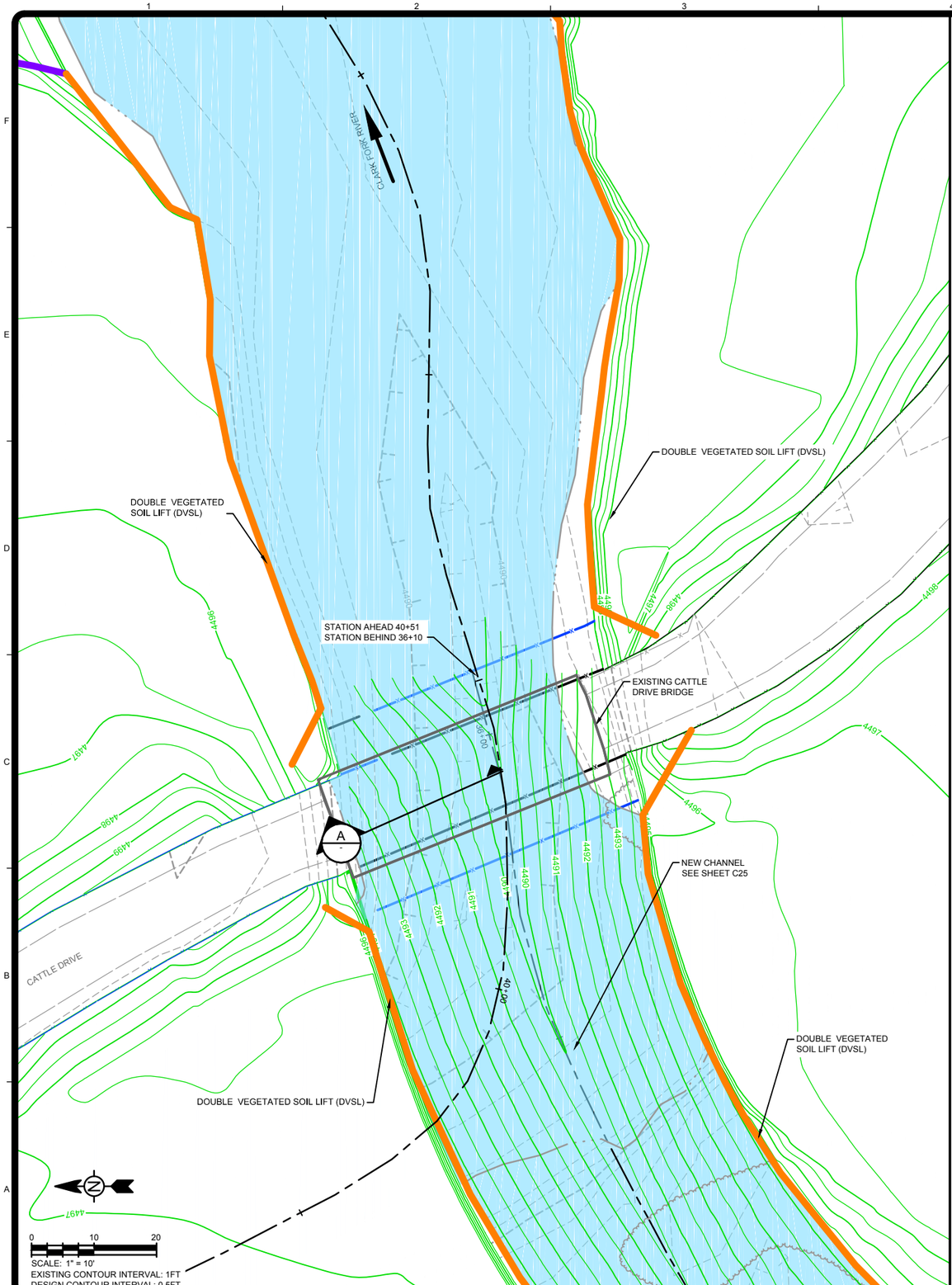
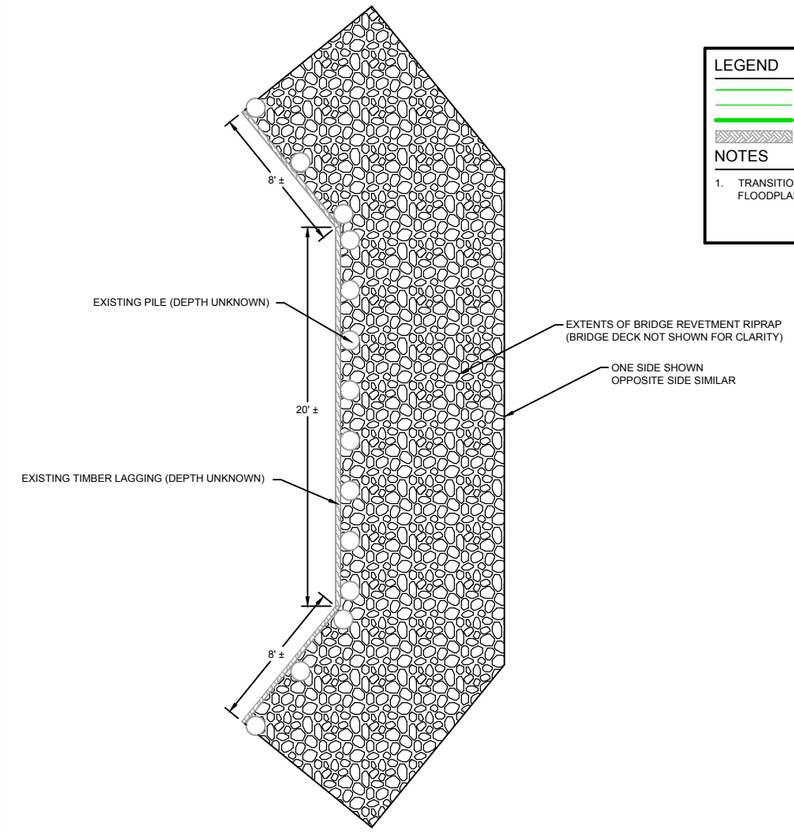
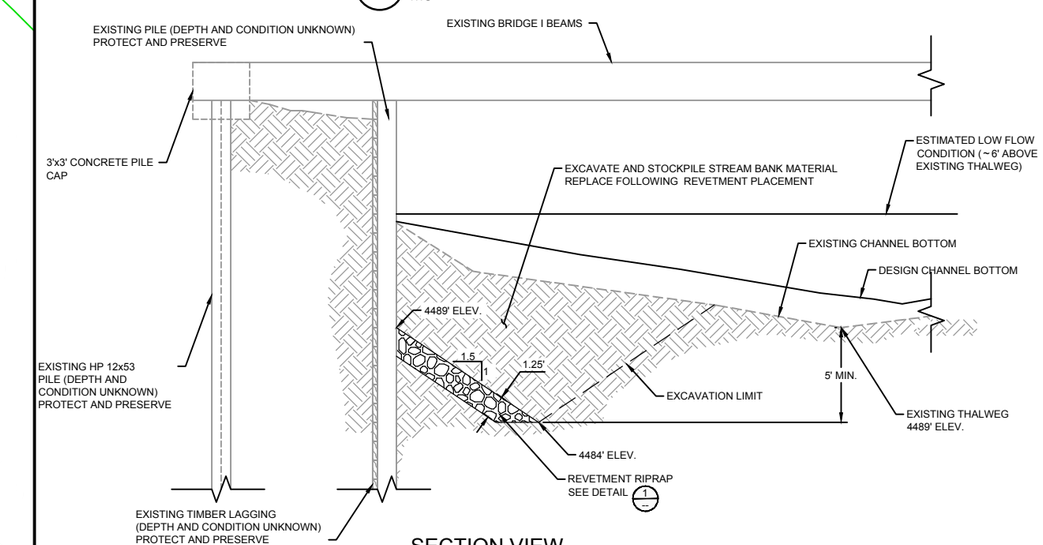




1 PLAN VIEW
EXTENT OF BRIDGE REVETMENT RIPRAP
NTS



A SECTION VIEW
EXTENT OF BRIDGE REVETMENT RIPRAP
NTS

LEGEND

- FLOODPLAIN MAJOR CONTOUR
- FLOODPLAIN MINOR CONTOUR
- REMOVAL BOUNDARY
- EXISTING GROUND

NOTES

1. TRANSITION GRADE BETWEEN EXISTING GROUND AND FLOODPLAIN REGRADING SMOOTHLY.

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CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

CATTLE DRIVE BRIDGE AREA PLAN AND DETAILS

Project No.:	114-560584
Designed By:	LC
Drawn By:	SEF/MEB
Checked By:	LDC

C27

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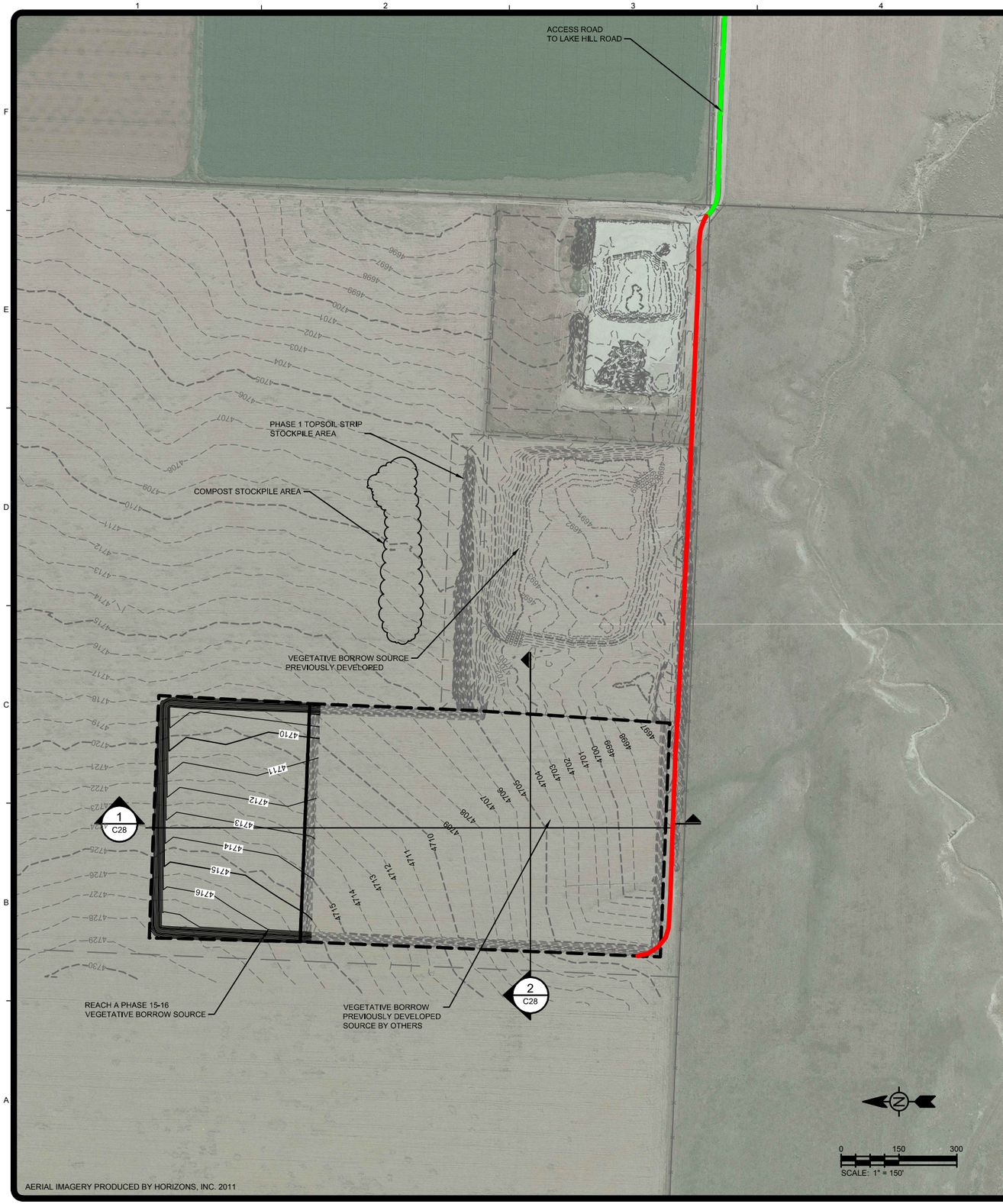
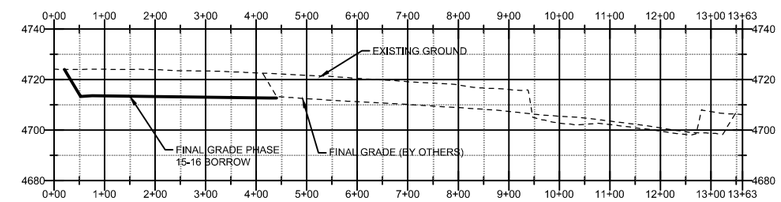


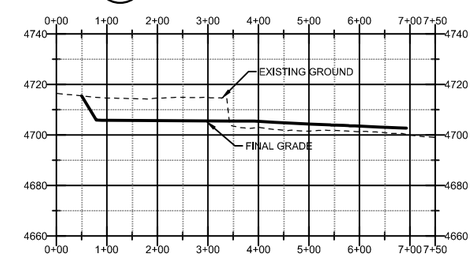
LEGEND:

EXISTING PRIVATE HAUL ROAD
MAGNESIUM CHLORIDE APPLICATION
AND MAINTENANCE

VEGETATIVE BORROW HAUL ROAD
MAGNESIUM CHLORIDE APPLICATION
AND MAINTENANCE



1 C28 VEGETATIVE BORROW
VERT. EXAG = 5



2 C28 VEGETATIVE BORROW
VERT. EXAG = 5

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CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

BECK BORROW
AREA DEVELOPMENT PLAN
AND CROSS-SECTIONS

Project No.:	114-560584
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C28

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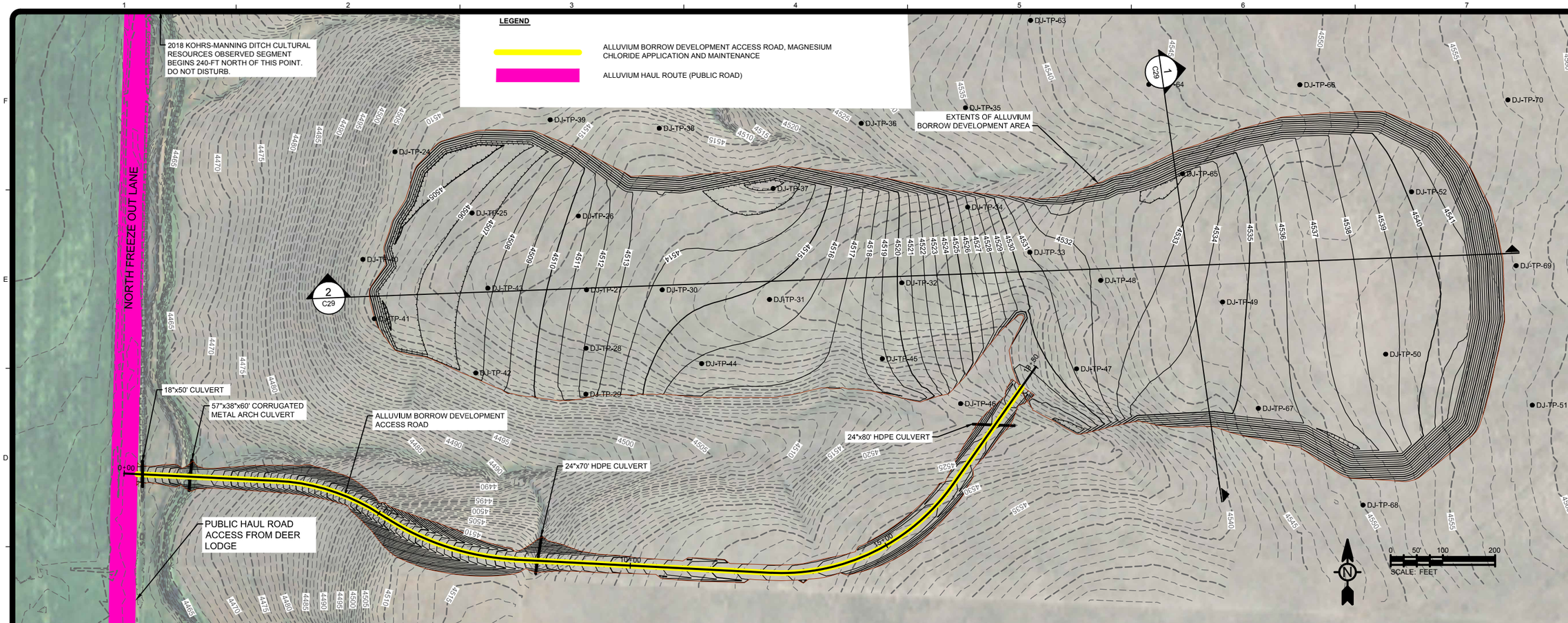
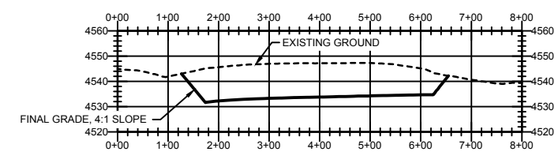
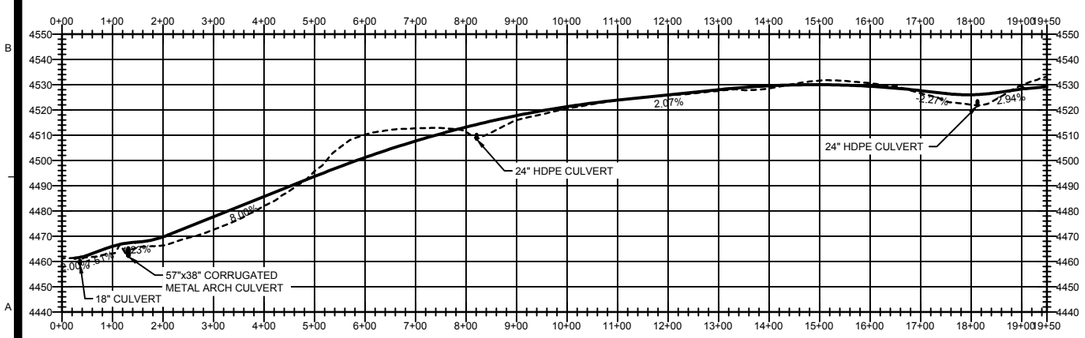
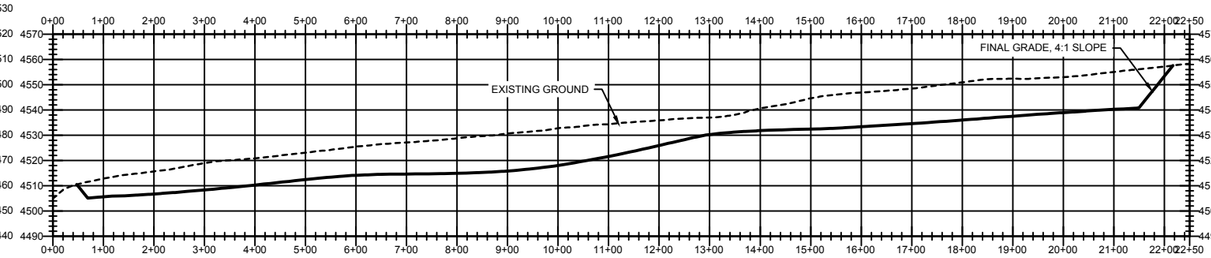




1 ALLUVIUM BORROW DEVELOPMENT SECTION
VERT. EXAG = 5



ALLUVIUM BORROW ACCESS ROAD PROFILE
VERT. EXAG = 5



2 ALLUVIUM BORROW DEVELOPMENT SECTION
VERT. EXAG = 5

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Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

JOHNSON BORROW AREA DEVELOPMENT PLAN AND CROSS-SECTIONS

Project No.:	114-560584
Designed By:	SPK
Drawn By:	SPK
Checked By:	MLH

C29

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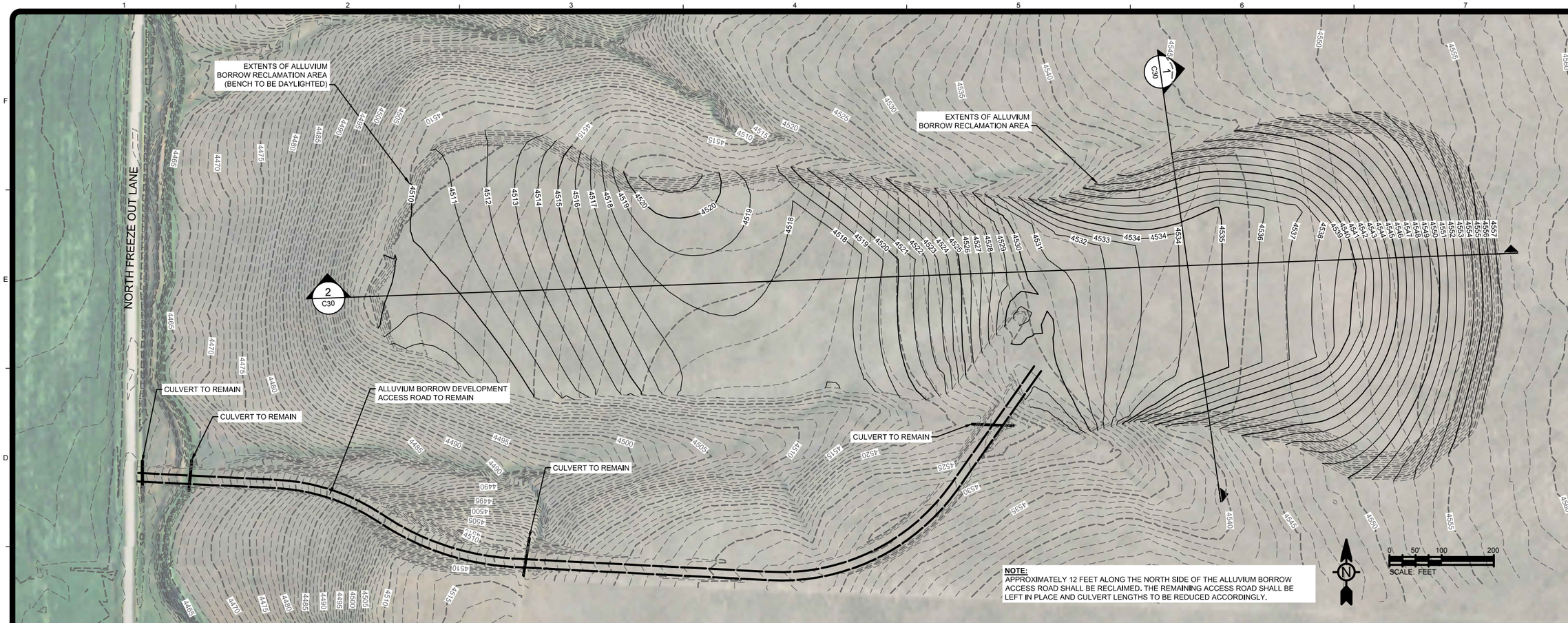
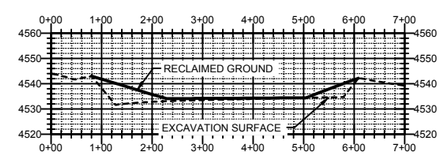
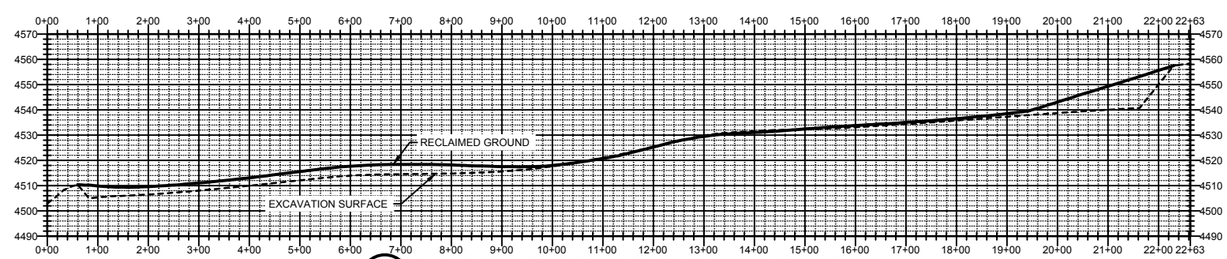


NOTE:
APPROXIMATELY 12 FEET ALONG THE NORTH SIDE OF THE ALLUVIUM BORROW ACCESS ROAD SHALL BE RECLAIMED. THE REMAINING ACCESS ROAD SHALL BE LEFT IN PLACE AND CULVERT LENGTHS TO BE REDUCED ACCORDINGLY.



1 ALLUVIUM BORROW RECLAMATION SECTION
VERT. EXAG = 5



2 ALLUVIUM BORROW RECLAMATION SECTION
VERT. EXAG = 5

TETRA TECH
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825 West Custer Avenue
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PHONE: 406-443-5210 FAX: 406-442-7182

DEQ Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY
0	7/20/18	ISSUED FOR CONSTRUCTION	SEF

Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA

CFR REACH A, PHASES 15 AND 16
CLARK FORK SITE

JOHNSON BORROW AREA RECLAMATION PLAN AND CROSS-SECTIONS

Project No.:	114-560584
Designed By:	SPK
Drawn By:	SPK
Checked By:	MLH

C30

Copyright: Tetra Tech

Bar Measures 1 inch

7/18/2018 3:36:44 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560584 - TO 38 CFR PHASE 15&16 CM\110-2D CADD\SHEETFILES\C-30-JOHNSON BORROW AREA RECLAMATION PLAN.DWG - FIELD, STEVE