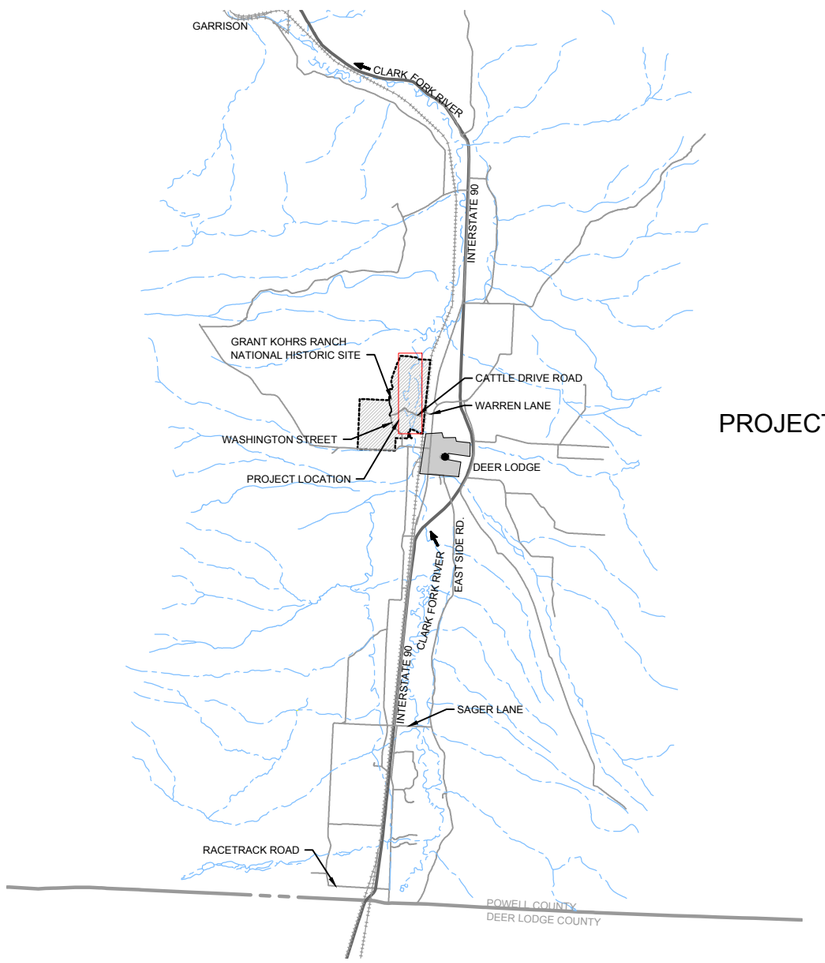
PRELIMINARY DRAWINGS

CLARK FORK RIVER OPERABLE UNIT
REACH A, PHASES 15 AND 16
MILLTOWN RESERVOIR/CLARK FORK RIVER NPL SITE
POWELL COUNTY, MONTANA



PREPARED FOR:

Montana Department of Environmental Quality

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
MINE WASTE CLEANUP BUREAU
THE MONTANA DEPARTMENT OF JUSTICE
NATURAL RESOURCE PROGRAM

PROJECT AREA

PREPARED BY:

TETRA TECH
303 Irene Street, Helena, MT 59601 (406) 443-5210

Geum Environmental Consulting, Inc.

Applied Geomorphology, Inc.

DRAFT - PRELIMINARY NOT FOR CONSTRUCTION

SHEET INDEX

G1	COVER
G2	GENERAL LEGEND AND ABBREVIATIONS
C1-C3	EXISTING CONDITIONS
C4-C6	DEWATERING PLAN
C7-C9	EXCAVATION PLAN
C9-C12	FINAL GRADING PLAN
C13-C15	REVEGETATION COVER TYPES
C16-C18	STREAMBANK TREATMENT PLAN
C19	TRANSPORTATION PLAN
C20	BORROW AREA PLAN AND CROSS-SECTIONS
C21	REPOSITORY PLAN AND CROSS-SECTIONS
XS1-XS2	FLOODPLAIN CROSS-SECTIONS
D1	DEWATERING DETAILS
D2-D3	STREAMBANK TREATMENT DETAILS
D4	FLOODPLAIN DETAILS
D5	EROSION CONTROL DETAILS

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

PROPOSED

- 5210 — BASE OF EXCAVATION MAJOR CONTOUR & ELEVATION LABEL
- BASE OF EXCAVATION MINOR CONTOUR
- 5210 — FINAL GROUND MAJOR CONTOUR & ELEVATION LABEL
- FINAL GROUND MINOR CONTOUR
- REMOVAL BOUNDARY
- DISTURBANCE BOUNDARY
- GENERAL SEDIMENT POND LOCATION
- GROUNDWATER DEWATERING TRENCH
- GROUNDWATER DEWATERING TRENCH DISCHARGE PIPE
- 2.7 — BASE OF EXCAVATION CUT-TICK

GENERAL NOTES

1. THE 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. THE 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:	BROWN & ASSOCIATES, BUTTE, MT
LiDAR DATA ACQUISITION	FUGRO EARTHDATA, INC., RAPID CITY, SD
LiDAR PROCESSING:	D J & A, MISSOULA, MT

SURVEY CONTROL

TBD

MAPPING DATUM

HORIZONTAL DATUM:	MONTANA STATE PLANE COORDINATES, NAD 83.
VERTICAL DATUM:	NAVD88.
UNITS:	INTERNATIONAL FEET.

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

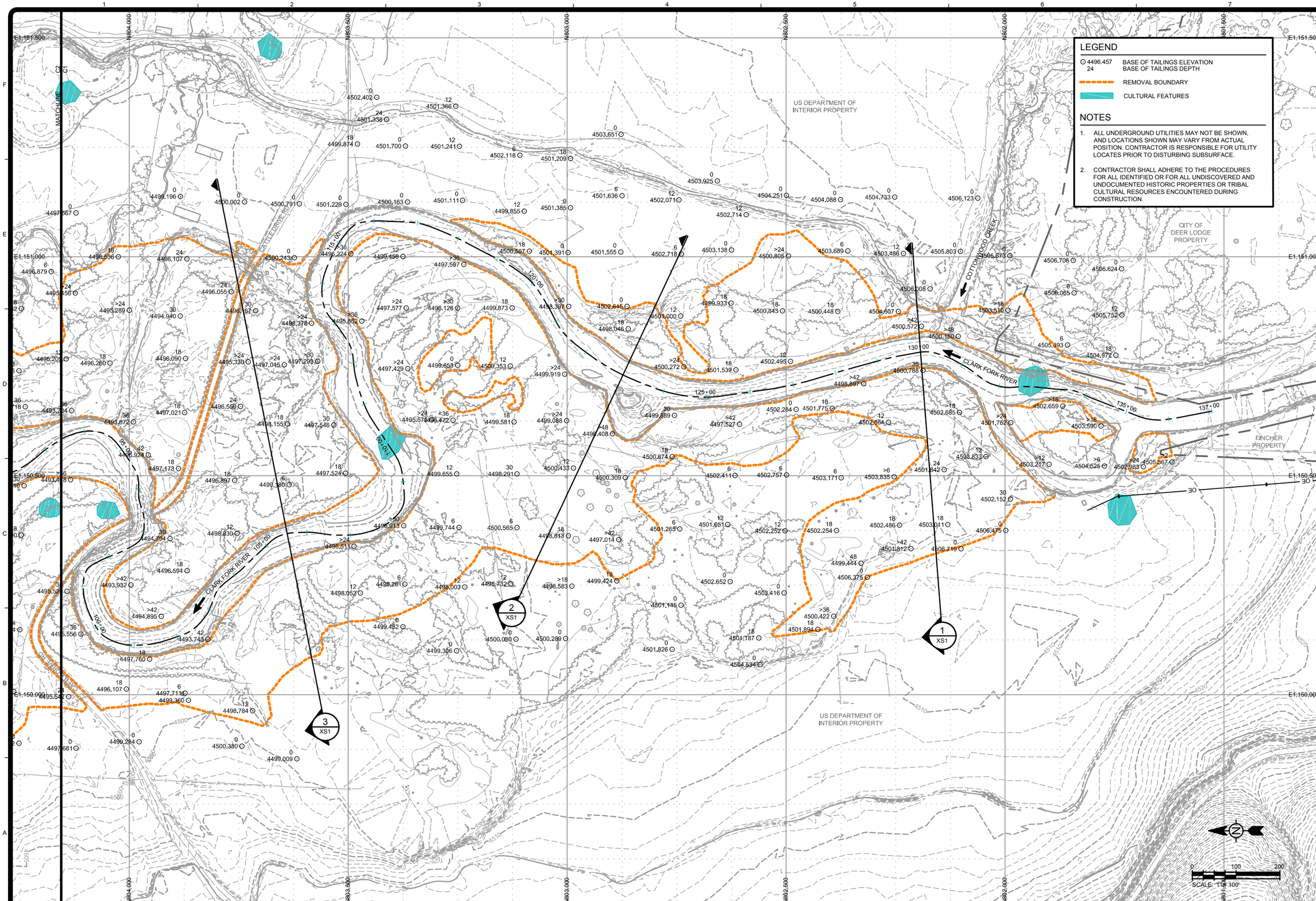
GENERAL LEGEND AND ABBREVIATIONS

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

G2

Copyright: Tetra Tech

2/27/2015 12:29:25 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\G-02-GENERAL LEGEND AND ABBREVIATIONS.DWG - FIELD, STEVE



LEGEND

4496.457	BASE OF TAILINGS ELEVATION
24	BASE OF TAILINGS DEPTH
	REMOVAL BOUNDARY
	CULTURAL FEATURES

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.

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

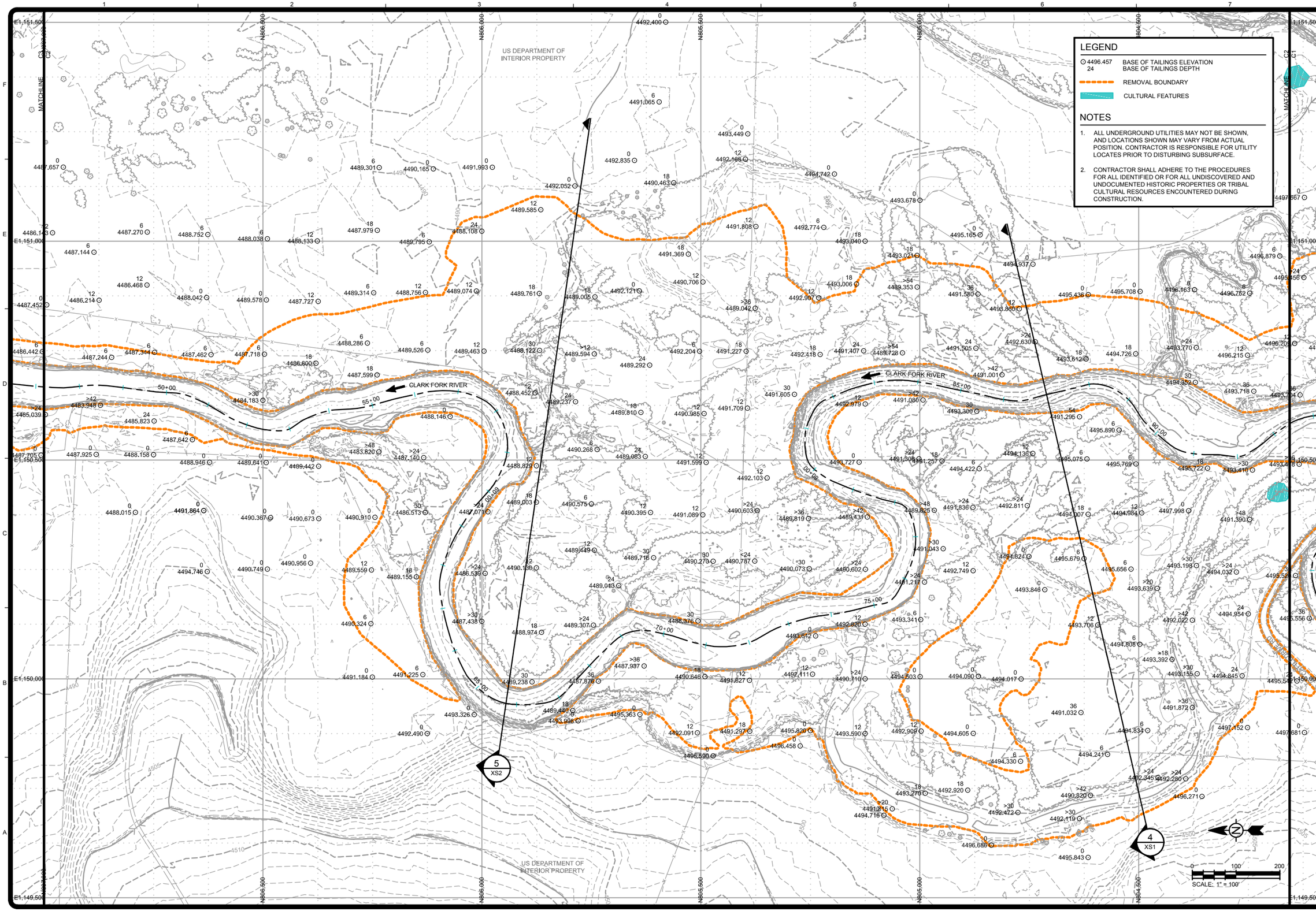
EXISTING CONDITIONS

Project No.:	114-560356
Designed By:	MLH
Drawn By:	SEF
Checked By:	MLH

C1

Copyright: Tetra Tech

2/27/2015 11:47:52 AM - O:\HM\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-01-02-03-EXISTING CONDITIONS.DWG - FIELD, STEVE



TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA
REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

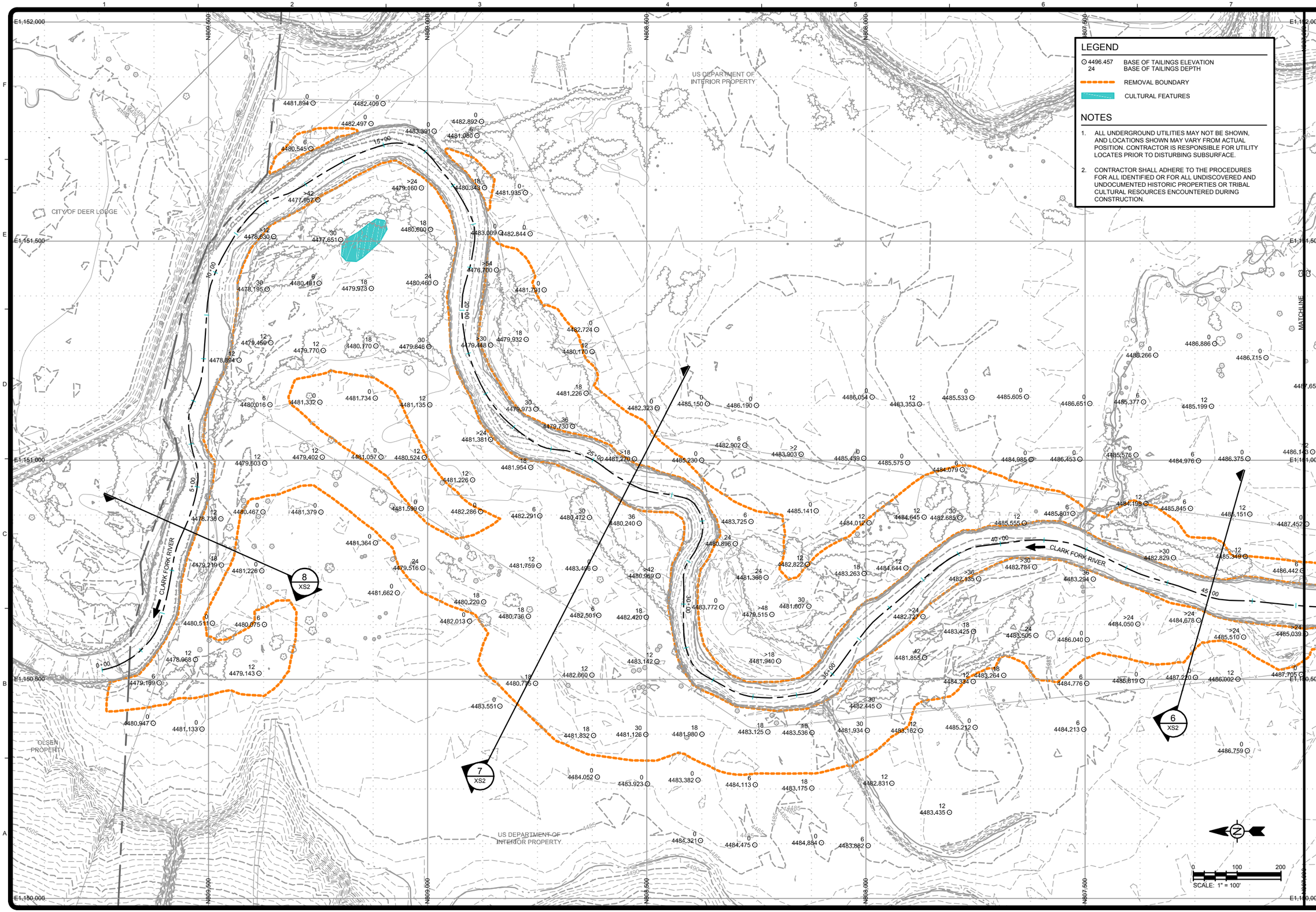
EXISTING CONDITIONS

Project No.:	114-560356
Designed By:	MEH
Drawn By:	SEF
Checked By:	MEH

C2

2/27/2015 11:48:11 AM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-01-02-03-EXISTING CONDITIONS.DWG - FIELD, STEVE

Copyright: Tetra Tech



LEGEND

- 4496.457 / 24 — BASE OF TAILINGS ELEVATION / BASE OF TAILINGS DEPTH
- REMOVAL BOUNDARY
- CULTURAL FEATURES

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.

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

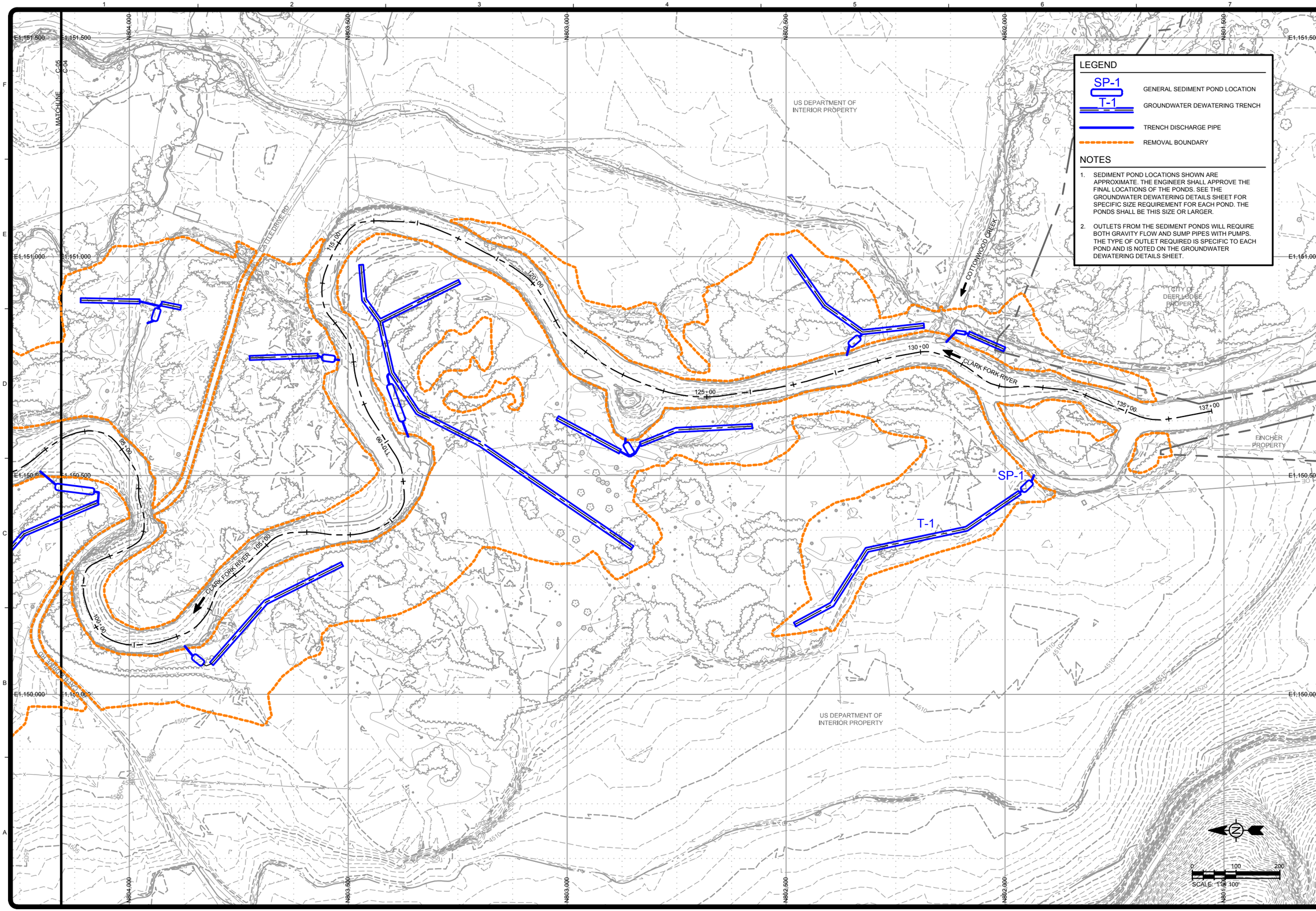
EXISTING CONDITIONS

Project No.:	114-560356
Designed By:	MLH
Drawn By:	SEF
Checked By:	MLH

C3

Copyright: Tetra Tech

2/27/2015 11:48:28 AM - O:\HM\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-01-02-03-EXISTING CONDITIONS.DWG - FIELD, STEVE



LEGEND

SP-1	GENERAL SEDIMENT POND LOCATION
T-1	GROUNDWATER DEWATERING TRENCH
	TRENCH DISCHARGE PIPE
	REMOVAL BOUNDARY

NOTES

1. SEDIMENT POND LOCATIONS SHOWN ARE APPROXIMATE. THE ENGINEER SHALL APPROVE THE FINAL LOCATIONS OF THE PONDS. SEE THE GROUNDWATER DEWATERING DETAILS SHEET FOR SPECIFIC SIZE REQUIREMENT FOR EACH POND. THE PONDS SHALL BE THIS SIZE OR LARGER.
2. OUTLETS FROM THE SEDIMENT PONDS WILL REQUIRE BOTH GRAVITY FLOW AND SUMP PIPES WITH PUMPS. THE TYPE OF OUTLET REQUIRED IS SPECIFIC TO EACH POND AND IS NOTED ON THE GROUNDWATER DEWATERING DETAILS SHEET.

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

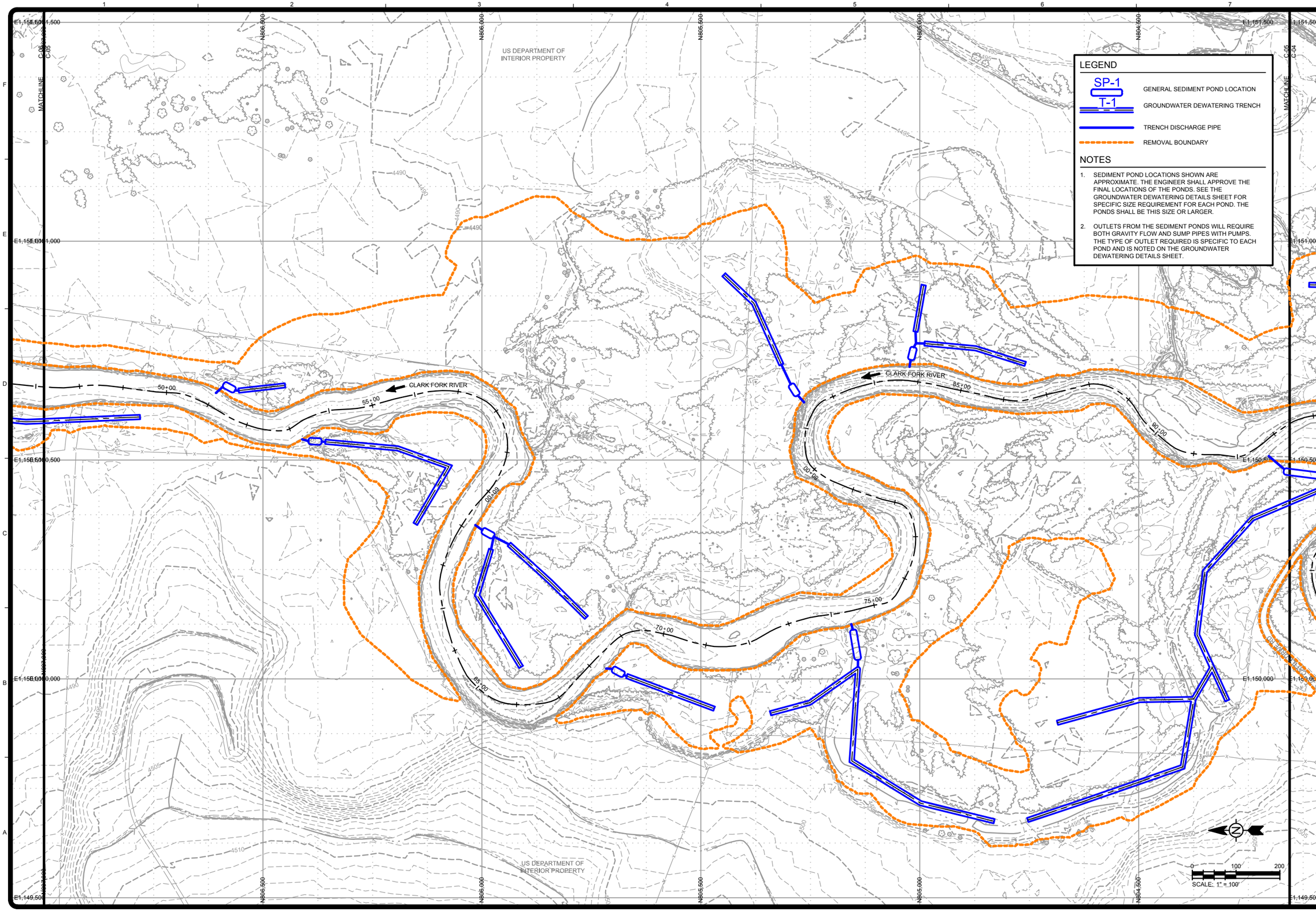
DEWATERING PLAN

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MEH

C4

Copyright: Tetra Tech

2/27/2015 11:56:50 AM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-04-05-06-DEWATERING PLAN.DWG - FIELD, STEVE



TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

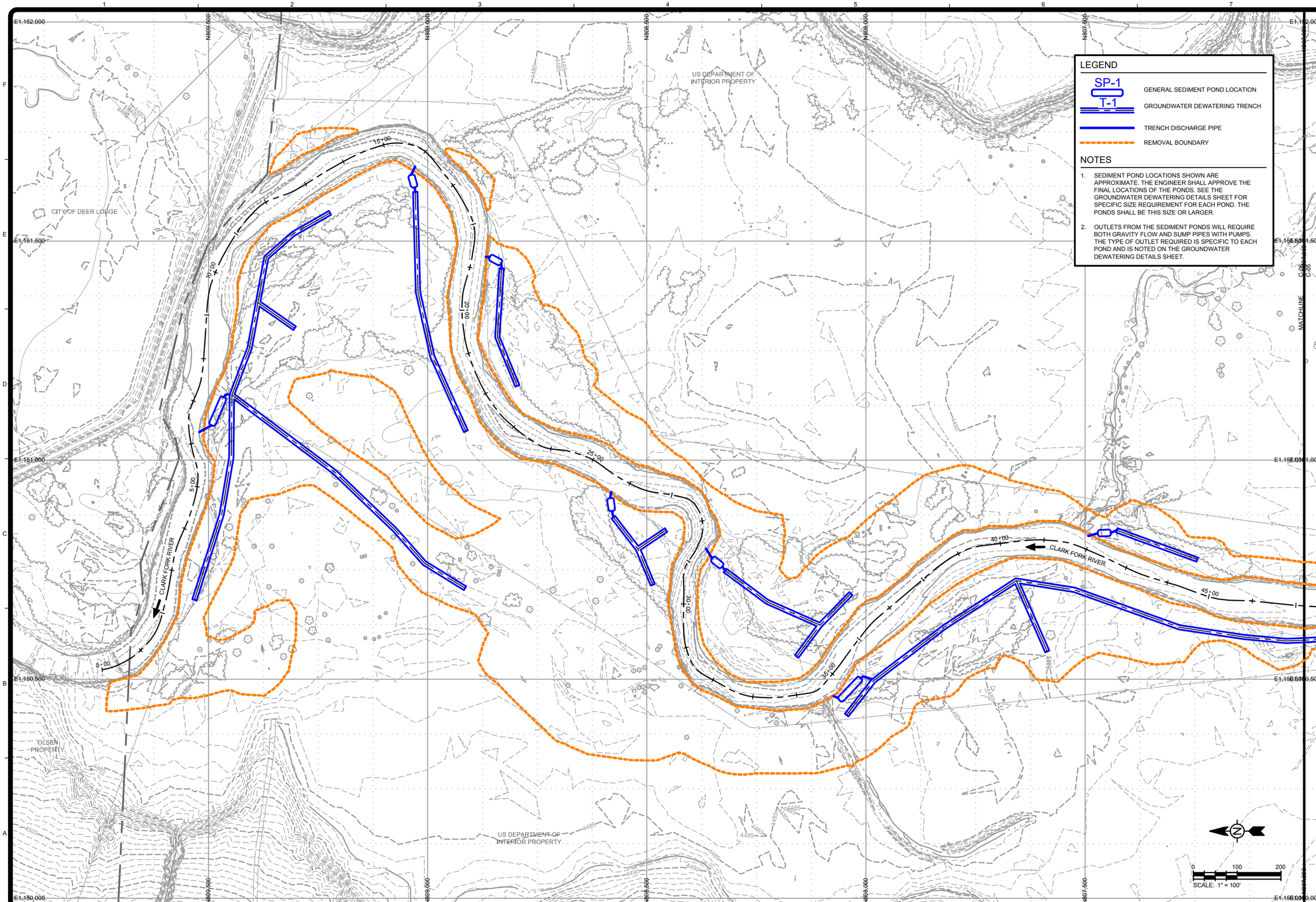
DEWATERING PLAN

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MEH

C5

Copyright: Tetra Tech

2/27/2015 11:57:07 AM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-04-05-06-DEWATERING PLAN.DWG - FIELD, STEVE



LEGEND

- SP-1 / T-1 — GENERAL SEDIMENT POND LOCATION
- GROUNDWATER DEWATERING TRENCH
- TRENCH DISCHARGE PIPE
- REMOVAL BOUNDARY

NOTES

1. SEDIMENT POND LOCATIONS SHOWN ARE APPROXIMATE. THE ENGINEER SHALL APPROVE THE FINAL LOCATIONS OF THE PONDS. SEE THE GROUNDWATER DEWATERING DETAILS SHEET FOR SPECIFIC SIZE REQUIREMENT FOR EACH POND. THE PONDS SHALL BE THIS SIZE OR LARGER.
2. OUTLETS FROM THE SEDIMENT PONDS WILL REQUIRE BOTH GRAVITY FLOW AND SUMP PIPES WITH PUMPS. THE TYPE OF OUTLET REQUIRED IS SPECIFIC TO EACH POND AND IS NOTED ON THE GROUNDWATER DEWATERING DETAILS SHEET.

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

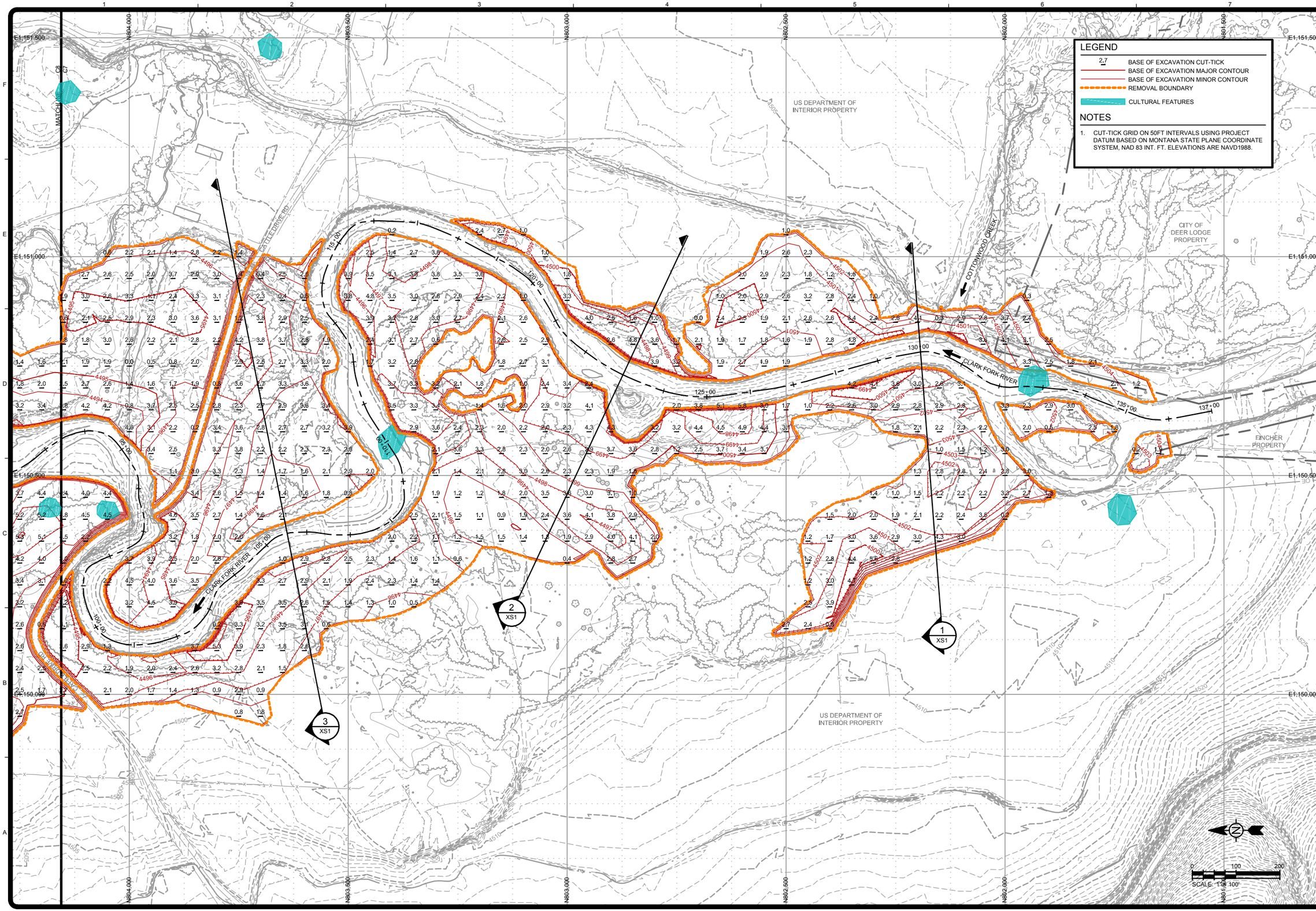
DEWATERING PLAN

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEK
Checked By:	MEH

C6

Copyright: Tetra Tech

2/27/2015 11:57:23 AM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-04-05-06-DEWATERING PLAN.DWG - FIELD, STEVE



TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

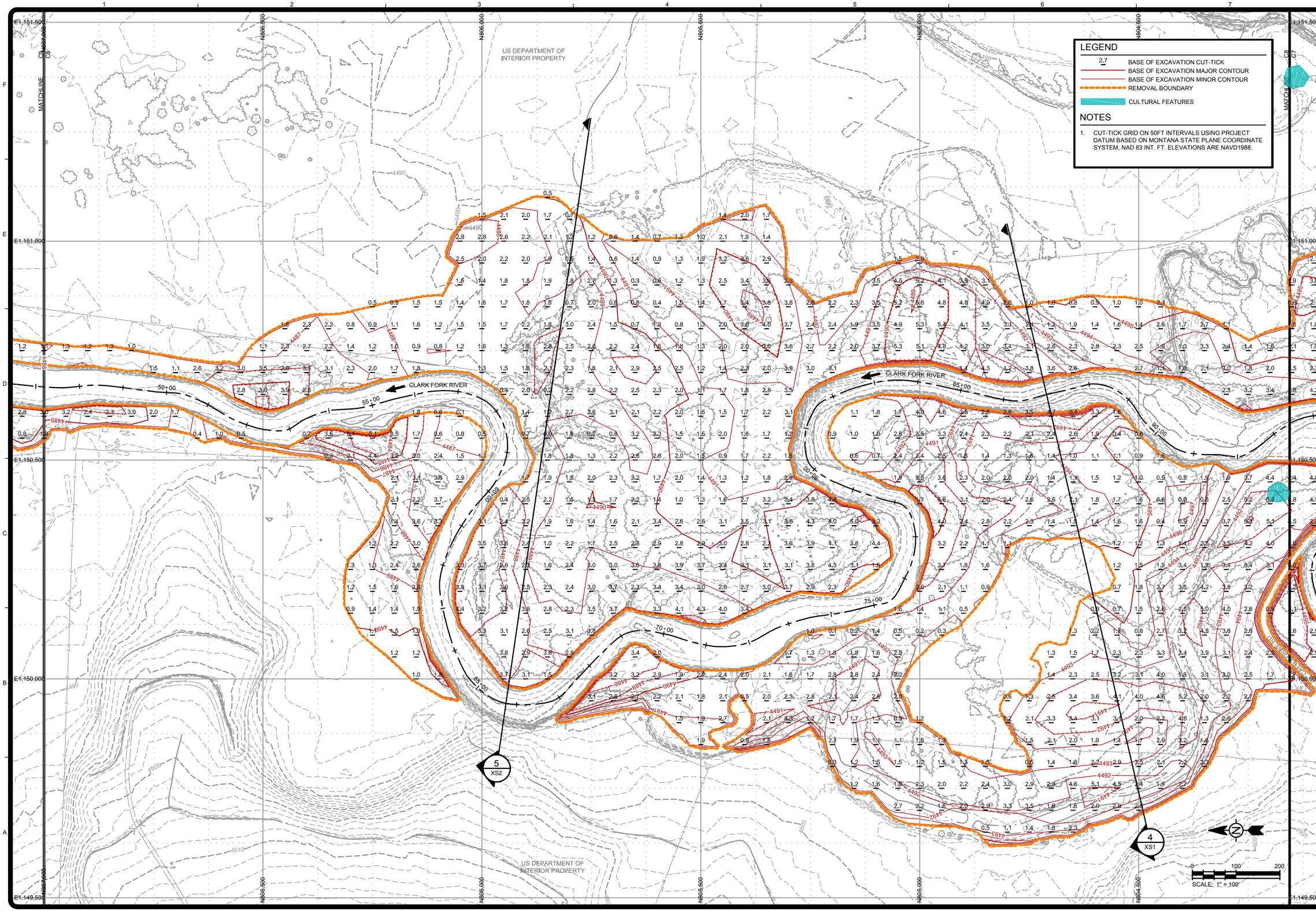
EXCAVATION PLAN

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C7

Copyright: Tetra Tech

2/27/2015 12:02:10 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-07-08-09-EXCAVATION PLAN.DWG - FIELD, STEVE



TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA
REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

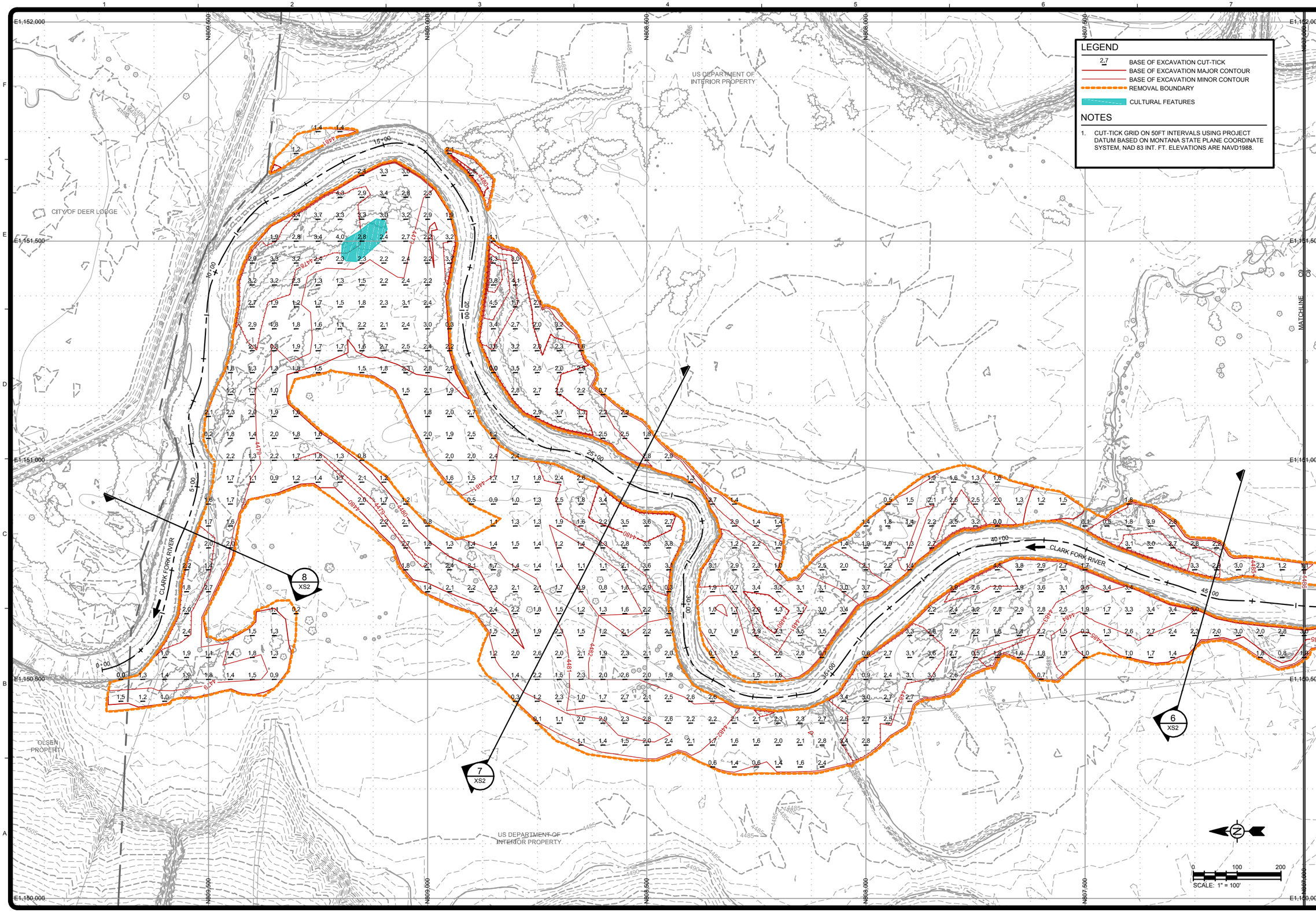
EXCAVATION PLAN

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C8

Copyright: Tetra Tech

2/27/2015 12:02:30 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-07-08-09-EXCAVATION PLAN.DWG - FIELD, STEVE



LEGEND

- 2.7 BASE OF EXCAVATION CUT-TICK
- BASE OF EXCAVATION MAJOR CONTOUR
- BASE OF EXCAVATION MINOR CONTOUR
- REMOVAL BOUNDARY
- CULTURAL FEATURES

NOTES

1. CUT-TICK GRID ON 50FT INTERVALS USING PROJECT DATUM BASED ON MONTANA STATE PLANE COORDINATE SYSTEM, NAD 83 INT. FT. ELEVATIONS ARE NAVD1988.

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

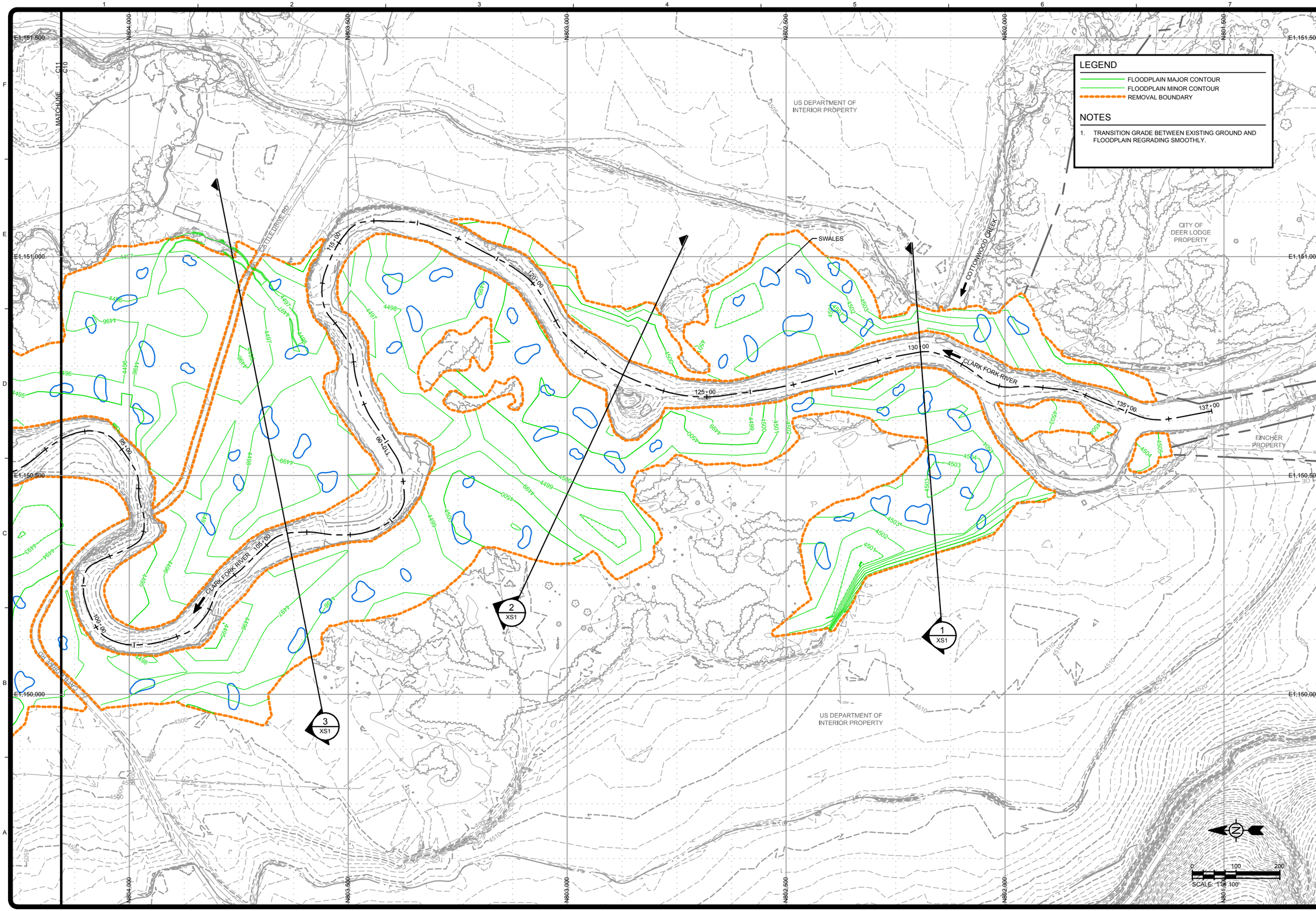
EXCAVATION PLAN

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C9

Copyright: Tetra Tech

2/27/2015 12:02:47 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-07-08-09-EXCAVATION PLAN.DWG - FIELD, STEVE



TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

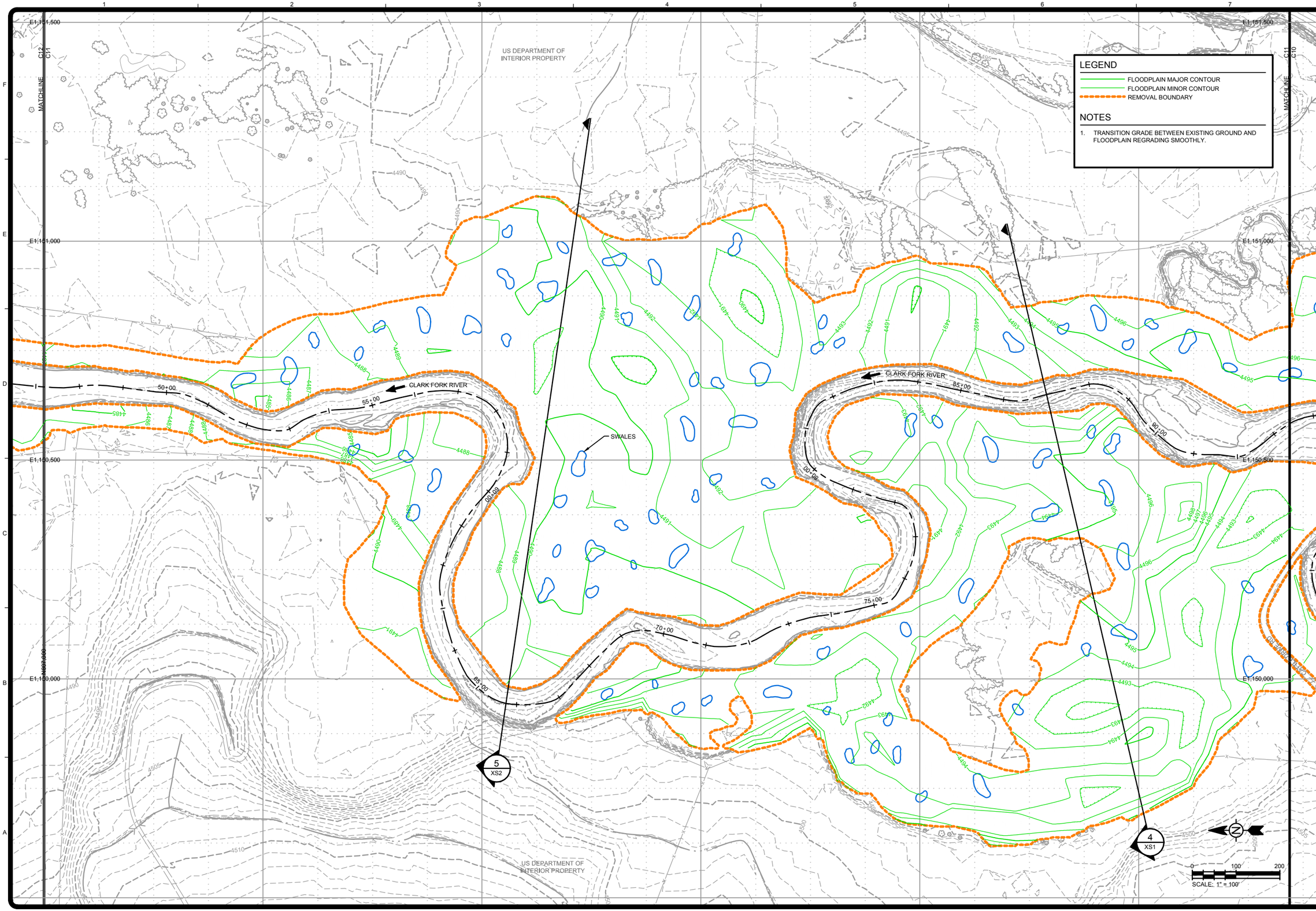
FINAL GRADING PLAN

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C10

Copyright: Tetra Tech

2/27/2015 12:06:17 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-10-11-12-FINAL GRADING PLAN.DWG - FIELD, STEVE



LEGEND

- FLOODPLAIN MAJOR CONTOUR
- FLOODPLAIN MINOR CONTOUR
- REMOVAL BOUNDARY

NOTES

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

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

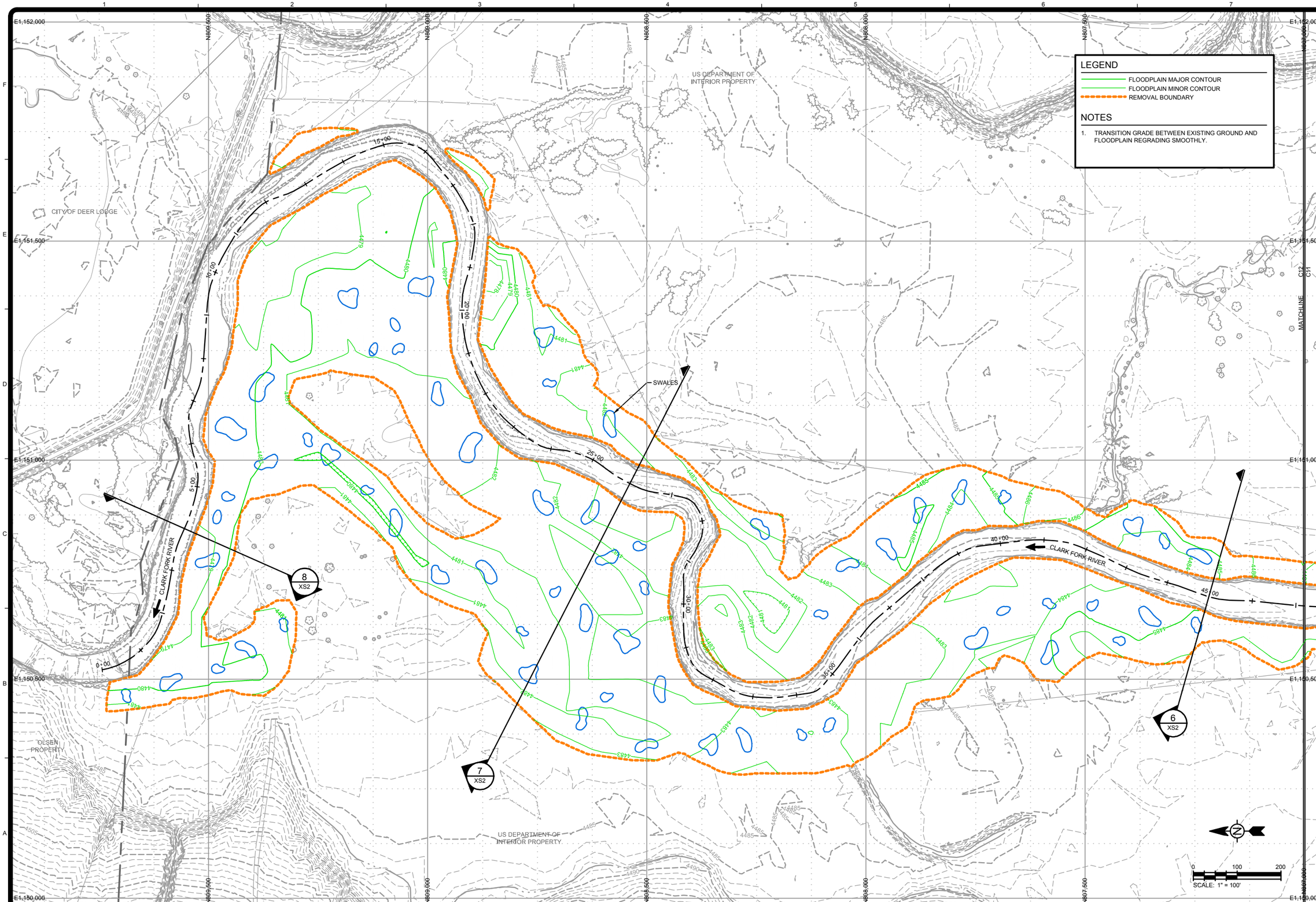
FINAL GRADING PLAN

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C11

Copyright: Tetra Tech

2/27/2015 12:06:39 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-10-11-12-FINAL GRADING PLAN.DWG - FIELD, STEVE



LEGEND

- FLOODPLAIN MAJOR CONTOUR
- FLOODPLAIN MINOR CONTOUR
- REMOVAL BOUNDARY

NOTES

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

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

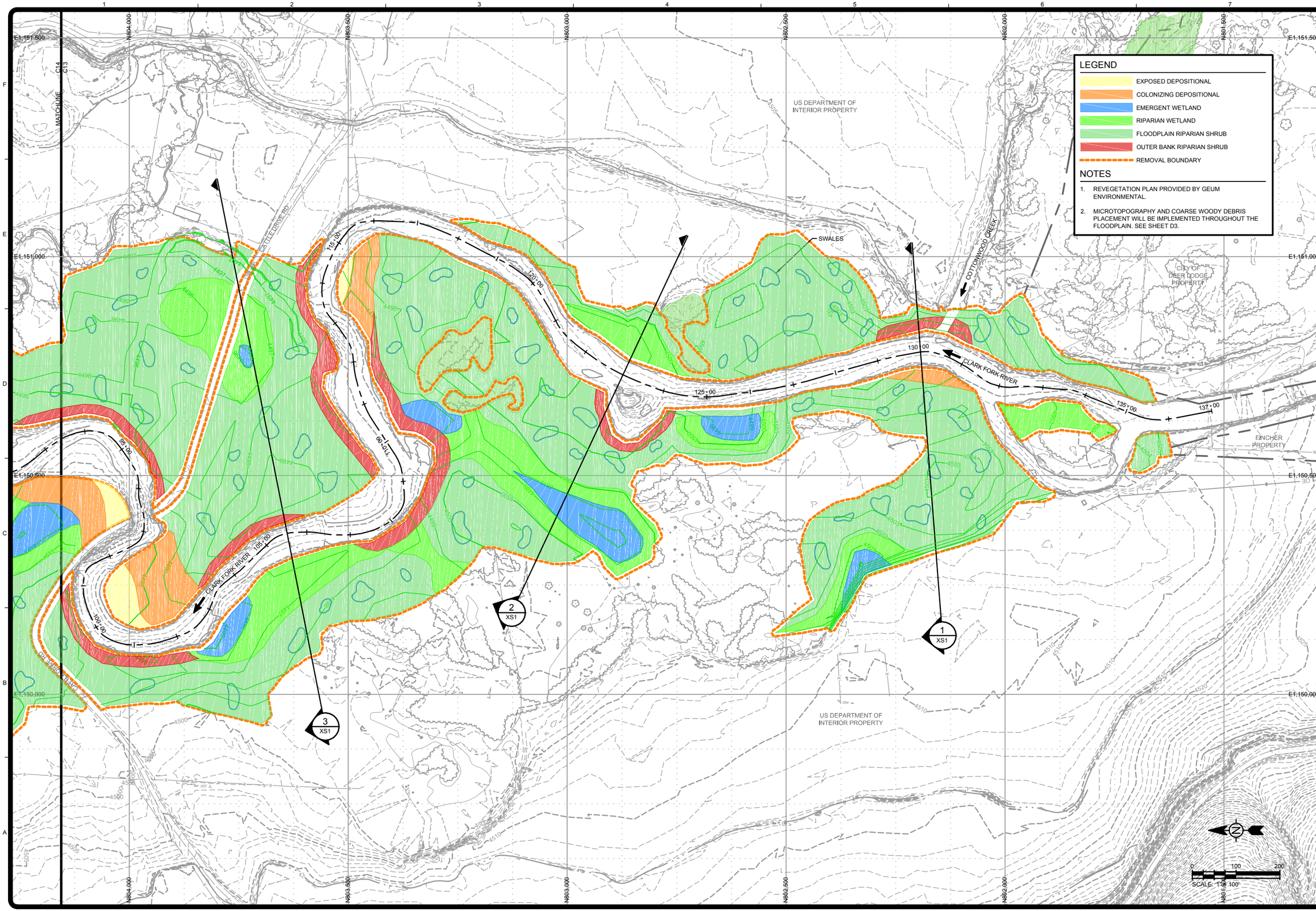
FINAL GRADING PLAN

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C12

Copyright: Tetra Tech

2/27/2015 12:06:59 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-10-11-12-FINAL GRADING PLAN.DWG - FIELD, STEVE



TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

Client: DEPARTMENT OF ENVIRONMENTAL QUALITY
Proj. Loc.: DEER LODGE, MONTANA
REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

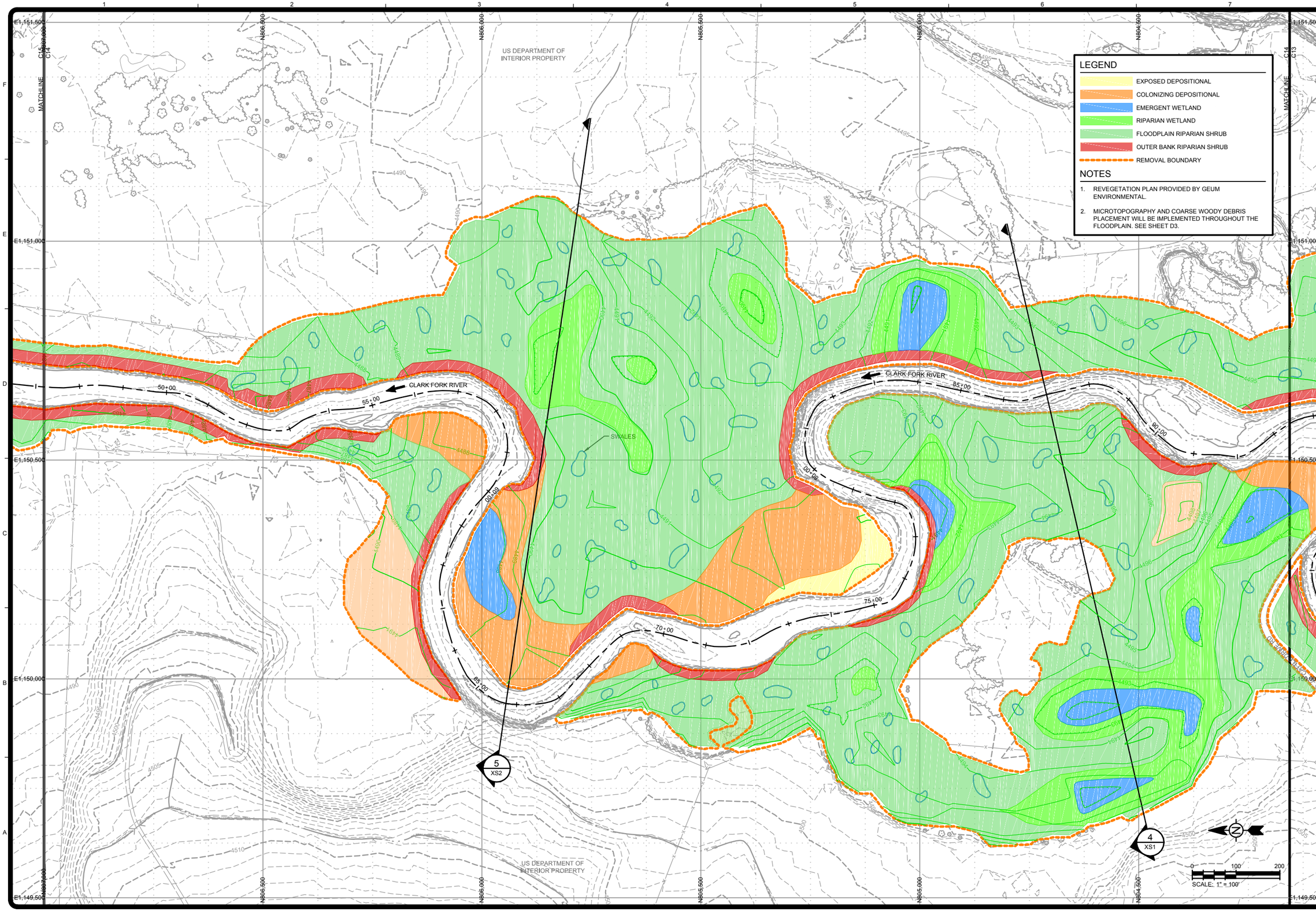
REVEGETATION COVER TYPES

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C13

Copyright: Tetra Tech

2/27/2015 12:10:00 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-13-14-15-REVEGETATION COVER TYPES.DWG - FIELD, STEVE



TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

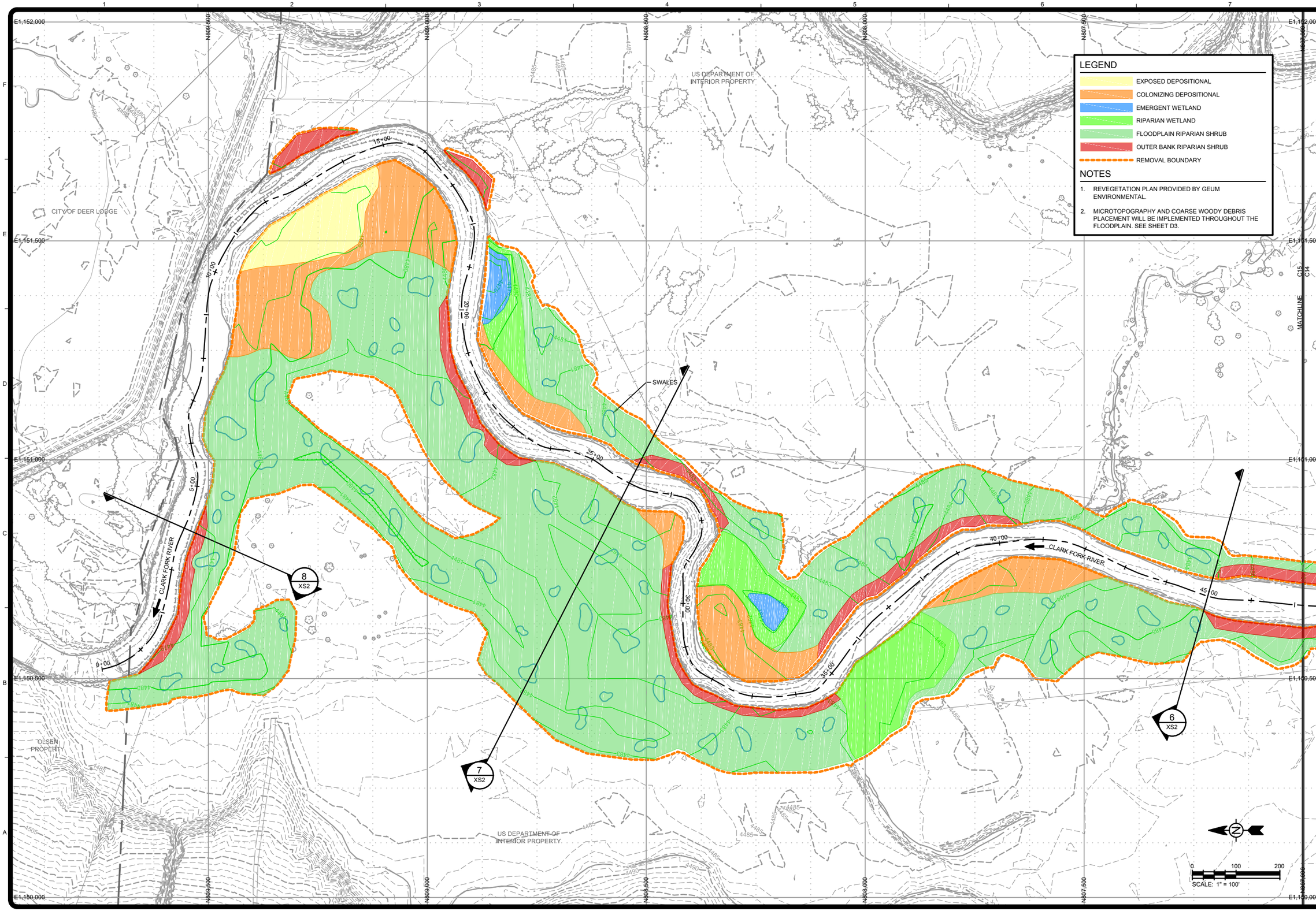
REVEGETATION COVER TYPES

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C14

Copyright: Tetra Tech

2/27/2015 12:10:22 PM - O:\H:\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-13-14-15-REVEGETATION COVER TYPES.DWG - FIELD, STEVE



TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

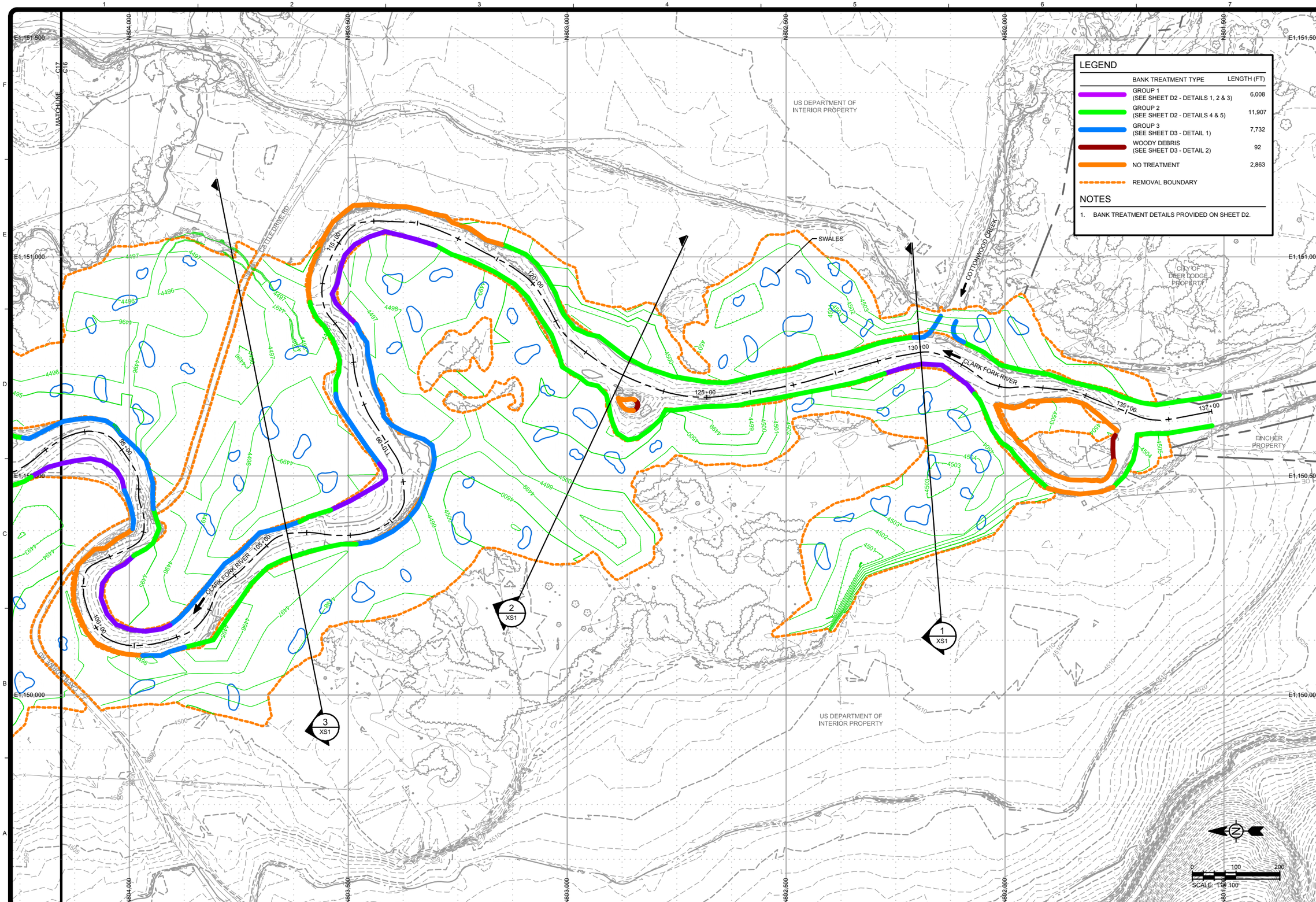
REVEGETATION COVER TYPES

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C15

Copyright: Tetra Tech

2/27/2015 12:10:43 PM - O:\HM\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-13-14-15-REVEGETATION COVER TYPES.DWG - FIELD, STEVE



LEGEND

BANK TREATMENT TYPE	LENGTH (FT)
GROUP 1 (SEE SHEET D2 - DETAILS 1, 2 & 3)	6,008
GROUP 2 (SEE SHEET D2 - DETAILS 4 & 5)	11,907
GROUP 3 (SEE SHEET D3 - DETAIL 1)	7,732
WOODY DEBRIS (SEE SHEET D3 - DETAIL 2)	92
NO TREATMENT	2,863
REMOVAL BOUNDARY	

NOTES

1. BANK TREATMENT DETAILS PROVIDED ON SHEET D2.

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

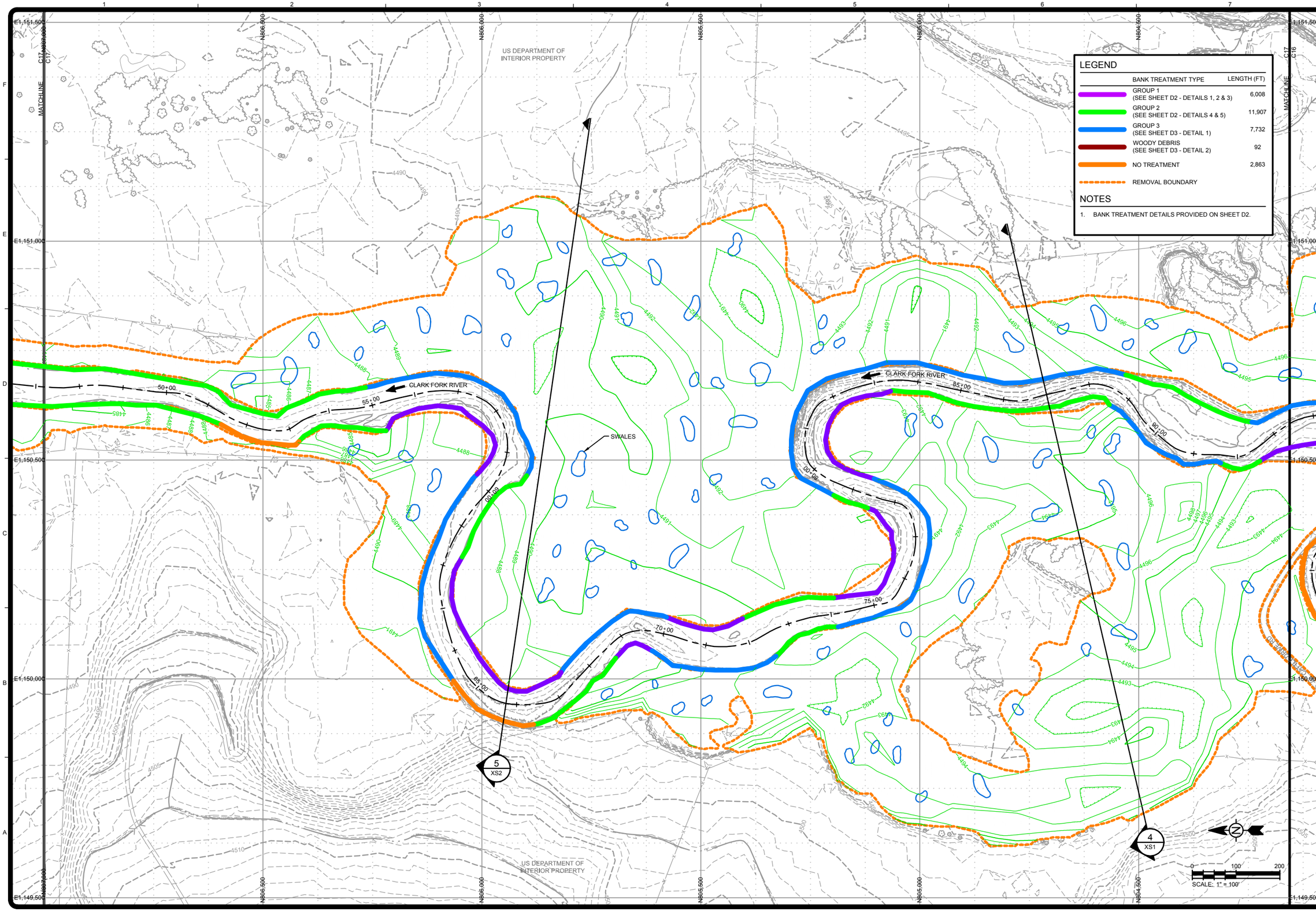
STREAMBANK TREATEMENT PLAN

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C16

Copyright: Tetra Tech

2/27/2015 12:13:51 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-16-17-18-STREAMBANK TREATMENT PLAN.DWG - FIELD, STEVE



LEGEND

BANK TREATMENT TYPE	LENGTH (FT)
GROUP 1 (SEE SHEET D2 - DETAILS 1, 2 & 3)	6,008
GROUP 2 (SEE SHEET D2 - DETAILS 4 & 5)	11,907
GROUP 3 (SEE SHEET D3 - DETAIL 1)	7,732
WOODY DEBRIS (SEE SHEET D3 - DETAIL 2)	92
NO TREATMENT	2,863
REMOVAL BOUNDARY	

NOTES

1. BANK TREATMENT DETAILS PROVIDED ON SHEET D2.

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

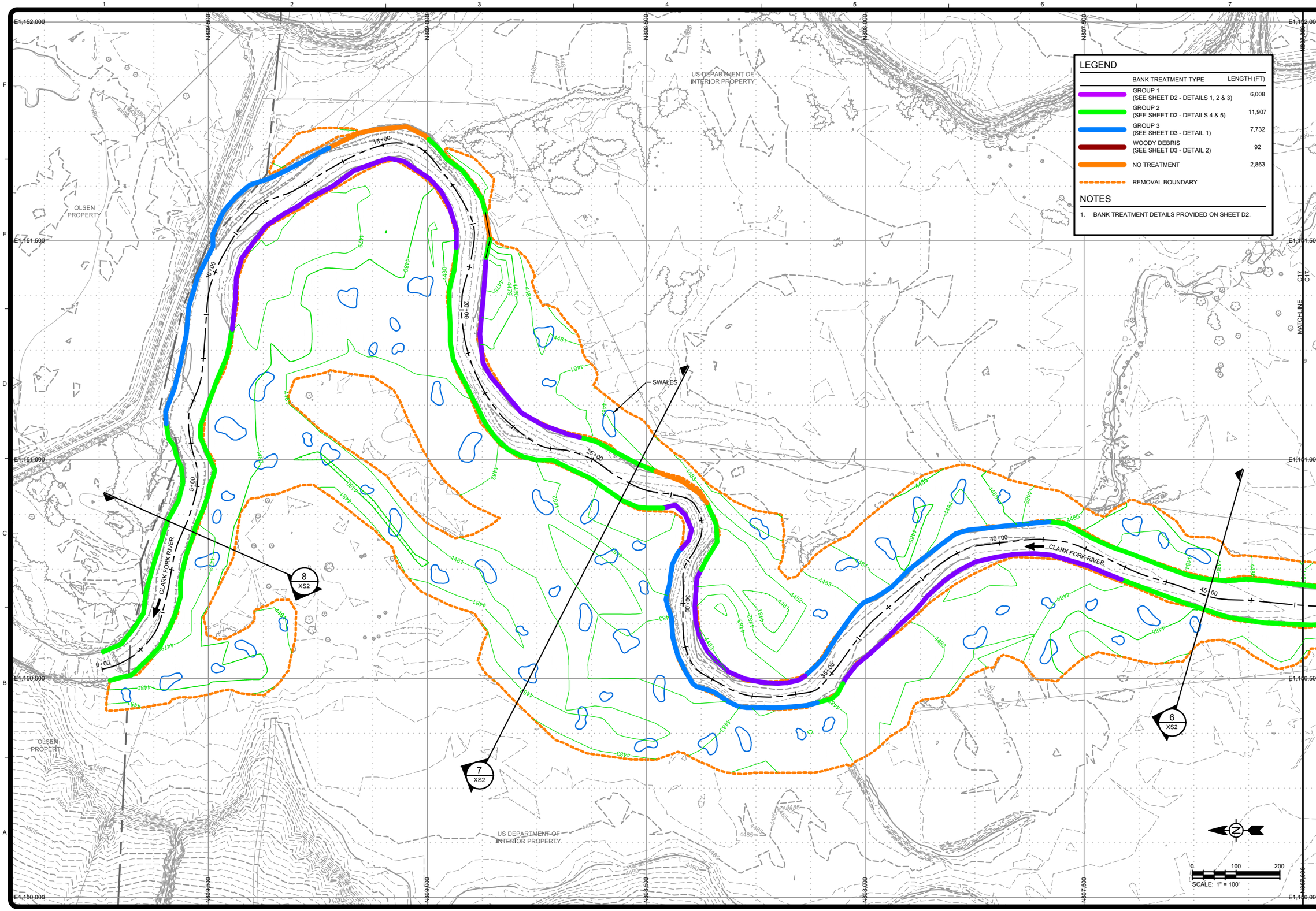
STREAMBANK TREATEMENT PLAN

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C17

Copyright: Tetra Tech

2/27/2015 12:14:12 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-16-17-18-STREAMBANK TREATMENT PLAN.DWG - FIELD, STEVE



LEGEND

BANK TREATMENT TYPE	LENGTH (FT)
GROUP 1 (SEE SHEET D2 - DETAILS 1, 2 & 3)	6,008
GROUP 2 (SEE SHEET D2 - DETAILS 4 & 5)	11,907
GROUP 3 (SEE SHEET D3 - DETAIL 1)	7,732
WOODY DEBRIS (SEE SHEET D3 - DETAIL 2)	92
NO TREATMENT	2,863
REMOVAL BOUNDARY	

NOTES

1. BANK TREATMENT DETAILS PROVIDED ON SHEET D2.

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

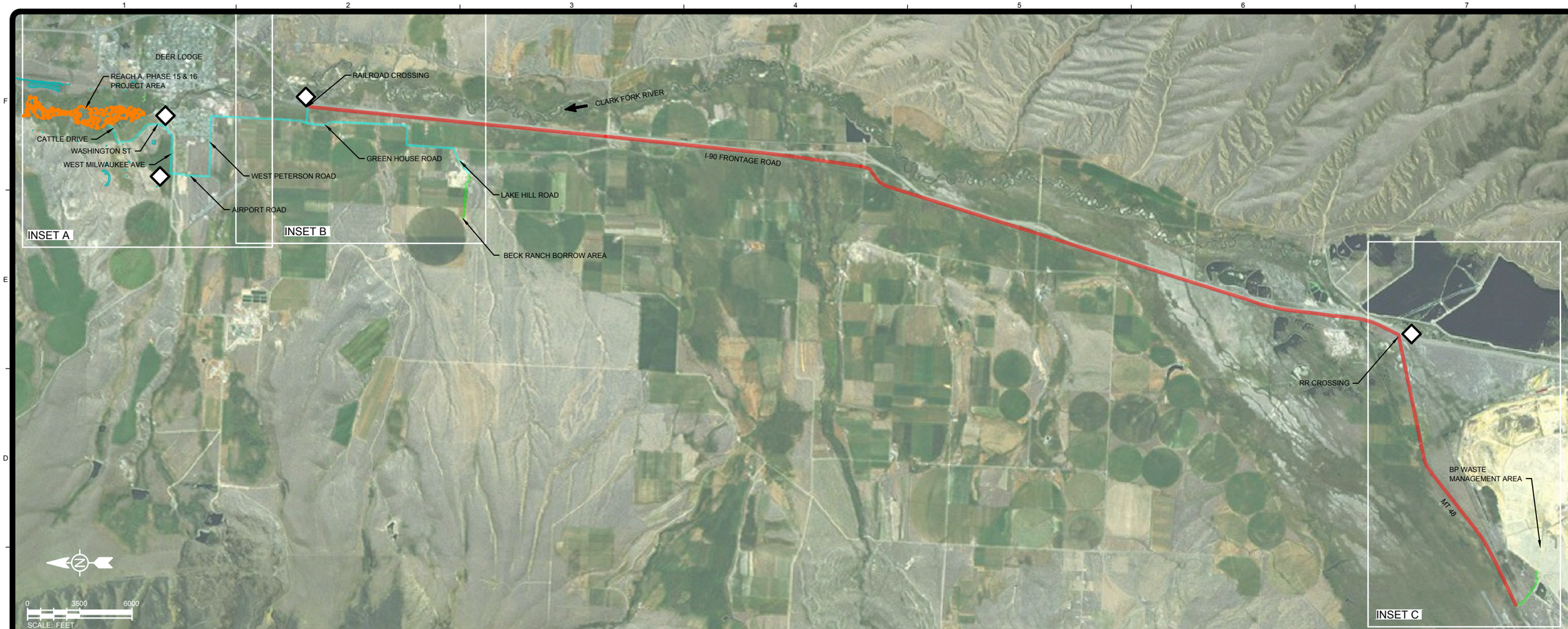
STREAMBANK TREATEMENT PLAN

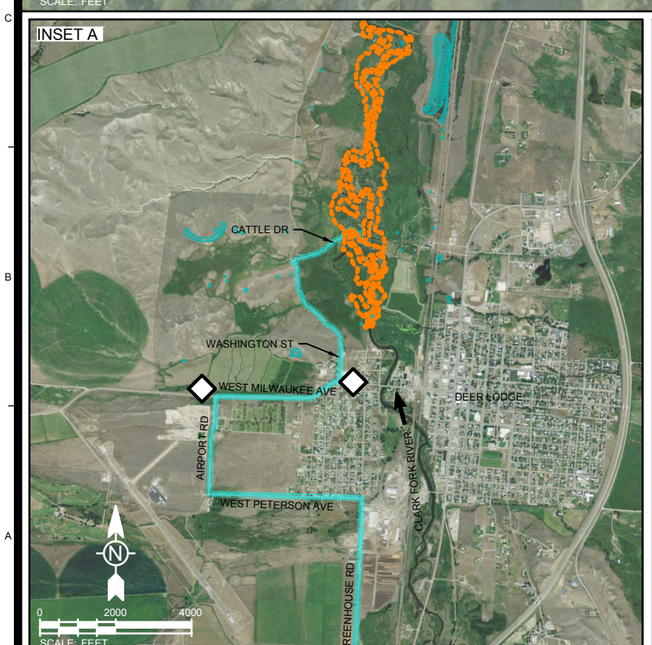
Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

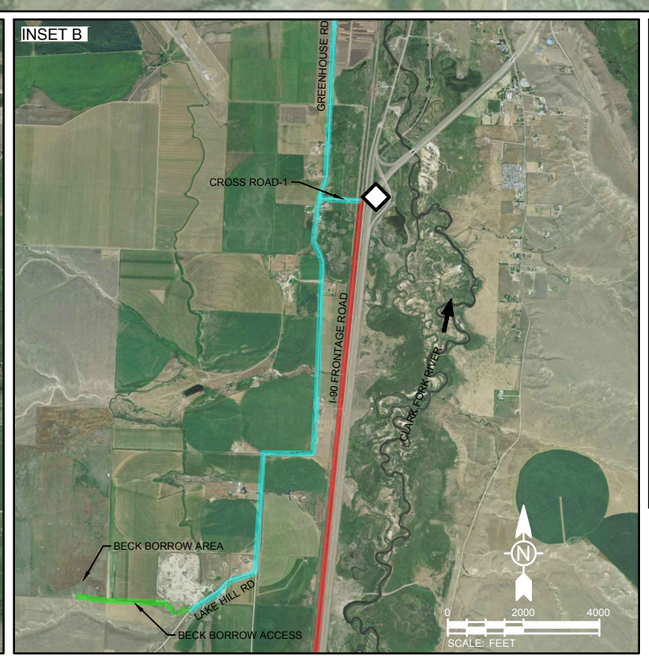
C18

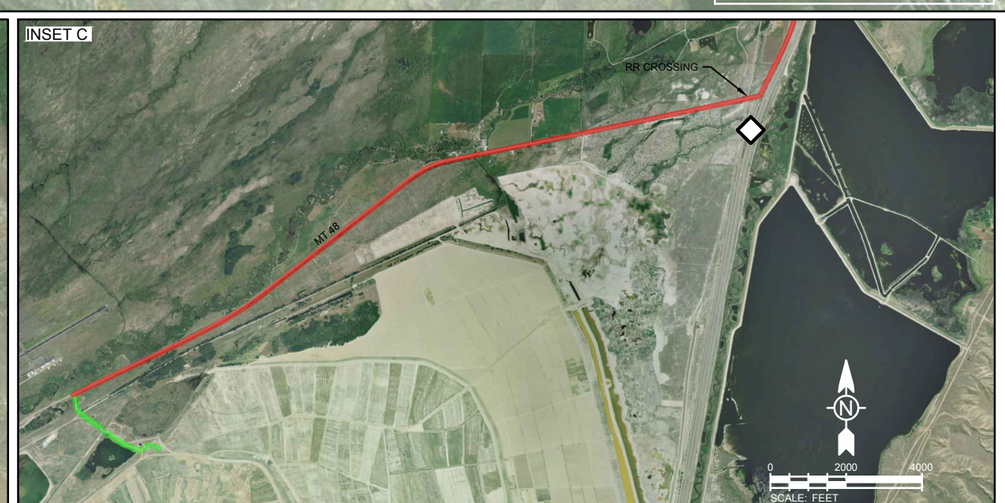
Copyright: Tetra Tech

2/27/2015 12:14:34 PM - O:\HM\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-16-17-18-STREAMBANK TREATMENT PLAN.DWG - FIELD, STEVE









◇ ENHANCED TRAFFIC CONTROL MEASURES

IMAGERY PROVIDED BY BING, 2012

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

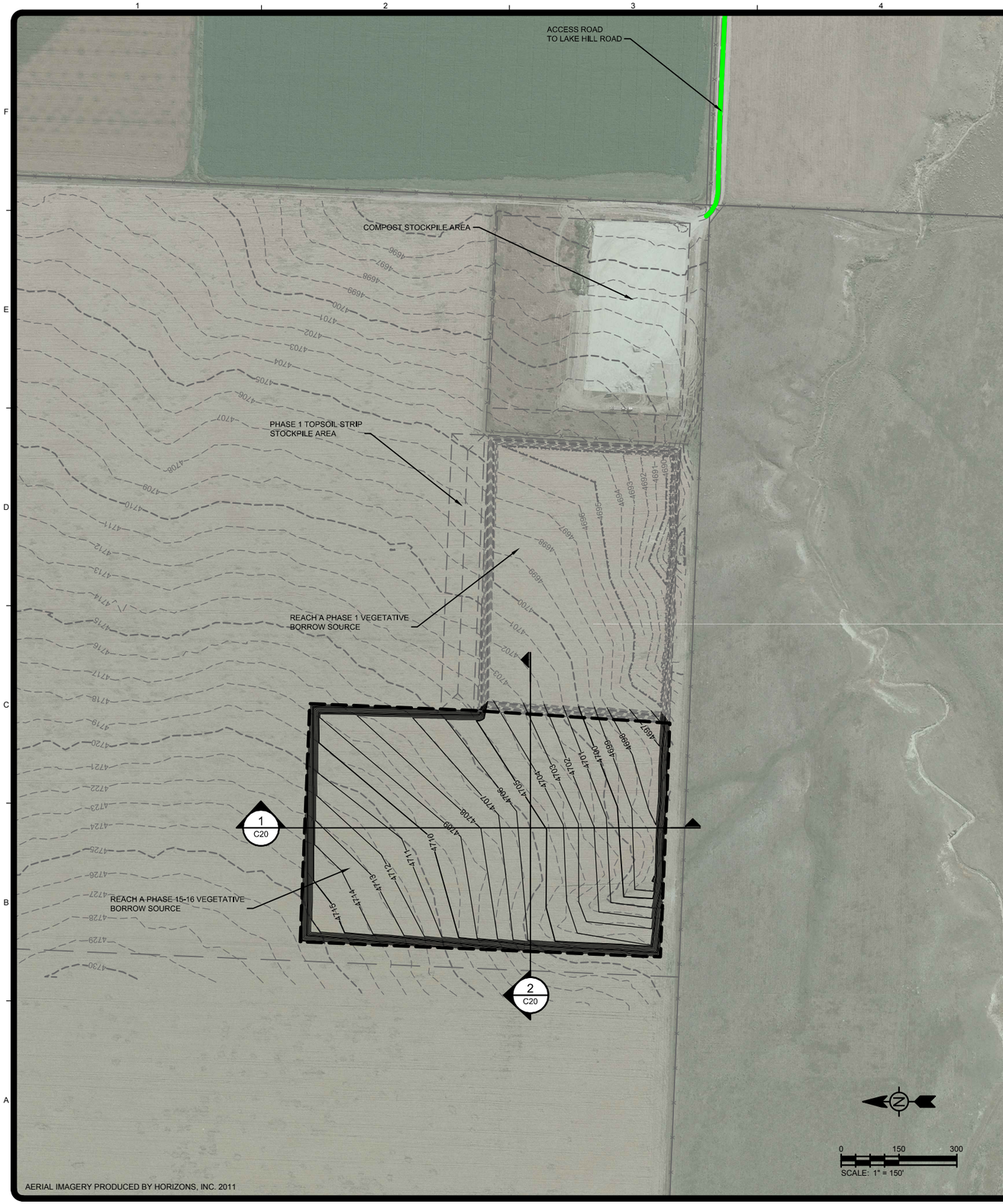
TRANSPORTATION PLAN

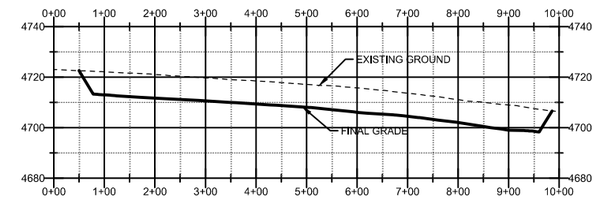
Project No.:	114-560356
Designed By:	MEH
Drawn By:	MEB
Checked By:	MEH

C19

Copyright: Tetra Tech

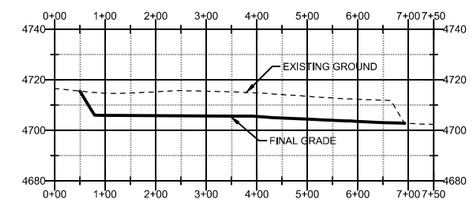
2/27/2015 12:16:16 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-19-TRANSPORTATION PLAN.DWG - FIELD, STEVE





1 C20 VEGETATIVE BORROW

VERT. EXAG = 5



2 C20 VEGETATIVE BORROW

VERT. EXAG = 5

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

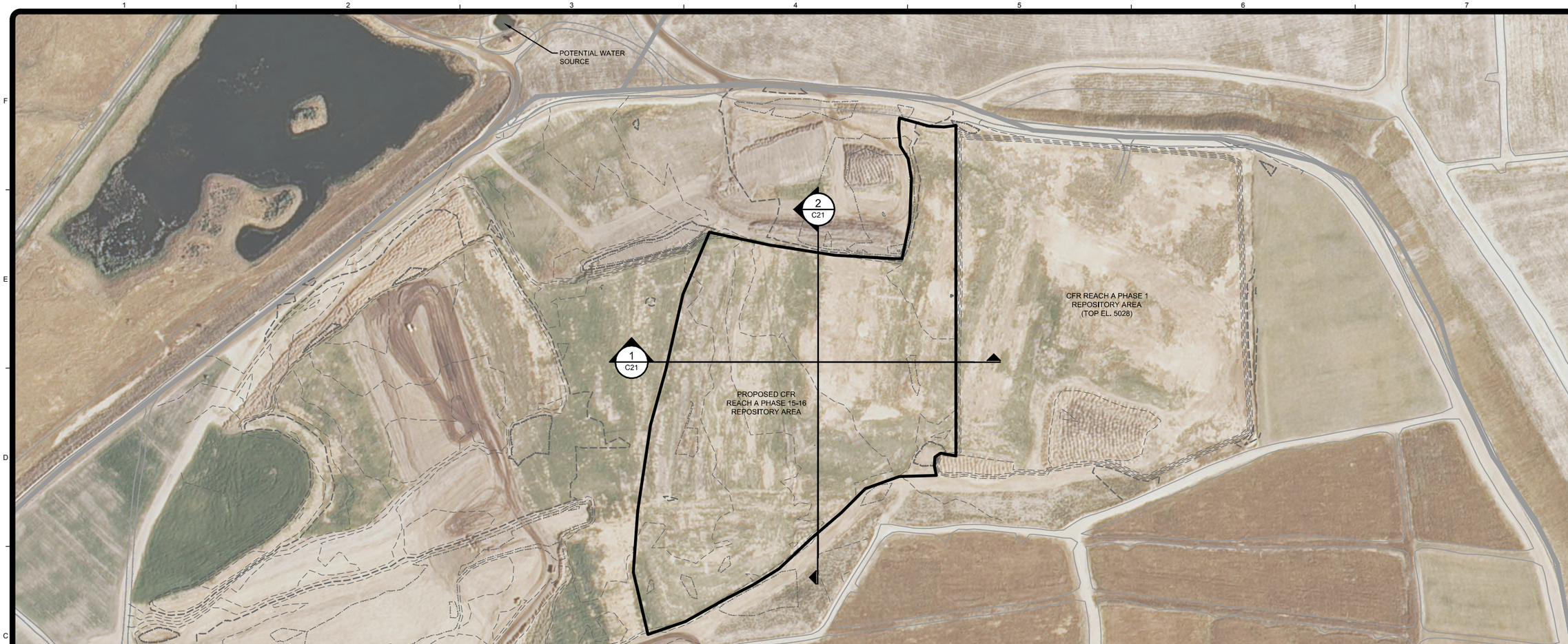
BORROW AREA PLAN

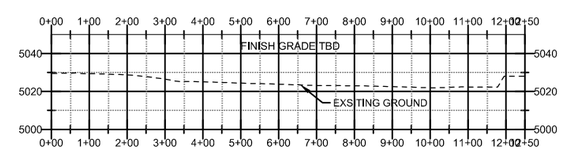
Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

C20

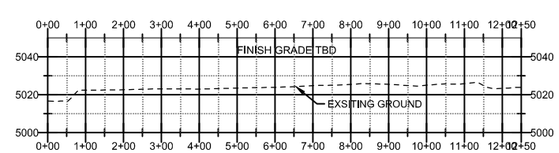
Copyright: Tetra Tech

2/27/2015 12:20:08 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-20-BORROW AREA PLAN.DWG - FIELD, STEVE





1 C21 REPOSITORY SECTION
VERT. EXAG = 5



2 C21 REPOSITORY SECTION
VERT. EXAG = 5

N

0 150 300
SCALE: 1" = 150'

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

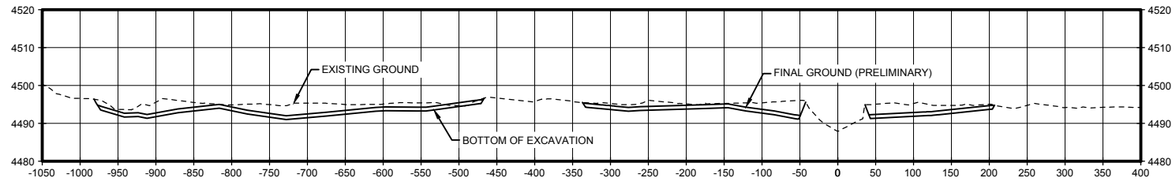
REPOSITORY PLAN AND SECTIONS

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

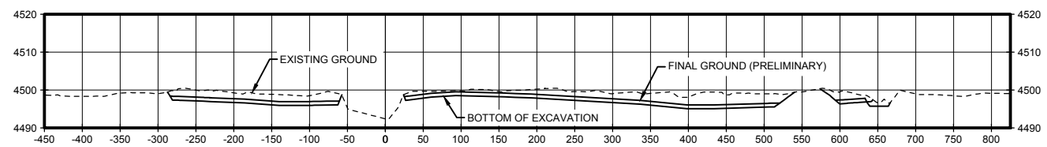
C21

Copyright: Tetra Tech

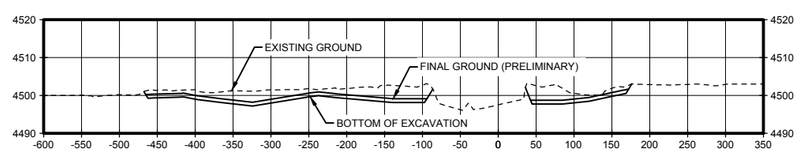
2/27/2015 12:22:09 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\C-21-REPOSITORY PLAN.DWG - FIELD, STEVE



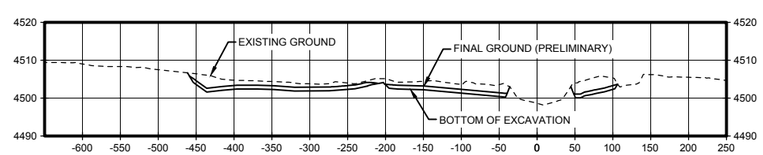
4 SECTION STATION 87+00
VERT. EXAG = 5



3 SECTION STATION 105+55
VERT. EXAG = 5



2 SECTION STATION 123+00
VERT. EXAG = 5



1 SECTION STATION 130+00
VERT. EXAG = 5

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

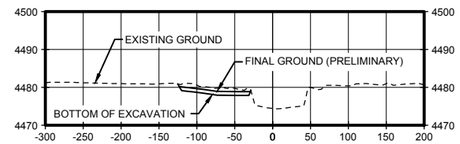
FLOODPLAIN CROSS-SECTIONS

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

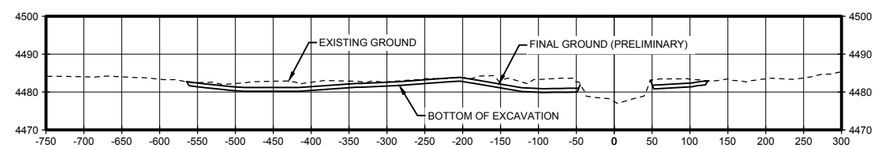
XS1

Copyright: Tetra Tech

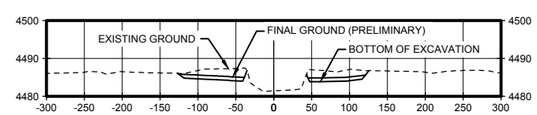
2/27/2015 12:31:04 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\XS-01-02-FLOODPLAIN CROSS-SECTIONS.DWG - FIELD, STEVE



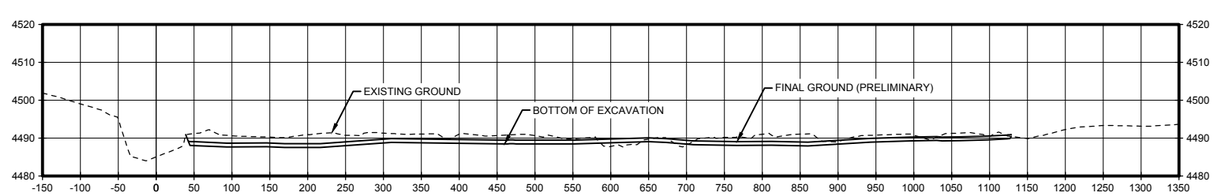
8 SECTION STATION 4+00
VERT. EXAG = 5



7 SECTION STATION 26+00
VERT. EXAG = 5



6 SECTION STATION 45+00
VERT. EXAG = 5



5 SECTION STATION 65+75
VERT. EXAG = 5

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

FLOODPLAIN CROSS-SECTIONS

Project No.:	114-560356
Designed By:	SEF
Drawn By:	SEF
Checked By:	MLH

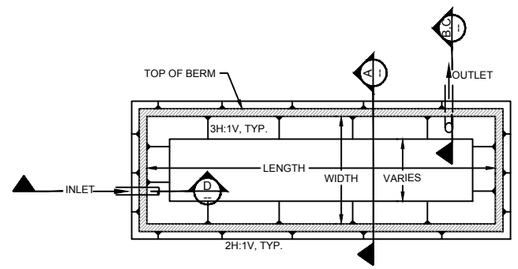
XS2

Copyright: Tetra Tech

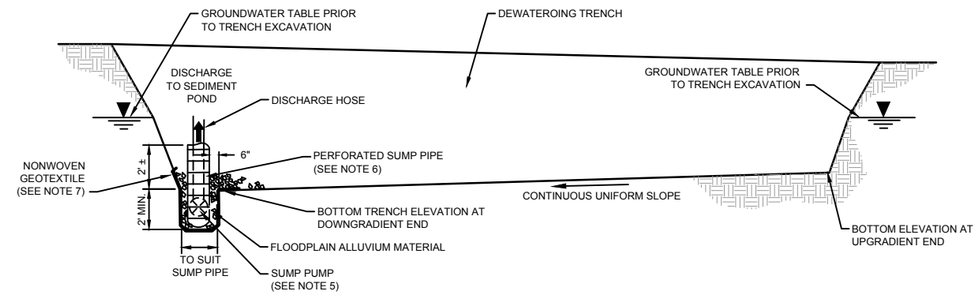
2/27/2015 12:31:07 PM - O:\H\MMONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\XS-01-02-FLOODPLAIN CROSS-SECTIONS.DWG - FIELD, STEVE

NOTES:

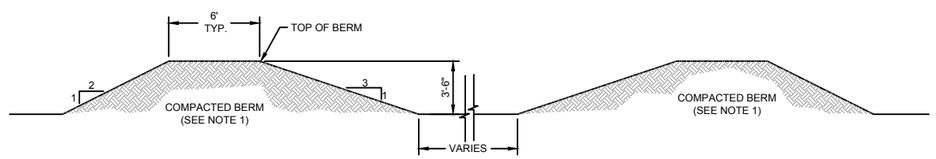
1. THE FILL FOR THE SEDIMENT DETENTION POND BERM SHALL BE ON-SITE MATERIALS FROM THE BASIN EXCAVATION. FILL FOR THE DEWATERING PIPE TRENCH SHALL BE FROM THE VEGETATIVE BACKFILL BORROW AREA. FILL SHALL BE PLACED AS A STRUCTURE EMBANKMENT AND COMPACTED TO 95% OF MAXIMUM DRY DENSITY. FILL SHALL HAVE NO ROCKS LARGER THAN 6" DIAMETER. EACH COMPACTED LIFT SHALL BE SCARIFIED TO A DEPTH OF AT LEAST 2" PRIOR TO THE PLACEMENT OF THE NEXT LIFT.
2. OUTLET PIPE SHALL BE CMP OR HDPE, SMOOTH INTERIOR CORRUGATED, ADVANCED DRAINAGE SYSTEMS, INC TYPE N-12 OR EQUAL. PIPE AND FITTINGS SHALL BE 12" DIAMETER.
3. WHEN THE TRENCH DISCHARGE IS REROUTED FROM THE SEDIMENT DETENTION POND TO THE STREAM CHANNEL, THE CHANNEL BANKS SHALL BE PROTECTED FROM EROSION AT THE NEW DISCHARGE POINTS IN A SIMILAR MANNER AS THE SEDIMENT BASIN DISCHARGE.
4. SEDIMENT DETENTION POND SUMP PUMP SHALL HAVE A MINIMUM CAPACITY EQUAL TO THE MAXIMUM INLET FLOWRATE.
5. THE PUMP SHALL HAVE A MINIMUM CAPACITY OF 100GAL/MIN/100FT OF TRENCH
6. SUMP PIPE SHALL BE 14 GAGE, 24" OR 36" DIAMETER CMP. OPEN SPACE OF PERFORATIONS IN SUMP PIPE SHALL EXCEED 80 SQUARE INCHES PER 100 FEET OF TRENCH.
7. GEOTEXTILE SHALL BE AS DESCRIBED IN THE SPECIAL PROVISIONS.
8. PROVIDE SUITABLE SUPPORT FOR PIPING AND ELECTRICAL CROSSINGS OF DEWATERING TRENCHES AND ACTIVE STREAM CHANNEL.



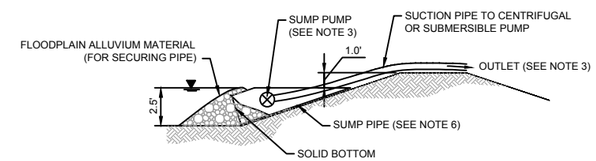
PLAN VIEW
SEDIMENT DETENTION POND
NOT TO SCALE



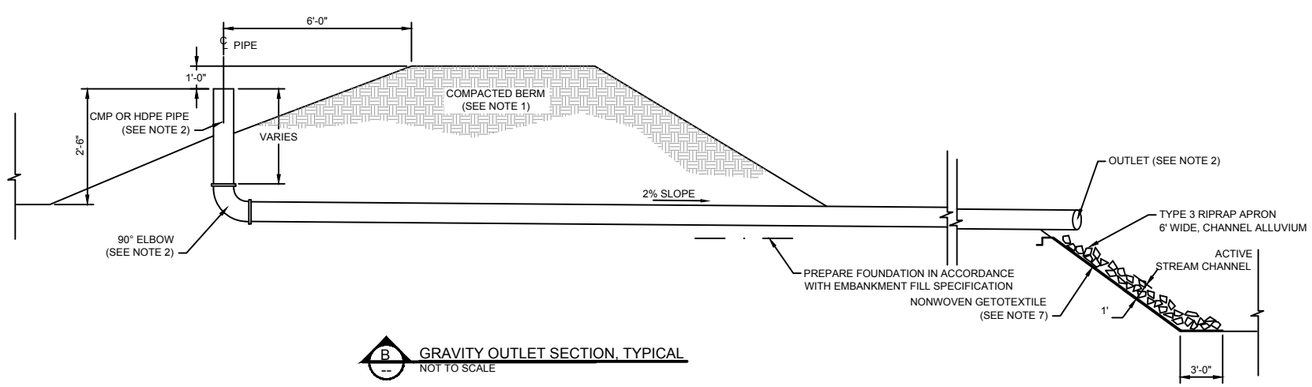
TYPICAL GROUNDWATER DEWATERING TRENCH AND SUMP PROFILE
NOT TO SCALE



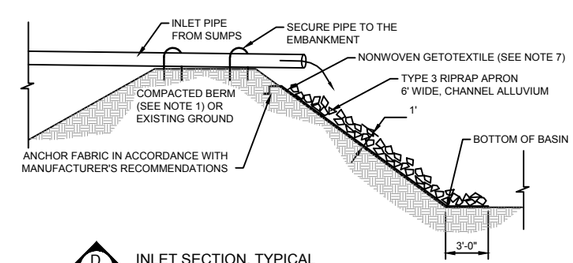
A SECTION
NOT TO SCALE



C PUMP OUTLET SECTION, TYPICAL
NOT TO SCALE



B GRAVITY OUTLET SECTION, TYPICAL
NOT TO SCALE



D INLET SECTION, TYPICAL
NOT TO SCALE

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

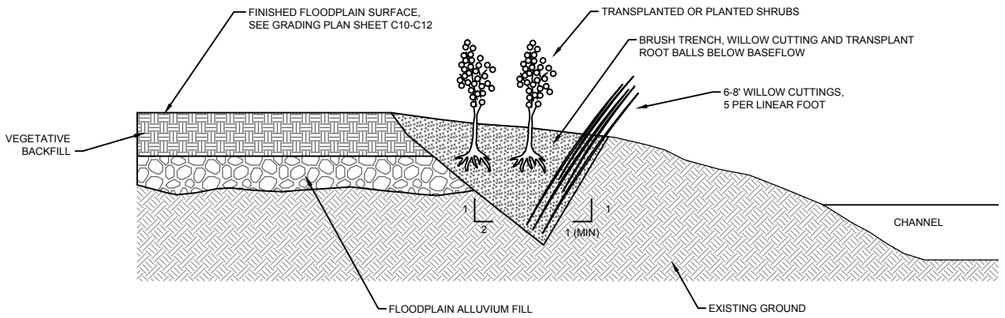
DEWATERING DETAILS

Project No.:	114-560356
Designed By:	MEH
Drawn By:	MEB
Checked By:	MEH

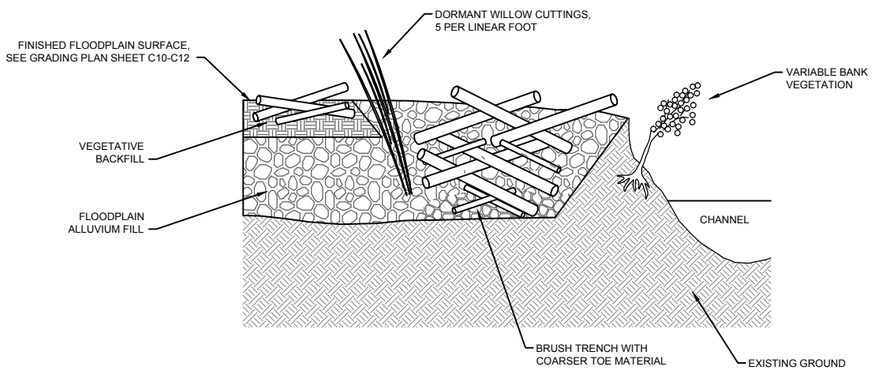
D1

Copyright: Tetra Tech

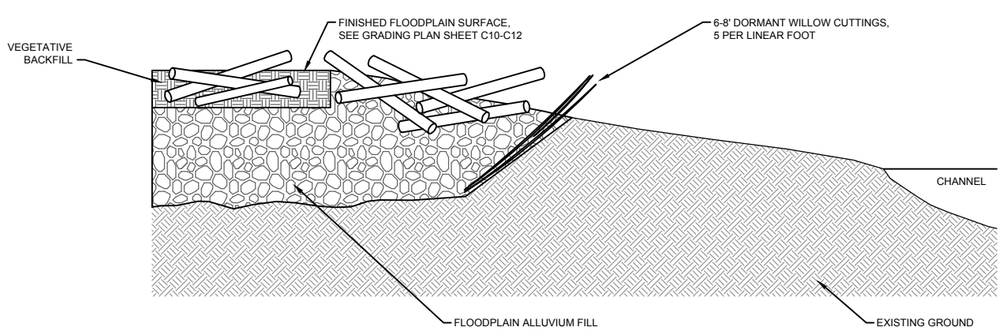
2/27/2015 12:22:54 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\D-01-DEWATERING DETAILS.DWG - FIELD, STEVE



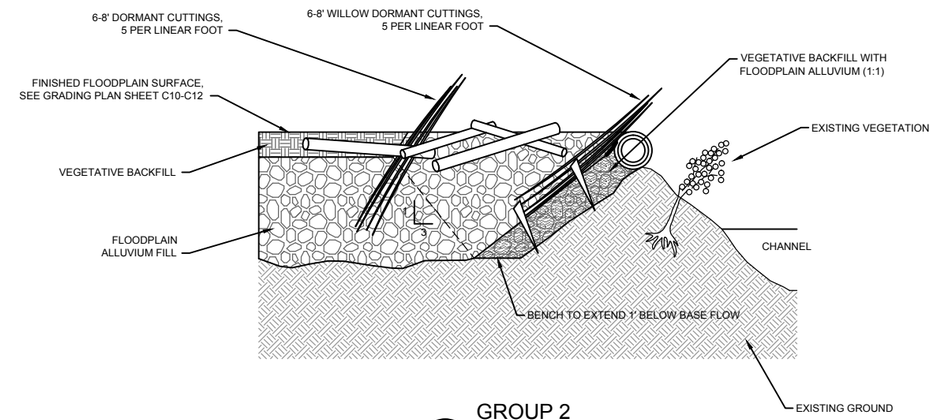
1 C16-18 GROUP 1 BRUSH TRENCH
NTS



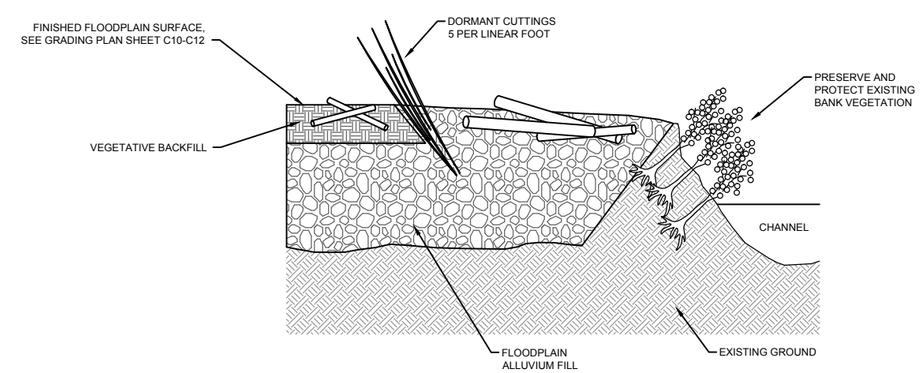
2 C16-18 GROUP 1 BRUSH TRENCH WITH REINFORCED TOE
NTS



3 C1-18 GROUP 1 POINT BAR BACKFILL
NTS



4 C16-18 GROUP 2 SINGLE LAYER SOIL LIFT
NTS



5 C16-18 GROUP 2 BACKFILL BANK
NTS

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

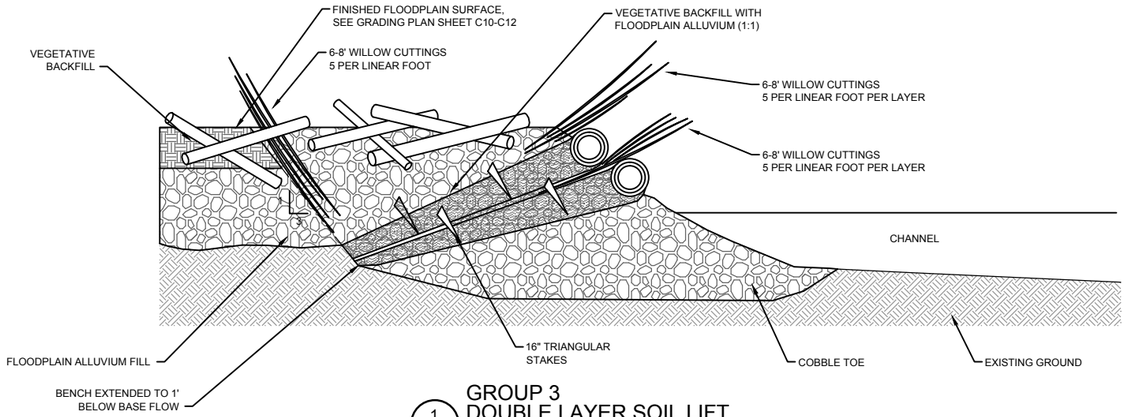
STREAMBANK TREATMENT DETAILS

Project No.:	114-560356
Designed By:	MEH
Drawn By:	RED
Checked By:	MEH

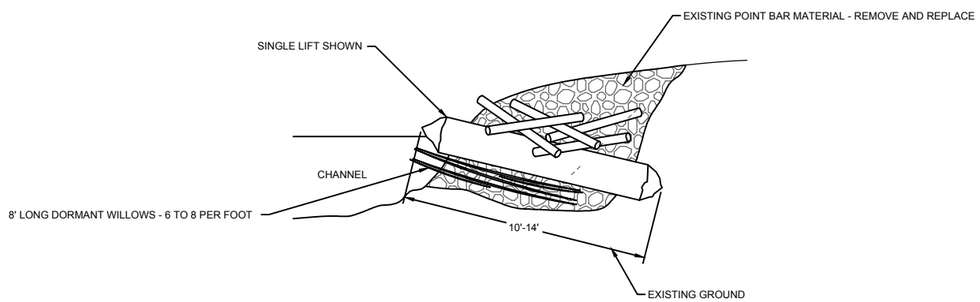
D2

Copyright: Tetra Tech

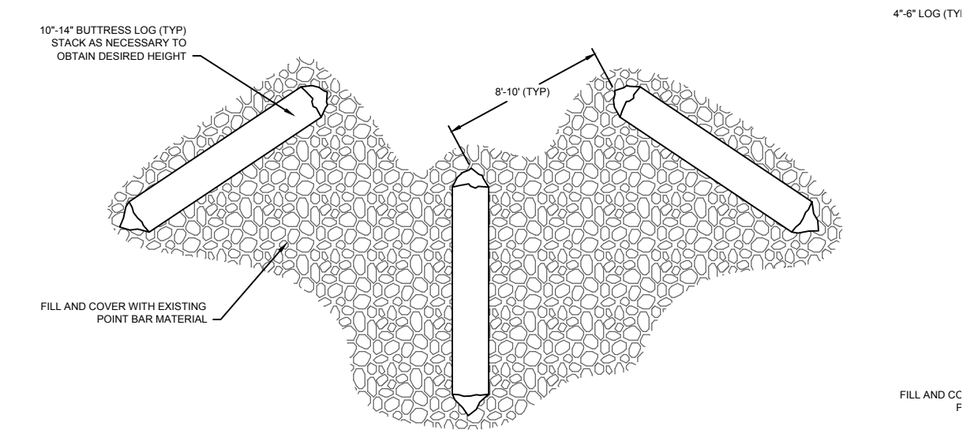
2/27/2015 12:23:39 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\D-02-03-STREAMBANK TREATMENT DETAILS.DWG - FIELD, STEVE

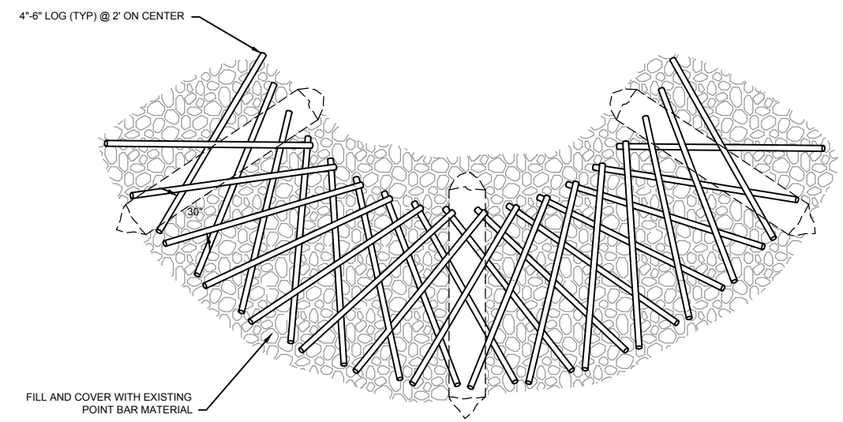


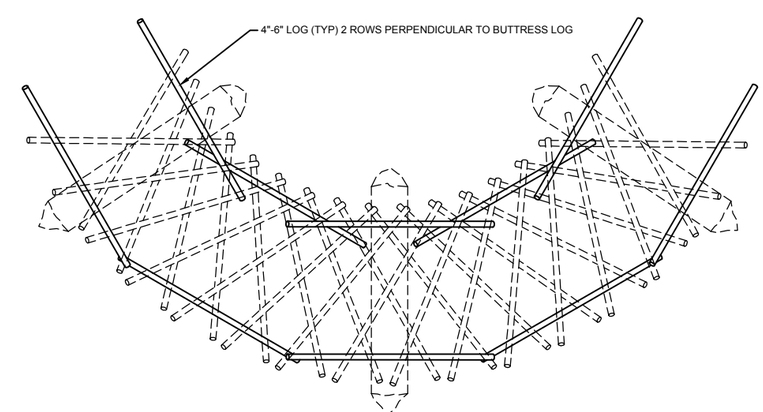
1 C16-18 GROUP 3 DOUBLE LAYER SOIL LIFT
NTS



2 C16-18 WOODY DEBRIS JAM
NTS







3 C16-18 POINT BAR RECONSTRUCTION SEQUENCE
NTS

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

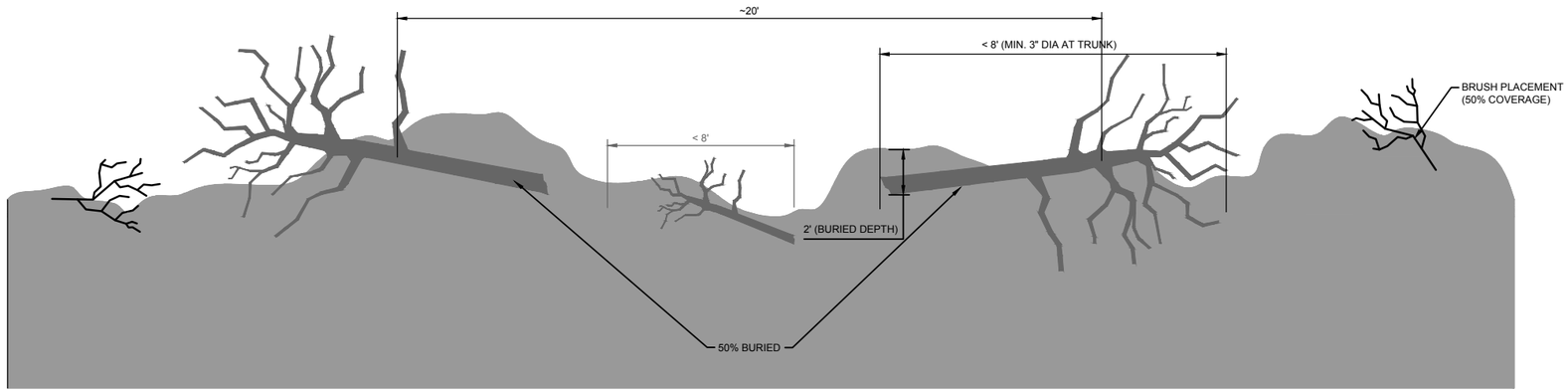
STREAMBANK TREATMENT DETAILS

Project No.:	114-560356
Designed By:	MEH
Drawn By:	RED
Checked By:	MEH

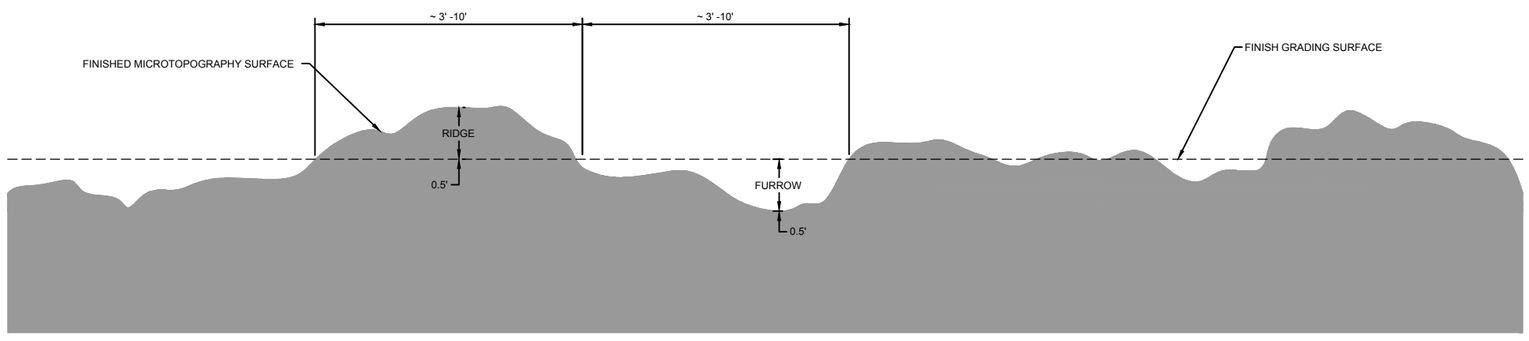
D3

Copyright: Tetra Tech

2/27/2015 12:23:41 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\D-02-03-STREAMBANK TREATMENT DETAILS.DWG - FIELD, STEVE



1 TYPICAL WOOD AND BRUSH PLACEMENT
NTS



2 TYPICAL MICROTOPOGRAPHY GRADING
NTS

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

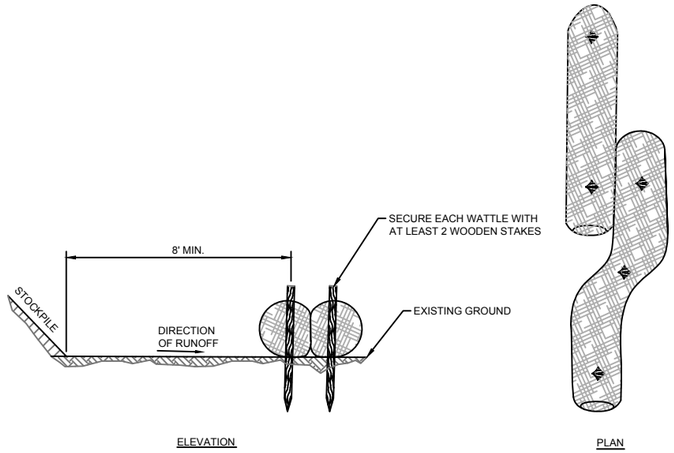
FLOOD PLAIN DETAILS

Project No.:	114-560356
Designed By:	MEH
Drawn By:	####
Checked By:	MEH

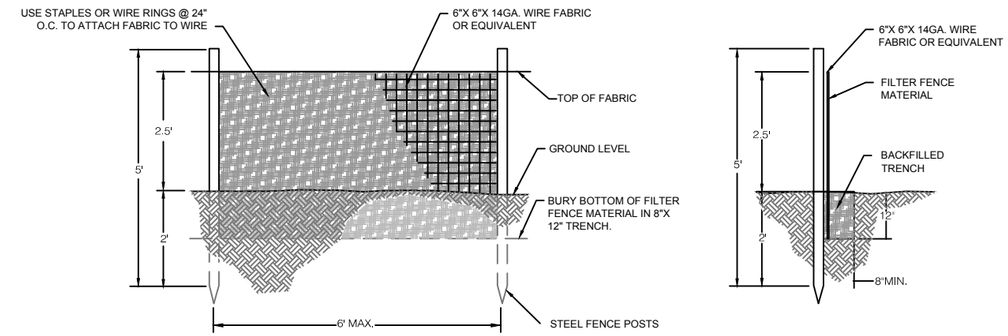
D4

Copyright: Tetra Tech

2/27/2015 12:24:20 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\D-04-FLOOD PLAIN DETAILS.DWG - FIELD, STEVE



1 – STRAW WATTLE DETAIL
NTS



2 – FILTER FENCE DETAIL
NTS

TETRA TECH
www.tetratech.com
303 Irene Street
Helena, Montana 59601
PHONE: 406-443-5210 FAX: 406-443-3729

Montana Department of Environmental Quality

MARK	DATE	DESCRIPTION	BY

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

REACH A, PHASE 15 AND 16
CLARK FORK RIVER OPERABLE UNIT

EROSION CONTROL DETAILS

Project No.:	114-560356
Designed By:	MEH
Drawn By:	MEB
Checked By:	MEH

D5

Copyright: Tetra Tech

2/27/2015 12:24:57 PM - O:\H-M\MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY\114-560435 - CFR RAP 15-16 FINAL PREL DES\110-2D CADD\SHEETFILES\D-05-EROSION CONTROL DETAILS.DWG - FIELD, STEVE