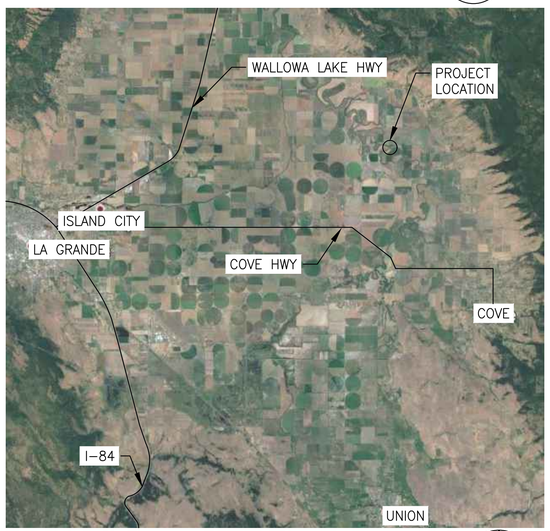
TROUT UNLIMITED/UNION SOIL AND WATER CONSERVATION DISTRICT

ELMER DAM MODIFICATIONS

ISSUED FOR CONSTRUCTION

VICINITY MAP
NTS



AREA MAP
NTS

PROJECT SITE PLAN
NTS

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M01	SPILLWAY AND FISHWAY GATES
M02	SPILLWAY MECHANICAL PLAN AND SECTIONS
L01	HABITAT IMPROVEMENT CONCEPTS

REGISTERED PROFESSIONAL ENGINEER 80853 PE OREGON 6/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REGISTERED PROFESSIONAL ENGINEER 76905PE OREGON JULY 12, 2005 NICHOLAS A. KRAUS
EXPIRATION DATE: 6/30/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

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River Structures CONSULTING
PO BOX 1643 | BOISE, ID 83701 | RIVERSTRUCTURES.COM

TU/USWCD
ELMER DAM MODIFICATIONS
COVER SHEET AND SHEET INDEX

DESIGNED J. WOODBURY
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING G01
SCALE: AS NOTED

N

GRAPHIC SCALE

0 500 1000

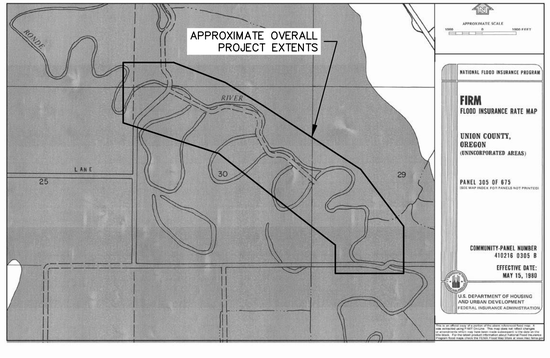
(IN FEET)
1 INCH = 500 FT.

LEGEND

- FLOW ARROW
- TOP BANK OF RIVER
- EXISTING IRRIGATION MAINLINES
- PROPOSED PIPELINE

NOTES

1. PROJECT EXTENTS LIE ENTIRELY WITHIN THE MAPPED 100-YEAR INUNDATION EXTENTS PER FEMA FIRM #410260305B DATED MAY 15, 1980. INUNDATED AREA IS DESIGNATED AS ZONE A WITH NO BASE FLOOD ELEVATIONS CALCULATED.



FLOOD INSURANCE RATE MAP (FIRM) EFFECTIVE MAY 15, 1980

Quadrant Consulting, Inc.
1904 W. Overland Rd
Boise, Idaho 83705
(208) 342-0091 PHONE (208) 342-0092 FAX
CIVIL ENGINEERING-SURVEYING

REGISTERED PROFESSIONAL ENGINEER 7890SPE OREGON JULY 12, 2005 NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM

OVERALL SITE PLAN

COVE OREGON

SCALE: 1"=500'
PROJECT NO. 703-19

DESIGNED BY:
DRAWN BY: IB/LA
CHECKED BY: NK
PLOT DATE: 6/29/22

DATE	DESCRIPTION

SHEET
G02

NOTES:

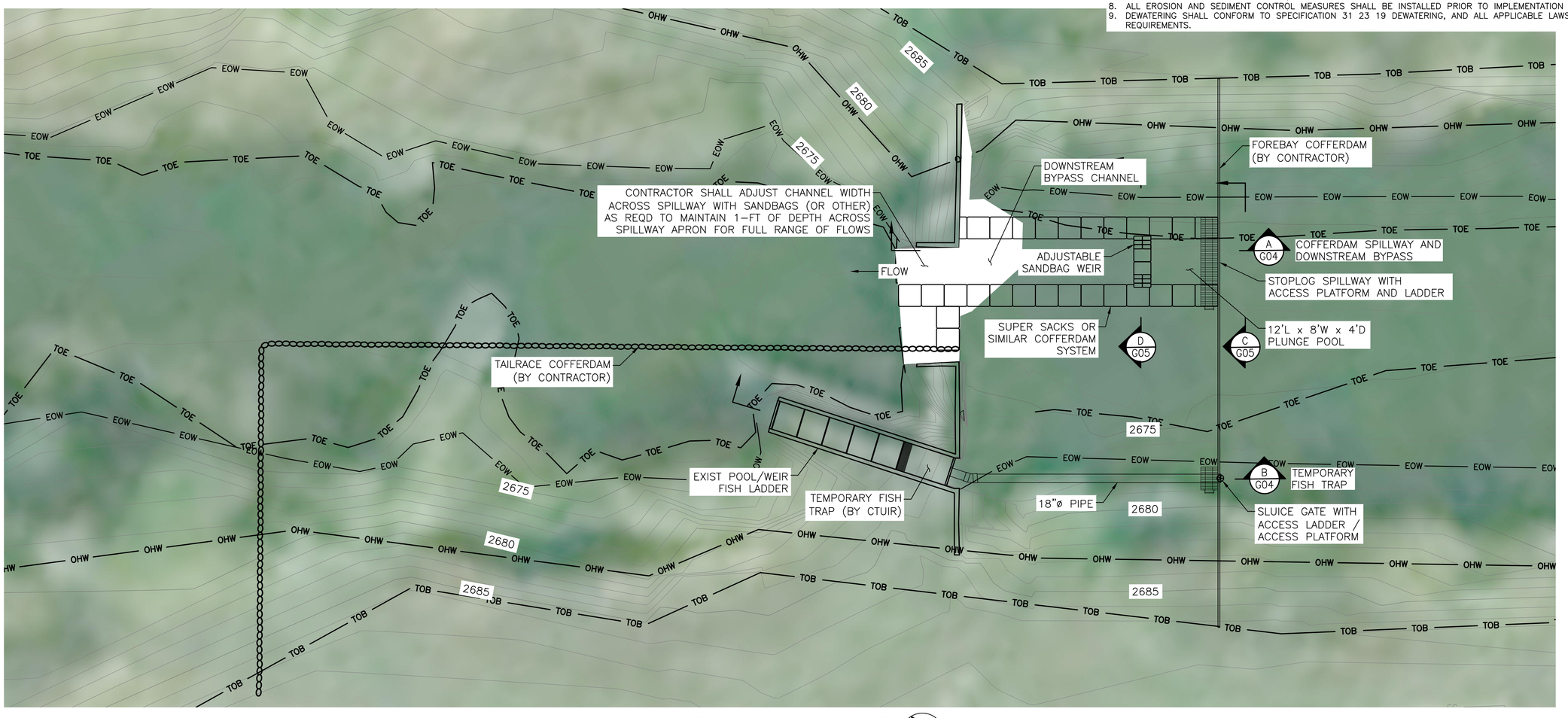
1. THE DAM AND FISHWAY CONCEPTUAL COFFERDAM PLAN PRESENTED ON SHEETS G03, G04, AND G05 ARE FOR REGULATORY APPROVAL AND THE CONTRACTOR'S UNDERSTANDING OF THE DEWATERING AND TEMPORARY FISH PASSAGE AND TRAPPING MEASURES REQUIRED FOR CONSTRUCTION OF ELMER DAM MODIFICATIONS.
2. THE TEMPORARY FACILITIES SHOWN IN THE PLAN SET ARE INFORMATIONAL ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN, IMPLEMENTATION, OPERATION AND MAINTENANCE AND REMOVAL OF ALL TEMPORARY DEWATERING, DOWNSTREAM FISH PASSAGE AND FISH TRAP WATER SUPPLY MEASURES. THE CONTRACTOR SHALL DESIGN AND IMPLEMENT THE TEMPORARY FACILITIES IN ACCORDANCE WITH THE CRITERIA PRESENTED IN THE DRAWINGS AND THE TEMPORARY FISH PASSAGE PLAN.
3. THE CONTRACTOR'S COFFERDAM STRUCTURAL DESIGN AND INSTALLATION PLANS SHALL BE SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF OREGON.
4. THE CONTRACTOR SHALL SUBMIT THE DESIGN OF THE ABOVE MEASURES AS PART OF THE CONTRACTOR'S DEWATERING PLAN. THE DEWATERING PLAN SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER AND REGULATORY AGENCIES.

FISH TRAPPING NOTES:

1. THE CONSTRUCTION WINDOW OVERLAPS WITH THE IN-MIGRATION WINDOW FOR CATHERINE CREEK SPRING CHINOOK.
2. THE CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION (CTUIR) SHALL BE RESPONSIBLE FOR IMPLEMENTATION AND OPERATION OF A TEMPORARY FISH TRAP WITHIN THE EXISTING FISHWAY, IN ACCORDANCE WITH THE TEMPORARY FISH PASSAGE PLAN, TO MITIGATE FOR DISRUPTION OF SPRING CHINOOK MIGRATION DUE TO CONSTRUCTION OF ELMER DAM MODIFICATIONS.
3. THE CONTRACTOR SHALL DESIGN AND IMPLEMENT A WATER SUPPLY SYSTEM BETWEEN THE FOREBAY COFFERDAM AND THE FISH TRAP. THE WATER SUPPLY SYSTEM SHALL BE EQUIPPED WITH FLOW CONTROLS (SLUICE GATE) AND BE ABLE TO DELIVER UP TO 10 CFS TO THE FISH TRAP.
4. ONLY QUALIFIED CTUIR STAFF SHALL BE INVOLVED WITH FISH TRAPPING OPERATIONS.
5. CTUIR SHALL BE RESPONSIBLE FOR FIELD ADJUSTING THE FISH TRAP WATER SUPPLY RATES AND STOPLOG HEIGHTS BASED ON THE NEEDS OF TRAPPING OPERATIONS AS WELL AS TAILWATER LEVELS IN CATHERINE CREEK. THE WATER SUPPLY SHALL BE THROTTLED AS NEEDED TO MINIMIZE TURBULENCE WITHIN THE TRAP TO PREVENT FISH EXHAUSTION.

DEWATERING NOTES:

1. CONSTRUCTION OF THE ELMER DAM MODIFICATIONS REQUIRES DEWATERING OF THE FOREBAY AND LEFT BANK OF THE TAILRACE. THE PRIMARY FOREBAY DEWATERING MEASURES SHALL INCLUDE THE FOREBAY COFFERDAM, DOWNSTREAM BYPASS, FISH TRAP WATER SUPPLY AND DEWATERING PUMPS.
2. THE FOREBAY COFFERDAM SHALL HAVE A MINIMUM TOP OF WALL ELEVATION OF 2884' AND PROVIDE A MAXIMUM FOREBAY ELEVATION OF 2883'. THE FOREBAY COFFERDAM SHALL BE EQUIPPED WITH AN ADJUSTABLE STOPLOG SPILLWAY AND WATER SUPPLY INTAKE GATE FOR THE FISH TRAP. THE STOPLOG SPILLWAY SHALL HAVE A MAX DISCHARGE CAPACITY OF 100 CFS. THE TEMPORARY TRAP WATER SUPPLY SHALL PROVIDE A MAX DISCHARGE OF 10 CFS. SEE SHEETS G04 AND G05 FOR ADDITIONAL CRITERIA AND DETAILS.
3. A DOWNSTREAM BYPASS CHANNEL SHALL BE CONSTRUCTED TO TRANSPORT RIVER FLOWS AND DOWNSTREAM MIGRATING FISH BETWEEN COFFERDAM SPILLWAY AND ELMER DAM. THE DOWNSTREAM BYPASS CHANNEL SHALL MAINTAIN A MINIMUM DEPTH OF 4' IN THE PLUNGE POOL AND 1' ACROSS THE SPILLWAY WEIR, PLUNGE POOL WEIR AND ELMER DAM SPILLWAY. THE CONTRACTOR SHALL PROVIDE DOWNSTREAM FISH PASSAGE IN ACCORDANCE WITH ODFW AND NMFS FISH PASSAGE CRITERIA FOR THE DURATION OF THE WORK.
4. INSTALLATION OF THE TAILRACE COFFERDAM SHALL PROCEED UPON COMPLETION OF THE TEMPORARY FISH TRAPPING OPERATIONS. THE CONTRACTOR MUST RECEIVE WRITTEN APPROVAL FROM ODFW IN ACCORDANCE WITH THE TEMPORARY FISH PASSAGE PLAN TO PROCEED WITH THE TAILRACE COFFERDAM INSTALLATION.
5. THE TAILRACE COFFERDAM HEIGHT AND STYLE SHALL BE DETERMINED BY THE CONTRACTOR. BOTH FOREBAY AND TAILRACE COFFERDAM STRUCTURAL DESIGN CALCULATIONS AND PLANS SHALL BE SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF OREGON AND SUBMITTED FOR APPROVAL BY THE ENGINEER.
6. THE CONTRACTOR SHALL COORDINATE WITH TROUT UNLIMITED, UNION SOIL AND WATER CONSERVATION DISTRICT (USWCD) AND ODFW ON FISH REMOVAL PRIOR TO DEWATERING THE FOREBAY OR TAILRACE.
7. THE CONTRACTOR'S DEWATERING PLAN SHALL ADDRESS TURBIDITY TREATMENT AND EROSION CONTROL MEASURES FOR SEEPAGE WATER REMOVAL FROM THE DEWATERED AREAS. ALL DISCHARGE FROM THE WORK AREA SHALL MEET LOCAL, STATE AND FEDERAL DISCHARGE REQUIREMENTS.
8. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO IMPLEMENTATION OF DEWATERING WORK.
9. DEWATERING SHALL CONFORM TO SPECIFICATION 31 23 19 DEWATERING, AND ALL APPLICABLE LAWS, REGULATIONS AND REQUIREMENTS.



PLAN
SCALE: 1"=10'-0"

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
MAR. 11, 2008
CHRISTOPHER C. BOYD
6/29/23
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
0 1/2 1
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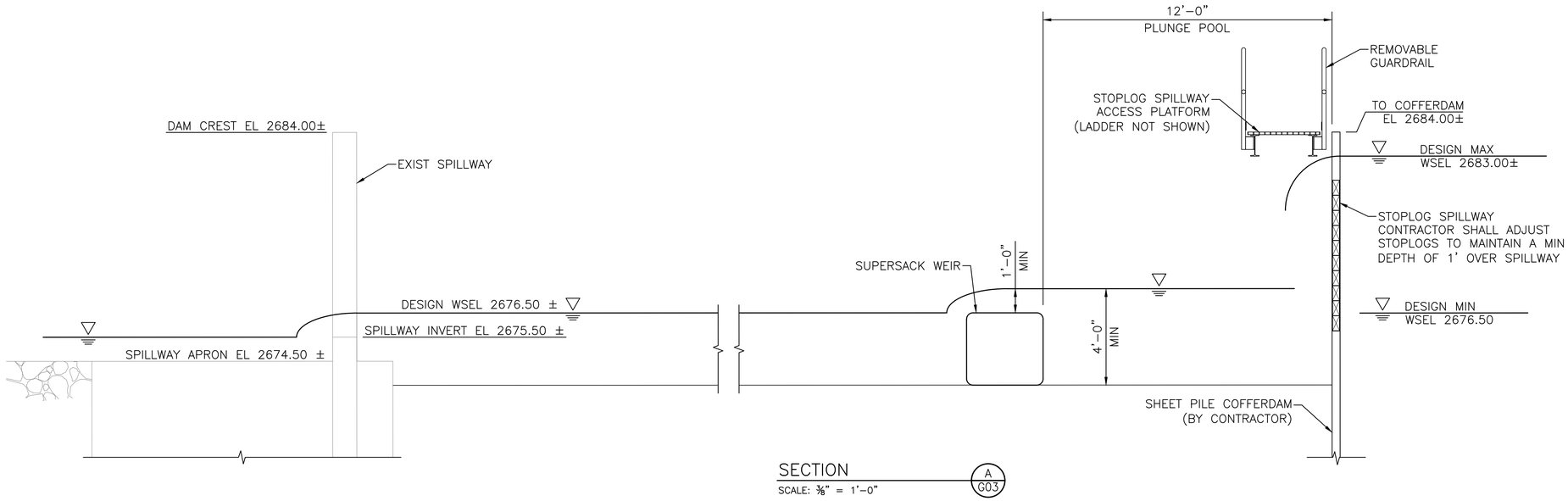
Quadrant Consulting, Inc.

River Structures CONSULTING
PO BOX 1643 | BOISE, ID 83701 | RIVERSTRUCTURES.COM

TU/USWCD
ELMER DAM MODIFICATIONS
DAM & FISHWAY
CONCEPTUAL COFFERDAM PLAN

DESIGNED J. WOODBURY
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

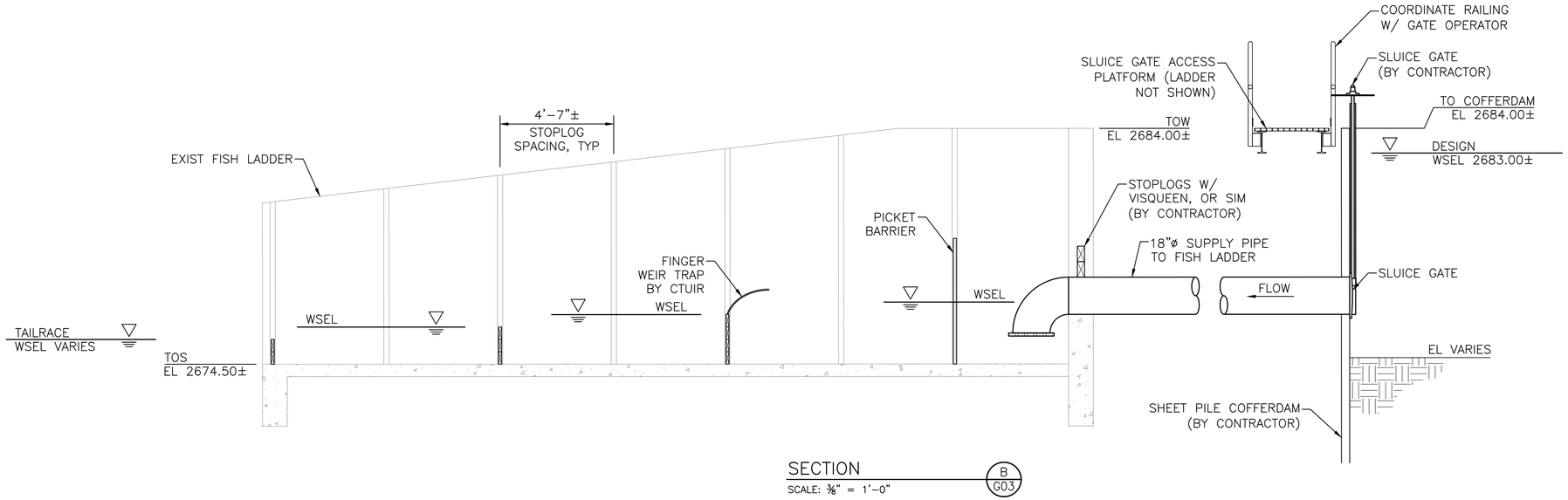
DRAWING
G03
SCALE: AS NOTED



SECTION
SCALE: ⅜" = 1'-0"
A
G03

NOTES:

1. INSTREAM FLOWS SHALL BE PROVIDED THROUGH A COMBINATION OF PIPED FLOW THROUGH THE EXIST FISH LADDER AND BYPASS SPILLWAY FLOW.
2. THE CONTRACTOR SHALL COORDINATE WITH LAND OWNERS/IRRIGATORS ON FOREBAY WATER LEVEL MANAGEMENT.
3. THE CONTRACTOR SHALL ADJUST STOPLOG HEIGHTS TO MAINTAIN 1 FT OF DEPTH OVER THE WEIR FOR RANGE OF BYPASS FLOWS, TYP 20-30 CFS (TOTAL).
4. THE BYPASS SPILLWAY SHALL BE CAPABLE OF PASSING FLOWS UP TO 100 CFS.
5. CONTRACTOR SHALL ADJUST SANDBAG PLACEMENT AT THE PLUNGE POOL WEIR AND EXIST SPILLWAY APRON TO MAINTAIN A MINIMUM OF 1 FT OF DEPTH.



SECTION
SCALE: ⅜" = 1'-0"
B
G03

TRAP NOTES:

1. CONTRACTOR SHALL PROVIDE AND INSTALL ALL COMPONENTS (SLUICE GATE, PIPE, WATER TIGHT CONNECTION TO LADDER, ETC) FOR UP TO 10 CFS WATER SUPPLY TO FISH LADDER.
2. CONTRACTOR SHALL INSTALL A PICKET BARRIER W/ 1" MAX OPENING OR SIM TO PREVENT FISH MIGRATION UPSTREAM THROUGH PIPE.
3. CTUIR SHALL INSTALL AND OPERATE FISH TRAP TO FIT IN EXIST FISH LADDER IN ACCORDANCE WITH THE TEMPORARY FISH PASSAGE PLAN.
4. CTUIR STAFF SHALL REGULATE THE FLOW TO THE FISH TRAP BY ADJUSTING THE SLUICE GATE. FLOWS SHALL BE REGULATED SUCH THAT VELOCITIES AND TURBULENCE WITHIN THE TRAP ARE SUITABLE FOR SUSTAINED SWIM SPEEDS TO PREVENT FISH EXHAUSTION.
5. CTUIR SHALL ADJUST STOPLOG HEIGHTS WITHIN THE FISH LADDER TO ACHIEVE OPTIMAL FLOW DEPTHS AND DROP HEIGHTS ACROSS THE LADDER AS TAILWATER ELEVATION VARIES.
6. THE SLUICE GATE MAY BE PARTIALLY OR FULLY CLOSED TO ASSIST WITH CROWDING AND NETTING OF FISH.
7. CTUIR STAFF SHALL BE RESPONSIBLE FOR ALL HANDLING AND TRANSPORT OF FISH.

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
6/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
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TU/USWCD

ELMER DAM MODIFICATIONS

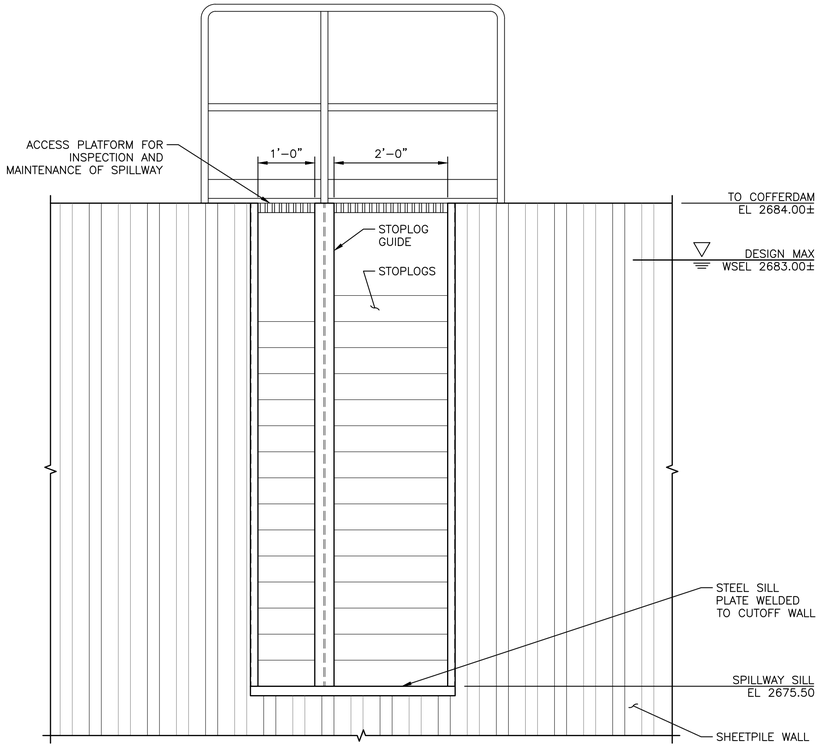
DAM & FISHWAY
CONCEPTUAL COFFERDAM SECTIONS 1

DESIGNED J. WOODBURY
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

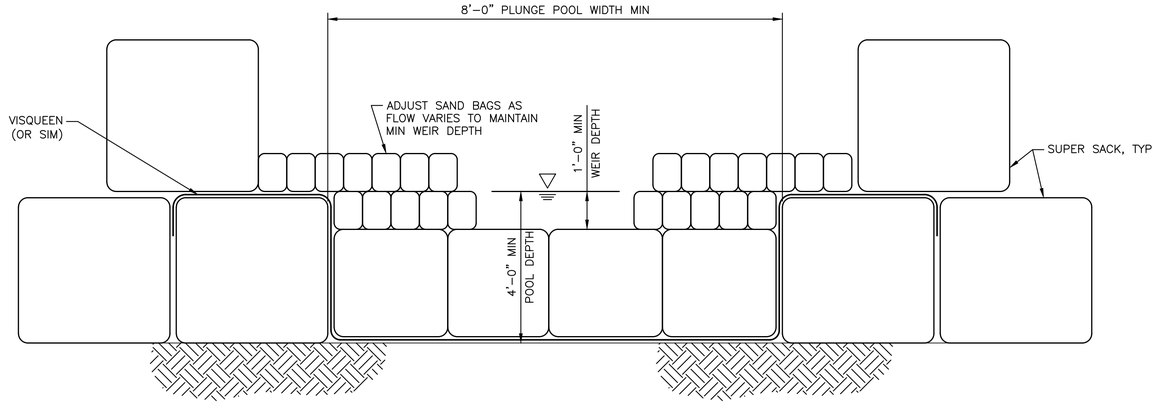
DRAWING
G04
SCALE: AS NOTED

NOTES:

1. COFFERDAM SPILLWAY SHALL BE DESIGNED, INSTALLED AND MAINTAINED BY CONTRACTOR.
2. SPILLWAY SHALL PASS FLOWS UP TO 100 CFS.
3. CONTRACTOR SHALL ADJUST SPILLWAY AS REQD TO MAINTAIN A MIN DEPTH OF 1' OVER SPILLWAY WEIR FOR DOWNSTREAM MIGRANTS.
4. PLUNGE POOL SHALL BE CENTERED BELOW THE COFFERDAM WEIR TO PREVENT FISH FROM IMPACTING PLUNGE POOL WALLS.
5. WEIR AND STOPLOGS SHALL BE FREE OF ANY SHARP PROTRUSIONS OR JAGGED CORNERS WHICH MAY HARM FISH.



SPILLWAY SECTION (C / G03)
SCALE: ¾" = 1'–0"



SAND BAG WEIR SECTION (D / G03)
SCALE: ½" = 1'–0"

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
6/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
0 1/2 1
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TU/USWCD

ELMER DAM MODIFICATIONS

DAM & FISHWAY
CONCEPTUAL COFFERDAM SECTIONS 2

DESIGNED J. WOODBURY
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING
G05
SCALE: AS NOTED

HATCH SYMBOLS

- ROCK, TYPE AS NOTED (PLAN/SECTION)
- BED ROCK
- EXISTING GRADE (SECTION)
- NEW SOIL (SECTION)
- CONCRETE (SECTION/PLAN)
- SAND, GROUT (PLAN/SECTION)
- STEEL (SECTION)
- GRATING (PLAN)
- MASONRY (PLAN)
- WOOD, SIZE/TYPE AS NOTED (PLAN)
- WOOD, SIZE/TYPE AS NOTED (SECTION)
- RIP RAP (PLAN/SECTION)
- ASPHALT CONCRETE PAVEMENT SURFACE (PLAN/SECTION)
- GRASS/VEGETATION (PLAN)

SITE PLAN LINETYPES

- FENCE LINE
- OVERHEAD POWER
- MAJOR CONTOUR
- MINOR CONTOUR
- DITCH CENTERLINE
- TOE OF BANK
- TOP OF BANK
- SANITARY SEWER
- STORM DRAIN
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- EDGE OF WATER
- WATTLE
- SILT FENCE
- CONSTRUCTION FENCE
- GAS LINE
- ORDINARY HIGH WATER MARK
- AREA OF POTENTIAL EFFECT

SHEET SYMBOLS

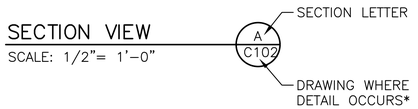
PLAN
SCALE: 1/2"= 1'-0" 0' 2' 4'

N

SECTION IDENTIFICATION

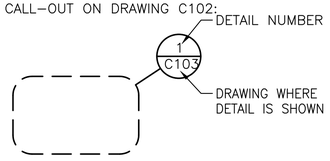
(1) SECTION CUT ON DRAWING C102:

(2) ON DRAWING C103 THIS SECTION IS IDENTIFIED AS:

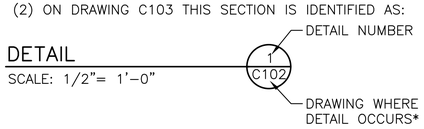


DETAIL IDENTIFICATION

(1) DETAIL CALL-OUT ON DRAWING C102:



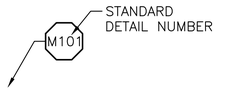
(2) ON DRAWING C103 THIS SECTION IS IDENTIFIED AS:



*NOTE: IF PLAN AND SECTION (OR DETAIL CALL-OUT AND DETAIL) ARE SHOWN ON SAME DRAWING. DRAWING NUMBER IS REPLACED BY A LINE.

STANDARD DETAIL IDENTIFICATION

(1) DETAIL CALL-OUT ON PLAN OR SECTION:



(2) ON DETAIL DRAWINGS, IDENTIFIED AS:

ELEVATION/IMAGE IDENTIFICATION

ABBREVIATIONS

A/C	AIR CONDITIONING
A/E	ARCHITECT/ENGINEER
AB	ANCHOR BOLT
ABC	AGGREGATE BASE COURSE
AC	ALTERNATING CURRENT
ADDL	ADDITIONAL
ADH	ADHESIVE
ADJ	ADJUSTABLE, ADJACENT
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AGGR	AGGREGATE
ALIG	ALIGNMENT
ALUM	ALUMINUM
ALT	ALTERNATE, ALTITUDE
ANC	ANCHOR
APRX	APPROXIMATE
ASSY	ASSEMBLY
ATM	ATMOSPHERE
AUTO	AUTOMATIC
AUX	AUXILIARY
AVE	AVENUE
AVG	AVERAGE
BE	BOTH ENDS, BELL END
BF	BOTH FACES, BOTTOM FACE, BLIND FLANGE, BOARD FEET
BFV	BUTTERFLY VALVE
BITUM	BITUMINOUS
BL	BASE LINE
BLDG	BUILDING
BLKG	BLOCKING
BM	BENCHMARK, BEAM
BOC	BACK OF CURB
BOT	BOTTOM
BP	BASE PLATE
BRG	BEARING
BS	BOTH SIDES
BTU	BRITISH THERMAL UNIT
BTW	BETWEEN
BV	BALL VALVE
BW	BOTH WAYS
C TO C	CENTER TO CENTER
C&G	CURB & GUTTER
C	CHANNEL SHAPE, CENTIGRADE, CONDUIT
CB	CATCH BASIN
CCW	COUNTER CLOCKWISE
CF	CUBIC FEET (FOOT)
CI	CURB INLET
CIP	CAST-IN-PLACE
CIRC	CIRCULATION, CIRCULAR
CJ	CONSTRUCTION JOINT, CONTROL JOINT
CL	CENTERLINE, CLASS, CLOSE
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
COMB	COMBINATION
CONC	CONCENTRIC, CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS, CONTINUED
COORD	COORDINATE
CPLG	COUPLING
CSK	COUNTERSINK
CTR	CENTER
CTRL	CONTROL
CU	COPPER, CUBIC
CW	CLOCKWISE
CY	CUBIC YARD
d	PENNY (NAIL MEASURE)
DBA	DEFORMED BAR ANCHOR
DBL	DOUBLE
DEG	DEGREE
DEG C	DEGREE CENTIGRADE
DEG F	DEGREE FAHRENHEIT
DEMO	DEMOLITION
DEPT	DEPARTMENT
DET	DETAIL
DI	DROP INLET, DUCTILE IRON
DIA	DIAMETER
DIAG	DIAGONAL, DIAGRAM
DIFF	DIFFERENTIAL, DIFFERENCE
DIM	DIMENSION
DIST	DISTANCE, DISTRIBUTION
DL	DEAD LOAD
DN	DOWN
DT	DOUBLE TEE, DRIP TRAP ASSEMBLY
DUP	DUPLICATE
DWG	DRAWING
DWL	DOWEL
E	EAST
EA	EACH, EXHAUST AIR
ECC	ECCENTRIC
EE	EACH END
EF	EACH FACE
EG	EXISTING GRADE
EGL	ENERGY GRADE LINE
EJ	EXPANSION JOINT
EL	ELBOW, ELEVATION
ELEC	ELECTRICAL
EMBD	EMBEDDED
ENCL	ENCLOSURE
ENGR	ENGINEER
ENTR	ENTRANCE
EOP	EDGE OF PAVEMENT
EOW	EDGE OF WATER
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
ES	EACH SIDE, EQUAL SPACE, EMERGENCY SHOWER
EST	ESTIMATE
EW	EACH WAY, EMERGENCY EYE/FACE WASH
EWEF	EACH WAY, EACH FACE
EWTB	EACH WAY, TOP AND BOTTOM
EXC	EXCAVATION
EXIST	EXISTING
EXP	EXPANSION, EXPOSED
EXT	EXTERIOR, EXTERNAL, EXTENSION
F TO F	FACE TO FACE
FAB	FABRICATE
FBO	FURNISHED BY OWNER
FD	FLOOR DRAIN
FE	FLANGED END
FF	FAR FACE, FACTORY FINISH, FLAT FACE
FG	FINISHED GRADE
FIG	FIGURE
FIN	FINISH
FL	FLOW, FLOW LINE
FLEX	FLEXIBLE
FLG	FLANGE
FLR	FLOOR
FND	FOUNDATION
FO	FINISHED OPENING
FOC	FACE OF CONCRETE, FACE OF CURB, FIBER OPTIC CABLE
FOM	FACE OF MASONRY
FOS	FACE OF STUDS
FPT	FEMALE PIPE THREAD
FR	FRAME
FRP	FIBERGLASS REINFORCED PLASTIC
FS	FLOOR SINK, FAR SIDE
FT	FEET, FOOT
FTG	FOOTING, FITTING FUR FURRED, FURRING
FURN	FURNITURE, FURNISH
FW	FIELD WELD, FIRE WALL
FWD	FORWARD
G	GRILLE, GROUND
GA	GAGE (METAL THICKNESS)
GAL	GALLON
GALV	GALVANIZED
GB	GRADE BREAK
GEN	GENERAL
GR	GRADE
GRND	GROUND
GRTG	GRATING
HC	HORIZONTAL CENTERLINE
HDR	HEADER
HDW	HARDWARE
HEX	HEXAGONAL
HORIZ	HORIZONTAL
HP	HIGH POINT, HORSEPOWER
HR	HOUR
HS	HEADED STUD, HIGH STRENGTH
HSS	HOLLOW STRUCTURAL SHAPE
HT	HEIGHT
HVAC	HEATING, VENTILATION & AIR CONDITIONING
HWL	HIGH WATER LEVEL
ID	INSIDE DIAMETER, INTERIOR DIMENSION
IE	INVERT ELEVATION
IF	INSIDE FACE
IN	INCH
INC	INCLUDE, INCANDESCENT
INT	INTERIOR, INTERSECTION
INTR	INTERMEDIATE, INTERIOR
INV	INVERT
IPS	IRON PIPE SIZE
IPT	INTERNAL PIPE THREAD
IRR	IRRIGATION
ISO	ISOMETRIC
JF	JOINT FILLER
JT	JOINT
K	KIP
KSI	KIPS PER SQUARE INCH
L	ANGLE, LENGTH, LAVATORY
LAM	LAMINATE
LB	LAG BOLT, POUND
LDR	LEADER
LF	LINEAR FOOT
LG	LONG
LH	LEFT HAND
LIN	LINEAR
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LNG	LONGITUDINAL
LOC	LOCATION
LT	LEFT
LTD	LIMITED
LTG	LIGHTING
LTL	LINTEL
LVR	LOUVER
LW	LIGHTWEIGHT
LWC	LIGHTWEIGHT CONCRETE
LWL	LOW WATER LEVEL
MAINT	MAINTENANCE
MAN	MANUAL
MATL	MATERIAL
MAX	MAXIMUM
MB	MACHINE BOLT
MCJ	MASONRY CONTROL JOINT
MECH	MECHANICAL
MED	MEDIUM
MFR	MANUFACTURER
MH	MANHOLE, METAL HALIDE
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MOD	MODULAR, MODIFY
MON	MONUMENT
MPT	MALE PIPE THREAD
MSL	MEAN SEA LEVEL
MU	MASONRY UNIT
MW	MONITORING WELL
N	NORTH, NEUTRAL
NA	NOT APPLICABLE
NAT	NATURAL
NC	NORMALLY CLOSED
NEG	NEGATIVE
NF	NEAR FACE, NON-FUSED
NG	NATURAL GAS
NIC	NOT IN CONTRACT
NOM	NOMINAL
NPS	NOMINAL PIPE SIZE
NPT	NATIONAL PIPE THREAD
NS	NEAR SIDE
NTS	NOT TO SCALE
O TO O	OUT-TO-OUT
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OVERHEAD
OPNG	OPENING
OPP	OPPOSITE
OPT	OPTIONAL
ORIG	ORIGINAL
OVFL	OVERFLOW
OVHG	OVERHANG
OZ	OUNCE
P	PAINT
PAR	PARALLEL, PARAPET
PC	POINT OF CURVE, PIECE, PRECAST
PCC	POINT OF COMPOUND CURVATURE
PCF	POUNDS PER CUBIC FOOT
PCT	PERCENT
PE	PLAIN END
PED	PEDESTAL
PEN	PENETRATION
PERF	PERFORATED
PERM	PERMANENT
PERP	PERPENDICULAR
PI	POINT OF INTERSECTION
PKG	PACKAGE
PL	PLATE, PROPERTY LINE
PLF	POUNDS PER LINEAR FOOT
POS	POSITIVE, POSITION
PRC	POINT OF REVERSE CURVATURE
PREF	PREFINISHED
PREFAB	PREFABRICATED
PRELIM	PRELIMINARY
PREP	PREPARE
PROP	PROPERTY
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAGE
PT	POINT, POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
PZ	PIEZOMETER
Q	RATE OF FLOW
QTR	QUARTER
QTY	QUANTITY
QUAL	QUALITY
R&R	REMOVE AND REPLACE
R&S	REMOVE AND SALVAGE
R	RADIUS, REGISTER, RISER
RCPT	RECEPTACLE
RECD	RECEIVED
RECT	RECTANGULAR
REF	REFERENCE
REINF	REINFORCING
REQD	REQUIRED
RET	RETAINING, RETURN
REV	REVISION, REVERSE
RND	ROUND
RO	ROUGH OPENING
ROW	RIGHT-OF-WAY
RPM	REVOLUTIONS PER MINUTE
RR	RAILROAD
RT	RIGHT
S	SOUTH, SINK
SCH	SCHEDULE
SCHEM	SCHEMATIC
SCRN	SCREEN
SEC	SECONDARY, SECONDS
SECT	SECTION
SF	SQUARE FOOT
SHT	SHEET
SHTG	SHEATHING
SIM	SIMILAR
SL	SLOPE
SLTD	SLOTTED
SLV	SLEEVE
SOG	SLAB ON GRADE
SP	SOUNDPROOF, STANDPIPE
SPC	SPACING
SPEC	SPECIFICATION
SQ	SQUARE
SST	STAINLESS STEEL
ST	STREET
STA	STATION
STD	STANDARD
STIF	STIFFENER
STIR	STIRRUP
STL	STEEL
STOR	STORAGE
STR	STRUCTURAL, STRAIGHT
SUB	SUBSTITUTE
SY	SQUARE YARD
SYM	SYMBOL
SYMM	SYMMETRICAL
SYS	SYSTEM
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROOVE
TAN	TANGENT
TBM	TEMPORARY BENCHMARK
TEMP	TEMPORARY, TEMPERATURE
THK	THICK
THRD	THREAD
THRU	THROUGH
TOB	TOP OF BOLT, TOP OF BANK, TOP OF BEAM
TOC	TOP OF CURB, TOP OF CONCRETE
TOF	TOP OF FOOTING
TOG	TOP OF GRATING
TOM	TOP OF MASONRY
TOP	TOP OF PLATE
TOPO	TOPOGRAPHY
TOS	TOP OF SLAB, TOP OF STEEL
TOW	TOP OF WALL
TRANS	TRANSITION
TYP	TYPICAL
UG	UNDERGROUND
ULT	ULTIMATE
UNFN	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UTIL	UTILITY
V	VENT, VELOCITY, VOLT
VAC	VACUUM
VAR	VARNISH, VARIABLE, VOLT AMPERES REACTIVE
VB	VAPOR BARRIER, VINYL BASE, VALVE BOX
VC	VERTICAL CURVE
VEL	VELOCITY
VENT	VENTILATION
VERT	VERTICAL
VS	VERSES, VAPOR SEAL
VOL	VOLUME
VPC	VERTICAL POINT OF CURVATURE
VPI	VERTICAL POINT OF INTERSECTION
VPT	VERTICAL POINT OF TANGENCY
W/	WITH
W/O	WITHOUT
W	WATT, WEST, WIDE, WINDOW, WIRE, WIDE FLANGE BEAM
WF	WIDE FLANGE, WASH FOUNTAIN
WL	WATER LEVEL
WLD	WELDED
WP	WATERPROOF, WORKING POINT
WS	WATERSTOP, WATER SURFACE
WSEL	WATER SURFACE ELEVATION
WT	WEIGHT, WATER TIGHT
WWF	WELDED WIRE FABRIC
XS	EXTRA STRONG
XXS	DOUBLE EXTRA STRONG
XSECT	CROSS SECTION
YH	YARD HYDRANT
YS	YIELD STRENGTH

GENERAL NOTES:

1. THESE ABBREVIATIONS APPLY TO THE ENTIRE SET OF CONTRACT DRAWINGS.
2. LISTING OF ABBREVIATIONS DOES NOT IMPLY ALL ABBREVIATIONS ARE USED IN THE CONTRACT DRAWINGS.
3. ABBREVIATIONS SHOWN ON THIS SHEET INCLUDE VARIATIONS OF THE WORD. FOR EXAMPLE, "MOD" MAY MEAN MODIFY OR MODIFICATION; "INC" MAY MEAN INCLUDED OR INCLUDING; "REINF" MAY MEAN EITHER REINFORCE OR REINFORCING.
4. SCREENING OR SHADING OF WORK IS USED TO INDICATE EXISTING COMPONENTS OR TO DE-EMPHASIZE PROPOSED IMPROVEMENTS TO HIGHLIGHT SELECTED TRADE WORK. REFER TO CONTEXT OF EACH SHEET FOR USAGE.

REGISTERED PROFESSIONAL ENGINEER 80853 PE
OREGON 6/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

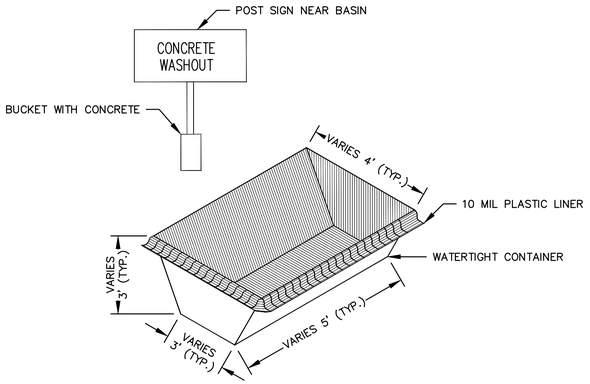
Quadrant Consulting, Inc.

River Structures CONSULTING
PO BOX 1643 | BOISE, ID 83701 | RIVERSTRUCTURES.COM

TU/USWCD
ELMER DAM MODIFICATIONS
STANDARD ABBREVIATIONS AND SYMBOLS

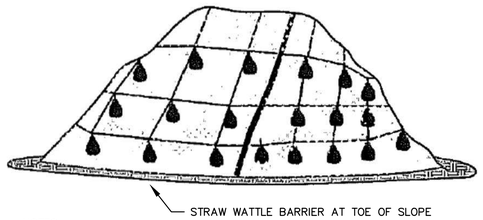
DESIGNED J. WOODBURY
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING G06
SCALE: AS NOTED



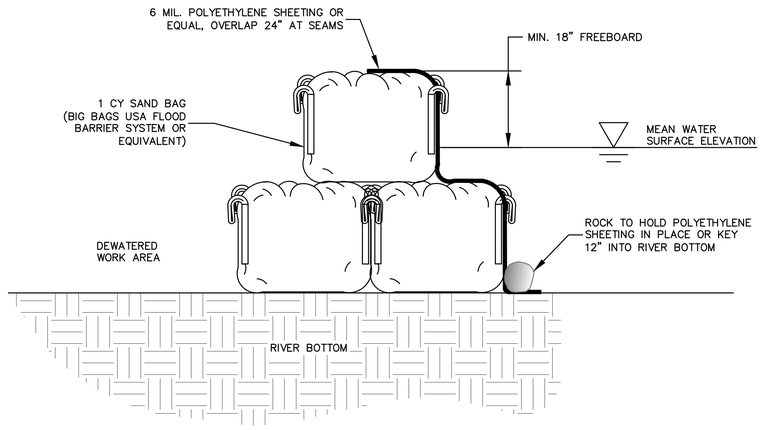
NOTES
1. DIMENSIONS VARY. RESPONSIBLE PERSON SHALL SIZE BASIN APPROPRIATELY.

CONCRETE WASHOUT
NTS



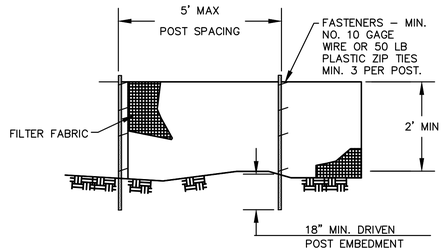
NOTES:
1. MINIMUM 12" OVERLAP OF ALL SEAMS REQUIRED.
2. STRAW WATTLE BARRIER REQUIRED @ TOE OF STOCK PILE.
3. COVERING MAINTAINED TIGHTLY IN PLACE BY USING SANDBAGS
4. ON ROPES WITH A MAXIMUM 10' GRID SPACING IN ALL DIRECTIONS.

PLASTIC SHEETING
NTS

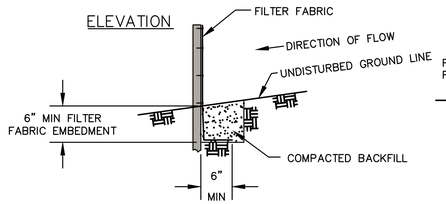


TEMPORARY COFFERDAM DETAIL
NTS

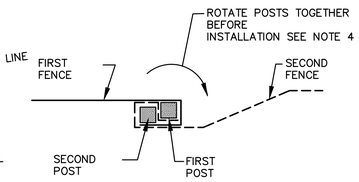
NOTE: PROVIDE ADDITIONAL SAND BAG TIER AS NECESSARY TO ACCOMMODATE DEEPER WATER DEPTHS UP TO A MAXIMUM OF 3 TIERS TOTAL.



NOTES:
1. TEMPORARY SILT FENCE SHALL BE INSTALLED PRIOR TO ANY GRADING WORK IN THE AREA TO BE PROTECTED. FENCE SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND REMOVED IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.
2. INSTALLATION OF THE SILT FENCE SHALL BE IN ACCORDANCE WITH ASTM D 6462, THE MANUFACTURER'S RECOMMENDATIONS AND THE DETAILS SHOWN ON THIS SHEET. POST SPACING SHOWN IS MAXIMUM FOR UNSUPPORTED INSTALLATION WITH ELONGATION <50% (ASTM D 4632). FOR SILT FENCE MATERIAL WITH ELONGATION >50% AND SUPPORTED SILT FENCES, THE MAXIMUM POST SPACING IS 4 FEET.
3. FENCE POSTS SHALL BE EITHER WOOD WITH A MINIMUM CROSS–SECTIONAL AREA OF 1.5" X 1.5" OR A STANDARD STEEL POST.
4. WHEN SPLICES ARE NECESSARY, MAKE SPLICE AT POST ACCORDING TO SPLICE DETAIL. PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE. ROTATE BOTH POSTS TOGETHER AT LEAST 180 DEGREES TO CREATE A TIGHT SEAL WITH THE FABRIC MATERIAL. CUT THE FABRIC NEAR THE BOTTOM OF THE POSTS TO ACCOMMODATE THE 6 INCH FLAP, THEN DRIVE BOTH POSTS AND BURY THE FLAP. COMPACT BACKFILL WELL.

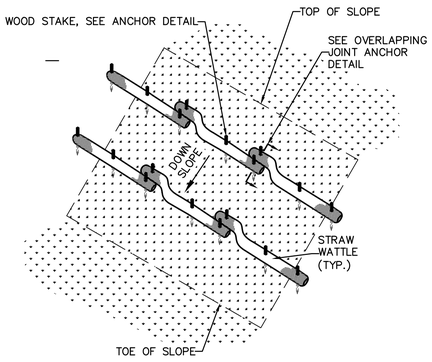


FABRIC ANCHOR DETAIL

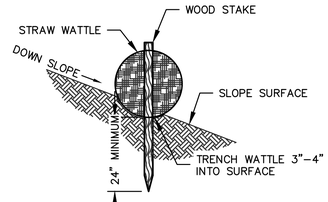


SPLICE DETAIL–PLAN VIEW

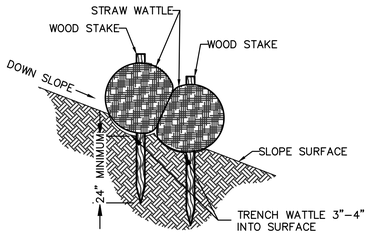
SILT FENCE SEDIMENT CONTROL
NTS



STRAW WATTLE SEDIMENT CONTROL
NTS



ANCHOR DETAIL



OVERLAPPING JOINT ANCHOR DETAIL

Quadrant Consulting, Inc.
1904 W. Overland Rd
Boise, Idaho 83705
(208) 342–0091 PHONE (208) 342–0092 FAX
CIVIL ENGINEERING–SURVEYING

REGISTERED PROFESSIONAL ENGINEER 7890SPE OREGON JULY 12, 2005 NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM

EROSION AND SEDIMENT CONTROL DETAILS

OREGON COVE

PROJECT NO. 703–19

SCALE: NTS

DESIGNED BY: IB/LA/KD
DRAWN BY:
CHECKED BY: NK
PLOT DATE: 5/23/22

DATE	DESCRIPTION

SHEET
EC1

ODEQ STANDARD EROSION AND SEDIMENT CONTROL NOTES:

1. HOLD A PRE-CONSTRUCTION MEETING OF PROJECT CONSTRUCTION PERSONNEL THAT INCLUDES THE INSPECTOR TO DISCUSS EROSION AND SEDIMENT CONTROL MEASURES AND CONSTRUCTION LIMITS. (SCHEDULE A.8.C.I.(3))
2. ALL INSPECTIONS MUST BE MADE IN ACCORDANCE WITH DEQ 1200-C PERMIT REQUIREMENTS. (SCHEDULE A.12.B AND SCHEDULE B.1)
3. INSPECTION LOGS MUST BE KEPT IN ACCORDANCE WITH DEQ'S 1200-C PERMIT REQUIREMENTS. (SCHEDULE B.1.C AND B.2)
4. RETAIN A COPY OF THE EROSION AND SEDIMENT CONTROL PLAN (ESCP) AND ALL REVISIONS ON SITE AND MAKE IT AVAILABLE ON REQUEST TO DEQ, AGENT, OR THE LOCAL MUNICIPALITY. DURING INACTIVE PERIODS OF GREATER THAN SEVEN (7) CONSECUTIVE CALENDAR DAYS, THE ABOVE RECORDS MUST BE RETAINED BY THE PERMIT REGISTRANT BUT DO NOT NEED TO BE AT THE CONSTRUCTION SITE. (SCHEDULE B.2.C)
5. ALL PERMIT REGISTRANTS MUST IMPLEMENT THE ESCP. FAILURE TO IMPLEMENT ANY OF THE CONTROL MEASURES OR PRACTICES DESCRIBED IN THE ESCP IS A VIOLATION OF THE PERMIT. (SCHEDULE A 8.A)
6. THE ESCP MUST BE ACCURATE AND REFLECT SITE CONDITIONS. (SCHEDULE A.12.C.I)
7. SUBMISSION OF ALL ESCP REVISIONS IS NOT REQUIRED. SUBMITTAL OF THE ESCP REVISIONS IS ONLY UNDER SPECIFIC CONDITIONS. SUBMIT ALL NECESSARY REVISION TO DEQ OR AGENT WITHIN 10 DAYS. (SCHEDULE A.12.C.IV. AND V)
8. PHASE CLEARING AND GRADING TO THE MAXIMUM EXTENT PRACTICAL TO PREVENT EXPOSED INACTIVE AREAS FROM BECOMING A SOURCE OF EROSION. (SCHEDULE A.7.A.III)
9. IDENTIFY, MARK, AND PROTECT (BY CONSTRUCTION FENCING OR OTHER MEANS) CRITICAL RIPARIAN AREAS AND VEGETATION INCLUDING IMPORTANT TREES AND ASSOCIATED ROOTING ZONES, AND VEGETATION AREAS TO BE PRESERVED. IDENTIFY VEGETATIVE BUFFER ZONES BETWEEN THE SITE AND SENSITIVE AREAS (E.G., WETLANDS), AND OTHER AREAS TO BE PRESERVED, ESPECIALLY IN PERIMETER AREAS. (SCHEDULE A.8.C.I.(1) AND (2))
10. PRESERVE EXISTING VEGETATION WHEN PRACTICAL AND RE-VEGETATE OPEN AREAS. RE-VEGETATE OPEN AREAS WHEN PRACTICABLE BEFORE AND AFTER GRADING OR CONSTRUCTION.
11. MAINTAIN AND DELINEATE ANY EXISTING NATURAL BUFFER WITHIN 50-FEET OF WATERS OF THE STATE. (SCHEDULE A.7.B.I.AND (2(A)(B))
12. INSTALL PERIMETER SEDIMENT CONTROL, INCLUDING STORM DRAIN INLET PROTECTION AS WELL AS ALL SEDIMENT BASINS, TRAPS, AND BARRIERS PRIOR TO LAND DISTURBANCE. (SCHEDULE A.8.C.I.(5))
13. CONTROL BOTH PEAK FLOW RATES AND TOTAL STORMWATER VOLUME TO MINIMIZE EROSION AT OUTLETS AND DOWNSTREAM CHANNELS AND STREAMBANKS. (SCHEDULE A.7.C)
14. CONTROL SEDIMENT AS NEEDED ALONG THE SITE PERIMETER AND AT ALL OPERATIONAL INTERNAL STORM DRAIN INLETS AT ALL TIMES DURING CONSTRUCTION, BOTH INTERNALLY AND AT THE SITE BOUNDARY. (SCHEDULE A.7.D.I)
15. ESTABLISH CONCRETE TRUCK AND OTHER CONCRETE EQUIPMENT WASHOUT AREAS BEFORE BEGINNING CONCRETE WORK. (SCHEDULE A.8.C.I.(6))
16. APPLY TEMPORARY AND/OR PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS AS GRADING PROGRESSES. TEMPORARY OR PERMANENT STABILIZATIONS MEASURES ARE NOT REQUIRED FOR AREAS THAT ARE INTENDED TO BE LEFT UNVEGETATED, SUCH AS DIRT ACCESS ROADS.
17. ESTABLISH MATERIAL AND WASTE STORAGE AREAS, AND OTHER NON-STORMWATER CONTROLS. (SCHEDULE A.8.C.I.(7))
18. PREVENT TRACKING OF SEDIMENT ONTO PUBLIC OR PRIVATE ROADS USING BMPS SUCH AS: CONSTRUCTION ENTRANCE, GRAVELED (OR PAVED) EXITS AND PARKING AREAS, GRAVEL ALL UNPAVED ROADS LOCATED ONSITE, OR USE AN EXIT TIRE WASH. THESE BMPS MUST BE IN PLACE PRIOR TO LAND-DISTURBING ACTIVITIES. (SCHEDULE A 7.D.II AND A.8.C.I(4))
19. WHEN TRUCKING SATURATED SOILS FROM THE SITE, EITHER USE WATER-TIGHT TRUCKS OR DRAIN LOADS ON SITE. (SCHEDULE A.7.D.II.(5))
20. CONTROL PROHIBITED DISCHARGES FROM LEAVING THE CONSTRUCTION SITE, I.E., CONCRETE WASH-OUT, WASTEWATER FROM CLEANOUT OF STUCCO, PAINT AND CURING COMPOUNDS. (SCHEDULE A.6)
21. USE BMPS TO PREVENT OR MINIMIZE STORMWATER EXPOSURE TO POLLUTANTS FROM SPILLS; VEHICLE AND EQUIPMENT FUELING, MAINTENANCE, AND STORAGE; OTHER CLEANING AND MAINTENANCE ACTIVITIES; AND WASTE HANDLING ACTIVITIES. THESE POLLUTANTS INCLUDE FUEL, HYDRAULIC FLUID, AND OTHER OILS FROM VEHICLES AND MACHINERY, AS WELL AS DEBRIS, FERTILIZER, PESTICIDES AND HERBICIDES, PAINTS, SOLVENTS, CURING COMPOUNDS AND ADHESIVES FROM CONSTRUCTION OPERATIONS. (SCHEDULE A.7.E.I.(2))
22. IMPLEMENT THE FOLLOWING BMPS WHEN APPLICABLE: WRITTEN SPILL PREVENTION AND RESPONSE PROCEDURES, EMPLOYEE TRAINING ON SPILL PREVENTION AND PROPER DISPOSAL PROCEDURES, SPILL KITS IN ALL VEHICLES, REGULAR MAINTENANCE SCHEDULE FOR VEHICLES AND MACHINERY, MATERIAL DELIVERY AND STORAGE CONTROLS, TRAINING AND SIGNAGE, AND COVERED STORAGE AREAS FOR WASTE AND SUPPLIES. (SCHEDULE A. 7.E.III.)
23. USE WATER, SOIL-BINDING AGENT OR OTHER DUST CONTROL TECHNIQUE AS NEEDED TO AVOID WIND-BLOWN SOIL. (SCHEDULE A 7.A.IV)
24. THE APPLICATION RATE OF FERTILIZERS USED TO REESTABLISH VEGETATION MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS TO MINIMIZE NUTRIENT RELEASES TO SURFACE WATERS. EXERCISE CAUTION WHEN USING TIME-RELEASE FERTILIZERS WITHIN ANY WATERWAY RIPARIAN ZONE. (SCHEDULE A.9.B.III)
25. IF AN ACTIVE TREATMENT SYSTEM (FOR EXAMPLE, ELECTRO-COAGULATION, FLOCCULATION, FILTRATION, ETC.) FOR SEDIMENT OR OTHER POLLUTANT REMOVAL IS EMPLOYED, SUBMIT AN OPERATION AND MAINTENANCE PLAN (INCLUDING SYSTEM SCHEMATIC, LOCATION OF SYSTEM, LOCATION OF INLET, LOCATION OF DISCHARGE, DISCHARGE DISPERSION DEVICE DESIGN, AND A SAMPLING PLAN AND FREQUENCY) BEFORE OPERATING THE TREATMENT SYSTEM. OBTAIN PLAN APPROVAL BEFORE OPERATING THE TREATMENT SYSTEM. OPERATE AND MAINTAIN THE TREATMENT SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS. (SCHEDULE A.9.D)
26. TEMPORARILY STABILIZE SOILS AT THE END OF THE SHIFT BEFORE HOLIDAYS AND WEEKENDS, IF NEEDED. THE REGISTRANT IS RESPONSIBLE FOR ENSURING THAT SOILS ARE STABLE DURING RAIN EVENTS AT ALL TIMES OF THE YEAR. (SCHEDULE A 7.B)
27. AS NEEDED BASED ON WEATHER CONDITIONS, AT THE END OF EACH WORKDAY SOIL STOCKPILES MUST BE STABILIZED OR COVERED, OR OTHER BMPS MUST BE IMPLEMENTED TO PREVENT DISCHARGES TO SURFACE WATERS OR CONVEYANCE SYSTEMS LEADING TO SURFACE WATERS. (SCHEDULE A 7.E.II.(2))
28. CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATION AND BARE GROUND ACTIVITIES DURING WET WEATHER. (SCHEDULE A.7.A.I)
29. SEDIMENT FENCE: REMOVE TRAPPED SEDIMENT BEFORE IT REACHES ONE THIRD OF THE ABOVE GROUND FENCE HEIGHT AND BEFORE FENCE REMOVAL. (SCHEDULE A.9.C.I)
30. OTHER SEDIMENT BARRIERS (SUCH AS BIOBAGS): REMOVE SEDIMENT BEFORE IT REACHES TWO INCHES DEPTH ABOVE GROUND HEIGHT AND BEFORE BMP REMOVAL. (SCHEDULE A.9.C.I)
31. CATCH BASINS: CLEAN BEFORE RETENTION CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT. SEDIMENT BASINS AND SEDIMENT TRAPS: REMOVE TRAPPED SEDIMENTS BEFORE DESIGN CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT AND AT COMPLETION OF PROJECT. (SCHEDULE A.9.C.III& IV)
32. WITHIN 24 HOURS, SIGNIFICANT SEDIMENT THAT HAS LEFT THE CONSTRUCTION SITE, MUST BE REMEDIATED. INVESTIGATE THE CAUSE OF THE SEDIMENT RELEASE AND IMPLEMENT STEPS TO PREVENT A RECURRENCE OF THE DISCHARGE WITHIN THE SAME 24 HOURS. ANY IN-STREAM CLEAN-UP OF SEDIMENT SHALL BE PERFORMED ACCORDING TO THE OREGON DIVISION OF STATE LANDS REQUIRED TIMEFRAME. (SCHEDULE A.9.B.I)
33. THE INTENTIONAL WASHING OF SEDIMENT INTO STORM SEWERS OR DRAINAGE WAYS MUST NOT OCCUR. VACUUMING OR DRY SWEEPING AND MATERIAL PICKUP MUST BE USED TO CLEANUP RELEASED SEDIMENTS. (SCHEDULE A.9.B.II)
34. THE ENTIRE SITE MUST BE TEMPORARILY STABILIZED USING VEGETATION OR A HEAVY MULCH LAYER, TEMPORARY SEEDING, OR OTHER METHOD SHOULD ALL CONSTRUCTION ACTIVITIES CEASE FOR 30 DAYS OR MORE. (SCHEDULE A.7.F.I)
35. PROVIDE TEMPORARY STABILIZATION FOR THAT PORTION OF THE SITE WHERE CONSTRUCTION ACTIVITIES CEASE FOR 14 DAYS OR MORE WITH A COVERING OF BLOWN STRAW AND A TACKIFIER, LOOSE STRAW, OR AN ADEQUATE COVERING OF COMPOST MULCH UNTIL WORK RESUMES ON THAT PORTION OF THE SITE. (SCHEDULE A.7.F.II)
36. DO NOT REMOVE TEMPORARY SEDIMENT CONTROL PRACTICES UNTIL PERMANENT VEGETATION OR OTHER COVER OF EXPOSED AREAS IS ESTABLISHED. ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED, ALL TEMPORARY EROSION CONTROLS AND RETAINED SOILS MUST BE REMOVED AND DISPOSED OF PROPERLY, UNLESS DOING SO CONFLICTS WITH LOCAL REQUIREMENTS. (SCHEDULE A.8.C.III(1) AND D.3.C.II AND III)

ODEQ STANDARD INSPECTION SCHEDULE:

Site Conditon	Minimum Frequency
1. Active Period	Daily when stormwater runoff, including runoff from snow melt is occourring. At least once every 14 days, regardless of whether stormwater runoff is occouring.
2. Prior to the site becoming inactive or in anticipation of site inaccessibility	Once to ensure that erosion and sediment control measures are in working order. Any necessary maintenace and repair must be made prior to leaving the site.
3. Inactive periods greater than 14 consecutive calender days	Once every month.
4. Periods during which the site is anaccessible due to inclement weather.	If practical, inpections must occur daily at a relevant and accessible discharge point of downstream location.
5. Periods during which discharge is unlikely due to frozen conditions.	Monthly. Resume monitoring immediately upon melt, or when weather conditoins make discharges likely.

Quadrant Consulting, Inc.
1904 W. Overland Rd
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(208) 342-0091 PHONE (208) 342-0092 FAX
CIVIL ENGINEERING-SURVEYING

REGISTERED PROFESSIONAL ENGINEER 7890SPE OREGON JULY 12, 2005 NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM
EROSION AND SEDIMENT CONTROL NOTES

COVE OREGON

SCALE: NTS
PROJECT NO. 703-19

DESIGNED BY: IB/LA/KD
DRAWN BY: IB/LA/KD
CHECKED BY: NK
PLOT DATE: 6/29/22

DATE	DESCRIPTION

SHEET
EC2

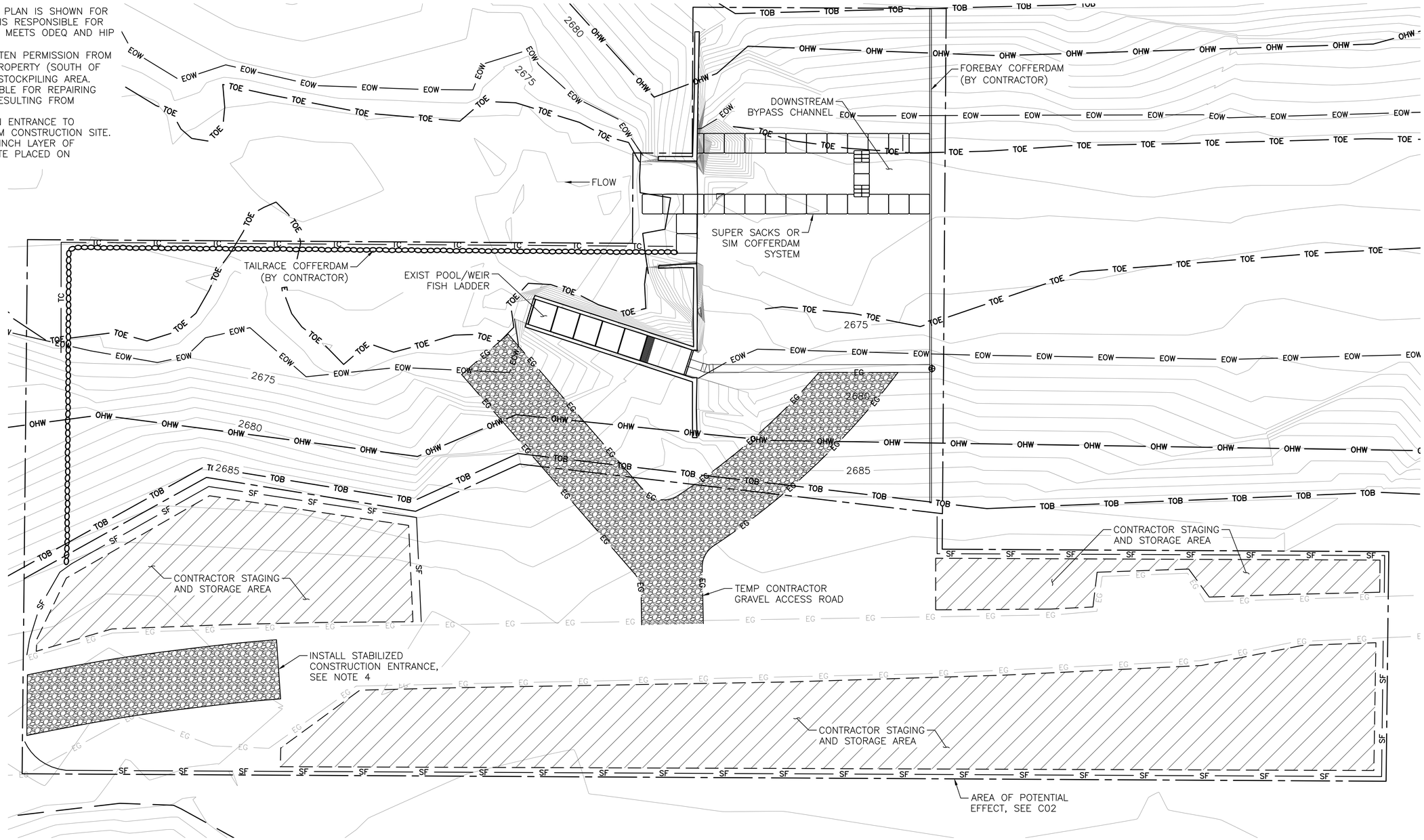
SHEET NOTES:

1. EROSION AND SEDIMENT CONTROL PLAN IS SHOWN FOR INFORMATION ONLY. CONTRACTOR IS RESPONSIBLE FOR DEVELOPMENT OF ESC PLAN THAT MEETS ODEQ AND HIP REQUIREMENTS (SEE GC1).
2. CONTRACTOR SHALL RECEIVE WRITTEN PERMISSION FROM OWNER FOR USE OF ADJACENT PROPERTY (SOUTH OF ACCESS ROAD) AS STAGING AND STOCKPILING AREA.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING PROPERTY FROM ANY DAMAGES RESULTING FROM COMPLETION OF THE WORK.
4. INSTALL STABILIZED CONSTRUCTION ENTRANCE TO PREVENT TRAVELING OF DIRT FROM CONSTRUCTION SITE. ENTRANCE SHALL CONSIST OF 6–INCH LAYER OF CRUSHED 2 TO 3–INCH AGGREGATE PLACED ON GEOTEXTILE FABRIC.

LEGEND:

SF — SILT FENCE

TC — TURBIDITY CURTAIN



PLAN

SCALE: 1"=10'–0"

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
6/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING

0 1/2 1

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TU/USWCD

ELMER DAM MODIFICATIONS

DAM & FISHWAY
EROSION AND SEDIMENT CONTROL PLAN

DESIGNED J. WOODBURY

DRAWN J. LAHMON

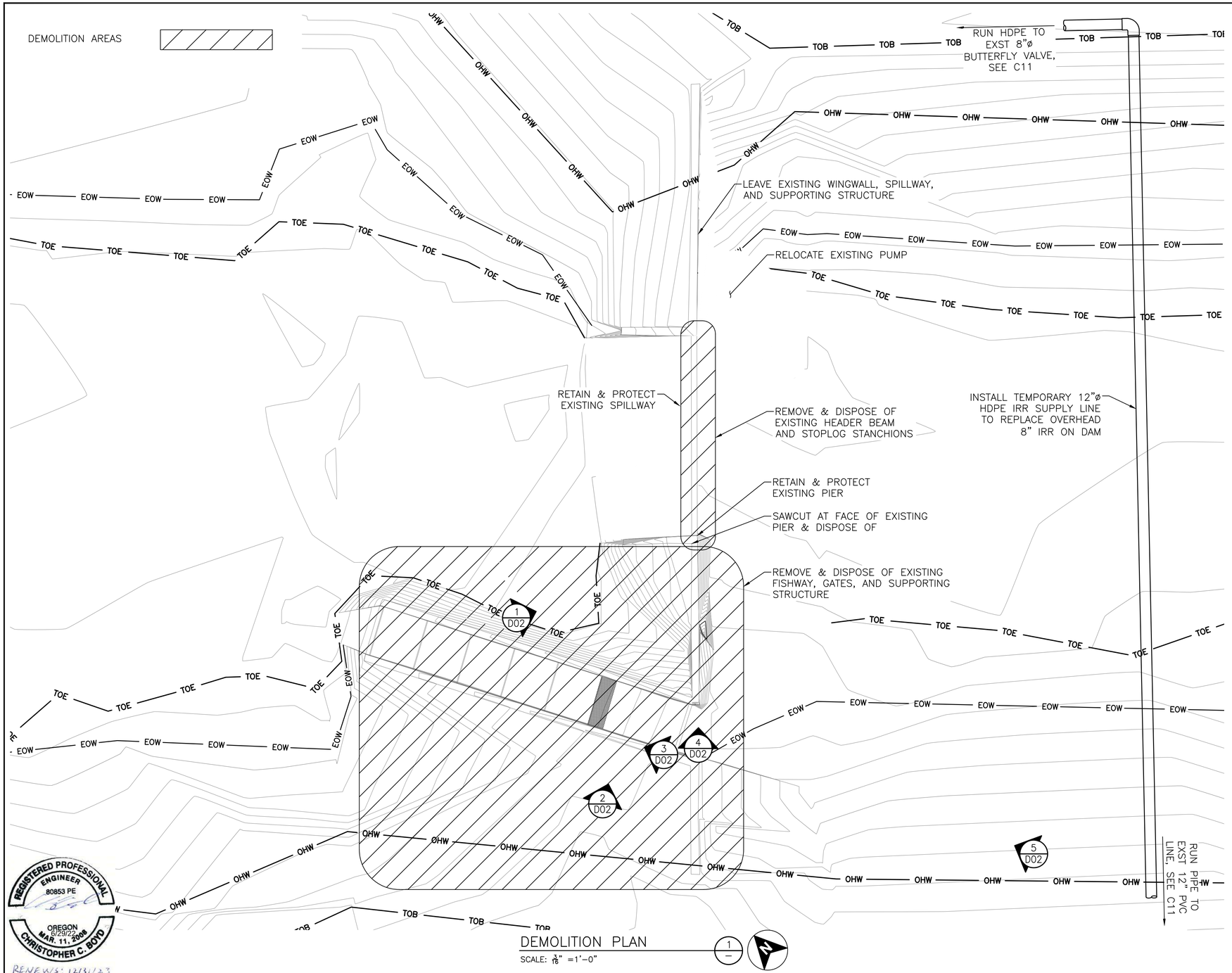
CHECKED C. BOYD

ISSUED DATE 06/17/22

DRAWING

EC3

SCALE: AS NOTED



DEMOLITION PLAN

SCALE: 1/8" =1'-0"

NOTES:

1. CONTRACTOR SHALL REMOVE EXISTING FISHWAY AND RELOCATE EXISTING PUMP.
2. ALL DEMOLISHED MATERIALS, SITE DEBRIS, RUBBISH, AND OTHER MATERIALS RESULTING FROM RECONSTRUCTION OR DEMOLITION OPERATIONS SHALL BE DISPOSED OF AT THE CONTRACTOR'S EXPENSE AT AN APPROVED OFFSITE FACILITY. DISPOSAL SHALL BE IN COMPLIANCE WITH LOCAL, STATE, AND FEDERAL CODES AND REQUIREMENTS.
3. CONTRACTOR SHALL RETAIN AND PROTECT OR REMOVE AND REPLACE ALL FEATURES, UTILITIES, AND EQUIPMENT NOT DESIGNATED FOR REMOVAL. ALL CONTROLS AND EQUIPMENT SHALL BE OPERATIONAL AFTER CONSTRUCTION IS COMPLETE.
4. THE CONTRACTOR SHALL CAREFULLY COORDINATE THE WORK IN AREAS WHERE EXISTING FACILITIES ARE INTERCONNECTED WITH NEW FACILITIES AND WHERE EXISTING FACILITIES REMAIN OPERATIONAL. THE WORK AS INDICATED IS NOT ALL INCLUSIVE, AND THE CONTRACTOR SHALL BE RESPONSIBLE TO PERFORM THE RECONSTRUCTION INDICATED PLUS THAT WHICH CAN BE REASONABLY INFERRED FROM THE CONTRACT DOCUMENTS AS NECESSARY TO COMPLETE THE PROJECT. THE SPECIFICATIONS AND DRAWINGS IDENTIFY THE MAJOR FACILITIES THAT SHALL BE DEMOLISHED AND RECONSTRUCTED, BUT AUXILIARY UTILITIES ARE NOT NECESSARILY SHOWN.
5. THE CONTRACTOR SHALL NOTE THAT THE DRAWINGS USED TO INDICATE DEMOLITION AND RECONSTRUCTION ARE BASED ON RECORD DRAWINGS OF THE EXISTING FACILITIES. THESE RECORD DRAWINGS HAVE BEEN REPRODUCED TO SHOW EXISTING CONDITIONS AND TO CLARIFY THE SCOPE OF WORK AS MUCH AS POSSIBLE. PRIOR TO BIDDING, THE CONTRACTOR SHALL CONDUCT A COMPREHENSIVE INVESTIGATION OF THE SITE TO VERIFY THE CORRECTNESS AND EXACTNESS OF THE DRAWINGS, THE SCOPE OF WORK, AND THE EXTENT OF AUXILIARY UTILITIES.
6. WHILE DEMOLITION AND RECONSTRUCTION ARE BEING PERFORMED, THE CONTRACTOR SHALL PROVIDE ADEQUATE ACCESS FOR THE CONTINUED OPERATION AND MAINTENANCE OF EQUIPMENT AND TREATMENT PROCESSES. THE CONTRACTOR SHALL ERECT AND MAINTAIN FENCES, WARNING SIGNS, BARRICADES, AND OTHER DEVICES AROUND THE RECONSTRUCTION AS REQUIRED FOR THE PROTECTION OF THE CONTRACTOR'S EMPLOYEES AND THE COMPANY'S PERSONNEL. THE CONTRACTOR SHALL REMOVE SUCH PROTECTION WHEN RECONSTRUCTION ACTIVITIES ARE COMPLETE, OR AS WORK PROGRESSES, OR WHEN DIRECTED BY THE COMPANY.
7. EXISTING PAVEMENT, STRUCTURES, EQUIPMENT, AND RELATED APPURTENANCES SUCH AS ANCHORS, SUPPORTS, AND HARDWARE INDICATED OR REQUIRED TO BE DEMOLISHED AS PART OF THE WORK SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE INDICATED. REMOVED ITEMS SHALL BE DISPOSED OF OFFSITE BY THE CONTRACTOR.
8. ITEMS OF EXISTING EQUIPMENT AND APPURTENANCES INDICATED TO BE SALVAGED SHALL BE PROTECTED IN PLACE OR REMOVED WITHOUT ANY DEGRADATION IN CONDITION FROM THAT PRIOR TO REMOVAL. SALVAGED ITEMS SHALL BE STOCKPILED AND PROTECTED ON THE SITE. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROPERLY SAFEGUARD THE SALVAGED ITEMS AGAINST DAMAGE AND LOSS DURING REMOVAL AND HANDLING.
9. EXISTING CIVIL, LANDSCAPING, AND STRUCTURAL WORK DISTURBED OR DAMAGED BY RECONSTRUCTION ACTIVITIES SHALL BE REPAIRED AND REHABILITATED AS INDICATED. DAMAGED ITEMS SHALL BE REPAIRED OR REPLACED WITH NEW ITEMS TO RESTORE ITEMS OR SURFACES TO A CONDITION EQUAL TO AND MATCHING THAT EXISTING PRIOR TO DAMAGE.
10. THE CONTRACTOR SHALL VERIFY THAT ANY UTILITIES CONNECTED TO STRUCTURES, EQUIPMENT, AND FACILITIES TO BE REMOVED, RELOCATED, SALVAGED, REPLACED, OR ABANDONED ARE RENDERED INOPERABLE, REPLACED WITH NEW UTILITIES, OR ADEQUATELY BYPASSED WITH TEMPORARY UTILITIES BEFORE PROCEEDING WITH DEMOLITION AND RECONSTRUCTION.
11. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO AVOID DAMAGE TO ADJACENT FACILITIES AND TO LIMIT THE WORK ACTIVITIES TO THE EXTENT INDICATED. IF RECONSTRUCTION BEYOND THE SCOPE INDICATED IS REQUIRED, THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE COMPANY PRIOR TO COMMENCING.
12. PERSONS AND VEHICLES SHALL BE AFFORDED SAFE PASSAGES AROUND AREAS OF DEMOLITION.
13. STRUCTURAL ELEMENTS SHALL NOT BE OVERLOADED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SHORING, BRACING, OR ADDING NEW SUPPORTS AS MAY BE REQUIRED FOR ADEQUATE STRUCTURAL SUPPORT AS A RESULT OF WORK PERFORMED UNDER THIS SECTION. THE CONTRACTOR SHALL REMOVE TEMPORARY PROTECTION WHEN THE WORK IS COMPLETE OR WHEN SO AUTHORIZED BY THE COMPANY.
14. DEMOLITION AND REMOVAL OF DEBRIS SHALL MINIMIZE INTERFERENCE WITH ROADS, STREETS, WALKS, AND OTHER ADJACENT OCCUPIED OR USED FACILITIES WHICH SHALL NOT BE CLOSED OR OBSTRUCTED WITHOUT PERMISSION FROM THE COMPANY.
15. WHEN AREA OF WORK IS A CONFINED SPACE AND ALL REQUIRED SHALL BE MEET BY THE CONTRACTOR FOR PERFORMING WORK IN A CONFINED SPACE.
16. WATER SPRINKLING, TEMPORARY ENCLOSURES, CHUTES, AND OTHER SUITABLE METHODS SHALL BE USED TO LIMIT DUST AND DIRT RISING AND SCATTERING IN THE AREA. THE CONTRACTOR SHALL COMPLY WITH GOVERNMENT REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION.

REGISTERED PROFESSIONAL ENGINEER 80853 PE OREGON 6/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD

RENEWS: 12/31/23

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WARNING

0 1/2 1

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TU/USWCD

ELMER DAM MODIFICATIONS

DAM AREA DEMOLITION PLAN

DESIGNED J. WOODBURY

DRAWN J. LAHMON

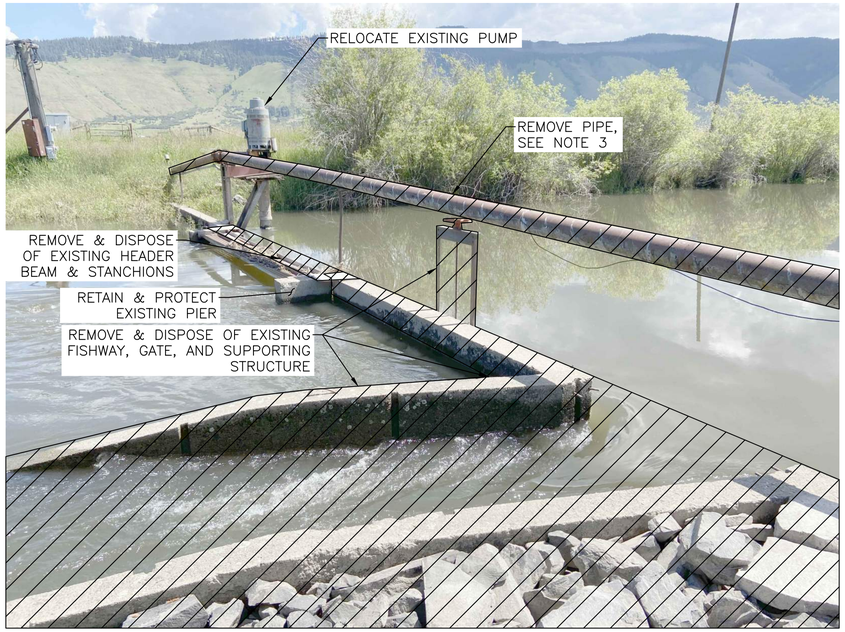
CHECKED C. BOYD

ISSUED DATE 06/17/22

DRAWING D01

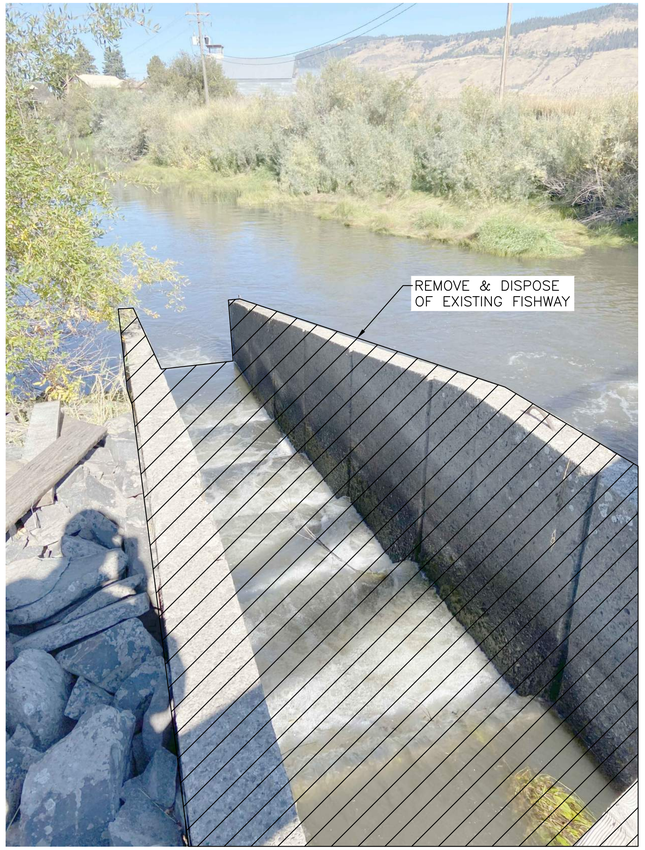
SCALE: AS NOTED

DEMOLITION VIEW 1
NTS



DEMOLITION VIEW 2
NTS

SHEET NOTES:
1. SEE D01 FOR ADDITIONAL NOTES & DETAILS.
2. RELOCATE EXISTING PUMP & REMOVE PIPING.
3. CONTRACTOR SHALL INSTALL TEMP 12"ø HDPE IRR SUPPLY LINE TO REPLACE EXST 8" OVERHEAD PIPE TO BE DEMOLISHED. IRRIGATION SUPPLY SHALL BE MAINTAINED THROUGHOUT THE ENTIRE IRR SEASON.
4. REMOVE HATCHED AREAS AS SHOWN AND MAKE SAW CUTS FLUSH WITH EXISTING STRUCTURES.



DEMOLITION VIEW 3
NTS

DEMOLITION VIEW 4
NTS

DEMOLITION VIEW 5
NTS

REGISTERED PROFESSIONAL ENGINEER 80853 PE
OREGON MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

DEMOLITION AREAS

REV	DATE	BY	DESCRIPTION
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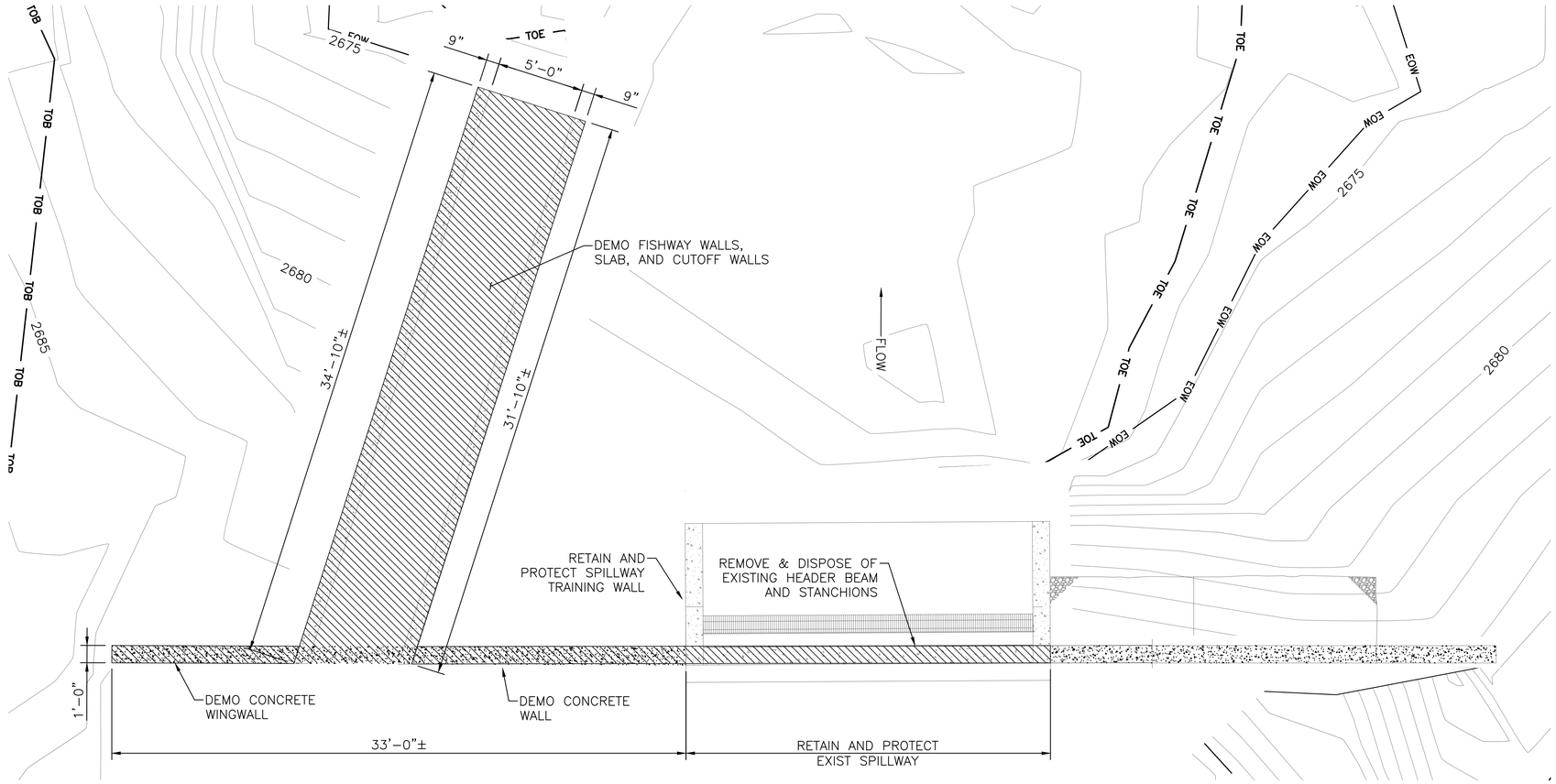
TU/USWCD

ELMER DAM MODIFICATIONS

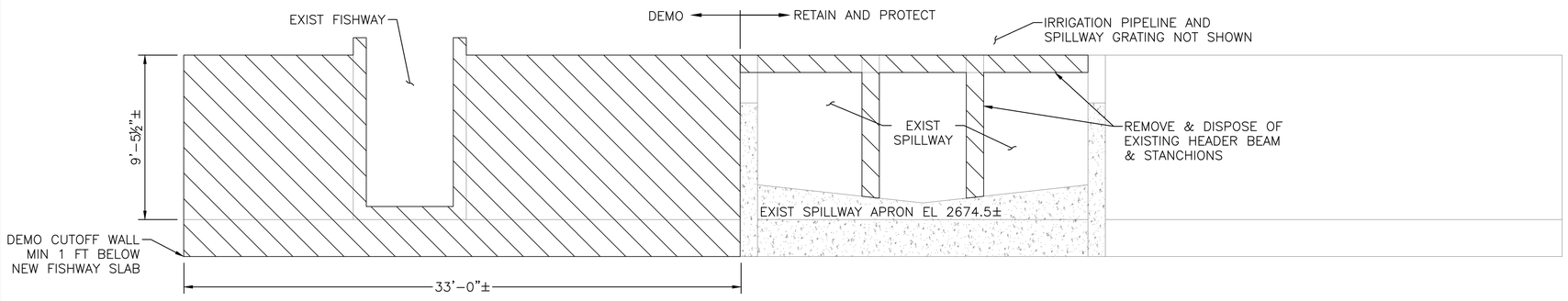
DEMOLITION PHOTOS

DESIGNED J. WOODBURY
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING D02
SCALE: AS NOTED



DEMOLITION PLAN
SCALE: ¼" =1'-0"



DEMOLITION SECTION
SCALE: ¼" =1'-0"

NOTES:
1. EXISTING STRUCTURAL DIMENSIONS ARE BASED ON AS-BUILT DRAWINGS AND MAY VARY IN THE FIELD.
2. DEMOLITION DIMENSIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND ARE PRESENTED TO DELINEATE EXTENTS OF CONCRETE DEMOLITION.
3. CONTRACTOR SHALL RETAIN AND PROTECT ALL EXISTING DAM FEATURES, STRUCTURAL OR MECHANICAL, THAT ARE NOT EXPLICITLY IDENTIFIED FOR DEMOLITION.
4. CONTRACTOR SHALL STOCKPILE AND REUSE EXIST ROCK RIPRAP. CONCRETE RIPRAP IS NOT SUITABLE FOR REUSE.

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
8/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
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TU/USWCD
ELMER DAM MODIFICATIONS
DEMOLITION PLAN & SECTIONS

DESIGNED J. WOODBURY
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING
D03
SCALE: AS NOTED

HIP GENERAL CONSERVATION MEASURES APPLICABLE TO ALL ACTIONS

THE ACTIVITIES COVERED UNDER THE HIP ARE INTENDED TO PROTECT AND RESTORE FISH AND WILDLIFE HABITAT WITH LONG-TERM BENEFITS TO ESA-LISTED SPECIES. THE FOLLOWING GENERAL CONSERVATION MEASURES (DEVELOPED IN COORDINATION WITH USFWS AND NMFS) WILL BE APPLIED TO ALL ACTIONS OF THIS PROJECT.

PROJECT DESIGN AND SITE PREPARATION.

1. STATE AND FEDERAL PERMITS.

A. ALL APPLICABLE REGULATORY PERMITS AND OFFICIAL PROJECT AUTHORIZATIONS WILL BE OBTAINED BEFORE PROJECT IMPLEMENTATION.

B. THESE PERMITS AND AUTHORIZATIONS INCLUDE, BUT ARE NOT LIMITED TO, NATIONAL ENVIRONMENTAL POLICY ACT, NATIONAL HISTORIC PRESERVATION ACT, THE APPROPRIATE STATE AGENCY REMOVAL AND FILL PERMIT, USACE CLEAN WATER ACT (CWA) 404 PERMITS, CWA SECTION 401 WATER QUALITY CERTIFICATIONS, AND FEMA NO-RISE ANALYSES.

2. TIMING OF IN-WATER WORK.

A. APPROPRIATE STATE (OREGON DEPARTMENT OF FISH AND WILDLIFE (ODFW), WASHINGTON DEPARTMENT OF FISH AND WILDLIFE (WDFW), IDAHO DEPARTMENT OF FISH AND GAME (IDFG), AND MONTANA FISH WILDLIFE AND PARKS (MFWP)) GUIDELINES FOR TIMING OF IN-WATER WORK WINDOWS (IWW) WILL BE FOLLOWED.

B. CHANGES TO ESTABLISHED WORK WINDOWS WILL BE APPROVED BY REGIONAL STATE BIOLOGISTS AND BPA'S EC LEAD.

C. BULL TROUT. FOR AREAS WITH DESIGNATED IN-WATER WORK WINDOWS FOR BULL TROUT OR AREAS KNOWN TO HAVE BULL TROUT, PROJECT PROPONENTS WILL CONTACT THE APPROPRIATE USFWS FIELD OFFICE TO INSURE THAT ALL REASONABLE IMPLEMENTATION MEASURES ARE CONSIDERED AND AN APPROPRIATE IN-WATER WORK WINDOW IS BEING USED TO MINIMIZE PROJECT EFFECTS.

D. LAMPREY. WORKING IN STREAM OR RIVER CHANNELS THAT CONTAIN PACIFIC LAMPREY WILL BE AVOIDED FROM MARCH 1 TO JULY 1 FOR REACHES <5,000 FEET IN ELEVATION AND FROM MARCH 1 TO AUGUST 1 FOR REACHES >5,000 FEET. IF EITHER TIMEFRAME IS INCOMPATIBLE WITH OTHER OBJECTIVES, THE AREA WILL BE SURVEYED FOR NESTS AND LAMPREY PRESENCE, AND AVOIDED IF POSSIBLE. IF LAMPREYS ARE KNOWN TO EXIST, THE PROJECT SPONSOR WILL UTILIZE DEWATERING AND SALVAGE PROCEDURES (SEE FISH SALVAGE AND ELECTROFISHING SECTIONS) TO MINIMIZE ADVERSE EFFECTS.

E. THE IN-WATER WORK WINDOW WILL BE PROVIDED IN THE CONSTRUCTION PLANS.

3. CONTAMINANTS.

A. EXCAVATION OF MORE THAN 20 CUBIC YARDS WILL REQUIRE A SITE VISIT AND DOCUMENTED ASSESSMENT FOR POTENTIAL CONTAMINANT SOURCES. THE SITE ASSESSMENT WILL BE STORED WITH PROJECT FILES OR AS AN APPENDIX TO THE BASIS OF DESIGN REPORT.

B. THE SITE ASSESSMENT WILL SUMMARIZE:

1. THE SITE VISIT, CONDITION OF THE PROPERTY, AND IDENTIFICATION OF ANY AREAS USED FOR VARIOUS INDUSTRIAL PROCESSES;
2. AVAILABLE RECORDS, SUCH AS FORMER SITE USE, BUILDING PLANS, AND RECORDS OF ANY PRIOR CONTAMINATION EVENTS;
3. INTERVIEWS WITH KNOWLEDGEABLE PEOPLE, SUCH AS SITE OWNERS, OPERATORS, OCCUPANTS, NEIGHBORS, OR LOCAL GOVERNMENT OFFICIALS; AND
4. THE TYPE, QUANTITY, AND EXTENT OF ANY POTENTIAL CONTAMINATION SOURCES.

4. SITE LAYOUT AND FLAGGING.

A. CONSTRUCTION AREAS TO BE CLEARLY FLAGGED PRIOR TO CONSTRUCTION.

B. AREAS TO BE FLAGGED WILL INCLUDE:

1. SENSITIVE RESOURCE AREAS, SUCH AS AREAS BELOW ORDINARY HIGH WATER, SPAWNING AREAS, SPRINGS, AND WETLANDS;
2. EQUIPMENT ENTRY AND EXIT POINTS;
3. ROAD AND STREAM CROSSING ALIGNMENTS;
4. STAGING, STORAGE, AND STOCKPILE AREAS; AND
5. NO-SPRAY AREAS AND BUFFERS.

5. TEMPORARY ACCESS ROADS AND PATHS.

A. EXISTING ACCESS ROADS AND PATHS WILL BE PREFERENTIALLY USED WHENEVER REASONABLE, AND THE NUMBER AND LENGTH OF TEMPORARY ACCESS ROADS AND PATHS THROUGH RIPARIAN AREAS AND FLOODPLAINS WILL BE MINIMIZED.

B. VEHICLE USE AND HUMAN ACTIVITIES, INCLUDING WALKING, IN AREAS OCCUPIED BY TERRESTRIAL ESA-LISTED SPECIES WILL BE MINIMIZED.

C. TEMPORARY ACCESS ROADS AND PATHS WILL NOT BE BUILT ON SLOPES WHERE GRADE, SOIL, OR OTHER FEATURES SUGGEST A LIKELIHOOD OF EXCESSIVE EROSION OR FAILURE. IF SLOPES ARE STEEPER THAN 30%, THEN THE ROAD WILL BE DESIGNED BY A CIVIL ENGINEER WITH EXPERIENCE IN STEEP ROAD DESIGN.

D. THE REMOVAL OF RIPARIAN VEGETATION DURING CONSTRUCTION OF TEMPORARY ACCESS ROADS WILL BE MINIMIZED. WHEN TEMPORARY VEGETATION REMOVAL IS REQUIRED, VEGETATION WILL BE CUT AT GROUND LEVEL (NOT GRUBBED).

E. AT PROJECT COMPLETION, ALL TEMPORARY ACCESS ROADS AND PATHS WILL BE OBLITERATED, AND THE SOIL WILL BE STABILIZED AND REVEGETATED. ROAD AND PATH OBLITERATION REFERS TO THE MOST COMPREHENSIVE DEGREE OF DECOMMISSIONING AND INVOLVES DECOMPACTING THE SURFACE AND DITCH, PULLING THE FILL MATERIAL ONTO THE RUNNING SURFACE, AND RESHAPING TO MATCH THE ORIGINAL CONTOUR.

F. HELICOPTER FLIGHT PATTERNS WILL BE ESTABLISHED IN ADVANCE AND LOCATED TO AVOID TERRESTRIAL ESA-LISTED SPECIES AND THEIR OCCUPIED HABITAT DURING SENSITIVE LIFE STAGES.

6. TEMPORARY STREAM CROSSINGS.

A. EXISTING STREAM CROSSINGS WILL BE PREFERENTIALLY USED WHENEVER REASONABLE, AND THE NUMBER OF TEMPORARY STREAM CROSSINGS WILL BE MINIMIZED.

B. TEMPORARY BRIDGES AND CULVERTS WILL BE INSTALLED TO ALLOW FOR EQUIPMENT AND VEHICLE CROSSING OVER PERENNIAL STREAMS DURING CONSTRUCTION. TREATED WOOD SHALL NOT BE USED ON TEMPORARY BRIDGE CROSSINGS OR IN LOCATIONS IN CONTACT WITH OR DIRECTLY OVER WATER.

C. FOR PROJECTS THAT REQUIRE EQUIPMENT AND VEHICLES TO CROSS IN THE WET:

1. THE LOCATION AND NUMBER OF ALL WET CROSSINGS SHALL BE APPROVED BY THE BPA EC LEAD AND DOCUMENTED IN THE CONSTRUCTION PLANS;
2. VEHICLES AND MACHINERY SHALL CROSS STREAMS AT RIGHT ANGLES TO THE MAIN CHANNEL WHENEVER POSSIBLE;
3. NO STREAM CROSSINGS WILL OCCUR 300 FEET UPSTREAM OR 100 FEET DOWNSTREAM OF AN EXISTING REDD OR SPAWNING FISH; AND
4. AFTER PROJECT COMPLETION, TEMPORARY STREAM CROSSINGS WILL BE OBLITERATED AND BANKS RESTORED.

7. STAGING, STORAGE, AND STOCKPILE AREAS.

A. STAGING AREAS (USED FOR CONSTRUCTION EQUIPMENT STORAGE, VEHICLE STORAGE, FUELING, SERVICING, AND HAZARDOUS MATERIAL STORAGE) WILL BE 150 FEET OR MORE FROM ANY NATURAL WATER BODY OR WETLAND. STAGING AREAS CLOSER THAN 150 FEET WILL BE APPROVED BY THE EC LEAD.

B. NATURAL MATERIALS USED FOR IMPLEMENTATION OF AQUATIC RESTORATION, SUCH AS LARGE WOOD, GRAVEL, AND BOULDERS, MAY BE STAGED WITHIN 150 FEET IF CLEARLY INDICATED IN THE PLANS THAT AREA IS FOR NATURAL MATERIALS ONLY.

C. ANY LARGE WOOD, TOPSOIL, AND NATIVE CHANNEL MATERIAL DISPLACED BY CONSTRUCTION WILL BE STOCKPILED FOR USE DURING SITE RESTORATION AT A SPECIFICALLY IDENTIFIED AND FLAGGED AREA.

D. ANY MATERIAL NOT USED IN RESTORATION, AND NOT NATIVE TO THE FLOODPLAIN, WILL BE DISPOSED OF OUTSIDE THE 100-YEAR FLOODPLAIN.

8. EQUIPMENT.

A. MECHANIZED EQUIPMENT AND VEHICLES WILL BE SELECTED, OPERATED, AND MAINTAINED IN A MANNER THAT MINIMIZES ADVERSE EFFECTS ON THE ENVIRONMENT (E.G., MINIMALLY-SIZED, LOW PRESSURE TIRES; MINIMAL HARD-TURN PATHS FOR TRACKED VEHICLES; TEMPORARY MATS OR PLATES WITHIN WET AREAS OR ON SENSITIVE SOILS).

B. EQUIPMENT WILL BE STORED, FUELED, AND MAINTAINED IN AN CLEARLY IDENTIFIED STAGING AREA THAT MEETS STAGING AREA CONSERVATION MEASURES;

C. EQUIPMENT WILL BE REFUELED IN A VEHICLE STAGING AREA OR IN AN ISOLATED HARD ZONE, SUCH AS A PAVED PARKING LOT OR ADJACENT, ESTABLISHED ROAD (THIS MEASURE APPLIES ONLY TO GAS-POWERED EQUIPMENT WITH TANKS LARGER THAN 5 GALLONS);

D. BIODEGRADABLE LUBRICANTS AND FLUIDS WILL BE USED ON EQUIPMENT OPERATING IN AND ADJACENT TO THE STREAM CHANNEL AND LIVE WATER.

E. EQUIPMENT WILL BE INSPECTED DAILY FOR FLUID LEAKS BEFORE LEAVING THE VEHICLE STAGING AREA FOR OPERATION WITHIN 150 FEET OF ANY NATURAL WATER BODY OR WETLAND; AND

F. EQUIPMENT WILL BE THOROUGHLY CLEANED BEFORE OPERATION BELOW ORDINARY HIGH WATER, AND AS OFTEN AS NECESSARY DURING OPERATION, TO REMAIN GREASE FREE.

9. EROSION CONTROL.

A. TEMPORARY EROSION CONTROL MEASURES INCLUDE:

1. TEMPORARY EROSION CONTROLS WILL BE IN PLACE BEFORE ANY SIGNIFICANT ALTERATION OF THE ACTION SITE AND APPROPRIATELY INSTALLED DOWNSLOPE OF PROJECT ACTIVITY WITHIN THE RIPARIAN BUFFER AREA UNTIL SITE REHABILITATION IS COMPLETE;
2. IF THERE IS A POTENTIAL FOR ERODED SEDIMENT TO ENTER THE STREAM, SEDIMENT BARRIERS WILL BE INSTALLED AND MAINTAINED FOR THE DURATION OF PROJECT IMPLEMENTATION;
3. TEMPORARY EROSION CONTROL MEASURES MAY INCLUDE SEDGE MATS, FIBER WATTLES, SILT FENCES, JUTE MATTING, WOOD FIBER MULCH AND SOIL BINDER, OR GEOTEXTILES AND GEOSYNTHETIC FABRIC;
4. SOIL STABILIZATION UTILIZING WOOD FIBER MULCH AND TACKIFIER (HYDRO-APPLIED) MAY BE USED TO REDUCE EROSION OF BARE SOIL IF THE MATERIALS ARE NOXIOUS WEED FREE AND NONTOXIC TO AQUATIC AND TERRESTRIAL ANIMALS, SOIL MICROORGANISMS, AND VEGETATION;
5. SEDIMENT WILL BE REMOVED FROM EROSION CONTROLS ONCE IT HAS REACHED 1/3 OF THE EXPOSED HEIGHT OF THE CONTROL; AND
6. ONCE THE SITE IS STABILIZED AFTER CONSTRUCTION, TEMPORARY EROSION CONTROL MEASURES WILL BE REMOVED.

B. EMERGENCY EROSION CONTROLS. THE FOLLOWING MATERIALS FOR EMERGENCY EROSION CONTROL WILL BE AVAILABLE AT THE WORK SITE:

1. A SUPPLY OF SEDIMENT CONTROL MATERIALS; AND
2. AN OIL-ABSORBING FLOATING BOOM WHENEVER SURFACE WATER IS PRESENT.

10. DUST ABATEMENT.

A. THE PROJECT SPONSOR WILL DETERMINE THE APPROPRIATE DUST CONTROL MEASURES BY CONSIDERING SOIL TYPE, EQUIPMENT USAGE, PREVAILING WIND DIRECTION, AND THE EFFECTS CAUSED BY OTHER EROSION AND SEDIMENT CONTROL MEASURES.

B. WORK WILL BE SEQUENCED AND SCHEDULED TO REDUCE EXPOSED BARE SOIL SUBJECT TO WIND EROSION.

C. DUST-ABATEMENT ADDITIVES AND STABILIZATION CHEMICALS (TYPICALLY MAGNESIUM CHLORIDE, CALCIUM CHLORIDE SALTS, OR LIGNINSULFONATE) WILL NOT BE APPLIED WITHIN 25 FEET OF WATER OR A STREAM CHANNEL AND WILL BE APPLIED SO AS TO MINIMIZE THE LIKELIHOOD THAT THEY WILL ENTER STREAMS. APPLICATIONS OF LIGNINSULFONATE WILL BE LIMITED TO A MAXIMUM RATE OF 0.5 GALLONS PER SQUARE YARD OF ROAD SURFACE, ASSUMING MIXED 50:50 WITH WATER.

D. APPLICATION OF DUST ABATEMENT CHEMICALS WILL BE AVOIDED DURING OR JUST BEFORE WET WEATHER, AND AT STREAM CROSSINGS OR OTHER AREAS THAT COULD RESULT IN UNFILTERED DELIVERY OF THE DUST ABATEMENT MATERIALS TO A WATERBODY (TYPICALLY THESE WOULD BE AREAS WITHIN 25 FEET OF A WATERBODY OR STREAM CHANNEL; DISTANCES MAY BE GREATER WHERE VEGETATION IS SPARSE OR SLOPES ARE STEEP).

E. SPILL CONTAINMENT EQUIPMENT WILL BE AVAILABLE DURING APPLICATION OF DUST ABATEMENT CHEMICALS.

F. PETROLEUM-BASED PRODUCTS WILL NOT BE USED FOR DUST ABATEMENT.

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CIVIL ENGINEERING-SURVEYING

REGISTERED PROFESSIONAL ENGINEER
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JULY 12, 2005
NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM
HIP IV CONSERVATION MEASURES SHEET 1
COVE OREGON

SCALE: NTS
PROJECT NO. 703-19

DESIGNED BY:
DRAWN BY: IB/LA/KD
CHECKED BY: NK
PLOT DATE: 6/29/22

DATE	DESCRIPTION

SHEET
GC1

PROJECT DESIGN AND SITE PREPARATION (CONTINUED).

11. SPILL PREVENTION, CONTROL, AND COUNTER MEASURES.

A. A DESCRIPTION OF HAZARDOUS MATERIALS THAT WILL BE USED, INCLUDING INVENTORY, STORAGE, AND HANDLING PROCEDURES WILL BE AVAILABLE ON-SITE.

B. WRITTEN PROCEDURES FOR NOTIFYING ENVIRONMENTAL RESPONSE AGENCIES WILL BE POSTED AT THE WORK SITE.

C. SPILL CONTAINMENT KITS (INCLUDING INSTRUCTIONS FOR CLEANUP AND DISPOSAL) ADEQUATE FOR THE TYPES AND QUANTITY OF HAZARDOUS MATERIALS USED AT THE SITE WILL BE AVAILABLE AT THE WORK SITE.

D. WORKERS WILL BE TRAINED IN SPILL CONTAINMENT PROCEDURES AND WILL BE INFORMED OF THE LOCATION OF SPILL CONTAINMENT KITS.

E. ANY WASTE LIQUIDS GENERATED AT THE STAGING AREAS WILL BE TEMPORARILY STORED UNDER AN IMPERVIOUS COVER, SUCH AS A TARPAULIN, UNTIL THEY CAN BE PROPERLY TRANSPORTED TO AND DISPOSED OF AT A FACILITY THAT IS APPROVED FOR RECEIPT OF HAZARDOUS MATERIALS.

F. PUMPS USED ADJACENT TO WATER SHALL USE SPILL CONTAINMENT SYSTEMS.

12. INVASIVE SPECIES CONTROL.

A. PRIOR TO ENTERING THE SITE, ALL VEHICLES AND EQUIPMENT WILL BE POWER WASHED, ALLOWED TO FULLY DRY, AND INSPECTED TO MAKE SURE NO PLANTS, SOIL, OR OTHER ORGANIC MATERIAL ADHERES TO THE SURFACE.

B. WATERCRAFT, WADERS, BOOTS, AND ANY OTHER GEAR TO BE USED IN OR NEAR WATER WILL BE INSPECTED FOR AQUATIC INVASIVE SPECIES.

C. WADING BOOTS WITH FELT SOLES ARE NOT TO BE USED DUE TO THEIR PROPENSITY FOR AIDING IN THE TRANSFER OF INVASIVE SPECIES UNLESS DECONTAMINATION PROCEDURES HAVE BEEN APPROVED BY THE EC LEAD.

WORK AREA ISOLATION AND FISH SALVAGE.

1. WORK AREA ISOLATION.

A. ANY WORK AREA WITHIN THE WETTED CHANNEL WILL BE ISOLATED FROM THE ACTIVE STREAM WHENEVER ESA-LISTED FISH ARE REASONABLY CERTAIN TO BE PRESENT, OR IF THE WORK AREA IS LESS THAN 300-FEET UPSTREAM FROM KNOWN SPAWNING HABITATS.

B. WORK AREA ISOLATION AND FISH SALVAGE ACTIVITIES WILL COMPLY WITH THE IN-WATER WORK WINDOW.

C. DESIGN PLANS WILL INCLUDE ALL ISOLATION ELEMENTS AND AREAS (COFFER DAMS, PUMPS, DISCHARGE AREAS, FISH SCREENS, FISH RELEASE AREAS, ETC.).

D. WORK AREA ISOLATION AND FISH CAPTURE ACTIVITIES WILL OCCUR DURING PERIODS OF THE COOLEST AIR AND WATER TEMPERATURES POSSIBLE, NORMALLY EARLY IN THE MORNING VERSUS LATE IN THE DAY, AND DURING CONDITIONS APPROPRIATE TO MINIMIZE STRESS AND DEATH OF SPECIES PRESENT.

2. FISH SALVAGE.

A. MONITORING AND RECORDING WILL TAKE PLACE FOR DURATION OF SALVAGE. THE SALVAGE REPORT WILL BE COMMUNICATED TO AGENCIES VIA THE PROJECT COMPLETION FORM (PCF).

B. SALVAGE ACTIVITIES SHOULD TAKE PLACE DURING CONDITIONS TO MINIMIZE STRESS TO FISH SPECIES, TYPICALLY PERIODS OF THE COOLEST AIR AND WATER TEMPERATURES WHICH OCCUR IN THE MORNING VERSUS LATE IN THE DAY.

C. SALVAGE OPERATIONS WILL FOLLOW THE ORDERING, METHODOLOGIES, AND CONSERVATION MEASURES SPECIFIED BELOW:

1. SLOWLY REDUCE WATER FROM THE WORK AREA TO ALLOW SOME FISH TO LEAVE VOLITIONALLY.
2. BLOCK NETS WILL BE INSTALLED AT UPSTREAM AND DOWNSTREAM LOCATIONS AND MAINTAINED IN A SECURED POSITION TO EXCLUDE FISH FROM ENTERING THE PROJECT AREA.
3. BLOCK NETS WILL BE SECURED TO THE STREAM CHANNEL BED AND BANKS UNTIL FISH CAPTURE AND TRANSPORT ACTIVITIES ARE COMPLETE. BLOCK NETS MAY BE LEFT IN PLACE FOR THE DURATION OF THE PROJECT TO EXCLUDE FISH AS LONG AS PASSAGE REQUIREMENTS ARE MET.
4. NETS WILL BE MONITORED HOURLY DURING IN-STREAM DISTURBANCE.
5. IF BLOCK NETS REMAIN IN PLACE MORE THAN ONE DAY, THE NETS WILL BE MONITORED AT LEAST DAILY TO ENSURE THEY ARE SECURED AND FREE OF ORGANIC ACCUMULATION. IF BULL TROUT ARE PRESENT, NETS ARE TO BE CHECKED EVERY 4 HOURS FOR FISH IMPINGEMENT.
6. CAPTURE FISH THROUGH SEINING AND RELOCATE TO STREAMS.
7. WHILE DEWATERING, ANY REMAINING FISH WILL BE COLLECTED BY HAND OR DIP NETS.
8. SEINES WITH A MESH SIZE TO ENSURE CAPTURE OF THE RESIDING ESA-LISTED FISH WILL BE USED.
9. MINNOW TRAPS WILL BE LEFT IN PLACE OVERNIGHT AND USED IN CONJUNCTION WITH SEINING.
10. ELECTROFISH TO CAPTURE AND RELOCATED FISH NOT CAUGHT DURING SEINING PER ELECTROFISH CONSERVATION MEASURES.
11. CONTINUE TO SLOWLY DEWATER STREAM REACH.
12. COLLECT ANY REMAINING FISH IN COLD-WATER BUCKETS AND RELOCATED TO THE STREAM.
13. LIMIT THE TIME FISH ARE IN A TRANSPORT BUCKET.
14. MINIMIZE PREDATION BY TRANSPORTING COMPARABLE SIZES IN BUCKETS.
15. BUCKET WATER TO BE CHANGED EVERY 15 MINUTES OR AERATED.
16. BUCKETS WILL BE KEPT IN SHADED AREAS OR COVERED.
17. DEAD FISH WILL NOT BE STORED IN TRANSPORT BUCKETS, BUT WILL BE LEFT ON THE STREAM BANK TO AVOID MORTALITY COUNTING ERRORS.

D. SALVAGE GUIDELINES FOR BULL TROUT, LAMPREY, MUSSELS, AND NATIVE FISH.

1. CONDUCT SITE SURVEY TO ESTIMATE SALVAGE NUMBERS.
2. PRE-SELECT SITE(S) FOR RELEASE AND/OR MUSSEL BED RELOCATION.
3. SALVAGE OF BULL TROUT WILL NOT TAKE PLACE WHEN WATER TEMPERATURES EXCEED 15 DEGREES CELSIUS.
4. IF DRAWDOWN LESS THAN 48 HOURS, SALVAGE OF LAMPREY AND MUSSELS MAY NOT BE NECESSARY IF TEMPERATURES SUPPORT SURVIVAL IN SEDIMENTS.
5. SALVAGE MUSSELS BY HAND, LOCATING BY SNORKELING OR WADING.
6. SALVAGE LAMPREY BY ELECTROFISHING (SEE ELECTROFISHING FOR LARVAL LAMPREY SETTINGS AND LARVAL LAMPREY DRY SHOCKING SETTINGS.
7. SALVAGE BONY FISH AFTER LAMPREY WITH NETS OR ELECTROFISHING (SEE ELECTROFISHING FOR APPROPRIATE SETTINGS).
8. REGULARLY INSPECT DEWATERED SITE SINCE LAMPREY LIKELY TO EMERGE AFTER DEWATERING AND MUSSELS MAY BECOME VISIBLE.
9. MUSSELS MAY BE TRANSFERRED IN COOLERS.
10. MUSSELS WILL BE PLACED INDIVIDUALLY TO ENSURE ABILITY TO BURROW INTO NEW HABITAT.

3. ELECTROFISHING.

A. INITIAL SITE SURVEY AND INITIAL SETTINGS.

1. IDENTIFY SPAWNING ADULTS AND ACTIVE REDDS TO AVOID.
2. RECORD WATER TEMPERATURE. ELECTROFISHING WILL NOT OCCUR WHEN WATER TEMPERATURES ARE ABOVE 18 DEGREES CELSIUS.
3. IF POSSIBLE, A BLOCK NET WILL BE PLACED DOWNSTREAM AND CHECKED REGULARLY TO CAPTURE STUNNED FISH THAT DRIFT DOWNSTREAM.
4. INITIAL SETTINGS WILL BE 100 VOLTS, PULSE WIDTH OF 500 MICRO SECONDS, AND PULSE RATE OF 30 HERTZ.
5. RECORDS FOR CONDUCTIVITY, WATER TEMPERATURE, AIR TEMPERATURE, ELECTROFISHING SETTINGS, ELECTROFISHER MODEL, ELECTROFISHER CALIBRATION, FISH CONDITIONS, FISH MORTALITIES, AND TOTAL CAPTURE RATES WILL BE INCLUDED IN THE SALVAGE LOG BOOK.

B. ELECTROFISHING TECHNIQUE.

1. SAMPLING WILL BEGIN USING STRAIGHT DC. POWER WILL REMAIN ON UNTIL THE FISH IS NETTED WHEN USING STRAIGHT DC. GRADUALLY INCREASE VOLTAGE WHILE REMAINING BELOW MAXIMUM LEVELS.
2. MAXIMUM VOLTAGE WILL BE 1100 VOLTS WHEN CONDUCTIVITY IS <100 MILLISECONDS, 800 VOLTS WHEN CONDUCTIVITY IS BETWEEN 100 AND 300 MILLISECONDS, AND 400 VOLTS WHEN CONDUCTIVITY IS >300 MILLISECONDS.
3. IF FISH CAPTURE IS NOT SUCCESSFUL USING STRAIGHT DC, THE ELECTROFISHER WILL BE SET TO INITIAL VOLTAGE FOR PDC. VOLTAGE, PULSE WIDTH, AND PULSE FREQUENCY WILL BE GRADUALLY INCREASED WITHIN MAXIMUM VALUES UNTIL CAPTURE IS SUCCESSFUL.
4. MAXIMUM PULSE WIDTH IS 5 MILLISECONDS. MAXIMUM PULSE RATE IS 70 HERTZ
5. ELECTROFISHING WILL NOT OCCUR IN ONE AREA FOR AN EXTENDED PERIOD.
6. THE ANODE WILL NOT INTENTIONALLY COME INTO CONTACT WITH FISH. THE ZONE FOR POTENTIAL INJURY OF 0.5 M FROM THE ANODE WILL BE AVOIDED.
7. SETTINGS WILL BE LOWERED IN SHALLOWER WATER SINCE VOLTAGE GRADIENTS LIKELY TO INCREASE.
8. ELECTROFISHING WILL NOT OCCUR IN TURBID WATER WHERE VISIBILITY IS POOR (I.E. UNABLE TO SEE THE BED OF THE STREAM).
9. OPERATIONS WILL IMMEDIATELY STOP IF MORTALITY OR OBVIOUS FISH INJURY IS OBSERVED. ELECTROFISHING SETTINGS WILL BE REEVALUATED.

C. SAMPLE PROCESSING.

1. FISH SHOULD BE SORTED BY SIZE TO AVOID PREDATION DURING SAMPLING.
2. SAMPLERS WILL REGULARLY CHECK CONDITIONS OF FISH HOLDING CONTAINERS, AIR PUMPS, WATER TRANSFERS, ETC.
3. FISH WILL BE OBSERVED FOR GENERAL CONDITIONS AND INJURIES
4. EACH FISH WILL BE COMPLETELY REVIVED BEFORE RELEASE. ESA-LISTED SPECIES WILL BE PRIORITIZED FOR SUCCESSFUL RELEASE.

D. BULL TROUT ELECTROFISHING.

1. ELECTROFISHING FOR BULL TROUT WILL ONLY OCCUR FROM MAY 1 TO JULY 31. NO ELECTROFISHING WILL OCCUR IN ANY BULL TROUT OCCUPIED HABITAT AFTER AUGUST 15. IN FMO HABITATS ELECTROFISHING MAY OCCUR ANY TIME.
2. ELECTROFISHING OF BULL TROUT WILL NOT OCCUR WHEN WATER TEMPERATURES EXCEED 15 DEGREES CELSIUS.

E. LARVAL LAMPREY ELECTROFISHING.

1. PERMISSION FROM EC LEAD WILL BE OBTAINED IF LARVAL LAMPREY ELECTROFISHER IS NOT ONE OF FOLLOWING PRE-APPROVED MODELS: ABP-2 "WISCONSIN", SMITH-ROOT LR-24, OR SMITH-ROOT APEX BACKPACK.
2. LARVAL LAMPREY SAMPLING WILL INCORPORATE 2-STAGE METHOD: "TICKLE" AND "STUN".
3. FIRST STAGE: USE 125 VOLT DC WITH A 25 PERCENT DUTY CYCLE APPLIED AT A SLOW RATE OF 3 PULSES PER SECOND. IF TEMPERATURES ARE BELOW 10 DEGREES CELSIUS, VOLTAGE MAY BE INCREASED GRADUALLY (NOT TO EXCEED 200 VOLTS). BURSTED PULSES (THREE SLOW AND ONE SKIPPED) RECOMMENDED TO INCREASE EMERGENCE.
4. SECOND STAGE (OPTIONAL FOR EXPERIENCED NETTERS): IMMEDIATELY AFTER LAMPREY EMERGE, USE A FAST PULSE SETTING OF 30 PULSES PER SECOND.
5. USE DIP NETS FOR VISIBLE LAMPREY. SIENES AND FINE MESH NET SWEEPS MAY BE USED IN POOR VISIBILITY.
6. SAMPLING WILL OCCUR SLOWLY (>60 SECONDS PER METER) STARTING AT UPSTREAM AND WORKING DOWNSTREAM.
7. MULTIPLE SWEEPS TO OCCUR WITH 15 MINUTES BETWEEN SWEEPS.
8. POST-DRAWDOWN "DRY-SHOCKING" WILL BE APPLIED IF LARVAL LAMPREY CONTINUE TO EMERGE. ANODES TO BE PLACED ONE METER APART TO SAMPLE ONE SQUARE METER AT A TIME FOR AT LEAST 60 SECONDS. FOR TEMPERATURES LESS THAN 10 DEGREES CELSIUS, MAXIMUM VOLTAGE MAY BE GRADUALLY INCREASED TO 400 VOLTS (DRY-SHOCKING ONLY).

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CIVIL ENGINEERING-SURVEYING

REGISTERED PROFESSIONAL ENGINEER 7890SPE OREGON JULY 12, 2005 NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM
HIP IV CONSERVATION MEASURES SHEET 2
COVE
OREGON
SCALE: NTS
PROJECT NO. 703-19

DESIGNED BY: IB/LA/KD
DRAWN BY:
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DATE	DESCRIPTION

SHEET
GC2

WORK AREA ISOLATION AND FISH SALVAGE (CONTINUED).

4. DEWATERING.

A. DEWATERING WILL OCCUR AT A RATE SLOW ENOUGH TO ALLOW SPECIES TO NATURALLY MIGRATE OUT OF THE WORK AREA.

B. WHERE A GRAVITY FEED DIVERSION IS NOT POSSIBLE, A PUMP MAY BE USED. PUMPS WILL BE INSTALLED TO AVOID REPETIVE DEWATERING AND REWATERING.

C. WHEN FISH ARE PRESENT, PUMPS WILL BE SCREENED IN ACCORDANCE WITH NMFS FISH SCREEN CRITERIA. NMFS ENGINEERING REVIEW AND APPROVAL WILL BE OBTAINED FOR PUMPS EXCEEDING 3 CUBIC FEET PER SECOND.

D. DISSIPATION OF FLOW ENERGY AT THE BYPASS OUTFLOW WILL BE PROVIDED TO PREVENT DAMAGE TO THE STREAM CHANNEL AND RIPARIAN VEGETATION.

E. SEEPAGE WATER WILL BE PUMPED TO A TEMPORARY STORAGE AND TREATMENT SITE OF INTO UPLAND AREAS TO ALLOW WATER TO PERCOLATE THROUGH SOIL AND VEGETATION PRIOR TO REENTERING THE STREAM CHANNEL.

CONSTRUCTION AND POST CONSTRUCTION CONSERVATION MEASURES.

1. FISH PASSAGE.

A. FISH PASSAGE WILL BE PROVIDED FOR ADULT AND JUVENILE FISH LIKELY TO BE PRESENT DURING CONSTRUCTION UNLESS PASSAGE DID NOT EXIST BEFORE CONSTRUCTION, THE STREAM IS NATURALLY IMPASSABLE, OR PASSAGE WILL NEGATIVELY IMPACT ESA-LISTED SPECIES OR THEIR HABITAT.

B. FISH PASSAGE ALTERNATIVES WILL BE APPROVED BY THE BPA EC LEAD UNDER ADVISEMENT BY THE NMFS HABITAT BIOLOGIST.

2. CONSTRUCTION AND DISCHARGE WATER.

A. SURFACE WATER MAY BE DIVERTED TO MEET CONSTRUCTION NEEDS ONLY IF DEVELOPED SOURCES ARE UNAVAILABLE OR INADEQUATE.

B. DIVERSIONS WILL NOT EXCEED 10% OF THE AVAILABLE FLOW.

C. CONSTRUCTION DISCHARGE WATER WILL BE COLLECTED AND TREATED TO REMOVE DEBRIS, NUTRIENTS, SEDIMENT, PETROLEUM HYDROCARBONS, METALS, AND OTHER POLLUTANTS.

3. TIME AND EXTENT OF DISTURBANCE.

A. EARTHWORK REQUIRING IN-STREAM MECHANIZED EQUIPMENT (INCLUDING DRILLING, EXCAVATION, DREDGING, FILLING, AND COMPACTING) WILL BE COMPLETED AS QUICKLY AS POSSIBLE.

B. MECHANIZED EQUIPMENT WILL WORK FROM TOP OF BANK UNLESS WORK FROM ANOTHER LOCATION WILL RESULT IN LESS HABITAT DISTURBANCE (TURBIDITY, VEGETATION DISTURBANCE, ETC.).

4. CESSATION OF WORK.

A. PROJECT OPERATIONS WILL CEASE WHEN HIGH FLOW CONDITIONS MAY RESULT IN INUNDATION OF THE PROJECT AREA (FLOOD EFFORTS TO DECREASE DAMAGES TO NATURAL RESOURCES PERMITTED).

B. WATER QUALITY LEVELS EXCEEDED. SEE CWA SECTION 401 WATER QUALITY CERTIFICATION AND TURBIDITY MEASURES.

5. SITE RESTORATION.

A. DISTURBED AREAS, STREAM BANKS, SOILS, AND VEGETATION WILL BE CLEANED UP AND RESTORED TO IMPROVED OR PRE-PROJECT CONDITIONS.

B. PROJECT-RELATED WASTE WILL BE REMOVED.

C. TEMPORARY ACCESS ROADS AND STAGING WILL BE DECOMPACTED AND RESTORED. SOILS WILL BE LOOSENED IF NEEDED FOR REVEGETATION OR WATER INFILTRATION.

D. THE PROJECT SPONSOR WILL RETAIN THE RIGHT OF REASONABLE ACCESS TO THE SITE TO MONITOR AND MAINTAIN THE SITE OVER THE LIFE OF THE PROJECT.

6. REVEGETATION.

A. PLANTING AND SEEDING WILL OCCUR PRIOR TO OR AT THE BEGINNING OF THE FIRST GROWING SEASON AFTER CONSTRUCTION.

B. A MIX OF NATIVE SPECIES (INVASIVE SPECIES NOT ALLOWED) APPROPRIATE TO THE SITE WILL BE USED TO REESTABLISH VEGETATION, PROVIDE SHADE, AND REDUCE EROSION. REESTABLISHED VEGETATION SHOULD BE AT LEAST 70% OF PRE-PROJECT CONDITIONS WITHIN THREE YEARS.

C. VEGETATION SUCH AS WILLOWS, SEDGES, OR RUSH MATS WILL BE SALVAGED FROM DISTURBED OR ABANDONED AREAS TO BE REPLANTED.

D. SHORT-TERM STABILIZATION MEASURE MAY INCLUDE THE USE OF NON-NATIVE STERILE SEED MIX (WHEN NATIVE NOT AVAILABLE), WEED-FREE CERTIFIED STRAW, OR OTHER SIMILAR TECHNIQUES.

E. SURFACE FERTILIZER WILL NOT BE APPLIED WITHIN 50 FEET OF ANY STREAM, WATE BODY, OR WETLAND.

F. FENCING WILL BE INSTALLED AS NECESSARY TO PREVENT ACCESS TO REVEGETATED SITES BY LIVESTOCK OR UNAUTHORIZED PERSONS.

G. INVASIVE PLANTS WILL BE REMOVED OR CONTROLLED UNTIL NATIVE PLANT SPECIES ARE WELL ESTABLISHED (TYPICALLY THREE YEARS POST-CONSTRUCTION).

7. SITE ACCESS AND IMPLEMENTATION MONITORING.

A. THE PROJECT SPONSOR WILL PROVIDE CONSTRUCTION MONITORING DURING IMPLEMENTATION TO ENSURE ALL CONSERVATION MEASURES ARE ADEQUATELY FOLLOWED, EFFECTS TO LISTED SPECIES ARE NOT GREATER THAN PREDICTED, AND INCIDENTAL TAKE LIMITATIONS ARE NOT EXCEEDED.

B. THE PROJECT SPONSOR OR DESIGNATED REPRESENTATIVE WILL SUBMIT THE PROJECT COMPLETION FORM (PCF) WITHIN 30 DAYS OF PROJECT COMPLETION.

8. CWA SECTION 401 WATER QUALITY CERTIFICATION.

A. THE PROJECT SPONSOR OR DESIGNATED REPRESENTATIVE WILL COMPLETE AND RECORD WATER QUALITY OBSERVATIONS (SEE TURBIDITY MONITORING) TO ENSURE IN-WATER WORK IS NOT DEGRADING WATER QUALITY.

B. DURING CONSTRUCTION, WATER QUALITY PROVISIONS PROVIDED BY THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY, WASHINGTON DEPARTMENT OF ECOLOGY, IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY WILL BE FOLLOWED.

9. STAGED REWATERING PLAN.

A. WHEN REINTRODUCING WATER TO DEWATERED AREAS AND NEWLY CONSTRUCTED CHANNELS, A STAGED REWATERING PLAN WILL BE APPLIED.

B. THE FOLLOWING WILL BE APPLIED TO ALL REWATERING EFFORTS. COMPLEX REWATERING EFFORTS MAY REQUIRE ADDITIONAL NOTES OR A DEDICATED SHEET IN THE CONSTRUCTION DETAILS.

1. TURBIDITY MONITORING PROTOCOL WILL BE APPLIED TO REWATERING EFFORTS.
2. PRE-WASH THE AREA BEFORE REWATERING. TURBID WASH WATER WILL BE DETAINED AND PUMPED TO THE FLOODPLAIN OR SEDIMENT CAPTURE AREAS RATHER THAN DISCHARGING TO FISH-BEARING STREAMS.
3. INSTALL SEINE NETS AT UPSTREAM END TO PREVENT FISH FROM MOVING DOWNSTREAM UNTIL 2/3 OF TOTAL FLOW IS RESTORED TO THE CHANNEL.
4. STARTING IN EARLY MORNING INTRODUCE 1/3 OF NEW CHANNEL FLOW OVER PERIOD OF 1-2 HOURS.
5. INTRODUCE SECOND THIRD OF FLOW OVER NEXT 1 TO 2 HOURS AND BEGIN FISH SALVAGE OF BYPASS CHANNEL IF FISH ARE PRESENT.
6. REMOVE UPSTREAM SEINE NETS ONCE 2/3 FLOW IN REWATERED CHANNEL AND DOWNSTREAM TURBIDITY IS WITHIN ACCEPTABLE RANGE (LESS THAN 40 NTU OR LESS THAN 10% BACKGROUND).
7. INTRODUCE FINAL THIRD OF FLOW ONCE FISH SALVAGE EFFORTS ARE COMPLETE AND DOWNSTREAM TURBIDITY VERIFIED TO BE WITHIN ACCEPTABLE RANGE.
8. INSTALL PLUG TO BLOCK FLOW INTO OLD CHANNEL OR BYPASS. REMOVE ANY REMAINING SEINE NETS.
9. IN LAMPREY SYSTEMS, PERFORM LAMPREY SALVAGE AND DRY SHOCKING MAY BE NECESSARY.

10. TURBIDITY MONITORING.

A. RECORD THE READING, LOCATION, AND TIME FOR THE BACKGROUND READING APPROXIMATELY 100 FEET UPSTREAM OF THE PROJECT AREA USING A RECENTLY CALIBRATED TURBIDIMETER OR VIA VISUAL OBSERVATION (SEE THE HIP HANDBOOK TURBIDITY MONITORING SECTION FOR A VISUAL OBSERVATION KEY).

B. RECORD THE TURBIDITY READING, LOCATION, AND TIME AT THE MEASUREMENT COMPLIANCE LOCATION POINT.

1. 50 FEET DOWNSTREAM FOR STREAMS LESS THAN 30 FEET WIDE.
2. 100 FEET DOWNSTREAM FOR STREAMS BETWEEN 30 AND 100 FEET WIDE.
3. 200 FEET DOWNSTREAM FOR STREAMS GREATER THAN 100 FEET WIDE.
4. 300 FEET FROM THE DISCHARGE POINT OR NONPOINT SOURCE FOR LOCATIONS SUBJECT TO TIDAL OR COASTAL SCOUR.

C. TURBIDITY SHALL BE MEASURED (BACKGROUND LOCATION AND COMPLIANCE POINTS) EVERY 4 HOURS WHILE WORK IS BEING IMPLEMENTED.

D. IF THERE IS A VISIBLE DIFFERENCE BETWEEN A COMPLIANCE POINT AND THE BACKGROUND, THE EXCEEDANCE WILL BE NOTED IN THE PROJECT COMPLETION FORM (PCF). ADJUSTMENTS OR CORRECTIVE MEASURES WILL BE TAKEN IN ORDER TO REDUCE TURBIDITY.

E. IF EXCEEDANCES OCCUR FOR MORE THAN TWO CONSECUTIVE MONITORING INTERVALS (AFTER 8 HOURS), THE ACTIVITY WILL STOP UNTIL THE TURBIDITY LEVEL RETURNS TO BACKGROUND. THE BPA EC LEAD WILL BE NOTIFIED OF ALL EXCEEDANCES AND CORRECTIVE ACTIONS AT PROJECT COMPLETION.

F. IF TURBIDITY CONTROLS (COFFER DAMS, WADDLES, FENCING, ETC.) ARE DETERMINED INEFFECTIVE, CREWS WILL BE MOBILIZED TO MODIFY AS NECESSARY. OCCURRENCES WILL BE DOCUMENTED IN THE PROJECT COMPLETION FORM (PCF).

G. FINAL TURBIDITY READINGS, EXCEEDANCES, AND CONTROL FAILURES WILL BE SUBMITTED TO THE BPA EC LEAD USING THE PROJECT COMPLETION FORM (PCF).

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CIVIL ENGINEERING-SURVEYING

REGISTERED PROFESSIONAL ENGINEER 7890SPE OREGON JULY 12, 2005 NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM
HIP IV CONSERVATION MEASURES SHEET 3
COVE OREGON

PROJECT NO. 703-19
SCALE: NTS

DESIGNED BY: IB/LA/KD
DRAWN BY:
CHECKED BY: NK
PLOT DATE: 6/29/22

DATE	DESCRIPTION

SHEET
GC3

RETAIN AND PROTECT EXISTING OVERHEAD POWER

EXISTING PUMP STATION CONTROL PANEL AND VFD, RELOCATE TO NEW PUMP SITE, SEE SHEET C11

DISCONNECT AERIAL 8" DIA. STEEL PIPE AT BUTTERFLY VALVE, RETAIN AND PROTECT VALVE FOR RECONNECTION OF NEW PIPELINE CROSSING, SALVAGE 2" FLOW METER FOR RE-USE

REMOVE ELECTRICAL SERVICE AND TELEMETRY FEED TO PUMP STATION, DISPOSE OFF-SITE

REMOVE EXISTING VERTICAL TURBINE PUMP AND MOUNTING PLATFORM, SALVAGE INTAKE SCREEN TO LANDOWNER, RELOCATE PUMP TO WET WELL SOUTH SIDE OF CATHERINE CREEK, SEE SHEET C11 AND C12

ELMER DAM, SEE STRUCTURAL DRAWINGS FOR IMPROVEMENTS

RETAIN AND PROTECT EXISTING ELECTRICAL SERVICE AND UNDERGROUND POWER TO ODFW TELEMETRY ARRAY, LOCATION APPROXIMATE

ODFW TELEMETRY ARRAY

TO ACCESS ROAD AND BOOTH LANE

REMOVE EXISTING 8" DIA. STEEL PIPELINE, SALVAGE TO LANDOWNER (PHASE II WORK)

REMOVE EXISTING FISHWAY AND DISPOSE OFF-SITE, SEE SHEET C02 FOR NEW FISHWAY DETAILS

DISCONNECT AERIAL 8" DIA. STEEL PIPE AT BUTTERFLY VALVE, SALVAGE 2" FLOW METER FOR RE-USE

REMOVE EXISTING BURIED PIPE AND DISPOSE OFF-SITE, SEE SHEET C11 FOR EXTENTS

RETAIN AND PROTECT

REMOVE EXISTING PIPELINE TO LOCATION SHOWN FOR RECONNECTION TO RELOCATED PUMP STATION, SEE SHEET C11

RESERVOIR 1

CATHERINE CREEK (RESERVOIR 4)

RETAIN AND PROTECT

RETAIN AND PROTECT

EDGE OF EXISTING ROAD

IRRIGATED FARM GROUND

N

GRAPHIC SCALE

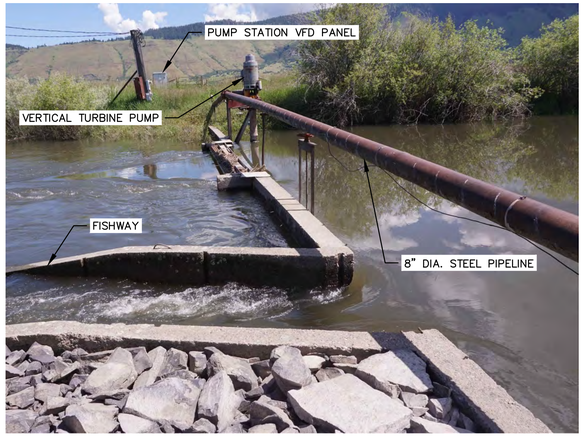
0 20 40

(IN FEET)
1 INCH = 20 FT.

LEGEND

- FLOW ARROW
- TOP BANK OF RIVER/RESERVOIR
- TOE OF RIVER/RESERVOIR
- OP — EXISTING OVERHEAD POWER
- UP — EXISTING UNDERGROUND POWER
- OHW — ORDINARY HIGH WATER MARK
- EXISTING PIPELINE
- EG — EDGE OF EXISTING ROAD

EXISTING PUMP STATION/ODFW TELEMETRY SERVICE POLE



EXISTING DAM INFRASTRUCTURE PHOTO

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CIVIL ENGINEERING-SURVEYING

REGISTERED PROFESSIONAL ENGINEER 7880SPE OREGON JULY 12, 2005 NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM

EXISTING DAM AREA PLAN/DEMOLITION PLAN

OREGON COVE

PROJECT NO. 703-19

SCALE: 1"=20'

CHECKED BY: NK
PLOT DATE: 6/29/22

DESIGNED BY:
DRAWN BY: IB/LA

DATE	DESCRIPTION

SHEET
C01

NOTES:

AREA OF POTENTIAL EFFECT (APE) MEASUREMENTS WERE ROUNDED UP TO 100 SF INCREMENTS.

- APE ABOVE TOP OF BANK = 14,000 SF
- APE BELOW TOP OF BANK = 11,000 SF

1. PROJECT EXTENTS LIE ENTIRELY WITHIN THE MAPPED 100-YEAR INUNDATION EXTENTS PER FEMA FIRM #410260305B DATED MAY 15, 1980 (SEE SHEET G02). INUNDATED AREA IS DESIGNATED AS ZONE A WITH NO BASE FLOOD ELEVATIONS CALCULATED.
2. APE ABOVE TOP OF BANK INCLUDES SPACE FOR ACCESS, STAGING, STOCKPILES, AND REFUELING WITH PROTECTION PER THE HIP CONSERVATION MEASURES.

CATHERINE CREEK
APE BELOW TOP OF BANK
WATER SURFACE AT TIME OF SURVEY, TYP
ELMER DAM
TEMPORARY DENIL FISHWAY
TEMPORARY COFFERDAM DURING CONSTRUCTION
SPILLWAY IMPROVEMENTS
NEW FISHWAY
ORDINARY HIGH WATER MARK
TOP OF BANK, TYP
APE ABOVE TOP OF BANK
CONTRACTOR STAGING AND STORAGE AREA
APPROXIMATE EDGE OF EXISTING FARM ROAD
TO GRAVEL ACCESS ROAD & BOOTH LANE
IRRIGATED FARM GROUND
OXBOW RESERVOIR 1

FISHWAY AREA PLAN
SCALE: 1"=10'-0"

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
6/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

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River Structures CONSULTING
PO BOX 1643 | BOISE, ID 83701 | RIVERSTRUCTURES.COM

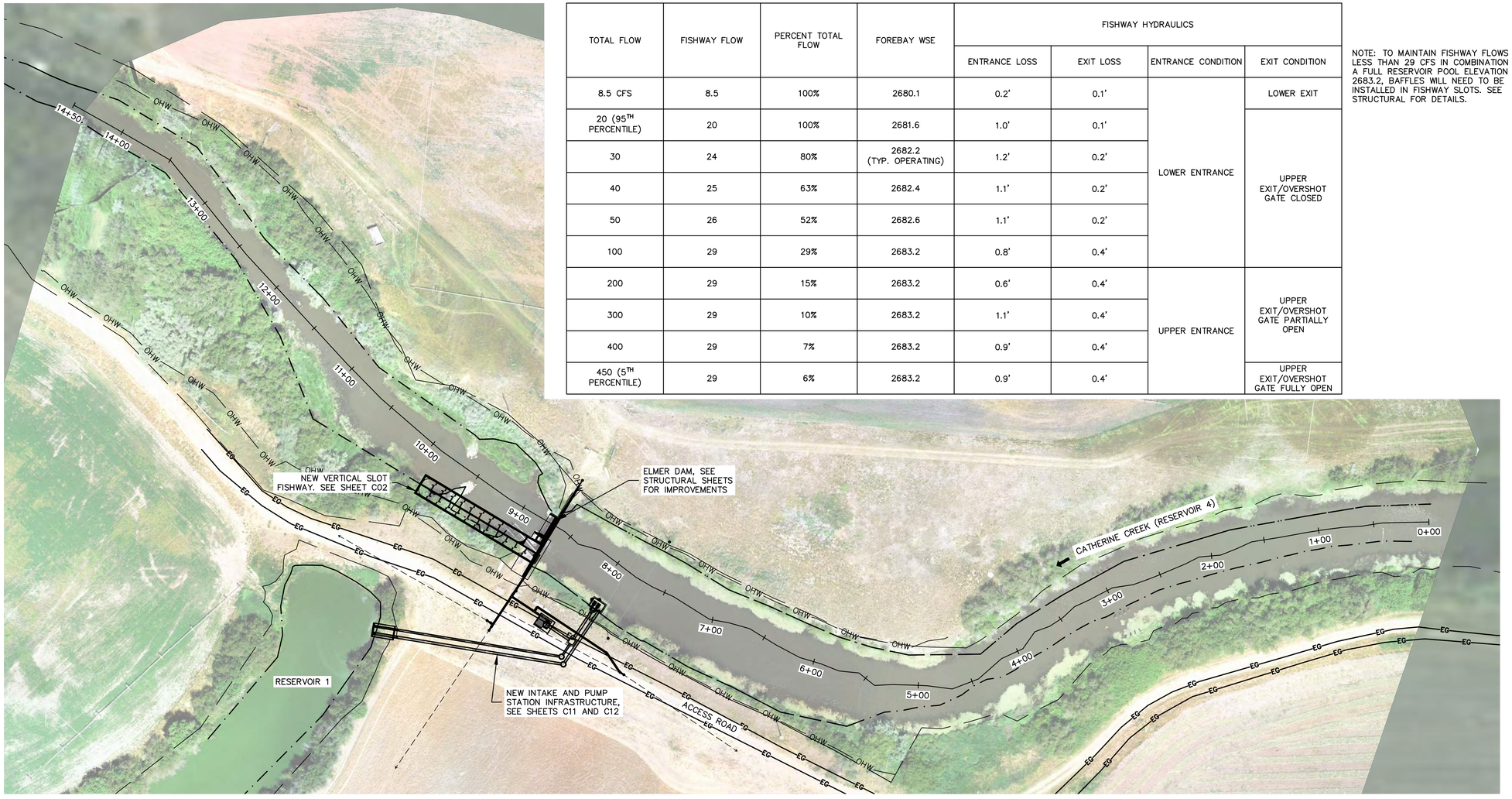
TU/USWCD
ELMER DAM MODIFICATIONS
FISHWAY AREA OF POTENTIAL EFFECT

DESIGNED J. WOODBURY
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING
C02
SCALE: AS NOTED

TOTAL FLOW	FISHWAY FLOW	PERCENT TOTAL FLOW	FOREBAY WSE	FISHWAY HYDRAULICS			
				ENTRANCE LOSS	EXIT LOSS	ENTRANCE CONDITION	EXIT CONDITION
8.5 CFS	8.5	100%	2680.1	0.2'	0.1'	LOWER ENTRANCE	LOWER EXIT
20 (95TH PERCENTILE)	20	100%	2681.6	1.0'	0.1'		UPPER EXIT/OVERSHOT GATE CLOSED
30	24	80%	2682.2 (TYP. OPERATING)	1.2'	0.2'		
40	25	63%	2682.4	1.1'	0.2'		
50	26	52%	2682.6	1.1'	0.2'		
100	29	29%	2683.2	0.8'	0.4'		
200	29	15%	2683.2	0.6'	0.4'	UPPER ENTRANCE	UPPER EXIT/OVERSHOT GATE PARTIALLY OPEN
300	29	10%	2683.2	1.1'	0.4'		
400	29	7%	2683.2	0.9'	0.4'		
450 (5TH PERCENTILE)	29	6%	2683.2	0.9'	0.4'		UPPER EXIT/OVERSHOT GATE FULLY OPEN

NOTE: TO MAINTAIN FISHWAY FLOWS AT LESS THAN 29 CFS IN COMBINATION WITH A FULL RESERVOIR POOL ELEVATION OF 2683.2, BAFFLES WILL NEED TO BE INSTALLED IN FISHWAY SLOTS. SEE STRUCTURAL FOR DETAILS.



CATHERINE CREEK RESERVOIR 4 PROFILE
VERTICAL SCALE: 1 INCH = 10 FT.

N

GRAPHIC SCALE
0 50 100
(IN FEET)
1 INCH = 50 FT.

LEGEND
- FLOW ARROW
- TOP BANK OF RIVER/RESERVOIR
- TOE OF RIVER/RESERVOIR
- EG — EDGE OF EXISTING ROAD
- OHW — ORDINARY HIGH WATER MARK

CATHERINE CREEK HYDROLOGY	
95TH PERCENTILE	20 CFS
5TH PERCENTILE	449 CFS
$Q_{1.05}$	1099 CFS
Q_{10}	3356 CFS
Q_{100}	4909 CFS

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(208) 342-0091 PHONE (208) 342-0092 FAX
CIVIL ENGINEERING–SURVEYING

REGISTERED PROFESSIONAL ENGINEER 78905PE OREGON JULY 12, 2005 NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-24

ELMER DAM
DAM AND FISHWAY HYDRAULIC OPERATING CONDITIONS
COVE OREGON

PROJECT NO. 703-19
SCALE: 1"=50'

CHECKED BY: NK
PLOT DATE: 6/29/22

DESIGNED BY:
DRAWN BY: IB/LA

DATE	DESCRIPTION

SHEET
C03

N

GRAPHIC SCALE

0 150 300

(IN FEET)

1 INCH = 150 FT.

LEGEND

- FLOW ARROW
- TOP BANK OF RIVER/RESERVOIR
- TOE OF RIVER/RESERVOIR
- EG — EDGE OF EXISTING ROAD
- OP — OVERHEAD POWER
- UP — UNDERGROUND POWER

GENERAL ELECTRICAL SERVICE NOTES

1. COORDINATE INSTALLATION OF NEW 3 PHASE OVERHEAD POWER EXTENSION AND TRANSFORMERS WITH OREGON TRAIL ELECTRICAL COOPERATIVE (541-963-3155).
2. DIRECT BURY CONDUCTOR SHALL MEET NEC REQUIREMENTS FOR UNDERGROUND INSTALLATION AND ALLOWABLE VOLTAGE DROP, CONDUCTOR SIZING BY ELECTRICAL CONTRACTOR. COORDINATE FINAL ALIGNMENT IN FIELD WITH LANDOWNER.
3. INSTALL WARNING TAPE IN BURIED POWER TRENCHES LABELED "CAUTION BURIED ELECTRICAL LINE BELOW." PLACE IN TRENCH MINIMUM 18" OVER TOP OF CONDUCTOR(S).

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REGISTERED PROFESSIONAL ENGINEER 17680PE
OREGON JULY 12, 2005
NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM

ELECTRICAL SERVICE PLAN

OREGON COVE

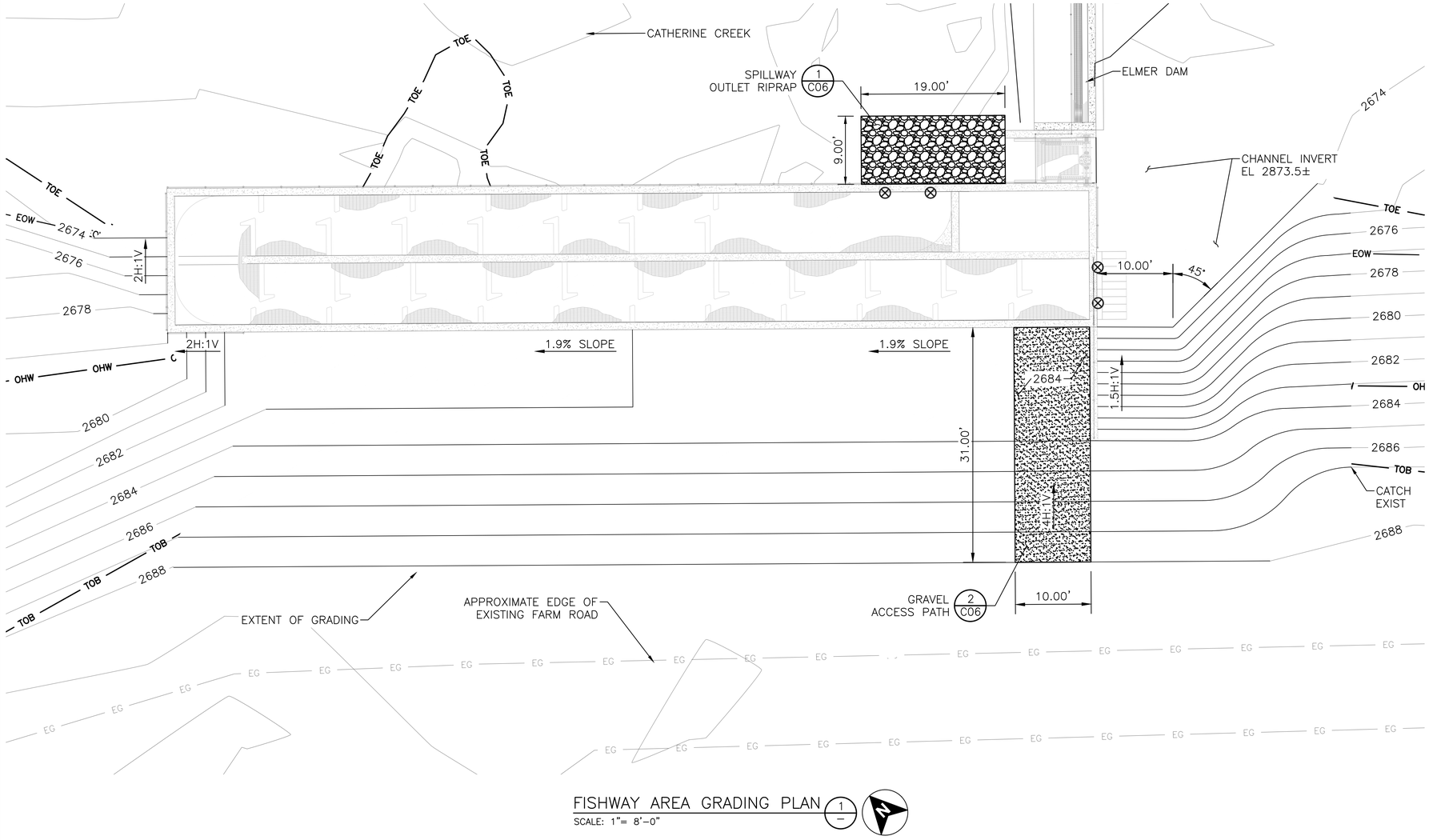
SCALE: 1"=150'

PROJECT NO. 703-19

DESIGNED BY:
DRAWN BY: IB/LA
CHECKED BY: NK
PLOT DATE: 5/29/22

DATE	DESCRIPTION

SHEET C04



FISHWAY AREA GRADING PLAN 1 C06

SCALE: 1"= 8'-0"

SHEET NOTES:

1. EXCAVATED MATERIAL MAY BE RE-USED FOR EMBANKMENT GRADING IF IT MEETS CIVIL FILL REQUIREMENTS PER SPEC 31 30 00.
2. EXIST RIPRAP MAY BE REUSED IF DEEMED SUITABLE BY ENGINEER. CONCRETE SHALL NOT BE REUSED AS RIPRAP OR FILL MATERIAL.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND DISPOSAL OF ALL EXCESS MATERIAL AT AN APPROVED OFFSITE LOCATION.
4. ALL DISTURBED GROUND ABOVE EOW LINE SHALL BE REVEGETATED IN ACCORDANCE WITH SPECIFICATION 31 22 19.

REGISTERED PROFESSIONAL ENGINEER 80853 PE OREGON 6/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD

RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

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TU/USWCD

ELMER DAM MODIFICATIONS

FISHWAY AREA GRADING PLAN AND SECTIONS

DESIGNED J. WOODBURY

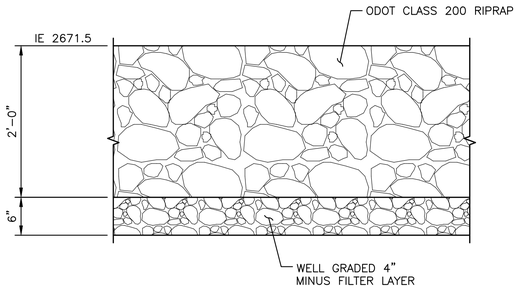
DRAWN J. LAHMON

CHECKED C. BOYD

ISSUED DATE 06/17/22

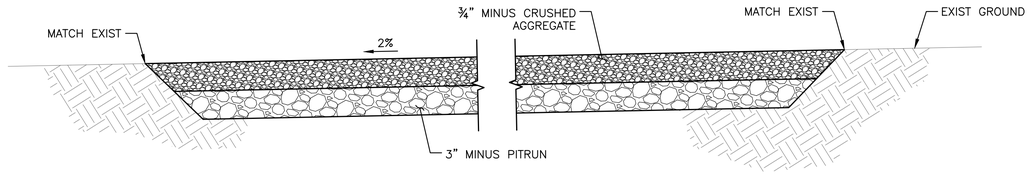
DRAWING C05

SCALE: AS NOTED



SPILLWAY OUTLET RIPRAP DETAIL (1/C05)

SCALE: 1" = 1'-0"



GRAVEL ACCESS PATH DETAIL (2/C05)

SCALE: 3/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
MAR. 11, 2008
CHRISTOPHER C. BOYD
6/29/22
RENEWS: 12/31/23

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TU/USWCD

ELMER DAM MODIFICATIONS

FISHWAY AREA GRADING SECTIONS

DESIGNED J. WOODBURY

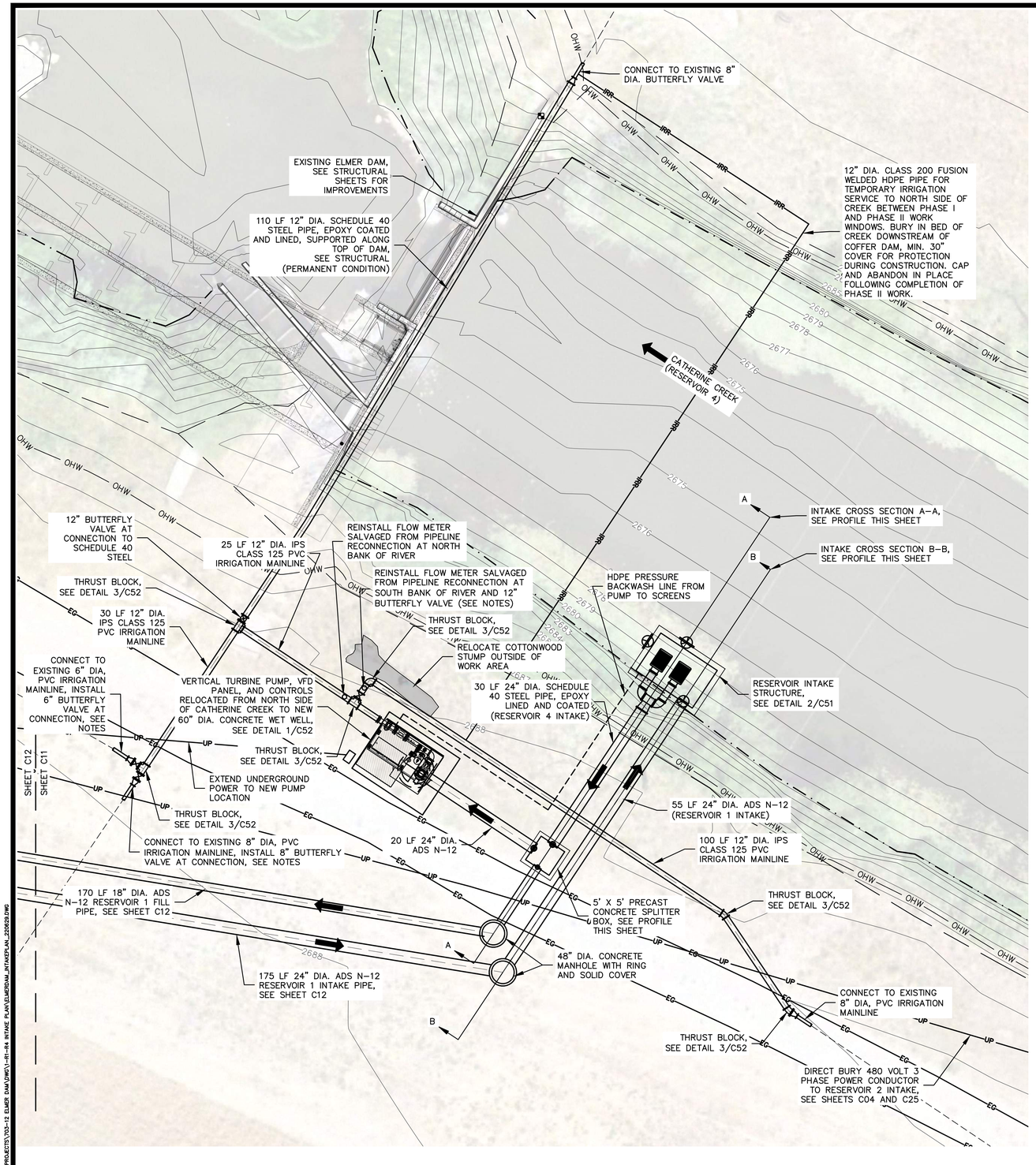
DRAWN J. LAHMON

CHECKED C. BOYD

ISSUED DATE 06/17/22

DRAWING C06

SCALE: AS NOTED



LEGEND

- FLOW ARROW
- TOP BANK OF RIVER/RESERVOIR
- TOE OF RIVER/RESERVOIR
- OP — EXISTING OVERHEAD POWER
- OHW — ORDINARY HIGH WATER MARK
- EXISTING IRRIGATION PIPE
- EG — EDGE OF EXISTING ROAD

N

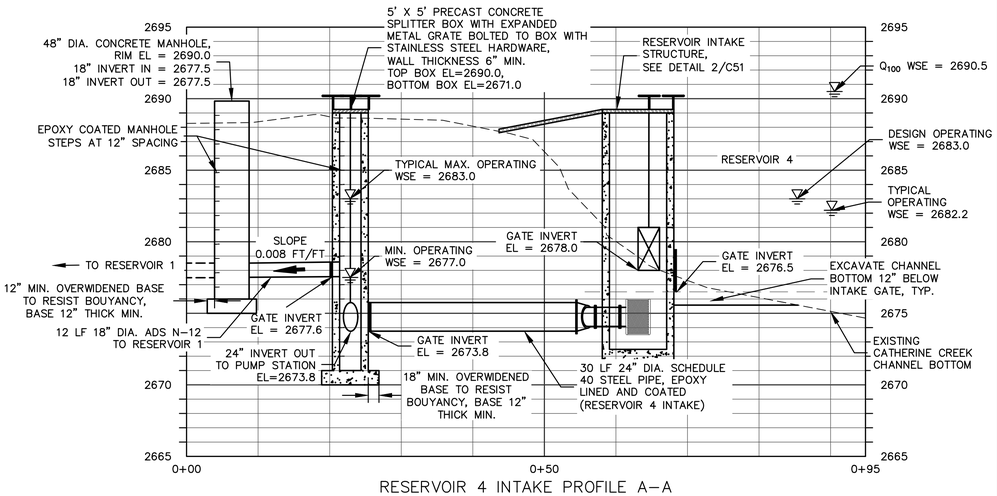
GRAPHIC SCALE
0 10 20
(IN FEET)
1 INCH = 10 FT.

GENERAL CONSTRUCTION NOTES

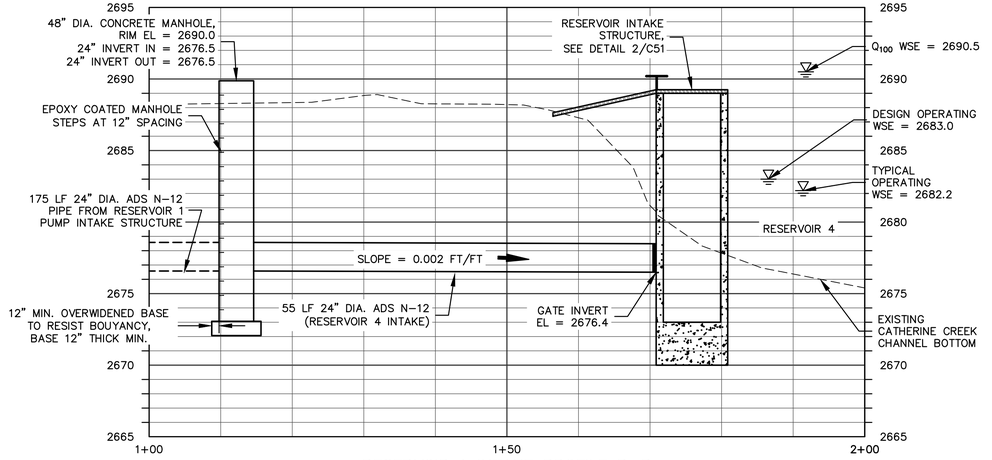
1. LOCATIONS OF EXISTING IRRIGATION PIPELINES SHOWN ON THIS PLAN ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY AND ADJUST NEW PIPELINE LENGTHS AND LOCATIONS TO MAKE CONNECTIONS.
2. PROVIDE AND INSTALL ALL PRESSURIZED PIPELINE FITTINGS NECESSARY TO COMPLETE NEW PRESSURIZED IRRIGATION INFRASTRUCTURE AND FOR CONNECTION TO EXISTING SYSTEM.
3. BUTTERFLY VALVES TO BE DIRECT BURY RATED AND APPROVED FOR IRRIGATION USE. EXTEND CAST IRON VALVE RISERS 24" ABOVE FINISHED GRADE AND MARK WITH 4X4 PRESSURE TREATED POST, MIN. 5' EXPOSED ABOVE FINISHED GRADE.

RESERVOIR INTAKE DESIGN NOTES

1. Q_{MAX} AT PUMP STATION = 2000 GPM (4.46 CFS)
2. INTAKE SCREEN APPROACH VELOCITY = 0.2 FT/S MAX.



RESERVOIR 4 INTAKE PROFILE A–A
VERTICAL SCALE: 1 INCH = 2 FT.



RESERVOIR 1 INTAKE PROFILE B–B
VERTICAL SCALE: 1 INCH = 2 FT.

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CIVIL ENGINEERING–SURVEYING

REGISTERED PROFESSIONAL ENGINEER 7800SPE OREGON JULY 12, 2005 NICHOLAS A. KRAUS EXPIRATION DATE: 6-30-23

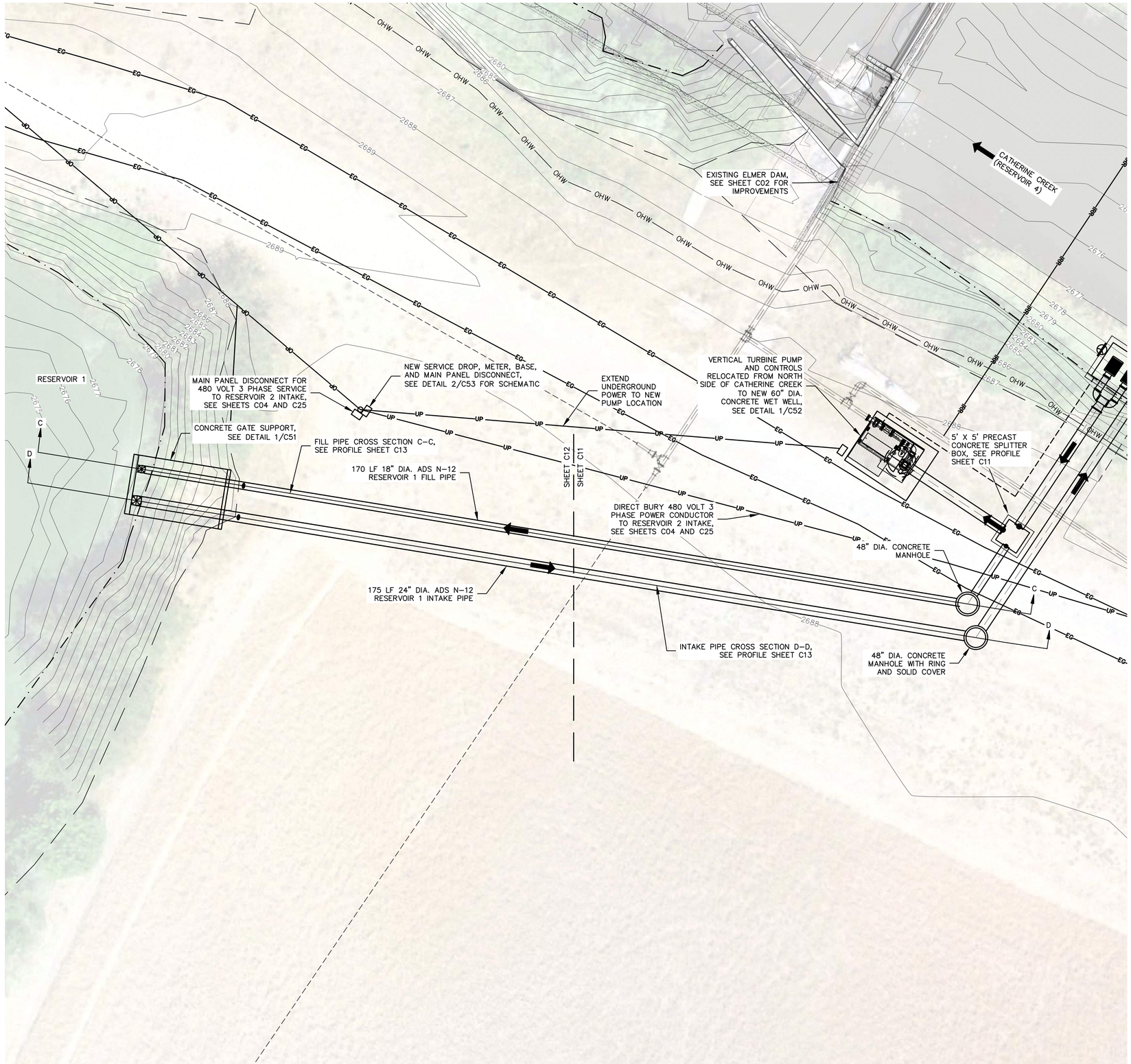
ELMER DAM
RESERVOIR 4 PUMP STATION PLAN
OREGON
COVE

PROJECT NO. 703–19
SCALE: 1"=10'

CHECKED BY: NK
PLOT DATE: 6/29/22

DESIGNED BY: NK DRAWN BY: GH	DATE	DESCRIPTION

SHEET
C11



LEGEND

➡	FLOW ARROW
— — —	TOP BANK OF RIVER/RESERVOIR
—·—·—	TOE OF RIVER/RESERVOIR
——OP——	EXISTING OVERHEAD POWER
—— OHW ——	ORDINARY HIGH WATER MARK
— — — —	AREA OF POTENTIAL EFFECT
——EG——	EDGE OF EXISTING ROAD

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REGISTERED PROFESSIONAL ENGINEER
76905PE
OREGON
JULY 12, 2005
NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM

RESERVOIR 1 INTAKE/OUTLET PLAN

COVE OREGON

SCALE: 1"=10'

PROJECT NO. 703-19

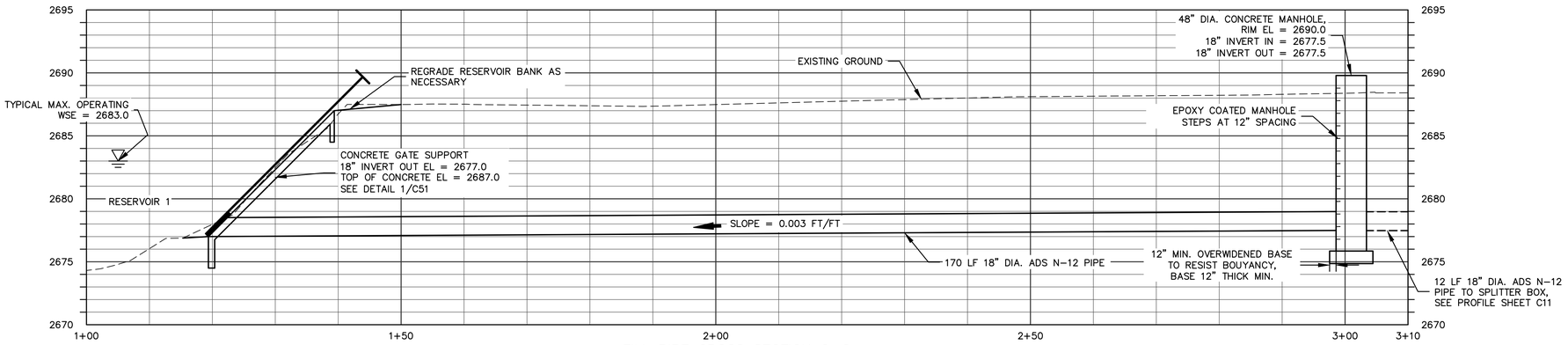
DESIGNED BY: NK
DRAWN BY: GH
CHECKED BY: NK
PLOT DATE: 6/29/22

DATE	DESCRIPTION

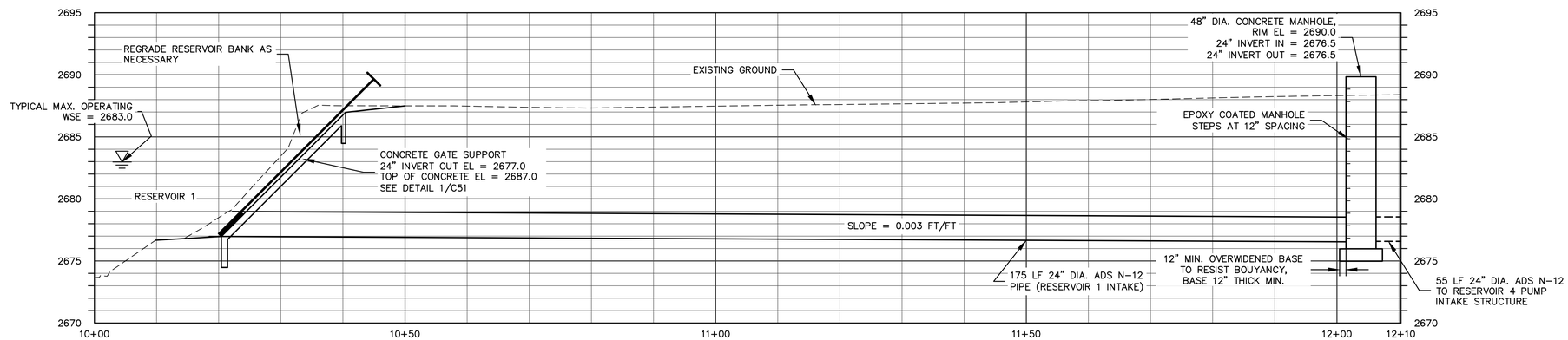
SHEET
C12

USER: GUS HANSEN QCI1 LOCATION: D:\1-PROJECTS\703-12 ELMER DAM\DWG\1-R1-R4 INTAKE PLAN\ELMERDAM_INTAKEPLAN_220629.DWG

GRAPHIC SCALE
0 10 20
(IN FEET)
1 INCH = 10 FT.



FILL PIPE CROSS SECTION C–C
VERTICAL SCALE: 1 INCH = 2 FT.



INTAKE PIPE CROSS SECTION D–D
VERTICAL SCALE: 1 INCH = 2 FT.

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REGISTERED PROFESSIONAL ENGINEER
7890SPE
OREGON
JULY 12, 2005
NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM
INTAKE AND FILL PIPE CROSS SECTIONS
COVE
OREGON

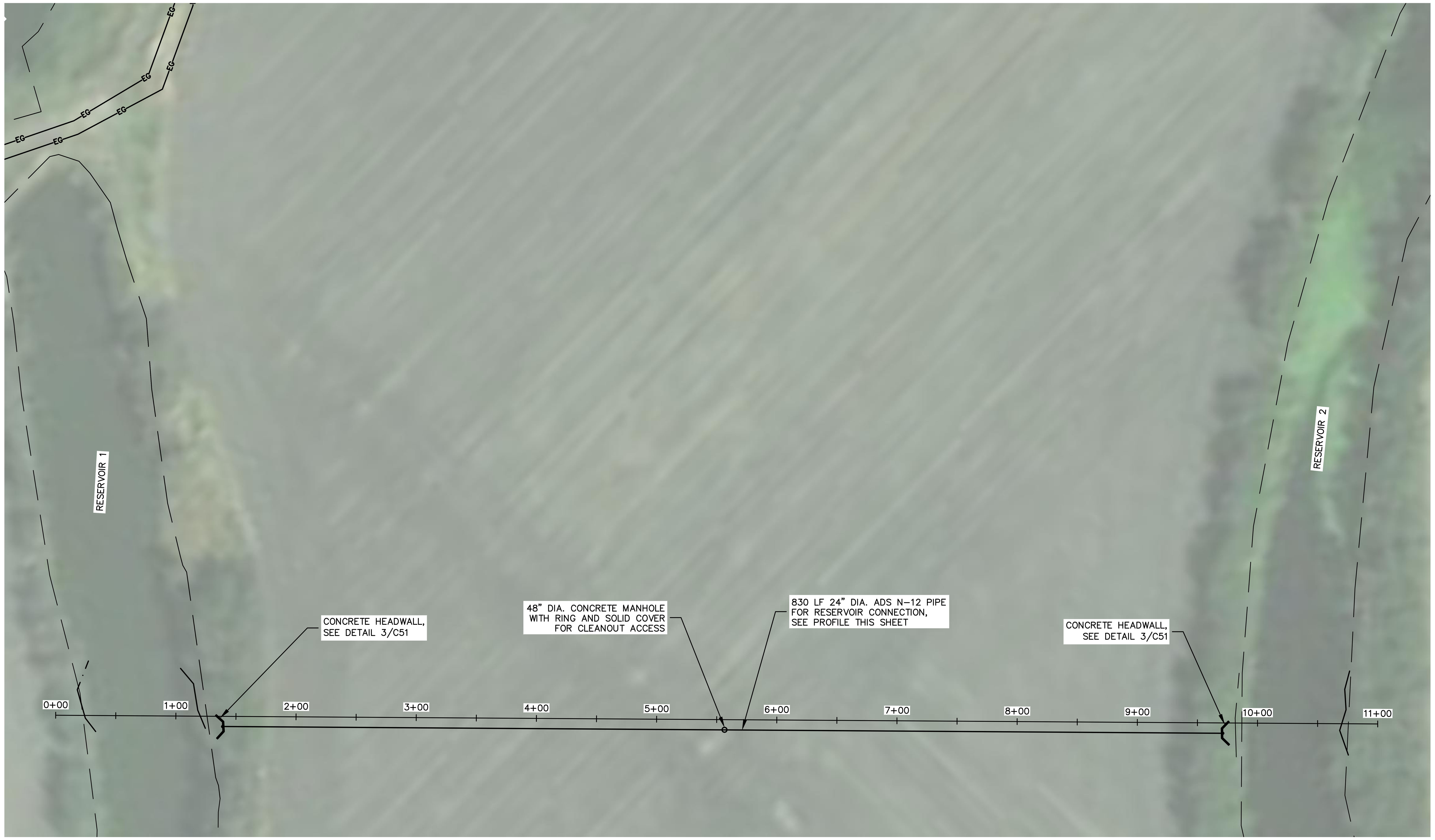
PROJECT NO. 703-19
SCALE: 1"=10'

CHECKED BY: NK
PLOT DATE: 6/29/22

DESIGNED BY: NK
DRAWN BY: GH

DATE	DESCRIPTION

SHEET
C13



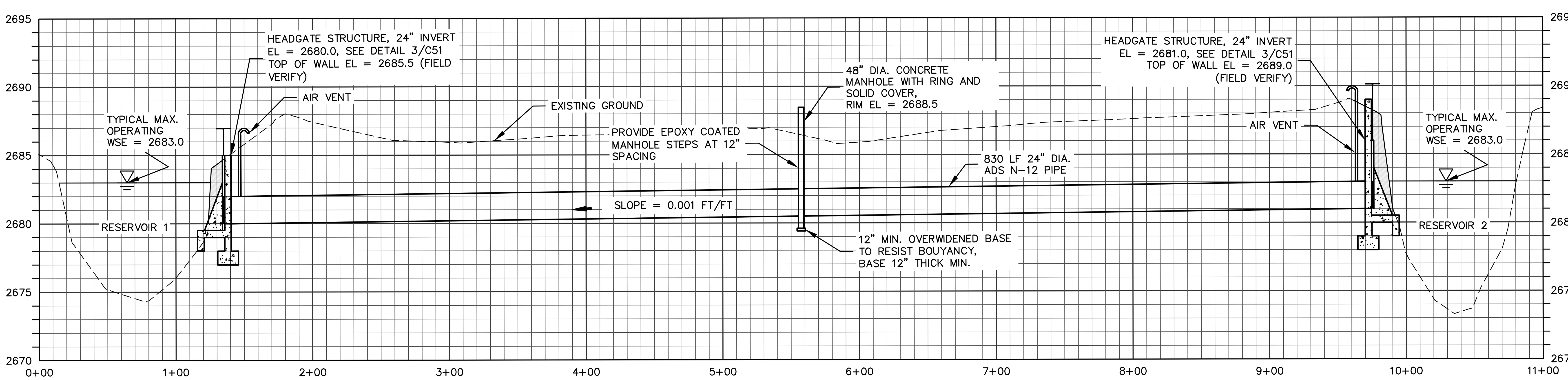
GRAPHIC SCALE

0 50 100

(IN FEET)
1 INCH = 50 FT.

LEGEND

— — —	TOP BANK OF RIVER/RESERVOIR
—EG—	EDGE OF EXISTING ROAD



RESERVOIR 1/2 INTERCONNECT ALIGNMENT PROFILE
VERTICAL SCALE: 1 INCH = 10 FT.

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CIVIL ENGINEERING-SURVEYING

REGISTERED PROFESSIONAL ENGINEER 76905PE
OREGON
JULY 12, 2005
NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM

RESERVOIR 1 & 2 CONNECTION PLAN AND PROFILE

COVE OREGON

PROJECT NO. 703-19

SCALE: 1"=50'

CHECKED BY: NK
PLOT DATE: 6/29/22

DESIGNED BY:
DRAWN BY: IB/LA

DATE	DESCRIPTION

SHEET
C21

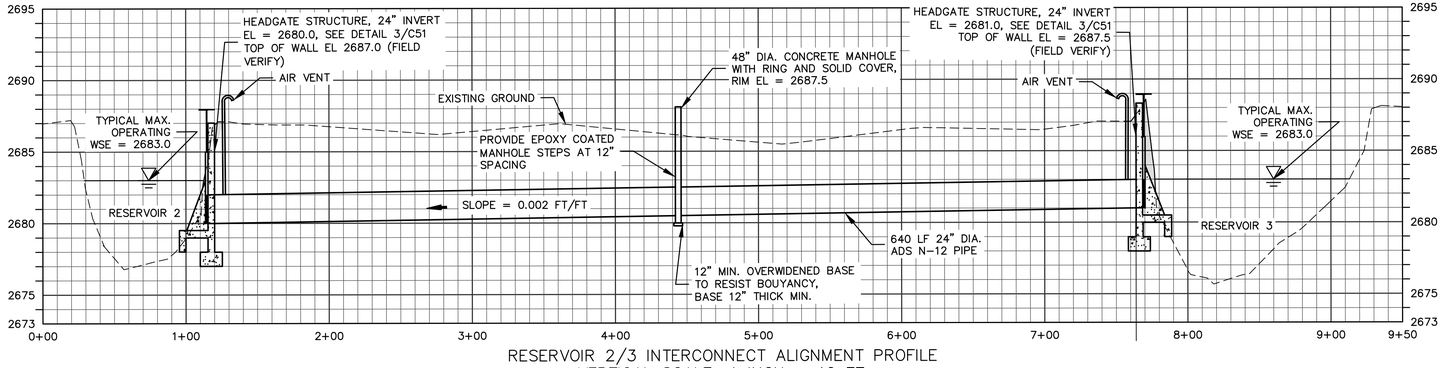
GRAPHIC SCALE

0 50 100

(IN FEET)
1 INCH = 50 FT.

LEGEND

- FLOW ARROW
- TOP BANK OF RIVER/RESERVOIR
- EG EDGE OF EXISTING ROAD



RESERVOIR 2/3 INTERCONNECT ALIGNMENT PROFILE
VERTICAL SCALE: 1 INCH = 10 FT.

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CIVIL ENGINEERING—SURVEYING

REGISTERED PROFESSIONAL ENGINEER
76905PE
OREGON
JULY 12, 2005
NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM
RESERVOIR 2 & 3 CONNECTION PLAN AND PROFILE

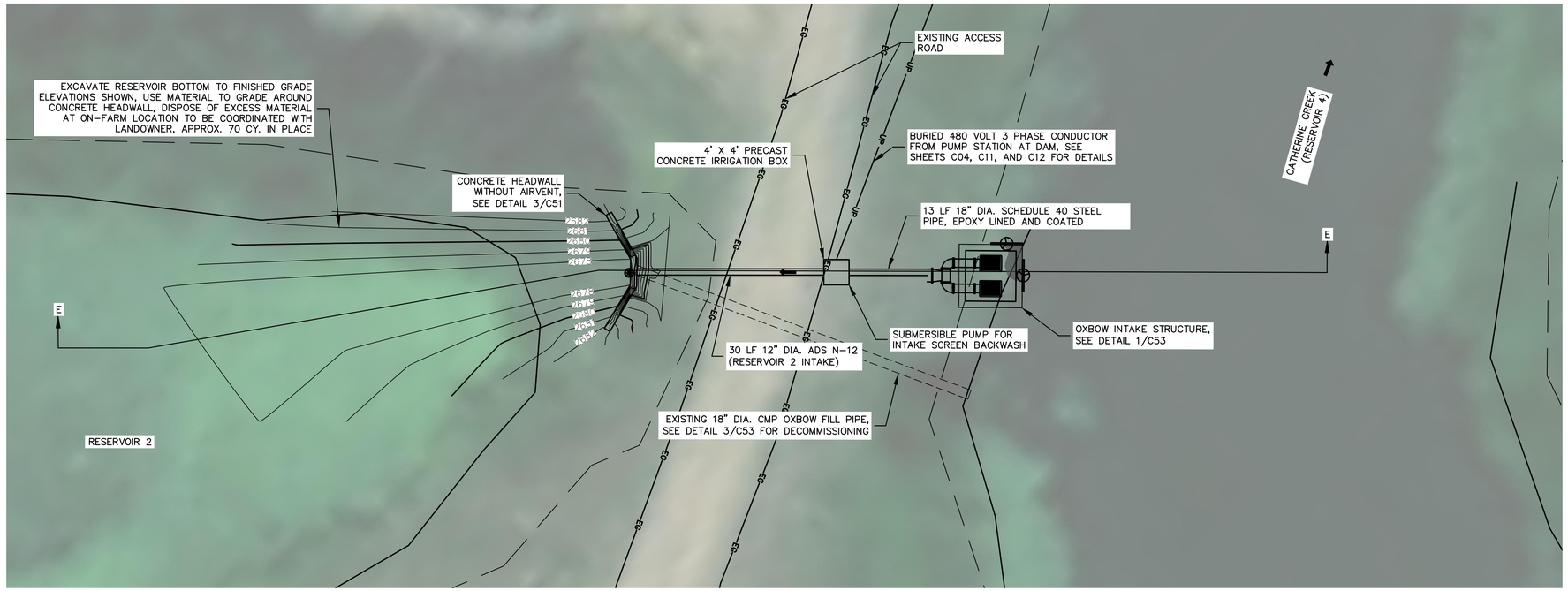
COVE OREGON

SCALE: 1"=50'
PROJECT NO. 703-19

DESIGNED BY:
DRAWN BY: IB/LA
CHECKED BY: NK
PLOT DATE: 6/29/22

DATE	DESCRIPTION

SHEET
C22

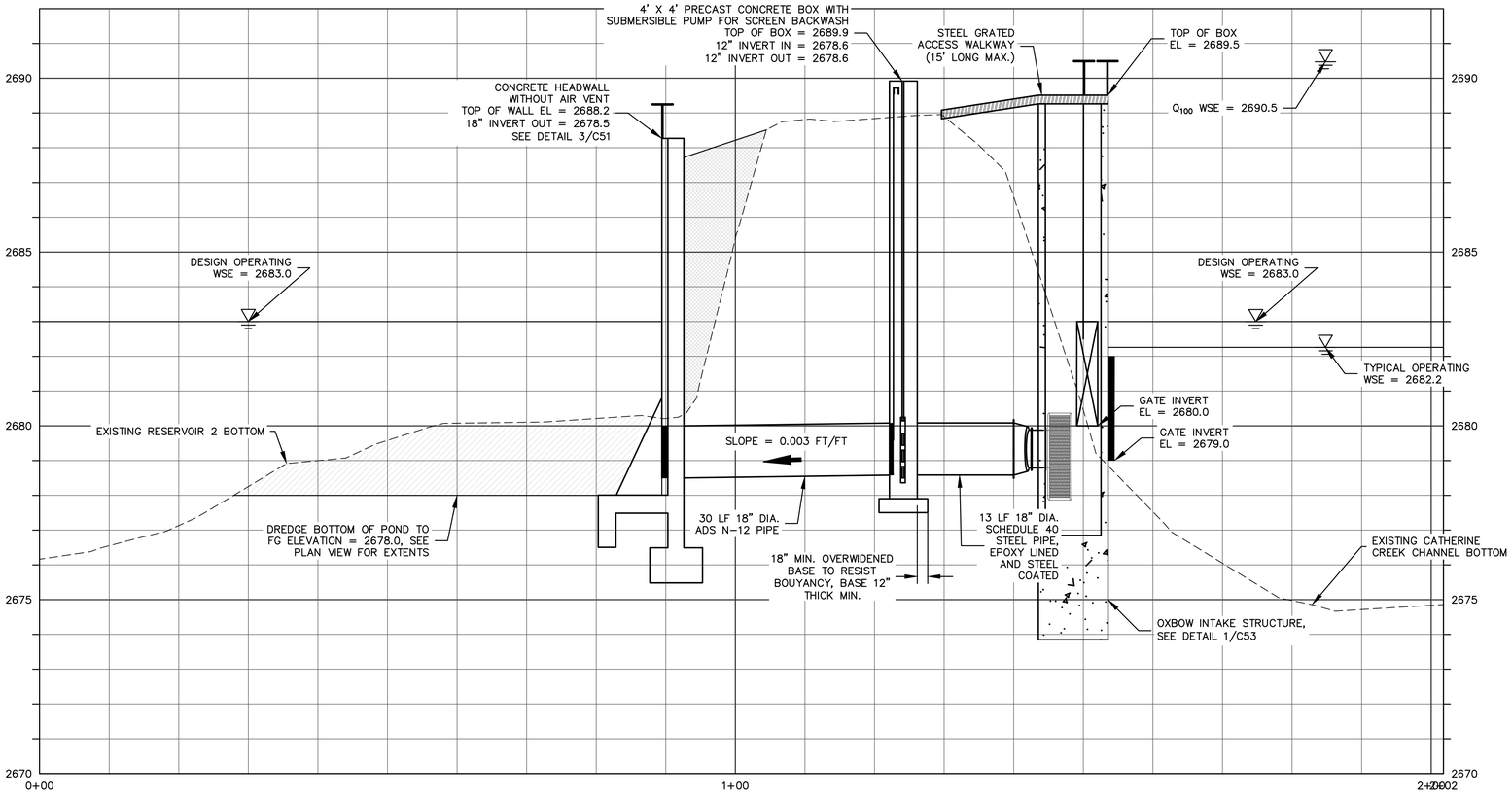


LEGEND

- FLOW ARROW
- TOP BANK OF RIVER/RESERVOIR
- EDGE OF EXISTING ROAD (EG)

RESERVOIR 2 INTAKE DESIGN NOTES

1. Q_{MAX} FOR RESERVOIR 2 FILL = 2000 GPM (4.46 CFS) – ORIFICE CONTROL
2. INTAKE SCREEN APPROACH VELOCITY = 0.2 FT/S MAX.



RESERVOIR 2 INTAKE CROSS SECTION E–E
VERTICAL SCALE: 1 INCH = 5 FT.

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REGISTERED PROFESSIONAL ENGINEER
76905PE
OREGON
JULY 12, 2005
NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM
RESERVOIR 2 INTAKE PLAN
COVE
OREGON

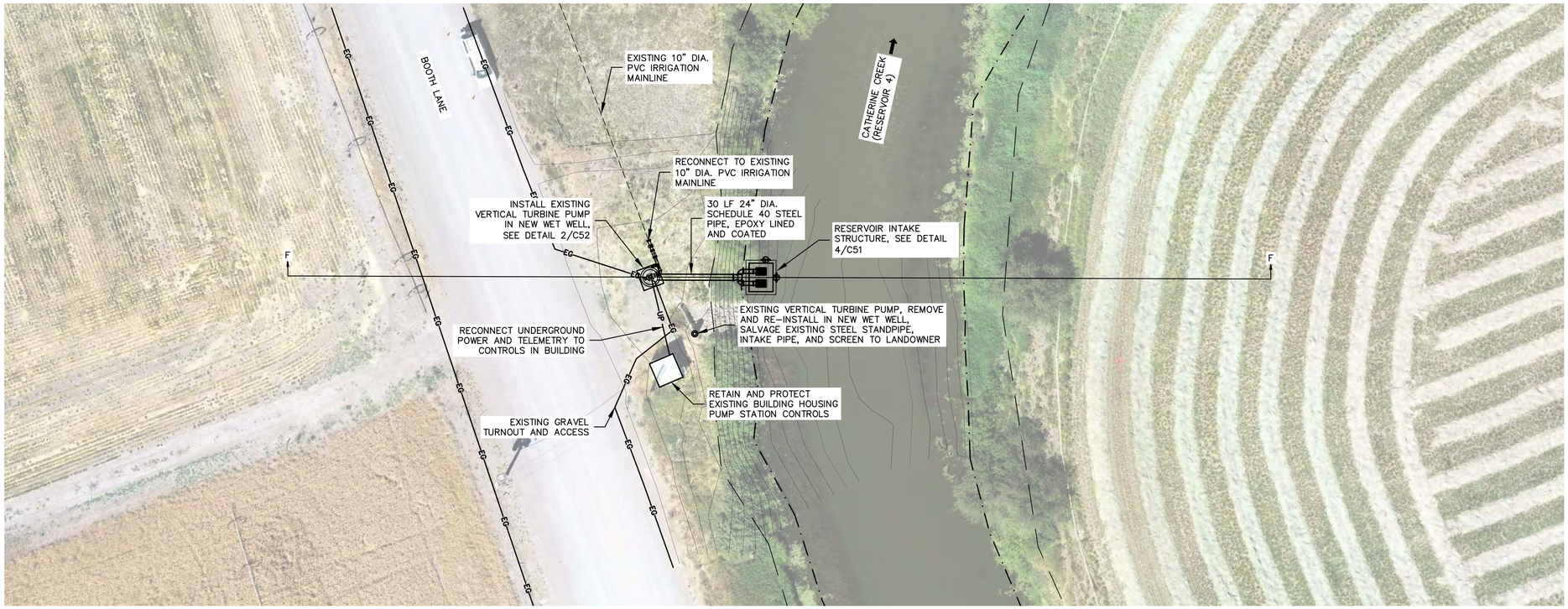
PROJECT NO. 703-19
SCALE: 1"=10'

CHECKED BY: NK
PLOT DATE: 6/29/22

DESIGNED BY:
DRAWN BY: IB/LA

DATE	DESCRIPTION

SHEET
C25



GRAPHIC SCALE

0 20 40

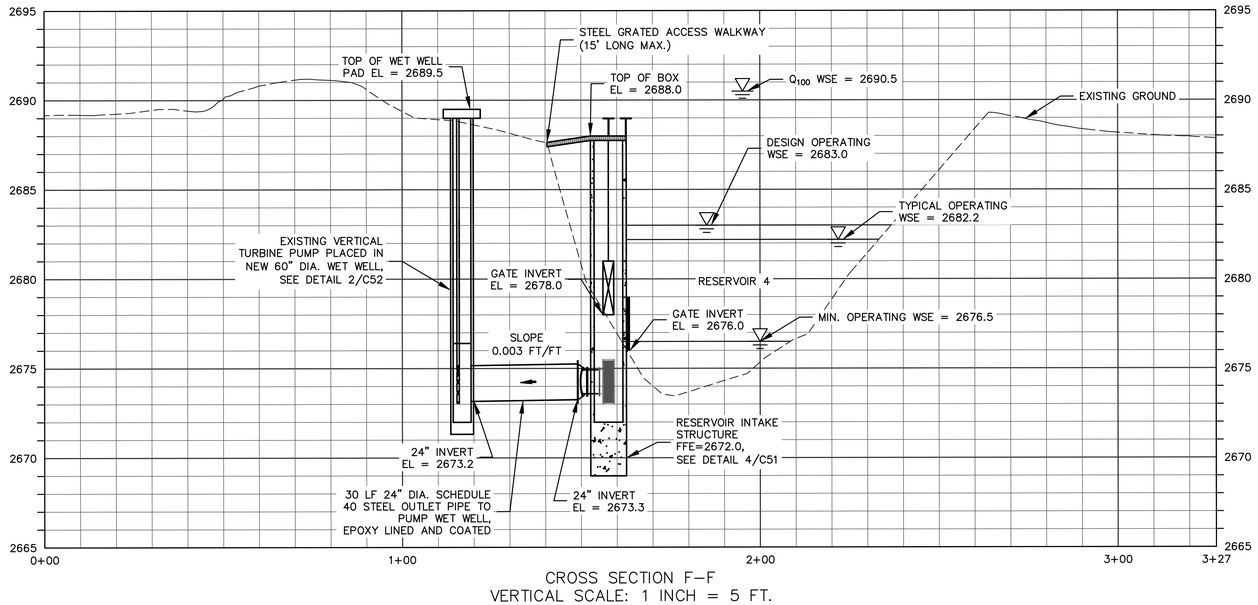
(IN FEET)
1 INCH = 20 FT.

LEGEND

- FLOW ARROW
- TOP BANK OF RIVER/RESERVOIR
- TOE OF RIVER/RESERVOIR
- EXISTING IRRIGATION MAINLINES
- EG — EDGE OF EXISTING ROAD

RESERVOIR INTAKE DESIGN NOTES

1. Q_{MAX} AT PUMP STATION = 2000 GPM (4.46 CFS)
2. INTAKE SCREEN APPROACH VELOCITY = 0.2 FT/S MAX.



CROSS SECTION F–F
VERTICAL SCALE: 1 INCH = 5 FT.

GENERAL CONSTRUCTION NOTES

1. LOCATIONS OF EXISTING IRRIGATION PIPELINES SHOWN ON THIS PLAN ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY AND ADJUST NEW PIPELINE LENGTHS AND LOCATIONS AS NECESSARY TO MAKE CONNECTIONS.
2. PROVIDE AND INSTALL ALL PRESSURIZED PIPELINE FITTINGS AS NECESSARY TO COMPLETE NEW PRESSURIZED IRRIGATION INFRASTRUCTURE AND FOR CONNECTION TO EXISTING SYSTEM.

EXISTING VERTICAL TURBINE PUMP

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REGISTERED PROFESSIONAL ENGINEER
76905PE
OREGON
JULY 12, 2005
NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM
BOOTH LANE PUMP STATION PLAN AND PROFILE
OREGON
COVE

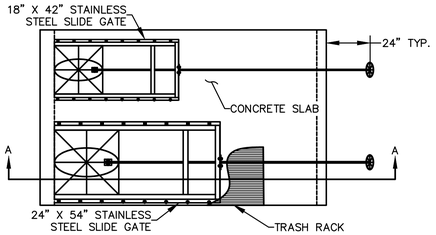
PROJECT NO. 703-19
SCALE: 1"=20'

CHECKED BY: NK
PLOT DATE: 6/29/22

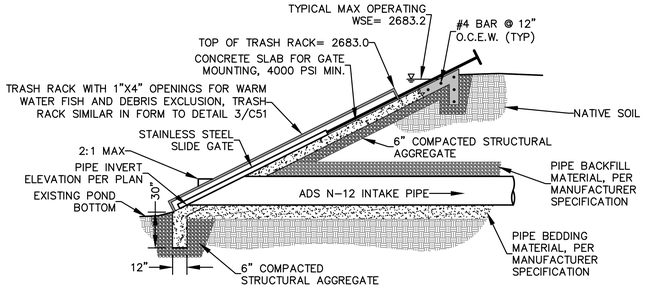
DESIGNED BY: NK
DRAWN BY: RS/DH

DATE	DESCRIPTION

SHEET
C31

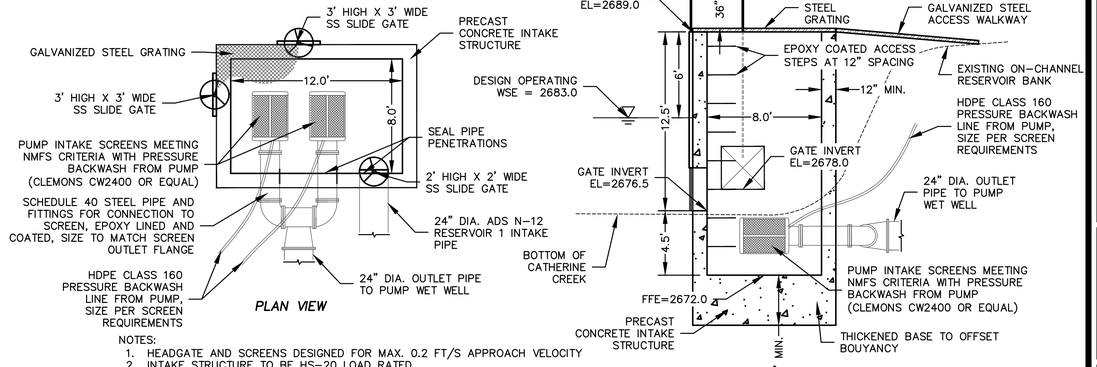


PLAN VIEW



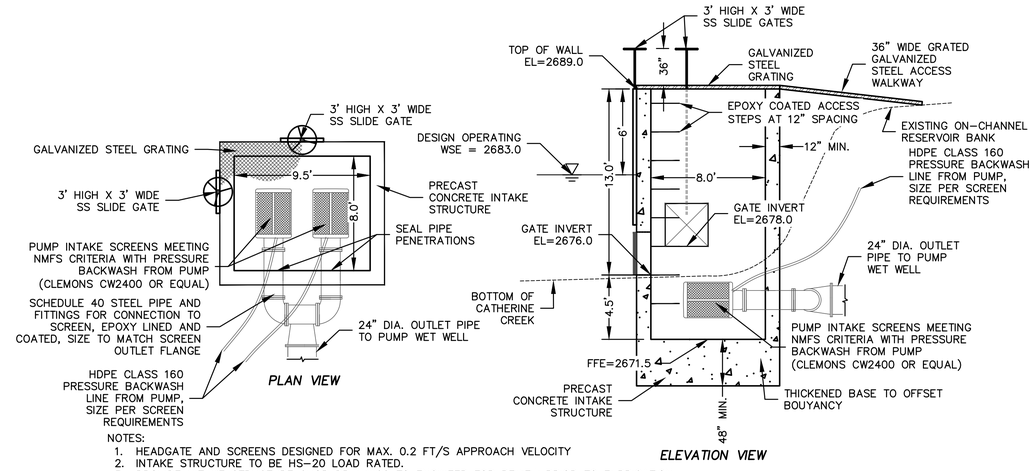
SECTION A–A

CONCRETE GATE SUPPORT 1/C51
NTS



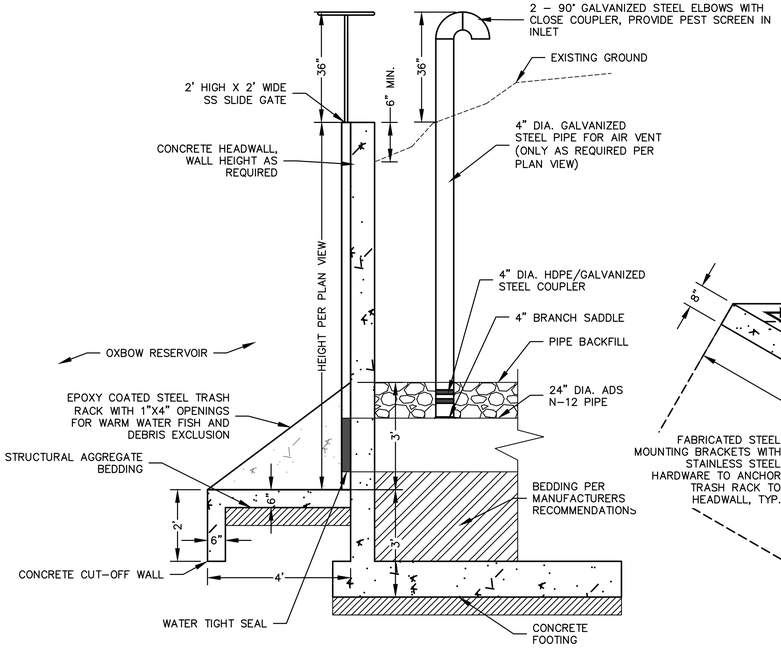
NOTES:
1. HEADGATE AND SCREENS DESIGNED FOR MAX. 0.2 FT/S APPROACH VELOCITY
2. INTAKE STRUCTURE TO BE HS–20 LOAD RATED.
3. PROVIDE INTAKE STRUCTURE SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.
4. GRATING AND ANY SUPPORTING FRAMEWORK SHALL BE DESIGNED FOR A MAXIMUM DEFLECTION OF L/120 WITH A UNIFORM LIVE LOAD OF 50LBS/SF AND A CONCENTRATED LOAD OF 250 LBS.

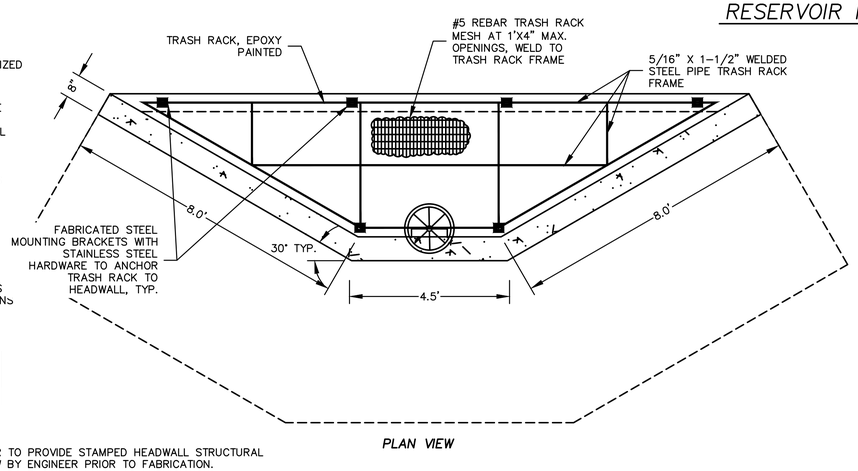
RESERVOIR INTAKE STRUCTURE AT DAM DETAIL 2/C51
NTS



NOTES:
1. HEADGATE AND SCREENS DESIGNED FOR MAX. 0.2 FT/S APPROACH VELOCITY
2. INTAKE STRUCTURE TO BE HS–20 LOAD RATED.
3. PROVIDE INTAKE STRUCTURE SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.
4. GRATING AND ANY SUPPORTING FRAMEWORK SHALL BE DESIGNED FOR A MAXIMUM DEFLECTION OF L/120 WITH A UNIFORM LIVE LOAD OF 50LBS/SF AND A CONCENTRATED LOAD OF 250 LBS.

RESERVOIR INTAKE STRUCTURE AT BOOTH LANE DETAIL 4/C51
NTS





NOTE: CONTRACTOR TO PROVIDE STAMPED HEADWALL STRUCTURAL DESIGN FOR REVIEW BY ENGINEER PRIOR TO FABRICATION.

CONCRETE HEADWALL DETAIL 3/C51
NTS

Quadrant Consulting, Inc.
1904 W. Overland Rd
Boise, Idaho 83705
(208) 342-0091 PHONE (208) 342-0092 FAX
CIVIL ENGINEERING–SURVEYING

REGISTERED PROFESSIONAL ENGINEER 7690SPE OREGON JULY 12, 2005 NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM
CIVIL DETAILS
OREGON COVE

PROJECT NO. 703–19

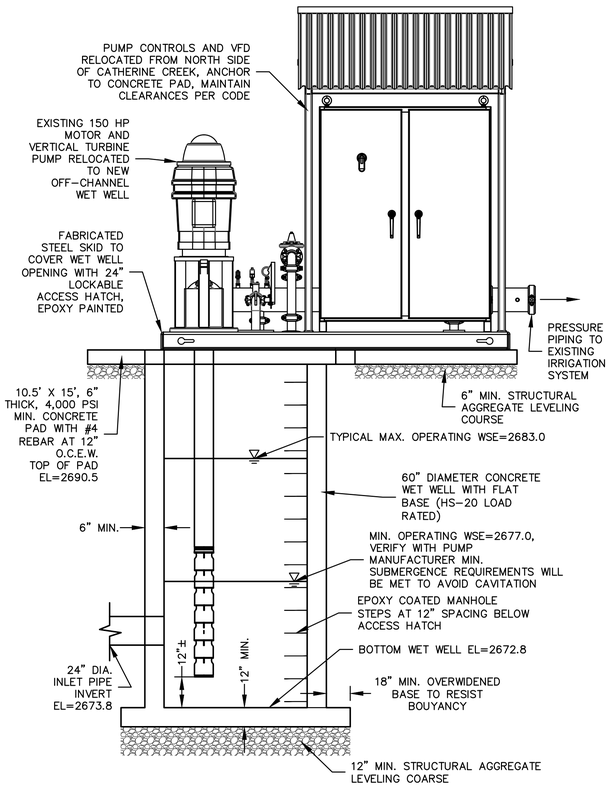
SCALE: NTS

CHECKED BY: NK
PLOT DATE: 6/29/22

DESIGNED BY: NK
DRAWN BY: GH

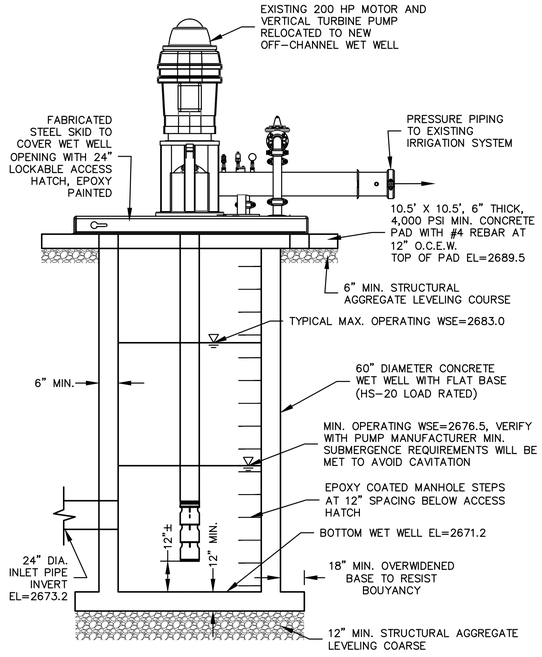
DATE	DESCRIPTION

SHEET
C51



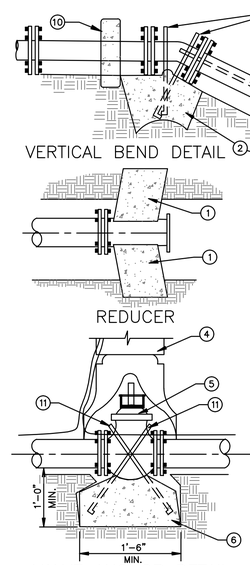
NOTES:
1. EXISTING PUMP INTAKE ASSEMBLY MEASURES APPROXIMATELY 11.6' FROM BOTTOM OF DISCHARGE HEAD TO SUCTION INTAKE. EXTEND DISCHARGE PIPE AND LINE SHAFT TO DIMENSIONS REQUIRED TO MATCH THE ELEVATIONS SHOWN IN THIS DETAIL.
2. MODIFY SUCTION INTAKE AS NECESSARY TO INSTALL BASKET STRAINER.
3. INSTALL PRESSURE BACKWASH FEED FROM PUMP STATION TO SCREENS AT INTAKE STRUCTURE. PROVIDE FILTRATION AND SIZE COMPONENTS TO MEET SCREEN REQUIREMENTS.
4. PRESSURE BACKWASH SYSTEM TO BE TIMER CONTROLLED FROM PUMP STATION PANEL.
5. STEEL SKID AND DECKING SHALL BE DESIGNED FOR A MAXIMUM DEFLECTION OF L/120 WITH A UNIFORM LIVE LOAD OF 50LBS/SF AND A CONCENTRATED LOAD OF 250 LBS IN ADDITION TO DEAD LOAD OF PUMP COMPONENTS.

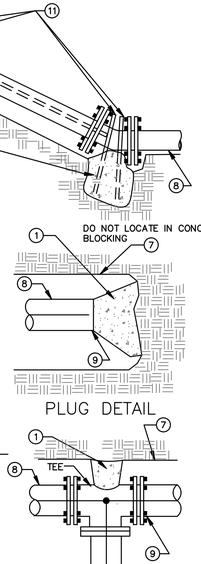
PUMP RE-INSTALLATION AT DAM — NTS — 1 / C52



NOTES:
1. MODIFY SUCTION INTAKE AS NECESSARY TO INSTALL BASKET STRAINER.
2. INSTALL PRESSURE BACKWASH FEED FROM PUMP STATION TO SCREENS AT INTAKE STRUCTURE. PROVIDE FILTRATION AND SIZE COMPONENTS TO MEET SCREEN REQUIREMENTS.
3. PRESSURE BACKWASH SYSTEM TO BE TIMER CONTROLLED FROM PUMP STATION PANEL.
5. STEEL SKID AND DECKING SHALL BE DESIGNED FOR A MAXIMUM DEFLECTION OF L/120 WITH A UNIFORM LIVE LOAD OF 50LBS/SF AND A CONCENTRATED LOAD OF 250 LBS IN ADDITION TO DEAD LOAD OF PUMP COMPONENTS.

PUMP RE-INSTALLATION AT BOOTH LANE — NTS — 2 / C52





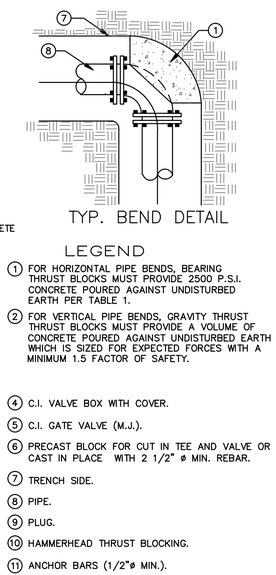


TABLE 1
THRUST AREA FOR HORIZONTAL BENDS ***

SOIL BEARING PRESSURE = 2000 PSF WORKING PRESSURE RATING = 150 PSI SAFETY FACTOR = 1.5				
	MINIMUM SQUARE FEET OF THRUST AREA ONTO UNDISTURBED EARTH*			
PIPE SIZE	TEE, PLUG OR VALVE	90° BEND**	45° BEND	22.5°, 11.25° BENDS OR REDUCER
3	0.8	1.1	0.6	0.3
4	1.4	2.0	1.1	0.6
6	3.2	4.5	2.4	1.2
8	5.7	8.0	4.3	2.2
10	8.8	12.5	6.8	3.4
12	12.7	18.0	9.7	5.0
14	17.3	24.5	13.3	6.8
16	22.6	32.0	17.3	8.8
18	28.6	40.5	21.9	11.2

* MUST BE INCREASED BASED ON DIFFERENT CONDITIONS (HIGHER WORKING PRESSURE OR LOWER SOIL BEARING STRENGTH).
** OR TEE ACTING AS A 90° BEND.
*** THRUST BLOCK DEPTH TO BE A MINIMUM OF 12" FOR PIPE SIZES 3"-8" AND 18" FOR PIPE SIZES 10"-18" OR THE SQUARE ROOT OF THE REQUIRED BEARING AREA, WHICHEVER IS GREATER.

LEGEND

(1) FOR HORIZONTAL PIPE BENDS, BEARING THRUST BLOCKS MUST PROVIDE 2500 P.S.I. CONCRETE POURED AGAINST UNDISTURBED EARTH PER TABLE 1.
(2) FOR VERTICAL PIPE BENDS, GRAVITY THRUST THRUST BLOCKS MUST PROVIDE A VOLUME OF CONCRETE POURED AGAINST UNDISTURBED EARTH WHICH IS SIZED FOR EXPECTED FORCES WITH A MINIMUM 1.5 FACTOR OF SAFETY.
(4) C.I. VALVE BOX WITH COVER.
(5) C.I. GATE VALVE (M.J.).
(6) PRECAST BLOCK FOR CUT IN TEE AND VALVE OR CAST IN PLACE WITH 2 1/2" ø MIN. REBAR.
(7) TRENCH SIDE.
(8) PIPE.
(9) PLUG.
(10) HAMMERHEAD THRUST BLOCKING.
(11) ANCHOR BARS (1/2"ø MIN.).

NOTES:
(A) ANCHOR ALL VALVES CONNECTED TO P.V.C. PIPE AS SHOWN.
(B) COVER BOLTS AND FLANGES WITH PLASTIC TO PROTECT FROM CONCRETE ADHERENCE DURING CONSTRUCTION OF THRUST BLOCKS.
(C) SEE CHART FOR MIN THRUST BLOCKS BEARING AREAS.
(D) ALL CONCRETE TO BE 2500 P.S.I. STRENGTH POURED AGAINST UNDISTURBED EARTH.
(E) PROVIDE 6 MIL POLYPROPYLENE BETWEEN FITTINGS AND CONCRETE.
(F) NOTIFY ENGINEER FOR ANY CONDITION OR PIPE SIZE NOT INDICATED.
(D) ALL BLOCKS TO BE CENTERED AROUND PIPE SPRING LINE.

CONCRETE THRUST BLOCK — NTS — 3 / C52

Quadrant Consulting, Inc.
1904 W. Overland Rd
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(208) 342-0091 PHONE (208) 342-0092 FAX
CIVIL ENGINEERING-SURVEYING

REGISTERED PROFESSIONAL ENGINEER 16905PE OREGON JULY 12, 2005 NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM — OREGON
CIVIL DETAILS
COVE

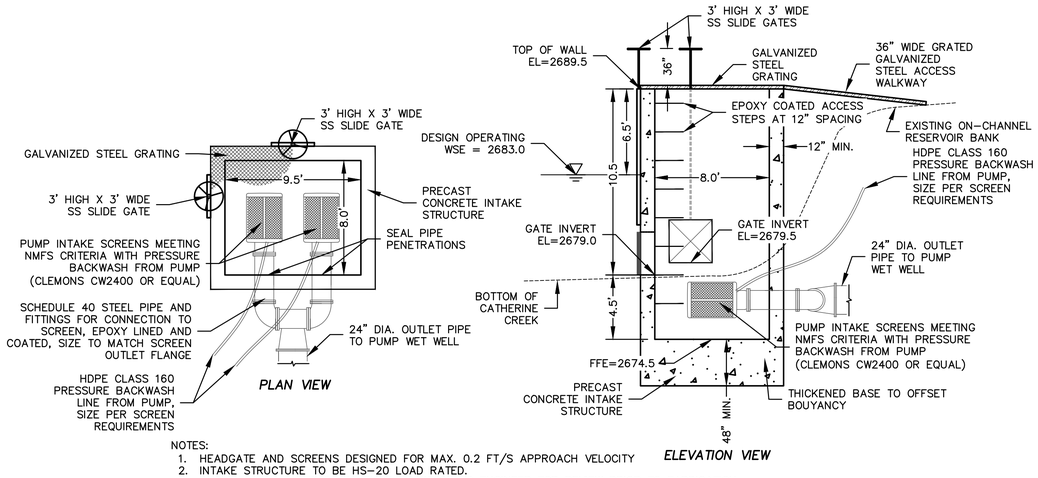
PROJECT NO. 703-19
SCALE: NTS

CHECKED BY: NK
PLOT DATE: 6/29/22

DESIGNED BY: NK
DRAWN BY: GH

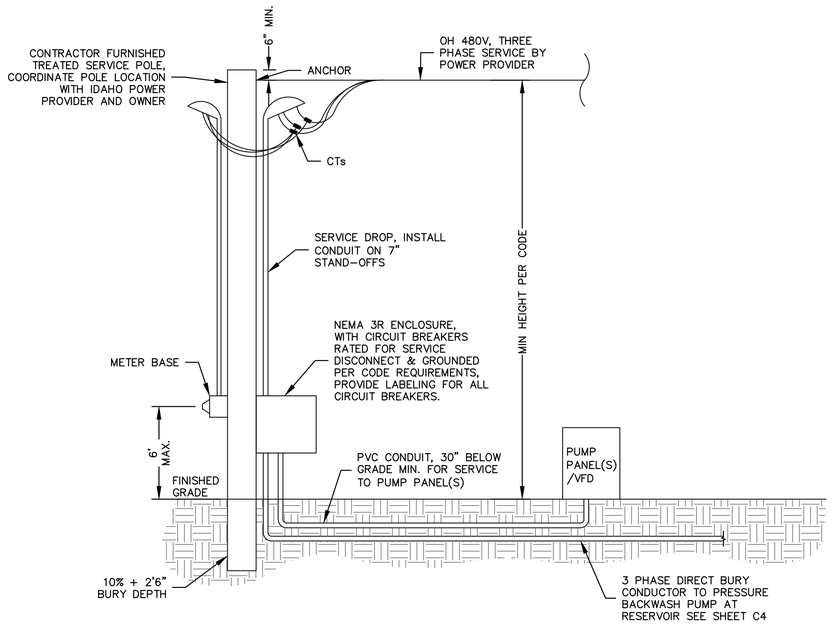
DATE	DESCRIPTION

SHEET C52



NOTES:
1. HEADGATE AND SCREENS DESIGNED FOR MAX. 0.2 FT/S APPROACH VELOCITY
2. INTAKE STRUCTURE TO BE HS-20 LOAD RATED.
3. PROVIDE INTAKE STRUCTURE SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.
4. GRATING AND ANY SUPPORTING FRAMEWORK SHALL BE DESIGNED FOR A MAXIMUM DEFLECTION OF L/120 WITH A UNIFORM LIVE LOAD OF 50LBS/SF AND A CONCENTRATED LOAD OF 250 LBS.

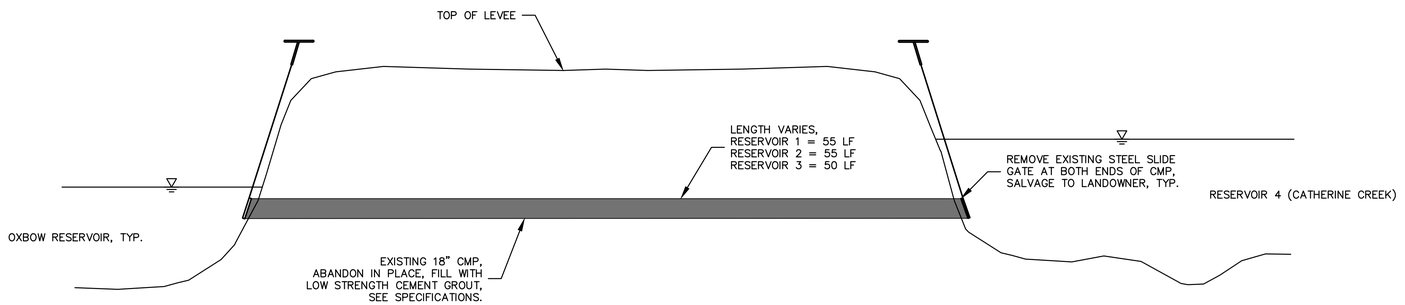
RESERVOIR 2 INTAKE STRUCTURE DETAIL
NTS — 1 / C53



NOTES:
1. THIS SCHEMATIC PROVIDED FOR INFORMATIONAL PURPOSES ONLY. POWER CONNECTION LOGISTICS, WIRE SIZING, AND CODE COMPLIANCE SHALL BE ESTABLISHED BY A QUALIFIED OREGON LICENSED ELECTRICIAN EXPERIENCED WITH IRRIGATION PROJECTS.
2. ALL ELECTRICAL WORK SHALL BE COMPLETED BY A QUALIFIED OREGON LICENSED ELECTRICIAN AND INSPECTED PER OREGON CODE.
3. ELECTRICAL CONNECTION WORK SHALL BE COORDINATED WITH OREGON TRAIL ELECTRICAL COOPERATIVE, AND THE GENERAL CONTRACTOR.
4. INSTALL SERVICE GROUND PER CODE REQUIREMENTS.
5. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL EQUIPMENT AND MATERIALS TO MAKE A COMPLETE INSTALLATION AS SHOWN ON THESE PLANS.
6. ALL EQUIPMENT SHALL BE UL LISTED.
7. THE "NECA STANDARDS OF INSTALLATION" SHALL BE THE STANDARD OF QUALITY FOR INSTALLATION.
8. PANEL DISCONNECT SWITCHES AND OTHER POWER EQUIPMENT SHALL BE GE, SQUARE D, OR CUTLER HAMMER.
9. THE ELECTRICAL CONTRACTOR SHALL APPLY FOR, SECURE, AND PAY FOR ALL REQUIRED PERMITS, FEES, AND LICENSES TO ACCOMPLISH THE WORK.
10. INSTALL WARNING TAPE IN BURIED POWER TRENCHES LABELED "CAUTION BURIED ELECTRICAL LINE BELOW." PLACE IN TRENCH MINIMUM 18" OVER TOP OF CONDUCTOR(S).

ELECTRICAL PROVIDER CONTACT INFORMATION
OREGON TRAIL ELECTRICAL COOPERATIVE : (541)-963-3155

ELECTRICAL SERVICE DROP SCHEMATIC
NTS — 2 / C53



NOTE: DETAIL APPLIES TO EXISTING RESERVOIR 1 AND 3 DIVERSIONS.

EXISTING DIVERSION ABANDONMENT DETAIL
NTS — 3 / C53

Quadrant Consulting, Inc.
1904 W. Overland Rd
Boise, Idaho 83705
(208) 342-0091 PHONE (208) 342-0092 FAX
CIVIL ENGINEERING-SURVEYING

REGISTERED PROFESSIONAL ENGINEER 7690SPE OREGON JULY 12, 2005 NICHOLAS A. KRAUS
EXPIRATION DATE: 6-30-23

ELMER DAM
CIVIL DETAILS
OREGON
COVE

PROJECT NO. 703-19
SCALE: NTS

DESIGNED BY: NK
DRAWN BY: GH
CHECKED BY: NK
PLOT DATE: 5/23/22

DATE	DESCRIPTION

SHEET
C53

GENERAL STRUCTURAL NOTES:

THE FOLLOWING NOTES ARE GENERAL AND APPLY TO THE ENTIRE PROJECT, UNLESS SPECIFICALLY NOTED OTHERWISE (UNO)

1) GENERAL:

A. CONSTRUCTION DOCUMENTS:
   1. THE CONTRACTOR SHALL REVIEW THE APPROVED CONTRACT DOCUMENTS AND NOTIFY THE ENGINEER OF ANY ERRORS OR DISCREPANCIES PRIOR TO THE START OF CONSTRUCTION.
   2. THE CONTRACTOR SHALL FURNISH AND INSTALL EVERYTHING REQUIRED TO PROVIDE A COMPLETE STRUCTURE AS SHOWN HEREIN. IF THERE IS AN OMISSION ON THE PLANS, SUCH OMISSION SHALL NOT BE CONSTRUED TO MEAN THAT THE CONTRACTOR IS NOT REQUIRED TO FURNISH OR PROVIDE EVERYTHING THAT IS NECESSARY TO COMPLETE THE PROJECT TO THE MINIMUM REQUIREMENTS OF THE IBC AND ALL OTHER SPECIFICATIONS, CODES AND STANDARDS NOTED ON THE APPROVED CONTRACT DOCUMENTS.
   3. THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY IF ANY UNIDENTIFIED EXISTING UNDERGROUND UTILITIES ARE DISCOVERED. THE ENGINEER IS NOT RESPONSIBLE FOR THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES WHETHER OR NOT SHOWN ON THE DRAWINGS.
   4. THE STRUCTURAL CONTRACT DOCUMENTS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT ARE NOT LIMITED TO, BRACING AND/OR SHORING FOR LOADS DUE TO CONSTRUCTION EQUIPMENT, ETC. CONTRACTOR AT HIS/HER OWN EXPENSE SHALL ENGAGE PROPERLY QUALIFIED PERSONS TO DESIGN BRACING, SHORING, ETC. OBSERVATION VISITS TO THE SITE BY THE ENGINEER SHALL NOT INCLUDE OBSERVATION OF THE ABOVE NOTED ITEMS.
   5. UNDER NO CIRCUMSTANCES CAN STRUCTURAL COMPONENTS BE SUBSTITUTED, OMITTED, OR ALTERED FROM THE APPROVED SET OF CONSTRUCTION DOCUMENTS WITHOUT WRITTEN APPROVAL FROM THE ENGINEER.

B. DIMENSIONS AND NOTATIONS:
   1. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. DO NOT SCALE DRAWINGS.
   2. ABBREVIATIONS USED ON THE APPROVED CONTRACT DOCUMENTS SHALL BE CONSIDERED TYPICAL ABBREVIATIONS FOR THE INDUSTRY. THE CONTRACTOR SHALL BE RESPONSIBLE TO NOTIFY THE ENGINEER IMMEDIATELY OF ANY ABBREVIATIONS THAT ARE UNKNOWN TO THE CONTRACTOR.

C. SHOP DRAWINGS:
   1. SHOP DRAWINGS, AS REQUIRED PER THESE STRUCTURAL NOTES, SHALL BE SUBMITTED TO THE ENGINEER IN A TIMELY FASHION PRIOR TO FABRICATION TO ALLOW FOR PROPER REVIEW.
   2. SHOP DRAWING ITEMS SHALL NOT BE INSTALLED UNTIL THE CONSTRUCTION DOCUMENTS HAVE BEEN APPROVED BY THE BUILDING OFFICIAL AND SHOP DRAWINGS HAVE BEEN APPROVED BY THE ENGINEER.
   3. DURING SHOP DRAWING REVIEW, DIMENSIONS AND QUANTITIES ARE NOT REVIEWED BY THE ENGINEER AND MUST BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR SHALL REVIEW AND STAMP SHOP DRAWINGS PRIOR TO REVIEW BY ENGINEER.

D. SPECIAL INSPECTION:
   1. THE OWNER SHALL EMPLOY A SPECIAL INSPECTION SERVICE AS REQUIRED PER THESE STRUCTURAL NOTES.

E. TYPICAL NOTES AND DETAILS:
   1. SPECIFIC NOTES AND DETAILS SHALL TAKE PRECEDENCE OVER STANDARD TYPICAL NOTES AND DETAILS.
   2. STANDARD TYPICAL NOTES AND DETAILS ARE TO BE USED WHEN REFERRED TO OR WHEN NO OTHER MORE RESTRICTIVE OR DIFFERENT DETAILS ARE SHOWN ON THE DRAWINGS.
   3. WORK NOT PARTICULARLY SHOWN OR SPECIFIED SHALL BE THE SAME AS SIMILAR PARTS THAT ARE SHOWN OR SPECIFIED.

F. CODE REQUIREMENTS:
   1. ALL WORK SHALL CONFORM TO THE MINIMUM STANDARDS OF THE FOLLOWING CODES:
      - 2019 OREGON STRUCTURAL SPECIALTY CODE
      - 2018 INTERNATIONAL BUILDING CODE (IBC)
      - ANY OTHER REGULATING AGENCIES WHICH MAY HAVE AUTHORITY OVER ANY PORTION OF THE WORK.
   2. SPECIFICATIONS, CODES AND STANDARDS NOTED SHALL BE OF THE LATEST APPROVED ISSUE, INCLUDING SUPPLEMENTS, UNLESS NOTED OTHERWISE.

2) FOUNDATIONS AND GEOTECHNICAL:

A. GEOTECHNICAL DESIGN CRITERIA IS BASED ON THE RECOMMENDATIONS CONTAINED IN THE GEOTECHNICAL INVESTIGATION, ELMER DAM RENOVATIONS BY ATLAS TECHNICAL CONSULTANTS, LLC. DATED MAY 19, 2021.
B. FOR FROST PROTECTION, THE BOTTOM OF ALL EXTERIOR FOOTINGS SHALL BE 24 INCHES MINIMUM BELOW ADJACENT FINISHED GRADE, UNO.
C. STRUCTURAL BACKFILL SHALL BE COMPACTED TO 95 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY ASTM D1557.

3) STRUCTURAL AND MISCELLANEOUS STEEL:

A. ALL STRUCTURAL STEEL WORK SHALL CONFORM TO THE LATEST EDITION OF THE AISC SPECIFICATIONS.
B. WELDS: PROVIDE 70ksi LOW HYDROGEN ELECTRODE OR PROCESS IN ACCORDANCE WITH AWS A5.1.
C. EPOXY BOLT OR EXPANSION BOLT SUBSTITUTIONS FOR EMBEDDED BOLTS IS PROHIBITED WITHOUT WRITTEN CONSENT FROM THE ENGINEER.
D. ALL STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE AISC CODE OF STANDARD PRACTICE, EXCEPT AS MODIFIED IN THESE NOTES AND THE PROJECT SPECIFICATIONS.
E. SPLICING OF STEEL MEMBERS, UNLESS SHOWN ON THE DRAWINGS, IS PROHIBITED WITHOUT WRITTEN APPROVAL OF THE PROJECT ENGINEER.
F. ALL STEEL SHALL BE GALVANIZED AFTER FABRICATION.

STRUCTURAL AND MISCELLANEOUS STEEL	
WIDE FLANGE SHAPES	ASTM A992
SHAPES, PLATES, BARS	ASTM A36
HSS	ASTM A500, GRADE B
PIPE	ASTM A53, GRADE B
BOLTS	
STEEL TO CONCRETE CONNECTIONS	ASTM A307
STEEL TO STEEL CONNECTIONS	ASTM A325N

4) CONCRETE:

A. ALL CONCRETE WORK SHALL CONFORM TO THE LATEST EDITION OF ACI 301 AND ACI 117, EXCEPT AS MODIFIED BY THE FOLLOWING SUPPLEMENTAL REQUIREMENTS:
B. ALL CONCRETE SHALL BE NORMAL WEIGHT CONCRETE.
C. CONCRETE MIX DESIGN SHALL BE ESTABLISHED IN ACCORDANCE WITH CHAPTER 5 OF ACI 318.
D. APPROVED ADMIXTURES:
   1. FLYASH PER ASTM C-618
   2. AIR ENTRAINING PER ASTM C-260
   3. WATER REDUCING PER ASTM C-494
E. REINFORCEMENT FOR CONCRETE:
   1. ALL REINFORCING SHALL BE SUPPORTED IN FORMS SPACED WITH NECESSARY ACCESSORIES AND SHALL BE SECURELY WIRED TOGETHER IN ACCORDANCE WITH THE LATEST EDITION OF THE CRSI "MANUAL OF STANDARD PRACTICE"
      a) DEFORMED BARS – ASTM A615, GRADE 60

F. MINIMUM CONCRETE COVER OVER REINFORCEMENT:
   1. CAST-IN-PLACE CONCRETE
      a) CONCRETE CAST AGAINST EARTH = 3"
      b) ALL OTHER CONCRETE = 2"
G. SLAB-ON-GRADE REINFORCEMENT SHALL BE PLACED AT THE MID-DEPTH OF THE SLAB, UNO.
H. FORMWORK: DESIGN, ERECT, SUPPORT, BRACE AND MAINTAIN FORMWORK TO SUPPORT VERTICAL, LATERAL, STATIC AND DYNAMIC LOADS THAT MIGHT BE APPLIED UNTIL STRUCTURE CAN SUPPORT SUCH LOADS.

STANDARD STRUCTURAL SPECIAL INSPECTION

SPECIAL INSPECTION TABLE

SPECIAL INSPECTION ITEM	CONTINUOUS INSPECTION	PERIODIC INSPECTION	NOTES
1. STRUCTURAL AND LIGHT GAGE STEEL CONSTRUCTION			
A. STEEL FABRICATED IN AN APPROVED FABRICATION SHOP			FABRICATOR SHALL SUBMIT A CERTIFICATE OF COMPLIANCE STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH THE APPROVED CONSTRUCTION DRAWINGS
B. VERIFY STRUCTURAL STEEL AND METAL DECKING CONFORMS TO AISC AND THE CONSTRUCTION DOCUMENTS		X	
C. HIGH STRENGTH BOLTING			
1) VERIFY IDENTIFICATION MARKINGS AND THE MANUFACTURERS CERTIFICATE OF COMPLIANCE		X	
2) VERIFICATION OF BOLT TENSION		X	
3) VERIFICATION OF BOLT TENSION WHEN "TURN OF THE NUT" OR "CALIBRATED WRENCH" INSTALLATION METHODS ARE USED	X		
D. WELDING			
1) VERIFY IDENTIFICATION MARKINGS AND THE MANUFACTURERS CERTIFICATE OF COMPLIANCE		X	
2) SINGLE PASS FILLET WELDS 5/16" AND LESS, STEEL STUDS AND WELDING OF STEEL DECK		X	
3) WELDING OF STAIRS AND RAILINGS		X	
4) ALL OTHER WELDS	X		
E. VERIFICATION OF STRUCTURAL STEEL FRAME JOINT DETAILS INCLUDING MEMBER LOCATION, APPLICATION OF JOINT DETAILS AND DETAILS SUCH AS BRACING AND STIFFENING		X	
2. CONCRETE CONSTRUCTION			
A. ISOLATED SPREAD FOOTINGS FOR STRUCTURES 3 STORIES OR LESS			SPECIAL INSPECTION IS NOT REQUIRED
B. CONTINUOUS SPREAD FOOTING SUPPORTING WALLS OF LIGHT FRAMED CONSTRUCTION OF 3 STORIES OR LESS AND ARE DESIGNED WITH A COMPRESSIVE STRENGTH OF 2,500 PSI OR LESS REGARDLESS OF THE CONCRETE STRENGTH			SPECIAL INSPECTION IS NOT REQUIRED
C. CONCRETE SLABS AND SIDEWALKS DIRECTLY SUPPORTED ON THE GROUND			SPECIAL INSPECTION IS NOT REQUIRED
D. INSPECTION OF FORMWORK FOR SHAPE, SIZE AND LOCATION OF CONCRETE MEMBERS		X	
E. VERIFICATION OF STEEL MATERIAL, SIZE AND LOCATION		X	
F. VERIFICATION OF BOLTS STUDS OR ANCHORS EMBEDDED IN CONCRETE FOR LOCATION, SIZE AND CONFIGURATION	X		SPECIAL INSPECTION IS NOT REQUIRED WHERE BOLTS HAVE BEEN DESIGNED WITH HALF STRESSED
G. VERIFY THE USE OF THE REQUIRED MIX DESIGN		X	
H. SAMPLING OF FRESH CONCRETE FOR COMPRESSIVE STRENGTH, AIR CONTENT, SLUMP, AND TEMPERATURE	X		
I. INSPECTION FOR THE MAINTENANCE OF CURING TEMPERATURE AND TECHNIQUES		X	
J. INSPECTION OF ANCHORS INSTALLED IN HARDENED CONCRETE		X	SPECIAL INSPECTION IS NOT REQUIRED WHERE ANCHORS HAVE BEEN DESIGNED WITH HALF STRESSES

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
6/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

Quadrant Consulting, Inc.

River Structures CONSULTING

PO BOX 1643 | BOISE, ID 83701 | RIVERSTRUCTURES.COM

TU/USWCD

ELMER DAM MODIFICATIONS

GENERAL STRUCTURAL NOTES

DESIGNED J. FISHER

DRAWN J. LAHMON

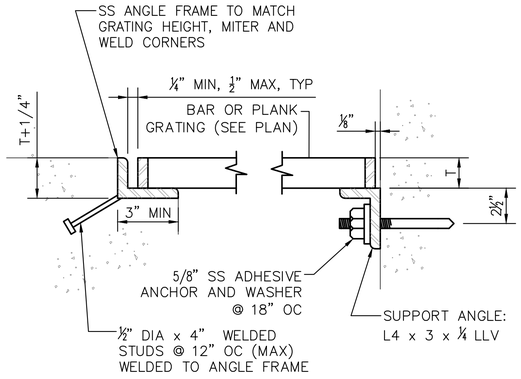
CHECKED C. BOYD

ISSUED DATE 06/17/22

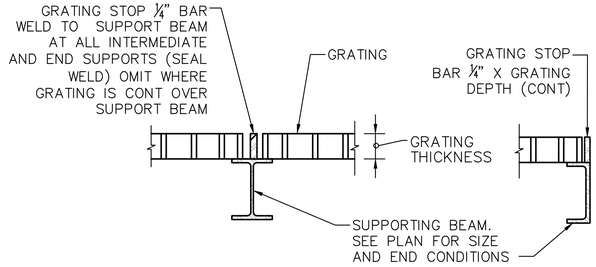
DRAWING

GS1

SCALE: AS NOTED



NOTES:
1. UNLESS INDICATED OTHERWISE, ALL GRATING SHALL BE GALVANIZED.
2. ALL ENDS AND OPENINGS OF BAR GRATING SHALL BE BANDED.

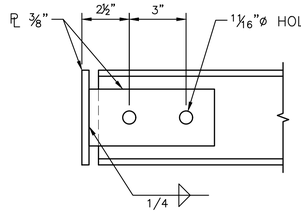


GRATING STOP DETAIL

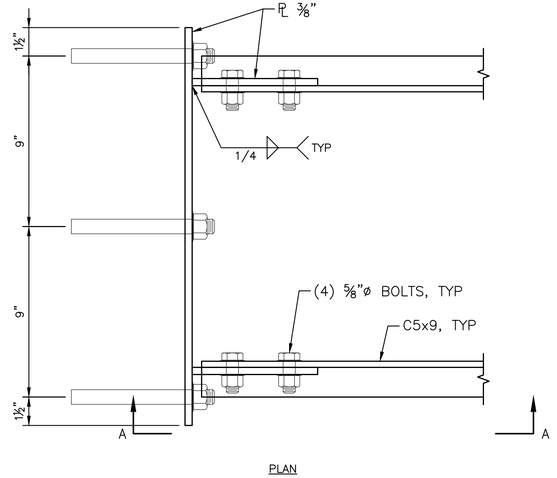
TYPICAL GRATING SUPPORT DETAIL

SCALE: NTS

1



SECTION A–A

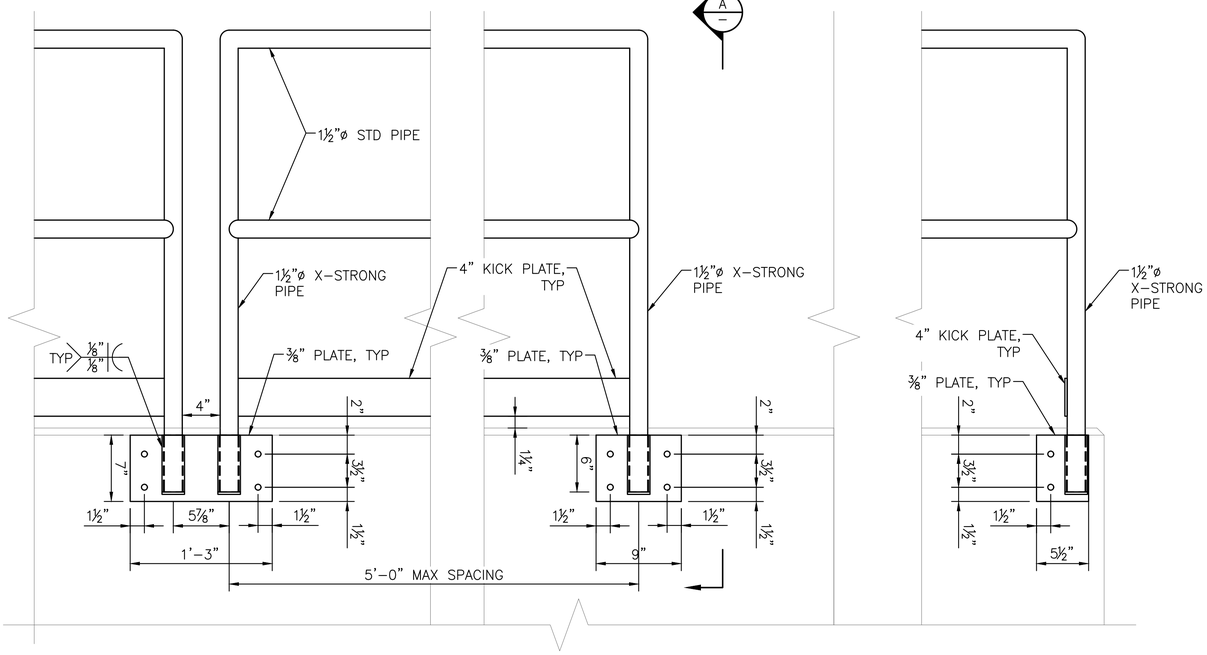


PLAN

TURNING POOL CHANNEL BRACKET DETAIL

SCALE: 3" = 1'–0"

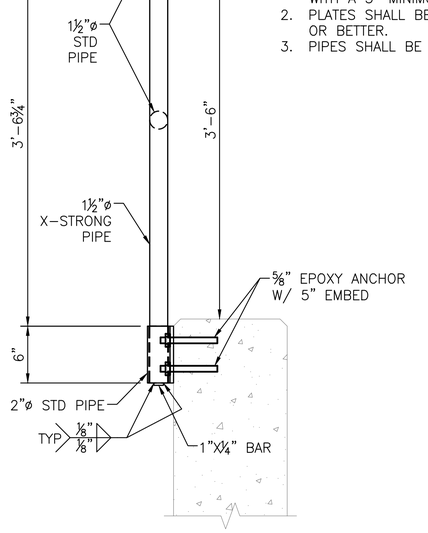
3



REMOVABLE GUARDRAIL BRACKET DETAIL

SCALE: 1½""=1'–0"

2



NOTES:
1. EPOXY ANCHORS SHALL BE HILTI HIT–HY 200 WITH ⅝"ø HAS–V–36 (ASTM F1554 Gr. 36) THREADED ROD WITH A 5" MINIMUM EMBEDMENT.
2. PLATES SHALL BE ASTM A36 STEEL OR BETTER.
3. PIPES SHALL BE ASTM A53 Gr.B

REMOVABLE GUARDRAIL BRACKET SECTION

SCALE: 1½"=1'–0"

A

REGISTERED PROFESSIONAL ENGINEER 80853 PE
OREGON MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING

0 1/2 1

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TU/USWCD

ELMER DAM MODIFICATIONS

STANDARD STRUCTURAL DETAILS 1

DESIGNED J. FISHER

DRAWN J. LAHMON

CHECKED C. BOYD

ISSUED DATE 06/17/22

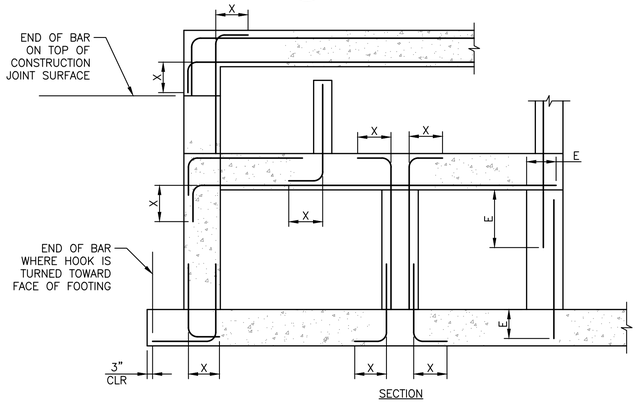
DRAWING GS2

SCALE: AS NOTED

TYPICAL LAP SPLICE LENGTHS IN INCHES, PER ACI 318/350									
BAR SIZE	LAP CLASS	f'c=3,000 psi		f'c=4,000 psi		f'c=5,000 psi		f'c=6,000 psi	
		CAT.1	CAT.2	CAT.1	CAT.2	CAT.1	CAT.2	CAT.1	CAT.2
#3	A	16	25	14	21	13	19	12	17
	B	21	32	19	28	17	25	15	23
#4	A	22	33	19	28	17	25	15	23
	B	28	43	25	37	22	33	20	30
#5	A	27	41	24	36	21	32	19	29
	B	36	53	31	46	28	41	25	38
#6	A	33	49	28	43	25	38	23	35
	B	43	64	37	55	33	50	30	45
#7	A	48	72	42	62	37	56	34	51
	B	62	93	54	81	48	72	44	66
#8	A	55	82	47	71	42	64	39	58
	B	71	106	61	92	55	83	50	76
#9	A	62	92	53	80	48	72	44	65
	B	80	120	69	104	62	93	57	85

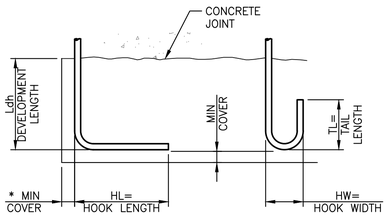
NOTES:
1. FOR GRADE 60 REINFORCING STEEL BARS.
2. ALL LAP SPLICES SHALL BE CLASS B, UNLESS NOTED OTHERWISE.
3. CATEGORY 1: CLEAR COVER >= db & CLR. SPACING >= db, AND STIRRUPS OR TIES THROUGHOUT Ld ARE PROVIDED.
   CATEGORY 2: CLEAR COVER < db OR CLR. SPACING < 2db.
   CATEGORY 1: CLEAR COVER >= db & CLR. SPACING >= 2db.
4. FOR TOP BARS MULTIPLY LAP LENGTH LISTED BY 1.30 TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BARS.
5. MODIFY ABOVE VALUES FOR LIGHT-WEIGHT CONCRETE.

LAP SPLICE SCHEDULE (1)
SCALE: NTS



SECTION

STANDARD 90° BAR HOOKS AND EMBEDMENT LENGTHS (5)
SCALE: NTS



90° STD HOOK 180° STD HOOK

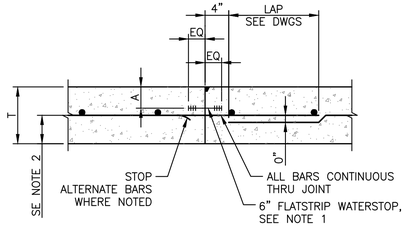
BAR SIZE GRADE 60				
	Ldh*	HL	HW	TL
#3	6"	6"	3"	3"
#4	7"	8"	4"	4 1/2"
#5	9"	10"	5"	5"
#6	10"	1'-0"	6"	6"
#7	1'-0"	1'-2"	7"	7"
#8	1'-2"	1'-4"	8"	8"
#9	1'-3"	1'-7"	11 3/4"	10 1/2"
#10	1'-5"	1'-10"	1'-1 1/4"	11 1/2"
#11	1'-7"	2'-0"	1'-2 3/4"	1'-1"

* COMPLYING WITH MINIMUM COVER REQUIREMENTS OF ACI 318, 12.5.3.2. OTHERWISE Ldh MUST BE RE-CALCULATED.

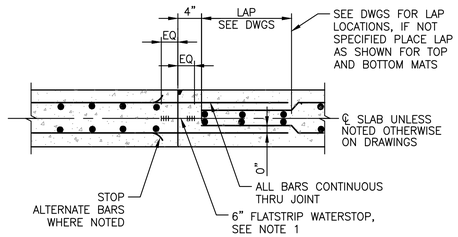
REINFORCING HOOK SCHEDULE (2)
SCALE: NTS

LENGTH (*)		
BAR SIZE	HOOK X	EMBEDMENT E
#3	6"	12" (16")
#4	8"	12" (16")
#5	10"	15" (20")
#6	12"	22" (28")
#7	14"	37" (48")
#8	16"	48" (62")
#9	19"	61" (79")
#10	22"	77" (100")
#11	24"	95" (123")

* USE LENGTH IN PARENTHESIS FOR WALL HORIZONTAL REBARS AND SLAB BARS WITH 12" OR MORE OF FRESH CONCRETE UNDERNEATH



SINGLE MAT REINF



DOUBLE MAT REINF

T	A
6"	2"
7"	2½"
8"	2½"

NOTES:
1. WATERSTOPS TO BE PROVIDED IN ALL WATER RETAINING SLABS, SEE DRAWINGS, FOR OTHER LOCATIONS WHERE THEY MAY BE REQUIRED.
2. DIMENSIONS INDICATED ON DETAIL CONTROL MINIMUM COVER. FOR THIN SLABS, THE BOTTOM COVER MAY BE LESS THAN 3".
3. STAGGER SPLICES UNLESS NOTED OTHERWISE.

CONSTRUCTION JOINT (3)
SCALE: NTS

NOTES:
1. USE LAP LENGTHS AS DETERMINED FROM THESE TABLES UNLESS SHOWN OTHERWISE.
2. THE TABLES SHOWN ARE FOR f'c=4000psi, fy=60,000psi, 1.5" MIN CONCRETE COVER AND 3" MIN BAR SPACING.
3. MULTIPLY THE LAP AND E SHOWN IN THESE TABLES BY 1.5 FOR EPOXY COATED REINFORCING.
4. WHEN BARS OF DIFFERENT SIZES ARE LAP SPLICED, LAP LENGTH SHALL BE THE LARGER OF:
   EMBEDMENT LENGTH OF LARGER BAR LAP LENGTH OF SMALLER BAR.
5. UNLESS NOTED OTHERWISE USE REBAR COUPLERS FOR SPLICES OF #11 AND LARGER BARS.
6. ALL DOWEL BARS SHALL EXTEND AN EMBEDMENT LENGTH E INTO ANOTHER MEMBER OR ACROSS A CONSTRUCTION JOINT UNLESS SHOWN TO SPLICE WITH ITHER BARS OR TO EXTEND TO THE FAR FACE OF THE MEMBER AND END WITH A STANDARD HOOK.

CONSTRUCTION JOINT (4)
SCALE: NTS

REGISTERED PROFESSIONAL ENGINEER 80853 PE
OREGON 6/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

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WARNING
0 1/2 1
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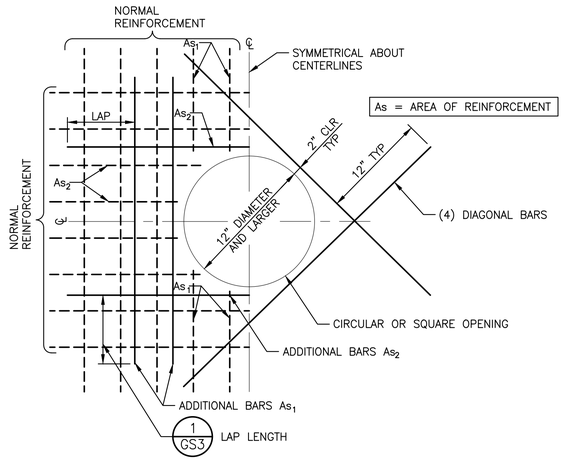
TU/USWCD
ELMER DAM MODIFICATIONS
STANDARD STRUCTURAL DETAILS 2

DESIGNED J. FISHER
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

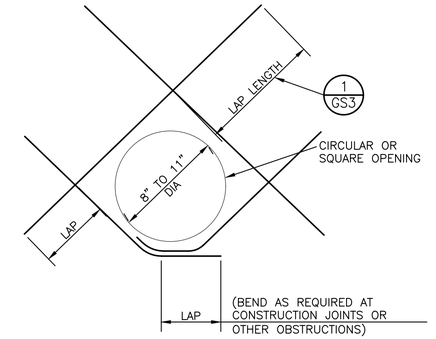
DRAWING
GS3
SCALE: AS NOTED



NOTES:
1. CUT NORMAL REINFORCEMENT AT OPENINGS: As_1 AND As_2 = ½ AREA OF CUT BARS TO BE ADDED ON EACH SIDE OF OPENING.
2. ADDITIONAL BARS As_1 AND As TO BE PLACED:
   A. AT CENTERLINE OF WALLS OR SLABS WHERE ONE LAYER OF REINFORCEMENT IS PROVIDED.
   B. AT EACH FACE OF WALLS OR SLABS WHERE TWO LAYERS OF REINFORCEMENT ARE PROVIDED.
3. INCREASE SIZE OF ADDITIONAL BARS AS NEEDED TO FIT WITHIN A DISTANCE OF 2 X WALL/SLAB THICKNESS FROM OPENING, PROVIDE 2" MIN CLEAR BETWEEN BARS.
4. THIS DETAIL TO BE USED ONLY WHEN NO OTHER DETAIL IS INDICATED ON THE DRAWINGS.
5. WHERE A SLAB OR INTERSECTING WALL CONNECTS WITHIN ONE WALL THICKNESS OF THE OPENINGS, ADDITIONAL BARS ON THAT SIDE MAY BE OMITTED.

ADDITIONAL REINFORCEMENT AT CIRCULAR AND SQUARE OPENINGS (12" DIA OR LARGER) 1/–

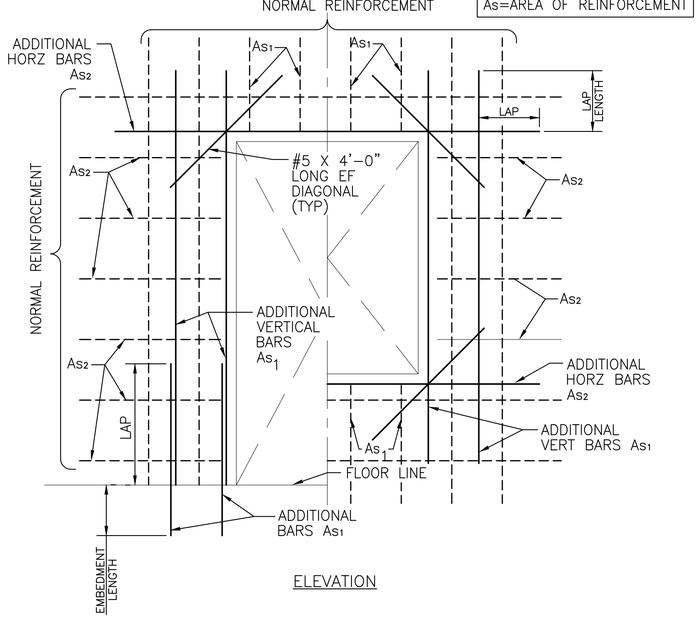
SCALE: NTS



NOTES:
1. CUT NORMAL REINFORCEMENT 2" CLEAR OF OPENING.
2. DIAGONAL BARS TO BE PLACED;
   A. AT CENTERLINE OF WALL OR SLAB WHERE ONE LAYER OF REINFORCEMENT IS PROVIDED.
   B. AT EACH FACE OF WALL OR SLAB WHERE TWO LAYERS OF REINFORCEMENT ARE PROVIDED.
3. UNLESS OTHERWISE NOTED, SIZE OF DIAGONAL BARS SHALL BE THE SIZE OF THE LARGEST NORMAL REINFORCING BAR CUT.
4. THIS DETAIL TO BE USED WHEN CALLED FOR ON THE DRAWINGS OR WHEN NO OTHER DETAIL IS SPECIFIED.

DIAGONAL REINF AT CIRCULAR AND SQUARE OPENINGS 2/–

SCALE: NTS



NOTES:
1. CUT NORMAL REINFORCEMENT AT OPENING: As_1 AND As_2 AREA OF CUT BARS TO BE ADDED ON EACH SIDE OF OPENING.
2. ADDITIONAL BARS As_1 AND AS_2 TO BE PLACED:
   A) AT CENTERLINE OF WALLS OR SLABS WHERE ONE LAYER OF REINFORCEMENT IS PROVIDED.
   B) AT EACH FACE OF WALLS OR SLABS WHERE TWO LAYERS OF REINFORCEMENT ARE PROVIDED.
3. INCREASE SIZE OF ADDITIONAL BARS AS NEEDED TO FIT WITHIN A DISTANCE OF 2x WALL/SLAB THICKNESS FROM OPENING. PROVIDE 2" MIN CLEAR BETWEEN BARS.
4. THIS DETAIL TO BE USED ONLY WHEN NO OTHER DETAILS IS INDICATED ON THE DRAWINGS.
5. WHERE A SLAB OR INTERSECTING WALL CONNECTS WITHIN ONE WALL THICKNESS OF THE OPENINGS, ADDITIONAL BARS ON THAT SIDE MAY BE OMITTED.

ADDITIONAL REINFORCEMENT AROUND RECTANGULAR OPENING 3/–

SCALE: NTS

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OREGON 6/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
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WARNING
0 1/2 1
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TU/USWCD

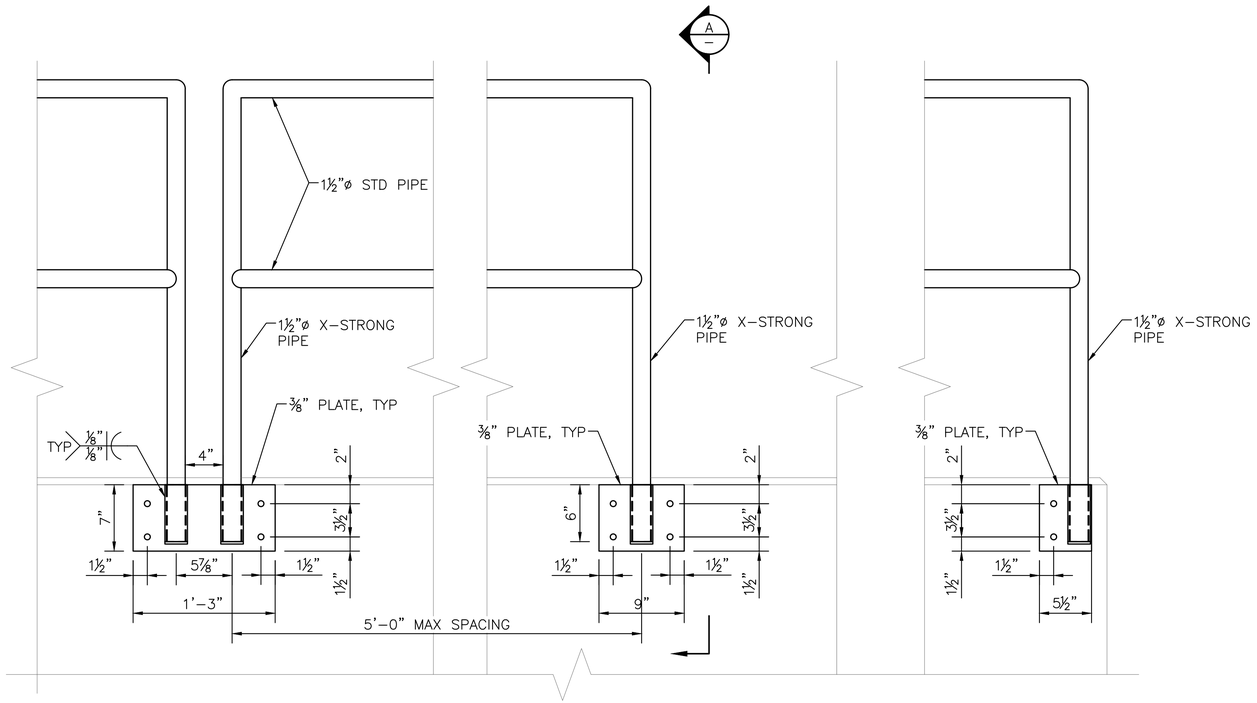
ELMER DAM MODIFICATIONS

STANDARD STRUCTURAL DETAILS 3

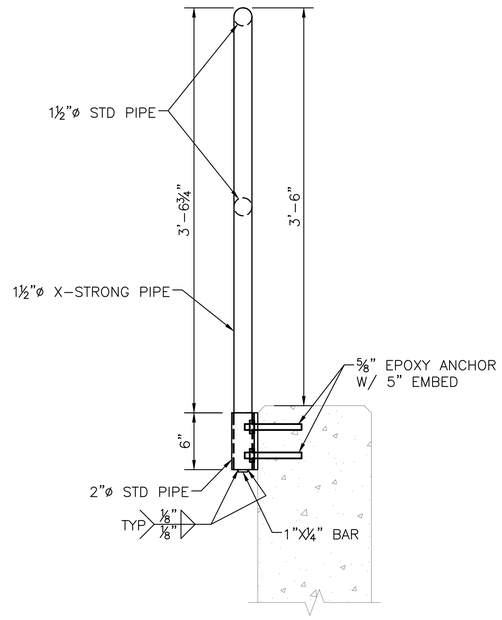
DESIGNED J. FISHER
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING
GS4
SCALE: AS NOTED

NOTES:
1. EPOXY ANCHORS SHALL BE HILTI HIT–HY 200 WITH ⅝"ø HAS–V–36 (ASTM F1554 Gr. 36) THREADED ROD WITH A 5" MINIMUM EMBEDMENT.
2. PLATES SHALL BE ASTM A36 STEEL OR BETTER.
3. PIPES SHALL BE ASTM A53 Gr.B



REMOVABLE GUARDRAIL BRACKET DETAIL (1/–)
SCALE: 1½""=1'–0"



REMOVABLE GUARDRAIL BRACKET SECTION (A/–)
SCALE: 1½"=1'–0"

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
MAR. 11, 2008
CHRISTOPHER C. BOYD
6/29/22
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
0 1/2 1
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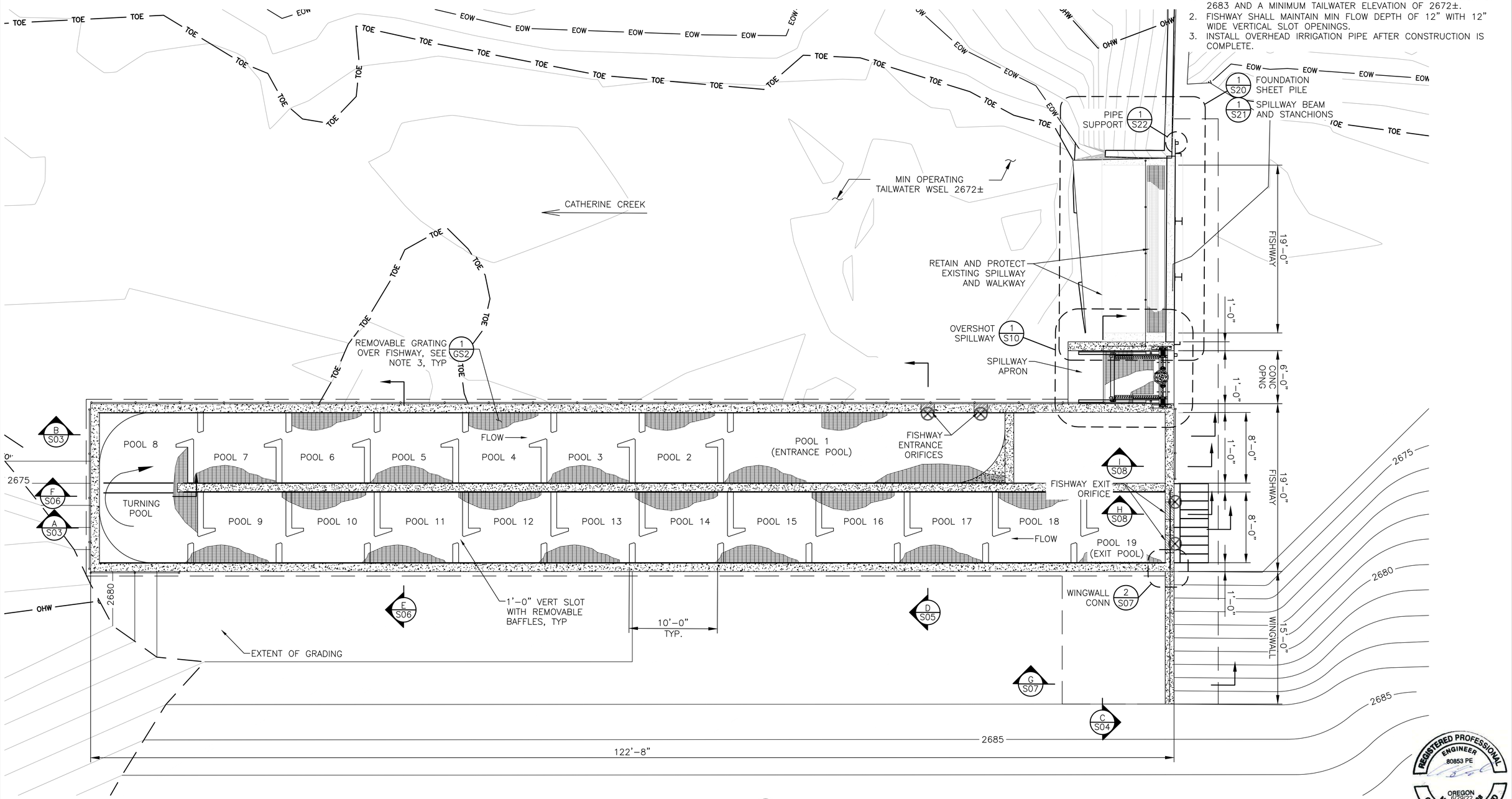
TU/USWCD
ELMER DAM MODIFICATIONS
STANDARD STRUCTURAL DETAILS 4

DESIGNED J. FISHER
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING
GS5
SCALE: AS NOTED

NOTES:
1. FISHWAY DESIGN BASED ON MAX FOREBAY POOL ELEVATION OF 2683 AND A MINIMUM TAILWATER ELEVATION OF 2672±.
2. FISHWAY SHALL MAINTAIN MIN FLOW DEPTH OF 12" WITH 12" WIDE VERTICAL SLOT OPENINGS.
3. INSTALL OVERHEAD IRRIGATION PIPE AFTER CONSTRUCTION IS COMPLETE.



FISHWAY PLAN
SCALE: 3/16" =1'-0"

1 A

REGISTERED PROFESSIONAL ENGINEER 80853 PE
OREGON 9/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
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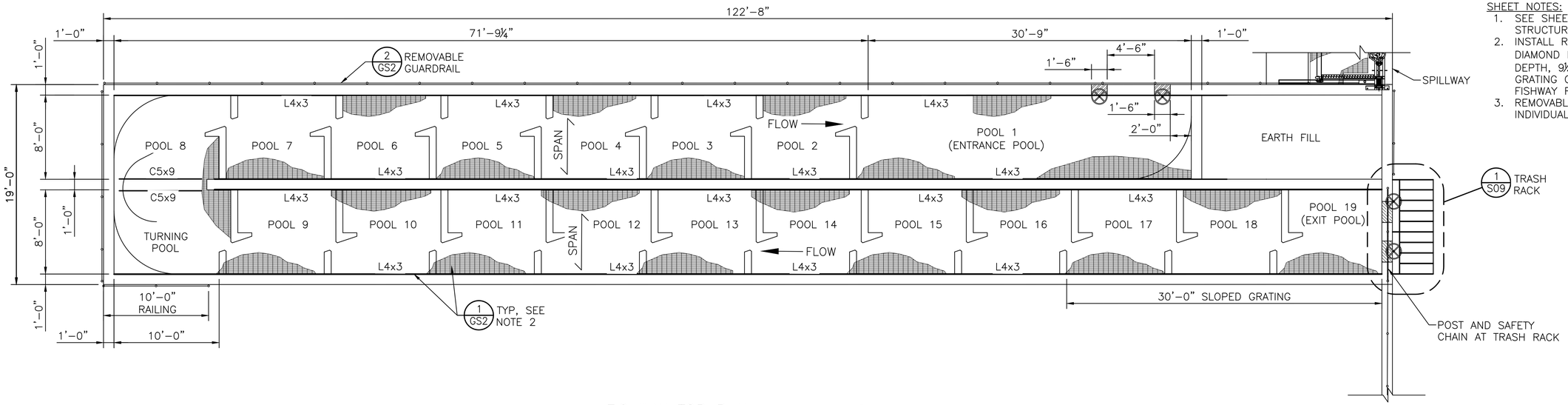
TU/USWCD
ELMER DAM MODIFICATIONS
FISHWAY & SPILLWAY PLAN

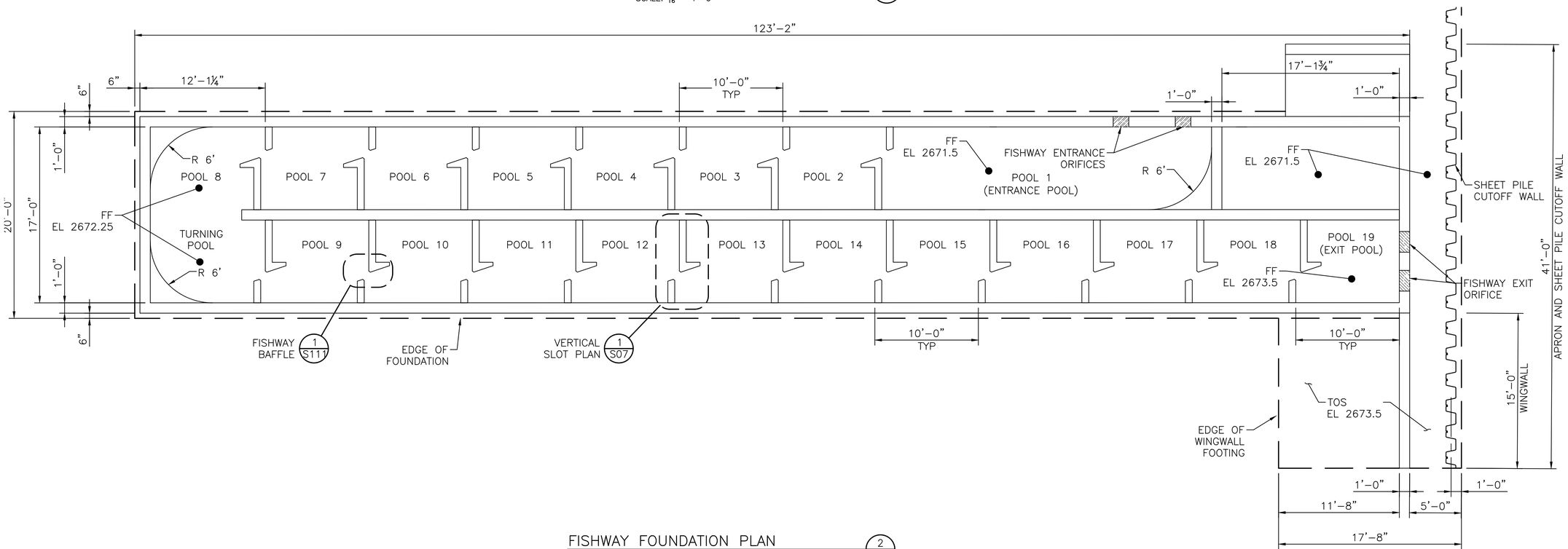
DESIGNED J. FISHER
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING S01
SCALE: AS NOTED



FISHWAY TOP PLAN (1/—)

SCALE: 1/8" =1'–0"



FISHWAY FOUNDATION PLAN (2/—)

SCALE: 3/16" =1'–0"

SHEET NOTES:
1. SEE SHEET GS01 FOR ADDITIONAL STRUCTURAL NOTES.
2. INSTALL REMOVABLE McNICHOLS, 2 DIAMOND HEAVY DUTY, 10 GAUGE, 2½" DEPTH, 9¼" WIDTH, GRIP STRUT PLANK GRATING OR APPROVED EQUAL OVER FISHWAY FOR ACCESS & MAINTENANCE.
3. REMOVABLE PLANKS SHALL NOT EXCEED INDIVIDUAL WEIGHT OF 60LBS.

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
6/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
0 1/2 1
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TU/USWCD

ELMER DAM MODIFICATIONS

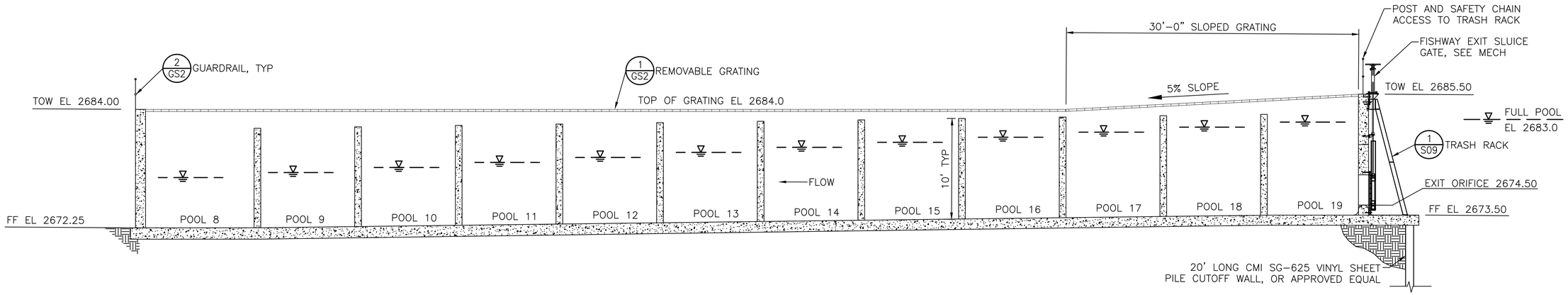
FISHWAY TOP PLAN & FOUNDATION PLAN

DESIGNED J. FISHER
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

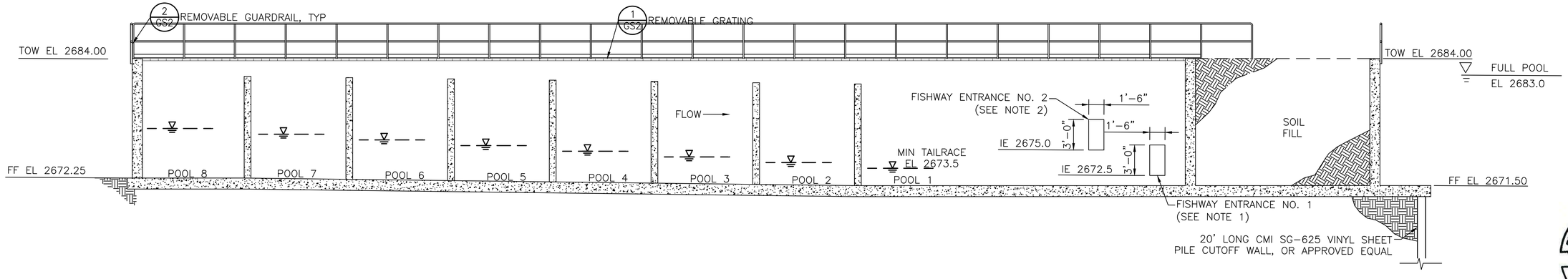
DRAWING
S02
SCALE: AS NOTED

SHEET NOTES:

1. FISHWAY ENTRANCE NO. 1 TO OPERATE FOR IN-STREAM FLOW RATES BETWEEN 8.5 CFS AND 100 CFS.
2. ENTRANCE ORIFICE NO. 2 TO OPERATE FOR IN-STREAM FLOW RATES GREATER THAN 100 CFS.
3. FISHWAY DESIGNED TO OPERATE FOR THE FOLLOWING RANGE OF CONDITIONS:
   TAILWATER: 2673.9 FT – 2677.6 FT
   FOREBAY: 2677.0 FT – 2683.0 FT (RESERVOIR OPERATIONS), 2675.0 – 2683.0 (OUTSIDE OF IRRIGATION SEASON).
4. WATER SURFACE ELEVATIONS SHOWN DO NOT DIRECTLY CORRELATE TO Q95 OR Q5 FLOWS DUE TO IRRIGATION OPERATIONS AND BACKWATER INFLUENCE FROM GRAND RONDE RIVER.



SECTION A S01
SCALE: 3/16" =1'-0"



SECTION B S01
SCALE: 3/16" =1'-0"

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
6/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
0 1/2 1
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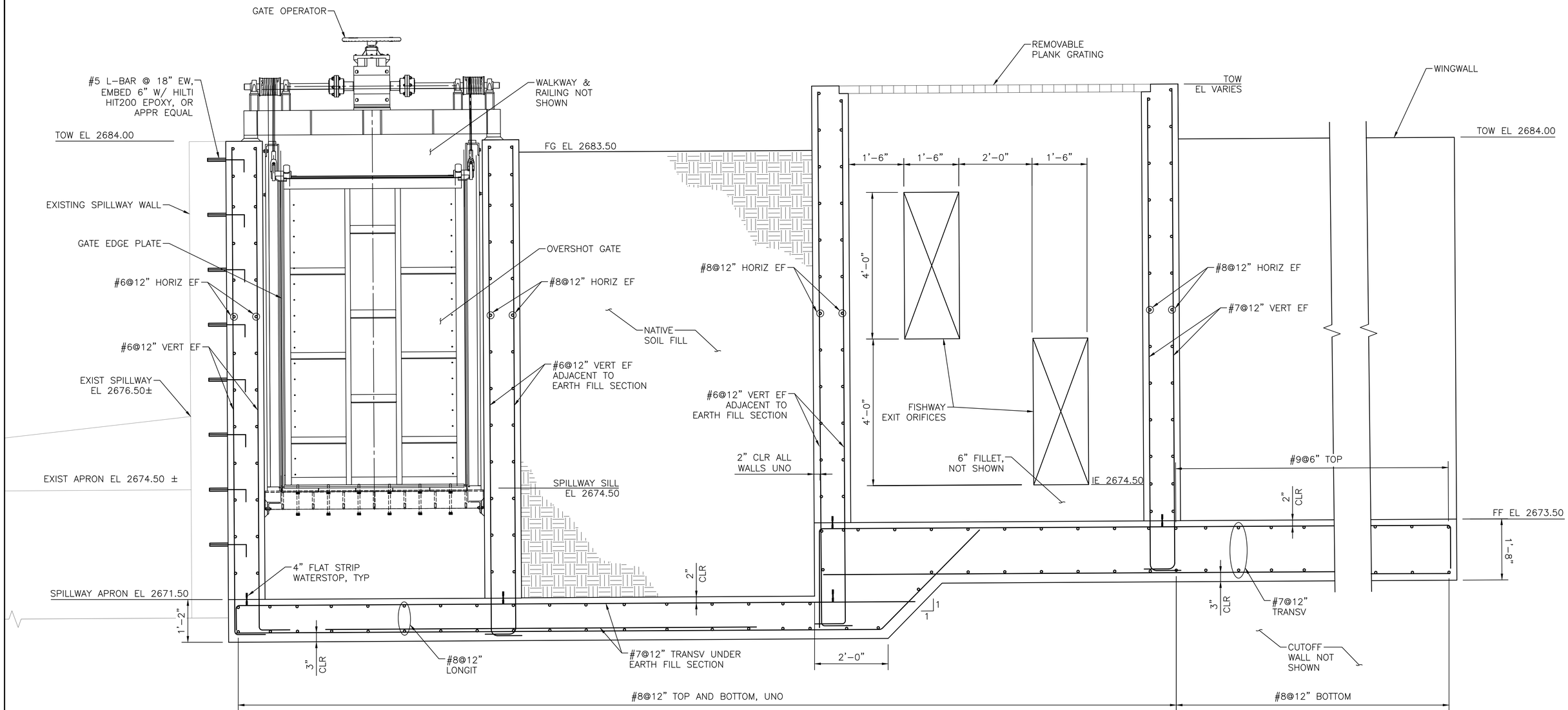
TU/USWCD
ELMER DAM MODIFICATIONS
FISHWAY PROFILES

DESIGNED J. FISHER
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING
S03
SCALE: AS NOTED



SECTION – LOOKING UPSTREAM (C / S01)

SCALE: ¾"=1'-0"

REGISTERED PROFESSIONAL ENGINEER 80853 PE
OREGON 01/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
0 1/2 1
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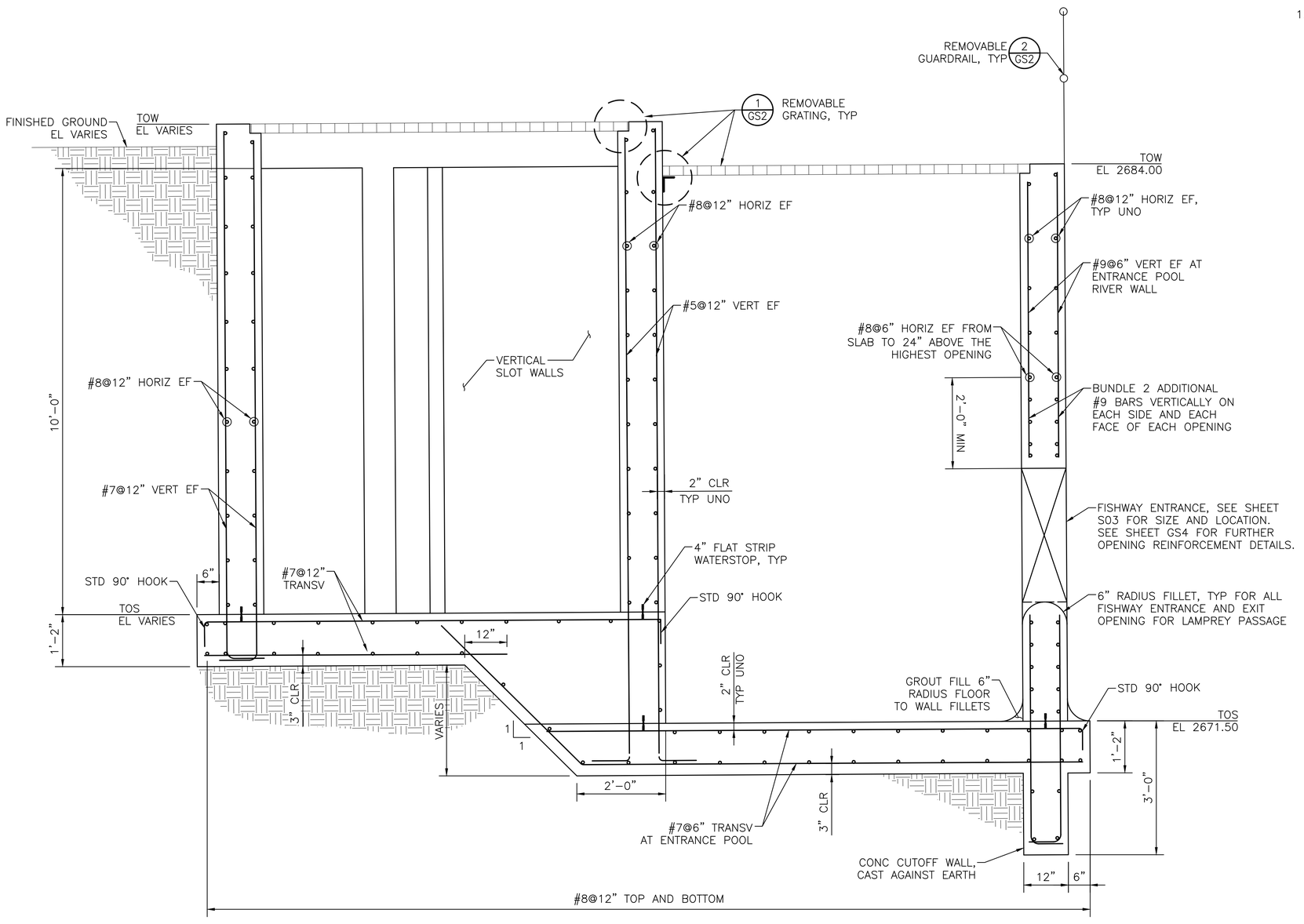
TU/USWCD
ELMER DAM MODIFICATIONS
FISHWAY SECTIONS 1

DESIGNED J. FISHER
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING S04
SCALE: AS NOTED

SHEET NOTES:

1. 6" RADIUS FILLETS AT FLOOR–WALL TRANSITIONS SHALL EXTEND 1–FT BEYOND ENTRANCE AND EXIT OPENINGS.



SECTION – LOOKING DOWNSTREAM (D / S01)

SCALE: ¾"=1'–0"

REGISTERED PROFESSIONAL ENGINEER 80853 PE OREGON 6/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD

RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

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TU/USWCD

ELMER DAM MODIFICATIONS

FISHWAY SECTION 2

DESIGNED J. FISHER

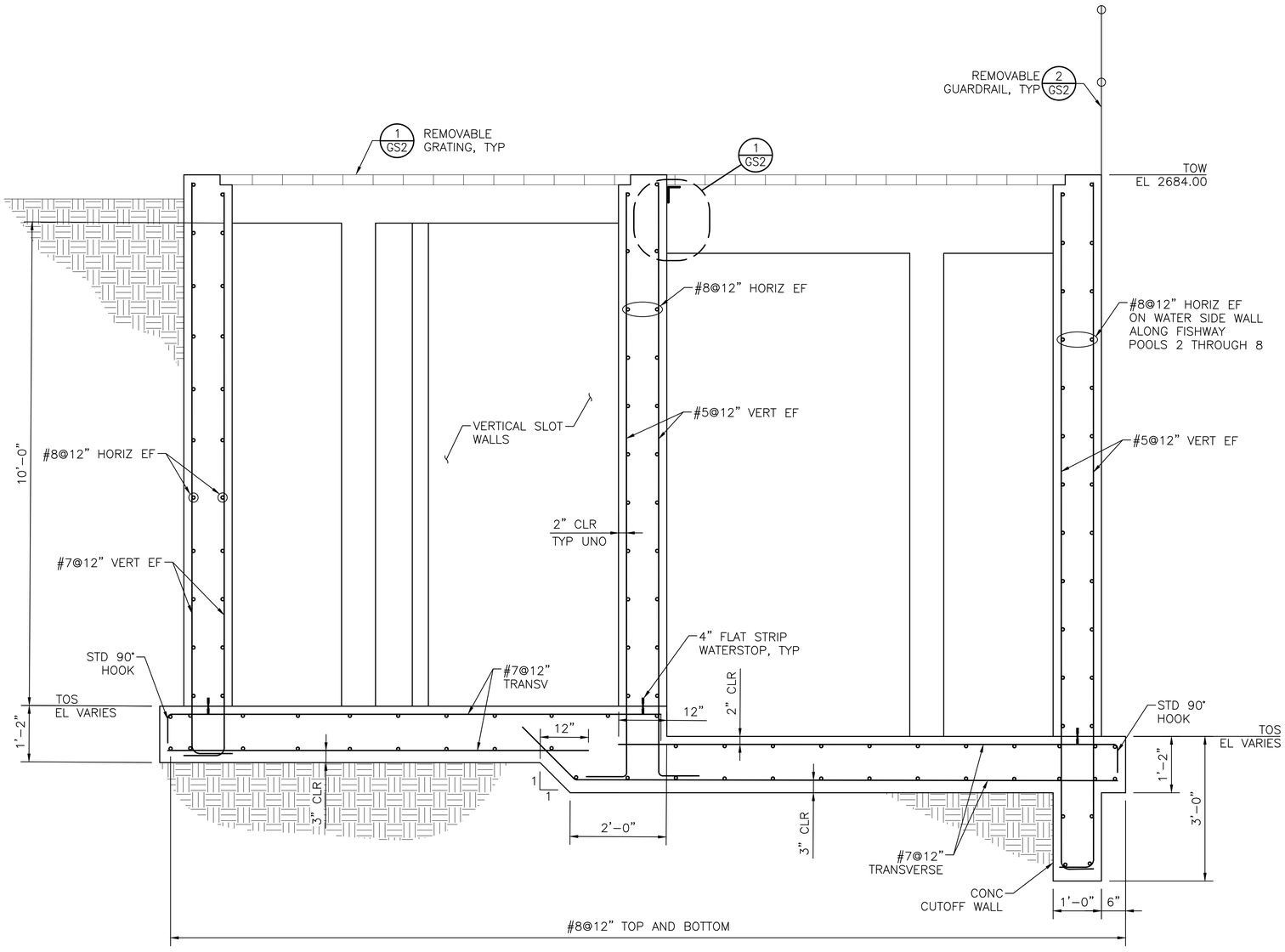
DRAWN J. LAHMON

CHECKED C. BOYD

ISSUED DATE 06/17/22

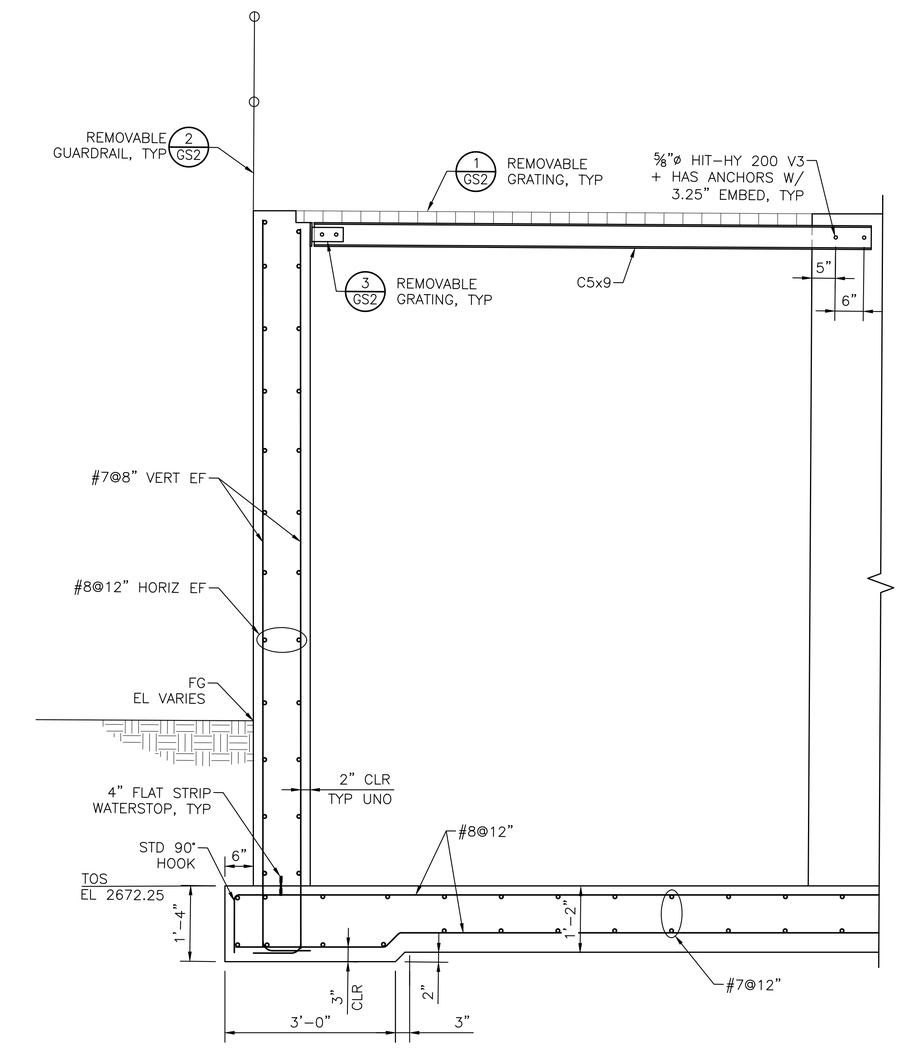
DRAWING S05

SCALE: AS NOTED



SECTION – LOOKING DOWNSTREAM (E / S01)

SCALE: ¾"=1'-0"



END WALL SECTION (F / S01)

SCALE: ¾"=1'-0"

REGISTERED PROFESSIONAL ENGINEER 80853 PE
OREGON 6/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING

0 1/2 1

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TU/USWCD

ELMER DAM MODIFICATIONS

FISHWAY SECTIONS 3

DESIGNED J. FISHER

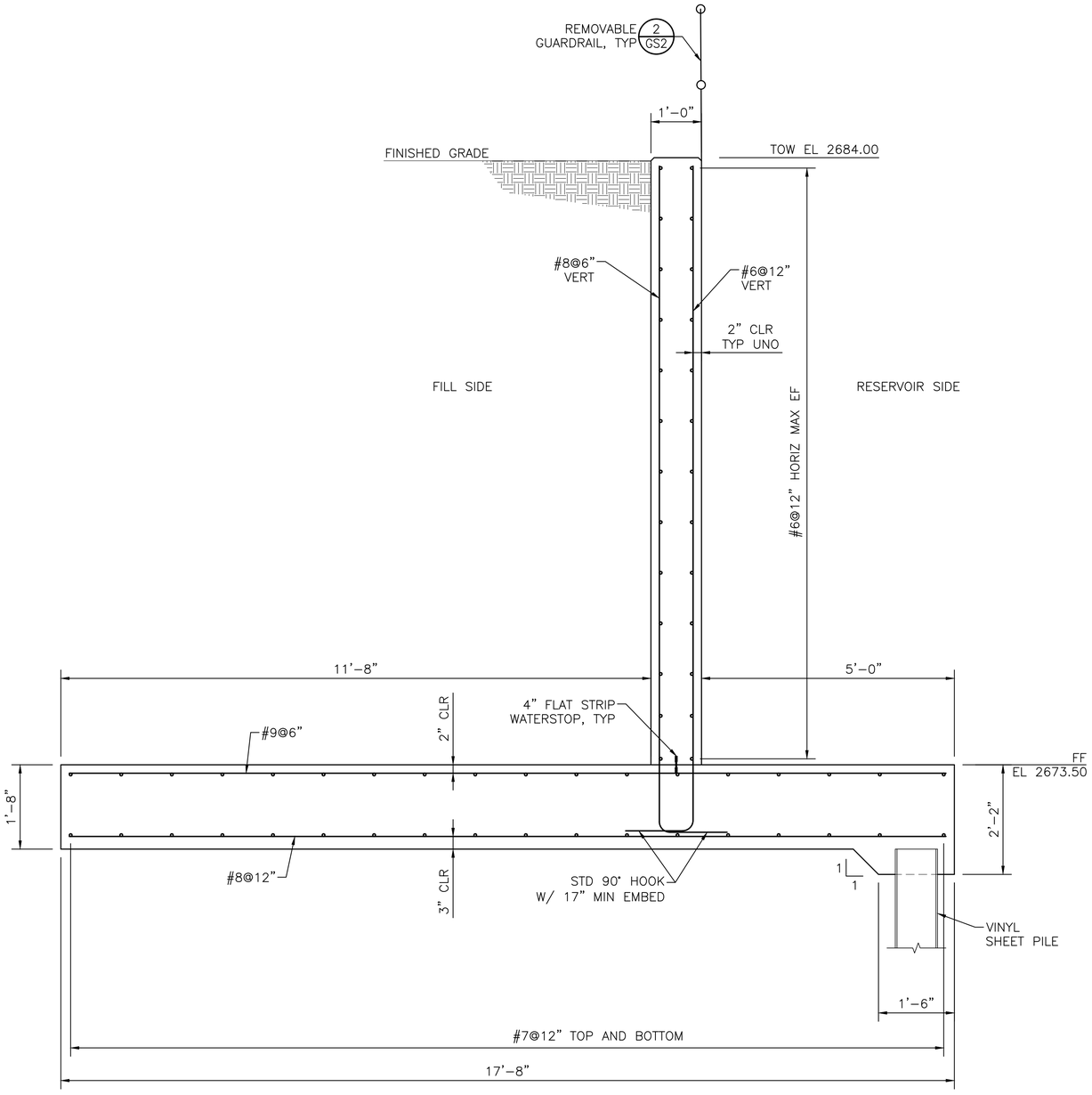
DRAWN J. LAHMON

CHECKED C. BOYD

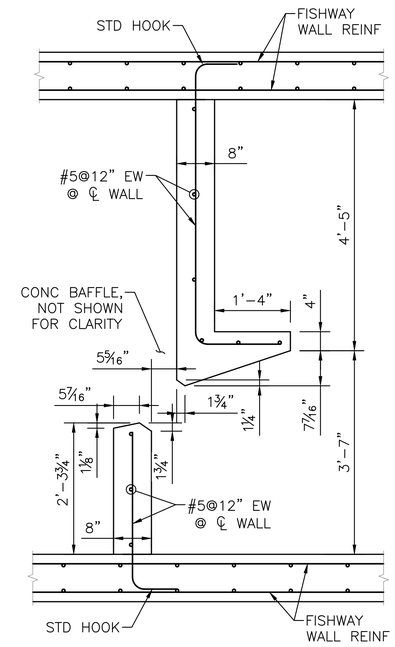
ISSUED DATE 06/17/22

DRAWING S06

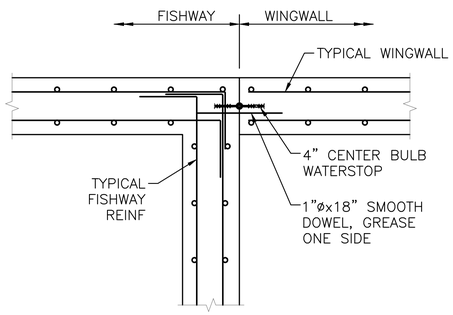
SCALE: AS NOTED



WINGWALL SECTION (G / S01)
SCALE: ¾"=1'-0"



VERTICAL SLOT DETAIL (1 / S02)
SCALE: ¾" =1'-0"



WINGWALL TO FISHWAY CONN (2 / S01)
SCALE: ¾"=1'-0"

REGISTERED PROFESSIONAL ENGINEER 80853 PE OREGON 6/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

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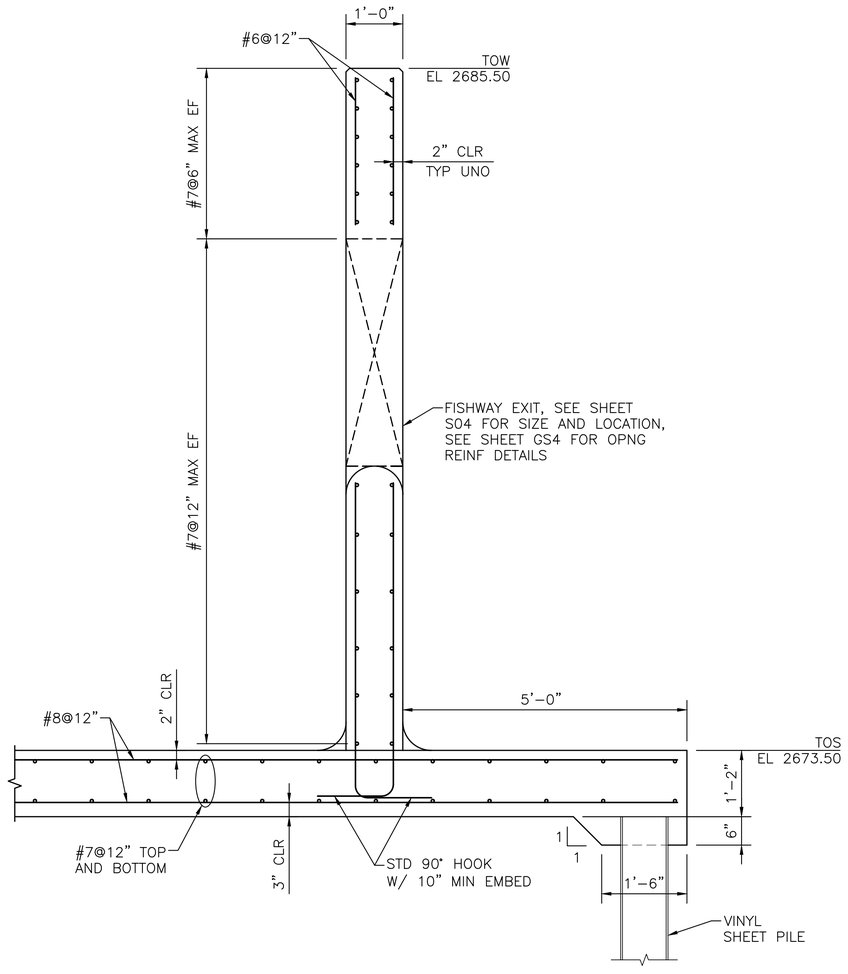
TU/USWCD
ELMER DAM MODIFICATIONS
FISHWAY SECTIONS 4

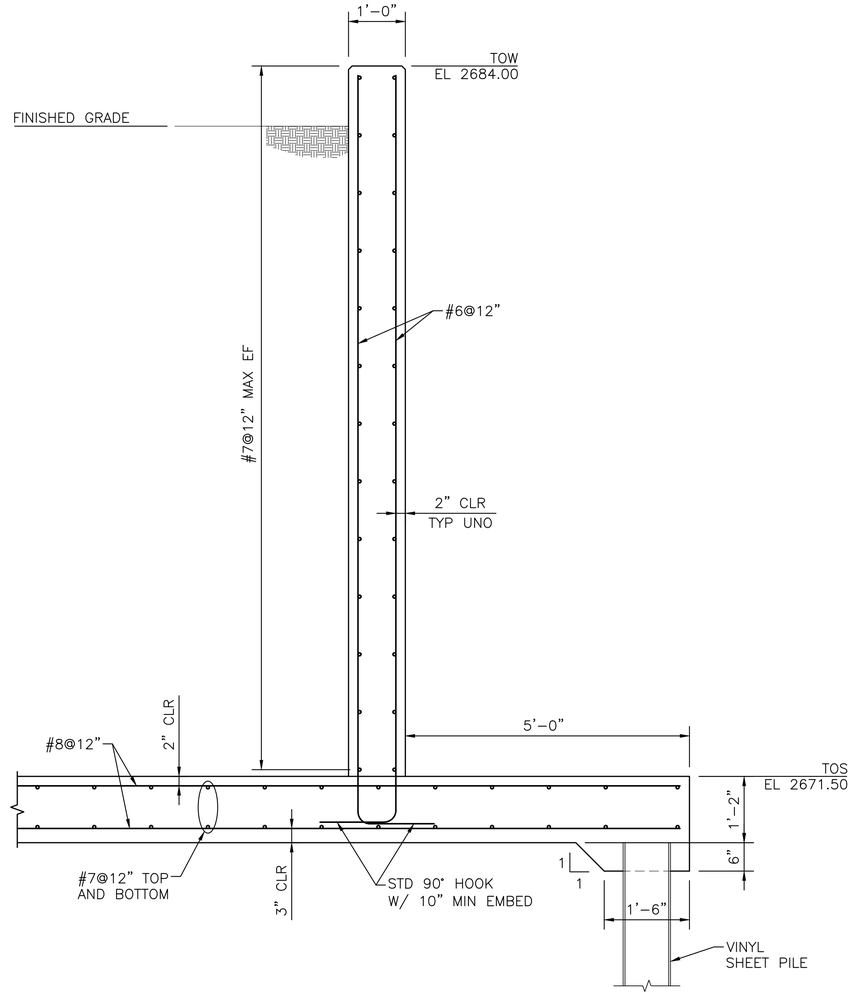
DESIGNED J. FISHER
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING S07
SCALE: AS NOTED



FISHWAY EXIT WALL SECTION (H / S01)

SCALE: ¾"=1'–0"



UPSTREAM WALL SECTION (I / S01)

SCALE: ¾"=1'–0"

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80853 PE
OREGON
6/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
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ELMER DAM MODIFICATIONS

FISHWAY SECTIONS 5

DESIGNED J. FISHER

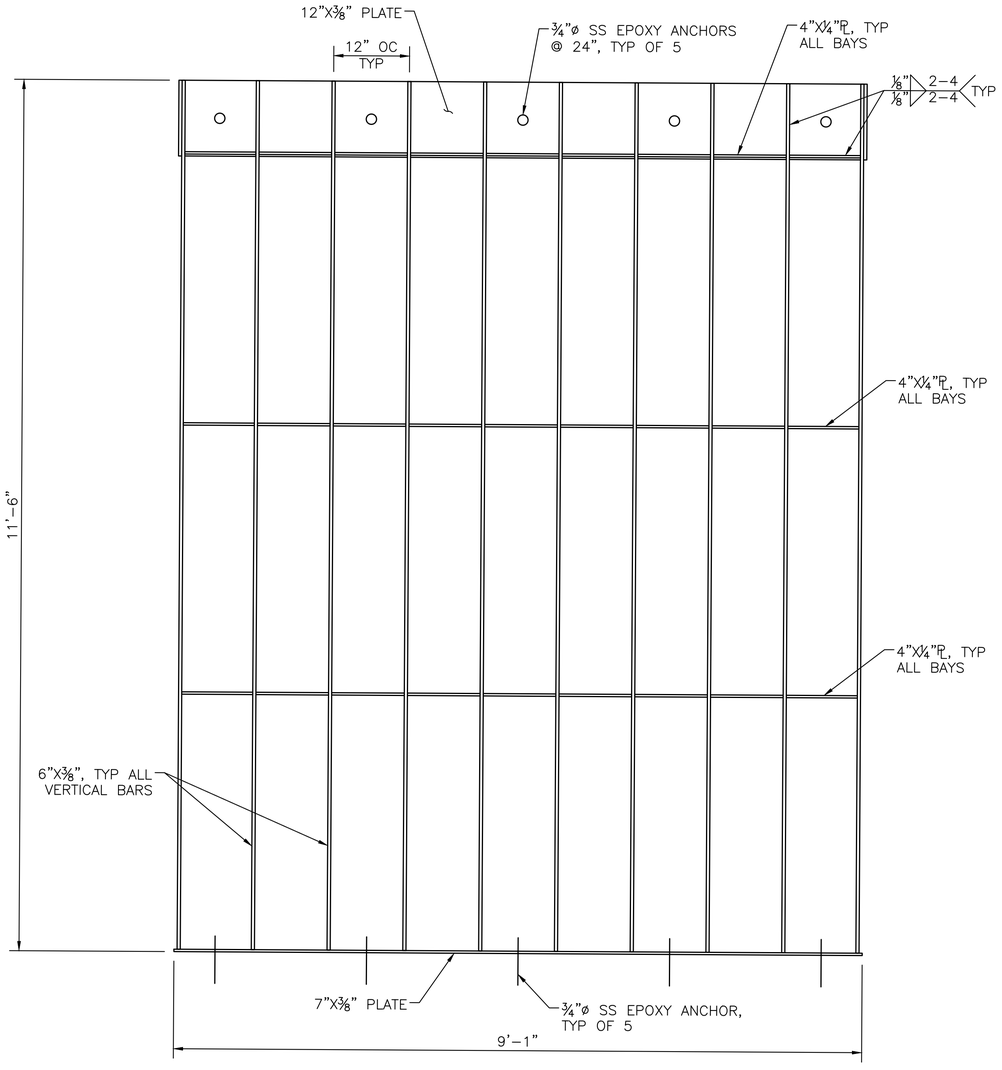
DRAWN J. LAHMON

CHECKED C. BOYD

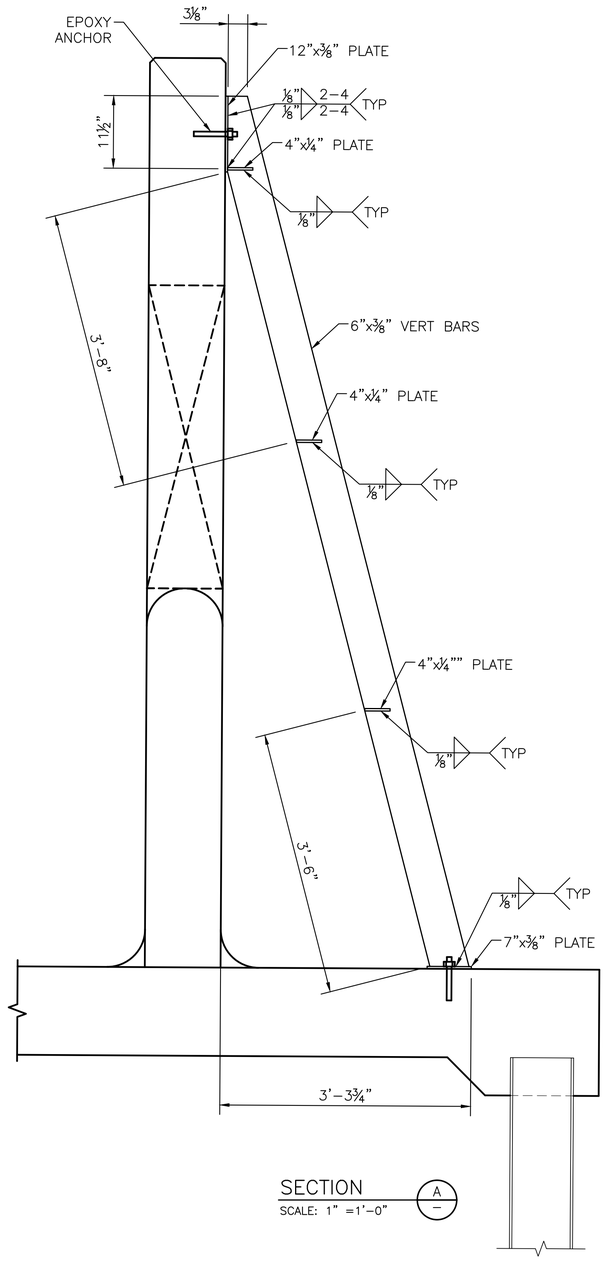
ISSUED DATE 06/17/22

DRAWING S08

SCALE: AS NOTED



TRASH RACK (1/S02)
SCALE: 1" =1'-0"



SECTION (A/—)
SCALE: 1" =1'-0"

SHEET NOTES:

1. EPOXY ANCHORS SHALL BE HILTI HIT-HY 200 WITH ¾"ø HAS-R-304/316 SS THREADED ROD WITH A 7" MINIMUM EMBEDMENT OR APPROVED EQUIVALENT.
2. PLATES AND BARS SHALL BE ASTM A36 STEEL OR BETTER, GALVANIZED AFTER FABRICATION.

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
6/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

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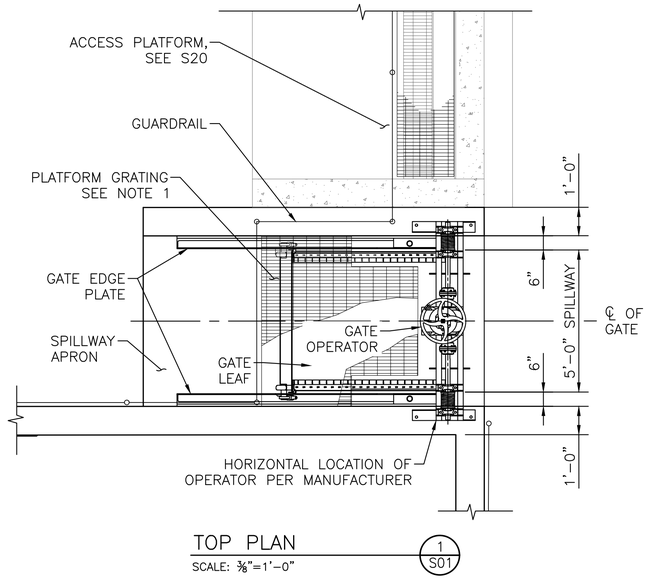
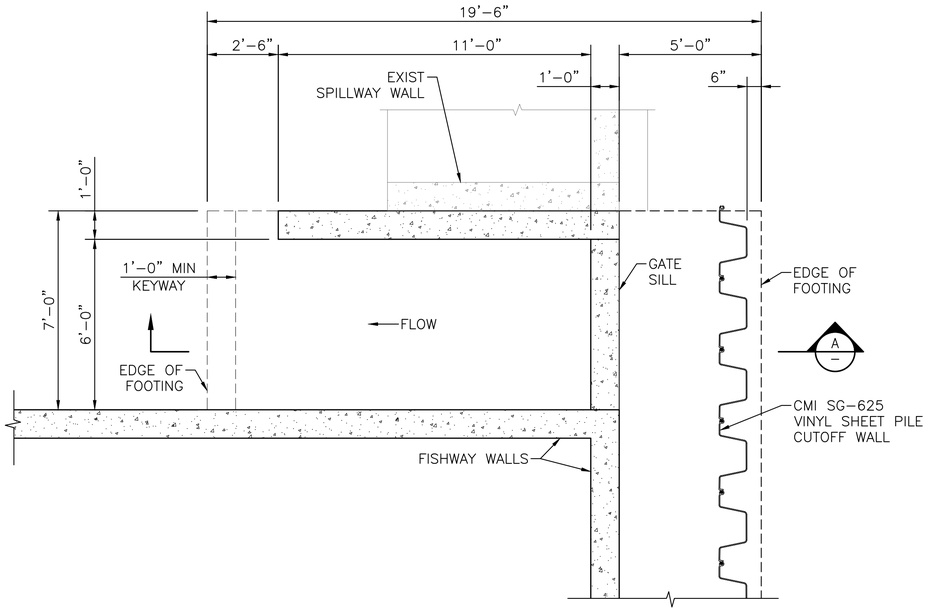
TU/USWCD
ELMER DAM MODIFICATIONS
TRASH RACK DETAILS

DESIGNED J. FISHER
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING
S09
SCALE: AS NOTED



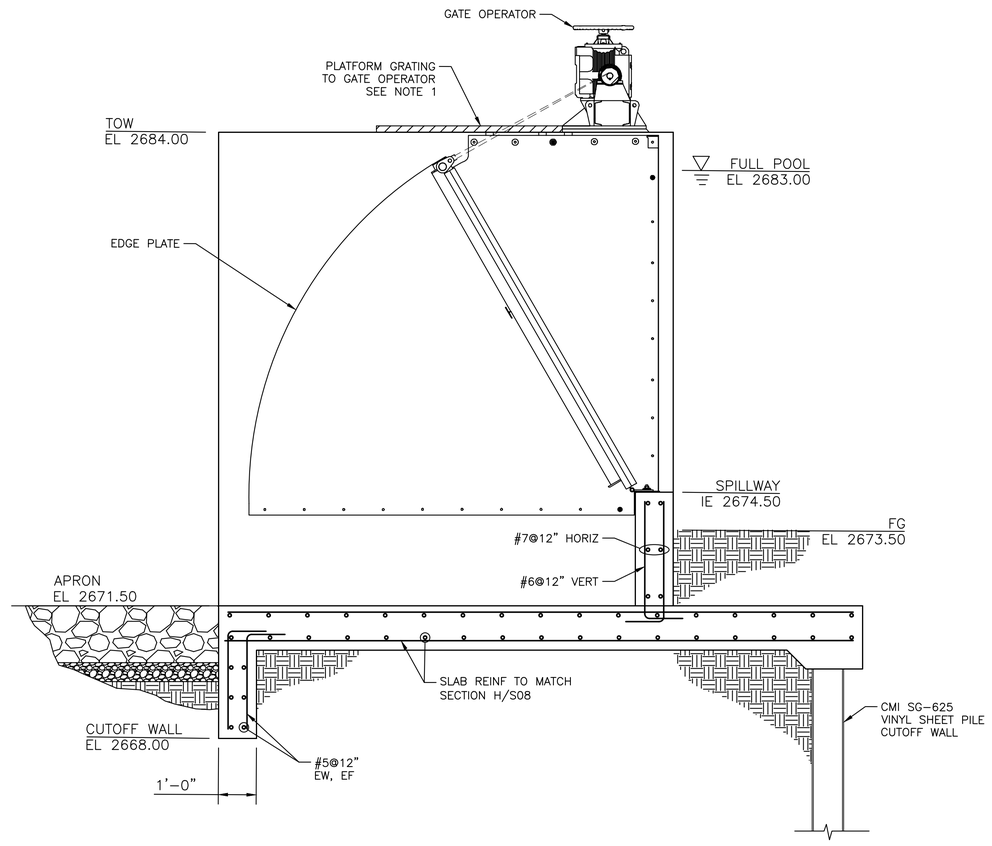
TOP PLAN (1/S01)
SCALE: ⅜"=1'-0"



FOUNDATION PLAN (1/S01)
SCALE: ⅜"=1'-0"

SHEET NOTES:

1. CONTRACTOR SHALL DESIGN PLATFORM GRATING AND GUARDRAIL ACROSS 5'-0" SPILLWAY. PLATFORM GRATING DESIGN SHALL PROVIDE ACCESS TO THE GATE OPERATOR FOR MAINTENANCE. PLATFORM GRATING AND SUPPORTS SHALL NOT CONFLICT WITH TILTING WEIR COMPONENTS.
2. PLATFORM GRATING DESIGN SHALL BE APPROVED BY ENGINEER PRIOR TO FABRICATION.
3. ANCHOR BOLT CONNECTION DETAILS FOR SILL PLATE, EDGE PLATE AND OPERATOR PER MANUFACTURER.



SECTION (A/S01)
SCALE: ½"=1'-0"

REGISTERED PROFESSIONAL ENGINEER 80853 PE
OREGON 6/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
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WARNING
0 1/2 1
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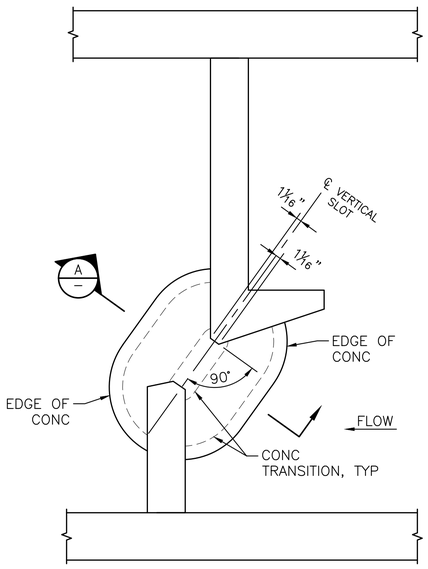
TU/USWCD
ELMER DAM MODIFICATIONS
SPILLWAY PLAN AND SECTION

DESIGNED J. FISHER
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

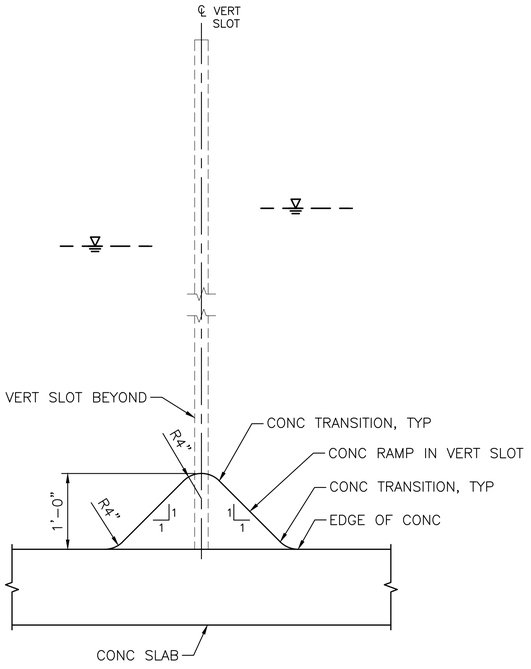
DRAWING S10
SCALE: AS NOTED

SHEET NOTES:

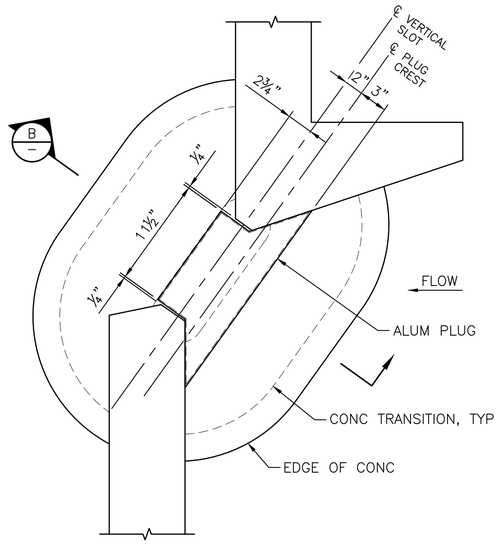
1. PLUGS SHALL BE FABRICATED FROM ALUM PLATE.
2. WELD ALL EDGES AND FINISH GRIND AS NECESSARY TO PROVIDE SMOOTH, FISH FRIENDLY SURFACES.



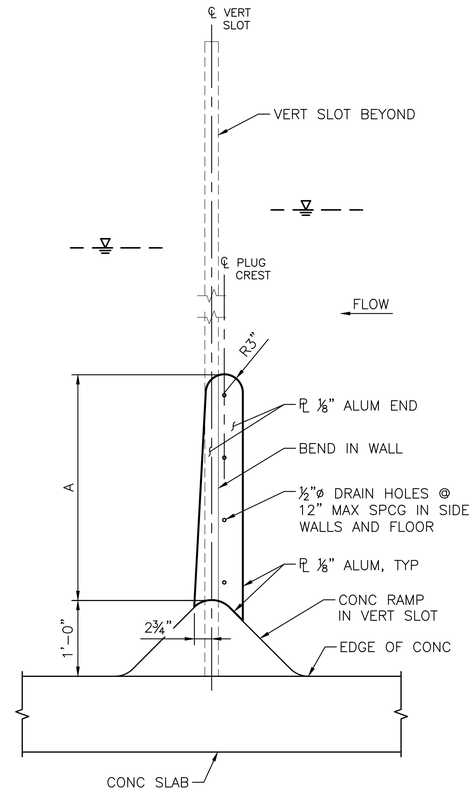
CONCRETE BAFFLE PLAN (ALL SLOTS) — 1/S02
SCALE: ¾" =1'–0"



BAFFLE SECTION — A/–
SCALE: 1" =1'–0"



PLUG PLAN (SEE TABLE FOR LOCATIONS) — 2/–
SCALE: 1 1/2" =1'–0"



BAFFLE SECTION — B/–
SCALE: 1" =1'–0"

BOUNDING POOL NUMBERS	BAFFLE HEIGHT (A)
18–19	3.5
17–18	3.1
16–17	2.8
15–16	2.4
14–15	2.0
13–14	1.6
12–13	1.3
11–12	0.9
10–11	0.5

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
8/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

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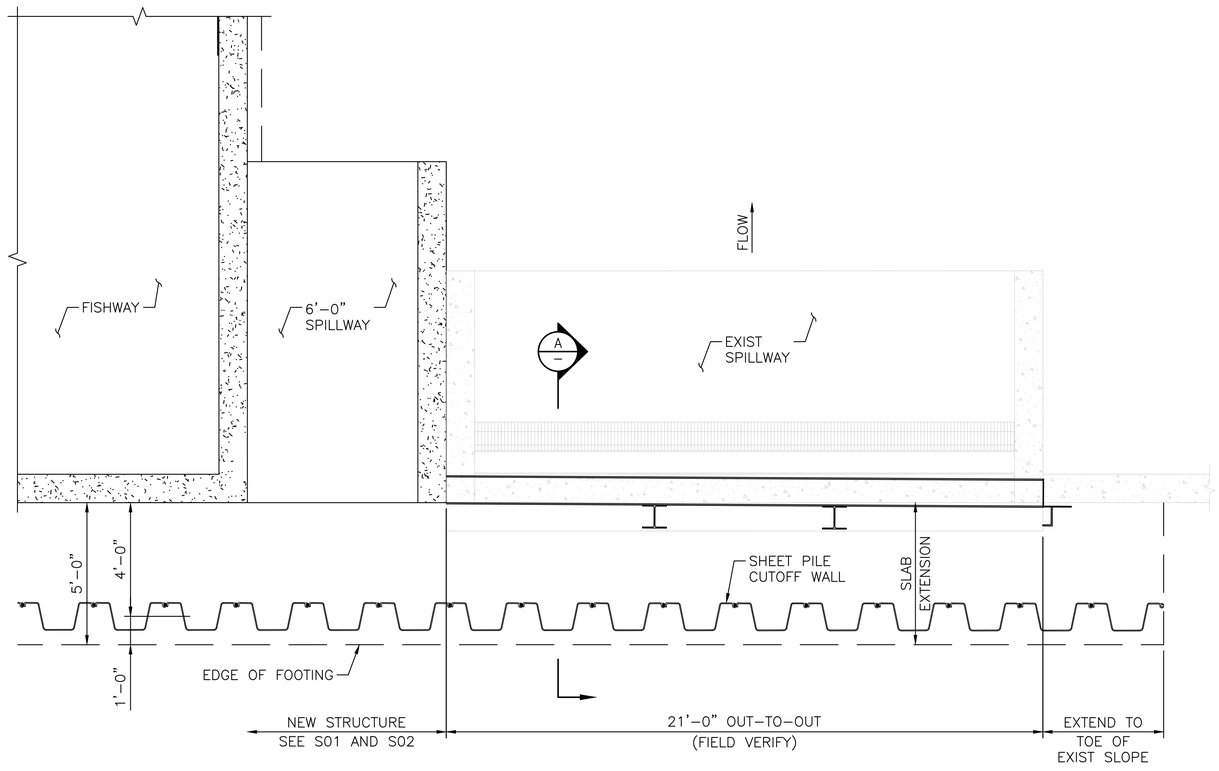
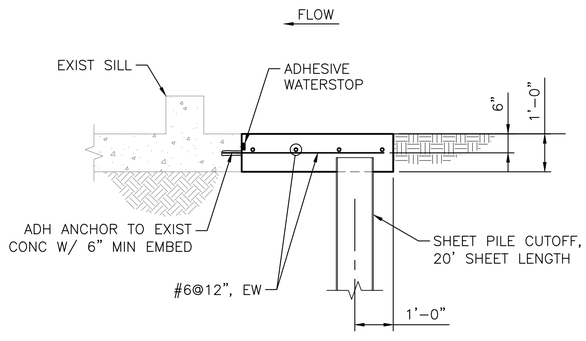
TU/USWCD
ELMER DAM MODIFICATIONS
FISHWAY BAFFLE DETAILS

DESIGNED J. FISHER
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING
S11
SCALE: AS NOTED



SHEET PILE PLAN
SCALE: ⅜" =1'–0"
1 / S01



SECTION
SCALE: ½" =1'–0"
A / –

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
6/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

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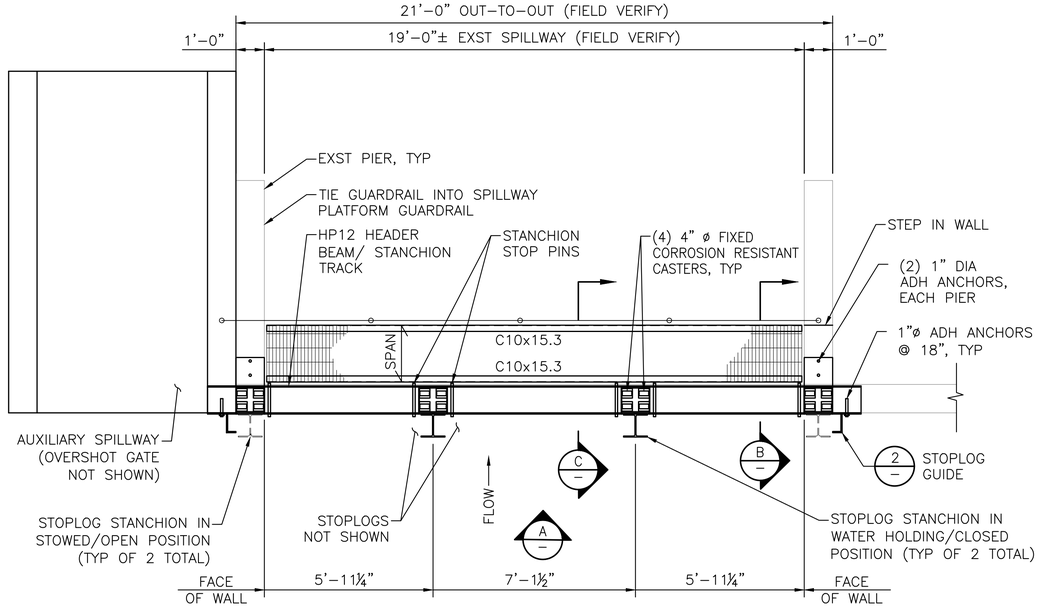
ELMER DAM MODIFICATIONS

EXISTING SPILLWAY IMPROVEMENTS
FOUNDATION PLAN AND SECTIONS

DESIGNED J. FISHER
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

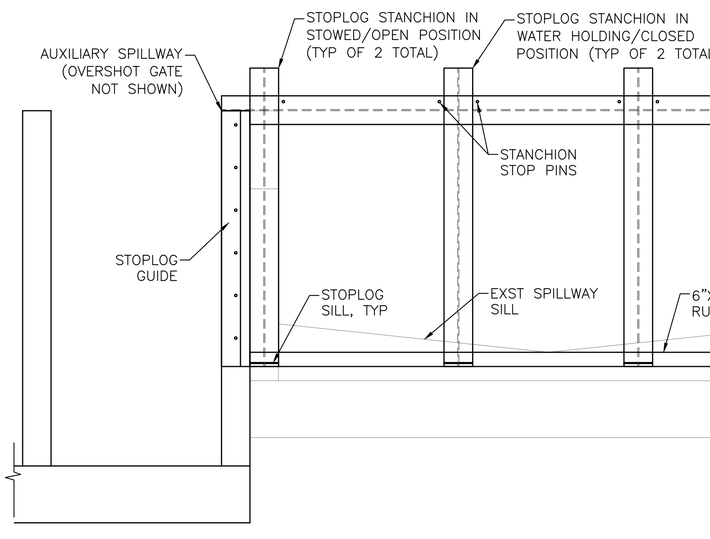
DRAWING
S20
SCALE: AS NOTED



SPILLWAY PLAN

SCALE: ⅜"=1'–0"

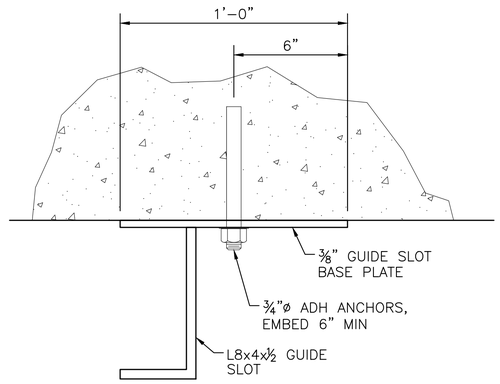
1 S01



FRONT ELEVATION

SCALE: ⅜"=1'–0"

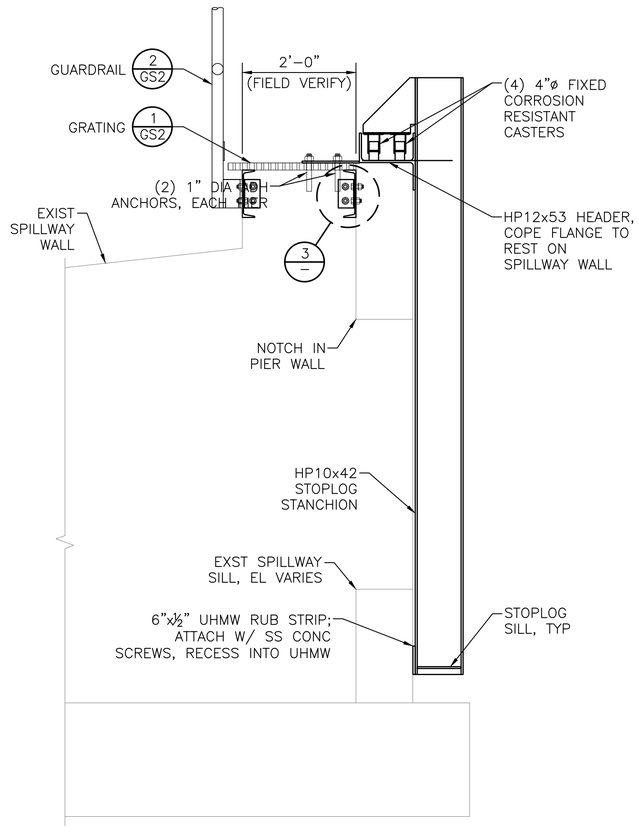
A



STOPLOG GUIDE

SCALE: 3"=1'–0"

2



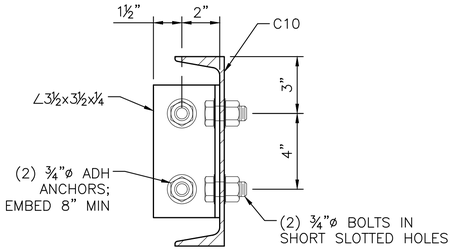
SECTION

SCALE: ¾"=1'–0"

B

SHEET NOTES:

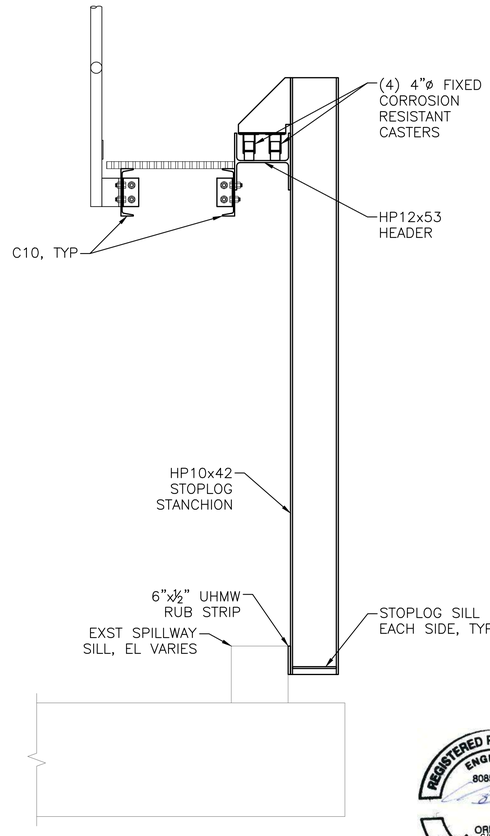
1. CASTERS SHALL BE 4–INCH DIAMETER, CORROSION RESISTANT CASTERS SUITABLE FOR OUTDOOR USE. CONTRACTOR SHALL SUBMIT PROPOSED CASTERS WITH FABRICATED STEEL SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL.



DETAIL

SCALE: 3"=1'–0"

3



SECTION

SCALE: ¾"=1'–0"

C

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
MAR. 11, 2008
CHRISTOPHER C. BOYD
9/29/23
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
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WARNING

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ELMER DAM MODIFICATIONS

EXISTING SPILLWAY IMPROVEMENTS
TOP PLAN AND SECTIONS

DESIGNED C. BOYD

DRAWN J. LAHMON

CHECKED G. HORECZY

ISSUED DATE 06/17/22

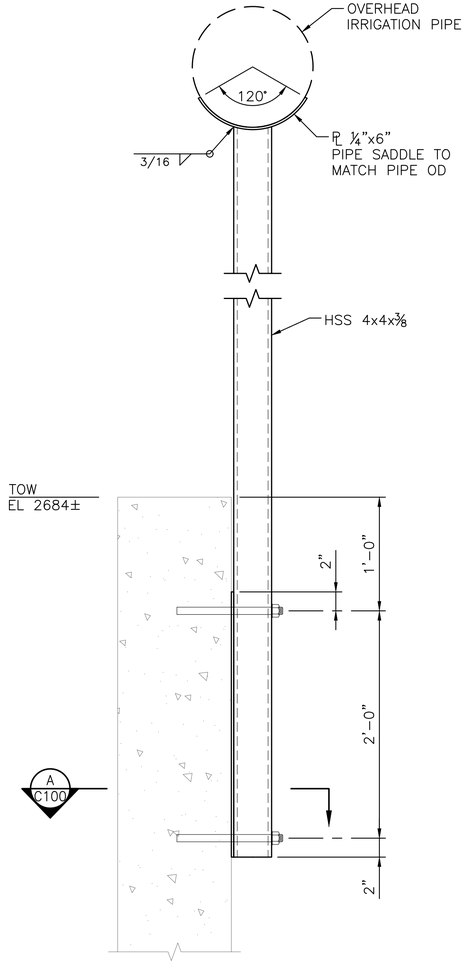
DRAWING

S21

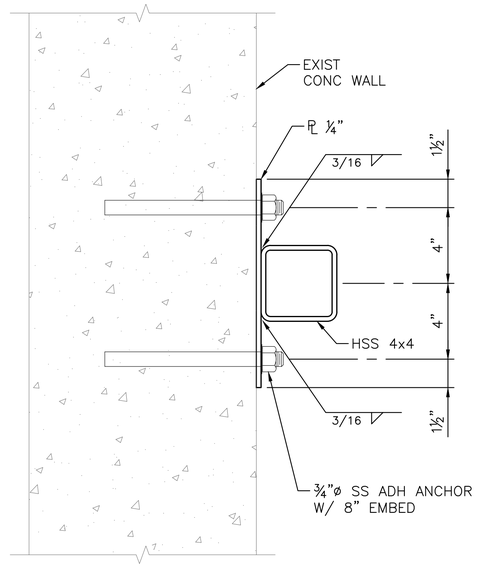
SCALE: AS NOTED

SHEET NOTES:

1. SEE CIVIL SHEETS FOR IRRIGATION PIPE REQUIREMENTS.
2. FIELD LOCATE PIPE SUPPORTS AT 30' MAX SPACING.



PIPE SUPPORT DETAIL
SCALE: 1½"=1'-0"
1
S01



SECTION
SCALE: 3"=1'-0"
A
—

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
MAR. 11, 2008
CHRISTOPHER C. BOYD
6/29/22
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
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WARNING
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ELMER DAM MODIFICATIONS

PIPE SUPPORT
SECTIONS AND DETAILS

DESIGNED C. BOYD
DRAWN J. LAHMON
CHECKED G. HORECZY
ISSUED DATE 06/17/22

DRAWING
S22
SCALE: AS NOTED

GATES							
EQUIP NO.	LOCATION	SERVICE	TYPE	CLEAR OPENING	OPERATOR	OPENING DIRECTION	COMMENTS
TW–1	SPILLWAY	FOREBAY CONTROL	TILTING WEIR	72" X 102"	HAND WHEEL WITH PORTABLE OPERATOR	DOWNWARD OPENING	CABLE TO BE LOCATED BEHIND SIDE PANEL AND PROTECTED FROM FLOW AND DEBRIS. GATE HEIGHT IS VERTICAL DISTANCE FROM SILL TO FULL POOL WATER SURFACE ELEVATION.
SG–1	FISHWAY ENTRANCE	FISHWAY ENTRANCE CONTROL – HIGH TAILWATER WATER CONDITION	SLIDE GATE	18" X 42"	HAND WHEEL	UPWARD OPENING	
SG–2	FISHWAY ENTRANCE	FISHWAY ENTRANCE CONTROL – LOW TAILWATER CONDITION	SLIDE GATE	18" X 42"	HAND WHEEL	UPWARD OPENING	
SG–3	FISHWAY EXIT	FISHWAY EXIT CONTROL – FULL POOL FOREBAY CONDITION	DUAL STEM SLIDE GATE	18" X 54"	HAND WHEEL	DOWNWARD OPENING	
SG–4	FISHWAY EXIT	FISHWAY EXIT CONTROL – LOW POOL FOREBAY CONDITION	SLIDE GATE	18" X 54"	HAND WHEEL	UPWARD	GATE WIDTH PER MANUFACTURE. DUAL STEMS SHALL BE LOCATED OUTSIDE OF CLEAR OPENING.

NOTES:

1. TILTING WEIR GATE SHOULD BE OF FRESNO VALVES MANUFACTURE OR APPROVED EQUAL.
2. ALL FISHWAY SLIDE GATES SHALL BE STAINLESS STEEL. MANUFACTURE SHALL BE WATERMAN OR APPROVED EQUAL.
3. ALL HANDWHEEL ACTUATORS SHALL BE REMOVABLE.

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
MAR. 11, 2008
CHRISTOPHER C. BOYD
6/29/22
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
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WARNING

0 1/2 1

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TU/USWCD

ELMER DAM MODIFICATIONS

MECHANICAL EQUIPMENT SCHEDULE

DESIGNED J. WOODBURY

DRAWN J. LAHMON

CHECKED W. ZIMMERMAN

ISSUED DATE 06/17/22

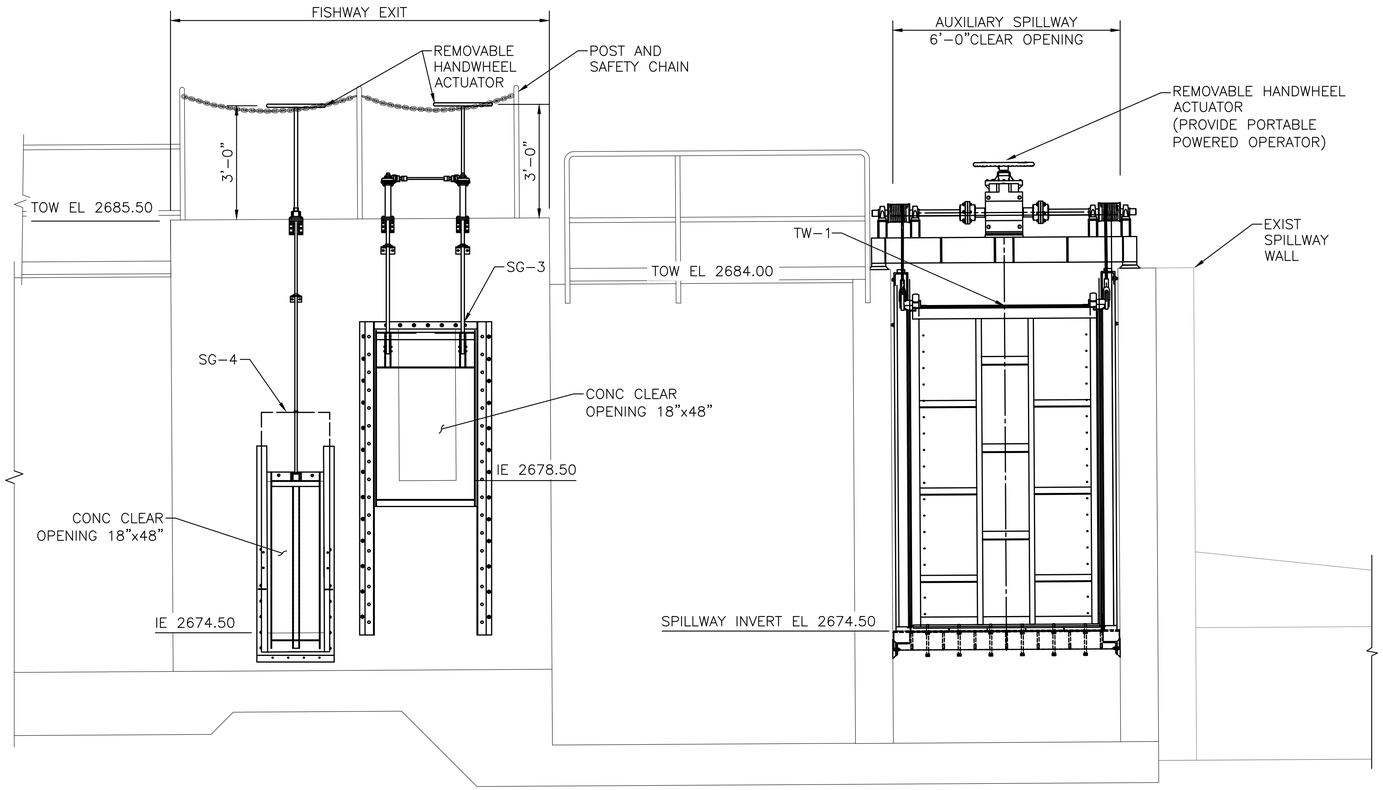
DRAWING

GM1

SCALE: AS NOTED

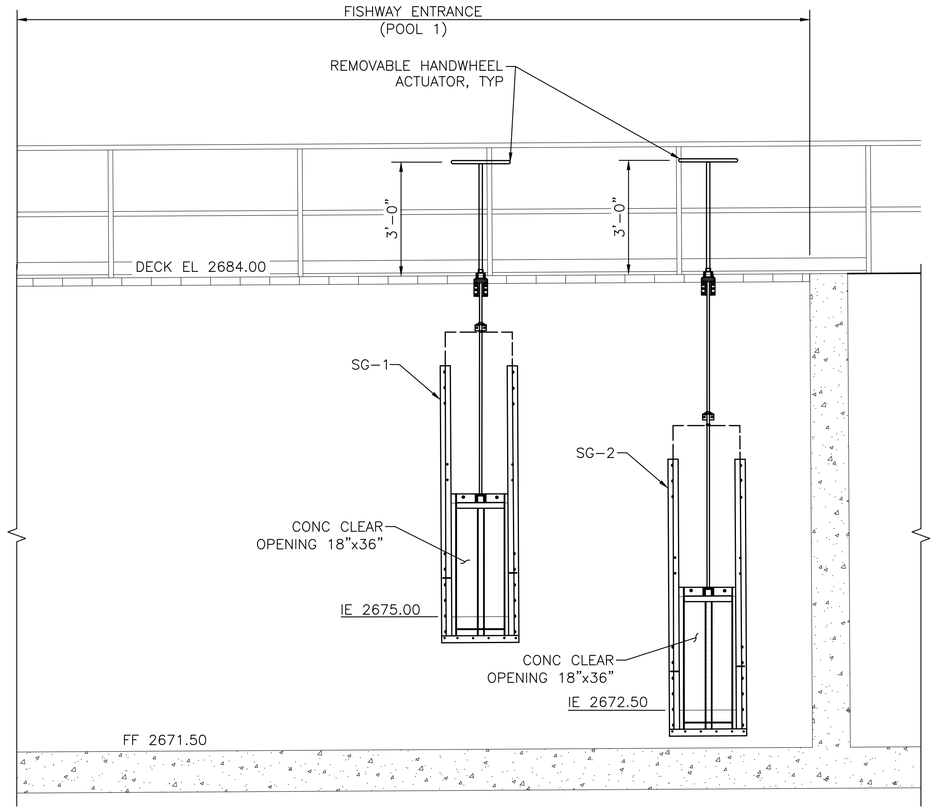
SHEET NOTES:

1. GATE CLEAR OPENING TO EXTEND 6" BELOW CONC OPENING INVERT DUE TO ROUNDED CORNERS FOR LAMPREY PASSAGE



FISHWAY EXIT AND SPILLWAY SECTION (LOOKING DOWNSTREAM) 1/–

SCALE: ½"=1'-0"



FISHWAY ENTRANCE SECTION (LOOKING NORTH) 2/–

SCALE: ½" =1'-0"

REGISTERED PROFESSIONAL ENGINEER 80853 PE
OREGON 01/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING

0 1/2 1

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TU/USWCD

ELMER DAM MODIFICATIONS

SPILLWAY AND FISHWAY GATES

DESIGNED J. WOODBURY

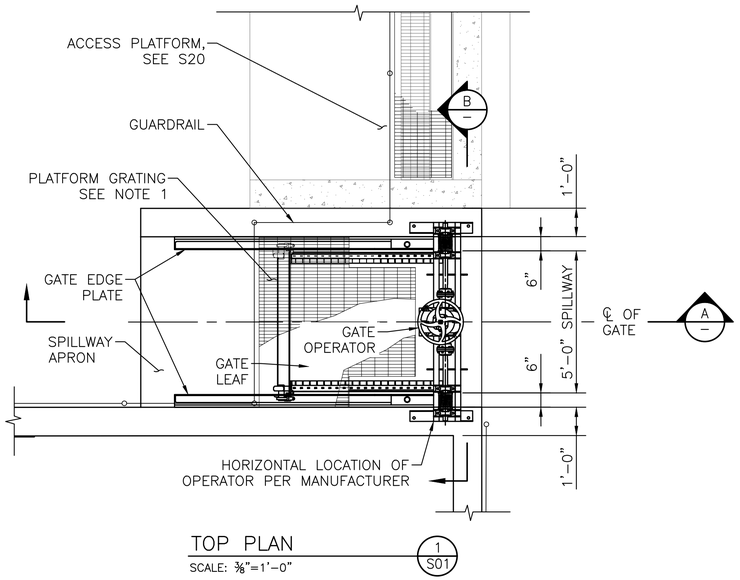
DRAWN J. LAHMON

CHECKED W. ZIMMERMAN

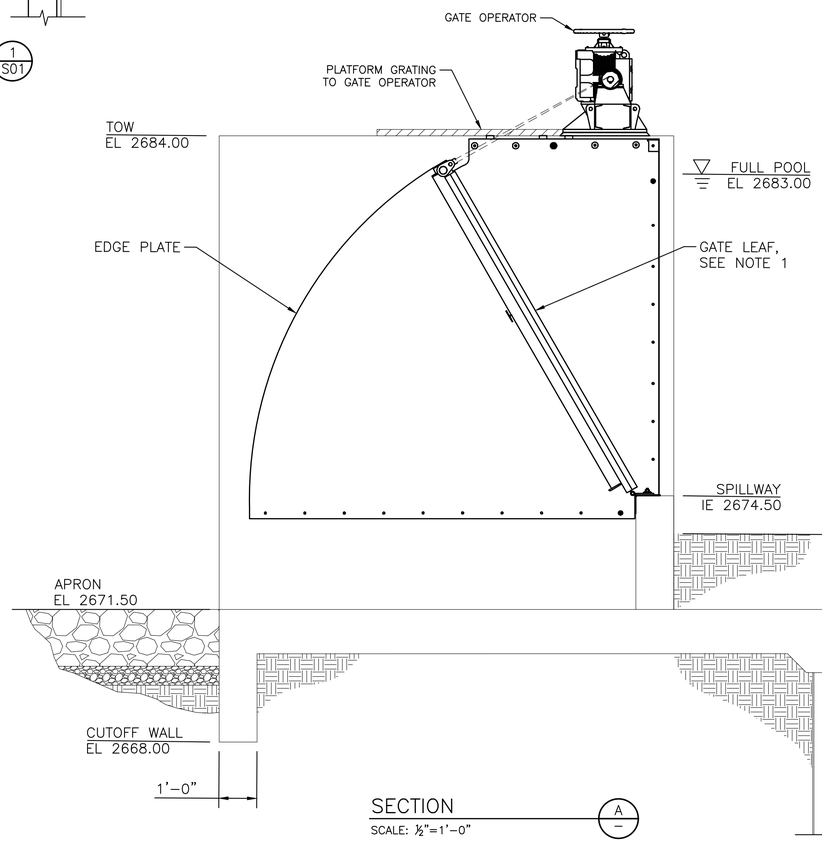
ISSUED DATE 06/17/22

DRAWING M01

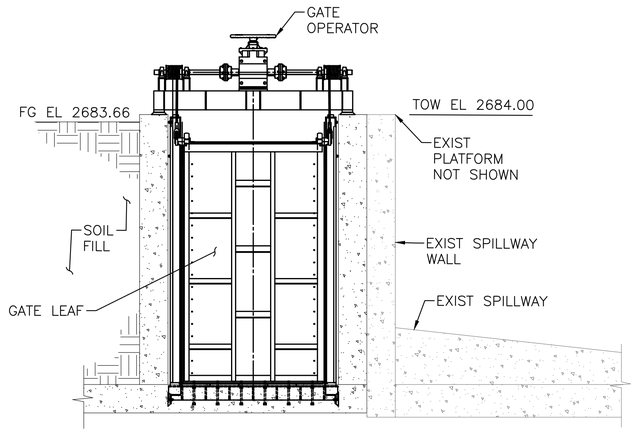
SCALE: AS NOTED



TOP PLAN
SCALE: ⅜"=1'-0"
1 / S01



SECTION
SCALE: ½"=1'-0"
A



SECTION
SCALE: ½"=1'-0"
B

SHEET NOTES:

1. OVERSHOT GATE AND CABLE HOIST SHALL BE REFERENCED FROM SPEC 35 20 90.
2. GATE MANUFACTURER SHALL PROVIDE GATE AND OPERATOR DESIGN BASED ON STRUCTURAL DIMENSIONS AND FULL POOL WSEL SHOWN ON DRAWINGS.
3. ANCHOR BOLT CONNECTION DETAILS FOR SILL PLATE, EDGE PLATE AND OPERATOR PER MANUFACTURER.

REGISTERED PROFESSIONAL ENGINEER
80853 PE
OREGON
6/29/22
MAR. 11, 2008
CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

Quadrant Consulting, Inc.

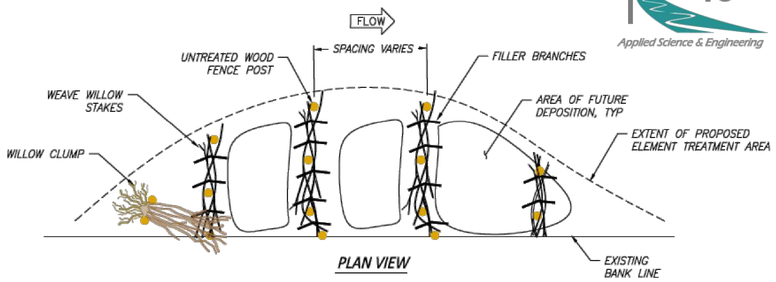
River Structures CONSULTING
PO BOX 1643 | BOISE, ID 83701 | RIVERSTRUCTURES.COM

TU/USWCD
ELMER DAM MODIFICATIONS
SPILLWAY MECHANICAL PLAN AND SECTION

DESIGNED J. ZANDER
DRAWN J. LAHMON
CHECKED W. ZIMMERMAN
ISSUED DATE 06/17/22

DRAWING
M02
SCALE: AS NOTED

Treatment: Post-Line Willow-Weave
Type: Reconnection and Restoration



PLAN VIEW

Application
- Used to reduce effective channel width and capture sediment forming point bars
- Primarily used to form or enhance the inside of bends
- Can be used with or without other treatments to capture sediment to fill over-widened channel areas

Biological Considerations
- Provides short-term cover and low-velocity refuge for juvenile salmonids
- Creates long-term vegetated point bar increasing habitat diversity, cover, and shade

Geomorphic Considerations
- Narrows effective channel width forming areas of contraction and expansion creating hydraulic diversity
- Captures fine sediment forming point bars increasing sinuosity and reducing overall width-to-depth ratio
- To be used in streams with moderate to high sediment supply

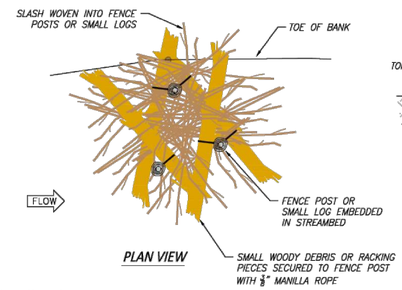
Design Considerations
- Consider adding willow clumps, LWM, or other structure to the upstream and/or outer ends of the willow-weave to dissipate energy
- Using live willows in the weave may increase the rate of point bar vegetation establishment

Over-widened channel before construction; Big Springs Creek, ID

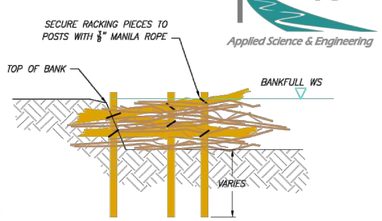
6 months after construction; fine sediment deposition observed between willow weaves; effective channel width reduced by approximately 50%

SECTION 1
SCALE: NTS

Treatment: Small Wood Material Structure
Type: Reconnection and Restoration



PLAN VIEW



SECTION VIEW

Application
- Used to create in-channel complexity, velocity, and depth variability
- Can be used to create channel constrictions promoting scour and gravel sorting
- Create cover for improved habitat

Biological Considerations
- Promotes velocity gradients and habitat diversity suitable for juvenile and adult salmonids
- Provides instream cover and interstitial spaces for juvenile salmonids

Geomorphic Considerations
- Increasing frequency and size of structures has a proportional affect on channel roughness
- Encourages sorting of bedload sediment

Design Considerations
- Incorporate LWD for increased stability and habitat diversity
- Consider excavating a scour pool to increase rate of channel response
- Anticipate channel response to determine size and frequency of structures

Small wood material structures 1 year after construction; Big Springs Creek, ID

Small wood material bank structures with excavated scour pool immediately after construction; Big Springs Creek, ID

Small and large wood material bank structures immediately after construction; Big Springs Creek, ID

SECTION 2
SCALE: NTS

NOTES:
1. HABITAT IMPROVEMENT LOCATIONS HAVE NOT BEEN IDENTIFIED AT THIS TIME.

REGISTERED PROFESSIONAL ENGINEER 80853 PE
OREGON 9/29/22 MAR. 11, 2008 CHRISTOPHER C. BOYD
RENEWS: 12/31/23

REV	DATE	BY	DESCRIPTION
0	06/17/22	CCB	ISSUED FOR CONSTRUCTION

WARNING
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TU/USWCD
ELMER DAM MODIFICATIONS
HABITAT IMPROVEMENT CONCEPTS

DESIGNED J. WOODBURY
DRAWN J. LAHMON
CHECKED C. BOYD
ISSUED DATE 06/17/22

DRAWING L01
SCALE: AS NOTED