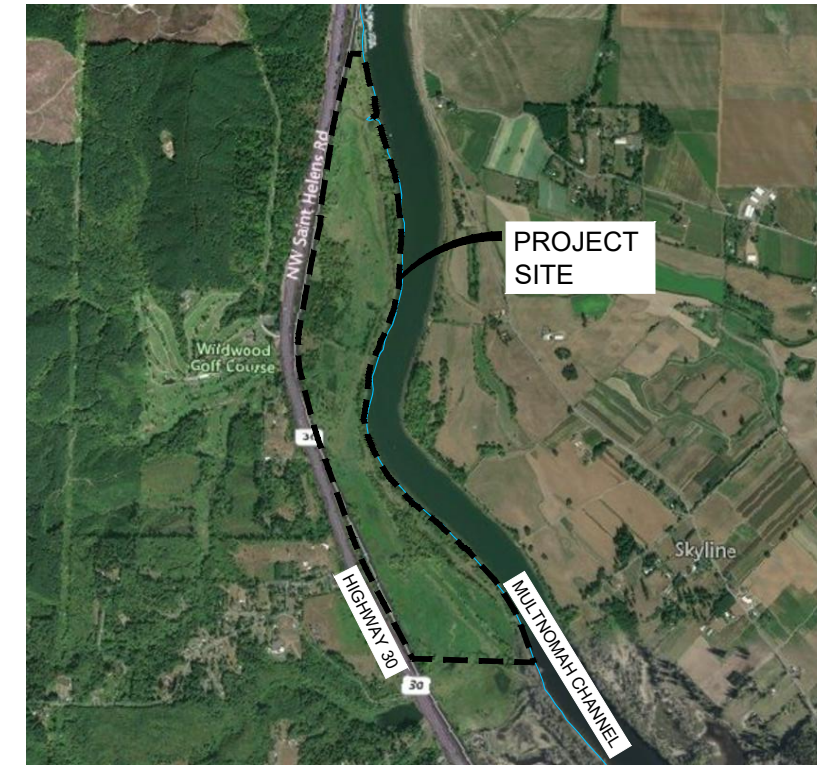


70% DESIGN	
APRIL 2026	

**NOT FOR
CONSTRUCTION**

#20200017

MULTNOMAH COUNTY, OR



REGIONAL MAP

NTS

PROJECT VICINITY

PROJECT AREA
NTS

SHEET INDEX

SHEET NUMBER	SHEET NAME	SHEET DESCRIPTION
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14	C3.3	UPLAND GRADING PLAN & SECTION
15	C3.4	SOUTH WETLAND GRADING PLAN & PROFILE
16	C3.5	SOUTH SLOUGH GRADING PLAN & PROFILE
17	C3.5.1	SOUTH SLOUGH SECTIONS
18	C3.6	SOUTH BREACH GRADING
19	C4.1	HABITAT DETAILS 1
20	C4.2	HABITAT DETAILS 2
21	C5.1	TESC DETAILS 1
22	C5.2	TESC DETAILS 2
23	L1.1	PLANTING DETAILS

13 C3.2 NORTH BREACH GRADING

COVER

REVISION NUMBER

[illegible]

ate 4/30/2026	Designed By RCC
rawn By DK	Checked By AJ

0 SCALE 1"

DB NO.

20200017

SHEET NO. _____

G1.0

1 OF 23

19

DWG: Z:\Shared\W2r\CAD\20200117-Mult Channel Natural Area (Estuary Partnership)\DWGS\SHEETS\G1.0 COVER.dwg
DATE: Apr 30, 2026 2:47pm XREFS:X-TB-W2r-22x34 X-LEGEND X-DESIGN, Seeding USER: dkelley

DWG: Z:\Shared\W2\CAD\2020017-Mult Channel Natural Area (Estuary Partnership)\DWG\SHEETS\G1.0 COVER.dwg USER: dkelley
DATE: Apr 30, 2026 2:47pm XREFS:X-TB-W2+22x34 X-LEGEND X-DESIGN_Seeding

GENERAL NOTES:

- DRIVING DIRECTIONS: FROM PORTLAND TAKE I-405 N AND TAKE EXIT 3 FOR US-30 W TOWARDS ST. HELENS. CONTINUE ON US-30 W FOR 13 MILES.
- EXISTING CONDITIONS TOPOGRAPHY IS A COMPOSITE SURFACE DERIVED FROM 2019 LIDAR FROM METRO/OLC, AND 2026 BATHYMETRIC AND TOPOGRAPHIC SURVEY COLLECTED BY W2R.
- AERIAL IMAGERY COLLECTED BY LCEP IN 2024.
- HORIZONTAL DATUM IS NAD83 OREGON STATE PLANE NORTH, INT. FT.
- VERTICAL DATUM IS NAVD88, FT.
- ALL SCALES SHOWN ARE FOR 22" X 34" SHEETS.

WORK PERIODS:

- WORK WITHIN ORDINARY HIGH WATER SHALL BE LIMITED TO JULY 1 THROUGH OCTOBER 31.
- SEE SHEET L1.1 FOR REVEGETATION TIMING.

CONSTRUCTION NOTES:

- CONTRACTOR SHALL ENSURE THAT ALL TESC AND POLLUTION PREVENTION MEASURES MEET THE REQUIREMENTS OF THE 1200C PERMIT, ANY CHANGES TO THIS PLAN MUST BE APPROVED BY DEQ.
- ALL ACCESS ROADS SHALL BE INSPECTED DAILY PRIOR TO DRIVING EQUIPMENT ON THEM. IF ANY WILDLIFE IS ENCOUNTERED, REMOVE IMMEDIATELY AS DIRECTED BY OPR.
- CONTRACTOR SHALL PROVIDE SECONDARY CONTAINMENT FOR ALL EQUIPMENT AND MATERIAL STORAGE IN STAGING AREAS WITHIN 150 FEET OF STREAMS AND WETLANDS.
- CONTRACTOR SHALL ALLOW FOR EXPANSION OF EXCAVATED MATERIAL AND COMPACTION OF PLACED MATERIAL AT NO ADDITIONAL COST. CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OF NON-CONCRETE WASTE FROM WCS OFF SITE.
- ALL EQUIPMENT SHALL BE WASHED PRIOR TO MOBILIZATION TO THE SITE TO MINIMIZE THE INTRODUCTION OF FOREIGN MATERIALS AND FLUIDS TO THE PROJECT SITE. ALL EQUIPMENT SHALL BE FREE OF OIL, HYDRAULIC FLUID, AND DIESEL FUEL LEAKS. TO PREVENT INVASION OF NOXIOUS WEEDS OR THE SPREAD OF WHIRLING DISEASE SPORES. ALL EQUIPMENT SHALL BE POWER WASHED OR CLEANED TO REMOVE MUD AND SOIL PRIOR TO MOBILIZATION INTO THE PROJECT AREA. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO INSURE THAT ADEQUATE MEASURES HAVE BEEN TAKEN.
- ALL WORK SHALL CONFORM TO THE CURRENT EDITIONS OF ODOT STANDARD PLANS & SPECIFICATIONS UNLESS INDICATED OTHERWISE BY CONTRACT DOCUMENTS.
- CONTRACTOR SHALL SUBMIT AN ACCESS, STAGING, AND STOCKPILE PLAN FOR APPROVAL PRIOR TO MOBILIZATION.
- THE ENTIRETY OF THE SITE IS IN THE WETLAND BOUNDARY OR WITHIN 150 FEET OF THE WETLAND BOUNDARY. OVERNIGHT STORAGE OF HAZARDOUS MATERIALS, WITH THE EXCEPTION OF LARGE EQUIPMENT, SHALL BE ALLOWED ONLY IN DESIGNATED STAGING AREAS THAT ARE OUTSIDE OF THE WETLAND BOUNDARY. ALL REFUELING SHALL OCCUR IN AREAS WITH ESTABLISHED SECONDARY CONTAINMENT USING A DEQ APPROVED LINER AND WITH ADEQUATE VOLUME TO CONTAIN SPILLS. THESE MATERIALS, METHODS, AND SPILL RESPONSE PLAN SHALL BE DESCRIBED IN THE CONTRACTORS SPCC PLAN.
- THE CONTRACTOR IS SOLELY RESPONSIBLE FOR OBTAINING ANY REQUIRED TRAFFIC CONTROL OR ACCESS PERMITS.
- THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING ANY REQUIRED TRAFFIC CONTROL INCLUDING, BUT NOT LIMITED TO, SIGNAGE AND FLAGGERS.
- ALL EQUIPMENT, MATERIALS, AND PERSONNEL SHALL REMAIN WITHIN THE WORK AREA BOUNDARY.
- THE CONTRACTOR SHALL KEEP THE WORK AREAS IN NEAT CONDITION, FREE OF DEBRIS AND LITTER FOR THE DURATION OF THE PROJECT.
- CONTRACTOR SHALL IMPLEMENT MEASURES TO CONTROL AND MINIMIZE WIND BLOWN DUST FROM THE SITE.
- ACCESS ROUTES SHALL NOT BE CLEARED OR GRADED WITHOUT PRIOR APPROVAL FROM OPR.
- EXCEPT WHERE APPROVED IN WRITING BY PROJECT OWNER, ALL DISTURBED AREAS OUTSIDE THE WORK AREA AND ACCESS BOUNDARY SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER AT NO ADDITIONAL COST TO THE OWNER.
- NO PETS ONSITE, INCLUDING IN TRUCKS.

CUT/FILL QUANTITIES					
GRADING AREA	CUT AREA (ACRES)	FILL AREA (ACRES)	CUT VOLUME (CY)	FILL VOLUME (CY)	HAUL DISTANCE TO UHE-1 (MILES)
N1	0.6	-	1,680	-	1.0
RELIC BEAVER DAM BREACH	0.1	0.1	250	250	-
N2	0.3	0.4	1,130	1,130	-
N3	0.4	-	1,060	-	0.9
N4	0.4	0.5	1,090	1,090	-
N5	0.4	0.5	790	790	-
N6	0.4	0.5	790	790	-
NORTH BREACH	0.3	-	970	-	0.4
UHE-1	-	1.0	-	3,710	-
S1	0.6	0.6	1,730	1,730	-
S2	0.4	0.3	840	840	-
S3	0.4	0.6	2,060	2,060	-
S4	0.3	0.4	1,560	1,560	-
SOUTH BREACH	0.2	0.3	930	930	-
TOTAL	4.8	5.1	14,880	14,880	-

GRADING AREAS BALANCES LOCALLY WITH THE EXCEPTION OF N1, N3 AND NORTH BREACH. ALL FILL FROM THE LISTED AREAS ARE HAULED FOR DISPOSAL IN THE UHE AREA.

WHS SUMMARY TABLE:

STRUCTURE TYPE	WHS QTY	LARGE W/ RW (MIN 18" DBH, MIN 40' LENGTH)	LARGE WO/ RW (MIN 18" DBH, MIN 40' LENGTH)	SMALL W/ RW (MIN 10" DBH, MIN 40' LENGTH)	SMALL W/O RW (MIN 10" DBH, MIN 40' LENGTH)	PIER LOG (MIN 10" DBH, MIN 20' LENGTH)	SLASH (CY)	LIVESTAKES
WHS TYPE 1 - HABITAT LOG	25	25	-	-	-	-	25	-
WHS TYPE 2 - CONTINUOUS LOG COMPLEX	4	20	16	36	60	56	200	1,160
WHS TYPE 3 - BASKING LOG	15	-	15	-	-	30	-	-
TOTAL QUANTITIES	44	45	31	36	60	86	225	1,160

MATERIAL NOTES:

- EXCAVATED MATERIAL FROM THE MARSH PLAIN LOWERING AREAS TO BE PLACED IN DESIGNATED UPLAND & WETLAND HABITAT ENHANCEMENT AREAS.
- DOWNED LOGS ENCOUNTERED DURING EXCAVATION TO BE SALVAGED, STOCKPILED AND PLACED ON OR EMBEDDED IN THE FINISHED GRADE MARSH PLAIN ACCORDING TO THE SPECIFICATIONS.
- ALL CUT QUANTITIES ARE BANK VOLUMES.

UTILITIES:

- THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR HAVING UTILITIES LOCATED PRIOR TO CONSTRUCTION ACTIVITIES.
- THE CONTRACTOR SHALL CALL 800-322-2344 FOR UTILITY LOCATE PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE AFFECTED UTILITY SERVICE TO REPORT ANY DAMAGED OR DESTROYED UTILITIES.
- THE CONTRACTOR SHALL PROVIDE EQUIPMENT AND LABOR TO AID THE AFFECTED UTILITY SERVICE IN REPAIRING DAMAGED OR DESTROYED UTILITIES AT NO ADDITIONAL COST.

LEGEND AND SYMBOLS

-----1-----	EXISTING MINOR CONTOUR (1' INTERVAL)
-----5-----	EXISTING MAJOR CONTOUR (5' INTERVAL)
-----1-----	PROPOSED MINOR CONTOUR (1' INTERVAL)
-----5-----	PROPOSED MAJOR CONTOUR (5' INTERVAL)
-----	TAXLOTS
-----OHP-----	EXISTING POWERLINES
-----	EXISTING SITE ACCESS
-----	PROPOSED TEMPORARY SITE ACCESS
-----	WORK AREA AND ACCESS BOUNDARY
-----	STRAW WATTLES
-----WB-----	WETLAND BOUNDARY
-----	OHW (2-YEAR FLOOD) BOUNDARY
-----	FEMA 100-YEAR FLOOD BOUNDARY
-----	FLOODWAY BOUNDARY
-----	MARSHPLAIN LOWERING (MPL)
-----	WETLAND HABITAT ENHANCEMENT (WHE)
-----	UPLAND HABITAT ENHANCEMENT (UHE)
-----	GENERAL PLANTING
-----	STAGING AREA
-----	TEMPORARY CROSSING
-----	HIBERNACULA
-----	WHS TYPE 1 - HABITAT LOG
-----	WHS TYPE 2 - CONTINUOUS LOG COMPLEX
-----	WHS TYPE 3 - BASKING LOG
-----	BEAVER DAM ANALOGUE

ABBREVIATIONS:

ACE	ANNUAL CHANCE EXCEEDANCE
APPROX	APPROXIMATE
BDA	BEAVER DAM ANALOGUE
BFE	BASE FLOOD ELEVATION
BMP	BEST MANAGEMENT PRACTICE
CHNL	CHANNEL
CL	CENTERLINE
CONC	CONCRETE
CONSTR	CONSTRUCTION
CY	CUBIC YARD
DEPT	DEPARTMENT
DS	DOWNSTREAM
EG	EXISTING GRADE/GROUND
ELEV, EL	ELEVATION
ESC	EROSION AND SEDIMENT CONTROL
EX, EXIST	EXISTING
FG	FINISHED GRADE/GROUND
FPGA	FLOODPLAIN GRADING AREA
FT	FEET
HAB	HABITAT
HIP	HABITAT IMPROVEMENT PROGRAMMATIC
IE	INVERT ELEVATION
IN	INCHES
INTL	INTERNATIONAL
LBS	POUNDS
LP	LOW POINT
LS	LIVESTAKE
MAX	MAXIMUM
MID	MIDDLE
MGMT	MANAGEMENT
MIN	MINIMUM
MPL	MARSHPLAIN LOWERING
N/A	NOT APPLICABLE
NIC	NOT IN CONTRACT
NAVD88	NORTH AMERICAN VERTICAL DATUM (1988)
NTS	NOT TO SCALE
ODFW	OREGON DEPT OF FISH & WILDLIFE
ODEQ	OREGON DEPT OF ENVIRONMENTAL QUALITY
ODOT	OREGON DEPARTMENT OF TRANSPORTATION
OHP	OVERHEAD POWER
OHW	ORDINARY HIGH WATER
OPR	OWNERS PROJECT REPRESENTATIVE
PROP	PROPOSED
ROW	RIGHT OF WAY
RR	RAILROAD
S	SLOPE
SF	SQUARE FEET
SHT	SHEET
SPEC	SPECIFICATION
STA	STATION
STD	STANDARD
TEMP	TEMPORARY
TESC	TEMPORARY EROSION AND SEDIMENT CONTROL
TOB	TOP OF BANK
TOE	TOE OF SLOPE
TOP	TOP OF SLOPE
TYP	TYPICAL
UHE	UPLAND HABITAT ENHANCEMENT
US	UPSTREAM
VIF	VERIFY IN FIELD
W/	WITH
WCS	WATER CONTROL STRUCTURE
WHE	WETLAND HABITAT ENHANCEMENT
WHS	WOOD HABITAT STRUCTURE
WSE	WATER SURFACE ELEVATION
YR	YEAR

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APRIL 2026

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CONSTRUCTION



WOLF WATER RESOURCES, INC.
1001 SE WATER AVE. SUITE #180
PORTLAND, OR 97214
503.207.6688

Lower Columbia
Estuary
Partnership



LOWER COLUMBIA
ESTUARY PARTNERSHIP
400 NE 11TH AVE
PORTLAND, OR 97232
503.226.1565

LOWER COLUMBIA ESTUARY PARTNERSHIP
MULTNOMAH CHANNEL
MARSH NATURAL AREA
MULTNOMAH COUNTY, OR

GENERAL NOTES

REVISION NUMBER

No.	Date	Revision

Date 4/30/2026	Designed By RCC
Drawn By DK	Checked By AJ

SCALE 0 1"

JOB NO.
20200017

SHEET NO.
G1.1
2 OF 23

DWG: Z:\Shared\W2\ICAD\2020017-Mult Channel Natural Area (Estuary Partnership)\DWG\SHHEETS\G2-X - HIP NOTES.dwg
DATE: Apr 30, 2026 2:47pm XREFS:X-TB-W2+22x34 USER: dkleiley

WORK AREA ISOLATION

ANY WORK AREA REQUIRING EXCAVATION OR MOBILIZATION OF SEDIMENT 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 ESA-LISTED FISH SPAWNING HABITATS. IF THE WORK AREA ISOLATION PRACTICES WOULD CAUSE GREATER IMPACTS THAN IT WOULD PREVENT, IS LOCATED IN DEEP OR SWIFTLY FLOWING WATER, OR IF FISH CAN BE EFFECTIVELY EXCLUDED BY NETS OR SCREENS, THEN A VARIANCE TO NOT ISOLATE THE WORK AREA MAY BE PURSUED. WORK AREA ISOLATION & FISH SALVAGE ACTIVITIES ARE CONSIDERED INCIDENTAL TO CONSTRUCTION-RELATED ACTIVITIES AND SHALL OCCUR DURING THE STATE RECOMMENDED IN-WATER WORK WINDOWS. WHEN WORK AREA ISOLATION IS REQUIRED, DESIGN PLANS WILL INCLUDE ALL ISOLATION ELEMENTS, FISH RELEASE AREAS, A PUMP TO BE USED TO DEWATER THE ISOLATION AREA, AND, WHEN FISH ARE PRESENT, A FISH SCREEN THAT MEETS NMFS'S FISH SCREEN CRITERIA (NMFS 2011, OR MOST CURRENT). WIDER MESH SCREENS MAY BE USED AFTER ALL FISH HAVE BEEN REMOVED FROM THE ISOLATED AREA. WORK AREA ISOLATION AND FISH CAPTURE ACTIVITIES TAKE PLACE 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 TO FISH SPECIES PRESENT.

A FISH BIOLOGIST WILL DETERMINE HOW TO REMOVE ESA-LISTED FISH, WITH LEAST HARM TO THE FISH, BEFORE IN-WATER WORK BEGINS. THIS WILL INVOLVE EITHER PASSIVE MOVEMENT OF FISH OUT OF THE PROJECT REACH THROUGH SLOW DEWATERING, OR ACTIVELY REMOVING THE FISH FROM THE PROJECT REACH. SHOULD ACTIVE REMOVAL BE WARRANTED, A FISH BIOLOGIST WILL CLEAR THE AREA OF FISH BEFORE THE SITE IS DEWATERED USING ONE OR MORE OF A VARIETY OF METHODS INCLUDING SEINING, DIPPING, OR ELECTROFISHING, DEPENDING ON SPECIFIC SITE CONDITIONS. IN AREAS OCCUPIED BY LARVAL LAMPREY, TO THE EXTENT POSSIBLE, SALVAGE USING GUIDANCE SET FORTH IN USFWS 2010 OR MOST RECENT GUIDANCE.

DEPENDENT UPON SITE CONDITIONS, A FISH BIOLOGIST WILL CONDUCT OR SUPERVISE THE FOLLOWING:

- 1) SLOWLY REDUCE WATER FROM THE WORK AREA TO ALLOW SOME FISH TO LEAVE THE WORK AREA VOLITIONALLY;

a) IF DEWATERED AREA CONTAINS LARGE FINE/ SANDY SEDIMENT DEPOSITS, LARVAL LAMPREY COULD BE PRESENT, AND POTENTIALLY IN LARGE NUMBERS. IF SO, CONSIDER ELECTROFISHING USING LAMPREY ELECTROFISHING SETTINGS (WHICH DO NOT AFFECT BONY FISH) PRIOR TO OR DURING DRAWDOWN. SEE SECTION FURTHER DOWN ON LAMPREY CONSERVATION MEASURES AND ELECTROFISHING GUIDELINES.
- 1) INSTALL BLOCK NETS;

a) BLOCK NETS WILL BE INSTALLED AT UPSTREAM AND DOWNSTREAM LOCATIONS AND MAINTAINED IN A SECURED POSITION TO EXCLUDE FISH FROM ENTERING THE PROJECT AREA.

b) 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.

c) IF BLOCK NETS REMAIN IN PLACE MORE THAN ONE DAY, THE NETS WILL BE MONITORED AT LEAST DAILY TO ENSURE THEY ARE SECURED TO THE BANKS AND FREE OF ORGANIC ACCUMULATION. IF THE PROJECT IS WITHIN BULL TROUT SPAWNING AND REARING HABITAT, THE BLOCK NETS MUST BE CHECKED EVERY 4 HOURS FOR FISH IMPINGEMENT ON THE NET. LESS FREQUENT INTERVALS MUST BE APPROVED THROUGH A VARIANCE REQUEST.

d) NETS WILL BE MONITORED HOURLY ANYTIME THERE IS INSTREAM DISTURBANCE.
- 3) CAPTURE FISH THROUGH SEINING, AND RELOCATE TO STREAMS;

a) WHILE DEWATERING, ANY REMAINING FISH WILL BE COLLECTED BY HAND OR DIP NETS.

b) SEINES WITH A MESH SIZE TO ENSURE CAPTURE OF THE RESIDING ESA-LISTED FISH WILL BE USED.

c) MINNOW TRAPS MAY BE LEFT IN PLACE OVERNIGHT AND USED IN CONJUNCTION WITH SEINING.
- 4) ELECTROFISH TO CAPTURE AND RELOCATE FISH NOT CAUGHT DURING SEINING, NMFS ELECTROFISHING GUIDELINES SHALL BE USED. THIS STEP IS TO BE USED AS A LAST RESORT; AFTER ALL PASSIVE TECHNIQUES HAVE BEEN EXHAUSTED.
- 5) CONTINUE TO SLOWLY DEWATER THE STREAM REACH;

a) COLLECT ANY REMAINING FISH IN COLD-WATER BUCKETS AND RELOCATE TO THE STREAM;

b) LIMIT THE TIME FISH WOULD BE IN A TRANSPORT BUCKET , AND RELEASE THEM AS QUICKLY AS POSSIBLE; THE NUMBER OF FISH WITHIN A BUCKET WILL BE LIMITED, AND FISH WILL BE OF RELATIVELY COMPARABLE SIZE TO MINIMIZE PREDATION;

c) AERATORS FOR BUCKETS WILL BE USED, OR THE BUCKET'S WATER WILL BE FREQUENTLY CHANGED WITH COLD, CLEAR, WATER AT 15 MINUTE, OR MORE-FREQUENT, INTERVALS.

d) BUCKETS WILL BE KEPT IN SHADED AREAS; OR IF IN EXPOSED AREAS, COVERED BY A CANOPY.

e) DEAD FISH WILL NOT BE STORED IN TRANSPORT BUCKETS BUT WILL BE LEFT ON THE STREAMBANK TO AVOID MORTALITY COUNTING ERRORS.

1) NMFS'S ELECTROFISHING GUIDELINES (NMFS 20005)

- 1) INITIAL SITE SURVEYS AND EQUIPMENT SETTINGS

a) IN ORDER TO AVOID CONTACT WITH SPAWNING ADULTS OR ACTIVE REDDS, RESEARCHERS MUST CONDUCT A CAREFUL VISUAL SURVEY OF THE AREA TO BE SAMPLED BEFORE BEGINNING ELECTROFISHING.

b) PRIOR TO THE START OF SAMPLING AT A NEW LOCATION, WATER TEMPERATURE AND CONDUCTIVITY MEASUREMENTS SHALL BE TAKEN TO EVALUATE ELECTROFISHER SETTINGS AND ADJUSTMENTS.

c) NO ELECTROFISHING SHOULD OCCUR WHEN WATER TEMPERATURES ARE ABOVE 18°C OR ARE EXPECTED TO RISE ABOVE THIS TEMPERATURE PRIOR TO CONCLUDING THE ELECTROFISHING SURVEY.

d) WHENEVER POSSIBLE, A BLOCK NET SHOULD BE PLACED BELOW THE AREA BEING SAMPLED TO CAPTURE STUNNED FISH THAT MAY DRIFT DOWNSTREAM.

e) EQUIPMENT MUST BE IN GOOD WORKING CONDITION AND OPERATORS SHOULD GO THROUGH THE MANUFACTURER'S PRESEASON CHECKS, ADHERE TO ALL PROVISIONS, AND RECORD MAJOR MAINTENANCE WORK IN A LOGBOOK.

f) EACH ELECTROFISHING SESSION MUST START WITH ALL SETTINGS (VOLTAGE, PULSE WIDTH, AND PULSE RATE) SET TO THE MINIMUMS NEEDED TO CAPTURE FISH. THESE SETTINGS SHOULD BE GRADUALLY INCREASED ONLY TO THE POINT WHERE FISH ARE IMMOBILIZED AND CAPTURED, AND GENERALLY NOT ALLOWED TO EXCEED CONDUCTIVITY-BASED MAXIMA.

- 2) ELECTROFISHING TECHNIQUE

a) SAMPLING SHOULD BEGIN USING STRAIGHT DC. THE POWER NEEDS TO REMAIN ON UNTIL THE FISH IS NETTED WHEN USING STRAIGHT DC. IF FISH CAPTURE IS UNSUCCESSFUL WITH INITIAL LOW VOLTAGE, GRADUALLY INCREASE VOLTAGE SETTINGS WITH STRAIGHT DC.

b) IF FISH CAPTURE IS NOT SUCCESSFUL WITH THE USE OF STRAIGHT DC, THEN SET THE ELECTROFISHER TO LOWER VOLTAGES WITH PDC. IF FISH CAPTURE IS UNSUCCESSFUL WITH LOW VOLTAGES, INCREASE PULSE WIDTH, VOLTAGE, AND PULSE FREQUENCY (DURATION, AMPLITUDE, AND FREQUENCY).

c) ELECTROFISHING SHOULD BE PERFORMED IN A MANNER THAT MINIMIZES HARM TO THE FISH. STREAM SEGMENTS SHOULD BE SAMPLED SYSTEMATICALLY, MOVING THE ANODE CONTINUOUSLY IN A HERRINGBONE PATTERN (WHERE FEASIBLE) THROUGH THE WATER. CARE SHOULD BE TAKEN WHEN FISHING IN AREAS WITH HIGH FISH CONCENTRATIONS. STRUCTURE WOOD, UNDERCUT BANKS) AND IN SHALLOW WATERS WHERE MOST BACKPACK ELECTROFISHING FOR JUVENILE SALMONIDS OCCURS. VOLTAGE GRADIENTS MAY BE HIGH WHEN ELECTRODES ARE IN SHALLOW WATER WHERE BOUNDARY LAYERS (WATER SURFACE AND SUBSTRATE) TEND TO INTENSIFY THE ELECTRICAL FIELD.

d) DO NOT ELECTROFISH IN ONE LOCATION FOR AN EXTENDED PERIOD (E.G., UNDERCUT BANKS) AND REGULARLY CHECK BLOCK NETS FOR IMMOBILIZED FISH.

e) FISH SHOULD NOT MAKE CONTACT WITH THE ANODE. THE ZONE OF POTENTIAL INJURY FOR FISH IS 0.5 M FROM THE ANODE.

f) ELECTROFISHING CREWS SHOULD BE GENERALLY OBSERVANT OF THE CONDITION OF THE FISH AND CHANGE OR TERMINATE SAMPLING WHEN EXPERIENCING PROBLEMS WITH FISH RECOVERY TIME, BANDING, INJURY, MORTALITY, OR OTHER INDICATIONS OF FISH STRESS.

g) NETTERS SHOULD NOT ALLOW THE FISH TO REMAIN IN THE ELECTRICAL FIELD ANY LONGER THAN NECESSARY BY REMOVING STUNNED FISH FROM THE WATER IMMEDIATELY AFTER NETTING.
- 3) SAMPLE PROCESSING AND RECORD KEEPING

a) FISH SHOULD BE PROCESSED AS SOON AS POSSIBLE AFTER CAPTURE TO MINIMIZE STRESS. THIS MAY REQUIRE A LARGER CREW SIZE.

b) ALL SAMPLING PROCEDURES MUST HAVE A PROTOCOL FOR PROTECTING HELD FISH. SAMPLERS MUST BE AWARE OF THE CONDITIONS IN THE CONTAINERS HOLDING FISH; AIR PUMPS, WATER TRANSFERS, ETC., SHOULD BE USED AS NECESSARY TO MAINTAIN SAFE CONDITIONS. ALSO, LARGE FISH SHOULD BE KEPT SEPARATE FROM SMALLER PREY-SIZED FISH TO AVOID PREDATION DURING CONTAINMENT.

c) FISH SHOULD BE OBSERVED FOR GENERAL CONDITION AND INJURIES (E.G., INCREASED RECOVERY TIME, DARK BANDS, AND VISUALLY OBSERVABLE SPINAL INJURIES). EACH FISH SHOULD BE COMPLETELY REVIVED BEFORE RELEASING AT THE LOCATION OF CAPTURE. A PLAN FOR ACHIEVING EFFICIENT RETURN TO APPROPRIATE HABITAT SHOULD BE DEVELOPED BEFORE EACH SAMPLING SESSION. ALSO, EVERY ANIMOT SHOULD BE MADE TO PROCESS AND RELEASE ESA-LISTED SPECIMENS FIRST.

d) PERTINENT WATER QUALITY (E.G., CONDUCTIVITY AND TEMPERATURE) AND SAMPLING NOTES SHOCKER SETTINGS, FISH CONDITION/INJURIES/MORTALITIES) SHOULD BE RECORDED IN A LOGBOOK TO IMPROVE TECHNIQUE AND HELP TRAIN NEW OPERATORS. IT IS IMPORTANT TO NOTE THAT RECORDS OF INJURIES OR MORTALITIES PERTAIN TO THE ENTIRE ELECTROFISHING SURVEY, INCLUDING THE FISH SAMPLE WORK-UP. THE ANODE WILL NOT INTENTIONALLY CONTACT FISH.

e) ELECTROFISHING SHOULD NOT BE CONDUCTED WHEN THE WATER CONDITIONS ARE TURBID AND VISIBILITY IS POOR. FOR EXAMPLE, WHEN THE SAMPLER CANNOT SEE THE STREAM BOTTOM IN ONE FOOT OF WATER.

g) IF MORTALITY OR OBVIOUS INJURY (DEFINED AS DARK BANDS ON THE BODY, SPINAL DEFORMATIONS, DE-SCALING OF 25% OR MORE OF BODY, AND TORPIDITY OR INABILITY TO MAINTAIN UPRIGHT ATTITUDE AFTER SUFFICIENT RECOVERY TIME) OCCURS DURING ELECTROFISHING, OPERATIONS WILL BE IMMEDIATELY DISCONTINUED, MACHINE SETTINGS, WATER TEMPERATURE, AND CONDUCTIVITY CHECKED, AND PROCEDURES ADJUSTED OR ELECTROFISHING POSTPONED TO REDUCE MORTALITY.

2) DEWATERING: DEWATERING, WHEN NECESSARY, WILL BE CONDUCTED OVER A SUFFICIENT PERIOD OF TIME TO ALLOW SPECIES TO NATURALLY MIGRATE OUT OF THE WORK AREA AND WILL BE LIMITED TO THE SHORTEST LINEAR EXTENT PRACTICABLE.

- 1) DIVERSION AROUND THE CONSTRUCTION SITE MAY BE ACCOMPLISHED WITH A COFFERDAM AND A BYPASS CULVERT OR PIPE, OR A LINED, NON-ERODIBLE DIVERSION DITCH. WHERE GRAVITY FEED IS NOT POSSIBLE, A PUMP MAY BE USED, BUT MUST BE OPERATED IN SUCH A WAY AS TO AVOID REPETITIVE DEWATERING AND REWATERING OF THE SITE. IMPOUNDMENT BEHIND THE COFFERDAM MUST OCCUR SLOWLY THROUGH THE TRANSITION, WHILE CONSTANT FLOW IS DELIVERED TO THE DOWNSTREAM REACHES.

2) ALL PUMPS WILL HAVE FISH SCREENS TO AVOID JUVENILE FISH IMPINGEMENT OR ENTRAINMENT, AND WILL BE OPERATED IN ACCORDANCE WITH NMFS'S CURRENT FISH SCREEN CRITERIA (NMFS 2011, OR MOST RECENT VERSION). IF THE PUMPING RATE EXCEEDS 3 CUBIC FEET PER SECOND (CFS), A NMFS ENGINEERING REVIEW WILL BE NECESSARY. IF THE SCREEN IS IN AN ISOLATED AREA WITH NO FISH (SALMONIDS OR LARVAL LAMPREY), A LARGER MESH SCREEN MAY BE USED.

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

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

5) IN AREAS OCCUPIED BY LARVAL LAMPREY, TO THE EXTENT POSSIBLE, SALVAGE USING GUIDANCE DESCRIBED IN ABOVE SECTION "CONSERVATION MEASURES FOR SALVAGE OF NATIVE FISH, LAMPREY AND MUSSELS" (WHICH IS BASED ON USFWS 2010) OR MOST RECENT GUIDANCE.

6) IN AREAS OCCUPIED BY NATIVE FRESHWATER MUSSELS, TO THE EXTENT POSSIBLE, SALVAGE USING GUIDANCE DEVELOPED BY THE XERCES SOCIETY (BLEVINS ET AL. 2018, 2019).

3.1.2.4 BULL TROUT ELECTROFISHING CONSERVATION MEASURES

- 1) FOR SALVAGE OPERATIONS IN KNOWN BULL TROUT SPAWNING AND REARING HABITAT ELECTROFISHING SHALL ONLY OCCUR FROM MAY 1 TO JULY 31. IN FMO HABITATS, ELECTROFISHING MAY OCCUR ANY TIME OF YEAR.

2) BULL TROUT ARE VERY TEMPERATURE SENSITIVE AND GENERALLY SHOULD NOT BE ELECTROFISHED OR OTHERWISE HANDLED WHEN TEMPERATURES EXCEED 15°C IN SPAWNING AND REARING HABITATS.

3) SALVAGE ACTIVITIES SHOULD TAKE PLACE DURING PERIODS OF THE COOLEST AIR AND WATER TEMPERATURES POSSIBLE, NORMALLY EARLY IN THE MORNING VERSUS LATE IN THE DAY, AND DURING

4) CONDITIONS APPROPRIATE TO MINIMIZE STRESS TO FISH SPECIES PRESENT.

3) SALVAGE OF NATIVE FISH, LAMPREY AND MUSSELS: IN ADDITION TO CONSERVATION RECOMMENDATIONS FOR SALMONIDS, ADDITIONAL EFFORTS WILL BE EMPLOYED TO SALVAGE OTHER NATIVE SPECIES. THE FOLLOWING GUIDELINES ARE DRAFT FROM THE U.S. FISH AND WILDLIFE SERVICE, WITH ASSISTANCE FROM THE XERCES SOCIETY, AND WILL BE USED AS APPROPRIATE AND TO THE EXTENT POSSIBLE.

- 1) CONDUCT NATIVE MUSSEL AND LAMPREY PRESENCE/ ABSENCE; APPROXIMATE NUMBERS FOR SALVAGE TO AID IN PLANNING FOR SALVAGE. PRE-SELECT SITE WHERE SALVAGED MUSSELS WILL BE RELOCATED. SUGGESTED DRAWDOWN: THIS ORDER SHOULD BE ADJUSTED FOR SITE-SPECIFIC CONDITIONS AND NUMBERS OF SPECIES AND INDIVIDUALS- FOR EXAMPLE, IF YOU ONLY HAVE A SMALL NUMBER OF MUSSELS OR VERY LIMITED LARVAL LAMPREY HABITAT, IT MAY BE MOST EFFICIENT TO SALVAGE ONLY DURING DRAWDOWN. IF DRAWDOWN OCCURS DURING COOL, WET WEATHER, AND THE AREA WILL BE REWATERED WITHIN 24-48 HOURS, MUSSELS AND LARVAL LAMPREY MAY SURVIVE IN THE SEDIMENTS, AND NOT REQUIRE SALVAGE. CONVERSELY, IF CONDITIONS ARE WARM OR HOT, LAMPREY CAN EXPIRE WITHIN A COUPLE OF HOURS. DEPENDING ON YOUR SITE AND CIRCUMSTANCES, OTHER ADJUSTMENTS MAY ALSO BE NECESSARY. A GENERALIZED ORDER PRIOR TO DRAWDOWN IS:

a) SALVAGE FW MUSSELS BY HAND, LOCATING BY SNORKELING OR WADING. IF MUSSELS ARE NUMEROUS (OR STAFF IS LIMITED), IT MAY BE NECESSARY TO DO THIS STEP IN THE DAYS BEFORE DRAWDOWN, AS RELOCATION/PLACEMENT CAN BE TIME CONSUMING. SALVAGE LARVAL LAMPREY BY E-FISHER UNDER WATERED CONDITIONS WITH LAMPREYSPECIFIC SETTINGS.

b) SALVAGE BONY FISH AFTER LAMPREY WITH NETS OR BY E-FISHER WITH APPROPRIATE SETTINGS.

c) IF THERE ARE SUFFICIENT NUMBERS OF PEOPLE AND EQUIPMENT, SOME PEOPLE CAN BE DRYSHOCKING DEWATERED AREAS, WHILE OTHERS ARE REMOVING REMAINING MUSSELS, AND OTHERS ARE SALVAGING SALMON.
- 3) CONTINUE SALVAGE LARVAL LAMPREY AND FW MUSSELS BY HAND DURING AND AFTER DRAWDOWN, AS WATER RECEDES AND LAMPREY CONTINUE TO EMERGE FROM SEDIMENTS AND OVERLOOKED MUSSELS BECOME VISIBLE. LARVAL LAMPREY MAY EMERGE HOURS AFTER DEWATERING OCCURS.

4) TO ENCOURAGE LARVAL LAMPREY EMERGENCE, "DRY SHOCK" IN AREAS OF FINE/SANDY DEPOSITS THAT ARE LIKELY TO HAVE HIGH LARVAL LAMPREY DENSITIES.

5) HOLD ALL FISH IN BUCKETS, FINE MESH BASKETS OR TANKS WITH ADEQUATE TEMPERATURES, SPACE AND OXYGEN. RELEASE ALL FISH THROUGHOUT THE SALVAGE PROCESS IN APPROPRIATE HABITATS TO MINIMIZE STRESS, THERMAL SHOCK AND PREDATION RISK. HOLD MUSSELS IN COOLERS AS DESCRIBED BELOW AND RELOCATE MUSSELS IN A PRE-SELECTED APPROPRIATE HABITAT; PLACEMENT OF EACH INDIVIDUAL IS NEEDED TO ALLOW MUSSELS TO RE-ESTABLISH/BURROW INTO THE NEW HABITAT. ELECTROFISHING SETTINGS FOR LARVAL LAMPREY.

- 1) ELECTROFISHING SHOULD BE PERFORMED IN A MANNER THAT MINIMIZES HARM TO FISHES. HANDLING TECHNIQUES AS DESCRIBED IN NMFS ELECTROFISHING GUIDELINES ARE PROTECTIVE OF LAMPREY. IF THERE IS A CONFLICT BETWEEN CONSERVATION MEASURES FOR ESA-LISTED SALMONIDS AND LAMPREY/MUSSELS NOTIFY EC LEAD AND PRIORITIZE PROTECTIONS TOWARDS THE ESA-LISTED FISH.

2) GENERALLY THREE TYPES OF ELECTROFISHERS ARE SUITABLE FOR LARVAL LAMPREY SAMPLING9:

a) ABP-2 "WISCONSIN" ELECTROFISHER (ETS ELECTROFISHING, VERONA, WI)

b) SMITH-ROOT LR-24 MODEL ELECTROFISHER WITH LAMPREY SETTINGS;

c) SMITH ROOT APEX BACKPACK ELECTROFISHER WITH LAMPREY SETTINGS.

3) ELECTROFISHERS USED FOR LARVAL LAMPREY SAMPLING SHOULD BE SET WITH TWO WAVE FORMS, A LOWER FREQUENCY "TICKLE" WAVE FORM TO COAX LARVAL LAMPREYS OUT OF THE SUBSTRATE AND A HIGHER FREQUENCY "STUN" WAVE FORM TO IMMOBILIZE LARVAL LAMPREYS FOR NETTING.

4) EFFECTIVE SAMPLING INVOLVES THIS 2-STAGE METHOD (TABLE 2):

a) FIRST STAGE: USE 125V DIRECT CURRENT WITH A 25 PERCENT DUTY CYCLE APPLIED AT A SLOW RATE OF 3 PULSES PER SECOND, TO INDUCE LARVAL LAMPREYS TO EMERGE FROM THE SEDIMENT. AT LOW WATER TEMPERATURE (<10C), VOLTAGE MAY NEED TO BE RAISED (150- 200V) TO MAINTAIN ITS EFFECTIVENESS (GRADUALLY INCREASE VOLTAGE TO FIND THE APPROPRIATE SETTING TO AVOID THE RISK OF ELECTRONARCOSIS).

b) USE A PATTERN OF 3 SLOW PULSES FOLLOWED BY A SKIPPED PULSE (BURSTED PULSE) HELPS LARVAL LAMPREYS TO EMERGE.

c) SECOND STAGE: IMMEDIATELY AFTER LARVAL LAMPREYS EMERGE, USE A FAST PULSE SETTING OF 30 PULSES PER SECOND TO IMMOBILIZE AND NET THEM. IT IS NOT NECESSARY TO STUN LAMPREY FOR NETTING FOR EXPERIENCED NETTERS.

5) AVOID EXPOSING LARVAL LAMPREYS TO EXTENDED PERIODS OF ELECTROFISHING AS IT HAS ALSO BEEN LINKED TO ELECTRONARCOSIS. RECOVERY FROM ELECTRONARCOSIS TAKES ABOUT 15 MINUTES.

6) USE DIP NETS TO CAPTURE LARVAL LAMPREYS WHERE THEY ARE READILY VISIBLE. WHERE NOT VISIBLE, SEINES MAY BE EFFECTIVE. USING FINE MESH NETS TO "SWEEP" THE WATER ("BLIND-NETTING") MAY INCREASE THE NUMBER OF SMALL LARVAE COLLECTED.

7) WITHIN EACH REACH, ELECTROFISHING SHOULD BE CONDUCTED IN A DOWNSTREAM TO UPSTREAM DIRECTION (FOR THE PURPOSE OF REDUCING TURBIDITY/MAINTAINING VISIBILITY) WITH ONE PERSON OPERATING THE ELECTROFISHER AND AT LEAST ONE PERSON NETTING LARVAL LAMPREYS. EACH REACH SHOULD BE THOROUGHLY AND SLOWLY SAMPLED (60-90 SEC/M), WITH MORE EFFORT DIRECTED AT SUITABLE LAMPREY REARING HABITAT AND LESS EFFORT IN AREAS WITH HARD SUBSTRATES OR HIGH WATER VELOCITY.

8) USING THE 2-STAGE METHOD DESCRIBED ABOVE, THE ELECTROFISHER SHOULD MAINLY BE OPERATED IN THE LOWER FREQUENCY OUTPUT MODE TO IRRITATE LARVAL LAMPREYS OUT OF THE SUBSTRATE. WHEN NECESSARY, THE HIGHER FREQUENCY MODE SHOULD BE ACTIVATED FOR CAPTURING EMERGENT LARVAL LAMPREYS.

9) MULTIPLE ELECTROFISHING PASSES SHOULD BE MADE TO ENSURE A MORE COMPLETE REMOVAL OF LARVAL LAMPREYS. A FIFTEEN MINUTE BREAK BETWEEN PASSES SHOULD BE TAKEN TO REDUCE THE CHANCE OF ELECTRONARCOSIS. SOME RESEARCH INDICATED ON AVERAGE, ONLY 30% LAMPREY EMERGE PER PASS, THUS THE NEED FOR MULTIPLE PASSES.

10) POST-DRAWDOWN: LARVAL LAMPREY MAY CONTINUE TO EMERGE FROM SEDIMENTS AFTER DRAWDOWN. THE FOLLOWING "DRY- SHOCKING" GUIDELINES CAN BE USED TO ENCOURAGE LARVAE TO EMERGE FROM THE SEDIMENTS SO THEY CAN BE SALVAGED.

a) DURING AND AFTER DEWATERING, DEWATERED AREAS WHERE LAMPREY MAY BE BURROWED SHOULD BE SHOCKED, AKA "DRY-SHOCKING." DRY SHOCK IN DEPOSITIONAL AREAS OF FINE AND SANDY SEDIMENT FOR LARVAL LAMPREY. JUVENILES (EYED MIGRANTS) AND ADULTS ARE SOMETIMES FOUND BURIED IN ROCKIER AREAS, AND THOSE AREAS SHOULD ALSO BE SHOCKED IF OTHER THESE LIFE STAGES MAY BE PRESENT. DRY-SHOCK A SQUARE METER AT A TIME. PLACE THE ANODES ABOUT 1 METER APART AND TICKLE-PULSE FOR 60 TO 90 SECONDS. REMOVE EMERGED LAMPREY ONCE THE SHOCKING HAS STOPPED. MOVE TO NEXT SQUARE METER AND CONTINUE. ADJUST TO LOCAL CONDITIONS IN SOME INSTANCES, 60 SECONDS OF SHOCKING WILL BE SUFFICIENT; IN OTHER AREAS 90 SECONDS IS NEEDED. IN COLD TEMPERATURES, IT CAN BE BENEFICIAL TO RAISE THE VOLTAGE TO INCREASE EFFICIENCY. A GENERAL GUIDELINE IS AT TEMPERATURES LESS THAN 100C, THE VOLTAGE CAN BE INCREASED TO 150-175 V. IF EMERGENCE IS REALLY SLOW (OR ON THE LAST SALVAGE PASS PRIOR TO COMPLETE DEWATERING), THE VOLTAGE CAN BE INCREASED TO 200 V INITIALLY, AND UP TO 400 V IF LOWER VOLTAGE IS NOT EFFECTIVE (DRY SHOCKING ONLY).

4) FISH SALVAGE NOTICE: MONITORING AND RECORDING OF FISH PRESENCE, HANDLING, AND MORTALITY MUST OCCUR FOR THE DURATION OF THE ISOLATION. SALVAGE, ELECTROFISHING, DEWATERING, AND DEWATERING OPERATIONS. ONCE OPERATIONS ARE COMPLETED, A SALVAGE REPORT WILL DOCUMENT PROCEDURES USED, ANY FISH INJURIES OR DEATHS (INCLUDING NUMBERS OF FISH AFFECTED), AND CAUSES OF ANY DEATHS.

70% DESIGN
APRIL 2026

NOT FOR
CONSTRUCTION



WOLF WATER RESOURCES, INC.
1001 SE WATER AVE. SUITE #80
PORTLAND, OR 97214
503.207.6888

Lower Columbia
Estuary
Partnership



LOWER COLUMBIA
ESTUARY PARTNERSHIP
400 NE 11TH AVE
PORTLAND, OR 97232
503.226.1565

LOWER COLUMBIA ESTUARY PARTNERSHIP

MULTNOMAH CHANNEL
MARSH NATURAL AREA

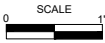
MULTNOMAH COUNTY, OR

HIP CONSERVATION
NOTES 2

REVISION NUMBER

No.	Date	Revision

Date 4/30/2026	Designed By RCC
Drawn By DK	Checked By AJ



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20200017

SHEET NO.

G2.1

4 OF 23



WOLF WATER RESOURCES, INC.
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LOWER COLUMBIA
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LOWER COLUMBIA ESTUARY PARTNERSHIP
MULTNOMAH CHANNEL
MARSH NATURAL AREA
MULTNOMAH COUNTY, OR

SHIP CONSERVATION

NOTES 3

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Date 4/30/2026	Designed By RCC
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5) CONSTRUCTION AND DISCHARGE WATER:

- 1) SURFACE WATER MAY BE DIVERTED TO MEET CONSTRUCTION NEEDS, BUT ONLY IF DEVELOPED SOURCES ARE UNAVAILABLE OR INADEQUATE.
- 2) DIVERSIONS WILL NOT EXCEED 10% OF THE AVAILABLE FLOW.
- 3) ALL CONSTRUCTION DISCHARGE WATER WILL BE COLLECTED AND TREATED USING THE BEST AVAILABLE TECHNOLOGY SUITABLE FOR SITE CONDITIONS.
- 4) TREATMENTS TO REMOVE DEBRIS, NUTRIENTS, SEDIMENT, PETROLEUM HYDROCARBONS, METALS AND OTHER POLLUTANTS LIKELY TO BE PRESENT WILL BE PROVIDED.

7) CESSATION OF WORK:PROJECT OPERATIONS WILL CEASE UNDER THE FOLLOWING CONDITIONS:

- 1) HIGH FLOW CONDITIONS THAT MAY RESULT IN INUNDATION OF THE PROJECT AREA, EXCEPT FOR EFFORTS TO AVOID OR MINIMIZE RESOURCE DAMAGE
- 2) WHEN ALLOWABLE WATER QUALITY IMPACTS, AS DEFINED BY THE STATE CWA SECTION 401 WATER QUALITY CERTIFICATION OR HIP TURBIDITY MONITORING PROTOCOL, HAVE BEEN EXCEEDED

8) SITE RESTORATION: WHEN CONSTRUCTION IS COMPLETE:

- 1) ALL STREAMBANKS, SOILS, AND VEGETATION WILL BE CLEANED UP AND RESTORED AS NECESSARY USING STOCKPILED LARGE WOOD, TOPSOIL, AND NATIVE CHANNEL MATERIAL.
- 2) ALL PROJECT-RELATED WASTE WILL BE REMOVED.
- 3) ALL TEMPORARY ACCESS ROADS, CROSSINGS, AND STAGING AREAS WILL BE DECOMPACTED AND RECONTOURED. WHEN NECESSARY FOR REVEGETATION AND INFILTRATION OF WATER, COMPACTED AREAS OF SOIL WILL BE LOOSENEED.
- 4) ALL DISTURBED AREAS WILL BE REHABILITATED IN A MANNER THAT RESULTS IN SIMILAR OR IMPROVED CONDITIONS RELATIVE TO PRE-PROJECT CONDITIONS. THIS WILL BE ACHIEVED THROUGH REDISTRIBUTION OF STOCKPILED MATERIALS, SEEDING, AND/OR PLANTING WITH LOCAL NATIVE SEED MIXES OR PLANTS.

9) REVEGETATION: LONG-TERM SOIL STABILIZATION OF DISTURBED SITES WILL BE ACCOMPLISHED WITH REESTABLISHMENT OF NATIVE VEGETATION USING THE FOLLOWING CRITERIA:

- 1) PLANTING AND SEEDING WILL OCCUR PRIOR TO OR AT THE BEGINNING OF THE FIRST GROWING SEASON AFTER CONSTRUCTION.
- 2) PLANT MATERIALS WILL BE COORDINATED WITH METRO PROJECT MANAGER. THE ORIGINAL SOURCE FOR MATERIAL WILL BE COLLECTED BELOW 1000 FEET IN ELEVATION AND WITHIN THE WILLAMETTE VALLEY ECOREGION OR THE PUGET LOWLAND ECOREGION (AS FOUND HERE: [HTTPS://WWW.EPA.GOV/ECO-RESEARCH/LEVEL-III-AND-IV-ECOREGIONS-CONTINENTAL-UNITED-STATES](https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states)) BELOW A LATITUDE OF 47 DEGREES. VEGETATION, SUCH AS WILLOW, SEDGE AND RUSH MATS, WILL BE SALVAGED FROM DISTURBED OR ABANDONED FLOODPLAINS, STREAM CHANNELS, OR WETLANDS, AND REPLANTED AT THE SITE IN APPROPRIATE LOCATIONS.
- 3) INVASIVE SPECIES WILL NOT BE USED.
- 4) SHORT-TERM STABILIZATION MEASURES MAY INCLUDE THE USE OF NON-NATIVE STERILE SEED MIX (WHEN NATIVE SEEDS ARE NOT AVAILABLE), WEED-FREE CERTIFIED STRAW, JUTE MATTING, AND OTHER SIMILAR TECHNIQUES.
- 5) SURFACE FERTILIZER WILL NOT BE APPLIED WITHIN 50 FEET OF ANY STREAM CHANNEL, WATERBODY, OR WETLAND.
- 6) FENCING WILL BE INSTALLED AS NECESSARY TO PREVENT ACCESS TO REVEGETATED SITES BY LIVESTOCK OR UNAUTHORIZED PERSONS.
- 7) RE-ESTABLISHMENT OF VEGETATION IN DISTURBED AREAS WILL ACHIEVE AT LEAST 70% OF PRE-PROJECT CONDITIONS WITHIN 3 YEARS.
- 8) INVASIVE PLANTS WILL BE REMOVED OR CONTROLLED UNTIL NATIVE PLANT SPECIES ARE WELL ESTABLISHED (TYPICALLY 3 YEARS POST-CONSTRUCTION).

10) SITE ACCESS: THE PROJECT SPONSOR WILL RETAIN THE RIGHT OF REASONABLE ACCESS TO THE SITE IN ORDER TO MONITOR THE SUCCESS OF THE PROJECT OVER ITS LIFE.

11) IMPLEMENTATION MONITORING:PROJECT SPONSOR STAFF OR THEIR DESIGNATED REPRESENTATIVE WILL PROVIDE IMPLEMENTATION MONITORING BY FILLING OUT THE PROJECT COMPLETION FORM (PCF) TO ENSURE COMPLIANCE WITH THE APPLICABLE BIOP, DEMONSTRATING THAT:

- 1) GENERAL CONSERVATION MEASURES ARE ADEQUATELY FOLLOWED.
- 2) EFFECTS TO LISTED SPECIES ARE NOT GREATER THAN PREDICTED AND INCIDENTAL TAKE LIMITATIONS ARE NOT EXCEEDED.
- 3) TURBIDITY MONITORING IS BEING CONDUCTED IN ACCORDANCE WITH THE HIP TURBIDITY MONITORING PROTOCOL (SECTION 3.3, PG. 44) AND RECORDED IN THE PCF.

12) CWA SECTION 401 WATER QUALITY CERTIFICATION: THE PROJECT SPONSOR OR DESIGNATED REPRESENTATIVE WILL COMPLETE AND RECORD WATER QUALITY OBSERVATIONS TO ENSURE THAT IN-WATER WORK IS NOT DEGRADING WATER QUALITY. DURING CONSTRUCTION, CWA SECTION 401 WATER QUALITY CERTIFICATION PROVISIONS PROVIDED BY THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY, WASHINGTON DEPARTMENT OF ECOLOGY, OR IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY WILL BE FOLLOWED.

13) STAGED REWATERING PLAN: WHEN APPROPRIATE, THE PROJECT SPONSOR SHALL IMPLEMENT A STAGED REWATERING PLAN FOR PROJECTS THAT INVOLVE INTRODUCING STREAMFLOW INTO RECENTLY EXCAVATED CHANNELS UNDER THE 2A) IMPROVE SECONDARY CHANNEL AND WETLAND HABITAT ACTIVITY CATEGORY OR 2F) CHANNEL RECONSTRUCTION CATEGORIES. THIS PLAN MAY BE ALTERED ACCORDING TO SITE SPECIFIC CONDITIONS WITH COORDINATION AND FEEDBACK FROM BPA AND THE SERVICES.

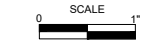
- 1) PRE-WASH THE NEWLY-EXCAVATED CHANNEL BEFORE REWATERING 10. TURBID WASH WATER WILL BE DETAINED AND PUMPED TO THE FLOODPLAIN OR INTO A REACH WITH SEDIMENT CAPTURE DEVICES, RATHER THAN DISCHARGING INTO FISH-BEARING WATERS.
- 2) PREPARE NEW CHANNEL FOR WATER BY INSTALLING SEINE NETS AT THE UPSTREAM END TO PREVENT FISH FROM MOVING DOWNSTREAM INTO THE NEW CHANNEL UNTIL 2/3 OF TOTAL STREAMFLOW IS AVAILABLE IN THAT CHANNEL. STARTING IN THE EARLY MORNING, INTRODUCE 1/3 OF THE FLOW INTO THE NEW CHANNEL OVER A PERIOD OF 1-2 HOURS.
- 3) WHEN REINTRODUCING STREAMFLOW INTO A DEWATERED STREAM REACH, MONITOR FOR TURBIDITY:
 - A) A SAMPLE MUST BE TAKEN TO ESTABLISH BACKGROUND TURBIDITY LEVELS PRIOR TO ANTICIPATED TURBIDITY PULSES. TAKE THE SAMPLE AT AN UNDISTURBED AREA APPROXIMATELY 100 FEET UPSTREAM FROM THE NEWLY EXCAVATED CHANNEL.
 - B) TAKE A SECOND SAMPLE OR OBSERVATION, IMMEDIATELY DOWNSTREAM OF THE NEWLY EXCAVATED CHANNEL, APPROXIMATELY:
 - C) 50 FEET DOWNSTREAM FOR STREAMS THAT ARE LESS THAN 30 FEET WIDE;
 - D) 100 FEET DOWNSTREAM FOR STREAMS BETWEEN 30 AND 100 FEET WIDE;
 - E) 200 FEET DOWNSTREAM FOR STREAMS GREATER THAN 100 FEET WIDE; AND
 - F) 300 FEET FROM THE DISCHARGE POINT OR NONPOINT SOURCE FOR LOCATIONS SUBJECT TO TIDAL OR COASTAL SCOUR.
 - G) A SAMPLE MUST THEN BE TAKEN EVERY 2 HOURS DURING REWATERING AND BE COMPARED AGAINST THE BACKGROUND MEASUREMENT.
 - H) AN EXCEEDANCE OCCURS WHENEVER BOTH OF THE FOLLOWING CONDITIONS ARE EXCEEDED:
 - I) DOWNSTREAM TURBIDITY EXCEEDS 40 NTU (FIGURE 1).
 - J) DOWNSTREAM TURBIDITY EXCEEDS 10% ABOVE BACKGROUND.
 - K) IN AN EXCEEDANCE OCCURS FOR TWO CONSECUTIVE READINGS (4 HOURS), STOP WORK IMMEDIATELY AND TAKE MEASURES TO REDUCE TURBIDITY BEFORE CONTINUING TO REINTRODUCE STREAMFLOW.
- 4) PREPARE TO INTRODUCE THE SECOND 1/3 OF THE FLOW (UP TO A TOTAL OF 2/3) TO THE NEW CHANNEL BY INSTALLING SEINE NETS AT THE UPSTREAM END OF THE OLD CHANNEL IN ORDER TO PREVENT FISH, LARVAL LAMPREY AND FRESHWATER MUSSELS FROM MOVING INTO A PARTIALLY-DEWATERED CHANNEL. INTRODUCE THE SECOND 1/3 OF THE FLOW OVER THE NEXT 1-2 HOURS. SALVAGE FISH FROM THE OLD 10 THE CONTRACTOR MAY FIND IT USEFUL TO HAVE PREWASHED GRAVEL BAGS AVAILABLE ONSITE TO CONTROL THE FLOW OF WATER. CHANNEL AT THIS TIME, SO THAT THE OLD CHANNEL IS FISH-FREE BEFORE DROPPING BELOW 1/3 OF THE FLOW. NOTE: THE FISH WILL BE TEMPORARILY BLOCKED FROM MOVING DOWNSTREAM INTO EITHER CHANNEL UNTIL 2/3 OF THE FLOW HAS BEEN TRANSITIONED TO THE NEW CHANNEL. THIS BLOCKAGE TO DOWNSTREAM FISH PASSAGE IS EXPECTED TO PERSIST FOR ROUGHLY 12 TO 14 HOURS, BUT FISH WILL STILL BE ABLE TO VOLITIONALLY MOVE OUT OF THE CHANNEL IN THE DOWNSTREAM DIRECTION. PERFORM MONITORING AS IN #3 ABOVE.
- 5) AFTER THE SECOND 1/3 OF FLOW IS INTRODUCED OVER 2 HOURS, AND TURBIDITY IS WITHIN 10% OF THE BACKGROUND LEVEL, REMOVE SEINE NETS FROM THE NEW CHANNEL, AND ALLOW FISH TO MOVE DOWNSTREAM BACK INTO THE CHANNEL. INTRODUCE THE FINAL 1/3 OF FLOW. ONCE 100% OF THE FLOW IS IN THE NEW CHANNEL, INSTALL PLUG TO BLOCK FLOW INTO THE OLD CHANNEL AND REMOVE SEINE NETS FROM THE OLD CHANNEL. ADDITIONAL EFFORTS TO SALVAGE LARVAL LAMPREY EMERGING FROM FINE SEDIMENT DEPOSITS SHOULD BE CONDUCTED AFTER THE FLOW IS GONE AND POSSIBLY FOR A FEW HOURS AFTER FLOW IS GONE, AS THE LARVAE WILL CONTINUE TO EMERGE.

14) HIP TURBIDITY MONITORING PROTOCOL: THE PROJECT SPONSOR SHALL COMPLETE AND RECORD THE FOLLOWING WATER QUALITY OBSERVATIONS ON THE HIP 4 PROJECT COMPLETION FORM (PCF). IF THE GEOMORPHOLOGY OF THE PROJECT AREA (E.G., SILTY OR CLAYLIKE MATERIALS) OR THE NATURE OF THE ACTION (E.G., LARGE AMOUNTS OF BARE EARTH EXPOSURE) SHALL PRECLUDE THE SUCCESSFUL COMPLIANCE WITH THESE TRIGGERS, NOTIFY YOUR EC LEAD & THE SERVICES IN ADVANCE OF THE LIKELIHOOD OF AN EXCEEDANCE AND SEEK ADDITIONAL RECOMMENDATIONS.

- 1) TAKE A BACKGROUND TURBIDITY MEASUREMENT APPROXIMATELY 100 FEET UPSTREAM FROM THE PROJECT AREA USING A RECENTLY-CALIBRATED TURBIDIMETER. RECORD THE OBSERVATION, LOCATION, AND TIME OF THE BACKGROUND MEASUREMENT BEFORE MONITORING AT THE DOWNSTREAM POINT, KNOWN AS THE MEASUREMENT COMPLIANCE POINT. IF THE BACKGROUND TURBIDITY IS LESS THAN 20 NTU, THEN USE VISUAL OBSERVATIONS (FIGURE 1).
- 2) TAKE A SECOND MEASUREMENT OR OBSERVATION AT THE MEASUREMENT COMPLIANCE POINT, IMMEDIATELY DOWNSTREAM OF THE DISTURBANCE AREA, APPROXIMATELY:
 - A) 50 FEET DOWNSTREAM FOR STREAMS THAT ARE LESS THAN 30 FEET WIDE;
 - B) 100 FEET DOWNSTREAM FOR STREAMS BETWEEN 30 AND 100 FEET WIDE;
 - C) 200 FEET DOWNSTREAM FOR STREAMS GREATER THAN 100 FEET WIDE; AND
 - D) 300 FEET FROM THE DISCHARGE POINT OR NONPOINT SOURCE FOR LOCATIONS SUBJECT TO TIDAL OR COASTAL SCOUR.
- E) RECORD THE DOWNSTREAM OBSERVATION, LOCATION, AND TIME.
- 3) TURBIDITY SHALL BE MEASURED (STEPS 1-2) EVERY 2 HOURS 11WHILE WORK IS BEING IMPLEMENTED. THE MONITORING INTERVAL OF 4 HOURS HAS BEEN PROPOSED BUT NOT APPROVED.
- 4) AN EXCEEDANCE OCCURS WHENEVER BOTH OF THE FOLLOWING CONDITIONS ARE EXCEEDED:
 - A) DOWNSTREAM TURBIDITY EXCEEDS 40 NTU.
 - B) DOWNSTREAM TURBIDITY EXCEEDS 10% ABOVE BACKGROUND FIGURE 1 SUGGESTED VISUAL OBSERVATIONAL DIFFERENCES IN TURBIDITY NOTE: FOR ANY STREAM WITH A BACKGROUND TURBIDITY OF 20 NTU OR LESS, IF YOU CANNOT SEE THE BOTTOM IN 2 FEET OF WATER AT EACH 2 HOUR INTERVAL, THEN TURBIDITY HAS LIKELY SURPASSED 40 NTUS AND YOU MUST ADJUST YOUR PROCEDURES. THIS WOULD ALLOW WORK TO CONTINUE WITH A TURBIDITY OF UNDER ABOUT 30-40 NTU. TURBIDITY OVER 40 NTU SHOULD BE AVOIDED.
- 1) IF AN EXCEEDANCE OCCURS THEN ADJUSTMENTS OR CORRECTIVE MEASURES MUST BE TAKEN IN ORDER TO REDUCE TURBIDITY. THE NMFS STAFF BIOLOGISTS OF THE AREA CAN PROVIDE TECHNICAL ASSISTANCE.
- 2) IF EXCEEDANCES OCCUR FOR MORE THAN TWO CONSECUTIVE MONITORING INTERVALS (AFTER 4HOURS), THE ACTIVITY MUST STOP UNTIL THE TURBIDITY LEVEL RETURNS TO BACKGROUND, AND THE EC LEAD MUST BE NOTIFIED AFTER THE PROJECT IS CONCLUDED. THE EC LEAD SHALL DOCUMENT THE REASONS FOR THE EXCEEDANCES AND THE CORRECTIVE MEASURES TAKEN. THIS IS VERY IMPORTANT AS BPA IS REQUIRED TO REPORT TO THE SERVICES UPON ALL EXCEEDANCES

No.	Date	Revision

Date 4/30/2026	Designed By RCC
Drawn By DK	Checked By AJ



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EXISTING CONDITIONS PLAN - NORTH

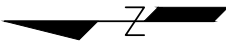
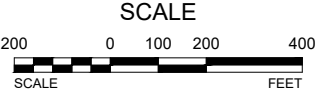
SCALE: 1" = 200'

NOTES:

- EXISTING CONDITIONS TOPOGRAPHY IS A COMPOSITE SURFACE DERIVED FROM 2019 LIDAR FROM METRO/OLC, AND 2026 BATHYMETRIC AND TOPOGRAPHIC SURVEY COLLECTED BY W2R.
- EXISTING POWER LINES AND ACCESS ROAD LOCATIONS ARE APPROXIMATE & SHOWN FOR REFERENCE ONLY

LEGEND:

- 1--- EXISTING MINOR CONTOUR (1' INTERVAL)
- 5--- EXISTING MAJOR CONTOUR (5' INTERVAL)
- 1--- PROPOSED MINOR CONTOUR (1' INTERVAL)
- 5--- PROPOSED MAJOR CONTOUR (5' INTERVAL)
- TAXLOTS
- OHP --- EXISTING POWERLINES
- EXISTING SITE ACCESS
- WB --- WETLAND BOUNDARY
- OHW (2-YEAR FLOOD) BOUNDARY
- FEMA 100-YEAR FLOOD BOUNDARY
- FLOODWAY BOUNDARY



No.	Date	Revision

Date 4/30/2026	Designed By RCC
Drawn By DK	Checked By AJ

SCALE 0 1"

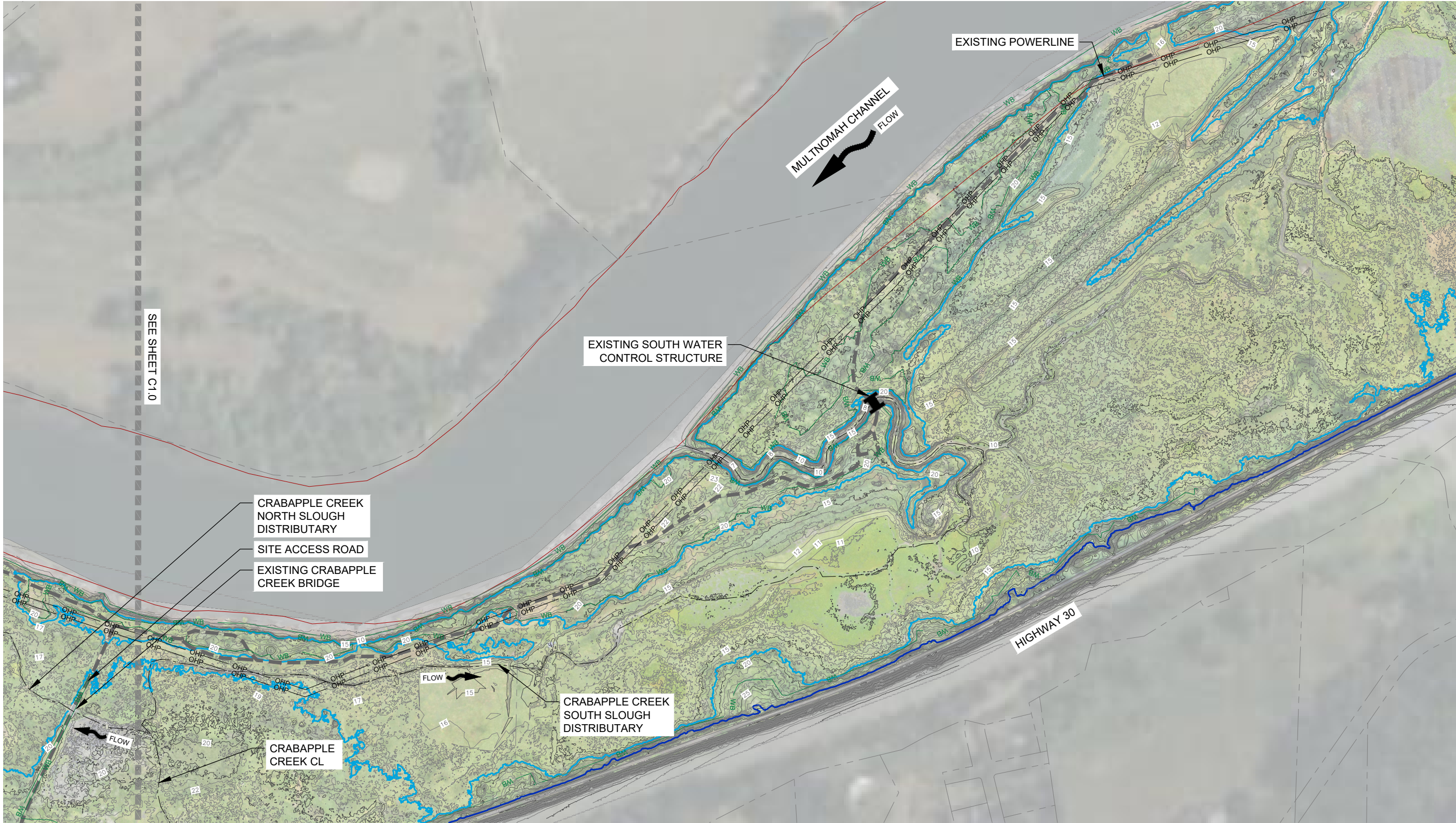
JOB NO.

20200017

SHEET NO.

C1.1

7 OF 23



EXISTING CONDITIONS PLAN - SOUTH

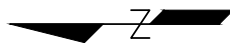
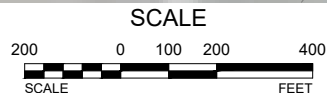
SCALE: 1" = 200'

NOTES:

- EXISTING CONDITIONS TOPOGRAPHY IS A COMPOSITE SURFACE DERIVED FROM 2019 LIDAR FROM METRO/OLC, AND 2026 BATHYMETRIC AND TOPOGRAPHIC SURVEY COLLECTED BY W2R.
- EXISTING POWER LINES AND ACCESS ROAD LOCATIONS ARE APPROXIMATE & SHOWN FOR REFERENCE ONLY

LEGEND:

-----1-----	EXISTING MINOR CONTOUR (1' INTERVAL)	-----	EXISTING SITE ACCESS
-----5-----	EXISTING MAJOR CONTOUR (5' INTERVAL)	WB	WETLAND BOUNDARY
-----1-----	PROPOSED MINOR CONTOUR (1' INTERVAL)	---	OHV (2-YEAR FLOOD) BOUNDARY
-----5-----	PROPOSED MAJOR CONTOUR (5' INTERVAL)	---	FEMA 100-YEAR FLOOD BOUNDARY
---	TAXLOTS	---	FLOODWAY BOUNDARY
--- OHP ---	EXISTING POWERLINES		



NOT FOR
CONSTRUCTION

WOLF WATER RESOURCES
WOLF WATER RESOURCES, INC.
1001 SE WATER AVE. SUITE #180
PORTLAND, OR 97214
503.207.6888

Lower Columbia Estuary Partnership
LOWER COLUMBIA
ESTUARY PARTNERSHIP
400 NE 11TH AVE
PORTLAND, OR 97232
503.226.1565

LOWER COLUMBIA ESTUARY PARTNERSHIP
**MULTNOMAH CHANNEL
MARSH NATURAL AREA**
MULTNOMAH COUNTY, OR

RESTORATION
OVERVIEW PLAN -
NORTH

REVISION NUMBER

No.	Date	Revision

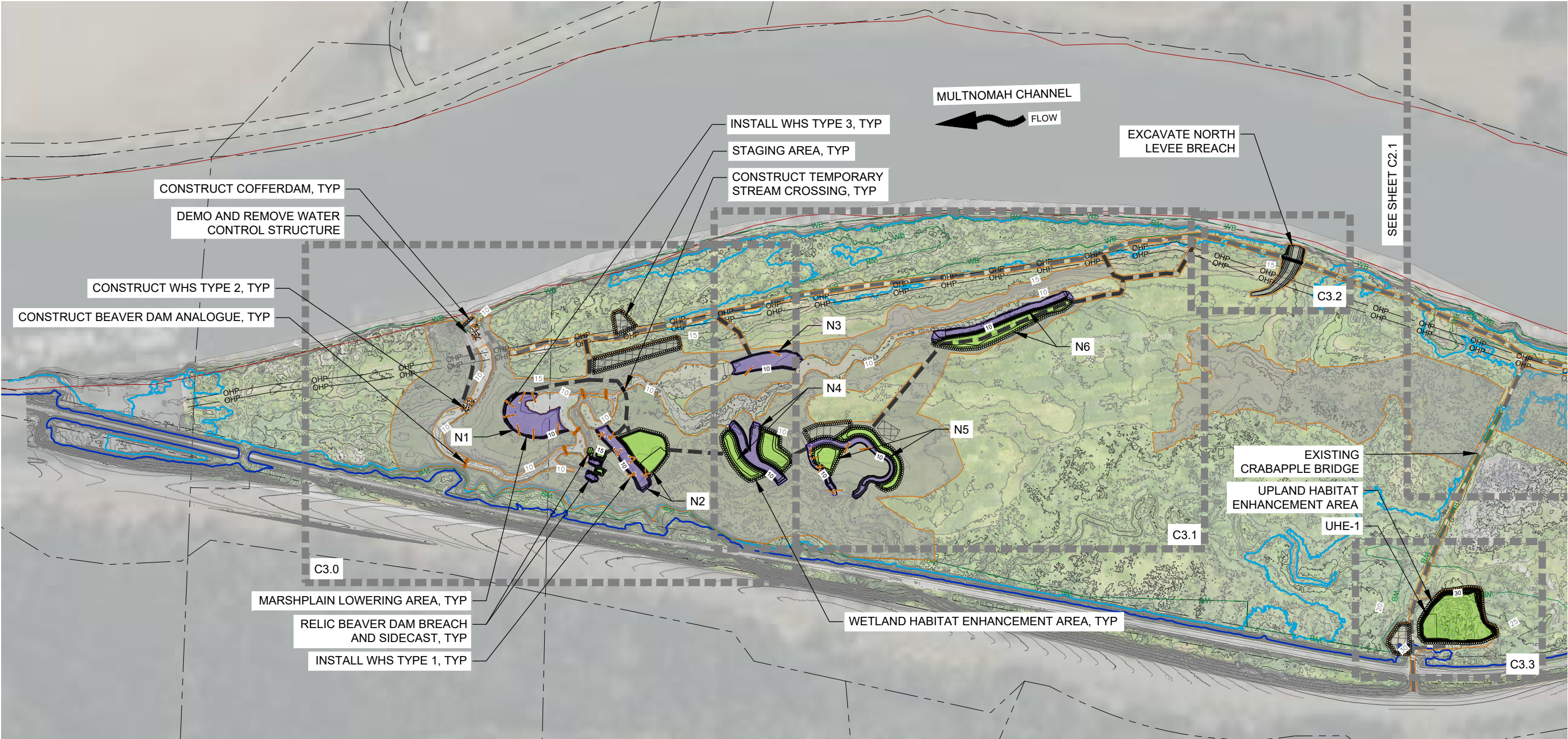
Date: 4/30/2026
Designed By: RCC
Drawn By: DK
Checked By: AJ

SCALE
0 1" = 200'

JOB NO.
20200017

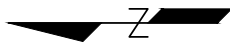
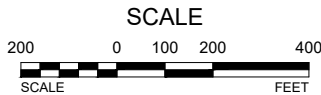
SHEET NO.
C2.0

8 OF 23



NORTH WETLAND RESTORATION PLAN

SCALE: 1" = 200'



NOTES:

1. CONTRACTOR SHALL COORDINATE WITH METRO FOR SITE ACCESS.
2. FLAG AREAS TO BE CLEARED AND GRUBBED. OPR SHALL REVIEW AND APPROVE MARKED AREAS BEFORE CLEARING. NATIVE PLANT MATERIALS CLEARED AND GRUBBED SHALL BE STOCKPILED AND USED FOR BDA CONSTRUCTION.
3. CONSTRUCT WOOD FEATURES AT THE LOCATIONS AND ELEVATIONS SHOWN HERE AND AND PER DETAILS ON SHEETS C3.0 - C3.5.
4. ALL NON-NATIVE EXCAVATED MATERIAL SHALL BE DISPOSED AS SPECIFIED.
5. FINISHED SURFACE SHALL VARY NATURALLY WITHIN ± 0.5 FT OF THE DESIGN ELEVATION.
6. STAGING AREAS BELOW ORDINARY HIGH WATER FOR TEMPORARY STOCKPILE MATERIAL ONLY. OVERNIGHT STORAGE OF EQUIPMENT AND REFUELING SHALL USE THE UPLAND STAGING AREA ON SHEET C3.3.
7. SEED AND PLANT WORK AREAS PER SCHEDULES ON SHEET L1.1.

LEGEND:

---	EXISTING MINOR CONTOUR (1' INTERVAL)				FLOODWAY BOUNDARY
---	EXISTING MAJOR CONTOUR (5' INTERVAL)				MARSHPLAIN LOWERING (MPL)
---	PROPOSED MINOR CONTOUR (1' INTERVAL)				WETLAND HABITAT ENHANCEMENT (WHE)
---	PROPOSED MAJOR CONTOUR (5' INTERVAL)				UPLAND HABITAT ENHANCEMENT (UHE)
---	TAXLOTS				GENERAL PLANTING
---	EXISTING POWERLINES				STAGING AREA
---	EXISTING SITE ACCESS				TEMPORARY CROSSING
---	PROPOSED TEMPORARY SITE ACCESS				HIBERNACULA
---	WORK AREA AND ACCESS BOUNDARY				WHS TYPE 1 - HABITAT LOG
---	STRAW WATTLES				WHS TYPE 2 - CONTINUOUS LOG COMPLEX
---	WETLAND BOUNDARY				WHS TYPE 3 - BASKING LOG
---	OHV (2-YEAR FLOOD) BOUNDARY				BEAVER DAM ANALOGUE
---	FEMA 100-YEAR FLOOD BOUNDARY				

No.	Date	Revision

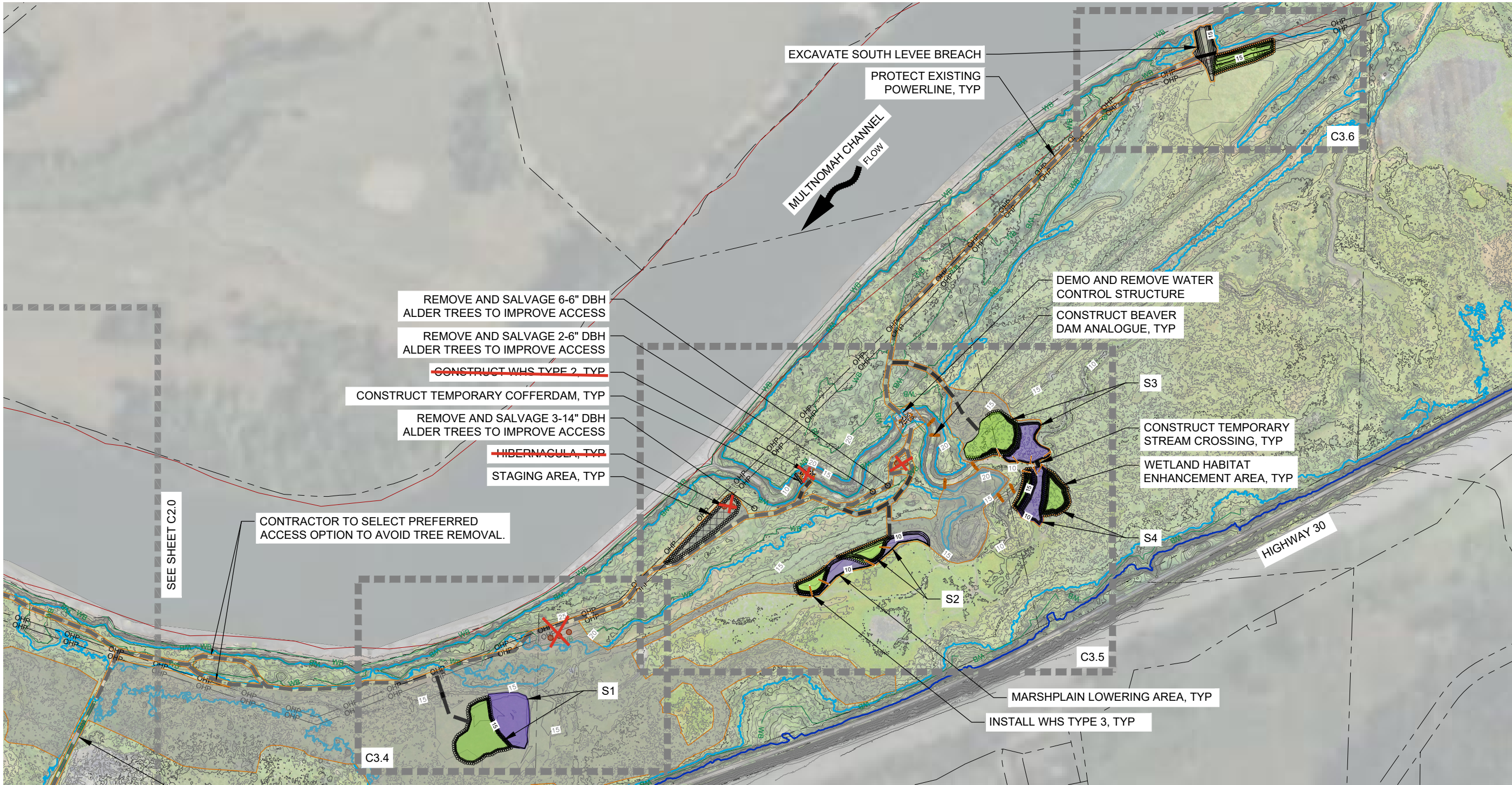
Date 4/30/2026	Designed By RCC
Drawn By DK	Checked By AJ

SCALE 0 100 200 400 FEET

JOB NO. 20200017

SHEET NO. C2.1

9 OF 23



SOUTH WETLAND RESTORATION PLAN

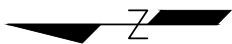
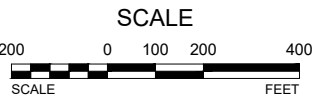
SCALE: 1" = 200'

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH METRO FOR SITE ACCESS.
2. FLAG AREAS TO BE CLEARED AND GRUBBED. OPR SHALL REVIEW AND APPROVE MARKED AREAS BEFORE CLEARING. NATIVE PLANT MATERIALS CLEARED AND GRUBBED SHALL BE STOCKPILED AND USED FOR BDA CONSTRUCTION.
3. CONSTRUCT WOOD FEATURES AT THE LOCATIONS AND ELEVATIONS SHOWN HERE AND ON SHEETS C3.0 - C3.5.
4. ~~CONSTRUCT HIBERNACULA FROM WCS CONCRETE SPOILS, PER NOTES ON SHEET C3.1.~~
5. ALL NON-NATIVE EXCAVATED MATERIAL BE DISPOSED AS SPECIFIED.
6. FINISHED SURFACE SHALL VARY NATURALLY WITHIN ± 0.5 FT OF THE DESIGN ELEVATION.
7. STAGING AREAS BELOW ORDINARY HIGH WATER FOR TEMPORARY MATERIAL STOCKPILE ONLY. OVERNIGHT STORAGE OF EQUIPMENT AND REFUELING SHALL USE THE UPLAND STAGING AREA ON SHEET C3.3.
8. SEED AND PLANT WORK AREAS PER SCHEDULES ON SHEET L1.1.

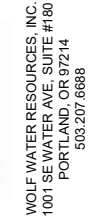
LEGEND:

---	EXISTING MINOR CONTOUR (1' INTERVAL)		FLOODWAY BOUNDARY
---	EXISTING MAJOR CONTOUR (5' INTERVAL)		MARSHPLAIN LOWERING (MPL)
---	PROPOSED MINOR CONTOUR (1' INTERVAL)		WETLAND HABITAT ENHANCEMENT (WHE)
---	PROPOSED MAJOR CONTOUR (5' INTERVAL)		UPLAND HABITAT ENHANCEMENT (UHE)
---	TAXLOTS		GENERAL PLANTING
---	EXISTING POWERLINES		STAGING AREA
---	EXISTING SITE ACCESS		TEMPORARY CROSSING
---	PROPOSED TEMPORARY SITE ACCESS		HIBERNACULA
---	WORK AREA AND ACCESS BOUNDARY		WHS TYPE 1 - HABITAT LOG
---	STRAW WATTLES		WHS TYPE 2 - CONTINUOUS LOG COMPLEX
---	WETLAND BOUNDARY		WHS TYPE 3 - BASKING LOG
---	OHW (2-YEAR FLOOD) BOUNDARY		
---	FEMA 100-YEAR FLOOD BOUNDARY		



DWG: Z:\Shared\W2\CAD\20200017-Mult Channel Natural Area (Estuary Partnership)\DWGSHEETS\C1.0 PROPOSED OVERVIEW.dwg USER: dkelley
DATE: Apr 30, 2026 2:49pm XREFS:X-TB-W2-22x34 X-TAXLOTS X-WHS X-IMAGE X-EG SURFACE X-PLANTING X-MAP X-LEGEND X-DESIGN Seeding

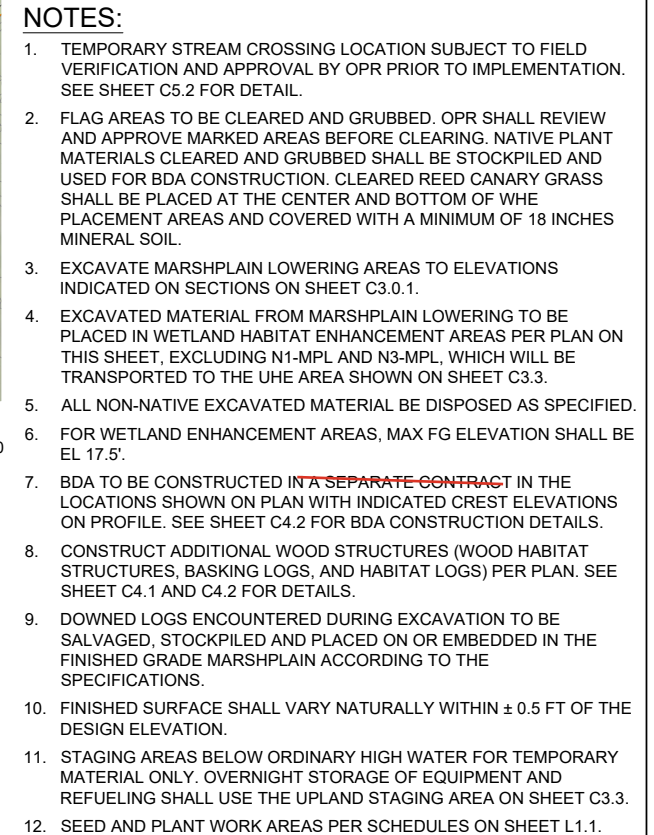
NOT FOR
CONSTRUCTION



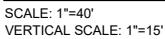
LOWER COLUMBIA
ESTUARY PARTNERSHIP
400 NE 11TH AVE
PORTLAND, OR 97232
503.226.1565

NORTH SLOUGH GRADING PLAN & PROFILE

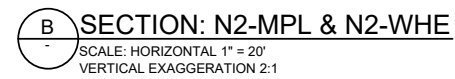
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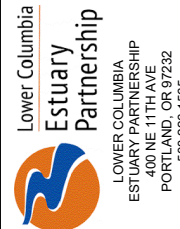
SCALE: 1" = 60'



Z:\Shared\W2r\CAD\20200017-Mult Channel Natural Area (Estuary Partnership)\DWG\SHEETS\C2.0 PROPOSED CONDITIONS BDA PLACEMENT PROFILE.dwg USER: dkelley



1. FLAG AREAS TO BE CLEARED AND GRUBBED. OPR SHALL REVIEW AND APPROVE MARKED AREAS BEFORE CLEARING. NATIVE PLANT MATERIALS CLEARED AND GRUBBED SHALL BE STOCKPILED AND USED FOR BDA CONSTRUCTION. CLEARED REED CANARY GRASS SHALL BE PLACED AT THE CENTER AND BOTTOM OF WHE PLACEMENT AREAS AND COVERED WITH A MINIMUM OF 18 INCHES MINERAL SOIL.
2. CONSTRUCT MARSHPLAIN LOWERING AND WETLAND HABITAT ENHANCEMENT TO THE ELEVATIONS AND GRADES SHOWN ON SECTIONS HERE.
3. SCARIFY THE EXISTING GRADE SURFACE PRIOR TO PLACING FILL TO PROMOTE GROUNDWATER EXCHANGE THROUGH THE FILL AREA AS SPECIFIED. ROUGHEN SURFACE OF FINISHED GRADE AS SHOWN IN C5.1.
4. FOR WETLAND HABITAT ENHANCEMENT AREAS, MAX FG ELEVATION SHALL BE EL 17.5'.
5. FINISHED SURFACE SHALL VARY NATURALLY WITHIN ± 0.5 FT OF THE DESIGN ELEVATION.
6. DOWNED LOGS ENCOUNTERED DURING EXCAVATION TO BE SALVAGED, STOCKPILED AND PLACED ON OR EMBEDDED IN THE FINISHED GRADE MARSHPLAIN ACCORDING TO THE SPECIFICATIONS.



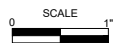
**LOWER COLUMBIA ESTUARY PARTNERSHIP
MULTNOMAH CHANNEL
MARSH NATURAL AREA
MULTNOMAH COUNTY, OR**

NORTH SLOUGH SECTIONS

REVISION NUMBER

[illegible]

Date 4/30/2026	Designed By RCC
Drawn By DK	Checked By AJ

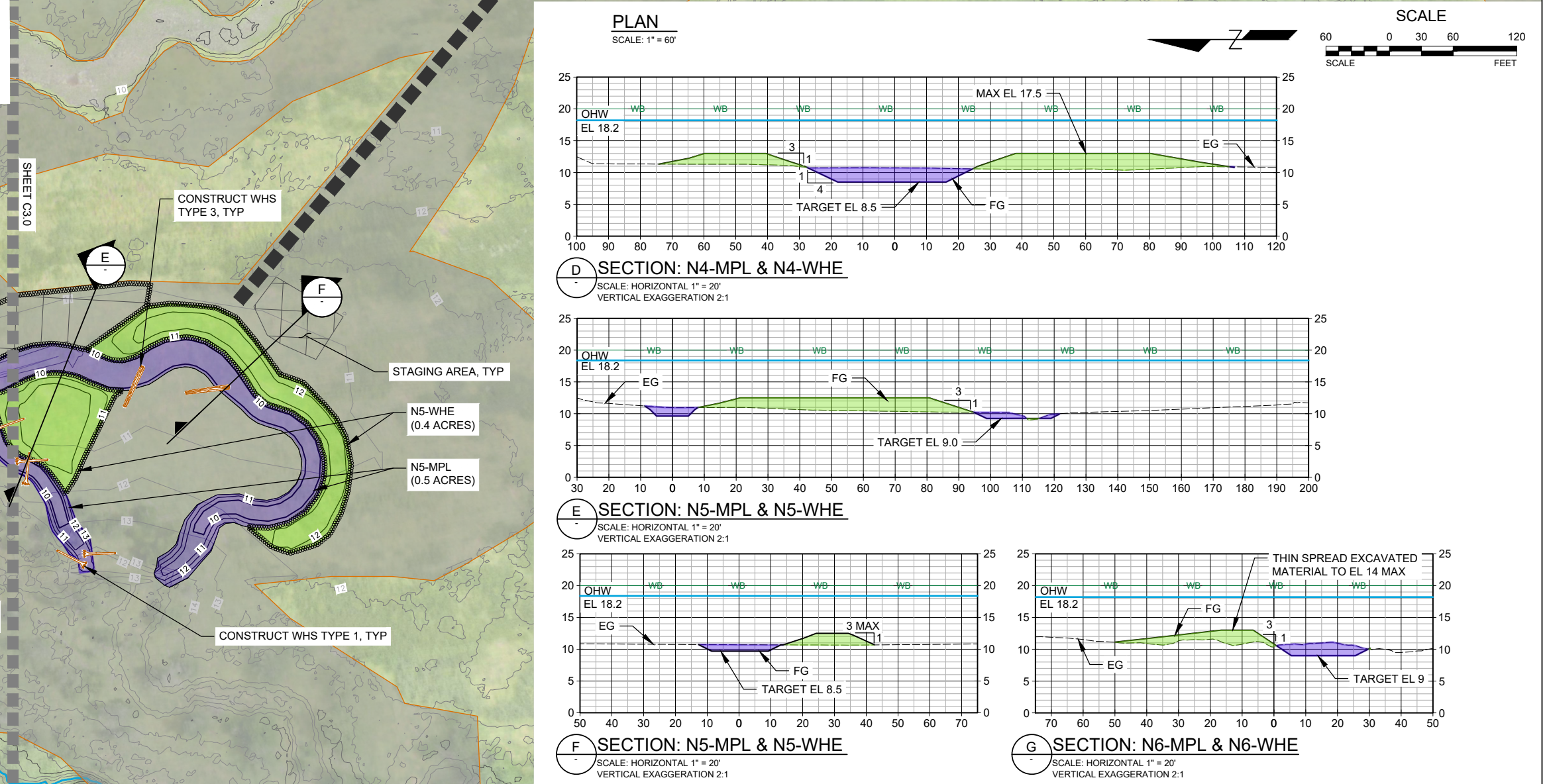
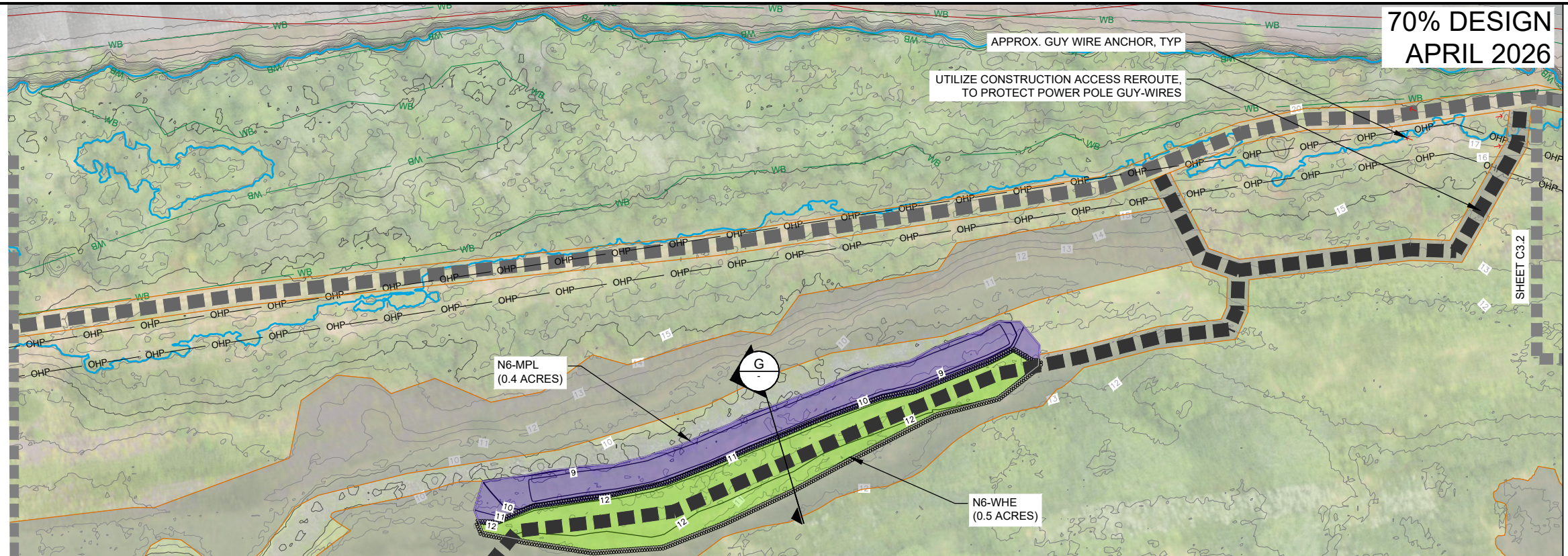


JOB NO.

SHEET NO.
C3.0.1

11 OF 23

1. TEMPORARY STREAM CROSSING LOCATION SUBJECT TO FIELD VERIFICATION AND APPROVAL BY OPR PRIOR TO IMPLEMENTATION. SEE SHEET C5.2 FOR DETAIL.
2. FLAG AREAS TO BE CLEARED AND GRUBBED. OPR SHALL REVIEW AND APPROVE MARKED AREAS BEFORE CLEARING. NATIVE PLANT MATERIALS CLEARED AND GRUBBED SHALL BE STOCKPILED AND USED FOR BDA CONSTRUCTION. CLEARED REED CANARY GRASS SHALL BE PLACED AT THE CENTER AND BOTTOM OF WHE PLACEMENT AREAS AND COVERED WITH A MINIMUM OF 18 INCHES MINERAL SOIL.
3. EXCAVATE MARSHPLAIN LOWERING AREAS TO ELEVATIONS INDICATED IN SECTIONS.
4. EXCAVATED MATERIAL FROM MARSHPLAIN LOWERING TO BE PLACED IN WETLAND HABITAT ENHANCEMENT AREAS PER PLAN AND SECTIONS ON THIS SHEET.
5. SCARIFY THE EXISTING GRADE SURFACE PRIOR TO PLACING FILL TO PROMOTE GROUNDWATER EXCHANGE THROUGH THE FILL AREA AS SPECIFIED. ROUGHEN SURFACE OF FINISHED GRADE AS SHOWN IN C5.1.
6. FOR WETLAND HABITAT ENHANCEMENT AREAS, MAX FG ELEVATION SHALL BE EL 17.5'.
7. ALL NON-NATIVE EXCAVATED MATERIAL BE DISPOSED OF OFFSITE IN A LEGAL MANNER.
8. CONSTRUCT BASKING LOGS AND HABITAT LOGS PER PLAN. SEE SHEET C4.1 AND C4.2 FOR DETAILS.
9. DOWNED LOGS ENCOUNTERED DURING EXCAVATION TO BE SALVAGED, STOCKPILED AND PLACED ON OR EMBEDDED IN THE FINISHED GRADE MARSH PLAIN ACCORDING TO THE SPECIFICATIONS.
10. FINISHED SURFACE SHALL VARY NATURALLY WITHIN ± 0.5 FT OF THE DESIGN ELEVATION.
11. STAGING AREAS BELOW ORDINARY HIGH WATER FOR TEMPORARY MATERIAL ONLY. OVERNIGHT STORAGE OF EQUIPMENT AND REFUELING SHALL USE THE UPLAND STAGING AREA ON SHEET C3.3.
12. SEED AND PLANT WORK AREAS PER SCHEDULES ON SHEET L1.1.



WOLF WATER RESOURCES, INC.
1001 SE WATER AVE, SUITE #180
PORTLAND, OR 97214
503.207.6688



**Estuary
Partnership**
LOWER COLUMBIA
ESTUARY PARTNERSHIP
400 NE 11TH AVE
PORTLAND, OR 97232
503.296.1555

MULTNOMAH CHANNEL
MARSH NATURAL AREA
MULTNOMAH COUNTY, OR

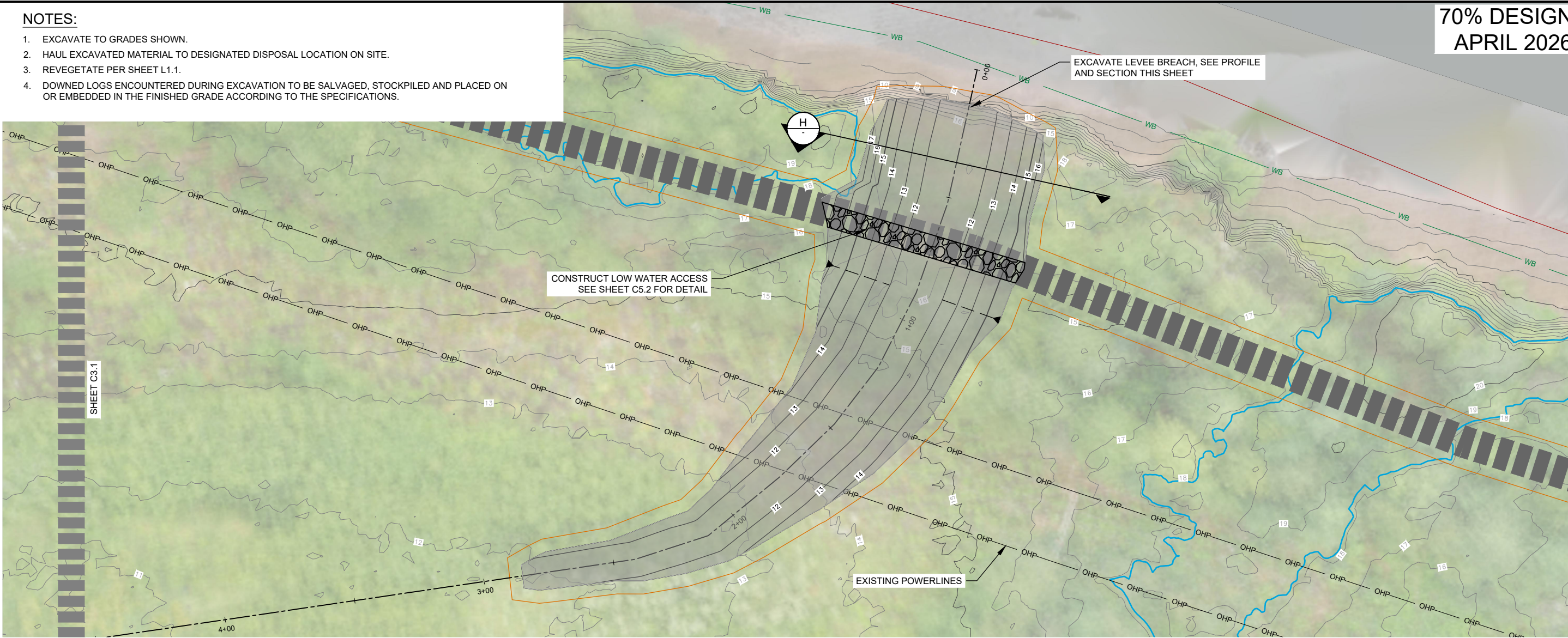
NORTH SWALE GRADING PLAN & SECTION

[illegible]

NOTES:

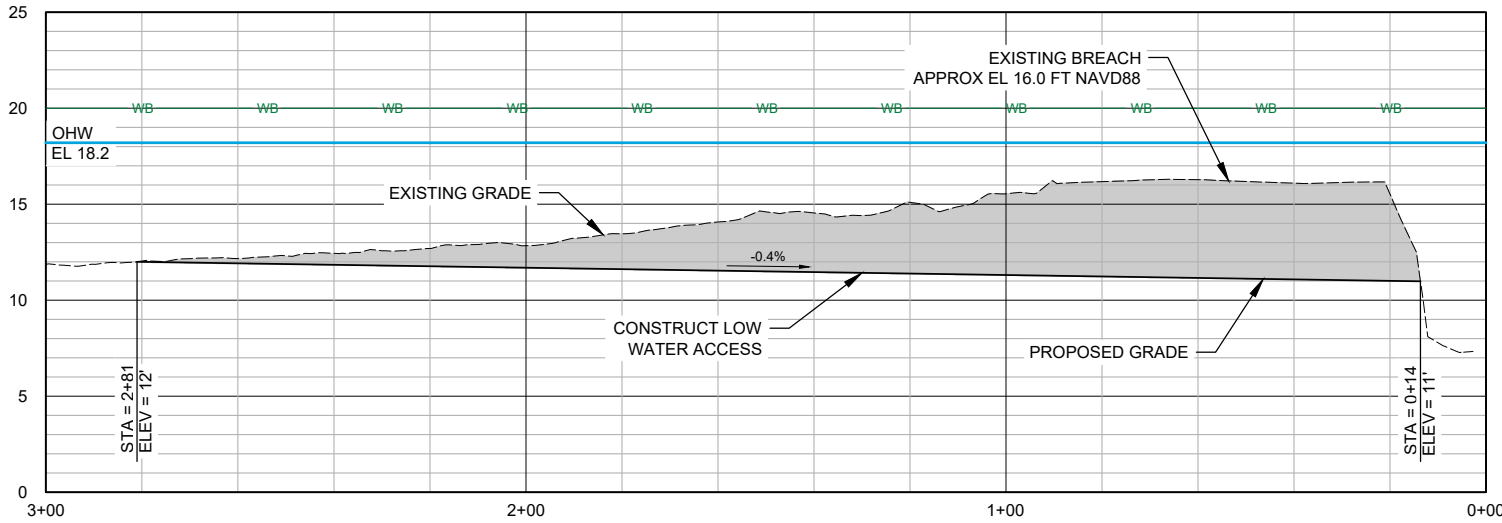
1. EXCAVATE TO GRADES SHOWN.
2. HAUL EXCAVATED MATERIAL TO DESIGNATED DISPOSAL LOCATION ON SITE.
3. REVEGETATE PER SHEET L1.1.
4. DOWNED LOGS ENCOUNTERED DURING EXCAVATION TO BE SALVAGED, STOCKPILED AND PLACED ON OR EMBEDDED IN THE FINISHED GRADE ACCORDING TO THE SPECIFICATIONS.

70% DESIGN
APRIL 2026



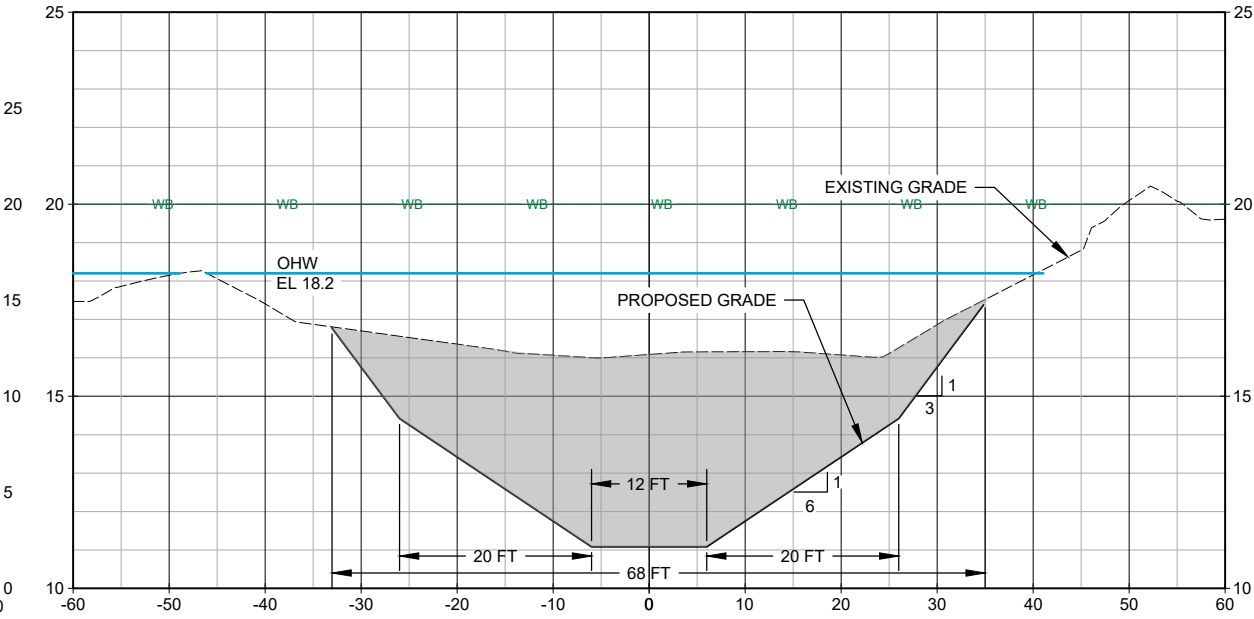
PLAN: NORTH LEVEE BREACH

SCALE: 1" = 20'



PROFILE: NORTH LEVEE BREACH

SCALE: HORIZONTAL 1" = 20'
VERTICAL EXAGGERATION 4:1



SECTION: NORTH LEVEE BREACH

SCALE: HORIZONTAL 1" = 10'
VERTICAL EXAGGERATION 2:1

NOT FOR
CONSTRUCTION



WOLF WATER RESOURCES, INC.
1001 SE WATER AVE. SUITE #180
PORTLAND, OR 97214
503.207.6888

Lower Columbia
Estuary
Partnership



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ESTUARY PARTNERSHIP
400 NE 11TH AVE
PORTLAND, OR 97232
503.226.1565

LOWER COLUMBIA ESTUARY PARTNERSHIP
MULTNOMAH CHANNEL
MARSH NATURAL AREA
MULTNOMAH COUNTY, OR

NORTH BREACH
GRADING

REVISION NUMBER

No.	Date	Revision

Date: 4/30/2026
Designed By: RCC
Drawn By: DK
Checked By: AJ

SCALE
0 1"

JOB NO.
20200017

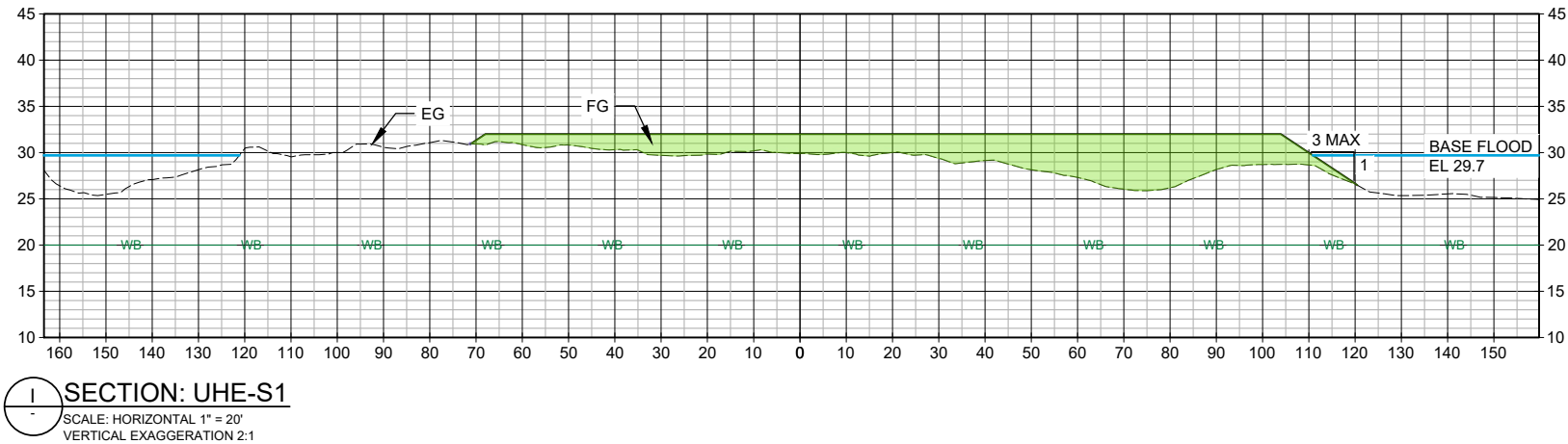
SHEET NO.
C3.2

13 OF 23

DWG: Z:\Shared\W2\CAD\20200017-Mult Channel Natural Area (Estuary Partnership)\DWG\SHEETS\C2.0 PROPOSED CONDITIONS BDA PLACEMENT PROFILE.dwg USER: dkelley
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UPLAND GRADING PLAN
SCALE: 1" = 40'



SECTION: UHE-S1
SCALE: HORIZONTAL 1" = 20'
VERTICAL EXAGGERATION 2:1

- NOTES:
1. FLAG AREAS TO BE CLEARED AND GRUBBED. OPR SHALL REVIEW AND APPROVE MARKED AREAS BEFORE CLEARING. NATIVE PLANT MATERIALS CLEARED AND GRUBBED SHALL BE STOCKPILED AND USED FOR BDA CONSTRUCTION.
 2. SCARIFY THE EXISTING GRADE SURFACE PRIOR TO PLACING FILL TO PROMOTE GROUNDWATER EXCHANGE THROUGH THE FILL AREA AS SPECIFIED. ROUGHEN SURFACE OF FINISHED GRADE AS SHOWN IN C5.1.
 3. UPLAND ENHANCEMENT AREA HAS NO MAXIMUM ELEVATION.
 4. FINISHED SURFACE SHALL VARY NATURALLY WITHIN ± 0.5 FT OF THE DESIGN ELEVATION.
 5. STAGING AREAS BELOW ORDINARY HIGH WATER FOR TEMPORARY MATERIAL ONLY. OVERNIGHT STORAGE OF EQUIPMENT AND REFUELING SHALL USE THE UPLAND STAGING AREA ON THIS SHEET.
 6. SEED AND PLANT WORK AREAS PER SCHEDULES ON SHEET L1.1.
 7. EXCAVATE, HAUL AND LEGALLY DISPOSE OF CONCRETE PAD.

70% DESIGN
APRIL 2026

NOT FOR
CONSTRUCTION



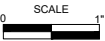
LOWER COLUMBIA ESTUARY PARTNERSHIP
MULTNOMAH CHANNEL
MARSH NATURAL AREA
MULTNOMAH COUNTY, OR

UPLAND GRADING
PLAN & SECTION

REVISION NUMBER

No.	Date	Revision

Date 4/30/2026	Designed By RCC
Drawn By DK	Checked By AJ



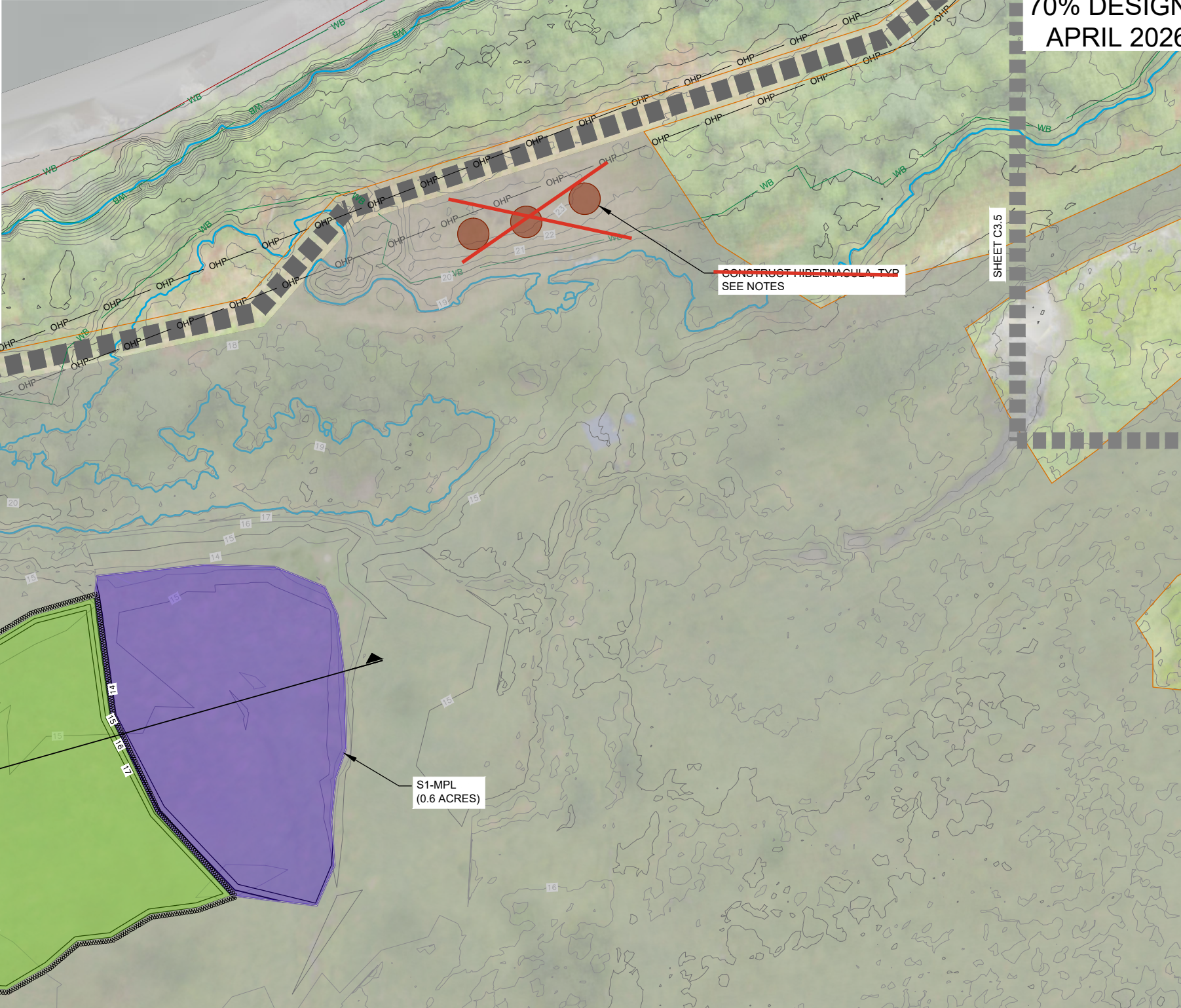
JOB NO. 20200017

SHEET NO. C3.3

14 OF 23

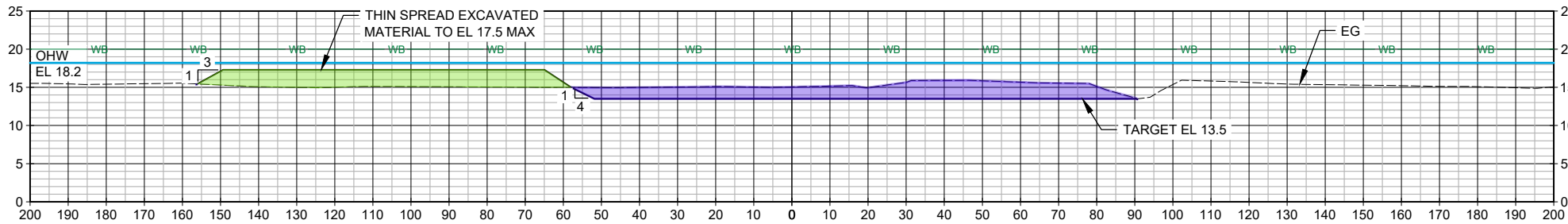
NOTES:

1. FLAG AREAS TO BE CLEARED AND GRUBBED. OPR SHALL REVIEW AND APPROVE MARKED AREAS BEFORE CLEARING. NATIVE PLANT MATERIALS CLEARED AND GRUBBED SHALL BE STOCKPILED AND USED FOR BDA CONSTRUCTION. CLEARED REED CANARY GRASS SHALL BE PLACED AT THE CENTER AND BOTTOM OF WHE PLACEMENT AREAS AND COVERED WITH A MINIMUM OF 18 INCHES MINERAL SOIL.
2. EXCAVATE MARSHPLAIN LOWERING AREAS TO ELEVATIONS INDICATED IN SECTION.
3. EXCAVATED MATERIAL FROM MARSHPLAIN LOWERING TO BE PLACED IN WETLAND HABITAT ENHANCEMENT AREAS PER PLAN AND SECTION ON THIS SHEET.
4. SCARIFY THE EXISTING GRADE SURFACE PRIOR TO PLACING FILL TO PROMOTE GROUNDWATER EXCHANGE THROUGH THE FILL AREA AS SPECIFIED. ROUGHEN SURFACE OF FINISHED GRADE AS SHOWN IN C5.1.
5. FOR WETLAND HABITAT ENHANCEMENT AREAS, MAX FG ELEVATION SHALL BE EL 17.5'.
6. DOWNED LOGS ENCOUNTERED DURING EXCAVATION TO BE SALVAGED, STOCKPILED AND PLACED ON OR EMBEDDED IN THE FINISHED GRADE MARSHPLAIN ACCORDING TO THE SPECIFICATIONS.
7. FINISHED SURFACE SHALL VARY NATURALLY WITHIN ± 0.5 FT OF THE DESIGN ELEVATION.
8. ~~HIBERNACULA SHALL BE CONSTRUCTED APPROXIMATELY 30 FT X 30 FT PER LOCATION IN PLAN, FORMING MOUNDED STRUCTURES 3 - 5 FT IN HEIGHT. MOUNDS SHALL CONSIST OF WGS CONCRETE SPOILS, BROKEN INTO IRREGULAR PIECES TO CREATE INTERNAL VOIDS SUITABLE FOR TERRESTRIAL SPECIES USAGE. INCORPORATE SALVAGED SLASH AS AVAILABLE AND AS INSTRUCTED BY OPR OR ENGINEER.~~
9. STAGING AREAS BELOW ORDINARY HIGH WATER FOR TEMPORARY MATERIAL ONLY. OVERNIGHT STORAGE OF EQUIPMENT AND REFUELING SHALL USE THE UPLAND STAGING AREA ON SHEET C3.3.
10. SEED AND PLANT WORK AREAS PER SCHEDULES ON SHEET L1.1.



SOUTH WETLAND GRADING PLAN

SCALE: 1" = 40'



SECTION: S1-MPL & S1-WHE
SCALE: HORIZONTAL 1" = 20'
VERTICAL EXAGGERATION 2:1

70% DESIGN
APRIL 2026

NOT FOR
CONSTRUCTION



WOLF WATER RESOURCES, INC.
1001 SE WATER AVE. SUITE #80
PORTLAND, OR 97214
503.207.6888

Lower Columbia
Estuary
Partnership



LOWER COLUMBIA
ESTUARY PARTNERSHIP
400 NE 11TH AVE
PORTLAND, OR 97232
503.226.1565

LOWER COLUMBIA ESTUARY PARTNERSHIP
MULTNOMAH CHANNEL
MARSH NATURAL AREA
MULTNOMAH COUNTY, OR

SOUTH WETLAND
GRADING PLAN &
PROFILE

REVISION NUMBER

No.	Date	Revision

Date: 4/30/2026
Designed By: RCC
Drawn By: DK
Checked By: AJ

SCALE: 1" = 40'

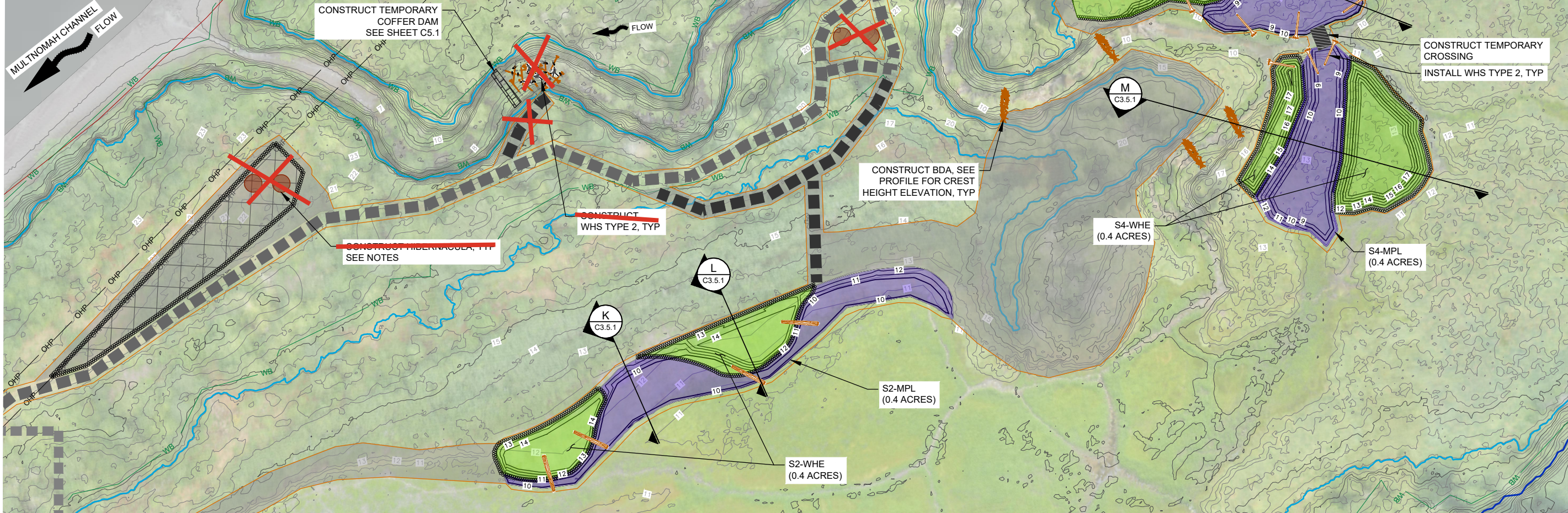
JOB NO. 20200017

SHEET NO. C3.4

15 OF 23

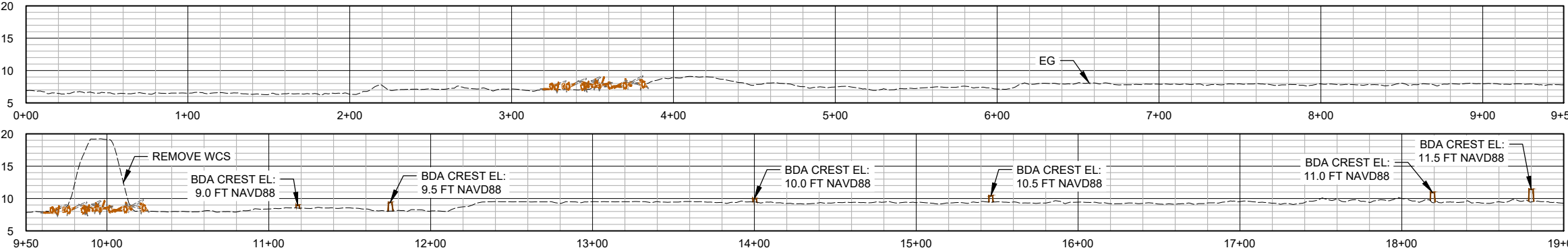
NOTES:

1. TEMPORARY STREAM CROSSING LOCATION SUBJECT TO FIELD VERIFICATION AND APPROVAL BY OPR PRIOR TO IMPLEMENTATION. SEE SHEET C5.2 FOR DETAIL.
2. FLAG AREAS TO BE CLEARED AND GRUBBED. OPR SHALL REVIEW AND APPROVE MARKED AREAS BEFORE CLEARING. NATIVE PLANT MATERIALS CLEARED AND GRUBBED SHALL BE STOCKPILED AND USED FOR BDA CONSTRUCTION. CLEARED REED CANARY GRASS SHALL BE PLACED AT THE CENTER AND BOTTOM OF WHE PLACEMENT AREAS AND COVERED WITH A MINIMUM OF 18 INCHES MINERAL SOIL.
3. EXCAVATE MARSHPLAIN LOWERING AREAS ELEVATIONS INDICATED ON SECTIONS ON SHEET C3.5.1.
4. EXCAVATED MATERIAL FROM MARSHPLAIN LOWERING TO BE PLACED IN WETLAND HABITAT ENHANCEMENT AREAS PER PLAN ON THIS SHEET AND SECTIONS ON SHEET C3.5.1.
5. ALL NON-NATIVE EXCAVATED MATERIAL BE DISPOSED OF OFFSITE IN A LEGAL MANNER.
6. FOR WETLAND HABITAT ENHANCEMENT AREAS, MAX FG ELEVATION SHALL BE EL 17.5'.
7. CONSTRUCT BDA IN THE LOCATIONS SHOWN ON PLAN WITH INDICATED CREST ELEVATIONS ON PROFILE. SEE SHEET C4.2 FOR BDA CONSTRUCTION DETAILS.
8. CONSTRUCT WOOD HABITAT STRUCTURES AND HABITAT LOGS PER PLAN. SEE SHEET C4.1 AND C4.2 FOR DETAILS.
9. DOWNED LOGS ENCOUNTERED DURING EXCAVATION TO BE SALVAGED, STOCKPILED AND PLACED ON OR EMBEDDED IN THE FINISHED GRADE MARSHPLAIN ACCORDING TO THE SPECIFICATIONS.
10. ~~HIBERNACULA SHALL BE CONSTRUCTED APPROXIMATELY 30 FT X 30 FT PER LOCATION IN PLAN, FORMING MOUNDED STRUCTURES 3-5 FT IN HEIGHT. MOUNDS SHALL CONSIST OF WCS CONCRETE SPOILS, BROKEN INTO IRREGULAR PIECES TO CREATE INTERNAL VOIDS SUITABLE FOR TERRESTRIAL SPECIES USAGE. INCORPORATE SALVAGED SLASH AS AVAILABLE AND AS INSTRUCTED BY OPR OR ENGINEER.~~
11. STAGING AREAS BELOW ORDINARY HIGH WATER FOR TEMPORARY MATERIAL ONLY. OVERNIGHT STORAGE OF EQUIPMENT AND REFUELING SHALL USE THE UPLAND STAGING AREA ON SHEET C3.2.
12. SEED AND PLANT WORK AREAS PER SCHEDULES ON SHEET L1.1.



SOUTH SLOUGH PLAN

SCALE: 1" = 60'



SOUTH SLOUGH PROFILE

SCALE: 1" = 40'

VERTICAL SCALE: 1" = 15'

70% DESIGN
APRIL 2026

NOT FOR
CONSTRUCTION

WOLF WATER RESOURCES, INC.
1001 SE WATER AVE. SUITE #80
PORTLAND, OR 97214
503.207.6888

Lower Columbia Estuary Partnership
LOWER COLUMBIA
ESTUARY PARTNERSHIP
400 NE 11TH AVE
PORTLAND, OR 97232
503.226.1565

LOWER COLUMBIA ESTUARY PARTNERSHIP
MULTNOMAH CHANNEL
MARSH NATURAL AREA
MULTNOMAH COUNTY, OR

SOUTH SLOUGH
GRADING PLAN &
PROFILE

REVISION NUMBER

No.	Date	Revision

Date: 4/30/2026
Designed By: RCC
Drawn By: DK
Checked By: AJ

SCALE: 1" = 100'

JOB NO. 20200017

SHEET NO. C3.5

16 OF 23

NOT FOR
CONSTRUCTION



Lower Columbia
Estuary
Partnership



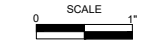
LOWER COLUMBIA ESTUARY PARTNERSHIP
MULTNOMAH CHANNEL
MARSH NATURAL AREA
MULTNOMAH COUNTY, OR

SOUTH SLOUGH
SECTIONS

REVISION NUMBER

No.	Date	Revision

Date 4/30/2026	Designed By RCC
Drawn By DK	Checked By AJ



JOB NO.

20200017

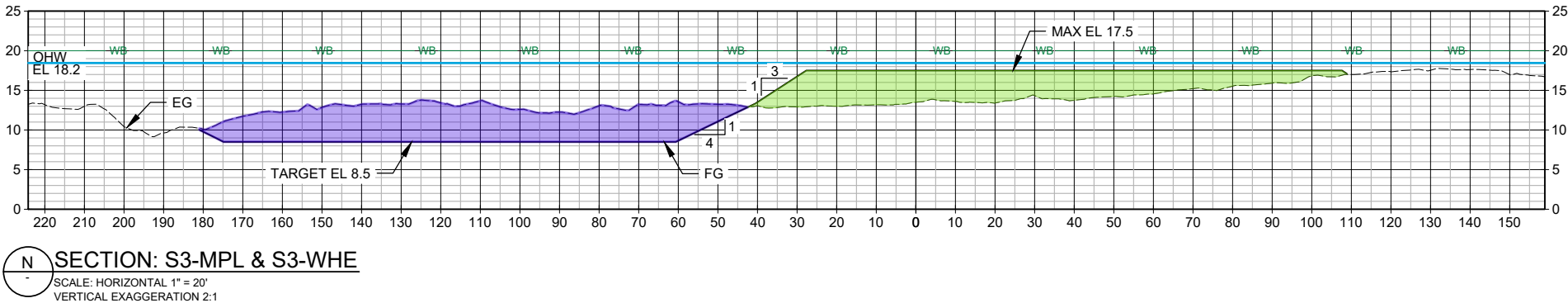
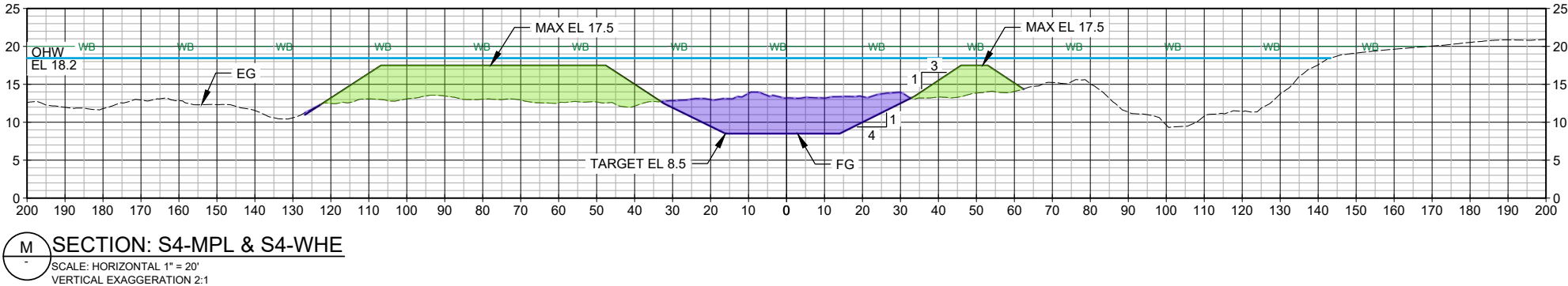
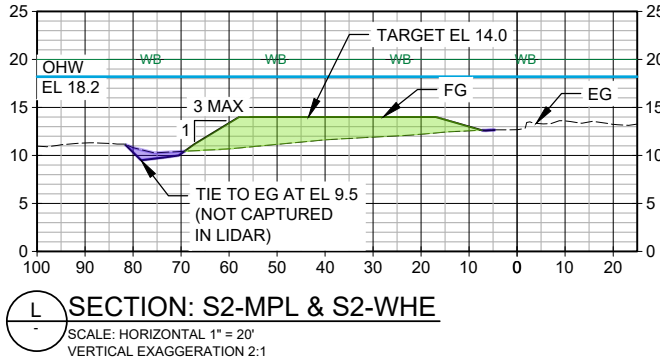
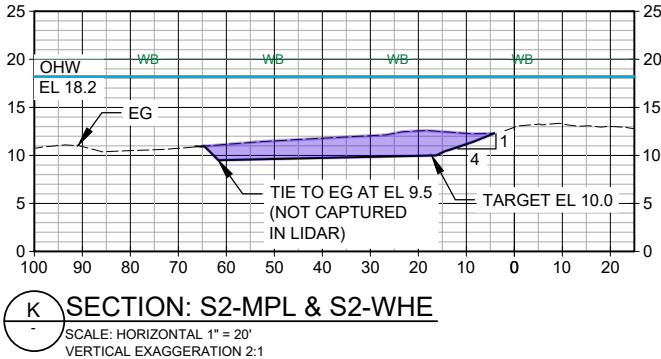
SHEET NO.

C3.5.1

17 OF 23

NOTES:

1. FLAG AREAS TO BE CLEARED AND GRUBBED. OPR SHALL REVIEW AND APPROVE MARKED AREAS BEFORE CLEARING. NATIVE PLANT MATERIALS CLEARED AND GRUBBED SHALL BE STOCKPILED AND USED FOR BDA CONSTRUCTION. CLEARED REED CANARY GRASS SHALL BE PLACED AT THE CENTER AND BOTTOM OF WHE PLACEMENT AREAS AND COVERED WITH A MINIMUM OF 18 INCHES MINERAL SOIL.
2. CONSTRUCT MARSHPLAIN LOWERING AND WETLAND HABITAT ENHANCEMENT TO THE ELEVATIONS AND GRADES SHOWN ON SECTIONS HERE.
3. SCARIFY THE EXISTING GRADE SURFACE PRIOR TO PLACING FILL TO PROMOTE GROUNDWATER EXCHANGE THROUGH THE FILL AREA AS SPECIFIED. ROUGHEN SURFACE OF FINISHED GRADE AS SHOWN IN C5.1.
4. FOR WETLAND HABITAT ENHANCEMENT AREAS, MAX FG ELEVATION SHALL BE EL 17.5'.
5. FINISHED SURFACE SHALL VARY NATURALLY WITHIN ± 0.5 FT OF THE DESIGN ELEVATION.
6. DOWNED LOGS ENCOUNTERED DURING EXCAVATION TO BE SALVAGED, STOCKPILED AND PLACED ON OR EMBEDDED IN THE FINISHED GRADE MARSHPLAIN ACCORDING TO THE SPECIFICATIONS.



No.	Date	Revision

Date 4/30/2026	Designed By RCC
Drawn By DK	Checked By AJ

SCALE 0 1"

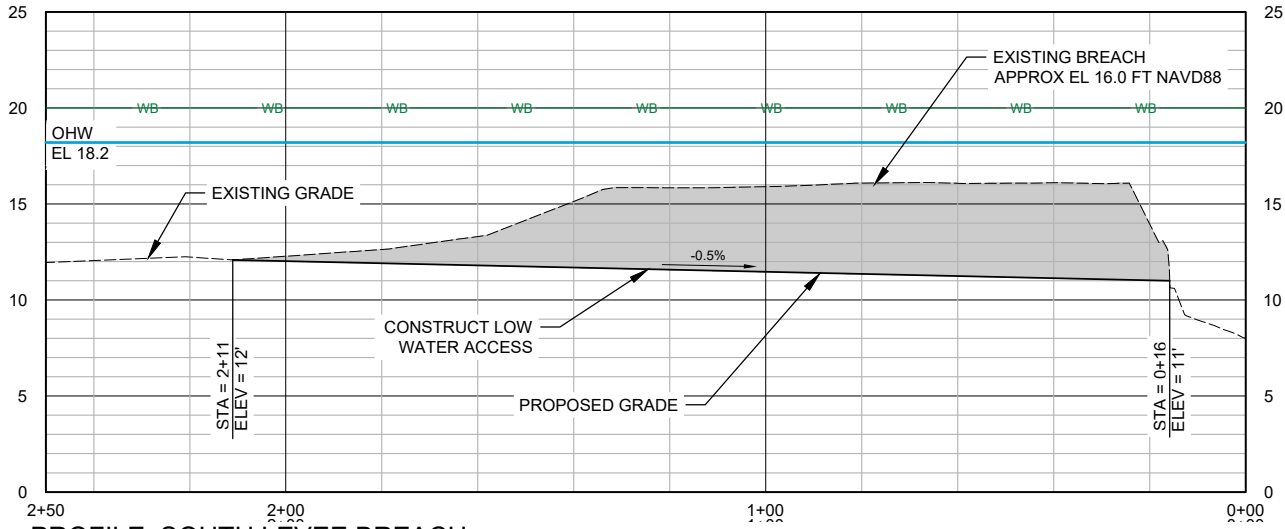
JOB NO. 20200017

SHEET NO. C3.6 18 OF 23

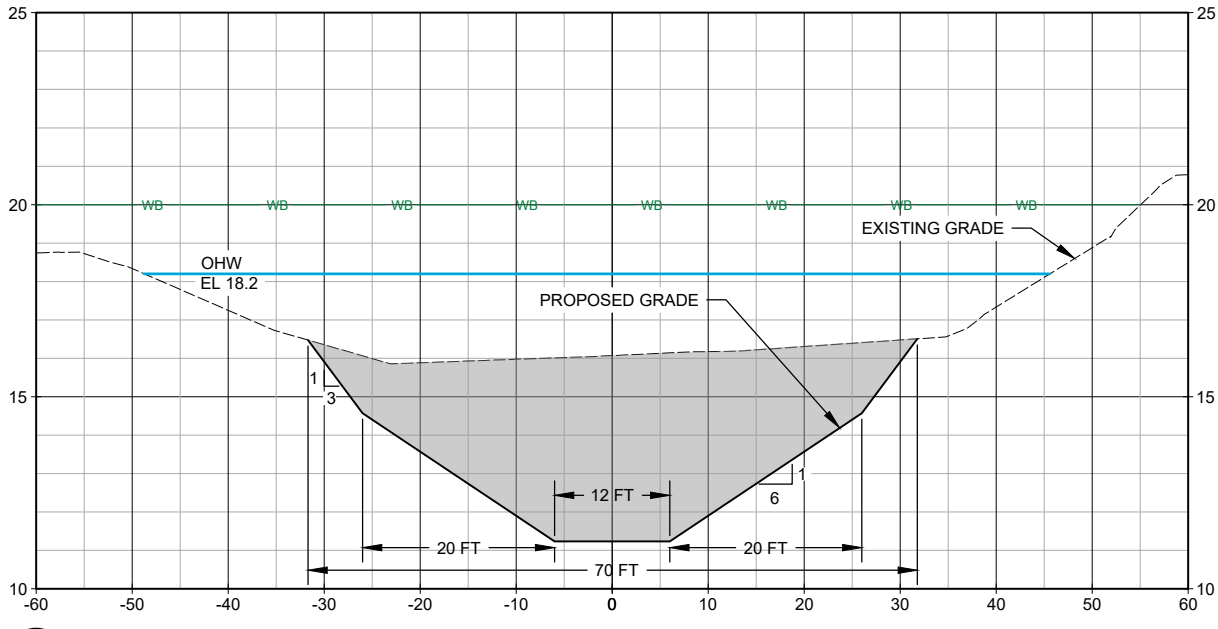


PLAN: SOUTH LEVEE BREACH
SCALE: 1" = 20'

- NOTES:**
- EXCAVATE TO GRADES SHOWN.
 - DISPOSE EXCAVATED MATERIAL FROM BREACH IN ADJACENT WHE SHOWN ON THIS SHEET.
 - REVEGETATE PER SHEET L1.1.
 - DOWNED LOGS ENCOUNTERED DURING EXCAVATION TO BE SALVAGED, STOCKPILED AND PLACED ON OR EMBEDDED IN THE FINISHED GRADE ACCORDING TO THE SPECIFICATIONS.



PROFILE: SOUTH LEVEE BREACH
SCALE: 1" = 20'
VERTICAL SCALE: 1" = 5'

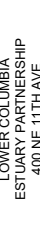


SECTION: SOUTH LEVEE BREACH
SCALE: HORIZONTAL 1" = 10'
VERTICAL EXAGGERATION 2:1



NTS

**NOT FOR
CONSTRUCTION**



MARSH NATURAL AREA

HABITAT DETAILS 2

Date	Revision

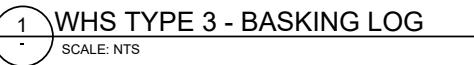
Designed
RCC
Checked
AJ

1st

1

2

4

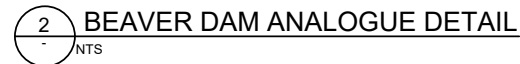


BASKING LOG			
MATERIAL	MIN DIAMETER (IN)	MIN LENGTH (FT)	QUANTITY PER STRUCTURE
VARIABLE SIZE LOG WITHOUT ROOTWAD	10-20	20	1
PIER LOG	8-12	5	2

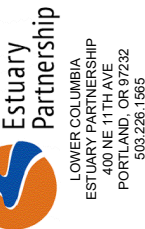


BDA STRUCTURE COMPONENTS			
MATERIAL	DIAMETER (IN)	LENGTH (FT)	QUANTITY PER 12 FEET OF STRUCTURE LENGTH
WILLOW BRANCH	1 TO 2	5	500
UNTREATED WOODEN POSTS	4	6	12

1. COORDINATE WITH ENGINEER ON SITE TO CONSTRUCT FIRST BDA TO ENSURE PROPER LOCATION, CONSTRUCTION METHODS, INTENT, AND FINAL INSTALLED CONDITION.
2. BEAVER DAM ANALOGUES SHALL BE PACKED WITH MUD AND NATIVE ORGANIC MATERIAL TO SEAL HOLES IN THE BOTTOM 6 INCHES OF THE STRUCTURE. IF AVAILABLE, PLACE A LAYER OF CONIFER BRANCHES AT THE BOTTOM OF THE CHANNEL PRIOR TO DRIVING POSTS AND WEAVING/EMBEDDING WILLOW BRANCHES.
3. UNTREATED WOOD POSTS SHALL BE EMBEDDED A MINIMUM OF 4'. POSTS SHALL BE STAGGERED +/-3 INCHES FROM A LINE PERPENDICULAR TO FLOW. THE STRUCTURE SHALL HAVE A UNIFORM CREST HEIGHT AT THE ELEVATION INDICATED ON SHEETS C3.0 AND C3.5.
4. WILLOW BRANCHES SHALL BE HAND DRIVEN INTO CHANNEL BOTTOM AND BANKS TO A MINIMUM EMBEDMENT OF 16" AT A 4" SPACING, THEY SHALL BE DRIVEN IN AT VARIABLE ANGLES AND WOVEN INTO THE STRUCTURE WITH ADDITIONAL WILLOW BRANCHES.

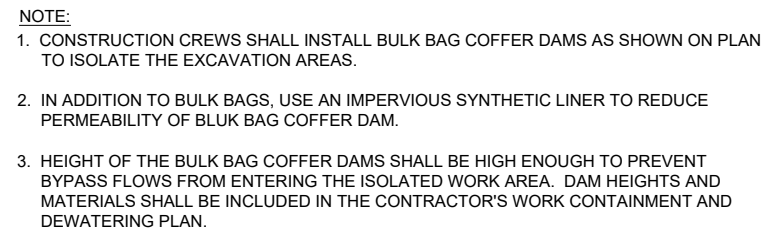


**NOT FOR
CONSTRUCTION**



MULTNOMAH CHANNEL
MARSH NATURAL AREA
MULTNOMAH COUNTY, OR

TESC DETAILS 1

[illegible]

ABUT ENDS TIGHTLY. PLACE IN SERIES, PARALLEL WITH CONTOURS

PLAN VIEW

COTTON WRAPPED STRAW WATTLES MADE WITH LOOSE COMPACTION RICE STRAW

25'-0"

8" to 9"

STAKES

STAKE AT 4" OFF CENTER

SECTION

BIODEGRADABLE STRAW WATTLES, PER SPECIFICATIONS

9"

3" MIN.

6" MIN

Detailed description: The diagram consists of two parts. The 'PLAN VIEW' at the top shows a long, cylindrical structure made of straw wattles, with a central section labeled '25'-0"'. The ends are shown as being joined tightly. A dimension of '8" to 9"' is shown at the right end. The 'SECTION' at the bottom shows a cross-section of the wattle structure, which is a circular shape with a hatched pattern. A stake is shown passing through the center, with a dimension of '4" OFF CENTER'. The wattle structure is shown with a '3" MIN.' thickness and a '6" MIN' height. A dimension of '9"' is shown for the top part of the wattle. The text 'BIODEGRADABLE STRAW WATTLES, PER SPECIFICATIONS' points to the wattle structure. The text 'COTTON WRAPPED STRAW WATTLES MADE WITH LOOSE COMPACTION RICE STRAW' points to the wattle structure. The text 'ABUT ENDS TIGHTLY. PLACE IN SERIES, PARALLEL WITH CONTOURS' is at the top. The text 'STAKES' and 'STAKE AT 4" OFF CENTER' point to the stake in the section view.

CORRECT

NOTE: GROOVE BY CUTTING SERRATIONS ALONG THE CONTOUR. IRREGULARITIES IN THE SOIL SURFACE CATCH RAINWATER, SEED, MULCH AND FERTILIZER.

SLOPE BOARD

SLOPE

'TRACKING' WITH MACHINERY UP AND DOWN THE SLOPE PROVIDES GROOVES THAT WILL CATCH SEED RAINFALL AND REDUCE RUNOFF.

DOZER TRACKS CREATING GROOVES PERPENDICULAR TO SLOPE

INCORRECT

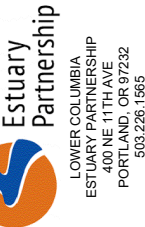
SLOPE

TRACKING

DRAWING NOT TO SCALE

2 SURFACE ROUGHENING

**NOT FOR
CONSTRUCTION**



TESC DETAILS 2

REVISION NUMBER

- | Date | Revision |
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0 SCALE 1"

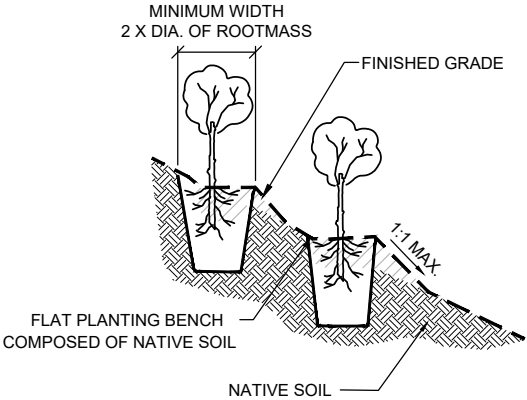
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C5.2

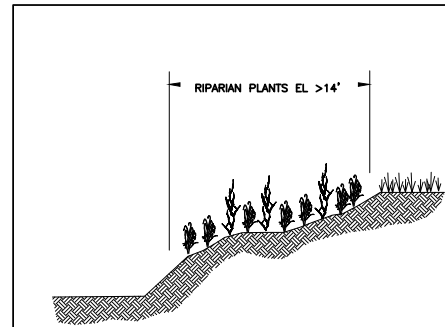
22 OF 23

PLANT AND SEEDING NOTES

1. SEED AND PLANT AREAS PER PLAN SHEETS C2.0 TO C3.6 AND THE ELEVATION RANGES ON THIS SHEET. SEEDING AND PLANTING SCHEDULES ARE COLOR CODED TO MATCH GRADING AREA AND GENERAL PLANTING AREA HATCHES.
2. SEED MARSHPLAIN LOWERING AREAS AS SHOWN ON THE PLANS WITH MARSHPLAIN SEED MIX FROM TABLE 1 ON THIS SHEET.
3. PLANT THE MARSHPLAIN PLUGS IN CLUSTERS AS DIRECTED IN THE FIELD BY OPR.
4. SEED WETLAND AREAS BELOW ELEVATION 18.2 FEET NAVD88 AS SHOWN ON THE PLANS WITH WETLAND SEED MIX FROM TABLE 2 ON THIS SHEET.
5. SEED UPLAND HABITAT ENHANCEMENT AREAS ABOVE ELEVATION 18.2 NAVD88 WITH UPLAND SEED MIX FROM TABLE 2 ON THIS SHEET.



1 PLANTING



2 TYPICAL PLANTING SECTION

TABLE 1: MARSHPLAIN SEED MIX

AREA: 4.3 ACRE			
	COMMON NAME	BOTANICAL NAME	LBS PLS/ACRE
	SHORTAWN FOXTAIL	<i>ALOPECURUS AEQUALIS</i>	1.00
	SLOUGH GRASS	<i>BECKMANNIA SYZIGACHNE</i>	3.00
	CREEPING SPIKERUSH	<i>ELEOCHARIS PALUSTRIS</i>	0.15
	SLOUGH SEDGE	<i>CAREX OBNUPTA</i>	0.25
	AWLFRUIT SEDGE	<i>CAREX STIPATA</i>	0.25
	COMMON RUSH	<i>JUNCUS EFFUSUS</i>	0.1
	RICE CUTGRASS	<i>LEERSIA ORYZOIDES</i>	2.00
	DENSE SPIKE PRIMROSE	<i>EPILOBIUM DENSIFLORUM</i>	1.00
	WAPATO	<i>SAGITTARIA LATIFOLIA</i>	1.00

TABLE 2: WETLAND SEED MIX

AREA: 62.4 AC, ELEVATION RANGE: <18.2 FT NAVD88 7.5 AC			
	COMMON NAME	BOTANICAL NAME	LBS PLS/ACRES
	SPIKE BENTGRASS	<i>AGROSTIS EXARATA</i>	0.25
	MEADOW BARLEY	<i>HORDEUM BRACHYANTHERUM</i>	7.00
	TUFTED HAIRGRASS	<i>DESCHAMPSIA CESPITOSA</i>	1.00
	SLOUGH GRASS	<i>BECKMANNIA SYZIGACHNE</i>	1.25
	PUGET SOUND GUMWEED	<i>GRINDELIA INTEGRIFOLIA</i>	1.00
	CLUSTERED TARWEED	<i>MADIA GLOMERATA</i>	1.00
	LARGE-LEAF LUPINE	<i>LUPINUS POLYPHYLLUS</i>	1.00

TABLE 3: UPLAND SEED MIX

AREA: 1.0 AC, ELEVATION RANGE: >18.2 FT NAVD88			
	COMMON NAME	BOTANICAL NAME	LBS PLS/ACRE
	BLUE WILDRYE***	<i>ELYMUS GLAUCUS</i>	5.00
	CALIFORNIA BROME***	<i>BROMUS CARINATUS</i>	7.00
	SHOWY TARWEED	<i>MADIA ELEGANS</i>	1.50
	YARROW	<i>ACHILLEA MILLEFOLIUM</i>	0.125
	WOOL OR/OR SUNSHINE	<i>ERIOPHYLLUM LANATUM</i>	0.25
	RIVERBANK LUPINE	<i>LUPINUS RIVULARIS</i>	0.50
	CINGUEFOIL	<i>POTENTILLA GRACILIS</i>	0.25
	SELFHEAL; HEAL-ALL	<i>PRUNELLA VULGARIS</i> VAR. <i>LANCELOATA</i>	2.00
	WESTERN BUTTERCUP	<i>RANUNCULUS OCCIDENTALIS</i>	2.00
	MEADOW CHECKERMALLOW	<i>SIDALCEA CAMPESTRIS</i>	3.00
	CALIFORNIA OATGRASS	<i>DANTHONIA CALIFORNICA</i>	4.00
	ROMER'S FESCUE	<i>FESTUCA ROEMERI</i>	2.00

TABLE 4: MARSHPLAIN PLANTING SCHEDULE NIC

AREA: 4.3 ACRE					
	COMMON NAME	BOTANICAL NAME	CONDITION	SPACING (FT ON-CENTER)	TOTAL PER SPECIES
	NORTHERN WATER PLANTAIN	<i>ALISMA TRIVIALE</i>	PLUGS	3	430
	COMMON SNEEZEWEED	<i>HELENIUM AUTUMNALE</i>	PLUGS	3	430
	SLENDERBEAK SEDGE	<i>CAREX ATHROSTACHYA</i>	PLUGS	3	430
	THICK-HEAD SEDGE	<i>CAREX PACHYSTACHYA</i>	PLUGS	3	430

TABLE 5: WETLAND PLANTING SCHEDULE NIC

AREA: 62.4 AC, ELEVATION RANGE: <18.2 FT NAVD88					
	COMMON NAME	BOTANICAL NAME	CONDITION	SPACING (FT ON-CENTER)	TOTAL PER SPECIES
	RED-OSIER DOGWOOD	<i>CORNUS STOLONIFERA</i>	1 GAL/BARE ROOT	4	12300
	DOUGLAS HAWTHORNE	<i>CRATAEGUS DOUGLASII</i>	1 GAL/BARE ROOT	4	14200
	OREGON ASH	<i>FRAXINUS LATIFOLIA</i>	BARE ROOT	4	14200
	OREGON ASH	<i>FRAXINUS LATIFOLIA</i>	1 GAL	4	4800
	BLACK TWINBERRY	<i>LONICERA INVOLUCRATA</i>	BARE ROOT	4	14200
	PACIFIC NINEBARK	<i>PHYSOCARPOS CAPITATUS</i>	BARE ROOT	4	14200
	SWAMP/CLUSTERED ROSE	<i>ROSA PISOCARPA</i>	BARE ROOT	4	14200
	PACIFIC WILLOW	<i>SALIX LASSIANDRA</i>	LIVESTAKES	4	37900
	SITKA WILLOW	<i>SALIX SITCHENSIS</i>	LIVESTAKES	4	37900
	HOOKER'S/PIPER'S WILLOW	<i>SALIX HOOKERIANA</i>	LIVESTAKES	4	37900
	DOUGLAS SPIREA	<i>SPIREA DOUGLASII</i>	BARE ROOT	4	19000

TABLE 6: UPLAND PLANTING SCHEDULE NIC

AREA: 1.0 AC, ELEVATION RANGE: >18.2 FT NAVD88					
	COMMON NAME	BOTANICAL NAME	CONDITION	SPACING (FT ON-CENTER)	TOTAL PER SPECIES
	SCOULER WILLOW	<i>SALIX SCOULERIANA</i>	BAREROOT	8	100
	OSOBERRY/INDIAN-PLUM	<i>OEMLERIA CERASIFORMIS</i>	BAREROOT	8	100
	TALL OREGON-GRAPE	<i>MAHONIA AQUIFOLIUM</i>	BAREROOT	8	200
	WESTERN CHOKECHERRY	<i>PRUNUS VIRGINIANA</i> VAR. <i>DEMISSA</i>	BAREROOT	8	200
	OREGON WHITE OAK	<i>QUERCUS GARRYANA</i>	BAREROOT	8	200
	RED FLOWERING CURRANT	<i>RIBES SANGUINEUM</i>	BAREROOT	8	200
	BLUE ELDERBERRY	<i>SAMBUCUS CAERULEA</i>	BAREROOT	8	200
	OCEANSPRAY	<i>HOLODISCUS DISCOLOR</i>	BAREROOT	8	200
	SASKATOON SERVICEBERRY	<i>AMELANCHIER ALNIFOLIA</i>	BAREROOT	8	200
	BLACK HAWTHORN	<i>CRATAEGUS DOUGLASII</i>	BAREROOT	8	200
	CASCARA	<i>RAMNUS PURSHIANA</i>	BAREROOT	8	200
	MOCKORANGE	<i>PHILADELPHUS LEWISII</i>	BAREROOT	8	200
	NOOTKA ROSE OR BALDHIP	<i>ROSA NUTKANA</i> OR <i>R. GYMNOCARPA</i>	BAREROOT	8	200
	SNOWBERRY	<i>SYMPHORICARPOS ALBA</i>	BAREROOT	8	200

70% DESIGN
APRIL 2026

NOT FOR
CONSTRUCTION



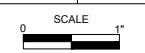
LOWER COLUMBIA ESTUARY PARTNERSHIP
MULTNOMAH CHANNEL
MARSH NATURAL AREA
MULTNOMAH COUNTY, OR

PLANTING DETAILS

REVISION NUMBER

No.	Date	Revision

Date 4/30/2026	Designed By RCC
Drawn By DK	Checked By AJ



JOB NO.
20230020

SHEET NO.
L1.1
23 OF 23