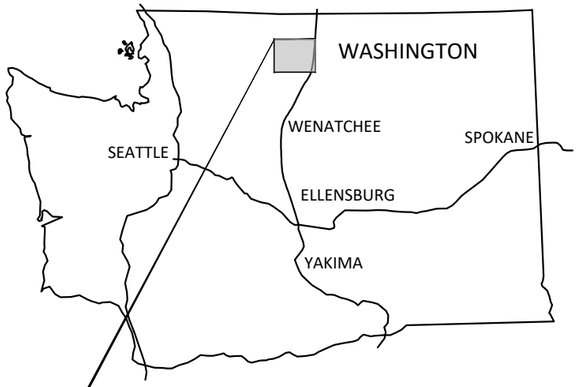
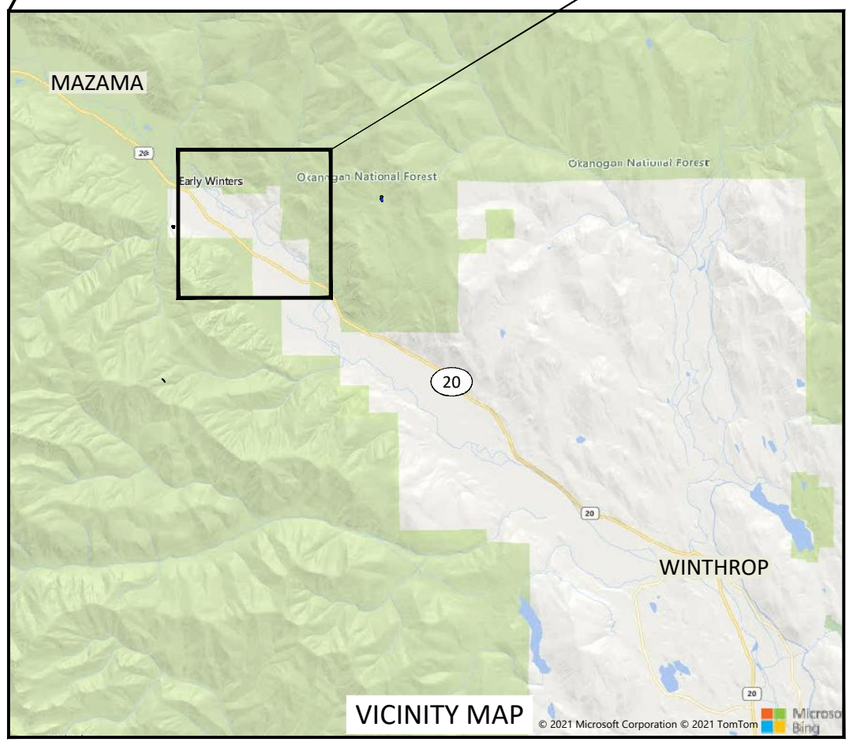
METHOW RIVER - SUSPENSION REACH

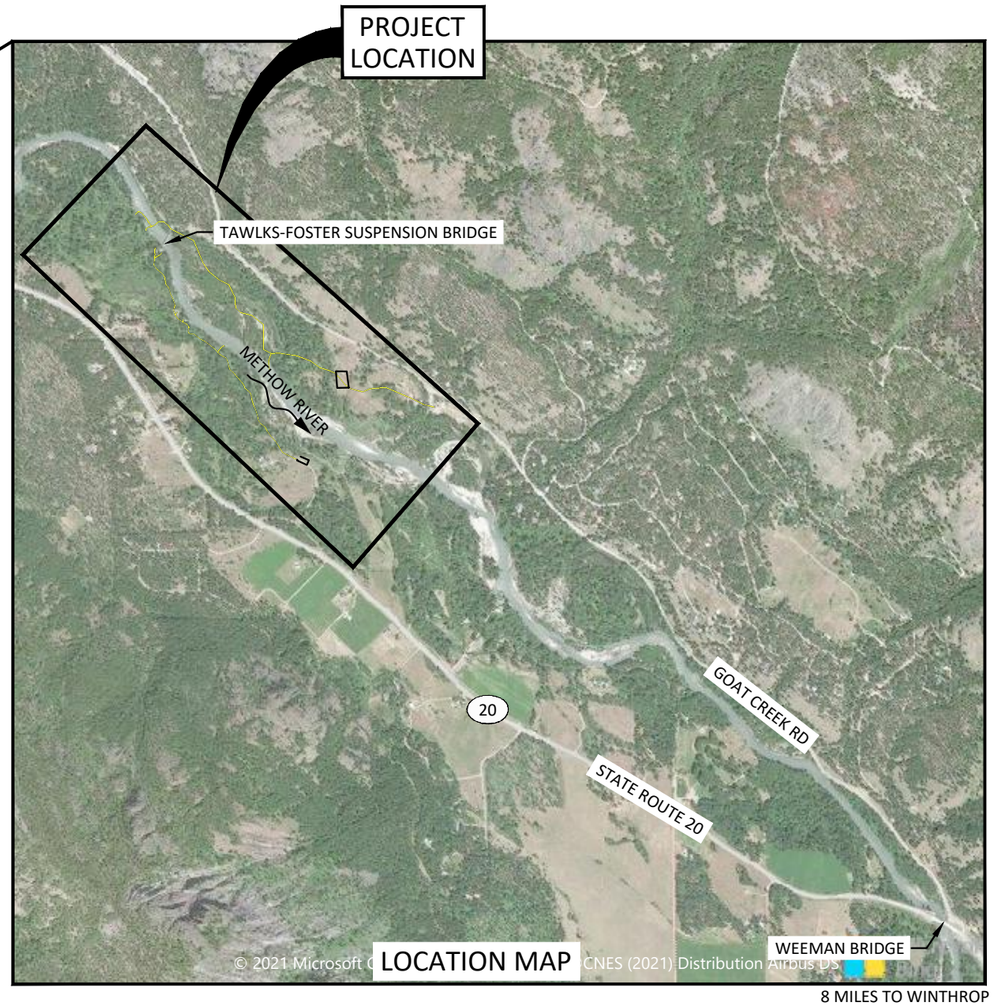
FISH HABITAT ENHANCEMENT PROJECT

Final Design





VICINITY MAP



LOCATION MAP

8 MILES TO WINTHROP

SITE LOCATION:

LATITUDE: 48°34'4"
LONGITUDE: -120°21'44"
OKANOGAN COUNTY, WASHINGTON
SECTION 5, TOWNSHIP 35N, RANGE 20E

WATERBODY: METHOW RIVER
TRIBUTARY OF: COLUMBIA RIVER

YAKAMA NATION FISHERIES
2 JOHNSON LANE
WINTHROP WA, 98862

SHEET LIST

NO.	BY	DATE	REVISION DESCRIPTION

MM	MB	JJ
DRAWN	DESIGNED	CHECKED
----	04/28/22	
APPROVED	DATE	PROJECT

YAKAMA NATION FISHERIES PROGRAM
METHOW RIVER - SUSPENSION REACH
FISH HABITAT ENHANCEMENT

501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

TITLE SHEET

SHEET
1 OF 14

IT IS STRONGLY SUGGESTED THAT THE CONTRACTOR ATTEND THE PRE-CONSTRUCTION MEETING WITH THE OWNER AND OWNER'S REPRESENTATIVE PRIOR TO BEGINNING CONSTRUCTION. THE PROJECT SITE IS ON PRIVATE PROPERTY. SITE VISITS PRIOR TO THE PRE-CONSTRUCTION MEETING ARE NOT ALLOWED WITHOUT PRIOR PERMISSION FROM THE YAKAMA NATION PROJECT MANAGER.

ALL WORK SHALL CONFORM TO THE LATEST EDITIONS OF STANDARD PLANS AND SPECIFICATIONS OF THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT), AND LOCAL STANDARDS UNLESS INDICATED OTHERWISE BY THE CONTRACT DOCUMENTS. IN CASE OF A CONFLICT BETWEEN THE REGULATORY STANDARDS OR SPECIFICATIONS, THE MORE STRINGENT WILL PREVAIL.

BPA HIP

THIS PROJECT WAS DESIGNED IN ACCORDANCE WITH THE BPA HABITAT IMPROVEMENT PROGRAM, PROGRAMMATIC BIOLOGICAL OPINION (HIP). HIP GENERAL CONSERVATION MEASURES (CMs) ARE INCLUDED ON SHEETS 4 - 6. SITE SPECIFIC DIRECTION IS INCLUDED IN THE FOLLOWING GENERAL NOTES. ANY VARIANCES FROM HIP CMs WILL BE REQUESTED BY OWNER. IN CASE OF A CONFLICT BETWEEN THE REGULATORY STANDARDS OR SPECIFICATIONS, LOCAL REGULATIONS, OR OTHER CONTRACT DOCUMENTATION, THE MORE STRINGENT WILL PREVAIL, UNLESS SPECIFIED IN WRITING BY THE OWNER.

EXISTING DATA

TOPOGRAPHIC SURVEY COLLECTED BY INTER-FLUVE BY RTK GPS AND TOTAL STATION IN 2016 & 2021, REFERENCED TO NAD83 WASHINGTON STATE PLANE, NORTH ZONE US FEET NAVD 88.

CULTURAL RESOURCES

A YAKAMA NATION ARCHEOLOGIST WILL BE ON SITE DURING CONSTRUCTION. ENCOUNTERING THE FOLLOWING CULTURAL RESOURCES REQUIRES THE IMMEDIATE DISCONTINUATION OF ALL GROUND-DISTURBING ACTIVITY:

-NATIVE AMERICAN CULTURAL ARTIFACTS (EXAMPLE: FLAKES, ARROWHEADS, STONE TOOLS, BONE TOOLS, POTTERY, ETC.)

-HISTORIC ERA ARTIFACTS (EXAMPLE: BUILDING FOUNDATIONS, HOMESTEADS, SHIPWRECKS, MINING CAMPS, ETC.)

-HUMAN SKELETAL REMAINS AND BONE FRAGMENTS

DO NOT TOUCH OR MOVE THE OBJECTS AND MAINTAIN THE CONFIDENTIALITY OF THE SITE. FOLLOW THE PROCEDURES LISTED IN THE BPA INADVERTENT DISCOVERY PROCEDURE AND AWAIT FURTHER DIRECTION FROM THE ARCHEOLOGIST AND BPA'S CULTURAL RESOURCES STAFF.

LIVE TREES

ALL TREES NOT MARKED FOR REMOVAL SHALL BE PRESERVED AND UNDISTURBED. CONSTRUCTION ACTIVITY SHALL NOT DEBARK OR DAMAGE LIVE TREES.

KEEP OUT OF DRIP LINE OF ALL PRESERVED EXISTING TREES.

ALL SAPLING AND TREES TO BE REMOVED FOR ACCESS WILL BE APPROVED AND CLEARLY MARKED BY THE OWNER'S REPRESENTATIVE.

ALL TREES REMOVED WITHIN CLEARING LIMITS SHALL BE REMOVED WHOLE WITH ROOTS INTACT AND UTILIZED IN THE CONSTRUCTION AS DIRECTED BY OWNER'S REPRESENTATIVE.

ABBREVIATIONS

APPROX	APPROXIMATE	INV	INVERT
CY	CUBIC YARDS	LWM	LARGE WOODY MATERIAL
°	DEGREES	MAX	MAXIMUM
DIA or Ø	DIAMETER	MIN	MINIMUM
DBH	DIAMETER AT BREAST HEIGHT	OHW	ORDINARY HIGH WATER
EA	EACH	%	PERCENT
EL or ELEV	ELEVATION	RMx	RIVER MILE x
ESC	EROSION AND SEDIMENT CONTROL	STA	STATION
EXIST	EXISTING	TBD	TO BE DETERMINED
FT or '	FEET	TYP	TYPICAL
FTR	FULLY THREADED ROD	VERT	VERTICAL
HORIZ	HORIZONTAL	WSE	WATER SURFACE ELEVATION
IN or "	INCH	YR	YEAR

CONSTRUCTION QUANTITIES

SITE	LOGS WITH ROOTS	TIMBER PILES	EARTHWORK	COFFERDAM
B1	33	11	370 CY	
B2	18	8	150 CY	
B3	15	6	270 CY	
P1	12	6		
P2	12	8		
B4	33	11	370 CY	
B5	18	4	350 CY	
B6	18	4	350 CY	
A1	23*	12	430 CY	300 FT
A2	23*	12	300 CY	300 FT
A3	23*	12	440 CY	300 FT

*MIN 21" DBH LOGS WITH ROOTS FOR BAR APEX LOG STRUCTURES A1,A2,A3

EXCAVATION QUANTITIES ARE APPROXIMATE.

SHEET PILE COFFERDAM IS RECOMMENDED TO SUPPORT EXCAVATED SIDEWALLS AND MINIMIZE GROUNDWATER INFILTRATION RATE. UTILIZE PUMPING AS REQUIRED TO INSTALL WOOD AND CONTROL TURBIDITY. NO TURBIDITY SHALL ENTER THE WATERWAY.

NO.	BY	DATE	REVISION DESCRIPTION

MM	MB	JJ
DRAWN	DESIGNED	CHECKED
----	03/31/22	
APPROVED	DATE	PROJECT

YAKAMA NATION FISHERIES PROGRAM
METHOW RIVER - SUSPENSION REACH
FISH HABITAT ENHANCEMENT

inter·fluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

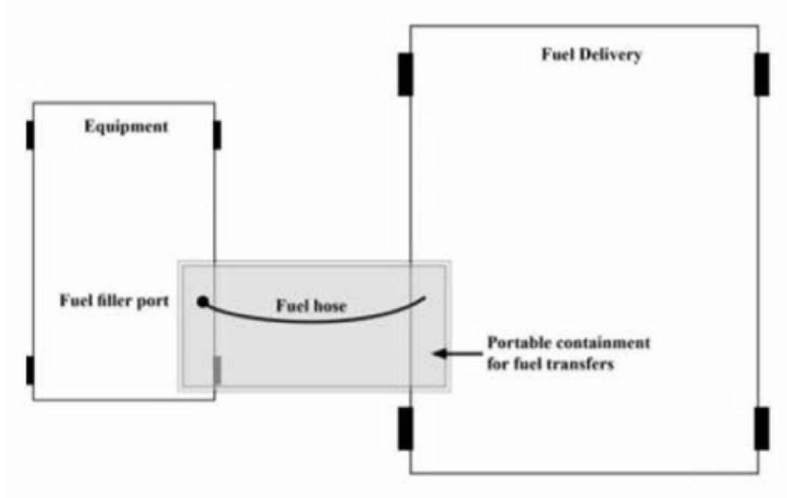
GENERAL NOTES

SHEET
2 OF 14

FUELING NOTES:

CONTRACTOR SHALL PROVIDE ADDITIONAL PROTECTION MEASURES AGAINST FUEL SPILLS SINCE REFUELING AREA IS WITHIN 150 FT OF A WETLAND AND THE RIVER. ADDITIONAL PROTECTION MEASURES SHALL CONSIST OF:

1. CONTAINMENT EQUIPMENT SIZED TO CONTAIN THE MOST LIKELY VOLUME OF FUEL SPILLED DURING A FUEL TRANSFER.
2. PORTABLE CONTAINMENT EQUIPMENT SHALL BE POSITIONED TO CATCH ANY FUEL SPILLS DUE TO OVERFILLING THE EQUIPMENT AND ANY OTHER SPILLS THAT MAY OCCUR AT OR NEAR THE FUEL FILLER PORT TO THAT EQUIPMENT DURING EACH REFUELING ACTIVITY.
3. PERSONNEL MUST ATTEND TO THE FUELING PROCESS TO ENSURE THAT ANY SPILLS WILL BE OF LIMITED VOLUME.



1/3 FUELING AREA PROTECTION
NOT TO SCALE

NO.	BY	DATE	REVISION DESCRIPTION

MM	MB	JJ
DRAWN	DESIGNED	CHECKED
----	11/29/22	
APPROVED	DATE	PROJECT

YAKAMA NATION FISHERIES PROGRAM
METHOW RIVER - SUSPENSION REACH
FISH HABITAT ENHANCEMENT

inter·fluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

BMPS

SHEET
3 OF 14

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 OR BEDROCK 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.

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.

Designed
Drawn
Checked
Approved
Title

HIP GENERAL CONSERVATION MEASURES

BONNEVILLE POWER ADMINISTRATION: ENVIRONMENT, FISH AND WILDLIFE DIVISION

File Name
2021 HIP GCA

Drawing No.

Sheet 1 of 3

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, METHODS, 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 SHOULD 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 SHALL BE SORTED BY SIZE TO AVOID PREDATION DURING CONTAINMENT.

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).

Designed
Drawn
Checked
Approved
Title

HIP GENERAL CONSERVATION MEASURES

BONNEVILLE POWER ADMINISTRATION: ENVIRONMENT, FISH AND WILDLIFE DIVISION

File Name
2021 HIP GCA

Drawing No.

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.

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).

Designed
Drawn
Checked
Approved
Title

HIP GENERAL CONSERVATION MEASURES

BONNEVILLE POWER ADMINISTRATION: ENVIRONMENT, FISH AND WILDLIFE DIVISION

File Name
2021 HIP GCA

Drawing No.

SITE 1
SEE SHEET 8

SITE 2
SEE SHEET 9

TAWLKS-FOSTER SUSPENSION BRIDGE

SITE 3
SEE SHEET 10

SITE 4
SEE SHEET 11

SITE 5
SEE SHEET 12

LARGE WOOD STAGING AREA
FOR HELICOPTER TRANSPORT

STAGING AREA
FOR EQUIPMENT

FLOW

HWY 20

LEGEND

- OHW — ORDINARY HIGH WATER
- BANK BURIED LOG JAM
- APEX LOG JAM
- METHOW COMMUNITY TRAIL
- TEMPORARY ACCESS ROUTE

0 300 600
SCALE IN FEET

NO.	BY	DATE	REVISION DESCRIPTION

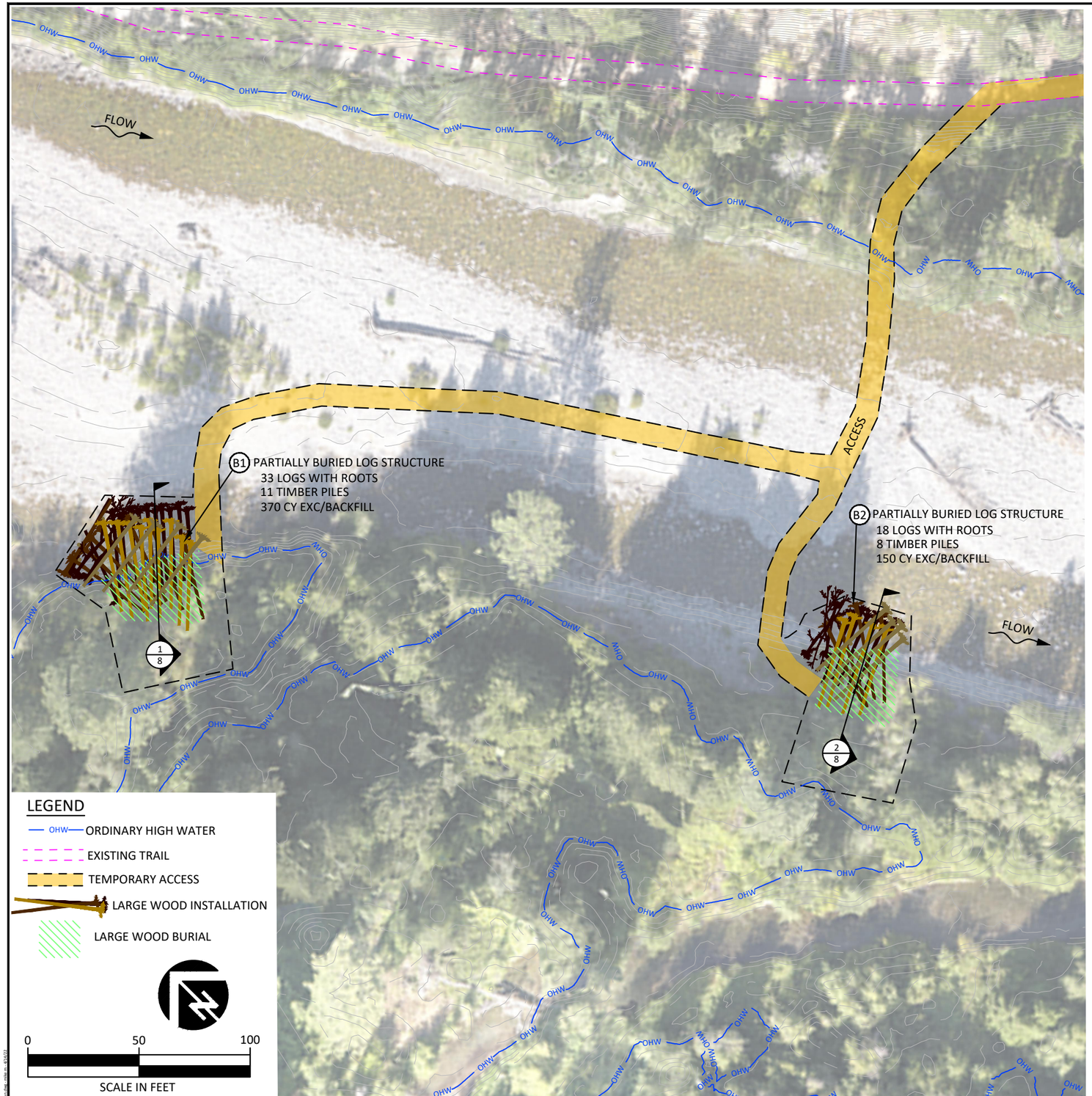
MM	MB	JJ
DRAWN	DESIGNED	CHECKED
----	03/31/22	
APPROVED	DATE	PROJECT

YAKAMA NATION FISHERIES PROGRAM
METHOW RIVER - SUSPENSION REACH
FISH HABITAT ENHANCEMENT

inter·fluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

PROJECT OVERVIEW & ACCESS

SHEET
7 OF 14

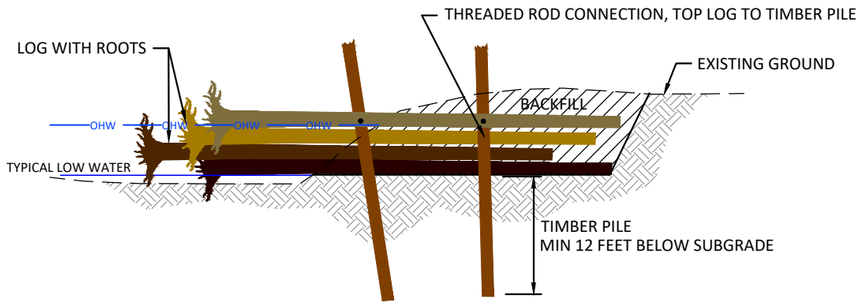


LEGEND

- OHW — ORDINARY HIGH WATER
- EXISTING TRAIL
- TEMPORARY ACCESS
- LARGE WOOD INSTALLATION
- LARGE WOOD BURIAL

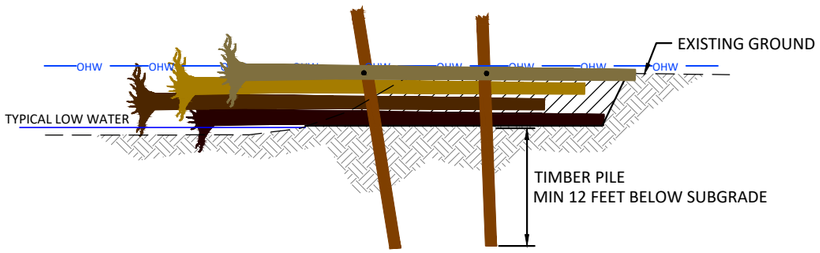
0 50 100

SCALE IN FEET



1/8 SECTION - LOG STRUCTURE B1

1"=15'



2/8 SECTION - LOG STRUCTURE B2

1"=15'

NOTES

1. WOOD PLACEMENTS SHOWN ON PLANS ARE APPROXIMATE AND ARE SUBJECT TO CHANGE IN THE FIELD.
2. ALL SLASH GENERATED DURING CLEARING SHALL BE INCORPORATED INTO THE LARGE WOOD STRUCTURES.
3. VARY THE APPEARANCE OF TIMBER PILES BY INSTALLING THEM AT ANGLES AND WITH DIFFERENT HEIGHTS ABOVE GROUND. CUT OR GRIND TOPS OF PILES TO MAKE A NATURAL APPEARANCE.
4. EACH TOP LAYER LOG SHALL BE CONNECTED TO A MINIMUM OF 2 TIMBER PILES.

RECOMMENDED CONSTRUCTION SEQUENCE

1. EXCAVATE LOG INSTALLATION AREA TO JUST ABOVE EDGE OF WATER.
2. INSTALL LOGS AND SLASH.
3. INSTALL TIMBER PILES AND THREADED ROD.
4. BACKFILL LOGS.
5. APPLY STRAW MULCH TO DISTURBED SLOPES GREATER THAN 10%.

NO.	BY	DATE	REVISION DESCRIPTION

DRAWN	DESIGNED	CHECKED
MM	MB	JJ
APPROVED	DATE	PROJECT
----	03/31/22	

YAKAMA NATION FISHERIES PROGRAM
METHOW RIVER - SUSPENSION REACH
FISH HABITAT ENHANCEMENT

inter·fluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

SITE 1

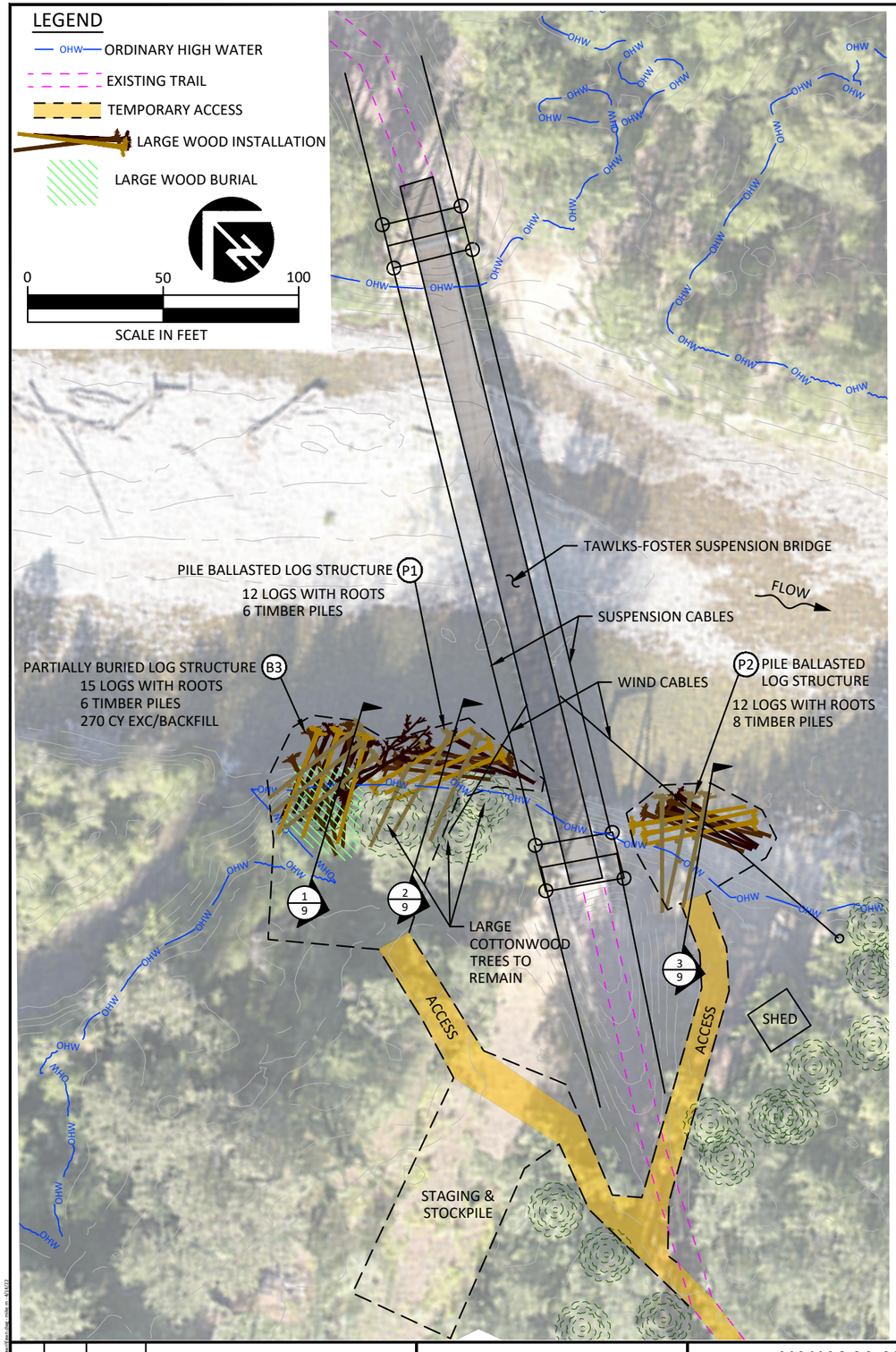
SHEET 8 OF 14

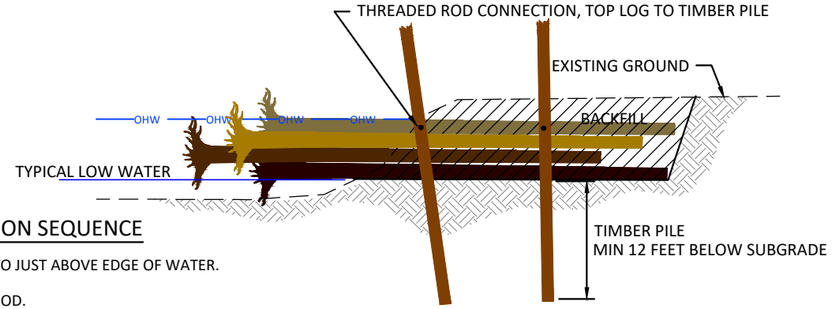
LEGEND

- OHW — ORDINARY HIGH WATER
- EXISTING TRAIL
- TEMPORARY ACCESS
- LARGE WOOD INSTALLATION
- LARGE WOOD BURIAL

0 50 100

SCALE IN FEET



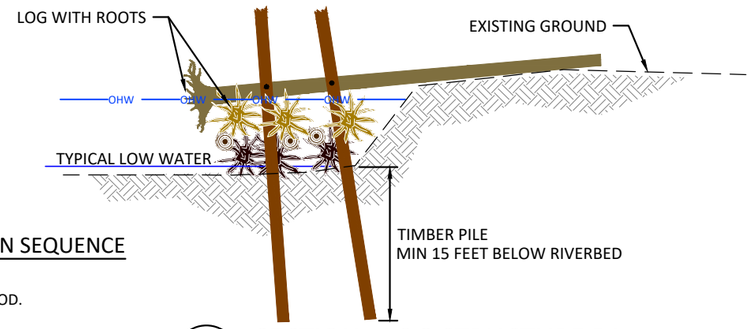


RECOMMENDED CONSTRUCTION SEQUENCE

1. EXCAVATE LOG INSTALLATION AREA TO JUST ABOVE EDGE OF WATER.
2. INSTALL LOGS AND SLASH.
3. INSTALL TIBER PILES AND THREADED ROD.
4. BACKFILL LOGS.
5. APPLY STRAW MULCH TO DISTURBED SLOPES GREATER THAN 10%.

1/9 SECTION - LOG STRUCTURE B3

1"=15'



RECOMMENDED CONSTRUCTION SEQUENCE

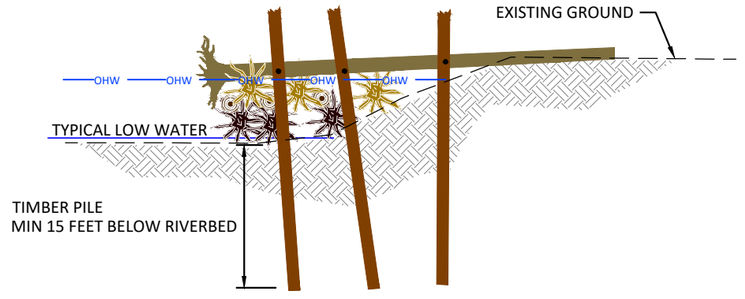
1. INSTALL LOGS AND SLASH.
2. INSTALL TIMBER PILES AND THREADED ROD.

2/9 SECTION - LOG STRUCTURE P1

1"=15'

NOTES

1. WOOD PLACEMENTS SHOWN ON PLANS ARE APPROXIMATE AND ARE SUBJECT TO CHANGE IN THE FIELD.
2. ALL SLASH GENERATED DURING CLEARING SHALL BE INCORPORATED INTO THE LARGE WOOD STRUCTURES.
3. VARY THE APPEARANCE OF TIMBER PILES BY INSTALLING THEM AT ANGLES AND WITH DIFFERENT HEIGHTS ABOVE GROUND. CUT OR GRIND TOPS OF PILES TO MAKE A NATURAL APPEARANCE.
4. EACH TOP LAYER LOG SHALL BE CONNECTED TO A MINIMUM OF 2 TIMBER PILES.



3/9 SECTION - LOG STRUCTURE P2

1"=15'

NO.	BY	DATE	REVISION DESCRIPTION

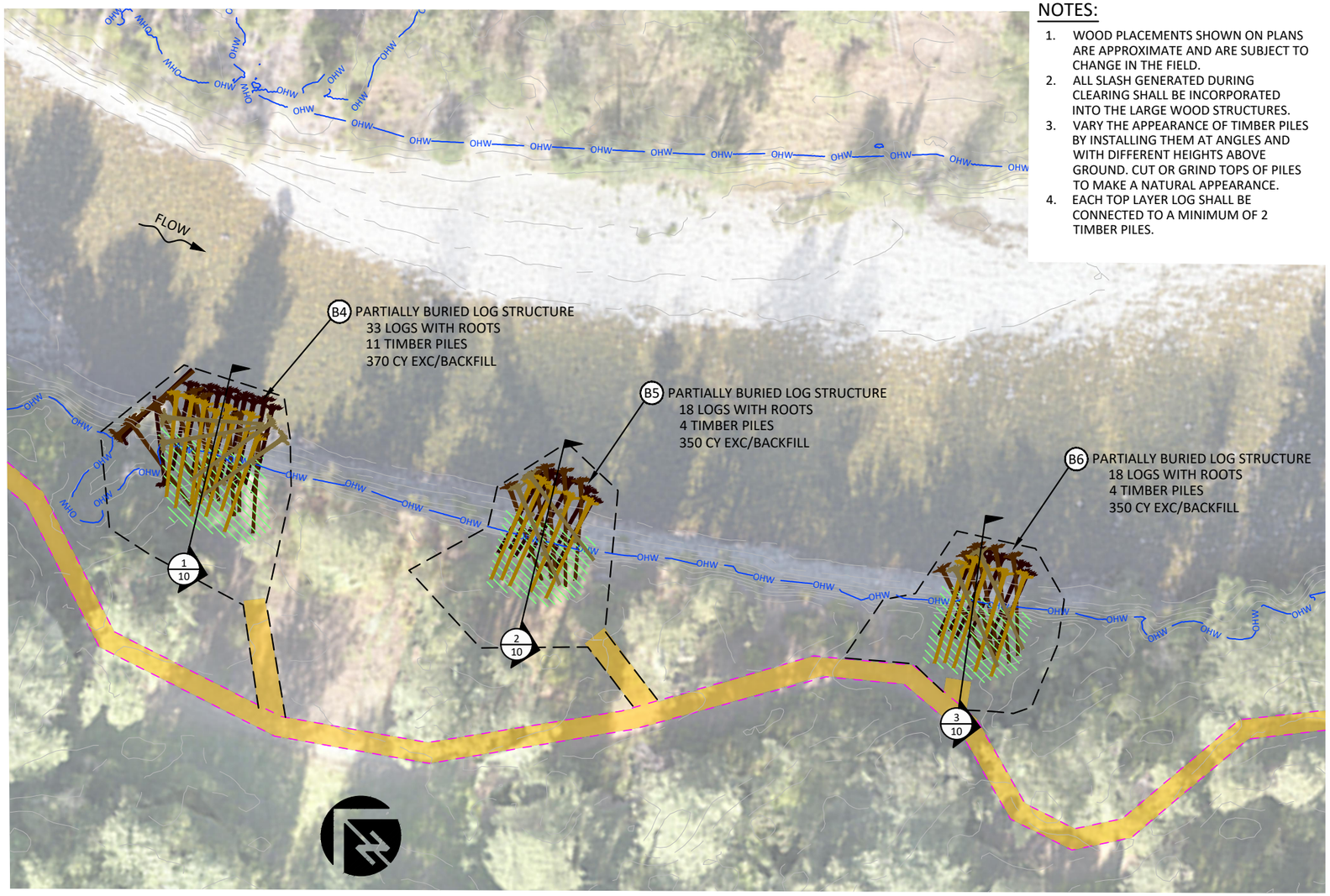
MM	MB	JJ
DRAWN	DESIGNED	CHECKED
----	03/31/22	
APPROVED	DATE	PROJECT

YAKAMA NATION FISHERIES PROGRAM
METHOW RIVER - SUSPENSION REACH
FISH HABITAT ENHANCEMENT

interfluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

SITE 2

SHEET 9 OF 14



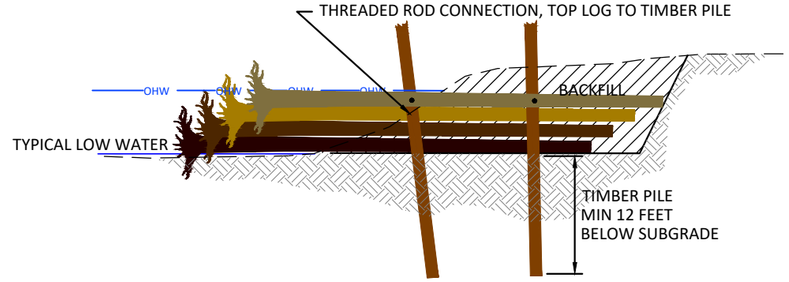
NOTES:

1. WOOD PLACEMENTS SHOWN ON PLANS ARE APPROXIMATE AND ARE SUBJECT TO CHANGE IN THE FIELD.
2. ALL SLASH GENERATED DURING CLEARING SHALL BE INCORPORATED INTO THE LARGE WOOD STRUCTURES.
3. VARY THE APPEARANCE OF TIMBER PILES BY INSTALLING THEM AT ANGLES AND WITH DIFFERENT HEIGHTS ABOVE GROUND. CUT OR GRIND TOPS OF PILES TO MAKE A NATURAL APPEARANCE.
4. EACH TOP LAYER LOG SHALL BE CONNECTED TO A MINIMUM OF 2 TIMBER PILES.

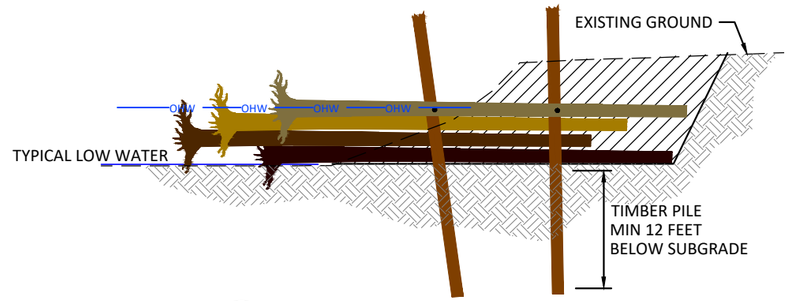
LEGEND

- OHW — ORDINARY HIGH WATER
- EXISTING TRAIL
- TEMPORARY ACCESS
- LARGE WOOD INSTALLATION
- LARGE WOOD BURIAL

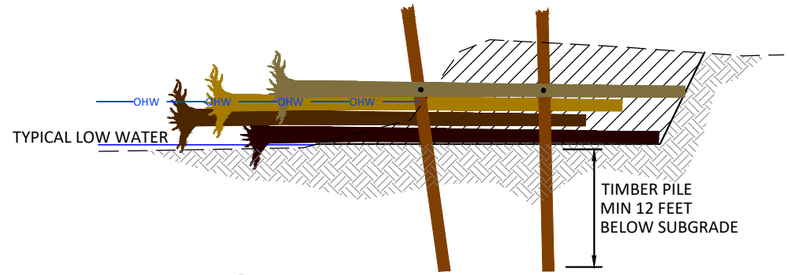
0 50 100
SCALE IN FEET



1/10 SECTION - LOG STRUCTURE B4
1"=15'



2/10 SECTION - LOG STRUCTURE B5
1"=15'



3/10 SECTION - LOG STRUCTURE B6
1"=15'

RECOMMENDED CONSTRUCTION SEQUENCE

1. EXCAVATE LOG INSTALLATION AREA TO JUST ABOVE EDGE OF WATER.
2. INSTALL LOGS AND SLASH.
3. INSTALL TIMBER PILES AND THREADED ROD.
4. BACKFILL LOGS.
5. APPLY STRAW MULCH TO DISTURBED SLOPES GREATER THAN 10%.

NO.	BY	DATE	REVISION DESCRIPTION

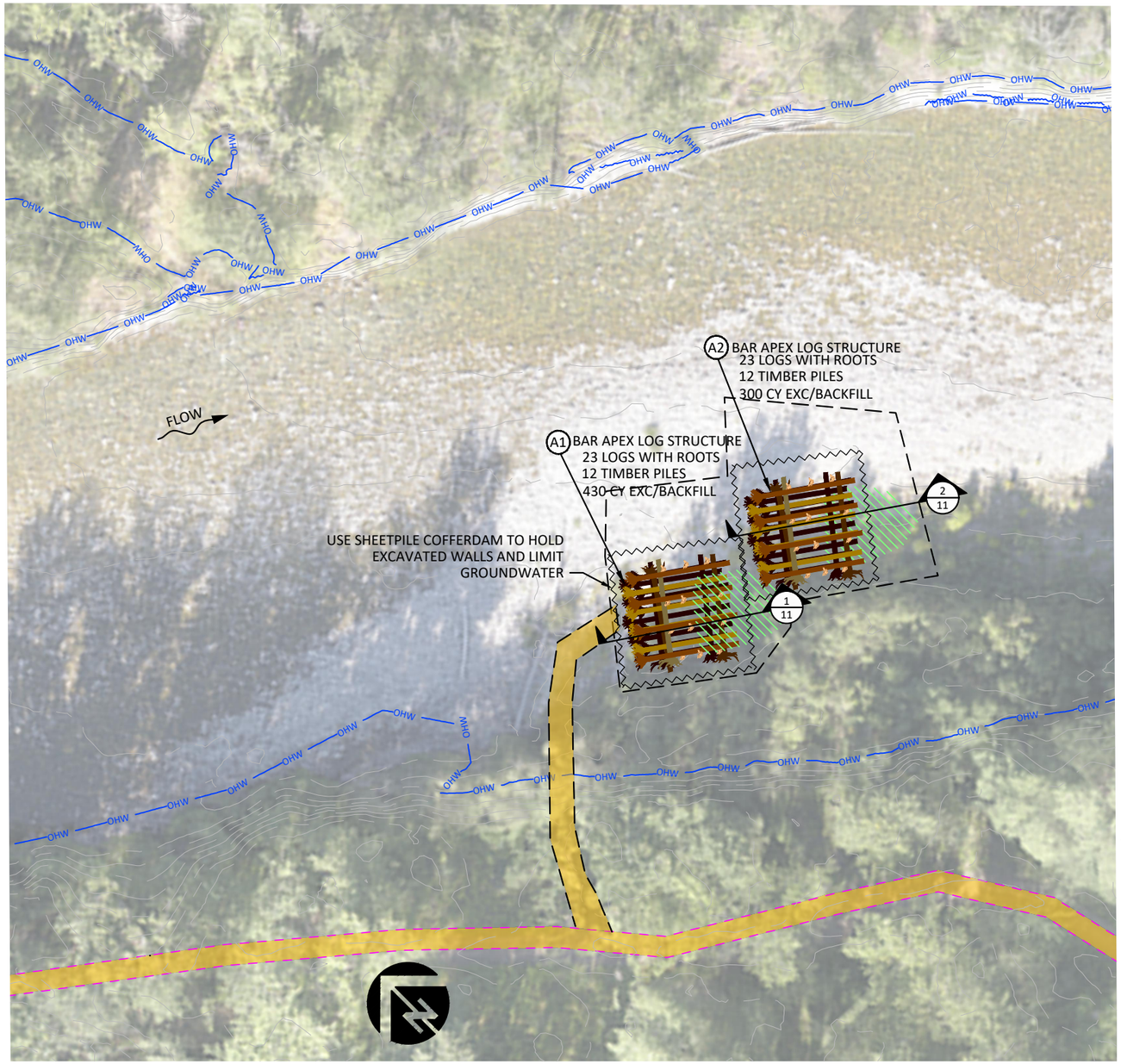
MM	MB	JJ
DRAWN	DESIGNED	CHECKED
----	03/31/22	
APPROVED	DATE	PROJECT

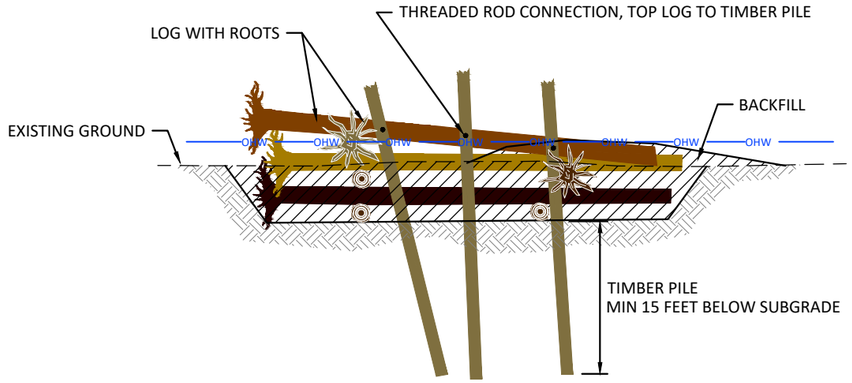
YAKAMA NATION FISHERIES PROGRAM
METHOW RIVER - SUSPENSION REACH
FISH HABITAT ENHANCEMENT

inter·fluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

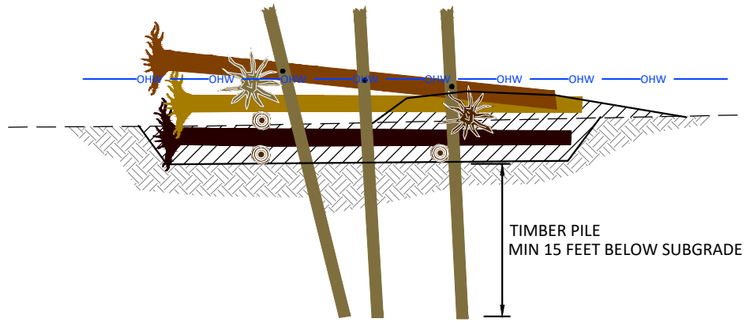
SITE 3

SHEET
10 OF 14





1/11 SECTION - LOG STRUCTURE A1
1"=15'



2/11 SECTION - LOG STRUCTURE A2
1"=15'

RECOMMENDED CONSTRUCTION SEQUENCE

1. INSTALL COFFERDAM
2. EXCAVATE BURIED LOG INSTALLATION AREA
3. INSTALL LOGS AND SLASH
4. INSTALL TIMBER PILES AND THREADED ROD
5. PLACE BACKFILL AS SHOWN
6. REMOVE COFFERDAM

NOTES:

1. WOOD PLACEMENTS SHOWN ON PLANS ARE APPROXIMATE AND ARE SUBJECT TO CHANGE IN THE FIELD.
2. ALL SLASH GENERATED DURING CLEARING SHALL BE INCORPORATED INTO THE LARGE WOOD STRUCTURES.
3. VARY THE APPEARANCE OF TIMBER PILES BY INSTALLING THEM AT ANGLES AND WITH DIFFERENT HEIGHTS ABOVE GROUND. CUT OR GRIND TOPS OF PILES TO MAKE A NATURAL APPEARANCE.
4. EACH TOP LAYER LOG SHALL BE CONNECTED TO 3 TIMBER PILES.

LEGEND

- OHW — ORDINARY HIGH WATER
- EXISTING TRAIL
- TEMPORARY ACCESS
- LARGE WOOD INSTALLATION
- BACKFILL ABOVE GROUND
- SHEETPILE COFFERDAM

0 — 50 — 100
SCALE IN FEET

NO.	BY	DATE	REVISION DESCRIPTION

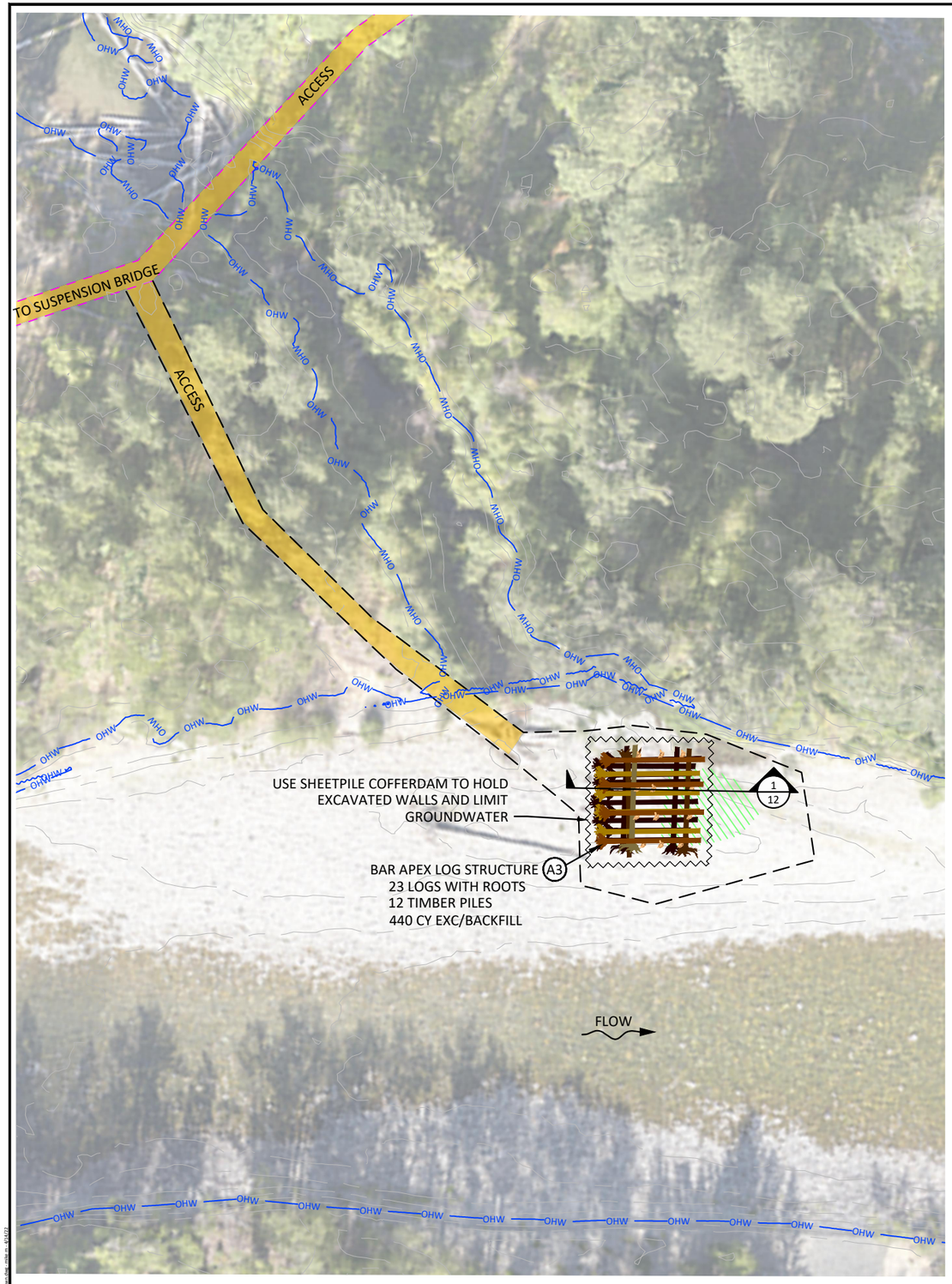
MM	MB	JJ
DRAWN	DESIGNED	CHECKED
----	03/31/22	
APPROVED	DATE	PROJECT

YAKAMA NATION FISHERIES PROGRAM
METHOW RIVER - SUSPENSION REACH
FISH HABITAT ENHANCEMENT

inter·fluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

SITE 4

SHEET
11 OF 14

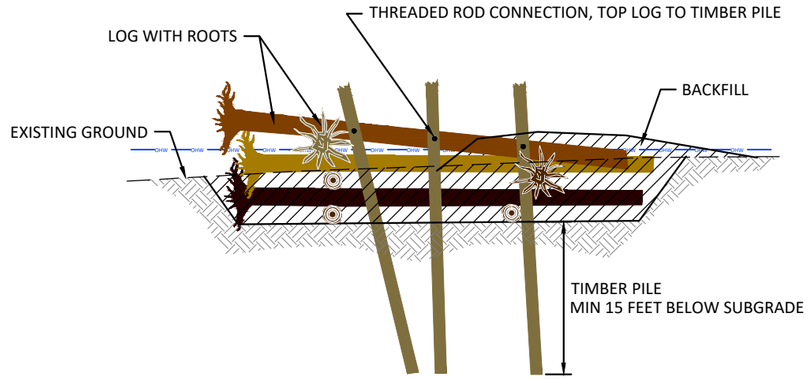


LEGEND

- OHW — ORDINARY HIGH WATER
- EXISTING TRAIL
- TEMPORARY ACCESS
- LARGE WOOD INSTALLATION
- BACKFILL ABOVE GROUND
- SHEETPILE COFFERDAM

0 50 100

SCALE IN FEET



1/12 SECTION - LOG STRUCTURE A3

1"=15'

RECOMMENDED CONSTRUCTION SEQUENCE

1. INSTALL COFFERDAM
2. EXCAVATE BURIED LOG INSTALLATION AREA
3. INSTALL LOGS AND SLASH
4. INSTALL TIMBER PILES AND THREADED ROD
5. PLACE BACKFILL AS SHOWN
6. REMOVE COFFERDAM

NOTES:

1. WOOD PLACEMENTS SHOWN ON PLANS ARE APPROXIMATE AND ARE SUBJECT TO CHANGE IN THE FIELD.
2. ALL SLASH GENERATED DURING CLEARING SHALL BE INCORPORATED INTO THE LARGE WOOD STRUCTURES.
3. VARY THE APPEARANCE OF TIMBER PILES BY INSTALLING THEM AT ANGLES AND WITH DIFFERENT HEIGHTS ABOVE GROUND. CUT OR GRIND TOPS OF PILES TO MAKE A NATURAL APPEARANCE.
4. EACH TOP LAYER LOG SHALL BE CONNECTED TO 3 TIMBER PILES.

NO.	BY	DATE	REVISION DESCRIPTION

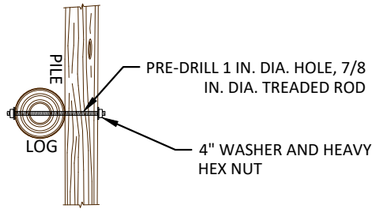
MM	MB	JJ
DRAWN	DESIGNED	CHECKED
----	03/31/22	
APPROVED	DATE	PROJECT

YAKAMA NATION FISHERIES PROGRAM
METHOW RIVER - SUSPENSION REACH
FISH HABITAT ENHANCEMENT

inter·fluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

SITE 5

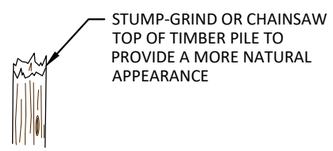
SHEET
12 OF 14



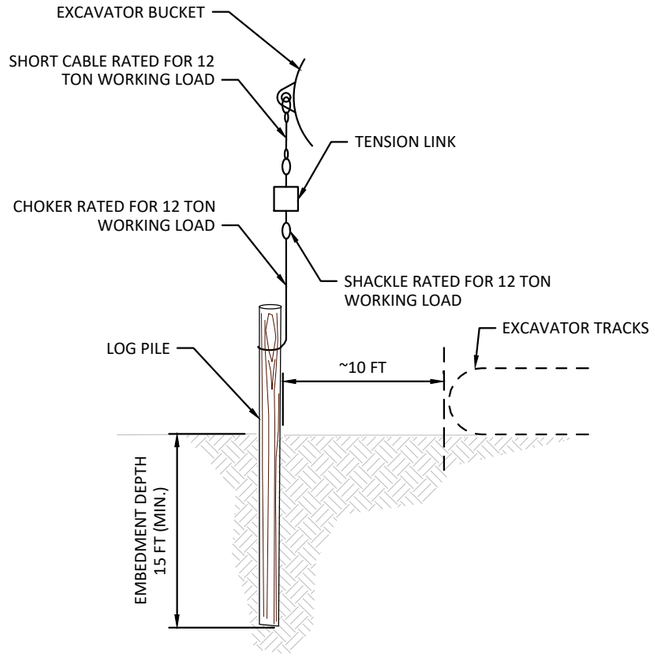
1/13 TYPICAL DETAIL
LOG-PILE CONNECTIONS
NOT TO SCALE

BOLTED CONNECTION NOTES

PIN LOGS TO LOGS
1. DRILL 1" DIA HOLE THROUGH LOGS.
2. INSERT 7/8" DIA THREADED ROD.
3. INSTALL STEEL PLATES AND HEAVY HEX NUTS. SECURE NUTS BY CHISELING THREADS OR MUSHROOMING EXPOSED ENDS OF ROD.
4. FILE OR GRIND OFF SHARP EDGES



3/13 TYPICAL DETAIL
ROUGHENED TOP
NOT TO SCALE



2/13 TYPICAL DETAIL
PILE PULL OUT TEST
NOT TO SCALE

TIMBER PILE NOTES:

GENERAL

1. THE RESULTS OF ON-SITE PULLOUT TESTS WILL INFORM THE ENGINEER OF THE ACTUAL PERFORMANCE OF SUBSURFACE SOILS, WHICH WILL INFORM THE REQUIRED EMBEDMENT DEPTH. THE CONTRACTOR IS SOLEY RESPONSIBLE FOR SITE SAFETY .

RIGGING

1. RIGGING FOR PILE TESTING SHALL CONFORM TO THE TENSION SCALE MANUFACTURER'S RECOMMENDATIONS.
2. CHOKERS, CABLES AND AND SHACKLES SHALL BE WORKING LOAD RATING OF 12 TONS. FITTINGS SHALL BE SIZED ACCORDINGLY.

TESTING

1. TESTING OF PILES SHALL BE PERFORMED IN THE PRESENCE OF THE ENGINEER. UP TO FOUR LOAD TESTS SHALL BE APPLIED TO EACH TESTED PILE. EACH OF THE FOUR LOAD TESTS SHALL BE APPLIED TO THE PILE WITH A DIFFERENT INSTALLED DEPTH. PROOF TESTS SHALL BE MADE AT UP TO FOUR EMBEDMENT DEPTHS. DEPTHS SHALL BE DETERMINED IN THE FIELD. AS A GUIDELINE, TEST EMBEDMENT DEPTHS MIGHT INCLUDE 8 FT, 10 FT, 11 FT, AND 12 FT.
2. EACH PILE TEST SHALL HAVE UPWARD LOAD GRADUALLY INCREASED AND AS ALIGNED TO THE LONG AXIS OF THE PILE. RECORD THE PILE DIAMETER, EMBEDMENT DEPTH AND MAXIMUM FORCE REQUIRED TO MOVE THE PILE VERTICALLY APPROXIMATELY 1 INCH. THEN DRIVE THE PILE TO A NEW DEPTH. APPLY NEW LOAD AND RECORD MAX FORCE THAT CAUSES THE PILE TO MOVE VERTICALLY 1 INCH. REPEAT FOR THIRD AND FOURTH TEST.
3. EXCAVATOR SHALL BE NO CLOSER TO PILE THAN NEEDED TO GENERATE DESIRED LOADING. LIMIT COMPRESSIVE LOADING OF THE TRACKS ON THE GROUND BY DRIVING THE EXCAVATOR ONTO LOGS LAID ON THE GROUND TO DISTRIBUTE THE WEIGHT OVER A LARGER AREA.
4. UP TO 10% OF PRODUCTION PILINGS SHALL BE PROOF TESTED. IF RESULTS VARY MORE THAN 50% THEN IT SHOULD BE ANTICIPATED THAT UP TO 25% OF THE PRODUCTION PILINGS SHALL BE PROOF TESTED.
5. PILE EMBEDMENT DEPTH SPECIFIED IN THESE DRAWINGS MIGHT BE INCREASED AT NO ADDITIONAL COST TO THE OWNER PENDING PULL OUT TEST RESULTS . ASSUMED RESISTANCE IS 20,000 POUNDS. IF TESTING REVEALS FIELD PULLOUT RESISTANCE VALUES THAT ARE LESS THAN THE ASSUMED VALUES, PILES MAY BE REQUIRED TO BE DRIVEN UP TO 5 FT DEEPER THAN INDICATED IN PLANS.

NO.	BY	DATE	REVISION DESCRIPTION

MM DRAWN | MB DESIGNED | JJ CHECKED
---- APPROVED | 11/29/22 DATE | PROJECT

YAKAMA NATION FISHERIES PROGRAM
METHOW RIVER - SUSPENSION REACH
FISH HABITAT ENHANCEMENT

inter·fluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

PILES

SHEET 13 OF 14

Provisions

INTRODUCTION

The contractor shall attend a pre-construction meeting with the owner and owner's representative prior to beginning construction.

The Washington State Department of Transportation's Standard Specifications for Road, Bridge and Municipal Construction 2022 (WSDOT Standard Specifications) shall apply unless otherwise noted in the following Provisions. In case of a conflict between the regulatory standards or specifications, the more stringent will govern. The "Contracting Agency" or "Owner" shall be the Confederated Tribes and Bands of the Yakama Nation. Additional specifications in the following contract sections are included for items not covered by the WSDOT Standard Specifications.

Sections 1-02, 1-03, and 1-08 (except 1-08.6, 1-08.7, 1-08.8) of the Standard Specifications do not apply.

The in-water work window is July 1 - July 31, 2021. High water in the river is commonly until mid-July. Work may occur outside of water before or after the in-water work window. Work shall be only within 7am to 7pm, and maximum of 6 days per week (Mon-Sat).

This project was designed in accordance with the BPA Habitat Improvement Program (HIP). HIP General Conservation Measures (CMs) are included on sheets 4-6. Site specific direction is added to the following Provisions. Any variances from HIP CMs will be requested by Owner. In a case of a conflict between the regulatory standards or specifications, local regulations, or other contract documentation, the more stringent will govern, unless specified in writing by the owner.

All excavation activity will be monitored by a cultural resource specialist. If your work brings you into contact with any of the following cultural resources:

- native american cultural artifacts (example: flakes, arrowheads, stone tools, bone tools, pottery, etc.)
- historic era artifacts (example: building foundations, homesteads, shipwrecks, mining camps, etc.)
- human skeletal remains or bone fragments

you must immediately discontinue all ground-disturbing activity. Do not touch or move the objects and maintain the confidentiality of the site. Follow the procedures listed in the BPA inadvertent discovery procedure and await further direction from BPA's cultural resources staff.

LiDAR contours in NAD83 Washington State Plane, North Zone US Feet, NAVD88.

ITEM 001- TESC, SPCC PLAN AND IMPLEMENTATION

Description

This work shall provide for preparation, implementation, and removal of a Temporary Erosion Sediment Control (TESC) plan and for the preparation and implementation of a Spill Prevention Control and Countermeasure (SPCC) plan in accordance with Section 1-07.15 of the Standard Specifications, and as amended by these Special Provisions.

The Contractor shall submit a TESC for the project to the Owner for approval. The TESC must satisfy the requirements of the Washington Department of Ecology NPDES Stormwater General Permit for Construction Activity and all other applicable permits. The TESC included in the Drawings and described herein is intended to provide a baseline for sediment and erosion control and does not ensure that the standards established by any applicable permits will be met. The Contractor may use these measures or alternative measures of his own design to ensure satisfactory performance and that the erosion control requirements of all applicable permits are met. The contractor shall be named as the permit holder. The contractor shall be responsible for implementing, inspecting and filing reports, maintaining, replacing, and removing TESC and SPCC measures. The plan shall include the name, address and 24-hour contact number of the person responsible for erosion prevention and sediment control measures.

1. A Spill Containment Kit shall be on site and crews shall be trained in its use.
2. Biodegradable Hydraulic Fluid shall be installed into each piece of heavy machinery working within 50 feet of the river.

Measurement

"TESC, SPCC Plan and Implementation," including the above amendments to the item will be measured by lump sum.

Payment

Payment shall be considered full compensation for all equipment, labor, tools, materials, and incidentals necessary to complete. "TESC, SPCC Plan and Implementation", lump sum.

ITEM 002 - MOBILIZATION

This item shall consist of preparation work and operations performed by the Contractor in accordance with Okanagan County road requirements, the provisions of Section 1-09.7 of the Washington Department of Transportation Standard Specifications (Standard Specifications), and amended as follows:

1. Prior to entering the site, all equipment shall be power washed, become fully dry, and inspected to make sure no plants, soil, or other organic material adheres to the surface. if equipment leaves the site and returns, it shall be rewashed and inspected prior to accessing the site.
2. The contractor shall provide a water tender, and an excavator and operator to the large wood staging area, along Goat Creek Road by 7:00 AM on the morning of July 1, 2022. The excavator and operator shall be available 12 hours per day for 3 days to assist with log deck maintenance during helicopter flight operations. The water tender shall maintain a dust free helipad during flight operations.
3. Temporary site access shall be along alignments and staging are shown in the plans. These are approximate. Actual disturbance limits will be staked and flagged in the field by the Owner. Designated disturbance limits shall be strictly adhered to.
4. Designated river crossings are shown in the Plans. River crossings shall be limited to a total of 12 one-way passes.
5. Site access requires equipment crossings on two trail bridges. It shall be the contractor's responsibility to select equipment size, use trailers, and employ protection measures to cross these bridges safely and without damaging the structures. Bridge damage shall be repaired at contractor's expense.
6. Road Repair - Apply 3" compacted blanket of 5/8" Crushed Surfacing Top Course to access road, which is 0.25 miles long and 10' wide. See Road Repair requirements in "Design Updates and Field Notes for Contractor Site Tours 4/25/22".
7. Where directed by the Owner, 24 Cubic Yards of 5/8" Crushed Surfacing Top Course shall be tailgated and spread evenly over an adjacent landowner's driveway. A map can will be provided upon request.
8. Prior to demobilization, equipment tracks shall be graded smooth. Access routes, and stockpile and staging areas shall be returned to original or better condition. Any removed or damaged fences shall be repaired or replaced.

Measurement and Payment

Payment for Mobilization shall be by the lump sum contract price for, 'Mobilization', partial payments will be made as in accordance with Section 1-09.9 of the Standard Specifications. Payment shall be considered full compensation for all equipment, labor, tools, materials, and incidentals necessary to complete this work as specified.

ITEM 003 - TRAFFIC CONTROL

Temporary traffic control requirements shall include measures per Section 1-10 and local regulations. It is the Contractor's responsibility to obtain County permit.

Measurement

"Traffic Control" will be measured by lump sum.

Payment

"Traffic Control", lump sum.

ITEMS 004-014 LOG STRUCTURE

Description

"Log Structure" includes all work associated with onsite movement and installation of logs with roots, timber piles, bumpers. salvaged trees, slash. The work includes securing using threaded rod as shown in the Plans. This item includes movement from stockpiles to installation areas, excavation and backfill to partially bury "Log Structure". Cofferdam and pumping are required at designated "Log Structures" shown in the Plans.

Materials

Logs with Roots and Timber Piles will be supplied by the Owner to the staging areas shown in the Plans. The Contractor shall load and haul the logs from the Owner's stockpile. Quantities to be moved to each site are shown in the Plans.

Owner supplied Logs will have the following characteristics:

1. Logs with Roots: 40' long and >18" dbh.
2. Timber Piles: 30' long and 16" diameter in middle of log.
3. Slash: Slash includes shrubs and small trees removed from access routes and excavation areas.
4. Threaded Rod: Install threaded rod, washers, and nuts as specified in the Plans.

Construction Requirements

Logs: Locations of Logs with Roots shall generally be as indicated on the Plans. However, final location will depend upon the size, shape and quantity of material delivered or salvaged. Installation of Logs with Roots shall be understood to require a "fit in the field" approach as directed by the Owner. Logs with Roots shall be stabilized by partial burial attachment to Timber Piles using Threaded Rod. The ends of cut logs will be incorporated into Log Structures as Slash.

Timber Piles: Approximate installation locations of timber piles are shown in the Plans. Specific locations shall be determined in the field and directed by the Owner. The required embedment depth is indicated on the plans. Installed Timber Piles shall also have the following field-directed characteristics:

a. Timber Piles shall be installed at various angles and with varying heights above ground to break up a uniform appearance.

b. Each Timber Pile log shall have a "broken top" by stump-grinding or making multiple plunge cuts with chain saw to provide a roughened or ragged end.

Timber Piles shall be installed by vibratory hammer. Vibratory hammer shall have the following characteristics:

a. Minimum of 800 kN (80 tons) of centrifugal force.

b. Side grip with minimum 16" space between ends of jaws so that 16" diameter log will fit into the jaws without needing to slide the grip over the end and down the log.

Testing: At each Log Structure site, a minimum of one pile shall be tested for pullout resistance. Each test will require up to four individual pulls, each at a deeper depth. See details in Plans. The Contractor shall provide the tension link, meter, and associated hardware (rated 12 ton).

Threaded Rod: Install threaded rod where shown in the Plans or as directed by Owner.

Slash: Slash shall be incorporated into log structures as directed by the Owner. Intermingle, stack, and rack slash material to the installed logs and piles to emulate natural accumulations of wood material.

Earthwork: Where partial burial of logs is required, excavate to subgrade. Stockpile the fill within the designated disturbance area. Sort materials by general sizes, separating piles for coarse and fine material. Backfill the logs as each layer is installed. Use coarse fill in lower layer and along waterward edge, and finer materials on top layer. A cultural staff person will be present on site during all excavation activities.

Cofferdam: Where Cofferdam is shown in plans. Sheet Pile shall be used to support excavated sidewalls and reduce groundwater. Shhet Pile is pre approved. Alternative cofferdam method or material shall be included in the Contractor's proposal for review. Only approved cofferdam may be used.

Measurement

Measurement will be based on the completed site (B1-B6, P1-P2, A1-A3).

"Log Structure" will be measured by per each.

Payment

Payment will be made in accordance with Section 1-09.9 for the following bid items: "Log Structure" as per each.

The contract price for "Log Structure" shall be full compensation for all costs incurred for equipment, materials and labor for loading and hauling logs from stockpile areas, installing and securing logs, timber piles, and slash as outlined in the plans. Earthwork, installing slash, cofferdam, and threaded rod shall be incidental to Log Structures.

NO.	BY	DATE	REVISION DESCRIPTION

MM	MB	JJ
DRAWN	DESIGNED	CHECKED
----	04/28/22	
APPROVED	DATE	PROJECT

YAKAMA NATION FISHERIES PROGRAM
METHOW RIVER - SUSPENSION REACH
FISH HABITAT ENHANCEMENT

inter·fluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

SPECIFICATIONS

SHEET
14 OF 14