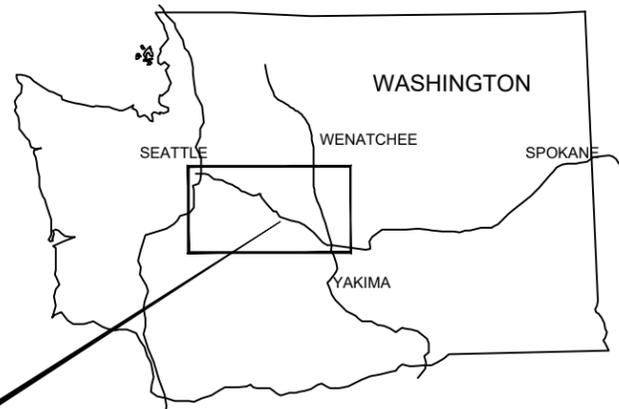


# WEST FORK TEANAWAY RIVER

## RIVER MILE 5.1-7.2 RESTORATION PROJECT - FINAL DESIGN



COORDINATES:  
 LATITUDE 47° 16' 52.51" N  
 LONGITUDE 120° 59' 41.74" W

SECTIONS 19,30,31&32, TOWNSHIP 21N, RANGE 15E

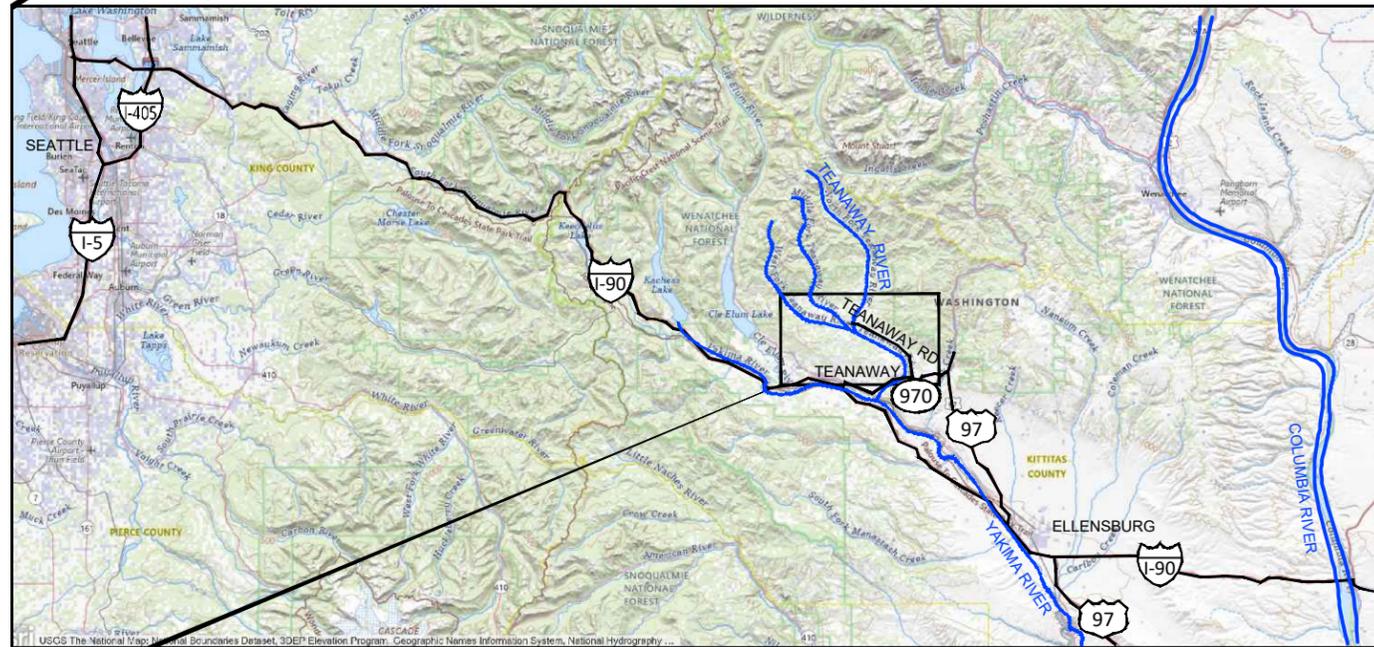
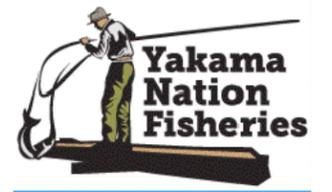
WATERBODY: WEST FORK TEANAWAY RIVER  
 TRIBUTARY OF: YAKIMA RIVER

THESE DRAWINGS ARE RELATIVE TO DATUMS NAD83 WASHINGTON STATE PLANE SOUTH, AND NAVD88, US SURVEY FEET.

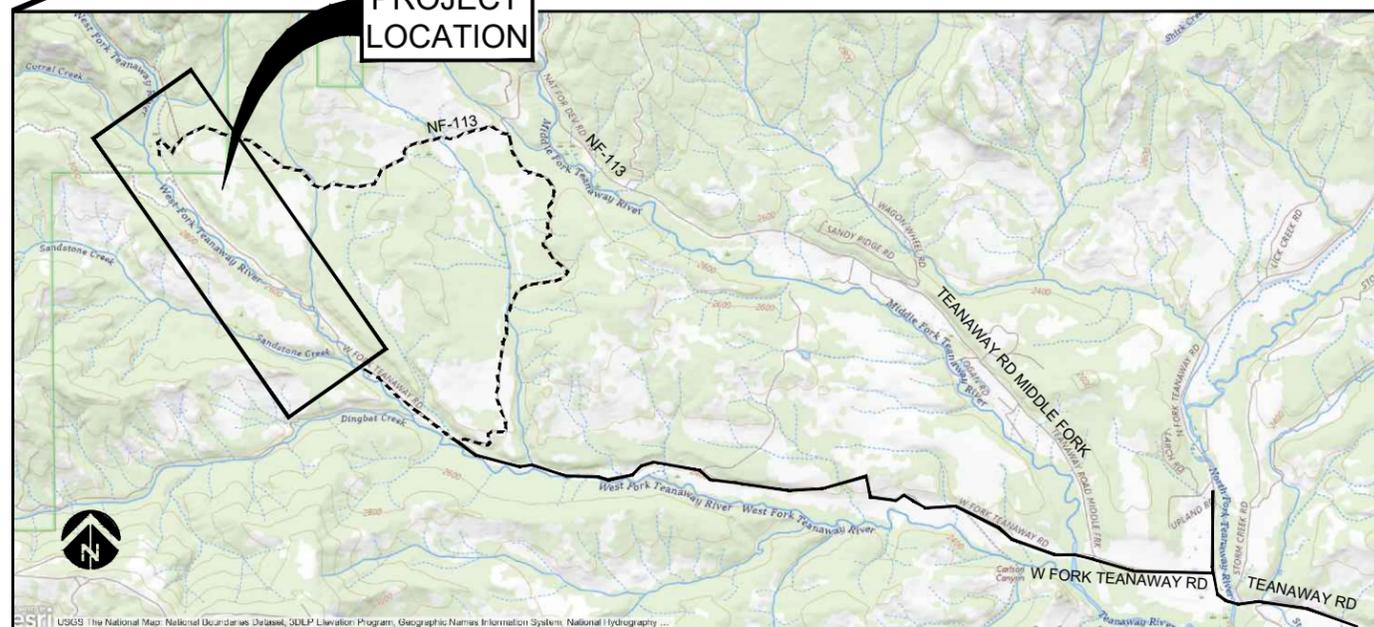
DESIGNS INCLUDE TWO PLAN SETS.  
 PLANS FOR RM 5.1-6.75 CREATED BY INTER-FLUVE, INC (IFI).  
 PLANS FOR RM 6.75-7.2 CREATED BY WA DEPT OF FISH AND WILDLIFE (WDFW)  
 REVEGETATION PLANS FOR RM 5.1-7.2 CREATION LEAD BY MID-COLUMBIA FISHERIES (MCF)

MARCH 2026

IN-WATER WORK WINDOW IS JULY 16-OCTOBER 31, 2026



FREEWAY MAP | 20 MILES



ROAD MAP | 1 MILE | 7 MILES TO 970

### SHEET LIST

- 1 COVER
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  - 6 HIP GENERAL CONSERVAION MEASURES (2 OF 3)
  - 7 HIP GENERAL CONSERVAION MEASURES (3 OF 3)
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NO.	BY	DATE	REVISION DESCRIPTION

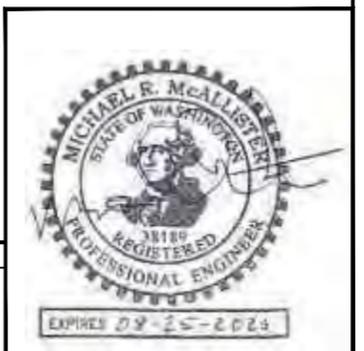
CM	MM, PL, MB	MM, PL
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MM, PL	3/11/26	24-02-17
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WF TEANAWAY RIVER  
 RM 5.1-6.75 RESTORATION  
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COVER

SHEET  
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THE CONTRACTOR SHALL ATTEND A PRE-CONSTRUCTION MEETING WITH THE CONTRACTING AGENT (MID-COLUMBIA FISHERIES (MCF) AND YAKAMA NATION (YN)), WA DEPT OF FISH AND WILDLIFE (WDFW), SCIENCE STAFF AND ENGINEERS (INTER-FLUVE INC AND WA DEPT OF FISH AND WILDLIFE (WDFW)) PRIOR TO BEGINNING CONSTRUCTION.

ALL WORK SHALL CONFORM TO THE CURRENT 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 SHALL PREVAIL.

IN CASE OF DISCREPANCY, BETWEEN NOTES, LOCAL REGULATIONS, OR OTHER CONTRACT DOCUMENTATION, CONTRACTOR SHALL OBTAIN CLARIFICATION/DIRECTION FROM CONTRACTING AGENT OR ENGINEERS.

**EXISTING DATA**

TOPOGRAPHIC SURVEY COLLECTED BY INTER-FLUVE, INC. USING RTK GPS AND A TOTAL STATION ON MAY 14-15,2025. SURVEY DATA IS REFERENCED TO NAD83 WASHINGTON STATE PLANE, SOUTH ZONE, US FEET, NAVD 88.

LIDAR DATA SOLICITED BY WASHINGTON DEPARTMENT OF NATURAL RESOURCES AS PART OF THE YAKIMA BASIN DATA SET. DATA ACQUIRED BY QUANTUM SPATIAL IN 2023.

HYDRAULIC MODELING BY INTER-FLUVE USING USACE HEC-RAS (6.6). MODEL VALIDATED USING SURVEYED WATER SURFACE ELEVATIONS AND FIELD OBSERVATIONS.

**WATERS OF THE U.S.**

THE ORDINARY HIGH WATER (OHW) LINES DISPLAYED IN THE DESIGN PACKAGE ARE BASED UPON ANALYSIS, MODELING AND BEST PROFESSIONAL JUDGEMENT.

WETLAND DELINEATION WAS COMPLETED IN 2025 BY GG ENVIRONMENTAL, LLC.

**SOILS**

WEST FORK TEANAWAY ALLUVIUM: SMALL BOULDER, COBBLE, GRAVEL, SAND AND FINES

**UTILITIES**

THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR HAVING UTILITIES LOCATED PRIOR TO CONSTRUCTION ACTIVITIES.

INFORMATION FOR UTILITY LOCATION CAN BE FOUND AT:

CALL 811.COM/911-IN-YOUR-STATE/MAP/STATE/WASHINGTON

THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE AFFECTED UTILITY SERVICE TO REPORT ANY DAMAGED OR DESTROYED UTILITIES. THE CONTRACTOR SHALL PROVIDE EQUIPMENT OR LABOR TO AID THE AFFECTED UTILITY SERVICE IN REPAIRING DAMAGED OR DESTROYED UTILITIES AT NO COST TO MCFY/YN.

**IN-WATER WORK PERIODS**

WORK SHALL OCCUR DURING THE PERMITTED IN-WATER WORK PERIOD AS STATED IN THE APPLICABLE PERMITS. (JULY 16 - OCTOBER 31)

**FISH RESCUE**

ALL FISH RESCUE EFFORTS SHALL BE SUPERVISED BY A QUALIFIED CONTRACTING AGENT'S FISHERIES/AQUATIC BIOLOGIST EXPERIENCED WITH THE COLLECTION AND HANDLING OF SALMONID FISHES FROM CONSTRUCTION SITES.

ALL FISH TRAPPED IN RESIDUAL POOLS WITHIN THE PROJECT AREA SHALL BE CAREFULLY COLLECTED BY SEINE AND/OR DIP NETS AND PLACED IN CLEAN TRANSFER CONTAINERS WITH ADEQUATE VOLUME OF WATER AND HELD WITHIN NO LONGER THAN 10 MINUTES.

CAPTURED FISHES SHALL BE IMMEDIATELY RELEASED INTO THE RIVER.

CONTRACTOR WILL PROVIDE AGREED UPON ADVANCE NOTICE TO CONTRACTING AGENT PRIOR TO FISH RESCUE. CONTRACTOR IS RESPONSIBLE FOR ISOLATING THE CONSTRUCTION LOCATION FROM THE STREAM.

**CULTURAL RESOURCES**

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, HEARTH FEATURES, ETC)
- HISTORIC ERA ARTIFACTS (EXAMPLE: BUILDING FOUNDATIONS, HOMESTEADS, MINING CAMPS, ETC)
- HUMAN SKELETAL REMAINS AND 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 INADVERTENT DISCOVERY PLAN. THEN AWAIT FURTHER DIRECTION FROM CULTURAL RESOURCES STAFF.

ALL GROUND-DISTURBING WORK UPSTREAM OF STA 132+50 WILL REQUIRE A CULTURAL RESOURCES MONITOR. COORDINATE WITH CONTRACTING AGENT MINIMUM TWO WEEKS PRIOR TO WORK.

**TREE SALVAGE**

ALL REMOVED NATIVE VEGETATION SHALL BE INCORPORATED INTO LOG STRUCTURES AS DIRECTED BY CONTRACTING AGENT OR THE ENGINEERS. IF EXCESS VEGETATION MATERIAL NEEDS DISPOSAL OUTSIDE OF CHANNEL WORK, IT SHALL BE DISTRIBUTED IN DESIGNATED AREAS ON THE FLOODPLAIN OR ON THE FLOODPLAIN AS DIRECTED BY ENGINEERS.

ALL TREES REMOVED WITHIN CLEARING LIMITS SHALL BE REMOVED WHOLE WITH ROOTS INTACT AND UTILIZED IN CONSTRUCTION AS DIRECTED BY ENGINEERS. EXCEPT FOR MECHANICALLY THINNED TREES WHICH ARE HAND CUT (CHAINSAW) AND UTILIZED WITHOUT ROOTWAD.

REMOVE SOIL FROM ROOTS OF SALVAGED TREES BEFORE PLACEMENT IN THE WATERWAY.

**CONTRACTOR'S PLANS**

CONTRACTOR SHALL PREPARE AND SUBMIT FOR APPROVAL BY THE CONTRACTING AGENT PRIOR TO COMMENCING WORK THE FOLLOWING PLANS:

- ACCESS, TRAFFIC CONTROL AND TEMPORARY STREAM CROSSING PLAN
- CONSTRUCTION SEQUENCING PLAN
- STREAM DIVERSION AND SITE DEWATERING PLAN
- EROSION, SEDIMENT AND DUST CONTROL PLAN
- EARTHWORKS EXCAVATION, PLACEMENT, SALVAGE & REUSE, AND DISPOSAL PLAN

**CONSTRUCTION ACCESS**

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR OBTAINING ANY REQUIRED TRAFFIC CONTROL AND PROVIDING REQUIRED TRAFFIC CONTROL MEASURES INCLUDING, BUT NOT LIMITED TO, SIGNAGE AND FLAGGERS.

ALL EQUIPMENT, MATERIALS AND PERSONNEL SHALL REMAIN WITHIN THE LIMITS OF DISTURBANCE.

THE CONTRACTOR SHALL KEEP THE WORK AREAS IN A NEAT AND CLEAN CONDITION FREE OF DEBRIS AND LITTER FOR THE DURATION OF THE PROJECT.

TEMPORARY ACCESS ROUTES IN AREAS PRONE TO INUNDATION DURING THE IN-WATER WORK WINDOW SHALL BE DECOMMISSIONED BEFORE THE END OF THE IN-WATER WORK WINDOW.

**CONSTRUCTION STAKING**

CONTRACTING AGENT WILL INSTALL FLAGGING TO DELINEATE EQUIPMENT ENTRY AND EXIT POINTS, STAGING AND STOCKPILE AREAS, APPROXIMATE LOG STRUCTURE LOCATIONS, AND PROJECT LIMITS. THE ENGINEERS WILL INSTALL A SET OF ELEVATION CONTROL POINTS. THE CONTRACTOR SHALL BE RESPONSIBLE, AT OWN EXPENSE, FOR STAKING AND REPLACING DAMAGED OR MISSING STAKES.

CONTRACTING AGENT OR THEIR ENGINEERS WILL MARK LIMITS OF DISTURBANCE PRIOR TO MOBILIZATION OF EQUIPMENT OR MATERIALS ONTO THE SITE.

SOME FIELD ADJUSTMENTS TO THE LINES AND GRADES ARE TO BE EXPECTED. LOCATION, ALIGNMENT, AND ELEVATION OF LOGS AND LOGS WITH ROOTWADS ARE SUBJECT TO ADJUSTMENT BASED ON FIELD CONDITIONS, AND MATERIAL SIZE PER DIRECTION FROM THE ENGINEERS.

ANY PROPERTY MONUMENTS DISTURBED OR DESTROYED SHALL BE REPLACED BY A WASHINGTON STATE PROFESSIONAL LICENSED SURVEYOR AT CONTRACTOR'S EXPENSE.

**ABBREVIATIONS**

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

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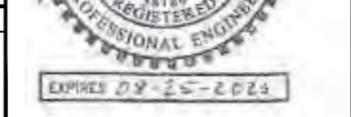
**WF TEANAWAY RIVER  
RM 5.1-6.75 RESTORATION  
FINAL DESIGN**



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Hood River, OR 97031  
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**GENERAL NOTES AND  
ABBREVIATIONS**

SHEET  
**2 OF 35**



# PROJECT QUANTITIES

## IFI AND WDFW COMBINED (RM 5.1-6.75) - EARTHWORK QUANTITIES & LARGE WOOD SITES

Description	Unit	Quantity								Total
		WDFW RM 6.75-7.2	IFI Ste 1	IFI Ste 2	IFI Ste 3	IFI Ste 4	IFI Ste 5	IFI Ste 6	IFI Ste 7	
<b>Earthworks</b>										
Cut	CY	35,000	17,032	11,292	8,490	5,050	2,565	63	700	80,192
Fill	CY	29,000	15,894	6,546	8,421	2,190	3,463	63	700	66,277
Boulders (3' diameter)	EA	70								70
<b>Large Wood Sites</b>										
WDFW Type 1- Channel Spanning	EA	5								5
WDFW Type 2- Flow Spreading	EA	7								7
WDFW Type 3- Pool Maintenance/Ba	EA	5								5
IFI - Mid-Channel	EA		1		2		1			4
IFI - Bank Buried (mainstem)	EA		11	5	4	3	8	1	1	33
IFI - Channel Spanning	EA			1	1	1	2		2	
IFI - Partial Channel Fill	EA		1	1	1	1				4
IFI - Backwater Alcove	EA		1	1			1			3
<b>Floodplain Treatment</b>										
WDFW - Roughness Wood with Slash	AC	10								10
IFI - Floodplain Roughness Wood	AC		4.4	2.1	1.5	1.9	0.9			11

## IFI (RM 5.1-6.75) LARGE WOOD QUANTITIES BY SITE AND STRUCTURE TYPE

Large Wood Description and Structure Type	IFI Site 1	IFI Site 2	IFI Site 3	IFI Site 4	IFI Site 5	IFI Site 6	IFI Site 7	Sum
<b>Salvaged Logs with Roots (&gt;18" DBH, 40' Length)</b>								
For Mid-Channel Jams	20	0	40	0	20	0	0	
For Bank Buried Jams	116	54	42	32	86	10	0	
For Channel Spanning Jams	0	48	48	48	96	0	0	
<b>Total Salvage Logs with Roots per Site</b>	<b>136</b>	<b>102</b>	<b>130</b>	<b>80</b>	<b>202</b>	<b>10</b>	<b>0</b>	<b>660</b>
<b>Salvaged Trees (12-17" DBH, variable length)</b>								
For Bank Buried Jams	77	35	28	21	56	7	0	
For Channel Spanning Jams	0	2	2	2	4	0	0	
For Backwater Alcoves	45	45	0	0	45	0	0	
For Partial Channel Fill	40	15	105	50	0	0	0	
For Floodplain Roughness	134	63	45	57	27	0	0	
<b>Total Salvage Trees per Site</b>	<b>296</b>	<b>160</b>	<b>180</b>	<b>130</b>	<b>132</b>	<b>7</b>	<b>0</b>	<b>905</b>
<b>Salvaged Slash (&lt;11" DBH, variable length)</b>								
For Mid channel Jams	50	0	100	0	50	0	0	
For Banks Buried Jams	220	100	80	60	160	20	20	
For Channel Spanning Jams	0	50	50	50	100	0	100	
For Backwater Alcoves	45	45	0	0	45	0	0	
For Partial Channel Fill	40	15	105	50	0	0	0	
For Floodplain Roughness and Channel Flugs	187	89	63	80	38	0	0	
<b>Total Slash per Site</b>	<b>542</b>	<b>299</b>	<b>398</b>	<b>240</b>	<b>393</b>	<b>20</b>	<b>120</b>	<b>2012</b>
<b>Imported Logs with Roots (&gt;18" DBH, 40' length)</b>								
For Bank Buried Jams	16*	6*	6*	4*	10*	2*	6**	
For Channel Spanning Jams	0	0	0	0	0	0	66**	
<b>Total Imported Logs per Site</b>	<b>16</b>	<b>6</b>	<b>6</b>	<b>4</b>	<b>10</b>	<b>2</b>	<b>72</b>	<b>116</b>
<b>Imported Tree Tops (&gt;12" DBH, variable length)</b>								
For Bank Buried Jam	0	0	0	0	0	0	6**	
For Channel Spanning Jams	0	0	0	0	0	0	30**	
<b>Total Imported Tree Tops (Site 7)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>36</b>	<b>36</b>

\*Wood Imported from USBR stockpile will be incorporated in Bank Buried Jams throughout Sites 1-6

\*\*Wood Imported from TVU Meadows Site will be installed at Site 7

## IFI (RM 5.1-6.75) LARGE WOOD TYPE AND QUANTITY PER STRUCTURE

### Large Wood per Structure Type

<b>Bank Buried Jam</b>		
Material	Size	Number Per Jam
Salvaged or Imported Log with Roots	>18" DBH, 40' length	12*
Salvaged Tree	>12" DBH, Variable length	7
Salvaged Slash	<11" DBH, Variable length	approx. 20
* Bank Buried Jam in Site 7 will only have two layers. 6 logs with rootwads and 6 tree tops, totaling 12 pieces of wood		
<b>Mid-Channel Jam</b>		
Material	Size	Number Per Jam
Salvaged Log with Roots	>18" DBH, 40' length	20
Salvaged Slash	<11" DBH, Variable length	approx. 50
<b>Channel Spanner Jam</b>		
Material	Size	Number Per Jam
Salvaged or Imported Log with Roots	>18" DBH, 40' length	48**
Salvaged Tree	>12" DBH, Variable length	2
Salvaged Slash	<11" DBH, Variable length	approx. 50
** Channel Spanner Jams in Site 7 will be made up of 33 imported logs with rootwads and 15 tree tops, totaling 48 pieces of wood for each jam		

## WDFW (RM 6.75-7.2) LARGE WOOD QUANTITY TABLE

WDFW REACH RM 6.75-7.2 LARGEWOOD	
Imported Logs with Rootwads (<22" DBH, 40' length)	40
Imported Logs with Rootwads (>18" DBH, 40' length)	20
Imported Logs no Rootwads (14"-22" DBH no R/W, 40' length)	900
Full trees Salvaged On-site with Rootwads (>16" DBH)	150

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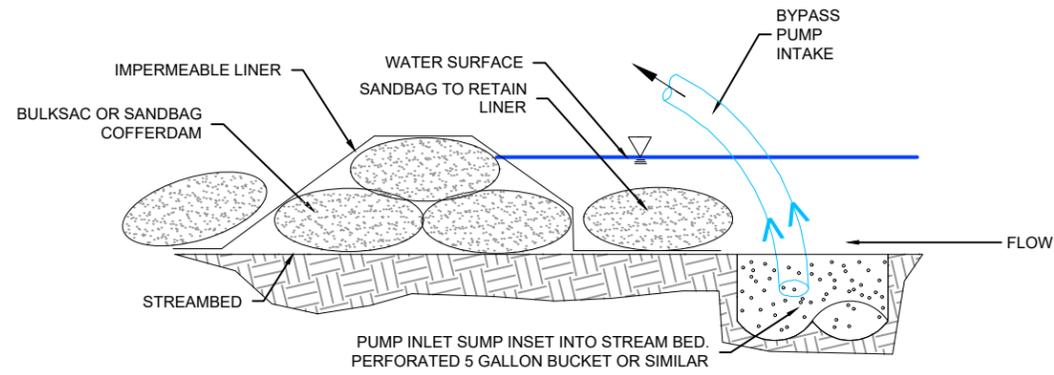
PROJECT QUANTITIES

SHEET

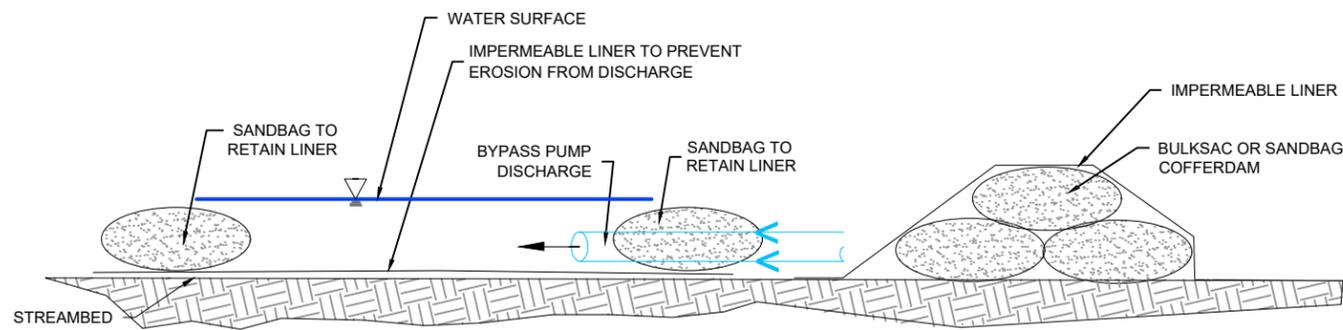
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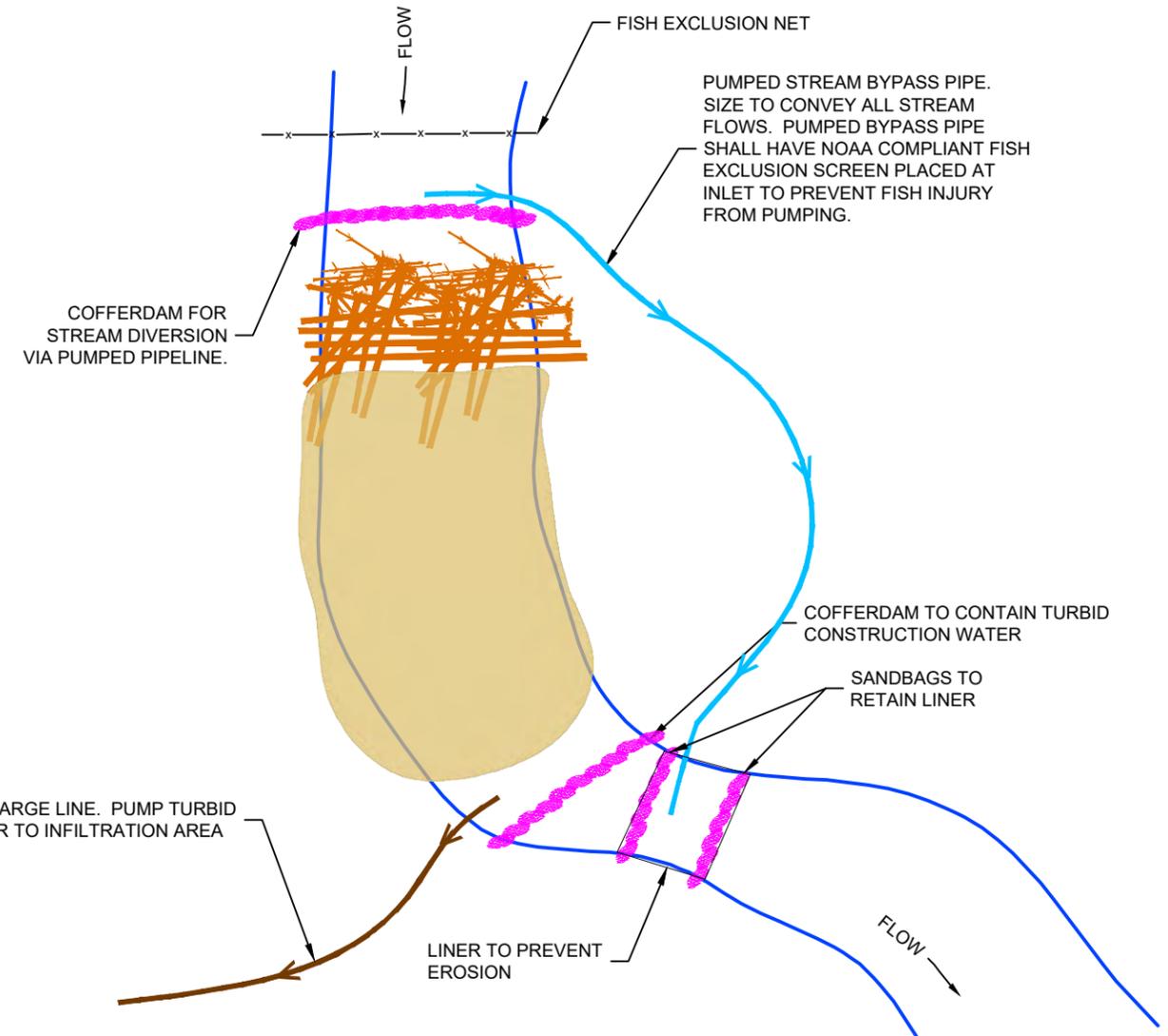
1. COORDINATE WITH CONTRACTING AGENTS TO ENSURE INSTALLATION OF FISH EXCLUSION NETS AND RESCUE OF FISH FROM WORK AREA.
2. INSTALL COFFERDAMS.
3. UPSTREAM OF UPSTREAM COFFERDAM, PUMP TO DIVERT STREAM FLOW AROUND WORK AREA. DISCHARGE DIVERTED FLOW TO CHANNEL DOWNSTREAM OF WORK AREA. PROTECT DISCHARGE AREA USING PLASTIC SHEETING AND SANDBAGS (DETAIL) AS DIRECTED IN PERMITS.
4. UPSTREAM OF THE DOWNSTREAM COFFERDAM, USE DEWATERING PUMP TO MOVE CONSTRUCTION WATER (TURBIDITY) TO INFILTRATION AREA. MONITOR INFILTRATION AND MOVE DISCHARGE POINT AS NEEDED TO PREVENT TURBIDITY FROM ENTERING THE WATERWAY DOWNSTREAM OF THE COFFERDAM. DEWATERING PUMP CAN BE USED TO WASH FILL AS IT IS PLACED IN THE CHANNEL WITHIN THE WORK AREA.



**1-PUMPED DIVERSION INLET - ELEVATION VIEW**



**2-DIVERSION OUTLET - ELEVATION VIEW**



**STREAM BYPASS INLET AND OUTLET DETAILS**

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**BMPS**

SHEET  
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**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.

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**HIP GENERAL CONSERVATION MEASURES**

BONNEVILLE POWER ADMINISTRATION: ENVIRONMENT, FISH AND WILDLIFE DIVISION

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

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**HIP GENERAL CONSERVATION MEASURES**

BONNEVILLE POWER ADMINISTRATION: ENVIRONMENT, FISH AND WILDLIFE DIVISION

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**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 REPETITIVE 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 LOOSENEED 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, WATER 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.

**STAGED REWATERING PLAN.**

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

**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 \_\_\_\_\_

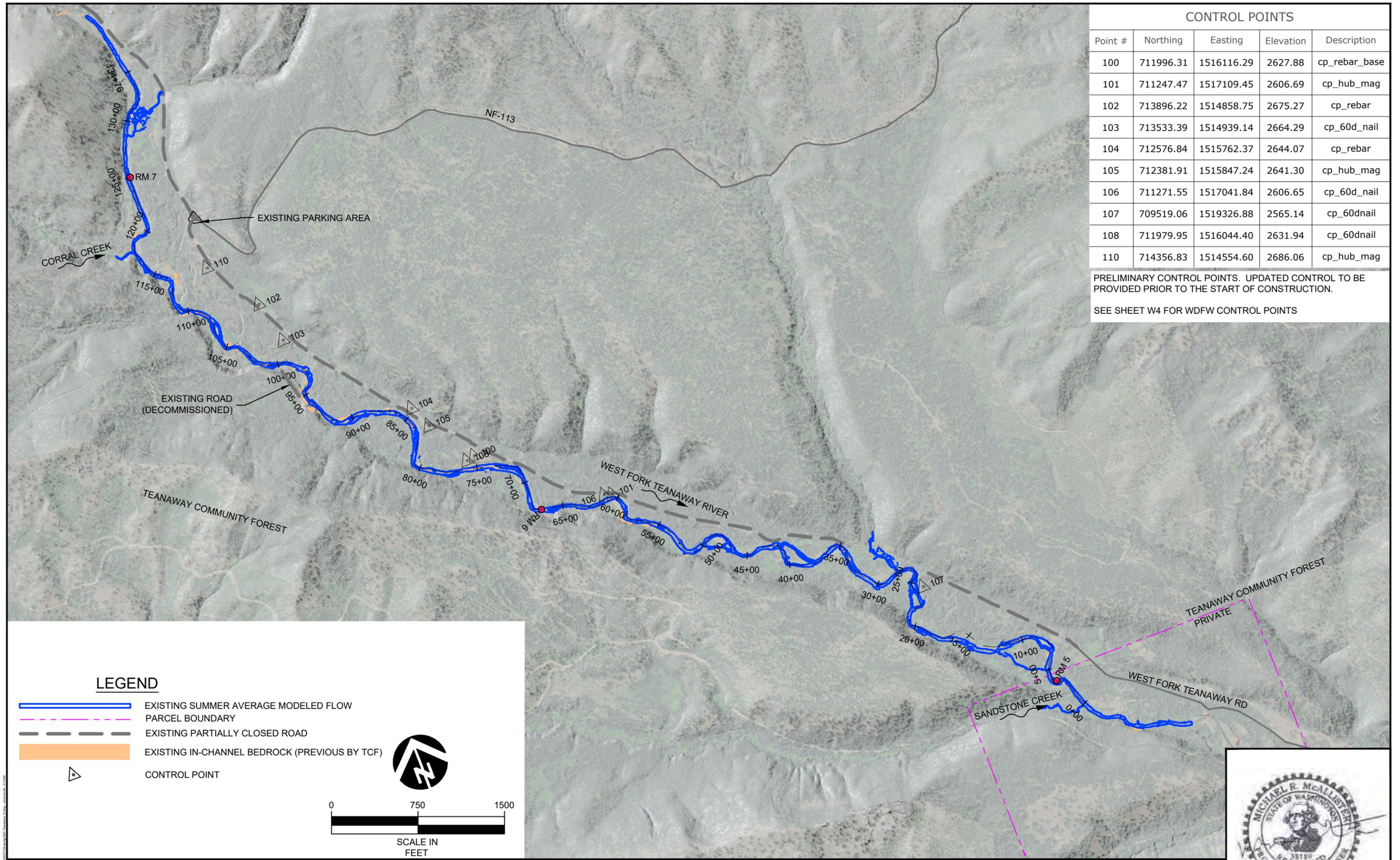
**HIP GENERAL CONSERVATION MEASURES**

BONNEVILLE POWER ADMINISTRATION: ENVIRONMENT, FISH AND WILDLIFE DIVISION

File Name

2021 HIP GCA

Drawing No.

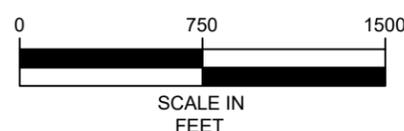


CONTROL POINTS				
Point #	Northing	Easting	Elevation	Description
100	711996.31	1516116.29	2627.88	cp_rebar_base
101	711247.47	1517109.45	2606.69	cp_hub_mag
102	713896.22	1514858.75	2675.27	cp_rebar
103	713533.39	1514939.14	2664.29	cp_60d_nail
104	712576.84	1515762.37	2644.07	cp_rebar
105	712381.91	1515847.24	2641.30	cp_hub_mag
106	711271.55	1517041.84	2606.65	cp_60d_nail
107	709519.06	1519326.88	2565.14	cp_60dnail
108	711979.95	1516044.40	2631.94	cp_60dnail
110	714356.83	1514554.60	2686.06	cp_hub_mag

PRELIMINARY CONTROL POINTS. UPDATED CONTROL TO BE PROVIDED PRIOR TO THE START OF CONSTRUCTION.  
SEE SHEET W4 FOR WDFW CONTROL POINTS

**LEGEND**

- EXISTING SUMMER AVERAGE MODELED FLOW
- PARCEL BOUNDARY
- EXISTING PARTIALLY CLOSED ROAD
- EXISTING IN-CHANNEL BEDROCK (PREVIOUS BY TCF)
- CONTROL POINT



NO.	BY	DATE	REVISION DESCRIPTION

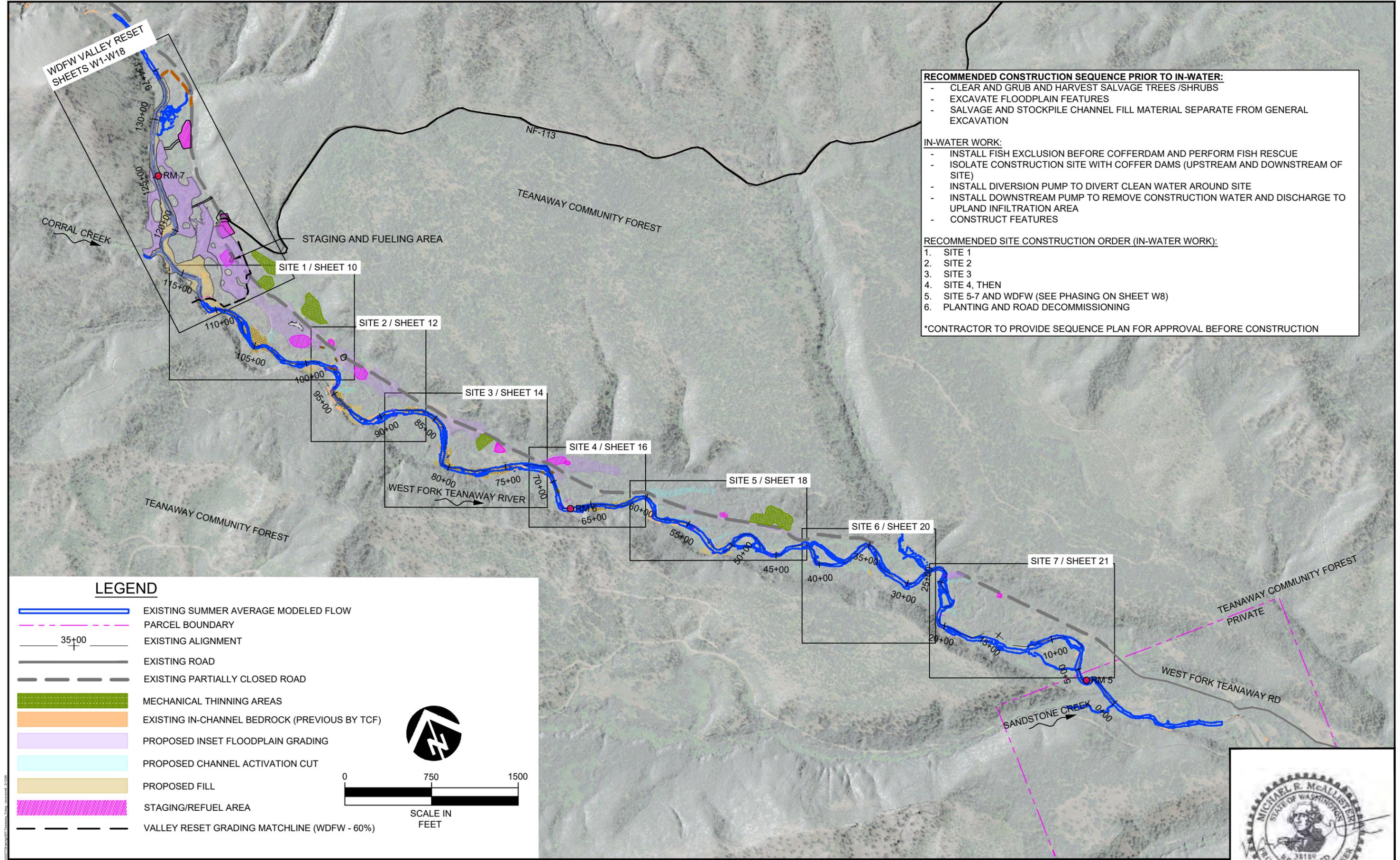
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DRAWN	DESIGNED	CHECKED
MM, PL	3/11/26	24-02-17
APPROVED	DATE	PROJECT

**WF TEANAWAY RIVER  
RM 5.1-6.75 RESTORATION  
FINAL DESIGN**

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**EXISTING CONDITIONS**





- RECOMMENDED CONSTRUCTION SEQUENCE PRIOR TO IN-WATER:**
- CLEAR AND GRUB AND HARVEST SALVAGE TREES /SHRUBS
  - EXCAVATE FLOODPLAIN FEATURES
  - SALVAGE AND STOCKPILE CHANNEL FILL MATERIAL SEPARATE FROM GENERAL EXCAVATION
- IN-WATER WORK:**
- INSTALL FISH EXCLUSION BEFORE COFFERDAM AND PERFORM FISH RESCUE
  - ISOLATE CONSTRUCTION SITE WITH COFFER DAMS (UPSTREAM AND DOWNSTREAM OF SITE)
  - INSTALL DIVERSION PUMP TO DIVERT CLEAN WATER AROUND SITE
  - INSTALL DOWNSTREAM PUMP TO REMOVE CONSTRUCTION WATER AND DISCHARGE TO UPLAND INFILTRATION AREA
  - CONSTRUCT FEATURES
- RECOMMENDED SITE CONSTRUCTION ORDER (IN-WATER WORK):**
1. SITE 1
  2. SITE 2
  3. SITE 3
  4. SITE 4, THEN
  5. SITE 5-7 AND WDFW (SEE PHASING ON SHEET W8)
  6. PLANTING AND ROAD DECOMMISSIONING
- \*CONTRACTOR TO PROVIDE SEQUENCE PLAN FOR APPROVAL BEFORE CONSTRUCTION

**LEGEND**

- EXISTING SUMMER AVERAGE MODELED FLOW
  - PARCEL BOUNDARY
  - 35+00 EXISTING ALIGNMENT
  - EXISTING ROAD
  - EXISTING PARTIALLY CLOSED ROAD
  - MECHANICAL THINNING AREAS
  - EXISTING IN-CHANNEL BEDROCK (PREVIOUS BY TCF)
  - PROPOSED INSET FLOODPLAIN GRADING
  - PROPOSED CHANNEL ACTIVATION CUT
  - PROPOSED FILL
  - STAGING/REFUEL AREA
  - VALLEY RESET GRADING MATCHLINE (WDFW - 60%)
- SCALE IN FEET

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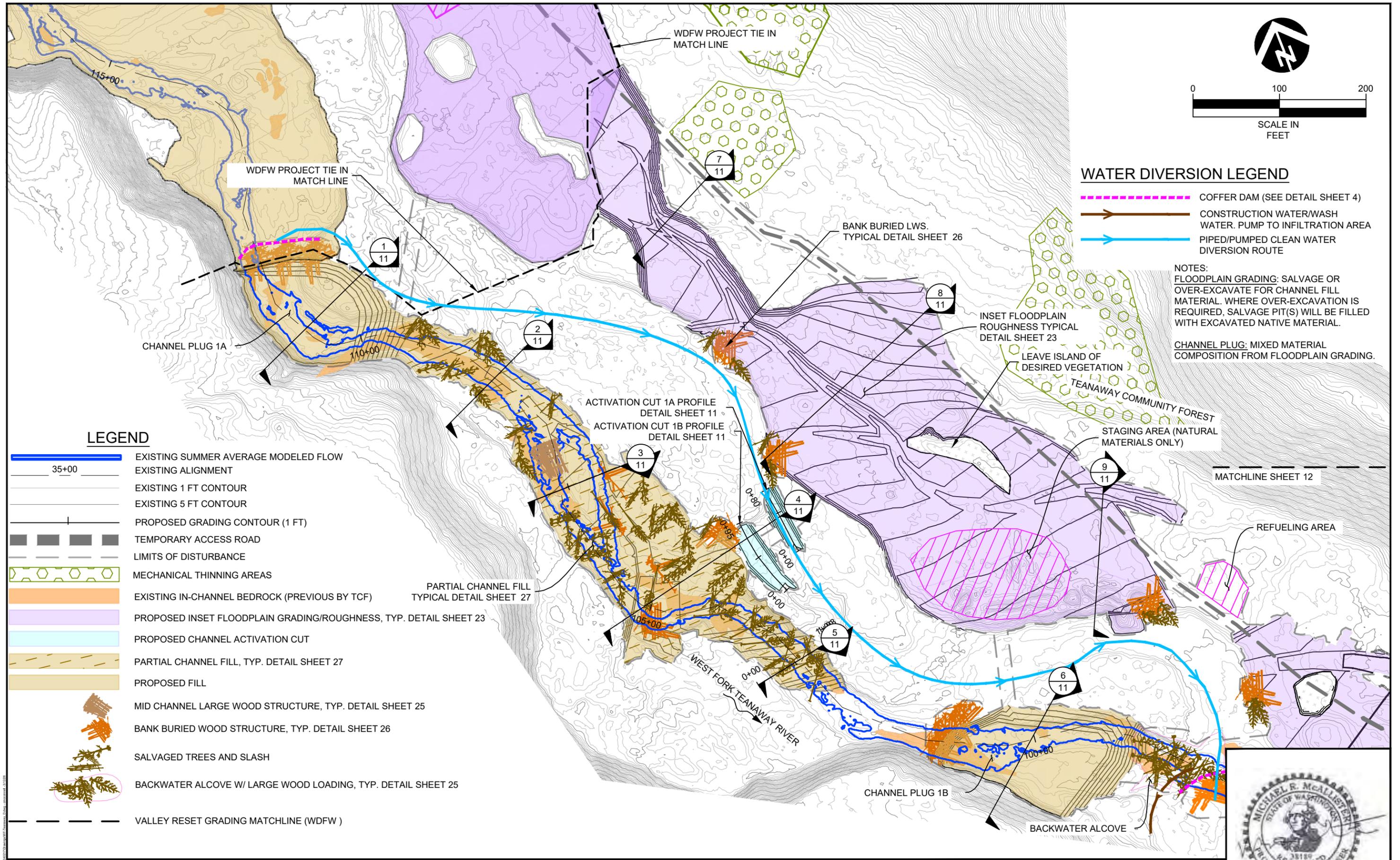
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**PROPOSED CONDITIONS**  
**OVERVIEW & SHEET INDEX**  
**RM 5.1-7.2**

SHEET  
**9 OF 35**





**LEGEND**

- EXISTING SUMMER AVERAGE MODELED FLOW
- EXISTING ALIGNMENT
- EXISTING 1 FT CONTOUR
- EXISTING 5 FT CONTOUR
- PROPOSED GRADING CONTOUR (1 FT)
- TEMPORARY ACCESS ROAD
- LIMITS OF DISTURBANCE
- MECHANICAL THINNING AREAS
- EXISTING IN-CHANNEL BEDROCK (PREVIOUS BY TCF)
- PROPOSED INSET FLOODPLAIN GRADING/ROUGHNESS, TYP. DETAIL SHEET 23
- PROPOSED CHANNEL ACTIVATION CUT
- PARTIAL CHANNEL FILL, TYP. DETAIL SHEET 27
- PROPOSED FILL
- MID CHANNEL LARGE WOOD STRUCTURE, TYP. DETAIL SHEET 25
- BANK BURIED WOOD STRUCTURE, TYP. DETAIL SHEET 26
- SALVAGED TREES AND SLASH
- BACKWATER ALCOVE W/ LARGE WOOD LOADING, TYP. DETAIL SHEET 25
- VALLEY RESET GRADING MATCHLINE (WDFW)

**WATER DIVERSION LEGEND**

- COFFER DAM (SEE DETAIL SHEET 4)
- CONSTRUCTION WATER/WASH WATER. PUMP TO INFILTRATION AREA
- PIPED/PUMPED CLEAN WATER DIVERSION ROUTE

NOTES:  
 FLOODPLAIN GRADING: SALVAGE OR OVER-EXCAVATE FOR CHANNEL FILL MATERIAL. WHERE OVER-EXCAVATION IS REQUIRED, SALVAGE PIT(S) WILL BE FILLED WITH EXCAVATED NATIVE MATERIAL.  
 CHANNEL PLUG: MIXED MATERIAL COMPOSITION FROM FLOODPLAIN GRADING.

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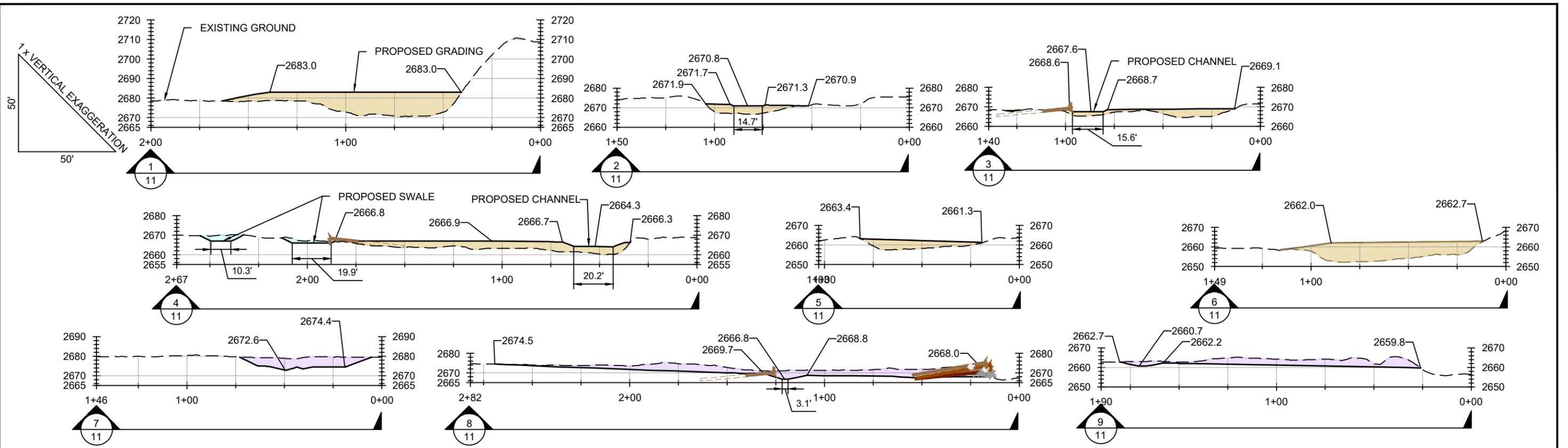
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**SITE 1 PLAN VIEW**

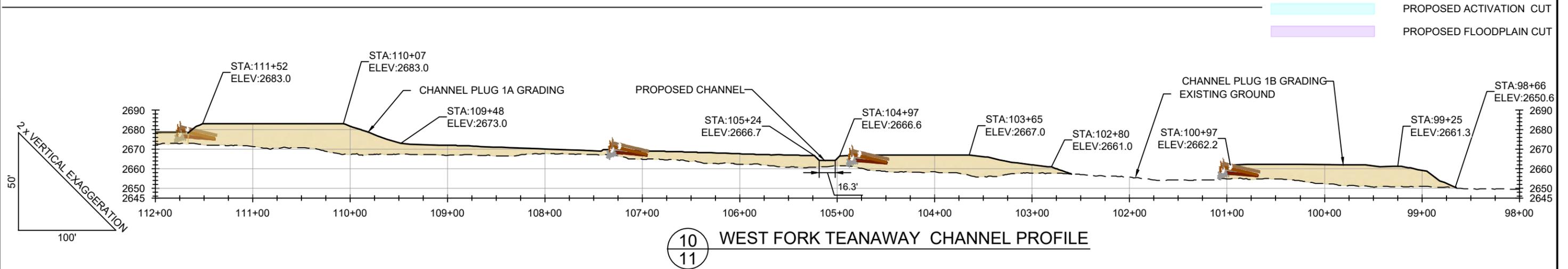
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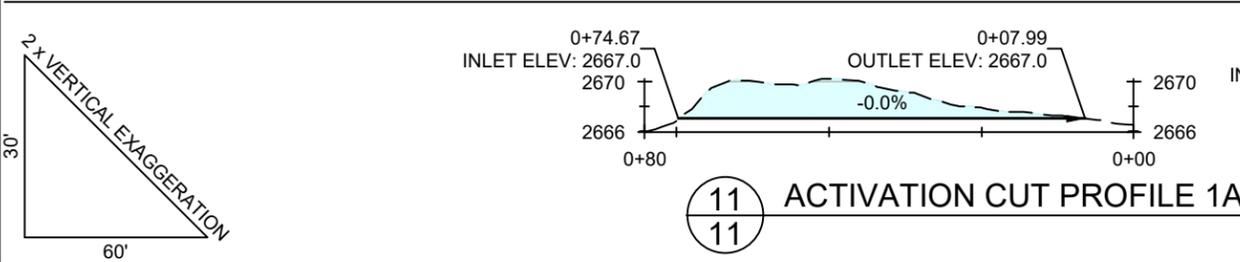


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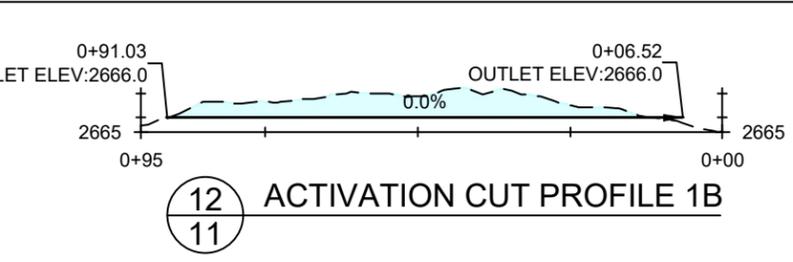
- PROPOSED FILL
- PROPOSED ACTIVATION CUT
- PROPOSED FLOODPLAIN CUT



WEST FORK TEANAWAY CHANNEL PROFILE



ACTIVATION CUT PROFILE 1A



ACTIVATION CUT PROFILE 1B

SITE 1 PROFILES

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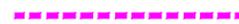
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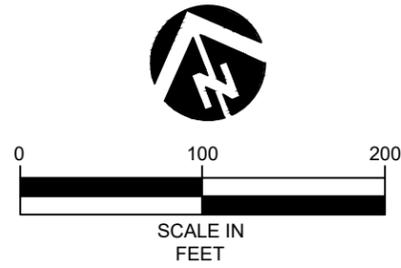
**SITE 1 CROSS SECTIONS &  
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**11 OF 35**

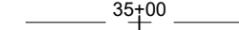
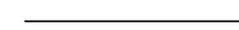
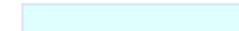


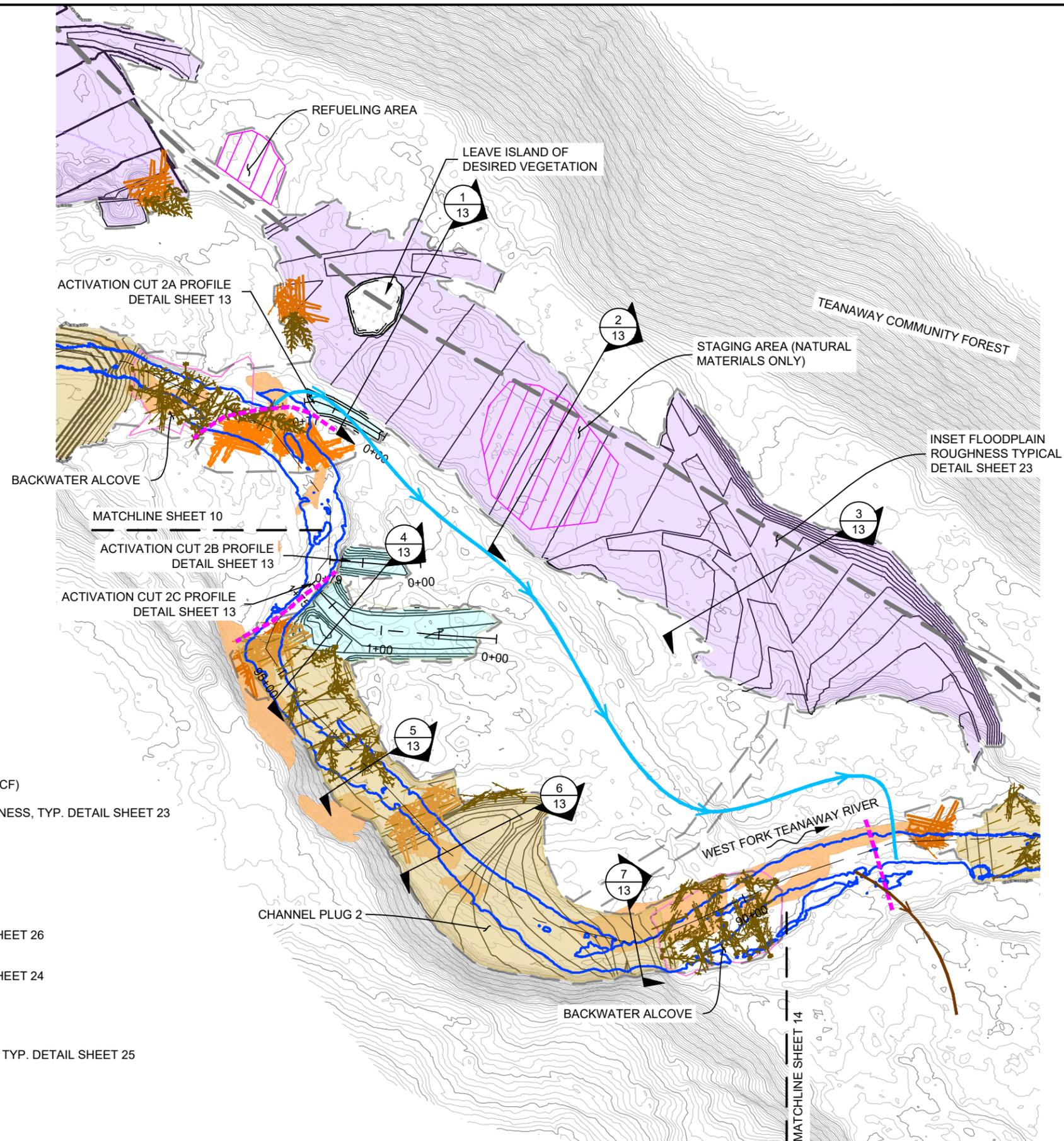
### WATER DIVERSION LEGEND

-  COFFER DAM (SEE DETAIL SHEET 4)
-  CONSTRUCTION WATER/WASH WATER. PUMP TO INFILTRATION AREA
-  PIPED/PUMPED CLEAN WATER DIVERSION ROUTE



### LEGEND

-  EXISTING SUMMER AVERAGE MODELED FLOW
-  EXISTING ALIGNMENT
-  EXISTING 1 FT CONTOUR
-  EXISTING 5 FT CONTOUR
-  PROPOSED GRADING CONTOUR (1 FT)
-  TEMPORARY ACCESS ROAD
-  LIMITS OF DISTURBANCE
-  EXISTING IN-CHANNEL BEDROCK (PREVIOUS BY TCF)
-  PROPOSED INSET FLOODPLAIN GRADING/ROUGHNESS, TYP. DETAIL SHEET 23
-  PROPOSED CHANNEL ACTIVATION CUT
-  PARTIAL CHANNEL FILL, TYP. DETAIL SHEET 27
-  PROPOSED FILL
-  BANK BURIED WOOD STRUCTURE, TYP. DETAIL SHEET 26
-  CHANNEL SPANNING STRUCTURE, TYP. DETAIL SHEET 24
-  SALVAGED TREES AND SLASH
-  BACKWATER ALCOVE W/ LARGE WOOD LOADING, TYP. DETAIL SHEET 25



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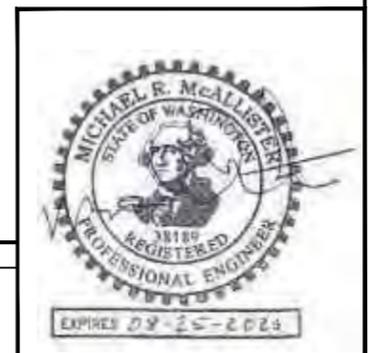
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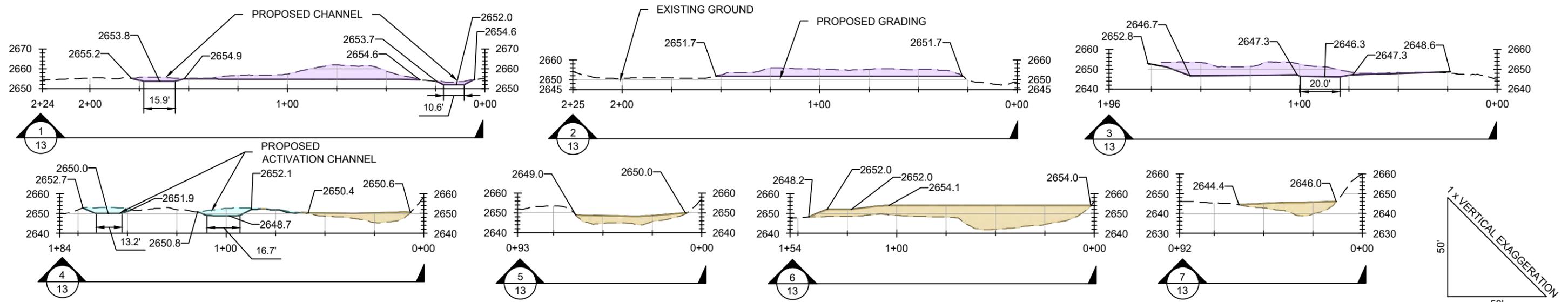


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SITE 2 PLAN VIEW

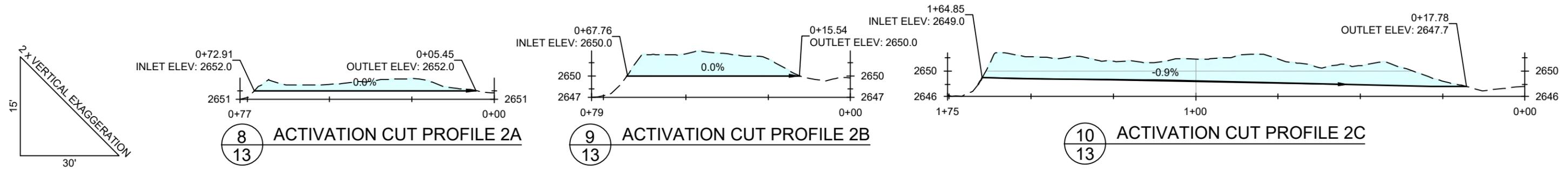
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**SITE 2 CROSS SECTIONS**

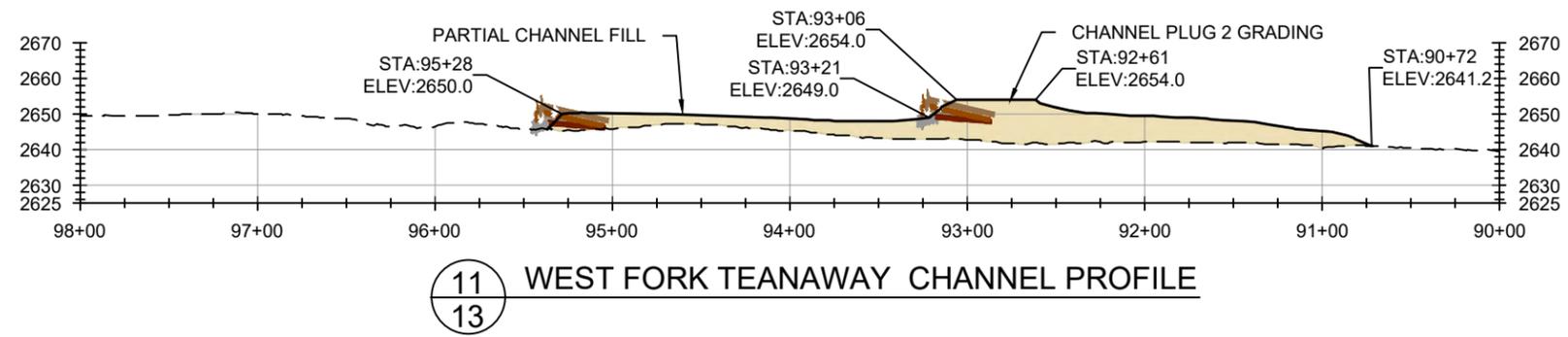
- PROPOSED FILL
- PROPOSED ACTIVATION CUT
- PROPOSED FLOODPLAIN CUT



**8 ACTIVATION CUT PROFILE 2A**

**9 ACTIVATION CUT PROFILE 2B**

**10 ACTIVATION CUT PROFILE 2C**



**11 WEST FORK TEAWAY CHANNEL PROFILE**

**SITE 2 PROFILES**

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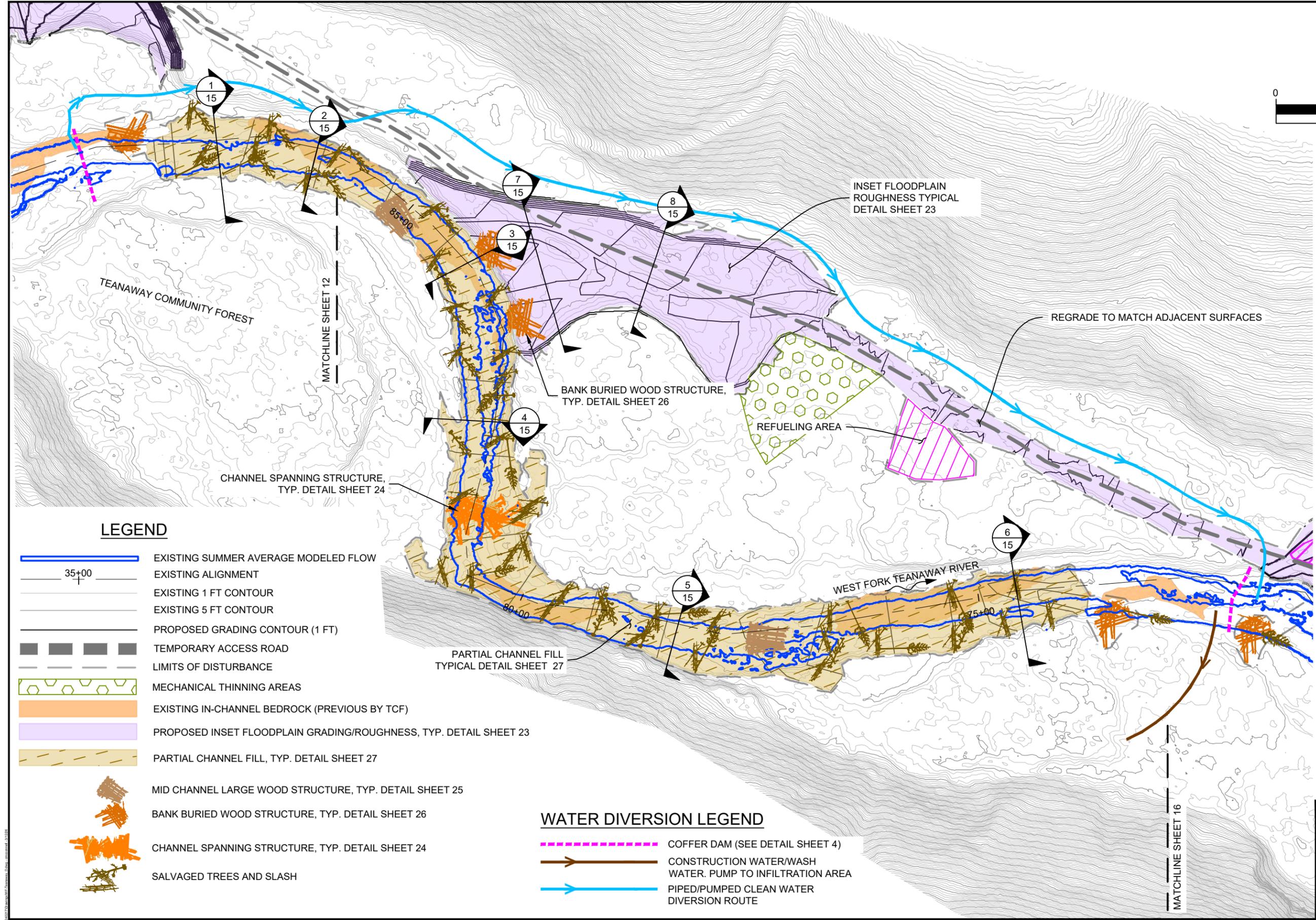
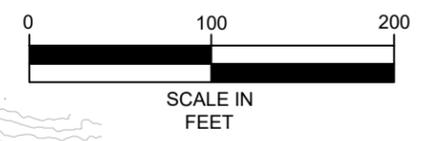


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**SITE 2 CROSS SECTIONS &  
PROFILES**

SHEET  
**13 OF 35**





**LEGEND**

- EXISTING SUMMER AVERAGE MODELED FLOW
- 35+00 EXISTING ALIGNMENT
- EXISTING 1 FT CONTOUR
- EXISTING 5 FT CONTOUR
- PROPOSED GRADING CONTOUR (1 FT)
- TEMPORARY ACCESS ROAD
- LIMITS OF DISTURBANCE
- MECHANICAL THINNING AREAS
- EXISTING IN-CHANNEL BEDROCK (PREVIOUS BY TCF)
- PROPOSED INSET FLOODPLAIN GRADING/ROUGHNESS, TYP. DETAIL SHEET 23
- PARTIAL CHANNEL FILL, TYP. DETAIL SHEET 27
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- BANK BURIED WOOD STRUCTURE, TYP. DETAIL SHEET 26
- CHANNEL SPANNING STRUCTURE, TYP. DETAIL SHEET 24
- SALVAGED TREES AND SLASH

**WATER DIVERSION LEGEND**

- COFFER DAM (SEE DETAIL SHEET 4)
- CONSTRUCTION WATER/WASH WATER. PUMP TO INFILTRATION AREA
- PIPED/PUMPED CLEAN WATER DIVERSION ROUTE

NO.	BY	DATE	REVISION DESCRIPTION

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**WF TEANAWAY RIVER  
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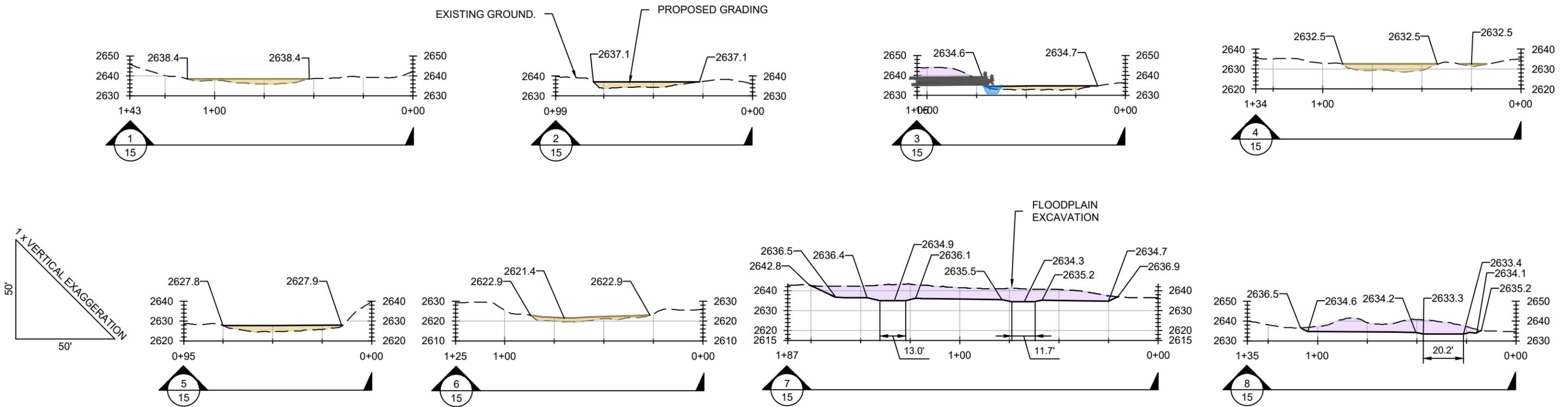


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**SITE 3 PLAN VIEW**

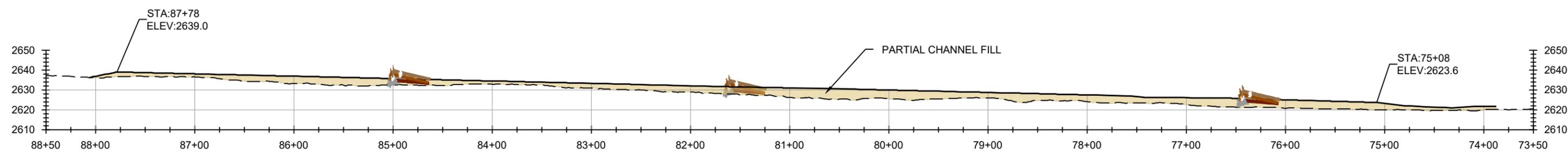
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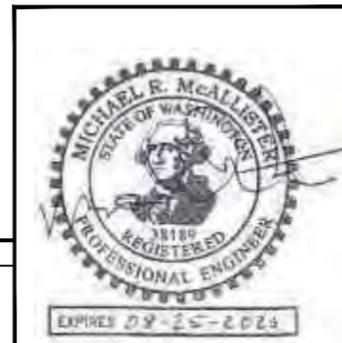
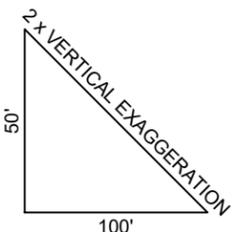


SITE 3 CROSS SECTIONS

PROPOSED FILL  
 PROPOSED FLOODPLAIN CUT



9 15 WEST FORK TEANAWAY CHANNEL PROFILE



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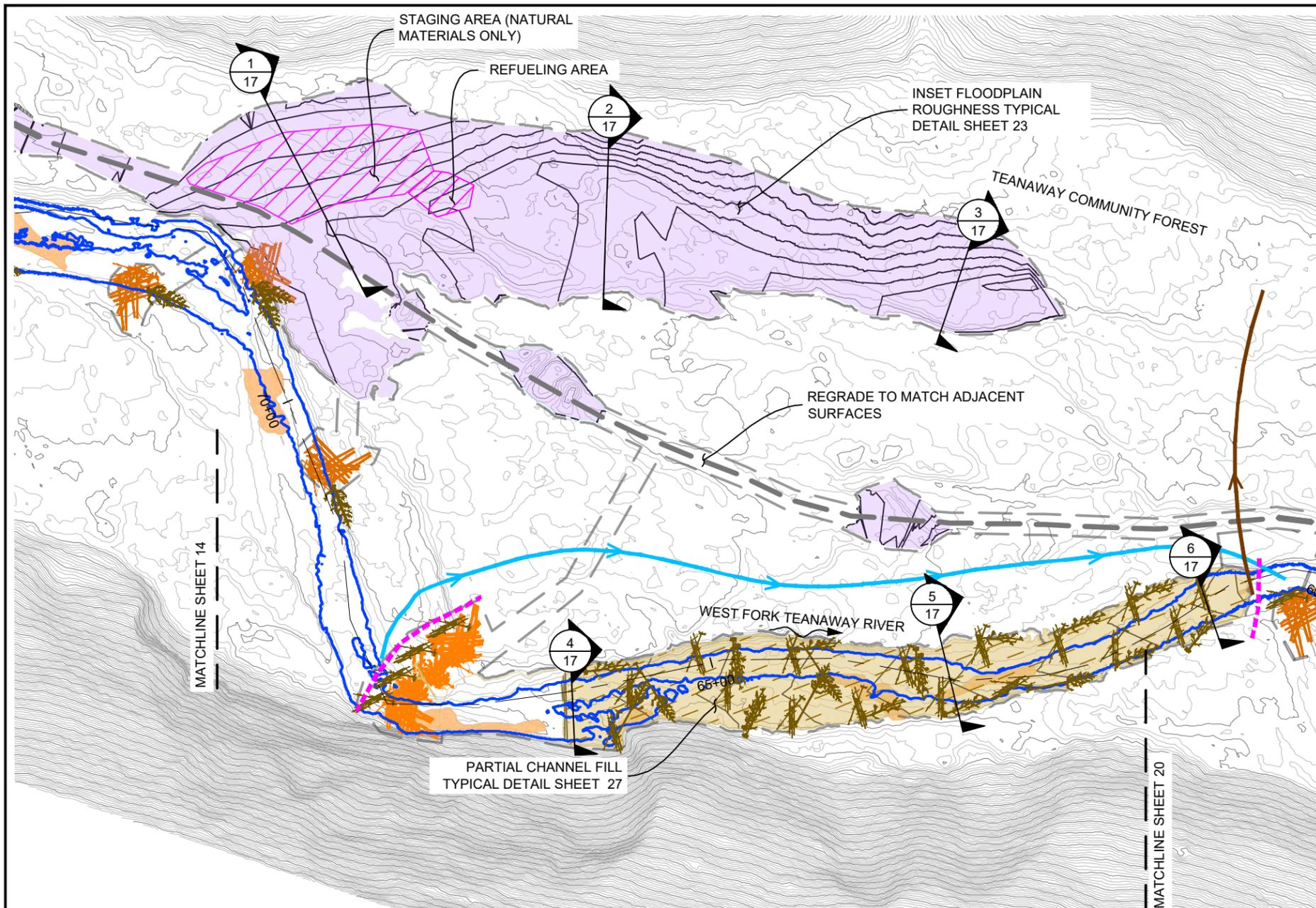
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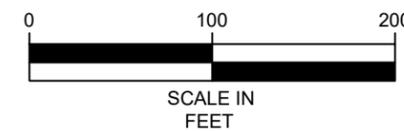


**LEGEND**

- EXISTING SUMMER AVERAGE MODELED FLOW
- EXISTING ALIGNMENT
- EXISTING 1 FT CONTOUR
- EXISTING 5 FT CONTOUR
- PROPOSED GRADING CONTOUR (1 FT)
- TEMPORARY ACCESS ROAD
- LIMITS OF DISTURBANCE
- EXISTING IN-CHANNEL BEDROCK (PREVIOUS BY TCF)
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- CHANNEL SPANNING STRUCTURE, TYP. DETAIL SHEET 24
- SALVAGED TREES AND SLASH

**WATER DIVERSION LEGEND**

- COFFER DAM (SEE DETAIL SHEET 4)
- CONSTRUCTION WATER/WASH WATER. PUMP TO INFILTRATION AREA
- PIPED/PUMPED CLEAN WATER DIVERSION ROUTE



NO.	BY	DATE	REVISION DESCRIPTION

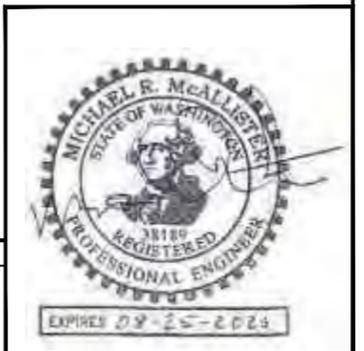
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DRAWN	DESIGNED	CHECKED
MM, PL	3/11/26	24-02-17
APPROVED	DATE	PROJECT

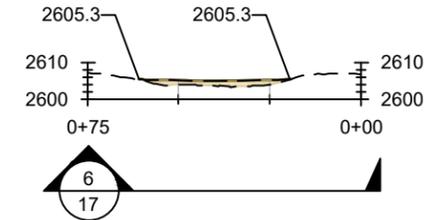
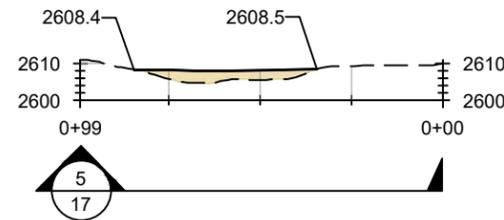
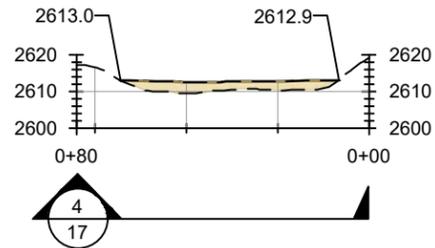
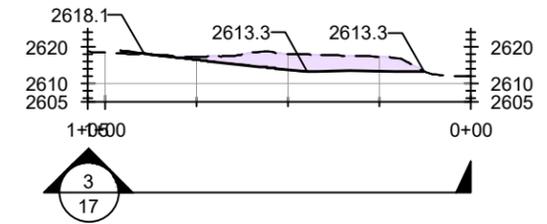
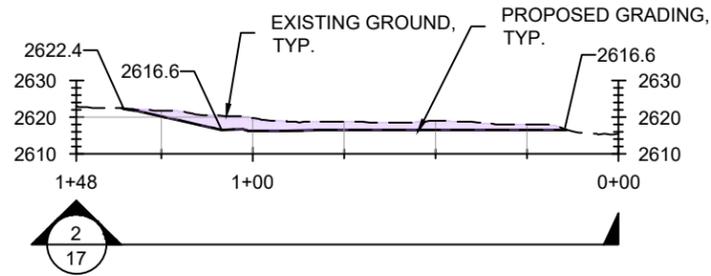
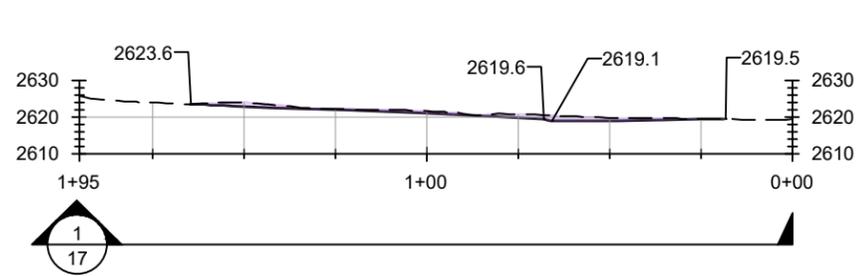
**WF TEANAWAY RIVER  
RM 5.1-6.75 RESTORATION  
FINAL DESIGN**

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541.386.9003  
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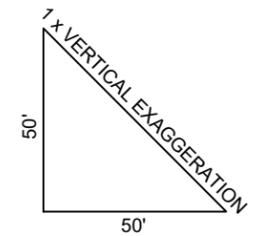
**SITE 4 PLAN VIEW**

SHEET  
**16 OF 35**

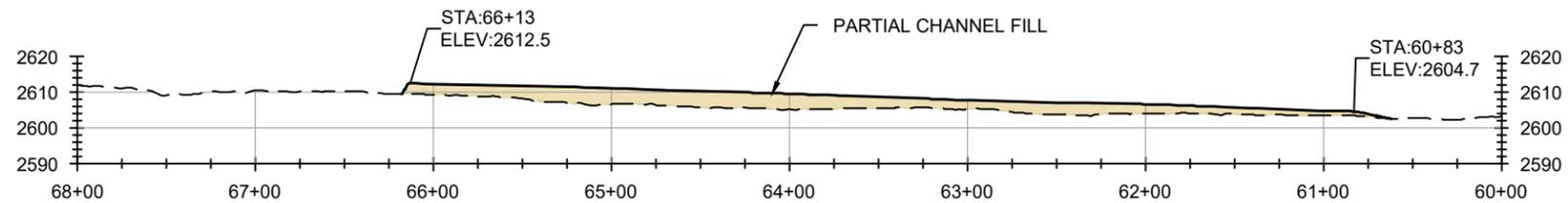
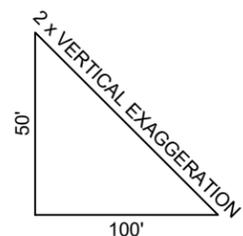




**SITE 4 CROSS SECTIONS**



- PROPOSED FILL
- PROPOSED FLOODPLAIN CUT



**WEST FORK TEANAWAY CHANNEL PROFILE**



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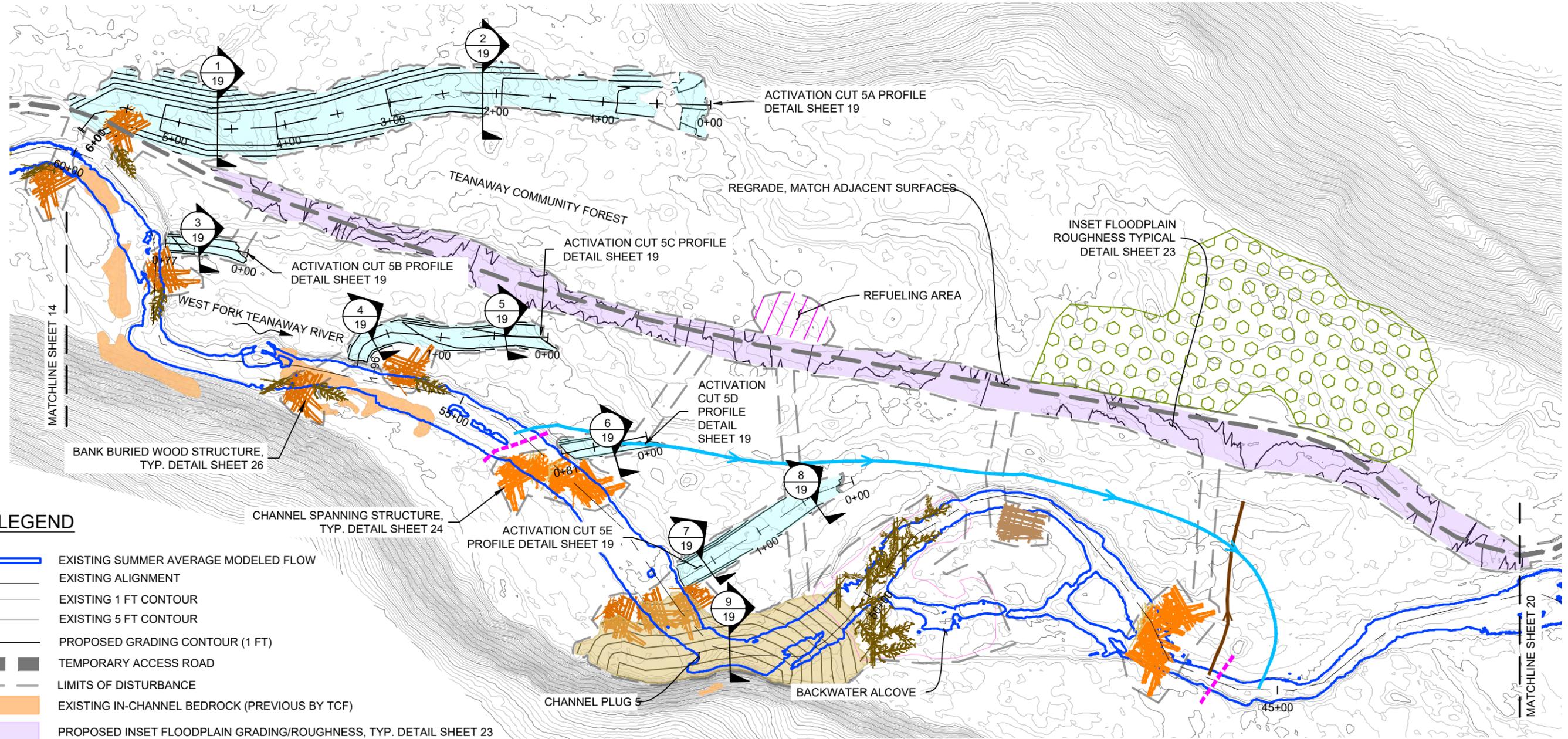
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**SITE 4 CROSS SECTIONS**

SHEET  
**17 OF 35**



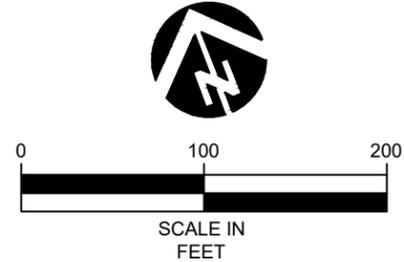
**LEGEND**

- EXISTING SUMMER AVERAGE MODELED FLOW
- EXISTING ALIGNMENT
- EXISTING 1 FT CONTOUR
- EXISTING 5 FT CONTOUR
- PROPOSED GRADING CONTOUR (1 FT)
- TEMPORARY ACCESS ROAD
- LIMITS OF DISTURBANCE
- EXISTING IN-CHANNEL BEDROCK (PREVIOUS BY TCF)
- PROPOSED INSET FLOODPLAIN GRADING/ROUGHNESS, TYP. DETAIL SHEET 23
- PROPOSED CHANNEL ACTIVATION CUT
- PROPOSED FILL
- MECHANICAL THINNING AREAS
- MID CHANNEL LARGE WOOD STRUCTURE, TYP. DETAIL SHEET 25
- BANK BURIED WOOD STRUCTURE, TYP. DETAIL SHEET 26
- CHANNEL SPANNING STRUCTURE, TYP. DETAIL SHEET 24
- SALVAGED TREES AND SLASH
- BACKWATER ALCOVE W/ LARGE WOOD LOADING, TYP. DETAIL SHEET 25

**WATER DIVERSION LEGEND**

- COFFER DAM (SEE DETAIL SHEET 4)
- CONSTRUCTION WATER/WASH WATER. PUMP TO INFILTRATION AREA
- PIPED/PUMPED CLEAN WATER DIVERSION ROUTE

NOTE:  
FLOODPLAIN GRADING: TOPSOIL MATERIAL WILL BE SALVAGED FOR REUSE ON SITE AS PLANTING MEDIA. SEE PLANTING DETAILS, SHEETS 29-35



NO.	BY	DATE	REVISION DESCRIPTION

CM	MM, PL, MB	MM, PL
DRAWN	DESIGNED	CHECKED
MM, PL	3/11/26	24-02-17
APPROVED	DATE	PROJECT

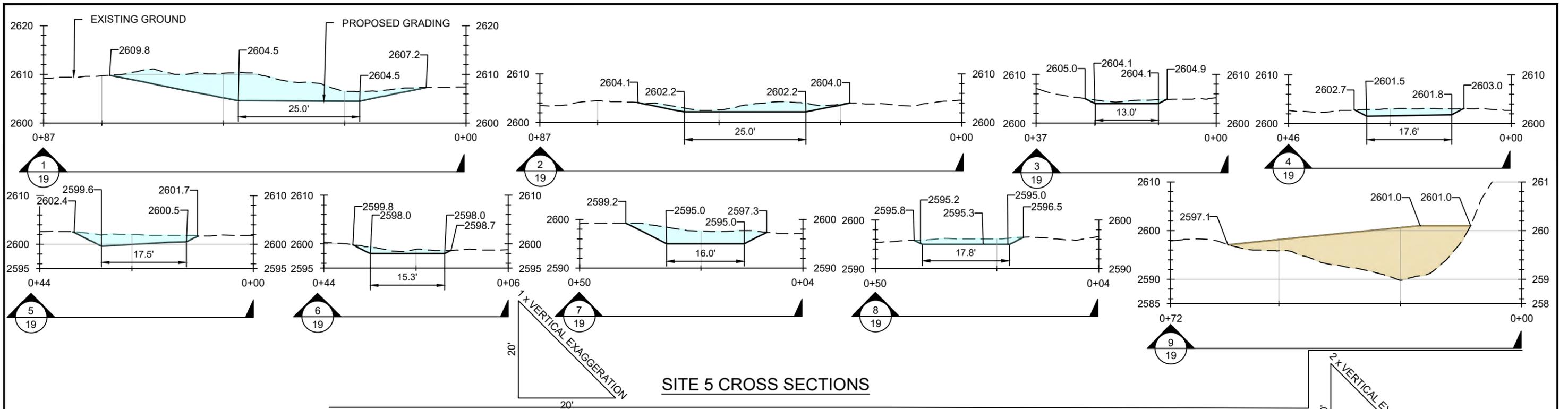
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FINAL DESIGN**

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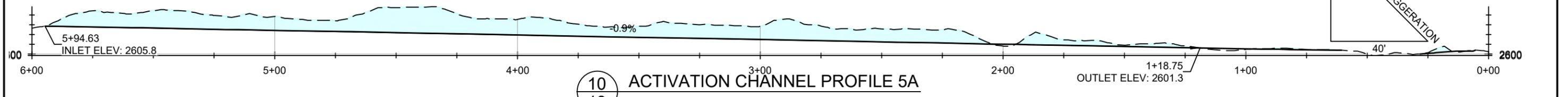
**SITE 5 PLAN VIEW**

SHEET  
**18 OF 35**

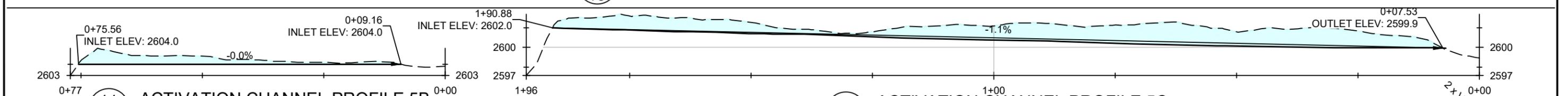




**SITE 5 CROSS SECTIONS**

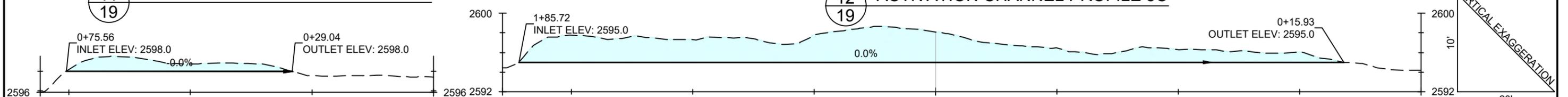


**10 ACTIVATION CHANNEL PROFILE 5A**



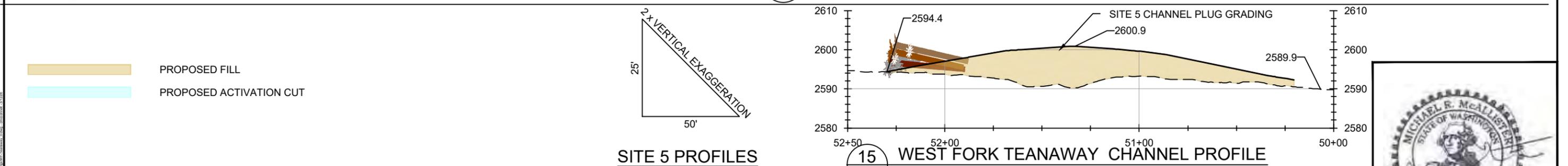
**11 ACTIVATION CHANNEL PROFILE 5B**

**12 ACTIVATION CHANNEL PROFILE 5C**



**13 ACTIVATION CHANNEL PROFILE 5D**

**14 ACTIVATION CHANNEL PROFILE 5E**



**SITE 5 PROFILES**

**15 WEST FORK TEANAWAY CHANNEL PROFILE**

NO.	BY	DATE	REVISION DESCRIPTION

CM	MM, PL, MB	MM, PL
DRAWN	DESIGNED	CHECKED
MM, PL	3/11/26	24-02-17
APPROVED	DATE	PROJECT

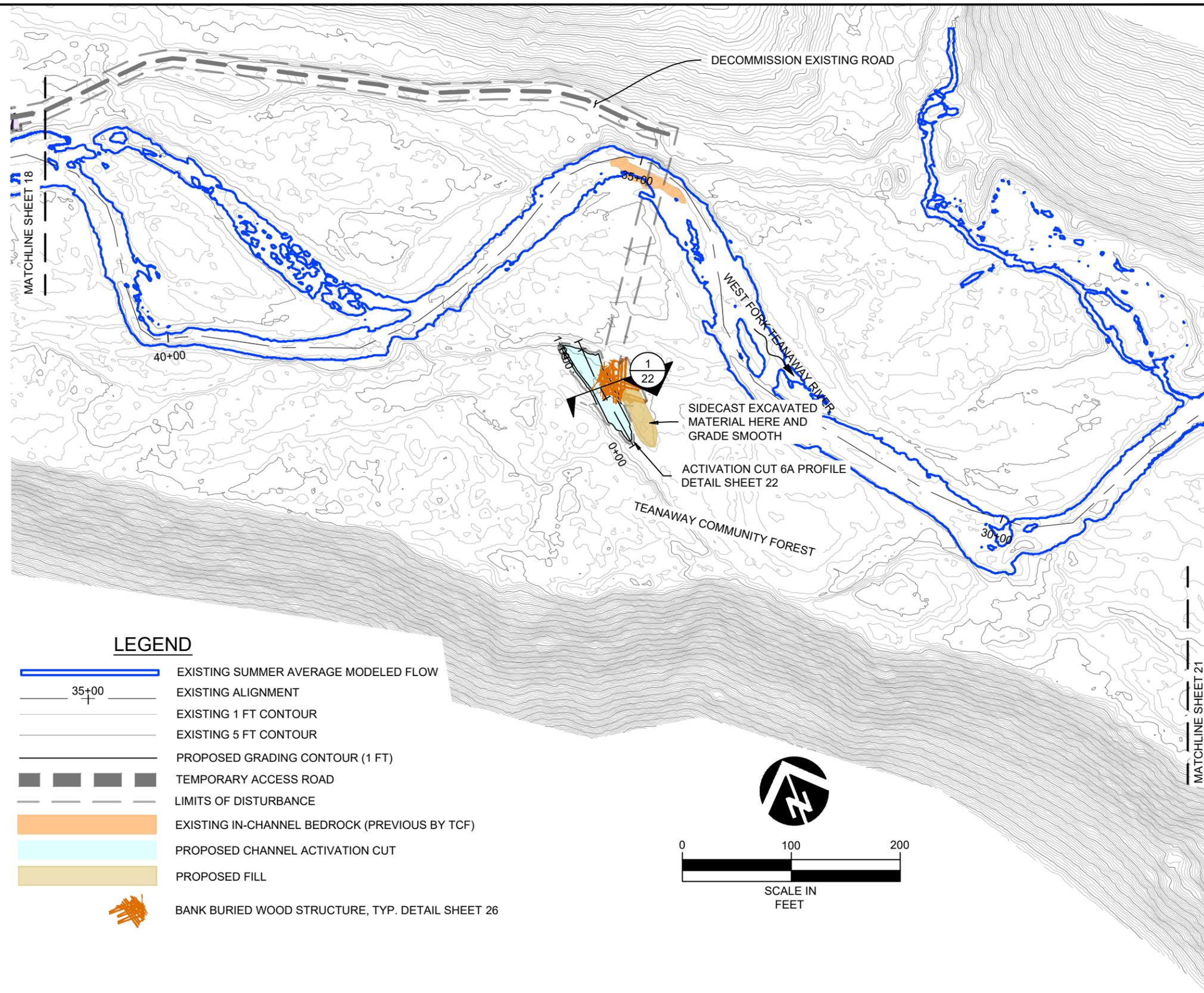
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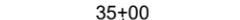
**SITE 5 CROSS SECTIONS &  
PROFILES**

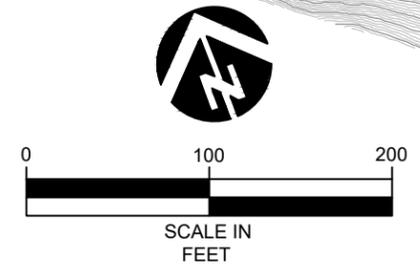
SHEET  
**19 OF 35**





**LEGEND**

-  EXISTING SUMMER AVERAGE MODELED FLOW
-  35+00  
EXISTING ALIGNMENT
-  EXISTING 1 FT CONTOUR
-  EXISTING 5 FT CONTOUR
-  PROPOSED GRADING CONTOUR (1 FT)
-  TEMPORARY ACCESS ROAD
-  LIMITS OF DISTURBANCE
-  EXISTING IN-CHANNEL BEDROCK (PREVIOUS BY TCF)
-  PROPOSED CHANNEL ACTIVATION CUT
-  PROPOSED FILL
-  BANK BURIED WOOD STRUCTURE, TYP. DETAIL SHEET 26



NO.	BY	DATE	REVISION DESCRIPTION

CM	MM, PL, MB	MM, PL
DRAWN	DESIGNED	CHECKED
MM, PL	3/11/26	24-02-17
APPROVED	DATE	PROJECT

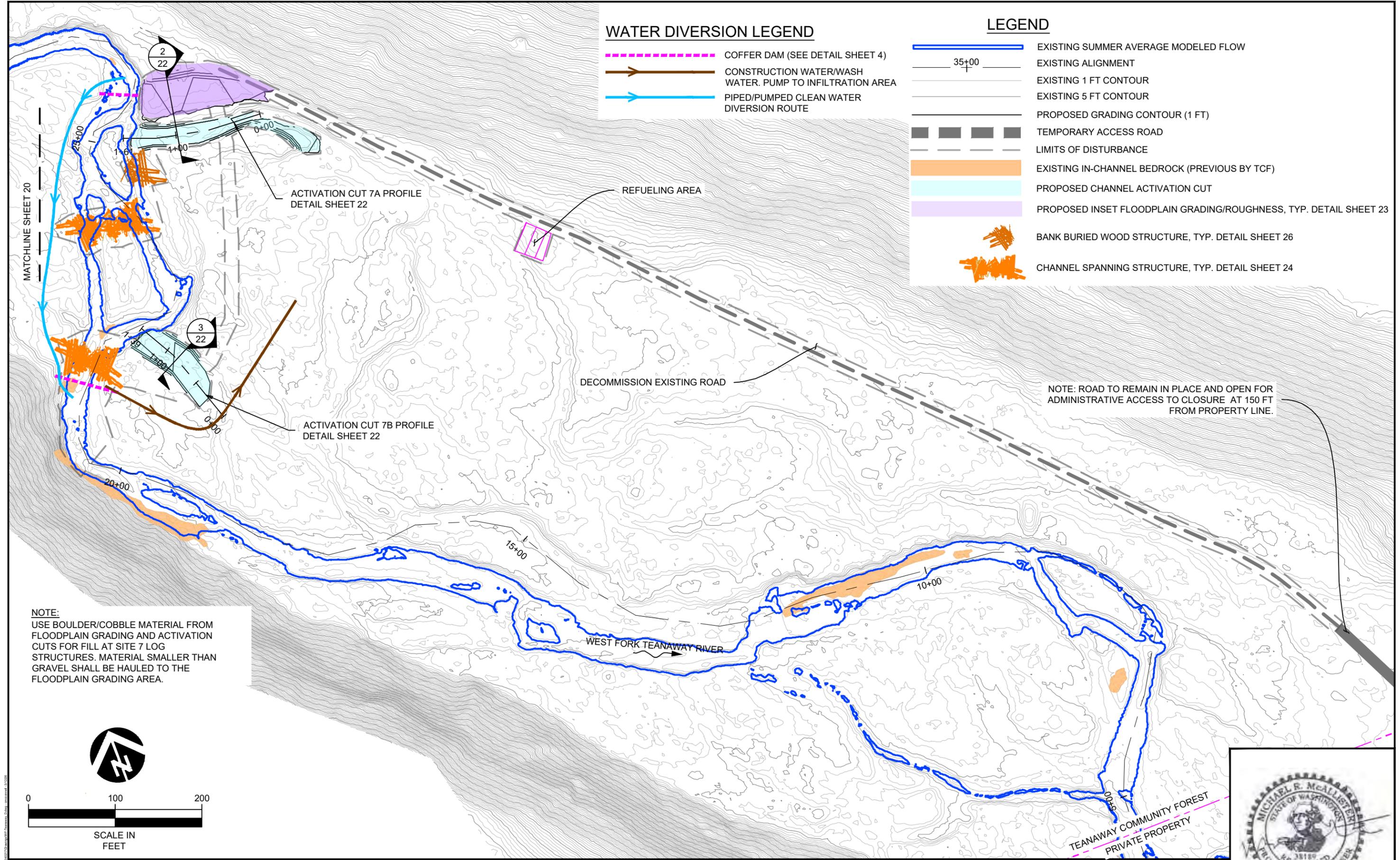
**WF TEANAWAY RIVER  
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**SITE 6 PLAN VIEW**





**WATER DIVERSION LEGEND**

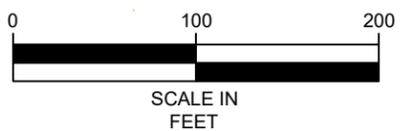
- COFFER DAM (SEE DETAIL SHEET 4)
- CONSTRUCTION WATER/WASH WATER. PUMP TO INFILTRATION AREA
- PIPED/PUMPED CLEAN WATER DIVERSION ROUTE

**LEGEND**

- EXISTING SUMMER AVERAGE MODELED FLOW
- EXISTING ALIGNMENT
- EXISTING 1 FT CONTOUR
- EXISTING 5 FT CONTOUR
- PROPOSED GRADING CONTOUR (1 FT)
- TEMPORARY ACCESS ROAD
- LIMITS OF DISTURBANCE
- EXISTING IN-CHANNEL BEDROCK (PREVIOUS BY TCF)
- PROPOSED CHANNEL ACTIVATION CUT
- PROPOSED INSET FLOODPLAIN GRADING/ROUGHNESS, TYP. DETAIL SHEET 23
- BANK BURIED WOOD STRUCTURE, TYP. DETAIL SHEET 26
- CHANNEL SPANNING STRUCTURE, TYP. DETAIL SHEET 24

NOTE: ROAD TO REMAIN IN PLACE AND OPEN FOR ADMINISTRATIVE ACCESS TO CLOSURE AT 150 FT FROM PROPERTY LINE.

NOTE:  
USE BOULDER/COBBLE MATERIAL FROM FLOODPLAIN GRADING AND ACTIVATION CUTS FOR FILL AT SITE 7 LOG STRUCTURES. MATERIAL SMALLER THAN GRAVEL SHALL BE HAULED TO THE FLOODPLAIN GRADING AREA.



NO.	BY	DATE	REVISION DESCRIPTION

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DRAWN	DESIGNED	CHECKED
MM, PL	3/11/26	24-02-17
APPROVED	DATE	PROJECT

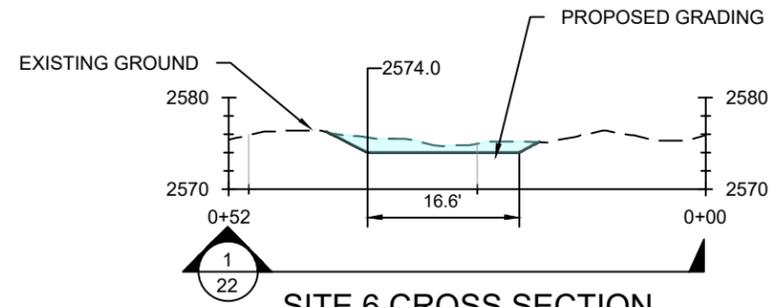
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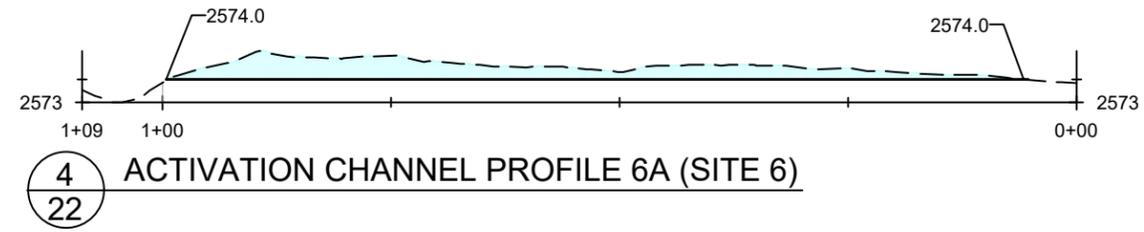
**SITE 7 PLAN VIEW**

SHEET  
**21 OF 35**

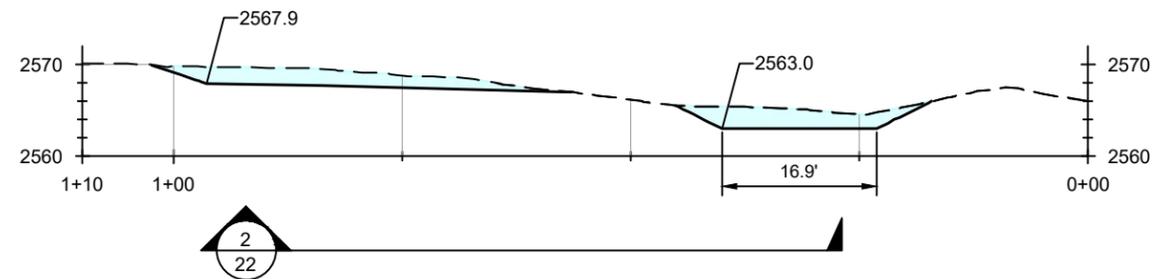




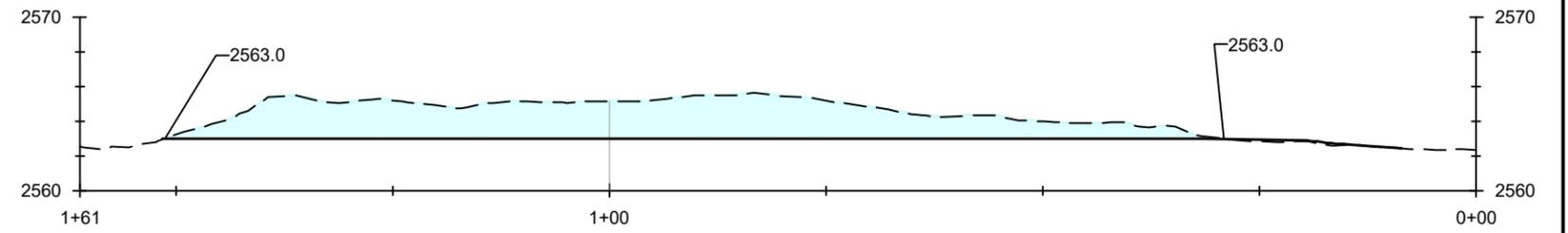
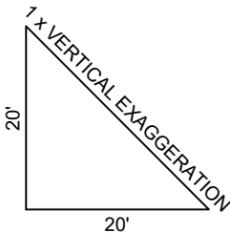
**SITE 6 CROSS SECTION**



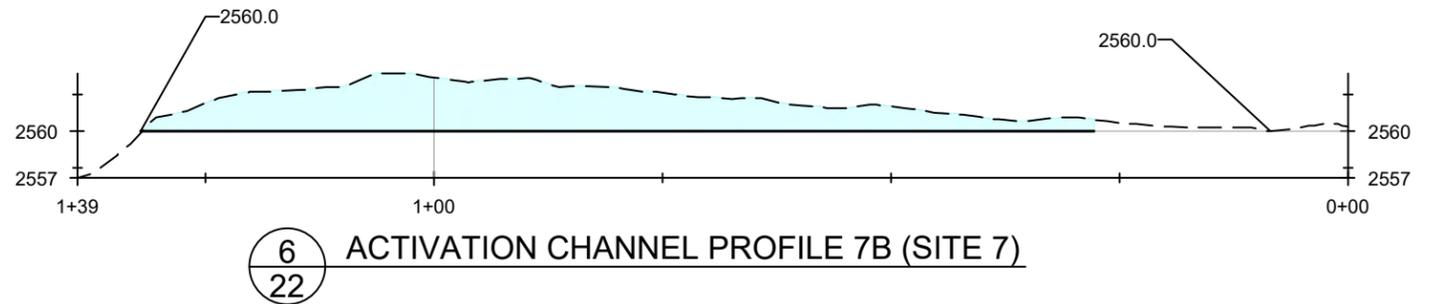
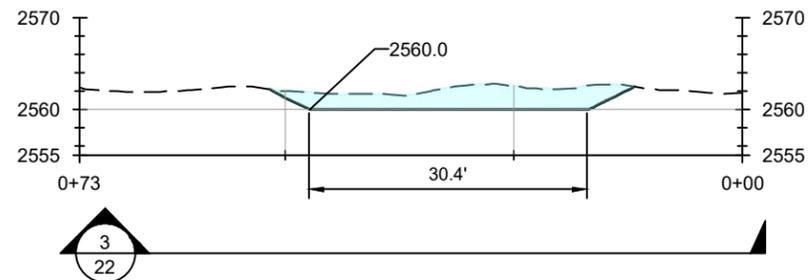
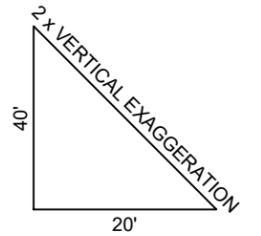
**ACTIVATION CHANNEL PROFILE 6A (SITE 6)**



**SITE 7 CROSS SECTIONS**



**ACTIVATION CHANNEL PROFILE 7A (SITE 7)**



**ACTIVATION CHANNEL PROFILE 7B (SITE 7)**

NO.	BY	DATE	REVISION DESCRIPTION

CM	MM, PL, MB	MM, PL
DRAWN	DESIGNED	CHECKED
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**WF TEANAWAY RIVER  
RM 5.1-6.75 RESTORATION  
FINAL DESIGN**

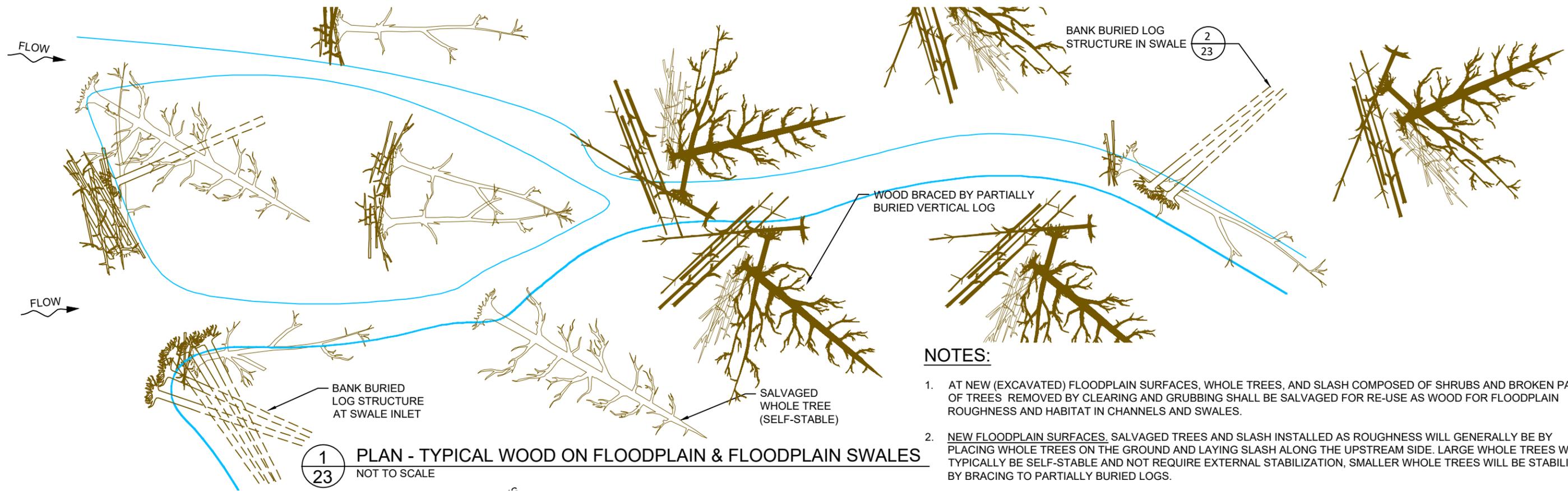


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**SITES 6 & 7 CROSS SECTIONS &  
PROFILES**

SHEET  
**22 OF 35**





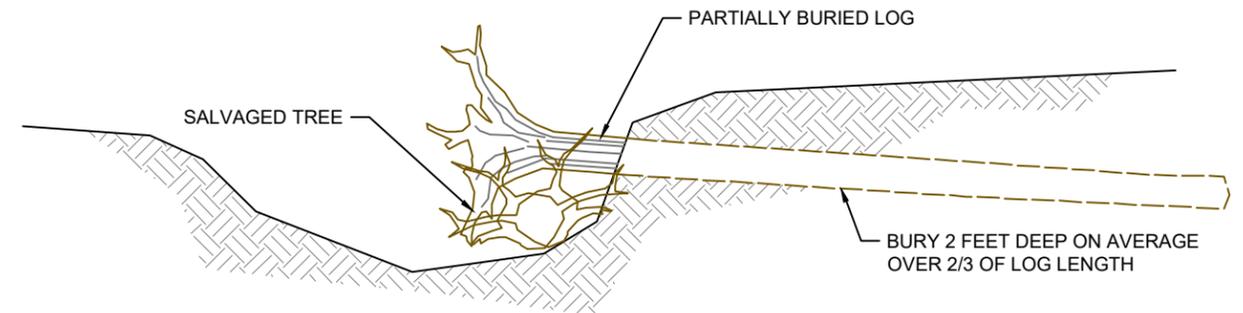
**1**  
**23** PLAN - TYPICAL WOOD ON FLOODPLAIN & FLOODPLAIN SWALES  
NOT TO SCALE

**NOTES:**

1. AT NEW (EXCAVATED) FLOODPLAIN SURFACES, WHOLE TREES, AND SLASH COMPOSED OF SHRUBS AND BROKEN PARTS OF TREES REMOVED BY CLEARING AND GRUBBING SHALL BE SALVAGED FOR RE-USE AS WOOD FOR FLOODPLAIN ROUGHNESS AND HABITAT IN CHANNELS AND SWALES.
2. NEW FLOODPLAIN SURFACES, SALVAGED TREES AND SLASH INSTALLED AS ROUGHNESS WILL GENERALLY BE BY PLACING WHOLE TREES ON THE GROUND AND LAYING SLASH ALONG THE UPSTREAM SIDE. LARGE WHOLE TREES WILL TYPICALLY BE SELF-STABLE AND NOT REQUIRE EXTERNAL STABILIZATION, SMALLER WHOLE TREES WILL BE STABILIZED BY BRACING TO PARTIALLY BURIED LOGS.
3. EXISTING FLOODPLAIN SURFACES, SALVAGED WOOD MAY BE INSTALLED AS ADDITIONAL FLOODPLAIN ROUGHNESS. BRACING TO EXISTING TREES OR VERTICAL LOGS WILL OCCUR AT LOCATIONS IDENTIFIED IN THE FIELD TO PROVIDE HORIZONTAL STABILITY.
4. ACTUAL ORIENTATION OF WOOD WILL BE FIELD-FIT AND MAY VARY FROM TYPICAL DRAWINGS DEPENDING ON SIZE AND SHAPE OF SALVAGED TREES.
5. ANY EXCESS SALVAGED WHOLE TREES LOGS OR SLASH WILL BE PLACED AS ADDITIONAL FLOODPLAIN ROUGHNESS INCLUDING BETWEEN FLOODPLAIN ROUGHNESS CLUSTERS AND ON DISTURBED SURFACES. DISTRIBUTION OF EXCESS MATERIAL WILL BE DONE IN COORDINATION WITH PLANT INSTALLATION.

**NOTES:**

SPECIFIC ORIENTATION OF WOOD MAY VARY FROM TYPICAL DRAWINGS DEPENDING ON SIZE AND SHAPE OF SALVAGED TREES. WORK SHALL BE FIELD-FIT AS DIRECTED BY THE ENGINEER.



**2**  
**23** SECTION - SWALE BANK BURIED LARGE WOOD  
NOT TO SCALE



EXCESS SALVAGED TREES, LOGS AND SLASH DISTRIBUTED ON SURFACES WITH PLANTINGS.



NO.	BY	DATE	REVISION DESCRIPTION

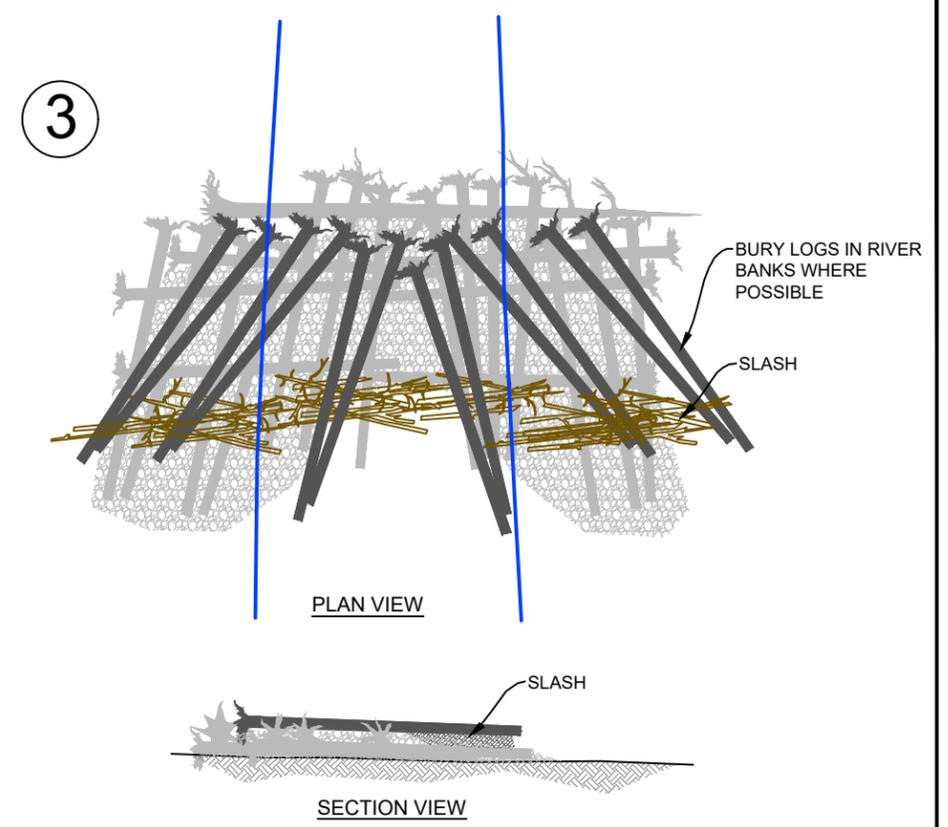
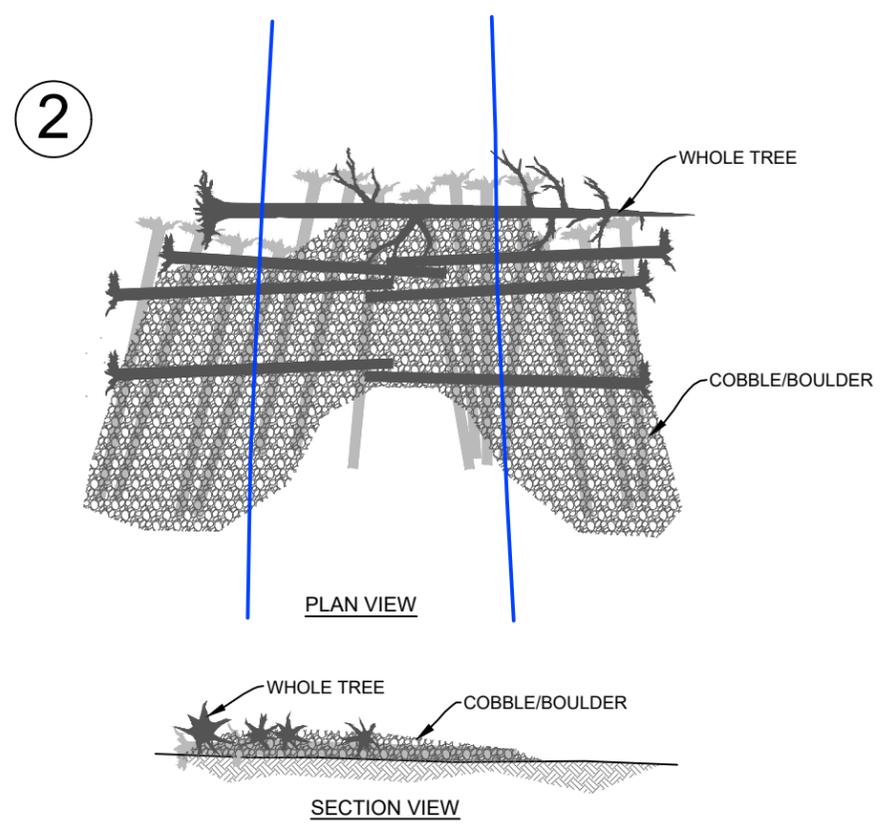
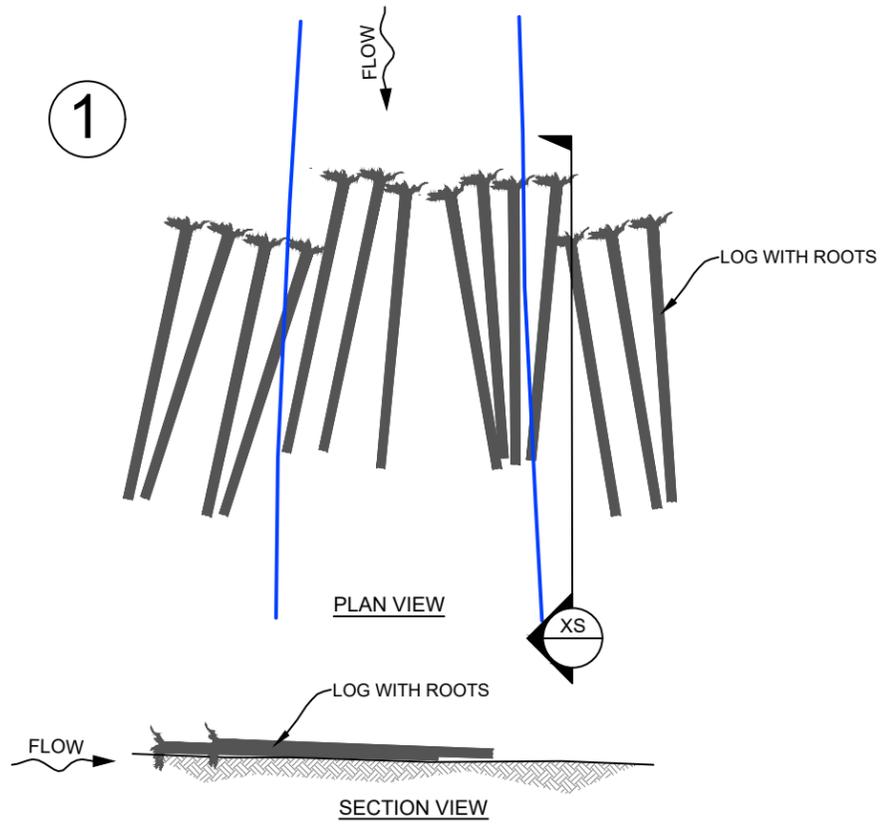
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DRAWN	DESIGNED	CHECKED
MM, PL	3/11/26	24-02-17
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**FLOODPLAIN ROUGHNESS  
DETAILS**

SHEET  
**23 OF 35**



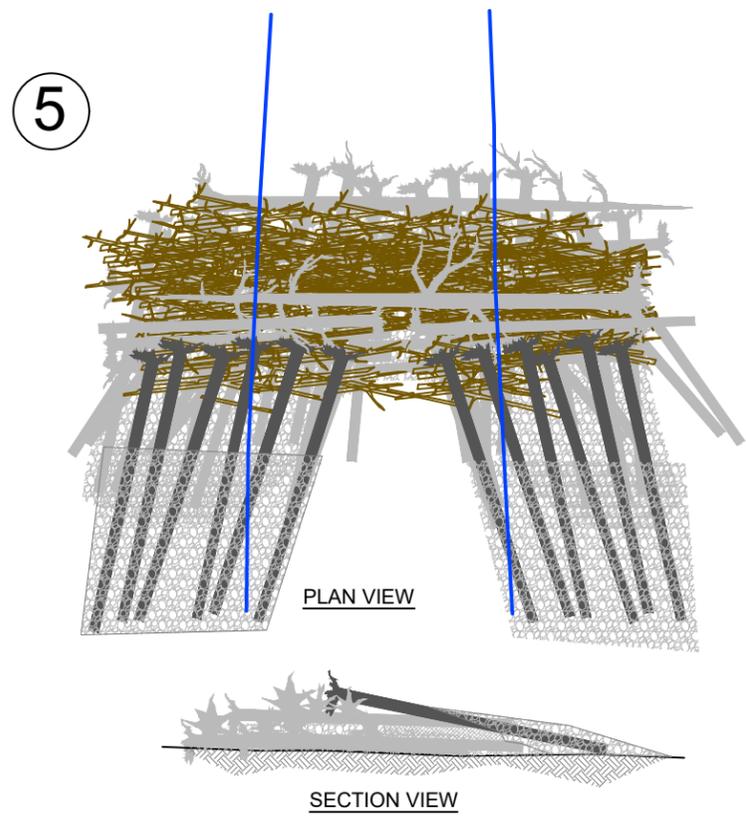
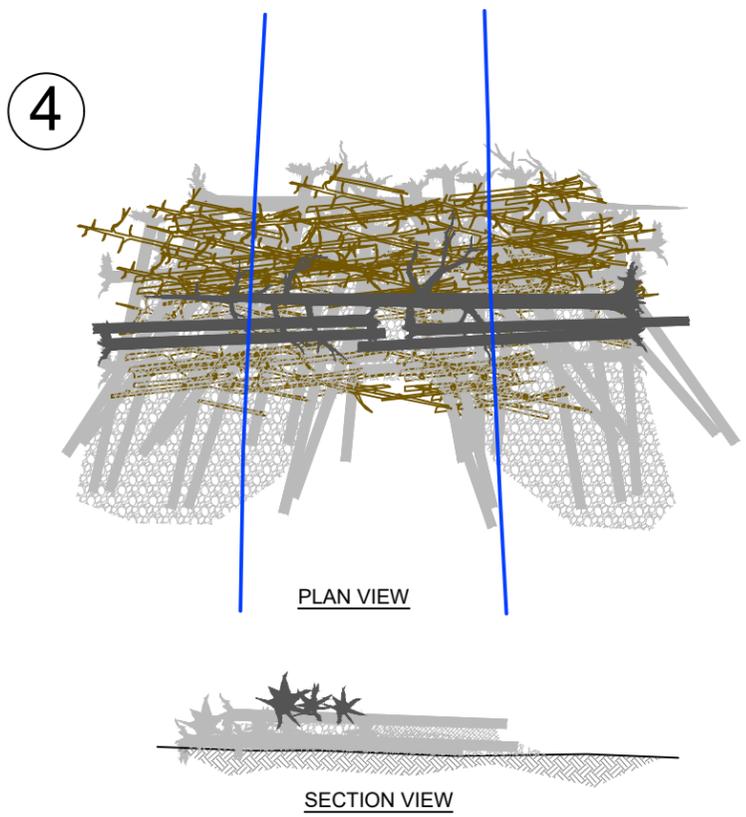
**CHANNEL SPANNING LOG STRUCTURE**

SHOWN AS 80 FEET WIDE, CONSTRUCTED FROM 48 SALVAGED LOGS WITH ROOTS, 2 SALVAGED WHOLE TREES, SALVAGED SLASH, AND 350 CY APPROXIMATELY COBBLE (50%) / BOULDER (50%) MIX. ACTUAL WIDTH MAY VARY.

LOGS WITH ROOTS ASSUMED TO BE 40 FEET LONG, >18" DBH., COBBLE/BOULDER MIX SALVAGED FROM FLOODPLAIN EXCAVATIONS. SLASH MATERIAL FROM SALVAGED TREES AND SHRUBS REMOVED DURING CLEARING AND GRUBBING.

**GENERAL CONSTRUCTION SEQUENCE**

1. INSTALL FIRST LAYER OF LOGS WITH ROOTS UPSTREAM.
2. PLACE SECOND LAYER OF LOGS GENERALLY PERPENDICULAR TO FIRST LAYER. BURY LOGS INTO RIVERBANKS WHERE POSSIBLE. PLACE LARGE SALVAGED WHOLE TREE. BURY BOTH LOG LAYERS WITH ~3 FEET OF COBBLE/BOULDER MIX.
3. PLACE LAYER 3 AT ANGLES RELATIVE TO LAYER 2. BURY LOGS INTO RIVERBANKS WHERE POSSIBLE, INSTALL SLASH.
4. PLACE LAYER 4 LOGS AND WHOLE TREE PERPENDICULAR TO FLOW. BURY LOGS INTO RIVERBANKS WHERE POSSIBLE. INSTALL SLASH.
5. INSTALL LAYER 5 WITH ROOTS ON TOP AND LOG ENDS BATTERED DOWNWARD. BURY TOP LAYER WITH 3' OF COBBLE AND BOULDER MIX.



NO.	BY	DATE	REVISION DESCRIPTION

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MM, PL APPROVED	3/11/26 DATE	24-02-17 PROJECT

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FINAL DESIGN

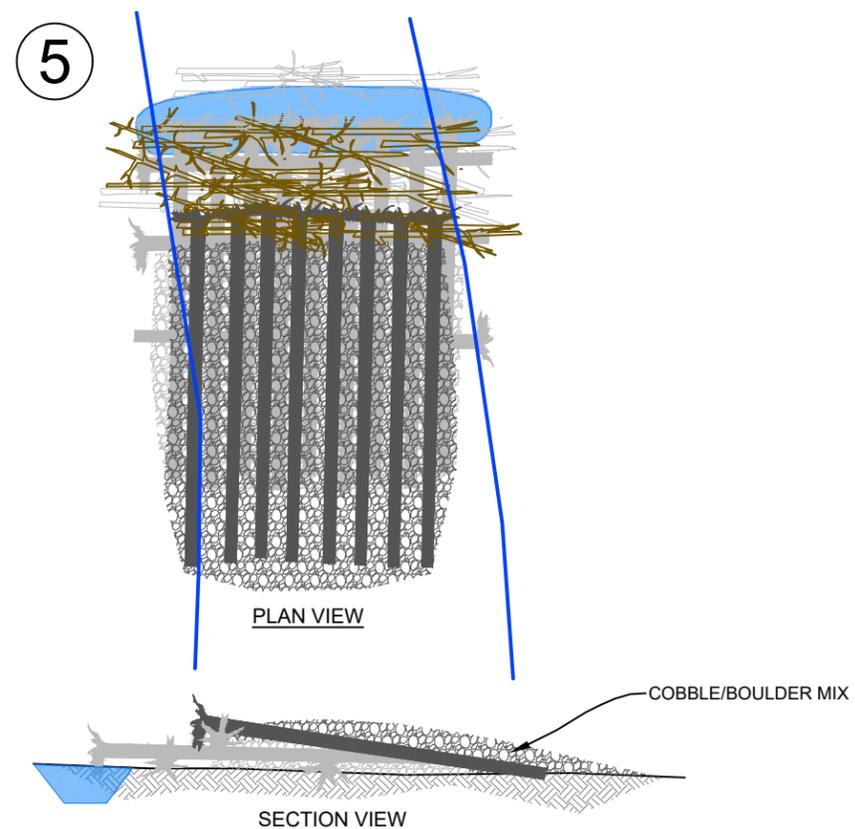
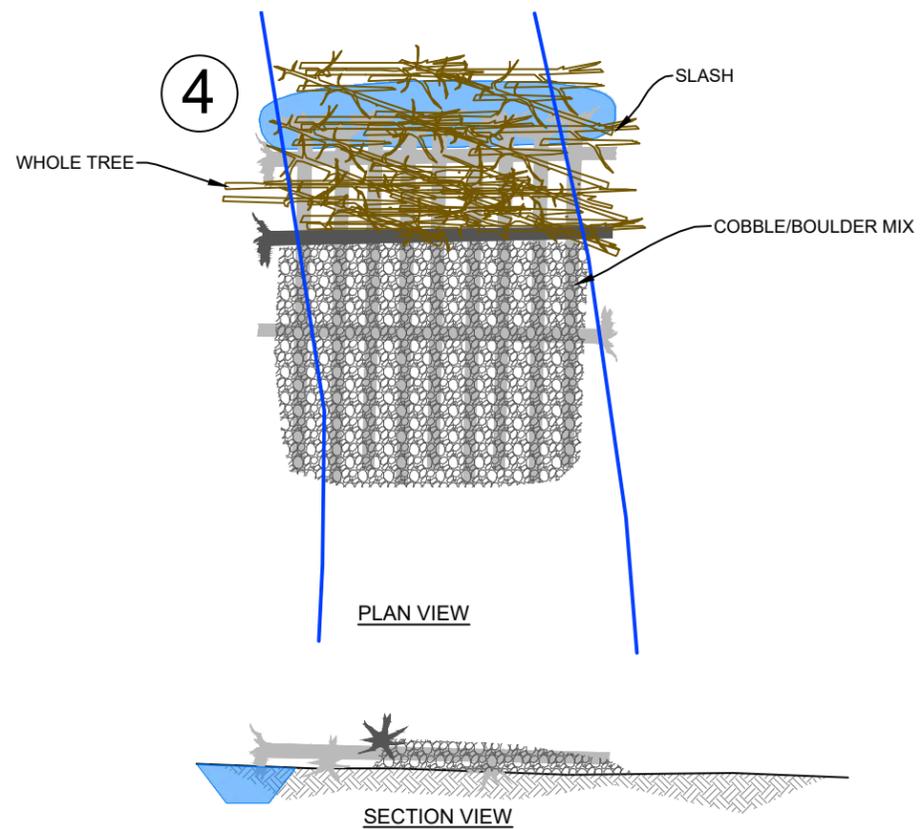
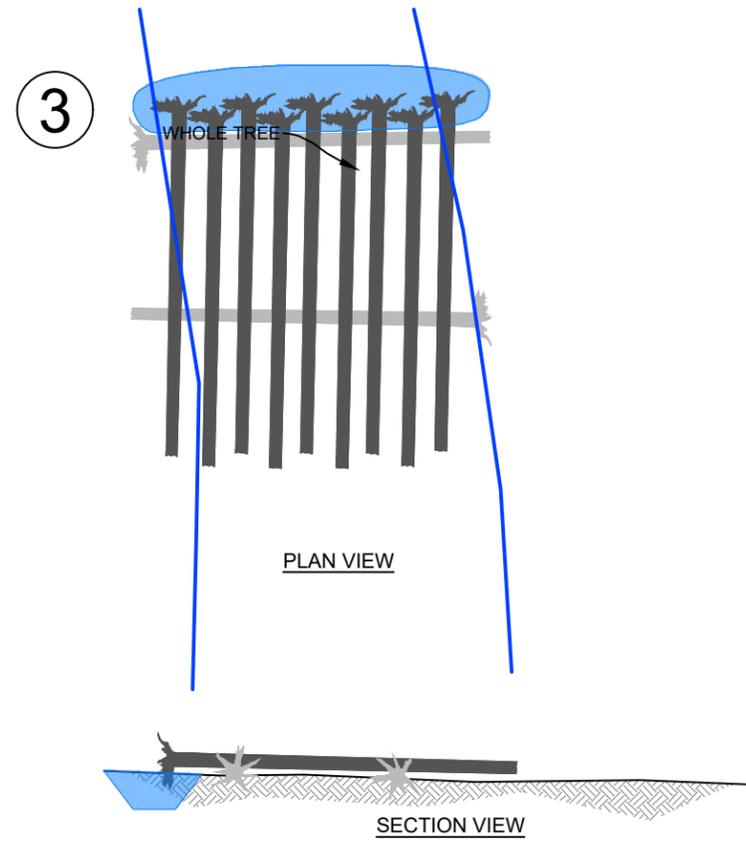
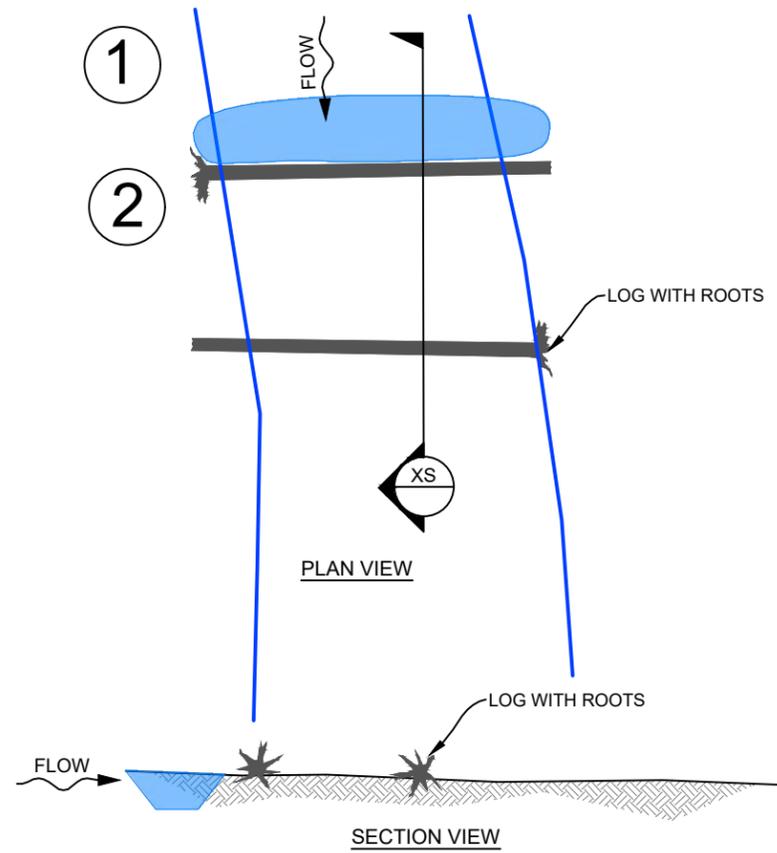


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CHANNEL SPANNING LARGE  
WOOD DETAIL

SHEET  
24 OF 35





### MID CHANNEL LOG STRUCTURE

SHOWN AS 40 FEET WIDE, CONSTRUCTED FROM 20 SALVAGED LOGS WITH ROOTS, SALVAGED SLASH, AND 300 CY OF FILL THAT IS APPROXIMATELY COBBLE (50%) / BOULDER (50%) MIXTURE.

SALVAGED LOGS WITH ROOTS ASSUMED TO BE 40 FEET LONG, >18" DBH. GRAVEL/COBBLE MIX SALVAGED FROM FLOODPLAIN EXCAVATIONS.

#### GENERAL CONSTRUCTION SEQUENCE

1. EXCAVATE SCOUR HOLE - UP TO 5 FEET DEEP OR TO BEDROCK AND 5 FEET IN FRONT OF FIRST LAYER OF WOOD. IF CONSTRUCTED ON BEDROCK, NO SCOUR HOLE IS NECESSARY.
2. INSTALL FIRST LAYER OF LOGS.
3. PLACE SECOND LAYER OF LOGS PERPENDICULAR TO FIRST LAYER, ROOTS UPSTREAM.
4. PLACE LAYER 3 LOG. ADD SALVAGED SLASH UPSTREAM OF LAYER 3 LOG. BURY BOTH LOG LAYERS DOWNSTREAM OF LAYER 3 LOG WITH ~3 FEET OF COBBLE/BOULDER MIX.
5. INSTALL LAYER 4 LOGS, ROOTS UPSTREAM, AND ENDS BATTERED DOWNWARD. ADD SLASH UPSTREAM TO UPSTREAM SIDE OF STRUCTURE. BURY TOP LOGS WITH ~3 FEET OF COBBLE/BOULDER MIX.

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MID CHANNEL LARGE WOOD  
STRUCTURE DETAIL

SHEET  
25 OF 35



FLOW

LOW-FLOW WATERLINE

SALVAGED LOG

**BANK BURIED LOG STRUCTURES**

1. 2-3 LAYERS OF LARGE WOOD. ADD SLASH AND WHOLE TREES IF AVAILABLE.
2. 1-2 LAYERS OF SALVAGED LOGS WITH ROOTS, AND TOP LAYER OF SALVAGED TREES.
3. SLASH MATERIAL FROM SALVAGED TREES AND SHRUBS REMOVED DURING CLEARING AND GRUBBING.
4. LOG BURIAL TRENCH TO BE EXCAVATED TO JUST ABOVE WATER SURFACE AT TIME OF CONSTRUCTION.
5. MINIMUM BURIAL DEPTH OF TOP LAYER OF WOOD IS 18". THREE LAYERS IS PLANNED FOR THESE STRUCTURES, BUT DECREASE TO TWO LAYERS IF NEEDED FOR 18" REQUIRED BURIAL DEPTH.

PLAN VIEW - BAR APEX BURIED LOG STRUCTURE

SLASH

SALVAGED LOG

LOG WITH ROOTS

SALVAGED WHOLE TREE

LOG WITH ROOTS

SALVAGED LOG

BURY 2/3 OF TOP LOG MIN 18" DEEP

SECTION VIEW

PLAN VIEW - BANK BURIED LOG STRUCTURE

XS



NO.	BY	DATE	REVISION DESCRIPTION

CM	MM, PL, MB	MM, PL
DRAWN	DESIGNED	CHECKED
MM, PL	3/11/26	24-02-17
APPROVED	DATE	PROJECT

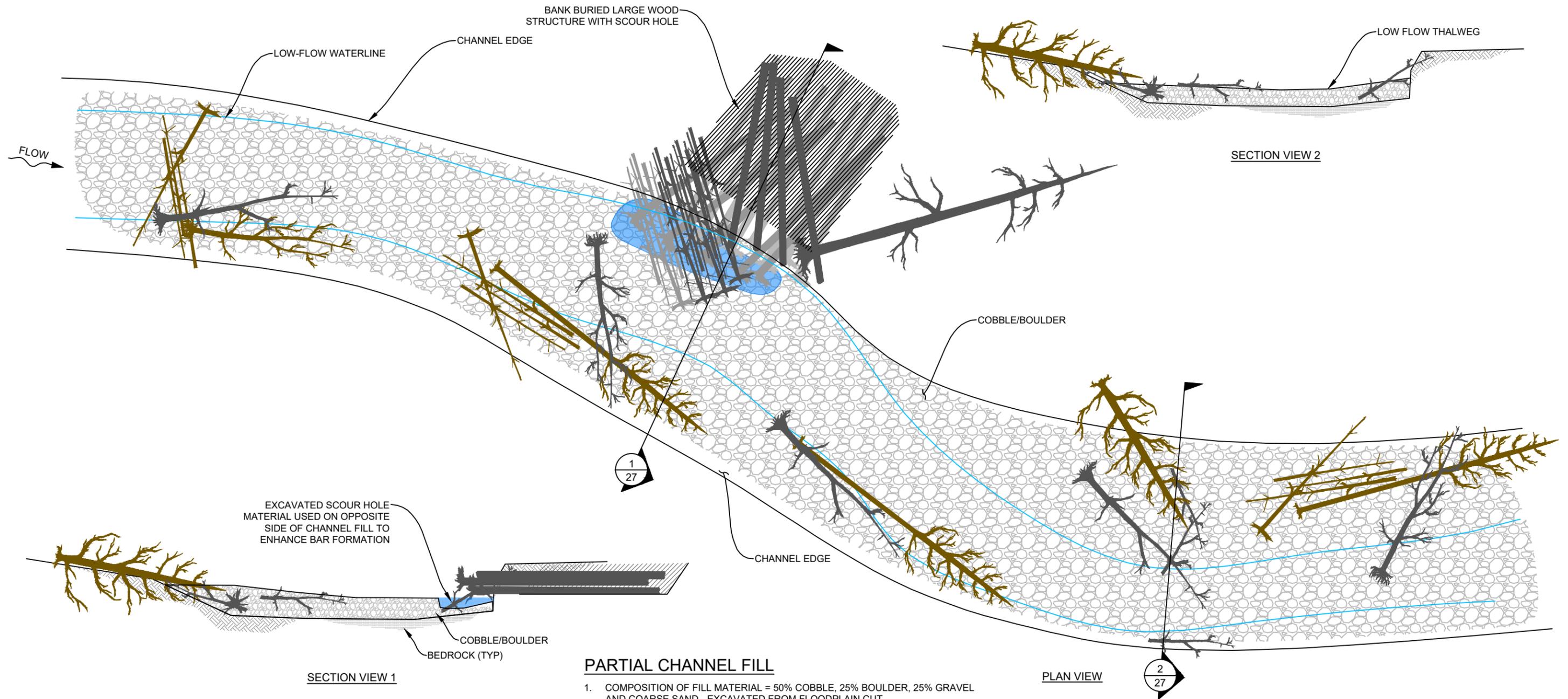
WF TEANAWAY RIVER  
RM 5.1-6.75 RESTORATION  
FINAL DESIGN



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

BANK BURIED LARGE WOOD  
STRUCTURE DETAILS

SHEET  
26 OF 35



**PARTIAL CHANNEL FILL**

1. COMPOSITION OF FILL MATERIAL = 50% COBBLE, 25% BOULDER, 25% GRAVEL AND COARSE SAND - EXCAVATED FROM FLOODPLAIN CUT.
2. PLACE FILL MATERIAL IN LIFTS UP TO 12" THICK AND COMPRESS WITH MACHINES. WASH IN FINES UNTIL WATER POOLS ON SURFACE BEFORE STARTING NEXT LIFT.
3. ADD WOOD DEBRIS (8-12" DBH AND 5-30 FT LONG) PARTIALLY BURIED INTO FILL MIX TO ADD ROUGHNESS OUTSIDE OF LOW-FLOW PATHWAY.
4. LOW-FLOW PATHWAY DEFINED BY SUBTLE THALWEG SWALE (APPROXIMATELY WIDE).
5. AT CONSTRUCTED BANK-BURIED AND MID-CHANNEL JAMS IN PARTIAL FILL, EXCAVATE SCOUR HOLE AT ROOT WADS. PLACE EXCAVATED SCOUR HOLE MATERIAL ON OPPOSITE SIDE OF CHANNEL AS BAR ENHANCEMENT. SUBTLE DEFINITION OF LOW-FLOW ROUTING.

NO.	BY	DATE	REVISION DESCRIPTION

CM	MM, PL, MB	MM, PL
DRAWN	DESIGNED	CHECKED
MM, PL	3/11/26	24-02-17
APPROVED	DATE	PROJECT

**WF TEANAWAY RIVER  
RM 5.1-6.75 RESTORATION  
FINAL DESIGN**

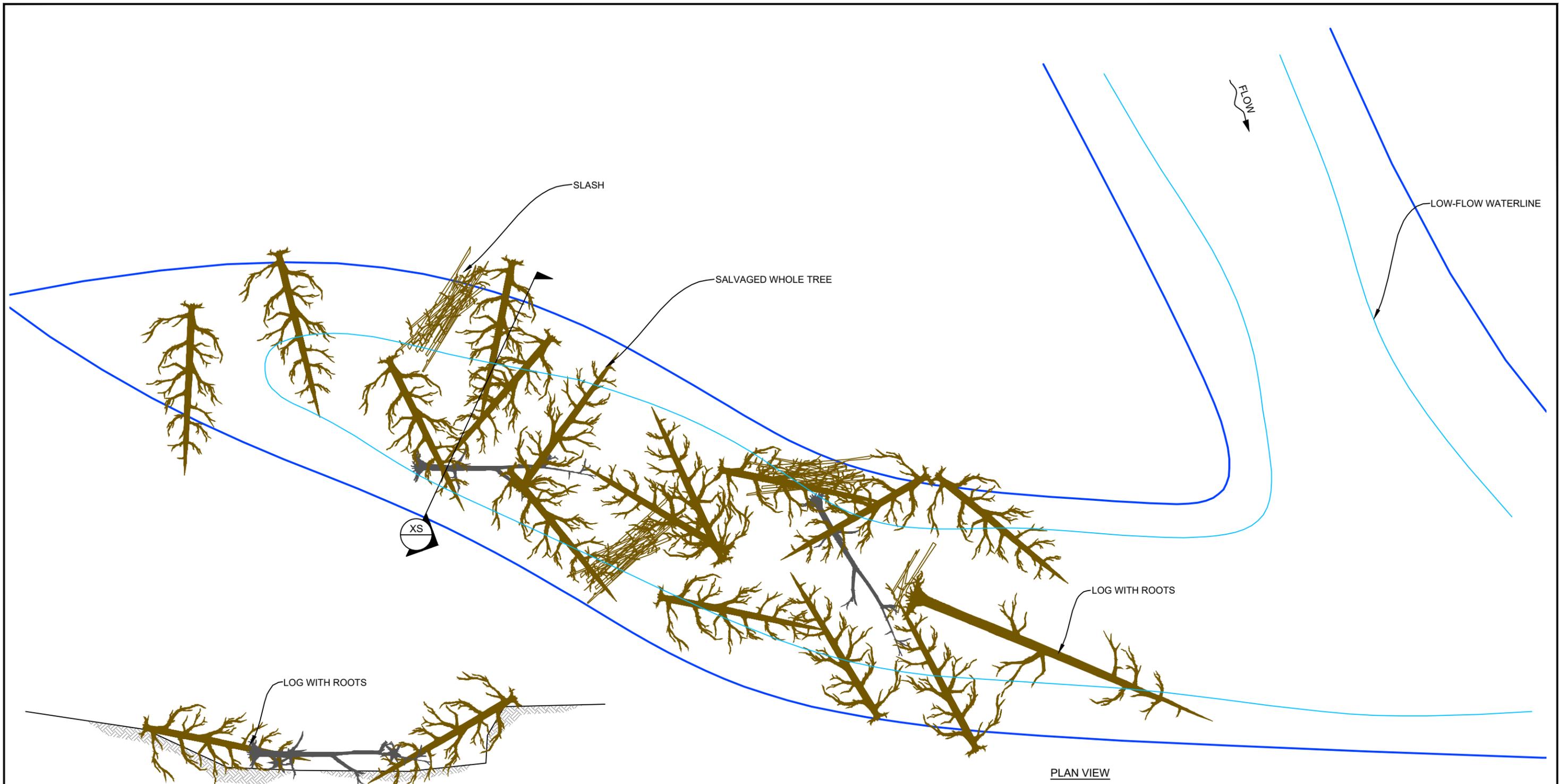


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**PARTIAL CHANNEL FILL**

SHEET  
**27 OF 35**





SECTION VIEW

PLAN VIEW

**BACKWATER ALCOVE WITH LARGE WOOD**

1-2 LAYERS OF LOGS. ADD SLASH AND WHOLE TREES IF AVAILABLE. OVERLAPPING LAYERS OF LARGE WOOD USING 45 PIECES OF SALVAGED TREES (12-17" DBH) AND 45 PIECES OF SALVAGED SLASH (<11" DBH).

LARGE WOOD IS LATTICED-PLACED FOR DISPERSED COVER. EVERY 4TH LOG HAS ROOTWAD PLACED ON BANK IN EXISTING VEGETATION.

NO.	BY	DATE	REVISION DESCRIPTION

CM	MM, PL, MB	MM, PL
DRAWN	DESIGNED	CHECKED
MM, PL	3/11/26	24-02-17
APPROVED	DATE	PROJECT

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RM 5.1-6.75 RESTORATION  
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541.386.9003  
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**BACKWATER ACLOVE WITH LARGE  
WOOD DETAIL**

SHEET  
**28 OF 35**



FILE NAME: G:\U-Z\WESTFORKTEANAWAYRM5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW\TEANAWAY\WDFW CHANNEL GRADING 2025 - W1-2-3-6-9-15\TEANAWAY WDFW CHANNEL GRADING 2025 - W1-3-3-.DWG  
 LAYOUT TAB: W1 COVER  
 SAVE TIME: 1/26/2026 3:59:16 PM  
 PLOT TIME: 1/26/2026  
 USER NAME: CRAIG MCCONNELL



# WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

## HABITAT RESTORATION PROJECT WEST FORK TEANAWAY RIVER, TRIBUTARY TO YAKIMA RIVER KITITAS COUNTY, WA. WRIA: 39

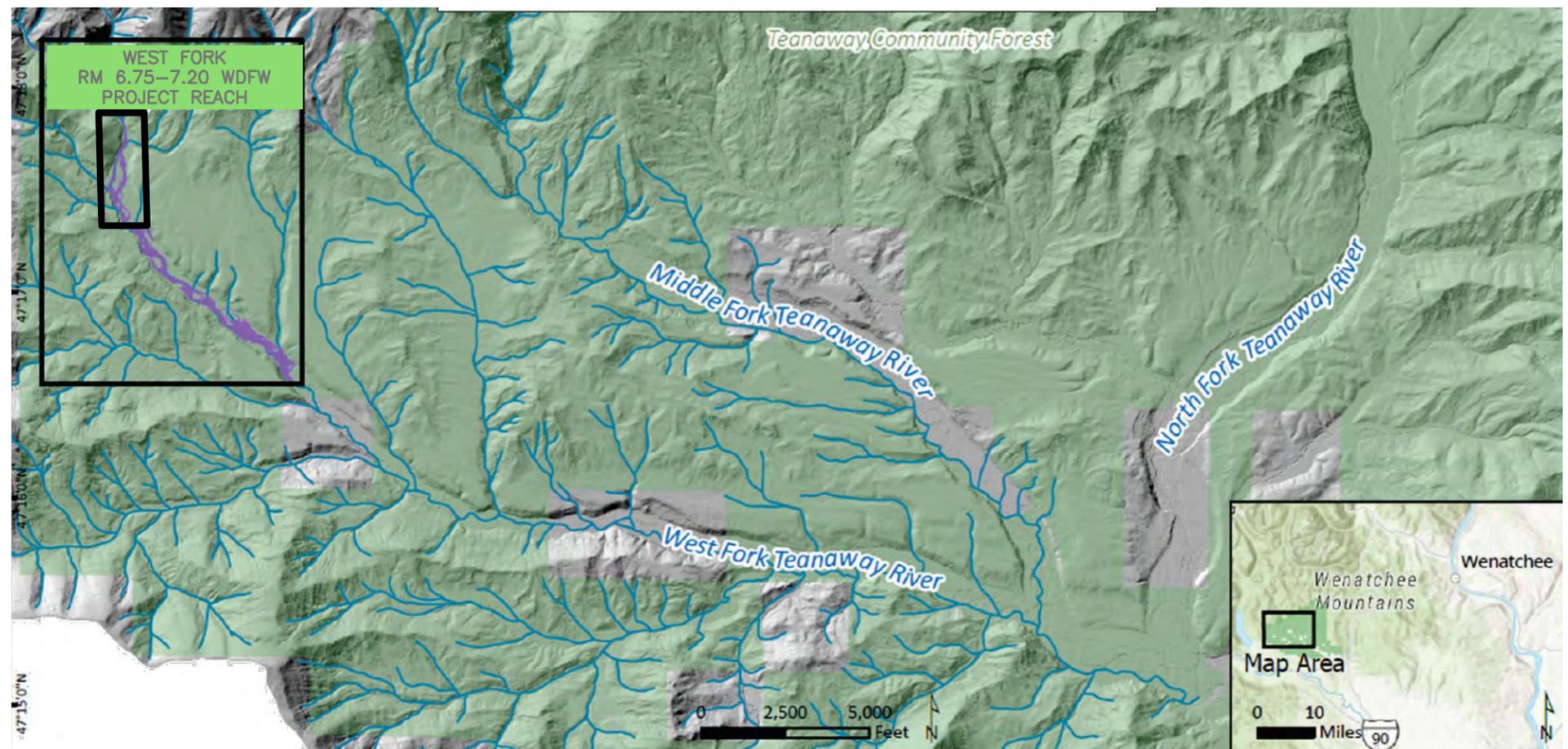
WEST FORK TEANAWAY, RIVER MILE 6.75 – 7.20  
HABITAT RESTORATION DESIGN

### SHEET INDEX

- W1. COVER SHEET
- W2. GENERAL NOTES
- W3. LEGEND AND ABBREVIATIONS
- W4. EXISTING CONDITIONS PLAN VIEW
- W5. TEST PITS LOCATIONS
- W6. TEST PIT RESULTS
- W7. STAGING AND TESC PLAN
- W8. SEQUENCING AND DEWATERING
- W9. TEMPORARY STREAM BYPASS
- W10. FINAL GRADING PLAN
- W11. FLOODPLAIN RESTORATION PLAN VIEW
- W12. STREAM PROFILE
- W13. VALLEY GRADING SECTIONS
- W14. VALLEY GRADING SECTIONS
- W15. EROSION CONTROL DETAILS
- W16. TYPE 1 JAM DETAIL
- W17. TYPE 2 JAM DETAIL
- W18. FLOODPLAIN ROUGHNESS AND LOOSE WOOD EXHIBIT

### PROJECT PARTNERS

- WASHINGTON DEPARTMENT FISH AND WILDLIFE
- MID COLUMBIA FISHERIES ENHANCEMENT GROUP
- YAKAMA NATION FISHERIES
- WASHINGTON DEPARTMENT OF NATURAL RESOURCES



**VICINITY MAP**  
SEC. 19 T. 21 N. R. 15 E. W.M.

**FINAL DESIGN**



WASHINGTON STATE  
DEPARTMENT OF FISH AND WILDLIFE

APPROVED AND RELEASED FOR CONSTRUCTION	
ENGINEER	DATE:
PROGRAM	DATE:

BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS	
DESIGNED BY	D. MATTHEWS, PE
CHECKED BY	A. UBER, PE
DRAWN BY	K. CORWIN
DATE	01/26/2026

WEST FORK TEANAWAY		PROJECT NO.
HABITAT RESTORATION PROJECT COVER SHEET		SHEET OF
		W1 18

FILE NAME: G:\U-Z\WESTFORKTEANAWAY\5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW DWG\TEANAWAY WDFW CHANNEL GRADING 2025 - W1-2-3-6-9-15\TEANAWAY WDFW CHANNEL GRADING 2025 - W1-3-3-.DWG  
 LAYOUT TAB: W2 GENERAL NOTES  
 SAVE TIME: 1/26/2026 3:59:16 PM  
 PLOT TIME: 1/26/2026  
 USER NAME: CRAIG MCCONNELL

## SURVEY NOTES

- THIS SURVEY WAS PERFORMED WITH BLUE-GREEN LIDAR DRONES IN FALL 2023 AND SUPPLEMENTED WITH RTK/TOTAL STATION SURVEY EQUIPMENT SUMMER 2024.
- THE DATA WITHIN THESE PLANS IS PROVIDED FOR THE SOLE PURPOSE OF THE STREAM RESTORATION PROJECT DESIGN AND CONSTRUCTION. ALL LOCATIONS OF EXISTING AND PROPOSED FEATURES ARE APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING WORK.
- THE DATUM FOR THIS PROJECT ARE AS FOLLOWS:  
 VERTICAL: NAVD88  
 HORIZONTAL: NAD83 STATE PLANE NORTH  
 UNITS: U.S. SURVEY FEET
- THIS IS NOT A PROPERTY BOUNDARY SURVEY, PROPERTY AND RIGHT-OF-WAY LINES HAVE NOT BEEN DETERMINED.
- UNDERGROUND UTILITIES WERE NOT EXAMINED OR CONSIDERED AS A PART OF THIS SURVEY.
- CONTOUR INTERVAL IS 1-FOOT.

## UTILITY NOTIFICATION NOTES

“BEFORE YOU DIG CALL THE ONE CALL UTILITY NOTIFICATION CENTER 811 OR 1-800-424-5555 OR VISIT [WWW.CALLBEFOREYODIG.ORG](http://WWW.CALLBEFOREYODIG.ORG) A MINIMUM OF TWO BUSINESS DAYS PRIOR TO CONSTRUCTION. IT’S THE LAW.” “WDFW MAKES NO REPRESENTATION AS TO THE EXISTENCE OR NONEXISTENCE OF ANY UTILITY, PUBLIC AND/OR PRIVATE, BURIED OR OVERHEAD, EXCEPT AS SHOWN ON THE DRAWINGS. WHERE UTILITIES ARE SHOWN ON THE DRAWINGS, THE LOCATION, DEPTH AND/OR HEIGHT ARE APPROXIMATE. THE EXACT LOCATION, DEPTH AND/OR HEIGHT MUST BE DETERMINED BY THE UTILITY COMPANY AND/OR THE LAND OWNER PRIOR TO ANY CONSTRUCTION WITHIN THE PROJECT VICINITY.”

## CONSTRUCTION SEQUENCE NOTES

- A PRE-CONSTRUCTION MEETING WITH THE OWNER AND OWNER’S REPRESENTATIVE..
- INITIAL PROJECT LAYOUT WILL BE PERFORMED BY WDFW.
- RESTRICT ROAD ACCESS FOR GENERAL PUBLIC LEADING TO PROJECT SITE.
- SEE SHEET W7 AND W8 FOR DETAILED CONSTRUCTION SEQUENCING.

## LARGE WOOD NOTES

- SIZE, LOCATION AND ORIENTATION OF LARGE WOOD PLACEMENTS ARE APPROXIMATE. FINAL LOCATION AND ORIENTATION WILL BE DEPEND UPON THE SIZE AND SHAPE OF THE MATERIAL SALVAGED. LARGE WOOD PLACEMENTS TO BE FIT IN THE FIELD AS DIRECTED BY ENGINEER.
- WOOD GREATER THAN 8” D.B.H. REMOVED FROM EXCAVATION AREA SHALL BE SALVAGED AND USED AS LWD WITH ROOTWADS ATTACHED AND FREE FROM INVASIVE PLANTS INCLUDING BLACKBERRIES, KNOTWEED, SCOTCH BROOM, ENGLISH IVY, ETC... ALL INVASIVE PLANTS ENCOUNTERED SHALL BE DISPOSED OF AT LEGAL LOCATION BY CONTRACTOR.
- SALVAGED LARGE WOOD SHALL BE STOCKPILED, THEN PLACED FOLLOWING FINAL GRADING AS DIRECTED BY THE ENGINEER.
- EXCAVATED MATERIAL MAY BE SUITABLE FOR FILL USE. APPROVAL REQUIRED BY ENGINEER AND WILL BE NOTED IN THE REVISION BLOCK.

## GENERAL CONSTRUCTION NOTES

- ALL PERMITS NECESSARY TO CONSTRUCT THE PROJECT WILL BE OBTAINED BY THE PROJECT OWNER. COPIES OF THE PERMITS SHALL BE MAINTAINED ONSITE BY THE CONTRACTOR AND MADE AVAILABLE WHEN/IF REQUESTED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL PERMIT TERMS AND CONDITIONS.
- THE ATTACHED CONSTRUCTION AND MATERIAL SPECIFICATIONS ARE PART OF THIS PLAN AND SHALL GOVERN THE INSTALLATION OF THIS PROJECT.
- MAXIMUM TOLERANCES SHALL BE AS FOLLOWS:
  - HORIZONTAL +/- 1.0 FT
  - VERTICAL +/- 0.5 FT
- FAILURE TO MEET THE ABOVE TOLERANCES MAY RESULT IN THE REMOVAL AND REPLACEMENT OF PORTIONS OF THE PROJECT AT NO ADDITIONAL COST.
- ADJUSTMENTS TO LOCATIONS/TOLERANCES MUST BE APPROVED BY ENGINEER.
- MAINTAIN A MINIMUM OF 5 FEET OF CLEARANCE FROM TREES MARKED FOR PRESERVATION.
- EXISTING RIPARIAN VEGETATION WILL BE IDENTIFIED BY THE ENGINEER PRIOR TO CONSTRUCTION FOR THE CONTRACTOR TO CAREFULLY FILL AND/OR CUT.

## CONSTRUCTION NOTES

- IDENTIFY ANY STRUCTURES OR MATERIALS WITHIN THE PROJECT AREA SLATED FOR RELOCATION OR REMOVAL PRIOR TO PROJECT IMPLEMENTATION (E.G. EXISTING BOULDERS/RIP RAP) AND CONDUCT OR ARRANGE FOR THEIR REMOVAL OR RELOCATION. DISPOSE OF THE DEBRIS GENERATED FROM REMOVAL AT AN APPROPRIATE OFF-SITE, UPLAND LOCATION, LANDFILL, OR RECYCLING FACILITY AS APPROPRIATE. IT IS EXPECTED THAT TRACK HOE AND DUMP TRUCK-TYPE EQUIPMENT WOULD BE USED TO ACCOMPLISH ANY NECESSARY DEMOLITION AND DISPOSAL OF THE DEBRIS.
- EQUIPMENT USED ON THIS PROJECT MUST BE IN EXCELLENT WORKING CONDITION, WELL MAINTAINED, FREE OF INVASIVE PLANTS, AND COMPLETELY FREE OF FLUID LEAKS OF ANY KIND.
- ALL WORK SHALL BE IN ACCORDANCE WITH HPA, OTHER PROJECT PERMITS, AND GENERAL HIP CONSERVATION MEASURES ON SHEETS 5-7
- CONDUCT INITIAL FISH REMOVAL EFFORTS USING A COMBINATION OF DIP NETS AND ELECTRO FISHING. ANY FISH CAPTURED FROM THE LOCALIZED IN-STREAM WORK AREA ARE TO BE REMOVED BY A QUALIFIED FISH BIOLOGIST BEFORE AND DURING DEWATERING AND SAFELY RELOCATED TO UNAFFECTED STREAM REACHES UPSTREAM OR DOWNSTREAM OF THE WORK AREA.
- AFTER INITIAL FISH REMOVAL, THE WORK AREA IS TO BE FULLY ISOLATED BY CONSTRUCTING TEMPORARY SAND-BAG-AND-PLASTIC DAMS AT OR JUST OUTSIDE OF THE PROJECT LIMITS AS NOTED ON PLANS. THE IN-STREAM WORK AREA IS TO BE DEWATERED FURTHER (BUT NOT COMPLETELY) AND ANY FISH MISSED DURING THE INITIAL REMOVAL ARE TO ALSO BE SAFELY REMOVED AND RELOCATED. CONTRACTOR SHALL HAVE BUCKETS, WATER AND HAND NETS FOR CONTINUED FISH SALVAGE THROUGH THE IN-WATER WORK WINDOW. CONTINUE FISH REMOVAL EFFORTS, WITH FURTHER, INCREMENTAL DEWATERING AS NECESSARY, UNTIL ALL FISH ARE PERCEIVED TO HAVE BEEN CAPTURED AND MOVED.
- STREAM DIVERSION SCREENS (IF USED) WILL BE REMOVED BY FIRST REMOVING LOWER COFFER DAM AND GRADUALLY LOWERING UPPER COFFER DAM.
- ALL EROSION CONTROL DEVICES MADE OF NON-BIO-DEGRADABLE MATERIALS TO BE REMOVED UPON DEMOBILIZATION.
- TEMPORARY SPOIL PILE LOCATIONS TO BE FLAGGED ONSITE BY ENGINEER PRIOR TO START OF WORK.
- ALL STREAMBED MATERIALS SHALL BE INSPECTED AND APPROVED BY ENGINEER PRIOR TO INSTALLATION.
- SUITABLE CUT MATERIAL WILL BE PLACED ON SITE IN LOCATION FLAGGED ON PLANS, UNSUITABLE MATERIAL WILL BE DISPOSED OF OFF-SITE.



**WASHINGTON STATE**  
**DEPARTMENT OF FISH AND WILDLIFE**

APPROVED AND RELEASED FOR CONSTRUCTION	
ENGINEER .....	DATE: .....
PROGRAM .....	DATE: .....

BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS	
DESIGNED BY .....	D. MATTHEWS, PE
CHECKED BY .....	A. UBER, PE
DRAWN BY .....	K. CORWIN
DATE .....	01/26/2026

WEST FORK TEANAWAY		PROJECT NO.	
HABITAT RESTORATION PROJECT		SHEET OF	
GENERAL NOTES		W2	18

FILE NAME: G:\U-Z\WESTFORKTEANAWAYRMS.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW\_DWG\TEANAWAY WDFW CHANNEL GRADING 2025 - W1-3-.DWG  
 LAYOUT TAB: W3 LEGEND AND ABBREVIATIONS  
 SAVE TIME: 1/26/2026 3:59:16 PM  
 PLOT TIME: 1/26/2026  
 USER NAME: CRAIG MCCONNELL

LINE LEGEND:

EXISTING MAJOR CONTOUR	
EXISTING MINOR CONTOUR	
PROPOSED MAJOR CONTOUR	
PROPOSED MINOR CONTOUR	
ALIGNMENT	
CROSS SECTION	
SILT FENCE	
WDFW PROJECT LIMITS	
EXISTING GROUND IN PROFILE	
PROPOSED GRADE IN PROFILE	
HIGH VISIBILITY FENCE	
DIVERSION COFFERDAM	
TEMPORARY DIVERSION PIPE	
DIVERSION FLOW PATH	
FISH EXCLUSION NET	

HATCH LEGEND:

OHW	
UNDISTURBED AREA	
EXISTING BEDROCK	
PHASE ONE (OUT OF WATER WORK)	
PHASE TWO (IN-WATER WORK)	
STAGING AREA	
FILL AREA	
CUT AREA	
TEMPORARY ACCESS ROAD	
LEAVE ISLAND AREA DELINIATION	
RIVER MILE (TENTHS)	

ABBREVIATIONS

APPROX.-	APPROXIMATELY	MOD.	-	MODEL
AASHTO	-	O.C.	-	ON CENTER
BGS	-	OD	-	OUTSIDE DIAMETER
BM	-	OHW	-	ORDINARY HIGH WATER
BR	-	PE	-	PROFESSIONAL ENGINEER
CL	-	PK	-	PARKER KALON NAIL
CLR.	-	PT	-	PRESSURE TREATED
CONC	-	REQ'D	-	REQUIRED
CP	-	RT	-	RIGHT
CR	-	S.	-	SOUTH
DIA.	-	SEC.	-	SECTION
DBH	-	S.F.	-	SQUARE FEET
E.	-	SHT.	-	SHEET
EX.	-	SPEC'S.	-	PROJECT SPECIFICATIONS
ELEV.	-	S.S.	-	STAINLESS STEEL
F.B.	-	TBM	-	TEMPORARY BENCH MARK
F.C.	-	TRIB.	-	TRIBUTARY
FG	-	TYP	-	TYPICAL
FT	-	US	-	UNITED STATES
HORZ.	-	VERT.	-	VERTICAL
HPA	-	W.	-	WEST
ID	-	WA.	-	WASHINGTON
IE	-	WRIA	-	WATER RESOURCE INVENTORY AREA
LAT.	-	WSDOT	-	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
LF	-	W.S.	-	WATER SURFACE
LG	-			
LONG.	-			
LT	-			
MAX.	-			
MIN.	-			
MISC.	-			
N.	-			
NF	-			
NO.	-			
N.T.S.	-			



**WASHINGTON STATE**  
**DEPARTMENT OF FISH AND WILDLIFE**

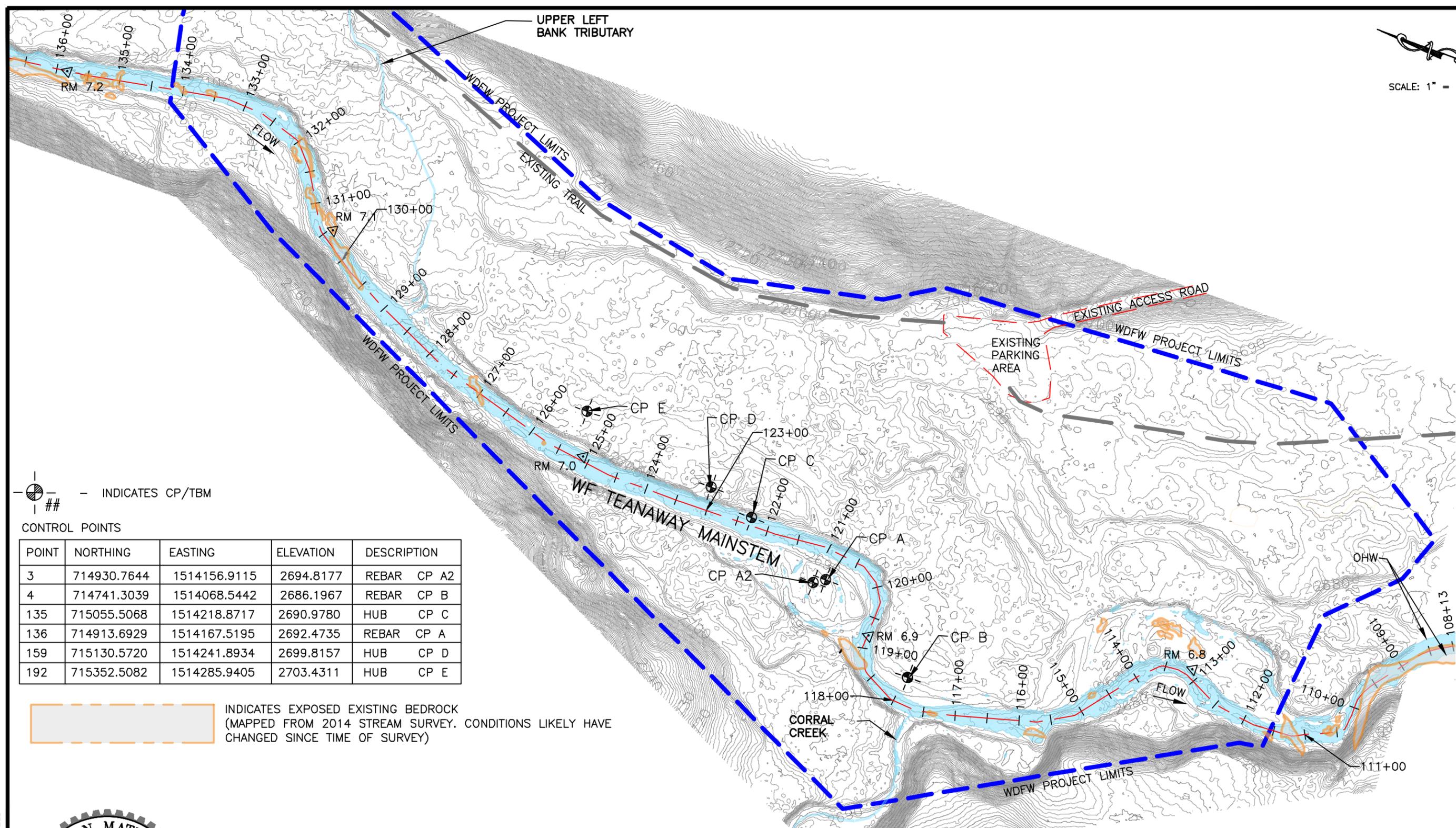
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PROGRAM	DATE:

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DESIGNED BY	D. MATTHEWS, PE
CHECKED BY	A. UBER, PE
DRAWN BY	K. CORWIN
DATE	01/26/2026

WEST FORK TEANAWAY  
 HABITAT RESTORATION PROJECT  
 LEGEND AND ABBREVIATIONS

PROJECT NO.	
SHEET	OF
W3	18

G:\U-Z\WESTFORKTEANAWAY\5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW\DWG\TEANAWAY\WDFW CHANNEL GRADING 2025 W4-5-7-8-10T014\TEANAWAY WDFW CHANNEL GRADING 2025 SURFACE SHEETS



SCALE: 1" = 150'

INDICATES CP/TBM

CONTROL POINTS

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
3	714930.7644	1514156.9115	2694.8177	REBAR CP A2
4	714741.3039	1514068.5442	2686.1967	REBAR CP B
135	715055.5068	1514218.8717	2690.9780	HUB CP C
136	714913.6929	1514167.5195	2692.4735	REBAR CP A
159	715130.5720	1514241.8934	2699.8157	HUB CP D
192	715352.5082	1514285.9405	2703.4311	HUB CP E

INDICATES EXPOSED EXISTING BEDROCK (MAPPED FROM 2014 STREAM SURVEY. CONDITIONS LIKELY HAVE CHANGED SINCE TIME OF SURVEY)



WASHINGTON STATE  
DEPARTMENT OF FISH AND WILDLIFE

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PROGRAM	DATE:

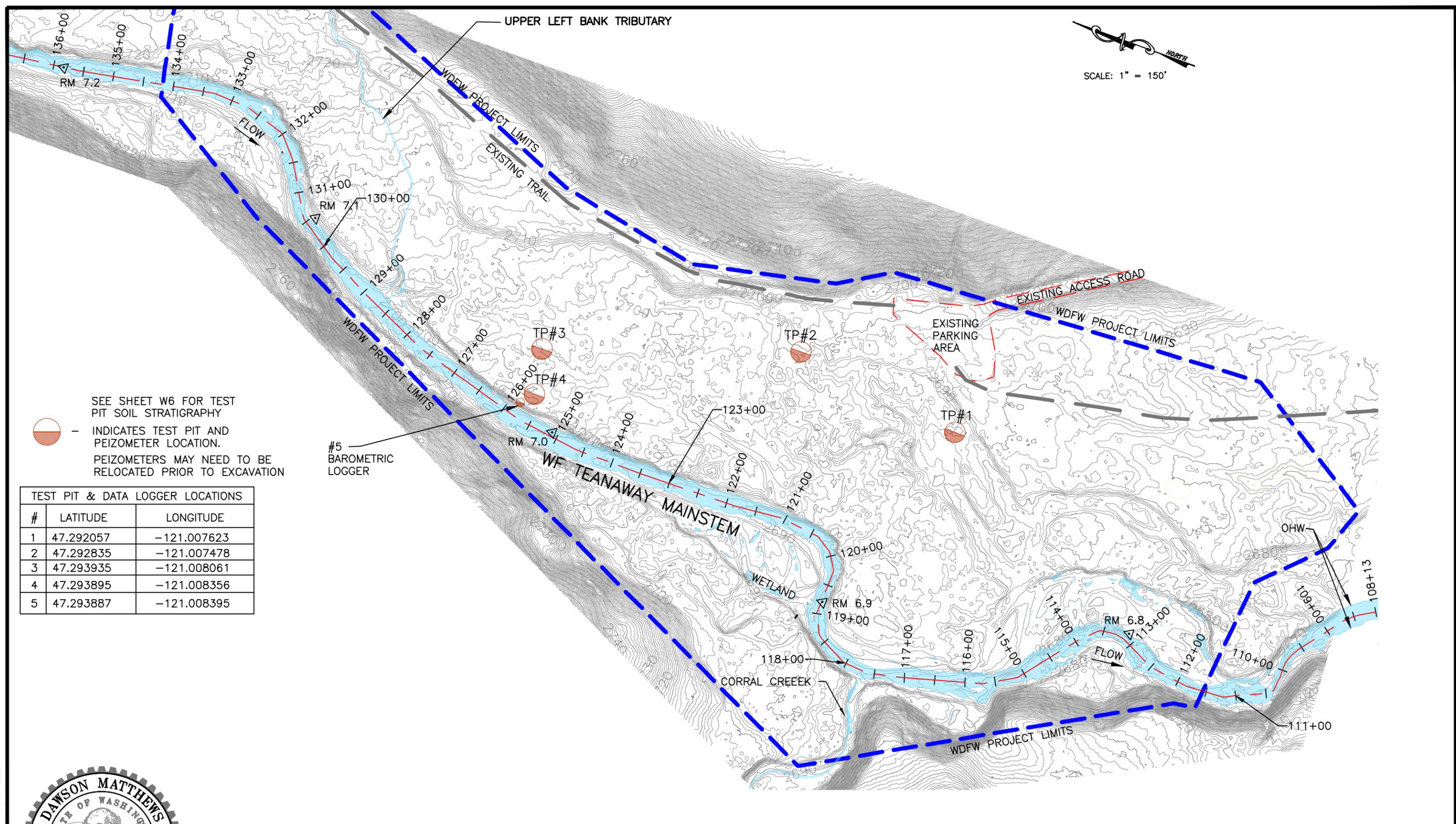
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DATE	01/26/2026

WEST FORK TEANAWAY  
HABITAT RESTORATION  
PROJECT  
EXISTING CONDITIONS PLAN VIEW

PROJECT NO.  
SHEET OF  
W4 18

FILE NAME: G:\U-Z\WESTFORKTEANAWAY\5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW\DWG\TEANAWAY\WDFW CHANNEL GRADING 2025 W4-5-7-8-10T014\TEANAWAY WDFW CHANNEL GRADING 2025 SURFACE SHEETS  
LAYOUT TAB: W4 EXISTING CONDITIONS PLAN VIEW  
SAVE TIME: 1/26/2026 4:02:30 PM  
PLOT TIME: 1/26/2026  
USER NAME: CRAIG MCCONNELL

G:\U-Z\WESTFORKTEANAWAY\RM5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW DWG\TEANAWAY WDFW CHANNEL GRADING 2025 W4-5-7-8-10T014\TEANAWAY WDFW CHANNEL GRADING 2025 SURFACE SHEETS



SEE SHEET W6 FOR TEST PIT SOIL STRATIGRAPHY  
 - INDICATES TEST PIT AND PEIZOMETER LOCATION.  
 PEIZOMETERS MAY NEED TO BE RELOCATED PRIOR TO EXCAVATION

TEST PIT & DATA LOGGER LOCATIONS		
#	LATITUDE	LONGITUDE
1	47.292057	-121.007623
2	47.292835	-121.007478
3	47.293935	-121.008061
4	47.293895	-121.008356
5	47.293887	-121.008395



WASHINGTON STATE  
 DEPARTMENT OF FISH AND WILDLIFE

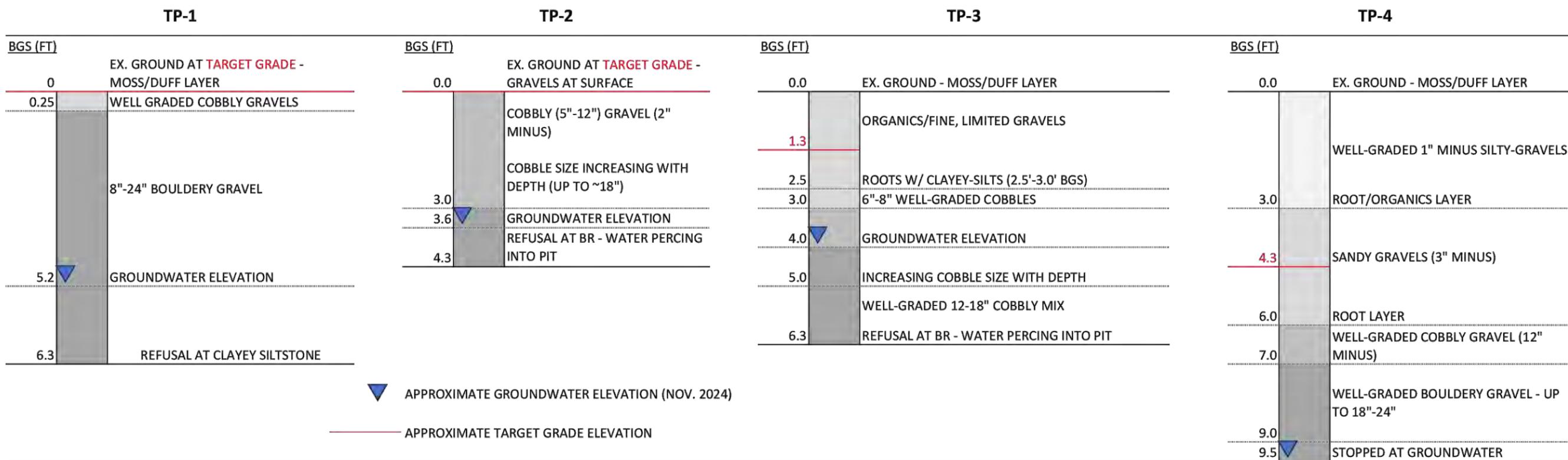
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ENGINEER	DATE:	CHECKED BY: A. UBER, PE
PROGRAM	DATE:	DRAWN BY: K. CORWIN
		DATE: 01/26/2026

WEST FORK TEANAWAY		PROJECT NO.
HABITAT RESTORATION		SHEET OF
PROJECT		W5 18
TEST PIT LOCATIONS		

FILE NAME: G:\U-Z\WESTFORKTEANAWAY\RM5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW DWG\TEANAWAY WDFW CHANNEL GRADING 2025 W4-5-7-8-10T014\TEANAWAY WDFW CHANNEL GRADING 2025 SURFACE SHEETS  
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 LAYOUT TAB: W6 TEST PIT RESULTS  
 SAVE TIME: 1/26/2026 3:59:16 PM  
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 USER NAME: CRAIG MCCONNELL

### UPPER WF TEANAWAY SUBSURFACE INVESTIGATION RESULTS



WASHINGTON STATE  
 DEPARTMENT OF FISH AND WILDLIFE

APPROVED AND RELEASED FOR CONSTRUCTION	
ENGINEER	DATE
PROGRAM	DATE

0 1"  
 BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS

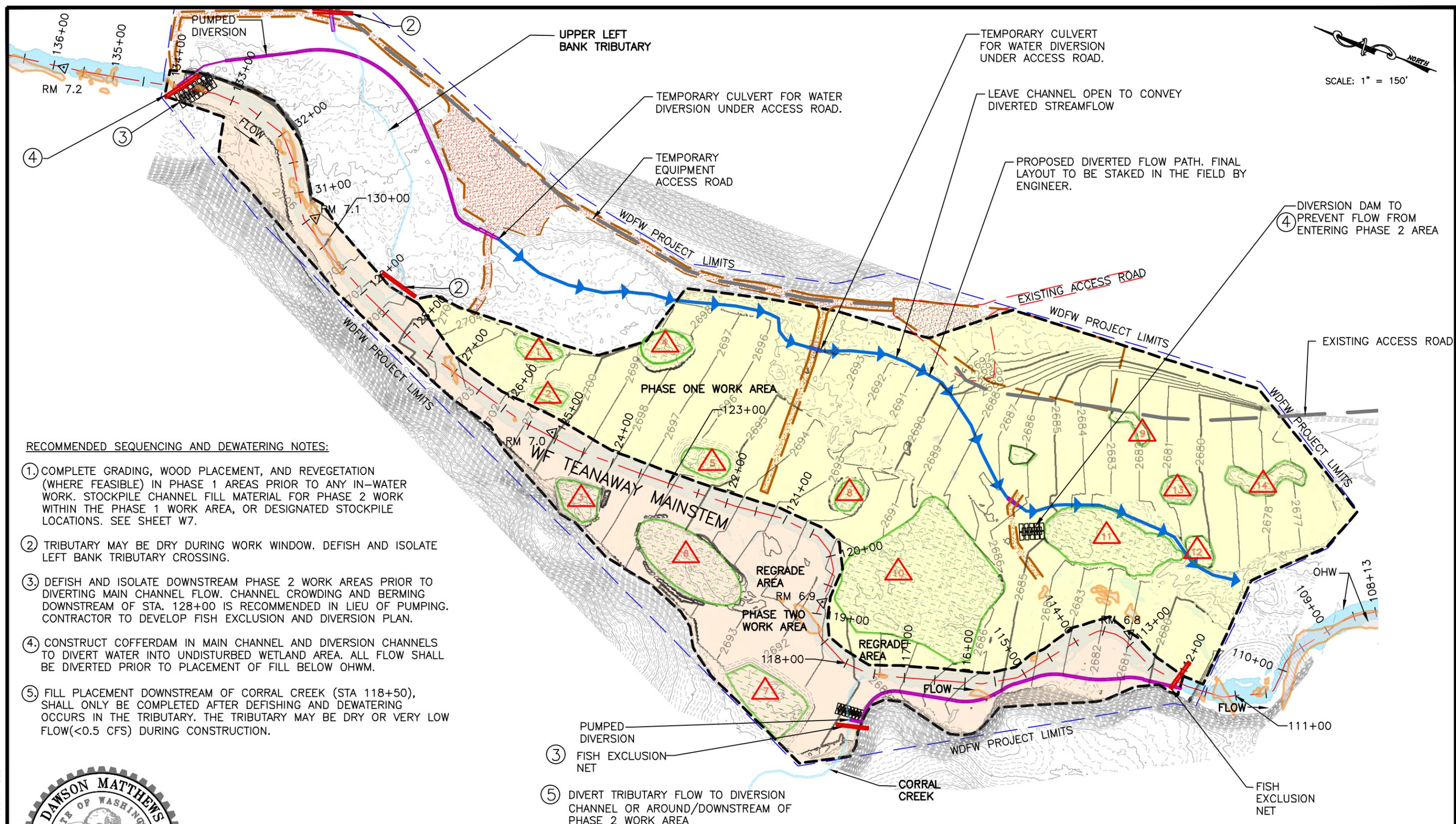
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WEST FORK TEANAWAY  
 HABITAT RESTORATION  
 PROJECT  
 TEST PIT RESULTS

PROJECT NO.  
 SHEET OF  
 W6 18



FILE NAME: G:\U-Z\WESTFORKTEANAWAY\5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW\DWG\TEANAWAY\WDFW CHANNEL GRADING 2025 W4-5-7-8-10T014\TEANAWAY WDFW CHANNEL GRADING 2025 SURFACE SHEETS  
 LAYOUT TAB: W8 SEQUENCING AND DEWATERING  
 SAVE TIME: 1/26/2026 4:02:30 PM  
 PLOT TIME: 1/26/2026  
 USER NAME: CRAIG MCCONNELL



- RECOMMENDED SEQUENCING AND DEWATERING NOTES:**
- ① COMPLETE GRADING, WOOD PLACEMENT, AND REVEGETATION (WHERE FEASIBLE) IN PHASE 1 AREAS PRIOR TO ANY IN-WATER WORK. STOCKPILE CHANNEL FILL MATERIAL FOR PHASE 2 WORK WITHIN THE PHASE 1 WORK AREA, OR DESIGNATED STOCKPILE LOCATIONS. SEE SHEET W7.
  - ② TRIBUTARY MAY BE DRY DURING WORK WINDOW. DEFISH AND ISOLATE LEFT BANK TRIBUTARY CROSSING.
  - ③ DEFISH AND ISOLATE DOWNSTREAM PHASE 2 WORK AREAS PRIOR TO DIVERTING MAIN CHANNEL FLOW. CHANNEL CROWDING AND BERMING DOWNSTREAM OF STA. 128+00 IS RECOMMENDED IN LIEU OF PUMPING. CONTRACTOR TO DEVELOP FISH EXCLUSION AND DIVERSION PLAN.
  - ④ CONSTRUCT COFFERDAM IN MAIN CHANNEL AND DIVERSION CHANNELS TO DIVERT WATER INTO UNDISTURBED WETLAND AREA. ALL FLOW SHALL BE DIVERTED PRIOR TO PLACEMENT OF FILL BELOW OHWM.
  - ⑤ FILL PLACEMENT DOWNSTREAM OF CORRAL CREEK (STA 118+50), SHALL ONLY BE COMPLETED AFTER DEFISHING AND DEWATERING OCCURS IN THE TRIBUTARY. THE TRIBUTARY MAY BE DRY OR VERY LOW FLOW (<0.5 CFS) DURING CONSTRUCTION.



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**DEPARTMENT OF FISH AND WILDLIFE**

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CHECKED BY	A. UBER, PE
DRAWN BY	K. CORWIN
DATE	01/26/2026

WEST FORK TEANAWAY  
 HABITAT RESTORATION  
 PROJECT  
 SEQUENCING AND DEWATERING

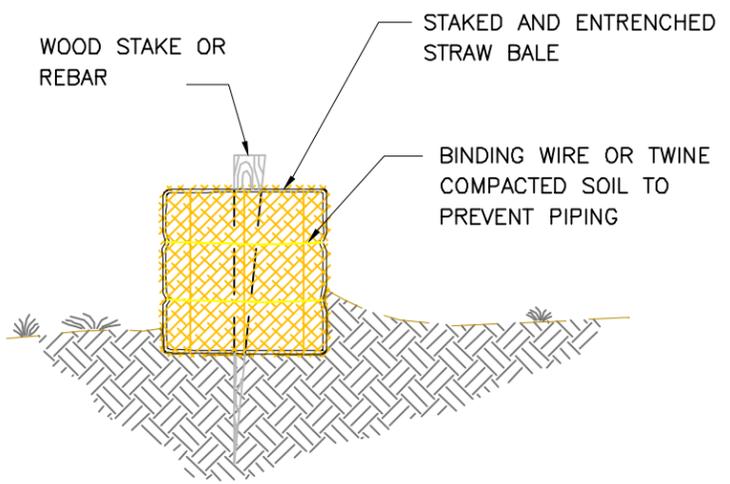
PROJECT NO.	
SHEET	OF
W8	18

FILE NAME: G:\U-Z\WESTFORKTEANAWAY\5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW DWG\TEANAWAY WDFW CHANNEL GRADING 2025 - W1-3-DWG  
 LAYOUT TAB: W9 - TEMPORARY STREAM BYPASS  
 SAVE TIME: 1/26/2026 3:59:16 PM  
 PLOT TIME: 1/26/2026  
 USER NAME: CRAIG MCCONNELL

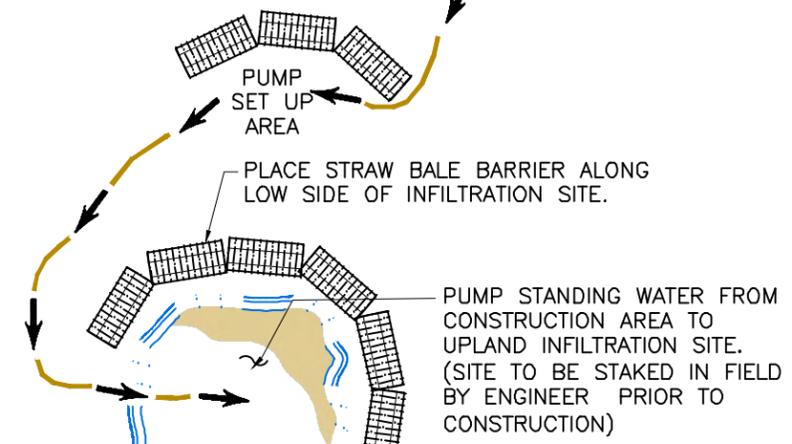
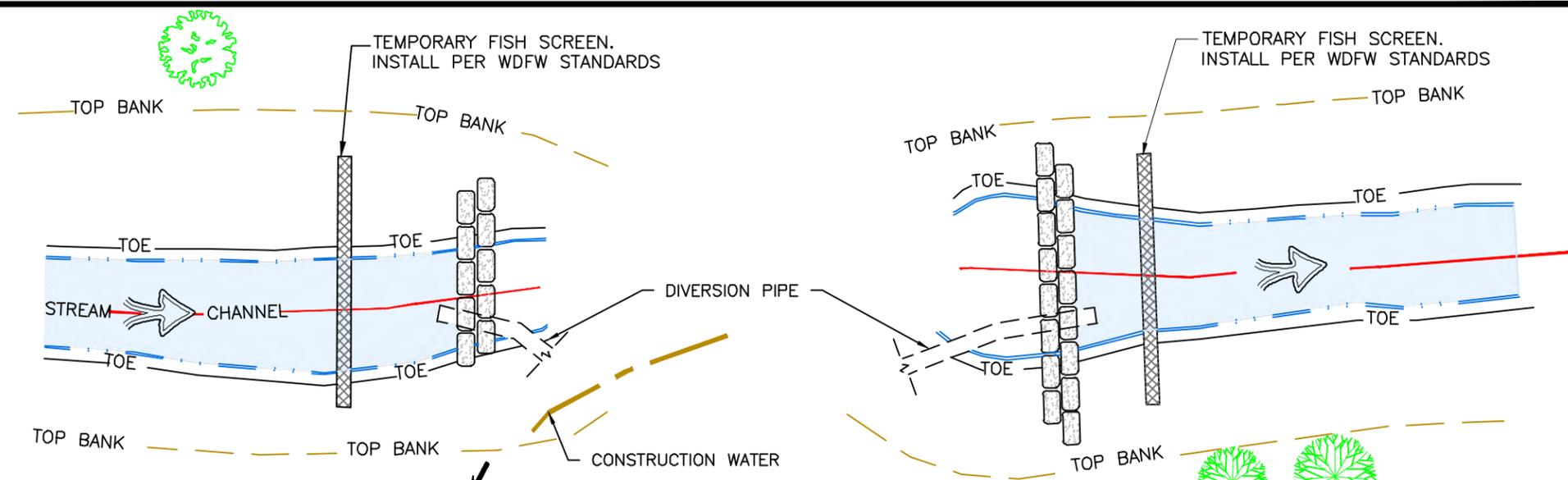
BALES SHALL BE PLACED IN A SINGLE ROW, LENGTHWISE ON THE CONTOUR, WITH ENDS OF ADJACENT BALES TIGHTLY ABUTTING ONE ANOTHER.

THE BARRIER SHALL BE ENTRENCHED AND BACKFILLED. A TRENCH SHALL BE A MINIMUM OF 4 INCHES. BACKFILL SOIL SHALL CONFORM TO THE GROUND LEVEL ON THE DOWNHILL SIDE AND SHALL BE BUILT UP 4 INCHES AGAINST THE UPHILL SIDE OF THE BARRIER. EACH BALE SHALL BE SECURELY ANCHORED BY AT LEAST 2 STAKES OR REBAR DRIVEN THROUGH THE BALE.

THE GAP BETWEEN THE BALES SHALL BE FILLED BY WEDGING WITH STRAW TO PREVENT WATER FROM ESCAPING BETWEEN THE BALES.

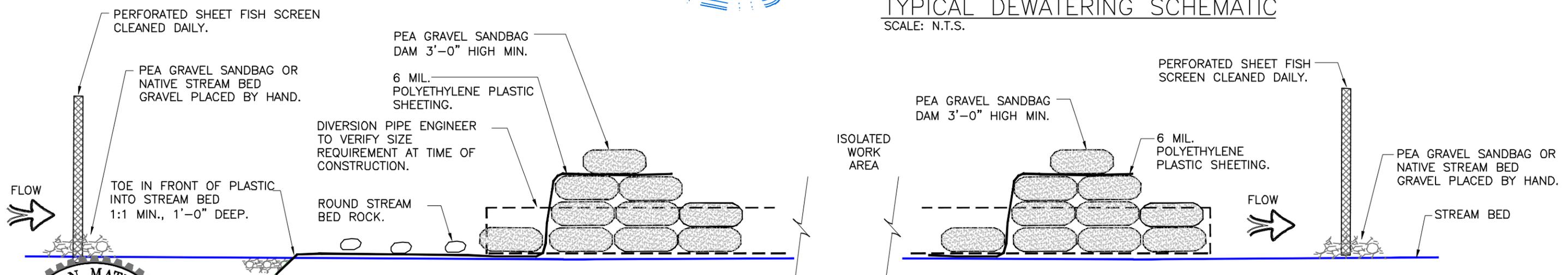


**STRAW BALE BARRIER**  
 SCALE: N.T.S.



**TYPICAL DEWATERING SCHEMATIC**  
 SCALE: N.T.S.

1. ALL WORK SHALL BE IN ACCORDANCE WITH HPA.
2. DURING CONSTRUCTION STREAM FLOW SHALL BE DIVERTED THROUGH BYPASS PIPE. DIVERSION SHALL BE APPROVED BY PROJECT ENGINEER PRIOR TO REMOVING EXISTING CULVERTS.
3. PLACE BAGS FILLED WITH PEA GRAVEL TO SEAL BYPASS INLET AND OUTLET.
4. EXCAVATE EXISTING FILL.
5. PLACE NEW BED MATERIAL MIX AND REMOVE BYPASS PIPE.
6. REMOVE DIVERSION BAGS AND FISH SCREENS BY HAND.



**TYPICAL DEWATERING SECTION**  
 SCALE: N.T.S.



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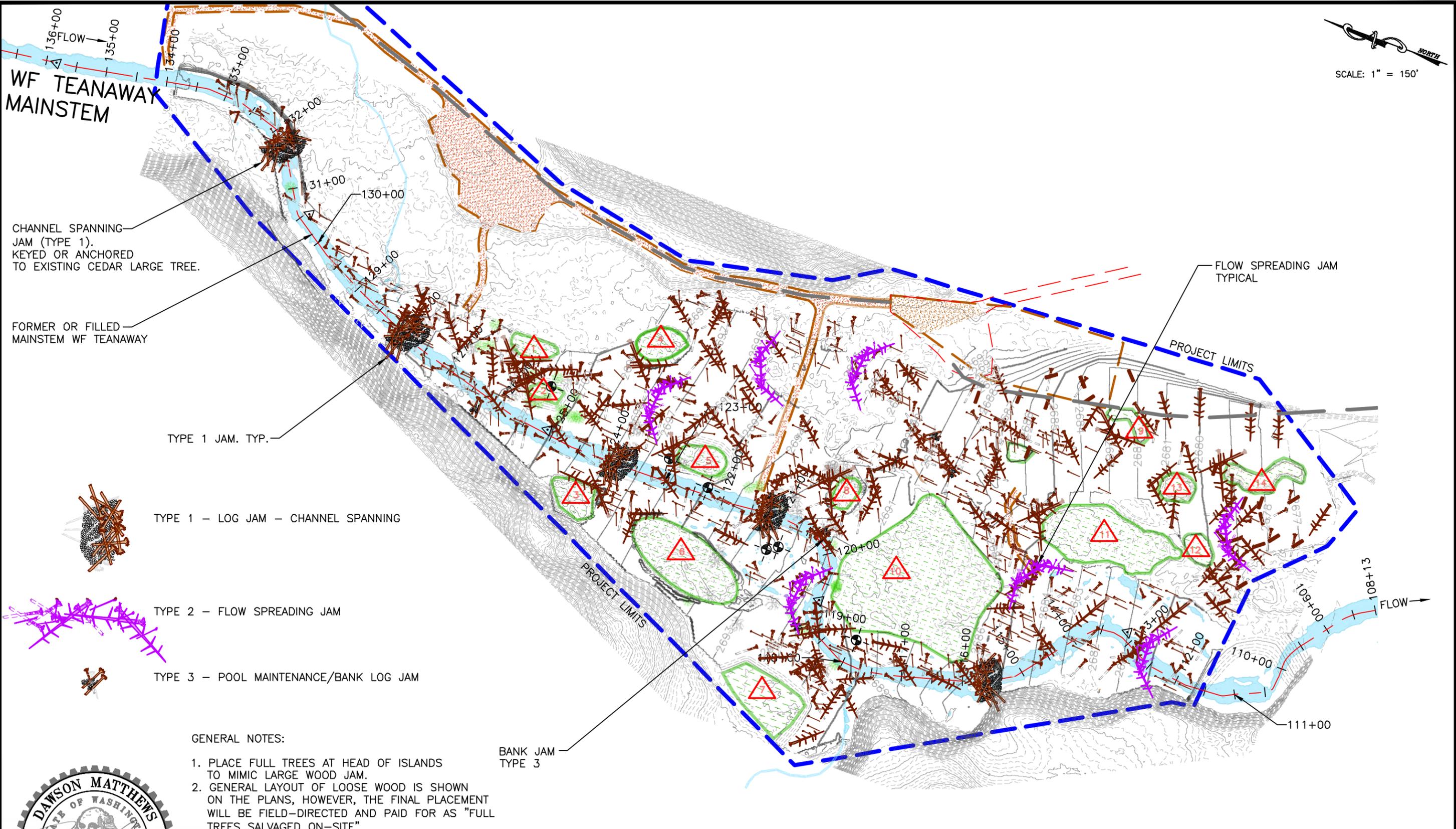
APPROVED AND RELEASED FOR CONSTRUCTION	
ENGINEER	DATE:
PROGRAM	DATE:
BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS	
DESIGNED BY	D. MATTHEWS, PE
CHECKED BY	A. UBER, PE
DRAWN BY	K. CORWIN
DATE	01/26/2026

WEST FORK TEANAWAY  
 HABITAT RESTORATION PROJECT  
 TEMPORARY STREAM BYPASS

PROJECT NO.  
 SHEET OF  
 W9 18



FILE NAME: G:\U-Z\WESTFORKTEANAWAY\5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW\_DWG\TEANAWAY WDFW CHANNEL GRADING 2025 W4-5-7-8-10T014\TEANAWAY WDFW CHANNEL GRADING 2025 SURFACE SHEETS  
 LAYOUT TAB: W11 -LARGE WOOD PLACEMENT  
 SAVE TIME: 3/11/2026 8:09:00 AM  
 PLOT TIME: 3/11/2026  
 USER NAME: CRAIG MCCONNELL



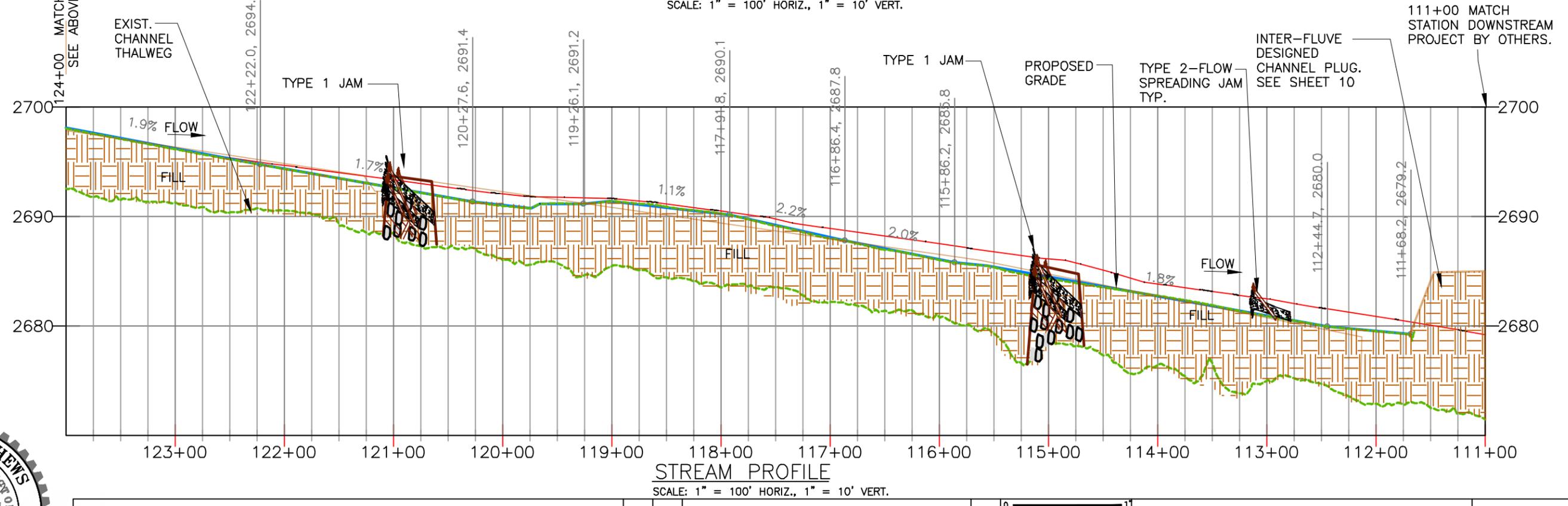
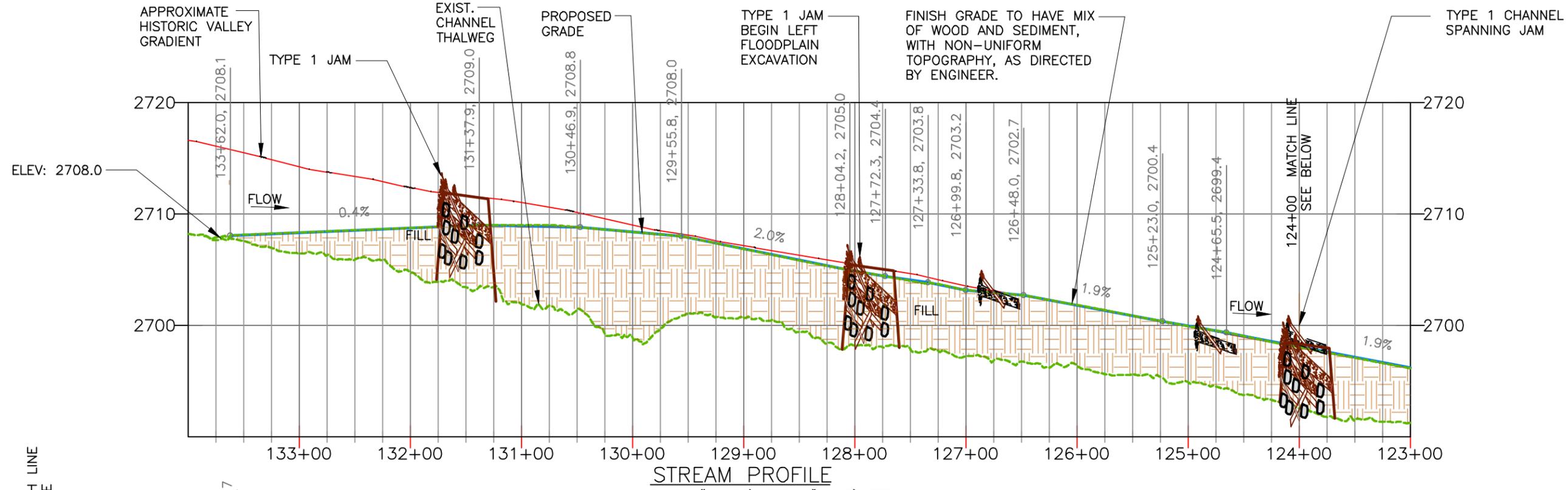
GENERAL NOTES:  
 1. PLACE FULL TREES AT HEAD OF ISLANDS TO MIMIC LARGE WOOD JAM.  
 2. GENERAL LAYOUT OF LOOSE WOOD IS SHOWN ON THE PLANS, HOWEVER, THE FINAL PLACEMENT WILL BE FIELD-DIRECTED AND PAID FOR AS "FULL TREES SALVAGED ON-SITE".

WASHINGTON STATE  
 DEPARTMENT OF FISH AND WILDLIFE

APPROVED AND RELEASED FOR CONSTRUCTION		DESIGNED BY: D. MATTHEWS, PE
ENGINEER	DATE:	CHECKED BY: A. UBER, PE
PROGRAM	DATE:	DRAWN BY: K. CORWIN
		DATE: 03/11/2026

WEST FORK TEANAWAY		PROJECT NO.
HABITAT RESTORATION PROJECT		SHEET OF
FLOODPLAIN RESTORATION PLAN VIEW		W11 18

FILE NAME: G:\U-Z\WESTFORKTEANAWAY\5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW CHANNEL GRADING 2025 W4-5-7-8-10TO14\TEANAWAY WDFW CHANNEL GRADING 2025 SURFACE SHEETS  
 LAYOUT TAB: W12 - STREAM PROFILE  
 SAVE TIME: 1/26/2026 4:02:30 PM  
 PLOT TIME: 1/26/2026  
 USER NAME: CRAIG MCCONNELL

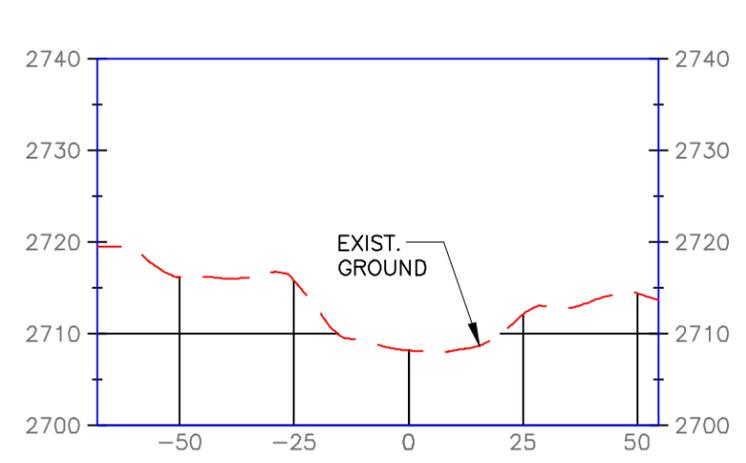


**WASHINGTON STATE**  
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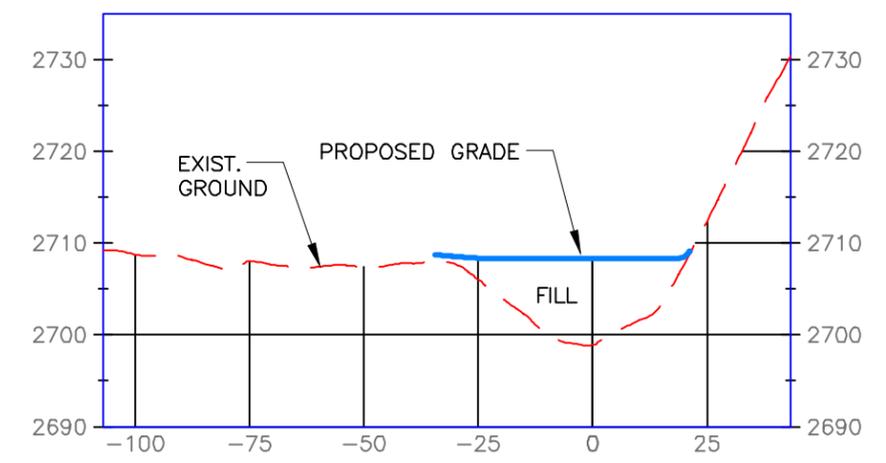
APPROVED AND RELEASED FOR CONSTRUCTION		BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS	
ENGINEER	DATE:	DESIGNED BY	D. MATTHEWS, PE
PROGRAM	DATE:	CHECKED BY	A. UBER, PE
		DRAWN BY	K. CORWIN
		DATE	01/26/2026

WEST FORK TEANAWAY		PROJECT NO.	
HABITAT RESTORATION		SHEET OF	
PROJECT		W12 18	
STREAM PROFILE			

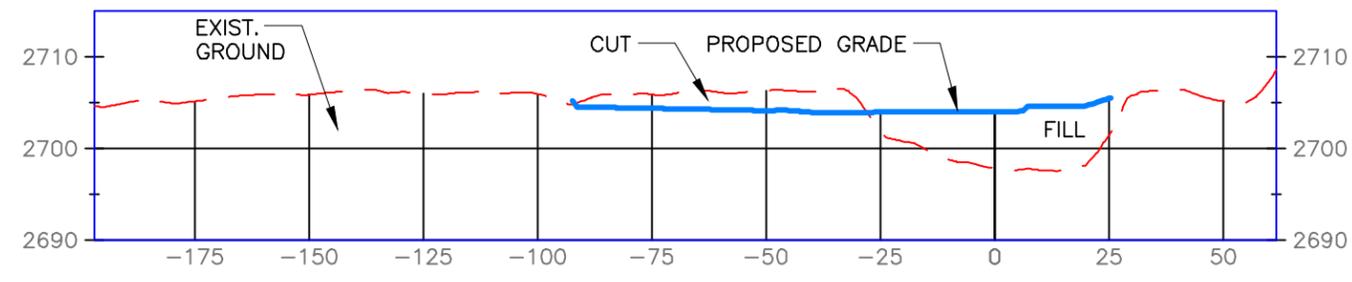
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 LAYOUT TAB: W13 - VALLEY GRADING SECTIONS  
 SAVE TIME: 1/26/2026 4:02:30 PM  
 PLOT TIME: 1/26/2026  
 USER NAME: CRAIG MCCONNELL



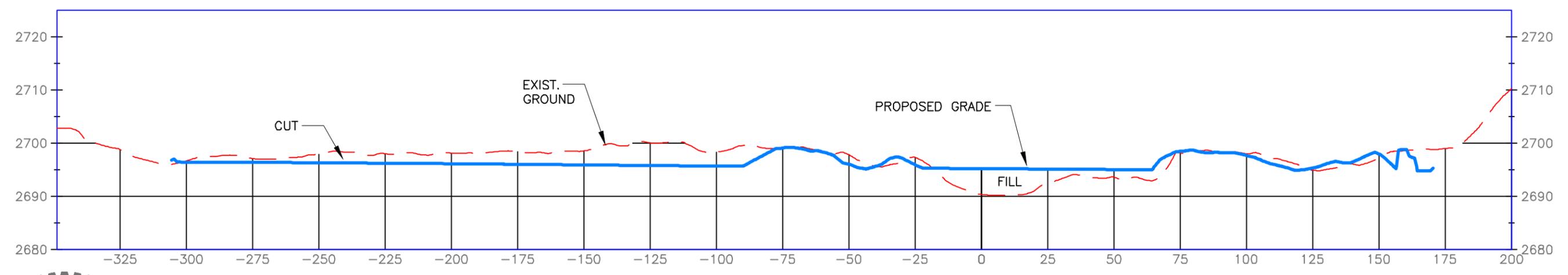
134+00



130+00



127+50



122+50

NOTE: VALLEY CROSS SECTIONS TO HAVE MIX OF WOOD AND SEDIMENT, WITH NON-UNIFORM TOPOGRAPHY. WOOD IS NOT SHOWN FOR TARGET GRADE PURPOSES.

**VALLEY GRADING SECTIONS**  
 SCALE: = 1" = 40' HORZ. & 1" = 20' VERT.



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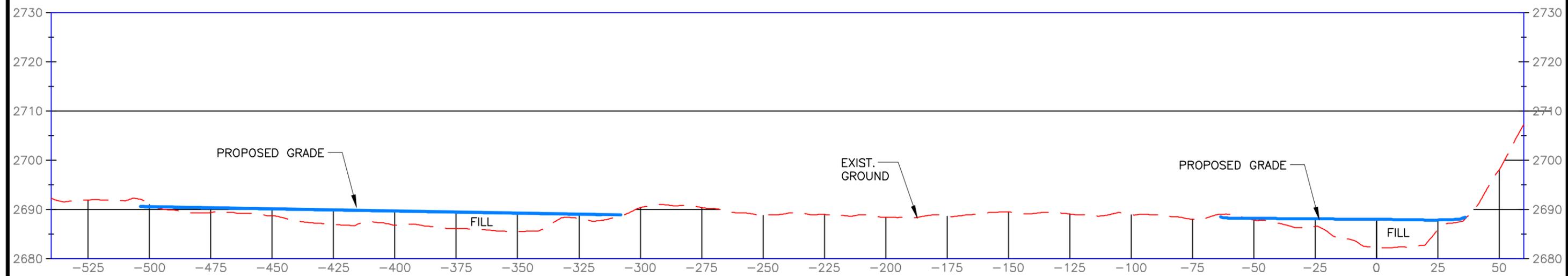
APPROVED AND RELEASED FOR CONSTRUCTION	
ENGINEER	DATE
PROGRAM	DATE

BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS	
DESIGNED BY	D. MATTHEWS, PE
CHECKED BY	A. UBER, PE
DRAWN BY	K. CORWIN
DATE	01/26/2026

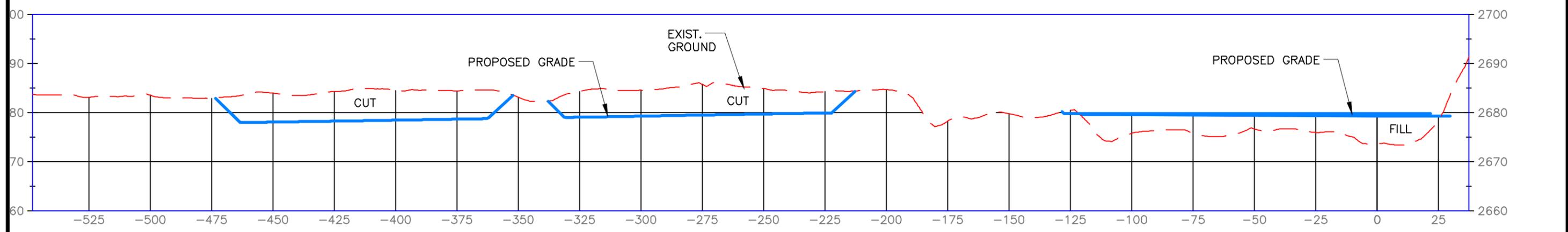
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HABITAT RESTORATION PROJECT		SHEET OF
VALLEY GRADING SECTIONS		W13 18

FILE NAME: G:\U-Z\WESTFORKTEANAWAY\5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW\DWG\TEANAWAY\WDFW CHANNEL GRADING 2025 W4-5-7-8-10TO14\TEANAWAY WDFW CHANNEL GRADING 2025 SURFACE SHEETS  
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 SAVE TIME: 1/26/2026 4:02:30 PM  
 PLOT TIME: 1/26/2026  
 USER NAME: CRAIG MCCONNELL

NOTE: VALLEY CROSS SECTIONS TO HAVE MIX OF WOOD AND SEDIMENT, WITH NON-UNIFORM TOPOGRAPHY. WOOD IS NOT SHOWN FOR TARGET GRADE PURPOSES.



117+00



112+25

**VALLEY GRADING SECTIONS**  
 SCALE: = 1" = 40' HORZ. & 1" = 20' VERT.



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DATE	01/26/2026

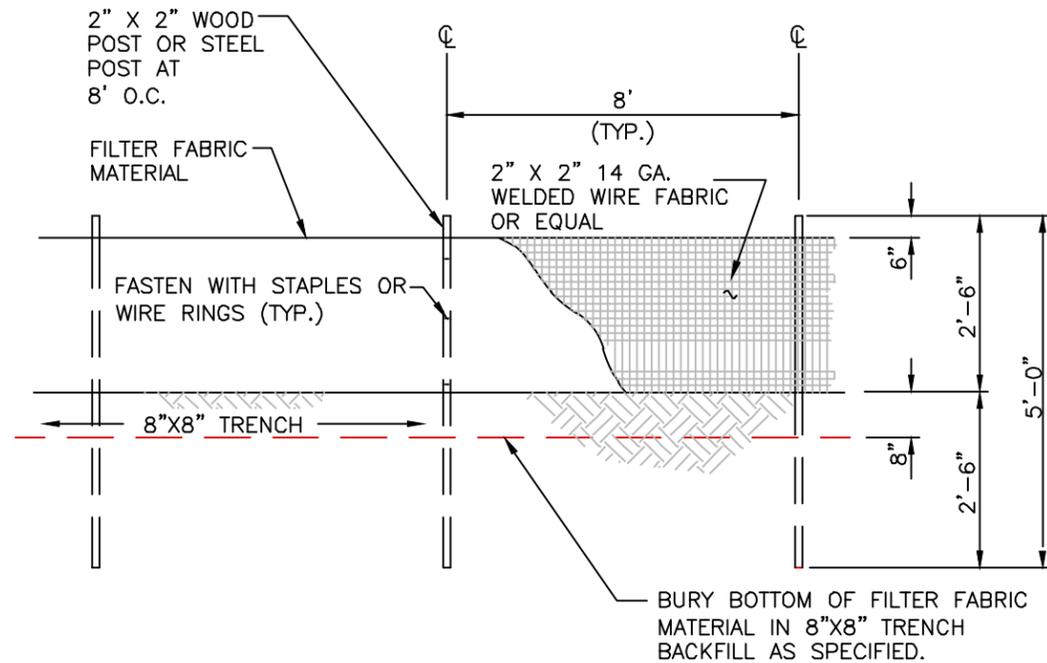
WEST FORK TEANAWAY  
 HABITAT RESTORATION  
 PROJECT  
 VALLEY GRADING SECTIONS

PROJECT NO.	
SHEET	OF
W14	18

FILE NAME: G:\U-Z\WESTFORKTEANAWAY\5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW\DWG\TEANAWAY\WDFW CHANNEL GRADING 2025 - W1-3-3-DWG  
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 SAVE TIME: 1/26/2026 3:59:16 PM  
 PLOT TIME: 1/26/2026  
 USER NAME: CRAIG MCCONNELL

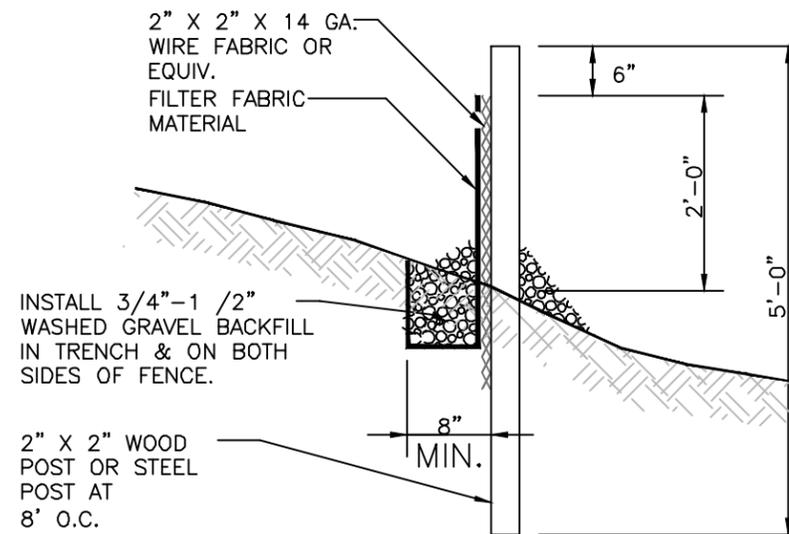
**SILT FENCE NOTES:**

1. FILTER FABRIC SHALL BE PURCHASED CONTINUOUS ROLL CUT TO LENGTH AS NEEDED. IF JOINTS ARE NECESSARY FABRIC SHALL BE SPLICED TOGETHER ONLY AT SUPPORT POSTS WITH A MINIMUM OF (6) INCH OVERLAP. BOTH ENDS SHALL BE SECURED AS REQUIRED.
2. SILT FENCING SHALL BE INSTALLED TO FOLLOW CONTOURS. FENCE POSTS SHALL BE SPACED A MAXIMUM OF EIGHT (8) FEET APART UNLESS OTHERWISE SHOWN HEREIN. ALL POSTS SHALL BE DRIVEN INTO THE GROUND A MINIMUM OF 30 INCHES.
3. A TRENCH SHALL BE EXCAVATED, ROUGHLY EIGHT (8) INCHES WIDE BY EIGHT (8) INCHES DEEP UPSLOPE AND ADJACENT TO THE POST TO ALLOW THE FILTER FABRIC TO BE BURIED.
4. WHEN STANDARD STRENGTH FILTER FABRIC IS UTILIZED, A WIRE SINGLE SPACE MESH SUPPORT FENCE SHALL BE FASTENED TO THE UPSLOPE SIDE OF THE POSTS USING ONE (1) INCH MINIMUM LENGTH WIRE STAPLES TIE WIRE OR APPROVED HOG RINGS. ALL WIRE SUPPORT SHALL EXTEND INTO THE TRENCH A MINIMUM OF FOUR (4) INCHES AND SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE ORIGINAL GRADE.
5. ALL FILTER FABRIC SHALL BE STAPLED OR WIRED TO SUPPORT FENCING AND A MINIMUM OF 20 INCHES OF FABRIC SHALL BE EXTENDED INTO THE TRENCH. FILTER FABRIC SHALL NOT BE STAPLED OR FASTENED TO EXISTING TREES OF STRUCTURES UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
6. IF HIGH STRENGTH FILTER FABRIC AND CLOSER SPACING ARE USED, THE WIRE SUPPORT FENCING MAY BE ELIMINATED. HIGH STRENGTH FABRIC SHALL BE STAPLED OR WIRED DIRECTLY TO POSTS AS REQUIRED BY THE ENGINEER.
7. TRENCH SHALL BE BACKFILLED WITH 3/4 INCH MINIMUM DIAMETER WASHED GRAVEL OR OTHER SIMILAR SOURCE AS APPROVED BY THE ENGINEER.
8. SILT FENCING SHALL BE INSTALLED WHERE SHOWN ON THE PLAN, OR AS MARKED IN THE FIELD BY THE ENGINEER, PRIOR TO COMMENCEMENT OF WORK. ALL FENCING SHALL BE INSPECTED DAILY DURING CONSTRUCTION AND AFTER EACH SIGNIFICANT RAINFALL EVENT UNTIL SITE HAS BEEN PERMANENTLY STABILIZED. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
9. REMOVAL OF TRAPPED SEDIMENT SHALL BE PERFORMED WHEN AMOUNTS REACH APPROXIMATELY 1/3 HEIGHT OF THE FENCE ABOVE GROUND.
10. SILT FENCING SHALL REMAIN IN-PLACE UNTIL SITE HAS BEEN REVEGETATED TO ORIGINAL CONDITION OR DIRECTED BY THE ENGINEER.



**TYPICAL SILT FENCE DETAIL**

SCALE: = N.T.S.

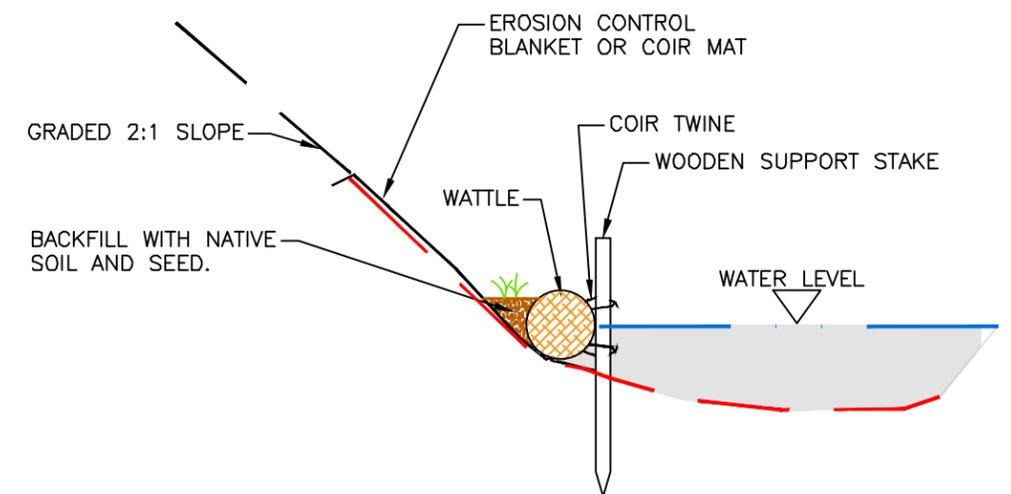


**TYPICAL SILT FENCE SECTION VIEW**

SCALE: = N.T.S.

**COIR WATTLE INSTALLATION NOTES:**

1. DESIGN BANK SLOPE VARIES, SEE PLAN VIEW.
2. INSTALL EROSION CONTROL COIR WATTLES AT THE WATER EDGE AT TOE OF SLOPE TO DEPTH OF 1/2 HEIGHT OF WATTLE.
3. TIE ENDS OF COIR WATTLES TOGETHER WITH COIR TWINE FOR A CONTINUOUS LINEAR SYSTEM.
4. DRIVE WOODEN STAKES NEXT TO THE COIR WATTLE EXTENDING 8\"/>



**SECTION VIEW**

SCALE: = N.T.S.



**WASHINGTON STATE**  
**DEPARTMENT OF FISH AND WILDLIFE**

APPROVED AND RELEASED FOR CONSTRUCTION	
ENGINEER	DATE:
PROGRAM	DATE:

BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS	
DESIGNED BY	D. MATTHEWS, PE
CHECKED BY	A. UBER, PE
DRAWN BY	K. CORWIN
DATE	01/26/2026

WEST FORK TEANAWAY	
HABITAT RESTORATION PROJECT	
EROSION CONTROL DETAILS	

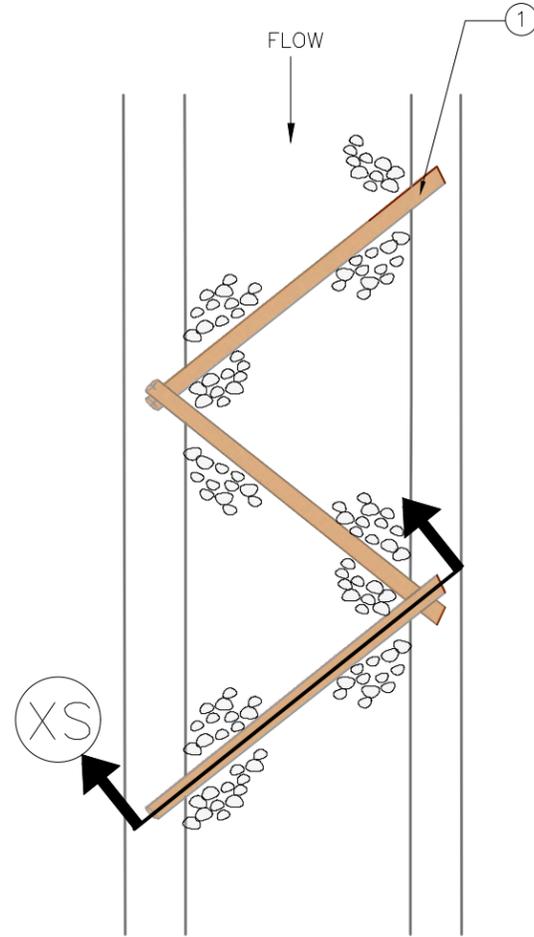
PROJECT NO.	
SHEET	OF
W15	18

**KEY NOTES:**

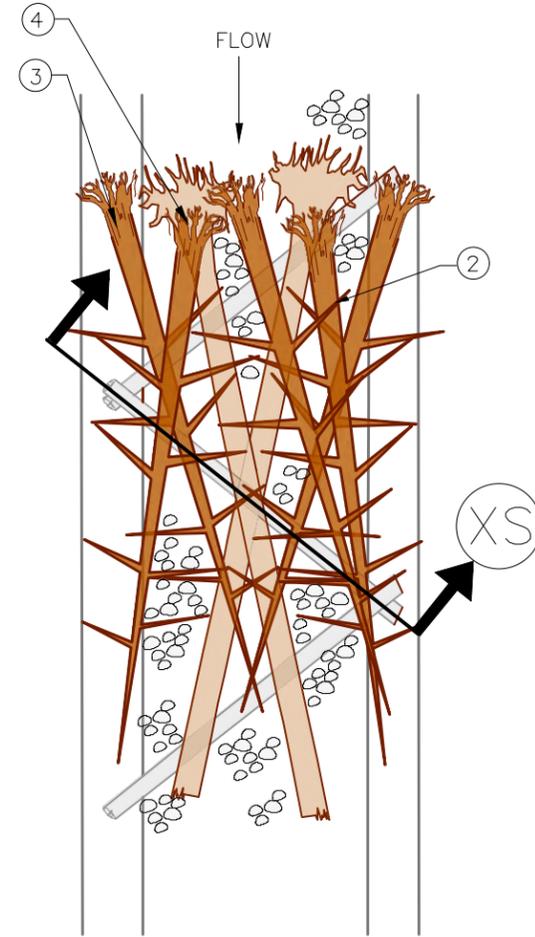
- ① LAY 12-18" IMPORTED CONIFERS ALTERNATING IN PITCH AND ELEVATION.
- ② BACKFILL WITH WOOD AND FLOODPLAIN FILL UP TO 2 FT. BELOW FINISH GRADE.
- ③ LAY FULL LAYER OF FULL TREES ACROSS FILL AND BACKFILL 1 FT. ROOTWAD SHALL FACE UPSTREAM.
- ④ LAY 2ND FULL TREE AND BACKFILL TO TARGET GRADE SO TREE ROOTS ARE PACKED SIDE BY SIDE AND STEMS OVERLAP. PLACE ADDITIONAL TREES IN SAME MANNER TO SPAN CHANNEL. ADJUST NUMBER OF PLACED FULL TREES TO HAVE ROOTWADS FULLY SPAN CHANNEL WIDTH.
- ⑤ PLACE 3 IMPORTED CONIFERS OVER CONNECTION POINTS NEAR BANKS. MAY USE TIE ROD TO CONNECT TO FULL TREE. TRUNK OF TREES TO BE EMBEDDED INTO BANKS.

**CHANNEL SPANNING JAM**  
 SHOWN AS 60 FEET WIDE, 6 FEET DEEP,  
 60 FEET LONG (IN DIRECTION OF FLOW)  
 CONSTRUCTED FROM MATERIALS LISTED IN THE TABLE BELOW.

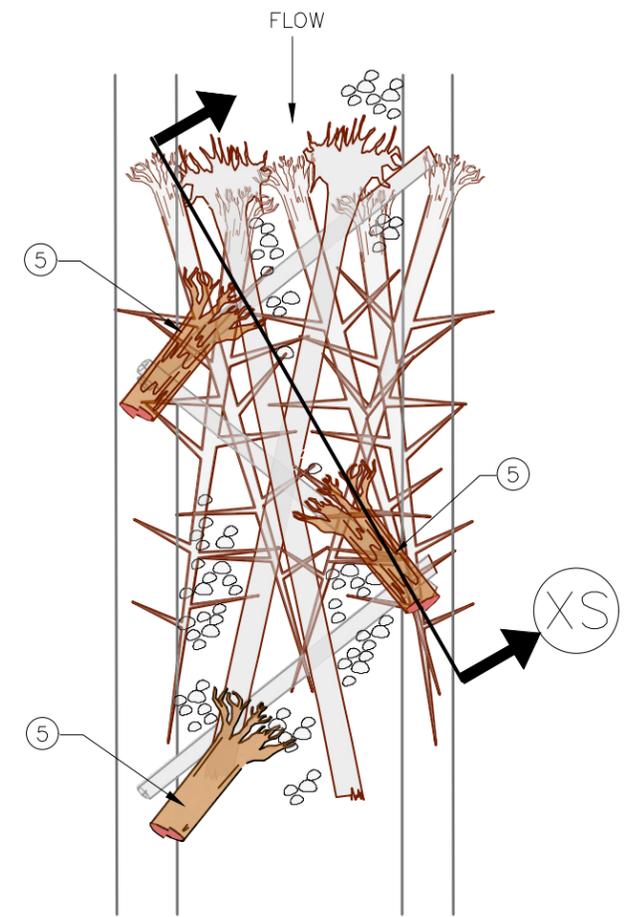
WIDER, NARROWER, OR DEEPER CHANNEL SECTIONS WILL  
 HAVE MODIFIED MATERIAL QUANTITIES BY RATIO WITH THIS  
 TYPICAL DETAIL.



PLAN VIEW

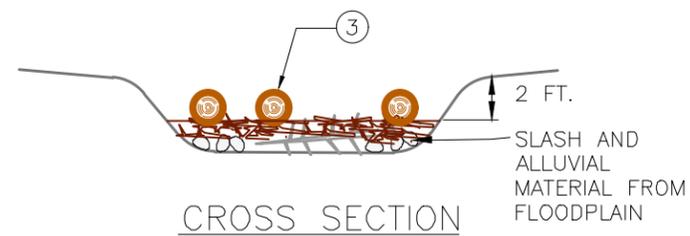


PLAN VIEW



PLAN VIEW

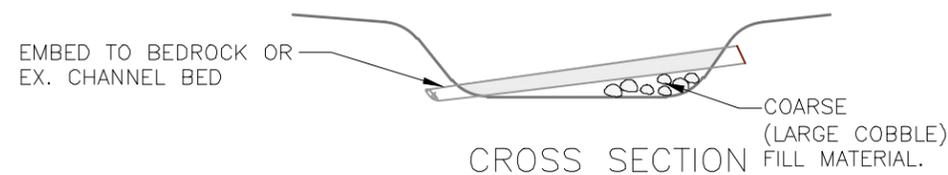
MATERIAL	SIZE	QTY PER STRUCTURE
IMPORT W/ROOTWAD	MIN. 18" DBH X 40'L	6 EA
IMPORT LOG	12"-22" DBH X 40'L	3 EA
SALVAGED TREE W/ROOTWAD	MIN. 18" DBH, LENGTH VARIES	6 EA
COBBLE/ALLUVIAL MIX RACKING	SEE SPECS	600 CY
	VARIES	80 CY



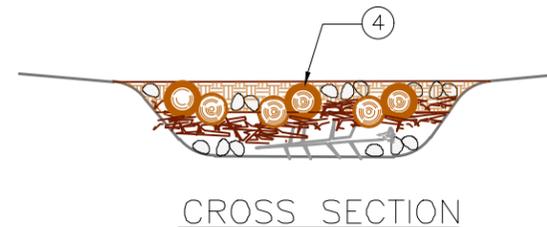
CROSS SECTION



CROSS SECTION



CROSS SECTION



CROSS SECTION

TYPE 1 JAM



**WASHINGTON STATE**  
**DEPARTMENT OF FISH AND WILDLIFE**

SYM	DATE	REVISION DESCRIPTION	BY
APPROVED AND RELEASED FOR CONSTRUCTION			
ENGINEER		.DATE:	
PROGRAM		.DATE:	

BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS	
DESIGNED BY	D. MATTHEWS, PE
CHECKED BY	A. UBER, PE
DRAWN BY	K. CORWIN
DATE	03/11/2026

WEST FORK TEANAWAY		PROJECT NO.
HABITAT RESTORATION PROJECT		SHEET OF
TYPE 1 JAM DETAILS		W16 18

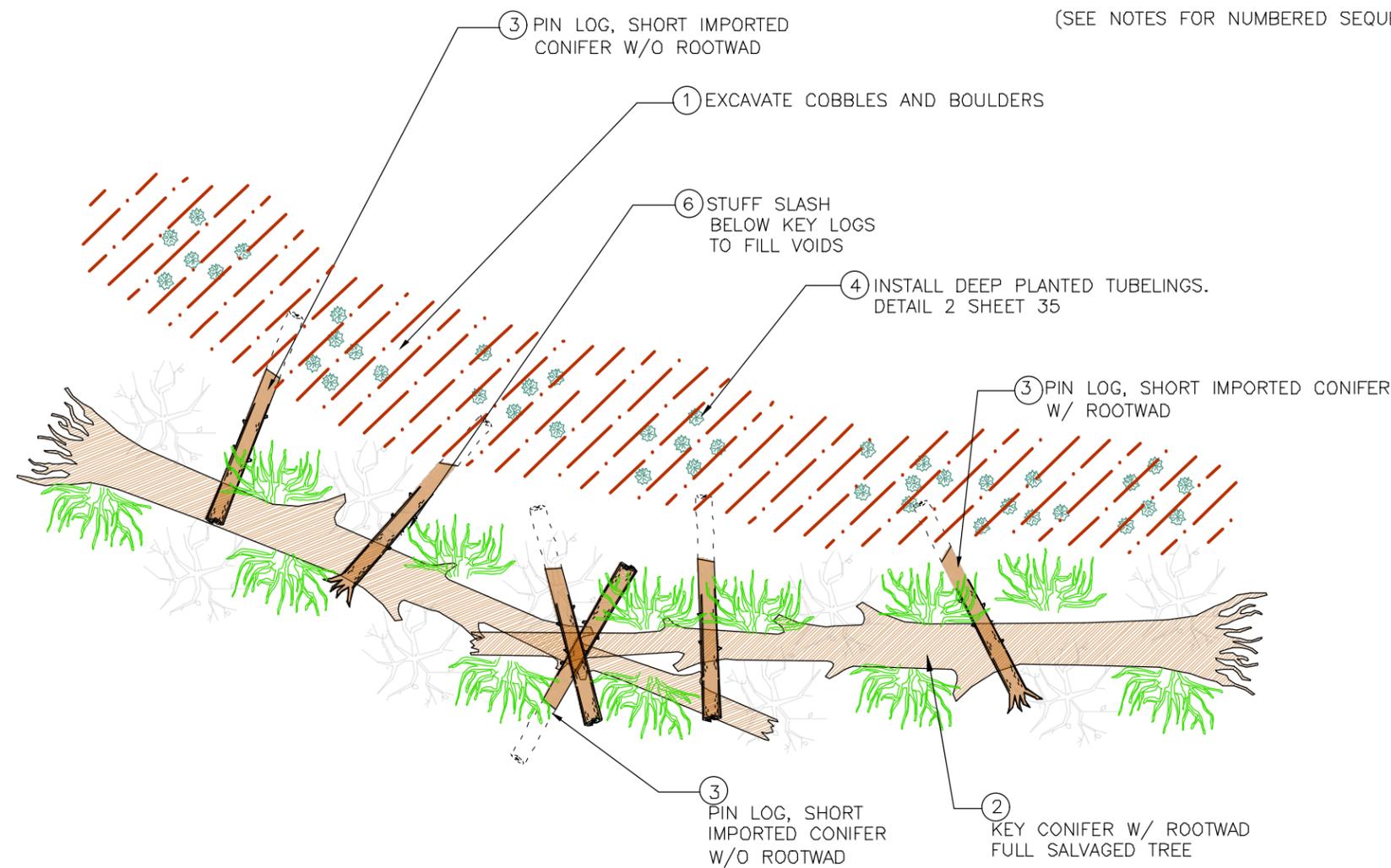
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 SAVE TIME: 3/11/2026 8:24:10 AM  
 PLOT TIME: 3/11/2026  
 USER NAME: CRAIG MCCONNELL

FILE NAME: G:\U-Z\WESTFORKTEANAWAYRMS.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW DWG\TEANAWAY WDFW\_SHT 16-18\TYPE 1 LOG DETAIL.DWG  
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 SAVE TIME: 3/12/2026 7:31:50 AM  
 PLOT TIME: 3/12/2026  
 USER NAME: CRAIG MCCONNELL

(SEE NOTES FOR NUMBERED SEQUENCE BELOW)

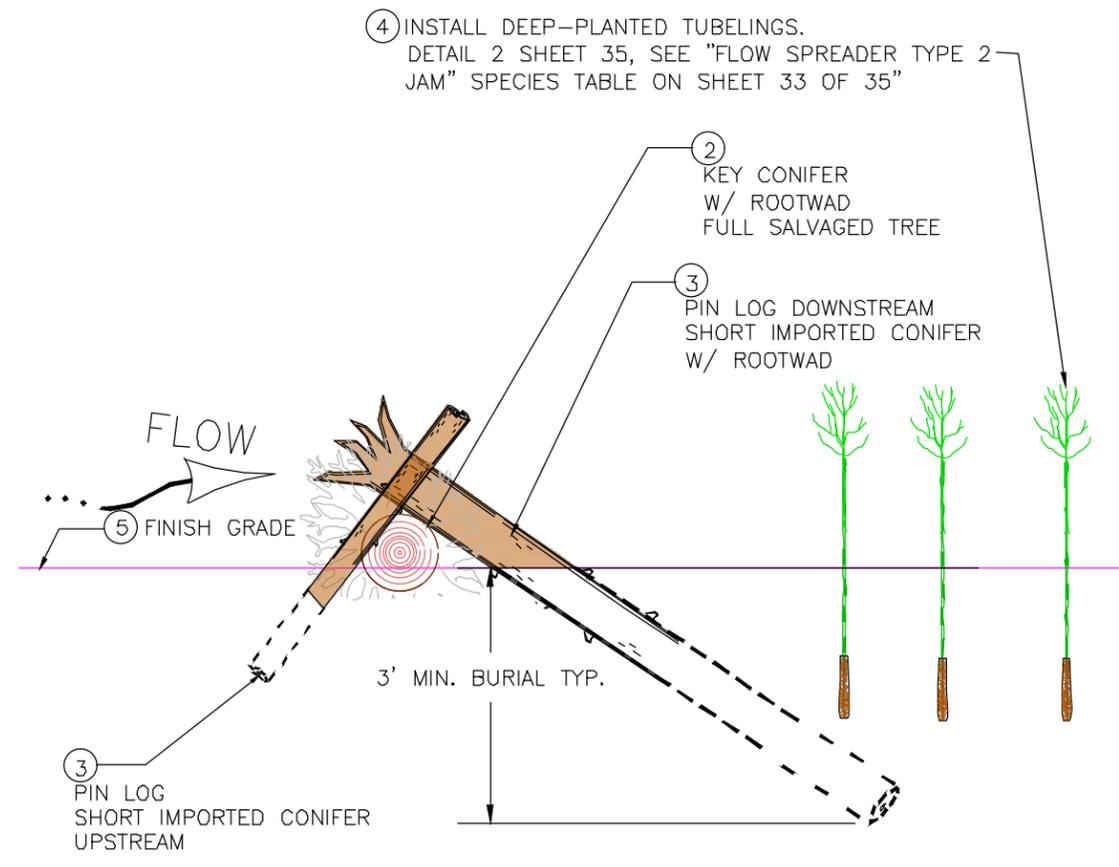
FLOW SPREADER JAM MATERIAL SUMMARY

MATERIAL	SIZE	QTY PER STRUCTURE
IMPORT LOG W/ROOTWAD	12"-22" DBH X 40'L	2 EA
SALVAGED TREE W/ROOTWAD	MIN. 18" DBH, LENGTH VARIES	2 EA
IMPORT LOG	12"-22" DBH X 40'L	6 EA
RACKING	VARIES	10 CY



FLOW SPREADER LOG JAM CONSTRUCTION SEQUENCE:

- NOTES:
- EXCAVATE AREA DOWNSTREAM OF FULL TREES TO EXPOSE AND REMOVE COBBLES AND BOULDERS, STOCKPILE LARGE MATERIAL FOR USE IN MAIN CHANNEL FILL.
  - PLACE FULL TREES ALONG UPSTREAM SIDE OF EXCAVATION.
  - INSTALL PIN LOGS INTO TRENCH AND OVERLAPPING THE KEY CONIFERS.
  - 40 DEEP PLANTED TUBELINGS SHALL BE INSTALLED PER DETAIL 2/37 AS PART OF EACH CHANNEL SPANNING LOG STRUCTURE. TUBELINGS SHOULD BE FIELD FIT ITEM TO BE PLACED AT THE DIRECTION OF OWNER OR OWNER REPRESENTATIVE. SEE PLANT LISTS FOR COMPOSITION AND SPACING.
  - BACKFILL UP TO TARGET GRADE.
  - STUFF SLASH TO PLUG VOIDS UPSTREAM AND DOWNSTREAM OF KEY LOGS.



TYPE 2 PLAN  
SCALE: N.T.S.

TYPE 2 PROFILE  
SCALE: N.T.S.



WASHINGTON STATE  
DEPARTMENT OF FISH AND WILDLIFE

SYM	DATE	REVISION DESCRIPTION	BY
APPROVED AND RELEASED FOR CONSTRUCTION			
ENGINEER			.DATE:
PROGRAM			.DATE:

BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS  
 DESIGNED BY D. MATTHEWS, PE  
 CHECKED BY A. UBER, PE  
 DRAWN BY K. CORWIN  
 DATE 03/12/2026

WEST FORK TEANAWAY  
 HABITAT RESTORATION PROJECT  
 TYPE 2 JAM DETAILS

PROJECT NO.  
 SHEET OF  
 W17 18

EXCAVATED UNDERFIT CHANNEL SHALL HAVE A MIX OF WOOD AND SEDIMENT GENERAL DOWNVALLEY FLOW

EXCAVATED FLOODPLAIN POOLS NO GREATER THAN 1 FT BELOW TARGET GRADE.



NOTES:

1. REDISTRIBUTE STOCKPILED TOPSOIL OVERBURDEN OVER GRADED AREAS TO DEPTH OF AT LEAST 1 FT AS REVEGETATION SEED SOURCE.
2. FINISH SURFACE SHALL BE WITHIN +/- 1FT OF TARGET GRADE ELEVATION SHOWN ON SHEET W10. GRADING SHALL CONTAIN A MIX OF POOLS, WOOD, AND SHALLOW CHANNELS AS SHOWN IN THE EXHIBIT.

PLAN VIEW

FLOODPLAIN MICRO-TOPOGRAPHY AND LOOSE WOOD DENSITY		
MATERIAL	SIZE	QTY PER ACRE
IMPORT LOG W/ROOTWAD	12"-18" DBH X 40' L	1-2
IMPORT LOG	12"-18" DBH X 40' L	70-80
SALVAGED TREE W/ROOTWAD	VARIES	7-10
RACKING	VARIES	200 CY

FILE NAME: G:\U-Z\WESTFORKTEANAWAYRM5.1\_7.1\_240217\DRAWINGS\REFERENCES\WDFW DWG\TEANAWAY WDFW SHT 16-18\TYPE 1 LOG DETAIL.DWG  
 LAYOUT TAB: W18 FLOODPLAIN ROUGHNESS  
 SAVE TIME: 3/11/2026 8:24:10 AM  
 PLOT TIME: 3/11/2026  
 USER NAME: CRAIG MCCONNELL



**WASHINGTON STATE**  
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PROGRAM		.DATE:	

DESIGNED BY	D. MATTHEWS, PE
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DRAWN BY	K. CORWIN
DATE	03/11/2026

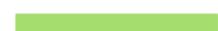
WEST FORK TEANAWAY		PROJECT NO.	
HABITAT RESTORATION		SHEET OF	
PROJECT		W18 18	
FLOODPLAIN ROUGHNESS AND			
LOOSE WOOD EXHIBIT			

WDFW VALLEY RESET SHEETS W1-W18

**LEGEND**

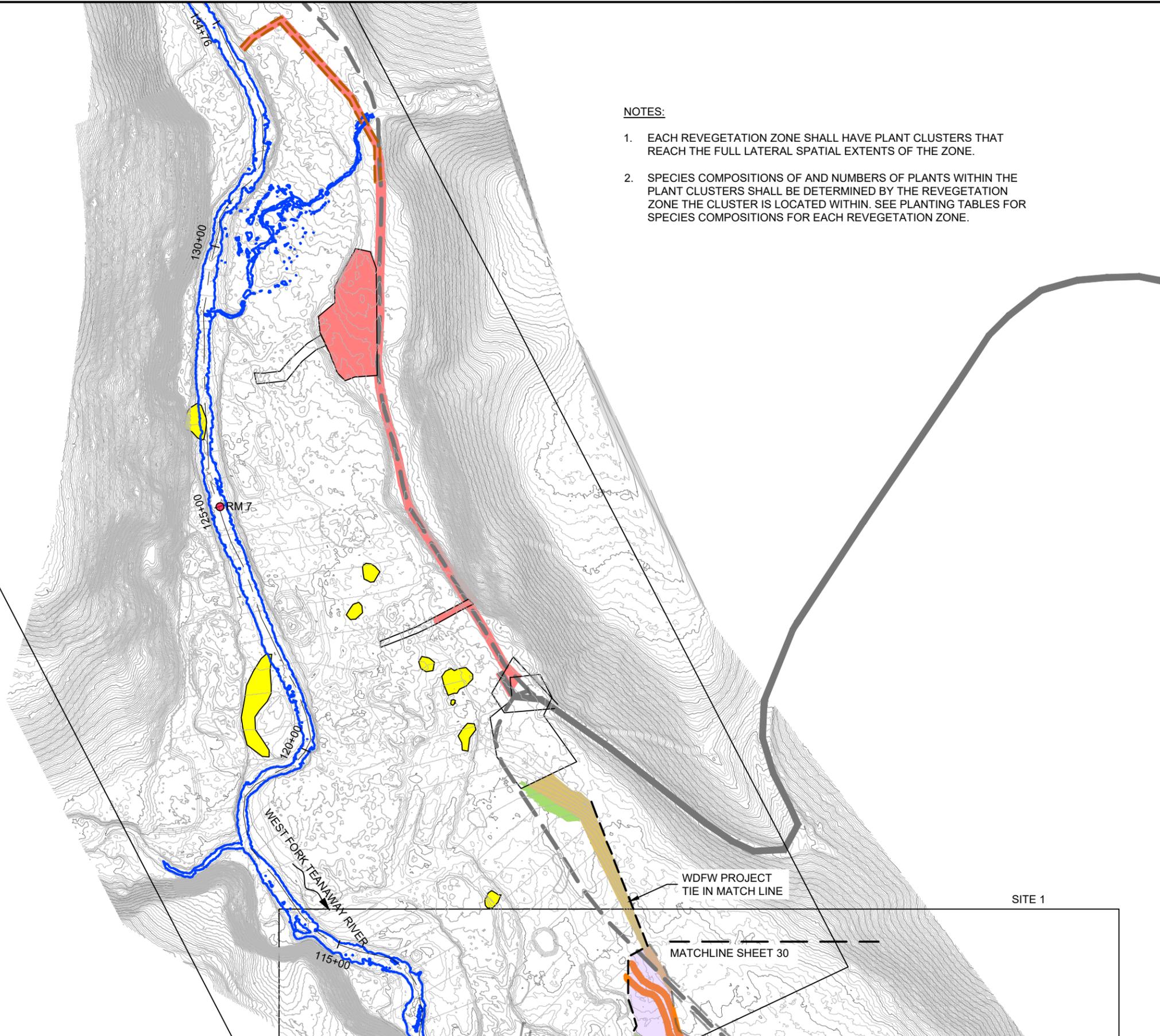
-  EXISTING SUMMER AVERAGE MODELED FLOW
-  35+00 EXISTING ALIGNMENT
-  EXISTING 1 FT CONTOUR
-  EXISTING 5 FT CONTOUR
-  LIMITS OF DISTURBANCE

**PLANTING KEY**

-  CONVENTIONAL RIPARIAN PLANTINGS
-  DEEP RIPARIAN PLANTINGS
-  UPLAND PLANTING AND SEEDING
-  WETLAND
-  CONVENTIONAL RIPARIAN BANK PLANTINGS
-  DEEP RIPARIAN BANK PLANTINGS
-  UPLAND SEEDING ONLY
-  STAGING AND ACCESS PLANTING/SEEDING
-  VEGETATION PRESERVATION AREAS

**NOTES:**

1. EACH REVEGETATION ZONE SHALL HAVE PLANT CLUSTERS THAT REACH THE FULL LATERAL SPATIAL EXTENTS OF THE ZONE.
2. SPECIES COMPOSITIONS OF AND NUMBERS OF PLANTS WITHIN THE PLANT CLUSTERS SHALL BE DETERMINED BY THE REVEGETATION ZONE THE CLUSTER IS LOCATED WITHIN. SEE PLANTING TABLES FOR SPECIES COMPOSITIONS FOR EACH REVEGETATION ZONE.



SCALE IN FEET

NO.	BY	DATE	REVISION DESCRIPTION

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EA, KS APPROVED	3/11/26 DATE	24-02-17 PROJECT

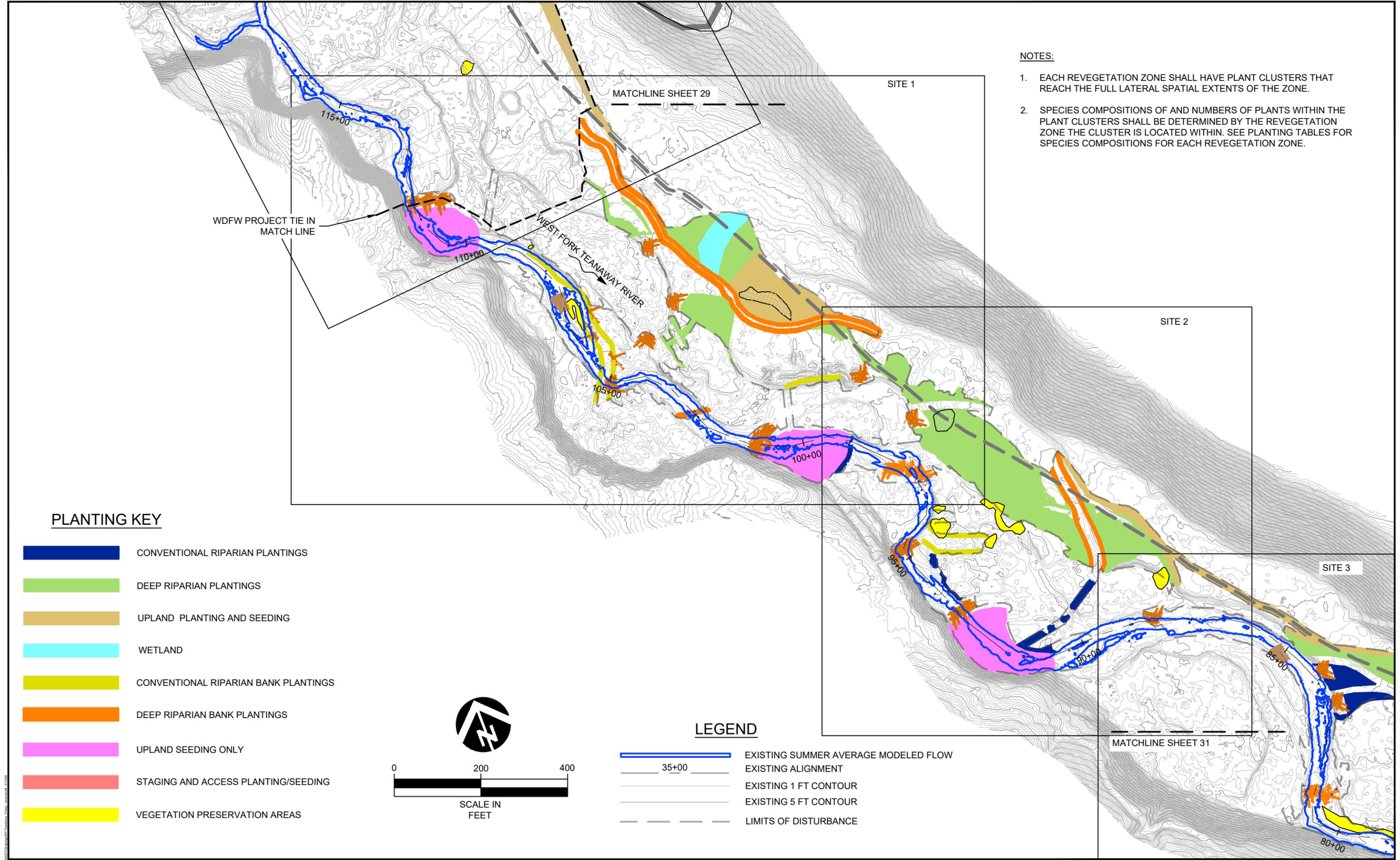
**WF TEANAWAY RIVER  
RM 5.1-6.75 RESTORATION  
FINAL DESIGN**



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**REVEGETATION PLAN RM 5.1-7.2  
(1 OF 4)**

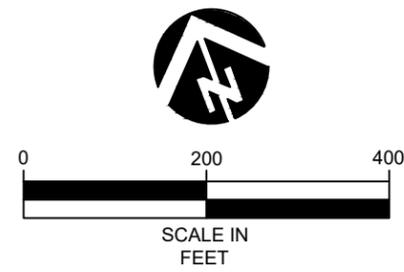
SHEET  
29 OF 35



- NOTES:**
1. EACH REVEGETATION ZONE SHALL HAVE PLANT CLUSTERS THAT REACH THE FULL LATERAL SPATIAL EXTENTS OF THE ZONE.
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**LEGEND**

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- EXISTING 5 FT CONTOUR
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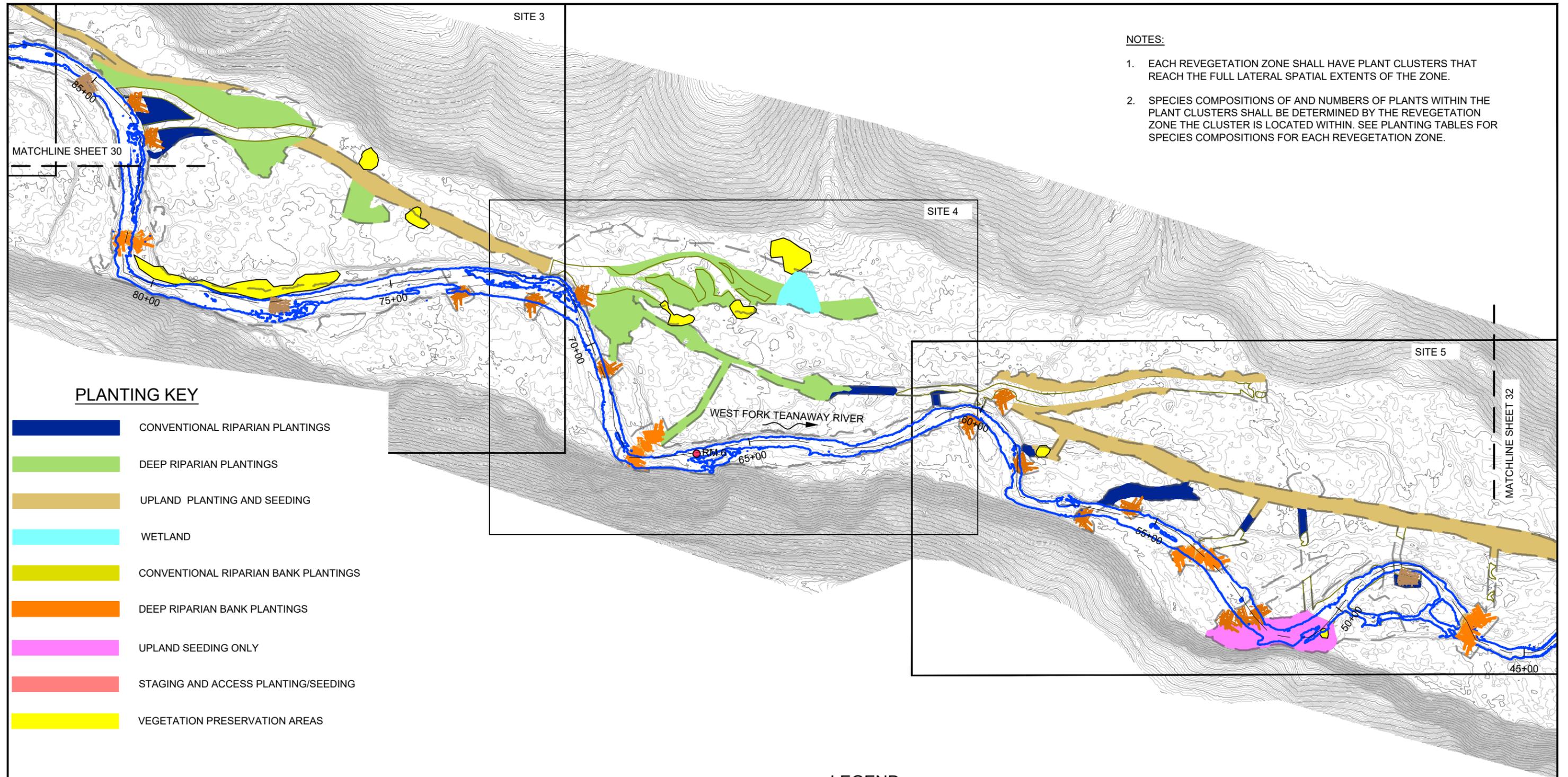
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**REVEGETATION PLAN RM 5.1-7.2  
(2 OF 4)**

SHEET  
**30 OF 35**



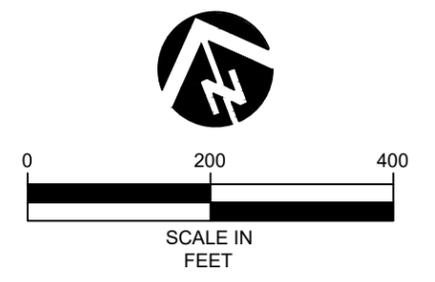
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- LIMITS OF DISTURBANCE



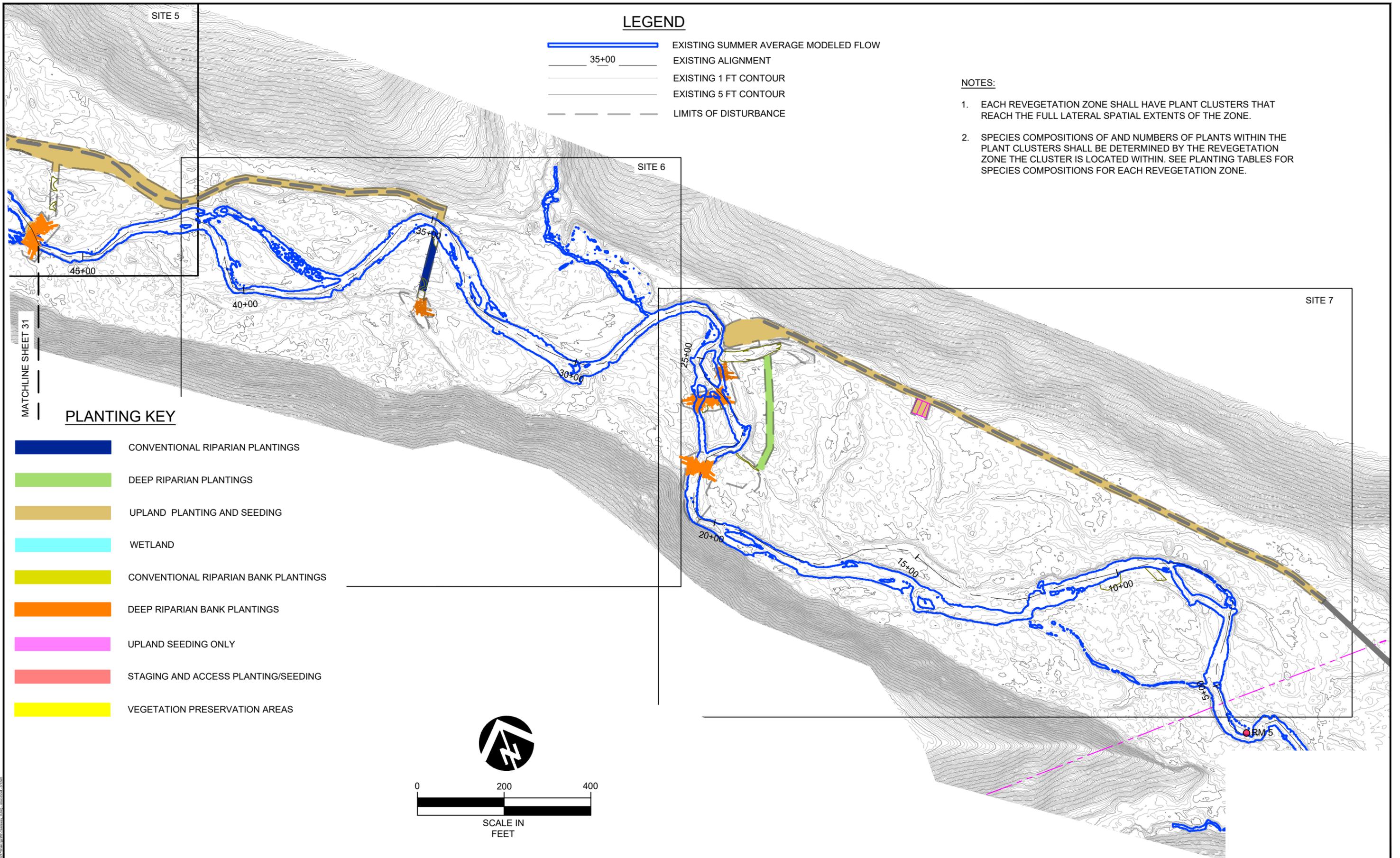
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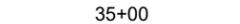
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**REVEGETATION PLAN RM 5.1-7.2  
(3 OF 4)**



**LEGEND**

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MATCHLINE SHEET 31



SCALE IN FEET

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**REVEGETATION PLAN RM 5.1-7.2  
(4 OF 4)**

SHEET

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**RIPARIAN PLANTING**

**Conventional Riparian Planting**

45 conventional tubelings will be installed per cluster.  
 Density: Clusters will be installed at 8 clusters/acre. Spacing between planting clusters is minimum 20 feet and maximum 60 ft from edge of cluster. Spacing between plantings is 6 feet on center.

COMMON NAME	SCIENTIFIC NAME	% OF SPECIES MIX	QUANTITY	PLANTS PER SPECIES GROUPING	MOISTURE TOLERANCE
Mountain maple	<i>Acer douglasii</i>	15%	35	3 to 5	Moderate
Mountain alder	<i>Alnus incana</i>	10%	23	3 to 5	High
Red alder	<i>Alnus rubra</i>	5%	12	3 to 5	Moderate
Black cottonwood	<i>Populus trichocarpa ssp. balsamifera</i>	30%	69	3 to 10	Moderate
Coyote willow	<i>Salix exigua</i>	15%	35	3 to 10	All
Barclay's willow	<i>Salix barclayi</i>	5%	12	3 to 5	High
Sitka willow	<i>Salix sitchensis</i>	10%	23	3 to 5	High
Douglas' spiraea	<i>Spiraea douglasii</i>	10%	23	3 to 5	Moderate

**Conventional Riparian Bank Plantings**

Tubelings shall cover in total 70% of Conventional Riparian Bank Planting zone. Wood and slash will occupy 30% of zone.  
 Density: Spacing between plantings is 6 feet on center.

COMMON NAME	SCIENTIFIC NAME	% OF SPECIES MIX	QUANTITY	PLANTS PER SPECIES GROUPING	MOISTURE TOLERANCE
Mountain maple	<i>Acer douglasii</i>	15%	31	3 to 5	Moderate
Mountain alder	<i>Alnus incana</i>	10%	20	3 to 5	High
Red alder	<i>Alnus rubra</i>	5%	10	3 to 5	Moderate
Black cottonwood	<i>Populus trichocarpa ssp. balsamifera</i>	30%	61	3 to 10	Moderate
Coyote willow	<i>Salix exigua</i>	15%	31	3 to 10	All
Barclay's willow	<i>Salix barclayi</i>	5%	10	3 to 5	High
Sitka willow	<i>Salix sitchensis</i>	10%	20	3 to 5	High
Douglas' spiraea	<i>Spiraea douglasii</i>	10%	20	3 to 5	Moderate

**Deep Riparian Plantings**

45 conventional container tubelings will be installed per cluster.  
 Density: Clusters will be installed at 8 clusters/acre. Spacing between planting clusters is minimum 20 feet and maximum 60 ft from edge of cluster. Spacing between plantings is 6 feet on center.

COMMON NAME	SCIENTIFIC NAME	% OF SPECIES MIX	QUANTITY	PLANTS PER SPECIES GROUPING	MOISTURE TOLERANCE
Mountain alder	<i>Alnus incana</i>	10%	150	3 to 10	High
Red-osier dogwood	<i>Cornus stolonifera</i>	10%	150	3 to 10	High
Black cottonwood	<i>Populus trichocarpa ssp. balsamifera</i>	40%	599	3 to 5	Moderate
Barclay's willow	<i>Salix barclayi</i>	10%	150	3 to 5	High
Coyote willow	<i>Salix exigua</i>	20%	300	3 to 10	All
Sitka willow	<i>Salix sitchensis</i>	10%	150	3 to 5	High

**Deep Riparian Bank Plantings**

Tubelings shall cover in total 70% of Deep Riparian Bank Planting zone. Wood and slash will occupy 30% of zone.  
 Density: Spacing between plantings is 6 feet on center.

COMMON NAME	SCIENTIFIC NAME	% OF SPECIES MIX	QUANTITY	PLANTS PER SPECIES GROUPING	MOISTURE TOLERANCE
Mountain alder	<i>Alnus incana</i>	10%	48	3 to 10	High
Red-osier dogwood	<i>Cornus stolonifera</i>	10%	48	3 to 10	High
Black cottonwood	<i>Populus trichocarpa ssp. balsamifera</i>	40%	193	3 to 5	Moderate
Barclay's willow	<i>Salix barclayi</i>	10%	48	3 to 5	High
Coyote willow	<i>Salix exigua</i>	20%	96	3 to 10	All
Sitka willow	<i>Salix sitchensis</i>	10%	48	3 to 5	High

WDFW TYPE 2  
 FLOW SPREADER  
 TYPICAL SHEET W17

**Type 2 Jam Plantings (7 Structures)**

40 deep-plant tubelings will be installed per structure. See typical for deep-plant installation with Flow Spreader Type 2 structures.

COMMON NAME	SCIENTIFIC NAME	% OF SPECIES MIX	QUANTITY	PLANTS PER SPECIES GROUPING
Red-osier dogwood	<i>Cornus stolonifera</i>	10%	28	3 to 5
Black cottonwood	<i>Populus trichocarpa ssp. balsamifera</i>	40%	112	3 to 5
Coyote willow	<i>Salix exigua</i>	25%	70	3 to 10
Barclay's willow	<i>Salix barclayi</i>	10%	28	3 to 5
Sitka willow	<i>Salix sitchensis</i>	15%	42	3 to 5

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**WF TEANAWAY RIVER  
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**SEED AND PLANT LISTS RM 5.1-7.2  
 (1 OF 2)**

SHEET
33 OF 35

**WETLAND PLANTING AND SEEDING**

Emergent Plugs shall be installed into the Erosion Control Blanket. Plants will be installed in groups of 3-5 plants of each species. See Specifications for installation details.

Density: Clusters (50 plants each) will be installed at 53 clusters/acre, covering 25% of the area across the full lateral extent of the planting zone. Spacing between planting clusters is a minimum of 10 feet and maximum of 25 feet from edge of cluster. Spacing between plantings is 2 feet on center.

PLUGS	COMMON NAME	SCIENTIFIC NAME	% OF SPECIES MIX	QUANTITY
	Spiked bentgrass	<i>Agrostis exarata</i>	10%	101
	Bluejoint reedgrass	<i>Calamagrostis canadensis</i>	15%	152
	Big-leaf sedge	<i>Carex amplifolia</i>	10%	101
	Cusick's sedge	<i>Carex cusickii</i>	10%	101
	Tall mannagrass	<i>Glyceria elata</i>	15%	152
	Baltic rush	<i>Juncus balticus</i>	15%	152
	Soft rush	<i>Juncus effusus</i>	15%	152
	Small-fruited bullrush	<i>Scirpus microcarpus</i>	10%	101

Wetland seed shall be installed within the Wetland Planting Zone prior to installation of Erosion Control Blanket. See Specifications for installation details.

WETLAND SEED	COMMON NAME	SCIENTIFIC NAME
	Spiked bentgrass	<i>Agrostis exarata</i>
	Bluejoint reedgrass	<i>Calamagrostis canadensis</i>
	Big-leaf sedge	<i>Carex amplifolia</i>
	Cusick's sedge	<i>Carex cusickii</i>
	Tall mannagrass	<i>Glyceria elata</i>
	Baltic rush	<i>Juncus balticus</i>
	Soft rush	<i>Juncus effusus</i>
	Small-fruited bullrush	<i>Scirpus microcarpus</i>

**PLANT MATERIAL QUANTITIES**

LIVE PLANTS	TOTAL (EA)
Total Deep-Planted Plants	2260
Total Emergent + Conventional Plants	1448
<b>SEEDING ZONES</b>	
<b>ACRES</b>	
UPLAND	6.3
RIPARIAN SEEDING	5.6
WETLAND SEEDING	0.4
STRAW MULCH	11.9

**SEEDING**

All Riparian Seeding: To be applied to Conventional Riparian Planting and Deep Riparian Plantings zones.

Seeding rate: Broadcast 40 lbs/acre; Hydroseed 20 lbs/acre.		
Riparian Acreage		5.61
COMMON NAME	SCIENTIFIC NAME	PERCENT OF
Mountain brome	<i>Bromus sitchensis var marginatus</i>	25
Slender hairgrass	<i>Deschampsia elongata</i>	10
Blue wildrye	<i>Elymus glaucus</i>	25
Slender wheatgrass	<i>Elymus trachycaulus</i>	25
Idaho fescue	<i>Festuca idahoensis</i>	15

Upland, Staging and Access, and Engineered Wood Jam Seeding

Seeding rate: Broadcast 40 lbs/acre. Hydroseed 20 lbs/acre.		
Total Acreage		7.71
COMMON NAME	SCIENTIFIC NAME	% OF MIX (PLS)
Large mountain brome	<i>Bromus sitchensis var marginatus</i>	20
Pinegrass	<i>Calamagrostis rubescens</i>	7
Elk sedge	<i>Carex geyeri</i>	8
Squirreltail	<i>Elymus elymoides</i>	10
Blue wildrye	<i>Elymus glaucus</i>	20
Slender wheatgrass	<i>Elymus trachycaulus</i>	20
Idaho fescue	<i>Festuca idahoensis</i>	15

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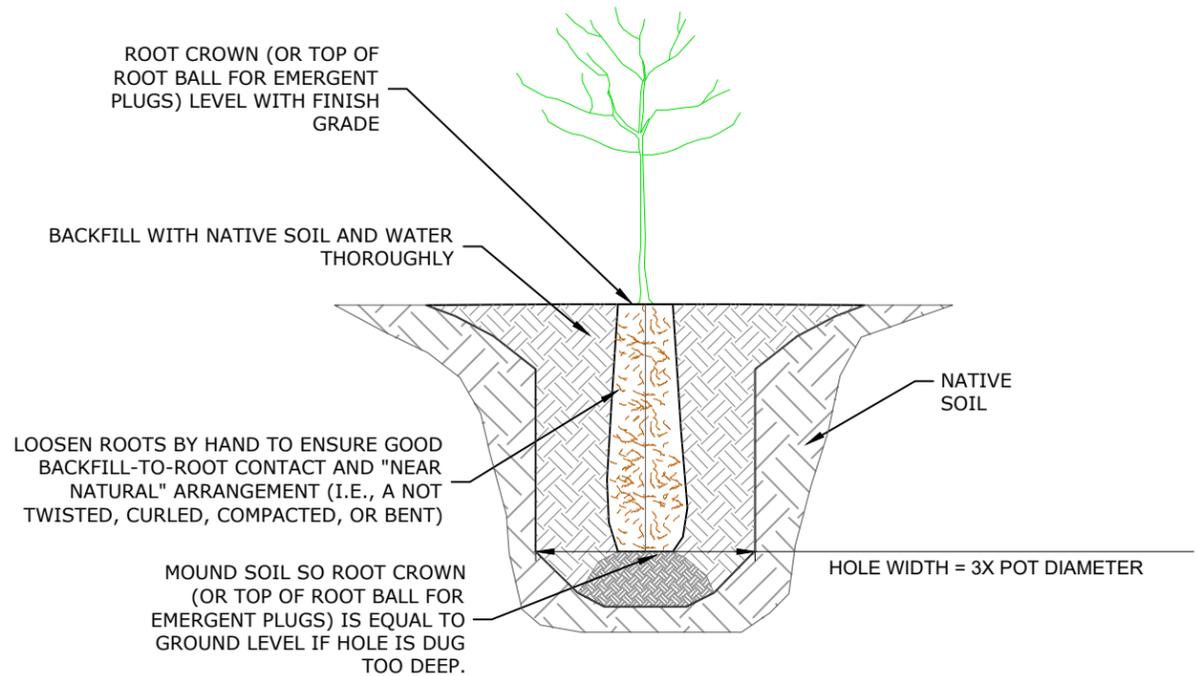
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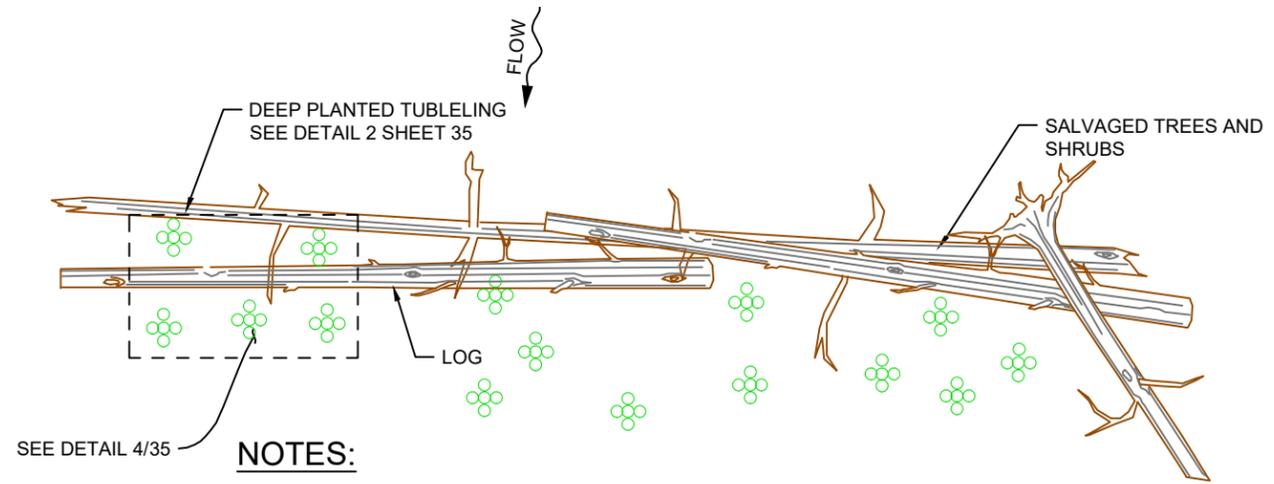
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SEED AND PLANT LISTS RM 5.1-7.2  
(2 OF 2)

SHEET  
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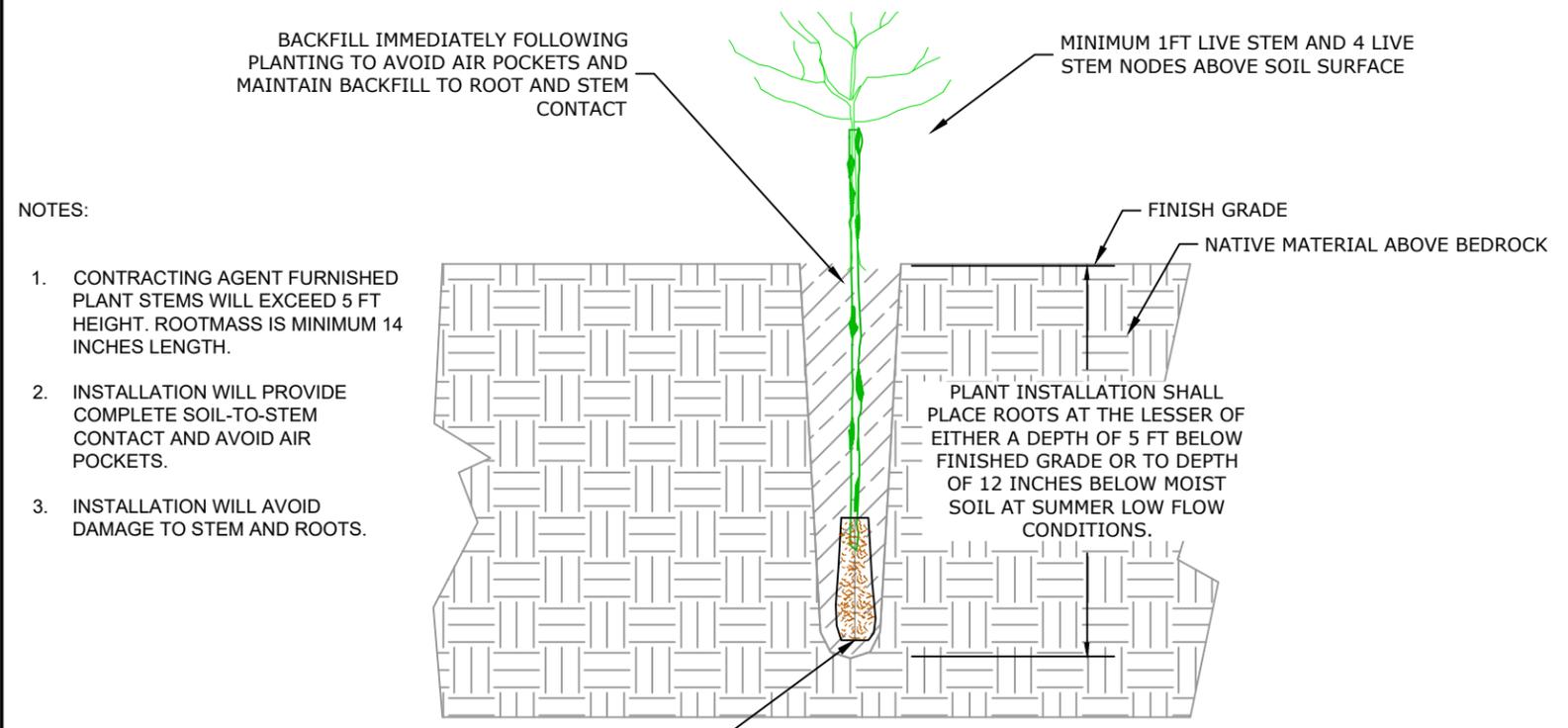


**1**  
**35** TYPICAL DETAIL - CONTAINER PLANT/TUBELING/EMERGENT PLUG  
NOT TO SCALE



- NOTES:**
1. DEEP PLANTED TUBELINGS SHALL BE INSTALLED ADJACENT TO UP TO 30% OF INSTALLED FLOODPLAIN ROUGHNESS WOOD DURING THE PLANTING WINDOW.
  2. EACH FLOODPLAIN ROUGHNESS CLUSTER SHALL HAVE A MINIMUM OF 2 GROUPINGS OF 3 COTTONWOODS (6 FEET ON CENTER) AND 3 GROUPS OF DIFFERENT SPECIES OF SHRUBS. ALL OF THESE ARE 6 FEET ON CENTER. GROUPINGS SHALL RANGE IN SIZE FROM 3 TO 5 PLANTS.

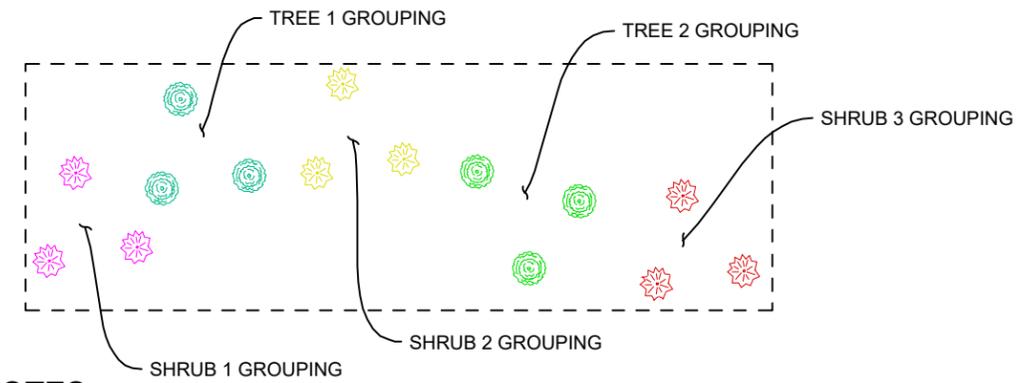
**3**  
**35** PLAN - DEEP PLANTED TUBELING WITH FLOODPLAIN ROUGHNESS WOOD  
NOT TO SCALE



- NOTES:**
1. CONTRACTING AGENT FURNISHED PLANT STEMS WILL EXCEED 5 FT HEIGHT. ROOTMASS IS MINIMUM 14 INCHES LENGTH.
  2. INSTALLATION WILL PROVIDE COMPLETE SOIL-TO-STEM CONTACT AND AVOID AIR POCKETS.
  3. INSTALLATION WILL AVOID DAMAGE TO STEM AND ROOTS.

LOOSEN ROOTS BY HAND TO ENSURE GOOD BACKFILL-TO-ROOT CONTACT AND "NEAR NATURAL" ARRANGEMENT (I.E., A NOT TWISTED, CURLED, COMPACTED, OR BENT)

**2**  
**35** TYPICAL DETAIL - DEEP PLANTED TUBELING  
NOT TO SCALE



- NOTES:**
1. LOCALIZED ADJUSTMENTS TO OPTIMIZE PLANTING CONDITIONS SUCH AS THE NEAREST APPROPRIATE LOCATION SHALL BE MADE TO MAXIMIZE SOIL MOISTURE, AVOIDING PLANTING ON LOGS, COMPACTED SLASH, ROCK OUTCROPS, COBBLE, GRAVEL, OR STANDING WATER.
  2. CLUSTER PLANTINGS SPECIES SHALL BE DEFINED BY GROUPINGS SHOWN ON THE LIVE PLANT LISTS. CLUSTERS SHALL HAVE A MINIMUM OF TWO GROUPINGS OF TREES (A MINIMUM OF TWO DIFFERENT TREE SPECIES WHEN PRESENT) AND MINIMUM OF THREE DIFFERENT GROUPINGS OF SHRUB SPECIES. WETLAND CLUSTERS SHALL INCLUDED A MINIMUM OF 3 SPECIES PER CLUSTER

**4**  
**35** PLAN - TYPICAL CLUSTER LAYOUT DETAIL  
NOT TO SCALE

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TYPICAL DETAILS - REVEGETATION  
RM 5.1-7.2

SHEET  
35 OF 35