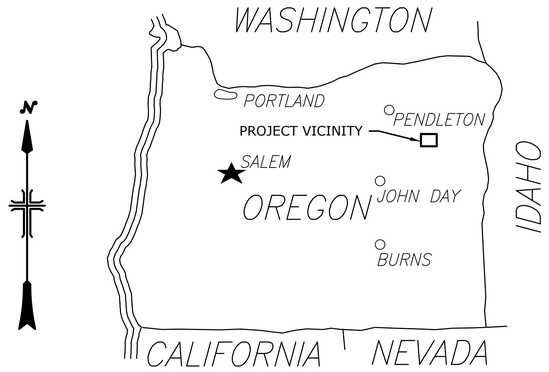
CONTROLLED

BUFFALO FLATS HABITAT IMPROVEMENT PROJECT

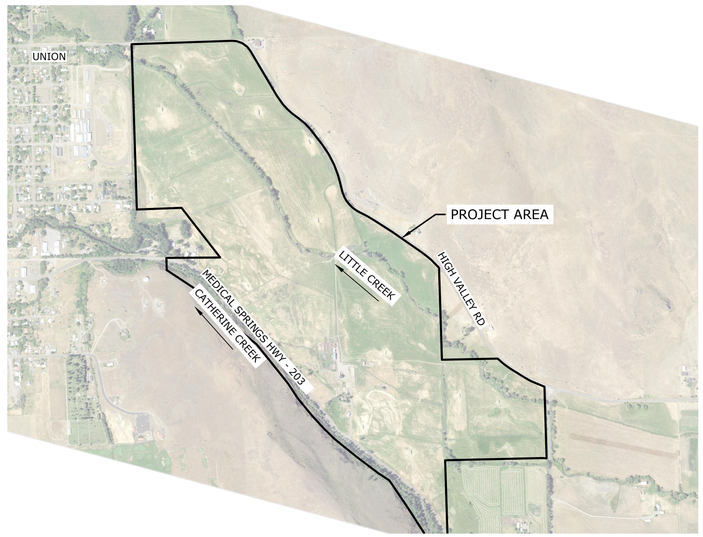
LITTLE CREEK - GRANDE RONDE RIVER SUBBASIN

80% DESIGN DRAWINGS

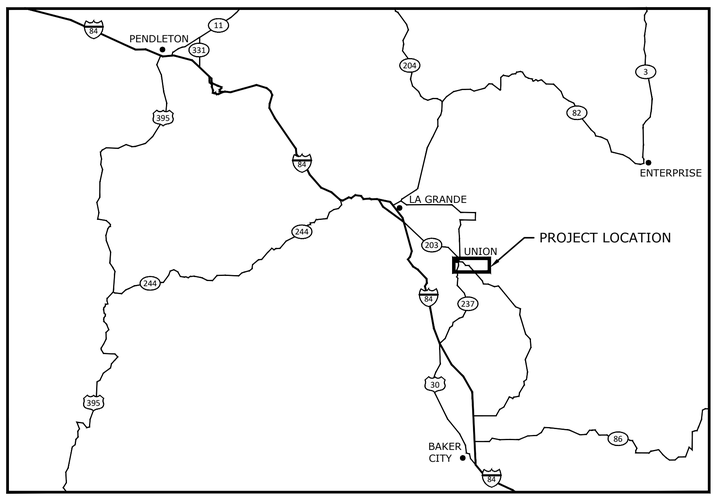
DECEMBER 2024



KEY MAP



LOCATION MAP



VICINITY MAP

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ON BEHALF OF:

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION,
PACIFIC NORTHWEST REGION
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PARTNERS:

BONNEVILLE POWER ADMINISTRATION
UNION SOIL AND WATER CONSERVATION DISTRICT
CTUIR
TROUT UNLIMITED
LANDOWNERS

Site Summary

T4S, R40E
Union County, Oregon

SHEET INDEX

BUREAU OF RECLAMATION

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COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
FCRPS HABITAT ENHANCEMENT PROGRAM - OREGON

GRANDE RONDE RIVER SUBBASIN
BUFFALO FLATS HABITAT IMPROVEMENT PROJECT

Draft
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UNION, OR 2024-12-09

COVER, SHEET INDEX & VICINITY MAPS

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SHEET 1 OF 37

LAST SAVED DATE
2024-12-09
LAST SAVED BY
MCOX

CAD SYSTEM
AUTOCAD 24.3 (LMS TECH)
CAD FILENAME
IFL_BUFFALOFLATS_D.DWG

CONTROLLED

GENERAL NOTES

1. Work shown in these contract documents will be performed for the Union County Soil and Water Conservation District, herein referred to as "Contracting Agency". Contracting Agency's representative assigned by Contracting Agency is herein referred to as the "Contracting Officer".
2. The drawings contained within should not be applied to any project except the one specified.
3. For those portions of full-size drawings (22x34 inches) showing scale bars, the major scale unit equals 1 inch. On comparable portions of half-size drawings (11x17 inches), the major scale unit equals 1/2 inch.
4. Elevations and distances shown are in feet and decimals with contour intervals at 1-foot and 5-foot increments.
5. Horizontal datum is State Plane Coordinate System, Oregon North Zone, NAD83 (2011), International Feet. The vertical datum is NAVD88.
6. Topographic mapping within stream banks was performed in 2019 (USBR and Inter-Fluve), 2020 (Inter-Fluve). Geometry of the stream bed and banks at the time of construction may be different than shown on the Drawings. Topographic mapping outside the stream banks is based on 2020 bathymetric LiDAR performed by Quantum Spatial (Corvallis, Oregon), and supplemental survey performed by USBR (2017, 2018, 2019 and 2020) and Inter-Fluve (2019 and 2022).

CONTRACTOR REQUIREMENTS

1. Contractor shall be responsible for obtaining, at Contractor's expense, all other permits as required by local, state, and Federal agencies (SWPPP for Construction Activities).
2. Contractor shall pursue work in a diligent manner and provide all material, labor, and equipment required to ensure timely completion of the project excluding materials provided by Contracting Agency.
3. Contractor shall furnish all material and workmanship necessary for compliance with permit conditions, approving agency (Contracting Agency) requirements, and contract documents.
4. Contractor shall post on-site in a location visible to the public the following documentation:
   a. Contractor's contact name, phone number, and address for the person responsible for oversight;
   b. A description of the hazardous materials that will be used, including inventory, storage, and handling procedures;
   c. Procedures to contain and control a spill of any hazardous material generated, used, or stored on-site, including notification of proper authorities; and
   d. A standing order to cease work in the event of high flows (as defined in specifications) except as necessary to minimize resource damage (above those addressed in the design and implementation plans) or exceedance of take or water quality limitations.
5. Contractor shall construct the project in accordance with the contract documents provided by Contracting Agency. Work shall not be done without the current set of approved construction plans.
6. Contractor shall be solely and completely responsible for the conditions of the Project Site, including safety of all persons and property during performance of the work. The contractor shall ensure that all work conforms to pertinent safety regulations and codes including OSHA.
7. All work within the existing ordinary high water and/or the diverted actively flowing channel shall occur within the allowable Oregon Department of Fish and Wildlife in-water work window, assumed to be July 1 to October 15.
8. Contractor shall coordinate with Contracting Officer to ensure fish salvage within the Project Site has been accomplished prior to construction activities. Fish salvage will be the responsibility of Contracting Agency.
9. Contractor shall avoid, preserve, and protect existing sensitive areas as marked in the field by Contracting Officer.
10. Construction shall minimize disturbance to existing riparian vegetated areas and maximize reuse of existing riparian vegetation.
11. All native materials not used on-site shall be disposed of on-site by Contractor as directed by the Contracting Officer and all non-native materials shall be hauled offsite by Contractor and properly disposed of.

UTILITY NOTES

1. The location of existing utilities shown on the drawings are approximate and have not been field verified. Utility location and protection is the sole responsibility of the contractor. The contractor shall be responsible for verifying the exact type, owner, location, and elevation of all buried and overhead utilities. It is the contractor's responsibility to perform the work in a safe manner and in accordance with any requirements set forth by the utility owner and applicable laws and regulations.
2. Contractor shall notify utility owners within the limits of construction a minimum of two weeks prior to excavation or other construction activity that may impact the utility. Contractor shall also contact the contracting officer prior to any construction activity in the area. Contractor shall provide access to utility owners for maintenance and work on their utilities during the course of the work.
3. Relocations and/or replacements of existing utilities shall be coordinated by the contractor with the utility owner. Contractor shall contact, schedule, and establish utility shut down times and determine the relocation and/or replacement requirements of existing utilities prior to the start of any work. The utility shall be relocated or replaced to the satisfaction of the utility owner.
4. The size, location and type of underground utilities exposed or modified by the contractor shall be accurately noted and placed on the contractor's as-built drawings.

CARE OF WATER

1. The Contractor is responsible for work area isolation and performing work in compliance with all permits and ESA stipulations which are detailed in BPA's HIP IV conservation measures on sheets 3-5. The Contractor may only work within ordinary high water (OHW) during the stipulated in-water work period.

WETLANDS AND WATERS OF THE US

1. The ordinary high water (OHW) and wetland lines displayed in this design package were delineated by Inter-Fluve staff in 2019 and are based upon analysis, modeling, field reconnaissance and best professional judgement.

   These do not represent jurisdictional boundaries. Within the state of Oregon, the Army Corps of Engineers and the Department of State Lands have the final authority in determining waters and wetlands boundaries and regulations.

ABBREVIATIONS

AC	Acre
BMP	Best Management Practices
B.O.	Biological Opinion
BPA	Bonneville Power Administration
CFS	Cubic Feet per Second
CO / C.O.	Contracting Officer
CP	Control Point
CSRO	Columbia-Snake Salmon Recovery Office
CWA	Clean Water Act
CY	Cubic Yards
DBH	Diameter at Breast Height
DC	Direct Current
DEQ	Department Environmental Quality
DIA	Diameter
DSL	Department of State Lands
E	East
El	Elevation
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FCRPS	Federal Columbia River Power System
FG	Finished Grade
FT	Foot
GRMW	Grande Ronde Model Watershed
HIP	Habitat Improvement Program
Hwy	Highway
I	Interstate
IN	Inch
LBS	Pounds
LF	Linear Feet
LWM	Large Woody Material
MAX	Maximum
MC	Main Channel
MIN	Minimum
MW	Monitoring Well
N	North
NAD	North American Datum
NAVD	North American Vertical Datum
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPDES	National Pollution Discharge Elimination System
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OHW	Ordinary High Water
OR	Oregon
OSHA	Occupational Safety and Health Administration
PDC	Pulsed Direct Current
PH	Phone
PLS/AC	Pure Live Seed per Acre
R	Range
S	South
SC	Side Channel
Sec.	Section
SHPO	State Historic Preservation Office
STA	Station
SWCD	Soil and Water Conservation District
SWPPP	Storm Water Pollution Prevention Plan
SY	Square Yards
T	Township
TESC	Temporary Erosion & Sediment Control
TOB	Top of Bank
Typ	Typical
U.S.	United States
USACE	United States Army Corps of Engineers
USBR	United State Bureau of Reclamation
USFS	United States Forest Service
USFWS	United States Fish & Wildlife Service
v	Volts
W	West
WSE	Water Surface Elevation
YR	Year
μs	Micro-Siemens

ESTIMATED EARTHWORK QUANTITIES

EARTHWORK		
Type	Unit	Quantity
Excavation	CY	35,960
Fill placed as restoration	CY	17,620 (22,025)[1]
Fill placed as stockpile	CY	13,935[2]

1. A 1.25% COMPACTION FACTOR HAS BEEN APPLIED TO THE VOLUME OF FILL PLACED AS RESTORATION.
2. THE VOLUME OF FILL PLACED AS STOCKPILE WILL VARY BASED ON THE OBSERVED COMPACTION REQUIRED DURING CONSTRUCTION TO MEET FINISH GRADES.

LARGE WOOD AND FLOODPLAIN STRUCTURE SCHEDULE

Structure Type	Rootwad Log (12" DBH, 35'L)	Small Whole Tree (8" DBH - 25' long)	Racking Wood (4" to 6" diameter, min 10 ft long)	Snags (10" diameter, 10ft long)	Willow Cuttings
Habitat Wood	184	92	552	--	--
Flow Split Wood	34	17	102	34	--
Channel Spanning Wood	60	80	160	160	--
Small Whole Tree - Channel	--	83	--	--	--
Small Whole Tree - Floodplain	--	59	--	--	--
Willow Trench (6680 LF)	--	--	--	--	20040
Flood Fence (2480 LF)	--	--	--	--	2480
Project Totals	278	331	814	194	22520

LAST SAVED DATE 2024-12-20 LAST SAVED BY MCOX

CAD SYSTEM AutoCAD 24.3S (LMS TECH) CAD FILENAME IFI_BUFFALOFLATS_D.DWG

— BUREAU OF — RECLAMATION

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GENERAL NOTES, QUANTITIES & ABBREVIATIONS

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SHEET 2 OF 37

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:

5. THE LOCATION AND NUMBER OF ALL WET CROSSINGS SHALL BE APPROVED BY THE BPA EC LEAD AND DOCUMENTED IN THE CONSTRUCTION PLANS;
6. VEHICLES AND MACHINERY SHALL CROSS STREAMS AT RIGHT ANGLES TO THE MAIN CHANNEL WHENEVER POSSIBLE;
7. NO STREAM CROSSINGS WILL OCCUR 300 FEET UPSTREAM OR 100 FEET DOWNSTREAM OF AN EXISTING REDD OR SPAWNING FISH; AND
8. 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:

8. 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;
9. 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;
10. 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;
11. 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;
12. SEDIMENT WILL BE REMOVED FROM EROSION CONTROLS ONCE IT HAS REACHED 1/3 OF THE EXPOSED HEIGHT OF THE CONTROL; AND
13. 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.

11. SPILL PREVENTION, CONTROL, AND COUNTER MEASURES.

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

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

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

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

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

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

12. INVASIVE SPECIES CONTROL.

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

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

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

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CONSERVATION MEASURES - PROJECT DESIGN AND SITE PREPARATION

3

SHEET 3 OF 37

LAST SAVED DATE 2024-12-20
LAST SAVED BY MCOX

CAD SYSTEM AutoCAD 24.3S (LMS TECH)
CAD FILENAME IFI_BUFFALOFLATS_D.DWG

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).

4. DEWATERING.

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

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

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

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

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

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UNION, OR 2021-06-17

CONSERVATION MEASURES - WORK AREA ISOLATION & FISH SALVAGE

CONSTRUCTION AND POST CONSTRUCTION CONSERVATION MEASURES.

1. FISH PASSAGE.

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

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

2. CONSTRUCTION AND DISCHARGE WATER.

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

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

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

3. TIME AND EXTENT OF DISTURBANCE.

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

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

4. CESSATION OF WORK.

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

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

5. SITE RESTORATION.

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

B. PROJECT-RELATED WASTE WILL BE REMOVED.

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

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

6. REVEGETATION.

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

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

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

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

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

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

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

7. SITE ACCESS AND IMPLEMENTATION MONITORING.

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

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

8. CWA SECTION 401 WATER QUALITY CERTIFICATION.

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

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

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.

7. TURBIDITY MONITORING PROTOCOL WILL BE APPLIED TO REWATERING EFFORTS.

8. 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.

9. INSTALL SEINE NETS AT UPSTREAM END TO PREVENT FISH FROM MOVING DOWNSTREAM UNTIL 2/3 OF TOTAL FLOW IS RESTORED TO THE CHANNEL.

10. STARTING IN EARLY MORNING INTRODUCE 1/3 OF NEW CHANNEL FLOW OVER PERIOD OF 1-2 HOURS.

11. INTRODUCE SECOND THIRD OF FLOW OVER NEXT 1 TO 2 HOURS AND BEGIN FISH SALVAGE OF BYPASS CHANNEL IF FISH ARE PRESENT.

12. 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).

13. INTRODUCE FINAL THIRD OF FLOW ONCE FISH SALVAGE EFFORTS ARE COMPLETE AND DOWNSTREAM TURBIDITY VERIFIED TO BE WITHIN ACCEPTABLE RANGE.

14. INSTALL PLUG TO BLOCK FLOW INTO OLD CHANNEL OR BYPASS. REMOVE ANY REMAINING SEINE NETS.

15. 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).

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CONSERVATION MEASURES - CONSTRUCTION, REWATERING PLAN, TURBIDITY

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SHEET 5 OF 37

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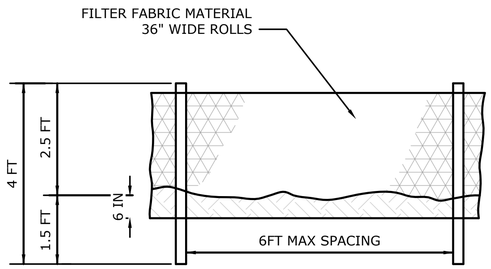

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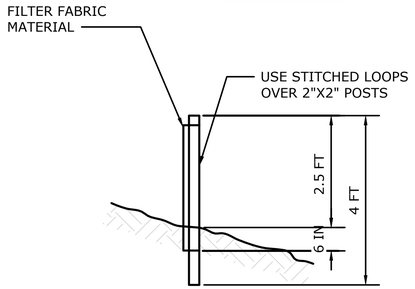

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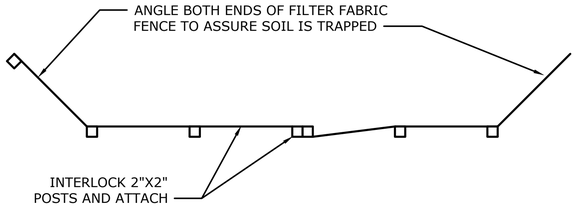
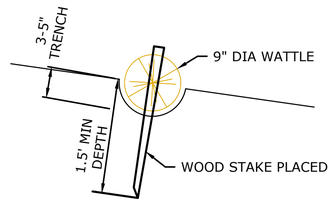


PLAN VIEW

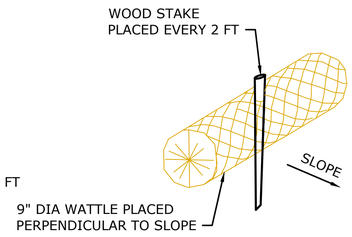
NOTES:

1. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6 INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST. ALTERNATIVELY, OVERLAP AND INTERLOCK TWO POSTS WITH ATTACHED FABRIC AS APPROVED BY THE OWNER'S REPRESENTATIVE.
2. THE SILT FENCE IS TO BE INSTALLED AT LOCATIONS SHOWN ON THE PLAN ALONG THE DOWNHILL PERIMETER OF DISTURBED AREAS. THE FENCE POST SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 24 INCHES APART.
3. THE FILTER FABRIC SHALL HAVE A MINIMUM VERTICAL BURIAL OF 6 INCHES. ALL EXCAVATED MATERIAL FROM SILT FENCE INSTALLATION SHALL BE BACK-FILLED AND COMPACTED ALONG THE ENTIRE DISTURBED AREA.
4. STANDARD OR HEAVY DUTY SILT FENCE SHALL HAVE MANUFACTURED STITCHED LOOPS FOR 2 INCHES X 2 INCHES POST INSTALLATION.
5. SILT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY PROTECTED AND STABILIZED, OR AS DIRECTED BY THE OWNER'S REPRESENTATIVE.

TYPICAL DETAIL – SILT FENCE
NOT TO SCALE



SECTION VIEW



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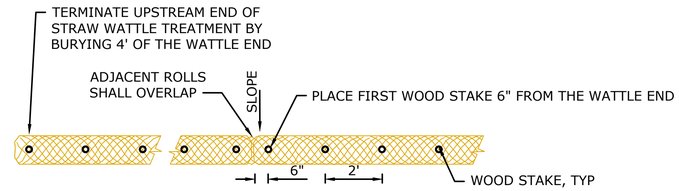

PLAN VIEW

NOTES:

1. INSTALL WATTLES WITHIN TRENCH, SO THAT NO GAPS EXIST BETWEEN THE SOIL AND THE BOTTOM OF THE WATTLE. THE ENDS OF ADJACENT WATTLES SHALL BE TIGHTLY ABUTTED SO THAT NO OPENING EXISTS FOR WATER OR SEDIMENT TO PASS THROUGH.
2. WOOD STAKES SHALL BE USED TO FASTEN THE WATTLES TO THE SOIL. WHEN CONDITIONS WARRANT, A STRAIGHT METAL BAR CAN BE USED TO DRIVE A "PILOT HOLE" THROUGH THE WATTLE AND INTO THE SOIL.
3. A WOOD STAKE SHALL BE PLACED 6" FROM THE WATTLE END, ANGLED SUCH THAT IT IS PERPENDICULAR TO GRADE. WOOD STAKES SHALL BE SPACED AT 2-FEET CENTERS LEAVING LESS THAN 1-2 INCHES OF STAKE EXPOSED ABOVE THE WATTLE.
4. AT TERMINAL ENDS OF WATTLES, EXCAVATE A KEY TRENCH (MINIMUM 2' DEEP) AND BURY A MINIMUM OF 4' OF THE WATTLE END
5. CARE SHALL BE TAKEN DURING INSTALLATION SO AS TO AVOID DAMAGE OCCURRING TO THE WATTLE AS A RESULT OF THE INSTALLATION PROCESS. SHOULD THE WATTLE BE DAMAGED DURING INSTALLATION, A WOODEN STAKE SHALL BE PLACED EITHER SIDE OF THE DAMAGED AREA TERMINATING THE WATTLE SEGMENT.
6. ANY WATTLE DAMAGED DURING PLACEMENT SHALL BE REPLACED AS DIRECTED BY AGENCY STAFF, AT THE CONTRACTOR'S EXPENSE.
7. INSTALL WATTLES ACCORDING TO THE FOLLOWING GUIDELINES:

STRAW WATTLE VERTICAL SPACING	
SLOPE	SPACING
2:1	10 Ft
2:1 - 5:1	25 Ft
<5:1	50 Ft

TYPICAL DETAIL – STRAW WATTLE
NOT TO SCALE

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COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
FCRPS HABITAT ENHANCEMENT PROGRAM - OREGON

GRANDE RONDE RIVER SUBBASIN
BUFFALO FLATS HABITAT IMPROVEMENT PROJECT

########## DRAWN

ACCEPTED

UNION, OR 2021-06-17

ESC DETAILS (1 OF 2)

6

SHEET 6 OF 37

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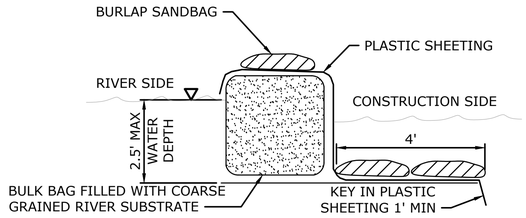

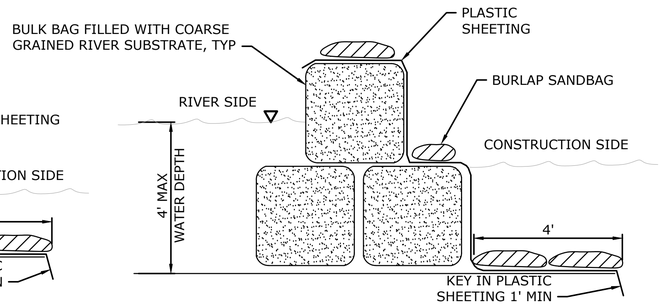

SINGLE LAYER COFFERDAM
(WATER DEPTH LESS THAN 2.5 FT)

STACKED BULK BAG COFFERDAM
(WATER DEPTH LESS THAN 2.5 FT)

TYPICAL DETAIL – TEMPORARY BULK BAG COFFERDAM
NOT TO SCALE

BULK BAG NOTES:

1. BULK BAG COFFERDAM SHALL BE CONSTRUCTED OF SEVERAL UNITS OF BULK BAGS FILLED WITH WASHED COBBLE, AND ABUTTED SIDE BY SIDE TO CREATE A ROW THAT ISOLATES THE CONSTRUCTION SITE.

2. IF WATER DEPTH EXCEEDS 85% OF THE BULK BAG HEIGHT, AN ADDITIONAL TOP ROW OF BULK BAGS SHALL BE INSTALLED, SUPPORTED BY TWO BOTTOM ROWS OF BULK BAGS. BULK BAG COFFERDAM SHALL BE SEALED BY COVERING THE COFFERDAM WITH PLASTIC SHEETING HELD IN PLACE BY STANDARD SANDBAGS PLACED IN ROWS ON TOP OF COFFERDAM, AND AT TOE OF COFFERDAM.

3. THE PLASTIC SHEETING SHALL BE DRAPED ALONG THE CHANNEL BOTTOM ON THE RIVER SIDE OF THE COFFERDAM WITH OUTWARD EDGE OF SHEETING MINIMUM 4-FEET FROM TOE OF COFFERDAM. THE DRAPED PORTION OF PLASTIC SHEETING SHALL BE PINNED TO THE CHANNEL BED BY MINIMUM TWO ROWS OF STANDARD SANDBAGS. ALL SANDBAGS SHALL BE FILLED WITH WASHED PEA GRAVEL.

4. THE TERMINAL ENDS OF BULK BAG COFFERDAM, WHERE IT CONNECTS TO CHANNEL BANK OR HIGH GROUND, SHALL BE SEALED WITH PLASTIC SHEETING AND STANDARD SANDBAGS.

5. BULK BAGS SHALL BE CUBE-SHAPED POLYPROPYLENE WOVEN FABRIC BAGS WITH FULLY OPEN TOP, FLAT BOTTOM, FOUR LOOPS, MINIMUM 2-TON WEIGHT CAPACITY, MINIMUM 5:1 SAFETY FACTOR.

6. PLASTIC SHEETING SHALL BE MINIMUM 10-MIL THICKNESS AND SHALL BE REINFORCED. ROLL LENGTH SHALL BE LONG ENOUGH TO ENSURE THAT ENTIRE LENGTH OF COFFERDAM WILL BE COVERED WITHOUT A SEAM. MINIMUM 12-FT WIDE ROLL SHALL BE USED FOR SINGLE LAYER BULK BAG COFFERDAM. MINIMUM 16-FT WIDE ROLL SHALL BE USED FOR 2-LAYER STACKED BULK BAG COFFERDAM. SHEETING MAY BE PLACED ON THE RIVER SIDE OF THE COFFERDAM IF PLASTIC FOOTPRINT (4' BEYOND OUTER EDGE OF THE BULK BAGS) IS DE-FISHED AND BEHIND A BLOCK NET (LEFT IN PLACE).

7. BULK BAG COFFERDAM SHALL BE COMPLETELY REMOVED AFTER CONSTRUCTION IS COMPLETED AND TURBIDITY HAS BEEN REMOVED. BULK BAG FILL (WASHED COBBLE) AND SANDBAG FILL (WASHED PEA GRAVEL) SHALL BE DISPOSED OF ON SITE. BAGS AND PLASTIC SHEETING SHALL BE REMOVED FROM THE SITE ONCE CONSTRUCTION IS COMPLETED.

8. MEASUREMENT AND PAYMENT FOR BULK BAG COFFERDAM, SAND BAGS, PLASTIC SHEETING, WASHED COBBLE PLACEMENT, AND MAINTENANCE AND REMOVAL OF ALL MATERIALS, SHALL BE INCIDENTAL TO THE LUMP SUM ALL INCLUSIVE COST FOR DIVERSION AND DEWATERING.

9. ALTERNATE COFFERDAM MATERIALS AND CONFIGURATIONS MAY BE ALLOWED BUT SHALL NOT BE IMPLEMENTED WITHOUT REVIEW AND APPROVAL BY THE OWNER'S REPRESENTATIVE. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS AND/OR VENDOR CUT SHEETS FOR SUBSTITUTIONS.

10. IF NECESSARY, GAPS BETWEEN BULK BAGS SHALL BE FILLED WITH WASHED STREAM GRAVEL TO IMPROVE COFFERDAM SEAL.

11. IF FLOW CONDITIONS ENCOUNTERED ON SITE DURING CONSTRUCTION DO NOT ALLOW FOR SUCCESSFUL DEWATERING USING THIS METHOD, SHEETPILE COFFERDAM (HIGH FLOWS) OR SAND BAG COFFERDAM (LOW FLOWS) MAY BE CONSIDERED.

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ESC DETAILS (2 OF 2)

7

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BOYD, ISABEL W

FRITZ, JON E & ANNE MARIE

BEVERAGE, MARK & DONNA M

120

SWACKHAMMER DIVERSION ELEVATED CROSSING (PHOTO 1)

EASTERN OREGON LIVESTOCK SHOW

EXISTING ARMORED BANK AND BERM (PHOTO 2)

LITTLE CREEK

EXISTING BRIDGE AND GRADE CONTROL (PHOTO 3)

EXISTING STATE DIVERSION DITCH (PHOTO 4)

HIGH VALLEY RD

EXISTING CHANNEL (PHOTO 5)

OREGON, STATE OF DOT

203

BUFFALO PEAK LAND AND LIVESTOCK

824

800

CATHERINE CREEK

HINDMAN, CODY & SHARA

EXISTING CHANNEL (PHOTO 6)

BUFFALO PEAK LAND AND LIVESTOCK

BUFFALO PEAK LAND AND LIVESTOCK

524

KOFFORD RD

PAGLIARULO, ANTHONY

PHOTO 1 (LOOKING DOWNSTREAM)

PHOTO 2 (LOOKING DOWNSTREAM)

PHOTO 3 (LOOKING DOWNSTREAM)

PHOTO 4 (LOOKING UPSTREAM)

PHOTO 5 (LOOKING UPSTREAM)

PHOTO 6 (LOOKING DOWNSTREAM)

LEGEND

PLAN SCALE IN FEET (AS SHOWN ON 22" X 34" SHEET)

0 300' 600'

- EXISTING CONTOURS (1 FT)
- TAXLOTS
- SURVEY CONTROL POINT
- EXISTING CHANNELS AND DIVERSIONS (MODELED, 30 CFS IN LITTLE CREEK)
- ORDINARY HIGH WATER (OHW)
- EXISTING WETLANDS
- EXISTING RIPRAP
- PIPELINE (APPROX LOCATION)

SURVEY CONTROL

POINT NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
120	576299.45	8883455.04	2807.05	NAIL
524	571515.35	8889000.63	2866.65	NAIL
800	572878.5	8886219.06	2836.73	REBAR
824	572931.96	8886213.50	2836.36	REBAR

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EXISTING CONDITIONS & SURVEY CONTROL

8
SHEET 8 OF 37

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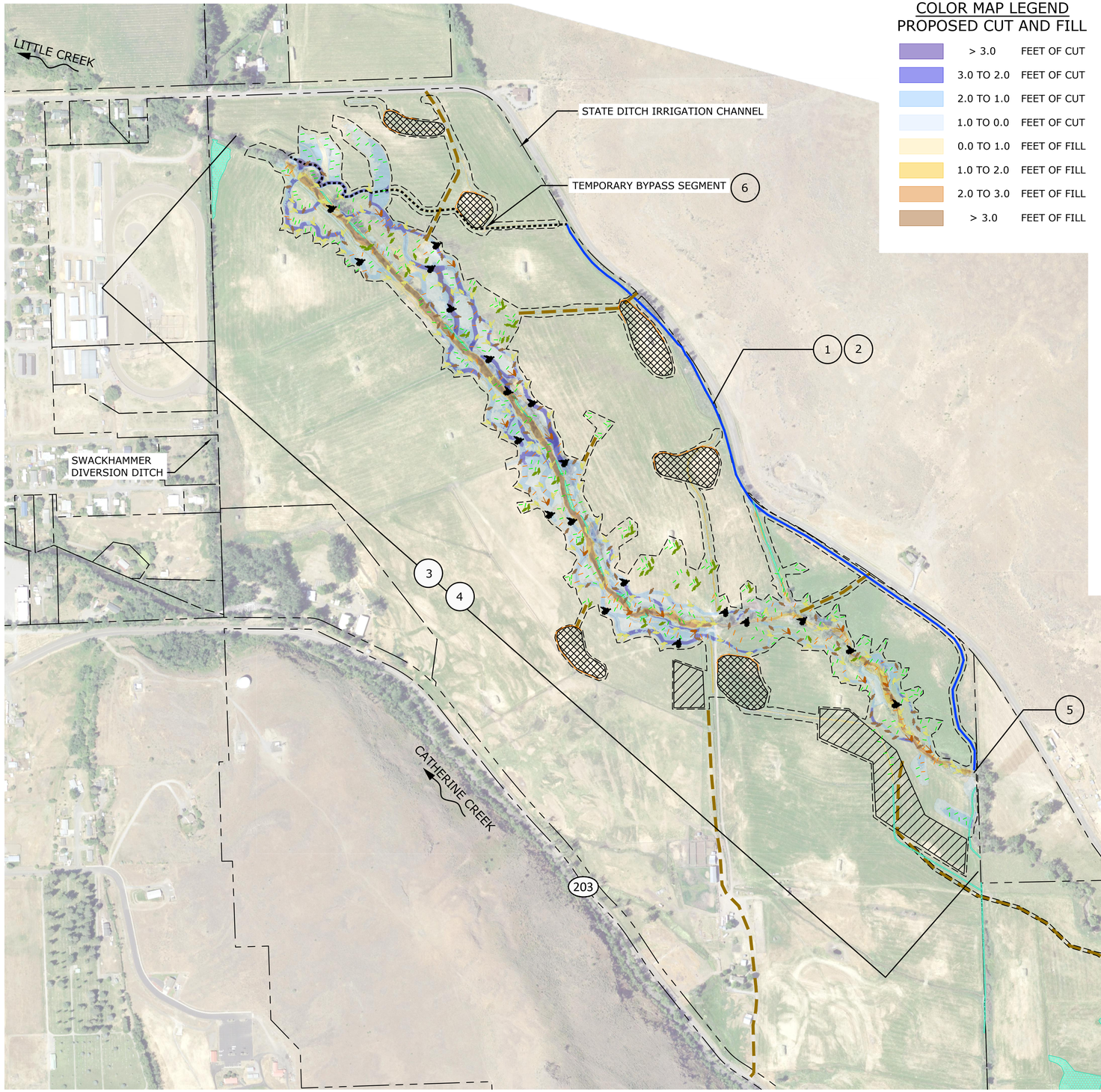

COLOR MAP LEGEND
PROPOSED CUT AND FILL

> 3.0	FEET OF CUT
3.0 TO 2.0	FEET OF CUT
2.0 TO 1.0	FEET OF CUT
1.0 TO 0.0	FEET OF CUT
0.0 TO 1.0	FEET OF FILL
1.0 TO 2.0	FEET OF FILL
2.0 TO 3.0	FEET OF FILL
> 3.0	FEET OF FILL

LEGEND

- TAXLOTS
- EXISTING WETLANDS
- TEMPORARY ACCESS
- STATE DITCH SEGMENT UTILIZED AS TEMPORARY BYPASS
- TEMPORARY BYPASS SEGMENT
- TEMPORARY STAGING
- LIMITS OF DISTURBANCE
- RIPRAP REMOVAL
- TEMPORARY SILT FENCE (SEE DETAIL, SHEET 6)
- SOIL STOCKPILE

0 300' 600'

PLAN SCALE IN FEET
(AS SHOWN ON
22" X 34" SHEET)

N

SUGGESTED CONSTRUCTION SEQUENCE:

1. CONSTRUCT STATE DITCH AND TEMPORARY BYPASS ALIGNMENT, STOCKPILING MATERIAL ADJACENT TO THE EXISTING CHANNEL.
2. INSTALL A COFFERDAM TO BLOCK THE STATE DITCH AT START OF TEMPORARY BYPASS SEGMENT. DIVERT LITTLE CREEK INTO TEMPORARY BYPASS SEGMENT.
3. GRADUALLY LOWER FLOWS IN LITTLE CREEK AND RESCUE FISH WITHIN THE DEWATERED REACH. A COFFERDAM MAY BE NECESSARY AT THE DOWNSTREAM BYPASS TIE IN TO PREVENT BACKWATERING AND FISH INGRESS INTO THE WORK AREA.
4. CONSTRUCT PROPOSED CHANNELS AND FLOODPLAIN GRADING, PLACING FILL WITHIN THE EXISTING CHANNEL ALIGNMENT AND DITCHES TO MEET FINISH GRADE. REMOVE RIPRAP FROM EXISTING CHANNEL.
5. INSTALL WOOD AND FLOODPLAIN ROUGHNESS TREATMENTS, INCLUDING INSTALLATION OF STRUCTURE-RELATED LIVE STAKES.
6. DIVERT WATER INTO THE NEW LITTLE CREEK ALIGNMENT PER THE HIP STAGED RE-WATERING GUIDELINES (SEE SHEET 3).
7. RESCUE FISH IN TEMPORARY BYPASS SEGMENT THEN FILL TO MATCH EXISTING FLOODPLAIN ELEVATIONS.
8. PLANT REMAINING VEGETATION DURING IDENTIFIED PLANTING WINDOW.

NOTES:

1. TEMPORARY ACCESS TO THE PROPERTY IS POSSIBLE VIA THE FOUR ROUTES SHOWN ON THIS DRAWING. ALL ACCESS AND STAGING MUST BE COORDINATED WITH THE LANDOWNER.
2. TEMPORARY ACCESS WITHIN THE PROJECT GRADING FOOTPRINT SHALL BE LOCATED TO MINIMIZE DISTURBANCE TO EXISTING VEGETATION AND WILL BE PREFERENTIALLY LOCATED WITHIN THE GRADING FOOTPRINT WHERE POSSIBLE.
3. ACCESS, SEQUENCING AND CONSTRUCTION ACTIVITY WILL BE COORDINATED WITH LANDOWNER TO MINIMIZE IMPACT TO RANCH OPERATIONS.
4. ACCESS WITHIN GRADING ZONE SHALL BE LIMITED TO LOCATIONS OF PROPOSED CUT/FILL.
5. SILT FENCE TO BE INSTALLED ON DOWNSLOPE SIDE OF SOIL STOCKPILE AREAS AND TO REMAIN IN PLACE AT PROJECT COMPLETION.

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GRANDE RONDE RIVER SUBBASIN
BUFFALO FLATS HABITAT IMPROVEMENT PROJECT

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ACCESS, STAGING, ESC & SUGGESTED CONSTRUCTION SEQUENCING

9

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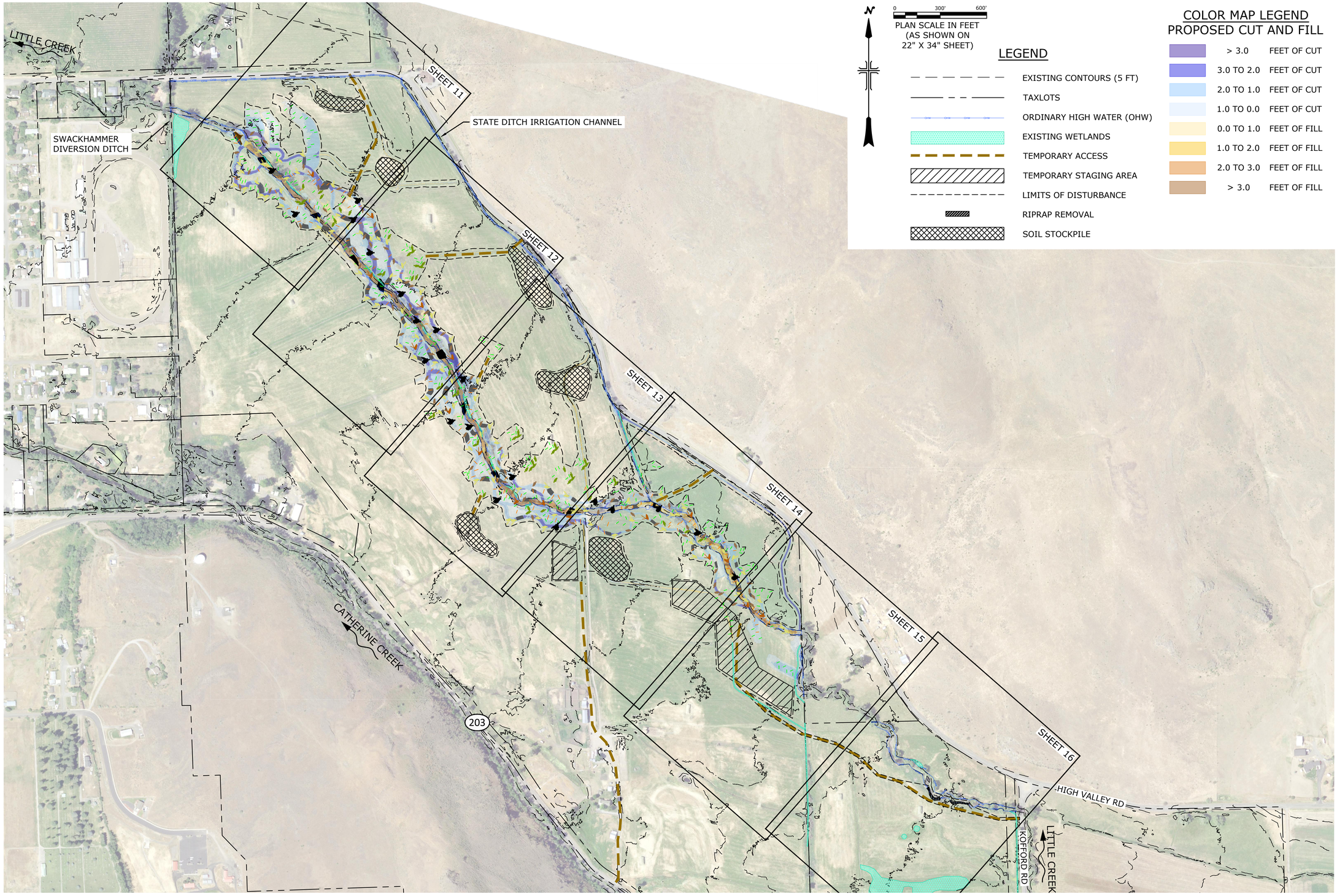

N

0 300' 600'

PLAN SCALE IN FEET
(AS SHOWN ON
22" X 34" SHEET)

LEGEND

- EXISTING CONTOURS (5 FT)
- TAXLOTS
- ORDINARY HIGH WATER (OHW)
- EXISTING WETLANDS
- TEMPORARY ACCESS
- TEMPORARY STAGING AREA
- LIMITS OF DISTURBANCE
- RIPRAP REMOVAL
- SOIL STOCKPILE

COLOR MAP LEGEND
PROPOSED CUT AND FILL

> 3.0	FEET OF CUT
3.0 TO 2.0	FEET OF CUT
2.0 TO 1.0	FEET OF CUT
1.0 TO 0.0	FEET OF CUT
0.0 TO 1.0	FEET OF FILL
1.0 TO 2.0	FEET OF FILL
2.0 TO 3.0	FEET OF FILL
> 3.0	FEET OF FILL

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PROPOSED CONDITIONS
SHEET INDEX

10

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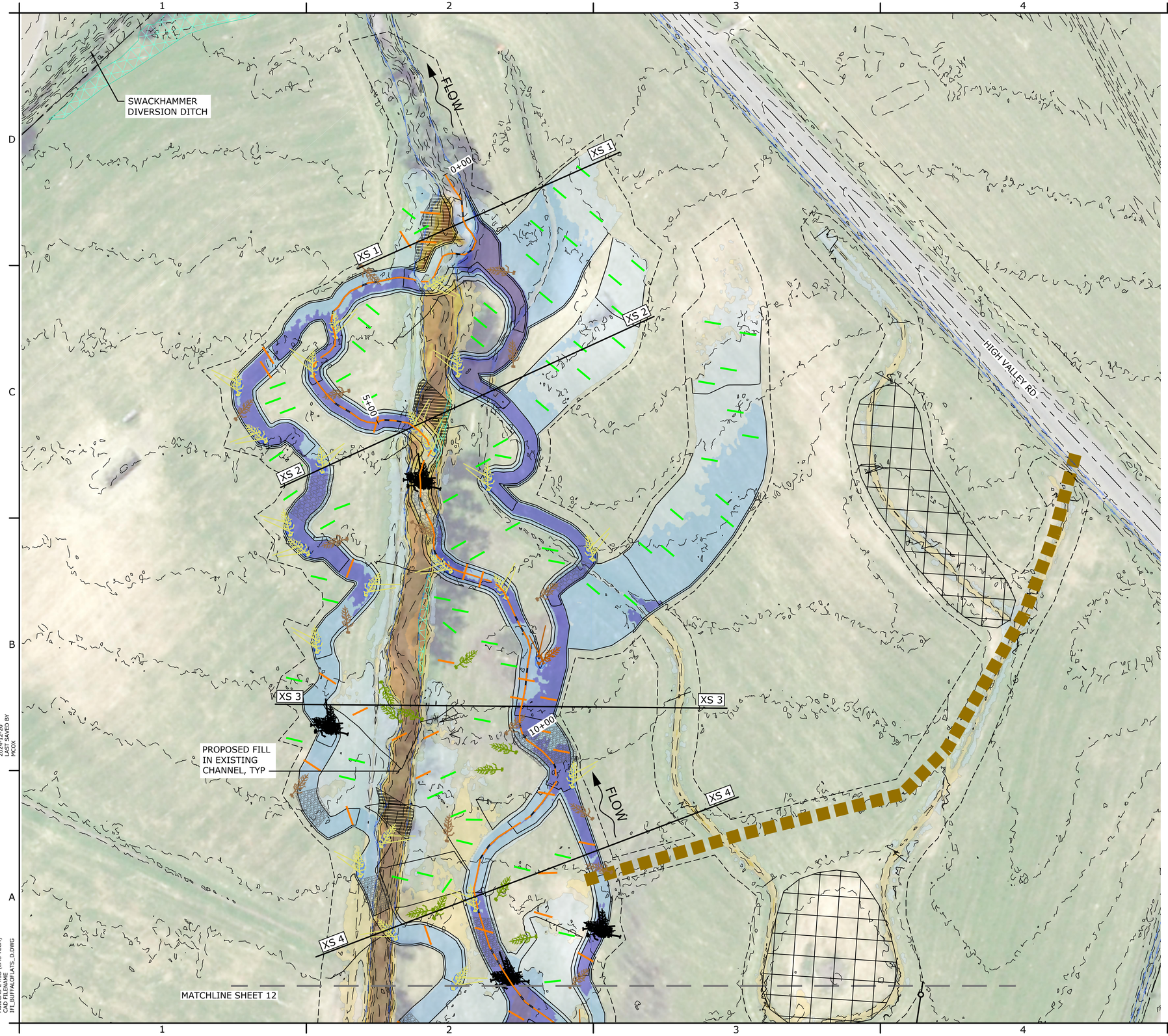

N

0 60' 120'

PLAN SCALE IN FEET (AS SHOWN ON 22" X 34" SHEET)

LEGEND

- EXISTING CONTOURS (1 FT)
- PROPOSED CONTOURS (1 FT)
- TAXLOTS
- ORDINARY HIGH WATER
- EXISTING WETLANDS
- TEMPORARY ACCESS
- LIMITS OF DISTURBANCE
- 1+00 — LOW-FLOW ALIGNMENT AND STATIONING
- SOIL STOCKPILE
- GRAVEL CHANNEL BED, SEE DETAIL SHEET 35
- GRAVEL CHANNEL PLUG, SEE DETAIL SHEET 35
- WILLOW TRENCH, SEE DETAIL SHEET 33
- FLOOD FENCE, SEE DETAIL SHEET 33
- SMALL WHOLE TREE (CHANNEL), SEE DETAIL SHEET 34
- SMALL WHOLE TREE (FLOODPLAIN), SEE DETAIL SHEET 34
- HABITAT LARGE WOOD, SEE DETAIL SHEET 31
- FLOW SPLIT LARGE WOOD, SEE DETAIL SHEET 32
- CHANNEL SPANNING LARGE WOOD, SEE DETAIL SHEET 32

COLOR MAP LEGEND
PROPOSED CUT AND FILL

> 3.0	FEET OF CUT	
3.0 TO 2.0	FEET OF CUT	
2.0 TO 1.0	FEET OF CUT	
1.0 TO 0.0	FEET OF CUT	
0.0 TO 1.0	FEET OF FILL	
1.0 TO 2.0	FEET OF FILL	
2.0 TO 3.0	FEET OF FILL	
> 3.0	FEET OF FILL	

NOTES:

1. SEE SHEET 17 FOR GRADING SECTIONS.
2. SEE SHEET 21 FOR LOW-FLOW PROFILE.
3. POOLS ASSOCIATED WITH WOOD STRUCTURES ARE NOT SHOWN IN THE PROPOSED CUT/ FILL COLOR RAMP.

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PROPOSED CONDITIONS PLAN (1 OF 6)

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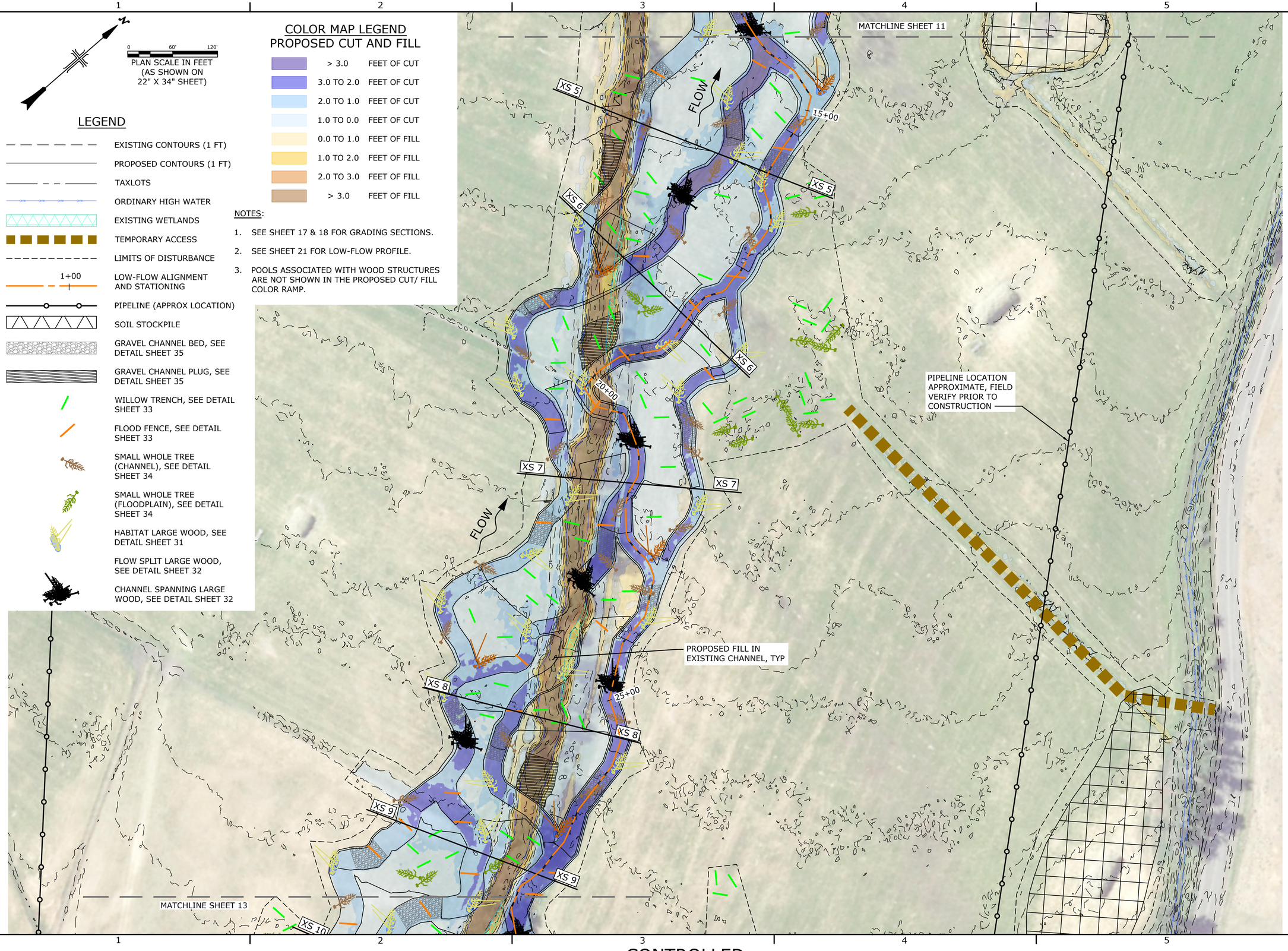

0 60' 120'

PLAN SCALE IN FEET
(AS SHOWN ON
22" X 34" SHEET)

LEGEND

- EXISTING CONTOURS (1 FT)
- PROPOSED CONTOURS (1 FT)
- TAXLOTS
- ORDINARY HIGH WATER
- EXISTING WETLANDS
- TEMPORARY ACCESS
- LIMITS OF DISTURBANCE
- 1+00 LOW-FLOW ALIGNMENT AND STATIONING
- PIPELINE (APPROX LOCATION)
- SOIL STOCKPILE
- GRAVEL CHANNEL BED, SEE DETAIL SHEET 35
- GRAVEL CHANNEL PLUG, SEE DETAIL SHEET 35
- WILLOW TRENCH, SEE DETAIL SHEET 33
- FLOOD FENCE, SEE DETAIL SHEET 33
- SMALL WHOLE TREE (CHANNEL), SEE DETAIL SHEET 34
- SMALL WHOLE TREE (FLOODPLAIN), SEE DETAIL SHEET 34
- HABITAT LARGE WOOD, SEE DETAIL SHEET 31
- FLOW SPLIT LARGE WOOD, SEE DETAIL SHEET 32
- CHANNEL SPANNING LARGE WOOD, SEE DETAIL SHEET 32

COLOR MAP LEGEND
PROPOSED CUT AND FILL

	> 3.0	FEET OF CUT
	3.0 TO 2.0	FEET OF CUT
	2.0 TO 1.0	FEET OF CUT
	1.0 TO 0.0	FEET OF CUT
	0.0 TO 1.0	FEET OF FILL
	1.0 TO 2.0	FEET OF FILL
	2.0 TO 3.0	FEET OF FILL
	> 3.0	FEET OF FILL

NOTES:

1. SEE SHEET 17 & 18 FOR GRADING SECTIONS.
2. SEE SHEET 21 FOR LOW-FLOW PROFILE.
3. POOLS ASSOCIATED WITH WOOD STRUCTURES ARE NOT SHOWN IN THE PROPOSED CUT/ FILL COLOR RAMP.

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PROPOSED CONDITIONS PLAN (2 OF 6)

12

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MATCHLINE SHEET 12

XS 9

XS 10

XS 10

FLOW

30+00

PIPELINE LOCATION APPROXIMATE, FIELD VERIFY PRIOR TO CONSTRUCTION

PROPOSED FILL IN EXISTING CHANNEL, TYP

XS 11

XS 11

35+00

XS 12

XS 12

PIPELINE LOCATION APPROXIMATE, FIELD VERIFY PRIOR TO CONSTRUCTION

FLOW

40+00

XS 13

XS 13

XS 14

XS 14

45+00

XS 15

MATCHLINE SHEET 14

STATE DITCH, SEE DETAILS SHEET 29

STATE DITCH RIFFLE LOCATION

0+00

N

0 60' 120'

PLAN SCALE IN FEET
(AS SHOWN ON
22" X 34" SHEET)

LEGEND

- EXISTING CONTOURS (1 FT)
- PROPOSED CONTOURS (1 FT)
- TAXLOTS
- ORDINARY HIGH WATER
- EXISTING WETLANDS
- TEMPORARY ACCESS
- LIMITS OF DISTURBANCE
- 1+00 LOW-FLOW ALIGNMENT AND STATIONING
- PIPELINE (APPROX LOCATION)
- SOIL STOCKPILE
- GRAVEL CHANNEL BED, SEE DETAIL SHEET 35
- GRAVEL CHANNEL PLUG, SEE DETAIL SHEET 35
- WILLOW TRENCH, SEE DETAIL SHEET 33
- FLOOD FENCE, SEE DETAIL SHEET 33
- SMALL WHOLE TREE (CHANNEL), SEE DETAIL SHEET 34
- SMALL WHOLE TREE (FLOODPLAIN), SEE DETAIL SHEET 34
- HABITAT LARGE WOOD, SEE DETAIL SHEET 31
- FLOW SPLIT LARGE WOOD, SEE DETAIL SHEET 32
- CHANNEL SPANNING LARGE WOOD, SEE DETAIL SHEET 32

COLOR MAP LEGEND
PROPOSED CUT AND FILL

> 3.0	FEET OF CUT
3.0 TO 2.0	FEET OF CUT
2.0 TO 1.0	FEET OF CUT
1.0 TO 0.0	FEET OF CUT
0.0 TO 1.0	FEET OF FILL
1.0 TO 2.0	FEET OF FILL
2.0 TO 3.0	FEET OF FILL
> 3.0	FEET OF FILL

NOTES:

1. SEE SHEET 18 & 19 FOR GRADING SECTIONS.
2. SEE SHEET 21 FOR LOW-FLOW PROFILE.
3. SEE SHEET 29 FOR STATE DITCH PROFILE.
4. POOLS ASSOCIATED WITH WOOD STRUCTURES ARE NOT SHOWN IN THE PROPOSED CUT/ FILL COLOR RAMP.

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PROPOSED CONDITIONS PLAN (3 OF 6)

13
SHEET 13 OF 37

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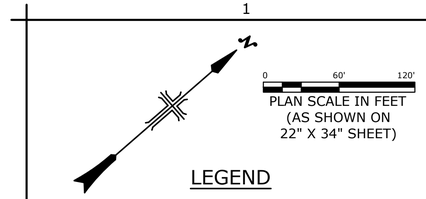

0 60' 120'

PLAN SCALE IN FEET
(AS SHOWN ON
22" X 34" SHEET)

LEGEND

- EXISTING CONTOURS (1 FT)
- PROPOSED CONTOURS (1 FT)
- TAXLOTS
- ORDINARY HIGH WATER
- EXISTING WETLANDS
- TEMPORARY ACCESS
- LIMITS OF DISTURBANCE
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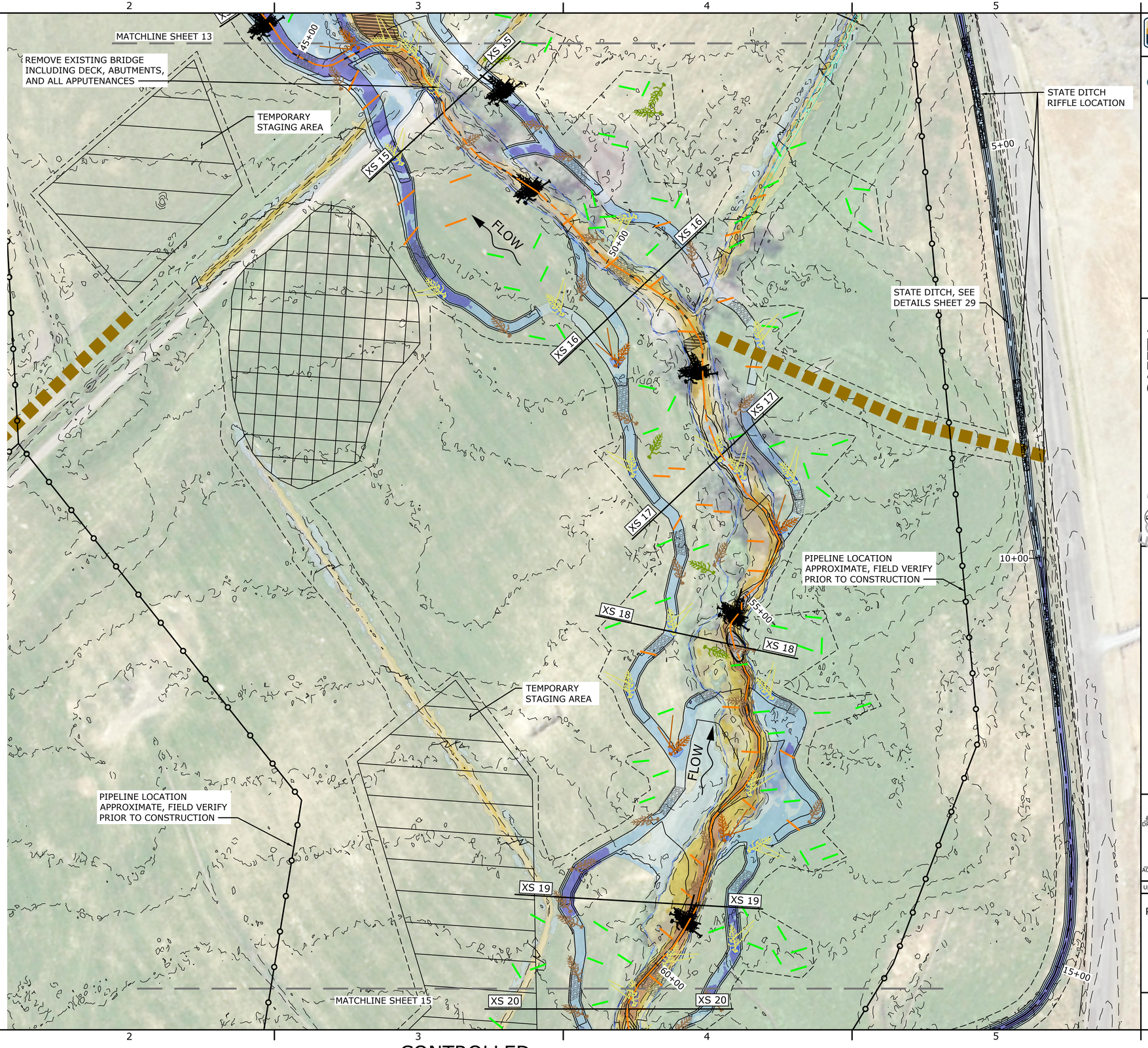
- CHANNEL SPANNING LARGE WOOD, SEE DETAIL SHEET 32

COLOR MAP LEGEND
PROPOSED CUT AND FILL

> 3.0	FEET OF CUT
3.0 TO 2.0	FEET OF CUT
2.0 TO 1.0	FEET OF CUT
1.0 TO 0.0	FEET OF CUT
0.0 TO 1.0	FEET OF FILL
1.0 TO 2.0	FEET OF FILL
2.0 TO 3.0	FEET OF FILL
> 3.0	FEET OF FILL

NOTES:

1. SEE SHEET 19 & 20 FOR GRADING SECTIONS.
2. SEE SHEET 21 FOR LOW-FLOW PROFILE.
3. SEE SHEET 29 FOR STATE DITCH PROFILE.
4. POOLS ASSOCIATED WITH WOOD STRUCTURES ARE NOT SHOWN IN THE PROPOSED CUT/ FILL COLOR RAMP.



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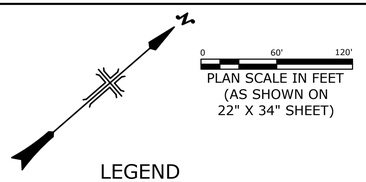


LEGEND

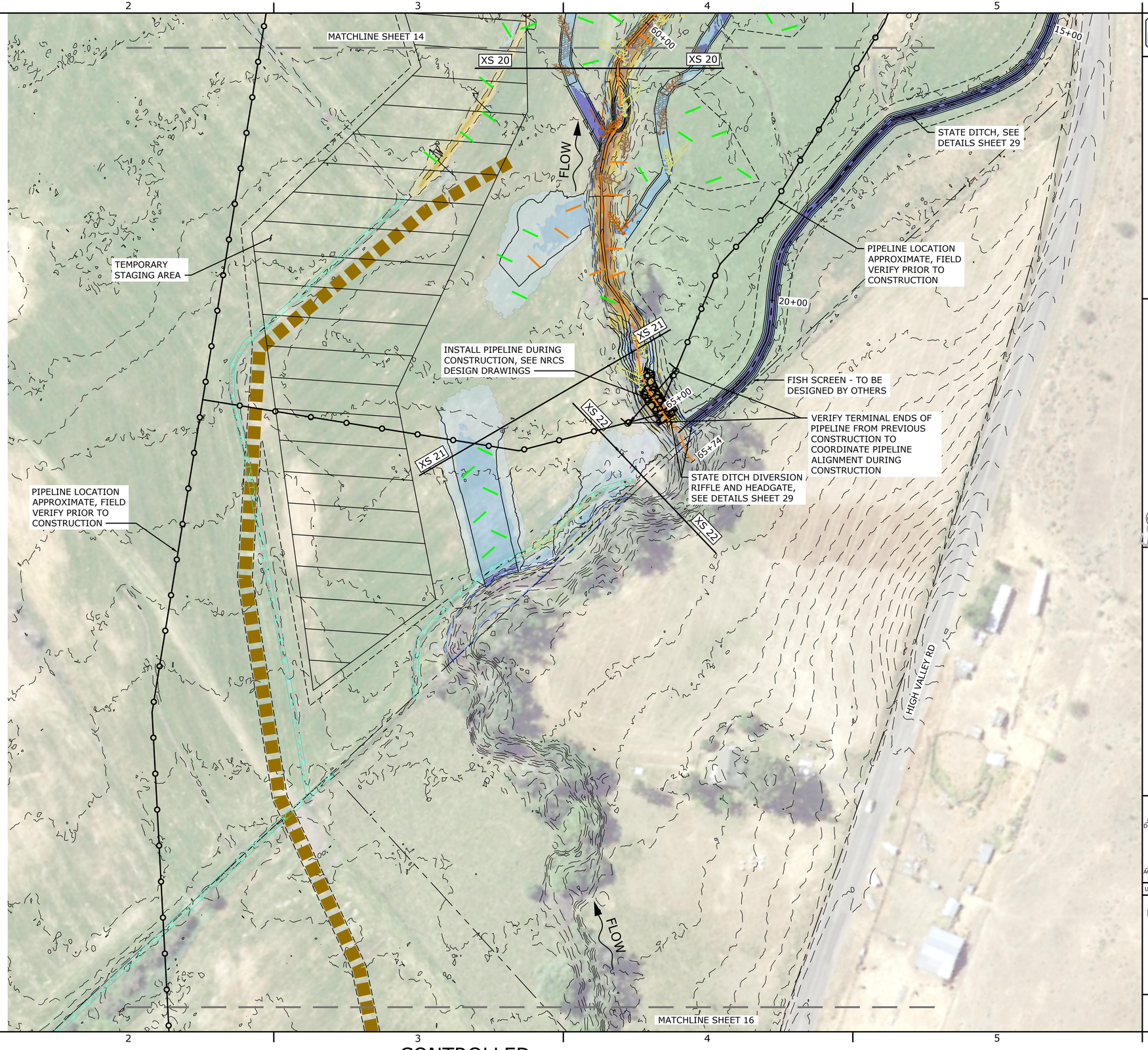
- EXISTING CONTOURS (1 FT)
- PROPOSED CONTOURS (1 FT)
- TAXLOTS
- ORDINARY HIGH WATER
- EXISTING WETLANDS
- TEMPORARY ACCESS
- LIMITS OF DISTURBANCE
- 1+00 LOW-FLOW ALIGNMENT AND STATIONING
- PIPELINE (APPROX LOCATION)
- SOIL STOCKPILE
- GRAVEL CHANNEL BED, SEE DETAIL SHEET 35
- GRAVEL CHANNEL PLUG, SEE DETAIL SHEET 35
- WILLOW TRENCH, SEE DETAIL SHEET 33
- FLOOD FENCE, SEE DETAIL SHEET 33
- SMALL WHOLE TREE (CHANNEL), SEE DETAIL SHEET 34
- SMALL WHOLE TREE (FLOODPLAIN), SEE DETAIL SHEET 34
- HABITAT LARGE WOOD, SEE DETAIL SHEET 31
- FLOW SPLIT LARGE WOOD, SEE DETAIL SHEET 32
- CHANNEL SPANNING LARGE WOOD, SEE DETAIL SHEET 32

COLOR MAP LEGEND
PROPOSED CUT AND FILL

> 3.0	FEET OF CUT
3.0 TO 2.0	FEET OF CUT
2.0 TO 1.0	FEET OF CUT
1.0 TO 0.0	FEET OF CUT
0.0 TO 1.0	FEET OF FILL
1.0 TO 2.0	FEET OF FILL
2.0 TO 3.0	FEET OF FILL
> 3.0	FEET OF FILL

NOTES:

1. SEE SHEET 20 FOR GRADING SECTIONS.
2. SEE SHEET 21 FOR LOW-FLOW PROFILE.
3. POOLS ASSOCIATED WITH WOOD STRUCTURES ARE NOT SHOWN IN THE PROPOSED CUT/ FILL COLOR RAMP.



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GRANDE RONDE RIVER SUBBASIN
BUFFALO FLATS HABITAT IMPROVEMENT PROJECT

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PROPOSED CONDITIONS PLAN (5 OF 6)

15
SHEET 15 OF 37

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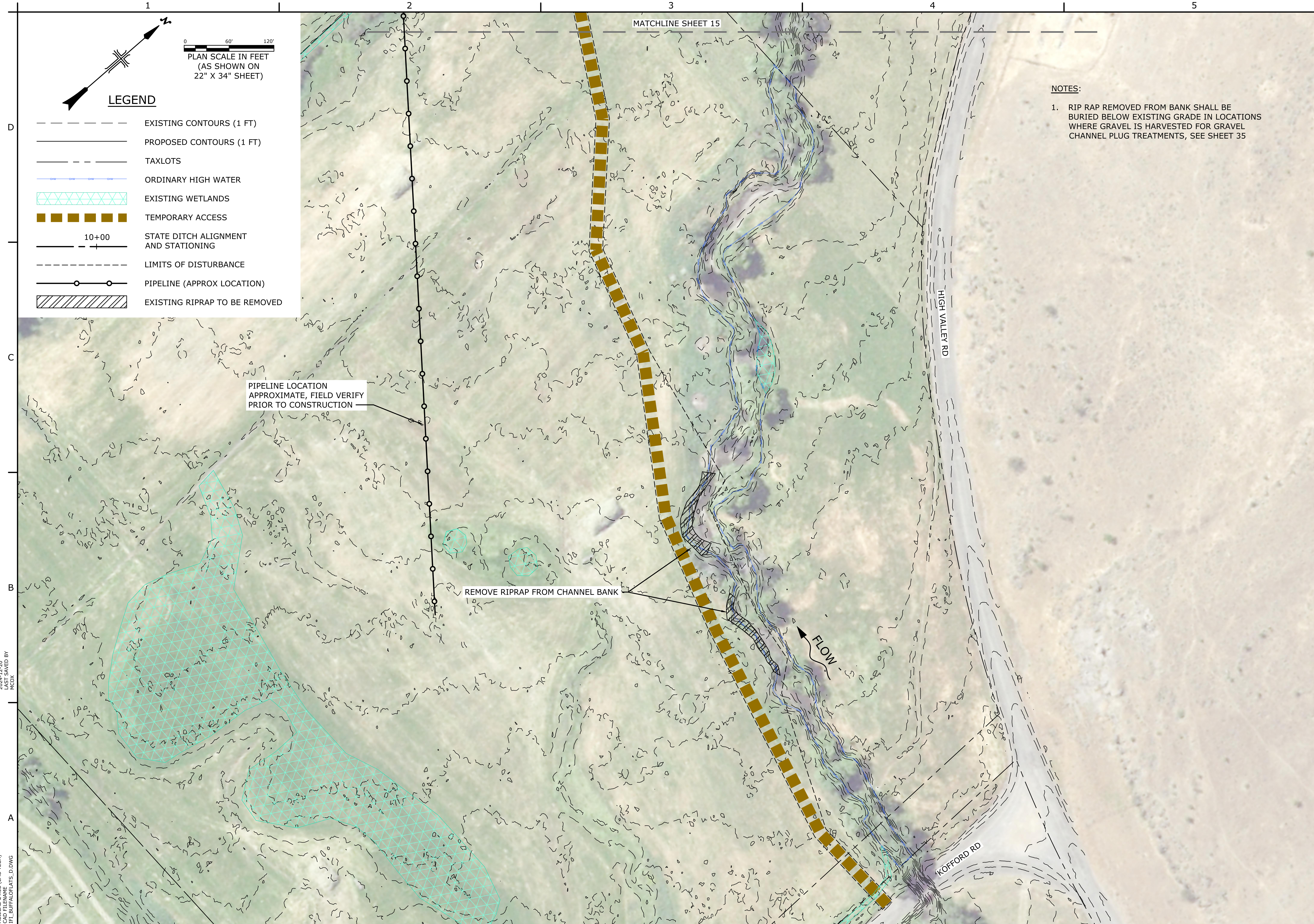

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PROPOSED CONDITIONS PLAN (6 OF 6)

16

SHEET 16 OF 37

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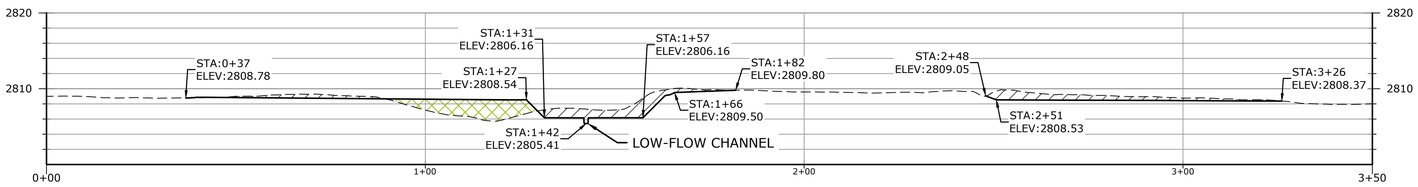

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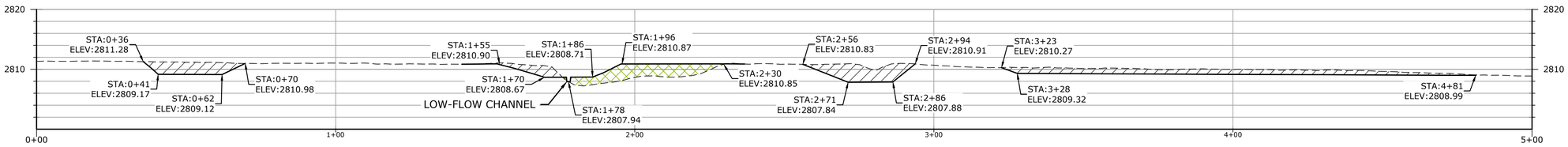

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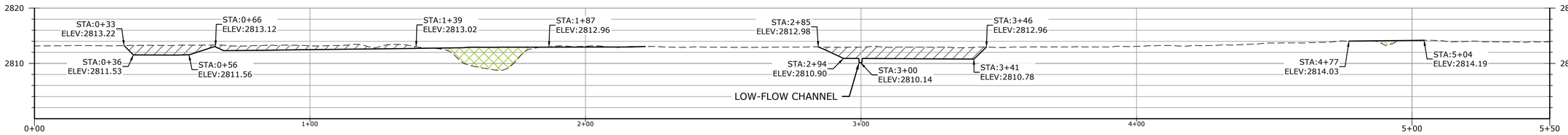

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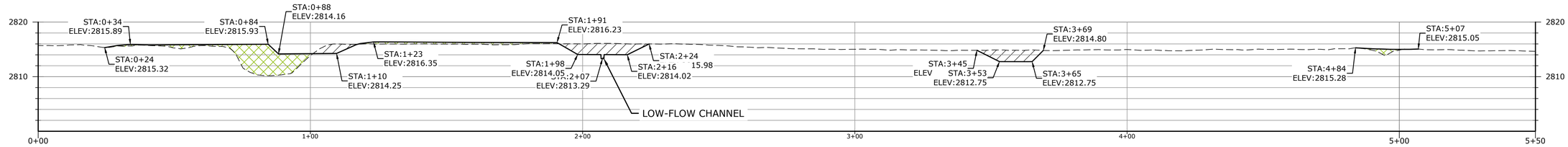

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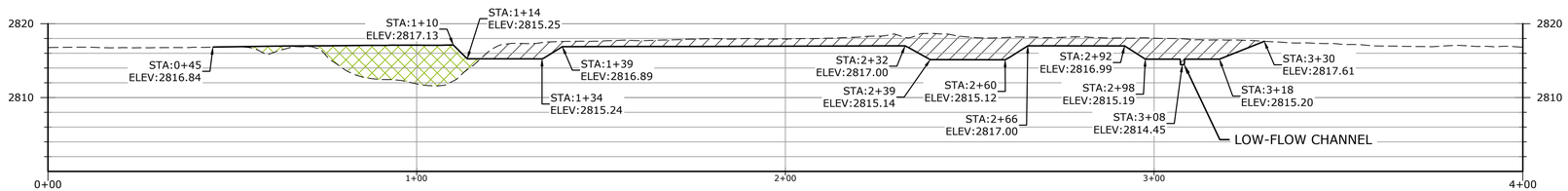
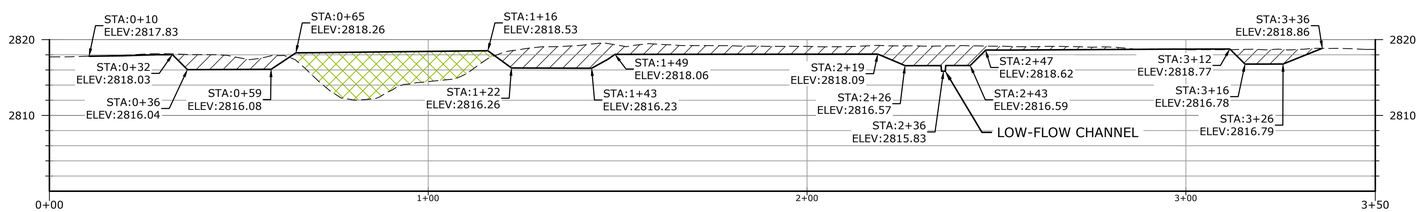


XS 5



XS 6

SECTION SCALE
(AS SHOWN ON 22" X 34" SHEET)
2x VERTICAL EXAGGERATION
10'
20'

LEGEND

- EXISTING GROUND
- PROPOSED GROUND
- CUT
- FILL

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PROPOSED GRADING SECTIONS (1 OF 4)

17

SHEET 17 OF 37

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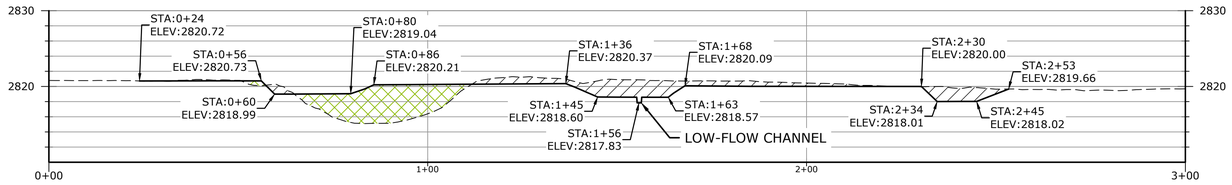

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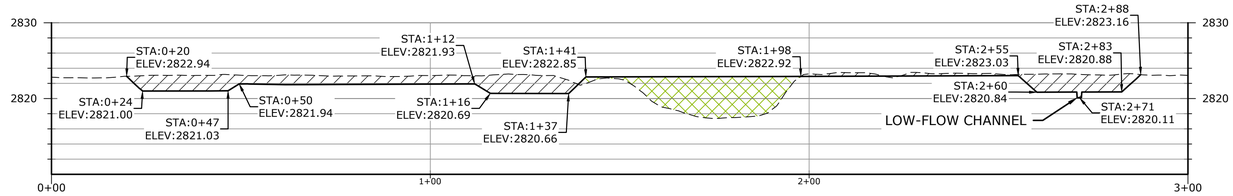

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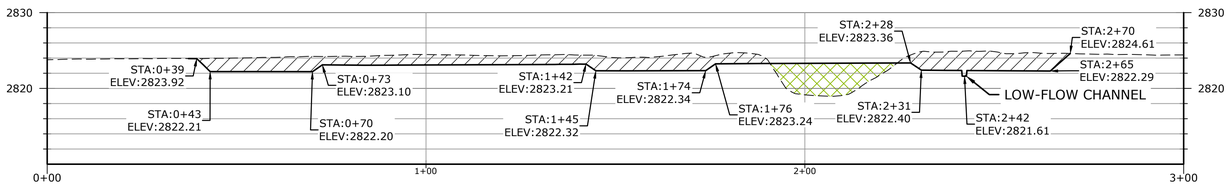

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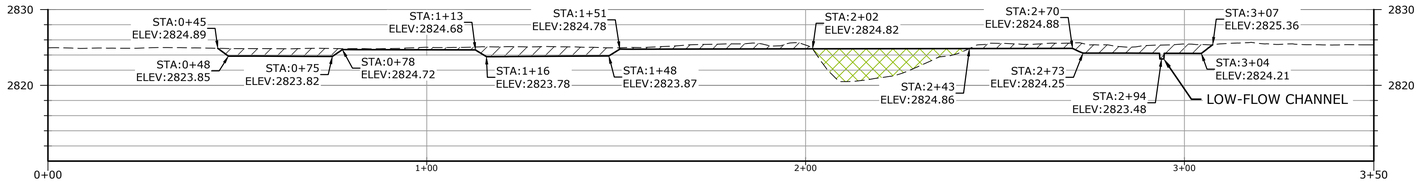

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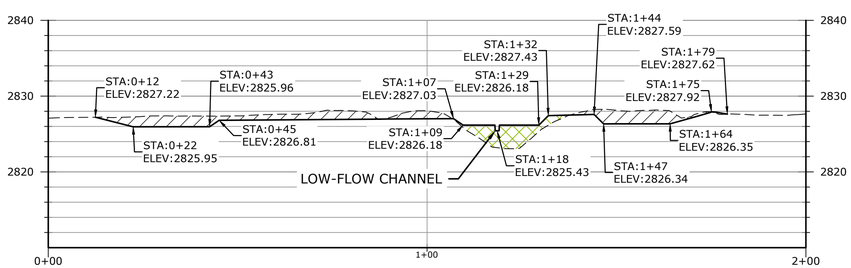

XS 11

SECTION SCALE
(AS SHOWN ON 22" X 34" SHEET)
2x VERTICAL EXAGGERATION
10'
20'

LEGEND

- EXISTING GROUND
- PROPOSED GROUND
- CUT
- FILL

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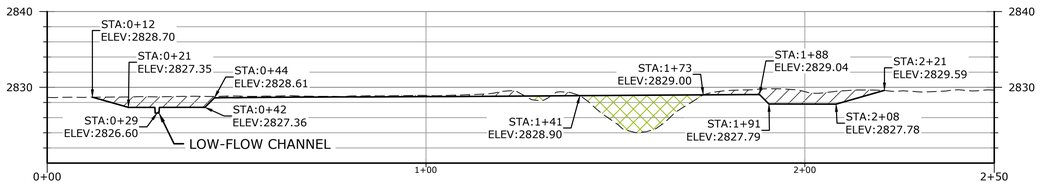
PROPOSED GRADING SECTIONS (2 OF 4)

18

SHEET 18 OF 37



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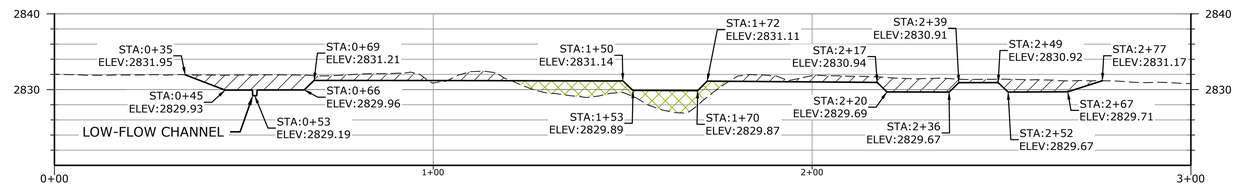

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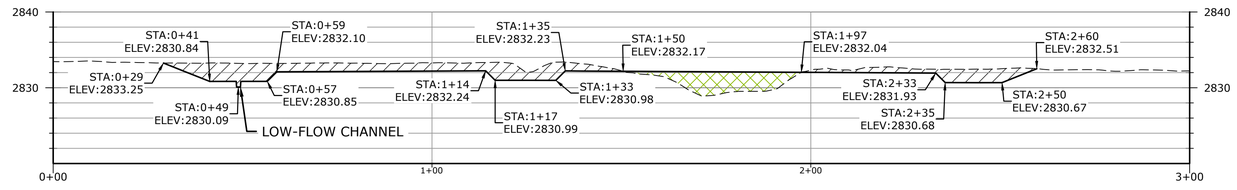

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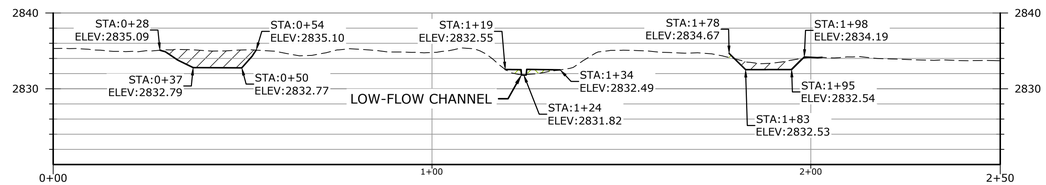
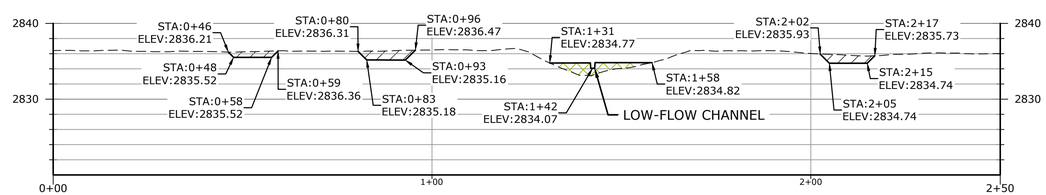
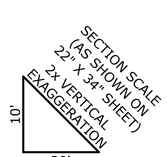


XS 15



XS 16



LEGEND

- EXISTING GROUND
- PROPOSED GROUND
- CUT
- FILL

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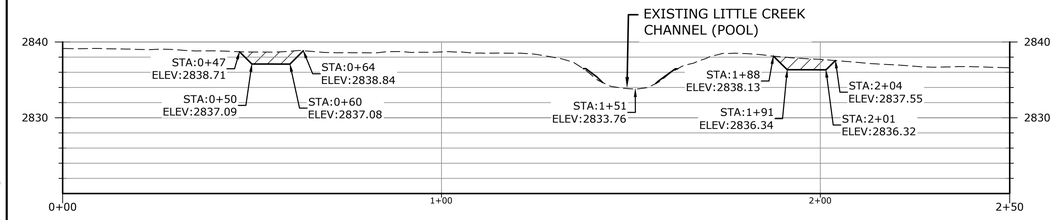
PROPOSED GRADING SECTIONS (3 OF 4)

19

SHEET 19 OF 37



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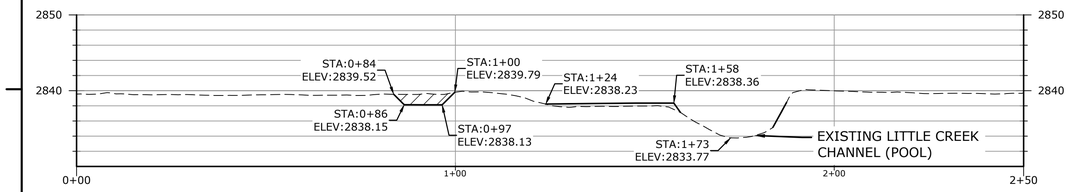

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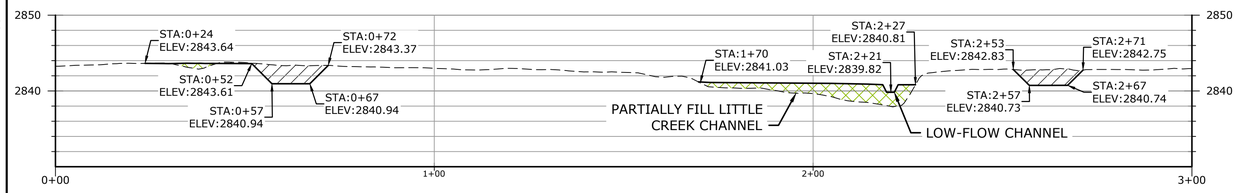

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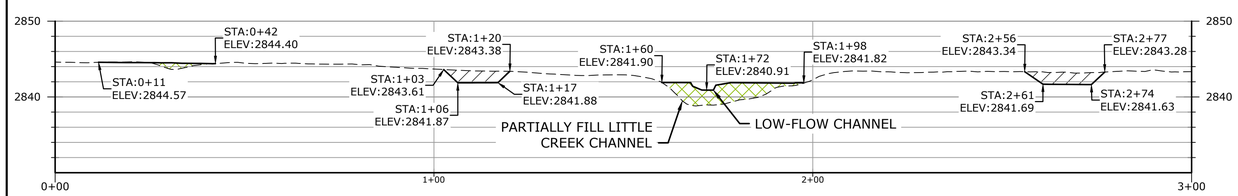

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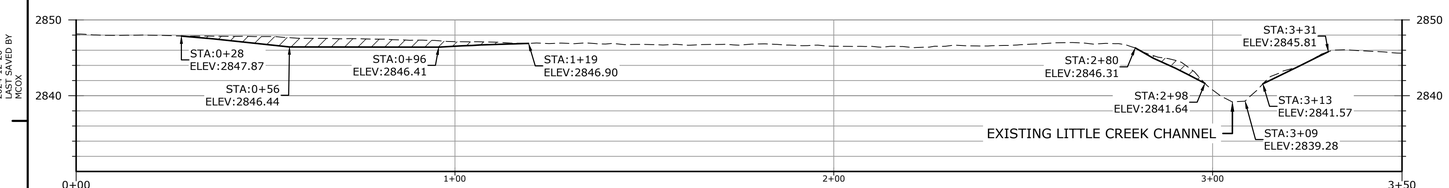

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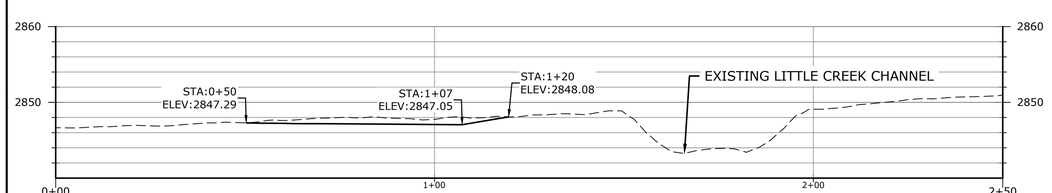
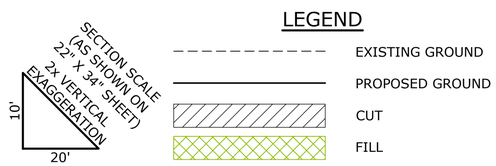


XS 22



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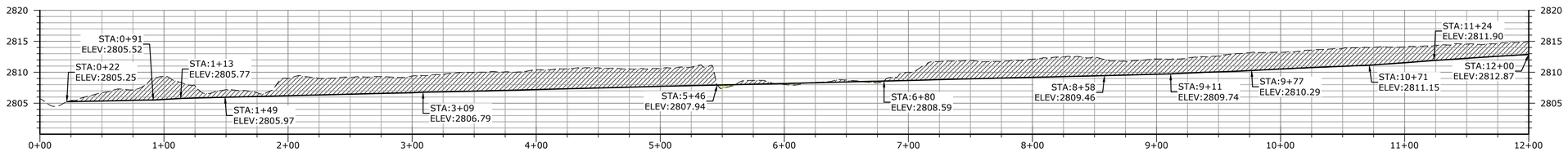
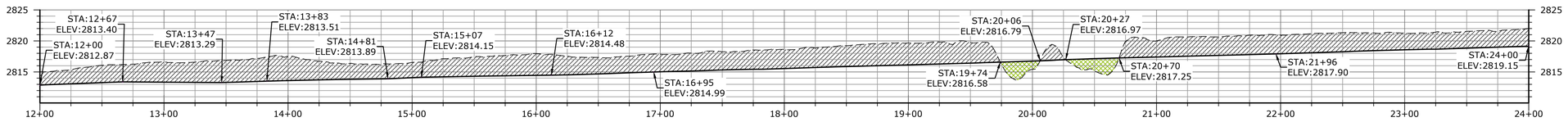
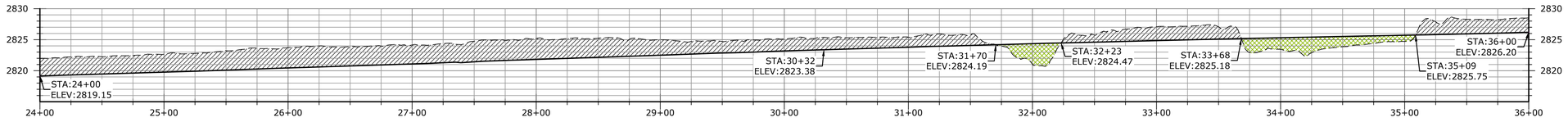
PROPOSED GRADING SECTIONS (4 OF 4)

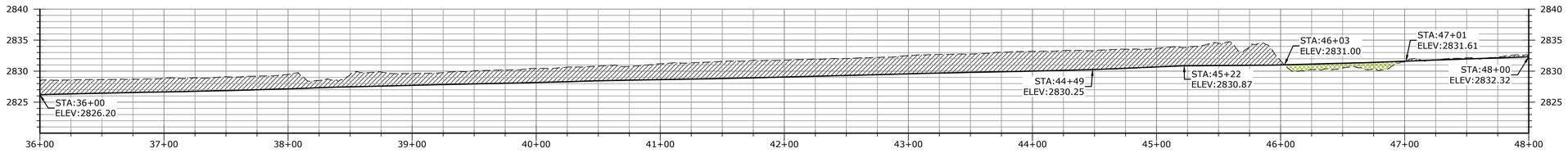
20

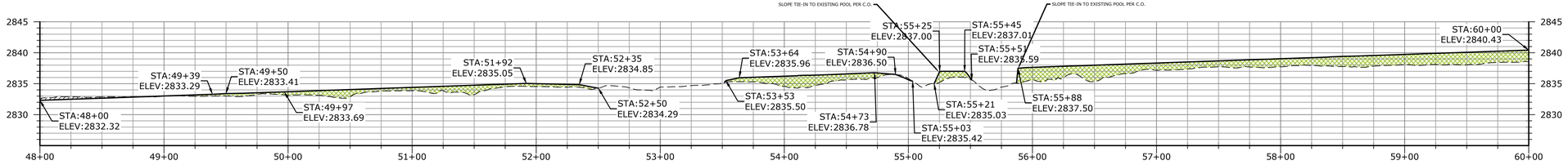
SHEET 20 OF 37

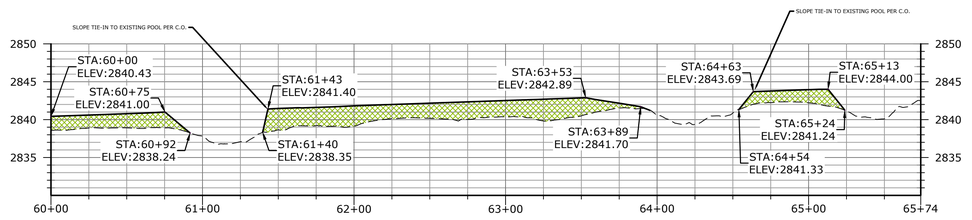


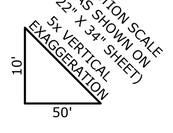






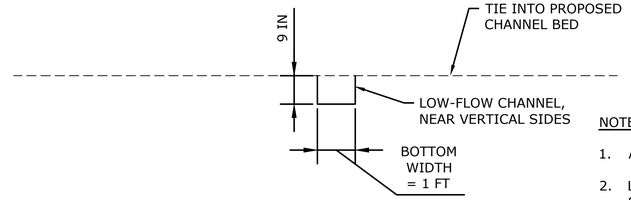


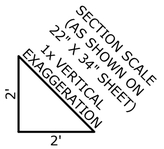




LEGEND

- EXISTING GROUND
- PROPOSED GROUND
- CUT
- FILL





NOTES:

1. AVERAGE CHANNEL SLOPE = 0.6%
2. LOW-FLOW CHANNEL TO BE CONSTRUCTED IN COORDINATION WITH THE PROJECT ENGINEER. EXACT LOCATION MAY BE ADJUSTED IN THE FIELD.

TYPICAL SECTION - LOW-FLOW CHANNEL

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LOW-FLOW CHANNEL PROFILE & TYPICAL SECTION

21

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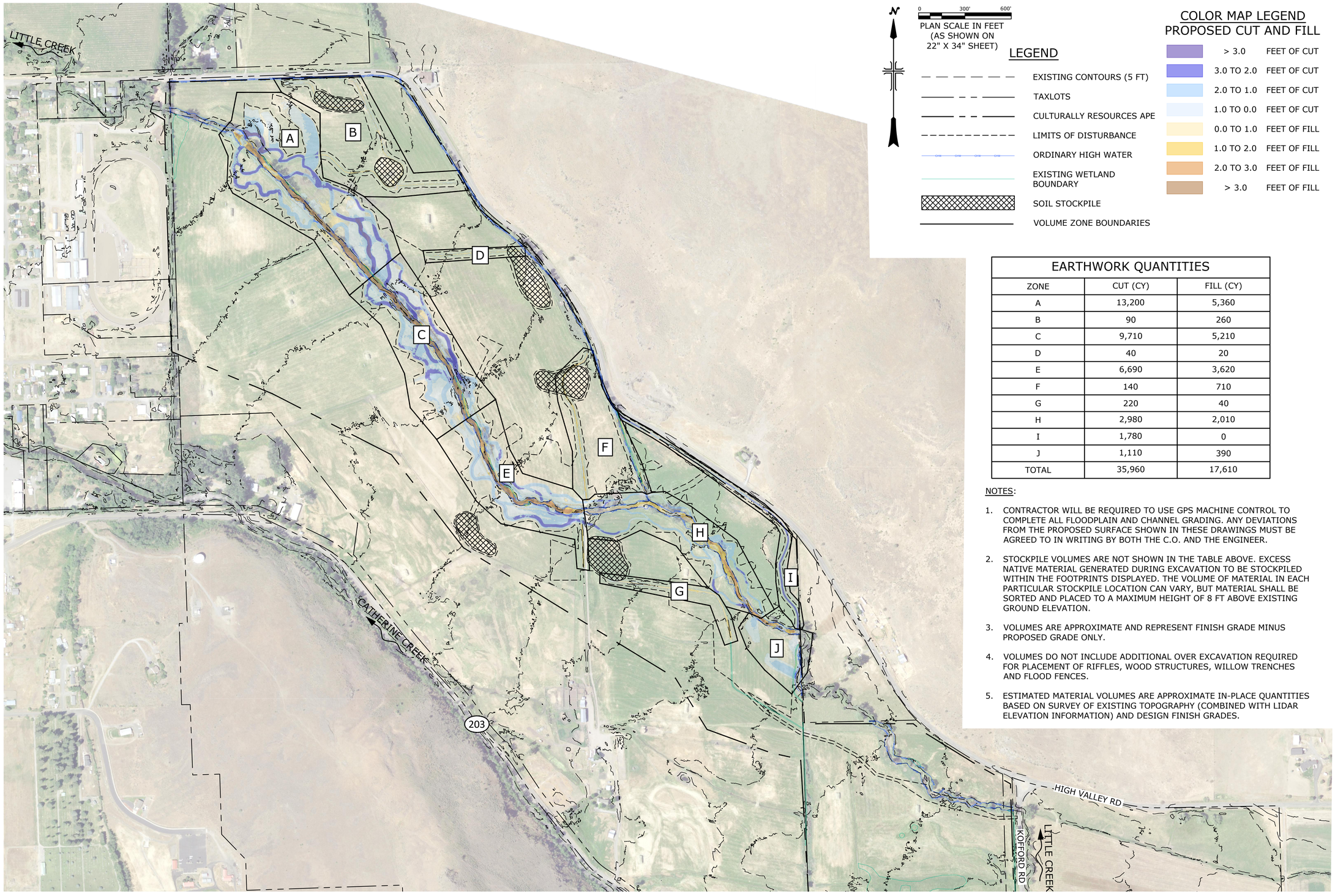

N

0 300' 600'

PLAN SCALE IN FEET
(AS SHOWN ON
22" X 34" SHEET)

LEGEND

- EXISTING CONTOURS (5 FT)
- TAXLOTS
- CULTURALLY RESOURCES APE
- LIMITS OF DISTURBANCE
- ORDINARY HIGH WATER
- EXISTING WETLAND BOUNDARY
- SOIL STOCKPILE
- VOLUME ZONE BOUNDARIES

COLOR MAP LEGEND
PROPOSED CUT AND FILL

> 3.0	FEET OF CUT
3.0 TO 2.0	FEET OF CUT
2.0 TO 1.0	FEET OF CUT
1.0 TO 0.0	FEET OF CUT
0.0 TO 1.0	FEET OF FILL
1.0 TO 2.0	FEET OF FILL
2.0 TO 3.0	FEET OF FILL
> 3.0	FEET OF FILL

EARTHWORK QUANTITIES

ZONE	CUT (CY)	FILL (CY)
A	13,200	5,360
B	90	260
C	9,710	5,210
D	40	20
E	6,690	3,620
F	140	710
G	220	40
H	2,980	2,010
I	1,780	0
J	1,110	390
TOTAL	35,960	17,610

NOTES:

1. CONTRACTOR WILL BE REQUIRED TO USE GPS MACHINE CONTROL TO COMPLETE ALL FLOODPLAIN AND CHANNEL GRADING. ANY DEVIATIONS FROM THE PROPOSED SURFACE SHOWN IN THESE DRAWINGS MUST BE AGREED TO IN WRITING BY BOTH THE C.O. AND THE ENGINEER.
2. STOCKPILE VOLUMES ARE NOT SHOWN IN THE TABLE ABOVE. EXCESS NATIVE MATERIAL GENERATED DURING EXCAVATION TO BE STOCKPILED WITHIN THE FOOTPRINTS DISPLAYED. THE VOLUME OF MATERIAL IN EACH PARTICULAR STOCKPILE LOCATION CAN VARY, BUT MATERIAL SHALL BE SORTED AND PLACED TO A MAXIMUM HEIGHT OF 8 FT ABOVE EXISTING GROUND ELEVATION.
3. VOLUMES ARE APPROXIMATE AND REPRESENT FINISH GRADE MINUS PROPOSED GRADE ONLY.
4. VOLUMES DO NOT INCLUDE ADDITIONAL OVER EXCAVATION REQUIRED FOR PLACEMENT OF RIFFLES, WOOD STRUCTURES, WILLOW TRENCHES AND FLOOD FENCES.
5. ESTIMATED MATERIAL VOLUMES ARE APPROXIMATE IN-PLACE QUANTITIES BASED ON SURVEY OF EXISTING TOPOGRAPHY (COMBINED WITH LIDAR ELEVATION INFORMATION) AND DESIGN FINISH GRADES.

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PROPOSED GRADING
CUT & FILL MAP

22

SHEET 22 OF 37

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N

0 60' 120'

PLAN SCALE IN FEET
(AS SHOWN ON
22" X 34" SHEET)

LEGEND

- EXISTING CONTOURS (1 FT)
- PROPOSED CONTOURS (1 FT)
- TAXLOTS
- LIMITS OF DISTURBANCE
- SOD REVEGETATION TREATMENT (SEE DETAIL, SHEET 36)
- RIPARIAN REVEGETATION ZONE
- TRANSITIONAL REVEGETATION ZONE
- UPLAND REVEGETATION ZONE
- SOIL STOCKPILE

NOTES:

1. SEE SHEET 37 FOR PLANTING DETAILS, TABLES AND SEED MIXES.

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REVEGETATION PLAN (1 OF 6)

23

SHEET 23 OF 37

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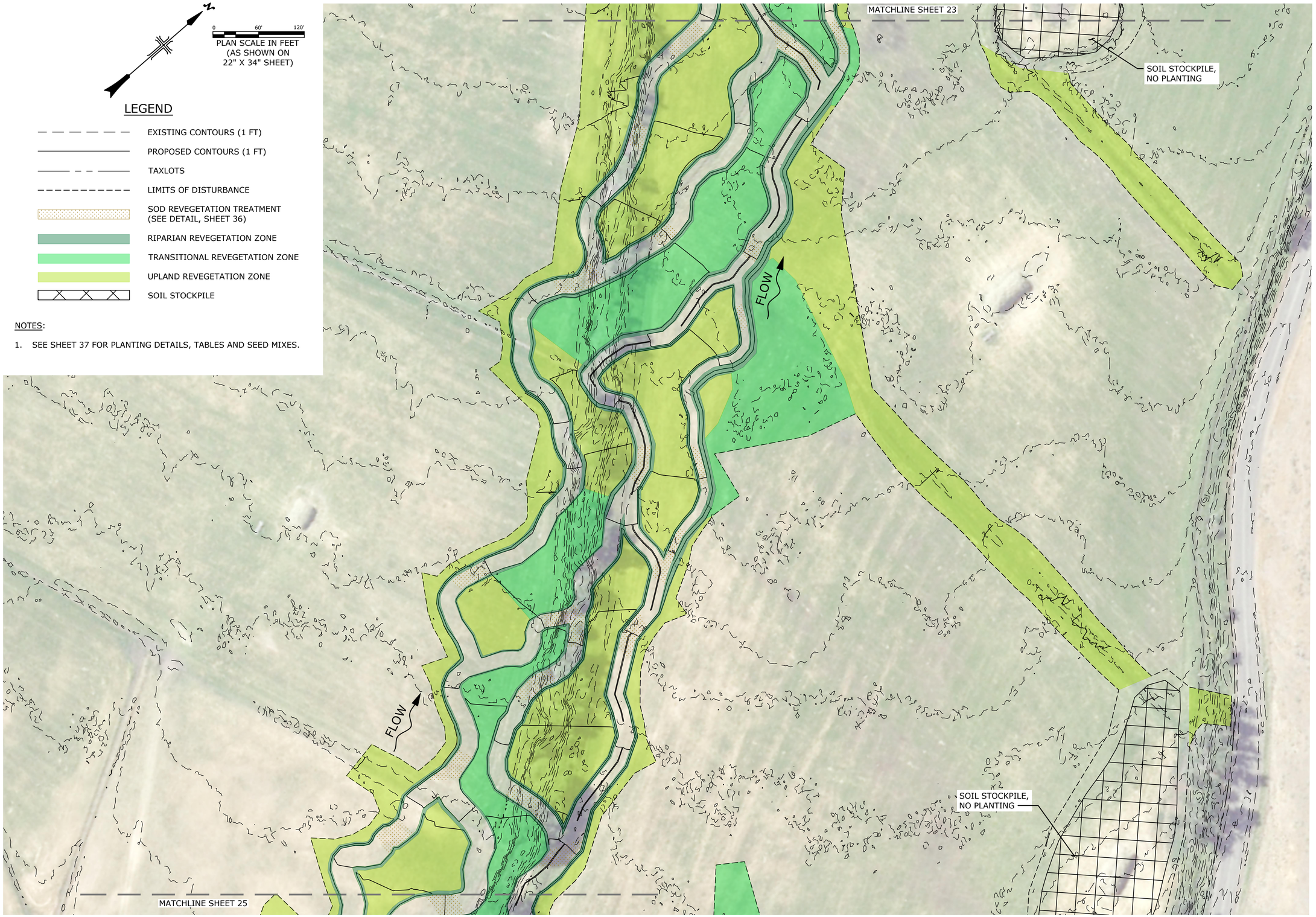

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REVEGETATION
PLAN (2 OF 6)

24

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MATCHLINE SHEET 24

FLOW

SOIL STOCKPILE, NO PLANTING

SOIL STOCKPILE, NO PLANTING

FLOW

MATCHLINE SHEET 26

N

0 60' 120'

PLAN SCALE IN FEET
(AS SHOWN ON
22" X 34" SHEET)

LEGEND

- EXISTING CONTOURS (1 FT)
- PROPOSED CONTOURS (1 FT)
- TAXLOTS
- LIMITS OF DISTURBANCE
- SOD REVEGETATION TREATMENT (SEE DETAIL, SHEET 36)
- RIPARIAN REVEGETATION ZONE
- TRANSITIONAL REVEGETATION ZONE
- UPLAND REVEGETATION ZONE
- SOIL STOCKPILE

NOTES:

1. SEE SHEET 37 FOR PLANTING DETAILS, TABLES AND SEED MIXES.

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REVEGETATION PLAN (3 OF 6)

25

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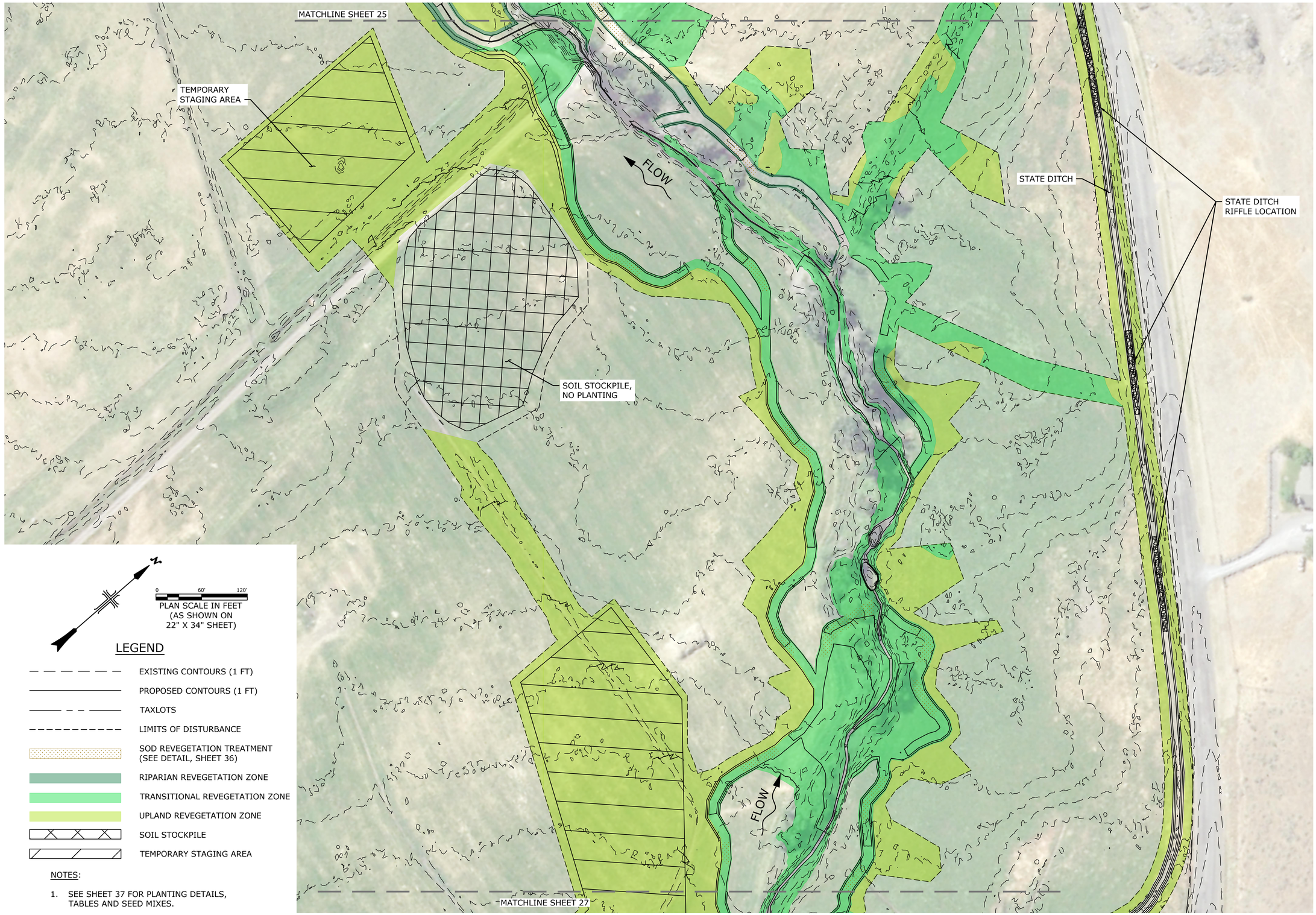

N

0 60' 120'

PLAN SCALE IN FEET
(AS SHOWN ON
22" X 34" SHEET)

LEGEND

- EXISTING CONTOURS (1 FT)
- PROPOSED CONTOURS (1 FT)
- TAXLOTS
- LIMITS OF DISTURBANCE
- SOD REVEGETATION TREATMENT (SEE DETAIL, SHEET 36)
- RIPARIAN REVEGETATION ZONE
- TRANSITIONAL REVEGETATION ZONE
- UPLAND REVEGETATION ZONE
- SOIL STOCKPILE
- TEMPORARY STAGING AREA

NOTES:

1. SEE SHEET 37 FOR PLANTING DETAILS, TABLES AND SEED MIXES.

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REVEGETATION PLAN (4 OF 6)

26

SHEET 26 OF 37

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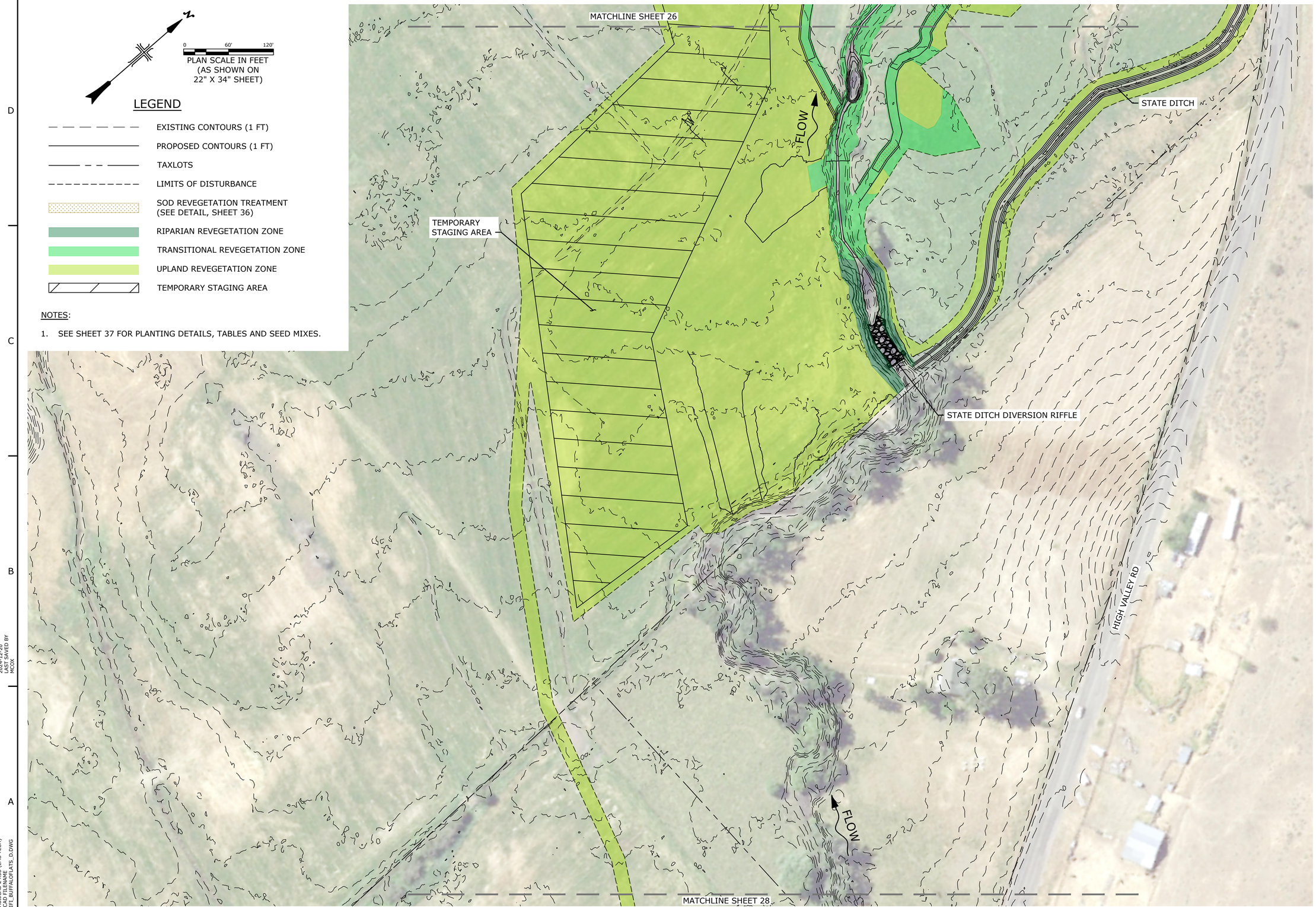

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REVEGETATION
PLAN (5 OF 6)

27

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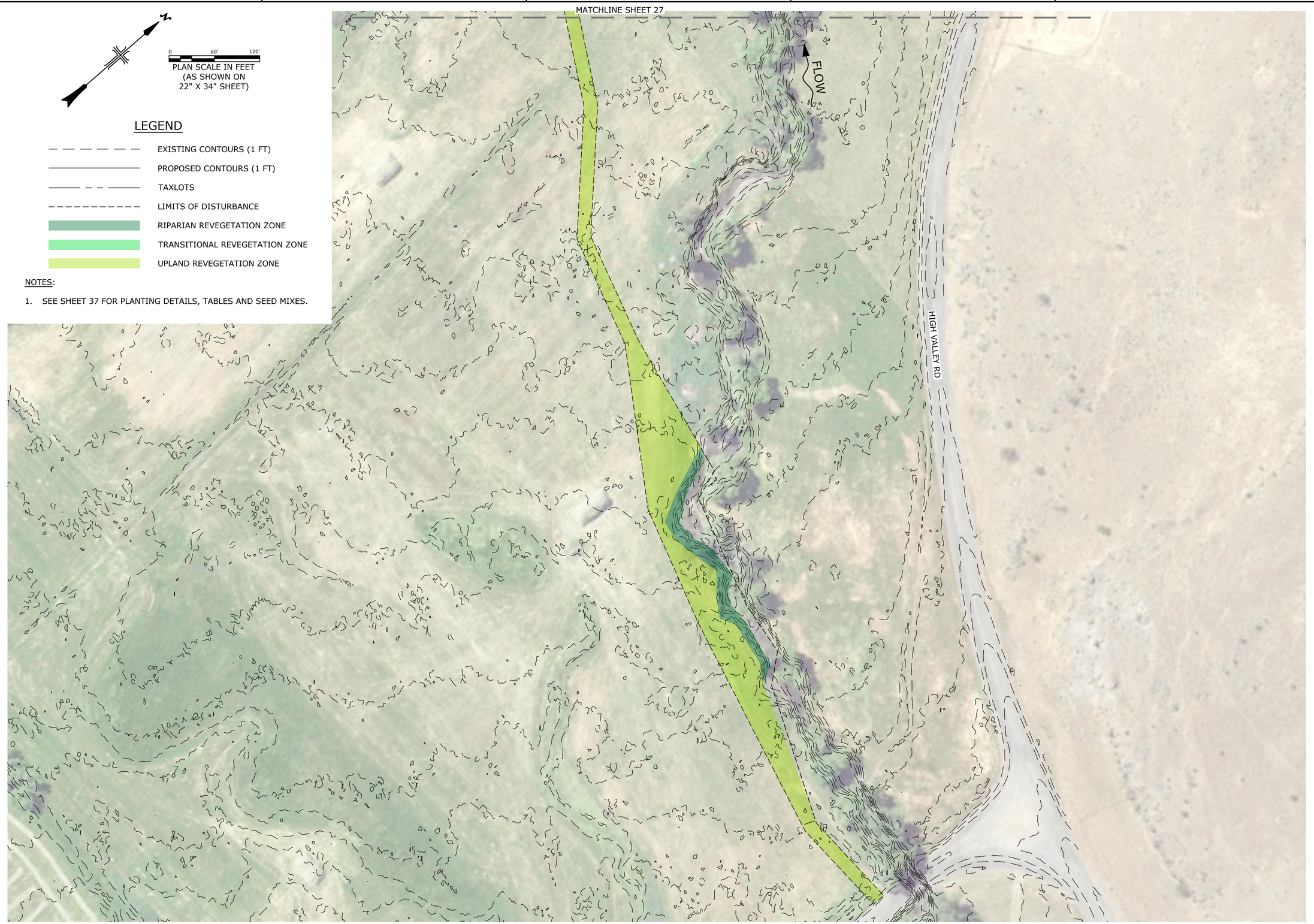

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REVEGETATION
PLAN (6 OF 6)

28

SHEET 28 OF 37

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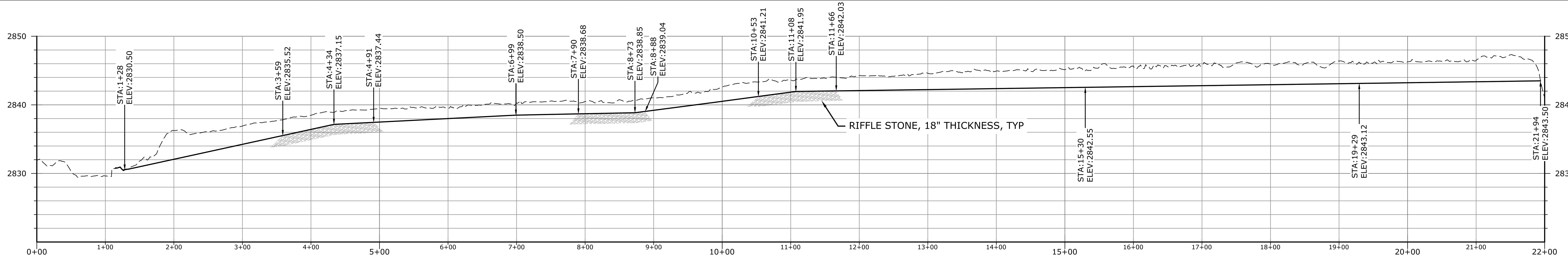
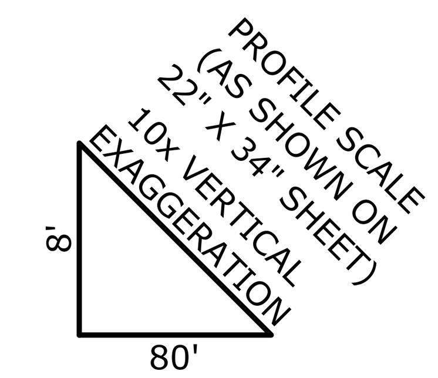
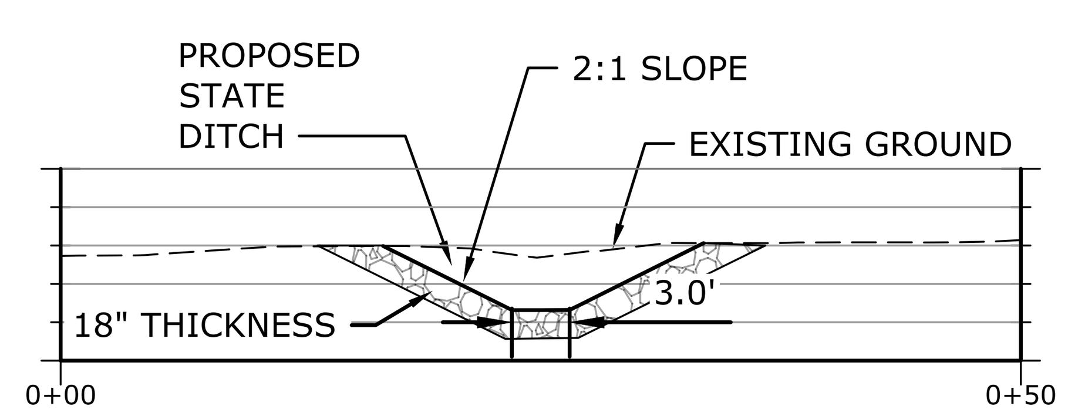
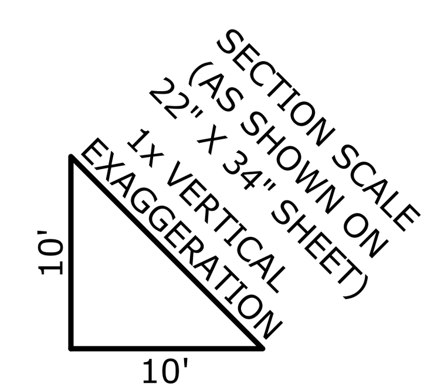


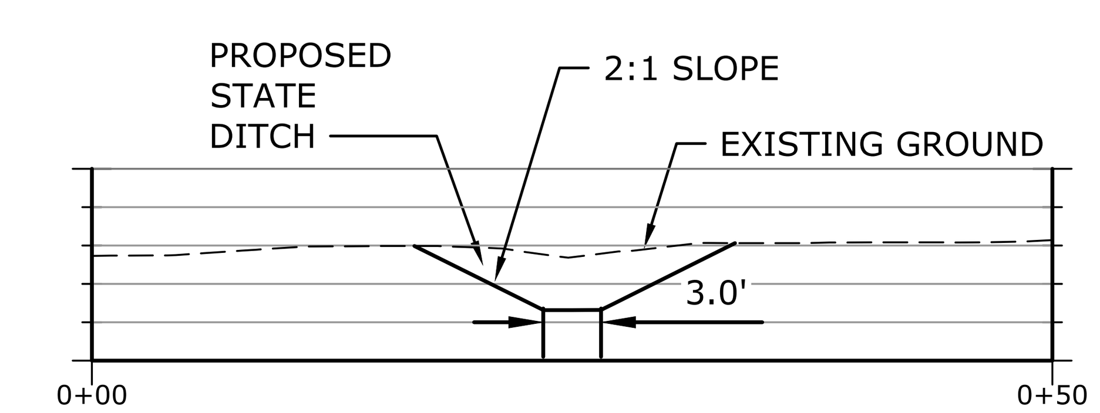
PROFILE – STATE DITCH

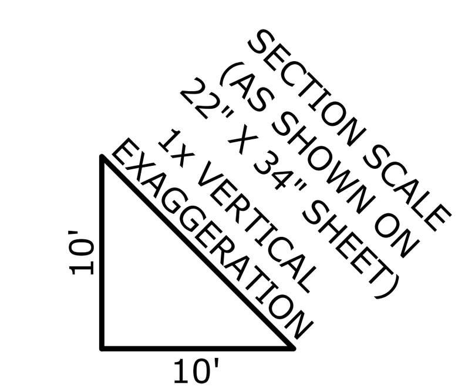




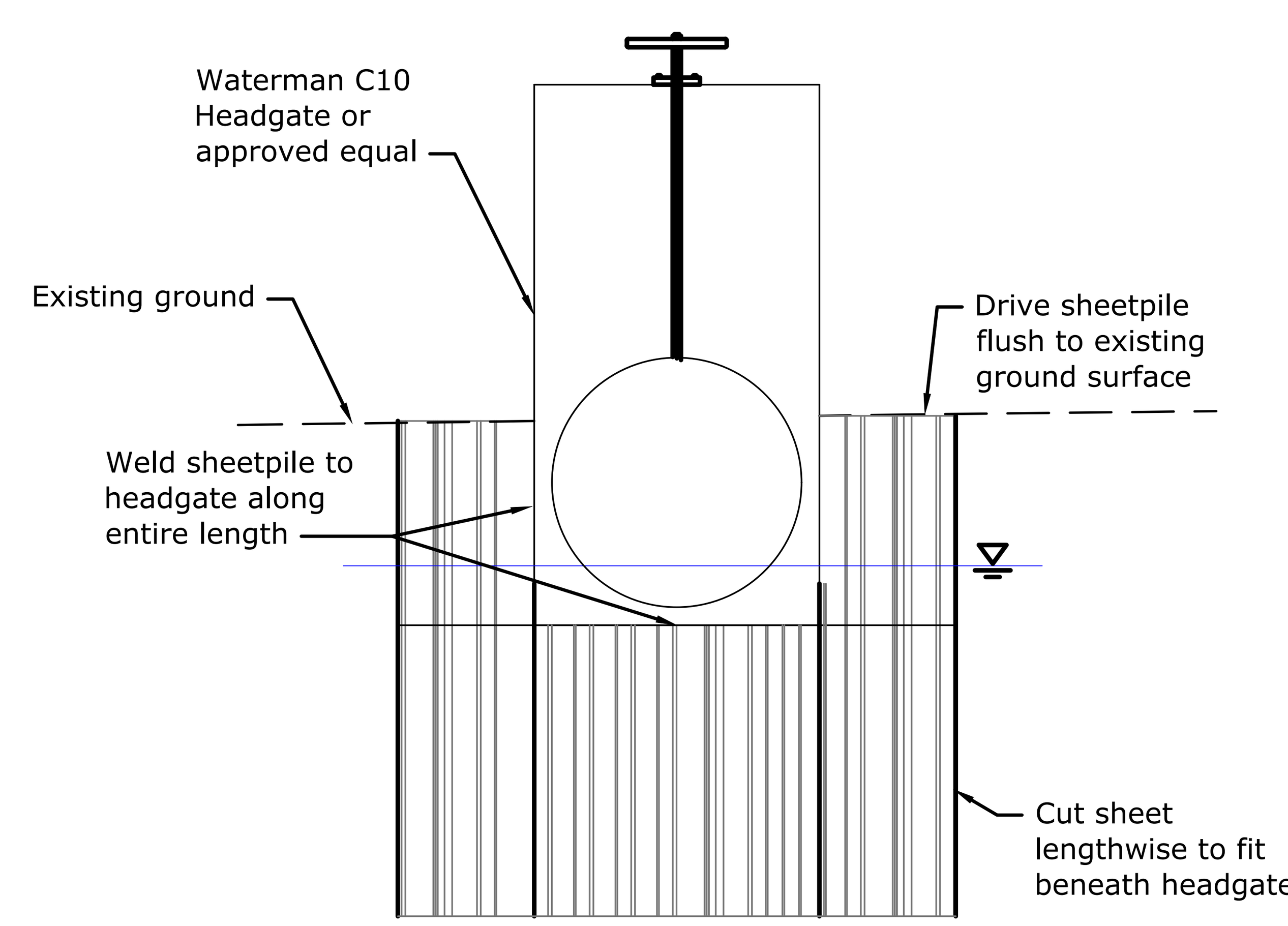


TYPICAL SECTION – PROPOSED STATE DITCH
SEGMENT LINED WITH RIFFLE STONE





TYPICAL SECTION – PROPOSED STATE DITCH



SECTION VIEW

TYPICAL PHOTO

TYPICAL DETAIL – HEADGATE
NOT TO SCALE

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STATE DITCH PROFILE, TYPICAL SECTION AND DETAILS

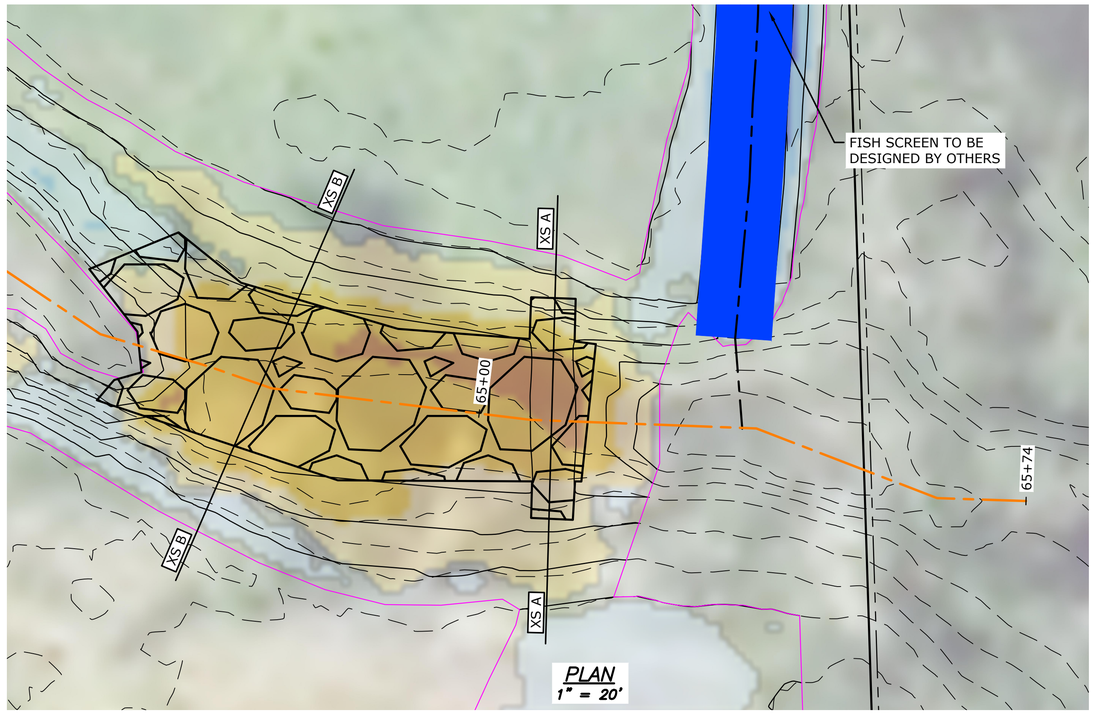
29

SHEET 29 OF 37

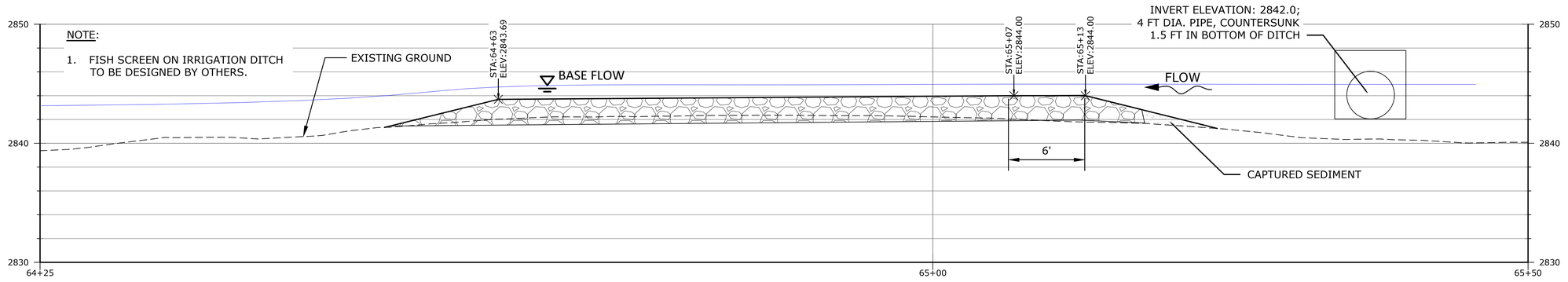
STONE GRADATION		
% PASSING	DIA. MIN.	DIA. MAX.
100	7	8
84	6	7
50	4	6
16	1	1
5	NO. 10 SIEVE	NO. 4 SIEVE

COLOR MAP LEGEND
PROPOSED CUT AND FILL

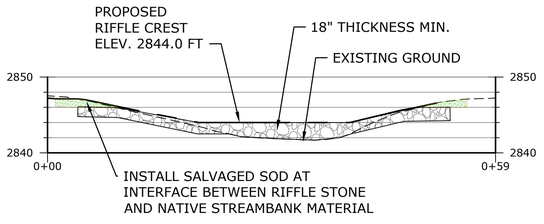
> 3.0	FEET OF CUT
3.0 TO 2.0	FEET OF CUT
2.0 TO 1.0	FEET OF CUT
1.0 TO 0.0	FEET OF CUT
0.0 TO 1.0	FEET OF FILL
1.0 TO 2.0	FEET OF FILL
2.0 TO 3.0	FEET OF FILL
> 3.0	FEET OF FILL

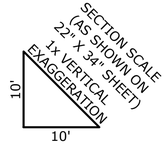


PLAN
1" = 20'

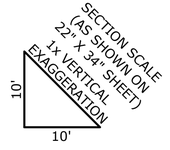


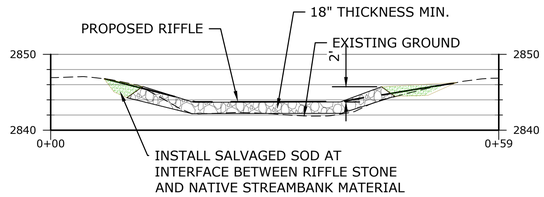
PROFILE – CONSTRUCTED RIFFLE
1" = 5'





XS A – TYPICAL SECTION – CONSTRUCTED RIFFLE CREST





XS B – TYPICAL SECTION – CONSTRUCTED RIFFLE

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TYPICAL DETAILS - CONSTRUCTED RIFFLE

30

SHEET 30 OF 37

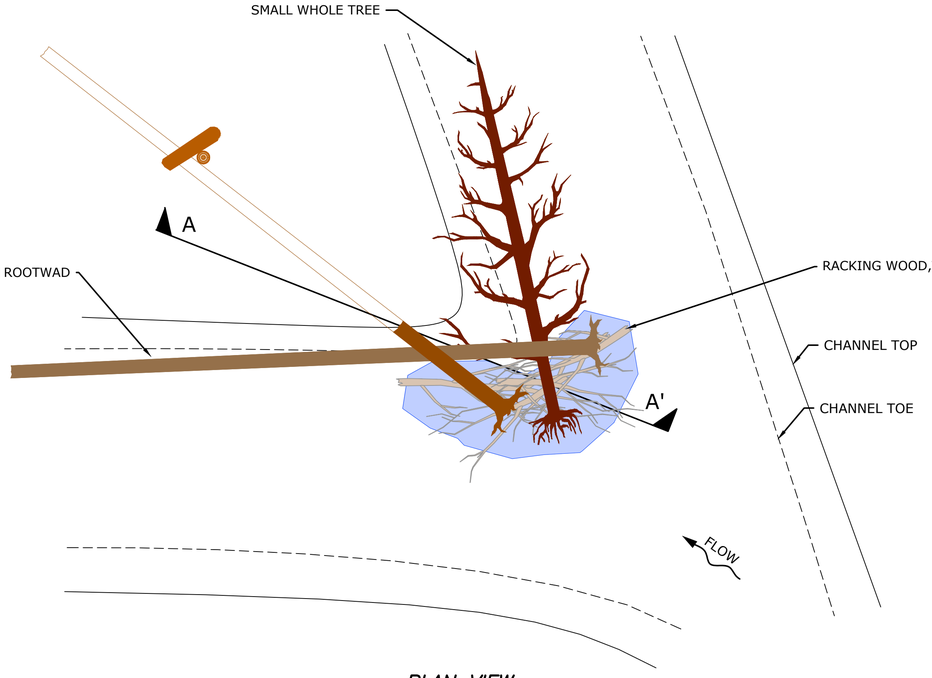
CONSTRUCTION NOTES:

Construction Sequence:

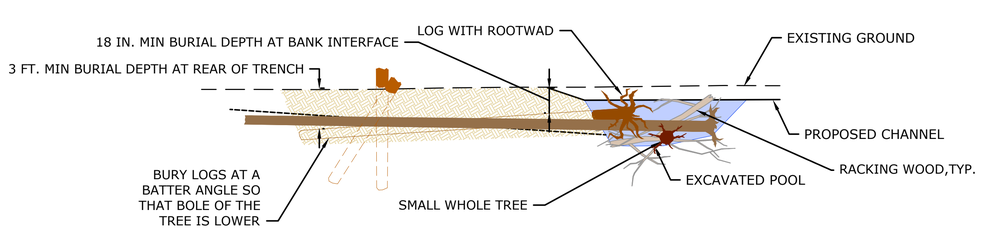
1. Dig scour pool.
2. Place racking wood.
3. Place small whole tree, pinning racking wood.
4. Place upper logs, anchoring upper log in the streambank.
5. Racking logs and slash shall have irregular and natural appearance and not be stacked.
6. Structure location and layout may be field adjusted by C.O..

Habitat LWS - Wood Quantity Per Structure	
Logs with Rootwad (12" to 18" DBH, 30' Long)	2
Small Whole Tree	1
Racking Wood	6
Angled Snag	1
Vertical Snag	1

TYPICAL PHOTO



PLAN VIEW



SECTION VIEW

TYPICAL DETAIL – FLOW SPLITTING LARGE WOOD STRUCTURE
NOT TO SCALE

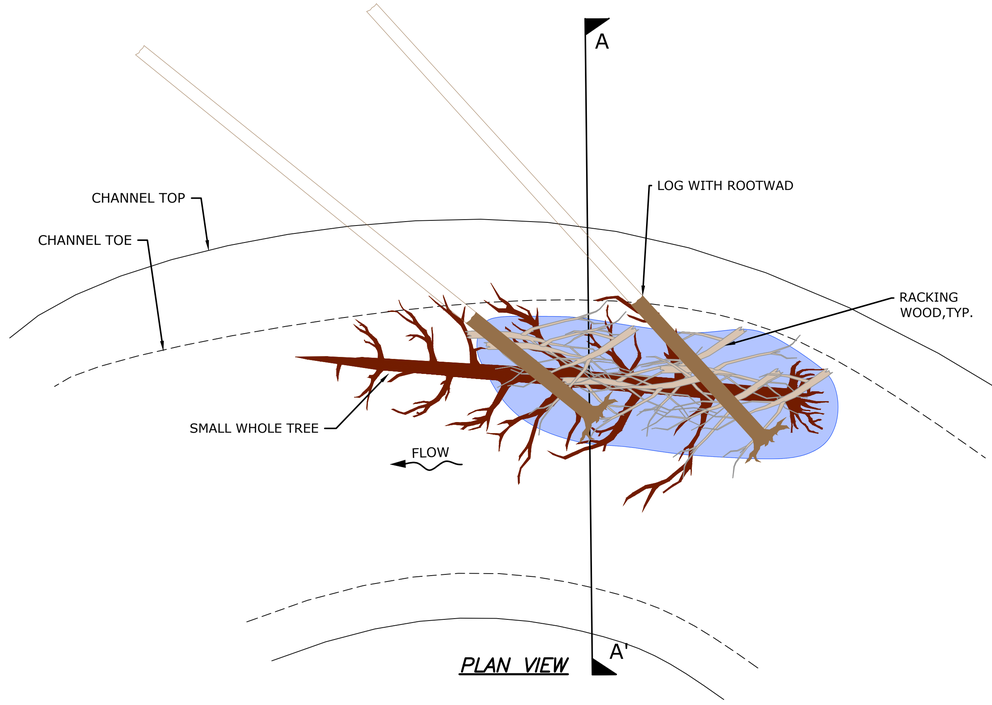
CONSTRUCTION NOTES:

Construction Sequence:

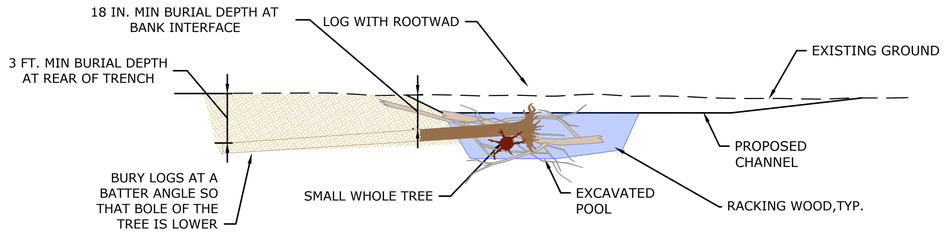
1. Dig scour pool.
2. Place small whole tree.
3. Place racking wood above, burying small whole tree.
4. Place upper logs, ends into streambank for anchoring.
5. Racking logs and slash shall have irregular and natural appearance and not be stacked.
6. Structure location and layout may be field adjusted by C.O..

Habitat LWS - Wood Quantity Per Structure	
Logs with Rootwad (12" to 18" DBH, 30' Long)	2
Small Whole Tree	1
Racking Wood	6

TYPICAL PHOTO



PLAN VIEW



SECTION VIEW

TYPICAL DETAIL – HABITAT LARGE WOOD STRUCTURE
NOT TO SCALE

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TYPICAL DETAILS - FLOW SPLITTING LWS, HABITAT LWS

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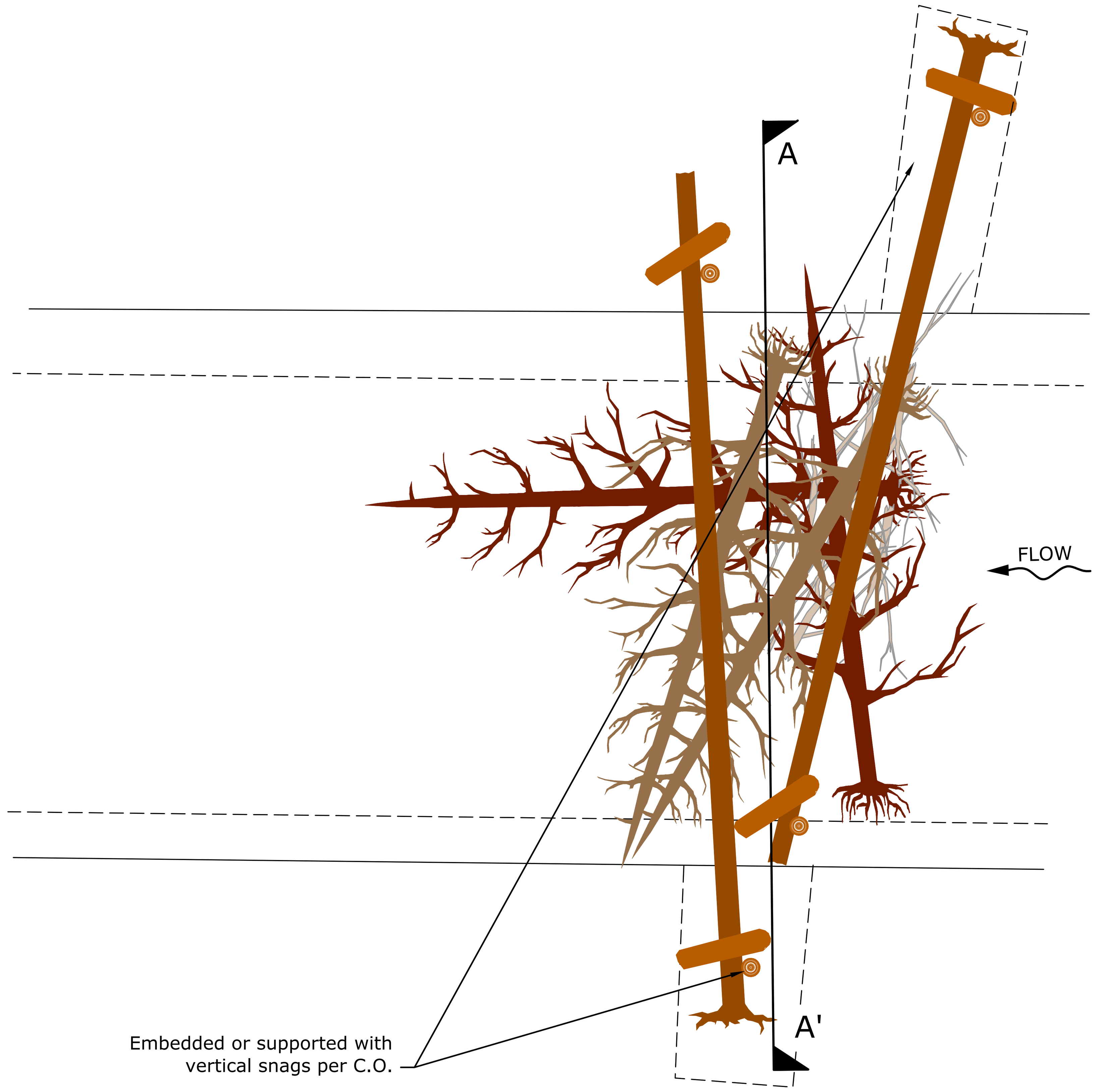


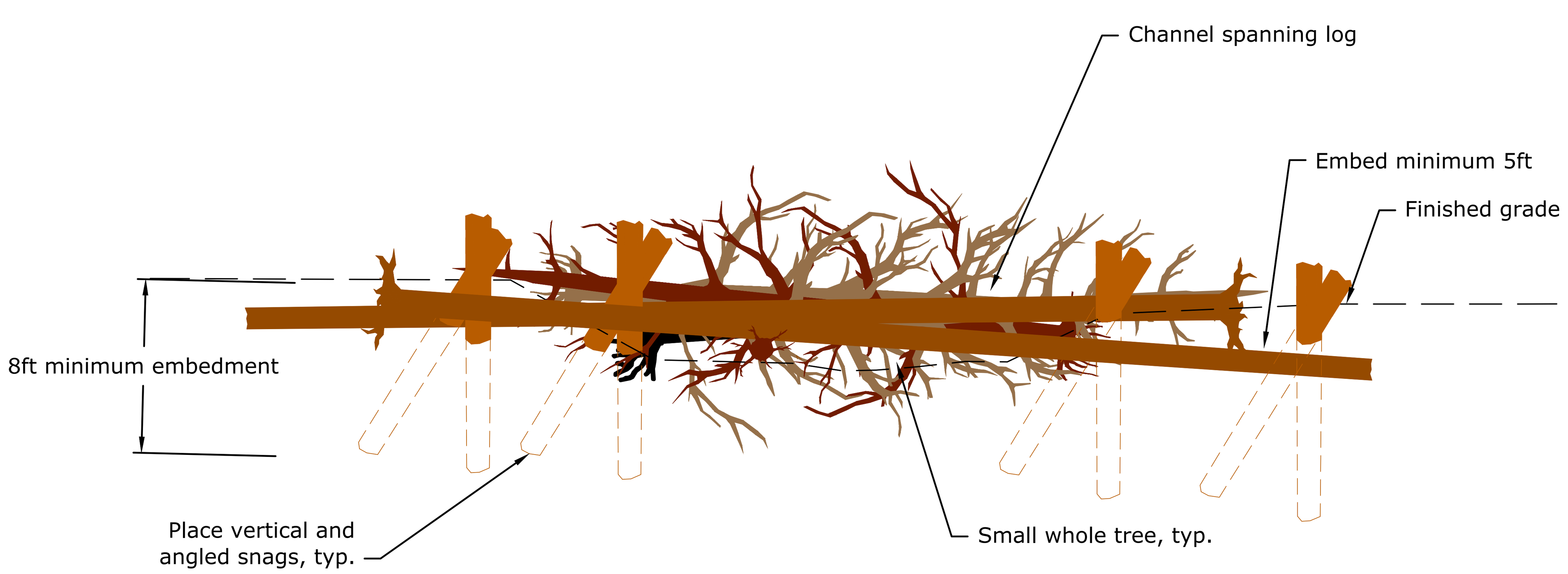
PLAN VIEW

TYPICAL PHOTO

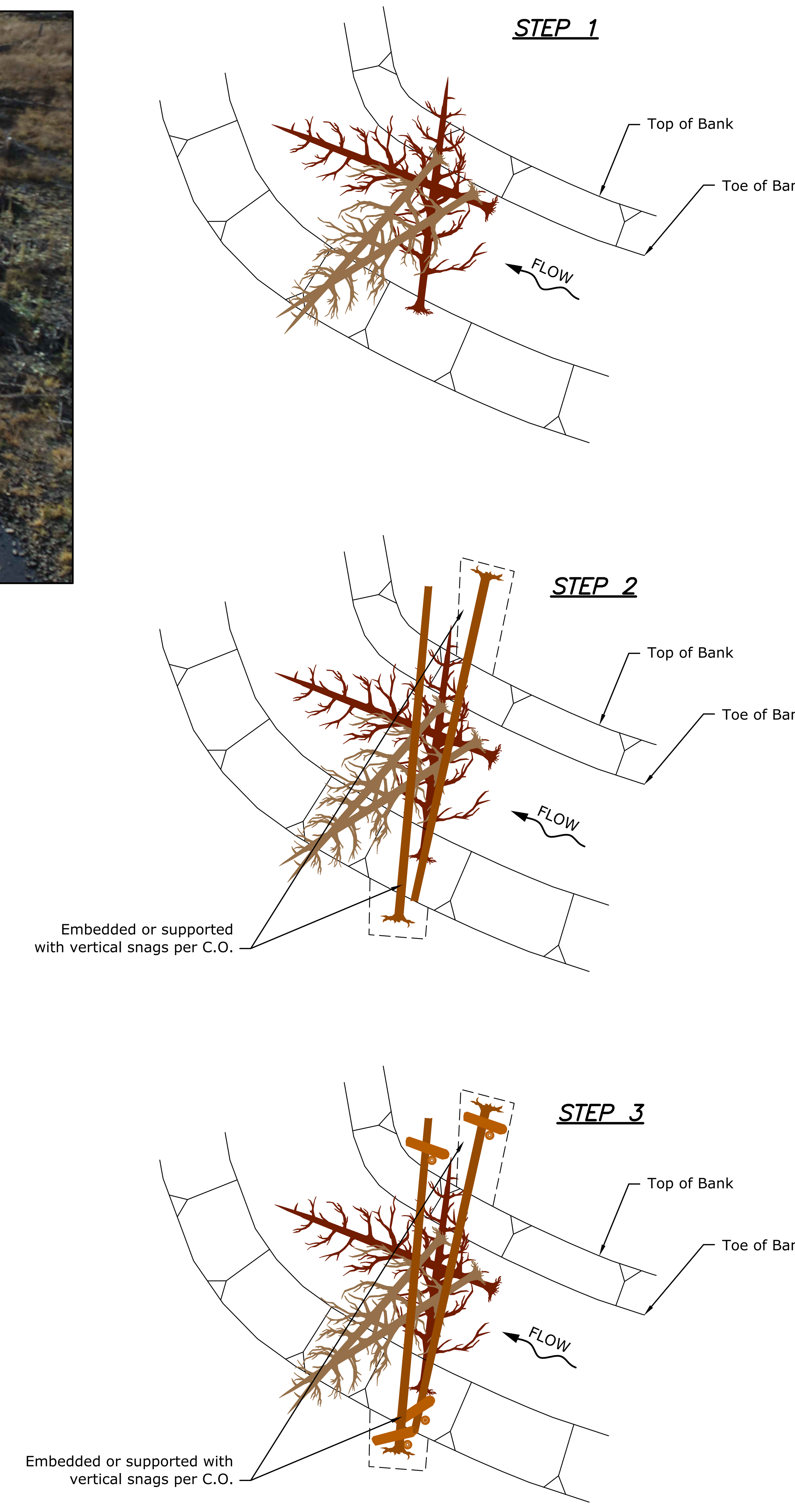
CONSTRUCTION NOTES:

1. Orientation may vary, per C.O.
2. Embed rootwad of large whole tree completely below finish grade.
3. Tip embedment depth may increase to a maximum of 10ft, or per C.O.

Channel Spanning LWS - Wood Quantity Per Structure	
Rootwad Log	2
Small Whole tree	4
Vertical Snag	4
Angled Snag	4
Racking Wood	8



SECTION VIEW



SEQUENCE

TYPICAL DETAIL – CHANNEL SPANNING LARGE WOOD STRUCTURE
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TYPICAL DETAILS - CHANNEL SPANNING LWS

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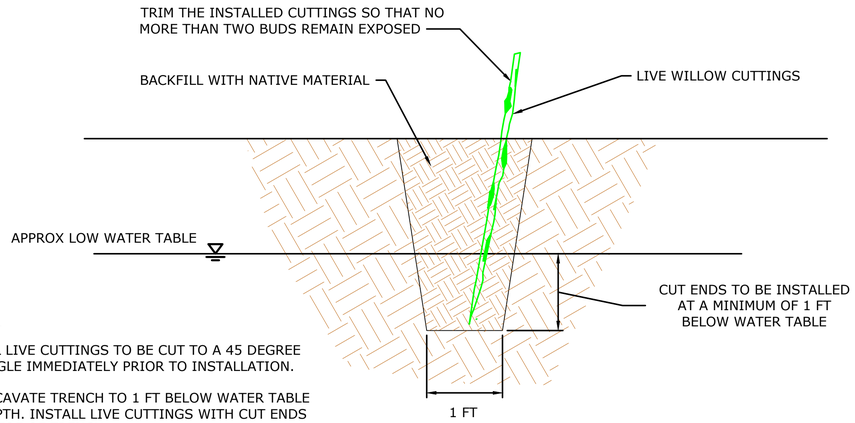


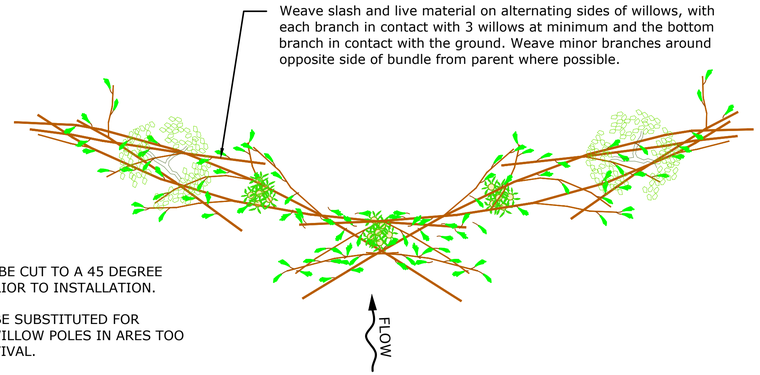
NOTES:

1. ALL LIVE CUTTINGS TO BE CUT TO A 45 DEGREE ANGLE IMMEDIATELY PRIOR TO INSTALLATION.
2. EXCAVATE TRENCH TO 1 FT BELOW WATER TABLE DEPTH. INSTALL LIVE CUTTINGS WITH CUT ENDS IN TOE OF TRENCH.
3. PUMP WATER INTO TRENCH AND COMPACT SOIL BACKFILL IN LIFTS TO IMPROVE STEM TO SOIL CONTACT.
4. "WATER IN" FINISHED CUTTING UNTIL WATER VISIBLY "BUBBLES" ON SURFACE.

SECTION

TYPICAL PHOTO

TYPICAL DETAIL – WILLOW TRENCH
NOT TO SCALE



NOTES:

1. ALL LIVE CUTTINGS TO BE CUT TO A 45 DEGREE ANGLE IMMEDIATELY PRIOR TO INSTALLATION.
2. 3" PEELED POSTS MAY BE SUBSTITUTED FOR POTTED WILLOWS OR WILLOW POLES IN ARES TOO WET FOR WILLOW SURVIVAL.
3. DESIGN INTENT IS TO INTERCEPT SHALLOW FLOODPLAIN FLOWS.

PLAN

ELEVATION

TYPICAL PHOTO – PRIOR TO WEAVING

TYPICAL PHOTO – ACTIVE DURING FLOODING

TYPICAL DETAIL – FLOOD FENCE
NOT TO SCALE

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TYPICAL DETAILS - WILLOW TRENCH, FLOOD FENCE

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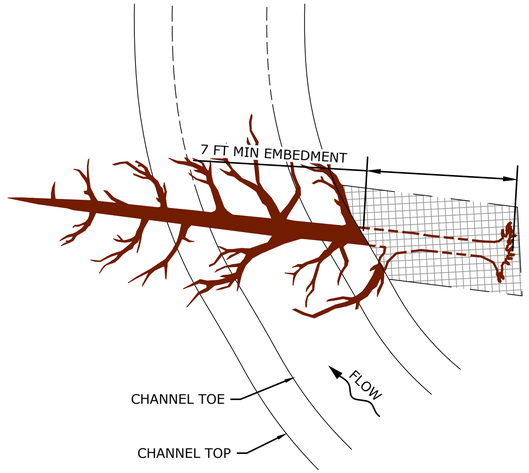
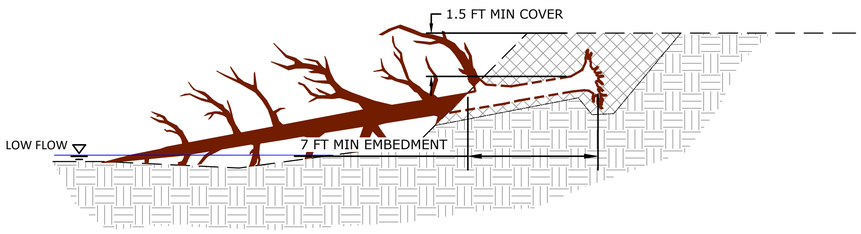


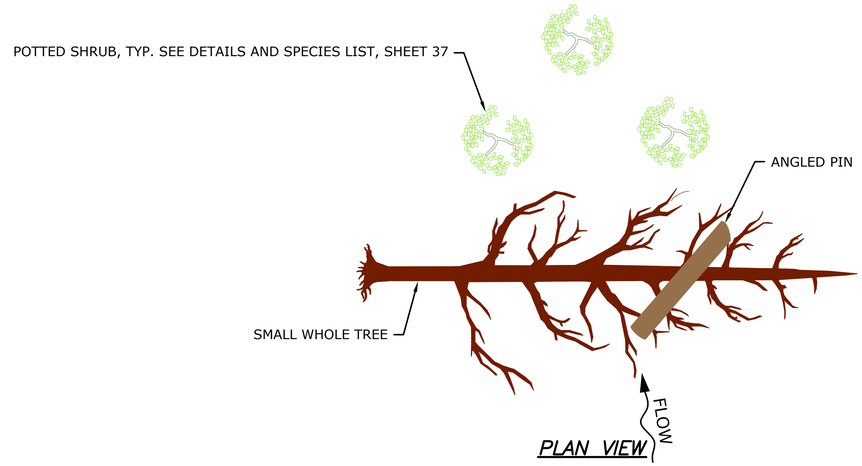
PLAN VIEW



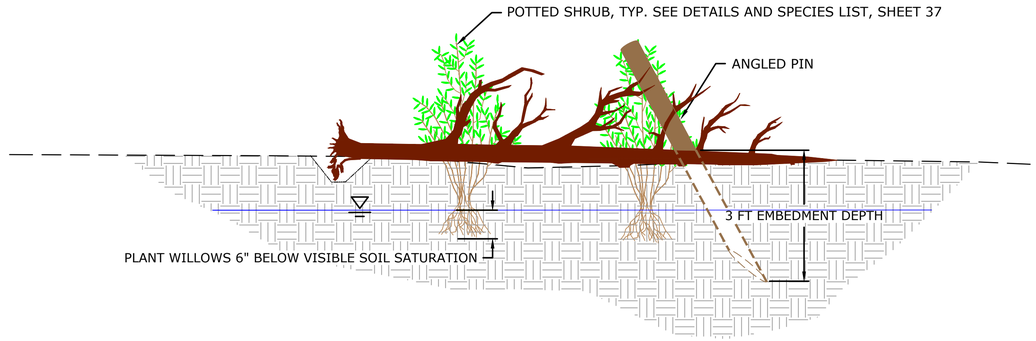
SECTION VIEW

TYPICAL PHOTO

TYPICAL DETAIL – SMALL WHOLE TREE PLACEMENT (CHANNEL)
NOT TO SCALE



PLAN VIEW



SECTION VIEW

TYPICAL PHOTO

TYPICAL DETAIL – SMALL WHOLE TREE PLACEMENT (FLOODPLAIN)
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TYPICAL DETAILS - SMALL WHOLE TREE PLACEMENT

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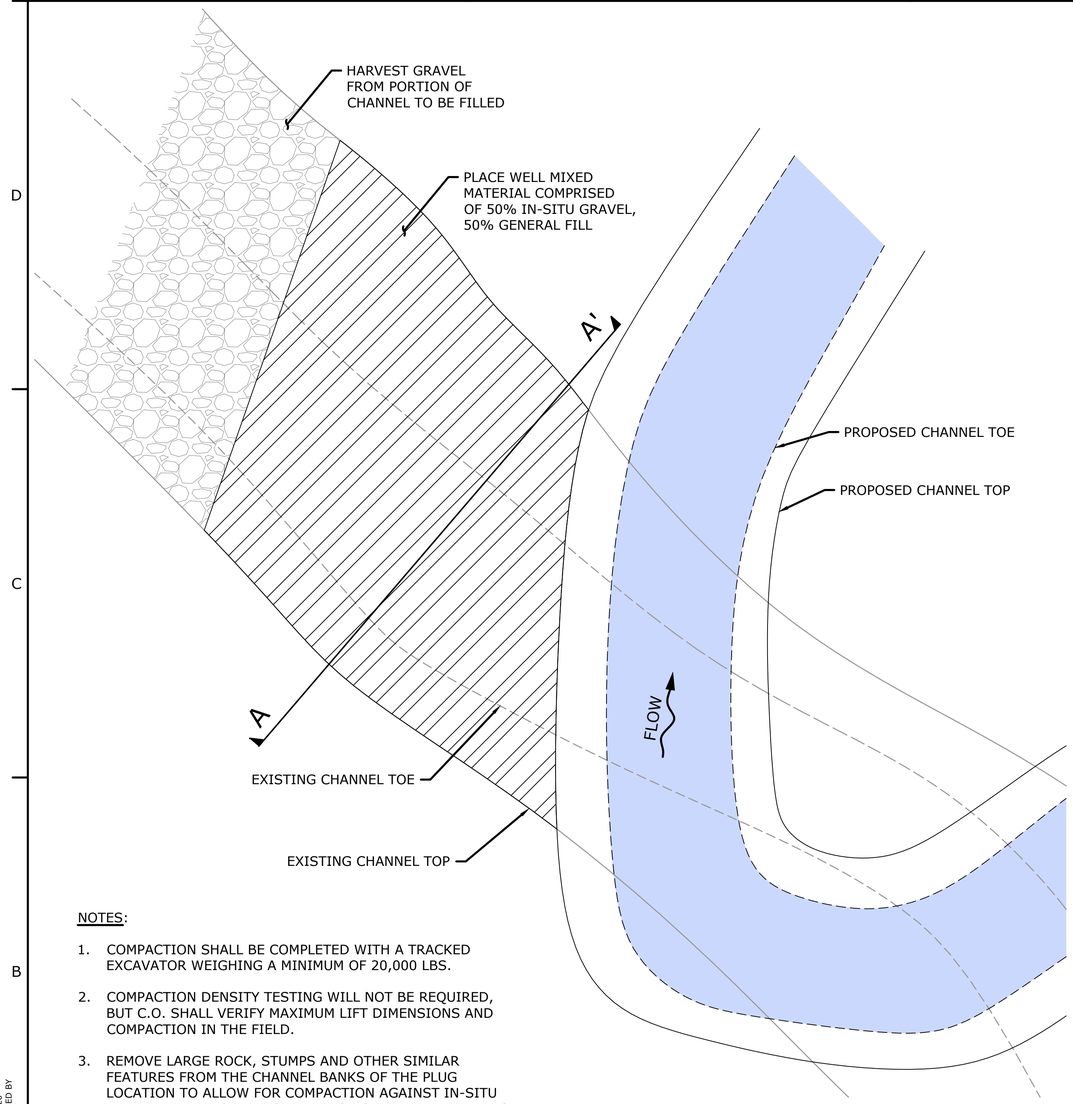
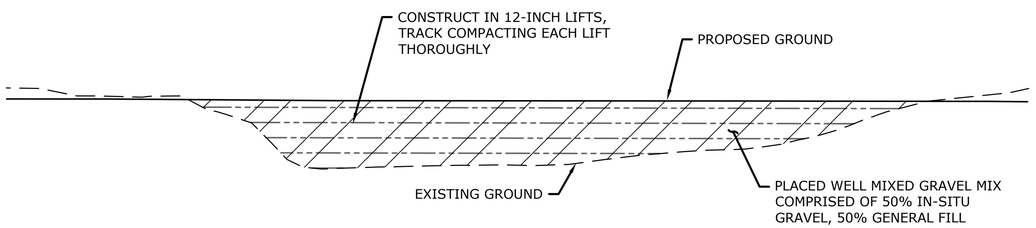


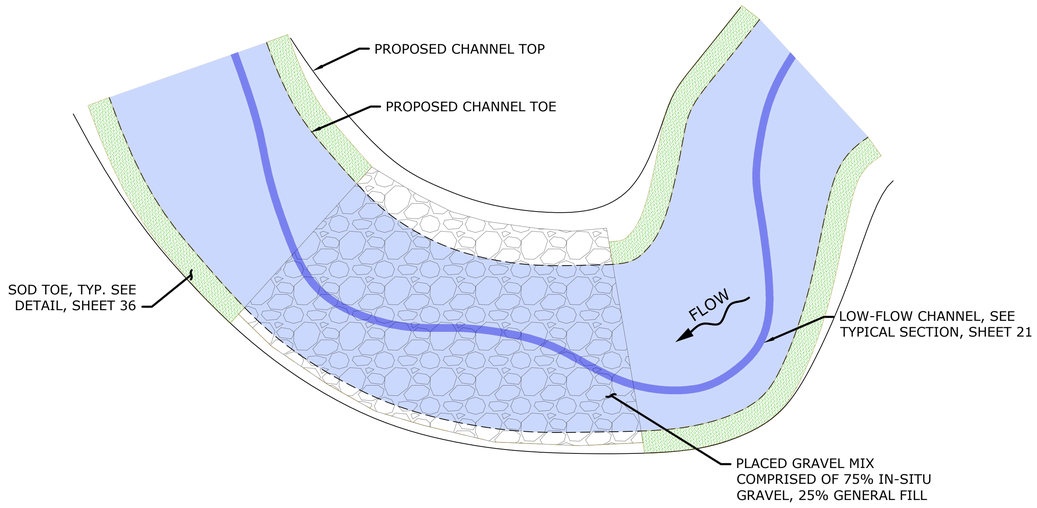
NOTES:

1. COMPACTION SHALL BE COMPLETED WITH A TRACKED EXCAVATOR WEIGHING A MINIMUM OF 20,000 LBS.
2. COMPACTION DENSITY TESTING WILL NOT BE REQUIRED, BUT C.O. SHALL VERIFY MAXIMUM LIFT DIMENSIONS AND COMPACTION IN THE FIELD.
3. REMOVE LARGE ROCK, STUMPS AND OTHER SIMILAR FEATURES FROM THE CHANNEL BANKS OF THE PLUG LOCATION TO ALLOW FOR COMPACTION AGAINST IN-SITU MATERIAL AND TO REDUCE THE RISK OF PREFERENTIAL FLOW ALONG THE BOUNDARY OF THE GRAVEL CHANNEL PLUG.

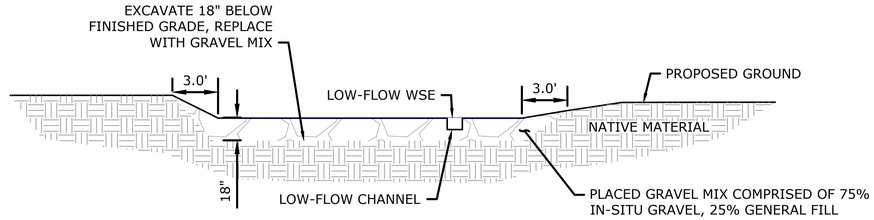


SECTION VIEW A–A'
1" = 5'

TYPICAL DETAIL – GRAVEL CHANNEL PLUG



PLAN VIEW
1" = 10'



SECTION VIEW
1" = 5'

TYPICAL DETAIL – GRAVEL CHANNEL BED

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TYPICAL DETAILS - GRAVEL CHANNEL PLUG AND GRAVEL CHANNEL BED

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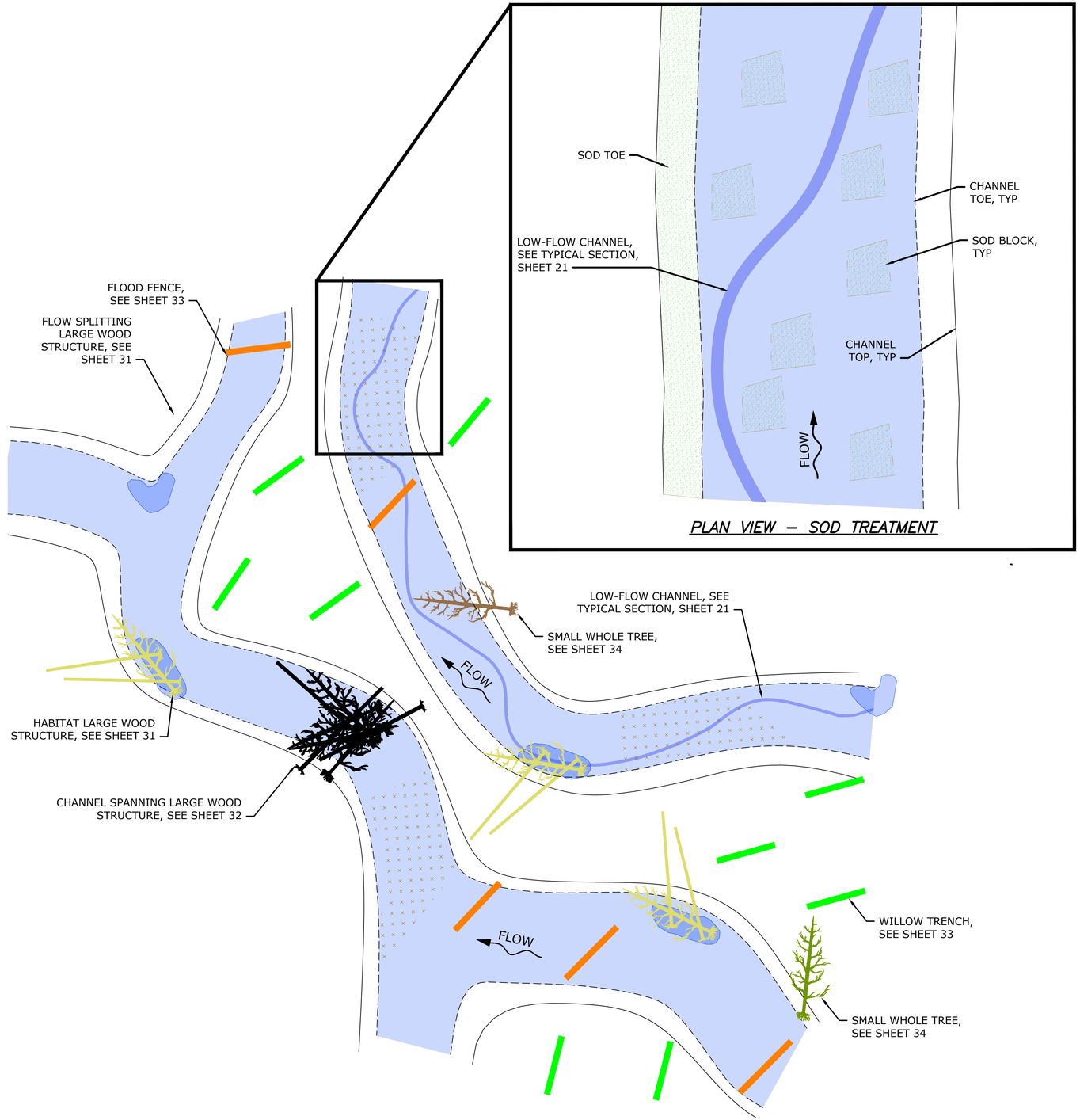
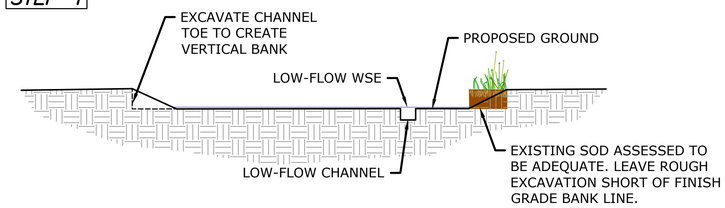


PLAN VIEW – TYPICAL TREATMENT LAYOUT

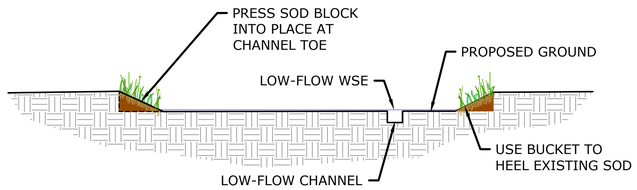
PLAN VIEW – SOD TREATMENT

STEP 1

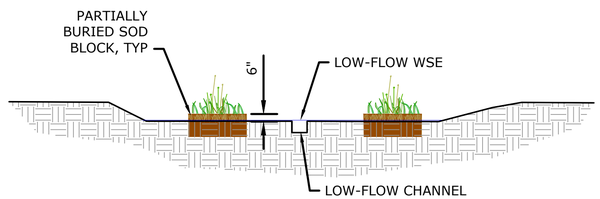


SECTION VIEW – SOD TOE (IN PROGRESS)

STEP 2



SECTION VIEW – SOD TOE (COMPLETED)



SECTION VIEW – SOD BLOCK IN CHANNEL

NOTES:

1. SOD TOE TREATMENT WILL BE USED IN ALL CHANNEL LOCATIONS WHERE EXISTING SOD IS INADEQUATE, PER C.O.
2. IF SOD IS ADEQUATE, CONTRACTOR SHALL USE AN EXCAVATOR BUCKET TO COMPRESS THE EXISTING SOD TO CONFORM TO FINISH GRADE, AS SHOWN IN THE COMPLETED SOD TOE SECTION VIEW.
3. SOD BLOCKS USED IN THIS TREATMENT SHALL BE APPROVED BY C.O. PRIOR TO INSTALLATION.
4. SALVAGED SOD SHALL BE BURIED IN THE PROPOSED CHANNELS TO PROVIDE ROUGHNESS AND SEED BANK MATERIAL.

TYPICAL DETAIL – SOD REVEGETATION

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TYPICAL DETAILS - SOD REVEGETATION

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RIPARIAN ZONE
3.3 ACRES

SEED MIX

COMMON NAME	SCIENTIFIC NAME	PERCENT OF WHOLE MIX
Tufted hairgrass	*Deschampsia caespitosa*	20%
Nebraska sedge	*Carex nebrascensis*	10%
Great Basin wildrye	*Leymus cinereus*	30%
Lewis flax	*Linum lewisii*	15%
Bluejoint reedgrass	*Calamagrostis canadensis*	25%

LIVE PLANTS

COMMON NAME	SCIENTIFIC NAME	STOCK	TYPE	SIZE
Coyote willow	*Salix exigua*	Shrub	Live cutting	4-6 ft, 0.5-1.5" diameter
Coyote willow	*Salix exigua*	Shrub	Tubeling	10 in3
Red osier dogwood	*Cornus sericea*	Shrub	Tubeling	10 in3

TRANSITIONAL ZONE
12.9 ACRES

SEED MIX

COMMON NAME	SCIENTIFIC NAME	PERCENT OF WHOLE MIX
Idaho fescue	*Festuca idahoensis*	15%
Great Basin wildrye	*Leymus cinereus*	25%
Bluebunch wheatgrass	*Pseudoroegneria spicata*	25%
Bottlebrush squirreltail	*Elymus elymoides*	15%
Blue wildrye	*Elymus glaucus*	20%

LIVE PLANTS

COMMON NAME	SCIENTIFIC NAME	STOCK	TYPE	SIZE
Pacific willow	*Salix lasiandra*	Tree	Live cutting	4-6 ft, 0.5-1.5" diameter
Pacific willow	*Salix lasiandra*	Tree	Tubeling	10 in3
Black cottonwood	*Populus trichocarpa*	Tree	Tubeling	10 in3
Black elderberry	*Sambucus nigra*	Tree	Potted	1 gallon

UPLAND ZONE
28.8 ACRES

SEED MIX

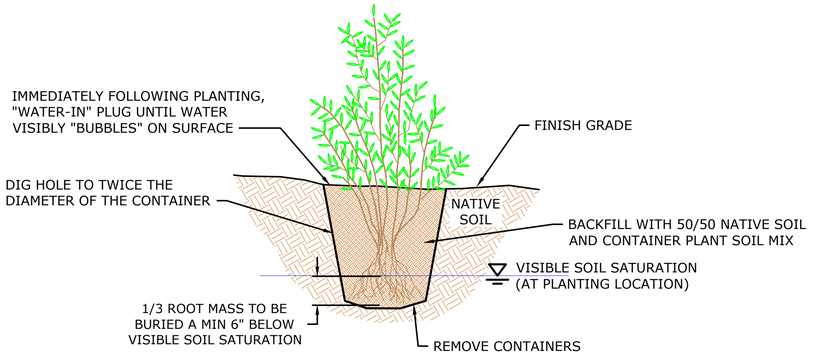
COMMON NAME	SCIENTIFIC NAME	PERCENT OF WHOLE MIX
Blue wildrye	*Elymus glaucus*	30%
Prairie junegrass	*Koeleria macrantha*	10%
Bluebunch wheatgrass	*Pseudoroegneria spicata*	30%
Thickspike wheatgrass	*Elymus lanceolatus*	30%

LIVE PLANTS

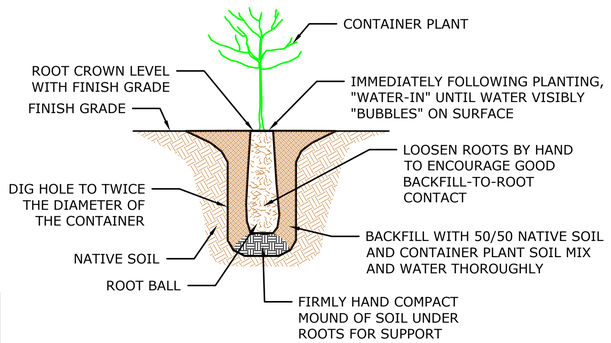
COMMON NAME	SCIENTIFIC NAME	STOCK	TYPE	SIZE
Mockorange	*Philadelphus lewisii*	Shrub	Potted	1 gallon
Chokecherry	*Prunus virginiana var. melanocarpa*	Shrub	Potted	1 gallon
Douglas hawthorn	*Crataegus douglasii*	Shrub	Potted	1 gallon
Serviceberry	*Amelanchier alnifolia ssp. Cusickii*	Shrub	Potted	1 gallon
Golden currant	*Ribes aureum*	Shrub	Potted	1 gallon
Woods Rose	*Rosa woodsii*	Shrub	Potted	1 gallon
Red elderberry	*Sambucus racemosa*	Shrub	Potted	1 gallon
Black cottonwood	*Populus trichocarpa*	Tree	Potted	1 gallon

NOTES:

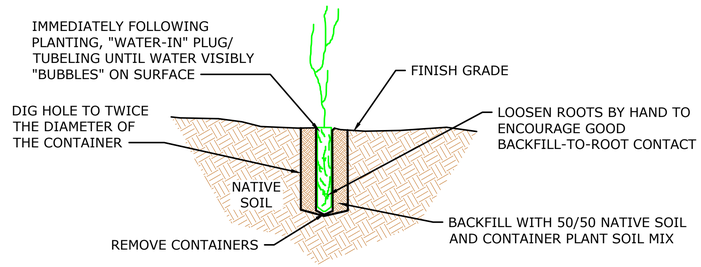
1. SOME PLANTING AREAS OVERLAP WITH LOG STRUCTURE PLACEMENTS AND SOME AREAS WILL BE MORE SUITABLE FOR PLANTING THAN OTHERS. PLANTING IN THESE AREAS WILL BE CONFIGURED TO WORK AROUND LOG STRUCTURES OR ADDED TO OTHER IDENTIFIED PLANTING AREAS TO OPTIMIZE PROJECT PERFORMANCE PER APPROVAL OF OWNER'S REPRESENTATIVE.
2. SEED AND PLANTING DENSITIES AND PERCENT COMPOSITION WILL BE FINALIZED WITH INPUT FROM PROJECT PARTNERS AND LOCAL NURSERIES AT FINAL 80% DESIGN PHASE.
3. SEEDING, WILLOW TRENCHES AND FLOOD FENCING WILL BE INSTALLED DURING THE SAME SEASON AS CONSTRUCTION (YEAR 1). ALL OTHER WOODY PLANTS WILL BE PLANTED THE FOLLOWING YEAR (YEAR 2) AND WILL DEPEND ON OBSERVATIONS OF THE HYDROLOGY AND PLANT COMMUNITY POST CONSTRUCTION. THE PLANTS PROVIDED ON THIS LIST ARE LIKELY TO BE INCLUDED IN YEAR 2 PLANTING.



TYPICAL DETAIL – BURIED POTTED/ TUBELING WILLOW
NOT TO SCALE



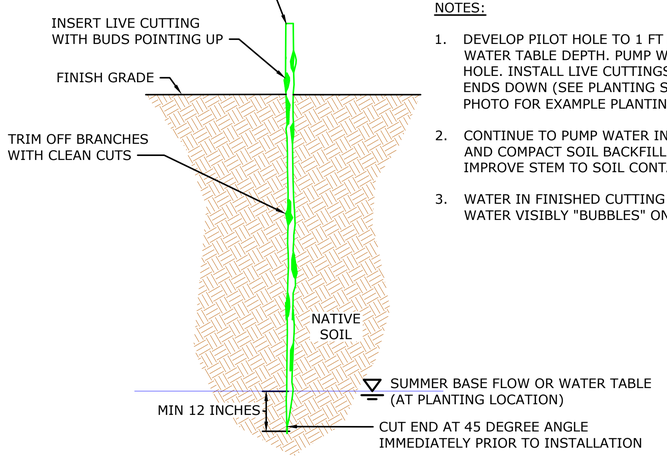
TYPICAL DETAIL – POTTED/ TUBELING
NOT TO SCALE



TYPICAL DETAIL – PLUG/ TUBELING
NOT TO SCALE

TYPICAL PHOTO – PLANTING STINGER

DRIVE LIVE CUTTINGS INTO NATIVE SOIL SO THAT A MINIMUM OF 12 INCHES EXTENDS BELOW THE SUMMER WATER TABLE ELEVATION, AND A MAXIMUM TWO BUDS OR 6" LENGTH REMAINS ABOVE GROUND.



NOTES:

1. DEVELOP PILOT HOLE TO 1 FT BELOW WATER TABLE DEPTH. PUMP WATER INTO HOLE. INSTALL LIVE CUTTINGS WITH CUT ENDS DOWN (SEE PLANTING STINGER PHOTO FOR EXAMPLE PLANTING TOOL).
2. CONTINUE TO PUMP WATER INTO HOLE AND COMPACT SOIL BACKFILL IN LIFTS TO IMPROVE STEM TO SOIL CONTACT.
3. WATER IN FINISHED CUTTING UNTIL WATER VISIBLY "BUBBLES" ON SURFACE.

TYPICAL DETAIL – LIVE CUTTING
NOT TO SCALE

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PLANTING TABLES, SEED MIXES AND TYPICAL DETAILS

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