CONSTRUCTION NOTES:

1. All Contractors working within the project boundaries are responsible for compliance with all applicable safety laws. The contractor shall be responsible for all barricades, safety devices and control of traffic within and around the construction area.

2. All material and workmanship furnished on or for the project must meet the minimum requirements of project permits, approving agencies, specifications as set forth herein, or whichever is more restrictive.

3. Contractor shall not work within any wetland area until the owner has obtained a CWA Section 404 permit from the United States Army Corps of Engineers. All work within or adjacent to any wetland area shall comply with the conditions of the 404 permit.

4. Contractor shall obtain all necessary permits prior to any dewatering and/or river diversion activities on site.

5. The Contractor shall install and maintain appropriate sediment control devices throughout the whole project site, including the construction staging area and stockpile area throughout the project’s construction. Temporary construction and permanent erosion control measures shall be designed, constructed and maintained in accordance with all applicable local, state and federal regulations.

6. Stream construction shall occur during the fish window for the project area or during periods of no flow through the project site.

7. Fish exclusion shall be conducted in the project area prior to any dewatering activities, or construction within or directly adjacent to the channel.

8. Surface and groundwater shall be drained away from active construction and into a sediment pond/trap to eliminate sediment from flowing into active stream channels.

9. Discharges entering active stream sites on site shall satisfy all state and federal standards and project permit requirements for contaminants and turbidity.

10. Diverted and controlled streamflow can be used to test and adjust newly constructed stream structures prior to permanently activating new stream segments.

11. Construction shall minimize disturbance to, and maximize reuse of existing riparian vegetation.

12. All material not used on-site shall be disposed of on-site as directed by the Karuk Tribe or shall be hauled offsite and properly disposed of.

13. Record information (as-built survey) shall be accurately recorded by the contractor and supplied to the owners and client for future use, reference, and monitoring. Submittal of record information is a condition of final acceptance.

CONSTRUCTION QUANTITIES

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Revision No: 1. Date: 05/28/2018

Seiad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

GeoEngineers
3601 West Elder Street, Suite 300
Boise, Idaho 83705

General Notes, Legend, and Quantities
Seiad Creek
Seiad Valley, California
Construction Sequencing and Fish Management Plan (See note 1 below)

Work in the river below the Ordinary High Water Mark (OHWM) shall only occur during the allowable "Fish Window," or as otherwise specified in project-specific environmental permits. Work above and beyond the OHWM may occur any time of the year as weather, site conditions and permits allow.

Construction shall occur in the following general steps, which correspond numerically to those shown on Sheets 4.1. Refer to the preceding design sheets for specifics regarding the construction of the proposed improvements.

It is likely the majority of the project reach will be dry due to subsurface discharge of Seiad Creek during the construction season. If discharge conditions require work to be completed in the active wet stream, refer to section 5 on this sheet for in-water work sequencing.

Numbers correspond to construction steps as noted on Sheet 4.1. Not all numbers are represented on Sheet 4.1.

1. General site preparation
1.1. Install and maintain necessary erosion and sedimentation controls, including a construction site entrance and all BMPs identified in the Stormwater Pollution Prevention Plan (SWPPP) prepared by the Contractor.
1.2. Remove blackberry bushes and unnecessary/undesirable underbrush in areas to be disturbed.
1.3. Establish survey control.
1.4. Establish limits of excavation/fill, stockpile areas, staging areas, haul roads and signage.
1.5. Mark all trees to remain. Provide protective barriers meeting requirements of the project specifications for tree and plant protection and salvage.

2. Excavate and rough grade floodplain area
2.1. Excavate floodplain area within limits of dry (no surface water) area.
2.2. Preserve existing trees where practical to maximize riparian integrity.
2.3. Place excavation spoils in spots area near downstream end of project (Main Spills Area). Grade excavated spoils through spoils area to maintain access during construction.
2.4. Temporarily stockpile suitable topsoil and channel bed material (gravel, cobbles & boulders) in the Temporary Spills Area identified on Sheet 4.2. Stockpiled material will be used in riffle construction and dressing of final grade for planting preparation. No stockpiled material in temporary stockpile areas shall remain on site after project is completed.
2.5. Screen excavated material to match riffle gradation as indicated on the riffle construction detail (see sheet 14.1). Sort stockpiled gradation ranges accordingly.

3. Excavate and rough grade main channel and side channels
3.1. Excavate and finish grade the proposed main channel and side channels within limits of dry work zones.
3.2. Place excavation spoils in spots area near downstream end of project (Main Spills Area). Grade excavated spoils through spots area to maintain access during construction.
3.3. Temporarily stockpile suitable channel riffle material (cobbles and boulders) in the Temporary Spills Area identified on Sheet 4.1. Stockpiled materials will be used in riffle construction.
3.4. Screen excavated material to match riffle gradation as indicated on the riffle construction detail (see sheet 14.1). Sort stockpiled gradation ranges accordingly.

4. Finish grade main channel and side channels
4.1. Finish grade the main and side channels within limits of dry work zones. This step includes grading the pools and constructing the riffles. Place gravel, cobbles and boulders in channels at riffle locations.

5. Excavate and finish grade floodplain, main channel and side channel in active wet stream area
5.1. Isolate the work zone from actively flowing water. Install a cofferdam in the stream beyond immediate area of disturbance in work zone. Cofferdams is intended to isolate clean river water from turbid water in active work zone (it's not intended to dry up construction zone). Cofferdams may consist of seclusion fencing, floating booms, sand bags, inflatable bladders and/or other suitable means. Cofferdams should include plastic liner or fine mesh silt fence to reduce the amount of fines entering the free flowing portion of the river. Excavate and sculpt the floodplain, main channel and side channel.
5.2. Working from upstream to downstream, the isolated work zone shall be seeded by a qualified crew of fish biologists, as designated by the Karuk Tribe. The creek channel can be seeded in smaller lengths, if necessary and as determined in the field. The Karuk Tribe is responsible for performing and overseeing the fish removal and obtaining the appropriate fish collection permits. (Actual physical removal of fish is excluded from contractor's responsibilities.)
5.3. Fish shall be pushed/towed out of active work zone.
5.4. Establish and maintain temporary construction access from the bank in a manner that minimizes disturbance.
5.5. Finish grade and enhance main channel and side channels. Install woody habitat structures, excavating deeper pool areas immediately adjacent to wood structures and planting woody vegetation in and around woody habitat structures.
5.6. Remove cofferdam after segment is constructed.

6. Install habitat structures in main channel and side channels
6.1. Install habitat structures in all channels.
6.2. Plant riparian shrubs and trees integral with habitat structures during installation of habitat structures.

7. Fine grade remaining disturbed areas
7.1. Heal all stockpiled soil, gravel, cobbles, rock and/or riprap to the Main Spills Area identified on Sheet 4.1.

8. Plant, transplant, hydrosed, mulch and irrigate disturbed areas as per vegetation plan
8.1. Plant, transplant, hydrosed, and mulch all disturbed areas with appropriate vegetation.
8.2. Install and maintain temporary erosion and sedimentation controls to prevent erosion and sediment from entering stream.
8.3. Irrigate all new vegetation during growing season.

9. Remove and dispose of properly all debris from site, and demobilize

10. Monitor, irrigate and maintain
CROSS SECTION C-C'
MAIN CHANNEL STATION 17+10

NOTE:
1. CROSS SECTIONS FACE DOWNSTREAM. CROSS SECTION CENTERLINE STATION IS LOCATED ALONG THALWEG ALIGNMENT OF THE PROPOSED MAIN CHANNEL.
2. Y-AXIS IS ELEVATION, X-AXIS IS DISTANCE IN FEET ALONG SECTION LINES SHOWN ON SHEETS 5.1 AND 5.2.

HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=4'

CROSS SECTION D-D'
MAIN CHANNEL STATION 19+56

Existing Grade

PROPOSED GRADE

PROPOSED SIDE CHANNEL 1

PROPOSED SIDE CHANNEL 2

PROPOSED SIDE CHANNEL 3

PROPOSED MAIN CHANNEL

PROPOSED SIDE CHANNEL 4

Maintain and protect existing vegetation

PROPOSED FILL AREAS

PROPOSED CUT AREAS

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Valley Cross Sections
Selaid Creek
Selaid Valley, California

Sheet 6.2
11 of 54

Karuk Tribe of California
LEGEND

PROPOSED FILL AREAS
PROPOSED CUT AREAS

CROSS SECTION E-E'
MAIN CHANNEL STATION 21+00

NOTE:
1. CROSS SECTIONS FACE DOWNSTREAM. CROSS SECTION CENTERLINE STATION IS LOCATED ALONG THALWEG ALIGNMENT OF THE PROPOSED MAIN CHANNEL.
2. Y-AXIS IS ELEVATION, X-AXIS IS DISTANCE IN FEET ALONG SECTION LINES SHOWN ON SHEETS 5.1 AND 5.2.
HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=4'
1. Cross sections are shown at all major vertical grade breaks shown in profile view. Where grade breaks are greater than 50 feet apart supplemental sections are provided at 50 foot intervals. Cross sections can be found on sheets 8-14-8.

2. For large wood material structures see sheet 13.1-13.2.

3. All channel and bank materials shall be accepted by the contracting officer. Channel and banks shall consist of boulders, cobbles, and gravels naturally occurring in the Seiad Valley. Pockets of sand or unsuitable material shall be over excavated and replaced with suitable material to design elevations.

4. Riffle shall be graded to design elevations as shown on plans. Contracting officer shall accept or reject riffle bed material based on the graduation shown on sheet 14-1.
1. Cross sections are shown at all major vertical grade breaks shown in profile view, where grade breaks are greater than 50 feet apart. Supplemental sections are provided at 50-foot intervals. Cross sections can be found on sheets 8, 10, 12, 14.

2. For large wood material structures see sheet 11.1-11.3.

3. All channel and bank materials shall be accepted by the contracting officer. Channel and banks shall consist of boulders, cobble, and gravels naturally occurring in the Seiad Valley. Pockets of sand or unsuitable material shall be over excavated and replaced with suitable material to design elevations.

4. Riffle shall be graded to design elevations as shown on plans. Contracting officer shall accept or reject riffle bed material based on the gradation shown on sheet 14.2.
NOTES:
1. CROSS SECTIONS FACE DOWNSTREAM. CROSS SECTION CENTERLINE STATION IS LOCATED ALONG THE THALWEG ALIGNMENT.
2. Y-AXIS IS ELEVATION. X-AXIS IS DISTANCE IN FEET ALONG A CHORD PERPENDICULAR TO THE THALWEG. THE ZERO STATION SHOWN ON THESE CROSS SECTIONS REPRESENTS THE THALWEG ALIGNMENT.
3. CONSTRUCTED CHANNEL SHALL TRANSITION SMOOTHLY BETWEEN CROSS SECTIONAL GEOMETRIES SHOWN WITHIN THESE CROSS SECTIONS. CROSS SECTION GEOMETRY SHOWN REPRESENTS ONE POINT IN A SMOOTH TRANSITION.
4. CROSS-SECTIONS ARE TO BE USED TO STAKE OUT THE CHANNEL OFFSETS AT THE VERTICAL GRADE BREAKS OF THE CHANNEL PROFILE.
NOTES:
1. CROSS SECTIONS FACE DOWNSTREAM. CROSS SECTION CENTERLINE STATION IS LOCATED ALONG THE THALWEG ALIGNMENT.
2. Y-AXIS IS ELEVATION, X-AXIS IS DISTANCE IN FEET ALONG A CHORD PERPENDICULAR TO THE THALWEG. THE ZERO STATION SHOWN ON THESE CROSS SECTIONS Represents THE THALWEG ALIGNMENT.
3. CONSTRUCTED CHANNEL SHALL TRANSITION SMOOTHLY BETWEEN CROSS SECTION GEOMETRIES SHOWN WITHIN THESE CROSS SECTIONS. CROSS SECTION GEOMETRY SHOWN REPRESENTS ONE POINT IN A SMOOTH TRANSITION.
4. CROSS-SECTIONS ARE TO BE USED TO STAKE OUT THE CHANNEL OFFSETS AT THE VERTICAL GRADE BREAKS OF THE CHANNEL PROFILE.
1. CROSS SECTIONS FACE DOWNSTREAM. CROSS SECTION CENTERLINE STATION IS LOCATED ALONG THE THALWEG ALIGNMENT.

2. Y-AXIS IS ELEVATION, X-AXIS IS DISTANCE IN FEET ALONG A CHORD PERPENDICULAR TO THE THALWEG. THE ZERO STATION SHOWN ON THESE CROSS SECTIONS REPRESENTS THE THALWEG ALIGNMENT.

3. CONSTRUCTED CHANNEL SHALL TRANSITION SMOOTHLY BETWEEN CROSS SECTIONAL GEOMETRIES SHOWN WITHIN THESE CROSS SECTIONS. CROSS SECTION GEOMETRY SHOWN REPRESENTS ONE POINT IN A SMOOTH TRANSITION.

4. CROSS-SECTIONS ARE TO BE USED TO STAKE OUT THE CHANNEL OFFSETS AT THE VERTICAL GRADE BREAKS OF THE CHANNEL PROFILE.
NOTES:
1. CROSS SECTIONS FACE DOWNSTREAM. CROSS SECTION CENTERLINE STATION IS LOCATED ALONG THE THALweg ALIGNMENT.
2. Y-AXIS IS ELEVATION, X-AXIS IS DISTANCE IN FEET ALONG A CHORD PERPENDICULAR TO THE THALweg. THE ZERO STATION SHOWN ON THESE CROSS SECTIONS REPRESENTS THE THALweg ALIGNMENT.
3. CONSTRUCTED CHANNEL SHALL TRANSITION SMOOTHLY BETWEEN CROSS SECTION GEOMETRIES SHOWN WITHIN THESE CROSS SECTIONS. CROSS SECTION GEOMETRY SHOWN REPRESENTS ONE POINT IN A SMOOTH TRANSITION.
4. CROSS-SECTIONS ARE TO BE USED TO STAKE OUT THE CHANNEL, OFFSETS AT THE VERTICAL GRADE BREAKS OF THE CHANNEL PROFILE.
NOTES:
1. CROSS SECTIONS FACE DOWNSTREAM.
   CROSS SECTION CENTERLINE STATION IS LOCATED ALONG THE THALweg ALIGNMENT.

2. Y-AXIS IS ELEVATION, X-AXIS IS DISTANCE IN FEET ALONG A CHORD PERPENDICULAR TO THE THALweg. THE ZERO STATION SHOWN ON THESE CROSS SECTIONS REPRESENTS THE THALweg ALIGNMENT.

3. CONSTRUCTED CHANNEL SHALL TRANSITION SMOOTHLY BETWEEN CROSS SECTIONAL GEOMETRIES SHOWN WITHIN THESE CROSS SECTIONS. CROSS SECTION GEOMETRY SHOWN REPRESENTS ONE POINT IN A SMOOTH TRANSITION.

4. CROSS-SECTIONS ARE TO BE USED TO STAKE OUT THE CHANNEL OFFSETS AT THE VERTICAL GRADE BREAKS OF THE CHANNEL PROFILE.

VERTICAL EXAGGERATION = 5X
1" = 4'

Scale: 1" = 20 Feet

Seiad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

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Boise, Idaho 83705

Side Channel 1
Cross Sections
Seiad Creek
Seiad Valley, California

Sheet 9.2
27 of 54
LEGEND

- PROPOSED CUT AREAS
- PROPOSED FILL AREAS

NOTES:
1. CROSS SECTIONS FACE DOWNSTREAM. CROSS SECTION CENTERLINE STATION IS LOCATED ALONG THE THALWEG ALIGNMENT.

2. Y-AXIS IS ELEVATION, X-AXIS IS DISTANCE IN FEET ALONG A CHORD PERPENDICULAR TO THE THALWEG. THE ZERO STATION SHOWN ON THESE CROSS SECTIONS REPRESENTS THE THALWEG ALIGNMENT.

3. CONSTRUCTED CHANNEL SHALL TRANSITION SMOOTHLY BETWEEN CROSS SECTIONAL GEOMETRIES SHOWN WITHIN THESE CROSS SECTIONS. CROSS SECTION GEOMETRY SHOWN REPRESENTS ONE POINT IN A SMOOTH TRANSITION.

4. CROSS-SECTIONS ARE TO BE USED TO STAKE OUT THE CHANNEL OFFSETS AT THE VERTICAL GRADE BREAKS OF THE CHANNEL PROFILE.

VERTICAL EXAGGERATION = 5X
1' = 4'

Seiad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

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Boise, Idaho 83705

Side Channel 1
Cross Sections
Seiad Creek
Seiad Valley, California

Sheet 9.3
28 of 54
NOTES:
1. CROSS SECTIONS FACE DOWNSTREAM. CROSS SECTION CENTERLINE STATION IS LOCATED ALONG THE THALweg ALIGNMENT.
2. Y-AXIS IS ELEVATION, X-AXIS IS DISTANCE IN FEET ALONG A CHORD PERPENDICULAR TO THE THALweg. THE ZERO STATION SHOWN ON THESE CROSS SECTIONS REPRESENTS THE THALweg ALIGNMENT.
3. CONSTRUCTED CHANNEL SHALL TRANSITION SMOOTHLY BETWEEN CROSS SECTIONAL GEOMETRIES SHOWN WITHIN THESE CROSS SECTIONS. CROSS SECTION GEOMETRY SHOWN REPRESENTS ONE POINT IN A SMOOTH TRANSITION.
4. CROSS-SECTIONS ARE TO BE USED TO STAKE OUT THE CHANNEL OFFSETS AT THE VERTICAL GRADE BREAKS OF THE CHANNEL PROFILE.

VERTICAL EXAGGERATION = 5X
1" = 6 Feet

Seiad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

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Boise, Idaho 83705
Seiad Creek
Seiad Valley, California
1. CROSS SECTIONS FACE DOWNSTREAM. CROSS SECTION CENTERLINE STATION IS LOCATED ALONG THE THALweg ALIGNMENT.

2. Y-AXIS IS ELEVATION, X-AXIS IS DISTANCE IN FEET ALONG A CHORD PERPENDICULAR TO THE THALweg. THE ZERO STATION SHOWN ON THESE CROSS SECTIONS REPRESENTS THE THALweg ALIGNMENT.

3. CONSTRUCTED CHANNEL SHALL TRANSITION SMOOTHLY BETWEEN CROSS SECTION GEOMETRIES SHOWN WITHIN THESE CROSS SECTIONS. CROSS SECTION GEOMETRY SHOWN REPRESENTS ONE POINT IN A SMOOTH TRANSITION.

4. CROSS-SECTIONS ARE TO BE USED TO STAKE OUT THE CHANNEL OFFSETS AT THE VERTICAL GRADE BREAKS OF THE CHANNEL PROFILE.

VERTICAL EXAGGERATION = 5X
1' = 4'

Legend:
- PROPOSED CUT AREAS
- PROPOSED FILL AREAS
1. CROSS SECTIONS ARE SHOWN AT ALL MAJOR VERTICAL GRADE BREAKS SHOWN IN PROFILE VIEW. WHERE GRADE BREAKS ARE GREATER THAN 50 FEET APART, SUPPLEMENTAL SECTIONS ARE PROVIDED AT 50 FOOT INTERVALS. CROSS SECTIONS CAN BE FOUND ON SHEETS 11.1 - 11.3.


3. ALL CHANNEL AND BANK MATERIALS SHALL BE ACCEPTED BY THE CONTRACTING OFFICER. CHANNEL AND BANKS SHALL CONSIST OF BOULDERS, COBBLES, AND GRAVELS NATURALLY OCCURRING IN THE SEIAD VALLEY. POCKETS OF SAND OR UNSUITABLE MATERIAL SHALL BE OVER EXCAVATED AND REPLACED WITH SUITABLE MATERIAL TO DESIGN ELEVATIONS.

4. RIFFLE SHALL BE GRATED TO DESIGN ELEVATIONS AS SHOWN ON PLANS. CONTRACTING OFFICER SHALL ACCEPT OR REJECT RIFFLE BED MATERIAL BASED ON THE GRADATION SHOWN ON SHEET 14.1.

SIDE CHANNEL 3 PROFILE

Seiad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

Seiad Creek
Seiad Valley, California

Side Channel 3
Plan and Profile
Sheet 11.1
32 of 54
NOTES:
1. CROSS SECTIONS FACE DOWNSTREAM. CROSS SECTION CENTRILINE STATION IS LOCATED ALONG THE THALWEG ALIGNMENT.
2. Y-AXIS IS ELEVATION, X-AXIS IS DISTANCE IN FEET ALONG A CHORD PERPENDICULAR TO THE THALWEG. THE ZERO STATION SHOWN ON THESE CROSS SECTIONS REPRESENTS THE THALWEG ALIGNMENT.
3. CONSTRUCTED CHANNEL SHALL TRANSITION SMOOTHLY BETWEEN CROSS SECTIONAL GEOMETRIES SHOWN WITHIN THESE CROSS SECTIONS. CROSS SECTION GEOMETRY SHOWN REPRESENTS ONE POINT IN A SMOOTH TRANSITION.
4. CROSS-SECTIONS ARE TO BE USED TO STAKE OUT THE CHANNEL OFFSETS AT THE VERTICAL GRADE BREAKS OF THE CHANNEL PROFILE.

VERTICAL EXAGGERATION = 5X
1" = 4'


**NOTES:**

1. **CROSS SECTIONS FACE DOWNSTREAM.**
   CROSS SECTION CENTERLINE STATION IS LOCATED ALONG THE THALWEG ALIGNMENT.

2. **Y-AXIS IS ELEVATION, X-AXIS IS DISTANCE IN FEET ALONG A CHORD PERPENDICULAR TO THE THALWEG. THE ZERO STATION SHOWN ON THESE CROSS SECTIONS REPRESENTS THE THALWEG ALIGNMENT.**

3. **CONSTRUCTED CHANNEL SHALL TRANSITION SMOOTHLY BETWEEN CROSS SECTIONAL GEOMETRIES SHOWN WITHIN THESE CROSS SECTIONS. CROSS SECTION GEOMETRY SHOWN REPRESENTS ONE POINT IN A SMOOTH TRANSITION.**

4. **CROSS SECTIONS ARE TO BE USED TO STAKE OUT THE CHANNEL OFFSETS AT THE VERTICAL GRADE BREAKS OF THE CHANNEL PROFILE.**

**VERTICAL EXAGGERATION = 5X**

1" = 4'

Scale: 1" = 4'

Feet

---

**Revised By:**

**Date:**

**Description:**

**Inktype:**

**Design:**

**Checked:**

**Date:** 01/29/2018

**Project No.:** 18797-001-02

---

**Seiad Creek Habitat Enhancement**

**Siskiyou County, California**

**Karuk Tribe of California**

---

**GEOENGINEERS**

3501 West Elder Street, Suite 300
Bolivar, Idaho 83705

---

**Side Channel 4 Cross Sections**

**Seiad Creek**

**Seiad Valley, California**

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**Sheet 12.3**

37 of 54
Notes:
1. Locations of in-channel LWM structures shall be staked in the field by the contractor and must be approved by the contracting officer prior to beginning construction of that structure.
2. Rough grading of the channel shall be completed prior to construction of in-channel LWM structures.
4. Floodplain wood (Buried Snag) shall be placed as directed by the Contracting Officer, no survey staking is required.

Seiad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

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Proposed Habitat Structures
Sta. 15+00 - 24+00
Seiad Creek
Seiad Valley, California

Sheet 13.1
38 of 54
Notations:
1. Locations of in-channel LWM structures shall be staked in the field by the contractor and must be approved by the contracting officer prior to beginning construction of that structure.
2. Rough grading of the channel shall be completed prior to construction of in-channel LWM structures.
4. Floodplain wood (Buried Snag) shall be placed as directed by the Contracting Officer, no survey staking is required.
NOTES:
- INSTALL SUBSTRATE TO SECURE FINER MATERIAL. APPEAR NATURAL AND MAINTAIN A LOW FLOW CHANNEL.
- FEATURE TO BE CONSTRUCTED IN ONE FOOT VERTICAL LIFTS WITH FINES ADDED AND PRESSURE WASHED. SUCCESSFUL WASHING WILL BE DETERMINED BY MINIMIZATION OF VOIDS WITHIN PLACED MATRIX SUCH THAT PONDING OCCURS ON TOP OF LIFT WITH LITTLE TO NO PERCOLATION LOSSES OCCURRING THROUGH CONSTRUCTED FEATURE.
- PLACE BOULDERS (12'-18' DIAMETER) FOLLOWING THE FIRST LIFT.
- RIFFLE SHALL BE GRACED TO APPEAR NATURAL AND FUNCTION NATURALLY.

MAIN CHANNEL RIFFLE GRADATION VOLUMES

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MAIN CHANNEL MIXED GRADATION (APPROXIMATE)

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<td>Sands</td>
<td>0.0025 - 0.08 inch</td>
<td>10</td>
</tr>
<tr>
<td>Fines</td>
<td>less than 0.0025 (No. 200 Sieve)</td>
<td>5</td>
</tr>
</tbody>
</table>

Riffle  STATION RANGE  RIFFLE LENGTH  VOLUME PLACED MIX GRADATION
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>(FT)</th>
<th>(CY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC 1</td>
<td>0+28 - 0+68</td>
<td>40</td>
<td>53</td>
</tr>
<tr>
<td>SC 2</td>
<td>0+66.3</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>SC 2</td>
<td>1+72.2 - 2+65</td>
<td>108</td>
<td>143</td>
</tr>
<tr>
<td>SC 3</td>
<td>1+40 - 3+16</td>
<td>176</td>
<td>233</td>
</tr>
<tr>
<td>SC 4</td>
<td>2+68 - 2+98</td>
<td>30</td>
<td>45</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>594</td>
</tr>
</tbody>
</table>

SECTION B-B

VARIETIES
SEE CHANNEL GEOMETRY DETAILS ON CROSS SECTION SHEETS 8.1-8.8, 9.2-9.3, 10.2-10.3, 11.2-11.3 AND 12.2-12.3

Seiad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

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Typical Riffle Details
Seiad Creek
Seiad Valley, California

Sheet 14.1
40 of 54
NOTES:

- **CREATES OR ENLARGES MID-STREAM GRAVEL BARS, DIVERTS FLOW AND CREATES MULTIPLE CHANNELS AND/OR SIDE CHANNELS.**
- **PLACE JAM BELOW THE LOW WATER ELEVATION.**
- **UPSTREAM BAR GROWS AS A RESULT OF SLOWER "BACKWATERED" FLOW UPSTREAM.**
- **PRINCIPAL MECHANISM FOR FORMATION OF ANASTOMOSING CHANNEL SYSTEMS.**
- **ENHANCES FISH HABITAT BY CREATING MULTIPLE CHANNELS AND POOLS. SORTS GRAVEL.**
- **DESIGN SPECIFIES:**
  - PLACED OR CONSTRUCTED CHANNEL SPLITS.
  - NARROW END OF LARGE KEY MEMBERS AND SECONDARY MEMBERS ARE BURIED INTO THE BAR IN A DOWNWARD SLOPING MANNER TO REINFORCE STRUCTURE. SMALLER RACKED MEMBERS PLACED AMONG KEY MEMBERS.
  - FILL AND DENSE VEGETATION PLACED AND PLANTED ON TOP OF STRUCTURE.
  - FLOW THROUGH NEW SIDE CHANNEL MAY BE ENCOURAGED BY EXCAVATION.

### Typical Apex Jam Section

**NOT TO SCALE**

- **SLOWS CREEK VELOCITY.**
- **CREATES DIVERSE FISH HABITAT.**
- **ENCOURAGES SEDIMENT SORTING.**

**DESIGN SPECIFIES:**
- **PLACE LOCATE SNAG AS SHOWN ON PLANS AND/OR AS DIRECTED IN FIELD.**
- **SNAGS MAY BE PARALLEL OR ANGLED TO FLOW.**
- **TREES WITH BRANCHES AND/OR MULTIPLE TRUNKS PREFERRED.**
- **SEE QUANTITY TABLE FOR MEMBER SIZES.**
- **ROOT WADS MAY BE PLACED ABOVE GRADE IF THEY ARE BEING USED FOR FLOODPLAIN ROUGHNESS AND A MINIMUM OF 2/3 TRUNK LENGTH IS BURIED.**
- **BURIED SNAG SHALL HAVE A MINIMUM DBH OF 18-INCHES.**

### Typical Buried Snag Detail

**NOT TO SCALE**

<table>
<thead>
<tr>
<th>Detail Number</th>
<th>Description</th>
<th>Wood With Rootwad</th>
<th>Wood Without Rootwad</th>
<th>Racking Material</th>
<th>Boulder Ballast</th>
<th>Slash</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Buried Snag</td>
<td>45' (DBH=18&quot;)</td>
<td>30' (DBH=12&quot;)</td>
<td>PILE (DBH=12&quot;)</td>
<td>1.5' - 2.5' (MIN. DIA.)</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Apex Jam</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

**Typical Habitat Details**

Selad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

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Sheet 14.2
41 of 54
1. LOG 1 SHALL BE PLACED FIRST WITH DOWNSTREAM AND BURIED INTO BANK. LOG 2 SHALL BE SPLIT ON TOP OF LOG 1, LOGS SHALL BE PINNED TOGETHER.

2. RACKING MATERIAL SHALL BE PLACED BETWEEN KEY MEMBERS AND INTO BANK.

**LONGITUDINAL LOG PLAN VIEW**

**PROFILE A-A**

**TYPICAL LONGITUDINAL LOG SECTION**

**NOT TO SCALE**

**NOTES:**

- **PURPOSE:**
  - CREATES SCOUR.
  - HOLDS GRAVEL, UPSTREAM.
  - CREATES DIVERSE FISH HABITAT.
  - PROVIDES COVER.

- **DESIGN SPECIFICS:**
  - PLACE AS INDICATED ON HABITAT PLANS.
  - PLACE ROOT WAD ON OR IN STREAM BED.
  - TREES WITH BRANCHES OR MULTIPLE TRUNKS PREFERRED.
  - SECURE KEY MEMBERS BY PINNING TO PREVENT BOUNCING OF TREES DURING FLOODS.
  - BALLAST SHALL BE INSTALLED ON KEY MEMBERS BURIED INTO BANK.
  - SEE QUANTITY TABLE FOR MEMBER SIZES.

**TYPICAL LONGITUDINAL LOG DETAIL**

**NOT TO SCALE**

---

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Typical Habitat Details

Seiad Creek

Seiad Valley, California

Sheet 14.4

43 of 54
NOTES:
- RACKING MEMBERS ARE NOT SHOWN.
- DENSE VEGETATION SHALL BE PLANTED ON BANK TO ESTABLISH AN ADEQUATE ROOT ZONE.
- INSTALLATION SHALL TAKE PLACE FROM DOWNSTREAM TO UPSTREAM.

**MEANDER JAM 1 PLAN**

**SCALE: 1"=20'**

**SECTION**

**SCALE: 1"=20'**

<table>
<thead>
<tr>
<th>Detail Number</th>
<th>Description</th>
<th>WOOD WITH ROOTWAD</th>
<th>WOOD WITHOUT ROOTWAD</th>
<th>RACKING MATERIAL</th>
<th>BOULDER BALLAST</th>
<th>SLASH</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Meander Jam 1</td>
<td>45' (DBH=18&quot;)</td>
<td>45' (DBH=18&quot;)</td>
<td>30' (DBH=12&quot;)</td>
<td>PILE (DBH=12&quot;)</td>
<td>1.5' - 2.5' (MIN. DIA.)</td>
</tr>
</tbody>
</table>

---

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Seiad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

Meander Jam 1 Plan and Section
Sheet 14.5
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MEANDER JAM 2 PLAN VIEW

SCALE: 1"=20'

SECTION

SCALE: 1"=20'

<table>
<thead>
<tr>
<th>Detail Number</th>
<th>Description</th>
<th>WOOD WITH ROOTWAD</th>
<th>WOOD WITHOUT ROOT WAD</th>
<th>RACING MATERIAL</th>
<th>BOULDER BALLAST</th>
<th>SLASH</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Meander Jam 2</td>
<td>45' (DBH=18&quot;)</td>
<td>30' (DBH=18&quot;)</td>
<td>PILE (DBH=12&quot;)</td>
<td>20' LENGTH: (6'-10&quot; DIA.)</td>
<td>1.5'-2.5' (MIN. DIA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30' (DBH=12&quot;)</td>
<td></td>
<td></td>
<td>87</td>
<td>0</td>
</tr>
</tbody>
</table>

NOTES:
- RACKING MEMBERS ARE NOT SHOWN.
- DENSE VEGETATION SHALL BE PLANTED ON BANK TO ESTABLISH AN ADEQUATE ROOT ZONE.
- INSTALLATION SHALL TAKE PLACE FROM DOWNSTREAM TO UPSTREAM.
NOTES:
- RACKING MEMBERS ARE NOT SHOWN.
- DENSE VEGETATION SHALL BE PLANTED ON BANK TO ESTABLISH AN ADEQUATE ROOT ZONE.
- INSTALLATION SHALL TAKE PLACE FROM DOWNSTREAM TO UPSTREAM.

<table>
<thead>
<tr>
<th>Detail Number</th>
<th>Description</th>
<th>WOOD WITH ROOTWAD</th>
<th>WOOD WITHOUT ROOT WAD</th>
<th>RACKING MATERIAL</th>
<th>BOULDER BALLAST</th>
<th>SLASH</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Meander Jam 3</td>
<td>0</td>
<td>21</td>
<td>14</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

| 0             | 87' (DBH=18") | 45' (DBH=12") | 30' (DBH=12") | PILE (DBH=12") | 60' LENGTH; 6'-0" (6'5") DIA | 1'5" - 2'5" (MIN. DIA) | (CY) |

Seiad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

Meander Jam 3 Plan and Section
Seiad Valley, California
### MEANDER JAM 5 PLAN VIEW

**Scale:** 1"=20'°

### SECTION

**Scale:** 1"=20'

<table>
<thead>
<tr>
<th>Detail Number</th>
<th>Description</th>
<th>WOOD WITH ROOTWAD</th>
<th>WOOD WITHOUT ROOT WAD</th>
<th>RACKING MATERIAL</th>
<th>BOULDER BALLAST</th>
<th>SLASH</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 Meander Jam 5</td>
<td>0 24 10 0 0 72 0 40</td>
<td>45° [DBH=18&quot;]</td>
<td>45° [DBH=18&quot;]</td>
<td>30° [DBH=12&quot;]</td>
<td>PILE (DBH=12&quot;)</td>
<td>20' LENGTH; (6'-10&quot; DIA.)</td>
</tr>
</tbody>
</table>

**NOTES:**
- RACKING MEMBERS ARE NOT SHOWN.
- DENSE VEGETATION SHALL BE PLANTED ON BANK TO ESTABLISH AN ADEQUATE ROOT ZONE.
- INSTALLATION SHALL TAKE PLACE FROM DOWNSTREAM TO UPSTREAM.

**Designs & Plans:**
- Civil Engineer: John D. Smith
- Drawing: JDS
- Date: 05/28/2018
- Project No.: 58789-001-02

**GeoEngineers, Inc.**
- 3501 West Elder Street, Suite 300
- Boise, Idaho 83705

**Seiad Creek Habitat Enhancement**
- Siskiyou County, California
- Karuk Tribe of California

**Meander Jam 5 Plan and Section**
- Sheet 14.9
- 48 of 54
NOTES:
- RACKING MEMBERS ARE NOT SHOWN.
- DENSE VEGETATION SHALL BE PLANTED ON BANK TO ESTABLISH AN ADEQUATE ROOT ZONE.
- INSTALLATION SHALL TAKE PLACE FROM DOWNSTREAM TO UPSTREAM.

**SECTION**

**SCALE: 1"=20'**

<table>
<thead>
<tr>
<th>Detail Number</th>
<th>Description</th>
<th>WOOD WITH ROOTWAD</th>
<th>WOOD WITHOUT ROOTWAD</th>
<th>RACKING MATERIAL</th>
<th>BOULDER BALLAST</th>
<th>SLASH</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Meander Jam 6</td>
<td>0</td>
<td>20</td>
<td>8</td>
<td>0</td>
<td>60</td>
</tr>
</tbody>
</table>

**MEANDER JAM 6 PLAN VIEW**

**SCALE: 1"=20'**

Seiad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

Meander Jam 6 Plan and Section
Seiad Creek
Seiad Valley, California

GEOEngineers
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Boise, Idaho 83705

Sheet 14.10
49 of 54
NOTES:
- RACKING MEMBERS ARE NOT SHOWN.
- INSTALLATION OF WOOD MEMBERS SHALL TAKE PLACE FROM DOWNSTREAM TO UPSTREAM.
- PLACE SLASH AND RACKING MATERIAL IN STRUCTURE BETWEEN STEPS 2 AND 3 AND 4. RACKING MATERIAL SHALL BE PLACED IN A MANNER THAT SECURES MATERIAL WITHIN STRUCTURE.
- DENSE VEGETATION SHALL BE PLANTED ON BANKS ABOVE STRUCTURE TO ESTABLISH AN ADEQUATE ROOT ZONE.

**TYPICAL MEANDER JAM - STEP 1**

INSTALL 2 VERTICAL LAYERS OF PARALLEL MEMBERS STARTING FROM DOWNSTREAM TO UPSTREAM

**TYPICAL MEANDER JAM - STEP 2**

PREVIOUSLY INSTALLED KEY PIECE (TYP.)
APPROXIMATE LIMITS OF EXCAVATION (TYP.)
INSTALL KEY MEMBERS FROM DOWNSTREAM TO UPSTREAM
KEY MEMBERS WITH ROOTWADS ANGLED SLIGHTLY UPSTREAM

**TYPICAL MEANDER JAM - STEP 3**

INSTALL SECOND LAYER KEY MEMBERS WITH ROOTWADS ANGLED FURTHER UPSTREAM

**TYPICAL MEANDER JAM - STEP 4**

INSTALL FINAL LAYER OF KEY MEMBERS WITH ROOTWADS ANGLED DOWNSTREAM

- BACKFILL WOOD STRUCTURE TO PROPOSED FINISH GRADE.
- PLANT DENSE VEGETATION PER PROPOSED PLANTING PLAN.

Revision No. Date: Description: Initials: Published: RSC, DSM
- Created: DSM
- Checked: LJD
- Date: 05/28/2058
- Project No: 047287-051092

Seiad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

Typical Meander Jam Sequencing
Seiad Creek
Seiad Valley, California
<table>
<thead>
<tr>
<th>Bank Zone A</th>
<th>Area (AC)</th>
<th>Species</th>
<th>Indicator Status</th>
<th>Size</th>
<th>Avg. Spacing (ft.)</th>
<th>Percent of Zone</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.3</td>
<td>Sanbar willow (Salix Interior)</td>
<td>OBL</td>
<td>cutting</td>
<td>4</td>
<td>25%</td>
<td>885</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pacific willow (Salix lucida)</td>
<td>OBL</td>
<td>cutting</td>
<td>4</td>
<td>25%</td>
<td>885</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Peachleaf willow (Salix amygdaloides)</td>
<td>FACW</td>
<td>cutting</td>
<td>4</td>
<td>25%</td>
<td>885</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Black cottonwood (Populus balsamifera)</td>
<td>FACW</td>
<td>cutting</td>
<td>15</td>
<td>10%</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Common spikerush (Eleocharis palustris)</td>
<td>OBL</td>
<td>plugs</td>
<td>1</td>
<td>4%</td>
<td>2266</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bulrush (Scirpus sp.)</td>
<td>OBL</td>
<td>plugs</td>
<td>1</td>
<td>4%</td>
<td>2266</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nebraska sedge (Carex nebrascensis)</td>
<td>OBL</td>
<td>plugs</td>
<td>1</td>
<td>3.5%</td>
<td>1982</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sedge (Carex sp.)</td>
<td>OBL</td>
<td>plugs</td>
<td>1</td>
<td>3.5%</td>
<td>1982</td>
</tr>
<tr>
<td>Wet/Riparian Zone B</td>
<td>Area (AC)</td>
<td>1.8</td>
<td>Species</td>
<td>Indicator Status</td>
<td>Size</td>
<td>Avg. Spacing (ft.)</td>
<td>Percent of Zone</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sandbar willow (Salix Interior)</td>
<td>OBL</td>
<td>cutting</td>
<td>6</td>
<td>20%</td>
<td>436</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pacific willow (Salix lucida)</td>
<td>OBL</td>
<td>cutting</td>
<td>6</td>
<td>20%</td>
<td>436</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Peachleaf willow (Salix amygdaloides)</td>
<td>FACW</td>
<td>cutting</td>
<td>6</td>
<td>30%</td>
<td>654</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Black cottonwood (Populus balsamifera)</td>
<td>FACW</td>
<td>cutting/bare root</td>
<td>25</td>
<td>10%</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>California (White) alder (Alnus rhombifolia)</td>
<td>FACW</td>
<td>bare root</td>
<td>25</td>
<td>10%</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oregon ash (Fraxinus latifolia)</td>
<td>FACW</td>
<td>bare root</td>
<td>20</td>
<td>10%</td>
<td>20</td>
</tr>
<tr>
<td>Upland Transitional Zone C</td>
<td>Area (AC)</td>
<td>0.7</td>
<td>Species</td>
<td>Indicator Status</td>
<td>Size</td>
<td>Avg. Spacing (ft.)</td>
<td>Percent of Zone</td>
</tr>
<tr>
<td></td>
<td></td>
<td>California black oak (Quercus kelloggii)</td>
<td>UPL</td>
<td>bare root</td>
<td>30</td>
<td>35%</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Big Leaf Maple (Acer macrophyllum)</td>
<td>FAC</td>
<td>bare root</td>
<td>35</td>
<td>35%</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jeffrey pine (Pinus jeffreyi)</td>
<td>UPL</td>
<td>bare root</td>
<td>50</td>
<td>10%</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Douglas fir (Pseudotsuga menziesii)</td>
<td>UPL</td>
<td>bare root</td>
<td>30</td>
<td>20%</td>
<td>7</td>
</tr>
<tr>
<td>Seed mix for Zone A/B (Includes an additional 4.8 acres for access roads, staging areas, temporary stockpiles, etc.)</td>
<td>Area (AC)</td>
<td>8.4</td>
<td>Species</td>
<td>Indicator Status</td>
<td>Size</td>
<td>db/acre</td>
<td>Percent of Zone</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Beardless wildrye (Leymus triticiodes)</td>
<td>FAC</td>
<td>Seed</td>
<td>10</td>
<td>100%</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meadow barley (Hordeum brachyantherum)</td>
<td>FACW</td>
<td>Seed</td>
<td>5</td>
<td>100%</td>
<td>42</td>
</tr>
</tbody>
</table>

TYPICAL PLANTING ZONES
NOT TO SCALE

SEEDING RECOMMENDATIONS:
1. LOOSEN THE TOP 2 TO 3 INCHES OF SOIL WITHIN DISTURBED AREAS.
2. BREAK UP LARGER SOIL CLUMPS.
3. LEVEL THE AREAS WHERE EXCESS WATER MIGHT COLLECT.
4. DO NOT USE FERTILIZER OR WEED KILLER IN OR NEAR THE STREAM BED.
5. USE A BROADCAST SPREADER AND SPREAD SEED EVENLY.
6. APPLY SEEDS IN ACCORDANCE WITH LBS PER APPLICATION RATE.
7. LIGHTLY DRAZ THE GRASS SEED BED SO NO MORE THAN 1-4 INCH OF SOIL COVERS THE GRASS SEED.
8. KEEP GRASS SEED BED MOIST TO ENHANCE GERMINATION.
9. WATER LIGHTLY (DON'T SATURATE), AND FREQUENTLY (AT LEAST ONCE DAILY), UNTIL NEW GRASS IS TWO INCHES HIGH.
10. FOLLOWING ESTABLISHMENT, WATER NEW GRASS REGULARLY TO KEEP ROOTS MOIST.

PLANTING RECOMMENDATIONS:
1. PLANT ZONE A, B, AND C SHRUB AND TREE SPECIES ACCORDING TO DETAILS ON 15.2 - 15.4.
2. PLANT SHRUBS AND TREES IN CLUMP OR DRIFT PATTERN. DRIFT PATTERN SPACES PLANTS ACCORDING TO THE AVERAGE SPACING LISTED IN THE ADJACENT TABLE. CLUMP SPACING GROUPS 2 TO 5 PLANTS PER CLUMP.
DESCRIPTION: A LIVE BRUSH TRENCH IS A ROW OF LIVE MATERIAL INSERTED INTO A TRENCH IN THE GROUND AND COVERED WITH STONE. STONE IS USED TO ANCHOR THE PLANT MATERIAL AND THE LIVE MATERIAL PROMOTES SITATION, THEY ARE SOMETIMES REFERRED TO AS BRUSH TRAVERSIES. THIS IS CONSIDERED A SITATION TREATMENT, WHICH IS INTENDED TO PROTECT HEAD OF SAND BARS AND STREAM BANKS FROM EROSION. THIS TREATMENT REQUIRES A MODERATE TO HIGH SEDIMENT LOAD OF FINE MATERIAL AND IS NOT SUITABLE FOR AREAS WITH HIGH VELOCITIES OR PROLONGED INUNDATION.

LIVE BRUSH TRENCH
NOT TO SCALE

Saturated Zone

FLOW

Typical Trench

Island

Typical Trench

FLOW

2. DETERMINE THE DEPTH OF THE PLANTING HOLE. EXCAVATE A HOLE TO THE DEPTH OF THE ORIGINAL SOIL LINE, IF VISIBLE, OR SUCH THAT THE ROOT CROWN SITS AT OR JUST BELOW THE SOIL LINE. THE WIDTH OF THE PLANTING HOLE SHOULD BE ONE AND ONE HALF TIMES THE ROOT SPREAD.

3. BUILD A CONE OF SOIL IN THE BOTTOM OF THE PLANTING HOLE, DO NOT ADD FERTILIZER TO THE PLANTING HOLE.

4. INSERT PLANT INTO HOLE, SPREADING THE ROOTS AROUND THE SURFACE OF THE CONE. GENTLY BACKFILL THE HOLE, FIRMING THE SOIL. LEAVE A SLIGHT DEPRESSION AROUND THE PLANT TO HOLD WATER. WATER THE PLANT, SATURATING THE SOIL.

5. ONCE ESTABLISHED, LAY A 2-TO 3-INCH THICK LAYER OF MULCH AROUND, BUT NOT TOUCHING, THE PLANT TO CONSERVE MOISTURE AND DETER WEEDS.

BARE-ROOT PLANTING DETAIL
NOT TO SCALE
BLACK COTTONWOOD AND CUTTINGS FROM SUCKERS WITH TERMINAL BED PREFERRED.

POLE PLANTING WITH "STRINGER"
NOT TO SCALE

6 FT
REMOVE AIR POCKETS WHEN BACKFILLING
VADOSE ZONE
WATER TABLE
5-15 CM (2-6 IN.) Dia.

ROOTWAD WITH POLE PLANTING
NOT TO SCALE

NOTES:
1. POLE CUTTINGS OF WILLOW OR COTTONWOOD ARE LONGER AND HAVE A LARGER DIAMETER THAN BRANCH CUTTINGS OR LIVE STAKES.
2. LARGER DIAMETER CUTTING HAVE A GREATER SUPPLY OF STORED ENERGY (STORED PHOTOSYNTHESIS) THAN SMALLER DIAMETER CUTTINGS.
3. POLE CUTTINGS ARE BETTER SUITED FOR HIGHLY ERODIBLE AREAS AND SITES WITH FLUCTUATING WATER LEVELS.
4. THE POLE CUTTINGS SHOULD EXTEND THROUGH THE VADOSE ZONE AND INTO THE PERMANENT WATER TABLE. AT LEAST 3/4 TO 1/2 OF THE POLE SHOULD BE BELOW THE GROUND, AT LEAST 1.0M (3 FT), AND LONG ENOUGH TO EMERGE ABOVE ADJACENT VEGETATION.
5. "MUDDYING" - FILLING THE HOLE WITH WATER AND THEN SOIL TO MAKE A MUD SLURRY CAN REMOVE AIR POCKETS.
6. 1/2 TO 1/2 CUTTING LENGTH (1.0M) SHOULD BE BURIED.

POLE PLANTING DETAIL
NOT TO SCALE

FINISH GRADE
3/8 STAKE 1/2 STEEL LENGTH
DIAMETER
FLAT CUT ON TOP, DIAGONAL CUT ON BOTTOM, ADVANCE STAKE USING SOFT MALLET.
ADD MULCH LAYER OVER FINISH GRADE,
LENGTH STAKE BELOW FINISH GRADE, LENGTH ABOVE

NOTES:
FOR PLANTING ON SLOPES 3H:1V AND STEEPER, PLANT PER DETAIL 5

LIVE STAKING DETAIL
NOT TO SCALE

Seiad Creek Habitat Enhancement
Siskiyou County, California
Karuk Tribe of California

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Planting Notes and Details
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