HABITAT GOALS AND OBJECTIVES:
1. VOID SPACES IN LWD TO PROVIDE HYDRAULIC REFUGE, COVER AND STRUCTURE FOR JUVENILE SALMONIDS AND OTHER FISH SPECIES.
2. SORTED SEDIMENT DEPOSITS IN LEE OF LWD TO PROVIDE CHANNEL SUBSTRATE FOR SELECTIVE SPAWNING BY SALMON AND OTHER FISH SPECIES.

CONSTRUCTION NOTES:
1. ANCHORING TECHNIQUE MAY VARY ACCORDING TO SITE CONDITIONS. PERPENDICULAR LWD MAY BE PLACED BETWEEN EXISTING TREES OR BURIED INTO THE BANK. PLACEMENT CAN BE SECURED TOGETHER USING A LIMITED AMOUNT OF SYNTHETIC FIBER OR STEEL WIRE ROPE STRATEGICALLY DESIGNED INTO THE STRUCTURE.
2. SCOUR POOL EXTENTS ARE TYPICAL AND MAY BE EXCAVATED AS PART OF CONSTRUCTION.
3. ROOTWAD LOG ELEVATION IS RELATED TO THE ANTICIPATED TYPICAL ORDINARY HIGH WATER LEVEL.

LOG SPECIFICATIONS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DBH (IN)</th>
<th>MIN. LENGTH (FT)</th>
<th>ROOTWAD LOG 18 25 72</th>
<th>PIONEER PINE/DOUGLAS FIR</th>
</tr>
</thead>
</table>

NOT FOR CONSTRUCTION
HABITAT GOALS AND OBJECTIVES:
1. VOID SPACES IN LWD TO PROVIDE HYDRAULIC REFUGE, COVER AND STRUCTURE FOR JUVENILE SALMONIDS AND OTHER FISH SPECIES.
2. SORDED SEDIMENT DEPOSITS IN LEE OF LWD TO PROVIDE CHANNEL SUBSTRATE FOR SELECTIVE SPAWNING BY SALMON AND OTHER FISH SPECIES.

CONSTRUCTION NOTES:
1. ANCHORING TECHNIQUE MAY VARY ACCORDING TO SITE CONDITIONS. PERPENDICULAR LWD MAY BE PLACED BETWEEN EXISTING TREES OR BURIED INTO THE BANK. PLACEMENT CAN BE SECURED TOGETHER USING A LIMITED AMOUNT OF SYNTHETIC FIBER OR STEEL WIRE ROPE STRATEGICALLY DESIGNED INTO THE STRUCTURE.
2. SCOUR POOL EXTENTS ARE TYPICAL AND MAY BE EXCAVATED AS PART OF CONSTRUCTION.
3. ROOTWAD TOP ELEVATION IS RELATED TO THE ANTICIPATED TYPICAL ORDINARY HIGH WATER LEVEL.

LOG SPECIFICATIONS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DBH (IN)</th>
<th>MIN. LENGTH (FT)</th>
<th>MAX. DBH (IN)</th>
<th>SPECIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROOTWAD LOG</td>
<td>18</td>
<td>25</td>
<td>72</td>
<td>PONDEROSA PINE/ DOUGLAS FIR</td>
</tr>
</tbody>
</table>

HABITAT GOALS AND OBJECTIVES:
1. VOID SPACES IN LWD TO PROVIDE HYDRAULIC REFUGE, COVER AND STRUCTURE FOR JUVENILE SALMONIDS AND OTHER FISH SPECIES.
2. SORTED SEDIMENT DEPOSITS IN LEE OF LWD TO PROVIDE CHANNEL SUBSTRATE FOR SELECTIVE SPAWNING BY SALMON AND OTHER FISH SPECIES.

CONSTRUCTION NOTES:
1. ANCHORING TECHNIQUE MAY VARY ACCORDING TO SITE CONDITIONS. PERPENDICULAR LWD MAY BE PLACED BETWEEN EXISTING TREES OR BURIED INTO THE BANK. PLACEMENT CAN BE SECURED TOGETHER USING A LIMITED AMOUNT OF SYNTHETIC FIBER OR STEEL WIRE ROPE STRATEGICALLY DESIGNED INTO THE STRUCTURE.
2. SCOUR POOL EXTENTS ARE TYPICAL AND MAY BE EXCAVATED AS PART OF CONSTRUCTION.
3. ROOTWAD TOP ELEVATION IS RELATED TO THE ANTICIPATED TYPICAL ORDINARY HIGH WATER LEVEL.
HABITAT GOALS AND OBJECTIVES:

1. Flow Stagnation Areas upstream and downstream of the structure to provide hydraulic refuge for juvenile salmonid and other fish species.
2. Void spaces in LWD to provide hydraulic refuge, cover, and structure for juvenile salmonids and other fish species.
3. Sediment deposits in lee of LWD to provide media for vegetation growth, further promoting bar development and a diverse riparian zone.

CONSTRUCTION NOTES:

1. Anchoring technique may vary according to site conditions. Mechanical toe anchors or bolts may be used in place of rootwad piles.
2. Placement can be secured together using a limited amount of synthetic fiber or steel wire rope strategically designed into the structure to limit visibility.
3. Rootwad top elevation is related to the anticipated typical ordinary high water surface elevation.

LOG SPECIFICATIONS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DBH (IN.)</th>
<th>MIN. LENGTH (FT.)</th>
<th>ROOFTWAD (IN. DBH)</th>
<th>SPECIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rootwad Log</td>
<td>18</td>
<td>25</td>
<td>54</td>
<td>Ponderosa Pine/ Douglas Fir</td>
</tr>
<tr>
<td>Buried Log Pile</td>
<td>18</td>
<td>15</td>
<td>54</td>
<td>Ponderosa Pine/ Douglas Fir</td>
</tr>
<tr>
<td>Log Pole</td>
<td>18</td>
<td>12</td>
<td>None</td>
<td>Ponderosa Pine/ Douglas Fir</td>
</tr>
</tbody>
</table>

Habitat Goals and Objectives:

1. Flow stagnation areas upstream and downstream of the structure to provide hydraulic refuge for juvenile salmonid and other fish species.
2. Void spaces in LWD to provide hydraulic refuge, cover, and structure for juvenile salmonids and other fish species.
3. Sediment deposits in lee of LWD to provide media for vegetation growth, further promoting bar development and a diverse riparian zone.

Construction Notes:

1. Anchoring technique may vary according to site conditions. Mechanical toe anchors or bolts may be used in place of rootwad piles.
2. Placement can be secured together using a limited amount of synthetic fiber or steel wire rope strategically designed into the structure to limit visibility.
3. Rootwad top elevation is related to the anticipated typical ordinary high water surface elevation.
**LOG SPECIFICATIONS**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DBH (IN.)</th>
<th>LENGTH (FT.)</th>
<th>ROOTWAD (3x DBH)</th>
<th>SPECIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROUTING LOG</td>
<td>15</td>
<td>10</td>
<td>45</td>
<td>PONDEROSA PINE/DOUGLAS FIR</td>
</tr>
<tr>
<td>LOG POLE</td>
<td>18</td>
<td>20</td>
<td>NONE</td>
<td>PONDEROSA PINE/DOUGLAS FIR</td>
</tr>
</tbody>
</table>

**HABITAT NOTES:**

1. Void spaces in feature provide cover and structure for juvenile salmon and other fish species.
2. Structure promotes retention of mobile debris.

**CONSTRUCTION NOTES:**

1. Perpendicular logs on top layer shall be secured to piles with wire rope and hardware.
2. Depth of piles to be determined and specified upon further evaluation.
CONSTRUCTION NOTES:
1. Structure secured together using a limited amount of synthetic fiber or steel wire rope strategically designed into the structure.
2. Scour pool extents are typical and may be excavated as part of construction.
3. Structure voids and area downstream backfilled during construction with native channel sediment as shown.

HABITAT NOTES:
1. High flow refuge for juvenile salmon and other fish species provided by flow stagnation areas upstream and downstream of structure.
2. Void spaces in ELJ provide hydraulic refuge, cover, and structure for juvenile salmon and other fish species.
3. Sorted sediment deposits provide channel substrate variation for selective spawning by salmon and other fish species.

LOG SPECIFICATIONS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DBH (IN.)</th>
<th>ROOTWAD (3x DBH)</th>
<th>SPECIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rootwad Log</td>
<td>12</td>
<td>54</td>
<td>Ponderosa Pine/Douglas Fir</td>
</tr>
</tbody>
</table>

CONSTRUCTION NOTES:
1. Structure secured together using a limited amount of synthetic fiber or steel wire rope strategically designed into the structure.
2. Scour pool extents are typical and may be excavated as part of construction.
3. Structure voids and area downstream backfilled during construction with native channel sediment as shown.

TUCANNON PROJECT AREA 15

CHANNEL BARB ELJ TYPICAL SECTION (A-A')

CHANNEL BARB ELJ TYPICAL SECTION (B-B')

CHANNEL BARB ELJ TYPICAL PLAN
CONSTRUCTION NOTES:
1. STRUCTURE SECURED TOGETHER USING A LIMITED AMOUNT OF SYNTHETIC FIBER OR STEEL WIRE ROPE STRATEGICALLY DESIGNED INTO THE STRUCTURE.
2. SCOUR POOL EXTENTS ARE TYPICAL AND MAY BE EXCAVATED AS PART OF CONSTRUCTION.
3. ELJ TOP ELEVATION IS TYPICALLY DETERMINED BASED ON THE ANTICIPATED DESIGN FLOOD WATER SURFACE ELEVATION.
4. STRUCTURE VOIDS AND AREA DOWNSTREAM BACKFILLED DURING CONSTRUCTION WITH NATIVE CHANNEL SEDIMENT AS SHOWN.

HABITAT NOTES:
1. HIGH FLOW REFUGE FOR JUVENILE SALMON AND OTHER FISH SPECIES PROVIDED BY FLOW STAGNATION AREAS UPSTREAM AND DOWNSTREAM OF STRUCTURE.
2. VOID SPACES IN ELJ PROVIDE HYDRAULIC REFUGE, COVER, AND STRUCTURE FOR JUVENILE SALMON AND OTHER FISH SPECIES.
3. POOL AREAS PROVIDE HOLDING HABITAT FOR ADULT SALMON.
4. SORTED SEDIMENT DEPOSITS PROVIDE CHANNEL SUBSTRATE VARIATION FOR SELECTIVE SPAWNING BY SALMON AND OTHER FISH SPECIES.

CONSTRUCTION NOTES:
1. STRUCTURE SECURED TOGETHER USING A LIMITED AMOUNT OF SYNTHETIC FIBER OR STEEL WIRE ROPE STRATEGICALLY DESIGNED INTO THE STRUCTURE.
2. SCOUR POOL EXTENTS ARE TYPICAL AND MAY BE EXCAVATED AS PART OF CONSTRUCTION.
3. ELJ TOP ELEVATION IS TYPICALLY DETERMINED BASED ON THE ANTICIPATED DESIGN FLOOD WATER SURFACE ELEVATION.
4. STRUCTURE VOIDS AND AREA DOWNSTREAM BACKFILLED DURING CONSTRUCTION WITH NATIVE CHANNEL SEDIMENT AS SHOWN.

LOG SPECIFICATIONS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DBH (IN)</th>
<th>MIN. LENGTH (FT)</th>
<th>ROOTWAD (3x DBH)</th>
<th>SPECIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROOTWAD LOG</td>
<td>24</td>
<td>30</td>
<td>72</td>
<td>PONDEROSA PINE/DOUGLAS FIR</td>
</tr>
<tr>
<td>ROOTWAD LOG</td>
<td>18</td>
<td>30</td>
<td>54</td>
<td>PONDEROSA PINE/DOUGLAS FIR</td>
</tr>
<tr>
<td>ROOTWAD LOG</td>
<td>18</td>
<td>20</td>
<td>54</td>
<td>PONDEROSA PINE/DOUGLAS FIR</td>
</tr>
</tbody>
</table>

NOT FOR CONSTRUCTION
LOG SPECIFICATIONS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DBH (IN.)</th>
<th>MILL LENGTH (FT.)</th>
<th>LOG POLE</th>
<th>ROOTWAD LOG</th>
<th>SPECIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROOTWAD LOG</td>
<td>24</td>
<td>40</td>
<td>0</td>
<td>T2</td>
<td>PONDEROSA PINE/DOUGLAS FIR</td>
</tr>
<tr>
<td>ROOTWAD LOG</td>
<td>16</td>
<td>20</td>
<td>0</td>
<td>T4</td>
<td>PONDEROSA PINE/DOUGLAS FIR</td>
</tr>
<tr>
<td>LOG POLE</td>
<td>16</td>
<td>35</td>
<td>0</td>
<td>T4</td>
<td>PONDEROSA PINE/DOUGLAS FIR</td>
</tr>
</tbody>
</table>

HABITAT NOTES:
1. HIGH FLOW REFUGE FOR JUVENILE SALMON AND OTHER FISH SPECIES PROVIDED BY FLOW STAGNATION AREAS UPSTREAM AND DOWNSTREAM OF STRUCTURE.
2. VOID SPACES IN ELJ PROVIDE HYDRAULIC REFUGE, COVER, AND STRUCTURE FOR JUVENILE SALMON AND OTHER FISH SPECIES.
3. POOL AREAS PROVIDE HOLDING HABITAT FOR ADULT SALMON.
4. SORTED SEDIMENT DEPOSITS PROVIDE CHANNEL SUBSTRATE VARIATION FOR SELECTIVE SPAWNING BY SALMON AND OTHER FISH SPECIES.

CONSTRUCTION NOTES:
1. STRUCTURE SECURED TOGETHER USING A LIMITED AMOUNT OF SYNTHETIC FIBER OR STEEL WIRE STRATEGICALLY DESIGNED INTO THE STRUCTURE. ARMOR ROCK SALVAGED ONSITE MAY ALSO BE USED AS BALLAST.
2. SCOUR POOL EXTENTS AND SIZE MAY BE ADJUSTED IN ACCORDANCE WITH THE ANTICIPATED TYPICAL SCOUR POOL EXTENTS OR NATIVE SIZE.
3. ELJ TOP ELEVATION IS TYPICALLY DETERMINED BASED ON THE ANTICIPATED DESIGN FLOOD WATER SURFACE ELEVATION.
4. STRUCTURE Voids AND AREA DOWNSTREAM BACKFILLED DURING CONSTRUCTION WITH NATIVE CHANNEL SEDIMENT AS SHOWN.
**Habitat Goals and Objectives:**

1. Flow stagnation areas upstream and downstream of the structure to provide hydraulic refuge for juvenile salmonids and other fish species.

2. Void spaces in LWD to provide hydraulic refuge for juvenile salmonids and other fish species.

3. Structure to increase local floodplain connectivity and promote over-bank flow path development.

**Construction Notes:**

1. Anchoring technique may vary according to site conditions. Rootwad piles may be used in place of boulders.

2. Jams can be secured together using a limited amount of synthetic fiber or steel wire rope strategically designed into the structure. Jam secured in place using boulders to provide stability under hydraulic forces.

**Log Specifications**

<table>
<thead>
<tr>
<th>Description</th>
<th>DBH (in.)</th>
<th>Rootwat (in. DBH)</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rootwad Log</td>
<td>48</td>
<td>60</td>
<td>ponderosa pine/douglas fir</td>
</tr>
<tr>
<td>Log Pole</td>
<td>24</td>
<td>35</td>
<td>None</td>
</tr>
</tbody>
</table>

**Habitat Goals and Objectives:**

1. Flow stagnation areas upstream and downstream of the structure to provide hydraulic refuge for juvenile salmonids and other fish species.

2. Void spaces in LWD to provide hydraulic refuge for juvenile salmonids and other fish species.

3. Structure to increase local floodplain connectivity and promote over-bank flow path development.

**Construction Notes:**

1. Anchoring technique may vary according to site conditions. Rootwad piles may be used in place of boulders.

2. Jams can be secured together using a limited amount of synthetic fiber or steel wire rope strategically designed into the structure. Jam secured in place using boulders to provide stability under hydraulic forces.
FLOODPLAIN CHANNEL RECONNECTION

TYPICAL CHANNEL EXCAVATION SECTION

NOTE:
1. FLOOD WATER SURFACE ELEVATION IS APPROXIMATE; TO BE REFINED IN SUBSEQUENT PHASES OF DESIGN.

10 FT BOTTOM WIDTH

2:1 SIDE SLOPES TO EXISTING FLOODPLAIN ELEVATION

APPRAIS 2-YEAR FLOOD WATER SURFACE ELEVATION

FORMER FLOODPLAIN CHANNEL ALIGNMENT TO BE RECONNECTED
TRIBUTARY FLOW WILL ENTER LOWER TERRACE SECTION. NO EXCAVATION. LOCAL HIGH OR LOW AREAS WILL PROMOTE PONDING AND DEVELOPMENT OF WETLANDS AND BEAVER HABITAT. MISCELLANEOUS LWD (ROOTWADS, DEBRIS) MAY BE PLACED THROUGHOUT LOWER ALIGNMENT AS DESIRED.

0+45 TO 11+30

TRIBUTARY CHANNEL REALIGNED ACROSS FLOODPLAIN.

0+45 TO 11+30

SOME EXCAVATION REQUIRED. PLANT 15 FOOT BUFFER WHERE CHANNEL IS REALIGNED THROUGH CLEARED AREA OF FLOODPLAIN.

11+30 TO 13+30

CHANNEL REALIGNED THROUGH EXISTING FLOW PATHS. MINOR TO NO EXCAVATION.

13+30 TO 15+90

TRIBUTARY CHANNELE EXITS STEEPER GULLY.