DRY CREEK ECOSYSTEM RESTORATION PROJECT
PHASE VI (REACH 1/2A)

SOLICITATION NO: W912P7-23-B-XXXX
CONTRACT NO: W912P7-23-C-XXXX
ISSUE DATE: April 2023
DRAWING #: DC-1-103
### General Notes:
1. The contract officer must be responsible for the protection of all existing survey monuments and other survey markers during construction.
2. The contract officer must use only designated specific sizes for the storage of equipment and materials, and all equipment and materials shall be identified and utilized as shown in the plans.
3. Elevations shown on the plans shall be based upon a geodetic control, barycentric, or are based upon the topographic information shown on the plans and reflect site conditions at the time the surveys were completed. The contract officer must verify grades and existing surface elevation conditions prior to commencing work.
4. Grading notes shall be reviewed by the contractor and the engineer.
5. Grading notes shall be reviewed by the contractor and the engineer.
6. The contract officer must be responsible for determining the amount of soil to be excavated.
7. The contract officer must be responsible for delivering the excavation materials to the site.
8. The contract officer must be responsible for delivering the excavation materials to the site.
9. The contract officer must be responsible for delivering the excavation materials to the site.
10. The contract officer must be responsible for delivering the excavation materials to the site.

### Survey Notes:
1. The survey was completed by the U.S. Army Corps of Engineers, San Francisco District, Sonoma County, California, 94597.
2. The survey was completed by the U.S. Army Corps of Engineers, San Francisco District, Sonoma County, California, 94597.
3. The survey was completed by the U.S. Army Corps of Engineers, San Francisco District, Sonoma County, California, 94597.
4. The survey was completed by the U.S. Army Corps of Engineers, San Francisco District, Sonoma County, California, 94597.

### Grading Notes:
1. Because of the nature of the project, careful grading is mandatory. The contours shown on the plans shall be based upon the general shape of the land, but the overall result shall be a convex or concave slope, grade breaks, etc. It is important that grading shall not be so performed that smooth transitions can be made between the existing and proposed areas.
2. The contractor must provide all labor, equipment, and materials necessary to prepare the site for the proposed construction.
3. The contractor must provide all labor, equipment, and materials necessary to prepare the site for the proposed construction.
4. The contractor must provide all labor, equipment, and materials necessary to prepare the site for the proposed construction.
5. The contractor must provide all labor, equipment, and materials necessary to prepare the site for the proposed construction.

### Schedule of Drawings

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<thead>
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<tbody>
<tr>
<td>1</td>
<td>G-01</td>
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<td>2</td>
<td>G-02</td>
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<td>4</td>
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<td>STORING, STORAGE AND ACCESS OVERVIEW</td>
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### ABBREVIATIONS
- ED: Major Contour
- EG: Minor Contour
- LR: Property Line
- R: Reference to Drawings
- WLT: Elevation Without Limitations
- VERT: Vertical
- PROPOSED: As Proposed
- SCHEDULE OF DRAWINGS
- CONTRACT: Contract
detail and section referencing
- APEX WOOD STRUCTURE
- REVETMENT WOOD STRUCTURE
- FORCING WOOD STRUCTURE (SKELETON)
NOTES:
1. THE CONTRACTOR MUST BE RESPONSIBLE FOR IMPLEMENTING ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES. THE MEASURES MUST BE IN ACCORDANCE WITH THE GENERAL AQUATIC CONSERVATION MEASURES, THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP), AND THE CA CONSTRUCTION GENERAL PERMIT.
3. REFER TO G-07 AND G-08 FOR CONSTRUCTION SEQUENCING PLANS.
APRIL 2023

APPROXIMATE BASE FLOW WATER SURFACE ELEVATION SHOWN (110 CFS). CONTRACTOR RESPONSIBLE FOR DETERMINING WATER SURFACE ELEVATION DURING FIELD CONDITIONS (BASE FLOW).

EXISTING ACCESS ROUTE (TYP.)

ACCESS ROUTE TO REMAIN ON SCHWAB PROPERTY, CONTRACTOR MUST REMOVE THE GRAPE VINES AND CREATE ACCESS ROAD SUFFICIENT FOR CONSTRUCTION (TYP.) SEE ACCESS RAMP DETAIL ON SHEET G-08

PROPOSED ACCESS ROAD SEE DETAIL

STAGING, STORAGE, AND ACCESS: REACH 2A
NOTES:
1. THE CONTRACTOR MUST BE RESPONSIBLE FOR IMPLEMENTING ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES.
2. THE TEMPORARY AND SEDIMENT CONTROL MEASURES MUST BE IN ACCORDANCE WITH THE GENERAL AQUATIC CONSERVATION MEASURES, THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP), AND THE EPA CONSTRUCTION GENERAL PERMIT.
4. REFER TO G-07 AND G-08 FOR CONSTRUCTION SEQUENCING PLANS.
MITIGATION AND MONITORING EASEMENT (MME) TYP.

EXISTING TREES (TYP.)

APPROXIMATE WATER SURFACE EXTENTS OF 110 CFS INUNDATION SHOWN. CONTRACTOR RESPONSIBLE FOR VERIFYING BASE FLOW WATER SURFACE ELEVATIONS PRIOR TO CONSTRUCTION.

1" = 40'

NOTES:
1. APPROXIMATE BASE FLOW WATER SURFACE ELEVATIONS SHOWN. CONTRACTOR RESPONSIBLE FOR DETERMINING BASE FLOW W.S. BASED ON FIELD CONDITIONS.
2. SEE SHEET C-01 FOR PROPOSED PROJECT FEATURES.
1. APPROXIMATE BASE FLOW WATER SURFACE ELEVATIONS SHOWN. CONTRACTOR RESPONSIBLE FOR DETERMINING BASE FLOW WATER SURFACE BASED ON FIELD CONDITIONS.

2. SEE SHEET C-03 FOR PROPOSED PROJECT FEATURES.
MITIGATION AND MONITORING EASEMENT (MME) TYP.
EXISTING TREES (TYP.) APPROXIMATE WATER SURFACE EXTENTS OF 110 CFS INUNDATION SHOWN. CONTRACTOR RESPONSIBLE FOR VERIFYING BASE FLOW WATER SURFACE ELEVATIONS PRIOR TO CONSTRUCTION.

APN: 110-130-034
APN: 110-130-006
APN: 088-180-003
APN: 110-130-034

NOTES:
1. APPROXIMATE BASE FLOW WATER SURFACE ELEVATIONS SHOWN. CONTRACTOR RESPONSIBLE FOR DETERMINING BASE FLOW W.S. BASED ON FIELD CONDITIONS.
2. SEE SHEET C-04 FOR PROPOSED PROJECT FEATURES.
NOTES:
1. APPROXIMATE BASE FLOW WATER SURFACE EXISTING CONDITION SHEET 4
   MATCHLINE STA: (DC) 39+00 (SEE SHEET G-13)
   MATCHLINE STA: (DC) 50+00 (SEE SHEET G-15)
2. MARK SHEET ID
3. SEE SHEET C-05 FOR PROPOSED PROJECT FEATURES
4. FOOD CHAIN AND TRANSPORT NETWORK
5. MITIGATION AND MONITORING EASEMENT (MME) TYP.
6. APPROXIMATE WATER SURFACE EXTENTS OF 110 CFS INUNDATION SHOWN. CONTRACTOR RESPONSIBLE FOR VERIFYING BASE FLOW WATER SURFACE ELEVATIONS PRIOR TO CONSTRUCTION.
INVERT CHANNEL ELEVATION CONNECTION WITH DRY CREEK MAINSTEM MUST BE AT A DEPTH OF 16 INCHES (AND SLOPE) ACCORDINGLY TO MEET DESIGNED WATER DEPTH.

BELOW THE BASE FLOW WATER SURFACE ELEVATION (≈100 CFS). CONTRACTOR TO VERIFY BASE FLOW WATER SURFACE ELEVATIONS DURING CONSTRUCTION AND ADJUST THE INLET INVERT CHANNEL ELEVATION.

NOTE:
1. INVERT CHANNEL ELEVATION CONNECTION WITH DRY CREEK MAINSTEM MUST BE AT A DEPTH OF 16 INCHES (AND SLOPE) ACCORDINGLY TO MEET DESIGNED WATER DEPTH.

BELOW THE BASE FLOW WATER SURFACE ELEVATION (≈100 CFS). CONTRACTOR TO VERIFY BASE FLOW WATER SURFACE ELEVATIONS DURING CONSTRUCTION AND ADJUST THE INLET INVERT CHANNEL ELEVATION.

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BELOW THE BASE FLOW WATER SURFACE ELEVATION (≈100 CFS). CONTRACTOR TO VERIFY BASE FLOW WATER SURFACE ELEVATIONS DURING CONSTRUCTION AND ADJUST THE INLET INVERT CHANNEL ELEVATION.

NOTE:
1. INVERT CHANNEL ELEVATION CONNECTION WITH DRY CREEK MAINSTEM MUST BE AT A DEPTH OF 16 INCHES (AND SLOPE) ACCORDingly TO MEET DESIGNED WATER DEPTH.
NOTES:

1. INCHES BELOW THE BASE FLOW WATER SURFACE (≈110 CFS). CONTRACTOR TO VERIFY INVERT CHANNEL ELEVATION CONNECTION WITH DRY CREEK MAINSTEM MUST BE AT A DEPTH OF 4 CHANNEL ELEVATION (AND SLOPE) ACCORDINGLY TO MEET DESIGNED WATER DEPTH.

STA (CC3): 5+10.58 =

MITIGATION AND MONITORING

SECONDARY CHANNEL (SC-3) PROFILE

GRADE BREAK

STA: 2+46.11, ELEV: 62.21'

STA: 2+42.11, ELEV: 63.36'

WILLOW TRENCH

APN: 088-180-019

APX 062-04-03

STRUCTURE 1 (TYP.)

APEX WOOD

WOOD (TYP.)

EX. GROUND

SURFACE

SINGLE LOG HABITAT WOOD

SECONDARY CHANNEL (SC-2) PROFILE

GRADE BREAK, TIE INTO EG

STA (CC2): 1+27.38

DF: 69.27

EX. GROUND

FORCEMAIN DUCTILE IRON PIPE

IE: INVERT 58.93'

FORCEMAIN DUCTILE IRON PIPE

CC2-1+00

EX. SUSPENDED FLOW

FOR GRADING INFO.

0

8+00

NOTE: APPROXIMATE PROPOSED BETA FLOW WATER SURFACE ELEVATION BASED ON PROPOSED LOCATION OF WATER MAIN DUCTILE IRON PIPE. CONTRACTOR TO VERIFY LOCATION OF WATER MAIN DUCTILE IRON PIPE. A CONSTRUCTION COORDINATION MEETING WILL BE HELD TO DETERMINE THE LOCATION OF THE WATER MAIN DUCTILE IRON PIPE. CONTRACTOR TO VERIFY THE LOCATION OF THE WATER MAIN DUCTILE IRON PIPE.

APPROXIMATE PROPOSED BETA FLOW WATER SURFACE ELEVATION BASED ON PROPOSED LOCATION OF WET MAIN DUCTILE IRON PIPE. CONTRACTOR TO VERIFY LOCATION OF WET MAIN DUCTILE IRON PIPE. A CONSTRUCTION COORDINATION MEETING WILL BE HELD TO DETERMINE THE LOCATION OF THE WET MAIN DUCTILE IRON PIPE. CONTRACTOR TO VERIFY THE LOCATION OF THE WET MAIN DUCTILE IRON PIPE.

SECONDARY CHANNEL (SC-3) PROFILE

STA: 5+10.58 TO STA: 0+00

SECONDARY CHANNEL (SC-2) PROFILE

STA: 14+00 TO STA: 8+00

MATCHLINE SEE SHEET C-01
NOTES:
1. SEE SHEET C-03 FOR PLAN VIEW
APPROXIMATE PROPOSED BASE FLOW WATER SURFACE ELEVATION SHOWN (110 CFS). CONTRACTOR RESPONSIBLE FOR DETERMINING WATER SURFACE ELEVATION DURING FIELD CONDITIONS (BASE FLOW).
APPROXIMATE BASE FLOW
WATER SURFACE ELEVATION
SHOWN (110 CFS).
CONTRACTOR RESPONSIBLE
FOR DETERMINING WATER
SURFACE ELEVATION
DURING FIELD CONDITIONS
(BASE FLOW).

APN: 110-150-007
APN: 110-130-034
APN: 110-130-035
APN: 088-190-009
APN: 088-180-001
APN: 088-180-043

MITIGATION AND
MONITORING EASEMENT
(MME) TYPE.

DC-36+00
DC-37+00
DC-38+00
DC-39+00
DC-40+00
DC-41+00
DC-42+00
DC-43+00
DC-44+00
DC-45+00
DC-46+00
DC-47+00
DC-48+00
DC-49+00
DC-50+00
DC-51+00
DC-52+00
DC-53+00
DC-54+00
DC-55+00
DC-56+00
DC-57+00
DC-58+00

(SC5) 0+90
(SC5) 1+50
(SC5) 2+00
(SC5) 2+50
(SC5) 3+00
(SC5) 3+50
(SC5) 4+00
(SC5) 4+50
(SC5) 5+00
(SC5) 5+50
(SC5) 6+00
(SC5) 6+50
(SC5) 7+00
(SC5) 7+50
(SC5) 8+00
(SC5) 8+50

(DCN) 1+00.00
(DCN) 2+00.00
(DCN) 3+00.00
(DCN) 4+00.00
(DCN) 5+00.00
(DCN) 6+00.00
(DCN) 7+00.00
(DCN) 8+00.00
(DCN) 9+00.00
(DCN) 10+00.00
(DCN) 11+00.00
(DCN) 12+00.00

REACH 2-A PLAN VIEW SECTION LOCATION
APPROXIMATE PROPOSED WATER
SURFACE ELEVATION.
CONTRACTOR RESPONSIBLE FOR
DETERMINING BASE FLOW WATER
SURFACE BASED ON FIELD
CONDITIONS.
NOTE:
EROSION CONTROL FABRIC/SOIL LIFT (DETAIL 3/D-9) APPLICATION AND LOCATIONS ARE NOT CALLED OUT ON THESE DRAWINGS. THE APPLICATION AND LOCATION FOR EROSION CONTROL FABRIC/SOIL LIFT WILL BE AT THE DISCRETION OF THE CONTRACTING OFFICER IN AREAS THAT BANK DISTURBANCE, EROSION AND BANK STABILITY ARE OF CONCERN.
TREE SALVAGE REACH 2A

**REACH 1 TREE SALVAGE QUANTITIES**

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<tr>
<td>ASH</td>
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</tr>
<tr>
<td>COTTONWOOD</td>
<td>31</td>
</tr>
<tr>
<td>ELDERBERRY</td>
<td>1</td>
</tr>
<tr>
<td>LIVE OAK</td>
<td>1</td>
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<td>MAPLE</td>
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<td>WILLOW</td>
<td>91</td>
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<tr>
<td>WILLOW CLUMP</td>
<td>2</td>
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<tr>
<td>WALNUT</td>
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**LEGEND**

- **DISTURBANCE LIMIT**
- **EXISTING TREE**
- **SALVAGE TREE**

**NOTE:** ALL TREES TO BE REMOVED ARE GREATER THAN 12 IN DIAMETER.
A.P.N. 110-130-007
A.P.N. 088-180-020
A.P.N. 088-180-021
A.P.N. 088-180-024
A.P.N. 088-180-022
A.P.N. 088-180-035
A.P.N. 088-180-003
A.P.N. 088-180-018
A.P.N. 088-180-019
A.P.N. 088-180-025

LEGEND
DISTURBANCE LIMIT
EXISTING TREE
SALVAGE TREE

TREE SALVAGE REACH 1

REACH 2 TREE SALVAGE QUANTITIES

<table>
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<tr>
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<tr>
<td>Walnut</td>
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NOTE: ALL TREES TO BE REMOVED ARE GREATER THAN (> ) 12 IN DIAMETER.
FLOW
12" MIN
INSTALL TEMPORARY DAM USING GRAVEL BAGS.
OR AS DIRECTED BY CONTRACTING OFFICER

A PLAN
SECTION A-A

VARIES

EXISTING GROUND

8" DIA FIBER ROLL

BURY

1 1/2 DIA (TYP.)

EXISTING

GROUND

INSTALL 1"X2"X24" WOOD STAKES

PLACE FIBER ROLLS TO ELIMINATE ANY GAPS (1' OVERLAP MIN)

1. PLACEMENT OF FIBER ROLLS IS SUBJECT TO EXISTING CONDITIONS.
2. PLACE FIBER ROLLS AS SHOWN ON PLAN SHEET.
3. FIBER ROLLS MUST BE COMPLETELY MADE OF BIO-DEGRADABLE MATERIAL.
4. PLACE GRAVEL BAGS OVER FIBER ROLL WHEN STAKES CANNOT BE USED DUE TO BEDROCK.
5. UPON DEMOBILIZATION FIBER ROLLS MUST BE REMOVED FROM SITE. STRAW FROM FIBER ROLLS IS NOT TO BE SPREAD IN PLACE AS MULCHING MATERIAL.

NOTES:

1. THE ENTRANCE MUST BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO ROADWAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS MUST BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. USE SANDBAGS OR OTHER APPROVED METHODS TO CHANNELIZE RUNOFF TO BASIN AS REQUIRED.

SANDBAGS OR CONTINUOUS BERM OF EQUIVALENT HEIGHT ISOMETRIC VIEW

TYPICAL SLOPE STABILIZATION

NOTES:

1. SLOPE SURFACE MUST BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/BLANKETS MUST HAVE GOOD SOIL CONTACT.
2. USE SEEDING OR OTHER APPROVED METHODS TO CHANNELED SLOPE AREAS TO MAINTAIN DIRECT CONTACT WITH THE SOIL, DO NOT STRETCH.
3. MATS/BLANKETS SHOULD BE INSTALLED VERTICALLY DOWNSLOPE.

PRESENT SLOPE FOR STABILIZATION

NOTE:

1. SLOPE SURFACE MUST BE FREE OF ROCKS, CLODS, STICKS AND SANDBAGS; BLANKETS MUST HAVE GOOD SOIL CONTACT.
2. USE SEEDING OR OTHER APPROVED METHODS TO CHANNELED SLOPE AREAS TO MAINTAIN DIRECT CONTACT WITH THE SOIL, DO NOT STRETCH.
3. MATS/BLANKETS SHOULD BE INSTALLED VERTICALLY DOWNSLOPE.
NOTES:

1. Drape silt fence fabric over welded wire and fasten with tie wires @ 8" vertical and 3' horizontal spacing O.C.
2. Bury toe of silt fence fabric 0.50' in trench on upslope side
3. 0.50' to 1.50' min
4. 3.00' max

AFFIX WELDED WIRE FENCING TO POSTS @ 6.00' O.C. max

CONTRACT OFFICER MAY USE PRE MANUFACTURED SEDIMENT CONTROL FENCE AS APPROVED BY THE NPS.

PLACE FENCING SUCH THAT STORM RUNOFF CANNOT PASS AROUND OR UNDER FENCE

1. 2. 6.00' max

Continuous channel sections

NOTE:

DETAIL SHOWN IS FOR TREE PROTECTION FENCE, MATERIAL AND SPACING SHOWN ALSO APPLY TO CONSTRUCTION LIMIT FENCE. CLF & TREE PROTECTION FENCE SHALL BE 48" HIGH MINIMUM. FOR TREES WITH DRIPLINES THAT OVERHANG THE CONSTRUCTION AREAS, THE LOCATION OF THE TREE PROTECTION FENCE SHALL BE DETERMINED IN THE FIELD BY THE CONTRACT OFFICER.

WRAP CLF AROUND TREE UNDER WOOD 2"X4"X6' WOOD BATTEN BOUND TO TREE SEE DETAIL 'A'

EXISTING TREE 2"X4"X6' WOOD BATTEN STAPLE NAILED TO WOOD BATTEN NOT IN TREE (3 TOTAL) PER WOOD BATTEN 1/4" STEEL CABLE OR 3"Ø NYLON ROPE STRUNG THROUGH STAPLES AND BOUND TIGHTLY AROUND TREE

REFERENCE

REFER TO DETAIL 4-1 (EROSION MAT) AND DETAILS ON SHEET D-10 (FOR WILLOW INSTALLATION)

FINE GRAVELS AND COBBLES (TYP.) THALWEG (TYP.) REFER TO DETAIL 4-1 (EROSION MAT) AND DETAILS ON SHEET D-10 (FOR WILLOW INSTALLATION)

LARGE WOOD DEBRIS STRUCTURE THALWEG (TYP.)
**DESIGN SPECIFICS:**

1. INSTALL LIVE CUTTINGS AMONG LOGS AND SLASH (NOT SHOWN) WHILE INSTALLING LOGS.

2. BACKFILL AND COMPACT OVER SLASH WITH NATIVE ALLUVIUM.

3. BRUSH WITH ENDS EXTENDING APPROX. 12" BEYOND FOOTER LOG INTO CHANNEL.

4. EXCAVATE RAMP BEHIND FOOTER LOG FOR PLACEMENT OF SLASH/RACKING LAYER.

5. LOG SCHEDULE:

<table>
<thead>
<tr>
<th>Layer</th>
<th>Size (DBH)</th>
<th>Min Length (FT)</th>
<th>Rootwad</th>
<th>Quantity</th>
</tr>
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<tbody>
<tr>
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<td>18&quot; - 26&quot;</td>
<td>30</td>
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<td>1</td>
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</tbody>
</table>

6. VERTICAL PINNING LOGS MUST BE INSTALLED IN A MANNER THAT DOES NOT DISTURB THE SURROUNDING SOIL. AFTER STRUCTURE BACKFILL, TOPS OF PINNING LOGS MUST BE FLUSH.

7. FRAMES MUST BE INSTALLED IN A MANAGER THAT DOES NOT DISTURB THE CONTINUOUS BANK TREATMENT. AFTER BACKFILLING, TOPS OF FRAMES MUST BE BROKEN OFF TO NO MORE THAN FIVE (5) INCHES GRACE.

8. INSTALL LIKE CUTTINGS AMONG LOGS AND SLASH WHEN INSTALLING LOGS.

9. TOP OF TREE LOGS SHOULD NOT EXCEED MORE THAN 1/2 FOOT ABOVE TOP OF BANK.

10. LARGE BOULDERS "W" ABOVE FINISH GRADE (TYP /6)

11. INSTALL LAYER 2 PERPENDICULAR LOG W/ ROOTWAD (TYP.2)

12. INSTALL LAYER 1 LOG W/ ROOTWAD (TYP.1)

**NOTE:** THE ABOVE SPECIFICATIONS APPLY TO BEND LENGTHS OF APPROXIMATELY 30' AND WILL VARY DEPENDING ON ACTUAL LENGTH. ADDITIONAL ROOTWAD TREES AND CUT LOGS MUST BE ADDED, CONSISTENT WITH CONFIGURATION SHOWN IN PLANS, TO LENGTHEN STRUCTURE AS DIRECTED IN FIELD BY CONTRACT OFFICER.
1. **PURPOSE:**
   - Enhance fish habitat complexity and diversity.

2. **NOTES:**
   - Provide cover.
   - Incorporate large brace boulders into backfill for each log as shown.
   - Neutral color. Rods must be flush cut at the nuts and sharp edges ground flush.
   - Rods must be 1-inch diameter minimum fully threaded steel rods (ASTM A193, Grade B7) with steel nuts (ASTM A194, Grade 2H) and 4-inch washers (ASTM F436) on each end. Visible portions of hardware must be grey or other approved appearance. No flat cuts allowed.

3. **LOG SCHEDULE**

<table>
<thead>
<tr>
<th>LAYER</th>
<th>SIZE (IN)</th>
<th>MIN LENGTH (FT)</th>
<th>ROOTWAD</th>
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<td>18&quot; - 26&quot;</td>
<td>30</td>
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</tbody>
</table>

4. **APPEARANCE:**
   - Rods cannot be stacked.

5. **RACKING LOGS AND SLASH MUST HAVE IRREGULAR AND NATURAL APPEARANCE AND NOT STACKED.
   - Ends of pinning logs to remain intact until structure is backfilled. Ends to be broken off to create natural appearance leaving no more than 24" exposed above finish grade.
   - Portion of scoured pool and sort sediment. Or activate side channel.

6. **RACKING LOGS AND SLASH WEDGED BETWEEN ROOTWAD, CUT LOGS AND BOULDER BALLAST MUST NOT DISTURB THE SURROUNDING SOIL. AFTER STRUCTURE BACKFILL, TIES MUST BE INSTALLED IN A MANNER THAT DOES NOT IMPAIR THE STRUCTURE.
   - Roots of pinning log to remain intact. Structural boulders or boulders must be placed at least 3 ft from pinning log. Boulders must be placed in a manner that does not create new habitat.
   - Pinning logs must be installed in a manner that does not create new habitat.

7. **ROOTWAD AND CUT LOGS SECURED INTO ISLAND WITH COMPACTED NATIVE ALLUVIUM, PINNING LOGS AND BOULDER BALLAST.
   - Vertical pinning log (TYP).
   - Layer 1 Log (TYP).
   - Layer 2 Log (TYP).
   - Layer 3 Log (TYP).

8. **VERTICAL PINNING LOG:**
   - Layer 1 Log (TYP).
   - Layer 2 Log (TYP).
   - Layer 3 Log (TYP).

9. **BOULDER BALLAST (TYP.):**
   - 15" - 18" Ø, 30'± Long (TYP 2)
   - 15" - 18" Ø, 20'± Long W/O Rootwad (TYP 1)
   - 16" - 18" Ø, 20'± Long Racked Into Backfill (TYP 1)
   - 16" - 18" Ø, 20'± Long Racked Into Backfill (TYP 1)

10. **LAYER 1 LOGS (TYP):**
    - Rootwad Logs (TYP).
    - Rootwad Logs (TYP).
    - Rootwad Logs (TYP).
    - Rootwad Logs (TYP).
    - Rootwad Logs (TYP).

11. **LAYER 2 LOGS (TYP):**
    - Rootwad Logs, tower logs.
    - Vertical Pinning Log (TYP).
    - Vertical Pinning Log (TYP).
    - Vertical Pinning Log (TYP).
    - Vertical Pinning Log (TYP).

12. **LAYER 3 LOGS (TYP):**
    - Rootwad Logs, tower logs.
    - Vertical Pinning Log (TYP).
    - Vertical Pinning Log (TYP).
    - Vertical Pinning Log (TYP).
    - Vertical Pinning Log (TYP).

13. **SHARP EDGES GROUND FLUSH:**
    - Faced off to create natural appearance.

14. **SCOUR POOL AND SORT SEDIMENT:**
    - Faced off to create natural appearance.

15. **CREATE SCOUR POOL AND SORT SEDIMENT:**
    - Faced off to create natural appearance.

16. **REDUCE CHANNEL WIDTH-TO-DEPTH RATIOS:**
    - Faced off to create natural appearance.

17. **COLLECT MOBILIZED LARGE WOODY DEBRIS:**
    - Faced off to create natural appearance.

18. **DISTURB THE SURROUNDING SOIL:**
    - Faced off to create natural appearance.

19. **INCREASE FISH HABITAT COMPLEXITY AND DIVERSITY:**
    - Faced off to create natural appearance.

20. **FLUSH:**
    - Faced off to create natural appearance.
APPROXIMATELY 1/2 ROOTWAD DIAMETER MIN. 5'

EXISTING CHANNEL BED

PLACE RACKING LOGS AND SLASH BETWEEN AND UNDER KEY AND PINNING LOGS

APPROX. LOW FLOW ELEVATION

APPROX. BANKFULL FLOW ELEVATION

EXCAVATE SCOUR HOLE

FINISHED GROUND 2' MAX.

LOG SCHEDULE

<table>
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<tr>
<th>LAYER</th>
<th>NAME</th>
<th>SIZE (DBH)</th>
<th>MIN LENGTH (FT)</th>
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<th>QUANTITY</th>
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<tbody>
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NOTES

PROJECT IS PLANNED TO ALTER EXISTING INFRASTRUCTURE (HABITAT) TO MEET SPECIFIED REQUIREMENTS AND PROVIDE MODERATE TO HIGH FLOW ROUTE REQUIREMENTS.

DESIGN SPECIFICS:

1. PLACE AT HEAD OF ISLAND OR DEVELOPING GRAVEL BAR OR SIDE CHANNEL INLET.

2. ROOTWAD AND CUT LOGS SECURED INTO ISLAND WITH COMPACTED NATIVE ALLUVIUM, PINNING LOGS AND BOULDER BALLAST.

3. PINNING LOGS MUST BE INSTALLED IN A MANNER THAT DO NOT DISTURB THE SURROUNDING SOIL. AFTER STRUCTURE BACKFILL, TOPS OF PINNING LOGS MUST BE BROKEN OFF TO NO MORE THAN 2' ABOVE FINISH GRADE.

4. ENDS OF PINNING LOGS TO REMAIN INTACT UNTIL STRUCTURE IS BACKFILLED. ENDS TO BE BROKEN OFF TO CREATE NATURAL APPEARANCE LEAVING NO MORE THAN 24" EXPOSED ABOVE FINISH GROUND.

5. ALL VISIBLE ENDS OF LOGS MUST BE CUT OR BROKEN OFF TO CREATE NATURAL APPEARANCE. NO FLAT CUTS ALLOWED.

6. RACKING LOGS AND SLASH WEDGED BETWEEN KEY MEMBERS, PINNING LOGS AND BOULDERS.

7. RACKING LOGS AND SLASH MUST HAVE IRREGULAR AND NATURAL APPEARANCE AND NOT STACKED.

8. BACKFILL STRUCTURE WITH COMPACTED NATIVE ALLUVIUM.

9. ROADS MUST BE 1-INCH DIAMETER MINIMUM FULLY THREADED STEEL RODS (ASTM A193, GRADE B7) WITH STEEL NUTS (ASTM A194, GRADE 2H) AND 4-INCH WASHERS (ASTM F436) ON EACH END. VISIBLE PORTIONS OF HARDWARE MUST BE GREY OR OTHER APPROVED NEUTRAL COLOR. ROADS MUST BE FLUSH CUT AT THE NUTS AND SHARP EDGES GROUND FLUSH.
**PURPOSE:**

NOTES:

**CHANNEL PLUG STRUCTURE**

- **ADJUST AS NEEDED TO CONFORM IRREGULAR LOGS TO NEAT DIMENSIONS SHOWN.**

1. **INSTALL LIVE CUTTINGS AMONG LOGS AND SLASH (NOT SHOWN) WHILE INSTALLING PINNING LOGS MUST BE INSTALLED IN A MANNER THAT DOES NOT DISTURB THE REQUIRE THREE SEGMENTS. SIDE CHANNEL PLUGS REQUIRE TWO SEGMENTS.**

2. **PLACE IN CHANNEL LOCATIONS WHERE CHANNEL REALIGNMENT IS PROPOSED.**

3. **PERPENDICULAR LOGS AND SLASH WITH ROOTWAD FACING UPSTREAM.**

4. **INSTALL 12" LAYER OF SLASH INCLUDING TREE BRANCHES, STEMS, LIVE CUTTINGS, EXCAVATE RAMP BEHIND FOOTER LOG FOR PLACEMENT OF SLASH/RACKING LAYER.**

5. **EXCAVATE TRENCHES FOR LAYER 1 PERPENDICULAR LOGS. TRENCHES MUST BE DUG TO A DEPTH TO ALLOW FOR MINIMUM BURIAL DEPTH OF 5 FEET. 3 FEET SHOWN ON NEAT CHART. PLUS LOG OR MATERIAL TO BE CUSHIONING CHANNEL. LOG LOCATION, LAYER 1 PERPENDICULAR LOGS MUST BE PLACED WITH ROOTWADS FACING UPSTREAM AS SHOWN IN DETAIL.**

6. **PLACE LARGE BOULDERS ALONG PROPOSED CHANNEL BANK TOE IN BETWEEN LAYER 1 LOGS.**

7. **LAYER 2 PARALLEL LOG, 18"-26" Ø, 30' LONG W/ ROOTWAD (TYP 3 PER SEGMENT) FOR MAIN CHANNEL PLUGS ABUT PARALLEL LOG FROM ADJACENT SEGMENT TO CREATE CONTINUOUS TREATMENT FOR CHANNEL PLUGS AND SIDE CHANNELS.**

8. **LOG SCHEDULE (PER SEGMENT)**

<table>
<thead>
<tr>
<th>LAYER</th>
<th>SIZE</th>
<th>DBH</th>
<th>LENGTH</th>
<th>ROOTWAD</th>
<th>QUANTITY</th>
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<td>30'</td>
<td>30'±</td>
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<td>3</td>
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9. **INSTALL 12" LAYER OF SLASH INCLUDING TREE BRANCHES, STEMS, LIVE CUTTINGS, EXCAVATE RAMP BEHIND FOOTER LOG FOR PLACEMENT OF SLASH/RACKING LAYER.**

10. **EXCAVATE TRENCHES FOR LAYER 3 PERPENDICULAR LOGS. PLACE PERPENDICULAR LOGS WITH ROOTWADS OVERHANGING FOOTER LOGS AS SHOWN. BACKFILL AND COMPACT OVER PERPENDICULAR LOGS WITH NATIVE ALLUVIUM.**

11. **EXCAVATE TRENCHES FOR LAYER 4 PARALLEL LOG. FOR MAIN CHANNEL PLUGS ABUT PARALLEL LOG FROM ADJACENT SEGMENT TO CREATE CONTINUOUS TREATMENT FOR CHANNEL PLUGS AND SIDE CHANNELS.**

12. **INSTALL 12" LAYER OF SLASH INCLUDING TREE BRANCHES, STEMS, LIVE CUTTINGS, EXCAVATE RAMP BEHIND FOOTER LOG FOR PLACEMENT OF SLASH/RACKING LAYER.**

13. **EXCAVATE TRENCHES FOR LAYER 5 PERPENDICULAR LOG. PLACE PERPENDICULAR LOGS WITH ROOTWADS OVERHANGING FOOTER LOGS AS SHOWN. BACKFILL AND COMPACT OVER PERPENDICULAR LOGS WITH NATIVE ALLUVIUM.**

14. **INSTALL 12" LAYER OF SLASH INCLUDING TREE BRANCHES, STEMS, LIVE CUTTINGS, EXCAVATE RAMP BEHIND FOOTER LOG FOR PLACEMENT OF SLASH/RACKING LAYER.**

15. **EXCAVATE TRENCHES FOR LAYER 1 PERPENDICULAR LOGS. TRENCHES MUST BE DUG TO A DEPTH TO ALLOW FOR MINIMUM BURIAL DEPTH OF 5 FEET. 3 FEET SHOWN ON NEAT CHART. PLUS LOG OR MATERIAL TO BE CUSHIONING CHANNEL. LOG LOCATION, LAYER 1 PERPENDICULAR LOGS MUST BE PLACED WITH ROOTWADS FACING UPSTREAM AS SHOWN IN DETAIL.**

16. **PLACE LARGE BOULDERS ALONG PROPOSED CHANNEL BANK TOE IN BETWEEN LAYER 1 LOGS.**

17. **LAYER 2 PARALLEL LOG, 18"-26" Ø, 30' LONG W/ ROOTWAD (TYP 3 PER SEGMENT) FOR MAIN CHANNEL PLUGS ABUT PARALLEL LOG FROM ADJACENT SEGMENT TO CREATE CONTINUOUS TREATMENT FOR CHANNEL PLUGS AND SIDE CHANNELS.**

18. **LOG SCHEDULE (PER SEGMENT)**

<table>
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<tr>
<th>LAYER</th>
<th>SIZE</th>
<th>DBH</th>
<th>LENGTH</th>
<th>ROOTWAD</th>
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<td>30'</td>
<td>30'±</td>
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19. **INSTALL 12" LAYER OF SLASH INCLUDING TREE BRANCHES, STEMS, LIVE CUTTINGS, EXCAVATE RAMP BEHIND FOOTER LOG FOR PLACEMENT OF SLASH/RACKING LAYER.**

20. **EXCAVATE TRENCHES FOR LAYER 3 PERPENDICULAR LOGS. PLACE PERPENDICULAR LOGS WITH ROOTWADS OVERHANGING FOOTER LOGS AS SHOWN. BACKFILL AND COMPACT OVER PERPENDICULAR LOGS WITH NATIVE ALLUVIUM.**

21. **EXCAVATE TRENCHES FOR LAYER 4 PARALLEL LOG. FOR MAIN CHANNEL PLUGS ABUT PARALLEL LOG FROM ADJACENT SEGMENT TO CREATE CONTINUOUS TREATMENT FOR CHANNEL PLUGS AND SIDE CHANNELS.**

22. **INSTALL 12" LAYER OF SLASH INCLUDING TREE BRANCHES, STEMS, LIVE CUTTINGS, EXCAVATE RAMP BEHIND FOOTER LOG FOR PLACEMENT OF SLASH/RACKING LAYER.**

23. **EXCAVATE TRENCHES FOR LAYER 5 PERPENDICULAR LOG. PLACE PERPENDICULAR LOGS WITH ROOTWADS OVERHANGING FOOTER LOGS AS SHOWN. BACKFILL AND COMPACT OVER PERPENDICULAR LOGS WITH NATIVE ALLUVIUM.**
EXCAVATION LIMIT

BACKFILL WITH COMPACTED NATIVE ALLUVIUM AND SALVAGED BOULDERS.

APPROX. BANKFULL FLOW ELEVATION

APPROX. LOW FLOW ELEVATION

FLOODPLAIN LWM STRUCTURE (TYP SEE DETAIL ON SHEET ####)

BRUSH TRENCH (TYP SEE DETAIL SHEET ####)

40'± FINISH GROUND

SEE GRADING PLANS

EXISTING STREAMBED

UNDISTURBED NATIVE BED

VERTICAL PINNING LOG (TYP)

LAYER 1 LOG (TYP)

LAYER 2 LOG (TYP)

LAYER 3 LOG (TYP)

LAYER 4 LOG (TYP)

LAYER 5 LOG (TYP)

BOULDER TOE

PROPOSED CHANNEL BED

EXISTING GROUND

FILL EXISTING CHANNEL

VERTICAL PINNING LOG (TYP)

LAYER 1 LOG (TYP)

LAYER 2 LOG (TYP)

LAYER 3 LOG (TYP)

LAYER 4 LOG (TYP)

LAYER 5 LOG (TYP)

BOULDER TOE

RACKING AND SLASH WEAVED BETWEEN LOG LAYERS

THREAD ROD CONNECTION (TYP)

LAYER 1 LOG

LAYER 2 LOG

LAYER 3 LOG

LAYER 4 LOG

LAYER 5 LOG

SECTION VIEW A-A'

SECTION VIEW B-B'

CHANNEL PLUG
Upon completion of project contract officer to scarify soil to a minimum 12" and seed as shown in the plans.

3-5" thick road base silt fence/fiber roll.

See SWPP requirements.

Wrap soil with fabric.

Step 1
Wrap soil with fabric.

Step 2
Stake fabric.

Step 3
Wrap second layer of clean fill with fabric.

Step 4
Repeat steps 1, 2, and 3 until desired height of bank is reached.

Notes:
1. Fabric to create soil wrap should be 100% woven corn fiber in 50′ x 50′ rolls with at least a 700 gm weave count.
LOW WATER TABLE
APPROXIMATE EXTENT
OF EXCAVATION (TYP.)

WILLOW TRENCH INTENT OF BRUSH TRENCH IS TO ESTABLISH WOODY VEGETATION IN ALLUVIAL GRAVels. SURFACES FLOODPLAINs AND GRAVEL-BASED TO PROVIDE NEAR TERM VERDURE IN WET-MAINTAINED, CONSISTING OF VARIOUS WOODY BRANCHES FROM SHRUBS AND TREES AND LONG TERM ROUGHNESS PROVIDED BY LAI (GROWTH) MATERIAL IS PLACED FACING DOWNSTREAM AND ANGLED TO REMAIN HIGH FOR STABILITY, BYPASS stRONG WATER Currents TO FLOODPLAIN AND TO SLOW VELOCITIES, BUT NOT TOO SLOW TO COMpletely ONSECT BRUSH;

PLACE LAYER 1 - LIVE CUTTINGS 6" BELOW LOW WATER TABLE IN MANNER AS SPECIFIED BY "LIVE STAKING". PLACE ALONG SIMILAR TO C.0. AND DRAWINGS

CONTRACT OFFICER ON SITE

OUTSIDE OF HOLE ON DOWNSTREAM FACE AT 8"-12" SPACING WITH A MINIMUM OF 4 PER EXCAVATED HOLE AND AS SPECIFIED BY C.O. AND DRAWINGS.

PLACE 6" LAYER OF MATERIAL EXCAVATED FROM HOLE ON LAYER 1 (LIVE CUTTINGS) AND COMPACT AGAINST LAYER 1 WITH BUCKET.

PLACE 6" LAYER OF SLASH CONSISTING OF LIVE AND DEAD STEMS AND BRANCHES OF MIXED DIAMETER BETWEEN 3/4" TO 3".

BLEND OVER ANY REMAINING EXCAVATED ALLUVIAL MATERIAL INTO FLOODPLAIN TO CREATE MICRO-POCKETS PER C.O. AND DRAWINGS

1. POLE CUTTINGS OF WILLOW ARE LONGER AND HAVE A LARGER DIAMETER THAN BRANCH CUTTINGS OR LIVE STAKES.

2. POLE CUTTINGS WILL BE PROVIDED BY THE CONTRACT OFFICER ON SITE.

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 1/2 TO 2/3 OF THE POLE SHOULD BE BELOW THE GROUND, AT LEAST 6" AND LONG ENOUGH TO EMERGE ABOVE ADJACENT VEGETATION.

5. "NUDDING" - FILLING THE HOLE WITH WATER AND THEN SOIL TO MAKE A MUD SLURRY FOLLOWED BY ROD TAMPPING CAN REMOVE AIR POCKETS,

6. "NUDDING" IS USEFUL WHERE WILLOW CUTTINGS ARE BEING PLANTED IN A TRUE TRENCH OR HOE TRENCH, WHERE WILLOW POLE CUTTINGS ARE "NUDDED" IN PLACE UNDER WATER TO AVOID "ROD" OR "MUD" TO REMOVE AIR POCKETS.}

NOTES:
1. WILLOW POLE CUTTINGS ARE LONGER AND HAVE A LARGER DIAMETER THAN BRANCH CUTTINGS OR LIVE STAKES.

2. POLE CUTTINGS WILL BE PROVIDED BY THE CONTRACT OFFICER ON SITE.

3. POLE CUTTINGS ARE BETTER SUIT ED 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 1/2 TO 2/3 OF THE POLE SHOULD BE BELOW THE GROUND, AT LEAST 6" AND LONG ENOUGH TO EMERGE ABOVE ADJACENT VEGETATION.

5. "NUDDING" - FILLING THE HOLE WITH WATER AND THEN SOIL TO MAKE A MUD SLURRY FOLLOWED BY ROD TAMPPING CAN REMOVE AIR POCKETS,
**Floodplain Large Wood Material Structure**

**Notes:**
1. A2/1/2 Log Must Be Placed In The Presence Of The Contract Officer. Select And Adjust As Needed To Conform Irregular Logs To Neat Dimensions Shown. Please Provide Cover On The Floodplain During High Flow Events.

**Specifications:**
1. Whole Trees Salvaged From The Project Site With Rootwads And Limbs Intact May Be Used. Limbs Are Not Shown For Clarity.
2. Rootwad Logs Or Harvested Trees From Site Can Be Used For Pinning Or Layer 2 Logs.
3. Structures May Be Field Located By The Contract Officer.
4. Protect Existing Trees. Remove Only Trees As Marked Or Directed By Contract Officer.

**Log Schedule**

<table>
<thead>
<tr>
<th>Layer</th>
<th>Size (DBH)</th>
<th>Min Length (ft)</th>
<th>Rootwad</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18&quot; - 26&quot;</td>
<td>30'</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>P2 (Snag Log)</td>
<td>18&quot; - 26&quot;</td>
<td>20'</td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Pinning</td>
<td>16&quot; - 18&quot;</td>
<td>30'</td>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>Large Booulders</td>
<td>&gt;36&quot;</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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**Dry Creek Ecosystem Restoration Project**

**Phase VI (Reach 1/2A)**

**U.S. Army Corps of Engineers**

**San Francisco District**

**450 Golden Gate Ave, 4th Floor**

**San Francisco, CA 94102-3406**

**Sonoma County, California**

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**Designated By:**

**Drawn By:**

**Checked By:**

**Submitted By:**

**Issue Date:**

**Sollicitation No:**

**Contract No:**

**Description:**

**Status:** 99%
APPROX. WIDTH ("W") OF STREAM BED EQUALS APPROX. WIDTH ("W") OF STREAM BED, OR 5' MIN.

FLOW OF CHANNEL KEY INTO EMBANKMENT

IMPORT COBBLE TO FILL LARGEST SPACES BETWEEN BOULDERS (6"-12" & 16"-20" Ø)

KEY INTO EMBANKMENT

USE LARGER ROCK TO FORM "V" (20"-24" AVE Ø)

NOTE:

THE ELEVATION OF THE LARGE BOULDERS (20"-24" AVE Ø) MUST INCREASE AT 10% ± GOING AWAY FROM THE CHANNEL ℄ AND INTO THE EMBANKMENT.

ADD WILLOW STAKES TO BANKS OF GRADE CONTROL STRUCTURES AT DISCRETION OF THE CONTRACT OFFICER. (APPROXIMATELY 25 STAKES FOR STRUCTURE)

NOTES:

1. THE ELEVATION OF THE LARGE BOULDERS (20"-24" AVE Ø) MUST INCREASE AT 10% ± GOING AWAY FROM THE CHANNEL ℄.

2. ADD WILLOW STAKES TO BANKS OF GRADE CONTROL STRUCTURES AT DISCRETION OF THE CONTRACT OFFICER. (APPROXIMATELY 25 STAKES FOR STRUCTURE)

## PROPOSED GRADE CONTROL STRUCTURE

<table>
<thead>
<tr>
<th>PROPOSED GRADE CONTROL STRUCTURE</th>
<th>W (FT)</th>
<th>L (FT)</th>
<th>BOULDER WIDTH (FT)</th>
<th>BOULDERS (TON)</th>
<th>COBBLE/GRAVELS (TON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC-2 STA:13-00</td>
<td>5'</td>
<td>30'</td>
<td>4'</td>
<td>22</td>
<td>80</td>
</tr>
<tr>
<td>SC-5 STA: 0-10</td>
<td>5'</td>
<td>18'</td>
<td>4'</td>
<td>12</td>
<td>35</td>
</tr>
</tbody>
</table>

## PLAN VIEW

ROCK GRADE CONTROL

NOTES:

1. THE ELEVATION OF THE LARGE BOULDERS (20"-24" AVE Ø) MUST INCREASE AT 10% ± GOING AWAY FROM THE CHANNEL ℄ AND INTO THE EMBANKMENT.

2. ADD WILLOW STAKES TO BANKS OF GRADE CONTROL STRUCTURES AT DISCRETION OF THE CONTRACT OFFICER. (APPROXIMATELY 25 STAKES PER STRUCTURE.)

### PROPOSED GRADE CONTROL STRUCTURE W* (FT) L (FT) BOULDER WIDTH (FT) BOULDERS (TON) COBBLE/GRAVELS (TON)

| SC-2 STA:13-00 | 5' | 30' | 4' | 22 | 80 |
| SC-5 STA: 0-10 | 5' | 18' | 4' | 12 | 35 |
RIFFLE OVERVIEW

RIFFLES ARE INTENDED TO CREATE A NATURAL STREAM CHANNEL. RIFFLES ARE TO BE CONSTRUCTED SUCH THAT MEANDERING HYDRAULIC PROCESSES AREOfYearly_INCLUDED. POOL DEVELOPMENT FEATURES ARE TO BE CONSTRUCTED SUCH THAT LOW FLOW TURBIDITY ON THE SURFACE.

RIFFLE CONSTRUCTION STEPS

STEP 1 - ROUGH GRADE

PLACE LAYER OF 12-INCH LIFTS OF COMPACTED RIFFLE MATRIX MATERIAL TO 0.1' ABOVE FINISH GRADE. ADD A LAYER OF ADDITIONAL FINES ON THE MATRIX OVER THE 12-INCH LIFTS. PLACE ADDITIONAL FINES INTO RIFFLE MATERIAL SURROUNDING EXCAVATION AND SET BOULDERS TO 50% OF THE BOULDER DIAMETER AND RECOMPACTED - NOTE 8.

STEP 2 - FIRST LIFT

PLACE 12" LIFT OF COMPACTED RIFFLE MATRIX MATERIAL, SEE NOTE 4. PLACE 2ND LIFT OF COMPACTED RIFFLE MATRIX MATERIAL TO 0.1' ABOVE FINISH GRADE. PLACE ADDITIONAL FINES INTO RIFFLE MATERIAL SURROUNDING EXCAVATION AND SET BOULDERS TO 50% OF THE BOULDER DIAMETER AND RECOMPACTED - NOTE 8.

STEP 3 - SECOND LIFT

PLACE ADDITIONAL FINES INTO RIFFLE MATERIAL. COMPACT MATERIAL IN 12-INCH LIFTS USING BASE FLOW CONDITIONS. WASH ADDITIONAL FINES INTO RIFFLE MATERIAL SURROUNDING EXCAVATION AND SET BOULDERS TO 50% OF THE BOULDER DIAMETER AND RECOMPACTED - NOTE 8.

STEP 4 - BOULDER PLACEMENT AND TOP DRESSING

REPEAT RIFFLE CONSTRUCTION IN ANOTHER 12-INCH LIFT TO 0.3' ABOVE FINISH GRADE AS NEEDED AND DIRECTED BY C.O. FEATHER MATERIAL SUFFICIENTLY TO COMPACT. ADD A LAYER OF ADDITIONAL FINES ON THE SURFACE. WASH FINES INTO RIFFLE MATERIAL USING A TRASH PUMP AND 2-INCH TRASH PUMP, OR SIMILAR EQUIPMENT AS APPROVED BY C.O. TRACK ON SMALL WAVE ACTION TO CREATE DIVERSE FLOW PATTERNS AND HABITAT. EACH BOULDER IS TO BE EMBEDDED GRADE ELEVATION AND SHAPE. THE ACTUAL CONSTRUCTION ELEVATION WILL MATCH THE REQUIRED GRADE ELEVATION AND SHAPE. TOP DRESS WITH RIFFLE MATERIAL AS NEEDED AND DIRECTED BY C.O. FORM A NATURAL APPEARANCE. SURROUNDING CHANNEL MATERIALS TO FORM A NATURAL APPEARANCE.

RIFFLE REQUIREMENTS BY CHANNEL STATION

- REQUIRED MATERI

- MATERIAL QUANTITY AND SIZE DETAILS ARE SUBJECT TO CHANGE DURING CONSTRUCTION. THE ACTUAL CONSTRUCTION ELEVATION WILL MATCH THE REQUIRED GRADE ELEVATION AND SHAPE.

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ROCK BANK PROTECTION PROFILE VIEW B-B'

ROCK BANK PROTECTION PLAN VIEW (TYP.)

<table>
<thead>
<tr>
<th>ROCK BANK PROTECTION</th>
<th>WIDTH (FT)</th>
<th>LENGTH (FT)</th>
<th>DEPTH (FT)</th>
<th>BOULDER VOLUME REQUIRED (TON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCN 8+51 TO DCN 10+92</td>
<td>3</td>
<td>160</td>
<td>3.5</td>
<td>195</td>
</tr>
<tr>
<td>DCN 1+89 TO DCN 3+04</td>
<td>3</td>
<td>160</td>
<td>3.5</td>
<td>130</td>
</tr>
</tbody>
</table>

NOTE TO CONSTRUCTION CONTRACTOR: SEE DETAIL SHEET 14 FOR MATERIALS SPECIFICATIONS.