MARSHALL RANCH FLOW ENHANCEMENT PROJECT (APN 220-061-011)
DRAFT 100% DESIGN PLANS
BRICELAND, CA

PROJECT DESCRIPTION:
The primary objective of this project is construction of 10 million gallons of off-channel water storage and associated plumbing infrastructure designed to deliver approximately 30 gallons per minute of flow augmentation to Redwood Creek during the 5-month dry season to improve instream aquatic habitat. Storage will be in two ponds and five tanks filled with wet-season runoff including rainwater catchment and water diverted from two small Redwood Creek tributaries. Other ancillary project components include:

- Installation of large wood habitat enhancement and bank stabilization structures in Redwood Creek.
- Stabilization of three gullied tributaries with approximately 15 rock armor grade control structures and regrading.
- Construction of a passive cooling and filtration gallery in the existing gully to improve water quality and decrease water temperature in the augmented flows.
- Construction of a solar power system including a 2 kW solar array, battery bank, inverter, internet connection, and small control center building to support operations and monitoring capabilities.
- Upgrading access roads within the project area including three road/stream crossings upgrades and gravel surfacing to provide year-round access.
- Construct cattle exclusion fencing to protect riparian areas within the project vicinity.
- Installation of plumbing infrastructure to allow for a portion of the water stored in the tanks to be utilized for domestic, ranch, and fire suppression needs including two fire hydrants.

ADDITIONAL NOTES:
1. North and west parcel boundaries from 2021 survey. Northwest boundary is the centerline of Redwood Creek and is drawn based on 2008 USGS LiDAR. South and east parcel boundaries taken from Humboldt County GIS and modified based on north and west boundaries, approximate only.

EARTHWORK ESTIMATES:
- 35,630 CY CUT/CY FILL BALANCED ON SITE
- Instream features & gully repair - 100 CY riprap rock (backing to 4 ton)
- Pond fillaways - 100 CY (backing to 4 ton)
- French drain - 50 CY drain rock

ABBREVIATIONS AND SYMBOLS:
(E) Existing
(P) Proposed

OWNER:
The Marshall Ranch, LLC
Velma V. Marshall Estate
5720 Old Briceland Road
Garberville, CA 95542

APPLICANT:
Salmonid Restoration Federation
425 Snug Alley, Unit D
Eureka, CA 95501
SRF@CALSALMON.ORG

AGENT:
Joel Monschke PE
Stillwater Sciences
850 G Street, Suite K
Arcata, CA 95521
707-496-7075
JMONSCHKE@STILLWATERSCI.COM
MARSHALL RANCH FLOW ENHANCEMENT PROJECT

SIT PLAN

PROJECT NUMBER: 603.04
SCALE: AS NOTED
DATE: 12/15/2021
DESIGN: JM
DRAWN: CLTC
CHECKED: JM
APPROVED: JM
SITE PLAN

LEGEND

PROPERTY LINE
ROAD
STREAMSIDE MANAGEMENT AREA
EXISTING
PROPOSED

SETBACKS:
PROPOSED PROJECT INCLUDES INSTREAM HABITAT ENHANCEMENT AND EROSION CONTROL FEATURES RESULTING IN SETBACKS FROM STREAMS. ALL PROPOSED WORK TO BE MINIMUM 30' FROM PROPERTY BOUNDARIES EXCEPT FOR INSTREAM FEATURES.
MARSHALL RANCH FLOW ENHANCEMENT PROJECT
BRICE LAND, CA

EXCESS FILL GRADING
POD 2 AT CULVERT OUTLETS
POD 1 CROSSING UPGRADES
(1) ARMORED SPILLWAY
(1) CROSSING UPGRADES
(1) ARMORED SPILLWAY
(1) LOWER ROAD 3.2 MILLION GALLONS WITH 1.5' FREEBOARD.
(1) POD 1
(1) POD 2
(1) UPPER ROAD 3.8 MILLION GALLONS WITH 1.5' FREEBOARD.
(1) POND SURFACE CONTOURS, 1' INTERVAL
GROUND SURFACE FROM USGS LIDAR (2018). 1' INTERVAL, ELEVATIONS ASL.

3.8 MILLION GALLONS WITH 3.5' FREEBOARD.
5.7 MILLION GALLONS WITH 2' FREEBOARD.

DESIGN: JM
DRAWN: CL,TC
CHECKED: JM
APPROVED: JM
GRADING PLAN
PROJECT NUMBER: 603.04
SCALE: AS NOTED
DATE: 12/15/2021

JM
CL,TC
JM
JM

SHEET 5 OF 19

MARSHALL RANCH FLOW ENHANCEMENT PROJECT
BRICE LAND, CA

EXCESS FILL GRADING
POD 2 AT CULVERT OUTLETS
POD 1 CROSSING UPGRADES
(1) ARMORED SPILLWAY
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DESIGN: JM
DRAWN: CL,TC
CHECKED: JM
APPROVED: JM
GRADING PLAN
PROJECT NUMBER: 603.04
SCALE: AS NOTED
DATE: 12/15/2021

JM
CL,TC
JM
JM

SHEET 5 OF 19
MARSHALL RANCH FLOW ENHANCEMENT PROJECT
BRICE LAND, CA

DESIGN: JM
DRAWN: CLTC
CHECKED: JM
APPROVED: JM

SPILLWAY PLAN AND PROFILE

PROJECT NUMBER: 603.04
SCALE: AS NOTED
DATE: 12/15/2021

7 19

SCALE: 1" = 15' FEET

0) ROCK ARMORING UNDERLaid BY GEOTEXTILE FABRIC, BACKING TO ¼ TON; ~1.5' THICK
0) POND BERM
0) WATER SURFACE AT CAPACITY
0) SPILLWAY SIDE SLOPES AT 5:1 THROUGH ROAD SURFACE FROM CROSSING
0) SPILLWAY SURFACE, 1' CONTOURS
0) SPILLWAY INERT
0) POND BERM AND GROUND SURFACE

UPPER POND SPILLWAY

LOWER POND SPILLWAY

ELEVATION IN FEET (ASL)
STATION (FEET)

ELEVATION IN FEET (ASL)
STATION (FEET)
DEWATERING AND CONSTRUCTION SEQUENCING NOTES:

1. THE ENTIRE LENGTH OF CHANNEL WITHIN THE LIMIT OF WORK SHALL BE ELECTRO-FISHED BY DFW STAFF PRIOR TO ANY CONSTRUCTION ACTIVITY THAT COULD DISTURB THE CHANNEL.
2. CONSTRUCT NEW CHANNEL AND ALL FEATURES EXCEPT UPSTREAM AND DOWNSTREAM CONNECTIONS TO EXISTING CHANNEL; Dewater excavations as needed during construction to ensure that no turbid water runs off the site.
3. CONSTRUCT DOWNSTREAM CONNECTION BETWEEN NEW AND CURRENT CHANNEL; INSTALL TEMPORARY DEWATERING AND BYPASS FLOW SYSTEM AS SHOWN IN THE FIGURE ABOVE.
4. CONSTRUCT UPSTREAM CONNECTION BETWEEN NEW AND CURRENT CHANNEL; INSTALL TEMPORARY DEWATERING AND BYPASS FLOW SYSTEM AS SHOWN IN THE FIGURE ABOVE.

FISH SCREEN UPSTREAM OF PUMP TO PREVENT BIOLOGICAL RESOURCES FROM ENTERING WORK AREA.

DIVERSION PIPE ADEQUATELY SIZED FOR TYPICAL FLOWS (5 CFS). ENGINEER TO APPROVE FINAL DIAMETER.

TRASH PUMP INTAKE SIZED TO DIVERT FLOW AROUND WORK AREA.

FISH EXCLUSIONARY FENCING

PLACE COBBLE AROUND PUMP OUTFLOW TO PREVENT TURBIDITY

REDWOOD CREEK

WATER DIVERSION PIPE

SANDBAG OR GRAVEL COFFERDAM

PUMP INLET

(F) RIGHT BANK STABILIZATION AND HABITAT ENHANCEMENT. ANCHORING DETAILS ON SHEET 17

SCALE: 1" = 20'
ACCESS ROAD FOR USE DURING CONSTRUCTION THEN LONG TERM RANCH ACTIVITY

POND DIKE ACCESS ROADS

ACCESS ROAD CULVIST CROSSING (24" CMP)

START OF ACCESS ROAD

OLD SOMERVILLE CREEK ROAD

OVER-EXCAVATION AND PLACEMENT OF ~100 CY FILL TO STABILIZE SMALL SLUMP ON ACCESS ROAD CUT SLOPE

FIRE TRUCK TURNAROUND AND PARKING

FIRE HYDRANTS

ACCESS ROAD CULVIST CROSSINGS (36" CMP)

ACCESS ROAD FOR USE DURING CONSTRUCTION THEN LONG TERM RANCH ACTIVITY

PERMANENT ACCESS ROAD PLAN

MARSHALL RANCH FLOW ENHANCEMENT PROJECT

BRICELAND, CA

DESIGN: JM
DRAWN: OLTC
CHECKED: JM
APPROVED: JM

PROJECT NUMBER: 603.04
SCALE: AS NOTED
DATE: 12/15/2021

P: (707) 822-9607

850 G STREET SUITE K
ARCATA, CA 95521

SHEET 11 OF 19

SCALE: 1" = 70'
HUMBOLDT COUNTY
APN 220-061-011
REDWOOD CREEK
(P) CONTROL CENTER BUILDING
WITH OFF-GRID POWER SUPPLY
(2 KW PANELS, 8 L16 BATTERIES,
2,400 WATT INVERTER)
(P) POWER SUPPLY TO TWO
ELECTRONIC FLOW METERS/VALVES
AND TWO PUMPS
(P) POWER SUPPLY TO ELECTRONIC
FLOW METER/VALVE AND PUMP
(P) ELECTRONIC VALVE/METER
850 G STREET SUITE K
ARCATA, CA 95521
P: (707) 822-9607

DESIGN: JM
DRAWN: CL,TC
CHECKED: JM
APPROVED: JM
ELECTRICAL PLAN

MARSHALL RANCH FLOW ENHANCEMENT PROJECT
BRICEFIELD, CA

PROJECT NUMBER: 603.04
SCALE: AS NOTED
DATE: 12/15/2021

SHEET 12 OF 19
MONITORING AND INSTRUMENTATION PLAN

MARSHALL RANCH FLOW ENHANCEMENT PROJECT
BRICELAND, CA

PROJECT NUMBER: 603.04
SCALE: AS NOTED
DATE: 12/15/2021

DESIGN: JM
DRAWN: CL, TC
CHECKED: JM
APPROVED: JM

PT #1
PT #2
PT #3
PT #4
PT #5

SCALE: 1" = 70'

(P) CONDUIT CONNECTION FROM PRESSURE TRANSDUCER TO DATA LOGGER
(P) DATA LOGGER IN CONTROL CENTER. OFF GRID POWER SOURCE

0 35 70 140

0 50 100 150 FEET

SHEET 15 OF 19
SEEDING TABLE:

<table>
<thead>
<tr>
<th>Type of seed</th>
<th>Scientific name</th>
<th>Common name</th>
<th>Species composition</th>
<th>Amount of seed (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native grasses</td>
<td>Bromus carinatus</td>
<td>California bromegrass</td>
<td>40%</td>
<td>26.0</td>
</tr>
<tr>
<td></td>
<td>Elymus glaucus subsp.</td>
<td>Blue wild rye</td>
<td>40%</td>
<td>26.0</td>
</tr>
<tr>
<td>Native forbs</td>
<td>Achillea millefolium</td>
<td>Common yarrow</td>
<td>2%</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>Eschscholzia californica</td>
<td>California poppy</td>
<td>5%</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>Lupinus bicolor</td>
<td>Miniature lupine</td>
<td>5%</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>Salsichilium bellum</td>
<td>Western blue-eyed-grass</td>
<td>5%</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>65.0</strong></td>
</tr>
</tbody>
</table>

TOTAL AREA (ACRES): 2.6
1- AND 2-PIECE WOOD STRUCTURE DETAILS

1. Log structures shall be installed as shown on plan view sheets.
2. Where banks are steep, log structures may be trenched into the bank to allow for a lower angle and provide more wood volume in the active channel.
3. Log structure construction details may be modified in the field as approved by the project manager and engineer.

LOG-LOG OR LOG-TREE ANCHORING

Notes:
1. Notching not required on live trees to reduce impacts to tree health.

LOG-BOULDER ANCHORING

Notes:
1. Secure threaded rebar to 2-ton boulder using epoxy adhesive (Hilti HT-47 500-SD (Tube) epoxy cartridges, or approved equal). Hole depth must be sufficient to reach competent, un-fractured rock in order to obtain maximum bonding strength. A minimum of 12 inches is recommended; 1” diamond-tipped drill (tight fit).
STEEL OR WOOD POST
SET MIN 12" INTO GROUND
ATTACH EROSION FABRIC SECURELY TO UPSLOPE SIDE OF POST.

4' MAX SPACING
12" MIN
18" MIN
EROSION FABRIC SECURED TO POST W/ METAL FABRIC
DIG 6" TRENCH & BURY BOTTOM TAMP IN PLACE

1 SILT FENCING
2 STRAW WATTLE
3 CATTLE FENCING
4 SECURITY FENCING
5 DIVERSION INTAKE
6 CONTROL CENTER

NOTE: END & CORNER RUNS PER DETAIL ABOVE, STRAIGHT RUNS UP TO 40' CAN BE CONSTRUCTED WITH 10' T-POSTS

CONTROL CENTER BUILDING;
CONCRETE SLAB FLOOR AND 2X4 WOOD FRAMED WALLS, 8' HEIGHT.
INSULATED WOOD ROOF WITH 30-YEAR ASPHALT SHINGLES