

Dry Creek

The removal of a barrier to fish passage

Dry & Hopper Creeks

- Salmonid Spawning Habitat
 - High quality, cold water
- Upstream Migration
 - Chinook salmon - November
 - Steelhead - February

Storm
Frequency
(years)

Design Peak
Discharge (cfs)

2

1,775

5

2,917

10

3,497

25

5,071

50

5,590

100

6,033

Project Site





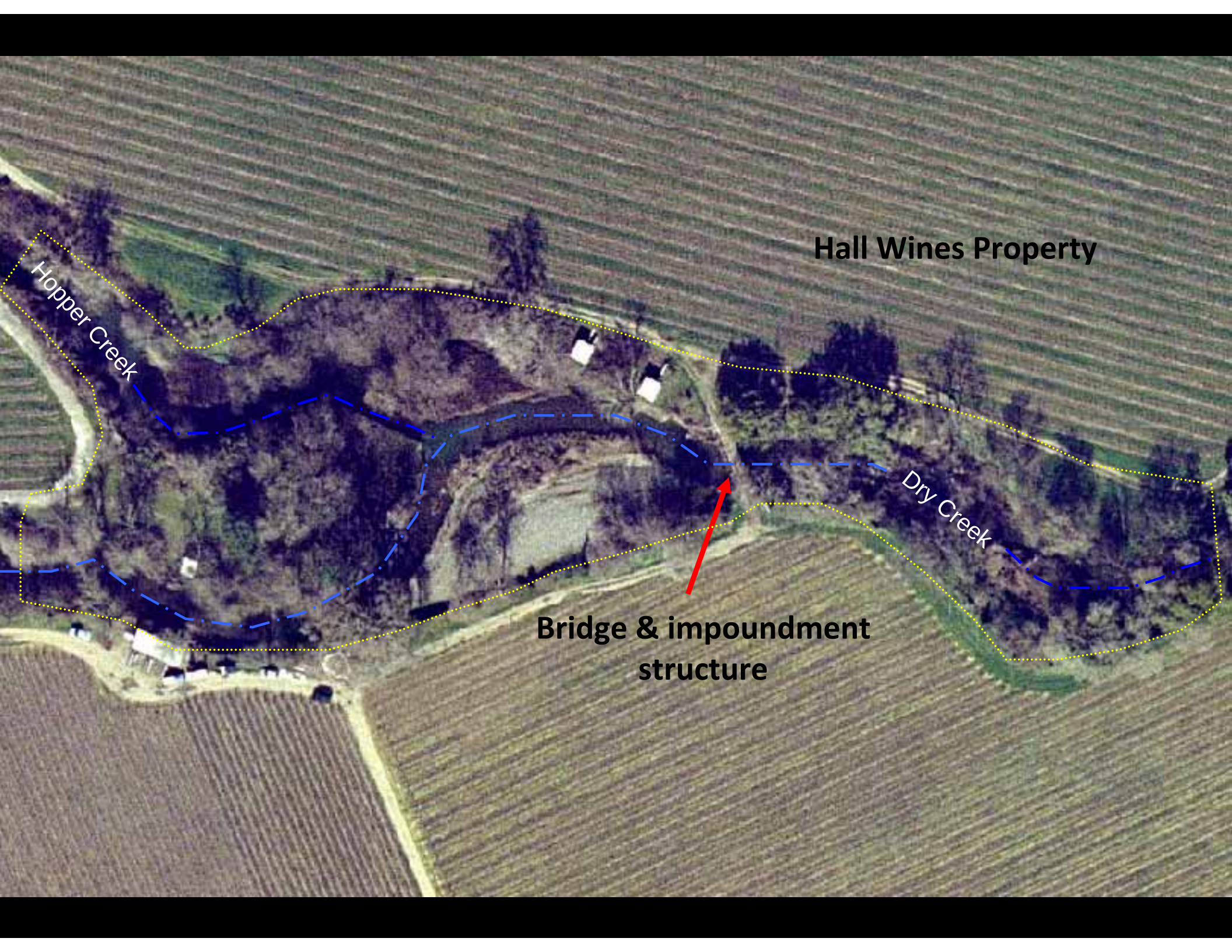
A photograph of a river flowing through a wooded area. The river is in the center, with water flowing over rocks. The banks are rocky and covered with some vegetation. Trees are visible in the background, some with green leaves and some bare. The sky is overcast.

Goals

- Improve fish passage for anadromous salmonids (steelhead and Chinook salmon)
- Stabilize eroding banks and channel thalweg
- Enhance riparian corridor

Timeline

- 2001
 - NCRCD habitat assessment & stabilization plan
- 2002-2003
 - NCRCD applied for DFG funds and NRCS Wildlife Habitat Incentives Program (WHIP) cost-share funds
 - Neighboring landowners installed alternative frost protection structures
- 2004-2006
 - NCRCD & DFG identified dam removal for fish passage as top priority
 - Philip Williams & Associates (PWA) completed a feasibility study
 - Terra Firma completed a topographic survey w/ NCRCD longitudinal profile
- 2006-2007
 - NRCS completed design w/ technical team review
 - NCRCD completed CEQA & permitting
 - Heide & Williams demolition & rock and grading construction
 - California Conservation Corps (CCC) install willow treatments



Hall Wines Property

Hopper Creek

Dry Creek

**Bridge & impoundment
structure**



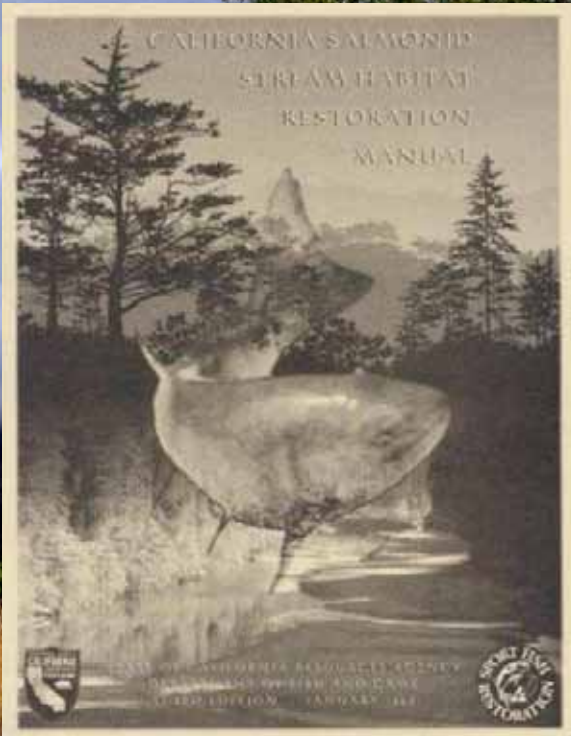
National Marine Fisheries Service
Southwest Region



GUIDELINES FOR SALMONID PASSAGE AT STREAM CROSSINGS

- Max Hydraulic Drop
 - 1 foot for adults
 - 2 foot jump pool depth
- Upstream Passage
 - 1-2 feet/second for short distances at 10% exceedance flow

Annual Exceedance (%)	Design Peak Discharge (cfs)
1	874
10	198
50	22
95	1.1



CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

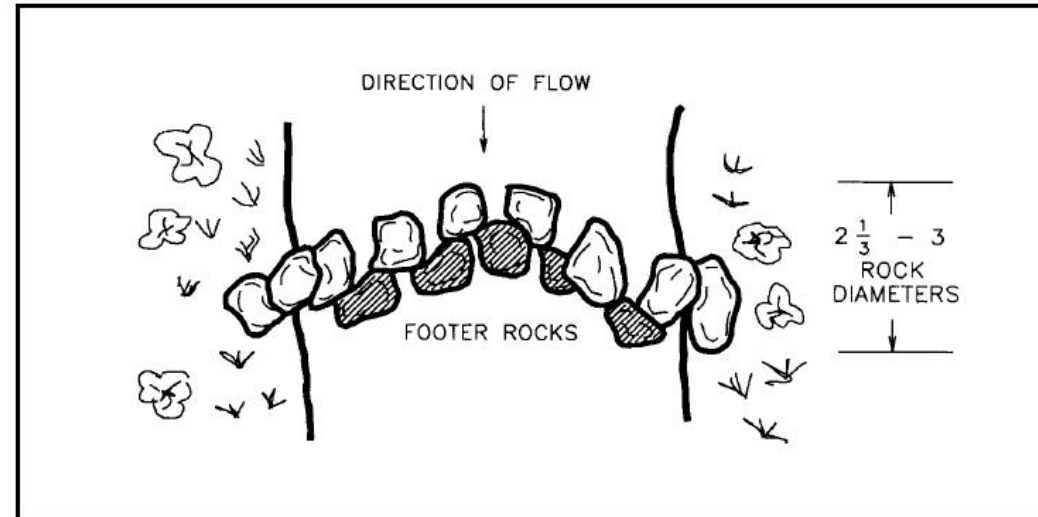
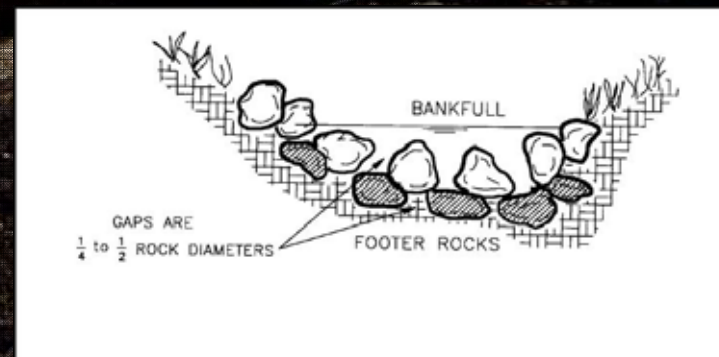


Figure VII-23. Vortex boulder weir, plan view (Rosgen, 1993).

- Benefits
 - V-shape
 - Scour pool
 - Grade control
- Modifications
 - Removed gaps between rocks



Streambank Soil Bioengineering Field Guide for Low Precipitation Areas



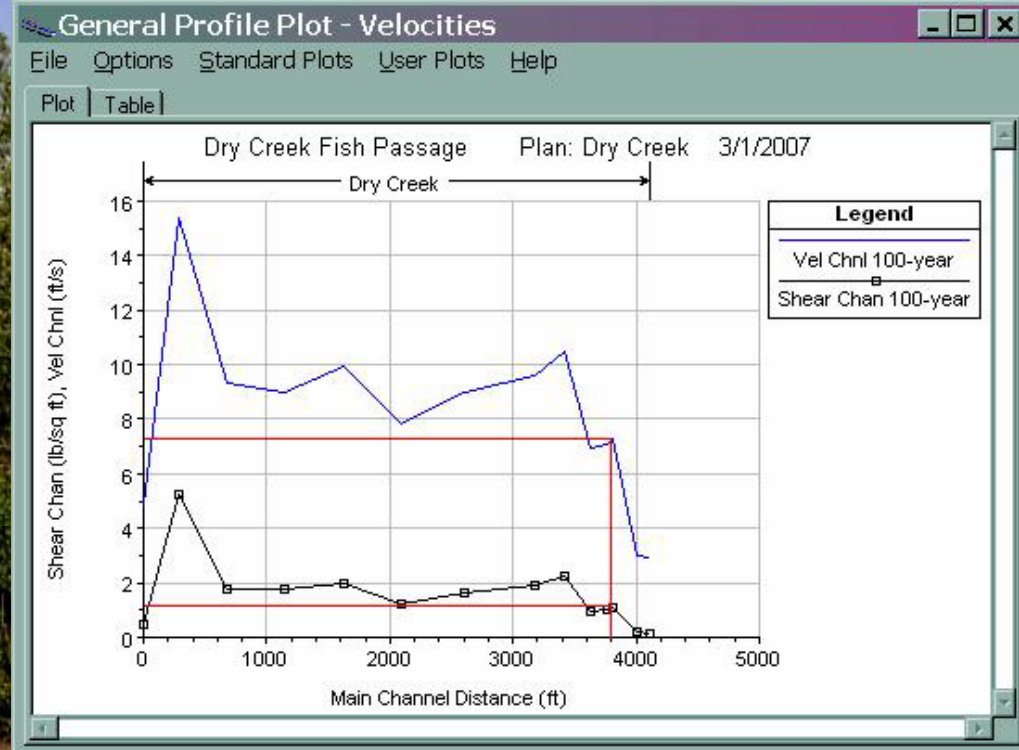
Prepared by

Chris Hoag, Wetland Plant Ecologist, USDA-NRCS, Plant Materials Center, P.O. Box 296, Aberdeen ID 83210

And

Jon Fripp, Stream Mechanics Civil Engineer, USDA-NRCS, National Design, Construction, and Soil Mechanics Center, P.O. Box 6567, Fort Worth TX, 76115

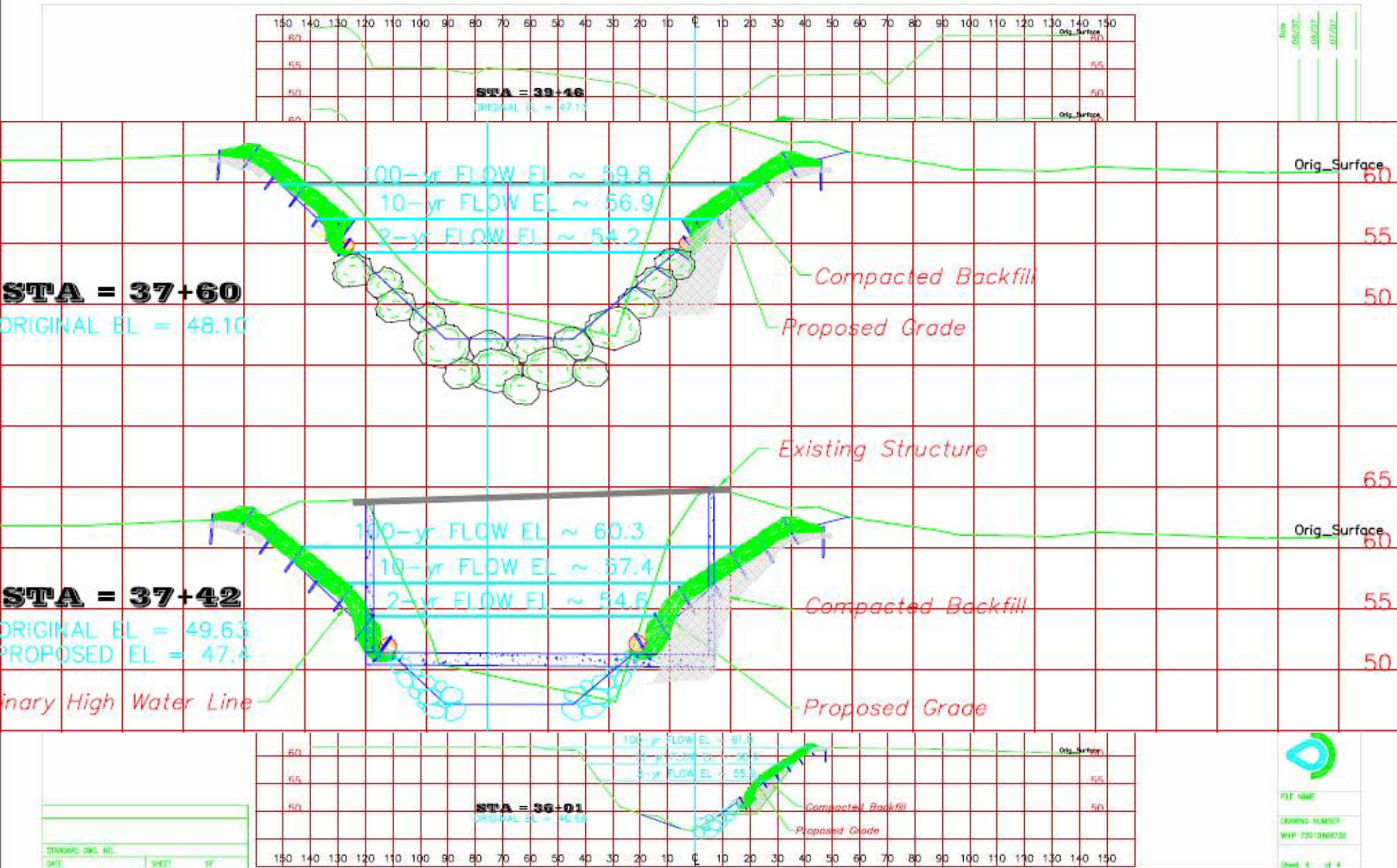
December 2002

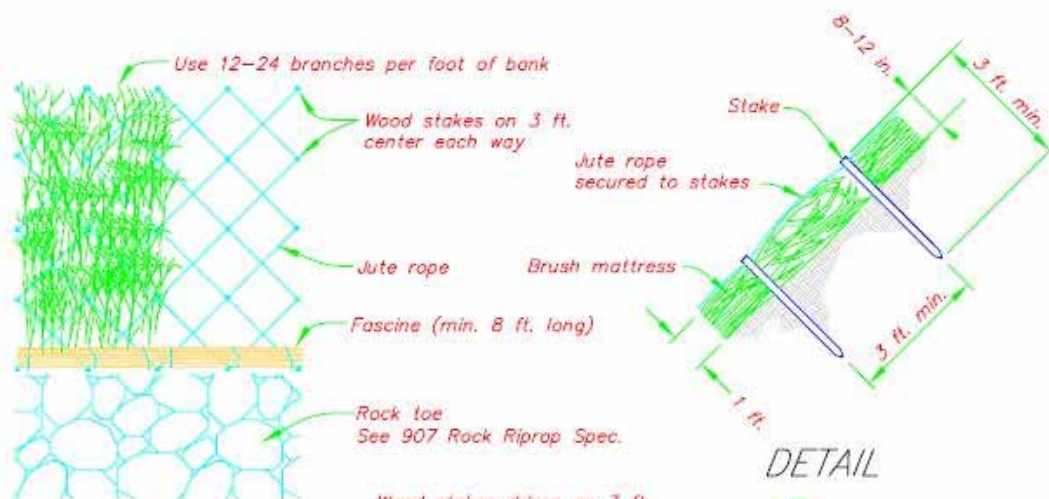


Limiting Velocity (proposed) $v = 1.49 / n S^{1/2} R_h^{2/3} = 7.5 \text{ ft/s}$

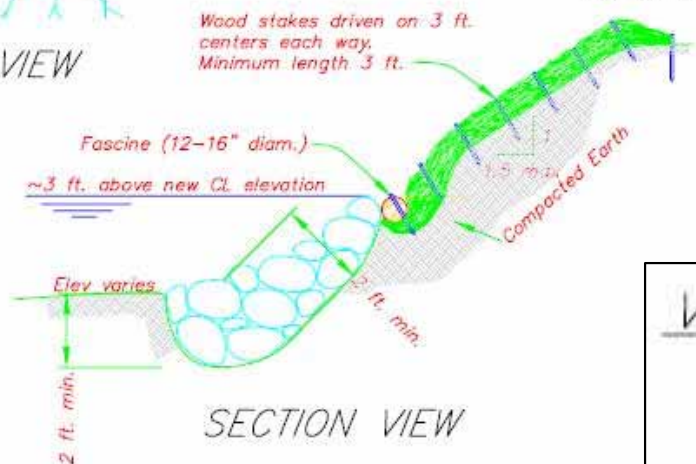
Limiting Shear Force (proposed) $\tau_o = g R_h S = 1.2 \text{ lb/ft}^2$

Streambank Soil Bioengineering Field Guide for Low Precipitation Areas, page 36	shear (lb/ft ²)	velocity (ft/s)
live fascine (immediately)	1.2	
fascine revetment	1.4	
fascines or vertical bundles	2.1	
wattle (woven, coarse sand between)	3.0	
wattle (woven, gravel between)	3.0	
wattle (woven, parallel or oblique to current)	1.0	
wattle fence (immediately)	3.0	
willow brush layer (immediately)	3.0	
willow cuttings/stakes	2.0	9.8
willow posts		8.0
willow stakes in riprap (immediately)	4.0	
willow cuttings in coarse gravel (immediately)	1.0	
brush mat (immediately)	1.0	
willow brush mat (immediately)	4.1	
willow brush mattress	6.5	
stone sill w/ live joint plantings	3.0	
deciduous tree planting (immediately)	3.0	
grass mixture on erosion resistant soils at 0-5% slope		5.0
5-10% slope		4.0
grass mixture on erodible soils at 0-5% slope		4.0
5-10% slope		3.0





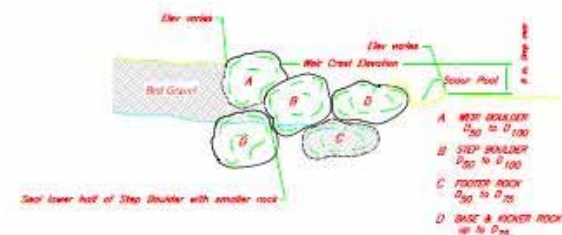
PLAN VIEW



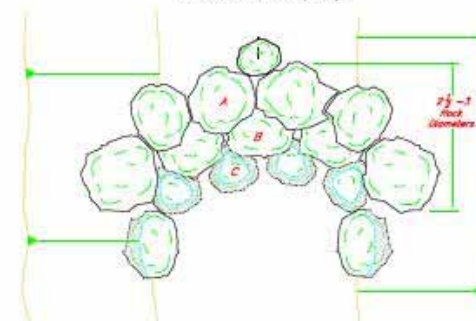
SECTION VIEW

CONSTRUCTION NOTES

1. Provide a mechanical barrier around all trees and land areas marked for protection. Exercise care in areas not so marked to avoid unnecessary damage to vegetation intended to be retained.
2. Trees to be removed will be clearly marked in the field by NRCS.
3. Prior to placing earth, roughen ground surface by scarifying to provide bond between the existing banks and earthfill. Earthfill material shall be stockpiled after being removed from excavation and borrow areas. Compaction shall be by hand or via hand directed machinery.
4. Concrete and rubble removal shall be done to retain as much natural stream material as possible. Natural streambed rocks shall be retained.



VORTEX ROCK WEIR
Profile View (nts)



VORTEX ROCK WEIR
Plan View (nts)

VORTEX ROCK (1 TON) SIZE GUIDE

$$\begin{aligned} D_{50} &= 30 \text{ to } 36 \text{ inches} \\ D_{75} &= 32 \text{ to } 38 \text{ inches} \\ D_{100} &= 36 \text{ to } 44 \text{ inches} \end{aligned}$$

CONSTRUCTION NOTES

1. Use angular, quarried boulders except where instream boulders are deemed acceptable by NRCS.
2. Weir boulders should be embedded into the substrate to a minimum depth of one third of their diameter to reduce the tendency to roll downstream.
3. The boulder keyway shall be excavated down to stable material and into the existing banks by a minimum of 2 feet or as determined by NRCS.
4. All soil backfill to be used on the banks shall be a low plasticity clay loam as approved by NRCS. It shall be placed in 6" lifts and compacted by hand-directed machinery.

STANDARD TITLE NO.	
DATE	SHEET OF

Date	05/07
Design	CM
Drawn	CM/1008
Checked	07/07
Approved	

END CLASS V	
JOE CODE 386, 410, 508	Plan Passage & Streambank Stabilization
	Bank Protection & Stream Bank Details
	Napa County RCD
	NAPA COUNTY RESOURCE CONSERVATION DISTRICT

NRCS	NRCS
FILE NAME	
DRAWING NUMBER	WVF-72310000136
Sheet 3	of 4





January 4, 2008
25-year storm

Resulting Benefits

- 16 miles of steelhead habitat
- Release of accumulated sediment
- Protection of vineyard from Pierce's Disease
- Enhanced bank stability & riparian health
- Successful partnership & landowner education
- Demonstration for future fish passage projects
 - Napa County RCD has identified several priority barrier removal projects

Costs

• Planning & Permitting	\$52,900
• Implementation	\$190,400
• Administration	\$48,100
• <u>Total</u>	<u>\$291,400</u>

Sources

• NRCS Wildlife Habitat Incentives Program	\$140,896
• DFG Fisheries Restoration Program	\$89,000
• SF Regional Water Quality Control Board	\$55,966
• Landowner	\$5,538



July 2007



December 2007

Next Steps

- Further upstream restoration work
- Continued invasive plant removal by CCC
- Native plant establishment by Acorn Soupe
- Assess opportunities for Napa River headcut
- Streamlined/coordinated riparian restoration permitting program

Future Opportunities



Ritchie Creek in Bothe State Park



Selby Creek at Silverado Trail



Napa River at Zinfandel Lane



Murphy Creek in Tulocay Creek Watershed

Partners & Funding

Napa County Resource Conservation District

Lead Agency, Project Coordination and Administration



Katherine Hall Wines and Bayview Vineyards

Private Landowners



USDA Natural Resources Conservation Service

WHIP Funds, Engineering & Design



California Department of Fish & Game

Fisheries Restoration funds, Permitting, Design Review



San Francisco Bay Water Quality Control Board

State Bonds & CWA funds for feasibility study & planning, Permits



CLSI Napa Green Fish Friendly Farming

Funds, Planning Oversight & Input

NOAA National Marine Fisheries Service

Planning Oversight & Input, Permitting



