

**C-Line Pond Removal
Restoration Project**

Unit 93-1

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MC 3/16/95
2:4 to DMS
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PROJECT ABSTRACT

This report describes the 1993 excavation of the largest known single road-stream crossing in Redwood National Park (RNP). The 32,100 yd³ crossing is located on the C-Line in Tom McDonald Creek, a major perennial tributary to Redwood Creek. Associated with, and located directly upstream of, the large crossing was an 0.8 acre man made pond. Presumably, water from the pond was used for logging operations, which may have included equipment cooling, dust abatement, and fire protection.

Several years ago, park geologists documented the appearance of sags, cracks and holes in the fill prism at this crossing. Concern by park geologists over rapid development of several five to six feet long, six to eight feet deep collapse features in the fill and water seeping from the base of the fill prism resulted in implementing this project. It was determined that removal of road fill and restoration of original stream morphology would prevent a catastrophic fill failure at this road-stream crossing. Heavy equipment was used to excavate the fill and restore original channel morphology.

Rich Barber Construction of Blue Lake, California was awarded the contract. The project was accomplished in 41 work days using the largest heavy equipment to date for watershed restoration in RNP. Heavy equipment used included a Caterpillar D9 bulldozer equipped with a pull-behind, single tooth ripper, a Caterpillar D6 bulldozer equipped with a winch, a Caterpillar 631 scraper, Caterpillar 225 and 245 excavators and a Caterpillar 988 loader. Heavy equipment costs for stream channel restoration totaled \$113,485.00. A breakdown of heavy equipment costs is presented in Table 1 of the project abstract.

Geologist Greg Bundros conducted the evaluation phase for the project, including prescribing restoration treatments and completing pre-excavation volumetric surveys. Geologist Darci Short was the Contracting Officers Representative (COR) and Geologist Peter Armato was Project Inspector (PI) and Lead Project Geologist. Armato conducted the post excavation volumetric surveys.

**TABLE 1. HEAVY EQUIPMENT WORK COST SUMMARY
WATERSHED RESTORATION PROJECT 93-1, C-LINE**

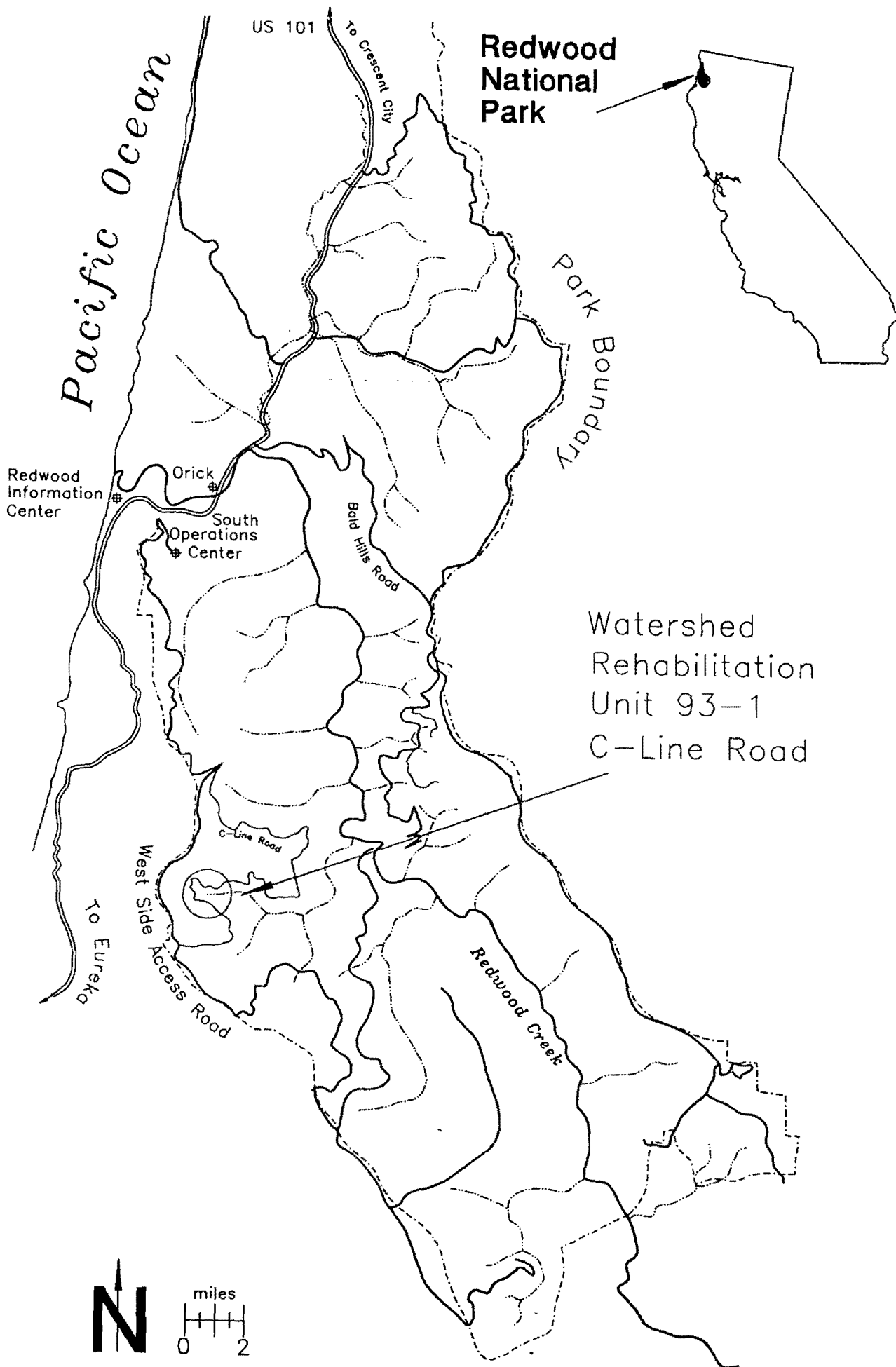
I. IFB CONTRACT 1443IB848093004

II. TOTAL HEAVY EQUIPMENT COST: \$113,485.00

TREATMENT	TOTAL COST	QUANTITY	UNIT COST	RATE
Move in/Move out	\$ 5,000.00	-----	-----	-----
Rip road ¹	\$ 600.00	1,102 feet	\$ 2,000.00/mi	220 ft/hr
Drain pond/Water quality	\$ 10,000.00	1 job	-----	-----
Road-stream crossing (RX 9+13)	\$ 96,300.00	32,100 yds ³ } # 3.31/yd ³	\$ 3.00/yd ³	55 yd ³ /hr
Modification 1 (Excavate above TOP)	\$ 410.00	41 yds ³	\$ 10.00/yd ³	-----
Modification 2 (Install cross road drain)	\$ 75.00	1 job	-----	-----
Log and rock placement	\$ 600.00	6 logs/rocks	\$ 100.00 ea	-----
Distribute straw (100 bales)	\$ 500.00	1 job	-----	-----

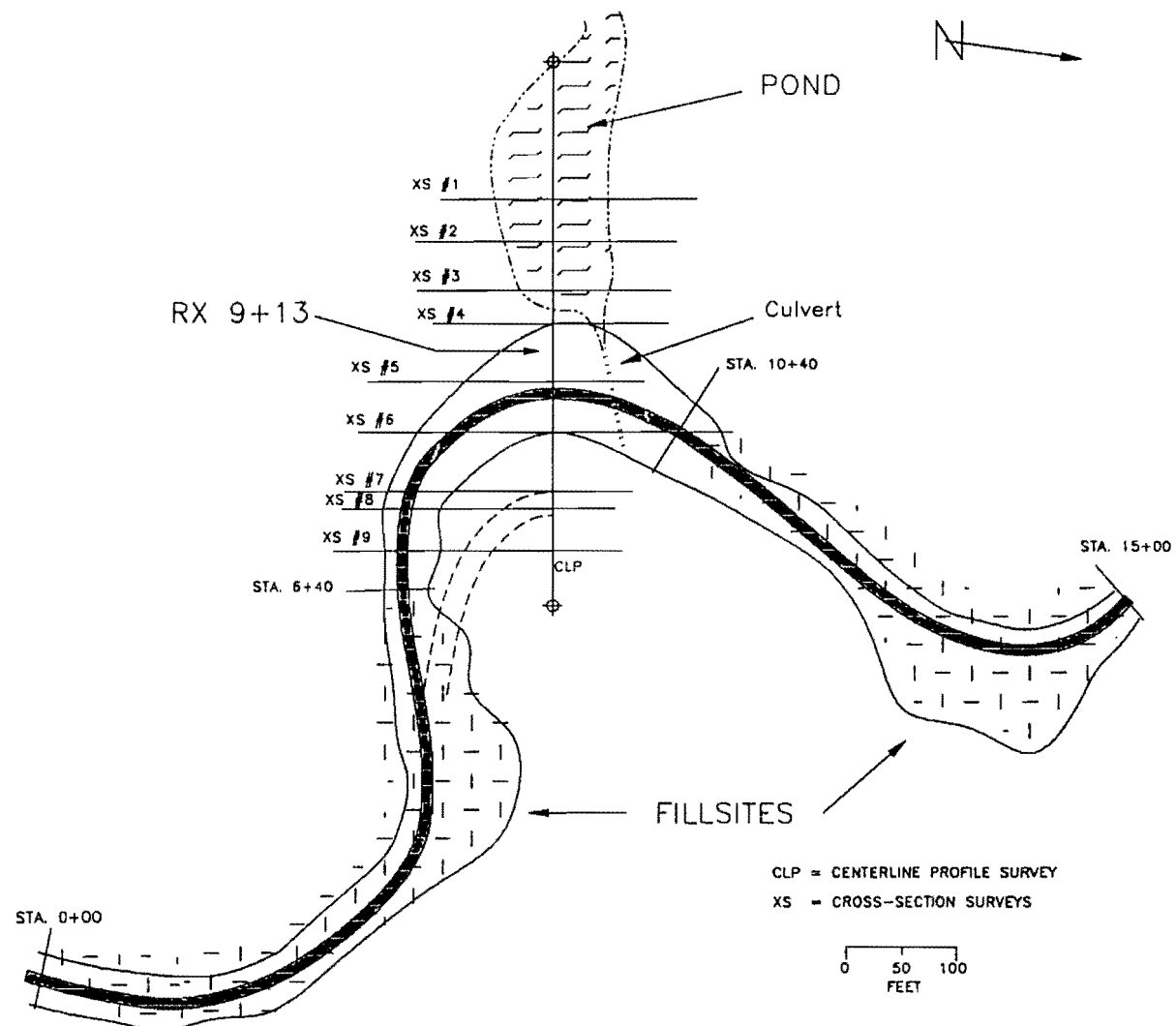
III. DISCUSSION: Although work was completed on schedule, the contractor's unfamiliarity with the goals of and approaches to stream channel restoration and hillslope recontouring resulted in his very low bid (Appendix 1). The contractor's inefficient heavy equipment approach to removing fill from the stream crossing, frequent equipment breakdowns, and weather related delays slowed completion of the project.

IV. COMMENTS: ¹ Contractor used a Caterpillar D9 bulldozer equipped with a pull-behind, single tooth ripper. Decompacting the road using the single tooth ripper was very slow. See Johnson's 89-6 (Lower Boyes Creek Roads) restoration report for comparison.

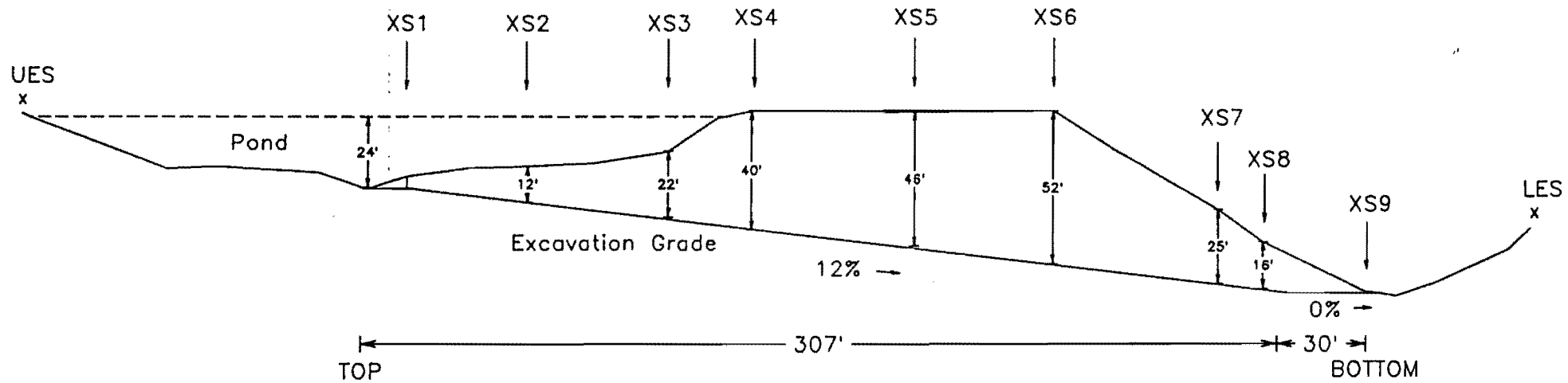


REHABILITATION UNIT 93-1

PLAN VIEW: C-LINE ROAD

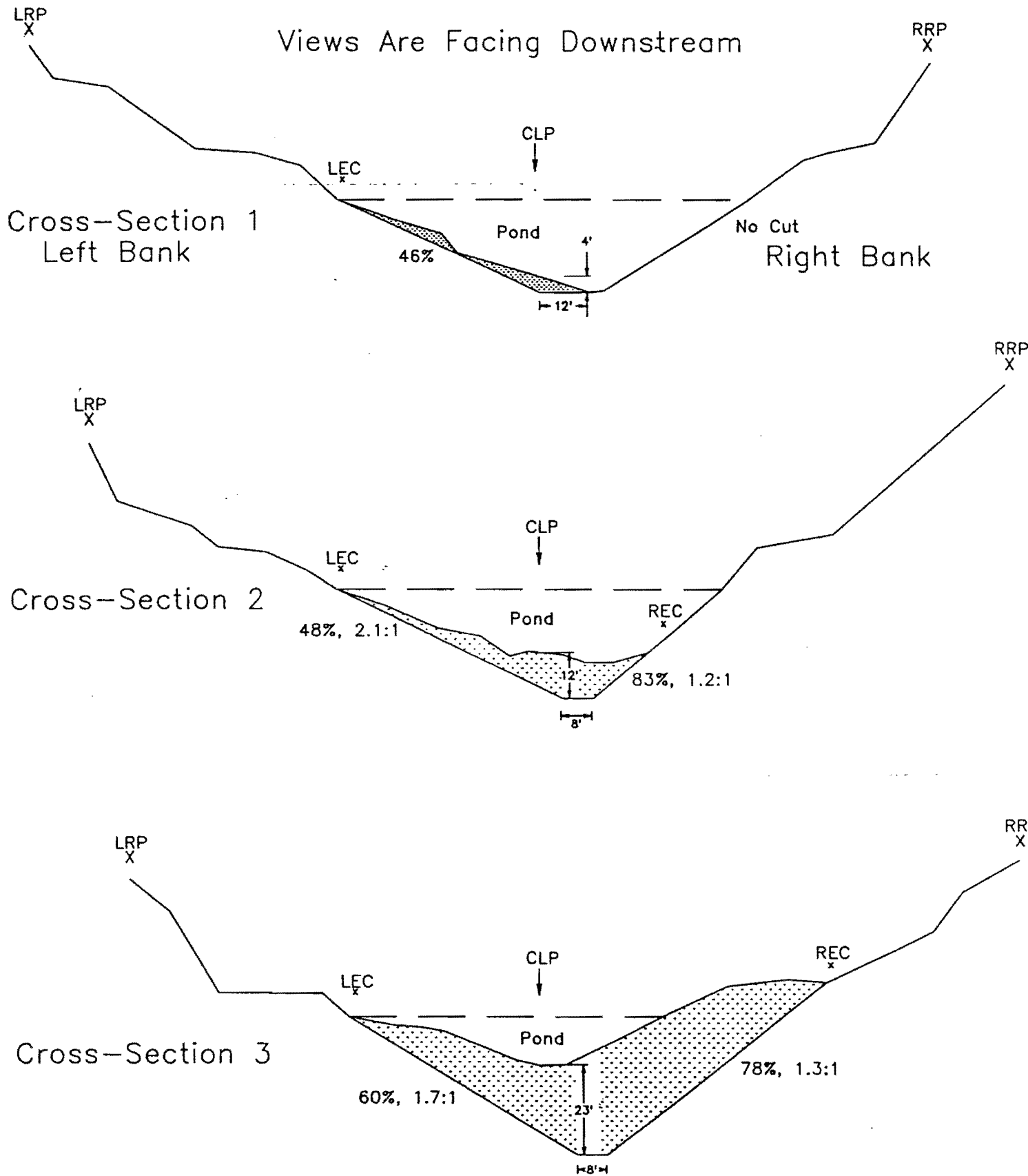


RX 9+13: Excavation Grade Along Centerline And Excavation Depth At Cross-Section Locations



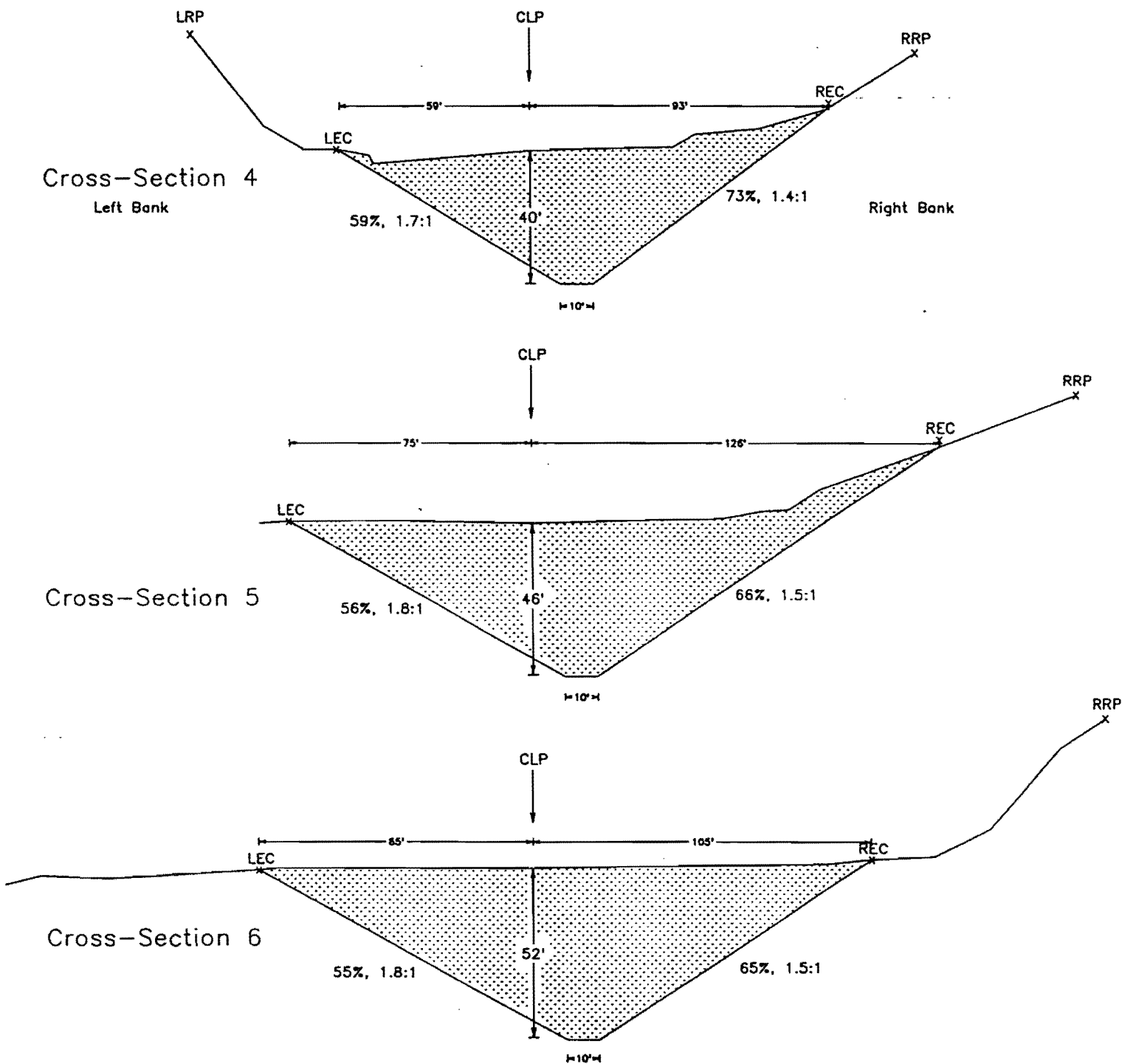
See Attached Drawings For Cross-Section Views

Excavation Depths and Grades Along Cross-Sections #1-#3



Excavation Depths and Grades Along Cross-Sections #4-#6

Views Are Facing Downstream



Excavation Depth and Grades Along Cross-Sections #7-#9

Views Are Facing Downstream

