

**CATALOG OF STREAM CROSSINGS WITH CULVERTS AND
OTHER MANMADE IMPEDIMENTS TO FISH PASSAGE
LOCATED ON ANADROMOUS STREAM REACHES WITHIN
ROSS CREEK, CORTE MADERA CREEK WATERSHED,
MARIN COUNTY, CA.**

Prepared for Friends of the Corte Madera Creek Watershed

**By
Ross Taylor and Associates**

NOTE: This catalog contains three pages for each stream crossing inventoried. The first page consists of location information, site-specific data, passage assessment, habitat notes, and treatment recommendations. The second page is a copy of the USGS map with the crossing of interest marked in “red” with adjacent sites marked in “blue”. The third page has inlet and outlet photographs, with the inlet photo on the top and the outlet photo on the bottom. The inventoried sites are ordered in an upstream direction, and from lowermost to uppermost road/stream intersection within a watershed. Finally, distances between crossings were measured from digitized USGS maps (Terrain Navigator by MapTech®) to the nearest 50-foot interval along the path of the stream channel.



**Ross Taylor and Associates
1254 Quail Run Court
McKinleyville, CA 95519
(707)-839-5022**

www.rosstaylorandassociates.com

Site ID# R-01: Ross Creek #1/Park Drive; Corte Madera Creek

Ownership: Private – Katharine Branson School

Ranking Matrix Score = 21.1 points **Ranking: #8 = High-Priority**

Location: USGS Quad: San Rafael. T1N, R6W. Lat/Long: N37° 57' 52.8" W122° 33' 57.9"
Milepost: 0.2 miles to Fern Hill Avenue.

Crossing Type: Arch culvert w/inlet and outlet aprons, Concrete. **Corrugations:** None.

Dimensions: 14.0' rise x 16.2' span **Length:** Culvert = 18.0'; Inlet apron = 21.3'; Outlet apron = 6.3'. **Slope:** inlet apron = 4.37%; inlet to outlet = -0.33%; outlet apron = 31.58%.

Modifications: None. **Rustline Height:** N/A **Average Active Channel Width:** 25.0'

Fill Estimate: Not estimated because of bridge-like construction of crossing. **Overall Condition:** Extremely poor – extensive cracks in concrete throughout crossing. **Sizing:** Properly Sized; HW/D = 1 on a storm flow with more than a 100-year recurrence interval.

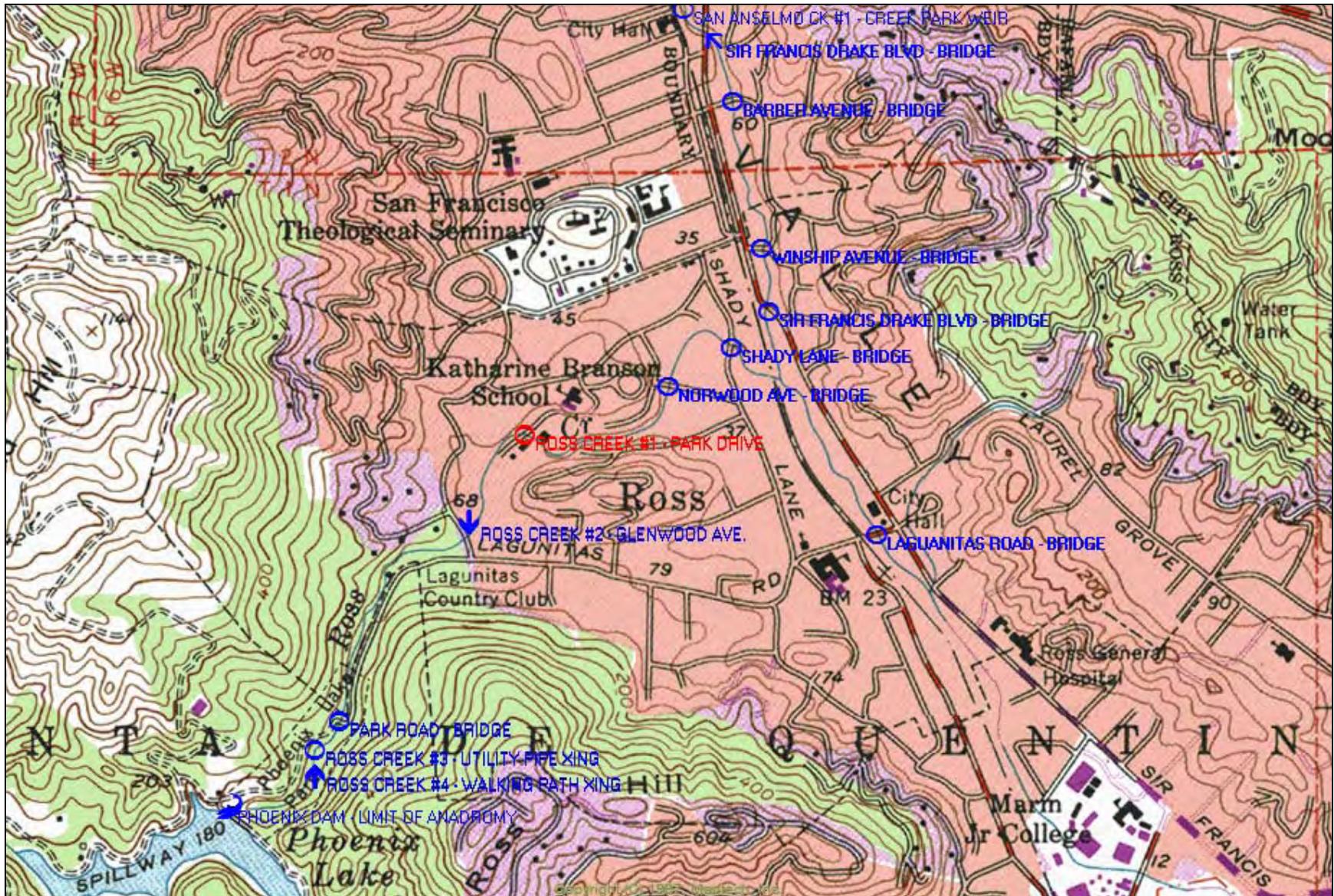
Drainage Area Upstream of Crossing: 2.81 square miles. **Estimated Migration Flows:** adults = 3.0–78.3 c.f.s., resident/2+ = 2.0–20.3 c.f.s., 1+/y-o-y = 1.0–8.8 c.f.s. **Passage Evaluation:** **RED:** as determined by the first-phase filter due to slope >3%; however FishXing was run for adult anadromous salmonids and the model suggested the crossing met the 8-16-16 ft/sec and 0.5ft minimum depth criteria for 10% of the range of estimated migration flow (71.0 – 78.0 c.f.s.). Main violation was lack-of-depth; however the steep break-in-slope over the outlet apron was not modeled in FishXing.

Additional Stream Crossings: Downstream – (≈900') to series of grade-control weirs which were surveyed in 2003, (≈1,600') to bridge at Norwood Avenue, (≈2,600') to bridge at Shady Lane, and (≈3,200') to confluence with Corte Madera Creek. Upstream – (≈1,100') to Site ID# R-02, (≈3,400') to bridge in Natalie Coffin Park, (≈3,850') to Site ID# R-03, (≈4,050') to Site ID# R-04, and (≈5,200') to base of Phoenix Dam.

Habitat: Quantity = approximately 5,200' of potential fish-bearing habitat upstream of Site ID# R-01. Phoenix Dam is the upper limit to migration since this structure fails to provide fish passage even though suitable habitat exists upstream of the dam. Quality = rated as “fair” for the ranking matrix based on Taylor and Associates survey crew’s field notes and interpretation of previous habitat assessment (Rich, 2000). At the crossing location, the creek is confined by retaining walls within the Branson School campus. The upper reach of Ross Creek is within Natalie Coffin Park and in areas designated as Marin County open space, thus will not be subjected to further residential development. The crossing was surveyed by Taylor and Associates on 7/07/05 and there was continuous flow in the channel. At 5:15 PM the air temp = 24°C and the water temp = 17°C. The survey crew noted a channel confined by retaining walls, numerous pools with minimal cover, and a moderately dense riparian zone of hardwoods. The crew noted extremely abundant numbers (>100 fish) of juvenile salmonids, roach, sticklebacks and other unknown fish species both downstream and upstream of Site ID# R-01. Most fish were observed in the outlet pool, including several non-native largemouth bass.

Preferred Treatment: Recommend having a qualified engineer assess the structural condition of the crossing. Recommend replacement with a properly sized open-bottom arch or a bridge.

Site ID# R-01: Ross Creek #1/Park Drive; Corte Madera Creek



Corte Madera Creek - Stream Crossing Catalog – Ross Creek Sites

Site ID# R-01: Ross Creek #1/Park Drive; Corte Madera Creek



Site ID# R-02: Ross Creek #2/Glenwood Avenue; Corte Madera Creek

Ownership: Town of Ross

Ranking Matrix Score = 3.9 points **Ranking: #21 = Low-Priority**

Location: USGS Quad: San Rafael. T1N, R6W. Lat/Long: N 37° 57' 57.8" W 122° 33' 41.4"
Milepost: 50' to Hilgirth Avenue.

Crossing Type: Box culvert, Concrete. **Corrugations:** None; however invert was partially embedded with sand, gravel, small cobbles. **Dimensions:** 14.0' H x 20.0' W.
Length: 19.5'. **Slope:** 0.01%. **Modifications:** None. **Rustline Height:** N/A **Average Active Channel Width:** 17.5'. However, channel upstream and downstream was constricted by retaining walls. **Fill Estimate:** Not estimated because of bridge-like construction of crossing. **Overall Condition:** Good. **Sizing:** Properly Sized; HW/D = 1 on a storm flow with more than a 100-year recurrence interval.

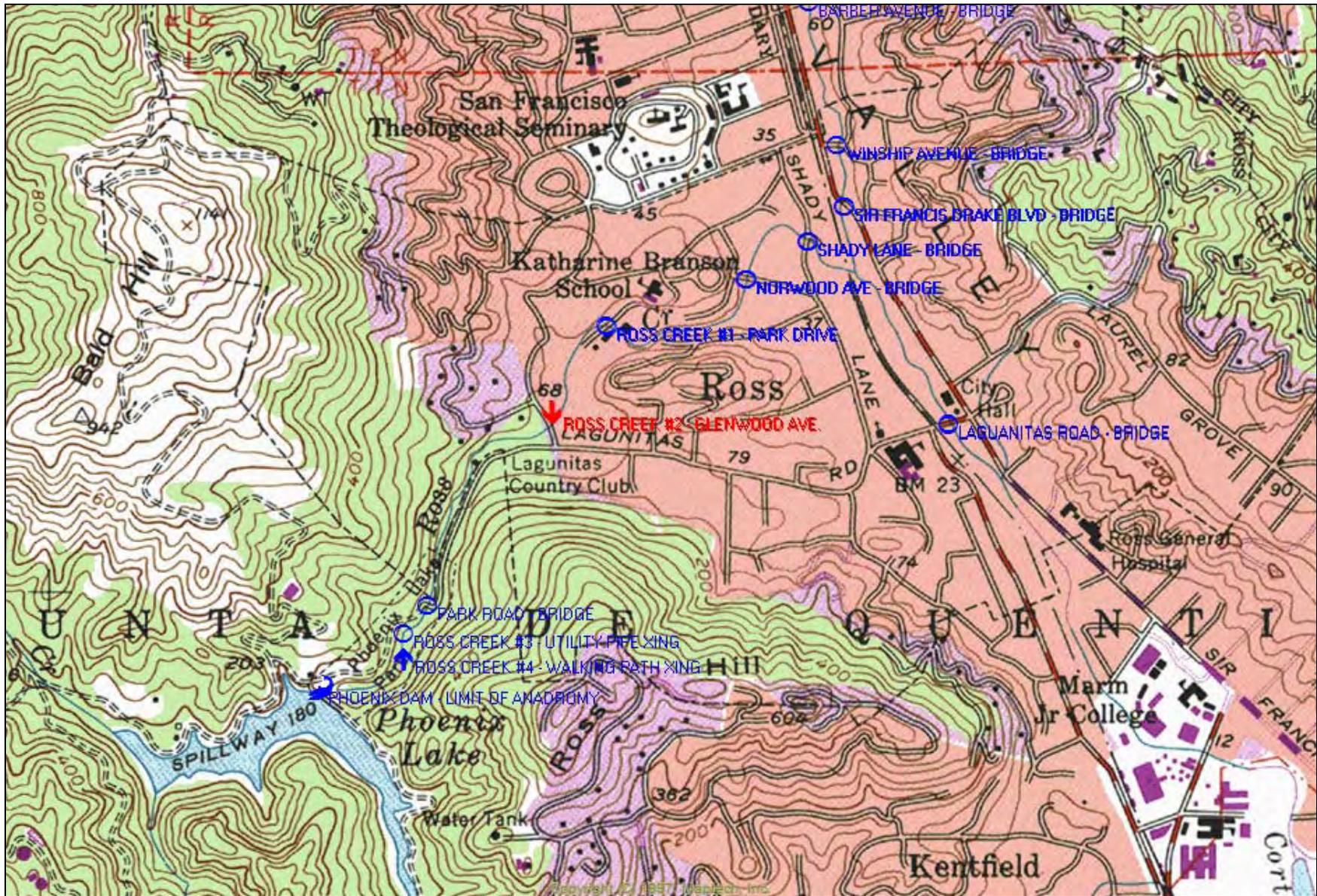
Drainage Area Upstream of Crossing: 2.78 square miles. **Estimated Migration Flows:** adults = 3.0–77.4 c.f.s.; resident/2+ = 2.0–20.0 c.f.s.; 1+/y-o-y = 1.0–8.7 c.f.s. **Passage Evaluation:** **GRAY:** as determined by the first-phase filter. FishXing was run for all age classes of salmonids and the model suggested that the crossing met passage requirements at all flows for all fish. When surveyed (summer low-flow conditions) the crossing was back-watered 0.26' at the outlet and 0.44' at the inlet.

Additional Stream Crossings: Downstream – (≈1,100') to Site ID# R-01, (≈2,000') to series of grade-control weirs surveyed in 2003, (≈2,700') to bridge at Norwood Avenue, (≈3,700') to bridge at Shady Lane, and (≈4,300') to confluence with Corte Madera Creek. Upstream – (≈2,300') to bridge in Natalie Coffin Park, (≈2,750') to Site IS #R-03, (≈2,950') to Site IS #R-04, and (≈3,800') to base of Phoenix Dam.

Habitat: Quantity = approximately 3,800' of potential fish-bearing habitat upstream of Site ID# R-02. Phoenix Dam is the upper limit to anadromous salmonid migration since this structure fails to provide fish passage even though suitable habitat exists upstream of the dam. Quality = rated as “fair” for the ranking matrix based on Taylor and Associates survey crew’s field notes and interpretation of previous habitat assessment (Rich, 2000). The upper reach of Ross Creek is within the Natalie Coffin Park and in areas designated as Marin County open space, thus will not be subjected to further residential development. The crossing was surveyed by Taylor and Associates on 6/09/05 and there was continuous flow in the channel. At 10:30 AM the air temp = 17°C and the water temp = 15°C. The survey crew noted a channel confined by retaining walls, several pools with minimal cover, and a moderately dense riparian zone of hardwoods. The crew noted a moderate abundance of (50-100 fish) of sticklebacks, roach, and juvenile salmonids both downstream and upstream of Site ID# R-02. Several of the salmonids were in the 3”- 6” size range.

Preferred Treatment: No treatment is recommended since the current crossing provides unimpeded passage, is in good condition, and is properly sized for storm flow conveyance. Recommend periodic inspection to monitor potential changes in elevation of the downstream channel and that the crossing remains back-watered.

Site ID# R-02: Ross Creek #2/Glenwood Avenue; Corte Madera Creek



Site ID# R-02: Ross Creek #2/Glenwood Avenue; Corte Madera Creek



Site ID# R-03: Ross Creek #3/Natalie Coffin Park; Corte Madera Creek

Ownership: MMWD

Ranking Matrix Score = 9.5 points **Ranking: #20 = Low-Priority**

Location: USGS Quad: San Rafael. T1N, R6W. Lat/Long: N 37° 57' 26.6" W 122° 34' 18.8"
Milepost: 0.4 miles to Glenwood Avenue.

Crossing Type: Utility pipe that perpendicularly crosses the stream channel.

Corrugations: None. **Dimensions:** Pipe is 18" in diameter **Length:** N/A since pipe is perpendicular to channel **Slope:** N/A. **Modifications:** None. **Rustline Height:** N/A

Average Active Channel Width: 22.6' **Fill Estimate:** Not estimated because of bridge-like construction of crossing. **Overall Condition:** Good. **Sizing:** Not applicable because crossing has no boundaries to limit capacity.

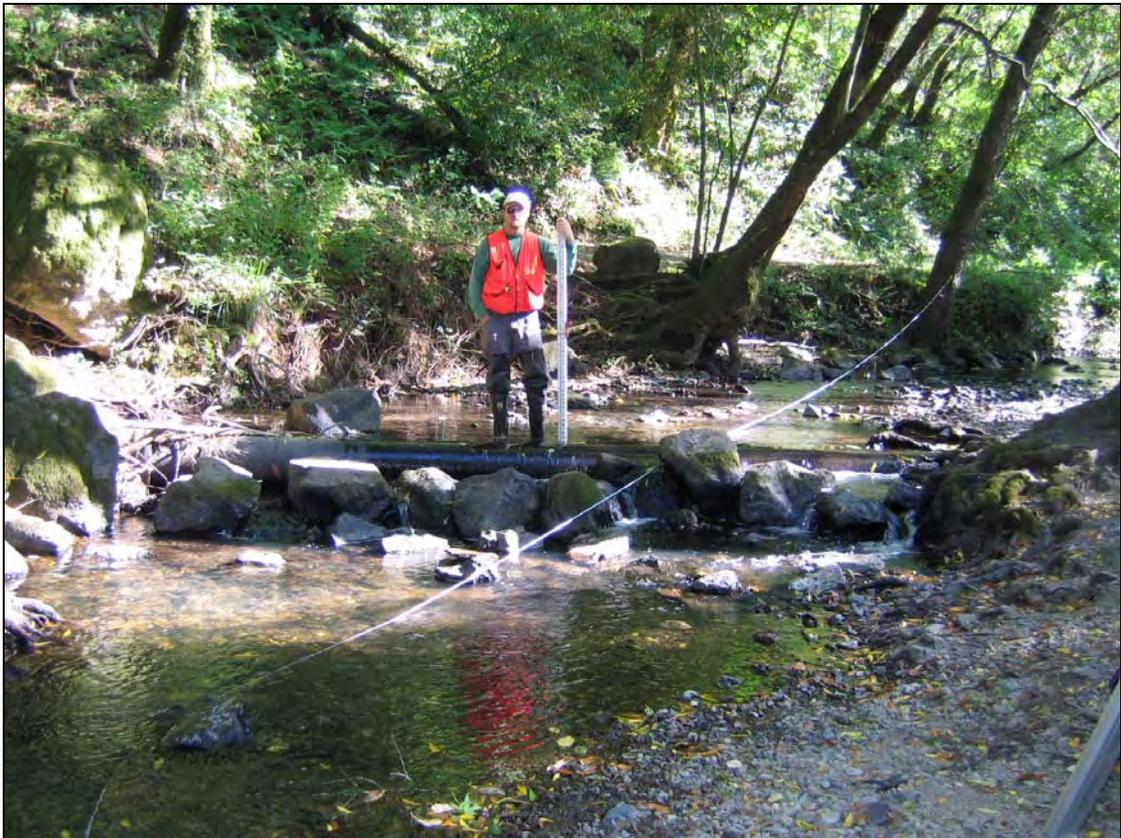
Drainage Area Upstream of Crossing: 2.69 square miles. **Estimated Migration Flows:** adults = 3.0–74.9 c.f.s.; resident/2+ = 2.0–19.4 c.f.s.; 1+/y-o-y = 1.0–8.4 c.f.s. **Passage Evaluation:** **GRAY:** as determined by the first-phase filter due to the drop over the pipe. FishXing estimated the crossing met the 8-16-16 ft/sec and 0.5ft minimum depth passage criteria for adult anadromous salmonids for the entire range of migration flows, met the resident trout/2+ passage criteria for 50% of the migration flows, and failed to meet passage criteria for 1+/y-o-y juveniles.

Additional Stream Crossings: Downstream – (≈150') to bridge in Natalie Coffin Park, (≈2,850') to Site ID# R-02, (≈4,250') to Site ID# R-01, (≈5,150') to series of grade-control weirs surveyed in 2003, (≈5,850') to bridge at Norwood Avenue, (≈6,850') to bridge at Shady Lane, and (≈7,450') to confluence with Corte Madera Creek. Upstream – (≈150') to Site ID# R-04 and (≈950') to base of Phoenix Dam.

Habitat: Quantity = approximately 950' of potential fish-bearing habitat upstream of Site ID# R-03. Phoenix Dam is the upper limit to migration since this structure fails to provide fish passage even though suitable habitat exists upstream of the dam. Quality = rated as "fair" for the ranking matrix based on Taylor and Associates survey crew's field notes and interpretation of previous habitat assessment (Rich, 2000). This upper reach of Ross Creek is within the Natalie Coffin Park and in areas designated as Marin County open space, thus will not be subjected to further residential development. The crossing was surveyed by Taylor and Associates on 6/06/05 and there was continuous flow in the channel. The survey crew noted numerous pools with minimal cover, a moderately dense riparian zone of hardwoods, and riffle with suitable spawning substrate. However, within Natalie Coffin Park there is still a substantial amount of stream channel constricted by armored banks (see rip-rap in site photos). The crew noted a moderate abundance of (50-100 fish) of sticklebacks, roach, and juvenile salmonids both downstream and upstream of Site ID# R-03. Several of the salmonids were in the 3"-6" size range. A lack of continuous surface flow may be an issue when spill over Phoenix Dam ceases during drier summers.

Preferred Treatment: No treatment recommended other than periodic inspection to assess changes in channel grade and height of drop over the utility pipe.

Site ID# R-03: Ross Creek #3/Natalie Coffin Park; Corte Madera Creek



Site ID# R-04: Ross Creek #4/Natalie Coffin Park; Corte Madera Creek

Ownership: Town of Ross **Ranking Matrix Score** = 18.9 points **Ranking: #14 = Medium-Priority**

Location: USGS Quad: San Rafael. T1N, R6W. Lat/Long: N 37° 57' 26.0" W 122° 34' 20.0"
Milepost: 0.4 miles to Glenwood Avenue.

Crossing Type: Bridge that serves as a walking path in park, with an extensive upstream apron and rock walls that form summertime wading pool area. **Corrugations:** None. **Dimensions:** 3.6'H x 24.4 W. **Length:** 72.5' for entire length of concrete invert. **Slope:** 0.2%.
Modifications: None. **Rustline Height:** N/A **Average Active Channel Width:** 22.6' **Fill Estimate:** Not estimated because of bridge-like construction of crossing. **Overall Condition:** Good. **Sizing:** Properly sized to pass more than the 100-year storm flow.

Drainage Area Upstream of Crossing: 2.67 square miles. **Estimated Migration Flows:** adults = 3.0–74.4 c.f.s.; resident/2+ = 2.0-19.3 c.f.s.; 1+/y-o-y = 1.0-8.4 c.f.s. **Passage Evaluation:** **RED:** as determined by the first-phase filter due to slope >3% through the crossing (4.09%) and over the length of the outlet apron (8.75%).

Additional Stream Crossings: Downstream – (≈150') to Site ID# R-03, (≈300') to bridge in Natalie Coffin Park, (≈3,000') to Site ID# R-02, (≈4,400') to Site ID# R-01, (≈5,300') to series of grade-control weirs surveyed in 2003, (≈6,000') to bridge at Norwood Avenue, (≈7,000') to bridge at Shady Lane, and (≈7,600') to confluence with Corte Madera Creek. Upstream – (≈800') to base of Phoenix Dam.

Habitat: Quantity = approximately 800' of potential fish-bearing habitat upstream of Site ID# R-04. Phoenix Dam is the upper limit to migration since this structure fails to provide fish passage even though suitable habitat exists upstream of the dam. Quality = rated as “fair” for the ranking matrix based on Taylor and Associates survey crew’s field notes and interpretation of previous habitat assessment (Rich, 2000). This upper reach of Ross Creek is within the Natalie Coffin Park and in areas designated as Marin County open space, thus will not be subjected to further residential development. The crossing was surveyed by Taylor and Associates on 6/06/05 and there was continuous flow in the channel. The survey crew noted numerous pools with minimal cover, a moderately dense riparian zone of hardwoods, and riffle with suitable spawning substrate. However, within Natalie Coffin Park there is still a substantial amount of stream channel constricted by armored banks (see rip-rap in site photos). The crew noted a moderate abundance of (50-100 fish) of green sunfish, largemouth bass, and juvenile salmonids both downstream and upstream of Site ID# R-04. Several of the salmonids were in the 3”-6” size range. A lack of continuous surface flow may be an issue when spill over Phoenix Dam ceases during drier summers.

Preferred Treatment: Although this crossing is a serious impediment to upstream migration, the relative lack of available upstream habitat renders this site a fairly low priority to restoration of anadromous salmonid habitat. However, if passage were restored at Phoenix Dam then this crossing would be of importance to fix. In addition to preventing steelhead from utilizing a significant reach of habitat (≈1.4 miles above upper end of reservoir), the dam cuts-off surface flow to the downstream channel during drier summer months and creates habitat (the reservoir) for non-native fishes that may predate juvenile steelhead when they spill over the dam (note fish observations at this site and R-01).

Site ID# R-04: Ross Creek #4/Natalie Coffin Park; Corte Madera Creek



Site ID# R-04: Ross Creek #4/Natalie Coffin Park; Corte Madera Creek

