

APPENDIX L: PRELIMINARY COST ESTIMATE

RECREATION, ACCESS, AND TRANSPORTATION

1.0. Trail System Cost Estimate Assumptions

The cost estimate for the future creek trail system must be based on many assumptions and generalizations about the improvements that will be required over a wide range of site conditions. These preliminary cost estimates are as detailed as possible to make them realistic, and to allow future planners and implementers of creek trail projects to understand and update the estimates.

1.1 Project Overhead Costs

Project overhead costs must be added to the individual component construction costs to prepare any project-specific cost estimate. Such overhead costs are highly variable, depending on the specific project scope and setting. The “placeholder” percentages outlined below are assumed to provide a realistic average budget for these factors on the overall creek trail system. They should be carefully re-examined in preparing an estimate for any subsequent specific plan or project.

Project construction overhead costs include contractor mobilization and demobilization, bonds and insurance, Storm Water Pollution Prevention Plan and related implementation measures, and a contingency for unanticipated conditions.

Item	Allowance: % of Construction Costs
Construction Overhead Costs	
Mobilization and Demobilization	5%
Bonds and Insurance	3%
Storm Water Pollution Prevention	3%
Contingency for Unanticipated Conditions	10%
SUBTOTAL	21%

Inflation factors should be added to all costs based on time elapsed since the estimate was prepared.

Project design and management overhead costs include design, environmental review/mitigation measures, and administration of the construction contract, including review and inspection.

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Item	Allowance: % of Construction Costs *
Project Planning, Design and Management	
Planning and Coordination	5%
Design - PS&E	10%
Environmental Review and Mitigations	5%
Construction Administration, Review and Inspection	10%
Contingency for Unanticipated Tasks	5%
SUBTOTAL	35%

* Including Construction Overhead Costs below

1.2 Trail Facility Improvements

Except for bridges, trail improvement costs are translated into per lineal foot costs to simplify estimating.

New Paved Trail (per lineal foot)

A new asphalt paved path (or concrete in case of some special project areas) 8' to 12' wide (12' is used for estimating purposes). Most of these trails would occupy the alignment of service roads along a modified creek channel.

Item	Unit	Unit Price	Quantity/ Frequency per l.f.	Cost per l.f. of Trail
New Paved Trail				
Clearing & Grubbing	SQ FT	\$ 1.00	16	\$ 16.00
Rough+Fine Grading	SQ FT	\$ 1.00	16	\$ 16.00
Construct/Re-Establish Side Ditch	LF	\$ 3.00	1	\$ 3.00
24" x 16' Culvert - 200' o.c.	EA	\$ 1,600.00	0.005	\$ 8.00
Drop Inlet - 200' o.c.	EA	\$ 1,400.00	0.005	\$ 7.00
12'-Wide Trail (2" AC over 4" AB)	SQ FT	\$ 4.00	12	\$ 48.00
2' Gravel (D.G.) Shoulder (x 2 sides)	SQ FT	\$ 1.50	4	\$ 6.00
SUBTOTAL				\$ 104.00

Cantilevered/Retained Trail (per lineal foot)

An 8' to 12' wide (12' is used for estimating purposes) paved trail supported by retaining walls or cantilevered boardwalk where channels have steep banks and no available level trail corridor exists beyond the bank.

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Item	Unit	Unit Price	Quantity/ Frequency per l.f.	Cost per l.f. of Trail
Cantilevered/Retained Trail				
Clearing & Grubbing	SQ FT	\$ 1.00	16	\$ 16.00
Rough+Fine Grading	SQ FT	\$ 1.00	16	\$ 16.00
Construct/Re-Establish Side Ditch	LF	\$ 3.00	1	\$ 3.00
Concrete Retaining Wall - avg 6' high	SQ FT	\$110.00	6	\$ 660.00
24" x 16' Culvert - 200' o.c.	EA	\$ 1,600.00	0.005	\$ 8.00
Drop Inlet - 200' o.c.	EA	\$ 1,400.00	0.005	\$ 7.00
12'-Wide Trail (2" AC over 4" AB)	SQ FT	\$ 4.00	12	\$ 48.00
2' Gravel (D.G.) Shoulder (x 2 sides)	SQ FT	\$ 1.50	4	\$ 6.00
48"-High Railing (or cyclone fence)	LF	\$ 75.00	1	\$ 75.00
SUBTOTAL				\$ 839.00

Cantilevered/Retained Urban Greenway Trail (per lineal foot)

Similar to the above cantilevered trail, but with a high level of improvement and amenities, similar to the Prince Memorial Greenway.

Item	Unit	Unit Price	Quantity/ Frequency per l.f.	Cost per l.f. of Trail
Cantilevered/Retained Urban Greenway Trail				
Clearing & Grubbing	SQ FT	\$ 1.00	16	\$ 16.00
Rough+Fine Grading	SQ FT	\$ 1.00	16	\$ 16.00
Lateral drainage provisions, connections	LF	\$ 3.00	1	\$ 3.00
Concrete Retaining Wall - avg 6' high	SQ FT	\$110.00	6	\$ 660.00
24" x 16' Culvert - 200' o.c.	EA	\$ 1,600.00	0.005	\$ 8.00
Drop Inlet - 200' o.c.	EA	\$ 1,400.00	0.005	\$ 7.00
12'-Wide Trail - decorative concrete	SQ FT	\$ 8.00	12	\$ 96.00
Site Furniture - benches, planters, trash receptacles, etc.	ALLOW	\$ 50.00	1	\$ 50.00
Pedestrian-level lighting - decorative	ALLOW	\$ 20.00	1	\$ 20.00
48"-High Decorative Railing	LF	\$ 75.00	1	\$ 75.00
SUBTOTAL				\$ 951.00

Pave Existing Gravel Service Road/Trail (per lineal foot)

An existing gravel (base rock) surfaced service road, typically 12' wide, assumed to be in good condition, would be paved with 2" of asphaltic concrete (A.C.).

Item	Unit	Unit Price	Quantity/ Frequency per l.f.	Cost per l.f. of Trail
Pave Existing Gravel Service Road/Trail				
Sweep and patch base rock surface	SQ FT	\$ 0.20	12	\$ 2.40
Pave 12'-Wide Trail (2" AC)	SQ FT	\$ 2.00	12	\$ 24.00
2' Gravel (D.G.) Shoulder (x 2 sides)	SQ FT	\$ 1.00	4	\$ 4.00
SUBTOTAL				\$ 30.40

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Dirt or "Soft" Trail (per lineal foot)

Improved pedestrian (and potentially mountain bike and/or equestrian) paths with compacted earth, decomposed granite or other "soft" surface. Width would vary from 4' to 8', with an assumed average of 6'. Typically constructed in more rural areas with natural creek channels and in protected open space areas adjacent to the creek. Requirement for culverts is assumed to be reduced due to out-sloping of trail to avoid

Item	Unit	Unit Price	Quantity/ Frequency/ per l.f.	Cost per l.f. of Trail
Dirt or Soft Trail				
Clearing & Grubbing	SQ FT	\$ 1.00	6	\$ 6.00
Rough+Fine Grading	SQ FT	\$ 1.00	6	\$ 6.00
Construct/Re-Establish Ditch	LF	\$ 3.00	1	\$ 3.00
24" x 16' Culvert - 400' o.c.	EA	\$ 1,600.00	0.0025	\$ 4.00
Gravel (D.G.) Surface (optional)	SQ FT	\$ 1.00	6	\$ 6.00
SUBTOTAL				\$ 25.00

collecting runoff, and due to minimal paved surface on the trail and in the vicinity.

Trail Bridge (per bridge)

Typically prefabricated steel 6'to 8' wide on a drilled concrete pier foundation accommodating all types of trail users, as well as small patrol and maintenance vehicles. Actual length, width and type could vary significantly, but most bridges crossing the main modified creek channels will be approximately 100' long, which is used for estimating purposes.

Item	Unit	Unit Price	Quantity	Cost per Bridge
Trail Bridge				
Earthwork	SQ FT	\$ 1.00	5000	\$ 5,000.00
Concrete pier foundation/headwalls	EA	\$ 70,000.00	1	\$ 70,000.00
Pre-Fab Steel Bridge 8' x 100'	EA	\$ 100,000.00	1	\$ 100,000.00
Set Bridge in Place	EA	\$ 18,000.00	1	\$ 18,000.00
SUBTOTAL				\$ 175,000.00

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1.3 Trail Street Crossing Improvements

Roadway Crossing Cost Estimates

Note: Cost estimates are based on planning level costs. An estimate range is provided for each crossing type. The range may vary based on the number of necessary driveways, concrete median construction, and high visibility crosswalk treatment type.

Crossing Type I: Local Roadway (2 Lane, Less than 5,000 ADT, Slow Speeds)

Item	Quantity	Unit	Unit Cost	Total
Pavement Marker (Reflective)	0	EA	\$4.25	\$0
Pavement Marker (Non-Reflective)	0	EA	\$3.00	\$0
Street Sign (Ped Signs, Creek Name Signs, Trail Signs)	8	EA	\$200.00	\$1,600
12" White Thremoplastic Traffic Stripe (Xwalk)	48	LF	\$4.00	\$192
12" Yellow Thremoplastic Traffic Stripe (School Xwalk)	0	LF	\$4.00	\$0
6" White Painted Traffic Stripe (Parking)	0	LF	\$2.50	\$0
4" White Painted Traffic Stripe (Parking)	0	LF	\$2.00	\$0
White Painted Paving Marking (Trail Xing Legend)	40	SF	\$4.00	\$160
12" White Thremoplastic Stop Bar (Trail)	8	LF	\$4.00	\$32
Concrete - Driveway Apron with Tactile Inlay	700	SF	\$7.00	\$4,900
Painted Symbols and/or Plaques at Entries	2	EA	\$300.00	\$600
Subtotal				\$7,484
Design			30%	\$2,245
Contingency			15%	\$1,123
Grand Total Type I Crossing				\$10,852

Total Cost Estimate \$3,000 - \$11,000 depending on driveway construction.

Crossing Type II: Collector/Transitional Roadway (2 Lane, Less than 7,500 ADT, Slow Speeds)

Item	Quantity	Unit	Unit Cost	Total
Pavement Marker (Reflective)	20	EA	\$4.25	\$85
Pavement Marker (Non-Reflective)	60	EA	\$3.00	\$180
Street Sign (Ped Signs, Creek Name Signs, Trail Signs)	8	EA	\$200.00	\$1,600
12" White Thremoplastic Traffic Stripe (Xwalk)	64	LF	\$4.00	\$256
12" Yellow Thremoplastic Traffic Stripe (School Xwalk)	0	LF	\$4.00	\$0
6" White Painted Traffic Stripe (Parking)	0	LF	\$2.50	\$0
4" White Painted Traffic Stripe (Parking)	0	LF	\$2.00	\$0
White Painted Paving Marking (Trail Xing)	0	SF	\$4.00	\$0
12" White Thremoplastic Stop Bar (Trail)	40	LF	\$4.00	\$160
Concrete - Driveway Apron with Tactile Inlay	700	SF	\$7.00	\$4,900
Painted Symbols and/or Plaques at Entries	2	EA	\$300.00	\$600
Subtotal				\$7,781
Design			30%	\$2,334
Contingency			15%	\$1,167
Grand Total Type II Crossing				\$11,282

Total Cost Estimate \$3,500 - \$11,000 depending on driveway construction.

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New Mid-Reach Entry (each)

Create 4' opening in existing chain link or barbed wire fence (or remove gate where specified), install 24" x 6' culvert in typical ditch along service road. Trail surface same as trail it connects to. Connection assumed to be 25' long where no connecting trail is otherwise planned.

Item	Unit	Unit Price	Quantity	Cost per Entry
New Mid-Block/Reach Entry				
Earthwork	SQ FT	\$ 1.00	300	\$ 300.00
4' opening in fence (2 posts)	EA	\$ 100.00	1	\$ 100.00
24" x 6' Culvert	EA	\$ 600.00	1	\$ 600.00
SUBTOTAL				\$ 1,000.00
(Add 25' of adjacent trail type)	LF	TBD	25	TBD

Creek Corridor Landscaping (per lineal foot)

Some creek reaches will be restored to a more natural conditions, which is estimated in the Resource Management Component. Other reaches are in rural areas and will need no special landscape treatment. But reaches in urban areas and adjacent to development may require formal or informal landscaping. Three alternative levels are estimated.

Item	Unit	Unit Price	Quantity/ Frequency per l.f.	Cost per l.f. of Trail
Creek Corridor Landscape Alternatives				
Non-irrigated native plant hydroseeding/shrub planting	SF	\$ 0.10	15	\$ 1.50
Formal landscaping, trees and shrubs with automatic irrigation	SF	\$ 2.00	15	\$ 30.00
Urban greenway landscaping with berms, turf, dense planting, large trees, automatic irrigation	SF	\$ 4.00	15	\$ 60.00

1.6 Trail Signage

Comprehensive Sign Design Program (one time cost)

For the citywide creek trail system to coordinates and reference all related sign design standards and objectives.

Trail Identity and Wayfinding

- Signs or pylons to identify the trail entries and route.
- Painted symbols or marking on the pavement and/or plaques embedded in the pavement.
- Signs or signposts with trail names and mileage at intersections.
- Name of each creek be stenciled or signed on each under-crossing or bridge.

Information/Direction

- Mapboard signs at major entry points – kiosk or signboard with an enlarged graphically-designed map and notice board.
- Standard rules and regulations signs and special regulation signs for problem areas.

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Interpretive

- Signs and/or plaques or more elaborate installations to interpret nature, hydrologic processes, history, etc.

Traffic Control and Warning

These signs are shown on the typical crossing details and included in the estimate for street crossing improvements

Item	Unit	Unit Price	Quantity/ Frequency per l.f.	Cost
Trail Signage				
System-Wide Sign Costs				
Comprehensive sign design program (1x cost)	ALLOW	\$ 20,000.00	1	\$ 20,000.00
Interpretive signs	EA	\$ 1,000.00	20	\$ 20,000.00
Mapboard signs/kiosks at major entry points	EA	\$ 2,000.00	10	\$ 20,000.00
Per Entry Sign Costs				
Signs or pylons to identify entries & route	EA	\$ 500.00	# entries	\$ TBD
Painted symbols and/or plaques at entries	EA	\$ 250.00	# entries	\$ TBD
Signs or signposts at intersections	EA	\$ 200.00	# entries	\$ TBD
Other Sign Costs				
Creek name on undercrossings & bridges	EA	\$ 100.00	# UCs and bridges	\$ TBD
Standard rules & regulations; special regulations, assume 1 per 1000 l.f.	EA	\$ 100.00	0.001	\$ 0.10
SUBTOTAL				\$ TBD

per l.f.

1.7 Support and Recreational Facilities

Restrooms (no cost estimated)

Existing public restrooms in parks or other public facilities or building close to the trail would also serve trail users. No new restrooms are proposed directly in conjunction with the trails.

Parking (no cost estimated)

Existing and potential public parking areas are identified on existing public sites near the trail. It is assumed these would be used or developed in conjunction with other park or public projects.

New Parks and Open Space (no cost estimated)

“Planned” parks that are approved City projects are typically already acquired, but not yet improved. “Potential/Concept” park or open space sites are identified, but these are assumed to be separate potential projects to the creek trail system.

On-Street Connections (no cost estimated)

Bike lane paving and striping, bike route signs, sidewalks for pedestrians, ADA curb ramps, trail route signs and other improvements for on-street connections are not estimated because determining the existing conditions and specific required

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improvements along the streets is beyond the scope of the Citywide Creeks Master Plan. These improvements are recommendations to be considered in the planning and implementation of bike and pedestrian routes in conjunction with the City's overall street transportation system.

2.0. Cost Estimate

Table L-1, Preliminary Cost Estimate, has been prepared to present a preliminary estimate of probable construction cost for the creek trail system, based on the quantities of individual items in Table E-1, Trail System Components, in Appendix E, and the per-unit and overhead cost assumptions in Section 1.0 above. This estimate is very generalized based on the schematic level of detail in the Citywide Creeks Master Plan.

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NATURAL RESOURCES

3.0. Natural Resources Project Cost Estimate Assumptions

The cost estimate for natural resources also must be based on many assumptions and generalizations about the improvements that will be required over a wide range of site conditions. It is very important, however, that precise estimates using the most recent information be prepared prior to implementation of any project proposed by the Master Plan.

3.1. Project Overhead Costs

The cost estimates for the natural resources projects include some overhead costs, including planning, design, and project management. Not included, however, are construction overhead costs. Similar to the creek trail system projects, 21% will be used to account for these costs.

3.2. Natural Resources Improvements

Natural resources projects proposed in the Master Plan include preservation, enhancement, and restoration of habitat and removal of barriers to fish migration.

Preservation. Preservation means that no physical changes are proposed, and the reach would be protected through an adequate creek setback or ultimately a conservation easement. Regular stream maintenance and management tasks would be conducted as needed in a preservation reach. Preservation costs are not estimated as part of the Master Plan.

Enhancement. Enhancement would include removal of invasive species and replanting with natives, including understory sedges, grasses, and shrubs, as well as tree species to form a stream canopy. Enhancement could also include minor bank repair or erosion control using 'soft' methods, including willow plantings. Enhancement costs are not estimated as part of the Master Plan.

Restoration. Restoration requires changing the physical basis of the channel in some way to return it to a past condition, ideally an ecologically healthier and self-sustaining state. This may involve removal of concrete and riprap, channel recontouring to restore meanders and create a low flow channel, installation of instream habitat structures such as rock or log weirs or anchored rootwads, 'soft' armoring of banks with willows and other plants, and other plantings of native species.

Previous estimates of the cost of restoration have been completed by City staff, in association with the Brush Creek Restoration, Pierson Reach Restoration, and Colgan Creek Restoration projects. Restoration cost per linear foot was estimated at \$800, \$2000, and \$1000 per linear foot, respectively. For the purposes of the Master Plan, an estimate of \$1500 per linear foot will be used for habitat restoration.

Migration Barriers. The solution to fish migration barriers will vary according to site conditions and the species of concern. Fish passage issues due to lack of depth or

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excessive jump height can often be addressed through placement of instream structures such as boulders or large woody debris to create pools, or creating weir or baffles to direct stream flow. Sometimes, however, it is necessary to completely replace a culvert with a larger size culvert or even a span bridge to correct the problem. Installation of a fish ladder structure is another option. The cost of instream structures could be as low as \$25,000. Culvert replacement could range from \$100,000 to \$300,000 per location, depending on site conditions. Cost estimates for culvert replacement and instream structures were based on *A Primer for Habitat Project Costs* (Shared Strategy for Puget Sound 2003) and adjusted for local prices and labor rates.

Table L-2 includes cost estimates for both restoration and fish migration barrier projects. Three restoration projects are not included in the cost estimate. On Santa Rosa Creek, the Pierson Reach Restoration and the restoration of Santa Creek between E Street and Santa Rosa Avenue are not included. On Matanzas Creek, the daylighting and/or fish ladder installation at the confluence with Santa Rosa Creek is not included.

4.0. Combined Cost Estimate

Table L-3 includes combined cost estimates for Natural Resources and Recreation, Access, and Transportation Projects.

Table L-1: Preliminary Cost Estimate for Public Access Improvements

Creek	Reach	Estimated Construction Cost	Construction Overhead 21%	Planning, Design & Mgmt 35%	Total
Santa Rosa Creek Watershed					
Santa Rosa Creek	1	\$30,697.10	\$6,446.39	\$10,743.99	\$47,887.48
Santa Rosa Creek	2	\$1,022,276.80	\$214,678.13	\$357,796.88	\$1,594,754.81
Santa Rosa Creek	3	\$944,490.70	\$198,343.05	\$330,571.75	\$1,473,407.49
Santa Rosa Creek	4	\$240,904.90	\$50,590.03	\$84,316.72	\$375,811.64
Santa Rosa Creek	5	\$366,829.10	\$77,034.11	\$128,390.19	\$572,254.40
Santa Rosa Creek	6	\$503,092.10	\$105,649.34	\$176,082.24	\$784,825.68
Santa Rosa Creek	7	\$609,045.70	\$127,899.60	\$213,166.00	\$950,113.29
Santa Rosa Creek	8	\$462,306.80	\$97,084.43	\$161,807.38	\$721,199.61
College Creek	1	\$205,751.80	\$43,207.88	\$72,013.13	\$320,973.81
Skyhawk Creek	1	\$251,346.10	\$52,782.68	\$87,971.14	\$392,100.92
Oakmont Creek	1	\$13,272.50	\$2,787.23	\$4,645.38	\$20,705.10
Totals		\$4,650,013.60	\$976,502.86	\$1,627,504.76	\$7,254,034.22
Brush Creek Watershed					
Brush Creek	1	\$207.40	\$43.55	\$72.59	\$323.54
Brush Creek	2	\$19,727.70	\$4,142.82	\$6,904.70	\$30,775.21
Brush Creek	3	\$2,158.20	\$453.22	\$755.37	\$3,366.79
Rincon Creek	1	\$141,851.00	\$29,788.71	\$49,647.85	\$221,287.56
Ducker Creek	1	\$877.70	\$184.32	\$307.20	\$1,369.21
Ducker Creek	2	\$51,231.60	\$10,758.64	\$17,931.06	\$79,921.30
Austin Creek	1	\$69,983.10	\$14,696.45	\$24,494.09	\$109,173.64
Austin Creek	2	\$972,054.40	\$204,131.42	\$340,219.04	\$1,516,407.86
Austin Creek	3	\$5,600.70	\$1,176.15	\$1,960.25	\$8,737.09
Totals		\$1,263,691.80	\$265,375.28	\$442,292.13	\$1,971,362.21
Matanzas Creek Watershed					
Matanzas Creek	1	\$303,976.00	\$63,834.96	\$106,391.60	\$474,202.56
Matanzas Creek	2	\$975.20	\$204.79	\$341.32	\$1,521.31
Matanzas Creek	3	\$4,050.20	\$850.54	\$1,417.57	\$6,318.31
Matanzas Creek	4	\$23,411.50	\$4,916.42	\$8,194.03	\$36,521.94
Spring Creek	1	\$1,233.70	\$259.08	\$431.80	\$1,924.57
Spring Creek	2	\$639,322.40	\$134,257.70	\$223,762.84	\$997,343.94
Spring Creek	3	\$161,122.80	\$33,835.79	\$56,392.98	\$251,351.57
Arroyo Sierra Creek	1	\$815,168.90	\$171,185.47	\$285,309.12	\$1,271,665.48
Lornadell Creek	1	\$3,075.30	\$645.81	\$1,076.36	\$4,797.47
Totals		\$1,952,336.00	\$409,990.56	\$683,317.60	\$3,045,647.16
Piner Creek Watershed					
Piner Creek	1	\$3,000.00	\$630.00	\$1,050.00	\$4,680.00
Piner Creek	2	\$112,922.90	\$23,713.81	\$39,523.02	\$176,159.72
Piner Creek	3	\$965,611.80	\$202,778.48	\$337,964.13	\$1,506,356.41
Peterson Creek	1	\$256,762.70	\$53,920.17	\$89,866.95	\$400,549.81
Forestview Creek	1	\$190,721.60	\$40,051.54	\$66,752.56	\$297,525.70
Coffey Creek	1	\$141,487.10	\$29,712.29	\$49,520.49	\$220,719.88
Russell Creek	1	\$12,404.40	\$2,604.92	\$4,341.54	\$19,350.86
Russell Creek	2	\$6,487.90	\$1,362.46	\$2,270.77	\$10,121.12
Indian Creek	1	\$0.00	\$0.00	\$0.00	\$0.00
Steele Creek	1	\$396,250.20	\$83,212.54	\$138,687.57	\$618,152.31
Totals		\$2,085,648.60	\$437,986.21	\$729,977.01	\$3,253,615.82

Table L-1: Preliminary Cost Estimate for Public Access Improvements

Creek	Reach	Estimated Construction Cost	Construction Overhead 21%	Planning, Design & Mgmt 35%	Total
Paulin Creek Watershed					
Paulin Creek	1	\$3,661.00	\$768.81	\$1,281.35	\$5,711.16
Paulin Creek	2	\$47,562.60	\$9,988.15	\$16,646.91	\$74,197.66
Paulin Creek	3	\$55,844.10	\$11,727.26	\$19,545.44	\$87,116.80
Paulin Creek	4	\$175,550.20	\$36,865.54	\$61,442.57	\$273,859.31
Paulin Creek	5	\$122,041.10	\$25,628.63	\$42,714.39	\$190,384.12
Paulin Creek	6	\$175,828.40	\$36,923.96	\$61,539.94	\$274,293.30
Pomo Creek	1	\$243.10	\$51.05	\$85.09	\$379.24
Poppy Creek	1	\$69,820.60	\$14,662.33	\$24,437.21	\$108,920.14
Poppy Creek	2	\$71,658.40	\$15,048.26	\$25,080.44	\$111,787.10
Totals		\$722,209.50	\$151,664.00	\$252,773.33	\$1,126,648.82
So. Santa Rosa Creeks Watershed					
Roseland Creek	1	\$17,948.90	\$3,769.27	\$6,282.12	\$28,000.28
Roseland Creek	2	\$148,838.20	\$31,256.02	\$52,093.37	\$232,187.59
Roseland Creek	3	\$663,718.30	\$139,380.84	\$232,301.41	\$1,035,401.55
Roseland Creek	4	\$666,438.70	\$139,952.13	\$233,253.55	\$1,039,646.37
Colgan Creek	1	\$411,416.50	\$86,397.47	\$143,995.78	\$641,809.74
Colgan Creek	2	\$423,511.00	\$88,937.31	\$148,228.85	\$660,678.16
Colgan Creek	3	\$271,507.90	\$57,016.66	\$95,027.77	\$423,553.32
Colgan Creek	4	\$334,313.80	\$70,205.90	\$117,009.83	\$521,530.53
Irwin Creek	1	\$318,193.20	\$66,820.57	\$111,367.62	\$496,382.39
Naval Creek	1	\$0.00	\$0.00	\$0.00	\$0.00
Gravenstein Creek	1	\$0.00	\$0.00	\$0.00	\$0.00
Countryside Creek	1	\$175,100.00	\$36,771.00	\$61,285.00	\$273,157.00
Old Colgan Creek	1	\$2.60	\$0.55	\$0.91	\$4.06
Totals		\$3,430,989.10	\$720,507.71	\$1,200,846.19	\$5,352,351.00
Todd Creek Watershed					
Todd Creek	1	\$926,274.80	\$194,517.71	\$324,196.18	\$1,444,990.69
Moorland Creek	1	\$38,830.00	\$8,154.30	\$13,590.50	\$60,574.80
Hunter Creek	1	\$100.00	\$21.00	\$35.00	\$156.00
Totals		\$965,204.80	\$202,693.01	\$337,821.68	\$1,505,721.49
System-wide Sign Costs		\$60,000.00	\$12,600.00	\$21,000.00	\$93,600.00
Preliminary Cost Estimate		\$15,130,093.40	\$3,177,319.61	\$5,295,532.69	\$23,602,980.70

Table L-2. Preliminary Cost Estimate for Natural Resources Projects											
Creek	Reach	Project Description	Habitat Restoration		Address fish migration barriers			total	Overhead cost		
			linear feet	cost (\$1500 per lf)	Replace Culvert	cost (per culvert)	Instream Structure		cost (per project)	21%	total
Santa Rosa Creek Watershed											
College	1	Fish passage at confluence					1	\$ 25,000.00	\$ 25,000.00	\$ 5,250.00	\$ 30,250.00
Brush Creek Watershed											
Brush	1	Fish passage at Badger					1	\$ 10,000.00	\$ 10,000.00	\$ 2,100.00	\$ 12,100.00
Brush	2	Restoration from Montecito to Austin Creek; Fish passage at Montecito, confluence with Austin Creek	8000	\$ 12,000,000.00			2	\$ 25,000.00	\$ 12,050,000.00	\$ 2,530,500.00	\$ 14,580,500.00
Rincon	1	Fish passage at Wallace, Deer Trail, Amber, Rielbli			4	\$ 100,000.00			\$ 400,000.00	\$ 84,000.00	\$ 484,000.00
Austin	1	Fish passage at St. Francis, San Ramon			2	\$ 150,000.00			\$ 300,000.00	\$ 63,000.00	\$ 363,000.00
Austin	2	Restoration from Middle Rincon to Tesoro Lane, Fish passage at Acacia, Jack London, Boas, Mission Boulevard	1000	\$ 1,500,000.00	2	\$ 150,000.00	2	\$ 25,000.00	\$ 1,850,000.00	\$ 388,500.00	\$ 2,238,500.00
Ducker	2	Restoration through Rincon Valley Park	900	\$ 1,350,000.00					\$ 1,350,000.00	\$ 283,500.00	\$ 1,633,500.00
Matanzas Creek Watershed											
Matanzas	1	Fish passage through golf course			3	\$ 200,000.00			\$ 600,000.00	\$ 126,000.00	\$ 726,000.00
Matanzas	3	Fish passage at Monterey Court			1	\$ 200,000.00			\$ 200,000.00	\$ 42,000.00	\$ 242,000.00
Spring	1	Fish passage at Stonehedge, Summerfield Road			2	\$ 300,000.00			\$ 600,000.00	\$ 126,000.00	\$ 726,000.00
Spring	2	Restoration from Summerfield to near Mayette	400	\$ 600,000.00					\$ 600,000.00	\$ 126,000.00	\$ 726,000.00
Spring	3	Restoration at Montgomery High School	1400	\$ 2,100,000.00					\$ 2,100,000.00	\$ 441,000.00	\$ 2,541,000.00
Lornadell	1	Restoration at Mesquite Park and Yulupa School	1500	\$ 2,250,000.00					\$ 2,250,000.00	\$ 472,500.00	\$ 2,722,500.00
Arroyo Sierra	1	Fish passage at Spring Creek diversion, Mayette, Hoen, Siskiyou			3	\$ 200,000.00	1	\$ 150,000.00	\$ 750,000.00	\$ 157,500.00	\$ 907,500.00
Piner Creek Watershed											
Piner	2	Fish passage at Hopper, Coffey, SMART			2	\$ 200,000.00	1	\$ 25,000.00	\$ 425,000.00	\$ 89,250.00	\$ 514,250.00
Piner	3	Restoration from Marlow Road and Santa Rosa Creek	8000	\$ 12,000,000.00					\$ 12,000,000.00	\$ 2,520,000.00	\$ 14,520,000.00
Steele Creek		Fish passage at Gamay, Marlow, Ridley, Lance, Dutton, and Piner Creek			5	\$ 200,000.00	1	\$ 25,000.00	\$ 1,025,000.00	\$ 215,250.00	\$ 1,240,250.00
Peterson		Restoration from Guerneville to Santa Rosa Creek, Fish passage at Santa Rosa Creek and Fulton	2300	\$ 3,450,000.00	1	\$ 200,000.00	1	\$ 25,000.00	\$ 3,675,000.00	\$ 771,750.00	\$ 4,446,750.00
Russell		Fish passage at concrete check dam downstream of Range					1	\$ 75,000.00	\$ 75,000.00	\$ 15,750.00	\$ 90,750.00
Paulin Creek Watershed											
Paulin	3	Fish passage at Chanate, Mendocino, Piner Reservoir					3	\$ 25,000.00	\$ 75,000.00	\$ 15,750.00	\$ 90,750.00
Paulin	4	Restoration along County Center, Fish passage at Highway 101	2000	\$ 3,000,000.00			1	\$ 100,000.00	\$ 3,100,000.00	\$ 651,000.00	\$ 3,751,000.00
Paulin	5	Restoration from West Steele to Piner Creek, Fish passage at Cleveland, Coffey, Steele	3000	\$ 4,500,000.00	3	\$ 200,000.00			\$ 5,100,000.00	\$ 1,071,000.00	\$ 6,171,000.00
Poppy	1	Restoration at Franklin Park	500	\$ 750,000.00					\$ 750,000.00	\$ 157,500.00	\$ 907,500.00
Southern Santa Rosa Creeks Watershed											
Roseland	1	Fish passage at Dutton Avenue					1	\$ 25,000.00	\$ 25,000.00	\$ 5,250.00	\$ 30,250.00
Roseland	3	Restoration between Burbank and Stony Point	5000	\$ 7,500,000.00					\$ 7,500,000.00	\$ 1,575,000.00	\$ 9,075,000.00
Roseland	4	Restoration from Fresno and Ludwig	400	\$ 600,000.00					\$ 600,000.00	\$ 126,000.00	\$ 726,000.00
Colgan	2	Restoration from Petaluma Hill and Colgan	2500	\$ 3,750,000.00					\$ 3,750,000.00	\$ 787,500.00	\$ 4,537,500.00
Colgan	3	Fish passage at SMART					1	\$ 25,000.00	\$ 25,000.00	\$ 5,250.00	\$ 30,250.00
Colgan	4	Restoration from Victoria to Bellevue	7000	\$ 10,500,000.00					\$ 10,500,000.00	\$ 2,205,000.00	\$ 12,705,000.00
Todd Creek Watershed											
Todd		Restoration from Robles to Scenic	8500	\$ 12,750,000.00					\$ 12,750,000.00	\$ 2,677,500.00	\$ 15,427,500.00
Hunter		Restoration from Hunter Lane to Todd Creek	900	\$ 1,350,000.00					\$ 1,350,000.00	\$ 283,500.00	\$ 1,633,500.00
									\$ -	\$ -	\$ -
		Totals	53300	\$ 79,950,000.00	28			\$ 560,000.00	\$ 85,810,000.00	\$ 18,020,100.00	\$ 103,830,100.00

Table L-3: Preliminary Cost Estimate for All Creek Master Plan Improvements

Creek	Reach	Estimated Access Project Costs	Estimated Natural Resources Project Costs	Construction Overhead 21%*	Planning, Design & Mgmt 35%**	Total
Santa Rosa Creek Watershed						
Santa Rosa Creek	1	\$30,697.10		\$6,446.39	\$10,743.99	\$47,887.48
Santa Rosa Creek	2	\$1,022,276.80		\$214,678.13	\$357,796.88	\$1,594,754.81
Santa Rosa Creek	3	\$944,490.70		\$198,343.05	\$330,571.75	\$1,473,407.49
Santa Rosa Creek	4	\$240,904.90		\$50,590.03	\$84,316.72	\$375,811.64
Santa Rosa Creek	5	\$366,829.10		\$77,034.11	\$128,390.19	\$572,254.40
Santa Rosa Creek	6	\$503,092.10		\$105,649.34	\$176,082.24	\$784,825.68
Santa Rosa Creek	7	\$609,045.70		\$127,899.60	\$213,166.00	\$950,113.29
Santa Rosa Creek	8	\$462,306.80		\$97,084.43	\$161,807.38	\$721,199.61
College Creek	1	\$205,751.80	\$25,000.00	\$48,457.88	\$72,013.13	\$351,223.81
Skyhawk Creek	1	\$251,346.10		\$52,782.68	\$87,971.14	\$392,100.92
Oakmont Creek	1	\$13,272.50		\$2,787.23	\$4,645.38	\$20,705.10
Totals		\$4,650,013.60	\$25,000.00	\$981,752.86	\$1,627,504.76	\$7,284,284.22
Brush Creek Watershed						
Brush Creek	1	\$207.40	\$10,000.00	\$2,143.55	\$72.59	\$12,423.54
Brush Creek	2	\$19,727.70	\$12,050,000.00	\$2,534,642.82	\$6,904.70	\$14,611,275.21
Brush Creek	3	\$2,158.20		\$453.22	\$755.37	\$3,366.79
Rincon Creek	1	\$141,851.00	\$400,000.00	\$113,788.71	\$49,647.85	\$705,287.56
Ducker Creek	1	\$877.70	\$1,350,000.00	\$283,684.32	\$307.20	\$1,634,869.21
Ducker Creek	2	\$51,231.60		\$10,758.64	\$17,931.06	\$79,921.30
Austin Creek	1	\$69,983.10	\$300,000.00	\$77,696.45	\$24,494.09	\$472,173.64
Austin Creek	2	\$972,054.40	\$1,850,000.00	\$592,631.42	\$340,219.04	\$3,754,907.86
Austin Creek	3	\$5,600.70		\$1,176.15	\$1,960.25	\$8,737.09
Totals		\$1,263,691.80	\$15,960,000.00	\$3,616,975.28	\$442,292.13	\$21,282,962.21
Matanzas Creek Watershed						
Matanzas Creek	1	\$303,976.00	\$600,000.00	\$189,834.96	\$106,391.60	\$1,200,202.56
Matanzas Creek	2	\$975.20		\$204.79	\$341.32	\$1,521.31
Matanzas Creek	3	\$4,050.20	\$200,000.00	\$42,850.54	\$1,417.57	\$248,318.31
Matanzas Creek	4	\$23,411.50		\$4,916.42	\$8,194.03	\$36,521.94
Spring Creek	1	\$1,233.70	\$600,000.00	\$126,259.08	\$431.80	\$727,924.57
Spring Creek	2	\$639,322.40	\$600,000.00	\$260,257.70	\$223,762.84	\$1,723,343.94
Spring Creek	3	\$161,122.80	\$2,100,000.00	\$474,835.79	\$56,392.98	\$2,792,351.57
Arroyo Sierra Creek	1	\$815,168.90	\$750,000.00	\$328,685.47	\$285,309.12	\$2,179,165.48
Lornadell Creek	1	\$3,075.30	\$2,250,000.00	\$473,145.81	\$1,076.36	\$2,727,297.47
Totals		\$1,952,336.00	\$7,100,000.00	\$1,900,990.56	\$683,317.60	\$11,636,647.16
Piner Creek Watershed						
Piner Creek	1	\$3,000.00		\$630.00	\$1,050.00	\$4,680.00
Piner Creek	2	\$112,922.90	\$425,000.00	\$112,963.81	\$39,523.02	\$690,409.72
Piner Creek	3	\$965,611.80	\$12,000,000.00	\$2,722,778.48	\$337,964.13	\$16,026,356.41
Peterson Creek	1	\$256,762.70	\$3,675,000.00	\$825,670.17	\$89,866.95	\$4,847,299.81
Forestview Creek	1	\$190,721.60		\$40,051.54	\$66,752.56	\$297,525.70
Coffey Creek	1	\$141,487.10		\$29,712.29	\$49,520.49	\$220,719.88
Russell Creek	1	\$12,404.40	\$75,000.00	\$18,354.92	\$4,341.54	\$110,100.86
Russell Creek	2	\$6,487.90		\$1,362.46	\$2,270.77	\$10,121.12
Indian Creek	1	\$0.00		\$0.00	\$0.00	\$0.00
Steele Creek	1	\$396,250.20		\$83,212.54	\$138,687.57	\$618,152.31
Totals		\$2,085,648.60	\$16,175,000.00	\$3,834,736.21	\$729,977.01	\$22,825,365.82

*21% Construction overhead on Access and Natural Resources projects
 **35% Planning, Design Management costs for Access projects only

Table L-3: Preliminary Cost Estimate for All Creek Master Plan Improvements

Creek	Reach	Estimated Access Project Costs	Estimated Natural Resources Project Costs	Construction Overhead 21%*	Planning, Design & Mgmt 35%**	Total
Paulin Creek Watershed						
Paulin Creek	1	\$3,661.00		\$768.81	\$1,281.35	\$5,711.16
Paulin Creek	2	\$47,562.60		\$9,988.15	\$16,646.91	\$74,197.66
Paulin Creek	3	\$55,844.10	\$75,000.00	\$27,477.26	\$19,545.44	\$177,866.80
Paulin Creek	4	\$175,550.20	\$3,100,000.00	\$687,865.54	\$61,442.57	\$4,024,859.31
Paulin Creek	5	\$122,041.10	\$5,100,000.00	\$1,096,628.63	\$42,714.39	\$6,361,384.12
Paulin Creek	6	\$175,828.40		\$36,923.96	\$61,539.94	\$274,293.30
Pomo Creek	1	\$243.10		\$51.05	\$85.09	\$379.24
Poppy Creek	1	\$69,820.60	\$750,000.00	\$172,162.33	\$24,437.21	\$1,016,420.14
Poppy Creek	2	\$71,658.40		\$15,048.26	\$25,080.44	\$111,787.10
Totals		\$722,209.50	\$9,025,000.00	\$2,046,914.00	\$252,773.33	\$12,046,898.82
So. Santa Rosa Creeks Watershed						
Roseland Creek	1	\$17,948.90	\$25,000.00	\$9,019.27	\$6,282.12	\$58,250.28
Roseland Creek	2	\$148,838.20		\$31,256.02	\$52,093.37	\$232,187.59
Roseland Creek	3	\$663,718.30	\$7,500,000.00	\$1,714,380.84	\$232,301.41	\$10,110,401.55
Roseland Creek	4	\$666,438.70	\$600,000.00	\$265,952.13	\$233,253.55	\$1,765,646.37
Colgan Creek	1	\$411,416.50		\$86,397.47	\$143,995.78	\$641,809.74
Colgan Creek	2	\$423,511.00	\$3,750,000.00	\$876,437.31	\$148,228.85	\$5,198,178.16
Colgan Creek	3	\$271,507.90	\$25,000.00	\$62,266.66	\$95,027.77	\$453,803.32
Colgan Creek	4	\$334,313.80	\$10,500,000.00	\$2,275,205.90	\$117,009.83	\$13,226,530.53
Irwin Creek	1	\$318,193.20		\$66,820.57	\$111,367.62	\$496,382.39
Naval Creek	1	\$0.00		\$0.00	\$0.00	\$0.00
Gravenstein Creek	1	\$0.00		\$0.00	\$0.00	\$0.00
Countryside Creek	1	\$175,100.00		\$36,771.00	\$61,285.00	\$273,157.00
Old Colgan Creek	1	\$2.60		\$0.55	\$0.91	\$4.06
Totals		\$3,430,989.10	\$22,400,000.00	\$5,424,507.71	\$1,200,846.19	\$32,456,351.00
Todd Creek Watershed						
Todd Creek	1	\$926,274.80	\$12,750,000.00	\$2,872,017.71	\$324,196.18	\$16,872,490.69
Moorland Creek	1	\$38,830.00		\$8,154.30	\$13,590.50	\$60,574.80
Hunter Creek	1	\$100.00	\$1,350,000.00	\$283,521.00	\$35.00	\$1,633,656.00
Totals		\$965,204.80	\$14,100,000.00	\$3,163,693.01	\$337,821.68	\$18,566,721.49
System-wide Sign Costs		\$60,000.00		\$12,600.00	\$21,000.00	\$93,600.00
Preliminary Cost Estimate		\$15,130,093.40	\$84,785,000.00	\$20,982,169.61	\$5,295,532.69	\$126,192,830.70

*21% Construction overhead on Access and Natural Resources projects
 **35% Planning, Design Management costs for Access projects only