

**APPENDIX G:  
Potential Strategy Implementation  
Schedule and Budget**

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## 1.0 INTRODUCTION

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The Study has identified a potential suite of strategies that if implemented are expected to result in achieving the targets for instream flow metrics and water quality as defined in the Permit. The Study has also identified several instream, riparian, and wetland habitat improvement strategies. The main body of the Study contains a schedule and cost estimates for potential near-term strategies. This appendix identifies the schedule and provides cost estimates for mid- and long-term strategies.

The schedule and budget below is organized by near-term, mid-term, and long-term actions within each of the partner jurisdictions. The identified suite of projects and programs in the Study, if fully implemented, are expansive and expensive. A 100-year horizon was selected in consideration of the financial and political feasibilities of the identified potential strategies. Yet, as the time horizon expands, so does uncertainty. New and improved technologies and techniques, shifting economic and political scenes, and changing individual behaviors and values are expected over a 100-year period. The long-term nature of the watershed management stresses the importance of adaptive management to better track, handle, and incorporate new information.

The first phase of the Study (first 10 years) initiates the non-structural programs expected to be maintained throughout the 100-year Study and, in many cases, beyond. The near-term phase also includes the many structural elements: stormwater control projects in the identified high priority catchments and habitat restoration projects throughout the watershed. Development and implementation of a monitoring program, a fecal bacteria source control study, an agricultural BMP assessment, and a flow-transfer feasibility study are also recommended for the near-term.

The mid-term phase (year 11 to 20) includes implementation of many of the structural strategies identified, as well as continuation of the non-structural strategies initiated in the near-term. The long-term phase (year 21 to 100) includes maintenance and enhancement of non-structural strategies and continued structural strategy construction as funding allows. Monitoring, evaluation, and strategy adaption are integrated throughout all phases of implementation.

The budgets detailed in this appendix represent costs associated with projects and programs in addition to those already in place. This is useful for defining the level of additional funding that would be needed if projects and programs were fully implemented to meet watershed goals.

The metric targets are expected to be achieved following the full implementation of the strategies identified in the Study (Table 1). Model output indicates that the targets for dissolved copper and zinc are met under with or without Study implementation, with the exception of one model domain for copper during one year where multiple exceedances were simulated. Construction of the structural stormwater strategies detailed in Section 4.3 is expected to result in meeting the B-IBI target. Riparian tree planting, as identified in

Section 7.3 and in the modeling report, is not expected to result in meeting the temperature target. Temperatures were found to exceed standards under the future mitigated and the fully forested scenarios, even with the adjustment for microclimate cooling. Tree shading, however, will provide substantial shading and result in colder water temperatures and is a recommended strategy.

Bacteria concentrations are extremely variable and difficult to predict. The calibration of the watershed model resulted in general agreement between the observed and simulated concentrations, although with a low bias. Under both the future built-out and the mitigated scenarios, water quality standards were not exceeded based on modeled results (i.e., less than 10 percent of the samples were above 100 CFU/100 mL and a geometric mean under 50 CFU/100 mL). However, given the known underestimation of the model and the number of the simulated storm events resulting in fecal coliform levels over 100 CFU/100 mL, the project team predicts, in spite of modeled results, that water quality standards will not be met in the future without mitigation. The Study recommends the non-structural source control strategy as defined in Section 4.4. The source control strategy is expected to result in more cost-effective and earlier mitigation than expected with future build-out and built stormwater infrastructure controls.

**Table 1. Achievement of modeled metrics targeted with and without Study implementation.**

Parameter	Future Build-out Under Current Code	Future Build-out with Study Implementation
Dissolved Copper	NO*	YES
Dissolved Zinc	YES	YES
Temperature	NO	NO**
Fecal Coliform	NO***	YES***
B-IBI	NO	YES

\*Copper exceeded in one model domain over the course of one modeled year multiple times.

\*\*Temperature exceeds thresholds under fully forested conditions and with consideration of microclimate cooling.

\*\*\*Fecal coliform levels are expected to exceed standards without implementation of a source control program in addition to stormwater mitigation.

To meet the Permit-defined modeled targets, the analysis shows Partners could implement the identified structural stormwater strategies and the identified pollution source control nonstructural strategies. While not expected to result in full compliance with the water quality standards for temperature, temperature issues would be alleviated by planting the riparian area to at least a 65-foot buffer, totaling about 600 acres of new plantings on top of what identified in Section 7.3. Planting 600 acres is estimated to cost \$18.3 million without consideration of land acquisition or easement costs.

Instream habitat, 165-foot riparian corridor, and wetland restoration and preservation strategies would not affect the achievement of Permit-defined targets. These strategies

were not part of the modeled solutions needed to meet the NPDES permit targets. These strategies, however, are expected to result in the achievement of the watershed goals defined in Chapter 2 and the support the designated and existing uses of Bear Creek.

## 2.0 POTENTIAL SCHEDULE FOR SELECTED STRATEGIES

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The identified schedule and cost for implementing the Study is summarized in Tables 2 to 5 for the respective partner jurisdictions: King County, Snohomish County, City of Redmond, and City of Woodinville.

In the mid-term phase (year 11-20), King County may focus on coordinating the implementation of projects associated with the prioritized stormwater catchments, instream habitat, riparian, and wetland projects. The remaining three prioritized stormwater catchments may be completed in the mid-term. Ten percent of the higher priority instream habitat projects may be completed. King County may plant trees on remaining half (50 percent) of the prioritized riparian corridors located on public land during the mid-term.

During the mid-term phase, the Snohomish County, Redmond, and Woodinville may continue focusing on the prioritized catchments (see Chapter 4 and *Appendix A: Prioritization: Water Quality and Quantity Strategies*) that total to approximately 10 percent of the total cost estimate for stormwater. The cities of Redmond and Woodinville may implement their tree planting incentive program, focusing on riparian corridors.

In the long-term phase (year 21-100), jurisdictions may continue to implement the programs initiated in the near-term, revising them as appropriate through adaptive management. The Study is expected to be notably different by the end of the proposed timeline from its initial conception. Incorporation of new technologies, new monitoring data, and changes in watershed goals are recommended as the Study is adaptively managed. The emphasis will be to ensure it is effective.

**Table 2. King County Watershed Study potential implementation schedule.**

Category	Description	Near-term Action (Years 1-10)	Mid-term action (Years 11-20)	Long-term action (Beyond 20)	
Program	Public Engagement/ Education Program	Develop Public Engagement/ Education Program	Implement public engagement and education		
		<b>\$100,000 over 2 years</b>	<b>\$50,000/year</b>	<b>\$50,000/year</b>	
	LID Incentive Program	Develop LID Incentive Program	Install LIDs on participating private properties		
		<b>\$100,000 over 2 years to develop \$2M/year over 5 years to implement</b>	<b>\$9M/year</b>	<b>\$9M/year</b>	
	In-lieu fee Program	Develop In-lieu fee Program	Direct in-lieu fees to high priority projects		
		<b>\$100,000 over 2 years</b>	<b>No Cost</b>	<b>No Cost</b>	
	Monitoring and Assessment Management Plan	Develop Monitoring Plan	Monitor and evaluate results		
		<b>\$50,000 over 2 years</b>	<b>\$100,000/year</b>	<b>\$100,000/year</b>	
	Tree Planting Incentive Program	Tree Planting Incentive Program	Plant trees on willing private property		
		<b>\$50,000 over 2 years</b>	<b>\$50,000/year</b>	<b>\$50,000/year</b>	
	Fish Passage Study	Complete Inventory of Fish Barriers			
		<b>\$100,000 over 2 years</b>			
Structural Projects	Construct Stormwater Facilities	Build new facilities in priority catchments	Build new facilities in priority catchments	Build new facilities in remaining catchments	
		<b>\$846,000/year</b>	<b>\$4.9M/year</b>	<b>\$4.9M/year</b>	
	Evaluate and Optimize Existing Stormwater Facilities	Evaluate/optimize in priority catchments	Evaluate/optimize in priority catchments		
		<b>No Additional Cost</b>	<b>No Additional Cost</b>		

Category	Description	Near-term Action (Years 1-10)	Mid-term action (Years 11-20)	Long-term action (Beyond 20)
	Instream Habitat Projects	Construct high priority projects	Construct high priority projects	Construct remaining priority projects
		<b>\$343,000/year over 5 years</b>	<b>\$386,000/year</b>	<b>\$394,000/year</b>
	Remove Fish Passage Barriers		Remove priority barriers	Remove remaining barriers
			<b>\$50,000/year</b>	<b>\$50,000/year</b>
	Riparian Restoration	Acquire/ease and preserve high priority areas		
		<b>\$91,000/year over 5 years</b>	<b>\$235,000/year</b>	<b>\$235,000/year</b>
	Wetland Restoration	Acquire/ease and preserve high priority areas		
		<b>\$19,000/year over 5 years</b>	<b>\$32,000/year</b>	<b>\$32,000/year</b>
Studies, Analyses	Flow Transfer Program (Done in First 5 Years)	Study program feasibility		
		<b>\$50,000 over 2 years</b>		
	Agricultural BMP Program	Assess existing regulation and incentive programs		
		<b>\$50,000 over 2 years</b>		
	Fecal Bacteria Source Tracking Study	Follow-up IDDE work for TMDL by King County SWS		
		<b>\$60,000/year over 5 years</b>		
Watershed Coordination and Strategy Administration	Program Management	Watershed Coordinator holds Committee meetings, prepares reports, oversees grants, and supervises staff		
		<b>\$30,000/year</b>	<b>\$30,000/year</b>	<b>\$30,000/year</b>
	Update Watershed Study	Update every 10 Years		
		<b>\$200,000</b>	<b>\$200,000</b>	<b>\$200,000</b>

All costs are in 2017 dollars, no discount or inflation rate applied.



**Table 3. Snohomish County Watershed Study potential implementation schedule.**

Category	Description	Near-term Action	Mid-term action	Long-term action
Structural Projects	Construct Stormwater Facilities	Build new facilities in priority catchments		
		<b>\$1.9M / year</b>	<b>\$349,000 / year</b>	<b>\$349,000 / year</b>
Studies and Analyses	MAMP (or equivalent)	Monitor and Evaluate Results		
		<b>\$9,000 / year last 5 years</b>	<b>\$9,000 / year</b>	<b>\$9,000 / year</b>
Watershed Coordination and Strategy Administration	Watershed Committee Participation	Participate in bi-annual watershed committee coordination meetings		
		<b>\$10,000 / year</b>	<b>\$10,000 / year</b>	<b>\$10,000 / year</b>
	Update Watershed Study	Update every 10 Years		
		<b>\$9,000</b>	<b>\$9,000</b>	<b>\$9,000</b>

All costs are in 2017 dollars, no discount or inflation rate applied.

**Table 4. City of Redmond Watershed Study potential implementation schedule.**

Category	Description	Near-term Action	Mid-term action	Long-term action
Structural Projects	Construct Stormwater Facilities	Complete Monticello Creek Restoration Plan	Build new facilities in priority catchments	
		<b>\$7.3M / year</b>	<b>\$1.4M / year</b>	<b>\$1.4M / year</b>
Implement Programs	Tree Planting Program	Plant trees on willing private property		
		<b>\$7,000 / year</b>	<b>\$16,000 / year</b>	<b>\$16,000 / year</b>
Studies and Analyses	MAMP (or equivalent)	Monitor and Evaluate Results		
		<b>\$10,000 / year (last 5 years)</b>	<b>\$10,000 / year</b>	<b>\$10,000 / year</b>
Watershed Coordination and Strategy Administration	Watershed Committee	Participate in bi-annual watershed committee coordination meetings		
		<b>\$10,000 / year</b>	<b>\$10,000 / year</b>	<b>\$10,000 / year</b>
	Update Watershed Study	Update every 10 Years		
		<b>\$10,000</b>	<b>\$10,000</b>	<b>\$10,000</b>

All costs are in 2017 dollars, no discount or inflation rate applied.

**Table 5. City of Woodinville Watershed Study potential implementation schedule.**

Category	Description	Near-term Action	Mid-term action	Long-term action
Structural Projects	Construct Stormwater Facilities	Build new facilities in priority catchments		
		<b>\$500,000 / year</b>	<b>\$112,000 / year</b>	<b>\$112,000 / year</b>
	Tree Planting Incentive Program	Program Development	Plant trees on willing private property	
<b>\$19,000 / year last 5 years</b>		<b>\$5,100 / year</b>	<b>\$5,100 / year</b>	
Studies and Analyses	MAMP (or equivalent)	Monitor and Evaluate Results		
		<b>\$6,000 / year</b>	<b>\$6,000 / year</b>	<b>\$6,000 / year</b>
Watershed Coordination and Strategy Administration	Watershed Committee	Participate in bi-annual watershed committee coordination meetings		
		<b>\$10,000 / year</b>	<b>\$10,000 / year</b>	<b>\$10,000 / year</b>
	Update Watershed Study	Update every 10 Years		
<b>\$6,000 / year</b>		<b>\$6,000 / year</b>	<b>\$6,000 / year</b>	

All costs are in 2017 dollars, no discount or inflation rate applied.

## 3.0 SUMMARY OF ESTIMATED COSTS FOR FULL IMPLEMENTATION OF SELECTED STRATEGIES

Table 6 summarizes the estimated costs of the Study’s elements during the different phases of the Study if the recommendations were fully implemented. Cost estimates are based on based on the best available information for instream habitat project costs (\$3M per mile), tree planting costs (\$30K per acre), stormwater structural strategy (construction, maintenance, and replacement) costs, property acquisition costs, and program management costs.

**Table 6. Watershed Study budget summary.**

Jurisdiction	Expense Type	Cost Incurred by Juris. or Private Indiv./Entity	Near-Term Actions (\$M)	Mid-term Actions (\$M)	Long-term Actions (\$M)	Total Watershed Study (\$M)
			Year	Year	Year	Year
			10-Jan	20-Nov	21-100	1-100
King County	Capital	Private	\$0.55	\$3.48	\$27.81	\$31.83
		Public	\$7.91	\$45.28	\$362.21	\$415.40
	O & M	Private	\$0.23	\$1.76	\$135.47	\$137.46
		Public	\$0.09	\$1.04	\$100.06	\$101.20
	Replacement	Private	\$0.00	\$0.36	\$72.03	\$72.39
		Public	\$0.00	\$0.00	\$61.55	\$61.55
	Habitat	Public	\$3.22	\$7.54	\$60.96	\$71.72
	Programs		\$2.57	\$2.46	\$19.20	\$24.23
	Studies		\$1.05	\$1.00	\$8.00	\$10.05
	Acquisitions		\$8.39	\$26.51	\$218.86	\$253.75
			<b>Total Private</b>	<b>\$0.78</b>	<b>\$5.60</b>	<b>\$235.31</b>
		<b>Total Public</b>	<b>\$23.23</b>	<b>\$83.83</b>	<b>\$830.83</b>	<b>\$937.90</b>
Snohomish County	Capital	Private	\$0.76	\$0.17	\$1.37	\$2.31
		Public	\$18.36	\$3.32	\$26.52	\$48.20
	O & M	Private	\$0.16	\$0.59	\$8.90	\$9.65
		Public	\$0.12	\$0.44	\$8.18	\$8.74
	Replacement	Private	\$0.00	\$0.48	\$3.73	\$4.21
		Public	\$0.00	\$0.00	\$17.12	\$17.12
	Habitat	Public	\$1.32	\$0.41	\$3.32	\$5.05
	Programs		\$0.11	\$0.11	\$0.87	\$1.09
	Acquisitions		\$9.22	\$0.88	\$7.06	\$17.17
		<b>Total Private</b>	<b>\$0.93</b>	<b>\$1.24</b>	<b>\$14.00</b>	<b>\$16.16</b>
		<b>Total Public</b>	<b>\$29.13</b>	<b>\$5.17</b>	<b>\$63.08</b>	<b>\$97.38</b>
Redmond	Capital	Private	\$54.34	\$1.09	\$7.74	\$63.17

APPENDIX G: Potential Strategy Implementation Schedule and Budget  
Bear Creek Watershed Management Study

Jurisdiction	Expense Type	Cost Incurred by Juris. or Private Indiv./Entity	Near-Term Actions (\$M)	Mid-term Actions (\$M)	Long-term Actions (\$M)	Total Watershed Study (\$M)	
			Year	Year	Year	Year	
			10-Jan	20-Nov	21-100	1-100	
	O & M	Public	\$19.44	\$12.78	\$102.22	\$134.44	
		Private	\$0.16	\$0.64	\$17.10	\$17.89	
		Public	\$0.10	\$0.39	\$7.69	\$8.18	
		Replacement	Private	\$0.00	\$0.00	\$7.65	\$7.65
			Public	\$0.00	\$0.00	\$4.93	\$4.93
		Habitat	Public	\$0.05	\$0.17	\$1.37	\$1.59
		Programs		\$0.16	\$0.21	\$1.68	\$2.05
		Acquisitions		\$0.00	\$3.50	\$27.99	\$31.48
<b>Total Private</b>		<b>\$54.50</b>		<b>\$1.72</b>	<b>\$32.49</b>	<b>\$88.71</b>	
<b>Total Public</b>		<b>\$19.76</b>	<b>\$17.04</b>	<b>\$145.88</b>	<b>\$182.68</b>		
Woodinville		Capital	Private	\$0.25	\$0.04	\$0.30	\$0.59
	Public		\$4.79	\$1.08	\$8.66	\$14.54	
	O & M	Private	\$0.04	\$0.18	\$4.35	\$4.57	
		Public	\$0.05	\$0.19	\$3.12	\$3.36	
	Replacement	Private	\$0.00	\$0.06	\$2.72	\$2.78	
		Public	\$0.00	\$0.00	\$2.60	\$2.60	
	Habitat	Public	\$0.09	\$0.07	\$0.57	\$0.73	
	Programs		\$0.34	\$0.17	\$1.33	\$1.83	
	Acquisitions		\$4.06	\$1.41	\$11.26	\$16.73	
	<b>Total Private</b>		<b>\$0.30</b>	<b>\$0.28</b>	<b>\$7.36</b>	<b>\$7.94</b>	
<b>Total Public</b>	<b>\$9.33</b>	<b>\$2.92</b>	<b>\$27.53</b>	<b>\$39.78</b>			
ALL PARTNERS	Capital	Private	\$55.91	\$4.77	\$37.22	\$97.90	
		Public	\$50.51	\$62.45	\$499.61	\$612.57	
	O & M	Private	\$0.60	\$3.16	\$165.80	\$169.56	
		Public	\$0.36	\$2.06	\$119.05	\$121.48	
	Replacement	Private	\$0.00	\$0.90	\$86.13	\$87.03	
		Public	\$0.00	\$0.00	\$86.21	\$86.21	
	Habitat	Public	\$4.69	\$8.20	\$66.21	\$79.10	
	Programs		\$3.18	\$2.95	\$23.08	\$29.20	
	Studies		\$1.05	\$1.00	\$8.00	\$10.05	
	Acquisitions		\$21.66	\$32.30	\$265.17	\$319.13	
<b>Total Private</b>	<b>\$56.50</b>	<b>\$8.83</b>	<b>\$289.15</b>	<b>\$354.49</b>			
<b>Total Public</b>	<b>\$81.45</b>	<b>\$108.96</b>	<b>\$1,067.33</b>	<b>\$1,257.74</b>			

Public: Cost incurred by public institutions  
Private: Cost incurred by private developers, firms, or individuals  
All costs are in 2017 dollars, no discount or inflation rate applied.