

Appendix E – Cost Estimates for Channel and Cold-Water Concepts and O&M Costs

Channel Concept Cost Estimates

Client: King County - Willowmoor
Project: Transition Zone Modification
Subject: Concept Alternative Cost Estimate Details
Alternative 2 - Main Channel Meander
Date : 27-Apr-15

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Preparation				
	Mobilization	1	ls	10%	\$ 251,820
	Clearing and Grubbing	1	ls	\$30,000	\$ 30,000
				subtotal	\$ 281,820
2	Main Channel Site Work				
	Channel Excavation	70,000	cy	\$20	\$ 1,400,000
	Habitat Wood	50	ea	\$1,200	\$ 60,000
	Boulders	50	ea	\$350	\$ 17,500
	Mechanical Anchors	100	ea	\$150	\$ 15,000
	Streambed Gravels	8,815	tn	\$35	\$ 308,500
	Weir Reconfiguration	1	ls	\$30,000	\$ 30,000
				subtotal	\$ 1,831,000
4	Dewatering/Water Isolation				
	Localized Pumping	5	ls	\$20,000	\$ 100,000
	Temporary Diversion Structure	2	ls	\$20,000	\$ 40,000
	Water isolation at downstream	1	ls	\$40,000	\$ 40,000
	Channel Excavation	20,400	cy	\$20	\$ 408,000
	Streambed Gravels	2,833	tn	\$35	\$ 99,200
				subtotal	\$ 687,200
5	Plantings and Revegetation				
	Site Preparation	1	ls	\$155,000	\$ 155,000
	Plants (Installed)	1	ls	\$287,428	\$ 287,400
	Mulch (Installed)	1	ls	\$81,150	\$ 81,200
	Watering	1	ls	\$165,156	\$ 165,200
	Weeding	1	ls	\$133,280	\$ 133,300
				subtotal	\$ 822,100
Total Estimated Direct Costs (Rounded)					\$ 3,622,000
Contingency 30.0%					\$ 1,087,000
Sales Tax (City of Redmond) 9.5%					\$ 447,000
Subtotal					\$ 5,156,000
Engineering (Design and Construction) 15.0%					\$ 773,000
Administration 10.0%					\$ 516,000
Alternative 2 - Total Estimated Project Costs					\$6,445,000

Client: King County - Willowmoor
Project: Transition Zone Modification
Subject: Concept Alternative Cost Estimate Details
Alternative 3 - Main Channel Meander with Hyporheic Channel
Date : 27-Apr-15

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Preparation				
	Mobilization	1	ls	10%	\$ 825,730
	Clearing and Grubbing	1	ls	\$30,000	\$ 30,000
				subtotal	\$ 855,730
2	Main Channel Site Work				
	Channel Excavation	70,000	cy	\$20	\$ 1,400,000
	Habitat Wood	50	ea	\$1,200	\$ 60,000
	Boulders	50	ea	\$350	\$ 17,500
	Mechanical Anchors	100	ea	\$150	\$ 15,000
	Streambed Gravels	8,815	tn	\$35	\$ 308,500
	Weir Reconfiguration	1	ls	\$30,000	\$ 30,000
				subtotal	\$ 1,831,000
3	Hyporheic Channel Site Work				
	Channel Excavation	205,000	cy	\$20	\$ 4,100,000
	Streambed Gravels	52,133	tn	\$35	\$ 1,824,700
	Habitat Wood	115	ea	\$1,200	\$ 138,000
	Boulders	115	ea	\$350	\$ 40,300
	Mechanical Anchors	230	ea	\$150	\$ 34,500
	Side Channel control structure	1	ls	\$50,000	\$ 50,000
				subtotal	\$ 6,187,500
4	Dewatering/Water Isolation				
	Localized Pumping	5	ls	\$20,000	\$ 100,000
	Temporary Diversion Structure	2	ls	\$20,000	\$ 40,000
	Water isolation at downstream	1	ls	\$40,000	\$ 40,000
	Channel Excavation	2,690	cy	\$20	\$ 53,800
	Streambed Gravels	142	tn	\$35	\$ 5,000
				subtotal	\$ 238,800
5	Plantings and Revegetation				
	Site Preparation	1	ls	\$155,000	\$ 155,000
	Plants (Installed)	1	ls	\$287,428	\$ 287,400
	Mulch (Installed)	1	ls	\$81,150	\$ 81,200
	Watering	1	ls	\$165,156	\$ 165,200
	Weeding	1	ls	\$133,280	\$ 133,300
				subtotal	\$ 822,100
Total Estimated Direct Costs (Rounded)					\$ 9,935,000
Contingency 30.0%					\$ 2,981,000
Sales Tax (City of Redmond) 9.5%					\$ 1,227,000
Subtotal					\$ 14,143,000
Engineering (Design and Construction) 15.0%					\$ 2,121,000
Administration 10.0%					\$ 1,414,000
Alternative 3 - Total Estimated Project Costs					\$17,678,000

Client: King County - Willowmoor
Project: Transition Zone Modification
Subject: Concept Alternative Cost Estimate Details
Alternative 4 - Main Channel Modification with Side Channel
Date : 27-Apr-15

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Preparation				
	Mobilization	1	ls	10%	\$ 342,740
	Clearing and Grubbing	1	ls	\$30,000	\$ 30,000
				subtotal	\$ 372,740
2	Main Channel Site Work				
	Channel Excavation	30,185	cy	\$20	\$ 603,700
	Habitat Wood	50	ea	\$1,200	\$ 60,000
	Boulders	50	ea	\$350	\$ 17,500
	Mechanical Anchors	100	ea	\$150	\$ 15,000
	Streambed Gravels	8,815	tn	\$35	\$ 308,500
	Weir Reconfiguration	1	ls	\$30,000	\$ 30,000
				subtotal	\$ 1,034,700
3	Side Channel Site Work				
	Channel Excavation	93,900	cy	\$20	\$ 1,878,000
	Streambed Gravels	3,230	tn	\$35	\$ 113,100
	Habitat Wood	115	ea	\$1,200	\$ 138,000
	Boulders	115	ea	\$350	\$ 40,300
	Mechanical Anchors	230	ea	\$150	\$ 34,500
	Side Channel control structure	1	ls	\$50,000	\$ 50,000
				subtotal	\$ 2,253,900
4	Dewatering/Water Isolation				
	Localized Pumping	1	ls	\$20,000	\$ 20,000
	Temporary Diversion Structure	1	ls	\$20,000	\$ 20,000
	Water isolation at downstream	1	ls	\$40,000	\$ 40,000
	Channel Excavation	2,690	cy	\$20	\$ 53,800
	Streambed Gravels	142	tn	\$35	\$ 5,000
				subtotal	\$ 138,800
5	Plantings and Revegetation				
	Site Preparation	1	ls	\$155,000	\$ 155,000
	Plants (Installed)	1	ls	\$287,428	\$ 287,400
	Mulch (Installed)	1	ls	\$81,150	\$ 81,200
	Watering	1	ls	\$165,156	\$ 165,200
	Weeding	1	ls	\$133,280	\$ 133,300
				subtotal	\$ 822,100
Total Estimated Direct Costs (Rounded)					\$ 4,622,000
Contingency 30.0%					\$ 1,387,000
Sales Tax (City of Redmond) 9.5%					\$ 571,000
Subtotal					\$ 6,580,000
Engineering (Design and Construction) 15.0%					\$ 987,000
Administration 10.0%					\$ 658,000
Alternative 4 - Total Estimated Project Costs					\$8,225,000

Client: King County - Willowmoor
Project: Transition Zone Modification
Subject: Concept Alternative Cost Estimate Details
Alternative 5 - Main Channel Modification
Date : 27-Apr-15

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Preparation				
	Mobilization	1	ls	10%	\$ 164,190
	Clearing and Grubbing	1	ls	\$30,000	\$ 30,000
				subtotal	\$ 194,190
2	Main Channel Site Work				
	Channel Excavation	30,185	cy	\$20	\$ 603,700
	Habitat Wood	50	ea	\$1,200	\$ 60,000
	Boulders	50	ea	\$350	\$ 17,500
	Mechanical Anchors	100	ea	\$150	\$ 15,000
	Streambed Gravels	8,815	tn	\$35	\$ 308,500
	Weir Reconfiguration	1	ls	\$30,000	\$ 30,000
				subtotal	\$ 1,034,700
3	Dewatering/Water Isolation				
	Localized Pumping	1	ls	\$20,000	\$ 20,000
	Temporary Diversion Structure at upstream	2	ls	\$20,000	\$ 40,000
	Water isolation at downstream	1	ls	\$40,000	\$ 40,000
	Channel Excavation	20,400	cy	\$20	\$ 408,000
	Streambed Gravels	2,833	tn	\$35	\$ 99,200
				subtotal	\$ 607,200
4	Plantings and Revegetation				
	Site Preparation	1	ls	\$100,370	\$ 100,400
	Plants (Installed)	1	ls	\$99,886	\$ 99,900
	Mulch (Installed)	1	ls	\$64,480	\$ 64,500
	Watering	1	ls	\$42,912	\$ 42,900
	Weeding	1	ls	\$56,385	\$ 56,400
				subtotal	\$ 364,100
Total Estimated Direct Costs (Rounded)					\$ 2,200,000
Contingency 30.0%					\$ 660,000
Sales Tax (City of Redmond) 9.5%					\$ 272,000
Subtotal					\$ 3,132,000
Engineering (Design and Construction) 15.0%					\$ 470,000
Administration 10.0%					\$ 313,000
Alternative 5 - Total Estimated Project Costs					\$3,915,000

Cold-Water Concept Cost Estimates

T31746 King County - Willowmoor
 Task 6 Cold Water Supplementation
 Concept Alternative Cost Estimate Details



Concept 1-Hypolimnetic Withdrawal From Lake Sammamish (20 cfs)

Date : 6-Jun-14

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Mobilization/Demobilization/Testing				
	Assume 8% of subtotal for items 2-5	1	ls	\$242,300	\$ 242,300
2	Sitework				
	<u>Pump Site</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$10,000	\$ 10,000
	Erosion control	1	ls	\$5,000	\$ 5,000
	Clear & grub	1	ls	\$5,000	\$ 5,000
	Excavation - Pipelines	640	cy	\$15	\$ 9,600
	Excavation - Pump station	40	cy	\$20	\$ 800
	Turbidity Curtain	200	lf	\$15	\$ 3,000
	Haul waste to disposal	1,300	ton	\$10	\$ 13,000
	Imported fill - Pipeline & Pump Station	1,300	ton	\$15	\$ 19,500
	Trench shoring	1	ls	\$5,000	\$ 5,000
	Dewatering for pipeline and pump station	5	days	\$200	\$ 1,000
	Crushed Surfacing Base Course	100	cy	\$30	\$ 3,000
	<u>Discharge Site At Weir</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$10,000	\$ 10,000
	Erosion control	1	ls	\$2,000	\$ 2,000
	Clear & grub	1	ls	\$2,000	\$ 2,000
	Excavation - Pipelines	210	cy	\$15	\$ 3,200
	Turbidity Curtain	200	lf	\$15	\$ 3,000
	Haul waste to disposal	400	ton	\$10	\$ 4,000
	Imported fill - Pipeline	400	ton	\$20	\$ 8,000
	Trench shoring	1	ls	\$2,000	\$ 2,000
	Dewatering for pipeline construction	2	days	\$200	\$ 400
	Rip Rap Energy Dissipation	30	ton	\$40	\$ 1,200
	Weir retrofit contingency allowance	1	ls	\$5,000	\$ 5,000
	Subtotal, Sitework				\$ 115,700

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
3	Piping				
	<u>Intake To Pump Station</u>				
	HDPE Intake MH & Cone Style Fish Screen	1	allow	\$50,000	\$ 50,000
	36" HDPE DIPS DR 21 Intake Pipe	16,000	lf	\$141	\$ 2,256,000
	36" Precast Pipe Anchors	640	ea	\$300	\$ 192,000
	4 - work boats for pipe positioning	1	ls	\$10,000	\$ 10,000
	30" HDPE DIPS DR 21 PS Transition Pipe	150	lf	\$105	\$ 15,800
	30" Valve	1	ea	\$25,000	\$ 25,000
	30" 45 Deg Bend	4	ea	\$732	\$ 2,900
	36x30 Reducer	1	ea	\$1,000	\$ 1,000
	<u>Discharge From Pump Station</u>				
	18" HDPE DIPS DR 21 PS Transition Pipe	150	lf	\$42	\$ 6,300
	18" Valve	1	ea	\$20,000	\$ 20,000
	18" 45 Deg Bend	8	ea	\$224	\$ 1,800
	24x18 Reducer	1	ea	\$500	\$ 500
	24" HDPE DIPS DR 21 Discharge Pipe	2,000	lf	\$69	\$ 138,000
	24" Precast Pipe Anchors	80	ea	\$300	\$ 24,000
	<u>Discharge Site At Weir</u>				
	24" HDPE DIPS DR 21 PS Transition Pipe	150	lf	\$69	\$ 10,400
	24" 45 Deg Bend	5	ea	\$371	\$ 1,900
	Subtotal, Piping				\$ 2,755,600
4	Structural and Architectural				
	<u>Pump Station</u>				
	Slab on grade (10'x20'x8")	5	cy	\$250	\$ 1,200
	Pump building (timber frame, 8'x16')	128	sf	\$200	\$ 25,600
	Subtotal, Structural and Architectural				\$ 26,800
5	Mechanical				
	<u>Pump Station</u>				
	Vertical Turbine Pump (single pump, with no backup pum	1	ea	\$126,000	\$ 126,000
	Building space heater and passive ventilation	1	ls	\$5,000	\$ 5,000
	Subtotal, Mechanical				\$ 131,000

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
6	Electrical				
	<u>Pump Station</u>				
	Pump station power and control panel	1	allow	\$100,000	\$ 100,000
	2-3" PVC direct bury conduit	500	lf	\$20	\$ 10,000
	Power extension to pump station	500	lf	\$20	\$ 10,000
	Meter & shutoff	1	ls	\$500	\$ 500
	Electrical contingency allowance	1	ls	\$2,500	\$ 2,500
	Subtotal, Electrical and Control				\$ 123,000
7	Intrumentation and Control				
	Included in electrical in section 6				\$ -
	Subtotal, Intrumentation and Control				\$ -
8	Site Restoration				
	<u>Pump Station</u>				
	Site landscaping	1	ls	\$2,000	\$ 2,000
	<u>Discharge Below Existing Weir</u>				
	Key Logs	3	ea	\$500	\$ 1,500
	Imported topsoil	100	cy	\$15	\$ 1,500
	Wetland landscaping	1	ls	\$2,000	\$ 2,000
	Subtotal, Site Restoration				\$ 7,000
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	Total Estimated Direct Costs (Rounded)				\$ 3,401,000
	General Contractor Overhead and Profit	15.0%			\$ 510,000
	Subtotal				\$ 3,911,000
	Contingency	30.0%			\$ 1,173,000
	Sales Tax (City of Redmond)	9.5%			\$ 483,000
	Subtotal				\$5,567,000
	Engineering (Design and Construction)	15.0%			\$ 835,000
	Administration	10.0%			\$ 557,000
	Alternative 1 - Total Estimated Project Costs				\$6,959,000

Client: T31746 King County - Willowmoor
 Project: Task 6 Cold Water Supplementation
 Subject: Concept Alternative Cost Estimate Details
 Concept 2-Pumped Groundwater to Pools



Date : 6-Jun-14

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Mobilization/Demobilization/Testing				
	Assume 8% of subtotal for items 2-5	1	ls	\$70,800	\$ 70,800
2	Sitework				
	<u>Well Site</u>				
	New well	1	ls	\$50,000	\$ 50,000
	Site fencing, landscaping, driveway etc	1	ls	\$75,000	\$ 75,000
	Erosion control	1	ls	\$2,000	\$ 2,000
	Trench shoring	1	ls	\$10,000	\$ 10,000
	Dewatering for pump station wet well	14	days	\$500	\$ 7,000
	<u>Transition Zone Pools</u>				
	Transition Zone Resting Pools - sitework by others during channel reconfiguration project				\$ -
					\$ 144,000
3	Piping				
	8" HDPE pipe	3,500	lf	\$30	\$ 105,000
	Pipe valves and appertenances	1	ls	\$15,000	\$ 15,000
	Excavation Pipe Trench	4,000	cy	\$20	\$ 80,000
	Pipe Trench Bedding	2,500	cy	\$35	\$ 87,500
	Trench Restoration - Hydroseed	0.75	ac	\$5,000	\$ 3,800
	River outfall locations energy dissipation & pool excavation	1	ls	\$50,000	\$ 50,000
	36" PVC C905 DR 25 Gravity Sewer	0	lf	\$250	\$ -
	Subtotal, Piping				\$ 341,300
4	Structural and Architectural				
	Pump Builiding	1	ls	\$300,000	\$ 300,000
	Subtotal, Structural and Architectural				\$ 300,000
5	Mechanical				
	Pump 25 hp w/ controls, electric hook up, plumb, mech for pump	1	ls	\$100,000	\$ 100,000

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
	Subtotal, Mechanical				\$ 100,000
6	Electrical				
	Pump station power and control panel	1	allow	\$100,000	\$ 100,000
	Subtotal, Electrical and Control				\$ 100,000
7	Intrumentation and Control				
	Included in electrical in section 6				\$ -
	Subtotal, Intrumentation and Control				\$ -
8	Site Restoration				
	Included in Section 3 pipe and Section 2 well site, above				\$ -
	Transition Zone Resting Pools - restoration by others during channel reconfiguration project				\$ -
	Subtotal, Site Restoration				\$ -
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	Total Estimated Direct Costs (Rounded)				\$ 1,056,000
	General Contractor Overhead and Profit	15.0%			\$ 158,000
	Subtotal				\$ 1,214,000
	Contingency	30.0%			\$ 364,000
	Sales Tax (City of Redmond)	9.5%			\$ 150,000
	Subtotal				\$1,728,000
	Engineering (Design and Construction)	15.0%			\$ 259,000
	Administration	10.0%			\$ 173,000
	Alternative 2 - Total Estimated Project Costs				\$2,160,000

T31746 King County - Willowmoor
 Task 6 Cold Water Supplementation
 Concept Alternative Cost Estimate Details



Concept 3-Shallow Groundwater Trench(es) to Pools

Date : 6-Jun-14

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Mobilization/Demobilization/Testing				
	Assume 8% of subtotal for items 2-5	1	ls	\$26,900	\$ 26,900
2	Sitework				
	<u>Groundwater Trench(es)</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$20,000	\$ 20,000
	Erosion control	1	ls	\$2,000	\$ 2,000
	Clear & grub	1	ls	\$2,000	\$ 2,000
	Excavation - Pipelines	4,300	cy	\$15	\$ 64,500
	Haul waste to disposal	8,000	ton	\$10	\$ 80,000
	Imported free draining fill - Pipeline	8,000	ton	\$15	\$ 120,000
	Trench shoring	1	ls	\$2,000	\$ 2,000
	Dewatering during trench work	7	days	\$200	\$ 1,400
	<u>Transition Zone Pools</u>				
	Transition Zone Resting Pools - sitework by others during channel reconfiguration project				\$ -
	Subtotal, Sitework				\$ 291,900
3	Piping				
	<u>Intake System</u>				
	Transiton zone discharge assembly	4	ea	\$250	\$ 1,000
	8" perforated pipe	2,000	lf	\$20	\$ 40,000
	Cleanouts	5	ea	\$200	\$ 1,000
	Tosh Creek intake assembly	1	ea	\$2,000	\$ 2,000
	Subtotal, Piping				\$ 44,000

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
4	Structural and Architectural				
	Not applicable - no structures				\$ -
	Subtotal, Structural and Architectural				\$ -
5	Mechanical				
	Not applicable - no mechanical system				\$ -
	Subtotal, Mechanical				\$ -
6	Electrical				
	Not applicable - no electrical system				\$ -
	Subtotal, Electrical and Control				\$ -
7	Intrumentation and Control				
	Not applicable - no I&C system				\$ -
	Subtotal, Intrumentation and Control				\$ -
8	Site Restoration				
	Surface restoration & landscaping	1	ls	\$5,000	\$ 5,000
	Transition Zone Resting Pools - restoration by others during channel reconfiguration project				\$ -
	Subtotal, Site Restoration				\$ 5,000
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	Total Estimated Direct Costs (Rounded)				\$ 368,000
	General Contractor Overhead and Profit	15.0%			\$ 55,200
	Subtotal				\$ 423,000
	Contingency	30.0%			\$ 127,000
	Sales Tax (City of Redmond)	9.5%			\$ 52,000
	Subtotal				\$602,000
	Engineering (Design and Construction)	15.0%			\$ 90,000
	Administration	10.0%			\$ 60,000
	Alternative 3 - Total Estimated Project Costs				\$752,000

T31746 King County - Willowmoor
 Task 6 Cold Water Supplementation
 Concept Alternative Cost Estimate Details



Concept 4-Purchase Potable Water & Pipe To Pools

Date : 6-Jun-14

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Mobilization/Demobilization/Testing				
	Assume 8% of subtotal for items 2-5	1	ls	\$30,800	\$ 30,800
2	Sitework				
	Water Meter 4"	1	ls	\$10,000	\$ 10,000
	City of Redmond Connection Fee	1	ls	\$155,000	\$ 155,000
	Trench shoring	1	ls	\$5,000	\$ 5,000
	Dewatering for pipeline construction	30	days	\$500	\$ 15,000
	<u>Transition Zone Pools</u>				
	Transition Zone Resting Pools - sitework by others during channel reconfiguration project				\$ -
	Subtotal, Sitework				\$ 185,000
3	Piping				
	4" HDPE	2,000	lf	\$15	\$ 30,000
	Pipe valves and appertenances	1	ls	\$15,000	\$ 15,000
	Excavation - Pipe Trench	2,500	cy	\$20	\$ 50,000
	Backfill Pipe Bedding	1,500	cy	\$35	\$ 52,500
	Trench Restoration - Hydroseed	0.50	ac	\$5,000	\$ 2,500
	River outfall locations energy dissipation & pool excavatio	1	ls	\$50,000	\$ 50,000
	Subtotal, Piping				\$ 200,000
4	Structural and Architectural				
	Not applicable - no structures				\$ -
	Subtotal, Structural and Architectural				\$ -
5	Mechanical				
	Not applicable - no mechanical system				\$ -
	Subtotal, Mechanical				\$ -

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
6	Electrical				
	Not applicable - no electrical system				\$ -
	Subtotal, Electrical and Control				\$ -
7	Intrumentation and Control				
	Not applicable - no I&C system				\$ -
	Subtotal, Intrumentation and Control				\$ -
8	Site Restoration				
	Included in Section 3 piping				\$ -
	Transition Zone Resting Pools - restoration by others during channel reconfiguration project				\$ -
	Subtotal, Site Restoration				\$ -

Total Estimated Direct Costs (Rounded)		\$ 416,000
General Contractor Overhead and Profit	15.0%	\$ 62,400
Subtotal		\$ 478,000
Contingency	30.0%	\$ 143,000
Sales Tax (City of Redmond)	9.5%	\$ 59,000
Subtotal		\$680,000
Engineering (Design and Construction)	15.0%	\$ 102,000
Administration	10.0%	\$ 68,000
Alternative 4 - Total Estimated Project Costs		\$850,000

T31746 King County - Willowmoor
 Task 6 Cold Water Supplementation
 Concept Alternative Cost Estimate Details



Concept 5-Pump Lake Water To Heat Exchange System

Date : 6-Jun-14

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Mobilization/Demobilization/Testing				
	Assume 8% of subtotal for items 2-5	1	ls	\$86,100	\$ 86,100
2	Sitework				
	<u>Pump Site</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$10,000	\$ 10,000
	Erosion control	1	ls	\$5,000	\$ 5,000
	Clear & grub	1	ls	\$5,000	\$ 5,000
	Trench shoring	1	ls	\$5,000	\$ 5,000
	Excavation - Pipelines	640	cy	\$15	\$ 9,600
	Excavation - Pump station	40	cy	\$20	\$ 800
	Turbidity Curtain	200	lf	\$15	\$ 3,000
	Haul waste to disposal	1,300	ton	\$10	\$ 13,000
	Imported fill - Pipeline & Pump Station	1,300	ton	\$15	\$ 19,500
	Dewatering for pipeline and pump station	5	days	\$200	\$ 1,000
	Crushed Surfacing Base Course	100	cy	\$30	\$ 3,000
	<u>Upland Pipe From Pump Station To Heat Exchange To Transition Zone Discharge</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$10,000	\$ 10,000
	Erosion control	1	ls	\$2,000	\$ 2,000
	Clear & grub	1	ls	\$2,000	\$ 2,000
	Trench shoring	1	ls	\$2,000	\$ 2,000
	Excavation - Conveyance Pipelines	2,300	cy	\$15	\$ 34,500
	Excavation - Heat Exchange Pipe Trench	3,200	cy	\$15	\$ 48,000
	Haul waste to disposal	10,200	ton	\$10	\$ 102,000
	Imported fill - Pipeline	10,200	ton	\$15	\$ 153,000
	Dewatering for pipeline construction	2	days	\$200	\$ 400
	<u>Transition Zone Pools</u>				
	Transition Zone Resting Pools - sitework by others during channel reconfiguration project				\$ -
	Subtotal, Sitework				\$ 428,800

3 PipingIntake To Pump Station

Fish Screen Assembly	1	ls	\$2,000	\$	2,000
16" HDPE DIPS DR 21 Intake Assembly	1	ls	\$3,000	\$	3,000
16" HDPE DIPS DR 21 Intake Pipe	130	lf	\$66	\$	8,600
36" Precast Pipe Anchors	2	ea	\$240	\$	500
Work boat for pipe intake positioning	2	day	\$200	\$	400
16x12 Reducer	1	ea	\$1,575	\$	1,600
12" HDPE DIPS DR 21 PS Transition Pipe	20	lf	\$35	\$	700
12" Valve	1	ea	\$5,400	\$	5,400
16" 45 Deg Bend	4	ea	\$1,575	\$	6,300

Upland Pipe From Pump Station To Heat Exchange To Transition Zone Discharge

12" HDPE DIPS DR 21 PS Transition Pipe	20	lf	\$35	\$	700
12" Valve	1	ea	\$5,400	\$	5,400
16x12 Reducer	1	ea	\$1,575	\$	1,600
16" 45 Deg Bend	4	ea	\$1,575	\$	6,300
16" HDPE DIPS DR 21 Discharge Pipe	1,100	lf	\$66	\$	72,600
Heat Exchange Pipe Transition	2	ea	\$5,000	\$	10,000
6" Heat Exchange Pipe	18,000	ea	\$15	\$	270,000

Transition Zone Pipe Discharge to Pools

16x6 Wye	4	ea	\$1,575	\$	6,300
16" Cleanout/Blowoff	1	ea	\$1,575	\$	1,600
6" Valve	4	ea	\$1,300	\$	5,200
6" Distribution Pipe	600	lf	\$15	\$	9,000

Subtotal, Piping				\$	415,200
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4 Structural and ArchitecturalPump Station

Slab on grade (10'x20'x8")	5	cy	\$250	\$	1,200
Pump building (timber frame, 8'x16')	128	sf	\$200	\$	25,600

Subtotal, Structural and Architectural				\$	26,800
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5	Mechanical					
	<u>Pump Station</u>					
	Pump System	1	ea	\$200,000	\$	200,000
	Building space heater and passive ventilation	1	ls	\$5,000	\$	5,000
	Subtotal, Mechanical				\$	205,000
6	Electrical					
	<u>Pump Station</u>					
	Pump station power and control panel	1	allow	\$75,000	\$	75,000
	2-3" PVC direct bury conduit	500	lf	\$20	\$	10,000
	Power extension to pump station	500	lf	\$20	\$	10,000
	Meter & shutoff	1	ls	\$500	\$	500
	Electrical contingency allowance	1	ls	\$2,500	\$	2,500
	Subtotal, Electrical and Control				\$	98,000
7	Intrumentation and Control					
	Included in electrical in section 6				\$	-
	Subtotal, Intrumentation and Control				\$	-
8	Site Restoration					
	<u>Pump Station</u>					
	Site landscaping	1	ls	\$2,000	\$	2,000
	<u>Upland Piping</u>					
	Surface restoration & landscaping	1	ls	\$10,000	\$	10,000
	<u>Discharge Site</u>					
	Transition Zone Resting Pools - restoration by others during channel reconfiguration project				\$	-
	Subtotal, Site Restoration				\$	12,000
<hr/>						
	Total Estimated Direct Costs (Rounded)				\$	1,272,000
	General Contractor Overhead and Profit	15.0%			\$	191,000
	Subtotal				\$	1,463,000
	Contingency	30.0%			\$	439,000
	Sales Tax (City of Redmond)	9.5%			\$	181,000
	Subtotal					\$2,083,000
	Engineering (Design and Construction)	15.0%			\$	312,000
	Administration	10.0%			\$	208,000
	Alternative 1 - Total Estimated Project Costs					\$2,603,000

T31746 King County - Willowmoor
 Task 6 Cold Water Supplementation
 Concept Alternative Cost Estimate Details



Concept 6-Pump Lake Water To Hyporheic Discharge

Date : 6-Jun-14

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Mobilization/Demobilization/Testing				
	Assume 8% of subtotal for items 2-5	1	ls	\$62,800	\$ 62,800
2	Sitework				
	<u>Pump Site</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$10,000	\$ 10,000
	Erosion control	1	ls	\$5,000	\$ 5,000
	Clear & grub	1	ls	\$5,000	\$ 5,000
	Trench shoring	1	ls	\$5,000	\$ 5,000
	Excavation - Pipelines	640	cy	\$15	\$ 9,600
	Excavation - Pump station	40	cy	\$20	\$ 800
	Turbidity Curtain	200	lf	\$15	\$ 3,000
	Haul waste to disposal	1,300	ton	\$10	\$ 13,000
	Imported fill - Pipeline & Pump Station	1,300	ton	\$15	\$ 19,500
	Dewatering for pipeline and pump station	5	days	\$200	\$ 1,000
	Crushed Surfacing Base Course	100	cy	\$30	\$ 3,000
	<u>Upland Pipe From Weir To Transition Zone Discharge</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$10,000	\$ 10,000
	Erosion control	1	ls	\$2,000	\$ 2,000
	Clear & grub	1	ls	\$2,000	\$ 2,000
	Trench shoring	1	ls	\$2,000	\$ 2,000
	Excavation - Pipelines	1,700	cy	\$15	\$ 25,500
	Haul waste to disposal	3,100	ton	\$10	\$ 31,000
	Imported fill - Pipeline	3,100	ton	\$20	\$ 62,000
	Dewatering for pipeline construction	2	days	\$200	\$ 400
	<u>Transition Zone Infiltration Trenches & Resting Pools</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$20,000	\$ 20,000
	Erosion control	1	ls	\$5,000	\$ 5,000
	Clear & grub	1	ls	\$5,000	\$ 5,000
	Excavation shoring	1	ls	\$2,000	\$ 2,000
	Excavation - Infiltration Trenches	1,600	cy	\$20	\$ 32,000

Haul waste to disposal	3,000	ton	\$10	\$	30,000
Imported gravel backfill - Infiltration Trenches	3,000	ton	\$20	\$	60,000
Transition Zone Resting Pools - sitework by others during channel reconfiguration project				\$	-
Subtotal, Sitework				\$	363,800

3 Piping

Intake To Pump Station

Fish Screen Assembly	1	ls	\$2,000	\$	2,000
16" HDPE DIPS DR 21 Intake Assembly	1	ls	\$3,000	\$	3,000
16" HDPE DIPS DR 21 Intake Pipe	130	lf	\$66	\$	8,600
36" Precast Pipe Anchors	2	ea	\$240	\$	500
Work boat for pipe intake positioning	2	day	\$200	\$	400
16x12 Reducer	1	ea	\$1,575	\$	1,600
12" HDPE DIPS DR 21 PS Transition Pipe	20	lf	\$35	\$	700
12" Valve	1	ea	\$5,400	\$	5,400
16" 45 Deg Bend	4	ea	\$1,575	\$	6,300

Discharge From Pump Station

12" HDPE DIPS DR 21 PS Transition Pipe	20	lf	\$35	\$	700
12" Valve	1	ea	\$5,400	\$	5,400
16x12 Reducer	1	ea	\$1,575	\$	1,600
16" 45 Deg Bend	10	ea	\$1,575	\$	15,800
16" HDPE DIPS DR 21 Discharge Pipe	2,930	lf	\$66	\$	193,400
24" Precast Pipe Anchors	100	ea	\$240	\$	24,000

Transition Zone Infiltration Trenches

16x6 Wye	4	ea	\$1,575	\$	6,300
16" Cleanout/Blowoff	1	ea	\$1,575	\$	1,600
6" Valve	4	ea	\$1,300	\$	5,200
6" Perforated Distribution Pipe	600	lf	\$15	\$	9,000

Subtotal, Piping **\$** **289,500**

4 Structural and Architectural

Pump Station

Slab on grade (10'x20'x8")	5	cy	\$250	\$	1,200
Pump building (timber frame, 8'x16')	128	sf	\$200	\$	25,600

Subtotal, Structural and Architectural **\$** **26,800**

5	Mechanical					
	<u>Pump Station</u>					
	Pump System	1	ea	\$100,000	\$	100,000
	Building space heater and passive ventilation	1	ls	\$5,000	\$	5,000
	Subtotal, Mechanical				\$	105,000

6	Electrical					
	<u>Pump Station</u>					
	Pump station power and control panel	1	allow	\$75,000	\$	75,000
	2-3" PVC direct bury conduit	500	lf	\$20	\$	10,000
	Power extension to pump station	500	lf	\$20	\$	10,000
	Meter & shutoff	1	ls	\$500	\$	500
	Electrical contingency allowance	1	ls	\$2,500	\$	2,500
	Subtotal, Electrical and Control				\$	98,000

7	Intrumentation and Control					
	Included in electrical in section 6				\$	-
	Subtotal, Intrumentation and Control				\$	-

8	Site Restoration					
	<u>Pump Station</u>					
	Site landscaping	1	ls	\$2,000	\$	2,000
	<u>Upland Piping & Infiltration Trenches</u>					
	Surface restoration & landscaping	1	ls	\$5,000	\$	5,000
	<u>Discharge Site</u>					
	Transition Zone Resting Pools - restoration by others during channel reconfiguration project				\$	-
	Subtotal, Site Restoration				\$	7,000

Total Estimated Direct Costs (Rounded)		\$	953,000
General Contractor Overhead and Profit	15.0%	\$	143,000
Subtotal		\$	1,096,000
Contingency	30.0%	\$	329,000
Sales Tax (City of Redmond)	9.5%	\$	135,000
Subtotal			\$1,560,000
Engineering (Design and Construction)	15.0%	\$	234,000
Administration	10.0%	\$	156,000
Alternative 1 - Total Estimated Project Costs			\$1,950,000

T31746 King County - Willowmoor
 Task 6 Cold Water Supplementation
 Concept Alternative Cost Estimate Details



Concept 7 - Riffle-Pool Complex with Hyporheic Zone Transition Zone

Date : 22-Aug-14

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Mobilization/Demobilization/Testing				
	Assume 8% of subtotal for items 2-5	1	ls	\$155,200	\$ 155,200
2	Sitework				
	<u>Transition Zone Riffle-Pool Construction</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$20,000	\$ 20,000
	Erosion control & turbidity curtains	1	ls	\$10,000	\$ 10,000
	Clear & grub	6.5	ac	\$6,800	\$ 44,200
	Salvage Topsoil in existing Transition Zone	6,000	cy	\$12	\$ 72,000
	Wet excavation in existing Transition Zone	31,900	cy	\$25	\$ 797,500
	Haul waste to disposal	1,900	ton	\$10	\$ 19,000
	Impermeable fill zone downstream of pools	1,000	cy	\$20	\$ 20,000
	Light rip rap protection of impervious zone	1,000	tn	\$40	\$ 40,000
	Course gravel fill in reconstructed Transition Zone	57,300	tn	\$16	\$ 916,800
	Transition Zone Resting Pools - sitework by others during channel reconfiguration project				\$ -
	Subtotal, Sitework				\$ 1,939,500
3	Piping				
	not applicable				\$ -
	Subtotal, Piping				\$ -
4	Structural and Architectural				
	not applicable				\$ -
	Subtotal, Structural and Architectural				\$ -
5	Mechanical				
	not applicable				\$ -
	Subtotal, Structural and Architectural				\$ -

6	Electrical					
		not applicable			\$	-
		Subtotal, Structural and Architectural			\$	-
<hr/>						
7	Intrumentation and Control					
		not applicable			\$	-
		Subtotal, Structural and Architectural			\$	-
<hr/>						
8	Site Restoration					
	<u>Transition Zone Riffle-Pool Construction</u>					
		Fine grading and slope dressing	1	ls	\$25,000	\$ 25,000
		Transition Zone Resting Pools - restoration by others during channel reconfiguration project			\$	-
		Subtotal, Structural and Architectural			\$	25,000

Total Estimated Direct Costs (Rounded)		\$	2,120,000
General Contractor Overhead and Profit	15.0%	\$	318,000
Subtotal		\$	2,438,000
Contingency	30.0%	\$	731,000
Sales Tax (City of Redmond)	9.5%	\$	301,000
Subtotal			\$3,470,000
Engineering (Design and Construction)	15.0%	\$	521,000
Administration	10.0%	\$	347,000
Alternative 7 - Total Estimated Project Costs			\$4,338,000

T31746 King County - Willowmoor
 Task 6 Cold Water Supplementation
 Concept Alternative Cost Estimate Details



Concept 8 - Hypolimnetic Cooling of Lake Sammamish Surface Water (20 cfs)

Date : 22-Aug-14

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Mobilization/Demobilization/Testing				
	Assume 8% of subtotal for items 2-5	1	ls	\$259,600	\$ 259,600
2	Sitework				
	<u>Pump Site</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$10,000	\$ 10,000
	Erosion control	1	ls	\$5,000	\$ 5,000
	Clear & grub	1	ls	\$5,000	\$ 5,000
	Excavation - Pipelines	640	cy	\$15	\$ 9,600
	Excavation - Pump station	40	cy	\$20	\$ 800
	Turbidity Curtain	200	lf	\$15	\$ 3,000
	Haul waste to disposal	1,300	ton	\$10	\$ 13,000
	Imported fill - Pipeline & Pump Station	1,300	ton	\$15	\$ 19,500
	Trench shoring	1	ls	\$5,000	\$ 5,000
	Dewatering for pipeline and pump station	5	days	\$200	\$ 1,000
	Crushed Surfacing Base Course	100	cy	\$30	\$ 3,000
	<u>Discharge Site At Weir</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$10,000	\$ 10,000
	Erosion control	1	ls	\$2,000	\$ 2,000
	Clear & grub	1	ls	\$2,000	\$ 2,000
	Excavation - Pipelines	210	cy	\$15	\$ 3,200
	Turbidity Curtain	200	lf	\$15	\$ 3,000
	Haul waste to disposal	400	ton	\$10	\$ 4,000
	Imported fill - Pipeline	400	ton	\$20	\$ 8,000
	Trench shoring	1	ls	\$2,000	\$ 2,000
	Dewatering for pipeline construction	2	days	\$200	\$ 400
	Rip Rap Energy Dissipation	30	ton	\$40	\$ 1,200
	Weir retrofit contingency allowance	1	ls	\$5,000	\$ 5,000
	Subtotal, Sitework				\$ 115,700

3

PipingIntake To Pump Station

Cylinder Style Fish Screen	1	allow	\$50,000	\$	50,000
36" HDPE Intake to Heat Exchange System	100	lf	\$141	\$	14,100
24" Alum Heat Exchange Pipe with Fittings	1,000	lf	\$240	\$	240,200
36" HDPE DIPS DR 21 Intake Pipe	16,000	lf	\$141	\$	2,256,000
36" Precast Pipe Anchors	640	ea	\$300	\$	192,000
Large work boat for fish screen & heat exchange	1	allow	\$12,000	\$	12,000
4 - small work boats for pipe positioning	1	ls	\$10,000	\$	10,000
30" HDPE DIPS DR 21 PS Transition Pipe	150	lf	\$105	\$	15,800
30" Valve	1	ea	\$25,000	\$	25,000
30" 45 Deg Bend	4	ea	\$732	\$	2,900
36x30 Reducer	1	ea	\$1,000	\$	1,000

Discharge From Pump Station

18" HDPE DIPS DR 21 PS Transition Pipe	150	lf	\$42	\$	6,300
18" Valve	1	ea	\$20,000	\$	20,000
18" 45 Deg Bend	8	ea	\$224	\$	1,800
24x18 Reducer	1	ea	\$500	\$	500
24" HDPE DIPS DR 21 Discharge Pipe	2,000	lf	\$69	\$	138,000
24" Precast Pipe Anchors	80	ea	\$300	\$	24,000

Discharge Site At Weir

24" HDPE DIPS DR 21 PS Transition Pipe	150	lf	\$69	\$	10,400
24" 45 Deg Bend	5	ea	\$371	\$	1,900

Subtotal, Piping **\$ 2,971,900**

4

Structural and ArchitecturalPump Station

Slab on grade (10'x20'x8")	5	cy	\$250	\$	1,200
Pump building (timber frame, 8'x16')	128	sf	\$200	\$	25,600

Subtotal, Structural and Architectural **\$ 26,800**

5

MechanicalPump Station

Vertical Turbine Pump (single pump, with no backup pum	1	ea	\$126,000	\$	126,000
Building space heater and passive ventilation	1	ls	\$5,000	\$	5,000

Subtotal, Mechanical **\$ 131,000**

6	Electrical					
	<u>Pump Station</u>					
	Pump station power and control panel	1	allow	\$100,000	\$	100,000
	2-3" PVC direct bury conduit	500	lf	\$20	\$	10,000
	Power extension to pump station	500	lf	\$20	\$	10,000
	Meter & shutoff	1	ls	\$500	\$	500
	Electrical contingency allowance	1	ls	\$2,500	\$	2,500
	Subtotal, Electrical and Control				\$	123,000

7	Intrumentation and Control					
	Included in electrical in section 6				\$	-
	Subtotal, Intrumentation and Control				\$	-

8	Site Restoration					
	<u>Pump Station</u>					
	Site landscaping	1	ls	\$2,000	\$	2,000
	<u>Discharge Below Existing Weir</u>					
	Key Logs	3	ea	\$500	\$	1,500
	Imported topsoil	100	cy	\$15	\$	1,500
	Wetland landscaping	1	ls	\$2,000	\$	2,000
	Subtotal, Site Restoration				\$	7,000

Total Estimated Direct Costs (Rounded)		\$	3,635,000
General Contractor Overhead and Profit	15.0%	\$	545,000
Subtotal		\$	4,180,000
Contingency	30.0%	\$	1,254,000
Sales Tax (City of Redmond)	9.5%	\$	516,000
Subtotal			\$5,950,000
Engineering (Design and Construction)	15.0%	\$	893,000
Administration	10.0%	\$	595,000
Alternative 8 - Total Estimated Project Costs			\$7,438,000

T32971 King County - Willowmoor
 Task 420 Alternative 4 (Previously Concept 2) - Pump Groundwater to Side Channel
 Subject: Concept Alternative Cost Estimate Details



Alternative 4 - Pump Groundwater to Side Channel

Date : 25-Nov-14

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Mobilization/Demobilization/Testing				
	Assume 8% of subtotal for items 2-5	1	ls	\$50,000	\$ 50,000
2	Sitework				
	<u>Well Site</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$10,000	\$ 10,000
	Erosion control	1	ls	\$5,000	\$ 5,000
	Clear & grub	1	ls	\$5,000	\$ 5,000
	Trench shoring	1	ls	\$1,000	\$ 1,000
	Construction entrance & well site access driveway	100	cy	\$30	\$ 3,000
	Excavation - Electrical Conduits	640	cy	\$15	\$ 10,000
	Haul waste to disposal	1,200	ton	\$10	\$ 12,000
	Imported concrete fill - Electrical Conduits	640	ton	\$111	\$ 71,000
	New well	1	ls	\$30,000	\$ 30,000
	<u>Discharge Pipeline</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$10,000	\$ 10,000
	Trench shoring	1	ls	\$5,000	\$ 5,000
	Excavation - Discharge Pipeline	5,680	cy	\$15	\$ 85,000
	Haul waste to disposal	10,500	ton	\$10	\$ 105,000
	Imported fill - Discharge Pipeline	5,680	ton	\$15	\$ 85,000
	<u>Side Channel Discharge</u>				
	Side Channel Discharge - sitework by others during channel reconfiguration project				\$ -
					\$ 437,000
3	Piping				
	10" HDPE pipe	3,500	lf	\$33	\$ 115,500
	Pipe valves and appertenances	1	ea	\$1,325	\$ 2,000
	Fittings	4	ea	\$300	\$ 1,200
	Subtotal, Piping				\$ 118,700

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
4	Structural and Architectural				
	<u>Well House</u>				
	Slab on grade (10'x20'x8")	5	cy	\$420	\$ 3,000
	Pump building (timber frame, 8'x16')	128	sf	\$200	\$ 26,000
	Subtotal, Structural and Architectural				\$ 29,000
5	Mechanical				
	Pump 25 hp w/ controls, electric hook up, plumb, & mech	1	ls	\$40,000	\$ 40,000
	Subtotal, Mechanical				\$ 40,000
6	Electrical				
	Wood electrical service pole at W Lake Sammish Pkwy	1	ea	\$2,000	\$ 2,000
	Trench 3 phase service connection from W Lk Sammamish Pkwy	300	lf	\$17	\$ 6,000
	Pump station power and control panel	1	allow	\$75,000	\$ 75,000
	Electrical contingency allowance	1	ls	\$5,000	\$ 5,000
	Subtotal, Electrical and Control				\$ 88,000
7	Intrumentation and Control				
	Included in electrical in section 6				\$ -
	Subtotal, Intrumentation and Control				\$ -
8	Site Restoration				
	<u>Well Site</u>				
	Site landscaping	1	ls	\$2,000	\$ 2,000
	<u>Upland Piping</u>				
	Surface restoration & landscaping	200	msf	\$67	\$ 13,400
	<u>Discharge Site</u>				
	Transition Zone Resting Pools - restoration by others during channel reconfiguration project				\$ -
	Subtotal, Site Restoration				\$ 15,400
<hr/>					
	Total Estimated Direct Costs (Rounded)				\$ 778,000
	General Contractor Overhead and Profit	15.0%			\$ 117,000
	Subtotal				\$ 895,000
	Contingency	30.0%			\$ 269,000
	Sales Tax (City of Redmond)	9.5%			\$ 111,000
	Subtotal				\$1,275,000
	Engineering (Design and Construction)	15.0%			\$ 191,000
	Administration	10.0%			\$ 128,000
	Alternative 2 - Total Estimated Project Costs				\$1,594,000

T32971 King County - Willowmoor
 Task 420 Alternative 5 (Refined Concept 5) - Heat Exchange Water Cooling
 Concept Alternative Cost Estimate Details



Alternative 5 - Pump River Water To Heat Exchange System

Date : 24-Nov-14

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
1	Mobilization/Demobilization/Testing				
	Assume 8% of subtotal for items 2-5	1	ls	\$141,600	\$ 141,600
2	Sitework				
	<u>Pump Site</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$10,000	\$ 10,000
	Erosion control	1	ls	\$5,000	\$ 5,000
	Clear & grub	1	ls	\$5,000	\$ 5,000
	Trench shoring	1	ls	\$5,000	\$ 5,000
	Excavation - Pipelines	1,280	cy	\$15	\$ 19,200
	Excavation - Pump station	40	cy	\$20	\$ 800
	Turbidity Curtain	200	lf	\$15	\$ 3,000
	Haul waste to disposal	2,400	ton	\$10	\$ 24,000
	Imported fill - Pipeline & Pump Station	2,400	ton	\$15	\$ 36,000
	Dewatering for pipeline and pump station	5	days	\$200	\$ 1,000
	Crushed Surfacing Base Course	100	cy	\$30	\$ 3,000
	<u>Upland Pipe From Pump Station To Heat Exchange To Transition Zone Discharge</u>				
	Archaeological monitoring (SHPO standards) allowance	1	ls	\$10,000	\$ 10,000
	Erosion control	1	ls	\$2,000	\$ 2,000
	Clear & grub	1	ls	\$2,000	\$ 2,000
	Trench shoring	1	ls	\$2,000	\$ 2,000
	Excavation - Conveyance & Discharge Pipelines	1,400	cy	\$15	\$ 21,000
	Excavation - Heat Exchange Pipe Trench	6,400	cy	\$15	\$ 96,000
	Excavation - Infiltration Pipelines	1,500	cy	\$15	\$ 22,500
	Haul waste to disposal	17,200	ton	\$10	\$ 172,000
	Imported free draining fill - Pipeline & Heat Exchange	17,200	ton	\$15	\$ 258,000
	Dewatering for pipeline construction	15	days	\$200	\$ 3,000
	<u>Transition Zone Resting Pools</u>				
	Transition Zone Resting Pools - sitework by others during channel reconfiguration work				\$ -
	Subtotal, Sitework				\$ 700,500

3 PipingIntake To Pump Station

Fish Screen Assembly	1	allow	\$5,000	\$	5,000
16" HDPE DIPS DR 21 Intake Assembly	1	ls	\$3,000	\$	3,000
16" HDPE DIPS DR 21 Intake Pipe	280	lf	\$69	\$	19,300
36" Precast Pipe Anchors	3	ea	\$240	\$	700
Work boat for pipe intake positioning	3	day	\$200	\$	600
16x12 Reducer	1	ea	\$1,600	\$	1,600
12" HDPE DIPS DR 21 PS Transition Pipe	20	lf	\$37	\$	700
12" Valve	1	ea	\$5,400	\$	5,400
16" 45 Deg Bend	4	ea	\$1,600	\$	6,400

Upland Pipe From Pump Station To Heat Exchange To Transition Zone

12" HDPE DIPS DR 21 PS Transition Pipe	20	lf	\$37	\$	700
12" Valve	1	ea	\$1,950	\$	2,000
16x12 Reducer	1	ea	\$1,600	\$	1,600
16" HDPE DIPS DR 21 Discharge Pipe	400	lf	\$69	\$	27,600
16" 45 Deg Bend	4	ea	\$1,600	\$	6,400
16" Wye	1	ea	\$1,950	\$	2,000
Heat Exchange Pipe Transition	4	ea	\$5,000	\$	20,000
6" Aluminum Heat Exchange Pipe	36,000	lf	\$18	\$	648,000

Transition Zone Pipe Discharge to Pools

16" HDPE DIPS DR 21 Discharge Pipe	250	lf	\$69	\$	17,300
16" Discharge Tee Energy Dissipator	2	ea	\$1,950	\$	3,900
6" Valve	4	ea	\$1,300	\$	5,200
8" Perforated Aluminum Infiltration Pipe	700	lf	\$14	\$	9,800

Subtotal, Piping **\$ 787,200**

4 Structural and ArchitecturalPump Station

Slab on grade (10'x20'x8")	5	cy	\$420	\$	2,100
Pump building (timber frame, 8'x16')	128	sf	\$200	\$	25,600

Subtotal, Structural and Architectural **\$ 27,700**

5 MechanicalPump Station

Pump System	1	ea	\$250,000	\$	250,000
Building space heater and passive ventilation	1	ls	\$5,000	\$	5,000

Subtotal, Mechanical **\$ 255,000**

6	Electrical					
	<u>Pump Station</u>					
	Pump station power and control panel	1	allow	\$75,000	\$	75,000
	2-3" PVC direct bury conduit	500	lf	\$20	\$	10,000
	Power extension to pump station	500	lf	\$20	\$	10,000
	Meter & shutoff	1	ls	\$500	\$	500
	Electrical contingency allowance	1	ls	\$2,500	\$	2,500
	Subtotal, Electrical and Control				\$	98,000

7	Intrumentation and Control					
	Included in electrical in section 6				\$	-
	Subtotal, Intrumentation and Control				\$	-

8	Site Restoration					
	<u>Pump Station</u>					
	Site landscaping	1	ls	\$2,000	\$	2,000
	<u>Upland Piping</u>					
	Surface restoration & landscaping	460	msf	\$67	\$	30,800
	<u>Discharge Site</u>					
	Transition Zone Resting Pools - restoration by others during channel reconfiguration project				\$	-
	Subtotal, Site Restoration				\$	32,800

Total Estimated Direct Costs (Rounded)		\$	2,043,000
General Contractor Overhead and Profit	15.0%	\$	306,000
Subtotal		\$	2,349,000
Contingency	30.0%	\$	705,000
Sales Tax (City of Redmond)	9.5%	\$	290,000
Subtotal			\$3,344,000
Engineering (Design and Construction)	15.0%	\$	502,000
Administration	10.0%	\$	334,000
Alternative 1 - Total Estimated Project Costs			\$4,180,000

O&M Cost Estimates

Willowmoor No Action Alternative O&M Costs

Date: Updated April 2015

Federal FY14 Interest Rate



					No Action		
Feature	No.	Item	Unit	Unit Cost	Qty	Cost	Notes
O&M		Planning/Permitting	LS	\$ 40,000	1.0	\$ 40,000	Permit applications, agency coordination, assume every 5 years (HPA, etc. valid for 5 years) Mowing and raking to remove debris, 7 acres, leaving a 10 foot willow buffer both sides of low-flow channel; likely trimming of willow buffer annually and thinning every other year Remove accumulated sediment on the channel bed, assume every 25 years Mitigation required for every permit renewal, assume 1 acre and monitoring Over a 50 year project life
		Mowing/Raking Both Banks	LS	\$ 20,000	1.0	\$ 20,000	
		Remove Sediment	LS	\$ 10,000	1.0	\$ 10,000	
		Mitigation -- Planting	LS	\$ 40,000	1.0	\$ 40,000	
		Annual Inspection	LS	\$ 3,000	1.0	\$ 3,000	
		NPV O&M Cost				\$972,719	
Discounted O&M Costs					Year	Cost	
		Interest Rate (Federal FY14)		3.500%	1	\$ 103,000	Planning, permitting, mowing/raking, and mitigation
		Project life		50	2	\$ 23,000	Mowing/raking
					3	\$ 23,000	Mowing/raking
					4	\$ 23,000	Mowing/raking
					5	\$ 103,000	Planning, permitting, mowing/raking, and mitigation
					6	\$ 23,000	Mowing/raking
					7	\$ 23,000	Mowing/raking
					8	\$ 23,000	Mowing/raking
					9	\$ 23,000	Mowing/raking
					10	\$ 103,000	Planning, permitting, mowing/raking, and mitigation
					11	\$ 23,000	Mowing/raking
					12	\$ 23,000	Mowing/raking
					13	\$ 23,000	Mowing/raking
					14	\$ 23,000	Mowing/raking
					15	\$ 103,000	Planning, permitting, mowing/raking, and mitigation
					16	\$ 23,000	Mowing/raking
					17	\$ 23,000	Mowing/raking
					18	\$ 23,000	Mowing/raking
					19	\$ 23,000	Mowing/raking
					20	\$ 103,000	Planning, permitting, mowing/raking, and mitigation
					21	\$ 23,000	Mowing/raking
					22	\$ 23,000	Mowing/raking
					23	\$ 23,000	Mowing/raking
					24	\$ 23,000	Mowing/raking

Willowmoor No Action Alternative O&M Costs

Date: Updated April 2015

Federal FY14 Interest Rate



	No Action		
	25	\$ 113,000	Planning, permitting, mowing/raking, remove sediment and mitigation
	26	\$ 23,000	Mowing/raking
	27	\$ 23,000	Mowing/raking
	28	\$ 23,000	Mowing/raking
	29	\$ 23,000	Mowing/raking
	30	\$ 103,000	Planning, permitting, mowing/raking, and mitigation
	31	\$ 23,000	Mowing/raking
	32	\$ 23,000	Mowing/raking
	33	\$ 23,000	Mowing/raking
	34	\$ 23,000	Mowing/raking
	35	\$ 103,000	Planning, permitting, mowing/raking, and mitigation
	36	\$ 23,000	Mowing/raking
	37	\$ 23,000	Mowing/raking
	38	\$ 23,000	Mowing/raking
	39	\$ 23,000	Mowing/raking
	40	\$ 103,000	Planning, permitting, mowing/raking, and mitigation
	41	\$ 23,000	Mowing/raking
	42	\$ 23,000	Mowing/raking
	43	\$ 23,000	Mowing/raking
	44	\$ 23,000	Mowing/raking
	45	\$ 103,000	Planning, permitting, mowing/raking, and mitigation
	46	\$ 23,000	Mowing/raking
	47	\$ 23,000	Mowing/raking
	48	\$ 23,000	Mowing/raking
	49	\$ 23,000	Mowing/raking
	50	\$ 113,000	Planning, permitting, mowing/raking, remove sediment and mitigation
	Sum	\$ 2,050,000	
	NPV	\$972,719	
	AVG	\$ 41,000	

Willowmoor Channel Concept O&M Costs
Date: April 2015
Federal FY14 Interest Rate

				Concept 2, Single Meander		Concept 3, Single Meander w/ Hyporheic Channels		Concept 4, Split Flow Channel		Concept 5, Widened Main Channel			
Feature	No.	Item	Unit	Unit Cost	Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost	Notes
O&M		Annual Inspection	LS	\$3,000.00	1.0	\$ 3,000	1.0	\$ 3,000	1.0	\$ 3,000	1.0	\$ 3,000	Assume one to two days for 2 people, every year, each at \$150 per hour. Inspection and documentation.
		Repair/replace Large Wood	Each	\$ 2,500	25	\$ 62,500	83	\$ 206,250	83	\$ 206,250	25	\$ 62,500	Unit cost assumes new LWD, anchors ~ \$2000 + 20% for mobilization = \$2500. Assume 50% replacement in 50 years.
		Replace Streambed Gravels	Ton	\$ 44	2330	\$ 102,502	12218	\$ 537,592	2437	\$ 107,237	2330	\$ 102,502	Unit cost assumes gravel cost + 25% for mobilization. Assume 20% replacement in 50 years.
		Clean Hyporheic Intake	LS	\$ 20,000	0.0	\$ -	1.0	\$ 20,000	0.0	\$ -	0.0	\$ -	Every 10 years
		Removal of Invasive Species	LS	\$20,000.00	1.0	\$ 20,000	1.0	\$ 20,000	1.0	\$ 20,000	1.0	\$ 20,000	Invasives Species Control; first 10 years only
		Vegetation Trimming	LS	\$10,000.00	1.0	\$ 10,000	2.0	\$ 20,000	2.0	\$ 20,000	1.0	\$ 10,000	Trimming estimated to be required every 5 years; Concepts 3 and 4 more expensive due to secondary channel(s)
		Mowing/Raking Banks	LS	\$ 15,000	1.0	\$ 15,000	1.0	\$ 15,000	0.0	\$ -	0.0	\$ -	Mowing/raking required every 2 years for concepts 2 and 3 that only slightly increase conveyance and maintain much of existing TZ
			LS		0.0	\$ -	0.0	\$ -	0.0	\$ -	0.0	\$ -	
		NPV O&M Cost				\$523,151		\$849,128		\$456,831		\$350,260	Over a 50 year project life
		Discounted O&M Costs			Year	Cost	Year	Cost	Year	Cost	Year	Cost	
		Interest Rate (Federal FY14)		3.500%	1	\$ 23,000	1	\$ 23,000	1	\$ 23,000	1	\$ 23,000	
		Project life		50	2	\$ 38,000	2	\$ 38,000	2	\$ 23,000	2	\$ 23,000	
					3	\$ 23,000	3	\$ 23,000	3	\$ 23,000	3	\$ 23,000	
					4	\$ 38,000	4	\$ 38,000	4	\$ 23,000	4	\$ 23,000	
					5	\$ 33,000	5	\$ 43,000	5	\$ 43,000	5	\$ 33,000	
					6	\$ 38,000	6	\$ 38,000	6	\$ 23,000	6	\$ 23,000	
					7	\$ 23,000	7	\$ 23,000	7	\$ 23,000	7	\$ 23,000	
					8	\$ 38,000	8	\$ 38,000	8	\$ 23,000	8	\$ 23,000	
					9	\$ 23,000	9	\$ 23,000	9	\$ 23,000	9	\$ 23,000	
					10	\$ 48,000	10	\$ 78,000	10	\$ 43,000	10	\$ 33,000	
					11	\$ 3,000	11	\$ 3,000	11	\$ 3,000	11	\$ 3,000	
					12	\$ 18,000	12	\$ 18,000	12	\$ 3,000	12	\$ 3,000	
					13	\$ 3,000	13	\$ 3,000	13	\$ 3,000	13	\$ 3,000	
					14	\$ 18,000	14	\$ 18,000	14	\$ 3,000	14	\$ 3,000	
					15	\$ 13,000	15	\$ 23,000	15	\$ 23,000	15	\$ 13,000	
					16	\$ 18,000	16	\$ 18,000	16	\$ 3,000	16	\$ 3,000	
					17	\$ 3,000	17	\$ 3,000	17	\$ 3,000	17	\$ 3,000	
					18	\$ 18,000	18	\$ 18,000	18	\$ 3,000	18	\$ 3,000	
					19	\$ 3,000	19	\$ 3,000	19	\$ 3,000	19	\$ 3,000	
					20	\$ 28,000	20	\$ 58,000	20	\$ 23,000	20	\$ 13,000	
					21	\$ 3,000	21	\$ 3,000	21	\$ 3,000	21	\$ 3,000	
					22	\$ 18,000	22	\$ 18,000	22	\$ 3,000	22	\$ 3,000	
					23	\$ 3,000	23	\$ 3,000	23	\$ 3,000	23	\$ 3,000	
					24	\$ 18,000	24	\$ 18,000	24	\$ 3,000	24	\$ 3,000	
					25	\$ 178,002	25	\$ 766,842	25	\$ 336,487	25	\$ 178,002	
					26	\$ 18,000	26	\$ 18,000	26	\$ 3,000	26	\$ 3,000	
					27	\$ 3,000	27	\$ 3,000	27	\$ 3,000	27	\$ 3,000	
					28	\$ 18,000	28	\$ 18,000	28	\$ 3,000	28	\$ 3,000	
					29	\$ 3,000	29	\$ 3,000	29	\$ 3,000	29	\$ 3,000	
					30	\$ 28,000	30	\$ 58,000	30	\$ 23,000	30	\$ 13,000	
					31	\$ 3,000	31	\$ 3,000	31	\$ 3,000	31	\$ 3,000	
					32	\$ 18,000	32	\$ 18,000	32	\$ 3,000	32	\$ 3,000	
					33	\$ 3,000	33	\$ 3,000	33	\$ 3,000	33	\$ 3,000	
					34	\$ 18,000	34	\$ 18,000	34	\$ 3,000	34	\$ 3,000	
					35	\$ 13,000	35	\$ 23,000	35	\$ 23,000	35	\$ 13,000	
					36	\$ 18,000	36	\$ 18,000	36	\$ 3,000	36	\$ 3,000	
					37	\$ 3,000	37	\$ 3,000	37	\$ 3,000	37	\$ 3,000	
					38	\$ 18,000	38	\$ 18,000	38	\$ 3,000	38	\$ 3,000	
					39	\$ 3,000	39	\$ 3,000	39	\$ 3,000	39	\$ 3,000	
					40	\$ 28,000	40	\$ 58,000	40	\$ 23,000	40	\$ 13,000	
					41	\$ 3,000	41	\$ 3,000	41	\$ 3,000	41	\$ 3,000	
					42	\$ 18,000	42	\$ 18,000	42	\$ 3,000	42	\$ 3,000	
					43	\$ 3,000	43	\$ 3,000	43	\$ 3,000	43	\$ 3,000	
					44	\$ 18,000	44	\$ 18,000	44	\$ 3,000	44	\$ 3,000	
					45	\$ 13,000	45	\$ 23,000	45	\$ 23,000	45	\$ 13,000	
					46	\$ 18,000	46	\$ 18,000	46	\$ 3,000	46	\$ 3,000	
					47	\$ 3,000	47	\$ 3,000	47	\$ 3,000	47	\$ 3,000	
					48	\$ 18,000	48	\$ 18,000	48	\$ 3,000	48	\$ 3,000	
					49	\$ 3,000	49	\$ 3,000	49	\$ 3,000	49	\$ 3,000	
					50	\$ 28,000	50	\$ 43,000	50	\$ 23,000	50	\$ 13,000	
					Sum	\$ 990,002	Sum	\$ 1,753,842	Sum	\$ 863,487	Sum	\$ 615,002	
					NPV	\$523,151	NPV	\$849,128	NPV	\$456,831	NPV	\$350,260	
					AVG	\$ 19,800	AVG	\$ 35,077	AVG	\$ 17,270	AVG	\$ 12,300	



Feature	No.	Item	Unit	Unit Cost	Hypolimnetic Withdrawal from Lake Sammamish		S Groundwater Pump to Side Channel		Shallow Groundwater Trenches to Pools		Purchase Potable Water to Pipe to Pools		Pump to 2-5 cfs Heat Exchangers to Pools		Pump Lake Water to Hyporheic Discharge at Pools		Riffle Pool and Hyporheic Transition Zone		Hypolimnetic Cooling of Lake Surface Water	
					Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost
O&M		Pump Usage Cost - Electricity	LS	\$ 1	1.0	\$ 6,300	1.0	\$ 3,200	0.0	\$ -	0.0	\$ -	1.0	\$ 16,800	1.0	\$ 900	0.0	\$ -	1.0	\$ 6,300
		Potable Water Usage Costs	LS	\$ 190,000	0.0	\$ -	0.0	\$ -	0.0	\$ -	1.0	\$ 190,000	0.0	\$ -	0.0	\$ -	0.0	\$ -	0.0	\$ -
		Annual On/Off	LS	\$ 1,000	1.0	\$ 1,000	1.0	\$ 1,000	0.0	\$ -	0.0	\$ -	1.0	\$ 1,000	1.0	\$ 1,000	0.0	\$ -	1.0	\$ 1,000
		Lake Intake Inspection	LS	\$ 5,000	1.0	\$ 5,000	0.0	\$ -	0.0	\$ -	0.0	\$ -	0.0	\$ -	0.0	\$ -	0.0	\$ -	1.0	\$ 5,000
		River Intake Inspection	LS	\$ 2,000	0.0	\$ -	0.0	\$ -	0.0	\$ -	0.0	\$ -	1.0	\$ 2,000	1.0	\$ 2,000	0.0	\$ -	0.0	\$ -
		Pump & Pipe Maintenance	LS	\$ 1,000	1.0	\$ 1,000	1.0	\$ 1,000	0.0	\$ -	0.0	\$ -	1.0	\$ 1,000	1.0	\$ 1,000	0.0	\$ -	1.0	\$ 1,000
		Perf Pipe Inspection & Cleaning	LS	\$ 1,000	0.0	\$ -	0.0	\$ -	1.0	\$ 1,000	0.0	\$ -	0.0	\$ -	1.0	\$ 1,000	0.0	\$ -	0.0	\$ -
		Heat exchange inspection and cleaning	LS	\$ 1,000	0.0	\$ -	0.0	\$ -	1.0	\$ 1,000	0.0	\$ -	1.0	\$ 1,000	0.0	\$ -	0.0	\$ -	0.0	\$ -
		Transition zone maintenance	LS	\$ 5,000	0.0	\$ -	0.0	\$ -	0.0	\$ -	0.0	\$ -	0.0	\$ -	0.0	\$ -	1.0	\$ 5,000	0.0	\$ -
		NPV O&M Cost				\$197,470		\$102,888		\$23,456		\$4,456,567		\$435,006		\$62,062		\$117,278		\$197,470

Discounted O&M Costs				Year	Cost	Year	Cost	Year	Cost	Year	Cost	Year	Cost	Year	Cost	Year	Cost	Year	Cost	
Interest Rate (Federal FY14)				1	\$ 7,300	1	\$ 4,200	1	\$ 1,000	1	\$ 190,000	1	\$ 1,900	1	\$ 5,000	1	\$ 7,300			
Project life				2	\$ 7,300	2	\$ 4,200	2	\$ 1,000	2	\$ 190,000	2	\$ 1,900	2	\$ 5,000	2	\$ 7,300			
3.500%				3	\$ 7,300	3	\$ 4,200	3	\$ 1,000	3	\$ 190,000	3	\$ 1,900	3	\$ 5,000	3	\$ 7,300			
50				4	\$ 7,300	4	\$ 4,200	4	\$ 1,000	4	\$ 190,000	4	\$ 1,900	4	\$ 5,000	4	\$ 7,300			
				5	\$ 13,300	5	\$ 5,200	5	\$ 1,000	5	\$ 190,000	5	\$ 5,900	5	\$ 5,000	5	\$ 13,300			
				6	\$ 7,300	6	\$ 4,200	6	\$ 1,000	6	\$ 190,000	6	\$ 1,900	6	\$ 5,000	6	\$ 7,300			
				7	\$ 7,300	7	\$ 4,200	7	\$ 1,000	7	\$ 190,000	7	\$ 1,900	7	\$ 5,000	7	\$ 7,300			
				8	\$ 7,300	8	\$ 4,200	8	\$ 1,000	8	\$ 190,000	8	\$ 1,900	8	\$ 5,000	8	\$ 7,300			
				9	\$ 7,300	9	\$ 4,200	9	\$ 1,000	9	\$ 190,000	9	\$ 1,900	9	\$ 5,000	9	\$ 7,300			
				10	\$ 13,300	10	\$ 5,200	10	\$ 1,000	10	\$ 190,000	10	\$ 5,900	10	\$ 5,000	10	\$ 13,300			
				11	\$ 7,300	11	\$ 4,200	11	\$ 1,000	11	\$ 190,000	11	\$ 1,900	11	\$ 5,000	11	\$ 7,300			
				12	\$ 7,300	12	\$ 4,200	12	\$ 1,000	12	\$ 190,000	12	\$ 1,900	12	\$ 5,000	12	\$ 7,300			
				13	\$ 7,300	13	\$ 4,200	13	\$ 1,000	13	\$ 190,000	13	\$ 1,900	13	\$ 5,000	13	\$ 7,300			
				14	\$ 7,300	14	\$ 4,200	14	\$ 1,000	14	\$ 190,000	14	\$ 1,900	14	\$ 5,000	14	\$ 7,300			
				15	\$ 13,300	15	\$ 5,200	15	\$ 1,000	15	\$ 190,000	15	\$ 5,900	15	\$ 5,000	15	\$ 13,300			
				16	\$ 7,300	16	\$ 4,200	16	\$ 1,000	16	\$ 190,000	16	\$ 1,900	16	\$ 5,000	16	\$ 7,300			
				17	\$ 7,300	17	\$ 4,200	17	\$ 1,000	17	\$ 190,000	17	\$ 1,900	17	\$ 5,000	17	\$ 7,300			
				18	\$ 7,300	18	\$ 4,200	18	\$ 1,000	18	\$ 190,000	18	\$ 1,900	18	\$ 5,000	18	\$ 7,300			
				19	\$ 7,300	19	\$ 4,200	19	\$ 1,000	19	\$ 190,000	19	\$ 1,900	19	\$ 5,000	19	\$ 7,300			
				20	\$ 13,300	20	\$ 5,200	20	\$ 1,000	20	\$ 190,000	20	\$ 5,900	20	\$ 5,000	20	\$ 13,300			
				21	\$ 7,300	21	\$ 4,200	21	\$ 1,000	21	\$ 190,000	21	\$ 1,900	21	\$ 5,000	21	\$ 7,300			
				22	\$ 7,300	22	\$ 4,200	22	\$ 1,000	22	\$ 190,000	22	\$ 1,900	22	\$ 5,000	22	\$ 7,300			
				23	\$ 7,300	23	\$ 4,200	23	\$ 1,000	23	\$ 190,000	23	\$ 1,900	23	\$ 5,000	23	\$ 7,300			
				24	\$ 7,300	24	\$ 4,200	24	\$ 1,000	24	\$ 190,000	24	\$ 1,900	24	\$ 5,000	24	\$ 7,300			
				25	\$ 13,300	25	\$ 5,200	25	\$ 1,000	25	\$ 190,000	25	\$ 5,900	25	\$ 5,000	25	\$ 13,300			
				26	\$ 7,300	26	\$ 4,200	26	\$ 1,000	26	\$ 190,000	26	\$ 1,900	26	\$ 5,000	26	\$ 7,300			
				27	\$ 7,300	27	\$ 4,200	27	\$ 1,000	27	\$ 190,000	27	\$ 1,900	27	\$ 5,000	27	\$ 7,300			
				28	\$ 7,300	28	\$ 4,200	28	\$ 1,000	28	\$ 190,000	28	\$ 1,900	28	\$ 5,000	28	\$ 7,300			
				29	\$ 7,300	29	\$ 4,200	29	\$ 1,000	29	\$ 190,000	29	\$ 1,900	29	\$ 5,000	29	\$ 7,300			
				30	\$ 13,300	30	\$ 5,200	30	\$ 1,000	30	\$ 190,000	30	\$ 5,900	30	\$ 5,000	30	\$ 13,300			
				31	\$ 7,300	31	\$ 4,200	31	\$ 1,000	31	\$ 190,000	31	\$ 1,900	31	\$ 5,000	31	\$ 7,300			
				32	\$ 7,300	32	\$ 4,200	32	\$ 1,000	32	\$ 190,000	32	\$ 1,900	32	\$ 5,000	32	\$ 7,300			
				33	\$ 7,300	33	\$ 4,200	33	\$ 1,000	33	\$ 190,000	33	\$ 1,900	33	\$ 5,000	33	\$ 7,300			
				34	\$ 7,300	34	\$ 4,200	34	\$ 1,000	34	\$ 190,000	34	\$ 1,900	34	\$ 5,000	34	\$ 7,300			
				35	\$ 13,300	35	\$ 5,200	35	\$ 1,000	35	\$ 190,000	35	\$ 5,900	35	\$ 5,000	35	\$ 13,300			
				36	\$ 7,300	36	\$ 4,200	36	\$ 1,000	36	\$ 190,000	36	\$ 1,900	36	\$ 5,000	36	\$ 7,300			
				37	\$ 7,300	37	\$ 4,200	37	\$ 1,000	37	\$ 190,000	37	\$ 1,900	37	\$ 5,000	37	\$ 7,300			
				38	\$ 7,300	38	\$ 4,200	38	\$ 1,000	38	\$ 190,000	38	\$ 1,900	38	\$ 5,000	38	\$ 7,300			
				39	\$ 7,300	39	\$ 4,200	39	\$ 1,000	39	\$ 190,000	39	\$ 1,900	39	\$ 5,000	39	\$ 7,300			
				40	\$ 13,300	40	\$ 5,200	40	\$ 1,000	40	\$ 190,000	40	\$ 5,900	40	\$ 5,000	40	\$ 13,300			
				41	\$ 7,300	41	\$ 4,200	41	\$ 1,000	41	\$ 190,000	41	\$ 1,900	41	\$ 5,000	41	\$ 7,300			
				42	\$ 7,300	42	\$ 4,200	42	\$ 1,000	42	\$ 190,000	42	\$ 1,900	42	\$ 5,000	42	\$ 7,300			
				43	\$ 7,300	43	\$ 4,200	43	\$ 1,000	43	\$ 190,000	43	\$ 1,900	43	\$ 5,000	43	\$ 7,300			
				44	\$ 7,300	44	\$ 4,200	44	\$ 1,000	44	\$ 190,000	44	\$ 1,900	44	\$ 5,000	44	\$ 7,300			
				45	\$ 13,300	45	\$ 5,200	45	\$ 1,000	45	\$ 190,000	45	\$ 5,900	45	\$ 5,000	45	\$ 13,300			
				46	\$ 7,300	46	\$ 4,200	46	\$ 1,000	46	\$ 190,000	46	\$ 1,900	46	\$ 5,000	46	\$ 7,300			
				47	\$ 7,300	47	\$ 4,200	47	\$ 1,000	47	\$ 190,000	47	\$ 1,900	47	\$ 5,000	47	\$ 7,300			
				48	\$ 7,300	48	\$ 4,200	48	\$ 1,000	48	\$ 190,000	48	\$ 1,900	48	\$ 5,000	48	\$ 7,300			
				49	\$ 7,300	49	\$ 4,200	49	\$ 1,000	49	\$ 190,000	49	\$ 1,900	49	\$ 5,000	49	\$ 7,300			
				50	\$ 13,300	50	\$ 5,200	50	\$ 1,000	50	\$ 190,000	50	\$ 5,900	50	\$ 5,000	50	\$ 13,300			
Sum				\$ 425,000	Sum	\$ 220,000	Sum	\$ 50,000	Sum	\$ 9,500,000	Sum	\$ 930,000	Sum	\$ 135,000	Sum	\$ 250,000	Sum	\$ 425,000		
NPV				\$197,470	NPV	\$102,888	NPV	\$23,456	NPV	\$4,456,567	NPV	\$435,006	NPV	\$62,062	NPV	\$117,278	NPV	\$197,470		
AVG				\$ 8,500	AVG	\$ 4,400	AVG	\$ 1,000	AVG	\$ 190,000	AVG	\$ 18,600	AVG	\$ 2,700	AVG	\$ 5,000	AVG	\$ 8,500		