Appendix G

BMP Cost Estimates

Table G-1a. Preliminary Cost Estimate -- Regional Infiltration Basins (Valley M.S.- Apple Valley, West Buckhill - Burnsville, Rolling Oaks - Lakeville)*

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$6,105	$6,105
Flow Diversion Structures	L.S.	3	$2,500	$7,500
Grit Chamber	L.S.	3	$25,000	$75,000
Clearing & Grubbing	Ac.	1.71	$1,000	$1,710
Basin Excavation	C.Y.	2307	$10	$23,071
18" Piping	L.F.	100	$54	$5,400
Overflow Sturcture	L.S.	3	$2,000	$6,000
Pond Restoration	Ac.	1.71	$2,000	$3,420
Subtotal				$128,206
Engineering & Design (15%)				$19,231
Contingencies (10%)				$12,821
Total				$160,257

Table G-1b. Preliminary Cost Estimate -- Regional Infiltration Basins (Valley M.S.- Apple Valley, West Buckhill - Burnsville)*

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$4,108	$4,108
Flow Diversion Structures	L.S.	2	$2,500	$5,000
Grit Chamber	L.S.	2	$25,000	$50,000
Clearing & Grubbing	Ac.	0.97	$1,000	$970
Basin Excavation	C.Y.	1484	$10	$14,843
18" Piping	L.F.	100	$54	$5,400
Overflow Sturcture	L.S.	2	$2,000	$4,000
Pond Restoration	Ac.	0.97	$2,000	$1,940
Subtotal				$86,260
Engineering & Design (15%)				$12,939
Contingencies (10%)				$8,626
Total				$107,825

Table G-1c. Preliminary Cost Estimate -- Regional Infiltration Basin in West Buckhill Park-Burnsville

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$2,245	$2,245
Flow Diversion Structure	L.S.	1	$5,000	$5,000
Grit Chamber	L.S.	1	$25,000	$25,000
Clearing & Grubbing	Ac.	0.61	$1,000	$610
Basin & Overland Flow Channel Excavation	C.Y.	807	$10	$8,067
Overflow Sturcture	L.S.	1	$5,000	$5,000
Pond Restoration	Ac.	0.61	$2,000	$1,220
Subtotal				$47,142
Engineering & Design (15%)				$7,071
Contingencies (10%)				$4,714
Total				$58,927

Table G-2. Preliminary Cost Estimate -- Apple Valley's Existing Redwood Upgrade/Expansion into Infiltration Basin

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$4,012	$4,012
Grit Chamber	L.S.	1	$25,000	$25,000
Basin Excavation	C.Y.	5324	$10	$53,240
Pond Restoration	Ac.	1	$2,000	$2,000
Subtotal				$84,252
Engineering & Design (15%)				$12,638
Contingencies (10%)				$8,425
Total				$105,315

Table G-3. Preliminary Cost Estimate -- Add Rainwater Gardens Throughout Entire Watershed Sized to Infiltration 1/4 Inch of Runoff from Impervious Areas

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$444,250	$444,250
Install Rainwater Gardens	S.F.	886,500	$10	$8,865,005
Pond Restoration	Ac.	10	$2,000	$20,000
Subtotal				$9,329,255
Engineering & Design (15%)				$1,399,388
Contingencies (10%)				$932,925
Total				$11,661,568

Table G-4. Preliminary Cost Estimate -- Add Rainwater Gardens Throughout Entire Watershed Sized to Infiltration 1/2 Inch of Runoff from Impervious Areas

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$887,500	$887,500
Install Rainwater Gardens	S.F.	1,773,001	$10	$17,730,009
Pond Restoration	Ac.	10	$2,000	$20,000
Subtotal				$18,637,509
Engineering & Design (15%)				$2,795,626
Contingencies (10%)				$1,863,751
Total				$23,296,887

Table G-5. Preliminary Cost Estimate -- Add Rainwater Gardens Throughout Entire Watershed Sized to Infiltration 3/4 Inch of Runoff from Impervious Areas

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$1,330,751	$1,330,751
Install Rainwater Gardens	S.F.	2,659,501	$10	$26,595,014
Pond Restoration	Ac.	10	$2,000	$20,000
Subtotal				$27,945,764
Engineering & Design (15%)				$4,191,865
Contingencies (10%)				$2,794,576
Total				$34,932,205

Table G-6. Preliminary Cost Estimate -- Add Rainwater Gardens Throughout Entire Watershed Sized to Infiltration 1 1/2 Inches of Runoff from Impervious Areas

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$2,660,501	$2,660,501
Install Rainwater Gardens	S.F.	5,319,003	$10	$53,190,027
Pond Restoration	Ac.	10	$2,000	$20,000
Subtotal				$55,870,528
Engineering & Design (15%)				$8,380,579
Contingencies (10%)				$5,587,053
Total				$69,838,160

Table G-7a. Preliminary Cost Estimate --Upgrade Existing Ponds to NURP Standards

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$37,219	$37,219
Basin Excavation	C.Y.	72439	$10	$724,387
Pond Restoration	Ac.	10	$2,000	$20,000
Subtotal				$781,606
Engineering & Design (15%)				$117,241
Contingencies (10%)				$78,161
Total				$977,008

Table G-7b. Preliminary Cost Estimate --Upgrade Select Existing Ponds to NURP Standards (Excludes Redwood Pond)

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$6,550	$6,550
Basin Excavation	C.Y.	12100	$10	$121,000
Pond Restoration	Ac.	5	$2,000	$10,000
Subtotal				$137,550
Engineering & Design (15%)				$20,633
Contingencies (10%)				$13,755
Total				$171,938

Table G-8. Preliminary Cost Estimate -- Add Ponds into A7a-1 & A7b-1

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$22,622	$22,622
Flow Diversion Structures	L.S.	2	$10,000	$20,000
Clearing & Grubbing	Ac.	4	$1,000	$4,000
Basin Excavation	C.Y.	31944	$10	$319,440
60" Piping	L.F.	450	$180	$81,000
Weir Outlet/Overflow Sturcture	L.S.	2	$10,000	$20,000
Pond Restoration	Ac.	4	$2,000	$8,000
Subtotal				$475,062
Engineering & Design (15%)				$71,259
Contingencies (10%)				$47,506
Total				$593,828

Table G-9. Preliminary Cost Estimate -- Ropute Keller Lake Outflows Directly to Crystal Lake Outlet

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$31,180	$31,180
Flow Diversion Structure	L.S.	1	$20,000	$20,000
36" PE Piping	L.F.	5,300	$ 112.00	$593,600
Weir Outlet/Overflow Sturcture	L.S.	1	$10,000	$10,000
Subtotal				$654,780
Engineering & Design (25%)				$163,695
Contingencies (25%)				$163,695
Total				$982,170

Table G-10. Preliminary Cost Estimate -- Construct a Alum Treatment Plant at CL-2b (10 cfs)

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$36,980	$36,980
Building, Injection System, Alum Storage, Controls	L.S.	1	$175,000	$175,000
Monitoring System	L.S.	1	$10,000	$10,000
Piping, Diversions, Weirs and Stop Logs	L.S.	1	$250,000	$250,000
Pond Excavation	C.Y.	23,869	$10	$238,685
Pond Restoration (assumes 5' Avg Depth)	Ac.	3.0	$2,000	$5,918
Bench Testing and Dosing	L.S.	1	$60,000	$60,000
Subtotal				$776,583
Engineering & Design (25%)				$194,146
Contingencies (25%)				$194,146
Total				$1,164,874

Table G-11. Preliminary Cost Estimate -- Construct a Alum Treatment Plant at Keller Lake Outlet (5 cfs)

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$26,498	$26,498
Building, Injection System, Alum Storage, Controls	L.S.	1	$175,000	$175,000
Monitoring System	L.S.	1	$10,000	$10,000
Piping, Diversions, Weirs and Stop Logs	L.S.	1	$200,000	$200,000
Pond Excavation	C.Y.	8,290	$10	$82,895
Pond Restoration (assumes 5' Avg Depth)	Ac.	1.0	$2,000	$2,055
Bench Testing and Dosing	L.S.	1	$60,000	$60,000
Subtotal				$556,448
Engineering & Design (25%)				$139,112
Contingencies (25%)				$139,112
Total				$834,672

Table G-12. Preliminary Cost Estimate -- In-Lake Alum Application to Crystal Lake

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$9,500	$9,500
Alum Application	Ac.	292.3	$650	$189,995
Subtotal				$199,495
Dosing Determination, Analytical	L.S.	1	$10,000	$10,000
Engineering & Design (15%)				$29,924
Contingencies (10%)				$19,949
Total				$259,368

Table G-13. Preliminary Cost Estimate -- In-Lake Alum Application to Keller Lake

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$1,788	$1,788
Alum Application	Ac.	55	$650	$35,750
Subtotal				$37,538
Dosing Determination, Analytical	L.S.	1	$10,000	$10,000
Engineering & Design (15%)				$5,631
Contingencies (10%)				$3,754
Total				$56,922

Table G-14. Preliminary Cost Estimate -- In-Lake Alum Application to Main Basin of Crystal Lake

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$6,078	$6,078
Alum Application	Ac.	187	$650	$121,550
Subtotal				$127,628
Dosing Determination, Analytical	L.S.	1	$10,000	$10,000
Engineering & Design (15%)				$19,144
Contingencies (10%)				$12,763
Total				$169,534

Table G-15. Preliminary Cost Estimate -- In-Lake Cooper Sulfate Application to Crystal Lake

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$292	$292
Alum Application	Ac.	292.3	$ 20.00	$5,846
Total				$6,138

Table G-16. Preliminary Cost Estimate -- In-Lake Alum Application to Crystal Lake Main Basin and Alum+Lime Treatment for 15% of Crystal Lake's Littoral Zone

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$7,641	$7,641
Alum Application	Ac.	200.3	$650	$130,195
Lime Application	Ac.	31.2	$ 725.00	$22,620
Subtotal				$160,456
Dosing Determination, Analytical	L.S.	1	$10,000	$10,000
Engineering & Design (15%)				$24,068
Contingencies (10%)				$16,046
Total				$210,570

Table G-17. Preliminary Cost Estimate -- In-Lake Alum Application to Crystal Lake Main Basin and Alum+Lime Treatment for 50% of Crystal Lake's Littoral Zone

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$12,048	$12,048
Alum Application	Ac.	254.7	$650	$165,555
Lime Application	Ac.	104	$ 725.00	$75,400
Subtotal				$253,003
Dosing Determination, Analytical	L.S.	1	$10,000	$10,000
Engineering & Design (15%)				$37,950
Contingencies (10%)				$25,300
Total				$326,253

Table G-18. Preliminary Cost Estimate -- In-Lake Alum Application to Crystal Lake Main Basin and Alum+Lime Treatment for 100% of Crystal Lake's Littoral Zone

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$17,040	$17,040
Alum Application	Ac.	292	$650	$189,995
Lime Application	Ac.	208	$ 725.00	$150,800
Subtotal				$357,835
Dosing Determination, Analytical	L.S.	1	$10,000	$10,000
Engineering & Design (15%)				$53,675
Contingencies (10%)				$35,783
Total				$457,293

Table G-19. Preliminary Cost Estimate -- Mechanical Harvesting of Curlyleaf Pondweed in Crystal Lake

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$2,600	$2,600
Mechanical Harvesting	Ac.	104	$500	$52,000
Total				$54,600

Table G-20. Preliminary Cost Estimate -- Mechanical Harvesting of Curlyleaf Pondweed in Keller Lake

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (0%)	L.S.	1	$684	$684
Mechanical Harvesting	Ac.	27	$500	$13,675
Total				$14,359

Table G-21. Preliminary Cost Estimate -- In-Lake Alum+Lime Treatment of 15% of Keller Lake's Littoral Zone

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$564	$564
Alum Application	Ac.	8	$650	$5,333
Lime Application	Ac.	8	$ 725.00	$5,949
Subtotal				$11,846
Dosing Determination, Analytical	L.S.	1	$10,000	$10,000
Engineering & Design (15%)				$1,777
Contingencies (10%)				$1,185
Total				$24,807

Table G-22. Preliminary Cost Estimate -- In-Lake Alum+Lime Treatment of 50% of Keller Lake's Littoral Zone

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$1,880	$1,880
Alum Application	Ac.	27	$650	$17,778
Lime Application	Ac.	27	$ 725.00	$19,829
Subtotal				$39,487
Dosing Determination, Analytical	L.S.	1	$10,000	$10,000
Engineering & Design (15%)				$5,923
Contingencies (10%)				$3,949
Total				$59,358

Table G-23. Preliminary Cost Estimate -- In-Lake Alum Application to Keller Lake and Alum+Lime Treatment of 100% of Keller Lake's Littoral Zone

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$3,761	$3,761
Alum Application	Ac.	55	$650	$35,555
Lime Application	Ac.	55	$ 725.00	$39,658
Subtotal				$78,973
Dosing Determination, Analytical	L.S.	1	$10,000	$10,000
Engineering & Design (15%)				$11,846
Contingencies (10%)				$7,897
Total				$108,716

Table G-24. Preliminary Cost Estimate -- Restore Wetland between Keller & Crystal Lake

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$7,432	$7,432
Flow Diversion Structures	L.S.	1	$10,000	$10,000
Clearing & Grubbing	Ac.	1	$1,000	$1,000
Basin Excavation	C.Y.	1613	$10	$16,133
18" Piping	L.F.	1400	$54	$75,600
12" Piping	L.F.	400	$36	$14,400
Wetland Restoration	Ac.	2.1	$15,000	$31,500
Subtotal				$156,065
Engineering & Design (15%)				$23,410
Contingencies (10%)				$15,607
Total				$195,081

Table G-25. Preliminary Cost Estimate -- Resume Operation of the $FeCl_3$ Treatment System (Withdraw and Treat Epilimnetic Waters)

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$500	$500
Reconfigure System to Withdraw Epilimnetic Water	L.S.	1	$10,000	$10,000
Subtotal				$10,500
Engineering & Design (15%)				$1,575
Contingencies (10%)				$1,050
Total				$13,125

Estimated Annual Costs for Operating $FeCl_3$ Withdrawal System (Based on 1996 & 1997 Actual Costs)

Item	Unit	Estimated Quantity	Unit Price	Extention
Chemical & Misc. Supplies	L.S.	1	$8,500	$8,500
Electrical	L.S.	1	$2,200	$2,200
Personnel Time	L.S.	1	$1,500	$1,500
Monitoring	L.S.	1	$15,000	$15,000
Trouble Shooting (unexpected Elec., Mech., etc.)	L.S.	1	$2,000	$2,000
Operational Reporting	L.S.	1	$4,000	$4,000
Subtotal				$33,200
Contingencies (10%)				$3,320
Total				$36,520

Table G-26. Preliminary Cost Estimate -- Add Pond into A7b-1

Item	Unit	Estimated Quantity	Unit Price	Extention
Mobilization (5%)	L.S.	1	$5,022	$5,022
Flow Diversion Structures	L.S.	1	$10,000	$10,000
Clearing & Grubbing	Ac.	1	$1,000	$1,000
Basin Excavation	C.Y.	7744	$10	$77,440
Weir Outlet/Overflow Sturcture	L.S.	1	$10,000	$10,000
Pond Restoration	Ac.	1	$2,000	$2,000
Subtotal				$105,462
Engineering & Design (15%)				$15,819
Contingencies (10%)				$10,546
Total				$131,828