



STORMWATER SYSTEM MASTER IMPROVEMENT PLAN

EDM EDM Incorporated
Consulting Engineers

220 Mansion House Center
St. Louis, Missouri 63102
Phone (314) 231-5485 Fax (314) 231-8167
edm@edm-inc.com

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SCALE

UPDATE NO. _____ DATE _____



FIGURE NO. 5-1

City of Frontenac
Stormwater System Master Improvement Plan
CONCEPTUAL LEVEL ANALYSIS

Project Name: FIGURE 5-1 OVERLAND FLOW
Solutions By: EDM INC. **DATE:** 11-5-08

Problem: Yard erosion at Q372 - 42 Portland Dr., Q352 - 39 Portland Dr. and Q356 - 41 Portland Dr. and yard ponding at Q191 - 130 Frontenac Forest and Q374 - 47 Portland Dr.

Strategy: 1) Install inlet and pipe system to collect water. Replace undersized storm sewer pipes. Resize driveway culverts at 37 and 39 Portland Dr. Reshape driveways at 49 and 51 Portland Dr. 2) Add Rain Garden and Bioswale to infiltrate runoff and protect natural channels.

Description	Unit	Quantity	Unit Cost	1) Alternative 1	2) Alternative 1
				Without BMP's	With BMP's
Single Area Inlet	EA	1	\$1,750	\$1,750	\$1,750
Single Inlet	EA	5	\$1,850	\$9,250	\$9,250
Double Inlet	EA	1	\$3,150	\$3,150	\$3,150
New Berm	LF	271	\$15	\$4,065	\$4,065
New Swale	LF	107	\$10	\$1,070	\$1,070
12" RCP CLASS III	LF	448	\$116	\$51,995	\$51,995
18" RCP CLASS III	LF	121	\$129	\$15,643	\$15,643
21" RCP CLASS III	LF	21	\$137	\$2,875	\$2,875
21" FES	EA	1	\$1,500	\$1,500	\$1,500
27" RCP CLASS III	LF	89	\$150	\$13,360	\$13,360
27" FES	EA	8	\$1,700	\$13,600	\$13,600
Reshape Driveway	LS	1	\$3,000	\$3,000	\$3,000
Rain Garden	EA	2	\$10,000	\$0	\$20,000
Bioswale	LF	240	\$30	\$0	\$7,200
Subtotal				\$121,257	\$148,457
Total Benefit Points				75	109
Individual Benefit Point Ratio				0.30	0.35
Estimated Increased Property Values				\$15,000	\$25,000

Problem: Yard erosion at Q189 - 124 Frontenac Forest and Q187 - 120 Frontenac Forest
Strategy: 1) Install a turf reinforcement mat to minimize channel erosion.

Description	Unit	Quantity	Unit Cost	1) Alternative 1	2) Alternative 1
				Without BMP's	With BMP's
Turf Reinforcement Mat	LF	202	\$20	\$4,040	\$4,040
Regrade around inlets	LS	1	\$2,000	\$2,000	\$2,000
Subtotal				\$6,040	\$6,040
Total Benefit Points				40	40
Individual Benefit Point Ratio				3.16	3.16
Estimated Increased Property Values				\$3,000	\$3,000

Total **\$127,297** **\$154,497**

Utility Relocation	20%	\$25,459	\$30,899
Clearing	5%	\$6,365	\$7,725
Mobilization	4%	\$5,092	\$6,180

Total with Percent Allowances **\$164,213** **\$199,301**

Contingency	25%	\$41,053	\$49,825
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Probable Construction Cost Estimate **\$205,267** **\$249,127**

Design Engineering and Geotechnical	30%	\$61,580	\$74,738
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Total Conceptual Cost Estimate **\$267,000** **\$324,000**

Total Benefit Points **120** **164**

Total Benefit Point Ratio **0.45** **0.51**

Additional Comments: Unit prices based on MSD Unit Prices January 2006 Construction Costs
Conceptual Cost are rounded to the nearest \$1000

City of Frontenac
Stormwater System Master Improvement Plan
CONCEPTUAL LEVEL ANALYSIS

Project Name: FIGURE 5-1 OVERLAND FLOW STRUCTURAL FLOODING
Solutions By: EDM INC. DATE: 11-5-08

Problem: Yard ponding and basement flooding at Q184 - 107 Frontenac Forest and yard erosion at Q185 - 108 Frontenac Forest.
Strategy: 1) Install inlet and pipe system to collect water. Add Rain Gardens to infiltrate runoff and protect natural channels.

Description	Unit	Quantity	Unit Cost	1) Alternative 1	2) Alternative 1
				Without BMP's	With BMP's
Single Area Inlet	EA	4	\$1,750	\$7,000	\$7,000
Manhole	EA	1	\$1,500	\$1,500	\$1,500
New Swale	LF	131	\$10	\$1,310	\$1,310
New Asphalt Curb	LF	297	\$20	\$5,940	\$5,940
12" RCP CLASS III	LF	90	\$116	\$10,445	\$10,445
15" RCP CLASS III	LF	164	\$124	\$20,382	\$20,382
15" FES	EA	1	\$1,200	\$1,200	\$1,200
Rain Garden	EA	3	\$10,000	\$0	\$30,000
Subtotal				\$47,777	\$77,777
Total Benefit Points				290	305
Individual Benefit Point Ratio				2.90	1.87
Estimated Increased Property Values				\$6,000	\$10,000

Total **\$47,777** **\$77,777**

Utility Relocation	20%	\$9,555	\$15,555
Clearing	5%	\$2,389	\$3,889
Mobilization	4%	\$1,911	\$3,111

Total with Percent Allowances **\$61,633** **\$100,333**

Contingency	25%	\$15,408	\$25,083
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Probable Construction Cost Estimate **\$77,041** **\$125,416**

Design Engineering and Geotechnical	30%	\$23,112	\$37,625
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Total Conceptual Cost Estimate **\$101,000** **\$164,000**

Total Benefit Points **270** **300**

Total Benefit Point Ratio **2.67** **1.83**

Additional Comments: Unit prices based on MSD Unit Prices January 2006 Construction Costs
Conceptual Cost are rounded to the nearest \$1000

FIGURE 5-1 STRUCTURE

City of Frontenac
Stormwater System Master Improvement Plan
CONCEPTUAL LEVEL ANALYSIS

Project Name: FIGURE 5-1 CHANNEL FTMNW
Solutions By: EDM INC. **DATE:** 11/5/2008

Problem: Damage to property due to erosion MSD-12. Flooding Q184 - 107 Frontenac Forest. Yard flooding and erosion Q186 - 113 Frontenac Forest. Bank erosion SR-5-102, 104, 107, 109, 111,114, 115, and 116 Frontenac Forest. Exposed VCP SR-4.

Strategy: 1) Install bank protection on FTMNW from station 44+50 to 56+00 (1,150 LF). Encase exposed VCP.

Description	Unit	Quantity	Unit Cost	ALT 1	ALT 2
Hard stabilization (L)	LF	1,150	\$300	\$345,000	\$0
Soft stabilization (L)	LF	1,150	\$200	\$0	\$230,000
Geomorphic Study	Ea.	2	\$10,000		\$20,000
Concrete encasement	CY	5	\$260	\$1,300	\$1,300
Total				\$346,300	\$251,300
				\$346,300	\$251,300
Utility Relocation					
Clearing			20%	\$69,260	\$50,260
Mobilization			5%	\$17,315	\$12,565
			4%	\$13,852	\$10,052
Total with Percent Allowances				\$446,727	\$324,177
Contingency			25%	\$111,682	\$81,044
Probable Construction Cost Estimate				\$558,409	\$405,221
Design Engineering and Geotechnical			30%	\$167,523	\$121,566
Total Conceptual Cost Estimate				\$726,000	\$527,000
Benefit Points				575	985
Benefit/Cost Ratio				0.79	1.87

Additional Comments: Unit prices based on MSD January 2006 Construction Costs and EDM Experience.
 Conceptual Cost are rounded to the nearest \$1000