

TABLE OF CONTENTS

1 EXECUTIVE SUMMARY 1

 Introduction..... 1

 MS4 Program..... 2

 City of Anchorage 4

 City of Jeffersontown 6

 City of Prospect..... 8

 City of Shively..... 10

 City of St. Matthews..... 11

 City of Louisville..... 13

 Jefferson County..... 16

 Kentucky Transportation Cabinet, District Five 18

 Louisville and Jefferson County Metropolitan Sewer District..... 21

 Stakeholders 29

 CSO Program 30

 SSO Program..... 33

 Program Costs 37

2 PROGRAMS..... 39

 2.1 The Municipal Separate Storm Sewer System Program..... 39

 2.1.1 Objectives 39

 2.1.2 History 39

 2.1.3 Program Elements..... 40

 2.1.3.1 Illicit Discharge Program (ID)..... 40

 2.1.3.2 Construction Site Runoff Controls (CS)..... 43

 2.1.3.3 Post Construction Controls (PC)..... 47

 2.1.3.4 Good Housekeeping/Pollution Prevention (GH) 51

 2.1.3.5 Public Education/Outreach Programs (PE)..... 59

 2.1.3.6 Monitoring (M)..... 64

 2.1.3.7 Reporting (R) 67

 2.1.3.8 Stakeholders..... 69

 2.1.4 Program Costs..... 80

2.2	The Combined Sewer Overflow Program.....	84
2.2.1	Objectives	84
2.2.2	History (MSD and Regulatory)	86
2.2.3	CSO Program Elements.....	86
2.2.3.1	Status of Long-Term Control Plans	86
2.2.3.2	Compliance with the Nine Minimum Controls	91
2.2.3.3	CSO Performance Summary	93
2.2.3.4	Backflow Prevention Device Installation Program.....	94
2.2.4	MFWTP Wet Weather Flows	95
2.2.5	Program Costs	95
2.3	The Sanitary Sewer Overflow Program	96
2.3.1	Objectives of the I/I and SSO Program	96
2.3.2	History	96
2.3.3	Program Elements.....	97
2.3.3.1	Flow Monitoring	97
2.3.3.2	Computer Modeling	98
2.3.3.3	Investigation.....	98
2.3.3.4	Rehabilitation / Capacity Enhancements.....	99
2.3.3.5	Post Rehabilitation Flow Monitoring	100
2.3.3.6	Other Programs	100
2.3.4	Program Costs	102
3	WATERSHEDS	103
3.1	Harrods Creek	103
3.1.1	History, Demographic and Community Information	103
3.1.2	Hydrology and Flooding.....	103
3.1.2.1	Flood Prevention Measures	104
3.1.3	Status of Water Quality	104
3.1.4	Water Quality Impacts.....	104
3.1.4.1	Point Source	104
3.1.4.2	Non-Point Source	105
3.1.4.3	Habitat and Biological Quality.....	105
3.1.5	Tracking Changes in Water Quality	105
3.1.6	MS4 Program – Co-Permittees	105

3.1.6.1	City of Prospect	106
3.1.6.2	Jefferson County	109
3.1.6.3	Kentucky Transportation Cabinet, District Five.....	112
3.1.6.4	MSD.....	115
3.1.6.5	Stakeholders.....	123
3.1.7	SSO Program – MSD.....	124
3.1.8	Cost Summary.....	125
3.2	Goose Creek.....	127
3.2.1	History, Demographic and Community Information.....	127
3.2.2	Hydrology and Flooding	127
3.2.2.1	Flood Prevention Measures	128
3.2.3	Status of Water Quality.....	128
3.2.4	Water Quality Impacts	128
3.2.4.1	Point Source	128
3.2.4.2	Non–Point Source	129
3.2.4.3	Habitat and Biological Quality	129
3.2.5	Tracking Changes in Water Quality	129
3.2.6	MS4 Program – Co-Permittees	129
3.2.6.1	City of Anchorage.....	130
3.2.6.2	City of Prospect	133
3.2.6.3	Jefferson County	135
3.2.6.4	Kentucky Transportation Cabinet, District Five.....	137
3.2.6.5	MSD.....	140
3.2.6.6	Stakeholders.....	148
3.2.7	SSO Program – MSD.....	149
3.2.8	Cost Summary.....	150
3.3	Beargrass Creek – Muddy Fork	152
3.3.1	History, Demographic and Community Information.....	152
3.3.2	Hydrology and Flooding.....	152
3.3.2.1	Flood Prevention Measures	153
3.3.3	Status of Water Quality.....	153
3.3.4	Water Quality Impacts	153

3.3.4.1	Point Source	153
3.3.4.2	Non-Point Source.....	153
3.3.4.3	Habitat and Biological Quality	154
3.3.5	Tracking Changes in Water Quality	154
3.3.6	MS4 Program – Co-Permittees	154
3.3.6.1	City of St. Matthews	155
3.3.6.2	City of Louisville.....	157
3.3.6.3	Jefferson County	160
3.3.6.4	Kentucky Transportation Cabinet, District Five.....	162
3.3.6.5	MSD.....	164
3.3.6.6	Stakeholders.....	173
3.3.7	CSO Program – MSD	175
3.3.8	SSO Program – MSD.....	177
3.3.9	Cost Summary.....	178
3.4	Beargrass Creek – Middle Fork.....	179
3.4.1	History, Demographic and Community Information.....	179
3.4.2	Hydrology and Flooding.....	179
3.4.2.1	Flood Prevention Measures	180
3.4.3	Status of Water Quality.....	180
3.4.4	Water Quality Impacts	180
3.4.4.1	Point Source	181
3.4.4.2	Non-Point Source.....	181
3.4.4.3	Habitat and Biological Quality	181
3.4.5	Tracking Changes in Water Quality	181
3.4.6	MS4 Program Co-Permittees	182
3.4.6.1	City of Anchorage.....	182
3.4.6.2	City of Jeffersontown.....	185
3.4.6.3	City of St. Matthews	188
3.4.6.4	City of Louisville.....	190
3.4.6.5	Jefferson County	193
3.4.6.6	Kentucky Transportation Cabinet, District Five.....	195
3.4.6.7	MSD.....	197

3.4.6.8 Stakeholders.....	207
3.4.7 CSO Program – MSD	211
3.4.8 SSO Program – MSD.....	213
3.4.9 Cost Summary.....	215
3.5 Beargrass Creek – South Fork	216
3.5.1 History, Demographic and Community Information.....	216
3.5.2 Hydrology and Flooding.....	216
3.5.2.1 Flood Prevention Measures	217
3.5.3 Status of Water Quality.....	217
3.5.4 Water Quality Impacts	218
3.5.4.1 Point Source.....	218
3.5.4.2 Non-Point Source.....	218
3.5.4.3 Habitat and Biological Quality	219
3.5.5 Tracking Changes in Water Quality	219
3.5.6 MS4 Program – Co-Permittees	219
3.5.6.1 City of Jeffersontown.....	220
3.5.6.2 City of Louisville.....	223
3.5.6.3 Jefferson County	225
3.5.6.4 Kentucky Transportation Cabinet, District Five.....	228
3.5.6.5 MSD.....	230
3.5.6.6 Stakeholders.....	244
3.5.7 CSO Program – MSD	247
3.5.8 SSO Program – MSD.....	254
3.5.9 Cost Summary.....	256
3.6 Ohio River.....	258
3.6.1 History, Demographic and Community Information.....	258
3.6.2 Hydrology and Flooding.....	258
3.6.2.1 Flood Prevention Measures	259
3.6.3 Status of Water Quality.....	259
3.6.4 Water Quality Impacts	259
3.6.4.1 Point Source.....	260
3.6.4.2 Non-Point Source.....	261

3.6.4.3	Habitat and Biological Quality	261
3.6.5	Tracking Changes in Water Quality	261
3.6.5.1	Monitoring Activities.....	261
3.6.6	MS4 Program – Co-Permittees	262
3.6.6.1	City of Prospect	262
3.6.6.2	City of Shively	264
3.6.6.3	City of Louisville.....	266
3.6.6.4	Jefferson County	268
3.6.6.5	Kentucky Transportation Cabinet, District Five.....	271
3.6.6.6	MSD.....	273
3.6.6.7	Stakeholders.....	282
3.6.7	CSO Programs – MSD.....	284
3.6.8	SSO Programs – MSD	289
3.6.9	Cost Summary.....	290
3.7	Mill Creek	291
3.7.1	History, Demographic and Community Information.....	291
3.7.2	Hydrology and Flooding.....	291
3.7.2.1	Flood Prevention Measures	291
3.7.3	Status of Water Quality.....	292
3.7.4	Water Quality Impacts	292
3.7.4.1	Point Source	292
3.7.4.2	Non-Point Source.....	293
3.7.4.3	Habitat and Biological Quality	293
3.7.5	Tracking Changes in Water Quality	293
3.7.6	MS4 Program – Co-Permittees	294
3.7.6.1	City of Shively	294
3.7.6.2	City of Louisville.....	296
3.7.6.3	Jefferson County	298
3.7.6.4	Kentucky Transportation Cabinet, District Five.....	301
3.7.6.5	MSD.....	303
3.7.6.6	Stakeholders.....	312
3.7.7	SSO Program – MSD.....	313

3.7.8	Cost Summary.....	314
3.8	Pond Creek.....	315
3.8.1	History, Demographic and Community Information.....	315
3.8.2	Hydrology and Flooding.....	315
3.8.2.1	Flood Prevention Measures.....	316
3.8.3	Status of Water Quality.....	316
3.8.4	Water Quality Impacts.....	317
3.8.4.1	Point Source.....	317
3.8.4.2	Non-Point Source.....	317
3.8.4.3	Habitat and Biological Quality.....	318
3.8.5	Tracking Changes in Water Quality.....	318
3.8.6	MS4 Program – Co-Permittees.....	318
3.8.6.1	City of Jeffersontown.....	319
3.8.6.2	City of Louisville.....	321
3.8.6.3	Jefferson County.....	324
3.8.6.4	Kentucky Transportation Cabinet, District Five.....	326
3.8.6.5	MSD.....	328
3.8.6.6	Stakeholders.....	338
3.8.7	SSO Program – MSD.....	340
3.8.8	Cost Summary.....	343
3.9	Pennsylvania Run.....	344
3.9.1	History, Demographic and Community Information.....	344
3.9.2	Hydrology and Flooding.....	344
3.9.2.1	Flood Prevention Measures.....	345
3.9.3	Status of Water Quality.....	345
3.9.4	Water Quality Impacts.....	345
3.9.4.1	Point Source.....	345
3.9.4.2	Non-Point Source.....	345
3.9.4.3	Habitat and Biological Quality.....	346
3.9.5	Tracking Changes in Water Quality.....	346
3.9.6	MS4 Programs – Co-Permittees.....	346
3.9.6.1	Jefferson County.....	347

3.9.6.2	Kentucky Transportation Cabinet, District Five.....	349
3.9.6.3	MSD.....	352
3.9.6.4	Stakeholders.....	359
3.9.7	SSO Program – MSD.....	359
3.9.8	Cost Summary.....	361
3.10	Cedar Creek	362
3.10.1	History, Demographic and Community Information.....	362
3.10.2	Hydrology and Flooding.....	362
3.10.2.1	Flood Prevention Measures	362
3.10.3	Status of Water Quality.....	363
3.10.4	Water Quality Impacts	363
3.10.4.1	Point Source	363
3.10.4.2	Non-Point Source.....	363
3.10.4.3	Habitat and Biological Quality	364
3.10.5	Tracking Changes in Water Quality	364
3.10.6	MS4 Program – Co-Permittees	364
3.10.6.1	Jefferson County	365
3.10.6.2	Kentucky Transportation Cabinet, District Five.....	367
3.10.6.3	MSD.....	369
3.10.6.4	Stakeholders.....	377
3.10.7	SSO Program – MSD.....	378
3.10.8	Cost Summary.....	380
3.11	Floyds Fork	381
3.11.1	History, Demographic and Community Information.....	381
3.11.2	Hydrology and Flooding.....	381
3.11.2.1	Flood Prevention Measures	382
3.11.3	Status of Water Quality.....	382
3.11.4	Water Quality Impacts	382
3.11.4.1	Point Source	382
3.11.4.2	Non-Point Source.....	383
3.11.4.3	Habitat and Biological Quality	383
3.11.5	Tracking Changes in Water Quality	383

3.11.6 MS4 Program – Co-Permittees	383
3.11.6.1 City of Anchorage.....	384
3.11.6.2 City of Jeffersontown.....	387
3.11.6.3 Jefferson County	389
3.11.6.4 Kentucky Transportation Cabinet, District Five.....	392
3.11.6.5 MSD.....	394
3.11.6.6 Stakeholders.....	404
3.11.7 SSO Program – MSD.....	405
3.11.8 Cost Summary	407

LIST OF TABLES

ExecSum	MS4 Permit Program Element Co-Permittee Responsibilities	3
ExecSum	MSD's MS4 Activities by Permit Component – Directory for Section 2 and Section 3.....	27
ExecSum	CSO Point Source Summary by Watershed.....	30
ExecSum	CSO Projects – July 1999 to June 2000.....	32
ExecSum	SSO Point Source Summary by Watershed	34
ExecSum	SSO Projects – July 1999 to June 2000	36
ExecSum	Summary of Total Co-Permittee MS4 Permit Costs for July 1999 – June 2003	37
ExecSum	MSD's MS4, CSO, SSO Related Costs for July 1999 – June 2003	38
Table 1.	Illicit Discharge Program – Co-Permittee Activities: July 1, 1999 – June 30, 2000	42
Table 2.	Construction Site Runoff Controls – Co-Permittee Activities: July 1, 1999 – June 30, 2000	44
Table 3.	Post Construction Controls – Co-Permittee Activities: July 1, 1999 – June 30, 2000	48
Table 4.	Good Housekeeping/Pollution Prevention – Co-Permittee Activities: July 1, 1999 – June 30, 2000	53
Table 5.	Public Education/Outreach Programs – Co-Permittee Activities: July 1, 1999 – June 30, 2000	61
Table 6.	Monitoring – Co-Permittee Activities: July 1, 1999 – June 30, 2000 ..	65
Table 7.	Reporting – Co-Permittee Activities: July 1, 1999 – June 30, 2000	68
Table 8.	Summary of Total Co-Permittee MS4 Permit Costs for July 1999 – June 2003	80
Table 9.	MSD Total MS4 Permit Costs for July 1999 – June 2003	82
Table 10.	Additional MSD MS4 Related Costs for July 1999 – June 2003	83
Table 11.	Fiscal Year 2000 and 2001 Overflow Monitoring Sites	93
Table 12.	Average Annual CSO Volume and Frequency Reductions.....	94
Table 13.	Backflow Prevention Program Totals.....	95
Table 14.	CSO Program Related Costs for July 1999 – June 2003	95
Table 15.	SSO Rehabilitation Projects.....	99
Table 16.	SSO Program Related Costs for July 1999 – June 2003.....	102
Table 17.	Land Use Percentages (2000) – Harrods Creek Watershed.....	103
Table 18.	303(d) List of Waters for TMDL Development – Harrods Creek Watershed	104
Table 19.	Summary of Point Sources – Harrods Creek Watershed	104
Table 20.	Prospect MS4 Permit Related Costs for July 1999 – June 2003, Harrods Creek Watershed	108
Table 21.	Jefferson County MS4 Permit Related Costs for July 1999 – June 2003, Harrods Creek Watershed.....	112
Table 22.	KYTC MS4 Permit Related Costs for July 1999 – June 2003, Harrods Creek Watershed.....	114
Table 23.	Monitoring Locations – Harrods Creek Watershed.....	120

Table 24.	MSD MS4 Permit Related Costs for July 1999 – June 2003, Harrods Creek Watershed.....	123
Table 25.	SSO Program Related Costs for July 1999 – June 2003, Harrods Creek Watershed.....	125
Table 26.	Summary MS4 Permit Related Costs for July 1999 – June 2003 Harrods Creek Watershed.....	126
Table 27.	MSD’s MS4 and SSO Related Costs for July 1999 – June 2003 Harrods Creek Watershed.....	126
Table 28.	Land Use Percentages (2000) – Goose Creek Watershed	127
Table 29.	303(d) List of Waters for TMDL Development – Goose Creek Watershed.....	128
Table 30.	Summary of Point Sources – Goose Creek Watershed.....	128
Table 31.	Anchorage MS4 Permit Related Costs for July 1999 – June 2003, Goose Creek Watershed.....	133
Table 32.	Jefferson County MS4 Permit Related Costs for July 1999 – June 2003, Goose Creek Watershed	137
Table 33.	KYTC MS4 Permit Related Costs for July 1999 – June 2003, Goose Creek Watershed.....	139
Table 34.	Monitoring Locations – Goose Creek Watershed.....	145
Table 35.	MSD MS4 Permit Related Costs for July 1999 – June 2003, Goose Creek Watershed.....	148
Table 36.	SSO Program Related Costs for July 1999 – June 2003, Goose Creek Watershed.....	150
Table 37.	Summary MS4 Permit Related Costs for July 1999 – June 2003 Goose Creek Watershed.....	150
Table 38.	MSD’s MS4 and SSO Related Costs for July 1999 – June 2003 Goose Creek Watershed.....	151
Table 39.	Land Use Percentages (2000) – Muddy Fork of Beargrass Creek Watershed.....	152
Table 40.	303(d) List of Waters for TMDL Development – Muddy Fork of Beargrass Creek Watershed.....	153
Table 41.	Summary of Point Sources – Muddy Fork of Beargrass Creek Watershed.....	153
Table 42.	St. Matthews MS4 Permit Related Costs for July 1999 – June 2003, Muddy Fork of Beargrass Creek Watershed.....	157
Table 43.	Louisville MS4 Permit Related Costs for July 1999 – June 2003, Muddy Fork of Beargrass Creek Watershed.....	159
Table 44.	Jefferson County MS4 Permit Related Costs for July 1999 – June 2003, Muddy Fork of Beargrass Creek Watershed.....	161
Table 45.	KYTC MS4 Permit Related Costs for July 1999 – June 2003, Muddy Fork of Beargrass Creek Watershed	164
Table 46.	MSD MS4 Permit Related Costs for July 1999 – June 2003, Muddy Fork of Beargrass Creek Watershed	172
Table 47.	CSO Program Related Costs for July 1999 – June 2003, Muddy Fork of Beargrass Creek Watershed.....	176
Table 48.	SSO Program Related Costs for July 1999 – June 2003, Muddy	

	Fork of Beargrass Creek Watershed	178
Table 49.	Summary of MS4 Permit Related Costs for July 1999 – June 2003, Muddy Fork of Beargrass Creek Watershed.....	178
Table 50.	MSD’s MS4, CSO and SSO Related Costs for July 1999 – June 2003, Muddy Fork of Beargrass Creek Watershed.....	178
Table 51.	Land Use Percentages (2000) – Middle Fork of Beargrass Creek Watershed.....	179
Table 52.	303(d) List of Waters for TMDL Development – Middle Fork of Beargrass Creek Watershed	180
Table 53.	Summary of Point Sources – Middle Fork of Beargrass Creek Watershed.....	181
Table 54.	Anchorage MS4 Permit Related Costs for July 1999 – June 2003, Middle Fork of Beargrass Creek Watershed.....	185
Table 55.	Jeffersontown MS4 Permit Related Costs for July 1999 – June 2003, Middle Fork of Beargrass Creek Watershed.....	187
Table 56.	St. Matthews MS4 Permit Related Costs for July 1999 – June 2003, Middle Fork of Beargrass Creek Watershed.....	190
Table 57.	Louisville MS4 Permit Related Costs for July 1999 – June 2003, Middle Fork of Beargrass Creek Watershed.....	192
Table 58.	Jefferson County MS4 Permit Related Costs for July 1999 – June 2003, Middle Fork of Beargrass Creek Watershed.....	194
Table 59.	KYTC MS4 Permit Related Costs for July 1999 – June 2003, Middle Fork of Beargrass Creek Watershed	197
Table 60.	Monitoring Locations – Middle Fork of Beargrass Creek Watershed..	203
Table 61.	MSD MS4 Permit Related Costs for July 1999 – June 2003, Middle Fork of Beargrass Creek Watershed	207
Table 62.	CSO Program Related Costs for July 1999 – June 2003, Middle Fork of Beargrass Creek Watershed	212
Table 63.	SSO Program Related Costs for July 1999 – June 2003, Middle Fork of Beargrass Creek Watershed	214
Table 64.	Summary MS4 Permit Related Costs for July 1999 – June 2003, Middle Fork of Beargrass Creek Watershed	215
Table 65.	MSD’s MS4, CSO, and SSO Related Costs for July 1999 – June 2003, Middle Fork of Beargrass Creek Watershed.....	215
Table 66.	Land Use Percentages (2000) – South Fork of Beargrass Creek Watershed.....	216
Table 67.	303(d) List of Waters for TMDL Development – South Fork of Beargrass Creek Watershed	218
Table 68.	Summary of Point Sources – South Fork of Beargrass Creek Watershed.....	218
Table 69.	Monitoring Locations – South Fork of Beargrass Creek Watershed....	219
Table 70.	Jeffersontown MS4 Permit Related Costs for July 1999 – June 2003, South Fork of Beargrass Creek Watershed.....	222
Table 71.	Louisville MS4 Permit Related Costs for July 1999 – June 2003, South Fork of Beargrass Creek Watershed.....	225
Table 72.	Jefferson County MS4 Permit Related Costs for July 1999 – June 2003,	

	South Fork of Beargrass Creek Watershed.....	227
Table 73.	KYTC MS4 Permit Related Costs for July 1999 – June 2003, South Fork of Beargrass Creek Watershed.....	230
Table 74.	2000 Outfall Summary – South Fork of Beargrass Creek Watershed..	231
Table 75.	Comparison of 1993 and 2000 Outfall Data for South Fork of Beargrass Creek Watershed.....	232
Table 76.	ICAM Contaminated Outfall Response – South Fork of Beargrass Creek Watershed.....	234
Table 77.	Monitoring Locations – South Fork of Beargrass Creek Watershed....	240
Table 78.	MSD MS4 Permit Related Costs for July 1999 – June 2003, South Fork of Beargrass Creek Watershed.....	243
Table 79.	CSO 108 CDS Demonstration Project – Storm Events Sampled	249
Table 80.	CSO Program Related Costs for July 1999 – June 2003, South Fork of Beargrass Creek Watershed.....	254
Table 81.	SSO Program Related Costs for July 1999 – June 2003, South Fork of Beargrass Creek Watershed.....	256
Table 82.	Summary MS4 Permit Related Costs for July 1999 – June 2003, South Fork of Beargrass Creek Watershed.....	256
Table 83.	MSD’s MS4, CSO and SSO Related Costs for July 1999 – June 2003, South Fork of Beargrass Creek Watershed.....	256
Table 84.	Land Use Percentages (2000) – Ohio River Watershed	258
Table 85.	303(d) List of Waters for TMDL Development – Ohio River Watershed	259
Table 86.	Summary of Point Source Regulatory Obligations – Ohio River Watershed	260
Table 87.	Shively MS4 Permit Related Costs for July 1999 – June 2003, Ohio River Watershed.....	265
Table 88.	Louisville MS4 Permit Related Costs for July 1999 – June 2003, Ohio River Watershed.....	268
Table 89.	Jefferson County MS4 Permit Related Costs for July 1999 – June 2003, Ohio River Watershed.....	270
Table 90.	KYTC MS4 Permit Related Costs for July 1999 – June 2003, Ohio River Watershed.....	273
Table 91.	MSD MS4 Permit Related Costs for July 1999 – June 2003, Ohio River Watershed.....	282
Table 92.	Effective Storage Volume.....	285
Table 93.	Average Annual Volume Overflow	286
Table 94.	Percent Capture.....	286
Table 95.	CSO Program Related Costs for July 1999 – June 2003, Ohio River Watershed.....	289
Table 96.	SSO Program Related Costs for July 1999 – June 2003, Ohio River Watershed.....	290
Table 97.	Summary MS4 Permit Related Costs for July 1999 – June 2003, Ohio River Watershed.....	290
Table 98.	MSD’s MS4, CSO and SSO Related Costs for July 1999 – June 2003, Ohio River Watershed.....	290

Table 99.	Land Use Percentages (2000) – Mill Creek Watershed.....	291
Table 100.	303(d) List of Waters for TMDL Development – Mill Creek Watershed	292
Table 101.	Summary of Point Sources – Mill Creek Watershed.....	293
Table 102.	Shively MS4 Permit Related Costs for July 1999 – June 2003, Mill Creek Watershed.....	295
Table 103.	Louisville MS4 Permit Related Costs for July 1999 – June 2003, Mill Creek Watershed.....	298
Table 104.	Jefferson County MS4 Permit Related Costs for July 1999 – June 2003, Mill Creek Watershed.....	300
Table 105.	KYTC MS4 Permit Related Costs for July 1999 – June 2003, Mill Creek Watershed.....	303
Table 106.	Monitoring Locations – Mill Creek Watershed.....	309
Table 107.	MSD MS4 Permit Related Costs and July 1999 – June 2003, Mill Creek Watershed.....	312
Table 108.	SSO Program Related Costs for July 1999 – June 2003, Mill Creek Watershed	314
Table 109.	Summary MS4 Permit Related Costs for July 1999 – June 2003, Mill Creek Watershed.....	314
Table 110.	MSD’s MS4 and SSO Related Costs for July 1999 – June 2003, Mill Creek Watershed.....	314
Table 111.	Land Use Percentages (2000) – Pond Creek Watershed	315
Table 112.	303(d) List of Waters for TMDL Development – Pond Creek Watershed	317
Table 113.	Summary of Point Source Regulatory Obligations – Pond Creek Watershed.....	317
Table 114.	Jeffersontown MS4 Permit Related Costs for July 1999 – June 2003, Pond Creek Watershed.....	321
Table 115.	Louisville MS4 Permit Related Costs for July 1999 – June 2003, Pond Creek Watershed.....	323
Table 116.	Jefferson County MS4 Permit Related Costs for July 1999 – June 2003, Pond Creek Watershed.....	325
Table 117.	KYTC MS4 Permit Related Costs for July 1999 – June 2003, Pond Creek Watershed.....	328
Table 118.	Monitoring Locations – Pond Creek Watershed.....	334
Table 119.	MSD MS4 Related Costs for July 1999 – June 2003, Pond Creek Watershed.....	338
Table 120.	SSO Program Related Costs for July 1999 – June 2003, Pond Creek Watershed.....	342
Table 121.	Summary MS4 Permit Related Costs for July 1999 – June 2003, Pond Creek Watershed.....	343
Table 122.	MSD’s MS4 and SSO Related Costs for July 1999 – June 2003, Pond Creek Watershed.....	343
Table 123.	Land Use Percentages (2000) – Pennsylvania Run Watershed	344
Table 124.	303(d) List of Waters for TMDL Development – Pennsylvania Run Watershed.....	345

Table 125.	Summary of Point Sources – Pennsylvania Run Watershed	345
Table 126.	Jefferson County MS4 Permit Related Costs for July 1999 – June 2003, Pennsylvania Run Watershed	349
Table 127.	KYTC MS4 Permit Related Costs for July 1999 – June 2003, Pennsylvania Run Watershed	351
Table 128.	Monitoring Locations – Pennsylvania Run Watershed	356
Table 129.	MSD MS4 Permit Related Costs for July 1999 – June 2003, Pennsylvania Run Watershed	358
Table 130.	SSO Program Related Costs for July 1999 – June 2003, Pennsylvania Run Watershed	361
Table 131.	Summary MS4 Permit Related Costs for July 1999 – June 2003, Pennsylvania Run Watershed	361
Table 132.	MSD’s MS4 and SSO Related Costs for July 1999 – June 2003, Pennsylvania Run Watershed	361
Table 133.	Land Use Percentages (2000) – Cedar Creek Watershed	362
Table 134.	303(d) List of Waters for TMDL Development – Cedar Creek Watershed.....	363
Table 135.	Summary of Point Sources – Cedar Creek Watershed	363
Table 136.	Jefferson County MS4 Permit Related Costs for July 1999 – June 2003, Cedar Creek Watershed	366
Table 137.	KYTC MS4 Permit Related Costs for July 1999 – June 2003, Cedar Creek Watershed	369
Table 138.	ICAM Contaminated Outfall Response – Cedar Creek Watershed.....	370
Table 139.	Monitoring Locations – Cedar Creek Watershed	374
Table 140.	MSD MS4 Permit Related Costs for July 1999 – June 2003, Cedar Creek Watershed	377
Table 141.	SSO Program Related Costs for July 1999 – June 2003, Cedar Creek Watershed	380
Table 142.	Summary MS4 Permit Related Costs for July 1999 – June 2003, Cedar Creek Watershed	380
Table 143.	MSD’s MS4 Permit Related Costs for July 1999 – June 2003, Cedar Creek Watershed	380
Table 144.	Land Use Percentages (2000) – Floyds Fork Watershed.....	381
Table 145.	303(d) List of Waters for TMDL Development – Floyds Fork Watershed	382
Table 146.	Summary of Point Sources – Floyds Fork Watershed	382
Table 147.	Jeffersontown MS4 Permit Related Costs for July 1999 – June 2003, Floyds Fork Watershed.....	389
Table 148.	Jefferson County MS4 Permit Related Costs for July 1999 – June 2003, Floyds Fork Watershed.....	391
Table 149.	KYTC MS4 Permit Related Costs for July 1999 – June 2003, Floyds Fork Watershed.....	394
Table 150.	ICAM Contaminated Outfall Response – Floyds Fork Watershed	395
Table 151.	Monitoring Locations – Floyds Fork Watershed.....	400
Table 152.	MSD MS4 Permit Related Costs for July 1999 – June 2003, Floyds Fork Watershed.....	403

Table 153.	SSO Program Related Costs for July 1999 – June 2003, Floyds Fork Watershed.....	407
Table 154.	Summary MS4 Permit Related Costs for July 1999 – June 2003, Floyds Fork Watershed.....	407
Table 155.	MSD’s MS4 Permit Related Costs for July 1999 – June 2003, Floyds Fork Watershed.....	408

LIST OF FIGURES

ExecSum	Watersheds of Jefferson County	1
ExecSum	Stream in Middle Fork of Beargrass Creek Watershed	2
ExecSum	Co-Permittee Locations	2
ExecSum	No Mow Zone – Anchorage	4
ExecSum	Porous Pavement Driveway, Anchorage	5
ExecSum	Tree Preservation Program, Anchorage.....	5
ExecSum	Salt Dome, St. Matthews	12
ExecSum	St. Timothy Wetland Site, KYTC.....	19
ExecSum	Greenwood Road Wetland Site, KYTC.....	19
ExecSum	2000 Student Outfall Program	21
ExecSum	Minimonitor	26
ExecSum	Water Quality Report.....	26
ExecSum	Gross Screening at Beargrass Creek Pump Station	32
ExecSum	SSO Location.....	33
ExecSum	Remote SSO Monitor.....	35
Figure 1.	MS4 Permit, ID Component Timeline.....	41
Figure 2.	MS4 Permit, CS Component Timeline	44
Figure 3.	MS4 Permit, PC Component Timeline	48
Figure 4.	MS4 Permit, GH Component Timeline	52
Figure 5.	MS4 Permit, PE Component Timeline	60
Figure 6.	MS4 Permit, M Component Timeline	65
Figure 7.	Stream Flow/Minimonitor Location	66
Figure 8.	MS4 Permit, R Component Timeline	68
Figure 9.	Agriculture Water Quality Field Day	73
Figure 10.	Teacher/Farmer Workshop	74
Figure 11.	Earth Day	74
Figure 12.	Gross Screening at Beargrass Creek Pump Station	92
Figure 13.	Change in Peaking Factor from Pre-Rehabilitation to Post Rehabilitation.....	97
Figure 14.	Monitor Antenna at Beechwood Village	101
Figure 15.	Monitor Installation at Beechwood Village.....	101
Figure 16.	Taking a Grab Sample Downstream of an SSO.....	101
Figure 17.	Sampling Results for TSS for an SSO	102
Figure 18.	Harrods Creek Watershed – Jefferson County Portion Only.....	103
Figure 19.	Co-Permittee Locations	106
Figure 20.	The City of Prospect	107
Figure 21.	Jefferson County	109
Figure 22.	New MSD Catch Basin Design.....	116
Figure 23.	ECO Mapping	119
Figure 24.	Water Quality Report.....	121
Figure 25.	Goose Creek Watershed.....	127
Figure 26.	Co-Permittee Locations	130
Figure 27.	The City of Anchorage.....	131

Figure 28.	No Mow Zone, Anchorage	131
Figure 29.	Porous Pavement Driveway, Anchorage	131
Figure 30.	Tree Preservation Program, Anchorage.....	132
Figure 31.	The City of Prospect	133
Figure 32.	Jefferson County	135
Figure 33.	New MSD Catch Basin Design.....	141
Figure 34.	ECO Mapping	144
Figure 35.	Water Quality Report.....	146
Figure 36.	Muddy Fork Watershed	152
Figure 37.	Co-Permittee Locations	154
Figure 38.	The City of St. Matthews	155
Figure 39.	Salt Dome, St. Matthews	156
Figure 40.	City of Louisville	157
Figure 41.	Jefferson County	160
Figure 42.	New MSD Catch Basin Design.....	165
Figure 43.	ECO Mapping	168
Figure 44.	Water Quality Report.....	170
Figure 45.	Middle Fork of Beargrass Creek Watershed.....	179
Figure 46.	Co-Permittee Locations	182
Figure 47.	The City of Anchorage.....	183
Figure 48.	No Mow Zone, Anchorage	183
Figure 49.	Porous Pavement Driveway, Anchorage	183
Figure 50.	Tree Preservation Program, Anchorage.....	184
Figure 51.	The City of Jeffersontown	186
Figure 52.	2000 Student Outfall Program at Jeffersontown High School	186
Figure 53.	The City of St. Matthews	188
Figure 54.	Salt Dome, St. Matthews	189
Figure 55.	City of Louisville	190
Figure 56.	Jefferson County	193
Figure 57.	December 2000, KYTC’s Adopt-A-Highway Calendar, Artist Michela Brockman, 14, Walden School, Middle Fork Watershed	197
Figure 58.	New MSD Catch Basin Design.....	199
Figure 59.	ECO Mapping	202
Figure 60.	Water Quality Report.....	204
Figure 61.	CSO 209 Sewer Separation Project	211
Figure 62.	South Fork of Beargrass Creek Watershed.....	216
Figure 63.	Co-Permittee Locations	220
Figure 64.	The City of Jeffersontown	220
Figure 65.	2000 Student Outfall Program at Jeffersontown High School	221
Figure 66.	City of Louisville	223
Figure 67.	Jefferson County	226
Figure 68.	Student Outfall Program Data Collection.....	231
Figure 69.	Identified Structures.....	233
Figure 70.	New MSD Catch Basin Design.....	235
Figure 71.	ECO Mapping	239
Figure 72.	Water Quality Report.....	241

Figure 73.	Construction inside Sneads Branch Relief Drain	247
Figure 74.	CSO 88 Outfall	248
Figure 75.	Typical CDS Unit	249
Figure 76.	February 13, 2000 TSS Results	250
Figure 77.	February 18, 2000 TSS Results	250
Figure 78.	March 16, 2000 TSS Results	251
Figure 79.	April 7, 2000 TSS Results	251
Figure 80.	Ohio River Watershed.....	258
Figure 81.	Co-Permittee Locations	262
Figure 82.	The City of Prospect	262
Figure 83.	The City of Shively.....	264
Figure 84.	City of Louisville	266
Figure 85.	Jefferson County	269
Figure 86.	New MSD Catch Basin Design.....	274
Figure 87.	ECO Mapping	277
Figure 88.	Water Quality Report.....	280
Figure 89.	Typical Storage Gate	285
Figure 90.	Brady Lake – Proposed Site for a 17.25 MG Earthen Basin	287
Figure 91.	Mill Creek Watershed.....	291
Figure 92.	Co-Permittee Locations	294
Figure 93.	The City of Shively	294
Figure 94.	City of Louisville	296
Figure 95.	Jefferson County	299
Figure 96.	St. Timothy Wetland Site, KYTC.....	302
Figure 97.	Greenwood Road Wetland Site, KYTC.....	302
Figure 98.	New MSD Catch Basin Design.....	305
Figure 99.	ECO Mapping	307
Figure 100.	Water Quality Report.....	310
Figure 101.	Pond Creek Watershed (Jefferson County Only).....	315
Figure 102.	Co-Permittee Locations	318
Figure 103.	City of Jeffersontown.....	319
Figure 104.	2000 Student Outfall Program in Jeffersontown High School	319
Figure 105.	City of Louisville	321
Figure 106.	Jefferson County	324
Figure 107.	New MSD Catch Basin Design.....	330
Figure 108.	ECO Mapping	333
Figure 109.	Water Quality Report.....	335
Figure 110.	Pennsylvania Run Watershed	344
Figure 111.	Co-Permittee Locations	347
Figure 112.	Jefferson County	347
Figure 113.	New MSD Catch Basin Design.....	353
Figure 114.	Water Quality Report.....	357
Figure 115.	Cedar Creek Watershed	362
Figure 116.	Co-Permittee Locations	364
Figure 117.	Jefferson County	365
Figure 118.	New MSD Catch Basin Design.....	371

Figure 119. Water Quality Report.....	375
Figure 120. Floyds Fork Watershed (Jefferson County Only).....	381
Figure 121. Co-Permittee Locations	384
Figure 122. The City of Anchorage.....	384
Figure 123. No Mow Zone, Anchorage	385
Figure 124. Porous Pavement Driveway, Anchorage	385
Figure 125. Tree Preservation Program, Anchorage.....	386
Figure 126. The City of Jeffersontown	387
Figure 127. 2000 Student Outfall Program at Jeffersontown High School	387
Figure 128. Jefferson County	390
Figure 129. New MSD Catch Basin Design.....	396
Figure 130. ECO Mapping	399
Figure 131. Water Quality Report.....	401

LIST OF EXHIBITS

Exhibit 1. Watershed Information and Water Quality Summary 38
Exhibit 2. Water Quality Tool Sampling 95
Exhibit 3. Backflow Program 95
Exhibit 4. FY00 and FY01 Overflow Monitoring Sites CSO Program..... 95
Exhibit 5. Harrods Creek Watershed 125
Exhibit 6. Goose Creek Watershed..... 152
Exhibit 7. Solids and Floatables Design Project Muddy Fork Watershed..... 177
Exhibit 8. Muddy Fork of Beargrass Creek Watershed..... 177
Exhibit 9. Middle Fork of Beargrass Creek Watershed..... 216
Exhibit 10. 2000 Student Outfall Program South Fork of Beargrass Creek..... 257
Exhibit 11. South Fork of Beargrass Creek Watershed 257
Exhibit 12. RTC Studied Control Sites Ohio River Watershed..... 290
Exhibit 13. City/Ohio River Watershed..... 290
Exhibit 14. Mill Creek Watershed 314
Exhibit 15. Pond Creek Watershed..... 343
Exhibit 16. Pennsylvania Run Watershed..... 361
Exhibit 17. Cedar Creek Watershed 380
Exhibit 18. Floyds Fork Watershed 408
Exhibit 19. Reoccurring SSO’s and Contributing Sewers.....Appendix 5
Exhibit 20. SSES DistrictsAppendix 5
Exhibit 21. 2000 CSO, SSO, and MS4 ProjectsAppendix 6

LIST OF APPENDICIES

Appendix I	Waters Report and GIS Application
Appendix II	MS4 Permit – KPDES No: KYS000001
Appendix III	MS4 Matrix of Elements
Appendix IV	Erosion Prevention and Sediment Control Proposed Ordinance
Appendix V	SSO Fact Sheets
Appendix VI	List of Fiscal Year 2000 Projects and Project Map
Appendix VII	Storm Water Outfall Data 2000 and ICAM Follow-up
Appendix VIII	CSO Tables

GLOSSARY OF ACRONYMS AND UNITS

Acronyms

AAOV	Average Annual Overflow Volume
ACRE	Association of Chenoweth Run Environmentalists
APWA	American Public Waterworks Association
ARC/INFO™	Geographic Information System Software from Environmental Systems Research, Inc.
ArcView™	Geographic Information System Software from Environmental Systems Research, Inc.
BCTF	Beargrass Creek Task Force
BGI	Beargrass Creek Interceptor
BGIR	Beargrass Creek Interceptor Relief
BMP	Best Management Practice
BOD	Biological Oxygen Demand
CAFO	Concentrated Animal Feeding Operation
Cd	Cadmium
CDPD	Cellular Digital Packet Data
CDS	Continuous Deflection Separation
CIPP	Cured In Place Pipe
Cr	Chromium
CRD	Central Relief Drain
CRS	Community Rating System
CS	Construction Site Erosion Control
CSO	Combined Sewer Overflow
CSOP	Combined Sewer Operational Plan
Cu	Copper
DO	Dissolved Oxygen
ECC	Environmental Compliance Committee
ECO	Environmental/Constructability Overview
EDA	Economic Development Administration
EPSC	Erosion Prevention and Sediment Control
FC	Fecal Coliform
Fe	Iron
FEMA	Federal Emergency Management Administration
FFEA	Floyds Fork Environmental Association
FIRM	Flood Inspection Rate Map
FOBC	Friends of Beargrass Creek
FY99	Fiscal Year starting July 1, 1998 and ending June 30, 1999
FY00	Fiscal Year starting July 1, 1999 and ending June 30, 2000
FY01	Fiscal Year starting July 1, 2000 and ending June 30, 2001
FY02	Fiscal Year starting July 1, 2001 and ending June 30, 2002
FY03	Fiscal Year starting July 1, 2002 and ending June 30, 2003
GH	Good Housekeeping/Pollution Prevention
GIS	Geographic Information System

HAZMAT	Hazardous Materials
HBAL	Home Builders Association of Louisville
Hg	Mercury
HSPF	Hydrologic Simulation Program – FORTRAN
HTML	Hypertext Markup Language
HUD	United States Department of Housing and Urban Development
ICAM	Industrial Compliance and Monitoring Program
IC	Illicit Connection and Improper Disposal
ICC	Interbasin Coordinating Committee
ID	Industrial Discharge Program
I/I	Inflow and Infiltration
ILS	In-line Storage
IMS	Infrastructure Management System
IPL	Inspections, Permits, and Licenses
IWD	Industrial Waste Disposal
JCET	Jefferson County Environmental Trust
JCPS	Jefferson County Public Schools
KAR 5:005	Title 401 of the Kentucky Administrative Regulation, Chapter 5, Section 5
KDOW	Kentucky Division of Water
KIESD	Kentucky Institute for the Environment and Sustainable Development, University of Louisville
KIPDA	Kentuckiana Regional Planning and Development Agency
KPDES	Kentucky Pollutant Discharge Elimination System
KYTC	Kentucky Transportation Cabinet
KWA	Kentucky Waterways Alliance
LEEP	Louisville Education Employment Partnership
LOJIC	Louisville and Jefferson County Information Consortium
LTCP	Long-Term Control Plan
M	Monitoring
MDS	Main Diversion Structure
MFWTP	Morris Forman Wastewater Treatment Plant
MMR	Monthly Monitoring Reports
MS4	Municipal Separate Storm Sewer System
MSD	Louisville and Jefferson County Metropolitan Sewer District
NACCP	Neighborhood Association for Cedar Creek Preservation
NCAP	North County Action Plan
NPDES	National Pollution Discharge Elimination System
NFIP	National Flood Insurance Program
NH ₃	Ammonia
NH ₄	Ammonia Nitrogen
NMC	Nine Minimum Controls
NO ₃	Nitrate
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSTS	Northeastern Sanitary Trunk Sewer
ORFM	Ohio River Force Main

ORI	Ohio River Interceptor
ORMP	Ohio River Mile Point
ORSANCO	Ohio River Valley Sanitation Commission
P	Point Source
Pb	Lead
PC	Post Construction Program
PE	Public Education/Outreach Program
PS	Pump Station
PSC	Property Service Connection
R	Reporting
RTC	Real Time Control
SBRD	Snead's Branch Relief Drain
SMMP	Strategic Manhole Monitoring Program
SRP	Soluble Reactive Phosphorus
SSES	Sanitary Sewer Evaluation Study
SSO	Sanitary Sewer Overflow
SSOAEP	Sanitary Sewer Overflow Abatement and Elimination Plan
SWMM	Storm Water Management Model
SWMS	City of Louisville, Solid Waste Management Services
TDS	Total Dissolved Solids
THM	Trihalomethanes
TKN	Organic Nitrogen
TMDL	Total Maximum Daily Loads
TP	Total Phosphorus
TSS	Total Suspended Solids
TVI	Television Inspection
TVSS	Total Volatile Suspended Solids
UDRTRSF	Upper Dry Run Trunk Regional Storage Facility
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
USI	Underground Sewer Inspection
UV	Ultraviolet
W	Wet Weather
WATERS	Watershed Approach to Environmentally Responsible Stewardship
WCWTP	West County Wastewater Treatment Plant
WDR	Wastewater Discharge Regulations
WDM	Watershed Data Management
WEF	Water Environment Federation
WEFTEC	Water Environment Federation Technical Exposition and Conference
WTP	Wastewater Treatment Plant
XL	Excellence in Leadership
YEA	Youth Environmentally Aware
Zn	Zinc

Units

gpd	gallons per day
lf	linear feet
MG	million gallons
MGD	million gallons per day
sq. mi.	square mile