

CHAPTER 4: SELECTION OF FINAL SANITARY SEWER DISCHARGE PLAN

TABLE OF CONTENTS

4.1	FINAL PROJECT SELECTION.....	2
4.1.1	Preferred Solutions.....	2
4.1.2	Level of Protection Evaluation.....	8
4.1.3	Final SSDP Projects	18
4.2	DEVELOPMENT OF RECOMMENDED PLAN	26
4.2.1	Prioritization of Projects	26
4.2.2	Implementation Schedule to Achieve Consent Decree Requirements.....	26
4.3	PUBLIC INVOLVEMENT	27
4.4	ENVIRONMENTAL BENEFITS OF RECOMMENDED PROGRAM	29
4.4.1	Determining Environmental Benefits	29
4.4.2	Measuring and Modeling Environmental Benefits	31
4.5	MEASURES OF SUCCESS	31
4.5.1	Goal One: No Wet Weather, Capacity-Related SSOs under the Selected Level of Protection	32
4.5.2	Goal Two: No Wet Weather, Capacity-Related Basement Backups under the Selected Design Level	33
4.5.3	Goal Three: Sufficient Treatment Capacity under the Selected Level of Protection	33
4.5.4	Goal Four: Project Flow Monitoring Performed and Documented	34
4.5.5	Benefits of the Measures of Success	36
4.5.6	Additional Performance Goals	36
4.5.7	New SSO Locations.....	36

SUPPORTING INFORMATION

Appendix 2.3.4 RDI/I Method and Modeling Techniques Technical Paper

Appendix 4.1.1 Optimized Solution Cost Estimates and Benefit-Cost Analyses

Appendix 4.1.2 Final SSDP Project Cost Estimates

Appendix 4.1.3 Evaluation of All Levels of Protection Analysis

Appendix 4.5.1 SSO Fact Sheets

CHAPTER 4: SELECTION OF FINAL SANITARY SEWER DISCHARGE PLAN

The Final Sanitary Sewer Discharge Plan (SSDP) approach to sanitary sewer overflow (SSO) elimination is based upon identifying the solution that provides the highest benefit-cost ratio for each modeled watershed branch. As presented in Chapter 3, Louisville and Jefferson County Metropolitan Sewer District (MSD) developed a solution development process. The following is a summary of the Final SSDP solution development process.

- Solutions were developed that eliminated SSOs and known surcharging under site-specific levels of protection using a diverse set of solution technologies.
- Benefits, capital costs, and benefit-cost ratios were developed for each solution at the baseline level of protection (1.82-inch cloudburst storm event).
- The solution with the best benefit-cost ratio was selected for further development and analysis of the preferred level of protection.

Chapter 4 summarizes the final steps in the solution development process. The Chapter discusses the optimized level of protection evaluations and the resulting list of selected projects. Additionally, the chapter reviews the Integrated Overflow Abatement Plan (IOAP) public involvement process. The chapter ends by discussing the process used for tracking and determining success of the Final SSDP projects.

4.1 FINAL PROJECT SELECTION

As detailed in Chapter 3, MSD used a standard benefit-cost ratio process to determine and select the most effective solution (referred to as the preferred solution). The same process was used to set optimal levels of protection for the selected solutions. The following section revisits the preferred solution process.

4.1.1 Preferred Solutions

During the development of SSO elimination strategies and alternatives, a wide range of technology approaches were considered for the baseline level of protection. The approaches included the following:

- Source control through infiltration and inflow (I/I) reduction
- Reduced surcharging in systems hydraulically connected to SSOs and solutions
- A wide variety of conventional constructed facilities commonly referred to as gray infrastructure, including:
 - Peak flow storage (constructed storage tanks, or oversized pipes providing “in-line” storage)

- Increased conveyance capacity (increased pipe sizes, parallel relief sewers, new or expanded pump stations)
- Flow diversions to other portions of the system that have available capacity
- Expanded wastewater treatment capacity (provided at existing regional treatment facilities or provided remotely as high-rate wet weather treatment facilities)

Table 4.1.1 recaps the preferred solution technology list developed for the baseline level of protection. Projects are listed by the eleven model areas.

**TABLE 4.1.1
SUMMARY OF PREFERRED SOLUTIONS**

SSDP Recommended Project Name/Location	Region and Branch ID	SSO(s) Addressed	Technology
Cedar Creek Area			
Idlewood Inline Storage	Cedar Creek - 70158	28998, 28984, 63094, 63095, 70158	Inline Storage
Fairmount Rd. Pump Station Improvements	Cedar Creek - 81316	Fairmount Road Pump Station (PS) (81316 & 97362)	PS Upgrades
Little Cedar Creek Interceptor Improvements	Cedar Creek - 67997	67997, 67999, 86423, 89195, 89197	Pipe Upgrades
Bardstown Rd. PS Improvements	Cedar Creek - MSD1025	88545	PS Upgrades
Running Fox PS Elimination	Cedar Creek – MSD1080	Running Fox PS (MSD1080-LS)	Diversion
Hite Creek Area			
Meadow Stream PS Inline Storage	Hite Creek - MSD1082	Meadow Steam PS (91087 & MSD1082-PS)	Inline Storage
Floydsburg Rd. I/I Investigation & Rehabilitation	Hite Creek - MSD1086	Floydsburg Road (MSD1086-PS, 90776, 108956, 108957, 108958)	I/I Reduction
Kavanaugh Rd. PS Improvements	Hite Creek - MSD1085	Kavanaugh Road (MSD1085-PS)	PS & Force Main Upgrades
Floyds Fork Area			
Woodland Hills PS Diversion	Floyds Fork - NB01	33003, 65531	Diversion
Eden Care PS SSO Investigation	Floyds Fork - NB02	Eden Care PS (MSD1105-PS)	Monitor
Ashburton PS Improvements & Diversion	Floyds Fork - NB03	Olde Copper Court PS (MSD0165-PS), Ashburton PS (MSD0166-PS)	Upgrade Force Main & Pipes
Jeffersontown Area			
Jeffersontown WQTC Elimination	Jeffersontown - NB01	28390, 28391, 28392, 28395, 31733, Jeffersontown WQTC (28173 & 64505 & MSD0255 & IS028-SI)	Offline Storage, Pipe Upgrades, WQTC Eliminations
Chenoweth Hills WQTC Elimination, Chenoweth Run and Chippewa PS Improvements	Jeffersontown - NB01A	Chenoweth Run PS (MSD0196-PS & 86052 & 64096), Chippewa PS (92061), Chenoweth Hills WQTC PS (MSD0263A-PS), Chenoweth Hills WQTC (MSD0263)	PS & Force Main Upgrades, WQTC Eliminations
Dell Rd and Charlane Pkwy Interceptor Improvements	Jeffersontown - NB02	Charlane Pkwy (28250, 28249, 28340, 28336, 104289), Dell Rd. (28413, 28414, 28415, 28416, 28417)	Pipe Upgrades
Raintree & Marian Ct PS Eliminations	Jeffersontown - NB03	28719, 28711, Marian Ct. PS (28729), Raintree PS (MSD0149-PS)	Diversion, Pipe Upgrades
Monticello PS Elimination	Jeffersontown - NB04	Monticello Place PS (MSD0151-PS & 27969)	Diversion

**TABLE 4.1.1
SUMMARY OF PREFERRED SOLUTIONS**

SSDP Recommended Project Name/Location	Region and Branch ID	SSO(s) Addressed	Technology
Middle Fork Area			
Middle Fork Relief Interceptor, Wet Weather Storage, and UMFLS Diversion	Middle Fork - MF01	02932, 02933, 02935, 08537, 23211, 23212, 27005, 45835, 47583, 47593, 47596, 47603, 47604, 51221, 51160, 51161, 90700, IS021A-SI, Middle Fork at Breckenridge (08935-SM)	Offline Storage & Pipe Upgrades
Goose Creek PS Improvements & Wet Weather Storage	Middle Fork - MF04	Devondale PS (21628-W), Goose Creek PS (46891 & 62418 & 91629 & 91630 & 105936), Saurel PS (43472)	Offline Storage, PS & Force Main Upgrades
Anchor Estates Inline Storage & PS Eliminations	Middle Fork - MF06	Vannah PS (01106), Anchor Estates #1 PS (00746 & 00056-W), Anchor Estates #2 PS (MSD0057-LS)	Inline Storage & Diversion
Hurstbourne I/I Investigation & Rehabilitation	Middle Fork – MF07	01793	I/I Reduction
Southeastern Diversion Area			
Parkview Estates I/I Investigation & Rehabilitation	Southeastern Diversion – NB03	47250	I/I Reduction
Klondike Interceptor	Southeastern Diversion – NB04	25676 (Alcona), 26650, 26651	Pipe Upgrades
Sutherland Interceptor	Southeastern Diversion – NB05	Sutherland (16649)	Pipe Upgrades
Beargrass Interceptor Rehab Ph. 2	Southeastern Diversion – NB06	51594	Pipe Rehab
Pond Creek Area			
Charleswood Interceptor Extension	Pond Creek - PC03	25477, 25478, Cooper Chapel PS (25480 & MSD0130-PS)	Pipe Upgrades
Cinderella PS Elimination	Pond Creek - PC04	Cinderella PS (60679 & MSD1013-PS), 35309	Diversion
Lantana PS I/I Investigation & Rehabilitation	Pond Creek - PC05	Lantana Drive #1 PS (25484 & 93719 & MSD0101-PS)	I/I Reduction
Government Center PS Elimination	Pond Creek - PC06	Government Center PS (MSD0180-PS)	Diversion
Avanti PS Elimination	Pond Creek - PC07	Avanti PS (21229-W)	Diversion
Lea Ann Way System Improvements	Pond Creek - PC08	19360, 19369, 29933, 29948, 29943, 31083, 31084, 79076, Lea Ann Way PS (MSD1010-PS)	Pipe Upgrades
Outer Loop & Caven Ave Wet Weather Storage	Pond Creek - PC09	27116, 70212, 17724, Caven Ave PS (MSD0133-PS)	Offline Storage & Pipe Upgrades
Leven PS Elimination	Pond Creek - PC10	Leven PS (36419 & MSD1019-PS)	Diversion
Edsel PS I/I Investigation & Rehabilitation	Pond Creek - PC11	Edsel PS (92098 & MSD1048-PS)	I/I Reduction

**TABLE 4.1.1
SUMMARY OF PREFERRED SOLUTIONS**

SSDP Recommended Project Name/Location	Region and Branch ID	SSO(s) Addressed	Technology
ORFM Area			
Mellwood System Improvements & PS Eliminations	ORFM - NB01	26752, 41374, 41416, Mockingbird Valley PS (MSD0007-PS), Winton PS (MSD0010-PS), Mellwood Avenue PS (24472 & MSD0023-PS), Canoe Lane PS (24152-W & MSD0024-PS)	PS Upgrades, Pipe Upgrades & Diversion
Leland Rd. SSO Investigation	ORFM - NB02	96020	Condition Assessment
Derington Ct. PS I/I Investigation & Rehab	ORFM - NB03	Derington Court PS (MSD0095-PS)	I/I Reduction
Prospect WQTC Eliminations, Harrods Creek PS, and ORFM System Improvements	ORFM - NB04 (Prospect)	40870, 40871, 40872, Barbour Lane PS (42680 & 65633 & 65635), West Goose Creek PS (22436 & MSD0123-PS), Phoenix Hill PS (MSD1044-PS), Glenview Hills PS (MSD0183-PS), Barbour Lane PS (MSD0192-PS), New Market PS (MSD0193-PS), Deep Creek PS (MSD1063-PS), Hunting Creek South WQTC (MSD0292)	PS and Pipe Upgrades, Diversion, WQTC eliminations
Mill Creek Area			
Shively Interceptor	Mill Creek - NB01	04498, 04542, Pioneer PS (81814-W), Fern Lea PS (MSD0047-PS), Garr's Lane PS (MSD0050-PS)	Pipe Upgrades
East Rockford PS Relocation	Mill Creek - NB02	East Rockford PS (04699-W)	PS Replacement and Relocation
Small WQTC Area			
Lucas Ln. PS Inline Storage	Berrytown - NB01	Lucas Lane PS (MSD0199-LS)	Inline Storage
Riding Ridge PS Improvements	Hunting Creek North - NB01	Riding Ridge PS (MSD1060-LS)	PS Upgrades
Gunpowder PS Inline Storage	Hunting Creek North - NB02	Gunpowder PS (MSD1055-LS)	Inline Storage
Fox Harbor Inline Storage	Hunting Creek North - NB03	Fox Harbor #1 and #2 PS (62769)	Inline Storage
Fairway View PS Improvements	Hunting Creek South - NB01	Fairway View PS (MSD1065-PS)	PS Upgrades
Lake Forest PS SSO Investigation	Lake Forest - NB01	Lake Forest PS (MSD1169-LS)	Monitor
St. Rene Rd. PS Inline Storage	Chenoweth Hills - CH01	94187	Inline Storage

**TABLE 4.1.1
SUMMARY OF PREFERRED SOLUTIONS**

SSDP Recommended Project Name/Location	Region and Branch ID	SSO(s) Addressed	Technology
CSS Area			
Sonne PS I/I Investigation & Rehabilitation	CSO - 42007	Sonne Avenue PS (MSD0042-PS)	I/I Reduction
Camp Taylor System Improvements	CSO - 30917	08717, 13931, 13943, 39763, 44396, 44397, 66349, 104223, 104231	SSES, Sewer Rehabilitation & Replacement, Offline Storage
Hazelwood PS I/I Investigation & Rehabilitation	CSO - 55665	Hazelwood PS (55665)	I/I Reduction
Legend: LS –Lift station, PS – Pump Station, CSO – Combined Sewer Overflow, SSO – Sanitary Sewer Overflow, CSS- Combined Sewer System, WQTC – Water Quality Treatment Center, SSES – Sanitary Sewer Evaluation Study, I/I – Inflow and Infiltration, UMFLS – Upper Middle Fork Lift Station, ORFM – Ohio River Force Main			

4.1.2 Level of Protection Evaluation

The IOAP sets the minimum level of protection at a 1.82-inch cloudburst storm event, and the maximum level of protection evaluated at a 2.60-inch cloudburst storm event. A 1.82-inch cloudburst storm is equivalent to a 3-hour, high-intensity event with a 50 percent probability of occurring in a given year. MSD selected this level of protection to be consistent with the cities of Atlanta, Cincinnati, and Knoxville who also use a 50 percent probability (often referred to as a two-year recurrence interval design storm) as the minimum protection level for SSOs.

For solution optimization, the starting point is the preferred solution and a baseline level of protection set at a 1.82-inch cloudburst storm. The solution is then analyzed at a 2.25-inch cloudburst and 2.60-inch cloudburst (if needed) storm level to compare benefit-cost ratios for the modeled branch. The method implemented involves analyzing the same solution determined at the 1.82-inch cloudburst level and modifying the solution to capture flows and prevent SSOs during the higher-intensity cloudburst storm events.

Costs and benefits are re-evaluated and a new benefit-cost ratio is determined for that solution. The following rules apply to the re-evaluated results:

- If the 2.25-inch cloudburst benefit-cost ratio does not exceed the 1.82-inch cloudburst benefit-cost ratio then the level of protection chosen for that particular solution is the 1.82-inch cloudburst storm level.
- If the 2.25-inch cloudburst benefit-cost ratio does exceed the 1.82-inch cloudburst benefit-cost ratio then the same process is repeated at the 2.60-inch cloudburst storm level.
- If the 2.60-inch cloudburst benefit-cost ratio does not exceed the 2.25-inch cloudburst benefit-cost ratio then the level of protection chosen for that particular solution is the 2.25-inch cloudburst storm level.
- If the 2.60-inch cloudburst benefit-cost ratio does exceed the 2.25-inch cloudburst benefit-cost ratio then the level of protection chosen for that particular solution is the 2.60-inch cloudburst storm level and no further evaluation is performed.

This approach to determine the optimal level of protection means that solutions to address an individual SSO location may be designed to protect against larger storms if that will yield a higher benefit-cost ratio in the analysis of project alternatives.

Additionally, three projects were chosen to examine the above approach by evaluating the 2.60-inch cloudburst event where all three levels of control had not been previously developed. The projects subject to this further evaluation are: Klondike Interceptor, Middle Fork Relief Interceptor, and the Shively Interceptor. The results presented in Table 4.1.2 illustrate that the evaluation rules presented above are appropriate, and identify the level of protection with the highest benefit-cost ratio. Table 4.1.2 sites the modeled area, lists the SSOs that are controlled, summarizes the design level of protection evaluation process for each modeled branch, and highlights the ultimate design level of protection for that particular branch. Projects are listed by modeled area. Level of Protection costs and benefit-cost detailed evaluation tables for each modeled branch are available in Appendix 4.1.1 Optimized Solution Cost Estimates and Benefit-Cost Analyses.

TABLE 4.1.2
SUMMARY OF LEVEL OF PROTECTION EVALUATION

SSDP Recommended Project Name/Location	SSO(s) Addressed	Technology	Level of Protection	Present Worth Benefit-Cost Ratio
Cedar Creek Area				
Idlewood Inline Storage	28998, 28984, 63094, 63095, 70158	Inline Storage	1.82-inch	31.36
			2.25-inch	27.11
Fairmount Rd. PS Improvements	Fairmount Road PS (81316 & 97362)	PS Upgrades	1.82-inch	26.79
			2.25-inch	31.33
			2.60-inch	33.29
Little Cedar Creek Interceptor Improvements	67997, 67999, 86423, 89195, 89197	Pipe Upgrades	1.82-inch	23.86
			2.25-inch	17.43
Bardstown Rd. PS Improvements	88545	PS Upgrades	1.82-inch	29.42
			2.25-inch	46.50
			2.60-inch	33.85
Running Fox PS Elimination	MSD1080-LS	Diversion	1.82-inch	659.52
			2.25-inch	118.87
Hite Creek Area				
Meadow Stream PS Inline Storage	Meadow Steam PS (91087 & MSD1082-PS)	Inline Storage	1.82-inch	13.77
			2.25-inch	11.71
Floydsburg Rd. I/I Investigation & Rehabilitation	Floydsburg Road (MSD1086-PS, 90776, 108956, 108957, 108958)	I/I Reduction	Sewer System Evaluation Study (SSES)/Rehab	
Kavanaugh Rd. PS Improvements	Kavanaugh Road (MSD1085-PS)	PS & Force Main Upgrades	1.82-inch	19.77
			2.25-inch	20.23
			2.60-inch	21.09
Floyds Fork Area				
Woodland Hills PS Diversion	33003, 65531	Diversion	1.82-inch	92.26
			2.25-inch	17.75
			2.60-inch	15.45
Eden Care PS SSO Investigation	Eden Care PS (MSD1105-PS)	Monitoring	Monitoring	
Ashburton PS Improvements & Diversion	Olde Copper Court PS (MSD0165-PS), Ashburton PS (MSD0166-PS)	Upgrade Force Main & Pipes	1.82-inch	161.00
			2.25-inch	82.24

TABLE 4.1.2
SUMMARY OF LEVEL OF PROTECTION EVALUATION

SSDP Recommended Project Name/Location	SSO(s) Addressed	Technology	Level of Protection	Present Worth Benefit-Cost Ratio
Jeffersontown Area				
Jeffersontown WQTC Elimination	28390, 28391, 28392, 28395, 31733, Jeffersontown WQTC (28173 & 64505 & MSD0255 & IS028-SI)	Offline Storage, Pipe Upgrades, WQTC Elimination	1.82-inch	5.23
			2.25-inch	5.09
Chenoweth Hills WQTC Elimination, Chenoweth Run and Chippewa PS Improvements	Chenoweth Run PS (MSD0196-PS & 86052 & 64096), Chippewa PS (92061), Chenoweth Hills WQTC PS (MSD0263A-PS), Chenoweth Hills WQTC (MSD0263)	PS & Force Main Upgrades, WQTC Elimination	1.82-inch	20.05
			2.25-inch	17.94
Dell Rd and Charlane Pkwy Interceptor Improvements	Charlane Pkwy (28250, 28249, 28340, 28336, 104289), Dell Rd. (28413, 28414, 28415, 28416, 28417)	Pipe Upgrades	1.82-inch	31.34
			2.25-inch	26.28
Raintree & Marian Ct. PS Eliminations	28719, 28711, Marian Court PS (28729), Raintree PS (MSD0149-PS)	Diversion, Pipe Upgrades	1.82-inch	72.76
			2.25-inch	51.97
Monticello PS Elimination	Monticello Place PS (MSD0151-PS & 27969)	Diversion	1.82-inch	48.90
			2.25-inch	63.24
			2.60-inch	65.85
Middle Fork Area				
Middle Fork Relief Interceptor, Wet Weather Storage, and UMFLS Diversion	02932, 02933, 02935, 08537, 23211, 23212, 27005, 45835, 47583, 47593, 47596, 47603, 47604, 51221, 51160, 51161, 90700, IS021A-SI, Middle Fork at Breckenridge (08935-SM)	Offline Storage & Pipe Upgrades	1.82-inch	1.26
			2.25-inch	1.07
			2.60-inch	0.90
Goose Creek PS Improvements & Wet Weather Storage	Devondale PS (21628-W), Goose Creek PS (46891 & 62418 & 91629 & 91630 & 105936), Saurel PS (43472)	Offline Storage, PS & Force Main Upgrades	2.25-inch	11.00
			2.60-inch	6.84
Anchor Estates PS Eliminations	Vannah PS (01106), Anchor Estates #1 PS (00746 & 00056-W), Anchor Estates #2 PS (MSD0057-LS)	Diversion	1.82-inch	25.39
			2.25-inch	29.55
			2.60-inch	31.14
Hurstbourne I/I Investigation & Rehabilitation	01793	I/I Reduction	SSES/Rehab	

TABLE 4.1.2
SUMMARY OF LEVEL OF PROTECTION EVALUATION

SSDP Recommended Project Name/Location	SSO(s) Addressed	Technology	Level of Protection	Present Worth Benefit-Cost Ratio
Southeastern Diversion Area				
Parkview Estates I/I Investigation & Rehabilitation	47250	I/I Reduction	SSES/Rehab	
Klondike Interceptor	Alcona (25676), 25560, 25561	Pipe Upgrades	1.82-inch	9.11
			2.25-inch	9.11
			2.60-inch	7.02
Sutherland Interceptor	Sutherland (16649)	Pipe Upgrades	1.82-inch	25.22
			2.25-inch	31.98
			2.60-inch	32.71
Beargrass Interceptor Rehab Phase 2	51594	Sewer Rehab	Rehabilitation	
Pond Creek Area				
Charleswood Interceptor Extension	25477, 25478, Cooper Chapel PS (25480 & MSD0130-PS)	Pipe Upgrades	1.82-inch	62.84
			2.25-inch	7.14
Cinderella PS Elimination	Cinderella PS (60679 & MSD1013-PS), 35309	Diversion	1.82-inch	43.86
			2.25-inch	38.20
Lantana PS I/I Investigation & Rehabilitation	Lantana Drive #1 PS (25484 & 93719 & MSD0101-PS)	I/I Reduction	SSES/Rehab	
Government Center PS Elimination	Government Center PS (MSD0180-PS)	Diversion	1.82-inch	50.05
			2.25-inch	48.01
Avanti PS Elimination	Avanti PS (21229-W)	Diversion	1.82-inch	1448.28
			2.25-inch	1448.28
			2.60-inch	1448.28
Lea Ann Way System Improvements	19360, 19369, 29933, 29948, 29943, 31083, 31084, 79076, Lea Ann Way PS (MSD1010-PS)	Pipe Upgrades	1.82-inch	49.01
			2.25-inch	5.63
Outer Loop & Caven Ave Wet Weather Storage	27116, 70212, 17724, Caven Ave PS (MSD0133-PS)	Offline Storage & Pipe Upgrades	1.82-inch	7.08
			2.25-inch	5.38
Leven PS Elimination	Leven PS (36419 & MSD1019-PS)	Diversion	1.82-inch	152.13
			2.25-inch	74.72
Edsel PS I/I Investigation & Rehabilitation	Edsel PS (92098 & MSD1048-PS)	I/I Reduction	SSES/Rehab	

TABLE 4.1.2
SUMMARY OF LEVEL OF PROTECTION EVALUATION

SSDP Recommended Project Name/Location	SSO(s) Addressed	Technology	Level of Protection	Present Worth Benefit-Cost Ratio
ORFM Area				
Mellwood System Improvements & PS Eliminations	26752, 41374, 41416, Mockingbird Valley PS (MSD0007-PS), Winton PS (MSD0010-PS), Mellwood Avenue PS (24472 & MSD0023-PS), Canoe Lane PS (24152-W & MSD0024-PS)	PS Upgrades, Pipe Upgrades & Diversion	1.82-inch	25.09
			2.25-inch	26.97
			2.60-inch	26.09
Leland Rd. SSO Investigation	96020	Condition Assessment	Condition Assessment	
Derington Ct. PS I/I Investigation & Rehabilitation	Derington Court PS (MSD0095-PS)	I/I Reduction	SSES/Rehab	
Prospect WQTC Eliminations, Harrods Creek PS, and ORFM System Improvements	40870, 40871, 40872, Barbour Lane PS (42680 & 65633 & 65635), West Goose Creek PS (22436 & MSD0123-PS), Phoenix Hill PS (MSD1044-PS), Glenview Hills PS (MSD0183-PS), Barbour Lane PS (MSD0192-PS), New Market PS (MSD0193-PS), Deep Creek PS (MSD1063-PS), Hunting Creek South WQTC (MSD0292)	PS and Pipe Upgrades, Diversion, WQTC eliminations	2.25-inch	1.69
			2.60-inch	0.99
Mill Creek Area				
Shively Interceptor	04498, 04542, Pioneer PS (81814-W), Fern Lea PS (MSD0047-PS), Garr's Lane PS (MSD0050-PS)	Pipe Upgrades	1.82-inch	5.20
			2.25-inch	6.68
			2.60-inch	6.70
East Rockford PS Relocation	East Rockford PS (04699-W)	PS Replacement and Relocation	PS Relocation	
Small WQTC Area				
Lucas Ln. PS Inline Storage	Lucas Lane PS (MSD0199-LS)	Inline Storage	1.82-inch	112.86
			2.25-inch	95.75
Riding Ridge PS Improvements	Riding Ridge PS (MSD1060-LS)	PS Upgrades	1.82-inch	52.02
			2.25-inch	19.61
Gunpowder PS Inline Storage	Gunpowder PS (MSD1055-LS)	Inline Storage	1.82-inch	78.71
			2.25-inch	59.15
Fox Harbor Inline Storage	Fox Harbor #1 and #2 PS (62769)	Inline Storage	1.82-inch	43.49
			2.25-inch	81.40
			2.60-inch	87.55

TABLE 4.1.2
SUMMARY OF LEVEL OF PROTECTION EVALUATION

SSDP Recommended Project Name/Location	SSO(s) Addressed	Technology	Level of Protection	Present Worth Benefit-Cost Ratio
Fairway View PS Improvements	Fairway View PS (MSD1065-PS)	PS Upgrades	1.82-inch	10.32
			2.25-inch	7.64
Lake Forest PS SSO Investigation	Lake Forest PS (MSD1169-LS)	Monitoring	Monitoring	
St. Rene Rd. PS Inline Storage	94187	Inline Storage	1.82-inch	212.00
			2.25-inch	97.68
CSS Area				
Sonne PS I/I Investigation & Rehabilitation	Sonne Avenue PS (MSD0042-PS)	I/I Reduction	SSES/Rehab	
Camp Taylor System Improvements	08717, 13931, 13943, 36763, 44396, 44397, 66349, 104223, 104231	SSES, Sewer Rehabilitation & Replacement, Offline Storage	1.82-inch	65.12
			2.25-inch	67.63
			2.60-inch	68.47
Hazelwood PS I/I Investigation & Rehabilitation	Hazelwood PS (55665)	I/I Reduction	SSES/Rehab	
Legend: LS –Lift station, PS – Pump Station, CSO – Combined Sewer Overflow, SSO – Sanitary Sewer Overflow, CSS- Combined Sewer System, WQTC – Water Quality Treatment Center, SSES – Sanitary Sewer Evaluation Study, I/I – Inflow and Infiltration, UMFLS – Upper Middle Fork Lift Station, ORFM – Ohio River Force Main				

Level of Protection Evaluation Results

The level of protection evaluation presented in Table 4.1.2 was assessed by an analysis referred to as the "knee-of-the-curve" analysis. A knee-of-the-curve analysis typically involves estimating costs for a range of design levels, then comparing performance (benefits) versus cost and identifying the point of diminishing returns. For the Final SSDP, the knee-of-the-curve analysis focused on a comparison of total benefits versus total capital costs at various levels of protection.

The Final SSDP optimization process did not calculate the total capital costs and benefits for each preferred technology at all levels of protection. Total capital costs and benefits were calculated for 35 preferred technologies at a level of protection corresponding to the 1.82-inch and 2.25-inch cloudburst storms. Cost and benefits were calculated for several of the preferred technologies at the 1.52-inch and 2.60-inch levels of protection (recall the 2.60-inch level was not calculated if the 1.82-inch benefit-cost ratio was higher than the 2.25-inch benefit-cost ratio). Costs and benefits for all other preferred technologies at the 1.52-inch and 2.60-inch levels were estimated by extrapolation of the 1.82-inch or 2.25-inch level-of-protection values. All costs reflect the more detailed budget-level cost estimates prepared for the preferred alternatives.

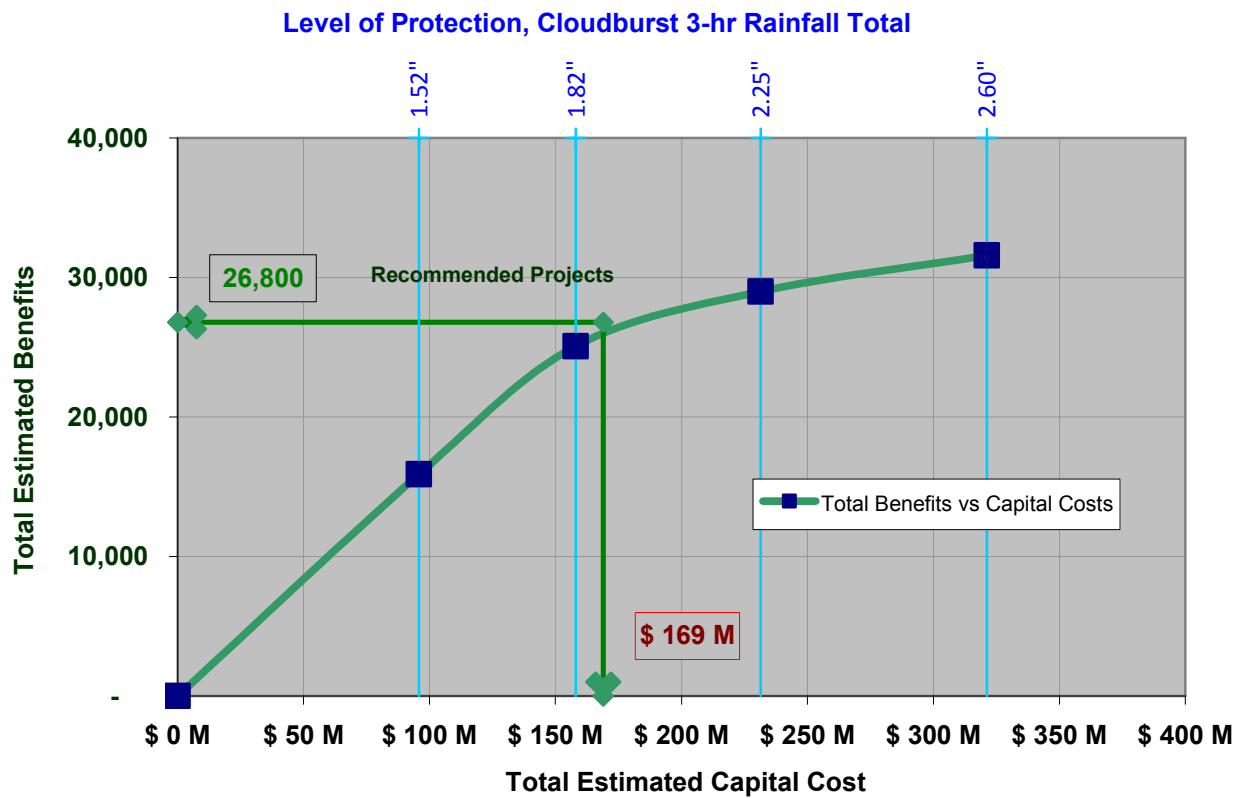
Figure 4.1.1 shows a curve of total benefits as a function of total capital cost for each level of protection. This figure also shows a single point above the curve denoting the total benefits (26,800) and total capital cost (\$169 million, 2008 dollars) for the recommended projects (not including Interim SSDP projects). The figure illustrates a typical knee of the curve response, with the point of inflection representing the point of diminishing returns. As depicted, beyond the 1.82-inch level of protection, additional capital expenditures result in a much slower increase in total benefits. The single point corresponding to the recommended projects lies just at the knee of the curve, demonstrating that the program maximizes benefits to the community with a controlled cost.

Figure 4.1.2 shows a curve of average project benefit-cost ratio versus total capital cost for each level of protection. There is a single point representing the average benefit-cost ratio (94) and total capital cost (\$169 million, 2008 dollars) for the recommended projects. This curve is plotted in a format to illustrate optimization of the benefit-cost ratio. This figure shows that the maximum average benefit-cost ratio occurs around the 1.82-inch cloudburst storm and benefit-cost ratios decline significantly beyond a 1.82-inch level of protection. The single point shows that the recommended projects are at the highest benefit-cost ratio, again demonstrating that the program maximizes benefits to the community.

Figure 4.1.3 shows a Benefit-Cost curve of three projects (Klondike Interceptor, Middle Fork Relief Interceptor, and Shively Interceptor) at all three levels of evaluation. Based on the evaluation of the three projects selected, the assumptions regarding benefit-cost trends appear to be valid. In two of the three cases, the benefit-cost score for the 2.25-inch cloudburst storm alternative is equal to or less than the score for the 1.82-inch cloudburst storm. In both of these cases the benefit-cost scores for the 2.60-inch cloudburst storm are less than that of the 2.25-inch cloudburst storm. In one case, the benefit-cost score for the 2.25-inch cloudburst storm is greater than the 1.82-inch cloudburst storm, and in this case the 2.60-inch cloudburst storm

benefit/cost score is slightly greater than the 2.25-inch cloudburst storm, and this is the level of protection that was selected. For a full explanation and results of the analysis refer to Appendix 4.1.3 Evaluation of All Levels of Protection Analysis.

FIGURE 4.1.1 SSDP PROJECT OPTIMIZATION: TOTAL BENEFITS VERSUS TOTAL CAPITAL COST (2008 DOLLARS)



**FIGURE 4.1.2 SSDP PROJECT OPTIMIZATION: AVERAGE B/C RATIO VERSUS
TOTAL CAPITAL COST (2008
DOLLARS)**

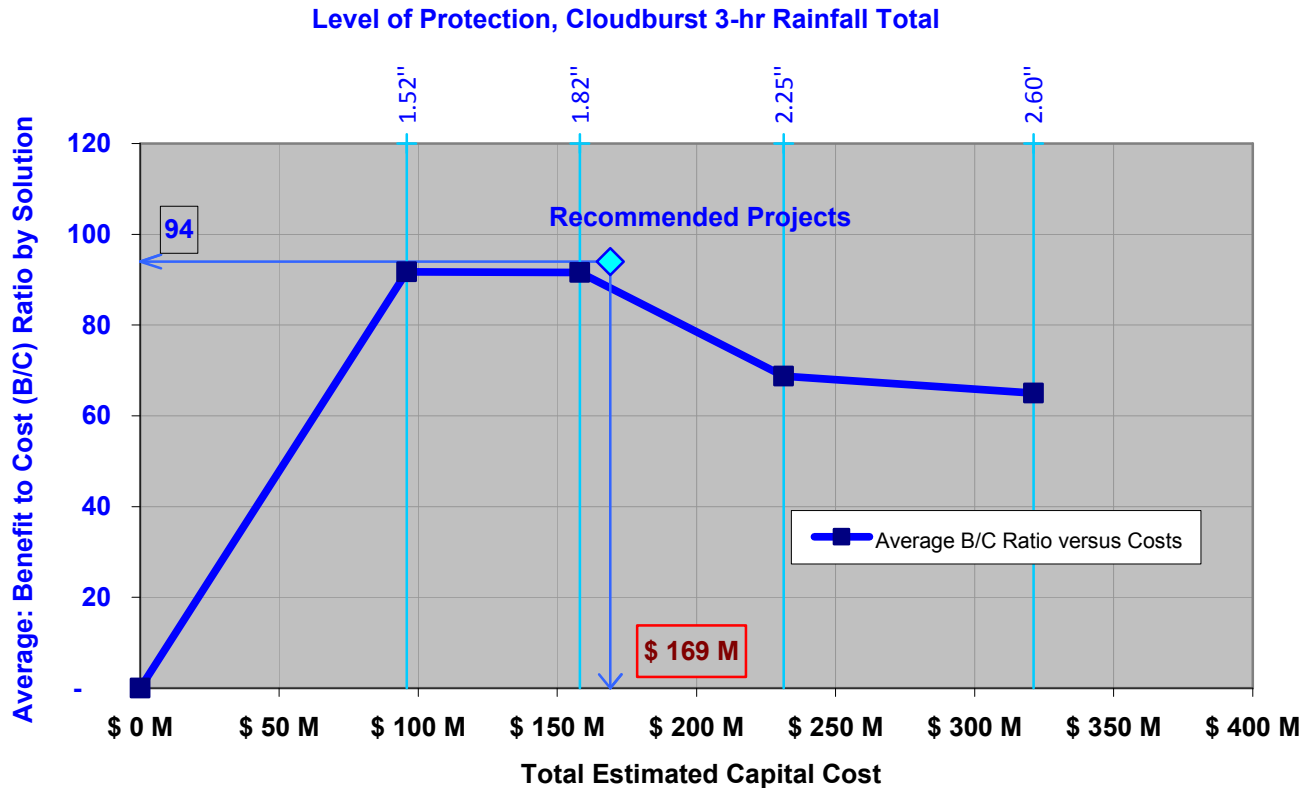
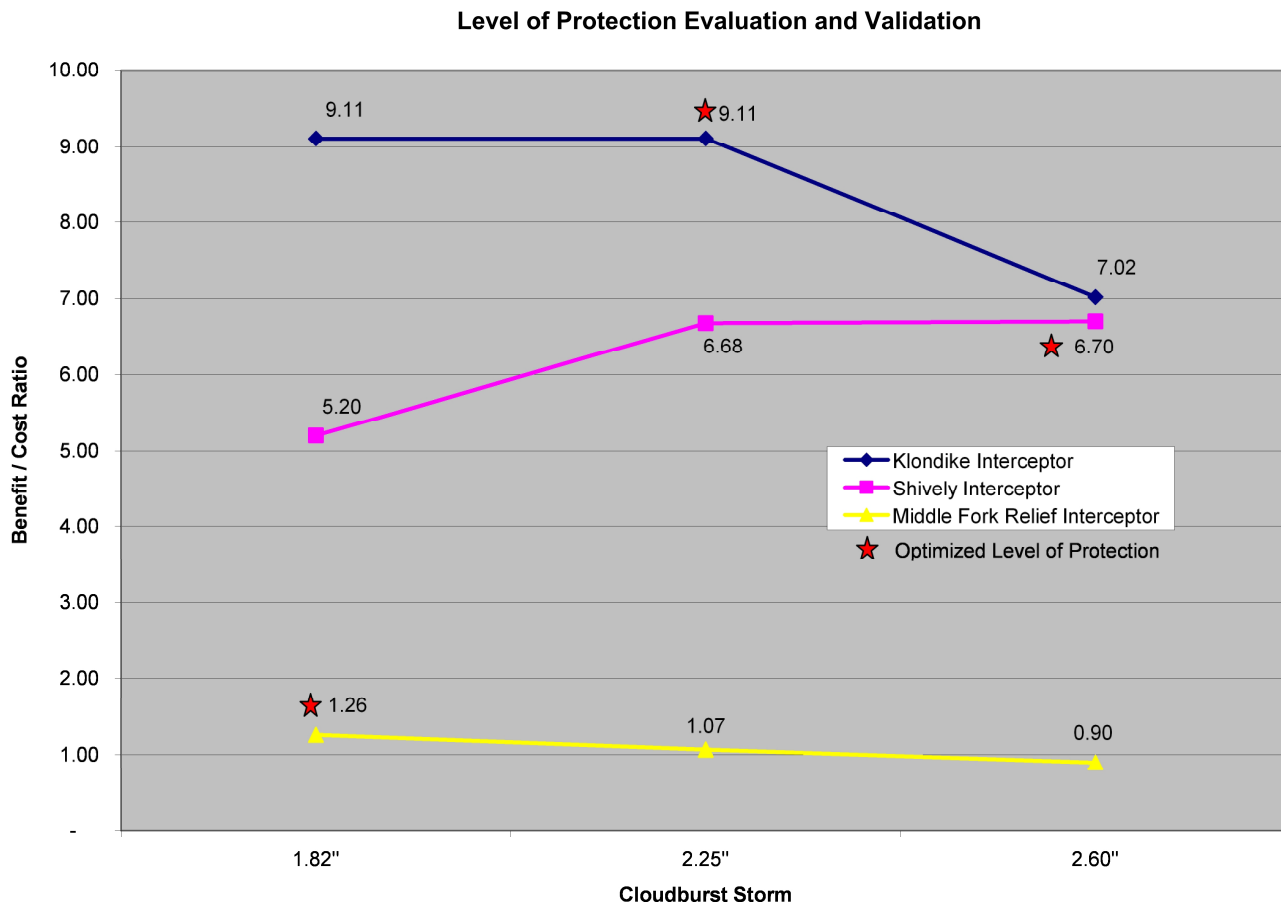


FIGURE 4.1.3 SSDP LEVEL OF PROTECTION EVALUATION



4.1.3 Final SSDP Projects

Driven by the values-based benefit-cost analysis discussed in Chapter 3, the IOAP seeks to present a balanced mix of “green infrastructure” and “gray” solutions to prevent and control SSOs. Since green infrastructure generally is intended to reduce stormwater runoff, it is not directly applicable to flow reduction in a separate sanitary sewer system (SSS). The equivalent to green infrastructure in the Final SSDP includes controlling I/I, using techniques such as disconnecting building laterals, downspouts, sump pumps, and foundation drains that are a direct source of I/I. Gray solutions include options such as storage, diversion, treatment, and conveyance/transport.

The final projects selected for eliminating SSOs also include a mixture of source control (including I/I reduction efforts), wet weather storage, system diversion, conveyance/transport, and basement flooding protection. This mix of control options for SSO locations is a reflection of the benefit-cost analysis and site-specific considerations. Consistent with the Final CSO Long-Term Control Plan (LTCP), the Final SSDP project alternatives are designed to be built around MSD’s existing infrastructure, which may include large diameter pipes and water quality treatment centers (WQTC), and draw on synergistic benefits from other MSD projects.

Overall, the Final SSDP includes 38 gray infrastructure projects, eight I/I reduction projects, and three SSO investigation projects. The Interim SSDP includes six gray infrastructure projects.

The gray infrastructure projects, including the six Interim SSDP projects, are divided into a combination of the following categories, (some projects fall into more than one category):

- 23 conveyance capacity upgrades
- 11 storage projects, inline and offline, many with pipe upgrades as well
- Upgrades or replacements to 12 pump stations
- Elimination of 18 pump stations
- Elimination of 6 small WQTCs, including 5 in the Prospect area
- Expansion of a WQTC

The site-specific level of protection as determined by the value-based benefit-cost analysis resulted in the following for the 38 Final SSDP gray infrastructure projects:

- 24 projects eliminate SSOs up to the 1.82-inch cloudburst storm
- 5 projects eliminate SSOs up to the 2.25-inch cloudburst storm
- 9 projects eliminate SSOs up to the 2.60-inch cloudburst storm

Table 4.1.3 represents the final projects chosen for eliminating SSOs at the selected site-specific level of protection. The table includes a list of projects, SSOs controlled by that project, chosen level of protection, capital costs, and scheduled project completion year. In total, there are 214 documented, suspected, and modeled SSOs addressed by the 55 projects (49 Final SSDP and 6 Interim SSDP) listed in Table 4.1.3. This number includes SSOs eliminated by the Interim SSDP projects. Projects are listed by modeled area.

Final SSDP Project Fact Sheets and Maps

Project fact sheets for the Final SSDP projects detailing project specifics are available at the end of this chapter. Each fact sheet includes a project description for the abatement solution, associated capital cost and associated benefit-cost ratio, and lists SSOs addressed by the project solution.

Detailed project maps for each Final SSDP project specify project location and type of solution. Maps also are located at the end of this chapter behind each respective project fact sheet. *Please note: The general representation of the overflow abatement solutions are for preliminary planning purposes only. Alignments and locations may be altered or refined during the design phase.*

The Final SSDP project fact sheets and maps are presented in the same order as the projects listed in Table 4.1.3. Additionally, project fact sheets and detailed project maps for the six Interim SSDP projects are located at the end of this chapter behind the Final SSDP fact sheets and maps. A total of 41 SSOs are addressed by the six Interim SSDP projects.

TABLE 4.1.3
LIST OF FINAL SSDP PROJECTS

SSDP Recommended Project Name/Location	SSO(s) Addressed	Technology	Level of Protection	Present Worth Benefit-Cost Ratio	Capital Cost \$ ¹	Annual O&M Dollars	Scheduled Completion Year
Cedar Creek Area							
Idlewood Inline Storage	28998, 28984, 63094, 63095, 70158	Inline Storage	1.82-inch	31.36	\$2,317,000	\$2,800	2023
Fairmount Rd. PS Improvements	Fairmount Road PS (81316 & 97362)	PS Upgrades	2.60-inch	33.29	\$874,000	\$0	2023
Little Cedar Creek Interceptor Improvements	67997, 67999, 86423, 89195, 89197	Pipe Upgrades	1.82-inch	23.86	\$1,875,000	\$21,800	2024
Bardstown Rd. PS Improvements	88545	PS Upgrades	2.25-inch	46.50	\$281,000	\$400	2021
Running Fox PS Elimination	MSD1080-LS	Diversion	1.82-inch	659.52	\$96,000	\$100	2010
Hite Creek Area							
Meadow Stream PS Inline Storage	Meadow Steam PS (91087 & MSD1082-PS)	Inline Storage	1.82-inch	13.77	\$974,000	\$13,000	2016
Floydsburg Rd. I/I Investigation & Rehabilitation	Floydsburg Road (MSD1086-PS, 90776, 108956, 108957, 108958)	I/I Reduction	1.82-inch	--	\$57,000	\$0	2010
Kavanaugh Rd. PS Improvements	Kavanaugh Rd (MSD1085-PS)	PS & Force Main Upgrades	2.60-inch	21.09	\$1,110,000	\$1,400	2024
Floyds Fork Area							
Woodland Hills PS Diversion	33003, 65531	Diversion	1.82-inch	92.26	\$20,000	\$100	2011
Eden Care PS SSO Investigation	Eden Care PS (MSD1105-PS)	Monitor	Monitor	--	--	--	2012
Ashburton PS Improvements & Diversion	Olde Copper Court PS (MSD0165-PS), Ashburton PS (MSD0166-PS)	Upgrade Force Main & Pipes	1.82-inch	161.00	\$118,000	\$100	2021

¹ Detailed cost evaluations are included in Appendix 4.1.2 Final SSDP Project Cost Estimates

TABLE 4.1.3
LIST OF FINAL SSDP PROJECTS

SSDP Recommended Project Name/Location	SSO(s) Addressed	Technology	Level of Protection	Present Worth Benefit-Cost Ratio	Capital Cost \$ ¹	Annual O&M Dollars	Scheduled Completion Year
Jeffersontown Area							
Jeffersontown WQTC Elimination	28390, 28391, 28392, 28395, 31733, Jeffersontown WQTC (28173 & 64505 & MSD0255 & IS028-SI)	Offline Storage, Pipe Upgrades, WQTC Elimination	1.82-inch	5.23	\$23,737,000	\$28,500	2015
Chenoweth Hills WQTC Elimination, Chenoweth Run and Chippewa PS Improvements	Chenoweth Run PS (MSD0196-PS & 86052 & 64096), Chippewa PS (92061), Chenoweth Hills WQTC PS (MSD0263A-PS), Chenoweth Hills WQTC (MSD0263)	PS & Force Main Upgrades, WQTC Elimination	1.82-inch	20.05	\$3,140,000	\$43,800	2015
Dell Rd and Charlane Pkwy Interceptor Improvements	Charlane Pkwy (28250, 28249, 28340, 28336, 104289), Dell Rd. (28413, 28414, 28415, 28416, 28417)	Pipe Upgrades	1.82-inch	31.34	\$917,000 ¹	\$1,900	2022
Raintree & Marian Ct PS Eliminations	28719, 28711, Marian Court PS (28729), Raintree PS (MSD0149-PS)	Diversion, Pipe Upgrades	1.82-inch	72.76	\$1,005,000	\$1,000	2021
Monticello PS Elimination	Monticello Place PS (MSD0151-PS & 27969)	Diversion	2.60-inch	65.85	\$207,000	\$300	2022
Middle Fork Area							
Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	02932, 02933, 02935, 08537, 23211, 23212, 27005, 51221, 51160, 51161, 45835, 47583, 47593, 47596, 47603, 47604, 90700, IS021A-SI, Middle Fork at Breckenridge (08935-SM)	Offline Storage & Pipe Upgrades	1.82-inch	1.26	\$26,627,000	\$18,700	2013, 2023
Goose Creek PS Improvements & Wet Weather Storage	Devondale PS (21628-W), Goose Creek PS (46891 & 62418 & 91629 & 91630 & 105936), Saurel PS (43472)	Offline Storage, PS & Force Main Upgrades	2.25-inch	11.00	\$2,844,000	\$2,100	2024

¹ Detailed cost evaluations are included in Appendix 4.1.2

TABLE 4.1.3
LIST OF FINAL SSDP PROJECTS

SSDP Recommended Project Name/Location	SSO(s) Addressed	Technology	Level of Protection	Present Worth Benefit-Cost Ratio	Capital Cost \$ ¹	Annual O&M Dollars	Scheduled Completion Year
Anchor Estates PS Eliminations	Vannah PS (01106), Anchor Estates #1 PS (00746 & 00056-W), Anchor Estates #2 PS (MSD0057-LS)	Diversion	2.60-inch	31.14	\$1,909,000	\$51,200	2013, 2016
Hurstbourne I/I Investigation & Rehabilitation	01793	I/I Reduction	1.82-inch	--	\$536,000	\$0	2011
Southeastern Diversion Area							
Parkview Estates I/I Investigation & Rehabilitation	47250	I/I Reduction	1.82-inch	--	\$285,000	\$0	2011
Klondike Interceptor	25676 (Alcona), 26650, 26651	Pipe Upgrades	2.25-inch	9.11	\$558,000	\$2,200	2015
Sutherland Interceptor	Sutherland (16649)	Pipe Upgrades	2.60-inch	32.71	\$412,000	\$900	2023
Beargrass Interceptor Rehab Ph. 2	51594	Pipe Rehab	1.82-inch	--	\$57,000	\$0	2010
Pond Creek Area							
Charleswood Interceptor Extension	25477, 25478, Cooper Chapel PS (25480 & MSD0130-PS)	Pipe Upgrades	1.82-inch	62.84	\$603,000	\$900	2022
Cinderella PS Elimination	Cinderella PS (60679 & MSD1013-PS), 35309	Diversion	1.82-inch	22.14	\$2,205,000 ¹	\$100	2023
Lantana PS I/I Investigation & Rehabilitation	Lantana Drive #1 PS (25484 & 93719 & MSD0101-PS)	I/I Reduction	1.82-inch	--	\$20,000	\$100	2011
Government Center PS Elimination	Government Center PS (MSD0180-PS)	Diversion	1.82-inch	44.91	\$1,225,000	\$100	2024
Avanti PS Elimination	Avanti PS (21229-W)	Diversion	2.60-inch	1000.48	\$31,000	\$200	2010

¹ Detailed cost evaluations are included in Appendix 4.1.2

TABLE 4.1.3
LIST OF FINAL SSDP PROJECTS

SSDP Recommended Project Name/Location	SSO(s) Addressed	Technology	Level of Protection	Present Worth Benefit-Cost Ratio	Capital Cost \$ ¹	Annual O&M Dollars	Scheduled Completion Year
Lea Ann Way System Improvements	19360, 19369, 29933, 29948, 29943, 31083, 31084, 79076, Lea Ann Way PS (MSD1010-PS)	Pipe Upgrades	1.82-inch	49.01	\$827,000	\$1,600	2015
Outer Loop & Caven Ave Wet Weather Storage	27116, 70212, 17724, Caven Ave PS (MSD0133-PS)	Offline Storage & Pipe Upgrades	1.82-inch	7.08	\$6,084,000	\$100	2016, 2024
Leven PS Elimination	Leven PS (36419 & MSD1019-PS)	Diversion	1.82-inch	95.93	\$376,000	\$100	2022
Edsel PS I/I Investigation & Rehabilitation	Edsel PS (92098 & MSD1048-PS)	I/I Reduction	1.82-inch	--	\$367,000	\$0	2011
ORFM Area							
Mellwood System Improvements & PS Eliminations	26752, 41374, 41416, Mockingbird Valley PS (MSD0007-PS), Winton PS (MSD0010-PS), Mellwood Avenue PS (24472 & MSD0023-PS), Canoe Lane PS (24152-W & MSD0024-PS)	PS Upgrades, Pipe Upgrades & Diversion	2.25-inch	26.97	\$3,055,000 ¹	\$2,100	2012, 2024
Leland Rd. SSO Investigation	96020	Condition Assessment	Monitor	--	--	--	2012
Derington Ct. PS I/I Investigation & Rehabilitation	Derington Court PS (MSD0095-PS)	I/I Reduction	1.82-inch	--	\$265,000	\$700	2012
Prospect WQTC Eliminations, Harrods Creek PS, and ORFM System Improvements	40870, 40871, 40872, Barbour Lane PS (42680 & 65633 & 65635), West Goose Creek PS (22436 & MSD0123-PS), Phoenix Hill PS (MSD1044-PS), Glenview Hills PS (MSD0183-PS), Barbour Lane PS (MSD0192-PS), New Market PS (MSD0193-PS), Deep Creek PS (MSD1063-PS), Hunting Creek South WQTC (MSD0292)	PS and Pipe Upgrades, Diversion, WQTC eliminations	2.25-inch	1.69	\$34,062,000	\$78,300	2015, 2016

¹ Detailed cost evaluations are included in Appendix 4.1.2

**TABLE 4.1.3
LIST OF FINAL SSDP PROJECTS**

SSDP Recommended Project Name/Location	SSO(s) Addressed	Technology	Level of Protection	Present Worth Benefit-Cost Ratio	Capital Cost \$ ¹	Annual O&M Dollars	Scheduled Completion Year
Mill Creek Area							
Shively Interceptor	04498, 04542, Pioneer PS (81814-W), Fern Lea PS (MSD0047-PS), Garr's Lane PS (MSD0050-PS)	Pipe Upgrades	2.60-inch	6.70	\$16,419,000	\$11,400	2014
East Rockford PS Relocation	East Rockford PS (04699-W)	PS Replacement and Relocation	1.82-inch	----	\$1,044,000	\$9,300	2021
Small WQTC Area							
Lucas Ln. PS Inline Storage	Lucas Lane PS (MSD0199-LS)	Inline Storage	1.82-inch	112.86	\$183,000	\$400	2021
Riding Ridge PS Improvements	Riding Ridge PS (MSD1060-LS)	PS Upgrades	1.82-inch	52.02	\$27,000	\$100	2014
Gunpowder PS Inline Storage	Gunpowder PS (MSD1055-LS)	Inline Storage	1.82-inch	78.71	\$176,000	\$9,700	2021
Fox Harbor Inline Storage	Fox Harbor #1 and #2 PS (62769)	Inline Storage	2.60-inch	87.55	\$328,000	\$8,000	2021
Fairway View PS Improvements	Fairway View PS (MSD1065-PS)	PS Upgrades	1.82-inch	10.32	\$87,000	\$300	2014
Lake Forest PS SSO Investigation	Lake Forest PS (MSD1169-LS)	Monitor	Monitor	--	--	--	2012
St. Rene Rd. PS Inline Storage	94187	Inline Storage	1.82-inch	212.00	\$30,000	\$400	2021
CSS Area							
Sonne PS I/I Investigation & Rehabilitation	Sonne Avenue PS (MSD0042-PS)	I/I Reduction	1.82-inch	--	\$265,000	\$11,600	2011
Camp Taylor System Improvements	08717, 13931, 13943, 36763, 44396, 44397, 66349, 104223, 104231	SSES, Sewer Rehabilitation & Replacement, Offline Storage	2.60-inch	68.47	\$28,279,000	\$0	2011, 2013, 2017, 2023
Hazelwood PS I/I Investigation & Rehabilitation	Hazelwood PS (55665)	I/I Reduction	1.82-inch	--	\$173,000	\$1,400	2011

¹Detailed cost evaluations are included in Appendix 4.1.2, Final SSDP Project Cost Estimates

**TABLE 4.1.3
LIST OF FINAL SSDP PROJECTS**

SSDP Recommended Project Name/Location	SSO(s) Addressed	Technology	Level of Protection	Capital Cost \$ ¹	Scheduled Completion Year
Interim SSDP Projects					
Beechwood Village Sanitary Sewer Replacement	21061, 21089, 21101, 21153, 21156	Sewer Replacement	--	\$11,800,000	2011
Hikes Lane Interceptor and Highgate Springs PS	17571, 18134, 18298, 18302, 18318-W, 18434, 18471, 18483, 18505, 18595, 49236, 49672, 49673, 49224, MSD0012-PS	PS Elimination and New Interceptor	--	\$21,216,000	2012
Northern Ditch Diversion Interceptor	MSD0271	New Interceptor / WQTC Elimination	--	\$20,397,000	2011
Sinking Fork Relief Sewer	21103, 25012, 63319	New Relief Sewer	--	\$1,690,000	2010
Southeastern Diversion Structure and Interceptor	08426, 08427, 08430, 08431, 30701, 30702, 49647, 63779, 30680, 30681, 72571-X	New Relief Sewer and Flow Control Modifications	4.50-inch	\$1,744,000	2012
Derek R. Guthrie WQTC	22370, 22385, 32682, 32688, 59169, MSD0277	WQTC Upgrade	4.50-inch	\$102,700,000	2011

¹ Detailed cost evaluations are included in Appendix 4.1.2 Final SSDP Project Cost Estimates

4.2 DEVELOPMENT OF RECOMMENDED PLAN

4.2.1 Prioritization of Projects

As a guiding principle, MSD's IOAP is being developed based on front-end consideration of source control and green infrastructure. Overall, this means that traditional gray infrastructure in the IOAP are sized after considering both the anticipated flow-reduction benefits of programmatic and site-specific green infrastructure solutions (in the Final LTCP), and source control including reduction of private sources of I/I (in the Final SSDP). Prior to the final design of gray solutions, the actual flow reduction performance will be documented and compared against the estimated targets. The final sizing of the gray solutions will then be based on documented performance of the green infrastructure or other source control solutions previously implemented.

Several green infrastructure and source control solutions in the IOAP will be implemented early in the program to allow data to be gathered on the flow reduction benefits. The following list represents the general order of priority that was used to set the implementation schedule for the Final SSDP projects, in descending order:

- Interim SSDP projects and milestones from previously approved submittals
- "Enabling projects" required to implement Consent Decree or milestone projects
- Source control solutions (especially targeted I/I reduction locations)
- Downstream projects that need to be constructed to capture additional flow when smaller upstream projects are constructed (for example, the Buechel Basin is required prior to constructing the Upper Middle Fork Relief Sewer)
- Capital Improvement Projects already under design that address SSOs, as discussed in Chapter 2, Section 2.3.5.9 (i.e., Shively Interceptor)
- Remaining projects rank-ordered based on benefit-cost ratio and scheduled to assist with cash flow leveling

4.2.2 Implementation Schedule to Achieve Consent Decree Requirements

The Final SSDP project implementation schedule is represented in Figure 4.2.1 at the end of this chapter, prior to the project fact sheets and maps. Eight Final SSDP projects have been divided into multiple construction phases and are reflected in multiple fact sheets and maps at the end of the chapter. Multiple cost estimates representing these projects are also in Appendix 4.1.2.

This phasing approach was implemented to accommodate various construction schedules occurring in one project or to allow for components of one project (if vastly different) to be constructed at different times.

The eight Final SSDP projects that are divided into multiple phases are:

- Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork Lift Station Diversion
- Camp Taylor System Improvements
- Prospect WQTC Eliminations, Harrods Creek Pump Station, and Ohio River Force Main System Improvements
- Mellwood System Improvements and Pump Station Eliminations
- Anchor Estates Pump Station Eliminations
- Outer Loop and Caven Avenue Wet Weather Storage
- Raintree and Marian Court Pump Station Eliminations
- Goose Creek Pump Station Improvements and Wet Weather Storage

4.3 PUBLIC INVOLVEMENT

As stated in the Consent Decree, one requirement for public involvement is for the Wet Weather Team (WWT) to assist in developing the plan to involve the public in planning, prioritization and selection of projects. This section recaps the public involvement process throughout the development of the Final SSDP projects.

Early in the IOAP development stage, the WWT, including the WWT Stakeholder Group and the technical team, developed a risk-management approach to evaluating and prioritizing alternative approaches to SSO control. This process was based on managing the risks to a set of community values identified by the WWT Stakeholder Group. The process of identifying, evaluating, and prioritizing projects was a highly interactive process involving all members of the WWT. The interactive process, with the essential engagement of the WWT Stakeholder Group, was critical to the success of the Final SSDP because it created a well-documented and transparent process to consider a wide range of community concerns. This process used a benefit-cost approach with performance measures that had complete buy-in from the WWT Stakeholder Group.

A review of the steps of the values-based decision making process is as follows:

- WWT Stakeholder Group defined values and relative weights for the values;
- The technical team developed draft performance measures and scales based on the “focus areas” or objectives WWT Stakeholder Group identified for the values;
- WWT Stakeholder Group reviewed and helped refine the performance measurement scales;
- The technical team used the performance scales to evaluate alternatives; and
- WWT Stakeholder Group reviewed the results and refined scoring considerations.

During the course of 22 WWT Stakeholder Group meetings, numerous ideas for specific education programs and potential SSO abatement solutions were identified. Records of the ideas were distributed to the technical team for consideration as the potential solutions were identified and evaluated.

The work of the WWT was essential to define the goals and objectives of the IOAP and the public involvement program. With the goals and objectives in hand, the technical team of consultants and MSD staff conceptualized and prepared approaches for the broader public to review and provide comment at public meetings. MSD and the WWT believed it would be valuable to have frequent contact with the public to validate the guidance provided by the WWT Stakeholder Group. As a result, there were four rounds of public meetings; each at a specific phase of the planning process when decisions and selection of priorities were needed.

The first two rounds of public meetings, held in Spring 2007 and Fall 2007 respectively, focused on defining the Project WIN purpose and preparing the public for what was to come in the future related to infrastructure improvements and associated sewer rate increases. The third round of public meetings, in Spring 2008, was specifically designed to give the public and impacted neighborhoods information on the types, locations, and size of facilities that were being considered. The public meetings provided public notice that the facilities were under serious consideration for mitigation; engaged the public in discussion about these facilities and the proposed schedule for construction; and informed the public of the remaining steps of the process.

The fourth round of public meetings to receive public comment on the IOAP was held in November 2008. These public meetings were specifically designed to present the IOAP program in an informal forum that encouraged questions and answers with the public. The presentations included an overview of the program, including project lists, budgets, schedules, and potential rate impacts. To reach as many customers as possible, a presentation was also videotaped for viewing by the public.

In addition to the public meetings, a public hearing was held on December 2, 2008. The purpose of the public hearing was to receive formal comments from the public about the content of the IOAP. The draft IOAP was distributed for public review 30 days before the public hearing. The public notice was published in *The Courier-Journal* announcing the availability of the draft plan, the public hearing date, time and location, and the deadline for the acceptance of comments on the plan. The deadline for accepting comments on the plan was 30 days after the notice of the plan availability.

4.4 ENVIRONMENTAL BENEFITS OF RECOMMENDED PROGRAM

Environmental benefits, in addition to the public health benefits of SSO reduction, are a critical measure for selecting and optimizing solutions to eliminate SSOs and basement backups. This section describes the environmental benefits of SSO elimination.

4.4.1 Determining Environmental Benefits

Through the stakeholder process, a list of values most vital to the community, as well as the means to measure them, was identified and refined. The WWT Stakeholder Group ultimately identified five project-specific values and associated performance criteria that were selected to be evaluated during the benefit-cost analysis. All of the criteria included environmental benefit.

Five Project-Specific Values with Required Environmental Benefits

- 1 Regulatory Performance
- 2 Public Health Enhancement
- 3 Asset Protection
- 4 Environmental Enhancement
- 5 Eco-Friendly Solutions

The benefit-cost analysis tool was important because it provided the means to track and rate the diverse environmental benefits of each solution. It also included cost contingencies for properly designing, installing, and maintaining the environmental benefits inherent to the proposed solutions. The benefit-cost analysis tool also provided standards through a list of criteria that could not be violated (fatal flaws) regardless of any cost advantage.

Table 4.4.1 provides an overview of how the Final SSDP performs with respect to these five values. Under some values, such as Regulatory Performance, the Final SSDP will provide complete compliance for all rainfall events at or less than the defined level of protection.

**TABLE 4.4.1
SSDP PROJECT-SPECIFIC VALUES WITH ENVIRONMENTAL BENEFITS**

Criteria		SSDP Distinguishing Attribute
Regulatory Performance	Eliminating Overflows	No overflows at or below the defined level of protection at known or suspected SSO locations.
	Eliminating or Reducing Overflow Volume	No overflows at or below defined level of protection at known or suspected SSO locations. Overflow volumes may be reduced above the defined level of protection at known and suspected SSOs.
Asset Protection	Eliminating or reducing surcharging and basement back-ups	No basement back-ups at or below the defined level of protection within zone of influence of known or suspected SSO locations. Surcharging reduced above the defined level of protection within zone of influence of known or suspected SSO locations.
Environmental Enhancement	Aquatic and Terrestrial Habitat Protection	No solution will, in any way, impact the aquatic and terrestrial habitat of endangered species.
	Aesthetics - Solids and Floatables	All solutions will reduce floatables by 1) eliminating overflows, and thus floatables, at or below the defined level of protections and 2) reducing overflow volumes above the defined level of protections, in particular first-flush floatables.
	Aesthetics - Odor and Air Emissions	No solution will create odors occasionally affecting more than 20 customers. All storage solutions near customers will be required to install and maintain odor-control equipment.
	Dissolved Oxygen Impacts	All solutions will provide intermittent improvement of in-stream dissolved oxygen.
	Downstream Impacts	All solutions will provide intermittent improvement of in-stream BOD and nutrient loads.
	Stream Flow Impacts (Peak flows)	All solutions will provide intermittent reduction of stream peak flows.
	Stream Flow Impacts (Dry Weather Flow)	No solution will impact dry weather flow.
Eco-Friendly Solutions	Non-Renewable Energy Consumption	No solution will require energy greater than secondary treatment. All conveyance solutions and many storage solutions will rely on gravity and will require no energy except for periodic O&M measures.
	Use of Natural Systems	No solutions will permanently displace more than 5 acres of wetlands or 50% of locally available green space. Most conveyance solutions will replace existing features and will have no permanent displacement of wetlands or green areas.
	Multiple-Use Facilities	No Solution will impact recreational opportunities. In fact, many solutions will provide new recreational opportunities.
	Source Control of sub watershed pollutant loads	By elimination of overflows at known, suspected and new SSOs, there will be complete source control at or below the defined level of protection. There will be some source control above the defined level of protection, particularly of the first-flush contaminants.
	Non-Obtrusive Construction Techniques	All RDII reduction will be done with the latest non-obtrusive techniques such as in-situ lining and repairs. There will also be opportunities for non-obtrusive pipe work such as directional drilling. Given the nature of the solutions, there will be limited opportunities for non-obtrusive construction techniques for gray projects such as storage sites. BMPs will be required for all construction projects.
	Consistent Land Use	All features will be consistent with neighborhood or adjacent land use. Most conveyance solutions will be underground using existing right of ways.
	Impermeable Surfaces	Most conveyance solutions and many storage solutions, especially underground storage, will result in no change in impervious areas. All other solutions will include stormwater management features.
	LEEDS Performance	Most systems use gravity for energy. There will be opportunities for LEEDS in pumps, controls and lighting.

4.4.2 Measuring and Modeling Environmental Benefits

Elimination of SSOs and basement backups clearly provide environmental benefits as a whole. Based on water quality data from 2005-2007 normalized by rainfall annually, over 290 million gallons (MG) of overflows could potentially be removed by implementing the Final SSDP. On average, this would annually remove 100 tons of biochemical oxygen demand (BOD)₅ and 200 tons of suspended solids from local waterways. In addition, the improvements to the Jeffersontown WQTC and elimination of the Prospect WQTCs would reduce nutrient loads in the respective watersheds.

Under the Final SSDP, there is no specific program to measure and model the benefits of SSO reduction on the environment. In the next section, the elimination of SSOs and basement backups as the key measurement of success are discussed. Moreover, other programs will capture the benefits and evaluate the overall improvements of modeled areas. For example, the Beargrass Creek Total Maximum Daily Load (TMDL) program will use reduced SSO events and volumes as well as positive impacts from the Final CSO LTCP to predict in-stream improvements.

4.5 MEASURES OF SUCCESS

This section provides an overview of known, documented SSO locations and the associated project that addresses the SSO, as well as a detailed discussion of the performance goals that will be used to measure the success of each Final SSDP project. The measures of success are a means to demonstrate compliance with the Consent Decree requirements and to quantify the benefits achieved from SSO elimination projects. Each project's performance goals should be tailored to site-specific situations. A review of the Final SSDP projects after completion will evaluate how well the project accomplished the performance goals that were established before the project began.

Table 4.5.1 at the end of this chapter, following the implementation schedule, lists the known, documented SSOs, SSO characteristics, the associated project that addresses the SSO (including Final SSDP, Interim SSDP, and Capital Improvement Projects), levels of protection, overflow volumes, and project start/complete dates. The table is sorted by Project Name followed by SSO ID. Detailed fact sheets for each documented SSO are available for review in Appendix 4.5.1 SSO Fact Sheets. The SSO fact sheets provide additional information such as a map of the SSO location, a background and history of the SSO location, downstream landuse, receiving stream, and the overflow volume summary for the past five years.

The four performance goals to be tracked under the Final SSDP include:

1. No Wet Weather, Capacity-Related SSOs under the Selected Level of Protection
2. No Wet Weather, Capacity-Related Basement Backups under the Selected Level of Protection
3. Sufficient Treatment Capacity under the Selected Level of Protection
4. Project Flow Monitoring Performed and Documented

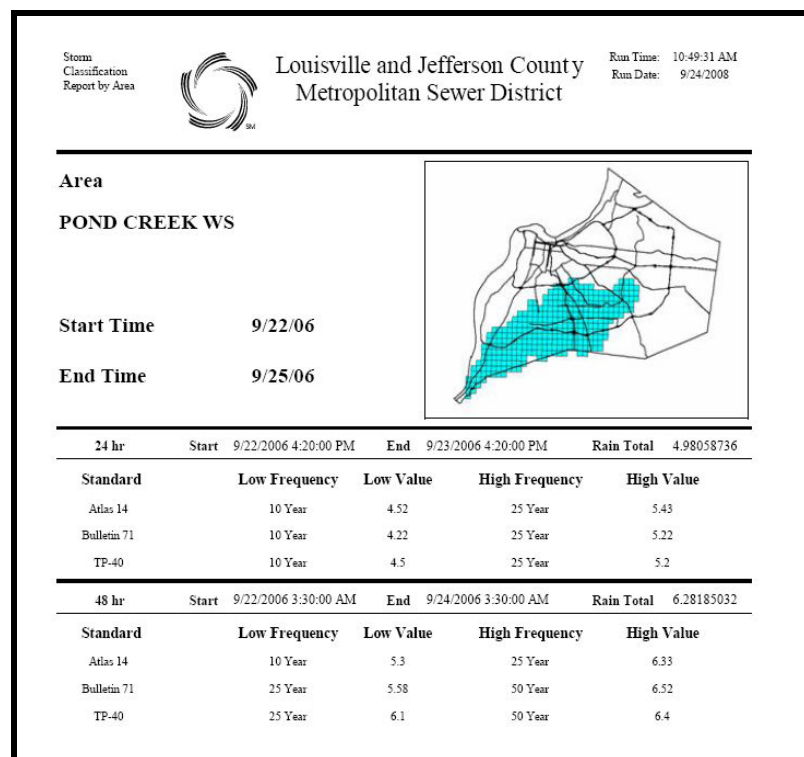
It is worth noting that Goal One is the only goal specifically required by the Consent Decree. Goals Two through Four are in response to WWT Stakeholder Group requests and/or Kentucky Department of Environmental Protection (KDEP) Permit and regulatory requirements. Additionally, an overriding success measure and initial goal identified by MSD already met is that the plan is cost-effective for MSD ratepayers as presented in Figure 4.1.2. The next section provides an overview of the measure of success for each performance goal.

4.5.1 Goal One: No Wet Weather, Capacity-Related SSOs under the Selected Level of Protection

Since the main premise of the Consent Decree is to prevent unauthorized discharges, the goal of the Final SSDP is to eliminate capacity-related SSOs under the site-specific levels of protection. To demonstrate the success of the Consent Decree premise, monitoring of the SSOs will be implemented. MSD will follow Sewer Overflow Response Protocol (SORP) guidelines to monitor SSOs.

Key to the monitoring is determining the magnitude of the rainfall, how significant the rainfall event was, and did the event exceed the level of protection for the appropriate area. MSD developed a rain-tracking tool called *MSD-NET RainTrack* that utilizes MSD's rain gauge network, radar data, and various software to determine the rainfall frequency for any area within the MSD collection system. Figure 4.5.1 is an example of the tool output displaying the rainfall frequency for various durations and rainfall distributions for a significant September 2006 storm in the Pond Creek watershed.

FIGURE 4.5.1 EXAMPLE OF OUTPUT FROM MSD RAIN-TRACKING TOOL



In addition to the rain-tracking tool, the hydraulic models can provide insight into the magnitude of the storm. The Post Construction Compliance Monitoring Plan, (Volume 1, Section 6.5) discusses how the hydraulic models will be maintained. The models will be re-calibrated on a regular basis and will be modified to reflect changes in collection systems, Final SSDP improvements, and rainfall-derived infiltration and inflow (RDI/I) reduction measures. Additionally, calibrated models can be used to determine if specific significant storms created watershed conditions that exceed the levels of protection.

Once a solution has been constructed and a significant storm has been monitored, MSD can measure the success of that solution. If the measure is successful for two consecutive significant storm events, then the solution is deemed successful relative to Goal One.

If the measure is unsuccessful under one significant (defined level of protection) storm event, MSD will utilize its adaptive management process to improve the project. For example, these improvements could include additional storage or targeted RDI/I-reduction measures upstream of the solution.

4.5.2 Goal Two: No Wet Weather, Capacity-Related Basement Backups under the Selected Design Level

A second goal for measuring the success of Final SSDP projects is to ensure basement flooding does not occur in the pre-remediated surcharge zone of influence under the level of protection and after the projects are complete. This is not a Consent Decree requirement, but rather a priority identified by the Wet Weather Stakeholder Group.

Success will be measured in the same manner as Goal One, except that the measurement will be for basement flooding in the zone of influence of known or suspected SSOs. If no basement backups due to capacity are reported for two consecutive significant storm events (defined level of protection or greater), then the solution is deemed to be successful relative to Goal Two.

If the measure is unsuccessful under one significant (defined level of protection) storm event, MSD will utilize their adaptive management process to improve the project. For example, these improvements could include additional storage or targeted RDI/I-reduction measures upstream of the solution.

4.5.3 Goal Three: Sufficient Treatment Capacity under the Selected Level of Protection

A third goal for measuring success of Final SSDP projects is to prevent WQTCs from exceeding wet weather capacity, which could potentially cause basement backups and SSOs in the upstream system and at the WQTC. The System Capacity Assurance Plan (SCAP) provides standards and details how the capacity of a WQTC is established, updated, and used for project evaluations. The SCAP is available on MSD's website under the Project WIN public repository at <http://www.msdlouky.org/projectwin/docs.htm>.

Success will be measured in the same manner as Goal One and Goal Two, except that the measurement will be for bypasses or violations at the WQTC. If no capacity related bypasses or violations are reported for two consecutive significant storm events (defined level of protection or greater), then WQTC improvements are deemed to be successful relative to Goal Three.

If the measure is unsuccessful under one significant (defined level of protection) storm event, MSD will utilize its adaptive management process to improve the project. For example, these improvements could include additional storage or targeted RDI/I-reduction measures upstream of the WQTC or additional WQTC improvements.

4.5.4 Goal Four: Project Flow Monitoring Performed and Documented

Flow monitoring related to the Final SSDP will build upon the pre-established Post Construction Compliance Monitoring program. Pre-construction data will be compared to the post-construction data to evaluate the effectiveness of improvements. Success will be measured in two ways. First, the flow monitoring will be used to determine if projected RDI/I reduction efforts (refer to Appendix 2.3.4 RDI/I Method and Modeling Techniques Technical Paper) utilized in solution development has been achieved. Second, downstream solutions must be successful, as measured by Goal One. Ultimately, data provided by flow monitoring will dictate success of the project.

Table 4.5.2 provides an overview of the specific requirements for each goal, type, the characteristics of success, and the specific feature that is successful.

**TABLE 4.5.2
FINAL SSDP MEASURES OF SUCCESS**

Goal		Measurement	Location of Measurement	Event Triggering Measurement	Program Responsible for Measurement	Agency Requiring Measurement	Characteristics of Success	Successful Feature
1	No Capacity Related Overflows under the Level of Protection	Overflow, or lack thereof, at known, suspected or new SSO location	By solution (branch)	Large rainfall event near or above level of protection for solution area (branch)	SORP	Consent Decree	Two or more periods with rainfall at or above design conditions with NO overflows at known, suspected or new SSO locations within branch	Solution
2	No Capacity Related Basement Back-ups under the Level of Protection	Basement back-ups, or lack thereof, in zone of influence upstream of known, suspected or new SSOs	By solution (branch)		SORP	WWT Stakeholder Group	Two or more periods with rainfall at or above design conditions with NO basement back-ups within zone of influence of overflows at known, suspected or new SSO locations	Downstream Solution
3	Sufficient Treatment Capacity under the Level of Protection	Bypass or inadequate treatment, or lack thereof, at WQTCs in separate sewer system	By WQTC	Large rainfall event near or above cloudburst conditions for collection-system area	SCAP/CMOM	KDEP	Two or more periods with rainfall at or above 2-year cloudburst design conditions with NO bypasses or WQTC violations	WQTC
4	Project Flow Monitoring Performed and Documented	Reduction of projected RDI/I used in Hydraulic Modeling (1)	By any solution requiring RDI/I reduction as part of technology (2)	Any large storm (comparison based on control basin)	Post Construction Compliance Monitoring Plan, (See Volume 1, Section 6.5)	WWT Stakeholder Group requirement for RDI/I reduction as first part of any solution	Two or more periods with rainfall where RDI/I is reduced at or above requirement listed in RDI/I reduction memorandum	Downstream Solutions success eliminates the need for additional monitoring
		Overflow, or lack thereof, at downstream known, suspected or new SSO locations	By solution (branch)	Large rainfall event near or above level of protection for solution area (branch)	SORP		Two or more periods with rainfall at or above level of protection with NO overflows at downstream known, suspected or new SSO locations	
Legend: CMOM - Capacity, Management, Operations, and Maintenance Notes: 1. These RDI/I reduction rates are listed in RDI/I-reduction memorandum (Appendix 2.3.4). 2. These solutions are listed in I/I program memorandum (Appendix 3.1.1)								

4.5.5 Benefits of the Measures of Success

The measures of success are a means to show compliance and benefits achieved from projects undertaken. Meeting these performance goals has many potential benefits including: improved water quality, reducing negative impacts on public health, fewer impacts on receiving waters, and legal compliance. These measures are also a means to provide documented project results and verification that the benefit-cost analyses and risk management approach used to choose targeted deficiencies, levels of protection, and project scheduling were effective. The success measures encompass a flexibility to consider site-specific and project-specific values in an effort to find cost-effective means to reduce SSOs. Communication, collaboration, data tracking, documentation, and trend monitoring will be instrumental in achieving these success measures. Operational data from the Capacity, Management, Operations, and Maintenance (CMOM) and SORP may also be useful to incorporate into projects.

4.5.6 Additional Performance Goals

In addition to the performance goals described in the previous section, projects will follow standard MSD business practices. Performance goals for sewer construction and acceptance testing will be based on MSD standard specifications and the Inspector Guidance Manual. The Flow Monitoring Field Operations Program (CMOM Section 2.2.6) provides data to support specific project needs such as watershed hydraulic modeling and calibration. The Water Quality Monitoring Program (CMOM Section 2.1.11) is a well-established program that uses a watershed management approach with routine water quality monitoring, investigative water quality monitoring, and water quality monitoring for spill impact. The Contingency Plan for Sewer and Treatment Systems Programs (CMOM Section 2.1.12) has its own performance goals for emergency response, public notification, agency notification, planning and water quality monitoring. Documentation and policies for emergency issues that could result in unauthorized discharges are detailed in the SORP section of the contingency plan. Additional green solution benefits and detailed monitoring procedures are found in Volume 1 of the IOAP.

4.5.7 New SSO Locations

It is anticipated that new SSO locations will be found over time. As a result, existing solutions will be modified to address new SSO locations. New SSOs could be a result of the following:

- Structural deficiencies that cause a loss of downstream capacity over time which may result in an overflow upstream of the structural deficiency. These structural deficiencies could include sewer collapses, the loss of efficiency at pump stations, blockages, or root intrusions.
- Increases in RDI/I due to long-term deterioration of the sewer system.
- Increases in flow through private property connections, such as illicitly-connected sump pumps. During wet weather, the increased flow could result in an overflow in the area adjacent or downstream of the connections.

These new locations will be addressed on a case-by-case basis through MSD's adaptive management process (e.g., new SSOs will be added to the SORP investigation list and monitored. If necessary, hydraulic models will be validated to the new SSOs and used to develop solutions). SSOs that are not capacity-related will be addressed through the Gravity Preventative Maintenance and Continuing Sanitary Sewer Assessment (CSSA) Programs.

Figure 4.2.1

Figure 4.2.1

Project Name	Finish																																																														
		2009				2010				2011				2012				2013				2014				2015				2016				2017				2018				2019				2020				2021				2022				2023				2024	
Sanitary Sewer Discharge Plan		31-Dec-24																																																													
Cedar Creek Area		31-Dec-24																																																													
Idlewood Inline Storage		31-Dec-23																																																													
Fairmount Rd PS Improvements		31-Dec-23																																																													
Little Cedar Creek Interceptor Improvements		31-Dec-24																																																													
Bardstown Rd PS Improvements		31-Dec-21																																																													
Running Fox PS Elimination		31-Dec-10																																																													
Hite Creek Area		31-Dec-24																																																													
Meadow Stream PS Inline Storage		31-Dec-16																																																													
Floydsburgh Rd I/I Investigation & Rehabilitation		31-Dec-10																																																													
Kavanaugh Rd PS Improvements		31-Dec-24																																																													
Floyds Fork Area		31-Dec-21																																																													
Woodland Hills PS Diversion		30-Jun-11																																																													
Eden Care PS SSO Investigation		31-Dec-12																																																													
Ashburton PS Improvements & Diversion		31-Dec-21																																																													
Jeffersontown Area		31-Dec-22																																																													
Jeffersontown WQTC Elimination		31-Dec-15																																																													
Chenoweth Hills WQTC Elimination & PS Improvemets		31-Dec-15																																																													
Dell Rd & Charlane Pkwy Interceptor Improvements		31-Dec-22																																																													
Raintree & Marian Ct Ph 1-PS Eliminations		31-Dec-21																																																													
Raintree & Marian Ct Ph 2-Pipe Upgrades		31-Dec-21																																																													
Monticello PS Elimination		31-Dec-22																																																													
Beargrass Creek Middle Fork Area		31-Dec-24																																																													
UMF #1-Buechel Basin		31-Dec-13																																																													
UMF #2-PS Diversion & Storage		31-Dec-23																																																													
Goose Creek PS Ph 1-Devondale PS WW Storage		31-Dec-24																																																													
Goose Creek PS Ph 2-PS & Force Main Upgrades		31-Dec-24																																																													
Anchor Estates-Vannah PS Elimination		31-Dec-13																																																													
Anchor Estates-Anchor Ests PS 1&2 Eliminations		31-Dec-16																																																													
Hurstbourne I/I Investigation & Rehabilitation		31-Dec-11																																																													

10-Jun-09 13:27

Figure 4.2.1

Figure 4.2.1

Project Name		Finish	2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		2024	
			Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Southeastern Diversion Area		31-Dec-23																																
	Parkview Estates I/I Investigation & Rehabilitation	30-Jun-11																																
		Klondike Interceptor	31-Dec-15																															
		Sutherland Interceptor	31-Dec-23																															
		Beargrass Interceptor Rehabilitation Ph 2	31-Dec-10																															
	Pond Creek Area		31-Dec-24																															
		Charleswood Interceptor Extension	31-Dec-22																															
		Cinderella PS Elimination	31-Dec-23																															
		Lantana PS I/I Investigation & Rehabilitation	31-Dec-11																															
		Government Center PS Elimination	31-Dec-24																															
		Avanti PS Elimination	31-Dec-10																															
		Lea Ann Way System Improvements	31-Dec-15																															
		Outer Loop & Caven Area Pipe Upgrades	31-Dec-16																															
		Outer Loop WW Storage	31-Dec-24																															
		Caven Ave WW Storage	31-Dec-24																															
		Leven PS Elimination	31-Dec-22																															
		Edsel PS I/I Investigation & Rehabilitation	30-Sep-11																															
	Ohio River Force Main Area		31-Dec-24																															
		Mellwood Sys 1-Mellwood PS & Force Main	31-Dec-12																															
		Mellwood Sys 2-Winton & Mockingbird PS Elims & Pipe Upgrds	31-Dec-24																															
		Leland Rd SSO Investigation	31-Dec-12																															
		Derington Ct PS I/I Investigation & Rehabilitation	31-Mar-12																															
		Prospect #1 - WQTC Eliminations	31-Dec-15																															
		Prospect #2 - Harrods Creek PS	31-Dec-15																															
		Prospect #3 - ORFM System Improvements	31-Dec-16																															
Mill Creek Area		31-Dec-21																																
	Shively Interceptor	31-Dec-14																																
	East Rockford PS Relocation	31-Dec-21																																
Combined Sewer System Area		31-Dec-23																																
	Sonne PS I/I Investigation & Rehabilitation	30-Jun-11																																

Figure 4.2.1

Final Sanitary Sewer Discharge Plan Implementation Schedule

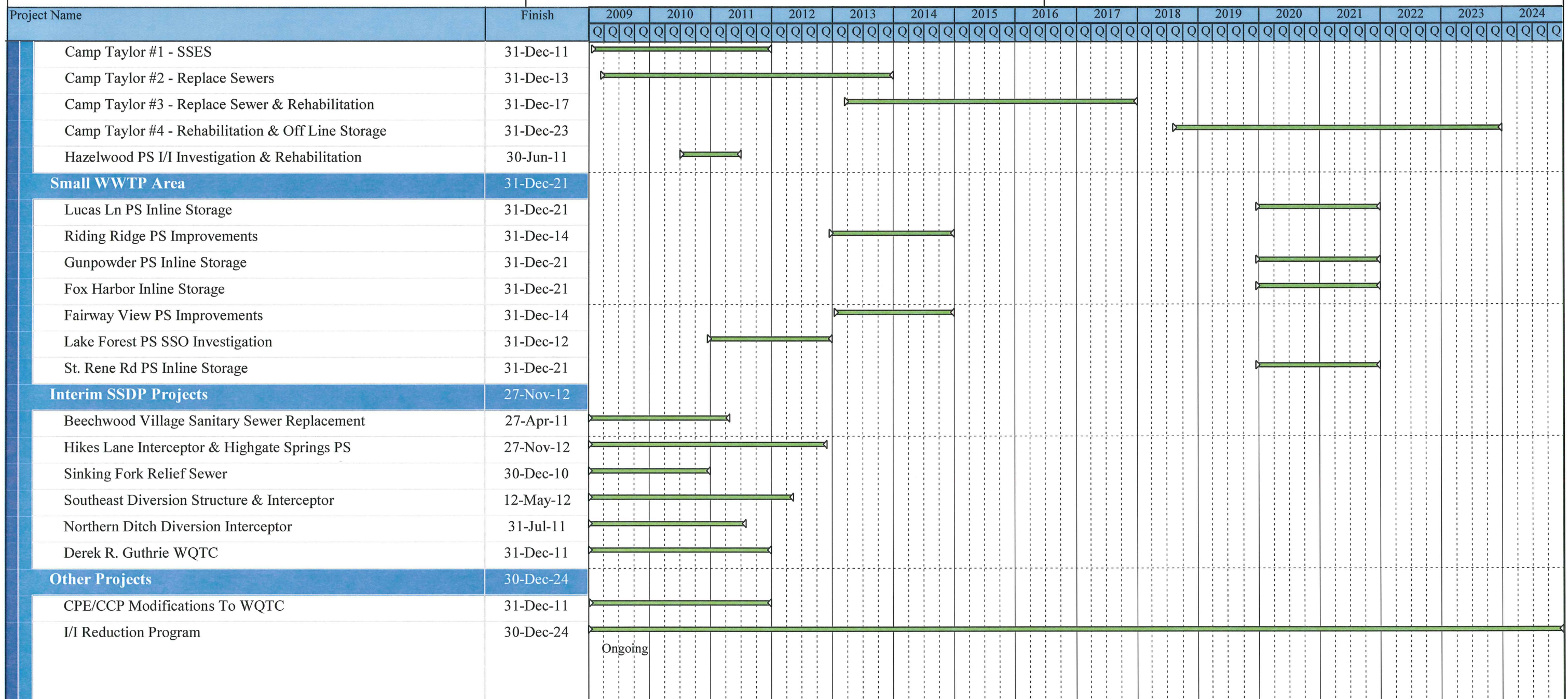


TABLE 4.5.1 SSOs ADDRESSED BY FINAL SSDP PROJECTS

No.	SSO ID	SSO Name/ Address	SSO Class	Overflow Type	Primary Cause	Project ID	Project Name	Solution Technology	Branch ID	Level of Protection	Minimum Rainfall after IOAP Project Completion ¹	Model-Predicted Volume per Incident beyond Level of Protection (gal) ²	Scheduled Project Start Date	Scheduled Project Completion Date
1	00746	Manhole Adjacent to Anchor Estates PS #1	Documented	Pumped	Bypass Pipe at Vannah Way, Undersized Pumps at Anchor Estates #1 and #2.	S_MI_MF_NB06_M_01_A_A	Anchor Estates PS Elimination	Diversion	MF06	2.60-inch	>2.60-inch	20,000 - 50,000	2013	2016
2	01106	Vannah PS Wetwell Manhole	Documented	Constructed	Bypass Pipe at Vannah Way, Undersized Pumps at Anchor Estates #1 and #2.	S_MI_MF_NB06_M_01_A_A	Anchor Estates PS Elimination	Diversion	MF06	2.60-inch	>2.60-inch	less than 10,000	2010	2013
3	00056-W	Anchor Estates #1 Wetwell	Documented	Manhole	Bypass Pipe at Vannah Way, Undersized Pumps at Anchor Estates #1 and #2.	S_MI_MF_NB06_M_01_A_A	Anchor Estates PS Elimination	Diversion	MF06	2.60-inch	>2.60-inch	Volume accounted for at MH 00746	2013	2016
4	MSD0057-LS	Anchor Estates #2	Documented	Lift Station	Bypass Pipe at Vannah Way, Undersized Pumps at Anchor Estates #1 and #2.	S_MI_MF_NB06_M_01_A_A	Anchor Estates PS Elimination	Diversion	MF06	2.60-inch	>2.60-inch	20,000 - 50,000	2013	2016
5	MSD0165-PS	Olde Copper Court	Documented	Lift station	Pump station capacity	S_FF_FF_NB03_M_01_C_A	Ashburton PS Improvements & Diversion	Upgrade Force Main & Pipes	NB03	1.82-inch	2.25-inch	10,000 - 20,000	2019	2021
6	MSD0166-PS	Ashburton	Documented	Lift station	Pump station capacity	S_FF_FF_NB03_M_01_C_A	Ashburton PS Improvements & Diversion	Upgrade Force Main & Pipes	NB03	1.82-inch	2.25-inch	10,000 - 20,000	2019	2021
7	21229-W	Avanti Way at Fernview Road	Documented	Constructed	Pump station capacity	S_PO_WC_PC07_M_01_A	Avanti PS Elimination	Diversion	PC07	2.60-inch	N/A	PS will be eliminated	2009	2010
8	88545	11101 Cambridge Commons Drive	Suspected	Manhole	System Capacity	S_CC_CC_MSD1025_S_03_B	Bardstown Rd PS Improvements	PS Upgrades	MSD1025	2.25-inch	2.60-inch	20,000 - 50,000	2019	2021
9	51594	Trevilian Way	Documented	Manhole	Obstructions and root masses	S_SD_MF_NB06_S_13_C	Beargrass Interceptor Rehab Ph 2	Pipe Rehab	NB06	1.82-inch	N/A	Not an overflow in model indicating maintenance-related	2009	2010
10	08717	Fincastle #2	Documented	Manhole	System capacity and poor system conditions in some areas	S_SF_MF_30917_M_09_A	Camp Taylor System Improvements	SSES, Sewer Replacement and Rehabilitation, Offline Storage	30917	2.60-inch	>2.60-inch	10,000 - 20,000	2009	2023
11	13931	Camp Taylor #4	Documented	Manhole	System capacity and poor system conditions in some areas	S_SF_MF_30917_M_09_A	Camp Taylor System Improvements	SSES, Sewer Replacement and Rehabilitation, Offline Storage	30917	2.60-inch	>2.60-inch	10,000 - 20,000	2009	2023
12	13943	Camp Taylor #3	Documented	Manhole	System capacity and poor system conditions in some areas	S_SF_MF_30917_M_09_A	Camp Taylor System Improvements	SSES, Sewer Replacement and Rehabilitation, Offline Storage	30917	2.60-inch	>2.60-inch	10,000 - 20,000	2009	2023
13	36763	3520 Fincastle Road	Suspected	Manhole	System capacity and poor system conditions in some areas	S_SF_MF_30917_M_09_A	Camp Taylor System Improvements	SSES, Sewer Replacement and Rehabilitation, Offline Storage	30917	2.60-inch	>2.60-inch	10,000 - 20,000	2009	2023
14	44396	Fincastle #4	Documented	Manhole	System capacity and poor system conditions in some areas	S_SF_MF_30917_M_09_A	Camp Taylor System Improvements	SSES, Sewer Replacement and Rehabilitation, Offline Storage	30917	2.60-inch	>2.60-inch	10,000 - 20,000	2009	2023
15	44397	Fincastle #3	Documented	Manhole	System capacity and poor system conditions in some areas	S_SF_MF_30917_M_09_A	Camp Taylor System Improvements	SSES, Sewer Replacement and Rehabilitation, Offline Storage	30917	2.60-inch	>2.60-inch	10,000 - 20,000	2009	2023
16	66349	Fincastle #1	Documented	Manhole	System capacity and poor system conditions in some areas	S_SF_MF_30917_M_09_A	Camp Taylor System Improvements	SSES, Sewer Replacement and Rehabilitation, Offline Storage	30917	2.60-inch	>2.60-inch	10,000 - 20,000	2009	2023
17	104223	Camp Taylor #1	Documented	Manhole	System capacity and poor system conditions in some areas	S_SF_MF_30917_M_09_A	Camp Taylor System Improvements	SSES, Sewer Replacement and Rehabilitation, Offline Storage	30917	2.60-inch	>2.60-inch	10,000 - 20,000	2009	2023
18	104231	Camp Taylor #2	Documented	Manhole	System capacity and poor system conditions in some areas	S_SF_MF_30917_M_09_A	Camp Taylor System Improvements	SSES, Sewer Replacement and Rehabilitation, Offline Storage	30917	2.60-inch	>2.60-inch	10,000 - 20,000	2009	2023
19	25477	6101 Price Lane Road	Suspected	Manhole	Pump station capacity	S_PO_WC_PC03_M_01_C	Charleswood Interceptor Extension	Pipe Upgrades	PC03	1.82-inch	>2.60-inch	0	2020	2022
20	25478	6006 Cooper Chapel Road	Suspected	Manhole	Pump station capacity	S_PO_WC_PC03_M_01_C	Charleswood Interceptor Extension	Pipe Upgrades	PC03	1.82-inch	>2.60-inch	0	2020	2022
21	25480	6112 Cooper Chapel Rd	Documented	Manhole	Pump station capacity	S_PO_WC_PC03_M_01_C	Charleswood Interceptor Extension	Pipe Upgrades	PC03	1.82-inch	>2.60-inch	0	2020	2022
22	MSD0130-PS	Cooper Chapel	Documented	Constructed	Pump station capacity	S_PO_WC_PC03_M_01_C	Charleswood Interceptor Extension	Pipe Upgrades	PC03	1.82-inch	>2.60-inch	PS will be eliminated	2020	2022
23	64096	Chenoweth Run #1	Documented	Manhole	System capacity, siphon, and WQTC	S_JT_JT_NB01A_M_03_C	Chenoweth Hills WQTC Elimination, Chenoweth Run and Chippewa PS Improvements	Pump Station & Force Main Upgrades, WQTC Elimination	NB01A	1.82-inch	2.25-inch	20,000 - 50,000	2012	2015
24	86052	4706 Chenoweth Run	Suspected	Manhole	System capacity, siphon, and WQTC	S_JT_JT_NB01A_M_03_C	Chenoweth Hills WQTC Elimination, Chenoweth Run and Chippewa PS Improvements	Pump Station & Force Main Upgrades, WQTC Elimination	NB01A	1.82-inch	2.25-inch	10,000 - 20,000	2012	2015
25	92061	11804 Chippewa Ridge Lane	Documented	Manhole	System capacity, siphon, and WQTC	S_JT_JT_NB01A_M_03_C	Chenoweth Hills WQTC Elimination, Chenoweth Run and Chippewa PS Improvements	Pump Station & Force Main Upgrades, WQTC Elimination	NB01A	1.82-inch	2.25-inch	Volume accounted for at 64096 & 86052	2012	2015
26	MSD0196-PS	Chenoweth Run	Documented	Lift Station	System capacity, siphon, and WQTC	S_JT_JT_NB01A_M_03_C	Chenoweth Hills WQTC Elimination, Chenoweth Run and Chippewa PS Improvements	Pump Station & Force Main Upgrades, WQTC Elimination	NB01A	1.82-inch	2.25-inch	Volume accounted for at 64096 & 86052	2012	2015
27	MSD0263	Chenoweth Hills WQTC	Documented	Treatment Plant	System capacity, siphon, and WQTC	S_JT_JT_NB01A_M_03_C	Chenoweth Hills WQTC Elimination, Chenoweth Run and Chippewa PS Improvements	Pump Station & Force Main Upgrades, WQTC Elimination	NB01A	1.82-inch	2.25-inch	20,000 - 50,000	2012	2015
28	MSD0263A-PS	Chenoweth Hills WQTC PS	Documented	Lift Station	System capacity, siphon, and WQTC	S_JT_JT_NB01A_M_03_C	Chenoweth Hills WQTC Elimination, Chenoweth Run and Chippewa PS Improvements	Pump Station & Force Main Upgrades, WQTC Elimination	NB01A	1.82-inch	2.25-inch	Volume accounted for at MSD0263	2012	2015
29	35309	Marjorie Drive	Documented	Manhole	Pump station and system capacity	S_PO_WC_PC04_M_01_C	Cinderella PS Elimination	Diversion	PC04	1.82-inch	N/A	PS will be eliminated	2020	2023
30	60679	Manhole Adjacent to Cinderella PS	Documented	Manhole	Pump station and system capacity	S_PO_WC_PC04_M_01_C	Cinderella PS Elimination	Diversion	PC04	1.82-inch	N/A	PS will be eliminated	2020	2023
31	MSD1013-PS	Cinderella	Documented	Lift Station	Pump station and system capacity	S_PO_WC_PC04_M_01_C	Cinderella PS Elimination	Diversion	PC04	1.82-inch	N/A	PS will be eliminated	2020	2023
32	28249	Charlane Parkway/St Edwards Drive	Documented	Manhole	System capacity	S_JT_JT_NB02_M_01_C	Dell Rd & Charlane Pkwy Interceptor Improvements	Pipe Upgrades	NB02	1.82-inch	2.25-inch	Volume accounted for at MH 28336 & 28340	2020	2022
33	28250	Charlane Parkway Near the Street	Documented	Manhole	System capacity	S_JT_JT_NB02_M_01_C	Dell Rd & Charlane Pkwy Interceptor Improvements	Pipe Upgrades	NB02	1.82-inch	2.25-inch	Volume accounted for at MH 28336 & 28340	2020	2022
34	28336	Parking Lot Charlane Parkway	Documented	Manhole	System capacity	S_JT_JT_NB02_M_01_C	Dell Rd & Charlane Pkwy Interceptor Improvements	Pipe Upgrades	NB02	1.82-inch	2.25-inch	20,000 - 50,000	2020	2022
35	28340	Charlane Parkway at Pool	Documented	Manhole	System capacity	S_JT_JT_NB02_M_01_C	Dell Rd & Charlane Pkwy Interceptor Improvements	Pipe Upgrades	NB02	1.82-inch	2.25-inch	10,000 - 20,000	2020	2022
36	28413	3317 Dell Road	Documented	Manhole	System capacity	S_JT_JT_NB02_M_01_C	Dell Rd & Charlane Pkwy Interceptor Improvements	Pipe Upgrades	NB02	1.82-inch	2.60-inch	Volume accounted for at MH 28415 & 28416	2020	2022
37	28414	3322 Dell Road	Documented	Manhole	System capacity	S_JT_JT_NB02_M_01_C	Dell Rd & Charlane Pkwy Interceptor Improvements	Pipe Upgrades	NB02	1.82-inch	2.60-inch	Volume accounted for at MH 28415 & 28416	2020	2022
38	28415	3406/3404 Dell Road	Documented	Manhole	System capacity	S_JT_JT_NB02_M_01_C	Dell Rd & Charlane Pkwy Interceptor Improvements	Pipe Upgrades	NB02	1.82-inch	2.60-inch	10,000 - 20,000	2020	2022
39	28416	Marlin Drive	Documented	Manhole	System capacity	S_JT_JT_NB02_M_01_C	Dell Rd & Charlane Pkwy Interceptor Improvements	Pipe Upgrades	NB02	1.82-inch	2.60-inch	10,000 - 20,000	2020	2022
40	28417	Locust Avenue/Marlin Drive	Documented	Manhole	System capacity	S_JT_JT_NB02_M_01_C	Dell Rd & Charlane Pkwy Interceptor Improvements	Pipe Upgrades	NB02	1.82-inch	2.60-inch	Volume accounted for at MH 28415 & 28416	2020	2022

TABLE 4.5.1 SSOs ADDRESSED BY FINAL SSDP PROJECTS

No.	SSO ID	SSO Name/ Address	SSO Class	Overflow Type	Primary Cause	Project ID	Project Name	Solution Technology	Branch ID	Level of Protection	Minimum Rainfall after IOAP Project Completion ¹	Model-Predicted Volume per Incident beyond Level of Protection (gal) ²	Scheduled Project Start Date	Scheduled Project Completion Date
41	104289	3620 Charlane Pky	Suspected	Manhole	System capacity	S_JT_JT_NB02_M_01_C	Dell Rd & Charlane Pkwy Interceptor Improvements	Pipe Upgrades	NB02	1.82-inch	2.25-inch	Volume accounted for at MH 28340	2020	2022
42	MSD0095-PS	Derington Court	Documented	Pumped	Pump station capacity	S_OR_MF_NB03_S_07_C	Derington Ct. PS I/I Investigation & Rehabilitation	I/I Reduction	NB03	1.82-inch	N/A	N/A	2010	2012
43	04699-W	East Rockford PS	Documented	Pumped	Surface flooding	S_MC_WC_NB02_S_03_C	East Rockford PS Relocation	Pump Station Replacement and Relocation	NB02	1.82-inch	N/A	N/A	2018	2021
44	MSD1105-PS	Eden Care	Documented	Lift Station	Pump station capacity	S_FF_FF_NB02_S_13_C	Eden Care PS SSO Investigation	Monitor	NB02	N/A	N/A	N/A	2009	2012
45	92098	7801 Edsel Lane (Upstream of Edsel Lane PS)	Documented	Pumped	Pump station capacity and hydraulic bottlenecks	S_PO_WC_PC11_M_07_C	Edsel PS I/I Investigation & Rehabilitation	I/I Reduction	PC11	1.82-inch	N/A	N/A	2009	2011
46	MSD1048-PS	Edsel	Documented	Lift Station	Pump station capacity and hydraulic bottlenecks	S_PO_WC_PC11_M_07_C	Edsel PS I/I Investigation & Rehabilitation	I/I Reduction	PC11	1.82-inch	N/A	N/A	2009	2011
47	81316	Fairmount Road #1	Documented	Manhole	Pump station capacity	S_FF_CC_81316_M_03_C_A	Fairmount Rd. PS Improvements	PS Upgrades	81316	2.60-inch	>2.60-inch	Volume accounted for at MH 97362	2021	2023
48	97362	Fairmount Road #2	Documented	Manhole	Pump station capacity	S_FF_CC_81316_M_03_C_A	Fairmount Rd. PS Improvements	PS Upgrades	81316	2.60-inch	>2.60-inch	50,000 - 100,000	2021	2023
49	MSD1065-PS	Fairway View	Documented	Lift Station	Pump station capacity	S_HC_HS_NB01_S_03_C_A	Fairway View PS Improvement	Pump Station Upgrades	NB01	1.82-inch	2.25-inch	less than 10,000	2013	2014
50	90776	Floydsburg Road #1	Documented	Manhole	Pump station capacity	S_HC_HC_MSD1086_M_07_C_A	Floydsburg Rd. I/I Investigation and Rehabilitation	I/I Reduction	MSD1086	1.82-inch	N/A	N/A	2009	2010
51	108956	Floydsburg Road #2	Documented	Manhole	Pump station capacity	S_HC_HC_MSD1086_M_07_C_A	Floydsburg Rd. I/I Investigation and Rehabilitation	I/I Reduction	MSD1086	1.82-inch	N/A	N/A	2009	2010
52	108957	Floydsburg Road #3	Documented	Manhole	Pump station capacity	S_HC_HC_MSD1086_M_07_C_A	Floydsburg Rd. I/I Investigation and Rehabilitation	I/I Reduction	MSD1086	1.82-inch	N/A	N/A	2009	2010
53	108958	Floydsburg Road #4	Documented	Manhole	Pump station capacity	S_HC_HC_MSD1086_M_07_C_A	Floydsburg Rd. I/I Investigation and Rehabilitation	I/I Reduction	MSD1086	1.82-inch	N/A	N/A	2009	2010
54	MSD1086-PS	Floydsburg Road	Documented	Lift Station	Pump station capacity	S_HC_HC_MSD1086_M_07_C_A	Floydsburg Rd. I/I Investigation and Rehabilitation	I/I Reduction	MSD1086	1.82-inch	N/A	N/A	2009	2010
55	62769	Fox Hill Road/ Fox Hunt Court	Documented	Constructed	Pump station capacities	S_HC_HN_NB03_S_09A_A_A	Fox Harbor Inline Storage	Inline Storage	NB03	2.60-inch	>2.60-inch	10,000 - 20,000	2019	2021
56	43472	Near Saurel Drive PS	Documented	Manhole	Pump station capacity	S_MI_MF_NB04_M_03_B	Goose Creek PS Improvements & Wet Weather Storage	Offline Storage, PS and Force Main Upgrades	MF04	2.25-inch	2.60-inch	10,000 - 20,000	2021	2024
57	46891	Goose Creek PS Wet Well	Documented	Manhole	Pump station capacity	S_MI_MF_NB04_M_03_B	Goose Creek PS Improvements & Wet Weather Storage	Offline Storage, PS and Force Main Upgrades	MF04	2.25-inch	2.60-inch	Volume accounted for at MH 105936	2021	2024
58	62418	Goose Creek PS Near Goose Creek	Documented	Manhole	Pump station capacity	S_MI_MF_NB04_M_03_B	Goose Creek PS Improvements & Wet Weather Storage	Offline Storage, PS and Force Main Upgrades	MF04	2.25-inch	2.60-inch	Volume accounted for at MH 105936	2021	2024
59	91629	Old Westport Road at Goose Creek PS #2	Documented	Manhole	Pump station capacity	S_MI_MF_NB04_M_03_B	Goose Creek PS Improvements & Wet Weather Storage	Offline Storage, PS and Force Main Upgrades	MF04	2.25-inch	2.60-inch	Volume accounted for at MH 105936	2021	2024
60	91630	Old Westport Road at Goose Creek PS #3	Documented	Manhole	Pump station capacity	S_MI_MF_NB04_M_03_B	Goose Creek PS Improvements & Wet Weather Storage	Offline Storage, PS and Force Main Upgrades	MF04	2.25-inch	2.60-inch	Volume accounted for at MH 105936	2021	2024
61	105936	Old Westport Road at Goose Creek PS #1	Documented	Manhole	Pump station capacity	S_MI_MF_NB04_M_03_B	Goose Creek PS Improvements & Wet Weather Storage	Offline Storage, PS and Force Main Upgrades	MF04	2.25-inch	2.60-inch	>100,000	2021	2024
62	21628-W	Devondale Wet Well Manhole (PS Overflow)	Documented	Pumped	Pump station capacity	S_MI_MF_NB04_M_03_B	Goose Creek PS Improvements & Wet Weather Storage	Offline Storage, PS and Force Main Upgrades	MF04	2.25-inch	2.60-inch	20,000 - 50,000	2021	2024
63	MSD0180-PS	Government Center	Documented	Lift Station	Pump station and system capacity	S_PO_WC_PC06_M_01_C	Government Center PS Elimination	Diversion	PC06	1.82-inch	N/A	PS will be eliminated	2021	2024
64	MSD1055-LS	Gunpowder	Documented	Pumped	Pump station capacity	S_HC_HN_NB02_S_09A_C_B	Gunpowder PS Inline Storage	Inline Storage	NB02	1.82-inch	2.25-inch	less than 10,000	2019	2021
65	55665	Hazelwood PS wetwell	Documented	Manhole	Pump Station capacity	S_MC_MF_55665_S_07_C	Hazelwood PS I/I Investigation & Rehabilitation	I/I Reduction	55665	1.82-inch	N/A	N/A	2010	2011
66	01793	9 Muirfield Place	Documented	Manhole	System Capacity	S_MI_MF_NB07_S_07_C	Hurstbourne I/I Investigation & Rehabilitation	I/I Reduction	MF07	1.82-inch	N/A	N/A	2009	2011
67	28984	Plumwood #1	Documented	Manhole	Hydraulic Bottleneck	S_CC_CC_70158_M_09A_C	Idlewood Inline Storage	Inline Storage	70158	1.82-inch	2.25-inch	Volume accounted for at MH 63095	2020	2023
68	28998	Plumwood #2	Documented	Manhole	Hydraulic Bottleneck	S_CC_CC_70158_M_09A_C	Idlewood Inline Storage	Inline Storage	70158	1.82-inch	2.25-inch	Volume accounted for at MH 63095	2020	2023
69	63094	Plumwood #4	Documented	Manhole	Hydraulic Bottleneck	S_CC_CC_70158_M_09A_C	Idlewood Inline Storage	Inline Storage	70158	1.82-inch	2.25-inch	Volume accounted for at MH 63095	2020	2023
70	63095	Plumwood #5	Documented	Manhole	Hydraulic Bottleneck	S_CC_CC_70158_M_09A_C	Idlewood Inline Storage	Inline Storage	70158	1.82-inch	2.25-inch	>200,000	2020	2023
71	70158	Plumwood #3	Documented	Manhole	Hydraulic Bottleneck	S_CC_CC_70158_M_09A_C	Idlewood Inline Storage	Inline Storage	70158	1.82-inch	2.25-inch	Volume accounted for at MH 63095	2020	2023
72	28173	Watterson Trail	Documented	Manhole	System capacity, siphon, and WQTC	S_JT_JT_NB01_M_01_C_A	Jeffersontown WQTC Elimination	Off-line Storage, Pipe Upgrades, WQTC Elimination	NB01	1.82-inch	2.25-inch	Volume accounted for at MH 64505	2010	2015
73	28390	10025 Grassland Road	MOP	Manhole	System capacity, siphon, and WQTC	S_JT_JT_NB01_M_01_C_A	Jeffersontown WQTC Elimination	Off-line Storage, Pipe Upgrades, WQTC Elimination	NB01	1.82-inch	2.25-inch	10,000 - 20,000	2010	2015
74	28391	Grassland #3	Documented	Manhole	System capacity, siphon, and WQTC	S_JT_JT_NB01_M_01_C_A	Jeffersontown WQTC Elimination	Off-line Storage, Pipe Upgrades, WQTC Elimination	NB01	1.82-inch	2.60-inch	Volume accounted for at MH 28395	2010	2015
75	28392	Grassland #2	Documented	Manhole	System capacity, siphon, and WQTC	S_JT_JT_NB01_M_01_C_A	Jeffersontown WQTC Elimination	Off-line Storage, Pipe Upgrades, WQTC Elimination	NB01	1.82-inch	2.60-inch	Volume accounted for at MH 28395	2010	2015
76	28395	Grassland #1	Documented	Manhole	System capacity, siphon, and WQTC	S_JT_JT_NB01_M_01_C_A	Jeffersontown WQTC Elimination	Off-line Storage, Pipe Upgrades, WQTC Elimination	NB01	1.82-inch	2.60-inch	10,000 - 20,000	2010	2015
77	31733	10001 Grassland Road	Suspected	Manhole	System capacity, siphon, and WQTC	S_JT_JT_NB01_M_01_C_A	Jeffersontown WQTC Elimination	Off-line Storage, Pipe Upgrades, WQTC Elimination	NB01	1.82-inch	2.25-inch	10,000 - 20,000	2010	2015
78	64505	3200 Ruckreigel Pky	Suspected	Manhole	System capacity, siphon, and WQTC	S_JT_JT_NB01_M_01_C_A	Jeffersontown WQTC Elimination	Off-line Storage, Pipe Upgrades, WQTC Elimination	NB01	1.82-inch	2.25-inch	10,000 - 20,000	2010	2015

TABLE 4.5.1 SSOs ADDRESSED BY FINAL SSDP PROJECTS

No.	SSO ID	SSO Name/ Address	SSO Class	Overflow Type	Primary Cause	Project ID	Project Name	Solution Technology	Branch ID	Level of Protection	Minimum Rainfall after IOAP Project Completion ¹	Model-Predicted Volume per Incident beyond Level of Protection (gal) ²	Scheduled Project Start Date	Scheduled Project Completion Date
79	IS028-SI	Jeffersontown WQTC Siphon	Documented	Constructed	System capacity, siphon, and WQTC	S_JT_JT_NB01_M_01_C_A	Jeffersontown WQTC Elimination	Off-line Storage, Pipe Upgrades, WQTC Elimination	NB01	1.82-inch	2.25-inch	50,000 - 100,000	2010	2015
80	MSD0255	Jeffersontown WQTC	Documented	Treatment Plant	System capacity, siphon, and WQTC	S_JT_JT_NB01_M_01_C_A	Jeffersontown WQTC Elimination	Off-line Storage, Pipe Upgrades, WQTC Elimination	NB01	1.82-inch	2.25-inch	*	2010	2015
81	MSD1085-PS	Kavanaugh Rd	Documented	Lift Station	Pump station capacity	S_HC_HC_MSD1085_S_03_A	Kavanaugh Rd PS Improvements	PS & Force Main Upgrades	MSD1085	2.60-inch	>2.60-inch	10,000 - 20,000	2021	2024
82	25676	Alcona Lane	Documented	Manhole	System Capacity	S_SD_MF_NB04_S_01_B_A	Klondike Interceptor	Pipe Upgrades	NB04	2.25-inch	>2.60-inch	less than 10,000	2012	2015
83	26650	Briarbridge Ln at South Fork Beargrass Creek	Documented	Manhole	System Capacity	S_SD_MF_NB04_S_01_B_A	Klondike Interceptor	Pipe Upgrades	NB04	2.25-inch	>2.60-inch	less than 10,000	2012	2015
84	26651	Klondike Ln at South Fork Beargrass Creek	Documented	Manhole	System Capacity	S_SD_MF_NB04_S_01_B_A	Klondike Interceptor	Pipe Upgrades	NB04	2.25-inch	>2.60-inch	less than 10,000	2012	2015
85	MSD1169-LS	Lake Forest	MOP	Lift Station	Pump station capacity	S_FF_LF_NB01_S_13_C_A	Lake Forest PS SSO Investigation	Monitor	NB01	N/A	N/A	N/A	2009	2012
86	25484	Near Lantana PS	Documented	Manhole	Pump station and system capacity	S_PO_WC_PC05_M_07_C	Lantana PS I/I Investigation and Rehabilitation	I/I Reduction	PC05	1.82-inch	N/A	N/A	2009	2011
87	93719	Wet Well for Lantana PS	Documented	Manhole	Pump station and system capacity	S_PO_WC_PC05_M_07_C	Lantana PS I/I Investigation and Rehabilitation	I/I Reduction	PC05	1.82-inch	N/A	N/A	2009	2011
88	MSD0101-PS	Lantana Drive PS #1	Documented	Lift Station	Pump station and system capacity	S_PO_WC_PC05_M_07_C	Lantana PS I/I Investigation and Rehabilitation	I/I Reduction	PC05	1.82-inch	N/A	N/A	2009	2011
89	19360	Rockwood Dr / Monaco	Suspected	Manhole	Pump station capacity	S_PO_WC_PC08_M_01_C	Lea Ann Way System Improvements	Pipe Upgrades	PC08	1.82-inch	2.25-inch	less than 10,000	2013	2015
90	19369	5221 Layne Road	Suspected	Manhole	Pump station capacity	S_PO_WC_PC08_M_01_C	Lea Ann Way System Improvements	Pipe Upgrades	PC08	1.82-inch	2.25-inch	less than 10,000	2013	2015
91	29933	6926 Sandstone Blvd	Suspected	Manhole	Pump station capacity	S_PO_WC_PC08_M_01_C	Lea Ann Way System Improvements	Pipe Upgrades	PC08	1.82-inch	2.60-inch	Volume accounted for at MH 29948	2013	2015
92	29943	6906 Sandstone Blvd	Suspected	Manhole	Pump station capacity	S_PO_WC_PC08_M_01_C	Lea Ann Way System Improvements	Pipe Upgrades	PC08	1.82-inch	2.60-inch	Volume accounted for at MH 29948	2013	2015
93	29948	Sandstone Blvd	Documented	Manhole	Pump station capacity	S_PO_WC_PC08_M_01_C	Lea Ann Way System Improvements	Pipe Upgrades	PC08	1.82-inch	2.60-inch	20,000 - 50,000	2013	2015
94	31083	6924 Sandstone Blvd	Suspected	Manhole	Pump station capacity	S_PO_WC_PC08_M_01_C	Lea Ann Way System Improvements	Pipe Upgrades	PC08	1.82-inch	2.60-inch	Volume accounted for at MH 29948	2013	2015
95	31084	6916 Sandstone Blvd	Suspected	Manhole	Pump station capacity	S_PO_WC_PC08_M_01_C	Lea Ann Way System Improvements	Pipe Upgrades	PC08	1.82-inch	2.60-inch	Volume accounted for at MH 29948	2013	2015
96	79076	6308 Hanses Drive	Suspected	Manhole	Pump station capacity	S_PO_WC_PC08_M_01_C	Lea Ann Way System Improvements	Pipe Upgrades	PC08	1.82-inch	2.25-inch	>100,000	2013	2015
97	MSD1010-PS	Lea Ann Way	Documented	Pumped	Pump station capacity	S_PO_WC_PC08_M_01_C	Lea Ann Way System Improvements	Pipe Upgrades	PC08	1.82-inch	>2.60-inch	0	2013	2015
98	96020	Leland Road	Documented	Manhole	Hydraulic bottleneck	S_OR_MF_NB02_S_13_C	Leland Rd SSO Investigation	Condition Assessment	NB02	N/A	N/A	N/A	2009	2012
99	36419	10601 Leven Blvd	Suspected	Manhole	Pump station capacity and hydraulic bottlenecks	S_PO_WC_PC10_M_01_C	Leven PS Elimination	Diversion	PC10	1.82-inch	N/A	PS will be eliminated	2020	2022
100	MSD1019-PS	Leven	Suspected	Pumped	Pump station capacity and hydraulic bottlenecks	S_PO_WC_PC10_M_01_C	Leven PS Elimination	Diversion	PC10	1.82-inch	N/A	PS will be eliminated	2020	2022
101	67997	7906 Gainsborough Court	Documented	Manhole	System capacity	S_CC_CC_67997_M_01_C	Little Cedar Creek Interceptor Improvements	Pipe Upgrades	67997	1.82-inch	2.25-inch	Volume accounted for at MH 86423	2021	2024
102	67999	7904 Shaw Court	Suspected	Manhole	System capacity	S_CC_CC_67997_M_01_C	Little Cedar Creek Interceptor Improvements	Pipe Upgrades	67997	1.82-inch	2.25-inch	Volume accounted for at MH 86423	2021	2024
103	86423	8314 Casualwood Way	MOP	Manhole	System capacity	S_CC_CC_67997_M_01_C	Little Cedar Creek Interceptor Improvements	Pipe Upgrades	67997	1.82-inch	2.25-inch	20,000 - 50,000	2021	2024
104	89195	8104 Kimberly Way	MOP	Manhole	System capacity	S_CC_CC_67997_M_01_C	Little Cedar Creek Interceptor Improvements	Pipe Upgrades	67997	1.82-inch	2.25-inch	Volume accounted for at MH 86423	2021	2024
105	89197	8104 Kimberly Way	MOP	Manhole	System capacity	S_CC_CC_67997_M_01_C	Little Cedar Creek Interceptor Improvements	Pipe Upgrades	67997	1.82-inch	2.25-inch	Volume accounted for at MH 86423	2021	2024
106	MSD0199-LS	Lucas Lane	Documented	Lift Station	Pump station capacity	S_FF_BT_NB01_S_09A_C_A	Lucas Ln PS Inline Storage	Inline Storage	NB01	1.82-inch	2.25-inch	20,000 - 50,000	2019	2021
107	91087	Near Meadow Stream PS	Documented	Manhole	Pump station capacity	S_HC_HC_MSD1082_S_09A_C	Meadow Stream PS Inline Storage	Inline Storage	MSD1082	1.82-inch	2.25-inch	>100,000	2014	2016
108	MSD1082-PS	Meadow Stream	Documented	Lift Station	Pump station capacity	S_HC_HC_MSD1082_S_09A_C	Meadow Stream PS Inline Storage	Inline Storage	MSD1082	1.82-inch	2.25-inch	Volume accounted for at MH 91087	2014	2016
109	24472	501 Mockingbird Valley Road	MOP	Manhole	Pump station capacity & system capacity	S_OR_MF_NB01_M_01_B	Mellwood System Improvements & PS Elimination	Pump Station Upgrades, Pipe Upgrades, & Diversion	NB01	2.25-inch	2.60-inch	20,000 - 50,000	2021	2024
110	26752	Brownsboro Road at Mockingbird Valley #1	Documented	Manhole	Pump station capacity & system capacity	S_OR_MF_NB01_M_01_B	Mellwood System Improvements & PS Elimination	Pump Station Upgrades, Pipe Upgrades, & Diversion	NB01	2.25-inch	2.60-inch	10,000 - 20,000	2021	2024
111	41374	Brownsboro Road at Mockingbird Valley #2	Documented	Manhole	Pump station capacity & system capacity	S_OR_MF_NB01_M_01_B	Mellwood System Improvements & PS Elimination	Pump Station Upgrades, Pipe Upgrades, & Diversion	NB01	2.25-inch	2.60-inch	Volume accounted for at MH 26752	2021	2024
112	41416	3202 Brownsboro Road	Suspected	Manhole	Pump station capacity & system capacity	S_OR_MF_NB01_M_01_B	Mellwood System Improvements & PS Elimination	Pump Station Upgrades, Pipe Upgrades, & Diversion	NB01	2.25-inch	2.60-inch	10,000 - 20,000	2021	2024
113	24152-W	3733 Canoe Lane (Wet Well for Canoe Ln PS)	Documented	Constructed	Pump station capacity & system capacity	S_OR_MF_NB01_M_01_B	Mellwood System Improvements & PS Elimination	Pump Station Upgrades, Pipe Upgrades, & Diversion	NB01	2.25-inch	>2.60-inch	Volume accounted for at MSD0024-PS	2021	2024
114	MSD0007-PS	Mockingbird Valley	Documented	Constructed	Pump station capacity & system capacity	S_OR_MF_NB01_M_01_B	Mellwood System Improvements & PS Elimination	Pump Station Upgrades, Pipe Upgrades, & Diversion	NB01	2.25-inch	N/A	PS will be eliminated	2021	2024
115	MSD0010-PS	Winton	Documented	Constructed	Pump station capacity & system capacity	S_OR_MF_NB01_M_01_B	Mellwood System Improvements & PS Elimination	Pump Station Upgrades, Pipe Upgrades, & Diversion	NB01	2.25-inch	N/A	PS will be eliminated	2021	2024
116	MSD0023-PS	Mellwood Avenue	Documented	Constructed	Pump station capacity & system capacity	S_OR_MF_NB01_M_01_B	Mellwood System Improvements & PS Elimination	Pump Station Upgrades, Pipe Upgrades, & Diversion	NB01	2.25-inch	2.60-inch	20,000 - 50,000	2009	2012
117	MSD0024-PS	Canoe Lane	Documented	Lift Station	Pump station capacity & system capacity	S_OR_MF_NB01_M_01_B	Mellwood System Improvements & PS Elimination	Pump Station Upgrades, Pipe Upgrades, & Diversion	NB01	2.25-inch	>2.60-inch	20,000 - 50,000	2021	2024
118	02932	Oxmoor #1	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	2.25-inch	Volume accounted for at MH 02933	2018	2023
119	02933	Oxmoor #2	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	2.25-inch	>200,000	2018	2023
120	02935	Oxmoor #3	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	2.25-inch	>200,000	2018	2023

TABLE 4.5.1 SSOs ADDRESSED BY FINAL SSDP PROJECTS

No.	SSO ID	SSO Name/ Address	SSO Class	Overflow Type	Primary Cause	Project ID	Project Name	Solution Technology	Branch ID	Level of Protection	Minimum Rainfall after IOAP Project Completion ¹	Model-Predicted Volume per Incident beyond Level of Protection (gal) ²	Scheduled Project Start Date	Scheduled Project Completion Date
121	08537	Northern Ditch Blow-off	Documented	Constructed	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	2.25-inch	less than 10,000	2018	2023
122	23211	Peabody Lane #1	Documented	Constructed	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	>2.60-inch	Volume accounted for at MH 51160 & MH 51161	2018	2023
123	23212	Peabody Lane #2	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	>2.60-inch	Volume accounted for at MH 51160 & MH 51161	2018	2023
124	27005	Bridge #6 - Cherokee Park	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	2.25-inch	>200,000	2018	2023
125	45835	Beargrass Road near Big Rock	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	>2.60-inch	20,000 - 50,000	2018	2023
126	47583	Oxmoor #4	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	2.25-inch	>200,000	2018	2023
127	47593	Near LG&E Power Station	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	2.25-inch	Volume accounted for at MH 02933	2018	2023
128	47596	7410 Steeplecrest Circle	Suspected	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	2.25-inch	>100,000	2018	2023
129	47603	Kindercare #1	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	2.25-inch	10,000 - 20,000	2018	2023
130	47604	Kindercare #2	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	2.25-inch	Volume accounted for at MH 47603	2018	2023
131	51160	Peabody Lane #3	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	>2.60-inch	50,000 - 100,000	2018	2023
132	51161	Brooklawn	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	>2.60-inch	50,000 - 100,000	2018	2023
133	51221	Watterson Expressway at South Fork Beargrass Creek	Documented	Constructed	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	>2.60-inch	Volume accounted for at MH 51160 & MH 51161	2018	2023
134	90700	Christian Court	Documented	Manhole	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	2.25-inch	Volume accounted for at MH 47603	2018	2023
135	08935-SM	Middle Fork at Breckenridge Lane	Documented	Constructed	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	2.25-inch	>200,000	2018	2023
136	IS021A-SI	Bowman Field Siphon	Documented	Constructed	System capacity	S_MISF_MF_NB01_M_01_C_A1	Middle Fork Relief Interceptor, Wet Weather Storage, and Upper Middle Fork LS Diversion	Off-line Storage and Pipe Upgrades	MF01	1.82-inch	>2.60-inch	>200,000	2018	2023
137	27969	4304 Rivanna Dr	Suspected	Manhole	Pump station capacity	S_JT_JT_NB04_M_01_A	Monticello PS Elimination	Diversion	NB04	2.60-inch	>2.60-inch	10,000 - 20,000	2020	2022
138	MSD0151-PS	Monticello Place	Documented	Lift Station	Pump station capacity	S_JT_JT_NB04_M_01_A	Monticello PS Elimination	Diversion	NB04	2.60-inch	>2.60-inch	Volume accounted for at MH 27969	2020	2022
139	17724	1096 Springview Drive	Documented	Manhole	System Capacity	S_PO_WC_PC09_M_09B_C	Outer Loop & Caven Ave Wet Weather Storage	Off-line Storage and Pipe Upgrades	PC09	1.82-inch	>2.60-inch	less than 10,000	2014	2016
140	27116	10306 Caven Avenue	Suspected	Manhole	System Capacity	S_PO_WC_PC09_M_09B_C	Outer Loop & Caven Ave Wet Weather Storage	Off-line Storage and Pipe Upgrades	PC09	1.82-inch	>2.60-inch	less than 10,000	2021	2024
141	70212	1095 Springview Drive	Suspected	Manhole	System Capacity	S_PO_WC_PC09_M_09B_C	Outer Loop & Caven Ave Wet Weather Storage	Off-line Storage and Pipe Upgrades	PC09	1.82-inch	>2.60-inch	less than 10,000	2014	2016
142	MSD0133-PS	Caven Avenue	Documented	Pumped	System Capacity	S_PO_WC_PC09_M_09B_C	Outer Loop & Caven Ave Wet Weather Storage	Off-line Storage and Pipe Upgrades	PC09	1.82-inch	>2.60-inch	less than 10,000	2021	2024
143	47250	1645 Rangeland Rd	MOP	Manhole	System Capacity	S_SD_MF_NB03_S_07_C	Parkview Estates I/I Investigation & Rehabilitation	I/I Reduction	NB03	1.82-inch	N/A	N/A	2010	2011
144	22436	Manhole Adjacent to West Goose Creek PS	Documented	Pumped	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	>2.60-inch	less than 10,000	2011	2015
145	40870	Muddy Fork PS #1	Documented	Manhole	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	2.60-inch	>100,000	2011	2015
146	40871	Muddy Fork PS #2	Documented	Manhole	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	2.60-inch	Volume accounted for at MH 40870 & MH 40872	2011	2015
147	40872	Muddy Fork PS #3	Documented	Manhole	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	2.60-inch	>100,000	2011	2015
148	42680	Barbour Lane #1	Documented	Pumped	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	>2.60-inch	less than 10,000	2011	2015
149	65633	Barbour Lane #2	Documented	Manhole	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	>2.60-inch	less than 10,000	2011	2015
150	65635	Barbour Lane #3	Documented	Manhole	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	>2.60-inch	less than 10,000	2011	2015
151	MSD0123-PS	West Goose Creek	Documented	Lift Station	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	>2.60-inch	less than 10,000	2011	2015
152	MSD0183-PS	Glenview Hills	Documented	Lift Station	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	>2.60-inch	less than 10,000	2011	2015
153	MSD0192-PS	Barbour Lane	Documented	Lift Station	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	>2.60-inch	less than 10,000	2011	2015
154	MSD0193-PS	New Market	Documented	Lift Station	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	2.60-inch	20,000 - 50,000	2011	2015
155	MSD0292	Hunting Creek South WQTC	Documented	Treatment Plant	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	N/A	WQTC will be eliminated	2011	2015
156	MSD1044-PS	Phoenix Hill	Documented	Pumped	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	2.60-inch	10,000 - 20,000	2011	2015
157	MSD1063-PS	Deep Creek	Documented	Lift Station	ORFM and pump station capacity	S_OR_MF_NB04_M_03_B_B	Prospect WQTC Elimination, Harrods Creek PS, and ORFM System Improvements	Pump Station & Pipe Upgrades, Diversion, WQTC Eliminations	NB04	2.25-inch	N/A	PS will be eliminated	2011	2015
158	28711	9510 Taylorsville Road	Suspected	Manhole	System & pump station capacity	S_JT_JT_NB03_M_01_C	Raintree and Marian Ct PS Elimination	Pipe Upgrades and Diversion	NB03	1.82-inch	2.25-inch	10,000 - 20,000	2018	2021
159	28719	Intersection of Gleeson and Wendell	MOP	Manhole	System & pump station capacity	S_JT_JT_NB03_M_01_C	Raintree and Marian Ct PS Elimination	Pipe Upgrades and Diversion	NB03	1.82-inch	2.25-inch	10,000 - 20,000	2018	2021

No.	SSO ID	SSO Name/ Address	SSO Class	Overflow Type	Primary Cause	Project ID	Project Name	Solution Technology	Branch ID	Level of Protection	Minimum Rainfall after IOAP Project Completion ¹	Model-Predicted Volume per Incident beyond Level of Protection (gal) ²	Scheduled Project Start Date	Scheduled Project Completion Date
160	28729	9100 Marian Ct (Wet Well for Marian Ct PS)	Documented	Constructed	System & pump station capacity	S_JT_JT_NB03_M_01_C	Raintree and Marian Ct PS Elimination	Pipe Upgrades and Diversion	NB03	1.82-inch	2.25-inch	10,000 - 20,000	2018	2021
161	MSD0149-PS	Raintree	MOP	Constructed	System & pump station capacity	S_JT_JT_NB03_M_01_C	Raintree and Marian Ct PS Elimination	Pipe Upgrades and Diversion	NB03	1.82-inch	2.25-inch	20,000 - 50,000	2018	2021
162	MSD1060-LS	Riding Ridge	Documented	Pumped	Pump station capacity	S_HC_HN_NB01_S_03_C_A	Riding Ridge PS Improvements	Pump Station Upgrades	NB01	1.82-inch	2.25-inch	less than 10,000	2012	2014
163	MSD1080-LS	Running Fox	Documented	Lift Station	Pump station capacity	S_CC_CC_MSD1080_S_01_C	Running Fox PS Elimination	Diversion	MSD1080	1.82-inch	N/A	PS will be eliminated	2009	2010
164	04498	820 Echo Bridge Road	Suspected	Manhole	Pump station capacity (hydraulic bottleneck & backwater effects)	S_MC_WC_NB01_M_01_C_A	Shively Interceptor	Pipe Upgrades	NB01	2.60-inch	N/A	PS will be eliminated	2009	2014
165	04542	Fern Lea PS Wet Well	Documented	Manhole	Pump station capacity (hydraulic bottleneck & backwater effects)	S_MC_WC_NB01_M_01_C_A	Shively Interceptor	Pipe Upgrades	NB01	2.60-inch	N/A	PS will be eliminated	2009	2014
166	81814-W	Pioneer Road PS	Documented	Pumped	Pump station capacity (hydraulic bottleneck & backwater effects)	S_MC_WC_NB01_M_01_C_A	Shively Interceptor	Pipe Upgrades	NB01	2.60-inch	N/A	PS will be eliminated	2009	2014
167	MSD0047-PS	Fern Lea	Documented	Pumped	Pump station capacity (hydraulic bottleneck & backwater effects)	S_MC_WC_NB01_M_01_C_A	Shively Interceptor	Pipe Upgrades	NB01	2.60-inch	N/A	PS will be eliminated	2009	2014
168	MSD0050-PS	Garrs Lane	Documented	Pumped	Pump station capacity (hydraulic bottleneck & backwater effects)	S_MC_WC_NB01_M_01_C_A	Shively Interceptor	Pipe Upgrades	NB01	2.60-inch	N/A	PS will be eliminated	2009	2014
169	MSD0042-PS	Sonne Avenue	Documented	Pumped	System capacity	S_OR_MF_42007_S_07_C	Sonne PS I/I Investigation & Rehabilitation	I/I Reduction	MSD0042-PS	1.82-inch	N/A	N/A	2009	2011
170	94187	Wet Well for St. Rene Road PS	Documented	Manhole	Pump station capacity	S_FF_CH_NB01_S_09A_C_A	St. Rene Rd. PS Inline Storage	Inline Storage	CH01	1.82-inch	2.25-inch	less than 10,000	2019	2021
171	16649	Wickland Road/ Sutherland Drive	Documented	Constructed	System Capacity	S_SD_MF_NB05_M_01_A	Sutherland Interceptor	Pipe Upgrades	NB05	2.60-inch	>2.60-inch	10,000 - 20,000	2021	2023
172	33003	815 Tucker Station Road	Suspected	Manhole	Hydraulic Bottleneck	S_FF_FF_NB01_S_01_C_A	Woodland Hills PS Diversion	Diversion	NB01	1.82-inch	2.25-inch	>100,000	2010	2011
173	65531	12400 Brierly Hill Place	Suspected	Manhole	Hydraulic Bottleneck	S_FF_FF_NB01_S_01_C_A	Woodland Hills PS Diversion	Diversion	NB01	1.82-inch	2.25-inch	Volume accounted for at MH 33003	2010	2011

¹Minimum Rainfall Depth is Approximate and is dependent on Antecedent Conditions and Rainfall Patterns
²Predicted Volumes are based on modeled design level rainfall depths. Actual Post IOAP volumes will be dependent on Antecedent Conditions and Rainfall Patterns

TABLE 4.5.1 CONT'D SSOs ADDRESSED BY INTERIM SSDP AND OTHER CAPITAL PROJECTS

No.	SSO ID	SSO Name/ Address	SSO Class	Overflow Type	Primary Cause	Project ID	Project Name	Solution Technology	Scheduled Project Start Date	Scheduled Project Completion Date
174	21061	4432 Cordova Rd and Tyne Ave (Beechwood Village) - IFP Pumped Location	Documented	Pumped	System Capacity / High Inflow & Infiltration	N/A	Beechwood Village Sanitary Sewer Replacement	Sewer Replacement	2007	2011
175	21089	207 Brunswick Rd (Beechwood Village) - IFP Pumped Location	Documented	Pumped	System Capacity / High Inflow & Infiltration	N/A	Beechwood Village Sanitary Sewer Replacement	Sewer Replacement	2007	2011
176	21101	Shelbyville Rd and Marshall Dr IFP Pumped Location	Documented	Pumped	System Capacity / High Inflow & Infiltration	N/A	Beechwood Village Sanitary Sewer Replacement	Sewer Replacement	2007	2011
177	21153	Biltmore Rd and Cordova Rd - IFP Pumped Location	Documented	Pumped	System Capacity / High Inflow & Infiltration	N/A	Beechwood Village Sanitary Sewer Replacement	Sewer Replacement	2007	2011
178	21156	Shelbyville Rd and Stonehenge Rd (Beechwood Village) IFP Pumped Location	Documented	Pumped	System Capacity / High Inflow & Infiltration	N/A	Beechwood Village Sanitary Sewer Replacement	Sewer Replacement	2007	2011
179	MSD0209A-PS	Berrytown WQTC PS	Documented	Pumped	PS / WQTC Capacity	N/A	Berrytown Interceptor (Capital Project)	New Interceptor / WQTC Elimination	TBD	TBD
180	22370	Greenbelt Hwy	Documented	Manhole	WQTC Capacity	N/A	Derek R Guthrie WQTC	WQTC Upgrade	2008	2011
181	22385	Johnsontown Rd #2	Documented	Manhole	WQTC Capacity	N/A	Derek R Guthrie WQTC	WQTC Upgrade	2008	2011
182	32682	12700 Abbey Rd. #2	Documented	Manhole	System Capacity	N/A	Derek R Guthrie WQTC	WQTC Upgrade	2008	2011
183	32688	12700 Abbey Rd. #1	Documented	Manhole	System Capacity	N/A	Derek R Guthrie WQTC	WQTC Upgrade	2008	2011
184	59169	Johnsontown Rd #1	Documented	Manhole	WQTC Capacity	N/A	Derek R Guthrie WQTC	WQTC Upgrade	2008	2011
185	MSD0277	West County	Documented	Pumped	WQTC Capacity	N/A	Derek R Guthrie WQTC	WQTC Upgrade	2008	2011
186	97806	Floyds Fork WQTC Influent PS Near Creek	Documented	Lift Station	PS / WQTC Capacity	N/A	Floyds Fork WQTC Expansion Phase 2 (Capital Project)	WQTC Expansion	TBD	TBD
187	MSD0294	Floyds Fork	Documented	Treatment Plant	PS / WQTC Capacity	N/A	Floyds Fork WQTC Expansion Phase 2 (Capital Project)	WQTC Expansion	TBD	TBD
188	17571	Carson Way and Ribble Rd (Hikes Point) IFP Pumped Location.	Documented	Pumped	System Capacity / High Inflow & Infiltration	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
189	18134	Downing At Wyckford Wy	Documented	Manhole	System Capacity	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
190	18298	Gerald Ct #3	Documented	Manhole	System Capacity	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
191	18302	Bardstown Rd / Paris Dr	Documented	Manhole	System Capacity	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
192	18434	Between Johnston Wy & Ainslie Wy	Documented	Manhole	System Capacity / High Inflow & Infiltration	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
193	18471	Dell Brooke Ave and Boaries Ln (Hikes Point) - IFP Pumped Location	Documented	Pumped	System Capacity / High Inflow & Infiltration	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
194	18483	3012 Boaries Ave and Rio Rita Ave (Hikes Point) - IFP Pumped Location.	Documented	Pumped	System Capacity / High Inflow & Infiltration	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
195	18505	3540 Ramona Ave and Flora Ave - IFP Pumped Location	Documented	Pumped	System Capacity / High Inflow & Infiltration	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
196	18595	3101 Wedgewood Way (Hikes Point) - IFP Pumped Location	Documented	Pumped	System Capacity / High Inflow & Infiltration	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
197	49224	Goldsmith Ln At Beargrass Creek - Near Dell Brooke Av	Documented	Manhole	System Capacity	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
198	49236	Rosemont Bv At Hikes Ln	Documented	Manhole	System Capacity	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
199	49672	Gerald Ct #2	Documented	Manhole	System Capacity	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
200	49673	Gerald Ct #1	Documented	Manhole	System Capacity	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
201	18318-W	Terrier Lane PS Wetwell	Documented	Lift Station	System Capacity	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
202	MSD0012-PS	Highgate Springs	Documented	Constructed	System Capacity / High Inflow & Infiltration	N/A	Hikes Lane Interceptor & Highgate Springs PS	New Interceptor / PS Elimination	2008	2012
203	11877	Hite Creek Near Influent PS	Documented	Manhole	PS Capacity	N/A	Hite Creek WQTC Influent PS Replacement (Capital Project)	PS Upgrades	TBD	TBD
204	30520	10723 Copper Ridge - Along Interceptor	Documented	Manhole	PS Capacity	N/A	Hite Creek WQTC Influent PS Replacement (Capital Project)	PS Upgrades	TBD	TBD
205	MSD0403	Lake Forest/Beckley Woods	Documented	Treatment Plant	WQTC Capacity	N/A	Lake Forest PS & Force Main (Capital Project)	PS Upgrades / WQTC Elimination	2010	2012
206	16556	Upper Highlands	Documented	Manhole	Blockage	N/A	N/A	Pipe Cleaning	2008	2008
207	MSD0271	Yorktown	Documented	Treatment Plant	WQTC Capacity	N/A	Northern Ditch Diversion Interceptor	New Interceptor / WQTC Elimination	2007	2011
208	61683	9412 Slayton Cr (Upstream of Silver Heights PS)	Documented	Manhole	Capacity	N/A	Overflows only occur beyond MSD maximum level of protection		N/A	N/A
209	21103	Blenheim Rd / Taggart Dr	Documented	Manhole	System Capacity / High Inflow & Infiltration	N/A	Sinking Fork Relief Sewer	New Relief Sewer	2008	2011
210	25012	Beaver Rd	Documented	Manhole	System Capacity / High Inflow & Infiltration	N/A	Sinking Fork Relief Sewer	New Relief Sewer	2008	2011
211	63319	Watterson X-way	Documented	Manhole	System Capacity / High Inflow & Infiltration	N/A	Sinking Fork Relief Sewer	New Relief Sewer	2008	2011
212	30680	3420 Fountain Dr Near Buechel Branch	Documented	Manhole	Bottleneck / High Inflow & Infiltration	N/A	Southeastern Diversion Structure and Interceptor	New Relief Sewer / Flow Control Modifications	2008	2011
213	30681	3401 Fountain Drive At Creek	Documented	Manhole	Bottleneck / High Inflow & Infiltration	N/A	Southeastern Diversion Structure and Interceptor	New Relief Sewer / Flow Control Modifications	2008	2011
214	72571-X	Southeast Diversion Structure	Documented	Constructed	Bottleneck / High Inflow & Infiltration	N/A	Southeastern Diversion Structure and Interceptor	New Relief Sewer / Flow Control Modifications	2008	2011
215	08426	Pruitt Ct #5	Documented	Manhole	Blockage	N/A	Southeastern Diversion Structure and Interceptor / Buechel Branch Interceptor Rehab	New Relief Sewer / Flow Control Modifications / Pipe Rehab	2008	2009
216	08427	Pruitt Ct #6	Documented	Manhole	Blockage	N/A	Southeastern Diversion Structure and Interceptor / Buechel Branch Interceptor Rehab	New Relief Sewer / Flow Control Modifications / Pipe Rehab	2008	2009
217	08430	Pruitt Ct #1	Documented	Manhole	Blockage	N/A	Southeastern Diversion Structure and Interceptor / Buechel Branch Interceptor Rehab	New Relief Sewer / Flow Control Modifications / Pipe Rehab	2008	2009
218	08431	Pruitt Ct #2	Documented	Manhole	Blockage	N/A	Southeastern Diversion Structure and Interceptor / Buechel Branch Interceptor Rehab	New Relief Sewer / Flow Control Modifications / Pipe Rehab	2008	2009
219	30701	Pruitt Ct #3	Documented	Manhole	Blockage	N/A	Southeastern Diversion Structure and Interceptor / Buechel Branch Interceptor Rehab	New Relief Sewer / Flow Control Modifications / Pipe Rehab	2008	2009
220	30702	Pruitt Ct #4	Documented	Manhole	Blockage	N/A	Southeastern Diversion Structure and Interceptor / Buechel Branch Interceptor Rehab	New Relief Sewer / Flow Control Modifications / Pipe Rehab	2008	2009
221	49647	Pruitt Ct #8	Documented	Manhole	Blockage	N/A	Southeastern Diversion Structure and Interceptor / Buechel Branch Interceptor Rehab	New Relief Sewer / Flow Control Modifications / Pipe Rehab	2008	2009
222	63779	Pruitt Ct #7	Documented	Manhole	Blockage	N/A	Southeastern Diversion Structure and Interceptor / Buechel Branch Interceptor Rehab	New Relief Sewer / Flow Control Modifications / Pipe Rehab	2008	2009
223	21506	Falgate Ct - IFP Pumped Location.	Documented	Pumped	System Capacity	N/A	Woodlawn Road PS Relocation (Capital Project)	New Interceptor / PS Elimination	2005	2009
224	MSD0039-PS	Woodlawn Park	Documented	Lift Station	PS Capacity	N/A	Woodlawn Road PS Relocation (Capital Project)	New Interceptor / PS Elimination	2005	2009