700 West Liberty Street | Louisville, KY 40203-1911
Phone: 502.540.6000 | LouisvilleMSD.org

September 6, 2018

Chief, Environmental Enforcement Section
Environmental and Natural Resources Division
U.S. Department of Justice
Post Office Box 7611
Washington DC 20044-7611

Jeff Cummins, Director
Division of Enforcement
Department for Environmental Protection
300 Sower Blvd., 2nd Floor
Frankfort, KY 40601

Chief, NPDES Permitting and Enforcement Branch
Water Protection Division
US EPA Region 4
Atlanta Federal Center
61 Forsyth Street SW
Atlanta, GA 30303

Subject: Minor Project Modifications
Ohio River Tunnel
I-64 and Grinstead Drive Storage Basin

DOJ Case No. 90-5-1-1-08254

Attention Chiefs and Director:

MSD is requesting approval of a proposed minor project modification to each of the following two projects:

Project Name	IOAP Project ID	New Project Name
I-64 and Grinstead Drive Storage Basin	L_MI_MF_127_M_09B_B_A_8	**Waterway Protection Tunnel**
Ohio River Tunnel	L_OR_MF_020_S_09B_B_A_8, L_OR_MF_155_M_09B_B_A_4, L_SO_MF_083_M_09B_B_A_8	

This request is part of the ongoing adaptive management review of the approved Integrated Overflow Abatement Plan (IOAP), dated May 2014. The proposed modifications have no impact to previously committed levels of control, residual Average Annual Overflow Volume (AAOV) or project sizing. Similarly, the final completion date of December 31, 2020, for the entire suite of Long Term Control Plan projects is not affected by this request. The unique details of this project modification request are provided below.

I-64 and Grinstead Drive Storage Basin

2009 IOAP Project Description

The original I-64 & Grinstead Drive Basin project involved the construction of a 2.74 million gallon (MG) storage basin to be completed by December 31, 2014, with a level of control of 8 overflows per Typical Year.

2012 IOAP Project Description

The project modification proposed in 2012 involved the construction of a 15.33 MG storage basin to be completed by December 31, 2020, with a level of control of 4 overflows per Typical Year. Given the significant increase in proposed size, moving the scheduled completion to 2020 was proposed to allow for

the incorporation of stormwater diversions and green infrastructure to be evaluated as a way to reduce the basin size.

2014 IOAP Project Modification

The project modification proposed in 2014 included adjusting the basin size to 8.5 MG and adding a stormwater interceptor line along Grinstead Drive to divert stormwater flow from CSO125, allowing disconnection of an existing storm sewer system that currently drains 123 acres and discharges into the combined sewer system. Additional stream and wetlands restoration in the floodplain was also proposed as part of this modification. The project remained at 4 overflows per Typical Year. More detailed descriptions of the history and justifications of prior project modifications can be found in the 2014 modification letter, which is provided as Attachment A.

2018 Project Modification Request

This minor project modification request is to incorporate the required storage volume for CSOs associated with the I-64 and Grinstead CSO Basin into an extension of the Waterway Protection Tunnel, eliminating the need for the storage basin. The tunnel volume will also include the volume necessary to accommodate the stormwater diversion project; however, MSD still intends to explore opportunities to divert some portions of the CSO125 drainage area. If it can be performed in a cost-effective and minimally intrusive manner, the diversion would provide contingency for the system and remove the need to treat stormwater at the Morris Forman Water Quality Treatment Center. Additionally, CSO126 will be mitigated with a weir raise in-lieu of conveying flow to the tunnel. This modification will not impact the level of control or schedule for mitigating these CSOs to 4 overflows per Typical Year by December 31, 2020. The Waterway Protection Tunnel project description below provides additional information and technical justification on the tunnel extension and basin elimination.

Waterway Protection Tunnel (Ohio River Tunnel)

2016 Project Modification – Ohio River Tunnel

This project was created in 2016 by combining the storage volumes of three CSO basins into a single linear wet weather storage solution. While many factors influenced changing the design, the deep-rock tunnel along Louisville's waterfront offered benefits to the community and operational sustainability advantages while maintaining the committed levels of control. Descriptions of the previous basin sizes and historical adaptive management approvals are contained in the approved 2016 modification letter, included in Attachment B.

The 2016 project modification involved combining the volumes of the 13th Street and Rowan Street, Story Avenue and Main Street, and Lexington Road and Payne Street Storage Basins and modifying the design technology from individual basins to a deep rock tunnel solution. At the time, the proposed tunnel dimensions were 20 feet in diameter and 13,200 feet along the Ohio River from the 13th Street and Rowan Street site location through the Story and Main Basin location, ending at the Lexington and Payne Basin location. This provided a total storage volume of 31.8 MG to capture 19 CSOs, each maintaining previously approved levels of control. Three CSOs (022, 023, and 058) where a level of control of eight overflows per Typical Year is met via weir modifications, remained unchanged.

This modification allowed for a consolidated tunnel solution with a storage volume equivalent to the sum of the previous storage basin volumes, effectively eliminating the need for basin solutions. The completion date for the tunnel is planned for December 31, 2020, consistent with the approved 2012 IOAP Modification schedule for the three individual basins (31.8 MG). Once the tunnel design was completed, the total tunnel

volume reached 35.2 MG, 3.4 MG more than the summation of the previous basin sizes, when considering volume contained in the wet well, drop shafts, and tunnel bifurcations.

2018 Project Modification – Waterway Protection Tunnel, Extension of the Ohio River Tunnel

This modification request proposes extending the tunnel a net additional 7,240 linear feet for an additional storage volume of 17 MG and eliminating the I-64 and Grinstead Basin Project. A weir raise will be performed at CSO126. Furthermore, the CSO125 diversion associated with the basin will be modified to reduce the amount of stormwater flow being diverted away from the combined system. While the volume necessary to accommodate stormwater from the CSO125 watershed is available in the tunnel, MSD is continuing to pursue a partial diversion if it can be performed in a cost-effective, non-obtrusive manner. In order to align with public-facing information and community outreach materials, we also request that the project name be changed to the Waterway Protection Tunnel.

Modification Drivers and Technical Justification

Many factors have influenced extending the tunnel alignment and eliminating the proposed basin and diversion project. A detailed review of the proposed capital and long-term costs, risks, construction impacts, and long-term impacts of both projects was performed that resulted in selecting the tunnel extension as the optimal path forward.

The modification of the CSO125 stormwater diversion also reduces construction impacts and potential risks along this alignment. The design of the CSO125 diversion project would have required Grinstead Drive, a significant thoroughfare, to have multiple lane closures for up to a year, and a complete closure for a section of the road during part of the year. Additionally, as part of the project, a proposed large stormwater line would have to cross Grinstead Drive, crossing both above an existing combined sewer and under an existing 60” Louisville Water Company (LWC) transmission main. There were also six other proposed crossings of the 60” line. This same water transmission main suffered a major break in recent years (after the CSO 125 project was proposed), resulting in temporary loss of water to parts of the community and causing flooding to property in the area. The crossing of this water main would have created a significant risk for an additional breakage as it is in solid rock and the stormwater line would need to pass under it. In the proposed project modification, MSD will continue to pursue diverting a portion of the CSO125 watershed, but only as much as can be conveyed without constructing new stormwater pipes in or across Grinstead Drive. Therefore, the risks associated with crossing under the LWC main and closures along Grinstead Drive are removed.

The tunnel extension and basin elimination at I-64 and Grinstead allow the elimination of a de-watering pump station, flushing gates, influent gates, control panels and other equipment at the site. This eliminates the long-term need for replacement, operation and maintenance of the equipment. Furthermore, this eliminates an additional site that must be regularly visited and maintained by limited MSD staff.

Because the storage will be moved to the underground tunnel, onsite buildings will also be eliminated, and the above-ground space will be more open for community use. This additional open space enhances livability, attractiveness, and overall quality of life for residents and commuters in this area. Public officials have commented that the available re-use of this land provides additional value to the community. This is especially important in this area, as the site is near Cherokee Park and adjacent to Beargrass Creek and the Beargrass Creek Bikeway Trail.

Likely, the greatest benefit and technical justification identified is that the proposed tunnel extension adds a net of 7.0 MG of storage when compared to the proposed basin and stormwater diversion. This additional 7.0 MG will serve two purposes – if everything in the system is operating correctly, the system will achieve a higher level of service than originally planned. More importantly, the additional volume provides overall

system redundancy and a considerable factor of safety if unexpected operating conditions occur to help maintain the overall system target to eliminate or capture and treat 98% of wet weather flows.

Below is a brief summary of the justifications and drivers for the tunnel extension.

- Reduced long-term operation and maintenance costs
- Overall reduction in Present Worth Value, when considering operation and maintenance reduction
- Reduced need for MSD staff to maintain an additional site
- Eliminates risk of crossing under the 60" Water Transmission Main
- Eliminates construction impacts along Grinstead Drive due to the stormwater diversion project
- Provides approximately 7 MG of additional storage for operational flexibility and additional waterway protection.

Below is an overall summary of the approved volumes compared to the expected Tunnel storage volumes.

2018 Waterway Protection Tunnel Extension

Eliminated CSO Basins now consolidated into Waterway Protection Tunnel	IOAP Project Number	CSOs	Level of Control (Overflows per Typical Year)	Waterway Protection Volume Capture Commitments	Expected Waterway Protection Tunnel Volume
13th Street & Rowan Street Storage Basin	L_OR_MF_020 _S_09B_B_A_8	9 CSOs (Weir raises at 3 CSOs remained unchanged)	8	9.8 MG	31.8 MG
Story Avenue & Main Street Storage Basin	L_OR_MF_155 _M_09B_B_A_4	1 CSO	8	8.3 MG	
Lexington Rd & Payne Street Storage Basin	L_SO_MF_083 _M_09B_B_A_8	9 CSOs	0	13.7 MG	
Additional storage based on final tunnel design					3.4 MG
I-64 and Grinstead Road Storage Basin **Elimination requested**	L_MI_MF_127_ M_09B_B_A_8	2 CSOs captured by basin and 1 weir raise	4	8.5 MG	10 MG
		1 CSO partial stormwater diversion from basin		1.5 MG	
Approximate additional storage provided by tunnel extension					7 MG
TOTAL				**41.8 MG**	**52.2 MG**

Both on an individual site level and on a programmatic level, the proposed modifications maintain current levels of control at each CSO as well as maintain the current system-wide residual AAOV when the LTCP is completed in December 2020. The cumulative suite of projects are expected to result in a residual AAOV of 340 MG or less (98% wet weather capture, diversion or separation by volume) during the Typical Year at the completion of the IOAP. The extended Waterway Protection Tunnel will provide wet weather CSO capture and storage of 52.2 MG, which is over 10 MG more than the approved volume summation required to meet level of control for the associated CSOs. This additional volume will provide a contingency and allow MSD to meet its goal for system-wide residual AAOV and percent capture even if existing or future facilities are not functioning based on their design.

For your reference, copies of project fact sheets and maps are provided. The approved 2014 I-64 and Grinstead storage basin project modification letter, fact sheets, and maps are included in Attachment A.

The approved 2016 Ohio River Tunnel minor project modification letter, fact sheets and maps are included in Attachment B. A new project fact sheet and map addressing the extended Waterway Protection Tunnel project consistent with this new project modification request have been provided in Attachment C.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have questions or need additional information, please contact me at (502) 540-6136.

Sincerely,

Angela Akridge, P.E.
Chief Engineer

cc: J. Parrot P. Purifoy

sbl. X:\Data\IOAP\2014 IOAP\2014 Modification\Mod Letters\August 2018 Minor Mod Letters

Attachments

2018 Minor Modification Request

Attachment A

Louisville and Jefferson County Metropolitan Sewer District
700 West Liberty Street
Louisville Kentucky 40203-1911
502-540-6000
www.msdlouky.org

April 30, 2014

Chief, Environmental Enforcement Section
Environmental and Natural Resources Division
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Jeff Cummins, Acting Director
Division of Enforcement
Department for Environmental Protection
300 Fair Oaks Lane
Frankfort, KY 40601

Chief, Water Programs Enforcement Branch
Water Management Program
US EPA Region 4
Atlanta Federal Center
61 Forsyth Street SW
Atlanta, GA 30303

Subject: I-64 and Grinstead Drive Storage Basin
Minor Project Modification
IOAP Project No. L_MI_MF_127_M_09B_B_A_8
DOJ Case No. 90-5-1-1-08254

Attention Chiefs and Director:

MSD is requesting approval of a proposed minor project modification to the I-64 and Grinstead Drive Storage Basin project (IOAP Project No. L_MI_MF_127_M_09B_B_A_8). This request is a revision to the request provided in our letter dated September 20, 2012. This modification is part of the ongoing adaptive management review of the approved 2009 IOAP that has been documented in the 2012 IOAP Modification to be formally submitted in 2014.

2009 IOAP Project Description

The original I-64 & Grinstead Drive Basin project involved the construction of a 2.74 million gallon (MG) storage basin to be completed by December 31, 2014, with an 8 overflows per typical year level of control.

2012 Project Modification Request

The project modification proposed in 2012 involved the construction of a 15.33 MG storage basin to be completed by December 31, 2020, with a 4 overflows per typical year level of control. Given the significant increase in proposed size, moving the scheduled completion to 2020 was proposed to allow for the incorporation of stormwater diversions and green infrastructure to be evaluated as a way to reduce the basin size.

2014 Project Modification Request

The project modification request includes adjusting the basin size to 8.5 million gallons and adding a stormwater interceptor line along Grinstead Drive, allowing disconnection of existing storm sewers that currently drain 123 acres and discharge into the combined sewer system. As further enhancements to the project, MSD proposes adding green infrastructure principles and stream restoration in the flood plain, performing downspout disconnections and sewer redirections of properties in the Kennedy Avenue area, and providing green infrastructure incentives for private property stormwater disconnections along Grinstead Drive.

The primary CSO control mechanisms proposed are the storage basin and the storm sewer disconnections. The green infrastructure and stream restoration proposed is intended to mitigate the potential for increased stormwater peak flows into Beargrass Creek and its tributaries. The downspout disconnections and green infrastructure incentives described are enhancements to the basic CSO control approach that will provide additional overflow reduction, but are not required to achieve the targeted overflow level of control, which remains at 4 overflows per year per the 2012 modification request. The proposed completion date remains at December 31, 2020, per the 2012 modification request.

These modifications are part of the ongoing adaptive management review of the approved 2009 IOAP. Additional sewer system monitoring, hydraulic modeling recalibration and enhancements to the physical representation of the sewer system resulted in a redistribution of the flow in individual sewer lines, thus affecting project approach and sizing in some cases. This and all future proposed change will be justified in detail through minor modification letters addressing benefits, costs and program implementation refinements required.

Technical Justification

Since the 2009 IOAP submittal, additional flow monitors have been installed in the system and on the overflow structures. Detailed topographic surveys were conducted at many of the CSO structures. Furthermore, the drainage boundary and connectivity of the upstream areas was revised and validated using additional desktop features and field reconnaissance. The combined sewer system model was updated with the new data and re-calibrated based on the data from the additional flow monitors.

Additionally, the public requested that the use of green infrastructure be considered in this area in conjunction with gray infrastructure. Based on this request, MSD evaluated both stormwater diversions and green infrastructure to determine if they could be used to cost-effectively reduce the basin size.

A detailed evaluation of the basin identified a large area with separate stormwater systems discharging into the combined sewer system. Hydrologic and hydraulic modeling showed that these connections could be re-piped to discharge directly to surface water tributaries of Beargrass Creek, thereby reducing the basin size to 8.5 million gallons while still maintaining the 4 overflows per year level of control proposed in 2012. The evaluation also identified opportunities to increase the disconnection of downspouts, and

providing green infrastructure incentives to property owners in the basin providing a further reduction in overflow volume beyond that required to achieve 4 overflows per year in the typical year.

For your reference, a copy of the project fact sheet and map from the 2012 modification request are in Attachment A. New project fact sheets and maps addressing this new project modification request have been provided in Attachment B.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have questions or need additional information, please contact me at (502) 540-6000.

Sincerely,

Angela L. Akridge, PE
Regulatory Services Director

cc: G. Heitzman P. Purifoy

Attachments

Attachment A

CSO Project Fact Sheet
2012 IOAP Project Modification

Project Name: I-64 and Grinstead Drive Storage Basin

Project Type: Off-Line Storage

Rec Stream: Middle Fork Beargrass Creek

Project Description: This project is to provide a 15.33 MG off-line storage facility consisting of a covered concrete basin for CSO125, 126, 127 & 166 to reduce overflows to 4 overflows per typical year. The facility will be a gravity in-pump out operation. Extensive evaluation of stormwater diversion away from the combined sewer system and into green infrastructure practices is currently underway, with a high probability that the basin size can be reduced through these diversion. Project will be "right-sized" using a green/gray optimization approach.

Design Assumption: No backflow from Beargrass Creek is accounted for in model. Flapgates may need to be analyzed. Direct runoff from I-64 into outfall pipes is currently included in basin size. Separation may reduce basin size if cost effective. CSO 126 likely will be conveyed directly under I-64.

Capital Cost: $48,591,000

Capital Benefit/Cost: 17.73

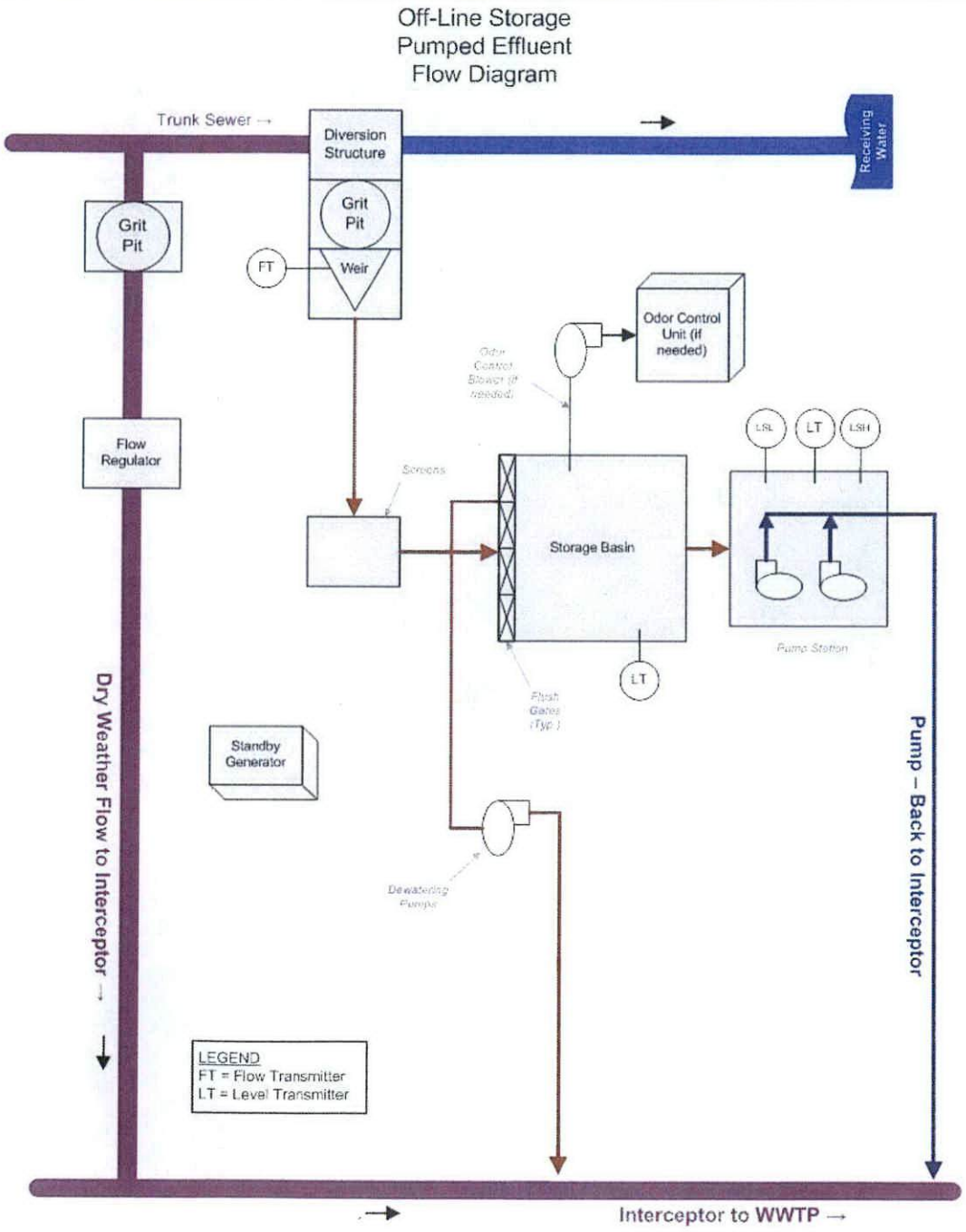
Present Worth Benefit Cost: 19.25

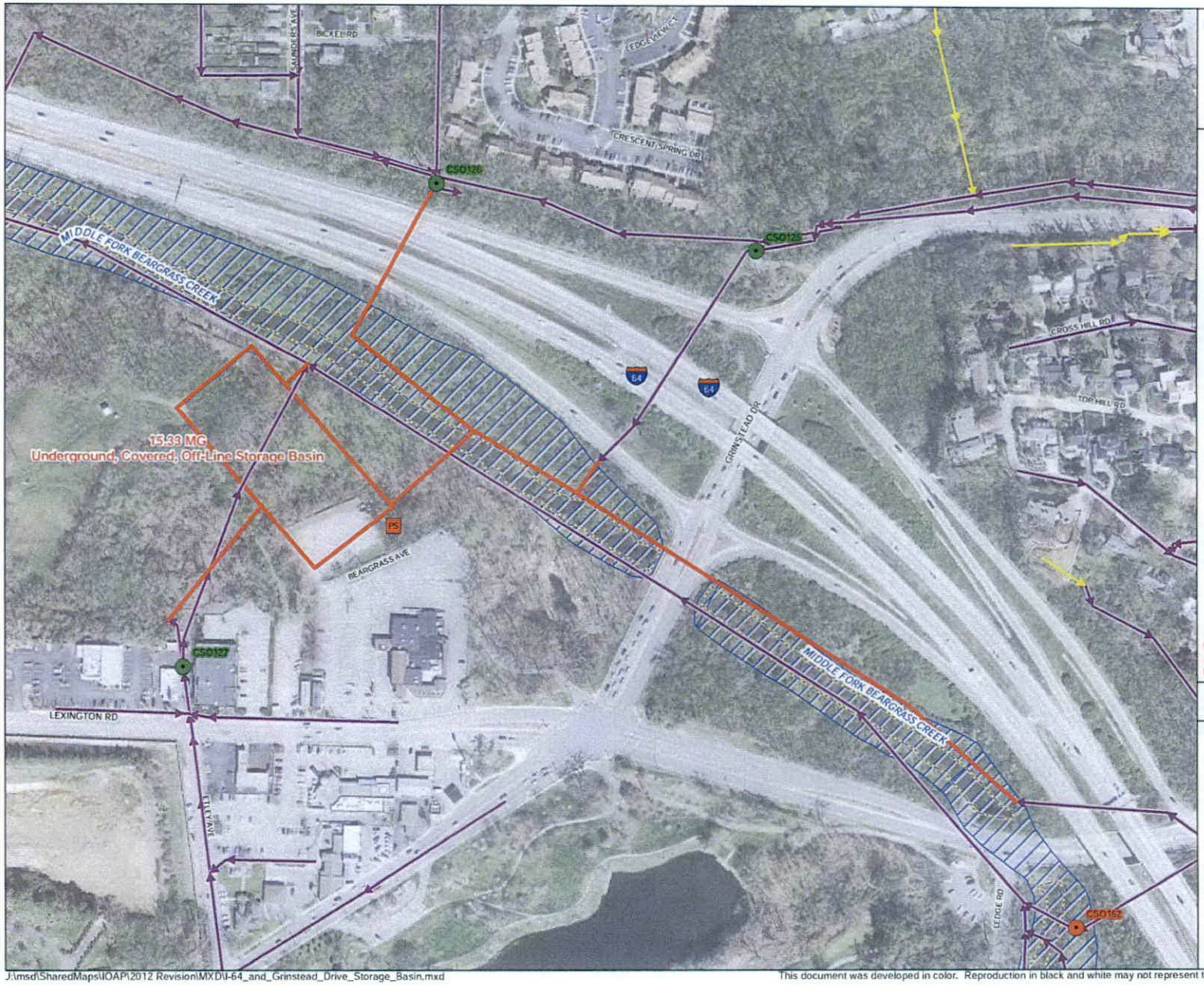
		Existing May 2012[1]		Baseline May 2012[2]	
CSO	CSO Name	Avg. Annual Overflow Volume	Avg. Annual Frequency	Avg. Annual Overflow Volume	Avg. Annual Frequency
CSO125	REG NO 24 - GRINSTEAD DR	201.71	57	200.36	57
CSO126	REG NO 26 - RAYMOND AVE	5.55	27	3.93	24
CSO127	ETLEY AVENUE	9.71	30	9.40	30
CSO166	BEALS BRANCH SAN DIV	64.66	36	62.36	36

1. Existing May 2012 conditions reflect existing system operating conditions as of that date.

2. Baseline May 2012 assumes all SSDP projects are complete and critical combined sewer facilities (e.g. Morris Forman WQTC Southwestern Pump Station, Starkey Pump Station) are operating at optimal, sustainable levels.

CSO LTCP
Project Fact Sheet





Integrated Overflow Abatement Plan

Vol. 2 - Final CSO Long Term Control Plan

Middle Fork Beargrass Creek

I-64 and Grinstead Drive Storage Basin

Preliminary - For Budget Development Only

- Active CSO
- Eliminated CSO
- Proposed Pump Station Solution
- Pump Stations
- Proposed Pipe Solution
- Combined Sewer Pipe
- Force Main
- Collector < 12"
- Interceptor >= 12"
- Streams
- Proposed Storage Solution
- Floodway
- Jefferson County Boundary

General representation of overflow abatement solutions are for preliminary planning purposes. Alignments and locations may be altered during design.

1 inch = 200 feet	N	Aerial Date: 2009	Map Revision: April 9, 2012

J:\msd\SharedMaps\IOAP\2012 Revision\MXD\I-64_and_Grinstead_Drive_Storage_Basin.mxd

This document was developed in color. Reproduction in black and white may not represent the data as intended. Scalable when printed on 11"x17" paper.

Attachment B

MSD Metropolitan Sewer District

CSO Project Fact Sheet
2012 IOAP Project Modification

PROJECT WIN Waterway Improvements Now

Project Name: I-64 and Grinstead Drive Storage Basin

Project Number: L_MI_MF_127_M_09B_B_A_8

Project Type: Off-Line Storage

Rec Stream: Middle Fork Beargrass Creek

Project Description: This project is to provide a 8.5 MG off-line storage facility consisting of a covered concrete basin for CSO125, 126, 127 & 166 to reduce overflows to 4 overflows per typical year. The facility will be a gravity in-pump out operation. A significant stormwater diversion away from the combined sewer system is also proposed.

Design Assumption: No backflow from Beargrass Creek is accounted for in model. Flapgates may need to be analyzed. Direct runoff from I-64 into outfall pipes is currently included in basin size. Separation may reduce basin size if cost effective. CSO 126 likely will be conveyed directly under I-64.

Capital Cost: $38,590,000

Capital Benefit/Cost: 17.73

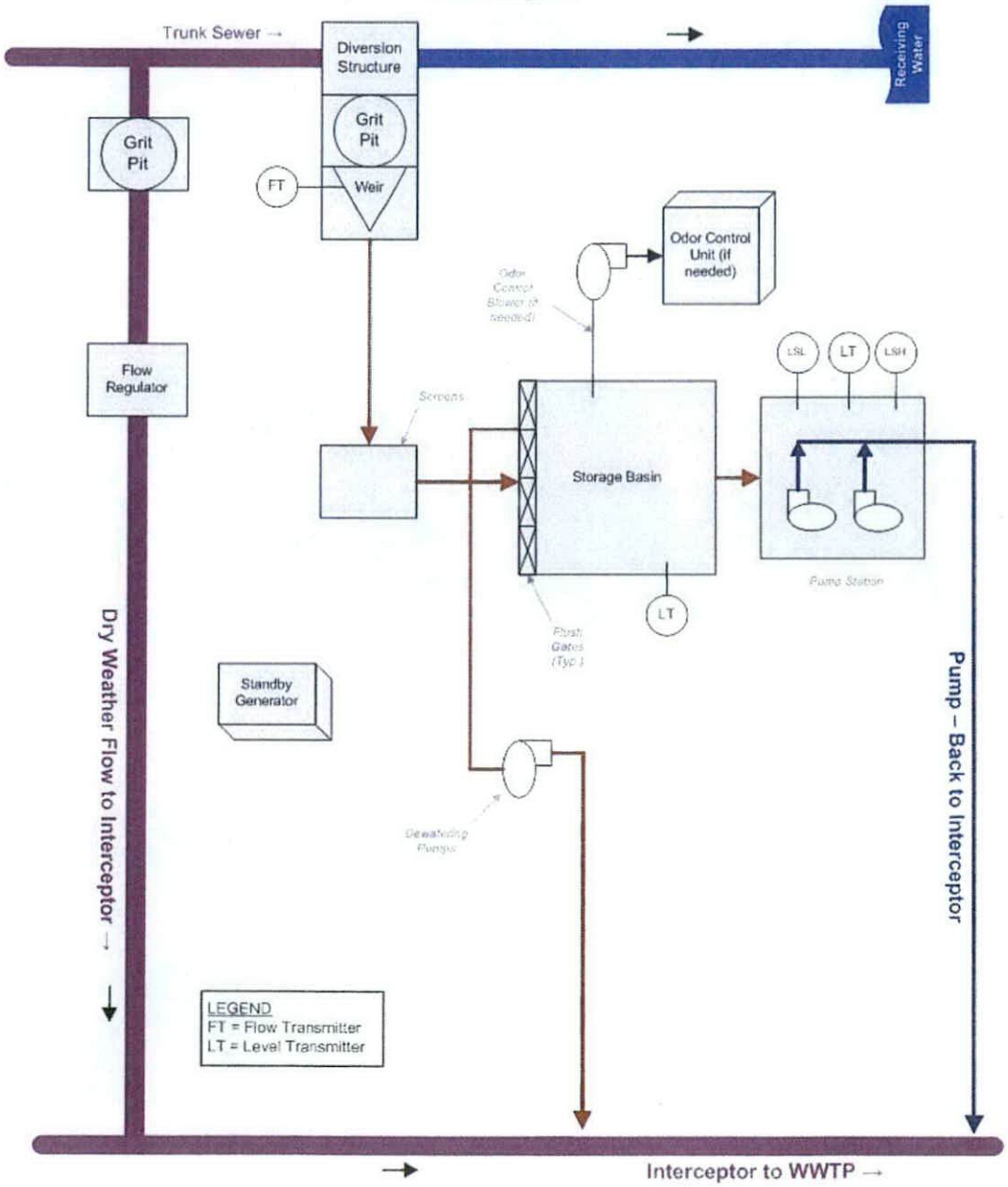
Present Worth Benefit Cost: 19.25

		Existing May 2012[1]		Baseline May 2012[2]	
CSO	CSO Name	Avg. Annual Overflow Volume	Avg. Annual Frequency	Avg. Annual Overflow Volume	Avg. Annual Frequency
CSO125	REG NO 24 - GRINSTEAD DR	201.71	57	200.36	57
CSO126	REG NO 26 - RAYMOND AVE	5.55	27	3.93	24
CSO127	ETLEY AVENUE	9.71	30	9.40	30
CSO166	BEALS BRANCH SAN DIV	64.66	36	62.36	36

1. Existing May 2012 conditions reflect existing system operating conditions as of that date.

2. Baseline May 2012 assumes all SSDP projects are complete and critical combined sewer facilities (e.g. Morris Forman WQTC Southwestern Pump Station, Starkey Pump Station) are operating at optimal, sustainable levels.

Off-Line Storage
Pumped Effluent
Flow Diagram



Integrated Overflow Abatement Plan

Vol. 2 - Final CSO Long Term Control Plan

Middle Fork Beargrass Creek

I-64 and Grinstead Drive Storage Basin

Preliminary - For Budget Development Only

- Active CSO
- Eliminated CSO
- Proposed Pump Station Solution
- Pump Stations
- Proposed Pipe Solution
- Combined Sewer Pipe
- Force Main
- Collector < 12"
- Interceptor >= 12"
- Streams
- Proposed Storage Solution
- Floodway
- Jefferson County Boundary

General representation of overflow abatement solutions are for preliminary planning purposes. Alignments and locations may be altered during design.

1 inch = 500 feet	N	Aerial Date: 2009	Map Revision: April 14, 2014

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2018 Minor Modification Request

Attachment B

msd
Safe, clean waterways

700 West Liberty Street | Louisville, KY 40203-1911
Phone: 502.540.6000 | LouisvilleMSD.org

October 17, 2016

Chief, Environmental Enforcement Section
Environmental and Natural Resources Division
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Jeff Cummins, Director
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Department for Environmental Protection
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Frankfort, KY 40601

Chief, NPDES Permitting and Enforcement Branch
Water Protection Division
US EPA Region 4
Atlanta Federal Center
61 Forsyth Street SW
Atlanta, GA 30303

Subject: Administrative Correction to the September 27, 2016, Minor Project Modification Letter

DOJ Case No. 90-5-1-1-08254

Attention Chiefs and Director:

It has come to our attention that the recently submitted Minor Project Modification Letter dated September 27, 2016, inadvertently contained an incorrect IOAP project number associated with the Lexington Road and Payne Street Storage Basin. The letter requested approval of a proposed minor project modification to consolidate the following three projects into a single Ohio River Tunnel solution:

13th Street and Rowan Street CSO Storage Basin (L_OR_MF_155_M_09B_B_B_4)
Story Avenue and Main Street Storage Basin (L_OR_MF_020_S_09B_B_A_8)
Lexington Road and Payne Street Storage Basin (L_SO_MF_083_M_09B_B_A_8)

The correct IOAP project number associated with the Lexington Road and Payne Street Storage Basin is listed above, not L_OR_MF_105_M_13_B_A_0, which is the project identification number for the Southwestern Parkway Storage Basin. To correct this oversight, and avoid confusion in the future, we have enclosed a revised submittal, dated October 17, 2016, with the correct IOAP project number reflected in the letter. The Ohio River Tunnel fact sheet (Attachment B) has been revised as well to show the appropriate IOAP project numbers and corresponding CSOs. No other changes were made regarding this submittal.

If you have questions or need additional information, please contact me at (502) 540-6136.

Sincerely,

Angela Akridge, P.E.
Chief Engineer

cc: T. Parrot P. Purifoy

sbl. X:\Data\IOAP\2014 IOAP\2014 Modification\Mod Letters\Oct 2016 Admin Change to Tunnel Mod Letter\Transmittal.docx

msd
Safe, clean waterways

700 West Liberty Street | Louisville, KY 40203-1911
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October 17, 2016

Chief, Environmental Enforcement Section
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Frankfort, KY 40601

Chief, NPDES Permitting and Enforcement Branch
Water Protection Division
US EPA Region 4
Atlanta Federal Center
61 Forsyth Street SW
Atlanta, GA 30303

Subject: Minor Project Modifications
13th Street and Rowan Street CSO Storage Basin
Story Avenue and Main Street CSO Storage Basin
Lexington Road and Payne Street Storage Basin

DOJ Case No. 90-5-1-1-08254

Attention Chiefs and Director:

MSD is requesting approval of a proposed minor project modification to each of the following three projects:

13th Street and Rowan Street CSO Storage Basin (L_OR_MF_155_M_09B_B_B_4)
Story Avenue and Main Street Storage Basin (L_OR_MF_020_S_09B_B_A_8)
Lexington Road and Payne Street Storage Basin (L_OR_MF_083_M_09B_B_A_8)

Over the past decade, MSD has maintained its commitment to achieve full compliance with the Consent Decree mandate. A fundamental strategy adopted early on by MSD has been to continually evaluate results over the life of the 20-year program, explore new technologies, and refine proposed solutions where there are opportunities to achieve environmental benefits paired with cost-savings or other benefits to the community. This adaptive management approach has led MSD to propose numerous modifications in projects over the years based on sound science and cost-benefit analysis. These modifications were subsequently approved by EPA because MSD was able to demonstrate that they continue to meet the ultimate goal of water quality improvement while also honoring the responsibility MSD has to consider community concerns such as affordability and construction impacts.

MSD is currently proposing a project modification that brings significant advantages to the community, and will continue to meet previously committed levels of control, residential Average Annual Overflow Volume (AAOV) and project sizing within the final completion date of December 31, 2020, for the entire suite of Long-Term Control Plan projects. The request to EPA and KDEP involves combining the volume of three individual basin projects into a single deep rock tunnel.

The advantages of the requested modification are significant for the impacted neighborhoods. Concern has been expressed by residents and business owners in the proposed storage basin project areas about the impacts they will experience throughout the multi-year construction duration and the lasting impact these basin facilities would have on their neighborhoods thereafter. Eliminating the storage basins and

replacing them with a deep rock tunnel minimizes the surface structures and surface disturbance durations in the affected neighborhoods. An added benefit of the tunnel is it provides enhanced operational redundancy for the Starkey Pump Station, one of the community's most critical facilities.

This request is part of the ongoing adaptive management review of the approved Integrated Overflow Abatement Plan (IOAP) dated May 2014. None of the proposed modifications impacts previously committed levels of control, residual Average Annual Overflow Volume (AAOV) or project sizing. Similarly, the final completion date of December 31, 2020, for the entire suite of Long Term Control Plan projects is not affected by this request. The unique details of each of the project modification requests are discussed below.

13th Street and Rowan Street Storage Basin

2009 IOAP Project Description

The original 13th and Rowan Storage Basin project involved the construction of a 14.44 MG storage basin to be completed by December 31, 2020, with a level of control of eight overflows per Typical Year. The original project also included 11 Central Relief Drain (CRD) CSOs.

2012 IOAP Modification

After the system-wide recalibration of the hydraulic model completed in 2010, the benefit cost analysis to justify project sizing and LOC was repeated. Additionally, a separate Green Infrastructure, In-line Storage, and Distribution project was created for the 11 CRD CSOs. The level of control analysis based on the benefit cost evaluation determined that the project level of control should be eight overflows per Typical Year. As a result of all of these changes, the basin size decreased from 14.4 MG to 4.4 MG. This was the basin size included in the approved 2012 IOAP Modification dated May 2014. The completion date remained December 31, 2020.

2015 Basin Balancing Project Modification Request

As part of the adaptive management approach outlined in the IOAP, MSD submitted a programmatic justification for proposed modifications to five IOAP projects. While the benefit cost methodology indicated that one basin (Southwestern Parkway Storage Basin) should be designed for eight overflows per Typical Year (compared to the existing level of control of zero overflows per Typical Year), optimization of basin sizes for four other projects offset the resulting higher AAOV at the Southwestern Parkway Storage Basin. Affected projects included the Portland Wharf, 13th Street and Rowan Street, Story Avenue and Main Street, and Lexington Road and Payne Street Storage Basins. The combined suite of five proposed modifications achieved a slightly lower programmatic residual AAOV with greater benefit to the community and environment. The table below presents the basin sizes that resulted from the AAOV optimization analysis. The suite of minor modifications corresponded to a residual AAOV of 340 MG per Typical Year, which was less than the 343 MG residual AAOV calculated for the 2012 IOAP Modification, and over 200 MG less than the residual AAOV calculated in the approved IOAP dated September 2009.

Project Optimization Analysis – Storage Basin Resizing

Project Name	2012 IOAP Modification		2015 Minor Modification	
	Basin Volume (MG)	Overflows in Typical Year	Basin Volume (MG)	Overflows in Typical Year
Portland Wharf Storage Basin	6.4	8	6.7	8
13th Street and Rowan Street Storage Basin	4.4	8	9.8	8
Story Avenue and Main Street Storage Basin	5.4	8	8.3	8
Lexington Road and Payne Street Storage Basin	8.2	0	13.7	0
Southwestern Parkway Storage Basin	11.1	0	20.0	8

2016 Project Modification Request

Replacement of underground storage basin with a tunnel along the Ohio River. See Ohio River Tunnel project description below for additional information.

Story Avenue and Main Street Storage Basin

2009 IOAP Project Description

The original Story Avenue and Main Street Storage Basin project involved the construction of a 0.13 MG storage basin to be completed by December 31, 2013, with a level of control of eight overflows per Typical Year.

2012 IOAP Modification

After the system-wide recalibration of the hydraulic model completed in 2010, the benefit cost analysis to justify project sizing and LOC was repeated. As a result of all of these changes, the basin size increased from 0.13 MG to 5.4 MG. Given the significant increase in proposed size, moving the scheduled completion to 2020 was proposed, and accepted in the approved IOAP dated May 2014. This was the basin size included in the approved 2012 IOAP Modification dated May 2014.

2015 Basin Balancing Project Modification Request

See summary above for 13th Street and Rowan Street Storage Basin

2016 Project Modification Request

Replacement of underground storage basin with a tunnel along the Ohio River. See Ohio River Tunnel project description below for additional information.

Lexington Road and Payne Street Storage Basin

2009 IOAP Project Description

The original Lexington Road and Payne Street Storage Basin project involved the construction of a 7.31 MG storage basin to be completed by December 31, 2020, with a level of control of zero overflows per Typical Year.

2012 IOAP Modification

After the system-wide recalibration of the hydraulic model completed in 2010, the benefit cost analysis to justify project sizing and LOC was repeated. The level of control analysis based on the benefit cost evaluation determined that the project level of control should be zero overflows per Typical Year. As a result of all of these changes, the basin size increased from 7.3 MG to 8.2 MG. This was the basin size included in the approved 2012 IOAP Modification dated May 2014. The completion date remained December 31, 2020.

2015 Basin Balancing Project Modification Request

See summary above for 13th Street and Rowan Street Storage Basin

2016 Project Modification Request

Replacement of underground storage basin with a tunnel along the Ohio River. See Ohio River Tunnel project description below for additional information.

Ohio River Tunnel Project

This project modification request involves combining the volume of three CSO abatement projects (13th Street and Rowan Street, Story Avenue and Main Street, and Lexington Road and Payne Street Storage Basins) and modifying the design method from individual basins to a single deep rock tunnel consolidated solution. The proposed tunnel will be a minimum of 20 feet in diameter and extend approximately 13,200 feet east along the Ohio River from the intersection of 12th Street and Rowan Street.

The CSOs associated with the tunnel are broken into three different project areas which under the initial IOAP were addressed by the 13th Street and Rowan Street, Story Avenue and Main Street, and Lexington Road and Payne Street Storage Basins. Each of the project areas below will discharge to this common tunnel. The Ohio River Tunnel Project replaces the previously mentioned basins and consolidates their individual approved storage volumes into a single tunnel solution.

A total CSO volume of 31.8 MG will be captured at 19 CSOs, each at the level of control approved following the 2015 Basin Balancing Project Modification Request. Three CSOs (022, 023, and 058) where level of control of eight overflows per Typical Year is met via weir modifications will remain unchanged. This modification request allows for a consolidated tunnel solution with a storage volume equivalent to the sum of the storage basin volumes listed below, which effectively eliminates the need for individual basin solutions. The completion date for the tunnel is planned for December 31, 2020, consistent with the approved 2012 IOAP Modification schedule for the three basins.

CSO Basin Consolidation – Ohio River Tunnel

Project Name	2012 IOAP Modification		2015 Minor Modification Request	
	Basin Volume (MG)	Overflows in Typical Year	Basin Volume (MG)	Overflows in Typical Year
13th Street and Rowan Street Storage Basin	4.4	8	9.8	8
Story Avenue and Main Street Storage Basin	5.4	8	8.3	8
Lexington Road and Payne Street Storage Basin	8.2	0	13.7	0

Modification Drivers and Technical Justification

Many factors have influenced changing the design of three individual storage basin projects to in-line storage along Louisville's waterfront via a deep-rock tunnel. A primary driver has been public opposition to the above-ground storage tank under design for Story and Main. Following public meetings with adamant resistance and close coordination with the neighborhood stakeholder group, MSD evaluated the cost to burying the basin. Because it is on the wet side of the flood wall, structural improvements to keep the basin from floating under flood conditions would require approximately $15 million in additional construction costs. Considering this amount in the total cost for the three basins, costs were comparable to those for the deep rock tunnel alternative.

The greatest benefit and technical justification identified is the operational redundancy that an Ohio River Tunnel alternative will provide for Starkey Pump Station where CSO 020 is located. As one of MSD's most critical facilities, maintaining and operating this station on a regular basis is a high priority. The tunnel alternative would allow storage capacity on dry weather days to divert flow if maintenance or critical repairs were necessary.

Justification as well as additional drivers that have contributed to the project modification are listed below.

- Operational benefits and redundancy at Starkey Pump Station
- Anticipated construction challenges for 13th and Rowan interceptor micro-tunnel including interference with utilities and building foundations along Main Street
- Potentially prohibitive economic losses associated with interceptor along Main Street
- Public opposition to above-grade CSO storage basins

Overall Summary

Below is a summary table summarizing the changes for each of the projects.

2016 Modification Request – Ohio River Tunnel Summary

Project Name	IOAP Project Number	Modification Request	Discussion
13th Street and Rowan Street Storage Basin	L_OR_MF_155_M_09B_B_B_4	Revise design to tunnel solution that consolidates CSO controls for13th and Rowan, Lexington and Payne, and Story and Main Storage Basins	Tunnel capacity will allow a level of control of eight overflows per Typical Year for 9 CSOs. Weir raises (level of control of eight) at 3 CSOs will remain unchanged
Story Avenue and Main Street Storage Basin	L_OR_MF_020_S_09B_B_A_8	Eliminate Story Avenue and Main Street Storage Basin project	Tunnel capacity will allow a level of control of eight overflows per Typical Year for 1 CSO.
Lexington Road and Payne Street Storage Basin	L_OR_MF_083_M_09B_B_A_8	Eliminate Lexington Road and Payne Street Storage Basin project	Tunnel capacity will allow a level of control of zero overflows per Typical Year for 9 CSOs.

Both on an individual site level and on a system wide level, the proposed modifications will have no impact to the levels of control at each site or residual AAOV for the entire system at the target completion date of 2020. The cumulative suite of projects will still result in a residual AAOV of 340 MG or less during the Typical Year at the completion of the project.

For your reference, copies of project fact sheets and maps are provided. The project fact sheets and maps for 13th Street and Rowan Street, Story Avenue and Main Street, and Lexington Road and Payne Street Storage Basins from the recently approved 2015 Basin Balancing Minor Project Modification are included in Attachment A. A new project fact sheet and map addressing the Ohio River Tunnel project consistent with this new project modification request have been provided in Attachment B.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have questions or need additional information, please contact me at (502) 540-6136.

Sincerely,

Angela Akridge, P.E.
Chief Engineer

cc: T. Parrot P. Purifoy

sbl. X:\Data\IOAP\2014 IOAP\2014 Modification\Mod Letters\ Tunnel Minor Mod Letter – 2016_10_17.docx

Attachments

Attachment A

CSO Project Fact Sheet
2015 IOAP Project Modification

Project Name: 13th Street and Rowan Street Storage Basin

Project Number: L_OR_MF_155_M_09B_B_B_4

Project Type: Off-Line Storage

Rec Stream: Ohio River

Project Description: This project includes a large conveyance line from multiple CSOs and 9.8 MG underground covered concrete basin to reduce overflows to 8 overflows per typical year. This project also includes weir modifications to CSO 023 and 058. Two routes and costs for the conveyance line have been identified. The first route involves micro-tunnelling along Main Street, and the alternate route involves traditional open cut sewer installation along River Road. A right-sizing analysis may be used to potentially reduce the size of the basins or eliminate some of the conveyance lines.

Design Assumption: Conveyance line along Main Street will be able to stay under existing utilities and over existing stormwater outfall lines. All CSOs are connected to the conveyance line near the weir, and no overflow pipes are used for conveyance due to the potential of additional direct stormwater runoff.

Capital Cost: $30,863,000

Capital Benefit/Cost: 40.71

Present Worth Benefit Cost: 51.31

		Existing May 2012[1]		Baseline May 2012[2]	
CSO	CSO Name	Avg. Annual Overflow Volume	Avg. Annual Frequency	Avg. Annual Overflow Volume	Avg. Annual Frequency
CSO022	FOURTH ST PS	3.13	7	3.13	7
CSO023	ORI @ 4th ST PS	3.95	6	16.15	15
CSO050	12th STREET	8.58	30	15.13	32
CSO051	11th STREET	1.18	13	1.89	15
CSO052	10th STREET	2.51	18	4.31	25
CSO053	8th STREET	4.62	38	4.62	38
CSO054	7th STREET	0.72	12	1.54	18
CSO055	6th STREET	2.66	14	6.53	21
CSO056	5th STREET	1.41	11	1.96	13
CSO058	PRESTON ST OVFL WEIR	1.29	13	69.55	51
CSO150	8th ST @ COMMON PLACE	0.86	14	1.88	21
CSO155	ROWAN ST @ 12th ST	2.36	38	2.36	38

1. Existing May 2012 conditions reflect existing system operating conditions as of that date.

2. Baseline May 2012 assumes all SSDP projects are complete and critical combined sewer facilities (e.g. Morris Forman WQTC Southwestern Pump Station, Starkey Pump Station) are operating at optimal, sustainable levels.

Integrated Overflow Abatement Plan

Vol. 2 - Final CSO Long Term Control Plan

Ohio River

N 13th St and Rowan St Storage Basin

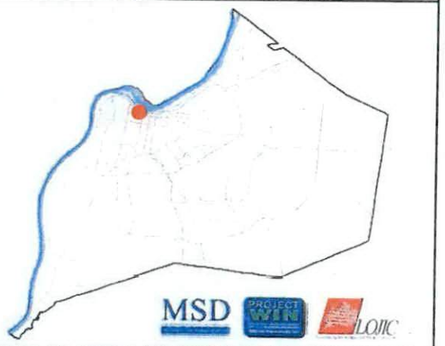
Preliminary - For Budget Development Only

9.8 MG
Underground, Covered,
Off-Line Storage Basin

- Active CSO
- Eliminated CSO
- Proposed Pump Station Solution
- Pump Stations
- Proposed Pipe Solution
- Combined Sewer Pipe
- Force Main
- Collector < 12"
- Interceptor >= 12"
- Drainage Mains
- Proposed Storage Solution
- Streams
- Floodway
- Jefferson County Boundary

General representation of overflow abatement solutions are for preliminary planning purposes. Alignments and locations may be altered during design.

1 inch = 400 feet	N	Aerial Date: 2012	Map Revision: June 19,2015



J:\msd\SharedMaps\IOAP\2012 Revision\MXD\13thSt_and_RowanSt_Storage_Basin.mxd

This document was developed in color. Reproduction in black and white may not represent the data as intended. Scalable when printed on 11"x17" paper.

CSO Project Fact Sheet
2015 IOAP Project Modification

Project Name: Story Avenue and Main Street Storage Basin

Project Number: L_OR_MF_020_S_09B_B_A_8

Project Type: Off-Line Storage

Rec Stream: Ohio River

Project Description: This project includes the construction of a 8.3 MG off-line underground covered storage basin for CSO020 to reduce overflows to 8 overflows per typical year. Project assumes that the Starkey Pump Station has a typical, minimum pumping rate of 108 MGD. Additional storage or a higher pump-out rate may be added if deemed advantageous to operational and maintenance flexibility as well as impacts to other downstream CSO control projects.

Design Assumption: Basins are designed to the 9th overflow event volume, resulting in 8 CSO overflows per typical year. Type of basin based on hydraulics and surroundings. Starkey PS must be able to maintain a minimum pumping rate of 108 MGD.

Capital Cost: $17,570,000

Capital Benefit/Cost: 18.78

Present Worth Benefit Cost: 20.37

		Existing May 2012[1]		Baseline May 2012[2]	
CSO	CSO Name	Avg. Annual Overflow Volume	Avg. Annual Frequency	Avg. Annual Overflow Volume	Avg. Annual Frequency
CSO020	BUCHANAN PS	436.87	51	143.94	37

1. Existing May 2012 conditions reflect existing system operating conditions as of that date.

2. Baseline May 2012 assumes all SSDP projects are complete and critical combined sewer facilities (e.g. Morris Forman WQTC Southwestern Pump Station, Starkey Pump Station) are operating at optimal, sustainable levels.

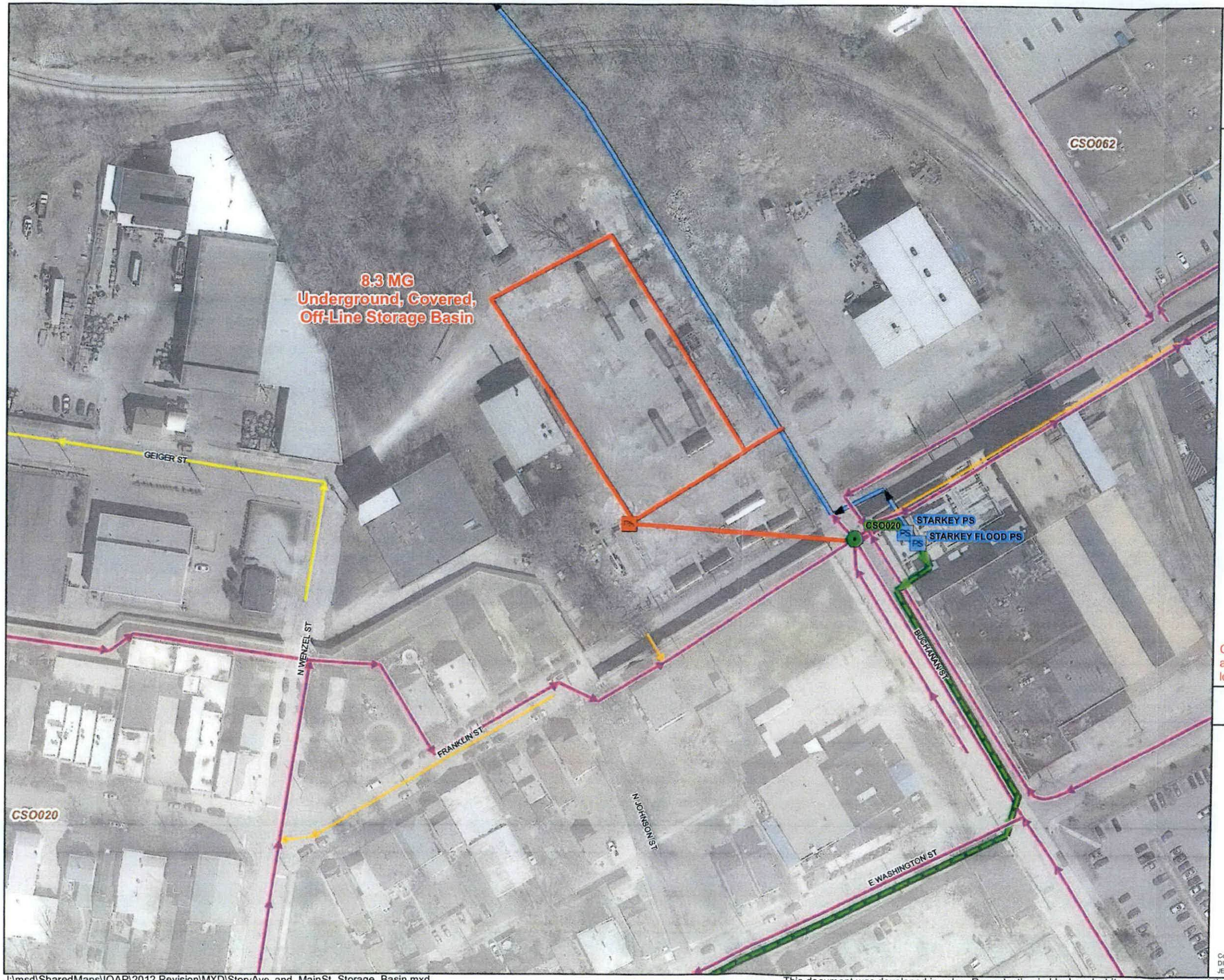
Integrated Overflow Abatement Plan

Vol. 2 - Final CSO Long Term Control Plan

Ohio River

Story Ave & Main St Storage Basin

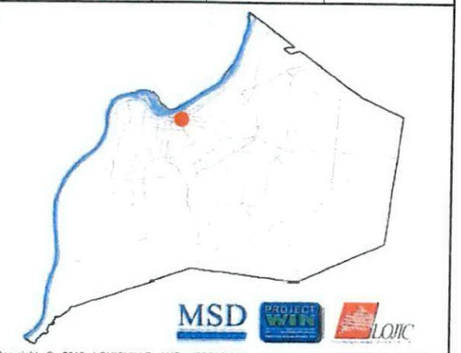
Preliminary - For Budget Development Only



- Active CSO
- Eliminated CSO
- Proposed Pump Station Solution
- Pump Stations
- Proposed Pipe Solution
- Combined Sewer Pipe
- Force Main
- Collector < 12"
- Interceptor >= 12"
- Drainage Mains
- Proposed Storage Solution
- Streams
- Floodway
- Jefferson County Boundary

General representation of overflow abatement solutions are for preliminary planning purposes. Alignments and locations may be altered during design.

1 inch = 100 feet	N	Aerial Date: 2012	Map Revision: June 19,2015



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CSO Project Fact Sheet
2015 IOAP Project Modification

Project Name: Lexington Road and Payne Street Storage Basin

Project Number: L_SO_MF_083_M_09B_B_A_8

Project Type: Off-Line Storage

Rec Stream: South Fork Beargrass Creek

Project Description: This project includes an 13.7 MG off-line covered storage basin for CSO083, 84, 118, 119, 120, 121, 141, 153 & 082 to reduce overflows to zero overflows per typical year. The basin will require an 13.7 MGD PS to return the stored flow to the interceptor.

Design Assumption: Basins are designed to the largest overflow event volume, resulting in zero CSO overflows in a typical year. The peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.

Capital Cost: $30,090,000

Capital Benefit/Cost: 67.61

Present Worth Benefit Cost: 75.16

		Existing May 2012[1]		Baseline May 2012[2]	
CSO	CSO Name	Avg. Annual Overflow Volume	Avg. Annual Frequency	Avg. Annual Overflow Volume	Avg. Annual Frequency
CSO082	BGI AT BGC	25.31	39	7.11	31
CSO083	BRENT ST & BROADWAY CONNECT	0.00	0	0.00	0
CSO084	BRENT ST @ BGC	3.27	18	3.26	18
CSO118	REG NO 15 - E BRDWY	41.27	33	38.88	33
CSO119	BRENT STREET SEWER	4.24	29	4.02	29
CSO120	PHOENIX HILL SEWER	15.51	51	15.36	52
CSO121	REG NO 18 - GREEN ST	1.06	6	0.92	6
CSO141	BAXTER AVE @ BGC	0.36	38	0.36	38
CSO153	COOPER STREET	9.72	47	8.63	46

1. Existing May 2012 conditions reflect existing system operating conditions as of that date.

2. Baseline May 2012 assumes all SSDP projects are complete and critical combined sewer facilities (e.g. Morris Forman WQTC Southwestern Pump Station, Starkey Pump Station) are operating at optimal, sustainable levels.

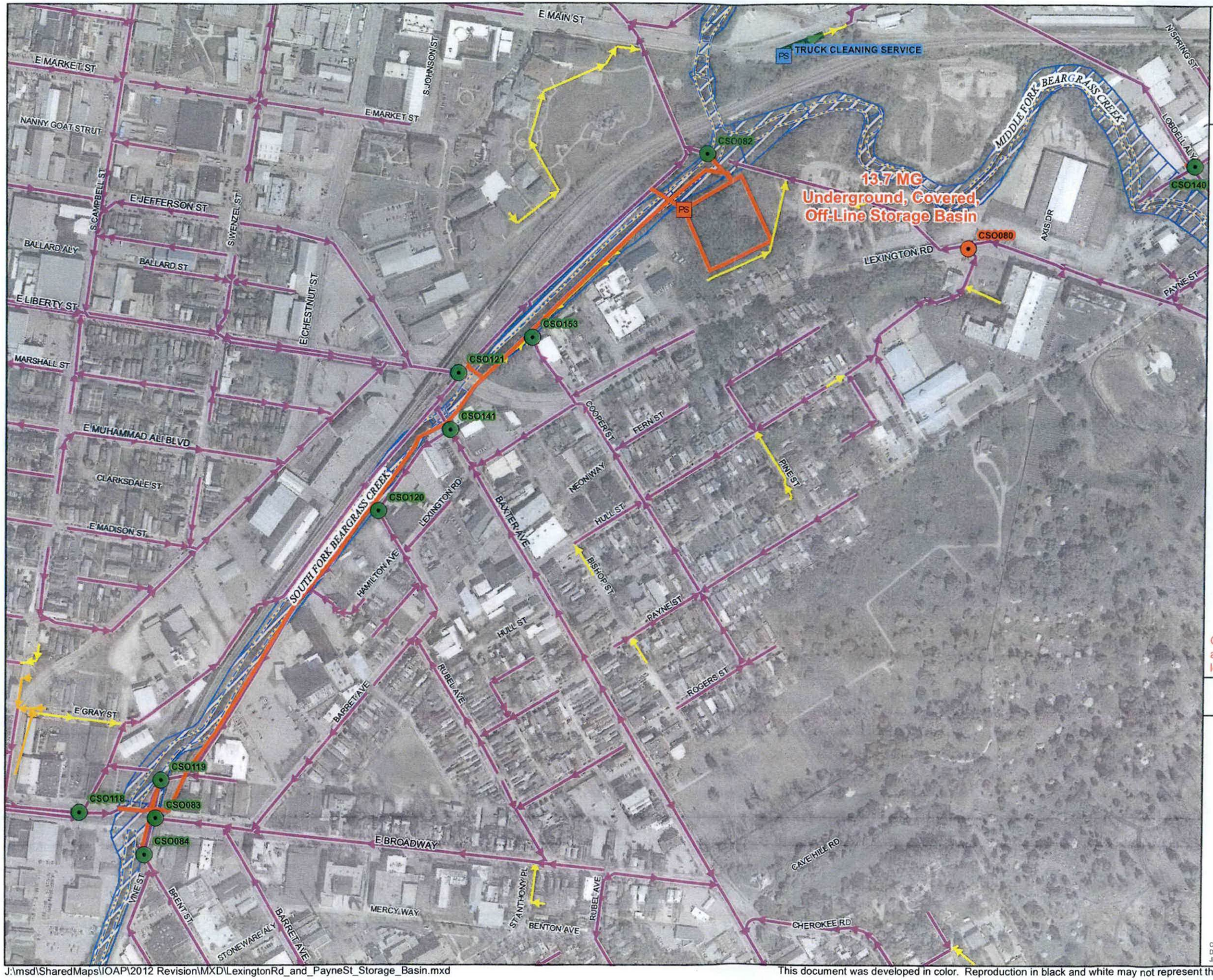
Integrated Overflow Abatement Plan

Vol. 2 - Final CSO Long Term Control Plan

South Fork Beargrass Creek

Lexington Rd and Payne St Storage Basin

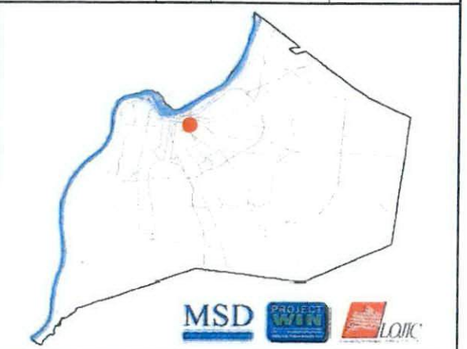
Preliminary - For Budget Development Only



- Active CSO
- Eliminated CSO
- Proposed Pump Station Solution
- Pump Stations
- Proposed Pipe Solution
- Combined Sewer Pipe
- Force Main
- Collector < 12"
- Interceptor >= 12"
- Drainage Mains
- Proposed Storage Solution
- Streams
- Floodway
- Jefferson County Boundary

General representation of overflow abatement solutions are for preliminary planning purposes. Alignments and locations may be altered during design.

1 inch = 400 feet	N	Aerial Date: 2012	Map Revision: June 19,2015



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Attachment B

CSO Project Fact Sheet
2016 IOAP Project Modification

Project Name: Ohio River Tunnel

Project Number: L_OR_MF_155_M_09B_B_B_4, L_OR_MF_020_S_09B_B_A_8, and L_SO_MF_083_M_09B_B_A_8

Project Type: Offline Storage

Rec Stream: Ohio River/Beargrass Creek

Project Description: An in-line storage tunnel along the Ohio River with a minimum storage volume of 31.8 million gallons. This will include the construction of approximately 13,200 LF of deep rock tunnel with a minimum diameter of 20 feet. The project will also require a pump station to return stored flows back to the Ohio River Interceptor. The CSOs associated with the tunnel are broken into three different project areas which under the initial IOAP were addressed by the 13th Street and Rowan Street, Story Avenue and Main Street, and Lexington Road and Payne Street Storage Basins. Each of the project areas below will discharge to this common tunnel. The Ohio River Tunnel Project replaces the previously mentioned basins and consolidates their individual approved storage volumes into a single tunnel solution.
13th/Rowan Project Area (L_OR_MF_155_M_09B_B_B_4) – Conveyance lines and interceptors will be constructed, as necessary, to connect individual CSOs along the Main Street corridor to the tunnel. Additionally, the project also includes weir modifications to CSOs 022, 023, 058. CSOs in this area will maintain a level of control of 8 overflows per Typical Year.
Story/Main Project Area (L_OR_MF_020_S_09B_B_A_8) – A conveyance line to a drop shaft will be constructed to connect CSO0020 to the Ohio River Tunnel. The CSO in this area will maintain a level of control of 8 overflows per Typical Year.
Lexington/Payne Project Area (L_SO_MF_083_M_09B_B_A_8) – An interceptor and conveyance lines along Beargrass Creek will be constructed to connect the CSOs from the Lexington/Payne project area. The interceptor will terminate at a drop shaft into the Ohio River Tunnel. CSOs in this area will maintain a level of control of 0 overflows per Typical Year.

Design Assumption: The project assumes connections to the CSOs will be made in the vicinity downstream of existing CSO overflow structures. Overflow lines cannot be used for conveyance due to additional direct stormwater runoff and Ohio River Flooding. The design of the facilities must be coordinate with MSD flood protection needs. Real time control will be implemented in the 13th/Rowan and CSO020 conveyance lines to manage inflows into the tunnel.

Capital Cost: $143,000,000

Capital Benefit/Cost:

Present Worth Benefit Cost:

		Existing May 2012[1]		Baseline May 2012[2]	
CSO	CSO Name	Avg. Annual Overflow Volume	Avg. Annual Frequency	Avg. Annual Overflow Volume	Avg. Annual Frequency
CSO020	BUCHANAN PS	355.00	74	294.00	71
CSO022	FOURTH ST PS	4.50	16	4.50	16
CSO023	ORI @ 4th ST PS	1.80	8	4.70	9
CSO050	12th STREET	19.60	55	22.50	55
CSO051	11th STREET	0.30	8	0.70	10
CSO052	10th STREET	2.50	21	3.20	24

1. Existing May 2012 conditions reflect existing system operating conditions as of that date.

2. Baseline May 2012 assumes all SSDP projects are complete and critical combined sewer facilities (e.g. Morris Forman WQTC Southwestern Pump Station, Starkey Pump Station) are operating at optimal, sustainable levels.

CSO053	8th STREET	7.70	50	7.70	50
CSO054	7th STREET	1.80	35	2.30	35
CSO055	6th STREET	4.90	17	6.80	21
CSO056	5th STREET	4.30	24	4.70	24
CSO058	PRESTON ST OVFL WEIR	51.40	68	52.20	63
CSO082	BGI AT BGC	19.20	50	15.80	46
CSO083	BRENT ST & BROADWAY CONNECT	0.50	7	0.50	7
CSO084	BRENT ST @ BGC	19.20	46	19.10	44
CSO118	REG NO 15 - E BRDWY	117.50	60	116.30	60
CSO119	BRENT STREET SEWER	10.30	53	10.10	51
CSO120	PHOENIX HILL SEWER	7.50	52	7.40	52
CSO121	REG NO 18 - GREEN ST	5.50	23	5.40	22
CSO141	BAXTER AVE @ BGC	0.70	20	0.70	20
CSO150	8th ST @ COMMON PLACE	0.80	10	1.20	16
CSO153	COOPER STREET	18.70	71	18.40	71
CSO155	ROWAN ST @ 12th ST	0.60	18	0.60	18

1. Existing May 2012 conditions reflect existing system operating conditions as of that date.

2. Baseline May 2012 assumes all SSDP projects are complete and critical combined sewer facilities (e.g. Morris Forman WQTC Southwestern Pump Station, Starkey Pump Station) are operating at optimal, sustainable levels.

Integrated Overflow Abatement Plan

Vol. 2 - Final CSO Long Term Control Plan

Ohio River

Ohio River Tunnel

Preliminary - For Budget Development Only

- Active CSO
- Eliminated CSO
- Proposed Pump Station Solution
- Pump Stations
- Proposed Pipe Solution
- Combined Sewer Pipe
- Force Main
- Collector < 12"
- Interceptor >= 12"
- Drainage Mains
- Proposed Storage Solution
- Streams
- Floodway
- Jefferson County Boundary

General representation of overflow abatement solutions are for preliminary planning purposes. Alignments and locations may be altered during design.

1 inch = 1,000 feet	±	Aerial Date: 2012	Map Revision: August 15,2016

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2018 Minor Modification Request

Attachment C

CSO Project Fact Sheet

2018 IOAP Project Modification

Project Name: Waterway Protection Tunnel

Project Number: L_MI_MF_127_M_09B_B_A_8, L_OR_MF_155_M_09B_B_B_4, L_OR_MF_020_S_09B_B_A_8, and L_SO_MF_083_M_09B_B_A_8

Project Type: Offline Storage

Rec Stream: Ohio River/Beargrass Creek

Project Description: An in-line storage tunnel along the Ohio River with a minimum storage volume of 41.8 million gallons. This will include the construction of approximately 20,440 LF of deep rock tunnel with a minimum diameter of 20 feet. The project will also require a pump station to return stored flows back to the Ohio River Interceptor. The CSOs associated with the tunnel are broken into four different project areas which under the initial IOAP were addressed by the 13th Street and Rowan Street, Story Avenue and Main Street, Lexington Road and Payne Street and I-64 and Grinstead Storage Basins. Each of the project areas below will discharge to this common tunnel. The Waterway Protection Tunnel Project replaces the previously mentioned basins and consolidates their individual approved storage volumes into a single tunnel solution.

13th/Rowan Project Area (L_OR_MF _155_M_09B_B_B_ 4) - Conveyance lines and interceptors will be constructed, as necessary, to connect individual CSOs along the Main Street corridor to the tunnel. Additionally, the project also includes weir modifications to CSOs 022, 023, 058. CSOs in this area will maintain a level of control of 8 overflows per Typical Year.

Story/Main Project Area (L_OR_MF 020_5_09B_B_A_8) - A conveyance line to a drop shaft will be constructed to connect CSO020 to the Ohio River Tunnel. The CSO in this area will maintain a level of control of 8 overflows per Typical Year.

Lexington/Payne Project Area (L_SO_MF 083_M_09B_B_A_8) - An interceptor and conveyance lines along Beargrass Creek will be constructed to connect the CSOs from the Lexington/Payne project area. The interceptor will terminate at a drop shaft into the Ohio River Tunnel. CSOs in this area will maintain a level of control of 0 overflows per Typical Year.

I-64 and Grinstead Project Area (L_MI_MF_127_M_09B_B_A_8) – An interceptor and conveyance lines along Beargrass Creek will be constructed to connect the CSOs from the I-64/Grinstead project area. The interceptor will terminate at a drop shaft into the Ohio River Tunnel. Additionally, the project also includes a weir modification at CSO 126. CSOs in this area will maintain a level of control of 4 overflows per Typical Year.

Design Assumption: The project assumes connections to the CSOs will be made in the vicinity downstream of existing CSO overflow structures. Overflow lines cannot be used for conveyance due to additional direct stormwater runoff and Ohio River Flooding. The design of the facilities must be coordinate with MSD flood protection needs. Real time control will be implemented in the 13th/Rowan and CSO020 conveyance lines to manage inflows into the tunnel.

Capital Cost: $188,000,000

Capital Benefit/Cost:

Present Worth Benefit Cost:

		Existing May 2012[1]		Baseline May 2012[2]	
CSO	CSO Name	Avg. Annual Overflow Volume	Avg. Annual Frequency	Avg. Annual Overflow Volume	Avg. Annual Frequency
CSO020	BUCHANAN PS	355.00	74	294.00	71
CSO022	FOURTH ST PS	4.50	16	4.50	16

1. Existing May 2012 conditions reflect existing system operating conditions as of that date.

2. Baseline May 2012 assumes all SSDP projects are complete and critical combined sewer facilities (e.g. Morris Forman WQTC Southwestern Pump Station, Starkey Pump Station) are operating at optimal, sustainable levels.

CSO023	ORI @ 4th ST PS	1.80	8	4.70	9
CSO050	12th STREET	19.60	55	22.50	55
CSO051	11th STREET	0.30	8	0.70	10
CSO052	10th STREET	2.50	21	3.20	24
CSO053	8th STREET	7.70	50	7.70	50
CSO054	7th STREET	1.80	35	2.30	35
CSO055	6th STREET	4.90	17	6.80	21
CSO056	5th STREET	4.30	24	4.70	24
CSO058	PRESTON ST OVFL WEIR	51.40	68	52.20	63
CSO082	BGI AT BGC	19.20	50	15.80	46
CSO083	BRENT ST & BROADWAY CONNECT	0.50	7	0.50	7
CSO084	BRENT ST @ BGC	19.20	46	19.10	44
CSO118	REG NO 15 - E BRDWY	117.50	60	116.30	60
CSO119	BRENT STREET SEWER	10.30	53	10.10	51
CSO120	PHOENIX HILL SEWER	7.50	52	7.40	52
CSO121	REG NO 18 - GREEN ST	5.50	23	5.40	22
CSO125	REG NO 24 - GRINSTEAD DR	201.71	57	200.36	57
CSO126	REG NO 26 - RAYMOND AVE	5.55	27	3.93	24
CSO127	ETLEY AVENUE	9.71	30	9.40	30
CSO141	BAXTER AVE @ BGC	0.70	20	0.70	20
CSO150	8th ST @ COMMON PLACE	0.80	10	1.20	16
CSO153	COOPER STREET	18.70	71	18.40	71
CSO155	ROWAN ST @ 12th ST	0.60	18	0.60	18
CSO166	BEALS BRANCH SAN DIV	64.66	36	62.36	36

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Integrated Overflow Abatement Plan

Vol. 2 - Final CSO Long Term Control Plan

Ohio River

Waterway Protection Tunnel

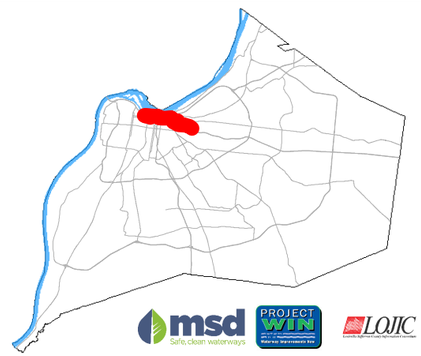
Preliminary - For Budget Development Only

41.8 MG
20,440 LF Deep Storage Tunnel
With Minimum Diameter of 20-ft

- Active CSO
- Eliminated CSO
- Proposed Pump Station Solution
- Pump Stations
- Proposed Pipe Solution
- Combined Sewer Pipe
- Force Main
- Collector < 12"
- Interceptor >= 12"
- Drainage Mains
- Streams
- Floodway
- Jefferson County Boundary

General representation of overflow abatement solutions are for preliminary planning purposes. Alignments and locations may be altered during design.

1 inch = 1,550 feet	N	Aerial Date: 2016	Map Revision: August 15,2018



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