



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

August 7, 2015

Jeffrey A. Cummins, Director
Division of Enforcement
Department for Environmental Protection
300 Fair Oaks Lane
Frankfort, KY 40601

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

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

Subject: Integrated Overflow Abatement Plan Modification
DOJ Case No. 90-5-1-1-08254

Attention Director and Chiefs:

As part of the adaptive management approach outlined in the approved Integrated Overflow Abatement Plan (IOAP) dated May 14, 2014, the Metropolitan Sewer District (MSD) has been expanding the monitoring network throughout its sewer system. MSD has been utilizing data from this network to recalibrate the hydrologic and hydraulic models used to size overflow abatement projects and refine individual project approaches and sizes based on an improved understanding of the sewer system operation and the relationship of certain overflows to one another.

As a result, MSD is submitting this programmatic justification for proposed modifications to five IOAP projects, utilizing the same benefit/cost methodology defined by the Wet Weather Team for the 2009 approved plan and the 2012 IOAP Modification. This justification demonstrates that while the benefit/cost methodology indicates that one basin (the proposed Southwestern Parkway Storage Basin) should be designed for eight overflows per year in the typical year (as compared to the existing level of control of zero overflows per year), the combined suite of five proposed modifications achieve a slightly lower residual annual average overflow volume (AAOV). In addition, the optimization of basin sizes to offset the resulting higher AAOV at the Southwestern Parkway Storage Basin results in a higher overall benefit to the community by reducing residual AAOV levels at discharge locations upstream of the Southwestern Parkway Basin discharge. Five individual project modification letters are enclosed along with this programmatic justification to provide additional detail for each project with significant proposed adjustments.

Technical Justification

Since the 2009 IOAP and 2012 IOAP Modification submittals, 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.



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Integrated Overflow Abatement Plan Modifications

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In 2012 MSD began reviewing and updating the geometric and hydrologic parameters of the InfoWorks Combined Sewer System Model. Additionally, a consistent, standardized procedure was developed for using the enhanced flow monitoring data to calibrate the combined sewer area models. The team prioritized the calibration revisions by project area, focusing initially on those projects with earlier deadlines or other critical features. In the approved 2012 IOAP Modification dated May, 2014, detailed calibration/review and updated project sizes were submitted for the following projects:

- I-64 and Grinstead Drive Storage Basin,
- Nightingale Pump Station Replacement and Storage,
- Bell's Lane Wet Weather Treatment Facility,
- Clifton Heights Storage Basin,
- Story Avenue and Spring Street Green Infrastructure, and;
- 18th and Northwestern Parkway Storage Basin.

For the other project areas, the model geometry was updated, but the hydrologic parameters for those areas were still based on what was previously provided in the model.

In 2014, subsequent to the approval of the 2012 IOAP Modification, MSD completed detailed hydrologic reviews for the remainder of the projects. The detailed reviews indicated no changes were needed from the 2012 submittal for the following projects:

- Logan Street and Breckinridge Street Storage Basin,
- CSO 206 Sewer Separation, and;
- Central Relief Drain (CRD) In-Line Storage, Green Infrastructure, and Distributed Storage.

The updated modeling indicated that the following projects could be constructed as proposed in the approved 2012 IOAP Modification with minor modifications to the project size or assumed set points:

- Southern Outfall Retention (SOR) 1 and SOR 2,
- Portland Wharf Storage Basin,
- 13th Street and Rowan Street Storage Basin, and;
- Story Avenue and Main Street Storage Basin.

The updated modeling also indicated that the Lexington Road and Payne Street Storage Basin would increase in size but the level of control would remain at 0 overflows per year in the typical year as submitted in the 2012 IOAP Modification. Note that the level of control for this basin in the approved 2009 IOAP was 8 overflows per year in the typical year.

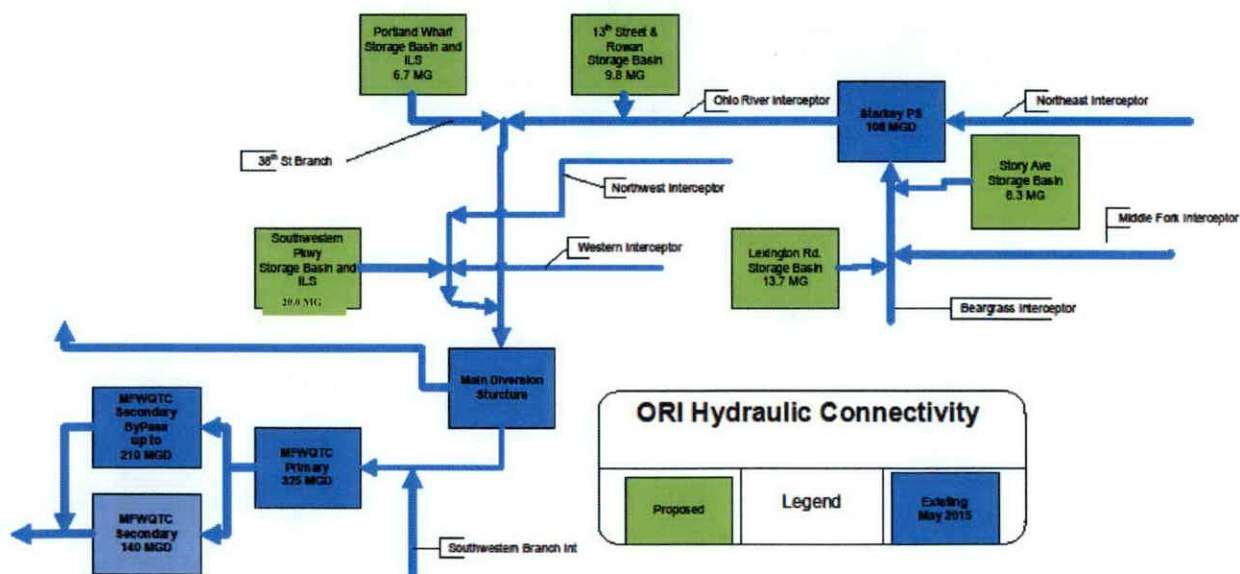
The 2014 detailed hydrologic review resulted in the Southwestern Parkway Storage Basin drainage area hydrologic parameters changing substantially. Changing these parameters changed the size and operational parameters for the storage.

Because of this significant change in the project size, and per previous direction from EPA/KDEP, MSD conducted a complete level of control analysis for the Southwestern Parkway Storage Basin in accordance with the procedure established in the approved IOAP dated September 2009. The results of that new level of control analysis using new basin sizes for 0, 2, 4, and 8 overflows per year in the typical year are shown in the table below.

Southwestern Parkway Storage Basin - Summary of Level of Control Revised Analyses

Level of Control (Overflows per Year in a Typical Year)	Storage Basin Volume (MG)	Benefit Score	Estimated Capital Cost	Benefit/Cost Ratio
0	43.0	1242	\$101,072,000	12.29
2	39.3	1026	\$93,932,000	10.92
4	25.5	972	\$66,208,000	14.68
8	20.0	738	\$49,841,000	14.81

In order to achieve an overall “no net increase” in the AAOV for these hydraulically connected areas, MSD resized the four upstream CSO basins to collectively mitigate the change in residual AAOV. The hydraulic connectivity is shown in the following flow schematic.



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The project optimization analysis was conducted to satisfy the following criteria:

- Each project must meet, at a minimum, the level of control with the highest benefit/cost ratio using the approach in the approved IOAP,
- The cumulative suite of projects must control residual CSO discharges to levels at or below the 343 million gallons per year residual AAOV submitted as part of the approved 2012 IOAP Modification, and
- The cumulative suite of projects should minimize costs if the other two criteria are met.

The following Table presents the proposed revisions to basin size resulting from the optimization analysis:

Project Optimization Analysis – Storage Basin Resizing

Project Name	IOAP Project Number	2012 IOAP Modification		Minor Modification Request	
		Basin Volume MG	Overflows in Typical Year	Basin Volume MG	Overflows in Typical Year
Portland Wharf Storage Basin	L_OR_MF_019_S_13_B_A_8	6.4	8	6.7	8
13 th Street and Rowan Street Storage Basin	L_OR_MF_155_M_09B_B_B_4	4.4	8	9.8	8
Story Avenue and Main Street Storage Basin	L_OR_MF_020_S_09B_B_A_8	5.4	8	8.3	8
Lexington Road and Payne Street Storage Basin	L_SO_MF_083_M_09B_B_A_8	8.2	0	13.7	0
Southwestern Parkway Storage Basin	L_OR_MF_105_M_13_B_A_0	11.1	0	20.0	8

Attachment A to this letter presents an explanation of the changes in residual AAOV resulting from model recalibration and project resizing. The key point in Attachment A is that the 340 million gallons per year residual AAOV resulting from this minor modification request and proposed resizing of the projects is less than the 343 million gallons per year residual AAOV calculated for the 2012 IOAP Modification, and over 200 million gallons per year less than the 550 million gallon per year residual AAOV calculated in the approved IOAP dated September 2009. In addition, the revised project sizing improves CSO control at locations upstream from the Southwestern Parkway Storage Basin, thereby reducing the potential for public contact with the overflows. This illustrates that each change proposed as part of MSD's adaptive management process has resulted in a net reduction in environmental impact and an improvement in public health protection as compared to the originally approved IOAP dated September, 2009.

MSD believes that this most recent recalibration has identified most of the major project modifications needed to successfully comply with overflow reduction targets. However, the monitoring system expansion is continuing and this additional data will be used for further model calibration. Coupled with overflow statistical analyses, green infrastructure impact assessments and upgrades to modeling technologies, MSD's understanding of system operation and interaction will continue to improve and may result in additional project adjustments as IOAP implementation continues.

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

Integrated Overflow Abatement Plan Modifications


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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 via phone at (502) 649-3850.

Sincerely,



Angela L. Akridge, PE
Chief Engineer

cc: Greg Heitzman
Paula Purifoy
File

X:\Data\IOAP\2014 IOAP\2014 Modification\Mod Letters\ Basin Balancing Modification Justification.docx

Attachment A – CSS Modeling and CSO Reduction Reporting

PREPARED FOR: Louisville & Jefferson County MSD

COPY TO: Angela Akridge
John Loechle
Stephanie Laughlin

PREPARED BY: Gary Swanson/CH2M HILL
Bill Sanders/Heritage Engineering

DATE: May 10, 2015

PROJECT NUMBER: 480781

Purpose and Scope

This technical memorandum (TM) will document MSD's adaptive management approach to modeling the Combined Sewer System (CSS) in support of the Integrated Overflow Abatement Plan (IOAP). The TM will describe the selection and evolution of the modeling platform, the approach to calibration and re-calibration of the CSS model as additional flow monitoring and sewer system physical characteristics become known, and the various ways the residual Annual Average Overflow Volume (AAOV) can be graphically depicted.

Background - Combined Sewer System Modeling

Selection of the collection system model was an early activity in the development of the IOAP. Model history and the rationale for selection of the InfoWorks CS model is detailed in the 2012 IOAP, Volume 2, Appendix 2.4.2 – Louisville/Jefferson County MSD Sewer Modeling History Report. The approach to initial model construction, calibration and peer review is contained in the following appendices to Volume 2:

- 2.4.3 - Hydraulic Sewer System Modeling Guidelines Report
- 2.4.4 - Peer Review Report Hydraulic Model
- 2.4.6 - CSO Model Calibration and Validation Report
- 2.4.7 – CSS Model QAQC Checklists, Comments, Response

The initial CSS model calibration used 25 in-system flow monitors, plus the Morris Forman WQTC effluent measurement. The model was initially calibrated to dry weather flow, then checked and compared to 2 significant rain events in April and May 2007. Note that at the time of the initial calibration MSD had flow or level monitors on 21 of the 102 CSO outfalls, so validation to actual discharges was not complete.

As part of the post-construction compliance monitoring (PPCM) plan, MSD has increased the number of in-system flow monitors and has installed either flow or level monitors on almost all of the CSO outfalls. A few of the outfalls are not able to be monitored due to submerged outfalls or difficult surface access issues. See Figure 1 for the timing of outfall monitoring.

Subsequent to the submittal of the 2009 IOAP, MSD decided to upgrade the InfoWorks model to the ICM version. ICM has a number of added features that MSD determined would increase the accuracy and usefulness of their CSS and SSS models. In converting the CS models to ICM, MSD took the opportunity to review and update the geometric and hydrologic parameters in the model. This included an in-depth

evaluation of a number of projects that were entering design. Revisions to those projects were documented in the 2012 IOAP Modification that was approved by EPA and KDEP on June 19 2014. Subsequent to submitting the 2012 IOAP Modification and consistent with the adaptive management provision of the 2009 and 2012 plans, MSD continued to do in-depth evaluations of the remaining projects, resulting in a proposed change to the level of control for the Southwestern Parkway Storage Basin and an optimization of the sizes of several hydraulically connected projects to achieve the same or better level of CSO control at the least additional cost to MSD's customers.

Results

In accordance with the adaptive management approach outlined in the IOAP, MSD has maintained and upgraded the collection system models used to develop the overflow abatement approach defined in the IOAP. As the flow monitoring system expanded and updated collection system information became available, MSD re-evaluated the size and suite of overflow control projects contained in the IOAP that was initially approved in September 2009. In order to achieve an overall "no net increase" in the AAOV for these hydraulically connected areas, MSD resized the four upstream CSO basins to collectively mitigate the change in residual AAOV. The IOAP approved in September 2009 defined an overflow control program with a 96% wet weather capture and a residual AAOV of approximately 550 MG in the typical year.

When the continued refinement of information inherent in the adaptive management process indicated that revisions to approved projects were required to be in compliance upon completion, MSD initiated a series of minor project modifications to communicate the proposed changes to regulators and receive approval to make changes to projects. These "minor modifications" are allowable, subject to regulatory approval, as long as the basic requirements of the Amended Consent Decree (compliance with the CSO Control Policy by December 31, 2020 and elimination of SSOs by December 31, 2024) are not impacted. MSD consolidated several minor modifications into an updated document titled the 2012 IOAP Modification. This document, and the modified projects contained in it, was approved in June 2014. The modified project suite resulted in a wet weather capture of approximately 98%, and a residual AAOV of 343 MG in the typical year.

In April of 2015, MSD started discussions with EPA and KDOW regarding a proposed minor modification to the Southwestern Parkway Storage Basin size and level of control (expressed as overflows per year in a typical year). Since this change in level of control increased the modeled residual AAOV for this project, MSD voluntarily reviewed several other hydraulically connected projects to optimize project size and level of control to achieve the same (or better) overall residual AAOV by the end of 2020.

The CSS model was recalibrated in late 2014 and updated to reflect the optimized project sizes proposed in May, 2015. The current version of the model represents the best information available at this time. The results of the 2015 model update indicate the wet weather capture is still approximately 98%, and the residual AAOV is 340 MG in the typical year.

In support of the review and approval of minor project modifications, MSD has updated information related to the extent and the schedule of CSO volume reductions. This information has been displayed graphically in a series of overlays that illustrate the impacts of proposed changes to individual project sizes and schedules.

In previous submittals, this information has depicted CSO volume reductions compared to "baseline" conditions. Baseline assumes that all SSO reduction projects have been completed. This is significant because some SSO reduction projects (Southeast Interceptor Relief, Buechel Basin, Northern Diversion Interceptor, Upper Middle Fork Diversion) also reduce peak flows in the CSS, due to the interconnections of the system. The charts incorporating baseline conditions more accurately represent the impact and timing of the CSO control projects alone, but ignore the timing of the SSO control projects that also impact AAOV. Including the timing of SSO projects into the AAOV reduction graphs more accurately represents the real-

world timing of actual AAOV reductions. In addition, previous submittals have illustrated the timing of CSO control starting with the implementation of the IOAP. This fails to illustrate MSD's previous CSO control efforts, including Real Time Control Phase 1 and other Early Action Projects. Figure 2 illustrates AAOV reduction from 2001 – 2024, including the timing of both LTCP and SSDP projects. Note that is a change in how the impacts are displayed, but does not represent a change in the actual timing of environmental benefits.

Recent updates to these graphs also illustrate the impacts of improved model calibration, which is independent of project changes but does affect how the adaptive management actions are perceived.

The current model illustrates the following:

- The initial model calibration in 2007 – 2008 under-estimated the initial AAOV from the CSS prior to MSD's implementation of CSO control projects. This impacts how AAOV reductions are displayed, which may result in incorrect perceptions that the most recent suite of proposed projects removes AAOV slower than the original plan. See Figure 3
- Proposed levels of final residual AAOV are less than those originally contained in the IOAP approved in September 2009, indicating that the overflow volume removed is much higher than originally calculated and AAOV removal happens quicker than original displayed. See Figure 4.
- The higher level of CSO volume removed implies that water quality improvements resulting from IOAP projects could be greater than originally calculated.

Summary

In accordance with the adaptive management principles defined in the approved IOAP, MSD has continued to voluntarily improve its understanding of the collection system geometry, in-system flows and combined sewer overflows in response to typical year rain events. The adaptive management process has resulted in a number of minor modifications to IOAP projects. The net result of these requested modifications has been a net reduction in final residual AAOV, and a significant increase in the amount of AAOV removed.

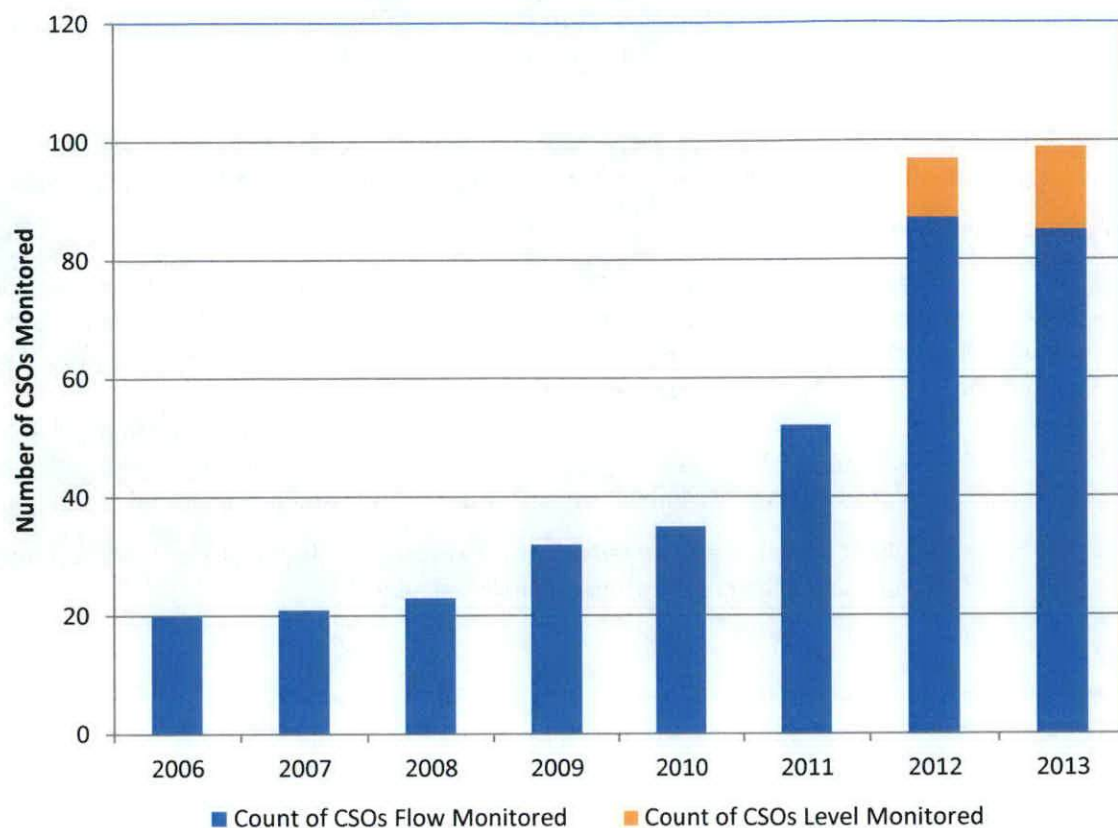
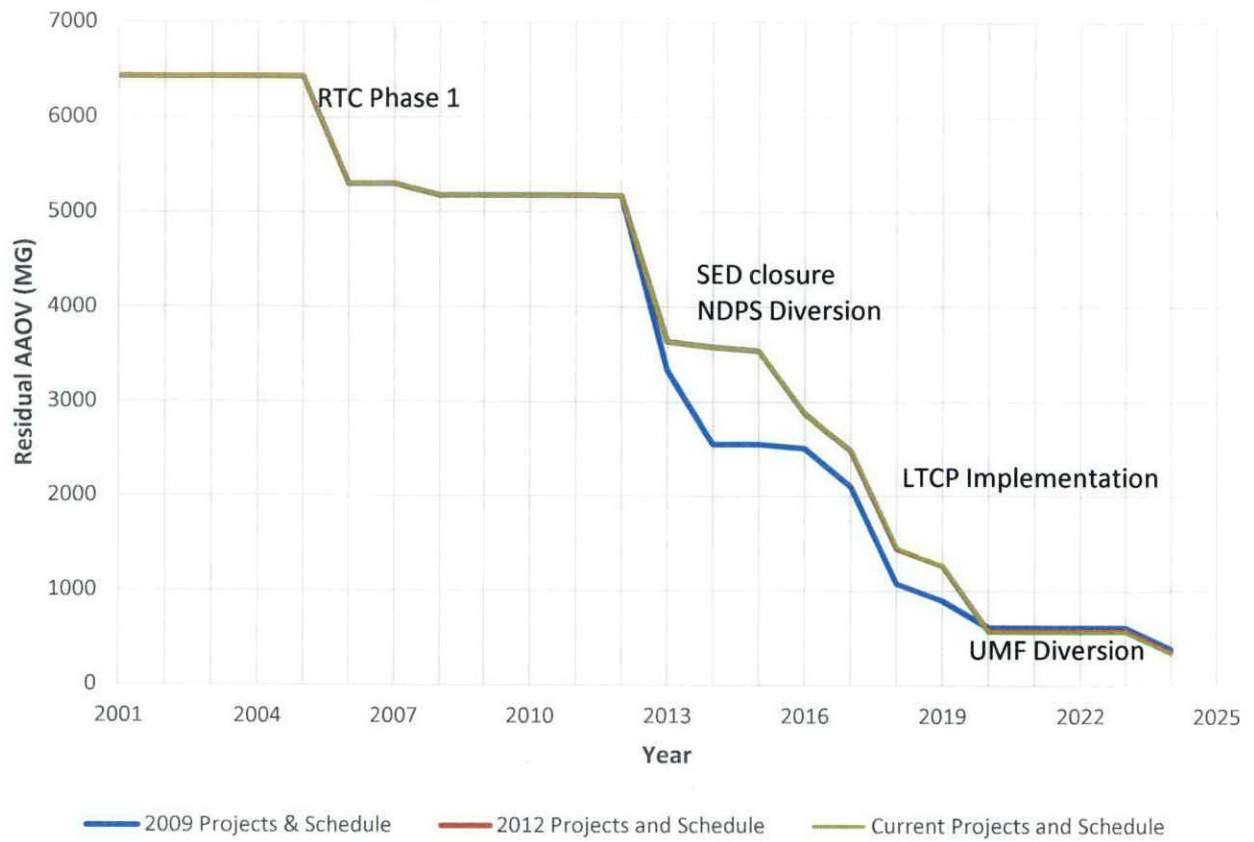
Figure 1 – MSD's CSO Monitoring System

Figure 2 - Residual AAOV 2001 - 2024

**Figure 3 - Residual IOAP AAOV Comparison
(2009, 2012, 2014)**

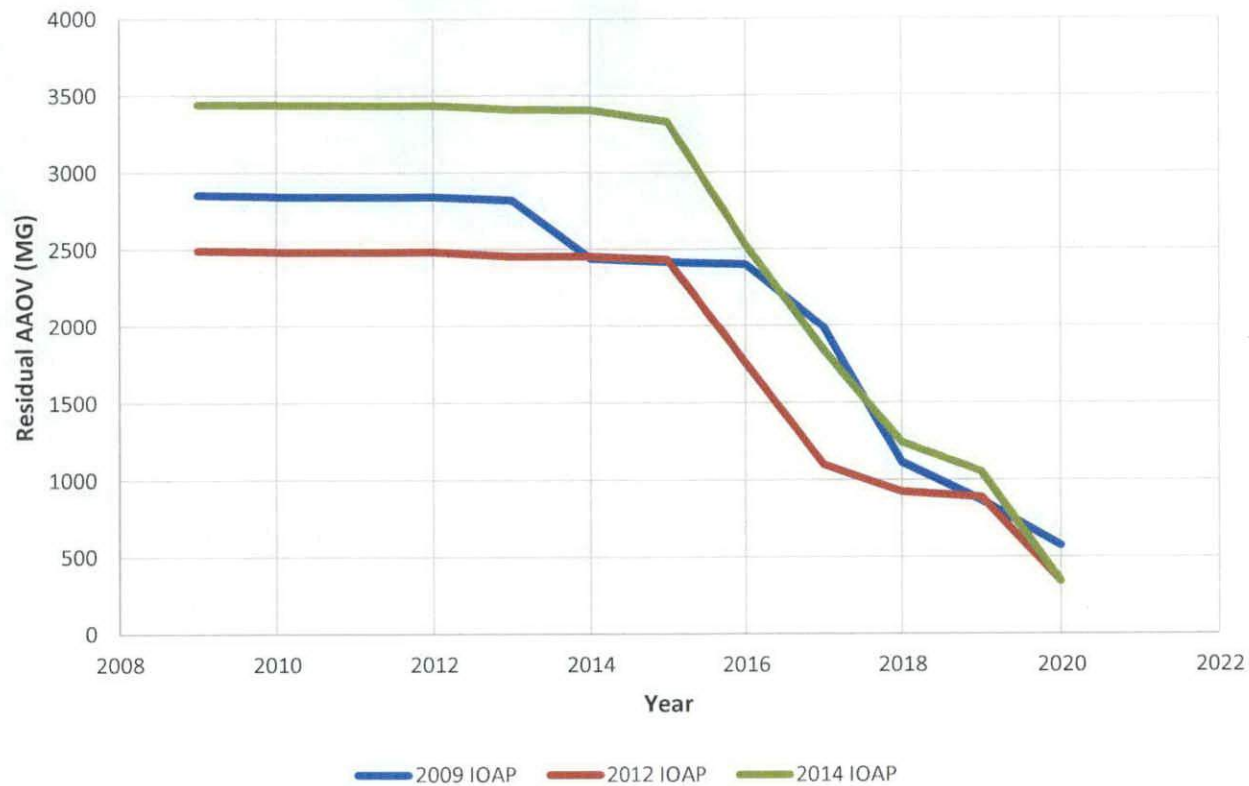
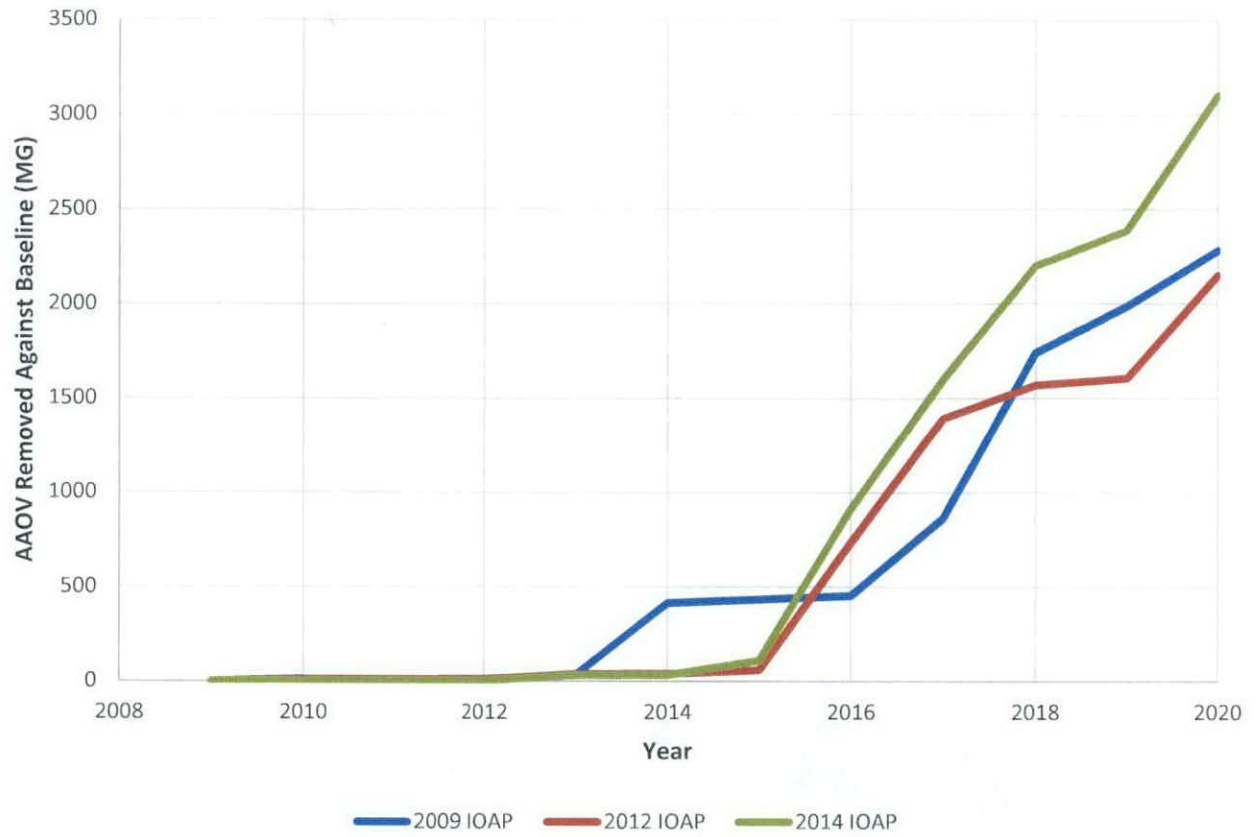


Figure 4 - Removed IOAP AAOV Comparision (2009, 2012, 2014)



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Subject: Southwestern Parkway Storage Basin
Minor Project Modification
IOAP Project No. L_OR_MF_105_M_13_B_A_0
DOJ Case No. 90-5-1-1-08254

Attention Chiefs and Director:

MSD is requesting approval of a proposed minor project modification to the Southwestern Parkway Storage Basin project (IOAP Project No. L_OR_MF_105_M_13_B_A_0). This request is part of the ongoing adaptive management review of the approved Integrated Overflow Abatement Plan (IOAP) dated May 2014.

2009 IOAP Project Description

The original Southwestern Parkway Storage Basin project involved the construction of a 5.08 million gallon (MG) storage basin to be completed by December 31, 2018, with a 0 overflows per typical year level of control.

2012 Project Modification

As a result of the system-wide recalibration of the hydraulic model completed in 2010, the basin size was revised, and level of control analysis was redone using the basin sizes resulting from the recalibrated model. The level of control analysis based on the benefit cost evaluation determined that the level of control should remain at 8 overflows per year in the typical year. The basin size increased from 5.08 MG to 11.07. This is the basin size included in the approved 2012 IOAP Modification dated May, 2014.



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2015 Project Modification Request

This project modification request includes increasing the Southwestern Parkway Storage Basin size from 11.07 MG to 20.0 MG. This basin size assumes the continued use of in-line storage in the Western Outfall and the Northwest Interceptor, and a proactive approach to green infrastructure in the sewershed aimed at reducing impervious area by at least 2% by the end of the year 2020. The level of control is proposed to change from 0 overflows per year in the typical year to 8 overflows per year in the typical year based on a revised level of control analysis performed in accordance with the procedures established as part of the 2009 approved IOAP. No change in project completion date is proposed.

Technical Justification

Since the 2009 IOAP and 2012 IOAP Modification submittals, 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.

In 2012 MSD began reviewing and updating the geometric and hydrologic parameters of the InfoWorks Combined Sewer System Model. Additionally, a consistent, standardized procedure was developed for using the enhanced flow monitoring data to calibrate the combined sewer area models.

In 2014, subsequent to the approval of the 2012 IOAP Modification, MSD completed detailed hydrologic reviews for the Southwestern Parkway Storage Basin project. The detailed hydrologic review resulted in the Southwestern Parkway Storage Basin drainage area hydrologic parameters changing substantially. Changing these parameters changed the size and operational parameters for the storage basin and MSD's understanding of how the entire combined sewer system performs.

Because of this significant change in the project size, and per previous direction from EPA/KDEP, MSD conducted a complete level of control analysis for the Southwestern Parkway Storage Basin in accordance with the procedure established in the approved IOAP dated September 2009. The results of that new level of control analysis using new basin sizes for 0, 2, 4, and 8 overflows per year in the typical year are shown in the table below.

Southwestern Parkway Storage Basin - Summary of Level of Control Analyses

Level of Control (Overflows per Year in a Typical Year)	Storage Basin Volume (MG)	Benefit Score	Estimated Capital Cost	Benefit/Cost Ratio
0	43.0	1242	\$101,072,000	12.29
2	39.3	1026	\$93,932,000	10.92
4	25.5	972	\$66,208,000	14.68
8	20.0	738	\$49,841,000	14.81

Southwestern Parkway Storage Basin
August 7, 2015
Page 3 of 3

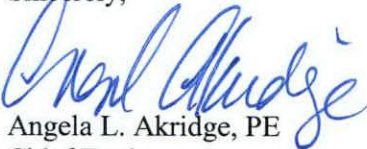
With the new basin sizes, a level of control of 8 overflows per year represents the best benefit/cost ratio. In order to achieve an overall "no net increase" in the AAOV for these hydraulically connected areas, MSD resized the four upstream CSO basins to collectively mitigate the change in residual AAOV.

For your reference, a copy of the project fact sheets and maps from the original approved IOAP dated September 2009, and the recently approved 2012 IOAP Modification dated May 2014 are included 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) 540-6136.

Sincerely,


Angela L. Akridge, PE
Chief Engineer

cc: G. Heitzman P. Purifoy

Attachments

X:\Data\IOAP\2014 IOAP\2014 Modification\Mod Letters\ Southwestern Parkway – Aug 7, 2015.docx

Appendix A



CSO Project Fact Sheet

2012 IOAP Project Modification



Project Name: Southwestern Parkway Storage Basin

Project Number: L_OR_MF_105_M_13_B_A_0

Project Type: In-Line & Off-Line Storage

Rec Stream: Ohio River

Project Description: This project includes a 11.07 MG underground covered concrete basin for CSO104, 105, and 189 and in-line storage in the Western Outfall and the Northwest Interceptor for an additional 8.8 MG using adjustable gates to reduced overflows to zero overflows per typical year.

Design Assumption: Available CSS storage capacity is based on June, 2001 BPR RTC Study. Model Run with RTC Coded in confirms available storage. Flow Control assumes inflatable dams are available at the time of construction.

Capital Cost: \$30,937,000

Capital Benefit/Cost: 22.14

Present Worth Benefit Cost: 24.06

CSO	CSO Name	Existing May 2012 ¹		Baseline May 2012 ²	
		Avg. Annual Overflow Volume	Avg. Annual Frequency	Avg. Annual Overflow Volume	Avg. Annual Frequency
CSO104	SW PKWY SEWER @ BROADWAY	3.90	16	3.90	16
CSO105	WESTERN OUTFALL @ BROADWAY	59.69	30	59.67	30
CSO189	NORTHWESTERN SAN DIV	51.19	28	43.98	28

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
Southwestern Parkway Storage Basin

Preliminary - For Budget Development Only

- Active CSO
- Eliminated CSO
- ▲ Proposed Flow Control Solution
- PS Proposed Pump Station Solution
- PS 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 = 300 feet N Aerial Date: 2009 Map Revision: April 9, 2012



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Appendix B

Project Name: Southwestern Parkway Storage Basin

Project Number: L_OR_MF_105_M_13_B_A_0

Project Type: In-Line & Off-Line Storage

Rec Stream: Ohio River

Project Description: This project includes a 20 MG underground covered concrete basin for CSO104, 105, and 189 and in-line storage in the Western Outfall and the Northwest Interceptor for an additional 8.8 MG using adjustable gates to reduce overflows to eight overflows per typical year.

Design Assumption: Available CSS storage capacity is based on June, 2001 BPR RTC Study. Model Run with RTC Coded in confirms available storage. Flow Control assumes inflatable dams are available at the time of construction.

Capital Cost: \$49,841,000

Capital Benefit/Cost: 14.81
















Present Worth Benefit Cost: 24.06

CSO	CSO Name	Existing May 2012 ¹		Baseline May 2012 ²	
		Avg. Annual Overflow Volume	Avg. Annual Frequency	Avg. Annual Overflow Volume	Avg. Annual Frequency
CSO104	SW PKWY SEWER @ BROADWAY	3.90	16	3.90	16
CSO105	WESTERN OUTFALL @ BROADWAY	59.69	30	59.67	30
CSO189	NORTHWESTERN SAN DIV	51.19	28	43.98	28

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.

Southwestern Parkway Storage Basin

-  Active CSO
-  Eliminated CSO
-  Proposed Flow Control Solution
-  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

1 inch = 300 feet



Aerial Date:
2012

Map Revision:
July 16, 2015



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Subject: Portland Wharf Storage Basin
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Attention Chiefs and Director:

MSD is requesting approval of a proposed minor project modification to the Portland Wharf Storage Basin project (IOAP Project No. L_OR_MF_019_S_13_B_A_8). This request is part of the ongoing adaptive management review of the approved Integrated Overflow Abatement Plan (IOAP) dated May 2014.

2009 IOAP Project Description

The original Portland Wharf Storage Basin project involved the construction of a 6.37 million gallon (MG) storage basin to be completed by December 31, 2019, with a 8 overflows per typical year level of control.

2012 Project Modification

There were no changes made to the Portland Wharf Storage Basin project in the 2012 IOAP Modification.

2015 Project Modification Request

This project modification request includes increasing the Portland Wharf Storage Basin size from 6.37 MG to 6.7 MG. The level of control is proposed to remain at 8 overflows per year in the typical year. The larger size



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does not reduce CSO occurrences significantly, but does provided a reduced residual AAOV. No change in project completion date is proposed.

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.

In 2012 MSD began reviewing and updating the geometric and hydrologic parameters of the InfoWorks Combined Sewer System Model. Additionally, a consistent, standardized procedure was developed for using the enhanced flow monitoring data to calibrate the combined sewer area models.

In 2014, subsequent to the approval of the 2012 IOAP Modification, MSD completed detailed hydrologic reviews for the Southwestern Parkway Storage Basin project. The detailed hydrologic review resulted in the Southwestern Parkway Storage Basin drainage area hydrologic parameters changing substantially. Changing these parameters changed the size and operational parameters for the storage basin and MSD's understanding of how the entire combined sewer system performs.

Because of this significant change in the project size, and per previous direction from EPA/KDEP, MSD conducted a complete level of control analysis for the Southwestern Parkway Storage Basin in accordance with the procedure established in the approved IOAP dated September 2009. The results of that new level of control analysis using new basin sizes for 0, 2, 4, and 8 overflows per year in the typical year resulted in 8 overflows per year being selected as the preferred level of control for the Southwestern Parkway Storage Basin. In order to achieve an overall "no net increase" in the AAOV for these hydraulically connected areas, MSD resized the four upstream CSO basins to collectively mitigate the change in residual AAOV.

MSD recognized that, despite using the approved benefit/cost approach that determined the level of control for all IOAP projects, the proposed level of control change for the Southwestern Parkway Storage Basin considered in isolation could be challenging for regulatory reviewers to approve. MSD decided to voluntarily reconsider the size of several other hydraulically connected projects. This analysis was initiated to optimize the project sizes and provide the same or better overall CSO volume reduction as that resulting from the project sizing in the approved 2012 IOAP Modification. The results of the analysis are documented in our letter of July 20, 2015 with a subject of "Integrated Overflow Abatement Plan Modifications". This requested change in the size of the Portland Wharf Storage Basin is a direct result of that sizing optimization.

For your reference, a copy of the project fact sheets and maps from the original approved IOAP dated September 2009, and the recently approved 2012 IOAP Modification dated May 2014 are included in Attachment A. New project fact sheets and maps addressing this new project modification request have been provided in Attachment B.

Portland Wharf Storage Basin
August 7, 2015
Page 3 of 3

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,

A handwritten signature in blue ink, appearing to read "Angela L. Akridge".

Angela L. Akridge, PE
Chief Engineer

cc: G. Heitzman P. Purifoy

Attachments

X:\Data\IOAP\2014 IOAP\2014 Modification\Mod Letters\ Portland Wharf – Aug 7, 2015.docx

Appendix A

Project Name: Portland Wharf Storage Basin

Project Number: L_OR_MF_019_S_13_B_A_8

Project Type: In-Line & Off-Line Storage

Rec Stream: Ohio River

Project Description: This project includes a 6.37 MG underground covered concrete storage basin, with 1.8 MG of in-line storage from CSO019 to reduce overflows to 8 overflows per year in a typical year. The facility will require a 6.37 MGD pump station to return the stored flow back to the interceptor.

Design Assumption: Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available. 34th Street Pump Station must continue to perform at current drawdown (approximately 11 MGD) rate.

Capital Cost: \$20,000,000

Capital Benefit/Cost: 9.87

Present Worth Benefit Cost:

CSO	CSO Name	Existing May 2012 ¹		Baseline May 2012 ²	
		Avg. Annual Overflow Volume	Avg. Annual Frequency	Avg. Annual Overflow Volume	Avg. Annual Frequency
CSO019	34th STREET PS	57.73	42	57.76	43

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
Portland Wharf Storage Basin

Preliminary - For Budget Development Only

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

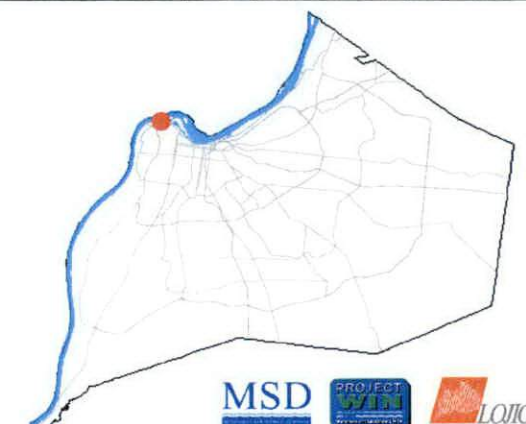
General representation of overflow abatement solutions are for preliminary planning purposes. Alignments and locations may be altered during design.

1 inch = 203 feet

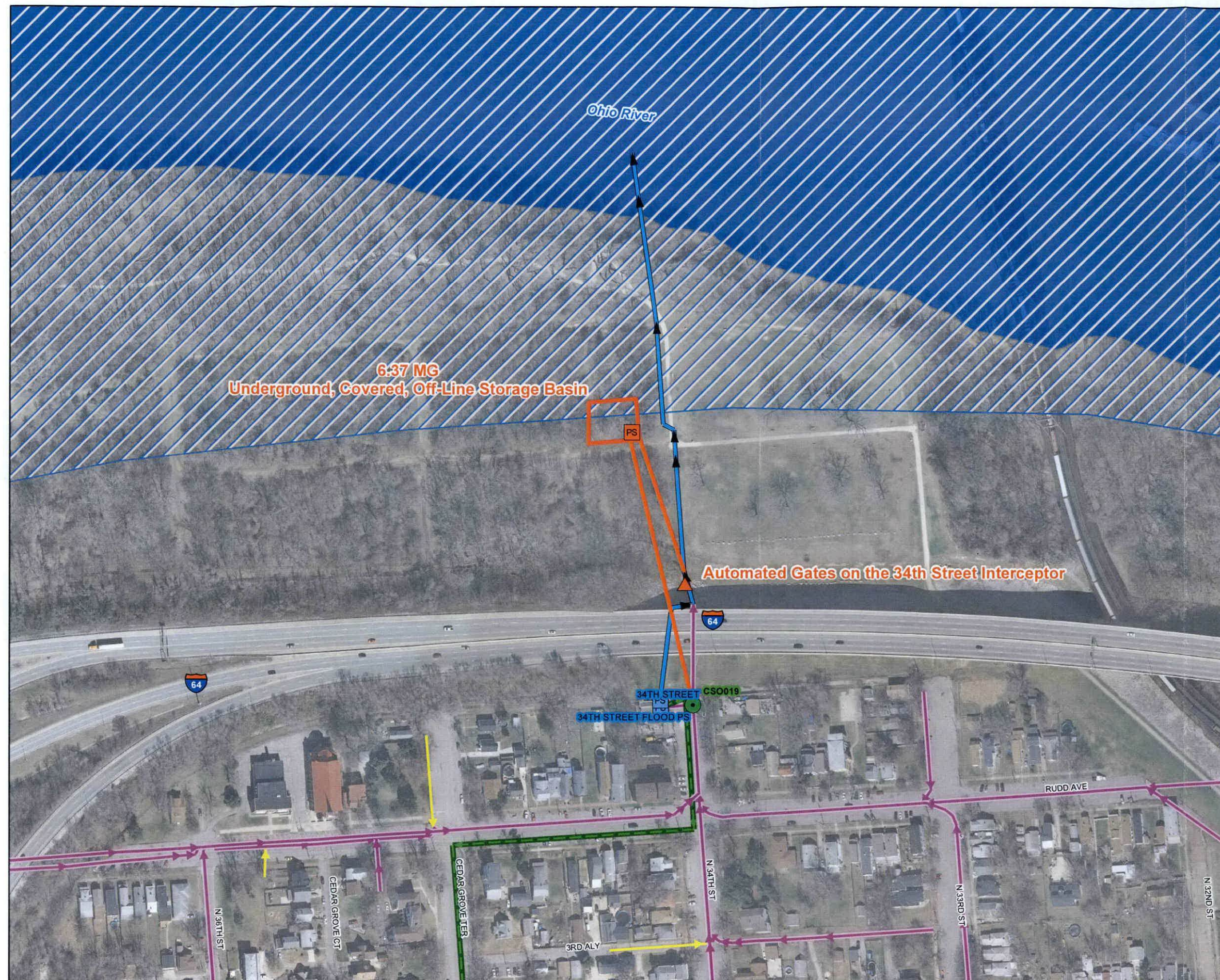


Aerial Date:
2009

Map Revision:
April 14, 2014



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Appendix B



CSO Project Fact Sheet

2015 IOAP Project Modification



Project Name: Portland Wharf Storage Basin

Project Number: L_OR_MF_019_S_13_B_A_8

Project Type: In-Line & Off-Line Storage

Rec Stream: Ohio River

Project Description: This project includes a 6.7 MG underground covered concrete storage basin, with 1.8 MG of in-line storage from CSO019 to reduce overflows to 8 overflows per year in a typical year. The facility will require a 6.37 MGD pump station to return the stored flow back to the interceptor.

Design Assumption: Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available. 34th Street Pump Station must continue to perform at current drawdown (approximately 11 MGD) rate.

Capital Cost: \$20,000,000

Capital Benefit/Cost: 9.87

Present Worth Benefit Cost:

CSO	CSO Name	Existing May 2012 ¹		Baseline May 2012 ²	
		Avg. Annual Overflow Volume	Avg. Annual Frequency	Avg. Annual Overflow Volume	Avg. Annual Frequency
CSO019	34th STREET PS	57.73	42	57.76	43

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

Portland Wharf Storage Basin

Preliminary - For Budget Development Only

- Active CSO
- Eliminated CSO
- ▲ Proposed Flow Control Solution
- PS Proposed Pump Station Solution
- PS 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 = 200 feet

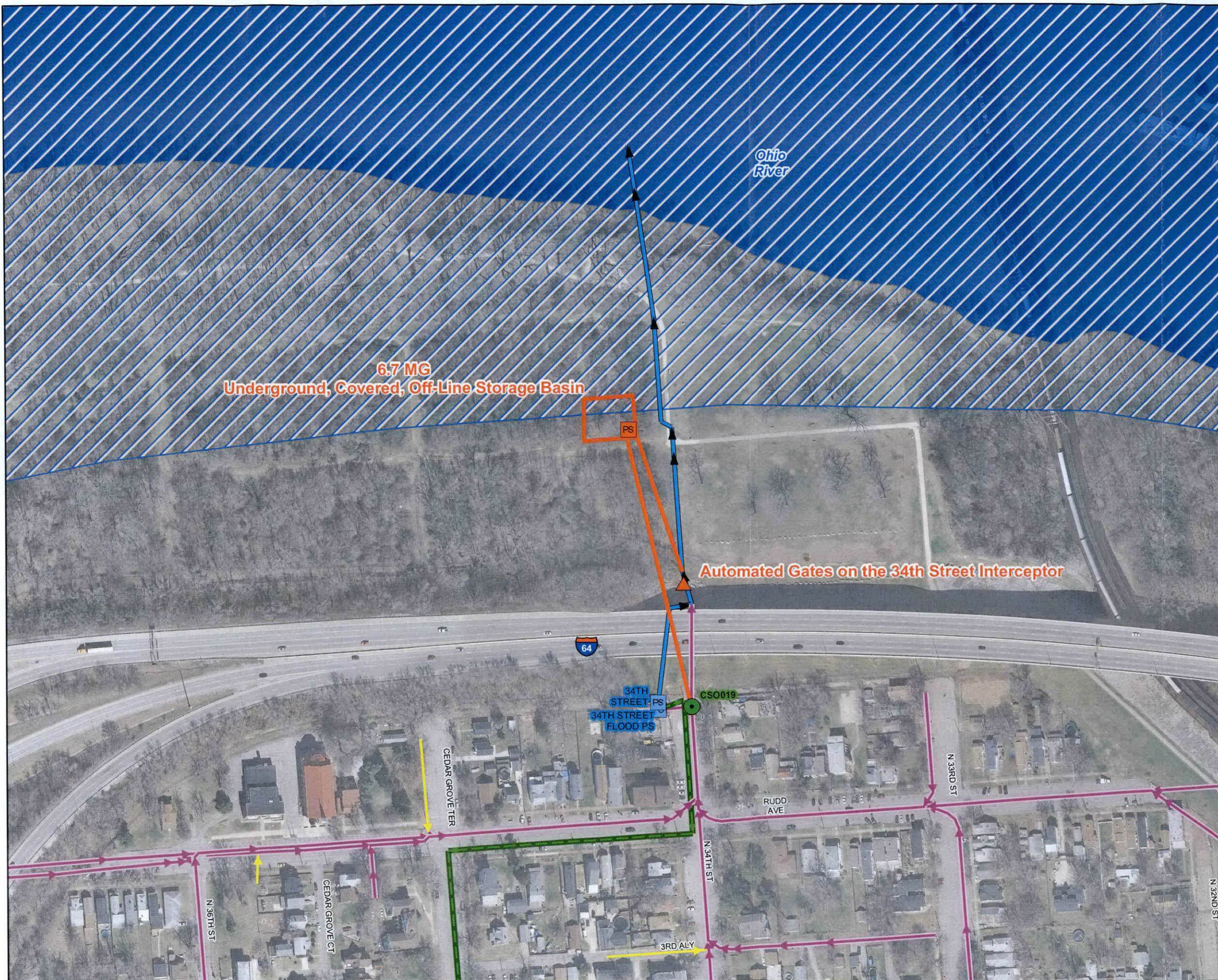


Aerial Date:
2012

Map Revision:
June 19, 2015



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

August 7, 2015

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 Fair Oaks Lane
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: Lexington Road and Payne Street Storage Basin
Minor Project Modification
IOAP Project No. L_SO_MF_083_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 Lexington Road and Payne Street Storage Basin project (IOAP Project No. L_OR_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.

2009 IOAP Project Description

The original Lexington Road and Payne Street Storage Basin project involved the construction of a 7.31 million gallon (MG) storage basin to be completed by December 31, 2020, with an eight overflows per typical year level of control.

2012 Project Modification

The project modification proposed in 2012 involved the construction of a 8.18 MG storage basin to be completed by December 31, 2020, with a zero overflows per typical year level of control.



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www.louisvillegreen.com

2015 Project Modification Request

This project modification request includes increasing the Lexington road and Payne Street Storage Basin size from 8.18 MG to 13.7 MG. The level of control is proposed to remain at zero overflows per year in the typical year. The larger size is necessary to retain the zero overflow per year level of control given other changes that have happened in the system. No change in project completion date is proposed.

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.

In 2012 MSD began reviewing and updating the geometric and hydrologic parameters of the InfoWorks Combined Sewer System Model. Additionally, a consistent, standardized procedure was developed for using the enhanced flow monitoring data to calibrate the combined sewer area models.

In 2014, subsequent to the approval of the 2012 IOAP Modification, MSD completed detailed hydrologic reviews for the Southwestern Parkway Storage Basin project. The detailed hydrologic review resulted in the Southwestern Parkway Storage Basin drainage area hydrologic parameters changing substantially. Changing these parameters changed the size and operational parameters for the storage basin and MSD's understanding of how the entire combined sewer system performs.

Because of this significant change in the project size, and per previous direction from EPA/KDEP, MSD conducted a complete level of control analysis for the Southwestern Parkway Storage Basin in accordance with the procedure established in the approved IOAP dated September 2009. The results of that new level of control analysis using new basin sizes for 0, 2, 4, and 8 overflows per year in the typical year resulted in 8 overflows per year being selected as the preferred level of control for the Southwestern Parkway Storage Basin. In order to achieve an overall "no net increase" in the AAOV for these hydraulically connected areas, MSD resized the four upstream CSO basins to collectively mitigate the change in residual AAOV.

MSD recognized that, despite using the approved benefit/cost approach that determined the level of control for all IOAP projects, the proposed level of control change for the Southwestern Parkway Storage Basin considered in isolation could be challenging for regulatory reviewers to approve. MSD decided to voluntarily reconsider the size of several other hydraulically connected projects. This analysis was initiated to optimize the project sizes and provide the same or better overall CSO volume reduction as that resulting from the project sizing in the approved 2012 IOAP Modification. The results of the analysis are documented in our letter of July 20, 2015 with a subject of "Integrated Overflow Abatement Plan Modifications". This requested change in the size of the Lexington Road and Payne Street Storage Basin is a direct result of that sizing optimization.

For your reference, a copy of the project fact sheets and maps from the original approved IOAP dated September 2009, and the recently approved 2012 IOAP Modification dated May 2014 are included in

Lexington Road and Payne Street Storage Basin
August 7, 2015
Page 3 of 3

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
Chief Engineer

cc: G. Heitzman P. Purifoy

Attachments

X:\Data\IOAP\2014 IOAP\2014 Modification\Mod Letters\ Lexington and Payne – Aug 7, 2015.docx

Appendix A

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 8.18 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 8.18 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: \$25,904,000

Capital Benefit/Cost: 67.61

Present Worth Benefit Cost: 75.16

CSO	CSO Name	Existing May 2012 ¹		Baseline May 2012 ²	
		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
- PS Proposed Pump Station Solution
- PS 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

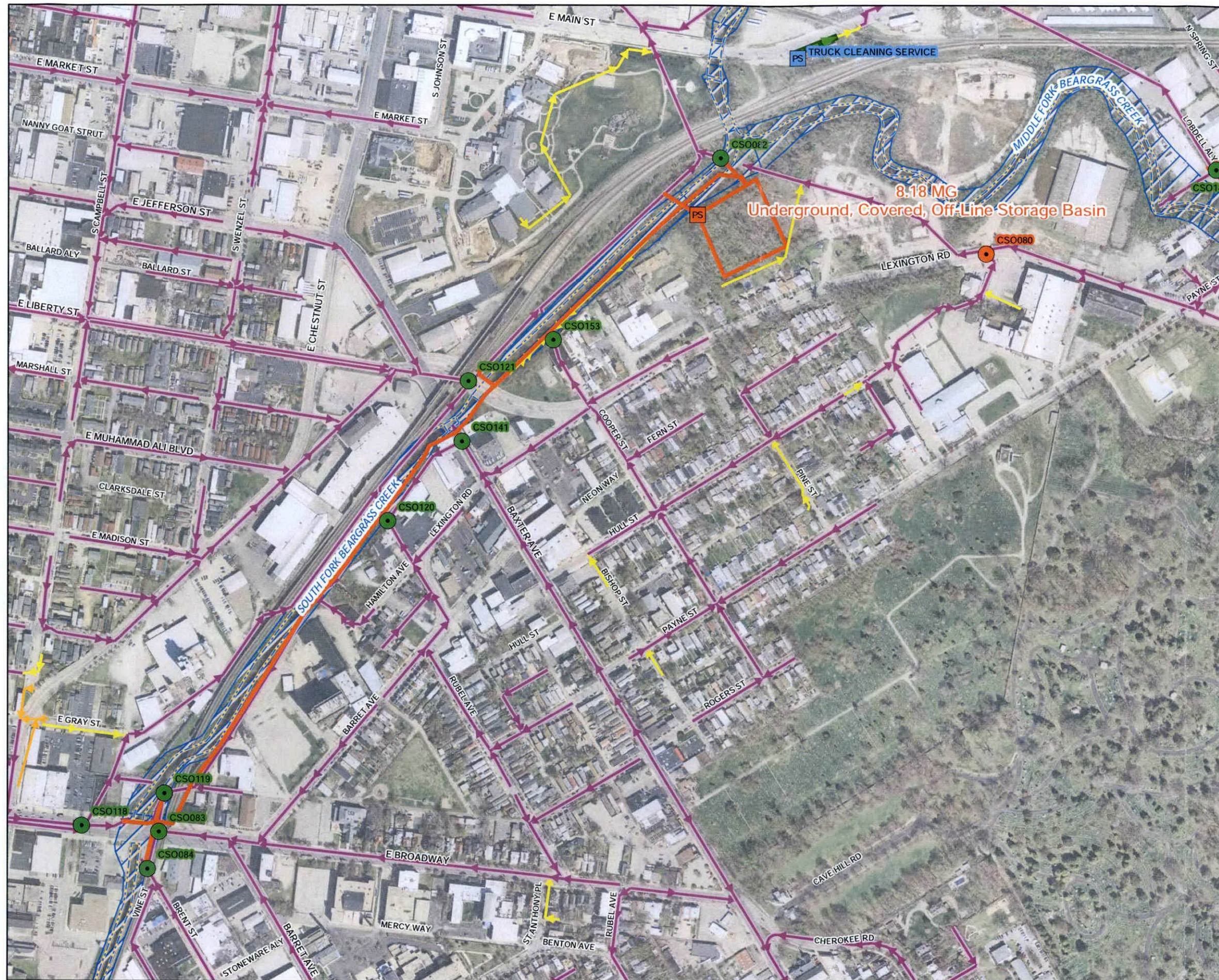


Aerial Date:
2009

Map Revision:
April 9, 2012



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Appendix B

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

CSO	CSO Name	Existing May 2012 ¹		Baseline May 2012 ²	
		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

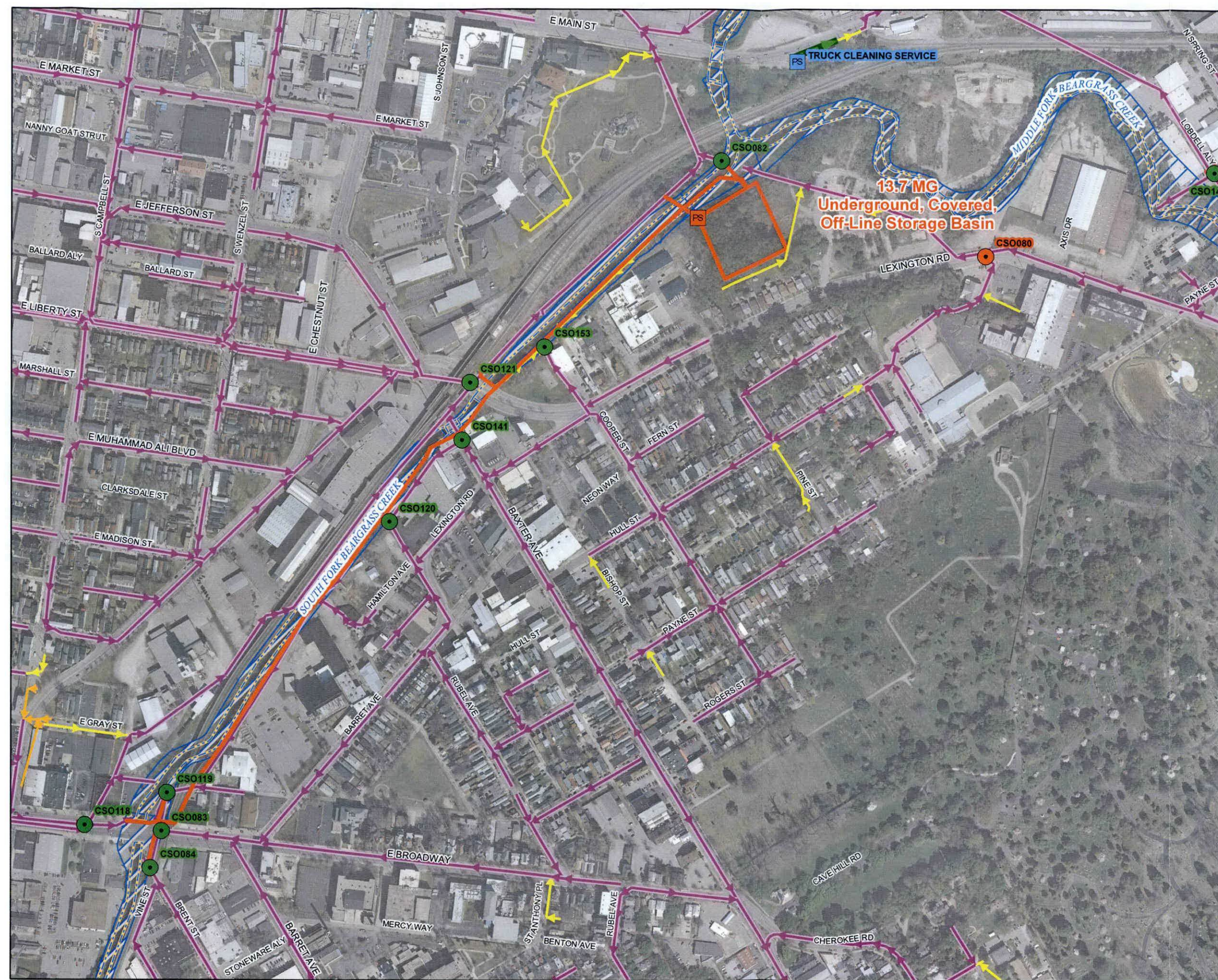
- Active CSO
- Eliminated CSO
- PS Proposed Pump Station Solution
- PS Pump Stations
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- Force Main
- Collector < 12"
- Interceptor >= 12"
- Drainage Mains
- Proposed Storage Solution
- Streams
- Floodway
- Jefferson County Boundary

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

August 7, 2015

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 Fair Oaks Lane
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: Story Avenue and Main Street Storage Basin
Minor Project Modification
IOAP Project No. L_OR_MF_020_S_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 Story Avenue and Main Street Storage Basin project (IOAP Project No. L_OR_MF_020_S_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.

2009 IOAP Project Description

The original Story Avenue and Main Street Storage Basin project involved the construction of a 0.13 million gallon (MG) storage basin to be completed by December 31, 2013, with an eight overflows per typical year level of control.

2012 Project Modification

The project modification proposed in 2012 involved the construction of a 5.4 MG storage basin to be completed by December 31, 2020, with an eight overflows per typical year level of control. Given the significant increase in proposed size, moving the scheduled completion to 2020 was proposed, and accepted in the approved IOAP dated May 2014..



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2015 Project Modification Request

This project modification request includes increasing the Story Avenue and Main Street Storage Basin size from 5.4 MG to 8.3 MG. The level of control is proposed to remain at 8 overflows per year in the typical year. The larger size does not reduce CSO occurrences significantly, but does provide a reduced residual AAOV. No change in project completion date is proposed.

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.

In 2012 MSD began reviewing and updating the geometric and hydrologic parameters of the InfoWorks Combined Sewer System Model. Additionally, a consistent, standardized procedure was developed for using the enhanced flow monitoring data to calibrate the combined sewer area models.

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Because of this significant change in the project size, and per previous direction from EPA/KDEP, MSD conducted a complete level of control analysis for the Southwestern Parkway Storage Basin in accordance with the procedure established in the approved IOAP dated September 2009. The results of that new level of control analysis using new basin sizes for 0, 2, 4, and 8 overflows per year in the typical year resulted in 8 overflows per year being selected as the preferred level of control for the Southwestern Parkway Storage Basin. In order to achieve an overall "no net increase" in the AAOV for these hydraulically connected areas, MSD resized the four upstream CSO basins to collectively mitigate the change in residual AAOV.

MSD recognized that, despite using the approved benefit/cost approach that determined the level of control for all IOAP projects, the proposed level of control change for the Southwestern Parkway Storage Basin considered in isolation could be challenging for regulatory reviewers to approve. MSD decided to voluntarily reconsider the size of several other hydraulically connected projects. This analysis was initiated to optimize the project sizes and provide the same or better overall CSO volume reduction as that resulting from the project sizing in the approved 2012 IOAP Modification. The results of the analysis are documented in our letter of July 20, 2015 with a subject of "Integrated Overflow Abatement Plan Modifications". This requested change in the size of the Story Avenue and Main Street Storage Basin is a direct result of that sizing optimization.

For your reference, a copy of the project fact sheets and maps from the original approved IOAP dated September 2009, and the recently approved 2012 IOAP Modification dated May 2014 are included in


Story Avenue and Main Street Storage Basin
August 7, 2015
Page 3 of 3

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
Chief Engineer

cc: G. Heitzman P. Purifoy

Attachments

X:\Data\IOAP\2014 IOAP\2014 Modification\Mod Letters\ Story and Main – Aug 7 2015.docx

Appendix A

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 5.42 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: \$12,576,000

Capital Benefit/Cost: 18.78

Present Worth Benefit Cost: 20.37

CSO	CSO Name	Existing May 2012 ¹		Baseline May 2012 ²	
		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
- PS Proposed Pump Station Solution
- PS 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



Aerial Date: 2009

Map Revision: April 9, 2012



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Appendix B

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

CSO	CSO Name	Existing May 2012 ¹		Baseline May 2012 ²	
		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
- PS Proposed Pump Station Solution
- PS 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



Aerial Date:
2012

Map Revision:
June 19, 2015



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

August 7, 2015

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 Fair Oaks Lane
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: 13th Street and Rowan Street Storage Basin
Minor Project Modification
IOAP Project No. L_OR_MF_155_M_09B_B_B_4
DOJ Case No. 90-5-1-1-08254

Attention Chiefs and Director:

MSD is requesting approval of a proposed minor project modification to the 13th Street and Rowan Street Storage Basin project (IOAP Project No. L_OR_MF_155_M_09B_B_B_4). This request is part of the ongoing adaptive management review of the approved Integrated Overflow Abatement Plan (IOAP) dated May 2014.

2009 IOAP Project Description

The original 13th Street and Rowan Street Storage Basin project involved the construction of a 14.4 million gallon (MG) storage basin to be completed by December 31, 2020, with a 4 overflows per typical year level of control.

2012 Project Modification

As a result of the system-wide recalibration of the hydraulic model completed in 2010, the overflows connected to the Central Relief Drain (CRD) were removed from this project and a new project created to address CRD overflows through green infrastructure and weir raising. With the CRD overflows removed, the basin size was reduced to 4.37 MG with eight overflows per year level of control. No changes were proposed in the schedule.



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2015 Project Modification Request

This project modification request includes increasing the 13th Street and Rowan Street Storage Basin size from 4.36 MG to 9.8 MG. The level of control is proposed to remain at 8 overflows per year in the typical year. The larger size does not reduce CSO occurrences significantly, but does provide a reduced residual AAOV. No change in project completion date is proposed.

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.

In 2012 MSD began reviewing and updating the geometric and hydrologic parameters of the InfoWorks Combined Sewer System Model. Additionally, a consistent, standardized procedure was developed for using the enhanced flow monitoring data to calibrate the combined sewer area models.

In 2014, subsequent to the approval of the 2012 IOAP Modification, MSD completed detailed hydrologic reviews for the Southwestern Parkway Storage Basin project. The detailed hydrologic review resulted in the Southwestern Parkway Storage Basin drainage area hydrologic parameters changing substantially. Changing these parameters changed the size and operational parameters for the storage basin and MSD's understanding of how the entire combined sewer system performs.

Because of this significant change in the project size, and per previous direction from EPA/KDEP, MSD conducted a complete level of control analysis for the Southwestern Parkway Storage Basin in accordance with the procedure established in the approved IOAP dated September 2009. The results of that new level of control analysis using new basin sizes for 0, 2, 4, and 8 overflows per year in the typical year resulted in 8 overflows per year being selected as the preferred level of control for the Southwestern Parkway Storage Basin. In order to achieve an overall "no net increase" in the AAOV for these hydraulically connected areas, MSD resized the four upstream CSO basins to collectively mitigate the change in residual AAOV.

MSD recognized that, despite using the approved benefit/cost approach that determined the level of control for all IOAP projects, the proposed level of control change for the Southwestern Parkway Storage Basin considered in isolation could be challenging for regulatory reviewers to approve. MSD decided to voluntarily reconsider the size of several other hydraulically connected projects. This analysis was initiated to optimize the project sizes and provide the same or better overall CSO volume reduction as that resulting from the project sizing in the approved 2012 IOAP Modification. The results of the analysis are documented in our letter of June 22, 2015 with a subject of "Integrated Overflow Abatement Plan Modifications". This requested change in the size of the 13th Street and Rowan Street Storage Basin is a direct result of that sizing optimization.

For your reference, a copy of the project fact sheets and maps from the original approved IOAP dated September 2009, and the recently approved 2012 IOAP Modification dated May 2014 are included in

13th Street and Rowan Street Storage Basin
August 7, 2015
Page 3 of 3

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
Chief Engineer

cc: G. Heitzman P. Purifoy

Attachments

X:\Data\IOAP\2014 IOAP\2014 Modification\Mod Letters\ 13 and Rowan – Aug 7, 2015.docx

Appendix A



CSO Project Fact Sheet

2012 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 4.36 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: \$27,863,000

Capital Benefit/Cost: 40.71

Present Worth Benefit Cost: 51.31

CSO	CSO Name	Existing May 2012 ¹		Baseline May 2012 ²	
		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

- Active CSO
- Eliminated CSO
- PS Proposed Pump Station Solution
- PS 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

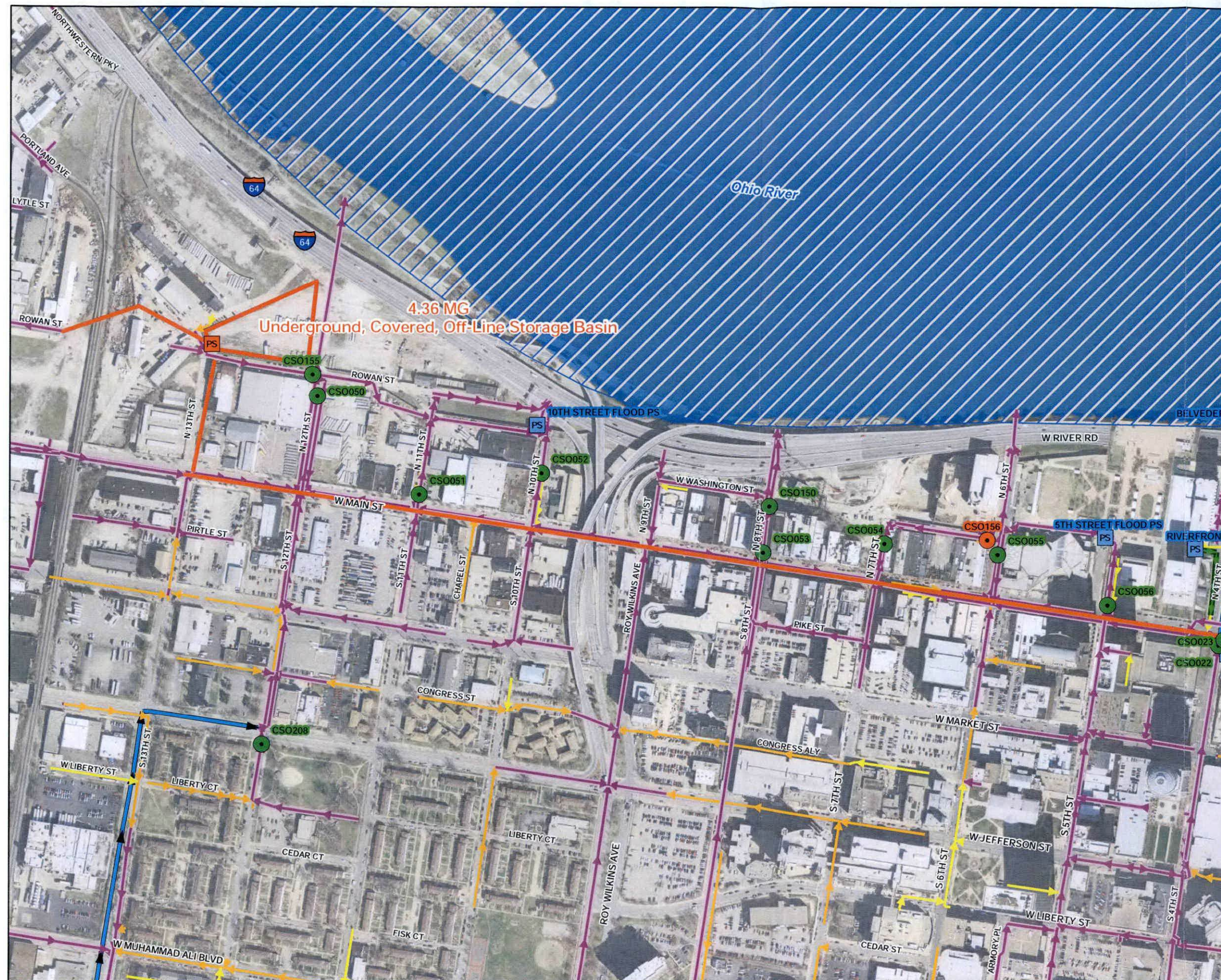


Aerial Date:
2009

Map Revision:
April 9, 2012



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Appendix B

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

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Monday, August 24, 2015

Integrated Overflow Abatement Plan Vol. 2 - Final CSO Long Term Control Plan

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N 13th St and Rowan St Storage Basin

Preliminary - For Budget Development Only

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- Eliminated CSO
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- Proposed Pipe Solution
- Combined Sewer Pipe
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General representation of overflow abatement solutions are for preliminary planning purposes. Alignments and locations may be altered during design.

1 inch = 400 feet



Aerial Date:
2012

Map Revision:
June 19, 2015



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