SD1
Managing Northern Kentucky's
Wastewater and Storm Water

April 30, 2018

Director of the Division of Enforcement
Department for Environmental Protection
300 Fair Oaks Lane
Frankfort, KY 40601

Chief, Environmental Enforcement Section
Environmental and Natural Resources Division
U.S. Department of Justice
601 D street NW
Washington, DC 20005
DOJ Case No. 90-5-1-1-08591

Ms. Denisse Diaz, Chief
NPDES Permitting and Enforcement Branch
U.S. Environmental Protection Agency, Region 4
Atlanta Federal Center
61 Forsyth Street, S.W.
Atlanta, Georgia 30303

Re: Consent Decree Case No. 2:05-cv-00199-WOB

To Whom It May Concern:

Pursuant to the above-referenced Consent Decree, Sanitation District No. 1 (SD1) is required to submit quarterly reports that demonstrate SD1's compliance with the Consent Decree:

> **42. Quarterly Reports**. The District shall submit to the Cabinet/EPA a quarterly report that describes the District's progress in complying with this Consent Decree for the previous quarter no later than thirty days after the end of each calendar quarter. The first such report shall be submitted to the Cabinet/EPA no later than thirty days after the second full quarter after entry of this Consent Decree.

Information contained within the enclosed Quarterly Report No. 42 describes SD1's compliance with Consent Decree Case No. 2:05-cv-00199-WOB for the period of January 1, 2018 through March 31, 2018. The report also contains an outlook for the upcoming calendar quarter period of April 1, 2018 through June 30, 2018. Additionally, an annual revision to SD1's Recurring Wet Weather SSO list is provided in this report.

A certification, as required by the Consent Decree (paragraph 68), is also enclosed.

To the best of my knowledge and belief, the enclosed report is true, accurate, and complete, and further demonstrates SD1's commitment to the mission of protecting and enhancing the water resources and quality of life in Northern Kentucky.

If you have any questions or concerns, do not hesitate to contact me at 859-578-7465 or by e-mail at achaney@sd1.org.

Best regards,

Adam Chaney
Executive Director

AC/wck
Enclosures

Sanitation District No. 1
April 30, 2018

# Consent Decree
# Quarterly Report No. 42
(January 1, 2018 through March 31, 2018)

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## CERTIFICATION

Consent Decree Quarterly Report No. 42
Consent Decree Case No. 2:05-cv-00199-WOB

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.

Adam Chaney
Executive Director

4/30/18
Date

COMMONWEALTH OF KENTUCKY

)ss.

COUNTY OF Kenton

The foregoing instrument was acknowledged before me this 30 day of April, 2018 by Adam Chaney, Executive Director of Sanitation District No. 1.

Angela M. Cook
NOTARY PUBLIC

Kenton County, Kentucky

My commission expires: 9-1-20

Angela M. Cook
Notary Public
Kentucky, State at Large
Comm. Exp. 09-01-2020
Notary ID 562735

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# CONSENT DECREE
# QUARTERLY REPORT NO. 42

April 30, 2018

Sanitation District No. 1
1045 Eaton Drive
Ft. Wright, KY 41017

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**TABLES**



# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AHPS | Advanced Hydrologic Prediction Service |
| Cabinet | Kentucky Energy and Environment Cabinet |
| CSAP | Continuous Sewer Assessment Program |
| CSO | Combined Sewer Overflow |
| CVG | Cincinnati-Northern Kentucky International Airport |
| EPA | U.S. Environmental Protection Agency |
| KDOW | Kentucky Division of Water |
| ID# | Identification Number |
| NWS | National Weather Service |
| SD1 | Sanitation District No. 1 |
| SORP | Sewer Overflow Response Plan |
| SSO | Sanitary Sewer Overflow |

# SECTION 1. INTRODUCTION

## 1.1 Purpose

This Quarterly Report is submitted to fulfill the requirements of Sanitation District No. 1's (SD1) Consent Decree, as entered on April 18, 2007. The Consent Decree is a legal agreement with the U.S. Environmental Protection Agency (EPA) and the Kentucky Energy and Environment Cabinet (Cabinet). The purpose of the Consent Decree is to address sanitary sewer overflows (SSOs) in SD1's sanitary sewer system and combined sewer overflows (CSOs) in the combined sewer system, in an effort to improve water quality throughout SD1's service area. Specifically, Section V Reporting Requirements, states that:

> **42. Quarterly Reports.** The District shall submit to the Cabinet/EPA a quarterly report that describes the District's progress in complying with this Consent Decree for the previous quarter no later than thirty days after the end of each calendar quarter.

## 1.2 Report Period

Information contained within this report describes SD1's compliance with Consent Decree Case No. 2:05-cv-00199-WOB for the period of January 1, 2018 through March 31, 2018. This report also contains an outlook for the upcoming calendar quarter period of April 1, 2018 through June 30, 2018.

## 1.3 Consent Decree Compliance Schedule

A comprehensive compliance schedule for meeting the requirements of the Consent Decree can be found in Appendix A. A more detailed listing of the projects and activities conducted to comply with the requirements of the Consent Decree, including schedules, project updates for the current reporting period, and planned activity for the subsequent quarter, can be found in Appendix B.

Additionally, Appendix B provides a schedule of the projects proposed in the first five years of the Watershed Plans for Northern Kentucky, as well as status updates on CSO

and SSO reduction projects that have not been formally proposed. The Watershed Plans were submitted on March 31, 2011, approved by the Cabinet and EPA in a letter dated February 14, 2014, and resubmitted March 14, 2014 with agreed to revisions, as requested in the February 14, 2014 letter.

Initial Watershed Projects

As shown in Appendix B, SD1 has completed its Initial Watershed Projects. A request to remove a project (Western Regional – Richwood C-039-00) was included in the revised Watershed Plans, submitted on March 31, 2011. Approval of the request to remove the project was granted in a letter dated May 13, 2013 from the Cabinet and EPA. SD1 submitted its final Initial Watershed Projects Annual Report on June 7, 2013.

Pump Station Operation Plan for Backup Power

As shown in Appendix B, SD1 has completed the Pump Station Operation Plan for Backup Power, before the Consent Decree deadline of December 31, 2015. SD1 submitted its Pump Station Operation Plan for Backup Power on December 14, 2007 and received regulatory approval on May 14, 2008. Of the 127 pump stations identified in the plan, 20 have been permanently eliminated and 107 have fully implemented backup power solutions to mitigate overflows due to power failures.

The schedule provided in Appendix B of this report only identifies 110 pump stations, because 17 of the 127 pump stations that required backup power were completed prior to the approval of the plan in 2007. The 17 projects that were identified as complete in Table 3.1 of the Pump Station Operation Plan for Backup Power, submitted on December 14, 2007, are not included in the final schedule provided in Appendix B of this report.

# SECTION 2. OVERFLOW DATA

This section of the Quarterly Report presents SD1's estimates of overflow activity in the collection systems.

Overflow Categories

For reporting and system performance measurement purposes, SD1 has categorized sewer overflows throughout the service area into five distinct categories:

- *SSOs Due to Wet Weather Capacity Issues*: Recurring and Inactive overflows from SD1's sanitary sewer system, due to a lack of capacity during wet weather. This category includes wet-weather discharges at pump stations that may or may not have a constructed bypass. Overflows are determined to be "Recurring" if they have been observed to overflow twice in a running twelve month period. Overflows are determined to be "Inactive" until they occur more than once in a running twelve month period. Inactive overflows are generally under investigation as suspected or predicted hydraulic model overflow points in the collection system.

- *SSOs Due to Operational Issues*: Overflows from SD1's sanitary sewer system that are not a result of wet-weather capacity issues, including releases from pump stations. Many of these are one-time, dry-weather occurrences caused by temporary system issues that are investigated and corrected as soon as practicable.

- *Wet-Weather CSOs*: Wet-weather discharges from the combined sewer system.

- *Dry-Weather CSOs*: Dry-weather discharges from the combined sewer system.

- *Building Backups:* The release of raw sewage from a service lateral into a building in SD1's service area. Building backups can be caused by several factors, such as constrained capacity during wet weather, or a blockage in the private service lateral or public main line. Building backups can be determined to be associated with the public sewer system or can be due to other causes beyond the control of SD1.

Quantitative Estimates

SD1 uses three general methods for developing quantitative overflow estimates:

- Field inspections are performed after wet-weather events to identify evidence of activations. This inspection program has been in place since 2005 and is adjusted, as needed, for record keeping and sewer overflow response cleanup. SD1's Collection Systems Department and Infrastructure Capital Planning Department perform routine inspections after rain events at prioritized Recurring and Inactive SSO locations to confirm overflow activity, and assess the need for

sewer overflow response cleanup. Generally, SD1 conducts post-wet-weather inspections of SSOs when cumulative rainfall depth exceeds one inch or two inches for a single storm event. Most SSOs are inspected in the one-inch storm event. Less active SSOs, as determined by modeling and inspection histories, are inspected in the two-inch storm event. Similarly, all CSOs are inspected when the combined sewer system experiences half an inch of cumulative rainfall in a single storm event. Immediately following a storm event, SD1's network of wireless rain gauges is used to determine which sewersheds were impacted, and if enough rain fell in a specific sewershed to warrant field inspections. Inspection routes are fixed to sewersheds, to better account for variation in storm magnitude and intensity across the District's approximate 200 square-mile service area. Political boundaries and average rainfalls are not used to determine when and where inspections are performed. If an isolated region of the service area experiences rainfall that triggers an inspection, SSO assessment efforts are focused only on the portion of the collection system that may be impacted by the isolated storm. This continuous inspection effort to verify overflow activity throughout the collection system ensures accurate record keeping, appropriate cleanup response, and characterization of capacity issues for wet-weather modeling. The field-based characterization of overflows ensures that the hydraulic model SD1 utilizes is effectively maintained and improved upon, which helps identify the most appropriate solutions for overflow mitigation.

- Simple hydraulic estimating, using the Manning's Gravity Flow and Pipe Calculation, to report overflows from pump stations with constructed bypasses, and industry standard volume estimations techniques and calculations are used for spills or for any witnessed overflow from a manhole. The only exceptions to this calculation methodology are at the Lakeview Pump Station and, as of January 2016, at the Highland Heights Pump Station. These two pump stations have flow meters in the bypass pipes that are used as the primary sources of overflow volumes estimation. If a flow meter malfunctions at one of these pump stations during an overflow, the Manning's Gravity Flow and Pipe Calculation will be used as the default method of volume estimation. These methods have been used historically for reporting purposes.

- SD1's hydraulic models are used for quarterly activation and volume estimations of wet-weather CSOs and SSOs. SD1 completed a year-long flow monitoring program in 2008, consisting of more than 245 flow meters and 45 rain gauges installed throughout the combined and separated systems, to update the calibration of SD1's system-wide hydraulic models. This calibration was undertaken to provide a model network that could confidently be used as an accurate tool in preparing SD1's Watershed Plans. Currently, SD1 maintains approximately 70 flow meters and 23 rain gauges throughout the year, which are used to continuously update and refine the models and investigate capacity issues. Additionally, the models are being used to provide information about the current performance of SD1's system on a quarterly basis. With the historical and current flow monitoring and inspection data, SD1 maintains its highly calibrated network of hydraulic models to provide an accurate representation of the collection system. These modeling and monitoring tools confidently provide estimates of overflow activations and volumes from the sewer systems as a result of wet weather. The models are continuously revised to incorporate rehabilitation and maintenance activities, completed capital projects, private developments, data gathered from GPS surveys, and mapping of discovered infrastructure. This process ensures that the models are kept up-to-date and accurately reflect the current collection system. This approach is consistent with SD1's commitment to provide the best available information on overflow activity.

For this submittal, SD1 has collected rainfall data from a series of 23 rain gauges located across the system, to simulate the wet weather that occurred between January 1, 2018 and March 31, 2018. The results of the model simulations have been summarized and included in this report as estimates of the frequency and total volume of the overflow locations within SD1's service area. These results are not a summary of observed or confirmed activations, but are a confident estimate of the overflow statistics based on the calibrated and verified models.

Precipitation Data

Rainfall statistics are an important component of overflow reporting, as rainfall conditions represent an uncontrolled variable impacting SD1's wet-weather CSO and SSO activity. Quarterly overflow activations and volumes change over time, due to natural variations in rainfall patterns and antecedent moisture conditions. Over time,

SD1 expects system improvements to show a clear trend in reduced overflow activity. However, reviewing overflow reports for any individual quarter, relative to previous quarters, also requires careful review of the rainfall associated with each period, in order to understand the impact of shifting rainfall patterns. For this reason, storm event summaries are included in all overflow reporting submittals. The data in Table 2.1 is from the Cincinnati-Northern Kentucky International Airport (CVG) rain gauge, maintained by the National Weather Service (NWS), in northeast Boone County.

**Table 2.1 Summary of Storm Events at CVG, per National Weather Service**
**(January 1, 2018 through March 31, 2018)**

| Month | Approximate # of Storm Events[1] | Rainfall (in) |
|---|---|---|
| January | 8 | 2.21 |
| February | 13 | 7.80 |
| March | 9 | 3.81 |
| **Total** | **30** | **13.82** |

*[1] A storm event is defined as at least 0.01" of rain with a minimum inter-event time of 7 hours.*

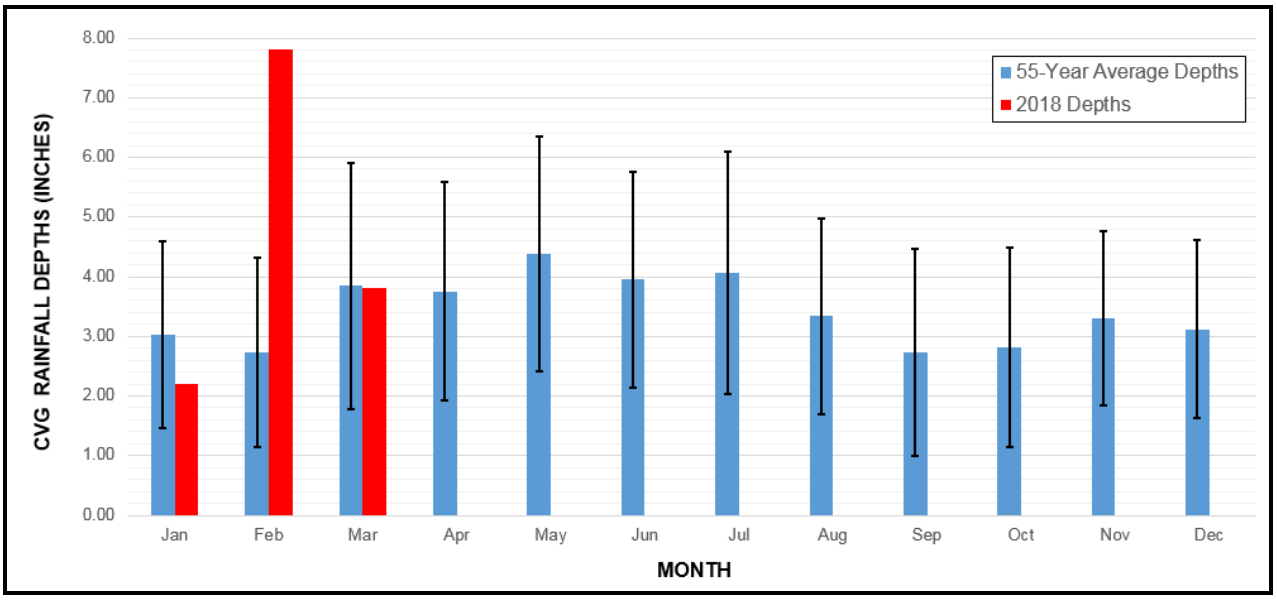
The average cumulative rainfall depth at CVG for the first quarter, from 1951 through 2005, is approximately 9.60 inches. The NWS's recorded cumulative rainfall depth of 13.82 inches for the first quarter of 2018 is approximately 44 percent greater than the 55-year average.

*Historic Wet Weather in the Month of February*

February is typically the driest month of the year in Northern Kentucky. However, the 7.8 inches observed at CVG in 2018 by the NWS is the largest depth of rainfall recorded for the month of February, since weather records have been maintained at that location.

Figure 2.1 demonstrates that the cumulative rainfall depth recorded at CVG in February 2018 is approximately three times the 55-year average, and 3.2 inches greater than the standard deviation of the average February. Additionally, Figure 2.1 demonstrates that February 2018 exceeded the standard deviation of the May, which is the wettest month on average, by more than an inch of cumulative rainfall.

**Figure 2.1 Monthly Cumulative Rainfall Depths Recorded at CVG in 2018 Compared to 55-Year Average**



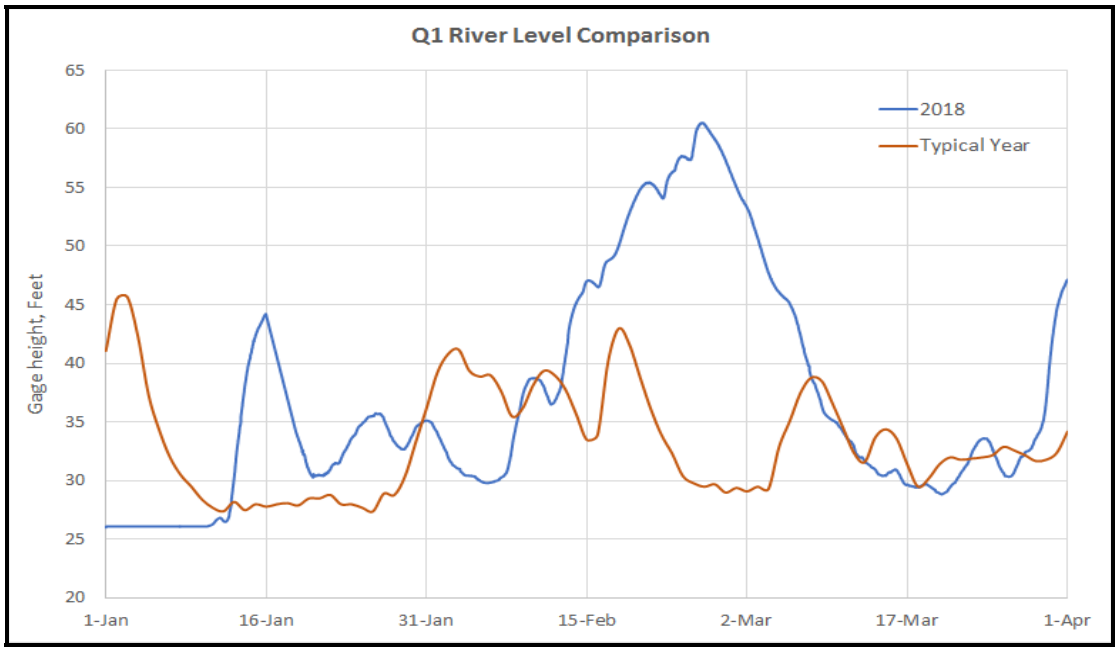

The NWS's Advanced Hydrologic Prediction Service (AHPS) uses radar-adjusted rain gauges and satellite imagery to summarize regional rainfall depths over defined periods of time. For the month of February 2018, the AHPS found that many parts of SD1's service area received as much as 10 inches of rain.

*Historic High River Conditions in February and March*

In addition to the record rainfall in February, the Ohio River reached its 22nd highest crest on record, in Cincinnati, according to observations made by the US Geological Survey and the US Army Corps of Engineers. The river was above action stage for 22 consecutive days, from February 14 to March 7 and crested at 60.53 feet on February 26, 2018. The historic high river conditions and historic rainfalls had a substantial impact on the capacity of SD1's collection systems and its pump station operations, during the first quarter of 2018.

Figure 2.2 illustrates the Ohio River levels for the first quarter of 2018, in comparison to the first quarter of the 1970 typical year.

**Figure 2.2 Ohio River Levels: 2018 Q1 and Typical Year Q1**




The remainder of this section provides overflow summaries for SD1's service area during the period of January 1, 2018 through March 31, 2018. Annual comparisons and a cumulative accounting of the rainfall recorded at CVG and SD1's overflows, from January 2008 through the current reporting period, can be found in Appendix C.

## 2.1 SSOs Due to Wet-Weather Capacity Issues

This section summarizes the Recurring and Inactive overflows from SD1's sanitary sewer system, due to lack of capacity during wet weather. Wet-weather discharges at pump stations are also included in this section. Sanitary Sewer Overflows are classified as Recurring if evidence of overflow is observed at least twice in a twelve month period. A single observation of overflow evidence is classified as an Inactive SSO, until overflow evidence is confirmed more than once in a twelve month period. An Inactive SSO will generally be under investigation for a minimum two years. Inactive SSOs may also be suspected or predicted hydraulic model overflow points, where little or no visual evidence of overflow has been found in the field to confirm the model prediction. All Inactive SSOs are investigated until they are confirmed to be either Recurring or Eliminated.

Recurring Wet-Weather SSOs

For the first quarter of 2018, modeled activation and volume statistics of SD1's 132 Recurring SSOs can be found in Appendix D. The Recurring SSO list is updated annually in the first Quarterly Report of every year to reflect the latest information from ongoing system characterization based upon: field inspections, flow monitoring, and hydraulic modeling. The variation in annual precipitation also significantly influences annual revisions to the Recurring SSO list. A detailed list of structure numbers and transaction descriptions for the revisions made to the Recurring SSO list in 2018 can be found in Appendix E.

During the first quarter of 2018, SD1 performed approximately 363 routine, post-wet-weather inspections at approximately 165 Recurring and Inactive SSOs. Approximately 95 of the 363 post-wet-weather inspections confirmed overflow evidence. There were three storm events that prompted the post-wet-weather inspections in the first quarter. The storm dates and the largest recorded rainfall depths in the service area are provided below:

- February 11-16 – 3.16 inches near the City of Alexandria, Campbell County
- February 21 – 1.77 inches at CVG, Boone County
- March 27 – 2.35 inches near the City of Alexandria, Campbell County

Recurring Wet-Weather SSO Pump Stations Listed in the Consent Decree

In addition to the 132 Recurring SSOs, there are 14 pump stations listed in the Consent Decree that have historically experienced recurring wet-weather capacity issues.

As previously described, Lakeview Pump Station is the only pump station listed in the Consent Decree that has a metered bypass to calculate overflow volumes. All other overflow volumes at Consent Decree listed pump stations are estimated using the Manning's Gravity Flow and Pipe Calculation with start/stop times provided by telemetry.

Table 2.2 lists each of the 14 pump stations identified in Exhibit E of the Consent Decree, and demonstrates their observed wet-weather SSO occurrences and estimated discharge volumes for the first quarter of 2018.

**Table 2.2 Discharges from Consent Decree Pump Stations, due to Lack of Capacity during Wet Weather**
**(January 1, 2018 through March 31, 2018)**

| Name of Pump Station | Number of Wet-Weather Related Discharge Occurrences | Total Estimated Volume (gallons) |
|---|---|---|
| Lakeview | 4 | 2,140,500 |
| Alex-Licking | 0 | 0 |
| Allen Fork | 0 | 0 |
| Crestview | 0 | 0 |
| Harrison Harbor | 0 | 0 |
| Highland Acres | 0 | 0 |
| Kentucky Aire | 0 | 0 |
| Riley Road | 0 | 0 |
| Ripple Creek | 0 | 0 |
| South Hampton | 0 | 0 |
| South Park | 0 | 0 |
| Sunset | 0 | 0 |
| Taylorsport | 0 | 0 |
| Union | 0 | 0 |
| **TOTAL** | **4** | **2,140,500** |

*Gray shading denotes where remedial measures have been completed for Exhibit E pump stations.*

Recurring Wet-Weather SSO Pump Stations Not Listed in the Consent Decree

In addition to tracking the recurring wet-weather SSOs at the pump stations listed in the Consent Decree, SD1 continuously monitors all pump stations throughout the service area for recurring wet-weather capacity issues. There are currently seven pump stations not listed in the Consent Decree that experience recurring wet-weather capacity issues.

Five of the seven pump stations were active in the first quarter of 2018. Table 2.3 provides a summary of the activity at the five pump stations.

The Highland Heights Pump Station has a flow meter installed in the bypass pipe to calculate discharge volumes. Two of the five overflows at the Highland Heights Pump Station were estimated using the flow meter in the bypass pipe. However, the flow meter did not operate correctly due to high river impacts, so SD1's hydraulic model was used to estimate the volume of the spills during the historic high river event. The model predicted that the Highland Heights Pump Station spilled approximately 6.75 million gallons from February 22 to February 29. All other pump station overflow volumes

provided in Table 2.3 have been estimated with the Manning's Gravity Flow and Pipe Calculation, using the start/stop times provided by telemetry.

**Table 2.3 Discharges from Recurring SSO Pump Stations Not Listed in the Consent Decree, due to Lack of Capacity during Wet Weather**
**(January 1, 2018 through March 31, 2018)**

| Name of Pump Station | Number of Wet-Weather Related Discharge Occurrences | Total Estimated Volume (gallons) |
|---|---|---|
| Bullitsville | 3 | 20,300 |
| Highland Heights | 5 | 7,194,900 |
| Keavy | 1 | 11,125 |
| Mafred | 3 | 28,000 |
| Sand Run | 1 | 6,400 |
| **TOTAL** | **13** | **7,260,725** |

*Sand Run Pump Station SSO*

SD1 recorded an overflow, via telemetry, at the Sand Run Pump Station on February 24, 2018, at the peak of the historic wet-weather conditions previously described. Based on the alarm, SD1 made initial notification to KDOW (Request ID# 62141) that an overflow occurred for approximately three hours and spilled 6,400 gallons, as documented in Table 2.3. However, SD1 cannot confirm visual evidence of the overflow during or following the rain event. The primary difficulty in confirming the overflow is that the spill point is not a bypass pipe at the pump station, but rather at a raised manhole approximately 200 feet upstream of the station. Additionally, SD1's model simulation of the rain event did not predict an overflow at the raised manhole. Refer to Quarterly Report No. 38 for a description of the difficulty in synchronizing the Sand Run wet-well overflow alarm with the rim of the newly raised manhole. Due to the ongoing potential for inaccurate or false overflow alarms at this location, SD1 is in the process of removing the wet-well overflow alarm from the Sand Run Pump Station telemetry, and installing an ultra-sonic level sensor with alarm capability, via cellular network, in the upstream manhole. Future overflow alarms for the Sand Run Pump Station will be directly related to levels that are remotely observed in Manhole ID# 2400001, instead of level observations in the pump station's wet well. Manhole ID# 2400001 has been added back to the Recurring SSO list (see Appendix E) to be inspected routinely for a minimum of two years. SD1 is confident that these overflow monitoring modifications will resolve any uncertainty of wet-weather capacity issues at the Sand Run Pump Station.

Inactive Wet-Weather SSOs

SD1 documented two Inactive SSOs during the historic wet-weather conditions previously described.

The first at Manhole ID# 2340032 along the Licking River in the City of Wilder. The SSO was a result of the Wilder Pump Station being shut down for eight consecutive days, from February 20 to February 28, while the Ohio River exceeded the station's action stage of 56 feet. Initial evidence of the SSO was recorded by a flow meter installed in Manhole ID# 2340032. Once the flood waters receded, residual overflow evidence was visually confirmed. SD1's model predicted an overflow that lasted approximately 5.5 days at Manhole ID# 2340032 that spilled an estimated total of 3.18 million gallons. Based on ongoing flow monitoring studies in this area, it appears that this site is only susceptible to overflows during high river events that require the Wilder Pump Station to be shut down. SD1 will continue to monitor the site with a flow meter and routine inspections as an Inactive SSO, as there is no evidence that it activates frequently enough to be classified as a Recurring SSO.

The second Inactive SSO occurred upstream of the Carlisle Pump Station, when the river exceeded the action stage of 55 feet. The pump station was shut down on February 25 for approximately three days, causing a model-predicted spill of approximately 0.26 million gallons. The Carlisle Pump Station service area is only susceptible to overflows during prolonged high river conditions above 55 feet, which requires the station to be shut down to protect it from long-term flood damage.

## 2.2 SSOs Due to Operational Issues

This category of SSO includes discharges from SD1's sanitary sewer collection system and pump stations that are not a result of wet-weather capacity issues. Many of these are one-time, dry-weather occurrences caused by temporary system failures that are investigated and corrected as soon as possible.

During the current reporting period, there were a total of 17 SSOs due to operational issues throughout SD1's service area, resulting in a combined total overflow volume of approximately 322,900 gallons.

Figure 2.3 and Figure 2.4 demonstrate, respectively, the primary causes and estimated discharge volumes of the operational SSOs that were observed in the first quarter of 2018.

**Figure 2.3 Occurrences of SSO due to Operational Issues, per Cause**
**(January 1, 2018 through March 31, 2018)**

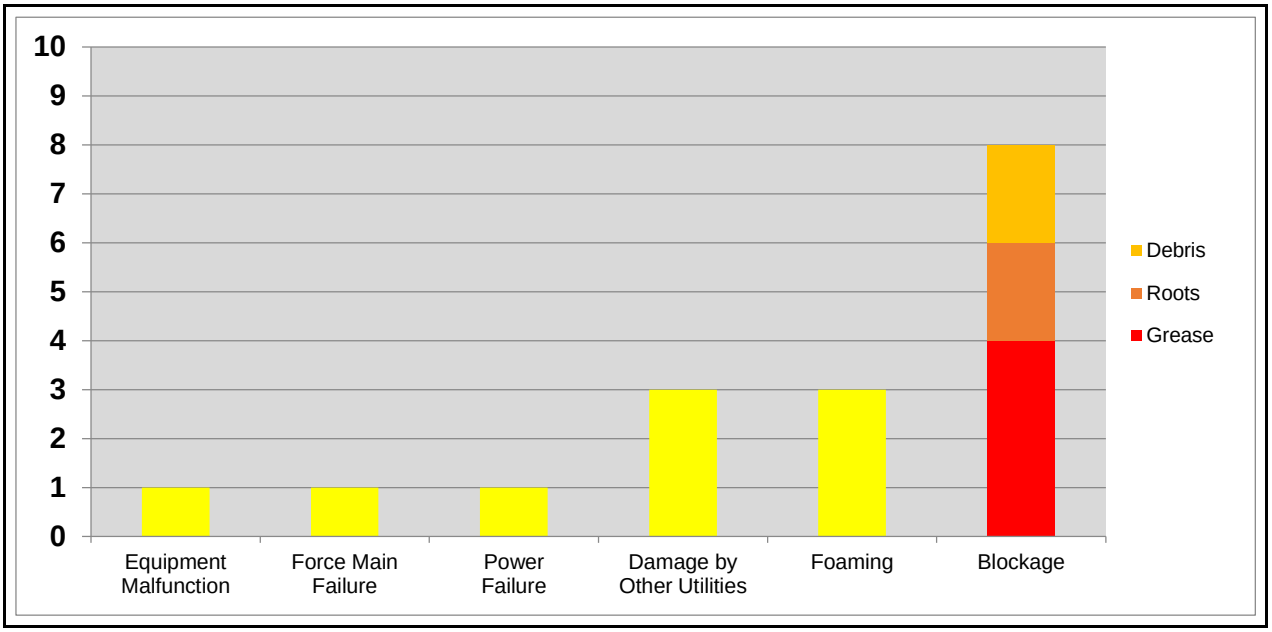
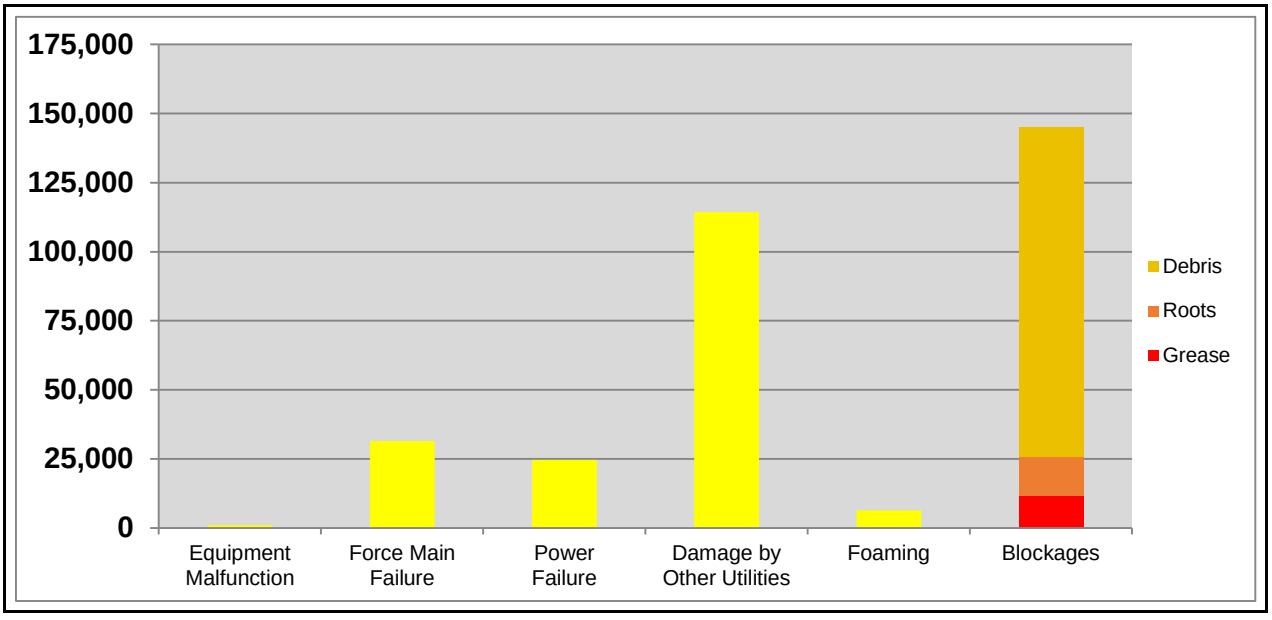



**Figure 2.4 Gallons of SSO due to Operational Issues, per Cause**
**(January 1, 2018 through March 31, 2018)**



The problems that led to these Operational SSOs were acted upon and corrected as soon as possible, in accordance with SD1's Sewer Overflow Response Plan (SORP). The sewers where structural or maintenance failures occurred were put into or updated in the Continuous Sewer Assessment Program (CSAP) to be inspected and cleaned, as determined by the CSAP logic, which also provides appropriate next actions to permanently address the causes of asset failure. Observed overflow events are recorded in SD1's asset management database, Lucity, and are periodically reviewed to identify if any trends or localized problem areas exist that warrant the need for increased inspections, new preventative maintenance routines, or improvement projects.

*Operational SSO at the Allen Fork Pump Station*

On February 12, 2018, an equipment malfunction during a routine check of the backup generator caused a power failure at the station's control panel. The temporary power failure caused an overflow at Manhole ID# 2390002 for approximately 45 minutes that spilled approximately 1,000 gallons.

*Foaming Events at Dry Creek Wastewater Treatment Plant*

In January 2018, a manhole at the Dry Creek Wastewater Treatment Plant experienced three foaming events on three separate occasions. The foaming caused minor overflows that were quickly contained, vactored up, and returned to the collection system. In each instance, SD1's Industrial Monitoring Group performed thorough inspections of the industrial and commercial facilities in the vicinity, but found no source of the foam. Therefore, no enforcement actions were taken by SD1 for the foaming events. SD1 believes that excessive road salt use during freezing conditions may have played a role in the foaming. To test the theory, SD1 plans to collect baseline chloride concentrations in the summer of 2018 to compare to chloride concentrations of any future winter foaming events at Dry Creek.

## 2.3 Wet-Weather CSOs

Included in Appendix F are the modeled activation and volume statistics of SD1's 95 CSOs, for the first quarter of 2018.

## 2.4 Dry-Weather CSOs

During the first quarter of 2018, one dry-weather CSO was observed by SD1 in the City of Ludlow. On March 13, 2018, debris from the historic high river conditions settled and created a blockage in the dry-weather diversion pipe of CSO 1500131 (KY0021466 - Outfall 66). The blockage caused a release of approximately 4,000 gallons of dry-weather CSO into the Ohio River. A post-high-river CSO inspection performed on March 9, 2018 revealed no blockages at the time, which indicates that the debris settled in the diversion pipe after the prescribed inspection routine for high river events. In less than two hours after discovery of the blockage, SD1 vactored the debris from the diversion pipe and returned the flow to the interceptor.

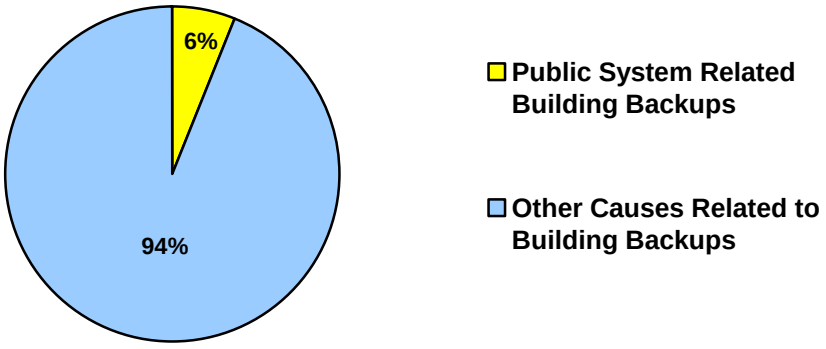
*Incorrect Initial Notifications of Dry-Weather CSOs*

On March 8, 2018, at 1:36 PM, SD1 provided two incorrect initial notifications to KDOW of dry-weather CSOs observed at Diversion Manhole ID#s 1850032 and 1850024. The incorrect initial notifications were assigned Request ID#s 62258 and 62259 by KDOW. Both diversions are associated with CSO 1850158, otherwise known as the Church Street CSO (KY0021466 - Outfall 76), in the City of Taylor Mill. Each diversion had blockages of debris that were immediately cleared when they were found during the inspection. However, the combined sewer system was still under the influence of the historic high-river event at the time of the inspections, as the Banklick Pump Station had just returned to normal pumping operations on March 7, at 12:48 PM. Both of the blockages were remediated within the 48-hour window for performing post-wet-weather and post-high-river CSO inspections. Therefore, both of the records that SD1 provided initial notification on should be classified as wet-weather CSOs, and not classified as dry-weather CSOs that are subject to stipulated penalties.

## 2.5 Building Backups

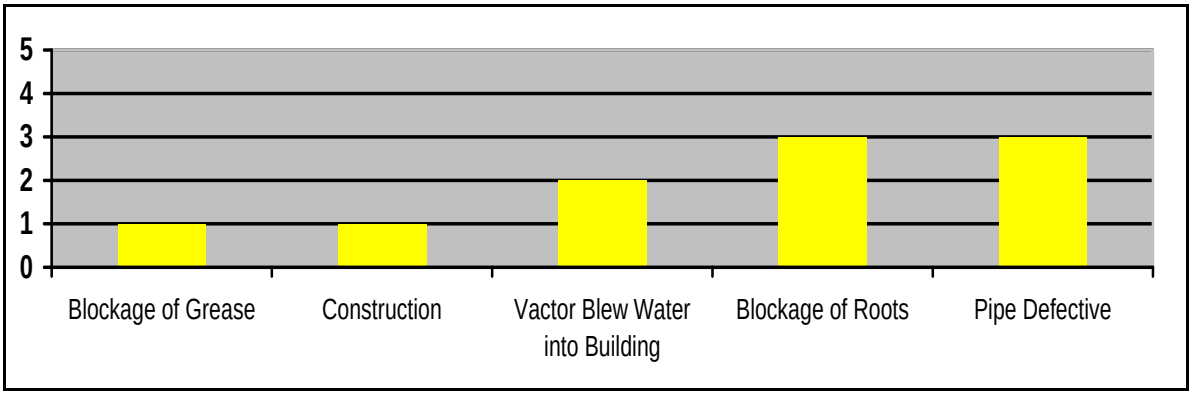
During the first quarter of 2018, there were approximately 163 building backups throughout SD1's service area. Of the 163 backups**,** approximately 10 were determined to be related to the condition or operation of the public sewers and 153 were caused by other issues, as shown in Figure 2.5. The building backups that were not related to the condition or operation of the public sewers, under normal circumstances, were caused by blockages in private service laterals and internal plumbing.

**Figure 2.5 Building Backups: Public System vs. Other Causes**
**(January 1, 2018 through March 31, 2018)**




The causes of the 10 building backups that were determined to be related to the condition or operation of the public sewer lines, under normal circumstances, are detailed in Figure 2.6.

**Figure 2.6 Occurrences of Public System Related Building Backups per Cause**
**(January 1, 2018 through March 31, 2018)**




The sewers where blockages occurred were put into or updated in SD1's CSAP, to be inspected and cleaned as determined by the program logic that provides appropriate next actions for maintenance issues.

All known building backups are recorded in SD1's asset management database, Lucity, and are periodically reviewed to identify if any trends or localized problem areas exist that warrant the need for a larger-scale inspection routine or improvement project.

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# APPENDIX A:

## *Consent Decree Compliance Schedule*

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# Consent Decree Compliance Schedule

| | CONSENT DECREE ACTIVITY | PERCENT COMPLETE | DUE DATE | DATE OF COMPLETION |
|---|---|---|---|---|
| | **ASSESSED STIPULATED PENALTIES** | | | |
| ✓ | $14,000 for 9 DWOs occuring April 18, 2009 through June 30, 2010 | 100% | 1/9/2011 | 12/21/2010 |
| ✓ | $22,000 for 11 DWOs occuring July 1, 2010 through June 30, 2014 | 100% | 1/2/2015 | 12/8/2015 |
| | **CIVIL PENALTY** | | | |
| ✓ | Pay Civil Penalties to EPPC and US EPA | 100% | 06/18/07 | 06/18/07 |
| | **CMOM PROGRAM REQUIREMENTS – 2007 through 2017** | | | |
| ✓ | Submit CMOM Program Self-Assessment | 100% | 10/18/07 | 10/17/07 |
| ✓ | Submit Grease Control Program | 100% | 10/18/07 | 09/17/07 |
| ✓ | Submit Pump Station Backup Power Plan | 100% | 04/18/08 | 12/14/07 |
| ✓ | Submit Sewer Overflow Response Plan (SORP) | 100% | 10/18/07 | 10/09/07 |
| **Submit CMOM Annual Report** | | | | |
| ✓ | CMOM Annual Report 1 | 100% | 12/31/07 | 12/28/07 |
| ✓ | CMOM Annual Report 2 | 100% | 12/31/08 | 12/19/08 |
| ✓ | CMOM Annual Report 3 | 100% | 12/31/09 | 12/18/09 |
| ✓ | CMOM Annual Report 4 | 100% | 12/31/10 | 12/21/10 |
| ✓ | CMOM Annual Report 5 | 100% | 12/31/11 | 12/21/11 |
| ✓ | CMOM Annual Report 6 | 100% | 12/31/12 | 12/31/12 |
| ✓ | CMOM Annual Report 7 | 100% | 12/31/13 | 12/31/13 |
| ✓ | CMOM Annual Report 8 | 100% | 12/31/14 | 12/31/14 |
| ✓ | CMOM Annual Report 9 | 100% | 12/31/15 | 12/31/15 |
| ✓ | CMOM Annual Report 10 | 100% | 12/31/16 | 12/31/16 |
| ✓ | CMOM Annual Report 11 | 100% | 12/31/17 | 12/29/17 |
| | CMOM Annual Report 11 | 0% | 12/31/18 | |
| **Phased Grease Control Implementation** | | | | |
| ✓ | Phase 1 Tasks | 100% | 01/08/09 | 01/08/09 |
| ✓ | Phase 2 Tasks | 100% | 01/08/10 | 01/08/10 |
| ✓ | Phase 3 Tasks | 100% | 01/08/11 | 01/08/11 |
| ✓ | Phase 4 Tasks / Full Implementation | 100% | 01/08/12 | 12/31/11 |
| **Complete Pump Station Backup Power Projects (110 Total)** | | 100% | 12/31/15 | 10/30/15 |
| **Complete SORP Annual Review** | | | | |
| ✓ | SORP Annual Review 1 | 100% | 05/14/09 | 07/10/09 |
| ✓ | SORP Annual Review 2 | 100% | 11/10/10 | 10/01/10 |
| ✓ | SORP Annual Review 3 | 100% | 11/10/11 | 11/10/11 |
| ✓ | SORP Annual Review 4 | 100% | 11/10/12 | 11/10/12 |
| ✓ | SORP Annual Review 5 | 100% | 11/10/13 | 11/08/13 |
| ✓ | SORP Annual Review 6 | 100% | 11/10/14 | 11/11/14 |
| ✓ | SORP Annual Review 7 | 100% | 11/10/15 | 11/10/15 |
| ✓ | SORP Annual Review 8 | 100% | 11/10/16 | 11/08/16 |
| ✓ | SORP Annual Review 9 | 100% | 11/10/17 | 09/05/17 |
| | SORP Annual Review 10 | 50% | 11/10/18 | |
| | **INITIAL WATERSHED PROJECTS** | | | |
| ✓ | Complete Initial Watershed Projects (51 Total) | 100% | 12/31/14 | 06/06/12 |
| **Submit Initial Watershed Projects Annual Report** | | | | |
| ✓ | Initial Watershed Projects Annual Report 1 | 100% | 04/18/08 | 04/08/08 |
| ✓ | Initial Watershed Projects Annual Report 2 | 100% | 06/07/09 | 06/05/09 |
| ✓ | Initial Watershed Projects Annual Report 3 | 100% | 06/07/10 | 06/04/10 |
| ✓ | Initial Watershed Projects Annual Report 4 | 100% | 06/07/11 | 06/07/11 |
| ✓ | Initial Watershed Projects Annual Report 5 | 100% | 06/07/12 | 06/07/12 |
| ✓ | Initial Watershed Projects Annual Report 6 (Final Submission) | 100% | 06/07/13 | 06/06/13 |
| | **NMC PROGRAM REQUIREMENTS – 2007 through 2017** | | | |
| ✓ | Submit NMC Documentation of Compliance | 100% | 04/18/08 | 03/12/08 |
| ✓ | Complete Additional NMC Compliance Activities (51 Total) | 100% | 04/18/09 | 4/18/09[1] |
| **Submit NMC Annual Report** | | | | |
| ✓ | NMC Annual Compliance Report 1 | 100% | 09/04/09 | 05/11/09 |
| ✓ | NMC Annual Compliance Report 2 | 100% | 09/04/10 | 06/04/10 |
| ✓ | NMC Annual Compliance Report 3 | 100% | 09/04/11 | 06/21/11 |
| ✓ | NMC Annual Compliance Report 4 | 100% | 09/04/12 | 07/02/12 |
| ✓ | NMC Annual Compliance Report 5 | 100% | 09/04/13 | 09/04/13 |
| ✓ | NMC Annual Compliance Report 6 | 100% | 09/04/14 | 09/04/14 |
| ✓ | NMC Annual Compliance Report 7 | 100% | 09/04/15 | 09/04/15 |
| ✓ | NMC Annual Compliance Report 8 | 100% | 09/04/16 | 09/02/16 |
| ✓ | NMC Annual Compliance Report 9 | 100% | 09/04/17 | 09/02/17 |
| | NMC Annual Compliance Report 10 | 0% | 09/04/18 | |

# Consent Decree Compliance Schedule

| | CONSENT DECREE ACTIVITY | PERCENT COMPLETE | DUE DATE | DATE OF COMPLETION |
|---|---|---|---|---|
| | **PUMP STATION OVERFLOW ELIMINATION PLAN (PSOEP) – 2007 through 2017** | | | |
| ✓ | Submit PSOEP | 100% | 10/18/07 | 09/18/07 |
| **Submit PSOEP Annual Report** | | | | |
| ✓ | PSOEP Annual Report 1 | 100% | 05/14/09 | 05/11/09 |
| ✓ | PSOEP Annual Report 2 | 100% | 05/14/10 | 05/14/10 |
| ✓ | PSOEP Annual Report 3 | 100% | 05/14/11 | 05/13/11 |
| ✓ | PSOEP Annual Report 4 | 100% | 05/14/12 | 05/14/12 |
| ✓ | PSOEP Annual Report 5 | 100% | 05/14/13 | 05/14/13 |
| ✓ | PSOEP Annual Report 6 | 100% | 05/14/14 | 05/13/13 |
| ✓ | PSOEP Annual Report 7 | 100% | 05/14/15 | 05/14/15 |
| ✓ | PSOEP Annual Report 8 | 100% | 05/14/16 | 05/14/16 |
| ✓ | PSOEP Annual Report 9 | 100% | 05/14/17 | 05/12/17 |
| | PSOEP Annual Report 10 | 0% | 05/14/18 | |
| | **REPORTING – 2007 through 2017** | | | |
| **Submit Quarterly Report** | | | | |
| ✓ | Submit Quarterly Report 1 | 100% | 01/30/08 | 01/30/08 |
| ✓ | Submit Quarterly Report 2 | 100% | 04/30/08 | 04/30/08 |
| ✓ | Submit Quarterly Report 3 | 100% | 07/30/08 | 07/30/08 |
| ✓ | Submit Quarterly Report 4 | 100% | 10/30/08 | 10/30/08 |
| ✓ | Submit Quarterly Report 5 | 100% | 01/30/09 | 01/30/09 |
| ✓ | Submit Quarterly Report 6 | 100% | 04/30/09 | 04/30/09 |
| ✓ | Submit Quarterly Report 7 | 100% | 07/30/09 | 07/30/09 |
| ✓ | Submit Quarterly Report 8 | 100% | 10/30/09 | 10/30/09 |
| ✓ | Submit Quarterly Report 9 | 100% | 01/30/10 | 01/29/10 |
| ✓ | Submit Quarterly Report 10 | 100% | 04/30/10 | 04/30/10 |
| ✓ | Submit Quarterly Report 11 | 100% | 07/30/10 | 07/30/10 |
| ✓ | Submit Quarterly Report 12 | 100% | 10/30/10 | 10/29/10 |
| ✓ | Submit Quarterly Report 13 | 100% | 01/30/11 | 01/28/11 |
| ✓ | Submit Quarterly Report 14 | 100% | 04/30/11 | 04/29/11 |
| ✓ | Submit Quarterly Report 15 | 100% | 07/30/11 | 07/29/11 |
| ✓ | Submit Quarterly Report 16 | 100% | 10/30/11 | 10/28/11 |
| ✓ | Submit Quarterly Report 17 | 100% | 01/30/12 | 01/30/12 |
| ✓ | Submit Quarterly Report 18 | 100% | 04/30/12 | 04/30/12 |
| ✓ | Submit Quarterly Report 19 | 100% | 07/30/12 | 07/30/12 |
| ✓ | Submit Quarterly Report 20 | 100% | 10/30/12 | 10/30/12 |
| ✓ | Submit Quarterly Report 21 | 100% | 01/30/13 | 01/30/13 |
| ✓ | Submit Quarterly Report 22 | 100% | 04/30/13 | 04/30/13 |
| ✓ | Submit Quarterly Report 23 | 100% | 07/30/13 | 07/30/13 |
| ✓ | Submit Quarterly Report 24 | 100% | 10/30/13 | 10/30/13 |
| ✓ | Submit Quarterly Report 25 | 100% | 01/30/14 | 01/30/14 |
| ✓ | Submit Quarterly Report 26 | 100% | 04/30/14 | 04/30/14 |
| ✓ | Submit Quarterly Report 27 | 100% | 07/30/14 | 07/30/14 |
| ✓ | Submit Quarterly Report 28 | 100% | 10/30/14 | 10/30/14 |
| ✓ | Submit Quarterly Report 29 | 100% | 01/30/15 | 01/30/15 |
| ✓ | Submit Quarterly Report 30 | 100% | 04/30/15 | 04/30/15 |
| ✓ | Submit Quarterly Report 31 | 100% | 07/30/15 | 07/30/15 |
| ✓ | Submit Quarterly Report 32 | 100% | 10/30/15 | 10/30/15 |
| ✓ | Submit Quarterly Report 33 | 100% | 01/30/16 | 01/29/16 |
| ✓ | Submit Quarterly Report 34 | 100% | 04/30/16 | 04/30/16 |
| ✓ | Submit Quarterly Report 35 | 100% | 07/30/16 | 07/29/16 |
| ✓ | Submit Quarterly Report 36 | 100% | 10/30/16 | 10/30/16 |
| ✓ | Submit Quarterly Report 37 | 100% | 01/30/17 | 01/30/17 |
| ✓ | Submit Quarterly Report 38 | 100% | 04/30/17 | 04/30/17 |
| ✓ | Submit Quarterly Report 39 | 100% | 07/30/17 | 07/30/17 |
| ✓ | Submit Quarterly Report 40 | 100% | 10/30/17 | 10/30/17 |
| ✓ | Submit Quarterly Report 41 | 100% | 01/30/18 | 01/30/18 |
| ✓ | Submit Quarterly Report 42 | 100% | 04/30/18 | 04/30/18 |
| | Submit Quarterly Report 43 | 0% | 07/30/18 | |

# Consent Decree Compliance Schedule

| | CONSENT DECREE ACTIVITY | PERCENT COMPLETE | DUE DATE | DATE OF COMPLETION |
|---|---|---|---|---|
| | **STATE ENVIRONMENTAL PROJECTS** | | | |
| ✓ | Setup 6 Separate Escrow Accounts | 100% | 10/18/07 | 10/18/07 |
| ✓ | Conservancies | 100% | 04/18/12 | 04/18/12 |
| ✓ | *Boone County* | 100% | 04/18/12 | 03/26/12 |
| ✓ | *Campbell County* | 100% | 04/18/12 | 02/23/12 |
| ✓ | *Kenton County* | 100% | 04/18/12 | 04/17/12 |
| ✓ | Licking River Watershed Watch | 100% | 04/18/12 | 09/28/11 |
| ✓ | Split Rock | 100% | 04/18/12 | 12/18/08 |
| ✓ | Education Programs | 100% | 04/18/12 | 08/04/11 |
| ✓ | State Environmental Project Completion Report | 100% | 06/17/12 | 06/15/12 |
| | **SUPPLEMENTAL PROJECTS** | | | |
| ✓ | Supplemental Environmental Projects | 100% | 04/18/12 | 04/12/12 |
| ✓ | SEP Completion Reports | 100% | 06/17/12 | 06/15/12 |
| | **WATERSHED COMMUNITY COUNCIL** | | | |
| ✓ | Watershed Summit | 100% | N/A | 08/30/07 |
| ✓ | Watershed Community Council Meeting 1 | 100% | N/A | 11/27/07 |
| ✓ | Watershed Community Council Meeting 2 | 100% | N/A | 02/26/08 |
| ✓ | Watershed Community Council Meeting 3 | 100% | N/A | 05/20/08 |
| ✓ | Watershed Community Council Meeting 4 | 100% | N/A | 08/19/08 |
| ✓ | Watershed Community Council Meeting 5 | 100% | N/A | 11/18/08 |
| ✓ | Watershed Community Council Meeting 6 | 100% | N/A | 02/17/09 |
| ✓ | Watershed Community Council Meeting 7 | 100% | N/A | 05/20/10 |
| ✓ | Watershed Community Council Meeting 8 | 100% | N/A | 11/03/10 |
| | **WATERSHED PLANS** | | | |
| **Framework for Developing Watershed Plans** | | | | |
| ✓ | Obtain Public Input on Framework for Watershed Plans | 100% | 04/09/08 | 04/09/08 |
| ✓ | Submit Framework for Watershed Plans | 100% | 04/18/08 | 04/17/08 |
| **First Round Watershed Plans** | | | | |
| ✓ | Obtain Public Input on First Round of Watershed Plans | 100% | 06/27/09 | 06/08/09 |
| ✓ | *Public Comment Period (5/7/09-6/8/09)* | 100% | 06/08/09 | 06/08/09 |
| ✓ | *Boone County Public Meeting* | 100% | N/A | 05/14/09 |
| ✓ | *Campbell County Public Meeting* | 100% | N/A | 05/19/09 |
| ✓ | *Kenton County Public Meeting* | 100% | N/A | 05/21/09 |
| ✓ | Submit First Round of Watershed Plans | 100% | 06/30/09 | 06/30/09 |
| ✓ | Resubmit First Round of Watershed Plans | 100% | 03/31/11 | 03/31/11 |
| ✓ | Resubmit First Round of Watershed Plans - Revision | 100% | 10/03/13 | 10/01/13 |
| ✓ | Final Submission of First Round of Watershed Plans | 100% | 03/15/14 | 03/14/14 |
| **Second Round Watershed Plans** | | | | |
| | Obtain Public Input on Second Round of Watershed Plans | 0% | To Be Determined[2] | |
| | Submit Second Round of Watershed Plans | 0% | To Be Determined[2] | |
| **Third Round Watershed Plans** | | | | |
| | Obtain Public Input on Third Round of Watershed Plans | 0% | To Be Determined[2] | |
| | Submit Third Round of Watershed Plans | 0% | To Be Determined[2] | |
| | **Consent Decree Compliance** | | | |
| | Consent Decree Compliance - Percentage of Term Complete | 61% | 12/31/25 | |

[1] *Project schedules for three of the 51 projects were extended beyond 4/18/2009, as described in the 2009 NMC Annual Report. The three projects were complete as of December 2009.*

[2] *Deadline is dependent on the approval date of each Watershed Plan.*

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# APPENDIX B:

## *Watershed Improvement Projects*

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# Initial Watershed Projects

| CIP Title | Basin | Scheduled Completion Date | Actual Completion Date | Status |
|---|---|---|---|---|
| **Initial Watershed Projects** | | | | |
| Strawberry PS Elimination | North | 2006 | 2005 | Complete |
| Beechwood Outfall Sewer Replacement | North | 2007 | 2007 | Complete |
| Eastern Regional - Contract 1--Pond Creek Force Main and Gravity Sewer to Eastern Regional WRF | East | 2008 | 2007 | Complete |
| Eastern Regional - Contract 2--Kahn's Gravity Sewer and Gravity Sewer to the Pond Creek PS | East | 2008 | 2007 | Complete |
| US 27 at Summit Assessment | East | 2008 | 2006 | Complete |
| Eastern Regional - Contract 4--Alex-Licking Gravity Sewer & Force Main to Contract 1 | East | 2009 | 2008 | Complete |
| Eastern Regional - Contract 6--Pond Creek PS | East | 2008 | 2007 | Complete |
| Eastern Regional - Contract 8A--Alex-Licking PS | East | 2009 | 2009 | Complete |
| Parkside PS Relocation | East | 2008 | 2007 | Complete |
| Eastern Regional Water Reclamation Facility | East | 2008 | 2008 | Complete |
| Highland Heights PS Study | East | 2006 | 2006 | Complete |
| Wilson/Waterworks Road Relief Sewer Study | East | 2008 | 2007 | Complete |
| Pinehill/Skyview Terrace Sewer | East | 2006 | 2005 | Complete |
| Eastern Regional - Contract 7--Riley Road #2 PS | East | 2009 | 2009 | Complete |
| Eastern Regional - Contract 3--Riley Force Main and Gravity Sewer to the ERWRF | East | 2009 | 2010 | Complete |
| Western Regional - KDOT - Turkeyfoot Road Force Main | West | 2006 | 2005 | Complete |
| Western Regional - Union Sewer (North and South) | West | 2013 | 2008 | Complete |
| American Sign PS Rehabilitation | West | 2008 | 2008 | Complete |
| Allen Fork Collection System - Phase I Improvements | West | 2009 | 2007 | Complete |
| Duncan Drive Assessment Project | West | 2007 | 2006 | Complete |
| Western Regional - Sunnybrook Sewer | West | 2013 | 2010 | Complete |
| Western Regional - Gunpowder Interceptor Sewer | West | 2013 | 2010 | Complete |
| Banklick PS Screening Facility | Central | 2006 | 2005 | Complete |
| Stevenson Road Relief Sewer Project Phase II | Central | 2006 | 2006 | Complete |
| Latonia Combined Sewer Separation | Central | 2009 | 2007 | Complete |
| Licking River Sewer Crossing Study | Central | 2007 | 2007 | Complete |
| McMillan PS Removal | Central | 2006 | 2005 | Complete |
| Meyer Road PS Rehabilitation | Central | 2008 | 2008 | Complete |
| Macke PS Rehabilitation | Central | 2008 | 2008 | Complete |



Updated: April 30, 2018

# Initial Watershed Projects

| CIP Title | Basin | Scheduled Completion Date | Actual Completion Date | Status |
|---|---|---|---|---|
| **Initial Watershed Projects** | | | | |
| Richwood PS Improvements | Central | 2006 | 2005 | Complete |
| Patton Street Sewer Study | Central | 2006 | 2006 | Complete |
| South Hills Outfall | Central | 2008 | 2007 | Complete |
| Grit Chamber Projects | Multiple | 2010 | 2008 | Complete |
| Fort Wright Illicit Discharge Removal | Multiple | 2007 | 2006 | Complete |
| Fort Wright Sanitary Sewer Rehabilitation Phase 1 | Multiple | 2007 | 2006 | Complete |
| Fort Wright Outfall Sewer - Phase II | Multiple | 2006 | 2006 | Complete |
| Dry Creek Treatment Plant - Grit Removal Modifications | Multiple | 2006 | 2005 | Complete |
| Large Diameter Sewer Assessment Program - Phase III | Multiple | 2007 | 2006 | Complete |
| Brookwood Subdivision SSES Study | Multiple | 2006 | 2006 | Complete |
| Southern Kenton Drainage Study | Multiple | 2007 | 2006 | Complete |
| Wilson Road Sewer Assessment Project | Multiple | 2006 | 2005 | Complete |
| Apple Drive Sewer Outfall | Multiple | 2006 | 2006 | Complete |
| Bluegrass Swim Club Sewer Separation | Multiple | 2008 | 2007 | Complete |
| Eastern Regional – Sunset Pump Station and Force Main Improvements | East | 2010 | 2010 | Complete |
| Western Regional Conveyance System to Western Regional WRF | West | 2013 | 2012 | Complete |
| Western Regional Water Reclamation Facility | West | 2013 | 2012 | Complete |
| Western Regional - Narrows Road Diversion PS | West | 2013 | 2012 | Complete |
| Western Regional - Frogtown Interceptor Sewer (from Sunnybrook Dr. to Frogtown Rd.) | West | 2014 | 2012 | Complete |
| Western Regional - South Fork Gunpowder Interceptor Sewer and Rosetta Sewer | West | 2013 | 2012 | Complete |
| Western Regional - Turkeyfoot Industrial Road Force Main | West | 2013 | 2012 | Complete |
| Western Regional - Richwood Sewer and Force Main | West | Removed from Initial Watershed Projects. Approved in letter from Cabinet dated May 13, 2013. | | |

**Watershed Plan Projects: Five Year Program**

## System-wide Programs

| CIP Title | Basin | Project Description | Target Project Benefit | Scheduled Completion Date | Actual Completion Date | Past Activity for 01/01/2018 to 03/31/2018 | Planned Activity for 04/01/2018 to 06/30/2018 |
|---|---|---|---|---|---|---|---|
| *(Schedules listed in this section are subject to change based on the approval of SD1's Watershed Plans.)* | | | | | | | |
| **Priority Inflow and Infiltration Source Identification & Removal Program** | | | | | | | |
| Lakeview I/I Source Identification & Removal | Central | SSES activities and I/I removal in areas where found to be cost effecitve and feasible upstream of the Lakeview Pump Station | Reduce I/I and SSOs in Lakeview PS service area | Beyond 2017 | n/a | Flow Monitoring, Modeling, and Initial Design | Flow Monitoring, Modeling, and Initial Design |
| Licking River Siphon Source Identification and Removal | Central | SSES activities and I/I removal in areas where found to be cost effecitve and feasible upstream of the Licking River Siphon | Reduce I/I and SSOs in Licking River Siphon area | Beyond 2017 | n/a | Initial Design | Initial Design |
| Taylor Creek Source Identification and Removal | East | SSES activities and I/I removal in areas where found to be cost effecitve and feasible in the Taylor Creek area | Reduce I/I and SSOs in Taylor Creek area | Beyond 2017 | n/a | Initial Design | Initial Design |
| **Green Programs (DRIP & GrIPP)** | | | | | | | |
| Boone Woods YMCA Detention Model | North | Partnership with Northern Kentucky University Center for Applied Ecology to retrofit a detention basin on Boone Woods YMCA property | Improve Water Quality | 2010 | 2010 | Complete | |
| City of Covington: 12th Street Bioswale | North | Partnership with City of Covington to install street planters leading to a bioswale and rain garden along 12th Street | Reduce CSO volume | 2011 | 2011 | Complete | |
| City of Covington: Main Strasse Gateway Biofiltration Swale | North | Partnership with City of Covington and Transit Authority of Northern Kentucky to install biolfiltration swales on city property at the Bakewell parking lot | Reduce CSO volume | 2012 | 2013 | Complete | |
| Notre Dame Academy Basin Retrofit | North | Partnership with Notre Dame Academy to retrofit an existing detention basin on school property | Reduce CSO volume | 2009 | 2009 | Complete | |
| City of Ft. Thomas: Rossford Park Rain Garden | East | Partnership with City of Ft. Thomas to install rain gardens at Rossford Park | Improve Water Quality | 2012 | 2012 | Complete | |
| City of Ft. Thomas: Memorial Parkway Bioswale | East | Partnership with City of Ft. Thomas to install a bioswale at the Northern Kentucky Water District property located along Memorial Parkway. | Improve Water Quality | 2010 | 2010 | Complete | |
| Kenton County School District: Turkeyfoot Middle School | Central | Partnership with Kenton County School District to install rain garden at Turkeyfoot Middle School | Improve Water Quality | 2010 | 2010 | Complete | |
| City of Covington: Madison Ave. Rain Garden | North | Partnership with City of Covington to install two rain gardens or street planters within the right-of-way along Madison Avenue | Reduce CSO volume | 2013 | 2013 | Complete | |
| Kenton County Public Library: Mary Ann Morgan Branch | North | Partnership with Kenton County Library to install rain gardens and permeable pavers on site at the Mary Ann Mongan Branch | Reduce CSO volume | 2013 | 2013 | Complete | |
| **Demonstration Projects (Pilot Projects & Innovative Technology Testing)** | | | | | | | |
| St. Elizabeth Detention Basin Retrofit | North | Modification of an existing dry detention basin located on property owned by St. Elizabeth Medical Center. | Reduce CSO volume in the Willow Run Sewershed | 2009 | 2009 | Complete<br>Post-Construction Monitoring | |
| Prisoner's Lake Rainwater Harvesting | North | Construction of a small storm water pumping station and force main to capture storm water runoff from Prisoner's Lake that will be re-used in an irrigation pond for a small public golf course. | Manage storm water entering the CSS | 2010 | 2010 | Complete | |
| Terraced Reforestation | North | Construction of a series of vegetated, terraced berms within the I-71/75 right-of-way in the City of Covington. | Manage storm water entering the CSS | 2010 | 2011 | Complete<br>Post-Construction Monitoring | |
| **Watershed Controls Pilot Projects - Regional and Decentralized Controls** | | | | | | | |
| Regional Project: Banklick Regional Wetlands | Central | Constructed wetland that treats flow diverted from Banklick Creek to reduce bacteria concentrations. | Improve water quality of Banklick Creek | 2011 | 2011 | Complete<br>Post-Construction Monitoring | |
| Decentralized Control Project | Central | Storm water control measures such as wetlands, biofiltration basins, and enhanced retention serving upstream drainage areas smaller than one square mile, but typically greater than five acres | Improve water quality of local streams | Beyond 2017 | n/a | Initial Design | Initial Design |

**Watershed Plan Projects: Five Year Program**

## Specific Basin Projects

| CIP Title | Basin | Project Description | Target Project Benefit | Scheduled Completion Date | Actual Completion Date | Past Activity for 01/01/2018 to 03/31/2018 | Planned Activity for 04/01/2018 to 06/30/2018 |
|---|---|---|---|---|---|---|---|
| *(Schedules listed in this section are subject to change based on the approval of SD1's Watershed Plans.)* | | | | | | | |
| Van Deren Sanitary Sewer Improvements | North | Sanitary and storm sewer improvements in a 100 home area to separate common manholes and remove illicit connections and I/I | Reduce SSOs and illicit discharges in Lakeside Park | 2011 | 2011 | Complete | |
| Avon Drive Sanitary Sewer Improvements | North | Replacement of 570 LF of 12-inch sewer with 24-inch pipe and installation of new storm sewer | Reduce SSOs in Lakeside Park | 2010 | 2010 | Complete | |
| Willow Run Direct Entry Point Bar Racks | North | Installed bar racks on 10 direct entry points where open storm channels discharge into sewer system | Reduce debris entry into system, maintain capacity and reduce blockages | 2009 | 2010 | Complete | |
| KYTC Basin - Green Infrastructure Retrofit | North | Conversion of traditional detention basin near I-75 to provide greater detention and infiltration by modifying the outlet structure and other improvements | CSO reduction, informs future green infrastructure design | 2012 | 2011 | Complete | |
| Lakeview PS Pump Replacement | Central | Replaceament of 8 pumps at the Lakeview pump station along with piping and electrical improvements to provide a reliable peak capacity of 22.5 MGD | Reduce SSOs at Lakeview PS and increase PS reliability | 2014 | 2013 | Complete | |
| Church Street (gray, green, and watershed controls) | Central | The separation of street load on six streets, new biofiltration basin and installation of approximately 1,300 linear feet of new 72-inch sewer. | Reduce CSO frequency and volume into Banklick Creek and improve structural integrity of sewer infrastructure. | 2014 | Ph 1 - 2015 | Ph 1 - Complete<br>Post-Contruction Monitoring | |
| | | | | 2018 | Ph 2 - n/a | Ph 2 - Construction | Ph 2 - Finish Construction |
| Vernon Lane – Public & Private Source I/I Removal | Central | Combination of private I/I removal, sewer rehabilitation in area comprising approximatley 270 homes | Eliminate Vernon Ln. SSO and improve water quality | 2014 | Ph 1 - 2014 | Ph 1 - Complete | |
| | | | | 2017 | Ph 2 - 2017 | Ph 2 - Complete | Post-Construction Monitoring |
| Ash Street PS and Forcemain | East | Construction of a new approximately 7 MGD pump station in Silver Grove and new force main to the Riley Rd. Pump Station in Alexandria. Also includes new force main to redirect flow from the Silver Grove PS to the Ash St. PS | Reduce overflows from Silver Grove CSO and SSO reduction in the Highland Heights PS and Silver Grove PS service areas. | 2018 | n/a | In-Progress | In-Progress |
| Riviera Sewer Replacement | East | Replacement of approximately 2,000 LF of deteriorated 24-inch pipe in the Taylor Creek area | Reduce CSOs into Taylor Creek and address structural issues | Beyond 2018 | n/a | Initial Design | Initial Design |
| | | Replacement of approximately 350 LF of deterioriated 24-inch pipe. Upsize to 54-inch pipe. | Replace collapsed ineterceptor and provide additional capacity. | 2018 | 2018 | Complete | Post-Construction Monitoring |
| | | Emergency repair of approximately 1,300 LF of collapsed 24-inch pipe. Upsize to 54-inch pipe. | | 2016 | 2016 | Complete | Post-Construction Monitoring |
| Lakeside Park – Public Sewer Rehab and Private Source Removal | North | Combinbination of private I/I removal, sewer rehabilitation/replacment and manhole lining, and stormwater BMPs where feasible in Lakeside Park | Eliminate SSOs in Lakside Park | 2014 | Ph 1 & 2 - 2014 | Ph 1 & 2- Complete | |
| | | | | 2017 | n/a | Ph 3 - Construction | Ph 3 - Finish Construction |
| Willow Run Dynamic Control Facility | North | Construction of a dynamic weir facility at the Willow Run overflow diversion to provide in-line storage | CSO reduction using in-line storage | Beyond 2018 | n/a | Initial Design | Initial Design |

## Other Committed Projects

| CIP Title | Basin | Project Description | Target Project Benefit | Scheduled Completion Date | Actual Completion Date | Past Activity for 01/01/2018 to 03/31/2018 | Planned Activity for 04/01/2018 to 06/30/2018 |
|---|---|---|---|---|---|---|---|
| *(Schedules listed in this section are subject to change based on the approval of SD1's Watershed Plans.)* | | | | | | | |
| Donnemeyer Improvements, Newport Pavilion Improvements, Bellevue Relief Sewer, Wilson/Waterworks Road, Covert Run | East | Multiple sewer projects including replacement with larger 18-30 -inch diameter sewers in the Taylor Creek area. Also included private source I/I removal | Reduce CSO and SSO in Taylor Creek area and address basement flooding | 2011 | 2011 | Complete | |
| Dry Creek WWTP Headworks Improvements | North | Construction of a new 110 MGD headworks facility at the Dry Creek WWTP | Increase reliability and wet weather treatment cpacity at Dry Creek WWTP | 2013 | 2013 | Complete | |

**Additional CSO and SSO Reduction Projects**

| Project Title | Basin | Project Description | Target Project Benefit | Scheduled Completion Date | Actual Completion Date | Planned Activity for 2018 |
|---|---|---|---|---|---|---|
| **CSO Reduction** | | | | | | |
| Aqua on the Levee | East | In partnership with a developer to construct a 48" separate storm outfall through the Ohio River levee in Newport. Project will provide storm water offloading opportunity for 5 acres, and extended opportunity for 19 acres of additional offloading along Saratoga St. Maximum extent of offloading opportunity with new storm outfall will be 38 acres, including Washington St. | Reduce CSO volumes at Saratoga St and Washington St CSOs approximately 4 MG in typical year with proximal separation. Extended separation will provide approximately 7.5 MG reduction in typical year. The maximum extent separation will provide more than 17 MG of CSO reduction during the typical year. | 2017 | n/a | Permitting Construction |
| Catch Basin Retrofits C480-11 | Central & North | Strategically disconnect catch basins in the CSS that are tied into the collection lines, main interceptors, or the regulating diversion MHs. Reconnect the catch basins to the wet-weather CSO outfall line, effectively removing the inflows from the CSS mainlines. Retrofit all reconnected CBs with solids and floatable controls. | Partial removal of street inflows in various areas of the combined system:<br>Kenner St (Ludlow) = 2 CBs<br>Adams St + Eastern Ave (Covington) = 3 CBs<br>Garrard St + Riverside Dr (Covington) = 4 CBs<br>Greenup St + Riverside Dr (Covington) = 2 CBs<br>Pike St + Rohmann Ave (Covington) = 4 CBs<br>Virginia Ave + 45th St (Covington) = 2 CBs<br>Warren St (Covington) = 3 CBs | 2011 | 2011 | Complete |
| Covington Detention Basins | North | In partnership with the City of Covington, construct detention basins in the low lying areas of the Peasleburg neighborhood to mitigate flooding from peak storm events. | The detention basins will provide approximately 2.5 to 3.5 MG of typical year CSO reduction in the Willow Run system. | 2015 | 2015 | Complete |
| Eighth St. Combined Sewer Separation (Covington) | North | Construct 2,300 LF of separate storm sewer along the 8th St. corridor, in Covington, to offload approximately 11.8 ac of public streets and private property. | Reduce SD1's sixth largest CSO at 8th St.(CSO 1420142 - KY0021466 Outfall 51) from approximately 92.8 MG to 87.4 MG in the typical year. | 2022 | n/a | Initial Design |
| Hazen Street, Ludlow Separation | North | In partnership with the City of Ludlow, replace and reconfigure CSS catch basins to improve drainage. | Consolidates CSS catch basins on Hazen St and at the entrance of River's Breeze Condominiums. Extends the initial scope of disconnection in Ludlow, beyond what was identified in Figure 8.2a of the Watershed Plans. Full disconnection will be possible with a new 42" separate storm pipe on West St. | 2013 | 2013 | Complete |
| Injection Wells Pilot | North, Central, East | Disconnect catch basins in portions of the CSS in Ludlow, Covington, and Bellevue for deep well injection into the alluvium, in three pilot areas. | Reduce activations and volumes at the Adella St CSO (Ludlow), E 6th St CSO (Covington), and Patchen St CSO (Bellevue) | Beyond 2017 | n/a | Aquifer characterization by USGS & Permitting |
| Jacob Price Ph1 | Central | Stormwater offloading from approximately 7.5 acres of Covington Housing development | Reduce CSO approximately 5.5 MG in the typical year at Robbins St and 11th St CSOs. | 2014 | 2014 | Complete |
| Jacob Price Ph3 | Central | Additional stormwater offlaoding of 9 acres adjacent to Jacob Price Ph 1 redevelopment, including installation of BMP for WQ. | Reduce CSO by approximately 6.6 MG in the typical year at the 8th St, 9th St, and 10th CSOs. The 9th St and 10th St CSOs are predicted to have no typical year activity following the completion of the project. | Beyond 2017 | n/a | Construction |
| Park Hills Separation | North | In partnership with the City of Park Hills, replace and locally separate CSS catch basins to improve drainage. Streets improved: Alhambra Ct, Exter Dr, Coram St, Harriet St, Irishrose Ln, Old State Rd, South Arlington Rd, Jackson St. | Removes catch basins from the local CSS and redirects to a drainage ditch. The ditch drains to Willow Run CSS, further downstream. This localized separation provides opportunity to completely remove the identified street flows from the Willow Run CSS with the replacement of the Brent Spence Bridge. | 2015 | 2015 | Complete |

**Additional CSO and SSO Reduction Projects**

| Project Title | Basin | Project Description | Target Project Benefit | Scheduled Completion Date | Actual Completion Date | Planned Activity for 2018 |
|---|---|---|---|---|---|---|
| **CSO Reduction** | | | | | | |
| State Route KY9 Realignment | Central | In partnership with KY Transportation Cabinet, offload stormwater from the existing CSS on approximately 2.5 miles of newly realigned state route KY9, along the Licking River in Newport. KYTC's proposed 36" separate storm pipe will be upsized by SD1 to 60" to accommodate additional offloading in the future. Utilizes two existing CSO outfalls and requires the construction of one new separate storm outfall through the levee. | Reduces CSO volumes in the short term at 4th St, 9th St, 10th St, and 12 St CSOs by approximately 10 MG. Maximum extent of potential separation in Newport is approximately 167 acres with the new separate storm outfall, which will provide approximately 63 MG of CSO reduction. Project also rehabilitates all intersecting sanitary assets and eliminates discovered illicit connections to the CSO outfalls. | 2016 | Southern Phase - 2016<br><br>Northern Phase - n/a | Southern Phase - Complete<br><br>Northern Phase- Finish Construction |
| Victory Ave Storm Sewer Improvement | Central | Construct a new 15" separate storm sewer to alleviate flooding of private property in south Covington. | Allows disconnection of four existing CSS catch basins that collect approximately 0.3 acres of street runoff. Reduces combined flows tributary to the Banklick PS and offloads to the Banklick Creek. | 2016 | 2016 | Complete |
| Water's Edge | East | Construct a new 36" separate storm sewer and disconnect existing CSS catch basins on Taylor Ave in Bellevue. Integrate BMPs for WQ. Four phases of offloading. | Reduce CSO volumes at Taylor Ave CSO and other local CSOs by approximately 6.1 MG in the typical year with Ph 1 and 15.68 MG with Ph 4. Improves flooding issues on Taylor and Eden Avenues. | 2017 | n/a | Finish Construction |
| **SSO Reduction** | | | | | | |
| Burlington Sewer Reroute | West | Near the Burlington Pump Station, construct 100 linear feet of 18" gravity sewer to reroute flows from the Allen Fork Pump Station to the Burlington Pump Station. | New sewer will remove approximately 70 homes from flowing to the Allen Fork PS and pipe them directly to the Burlington PS, improving wet-weather capacity at Allen Fork PS and making pumping operations more efficient. | 2017 | n/a | Finish Construction |
| Bullitsville Pump Station Intermediate Improvements | West | Install 150,000 gallons of EQ storage and structural modifications to existing pump station to allow the operation of three new pumps. | Increase pumping capacity to 3.0 MGD. Reduce frequency and magnitude of upstream Recurring SSO at MHID# 2370003. | 2022 | n/a | Initial Design |
| Elsmere Corridor | Central | In the City of Elsmere, upsize approximately 6,600 feet of existing gravity main from Covered Bridge Rd to Raintree Ct, and approximately 1,900 feet of existing gravity main west of Central Row Rd and north towards Edwards Rd. | Upsizing the sewers will eliminate approximately 1.87 MG of wet either SSO in the typical year. | 2020 | n/a | Final Design Construction |
| Lakeview Pipe Upgrades | Central | Approximately 85,000 feet of conveyance upgrades in the Lakeview sewershed, as described in Watershed Plans Section 3.3.1.d. | Addresses remaining SSOs in the Lakeview sewershed after the redirection of portions of the sewershed to Western Regional Water Reclamation Facility, Lakeview Pump Station upgrades, I/I removal, and storage. | 2020 | n/a | Initial Design |
| Richwood Forcemain Reroute | West | Remove Richwood PS from the Dry Creek/Lakeview PS sewershed and reroute to Western Regional Water Reclamation Facility with a new 20" force main. | Reduces SSO volume in the 2 year 6 hour event by approximately 1.4 MG, and eliminates six Recurring and Inactive SSOs. | 2018 | n/a | Finish Construction |
| US 27 & AA Highway Sewer Improvements | East | Relocate, redirect, and improve capacity of Cold Spring Crossing PS, and redirect flows from the Wolpert PS away from outfall sewer along Industrial Road and the Silver Grove PS to Eastern Reagional Water Reclamation Facility. | Reduce acitvation and volume of Recurring SSOs along industrial Road and in the vicninty of the Silver Grove PS. | 2022 | n/a | Initial Design |



Updated: April 30, 2018

# Pump Station Backup Power Plan

| CIP Title | Basin | Original Proposed Solution | Updated Solution | Scheduled Completion Date | Actual Completion Date | Final Status as of October 2015 |
|---|---|---|---|---|---|---|
| ***Category 1 Projects (4 total projects)*** | | | | | | |
| Alex Licking | East | Permanent Generator | n/a | 2008 | 2008 | Complete |
| American Sign | West | Permanent Generator | n/a | 2008 | 2008 | Complete |
| Riley Road | East | Permanent Generator | n/a | 2009 | 2009 | Complete |
| Sunset | East | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2010 | 2010 | Complete |
| | | | PS Elimination | 2013 | 2013 | Complete |
| **CIP Title** | **Basin** | **Original Proposed Solution** | **Updated Solution** | **Scheduled Completion Date** | **Actual Completion Date** | **Final Status as of October 2015** |
| ***Category 2 Projects (21 total projects)*** | | | | | | |
| Kahns | East | PS Elimination | n/a | 2007 | 2007 | Complete |
| Meadow Hill | Central | PS Elimination Study | PS Elimination | Study - 2008 | 2008 | Complete |
| | | | | 2012 - 2015 | 2010 | |
| Riley Road No. 1 | East | PS Elimination | n/a | 2009 | 2009 | Complete |
| Riley Road No. 2 | | | | | | |
| Riverwatch PS | North | PS Elimination Study | PS Elimination | Study - 2008 | 2008 | Complete |
| | | | | 2012 - 2015 | 2008 | Complete |
| South Park Industrial | North | PS Elimination Study | Backup Dry Prime Pump with a Diesel | Study - 2008 | 2008 | Complete |
| | | | | 2012 - 2015 | 2010 | Complete |
| Wedgewood Dr | Central | PS Elimination Study | Electrical hook up for portable generator | Study - 2008 | 2008 | Complete |
| | | | | 2015 | 2015 | Complete |
| Willow Bend No. 2 | West | PS Elimination Study | PS Elimination | Study - 2008 | 2008 | Complete |
| | | | | 2013 | 2013 | Complete |
| Army Reserve | East | PS Elimination Study | Electrical hook up for portable generator | Study - 2008 | 2008 | Complete |
| | | | | 2013-2014 | 2014 | Complete |
| Eagles Landing | West | PS Elimination Study | Electrical hook up for portable generator | Study - 2008 | 2008 | Complete |
| | | | | 2013-2014 | 2014 | Complete |
| Evergreen | Central | PS Elimination Study | Electrical hook up for portable generator | Study - 2008 | 2008 | Complete |
| | | | | 2014 | 2014 | Complete |
| Lamphill | East | PS Elimination Study | Electrical hook up for portable generator | Study - 2008 | 2008 | Complete |
| | | | | 2011 | 2011 | Complete |
| Mill House Crossing | Central | PS Elimination Study | Backup Dry Prime Pump with a Diesel | Study - 2008 | 2008 | Complete |
| | | | | 2012 | 2012 | Complete |
| Ridgefield | North | PS Elimination Study | Backup Dry Prime Pump with a Diesel | Study - 2008 | 2008 | Complete |
| | | | | 2014 | 2014 | Complete |
| War Admiral | West | PS Elimination Study | PS Elimination | Study - 2008 | 2008 | Complete |
| | | | | 2012 - 2015 | 2011 | Complete |
| Blackstone | West | PS Elimination Study | Electrical hook up for portable generator | Study - 2008 | 2008 | Complete |
| | | | | 2015 | 2015 | Complete |
| Dublin Green No. 1 | West | PS Elimination Study | PS Elimination | Study - 2008 | 2008 | Complete |
| | | | | 2015 | 2012 | Complete |
| Fowler Creek | West | PS Elimination | These stations were eliminated after the Western Regional collection system became operational. | 2013 | 2011 | Complete |
| Gammon Calmet | West | PS Elimination | | 2013 | 2012 | Complete |
| Gunpowder | West | PS Elimination | | 2013 | 2012 | Complete |
| Union | West | PS Elimination | | 2013 | 2012 | Complete |



Updated: April 30, 2018

# Pump Station Backup Power Plan

| CIP Title | Basin | Original Proposed Solution | Updated Solution | Scheduled Completion Date | Actual Completion Date | Final Status as of October 2015 |
|---|---|---|---|---|---|---|
| ***Category 3 Projects (24 total projects)*** | | | | | | |
| Airport Exchange Ind Park | North | Permanent Generator | n/a | 2009 | 2009 | Complete |
| Barrs Branch | East | Permanent Generator | Portable Generator | 2009 | 2009 | Complete |
| Cedar Point | East | Permanent Generator | n/a | 2009 | 2009 | Complete |
| Bullitsville | North | Permanent Generator | n/a | 2008 | 2008 | Complete |
| Catalpa | Central | Permanent Generator | n/a | 2009 | 2009 | Complete |
| Centerplex | East | Permanent Generator | n/a | 2008 | 2008 | Complete |
| Hempsteade | West | Permanent Generator | Permanent Generator | 2009 | 2009 | Complete |
| | | | PS Elimination | 2011 | 2011 | Complete |
| Highland Heights | East | Portable Generator | n/a | 2009 | 2009 | Complete |
| Dublin Green No. 2 | West | Permanent Generator | n/a | 2009 | 2009 | Complete |
| Brookwood | East | Permanent Generator | n/a | 2009 | 2009 | Complete |
| Ky Aire | West | Permanent Generator | Permanent Generator | 2008 | 2007 | Complete |
| | | | PS Elimination | 2014 | 2014 | Complete |
| Levi | West | Permanent Generator | n/a | 2008 | 2007 | Complete |
| Maple Ave | Central | Permanent Generator | n/a | 2009 | 2009 | Complete |
| Sand Run | North | Permanent Generator | n/a | 2008 | 2008 | Complete |
| Saturn | West | Permanent Generator | n/a | 2009 | 2009 | Complete |
| Second Street | Central | Permanent Generator | n/a | 2009 | 2009 | Complete |
| Skyport | North | Permanent Generator | n/a | 2008 | 2008 | Complete |
| South Hampton | West | Permanent Generator | Permanent Generator | 2008 | 2007 | Complete |
| | | | PS Elimination | 2012 | 2012 | Complete |
| Thornwilde | North | Permanent Generator | n/a | 2008 | 2008 | Complete |
| Bunning Lane | East | PS Elimination Study | Electrical hook up for portable generator | 2015 | 2015 | Complete |
| Kees | East | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2011 | 2011 | Complete |
| Overlook | East | Permanent Generator | Electrical hook up for portable generator | 2015 | 2015 | Complete |
| Riverview Farms | North | Permanent Generator | Electrical hook up for portable generator | 2015 | 2015 | Complete |
| Stillwater | East | Permanent Generator | Electrical hook up for portable generator | 2015 | 2015 | Complete |

# Pump Station Backup Power Plan

| CIP Title | Basin | Original Proposed Solution | Updated Solution | Scheduled Completion Date | Actual Completion Date | Final Status as of October 2015 |
|---|---|---|---|---|---|---|
| ***Category 4 Projects (50 total projects)*** | | | | | | |
| Banklick | Central | Permanent Generator | n/a | 2009-2014 | 2009 | Complete |
| Cedar | Central | Permanent Generator | n/a | 2009-2014 | 2009 | Complete |
| Fowler Ridge | Central | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2009-2014 | 2010 | Complete |
| Lassing Green | West | Permanent Generator | n/a | 2009-2014 | 2009 | Complete |
| Leathers Rd | Central | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2009-2014 | 2010 | Complete |
| Marshall Rd | Central | Permanent Generator | n/a | 2009-2014 | 2010 | Complete |
| Mineola Pike | North | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2009-2014 | 2010 | Complete |
| Newport Steel Mill | East | Permanent Generator | n/a | 2009-2014 | 2009 | Complete |
| Paul Rd | East | Permanent Generator | Portable Generator | 2009-2014 | 2010 | Complete |
| Rosewood Lane | East | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2009-2014 | 2010 | Complete |
| Shadow Lake | East | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2009-2014 | 2009 | Complete |
| Wolf Rd | Central | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2009-2014 | 2009 | Complete |
| Air Park West | North | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2009-2014 | 2011 | Complete |
| Arbortech | North | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2012 | 2012 | Complete |
| Arborwood | North | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2014 | 2014 | Complete |
| Brandtly Ridge | Central | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2012 | 2012 | Complete |
| Brentwood | North | Permanent Generator | Electrical hook up for portable generator | 2015 | 2014 | Complete |
| Brushup Lane | West | Permanent Generator | PS Elimination | 2012 | 2012 | Complete |
| Carlisle Ave | East | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2014 | 2014 | Complete |
| Cinnamon Ridge | West | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2012 | 2012 | Complete |
| Cold Spring Crossing | East | Permanent Generator | Permanent Generator | 2014 | 2014 | Complete |
| Cold Spring Plaza | East | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2012 | 2012 | Complete |
| Darma Ct | East | Permanent Generator | Electrical hook up for portable generator | 2013-2014 | 2014 | Complete |
| Deer Creek No. 1 | North | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2009-2014 | 2011 | Complete |
| Deer Creek No. 2 | North | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2009-2014 | 2011 | Complete |
| Eighth Street | Central | Connect to Grid Power | Permanent Generator | 2015 | 2015 | Complete |
| Gerrard Ave | East | Permanent Generator | Portable Generator | 2009-2014 | 2011 | Complete |
| Golf Course | Central | Permanent Generator | Electrical hook up for portable generator | 2012 | 2012 | Complete |
| Hampton Ridge | West | Permanent Generator | Electrical hook up for portable generator | 2015 | 2015 | Complete |
| Harrison Harbor | East | Permanent Generator | Portable Generator | 2009-2014 | 2011 | Complete |

# Pump Station Backup Power Plan

| CIP Title | Basin | Original Proposed Solution | Updated Solution | Scheduled Completion Date | Actual Completion Date | Final Status as of October 2015 |
|---|---|---|---|---|---|---|
| ***Category 4 Projects (continued)*** | | | | | | |
| Harvest Hill | Central | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2014 | 2014 | Complete |
| ICH | Central | Permanent Generator | Electrical hook up for portable generator | 2011 | 2011 | Complete |
| IDI | North | Permanent Generator | Electrical hook up for portable generator | 2012 | 2012 | Complete |
| Independence Station Rd | Central | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2009-2014 | 2011 | Complete |
| Jefferson Ave | East | Permanent Generator | Portable Generator | 2009-2014 | 2011 | Complete |
| Jericho Rd | Central | Permanent Generator | Electrical hook up for portable generator | 2011 | 2011 | Complete |
| Jonathan | West | Permanent Generator | Electrical hook up for portable generator | 2015 | 2015 | Complete |
| Litton | North | Permanent Generator | Electrical hook up for portable generator | 2012 | 2012 | Complete |
| Ohio Ave | East | Permanent Generator | Portable Generator | 2009-2014 | 2011 | Complete |
| Orchard Estates | West | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2014 | 2014 | Complete |
| Parkside No. 2 | East | Permanent Generator | Electrical hook up for portable generator | 2012 | 2012 | Complete |
| Patton Street | Central | Dual Utility Power Feed | Permanent Generator | 2015 | 2014 | Complete |
| Ria Vista | North | Permanent Generator | Electrical hook up for portable generator | 2011 | 2011 | Complete |
| Silver Grove | East | Permanent Generator | Permanent Generator | 2015 | 2015 | Complete |
| St Annes | East | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2014 | 2014 | Complete |
| Sycamore | West | Permanent Generator | PS Elimination | 2015 | 2012 | Complete |
| Taylor Mill Rd | Central | Permanent Generator | Electrical hook up for portable generator | 2011 | 2011 | Complete |
| Wilder | East | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2014 | 2014 | Complete |
| Wyndemere | North | Permanent Generator | Electrical hook up for portable generator | 2012 | 2012 | Complete |
| Youell Rd | West | Permanent Generator | Electrical hook up for portable generator | 2012 | 2012 | Complete |

# Pump Station Backup Power Plan

| CIP Title | Basin | Original Proposed Solution | Updated Solution | Scheduled Completion Date | Actual Completion Date | Final Status as of October 2015 |
|---|---|---|---|---|---|---|
| ***Category 5 Projects (6 total projects)*** | | | | | | |
| Keavy | Central | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2010-2015 | 2010 | Complete |
| Meadow Lane | Central | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2010-2015 | 2009 | Complete |
| Cardinal Cove | North | Permanent Generator | Permanent Generator | 2015 | 2013 | Complete |
| Crestview | East | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2015 | 2015 | Complete |
| Ripple Creek | East | PS Elimination Study | PS Elimination | 2010-2015 | 2010 | Complete |
| Winters Lane No. 2 | East | Permanent Generator | Electrical hook up for portable generator | 2014 | 2014 | Complete |
| **CIP Title** | **Basin** | **Original Proposed Solution** | **Updated Solution** | **Scheduled Completion Date** | **Actual Completion Date** | **Final Status as of October 2015** |
| ***Category 6 Projects (5 total projects)*** | | | | | | |
| Enzweiller | East | Permanent Generator | n/a | 2012-2015 | 2009 | Complete |
| Mafred | Central | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2012-2015 | 2009 | Complete |
| Ridgeway | Central | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2012-2015 | 2009 | Complete |
| Richwood | West | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2012 | 2012 | Complete |
| Twin Lakes | Central | Permanent Generator | Backup Dry Prime Pump with a Diesel | 2014 | 2014 | Complete |

| Progress Summary | Number |
|---|---|
| 2007 Complete Projects | 4 |
| 2008 Complete Projects | 8 |
| 2009 Complete Projects | 24 |
| 2010 Complete Projects | 11 |
| 2011 Complete Projects | 16 |
| 2012 Complete Projects | 18 |
| 2013 Complete Projects | 2 |
| 2014 Complete Projects | 16 |
| 2015 Complete Projects | 11 |
| **Total Complete** | **110** |

# Pump Station Overflow Elimination Plan

| CIP Title | Basin | Scheduled Completion Date | Actual Completion Date | Activity for 01/01/18 to 03/31/2018 | Planned Activity for 04/01/2018 to 06/30/2018 |
|---|---|---|---|---|---|
| **Pump Station Overflow Elimination Projects** | | | | | |
| Alex-Licking | East | 12/31/2010 | 2008 | Complete | Complete |
| Allen Fork | North | 12/31/2015 | 2014 | Complete | Additional Improvements to Burlington PS and Forcemain in Intital Design |
| Ash Street | East | 5/01/2021[1] | n/a | In-Progress | In-Progress |
| Crestview | East | 12/31/2015 | 2015 | Complete | Complete |
| Harrison Harbor | East | 12/31/2010 | *See PS Oveflow Elimination Annual Report May 11, 2009 | Complete | Complete |
| Highland Acres | West | 12/31/2010 | 2010 | Complete | Complete |
| Kentucky Aire | West | 12/31/2013 | 2014 | Complete | Complete |
| Riley Road No.1 | East | 12/31/2010 | 2009 | Complete | Complete |
| Ripple Creek | Central | 12/31/2010 | 2010 | Complete | Complete |
| South Hampton | West | 3/31/2013 | 2012 | Complete | Complete |
| South Park | North | 12/31/2010 | 2010 | Complete | Complete |
| Sunset | Central | 12/31/2010 | 2010 | Complete | Complete |
| Taylorsport | North | 12/31/2010 | 2004 | Complete | Complete |
| Union | West | 3/31/2013 | 2012 | Complete | Complete |
| Lakeview | Central | 12/31/2023[2] | n/a | In-Progress | In-Progress |

[1] *Force majeure request for timeline of the Ash St. PS granted in letter dated April 11, 2018 from Cabinet and USEPA, due to ongoing legal challenges delaying easement acquisitions. Anticipated completion date has been provided, but may require further adjustment due to ongoing litigation.*

[2] *Revised deadline approved by Cabinet in a letter dated May 13, 2013.*



Updated: April 30, 2018

# APPENDIX C:

## *Annual and Cumulative Overflow Data*

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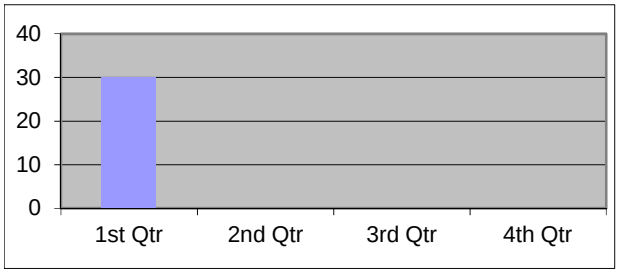
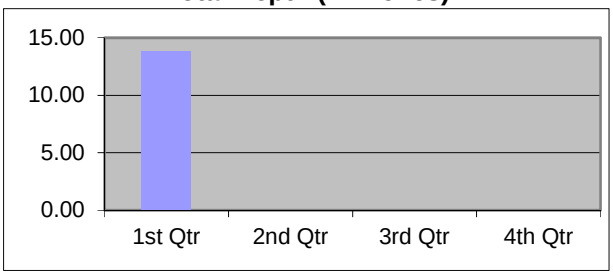
**Cumulative Overflow Data**
**January 1, 2018 through March 31, 2018**

## Rainfall at CVG

### Total Occurrences

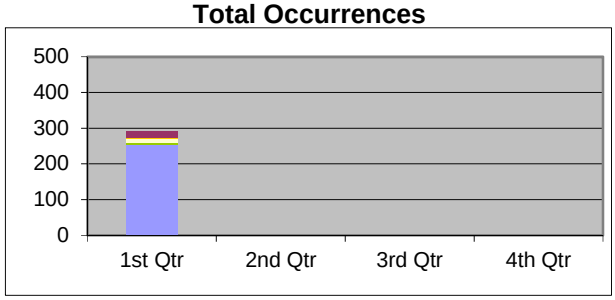



### Total Depth (In Inches)

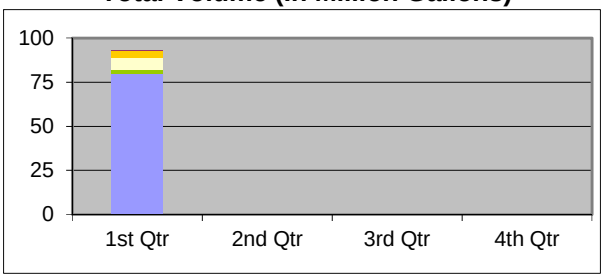



## SSOs - Due to Wet Weather (WW) and Operational Issues

### Total Occurrences



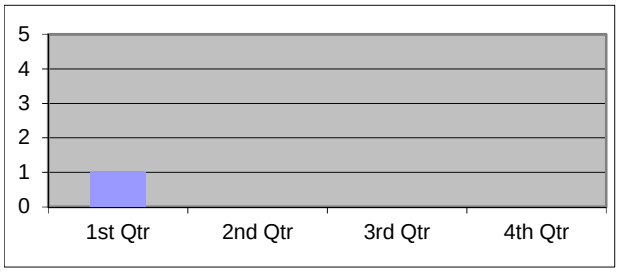

### Total Volume (In Million Gallons)



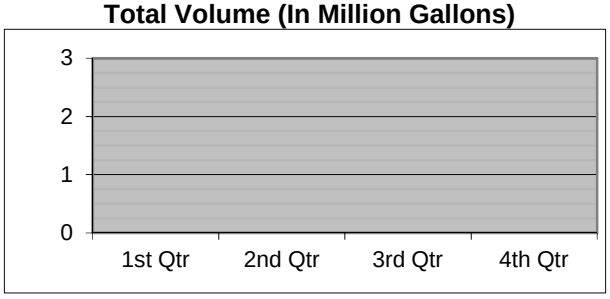

Recurring WW SSOs
Recurring WW CD Pump Station Overflows
Recurring WW Non-CD Pump Station Overflows
Inactive WW Overflows
SSOs Due to Operational Issues

## Dry Weather CSOs

### Total Occurrences

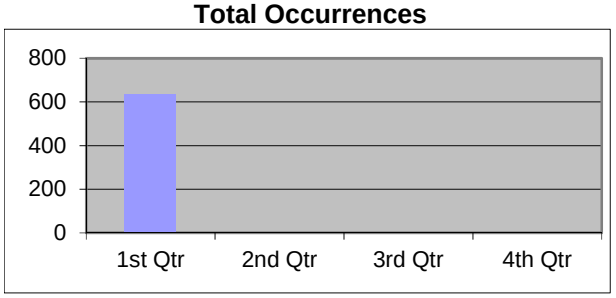



### Total Volume (In Million Gallons)

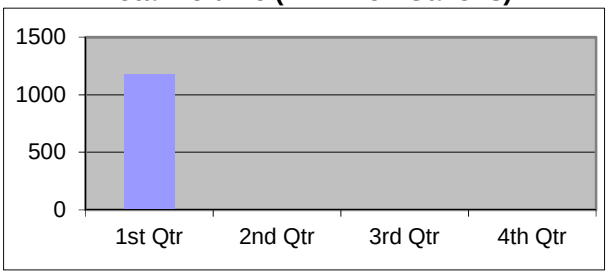



## Wet Weather CSOs

### Total Occurrences

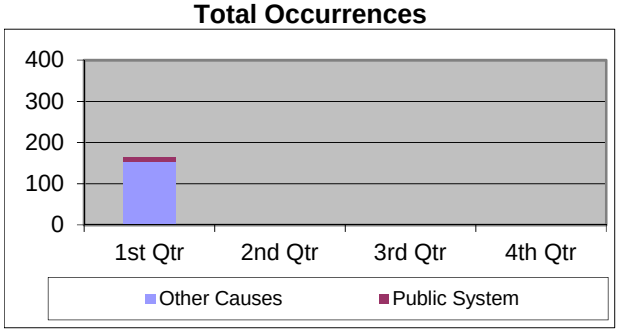



### Total Volume (In Million Gallons)




## Building Backups

### Total Occurrences



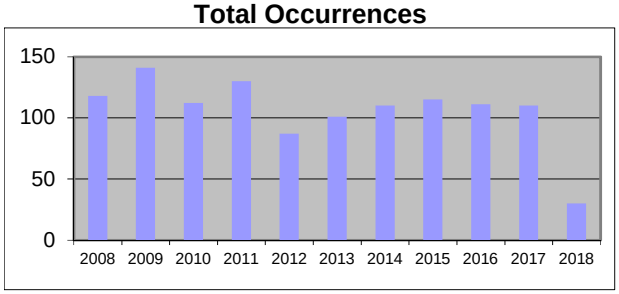

| 2018-Q1 Overflow Summary | | | |
|---|---|---|---|
| | **Occurrences** | **Volume** | |
| **Rainfall** | 30 | 13.820 | inches |
| **Recurring WW SSOs** | 271 | 89.186 | MG |
| **Inactive WW SSOs** | 2 | 3.440 | MG |
| **Operational SSOs** | 17 | 0.323 | MG |
| **Dry Weather CSOs** | 1 | 0.004 | MG |
| **Wet Weather CSOs** | 634 | 1170.524 | MG |
| | | | |
| **Building Backups (Other Causes)** | 153 | | |
| **Building Backups (Public System)** | 10 | | |

Updated: April 30, 2018

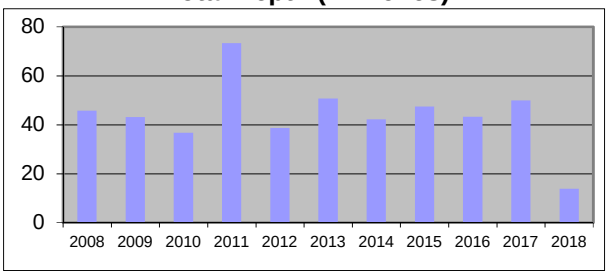
# Annual Cumulative Overflow Data
# 2008 through 2018-Q1

## Rainfall at CVG

### Total Occurrences

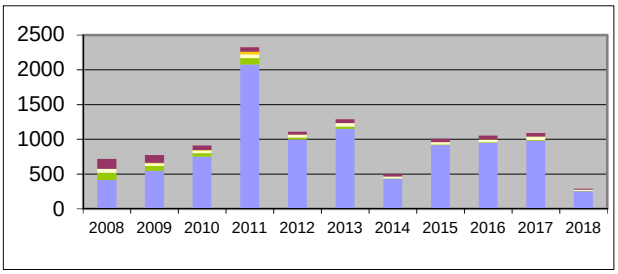



### Total Depth (In Inches)

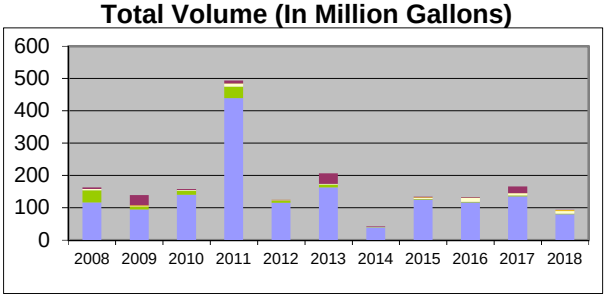



## SSOs - Due to Wet Weather (WW) and Operational Issues

### Total Occurrences



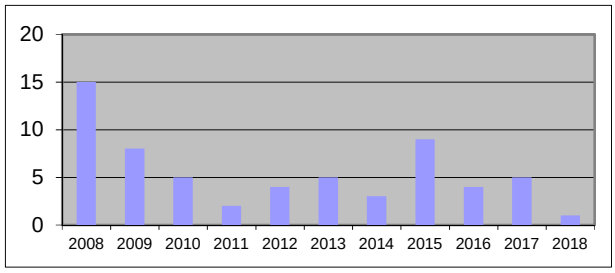

### Total Volume (In Million Gallons)



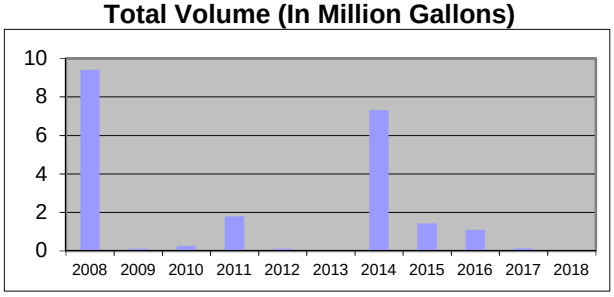

- Recurring WW SSOs
- Recurring WW CD Pump Station Overflows
- Recurring WW Other Pump Station Overflows
- Inactive WW Overflows
- SSOs Due to Operational Issues

## Dry Weather CSOs

### Total Occurrences

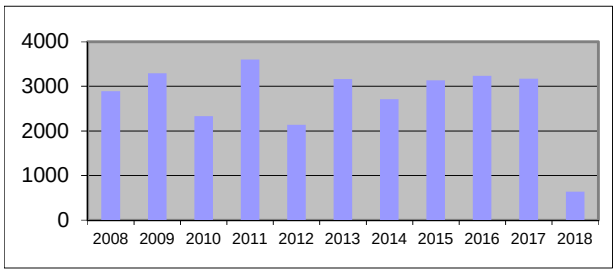



### Total Volume (In Million Gallons)

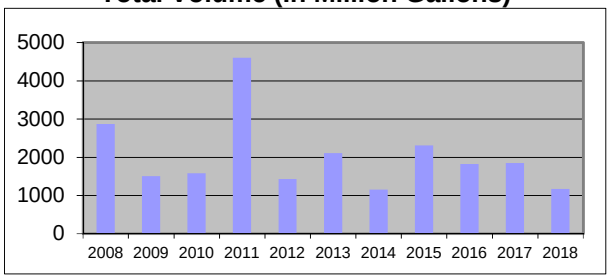



## Wet Weather CSOs

### Total Occurrences

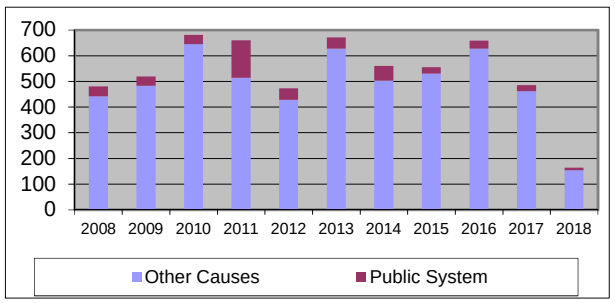



### Total Volume (In Million Gallons)




## Building Backups

### Total Occurrences




| Change from 2017 to 2018-Q1 | | | |
|---|---|---|---|
| | **Occurrences** | **Volume** | |
| **Rainfall** | -80 | -36.06 | inches |
| **Recurring WW SSOs** | -765 | -55.648 | MG |
| **Inactive WW SSOs** | 1 | 3.436 | MG |
| **Operational SSOs** | -38 | -21.128 | MG |
| **Dry Weather CSOs** | -4 | -0.116 | MG |
| **Wet Weather CSOs** | -2534 | -672.81 | MG |
| | | | |
| **Building Backups (Other Causes)** | -308 | | |
| **Building Backups (Public System)** | -14 | | |

Updated: April 30, 2018

# APPENDIX D:

## *Recurring Wet Weather SSOs*

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| Recurring Wet Weather SSOs | | | | | |
|---|---|---|---|---|---|
| **No.** | **MHID** | **City** | **County** | **Model Predicted Overflow Activations** | **Model Predicted Overflow Volume (MG)** |
| 1 | 0020006 | Silver Grove | Campbell | 10 | 10.799 |
| 2 | 0020007 | Silver Grove | Campbell | 6 | 0.128 |
| 3 | 0020008 | Unicorp Campbell County | Campbell | 6 | 0.062 |
| 4 | 0020030 | Silver Grove | Campbell | 0 | 0.000 |
| 5 | 0020032 | Unicorp Campbell County | Campbell | 3 | 1.156 |
| 6 | 0020050 | Unicorp Campbell County | Campbell | 0 | 0.000 |
| 7 | 0040003 | Fort Thomas | Campbell | 2 | 0.084 |
| 8 | 0050022 | Fort Thomas | Campbell | 1 | 0.026 |
| 9 | 0060001 | Unicorp Campbell County | Campbell | 3 | 0.115 |
| 10 | 0060002 | Unicorp Campbell County | Campbell | 2 | 0.094 |
| 11 | 0060004 | Unicorp Campbell County | Campbell | 1 | 0.056 |
| 12 | 0070044 | Highland Heights | Campbell | 0 | 0.000 |
| 13 | 0110002 | Fort Thomas | Campbell | 1 | 0.013 |
| 14 | 0110010 | Highland Heights | Campbell | 3 | 0.534 |
| 15 | 0120019 | Highland Heights | Campbell | 0 | 0.000 |
| 16 | 0150003 | Wilder | Campbell | 0 | 0.000 |
| 17 | 0150005 | Wilder | Campbell | 0 | 0.000 |
| 18 | 0150009 | Wilder | Campbell | 3 | 0.943 |
| 19 | 0150063 | Wilder | Campbell | 3 | 0.008 |
| 20 | 0150065 | Wilder | Campbell | 3 | 0.349 |
| 21 | 0150086 | Fort Thomas | Campbell | 3 | 0.324 |
| 22 | 0150356 | Southgate | Campbell | 0 | 0.000 |
| 23 | 0150399 | Wilder | Campbell | 7 | 1.726 |
| 24 | 0200003 | Fort Thomas | Campbell | 0 | 0.000 |
| 25 | 0220056 | Fort Thomas | Campbell | 1 | 0.006 |
| 26 | 0220058 | Fort Thomas | Campbell | 0 | 0.000 |
| 27 | 0220086 | Southgate | Campbell | 0 | 0.000 |
| 28 | 0230011 | Fort Thomas | Campbell | 0 | 0.000 |
| 29 | 0230016 | Fort Thomas | Campbell | 1 | 0.005 |
| 30 | 0260002 | Fort Thomas | Campbell | 0 | 0.000 |
| 31 | 0270020 | Fort Thomas | Campbell | 0 | 0.000 |
| 32 | 0270026 | Fort Thomas | Campbell | 1 | 0.010 |
| 33 | 0270062 | Fort Thomas | Campbell | 0 | 0.000 |
| 34 | 0270103 | Fort Thomas | Campbell | 0 | 0.000 |
| 35 | 0280001 | Fort Thomas | Campbell | 0 | 0.000 |
| 36 | 0330005 | Fort Thomas | Campbell | 0 | 0.000 |
| 37 | 0360004 | Dayton | Campbell | 1 | 0.001 |
| 38 | 0380005 | Fort Thomas | Campbell | 1 | 0.043 |
| 39 | 0390007 | Fort Thomas | Campbell | 1 | 0.014 |
| 40 | 0400002 | Fort Thomas | Campbell | 4 | 0.318 |
| 41 | 0400017 | Fort Thomas | Campbell | 0 | 0.000 |
| 42 | 0400034 | Fort Thomas | Campbell | 1 | 0.015 |
| 43 | 0410010 | Fort Thomas | Campbell | 3 | 0.059 |
| 44 | 0410019 | Fort Thomas | Campbell | 3 | 0.108 |
| 45 | 0410036 | Fort Thomas | Campbell | 0 | 0.000 |
| 46 | 0430006 | Newport | Campbell | 4 | 0.080 |
| 47 | 0440074 | Fort Thomas | Campbell | 1 | 0.013 |
| 48 | 0490035 | Newport | Campbell | 0 | 0.000 |
| 49 | 0490039 | Newport | Campbell | 0 | 0.000 |
| 50 | 0490137 | Newport | Campbell | 1 | 0.008 |
| 51 | 0500047 | Newport | Campbell | 1 | 0.108 |
| 52 | 0530083 | Newport | Campbell | 4 | 0.305 |

| Recurring Wet Weather SSOs | | | | | |
|---|---|---|---|---|---|
| **No.** | **MHID** | **City** | **County** | **Model Predicted Overflow Activations** | **Model Predicted Overflow Volume (MG)** |
| 53 | 0860001 | Wilder | Campbell | 23 | 22.326 |
| 54 | 0860003 | Wilder | Campbell | 0 | 0.000 |
| 55 | 0860016 | Wilder | Campbell | 0 | 0.000 |
| 56 | 1010002 | Fort Thomas | Campbell | 1 | 0.032 |
| 57 | 1010027 | Fort Thomas | Campbell | 1 | 0.018 |
| 58 | 1090069 | Edgewood | Kenton | 0 | 0.000 |
| 59 | 1110067 | Erlanger | Kenton | 4 | 0.719 |
| 60 | 1110161 | Erlanger | Kenton | 2 | 0.269 |
| 61 | 1110174 | Elsmere | Kenton | 1 | 0.115 |
| 62 | 1110226 | Elsmere | Kenton | 0 | 0.000 |
| 63 | 1210018 | Erlanger | Kenton | 0 | 0.000 |
| 64 | 1220016 | Erlanger | Kenton | 3 | 0.127 |
| 65 | 1220054 | Erlanger | Kenton | 3 | 0.654 |
| 66 | 1230019 | Erlanger | Kenton | 1 | 0.003 |
| 67 | 1240008 | Erlanger | Kenton | 6 | 0.445 |
| 68 | 1240012 | Erlanger | Kenton | 2 | 0.086 |
| 69 | 1330022 | Park Hills | Kenton | 0 | 0.000 |
| 70 | 1550036 | Fort Mitchell | Kenton | 0 | 0.000 |
| 71 | 1550053 | Fort Mitchell | Kenton | 3 | 0.275 |
| 72 | 1560016 | Fort Mitchell | Kenton | 1 | 0.135 |
| 73 | 1560074 | Fort Mitchell | Kenton | 0 | 0.000 |
| 74 | 1560092 | Fort Mitchell | Kenton | 3 | 0.579 |
| 75 | 1560121 | Fort Mitchell | Kenton | 1 | 0.022 |
| 76 | 1590006 | Lakeside Park | Kenton | 0 | 0.000 |
| 77 | 1610054 | Fort Mitchell | Kenton | 0 | 0.000 |
| 78 | 1690043 | Fort Wright | Kenton | 2 | 0.101 |
| 79 | 1690072 | Fort Wright | Kenton | 1 | 0.008 |
| 80 | 1700008 | Covington | Kenton | 1 | 0.066 |
| 81 | 1700025 | Park Hills | Kenton | 1 | 0.025 |
| 82 | 1730086 | Unicorp Kenton County | Kenton | 3 | 2.831 |
| 83 | 1730100 | Crescent Springs | Kenton | 1 | 0.045 |
| 84 | 1730103 | Fort Mitchell | Kenton | 0 | 0.000 |
| 85 | 1760047 | Edgewood | Kenton | 4 | 0.339 |
| 86 | 1760048 | Edgewood | Kenton | 3 | 0.226 |
| 87 | 1830020 | Unicorp Boone County | Boone | 0 | 0.000 |
| 88 | 1830067 | Unicorp Boone County | Boone | 1 | 0.002 |
| 89 | 1850140 | Covington | Kenton | 8 | 18.207 |
| 90 | 1850141 | Covington | Kenton | 12 | 4.947 |
| 91 | 1860108 | Taylor Mill | Kenton | 6 | 0.318 |
| 92 | 1870013 | Covington | Kenton | 0 | 0.000 |
| 93 | 1870014 | Covington | Kenton | 0 | 0.000 |
| 94 | 1920097 | Cold Spring | Campbell | 1 | 0.034 |
| 95 | 1920163 | Cold Spring | Campbell | 0 | 0.000 |
| 96 | 1930008 | Southgate | Campbell | 3 | 0.057 |
| 97 | 1940006 | Fort Wright | Kenton | 2 | 0.324 |
| 98 | 1940038 | Fort Wright | Kenton | 2 | 0.019 |
| 99 | 1940039 | Fort Wright | Kenton | 2 | 0.110 |
| 100 | 1940044 | Fort Wright | Kenton | 1 | 0.063 |
| 101 | 1950010 | Fort Wright | Kenton | 4 | 1.572 |
| 102 | 1950015 | Fort Wright | Kenton | 0 | 0.000 |
| 103 | 1950027 | Fort Wright | Kenton | 1 | 0.036 |
| 104 | 1950036 | Fort Wright | Kenton | 4 | 1.573 |

| Recurring Wet Weather SSOs | | | | | |
|---|---|---|---|---|---|
| **No.** | **MHID** | **City** | **County** | **Model Predicted Overflow Activations** | **Model Predicted Overflow Volume (MG)** |
| 105 | 1950092 | Fort Wright | Kenton | 0 | 0.000 |
| 106 | 1960002 | Fort Wright | Kenton | 1 | 0.033 |
| 107 | 2020035 | Covington | Kenton | 2 | 0.235 |
| 108 | 2020203 | Covington | Kenton | 1 | 0.009 |
| 109 | 2090008 | Elsmere | Kenton | 5 | 0.377 |
| 110 | 2100002 | Elsmere | Kenton | 3 | 0.420 |
| 111 | 2100036 | Elsmere | Kenton | 1 | 0.025 |
| 112 | 2100037 | Elsmere | Kenton | 1 | 0.001 |
| 113 | 2100057 | Elsmere | Kenton | 2 | 0.096 |
| 114 | 2100081 | Elsmere | Kenton | 0 | 0.000 |
| 115 | 2100106 | Elsmere | Kenton | 3 | 0.539 |
| 116 | 2100156 | Elsmere | Kenton | 0 | 0.000 |
| 117 | 2110002 | Elsmere | Kenton | 3 | 0.297 |
| 118 | 2120001 | Elsmere | Kenton | 3 | 0.126 |
| 119 | 2120041 | Elsmere | Kenton | 1 | 0.060 |
| 120 | 2130027 | Erlanger | Kenton | 1 | 0.642 |
| 121 | 2160006 | Fort Mitchell | Kenton | 0 | 0.000 |
| 122 | 2170097 | Crestview Hills | Kenton | 1 | 0.011 |
| 123 | 2280010 | Unicorp Kenton County | Kenton | 0 | 0.000 |
| 124 | 2280011 | Unicorp Kenton County | Kenton | 1 | 0.002 |
| 125 | 2280023 | Unicorp Kenton County | Kenton | 2 | 0.099 |
| 126 | 2290001 | Crescent Springs | Kenton | 1 | 0.007 |
| 127 | 2300011 | Erlanger | Kenton | 2 | 0.034 |
| 128 | 2300121 | Independence | Kenton | 9 | 1.419 |
| 129 | 2300123 | Unicorp Kenton County | Kenton | 5 | 0.690 |
| 130 | 2301274 | Erlanger | Kenton | 0 | 0.000 |
| 131 | 2370003 | Unicorp Boone County | Boone | 3 | 0.445 |
| 132 | 2400001 | Unicorp Boone County | Boone | 0 | 0.000 |
| | | | **TOTAL** | 254 | 79.784 |

**Threshold for model activation is 0.01 MGD and 0.001 MG**

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# APPENDIX E:

## *2018 Annual Revision Transactions of Recurring Wet-Weather SSOs*

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| Recurring Wet Weather SSO Locations - Revision Transactions | | | | |
|---|---|---|---|---|
| MHID | City | County | Revision | Comments |
| 0020050 | Unicorp Campbell County | Campbell | | |
| 0070044 | Highland Heights | Campbell | | |
| 0150086 | Fort Thomas | Campbell | | |
| 1010027 | Fort Thomas | Campbell | | |
| 1830020 | Unicorp Boone County | Boone | | |
| 2100081 | Elsmere | Kenton | Added | Identified as a recurring SSO based on field inspections |
| 2100156 | Elsmere | Kenton | Added | Identified as a recurring SSO based on field inspections |
| 2160006 | Fort Mitchell | Kenton | | |
| 0020006 | Silver Grove | Campbell | | |
| 0020007 | Silver Grove | Campbell | | |
| 0020008 | Unicorp Campbell County | Campbell | | |
| 0020030 | Silver Grove | Campbell | | |
| 0020032 | Unicorp Campbell County | Campbell | | |
| 0040003 | Fort Thomas | Campbell | | |
| 0050022 | Fort Thomas | Campbell | | |
| 0060001 | Unicorp Campbell County | Campbell | | |
| 0060002 | Unicorp Campbell County | Campbell | | |
| 0060004 | Unicorp Campbell County | Campbell | | |
| 0110002 | Fort Thomas | Campbell | Added | Identified as a recurring SSO based on field inspections |
| 0110010 | Highland Heights | Campbell | | |
| 0120018 | Highland Heights | Campbell | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 0120019 | Highland Heights | Campbell | | |
| 0150003 | Wilder | Campbell | | |
| 0150005 | Wilder | Campbell | | |
| 0150009 | Wilder | Campbell | | |
| 0150063 | Wilder | Campbell | | |
| 0150065 | Wilder | Campbell | | |
| 0150356 | Southgate | Campbell | | |
| 0150399 | Wilder | Campbell | | |
| 0200003 | Fort Thomas | Campbell | | |
| 0220056 | Fort Thomas | Campbell | | |
| 0220058 | Fort Thomas | Campbell | | |
| 0220086 | Southgate | Campbell | Added | Identified as a recurring SSO based on field inspections |
| 0230008 | Fort Thomas | Campbell | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 0230011 | Fort Thomas | Campbell | Added | Identified as a recurring SSO based on field inspections |
| 0230016 | Fort Thomas | Campbell | | |
| 0250002 | Fort Thomas | Campbell | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 0260002 | Fort Thomas | Campbell | | |
| 0270020 | Fort Thomas | Campbell | | |
| 0270026 | Fort Thomas | Campbell | | |
| 0270062 | Fort Thomas | Campbell | | |
| 0270103 | Fort Thomas | Campbell | | |
| 0280001 | Fort Thomas | Campbell | | |
| 0280073 | Fort Thomas | Campbell | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 0330005 | Fort Thomas | Campbell | | |
| 0360004 | Dayton | Campbell | | |
| 0380005 | Fort Thomas | Campbell | | |
| 0390007 | Fort Thomas | Campbell | | |
| 0400002 | Fort Thomas | Campbell | | |
| 0400017 | Fort Thomas | Campbell | | |
| 0400034 | Fort Thomas | Campbell | | |
| 0410010 | Fort Thomas | Campbell | | |
| 0410019 | Fort Thomas | Campbell | | |
| 0410036 | Fort Thomas | Campbell | | |
| 0430006 | Newport | Campbell | | |
| 0440074 | Fort Thomas | Campbell | | |
| 0490035 | Newport | Campbell | | |
| 0490039 | Newport | Campbell | | |
| 0490137 | Newport | Campbell | | |
| 0500047 | Newport | Campbell | | |
| 0530083 | Newport | Campbell | | |

| Recurring Wet Weather SSO Locations - Revision Transactions | | | | |
|---|---|---|---|---|
| MHID | City | County | Revision | Comments |
| 0530119 | Newport | Campbell | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 0860001 | Wilder | Campbell | | |
| 0860003 | Wilder | Campbell | | |
| 0860016 | Wilder | Campbell | | |
| 1010002 | Fort Thomas | Campbell | | |
| 1090069 | Edgewood | Kenton | | |
| 1110067 | Erlanger | Kenton | | |
| 1110161 | Erlanger | Kenton | | |
| 1110174 | Elsmere | Kenton | | |
| 1110226 | Elsmere | Kenton | | |
| 1190012 | Erlanger | Kenton | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 1210018 | Erlanger | Kenton | Added | Identified as a recurring SSO based on field inspections |
| 1220016 | Erlanger | Kenton | | |
| 1220054 | Erlanger | Kenton | | |
| 1230019 | Erlanger | Kenton | | |
| 1240008 | Erlanger | Kenton | | |
| 1240012 | Erlanger | Kenton | | |
| 1330022 | Park Hills | Kenton | | |
| 1550036 | Fort Mitchell | Kenton | | |
| 1550053 | Fort Mitchell | Kenton | | |
| 1560016 | Fort Mitchell | Kenton | | |
| 1560074 | Fort Mitchell | Kenton | | |
| 1560092 | Fort Mitchell | Kenton | | |
| 1560121 | Fort Mitchell | Kenton | | |
| 1590006 | Lakeside Park | Kenton | | |
| 1610054 | Fort Mitchell | Kenton | Added | Identified as a recurring SSO based on field inspections |
| 1690043 | Fort Wright | Kenton | | |
| 1690072 | Fort Wright | Kenton | | |
| 1700008 | Covington | Kenton | Added | Identified as a recurring SSO based on field inspections |
| 1700025 | Park Hills | Kenton | | |
| 1730086 | Unicorp Kenton County | Kenton | | |
| 1730100 | Crescent Springs | Kenton | | |
| 1730103 | Fort Mitchell | Kenton | | |
| 1760047 | Edgewood | Kenton | | |
| 1760048 | Edgewood | Kenton | | |
| 1790003 | Crescent Springs | Kenton | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 1830067 | Unicorp Boone County | Boone | | |
| 1850140 | Covington | Kenton | | |
| 1850141 | Covington | Kenton | | |
| 1860108 | Taylor Mill | Kenton | | |
| 1870013 | Covington | Kenton | | |
| 1870014 | Covington | Kenton | | |
| 1920086 | Cold Spring | Campbell | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 1920097 | Cold Spring | Campbell | | |
| 1920163 | Cold Spring | Campbell | | |
| 1930008 | Southgate | Campbell | | |
| 1930010 | Southgate | Campbell | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 1940006 | Fort Wright | Kenton | | |
| 1940022 | Fort Wright | Kenton | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 1940023 | Fort Wright | Kenton | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 1940038 | Fort Wright | Kenton | | |
| 1940039 | Fort Wright | Kenton | | |
| 1940044 | Fort Wright | Kenton | | |
| 1950010 | Fort Wright | Kenton | | |
| 1950015 | Fort Wright | Kenton | | |
| 1950027 | Fort Wright | Kenton | Added | Identified as a recurring SSO based on field inspections |
| 1950036 | Fort Wright | Kenton | | |
| 1950092 | Fort Wright | Kenton | | |
| 1960002 | Fort Wright | Kenton | Added | Identified as a recurring SSO based on field inspections |
| 1990018 | Covington | Kenton | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 2020035 | Covington | Kenton | Added | Identified as a recurring SSO based on field inspections |
| 2020203 | Covington | Kenton | Added | Identified as a recurring SSO based on field inspections |
| 2090008 | Elsmere | Kenton | | |

| Recurring Wet Weather SSO Locations - Revision Transactions | | | | |
|---|---|---|---|---|
| **MHID** | **City** | **County** | **Revision** | **Comments** |
| 2100002 | Elsmere | Kenton | | |
| 2100036 | Elsmere | Kenton | | |
| 2100037 | Elsmere | Kenton | | |
| 2100057 | Elsmere | Kenton | | |
| 2100106 | Elsmere | Kenton | | |
| 2100128 | Elsmere | Kenton | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 2100129 | Elsmere | Kenton | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 2110002 | Elsmere | Kenton | | |
| 2110006 | Elsmere | Kenton | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 2120001 | Elsmere | Kenton | | |
| 2120041 | Elsmere | Kenton | Added | Identified as a recurring SSO based on field inspections |
| 2130027 | Erlanger | Kenton | | |
| 2130028 | Erlanger | Kenton | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 2170097 | Crestview Hills | Kenton | | |
| 2280010 | Unicorp Kenton County | Kenton | | |
| 2280011 | Unicorp Kenton County | Kenton | Added | Identified as a recurring SSO based on field inspections |
| 2280023 | Unicorp Kenton County | Kenton | | |
| 2290001 | Crescent Springs | Kenton | | |
| 2300011 | Erlanger | Kenton | | |
| 2300019 | Erlanger | Kenton | Removed | Eliminated based on lack of field inspection overflow evidence in a 2-year period |
| 2300121 | Independence | Kenton | | |
| 2300123 | Unicorp Kenton County | Kenton | | |
| 2301274 | Erlanger | Kenton | | |
| 2370003 | Unicorp Boone County | Boone | | |
| 2400001 | Unicorp Boone County | Boone | Added | Identified as a recurring SSO based on field inspections |

**Total Recurring SSO Locations Added= 15**
**Total Recurring SSO Locations Removed = 17**

**Total Recurring SSO Locations after Revisions = 132**

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# APPENDIX F:

## *Wet-Weather CSOs*

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| Wet Weather CSOs | | | | |
|---|---|---|---|---|
| No. | CSO ID | KPDES Permit # | Model Predicted Activations | Model Predicted Overflow Volume (MG) |
| 1 | 0010220 | To Be Permitted | 3 | 0.271 |
| 2 | 0030031 | KY0021466 - Outfall 10 | 1 | 0.004 |
| 3 | 0200069 | KY0021466 - Outfall 11 | 9 | 0.237 |
| 4 | 0330100 | KY0021466 - Outfall 12 | 0 | 0.000 |
| 5 | 0340050 | KY0021466 - Outfall 14 | 3 | 0.048 |
| 6 | 0340051 | KY0021466 - Outfall 13 | 2 | 0.018 |
| 7 | 0360079 | To Be Permitted | 5 | 0.743 |
| 8 | 0540157 | To Be Permitted | 11 | 0.203 |
| 9 | 0540156 | To Be Permitted | 8 | 0.198 |
| 10 | 0540158 | To Be Permitted | 2 | 0.035 |
| 11 | 0550134 | To Be Permitted | 2 | 0.085 |
| 12 | 0570089 | KY0021466 - Outfall 16 | 4 | 12.179 |
| 13 | 0570090 | KY0021466 - Outfall 17 | 2 | 1.588 |
| 14 | 0600094 | KY0021466 - Outfall 18 | 2 | 0.134 |
| 15 | 0600096 | To Be Permitted | 2 | 0.047 |
| 16 | 0600097 | KY0021466 - Outfall 19 | 6 | 1.300 |
| 17 | 0600104 | To Be Permitted | 1 | 0.010 |
| 18 | 0610071 | KY0021466 - Outfall 21 | 17 | 8.998 |
| 19 | 0610072 | KY0021466 - Outfall 20 | 3 | 0.239 |
| 20 | 0620075 | KY0021466 - Outfall 23 | 18 | 2.311 |
| 21 | 0620077 | KY0021466 - Outfall 22 | 2 | 0.085 |
| 22 | 0630054 | To Be Permitted | 0 | 0.000 |
| 23 | 0630061 | KY0021466 - Outfall 83 | 4 | 0.521 |
| 24 | 0640090 | KY0021466 - Outfall 24 | 12 | 204.112 |
| 25 | 0650054 | To Be Permitted | 1 | 0.002 |
| 26 | 0650090 | KY0021466 - Outfall 26 | 8 | 6.703 |
| 27 | 0650098 | To Be Permitted | 3 | 3.302 |
| 28 | 0650100 | KY0021466 - Outfall 25 | 2 | 0.057 |
| 29 | 0660085 | To Be Permitted | 3 | 0.115 |
| 30 | 0690059 | To Be Permitted | 1 | 0.007 |
| 31 | 0690067 | To Be Permitted | 5 | 0.049 |
| 32 | 0730129 | To Be Permitted | 20 | 0.592 |
| 33 | 0770096 | KY0021466 - Outfall 28 | 2 | 0.051 |
| 34 | 0790084 | KY0021466 - Outfall 31 | 14 | 8.052 |
| 35 | 0790086 | KY0021466 - Outfall 29 | 19 | 78.113 |
| 36 | 0840111 | To Be Permitted | 1 | 0.039 |
| 37 | 0840112 | To Be Permitted | 16 | 0.888 |
| 38 | 0840116 | KY0021466 - Outfall 27 | 22 | 1.624 |
| 39 | 0870078 | KY0021466 - Outfall 33 | 2 | 0.142 |
| 40 | 0870079 | KY0021466 - Outfall 34 | 24 | 7.731 |
| 41 | 0880081 | KY0021466 - Outfall 36 | 19 | 22.769 |
| 42 | 0880082 | KY0021466 - Outfall 35 | 4 | 0.303 |
| 43 | 0890081 | To Be Permitted | 0 | 0.000 |
| 44 | 0910065 | KY0021466 - Outfall 38 | 15 | 162.230 |
| 45 | 0910066 | To Be Permitted | 0 | 0.000 |
| 46 | 0910068 | KY0021466 - Outfall 37 | 16 | 20.879 |
| 47 | 0910084 | To Be Permitted | 3 | 0.078 |

| Wet Weather CSOs | | | | |
|---|---|---|---|---|
| No. | CSO ID | KPDES Permit # | Model Predicted Activations | Model Predicted Overflow Volume (MG) |
| 48 | 0930102 | KY0021466 - Outfall 43 | 0 | 0.000 |
| 49 | 0930103 | KY0021466 - Outfall 42 | 3 | 0.350 |
| 50 | 0930104 | KY0021466 - Outfall 40 | 1 | 0.003 |
| 51 | 0930105 | KY0021466 - Outfall 41 | 17 | 20.498 |
| 52 | 0930106 | KY0021466 - Outfall 39 | 3 | 0.174 |
| 53 | 0960063 | KY0021466 - Outfall 45 | 7 | 7.364 |
| 54 | 0960064 | KY0021466 - Outfall 44 | 1 | 0.001 |
| 55 | 0980073 | KY0021466 - Outfall 46 | 3 | 0.051 |
| 56 | 0980080 | KY0021466 - Outfall 47 | 1 | 0.011 |
| 57 | 0980081 | KY0021466 - Outfall 48 | 23 | 16.473 |
| 58 | 1320112 | To Be Permitted | 0 | 0.000 |
| 59 | 1350155 | KY0021466 - Outfall 49 | 1 | 0.147 |
| 60 | 1380132 | To Be Permitted | 1 | 0.272 |
| 61 | 1380146 | To Be Permitted | 1 | 0.012 |
| 62 | 1420141 | KY0021466 - Outfall 50 | 11 | 0.151 |
| 63 | 1420142 | KY0021466 - Outfall 51 | 17 | 83.711 |
| 64 | 1420144 | KY0021466 - Outfall 52 | 0 | 0.000 |
| 65 | 1420145 | KY0021466 - Outfall 53 | 1 | 0.015 |
| 66 | 1420146 | KY0021466 - Outfall 54 | 0 | 0.000 |
| 67 | 1420147 | KY0021466 - Outfall 55 | 0 | 0.000 |
| 68 | 1440204 | KY0021466 - Outfall 59 | 2 | 0.020 |
| 69 | 1440206 | KY0021466 - Outfall 61 | 8 | 2.369 |
| 70 | 1440207 | To Be Permitted | 13 | 0.054 |
| 71 | 1440209 | KY0021466 - Outfall 56 | 27 | 24.179 |
| 72 | 1440508 | KY0021466 - Outfall 60 | 5 | 0.184 |
| 73 | 1470089 | KY0021466 - Outfall 62 | 1 | 0.038 |
| 74 | 1470093 | KY0021466 - Outfall 63 | 13 | 13.473 |
| 75 | 1480185 | To Be Permitted | 6 | 1.038 |
| 76 | 1480187 | KY0021466 - Outfall 30 | 20 | 306.113 |
| 77 | 1490132 | KY0021466 - Outfall 65 | 5 | 4.147 |
| 78 | 1490172 | KY0021466 - Outfall 64 | 0 | 0.000 |
| 79 | 1500131 | KY0021466 - Outfall 66 | 11 | 6.724 |
| 80 | 1510244 | To Be Permitted | 1 | 0.073 |
| 81 | 1710114 | KY0021466 - Outfall 69 | 5 | 1.202 |
| 82 | 1710116 | KY0021466 - Outfall 68 | 12 | 24.898 |
| 83 | 1710119 | KY0021466 - Outfall 70 | 7 | 19.777 |
| 84 | 1710121 | KY0021466 - Outfall 71 | 5 | 21.185 |
| 85 | 1710124 | KY0021466 - Outfall 72 | 5 | 26.551 |
| 86 | 1720109 | KY0021466 - Outfall 73 | 10 | 19.435 |
| 87 | 1730259 | KY0021466 - Outfall 75 | 8 | 2.976 |
| 88 | 1730262 | To Be Permitted | 0 | 0.000 |
| 89 | 1730263 | KY0021466 - Outfall 74 | 13 | 1.416 |
| 90 | 1840130 | To Be Permitted | 9 | 0.319 |
| 91 | 1850158 | KY0021466 - Outfall 76 | 11 | 16.113 |
| 92 | 1870193 | KY0021466 - Outfall 78 | 12 | 0.668 |
| 93 | 1870194 | KY0021466 - Outfall 79 | 2 | 0.066 |
| 94 | 1880090 | KY0021466 - Outfall 81 | 8 | 0.819 |

| Wet Weather CSOs | | | | |
|---|---|---|---|---|
| No. | CSO ID | KPDES Permit # | Model Predicted Activations | Model Predicted Overflow Volume (MG) |
| 95 | 1880091 | KY0021466 - Outfall 80 | 5 | 0.360 |
| | | TOTAL | 634 | 1170.524 |

**Threshold for model activation is 0.01 MGD and 0.001 MG**