



WET WEATHER
STAKEHOLDER TEAM

Wet Weather Team
Stakeholder Group Agenda
December 13, 2016
5:30 p.m. – 8:00 p.m.

- 5:00 – 5:45 Dinner served
- 5:30 – 5:45 Welcome & Intro
Clay Kelly, Strand Associates
- 5:45 – 6:00 MSD Update
Tony Parrott, MSD Executive Director
- 6:00 – 6:15 IOAP Update
John Loechle, MSD Engineering Director
- 6:15 – 6:45 20-year Comprehensive Facility Plan Financing Options
Gary Swanson, CH2M
- 6:45 – 7:15 Facility Plan Stakeholder Vision - Discussion and Finalization
Gary Swanson
- 7:15 – 7:45 Facility Plan Support Memo - Discussion and Finalization
Clay Kelly
- 7:45 – 7:55 Observer Comments, Wrap-up and Adjourn
Clay Kelly

Meeting Summary
Wet Weather Team Stakeholder Group Meeting
December 13, 2016
MSD Main Office, Louisville

The Wet Weather Team (WWT) Stakeholders, chartered by the Louisville and Jefferson County Metropolitan Sewer District (MSD), met on December 13, 2016, at MSD's main office. The objectives of the meeting were to:

- Provide a Consent Decree Integrated Overflow Abatement Plan (IOAP) update.
- Review the Facility Plan financing plan options, Stakeholder Vision, and Stakeholder support memo.

Welcome

Clay Kelly of Strand Associates opened the meeting by welcoming the members and reviewing the meeting objectives, agenda, and basic ground rules.

MSD Update

Tony Parrott, MSD Executive Director, shared that the Southwest Parkway CSO Basin held its ceremonial groundbreaking at Shawnee Park the previous week. Tony expressed his thanks to the many groups that worked together to make this project a reality, including Metro Parks, the Olmstead Conservatory, Councilwoman Cheri Bryant Hamilton, and numerous neighborhood groups and associations.

Tony reinforced the importance of the community conversations MSD will be having in early 2017 to explain the need for a rate increase to implement the Facility Plan. Three teams have been organized to help create and support the outreach plan:

1. Communication and Community Partners,
2. Media, and
3. Hotspots (providing examples of needs and problems that the Facility Plan implementation will address).

Tony congratulated Louisville Metro on the recent \$30 million revitalization grant from Housing and Urban Development (HUD) for the Russell neighborhood. Tony shared that MSD is interested in partnering on this project, looking for opportunities to be involved in installing green infrastructure, infrastructure renewal, and other related efforts. Stakeholders familiar with the grant encouraged anyone interested in being a part of this effort to get involved now as work is already underway.

Tony explained that through 5 months of the year, MSD has already spent 70 percent of the \$2 million budgeted for emergency repairs. He noted that the "band-aid" approach that has been discussed at previous meetings is not working and continuing with that strategy would lead to more failures and higher emergency expenses.

IOAP Update

Clay introduced this topic by sharing the copy of *Sustain* magazine that was included in each Stakeholder's meeting materials. The magazine publisher is a WWT Stakeholder and this issue includes a feature on communities facing sewer overflow Consent Decree issues. It includes an article about Louisville MSD by Angela Akridge as well as profiles of other communities facing similar issues.

John Loechle, MSD Engineering Director, gave a brief update on the IOAP implementation progress. Project specific updates include:

- The Ohio River Tunnel Project (which replaced three CSO storage basins) is currently in design.

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- The Southwest Parkway CSO Storage Basin recently bid out the first part of the construction contract. As Tony stated previously, the ceremonial groundbreaking was held the prior week. John showed new renderings of what the redesigned operations building will look like. The building will be built into the existing slope of the ground so that it is not visible across the lawn and is more inconspicuous.
- The Logan Street CSO Storage Basin construction continues. MSD is working with the Louisville Metro Housing Authority (LMHA) to transfer the site to LMHA after construction is complete. LMHA will develop a land-use plan for the area that emphasizes recreation. LMHA estimates there are approximately 200 children in the area with no playgrounds or other open space to play. MSD will help fund the improvements through the \$700,000 that is budgeted, and LMHA will be responsible for the site and implementation improvements following the completion of construction.
- The US EPA recently approved an extension to the completion deadline for the Nightingale CSO Storage Basin and Pump Station project. As shared in previous meetings, the site is completely in the floodplain, which prevents work from progressing during inclement weather.
- MSD has received positive feedback from the neighbors of the Muddy Fork Basin for its appearance and appropriateness in the area.
- The US EPA has also issued a deadline extension for the Bell's Lane Wet Weather Treatment Facility project, where schedule delays were caused by railroad permitting.

A Stakeholder asked if the Logan Street CSO Storage Basin will include pedestrian access to Beargrass Creek after construction is complete. John said that they were including access for MSD vehicles and that it will be up to LMHA to decide whether or not to include access to the creek from the site.

A Stakeholder asked whether the stream by Nightingale Pump Station was affected by the construction. John responded by saying that it was not.

A Stakeholder asked for an update on the basin project near Lanham Park. John stated that the Portland CSO Storage Basin project would start in spring of 2017 after a sewer line is relocated.

20-Year Comprehensive Facility Plan Financing Options

Gary Swanson of CH2M-Hill began his presentation by saying there are many financing scenarios that could be used to implement the Facility Plan under a variety of conditions. For this discussion though, he would present two options as "bookends". The first would be to enact a 6.9 percent rate increase each year (the maximum MSD's Board can do without Metro Council approval), and the second would be a 20 percent rate increase in FY2018 followed by not more than a 6.9 percent rate increase in the subsequent years remaining within the planning period. Gary added that to complete the Facility Plan recommendations per the recommended schedule would require a 20 to 25 percent increase in FY2018. Gary also stressed that these are projections and should be updated every 5 years to keep up with changing conditions.

Highlights from the attached presentation include:

- The budgets include funding to account for operations and maintenance of new facilities and to "catch up" on deferred renewal, replacement and preventive maintenance that has been underfunded in the past.
- The projections include proportional low-income rate relief expansion.
- It is in MSD's (and especially its customers') interest to maintain the current AA/Aa3 bond rating for any financing plan that is considered. There could be large increases in borrowing costs if the rating is downgraded.
- The recommended CIP in the Facility Plan shows a significant increase in stormwater investment occurring as IOAP spending declines, and then stable spending across all of MSD's core services.

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- The scenarios consider the impact on the recommended Capital Improvement Plan (CIP) with and without a significant upgrade to or replacement of the Morris Forman WQTC. This facility can meet its permit currently so there is no reason to replace it now. If and when permit requirements change, the anticipated cost to meet the potential permit changes is estimated to be around \$1.2 billion. The timing of a substantial permit change is unknown at this time. For planning purposes, it has been assumed it would occur midway through the 20-year period in the scenarios presented today that include this cost (note that this cost is not included in the base recommendations of the Facility Plan).
- Applying a 6.9 percent yearly rate increase would allow the IOAP and other regulatory commitments to be met but would result in the deferral of approximately \$480 million in renewal, replacement, stormwater and flood protection projects for at least 5 years. Catching up on operations and maintenance needs would take over 7 years. This is based on a scenario where the Morris Forman WQTC is not replaced within the 20-year period.
- Implementing a 20 percent rate increase in FY2018 followed by not more than 6.9 percent increases in the following years requires a smaller number of projects to be deferred (\$137 million instead of \$480 million) and provides operations and maintenance “catch up” in 3 years instead of 7 years. It also funds \$5 million of rate relief which equates to a 20 to 40 percent reduction in bills for low-income customers. If the Morris Forman WQTC replacement occurs within this 20-year window, additional project deferrals would be necessary.
- If the Morris Forman WQTC has to be replaced within the next 20 years, yearly 6.9 percent rate increases are not enough to maintain MSD’s financial health no matter how many Facility Plan projects are deferred.
- Generally speaking, project deferral would not affect non-regulatory or legally-bound projects by delaying their implementation. With just 6.9 percent rate increases, the ripple effect of deferrals would extend to 2036. With a 20 percent increase in the first year of the plan, the deferral effect would be almost dissipated by 2026. MSD staff would choose the projects that get deferred as part of its annual budgeting process using the prioritization factors and other information in the Facility Plan as guidance.

Throughout the presentation there was numerous conversations with and amongst the Stakeholders, as summarized in the following:

- A Stakeholder asked how rate relief would be funded. Gary responded by saying that there are various options to funded rate relief and that MSD would look to the community to direct them to an acceptable option. Tony added that in his conversations with the public, a lot of the feedback was that many people would not be able to afford a rate increase without corresponding rate relief. There was support to keep rates steady but not to reduce rates. As grants not allowed to subsidize rates, rate-relief programs have to be community led. Throughout the discussion, many comments were made supporting the inclusion of a robust rate-relief program.
- A Stakeholder shared that to convince the public this is necessary; we have to prove to them that this is the right thing to do for the right reasons. That way they will feel like it is something they should do, that it is the responsible thing to do, and not something they are being forced to do. Another Stakeholder agreed with this statement and expanded that when we blame the federal government and say they are “making” us do these things, we are obscuring the facts that these are actions we need to take for our community and larger environment. Many Stakeholders expressed agreement with these statements and/or similar remarks.
- A Stakeholder asked whether other comparable cities will be seeing these same levels of rate increase that we could use to compare against? Gary said that many other cities were going through the same struggles and listed several examples of multi-year, double-digit rate increases. Tony added that many communities bundled their needs such as stormwater and flood protection with their wastewater Consent Decrees so that rate increases could address all these needs at once. In Louisville, they were separated. One Stakeholder encouraged MSD to avoid talking about the how current and new rates

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compare to other cities because it takes focus away from larger issues such as public safety, economic development, and improving/protecting the environment.

- One Stakeholder complimented MSD for including rate relief in its plan and using the Low-Income Home Energy Assistance Program (LIHEAP) criteria as the conduit to qualification. This was followed up by a question on whether the 20 to 40 percent subsidy on bills will be included in current or future rate, and whether MSD's existing rate-relief program would continue. Gary said it would apply on future rates and that the enrollees in the current program would be grandfathered in, but no new enrollees would be accepted under the existing rate-relief program criterion as MSD would transition to a LIHEAP-type program.
- A Stakeholder said that using the Gulf of Mexico hypoxia-zone or other issues that are not local will not sway MSD's customers to support a rate increase. Instead talk about local safety, flood protection, and the fact that we have enjoyed low rates for a very long time. So now it is time to start paying the true costs of service.
- In discussing risk and deferred projects, one Stakeholder suggested using the risk matrix from the presentation and using it to color-code projects that would be delayed. The visual impacts could be considerable.
- Many Stakeholders agreed with the statement to pay attention to what advice MSD receives from Metro Council as they will ultimately be the deciders and know their constituents well.
- There was broad support to approach Metro Council to revise the ordinance that limits the size of rate increases MSD can enact without Council approval to a higher amount. This was discussed at length. Gary shared that at 9.9 percent yearly rate increases, MSD would be able to implement the Facility Plan fully as well as replace Morris Forman WQTC (if necessary, and assuming that replacing Morris Forman WQTC would not be necessary for at least ten years).
- Several suggestions were made on how to communicate the need and concepts to the public such as:
 - Provide examples of the potential consequences and tragedies that could happen without action.
 - Use pictures and graphics whenever possible.
 - Use the example of accelerated emergency spending as documentation of the need.
 - Discuss adding a neighbor-to-neighbor fund (similar to what LG&E does) in addition to the LIHEAP program.
 - Working with small groups could be more effective but will take more time to reach people.
 - Focus on what the community would gain from the rate increase, not the rate increase itself.
 - Look at history to tell the story. There are many examples where no one thought of the consequences and the results were tragic.
 - Frame the discussion around "cents per day" instead of a percent rate increase. A 20 percent rate increase sounds daunting, but a 20-cents per day increase is not noteworthy.

20-Year Comprehensive Facility Plan—Stakeholder Vision

Gary and Clay presented a revised version of the Vision document for the WWT Stakeholders to review. In response to a suggestion to add more funding scenarios to the document, Gary suggested instead that the document be reworded to emphasize that numerous scenarios exist and that the two options being presented in the document are being used for illustrative purposes. Several Stakeholders supported this approach and agreed that the focus should be on the end goal, not the minutia of how we get there. Another Stakeholder recommended including the suggestion made earlier of phrasing rate increases in terms of "cents per day" instead of percentages in this document. Several Stakeholders asked that the language related to loss of impervious area be revised to reflect the fact that current regulations require post-construction peak run-off to match pre-construction conditions. Lastly, a Stakeholder asked about how Louisville Green process at Morris Forman was incorporated. Gary responded that he would revise the section that discusses it to be more direct about its future.

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20-Year Comprehensive Facility Plan Support Memo

Clay asked the Stakeholders to review the revised Facility Plan Support Memo and provide feedback. After a period of review, there was a general consensus of agreement with the memo and a willingness to endorse it and the Vision (after the noted revisions were made).

Clay said that he would follow up with Stakeholders individually, especially absent members. He and Gary would revise the Vision and Support Memos, send out the updated versions, and work with the Stakeholders to get signatures and/or emailed approvals for the documents.

Observer Comments, Wrap-Up, and Adjourn

There were no comments from the observers.

Clay closed the meeting by saying that the specific date for the next meeting has not been determined.

Meeting Materials

- Agenda for the December 13, 2016 WWT Stakeholder Group Meeting
- Copy of the presentation slides – IOAP Update; 20-year Comprehensive Facility Plan Financing Options
- Draft Facility Plan Stakeholder Vision
- Draft Facility Plan Support Memo
- Copy of *Sustain* magazine

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Meeting Participants

Wet Weather Team Stakeholders (Present)

Stuart Benson, Louisville Metro Council, District 20
Deborah Bilitski, Louisville Metro Government, Direct of Develop Louisville
Billy Doelker, Key Homes
Tom Herman, retired from Zeon Chemicals
Rick Johnstone, Deputy Mayor, Louisville Metro Mayor's Office (retired)
Kurt Mason, USDA Natural Resources Conservation Service
Rocky Pusateri, Elite Built Homes
Lisa Santos, Irish Hill Neighborhood Association
Bruce Scott, Kentucky Waterways Alliance (retired)
Marty Storch, Louisville Metro Parks
David Wicks, Get Outdoors KY; Jefferson County Public Schools (Retired)

Wet Weather Team Stakeholders (Not Present)

Steve Barger, Labor (retired)
Susan Barto, Mayor of Lyndon
Allan Dittmer, University of Louisville Provost Office
Mark French, University of Louisville Speed School of Engineering
Armita Gadson, retired Executive Director, Kentucky Environmental Quality Commission
David James, Louisville Metro Council, District 6
Maria Koetter, Louisville Metro Government, Director of Sustainability
Gina O'Brien, Brightside Executive Director
David Tollerud, University of Louisville, School of Public Health and Information Sciences
Tina Ward-Pugh, citizen representative, former Metro Council member

Wet Weather Team MSD Personnel (Present)

Tony Parrott, MSD Executive Director
Angela Akridge, MSD Chief Engineer
Brian Bingham, MSD Chief of Operations
John Loechle, MSD Engineering Director

Technical Support

Gary Swanson, CH2M-Hill
Clay Kelly, Strand Associates
Paul Maron, Strand Associates

Meeting Observers

Chuck Anderson, Strand Associates
Lara Kurtz, B&N
Wolffie Miller, MSD
Mark Sneve, Strand Associates
Mike Harris, Jacobi, Toombs & Lanz

MEMORANDUM

TO: Louisville and Jefferson County Metropolitan Sewer District (MSD) Board

FROM: Stakeholder Group Members of the Wet Weather Team

DATE: December 20, 2016

SUBJECT: Draft 20-Year Comprehensive Facility Plan

As stakeholder members of MSD's Wet Weather Team (WWT), we wish to indicate our support for the adoption and implementation of the 20-Year Comprehensive Facility Plan. The attached document, "Vision for MSD's 20 Year Comprehensive Facility Plan," summarizes the Wet Weather Team Stakeholder Group's common understanding of the high-level recommendations of the Facility Plan, and the compelling need for MSD to take immediate and sustained action. Our support for the Facility Plan is based on the expectation that the complete plan is fully reflective of and consistent with the attached Facility Plan Vision. We support this Vision for improving the community in the following ways:

- enhance protection against the increased frequency of extreme storms that we have experienced, presumably related to the impacts of global climate change
- reverse the trend of deferred maintenance that threatens the reliability of our facilities and the health and safety of our community
- provide for responsible growth and development consistent with applicable land use planning

In this memorandum, we review the composition and charge of the Wet Weather Team, describe the results of the stakeholder subgroup's deliberations, and outline our support for the Facility Plan.

Wet Weather Team Composition and Charge

The Wet Weather Team consists of community representatives, elected officials, MSD personnel, and technical consultants. The Stakeholder Group members of the Wet Weather Team include individuals recognized as community opinion leaders associated with environmental advocacy, business and industry, elected officials, local government, community neighborhood, recreation, public health, environmental justice, and organized labor interests. WWT stakeholders have not formally represented their specific affiliated organizations as part of the team, but rather have provided input reflective of the broad interest areas in which they lead.

Originally formed in 2006 to provide guidance on the development of Integrated Overflow Abatement Plan (IOAP), the Stakeholder Group was re-chartered in 2014 to confirm the group's ongoing assistance relative to implementation of the IOAP and to expand the scope to include providing similar guidance for the Facility Plan. The re-chartered Stakeholder Group included sixteen members of the original Stakeholder Group, and added six additional members to reflect an expanded group of interests and diversity of opinions. Re-chartering defined the purpose of the group as:

- validate the use of programmatic and project-specific community values to drive decisions on projects and infrastructure investments
- review and comment on project-specific performance measures reflective of the values
- confirm the application of benefit scoring to alternative analysis and prioritization
- review the preliminary suite of projects
- assist with planning and implementing a plan for public outreach

Results of the Wet Weather Team's Deliberations

The Wet Weather Team met ten times between December 2014 and December 2016. These meetings addressed both IOAP implementation and Facility Plan development issues. For the Facility Plan, the Stakeholder Group provided guidance on the value-based benefit cost, recent developments and progress on the Facility Plan service areas, budget and rate issues, and other relevant topics. Some of the key outcomes of the Stakeholder Group efforts are as follows:

1. Adaptation of the Analytic Framework: The WWT Stakeholder Group, along with the other WWT members, reviewed and modified the previously developed set of community values to use in selection and prioritization of projects. The stakeholders also reviewed and commented on a performance evaluation framework that includes a benefit-cost scoring methodology for considering community values, a "risk reduction factor" that incorporates the principles of risk management into the decision process, and a systematic process for considering values that relate to the program as a whole. (This analytic framework is further described in the attached Vision.) We believe that this analytic framework is rigorous, transparent, and reproducible, and that it provides an effective way to understand and balance tradeoffs among potentially conflicting community interests.
2. Application of the Analytic Framework: The WWT Stakeholder Group reviewed examples of how MSD's Facility Plan Team used the values-based performance evaluation framework and risk-reduction factors to evaluate project alternatives to address aging infrastructure, current and anticipated regulatory imperatives, opportunities for responsible growth and development, and the challenges presented by the increased frequency of extreme storms. We believe the analytic framework has been applied consistent with the WWT's expectations in the development of the Facility Plan and has produced a robust, reproducible, and transparent analysis.
3. Summary of Facility Plan Projects: We believe the project mix and outcomes that form the backbone of the Facility Plan reflect responsiveness to the broad range of issues facing our community, while ensuring wise and effective use of our community resources. The Facility Plan Vision describes an approach to continuing MSD's commitment to the environment through compliance with current and anticipated regulatory requirements. It includes a significant component of renewal and replacement of aging infrastructure to improve system reliability and minimize overall life-cycle costs. The Facility Plan responds to the increased frequency of extreme storms with an approach aimed at providing protection to properties and buildings from surface flooding across the entire county from a storm with a 10-percent chance of occurring in a year (commonly referred to as a "10-year storm"). The Plan also provides guidance on reducing (but not eliminating) the risks associated with localized, unusual weather events.
4. Facility Plan Costs and Affordability: The attached Vision accurately summarizes the WWT's common understanding of the serious issues facing MSD and our community. We understand that the last ten-year focus on the Amended Consent Decree, coupled with the desire to maintain rates at or below the industry average has created a condition that deferred spending on critical infrastructure renewal and replacement. This approach also focused primarily on controlling sewer overflows with less attention given to the broad range of other critical issues facing MSD's wastewater, stormwater and flood protection infrastructure. We recognize that, while increased spending on infrastructure is needed, the affordability of utility services is a serious concern for those in our community, especially those who are living at or near poverty levels. To avoid imposing additional stressors on the low-income population of our community, we support the

concept of meaningful rate relief for those in need. To provide the benefits of a significant wastewater and drainage rate reduction for low-income customers, a very small proposed incremental increase in costs will be passed on to other customers who are better able to absorb it in their household budgets. As Stakeholder Group members of the WWT, we support this compassionate approach to providing funding for the infrastructure improvements our community needs.

5. Commitment to Community Outreach: We understand and applaud MSD's commitment to a multi-faceted community conversation about the infrastructure needs of our community, and the associated proposal to fund these improvements. Detailed analysis by a team of technical experts has identified the projects and programs we need for MSD to fulfill its commitment to provide safe, clean waterways for our community.
6. Financing the Facility Plan Implementation: The speed at which we complete these tasks are dependent on the community's willingness to pay for the work required. The WWT Stakeholder Group believes in the necessity of this body of work and the wisdom of attacking these critical issues immediately, but recognize the entire community should have the opportunity to have its voice heard before these difficult decisions are made by the MSD Board and Metro Council.

As MSD moves forward in coming years with Facility Plan implementation, we do anticipate the program, like all major capital construction programs, will face project-specific challenges related to local community understanding and acceptance. In this context, we understand MSD is committed to using focused and sustained neighborhood education and outreach efforts to support project-specific and overall program implementation and will strive to address localized needs consistent with overall community needs. At the same time, we believe all localities throughout the MSD system must keep in mind that individual Facility Plan project locations, priorities, and types have emerged from a rigorous and consistently applied technical analysis.

The Facility Plan represents a cohesive and comprehensive evaluation of our community's wastewater, stormwater, and flood protection needs for the next two decades. This approach is consistent with the OneWater initiative between MSD, Louisville Water Company, and Metro Public Works in that it considers the entire landscape of challenges and seeks solutions through collaboration and impartial prioritization rather than identifying and addressing issues in silos.

The undersigned Stakeholder Group of the Wet Weather Team appreciates the opportunity to have contributed to MSD's Facility Plan development efforts. We look forward to the MSD Board's review of the Draft Facility Plan and MSD's release of the Plan for public review and comment. We encourage MSD to use this Statement of Support to further the community understanding of the important issues that we have deliberated. Thank you for the opportunity to contribute to this critical community improvement initiative. Please feel free to contact us individually or collectively with any questions or perspectives you may have.

Stakeholder Members of the Wet Weather Team

<u>Member</u>	<u>Organization*</u>	<u>Participation</u>
Steve Barger	Small business owner; Labor (Retired)	2006 - current
Susan Barto	Mayor of Lyndon	2006 - current
Stuart Benson	Louisville Metro Council, District 20	2006 - current
Deborah Bilitski	Louisville Metro Government, Director of Develop Louisville	2016 - current
Allan Dittmer	University of Louisville, Professor Emeritus	2006 - current
Billy Doelker	Key Homes, LLC; Building Industry Association	2016 - current
Mark French	University of Louisville, Speed School of Engineering, Professor	2015 - current
Arnita Gadson	West Jefferson County Community Task Force	2006 - current
Mike Heitz	Louisville Metro Parks Department, former Director (Retired)	2006 - 2015
Tom Herman	Zeon Chemicals (Retired)	2006 - current
David James	Louisville Metro Council, District 6	2014 - current
Rick Johnstone	Deputy Mayor, Louisville Metro Mayor's Office (Retired)	2006 - current
Maria Koetter	Louisville Metro Government, Director of Sustainability	2015 - current
Bob Marrett	CMB Development Company, LLC	2006 - 2016
Kurt Mason	USDA Natural Resources Conservation Service	2006 - current
Jim Mims	former Louisville Metro Planning & Design Services Department	2014 - 2016
Gina O'Brien	Louisville Metro Government, Director of Brightside	2015 - current
Rocky Pusateri	Elite Built Homes	2015 - current
Lisa Santos	Irish Hill Neighborhood Association	2006 - current
Bruce Scott	Kentucky Waterways Alliance (Retired)	2006 - current
Marty Storch	Louisville Metro Parks Department, Deputy Director	2016 - current
David Tollerud	University of Louisville, Public Health & Information Sciences, Adjunct Professor (Retired)	2006 - current
Tina Ward-Pugh	former Louisville Metro Council - District 9	2006 - current
David Wicks	Get Outdoors KY; Jefferson County Public Schools (Retired)	2006 - current

*Stakeholders on the Wet Weather Team do not formally represent their specific affiliated organizations, but rather seek to provide input reflective of the broad interest areas in which they lead. Along with the stakeholder subgroup, the Wet Weather Team also includes MSD personnel and technical consultants.



20-year Comprehensive Facility Plan – Stakeholder Group Vision

Introduction

The Wet Weather Team Stakeholder Group has participated in the development of the Louisville & Jefferson County Metropolitan Sewer District (MSD) 20-year Comprehensive Facility Plan through a series of ten facilitated meetings held between December 2014 and December 2016. Through this process we have been exposed to a wide range of Facility Plan topics across all service and support areas. We have provided advice, feedback, and guidance on the values-based decision framework, specific metrics for project evaluation and prioritization, and the approaches to communicating the intent of the Facility Plan to the general public.

The Facility Plan Team has provided us the results of their analyses through examples, presentations and roll-up summaries. We have developed confidence in the information the Facility Plan Team has presented, and we strongly support the goals and objectives of the Facility Plan as we understand them. This Stakeholder Group Vision represents our understanding of the high-level issues and solutions as presented in the Facility Plan, and is the basis for our public endorsement of the Facility Plan.

Background

From 1985 to 2003, MSD spent close to \$1 billion on improvements to the wastewater collection and treatment system to address high priority public health and safety issues. During this same period, a \$134 million program for managing intermittent wet weather sewer overflows was also underway to study the system behavior, and subsequently design and construct several important sewer overflow abatement facilities. However, the investment made to tackle sewer overflows was not deemed sufficient to meet water quality goals within timeframes established by federal and state regulators. In 2003, MSD received a request for information from US Environmental Protection Agency (USEPA) in accordance with Section 308 of the Clean Water Act. This request for information was the first step in a process that eventually led to a notice of alleged Clean Water Act violations from USEPA and the Kentucky Department for Environmental Protection. This resulted in a negotiated settlement between these parties most commonly referred to as the Consent Decree.

One of the requirements of the Consent Decree was for MSD to develop overflow abatement plans to address combined sewer overflows, separate sewer overflows, and unauthorized discharges. In response to this requirement, MSD consolidated the required overflow abatement plans into the Integrated Overflow Abatement Plan (IOAP), a long-term plan to control combined sewer overflows and eliminate sanitary sewer overflows and other unauthorized discharges in MSD's sewer system. Submitted in December 2008, and approved by regulatory agencies in August 2009, the IOAP identified \$850 million in capital improvements, associated incremental operating costs, and a high-level financial plan that included cash flow projections, projected borrowing schedules, and projected rate increases through the year 2024.

With the filing of the enforcement action, sewer overflows became the top priority, and MSD shifted resources and investments agency-wide to tackle this massive federally-mandated undertaking. Spending in areas other than sewer overflow control was focused on the day-to-day operation and upkeep of wastewater, stormwater, and flood protection facilities. Major investments in infrastructure rehabilitation, renewal and replacement were limited by a desire to keep rates at or below industry averages even as capital and operating spending ramped up to meet the Consent Decree requirements.

**LOUISVILLE & JEFFERSON COUNTY MSD
20-YEAR COMPREHENSIVE FACILITY PLAN
STAKEHOLDER VISION**

This shift was especially significant given that portions of the stormwater and flood protection system were already in decline due to exceeding their expected design life prior to MSD assuming responsibility for these facilities in 1987. In addition, the initial funding source that had been established to address this deferred renewal and replacement was insufficient to address all the improvement needs identified.

The result of this deferred investment over the past 10 to 15 years is that Louisville's aging system of pipes, pumps, treatment plants, and flood gates are now in urgent need of rehabilitation if they are to continue providing reliable protection of public health and safety for the community. While iconic landmarks and prominent structures garner more attention, Louisville is also home to a less visible system of facilities that serve a higher calling behind the scenes every day - facilities that keep Ohio River floodwaters at bay, that prevent harmful bacteria from entering homes and local waterways through sewer overflows, and that reduce the likelihood of disease outbreaks such as Zika virus spawned by poor drainage. When pipes fail and structures in the system collapse into sinkholes, and when inland flooding blocks roadways, access to emergency services and critical care is denied. A properly functioning sanitary sewer, stormwater, and drainage system is needed to support the community's economic engine, protect jobs and sustain the local tax base.

Neglecting this essential system is no longer an option - serious failures are occurring at an increasingly rapid pace. The ability to successfully apply temporary repairs rather than permanent fixes diminishes significantly with each passing day. Rainfall totals that once could be managed by the system now overwhelm it. This risk is heightened by the increased frequency of extreme storm events. The back-to-back storm events experienced in 2015 flooded homes leaving families without shelter. Cars were washed away, streets were impassable, schools and businesses shut down, and public safety was threatened in proportions not seen in decades. Citizens demanded that measures be taken to prevent similar occurrences from happening again.

Given the magnitude of the required spending to complete the Consent Decree IOAP projects and the public opposition to increased cost of wastewater and stormwater services, adding investment in existing facilities is a daunting task. To help identify appropriate levels of investment and priorities, MSD developed a 20-year Comprehensive Facility Plan that consolidates MSD's planning for facility rehabilitation, renewal, replacement, upgrade, and expansion across all its service areas. Projects listed in the Facility Plan were determined by the Facility Plan Team to address critical needs requiring correction over the next 20 years to protect the health and safety of the community, provide environmental protection, meet customer expectations for level of service, and move closer to the goal of our local waterways achieving federal and state water quality standards. The Facility Plan will also consider the long term operating needs to accommodate maintenance and operation of new facilities coming on-line under the IOAP and other critical infrastructure investments.

Consistency in levels of service and protection for ratepayers across the entire Louisville community is also a key objective of the Facility Plan. The aim is to provide protection from drainage problems to a consistent 10% probability storm (also commonly referred to as a 10-year storm). Currently the most recently constructed areas in the community are designed to provide protection against drainage problems due to the 10% probability storm as defined by MSD's current design manual (a 4.5-inch rainstorm occurring in 24 hours). Many of the older neighborhoods in the service area, constructed prior to MSD assuming responsibility for stormwater management, begin to experience localized drainage problems in a 3-inch rainstorm occurring in 24 hours. This implication is that MSD's current level of protection is not consistent across the service area.

**LOUISVILLE & JEFFERSON COUNTY MSD
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Based on the analyses of the 20-Year Comprehensive Facility Plan, meeting the critical needs of the community is estimated to cost \$4.3 billion over the next two decades. The reality is that the original Consent Decree resulted in large part from a similar pattern of deferred maintenance and investment in critical wastewater infrastructure. The Facility Plan Team believes the community should not risk burdening our children and grandchildren with future federal mandates because of an unwillingness to dedicate adequate resources to the challenges of today.

Purpose and Scope

In January 2014, the MSD Board adopted a new Strategic Business Plan that defined a change agenda for MSD. The intent of the Strategic Business Plan is to dramatically improve customer care and service; make appropriate investments in technology, infrastructure and employees; and improve the quality of life in Louisville and Jefferson County while maintaining the financial viability of the utility. A key part of MSD's plan to implement the Strategic Business Plan is to develop this 20-Year Comprehensive Facility Plan (Facility Plan). The purpose of this Facility Plan is to:

- Consolidate MSD's planning and prioritization for facility rehabilitation, renewal, replacement, upgrade, and expansion across all its service areas
- Recommend and prioritize projects and programs to achieve the following objectives:
 - Protect the public health and safety of the community
 - Protect our aquatic and terrestrial environment
 - Meet customer expectations for a consistent level of service
 - Comply with all federal and state laws, regulations, orders and standards

The Facility Plan has identified overall financial needs for future facility rehabilitation, renewal, replacement, upgrade, and expansion. The projects are those recommended by the Facility Plan team as needed to achieve MSD's mission, vision, and goals. All projects have been assigned recommended schedule dates and durations based on the Facility Plan Team's assessment of their relative priority and needs. Further refinement of the project schedules will be prepared by MSD staff as part of the annual budgeting process. In addition, this Facility Plan, like all long-term plans, should be revisited on a recommended five-year cycle to make adjustments as changing conditions develop.

For projects directly affected by precipitation events, the Facility Plan includes projected rainfall intensity, duration, and frequency curves for the year 2035. This projection considers both statistical trends going back 60 years along with state-of-the art global circulation models that project future precipitation conditions. This reflects the observed increased frequency of extreme storm events that we have experienced, presumably related to the impacts of global climate change.

The Facility Plan recommends that MSD's current design criteria for facilities (based on published storm recurrence intervals) will apply to new facilities planned as appropriate, with revised precipitation projections applied to the recurrence intervals in the criteria. For example, stormwater culverts under secondary roadways will continue to be designed to the 10 percent probability storm (commonly known as the 10-year storm), but the 24-hour rainfall value used in the calculations reflects precipitation projections for the end of the 20-year planning period (2035). The Facility Plan recommends that MSD's design standards be modified to incorporate the projected 2035 precipitation projections in the requirements for new construction. For example, the 10% probability storm projected for 2035 is 5.2 inches of rain occurring in 24 hours, as compared to the current MSD design manual value of 4.5 inches of rain occurring in 24 hours.

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The Facility Plan considers the operating costs, including staff increases, to accommodate operations and maintenance of new facilities coming online under the IOAP and this Facility Plan. In addition, shortfalls in current O&M budgets and staffing levels for facility maintenance have been evaluated, and a program to adjust both budgets and staffing over time has been recommended. The recommended budgets and staffing levels are intended to allow predictive and preventive maintenance to occur in accordance with current industry best practices for asset management.

A key part of the Facility Plan is a recommended 20-year capital improvement plan (CIP). Projects in the recommended 20-year CIP were determined by the Facility Plan Team to address critical needs requiring correction over the next 20 years. Another key objective of the Facility Plan is consistent service for ratepayers across the entire Louisville community. The aim is to provide wastewater, drainage, and flood protection services to a ten percent probability storm (commonly known as a “ten-year storm”) for all customers within the MSD service area by the end of the 20-year planning period.

Project Development

The Facility Plan Team identified projects through a number of pathways. MSD’s current CIP contains over 100 projects related to wastewater systems. If these projects were already in design or construction, these existing projects were included in the recommended 20-year CIP without change. If the projects were not in design or construction, the project needs were identified and the costs verified. These projects were then subject to prioritization along with all the other projects.

The IOAP has a number of very large projects still to construct. These projects are required to be completed on the schedule presented in the approved IOAP. No changes were made to the IOAP projects or their schedules.

MSD has a number of existing planning studies related to wastewater that have not been fully implemented. The Facility Plan Team evaluated existing studies and found a number of worthwhile projects that have not been included in the CIP yet. These projects were evaluated and are included in the project mix for prioritization.

Finally, the Facility Plan Team looked for gaps in previous planning. This included a review of population projections, an assessment of regulatory changes that might occur during the 20-year planning period, and a condition assessment of facilities that included staff interviews, visual inspections, and in some cases diagnostic measurements. The projects resulting from regulatory changes will be mandatory to complete in the time frame dictated by the adoption of new regulations. The anticipated time frames for new regulations and new regulatory enforcement priorities have been identified by the Facility Plan team, understanding that regulatory issues are not totally predictable and not within MSD’s complete control. The condition assessment identified a number of projects that were critically needed to correct the past under-investment in renewal and replacement of assets. A review of maintenance trends confirms that the number of infrastructure failures (sewer collapse, pump station capacity shortfalls, etc.) is directly related to the age of the asset. This implies a system- wide deficiency in effective preventive maintenance, which impacts both the reliability and the overall cost of ownership of those assets.

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Project Evaluation and Prioritization

Project evaluation and prioritization requires a rigorous and transparent approach. The approach used to develop the IOAP was very successful in this regard, and to the extent possible was replicated in developing the Facility Plan.

Given the variety of ways that projects were identified and developed, capital and operating cost estimating used a variety of sources. The IOAP Cost Tool was used to develop project costs where applicable (new projects with standard components like sewers and pump stations). If the standard cost tool could not be applied, the team used industry-standard cost references such as R.S. Means. When similar MSD projects were available, the estimating was done using unit prices from those projects.

The prioritization of projects followed the values-based benefit/cost evaluation used successfully in the development of the IOAP. The Wet Weather Team Stakeholder Group was re-chartered to continue to assist with IOAP implementation and also to serve a role in helping guide the development of the Facility Plan. Many of the original members chose to continue serving on this team. Recognizing the broader scope of the Facility Plan, a number of new members representing different interest groups and demographics, were added to the Stakeholder Group.

A values-based benefit/cost evaluation assisted in the development of scoring scales to grade projects on their effectiveness at protecting the community in the following values:

- Environmental Protection
- Public Health Protection
- Regulatory Compliance
- Sustainability
- Property Protection
- Economic Vitality

The values-based benefit scores were coupled with life-cycle cost information to develop a benefit/cost score used for the first round of project prioritization. This approach was then supplemented with an evaluation of the effectiveness of the project in mitigating risk. Risk mitigation effectiveness is valued based on the change in either the probability of an event happening, or the consequence of that event if it does occur. As Figure 1 indicates, the combination of a high probability and a serious consequence result in a risk that is considered to be “critical”. The anticipated change in risk resulting from implementing a project resulted in a risk reduction factor that was used in conjunction with the benefit/cost score to prioritize projects.

Figure 1 – Risk Evaluation Matrix

Consequence	5	Critical	Critical	Critical	High	Medium
	4	Critical	Critical	High	Medium	Low
	3	Critical	High	Medium	Low	Low
	2	High	Medium	Low	Low	Very Low
	1	Medium	Low	Low	Very Low	Very Low
		5	4	3	2	1
		Probability				

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Recommended 20-year CIP

Table 1 below presents a summary of the recommended 20-year CIP, broken down by service area and major program. Note that the values have been escalated at three percent per year compounded to the projected mid-point of construction.

Table 1 – Recommended 20 Year CIP Summary

Service Area and Program	Capital Cost (in escalated dollars)				Total
	FY17 - FY21	FY22 - FY26	FY 27 - FY 31	FY 32- FY 36	FY 17 - FY 36
Wastewater	\$725.4-M	\$403.6-M	\$364.9-M	\$283.4-M	\$1,777.3-M
Consent Decree (IOAP)	\$449.3-M	\$38.7-M	\$0.0-M	\$0.0-M	\$488.0-M
NMC	\$112.7-M	\$33.2-M	\$35.1-M	\$40.0-M	\$221.0-M
CMOM	\$140.6-M	\$275.4-M	\$196.8-M	\$222.7-M	\$835.5-M
Development	\$22.9-M	\$56.2-M	\$133.0-M	\$20.7-M	\$232.8-M
Stormwater	\$350.8-M	\$616.8-M	\$628.9-M	\$785.7-M	\$2,382.2-M
Drainage	\$196.7-M	\$400.6-M	\$394.0-M	\$547.9-M	\$1539.2-M
Floodplain Management	\$22.0-M	\$25.4-M	\$29.4-M	\$34.1-M	\$110.8-M
Stormwater Quality (MS4)	\$4.6-M	\$17.7-M	\$18.4-M	\$21.3-M	\$62.0-M
Ohio River Flood Protection	\$127.6-M	\$173.1-M	\$187.1-M	\$182.3-M	\$670.1-M
Support Systems	\$41.7-M	\$27.7-M	\$24.1-M	\$26.6-M	\$120.1-M
Capital Equipment	\$11.3-M	\$14.7-M	\$16.7-M	\$19.0-M	\$61.8-M
Facilities	\$26.6-M	\$8.3-M	\$3.2-M	\$2.7-M	\$40.9-M
IT	\$3.1-M	\$3.8-M	\$3.1-M	\$3.6-M	\$13.6-M
LOJIC	\$0.6-M	\$1.0-M	\$1.1-M	\$1.3-M	\$3.9-M
Total Escalated Costs	\$1,117.9-M	\$1,048.1-M	\$1,018.0-M	\$1,095.6-M	\$4,279.6-M

Table 2 presents a summary of the first five years of the recommended 20-year CIP, broken down by year, service area and major program. Note that the values have been escalated at three percent per year compounded to the projected mid-point of construction. Note that MSD's FY 17 approved CIP did not fully fund the Facility Plan recommendations for that fiscal year. This is due to revenue limitations caused by a cap on the rate increases that the MSD Board can approve without receiving approval from the Metro Council. MSD staff prioritized CIP spending based on the funding available, resulting the FY 2017 CIP budget that was approved by the MSD Board. The net effect is that the project not funded in accordance with the Facility Plan recommendations will need to be reconsidered at a later date, if sufficient funding becomes available.

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Table 2 – Preliminary 5-Year CIP Summary

Service Area and Program	Capital Cost (in escalated dollars)					Total
	FY2017	FY2018	FY 2019	FY 2020	FY 2021	FY 17 - FY 21
Wastewater	\$159.7-M	\$198.7-M	\$176.6-M	\$106.6-M	\$83.8-M	\$725.4-M
Consent Decree (IOAP)	\$117.4-M	\$152.4-M	\$120.3-M	\$38.9-M	\$20.2-M	\$449.3-M
NMC	\$19.9-M	\$20.0-M	\$23.5-M	\$26.7-M	\$22.6-M	\$112.7-M
CMOM	\$19.7-M	\$24.1-M	\$27.3-M	\$32.0-M	\$37.5-M	\$140.6-M
Development	\$2.6-M	\$2.2-M	\$5.6-M	\$9.0-M	\$3.5-M	\$22.9-M
Stormwater	\$24.1-M	\$40.3-M	\$66.0-M	\$100.7-M	\$119.7-M	\$350.8-M
Drainage	\$8.6-M	\$17.9-M	\$36.2-M	\$69.5-M	\$64.6-M	\$196.7-M
Floodplain Management	\$4.2-M	\$4.2-M	\$4.4-M	\$4.5-M	\$4.6-M	\$22.0-M
Stormwater Quality (MS4)	\$0-M	\$0-M	\$0-M	\$0-M	\$4.6-M	\$4.6-M
Ohio River Flood Protection	\$11.3-M	\$18.2-M	\$25.5-M	\$26.7-M	\$45.8-M	\$127.6-M
Support Systems	\$12.2-M	\$4.7-M	\$7.0-M	\$6.8-M	\$10.9-M	\$41.7-M
Capital Equipment	\$6-M	\$1.4-M	\$1.9-M	\$2.4-M	\$5.0-M	\$11.3-M
Facilities	\$9.9-M	\$2.5-M	\$4.7-M	\$3.9-M	\$5.7-M	\$26.6-M
IT	\$1.6-M	\$7-M	\$3-M	\$3-M	\$3-M	\$3.1-M
LOJIC	\$1-M	\$1-M	\$1-M	\$3-M	\$0-M	\$6-M
Total Escalated Costs	\$196.0-M	\$243.8-M	\$249.6-M	\$214.1-M	\$214.4-M	\$1,117.9-M

Significant Service Area Projects and Programs

The following sections will address each of the MSD service areas, along with support services, describing specific assumptions that drove project development.

Wastewater

For the past 10 years, much of MSD's focus has been ensuring compliance with the requirements of the Consent Decree. Due to limited resources and a desire to maintain sewer and drainage rates at or below the national average, developing and implementing the IOAP has taken the focus off infrastructure renewal and repair for facilities not related to sewer overflow control. In addition, the weak economy from 2008 to 2012 also reduced the pressure to provide new wastewater service to developing areas. While the IOAP implementation is only half finished, the consequences of deferred maintenance are beginning to show itself in increased numbers of sewer collapses, including multiple problems with the Broadway Interceptor and its connecting lines. With the local economy strengthening, MSD is seeing much more interest from the development community to provide sewer service to growth areas across the county. The Facility Plan addresses all these issues, as described in the following sections.

Consent Decree and IOAP

The IOAP is a major part of MSD's Consent Decree compliance program. The IOAP is a long-term plan to control CSOs and eliminate sanitary sewer overflows (SSOs) and other unauthorized discharges from MSD's sewerage system. The IOAP is expected to improve water quality in both Beargrass Creek and the Ohio River through and below Jefferson County. The expected water quality benefits of the IOAP include: (a) reductions in the peak levels of bacteria in the Ohio River and Beargrass Creek; and (b) a reduction in the amount of time that average bacteria levels to exceed water quality standards. In addition the IOAP program will enhance public health and safety by reducing the potential for the public to come in contact with untreated sewer overflows, whether in the basements of their homes or in the streets and ground surfaces where sewer overflows currently discharge.

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Long Term Control Plan Benefits

The suite of projects selected for the Final CSO Long-Term Control Plan (LTCP) part of the IOAP will result in approximately 98 percent capture and treatment of wet weather combined sewage during an average year. This benefit represents an 89 percent reduction in CSO volume compared to conditions in 2008. As a point of reference, the presumptive approach for compliance with water quality standards in EPA's CSO Control Policy is based on a minimum of 85 percent capture and treatment of wet weather combined sewage.

Sanitary Sewer Discharge Plan Benefits

The suite of projects selected for the Final Sanitary Sewer Discharge Plan (SSDP) part of the IOAP will result in the elimination of capacity-related SSOs up to the site-specific level of protection. The SSO projects are anticipated to eliminate an average of 145 SSO events per year (290 million gallons {MG} of overflow volume), based on 2005–2007 data normalized for rainfall. In terms of water quality, SSO projects will eliminate 100 tons of five-day biochemical oxygen demand (BOD₅) and approximately 200 tons of suspended solids annually.

Sustainable Performance

MSD's IOAP is based on a "demonstration approach" to achieving compliance with the Consent Decree and the Clean Water Act requirements. While MSD is required to certify compliance with the CSO management requirements after completing the full suite of CSO projects in 2020, MSD's CSO management performance will continue to be monitored through the Morris Forman WQTC KPDES permit with performance standards consistent with the commitments of the IOAP. Similarly, the SSO elimination projects are required to be completed by the end of 2024. MSD's certification that the performance objectives have been met will mean that MSD's obligations under the Consent Decree have been discharged, but the requirements for continued operation of the collection and treatment facilities in the system to avoid further SSOs will continue through the KPDES permits for the WQTCs that govern operation of all the facilities. It is important to note that the Consent Decree requirements do not go away with the completion of the IOAP projects – the enforcement mechanism for sewer overflow and control changes from the Consent Decree to the respective KPDES permits.

IOAP Impacts on the Recommended CIP

Over the first five to nine years of the planning period, the wastewater service area CIP is dominated by completing the remaining major IOAP projects. The major CSO storage basins are all scheduled to be completed by the end of FY 21, with the remainder of the SSO elimination projects scheduled to be completed by the end of FY 25. Completing the entire suite of CSO and SSO projects in accordance with the IOAP schedule is required by the Consent Decree. Any failure to complete a project on schedule could be considered a violation of the Consent Decree with consequences including stipulated penalties that could total over a million dollars for a one-year delay in completion.

The next section of the Stakeholder Vision addresses the balance of the CIP. These projects address needs in wastewater, stormwater, flood protection and asset management infrastructure that have been deferred for the past 10 to 15 years as MSD's limited resources were focused on meeting Consent Decree requirements.

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Nine Minimum Controls (NMC)

The NMC program was initially developed as part of the Clean Water Act CSO Policy to address combined sewer system best management practices that do not require significant construction. In a continued focus on protection of public health and safety, the best practices required by the NMCs will be integrated into MSD's KPDES permits in order to ensure protection of public health, safety and the environment. Maximizing storage in the conveyance system, maintaining WQTC capacity, and ensuring effective public notification of sewer overflows are examples of the best management practices that will remain in place in perpetuity as conditions of the Morris Forman WQTC KPDES permit.

The recommended 20-year CIP recommendation includes funding for the formal NMC Program that is reported on quarterly as part of the Consent Decree requirements. Capital projects that help sustain the intent of the NMC requirements are included in the preliminary CIP through the end of the planning period.

The most significant long-term NMC activities are the Real Time Control (RTC) system in the combined sewer collection system and the Morris Forman WQTC improvements, which are also a major component of the IOAP. The recommended 20-year CIP recommendation provides annual funding for ongoing RTC rehabilitation and renewal to ensure proper operation of the RTC system which is necessary for long-term sustained compliance with the Clean Water Act CSO Policy, CSO Long-Term Control Plan, and NMC requirements.

Sustaining reliable treatment capability and capacity at the Morris Forman WQTC is critical to ensure proper wastewater treatment for Ohio River water quality protection. This is a significant endeavor that has been underfunded since the most recent overall plant rehabilitation was completed in the early 2000's. A detailed condition assessment has been prepared for the Morris Forman WQTC liquid process treatment facilities. Periodic equipment replacements and major plant renovations are scheduled in five year intervals for the purpose of financial planning. Overall, the recommended 20-year CIP recommendations include almost \$200 million in rehabilitation and renewal projects over the planning period. In order to protect public health, these rehabilitation and renewal projects are essential to maintaining reliable operation of the largest WQTC in MSD's system. Unfortunately, the 2015 failure of the Morris Forman WQTC high voltage electrical distribution center provided a catastrophic view of the consequences of deferring facility renewal and replacement. As power was lost to the main electrical system for the treatment plant, inadequate backup power resulted in flooding and extensive damage to the plant. Wastewater was discharged that had not been treated to the State of Kentucky's KPDES discharge standards creating a potential public health risk to the community. Ironically, the backup power supply for the plant had been deferred and therefore was not in place to avoid the costly damage to the plant.

The Facility Plan assumes there will be no major changes in the Morris Forman WQTC discharge requirements during the planning period, and therefore the existing plant will continue to operate as-is for the duration of the planning period, except for initial construction of facilities required for nutrient removal late in the planning period as noted below.

For many years MSD has produced a high quality soil conditioner called Louisville Green from the biosolids generated by the treatment plant. The condition of the Louisville Green production equipment (primarily the biosolids dryers and pellet processing equipment) is rapidly degrading due to the severe duty conditions experienced in processing the highly-abrasive dried biosolids product. MSD has, in the past, been able to sell all of the Louisville Green it could produce, thereby offsetting operating costs for

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the system. The current degraded condition of the equipment requires MSD to landfill dewatered biosolids when the capacity of the drying system is overwhelmed. MSD, under a separate initiative, is investigating short-term biosolids management solutions that may include increasing the amount of dewatered biosolids disposed of by landfill (by negotiating better prices in return for the commitment of guaranteed minimum amounts of dewatered biosolids being sent to the landfill), turning over management of the dewatered biosolids to a third-party vendor, and/or replacing the drying system with an alternate technology approach. Recognizing that implementing a new biosolids management approach may take several years to implement, the recommended 20-year CIP includes short-term fixes for the dryer system, and expansion of the dewatered cake handling system to allow increased landfilling as continued operation of the dryers becomes impractical. Other approaches to biosolids handling that are currently under consideration for a short-term solution may include design and construction of a handler by a third-party vendor, similar to how the high-purity oxygen generation system is currently being procured. If this procurement model is followed, MSD will not directly incur capital cost, and the project will have more impact on the annual operating budget than the CIP.

A 50-year look at continued operations of the Morris Forman WQTC at the current site has concluded that there will not be any major changes in discharge standards for nutrient removal or consideration of micro-constituents such as residual antibiotics, hormones, or other pharmaceuticals; residual personal care products; etc. within the current 20-year planning horizon. If major discharge standards changes occur this will likely require changes to both the liquid treatment and biosolids handling approaches. Given the severe constraints of the existing site, it will be necessary to locate new facilities on property not part of the current Morris Forman WQTC site. The long-term plan is being developed, and a phasing roadmap for systematic facilities expansion will be included. It is assumed that some level of nutrient removal may be required toward the end of the 20-year planning period. The recommended 20-year CIP recommendation includes funds for land purchase and the start of facility construction to address nutrient removal during years 15 to 20 of the planning period. Treatment for micro-constituents is not envisioned in the recommended 20-year CIP, but will represent a significant capital expense when required by new regulations. If/when the discharge requirements change to include advanced nutrient removal and increased removal of BOD₅ and total suspended solids from wet weather flow, the costs to expand and upgrade the Morris Forman plant could exceed \$1.2 billion (2016 dollars).

Capacity, Management, Operations and Maintenance (CMOM)

The next largest program within the wastewater service area is the Capacity, Management, Operations and Maintenance (CMOM) program. EPA Region 4 developed the initial program that became CMOM, and MSD's Consent Decree specifically requires the development and implementation of a CMOM program. The intent of the CMOM program is to ensure that best management practices are implemented across all aspects of the utility, thereby increasing the ability of the utility to meet its obligations under the Clean Water Act. CMOM activities represent best management practices for wastewater utilities and will be sustained for the entire 20-year planning period.

Major components of the CMOM program include projects for major renewal and replacement projects at the Hite Creek, Floyds Fork, Cedar Creek, and Derek R. Guthrie WQTCs. These renewal and replacement projects are scheduled at 5-year intervals for each of the centers to ensure that MSD can maintain efficient and effective wastewater treatment, a critical aspect of public health protection. The budget established for each center is the result of an asset inventory and condition assessment of each WQTC. The actual scope of each project will be established during detailed design.

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The CMOM program provides proactive asset management of the pipes and pump stations that make up most of MSD's collection system. Clear water intrusion of surface and ground water during rain events overloads the conveyance and treatment systems. This clear water intrusion, referred to as infiltration and inflow (I/I), is one of the main causes of sewer overflows. Budgets are recommended to provide inventory of critical parts for pump stations, rehabilitate and replace sewers that are leaking or in danger of structural failure, and provide stand-by generators in more locations to improve reliability during power outages. Studies suggest that approximately 50 percent of the I/I entering MSD's sewer system during a rain event may be coming from private property sources outside of MSD's direct control. To achieve and sustain the required overflow abatement levels, a substantial portion of this I/I must be removed from the system. A project with "seed money" to initiate a private property Infiltration/Inflow reduction program is also recommended in the CMOM budget. The private property I/I program is expected to become self-sustaining through new fees after initial start-up.

A significant addition to the CMOM program is the recommended expansion of the sewer rehabilitation and replacement activities to encompass major interceptors. In the past MSD deferred major rehab of these major interceptors due to the cost and difficulty in completing construction on these pipes. An increasing frequency of major interceptor failures indicates a critical need to proactively inspect and rehabilitate or replace these high-risk very old assets. When a major interceptor fails, a ripple effect is created across a much broader area due to road closures, traffic impacts, and other factors that directly impact the community. Since major interceptor rehabilitation projects have not been specifically identified at this time, an allowance has been recommended to begin the process of inspection, project development and early-action remediation of high-risk defects over the next five years. By the end of five years, the recommended allowance is increased to \$10 million per year, totally focused on major interceptor rehabilitation and replacement. At this sustained funding level, MSD will be able to renew these critical assets on a prioritized basis. Preemptive rehabilitation is much less expensive than making emergency repairs such as those MSD had to complete in response to a collapsed section of the Broadway Interceptor in 2015. This one repair interrupted businesses, severely impacted traffic flow on a main arterial roadway, and impeded access to a nearby hospital.

Development

The recommended 20-year CIP budget also includes capacity expansions for the Hite Creek, Floyds Fork, and Cedar Creek WQTCs. The timing of these expansion projects has been based on population projections for each service area. Ensuring that capacity is available in advance of development supports growth and development for the community by avoiding moratoriums due to the rated capacity of the WQTCs being exceeded. This expansion is in accordance with KDEP regulations. The Derek R. Guthrie and Morris Forman WQTCs are not anticipated to need a growth-related capacity expansion within the 20-year planning period, however, they will require investment to continue operating properly.

In addition to WQTC capacity, the recommended 20-year CIP program also addresses conveyance system capacity needs. Projects are recommended to address areas anticipated to have significant growth in the Floyds Fork and Cedar Creek service areas due in part to the development of the Parklands of Floyds Fork. Growth is also provided for in the Hite Creek and Derek R. Guthrie service areas. The Morris Forman WQTC service area is essentially built-out meaning growth will result from customers coming online through infill of existing developed areas. In addition to expansion of the sewer system, capacity issues with pump stations have also been identified and addressed. Several pump stations

have been identified that do not have adequate capacity to meet projected peak flows due to future growth. To avoid the creation of new SSOs, these pump stations must be expanded in advance of the upstream collection system expansions that will bring them additional flow. The intent is to provide the needed reliable capacity in both the gravity and pumped portions of the collection system so that new connection moratoriums can be avoided.

Regulations

The recommended CIP budget also includes future projects in anticipation of regulatory changes. Increased levels of treatment for nutrients (nitrogen and phosphorous) could be imposed prior to the end of the planning period which would seriously impact MSD's WQTCs. Projects to begin addressing nutrient removal requirements at all the WQTCs are included in the latter years of the planning period. Note that the timing of nutrient removal regulations will govern when these projects are actually implemented.

The removal of micro-constituents has also been identified as a potential future regulatory requirement. While the imposition of standards requiring removal of micro-constituents is not anticipated with the 20-year planning window, preliminary concepts have been developed and placeholder budgets recommended to address this potential future need. These placeholder budgets are not in the recommended 20-year CIP. Note that the timing of micro-constituent removal regulations will govern when these projects are actually implemented.

Stormwater Management

Stormwater management is a vital component of MSD's system as it directly impacts the health and safety of all Louisville residents. The recommended 20-year CIP includes a number of programs related to drainage and internal floodplain management. In 1987 MSD took over stormwater management and Ohio River flood protection through a Memorandum of Agreement with the City of Louisville (pre-merger with Jefferson County) and most of the small cities within Jefferson County. In 1988, MSD completed a Stormwater Drainage Master Plan that addressed the backlog of known drainage and flooding problems and planned for improvements in overall drainage and flood protection for the service area. MSD began implementing the recommendations of the Stormwater Master Drainage Plan on a prioritized basis, within the budget limitations imposed by the insufficient revenue generated through drainage fees. The flood of 1997 diverted the focus of stormwater management to deal with specific vulnerabilities exposed by that severe flooding event.

Project DRI

Drainage problems create health and safety impacts for citizens directly at their homes, schools, businesses, and transportation routes. Beginning in 2003, MSD initiated an aggressive program to address a wide variety of drainage issues that were pointed out by customers. This program, dubbed Project DRI (Drainage Response Initiative), assigned experienced project managers, contractors, and inspectors to address drainage problems on a "grade-to-drain" basis. Efforts under this program address problems ranging from structural flooding to alleviating minor standing water problems. Since 2003 most of the funds available through drainage fees have been allocated to Project DRI, with more than \$125 million in capital drainage improvements completed through this program. While MSD originally thought that Project DRI would be phased out as the backlog of customer drainage issues were resolved, customer drainage requests continue to be among the most common communication received by MSD's

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Customer Relations Department. This is likely due to drainage impacts of land use changes, the increased frequency of extreme storm events, and the degradation of drainage facilities due to aging. MSD's experience has proven that having the ability to respond quickly to individual property owner's drainage concerns is a vital part of providing quality service and building customer satisfaction. This has proven to be a very valuable program for MSD's customers, and the recommended 20-year CIP includes an annual allocation of \$2.8 to \$5 million per year to sustain Project DRI.

Stormwater Master Plan

Given the public concern over the effects of the increased frequency of extreme storm events, the localized drainage solutions offered by Project DRI need to be supplemented with a program to address issues of stormwater management and flood protection on a county-wide or watershed basis. To increase the public health and safety protection and provide a consistent level of protection for the entire service area, a significant increase in spending for drainage and flood protection is required.

Subsequent to the 1988 Stormwater Master Plan the primary county-wide stormwater planning completed by MSD has related to internal (i.e. not related to the Ohio River) floodplain management. MSD has completed studies in several watersheds to update the definition of the FEMA and Local Regulatory Floodplains. These studies rely on rainfall intensity-duration-flow (IDF) information that reflect historical observations. The Facility Plan team has projected IDF information out to for 2035, for the purposes of long-range planning. Since the projected 2035 values are not based on observed data, the updated floodplain information should not be used for regulatory purposes, but can be used to inform potential property owners of the risks associated with potential future extreme storm events.

While MSD requires plans for new development to document no adverse impacts on downstream flooding, the cumulative effects of land use changes within the existing developed areas prior to MSD assuming responsibility for stormwater management may not have been subject to the same level of scrutiny. The hydrologic and hydraulic models used for drainage planning have not been consistently updated to reflect recent land use changes, and are not available in a county-wide integrated data base to allow identification of potential downstream impacts of new projects.

A comprehensive, county-wide stormwater master plan is recommended to be initiated as one of the first recommendations from the stormwater portion of the Facility Plan. While current development standards require mitigation of the drainage impacts of land use changes, analysis of historical trends shows a significant reduction in natural green space and an increase in impervious surfaces that don't allow stormwater to seep into the ground. Runoff from impervious surfaces also causes increased runoff volume, and greatly increased runoff peak flows. In addition to addressing the potential impact of the increased frequency of extreme storms, the master plan should also consider a strategy to restore some of these surfaces to natural pervious conditions, which can have a significant impact on the amount of infrastructure that will be needed to address future needs. This plan should address floodplain management definition and non-floodplain related drainage problems in an integrated approach to deal with this highly visible MSD service. It protects downstream homes and businesses from flooding caused by the impacts of upstream development.

Early Action Projects

While the stormwater master plan is being developed it is obvious that MSD's customers expect immediate action to begin addressing stormwater issues. MSD and the Facility Plan Team have identified several areas across the county with a history of drainage problems primarily related to localized drainage, not directly related to floodplain management issues.

Stormwater Master Plan Implementation

Allowances have been established in the recommended 20-year CIP to provide for implementation of the Stormwater Master Plan. The recommended budgeted amounts were identified through extrapolation of the Early Action Plan projects described previously to the entire county. The intent is to provide the entire county with updated and expanded stormwater management facilities to consistently meet the level of protection of a 10-year storm, using stormwater IDF targets projected for the end of the planning period. The funding required to do this is anticipated to exceed \$600 million over the 20-year planning period, so the Facility Plan team deemed it critical to establish reasonable placeholder numbers in the long-range financial plan to be developed as part of the Facility Plan.

Viaduct Flooding

MSD is responsible for managing drainage from 32 viaducts that are subject to flooding during storm events. Some viaducts become completely impassable in relatively minor storms. Viaduct flooding disrupts transportation routes, and creates potential hazardous conditions if flooded roads are not barricaded in a timely manner, or drivers ignore the barricades and drive under the viaducts anyway. The Facility Plan Team identified conceptual drainage solutions for each of the viaducts for which MSD is responsible. The projects were prioritized based on the team's understanding of traffic load and perceived risk to public health and safety. Note that viaducts are a shared responsibility with Louisville Metro Public Works and the Kentucky Transportation Cabinet. Prior to initiating a costly viaduct drainage solution all parties should engage in determining the best approach to improving public safety at the viaduct locations.

Stormwater Quality Green Infrastructure

The purpose of the MS4 stormwater quality program is to improve stormwater runoff quality in Jefferson County, and to protect the public health, safety and welfare by reducing the introduction of harmful materials into the separate storm sewer systems that discharge into the streams of our community. The MS4 permit outlines the regulatory requirements for discharging municipal stormwater into local water bodies. Major categories for program compliance include, but are not limited to:

- Public education and outreach
- Management of industrial facilities
- Stormwater pollution prevention plan creation and oversight
- Administration of construction site management (EPSC)
- Post construction controls (green infrastructure)
- Maintenance and analysis of water quality monitoring equipment and data

The current 5-year MS4 permit cycle began on August 1, 2011. The permit establishes the Maximum Extent Practicable (MEP) effort for MS4 programs to maintain MSD compliance with the Clean Water Act.

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MSD uses green infrastructure techniques such as infiltration, rain gardens, basin retrofits etc. to offset the need and costs on conventional facilities such as storage basins. This has proven to be effective for volume reduction in the combined sewer system, and for water quality improvements for treatment of runoff in MS4 areas. There are requirements for new construction to include these types of practices to control the 80th percentile event (0.6 inches of rain) in Louisville Metro. MSD funding is available for construction cost offsets in the combined sewer system area, and potential stormwater fee credits in the MS4 areas. Funding commitments for this program were defined in the IOAP, and have been retained in the Facility Plan recommended CIP.

The Facility Plan identified a number of large stormwater retention basins with the potential for conversion of all or part of the basin to provide infiltration of stormwater. These projects are identified to be completed within the first five years of the CIP, providing very cost-effective green infrastructure solutions on a large scale.

Floodplain Management - Flood Response Fund

MSD has purchased approximately 200 homes through federal grant programs since the 1997 flood, and is currently working on eight open grant projects to purchase additional homes located in flood prone areas. MSD also has 13 grant applications under review by FEMA. These grant applications include an additional 58 flood prone properties that could be mitigated through acquisition.

Following a number of extreme storm events in 2015 the Mayor formed a multi-agency Flood Mitigation Workgroup to address impacted residents who were unable, for a variety of reasons, to get back in their homes after the flood waters receded. The Flood Mitigation Workgroup recommended a number of mitigation approaches including establishment of a “quick-buy” program to allow property owners to sell flood impacted property in a much shorter time than would typically be possible. The MSD Board approved allocation of \$1.5 million from the FY 16 budget to fund this program. The Flood Mitigation Workgroup recommended an annual fund be established to provide timely relief to property owners impacted by future extreme storm events.

The Flood Response Fund proved to be a vital part of the community’s recovery after the 2015 floods. The recommended 20-year CIP includes an annual allocation of \$4 million per year to the Flood Response Fund for various flood mitigation and response activities including continuing the quick-buy program where appropriate, implementing small-scale flood protection projects, and applying for, administering, and providing local-share funding for FEMA and other flood relief grant programs.

Ohio River Flood Protection

In 1987, as part of the Memorandum of Agreement with the City of Louisville related to drainage and flood protection services, MSD assumed responsibility for the Ohio River flood protection system.

The Ohio River flood protection system is critical to protecting Louisville and Jefferson County from the type of devastating flooding experienced in New Orleans following Hurricane Katrina, and all along the Mississippi River when similar flood levee and pump station systems failed during the extreme high water conditions experienced in the past decade. Louisville’s Ohio River flood protection system was evaluated in a Levee Safety Evaluation (LSE) by the US Army Corps of Engineers (USACE) in 2015 and found to be compliant with the level of protection required by FEMA. The level of Ohio River flood protection required by FEMA incorporates a “coincident frequency analysis” that statistically determines the probability of a rain event happening at the same time as high Ohio River levels. The coincident

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frequency analysis found the MSD Ohio River flood protection systems is adequately sized to handle a 1% probability (100 year storm) event. MSD's local drainage design criteria calls for conveyance (pumps and pipes) to be sized for at least the 10% event. While meeting the FEMA 1% criteria in a coincident frequency analysis, several of the flood pump stations would require significant expansion to achieve a capacity equivalent to a 10% probability event, should MSD decide to apply drainage criteria to the flood pump stations. The LSE contained a wealth of information about minor deficiencies that need to be corrected. These items have been included in the recommended 20-year CIP.

Flood Pump Stations

Much of the Ohio River flood protection system was constructed in the 1950s. Design criteria that could be located from records of this era usually indicated the flood pump stations were intended to pump the 10% probability storm (10-year storm), as defined by 1950 land use patterns and pre-1950 rainfall statistics. Some of the design documents recommended the capacity requirements be updated at 10-year intervals to account for land use changes, among other things. To our knowledge, prior to the LSE evaluation the capacity of these flood pump stations has never been reassessed through comprehensive hydraulic and hydrologic modeling. As noted previously, capacity assessment completed as part of the LSE study identified several flood pump stations that do not meet the 10% probability storm, even though their capacity is adequate to provide protection for a 1% probability event under a coincident frequency analysis.

In addition to capacity concerns, many of the flood pump stations have original 1950's vintage electrical and mechanical equipment. For the most part the stations are manually operated using control systems that cannot be repaired with off-the-shelf components. To assure the reliability and adequacy of the flood pump station system, all pump stations were subject to a condition assessment (in addition to the USACE LSE evaluation) and hydraulic and hydrologic modeling using storm IDF's projected for 2035. The recommended 20-year CIP includes rehabilitation and/or expansion of 15 of the 16 flood pump stations in MSD's system. Given the size of these facilities, the costs are substantial but the risks being addressed are vital to Louisville's protection against catastrophic flooding.

Levee and Floodwall System

MSD maintains a proactive maintenance program to assure the integrity of the levee and floodwall system. In addition, the USACE does a bi-annual inspection of the levee and floodwall, resulting in a report on any deficiencies noted. The recommended 20-year CIP includes continuation of a proactive preventive maintenance program, in addition to the corrective actions recommended by the LSE study. These efforts are critical to protect the Louisville community from flooding.

Support Systems

MSD owns a large inventory of rolling stock, IT systems, and above-ground facilities that support MSD's operation of wastewater, stormwater drainage and Ohio River flood protection services.

Capital Equipment

MSD owns more than 600 vehicles and portable equipment, ranging from passenger vehicles and pick-up trucks to large excavators and sewer cleaning trucks. MSD is has started leasing the commonly available passenger cars and pick-up trucks, which would move these costs from capital to operating budgets. The specialty equipment used in MSD's operation and maintenance activities are not available

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for lease, and MSD must continue to own them to be certain they are available any time they are required. This equipment is critical to MSD's ability to complete the preventive and corrective maintenance activities required to provide sustainable and reliable wastewater, stormwater, and flood protection services. For example, a comprehensive sewer inspection activity requires a sewer flush truck to clean the sewer, a vactor truck to capture the material flushed from the line to prevent it from moving downstream to cause problems elsewhere, and a CCTV truck to take a close look at the condition of the pipe. After the condition is established, either heavy construction equipment like excavators and loaders or specialty equipment to install cured-in-place sewer lining is used to correct deficiencies. The specialized equipment is very expensive to purchase and maintain, given the severe service conditions that this equipment is operated under. The recommended 20-year CIP includes an annual allowance for repair and replacement of this equipment.

Facilities

The Facility Plan team completed a condition assessment of over 200 buildings and recommended corrective actions where deficiencies were noted. The main areas of deficiency were in roofs. MSD has above-ground buildings with roofs all over the county, ranging from the massive roof system at the Central Maintenance Facility to the little roof over a 10'x10' pump station building. Roofs appear to be one area that MSD allows to "run to failure". Roofs are seldom replaced until a leak is detected inside the building. The Facility Plan recommends an extensive program of roof replacement in the first five years, using standardized roofing systems for different applications. After that, regular inspection and replacement before failure occurs is recommended to provide the minimum cost of ownership for the buildings protected by these roofs.

The Facility Condition Assessments also identified a number of deficiencies in areas related to HVAC, building egress, signage and ancillary equipment, and indications of conditions that could eventually cause structural issues, and even structural failure. The recommended 20-year CIP includes projects to address the specific recommendations identified by the Facility Plan Team, with future budgets recommended to complete periodic condition assessments following deficiency correction.

IT Systems and LOJIC Support

MSD maintains an extensive inventory of IT hardware and software that is essential to the overall operations of the agency. This includes the MSD internet system that is the backbone of MSD electronic communication and digital data generation, communication and storage, and regulatory compliance reporting. It also includes the MSD supervisory control and data acquisition (SCADA) system that controls over 300 pump stations and control gates. It is also the platform for implementation of the RTC system used to optimize use of MSD's conveyance facilities to cost-effectively maximize the use of existing facilities to reduce sewer overflows. Without adequate and updated IT systems, public health and safety could be at risk. This inventory is subject to periodic upgrade and replacement like all MSD's other assets. In addition, MSD hosts the Louisville & Jefferson County Information Consortium (LOJIC) systems, which similarly require periodic upgrades and replacements to hardware and software. The recommended 20-year CIP includes annual allowances to account for these anticipated future costs.

Finance

To implement a \$4.3 billion capital program and the associated costs to operate new facilities, MSD must have the funding to pay for it. Unlike the IOAP, which is required by Federal Consent Decree to be

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completed, most of the stormwater management and flood protection capacity projects developed in this Facility Plan are not specifically required by regulation. Providing for infrastructure renewal and replacement, and improving the consistent level of service in stormwater management and flood protection are local decisions driven by MSD's mission to provide safe, clean waterways for the community. MSD will implement this Facility Plan to the extent funding is provided through the rate-setting process. If sufficient funding is not provided to complete the recommended projects in the 20-year planning period, then projects will be deferred to the future, when funding comes available.

Revenue Requirements and Rates

The MSD Board approves *Rates Rentals and Charges* on an annual basis. The Board has the authority to raise rates up to 6.9% per year without Metro Council approval. Rate increases higher than 6.9% require Metro Council approval. The CIP recommended by the Facility Plan totals approximately \$4.3 billion over 20 years. The recommended CIP for FY 2017 - FY 2021 exceeds \$1 billion. The revenue generated by current rates, increased at 6.9% per year or less, will not generate enough revenue to support \$1 billion in capital spending over the next 5 years. If current rates are increased by no more than 6.9% per year (\$3.60 per month for a typical customer in FY 2018) for the next five years approximately \$480 million in capital projects will need to be deferred. While 6.9% per year rate increases do provide enough revenue to implement the entire Facility Plan CIP over the 20 year planning period the recommended schedule cannot be achieved, and completing critical public safety projects could be deferred by three to five years.

Completing the projects in the recommended CIP on the schedule recommended in the Facility Plan will require a 20% to 25% rate increase in FY 2018 (\$10.50 - \$13.12 per month for a typical customer in FY 2018), followed by rate increases up to 6.9% for the remaining years of the planning period. If a smaller rate increase is approved for FY 2018, the project schedule will need to be adjusted and recommended projects deferred to a later date based on MSD's resulting financial capabilities and project priorities identified by MSD staff. Projects directly related to Consent Decree, other regulatory requirements, or that address areas of high risk will receive the highest immediate priority. Projects that do not address regulatory requirements or mitigation of high-risk issues will be deferred until the major IOAP projects have been completed and funds are available. The project prioritization system used to determine the recommended Facility Plan schedule is available for MSD staff to use in determining the priorities based on the information available at the time the budget revisions are made.

Table 3 presents the recommended project deferrals that could be anticipated for two alternative rate increase scenarios, based on the Facility Plan prioritization approach and information available at the time the Facility Plan was drafted. Note that the alternative scenarios presented represent only two of the many rate approaches possible. Table 3 illustrates that if the funding scenario does not accommodate the recommended Facility Plan projects, the CIP implementation will be focused initially on completing the IOAP, and other regulatory commitments. Even projects that deal with high-risk issues may be deferred due to funding shortfalls. Table 3 also illustrates the impact of deferred funding on the overall cost of Facility Plan implementation.

Under the most limited funding scenario presented (no rate increase over 6.9% per year) \$480 million in capital projects must be deferred by three to five years. This has a ripple effect on the remainder of the 20-year cash flow, effectively pushing \$480 million in projects to the end of the planning period. While Table 3 presents the Facility Plan recommendations for deferral, actual project deferrals will be established during the annual CIP budgeting process.

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Table 3 – Recommended Major Project Deferrals

Major Construction Projects Affected By Rate Increase Scenarios (first 5 years)	Scenario 1 Current Maximum Funding Level 6.9% annual	Scenario 2 20% FY 18 6.9% annual max FY 19 - FY36	Facility Plan Recommendation
Amended Consent Decree Required Projects			
Integrated Overflow Abatement Program Total CIP	\$ 492.3 M	\$492.3 M	\$492.3 M
Community Risk Mitigation - Major Construction Project Starts (first 5 years)	Deferred Design & Construction (Fiscal Year)	Deferred Design & Construction (Fiscal Year)	Recommended Design & Construction (Fiscal Year)
Ohio River Flood Protection			
Paddy's Run Flood Pump Station Improvements	2021 - 2024	2019 - 2023	2018 - 2021
Western Parkway Flood Pump Station Improvements	2022 - 2024	2020 - 2022	2019 - 2021
Beargrass Creek Flood Pump Station Improvements	2024 - 2029	2022 - 2027	2021 - 2026
Stormwater Drainage and Inland Flooding			
Seatonville Early Action Drainage Relief Project	2021 - 2024	2020 - 2022	2018 - 2020
Pope Lick Early Action Drainage Relief Project	2022 - 2025	2020 - 2022	2018 - 2020
Auburndale Early Action Drainage Relief Project	2022 - 2026	2020 - 2022	2018 - 2021
Newburg Early Action Drainage Relief Project	2023 - 2026	2020 - 2022	2019 - 2021
Valley Creek Early Action Drainage Relief Project	2023 - 2026	2020 - 2022	2019 - 2021
Whispering Hills Early Action Drainage Relief Project	2023 - 2026	2020 - 2022	2019 - 2021
City of Hurstborne Early Action Drainage Relief Project	2023 - 2026	2020 - 2022	2019 - 2021
Prospect Early Action Drainage Relief Project	2024 - 2027	2020 - 2022	2020 - 2021
Richlawn Early Action Drainage Relief Project	2024 - 2025	2021 - 2022	2021 - 2022
Ten Broek Early Action Drainage Relief Project	2024 - 2025	2021 - 2022	2020 - 2021
Viaduct Drainage Challenges			
E. Brandais Avenue & Brook Street Viaduct Flooding Relief	2023 - 2026	2020 - 2023	2018 - 2020
3rd and Eastern Parkway Viaduct Flooding Relief	2023 - 2027	2022 - 2026	2020 - 2024
Floyd and Hill Viaduct Flooding Relief	2024 - 2028	2022 - 2026	2021 - 2025
4th St. and Industry Road Viaduct Flooding Relief	2024 - 2029	2022 - 2027	2021 - 2026
Aging Infrastructure			
Morris Forman RAS/WAS Pumping Rehab	2022 - 2024	2018 - 2021	2018 - 2021
Morris Forman Digester Lids and Mixer Rehab	2020 - 2023	2019 - 2021	2019 - 2021
Morris Forman DAF Thickener Rehab	2023 - 2024	2021 - 2022	2020 - 2021
Morris Forman WQTC Primary Sedimentation Basin Rehab	2020 - 2023	2018 - 2021	2018 - 2021
Major Interceptor Rehabilitation Program	2021 - 2026	2020 - 2023	2018 - 2021
Wastewater Facilities Performance and Reliability			
Floyd's Fork Zone B Sewers Phase 1	2022 - 2024	2020 - 2022	2018 - 2020
Floyd's Fork Zone C Sewers Phase 1	2023 - 2025	2022 - 2024	2019 - 2021
Le Ann Way Pump Station Elimination	2022 - 2024	2021 - 2023	2019 - 2021
20-year Cost of Facility Plan Program	\$4,530 million	\$4,330 million	\$4,306 million

Rate Relief

While increased spending on infrastructure is needed, the affordability of utility services is a serious concern for those in our community, especially those who are living at or near poverty levels. To avoid imposing additional stressors on the low-income population of our community, MSD is investigating the concept of meaningful rate relief for those in need. To provide the benefits of a significant wastewater rate reduction for low-income customers, a small incremental increase in costs (approximately \$1.30/month) would be passed on to other customers who are better able to absorb it in their household budgets.

To implement this, MSD has partnered with the Metro Department of Community Services (Community Services). Community Services currently administers the Low-income Home Energy Assistance Program (LiHEAP). Community Services has agreed in principle to administer a rate relief program for MSD, based on the qualification standards used in the LiHEAP program. Subject to Board approval, MSD is considering a rate relief subsidy proportional to annual rate increases, for customers who qualify. It is anticipated that the current Low-Income Senior Citizens Discount Program would be phased out, but seniors would be “grandfathered” into the new rate relief program regardless of LiHEAP qualification standards.

Summary

The 20-year Comprehensive Facility Plan represents MSD’s most ambitious planning effort in a decade. Working with the Wet Weather Team Stakeholder Group and MSD staff, the Facility Plan team reviewed the challenges our community faces now and in the future and has developed a roadmap to protect the health, economic vitality, and environment of our city. The recommendations in this Plan are the result of well-vetted analyses from some of the most experienced engineers in Louisville Metro. The recommendations developed by this team are essential to maintaining reliable and properly sized facilities that will allow MSD to fulfill its responsibility for safe, clean waterways, and to help preserve and promote our competitiveness as a city.

Wastewater collection and treatment is MSD’s largest service offering and was the original reason MSD was formed by state statute in 1946. Fully implementing the Facility Plan recommendations will accomplish the following wastewater service objectives:

- Fulfill the obligation of the Consent Decree, including completing all the projects contained in the IOAP on schedule
- Provide facilities that comply with the other environmental regulations MSD is governed by, and provide a plan to remain in compliance with future regulations currently under development
- Renew and replace aging wastewater infrastructure to provide reliable service and the lowest overall cost using a best-practice asset management approach, and
- Position MSD to support the community’s ability to grow responsibly as economic development opportunities become available

MSD assumed responsibility for stormwater management, including both drainage and interior floodplain management for most of Jefferson County in 1987. The drainage system at that time had a backlog of thousands of drainage complaints that MSD was expected to correct. While MSD has invested hundreds of millions of dollars in drainage infrastructure since 1987, drainage problems still are found across the entire county. In addition, the increased frequency of extreme storms that have been

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observed in Louisville Metro have raised customer concerns about the adequacy of our drainage and interior floodplain management systems. While current development standards require mitigation of the drainage impacts of land use changes, analysis of historical trends shows a significant reduction in natural green space and an increase in impervious services that don't allow stormwater to seep into the ground. Runoff from impervious surfaces also causes increased runoff volume, and greatly increased runoff peak flows. Together these factors exacerbate the observed deficiencies in the stormwater system that MSD now has responsibility for, impacting neighborhood drainage in addition to interior floodplain inundation. Implementing the Facility Plan recommendations will accomplish the following stormwater management objectives:

- Improve the level of protection against public health and property risks caused by inadequate stormwater drainage systems
- Continue support for the Project DRI neighborhood drainage solutions,
- Expand the efforts of the MS4 program to reduce stormwater contamination of our waterways, primarily through "best management practices" and continued proactive support of green infrastructure solutions to both quantity and quality concerns
- Recognize and respond to the impact of changing weather patterns including the increased frequency of extreme storms

The Ohio River flood protection system was developed in response to the flood of 1937. The system of levees, floodwalls and flood pump stations have protected Louisville since it became operational in the 1950s. While the system has an outstanding record of reliability, much of the system is over 60 years old, and includes antiquated equipment that cannot be repaired with standard parts available today. In addition, the same changing precipitation and land use patterns that affect drainage and inland floodplain management also impact the flood pump stations and related appurtenances. Implementing the Facility Plan recommendations will accomplish the following Ohio River flood protection system objectives:

- Maintain protection from Ohio River floods entering Louisville by proactive preventive and predictive maintenance activities related to the levee, floodwall and all the gates and other penetration closures that keep floodwaters at bay
- Modernize the flood pump stations with current mechanical and electrical equipment that can provide continued reliability and a predictable cost to maintain since parts will be more readily available at a more reasonable cost
- Expand the capacity of those flood pump stations to enhance community protection in response to changing precipitation and land use patterns

Implementing the recommendations for all three service areas in accordance with the schedule presented will require a significant investment from the community, which may mean a step-change increase in wastewater and drainage rates. If the community is unwilling to accept the rate increases necessary to fund the recommended project schedules presented, many important projects will not be able to be implemented in the near-term. The data indicates that not implementing necessary investments is almost certain to result in more infrastructure failures, an increase in the overall cost of implementing the Plan, and an ever more rapidly increasing likelihood of a failure that could have serious consequences for the residents and business that make Louisville Metro their home.

WWT IOAP Update

December 13, 2016



Design Project Status Update



Southwestern Parkway CSO Basin

Pardon our Dust Public Meeting held 11/29/16

- Basin storage volume is 20 Million Gallons
 - Basin will be underground and covered
 - Within the Great Lawn of Shawnee Park
 - Public was provided updates on the design and what to expect during construction
 - A project website was established for project communication throughout the life of the project

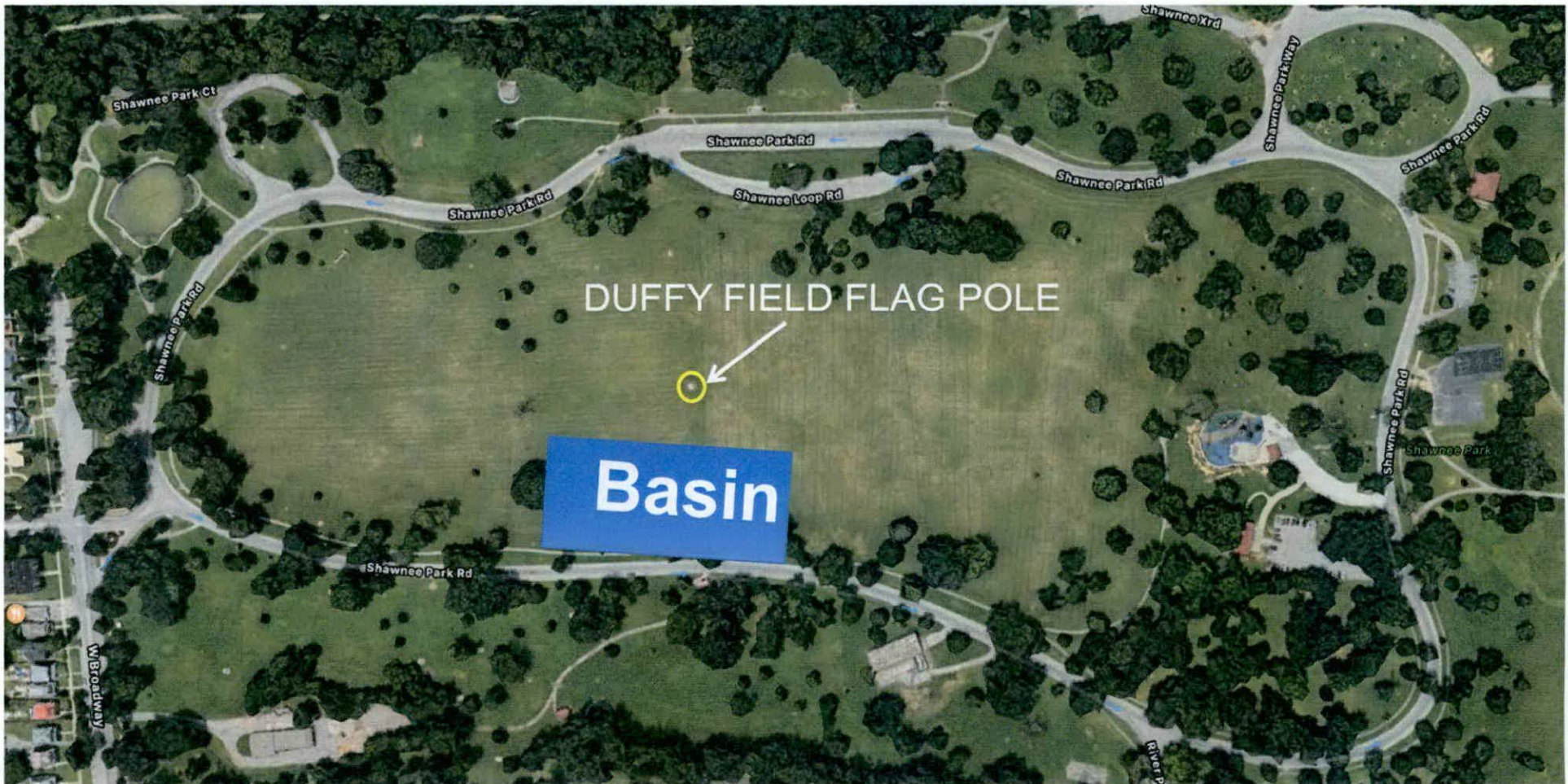
www.shawneeparkbasinproject.org



Public Meeting Recap

Basin Location

- 480' x 207.5'
- Average 55 ft total depth
- Average soil cover of 12 ft



Public Meeting Recap

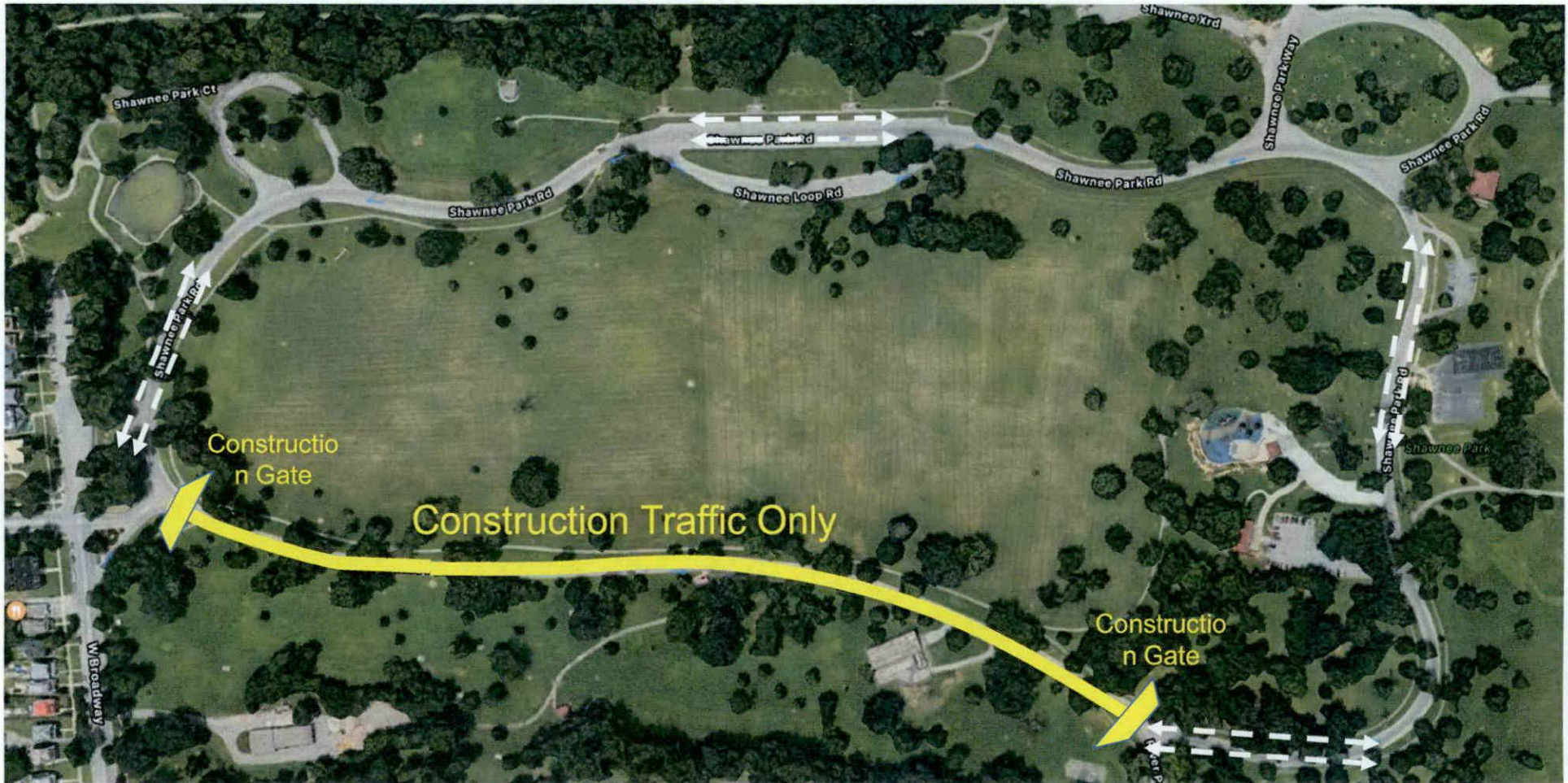
Area for Construction Activity



AREA FOR CONSTRUCTION ACTIVITY

Public Meeting Recap

Shawnee Park Temporary Traffic Plan



Public Meeting Recap

Operations Building



Conceptual Design from December 2015

Public Meeting Recap

Operations Building



Progressive Design Early Works Package

- The Early Works Package (Phase 1, Stage 2 Services) includes:
 - Basin Excavation
 - Support of Excavation (Sheeting/shoring)
 - Deep Foundation (Tension piles)
 - Dewatering
 - SWPPP BMPs
 - Traffic Control Measures
 - Temporary Fencing
 - Permitting
 - Design Services from 60% to 90%
- The Early Works Package activities are planned to commence in January 2017 following Board Approval on 12/19/16
- The Early Works Package GMP is \$19,219,485.21 (\$23 M Est)

Construction Project Status Update



Logan CSO Basin

Site Design Community Engagement

- LMHA will conduct community engagement program for the site surface treatment
- MSD will transfer the site to Louisville Metro Housing Authority (LMHA) and retain an easement for MSD facilities and access.
 - MSD Legal is preparing a Letter of Intent to transfer the property
 - MSD has HDR preparing a Property Management Plan
 - MSD Legal will prepare a property transfer agreement
- First community engagement public meeting is scheduled for 2nd week of January
- Any upgrades/additions to Basin scope will come from the \$700K MSD site contribution

Logan CSO Basin - Schedule

- Contract Amount: \$49,538,628.40
 - Walsh Construction
- Consent Decree Deadline: December 31, 2017
- Contract Substantial Completion: October 18, 2017
- Percent Complete (by Time): 65%
- Percent Complete (by Budget): 65%
 - Roof support columns complete
 - 2 of 8 pours of roof deck complete
 - Exterior walls 90% complete
 - Control Bldg foundation work to begin Jan 2017

Logan CSO Basin



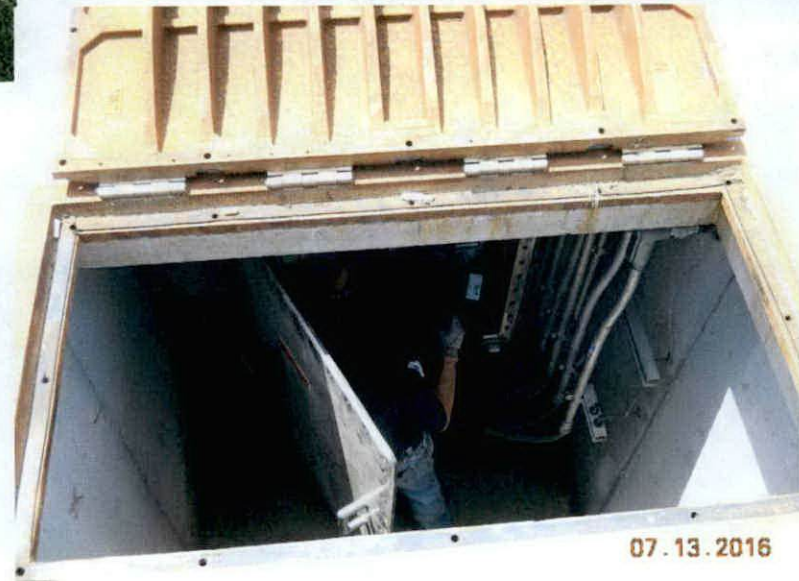
Logan CSO Basin



Logan CSO Interceptor - Schedule

- Contract Amount: \$31,514,351.79
 - Garney Construction
- Consent Decree deadline: December 31, 2017
- Contract Substantial Completion: May 9, 2017
- Projected Substantial Completion: April 1, 2017
- Percent Complete (by Time): 87%
- Percent Complete (by Budget): 97%
 - Remaining work:
 - CSO diversion structures – I&C / equipment start-ups
 - Access ramp at Logan Street and site restoration

Logan CSO Interceptor



Logan CSO Interceptor



Logan Street Access Ramp

Clifton Heights CSO Basin - Schedule

- Contract Amount: \$23,589,000
 - MAC Construction
- Consent Decree Deadline: December 31, 2018
- Contract Substantial Completion: June 1, 2018
- Percent Complete (by Time): 21%
- Percent Complete (by Budget): 13%
 - MAC stated their schedule is behind because they encountered water pockets and mud seams in wetwell area
 - To mitigate schedule they are revising their sequence of construction activities

Clifton Heights CSO Basin - Update



Clifton Heights CSO Basin - Update



Nightingale Pump Station - Schedule

- Contract Substantial Completion: October 24, 2016
- Estimated Substantial Completion: April 26, 2017
- Contract Amount: \$33,314,856.00
- Percent Complete (by Time): 106%
- Percent Complete (by Budget): 64%
- Project is behind 184 days
- Construction tasks
 - Floor Slab: 100%
 - Columns: 100%
 - Walls: 100%
 - Top Slab: 50%

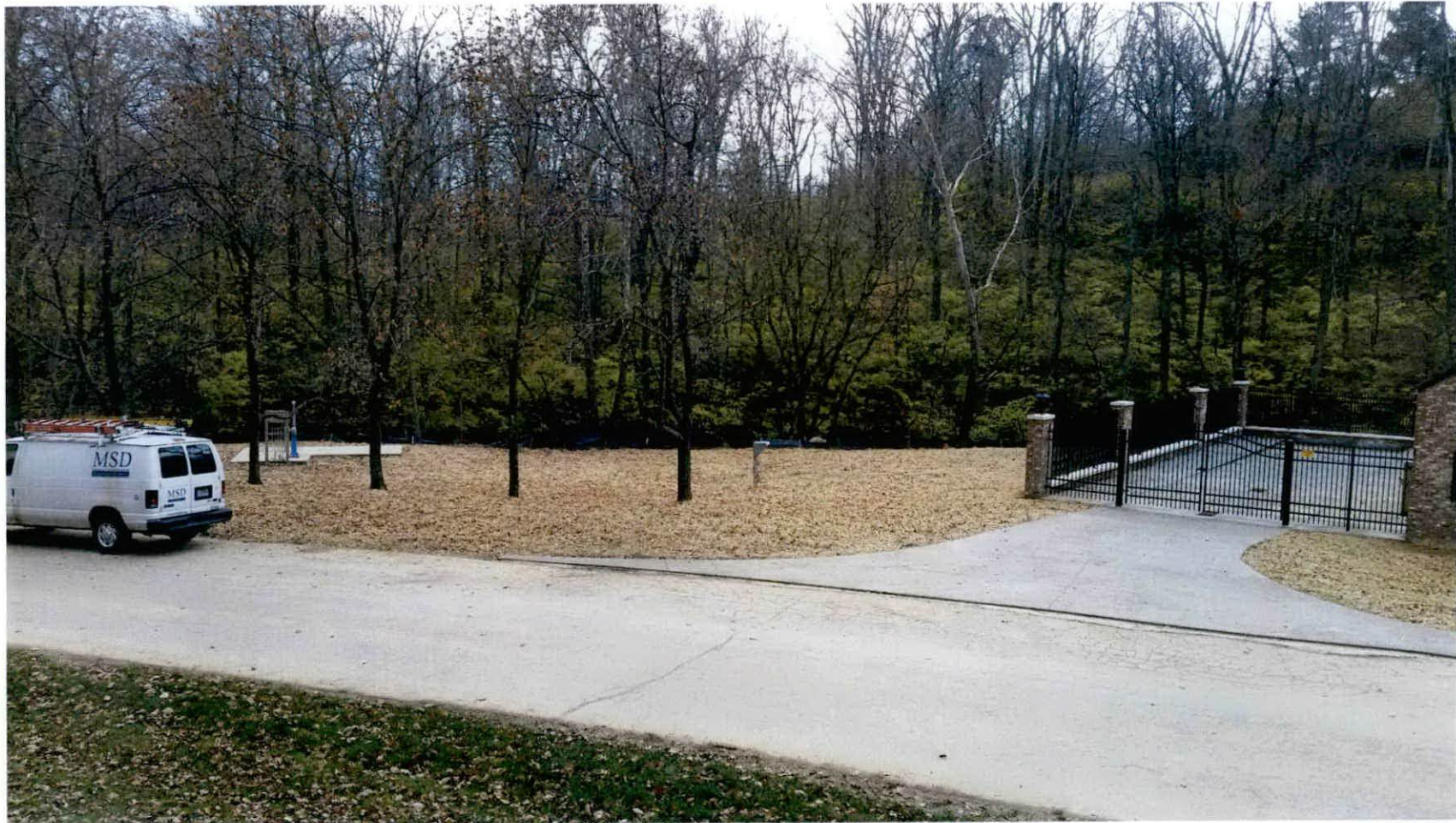
Nightingale Pump Station



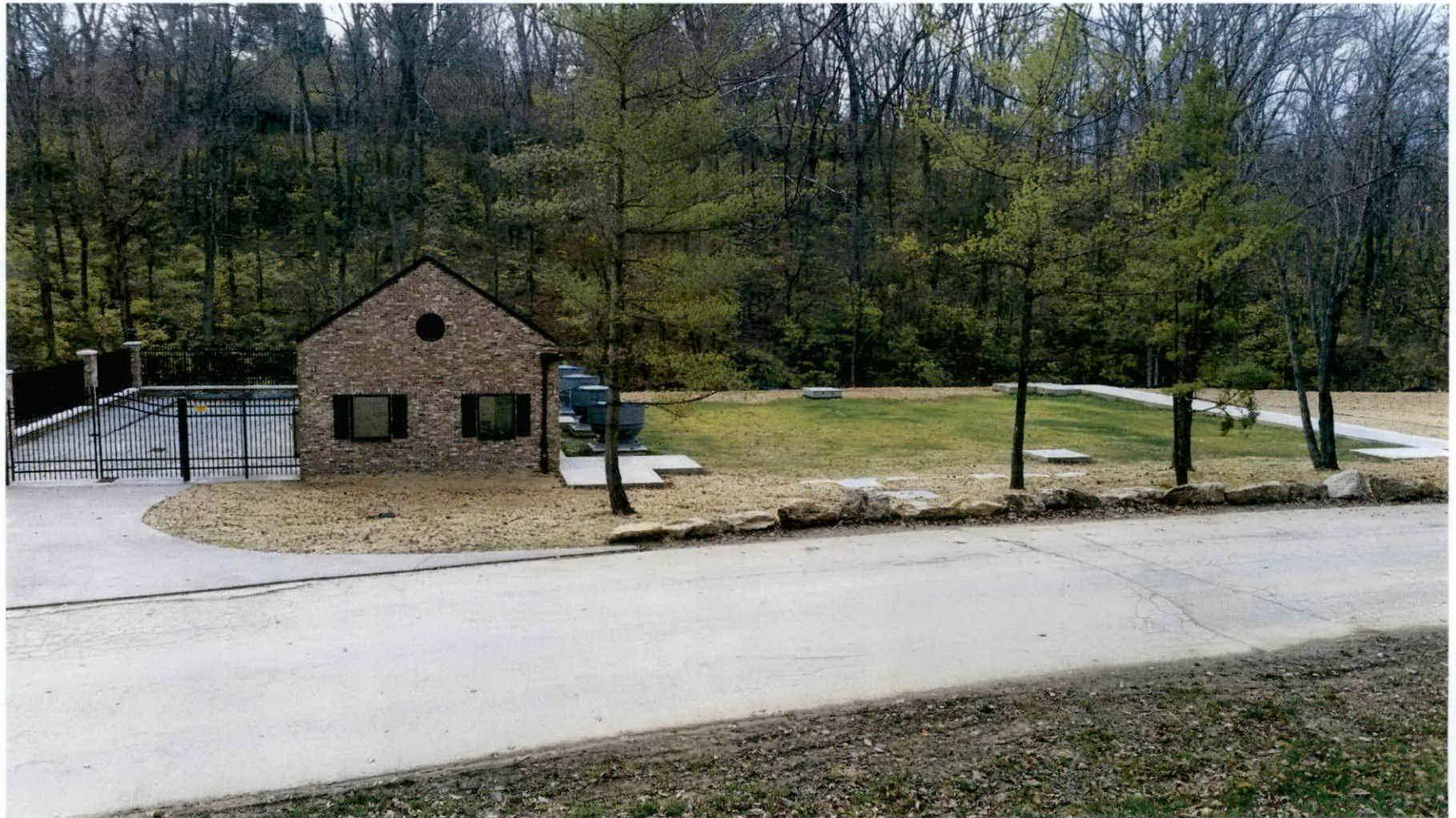
Muddy Fork Basin

- Start-up activities have been ongoing since October 31st
- Equipment check out has been acceptable
- Tuesday, December 13th is the demonstration of the basin in fully automatic.
- Substantial Completion will be verified at that time.
- Currently
 - Training is being performed and scheduled appropriately
 - O&M Manuals are forthcoming
 - Landscaping, Roadways, and other appurtenances are being addressed with City of Riverwood

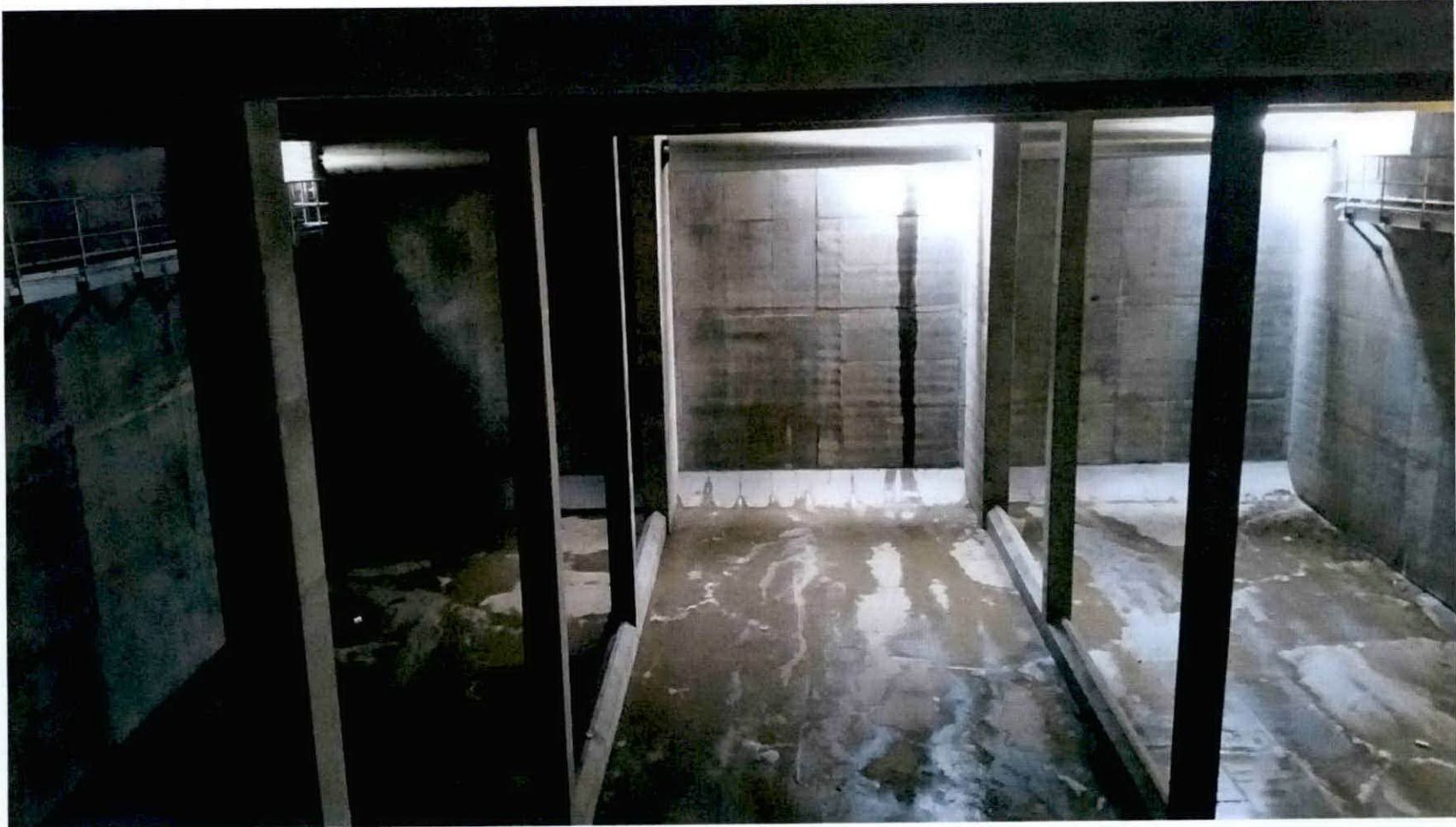
Muddy Fork Basin



Muddy Fork Basin



Muddy Fork Basin



Bells Lane WWTF

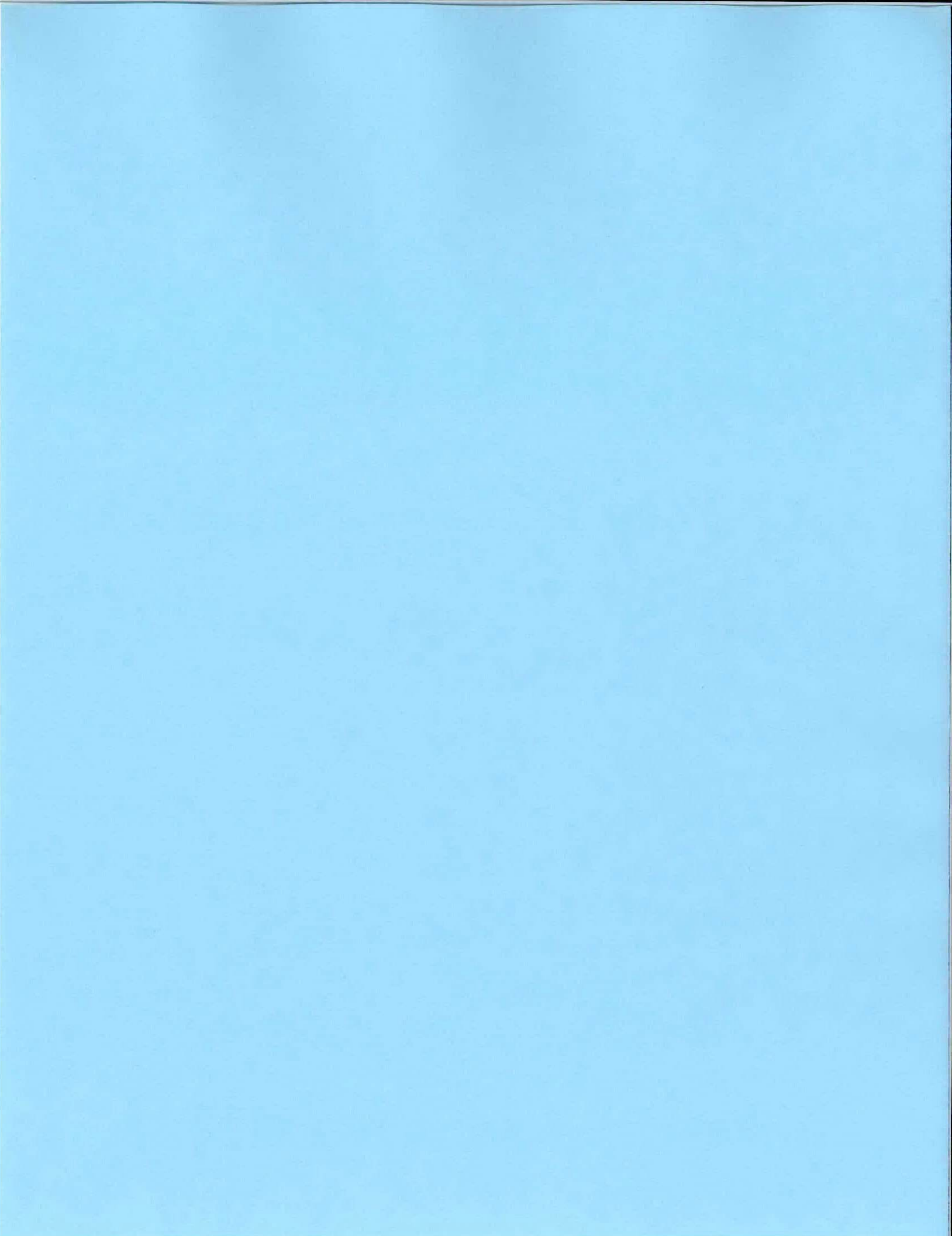
- Contract Final Completion: July 24, 2017
- Estimated Final Completion: October 3, 2017
- Contract Amount: \$41,984,420
- Percent Complete (by Time): 79%
- Percent Complete (by Budget): 82%
- Project is behind 69 days
- Hall Contracting Schedule includes
 - 60 Days for outstanding claims (under review by CH2)
 - 20 Days for MSD Programming

Bells Lane WWTF



Bells Lane WWTF





20-Year Comprehensive Facility Plan Financing Options

Joint Meeting
Infrastructure and Finance Committees
November 28, 2016

Discussion Topics

- Scope of Facility Plan financial analysis
- Boundary conditions and objectives
- Facility Plan Recommendations
 - Budgets and cash flows
 - Rate increase approach
- Alternative rate increase scenarios

Facility Plan Financial Analysis

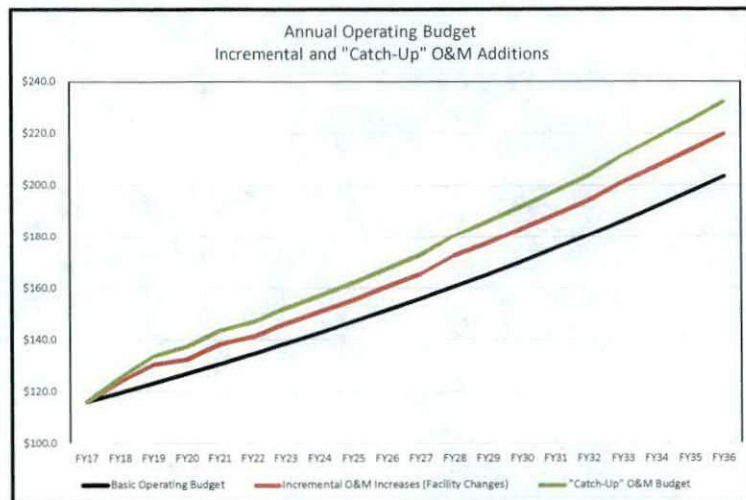
- High-level analysis to demonstrate potential funding approaches for Facility Plan recommendations
 - Alternative scenarios represent three of many possible approaches
 - 6.9% maximum rate increase
 - 9.9% maximum rate increase
 - 20% rate increase in FY 2018, not more than 6.9% any year after that
 - To complete CIP per Facility Plan schedule may require more than 20% increase in FY 2018
- MSD will adapt CIP schedule to actual rates implemented
- 20-year “crystal ball” projection requires update at 5-year intervals

20-Year Comprehensive Facilities Plan Identifies Long-Term Project Delivery Needs

Service Area and Program	Capital Costs*				Total FY 17 - FY 36
	FY 17 - FY 21	FY 22 - FY 26	FY 27 - FY 31	FY 32 - FY 36	
Stormwater	\$260,746,279	\$491,875,276	\$465,552,430	\$498,250,447	\$1,716,424,432
Drainage	\$132,438,516	\$312,543,776	\$312,019,930	\$314,362,947	\$1,071,365,169
Floodplain Management	\$20,100,000	\$20,000,000	\$20,000,000	\$20,000,000	\$80,100,000
Ohio River Flood Protection	\$95,835,263	\$144,050,000	\$109,720,000	\$130,075,000	\$479,680,263
Stormwater Quality (MS4)	\$12,372,500	\$15,281,500	\$23,812,500	\$33,812,500	\$85,279,000
Support Systems	\$47,935,000	\$33,750,000	\$32,850,000	\$32,850,000	\$147,385,000
Capital Equipment	\$23,050,000	\$27,000,000	\$27,000,000	\$27,000,000	\$104,050,000
Facilities	\$20,210,000	\$2,500,000	\$2,500,000	\$2,500,000	\$27,710,000
IT	\$3,100,000	\$3,000,000	\$2,100,000	\$2,100,000	\$10,300,000
LOJIC	\$1,575,000	\$1,250,000	\$1,250,000	\$1,250,000	\$5,325,000
Wastewater	\$747,408,423	\$281,960,500	\$211,468,500	\$225,555,500	\$1,466,392,923
CMOM	\$169,153,599	\$218,604,500	\$136,770,500	\$190,852,500	\$715,381,099
Consent Decree (IOAP)	\$472,169,371	\$11,950,000	\$0	\$0	\$484,119,371
Development	\$16,010,000	\$34,626,000	\$59,198,000	\$19,703,000	\$129,537,000
Facilities	\$4,000,000	\$0	\$0	\$0	\$4,000,000
NMC	\$86,075,453	\$16,780,000	\$15,500,000	\$15,000,000	\$133,355,453
Grand Total (Escalated Dollars)	\$1,087,000,000	\$993,000,000	\$1,012,000,000	\$1,250,000,000	\$4,342,000,000

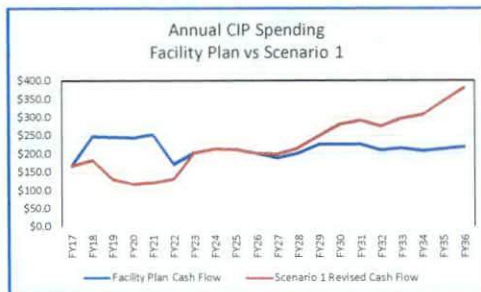
* Table costs are in 2016 Dollars except for Grand Total which is escalated at 3% per year

Facility Plan Recommended O&M Budgets

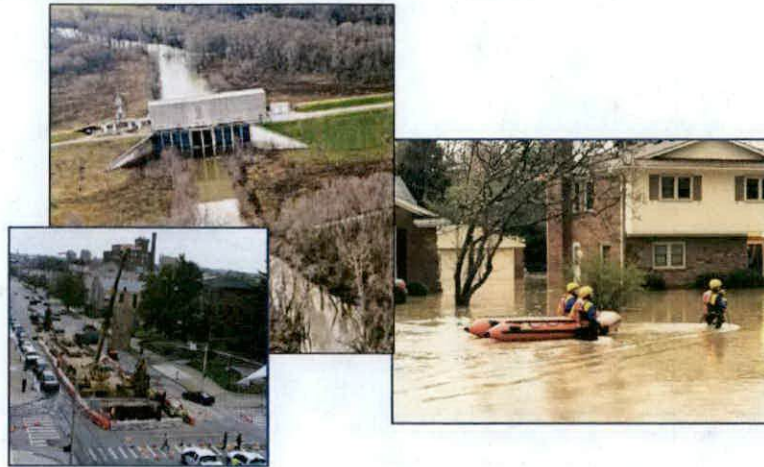


6.9% Rate Increases (No MFWQTC Upgrade) Defers both CIP and O&M spending

- Consent Decree and other regulatory commitments met
- \$480 M renewal and replacement, stormwater management and flood protection deferred 5 + years
- "Catch up" O&M changes implemented over 7 years
- Maintains existing \$1 M low income rate relief program for 5+ years, ramps up as funds become available



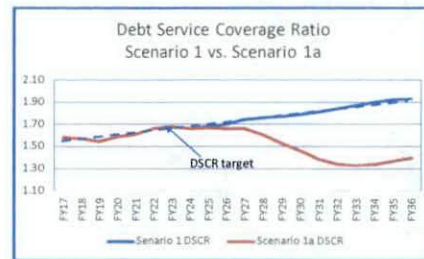
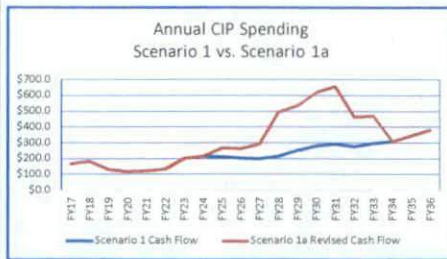
\$480 Million in Deferred Spending Affects Aging Infrastructure Renewal, Stormwater Management and Ohio River Flood Protection



6.9% Rate Increases (With MFWQTC Upgrades) Deferred Spending cannot offset Morris Forman WQTC Upgrade

MFWQTC Upgrade Adds \$1.8B (escalated)

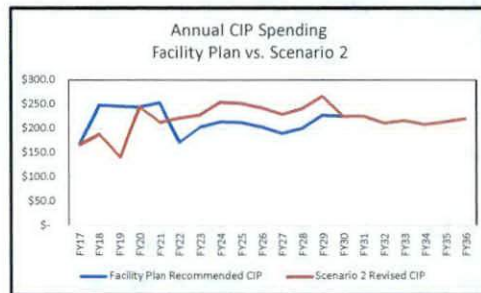
Without significant spending deferral
DSCR falls well below target levels



Rate increase greater than 6.9% required if Morris Forman WQWTC upgrade is required

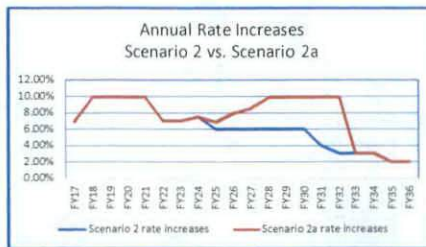
9.9% Rate Increases (No MFWQTC Upgrade) Defers Less CIP and O&M spending

- Consent Decree and other regulatory commitments met
- \$155 M renewal and replacement, stormwater management and flood protection deferred 5 + years
- “Catch up” O&M changes implemented over 5 years
- Provides \$3 M low income rate relief starting in FY 2018, ramps up as additional funding becomes available



9.9% Rate Increases (With MFWQTC Upgrades) Can accommodate Morris Forman WQTC Upgrade.

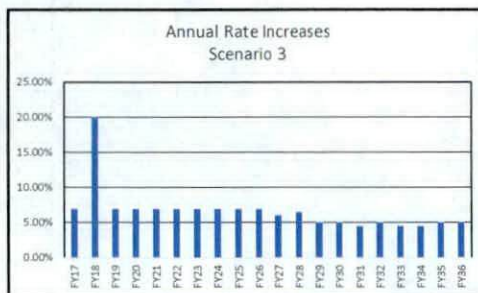
Without any further CIP deferrals DSCR trends maintained without exceeding 9.9% annual increase



FY 27 – FY31 bond totals higher than Hilliard Lyons calculated capacity
(FY 18 – FY 26 bond total well under capacity)

20% FY 2018 Rate Increase (No MFWQTC Upgrade) Requires Least CIP Deferral

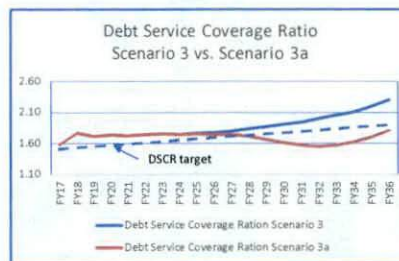
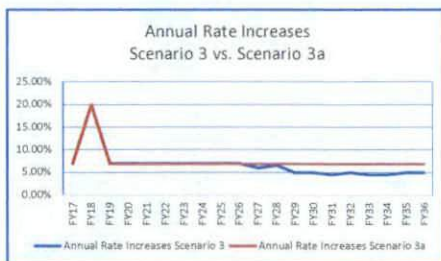
- Addresses Consent Decree and other regulatory requirements
- \$137 M renewal and replacement, stormwater management and flood protection deferred past initial 5 years
- Provides O&M “catch-up” in 3 years
- Provides \$5 million for low-income rate relief starting in FY 2018 (20% - 40% bill discount)



20% FY18 Rate Increase (With MFWQTC Upgrades)

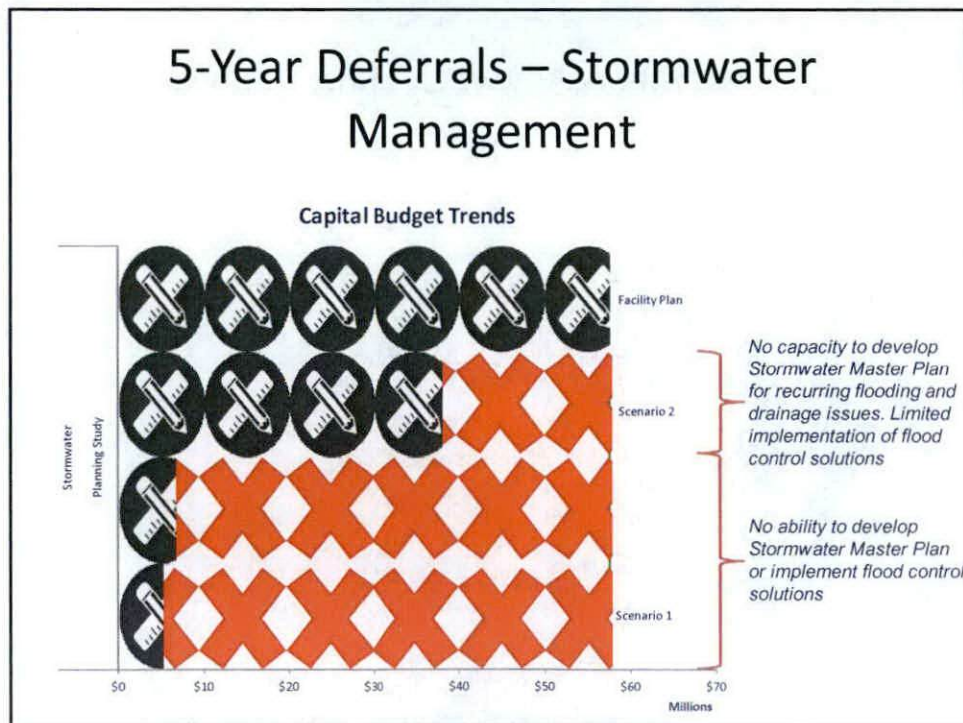
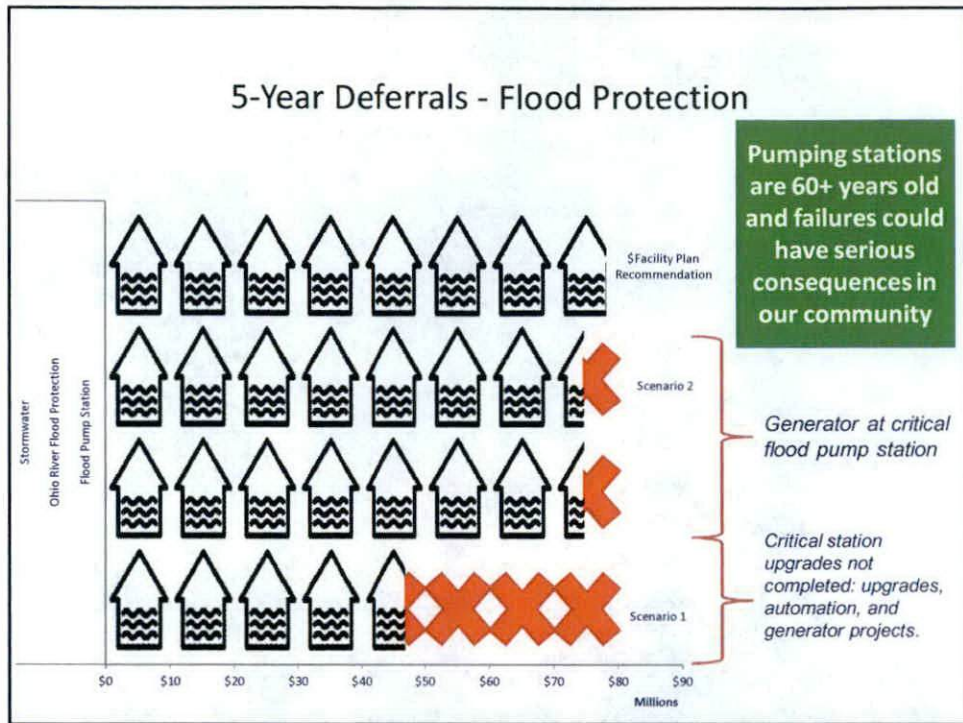
Requires CIP Deferrals to Maintain DSCR
With Morris Forman WQTC Upgrade.

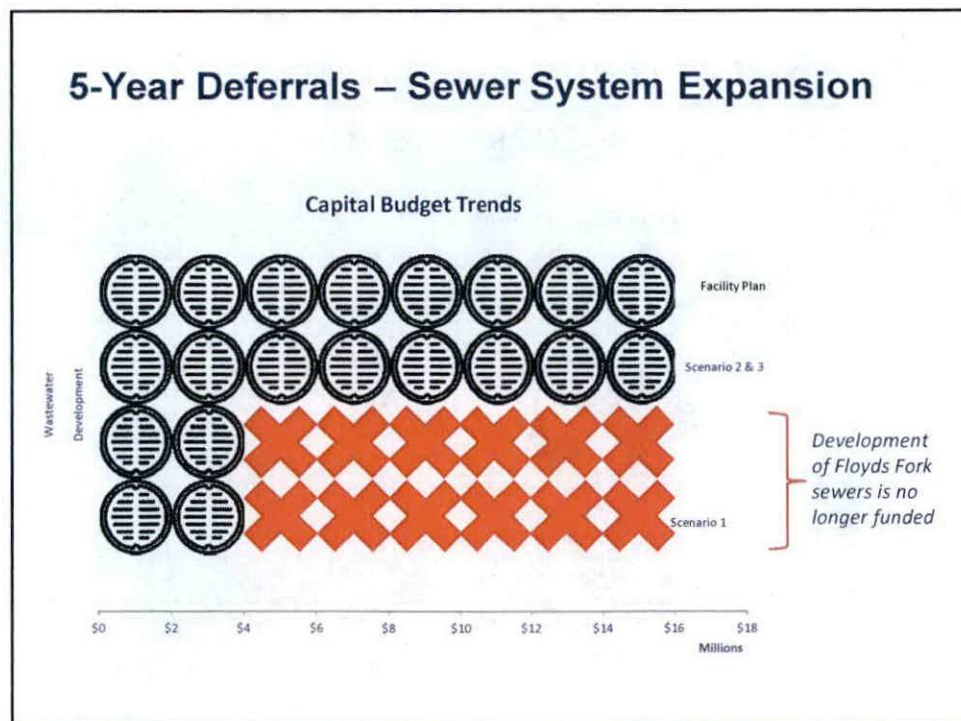
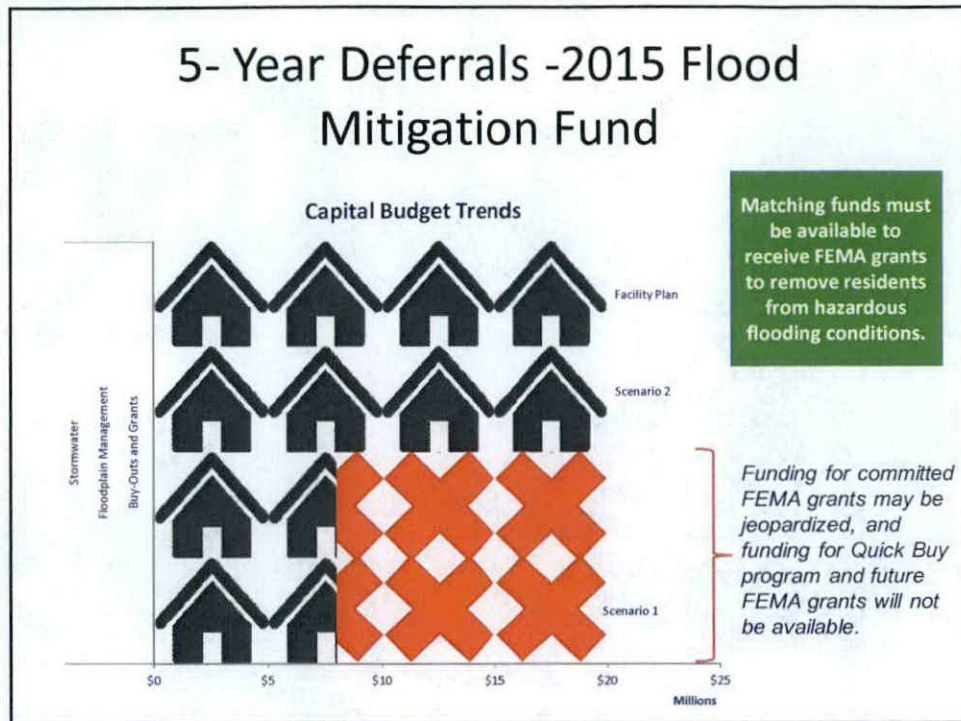
Without any further CIP deferrals DSCR trends drop well below target if
future rate increases do not exceed 6.9% annual increase



Bond totals higher than Hilliard Lyons calculated capacity

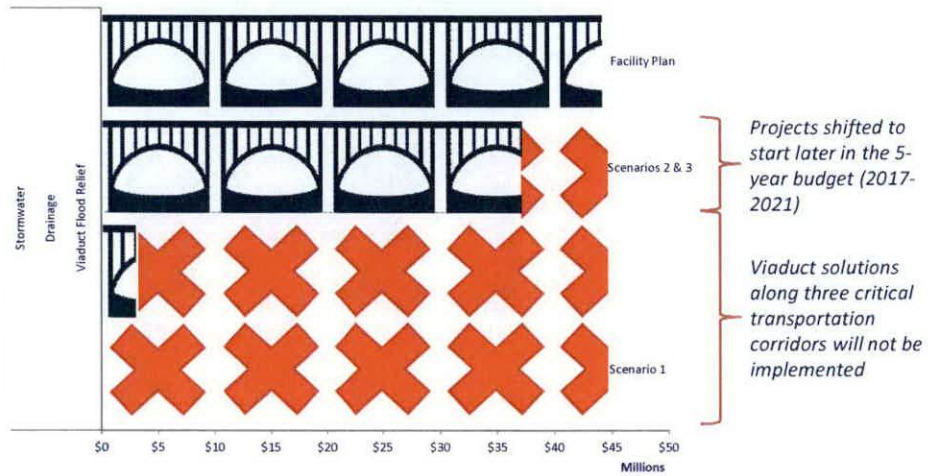
Rate increase greater than 6.9% required if Morris Forman WQWTC upgrade is required





5-Year Deferrals – Viaduct Flooding Reduction

FY17-FY21 Capital Budget Trends



Summary of Scenarios

Summary of Scenarios Without Morris Forman WQTC Upgrade

	Regulatory Obligations Met?	Deferral of Recommended Projects first 5 Years	O&M "Catch-Up"	FY 2018 Low Income Rate Relief Allocation
Scenario 1 - 6.9%	Yes	\$480 Million	7 years	\$1 Million
Scenario 2 - 9.9%	Yes	\$155 Million	5 years	\$3 Million
Scenario 3 - 20% + 6.9%	Yes	\$137 Million	3 years	\$5 Million

Summary of Scenarios Including Morris Forman WQTC Upgrade

	Regulatory Obligations Met?	Meets DSCR Trend Goal?	Achieves Objectives within Calculated Bond Capacity?
Scenario 1a - 6.9%	Yes	No	No
Scenario 2a - 9.9%	Yes	Yes	Yes
Scenario 3a - 20% + 6.9%	Yes	No	No

Questions?