

Appendix A
Background on Source Control-related
Efforts Supporting Documentation

A-1. Allegheny County Act 167 County-wide Stormwater Management Plan

The Allegheny County Act 167 Stormwater Management Plan was adopted by Allegheny County Council on Dec. 6, 2017. Enacted by the Pennsylvania Department of Environmental Protection, Act 167 is a statewide policy which requires that counties put a plan in place that addresses the problems caused by stormwater runoff. It is a plan to both reduce the amount of stormwater runoff and improve the quality of stormwater runoff.

This Stormwater Management Plan (PLAN) is the initial county-wide Stormwater Management Plan for Allegheny County, and serves as a Plan Update for the Allegheny County portions of eight watershed-based previously-approved Act 167 Plans including Deer Creek, Girty's Run, Little Sewickley Creek, Monongahela River, Montour Run, Pine Creek, Squaw Run, and Turtle Creek, with new hydrologic modeling analyses for the Flaugherty Run, Robinson Run, and Thompson Run Watersheds.

The PLAN consists of Part 1, which includes a report that documents the reasoning, methodologies, and requirements necessary to implement the PLAN. Part 2 of the PLAN consists of the Model Stormwater Management Ordinance including the watershed-based release rate maps. The PLAN covers legal, engineering, and municipal government topics which, combined, form the basis for implementation of a Stormwater Management Plan. It is the responsibility of the individual municipalities located within the County to adopt or amend an ordinance based on the Model Stormwater Management Ordinance to provide a consistent methodology for the management of stormwater throughout the County.

A-2. Municipal Source Reduction Studies

To comply with their PADEP Phase 1 Consent Order and Agreements, municipalities must conduct required activities such as developing flow targets, identifying and completing demonstration projects, and preparing Source Reduction Studies (MSRS) that describe how the municipality plans to address wet weather concerns. Flow targets are being evaluated in a collaborative process between ALCOSAN and the 3 Rivers Wet Weather Working Group Source Flow Reduction and Flow Target Subcommittee. 82 municipal MSRS were submitted to ALCOSAN in 2017.

Based on these MSRS, the following observations can be made:

- Each municipality/authority was required by their Consent Order and Agreement (COA) to implement one flow reduction demonstration project. The project could include enacting an ordinance addressing private laterals (separate systems) or expanding the use of Low Impact Development in development projects (combined systems). The studies were also required to quantify the effectiveness of the demonstration project, to the extent feasible.

The system wide results for all flow reduction demonstration projects, as summarized at the time of MSRS report preparation, include the following:

- As of Apr. 2018, a total of 69 demonstration projects were identified. 63 demonstration projects were completed, and five projects were underway, with one demonstration project yet to be selected (Reserve Township). A complete list of all demonstration projects is available in the summary.
 - Of the 69 demonstration projects, 25 received GROW grant funding award offers.
 - 20 municipalities/authorities indicated their demonstration project was an existing, amended or new ordinance enacted to address testing/repair of private sewer laterals at the time of sale or transfer of property. Nine of these ordinances were new with one more expected to be enacted in 2018¹. A listing of all demonstration ordinances identified in the MSRS is included as Figure A-2.1.
 - An estimated 1.4 BG of flow is removed from the sewer system on annual basis by the demonstration projects. Information on the corresponding overflow reduction was generally not reported. This projection is based on 51 of the demonstration projects for which sufficient information was available as supplied in the MSRS or available through estimates developed for GROW.
- Each municipality was also required to identify areas which may benefit from GSI (combined systems), infiltration/inflow reduction (separate systems), lateral inspection/repair (separate systems) and stream removal as well as additional flow reduction projects and strategies. They were also required to report the anticipated flow reduction benefit of the identified projects and strategies. The depth of content reported varied widely among the municipalities. There was a wide array of readiness of opportunities presented – some were specific projects with defined locations and preliminary design information and others were highly conceptual areas for targeting source reduction opportunities at a sewershed level. Many of the opportunities would require further investigation to determine their feasibility and/or cost effectiveness as a flow reduction measure. In total, there were 278 opportunities identified by 54 municipalities/authorities. There were 28 municipalities/authorities that did not identify any potential source reduction opportunities in their reports. Overall, there was insufficient information to estimate the total flow reduction for the opportunities.

¹ According to their website consulted in Jan. 2020, Blawnox has not codified their ordinance

Figure A-2.1. Flow Reduction Demonstration Ordinances Private Sewer Lateral Testing/Repair upon Property Sale/Transfer

Municipality/Authority	Ordinance ID	Action Taken	Year Enacted	Annual Flow Reduction Effectiveness due to Ordinance
Baldwin Borough	Ordinance No. 844	Continued w/ existing ordinance	2012	Not assessed
Blawnox	Not provided	Expecting to pass an ordinance in 2018	2018 (projected)	Not assessed
Chalfant	Ordinance 393	Passed new ordinance	2017	Not assessed
Collier	Ordinance No. 698 Chapter 18	Updated an existing ordinance	2017	Not assessed
East McKeesport	Private Lateral Time of Sale Ordinance	Passed new ordinance	2017	Not assessed
Fox Chapel	Not provided	Continued w/ existing ordinance	1990	Not assessed
Indiana Township	Not provided	Continued w/ existing ordinance	Not provided	Not assessed
Kennedy Township	Ordinance No. 492, which amends Ordinance No. 338	Passed new ordinance	2017	Not assessed
Kilbuck Township	Ordinance 0-17-01	Passed new ordinance	2017	Not assessed
Monroeville Municipal Authority	Resolution No. 348 and 364, Ordinance No. 2248	Amended existing ordinance	2015	Not assessed
North Huntingdon Township Municipal Authority	Not provided	Continued w/ existing ordinance	2008	Not assessed
O'Hara Township	Ordinance No. 1299	Continued w/ existing ordinance	1997	Not assessed
Penn Township Sanitary Authority	Ordinance 809/2005	Continued w/ existing ordinance	2005	Not assessed
Peters Township Sanitary Authority	Ordinance No. 507 for time of sale, plus supplemental resolutions related to property transfers.	Continued w/ existing ordinance	Not provided	Not assessed
Plum Borough Municipal Authority	Resolution No. 93-84, Ordinance 504	Continued w/ existing ordinance	1993	Estimated to reduce I/I by an additional 0.19 MG for each year in effect.
Thornburg	Ordinance No. 409 Chapter 18	Passed new ordinance	2017	Not assessed
Upper St. Clair	Chapter 106 "Sewers and Drains"	Passed new ordinance	2017	Not assessed
Wall	Private Lateral Time of Sale Ordinance	Passed new ordinance	2017	Not assessed
Whitaker Borough	Private Lateral Time of Sale Ordinance	Passed new ordinance	2017	Not assessed
Wilkinsburg	Chapter 217, Article VII	Passed new ordinance	2017	Not assessed

A-3. Pittsburgh Water and Sewer Authority

A-3.1 City of Pittsburgh Stormwater Management Requirements

The City of Pittsburgh Department of Planning has implemented stormwater management regulations for stormwater management for new and redevelopment projects within the City of Pittsburgh. [Chapter 1003: Land Operations Control and Stormwater Management](#) of the Pittsburgh Zoning Code includes stormwater rate and volume requirements for projects over a prescribed area of disturbance and with certain funding sources. For development and redevelopment projects that are regulated by this code, stormwater runoff from impervious areas on the site must be controlled on-site. If conditions exist that prevent the implementation of water quality and/or quantity control practices on site, upon written request by the applicant, the Department may at its sole discretion accept off-site stormwater management practices, retrofitting, stream restorations, or other practices that provide water quality and/or quantity control equal or greater than onsite practices for the volume which the applicant has demonstrated to be infeasible to manage and treat on site.

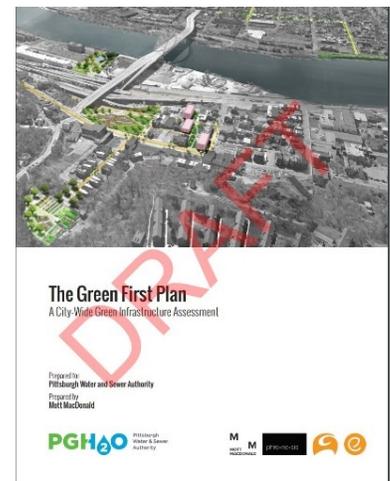
The onsite stormwater management techniques and facilities must be properly sized to, in priority of order, infiltrate, evapotranspire and/or harvest for reuse, without allowing any off-site discharge, and by using GSI and low impact development practices to the maximum extent technically feasible, the precipitation from all rainfall events less than or equal to the 95th percentile rainfall event (currently [1.5 inches](#)).

A-3.2 PWSA's Draft Citywide Green First Plan

The Citywide Green First Plan is the City of Pittsburgh and the Pittsburgh Water and Sewer Authority's (PWSA) plan to manage issues related to stormwater flow. The plan outlines how Pittsburgh intends to use innovative, cost-effective and green stormwater infrastructure (GSI) approaches to manage stormwater. Implementing the plan will help mitigate local street flooding and sewer backups caused by large rainstorms. The stormwater management practices outlined in the plan will help the City and the region comply with U.S. Environmental Protection Agency (EPA) combined sewer overflow mandates and improve the quality of local waterways.

The plan presents an adaptable solution that will address the root cause of Pittsburgh's stormwater challenges by investing in integrated stormwater management infrastructure. The draft Citywide Green First Plan examines the existing stormwater conditions that will guide where GSI will be installed to achieve the most cost-effective and beneficial results to the residents of Pittsburgh. Creating the plan required extensive sewershed and hydrology analysis, community and stakeholder outreach, and consideration of future development projects within the City. The draft plan analyzed nearly 14,000 acres in the City and proposes to manage runoff from 1,835 acres with green infrastructure over the next twenty years.

The draft plan includes concept-level details for six priority sewersheds where GSI would provide significant benefits. The GSI methods to be used in each sewershed were selected based on criteria that considered factors such as cost and community impact. This approach is designed to guide the integration of stormwater management with the City's capital improvement projects and urban planning process.



A-3.3 PWSA Green Stormwater Infrastructure Grant Program

In 2015, PWSA began a grant program design to support local GSI projects to manage stormwater in order to improve water quality, boost the local market for GSI design and installation services, increase public awareness about the benefits of GSI, decrease the amount of combined sewer overflows, revitalize neighborhoods, and stimulate economic development. Three categories of grants were given out including matching grants; mini grants for construction projects; and mini grants for education projects. In 2015 and 2016, 16 and 13 projects were awarded grants, respectively. This grant program ended in 2016. There are currently no plans for future awards under this program.

A-4. Additional Capital Improvement and Comprehensive Plans

Many of the Boroughs and Townships in ALCOSAN's combined sewer service area have their own comprehensive and capital improvement plans that lay out overarching priorities for redevelopment and investment and identify specific projects and areas where improvements are being focused. In addition, agencies such as the Pennsylvania Department of Transportation (PennDOT) have comprehensive plans that may impact ALCOSAN's service area and have synergies with potential source control strategies.

These individual plans should be referenced when thinking about where to strategically locate GSI and other source controls, as many of the recommendations in CtS can complement existing municipal initiatives related to development, infrastructure improvements and environmental protection.

A-4.1 PWSA Capital Improvement Plan

PWSA's Capital Improvement Program (CIP) focuses on sustaining cost-effective operations, while optimizing the system's asset performance and life expectancy. The 2020-2024 CIP invests in programs which consider risk and consequence of asset failure and levels of service benefits.

Due to funding limitations and the need to renew/replace a significant amount of aging infrastructure, the following criteria are used to evaluate and prioritize capital projects:

- **Safety** - Potential health and safety risks to personnel and the public if action is not taken.
- **Regulatory Compliance** – Regulatory compliance schedule and potential fines for non-compliance.
- **Reliability/Operational Flexibility** – Location, age and condition of infrastructure and risk if action is not taken.
- **Capacity** – Meets community health needs and growth, as needed.
- **Operations and Maintenance Efficiency** – Potential for operating cost savings.
- **Regional Cooperation/Stewardship** – Coordination with external stakeholders or meeting the community's needs.
- **Level of Service** – Improvement to customer service.
- **Sustainability** – Energy efficiency and “green” approach to improving water quality.

The CIP is organized into six project classes (types). The classes and the total 5-year budget (in millions) for the classes most related to source control are the following:

- Wastewater System – \$189.0
- Stormwater System (which includes GSI and DSIR projects) – \$131.8

Each project class is then made up of individual projects. Projects are defined based upon current information, which range from annual allowances for asset renewal and/or replacement activities, to major, multiple phase facility renewal projects.

At the request of the office of the Mayor of the City of Pittsburgh, PWSA has been tasked with evaluating the benefits of incorporating extensive and hydraulically/cost-effective GSI throughout the entire City to reduce the peak and sustained stormwater flows to the existing combined sewer system. GSI and DSIR projects and the

dedicated total project budget (in thousands) (not including pre-2020 expenditures for these projects) that are identified in PWSA's 2020-2024 CIP are the following:

1. Bus Rapid Transit – \$4,275
2. Four Mile Run – \$30,000
3. Lawn and Ophelia Parks – \$275
4. Martin Luther King Field – \$3,348
5. Maryland Avenue – Phase 1 – \$2,401
6. Overbrook Middle School – \$6,500
7. Queenston – \$1,500
8. Saw Mill Run Streambank – \$876
9. Southside – \$5,462
10. Spring Garden Stream Removal – \$1,479
11. St. Johns – \$4,777
12. Thomas and McPherson – \$4,901
13. Volunteer's Field – \$854
14. Wightman Park – \$3,563
15. Woods Run Stream Removal – \$9,652

Several of these projects are already underway (see <https://www.pgh2o.com/projects-maintenance/green-stormwater-projects> for more information).

A-4.2 PA Twelve Year Transportation Program (TYP)

PennDOT's Center for Program Development and Management (Program Center) under the Office of Planning is responsible for developing, managing and updating the Commonwealth's [Twelve Year Transportation Program](#) (TYP) which is the most comprehensive multi-modal project identification and prioritization tool. The TYP is updated every two years in partnership with Metropolitan and Rural Planning Organizations along with many other key stakeholders. The TYP represents all modes and means of transportation including highways, bridges, public transit, aviation, and rail, as well as non-motorized transportation such as bicycling and walking.

The TYP has opportunities to incorporate recommendations from CtS to integrate source controls and GSI into various transportation projects to improve drainage, foster pedestrian and vehicular safety, improve roadway aesthetics, promote traffic calming and create more sustainable streetscapes.

A-4.3 Allegheny County Capital Budget

The annual Capital Budget for Allegheny County includes various recommendations that have strong synergies with recommendations in this Framework.

For example, the 2019 Capital Budget of \$111.2 million includes 56 infrastructure and capital improvement projects, including various bridge improvements, the design, repair, construction and maintenance of over 408 miles of inter-municipal roads, park system facility improvements, and County building renovations. The 2019 Budget continues a series of strategic investments in Allegheny County infrastructure that will benefit the citizens of Allegheny County. This budget is a balanced mix of projects: roads, bridges and recreation, as well as improvements to government facilities and technology transformation.

A-4.4 City of Pittsburgh Capital Budget and Capital Improvement Plan

The City Code defines a capital project as "any project funded by public monies to design, build, restore, retain, or purchase any City-owned asset that is expected to provide a long-term public benefit or propose physical improvements in an element of the City's infrastructure." While maintenance is not a capital expenditure,

capital projects do include renovation and major repair or reconstruction of damaged and deteriorating city-owned assets.

Every April, the Mayor submits a list of priorities to all departments for the Capital Improvement Plan and these values guide the selection of projects that form the Mayor’s Capital Budget. For example, the 2019 priorities included Green Infrastructure in addition to items such as Critical Infrastructure, Mobility, Housing, Children and Families, Workforce and Entrepreneurship, Climate, and Arts, Culture, and Open Space.

At Capital Budget Deliberative Forums, members from the community reviewed the proposed Capital Budget and identified priorities in the coming year such as Complete Streets, Street Resurfacing, Park Reconstruction, and Sports/Rec Facility Improvements. All of these suggestions have strong linkages to potential GSI implementation opportunities as this Framework further discusses.

The Office of Management & Budget collects capital project proposals from departments, City Council, the Urban Redevelopment Authority, and community stakeholder organizations with a history of collaborating with the City and compiles them for the Capital Program Facilitation Committee (CPFC). The CPFC reviews project proposals and ranks them according to various criteria, including whether projects improve quality of life in all City neighborhoods.

A-4.5 City of Pittsburgh Parks Plan

The Pittsburgh Parks Conservancy and the City of Pittsburgh are making a commitment to achieve excellence and equity in every park in every neighborhood in Pittsburgh and have called this initiative the “Parks Plan.” With additional resources, parks and recreation facilities and programs throughout the City will be upgraded and modernized. From late 2018 through Apr. 2019, the City of Pittsburgh and the Pittsburgh Parks Conservancy embarked on the [Pittsburgh Parks Listening Tour](#). At community meetings held throughout the city, feedback was gathered regarding what citizens love about their parks and what they would like to improve. The three areas of improvement rated most important to Pittsburghers, by Pittsburghers are the following:

- Improved park safety.
- Increased fair funding and access.
- Upgraded maintenance and facilities.

[New resources will be invested in four key budget areas — each critical to a healthy, well-managed and well-maintained park.](#) These four key areas of investment are Maintenance, Rehabilitation, Capital Projects, and Programming. The amounts assigned to each of the key budget areas are intended to balance the program’s goal of making meaningful impacts in all areas with the public’s expressed preferences for certain types of interventions, such that all parks in all neighborhoods see some degree of improvement.

As public parks are strong candidates for GSI implementation, there are strong synergies to incorporate stormwater management and environmental education into any planned park capital improvements.

A-4.6 Char-West Multi-municipal Comprehensive Plan

The [Char-West Multi-municipal Comprehensive Plan](#) (the Plan) covers planning priorities for McKees Rocks Borough, Neville Township and Stowe Township, which are communities all or partially within ALCOSAN’s combined sewer service area. At a basic level, the Plan addresses the Municipalities Planning Code requirements, but it most importantly provides a blueprint for how the communities can rediscover their greatest strengths and to respond to their challenges. Despite population loss and a diminishing tax base, these waterfront communities recognize many opportunities for residential growth and revitalization.

Several of the nine overall goals of the Plan relate to the potential to incorporate GSI and source control implementation, such as stabilizing and enhancing neighborhoods and corridors, improving infrastructure by

completing strategic upgrades and replacement, and leveraging vacant and underutilized properties as opportunities for infill development. The Plan further identifies specific areas targeted for growth and redevelopment, opportunities for new greenways and parks, and several key transportation and sewer infrastructure projects.

A-4.7 Crafton-Ingram Implementable Comprehensive Plan

As neighboring boroughs with similar characteristics, Crafton and Ingram collaborated to produce an [Implementable Comprehensive Plan](#) and early intervention programs. The two policy initiatives together create an effective review and plan for creating changes that residents and officials desire while maximizing use of resources. The boroughs chose four working areas as the primary focus of the implementable plan – Deteriorating Properties, Commercial Development, Walkability & Connectivity, and Communications.

Recommendations that relate to the potential for implementing GSI and source controls include making improvements that enhance walkability and connectivity, such as roadway repairs, new sidewalks, more visible crosswalks and other amenities, and an emphasis on improving and redeveloping properties throughout the boroughs.

A-4.8 Sharpsburg Community Vision Plan

The [Sharpsburg Community Vision Plan](#) is the community’s roadmap to shape their future and guide development in the borough for the next five to 10 years. The Plan emphasizes enhancing “green links”, i.e., connecting existing green assets and developing new ones, prioritizing the pedestrian, strengthening the village character, and connecting to the riverfront both physically and mentally. The Plan discusses Sharpsburg’s environmental challenges, such as a lack of significant tree cover and streetscaping, the Borough’s location within the floodplain, and the excessive amount of impervious surfaces that contribute to CSOs and flooding. The Plan identifies specific examples for green links such as green infrastructure projects, park and open space improvements, and potential trail and pedestrian connections. All of these initiatives directly relate to the potential to implement GSI and other source controls

Many of the Boroughs and Townships in ALCOSAN’s combined sewer service area have their own comprehensive and capital improvement plans that lay out overarching priorities for redevelopment and investment and also identify specific projects and areas where improvements are being focused. For example, O’Hara Township’s Comprehensive Plan is a continuation of O’Hara Township’s commitment to providing a foundation for positive growth at all levels of municipal interaction for persons and businesses with investments in the community. The Plan identifies issues concerning the Freeport Road commercial corridor, traffic congestion, upgrading aging public utility systems in older developed areas, stormwater management and preserving open space, which have been addressed as the need arises.

These individual plans should be referenced when thinking about where to strategically locate GSI and other source controls, as many of the recommendations in CtS can tie into and complement existing municipal initiatives related to development, infrastructure improvements and environmental protection.

A-5. 3 Rivers Wet Weather (3RWW)

3 Rivers Wet Weather is a nonprofit environmental organization created in 1998 to support 82 Allegheny County municipalities and the City of Pittsburgh in addressing the region's wet weather overflow problem. Founded jointly by the Allegheny County Health Department (ACHD) and ALCOSAN, 3 Rivers Wet Weather is funded by federal, state and local resources, including local foundations. 3RWW has earned municipal trust by building relationships with municipal officials, regulatory agencies, legislators and other regional leaders.

With the cooperation and involvement of communities throughout the ALCOSAN service area, 3 Rivers Wet Weather is committed to laying the foundation for sewer system consolidation—the key to long-term system sustainability and improved water quality for generations to come.

To promote the most cost-effective, long-term, sustainable solutions, 3RWW develops technical guidance and resources to assist municipalities with regulatory compliance, convenes forums to encourage a consensus-based approach for feasible and affordable wet weather planning, educates the public and advocates for inter-municipal partnerships aimed to consolidate the fragmented municipal sewer collection system.

A-5.1 3RWW Municipal Demonstration Projects

From 1998-2000, 3RWW granted municipalities funding to complete projects in their municipalities that demonstrated and benchmarked new and cost-effective sewer techniques for manhole rehabilitation, sewer replacement, I/I reduction, and pipe bursting among others. Other projects included governance issues such as an authority merger study and trunk sewer agreements. Each project includes a summary and final report if available. Some example source control projects include the following:

- Center Avenue (McDonald) Area Sanitary Sewer Replacement.
- Development of a Long-term Control Plan (LTCP) for the Lower Nine-Mile Run Watershed.
- Investigation of Underground Abandoned Coal Mines as Storage Reservoirs for Wet Weather Overflows.
- Jack's Run Comprehensive Sewershed-wide Wet Weather Control.
- Little Pine Creek Sewershed Pilot Program.
- Lower Lowries Run Interceptor I/I Assessment/Reduction.
- Lowries Run Sewer System I/I Abatement.

A-5.2 3RWW Consolidation Grants

In early 2011, 3RWW awarded grants to Allegheny County municipalities to consider options for consolidating municipal sewer systems in order to save residents millions of dollars and improve water quality. A total of \$495,000 was awarded for six projects that included 43 municipalities and authorities. These participants explored options for consolidation that would be the most cost-effective, long-term strategy for the maintenance and operation of the public sewer system. Consolidation could include contract operation and maintenance to asset transfer. The six consolidation studies are described below:

- Congress of Neighboring Communities (CONNECT)
CONNECT is comprised of the City of Pittsburgh and 19 municipalities whose sewage drains through the PWSA system. This study evaluated the continued operations by individual agreements between PWSA and each municipality; what processes a municipality could use if it considered turning operations over to PWSA; standardizing agreement between PWSA and all municipalities; ALCOSAN operating the major multi-municipal sewers; and turning management over to PWSA or a joint authority of the participating municipalities.

- Chartiers Creek Watershed

The municipalities of Upper St. Clair, Mt. Lebanon, Scott Township and Bridgeville explored the development of a cooperative agreement related to sewer system ownership and operation in the George Run, McLaughlin Run, Painters Run and Scrubgrass sewersheds. The study discussed the alternatives evaluated, an assessment of the municipal willingness to consider the management alternatives, and legal, technical and financial requirements of each alternative.

- Ohio River Basin

McKees Rock Borough, and Stowe, Kennedy and Neville Townships studied issues, benefits, costs and challenges associated with joint management alternatives including integration of the local sewer owners/operators into a new regional owner/operator.

- South Fayette Township Municipal Authority

McDonald Municipal Authority, North Fayette Township, Oakdale Borough, and South Fayette Municipal Authority has operated for the past 20 years as an unincorporated operating committee for the Robinson Run tributary area. This project evaluated alternatives for expanding this cooperation within Robins Run and expanded services beyond Robinson Run and possibly forming a joint sewer authority.

- Pine Creek Watershed

The Borough of Etna, and Ross, Shaler and Indiana Townships evaluated options for more cost-effective sewer operation and maintenance including modifying shared service agreements; creating an Operating Committee; consolidation under a new entity; and asset transfer options.

- Munhall Sanitary Sewer Municipal Authority

Munhall Sanitary Sewer Municipal Authority and Whitaker, Homestead and West Homestead Boroughs examined what is needed to merge the various sewer services and the legal and financial concerns associated with merging.

A-6. Nine Mile Run Watershed Association

Nine Mile Run Watershed Association restores and protects its watershed ecosystem in Pittsburgh's East End, while working regionally to support and implement resilient solutions for a healthy urban environment. They support residents' efforts to implement innovative solutions to stormwater problems, provide citizen training for urban ecological stewardship, and act as an information clearinghouse about key watershed issues.

The Nine Mile Run Watershed Association's Rosedale Runoff Reduction Project (RRRP) is a multi-phase holistic sustainable stormwater project aiming to removing 25 million gallons of overflow entering Nine Mile Run through the construction and installation of three large green stormwater infrastructure (GSI) facilities, 40 stormwater management tree pits, 200 rain barrels, and 10 rain gardens. The RRRP, which is in the City of Pittsburgh's Homewood neighborhood, was selected as an area that would quickly have a positive impact on Nine Mile Run due to the 1.15 square mile area's annual 25 million gallons of annual sewer overflow to the stream.

StormWorks, a division of the Nine Mile Run Watershed Association, is geared towards providing Allegheny County residents with runoff mitigation products, services, and information in order to reduce stormwater damage to the water supply. The program provides sustainable greenscaping design services, as well as resources for residents to purchase, winterize and maintain rain barrel systems and stormwater planters.



A-7. Saw Mill Run Watershed

The Saw Mill Run Watershed Association's Mission is to improve and restore the health and vitality of the streams and communities in the Saw Mill Run Watershed through education, stewardship and advocacy. They provide environmental leadership, engaging citizens in direct action, and partnering on key issues that affect the well-being of the watershed.

In Jun. 2019, the Pittsburgh Water and Sewer Authority PWSA completed a study in the SMR watershed which developed control strategies by locating and evaluating potential projects (*Site Identification and Analysis TM*, Jun. 2019, also called the Arcadis study). The objective of the study was to identify targeted stormwater management areas within the watershed for achieving CSO reduction, water quality improvements and/or flooding reduction; to evaluate the environmental, social and economic benefits of GSI strategies for SMR, and to develop planning level costs for implementation. Projects were developed and ranked, and planning level cost presented in the plan total \$460M for the green, gray and watershed control opportunities within the watershed.

The Pittsburgh Water and Sewer Authority (PWSA), along with its partners, Watersheds of South Pittsburgh, Economic Development South, Saw Mill Run Watershed Association, the 11 local watershed municipalities, and the Allegheny County Sanitary Authority (ALCOSAN) worked together to develop an Integrated Watershed Management Plan (IWMP) for the Saw Mill Run watershed (Draft, Dec. 31, 2019). The objective of the IWMP is to consider alternatives that may be different from the traditional, end-of-pipe solutions to address the water quality issues in the watershed. The plan integrated results from the Site Identification and Analysis TM and evaluated various control strategies for the pollutants from the varied sources throughout the watershed. Hydraulic, hydrologic and water quality models were developed and updated to characterize the watershed stormwater runoff, sewer collection system performance, and in-stream fate and transport of the pollutants.

The following project types were selected to be included in the draft IWMP:

- PennDOT and PWSA regional stormwater management.
- Individual municipal projects (already implemented since 2018 or planned prior to 2022), including the following types:
 - Low impact development projects.
 - Stormwater detention projects.
 - Streambank stabilization and restoration projects.
- Dry weather source reduction.
- Recommended long-term implementation plan including:
 - Low impact development projects.
 - Stormwater detention projects.
 - Streambank stabilization and restoration projects.
 - Acid mine drainage (AMD) treatment projects.

A total of 70 projects identified by Arcadis in the Jul. 2019 analysis were then recommended for implementation in the IWMP, based on their potential to address the former and anticipated Consent Order and Agreement requirements for PWSA/City and the individual municipalities, and current stormwater MS4 and TMDL regulatory requirements, as well as providing other local community benefits (Table A-7.1). The projects identified by the Arcadis team were focused on implementation of GSI controls in the CSS and separate stormwater areas.

Table A-7.1. Summary of recommended Individual Municipal projects by type (Source: Table 9-3, December 2019 Draft IWMP)

Project Type	Pollutant Source Controlled: CSO	Pollutant Source Controlled: Stormwater	Total Number of Projects
Bioretention/Underground Detention & Surface Detention/Stream Rehab	0	2	2
Bioretention/Underground Detention & Surface Detention	0	5	5
Bioretention/Underground Detention	0	15	15
Bump Outs/Distributed Storage/Bio-Detention/Green Alley	9	26	35
Stream Rehab with Surface Detention	0	9	9
Stream Restoration	0	2	2
Surface Detention	0	1	1
Varied GI based on acquired sites	0	1	1
Grand Total	9	61	70

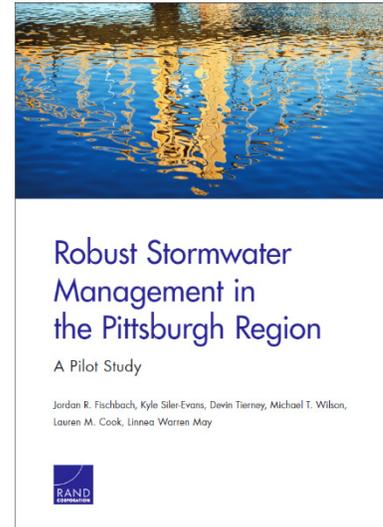
Using the updated Storm Water Management Model (SWMM), the IWMP team identified collection system improvements to meet the target of at least 85 percent combined sewage capture at all of the overflow points in the SMR sewershed. These additional improvements include the following:

- Upsizing the drop shaft that connects the two Saw Mill Run interceptors to the existing ALCOSAN tunnel, which results in a CSO volume decrease of approximately 286 MG in the typical year.
- Increasing underflow conveyance at 14 diversion structures, which results in a CSO volume decrease of approximately 31 MG in the typical year.
- Reducing I/I in sanitary sewers to achieve compliance with the “Gold Line” standard.
- Implementing GSI projects in 16 priority sewersheds.

A-8. RAND Corporation

In 2017, the RAND Corporation, with the support and input of many local entities, conducted a study of the ongoing challenge of stormwater management in the Pittsburgh region. They framed their research around several questions including the following:

- How might the Pittsburgh region’s vulnerability to future stormwater runoff and sewer overflow be affected by changing climate and population patterns?
- To what extent could CSOs and SSOs be reduced using innovative approaches under current conditions or future change?
- How do source controls compare with traditional gray infrastructure solutions in terms of overflow reduction benefits, costs, and cost-effectiveness?
- What trade-offs must be resolved to implement improved stormwater management across the region?



The key findings of the study were as follows:

- Recent sewer overflow volumes are up to 15 percent higher than previously estimated for the 2003 typical year and future rainfall, population, and land-use changes could further increase overflow volumes.
- Expanding wastewater treatment plant capacity could represent a low-regret, near-term option.
- Cleaning deep interceptors [if possible] could also represent a low-regret, near-term option.
- Large-scale investments in source reduction, or combining source reduction with treatment expansion and/or interceptor cleaning, could help reduce sewer overflow, but with a wide range of uncertainty regarding cost-effectiveness and relative strategy performance.
- None of the combined GSI strategies fully eliminates sewer overflows in current or plausible future conditions.
- GSI strategies, evaluated in isolation, yield poor cost-effectiveness for overflow reduction under commonly used rainfall, capital cost, and GSI performance assumptions.
- Source reduction strategies are more cost-effective in higher rainfall scenarios and could provide hedging value against future climate change.

The study presented several recommendations for how the Pittsburgh region should move forward with stormwater management planning, including the following:

- Plausible future changes should inform near-term planning and design for stormwater and wastewater infrastructure investments.
- Evaluations of GSI should consider other benefits beyond overflow reduction, such as flood risk reduction, ecosystem services, and economic development.
- Source reduction could help reliably reduce overflows, but additional research is needed to fully define a long-term, adaptive stormwater and wastewater management strategy.