

EXECUTIVE SUMMARY
SOURCE FLOW REDUCTION AND FLOW TARGET SUBCOMMITTEE
INTERIM REPORT

FEBRUARY 16, 2017 DRAFT

1. Background

This *interim* report is the product of the Source Flow Reduction Flow Target (SFRFT) Subcommittee of the Wet Weather Working Group (3WG), facilitated by 3 Rivers Wet Weather. This collaborative group has been developed through, and is an offshoot of, the cooperative efforts of the Allegheny County Sanitary Authority (ALCOSAN), Pittsburgh Water and Sewer Authority (PWSA) with the representatives of most of the 83 municipalities/sanitary authorities within the ALCOSAN service area. Additional stakeholders included the Allegheny Conference on Community Development, the Allegheny County Conservation District (ACCD), and Economic Development South.

The SFRFT has held 30+ meetings to discuss technical matters, policy issues, and implementation strategies surrounding potential development of a consensus-based, long term plan to accomplish source flow reduction in both separate and combined sewer systems, with the ultimate goal of supporting the ALCOSAN Interim Wet Weather Plan (IWWP) Implementation through cost-effective removal of Infiltration and inflow.

The IWWP is comprised of expansion of the ALCOSAN's Wastewater Treatment Plant, increased conveyance capacity and a limited regional tunnel system for equalization/storage. The IWWP is projected to reduce sewer overflows by approximately 65% relative to future (2046) flows at an estimated cost of \$2 billion. Additional overflow reduction measures will be required to comply with wet weather overflow policy. This could be accomplished through source reduction and/or other projected future grey/green infrastructure including supplemental tunnels and/or conveyance capacity. Prudent sewage facility planning efforts in terms of future wet weather improvements must include source reduction efforts that are determined to be more cost-effective than an increased regional tunnel system that could be implemented through a future expanded scope of the IWWP.

2. SFRFT Subcommittee Mission Statement

The SFRFT subcommittee adopted the following mission statement at the outset; *Recognizing the regulatory requirement to achieve water quality standards, the Source Flow Reduction and Flow Target Subcommittee will develop goals and implementation strategies to reduce groundwater infiltration and stormwater inflow to optimize local and regional sewer service. The goals and strategies are intended to be technically achievable, economically affordable, reasonably quantified, and enforceable. The Subcommittee will work to develop regional, consensus-based recommendations for cooperative implementation of the goals and strategies by ALCOSAN Customer Municipalities and Authorities, ALCOSAN, DEP, ACHD, and others.*

3. Purpose of this report

In June 2014, the United States Environmental Protection Agency (EPA) identified the need for municipal source flow reduction as a component of the regional wet weather plan.

The municipalities are currently responding to an Interim Consent Order (Phase I Consent Order and Agreement (COA) with the Pennsylvania Department of Environmental Protection (PaDEP) and/or Allegheny County Health Department (ACHD) to assess source flow reduction potential within their systems. ALCOSAN is currently responding to a Section 308 Request for Information mandating evaluation of municipality/POC-specific flow targets.

The purpose of this report is twofold:

- To provide a consensus-based summary document from a municipal perspective, which addresses Interim Investigative Flow Target Metric Thresholds as a resource to ALCOSAN's January 2017 response to the 308 letter received from United States Environmental Protection Agency (USEPA) in June 2015 as modified in October 2015.
- To provide a consensus-based framework for acceptance by the municipalities of a compliance process and Interim Investigative Flow Target Metric Thresholds for incorporation into potential regulatory implementation orders.

4. Interim Flow Targets Methodology Overview

After considering the merits of five distinct flow target methodologies, the SFRFT focused efforts related to a hybrid methodology which includes a portion of each of the five methodologies acknowledging that they may come into play at a later date as part of adaptive management process or may refine an established flow target(s) during implementation of the IWWP.

The selected methodology can be broadly described as a compliance/performance based Interim Investigative Flow Target Metric Threshold that would screen portions of the ALCOSAN system for initial, cost-effective and affordable source flow reduction prioritization followed by more stringent flow targets adaptable to IWWP implementation.

Adaptive management in this context is using data accumulated, results realized, and lessons learned to inform future implementation steps and refine established flow targets over time.

Underpinning all of this is the understanding that any selected metric must be cost-effective and affordable.

5. Municipal Interim Investigative Flow Target Metric Thresholds

After research and discussion of other urban wet weather plans, consideration of historic regulatory positions, analysis of the limited local data available, and intense debate and deliberation, the subcommittee has determined that there exists insufficient full-scale project data, associated capital and operating cost data, and engineering cost-effectiveness analyses to provide adequate guidance to inform, refine and select firm, universally-applied metrics that are known to be achievable, cost-effective, and affordable.

Consequently, as an interim step, it is proposed that in concert with USEPA's adaptive management framework to adopt individual short-term metrics for both sanitary sewer and combined sewer systems.

Work toward achieving the metrics will require completion of detailed engineering analyses in the targeted subsystems over an initial period of 4 to 6 years with the intent of developing a database to support the future implementation of more definitive flow target-type metrics.

The intent of the flow target metric thresholds (e.g. "gold line" sanitary metric, combined system capture metric) is that an assessment be performed based on available data (e.g. 2008 ALCOSAN synoptic data or other) and if found to exceed said threshold, a detailed evaluation would then be completed to identify cost effective/affordable source reduction opportunities. Full life-cycle analysis to include cost as well as non-cost aspects (traffic disruption, etc.) of the projects should also be evaluated in the cost-effectiveness analysis. The affordability of the project will need to be investigated, based on EPA affordability guidelines. If it is found to be cost-effective and affordable the projects will be implemented. Pre- and post- monitoring information will need to be collected to confirm performance.

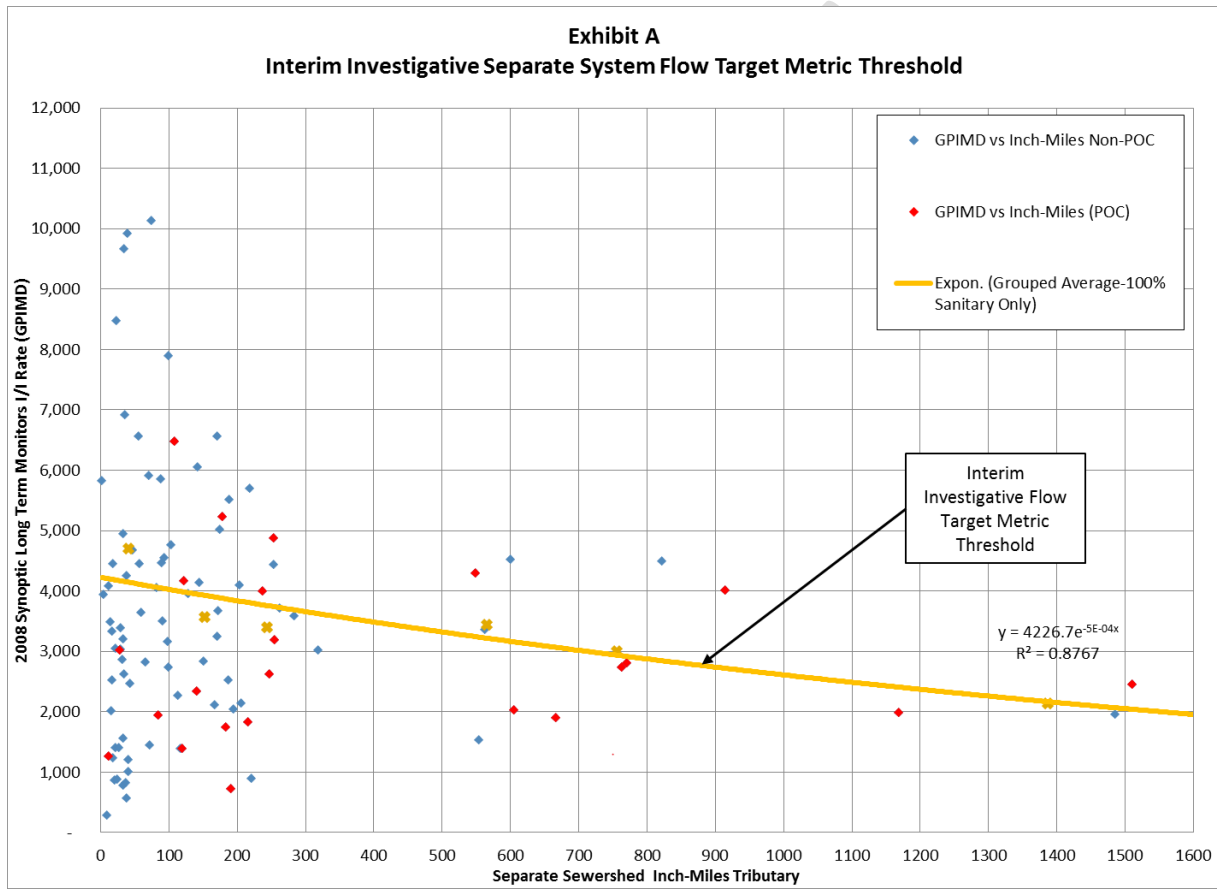
If thresholds are met, municipalities will continue with approved O/M program and/or Nine Minimum Controls (NMCs). SSO mitigation is a required element of the sanitary sewer metric.

Sanitary Sewer Systems

For municipal separate sanitary sewer systems the subcommittee is proposing the following Interim Investigative Flow Target Metric Threshold comprised of two components:

- 1) a cost-effectiveness, inch-mile based unitized annual volumetric flow rate, and
 - 2) a municipal SSO control threshold.
- Municipal Unitized Annual Volumetric Interim Investigative Flow Target Metric Threshold
 - ♦ It is proposed to utilize a 12-month average (or otherwise reasonable period allowing for seasonal variability definition and similitude adjustment to base 2008 RCS-FMP datum) cumulative annual GWI/RDII inclusive volumetric flow rate unitized based on inch miles of mainline sewer as presented as Exhibit A.
 - ♦ If the average unitized volumetric rate (as measured at separate sewer POCs to ALCOSAN, or at a municipal boundary or to a combined sewer system) is above the established threshold, the municipalities will perform a study to determine the cost effectiveness of source flow reduction and affordable in an effort to achieve a flow volume below the threshold.

- Municipal SSO's
 - ◆ For a given 12-month period no more than one (1) SSO occurrence for any non-snow melt storm event of a duration and total precipitation less than 1.18 inches per hour or 2.33 inches in 24 hours¹
 - ◆ If in a given 12-month period there is more than one (1) SSO for any non-snow melt storm events less than 1.18 inches per hour or 2.33 inches in 24 hours the municipalities will develop and implement a comprehensive flow monitoring program and develop a calibrated H&H model sufficient to derive and implement a solution to achieve compliance with this metric.



Combined Sewer Systems

As defined by the Source Flow Reduction and Flow Target Subcommittee, a combined sewer system metric is a basis for determining whether a combined sewer system needs to implement green stormwater infrastructure (GSI) or other source reduction projects (including sewer separation) to manage and reduce wet weather volume and ultimately reduce combined sewer overflow (CSO) volume, frequency, and duration to meet water quality standards or to provide water quality improvements.

The CSO Metric described below is based on the idea of attempting to “close the gap of the overflow volume to required levels,” incrementally over a period of time.

¹ ALCOSAN Wet Weather Plan Section 4 Table 4-1 2 Year Return SCS Type II Design Storm precipitation and (NOAA Atlas14, Volume 2, Version { Lat. 40.4407 Long -80.0027})

A. Combined Sewer System (CSS) Metric

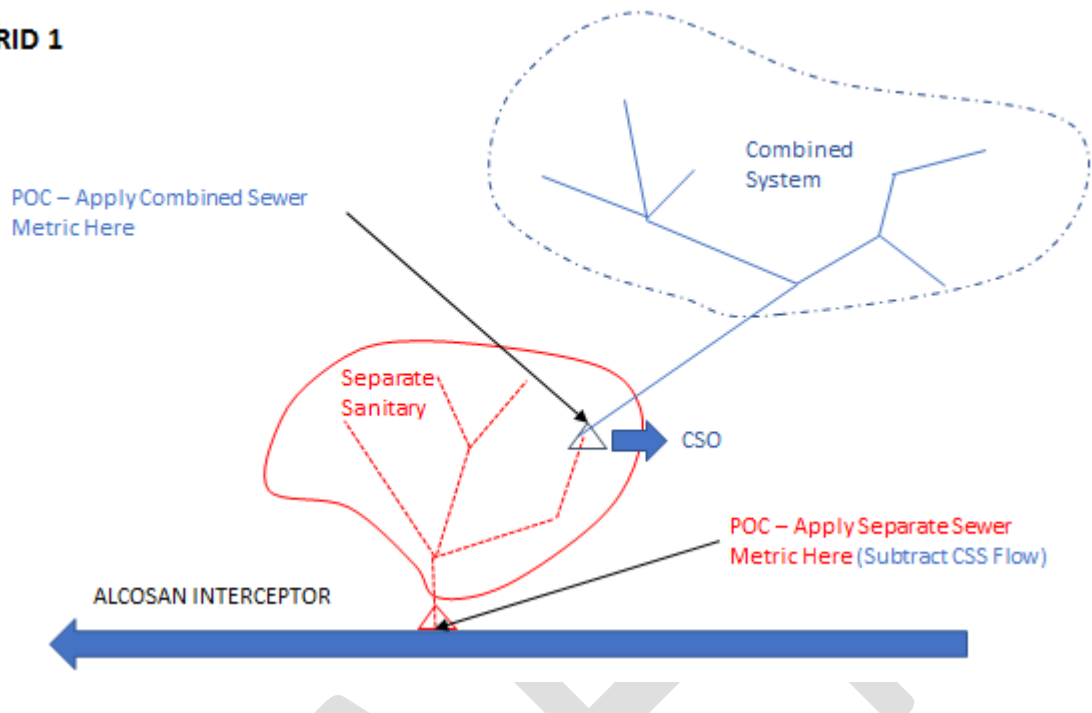
The basic CSS metric includes the following:

1. Evaluate runs of an agreed-upon, standardized model to determine levels of wet weather capture based on a typical year at the ALCOSAN outfalls designated as combined in ALCOSAN's CD as well as municipal CSO outfalls. These evaluations should be based on current conditions.
2. Areas with less than 85% wet weather flow capture will be highlighted as candidates to implement an investigation into the feasibility of source flow management and reduction efforts.
3. The candidates for flow reduction will perform evaluations to determine the cost-effectiveness of managing and reducing wet weather flows and/or CSO volume by 10% (analysis will also be done for 15% and 20% for evaluation purposes). The analysis would identify potential areas that may benefit from more stringent requirements for stormwater management in redevelopment projects, stream removal, or other potential projects that could be performed to convert or control impervious tributary areas.
4. The evaluation should include various phases of ALCOSAN's wet weather plan, up to and including the expansion of the WWTP and the tunnel construction. If the outfall does not meet the 85% capture for any of these scenarios, the evaluation will go forward.

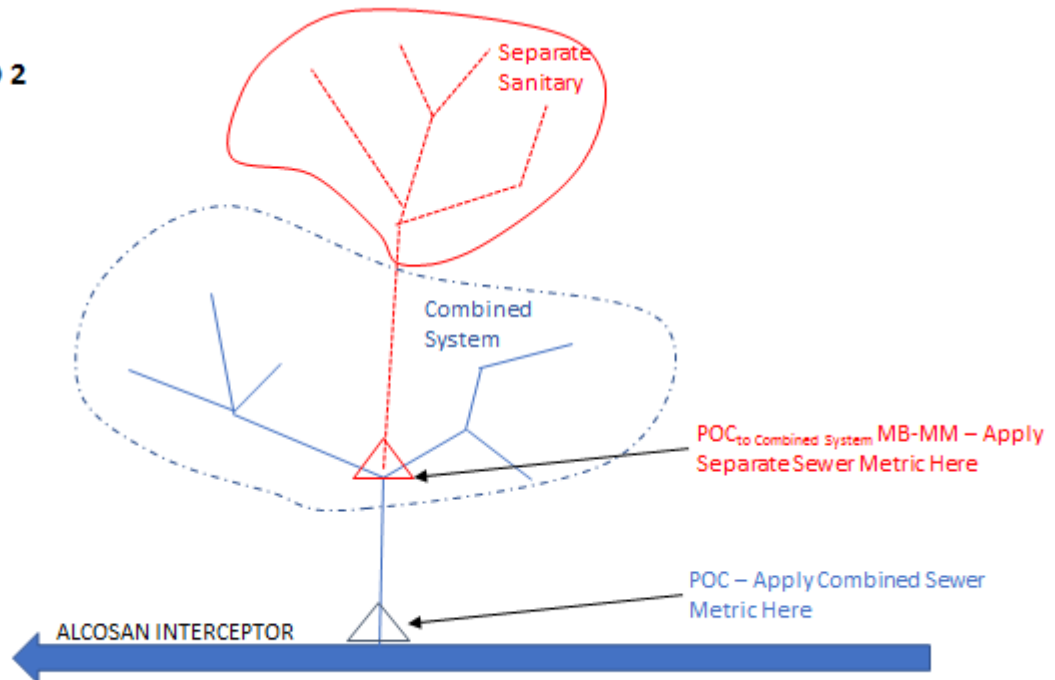
B. Hybrid System Metric

There are two basic types of hybrid systems, both classified as combined from ALCOSAN's point of view. Regardless of the type of hybrid system, the separate sanitary sewer portion will follow the separate sewer metric and the combined sewer system will follow the CSS Metric outlined above and illustrated below.

HYBRID 1

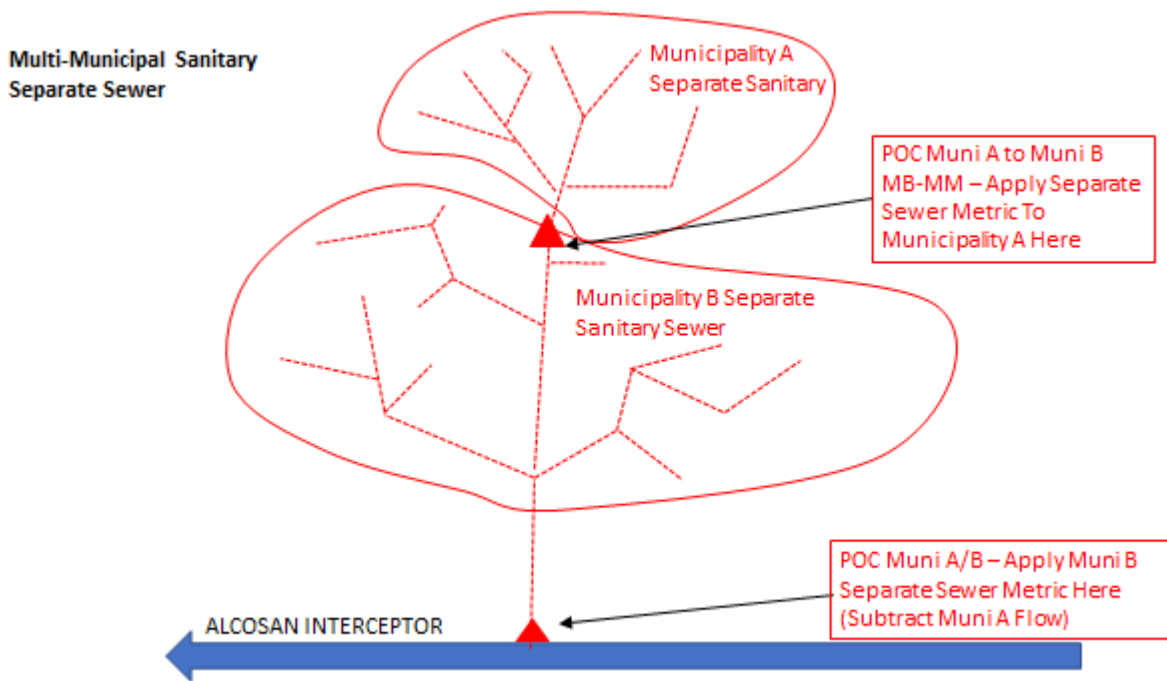


HYBRID 2



Multi-Municipal Systems

Multi-municipal systems are very common in the ALCOSAN service area. A schematic example of how to apply the separate sanitary sewer metric on a multi-municipal system illustrated below.



6. Other Considerations

The Interim Report acknowledges the importance of economic appropriateness of any source flow reduction program taking into consideration definitions associated with cost-effectiveness, affordability and incentivization.

Source flow reduction resources from prior 3RWW initiatives and well as a case study completed in 2015 specific to “cost-effectiveness” is presented.

“Affordability” provisions following US EPA’s Financial Capability Assessment guidelines for Combined Sewer Systems is summarized in the Interim Report.

“Incentivization”, a parallel concept to cost-effectiveness and/or affordability, is discussed including ALCOSANs recently implemented Green Revitalization of Our Waterways (GROW) grant program. Other types of incentivization (e.g. economic off-sets and/or economic penalties) are introduced.

A working summary of high level tasks to be performed from a municipal, ALCOSAN and 3RWW (collaborative) perspective is presented for the first six-year adaptive management check-in period starting in FY 2016 (Year 0) and moving forward through FY 2022 (Year 6).

In addition to discreet tasks presented, several technical, institutional, administrative concepts remain to be vetted by the SFRFT including but not limited to:

- Establishing the 2008 RCS-FMP Datum as the baseline condition to allow for adjustment of 2009 and later flow monitoring programs/flow regimes.
- Debate and/or discussion pertaining to enforcement of flow targets from a monitoring vs. metering vs. model (or some permutation/combination) perspective.
- Ability of municipalities and/or ALCOSAN to effectively manage “private source” RDII reduction.
- Identification of intermunicipal or multi-municipal management agencies to implement and/or manage source flow reduction efforts.
- Schedule refinement

The subcommittee is committed to continue its work toward developing strategies for source flow reduction to further address the region’s wet weather issues. The final report of the subcommittee, which will include this interim report and refined recommendations for future implementation, is under development.

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