

3 RIVERS WET WEATHER'S 2015 REGIONAL FLOW ISOLATION MEASUREMENT PROGRAM

As of January 30, 2015

PROGRAM OVERVIEW

Flow isolation monitoring involves taking nighttime sanitary sewer collection system flow measurements between the hours of midnight and 5:00 a.m., during which time it is presumed that the domestic sewage component of the wastewater flow is minimal, and therefore the measured flow essentially represents system groundwater infiltration and "isolates the extraneous flow." The manhole structures which are required to "isolate" the system into subunits are referred to as "Key Manholes," and the system is divided into various subunits having lengths of about 1,500 to 3,000 linear feet each.

Flow isolation studies are typically performed during periods of high groundwater levels when sustained infiltration rates are elevated - typically February through April in the Pittsburgh region. The measurements should not be done during or immediately after precipitation events so as not to include any potential direct inflow or otherwise known as rainfall dependent sources.

This is an EPA-funded pilot demonstration program to evaluate the effectiveness of four technologies/methodologies in the Pittsburgh area. These methodologies are described below. The outcome of the study will be the quantification of base infiltration to identify which areas are wet and which are relatively dry in order to cost-effectively guide source flow control initiatives. The data output will be a distribution of baseline infiltration flows (also commonly referred to as Ground Water Infiltration or GWI), most likely in GPIMD - gallons per inch of pipe diameter per mile per day for that section of the system. For portions of the study areas, depending on a number of different factors including methodology deployed and pipe slopes, an R value or percent of precipitation captured during a specific rainfall event may also be calculated. A white paper will be prepared with formal presentation at the 3RWW Annual Sewer Conference in October 2015.



The monitoring began on January 6, 2015 and since it is weather dependent, the program will be most successful if we receive adequate precipitation during the study period.

The study will require close coordination by 3RWW with the municipalities and the three vendors that will be working cooperatively to perform the study. The measurements will take place in the following municipalities (see the following table), with the project scope and a tentative, weather-dependent schedule as outlined below.

ALCOSAN/Regional Wet Weather Planning Basin Designation	Municipalities (Larger tributary area to smaller area)
A-60	Reserve
M-44	Munhall, West Homestead, PWSA
S-15	Dormont, Mt. Lebanon, Baldwin Twp., PWSA
C-48	Scott, Mt. Lebanon, Carnegie
C-49	Scott, Mt. Lebanon
T-29	Trafford

SCOPE OF WORK

A. Basin Monitoring - Basin Monitors will be installed at seven locations for a three-month period in the six basins. These are generally the same locations as the 2008 Flow Isolation Monitoring Program. These monitors are intended to quantify total flow to an ALCOSAN Point of Connection or at a connection to a downstream combined sewer system.

Vendor: ADS Environmental Services, Inc. (ADS)

Current Status and Schedule:

- Dec 16-18, 2014: Sites inspected, monitors installed for “settling-in” period.
- Jan 5-6, 2015: Final site calibrations were verified, flow monitoring period began January 6th and will likely continue until the first week in April 2015.

B. Sub-basin Monitoring (and Micro Monitoring) –

- Sub-basin monitors assist in quantifying total flow in primary branches upstream of Basin Monitors thereby breaking down the sanitary “basin” into smaller sub-basins. Thirteen (13) sub-basin monitors will be installed for a two-month period at strategic locations in all six basins.
- Micro Monitors are similar to Sub-Basin monitors with an additional primary device (weir) enabling lower flow regime rates (pipe slope dependent) to be quantified typically to a neighborhood or street level. Micro monitors (a total of 24 monitor months) are planned in the following basins:
 1. A-60: 11 Micro monitor installations (quantity to be confirmed)
 2. S-15: 17 Micro monitor installations (quantity to be confirmed)
 3. M-44: 17 Micro monitor installations (quantity to be confirmed)
 4. C-48: 17 Micro monitor installations (quantity to be confirmed)

Vendor : Stantec, Inc.

Current Status and Schedule:

- Sub-basin monitors were installed during the week of January 19, 2015.
- Micro-monitors will be installed in the designated areas for two-week durations. During the week of January 19, 2015, Micro monitors were installed in the A-60 basin. Installations in S-15

will occur February 2, 2015 (weather dependent), followed by M-44 on or about February 16, 2015 and C-48 on or about March 2, 2015. It should be noted that the amount of rainfall or snowfall (or lack thereof) could impact the duration of the A-60 installations, thereby impacting the tentative schedule for the other three basins.

- C. Dye Dilution Studies** – The scope of this effort includes sixteen dye dilution runs of approximately 1 mile in length. Twelve (12) dye dilution runs have been identified to date. The remaining four dye dilution runs will be identified based on information obtained during the other three tasks. This methodology which was widely used in the 1970's and includes introducing rhodamine in an upstream manhole with sampling occurring in "key manholes" downstream to the end of the study. The amount of dilution, determined by using a fluorometer, determines the amount of infiltration between specific key manholes. This work will be completed generally between the hours of 1 AM to 5 AM when sanitary sewer flows are negligible.

Vendor: Applied Science, Inc. (ASI)

Current Status:

ASI is completing preparatory work. One of the items that 3RWW will need to coordinate with municipalities is the location of the manholes identified for the dye dilution runs. Once antecedent soil moisture conditions and GWI is elevated to the point of producing adequate results, ASI will complete a single dye dilution run in a defined basin starting in A-60 and continue in the order of the table above.

- D. Nighttime Flow Isolation Weirings** - The scope of this effort includes night-time flow isolation measurements in approximately 434 key manholes at various locations throughout the six basins. This methodology uses portable v-notch weirs to measure flow rates generally between the hours of 1 AM to 5 AM when sanitary sewer flows are negligible.

Vendor: ADS Environmental Services, Inc. (ADS)

Current Status:

ADS is currently performing key manhole selection and is planning to initiate field crew mobilization on or about February 2. Again, this schedule is precipitation dependent such that measurements can be performed with ground water infiltration is high in the sanitary sewer systems. ADS' field staff will be field evaluating key manholes during the daylight hours in advance of the actual night-time measurements. ADS' field crews will have visible identification as well as clearly marked vehicles. Should access be required to backyard areas during the early morning testing hours, a door hanger notice will be placed on the visible entrances of impacted property owners in advance of performing the measurements. ADS will provide advance notification to municipal police and governmental services in advance of the field measurements.