

Infiltration and Inflow Offset Policy

Purpose

Infiltration and inflow (I/I) are generally understood to be groundwater and rainwater that enter the sewer system through a variety of pathways including structural defects in pipelines and manholes, offset/slipped joints between pipe segments, and direct or indirect connections between the storm drain and the sewer network. Infiltration and inflow sources are pervasive and require substantial resources to isolate, locate and eliminate.

The Town of Swampscott's sewer system is extremely vulnerable to I/I due to age, pipeline material, density of utilities in the street, and the abundance of basement sump pumps.

- Over 50% of the Town's sewer pipelines are over 90 years of age. Another 25% of the Town's sewer pipelines are over 60 years of age. Two-thirds (67%) of the Town's sewers are made of vitrified clay pipe. This combination of pipeline age and material has proven to be a major issue for the Town's infrastructure in terms of pipeline condition and the ingress of infiltration into the system.
- The Town is densely developed and there has been a significant history of utility work in the public rights of way. This has created a situation where buried sewer pipelines are disturbed over decades of construction projects, which has worsened pipeline condition.
- The Town maintains a listing of drainage pump pumps that are connected directly into the sewer system and is actively working to redirect the sump pumps. Drainage sump pump connections to the sewer system are prohibited, as they are a substantial source of inflow.

The I/I issue in Swampscott has led to a multitude of issues. First, sewer capacity is overwhelmed during large rain events due to inflow connections. It can take over a week from the time the rain storm ends to the time that flows return to normal. Elevated flows present a potential for sewer backups into property owners' basements and sanitary sewer overflows (SSOs) onto the streets. Second, surcharge in the sewer system has been exhibited to back up into the local drainage system, which can contribute to the water quality issues at the Town's beach resource areas, including King's Beach. Third, I/I has a major cost implication. The Town pays the Lynn Water and Sewer Commission (LWSC) to treat wastewater that is transported to their treatment facility. The average 3-year annual I/I flow from 2018 through 2020 has been estimated to be approximately 58% of all flow sent to LWSC.

Due to the public health, environmental pollution, and cost concerns attributed to I/I, the Town has decided to implement a new I/I offset policy to help generate revenues dedicated to identifying and eliminating I/I sources. In addition, to it being the right thing to do, this policy is also a requirement of current regulation, specifically 314 CMR 12.00. In 2014, this regulation was updated to mandate that communities that are permitted under a NDPES permit with a combined sewer system (or a co-permittee of that same permit), mitigate the impacts from any new sewer connections or extensions where proposed flows exceed 15,000 gallons per day. The mitigation requires that at least four gallons of I/I be removed for each gallon of new flow generated by the sewer connection or extension.

The I/I Offset Policy written below, is subject to future revision and approval by the Select Board, acting as Sewer Commissioners for the Town.

I. Policy Applicability

This policy is applicable to all proposed projects seeking a new sewer permit.

II. Basis for Calculating Flow

Estimated sewer flow rates shall be determined based on guidelines established by the Massachusetts Department of Environmental Protection and document under Title V: 310 CMR 15.00, as amended. Section 15.203 establishes unit flow rates for typical development units. For cases in which the proposed development does not match categories in Title V, the proposed must propose a unit flow rates for the project.

For cases where the proposed sewer connection or extension will displace an existing building with an approved sewer permit, the wastewater flow generated by the project will be calculated by subtracting the existing wastewater flow (as determined through water records) from the proposed wastewater flow.

The Town has ultimate authority in approving the applicability of Title V unit flow rates, or a proposed substituted method, for every proposed project.

III. I/I Offset Ratio

In accordance with 314 CMR 12.00, the project proponent is responsible for eliminating I/I from the Town's sewer system at a minimum ratio of 4 to 1.

Due the severe nature to which I/I negative affects the Town's sewer capacity, creates a risk for public health and environmental issues, and costs the Town substantial sums for the transportation and treatment of I/I, the current Offset Ratio for this policy is 8 to 1. For every gallon of new sewer flow, the project proponent must remove eight times that flow in I/I.

The Town reserves the right to adjust the Offset Ratio to any value greater than or equal to 4 to 1.

IV. Methods to Perform I/I Offset

The proponent requesting a new sewer permit that is subject to this Policy may choose one of two methods for performing I/I Offset:

Self-Perform

Under the Self-Perform method, the proponent identifies at his/her own risk the specific I/I project(s) to removal I/I at the I/I Offset Ratio under the current policy. At the time of the proposed sewer connection, the Town may already have identified specific I/I removal projects that it may assign to the proponent. However, in the event the Town does not have specific I/I removal projects identified, the proponent must identify and recommend projects to the Town and, subsequent to Town approval, self-perform the removal of I/I. All methods used for elimination of I/I must be submitted to and approved by the Town. Further, the Town will perform final validation and approval of the I/I flow rates removed as described in Section VI. Final approval to connect to the Town's sewer system will not be conveyed until the Town has provided written approval.

Pay I/I Offset Fee

As an alternative to self-performing the work, the proponent may prefer to pay an I/I Offset Fee that is directly proportional to the new sewer flow rate for the project. The I/I Offset Fee shall be calculated as detailed in Section V.

Fees paid to offset I/I will be deposited into a dedicated revolving account that shall be used expressly for the purposes of I/I mitigation. This may include engineering studies and investigations necessary to isolate and identify source(s) of I/I, in addition to the rehabilitation, renewal, or reconstruction of infrastructure to effect the elimination of I/I.

V. Calculation of I/I Offset Fee

The I/I Offset Fee shall be calculated by the product of the sewer flow rate, the I/I Offset Ratio, and the cost to remove I/I. The sewer flow rate and I/I Offset Ratio are established as described in Sections II and III, respectively. The cost to remove I/I shall initially be set at \$2.50 per gallon per day.

The cost to remove I/I and the I/I Offset Ratio shall be subject to periodic review and adjustment by the Select Board, acting as Sewer Commissioners. At a minimum, the cost to remove I/I and the I/I Offset Ratio shall be reviewed annually.

$$\text{I/I Offset Fee (\$)} = \text{I/I Offset Ratio} * \text{I/I Offset Fee (\$/gpd)} * \text{Flow (gpd)}$$

VI. Validation of I/I Removed

In the event the proponent self-performs the I/I mitigation all estimates of I/I removed from the sewer system shall be subject to validation by the Town. The project proponent must submit, as a minimum, the following information for review:

- (1) Engineering evaluations documenting existing I/I rates entering the collection system, including empirical evidence of I/I which may include, but not be limited to, internal CCTV pipeline inspections, manhole inspections, overnight flow isolation, smoke testing results, dyed water testing results, etc. Engineering evaluations shall be conducted utilizing current industry standard practices for quality control.
- (2) Documentation of I/I eliminated from the system through submission of as-built records of rehabilitation, renewal or replacement project(s) completed. The as-built records must be accompanied by a letter, stamped by a Professional Engineer, certifying the elimination of the I/I.

All documents validating I/I removed shall require Town approval prior to issuing a sewer connection permit.