

**Managing Infiltration and Inflow In
MWRA Community Sewer Systems
Policy No. BRP 09-01**

Effective Date: April 2, 2009

Revised Date: September 24, 2010

Program Applicability: BRP/Wastewater Management Program

Regulation Reference: 314 CMR 7.00

Approved by:  , Glenn Haas Acting Assistant Commissioner, BRP

I. Background

Infiltration and Inflow (“I/I”) into community and regional sewer systems continues to strongly contribute to sewer surcharging and sewer system overflows. Sewer system overflows present a serious public health hazard, as overflows result in untreated discharge of pathogens, metals, and other pollutants to surface waters or to the ground. In many instances, sewer backups into connected properties also coincide with the overflow events.

The majority of serious sewer overflow incidents are related to high flows during wet weather conditions. During these events, a wide array of infiltration and inflow sources contribute flow to the sewer system through direct and indirect connections. Inflow sources include sewer connections from catch basins, roof leaders, and sump pumps. Infiltration occurs when groundwater flow enters the sewer system through pipe or manhole defects in the system. These I/I sources can result in flows being dramatically greater than under dry weather conditions, and can exceed the capacity of the system. Since many sewered communities in Massachusetts are in older, urbanized areas, these systems are prone to have high volumes of I/I during wet weather. This is especially true in the MWRA service area, where some sewer lines were constructed over 100 years ago. Transporting and treating these extraneous flows at publicly owned treatment works also accounts for a substantial cost to all ratepayers, and puts further stress on treatment operations. Removal of I/I sources from the sewer systems is therefore an important public health and cost-saving measure. MassDEP, in January 1993, issued *Guidelines for performing Infiltration and Inflow Analyses and Sewer System Evaluation Survey*, which can be found on the MassDEP website at <http://www.mass.gov/dep/water/laws/iiguidln.pdf>. Communities should consult this Guidance when undertaking I/I studies to identify and remove I/I sources.

MWRA has been metering flows from its member communities for many years, which has provided extensive information on I/I contributions from member communities. MWRA metering data indicates that I/I flows account for well over 40% of the average daily flow to the MWRA system, and a much larger percentage of the wet

weather flow. While MWRA has been pro-active in establishing a grant program for its member communities for I/I abatement projects, it is clear that there is extensive I/I remaining in the system, which continues to contribute to sanitary sewer overflows, and also exacerbates the frequency and volume of combined sewer overflows in communities with combined sewers. Since I/I is a dominant flow source in the MWRA service area, MassDEP is establishing this policy as a regulatory means to ensure that communities proceed with programs to identify and remove I/I sources, and to ensure that flows associated with new development do not result in increased sanitary sewer overflows.

II. Applicability

This policy shall apply to all communities in the MWRA sewer service area. The provisions of section III, on sewer mitigation credits, are also applicable to all communities under an Administrative Consent Order (ACO) with MassDEP for I/I abatement, and to all communities under a MassDEP Unilateral Administrative Order (UAO) which includes I/I abatement requirements. For communities under an ACO or a UAO, the terms and provisions of the Order shall remain in full force and effect, until such time as the Order is modified or terminated, this policy notwithstanding.

MassDEP establishes under 314 CMR 7.00 the requirements for permits for new sewer connections and sewer extensions, as well as permit requirements for increases in flow through existing sewer connections. The regulations include thresholds which set forth when permits from MassDEP are required for any such extensions and connections. However, the provisions of 314 CMR 7.04 also give MassDEP broad authority to establish rigorous permitting requirements for any new sewer connections where such connections may result in violations of the Massachusetts Clean Waters Act, M.G.L. c. 21 s. 26-53. These regulations allow MassDEP impose conditions for I/I removal for new permits, or take other actions, up to and including prohibiting new connections to sewer systems where “inadequacies in the design or capacity of a sewer system exist.”

The Executive Office of Energy and Environmental Affairs (EEA) establishes requirements for public environmental review of development projects through its authority under the Massachusetts Environmental Policy Act (MEPA), M.G.L. c. 30, sections 61 through 62H. The regulatory thresholds for environmental reviews are identified in 301 CMR 11.03. Projects which exceed a threshold for an Environmental Impact Report (EIR) are generally considered to be projects which have the most potential environmental impacts, and for which mitigation work is most appropriate. **Where a project exceeds any MEPA threshold for an EIR, is within the MWRA wastewater service area, and will result in new wastewater flows exceeding 15,000 gpd, I/I mitigation will be required to offset the impacts from new sewer flows associated with the project.** Projects requiring a MassDEP sewer extension or connection permit [wastewater flows greater than 50,000 gpd, extensions greater than 1000 feet, or required to by MassDEP in accordance with 314 CMR 7.04(1)] will be required as a condition within the permit to meet this criteria, pursuant to MassDEP’s regulatory authority under 314 CMR 7.04(1). In addition, projects that require a

certification in accordance with 314 CMR 7.17(1) that do not commit to I/I mitigation, as outlined as part of this policy, within the MEPA process will be required to obtain a permit in accordance with 314 CMR 7.04(1). In situations where the applicant has committed to I/I mitigation as part of the MEPA process, the applicant will need to certify that the I/I requirement has been complied with in the post-construction compliance certification as required by 314 CMR 7.05(1)(h) and 7.17(1).

MassDEP will also apply the provisions of this policy to projects in non-MWRA service areas *where MassDEP determines that connection of new sewer flows would create a significant risk of SSO* events, given technical information on the capacity of the local or regional sewer system, and a review of past SSO events.

III. Mitigation

Offset Requirement

For communities which trigger an Environmental Impact Report in an MWRA sewer service community, and for which the community is not under an ACO or UAO with MassDEP, the project proponent must remove or cause the removal of four gallons of I/I flow for each gallon of new flow to be discharged to the sewer system. In certain situations, such as SSO impacts on drinking water supplies, MassDEP may require more than four gallons of I/I removed for each gallon of new flow to be discharged to the sewer system. The removal of I/I must take place in segments of the sewer system affected by new flows generated by the project. Where MassDEP determines near-term risk of SSO events is limited, where specific I/I abatement projects are not identified, or where otherwise cost-effective, a project proponent may seek to make a financial contribution to a community I/I abatement fund in lieu of undertaking mitigation work, subject to approval by MassDEP. Where this alternative is pursued, any funds contributed must be made in accordance with local sewer regulations, and must be retained in a dedicated account to be used only for I/I abatement work.

For all communities subject to an ACO or UAO with MassDEP, the mitigation requirements for any new sewer connections or extensions shall be as specifically noted in the provisions of the Order.

Sewer Banks

Sewer “Banks” are being administered in many communities as a means to control new connections to the sewer system, and ensure that where new connections are allowed, impacts to the sewer system will be properly managed through an active I/I abatement program. Where communities are implementing sewer banks, whether the subject of a MassDEP ACO or UAO, or as established through local sewer regulations, the following provisions shall also apply:

1. Flow mitigation offsets shall be as included in the MassDEP Order, and shall be a minimum of 4 gallons of I/I removal for each gallon of new flow. Sump pump removals shall be the sole exception to this offset ratio, and flow credits shall be allowed based on removal of one gallon of sump pump flow for each gallon of new flow. MassDEP notes that local sewer authorities may have more stringent requirements;
2. Sewer authorities, subject to MassDEP approval, may propose water conservation projects to serve as sewer mitigation offsets, with supporting documentation.
3. The sewer authority shall maintain a database of sewer connections (noting new sewer flows) and sewer credits, and shall ensure that all new flows discharged to the sewer system are allowed only in accordance with credits available in the sewer bank.
4. “New” flow shall be defined as any new flows from properties with no pre-existing sewer connection, or where a duly permitted existing connection exists, where flows from the property will increase from flows established in the sewer extension or connection permit. Where a connection has not been “used and maintained” in accordance with 314 CMR 7.00, and where properties have been vacant, or have had significant change in use or flows, historical sewer flows emanating from the property shall be used for the purpose of quantifying “existing” and “new” flows. In these cases, existing flows shall be defined as a five year average of daily wastewater flows from the property, as determined by water use records, suitably adjusted for consumptive uses.
5. Sewer authorities shall maintain records of all sewer connections, approved flows, sewer credits (noting I/I abatement projects), and other correspondence pertinent to administration of the sewer bank for a minimum of seven years, and such records shall be subject to MassDEP review upon request.

Calculation of Sewer Bank Credits

Sewer authorities will be responsible for estimating the I/I removal benefits of any sewer system rehabilitation work, subject to general oversight by MassDEP, and/or pursuant to the requirements of any ACO or UAO. Flow credits should be allotted based on the best technical information available, and should be based on the quantity of infiltration eliminated on a daily flow basis, and for inflow should be based on the quantity of flow eliminated from application of the 1 year, 6 hour design storm, which is characterized in MassDEP’s I/I Guidance as a storm with a total depth of 1.72 inches and an average intensity of 0.29 inches/hour over 6 hours.

Sewer authorities should utilize all available information in rendering a determination on the flow credits, including metering data, field investigations, and other information amassed during an I/I study or Sewer System Evaluation Survey (SSES). For infiltration projects, this will typically include flow isolation (metering) or TV inspection of segments of the system where infiltration flows can be estimated. For inflow projects, removals should be based on flow volumes associated with runoff from the 1 year, 6 hour design storm, taking into consideration the size of the drainage area and its imperviousness.

Where limited technical information exists to support quantification of I/I removals, MassDEP's I/I guidance includes estimates of flows from a range of potential I/I sources. Table 7 of the I/I Guidance includes flow estimates from many possible inflow sources. These estimates should only be used where no site specific technical information exists to quantify the I/I flow removals.

Sump Pump removals are considered a special case, and, as noted above, a 1:1 offset is allowed for each sump pump removed. MassDEP has determined that a flow credit of 1,200 gallons per day per sump pump is reasonable, unless more site specific information is available to support a higher or lower flow estimate. However, sump pump removal credit is contingent on elimination of sump pump connections to the sewer system through a permanent, hard-piped connection to an alternative means of discharge, such as a discharge to the ground, through a separate storm drain service connection, or by other means which ensures that sump pumps will not discharge to the sewer system.

In all instances, sewer authorities shall be diligent in documenting the basis of sewer credits for I/I abatement projects, which shall be subject to MassDEP review.

IV. Permits and SSO Reporting

MassDEP notes that in many instances sewer authorities are subject to I/I abatement requirements included in NPDES permits. Permit requirements for sewer authorities typically include provisions for undertaking I/I abatement programs, and reporting to MassDEP and EPA on the progress of the work. Sewer authorities should be mindful of all I/I requirements, and should be especially vigilant in providing notice to MassDEP and EPA of any sanitary sewer overflow. 314 CMR 7.04(3) states:

(3) Persons owning or operating a sewer system shall report bypasses and/or overflows as follows:

(a) In the event of an anticipated bypass or sanitary sewer overflow the owner shall provide notification to the Department, on a form approved by the Department, at least ten days prior to the event, if possible; or

(b) In the event of an unanticipated bypass or sanitary sewer overflow, as soon as the owner has knowledge of the bypass or sanitary sewer overflow and no later than 24

hours after its first occurrence, the owner shall provide notification to the Department, on a form approved by the Department, of such an event.

(c) Within five days of the event identified in either 314 CMR 7.04(3)(a) or (b) the owner shall provide the following information to the Department, on a form approved by the Department: All the activities that lead up to the event; steps taken to minimize the impact of the event on public health and the environment; and, steps taken to prevent such an event from happening in the future.

V. References

- Municipal Compliance Fact Sheet – Wastewater
http://www.mass.gov/dep/water/laws/mc_wastw.htm
- Sanitary Sewer Overflow Reporting Instructions
<http://www.mass.gov/dep/water/approvals/ssoform.pdf>
- DEP Guidelines for Performing Infiltration and Inflow Analyses and Sewer System Evaluation Survey, January 1993
<http://www.mass.gov/dep/water/laws/iiguidln.pdf>
- MassDEP Bureau of Resource Protection
Interim Infiltration and Inflow Policy, September 6, 2001
<http://www.mass.gov/dep/water/laws/iipolicy.doc>
- MassDEP Sewer Extension and Connection Permit Program
<http://www.mass.gov/dep/service/regulations/314cmr07.pdf>