

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
EPA NEW ENGLAND
ONE CONGRESS STREET
BOSTON, MASSACHUSETTS 02114

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT
TO DISCHARGE TO WATERS OF THE UNITED STATES.

NPDES PERMIT NO.: **MA0102997**

NAME AND ADDRESS OF APPLICANT:

**City of Worcester
Department of Public Works
20 East Worcester Street
Worcester, MA 01604**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

**Quinsigamond Avenue CSO Storage and Treatment Facility (QCSOSTF)
70 Quinsigamond Avenue
Worcester, MA 01608**

RECEIVING WATERS:

Mill Brook storm drain to the Blackstone River (USGS Hydrologic Code: 01090003)

RECEIVING WATER CLASSIFICATION: **Class B**

I. Proposed Action, Type of Facility, and Discharge Locations

The above named applicant has applied to the U.S. Environmental Protection Agency ("EPA") for the reissuance of its NPDES permit to discharge into the designated receiving water. The discharges are from combined sewer overflows (CSOs) which have undergone screening, detention, chlorination and dechlorination.

II. Description of Discharge

The City of Worcester's sewer system consists of about 60 miles of combined sewers, which convey a combination of sanitary (domestic) wastewater and storm waters, with about 330 miles of separate sanitary sewers and about 290 miles of storm sewers. The primary storm drain running through the City is Millbrook, which is an old canal enclosed by granite block walls. There are two main interceptors that run along Millbrook, each having several overflow regulators associated with them, which regulate flows to the QCSOSTF. See Figure 1 for a map of the combined sewer area of the City of Worcester.

The QCSOSTF operates first as a dry weather sewer pumping station. In this mode, it sends any flow collected in the system's overflow collectors or captured in the storage tanks following a wet weather event to the Upper Blackstone Water Pollution Abatement District (UBWPAD) for treatment. All dry weather flows and over 75% of rainfall events are currently treated entirely at the UBWPAD.

CSO discharges are a combination of sanitary sewage and storm water runoff which discharge only during significant storm events, when collection system capacity is exceeded. Typically, these flows are directed to the UBWPAD facility for treatment. When the flows are beyond what the UBWPAD facility is able to accept, flows are routed to the QCSOSTF for treatment. The operation of the QCSOSTF during a storm is computerized and keyed off certain precipitation gauges which determine when flows are sent to the facility for treatment instead of such flows being sent to the UBWPAD. When precipitation events are such that flows are sent to the facility, these CSO flows collect in a wet well prior to entry to the plant. When a certain level is reached in this wet well, scum removal equipment is activated and bar screens are operated continuously until a constant flow rate is maintained through the facility. These flows are directed to one of two detention tanks, which have a combined capacity of about 2.5 million gallons (MG). These flows are chlorinated with liquid sodium hypochlorite in the influent conduit prior to entry into the tanks with the chlorination rate paced to the influent rate. The QCSOSTF can pump up to a maximum rate of 19 million gallons per day (MGD). During a storm, when the UBWPAD cannot accept additional flows, the effluent gates at the QCSOSTF will operate to maintain a constant water elevation in the detention tanks. These flows are dechlorinated in the effluent conduit with liquid sodium bisulfite and are discharged to the Mill Brook conduit, which joins the Middle River about one third of a mile downstream to form the Blackstone River.

The QCSOSTF treatment performance is comparable to primary treatment, as it removes about 24% of biochemical oxygen demand (BOD) and 32% of total suspended solids (TSS). Secondary treatment is characterized by 85% removal of both parameters. When the storm has subsided to the point where there is a constant level in the influent wet well, the influent gates are closed. The QCSOSTF then must coordinate with the UBWPAD to determine when the detention tank flows can be sent to the UBWPAD for additional treatment. See Figure 2 for a schematic of the QCSOSTF. This facility was designed to allow bypassing of flows in excess of the 15 year storm flow of 185 MGD. The 1990 permit required the permittee to provide screening and disinfection of all flows at

rainfalls less than a storm of five year severity. This permit requires the permittee to provide screening and disinfection for all storms.

Long Term Control Plan

On February 26, 2004, the City of Worcester submitted its Phase II CSO Long Term Control Plan (LTCP) Report to the EPA and MADEP for review. This report was revised with a submission on June 23, 2004, which included different dates of completion for the planned improvements. This report followed up on the City's Phase I CSO planning efforts which considered the costs and benefits of a range of CSO control alternatives and ultimately arrived at a recommended plan (RP). The City believes that the RP outlined in the LTCP report provides significant reductions in the frequency and magnitude of treated discharges from this facility. These efforts are considered in conjunction with an extensive upgrade project at the UBWPAD, which is undertaking improvements at its facility which will allow for an increase in the peak wet weather flows that it can handle. These improvements are expected to reduce the frequency of treated CSO discharges at the QCSOSTF from the range of 12 to 24 per year to about 7 per year and are expected to be completed by August of 2006. With the expected improvements to the sewer system as part of the RP, the City expects that there will be a further decrease in treated discharges from about 7 to 2 per year. These are scheduled to be completed by 2011. The City also expects to be able to improve the treatment effectiveness of this facility based on implementing the RP and expects no untreated discharges except for those resulting from storms exceeding a 15-year return period. Importantly, the City's plan includes additional measures which could be implemented to increase the level of CSO control. Part I.E of the draft permit sets forth a compliance schedule which the City shall follow in implementing its RP. At this time, however, EPA is not requesting that the City implement CSO controls beyond those specified in the compliance schedule.

The City should recognize, however, that there are wet weather impairments to the receiving water that must be addressed. EPA expects that the City will build upon previous efforts and undertake more aggressive effort to remove illicit connections to storm sewers and to otherwise implement storm water controls to address these wet weather impairments. It appears that with available resources, investments in storm water controls will yield greater benefits than further investments in CSO control at this time. EPA anticipates reissuing the City of Worcester's Phase I MS4 (municipal separate storm sewer system) permit in the near future with requirements that reflect the need to address the significant wet weather related impairments.

III. Permit Basis

General Requirements

Under Section 301 (b)(1)(A) of the Clean Water Act CSOs are subject to technology-based effluent limitations and are not subject to secondary treatment regulations applicable to publicly owned treatment works (Montgomery Environmental Coalition vs. Costle, 646F.2d 568 (D.C. Cir 1980)).

Under Section 301(b)(1)(C) of the Clean Water Act (CWA) CSOs are also subject to effluent limitations based on water quality standards.

The Massachusetts Surface Water Quality Standards (SWQS) include the requirements for the regulation and control of toxic constituents and also require that EPA criteria established pursuant to Section 304(a) of the CWA shall be used unless site specific criteria are established. The state will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained or attained.

According to 40 CFR 122.44(l), when a permit is reissued, effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards or conditions in the previous permit unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued.

Technology-based requirements

EPA's National CSO control policy has established technology-based effluent limitations for CSOs using best professional judgement. The policy establishes the minimum technology-based requirements as implementation of nine minimum controls (NMCs). The NMCs are:

1. Proper operation and regular maintenance programs for the sewer system and the CSOs;
2. Maximum use of the collection system for storage;
3. Review and modification of pretreatment requirements to assure CSO impacts are minimized;
4. Maximization of flow to the POTW for treatment;
5. Prohibition of CSOs during dry weather;
6. Control of solid and floatable material in CSOs;
7. Pollution prevention;
8. Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts; and
9. Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls.

The National CSO Control Policy required CSO communities to submit documentation of their implementation of the nine minimum controls by January 1, 1997. The City of Worcester's documentation was included with the submittal of May 25, 2001 and this was approved by the EPA on October 26, 2001. This permit requires the City of Worcester to continue to implement its nine

minimum controls program in accordance with its documentation and to also perform EPA Region I's minimum implementation levels, which are defined in the draft permit (See part I.B.).

Water Quality Based Requirements

The Massachusetts SWQS establish water quality classifications for all waters of the Commonwealth. Water quality uses, and criteria to support those uses, are established for each classification. The water quality classifications are A, B, C (inland water classes) and SA, SB and SC (coastal and marine classes).

Class A and SA waters are designated as excellent habitat for fish and aquatic life; and suitable for primary and secondary contact recreation; Class A waters are designated as a source of public water supply; Class SA waters, in approved areas, are suitable for shellfish harvesting without depuration.

Class B and SB waters are designated as a habitat for fish, other aquatic life, and for primary and secondary contact recreation; Class B waters, where designated shall be suitable as a source of public water supply with appropriate treatment. Class SB waters, in approved areas shall be suitable for shellfishing with depuration.

The WQS may also assign restrictions to a receiving water, which establish a subcategory of use assigned to a receiving water segment. One of the subcategories which may be established is for CSO-impacted segments. The permitting authority may allow overflow events to waters identified as impacted by CSOs provided that;

- a. an approved facilities plan under 310 CMR 41.00 provides justification for the overflows;
- b. the Massachusetts Department of Environmental Protection (DEP) finds through a uses attainability analysis, and EPA concurs, that achieving a greater level of CSO control is not feasible for one of the reasons specified at 314 CMR 4.03(4)
- c. existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected; and
- d. public notice is provided through procedures for permit issuance or facility planning under M.G.L. c. 21 §§ 26 through 53 and regulations promulgated pursuant to M.G.L. c. 30A.

The WQS (314 CMR 4.00) do not allow the discharge of CSO, either treated or untreated, into a receiving water that is not designated as CSO impacted.

The DEP may also, with EPA concurrence, establish a water quality standards variance. A variance is a short-term modification of the standards, designed to obtain the information necessary to determine the appropriate water quality standard and level of CSO control for the segment.

Variations are discharger and pollutant specific, are time-limited, and do not forego the currently designated use. At the end of the variance, a final Administrative Determination is made regarding the appropriate level of CSO control and final water quality determinations are made.

Mill Brook and the Blackstone River are both classified as Class B warm water fisheries, with some CSO discharges. As discussed in Section II of this fact sheet, the City's LTCP outlined improvements to this facility and its pumping capabilities which would eventually reduce treated CSO discharges to the Mill Brook to an average of 2 per year. As described earlier, we believe that the LTCP will provide sufficient CSO reduction and that any additional resources should be spent on addressing storm water-related impacts, which we believe represent the main source of SWQS violations in the Blackstone River. In consideration of the City's ongoing CSO planning process and the upcoming reissuance of the City's storm water permit, a final determination on the level of CSO control to be required and the associated water quality standard have not yet been made by the MA DEP. Until such time, the receiving waters will continue to be designated as Class B. Following any such determination by the MA DEP, EPA will re-open this permit and establish, through a permit modification, limitations and conditions consistent with the water quality standards established by MA DEP and approved by EPA. The modification will require appropriate levels of CSO control.

IV. Permit Limitations

Flow

This facility is capable of pumping its discharge up to peak rate of 350 MGD and this will continue to be the permit's maximum flow limit. This flow represents the rough design capacity of the collection system for a 100 year storm through downtown Worcester. The permittee is required to report the total flow volume of each discharge and the duration of each discharge to the closest fifteen (15) minutes. For calendar years 2002 and 2003, these values were highly variable and ranged from 15 minutes to 20 hours in duration of discharge and from 0.018 to 118 million gallons (MG) per discharge event. This time period is also referenced below for other parameters.

BOD and TSS

For the last 2 calendar years, the effluent BOD values have ranged from 16 - 47 mg/l. For the same period, the TSS values have ranged from 4 - 165. This permit has maintained the requirement to sample for influent and effluent BOD and TSS for every discharge. These will be composite samples, to be taken at least hourly.

pH

The permittee has reported a pH range over the last 2 years of 5.6 - 8.9 standard units, with ten (10) violations of the 6.5 - 8.3 standard units range. Consistent with the WQS, this pH range will be maintained in this permit.

Bacteria Limitations

The Fecal Coliform limits are a geometric mean of no more than 200 colony forming units (cfu) per 100 ml and a daily maximum limit of 400 cfu/100 ml. These limits are consistent with Class B water requirements of the WQS and shall be measured for every discharge. There have been six (6) violations in the reporting period above. These limits were previously in effect for the period of April 1 through October 15. With this permit, this parameter shall be monitored and limited year round to protect the downstream secondary recreation uses on the Blackstone River and its tributaries.

Total Residual Chlorine (TRC)

Chlorine and chlorine compounds produced by the chlorination of wastewater can be very toxic to aquatic life. Effluent limits are based on water quality criteria for TRC which are specified in the water quality criteria document, often referred to as the EPA Goldbook. The criteria states that the average TRC in the receiving water should not exceed 11 ug/l for protection from chronic toxicity and the maximum TRC should not exceed 19 ug/l to protect fresh water aquatic life from acute toxicity.

The current TRC maximum daily limit of 0.02 mg/l was based on the acute criterion of 0.019 mg/l and a dilution factor of 1.1. By letter of April 1, 1993, EPA allowed the permittee to hold the TRC sample for 15 minutes to simulate the travel time before the effluent reached the Blackstone River. In addition, the analytical result for TRC was allowed to be divided by 5 to account for the dilution the effluent from the QCSOSTF would receive before reaching the Blackstone River. For this permit, the permit limit has alternatively been established at 72 ug/l which is calculated with the dilution factor of 3.8, and must be met at the effluent. In its LTCP Report, the permittee estimated that a dilution of 3.8 is available at the headwaters of the Blackstone River for a 5 year storm with the RP implemented. This dilution was estimated using flow-duration information at the USGS Kettle Brook gage (adjusted to account for an upstream flood diversion) and prorating the data collected there for the larger drainage area for the Blackstone River. See **Attachment A** for this calculation. These limits were previously in effect for the period of April 1 through October 15. With this permit, this parameter shall be monitored and limited year round to protect the downstream secondary recreation uses on the Blackstone River and its tributaries.

Whole Effluent Toxicity Testing

EPA's **Technical Support Document for Water Quality-Based Toxics Control, March 1991, EPA/505/2-90-001**, recommends using an "integrated strategy" containing both pollutant specific (chemical) approaches and whole effluent (biological) toxicity approaches to better detect toxics in effluent discharges. Such information may then be used to control the entrance of those toxic pollutants into the nation's waterways. Pollutant-specific approaches, such as those in the Gold Book and State regulations, address individual chemicals, whereas, whole effluent toxicity approaches

evaluate interactions between pollutants, i.e., the "Additivity", "Antagonistic" and/or "Synergistic" effects of pollutants. In addition, the presence of an unknown toxic pollutant can be discovered and addressed through this process.

Section 101(a)(3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts as does Massachusetts Water Quality Standards which state, in part that, "all surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife." The NPDES regulations under 40 CFR §122.44(d)(1)(v) require whole effluent toxicity (WET) limits in a permit when a discharge has a "reasonable potential" to cause or contribute to an excursion above the State's narrative criterion for toxicity.

Region I adopted this "integrated strategy" on July 1, 1991, for use in permit development and issuance. EPA Region I modified this strategy to protect aquatic life and human health in a manner that is both cost effective as well as environmentally protective.

The QCSOSTF's discharges have an unknown potential for causing toxicity to organisms. The 1990 QCSOSTF permit included a quarterly WET testing requirement for the first two (2) years of the permit life. The results of this testing showed 100% or greater levels for LC50 (the concentration of effluent which causes mortality to 50% of the test organisms) and NOAELs (no observed acute effect level) ranging from 25% to 50% for the minnow and the daphnid, the two organisms which were used. Presently, there is inadequate information for EPA to base a "reasonable potential" determination concerning this discharge's toxicity potential to cause or contribute to an excursion of the State's narrative water quality criterion. Thus, an inclusion of a WET testing monitoring requirement in the draft permit is necessary, reasonable and appropriate to gather this information in order to make a technically-based "reasonable potential" determination regarding whether or not this discharger is unknowingly contributing toxics to the receiving water. This approach is consistent with that recommended in **Technical Support Document for Water Quality-based Toxics Control**, March 1991, EPA/505/2-90-001, page 60.

The draft permit requires the permittee to report the results of acute WET tests using the daphnid, Ceriodaphnia dubia. Instead of duplicating the testing for the two (2) organisms as in the 1990 permit, the EPA has required quarterly testing for the life of the permit, for the one species that has been typically found to be more sensitive to such testing, the daphnid. Although the WET testing protocol requires the collection of 24 hour composite samples, the permittee may collect composite samples of smaller duration, since flow durations are variable and often less than 24 hours. If after eight consecutive sampling periods (two years), no toxicity is found, the permittee may request a reduction in toxicity testing.

Nutrients

This permit has established quarterly monitoring requirements for nutrients because the Blackstone River is currently in non-attainment of water quality standards for nutrients. This data will provide an understanding of the levels of nutrients that are being contributed by this discharge. The parameters that shall be monitored are total phosphorus, ortho-phosphorus, total Kjeldahl nitrogen and nitrate and nitrite nitrogen. These parameters shall be monitored quarterly, for each quarter that there is a sufficient discharge for sample collection.

V. State Certification Requirements

EPA may not issue a permit unless the DEP certifies or waives its right to certify that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate WQS. The staff of the DEP has reviewed the draft permit and advised EPA that the limitations are adequate to protect water quality. EPA has requested permit certification by the State pursuant to 40 CFR 124.53 and expects that the draft permit will be certified.

VI. Public Comment Period and Procedures for Final Decision

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the U.S. EPA, Massachusetts Office of Ecosystem Protection (CIP), 1 Congress Street, Suite 1100, Boston, Massachusetts 02114-2023. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office.

Following the close of the comment period, and after a public hearing, if such hearing is held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice.

During the 30 day period following the issuance of the permit, any person aggrieved by the issuance of the permit may file a request for an adjudicatory hearing at the MA DEP. The standing of a person to request a hearing and procedure for filing such a request are governed by the provisions of M.G.L. c.30A and 310 CMR 1.01. See also 314 CMR 2.08.

VII. EPA and MA DEP Contacts

Additional information concerning the draft permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays from:

George Papadopoulos, Massachusetts Office of Ecosystem Protection
One Congress Street Suite 1100 - Mailcode CIP
Boston, MA 02114-2023
Telephone: (617) 918-1579 FAX: (617) 918-1505

Paul Hogan, Massachusetts Department of Environmental Protection
Division of Watershed Management, Surface Water Discharge Permit Program
627 Main Street, 2nd Floor Worcester, Massachusetts 01608
Telephone: (508) 767-2796 FAX: (508) 791-4131

January 10, 2005
Date

Linda M. Murphy, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

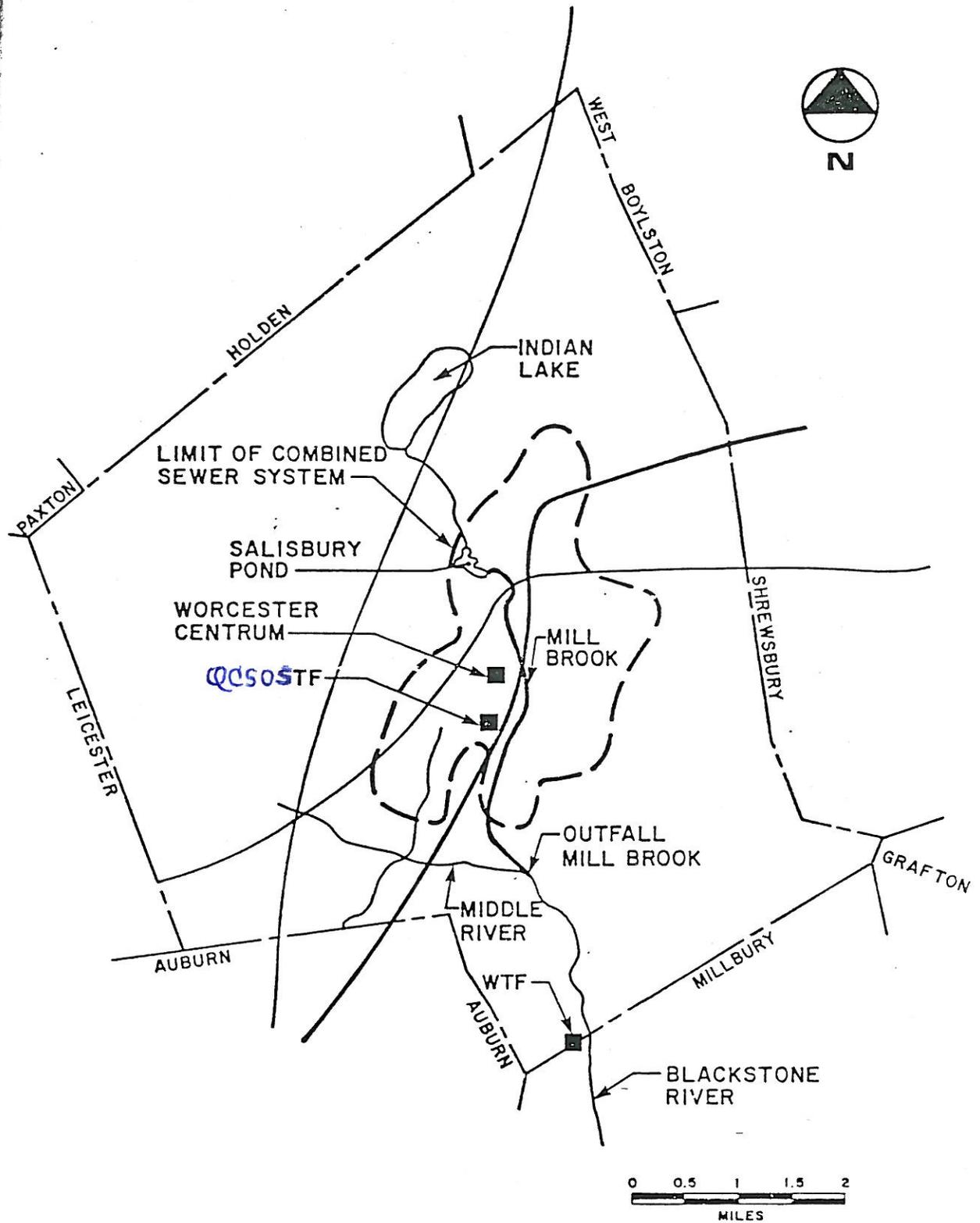


FIGURE 1
 CITY OF WORCESTER
 COMBINED SEWER SYSTEM

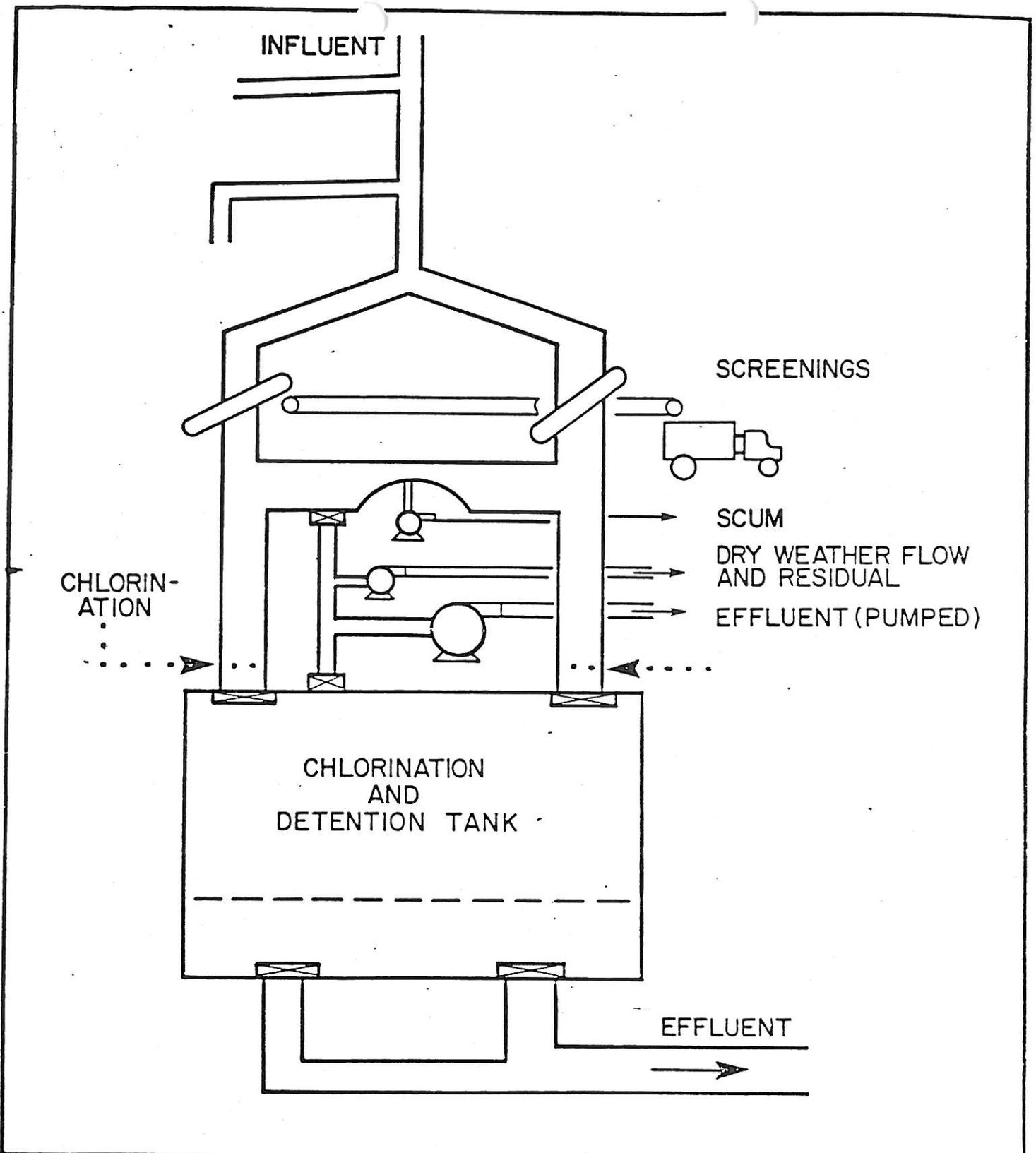


FIGURE 2
WORCESTER OVERFLOW
TREATMENT FACILITY
SCHEMATIC

ATTACHMENT A

WATER QUALITY BASED EFFLUENT LIMIT DERIVATION

Parameter: Chlorine, Total Residual (TRC)

Water Quality Criteria: Fresh water - Acute; 0.019 mg/l

Dilution granted for effluent upon entering the Blackstone River: 3.8

Effluent Limitations:

Daily Maximum:

3.8 (0.019 mg/l) =

72 ug/l