

Town of Grafton Wastewater Treatment Plant Improvements

September, 2014

Introduction

In August 2013, the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) issued a discharge permit to the Town of Grafton for its wastewater treatment plant which requires further reduction of the phosphorus and nitrogen discharged from the plant. Anticipating this revised permit, the Town and its engineer, CDM Smith, prepared an evaluation of the improvements necessary to meet the new discharge permit limits and bring the treatment plant up to current codes and standards. That project, as described in the Project Engineering Report (PER) is estimated to cost \$49 million. In May 2014, the Town of Grafton was issued an Administrative Order on Consent (AOC) by the EPA which orders compliance with the new permit limits and sets a schedule to do so.

Background

The Town of Grafton owns and operates a 2.4 million gallon per day (mgd) wastewater treatment plant located on Depot Street (shown in the aerial photo on back). The plant discharges to the Blackstone River which flows into the Seekonk River, joins the Providence River and discharges into Narragansett Bay and the Atlantic Ocean. The Town has operated a treatment plant at this location since the 1950s. A major upgrade to install a traditional primary and secondary treatment plant was completed and made operational in 1979. Since then, only minor capital improvements have been completed.

Grafton was issued a new discharge permit in August 2013 with more stringent phosphorus and nitrogen limits. The new permit reduces the total phosphorus permit limit from 1.0 mg/L to 0.2 mg/L in the warm weather months, April through October, and requires cold weather total phosphorus removal to 1.0 mg/L, in November through March. Additionally, the new permit established a total nitrogen limit during the warm weather months, May through October, of 8 mg/L. Previously, there were no winter phosphorus or total nitrogen limits.

The current wastewater treatment plant has consistently been able to meet permit limits since it began operation, successfully removing solids and organic matter, and disinfecting the wastewater prior to discharge. However, the existing systems do not have the ability to meet the new requirements for nutrient removal. Equipment installed as part of this project will focus on energy efficient, sustainable solutions to meet these new permit limits.

Summary of the Project Evaluation Report

The Project Engineering Report (PER), completed in June 2014, had three main objectives:

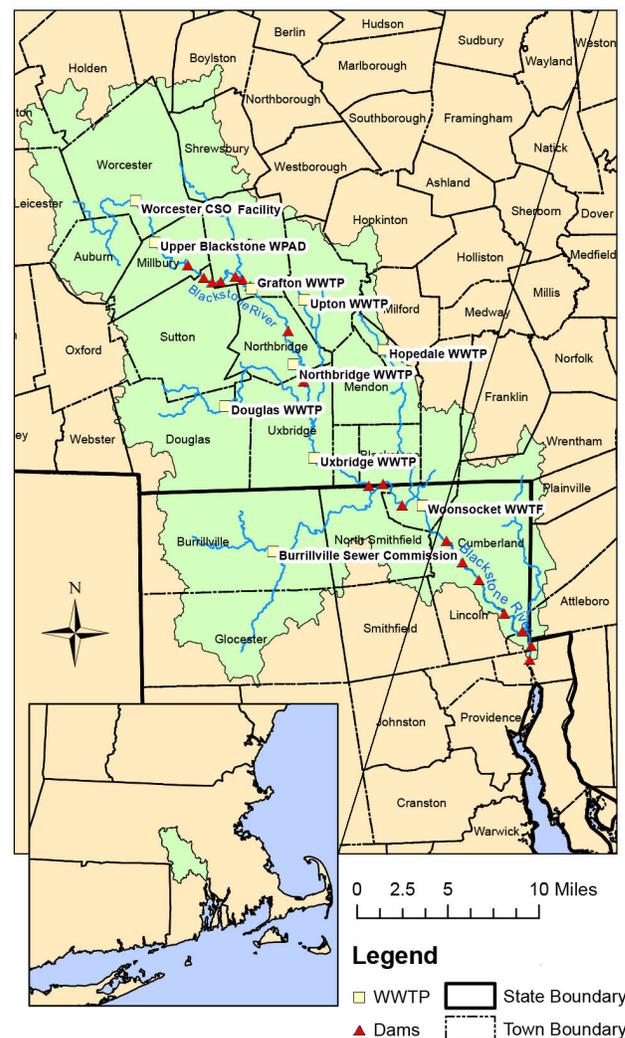
- Recommend treatment technologies to meet the new phosphorus and nitrogen limits
- Recommend improvements to bring the plant up to current codes and standards and extend the useful life of aging systems to ensure continual operation of the facility to meet discharge permit limits
- Establish a schedule and budget for the design, permitting, and construction of necessary improvements

Why Regulate Nutrients?

Phosphorus and nitrogen are two of the major nutrients found in all rivers and estuaries, such as the Blackstone River, the Seekonk River and Narragansett Bay. They are essential to the growth of phytoplankton, a source of food for aquatic life, but in excess, they become harmful to rivers and estuaries. Algae blooms result, using up oxygen in the water. As oxygen levels decline, the rivers and estuary can no longer support fish, shellfish or other aquatic life.

Effluent from wastewater treatment plants is one source of nutrients, but phosphorus and nitrogen also come from failing septic systems, fertilizers, plant decay, atmospheric deposition and animal waste. Phosphorus is typically the nutrient of concern in fresh water, while nitrogen is the limiting nutrient in saltwater bodies. Since the Grafton Wastewater Treatment Plant discharges to the Blackstone River which flows into Narragansett Bay – both nitrogen and phosphorus are the nutrients of concern and are regulated in the current permit.

While it is understood that much of the phosphorus loading to the Blackstone River comes from sources other than the treatment plant, these “non-point” sources are difficult to regulate or control. Regulatory agencies therefore have concentrated their efforts on treatment facilities that are regulated under their jurisdiction. Further reduction of non-point sources, such as eliminating or minimizing fertilizer use, and timely maintenance and repair of septic systems will aid the health of the Blackstone River.



Evaluation of Phosphorus Removal Technologies

In order to meet the new lower total phosphorus limit of 0.2 mg/L, an 80% reduction from the current permit limit of 1.0 mg/L, an add-on process is required to further filter or clarify the wastewater effluent. The PER identified and evaluated several treatment systems that could meet the proposed phosphorus limits. These systems were evaluated based on cost and non-cost criteria. Cost criteria included both capital cost to purchase and install the equipment, as well as the annual costs to operate and maintain the new equipment. Non-cost criteria included the ability of the system to reliably meet the new permit limits, the flexibility of the system to meet varying flow and load conditions, and the experience of the system at achieving similar limits at other operating treatment facilities.

Program Cost

The estimated program cost for the proposed plant improvements is presented below. The costs were escalated to the midpoint of construction to account for inflation and include both construction costs and engineering costs.

Project Costs

Total Opinion of Program Cost **\$49,000,000**

In order to pay for these EPA mandated improvements, it is assumed the project will be funded with low interest loans offered by the Commonwealth to municipalities for funding water pollution abatement projects.

This loan, from the State Revolving Loan Fund (SRF), allows the town to finance the project at an interest rate of 2.0% for up to 30 years. If the town does not appropriate funds for this project by the SRF deadline, the town may lose eligibility for these loans and will have to finance the project through a general obligation bond at a higher rate, as well as risking legal action for non-compliance with the AOC.

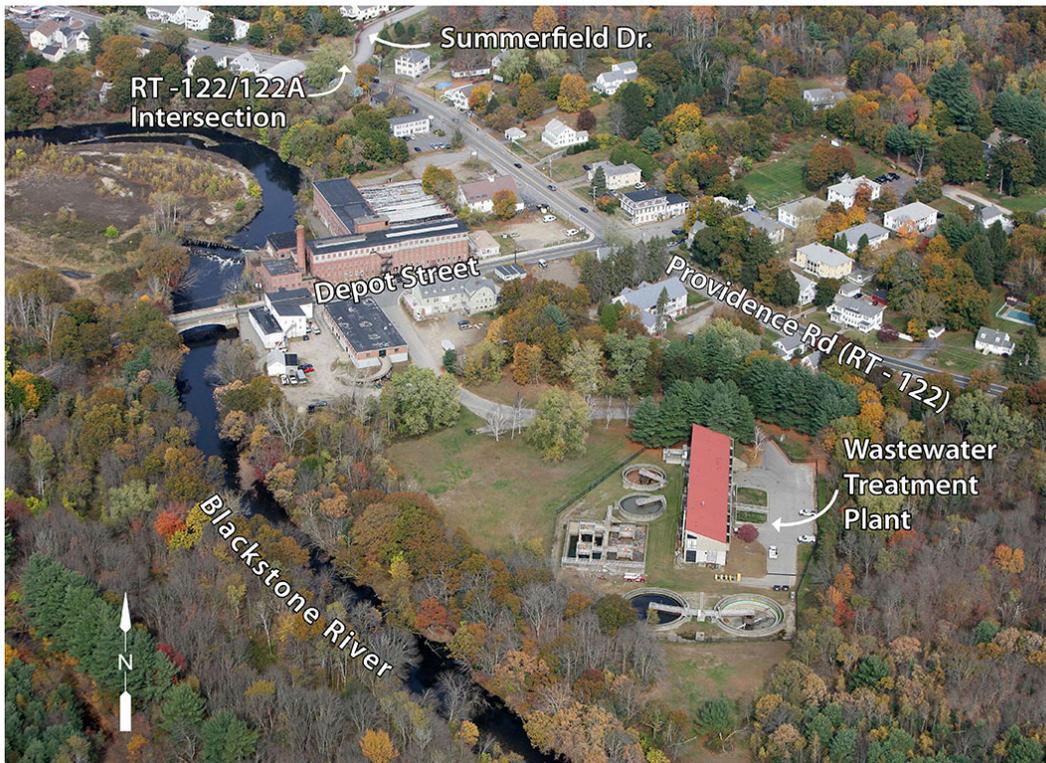
Project Schedule

The final Administrative Order on Consent (AOC) issued in May 2014 includes a compliance schedule that requires the Town to complete construction and begin operation of the upgraded plant to meet the new limits by April 1, 2018. The Town has communicated with the regulatory agencies on numerous occasions and agreed upon the following schedule, also issued in the final AOC:

Complete PER	June 30, 2014 <input checked="" type="checkbox"/>
Complete Design	August 1, 2015
Initiate Construction	January 1, 2016
Complete Construction*	April 1, 2018

*The construction of major facilities will be complete and operational by the AOC deadline, allowing the plant to meet the new permit limits.

Town Meeting is scheduled for October 20, 2014 (High School Auditorium) and will consider a warrant to authorize funding of the wastewater treatment improvements project.



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