



Merrimack Wastewater Treatment Facility

Phase II Upgrade Project

Presentation to Town Council
January 27, 2011

Agenda

1. Facility Status
2. Facility Upgrades to Date
3. Facility Study & Upgrades
4. Upgrade Benefits
5. Financing Options
6. Recommendation

Facility Status

- Facility began operation on May 5, 1970. Funded through Federal and State Grants when Clean Water Act was enacted by Congress
- Facility is meeting current permit limits
- Design flow is 5.0 MGD. Current average daily flow is 1.9 MGD. Capacity is not an issue for new connections or expansion for existing commercial/industrial/residential
- Forty year old equipment needs replacing and in some cases is oversized for current flows and loads
- Upgrades are now paid for through sewer user fees; not through taxes

Prior Upgrades

- 1987 - Added third final clarifier
- 1991 - Replaced mechanical aerators with more efficient aeration blowers at aeration tanks and fine bubble diffusers
- 1994 - Composting facility constructed
- 1995 - SCADA system installed; began one shift operation in 1996
- 1996 - Chemical Feed Upgrade for process chemicals
- 1999 - Electrical Upgrade to replace original and obsolete power feed equipment

Prior Upgrades, cont.

- 2006 - Phase I Upgrade: Removed trickling filter from service due to age and odor issues and redesigned aeration tanks to recover capacity lost due to removal of trickling filter (At this time AB installed an anaerobic digester at their facility to treat plant effluent and began water conservation measures which has reduced flows and loads to the wastewater facility)
- 2010 - Dewatering Upgrade: Replaced 40 year old belt filter press with new, more efficient screw press, which allows a 24/7 operation instead of only dewatering sludge for a few hours a day

Facility Study

- Goals of the study were twofold:
 - 1) Analyze expected process performance based on current waste stream from all sources, including AB
 - 2) Develop a logical plan for the replacement and improvements needed of various components and processes of the treatment facility and to meet NHDES design standards
- A phased approach was determined to be the best method of achieving our goals and to spread out future potential sewer rate increases
- Phase II Upgrades include: Raw wastewater pumps, primary clarifier effluent pumps, aeration system upgrades, plant water system, SCADA, facility lighting
- Estimated cost of Phase II is 4.2 million dollars

Raw Wastewater Pumps

- Pumps all wastewater received from the sewer collection system
- Replace existing two pump system with three smaller and more efficient pumps and controls
- Replace MPS Motor Control Center
- Estimated cost is \$606,000
- Estimated annual electrical savings is \$21,000



Primary Clarifier Effluent Pumps

- Primary Clarifier Effluent pumps move wastewater to the Aeration Tanks
- Replace two Primary Effluent pumps with three smaller, more efficient pumps and controls
- Estimated cost is \$575,000
- Estimated annual electrical savings is \$9,000



Aeration System

- The aeration system provides air/oxygen to the living biomass

1.) Aeration Blowers

- Replace 5 aeration blowers with new, more efficient turbo blowers and controls. Add more air diffusers
- Estimated cost is \$993,000

2) Return Sludge Pumps

- Replace 4 return sludge pumps and controls
- Estimated cost is \$472,000

3.) Internal Recycle Pumps

- Modify existing aeration system with internal recycle pumps to reduce energy demand by 20% and allow for improved process performance.
- Estimated cost is \$794,000

- Estimated overall electrical system savings is \$30,000



Plant Water System

- Replace original plant water system- Used to supply pressurized plant effluent to yard hydrants, dewatering press, and septage screening plant
- Critical support component for the operation of the facility
- Estimated Cost is \$242,000
- Estimated annual electrical savings is \$2,500



SCADA Improvements

- Supervisory Control and Data Acquisition
- SCADA provides automated control of facility functions and provides immediate data on all facility functions
- Replace existing dedicated PC's
- Replace existing PLC's (Programmable Logic Controllers) in each building with new, Ethernet based PLC's
- Eliminate original and obsolete DH 485 Plus communications system with Ethernet standard
- SCADA system allows plant to be operated unattended at night through on call system, a savings of five positions
- Implemented 1 shift operation in 1996
- Estimated cost is \$229,600



Dechlorination System

- Dechlorination is the elimination of free chlorine by adding sodium bisulfite before discharge of wastewater to the Merrimack River
- Currently use staff constructed dechlorination facility
- Limited capacity for peak demand
- Recommend installing permanent dechlorination facilities within the existing chlorination building
- Includes two storage tanks, spill containment, pumps, controls
- Use to meet NPDES chlorine limit in plant effluent
- Estimated cost is \$198,000



Facility Lighting

- Based on recommendations found in the PSNH energy audit
- Replaces existing lighting systems in all buildings with new and more efficient lights such as T-8 fluorescent and motion sensitive lights in areas that are not routinely occupied
- Estimate cost is \$75,000
- **Estimated annual electrical savings is \$5,000**



Upgrade Benefits

- PSNH Energy Audit estimated that overall reduction in energy usage from these and future improvements would be approximately 20%. Estimated electrical savings is \$67,500 per year for Phase II
- Phased in upgrades will provide the Town with a minimum 20 years of additional life to the facility barring any unforeseen changes to our NPDES permit requiring additional levels of treatment
- Improvements preserve plant capacity for future expansion within the Town and continued compliance with permit
- Phased improvements over the next several years at the plant will allow the Town to plan ahead for eventual improvements that will be needed for the collection system and pumping stations

Financing Options

- **SRF Loan** - 20 year loan; on \$4.2 MM project annual payments would be approximately \$300,000 per year. Interest is 2.864%. Repayments would begin in FY 13-14 (one year after substantial completion)
- **SAG** - 20% grant payment or approximately \$840,000. State legislature needs to reauthorize program
- **NH Bond Bank**- Interest rates are higher @ 4.02%. Repayments begin within one year of issue. Interest begins accumulating from date of bond sale. If this option is chosen, would design project in FY 11-12, construction in FY 12-13, repayments begin in FY 13-14

Recommendation

- Place warrant article for the Phase II Upgrades for Town Meeting consideration in March authorizing the Town Council to bond and/or seek NHDES SRF funding for \$4,200,000