City of Haverhill

Department of Public Works
Wastewater Division

City Council Meeting
February 2, 2016
Assessment and Control of Odors at the Haverhill Wastewater Treatment Plant

Woodard & Curran, Inc.
Bowker & Associates, Inc.
Tonight

- Odor control study
- Recommended Odor Control Program
- Loan Order for $2.2 million for Phase I
Background

- Built in 1970’s
- Little to no odor control
Current Odor Control

Areas with odor control
Odor Study

1. Sampling program
2. Computer modeling
3. Evaluation of odor control strategies
4. Recommendations for odor control systems
Study - Sampling Program

- Characterize and quantify odorous emissions
- 15 locations
- Samples and Continuous monitoring
- Measured strength of odor, concentration of odorous reduced sulfur compounds and hydrogen sulfide
Study - Odor Dispersion Modeling

- Predicts odor impact on surrounding neighborhoods
- Uses meteorological data and terrain data to predict worst case conditions
- Assess the effect of odor control strategies
- Target – 7 dilutions to threshold (D/T)
Modeling Results

Predicted frequency of odor level exceeding target threshold (hrs/yr)
Plant with current odor controls
Modeling Results

Predicted frequency of odor level exceeding target threshold (hrs/yr)
With proposed Phase II odor control program
Modeling Conclusions

- Odors in adjacent neighborhoods
- Terrain around the plant does not allow for good dispersion of the odors
- Even with comprehensive odor control measures, off-site odors may still be occasionally detectable under worst case meteorological conditions
- Controlling the main odor sources will reduce predicted odor detection frequency by approximately 80 percent
- The modeling did not show a significant benefit of fully covering the primary clarifiers vs. only the effluent channel.
- The Main Pumping Station is predicted to have a moderate impact on the adjacent area
Study - Proposed Areas for Odor Control

- - - - Recommended areas for odor control
Controlling these areas – 80% reduction
Evaluation of Odor Control Strategies

- Evaluated control strategies by odor source
- Existing biofilter is very effective
  - low cost and low maintenance
- Majority of cost is in the heating and ventilating equipment and covers.
Odor Study Recommendations

- Construct a central biofilter to treat odorous air from the screen room, grit room, primary clarifier influent and effluent channels, and sludge holding/dewatering processes.
- Install covers on the influent channel, the influent and effluent channels of the primary clarifiers and on the two gravity thickeners.
- Extract air from below the covers at approximately 1 cfm per square foot of covered surface area.
- Install new exhaust fans in screen room and grit room and exhaust to central biofilter at 12 air changes per hour (13,500 cfm).
- Extract approximately 1,600 cfm from the primary influent channels and 2,400 cfm from the primary effluent channels and convey to biofilter.
- Extract approximately 1,500 cfm from each gravity thickeners and convey to biofilter.
- Extract approximately 500 cfm from the existing sludge holding tank and 700 cfm from the centrate sump and cake conveyors, and direct this air to the central biofilter treatment.
- Re-direct 5,300 cfm of air from the sludge cake garage to the central biofilter. Reuse existing activated carbon absorber at main pump station.
- Conduct follow-up sampling in the summer of 2016 to confirm design data for main pumping station, primary clarifiers, and process exhausts.
Odor Control Program – Two Phases

Phase I – 6 months
- Near Term Improvements
- Engineering for Long Term Improvements
- $2.2 million

Phase II – 12 to 18 months
- Long Term
- Preliminary estimate - $6.2 million
- 80% reduction in predicted odor detection frequency
Near Term – Phase I

- Chemical addition system for dewatering system
- Extending hypochlorite piping
- Cover the influent channel
- Improvements to the screenings and grit areas
- Evaluate chemical addition to pumping station
Long Term – Phase II

- Cover primary clarifier influent and effluent channels
- Cover gravity thickener tanks
- New ductwork to capture odors from sludge blend tank, centrifuges, sludge garage and centrate sump
- New central biofilter
- Carbon system for main pumping station

Reduces predicted odor detection frequency by 80%
Loan Order Tonight – Phase I

- $2.2 million
- Funds Near Term improvements and engineering for long term improvements
- Funding for construction of Long Term measures will be a separate loan order
Future Phases ???

- Additional sampling and monitoring
- Included as part of Comprehensive Plant Evaluation
- Additional measures?
Questions