September 2015
Newburyport WPCF Odor Control Assessment Sheet

Headworks

- ☐ Excessively high sulfide (5 times recommended short-term limit) = hazardous environment and odors
- ☐ Inadequate ventilation compromises safety of staff
- ☐ Premature corrosion
- ☐ Greatest source of odors

- Odor and Safety
  - Add ferric chloride upstream to reduce sulfides from the force main
  - Convey air to a biofilter designed for high sulfide concentrations
  - Replace the vent near screenings barrel with a powered vent

Headworks Vent

Primary Clarifiers

- ☐ Clarifiers create sulfide and odors
- ☐ Odors are not treated by the odor control system

- Cover clarifiers with flat covers
- Cover scum pits
- Convey air to the biofilter
- Operate both clarifiers

Primary Clarifier

Odor Control Biofilter

- ☐ Expansion is needed to address safety and odor concerns
- ☐ Existing biofilter does not operate at full capacity

- Replace with a biofilter comprised of engineered media:
  - Higher sulfide loads possible
  - Smaller footprint
  - Significantly less maintenance
  - Better air flow control
  - Fewest changes to the existing system

Biofilter

Ventilation

- ☐ Inadequate for staff safety
- ☐ Insufficient for odor control
- ☐ Directly discharges odorous air
- ☐ Short circuits, bypassing the working level in the press room

- Assess and design ventilation corrections
- Increase the odor control air volume from sludge processing areas
- Provide powered & heated ventilation for supply air to the headworks

Sludge Press

Hyannis:
396 North Street, Hyannis, MA 02601
TL 508.568.5103 • FX 508.568.5125

Headquarters:
1900 Crown Colony Drive, Suite 402, Quincy, MA 02169
TL 617.657.0200 • FX 617.657.0201

Woburn:
18 Commerce Way, Suite 2000, Woburn, MA 01801
TL 781.281.2542 • FX 781.281.2543

www.envpartners.com

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Ferric Chloride Shed Improvements

☐ Ferric chloride thickens and freezes (10° F) in cold weather
☐ Entry/egress improvements are needed

- Enclose and add insulation prior to winter 2015
- Create a safe entry by building out the north (open) side of the building
- Provide temporary heat and ventilation until the broader design of ventilation system improvements

Ferric Chloride Storage Tank

Grit Handling and Disposal

☐ Very odorous location and operation
☐ Handling of noxious grit by staff

- Evaluate conveying the grit directly to sludge disposal
- Eliminate handling of the grit dumpster outside
- Keep grit in areas with odor control


Grit Dumpster

Septage Receiving

☐ Short term intense odors possible
☐ Inefficient odor control air collection

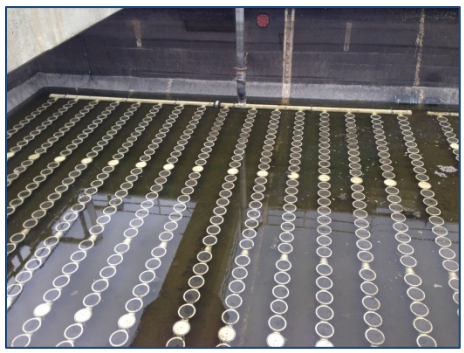
- Enclose the septage receiving station
- Convey air to the biofilter when septage is delivered


Septage Receiving

Process Changes in Aeration Basins

☐ Continue success with nitrification and denitrification
☐ Create a smaller anoxic area to increase efficiency

- Test the process in one basin with half of the influent flow
  - Reduces the likelihood of odors from process upsets
  - Reduces odorous bacteria in the secondary clarifiers
  - Less wastewater is stored in the process tanks


Aeration Basin

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September 2015
Newburyport WPCF Odor Control Upgrades Budgetary Costs

Opinion of Probable Budgetary Costs

Facility upgrades are needed to contain and convey the odorous air. Estimates include materials, installation with subcontractor costs and contractor markup and overhead, a 25% contingency, and 20% for engineering services. These costs are at a budgeting level and for planning purposes only. Costs are rounded for readability.

Table 1 – Budgetary Costs for Facility Upgrades Related to Odor Control

Facility Scope of Work	Opinion of Budgetary Cost
Ferric chloride dosing changes	$ 97,000
Primary clarifier covers for both clarifiers	$726,000
Ferric chloride building improvements	$145,000
Ventilation improvements for safety and odor control	$337,000
Septage receiving enclosure and odor handling	$112,000
Total	$1,417,000

Combined with the associated upgrades potentially needed throughout the facility, the total budgetary cost for the range of alternatives is from about $2.5 million to approximately $4 million.

Table 2 – Total Budgetary Costs for Odor Control Treatment and Facility Upgrades Alternatives

	Alternatives	Odor Treatment System	With Facility Work
1	Two 7,500 cfm organic biofilters One 5,000 cfm engineered media biofilter	$1,050,000	$2,350,000 (1)
2	Two 7,500 cfm organic biofilters One 5,000 cfm scrubber	$1,100,000	$2,510,000
3	**One 20,000 cfm engineered media biofilter**	**$1,890,000**	**$3,310,000**
4	Two 10,000 cfm engineered media biofilters	$2,020,000	$3,440,000
5	One 15,000 cfm organic biofilter One 5,000 cfm scrubber	$2,445,000	$3,860,000

(1) Alternative 1 does not include septage receiving improvements

Environmental Partners recommends proceeding with **Alternative 3 – 20,000 cfm engineered biofilter** and associated facility upgrades, with a budgetary allowance of **$3.5 million**.

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Newburyport WPCF Odor Control Upgrades Next Steps and Schedule

Projects	Preliminary Design	Final Design End Date	Construction Period
Chemical Feed System	October 2015	November 2015	November – December 2015
• Dose ferric chloride into influent manhole	City staff performing work	----------	September 2015
• Ferric chloride building enclosure with temporary H&V			
• Ferric chloride dosing matched to force main discharge			
Primary Clarifiers	October – November 2015	December – January 2016	March – April 2016
• Primary clarifier covers			
Ventilation System	October – November 2015	December – February 2016	April – May 2016
• Headworks air supply vent relocation and redesign			
• Grit wash room air supply from pump room			
• Ferric chloride building H&V			
• Dewatering building air supply short circuiting			
• Dewatering building / truck bay interconnections			
Odor Control Treatment System	October – December 2015	January – March 2016	May – June 2016
• Grit disposal			
• Truck bay & clarifiers odor control duct work			
• Septage receiving odor containment and treatment			
• 20,000 cfm engineered media biofilter system			
Aeration Basin "Selector" Testing	City staff performing work	with assistance from EPG	September 2015 – March 2016
• Install baffle for anoxic zone			
• Process sampling and testing			

Assumes Notice to Proceed by October 1, 2015

Colors represent potentially separately biddable projects

City Staff Labor