

Unfunded Mandates – What's This Going to Cost?

NEWEA Small Community
Specialty Conference
Presentation
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Lake Champlain P TMDL Timeline

Date	Milestone
2002	EPA approves VT TMDL
2008	CLF filed suit against EPA questioning the approval
2011	EPA disapproved the TMDL
	EPA began work on new TMDL
2015	EPA issued draft TMDL

Vermont wastewater treatment facilities contribute about 3% of the total phosphorus loading. The majority of the phosphorus is contributed from non-point sources with over 40% contributed by agricultural uses.

Concerns

UNCERTAINTY

- What is the timeline?
- What will the new limits be?
- Where is the money for the improvements coming from?

CONSEQUENCES

- Communities have deferred age related refurbishment projects which increases funding needs

Purpose of Planning Studies

- Develop an understanding of required WWTF improvements necessary to meet new P limits
- Scope
 - Document and assess existing conditions
 - Develop facility specific analysis model
 - Monitor regulatory information
 - Develop costs for various TP limit scenarios
- Studies used to educate State staff and legislators on real costs for compliance

WWTF's Evaluated

- Montpelier, VT
- Rutland, VT
- So. Burlington, VT
- Winooski, VT



Montpelier WWTF - Background

- Conventional activated sludge
- Constructed in 1962, upgraded in 1978
- Flows
 - Design: 3.97 mgd
 - Current: 1.86 mgd
- Sidestreams; septage, leachate
- Phosphorus
 - Effluent: 0.4 mg/l
 - Permit Limit: 0.8 mg/l (7,253 lbs per year)



Assessment of Age Related Needs

- Major Deficiencies – 2 to 5 years
 - Septage/leachate receiving
 - Headworks
 - Primary clarifiers
 - Aeration
 - Secondary clarifiers
 - Sludge dewatering
 - Anaerobic digestion
- Estimated Cost: \$4.3 M



Process Modeling Results

- For no growth scenario, pilot multi point chemical addition. Facility is performing at its current limit for P removal.
- At permitted capacity, effluent filtration is necessary for a TP limit <0.3 mg/l.
- Bioreactor volume is limiting factor at permitted capacity.

Phosphorus Removal Alternatives

➤ < 0.2 mg/l at current flows

➤ Dual point chemical feed system

➤ Estimated Cost:

➤ Capital: \$1 M

➤ < 0.2 mg/l at permitted flows

➤ (2) additional bioreactors

➤ (2) secondary clarifiers

➤ (1) digester tank

➤ Effluent filtration

➤ Estimated Cost:

➤ Capital: \$24M

Rutland WWTF - Background

- Conventional Activated sludge
- Constructed 1963, upgraded in 1984, 1993
- Flows
 - Design: 8.1 mgd
 - Current: 3.97 mgd
- High peak wet weather flows
- Phosphorus
 - Effluent: 0.23 mg/l
 - Permit Limit:
 - 0.8 mg/l (45.4 lbs/day monthly avg)



Assessment of Age Related Needs

- Major Deficiencies – 2 to 5 years
 - Influent valve pit
 - Headworks
 - Primary clarifiers
 - Aeration tanks
 - Flocculation tanks
 - Secondary clarifiers
 - Anaerobic digestion
- Estimated Cost - \$7.0 M



Process Modeling Results

- Performing at its limit for TP at present flows
- Insufficient VFA's to support bio P removal
- Facility has significant reserve capacity
- Effluent filtration required to meet TP limit of 0.20 to 0.10 mg/l



Phosphorus Removal Technologies

➤ 0.2 to 0.3 mg/l

- Meet these limits by optimizing existing processes with chemical addition, flocculation, and clarification

➤ < 0.2 mg/l

- Effluent filtration required
- Gravity flow can be maintained
- Estimated Cost:
 - Capital: \$6.0 M
 - O&M: \$120,000 to \$250,000 per year

So. Burlington – Bartlett's Bay WWTF

Background

- A/O process with cloth media filters
- Upgraded 1999
- Flows
 - Design: 1.25 mgd
 - Current: 0.72 mgd
- Brewery discharge
- Total Phosphorus
 - Effluent: 0.45 mg/l
 - Permit Limit: 0.8 mg/l (1935 lbs per year)



Assessment of Age Related Needs

- Major Deficiencies - 2 to 5 years
 - Minor needs
- Future Planning
 - Headworks; addition of grit removal
 - Aeration Blowers; Upgrade to improve energy efficiency
 - UV Disinfection system upgrade

Process Modeling Results

- P limit < 0.2 mg/l can be met by optimizing chemical dosage and filtration system at current and permitted flows
- Anaerobic system is too small and aerobic zone is too large



Phosphorus Removal Alternatives

➤ < 0.2 mg/l

- Optimize existing A/O process with existing cloth media filtration
- Estimated Cost: \$200,000

➤ < 0.1 mg/l

- Ballasted floc
- Estimated Cost:
 - Capital: \$6.0 M
 - O&M: \$100,000 to \$150,000 per year

Winooski WWTF

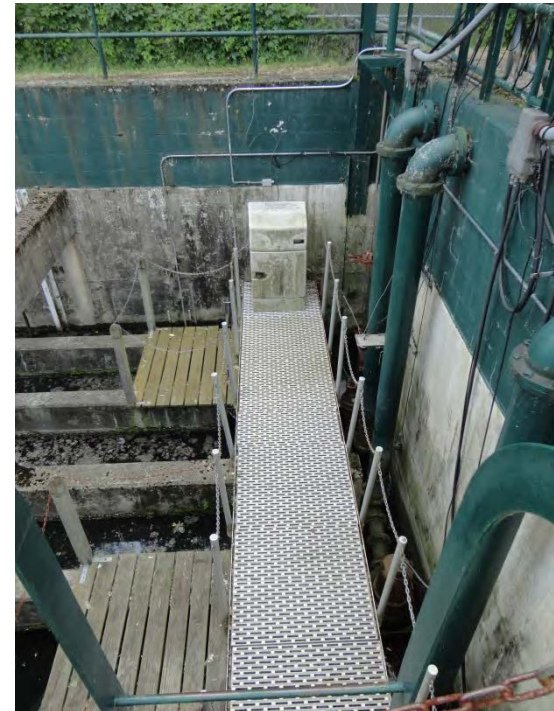
Background

- Extended aeration
- Constructed in 1969, upgraded in 1994, 1998
- Flows
 - Design: 1.4 mgd
 - Current: 0.69 mgd
- Total Phosphorus
 - Effluent: 0.44 mg/l
 - Permit Limit: 0.8 mg/l (2,557 lbs per year)



Assessment of Age Related Needs

- Major Deficiencies - 2 to 5 years
 - Headworks
 - Aeration Tanks
 - Secondary Clarifiers
 - Disinfection
 - Operations Building
 - Estimated Cost: \$500,000
- Future Planning
 - Headworks; Addition of screening



Process Modeling Results

- MCRT can be reduced to 20 days or less
- Aeration tankage is adequate, so process could be converted to A/O to improve Bio P removal



Phosphorus Removal Alternatives

➤ < 0.2 mg/l

- Tertiary treatment process required with disk filters
- Estimated Cost:
 - Capital: \$3.0M
 - O&M: \$50,000 to \$75,000 per year

➤ < 0.1 mg/l

- Ballasted floc
- Estimated Cost:
 - Capital: \$5.2 M
 - O&M: \$100,000 to \$150,000 per year

Lake Champlain P TMDL Status

Date	Milestone
August 14	EPA issued draft document
August - September	Public hearings conducted
October 15	Comment period closed
October - November	EPA is addressing comments

How Will It Impact WWTF's?

- Lower P limits for 28 of 59 facilities
- Timeline for permit renewals
 - 2016: So. Burlington
 - 2018: Montpelier and Winooski
 - 2020: Rutland
- WLA based on annual lbs and set at 0.2 mg/l at permitted flow
- Compliance schedule for P removal is required when 80% of WLA is triggered
- Accountability framework – 2017
- As an unfunded mandate, significant cost differences between 0.2 mg/l and 0.1 mg/l P limits with minimal benefits

QUESTIONS?

