Wastewater Reuse

Work Group Meeting, White Bear Lake Area Comprehensive Plan

Christopher Larson, PE, SEH July 24, 2025

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Wastewater Reuse - Purpose

Evaluate the feasibility of non-potable wastewater reuse to reduce demand on groundwater aquifer and improve White Bear Lake surface water levels.

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Wastewater Reuse - Concept

- Capture wastewater coming through White Bear Lake Area area for reuse.
- Identify volume of wastewater available for reuse.
- Identify potential reuse customers.
  - High volume commercial/industrial users
  - High volume irrigation users
  - High volume private wells

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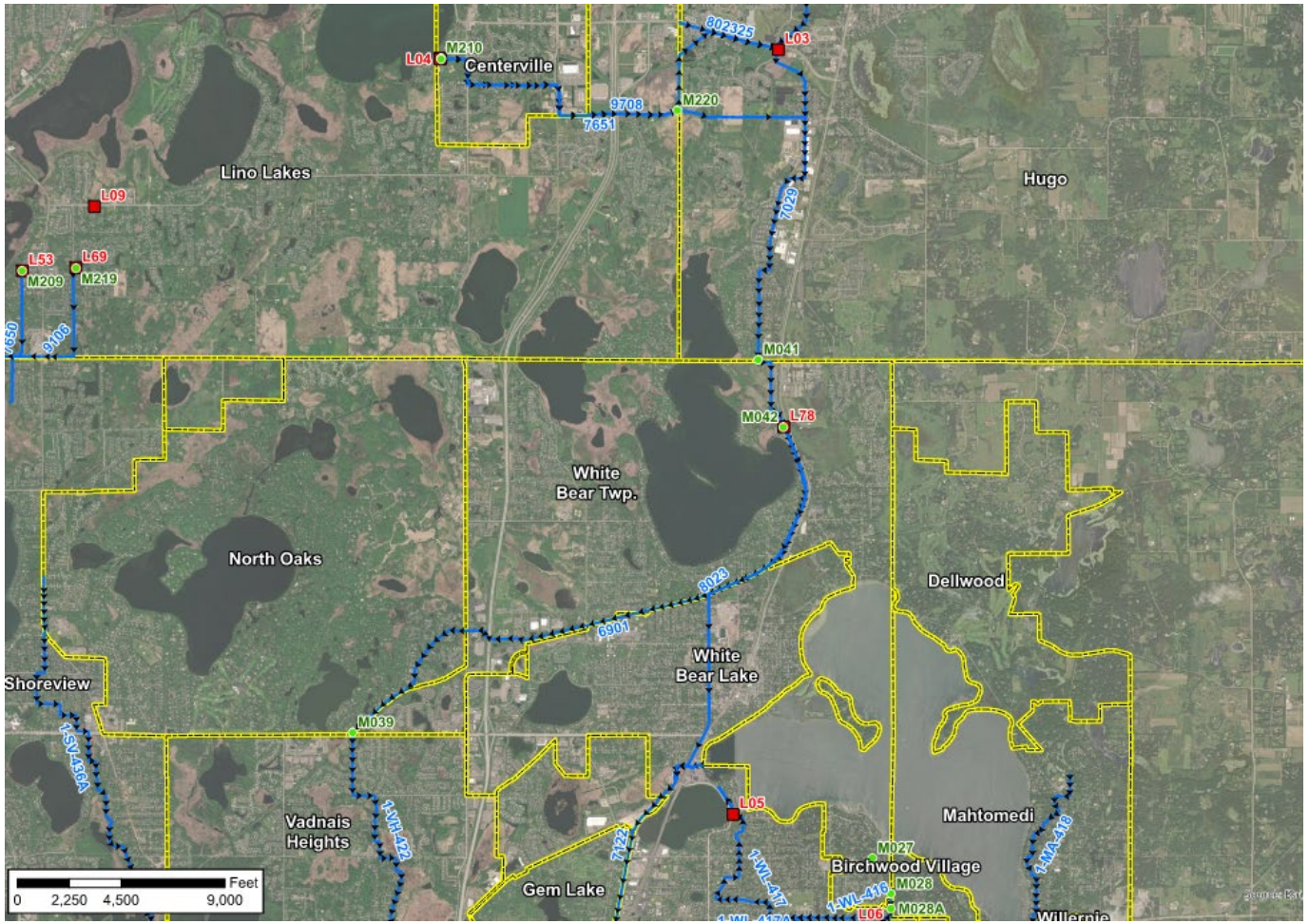
Sewer Interceptors in Northeast Metro



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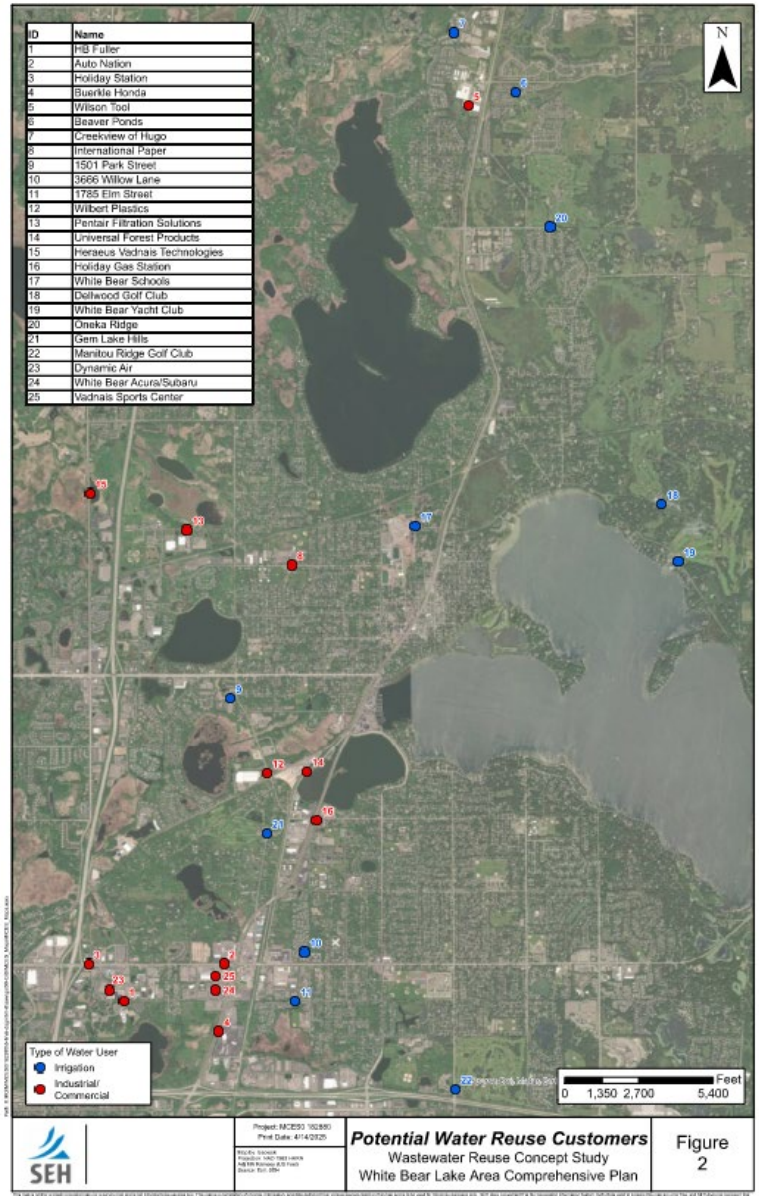
Large Volume Water Users



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Large Volume Water Users – Commercial/Industrial

- 0.17 MGD Commercial/Industrial Use

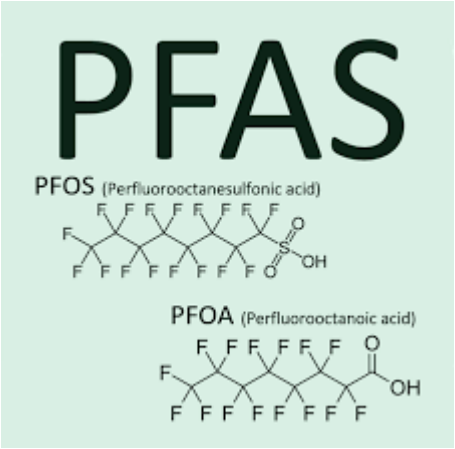
Large Water Users	City	Annual Commercial/Industrial Water Use (gal)	Irrigation Water Use (gal)
HB Fuller	Vadnais Heights	5,000,000	
Dyanamic Air Inc.	Vadnais Heights	3,100,000	
WB Acura Subaru	Vadnais Heights	3,000,000	
Vadnais Sports Center	Vadnais Heights	2,960,000	
Buerkle Honda	Vadnais Heights	2,300,000	
Buerkle Hyundai	Vadnais Heights	2,100,000	
Holiday Station (Co Rd E)	Vadnais Heights	1,900,000	
Wilson Tool	Hugo	5,600,000	
Beaver Ponds	Hugo		1,750,000
Creekview of Hugo	Hugo		1,300,000
International Paper	White Bear Lake	5,200,000	
1501 Park Street	White Bear Lake		4,200,000
3666 Willow Lane	White Bear Lake		3,600,000
1785 Elm Street	White Bear Lake		3,350,000
Wilbert Plastics	White Bear Twp	8,500,000	
Pentair Filtration Solutions	White Bear Twp	8,300,000	
Universal Forest Products	White Bear Twp	3,700,000	
Heraeus Vadnais Technologies	White Bear Twp	3,700,000	
Holiday Gas Station	White Bear Twp	2,800,000	
	Total:	**60,560,000**	**14,200,000**

Large Volume Private Wells

- 1.5 MGD of large-scale irrigation averaged over 90 days (large volume wells plus commercial irrigation)

Large Water Users	City	Annual Commercial/Industrial Water Use (gal)	Irrigation Water Use (gal)
White Bear Schools	White Bear Lake		1,500,000
Dellwood Golf Club	Dellwood		29,000,000
White Bear Yacht Club	Dellwood		27,000,000
Oneka Ridge	Hugo		25,000,000
Gem Lake Hills	White Bear Lake		15,800,000
Manitou Ridge Golf Club	White Bear Lake		25,000,000
		Total:	**123,300,000**

Raw Wastewater - Water Quality



- 250 mg/L Biological Oxygen Demand
- 250 mg/L Total Suspended Solids
- 7 mg/L Phosphorus
- 40 mg/L Total Nitrogen
- 500 mg/L Chloride
- PFAS

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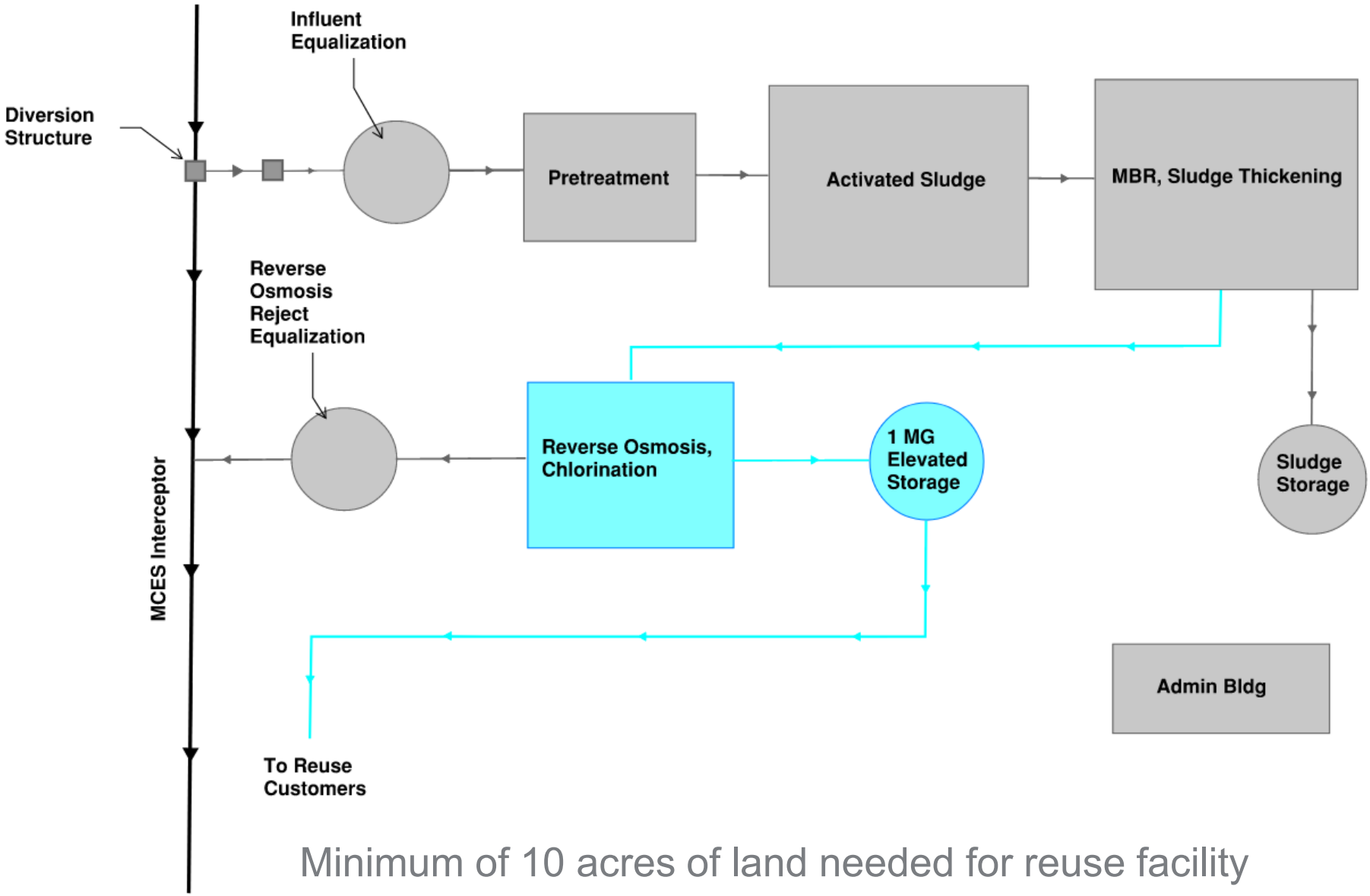
Reclaimed Wastewater – Water Quality Goals

- MPCA – Guidance for Disinfected Tertiary Reuse Water
- Industrial process, cooling, irrigation, food crops
- Chloride
  - Irrigation
  - Cooling Towers
  - Chloride Goal < 50 mg/L

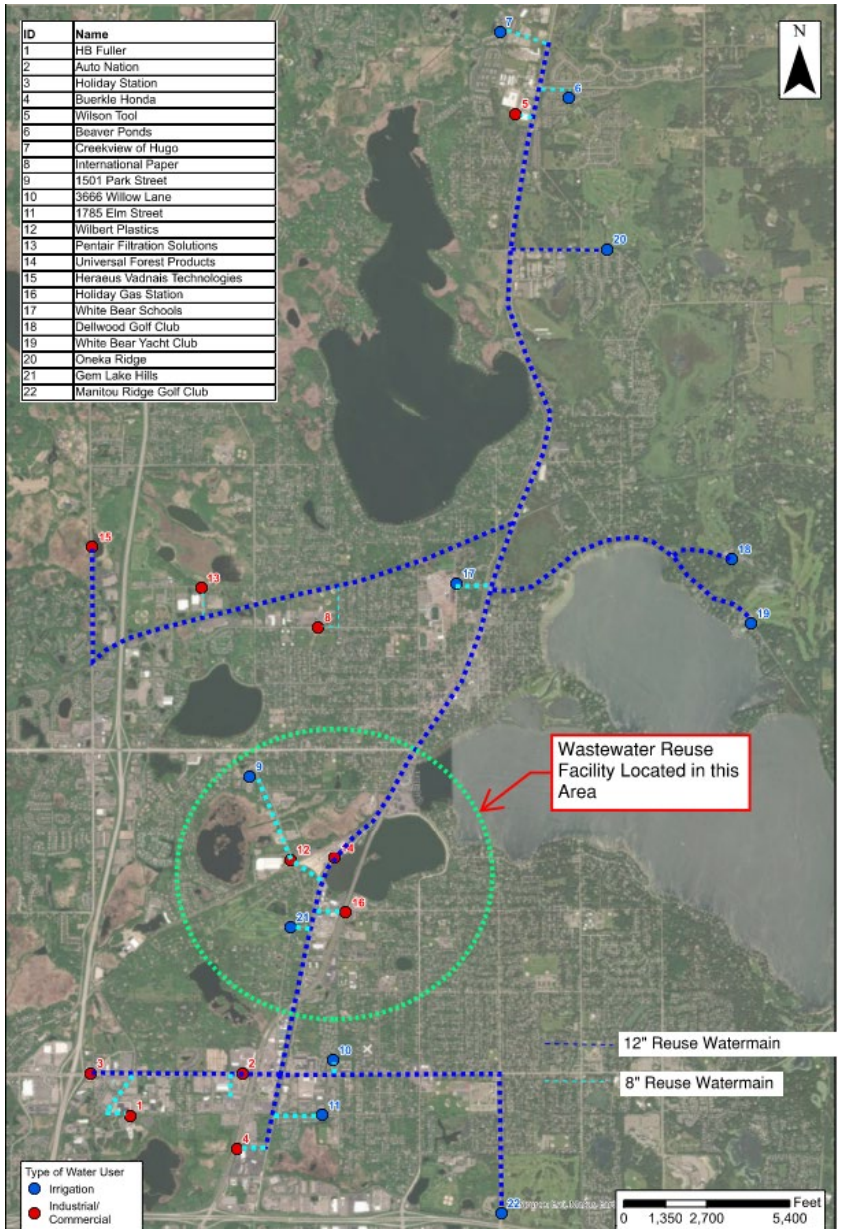
Chloride (ppm)	Effect on Crops
Below 70	Generally safe for all plants.
70-140	Sensitive plants show injury.
141-350	Moderately tolerant plants show injury.
Above 350	Can cause severe problems.

Wastewater Reuse Treatment Process



Minimum of 10 acres of land needed for reuse facility

Wastewater Reuse System Layout



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Wastewater Reuse – Capital Cost Opinion

Component	Unit	Est. Quantity	Unit Price	Cost
Effluent Diversion	LS	1	$910,000	$910,000
0.5 MG Equalization Tank	LS	1	$2,500,000	$2,500,000
2.5 MGD Wastewater Treatment Plant[1]	LS	1	$75,000,000	$75,000,000
2 MGD RO Reuse Treatment Plant	LS	1	$18,000,000	$18,000,000
1 MG Elevated Storage	LS	1	$7,000,000	$7,000,000
0.5 MG Reject Water Equalization	LS	1	$2,500,000	$2,500,000
12” Reuse Watermain	LF	91,000	$500	$45,500,000
8” Reuse Watermain	LF	14,000	$450	$8,550,000
			Subtotal	**$159,960,000**
			40% Contingency	$63,980,000
			Subtotal Construction	**$223,940,000**
			Land and Easement Acquisition	$5,000,000
			15% Engineering	$33,600,000
			15% Construction Admin	$33,600,000
			Total:	**$296,000,000**

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Wastewater Reuse – O&M Cost Opinion

Item	Annual Cost
Labor (3 FTE, licensed operators for WWRF operation and distribution system)	$450,000
Membrane Replacement (5 yr for RO and 7 yr for MBR)	$125,000
Chemicals	$150,000
Electricity	$225,000
Natural Gas	$100,000
Tower Maintenance	$50,000
Equipment Repair	$200,000
Lab Testing	$50,000
Total Annual O&M	**$1,350,000**

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Wastewater Reuse Conclusions

- Reduce demand on aquifer
- No obvious capital cost offset
- Reuse is expensive
- If pursued, combine with other options
- Collect wastewater samples
- The estimated average increase in the lake water elevation is less than 0.1 feet with the industrial and irrigation wells not pumping groundwater, based on the DNR's groundwater modeling results.

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Questions?

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