
Cambridge, Minn.

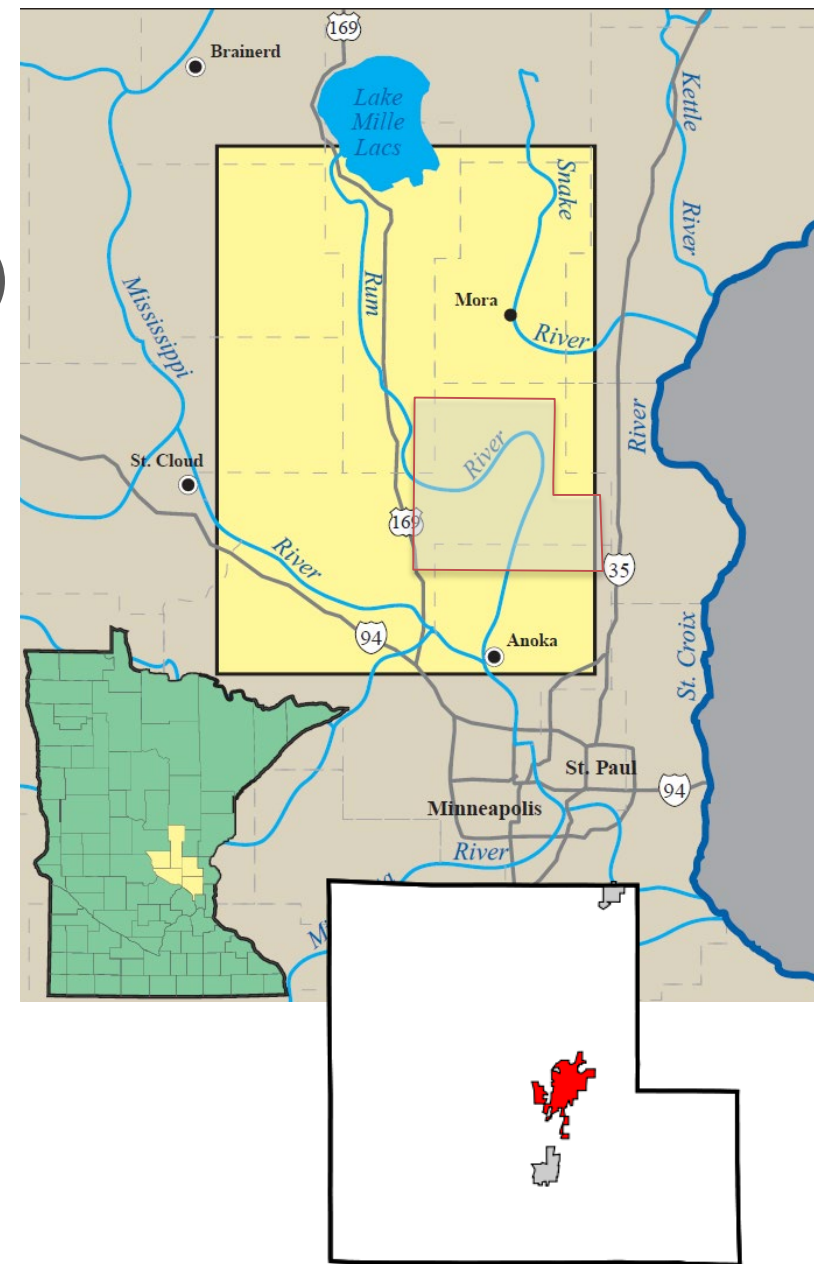
Wastewater Treatment Facility Improvements

June 16, 2016

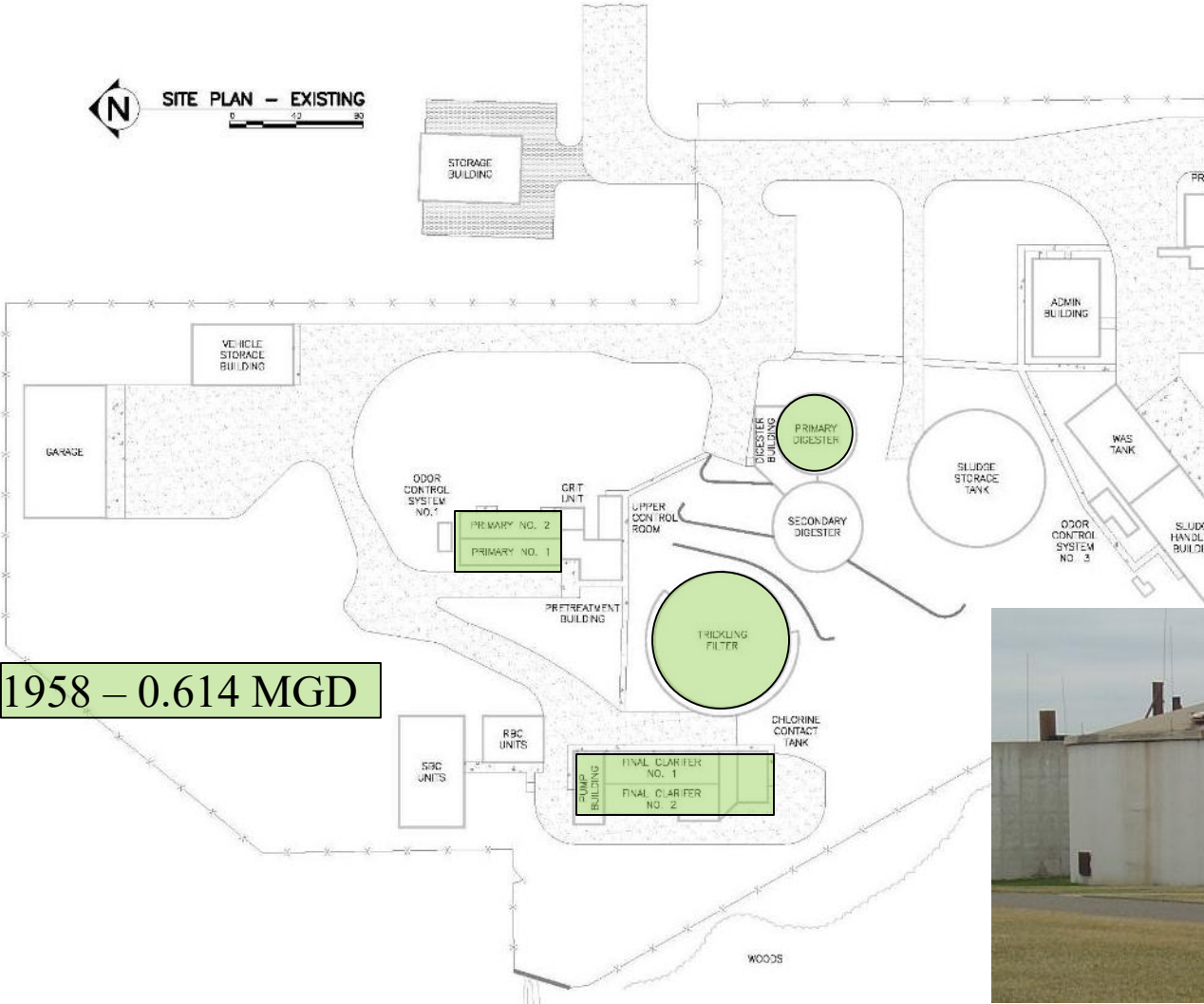


Cambridge, Minn.

- Population: 8,236 (2016)
- “City on the Rum River”



WWTF History

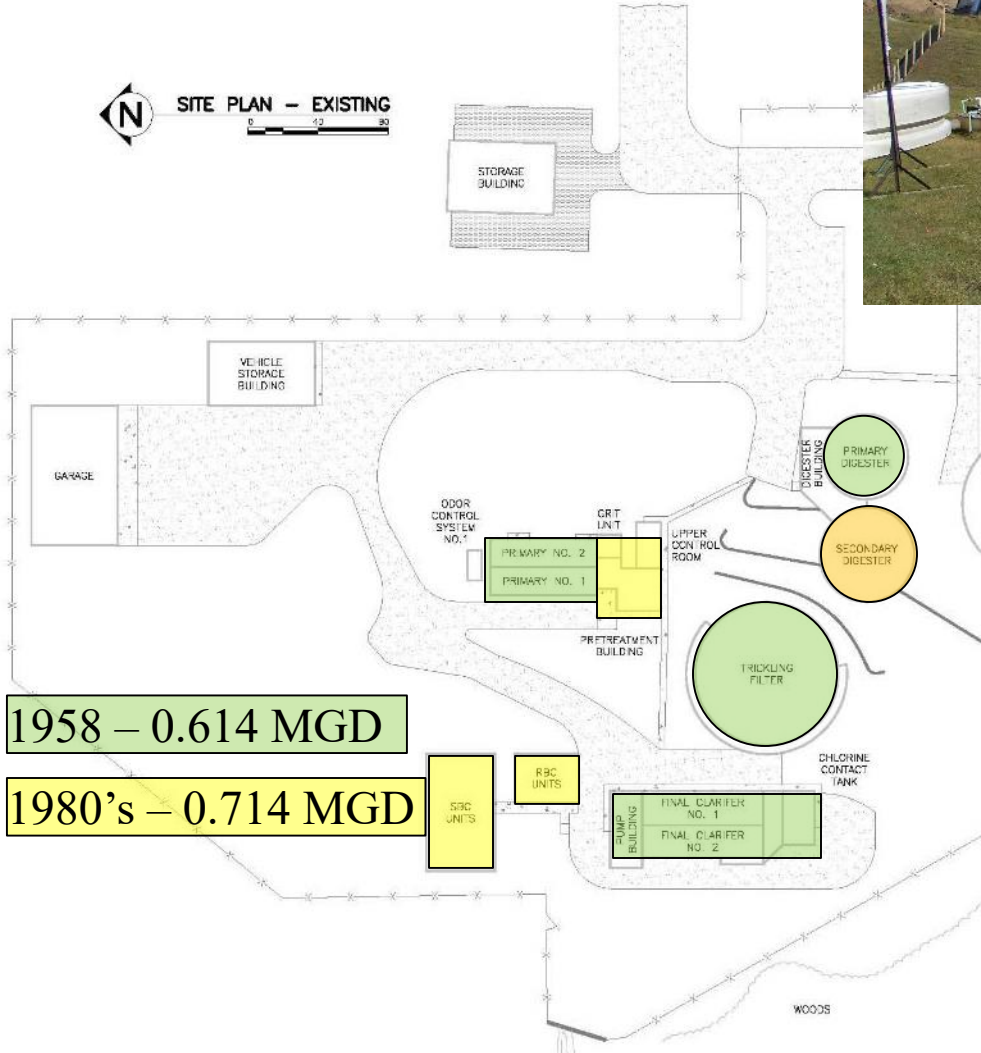


1958 – 0.614 MGD

WWTF History



SITE PLAN - EXISTING

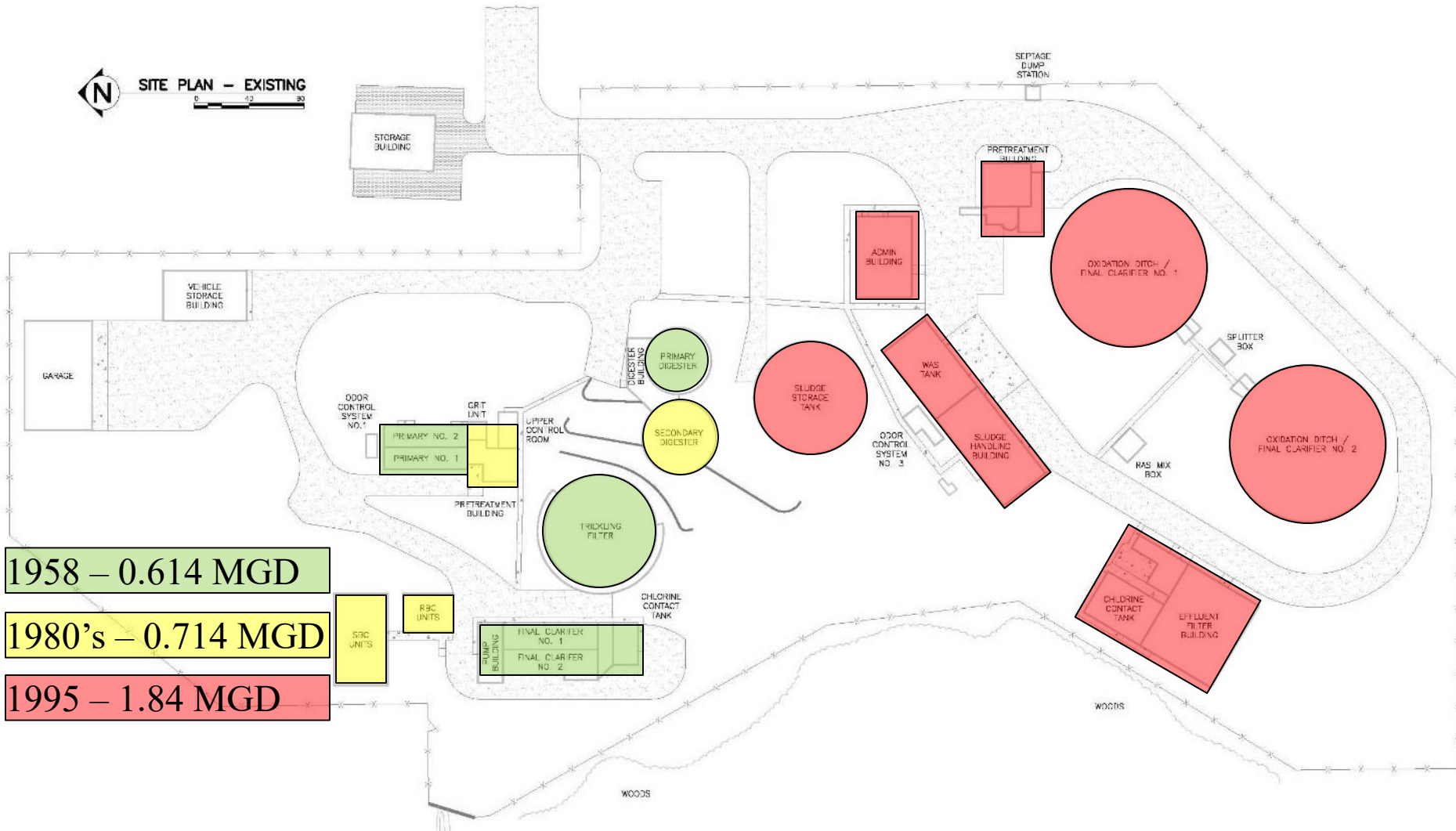


1958 – 0.614 MGD

1980's – 0.714 MGD



WWTF History



1958 – 0.614 MGD

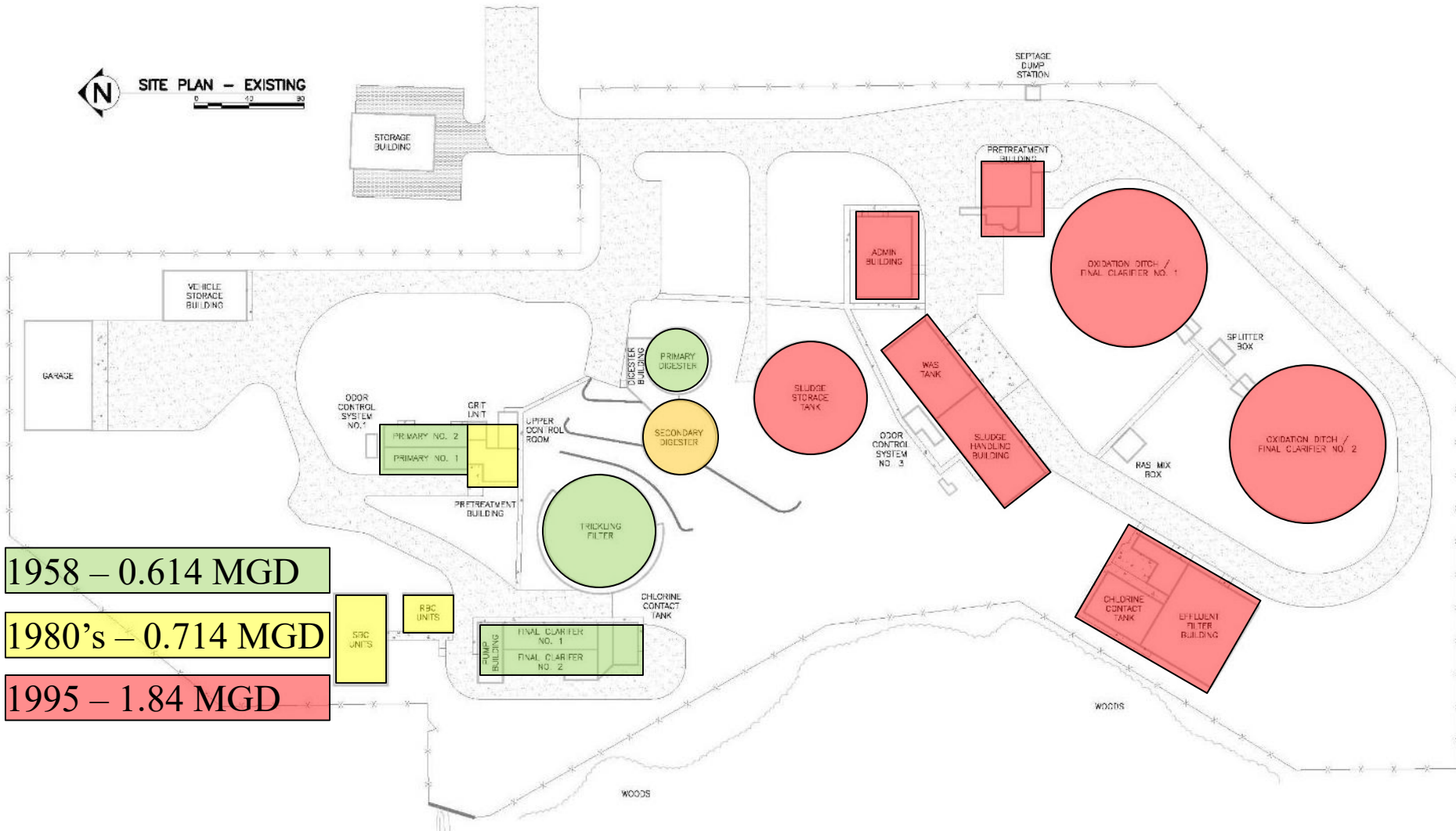
1980's – 0.714 MGD

1995 – 1.84 MGD

WWTF History



WWTF History



1958 – 0.614 MGD

1980's – 0.714 MGD

1995 – 1.84 MGD

Projections

- Population increase from 8,236 to 13,550
- Industrial increases from 177,000 gpd to 205,000 gpd

	Capacity	2011	2031
Average Dry Weather Flow	1.84 MGD	0.84 MGD	1.42 MGD
Average Wet Weather Flow	1.92 MGD	0.99 MGD	1.57 MGD
CBOD ₅	4,170 lb/d (3,210 lb/d)	1,443 lb/d	2,469 lb/d
TSS	3,710 lb/d	2,088 lb/d	3,332 lb/d
Ammonia	460 lb/d	186 lb/d	284 lb/d
Phosphorus	32 lb/d	82 lb/d	119 lb/d

Regulatory and Operational Issues

- Regulatory
 - 2,122 kg/L mass Phosphorus limit in 2015
 - 0.8 mg/L @ design AWWF
- Operational
 - Insufficient Sludge Storage
 - Aging Equipment



Pretreatment

This process now grinds debris, then is pumped to the upper level where it flows by gravity through the fine screens and grit removal portion of the process.

Changes during this project:

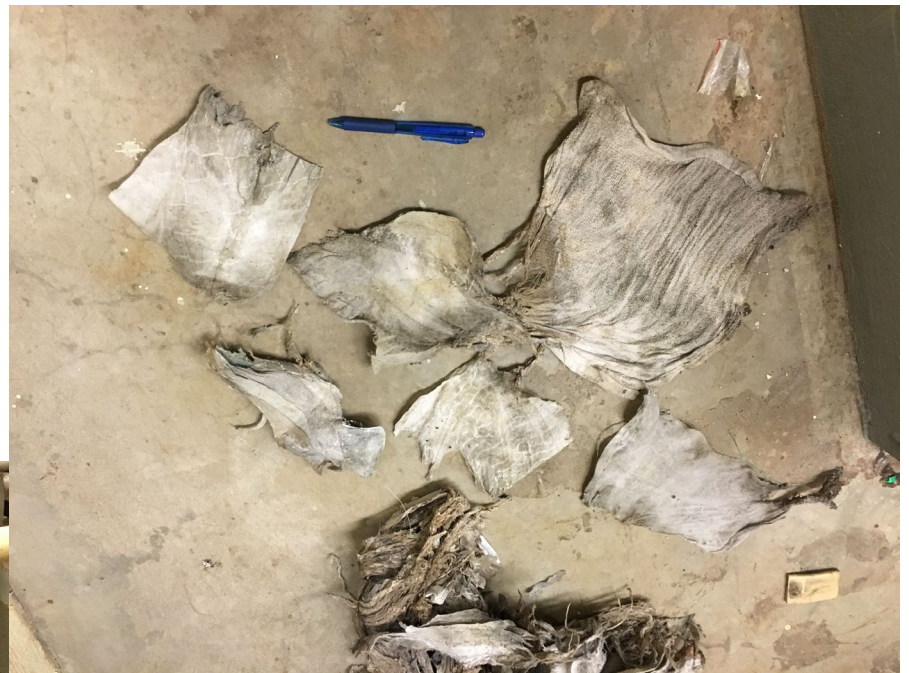
- Replaced influent pumps
- Replaced RAS/WAS pumps
- Replaced grit removal mechanical equipment
- Replaced fine screens
- Added grinder



Design Challenge



Pretreatment



Wet wipes and other products which find their way into our sewers are not dissolvable like standard toilet paper, but instead may contain materials which do not disintegrate in the same way that a paper-based tissue does.

Putting wet wipes down the toilet can cause blockages that lead to massive buildups.

Oxidation Ditch / Clarifiers

- Added 3rd Ditch/Clarifier

This portion of the treatment process removes dissolved organics and solids.

The clean water flows to the multi-media filters. The settled solids are pumped from the bottom of the clarifier to the solids handling portion of the process.



Oxidation Ditch / Clarifiers

- Added 3rd Ditch/Clarifier
- Replaced jet mixing and aeration system
- Replaced clarifier mechanisms



Filtration & Disinfection

The clean water from the clarifiers is polished through the filters and then disinfected in the chlorine contact tank. Prior to discharge, the chlorine is removed and the clean water is discharged to the Rum River.

Changes during this project:

- Rehabbed traveling bridge filters
- Replaced feed equipment
- Removed scrubber
- Relocated effluent sampler



Chemical Addition

Chemicals are added prior to the clarifiers to remove phosphorus and aid in the settling process.

Changes during this project:

- Added chemical feed room
- Added 10,800 gallons chemical storage



Solids Thickening

Solids from the clarifiers are aerated in the WAS tank, periodically the solids are allowed to settle and the clear water is decanted back to the head of the plant. The solids are thickened, and then pumped to the Primary Digester for further treatment.

Changes during this project:

- Added decant valve to WAS tank
- Replaced WAS tank diffusers



Operational Improvement
Operational Challenge



Solids Stabilization

Solids from the thickener are mixed and heated to 98 degrees in the Digester. Methane gas produced in this process is captured and used in the biogas boiler to heat the tanks thus greatly reducing the need to purchase natural gas.

Changes during this project:

- Replaced primary digester cover
- Replaced mixing and heating in primary digester
- Added mixing and heating to secondary digester
- Added biogas boiler

Construction Challenge
Operational Improvement



Biosolids Storage

Following Digestion the Biosolids are stored until they can be applied to one of the MPCA approved sites in the spring and fall.

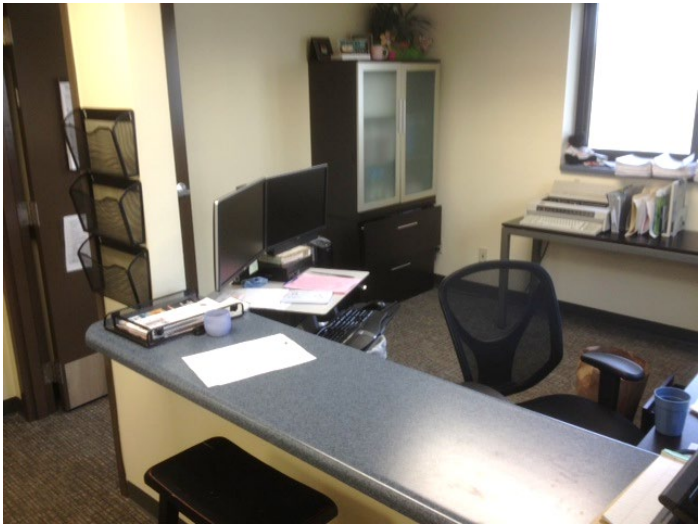
Changes during this project:

- Added 1 MG of storage
- Sized to reuse old TF cover
- Added decant building



Administration Building Addition

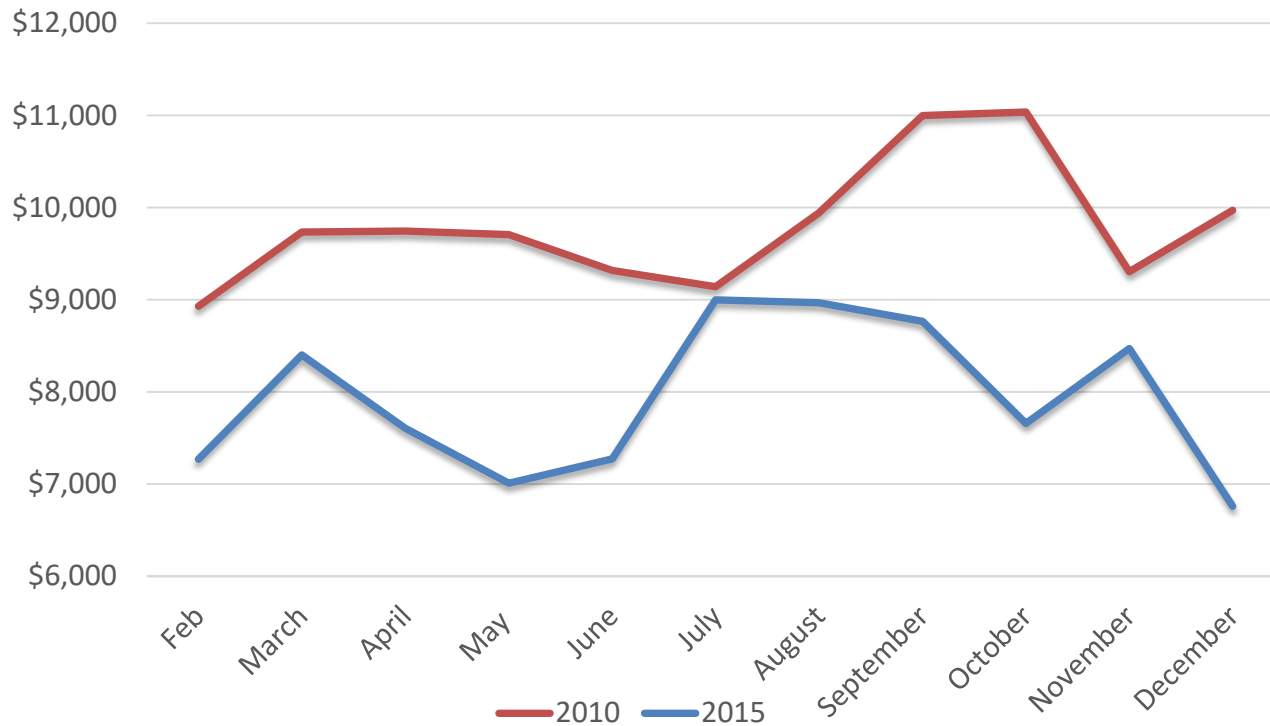
- Added 1440 sf (existing building was 2520 sf)



Reduced Operational Costs

- Reduced electricity demand by more than 20% (saving up to \$40,000 per year)

Electricity Costs



Reduced Operational Costs

- Reduced electricity demand by more than 20% (saving up to \$40,000 per year)
- Little increase in biosolids volume despite chemical sludge

Year	Biosolids (Gallons)
2007/2008	1,752,000
2008/2009	2,112,000
2009/2010	1,494,000
2015/2016	1,964,000

Reduced Operational Costs

- Reduced electricity demand by more than 20%
- Little increase in biosolids volume despite chemical sludge
- Reduced natural gas demand (approx. \$5,000/year)
- Reduced polymer and chlorine usage

Project Information

- Engineer's estimate: \$12,000,000
- R.L. Carr Bid: \$11,935,000
- Change Orders: \$ 58,157 (<0.5%)
- Funding/Financing:
 - PSIG - \$1,367,000
 - PFA Loan - 1% interest
 - VFD Rebate - \$27,900
 - Lighting Rebate – \$4,600
- Schedule
 - Notice to Proceed – May, 2013
 - Original Substantial Completion – Sept, 2014
 - Substantial Completion – Sept, 2015

Acknowledgements

City of Cambridge Staff

Todd Schwab

Rob Bredeson

Lynda Woulfe

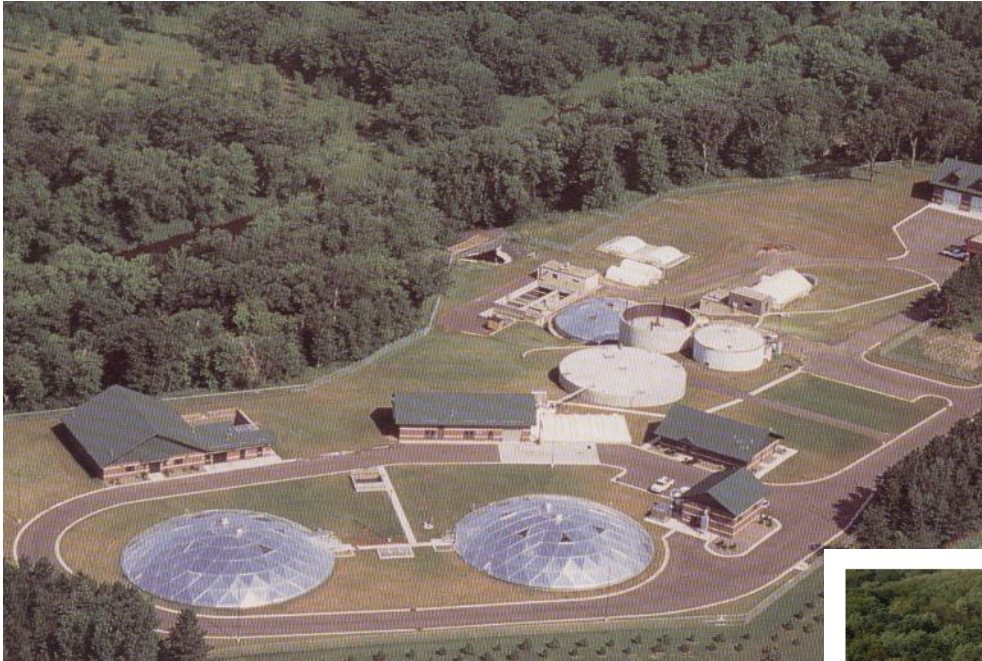
Caroline Moe

PFA – Kathe Barratt

MPCA – Corey Mathisen



For questions or if you would like a tour contact:



Todd Schwab
Utilities / Public Works Director
tschwab@ci.cambridge.mn.us

Rob Bredeson
Assistant Utilities Director
rbredeson@ci.cambridge.mn.us
763-689-1800

