

City of Lodi WWTF

Treatment Alternatives

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March 3, 2026





Fennimore

Agenda

- Technologies
- Existing Site Concepts
- Affordability Statistics
- Upgrade Timing: Available WWTF Capacity



Summary of Cost Estimates

Alternative	Description	Capital Cost	Present Worth
NS-1	Oxidation Ditch at New Site	\$65,500,000	\$72,000,000
NS-2	Conventional Activated Sludge at New Site	\$67,500,000- \$69,000,000	\$73,500,000- \$75,000,000
NS-3	Membrane Bioreactor at New Site	\$70,000,000- \$71,500,000	\$77,000,000- \$78,000,000
ES-1	Biotowers at Existing Site	\$55,500,000	\$71,000,000
ES-2	Sequencing Batch Reactor at Existing Site	\$45,500,000	\$57,000,000



TECHNOLOGIES FOR ALTERNATIVES





Dane-Iowa

NS-1 Oxidation Ditch and Sludge Dewatering at New Site

- Liquids
- + Fewer mechanical components
 - + Simple, stable operation
- Solids
- + Simplest Option
 - + Cake sludge volume

- Liquids
- Moderate process flexibility
 - Larger aeration basins required
 - Specific configurations proprietary
- Solids
- No separate sludge treatment; cannot be optimized



Oxidation Ditch



Twin Lakes



Tomah



Oxidation Ditch



Sullivan Joint Wastewater Commission

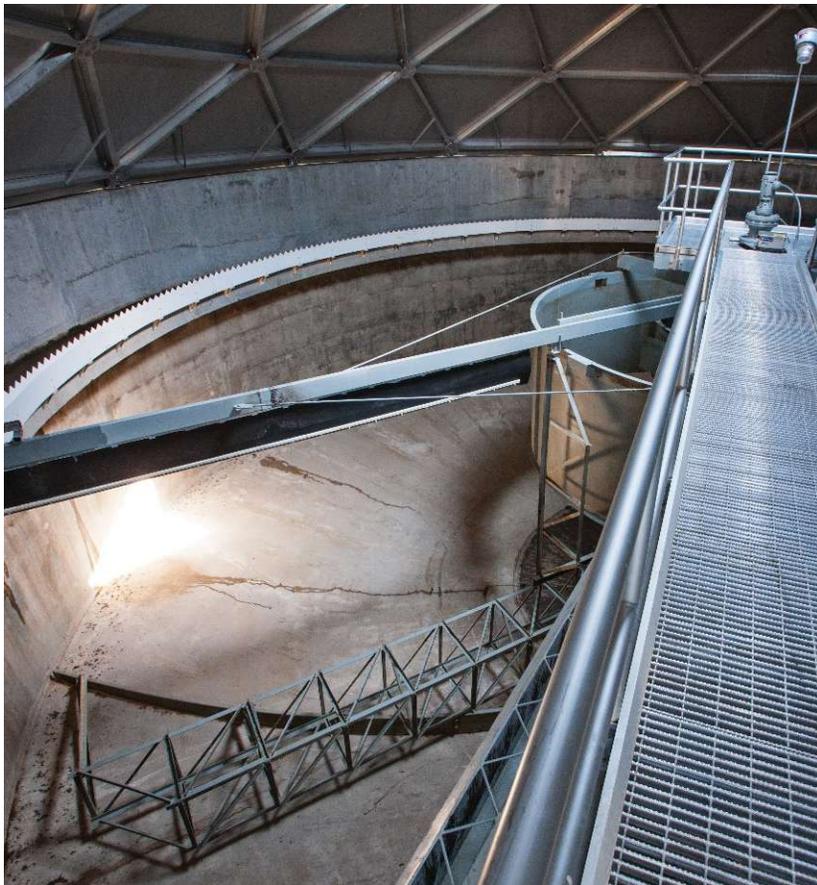


Sullivan Joint Wastewater Commission



Oxidation Ditch

Final Clarification



Rhinelander



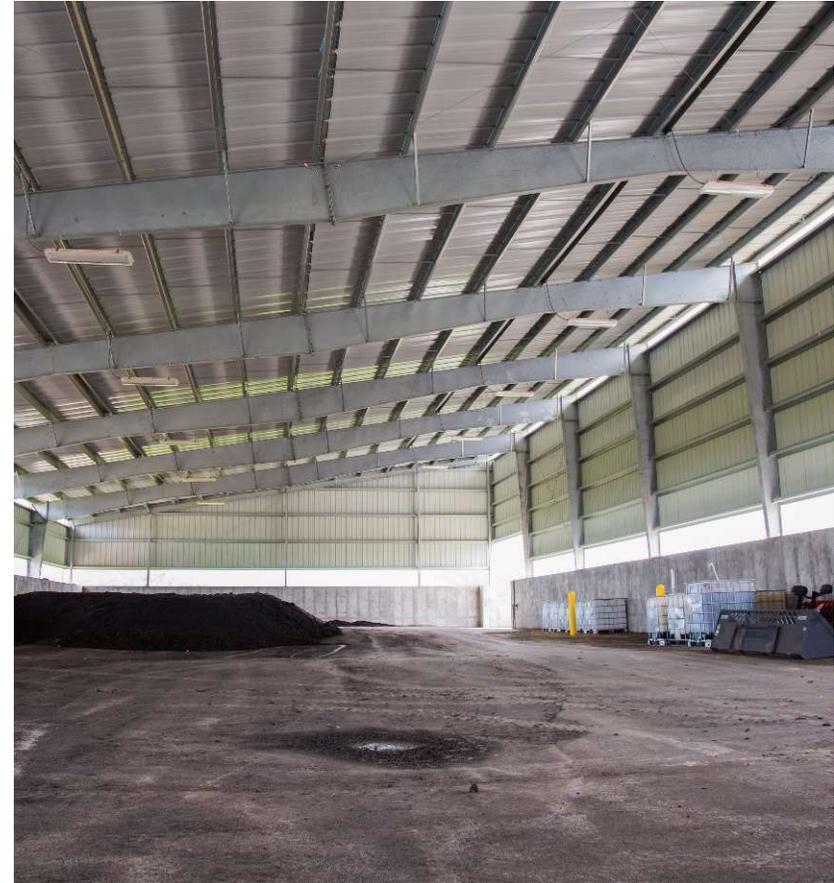
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Dewatering Sludge Dewatering and Storage



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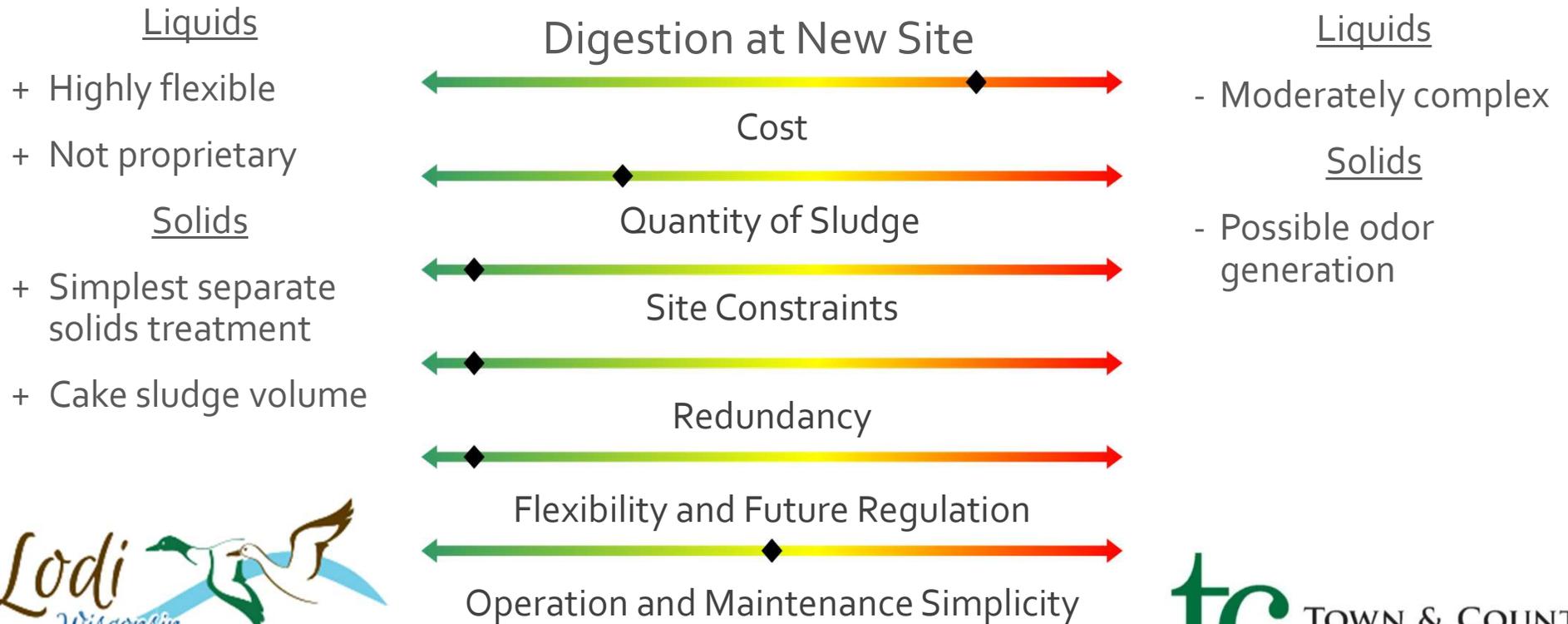
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Rhineland

NS-2 CAS and Aerobic Digestion at New Site



Conventional Activated Sludge Selectors/Aeration Basin



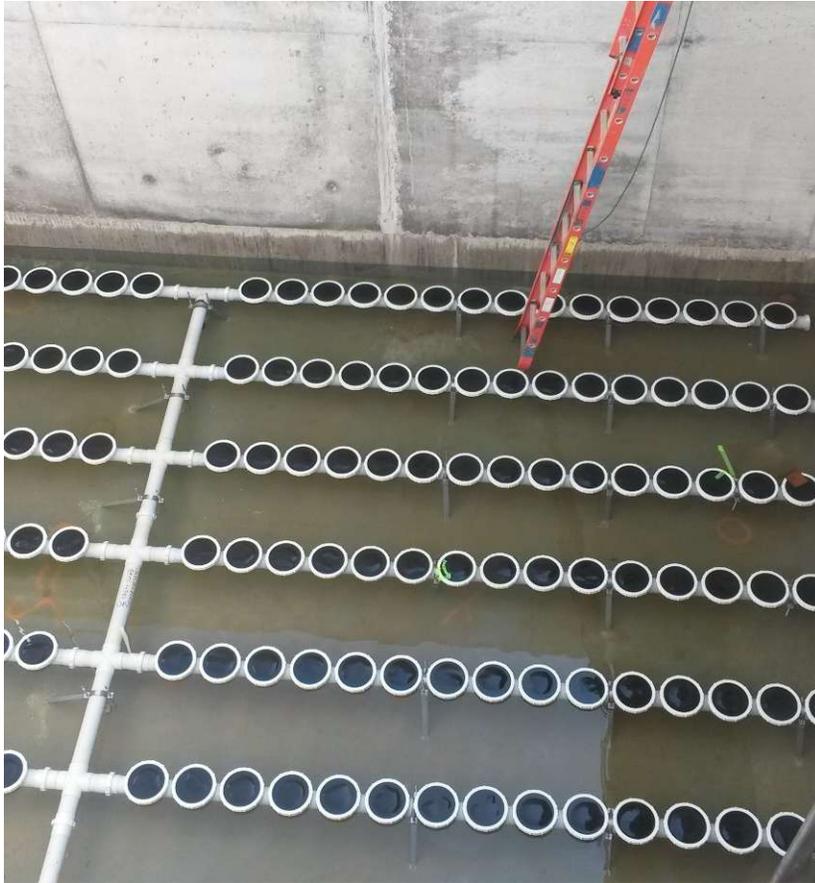
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Conventional Activated Sludge Aeration



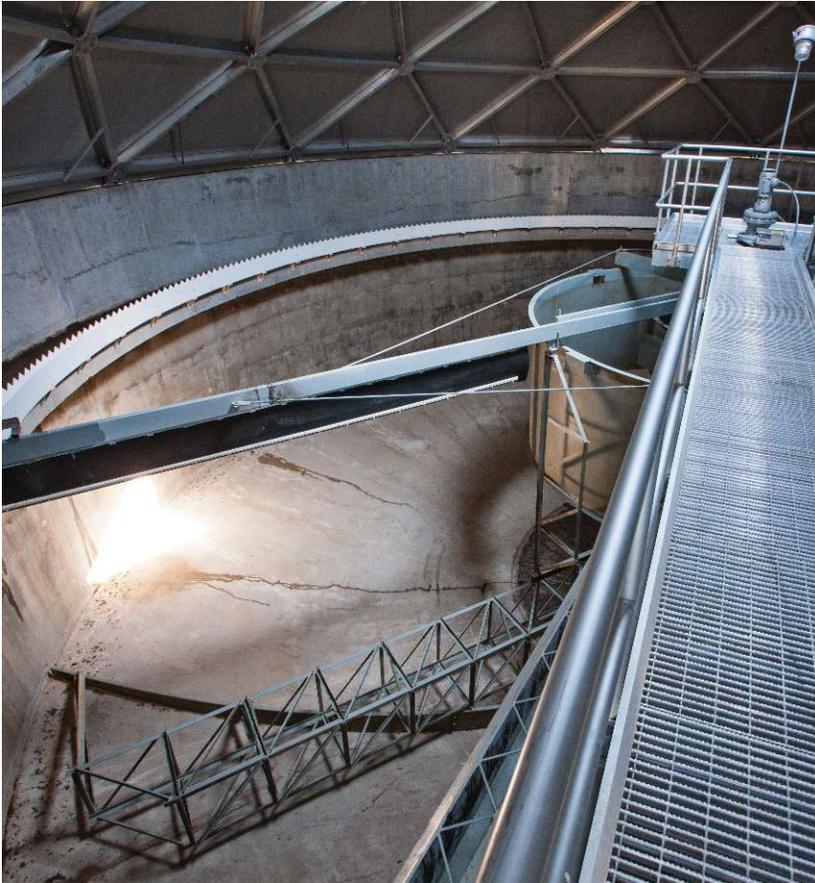
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Conventional Activated Sludge Final Clarification



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Aerobic Digestion



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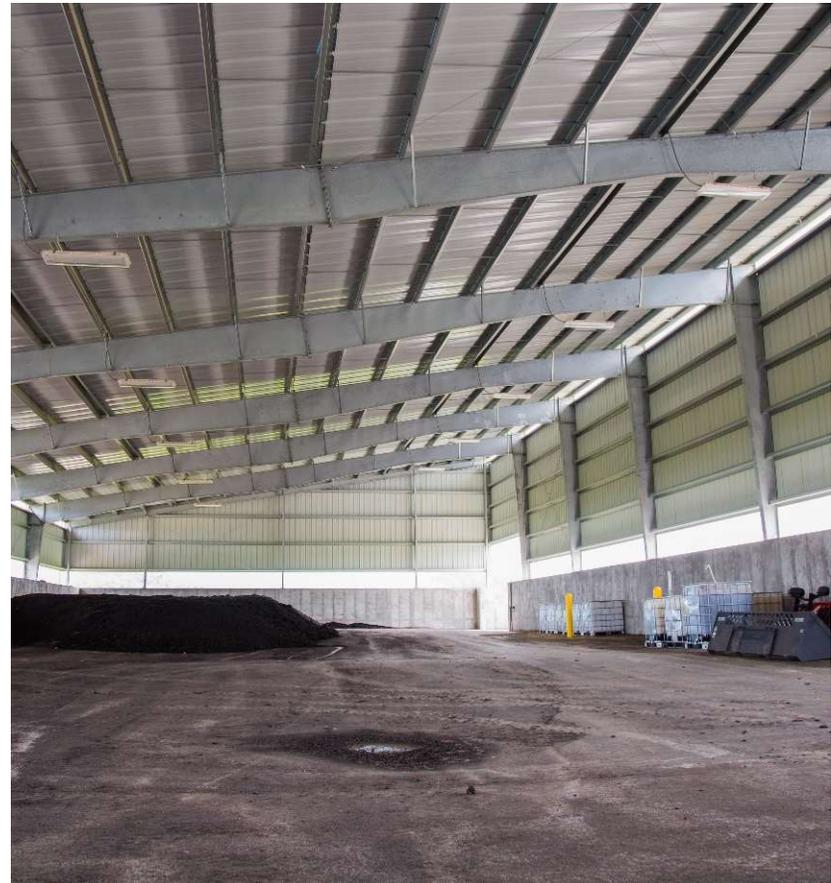


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Aerobic Digestion Sludge Dewatering and Storage



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PCI Membranes

NS-3 MBR and Aerobic Digestion at New Site

Liquids

- + Very flexible process
- + High Quality Effluent

Solids

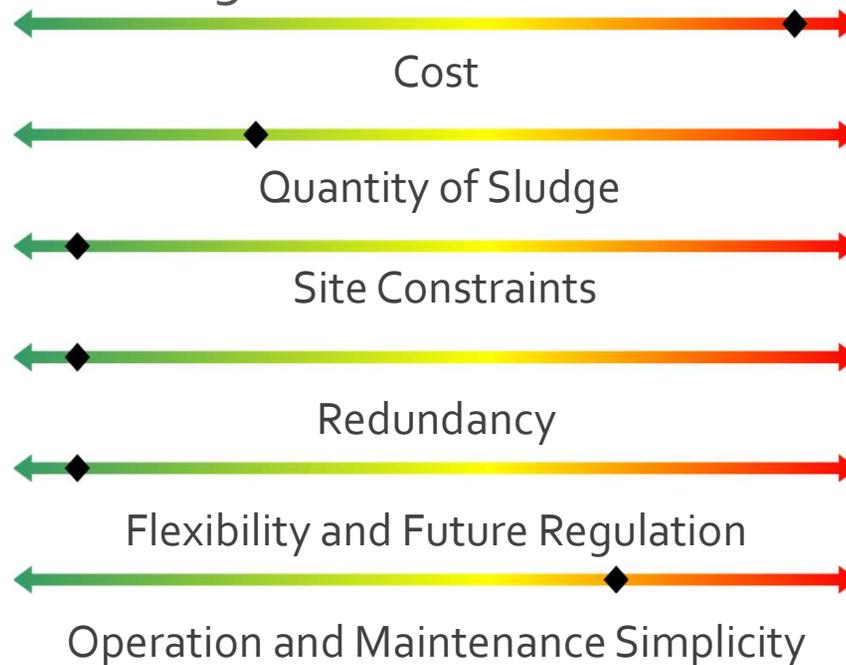
- + Simplest separate solids treatment
- + Cake sludge volume

Liquids

- Greatest complexity
- Most equipment
- Specific configurations proprietary
- Higher energy demand

Solids

- Possible odor generation



Membrane Bioreactor (MBR) Selectors/Aeration Basin



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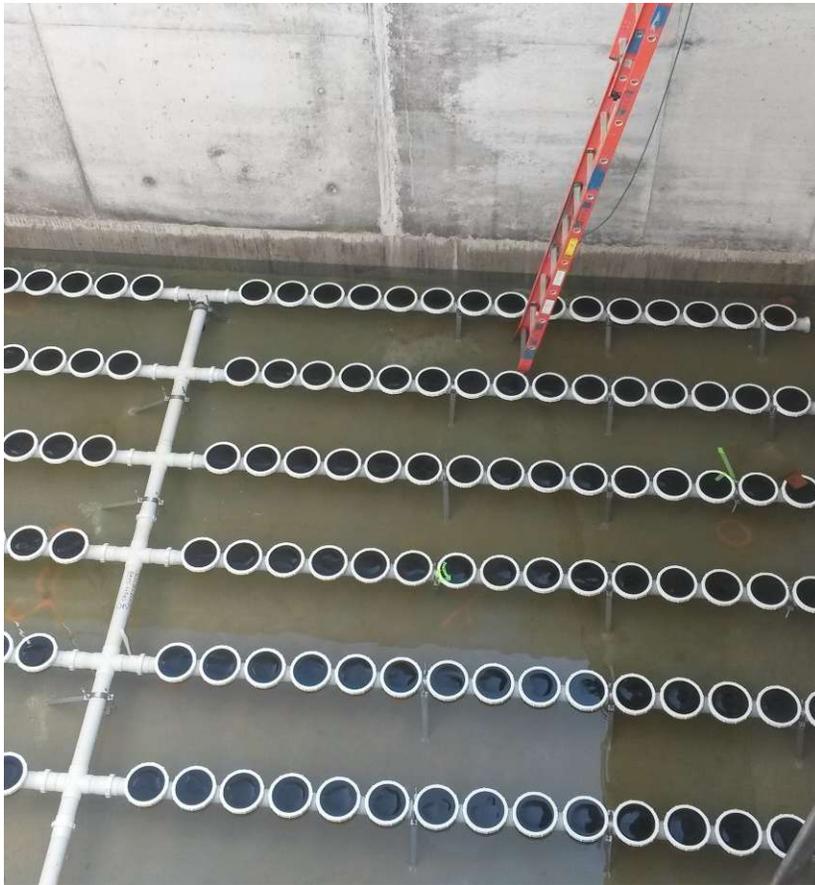


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Membrane Bioreactor (MBR)

Aeration



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Membrane Bioreactor (MBR)



Hinda



FILTEC



Aerobic Digestion



Sullivan Joint Wastewater Commission

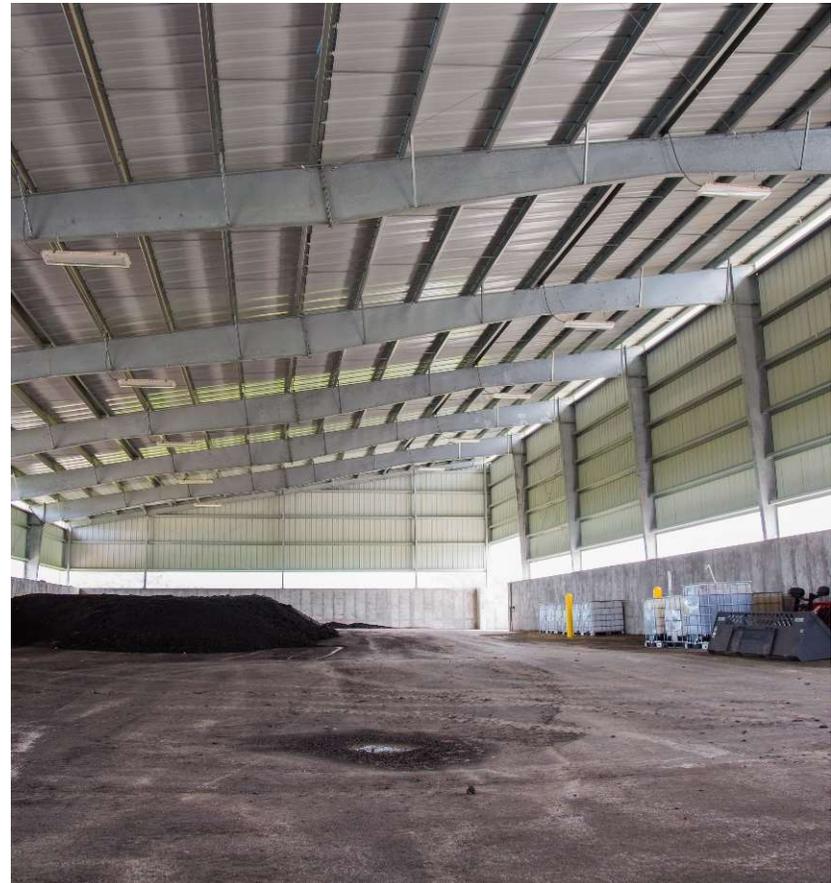


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Aerobic Digestion Sludge Dewatering and Storage



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Wastewater Treatment Products - Raschig USA, Inc.

ES-1 Biotowers and Anaerobic Digestion at Existing Site

Liquids

- + Familiar Process
- + Simplest operational control

Solids

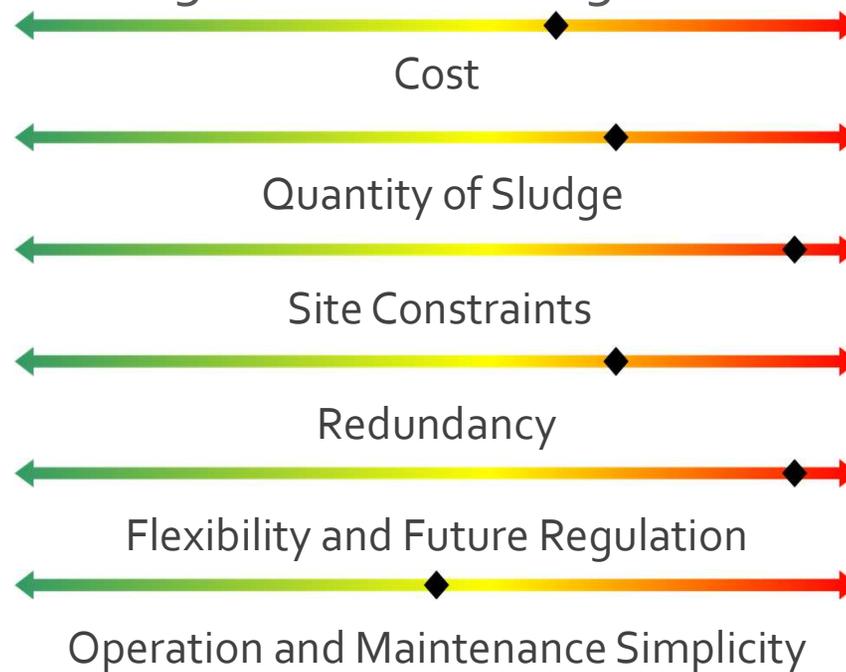
- + Captures energy in wastewater

Liquids

- Large Footprint
- Least operational flexibility and control

Solids

- Can negatively impact liquids train with recycled nutrients
- Liquid sludge volume



Biotower

Primary Clarification



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Biotower Distributor



Lodi WWTF



Envirodyne



Biotower Blower and Final Clarification



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Anaerobic Digestion Thickening and Heating



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Anaerobic Digestion



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Anaerobic Digestion

Thickening (again) and Liquid Sludge Storage



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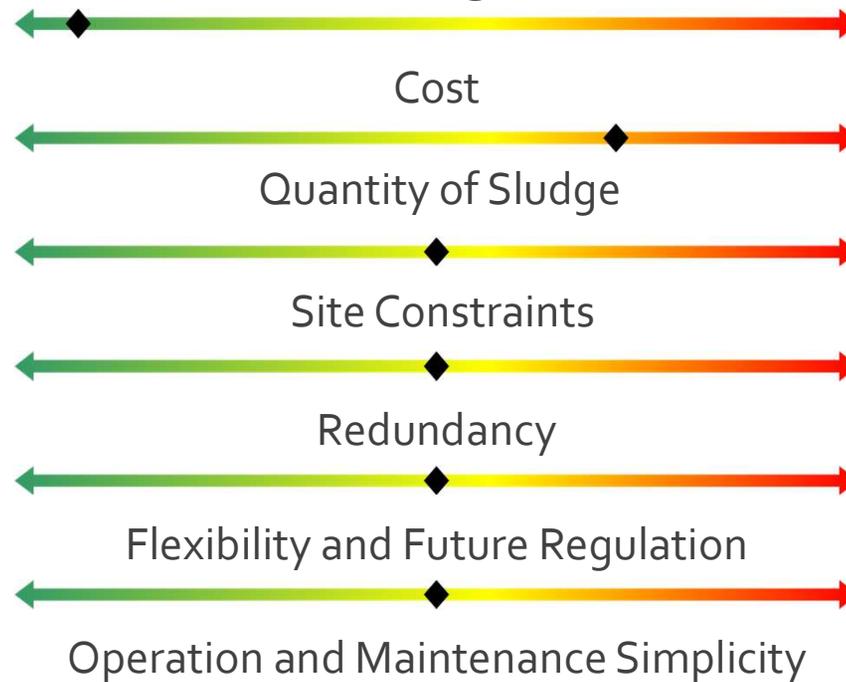


Rio de Janeiro
(Royal Haskoning DHV)

ES-2 SBR and Aerobic Digestion at Existing Site

- Liquids
- + Flexible process
 - + Compact footprint
 - + Reduced pumping needs
 - + Modular
- Solids
- + Simplest separate solids treatment

- Liquids
- Specific configurations proprietary
 - Complex SCADA control
 - Batch process (not continuous flow)
- Solids
- Possible odor generation
 - Liquid sludge volume



Sequencing Batch Reactor



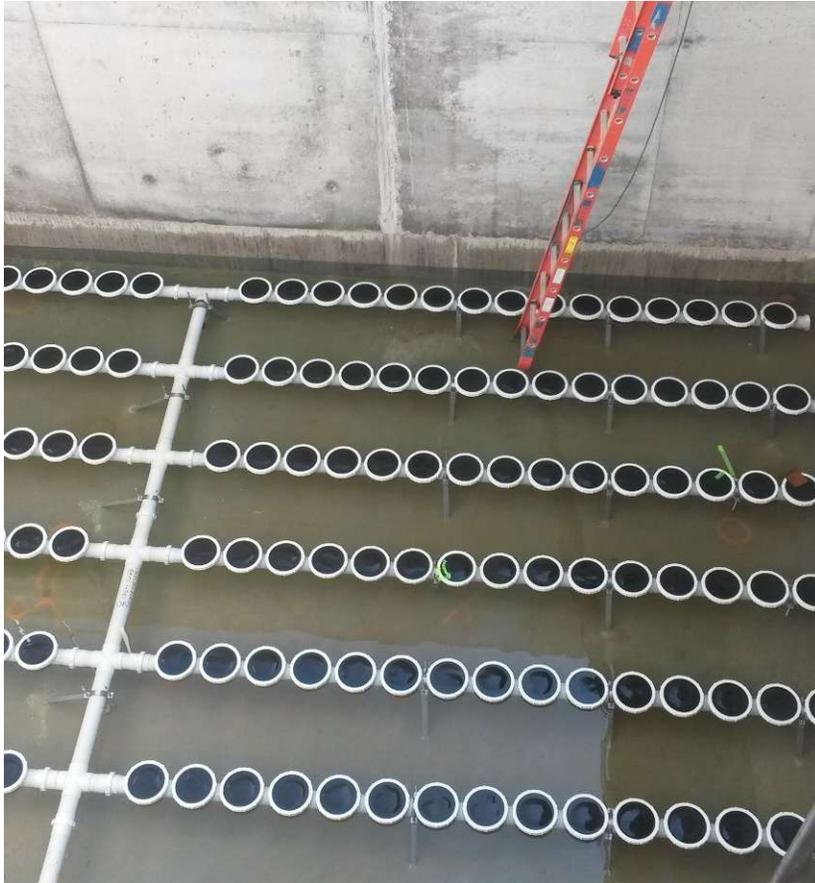
Epe, Netherlands (Royal Haskoning DHV)



Wolcott, KS (Aqua Aerobics Systems)



Sequencing Batch Reactor Aeration



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Aerobic Digestion



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Aerobic Digestion Mechanical Thickening and Liquid Sludge Storage



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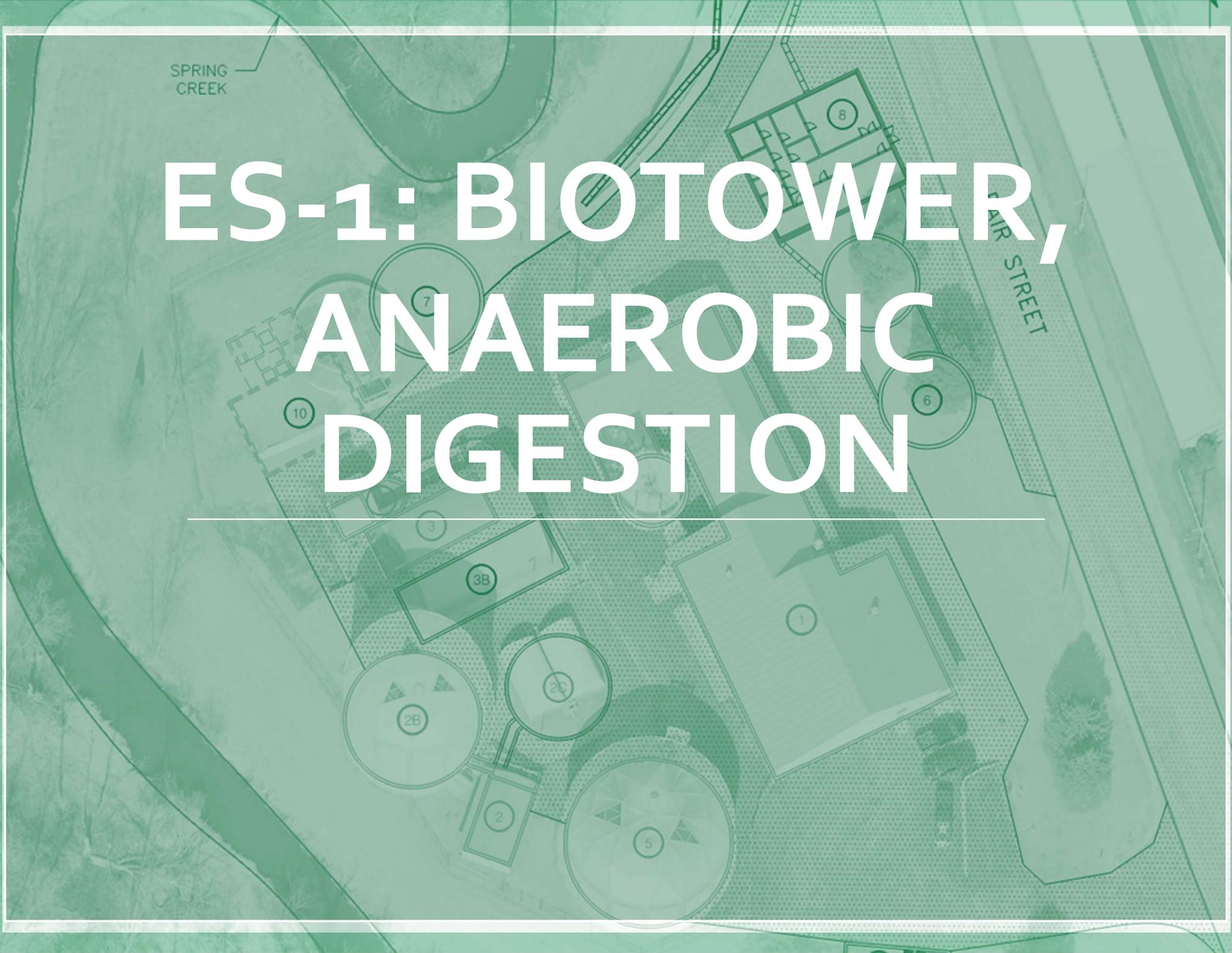
EXISTING SITE CONCEPTS



SPRING
CREEK

ES-1: BIOTOWER, ANAEROBIC DIGESTION

FAIR
STREET





1	Ex. Control Building
2	Ex. Biotower and Sludge Pumping
2B	Ex. Biotower
2C	New Biotower
3	Ex. Final Clarifier
3B	New Final Clarifier
4	Ex. UV Disinfection and Sampling
5	Ex. Sludge Storage
6	New Primary Clarifier
7	New Anaerobic Digester
8	New Administration Building
9	New Hauled Waste Receiving
10	Future Tertiary Filtration

SPRING
CREEK

ES-2: SBR, AEROBIC DIGESTION

FAIR STREET

7

6

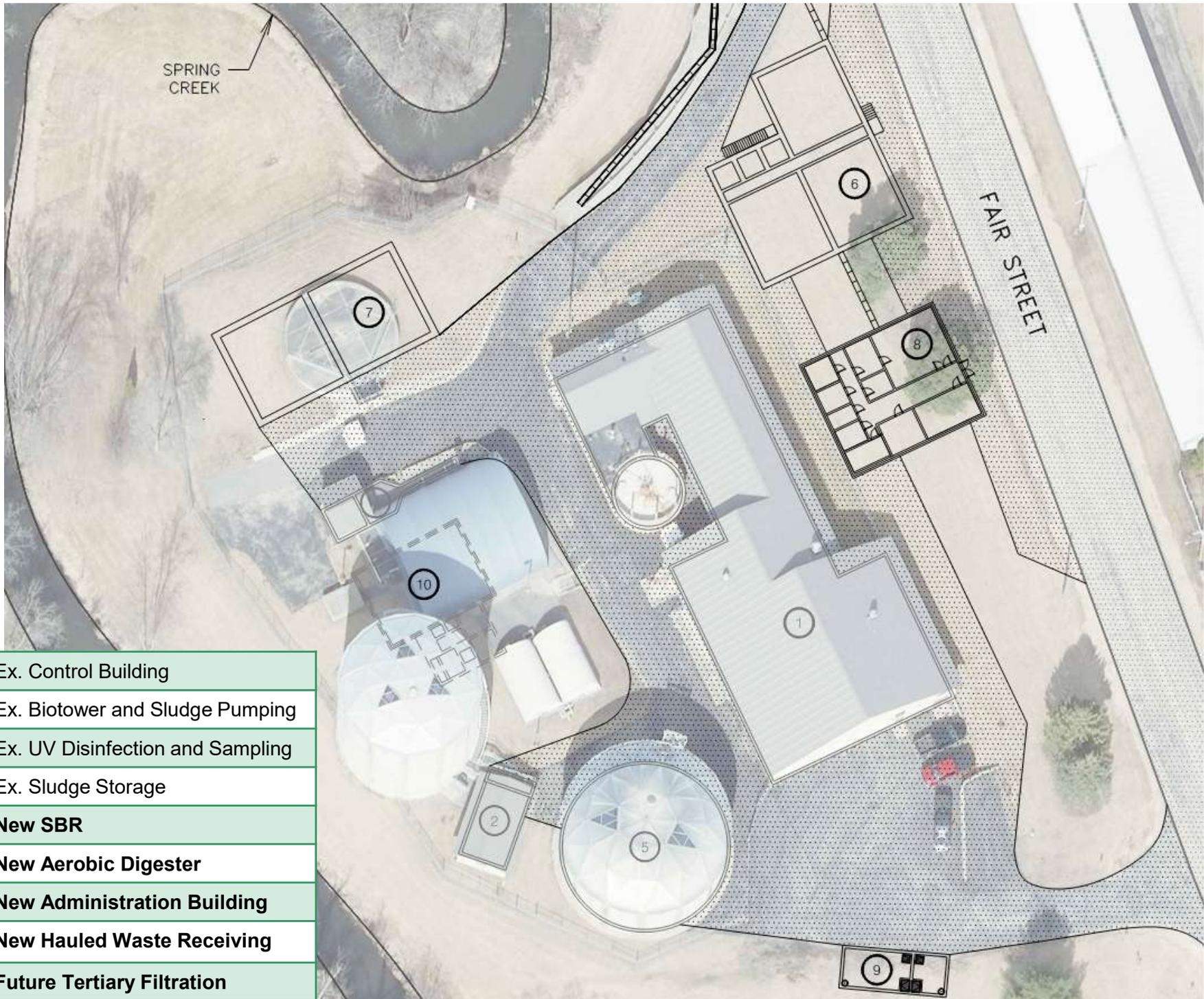
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1

2

5



AFFORDABILITY



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Debt Cost vs. Household Income

Alternative	Est. Monthly Debt Cost	% of Lowest Quintile Income*	% of MHI**
NS-1	\$123-\$150	2.8%-3.5%	1.3%-1.6%
NS-2	\$127-\$159	2.9%-3.7%	1.4%-1.7%
NS-3	\$131-\$164	3.0%-3.8%	1.4%-1.8%
ES-1	\$104-\$127	2.4%-2.9%	1.1%-1.4%
ES-2	\$85-\$104	2.0%-2.4%	0.9%-1.1%

*Lowest Quintile Income: \$52,000

**Median Household Income (MHI) = \$110,000



TIMING: AVAILABLE WWTF CAPACITY

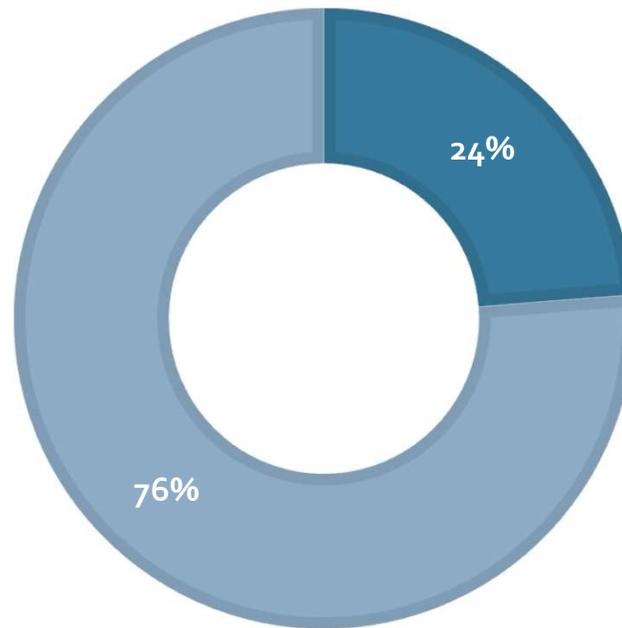


Remaining Biological Capacity



2025 Population

3,234



Additional Capacity

+ 1,000 Capita Equivalentents

100% Capacity Population: 4,208

40 Year Population Projection: 3,262 capita, 77% capacity





QUESTIONS/DISCUSSION