Small Town: Big Steps Toward

Combating Future Effluent Limits, Population Growth, Environmental Sustainability

Milton, NH **January 2023**

Casey Maranto, EIT; Wright-Pierce
Justin Durant, Wright-Pierce

WRIGHT-PIERCE
Engineering a Better Environment

Presentation Overview

- Background
- Timeline Overview
- Groundwater Contamination
- Process Evaluation and Alternatives
- Sludge Evaluation
- Next Steps

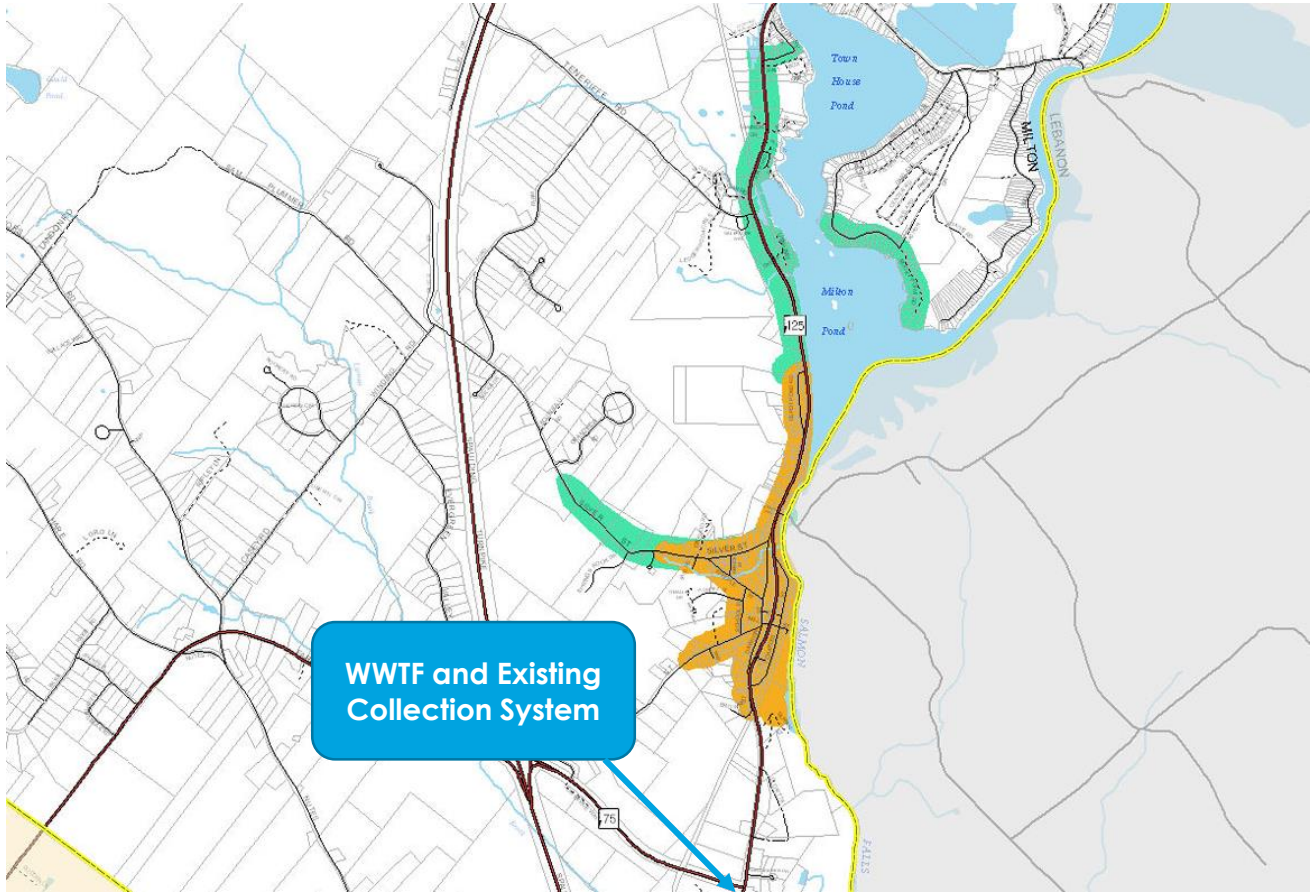
Background

Town of Milton

- Incorporated in 1802
- Two Villages: Milton & Milton Mills
- Population: 5,000
- Three Ponds

Background

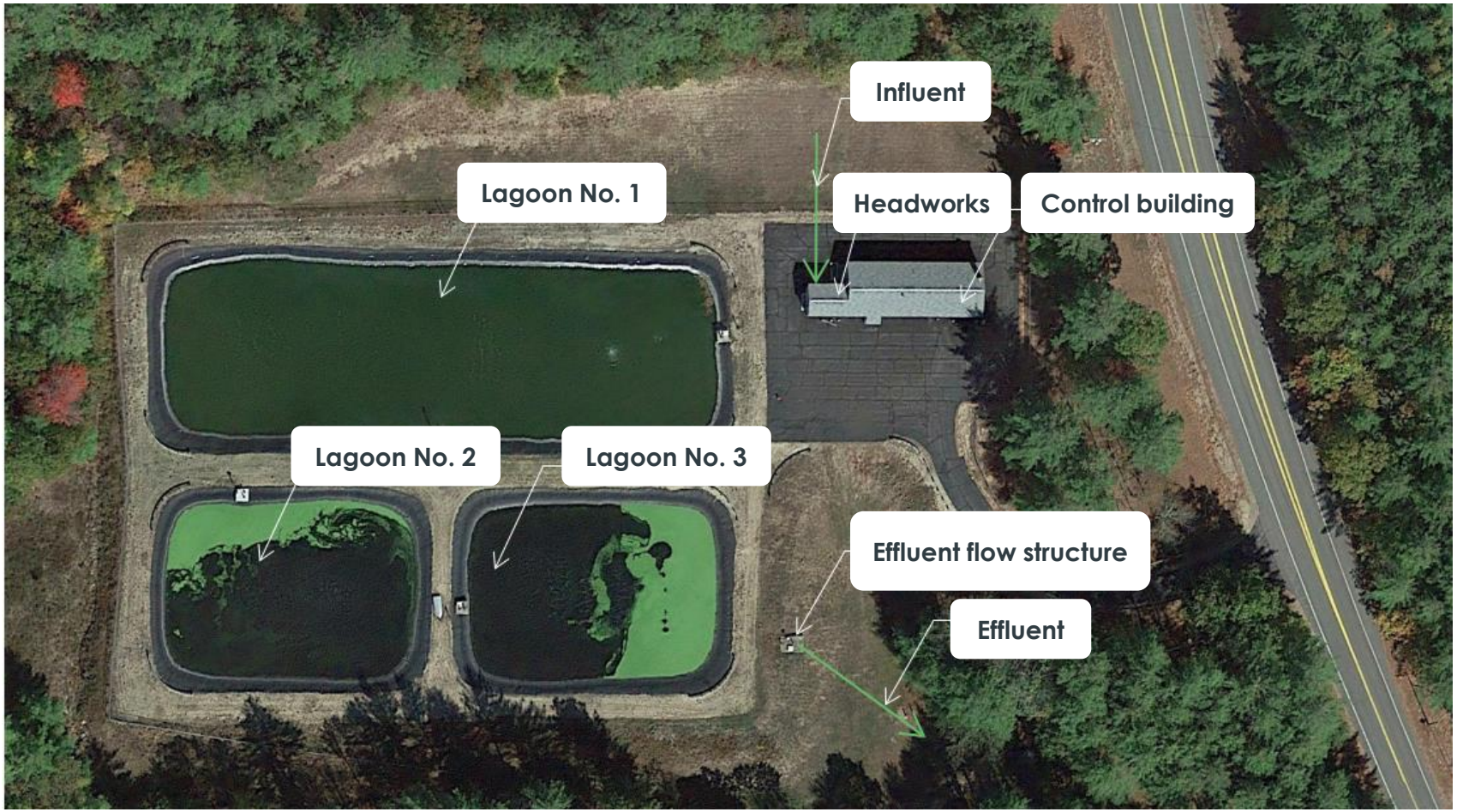
Collection System Overview



- Collection System
  - ~300 units in downtown are connected to existing collection system
    - 170 gpd per unit
  - 1 pump station
  - 4 miles of gravity sewer

Background

WWTP Overview



- Three Aerated Lagoon Plant
  - Design Capacity: 0.1 MGD
  - Average Flow: 0.05 MGD average
  - Discharge: Salmon Falls River
  - Permits:
    - GW Release Detection
    - Small WWTF General Permit
    - Great Bay Total Nitrogen

Timeline Overview

2020

March – June
NHDES requested a Corrective Action Plan from Milton.

W-P Selected for Facility Study

2021

January - August
Corrective Action Plan

- Groundwater Contamination
- Lagoon No. 1 Liner Evaluation
- MW-4 Install

2022

February – April
Secondary Treatment Evaluation

- Flows & Loads Analysis

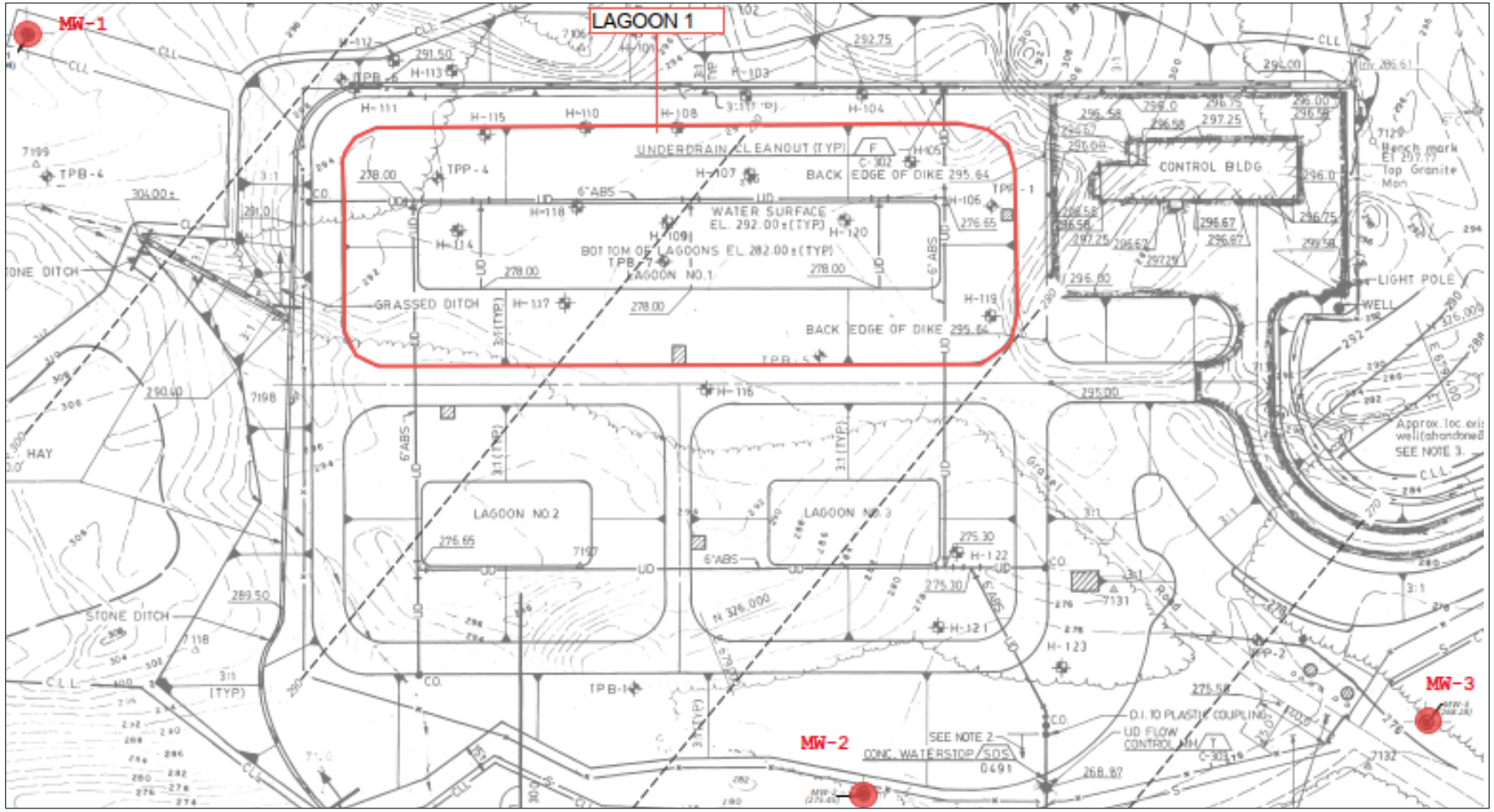
August
Lagoon No.1 Liner Repair

October
Sludge Survey

December
Facility Plan

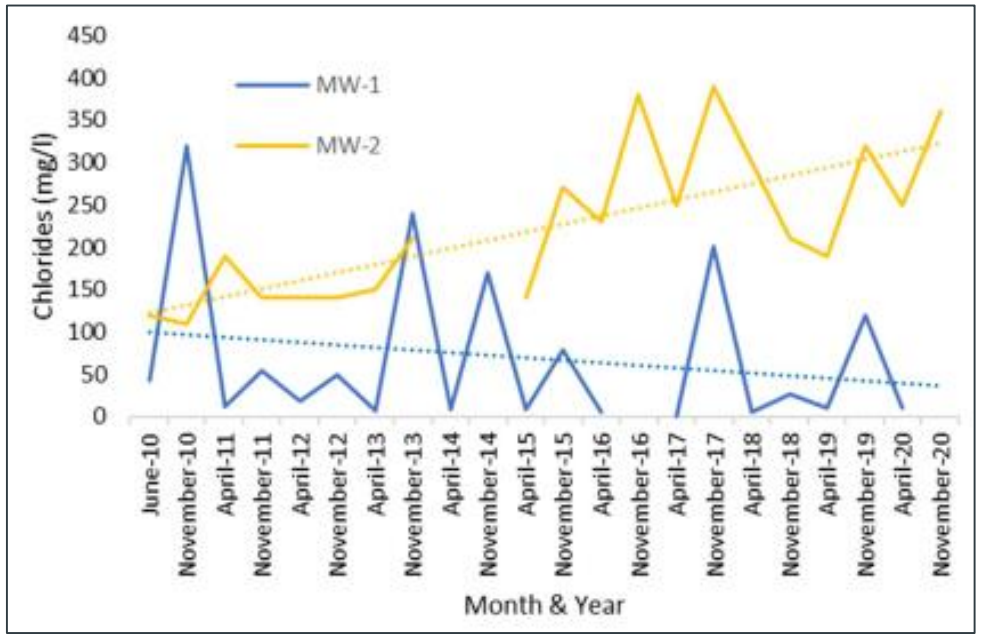
Groundwater Contamination

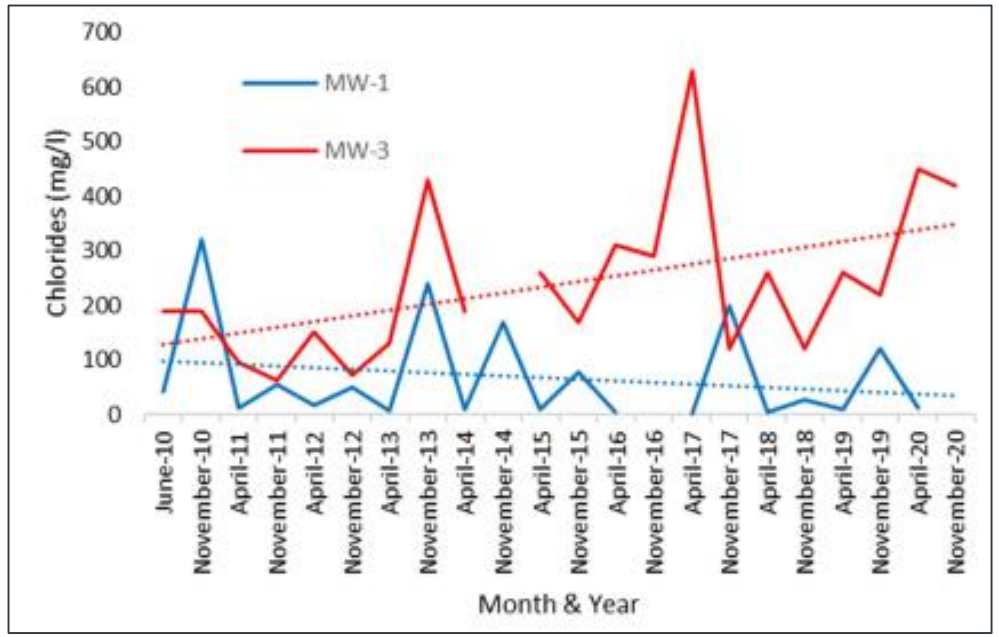
Sampling



- **Groundwater Release Detection Permit:**
  - **April & November**
    - **Specific Conductance**
    - **pH**
    - **Temperature**
    - **Chloride**
    - **Nitrate**
    - **TKN**
    - **Iron**
    - **Manganese**
    - **Fecal Coliform**
    - **E. Coli**
    - **Static Water Elevation**

Groundwater Contamination



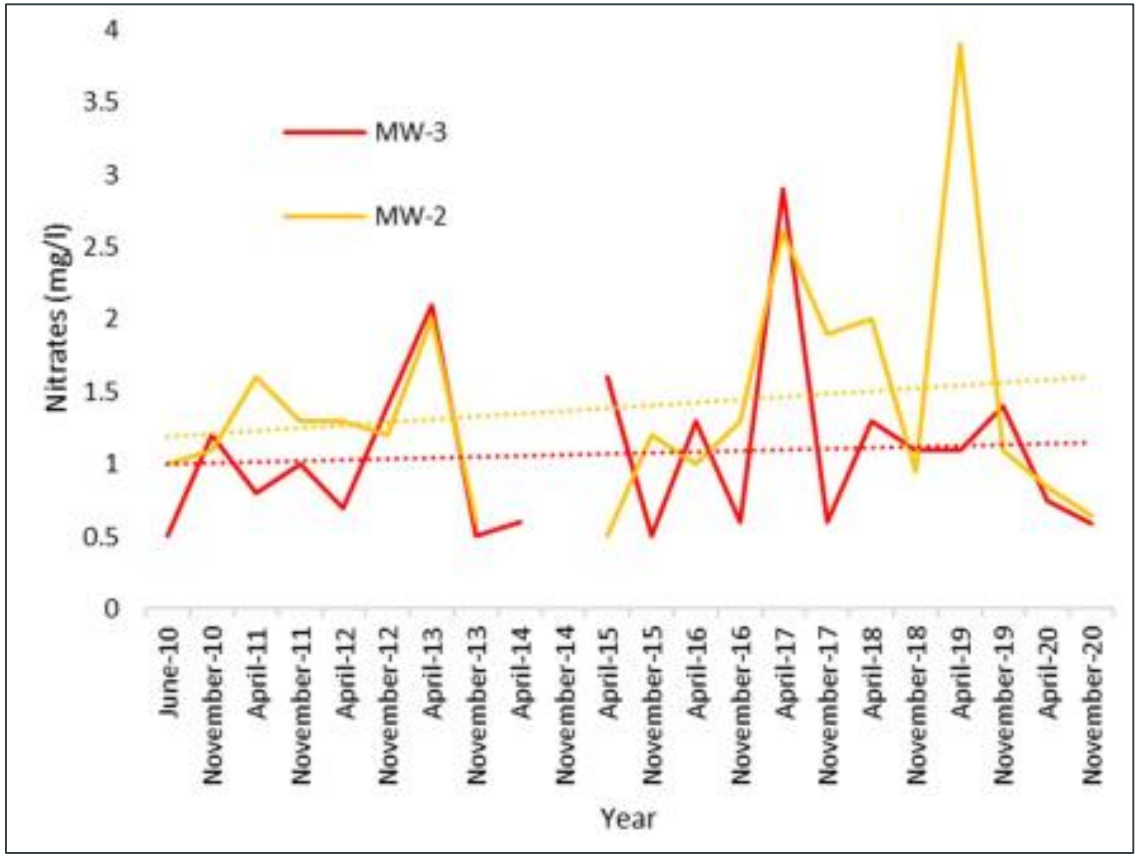


Findings – Chlorides (2010-2020)

- **MW-1**
  - Upstream of the WWTF
  - Downward trend
  - Spikes in concentration in November
- **MW-2 and -3**
  - Downstream of the WWTF
  - Similar spikes in November
  - Upward trend
- **Causes?**
  - Salt Storage
  - Groundwater Levels

Groundwater Contamination

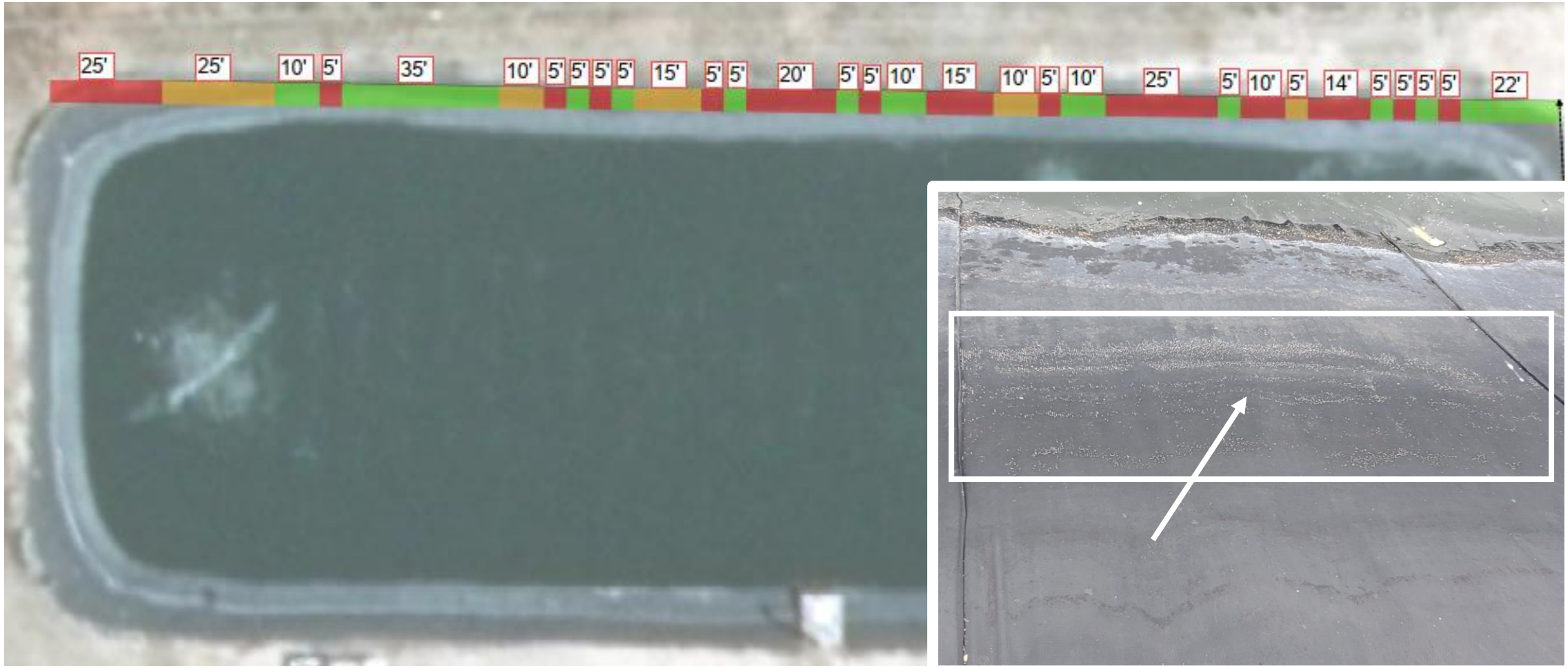
Findings – Nitrates (2010-2020)



- **MW-1**
  - **Below detectable**
- **MW-2 and -3**
  - **Upward trend**
- **Causes?**
  - **Possible deterioration of the Lagoon Liner**

Groundwater Contamination

Lagoon No. 1 Liner



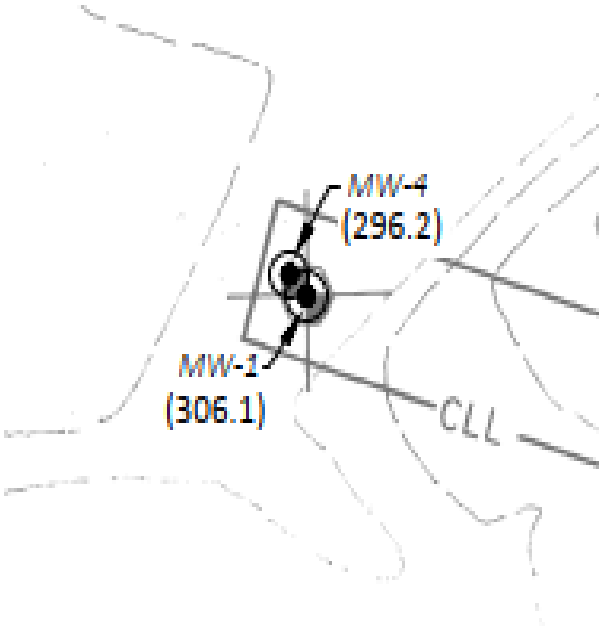
Groundwater Contamination

Corrective Action Plan (2021)

Intended Actions

- Collect additional data
- Maintain a lowered lagoon level
- Conduct liner repairs
- Facility Plan

Monitoring Well - 4



Liner Repair

- ~3,500 SF Hypalon Liner
- Completed August 2022
- Construction Cost: $121,000

Process Evaluation & Alternatives

Permitting

Small WWTF General Permit

Parameter	Monthly Average	Weekly Average	Daily Maximum
Flow, mgd	Report	—	Report
BOD_5, mg/l	25	40	45
TSS, mg/l	30	45	50
pH, Std. Units	6.5-8.0	6.5-8.0	6.5-8.0
Fecal Coliform, #/100 mL	126	—	406
Total Residual Chorine, mg/L	1.0	—	.5
Total Phosphorus (May 1 to September 30), lb/day	2.0	—	—

WWTP subject to PFAS monitoring and reporting 2/year following the availability of an EPA multi-lab validated testing method.

Great Bay Total Nitrogen

Effluent Limitations	Year-Round Reporting Requirements			
Total Nitrogen	**Total Nitrogen**		**Total Kjeldahl Nitrogen**	**Nitrate + Nitrite Nitrogen**
Rolling Seasonal Average (lb/day)	Monthly Average (lb/day)	Monthly Average (mg/L)	Monthly Average (mg/L)	Monthly Average (mg/L)
Report	Report	Report	Report	Report

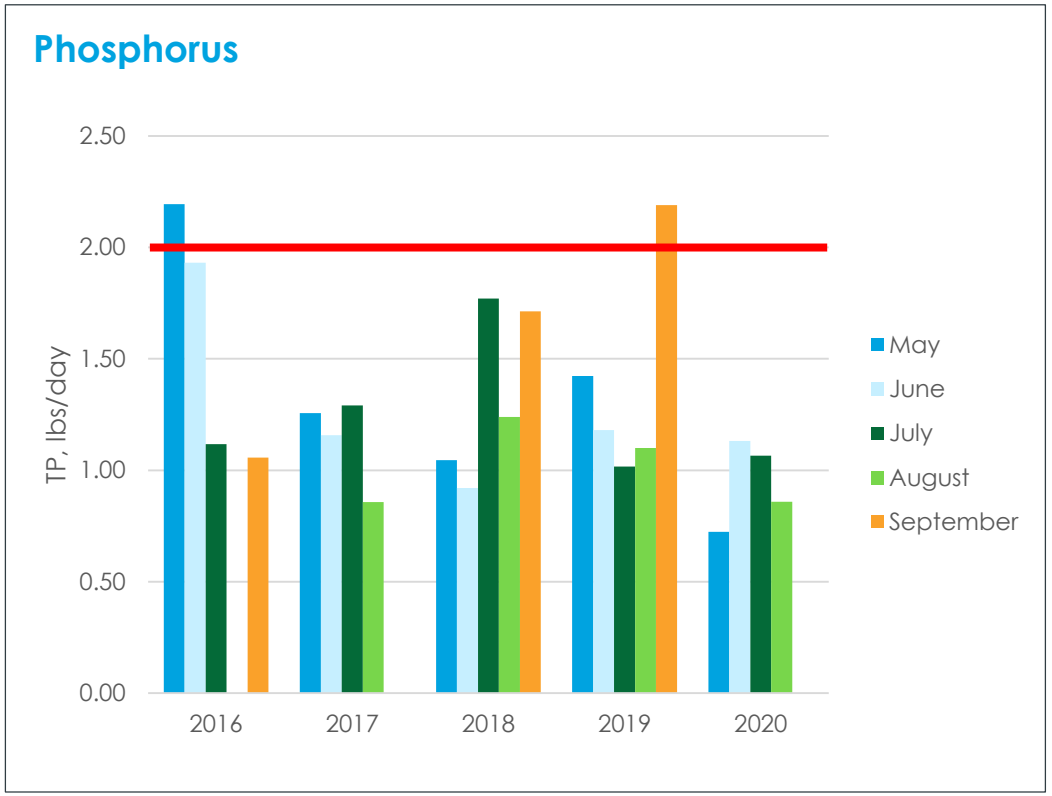
Process Evaluation & Alternatives

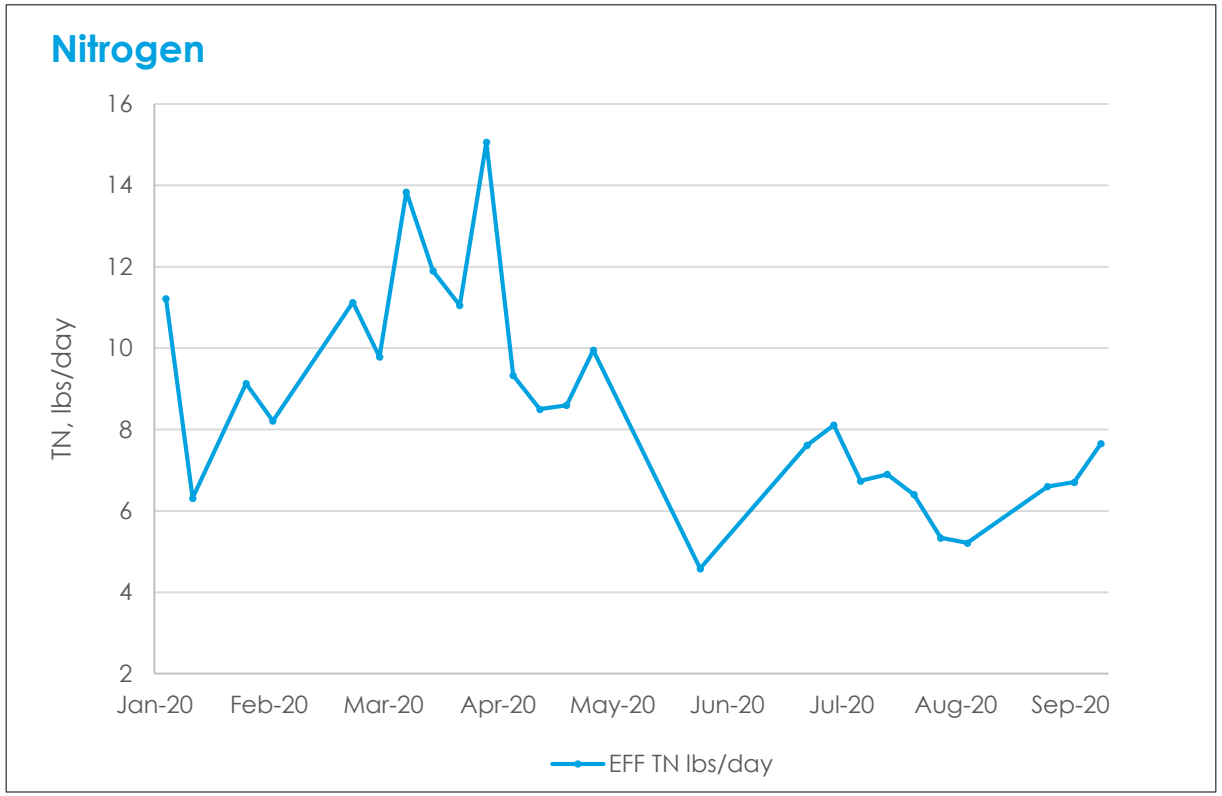
Current Influent Flows & Loads

Parameter	Flow		BOD5		TSS		P	
	MGD	P.F	lb/day	mg/l	lb/day	mg/l	lb/day	mg/l
Minimum day	0.02	0.0	22.9	60.	37.3	110	1.6	3.3
Annual average	0.05	1.0	59.0	164	81.7	227	2.0	5.1
Maximum month	0.09	1.7	106.8	310	149.5	400	-	-
Maximum day (100%)	0.17	3.4	130.2	340	176.5	430	2.7	6.7
Winter months	0.06	1.1	53.7	137	71.7	185	-	-
Summer months	0.04	0.8	52.8	193	74.9	274	-	-

WRIGHT-PIERCE
Engineering a Better Environment

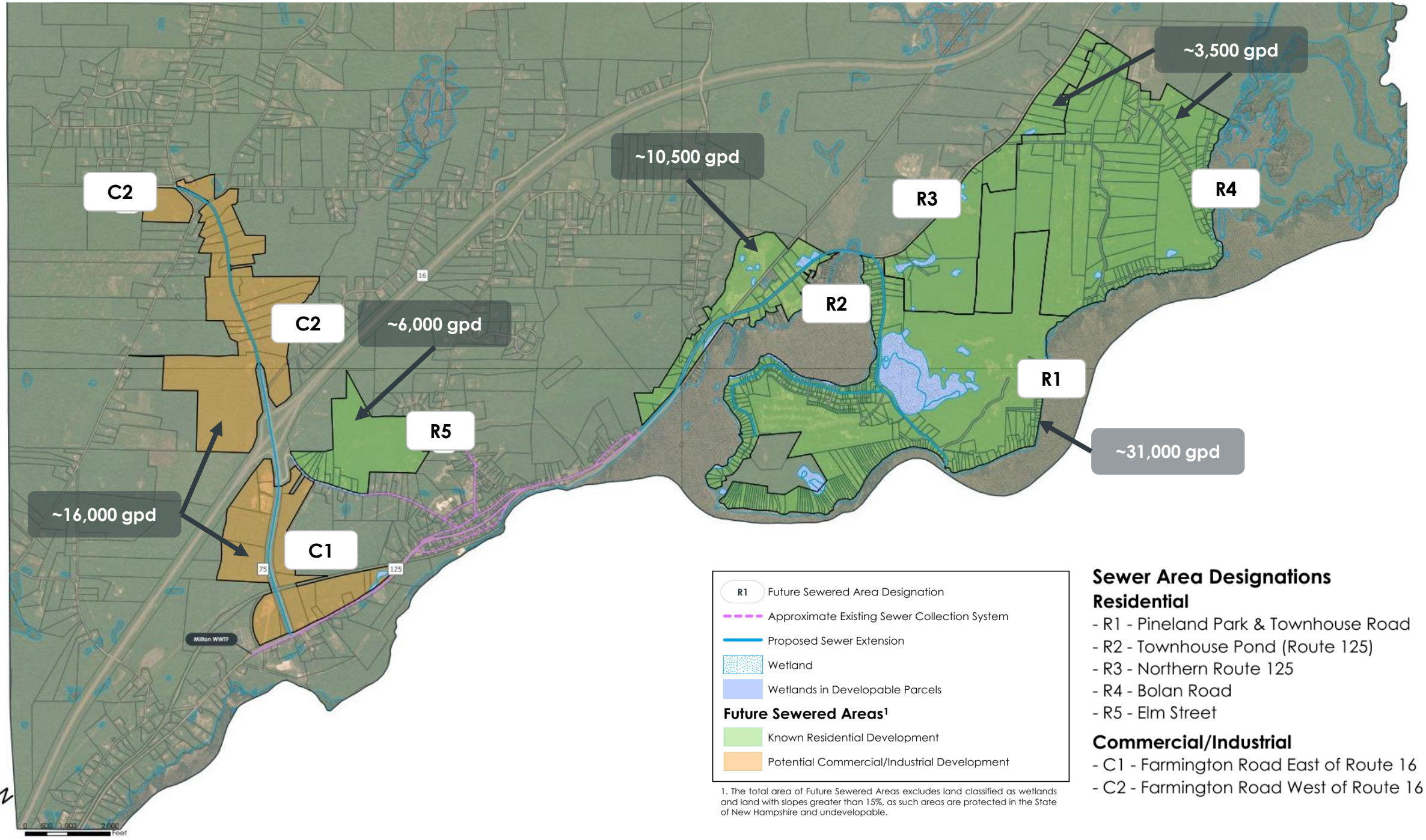
Existing Nutrient Removal





- **2.0 lbs/day (May – September)**
- **May not meet future TP limits**

- **Existing lagoons do not reliably nitrify/remove nitrogen**
- **Likely to see TN limits in future**



1. The total area of Future Sewered Areas excludes land classified as wetlands and land with slopes greater than 15%, as such areas are protected in the State of New Hampshire and undevelopable.

Sewer Area Designations

Residential

- R1 - Pineland Park & Townhouse Road
- R2 - Townhouse Pond (Route 125)
- R3 - Northern Route 125
- R4 - Bolan Road
- R5 - Elm Street

Commercial/Industrial

- C1 - Farmington Road East of Route 16
- C2 - Farmington Road West of Route 16

Process Evaluation & Alternatives

Future Flows & Loads

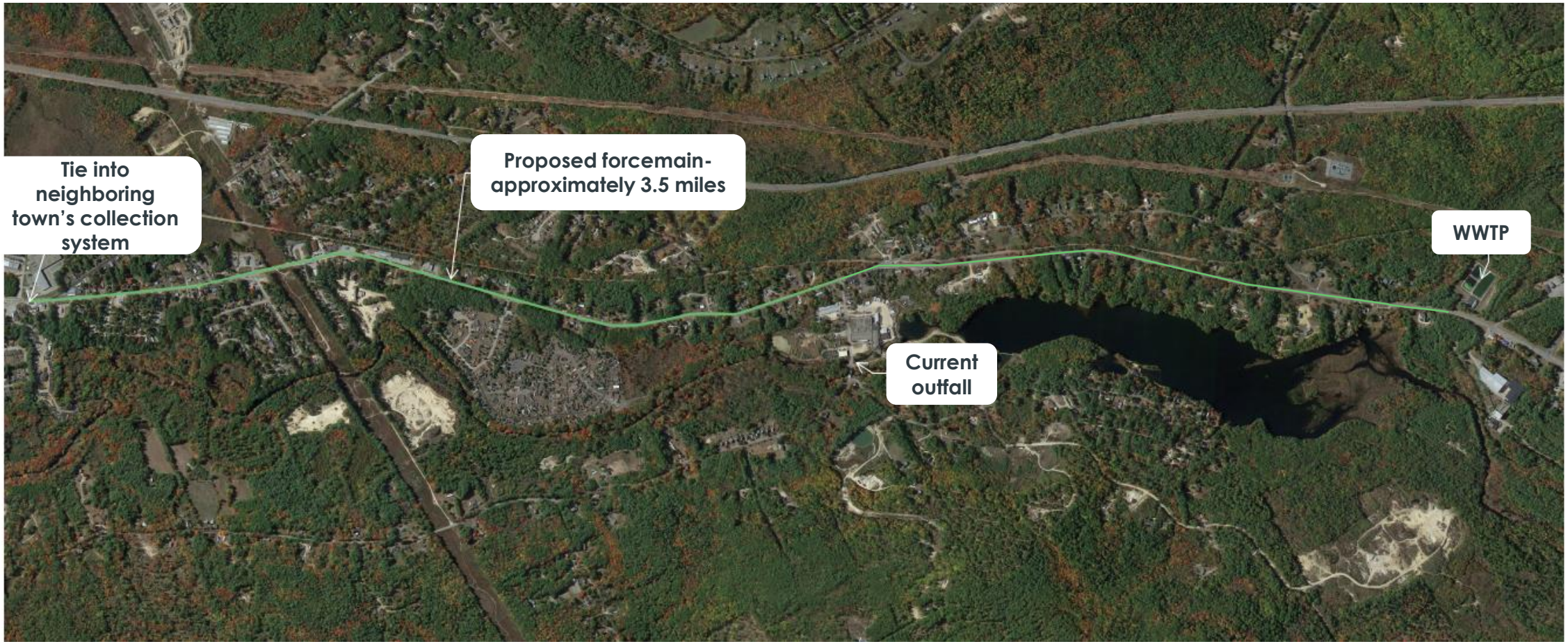
Parameter	Flow		BOD5	TSS	TN	TP
	gpd	mgd	lb/day	lb/day	lb/day	lb/day
Minimum day	29,000	0.029	43	71	8.7	3.1
Annual average	133,000	0.133	153	212	31.2	5.3
Maximum month	301,000	0.301	357	500	50.2	9.0
Maximum day (98%)	356,000	0.356	373	571	61.4	9.7
Instantaneous Peak	720,000	0.720	-	-	-	-

Process Evaluation & Alternatives

Secondary Treatment Alternatives - Regionalization

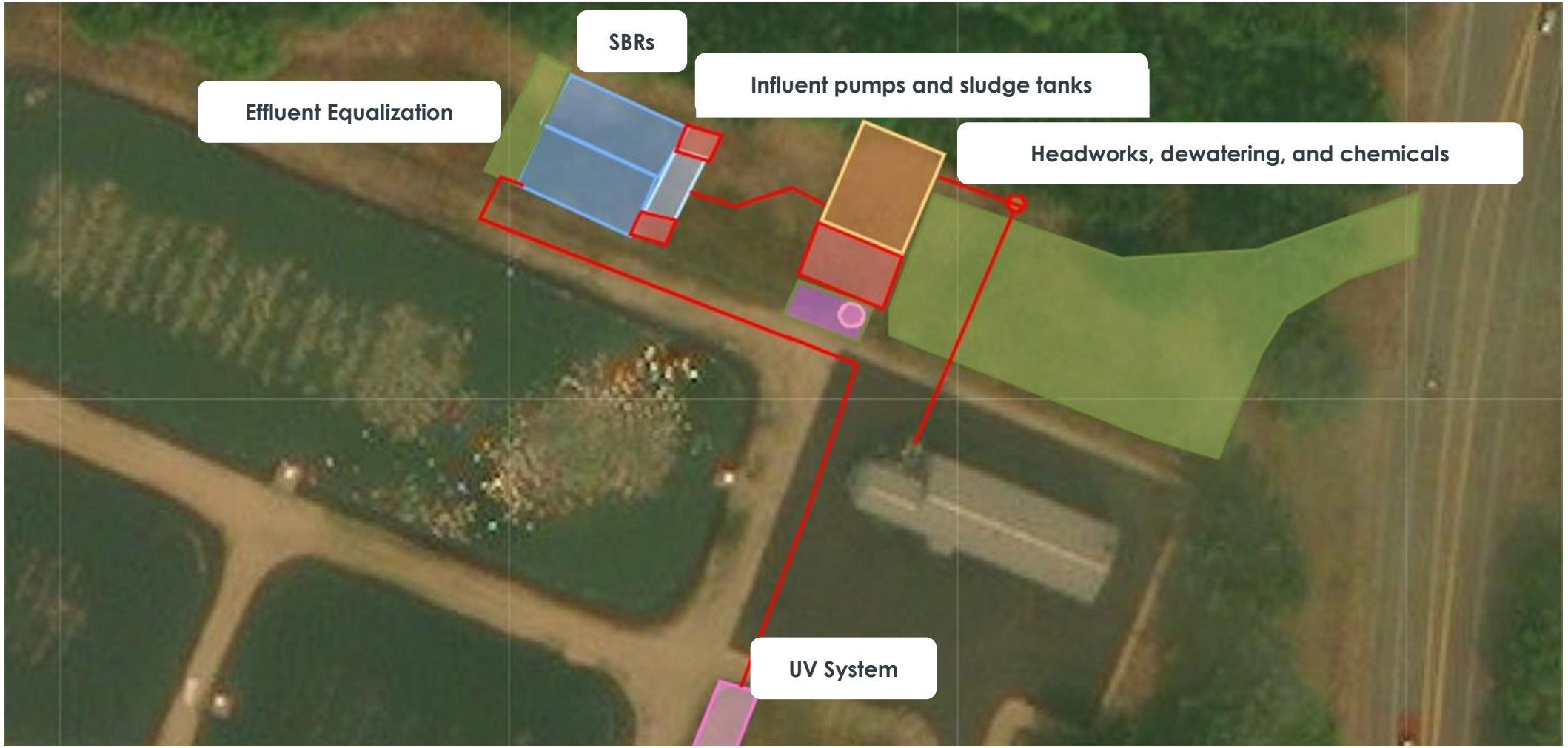
Process Evaluation & Alternatives

Secondary Treatment Alternatives - Regionalization



Process Evaluation & Alternatives

Secondary Treatment Alternatives – Sequencing Batch Reactors



Process Evaluation & Alternatives

Secondary Treatment Alternatives - Regionalization

Advantages

- Lowest cost option
  - Construction – $12M
  - 20-Year Present Worth - $20 M
- Lower operation and maintenance costs
- Decreased labor and operator requirements
- Allows for Town to construct sewer extensions at their own leisure
- Mutually beneficial potential

Disadvantages

- Coordination with neighboring town and NHDOT
- Initial connection fee, sewer use fee, and other costs
- Will require an intermunicipal agreement

Process Evaluation & Alternatives

Secondary Treatment Alternatives - SBRs

Advantages

- Flexible process
- Capable of meeting stringent effluent limitations
- Compatible with potential future TN discharge limits
- Maintains Town's independence for future growth

Disadvantages

- Highest cost option
  - Construction – $15M
  - 20-Year Present Worth - $25 M
- Increased mechanical and process system complexity
- Increased labor and operator training requirements
- Produces solids which must be stored and dewatered

Sludge Survey

Sampling & Results

Sludge Lagoon	Avg. Sludge Depth (in)	Wet Sludge Volume (ft^3)	Wet Sludge Weight (tons)	Dry sludge weight (tons) based on percent solids		
				2%	3%	4%
No. 1	23	27,100	1,100	21	32	42
No. 2	14	4,800	200	4	6	7
No. 3	8	2,500	100	2	3	4
Total	-	34,400	1,400	27	41	53

- **Determine volume of 30-year old sludge blanket**
- **Testing for Sludge Quality Certification (SQC)**
  - **High Copper in Lagoon 1**
- **$5 Million for complete decommission**

WRIGHT-PIERCE
Engineering a Better Environment

Next Steps

Facility Plan Recommendations

- Regionalization
  - More cost effective immediately and long term
  - Phasing
    - Federal, State and Town Assessments
    - Design and Construction
  - Funding

Casey Maranto & Justin Durant

THANK YOU

Casey.maranto@wright-pierce.com
Justin.Durant@wright-pierce.com