Lewes Board of Public Works
Special Board Meeting
January 29, 2024
City Hall Councill Chambers

1. **Welcome, Call to order**

2. **Roll Call**

Board Members
Thomas Panetta, President
Earl Webb, Vice President
D. Preston Lee, P.E., Secretary
Richard Nichols, Treasurer
Barbara Curtis, Assistant Treasurer

Ex- Officio Members
Austin Calaman, BPW General Manager
Robin Davis, BPW Assistant General Manager
Michael Hoffman, Legal Counsel
Andrew Williams, Mayor- ABSENT

Others
Ben Hearn, GMB
Tim Ritzert, City councilperson
Bob Heffernan, BPW Contingency Committee member
Bill Shultz, Cape Gazette
Donna Colton, BPW Contingency Committee member
Hans Medlarz, Sussex County engineer
Brenda Mitchell
Mark Prouty, BPW Contingency Committee member
Brandon Coleman, HDR
Nick Carter
Sharon Sexton, BPW Executive Assistant

3. **Open forum/general discussion on the presentation on the alternatives to GHD Report Option(s) 1 and 2 from the BPW Wastewater Treatment Facility Contingency Committee. INFORMATION/DISCUSSION/ACTION (Barbara Curtis)**

Barbara Curtis presented the overview of WWTF Contingency Committee activities, referred to Power Point presentation.

The committee recommended next steps:

- Determine the costs, risks/benefits, and community views for the revised options
    - Fund an engineering study for the new Options 1 and 2b
    - Review results of GHD study for new option 3c
- Continue negotiations with Sussex County
- If Option 3 is pursued, urge Aerobic Granular Sludge (AGS) technology be investigated for Wolfe Neck.

Brandon Coleman, HDR Engineering, presented on the AGS process and referred to Power Point presentation.

President Panetta questioned if an EQ tank was installed at the Wolcott site. Mr. Coleman stated that an EQ was not on site at the plant but further up the system. Wolcott took advantage of a pump station pumping to the EQ tank and drain into the gravity collection system to the plant. Having an EQ tank at the plant provides the most flexibility.

Mr. Calaman stated that Wolcott visited 3 other sites before deciding on AGS technology, Foley Alabama, Ireland, and London. Ireland had saltwater intrusion concerns and the system recovers quickly from shocks.

President Panetta questioned the efficiency of the plant during the six-month growth of the granules. Mr. Coleman stated that the facility was meeting the permit from the start. AquaNereda will set up the controls to promote granule growth. Wolcott started in the winter months and may have had more difficulty in the warmer months.

Mr. Lee compared the BPW 1.7 MGD plant to the Wolcott 2.0 MGD plant and questioned the acreage the Wolcott site and if there are buffers to neighbors. Mr. Coleman stated that Wolcott does not have neighbors and is on a 40-acre site. The footprint of each of the basins are 40x60 feet. A plant of this size would fit well on a 3-acre site. AS for odors, all plants have some odor but there are no odors perceived from the reactors and there is odor control on the headworks. Mr. Lee is concerned that 2 to 3 acres is small and will lack a buffer zone. Mr. Lee stated that it will be a challenge from the public to put the plant in a municipal area.

Mr. Lee questioned if the granules ever collapsed, and the process had to be started over. Mr. Coleman stated that Wolcott has not had this experience and he was not aware of any other facilities. The Foley plant operators are pleased with the technology. Ms. Curtis stated that there was one facility where was an industrial discharge that turned all water red and the plant recovered quickly from the incident.

Mr. Lee stated he is a little concerned about the ease of operating the system based on AquaNereda's need to tweak or make changes to the process. This is based off Paula Dorn's previous presentation. Mr. Coleman stated that the biggest headache was program related after startup. Mr. Coleman stated that the flexibility of the system is benefit. Paula Dorn had year long meetings every other week during start up. Conversations with other operators have been positive.

Mr. Lee questioned the total cost including sludge handling for the Wolcott facility. Mr. Coleman stated that in 2018 total cost was 37 to 38 million dollars which included the surge tank, site improvements, etc. Elevating the site cost around $1 million and much of the dirt was borrowed from the site. President Panetta questioned if there was difficulty in permitting processes, due to filling in a flood plain. Mr. Coleman stated there were no major impediments but was a lengthy process.

President questioned how many techs are at the Wolcott facility and the daily activities. Mr. Coleman stated that daily activities include checks, cleaning instruments, filling up reagents and the quarterly maintenance is performed by a vendor. The cost of the vendor is in the O+M cost. Ms. Curtis stated that Rick Bird, manager of the system for UG, projects $60,000 savings a year by bringing the maintenance of the instruments in house and a reduction of chemicals.

President Panetta questioned the programming aspect of the system. Mr. Coleman stated that at the Wolcott facility there is an AquaNereda controller and a separate SCADA system. AquaNereda can remote into the system remotely and there is a program to sign up for after the one-year warranty for AquaNereda to provide assistance. Mr. Calaman stated that this is like Suez, who BPW uses now.

Mr. Lee questions the truck traffic. Mr. Coleman stated most of the truck traffic is sludge handling.

Mr. Hoffman stated that the report has been presented and received and will need to be placed on a future agenda.

Hans Medlarz, Sussex County Engineer, stated that he is more comfortable with the technology than 18 months. Wolfe Neck decision was site driven and the savings were not there because of building in a hole. To build the AGS technology the hole would need to be filled. Mr. Medlarz stated that he is comfortable with the AGS technology. There would still be savings regarding concrete footage with the AGS technology.

Nick Carter, 1510 Bay Ave, in 1999 the BPW WWTF was operating at 750,000 gallons a day and wase encouraged to double in size by the EPA. The daily flow has appeared to continue to increase. Mr. Carter suggests including a moratorium to include bringing on new customers. Mr. Carter stated that the lowest cost solution is not the best solution. There is State and Federal funding money available. Mr. Carter stated that the WWTF decision impacts two major assets: Lewes Beach and Beebe Hospital. Mr. Carter would like to see the plant moved to higher ground. President Panetta stated that the BPW has the final decision and does not have to make a recommendation to City Council. President Panetta stated that permit load is 1.5 MGD and the average flow is 1 MGD.

Mr. Lee assured the public that the Board that this decision is not being taken lightly.

Bill Shultz, Cape Gazette, questioned if the AGS system is a cleaner/greener than the current system. Ms. Curtis stated that the AGS system does use less chemicals and power, but the effluent quality will match the current effluent.

Mr. Hoffman stated the resolution that created the committee says that the committee's work is done with the submission of this report. Ms. Curtis agrees but let the Board know, the committee stands ready to serve. President Panetta stated that the Board will discuss the Contingency Committee at the next Board meeting.

4. **Open forum/general discussion regarding the National League of Cities and Water Now Lead and Copper Rule Comments. INFORMATION/DISCUSSION/ACTION (D. Preston Lee P.E. and Austin Calaman)**

Mr. Lee stated that he received a letter from Water NOW asking for support in legislation as it relates to the lead and copper rule. The letter refers to ask for more money to be provided to local governments and agencies like the BPW. Mr. Lee would like to sign to support this effort. Mr. Nichols feels that the letter is ambiguous.

Mr. Hoffman clarified the EPA is writing the rule. The letter asks to have EPA take into consideration our requests to clearly delineate responsibility.

Mr. Nichols feels that the EPA is making the utility replace pipe up to the house.

ACTION: *Mr. Lee motioned to sign the letter as a Board. Mr. Webb seconded the motion, which passed unanimously.*

5. **Adjournment**

ACTION: *Mr. Lee motioned to adjourn. Mr. Nichols seconded the motion, which passed unanimously.*

President Panetta adjourned the meeting at 11:43 am.

Respectfully Submitted
Sharon Sexton
Executive Assistant

Lewes BPW WWTF Contingency Committee

Overview of Activities

Background: 2022 GHD Study *

- **Option 1**: Harden existing site - $23M capital / $2M annual O&M
- **Option 2**: New site at higher elevation
  - 2a - discharge via spray irrigation or rapid infiltration beds - $156M / $1M
  - 2b - discharge via existing outfall into the canal - $114M / $1M
  - 2c - discharge to ocean outfall - $186M / $1M
- **Option 3**: Partner with Sussex County at Wolfe Neck WWTP expansion
  - 3a - discharge to existing Lewes outfall to the canal - $20M / $1M
  - 3b - discharge to constructed wetlands on Wolfe Neck site - $20M / $1M

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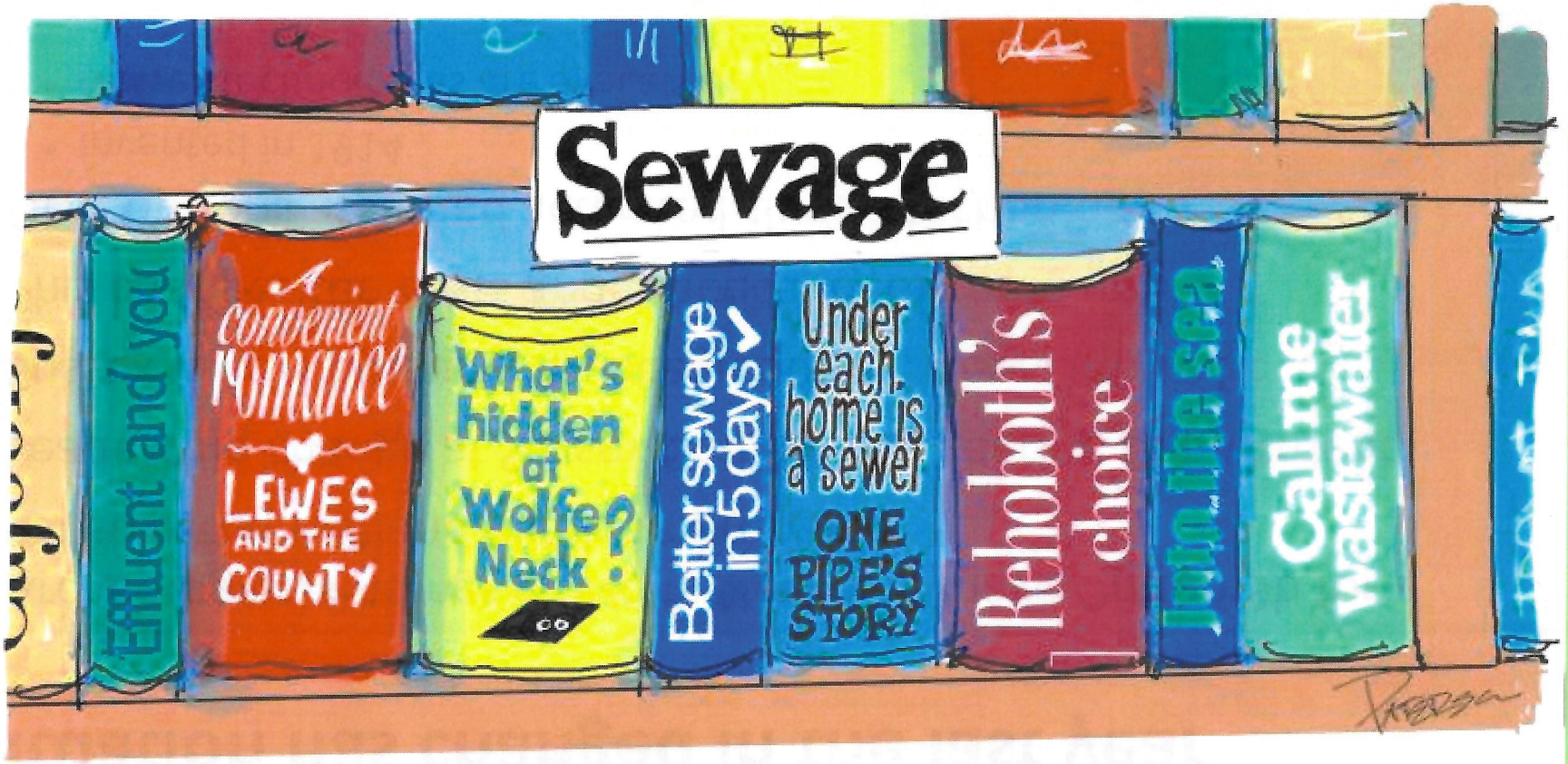
* *Costs were for Lewes only*

Background, cont.

- Seven Workshops – March 2022 through June 2023
- Public comments
- Board decision – focus on Option 3
- BPW resolution – July 2023 – WWTP Contingency Committee
  - Evaluate Options 1 & 2
  - Consider other proven treatment technologies
  - "Just in case"


Sewage
Effluent and you
A convenient romance
LEWES AND THE COUNTY
What's hidden at Wolfe Neck?
Better sewage in 5 days
Under each home is a sewer
ONE PIPE'S STORY
Rehoboth's choice
Join the sea
Call me wastewater

Situation has changed in the last year

- Archeological findings at Wolfe Neck site make Option 3b for a constructed wetland highly improbable
- Leadership change at Sussex County Engineering Department
- Sussex is now pursuing an ocean outfall, **new Option 3c**
- This changes the costs and practicality of some options
- GHD options assumed activated sludge technology
  - Invented in 1914
  - Newer technologies are available

WWTP Contingency Committee

Members

Barbara Curtis, Chair
Earl Webb, Board Member
Austin Calaman, General Manager BPW
Tim Ritzert, City Council ex-officio
Mark Prouty
Donna Colton
Sumner Crosby
Daphne Fuentevilla
Bob Heffernan

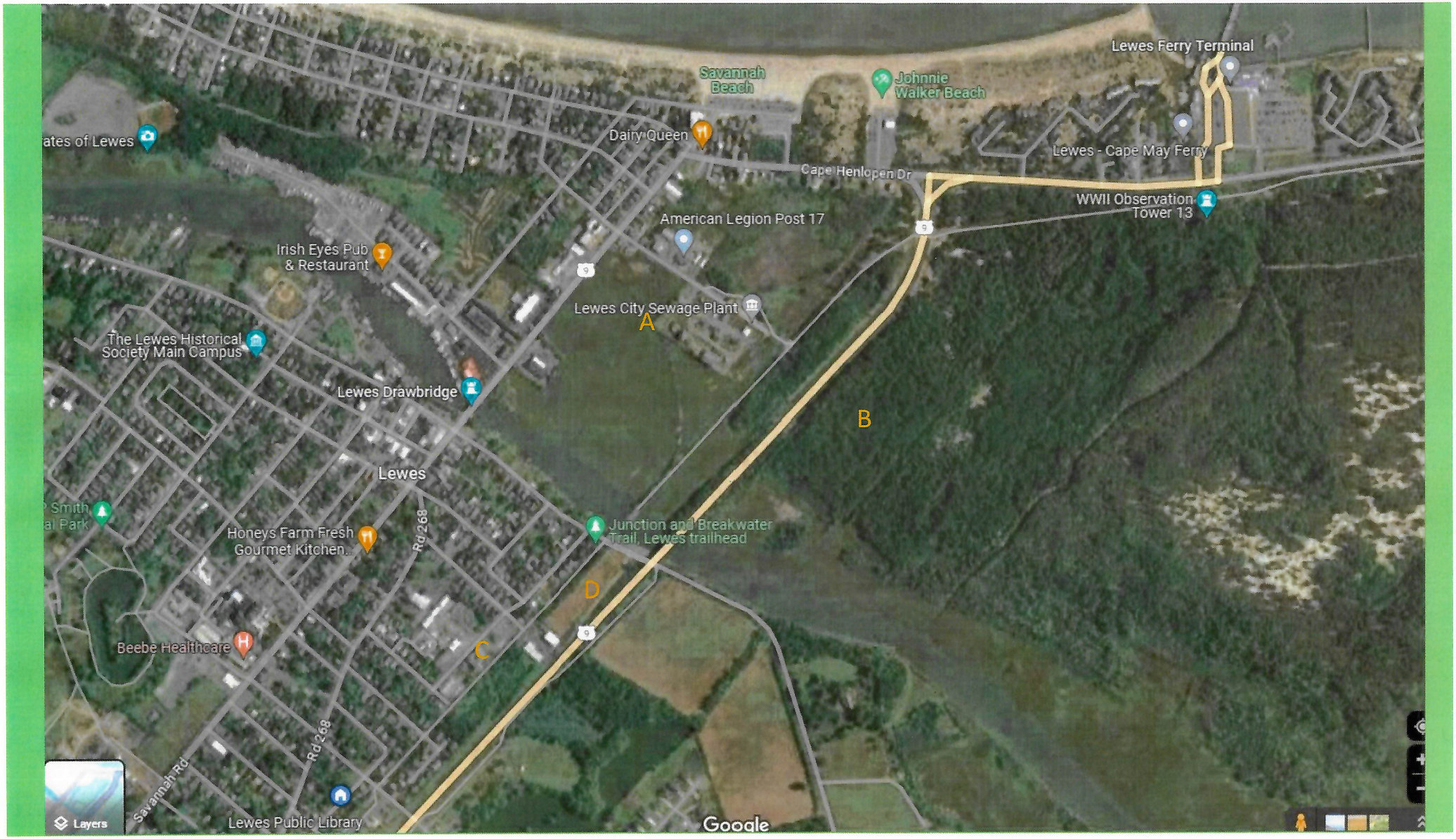
WWTP Contingency Committee

- Considered alternatives beyond those in the GHD study
- Explored different technologies
  - Webinars, visits, case studies, research, meetings, Q&As with engineers and operators for technologies of interest
- Explored alternate locations
  - Consulted UD experts
  - Elevation maps
- Discussions were as wide-ranging as possible

- The committee went as far as possible without spending any money

Meetings and Investigations

- Technologies considered: more sustainable + smaller footprint
  - **Sequencing Batch Reactors (SBR)**
    - Proven technology 30 years
  - **Aerobic Granular Sludge (AGS) "Nereda"**
    - 80+ operating plants world-wide
    - 2012 first operating municipal WWTP
- Presentations
  - Aqua-Aerobic Systems, Inc. - October meeting + several webinars + Q&As
- Tour of Berlin, MD - SBR WWTF
- Discussions with operators
  - Berlin WWTF
  - Riviera Utilities WWTF Alabama – 2020 startup
  - Whitefish WWTF Montana – 2021 startup
  - Wolcott WWTF Kansas – 2022 startup


Savannah Beach
Johnnie Walker Beach
Lewes Ferry Terminal
Dairy Queen
Lewes - Cape May Ferry
Cape Henlopen Dr
WWII Observation Tower 13
American Legion Post 17
Irish Eyes Pub & Restaurant
Lewes City Sewage Plant
A
The Lewes Historical Society Main Campus
Lewes Drawbridge
B
Lewes
Junction and Breakwater Trail, Lewes trailhead
Honeys Farm Fresh Gourmet Kitchen
Rd 268
D
Beebe Healthcare
C
Savannah Rd
Rd 268
Lewes Public Library
Layers
Google


Street / Tax Parcel / Watershed
VE 12
VE 10
AE 10
Cape Henlopen Dr
Anglers Rd
E Savannah Rd
AE 7
AE 8
AE 9
9
W 3rd St
W 4th St
Lewes
Savannah Rd
Kings Hwy
Theo C Freeman Memorial Hwy
Gills Neck Rd
Battlemixer Dr
AE 5
AE 6
LAT/LONG
-75.146102, 38.761964

Options Evaluated

- New Option1: Harden the current site
  - Also considered discharge into wetlands "A" via spray irrigation
- New Option 2: Build nearby (Option 2b from GHD Study):
  - "B" State lands within Lewes border
    - Spray irrigation / solid-set sprinklers for discharge from plant

      - and / or-
    - Lease a 2-4 acre parcel above floodplain from the state
  - "C" BPW/City Schley Avenue property
  - "D" Empty parcel

Option 1, revised

- **Current WWTF site**
  - Effluent quality better than permit requires… cleaner than water in the canal
  - Membrane technology is expensive to operate
  - Other technologies can achieve same quality at lower cost and in smaller space
  - Elevate structures rather than dike the site
  - Provide emergency access via hiking trail off Freeman Highway

- **Site can be floodproofed**
  - Sufficient room to install new system safely, while current operations continue
  - Reuse some existing equipment
  - Both SBR and AGS have lower operating costs
  - AGS has lower capital and operating costs – energy, labor, & chemicals
  - Both are proven technologies

Option 1

	GHD	AQUA-AEROBIC SYSTEMS, INC.
TECHNOLOGY	Oxidation ditch, MBR expansion	Aerobic Granular Sludge, tertiary filters
CAPITAL	$18M	Estimated similar: Aqua-Aerobic cost ~$3M
O&M	$2M/year	$500K/year [$300K at 2-year-old AGS plant]
LAND	Existing site + wetlands	Existing site
HARDENING	Dike property, larger EQ tank, elevate roadway	AGS tanks 20-24'; elevate buildings and equipment; floodproof digester building
ACCESS	Elevate road over dike	Widen hiking trail, access via Freeman Hwy
LABOR	6 FTE	2 FTE [+ manager, per DNREC rules]
ENERGY USE	6500 kWhr/day	Estimated 50% lower
CHEMICALS	$1,000/day	$200/day

Option 2b, revised

- GHD: Classic activated sludge plant – 20 acres
- New: Aerobic granular sludge plant – 2-3 acres

- 3 possible sites within Lewes
- No need for lengthy pipe runs
- Safe unless/until Lewes is forced to retreat

Option 2

	GHD Option 2b	AQUA-AEROBIC SYSTEMS, INC. New Option 2b
TECHNOLOGY	Activated sludge + tertiary filtration	Aerobic Granular Sludge [AquaNereda] + Aqua-Disk filters
PROJECT CAPITAL COST	$91M	Estimated at $35-40M [$35M capital cost for 2 mgd WWTF 2021 in floodplain]
O&M COSTS	$1M+ /year	$300-$500K/year [$300K budget 2024 for 2-year-old plant]
LAND	20 acres	2-3 acres
LABOR	6 FTE	2 FTE [+ manager, per DNREC rules]
DISCHARGE	Canal	Canal [fixed-head irrigation would add labor]

Conclusions

The committee is pleased to report that Lewes has options

- Recommended next steps
  - Determine the costs, risks / benefits, and community views for the revised options
    - **Fund an engineering study for the new Options 1 and 2b**
    - **Review results of GHD study for new Option 3c**
  - Continue negotiations with Sussex County

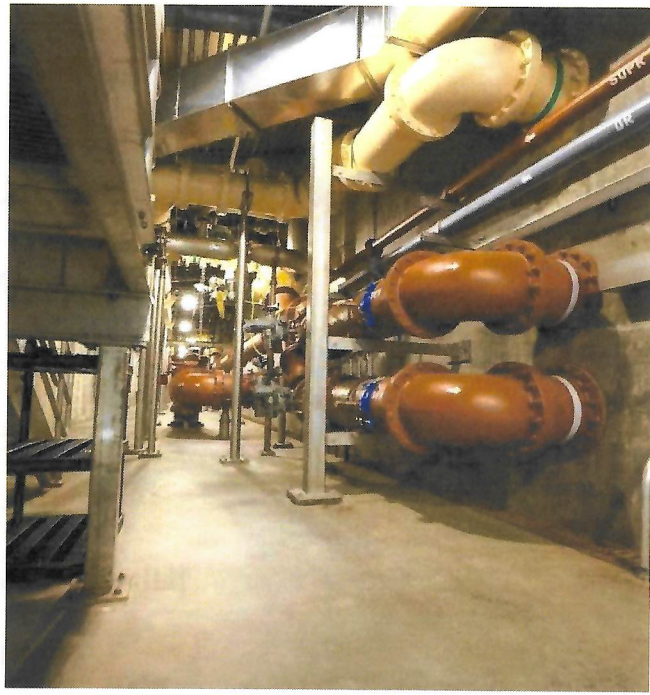
- When costs and risks are understood, the Board will be able to make a more informed decision
- If Option 3 is pursued, urge AGS technology be investigated for Wolfe Neck

Next Up

Brandon J. Coleman, P.E.
Vice President
HDR Engineering, Inc.
Kansas City, MO 64131
brandon.coleman@hdrinc.com

The Aerobic Granular Sludge Process

Wolcott, KS AGS



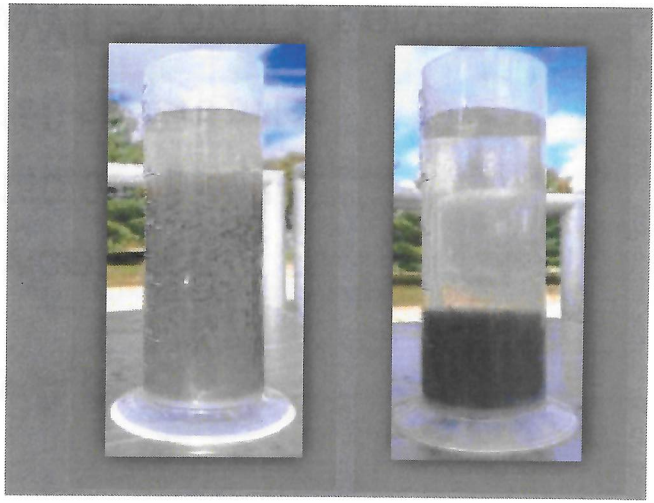
Aerobic Granular Sludge Process

Wolcott WWTP Unified Govt. of KCK

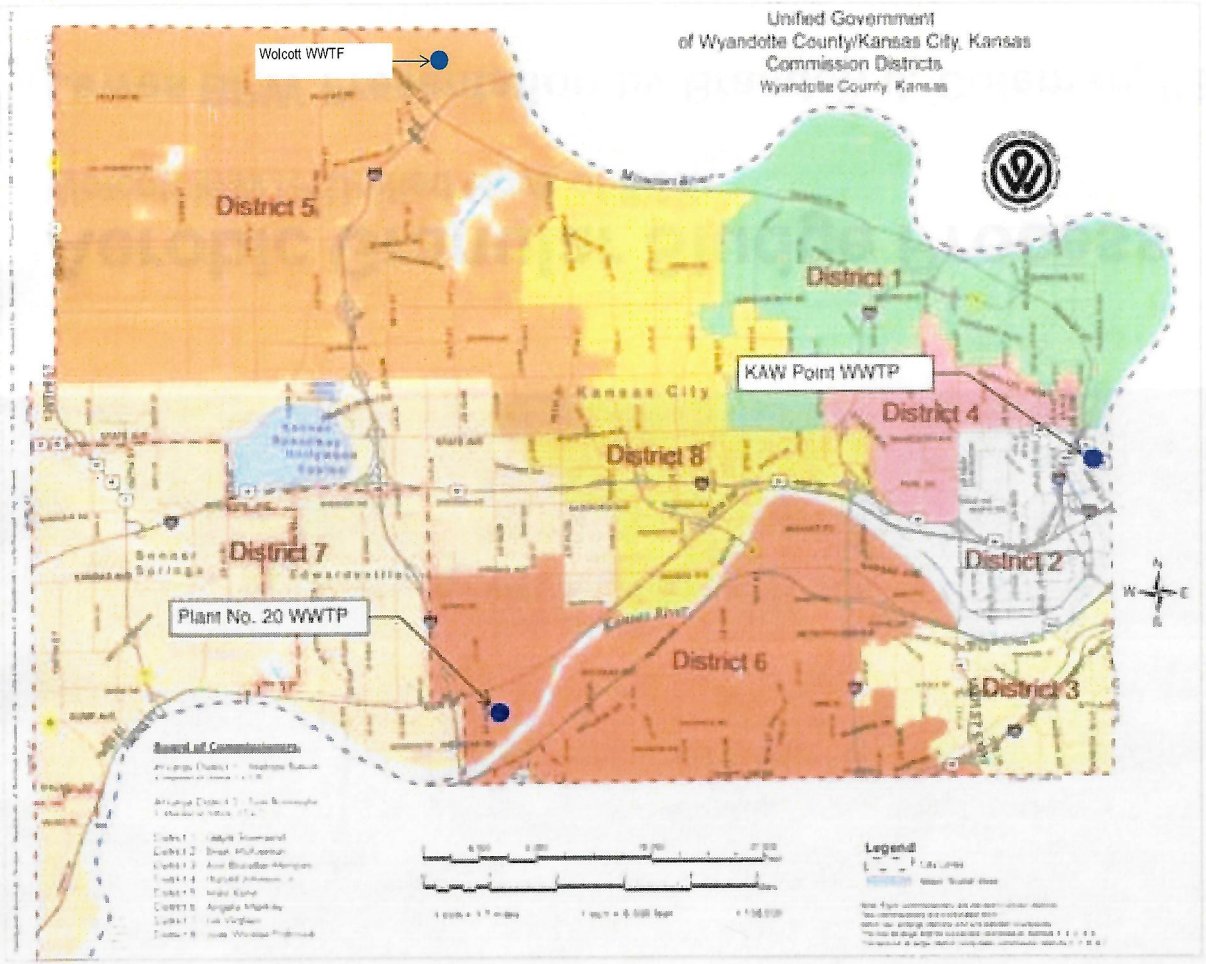
Lewes BPW Presentation by Brandon J. Coleman, PE

HDR

January 29, 2024



Unified Government Wastewater Service Area

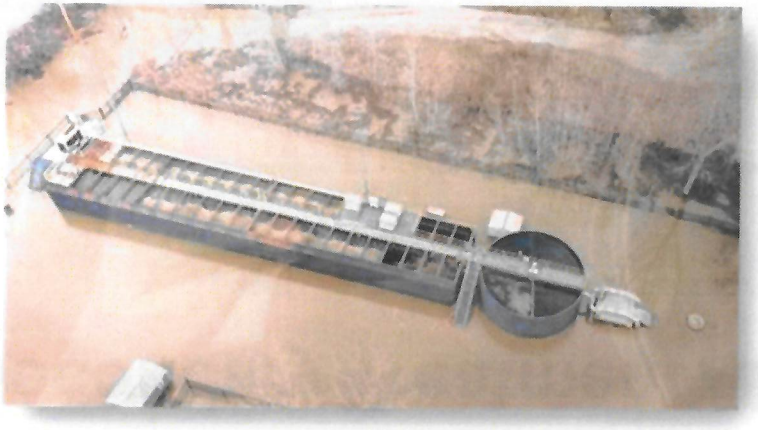


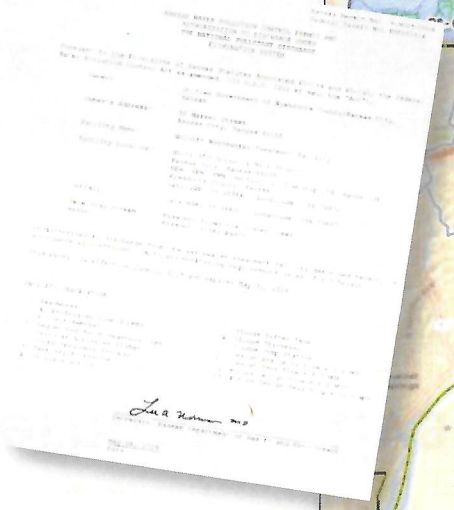
- Service area
  - 160,000 people
  - 150 square miles
- 5 WWTPs over 8 service districts
  - Kaw Point
  - Plant 3
  - Plant 14
  - Plant 20
  - Wolcott
- Combined treatment: 35 MGD

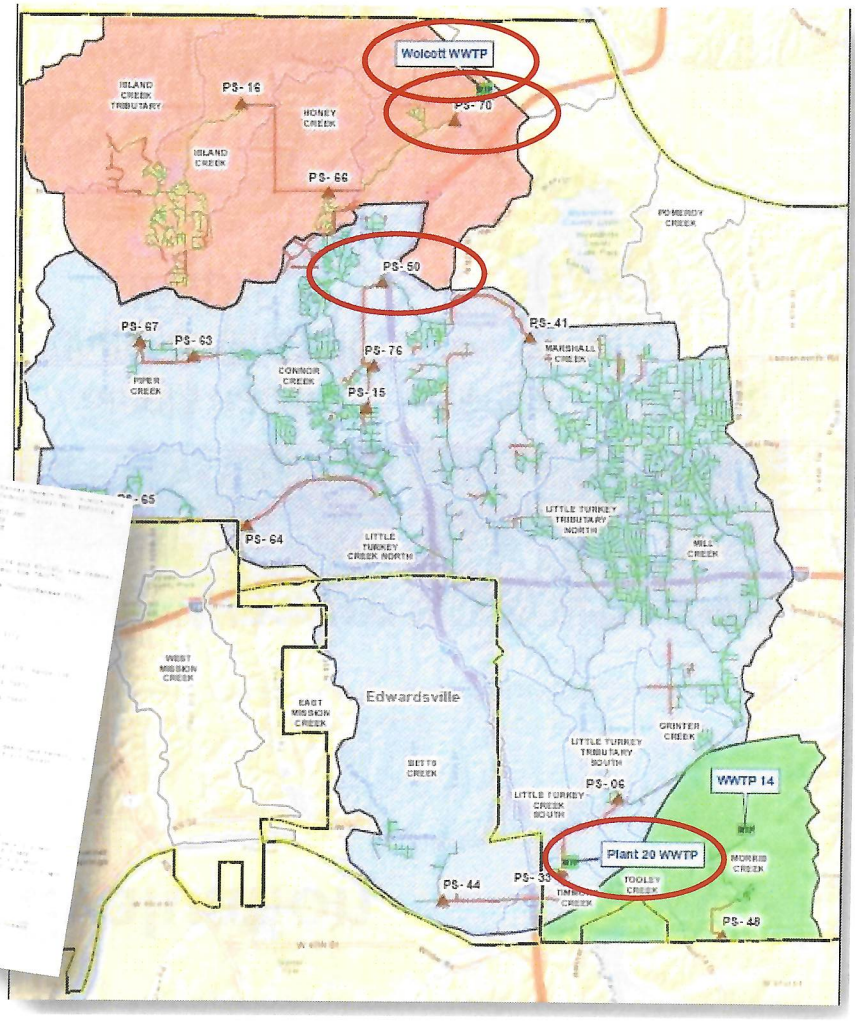
Wolcott Wastewater Treatment Plant

Project Drivers

- Growth within Wolcott watershed
- Reduce sanitary sewer overflows
- Reduce pollutant load to Kansas River
  - Improve dissolved oxygen conditions







Secondary Treatment Alternatives Evaluation

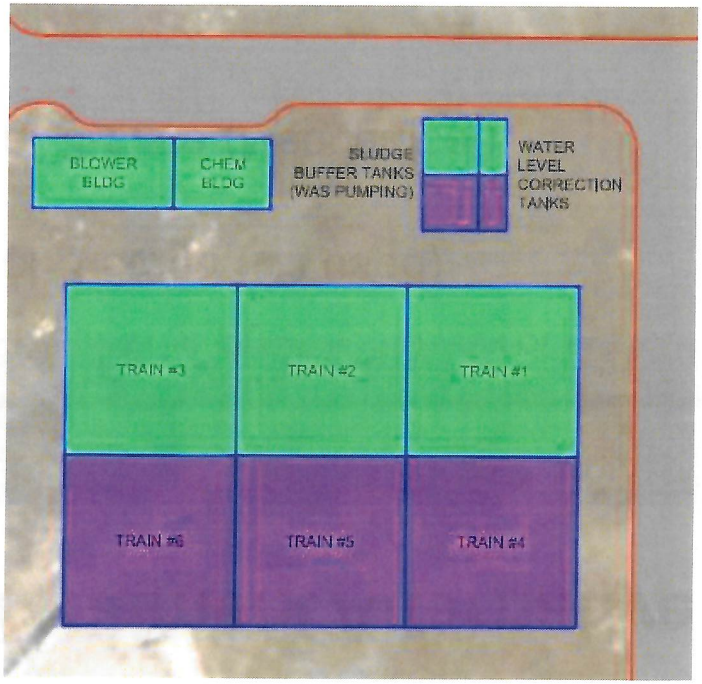
ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
Conventional 3-Stage (Diffused)	Conventional 3-Stage (Mechanical)	Integrated fixed-film activated sludge (IFAS)	Single basin, phased nit/denit (PNDN)	Aerobic Granular Sludge (AGS)

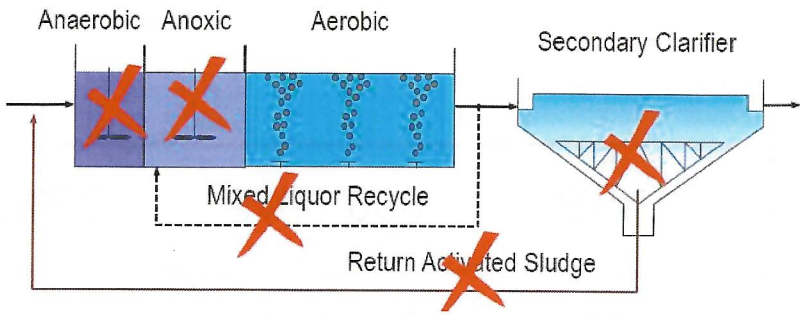
ALT 5

AGS

Features

- Similar to SBR, single tank operation (parallel trains)
- BNR via granular microbe population
- No separate clarification / RAS pumping





Advantages

- Reduced footprint, deep SWD, process intensification, no separate biological stages, clarifiers / RAS pumping (*applicable to Lewes*)
- Advanced treatment levels (*applicable to Lewes*)
- Rapid settling granules

Disadvantages

- Newer technology (Over 100 installations with 16 in the US)
- Need for flow EQ (>3:1 PF ratio, 2 basin operation)
- Controls/instruments/modulating valves complexity (compared to traditional CAS)

Secondary Treatment Alternatives Evaluated

Alternative	Capital Cost (1) (Millions)	Annual O&M Cost (1)	20-Year NPV Cost (1) (Millions)
Alt. 1 – Conventional 3-stage (Diffused)	$16.6	$198,000	$19.9
Alt. 2 – Conventional 3-state (Mechanical)	$18.9	$333,000	$24.3
Alt. 3 – IFAS	$18.2	$246,000	$22.3
Alt. 4 – Conventional Single Basin (Phased NDN)	$17.9	$263,000	$22.1
Alt. 5 – AGS PREFERRED ALTERNATIVE	$12.0	$163,000	$14.7

(1) Cost for secondary treatment train only, 2018 dollars.

HDR Installations/Evaluations of AquaNereda®

Operational:

Location	Design Capacity (mgd, average daily)
Wolcott, KS	2.0
South Sioux City, NE	2.5

Under Design:

Location	Design Capacity (mgd max month)
Cedar Rapids, IA	67
Omaha, NE Missouri River WWTF	46
Omaha, NE Papillion Creek WWTF	95
Charlotte, NC	15

Pilot Studies:

Location	Design Capacity (mgd max month)
Reno, NV	16

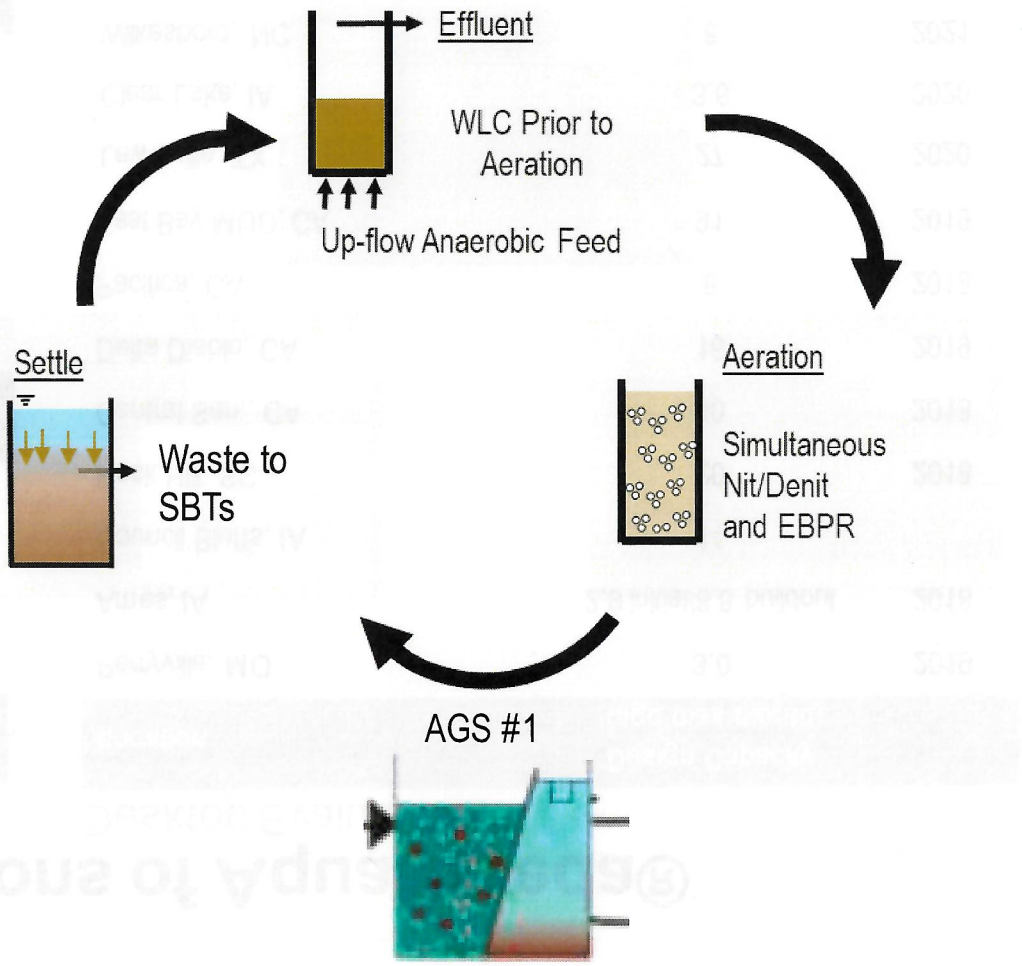
Desktop Evaluations:

Location	Design Capacity (mgd max month)	
Perryville, MO	3.0	2019
Ames, IA	2.9 initial/8.8 buildout	2018
Council Bluffs, IA	14	
Rock Hill, SC	20	2018
Central San., CA	40	2018
Delta Diablo, CA	16	2019
Pacifica, CA	6	2019
East Bay MUD, CA	91	2019
Lewisville, TX	27	2020
Clear Lake, IA	3.6	2020
Wilkesboro, NC	8	2021

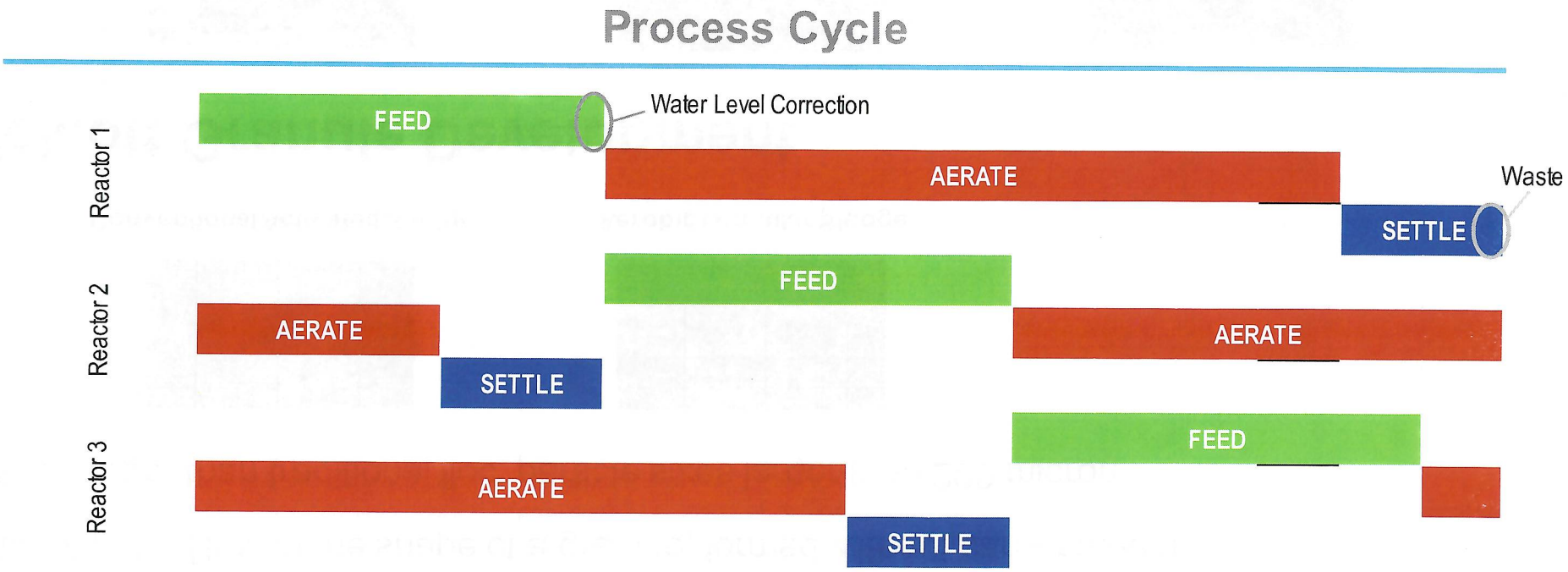
Aerobic Granular Sludge (AGS) Process

What is AGS?

- Royal Haskoning DHV, Licensed in United States by Aqua-Aerobic
- "AquaNereda®"
- Cyclic process, similar to SBR with three primary cycles



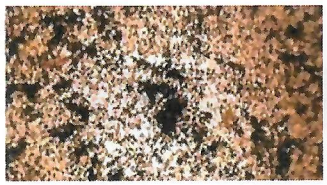
AGS Process – Cycles



- Continuous Reactor Feed (one at a time)
- Modulating Airflow Between Active Basins

What is a Granule?

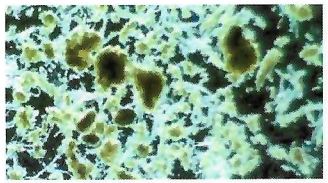
- Microbial biofilms in the shape of a granule, formed without carrier media
- Much larger than traditional floc, particle sizes larger than 200 micron



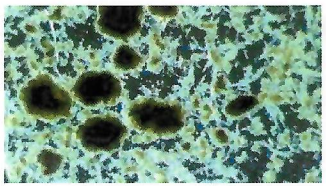
Conventional Activated Sludge

Aerobic Granular Sludge

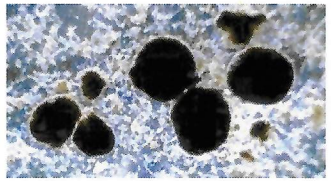
Wolcott Granule Development



March 1st
(~ 2 months)



March 24th
(~ 3 months)

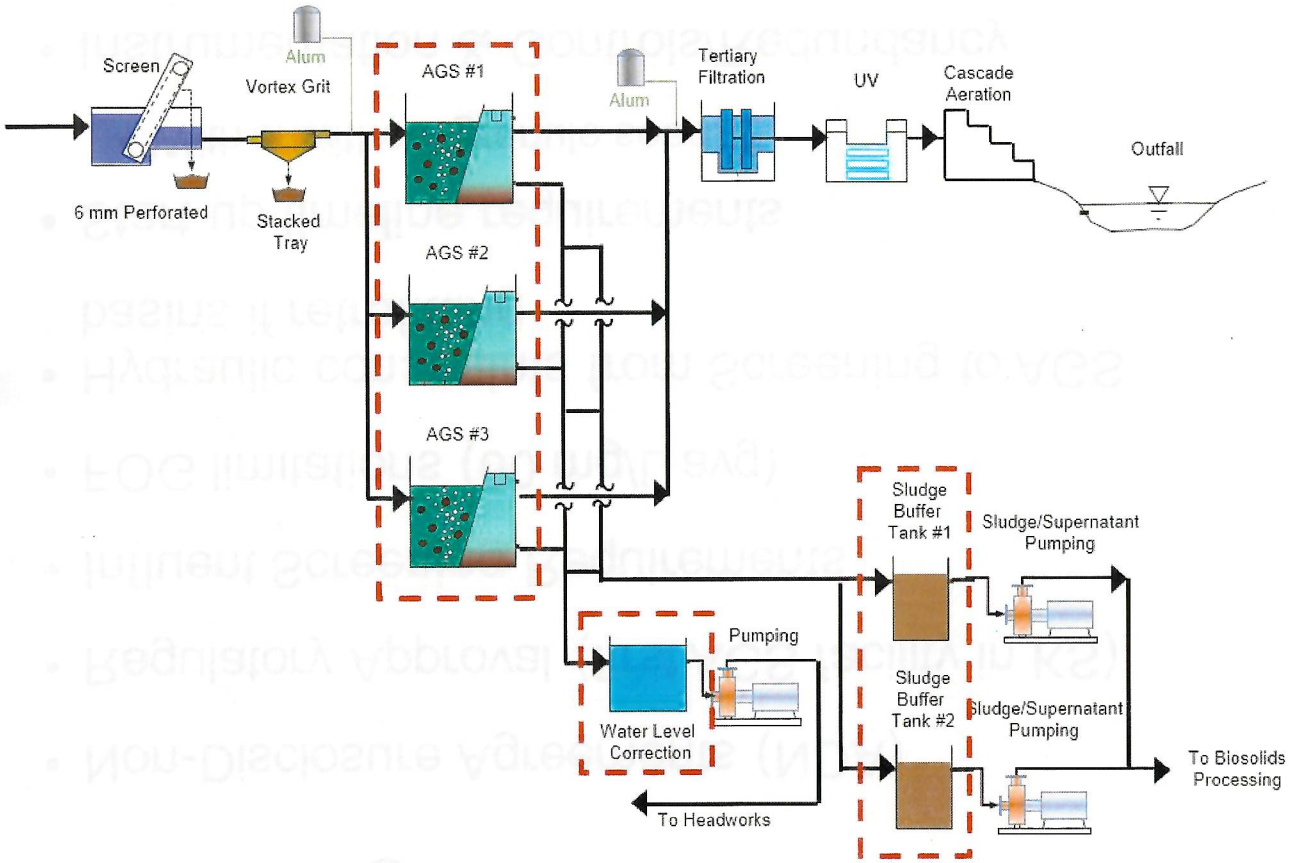


August 6th
(~ 6 months)

AGS Design Considerations

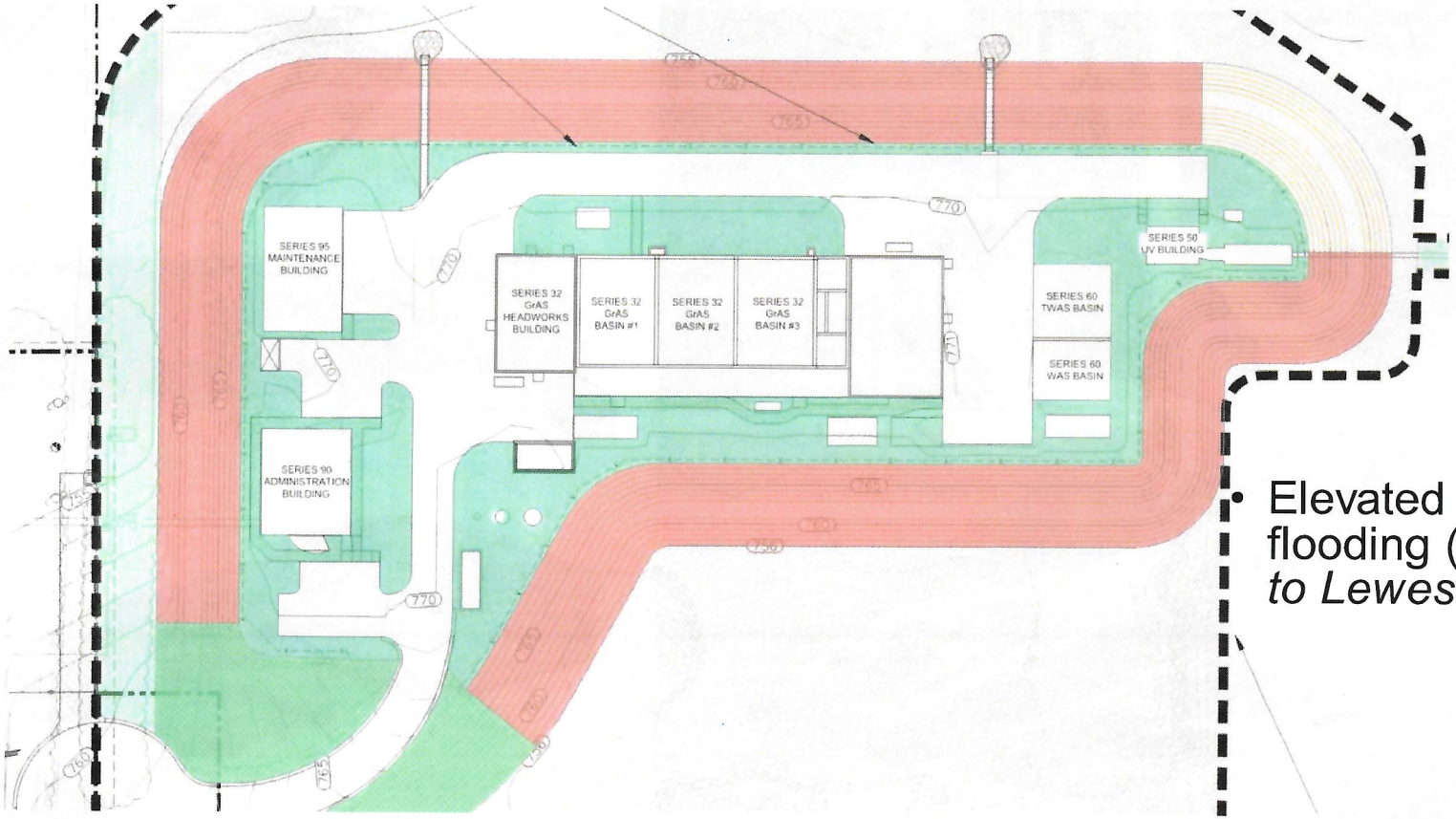
- Non-Disclosure Agreements (NDA)
- Regulatory Approval (first AGS facility in KS)
- Influent Screening Requirements
- FOG limitations (60 mg/L avg)
- Hydraulic constraints from Screening to AGS basins if retrofitting
- Start-up timeline requirements
  - With or without granule seed
- Instrumentation & Controls/Redundancy

Wolcott WWTF – Schematic/Design Values

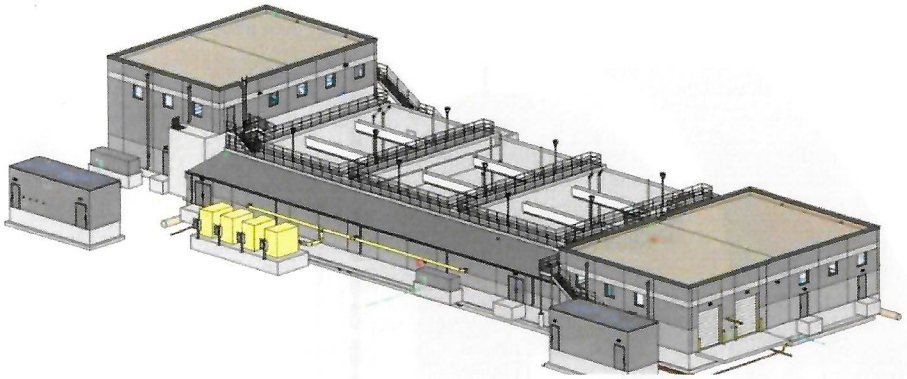


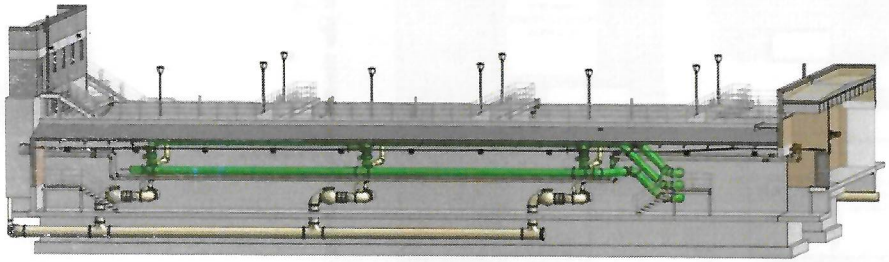
Design Criteria	
Design Average Flow	2.0 MGD
SRT @ 8,000 mg/l MLSS	18 Days
HRT	15 Hrs
Basin Volume, Total	1.23 MG
Number of Trains	3
Basin Dimensions (W x L)	42' x 62'
Train Depth (SWD)	21'

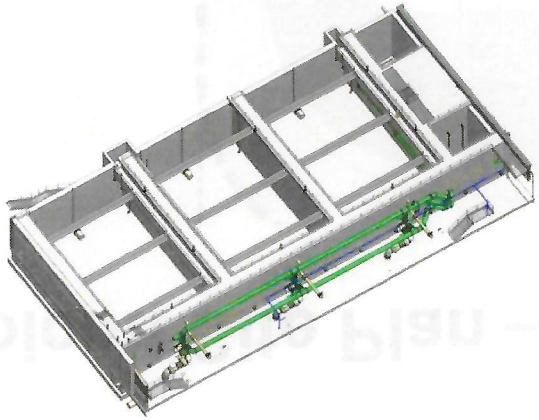
Wolcott Site Plan – Design

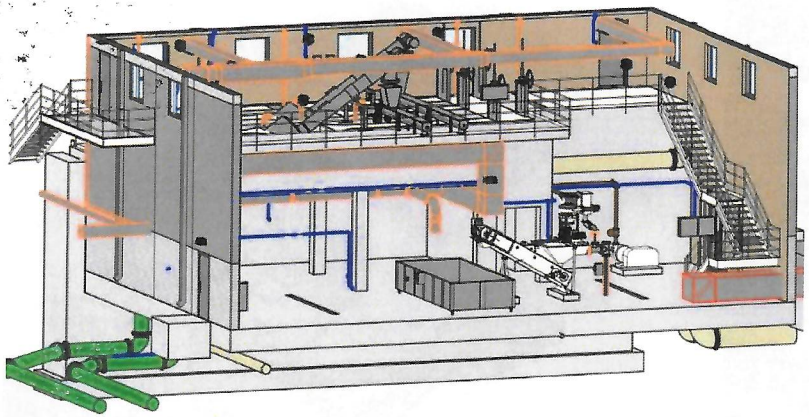


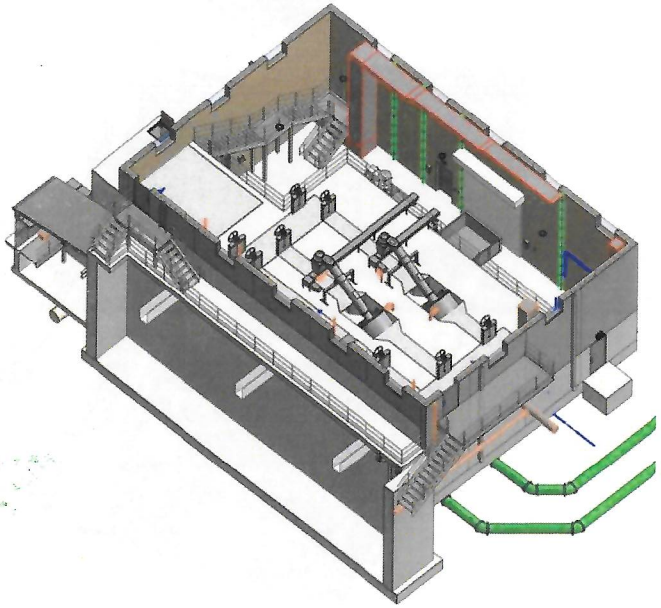
- Elevated site due to flooding (*applicable to Lewes*)

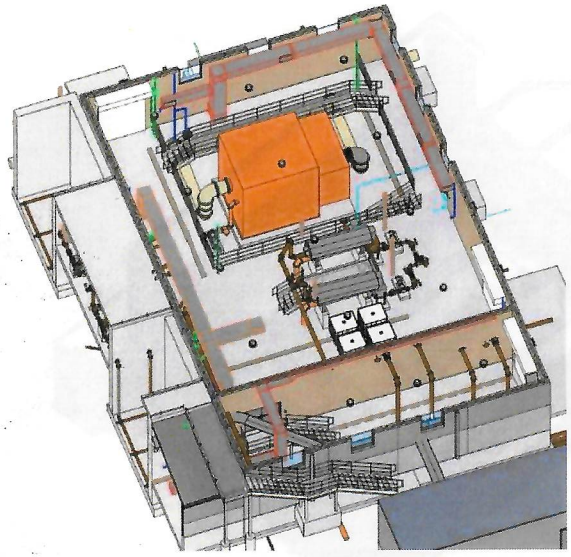


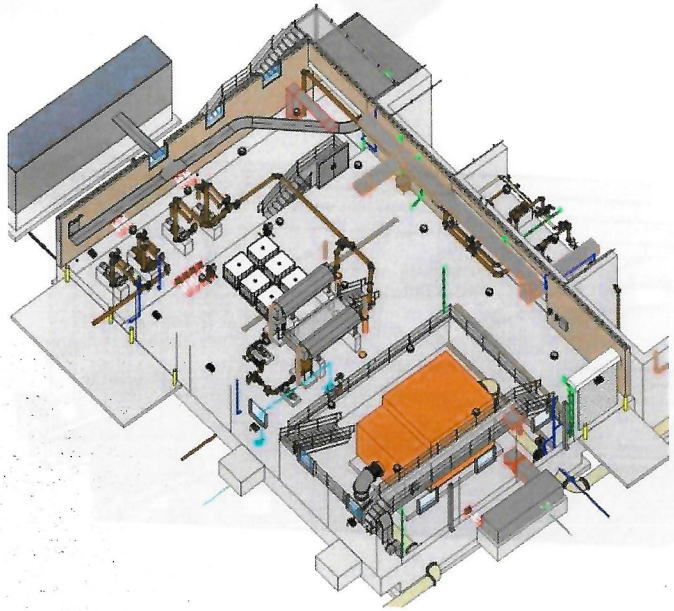








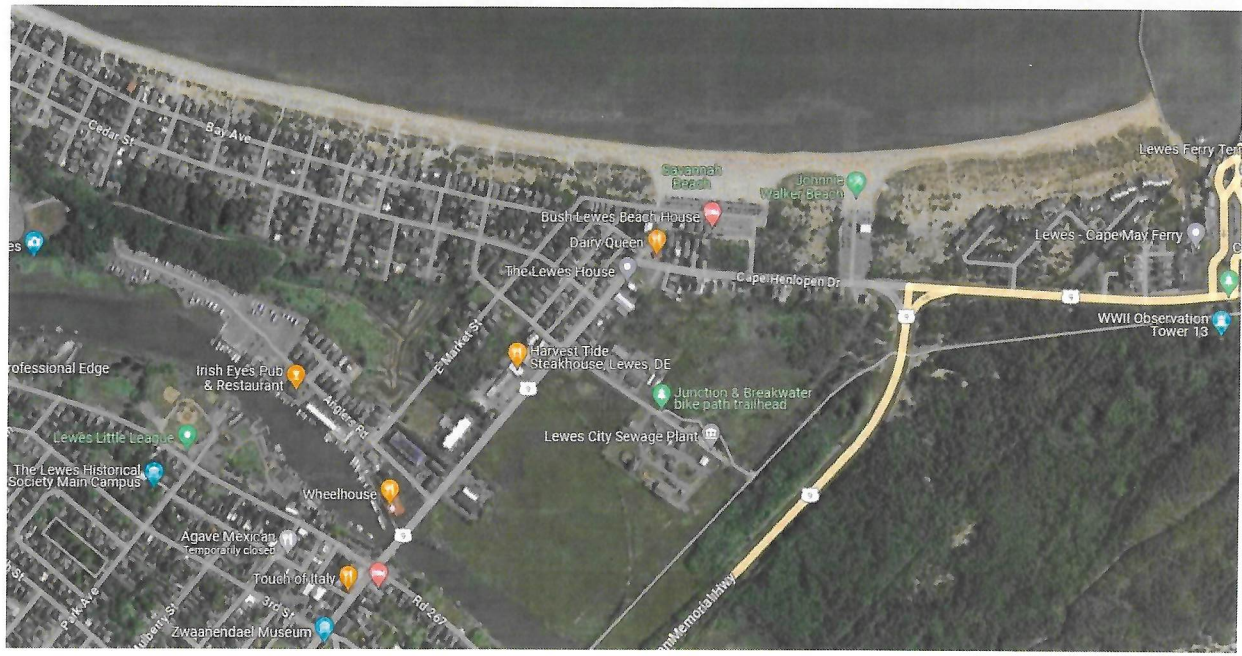




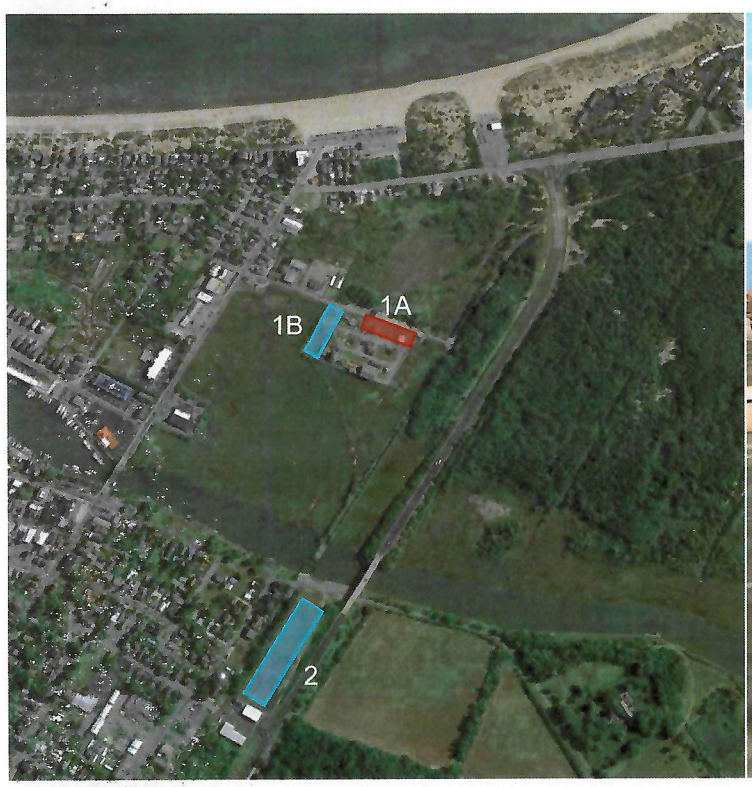

AquaDisk

Lewes Project Drivers

- Storm surge / flooding vulnerability at existing site
- O&M cost / complexity of membrane bioreactor system
- Influent screening requirements / complexity

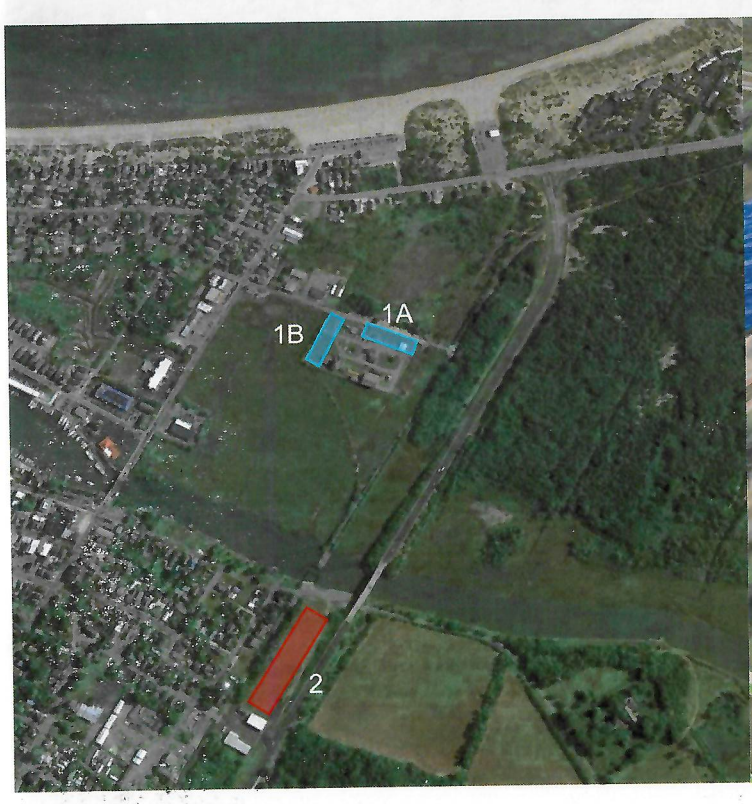


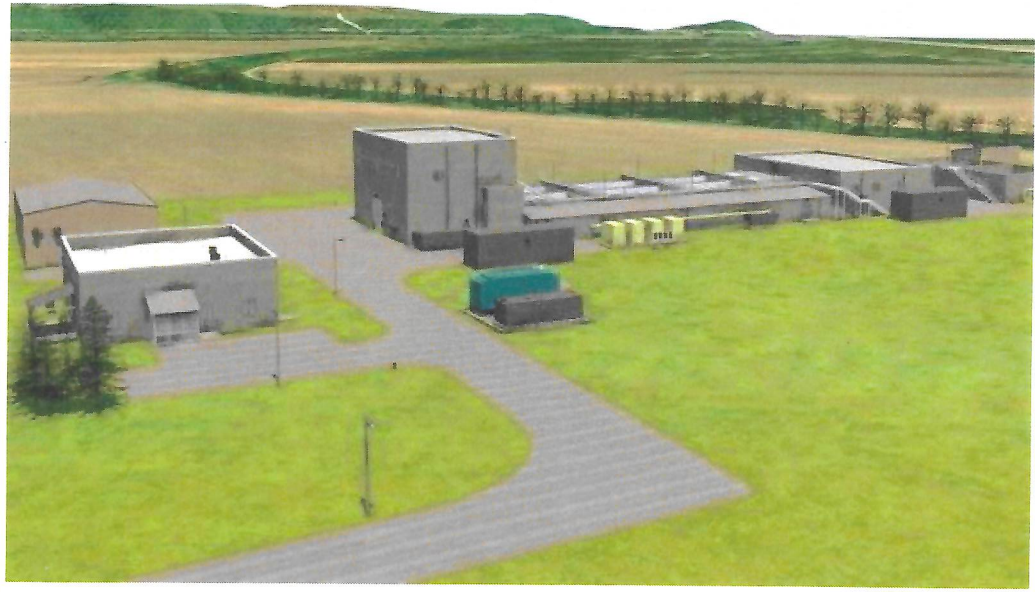
Lewes Site Option 1A – Located Over Existing Drying Beds



Lewes Option 1B – Located on Existing Open Ground

Lewes Option 2 – Alternative Site South of Canal





Brandon Coleman, PE
HDR Engineering Inc.
MO/KS Wastewater Treatment Lead
brandon.coleman@hdrinc.com