



# LCA Pretreatment Plant

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Update to the Board of Directors  
March 25, 2024





## Pretreatment Plant (PTP)

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1980s Goal: Centralize pretreatment & support growth in region

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Constructed by County of Lehigh in 1990

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Transferred to LCA in 2009 debt-free

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Viewed as a significant community investment!

Value of PTP  
to our region is huge!

## Lehigh County Authority Industrial Pretreatment Facility

Economic Contribution Analysis

**AECOM**

- 22 businesses across 11 industries located in Lehigh County rely on the PTP to support daily operations.
- These businesses employed an estimated 2,950 workers in 2022 generating \$253 million in annual earnings.
- The PTP has been successful in attracting and fostering a highly concentrated food and beverage manufacturing industry.

# LCA Mission

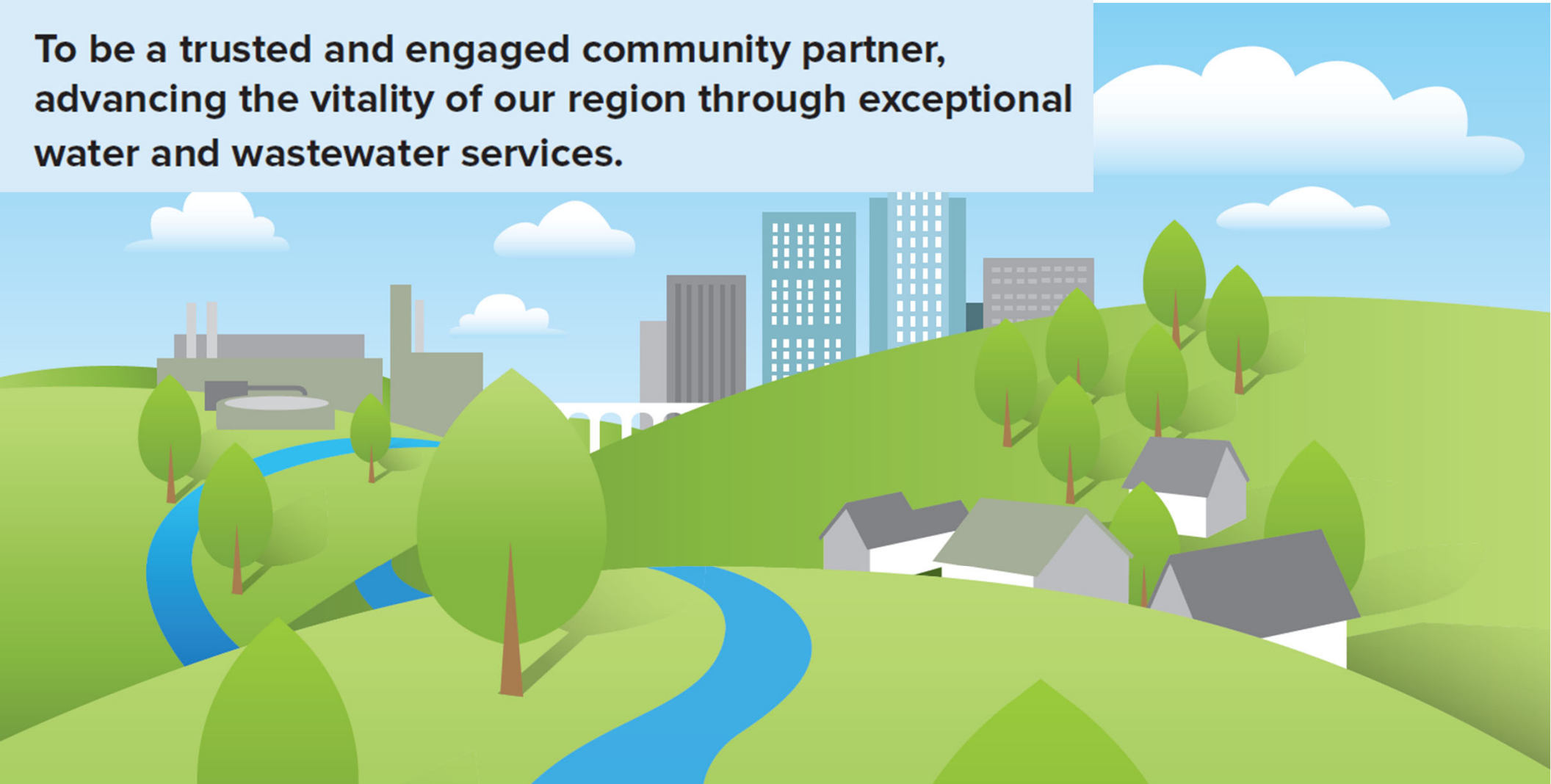


Lehigh County Authority

To protect public health and the environment by providing high-quality, safe, and reliable water and wastewater services.

## **Vision:**

**To be a trusted and engaged community partner, advancing the vitality of our region through exceptional water and wastewater services.**



# Overarching Goals for Centralized Pretreatment



- Support success and growth of existing industries
- Support economic growth desired in our region
- Develop cost-effective solutions
- Realize economies of scale
- Leverage regional support to maximize grant / funding opportunities
- Utilize tax-exempt / municipal status to lower borrowing costs



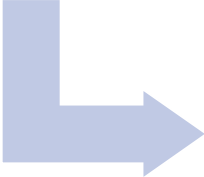
## Pretreatment Plant Project Goals

- Address near-term critical facility needs
- Develop cost-effective solutions (capital & operating costs)
- Balance loads appropriately via pretreatment & final treatment plants
- Establish processes to ensure long-term plant reliability
- Maximize value of the facility (natural gas capture → tax credits & revenue generation)

# How it works

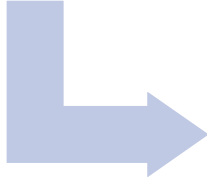
Industries & Other Users

- BOD Loadings = approx. 2200 mg/L (65,000 pounds)



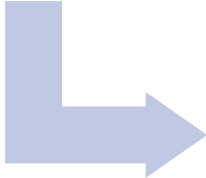
Pretreatment Plant

- Knocks BOD down to 25 mg/L (64,000 pounds removed)



Downstream WLI users

- Added BOD loading → approx. 150 mg/L at LCA MS 5 (Keck's Bridge) (12,500 pounds)



KIWWTP Total

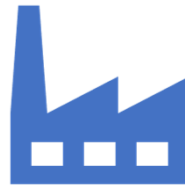
- LCA, City plus City signatory waste streams = 160 mg/L (42,000 lbs)



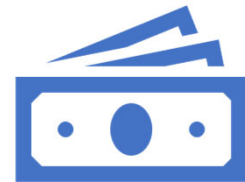
# Three major challenges



Pretreatment Plant at end of its useful life – major replacement needed



Limited / no remaining capacity available for new industrial growth



No financial mechanism to capture capital costs

# Renewal and Replacement Needs (Capital Improvements)

## 2022 Condition Assessment:

- Buildings / HVAC / Odor Control / Process Equip. / Electrical / Oxygen Plant

- Flow Equalization Basin
- Headworks
- Primary Sedimentation
- Hauled-waste receiving
- Secondary Treatment and Oxygen Plant
- Secondary Sedimentation
- Secondary Sludge Pump Station
- Digestion
- Dewatering Facilities
- Substation
- Odor Control

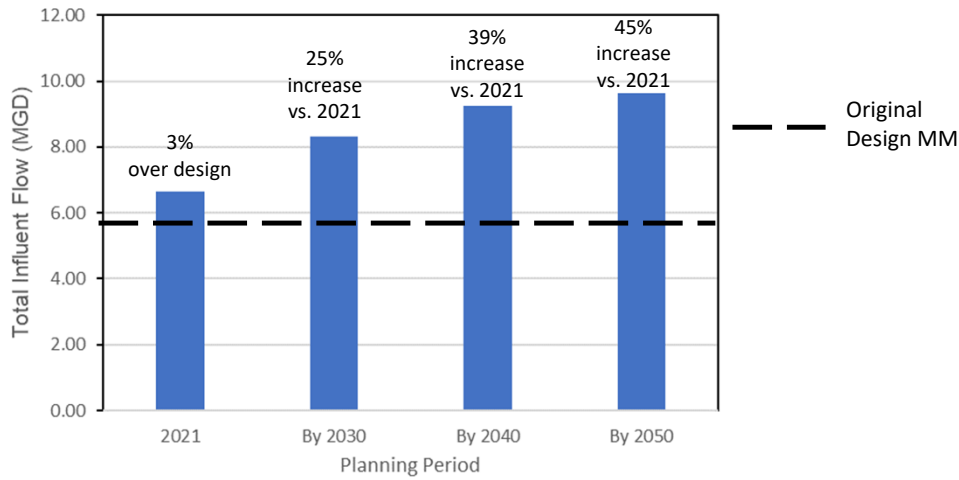


## Renewal and Replacement Needs (Capital Improvements)

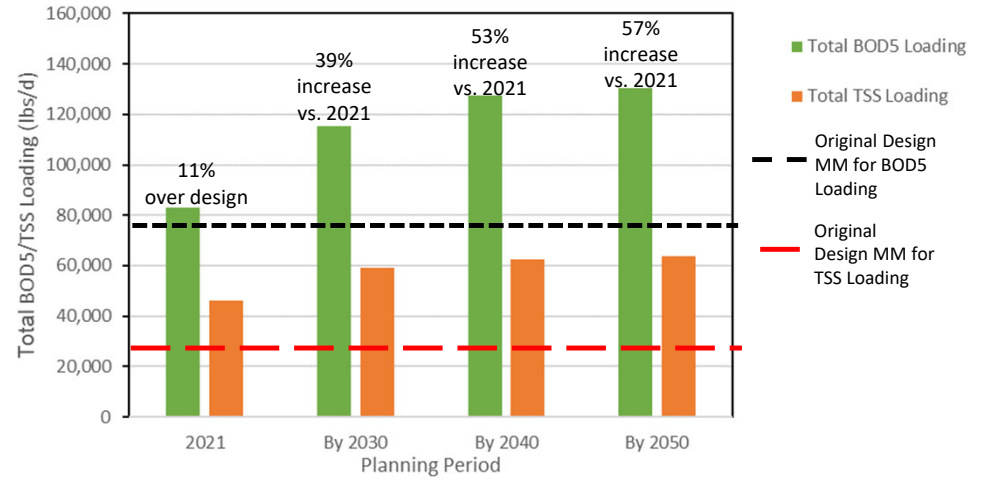
- **Main Findings:**
  - **PTP is >30 years old, useful life of mechanical and treatment equipment is 30 years**
  - **Electrical System is >30 years old, parts hard to find and equipment is becoming obsolete**
  - **Cryogenic Oxygen Generation Plant, requires increased level of improvements and maintenance - until replaced with new facility**
  - **Aeration treatment trains – cannot be removed from service for internal inspections and repairs**
  - **Secondary clarifiers – cannot be removed from service for recommended rehabilitation work**

# Current & Future Flows and Loads to PTP

Max Month (MM) Average Day (Treatment Plant Design Basis)



Future Flows vs. Original Design



Future Loadings vs. Original Design

Financial  
Challenge:  
Limited capacity  
renew the facility



Boston Beer as direct customer



Other industries as indirect customers

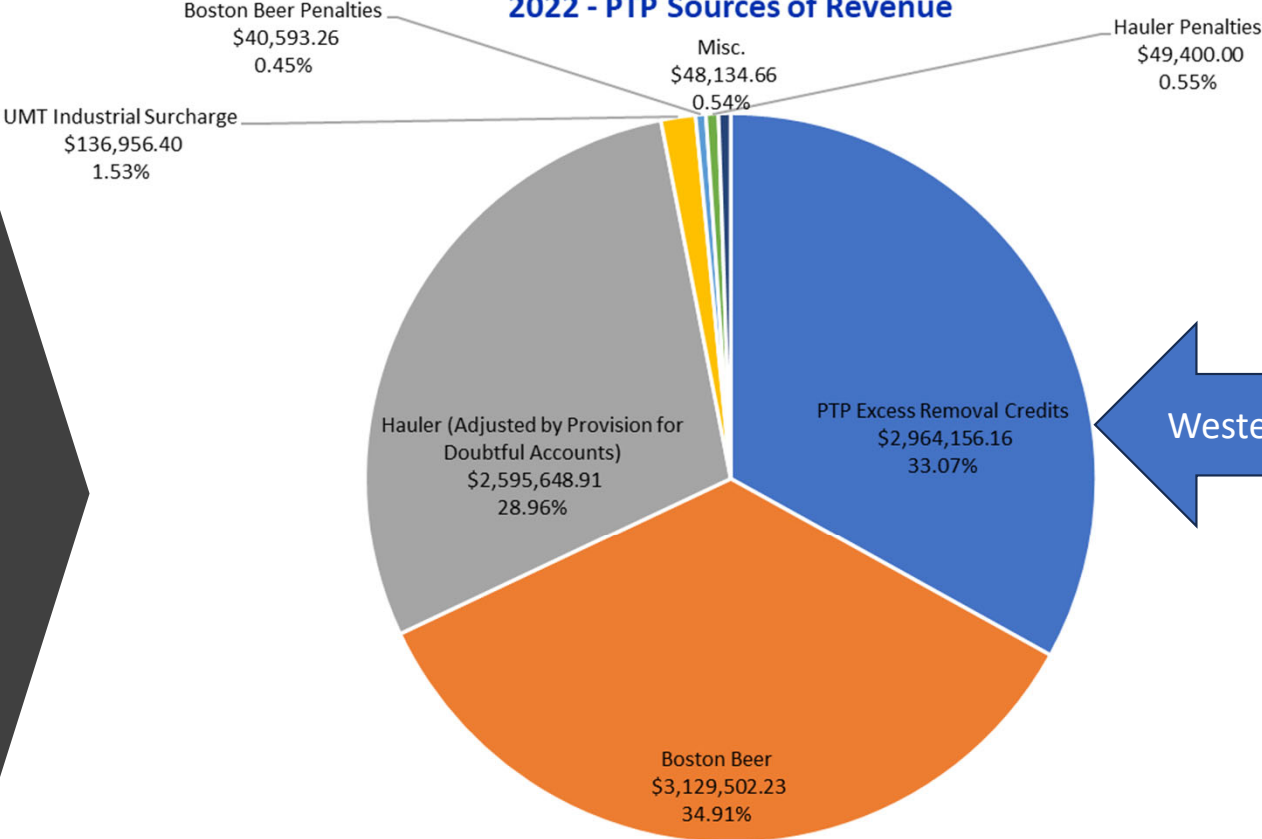


Waste hauler program driven by market price



Intermingled with residential wastes that don't need pretreatment

### 2022 - PTP Sources of Revenue



Current revenue sources

Western Lehigh

- PTP Excess Removal Credits
- Boston Beer
- Hauler (Adjusted by Provision for Doubtful Accounts)
- UMT Industrial Surcharge
- Boston Beer Penalties
- Hauler Penalties
- Misc.

# Facility Upgrade Options: Narrowing the Field

- Spring 2023: Jacobs Master Plan → \$267M
- 2023 Value Engineering Effort → many alternatives with cost major cost reductions

# Many Alternatives to Evaluate

Configurations for segregating industrial flows

Cost impacts for new pump stations & force mains

Anaerobic treatment technologies: UASB, BVF, others

Impacts on biogas production, operating risk

Levels of “polishing” of treated waste prior to discharge

Cost of replacing existing treatment systems at PTP

Shifting loads (and how much) to Kline’s Island WWTP

Operational and cost impacts at KIWWTP



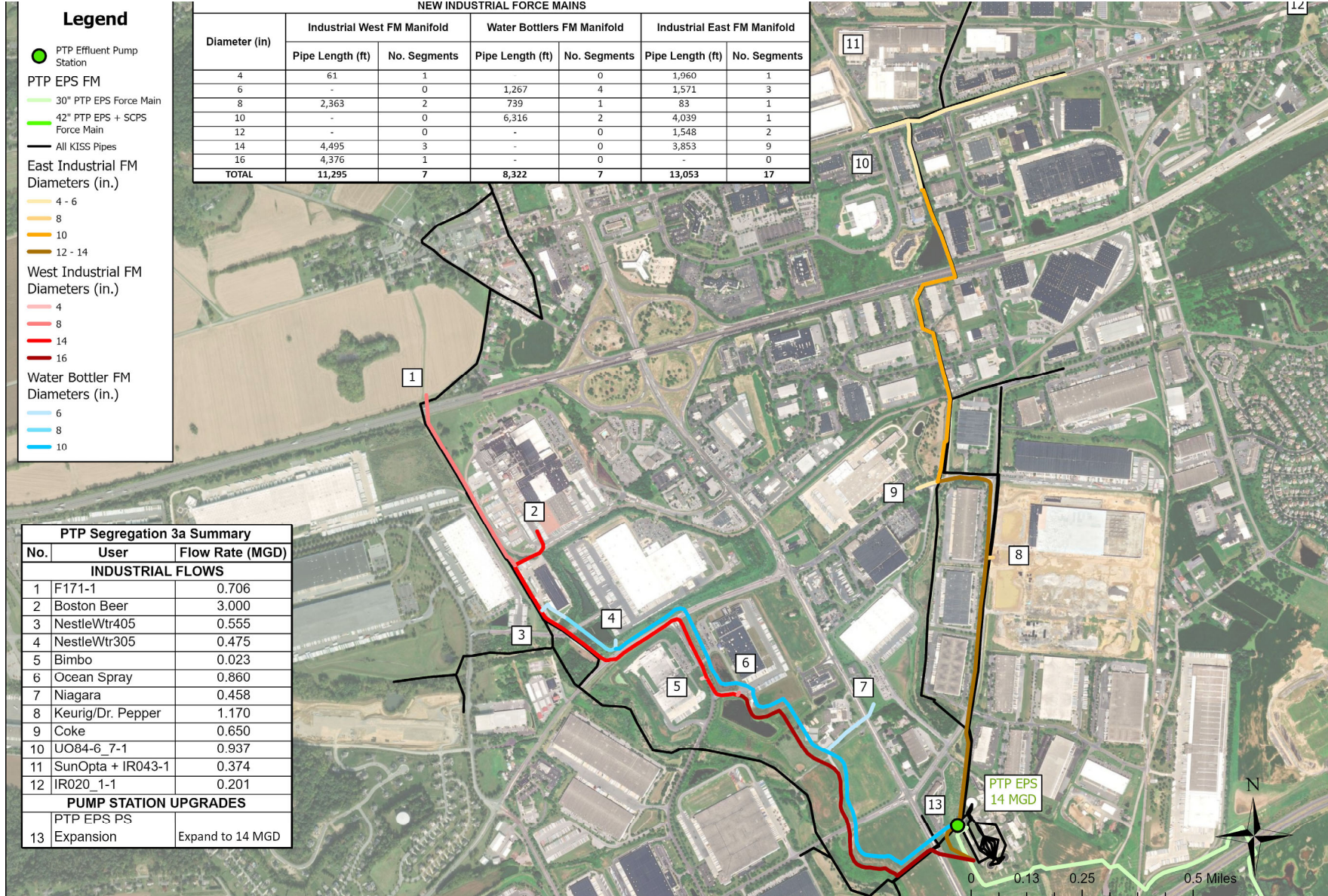
### Legend

- PTP Effluent Pump Station
- PTP EPS FM
- 30" PTP EPS Force Main
- 42" PTP EPS + SCPS Force Main
- All KISS Pipes
- East Industrial FM Diameters (in.)**
- 4 - 6
- 8
- 10
- 12 - 14
- West Industrial FM Diameters (in.)**
- 4
- 8
- 14
- 16
- Water Bottler FM Diameters (in.)**
- 6
- 8
- 10

### NEW INDUSTRIAL FORCE MAINS

Diameter (in)	Industrial West FM Manifold		Water Bottlers FM Manifold		Industrial East FM Manifold	
	Pipe Length (ft)	No. Segments	Pipe Length (ft)	No. Segments	Pipe Length (ft)	No. Segments
4	61	1	-	0	1,960	1
6	-	0	1,267	4	1,571	3
8	2,363	2	739	1	83	1
10	-	0	6,316	2	4,039	1
12	-	0	-	0	1,548	2
14	4,495	3	-	0	3,853	9
16	4,376	1	-	0	-	0
<b>TOTAL</b>	<b>11,295</b>	<b>7</b>	<b>8,322</b>	<b>7</b>	<b>13,053</b>	<b>17</b>

PTP Segregation 3a Summary		
No.	User	Flow Rate (MGD)
<b>INDUSTRIAL FLOWS</b>		
1	F171-1	0.706
2	Boston Beer	3.000
3	NestleWtr405	0.555
4	NestleWtr305	0.475
5	Bimbo	0.023
6	Ocean Spray	0.860
7	Niagara	0.458
8	Keurig/Dr. Pepper	1.170
9	Coke	0.650
10	UO84-6_7-1	0.937
11	SunOpta + IR043-1	0.374
12	IR020_1-1	0.201
<b>PUMP STATION UPGRADES</b>		
PTP EPS PS		
13	Expansion	Expand to 14 MGD



# Detailed Evaluation Process

## Step 1 – Senior Review Panel

### LCA Representatives

#### AECOM

- Chris Curran
- Ralph Eschborn
- Jim Li
- Jim McQuarrie

#### Jacobs

- Tom Johnson
- Tri Le
- John Tobia
- Dave Parry

## Step 2 – Technical Review Panel

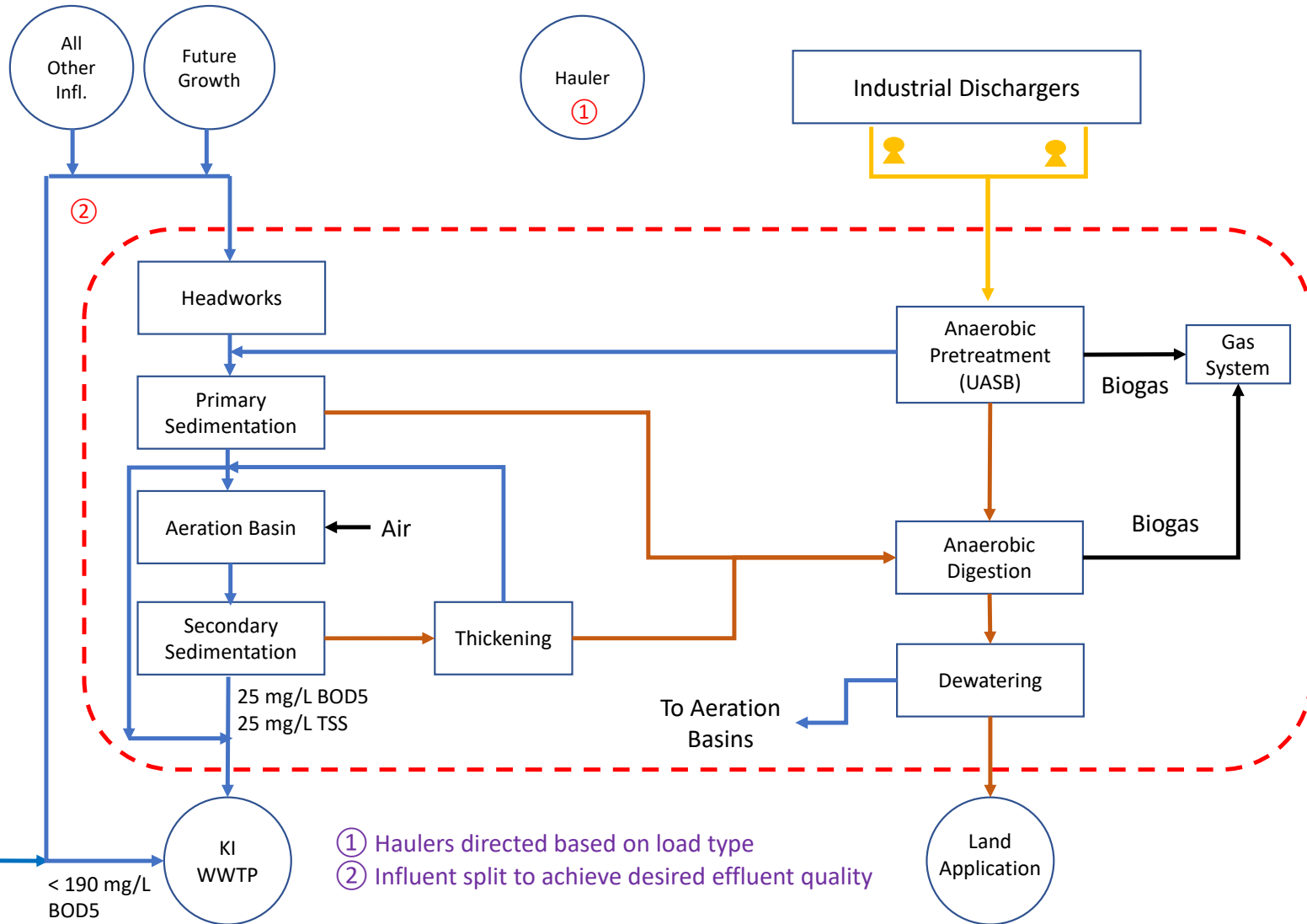
- Tom Bachman – Mead & Hunt
- Søren Nøhr Bak - Niras
- Joe Cleary – Geosyntec
- Frank DeOrio – US Water (CPS)
- Nerea Uri Carreño – VCS
- Sara Martin – Critical Path Solutions (CPS)
- Per Nielsen – VCS
- Bob Wimmer – Navitas (CPS)

# PTP Recommended Alternative

	Flow (MGD)	BOD5 (ppd)
To PTP Headworks	3.37	27,000
To PTP Pre-ANA	2.73	58,000
Bypass to KI WWTP	1.57	11,000
<b>Total to KI WWTP</b>	<b>7.67</b>	<b>12,300</b>

**Legend**

- Force-main
- Liquid
- Solid
- Gas
- PTP
- Pump Station



- ① Haulers directed based on load type
- ② Influent split to achieve desired effluent quality

# Facility Upgrade Options: Narrowing the Field

- Spring 2023: Jacobs Master Plan → \$267M
- 2023 Value Engineering Effort → many alternatives with cost major cost reductions
- Today: 2 primary approaches
  1. “Anaerobic option 8B” (UASB technology), shifting approx. 12,000 pounds BOD to KIWWTP
    - Capital Costs: Approximately \$181 Million at PTP
  2. Project phasing alternatives under review (immediate rehab now, full upgrade later)
    - Phasing impacts: Continued total cost increase due to project delays
    - Phasing impacts: Capacity for regional industrial growth
    - Phasing impacts: Renewable Natural Gas revenue & IRA tax credits

# Inflation Reduction Act (IRA) Tax Credits & Renewable Natural Gas

- 30-40% of biogas project costs eligible to be returned as tax credit
  - Best incentives if project construction starts in 2024 (tighter standards thereafter)
  - Tax credit reduced if issuing tax-exempt bonds
  - Eligible project costs are only those related to the production of biogas
  - Estimate = Approximately \$12 million credit may be achievable
- Renewable Natural Gas captured, cleaned, and sold to the market
  - Digester gas = 60-65% methane, can be purified to 98% methane (pipeline quality)
  - Current estimate = \$1.9M annual revenue generation to offset O&M costs
- Deferring PTP upgrade or decommissioning the PTP → both incentives at risk

# Industry Discussions

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## Started in August 2023

- Project background
- Refining flow / loading projections
- Cost-sharing approaches (conceptual)
- Grant application support

## Difficulty coming to conclusions!

- LCA engineering analysis & cost estimates still being refined
- Unknown regional commitment to support project or address future growth
- What will each industry decide?

# Next Steps

## Financial Analysis (Raftelis)

- Capital cost-sharing analysis & scenarios
- Ongoing O&M cost analysis & rate-setting

## Industry 1-1 Meetings (next round)

- Refined cost-sharing analysis
- How to make decisions?

## What about regional decision-making?

- Municipal commitments
- Other regional partners

# Thank you!

Discussion / Questions?

