



## ***USD Enhanced Treatment and Site Upgrade Program (ETSU) Program***

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**August 29, 2024**

# Agenda

Drivers

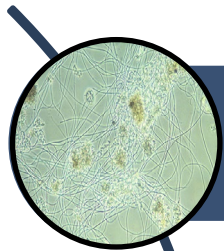
Design Loads

Phase 1 Design

Effluent Water Quality at the End of Phase 1

Summary

# Enhanced Treatment and Site Upgrade Program was developed to address several drivers



Capacity



Wet Weather Discharge



Aging Infrastructure

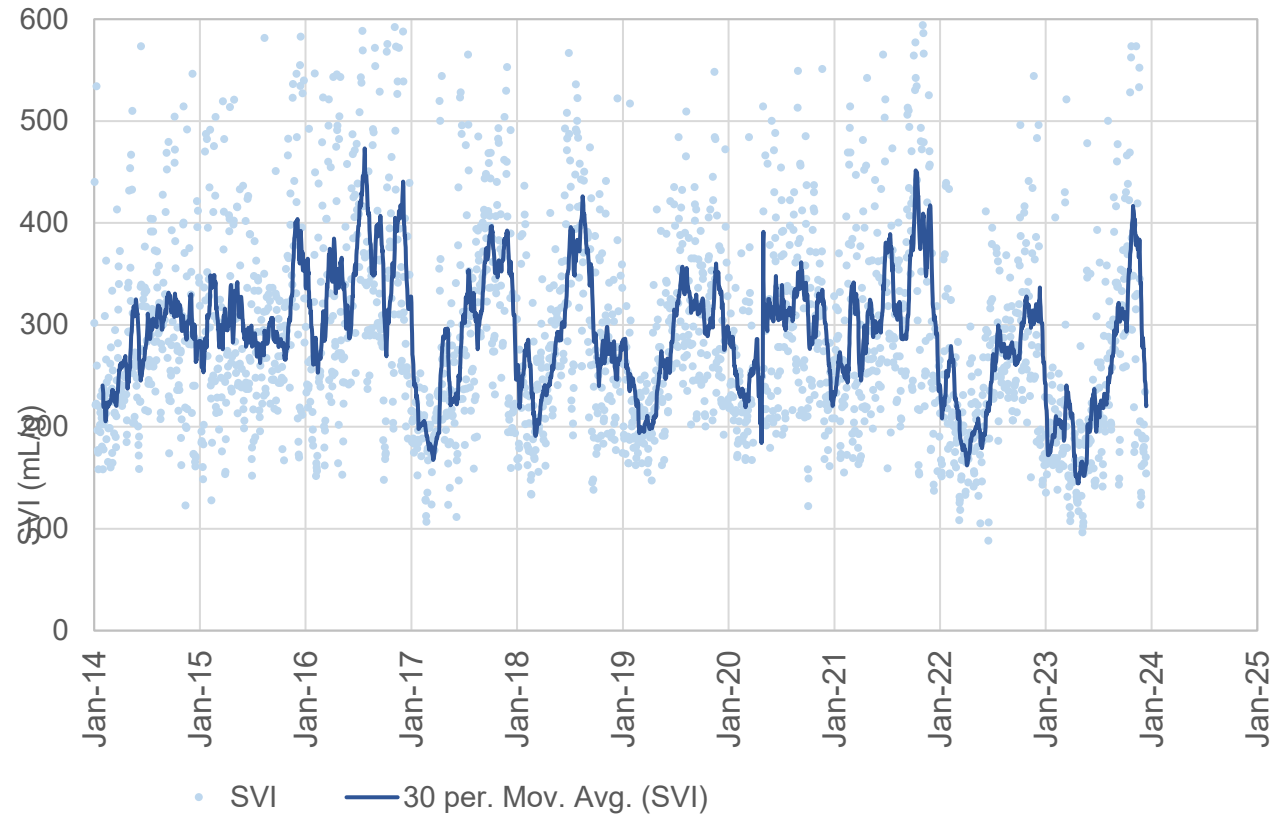


Nutrient Removal

# ETSU Program Drivers – Capacity



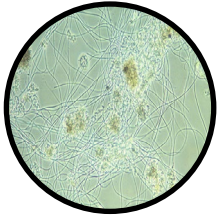
Poor settleability has resulted in a loss of capacity



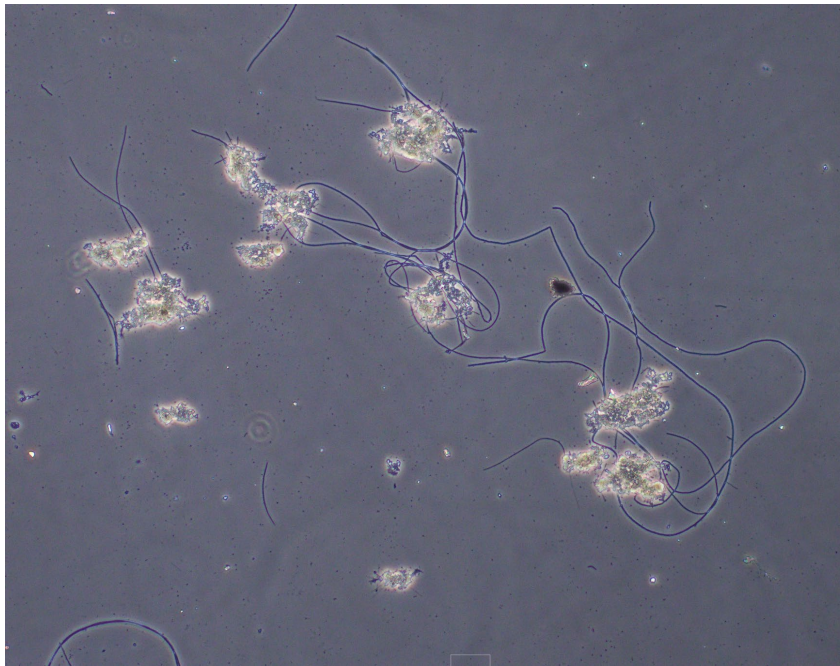
Percentile	SVI mL/g
95%	481
90%	422
75%	334
50%	254



# ETSU Program Drivers – Capacity



Poor settleability has resulted in a loss of capacity

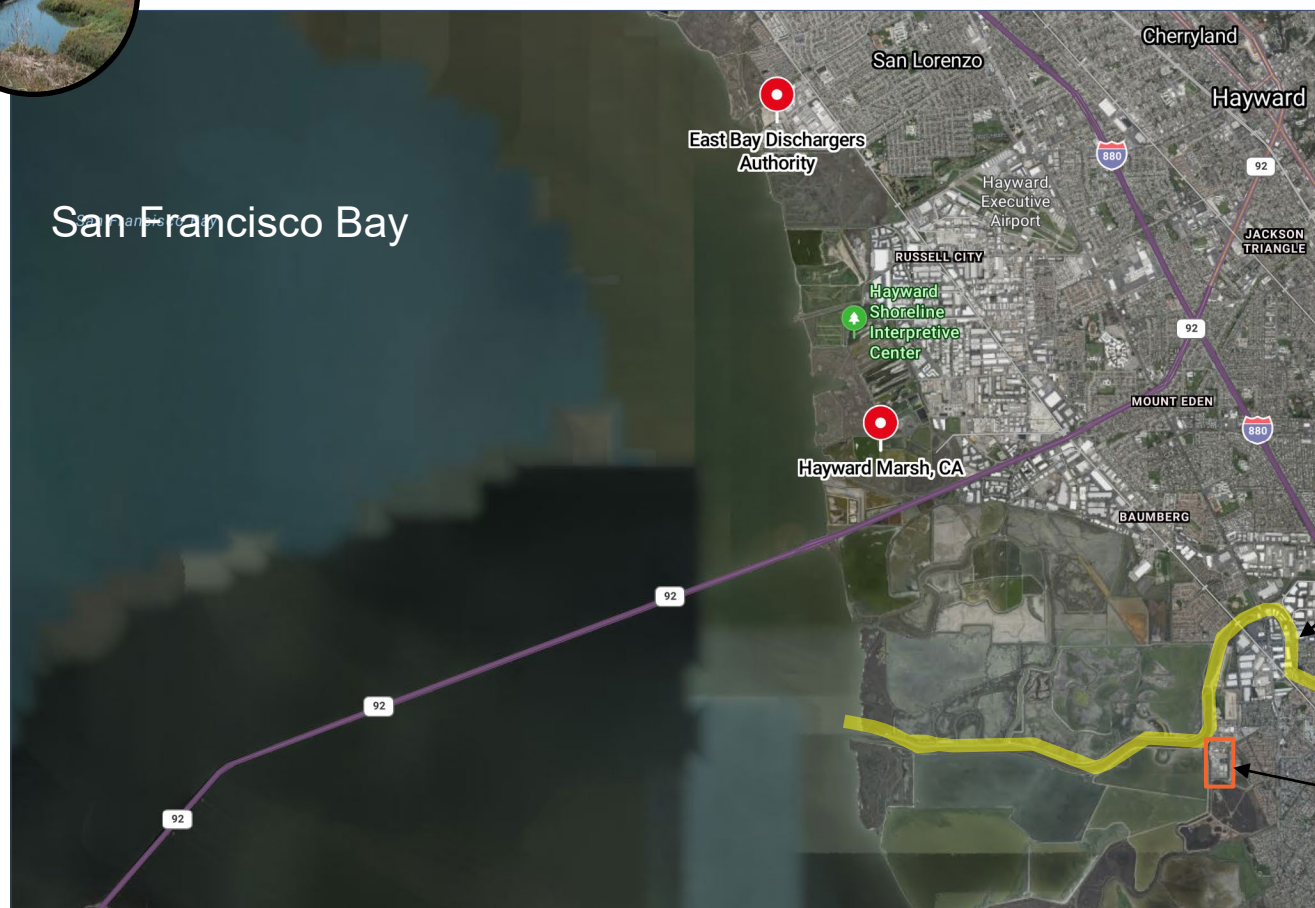


Common to Excessive filaments caused floc bridging resulting in high SVI

# ETSU Program Drivers – Wet Weather Discharge



Future of wet weather discharge options is uncertain



	Discharge Capacity
EBDA	42.9 mgd
Hayward Marsh	20 mgd
Old Alameda Creek	Flows > 62.9 mgd

Old Alameda Creek

USD Alvarado WWTP



# ETSU Program Drivers – Aging Infrastructure



## Aging Infrastructure



Significant issues with concrete roof of Existing Aeration Basins 1-4 (1978)

# ETSU Program Drivers – Nutrient Removal



## Future nutrient limits coming to the Bay Area

Place holders given uncertainty

### Initial Nutrient Removal

- Springboard for future effluent standards
- Permitting Old Alameda Creek discharge
- 50% TIN Reduction

### BACWA Level 2

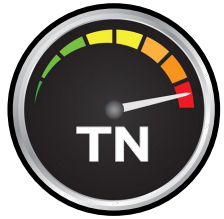
- TN = 15 mg/L
- TP = 1 mg/L

### BACWA Level 3

- TN = 6 mg/L
- TP = 0.3 mg/L



# ROWD Effluent Limitations and Discharge Specifications



**B. Total Inorganic Nitrogen.** Upon the Discharger satisfying the requirements of Provision VI.C.5.a of this Order, the annual average total inorganic nitrogen percent removal shall not be less than 50 percent (i.e., in each calendar year, the arithmetic mean of total inorganic nitrogen, by mass in kg/day, for effluent samples collected at Monitoring Location EFF-002D as described in the MRP, shall not exceed 50 percent of the arithmetic mean of total inorganic nitrogen, by mass in kg/day, for influent samples collected at Monitoring Location INF-002D.

**Total Inorganic Nitrogen = (Nitrate + Nitrite) + Total Ammonia**

# ETSU Design Loads

	Baseline 2018	2028 Loads	2040 Loads
AA Flow, mgd	23.4	25.8	29.1
COD, lbs/d	146,000	184,000	207,000
cBOD, lbs/d	52,600	66,000	75,000
TSS, lbs/d	70,500	89,000	100,000
TKN, lbs/d	10,650	13,000	15,000
NH <sub>3</sub> , lbs/d	7,240	9,100	10,300
TP, lbs/d	1,350	1,700	1,900

# ETSU Phase 1 Projects



**Phase 1A**  
Aeration Basin  
Modifications

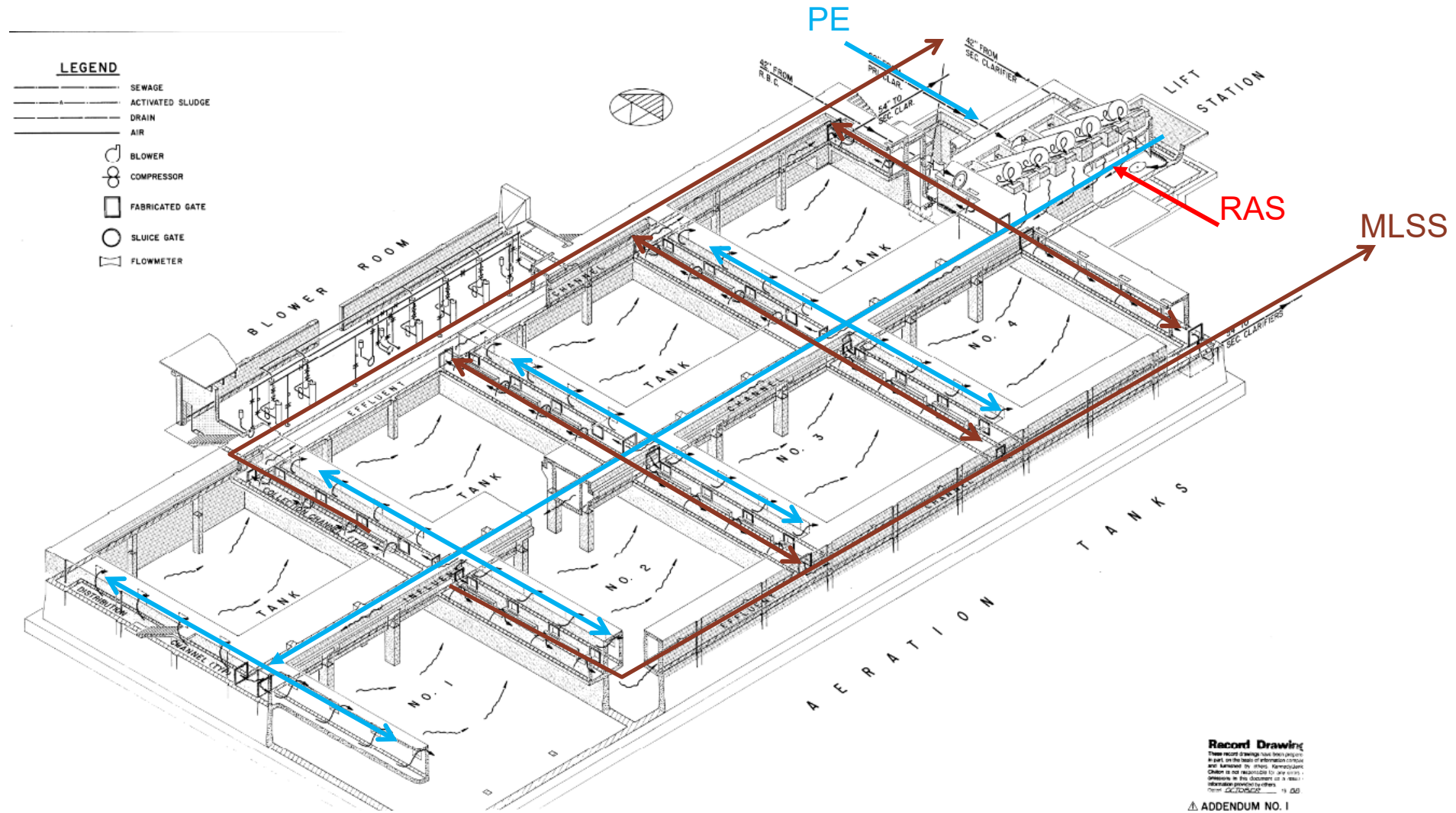
**Phase 1C**  
Plant Equalization  
Storage

**Phase 1B**  
Secondary Clarifiers and  
Effluent Facility

**Phase 1A**  
Campus Building

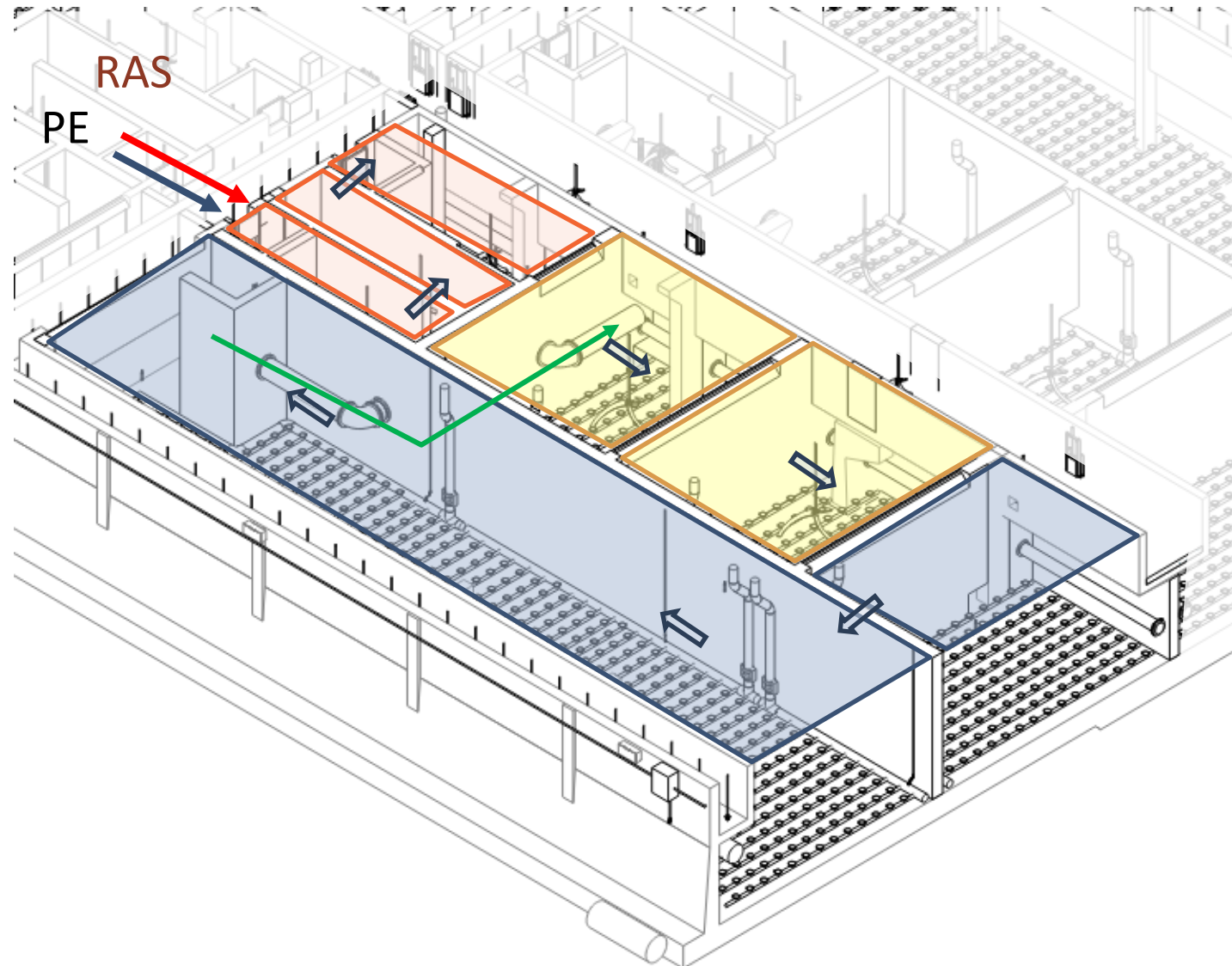


# Current Aeration Basin Configuration





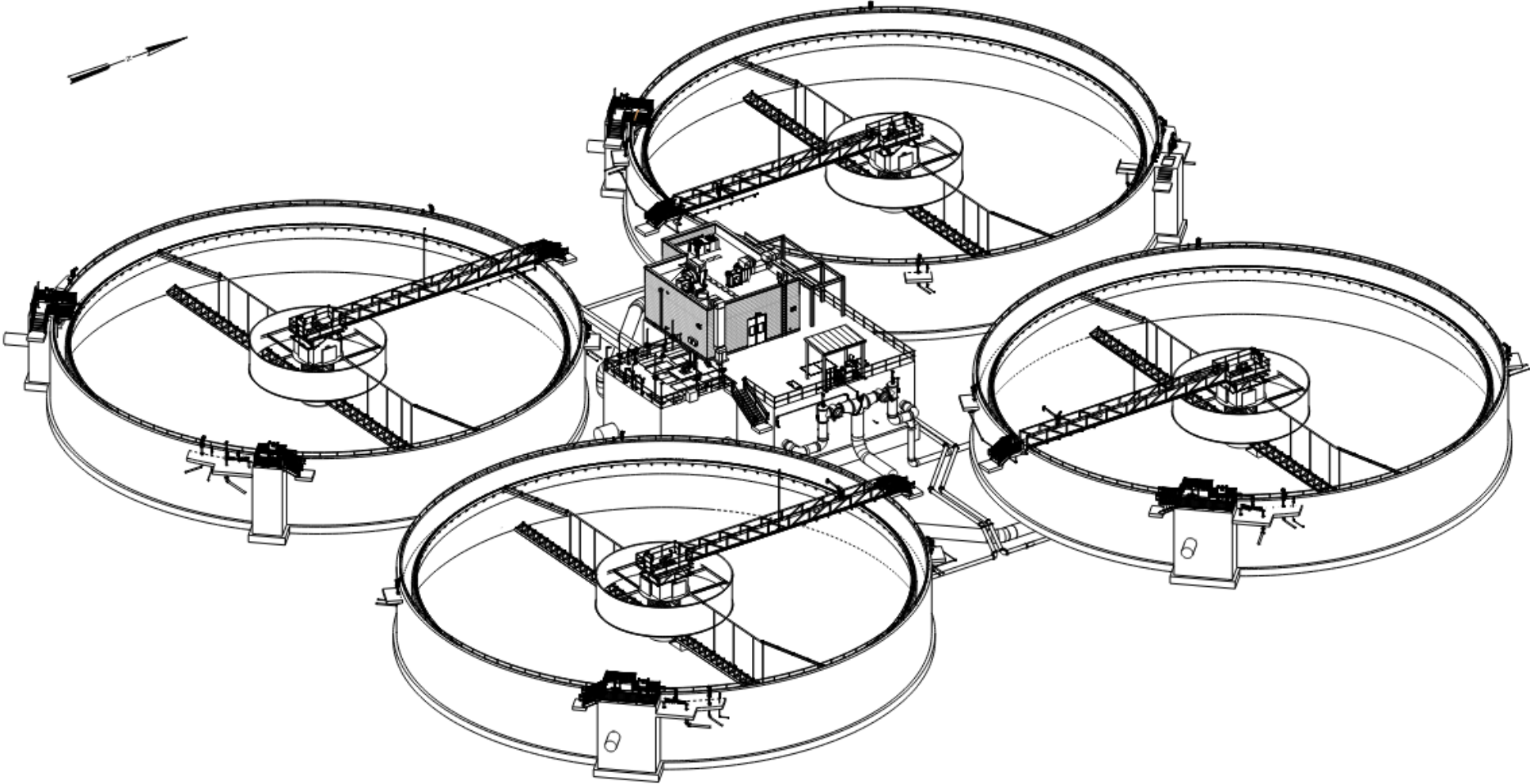
# Phase 1A - Modified Aeration Basin



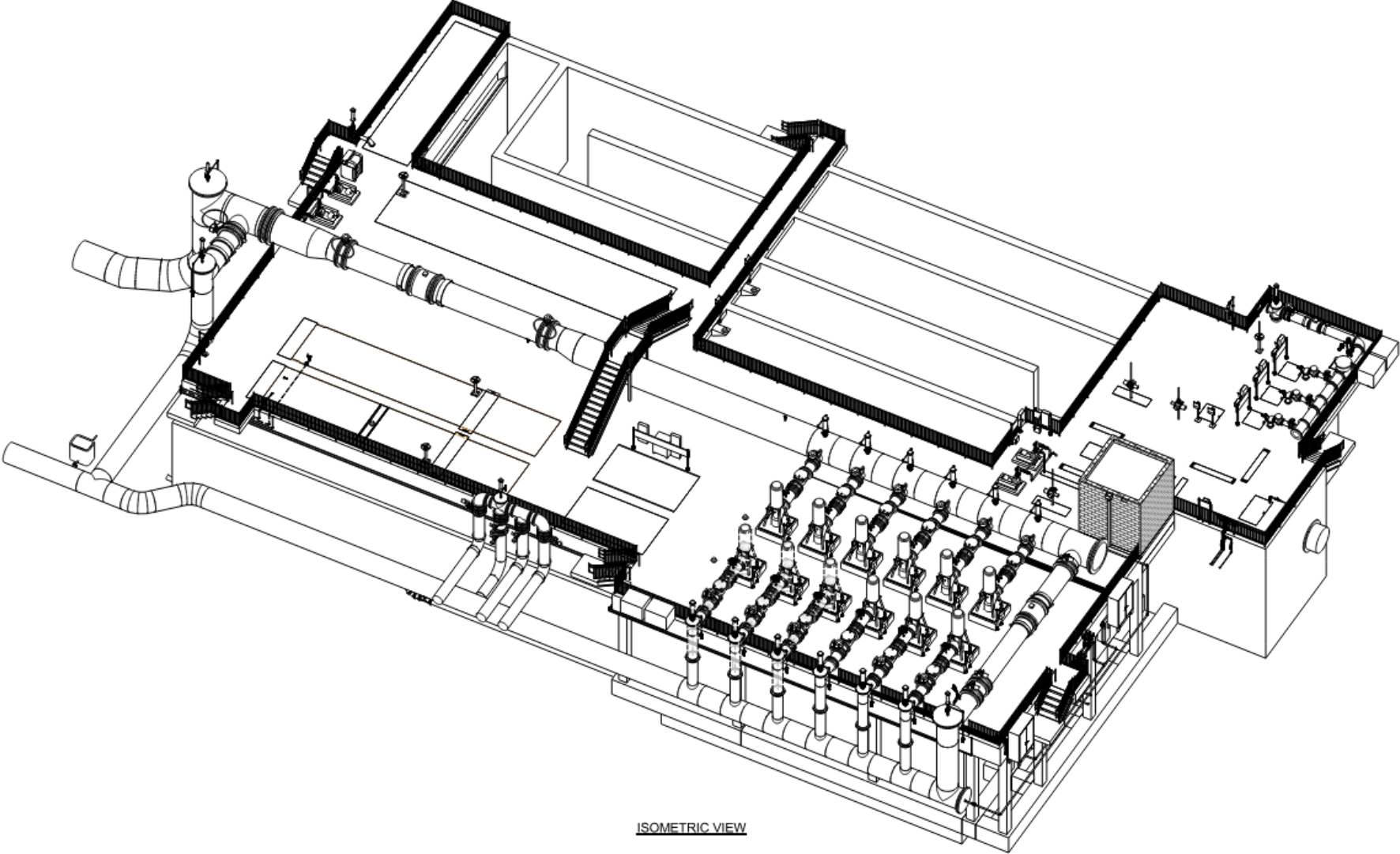
- Reconfiguring basins for more plug flow
- Providing zones to improve settleability and for denitrification
- Provide flexibility to adapt and optimize

- Anaerobic
- Anoxic
- Aerobic

# Phase 1B - Secondary Clarifier



# Phase 1B - Effluent Facility





# Status of Construction











## Status of Construction

Roof slab of new aeration basin 1 and new aeration basin 3.



# Status of Construction



# Effluent Water Quality Modeling Results

Year	2028	2040
AA Flow, mgd	25.8	29.1
COD, lbs/d	184,000	207,000
cBOD, lbs/d	66,000	75,000
TSS, lbs/d	89,000	100,000
TKN, lbs/d	13,000	15,000
NH3, lbs/d	9,100	10,300
TP, lbs/d	1,700	1,900
Eff TIN, mg/L	23-25	23-25
Eff NH3-N, mg/L	<4 mg/L	<4 mg/L

Phase 1 - Meets effluent water quality goals of 50% TIN removal and 90% ammonia removal



# Summary

- ETSU program was designed to balance a number of drivers
- A modular approach allows the District to right size the program
- Flexibility to address changing standards



Questions?