

Split Treatment Nutrient Reduction

City of Sunnyvale Water Pollution Control Plant

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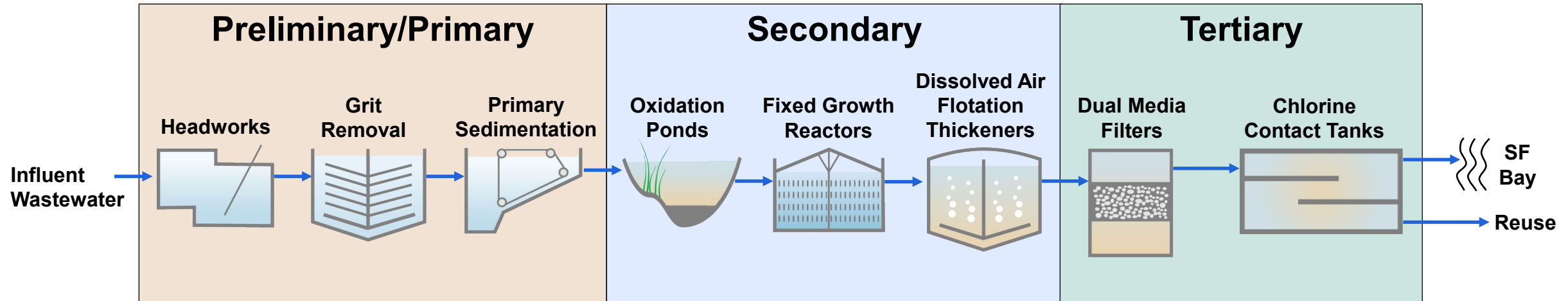


Sunnyvale Water Pollution Control Plant



*City of Sunnyvale Water Pollution Control Plant (WPCP)
(13.4 MGD current AAF)*

Process Flow Diagram



Secondary Treatment and Dewatering Project

- **Project Scope**
 - » Conventional activated sludge (CAS) BNR facilities
 - » Thickening and dewatering facilities for solids handling
 - » Demon sidestream treatment
- **Design completed:** January 2022
- **Construction complete:** June 2027
- **Construction Cost:** \$278 Million



Drivers for Upgrades

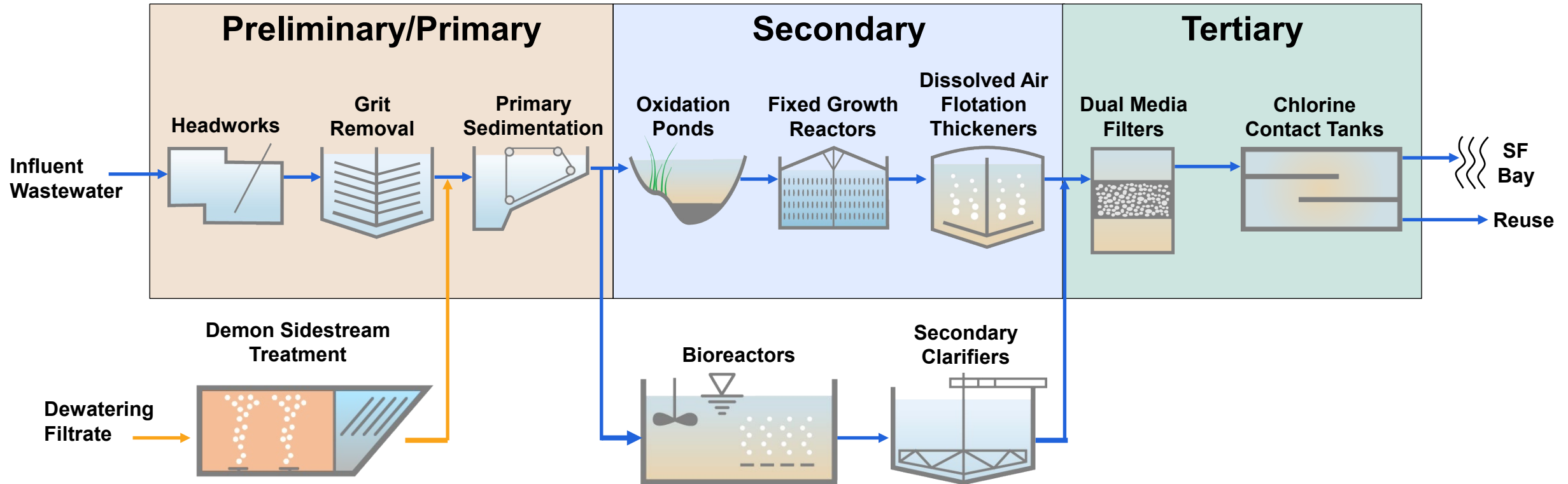


Activated Sludge BNR

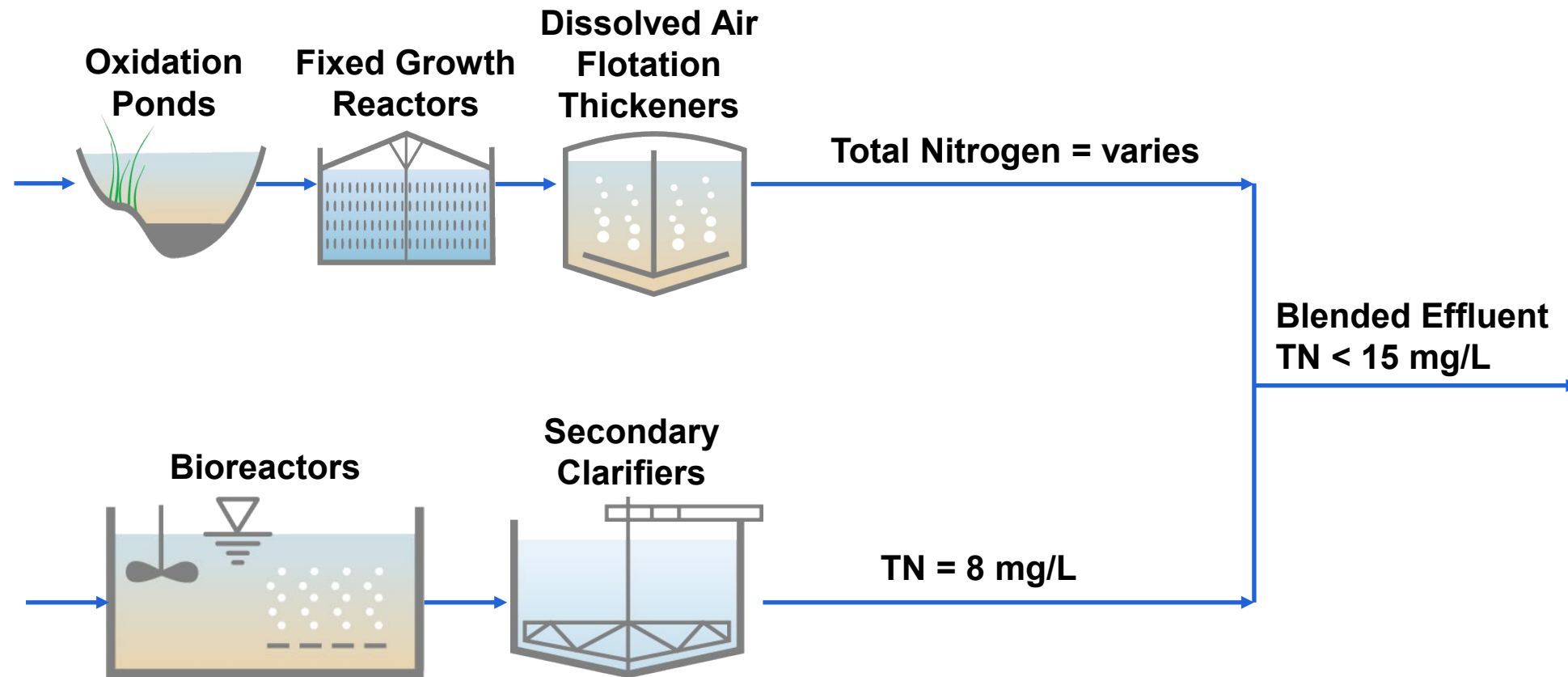
- **Bioreactors**
 - » Optimized for Modified Ludzack-Ettinger (MLE) with provisions for step feed
 - » Two (2) Bioreactors @ 2.75 MG each
 - » 26 feet side water depth
 - » 20% to 35% Anoxic
 - » 2,850 MLSS
 - » aSRT 5 days
 - » Target effluent TN of 8 mg/L
- **Secondary Clarifiers**
 - » Four (4) 80' diameter circular clarifiers



Split Flow Process Flow Diagram



Solution is a Phased Secondary Treatment Expansion that can Meet SF Bay Nutrient Limits



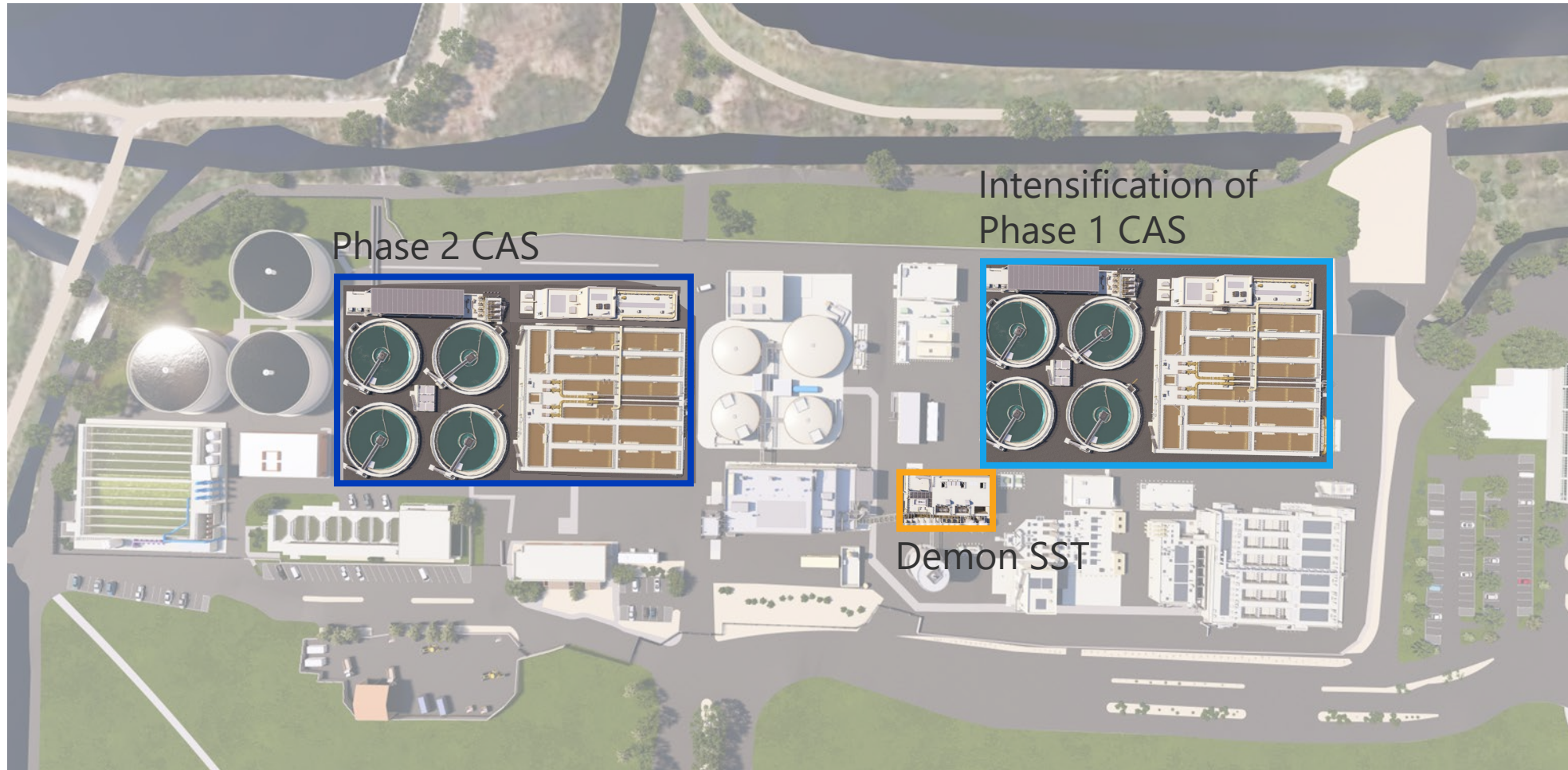
Phase 1 Sets Up Sunnyvale for a Flexible Future



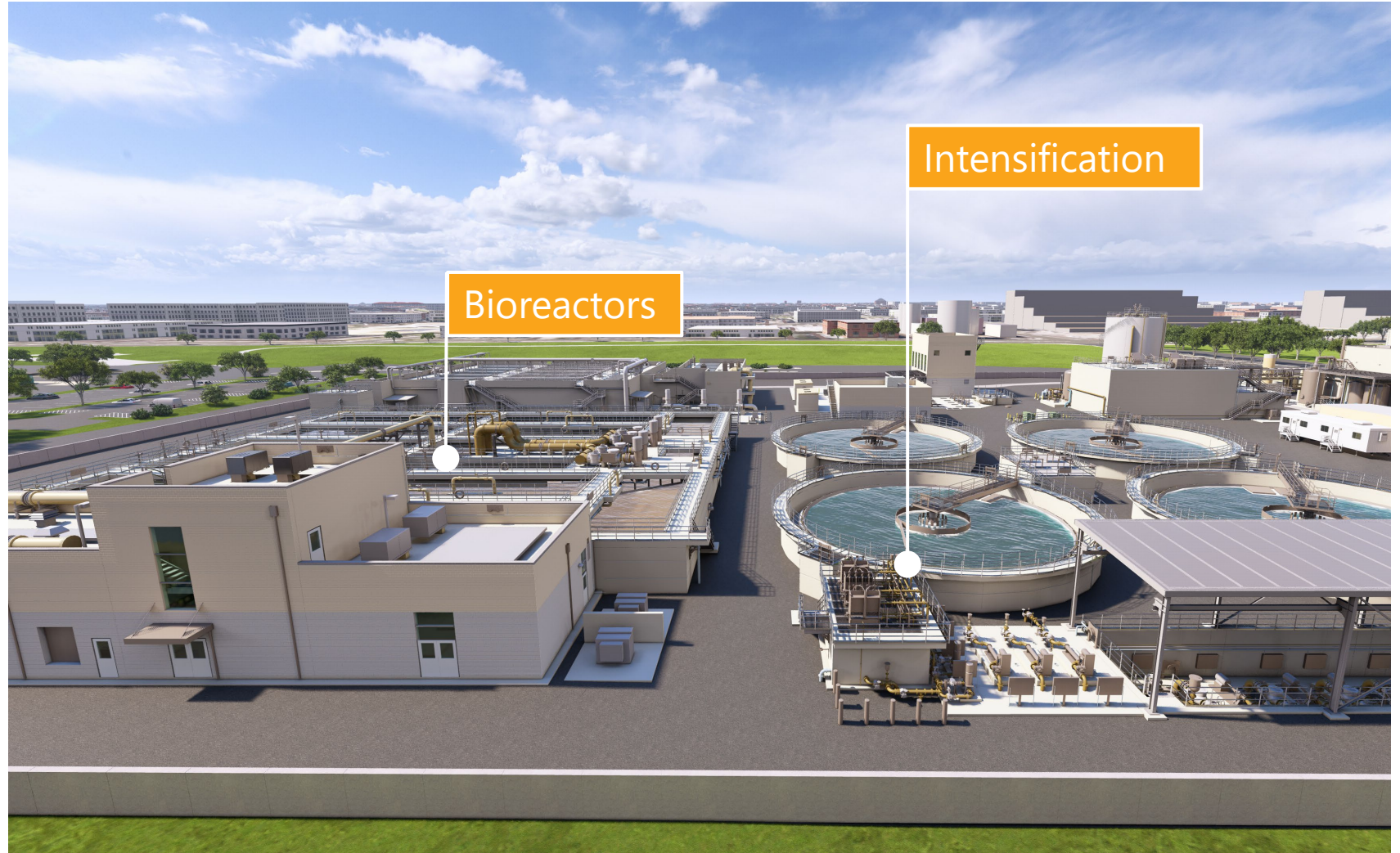
Phase 1 Sets Up Sunnyvale for a Flexible Future



Phase 1 Sets Up Sunnyvale for a Flexible Future



Highlight on CAS Design

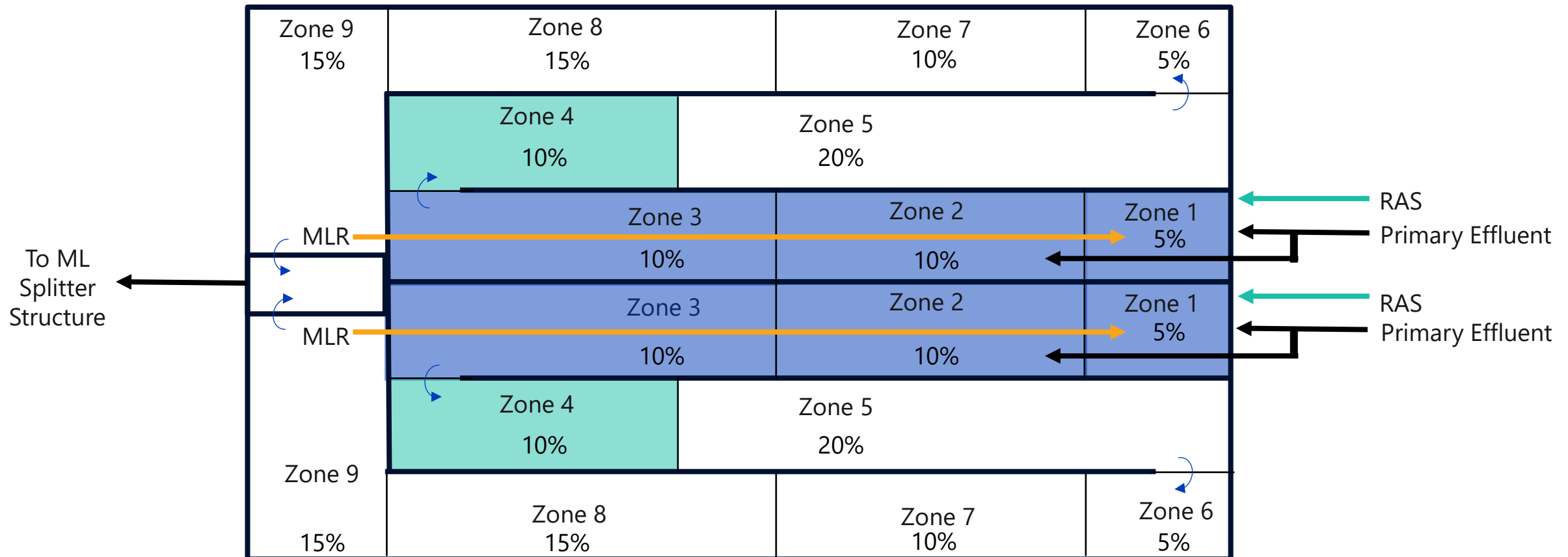
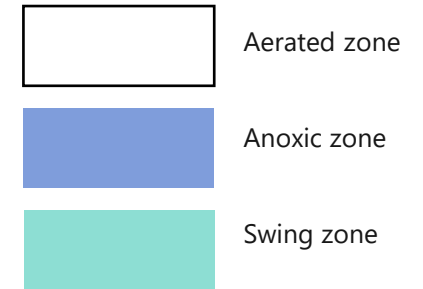


Bioreactor Configuration

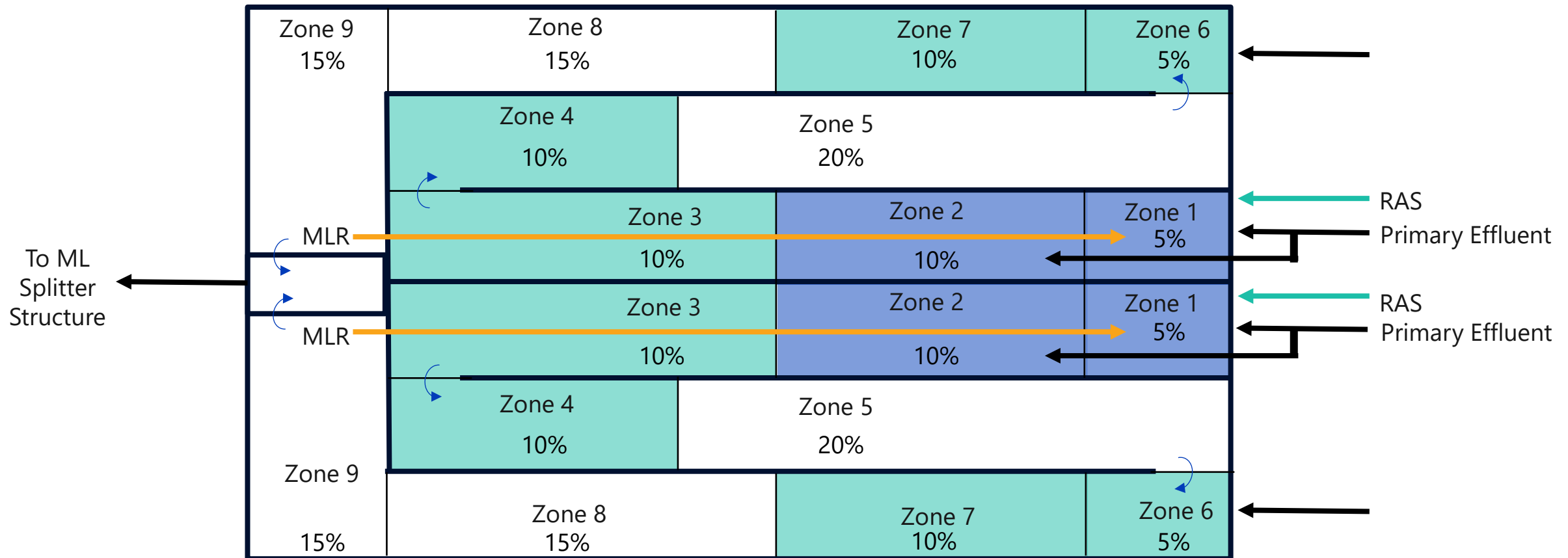
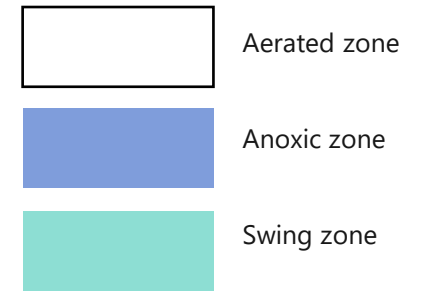
- Optimized for MLE configuration
- Originally designed with provisions to do some form of:
 - » Step feed
 - » Contact Stabilization
 - » A2O



Bioreactor Configuration



Bioreactor Configuration

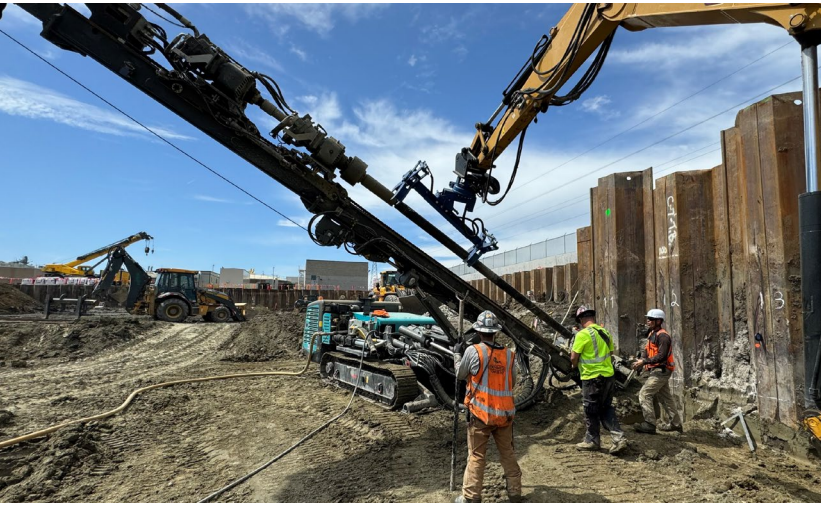


Intensification

- Phase 1 designed with Intensification in mind
 - » Hydraulics
 - » Equipment Layout (blowers, RAS pumps, WAS pumps, etc)
 - » InDense Hydrocyclones for selective sludge wasting and densification (lower SVI)
 - » Potential to add MABR to anoxic zones
 - » Experiment with wasting Demon granules to the mainstream (can retain in hydrocyclones)



Construction Progress



Construction Progress



Next Steps

- Complete Construction and Commission CAS 1
- Stress Test CAS 1



Conclusions

- Existing aging process not suitable for nutrient removal.
- Tight site constraints limit options for expansion.
- Split treatment phased approach:
 - » Balances cash flow
 - » Buys additional time for technology maturation
 - » Allows stress testing of CAS 1
 - » Right size CAS 2



Questions?

