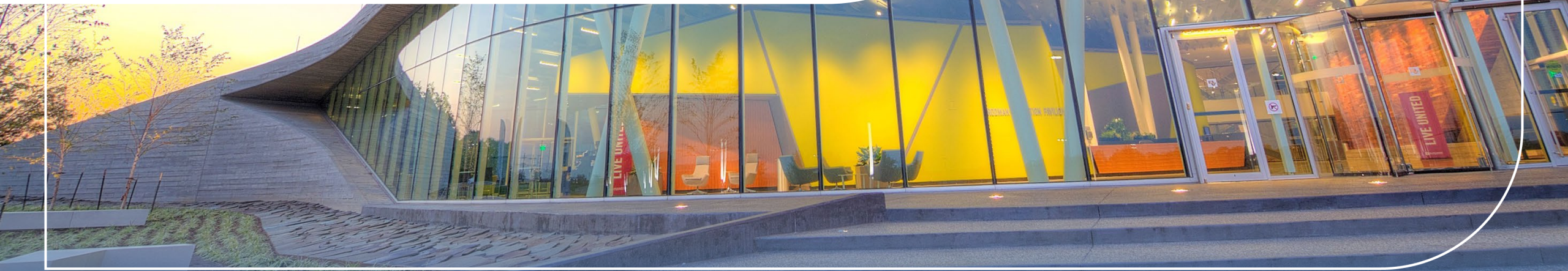


MABR design at Windsor WRF, CA

Francesca Cecconi

Wastewater Process Engineer at Black & Veatch



Acknowledgements

Garrett Broughton

Dave Ernst

Veronica Siwy



Town of Windsor
CALIFORNIA

Drivers of MABR for Nutrient Removal



Limited Footprint available



Sustainability – Lower energy usage and GHG Emissions



Intensify existing activated sludge basins without new construction



Adaptable and Modular for future growth

Windsor WRF, CA

Currently treats ADWF of 1.9 MGD

TASK 1 Secondary Clarifiers

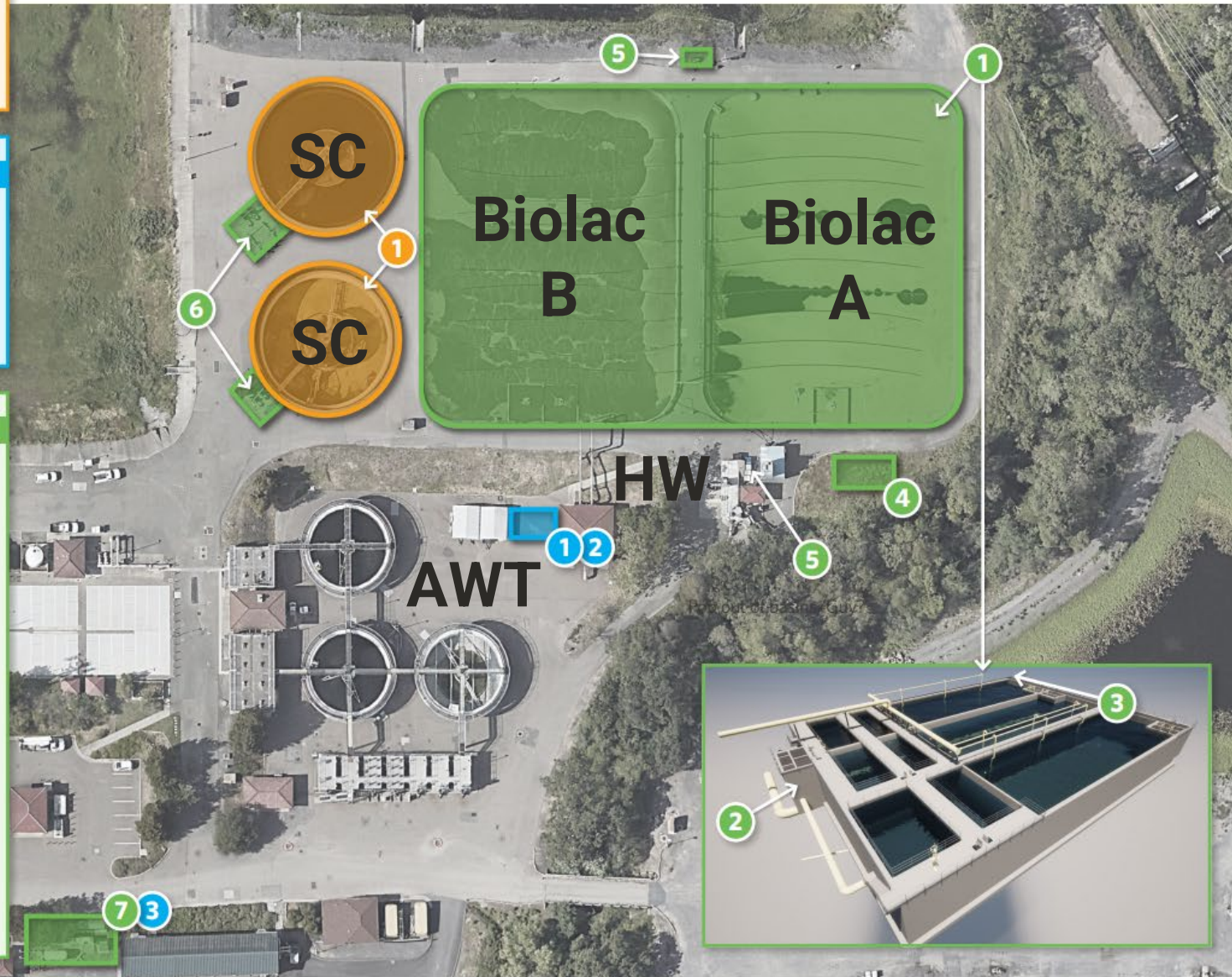
- Aging infrastructure
- MLSS from BNR

TASK 2 Blower Facility

- Insufficient capacity for BNR

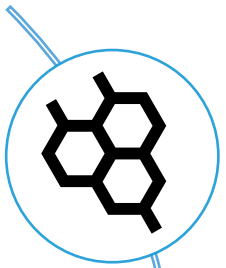
TASK 3 Aeration Basins

- Two parallel Biolac ponds
- NPDES limit for TN and TP
- Future growth
- Biolac cannot meet NPDES limit



BNR Design for Windsor WRF, CA

Adaptive planning approach to:



Meet stringent nutrient limits, total nitrogen and total phosphorous



Plan for uncertain growth and space constrained site



Decarbonization of BNR in line with Net Zero Sustainability Goals

BNR Design for Windsor WRF, CA

Expansion roadmap:

Phase I growth

- 3 trains of conventional A2O AS within Biolac A
- Initial installation of few MABR cassettes

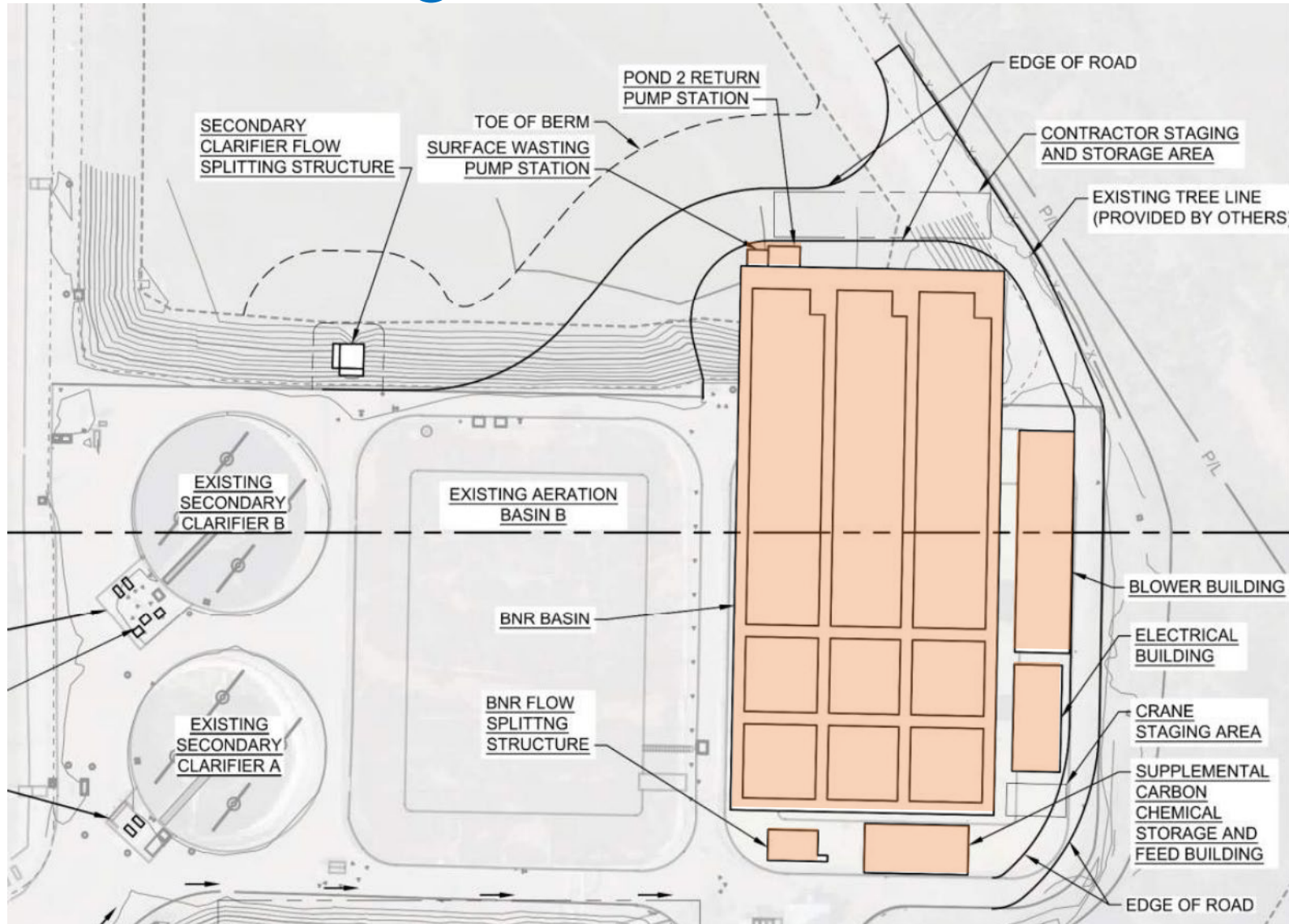
Phase II growth

- Addition of MABR cassettes without expansion

Further future growth

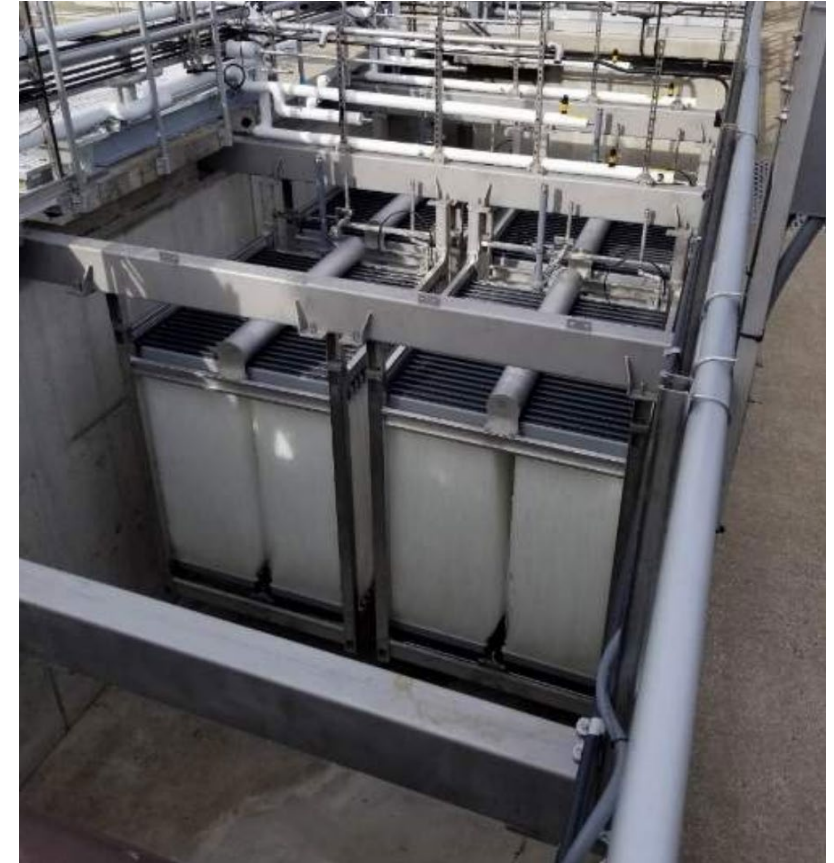
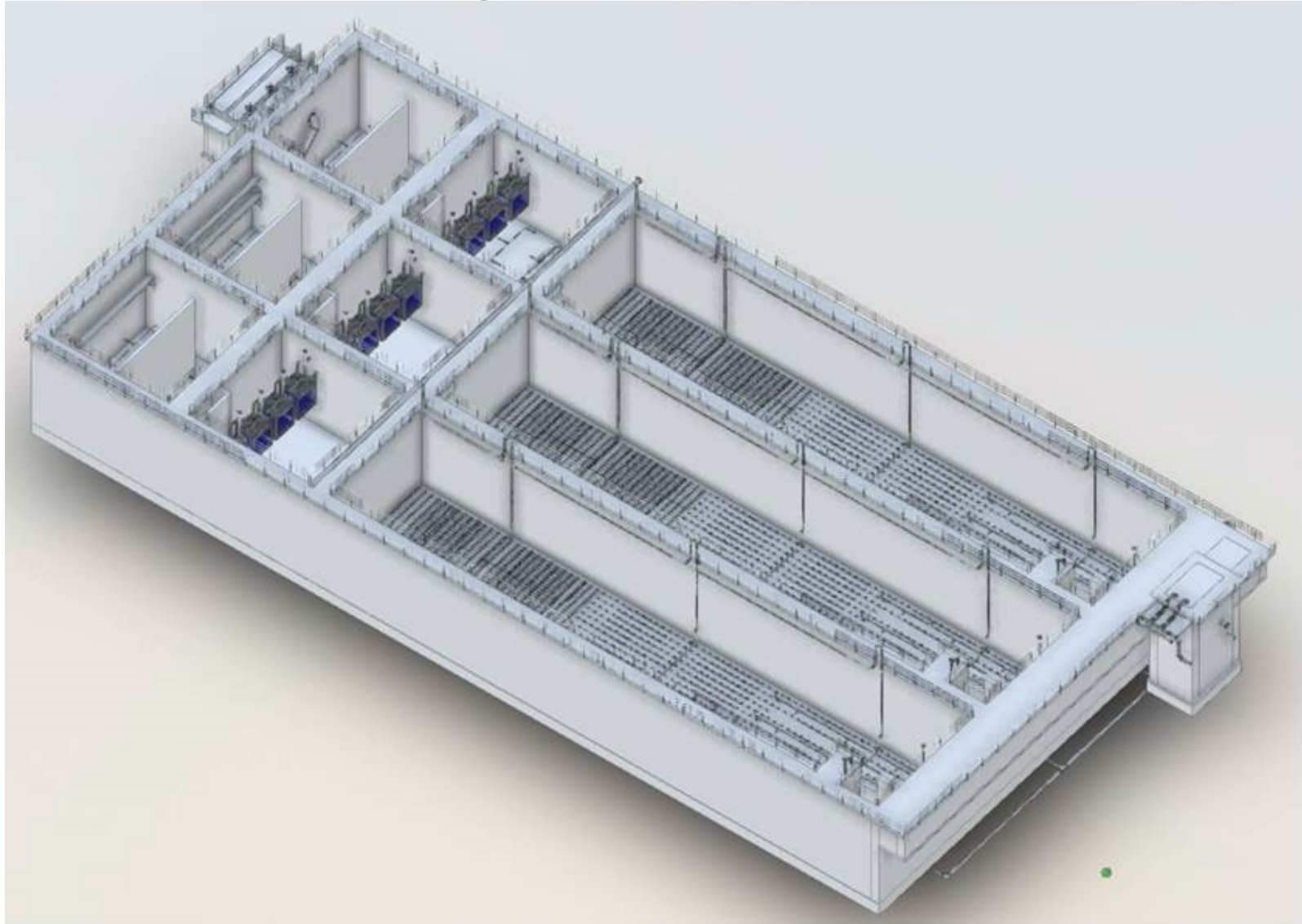
- Construction of 2 more trains of A2O with MABR

BNR Design for Windsor WRF, CA

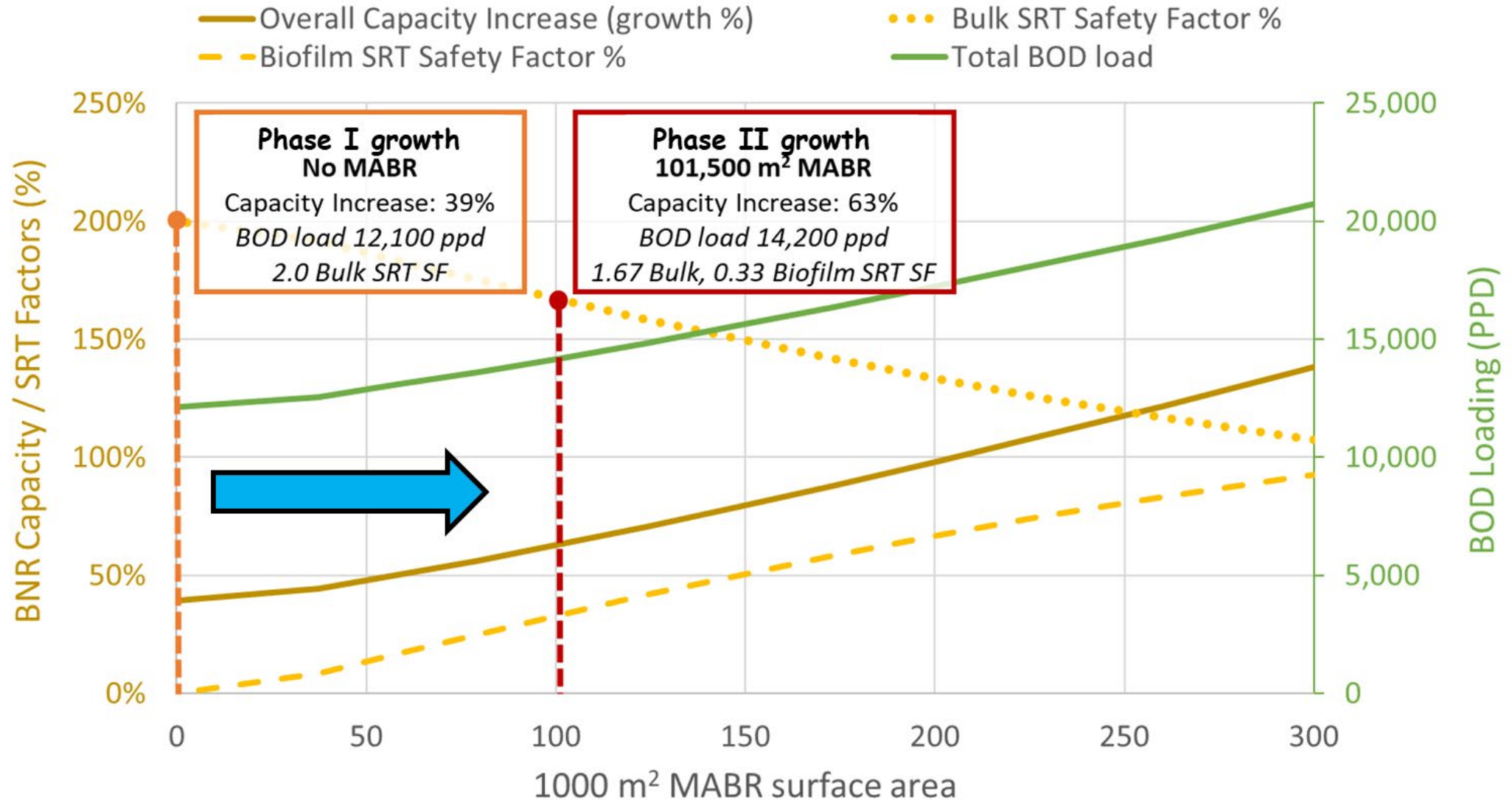


- ❖ Fits within Biolac A
- ❖ 3 trains A20
- ❖ Phase I growth

BNR Design for Windsor WRF, CA



BOD Load and BNR Capacity with MABR



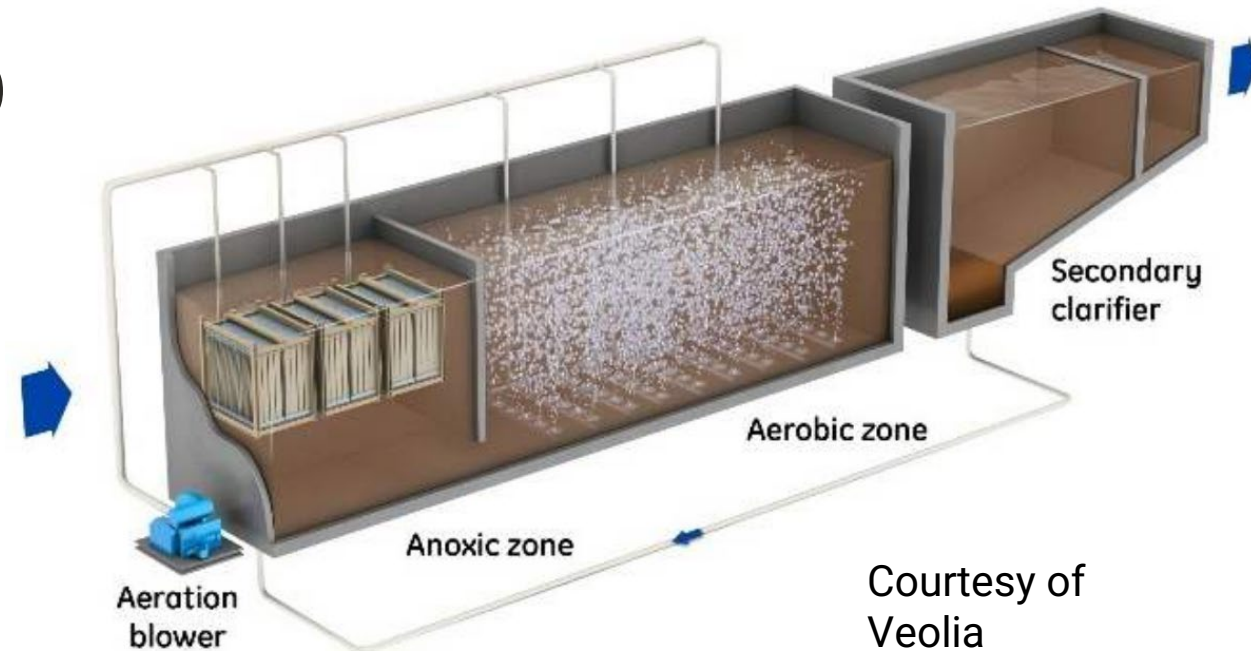
MABR Design and Cost Considerations

CAPTITAL CONSIDERATIONS

- Intensified treatment
- Fine screening requirements (2-3 mm)
- Limited blower addition

OPERATIONAL CONSIDERATIONS

- High oxygen transfer efficiency
- Lower pumping and chemical costs
- Low GHG emissions
- Membrane life of ~20 years



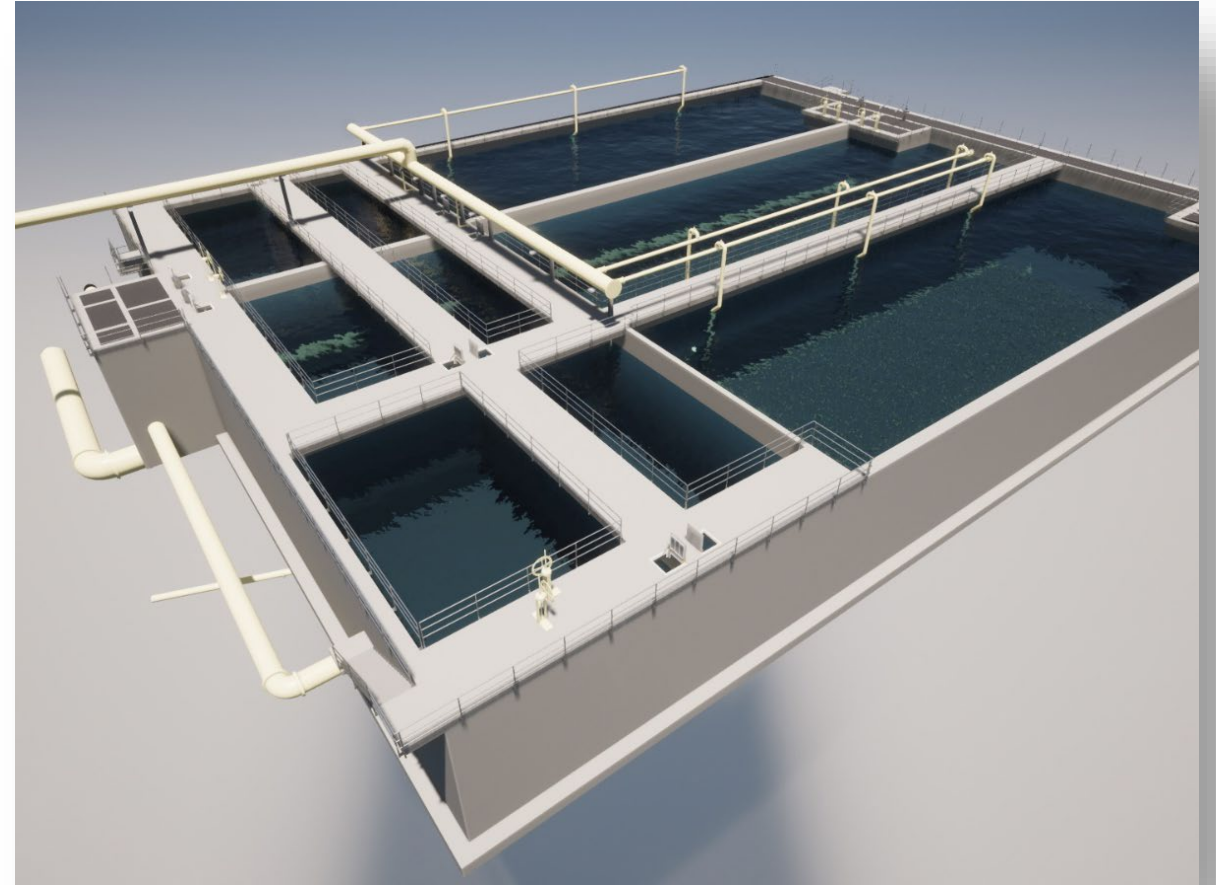
Thank You!

Questions?



Francesca Cecconi

cecconif@bv.com



Town of Windsor
CALIFORNIA