King County

Asset Management
Brightwater Treatment Plant

Presented to the Metropolitan Water Pollution Abatement Advisory Committee

September 3, 2020

King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Today's Presentation

- Brightwater's asset history
- Asset experiences since startup
- Recent capacity analysis

Brightwater – Asset History

- 2011 Brightwater construction completed
  - Approximately 13,000 assets acquired
- September 2011 plant operation began
- Equipment begins to age and wear

Equipment Service Life

Some conditions that reduce service life:

- Solids loading
  - Rags, rope, hair, etc. (clogging and binding of equipment)
  - Gravel, sand, grit (wearing of pumps, centrifuges, grinders, etc.)
- Chemical attack
  - Hydrogen sulfide
  - Process chemicals
- Thermal expansion
- Obsolescence

Operation of a New Treatment Plant

Brightwater is a unique design and tweaks were anticipated after startup

When equipment is not working as intended:

- Modify how it is operated
- Increase maintenance activities
- Redesign the system
  - Add equipment to mitigate issues
  - Replace the equipment with a different type

What We've Experienced Since Startup

- Digester mixers
  - Seals leaking after 5 years
  - Highly corrosive environment
  - Increased refurbishment timing
- Screenings pumps clogging
  - Pumps needed de-ragging once per day
  - Installed grinders upstream of the pumps

What We've Experienced Since Startup

- Emerson Ovation controls
  - Hardware and software needed upgrading after approximately 10 years
  - Ongoing upgrades planned
- Motor managers in motor control centers
  - Already going obsolete
  - Originally expected to last 15 year
- Foundation Fieldbus
  - A new automation technology at the time of design
  - Did not take off in the market place as anticipated
  - Overly complex for current needs – makes troubleshooting difficult

What We've Experienced Since Startup

- Chemical tank leaks (3 tanks)
  - Leaks developing from thermal expansion and filling/draining cycles
  - Planning on a 7-year replacement cycle or steel and SS options
- Chemical distribution piping leaks
  - Piping and glued joints starting to fail
  - Planning on a preventive maintenance cycle or new materials

Brightwater Capacity Analyses

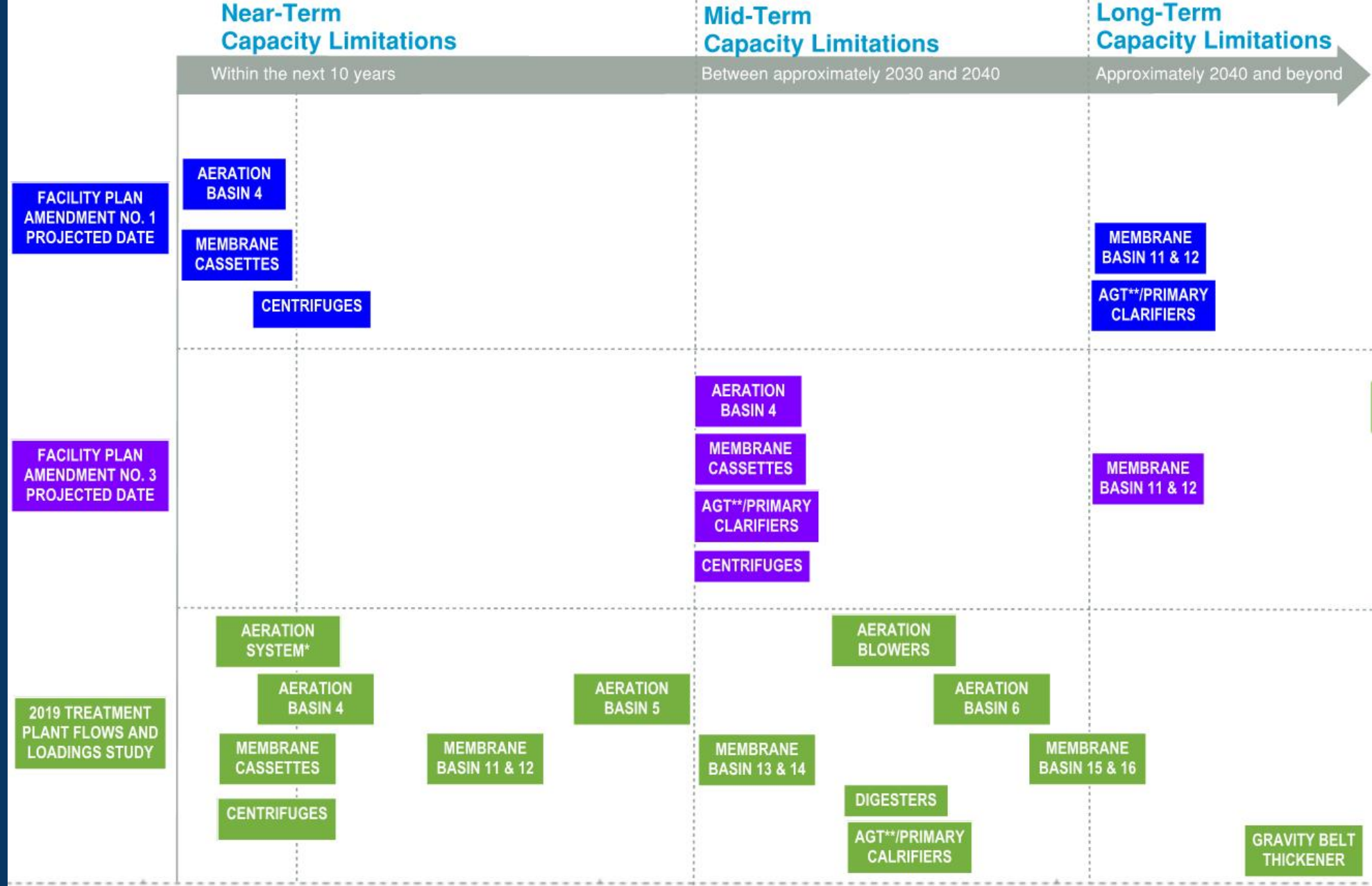
- Brightwater was planned and constructed for phased expansion

- 2016: Facility Plan Amendment No. 3
  - Updated projected phased expansion dates based on operating experience and updated flow projections

- 2019: Treatment Plant Flows and Loadings Study
  - Determined capacity needs and timing of major plant processes
  - Assumed all flows from Brightwater service area goes to Brightwater

Process Capacity Limitations

Brightwater



NOTES:
*Aeration system limitation being addressed in current project
**AGT=Aerated Grit Tanks

Treatment Planning Program

- Starting in 2021
- Comprehensively plan for near-term and long-term treatment needs at facility (treatment plant) and regional (system-wide) levels
  - Address regulatory requirements (potential treatment upgrades)
  - Accommodate growth (capacity improvements)
  - Determine project options, timing, and costs
- Identify policies, conceptual capital projects, and funding needed to meet treatment needs

Treatment Planning Program (continued)

- Define projects that integrate other system needs, opportunities, and priorities, including
  - capacity (flows and loadings)
  - asset management, resiliency
  - operational, process, maintenance
  - regulatory requirements (e.g., nitrogen, biosolids)
  - system optimization, flow swaps
  - impacts of climate change
  - energy, sustainability, reduced climate impacts, resource recovery opportunities
  - improved water quality outcomes

Next Steps

- Upcoming presentations on:
  - South Plant
  - West Point
  - Further information for all plants on condition assessment, analysis, and approach

Questions?

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