WTP Expansion Project Update

Town of Johnstown

August 29, 2022

Drivers for WTP Expansion

INCREASING DEMAND

TASTE & ODOR

AGING INFRASTRUCTURE

CONSTRAINTS = SCHEDULE + BUDGET

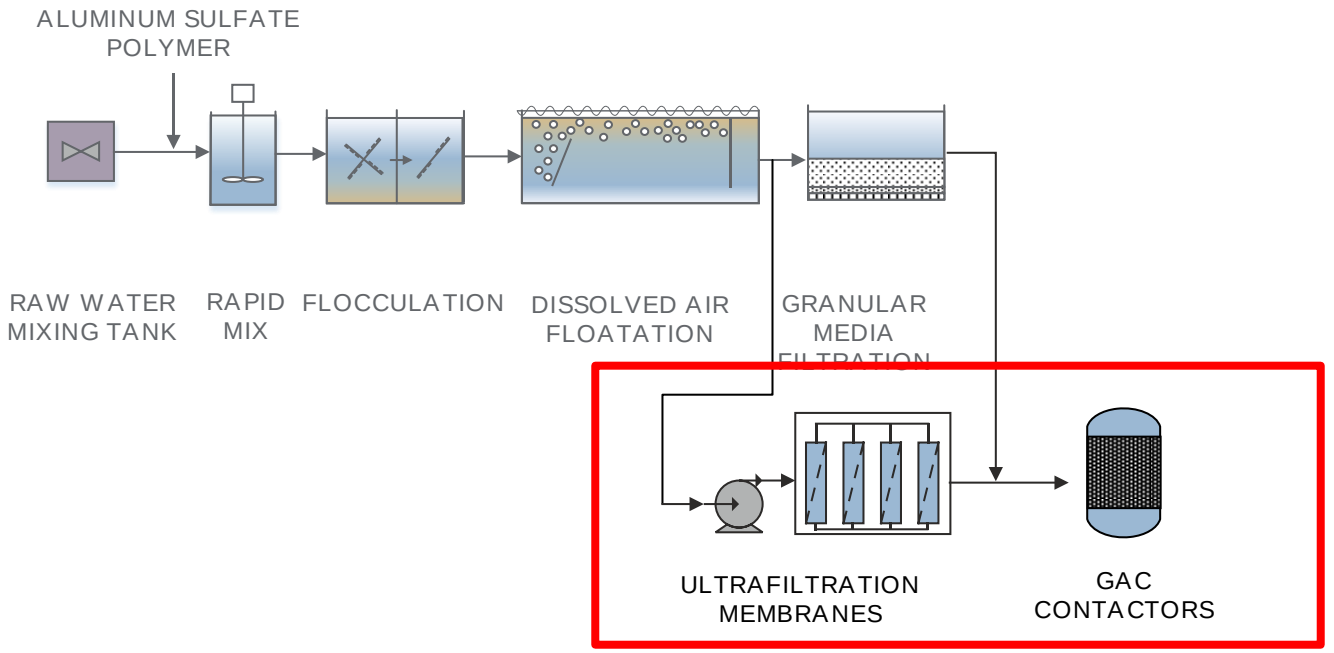
WTP Phasing

Current Capacity	Phase I	Phase II
• 6 mgd • 18,700 population	• 12 mgd • 21,000 population • Online 2025	• 21 mgd • 50,000 design population • Online TBD

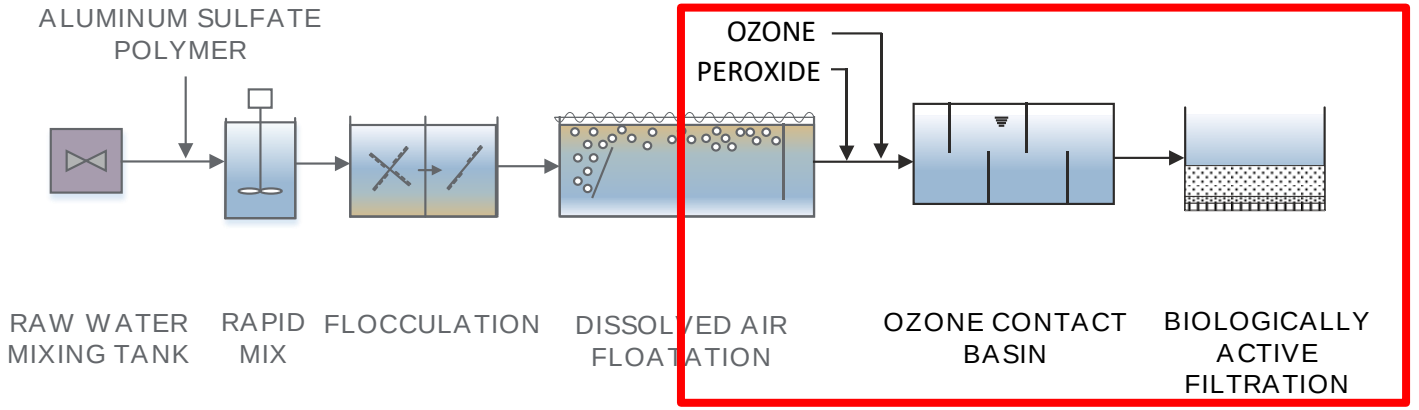
April 2021
Working Session

Taste & Odor Removal Trains (April 2021)

1. Membranes + GAC



2. Ozone + BAF



Estimated Construction Cost (April 2021)

Item	Membrane / GAC	Ozone / BAF
Construction Cost	$16M to $28M	$36M to $48M
Contingency 20%	$4M to $7M	$9M to $12M
Total	**$20M to $35M**	**$45M to $60M**

Current Status (August 2022)

- **Expanded Scope**
  - Residuals handling at WTP, not sanitary sewer
  - Expand onto southern site
  - Avoid existing infrastructure
  - Finished water volumes
  - Changed configuration
- **Escalation**
  - Inflation
  - High demand for materials
  - Supply chain impacts
  - Craft labor shortage

Current Status

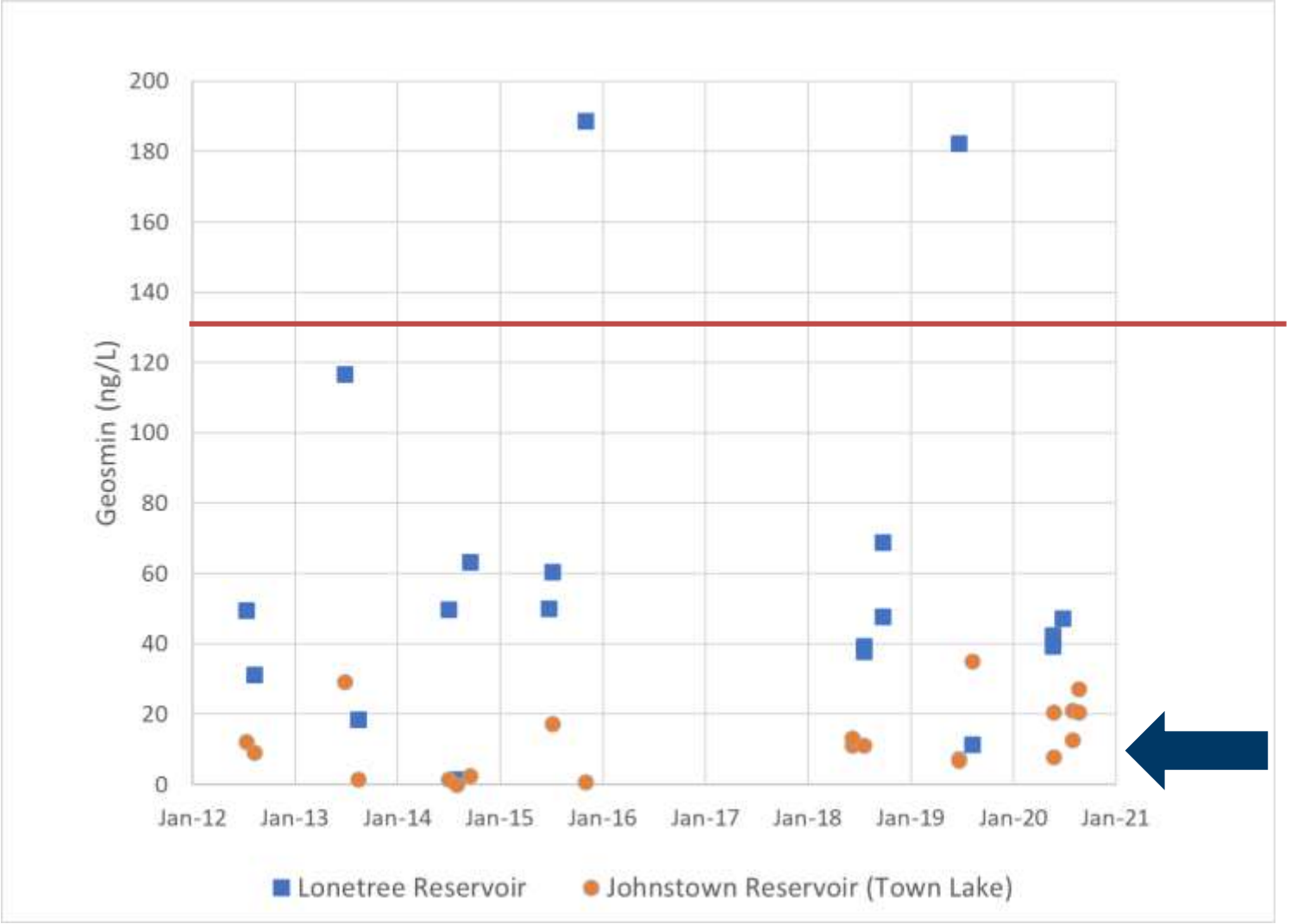
Proceed as Ozone & Biologically Active Filtration (BAF)

- September 2021 – Start of Design
- March 2022 – Basis of Design (15% Complete)
- Piloting
  - Spring 2022 – Pretreatment
  - Summer 2022 – Ozone & Biological Filtration
- May 2022 – Preliminary Design (30%)

Variable Water Quality

Exceeding Available Funds

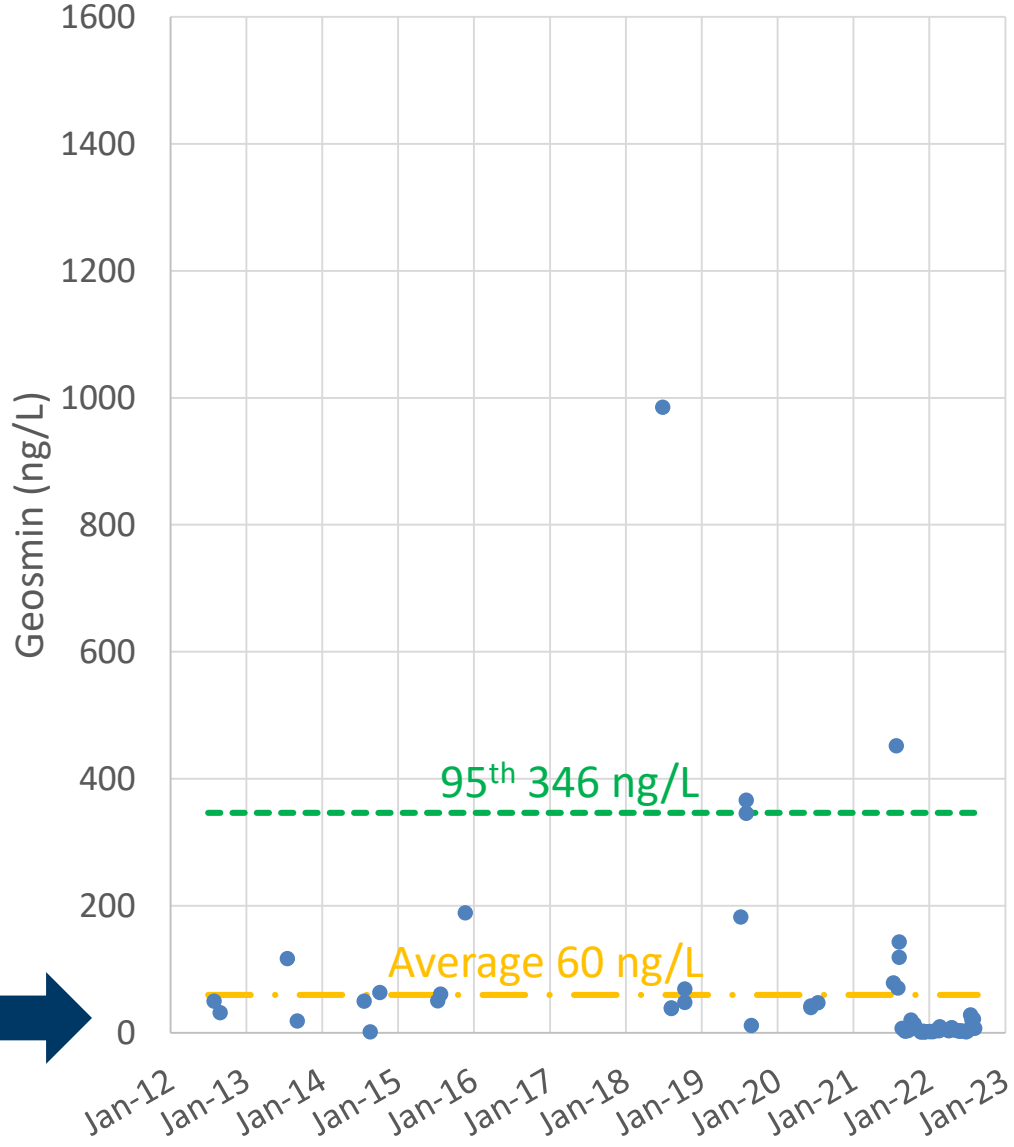
Historic Geosmin Concentrations (January 2021)



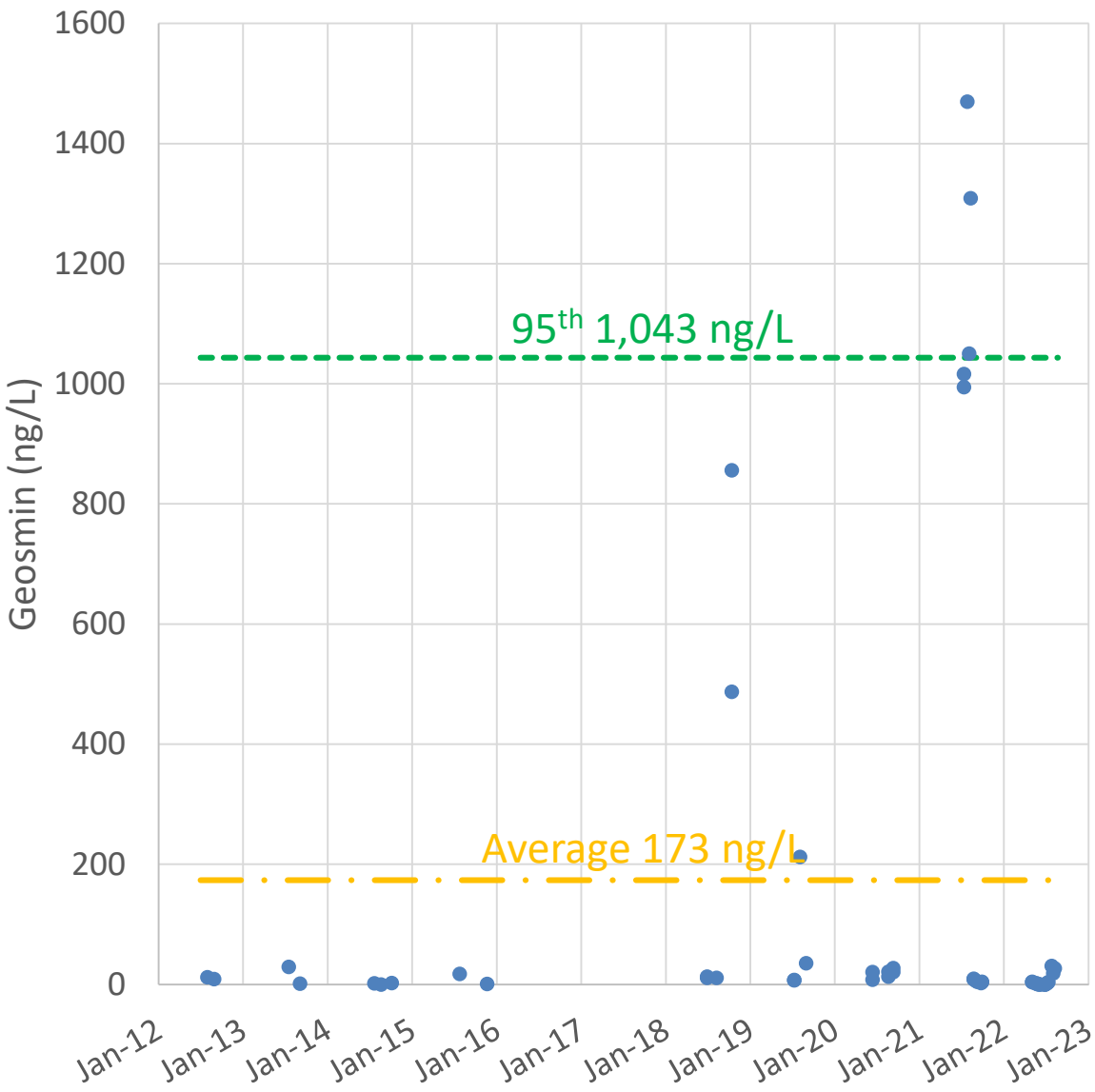
Average 129 ng/L

Goal: 6 to 10 ng/L
70 to 95% Removals

Lonetree Reservoir



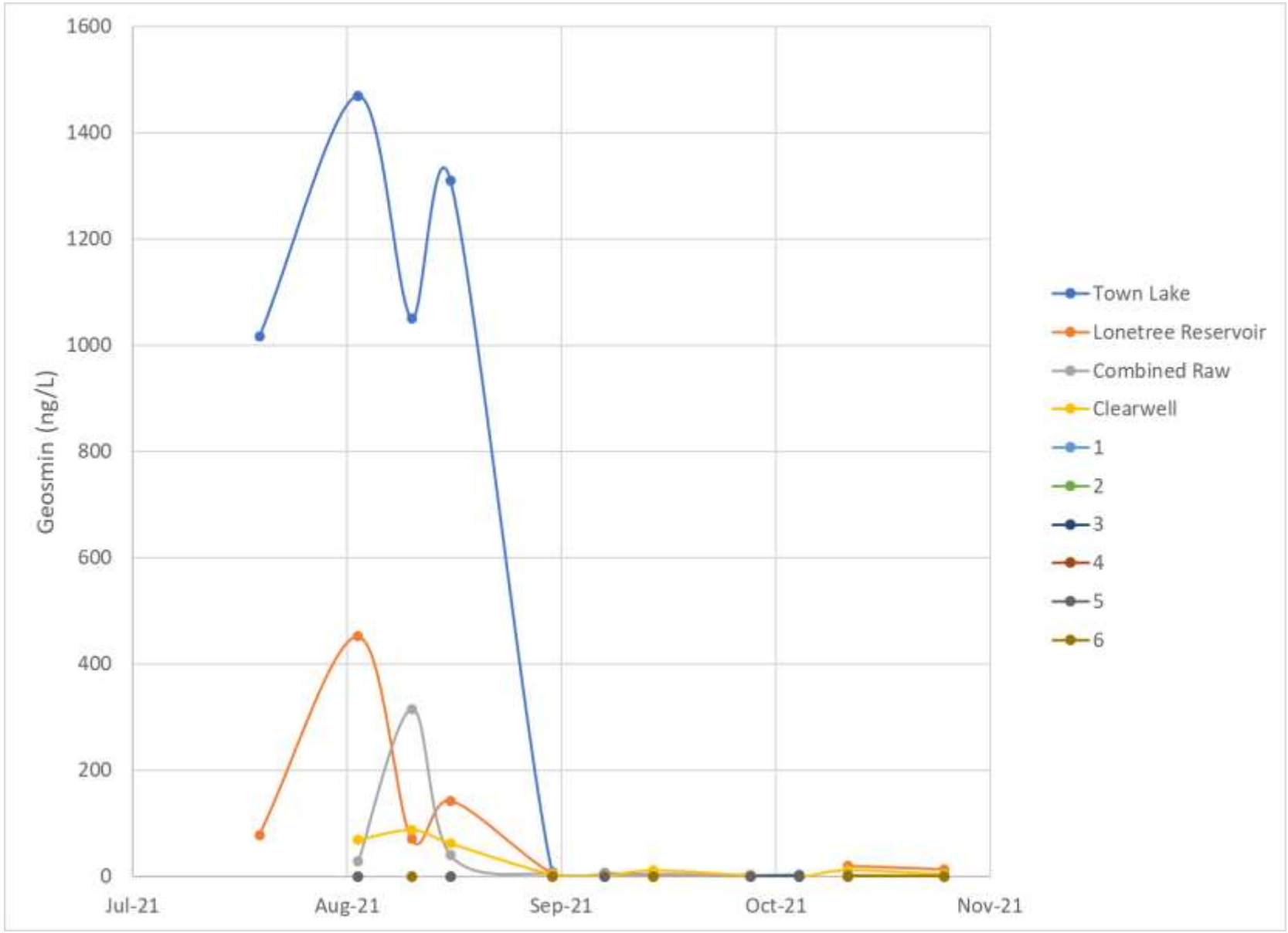
Town Lake



Goal: 6 to 10 ng/L

Geosmin Trends 2021

- Combination of Treatment & ***Source Water Management***



Multi-Barrier Approach to Taste & Odor

January 2021 Taste & Odor Study

Short Term (2021)

Source Water Management

- Blending Ratio
- Ultrasonic Algae Control
- Bypass Pumping from Home Supply Ditch
- Use Existing Interconnections

Powdered Activated Carbon

- Consider PAC use at Lone Tree during high events

Pretreatment

- Optimize DAF Removals

Granular Activated Carbon

- System installed 2021
- Permanent System as part of Expansion

Ozone

- Liquid Oxygen and Reactor
- Retrofit Existing Clarifiers

Biologically Active Filtration

- Add Nutrients to Create Biofilm
- Add Associated Chemical Systems
- Retrofit Existing Filters, Not Suitable for Membranes

Long Term – Achieve > 90% Removal

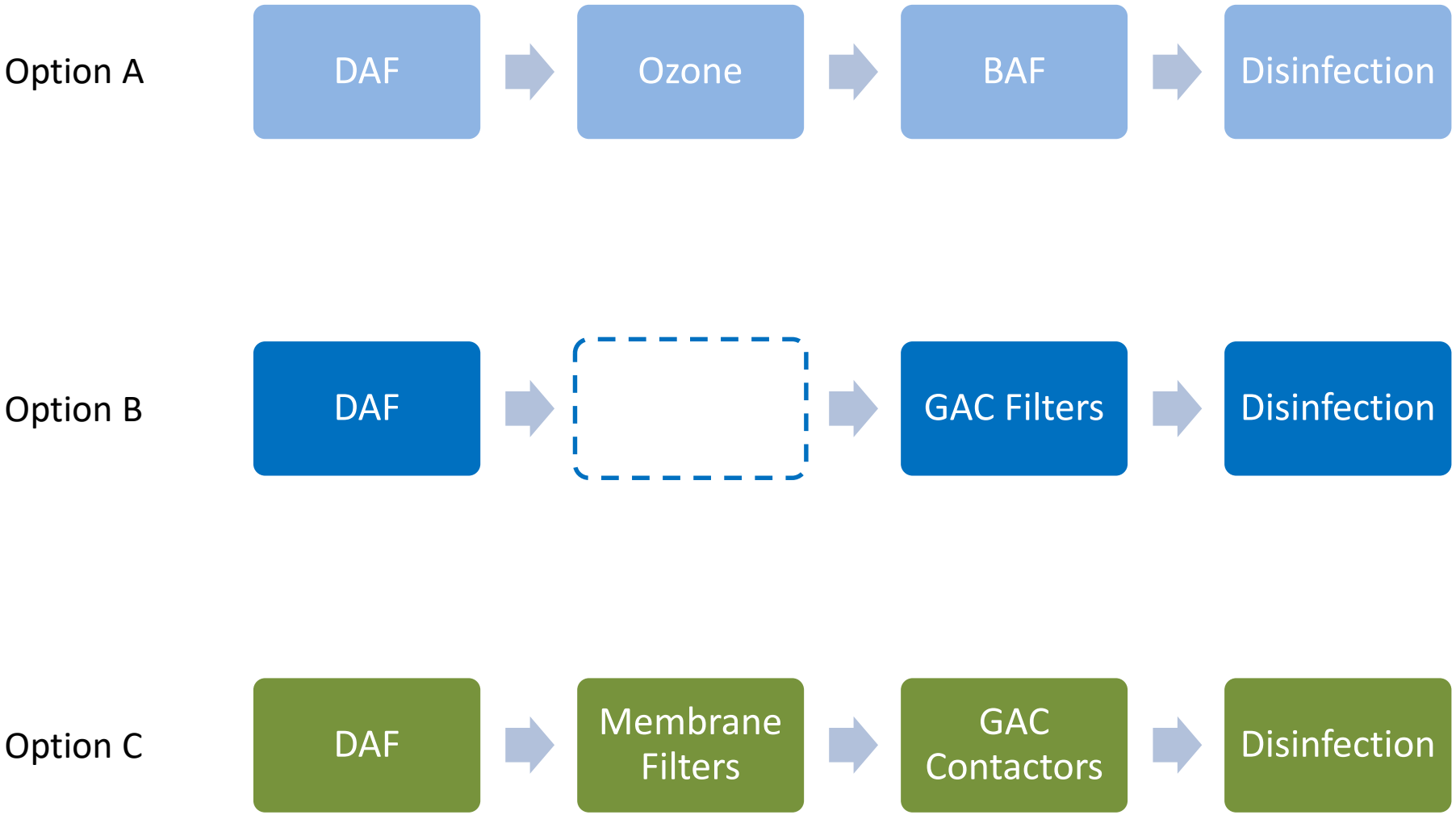
Mission Critical – Taste & Odor Performance

- Evaluate Risk at Elevated Geosmin Levels
  - Ability of system to treat all scenarios
- Manage escalating costs

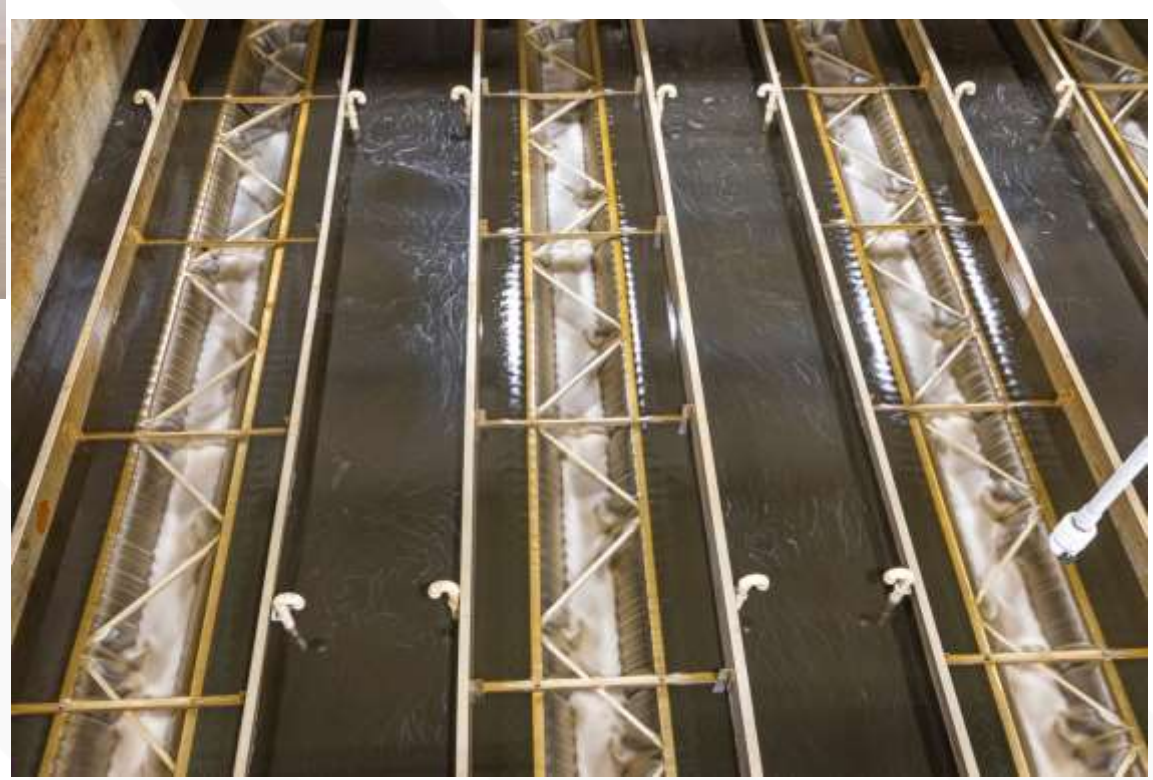
Option A
Ozone & BAF

Option B
GAC Filters

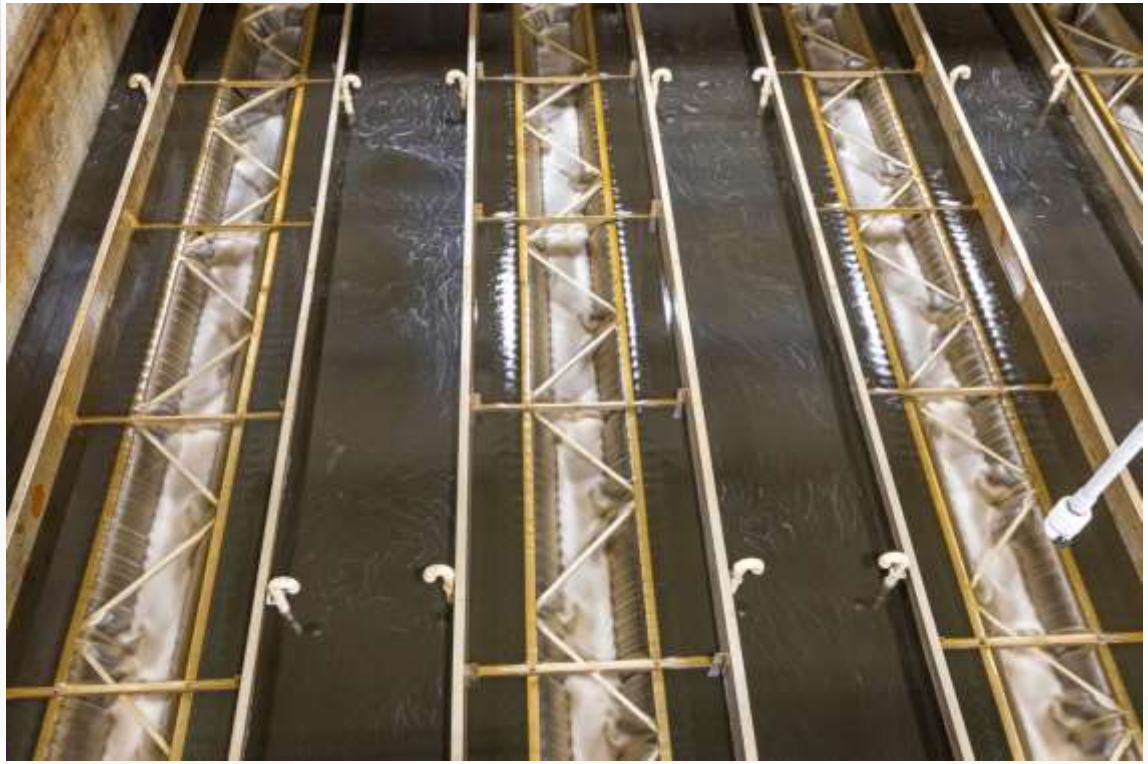
Option C
Membrane Filtration & GAC Contactors


Option A
DAF
Ozone
BAF
Disinfection
Option B
DAF
GAC Filters
Disinfection
Option C
DAF
Membrane Filters
GAC Contactors
Disinfection

Option A – Ozone & BAF



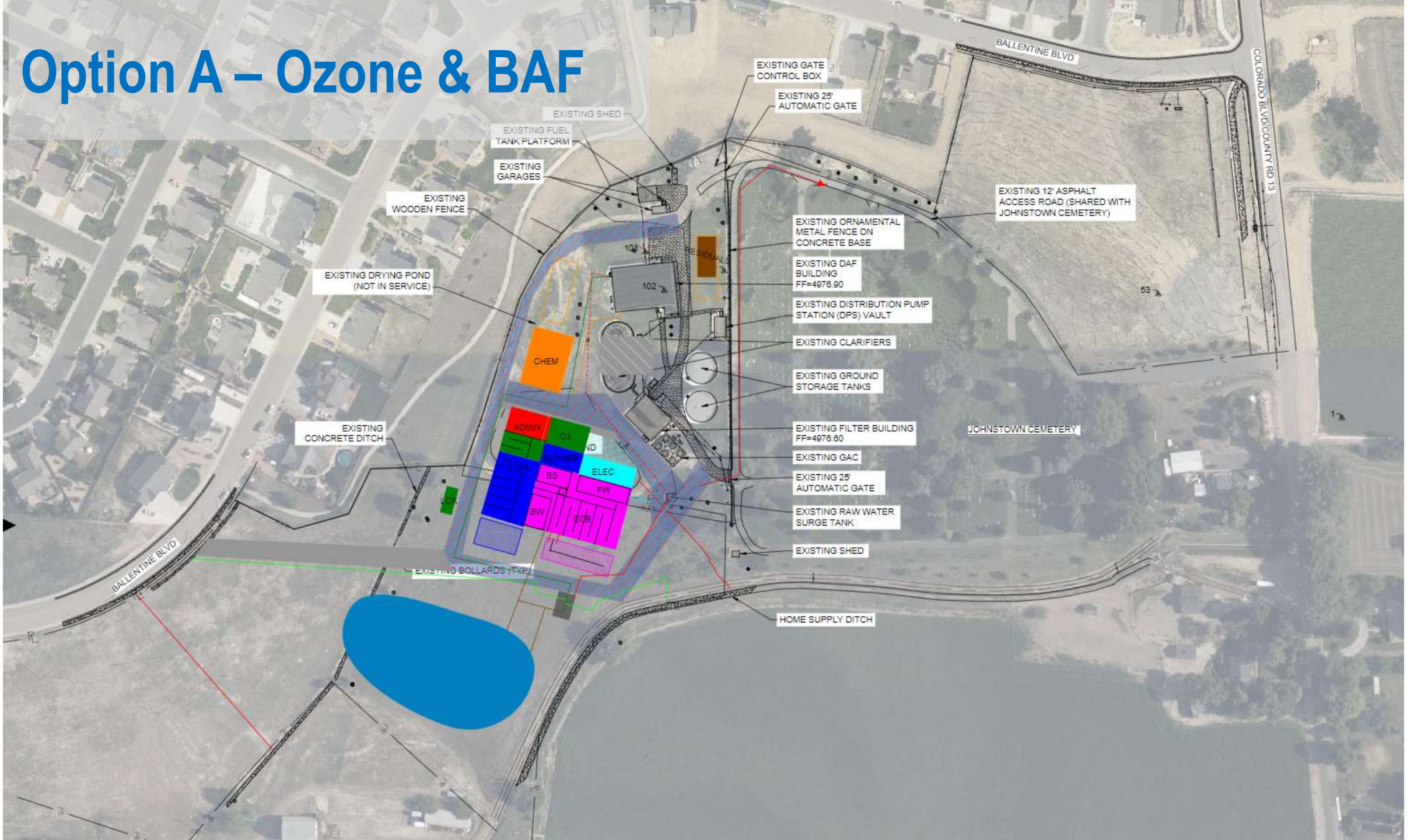
Option B – GAC Filters



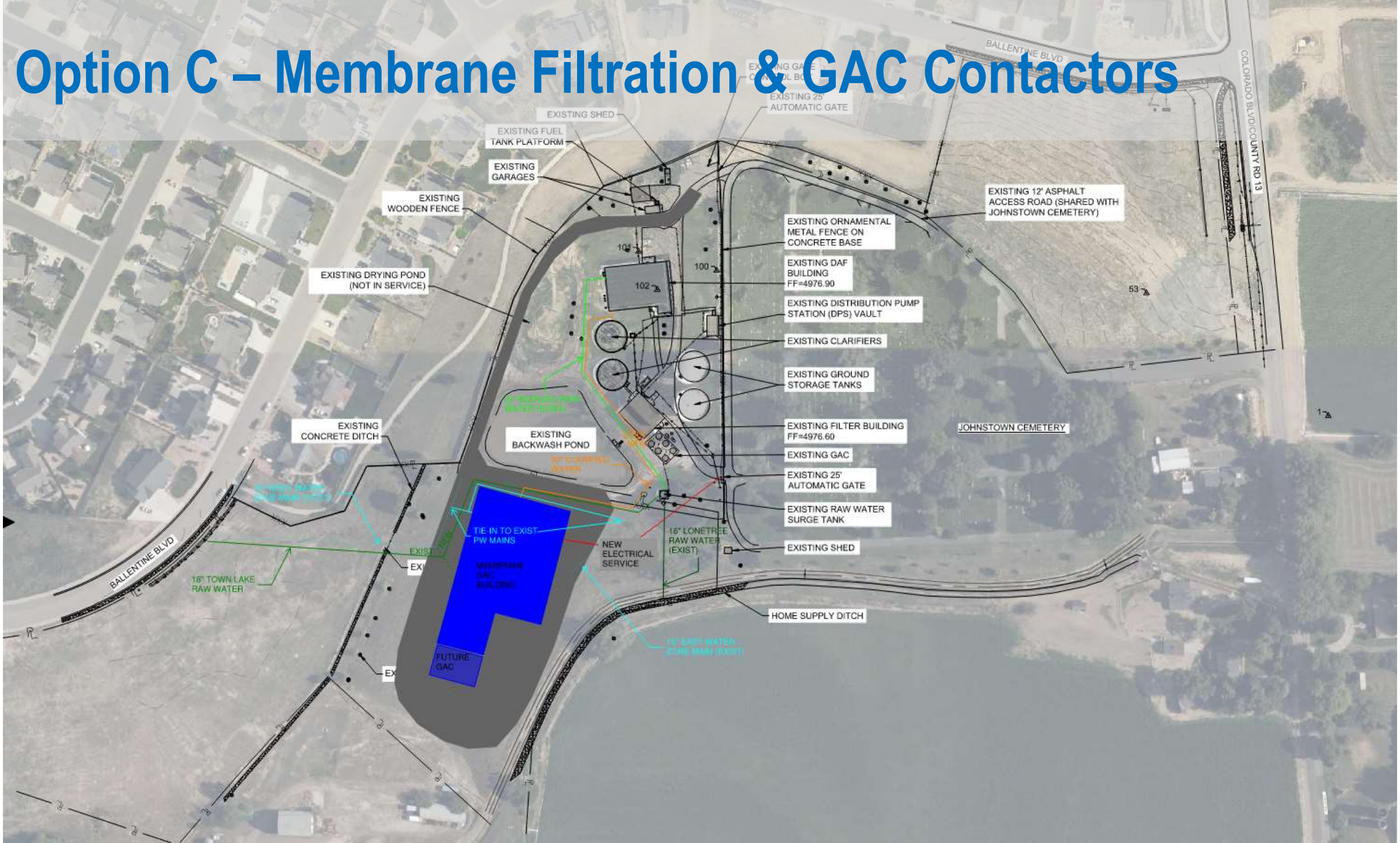
Option C – Membrane Filtration & GAC Contactors

30% Design – Ozone & BAF

Option A – Ozone & BAF



Option C – Membrane Filtration & GAC Contactors



Ranking (Non-Cost)

WEIGHT SCORED No. 1 (Non-Weighted)						
Option *	Taste & Odor Performance	Finished Water Quality	Scalability	Complexity	Reliability	Total
Option A: Ozone BAF	3.6	3.8	3.3	2.9	3.7	17.2
Option B: GAC Filters	3.8	3.6	3.0	3.9	3.5	17.7
Option C: Membranes GAC Contactors	4.6	4.7	4.9	4.0	4.4	22.6

** Assessed at high-risk water quality*

Option C: Membranes

Ranking (Weighted)

WEIGHT SCORED No. 2 (Non-Cost)						
Option	Taste & Odor Performance	Finished Water Quality	Scalability	Complexity	Reliability	Total
Option A: Ozone BAF	10.7	11.4	3.3	2.9	7.4	35.6
Option B: GAC Filters	11.3	10.7	3.0	3.9	7.0	35.8
Option C: Membranes GAC Contactors	13.9	14.1	4.9	4.0	8.8	45.6

	Option C: Membranes

Ranking (Cost-Weighted)

WEIGHT SCORED No. 3 (Cost)								
Option	Taste & Odor Performance	Finished Water Quality	Scalability	Complexity	Reliability	Construction Cost	Operating Cost	Total
Option A: Ozone BAF	7	7	0	0	0	11	13	38
Option B: GAC Filters	7	7	0	0	0	19	8	40
Option C: Membranes GAC Contactors	9	9	0	0	0	11	5	34

High Score	Option B: GAC

Ranking Summary

	Option A	Option B	Option C
Scenario*	Ozone BAF	GAC Filters	Membranes & GAC Contactors
Non-Weighted	3	2	1
T&O	3	2	1
Cost	2	1	3

** Assessed at high-risk water quality*

Cost Models

- Opinion of Probable Construction Cost
  - Phase I – Costs in 2022 for new WTP online in 2025
  - Phase II – Costs in 2031 for expanded WTP online in 2033
- 20-Year Net Present Value
  - Operation and maintenance
    - Electricity
    - Chemicals
    - Labor
    - Replacements – GAC media, membrane modules
  - Escalation at 3.5% to match CPI
    - Higher escalation assumed for GAC at 4.5%
- Options based on partially complete design.
- Accuracy varies by option, -30 to +50%

Cost Summary

Option	Option A	Option B	Option C
	Ozone & Biofilters	GAC Filters (Future Ozone)	Membranes & GAC Contactors
Phase I Capital Cost (2022)	$76,800,000	$67,700,000	$77,100,000
Phase II Capital Cost (2031)	$58,300,000	$67,400,000	$46,800,000
20-Year O&M	$33,900,000	$46,300,000	$61,300,000
20-Year Net Present Value	**$169,000,000**	**$181,400,000**	**$185,200,000**

Project Goals

INCREASING DEMAND

TASTE & ODOR

MEET AVAILABLE BUDGET

REQUESTING COUNCIL INPUT