AWAC MEETING

PROJECT UPDATE

— CITY OF —
ASHLAND

ASHLAND WATER TREATMENT PLANT & RESERVOIR

PROJECT NO. 217002

06 | 27 | 17

Get there!
KELLER associates

Meet **Our Team**

James Bledsoe, PE

Project Manager

Bryan Black, PE

Treatment Lead

Pierre Kwan, PE

Water Quality

CITY OF ASHLAND

Rod Linja, PE
Principal-in-Charge

JAMES BLEDSOE, PE
Project Manager

DESIGN MANAGER
LARRY RUPP, PE

TREATMENT
BRYAN BLACK, PE
Treatment Lead
PIERRE KWAN, PE (HDR)
Water Quality

STORAGE
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Structural Lead

PUMPING/PIPELINES
JASON KING, PE
Pumping/Pipelines Lead

SUPPORT STAFF

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Ozone Specialist

DAVID KINZER, PE
Structural Support

ADAM NEIWERT, PE
Electrical

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Site Civil

JEREMY WILSON, PE
Siting

MELINDA FRIEDMAN, PE (CE)
Distribution WQ

DONN HOGAN, AIA (HDR)
Architectural

KARL SUTTON, PE (HDR)
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ERIC ROUNDY, PE
Chemical Feed

DON BEST, PE (HDR)
Instrumentation/Controls

JOSH DOWNS (PEI)
SCADA

DAN BLACKWELL (HDR)
Cost Estimating

PETER OLSEN, PE
Permitting/Funding

ROBIN WARREN, PE, GE, RG (AG)
Geotechnical

RICHARD ALSPACH, PLS (TS)
Survey

RANDY BRIXEY
Inspection

CE = Confluence Engineering PEI = Portland Engineering PA = Process Applications AG = Applied Geotechnical TS = Terrasurvey

Key Planning Objectives

New Water Treatment Plant

- Replace existing water treatment plant
- 2 MGD, expandable to 10+ MGD
- Treat Reeder and TID source waters
- Meet treatment goals (presented later)

Crowson II Reservoir

- Provide additional system storage
- Similar grade to Crowson I Reservoir
- Provide clearwell volume
- Sizing TBD with ongoing master planning

Terrace Estate Pump Station

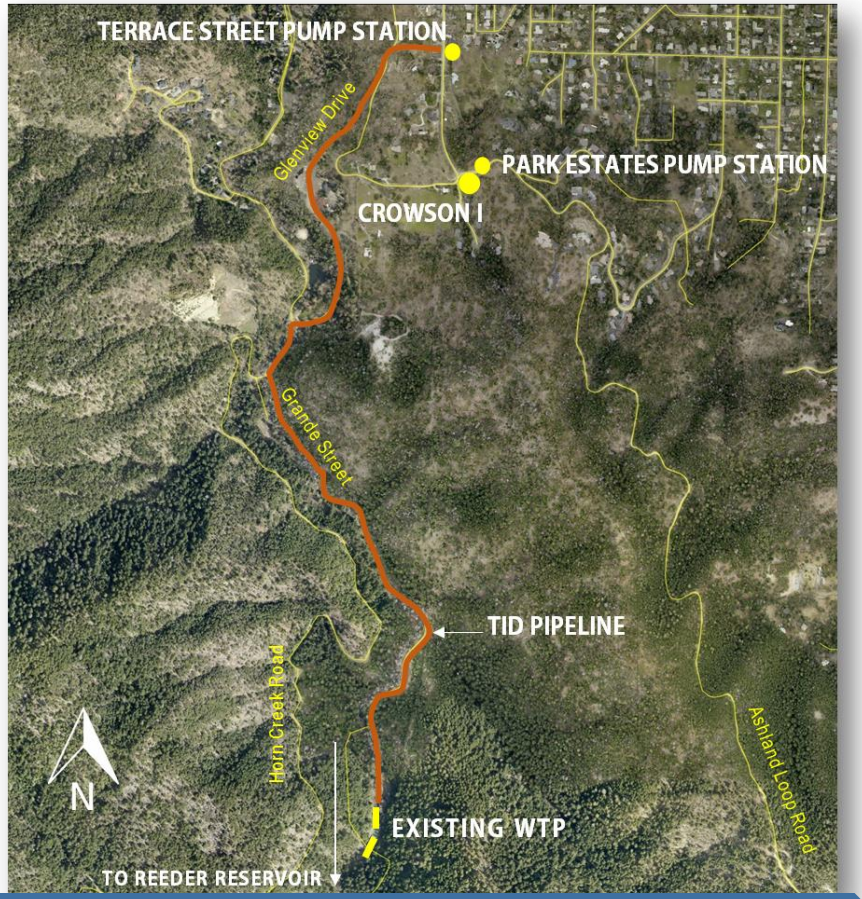
- Provide reliable backup TID supply to new plant
- 3.5 MGD firm capacity
- Flexibility to accommodate pumping to new plant and interim supply to existing plant

Park Estates Pump Station

- Better utilize existing Crowson I Reservoir storage
- Pump redundancy for domestic flows (<200 gpm) and fire flows (2,000 gpm)

Pump Stations

Schedule Constraints:
Construction during non-irrigation / low-demand period
Funding constraints



TERRACE ESTATE RAW WATER PUMP STATION

- Small footprint
- Convert wetwell dry pit to two compartment wetwell
- High-efficiency vertical turbine pumps

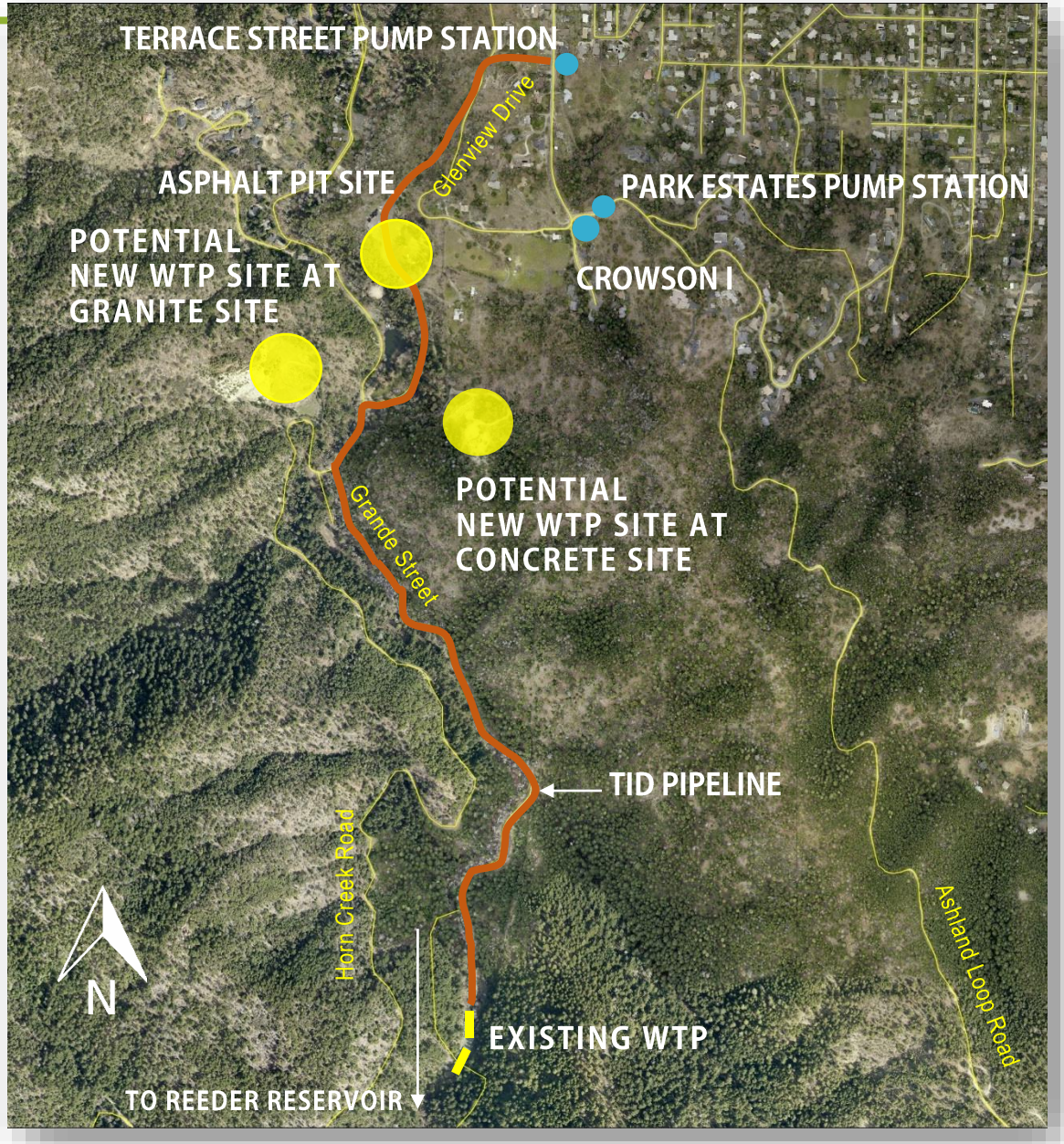
PARK ESTATES PUMP STATION

- Site near Crowson Tank
- 5 pumps, standby power

WTP and Reservoir Siting

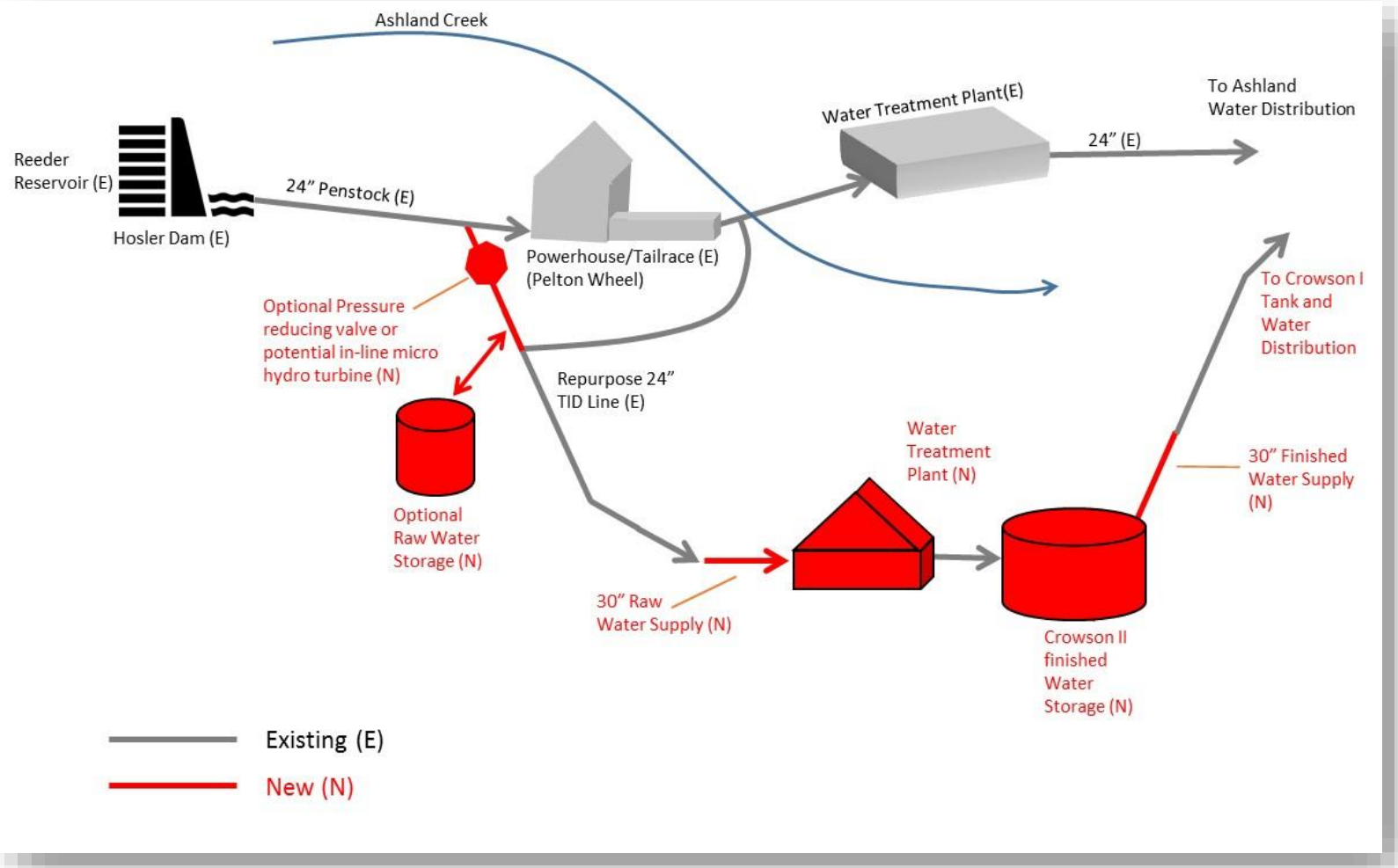
Evaluate Five Sites

- Concrete High
- Concrete Low
- Granite High
- Granite Low
- Asphalt Pit

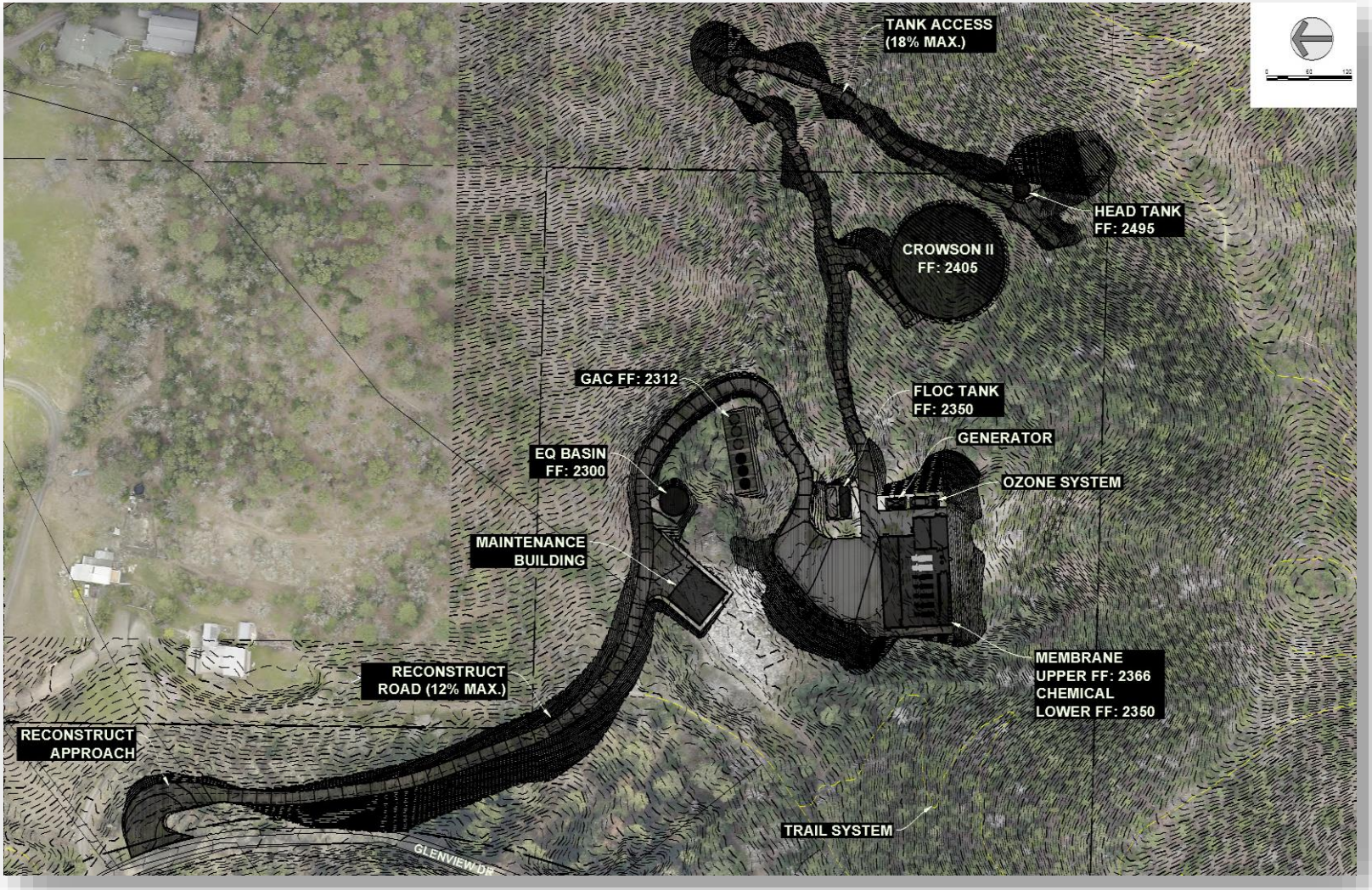


Gravity Flow Alternatives

- Penstock connection and high plant
  - 100% gravity flow
  - Power lost from hydropower is greater than power saved
- Tail race connection
  - 50% gravity flow possible for some sites

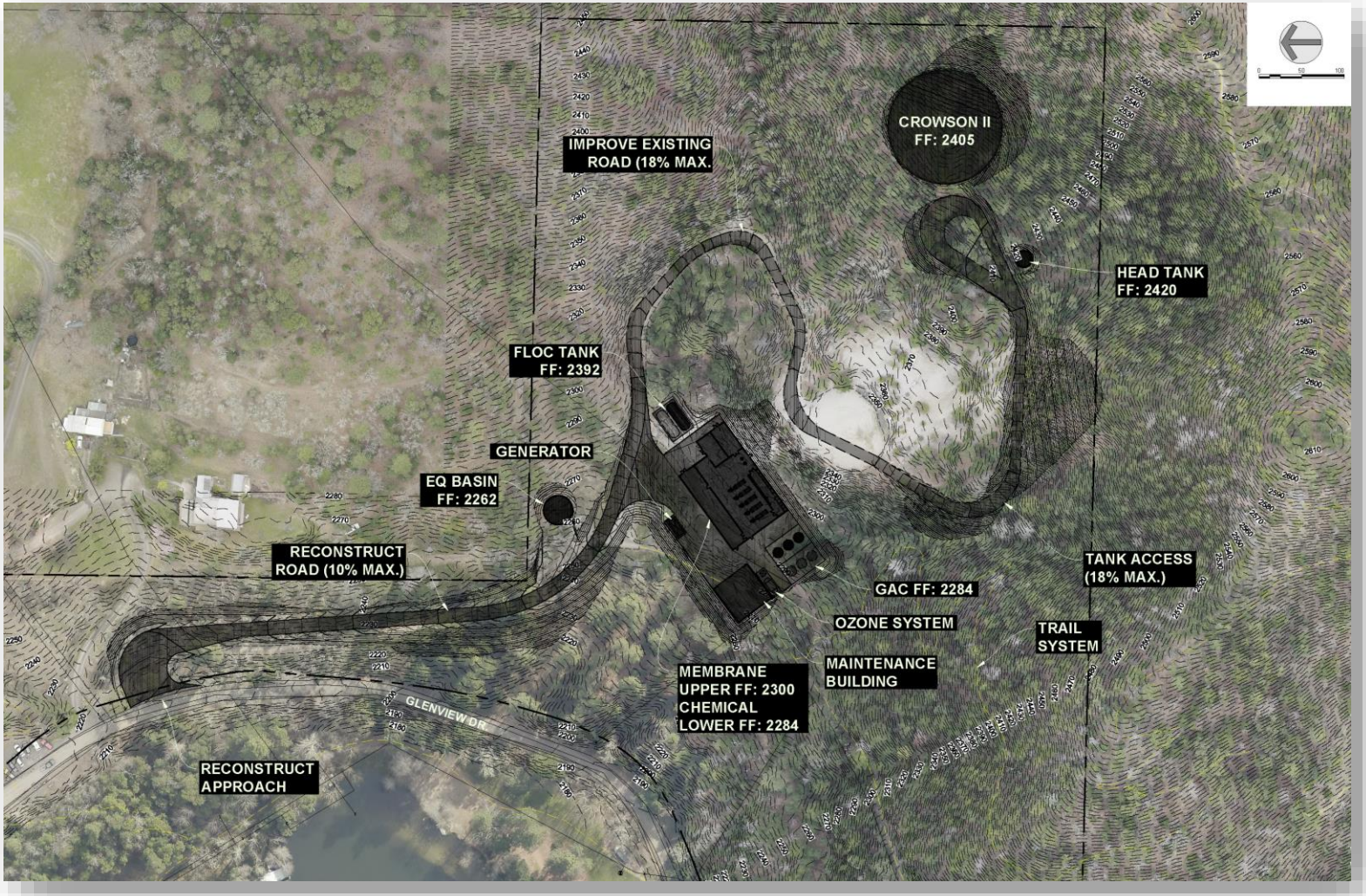


SITING CONCEPT 1: **Concrete Site, High Plant**



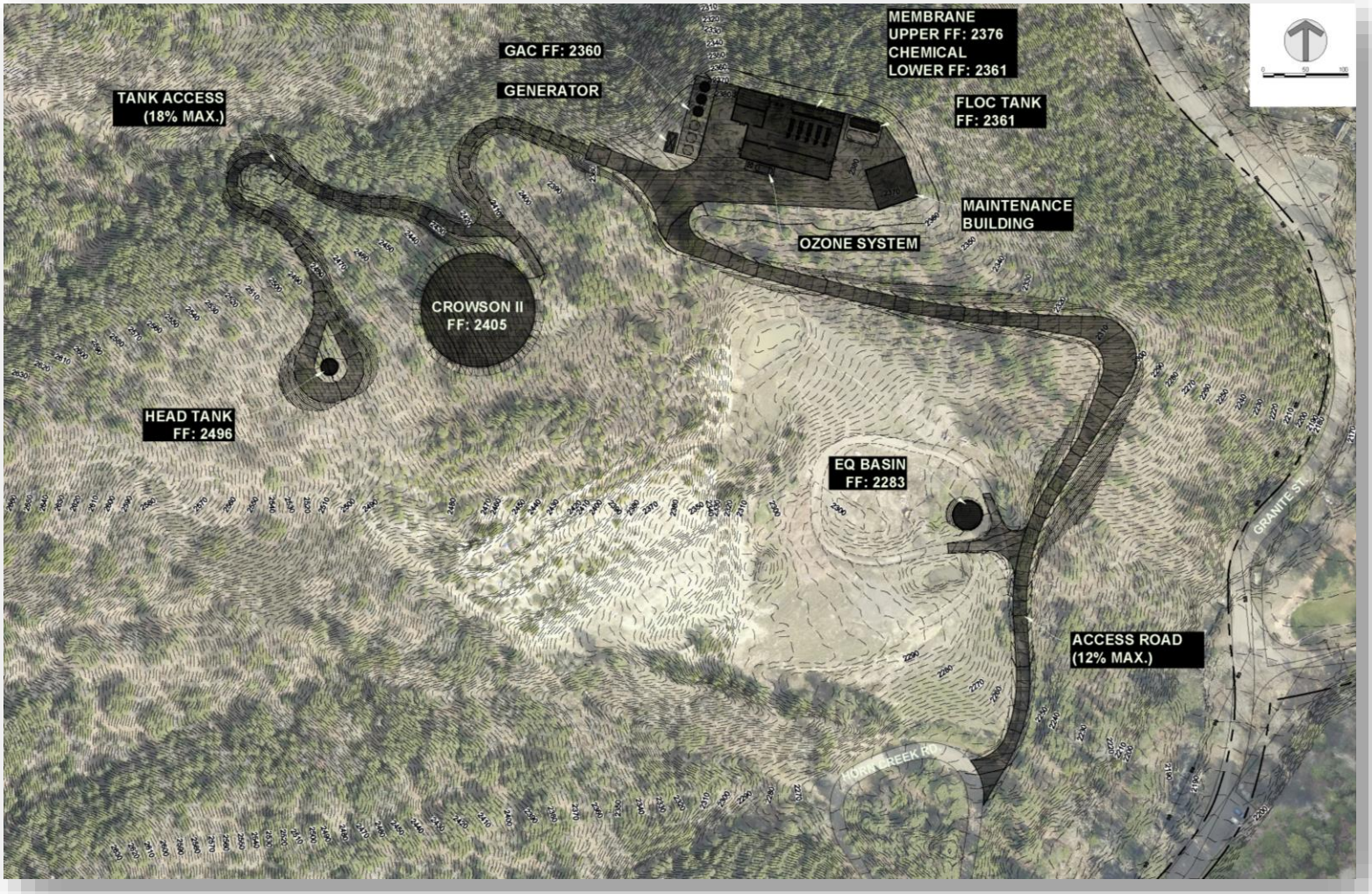
- Challenging topographical constraints
- Poorer access, expandability
- Gravity flow possible

SITING CONCEPT 2: **Concrete Site, Low Plant**



- Previous environmental concerns investigated and appear okay
- Better site access
- Site too low to accommodate gravity flow conditions
- Higher development cost

SITING CONCEPT 3: **Granite Site, High Plant**

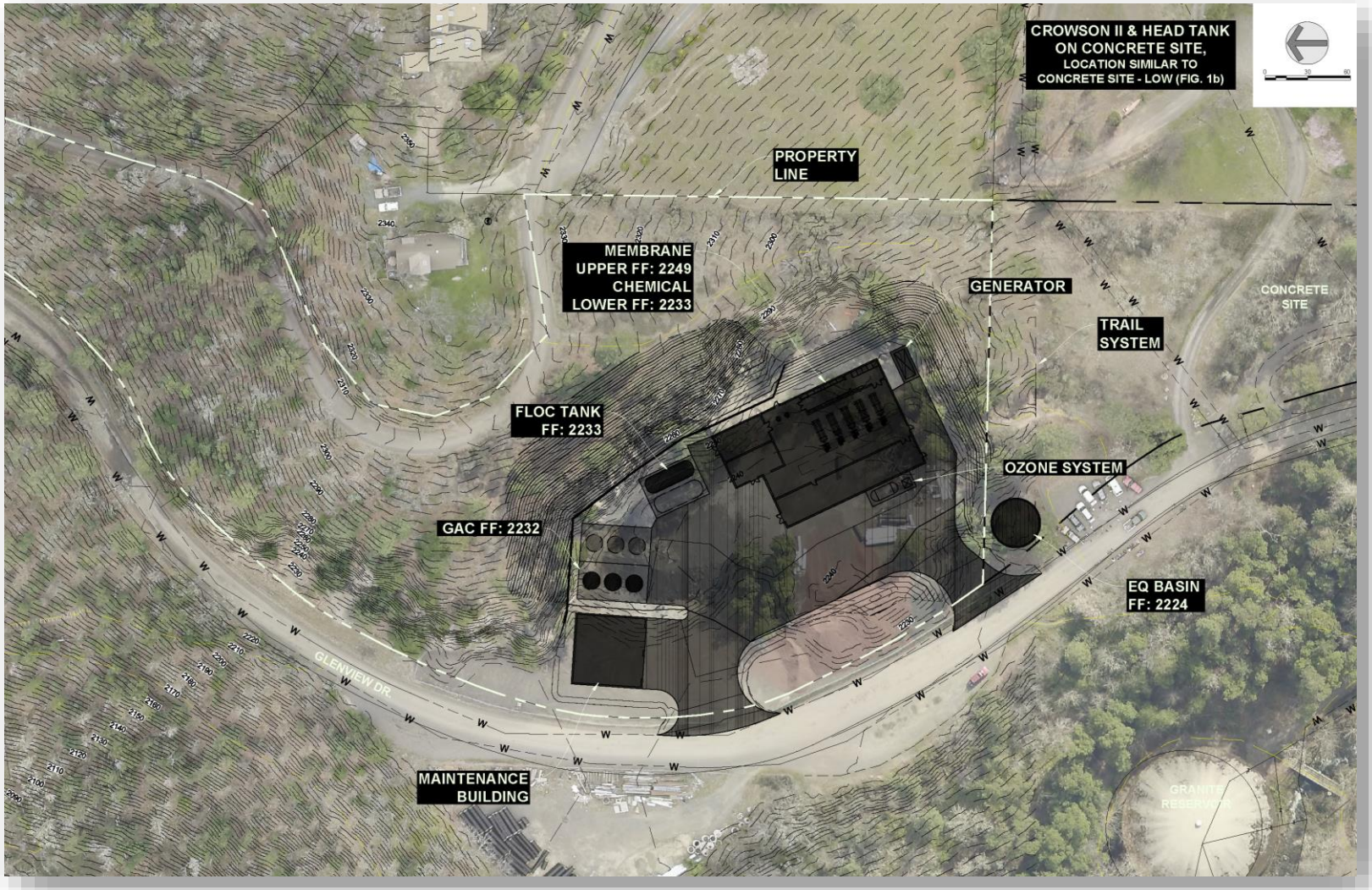


- Plant sited on top of knoll (shaved down)
- Gravity flow possible
- Less expandability potential
- Ashland Creek culvert replacement recommended to resist flood events
- Higher development cost

SITING CONCEPT 4: **Granite Site, Low Plant**

- Site more accommodating for alternative treatment technologies, expansion, access, and support structures
- Gravity flow possible
- Ashland Creek culvert replacement recommended to resist flood event
- Lower development cost

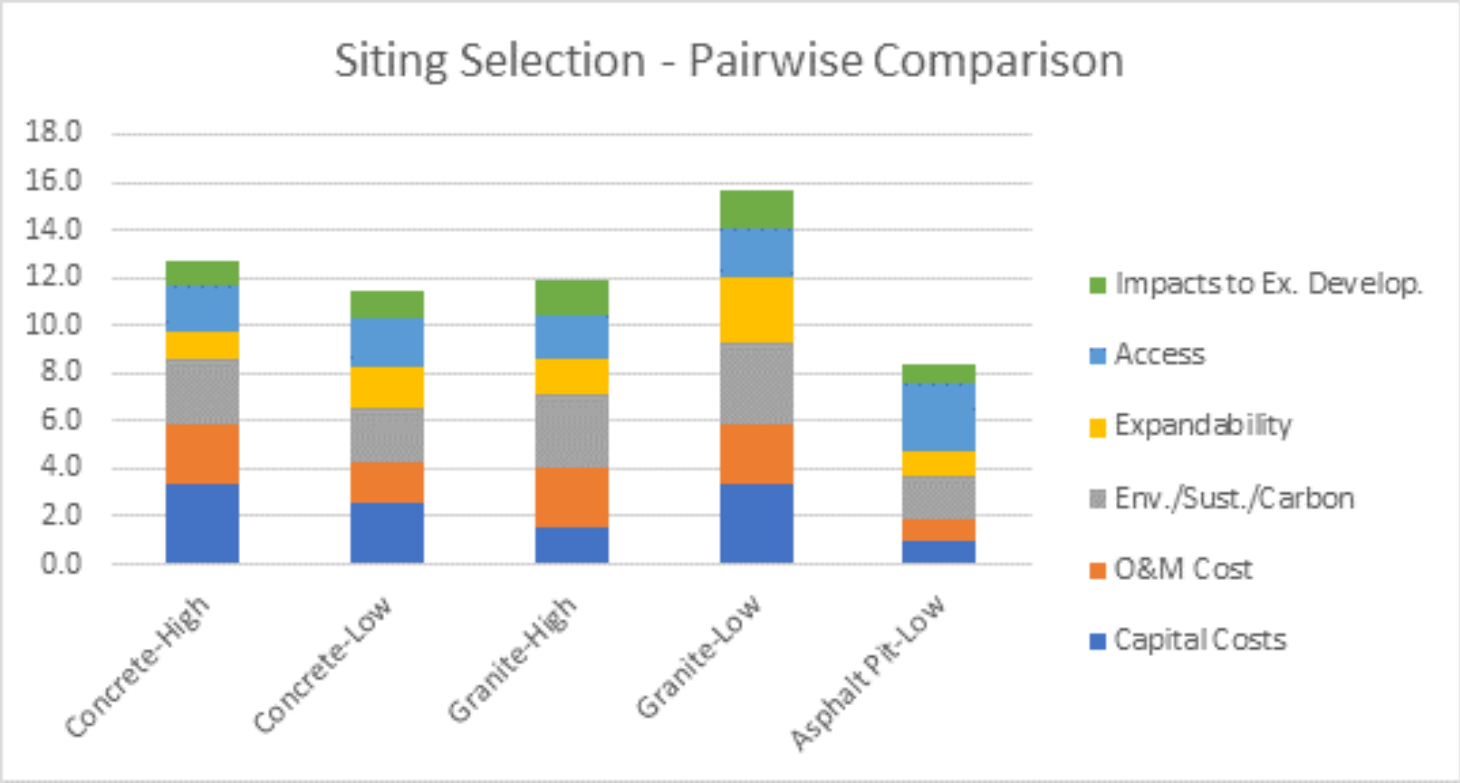
SITING CONCEPT 5: **Asphalt Pit**



- Best access
- Site is tight, requiring significant retaining walls, poor expansion capability
- Nearby Crowson II tank site not available
- Gravity option not viable
- Highest development and O&M costs

WTP Site Selection Criteria and Results

SITING CONCEPT: **Site Selection**

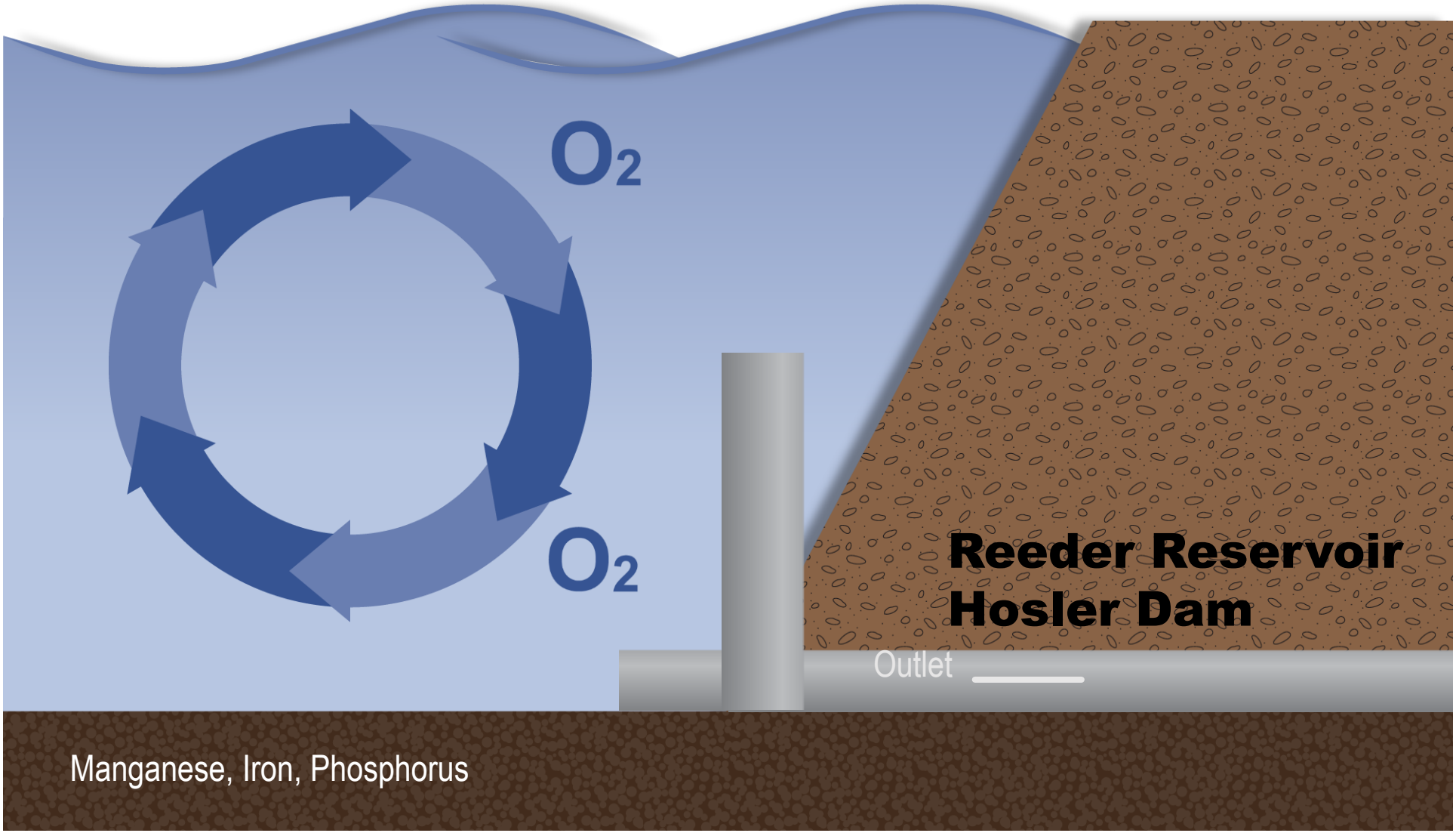


- Granite Low and Concrete High clearly have the lowest life-cycle costs and offer smaller carbon footprint potential
- Granite Low offers better access, expandability, and flexibility

WATER TREATMENT PROCESS EVALUATION

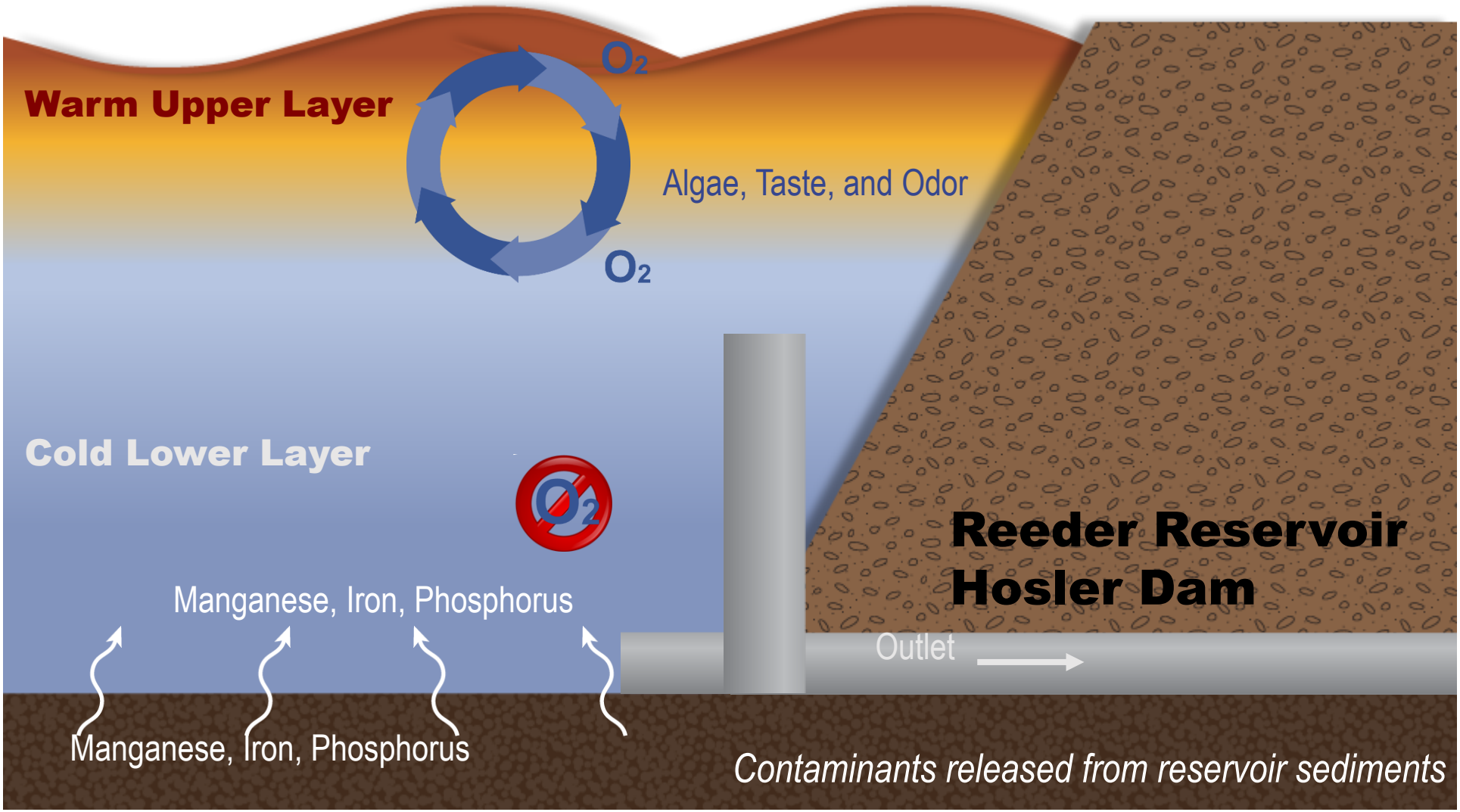
TREATMENT TECHNOLOGIES: **Winter**

Full lake mixing keeps contaminates in sediment



TREATMENT TECHNOLOGIES: **Summer**

Temperature layering releases contaminants



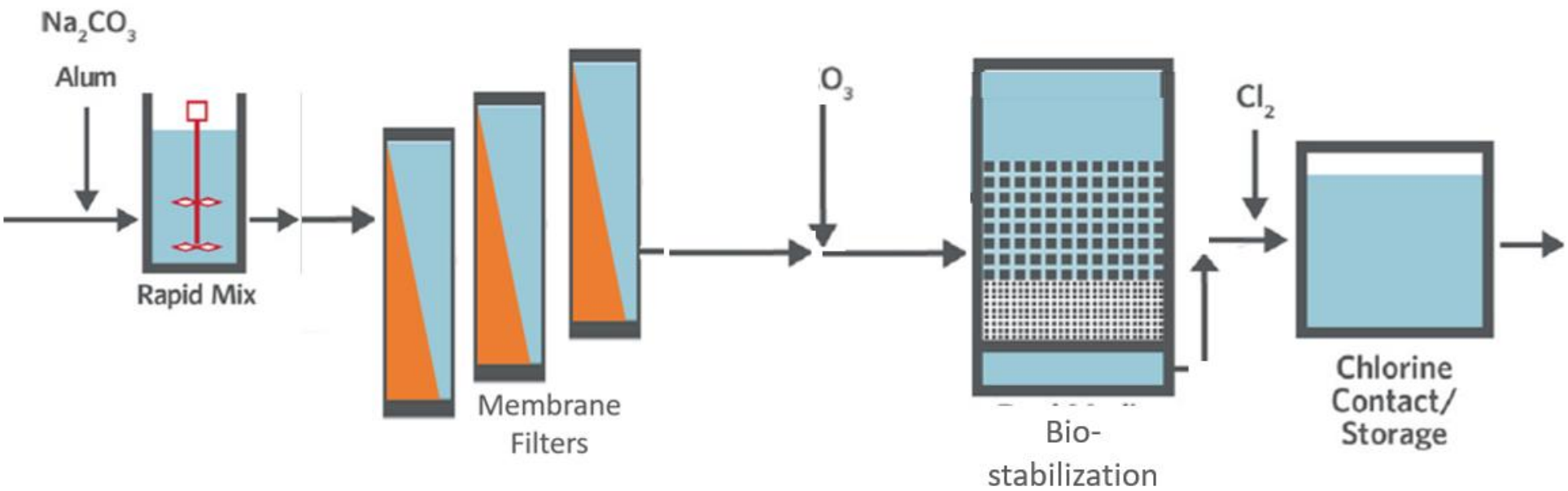
Treatment Goals

- Manganese and iron
- Organics and color
  - Disinfection byproduct control
- Algae / algal toxins
- Taste and odor (Geosmin)
- Disinfection
- Corrosion
- Achieve
  - Customer satisfaction
  - Regulatory compliance

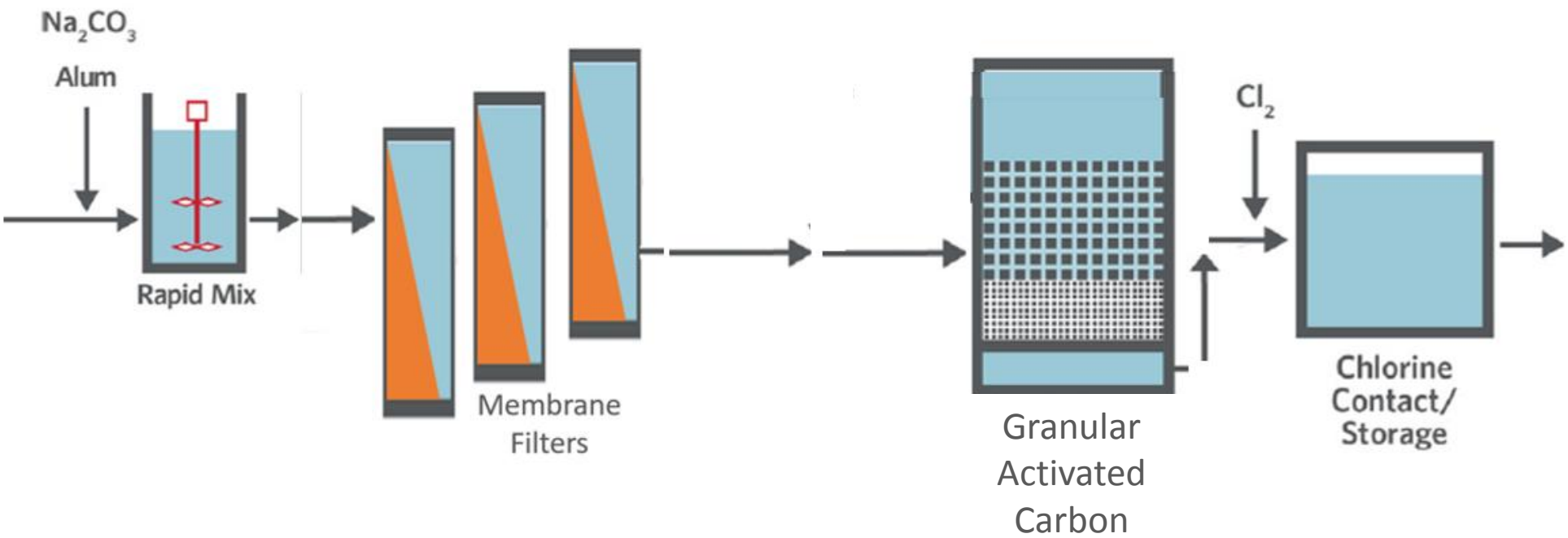
Treatment Needs and Methods

Need	Treatment
Iron / Manganese removal	**Oxidation** with sodium permanganate, **pH increase** with sodium hydroxide, precipitate for removal by filtration
Organics and color removal	**Precipitation** with chemical coagulant – likely aluminum chlorohydrate, **pH decrease** with carbon dioxide, removal by filtration
Algae removal, filtration	Membrane filtration or clarification with granular media filters
Corrosion control	**Alkalinity** and **pH increase**, likely with carbon dioxide and sodium hydroxide
Taste / odor removal, algal toxin destruction	**Ozonation** (gas oxidant), followed by biostabilization Could use granular activated carbon (**GAC**) for this
Disinfection	Liquid **chlorine** and clearwell storage in Crowson II reservoir

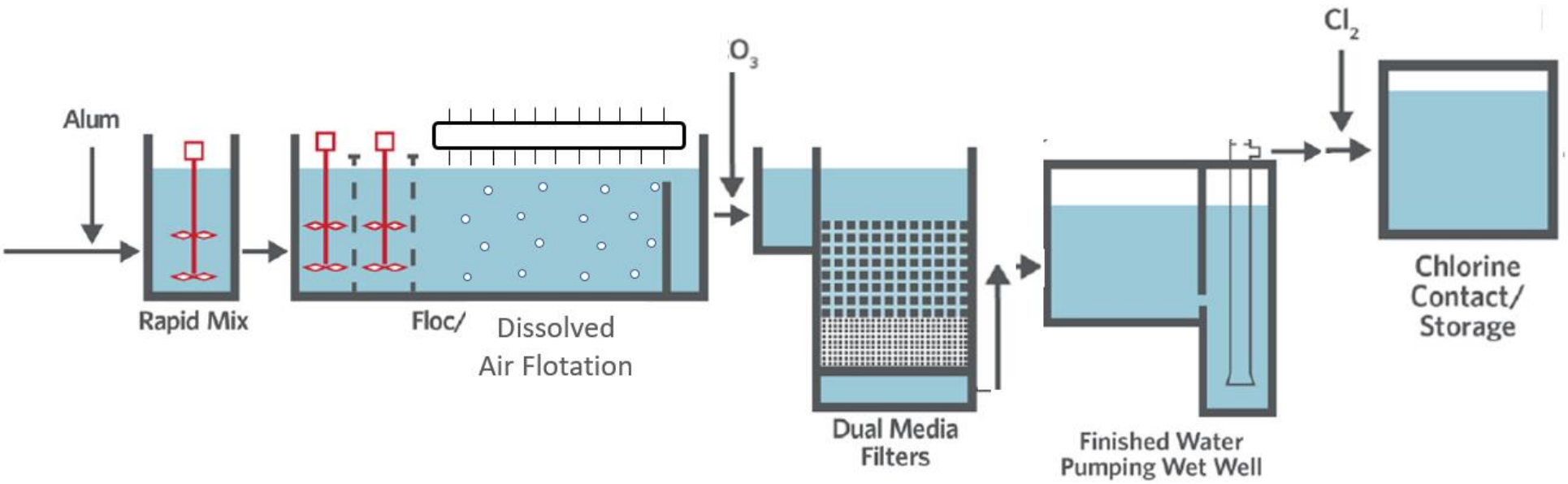
PRESSURIZED MEMBRANE: **Ozone Biostabilization**



PRESSURIZED MEMBRANE: **Granular Activated Carbon**



UNPRESSURIZED: **Granular Media-Based Process**



Membrane Filtration

MEMBRANE SYSTEM

MEMBRANE MODULE / FIBERS

Ozone Generation

LIQUID OXYGEN STORAGE AND FEED

OZONE GAS GENERATORS

Added Cost for Granular Filters

Concrete High	Concrete Low	Granite High	Granite Low	Asphalt Pit
$436,000	$956,000	$448,000	$1,018,000	$936,000

Treatment Process Selection Criteria

Criteria	Granular Media Filter	Membrane Filter
Power	-	+
Gravity Flow	-	+
Treatment Performance	O	+
Automation	O	+
Maximizing Capacity	O	+
Compact Footprint	O	+
Ease of Expansion	O	+
Cost		
Summary	O	+

Next Steps

- Treatment evaluation selection and report
- Next authorization with Council
- Pilot study treatment performance confirmation, August through November
- Equipment Procurement
- Design
- Construction