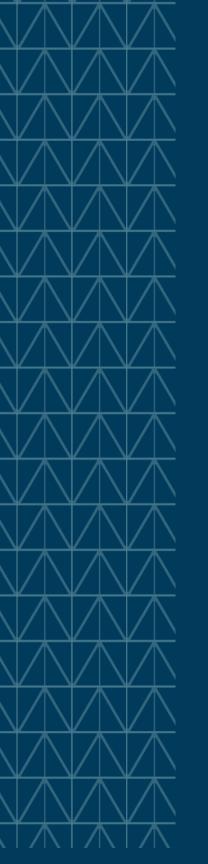
2023 PNWS-AWWA SPRING CONFERENCE Setting the Standard: City of Lacey pH Treatment Projects

Presented by: Puna Clarke, PE – City of Lacey Nathan Rostad, PE, PMP - Consor









Key Points



City of Lacey Program for Systemwide **Corrosion Control**

Benefits of Standardizing Similar Facilities



Examples of Customizing **Standard Designs**

Agenda

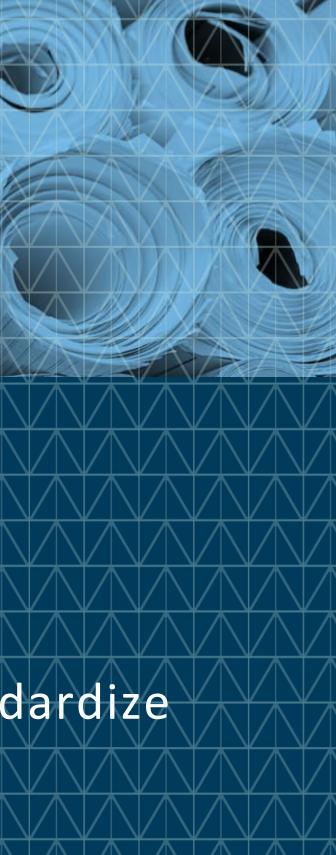
Background

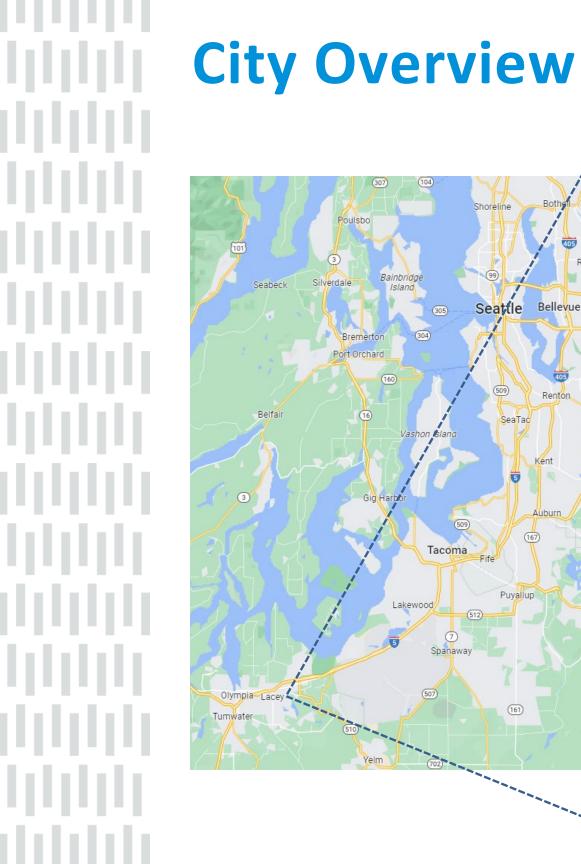
 Common Design Features Westside Wells Highlights 04 Madrona Wells Highlights Project Status and Closing Q&A





01 Background - The Drive to Standardize





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Seattle Bellevue

(509)

SeaTac

5

Puyallup

(161)

405

Renton

Kent

Auburn

(167)

(520)

90

Shoreline

Poulsbo

Bremerton Port Orchard

16

Bainbridge

Island

(160)

Gig Harb

Yelm

(304)

Vashon Island

(509)

Fife

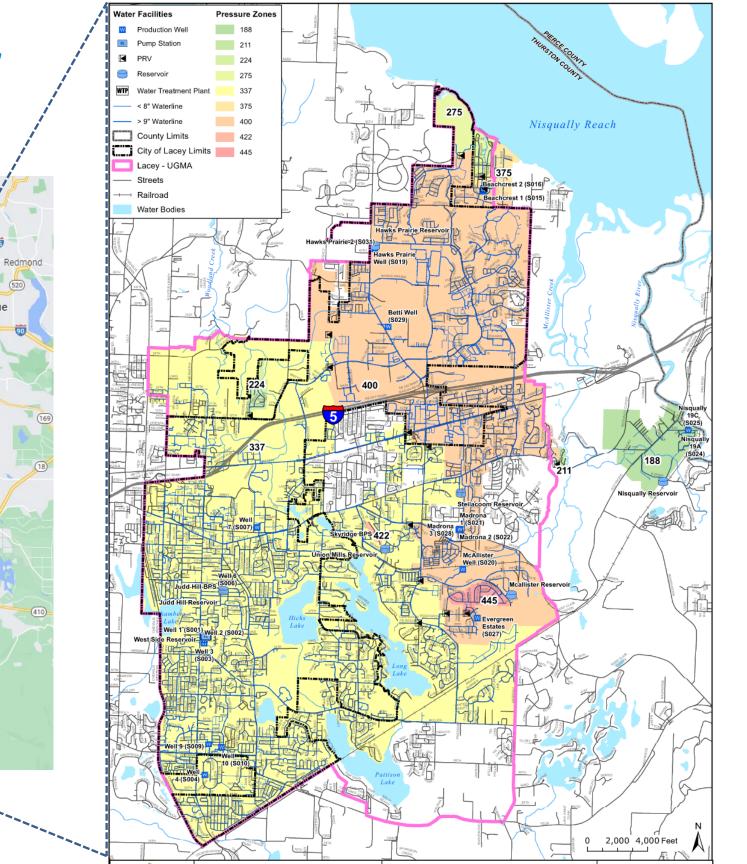
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Tacoma

7 Spanaway

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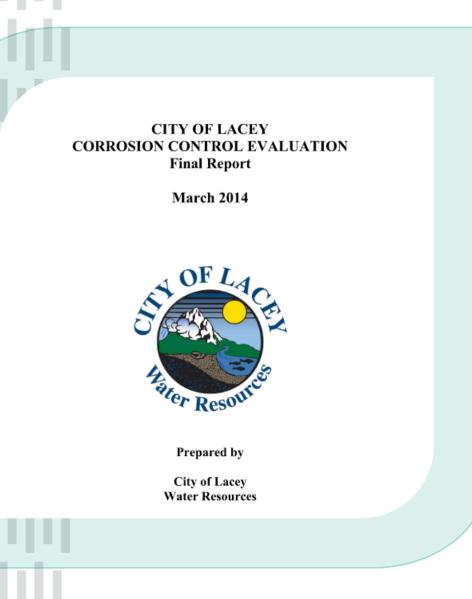
Lakewood







Citywide Corrosion Control Needs History



• Under 1991 Lead and Copper Rule: as a Large System, City must conduct a corrosion control study to determine if system is optimized for corrosion control, even though sampling below Action Levels.

2014 Corrosion Control Study

- Concluded system optimized at the time based upon planned improvements
- Follow up sampling

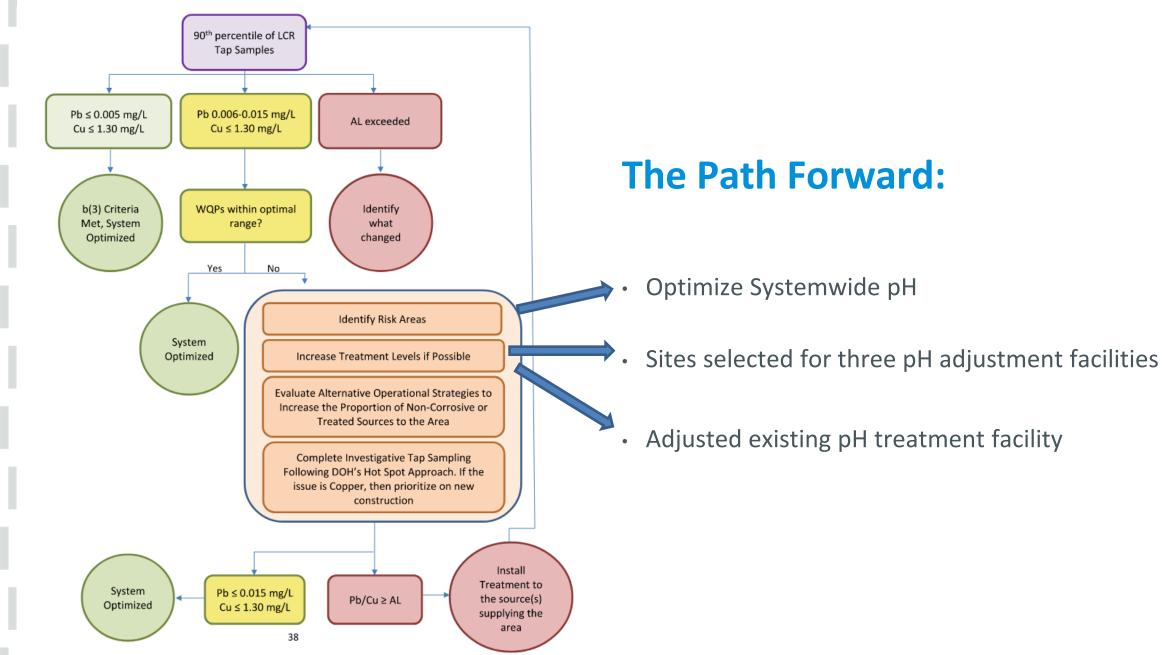
2019 Corrosion Control Study

- Changes to planned supply from Olympia
- Recommended pH treatment to raise pH at three additional wellfields
- Further evaluation after project completion and based upon Revised Lead and Copper Rule.





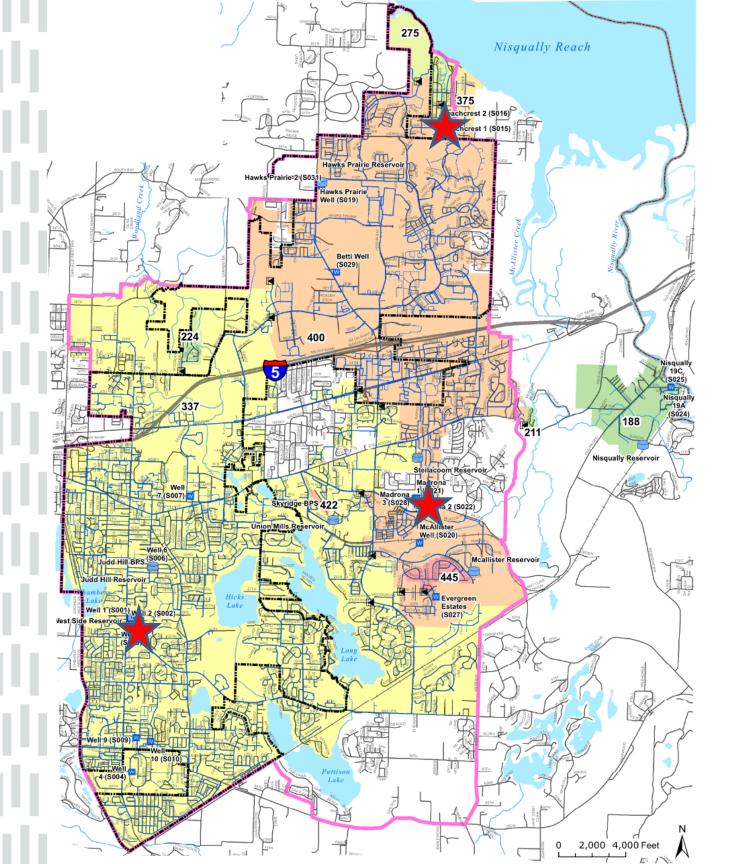
Citywide Corrosion Control Optimization









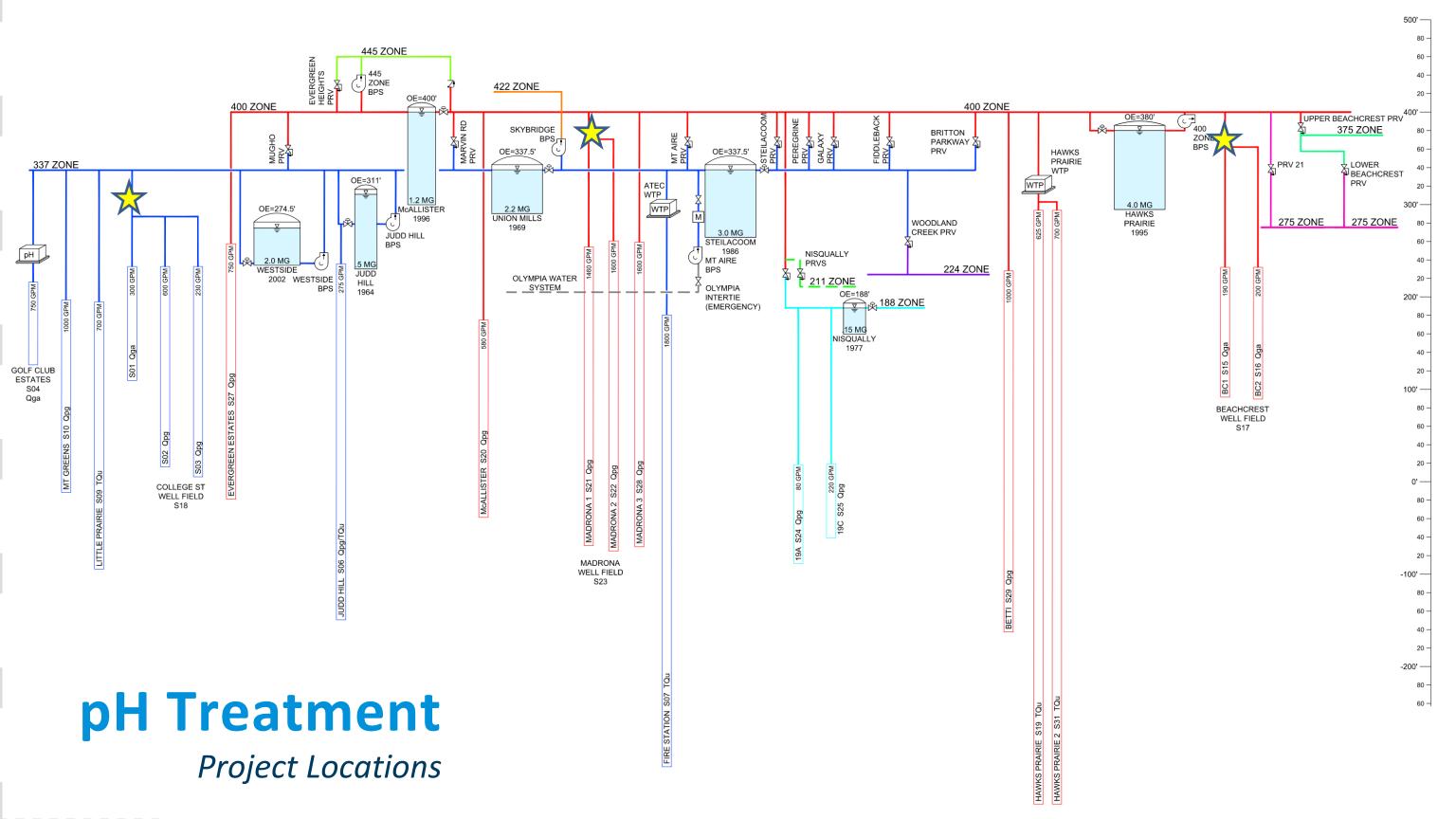


pH Treatment Project Locations

- Beachcrest Wells
- Madrona Wells
- Westside Wells







Existing Madrona Site



- Small site in residential neighborhood
- City's largest capacity source
- Three wells
- facility
- "Vacant" parcel at east side of site



- Sodium hypochlorite generation





Existing Westside Site



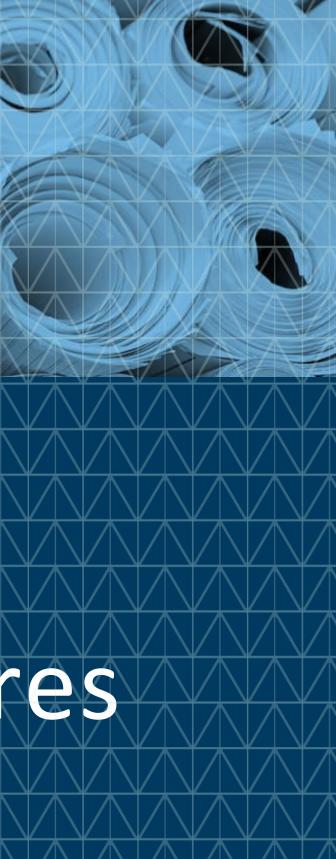
- Large mostly forested site
- Three wells
- Planned Well 1 replacement
- Sodium hypochlorite generation facility
- Booster pump station
- Reservoir







02 Common Design Features



pH Adjustment Alternatives

Based upon 2014 /2019 Study the City considered:

- Caustic soda addition
 - Used by City at Source 4
- Aeration

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- Used by neighboring water systems
- Operator safety is key
 - Aeration selected as preferred

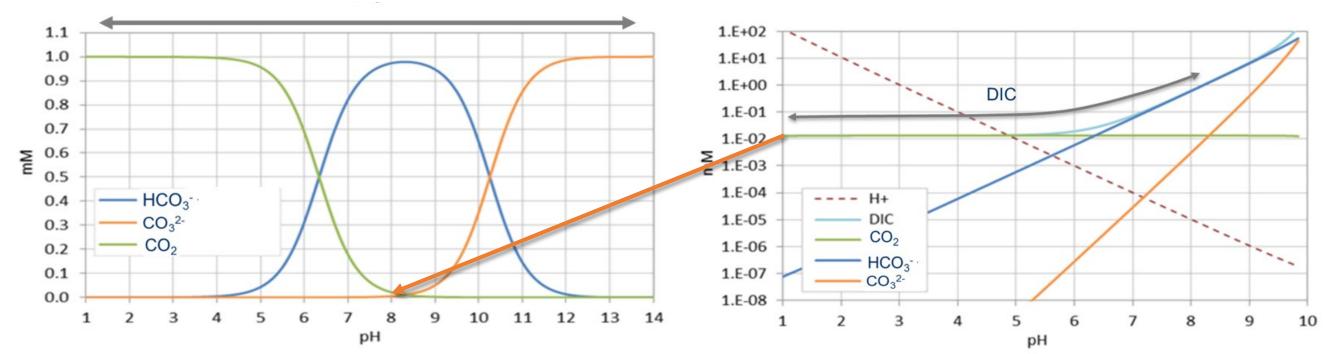
	C SODA
DO NOT TA	KE INTERNALLY
AVOID CONTACT WITH EYES, MOUTH OR CLOTHING	
USE ONLY IN WELL USE ONLY WHERE THER	KEEP FIRE AWAY VENTILATED AREAS. E ARE NO OPEN FLA RCES OF IGNITION
KEEP AWAY FROM HEAT, S KEEP CONTA	
ATTENTION NEVER ATTEMPT TO GIVE ANYTH	ING BY MOUTH TO AN UNCONSCIOUS CODE NUMBERS
301	4-SEVERE 3-SERIOUS 2-MODERATE 1-SLIGHT 0-MINIMAL
EXTINGUISHING METHOD	PERSONAL PROTEC
USE "ALCOHOL" FOAM, DRY Chemical or cabon dioxide.	WEAR EYE PROTECTION AND PERSONAL PROTEC CONSULT CORRESPOND



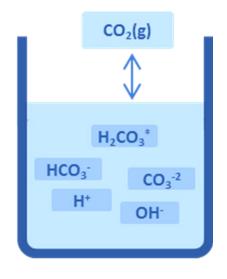




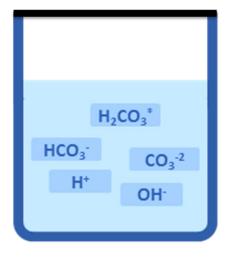
Aeration for pH Adjustment The Science



THE CARBONATE SYSTEM







closed system





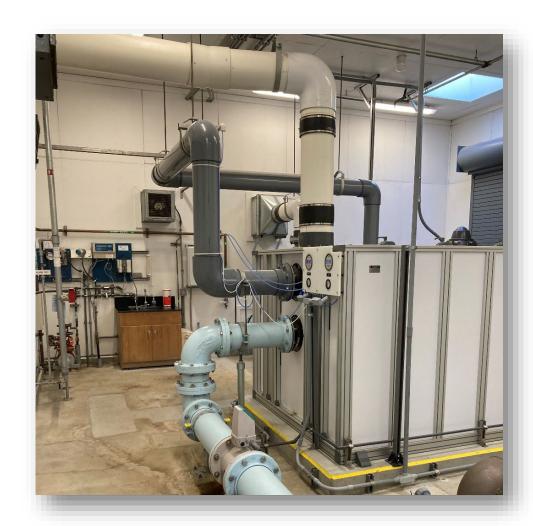


Aeration System Technology

Two alternatives considered

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- Packaged Aeration System
 - Multi-stage diffused bubble
- Packed Tower system











Aeration System Technology



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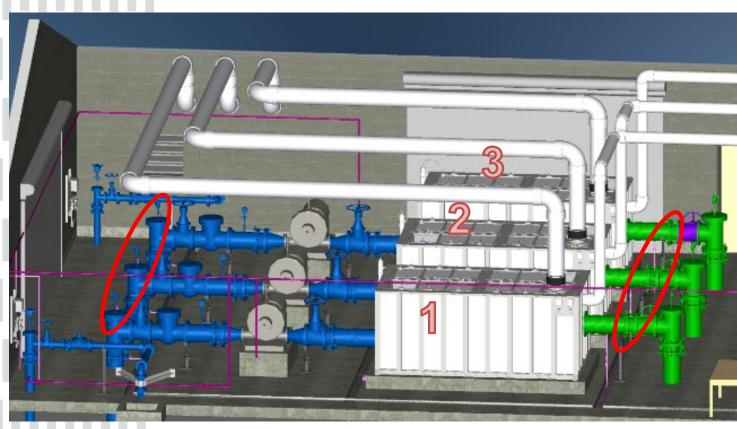
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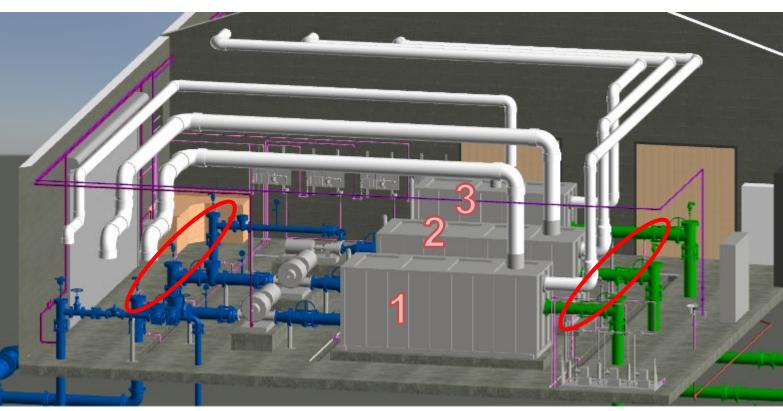






Common Process Features

- **Chlorine Injection Location** •
- 1:1 Well to Aeration Unit
- injection latency

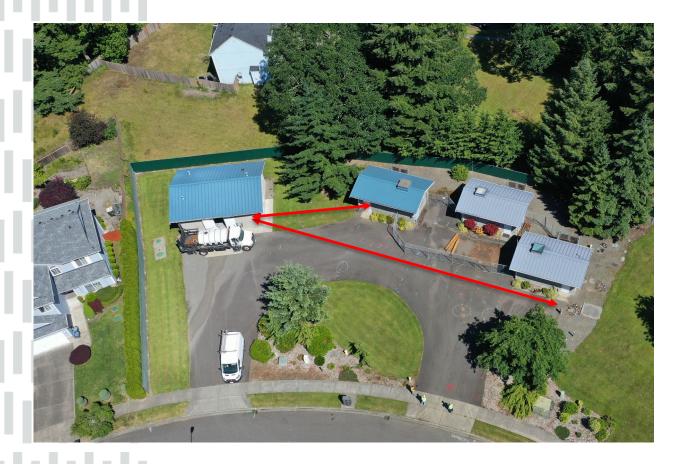


• Chlorine Sampling Location

Reduced Chlorine sampling /

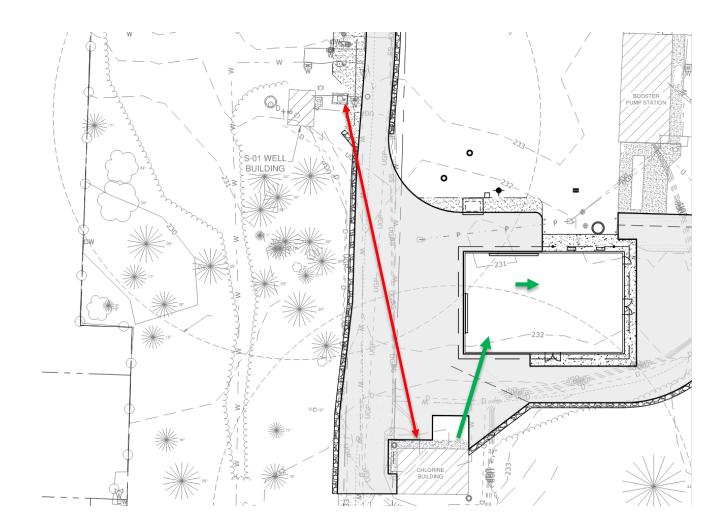






- Chlorine Injection Location
- Chlorine Sampling Location
- 1:1 Well to Aeration Unit
- Reduced Chlorine sampling / injection latency

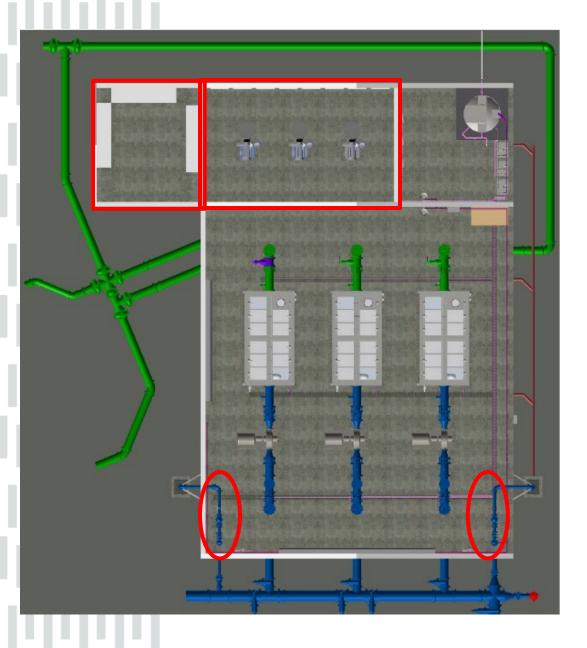
Common Process Features

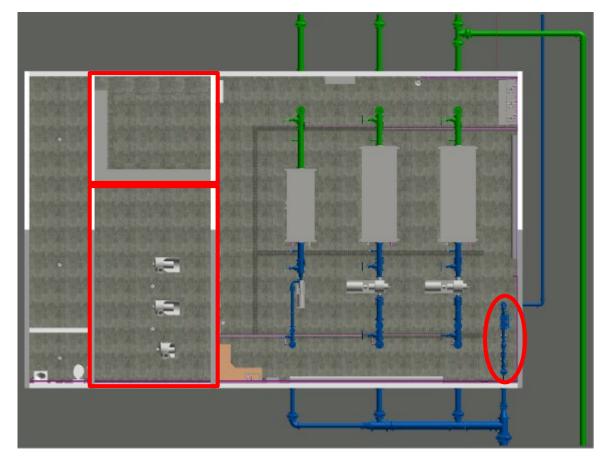






Common Design Features





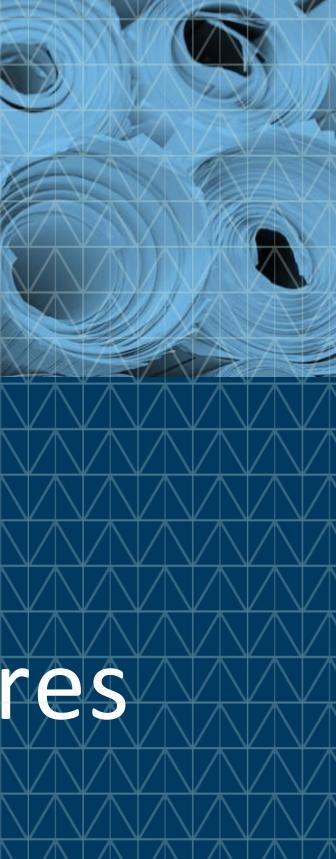
- Dedicated Blower Room
- Dedicated Electrical Room
- Pressure relief valves inside building
- Flow Meter Vaults Outside Building







03 Westside Design Features



Existing Westside Site - Unique Drivers

- Existing Reservoir and Pump Station
 Operation
- Restroom Needs

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- Storage in Existing Booster Pump Station
- Future Well Development / Existing Undersized Well Casing







Westside Site- Unique Features



• Bathroom

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- Storage Room
- Control Valve Vault
- Retaining Lineshaft Well Pump / **Provisions for Connection to Future** Well







Westside Site- Bathroom and Storage

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• Bathroom

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- Storage Room
- Control Valve Vault
- Retaining Lineshaft Well Pump / **Provisions for Connection to** Future Well



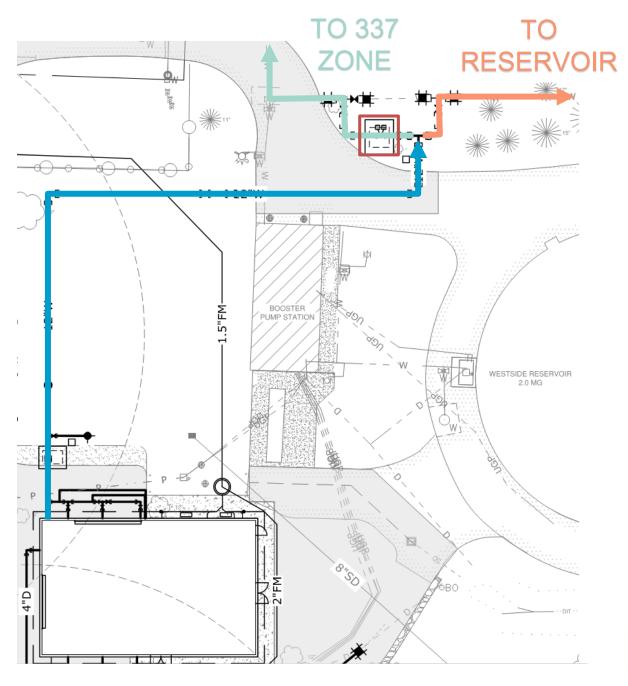






Westside Site - Control Valve Vault

- Bathroom
- Storage Room
- Control Valve Vault
 - Reservoir operation & water quality improvements
- Retaining Lineshaft Well Pump / Provisions for Connection to Future Well







Westside Site - Well 1 and 1S

• Bathroom

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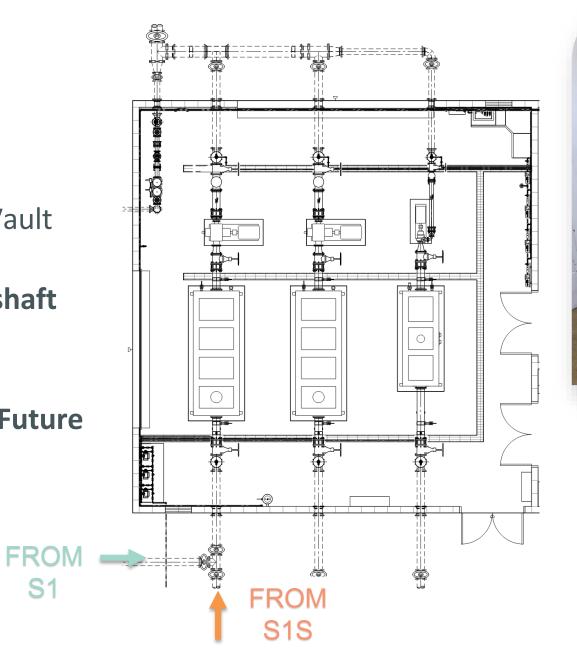
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- Storage Room
- Control Valve Vault
- Retaining Lineshaft
 Well Pump /
 Provisions for
 Connection to Future
 Well



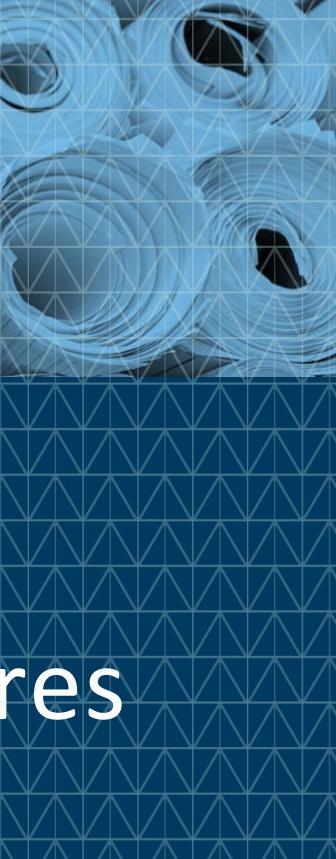








04 Madrona Design Features



Existing Madrona Site - Unique Drivers

Motivations for Unique Design Components

City's Largest Capacity Source

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- Currently Pumps to 400 Zone, then PRV to 337
- Portable Generator Parked At Site
- Large Distance from Chlorine Building to New building







Madrona Site- Unique Features

New Generator

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- Chlorine Transfer
 Pump and
 Hypochlorite
 Room
- Connection to Multiple Zones / Process Flexibility







Madrona Site- Generator



• New generator

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- Chlorine Transfer Pump and Hypochlorite room
- Connection to Multiple Zones / Process Flexibility



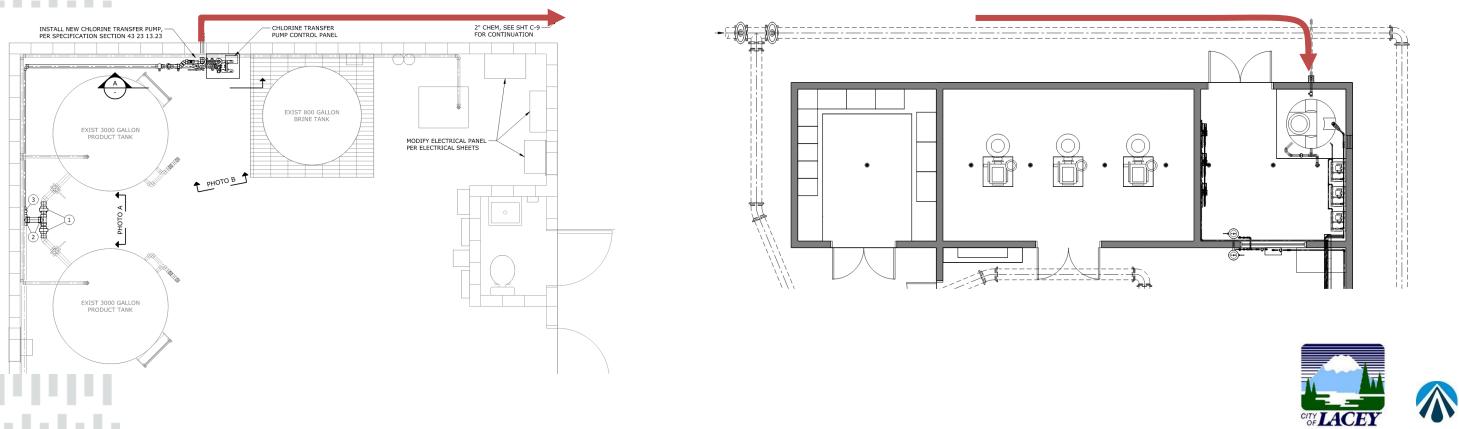




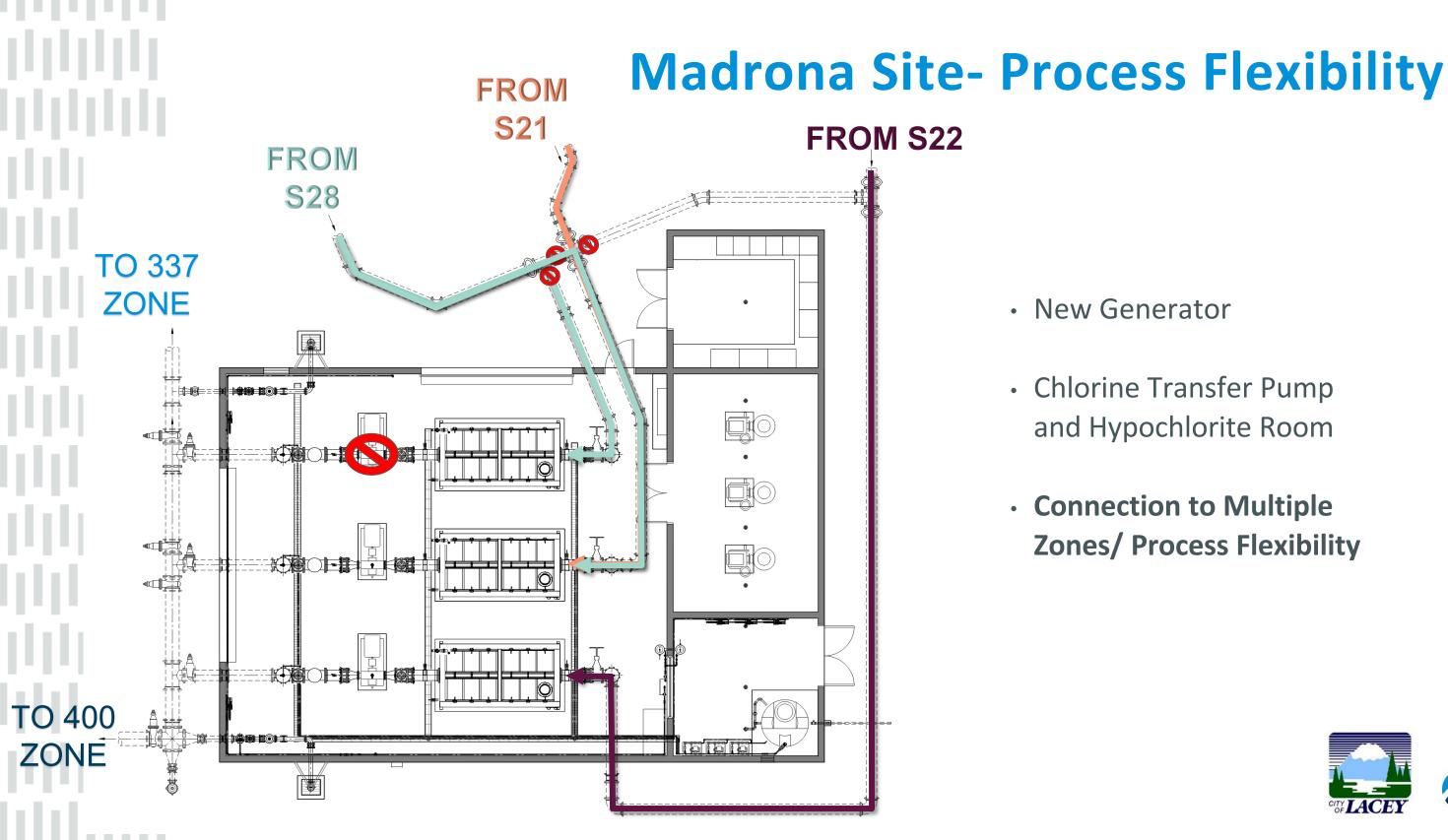


Madrona Site- Hypochlorite Transfer and Storage

- New Generator
- Chlorine Transfer Pump and Hypochlorite Room
- Connection to Multiple Zones/ Process Flexibility







- New Generator
- Chlorine Transfer Pump
- Connection to Multiple



and Hypochlorite Room

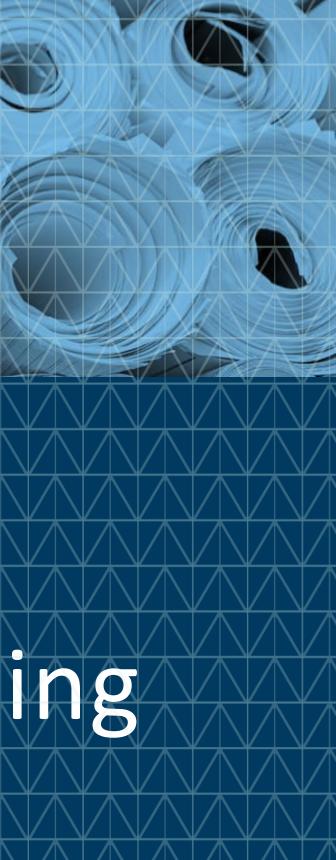
Zones/ Process Flexibility

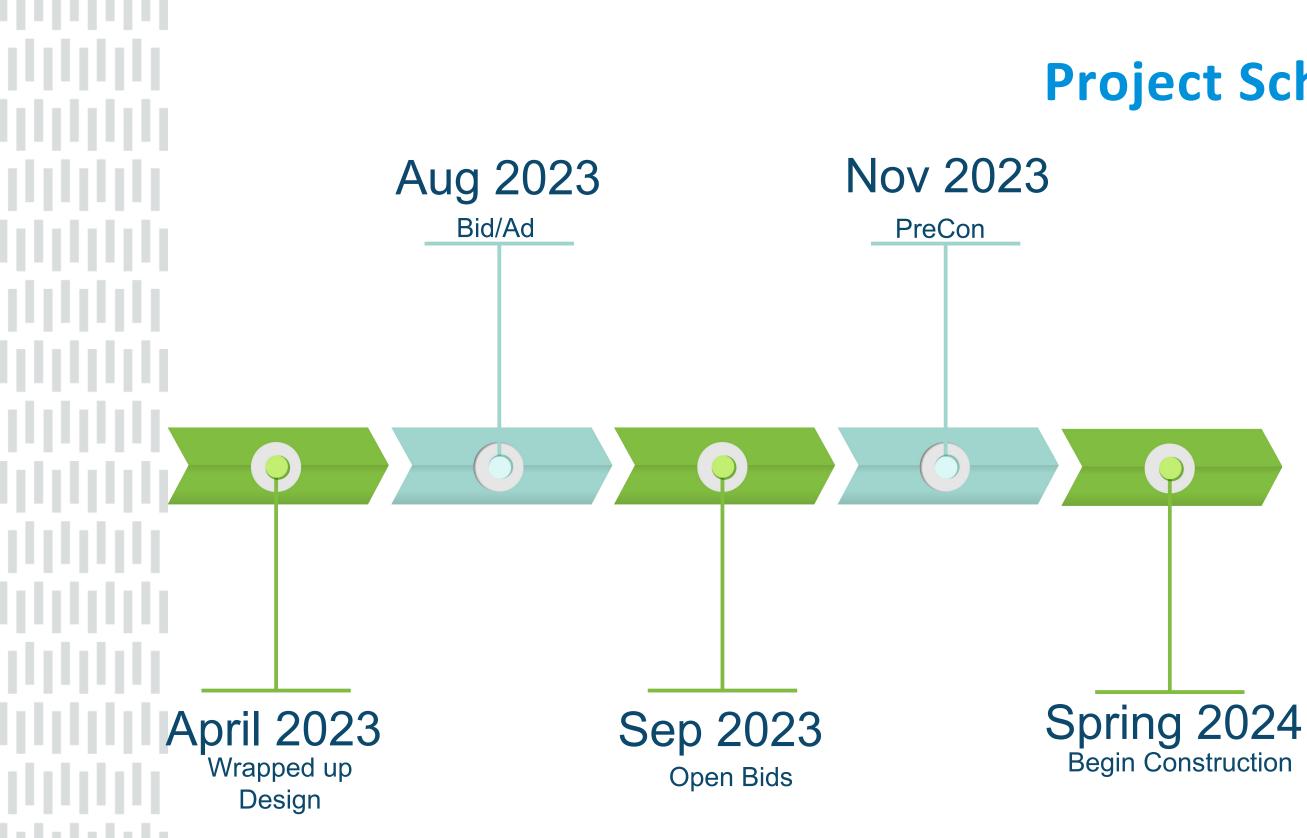






05 Project Status and Closing





Project Schedule















• City of Lacey Public Works City of Lacey Community and Economic Development





Project Team – Consultant Team

Owner	City of Lacey
Prime Consultant	Consor
Electrical, Instrumentation & Controls	Industrial Systems, Inc.
Structural Engineer	CG Engineering
Hydrogeologist	Mott MacDonald (PGG)
Geotechnical Engineer	HWA Geosciences, Inc.
Environmental / Permitting	Environmental Science Associates

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Systems Inc.	MOTT MACDONALD	ENGINE







Key Takeaways



Aeration Can Provide a Safe Alternative for pH Treatment



Standard Design Components Ease Operations

Remain **Flexible to Customize for Site Condition**



06 Q&A

Presented by: Puna Clarke, PE – City of Lacey Nathan Rostad, PE, PMP - Consor

