

# City of Watsonville Wastewater Master Plan Study Session

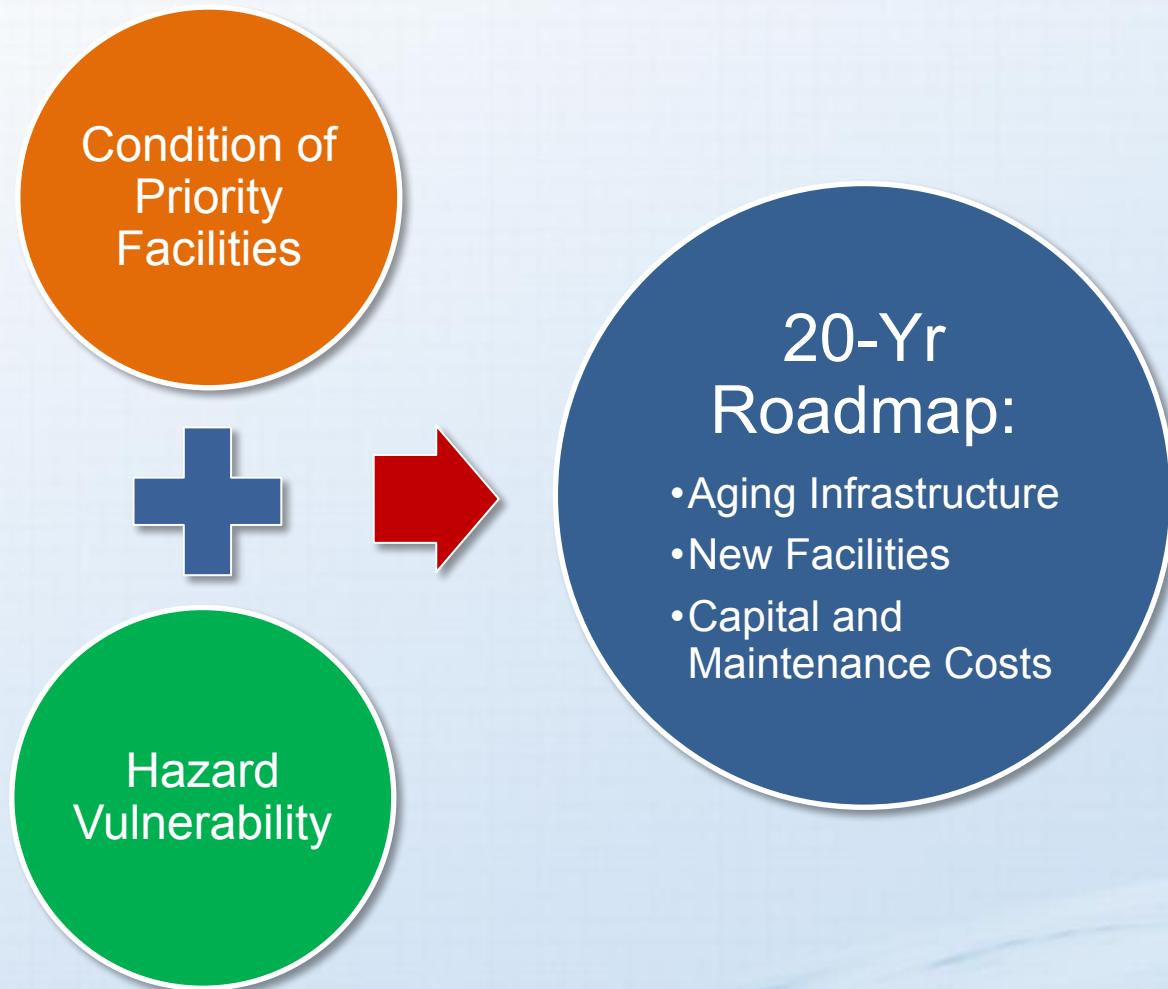
March 10, 2020



# Project Timeline

- November 2018
  - Council identified as priority project and awarded contract to Carollo Engineers
- December 2018
  - Staff and Carollo began working on Master Plan (first comprehensive plan)
- March 2020
  - Master Plan analysis and Draft CIP complete
  - **Tonight's objective: Provide update on Master Plan and receive input from City Council**

# Purpose of Master Plan



Capacity not analyzed as Staff believes WWTF has sufficient capacity to meet anticipated flows over next 20 years.

# Treatment Facility Overview



## LEGEND

|  |   |                              |
|--|---|------------------------------|
| ① Influent Pump Station*                       | ⑧ Blower Building and RAS/WAS Pump Station      | ⑯ Solids Dewatering Building |
| ② Preaeration Tanks                            | ⑨ Secondary Clarifiers                          | ⑰ Energy Recovery Building   |
| ③ Primary Sedimentation Tanks                  | ⑩ Effluent Pump Station and Electrical Building | ⑯ Waste Gas Burner           |
| ④ Blower and Primary Sludge Pump Rooms         | ⑪ Gravity Thickeners                            | ⑮ Soil Scrubber Bed          |
| ⑤ Recycle Pump Station and Electrical Building | ⑫ Thickener Equipment Building*                 | ⑯ Odor Control Facilities    |
| ⑥ Roughing Filters                             | ⑬ Anaerobic Digesters                           | ⑰ Main Switchgear Building   |
| ⑦ Aeration Basins                              | ⑭ Digester Control Building                     |                              |

## NOTE:

\* Indicates visual condition assessment only.

- City owned/operated
- Service area:  
Watsonville & County Sanitation Districts:
  - Freedom (SC)
  - Salsipuedes (SC)
  - Pajaro (M)
- Population served:  
60,000
- Rated capacity  
10.3 mgd Avg Annual
- Current flow  
5.3 mgd Avg Annual

Majority of liquid and solids treatment facilities evaluated.

# Sewer Pump Stations Overview

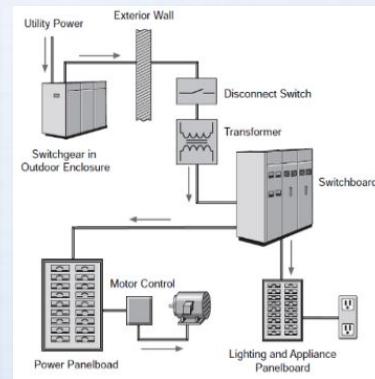


- City owned and operated
- 4 Coastal and 8 Inland PS Evaluated
- City staff conducted visual assessment
- Carollo evaluated project needs, priorities, timing, and costs

# Condition Assessment and Hazard Vulnerability



Structural Assets



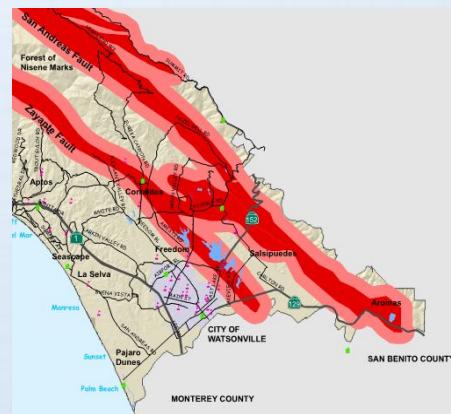
Power Distribution System



Mechanical Assets



SCADA and PLC Network System



Seismic Vulnerability



Flood Risk

# Original Useful Life

| Asset Category | Description <sup>(1)</sup> | Original Useful Life (Yrs)                                   |
|----------------|----------------------------|--|
| Structural     | Concrete<br>Steel          | Up to 50 - Depends on Rebar<br>Up to 25 - Depends on Coating |
| Mechanical     | Pumps – Wastewater         | 15   |
| Electrical     | Motor Control Centers      | 25   |

Notes:

(1) Adapted from the International Infrastructure Management Manual (IIMM) Edition 2006, USEPA guides, and Carollo experience.

## Age of Plant Facilities:

- Most Structures: >35 Yrs
- Preaeration and Sedimentation Basins: >50 Yrs
- Aeration Basins, Blower/RAS-WAS Bldg: 23 Yrs

## Age of Pump Stations:

- Most >35 Yrs
- PS 1 Pajaro Dunes Master: 55 Yrs

# Key Findings

# Structural Assessment Key Findings



Replace Anchor Bolts and Grout  
(Recycle PS)



Repair Cracks/Spalling (Energy Recovery)



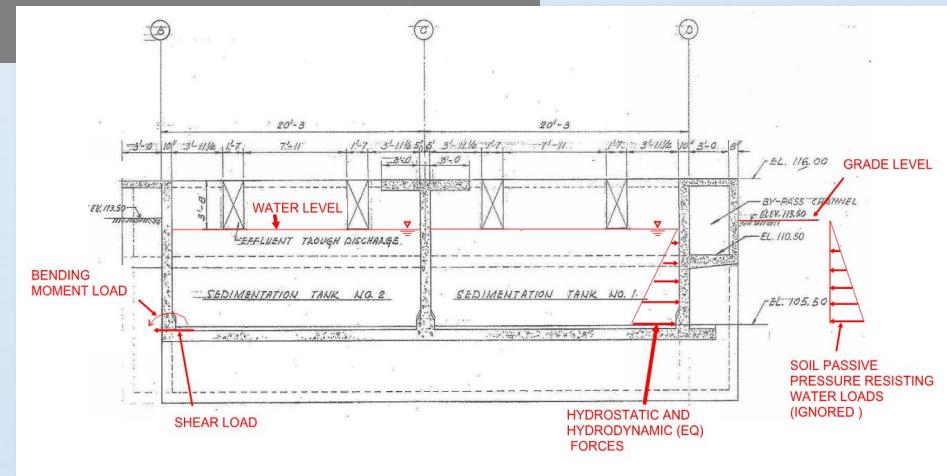
Repair Corrosion (Gravity Thickeners)

# Seismic Assessment Key Findings



Limited Lateral Bracing (Gravity Thickeners)

Staff to evaluate  
timing and prioritization  
of seismic retrofits.



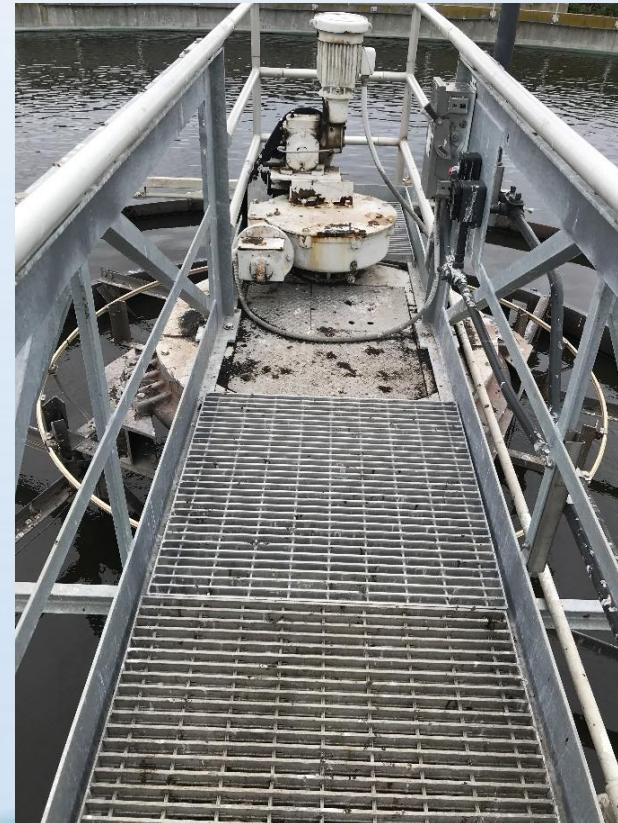
Majority of tanks and buildings' seismic vulnerability can be mitigated through retrofit projects.

# Mechanical Assessment Key Findings

City staff has been proactive in repairing and replacing equipment as-needed to prolong useful life.



Equipment rebuilt when needed



Planned improvement projects

# Electrical and Instrumentation Key Findings

Majority of assets obsolete and near end of useful life.



Age and Obsolescence  
(Replace Most MCCs)

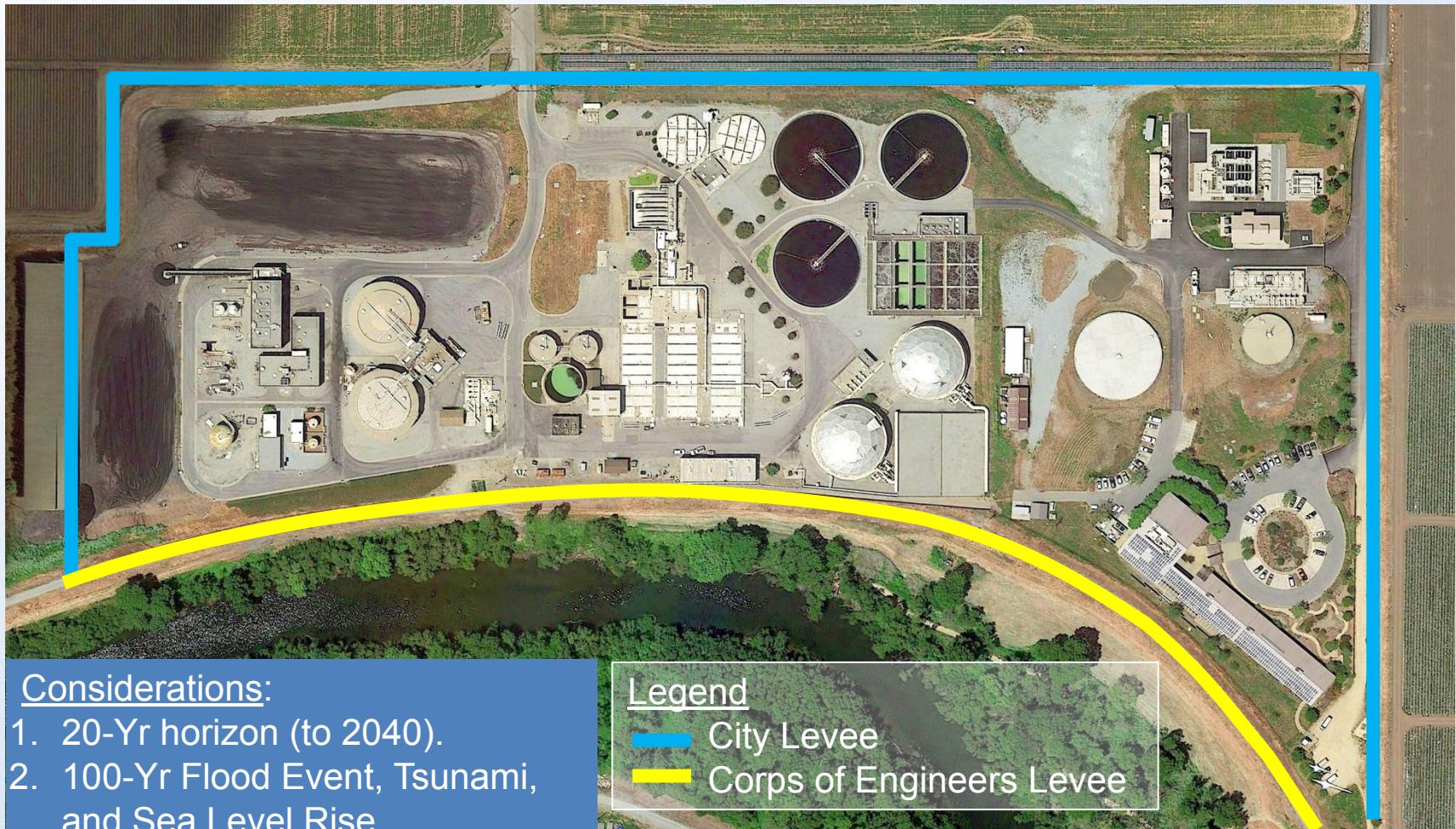


Relocation (Gravity Thickener Rm)



Corrosion

# Flood Hazard Assessment



## Considerations:

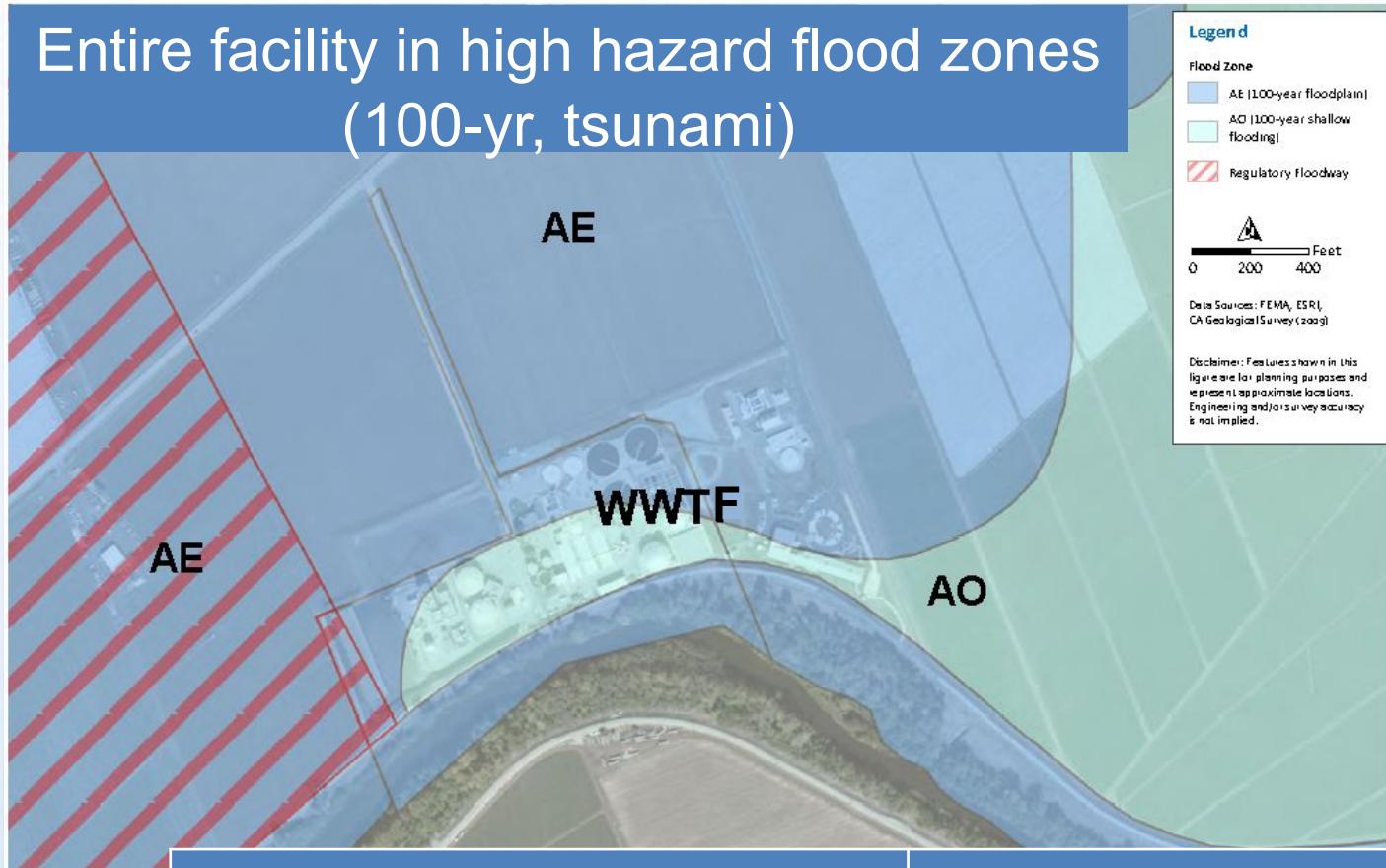
1. 20-Yr horizon (to 2040).
2. 100-Yr Flood Event, Tsunami, and Sea Level Rise.
3. Facilities prioritized by operational criticality.

## Legend

- City Levee
- Corps of Engineers Levee

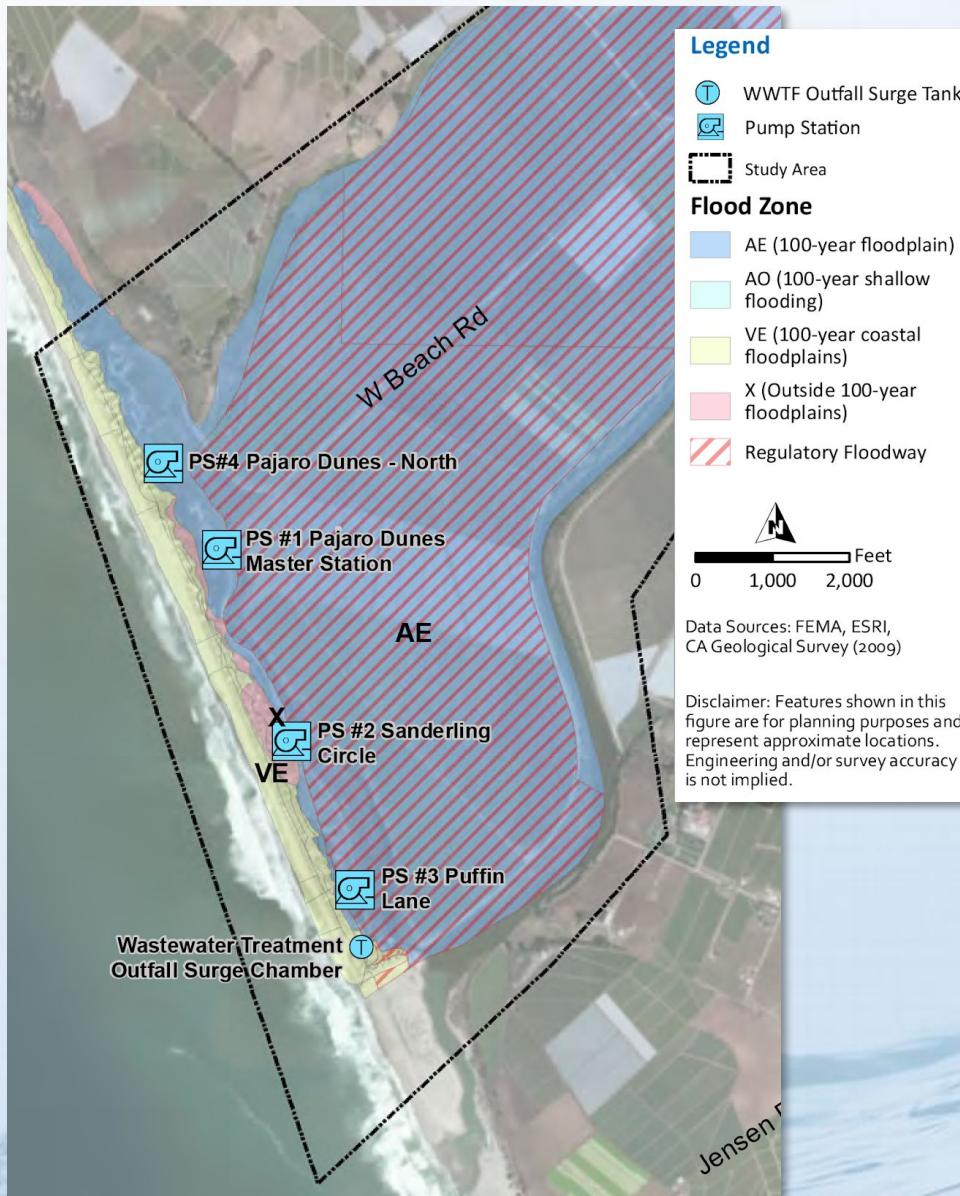
# Treatment Facility Flood Assessment

Entire facility in high hazard flood zones  
(100-yr, tsunami)



| KEY FINDING   | RECOMMENDATION  |
|---|---|
| Prioritize improving levee reliability and level of protection. | Further analysis (geotechnical, survey, maintenance). |
| WWTF not flooded by projected SLR alone                         | Protect key assets.                                   |

# Coastal Facilities Flood Assessment

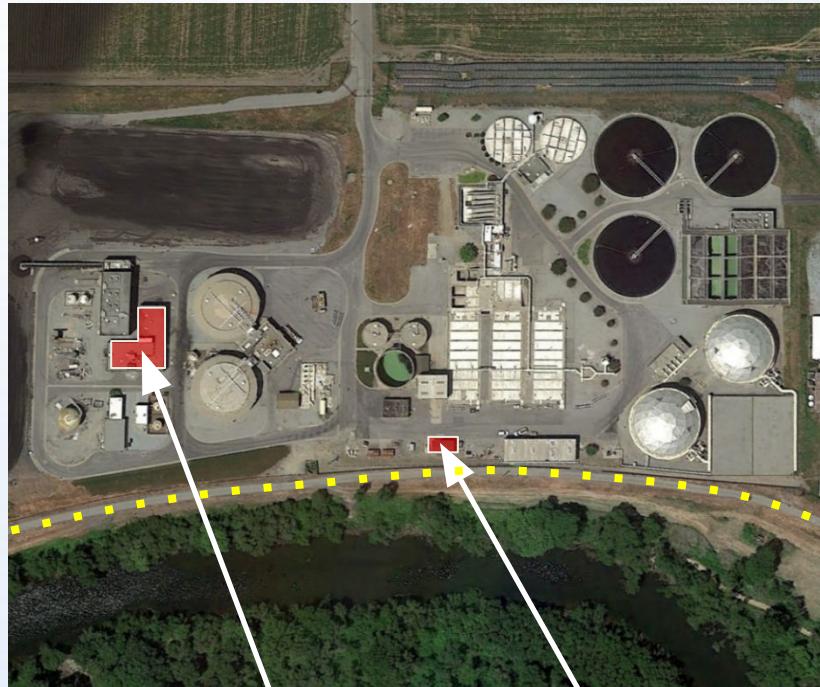


Coastal facilities in high hazard flood zones  
(100-yr, tsunami)

| KEY FINDING   | RECOMMENDATION   |
|---|--|
| <ul style="list-style-type: none"><li>Existing Risk: Submerged by tsunami or 100-yr flood</li><li>Future Risk: SLR will exacerbate flood impact</li></ul> | Flood proof facilities and flood-resistant equipment upgrades. |

# Priority Projects

# 1. Main Switchgear and Standby Generators



\$12.9M Project  
Proposed Construction 2022-24



Levee Stabilization Project



Standby Generators in Energy Recovery Building



Main Switchgear Building and PG&E Transformer



# Main Switchgear Recommendations

- Most critical part of electrical system at end of service life; needs replacement.
- Vulnerable to tsunami & 100-yr flood.
- Building & equipment replacement, \$6M.



Obsolete Equipment



Excessive Heating (ATS)



Significant Corrosion  
(Transformer Busway)

# Standby Generators Recommendations



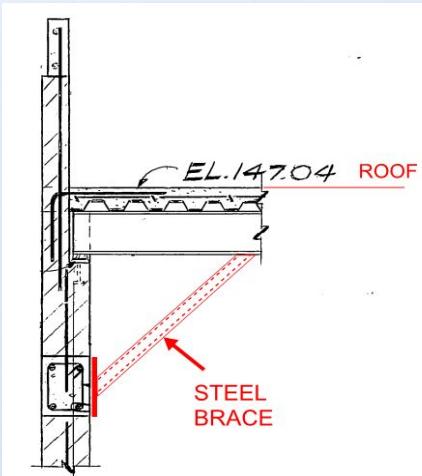
Antiquated Technology



Reliability Concerns



Potential Flood Risk



Seismic Concerns

- Failure = plant without standby power.
- Vulnerable to tsunami & 100-yr flood.
- Equipment replacement, \$4.2M
- Building flood hazard mitigation, \$1.1M.

# Coordinate with Levee Stabilization Project

Proposed in 2022-24, \$1.6M  
(Previously identified City project)

— Existing Underground  
Electrical Service to  
WWTP



PG&E Service Entrance Affected by Proposed Sheet Piles

## 2. Digesters, Digester Building and FOG

\$11.3M Project  
Proposed Multi-Year Construction



Digesters 1 and 2

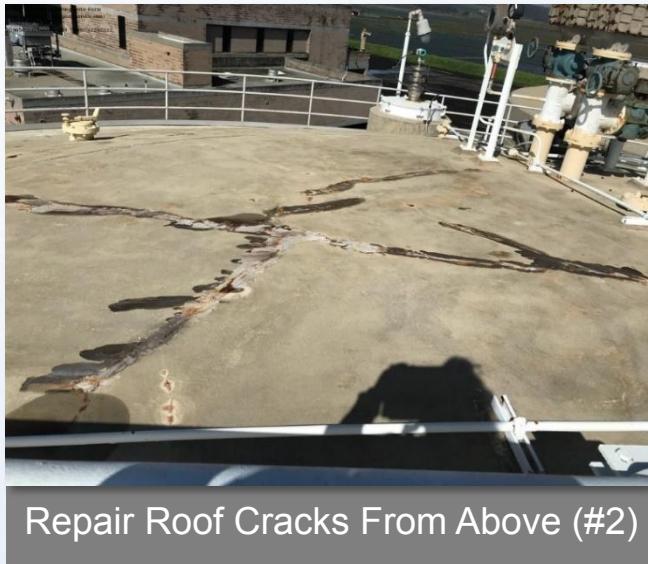


Fats, Oil and Grease (FOG) Station



Digester Control Building

# Digesters 1 & 2 Recommendations



- Requires multi-step crack repair and lining.
- Proposed in 2020 and 2025/27, \$2.2M.



Repair Possible Roof Cracks From Interior (Drone Inspection of #2)



# Control Building Area Recommendations

- Digester No. 1 Mixing Replacement, FY 2021-22, \$1.3M.
- Digester No. 2 Mixing Improvements, FY 2025-26, \$520K.
- Seismic retrofit project, FY 2026-28, \$240K.
- Miscellaneous equipment replacement, \$500K.



# Fats, Oil, and Grease Recommendations

- Existing Receiving Station Improvements, \$910K
- New Receiving Station and Thickening, FY2025-30, \$5.6M



Existing FOG Receiving Station



Proposed 2<sup>nd</sup> FOG Receiving Station

### 3. Headworks and Influent Pump Station



Total Project \$12M  
Proposed Construction 2026-28



Influent Pump Station



Headworks Screens and Electrical Building



# Structural & Mechanical Recommendations



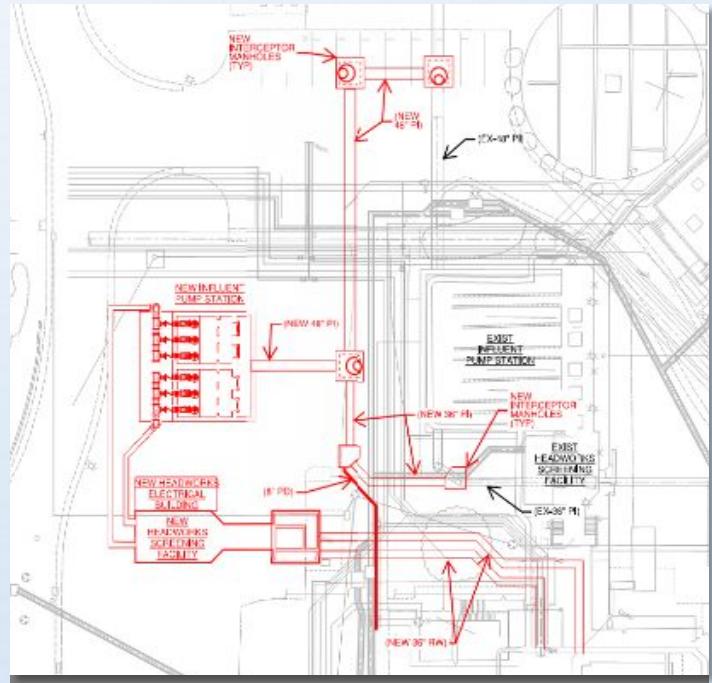
Significant Concrete Damage



Aged Mechanical Equipment

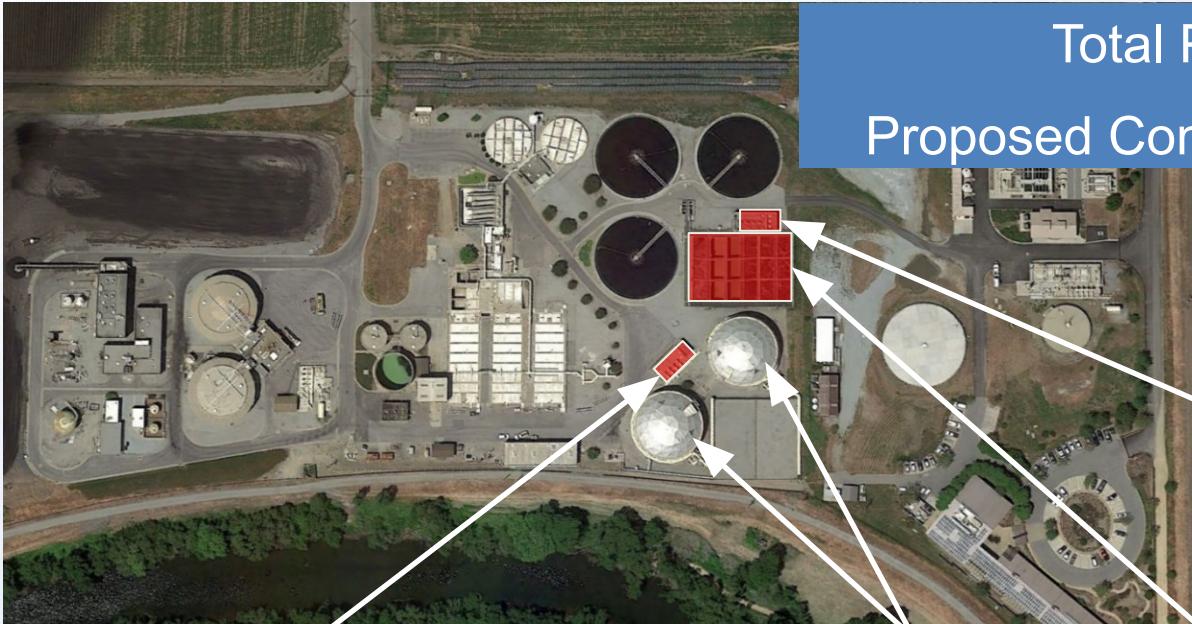
- Facility approaching end of useful life.
- Replace Headworks and Influent PS (previously identified City project).

# Headworks Electrical Recommendations



- Replace with new electrical building (previously identified City Project).

# 4. Secondary Treatment Process Upgrade



Total Project \$14.8M

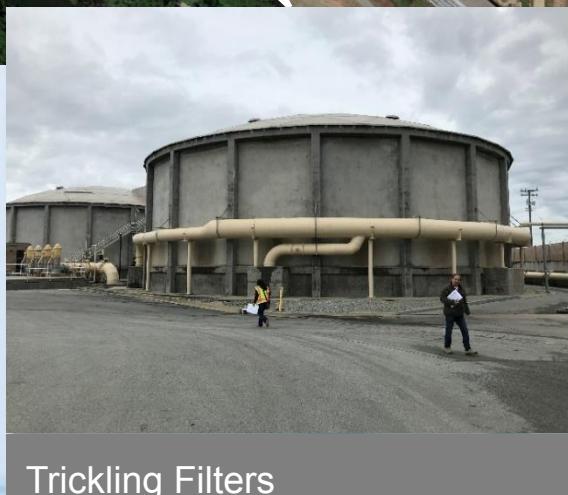
Proposed Construction Start in 2030



Blower and  
RAS/WAS  
Building



Recycle PS



Trickling Filters



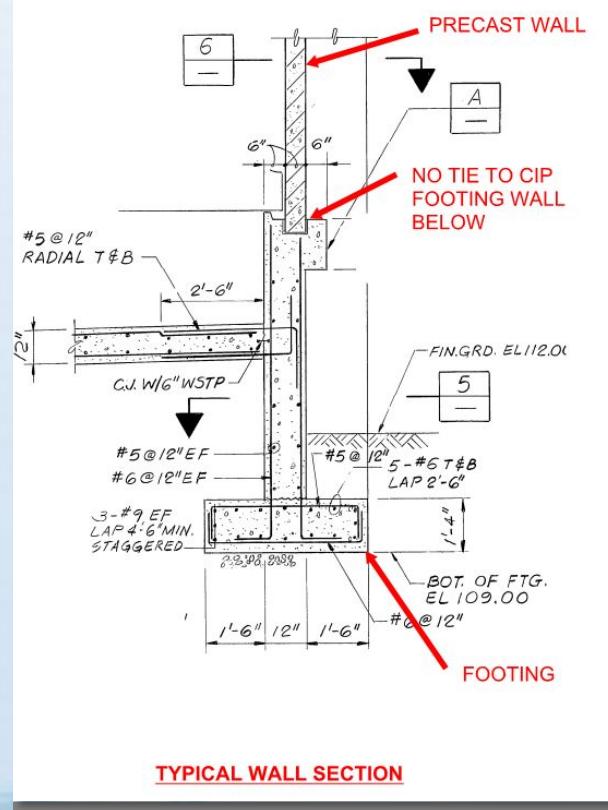
Aeration Basins

# Trickling Filters

Seismic, Mechanical and Electrical upgrades needed in ~10 yrs due to age and obsolescence.



Mechanical arm replaced by Staff but media nearing end of useful life



Significant seismic deficiencies may be difficult to retrofit

# Aeration Basins and Blowers

- Mechanical & Electrical upgrades needed in ~10 yrs due to age and obsolescence.
- Consider regulatory drivers with process upgrades.



Update diffuser system for process efficiency.



Replace centrifugal blowers with high efficiency turbo blowers.



San Francisco Bay Regional Water Quality Control Board

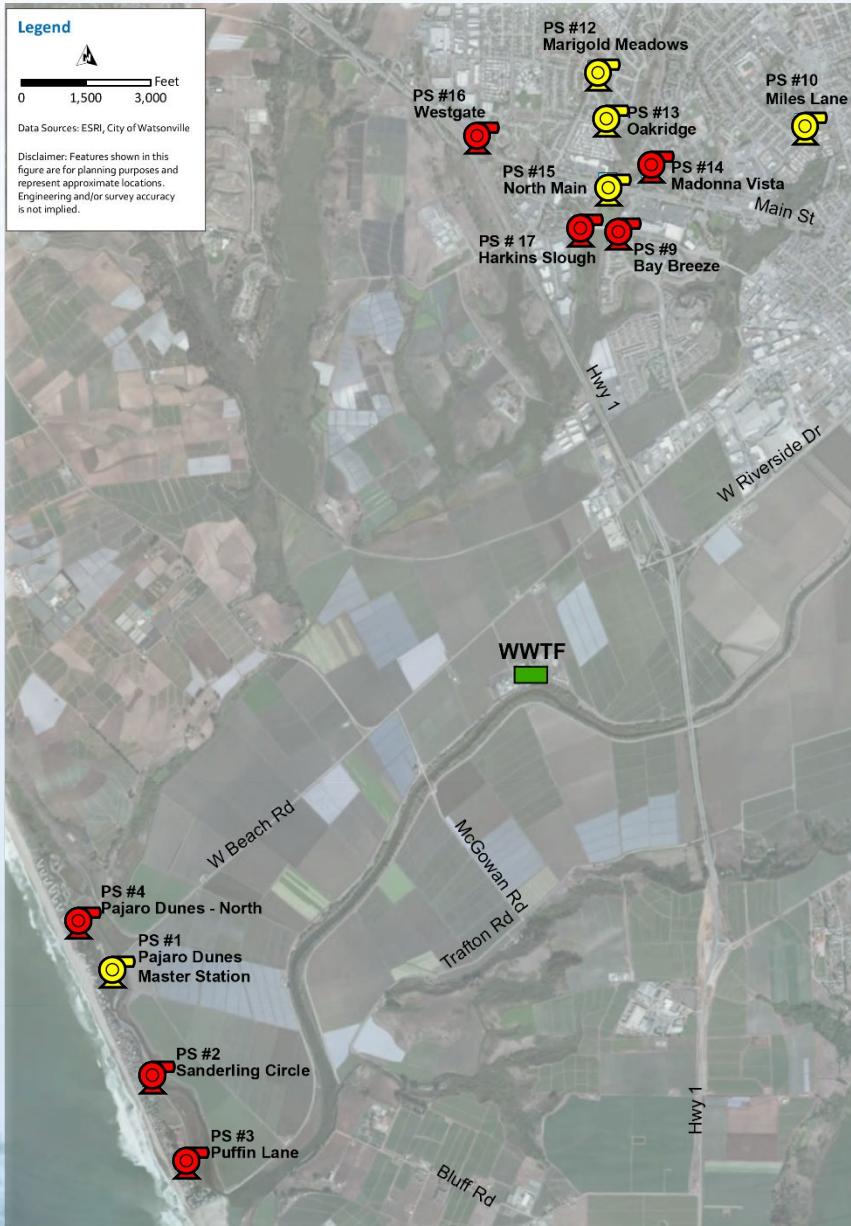
ORDER No. R2-2019-00XX  
NPDES No. CA0038873

WASTE DISCHARGE REQUIREMENTS FOR NUTRIENTS  
FROM MUNICIPAL WASTEWATER DISCHARGES TO SAN FRANCISCO BAY

The following dischargers are subject to waste discharge requirements (WDRs) set forth in this Order, for the purpose of regulating nutrient discharges to San Francisco Bay<sup>1</sup> and its contiguous bay segments:



# 5. Sewer Pump Station Projects



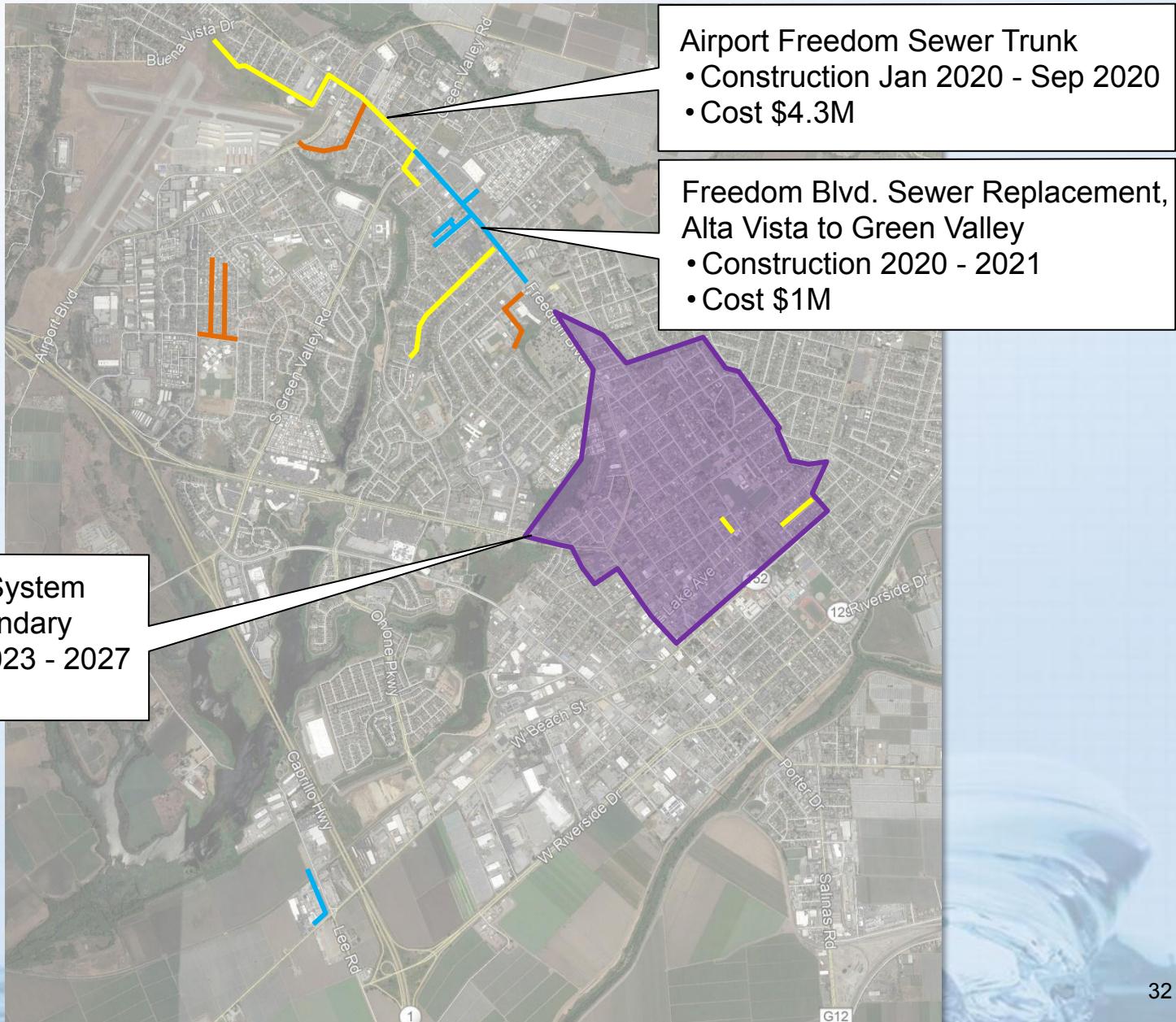
**\$5.7M Replacement Recommended**  
(Wet Well, Pump, Electrical)



**\$3.4M Maintenance Recommended**  
(Pump and Generator Replacement, New Controls, Wet Well Lining)



# 6. Priority Sewer Pipeline Projects



# CIP Cost Development

# Capital Improvements Process



# 20-Year CIP Costs

| Project Description <sup>1</sup>  | 2020-25         | 2025-30         | 2030-40        | Total Costs     |
|---|-----------------|-----------------|----------------|-----------------|
| WWTF Main Switchgear, Standby Generators and Plant Electrical System <sup>2</sup> | \$ 12.9M        | ---             | ---            | \$ 12.9M        |
| WWTF Digesters and FOG Improvements Projects                                      | \$ 2.4M         | \$ 8.9M         | ---            | \$ 11.3M        |
| WWTF Headworks and Influent Pump Station  | ---             | \$12.0M         | ---            | \$ 12.0M        |
| WWTF Secondary Treatment Process Improvements                                     | ---             | ---             | \$ 14.8M       | \$ 14.8M        |
| Collection System Pump Station Improvements                                       | \$ 2.1M         | \$ 7.0M         | ---            | \$ 9.1M         |
| Remainder of Identified CIP Projects  | \$ 9.8M         | \$ 15.8M        | \$25.6M        | \$ 51.2M        |
| <b>Total 20-Yr CIP Costs <sup>3</sup></b>   | <b>\$ 27.2M</b> | <b>\$ 43.7M</b> | <b>\$40.4M</b> | <b>\$111.3M</b> |

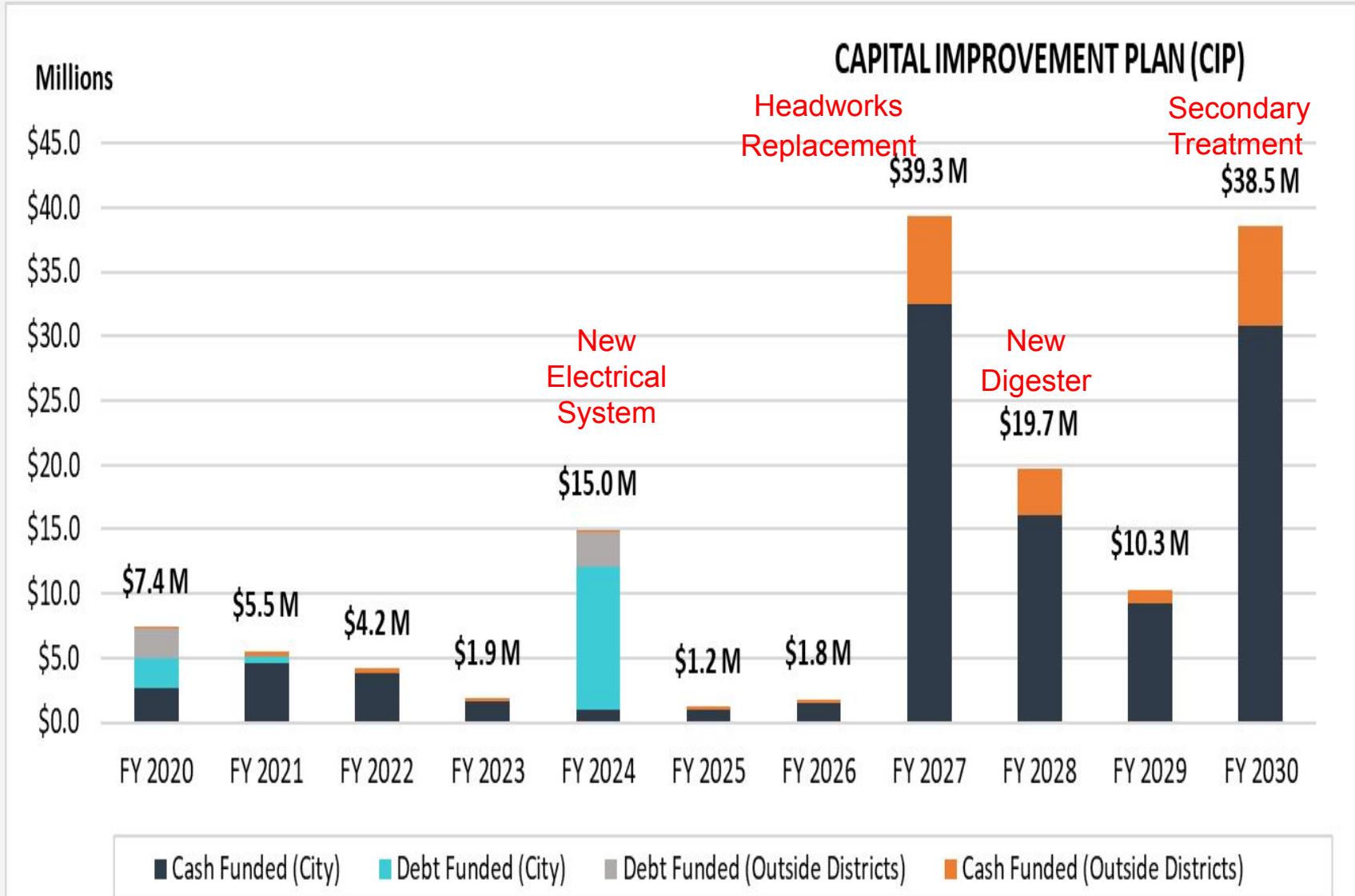
## Notes:

1. Refer to Attachment B, Capital Improvement Plan Summary, for detailed breakdowns.
2. Includes Levee Embankment Stabilization Project.
3. Includes both Master Plan and previously identified City Projects.

# 20-Yr CIP Costs - Master Plan/Existing CIP

|                                     | 2020-25         | 2025-30         | 2030-40        | Total Costs     |
|-------------------------------------|-----------------|-----------------|----------------|-----------------|
| Master Plan Projects                | \$ 19.0M        | \$ 22.6M        | \$40.4M        | \$ 82.0M        |
| Previously Identified City Projects | \$ 8.2M         | \$ 21.1M        | ---            | \$ 29.3M        |
| <b>Total 20-Yr CIP Costs</b>        | <b>\$ 27.2M</b> | <b>\$ 43.7M</b> | <b>\$40.4M</b> | <b>\$111.3M</b> |

# Wastewater Enterprise: 10-Year CIP



# In Summary

- Completed Master Plan = strategically plan improvements next 20 years; serve reliably and meet regulatory needs.
- Balance between project prioritization and funding available – avoid emergency repair costs.
- Next steps:
  - Incorporate projects into 5-year rate study.
  - As development and land use changes are updated, reevaluate sewer pump station and pipeline project priorities.
  - Consider funding opportunities (grants, low interest loans).

# Questions and Discussion

