Metropolitan Wastewater
MANAGEMENT COMMISSION

partners in wastewater management

Resiliency Project Overview

WATER
OUR FOCUS
OUR BUSINESS
OUR PASSION

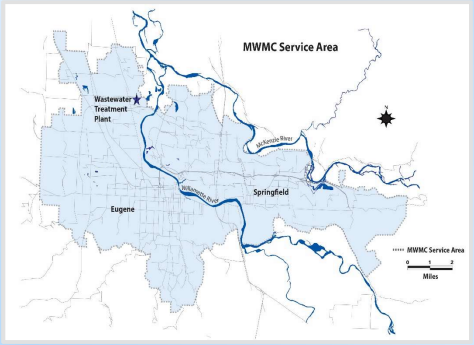
carollo
Engineers...Working Wonders With Water®

Infra • Terra

seft
CONSULTING GROUP

McMILLEN JACOBS ASSOCIATES

MWMC: Built on Partnerships



City of Springfield: *Administration*
City of Eugene: *Operations*
Lane County

The Commission

Pat Farr
MWMW President
Lane County Commission

Jennifer Yeh
MWMC Vice-President
Eugene City Council

Bill Inge
Lane County citizen

Doug Keeler
Springfield citizen

Walt Meyer
Eugene citizen

Joe Pishioneri
Springfield City Council

Peter Ruffier
Eugene citizen

3 elected officials
4 citizen representatives

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MWMC: Regional Facilities

Wastewater Treatment Plant

- Plant operates 24/7, 365 days a year
- Capacity to handle peak flows of 277 million gallons/day

Average flow
33 million gallons per day

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MWMC: Regional Facilities

Biosolids Management Facility

- Beneficial use of biosolids applied to agricultural land

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Resiliency Project Purpose

- Establish resilient MWMC wastewater conveyance and treatment system that will effectively respond to meet community needs after a devastating natural disaster
  - Cascadia Subduction Zone Earthquake
  - 500 Year Flood
  - Climate Change Factored into Flood Assessment

Resilience Project Scope

- Setting of Service Goals for Recovery
- Vulnerability Assessment of MWMC Critical Infrastructure
- Critical Interdependencies Assessment
- MWMC Disaster Mitigation & Recovery Plan

Level of Service Goals

LOS Goals – CSZ Seismic Event
Conveyance Pump Stations & Pipelines
- Consistent with Oregon Resilience Plan

Phase 1: Short-Term			Phase 2: Intermediate-Term			Phase 3: Long-Term		
Days			Weeks			Months		
0-1	1-3	3-7	1-2	2-4	4-12	3-6	6-9	9-12
			Capable of routing 30% AWWF to Plant		Capable of routing 60% AWWF to Plant	Capable of routing 90% AWWF to Plant		

AWWF = Average Wet Weather Flow (52.5 million gallons per day)

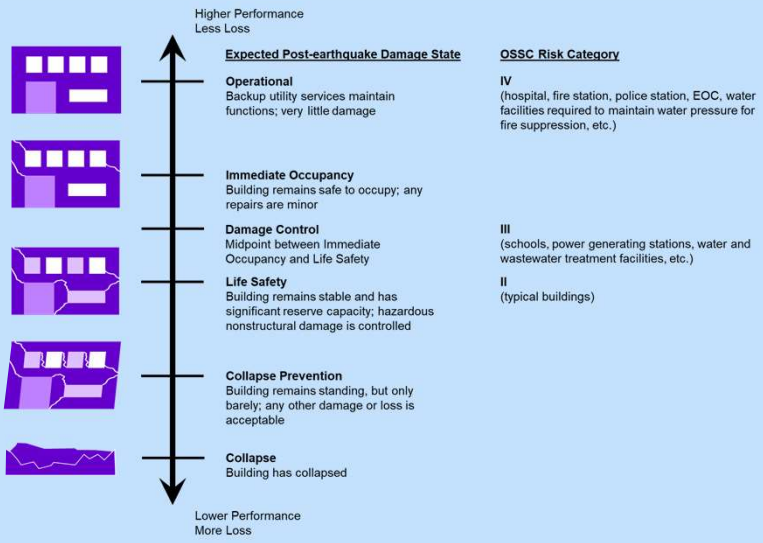
LOS Goals – CSZ Seismic Event Treatment Facilities

- Consistent with Oregon Resilience Plan

Target Timeframe for Recovery								
Phase 1: Short-Term			Phase 2: Intermediate-Term			Phase 3: Long-Term		
Days			Weeks			Months		
0-1	1-3	3-7	1-2	2-4	4-12	3-6	6-9	9-12
Flow to emergency outfall or through plant to regular outfall			Primary treatment and disinfection for ADWF			Primary treatment, secondary treatment, and disinfection for ADWF		Operating to meet regulatory require-ments

ADWF = Average Dry Weather Flow (28 million gallons per day)

Performance Objectives for Structures – Seismic



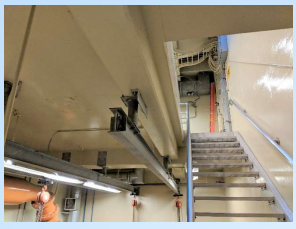
Overall Findings of Geotechnical Evaluation:

- Geotechnical Conditions:
  - No significant areas of:
    - Liquefaction
    - Landslides or slip plane failures
  - Peak ground accelerations and velocities:
    - Considered to be moderate
    - Within design values for recent projects.
- Several locations along East Bank Interceptor identified for future site-specific analysis
- One area at the WPCF identified for analysis to better understand seismic-induced settlement/lateral spreading

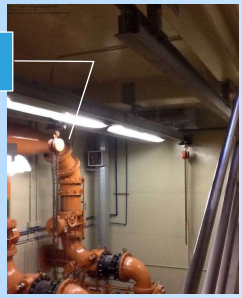
Structural Observations – Pump Stations

- Irvington PS

Buried PS with no major structural deficiencies



Lateral Pipe Braces Needed



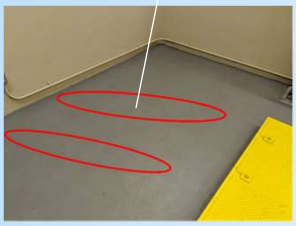
Anchors Needed to Attach Equip. to Base

Structural Observations – Pump Stations

- Glenwood PS

Overall only moderate upgrades identified.

Existing cracks should be analyzed to determine cause and then repaired.



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Structural Observations – Pump Stations

- Wet Weather PS/Facility

Building will likely collapse due "free story" type of failure mechanism; roof is not adequately attached to walls.

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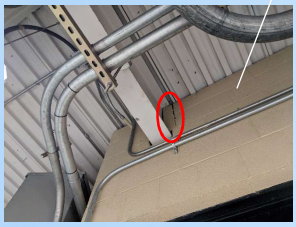
Structural Observations – Pump Stations

- Willakenzie PS

Overall only moderate upgrades identified for roof/wall connections

Cracks in older section of PS should be analyzed to determine cause and then repaired.

Electrical equipment should be assessed for seismic vulnerability – anchorage and bracing.



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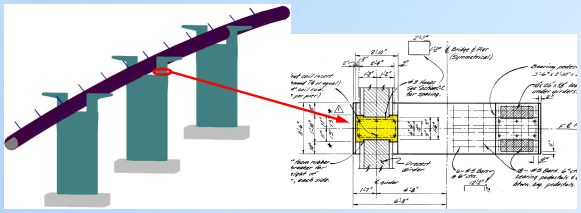
Structural Observations – Owosso Bridge

Force main

Power conduits



Beam-pier connection may fail causing failure of bridge

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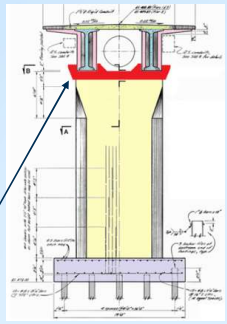
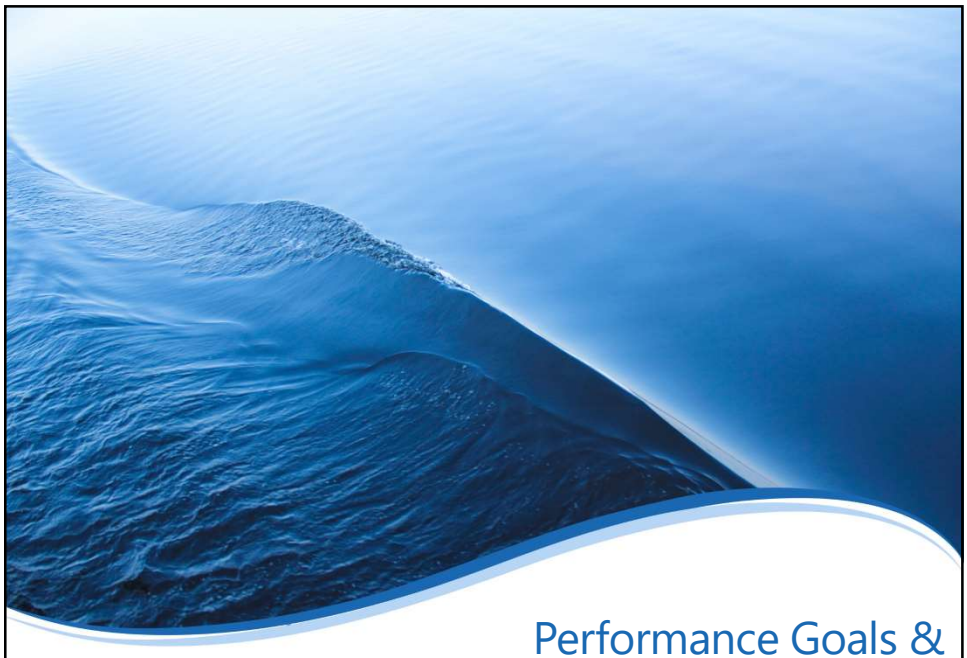
Example of Recommendations – Owosso Bridge

- Reinforcement of pier to beam interface at piers
- Geotechnical investigation at abutments to confirm no seismic-induced settlement or lateral spreading



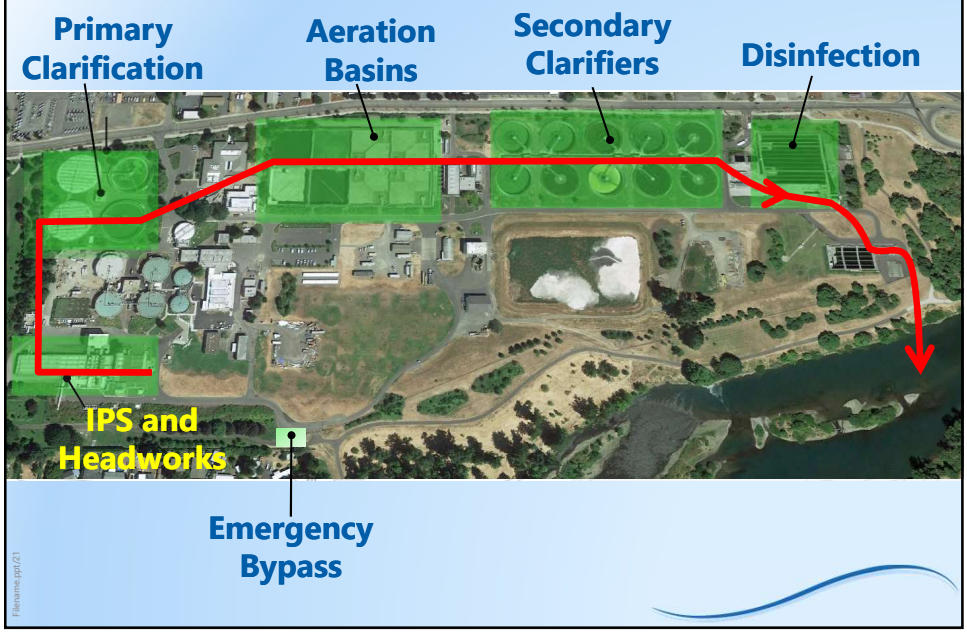


Performance Goals & Seismic Vulnerability Assessment - Treatment

Phase 1 - Immediately after CSZ event (0 – 1 days)

Phase 2 – Intermediate-Term (1 to 2 Weeks)

Phase 3 – Long-Term (3 to 6 Months)



Typical Structural Deficiencies for Treatment Facilities

Structures Built in 1979	Recent Structures	Tanks
• Typical rigid wall / flexible diaphragm (RWFD) deficiencies. • Roof to wall connections are not sufficient. • Clear span construction will lead to failures. • Can expect these buildings to be damaged and red-tagged after event if not upgraded.	• Some items to be addressed but all in all will not be severely damaged after the event.	• Good performance due to robust nature of design for leakage control and lack of significant ground movements. • Wall added in aeration basin for process control was not designed for seismic loads and will likely fail.

Example of Recommendations - Treatment

Upgrade Rigid Wall Flexible Diaphragm Structures

Final Treatment Building

Primary Sludge PS

Boiler Building

Secondary Controls Building

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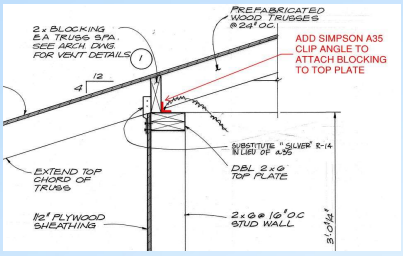
Example of Recommendations - Treatment

Operations Building – Upgrade for $2.6 M or Replace?



- Reinforce roof system
- Reinforce roof to wall interface
- Reinforce wall to foundation
- Requires removal of all or parts of ceiling, roof, and interior walls to access
- Lateral bracing pipes/ducts, ceiling
- Equipment anchoring

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Typical Nonstructural Deficiencies for Collection System

1979 - 1990's Construction	Recent Construction
• No Lateral bracing • Fall-prone content like shelves and cabinets are not anchored.	• Bracing included.

Inadequate lateral bracing or anchoring

Adequate lateral bracing

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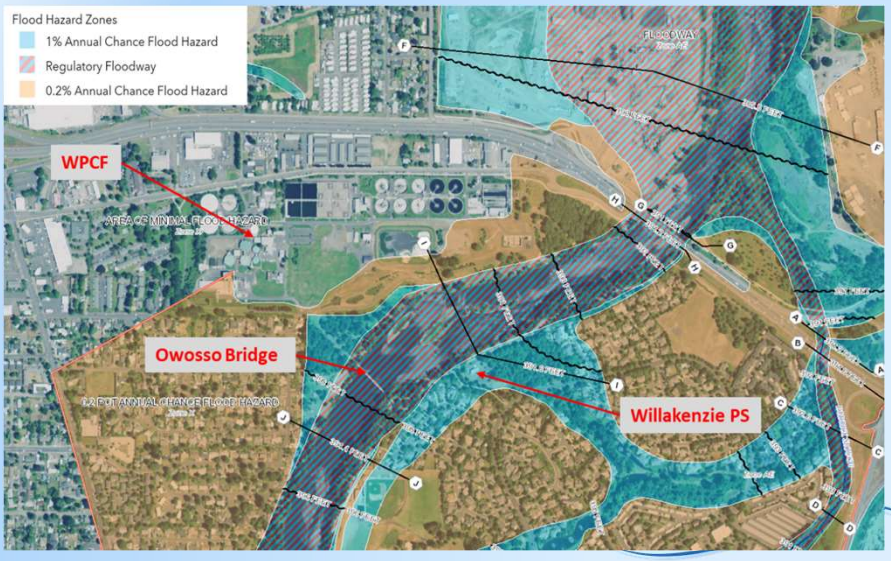
Eugene/Springfield Water Pollution Control Facility 500 Year Flood Elevation



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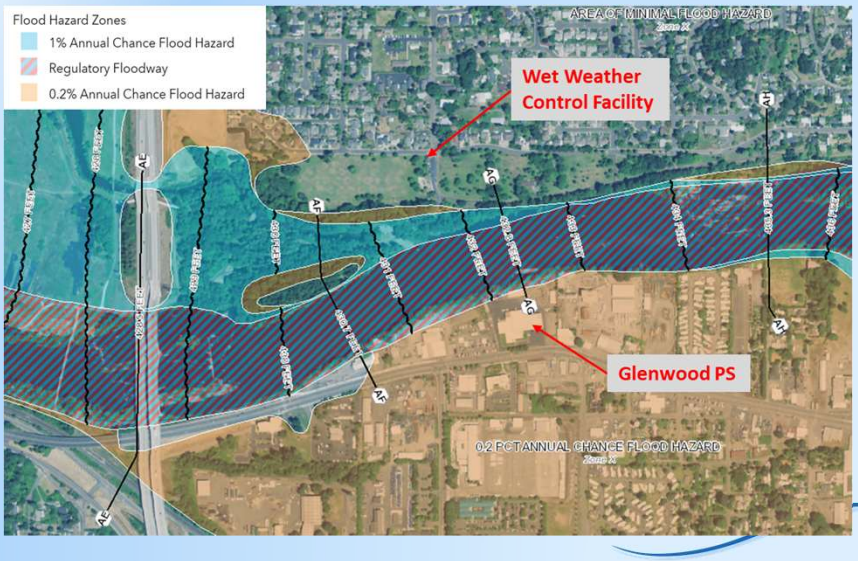
Glenwood Pump Station
500 Year Flood Elevation



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Critical Interdependencies Assessment

- Objectives:
  - Identify and understand top 10 dependencies that would substantially impact disaster response and recovery
  - Identify mitigation strategies to minimize potential for cascading failure

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Top 10 Dependencies

Dependency	Rank
Employee and Family Preparedness	1
City/Regional Roads	2
Telecommunications	3
Structural Inspection	4
Emergency Operations Plan	5
Electrical Power	6
Data	7
Vendors and their Shipping Services	8
Fuel	9
Electrical, Piping, Equipment Assessments	10

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Cost Summary

Estimated Capital Costs			
Facility	Seismic	Flooding	Total
Conveyance Pipelines	$130,000	-----	$130,000
Conveyance Pump Stations	$5,155,000	$900,000	$6,055,000
WPCF	$25,845,000	$1,260,000	$27,105,000
BMF	$965,000	-----	$965,000
Interdependencies	$325,000		$325,000
Totals	$32,095,000	$2,160,000	$34,580,000

Estimated Annual O&M Cost	
Interdependencies: Emergency Preparedness, Communication Equipment, On-call Assessment & Vendor Contracts, and Staff Training	$100,000

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QUESTIONS?