

Update

Water Reuse Hydrogeologic Studies

City of Morro Bay
Water Reclamation Facility
Citizens Advisory Committee

February 7, 2017

Paul Sorensen
Principal Hydrogeologist
GSI Water Solutions, Inc.



Water Reuse Hydrogeologic Studies

Presentation Overview

- ▶ Overall objectives of hydrogeologic studies
- ▶ Key findings
- ▶ Upper Morro Valley reconnaissance investigation
- ▶ Morro Valley feasibility alternatives study
- ▶ Chorro Valley feasibility alternatives study
- ▶ Lower Morro Valley screening-level modeling for injection feasibility

Water Reuse Hydrogeologic Studies

Objectives of Hydrogeologic Studies

- ▶ Assess best approaches to water reclamation
- ▶ Provide support to inform MWRP
- ▶ Estimate benefit to City's water supply
- ▶ Increase water supply options and flexibility
- ▶ Cost-effectively reuse effluent
- ▶ Evaluate feasibility to recharge groundwater

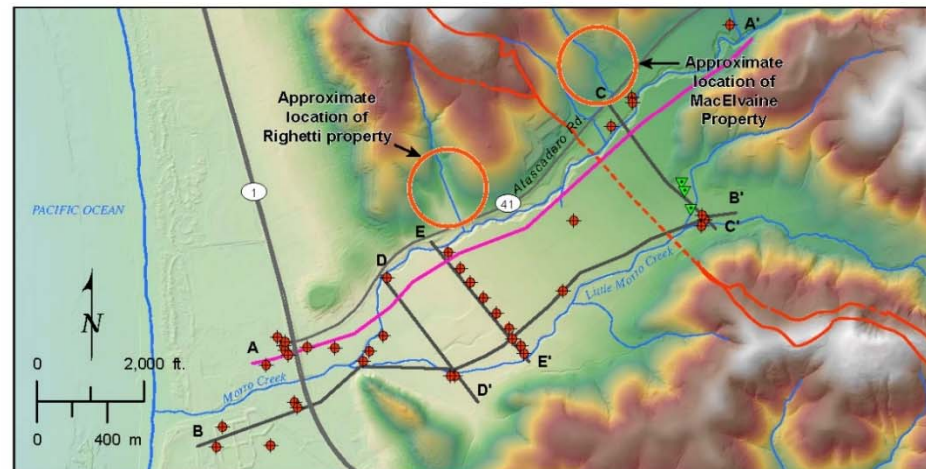
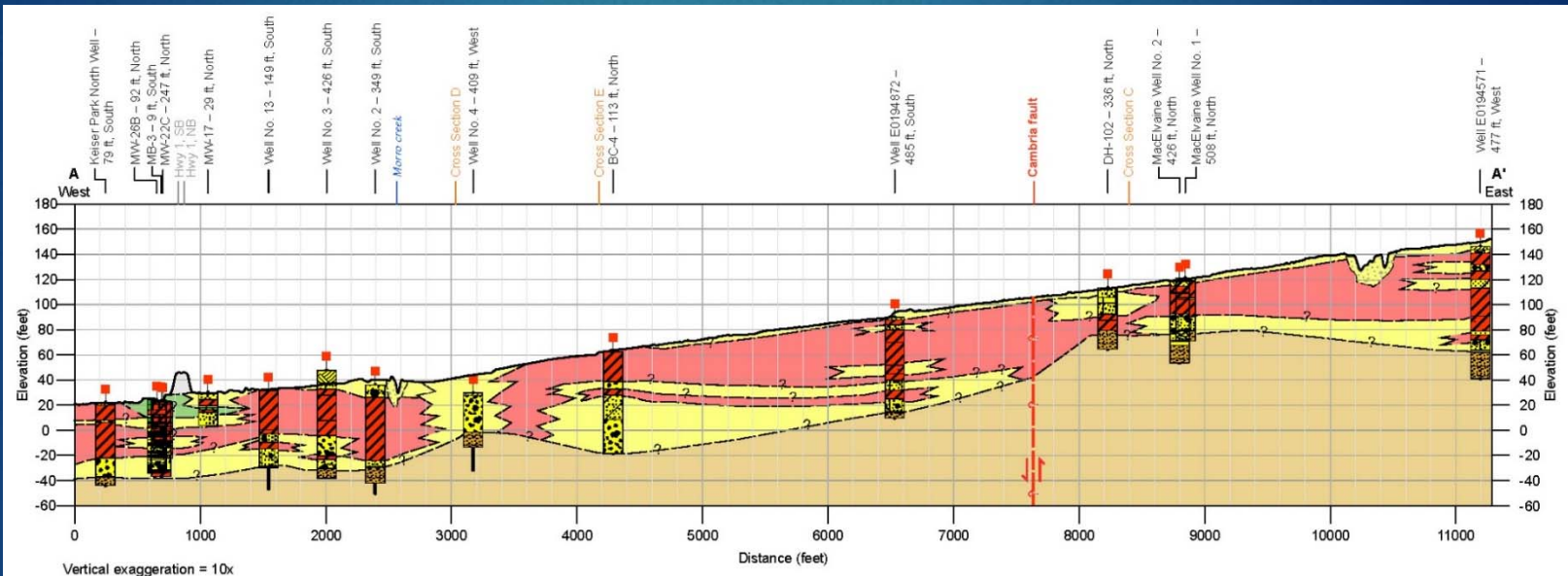
Water Reuse Hydrogeologic Studies

Key Findings

- ▶ Upper Morro Valley
Not Feasible
- ▶ Chorro Valley
Potentially Feasible, but significant obstacles
- ▶ Lower Morro Valley Injection/Recovery
Feasible

Water Reuse Hydrogeologic Studies

Upper Morro Valley Reconnaissance



CROSS SECTION
Morro Valley
Recharge Recon
San Luis Obispo

Water Reuse Hydrogeologic Studies

Upper Morro Valley Reconnaissance

- ▶ The valley is interbedded and dominated by fine-grained materials that impede vertical percolation and inhibit aquifer recharge.
- ▶ Percolation ponds appear infeasible.
- ▶ The potential for recharge by injection wells is limited.
- ▶ The only part of the valley that may be feasible to develop recharge facilities is the westernmost part of the valley, just above the Narrows.

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Morro Valley Feasibility Alternatives Study

Alternatives

- ▶ Groundwater Recharge through Infiltration Basins
- ▶ In-Lieu Recharge
- ▶ Injection and Recovery at City Wells
- ▶ Injection for Seawater Intrusion Barrier
- ▶ Sale of Water Directly to Growers
- ▶ Continued Use of City's Brine Disposal Pipeline
- ▶ Riparian Rights Agreement with Ag Users

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Morro Valley Feasibility Alternatives Study

For Each Alternative, We Assessed:

- ▶ Volume of Effluent Managed
- ▶ Net Water Supply Benefit
- ▶ Regulatory and Permitting Constraints
- ▶ Cooperation Agreements Required
- ▶ Seasonal Constraints
- ▶ Water Rights Issues
- ▶ Environmental Impacts
- ▶ Water Quality Impacts
- ▶ Capital and O&M Costs

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Morro Valley Feasibility Alternatives Study

Alternatives

- ▶ Groundwater Recharge through Infiltration Basins – **Not Feasible (geology)**
- ▶ In-Lieu Recharge – **Not Feasible (water rights, lack of benefit to growers, limited enhancement of City water supply)**
- ▶ Injection and Recovery at City Wells – **Warrants additional study**

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Morro Valley Feasibility Alternatives Study

Alternatives

- ▶ Injection for Seawater Intrusion Barrier – **Warrants additional study**
- ▶ Sale of Water Directly to Growers – **Technically possible, but Concluded Not Feasible** (institutional and financial obstacles, lack of benefit to City water supply)
 - ▶ Exchange is being considered in MWRP
- ▶ Continued Use of City's Brine Disposal Pipeline - **Feasible, but no benefit to City water supply**
- ▶ Riparian Rights Agreement with Ag Users – **Feasible? (water rights concerns, seasonality)**

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Chorro Valley Feasibility Alternatives Study

Alternatives

- ▶ Groundwater Recharge through Infiltration Basins – **Not Feasible (geology)**
- ▶ In-Lieu Recharge – **Potentially Feasible?, but less attractive than MV (significant water rights issues, lack of water treatment infrastructure, lack of benefit to growers, limited enhancement of City supply)**
- ▶ Injection and Recovery at City Wells – **Not Feasible (permitting constraints, water quality requires treatment)**

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Lower Morro Valley Modeling for IPR Feasibility

Objectives

- ▶ Develop screening-level model as a tool
- ▶ Assess feasibility of injection and subsequent recovery of recycled water
- ▶ Cost-effective enhancement of City water supply

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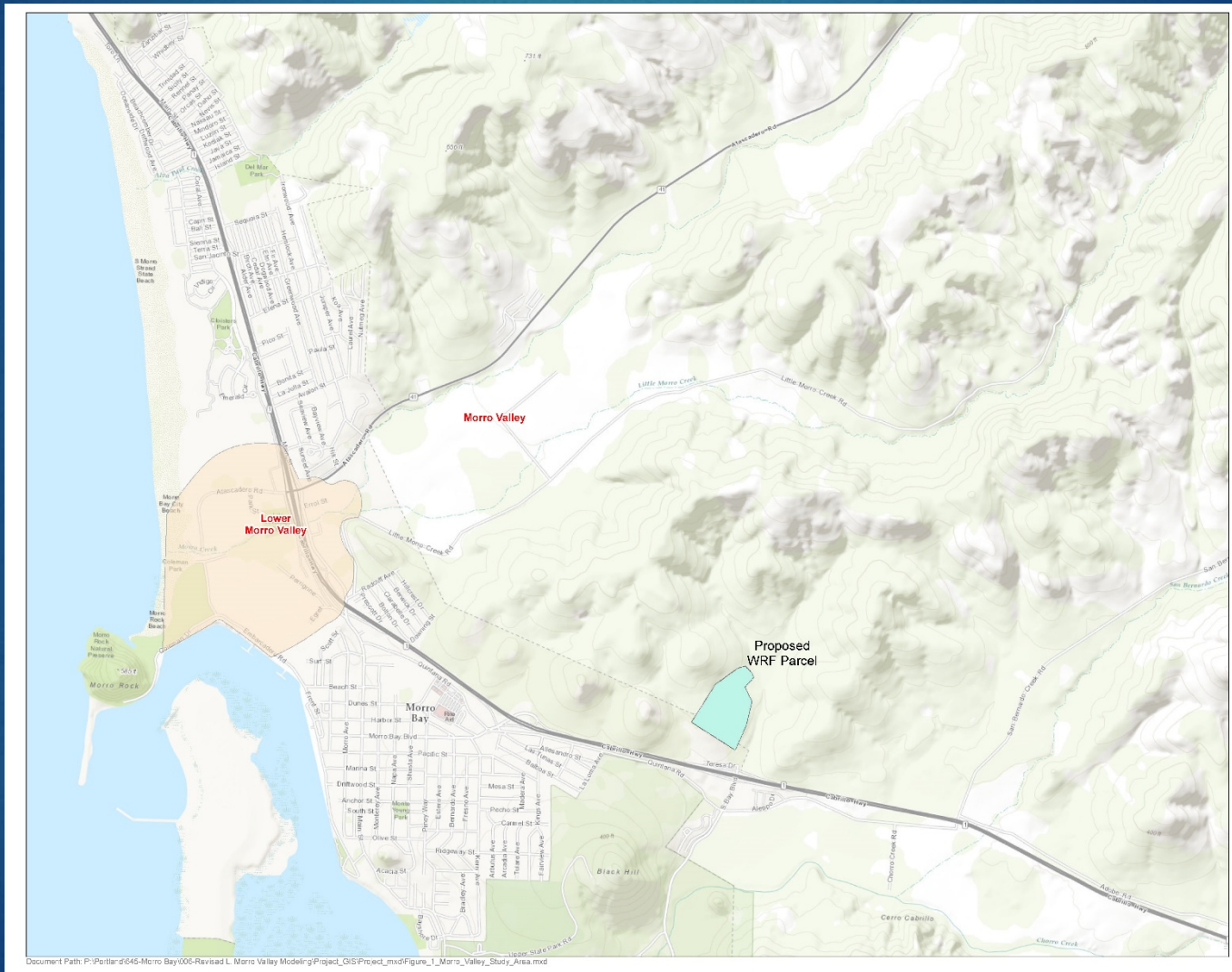
Lower Morro Valley Modeling for IPR Feasibility

Goals

- ▶ Inject up to 825 AFY of recycled water
- ▶ Maximize City pumping without inducing seawater intrusion
 - ▶ 581 AFY of existing licensed pumping rights
- ▶ Meet Title 22 minimum response time requirements

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Lower Morro Valley Modeling for IPR Feasibility



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Lower Morro Valley Modeling for IPR Feasibility

Scenarios

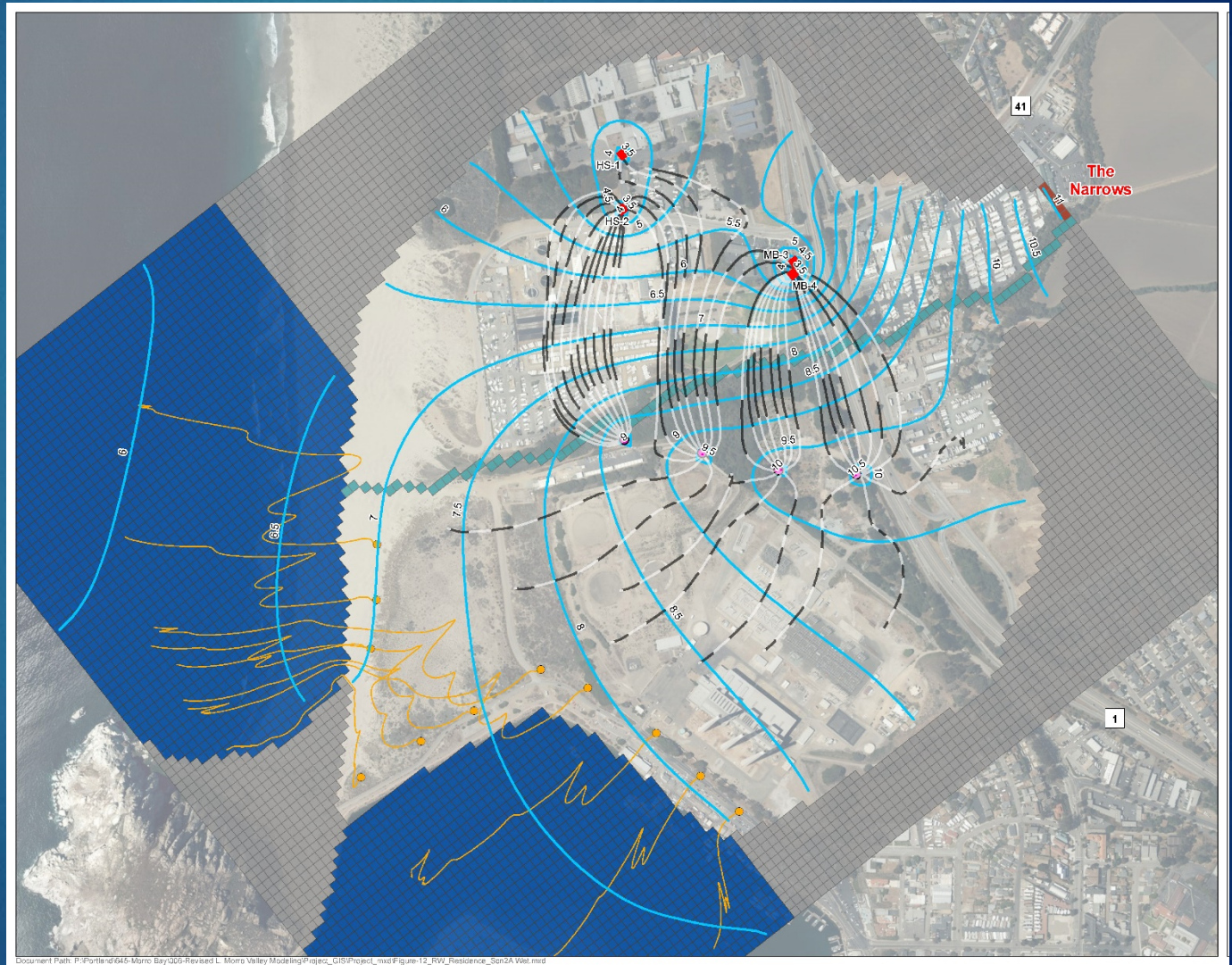
- ▶ Scenarios 1A and 1B evaluated recycled water injection upgradient of the City's wells, near the Narrows
- ▶ Scenarios 2A and 2B evaluated recycled water injection downgradient of the City's wells

Lower Morro Valley Modeling for IPR Feasibility

Water Reuse Hydrogeologic Studies

Lower Morro Valley Modeling for IPR Feasibility

Scenarios 2A
and 2B



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Lower Morro Valley Modeling for IPR Feasibility Results

Scenario No.	Description	Injection (AFY)	Pumping (AFY)	Residence Time (months)	Seawater Intrusion Potential
1A	Upgradient Injection with pumping @ MB-1, MB-2, Flippos, HS-1, HS-2	825	943	>4	Limited
1B	Scenario 1A plus new pumping well at bike path	825	1,193	Mostly >4	Moderate
2A	Downgradient Injection with pumping @ MB-3, MB-4, HS-1, HS-2	801	1,119	>3 and <4	Limited
2B	Scenario 2A plus pumping @ Flippos	814	1,305	>3 and <4	High

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Lower Morro Valley Modeling for IPR Feasibility

Conclusions

- ▶ Recycled Water Injection
 - ▶ Can accept 800-825 AFY recycled water
 - ▶ Minimum of 4 injection wells required

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Lower Morro Valley Modeling for IPR Feasibility

Conclusions

- ▶ Groundwater Pumping Volumes
 - ▶ Can produce up to 1,200 AFY water
 - ▶ Seawater intrusion potential increases with higher production volumes

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Lower Morro Valley Modeling for IPR Feasibility

Conclusions

- ▶ Recycled Water Residence Time
 - ▶ May meet minimum 2 months residence time
 - ▶ May require additional testing and demonstration to satisfy minimum DDW and RWQCB standards

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Conclusions

- ▶ Upper Morro Valley
Not Feasible
- ▶ Chorro Valley
Potentially Feasible, but significant obstacles
- ▶ Lower Morro Valley Injection/Recovery
Feasible

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Recommendations

- ▶ Use analysis to evaluate reuse options in MWRP
- ▶ Consult with DDW and RWQCB
- ▶ Conduct pilot injection program
- ▶ Perform seawater intrusion monitoring
- ▶ Install groundwater monitoring devices
- ▶ Perform synoptic streamflow measurements