

CITY OF ORANGE ANNEX

The City of Orange (Orange) is a participant (Member Agency [MA]) in the Orange County Water and Wastewater Multi-Jurisdictional Hazard Mitigation Plan (HMP or Plan). As a participant MA, Orange representatives were part of the HMP Planning Process and served on the Planning Team responsible for the Plan Update; refer to Section 2 of the Plan. The primary Plan, including the hazard mitigation plan procedural requirements and planning process apply to Orange.

This Annex supplements information contained in the primary Plan and describes how Orange’s risks vary from the planning area. The Risk Assessment (Section 3) summarizes the hazards and risks that pose a threat to Orange County. The primary Plan treats the entire County as the planning area and identifies which MAs are subject to a profiled hazard. The purpose of this Annex is to provide additional information specific to Orange with a focus on the risk assessment and mitigation strategy.

The City of Orange Water and Wastewater Division participated in this multi-jurisdictional plan as a component of long-standing best practices between Orange County water and wastewater agencies. Orange County agencies have worked together for decades to improve regional and local reliability and resiliency through joint or collaborative capital improvement projects, planning processes and emergency management practices. The Water and Wastewater Division service boundaries are very similar to the City’s political boundaries. City water and wastewater services are managed within an enterprise fund governed by the City Council, thus allowing them to participate in this more focused planning effort.

In order to meet the FEMA guidelines for mitigation plans to address a jurisdiction in its entirety, the city has a current adopted single-jurisdiction local hazard mitigation plan for the entire city. It is recognized that the approval of this plan and therefore eligibility for hazard mitigation grant funding for the city water and wastewater services within this plan, is contingent upon maintaining a current approved city-wide mitigation plan.

The “City of Orange Hazard Mitigation Plan” was approved on June 13, 2017. Water and Wastewater Division staff participated in the City planning process. Water and wastewater facilities are identified as critical infrastructure in the City plan. The Division staff developed risk assessments and mitigation actions for both plan processes by cross-referencing each plan as appropriate based on planning timelines. However, it should be noted that since the risks identified within this plan is based specifically on risks to water and wastewater infrastructure, this matrix may be slightly different than the City’s risk matrix. Within the City plan the Water and Wastewater Division and all critical infrastructure is addressed in Chapter 3: Hazard Assessments and Chapter 4: Mitigation Actions. A copy of the LHMP can be downloaded under “Mitigation” at:

<https://www.mwdoc.com/your-water/emergency-management/emergency-management-resources/>

HAZARD MITIGATION PLAN POINT OF CONTACT AND DEVELOPMENT TEAM

The following representatives attended the Planning Team meetings on behalf of Orange and coordinated the hazard mitigation planning efforts with Orange staff:

Primary Point of Contact

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JURISDICTION PROFILE (Service Population: 140,504)

The City of Orange is in northern Orange County, serving an area of 25.79 square miles. The City of Orange’s water system was established in October 1904 serving a population of 1,216 people. Since then, the water system has grown tremendously to support a current population of over 140,504 people. The City’s water system is comprised of 13 groundwater wells, eight connections to the imported water supply, 15 water storage tanks with a total storage capacity of over 42 million gallons, 15 pumping stations, 452 miles of pipelines, and over 36,391 service connections. Orange’s water comes from two sources: the primary source is groundwater from OCWD, which makes up 64 to 75 percent of the supply; the second source is imported water purchased from Metropolitan through MWDOC. The City also utilizes local supply through an agreement with Serrano Water District who provides treated local runoff captured in Irvine Lake.

The governing body of the City of Orange is a five-member Council. Under a council-manager form of government, a mayor is elected every two years and four council members are elected to four-year terms alternating on a two-year basis. The City Manager, who is the administrative official of the City, is appointed by the City Council. The water rate structure and all other regulations must be approved by City Council before becoming effective.

Hazards

Detailed hazard profiles for the planning area are provided in Section 3. The City of Orange is located inland and therefore is not subject to coastal hazards, such as coastal storms/erosion and tsunamis. However, the City is subject to most of the other hazards identified for the planning area. Many of these hazards are disperse and may affect the entire region, including climate change, drought, ground shaking from earthquakes, geologic hazards, and high wind. The eastern side of the City contains areas in the high or very high fire hazard severity zones. Small areas of the City are in the 100-year flood zones and the 500-year FEMA flood zone. The City also contains hills that are susceptible to landslides. Human-caused hazards and power outages are also hazards that could impact the City. The City is located downstream of Peters Canyon Dam and Prado Dam. In the event of dam failure large areas of the City could be inundated. There are no hazards that are unique to the City of Orange.

Based on the risk assessment, the City of Orange development team identified the following hazards that affect the city and summarized their geographic extent, probability of future occurrence, magnitude/severity and significance; refer to Table M-1.

**Table M-1
Orange Hazard Identification**

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/Severity	Significance
Climate Change	Limited	Occasional	Negligible	Low
Contamination/ Salt Water Intrusion	Limited	Unlikely	Limited	Low
Dam/Reservoir Failure	Significant	Unlikely	Catastrophic	Medium
Drought	Extensive	Limited	Limited	Medium
Earthquake Fault Rupture & Seismic Hazards	Limited	Limited	Catastrophic	High
Flood	Limited	Unlikely	Negligible	Low
Geologic Hazards	Extensive	Occasional	Limited	Medium
High Winds/ Santa Ana Winds	Significant	Likely	Limited	Medium
Landslide/Mudflow	Limited	Unlikely	Critical	Medium
Wildland/Urban Fire	Significant	Likely	Catastrophic	High
Human-Caused Hazards	Significant	Occasional	Critical	Medium
Power Outage	Extensive	Likely	Catastrophic	High
Geographic Extent Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area		Magnitude/Severity Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths. Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability. Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability. Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid.		
Probability of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year, or happens every year. Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.		Significance Low: Minimal potential impact Medium: Moderate potential impact High: Widespread potential impact		

The identification of hazards provided in Table M-1 is highly dependent on the location of facilities within each agencies jurisdiction and takes into consideration the history of the hazard and associated damage (if any), information provided by agencies specializing in a specific hazard (e.g., FEMA, California Geological Survey), and relies upon each agencies’ expertise and knowledge.

Hazard Maps

The following maps show the location of hazard zones within the jurisdiction relative to either potable water or wastewater systems, as applicable.

Figure M-1
Fire Hazard and City of Orange Potable Water Infrastructure

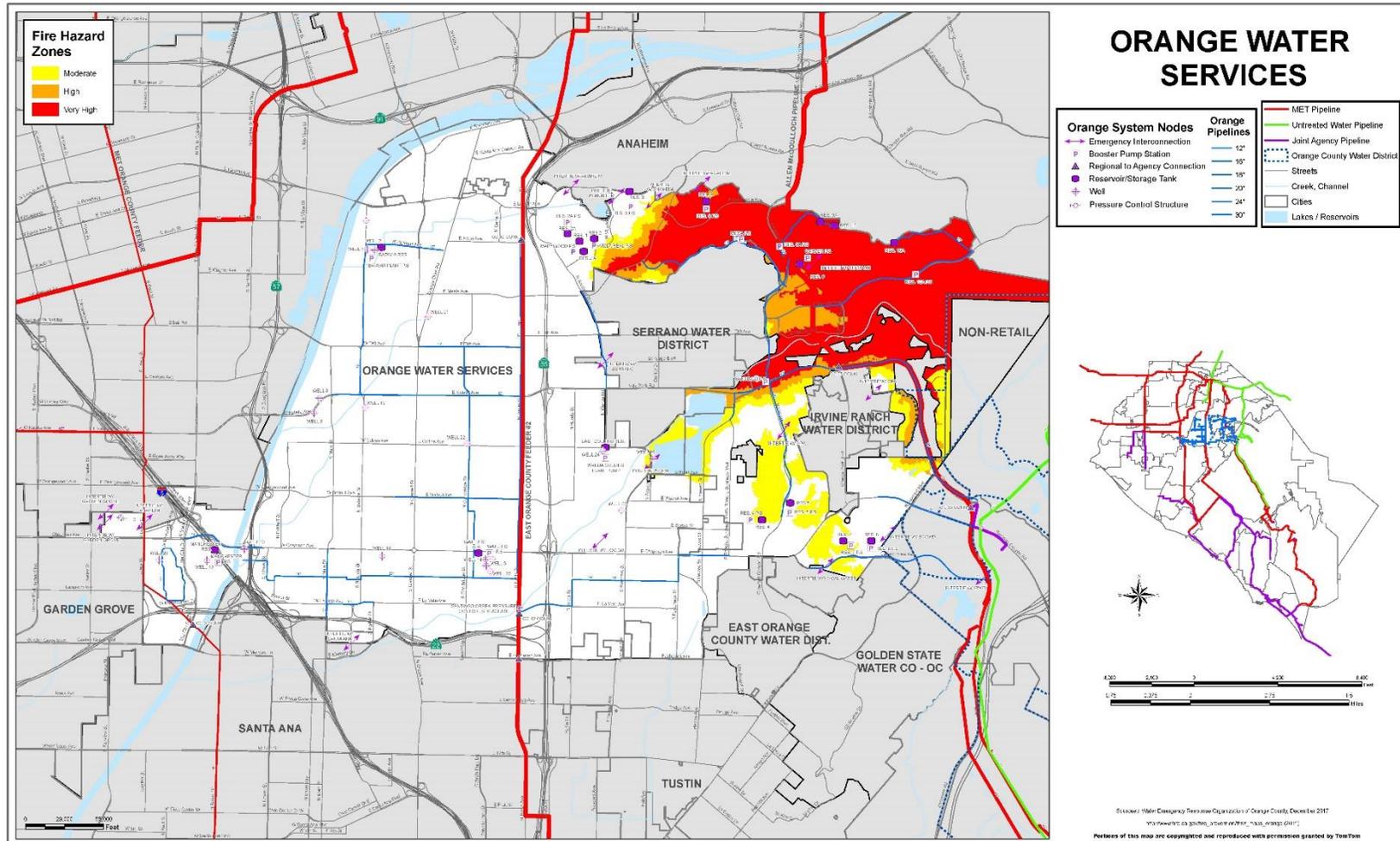


Figure M-2
Fire Hazard and City of Orange Wastewater Infrastructure

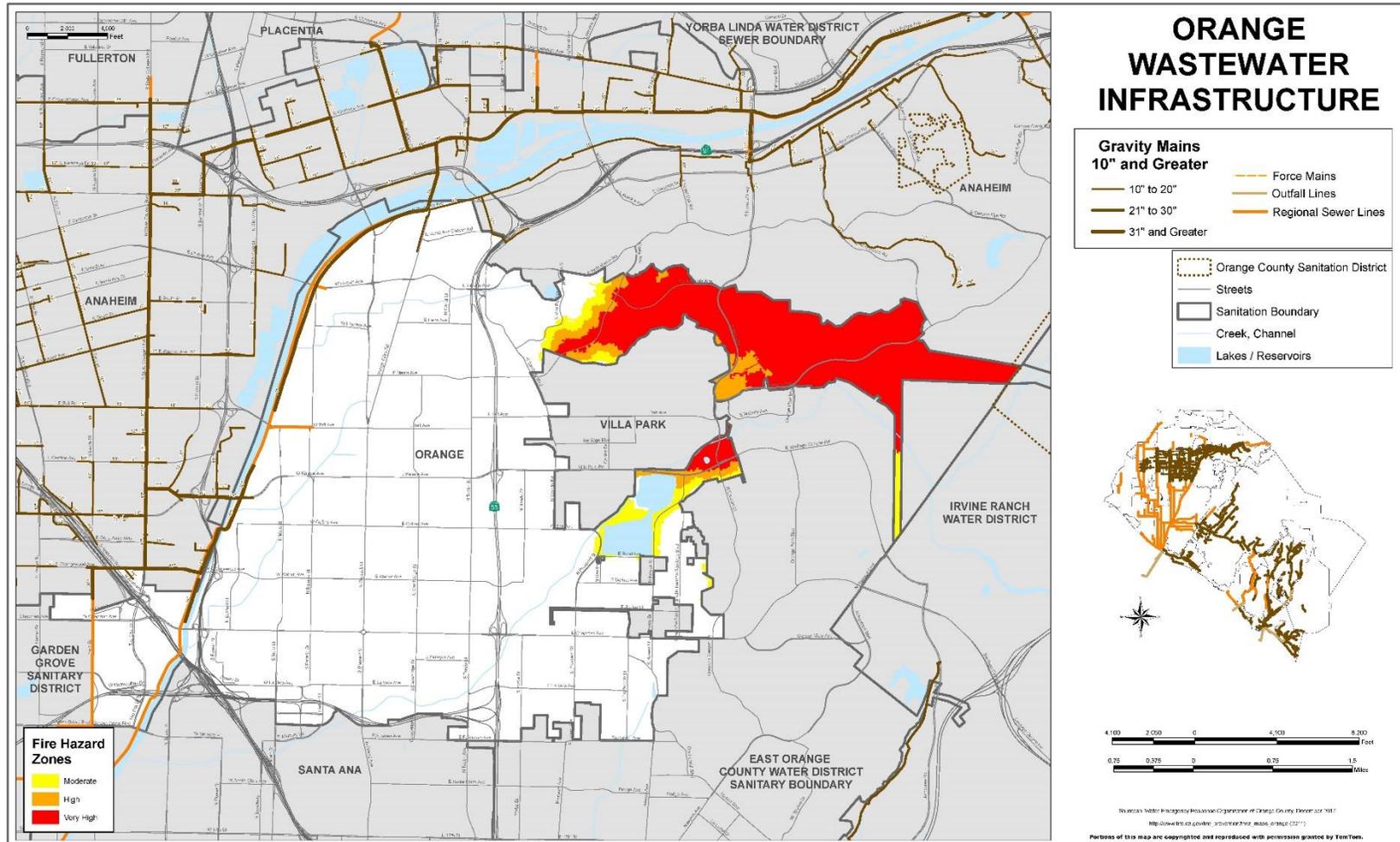


Figure M-3
Flood Hazard and City of Orange Potable Water Infrastructure

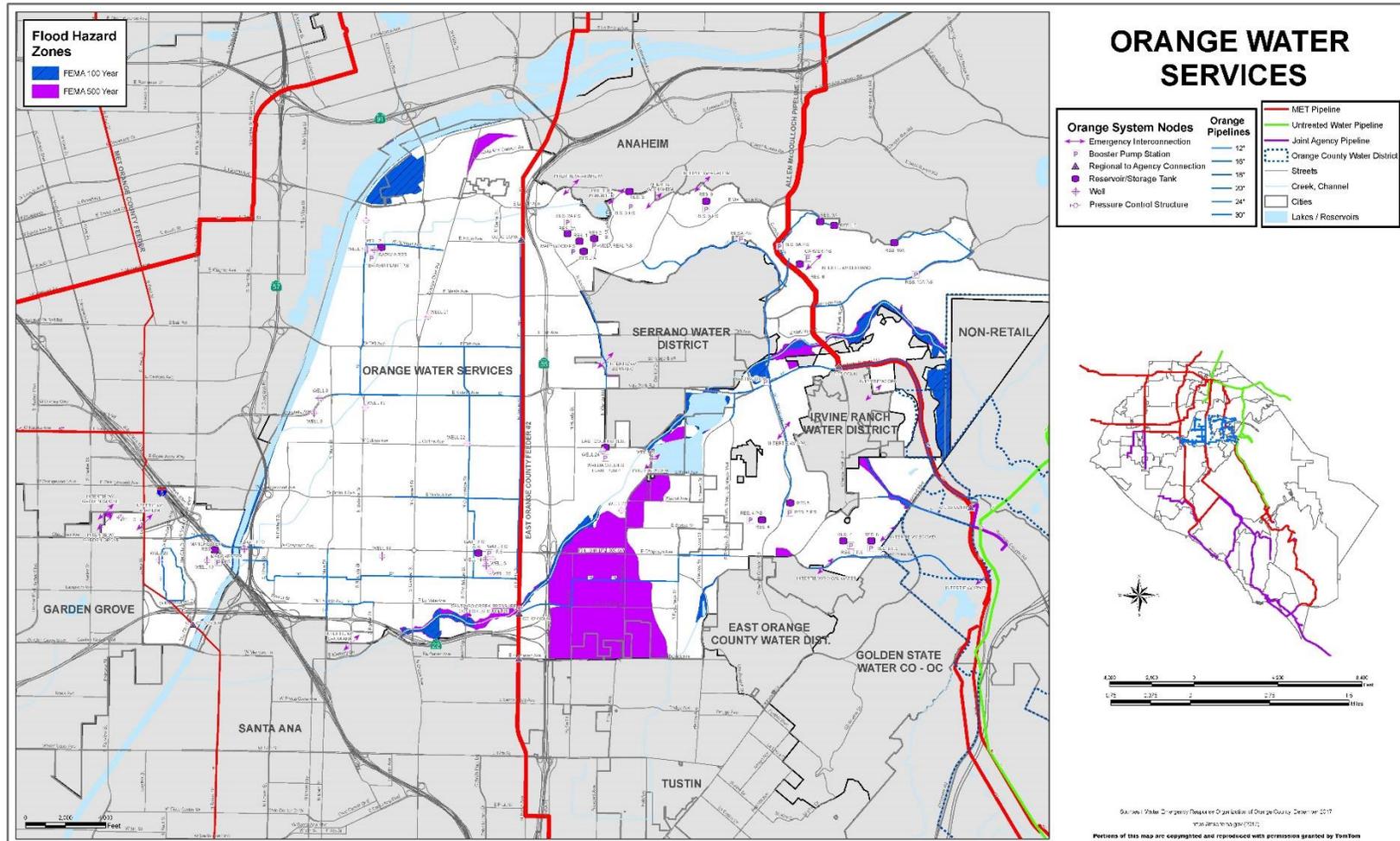


Figure M-4
Flood Hazard and City of Orange Wastewater Infrastructure

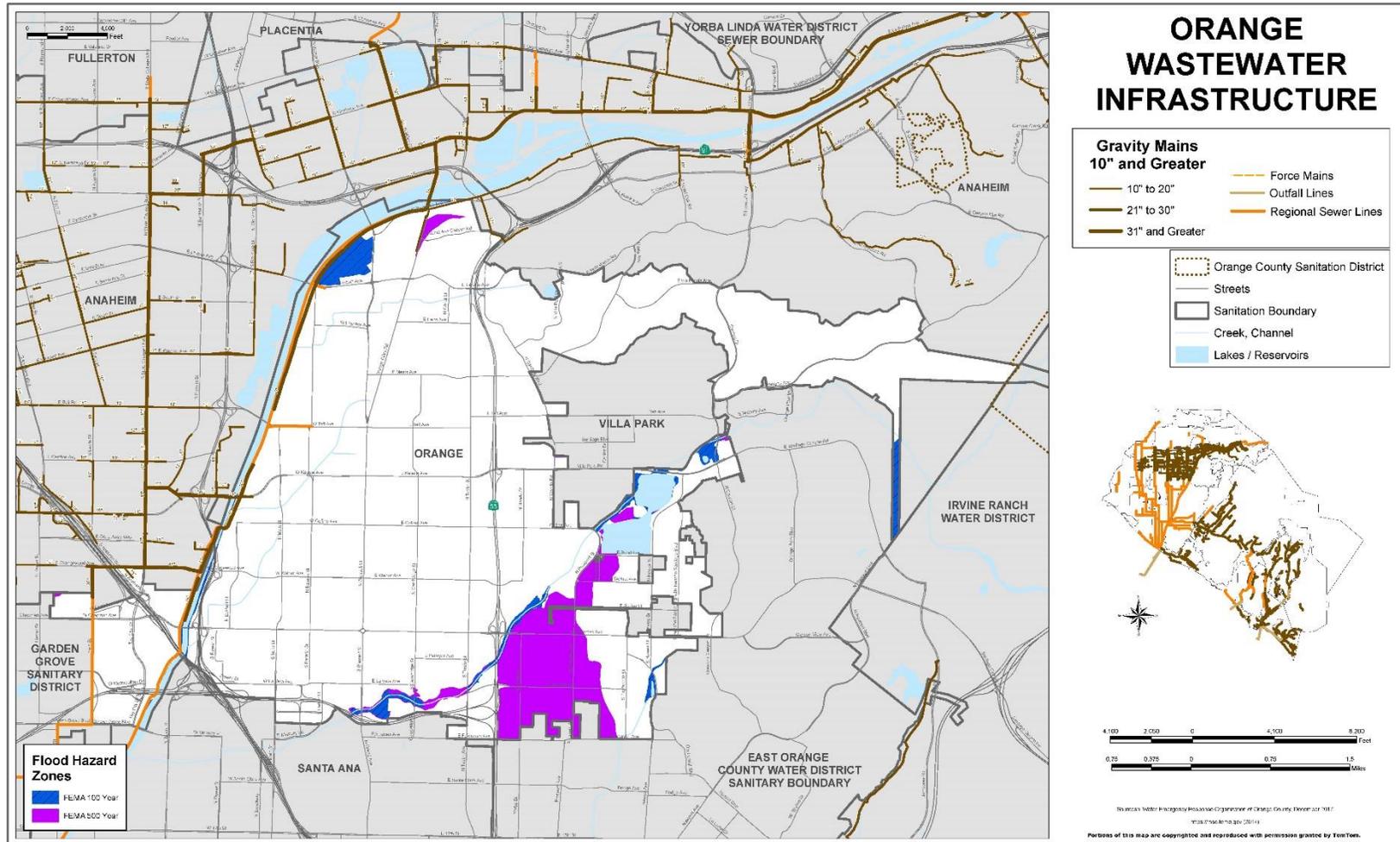


Figure M-5
Ground Shaking and City of Orange Potable Water Infrastructure

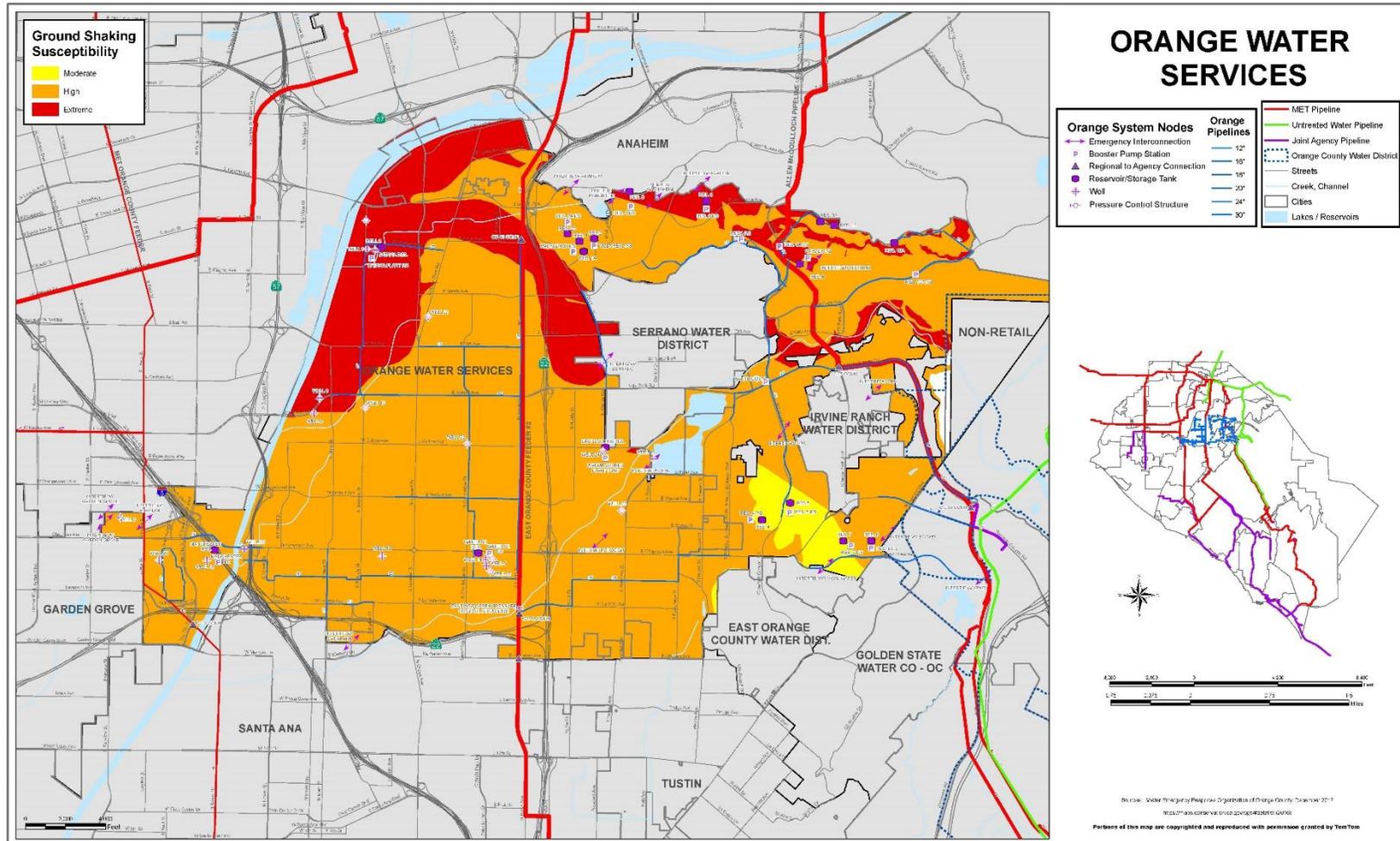


Figure M-6
Ground Shaking and City of Orange Wastewater Infrastructure

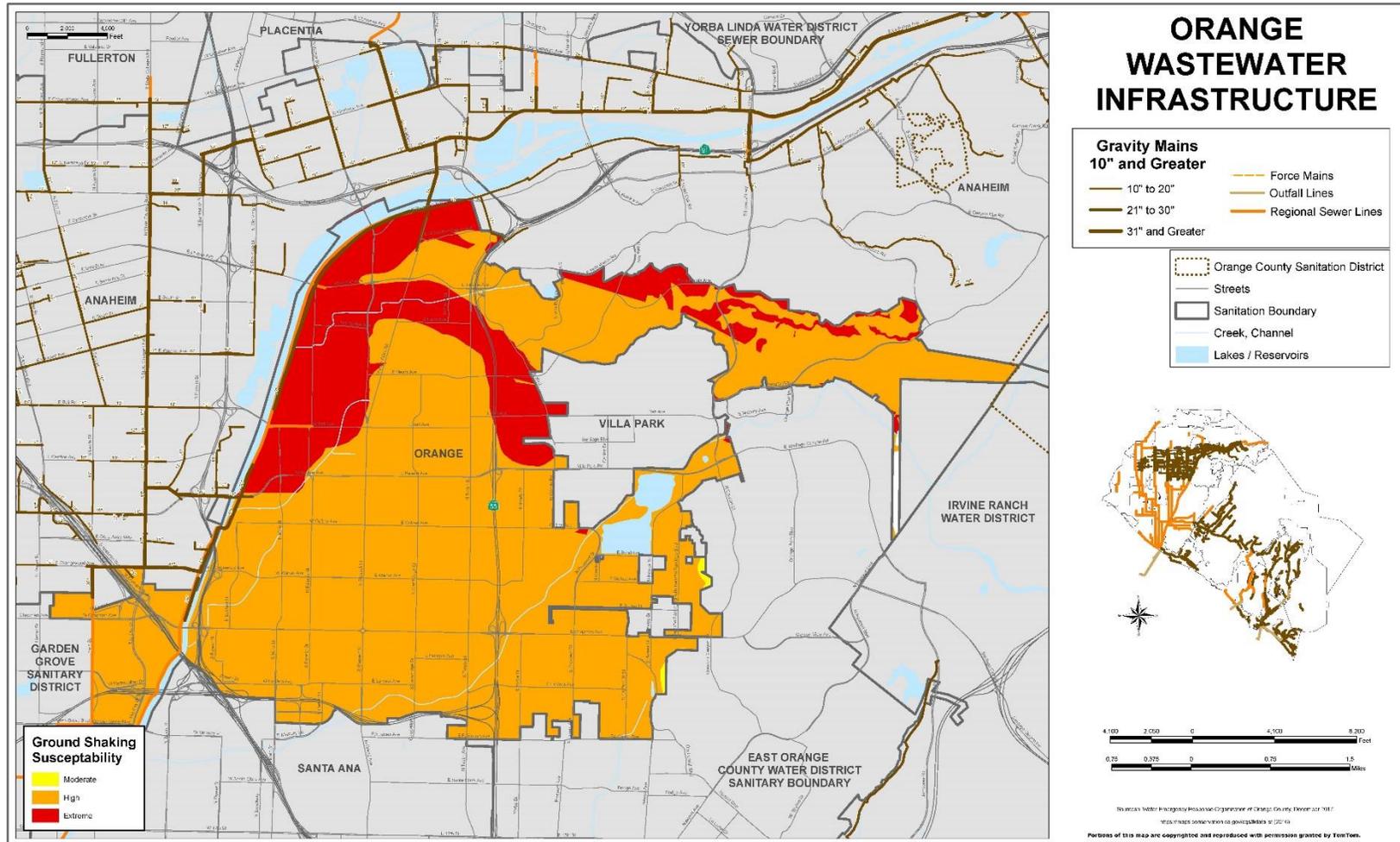


Figure M-7
Liquefaction and City of Orange Potable Water Infrastructure

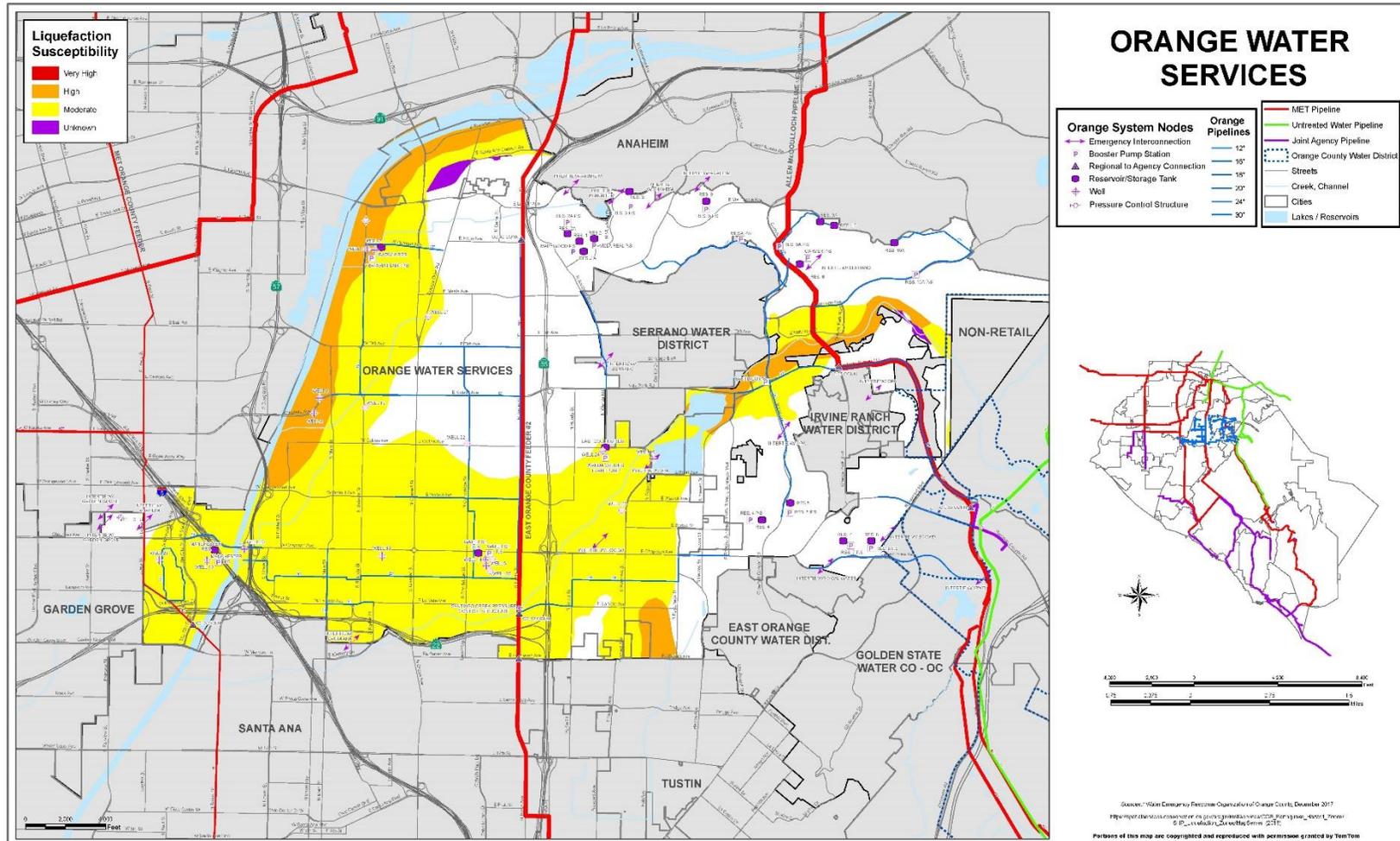


Figure M-8
Liquefaction and City of Orange Wastewater Infrastructure

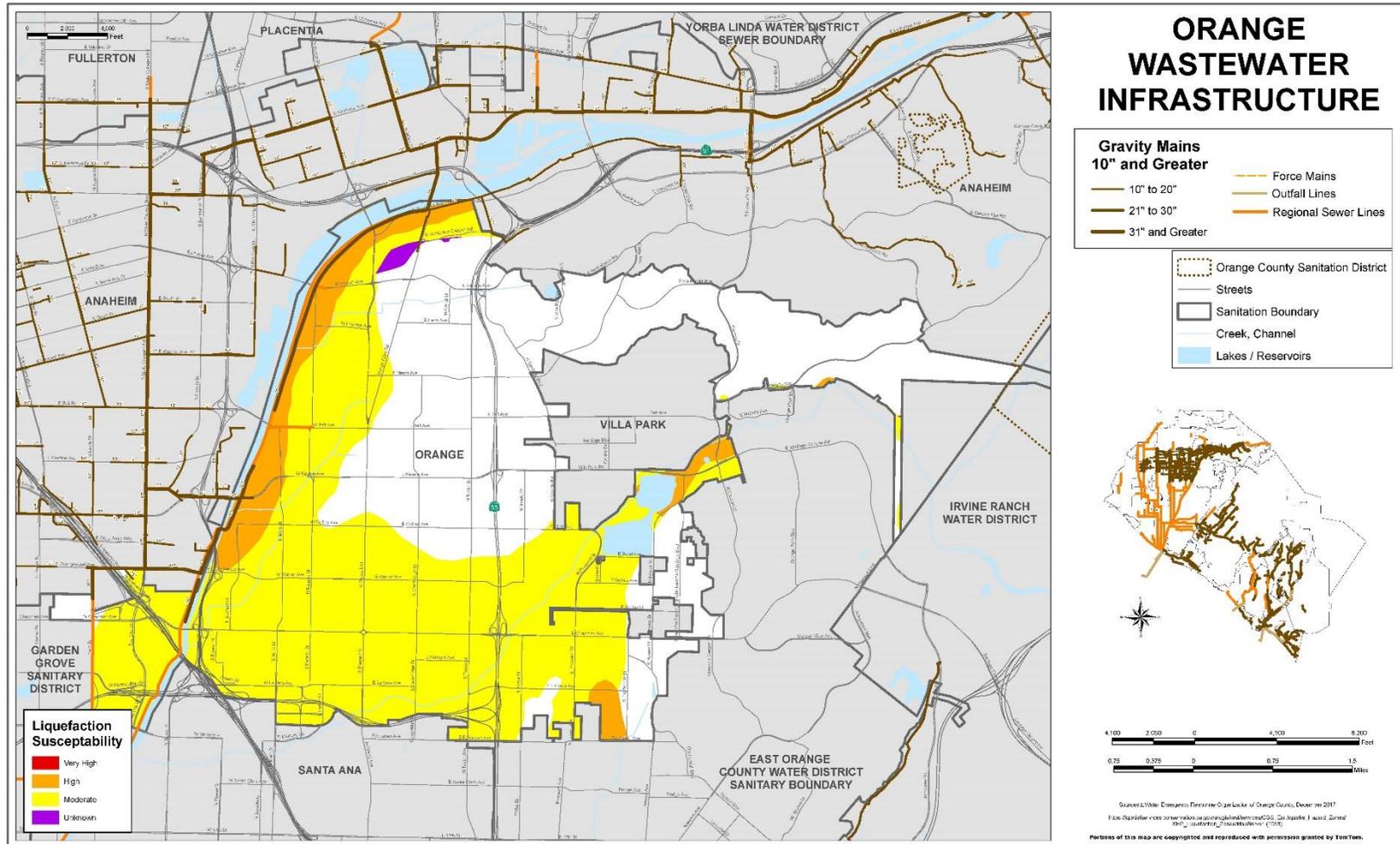
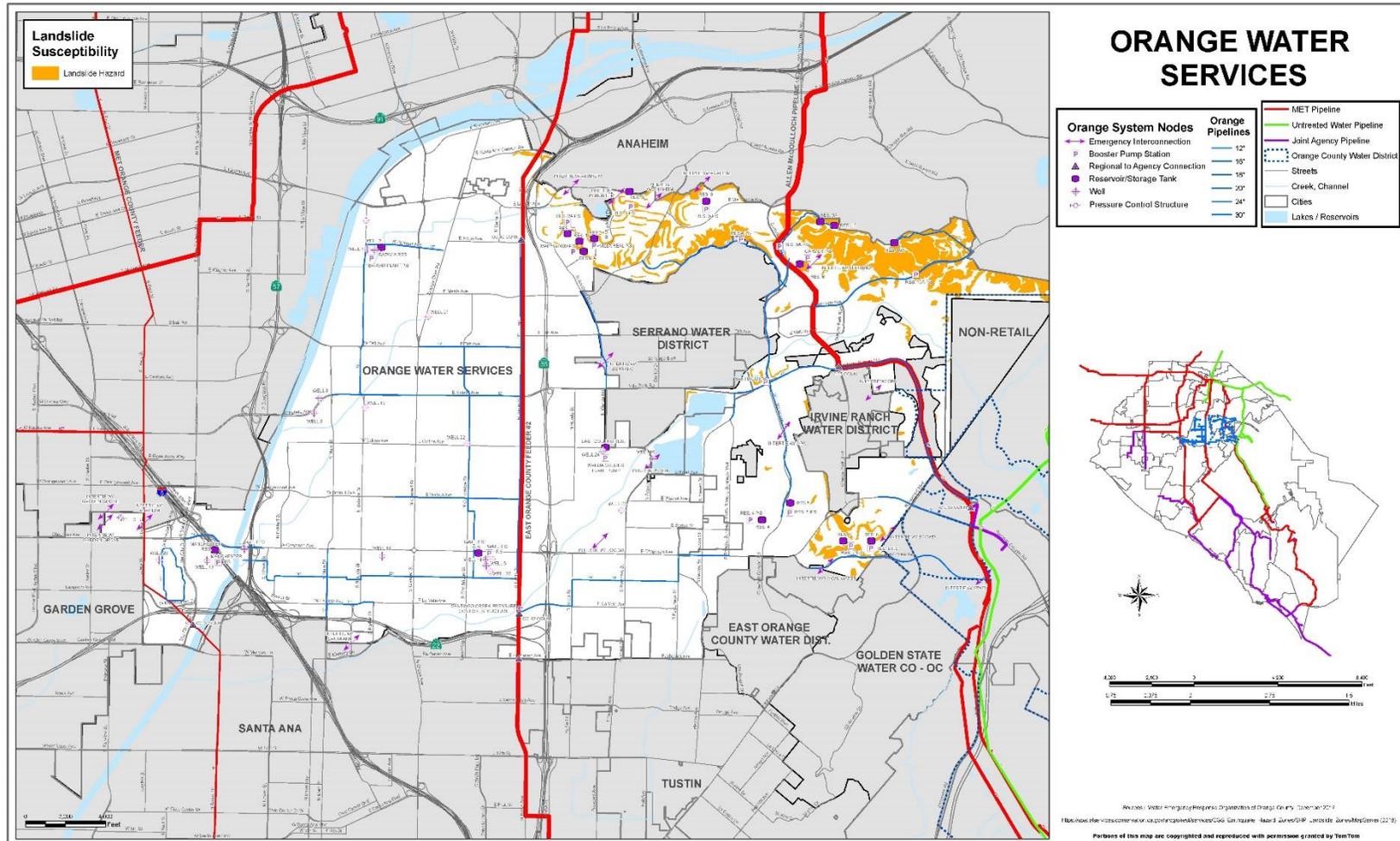


Figure M-9
Landslide and City of Orange Potable Water Infrastructure



VULNERABILITY AND RISK ASSESSMENT

Assets Susceptible to Hazard Events

Table M-2, Orange Infrastructure and Exposure to Hazards, identifies Orange’s water and wastewater infrastructure assets that are located within the mapped hazard zones, identified above.

**Table M-2
City of Orange Infrastructure and Exposure to Hazards**

Hazard		Infrastructure Type				
		Interties (#)	Pump Stations (#)	Reservoirs (#)	Wells (#)	Potable Pipeline (miles)
Fire Hazard Zone	Moderate	3	5	5	0	1.7
	High	0	0	0	0	3.2
	Very High	2	5	5	0	6.6
FEMA Flood Zone	100-Year	0	0	0	0	0.7
	500-Year	2	0	0	10	1.3
Alquist-Priolo Rupture Zone		0	0	0	0	0
Ground Shaking	Moderate	9	2	3	0	0.8
	High	11	9	8	11	0.0
	Extreme	5	5	7	5	28.5
Liquefaction	Moderate	3	4	4	13	13.7
	High	9	0	0	5	1.0
	Very High	0	0	0	0	0
	Unknown	0	0	0	0	0.1
Landslide Zone		3	5	5	0	1.8

The City has several facilities located within moderate and very high fire hazard zones, as well as within areas identified at risk for the 500-year flood and areas subject to landslides. The majority of the City, and its potable water and wastewater infrastructure are located within areas identified as having high and extreme risk of ground shaking in the event of an earthquake. Several facilities and miles of pipeline are also located with areas identified as having moderate and high risk of liquefaction.

CAPABILITIES ASSESSMENT

The capabilities assessment is designed to identify existing local agencies, personnel, planning tools, public policy and programs, technology, and funds that have the capability to support hazard mitigation activities and strategies outlined in this Plan. Orange’s internal development team revised the capabilities identified in the 2012 plan and collaborated to identify current local capabilities and mechanisms available to the MA for reducing damage from future hazard events. Tables M-3a through M-3d assess the authorities, policies, programs, and resources that the jurisdiction has in place that are available to help with the long-term reduction of risk through mitigation. These capabilities include planning and regulatory tools,

administrative and technical resources, financial resources, and education and outreach programs. The agency has the ability to create or expand existing policies and programs to implement mitigation programs.

**Table M-3a
Planning and Regulatory Capabilities Summary**

Ordinance, Plan, Policy, Program	Responsible Agency or Department	Description/Comments
Building Code	Fire Department, City of Orange	Regulates construction standards and ensures enforcement of City's adopted standards. The City adheres to both the State and City building code.
Zoning Ordinance	Planning Department, City of Orange	Controls land use to protect public health, welfare and safety. Through the zoning code, the City controls and limits the type and density of development.
Subdivision Ordinance or Regulations	Planning Department, City of Orange	Regulates the development of housing, commercial, industrial, and other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development.
Special Purpose Ordinance	Regional Water Quality Control Board, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife	Complies with the applicable ordinances and regulation.
Growth Management Ordinances	Planning Department, City of Orange	Complies with the applicable General Plans, and works with the cities within the District service area.
Site Plan Review Requirements	Planning Department, City of Orange	Complies with the applicable General Plans, and works with the cities within the District service area.
General Plan	Planning Department, City of Orange	Complies with the applicable General Plans, and works with the cities within the District service area.
Capital Improvements Plan	Finance Department, City of Orange	Guides the scheduling of spending on Capital Improvement Projects (CIP), and serves a mechanism to guide future development.
Economic Development Plan	Finance Department, City of Orange	Complies with the applicable General Plans, and works with the cities within the District service area.
Emergency Response Plan	Fire Department, City of Orange	Complies with the applicable General Plans, and works with the cities within the District service area.
Post-Disaster Recovery Plan	Fire Department, City of Orange	Complies with the applicable General Plans, and works with the cities within the District service area.
Post-Disaster Recovery Ordinance	FEMA/State	Complies with Federal and State regulations.
How can these capabilities be expanded and improved to reduce risk?		
<p>Conduct a Risk and Resilience Assessment (RRA) and corresponding Emergency Response Plan (ERP) per the America's Water Infrastructure Act of 2018 (AWIA). Consider this plan as a resource to meet the AWIA requirements.</p> <p>Conduct disaster response fuel analysis and contingency planning with WEROC as a component of the CA Southern California Catastrophic Plan.</p> <p>Evaluate ability to contract with local fuel distributors and gas stations for emergency backup supply.</p> <p>Incorporate hazard information into the next General Plan Update.</p> <p>Implement a process to ensure mitigation actions identified in the hazard mitigation plan are reviewed as part of the update to the Capital Improvements Program, Water Master Plan and Emergency Operations Plan.</p>		

**Table M-3b
Administrative and Technical Capabilities Summary**

Staff/Personnel or Type of Resource	Responsible Agency or Department	Description/Comments
Planner(s) or Engineer(s) with Knowledge of Land Development and Land Management Practices	Public Works/City Engineer; City of Orange	Environmental Planners with expertise in land development practices. Collaborate with Engineering and cities to comply with all requirements.
Engineer(s) or Professional(s) Trained in Construction Practices Related to Buildings and/or Infrastructure	Public Works/City Engineer; City of Orange	Licensed Civil Engineers and certified building evaluators (Safety Assessment Program certified by Cal OES).
Planners or Engineer(s) with an Understanding of Natural and/or Human - Caused Hazards	Public Works/City Engineer; City of Orange	Planners with expertise in hazard identification.
Floodplain manager	Orange County Flood Control District	Work with the county floodplain manager.
Personnel Skilled in GIS and/or HAZUS	Public Works; City of Orange	City employs GIS expert.
Emergency Manager	City Manager; City of Orange	Work with the City Emergency Manager.
Grant Writers	City Manager; City of Orange	Work with the city to identify federal and state grants.
Water Quality Lab	Public Works, Water Division; City of Orange	Internal Lab.
How can these capabilities be expanded and improved to reduce risk?		
<p>Evaluate participation in MWDOC Water Loss Control Program, including meter testing and leak detection through training of internal staff or through MWDOC's Choice program.</p> <p>Have all agency registered engineers and other qualified individuals attend CalOES Safety Assessment Program (SAP) training for building inspections.</p> <p>Coordinate with department managers to regularly review the HMP and progress towards implementation.</p> <p>Identify information that should be included in future updates.</p>		

**Table M-3c
Financial Capabilities Summary**

Financial Resources	Agency or Department
Community Development Block Grants (CDBG)	Finance Department; City of Orange
Capital Improvements Project Funding	Finance Department; City of Orange
Authority to Levy Taxes for Specific Purposes	Finance Department; City of Orange
Fees for Water, Sewer, Gas, or Electric Service	Public Works; City of Orange
Impact Fees for Homebuyers or Developers for New Developments/Homes	Finance Department; City of Orange
Incur Debt Through General Obligation Bonds	Finance Department; City of Orange
Incur Debt Through Private Activity Bonds	Finance Department; City of Orange
How can these capabilities be expanded and improved to reduce risk?	
<p>Learn about how to utilize post disaster mitigation grants (Section 406) and incorporate it into the utility's disaster recovery strategy.</p> <p>Coordinate with other departments, organizations, and agencies to identify potential assets and resources that may not currently be considered.</p>	

**Table M-3d
Education and Outreach Capability Summary**

Resource/Programs	Agency or Department	Description/Comments
Community Emergency Preparedness	City Manager; City of Orange	Residents are encouraged to visit Ready.gov for information on how to prepare for emergencies.
Community Emergency Response Team	Police Department; City of Orange	The Orange Police Department, in collaboration with the Orange Fire Department, offers the Community Emergency Response Team (CERT) training. CERT is about readiness, people helping people, rescuer safety and doing the greatest good for the greatest number of people.
Emergency Alert System	Police Department; City of Orange	Residents are encouraged to sign up for emergency alerts with the City.
AlertOC	County of Orange	Residents are encouraged to sign up for emergency alerts with the City.
How can these capabilities be expanded and improved to reduce risk?		
Participate in WEROC lead efforts to develop standardized messaging for water outages, dam events and general disaster response. Ensure that messaging will work for the general community, as well as the Access, Disability, and Functional Needs community specific to our utility. Work with other organizations, such as the Red Cross, to identify educational resources available to the public and opportunities to provide the information to the community. Identify a variety of opportunities to provide hazard information to the community and ways they can minimize impacts associated with a disaster event.		

MITIGATION STRATEGY

Mitigation Goals

Orange adopts the hazard mitigation goals developed by the Planning Team; refer to Section 4.

Mitigation Actions

The internal development team reviewed the mitigation actions identified in the 2012 plan and the updated risk assessment to determine if the mitigation actions were completed, require modification, should be removed because they are no longer relevant, and/or should remain in the Plan Update. New mitigation actions to address the updated risk assessment and capabilities identified above were also considered and added. Table M-4, Orange Mitigation Actions, identifies the mitigation actions, including the priority, hazard addressed, risk, timeframe, and potential funding sources.

**Table M-4
Orange Mitigation Actions**

Priority (High, Medium, or Low)	Action/Task/ Project Description	Location/ Facility	Hazard	Risk (High, Medium, or Low)	Cost	Responsible	Timeframe (Immediate, Short Term, or Long Term)	Possible Funding Sources	Status/ Progress (New, Existing, Modified, Removed, Complete)	Status Rationale
Medium	Continuous monitoring of hazard sensitive areas.	Reservoir 2A	Multi-hazard	Medium	\$500K	Emergency Management	Immediate	CIP Budget	Ongoing	Daily site security checks. All Hazards
High	Propose improvement and retrofit for seismic protection.	All reservoir sites	Multi-hazard	Medium	\$1 M	Engineering	Long term	Dept. Budget	Ongoing	Have installed protection to storage structures and piping to various sites. Additional sites will be completed in the next years. All Hazards
Medium	Improve structural and connection of reservoirs and pump stations.	City wide	Multi-hazard	Low	Unknown	Operations	Long term	Dept. Budget	Ongoing	Protect and prevent major damage to facilities. All Hazards
Medium	Provide backup power for all well sites and pump stations.	All Well sites	Multi-hazard	Low	\$500K	Operations	Short term	CIP Budget	Ongoing	Generators have been installed at various critical locations. Currently analyzing the installation of generators at the remaining facilities. All Hazards
Medium	Increase storage capacity.	City wide	Multi-hazard	Medium	\$5M	Operations/ Engineering	Long term	CIP Budget	Ongoing	Work with stakeholders to determine to determine adequate locations for additional storage. All Hazards
Medium	Participate and coordinate with WEROC and other member agencies to improve vulnerability.	City wide	Multi-hazard	Low	Unknown	Emergency Management	Long term	Dept. Budget	Ongoing	Continue working with WEROC staff to strengthen preparedness and response efforts. All Hazards
High	Perform retrofitting for facilities in disaster prone areas.	City wide	Multi-hazard	Low	\$1 M	Operations/ Engineering	Long term	Dept. Budget	Ongoing	Have performed retrofit of critical infrastructure. Currently evaluating retrofit to administration building. All Hazards
Medium	Avoid building in high-risk areas.	City wide	Multi-hazard	Medium	Unknown	Engineering	Long term	Dept. Budget	Ongoing	Work with City of Orange and WEROC to ensure new construction is built in low risk hazard zones. All Hazards
Medium	Install camera and wireless communication at all facilities.	All Sites	Man made	Low	\$100K	Operations	Long term	CIP Budget	Ongoing	Installed camera and wireless communication s to most sites. Additional sites will be completed. Human Cause Hazard

**Table M-4 [continued]
Orange Mitigation Actions**

Priority (High, Medium, or Low)	Action/Task/Project Description	Location/Facility	Hazard	Risk (High, Medium, or Low)	Cost	Responsible	Timeframe (Immediate, Short Term, or Long Term)	Possible Funding Sources	Status/Progress (New, Existing, Modified, Removed, Complete)	Status Rationale
High	Continue with backflow prevention program.	City wide	Man made	Medium	\$1 M	Public Affairs	Long term	Dept. Budget	Ongoing	Installed backflow prevention devices. Continually monitoring devices and recertifying users. Human Cause Hazard

Notes:
Timeframe to Completion of Project: "Immediate" is up to 1 year; "Short Term" is 1 to 3 years; "Long Term" is 3 years or longer.
Status: "New" refers to a mitigation initiative newly created as part of the plan update process; "Existing" refers to an unfinished initiative that is carried over from the 2012 plan; "Modified" refers to an existing initiative that carried over from the previous plan, but has changed to limit or expand its scope of activities.
Status Rationale: A statement of justification as to why the project is currently in the status it is in.

Completed or Removed Mitigation Initiatives

The following mitigation actions from the 2012 plan have been completed or are in progress and therefore are removed from the Plan update.

Mitigation: Improve site fencing per Vulnerability Assessment Studies recommendation.

Status: Installed fencing to all sites.

Mitigation: Secure above ground assets at all facilities.

Status: Similar to other mitigation item. Removed

Mitigation: Prepare the Asset Management plan, which includes and takes into consideration Economic and financial impacts to Orange.

Status: Staffing, prioritize, and funding shortage has hindered its completion. Removed

PLAN INTEGRATION

Orange's General Plan, Capital Improvement Plan, Municipal Code, Water Master Plan, Wastewater Master Plan, and Emergency Operations Plan are all used to implement mitigation initiatives identified in this annex. After adoption of the HMP, the City will continue to integrate mitigation priorities into these documents.

Since the previous Plan Update, Orange incorporated information from the HMP in its CIP, in addition to the following planning mechanisms:

- The risk assessment and mitigation actions were used to inform the City's Water Master Plan and Urban Water Management Plan.
- Mitigation actions were incorporated into the CIP.

NATIONAL FLOOD INSURANCE PROGRAM

The National Flood Insurance Program (NFIP) was created by the U.S. Congress in 1968. Although a community's participation in the NFIP is voluntary, to receive assistance and funding from FEMA following a flood, the community must participate in the program. The City of Orange has participated in the NFIP since May 1, 1987 (City ID No. 060228) and intends to continue to participate in the NFIP. The City has adopted Flood Plain overlay districts (FP-1 and FP-2), which are applied to areas of the City subject to flooding. Development in the flood prone areas of the City is regulated in accordance with Section 17.28.040 – Flood Plain Overlay of the City's Municipal Code.

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