

# 2024



**Orange County Water and Wastewater  
Multi-Jurisdictional Hazard Mitigation Plan**

**Annex M: Trabuco Canyon Water District**



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## TRABUCO CANYON WATER DISTRICT ANNEX

Trabuco Canyon Water District (TCWD) is a participant (Member Agency [MA]) in the Orange County Water and Wastewater Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). As a participant MA, TCWD representatives were part of the MJHMP planning process and served on the planning team responsible for the plan update; refer to **Section 2** of the MJHMP. The base plan, including the MJHMP procedural requirements and planning process apply to TCWD.

This annex details the hazard mitigation planning elements specific to TCWD and describes how TCWD's risks vary from the planning area. This annex is not intended to be a standalone document but supplements the information contained in the base plan. All sections of the MJHMP, including the planning process and other procedural requirements, apply to and were met by TCWD. The base 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 TCWD with a focus on the risk assessment and mitigation strategies.

### M.1 HAZARD MITIGATION PLAN POINT OF CONTACT AND DEVELOPMENT TEAM

The representative listed in **Exhibit M-1** lead the TCWD planning team, attended meetings, and coordinated the hazard mitigation planning efforts with TCWD staff and the consultant team supporting the effort.

**Exhibit M-1. Planning Team Lead**

Primary Point of Contact
Name: Michael Perea
Title: Assistant General Manager
Telephone: (949) 858-0277
Email: mperea@tcwd.ca.gov

TCWD followed the planning process detailed in **Section 2** and formed an internal team to support and provide information for the plan update. The following staff served as TCWD's internal hazard mitigation planning development team.

**Exhibit M-2. Internal Hazard Mitigation Planning Development Team**

Name	Title
Lorrie Lausten	District Engineer
David Rodriguez	Engineering Support

Outreach to the public within TCWD's service area was performed to ensure residents could access information on this planning effort. To reach the largest number of people possible, TCWD maintains a dedicated webpage to the MJHMP update on its official website with a link to the public input online survey. TCWD used its social media platform outlets (X, Facebook, and Instagram) to communicate to the public, and specifically, its customers, regarding the MJHMP update efforts and the need for public input by the online survey in September and October 2024. Additionally, District staff agendized the MJHMP update process for review with the District's Engineering/Operational Committee and the Board of Directors at public meetings held at the Administration Facility in October 2024.

## M.2 JURISDICTION PROFILE

### *Service Population: 12,700*

TCWD is a county water district organized and operating pursuant to Section 30,000 and following of the Water Code of the State of California. TCWD was organized on February 26, 1962, under Division XII of the California Water Code. TCWD is governed by a five-member Board of Directors elected to alternating four-year terms at elections held every two years.

TCWD is located in the southeastern portion of Orange County at the foothills of the Santa Ana Mountains and encompasses approximately 9,100 acres. The terrain within TCWD is generally steep hills and canyons throughout the central area. The east and west sides consist of more gentle terrain made primarily of rolling hills. Elevations within TCWD range from approximately 900 feet above mean sea level in the lower Aliso Creek area and the southern area of Dove Canyon, to nearly 2,400 feet in the northeasterly portion adjacent to the Cleveland National Forest. In addition, TCWD owns, operates and maintains water and sewer facilities outside of its service area and these vary in elevation from 575 feet (ARWTL) to 950 feet (El Toro Road Trunk Sewer) above mean sea level.

TCWD serves a 2015 estimated population of 12,700 in the Cities of Rancho Santa Margarita, Mission Viejo, and Lake Forest, and unincorporated areas of Orange County in Trabuco Canyon.

TCWD provides water, wastewater, and recycled water service to major communities within the service area. TCWD sources of water supply are imported treated water, imported surface water treated at the TCWD treatment plant, and treated local groundwater. To provide reliability and redundancy, TCWD system is interconnected with adjacent utilities including Santa Margarita Water District, El Toro Water District, and Irvine Ranch Water District.

## M.3 HAZARDS

This section is intended to profile the hazards and assess the vulnerabilities that TCWD faces, distinct from that of the county-wide planning area. The hazard profiles in the MJHMP discuss overall impacts to the planning area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. For more information on risk assessment methodologies, see **Section 3**.

TCWD's service area is subject to most of the other hazards identified for the planning area. Many of these hazards are dispersed and may affect the entire region, including power outages, drought, seismic shaking, and windstorms. Based on the risk assessment, the TCWD development team discussed which hazards should or should not be profiled in the base plan. This discussion resulted in the identification of the following hazards that affect TCWD and summarized their probability of future occurrence, level of impact and significance as outlined in **Exhibit M-3**. Detailed hazard profiles for the planning area are provided in **Section 3** of the base plan.

**Exhibit M-3. Trabuco Canyon Hazard Identification**

Hazard Type	Occurrence Probability*	Affected Area*	Primary Impact*	Secondary Impact*	Hazard Planning Consideration*	Significance to Trabuco Canyon
Human-Caused Hazards: Power Outage	Highly Likely	Medium	Catastrophic	High	High	High
Wildfire	Highly Likely	Medium	Critical	High	High	High
Human-Caused Hazards: Terrorism (Cyber Threat)	Highly Likely	Medium	Critical	Limited	High	High
Seismic Hazards: Seismic Shaking	Likely	Medium	Catastrophic	High	High	High
Seismic Hazards: Seismic Liquefaction	Likely	Medium	Catastrophic	High	High	Low
Severe Weather: Windstorm	Highly Likely	Large	Limited	Negligible	Medium	High
Severe Weather: Extreme Heat	Likely	Medium	Critical	Moderate	Medium	Medium
Severe Weather: Drought	Highly Likely	Large	Negligible	Negligible	Medium	High
Dam/Reservoir Failure	Somewhat Likely	Medium	Catastrophic	High	Medium	High
Flood	Likely	Medium	Limited	Negligible	Medium	Medium
Coastal Hazards: Coastal Storms	Likely	Small	Limited	Limited	Medium	N/A
Coastal Hazards: Coastal Erosion	Likely	Isolated	Limited	Limited	Medium	N/A
Seismic Hazards: Fault Rupture	Somewhat Likely	Isolated	Catastrophic	Limited	Medium	Low
Geological Hazards: Landslide and Mudflow	Somewhat Likely	Small	Limited	Moderate	Medium	Medium
Coastal Hazards: Sea Level Rise	Likely	Isolated	Limited	Negligible	Medium	N/A
Human-Caused Hazards: Contamination/ Saltwater Intrusion	Unlikely	Small	Critical	High	Low	Medium
Human-Caused Hazards: Terrorism (MCI)	Unlikely	Isolated	Critical	Moderate	Low	Low
Human-Caused Hazards: Hazardous Materials	Unlikely	Isolated	Limited	Moderate	Low	Medium
Urban Fire	Unlikely	Isolated	Limited	Negligible	Low	Low
Geological Hazards: Land Subsidence	Unlikely	Isolated	Negligible	Limited	Low	Low
Geological Hazards: Expansive Soils	Unlikely	Isolated	Negligible	Limited	Low	Low
Coastal Hazards: Tsunami	Unlikely	Isolated	Negligible	Negligible	Low	N/A

\*The values within these columns are representative of the entire planning area of Orange County and are not narrowed down to TCWD's service area.

<b>Geographic Affected Area</b> <ul style="list-style-type: none"> <li>Isolated: Less than 10% of planning area</li> <li>Small: 10-30% of planning area</li> <li>Medium: 30-60% of planning area</li> <li>Large: 60-100% of planning area</li> </ul>	<b>Significance</b> <ul style="list-style-type: none"> <li>Low: Minimal potential impact</li> <li>Medium: Moderate potential impact</li> <li>High: Widespread potential impact</li> </ul>
<b>Probability of Future Occurrences</b> <ul style="list-style-type: none"> <li>Highly Likely: Near 100% chance of occurrence in next year or happens every year.</li> <li>Likely: Between 10 and 100% chance of occurrence in next year or has a recurrence interval of 10 years or less.</li> <li>Occasional: Between 1 and 10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.</li> <li>Unlikely: Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years</li> </ul>	<b>Magnitude/Severity</b> <ul style="list-style-type: none"> <li>Catastrophic: More than 50% of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths.</li> <li>Critical: 25-50% of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability.</li> <li>Limited: 10-25% of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable; does not result in permanent disability.</li> <li>Negligible: Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid</li> </ul>

The FEMA Local Mitigation Planning Handbook requires each agency to identify the magnitude/severity of each hazard to their infrastructure. The identification of hazards provided in **Exhibit M-3** is highly dependent on the location of facilities within each agency's 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 agency's expertise and knowledge. The table was created with input from the Water Emergency Response Organization of Orange County (WEROC), consultant staff, and TCWD.

## M.4 HAZARD MAPS

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

### Exhibit M-4. Fire Hazard and TCWD Potable Water Infrastructure

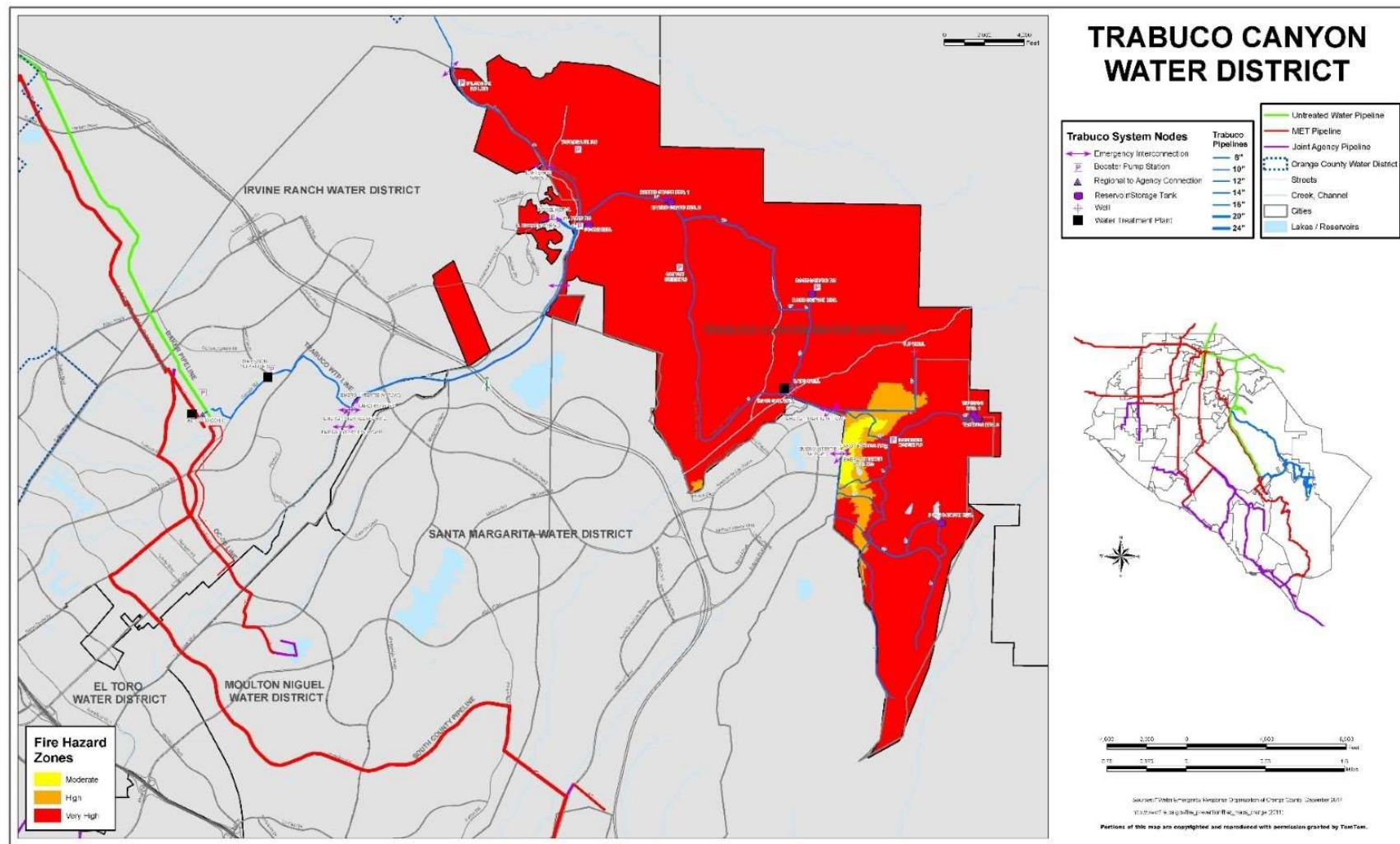


Exhibit M-5. Fire Hazard and TCWD Wastewater Infrastructure

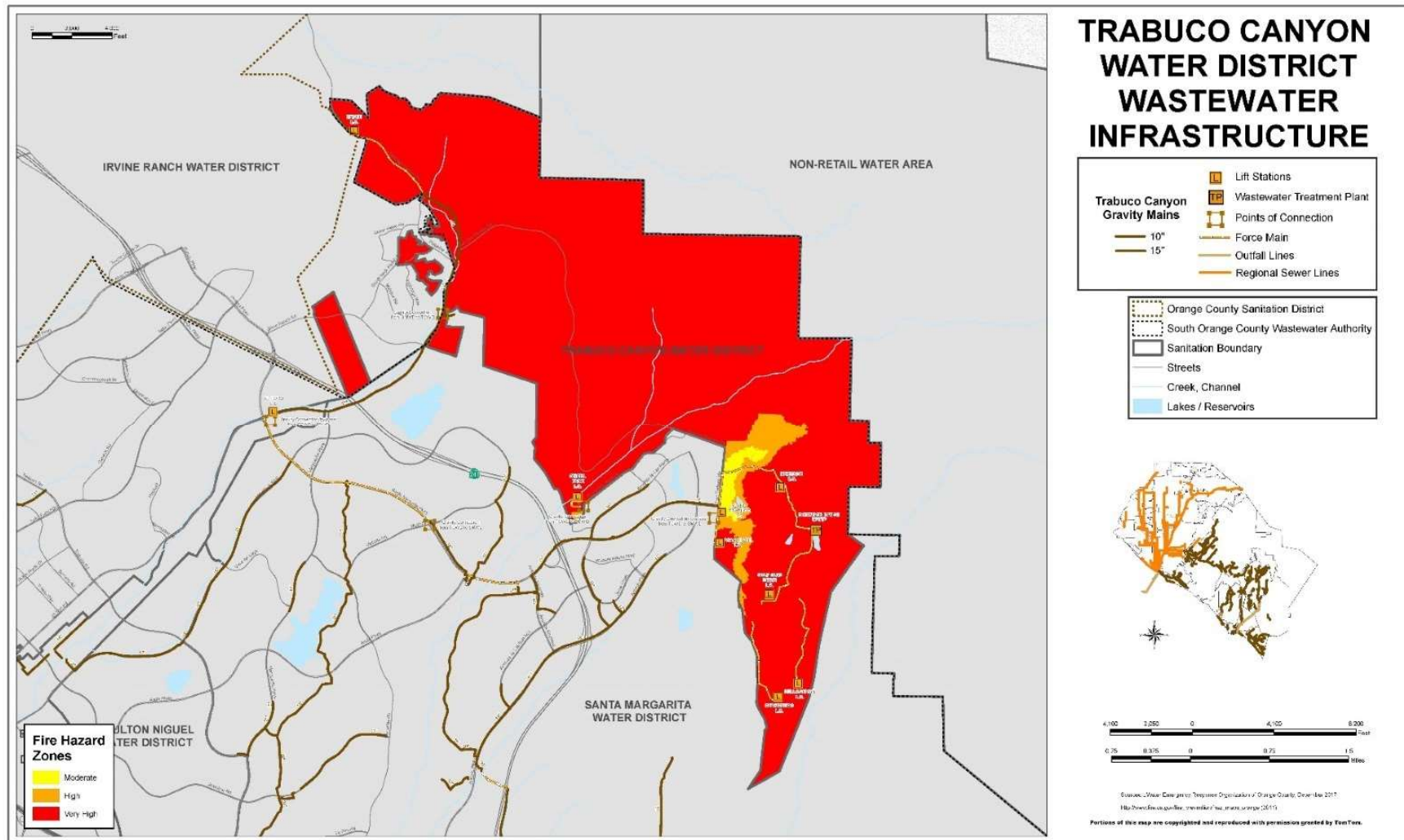




Exhibit M-7. Flood Hazard and TCWD Wastewater Infrastructure

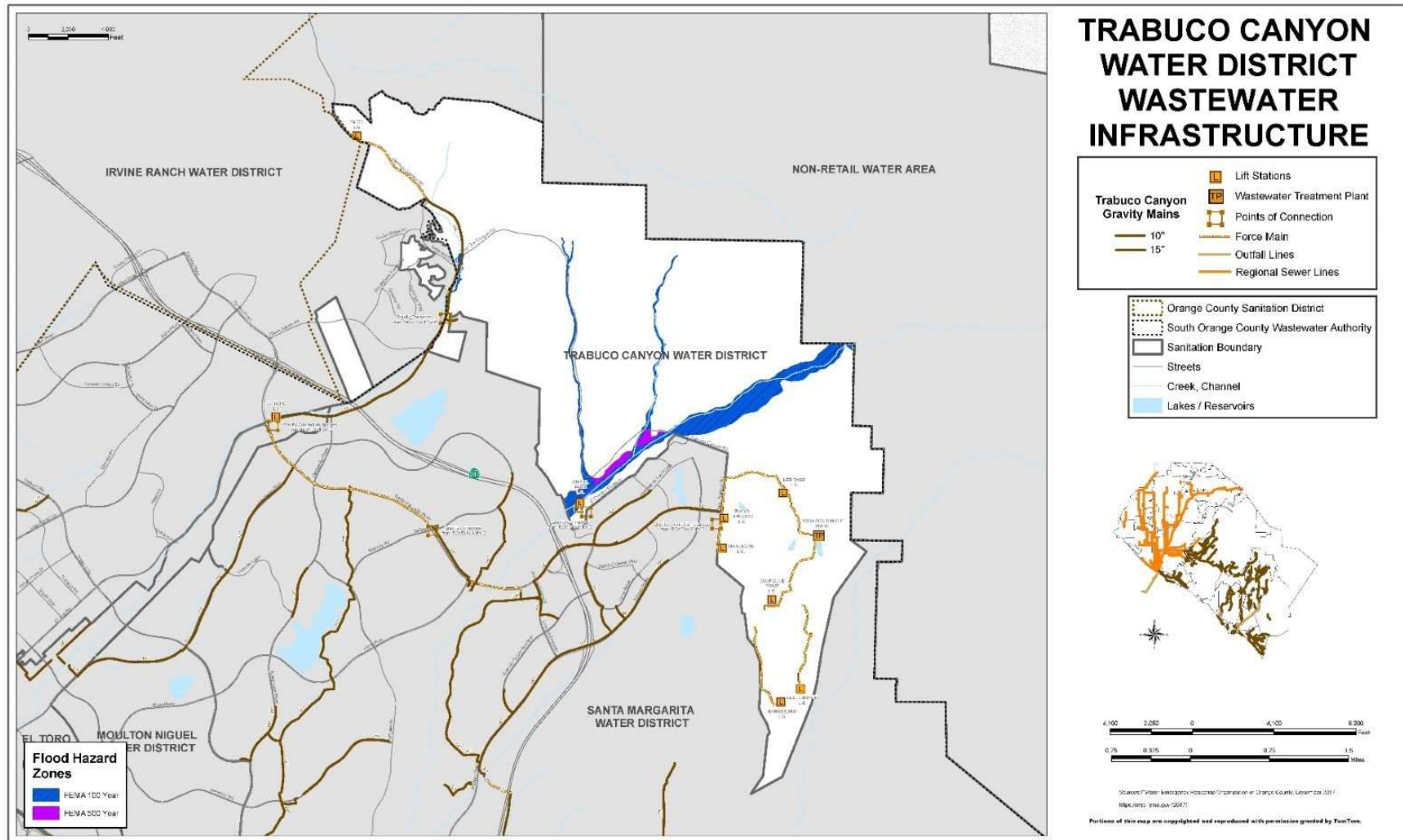


Exhibit M-8. Seismic Shaking Hazard and TCWD Potable Water Infrastructure

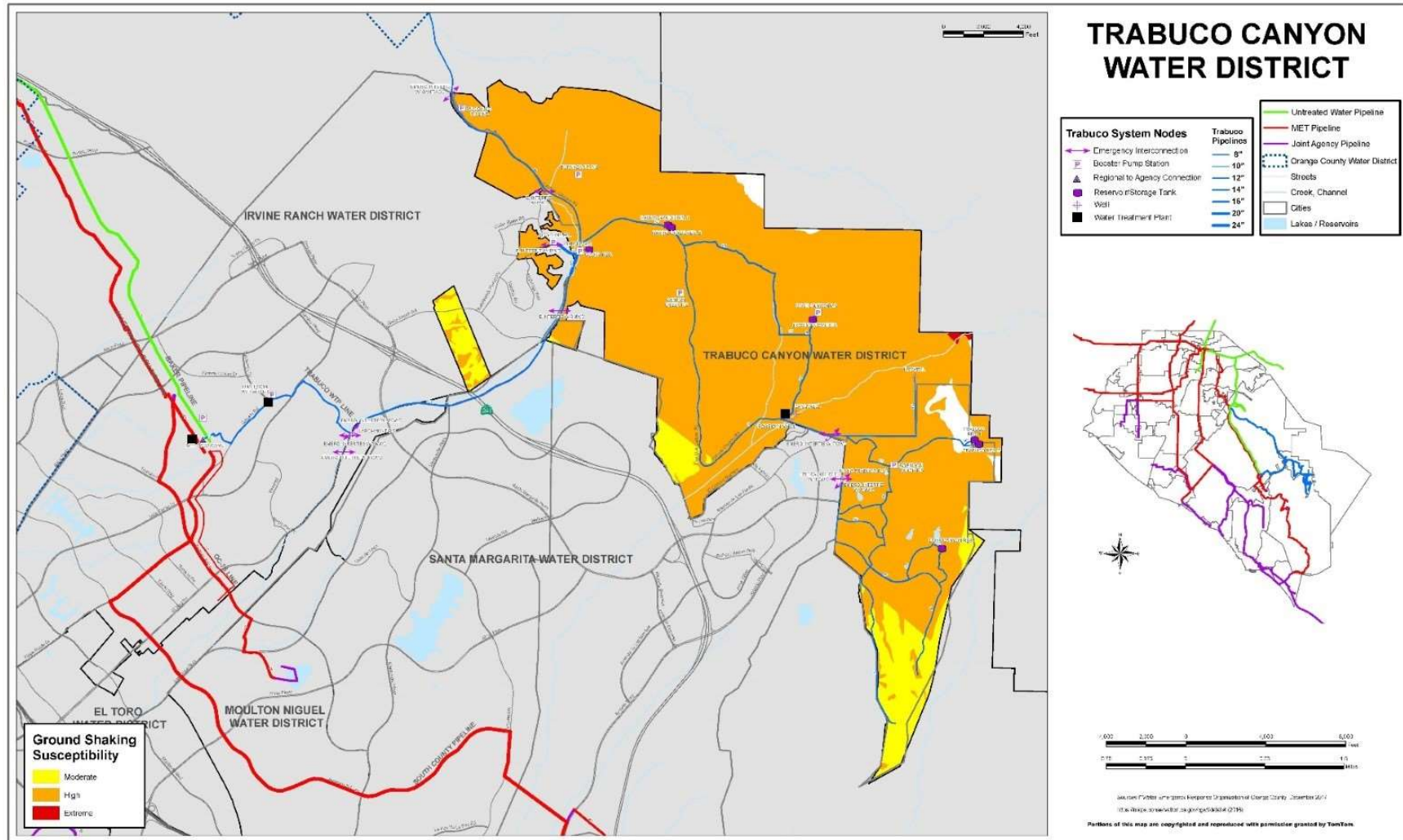
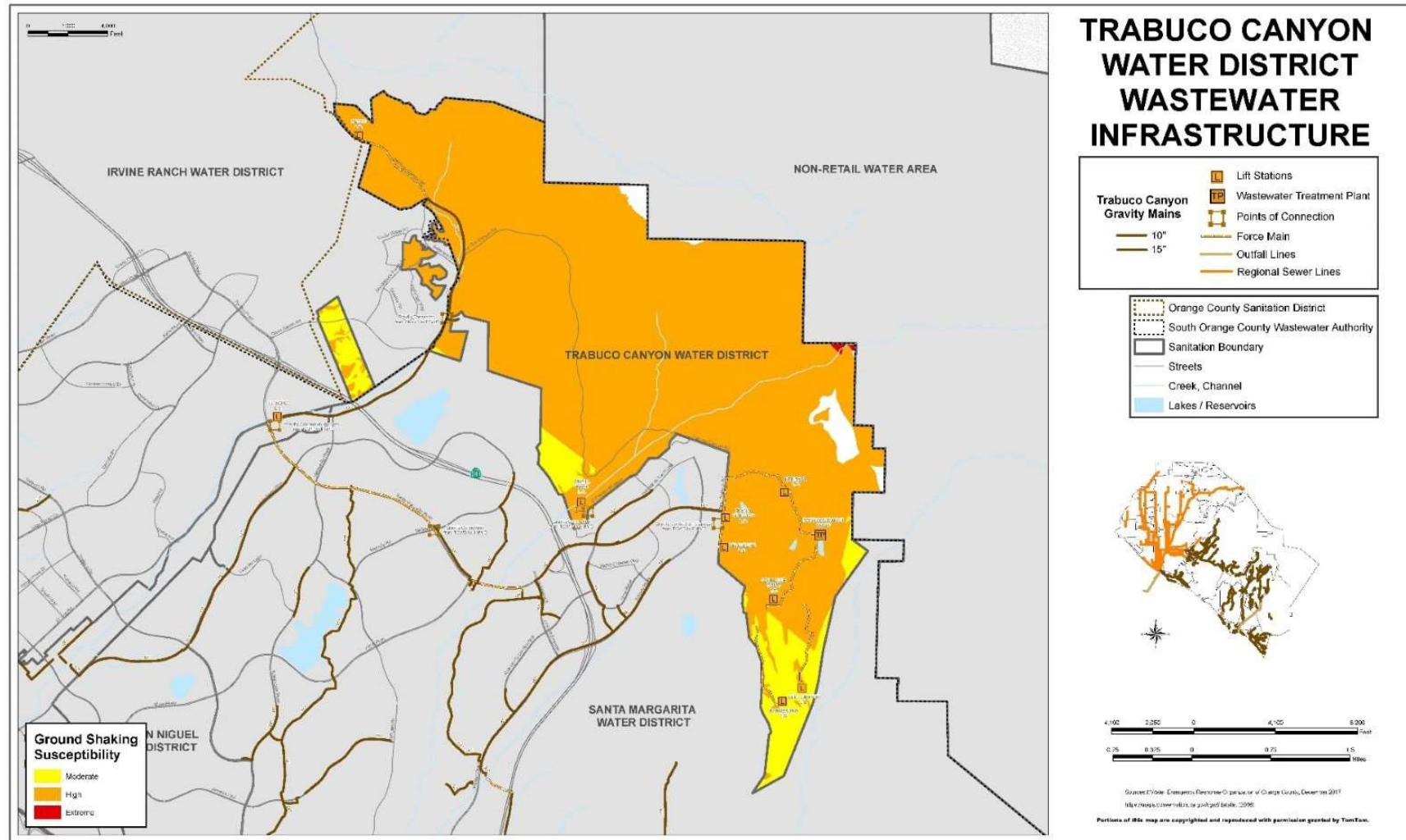


Exhibit M-9. Seismic Shaking and Trabuco Canyon Wastewater Infrastructure



### Exhibit M-10. Landslide Hazard and TCWD Potable Water Infrastructure

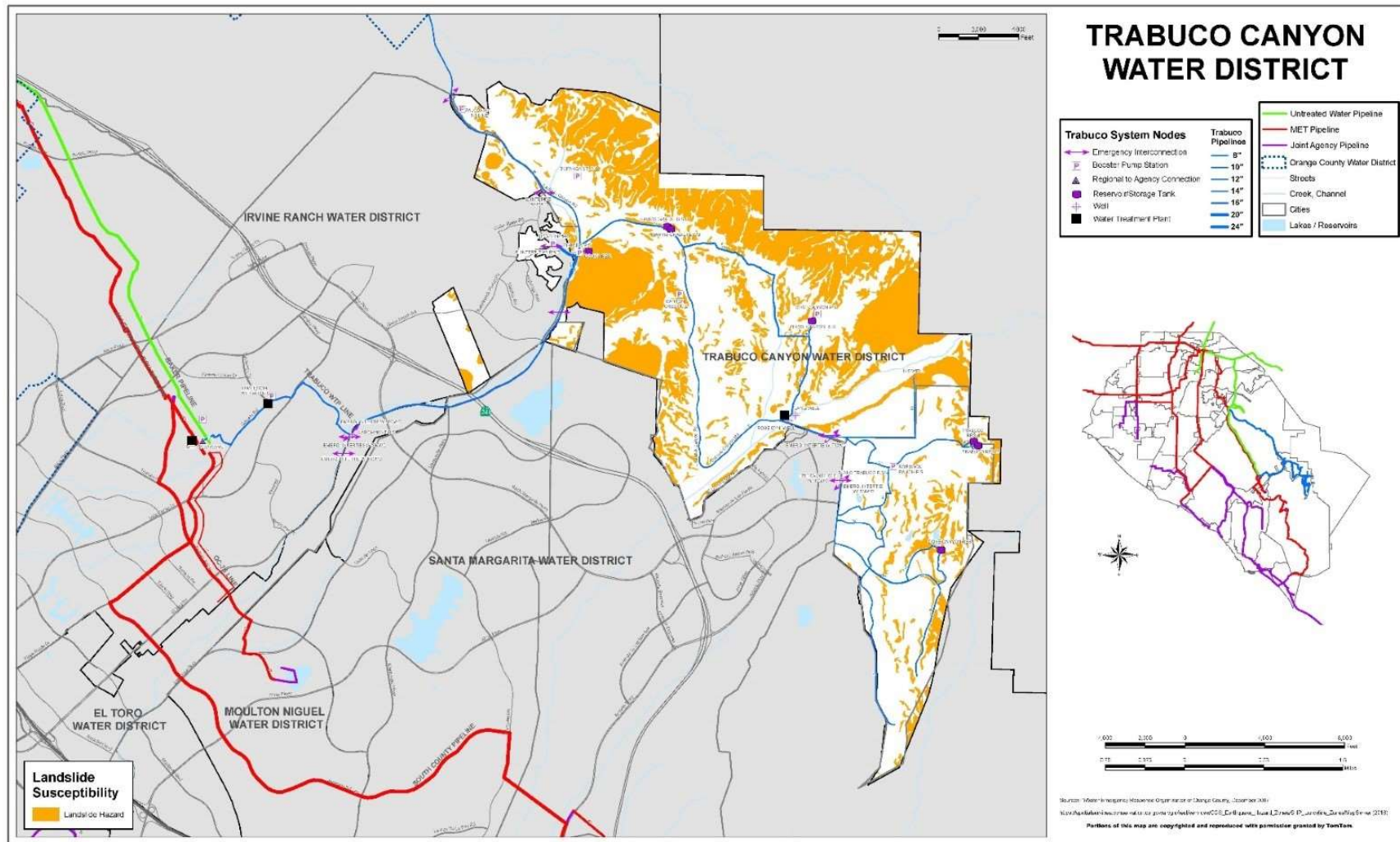


Exhibit M-11. Landslide Hazard and TCWD Wastewater Infrastructure

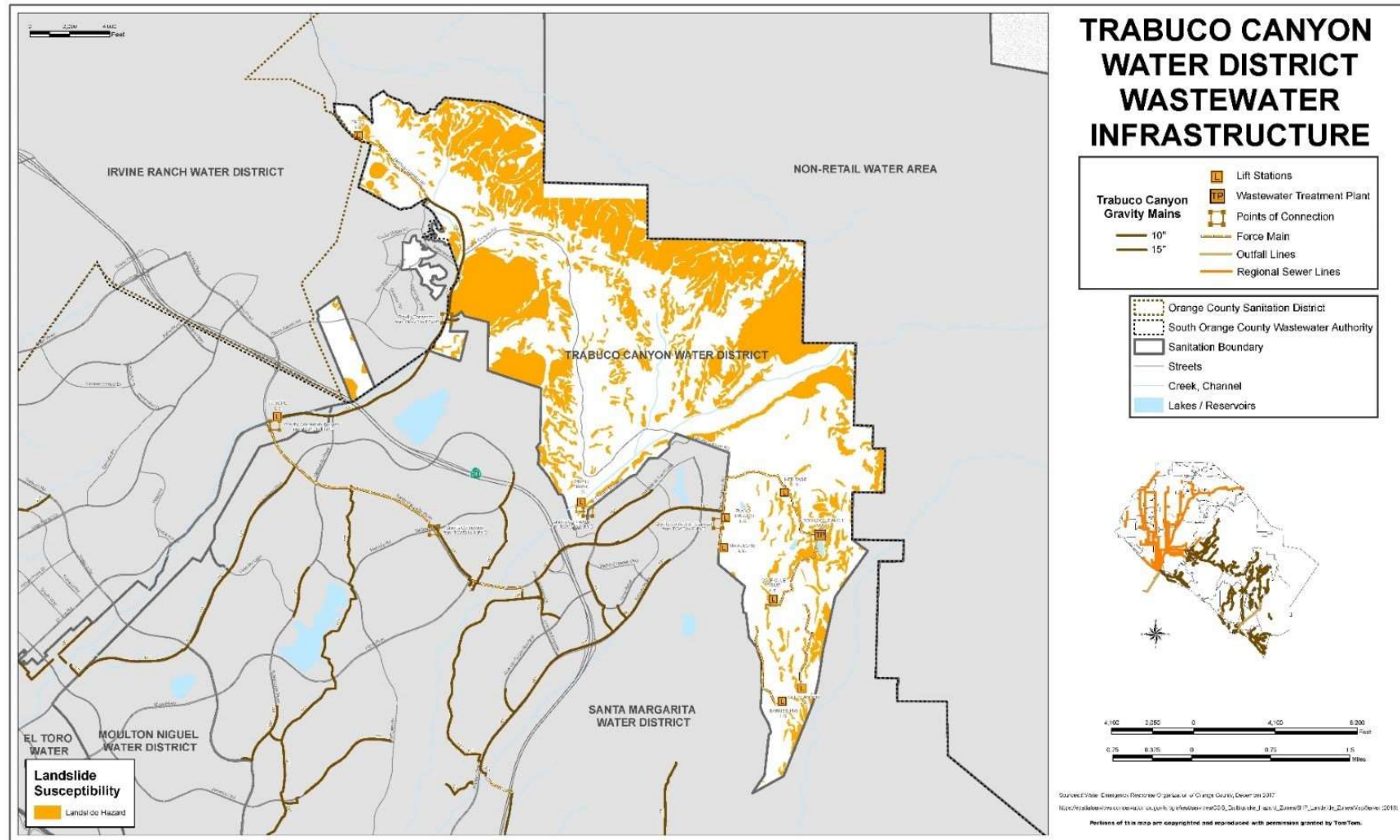


Exhibit M-12. Liquefaction Hazard and TCWD Potable Water Infrastructure

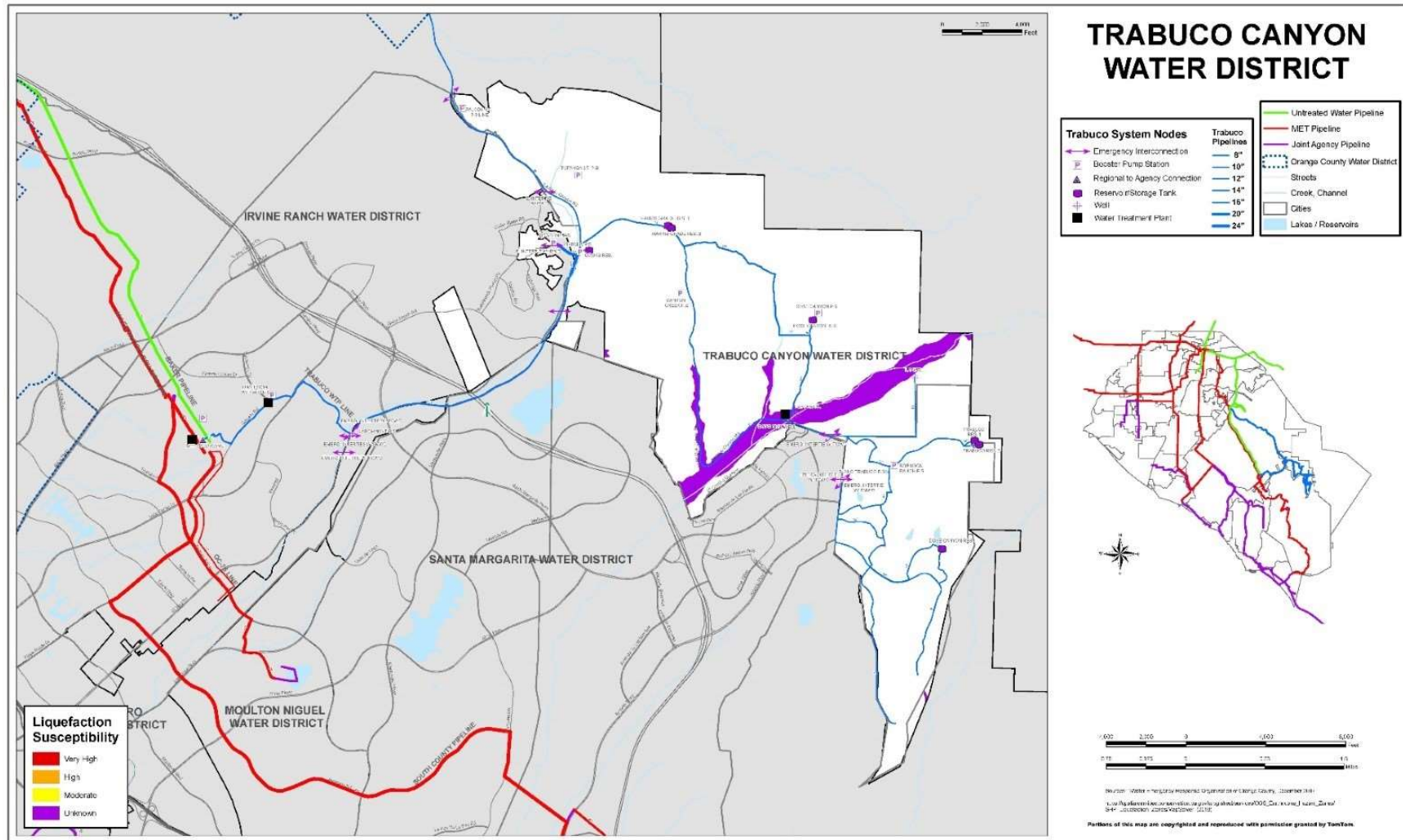
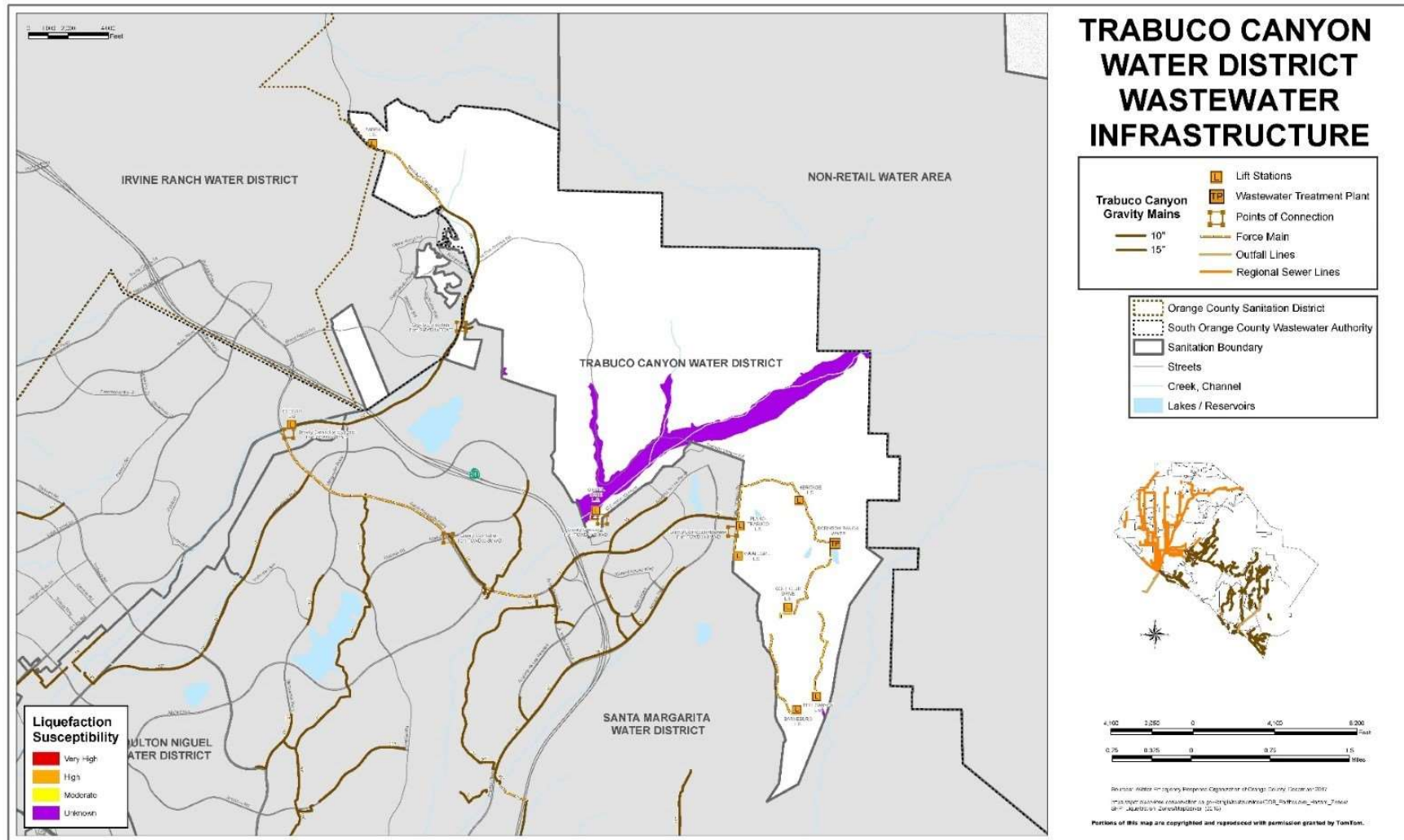


Exhibit M-13. Liquefaction Hazard and TCWD Wastewater Infrastructure



## M.5 VULNERABILITY AND RISK ASSESSMENT

Assessing vulnerabilities shows the unique characteristics of individual hazards and begins the process of narrowing down locations within TCWD's service area that are vulnerable to specific hazard events. The vulnerability assessment considered unique local knowledge of hazards and impacts and a GIS overlaying method for examining such vulnerabilities more in depth. Using these methods vulnerable populations, infrastructure, and potential losses from hazards can be estimated.

### *Assets Susceptible to Hazard Events*

TCWD's infrastructure is outlined in **Exhibit M-14**, which lists the number of TCWD's infrastructure assets are located within the mapped hazard zones identified above.

**Exhibit M-14. TCWD Infrastructure and Exposure to Hazards**

Hazard		Infrastructure Type							
		Interries (#)	Pump Stations (#)	Reservoirs (#)	Wells (#)	Treatment Plants (#)	Lift Stations (#)	Potable Pipelines (miles)	Wastewater Pipelines (miles)
<b>Fire Hazard Zone</b>	Moderate	2	1	0	0	0	2	1.2	0
	High	0	0	0	0	1	0	2.8	0
	Very High	6	7	8	3	1	7	13.4	3.5
<b>FEMA Flood Zone</b>	100-Year	0	0	0	2	0	1	0.5	0.2
	500-Year	0	0	0	0	1	0	0	0
<b>Alquist-Priolo Rupture Zone</b>		0	0	0	0	0	0	0	0
<b>Seismic Shaking</b>	Moderate	0	0	0	0	0	2	0.6	0.1
	High	8	10	7	2	2	6	16.5	3.4
	Extreme	0	1	1	0	0	0	0	0
<b>Liquefaction</b>	Moderate	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0
	Very High	0	0	0	0	0	0	0	0
	Unknown	1	2	0	3	1	1	2.0	0.5
<b>Landslide Zone</b>		0	2	5	0	0	5	1.2	0.5
<b>Tsunami Zone</b>		0	1	1	0	0	0	0	0

Much of TCWD's service area and its associated infrastructure are located in very high fire hazard areas and high seismic shaking hazard areas. Several reservoirs and lift stations are located within landslide hazard areas. Additionally, TCWD does not contain infrastructure or pipelines in the Alquist-Priolo Rupture Zone nor in the tsunami zone except for the new Saddlecrest location.

### *Changes in Land Use and Development*

TCWD serves eight communities across 7,000 plus acres that consist mostly of residential and open space land use. Approximately 56% of the service area is residential housing, with high, medium, and low-income families living in the communities. Within these communities, there are currently over 40 development projects that are anticipated to generate an additional 1.3 MGD of average daily demand by 2035. To ensure the ability to serve all customers, TCWD has a variety of projects ongoing and planned to increase service capacity. Projects on the potable water system

such as improvements at the Dimension Water Treatment Plant, upgrades to Plano Trabuco Pump Station, pipeline replacements, and the creation of a new 1.5 MG reservoir are anticipated to help meet the new drinking water demand. Within the wastewater system, TCWD is performing upgrades to lift stations across the service area and improvements to the Robinson Ranch Wastewater Treatment Plant.

### ***Vulnerabilities Associated with Climate Change***

<b>Hazard</b>	<b>Climate Change Vulnerabilities</b>
<b>Hazards of High Concern</b>	
<b>Dam/Reservoir Failure</b>	There are no expected climate change impacts on dam/reservoir failure. However, fluctuations in the amount of precipitation and intensity of events could cause stress on dam/reservoir facilities not previously anticipated during initial design. These types of issues could increase the vulnerability of these facilities, which is described in the base plan.
<b>Human-Caused Hazard: Power Outage</b>	Climate change will likely increase TCWD's vulnerability to power outages as local electric companies implement protocols such as rolling blackouts or targeted shutoffs that may impact facilities located within areas such as the Dove Canyon and Bell Peak area.
<b>Human-Caused Hazards: Terrorism (Cyber Threat)</b>	Connections between climate change and cyber based terrorism have not been identified.
<b>Seismic Hazards: Seismic Shaking</b>	Climate change is not expected to cause any changes to the frequency or intensity of seismic shaking occurring within TCWD's service area.
<b>Severe Weather: Drought</b>	Droughts are expected to increase in length and frequency due to climate change and impact TCWD as described in the base plan.
<b>Severe Weather: Windstorm</b>	The challenges to TCWD from climate change's impacts on windstorms is expected to follow the impacts described in the base plan.
<b>Wildfire</b>	Climate change is expected to cause an increase in wildfires within TCWD's service area due to the high amount of urban-wildland interfaces and the proximity to the Trabuco Ranger District of the Cleveland National Forest.
<b>Hazards of Medium Concern</b>	
<b>Flood</b>	Climate change is expected to potentially cause some increased flooding within TCWD's service area, especially along the Tijeras Creek area.
<b>Geological Hazards: Landslide and Mudflow</b>	Climate change could indirectly affect the conditions for landslides within TCWD's service area as increased precipitation and storm intensities may cause more moisture-induced landslides.
<b>Human-Caused Hazards: Contamination/ Saltwater Intrusion</b>	Changes in contamination and saltwater intrusion vulnerability due to climate change are expected to follow the changes outlined in the base plan.
<b>Human-Caused Hazards: Hazardous Materials</b>	Climate change has the potential of increasing hazardous materials releases resulting from transportation crashes or damage to storage vessels.
<b>Severe Weather: Extreme Heat</b>	Temperatures are expected to increase due to climate change and impact TCWD's service area as described in the base plan.
<b>Hazards of Low Concern</b>	
<b>Geological Hazards: Expansive Soils</b>	The impacts to expansive soils within TCWD's service area are anticipated to be as described in the base plan.
<b>Geological Hazards: Land Subsidence</b>	TCWD's vulnerability to land subsidence is not expected to change due to climate change and is anticipated to be similar to those described in the base plan.

Hazard	Climate Change Vulnerabilities
<b>Human-Caused Hazards: Terrorism (MCI)</b>	Climate change has no direct link to human-caused hazards and is expected to follow the impacts described in the base plan.
<b>Seismic Hazards: Fault Rupture</b>	There are no expected changes to the frequency or intensity of fault ruptures occurring within Trabuco Canyon’s service area as a result of climate change.
<b>Seismic Hazards: Seismic Liquefaction</b>	Climate change is anticipated to impact liquefaction potential within the TCWD service area as periods of both intense rain and drought could potentially increase or decrease groundwater elevations affecting the risk of liquefaction, depending on the circumstances.
<b>Urban Fire</b>	There is no anticipated impact to how climate change could influence the ignition or behavior of urban fires.

## M.6 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 MJHMP. TCWD’s internal development team revised the capabilities identified in the 2019 plan and collaborated to identify current local capabilities and mechanisms available to the MA for reducing damage from future hazard events. **Exhibits M-15a through M-15d** 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. TCWD has the ability to expand on and improve existing emergency management policies and programs to implement mitigation programs. In some instances, methods of expansion and improvement have been identified within a specific capability, while a majority of these capabilities are anticipated to be expanded and improved upon through additional projects/initiatives underway by the Agency. These have been included at the bottom of each table.

**Exhibit M-15a. Planning and Regulatory Capabilities Summary**

Ordinance, Plan, Policy, Program	Responsible Agency or Department	Description/Comments
Building Code	Local Cities, CA Division of Dams, OCFA, AQMD	TCWD complies with applicable building codes and works with public agencies in the service area. <b>Expansion and Improvement:</b> As retrofits and replacement projects are identified TCWD will anticipate meeting or exceeding the latest building codes to ensure greater resilience is incorporated into their infrastructure.
Zoning Ordinance	County of Orange, City of Rancho Santa Margarita, City of Lake Forest, City of Mission Viejo	TCWD complies with applicable zoning ordinances and works with public agencies in the service area.
Subdivision Ordinance or Regulations	Local cities, County of Orange	TCWD complies with applicable subdivision ordinances or regulations and works with public agencies in the service area.

Ordinance, Plan, Policy, Program	Responsible Agency or Department	Description/Comments
Special Purpose Ordinance	County of Orange, Army Corps of Engineers, USFWS/CDFG	TCWD complies with applicable special purpose ordinances and works with the cities within the service area.
Growth Management Ordinances	Local cities, County of Orange, Foothill Specific Plan, LAFCO	TCWD complies with applicable growth management ordinances and works with the public agencies in the service area. <b>Expansion and Improvement:</b> Growth management ordinances need to take into account water needs and available supplies for existing and future populations. Working closely with the Cities and County in the region, SCWD can help better understand how growth management ordinances could impact these resources.
Site Plan Review Requirements	Local Cities, County of Orange, Orange County Fire Authority, CA Legislative Bills and Propositions	TCWD complies with applicable site plan review requirements and works with public agencies within the service area. <b>Expansion and Improvement:</b> Developing better methods and techniques to support site plan reviews within Orange County can help ensure adequate planning, design, and engineering analysis is available to Cities and the County when new subdivisions are proposed.
General Plans	TCWD Master Plan	TCWD Master Plan outlines the current and future conditions and complies with applicable General Plans for cities within the service area.
Capital Improvements Plan	TCWD CIP	TCWD develops a 10-year CIP for water, wastewater, and recycled water. <b>Expansion and Improvement:</b> Incorporation of mitigation strategies into the CIP can help support future funding of improvements necessary to enhance water/wastewater systems.
Emergency Response Plan	CDHP, SEMS, NIMS, WEROC, MET	The district works with local agencies and WEROC for emergency response. <b>Expansion and Improvement:</b> Continued improvement and enhancement of emergency response plans can help ensure TCW is better prepared for future incidents and can anticipate their communities' needs.
Disaster Recovery Plan	County of Orange	Adhere to County plan.
Post-Disaster Recovery Ordinance	Local cities, County of Orange, State of California, FEMA	Works with County on Post-Disaster Recovery Ordinance.
Water Discharge Requirements	RWQCB, SOCWA, EPA, County of Orange State Water Resources Control Board	Adhere to all Federal and State regulations.
Vulnerability Assessment	EPA, CA State Water Resources Control Board, Division of Drinking Water	The district works with State, local agencies to determine vulnerabilities.

Ordinance, Plan, Policy, Program	Responsible Agency or Department	Description/Comments
Urban Water Management Plan	TCWD	<p>The UWMP has been prepared consistent with the requirements under Water Code Sections 10610 through 10656 of the Urban Water Management Planning Act and is due to the California Department of Water Resources (DWR) by July 1, 2021.</p> <p><b>Expansion and Improvement:</b> Integration of future projects from UWMPs into Local Hazard Mitigation Plans can ensure both plans are supporting the necessary improvements needed to ensure future water supplies and minimize risks to hazards and disasters.</p>

**How can these capabilities be expanded and improved to reduce risk?**

- Update the 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.
- Conduct disaster response fuel analysis and contingency planning with WEROC as a component of the Southern California Catastrophic Plan.
- Evaluate ability to contract with local fuel distributors and gas stations for emergency backup supply.

**Exhibit M-15b. 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	Outside consultants in coordination with the Engineering Department	District staff utilizes an outside consultant with input from staff.
Engineer(s) or Professional(s) Trained in Construction Practices Related to Buildings and/or Infrastructure	Outside consultants in coordination with the Engineering Department	District staff utilizes an outside consultant with input from staff.
Planners or Engineer(s) with an Understanding of Natural and/or Human - Caused Hazards	Outside consultants in coordination with the Engineering Department	District staff utilizes an outside consultant with input from staff.
Staff with Education or Expertise to Assess the Community's Vulnerability to Hazards	County of Orange, Emergency Response Plan, Sheriff's Dept., OCFA	Work with the County and local agencies to assess vulnerabilities.
Personnel Skilled in GIS and/or HAZUS	MWDOC, Center for Demographics Research, Outside Consultant	Work with MWDOC and outside consultant.
Emergency Manager	MWDOC, WEROC, Emergency Coordinator	Coordinate with WEROC and the County.
Lab Specialist	Contract Laboratories, Neighboring Water Districts	Coordinates with other agencies and outsider consultant.
Floodplain manager	County of Orange, Sheriff's Department	

Staff/Personnel or Type of Resource	Responsible Agency or Department	Description/Comments
Grant Writers	Engineering Department	Actively searches for Federal and State grants.
Scientists Familiar with the Hazards of the Community	County, Orange County Fire Authority, Outside Consultants, Local University and Non-Profit Research Centers	Work with the County and local agencies who are familiar with community hazards.
Surveyors	Outside consultant in coordination with District staff	District staff utilizes an outside consultant with input from staff.
Mutual aid agreements	WEROC	As an MA of MWDOC/WEROC, TCWD has utilized mutual aid requests for disaster response efforts.

**How can these capabilities be expanded and improved to reduce risk?**

- 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.
- Have all agency-registered engineers and other qualified individuals attend California Governor's Office of Emergency Services (CalOES) Safety Assessment Program (SAP) training for building inspections.

**Exhibit M-15c. Financial Capabilities Summary**

Financial Resources	Agency or Department	Description/Comments
Capital Improvements Project Funding	Administrative Services Department	Annual review of capital requirements and forecasting future cap needs. <b>Expansion and Improvement:</b> During annual budgeting TCWD can highlight HMP strategies that support funding needs for the CIP.
Fees for Water, Sewer, Gas, or Electric Service	Administrative Services Department	TCWD is able to charge customers fees for water and sewer services. <b>Expansion and Improvement:</b> Analysis of future fees for services should analyze potential mitigation funding support opportunities to capture funding for these projects.
Incur Debt Through General Obligation Bonds	Administrative Services Department	Through a general election, TCWD can incur debt through general obligation bonds.
Incur Debt Through Special Tax And Revenue Bonds	Administrative Services Department	TCWD may incur special tax or revenue bonds as needed through the appropriate legal process.
Grants	Engineering Department	TCWD actively searches for Federal and State grants.

**How can these capabilities be expanded and improved to reduce risk?**

- Learn about how to utilize post-disaster mitigation grants (Section 406) and incorporate it into the utility's disaster recovery strategy.

### Exhibit M-15d. Education and Outreach Capability Summary

Resource/ Programs	Agency or Department	Description/Comments
AlertOC	County of Orange	Residents are encouraged to sign up for emergency alerts with the City.
Emergency Preparedness Information	Municipal Water District of Orange County, Federal, State	TCWD directs the public the website for emergency preparedness resources.
Public Awareness and Education	District website & Social Media platforms	TCWD uses its official website as the primary source of public awareness and education. Social media platforms are a secondary source of public awareness and education.
Local News	Orange County Register	The newspaper is used for the publication of required notices or public outreach purposes.
Community Newsletter	TCWD On Tap Newsletter	TCWD publishes a monthly newsletter that is included with customer utility bills.

#### How can these capabilities be expanded and improved to reduce risk?

- Participation in WEROC-led 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 TCWD.

## M.7 MITIGATION STRATEGY

### M.7.1 Mitigation Goals

TCWD adopts the hazard mitigation goals developed by the planning team; refer to **Section 4**.

### M.7.2 Mitigation Actions

The internal development team reviewed the mitigation actions identified in the 2019 plan and the updated risk assessment to determine if the mitigation actions were completed, required modification, should be removed because they are no longer relevant, and/or should remain in the MJHMP update. New mitigation actions to address the updated risk assessment and capabilities identified above were also considered and added. **Exhibit N-16**, TCWD Mitigation Actions, identifies the mitigation actions, including the priority, hazard addressed, risk, timeframe, and potential funding sources.

**Exhibit M-16. TCWD Mitigation Actions**

Action/Task/Project Description	Location/ Facility	Hazard	Cost	Responsible	Timeframe	Possible Funding Sources	Status
<b>HIGH PRIORITY</b>							
Dove and Trabuco Dam Outlet Gate Structure Repair/Replacement.	Trabuco Dam	Dam/Reservoir Failure	\$2,500,000	Engineering	Immediate	Grants, General Fund	New
Implement erosion control and slope stabilization measures at existing Transmission Mains. Install new structural supports and reinforce or replace unstable foundations and soils and bridge crossings.	System Wide, including 16-inch water main bridge crossings on old El Toro Road.	Geological Hazards: Landslide and Mudflow	>\$5 Million	Operations	Short to Long Term	Grants, General Fund	Existing, On Going
Conduct structural, geotechnical, and/or erosion control studies to determine site specific mitigation measures to protect existing transmission mains. Mitigation measures may include rip-rap, drainage structures/pipes, asphalt paving, and re-compaction/fill of slopes and unpaved areas at or above existing transmission mains. If more feasible, relocate sections of piping and valves.	System Wide, including Rose Canyon water mains in unpaved areas, various treated water mains at and near Trabuco Creek, adjacent hill sides, and unpaved areas on Plano Trabuco Road	Geological Hazards: Landslide and Mudflow	>\$10 Million	Engineering	Short to Long Term	Grants, General Fund	Existing, On Going
<b>MEDIUM PRIORITY</b>							
Evaluate water tanks for structural stability and seismic activity and install flexible coupling and seismic valves where recommended.	Water storage tanks	Seismic Hazards: Seismic Shaking	\$5 Million	Engineering	Immediate	General Fund	Existing, On Going
Implement erosion control and slope stabilization measures at Wastewater Treatment Plant and service roads to the facility.	Wastewater treatment plant and service road	Geological Hazards: Landslide and Mudflow	>\$1 Million	Operations	Long Term	Grants, General Fund	Existing, On Going
Construct a new storage tank with a capacity of 1.5 MG	New water storage tank	All Hazards	\$7 Million	Operations	Short Term	Grants /Developer	Existing, On Going

Action/Task/Project Description	Location/ Facility	Hazard	Cost	Responsible	Timeframe	Possible Funding Sources	Status
Install emergency standby generators	Water treatment plant, high altitude pressure zones (Robinson Ranch Pump Station, Canyon Creek, Rose Reservoir)	Human-Caused Hazards: Power Outage; Severe Weather: Windstorm; Wildfire	\$4 Million	Operations	Short Term	Grant, General Fund	Existing, On Going
Fire Flow Availability Improvements	Sections of service area with less-than-optimal fire flow availability.	Wildfire, Urban Fire	\$1,540,000	Engineering	Long Term	General Fund	New
<b>LOW PRIORITY</b>							
Install surveillance and lighting equipment.	Water Treatment Plants and System Storage Tanks	Human-Caused Hazards: Terrorism (MCI)	\$250,000	Operations	Long Term	Grants	Existing, On Going
Expand SCADA system monitoring.	Water and Wastewater Facilities	Human-Caused Hazards: Terrorism (Cyber Threat)	\$3 Million	Information Technology and Operations	Short Term	General Fund, Restricted Reserves	Existing, On Going
Add laboratory sampling and analyses for unregulated compounds related to potential terrorist threat or vandalism.	Water Treatment Plants and System Storage Tanks	Human-Caused Hazards: Contamination/ Saltwater Intrusion	No cost estimate available	Water Quality	Long Term	Grants, General Fund	Existing, On Going

### M.7.3 Completed or Removed Mitigation Initiatives

The following mitigation actions from the 2019 plan have been completed or are in progress and therefore are removed from this plan update.

- **Mitigation:** Construct new Saddlecrest storage tank.
  - **Status:** Complete in 2023.

## M.8 PLAN INTEGRATION

TCWD's capital budget, Water, Reclaimed Water, and Wastewater Master Plan are all used to implement mitigation initiatives identified in this annex. After adoption of the MJHMP, TCWD will continue to integrate mitigation priorities into these documents.

Since the previous Plan Update, TCWD incorporated information from the MJHMP 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 Capital Budget to prioritize and complete initiatives.