2024 Hazard Mitigation Plan

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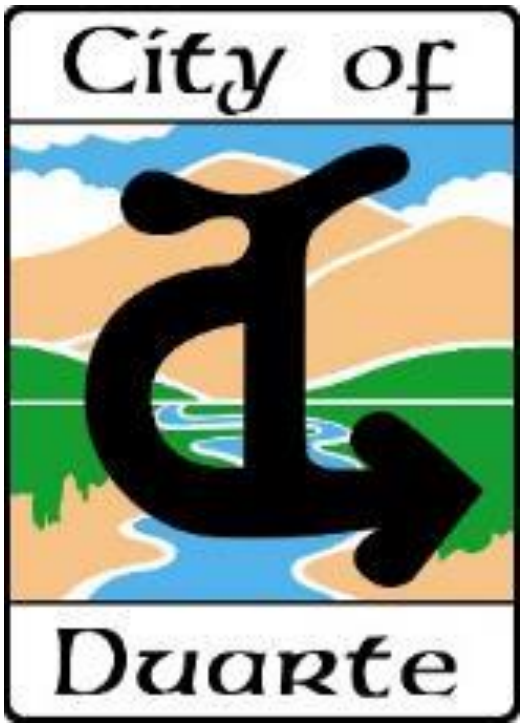
Emergency Planning Consultants



Relevant Background

- Land Use Planner
  - General Plan, Subdivisions, Zoning Ordinance, Growth Management
- Emergency Manager
  - Plans: Hazard Mitigation, Emergency Operations, Continuity of Operations, Catastrophic, Pre-Disaster Recovery
  - Training: SEMS, NIMS, ICS, FEMA Courses
  - Exercises: Tabletop, Functional, Full-Scale
- Degrees & Certifications:
  - Master of Public Administration
  - Certified Emergency Manager (CEM®)
- Leader:
  - 2021-2022 President, International Association of Emergency Managers – USA Council

150+ FEMA-Approved Hazard Mitigation Plans

- City of Duarte
- City of Bradbury
- City of Rosemead
- City of Montebello
- City of San Fernando
- City of Sierra Madre
- City of South El Monte
- City of Palos Verdes Estates
- City of Rancho Palos Verdes
- County of Los Angeles
- Los Angeles Metropolitan Transportation Authority
- Mountains Recreations and Conservation Authority

What is Hazard Mitigation?

Hazard Mitigation Includes Actions Taken To Minimize Or Eliminate Threats Associated With Hazards

Deliverables:

- **Planning Process**
  - Research and Write Plan
  - 5 Planning Team Meetings (PT 12 hours/PM 30-40 hours)
  - Community Outreach
  - Approval and Adoption
- **Risk Assessment**
  - Community Profile
  - Hazard Mapping
  - HAZUS
  - Capability Assessment
- **Hazard Mitigation Strategy**
- **Plan Maintenance Process**

Tasks	June 2024	July-September	October	November	December	January 2024	February	March	April	May	June	July	August	September	October	November
Planning Process and Organizing Resources																
Plan Writing (Initial, First, Second, Final)			X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brief Planning Team on "New Rules"	X															
Develop Stakeholder List and Conduct Initial Community Outreach		X														
Planning Team Meeting #1 Project Overview, Initial Hazard Results, and Community Outreach Strategy			X													
Develop and Distribute Preparedness/Mitigation Survey			X													
Planning Team Meeting #2 Results of Survey, HAZUS and Capability Assessment					X											
Planning Team Meeting #3 Status on 2020 Mitigation Action Items						X										
Planning Team Meeting #4 Future Mitigation Action Items							X									
Planning Team Meeting #5 Review Initial Draft Plan									X							
Present First Draft Plan to Planning Commission at Public Forum									X							
Seek Public and Stakeholder Input to First Draft Plan										X						
Risk Assessment																
Conduct Risk and Vulnerability Assessment			X	X												
Prepare HAZUS and Critical Asset Maps			X	X												
Prepare Capability Assessment			X	X												
Hazard Mitigation Strategy																
Update Status of Mitigation Actions and Develop New Actions					X	X										
Include Monitoring, Evaluating and Updating the Plan			X													
Plan Maintenance Process																
Submit Second Draft Plan to Cal OES/FEMA. Complete Mandated Revisions.										X	X	X	X	X		
Receive FEMA's Approvable Pending Adoption														X		
Conduct City Council Meeting to Adopt the Final Draft Plan															X	
Submit Proof of Adoption to FEMA															X	
Receive FEMA Final Approval & Issue Final Plan																X

New FEMA Requirements

Mitigation Planning Guide

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il 19, 2022, Effective April 19, 2023

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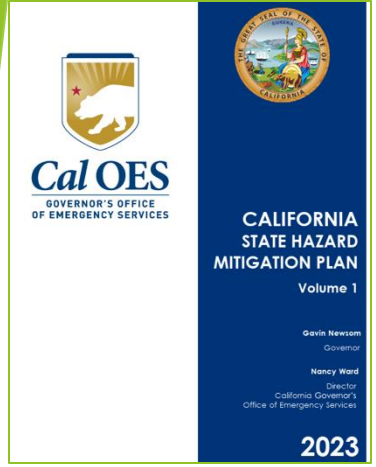
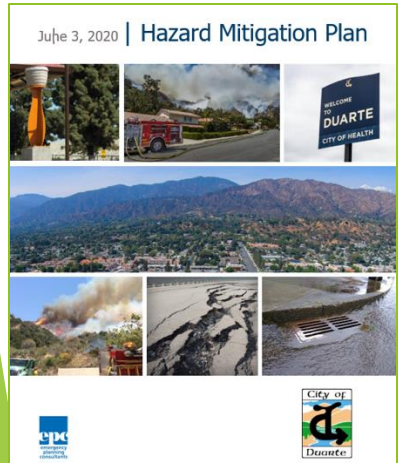
FEMA

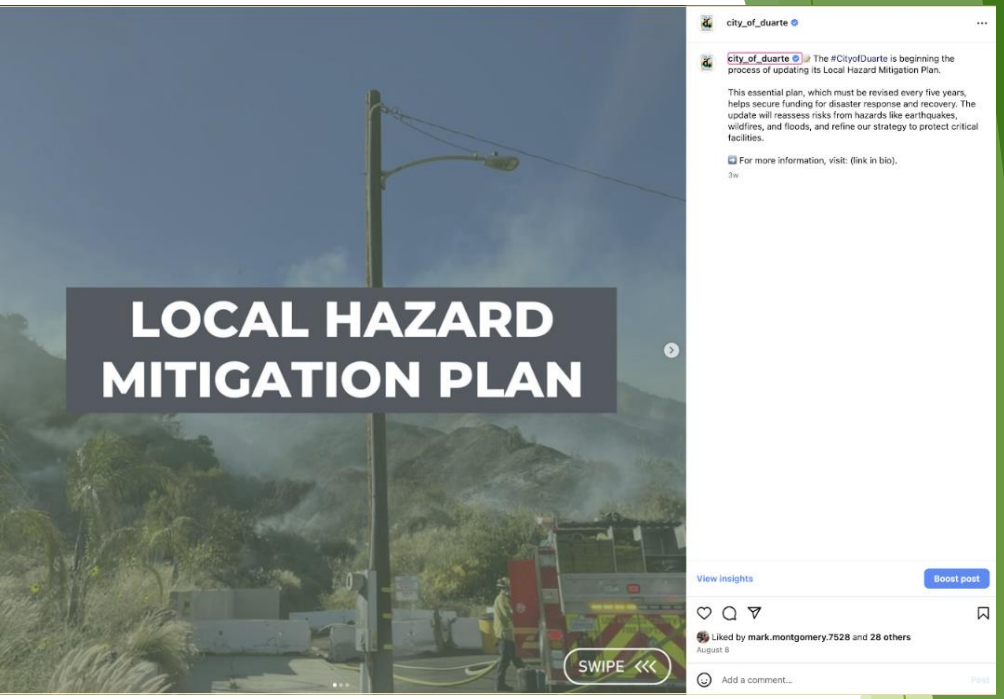


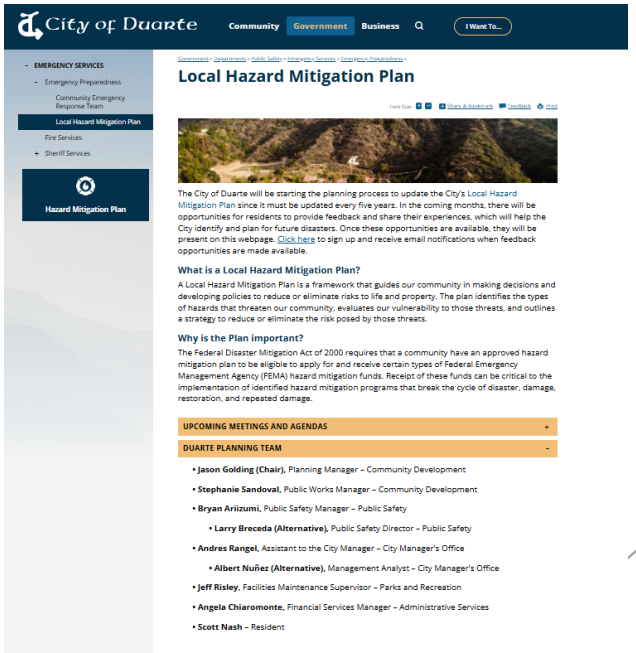


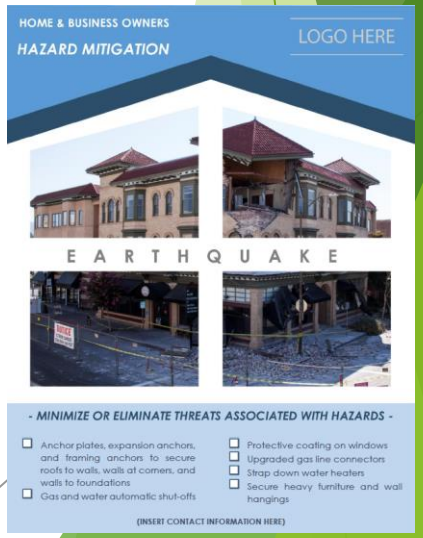
Hazard Identification

Mitigation Funding is for Natural Hazards	
State HMP:	Earthquake, Geologic, Flood, Wildfire, Other (Climate Change & Drought)
County's AHMP:	Earthquake, Drought, Landslide, Flood, Tsunami, Wildfire, Dam Failure
City's General Plan Safety Element:	Seismic & Geologic, Flood, Wildfire, Dam Failure, Hazardous Materials
City's 2020 HMP:	Earthquake, Flood, Dam Failure, Windstorm, Wildfire, Landslide, Hazardous Materials

Community Outreach - Tools







- *Preparedness/Mitigation Survey*
- *Planning Process Video*
- *Flyers (w/QR code)*
- *Press Releases*
- *Social Media*
- *Public Forums*

Community Outreach – Public and Stakeholders

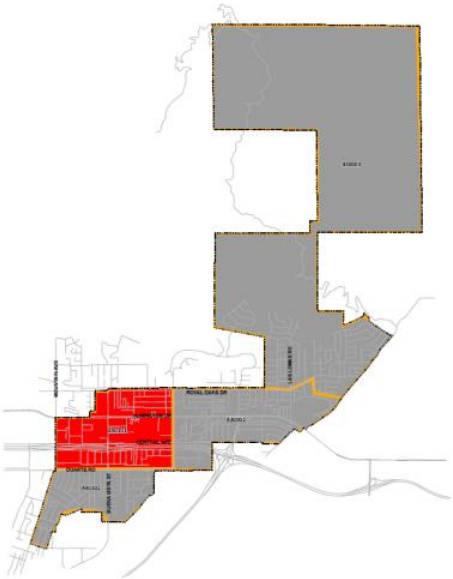
Involve Throughout the Planning Process:

- Local and regional agencies involved in mitigation activities
- Agencies that have the authority to regulate development
- Neighboring communities and special districts
- Business organizations, academia, and private interests*
- Non-profit and community-based organizations that work directly with underserved communities and socially vulnerable populations

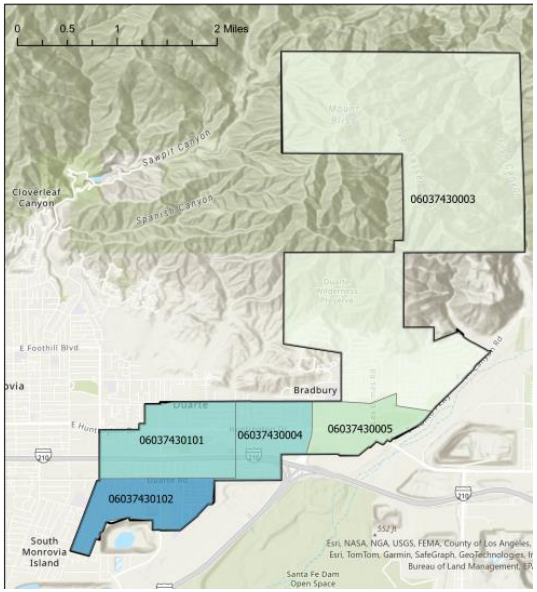
** Community lifelines - the most fundamental services in the community that, when stabilized, enable all other aspects of society to function.*

Disadvantaged Communities & Socially Vulnerable Populations

Disadvantaged



Locating Socially Vulnerable



Legend

Social Vulnerability Index (SVI)

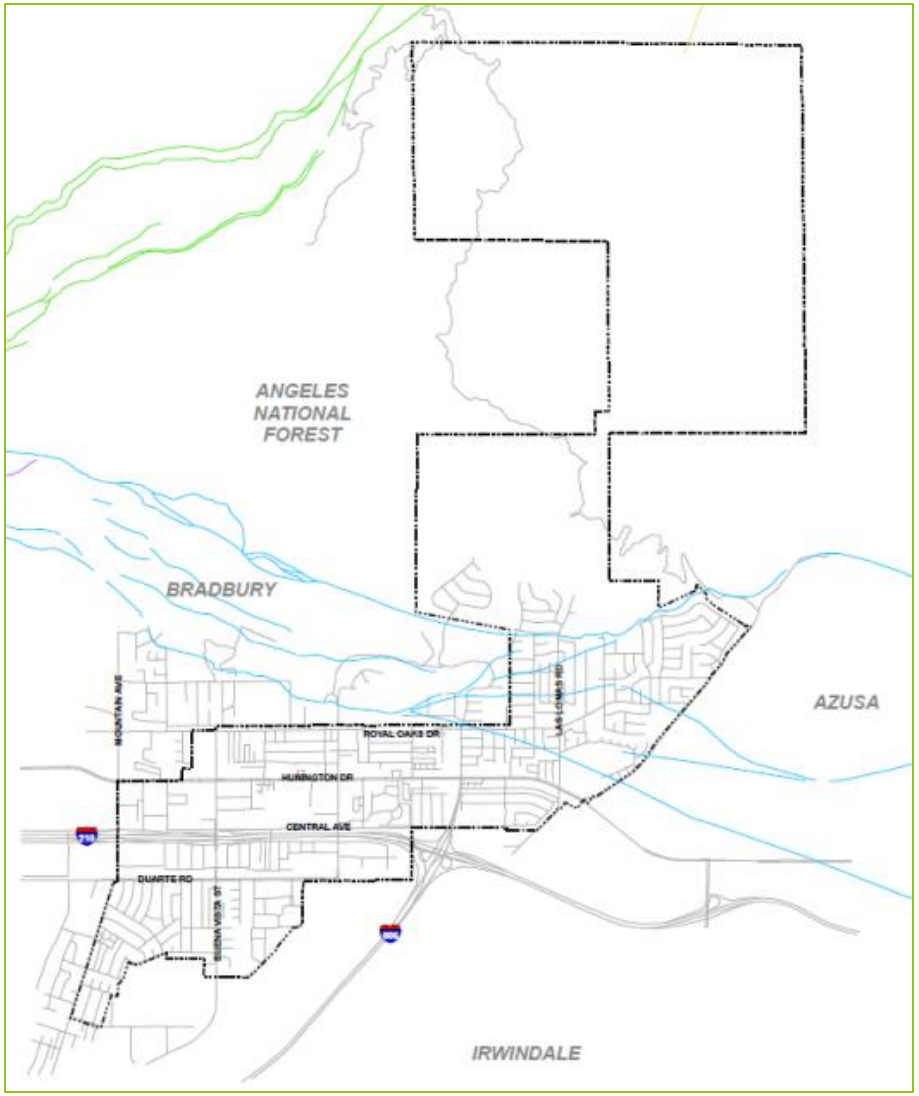
- Low (Less than 25th Percentile)
- Medium Low (Less than 50th Percentile)
- Medium High (Less than 75th Percentile)
- High (Greater than 75th Percentile)
- City of Duarte Boundary

Defining Social Vulnerability

Overall Vulnerability

Socioeconomic Status	Below 150% Poverty Unemployed Housing Cost Burden No High School Diploma No Health Insurance
Household Characteristics	Aged 65 & Older Aged 17 & Younger Civilian with a Disability Single-Parent Households English Language Proficiency
Racial & Ethnic Minority Status	Hispanic or Latino (of any race) Black or African American, Not Hispanic or Latino Asian, Not Hispanic or Latino American Indian or Alaska Native, Not Hispanic or Latino Native Hawaiian or Pacific Islander, Not Hispanic or Latino Two or More Races, Not Hispanic or Latino Other Races, Not Hispanic or Latino
Housing Type & Transportation	Multi-Unit Structures Mobile Homes Crowding No Vehicle Group Quarters

Earthquake Faults: *General Plan Safety Element*



Legend

- Duarte City Limits
- Pine Mountain Fault
- Raymond Fault
- Sierra Madre Fault Zone - Clamshell-Sawpit Section
- Sierra Madre Fault Zone - Sierra Madre C Section
- Sierra Madre Fault Zone, Sierra Madre D Section

Earthquake Magnitude: Richter

- Magnitude = Richter Scale – using *logarithmic scale* to describe ground movement.
- Every increase of one whole point on the magnitude scale (M) means another 10-fold increase in ground movement.
- Example: M8 involves 10 times more movement than a M7 and 100 times more movement than a M6.

Earthquake Intensity: Modified Mercalli Scale

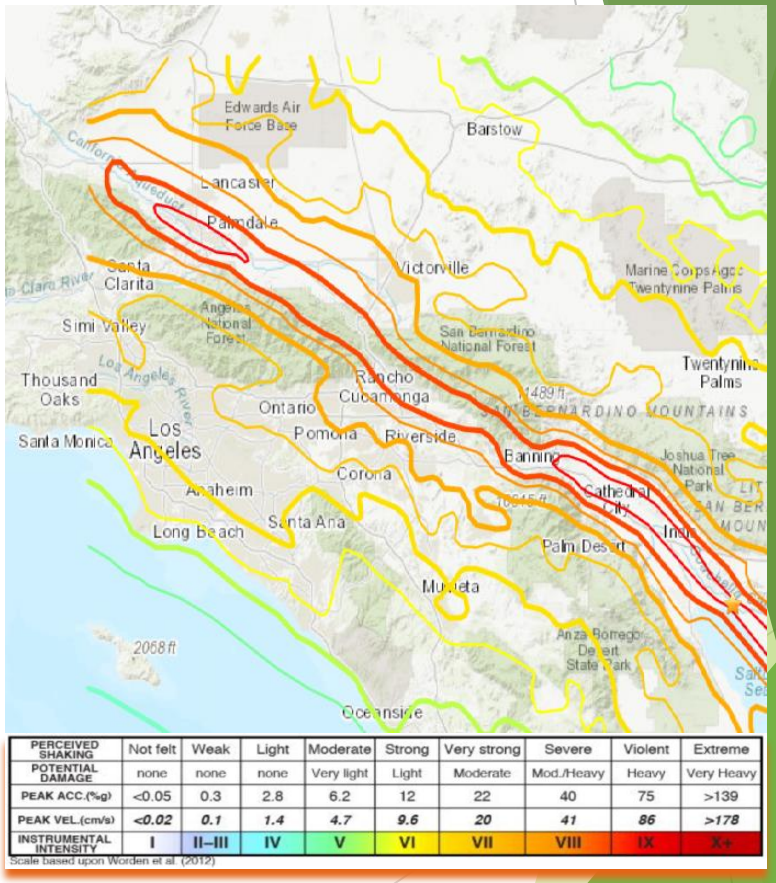
Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest,especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Southern San Andreas
USGS

★ Epicenter

- 180-mile fault rupture
- 100-seconds of fault rupture
- Magnitude 7.8
- Shaking for 2+ minutes

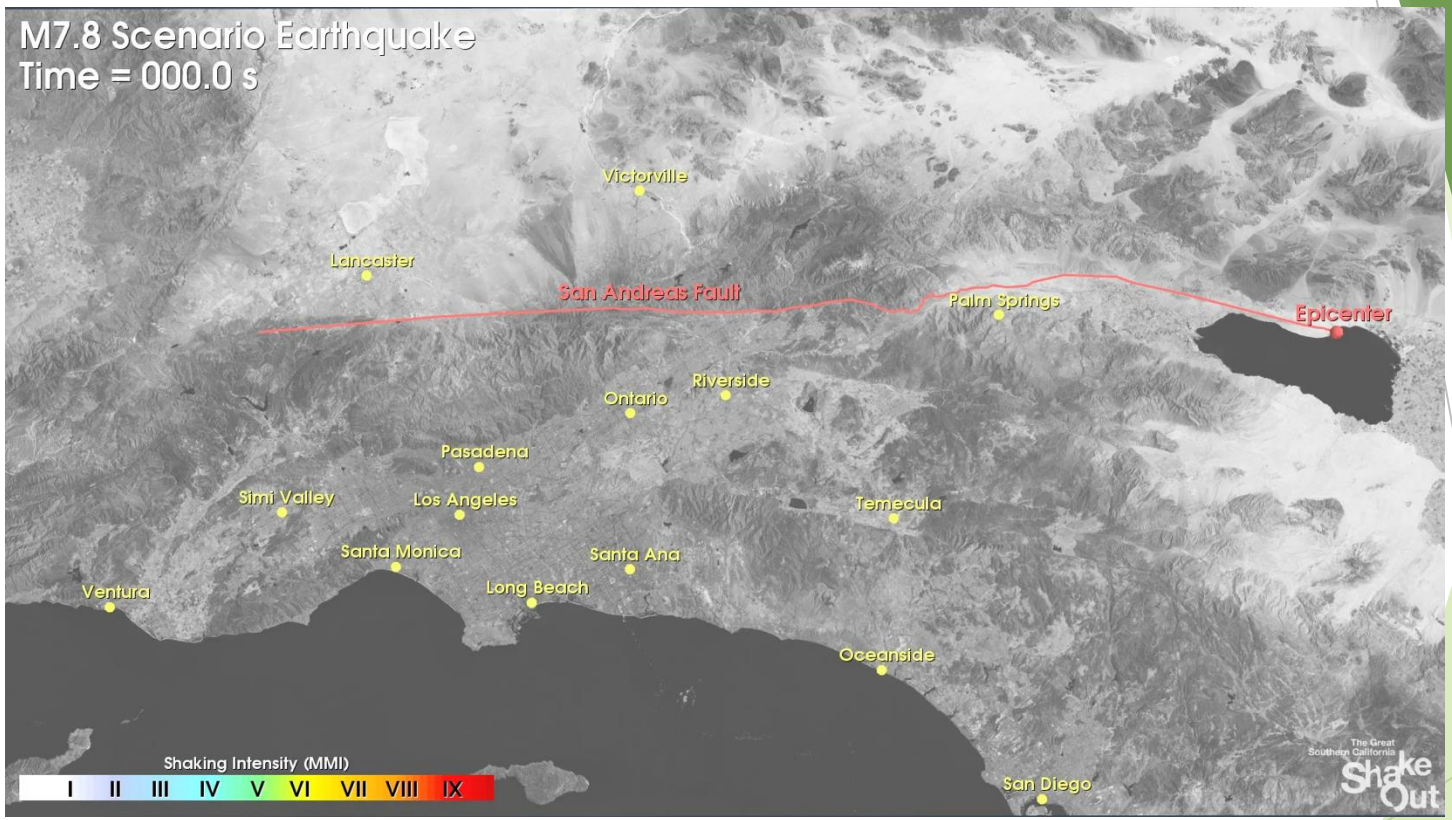
M 7.8 Scenario Earthquake - S. San Andreas; Mojave S, 10.4 km depth



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	*<0.02*	*0.1*	*1.4*	*4.7*	*9.6*	*20*	*41*	*86*	*>178*
INSTRUMENTAL INTENSITY	I	II–III	IV	V	VI	VII	VIII	IX	X+

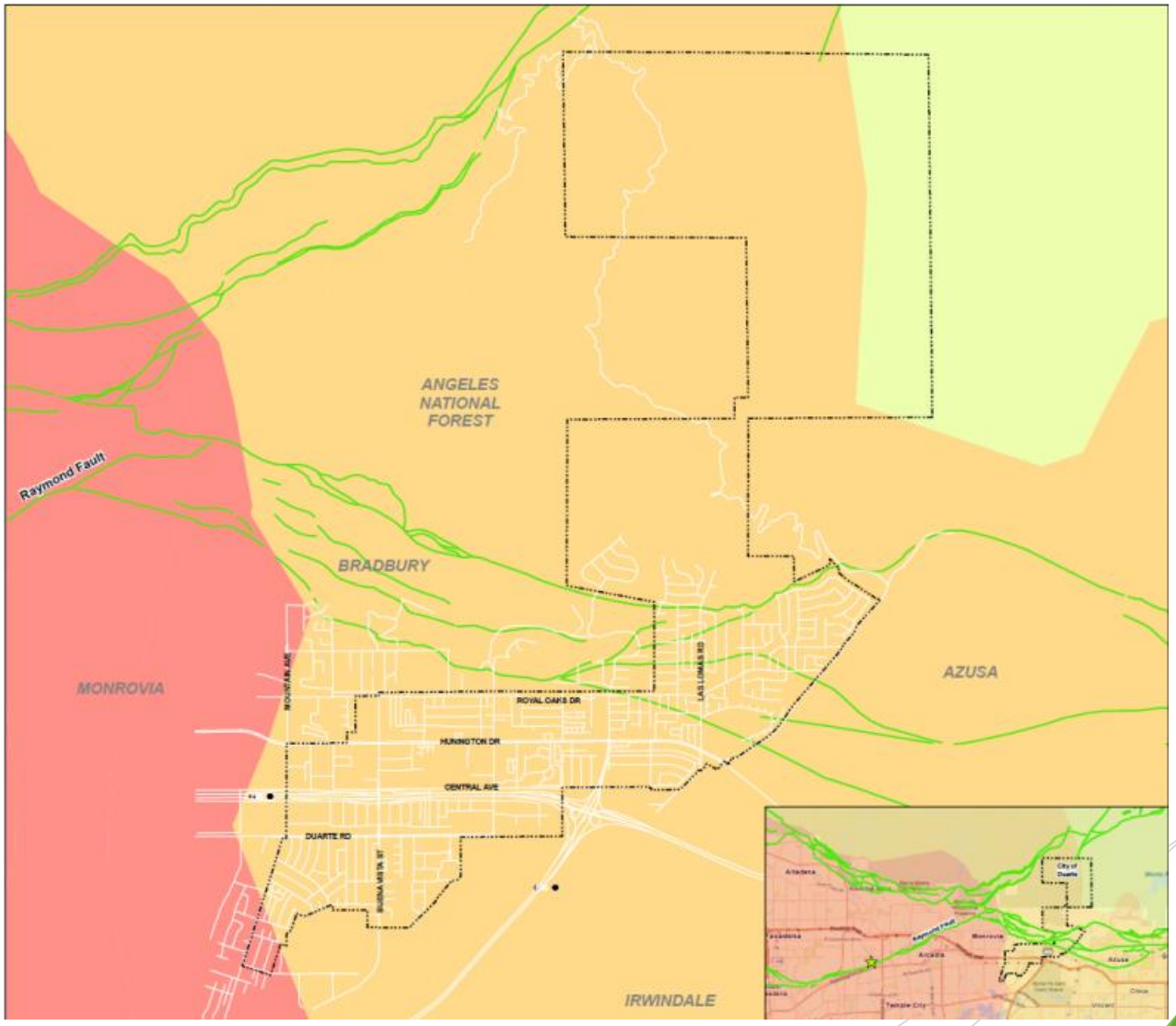
Scale based upon Worden et al. (2012)

Shaking of Long Duration

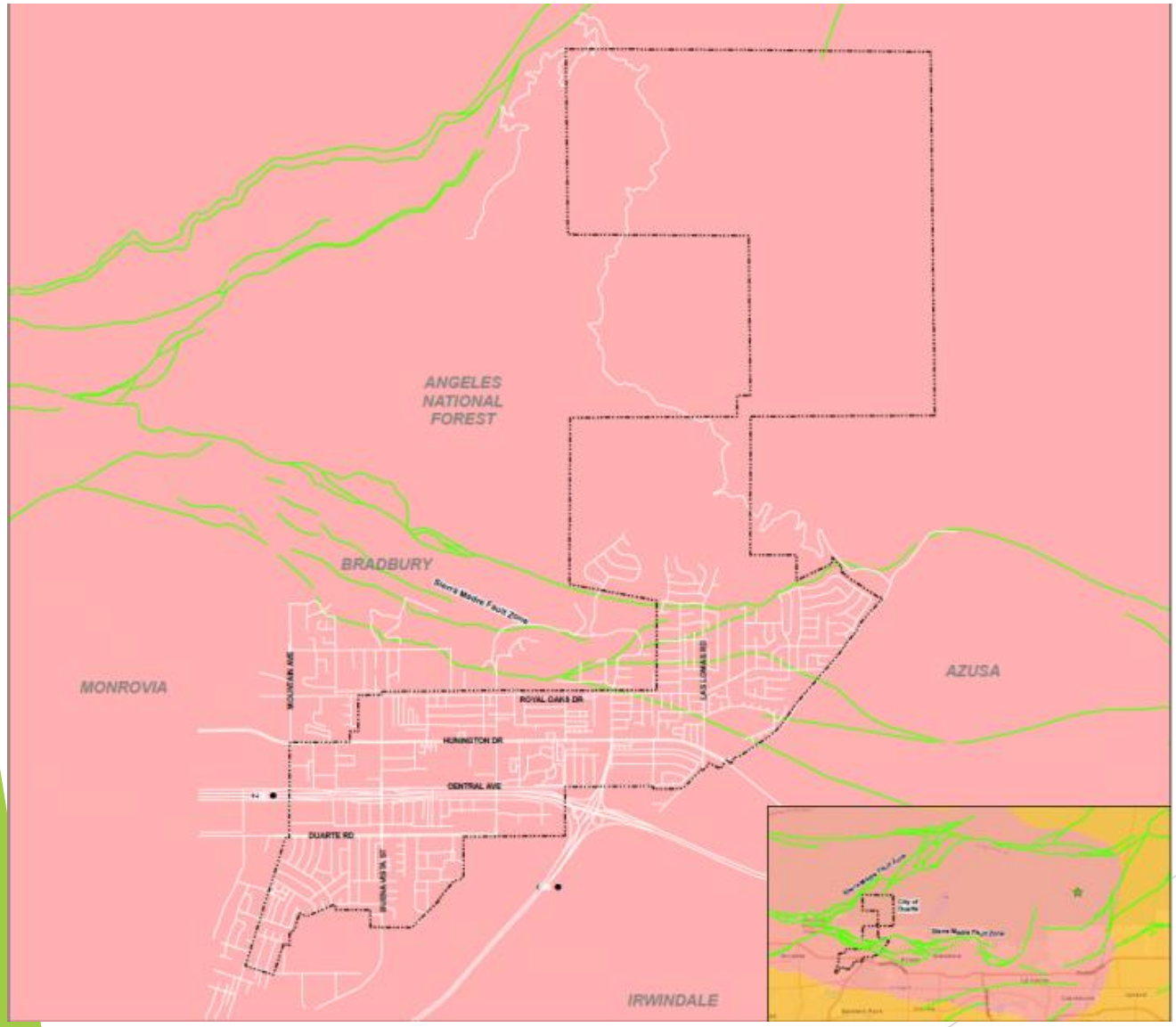


(Note: Northridge Earthquake strong shaking lasted 7-15 seconds)

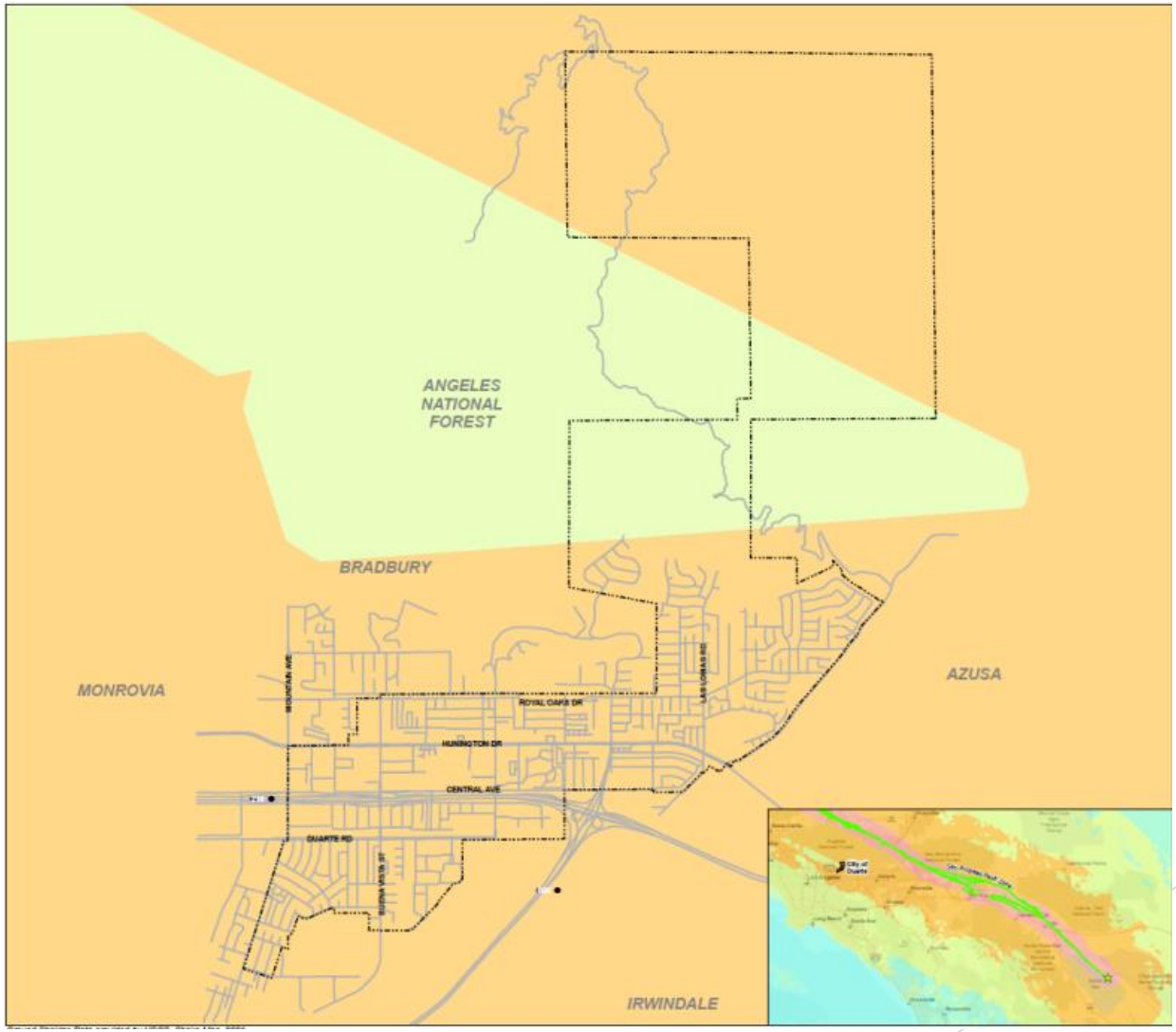
Earthquake
M7.0 Puente Hills Blind Thrust Fault
General Plan Safety Element



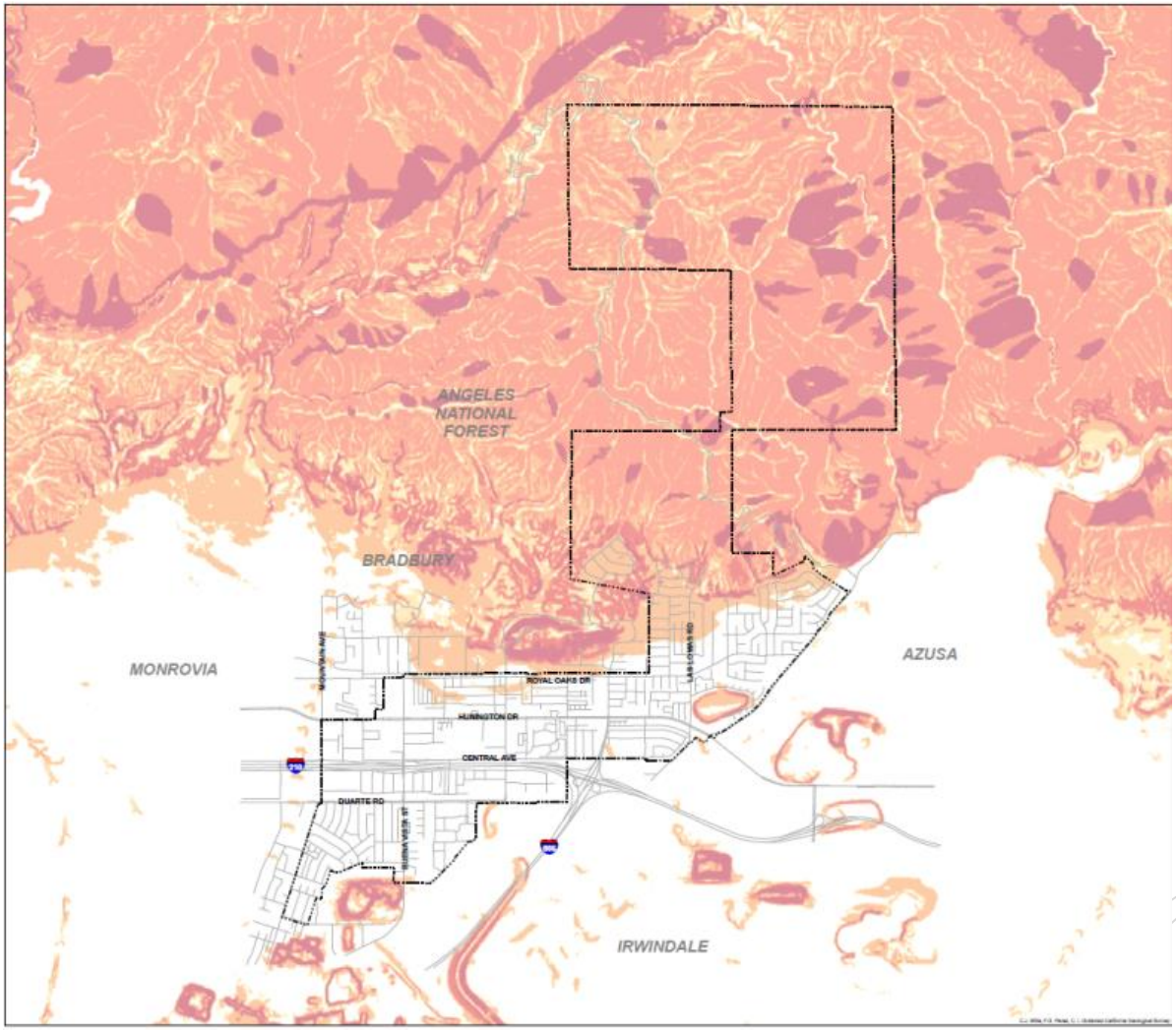
Earthquake
M7.2 Sierra Madre Fault
General Plan Safety Element



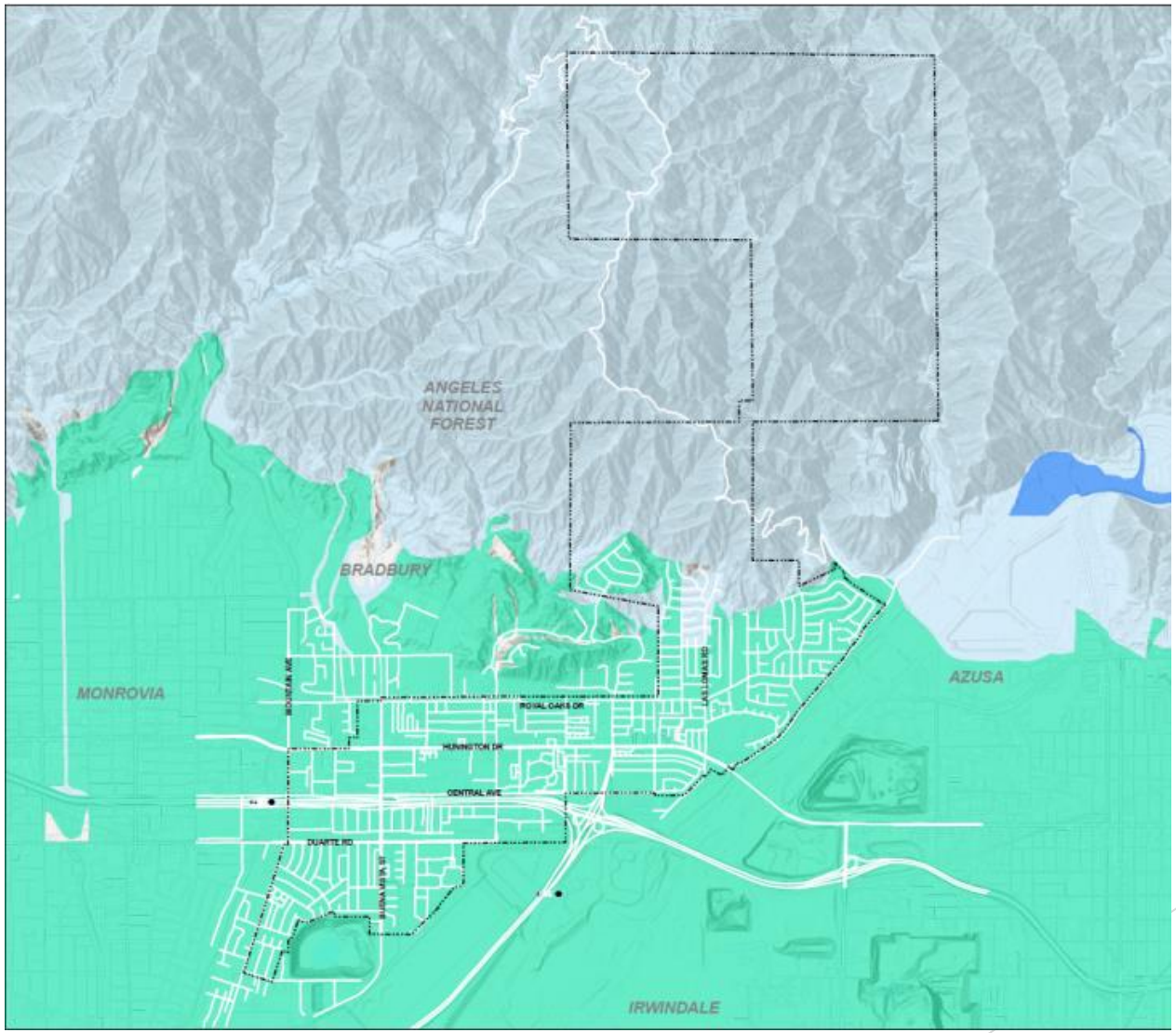
Earthquake
M7.8 San Andreas Fault
General Plan Safety Element



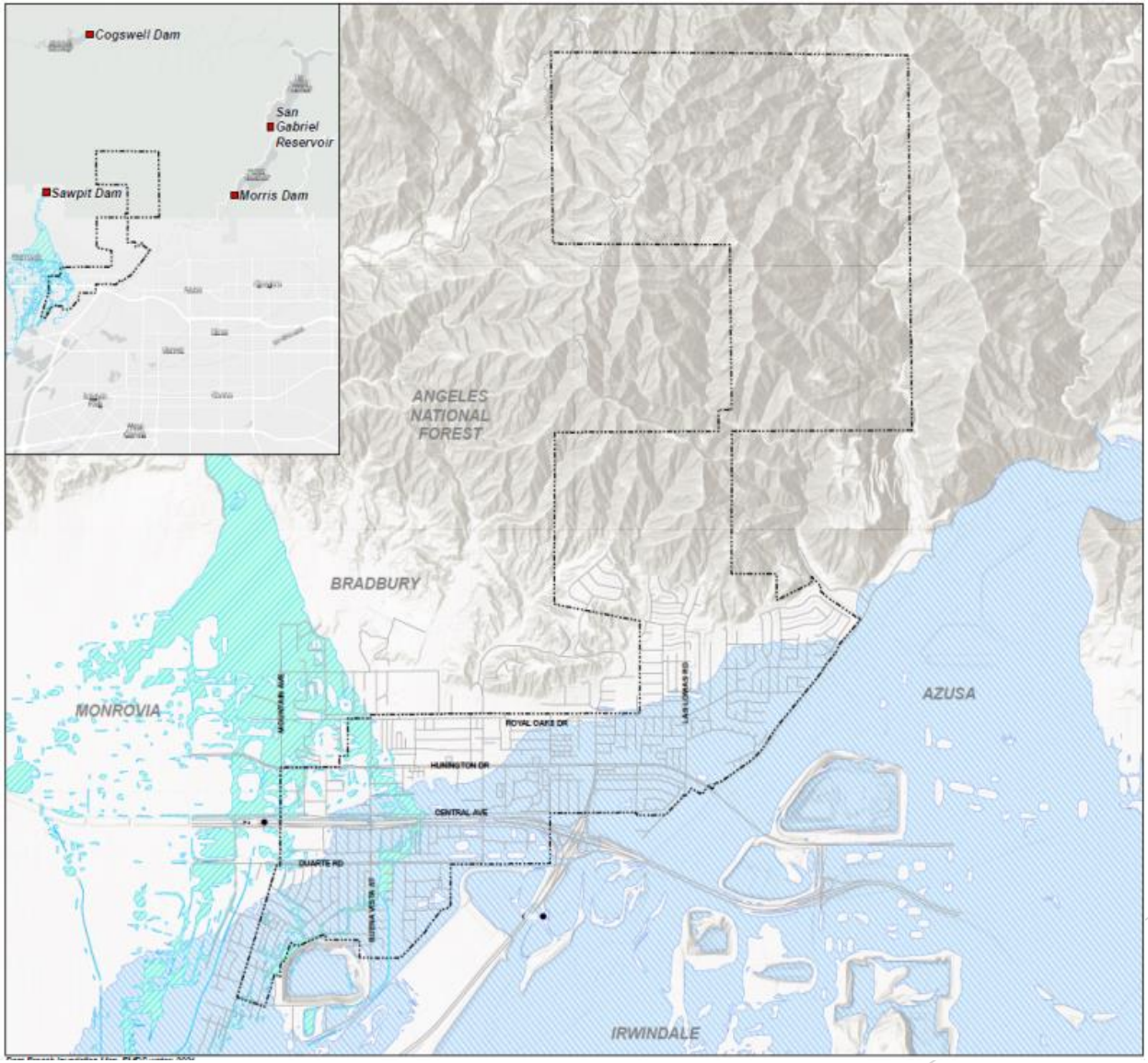
Liquefaction and Landslide Hazards
General Plan Safety Element



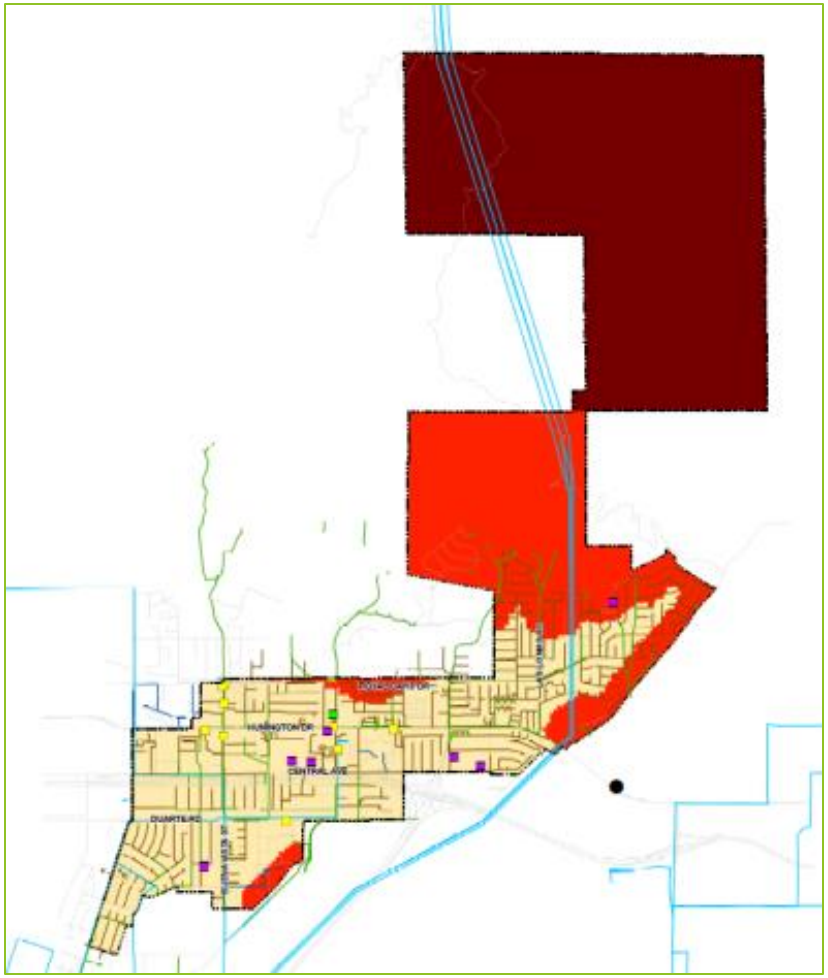
Flooding
General Plan Safety Element



Dam Failure Inundation
General Plan Safety Element



Wildfire
General Plan Safety Element



Legend

- Duarte City Limits
- Sewer Pump Station
- Fire Stations
- Schools
- GeneralAcuteCareHospital
- Electric Transmission Lines
- Gravity Main
- Non-SMD Pipe
- Sewer Pipe

State or Federal Responsibility Area

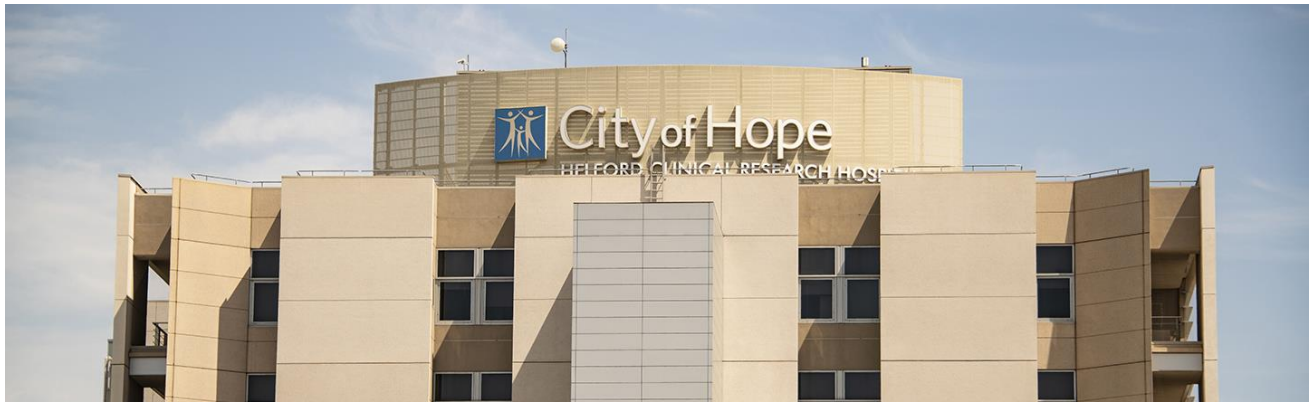
- Very High Fire Hazard Severity Zones

Local Responsibility Area

- Very High Fire Hazard Severity Zones
- Non-Very High Fire Hazard Severity Zones

Windstorm – Santa Ana Winds

- *December 2011 - winds strongest Santa Ana winds ever recorded.*
- *San Gabriel Valley sustained winds at 97 mph and gusts up to 167 mph.*



Hazardous Materials

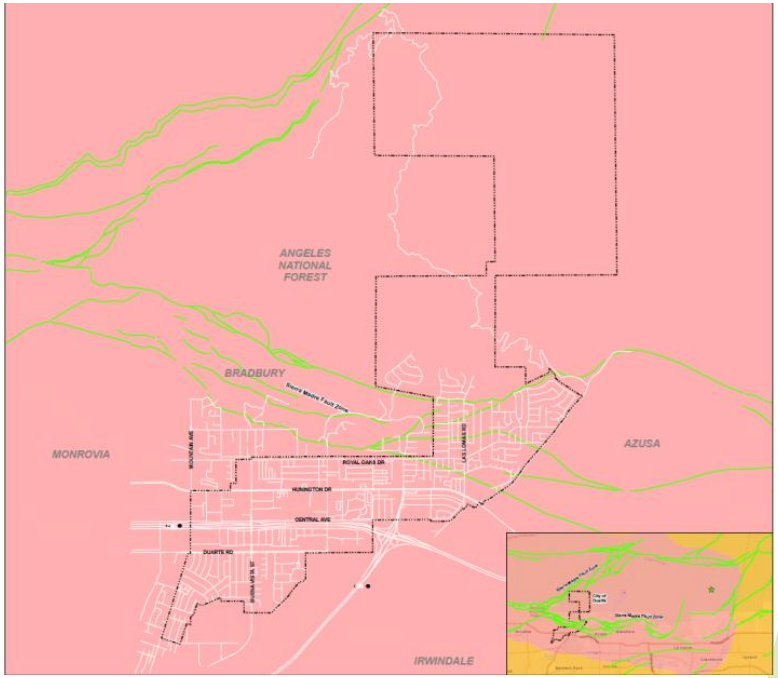
Comparing Hazards - Calculated Priority Risk Index

4 Criteria:

- Probability (45%)
- Magnitude and Severity (30%)
- Warning Time (15%)
- Duration (10%)

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	Extremely rare with no documented history of occurrences or events. Annual probability of less than 1 in 1,000 years.	1	45%
	Possibly	Rare occurrences. Annual probability of between 1 in 100 years and 1 in 1,000 years.	2	
	Likely	Occasional occurrences with at least 2 or more documented historic events. Annual probability of between 1 in 10 years and 1 in 100 years.	3	
	Highly Likely	Frequent events with a well documented history of occurrence. Annual probability of greater than 1 every year.	4	
Magnitude/ Severity	Negligible	Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure. Injuries or illnesses are treatable with first aid and there are no deaths. Negligible loss of quality of life. Shut down of critical public facilities for less than 24 hours.	1	30%
	Limited	Slight property damage (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). Injuries or illnesses do not result in permanent disability, and there are no deaths. Moderate loss of quality of life. Shut down of critical public facilities for more than 1 day and less than 1 week.	2	
	Critical	Moderate property damage (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and at least 1 death. Shut down of critical public facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	Severe property damage (greater than 50% of critical and non-critical facilities and infrastructure). Injuries and illnesses result in permanent disability and multiple deaths. Shut down of critical public facilities for more than 1 month.	4	
Warning Time	More than 24 hours	Population will receive greater than 24 hours of warning.	1	15%
	12 – 24 hours	Population will receive between 12-24 hours of warning.	2	
	6-12 hours	Population will receive between 6-12 hours of warning.	3	
	Less than 6 hours	Population will receive less than 6 hours of warning.	4	
Duration	Less than 6 hours	Disaster event will last less than 6 hours	1	10%
	Less than 24 hours	Disaster event will last less than 6-24 hours	2	
	Less than 1 week	Disaster event will last between 24 hours and 1 week.	3	
	More than 1 week	Disaster event will last more than 1 week	4	

CPRI: Earthquake – M7.2 Sierra Madre Fault



- **Probability** = Likely = 3
- **Magnitude/Severity** = Critical = 3
- **Warning Time** = Less than 6 hours = 4
- **Duration** = Less than 6 hours = 1

Calculatinge the CPRI:

[(3 x 0.45 = 1.35) + (3 x 0.30 = .90) +

(4 x 0.15 = .60) + (1 x 0.10 = .10)] =
2.95 CPRI Total

CPRI Ranking for Duarte

Hazard	Probability	X 45% (.45)	Magnitude / Severity	X 30% (.30)	Warning Time	X 15% (.15)	Duration	X 10% (.10)	CPRI Total	Hazard Priority Ranking (H-High, M-Medium, L-Low) *
Earthquake	3	1.35	3	.90	4	.60	1	.10	2.75	H
Dam Inundation	2	.90	3	.90	4	.60	2	.20	2.60	M
Wildfire	3	1.35	3	.90	4	.60	3	.30	3.15	H
Landslide (including debris flow)	3	1.35	2	.90	4	.60	1	.10	2.95	M
Windstorm	2	.90	2	.90	1	.15	2	.20	2.15	L
Hazardous Materials	2	.90	2	.90	4	.60	1	.10	2.50	L

*Hazard Priority Ranking
High=CPRI score for probability + magnitude/severity (impact) = 6 or higher
Medium=CPRI score for probability + magnitude/severity (impact) = 5
Low=CPRI score for probability + magnitude/severity (impact) = 3 or 4
N/A=CPRI score for probability + magnitude/severity (impact) = 2

Closing Comments

- Requested Documents
  - Emergency Operations Plan
  - Capital Improvement Program