



ALL-HAZARDS RISK ASSESSMENT—2016

TACOMA FIRE DEPARTMENT

MISSION: To protect people, property and the environment

CONTENTS

Executive Summary.....	2
Overview of Service Area	4
Hazards Identification and Profile.....	14
Fire.....	14
Emergency Medical Services	19
Specialty Risk	25
Hazardous Materials	25
Technical Rescue	25
Marine	26
Natural & Technological	28
Geological Hazards	28
Meteorological	34
Technological.....	37
Fire Management Zone Details.....	39
Downtown Fire Management Zone.....	40
Upper Tacoma	43
North End	46
West End.....	48
South End.....	50
South Central	52
South West	54
Eastside.....	57
Northeast.....	59
Tideflats	61
Fife/District 10	64
Fircrest	66
Point Defiance	68
Appendix A—Demographic Data	70
Appendix B—Land use/Borders/Infrastructure	84
Appendix C—Additional Environmental Conditions	107
References	111

ALL-HAZARDS RISK ASSESSMENT

TACOMA FIRE DEPARTMENT

EXECUTIVE SUMMARY

Key findings in this risk assessment include:

FIRE RISK—Fire Management Zones (FMZs) with the highest number of moderate and high-risk fires:

- Downtown, Upper Tacoma, South West

EMS RISK—FMZs with the highest frequency of all EMS incidents:

- South West, Downtown, West End

SPECIALTY RISK—(Haz-Mat/Technical Rescue/Marine Firefighting and Rescue) FMZs with the highest overall specialty risk:

- Tideflats, South West

NATURAL RISK—(Earthquake/lahar/landslide/tsunami/flood/drought/wind) FMZs with the highest overall natural disaster risk:

- Tideflats, Fife/District 10
- Climate change: Locally, predictions for the Puget Sound Region include:
 - ✓ warming temperatures,
 - ✓ heavy rainfall in terms of frequency and intensity that could exacerbate flood risks in many watersheds,
 - ✓ rising sea level,
 - ✓ a greater proportion of winter precipitation to fall as rain rather than snow,
 - ✓ an increase in landslide risk, erosion, and sediment transport in fall, winter and spring,
 - ✓ general flooding

TECHNOLOGICAL—(Civil disturbance, epidemic, energy emergency) FMZs with the highest overall “human” caused risk:

- Tideflats, Downtown

RISKS

Each community has risks.

Risks are based on the probability of an event occurring and the consequences of that event.

Each creates different requirements in the

community for a

commitment of resources.

Effectively managing a fire

department requires an

understanding of how

changes in resources will

affect community outcomes

regarding civilian injury and

death; firefighter injury and

death; and property loss.

CALL VOLUME INCREASE

Based on the predicted population growth of 127,000, and an estimated per capita call volume of 190 incidents per 1,000, it is projected that requests for emergency services will climb to 66,245 annually by the year 2040. This represents a 57% increase in calls over current rates and must be accounted for in future planning initiatives.

DAYTIME POPULATION

The concept of the daytime population refers to the number of people who are present in an area during normal business hours, including workers. This is in contrast to the resident population, which refers to people who reside in a given area and are typically present during the evening and nighttime hours.

Despite having only the fourth largest resident population totals (24,667), the South West FMZ jumps to the highest population total (63,817) using daytime estimate methodology.

The total daytime population estimate in our service area is 371,360.

VULNERABLE POPULATIONS

The Eastside FMZ (9.4%) and South West FMZ (8.8%) have the highest concentration of the population under the age of five, and the Point Defiance FMZ (25.7%) and West End (19.3%) have the highest concentration of the population above age 65.

FUTURE ANALYSIS

Future analysis will include work on a comprehensive inventory of assets and estimated losses related to the risk hazards identified in this plan within our service area. Additionally, creating an interactive on-line map book of this analysis will be developed.



Introduction

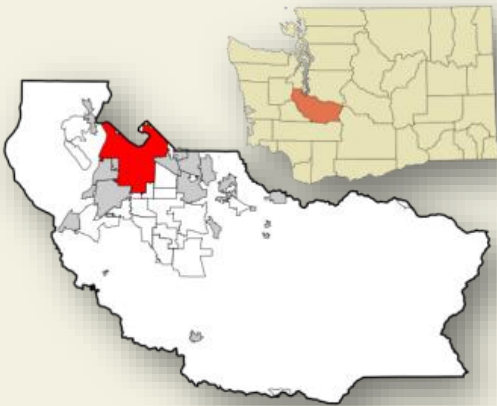
Each community has risks. Risks are based on the probability of an event occurring and the consequences of that event. Each creates different requirements in the community for a commitment of resources.

This document describes Tacoma Fire Departments (TFD) methodology for identifying, assessing, categorizing and classifying risk. A framework developed by the Federal Emergency Management Agency (FEMA) has been adapted for use by TFD to develop a comprehensive risk assessment. The four basic components of the risk assessment are: (1) identify hazards; (2) profile hazard events; (3) inventory assets and (4) estimate losses. This process measures the potential loss of life, personal injury, economic injury and property damage resulting from hazards by assessing the vulnerability of people, buildings, and infrastructure.

The goal of this document is to identify and profile the risks in the Tacoma Fire Department service area. Subsequent planning work will explore the final two components of the risk assessment.

OVERVIEW OF SERVICE AREA

The City of Tacoma was incorporated in 1884. From its humble origins of less than 1,000 residents, the city has grown in population to roughly 200,000 today. The city, like many established communities, is a mixture of old and new. Recently constructed high-rise condominium buildings contrast with century-old single-family residential neighborhoods. The city's economic base is comprised of a wide variety of industries—healthcare, education, retail, gaming, and the Port of Tacoma.



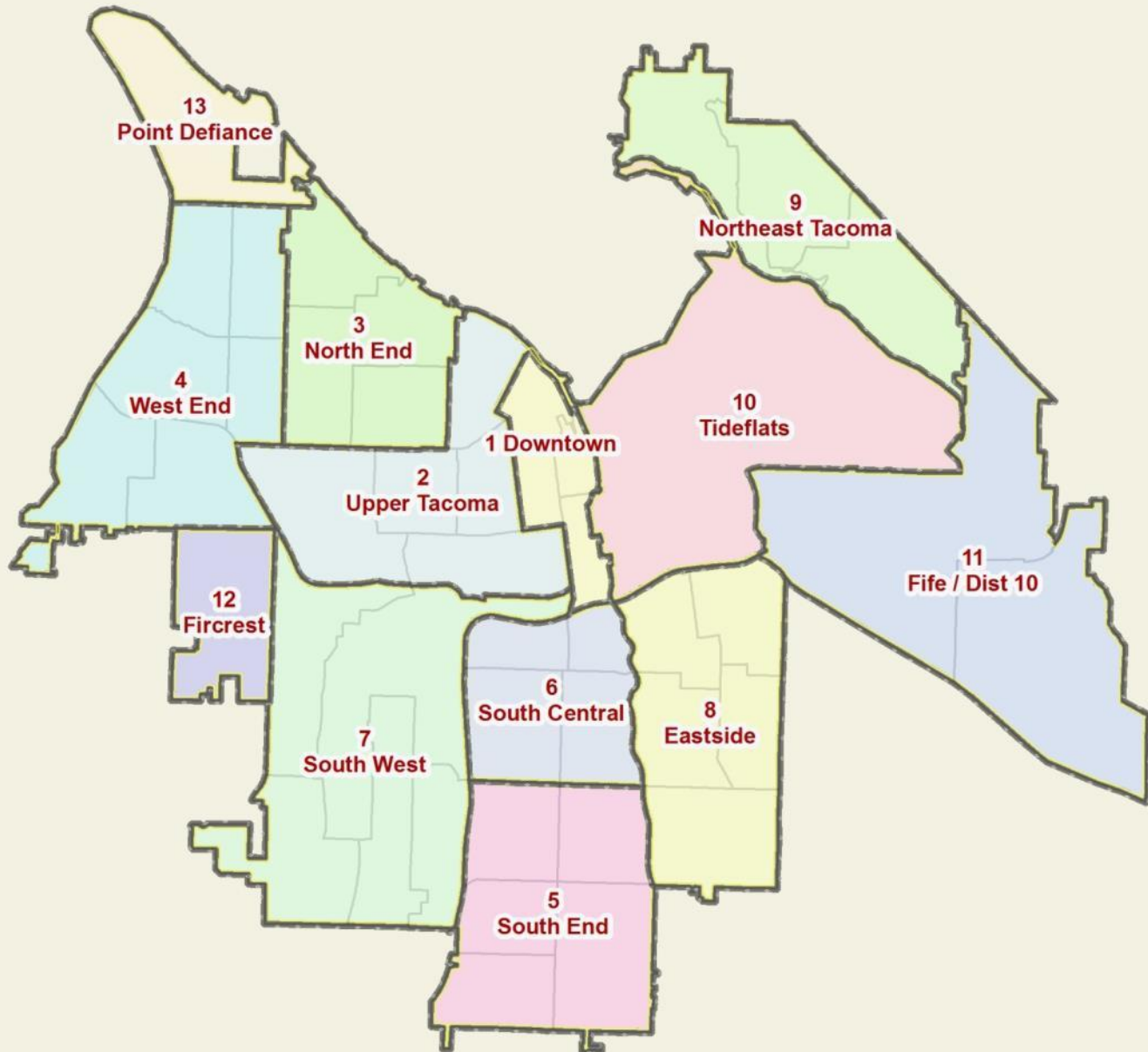
There are 62.1 square miles of land within the city limits and contract areas, along with 44 miles of shoreline, and 25 square miles of saltwater. The city is divided by Interstates 5 and 705 along with State Routes 16 and 509.

TFD also provides contracted fire and emergency medical service to the City of Fircrest and the City of Fife/District 10. The City of Fife/District 10 is TFD's second largest jurisdiction and stretches approximately 9.3 square miles. The City of Fife encompasses multiple land use zones that include residential, commercial, plus light and heavy industrial. The majority of the Fife area is in the lowlands of the region near similar elevations as the Port of Tacoma/Tideflats area of Tacoma. Fife is the home of numerous large-scale storage/warehouse buildings, multiple automobile dealerships, industrial manufacturing buildings, hotels, and residential areas.

The City of Fircrest is the smallest area served by TFD and covers approximately 1.5 square miles. Fircrest is a small suburban area that is comprised mostly of single-family homes with a few multifamily and commercial buildings. Fircrest is the home of an 18-hole private golf course with various areas of wildland interfaces.

Fire Management Zones

For planning purposes, TFD fire management planning zones (FMZs) are grouped by regional identifiers and then further broken down into smaller sub-zones by census tract. The following examination will focus on the hazards specific to our overall service area and to each of the FMZs.



Topography and Climate

Located along the shores of Commencement Bay in Southern Puget Sound in Pierce County, Tacoma is primarily situated on a plateau that rises approximately 400 feet up from the shoreline. The Cascade Mountains ascend to the east with Mount Rainier, the city's picturesque namesake (Mt. Tahoma), dominating the landscape. To the west, the distant spires of the Olympic Mountains emerge above the waters of the

sound. Tacoma lies approximately 32 miles south of Seattle, the state's largest city, and approximately 30 miles north of Olympia, the state capital.

The diverse topography and maritime influence create weather conditions that are among the most temperate in the world. Temperatures are mild with typical summer afternoon readings in the 70s and average winter daytime temperatures in the 40s. Most of the 39 inches of annual precipitation falls as rain from October through March with some short-lived accumulations of snow. Although the Tacoma area does not encounter the severe weather conditions seen in other parts of the country, such as hurricanes and tornadoes, it does experience occasional significant rain or wind-related damage from flooding, landslides, and downed trees. The Tacoma area also is susceptible to other, although less frequent, natural phenomena due to the surrounding geography. These phenomena include earthquakes, volcanic activity, lahars and tsunamis that pose a higher risk for casualties to citizens and damage to buildings and infrastructure.

Factors Unique to Tacoma

The Port of Tacoma is a seaport located within the Tideflats area of Tacoma and sits near an elevation of 12 to 14 feet above sea level. The Tideflats area consists primarily of maritime/heavy industrial activities that bring together heavy long-haul truck traffic, large ocean-going ships, and heavy rail traffic. Some of the major businesses in the Tideflats are U.S.

Oil & Refining, WestRock paper mill, and Targa flammable fuel storage.

Many of the manufacturing and storage buildings in the Tideflats were constructed near the turn of the century from heavy timber construction. A high percentage of these older warehouse buildings have been demolished to make way for ship container storage and trans-load operations. Multiple facilities process, store and distribute varying hazardous materials, ranging from flammable liquids/gasses,



cryogenics, and corrosives. Due to the extremely industrial nature of the Tideflats, no residential occupancies are located here, nor are there any current land use zoning that would allow for this. There is a large scale Immigration Enforcement Detention Facility, for 24/7 housing of up to 1,500 presumed illegal aliens waiting for legal processing by the federal government. A large percentage of the Tideflats is situated within the 100-year flood plain and is intersected by the Puyallup River, a major river within Pierce County. Tacoma's main wastewater treatment plant resides along the Puyallup River by a large dike.

The highly popular Point Defiance Park is a 760 acre, old-growth forested, Suburban Park located at the most northern tip of North Tacoma’s residential neighborhood and is considered a Wildland interface area. The park attracts over 3 million visitors annually. There are wildland interface areas throughout Tacoma, but especially adjacent to low-and-medium density residential areas and along the waterway borders. Some of these wildland areas abut directly to private properties and are very steep and difficult to access.



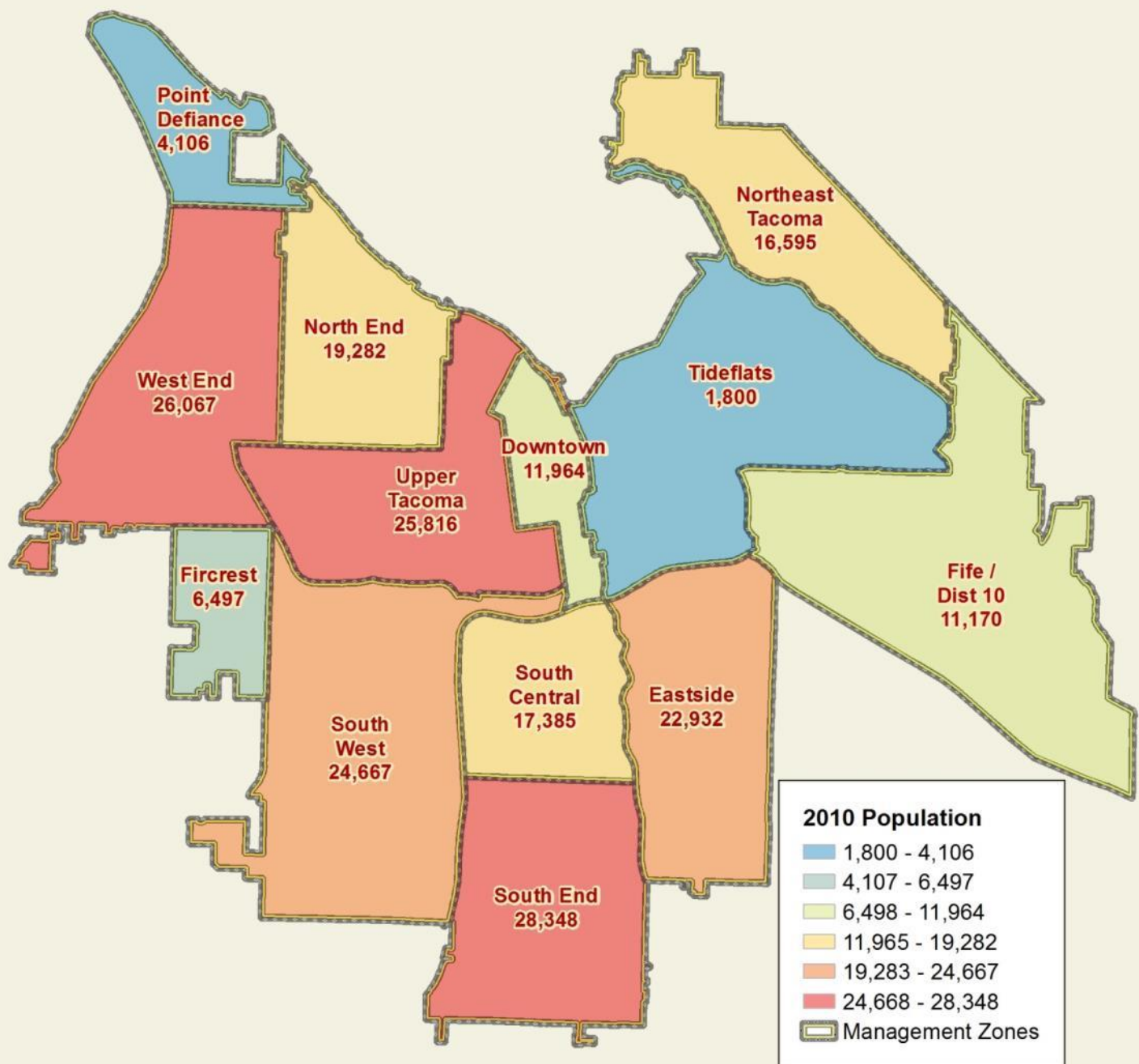
Demographics/Population¹

Based on 2010 census data, population estimates for the TFD service area is 215,915. Included is Tacoma, the state's third most populous city, and (per contracted services) the City of Fircrest and the City of Fife/District 10. The South End, Upper Tacoma, and West End FMZs have the highest concentration of resident population in our service area. See Appendix A for additional demographic details.

Table 1	Service Area	Washington
Population estimate	215,915	6,724,540
Persons under 5	7%	6.5%
Persons 65 years and over	11.3%	12.3%
Female persons	50.7%	50.2%
Male persons	49.3%	49.8%
Homeownership rate	54.1%	63.9%
Renter rate	45.9%	36.1%
Average household size	2.45	2.54

¹ U.S. Census Data, 2010

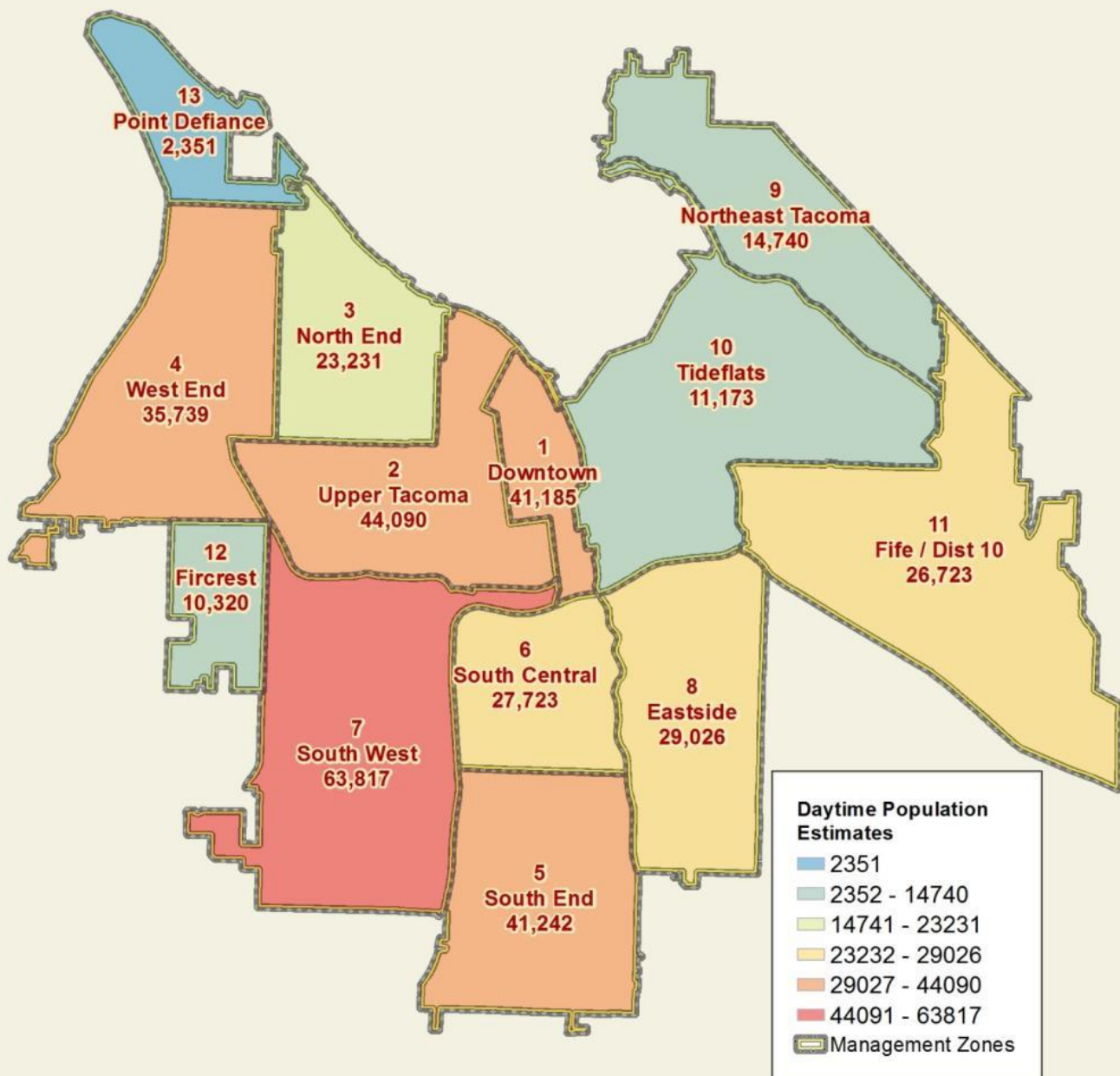
Population Totals by FMZ



Daytime Population²

The concept of the daytime population refers to the number of people who are present in an area during normal business hours, including workers. This is in contrast to the resident population, which refers to people who reside in a given area and are typically present during the evening and nighttime hours. Daytime population estimates help provide a fuller explanation of the number of people in a given portion of our service area.

Of note, despite having only the fourth largest resident population totals (24,667), the South West FMZ jumps to the highest population total (63,817) using daytime estimate methodology. The total daytime population estimate in our service area is 371,360.



Growth Trends

The Puget Sound Region was home to almost 3.9 million people in 2014 and is continuing to grow due to natural increases in the population, as well as people moving here in pursuit of job opportunities and to enjoy the area's quality of life. The region has a relatively young and very well-educated labor force in comparison to the nation, which it attracts from other parts of the country and the world.

The region is forecast to reach a population of nearly 5 million people by 2040. King County is expected to receive the largest share of the forecast growth; however, if trends over the last 30 years continue to hold, an increasing share of the growth is likely to be absorbed by Kitsap, Pierce and Snohomish counties.

As part of the regional growth strategy, local jurisdictions are required to plan to accommodate an allocation of future regional population and employment growth. The City of Tacoma must plan for 127,000 additional residents and 97,000 jobs by 2040. This growth will place considerable demands on the city's existing infrastructure and land supply. <http://www.tacoma2040.com/>

Population Growth and Call Volume

Assuming population estimates hold true by 2040, TFD can expect a corresponding increase in the number of calls we respond to.

Using current per capita call volume of 186 calls per 1,000 people, (2014 call volume of 42,000 divided by a population estimate of 220,000, multiplied by 1,000) and the predicted growth of 127,000 residents, it is estimated that there will be 190 calls per 1,000 in 2040. This translates to an annual estimate of 66,245 calls, a 57% increase over current rates.

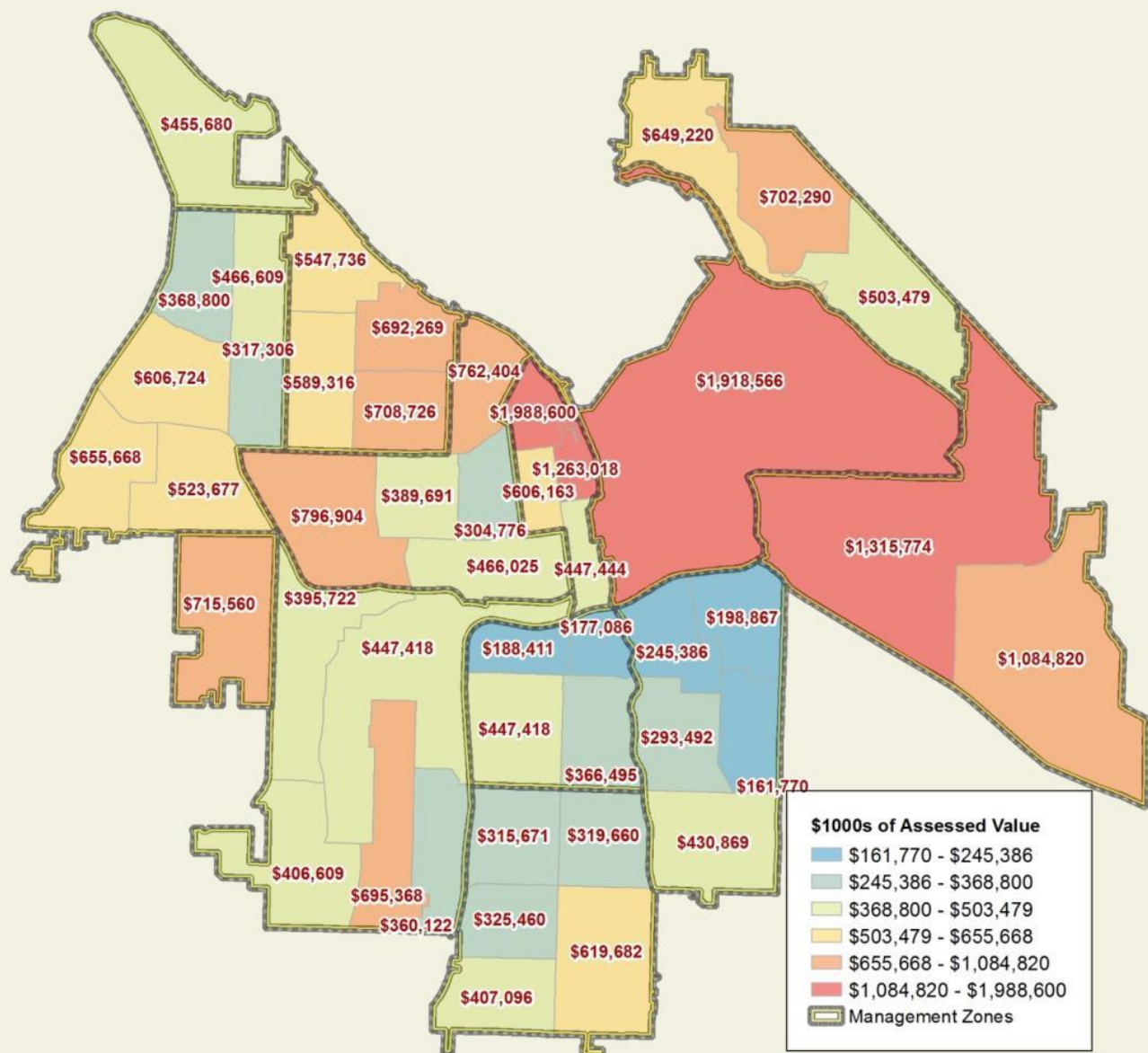


Parcels³

The following summarizes the number of land parcels in TFD's service area. See Appendix B for additional parcel information.

Table 2	# Parcels	Land Value	Average Land Value	Improved Value	Average Improved Value
Service area	81,519	\$9,227,925,000	\$113,199	\$19,424,069,000	\$238,277

Total Assessed Value	Average Assessed Value
\$28,651,994,000	\$351,476



Housing Summary^{4 5}

Of the approximately 90,000 housing units in our service area in 2010, 92% are occupied:

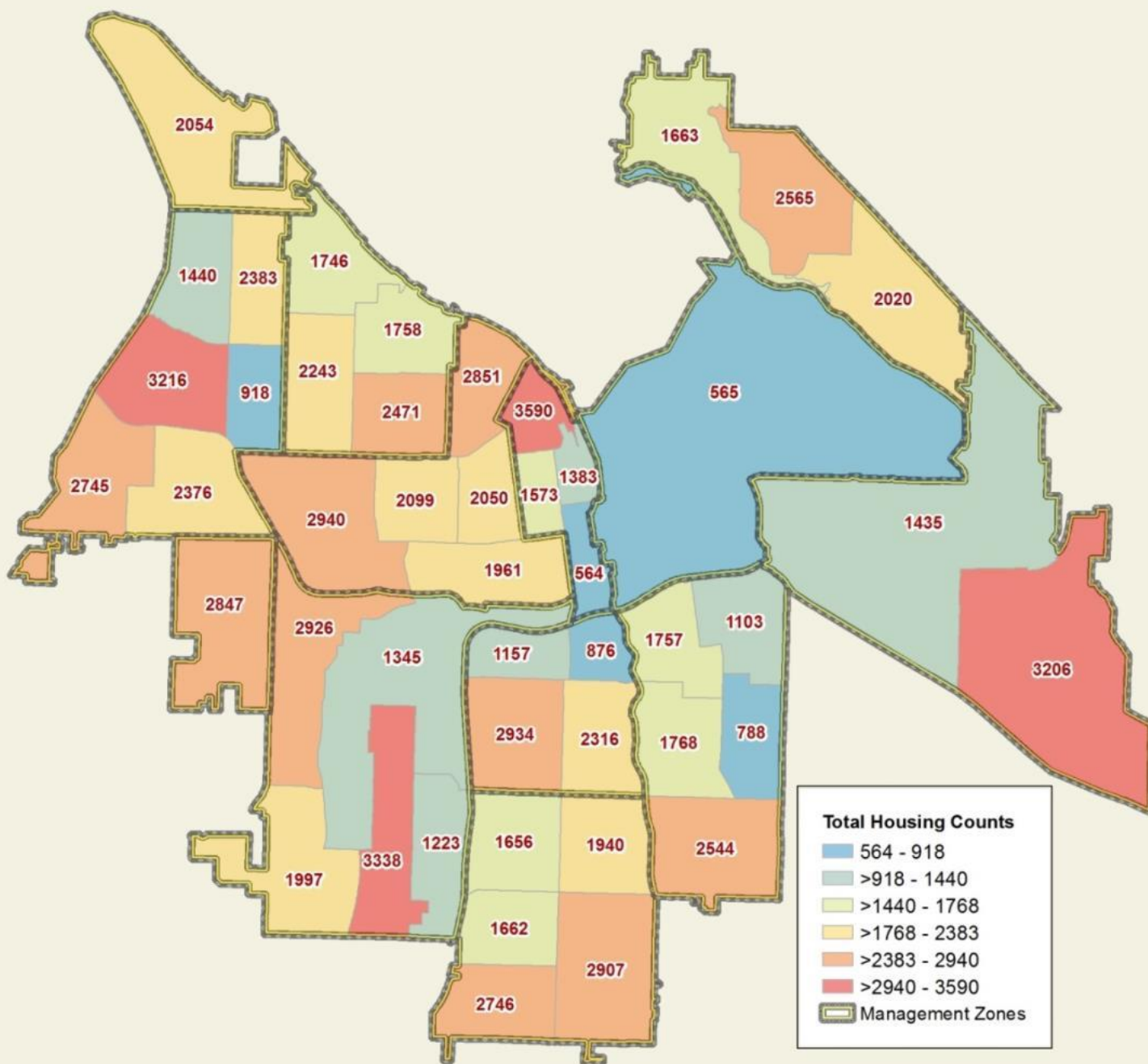
- Of the occupied housing units, 54.1% were owner occupied and 45.9% renter occupied.
- Average household size—2.45

Table 3	# Buildings	Year Built	Count	% of Total
Service area	89,884	1939 or before	28,499	31.7%
		1940-1949	10,955	12.1%
		1950-1959	9,668	10.7%
		1960-1969	8,650	9.6%
		1970-1979	7,963	8.8%
		1980-1989	7,039	7.8%
		1990-1999	6,965	7.7%
		2000-2009	8,142	9.0%
		2010 or after	2,003	2.2%



⁴ Pierce County Assessor Treasurer, 2015

⁵ U.S. Census Data, 2010



Portions of the Downtown, West End, South West and Fife/District 10 FMZ's have the highest concentration of housing units.

Thirty-one percent of all housing units in the service area were built prior to 1939.

HAZARDS IDENTIFICATION AND PROFILE

A hazard or risk is a situation that poses a threat to life, health, property, or the environment. Historically, the fire service has focused its efforts on the suppression and prevention of fires. Modern practices have been expanded to examine and account for risks from a variety of sources that affect public safety. The following overview details the risks that exist in our service area with those the fire department typically responds to presented first.

Fire

Fire risk is defined as the characteristics of the community that generate fire risk persistently over time. Our response area has a diverse blend of structures that pose a fire risk. All buildings have been designated as a low, moderate, and high risk for structure fire based on factors like required fire flow, the number of stories and the life safety threat posed. Generally, low-risk structures are those that require a single company response. These include dumpster fires, sheds, or small detached garages. Examples of moderate risk structures are single-family dwellings, multifamily dwellings less than two-stories, and small commercial buildings. High-risk structures include multifamily buildings over two stories, commercial structures that include hazardous operations/materials, hospitals, schools, and unsprinklered multifamily dwellings.



FMZ BUILDING FIRE RISK DISTRIBUTION

Table 4 Management Zones	High	Moderate	Low	Total
Downtown	1,412	986	446	2,844
Upper Tacoma	977	8,346	2,722	12,045
North End	220	7,566	2,974	10,760
West End	1,342	7,291	773	9,406
South End	421	8,659	1,935	11,015
South Central	339	6,180	2,414	8,933
South West	1,092	6,412	1,898	9,402
Eastside	274	7,123	1,360	8,757
Northeast Tacoma	189	5,591	206	5,986
Tideflats	610	310	136	1,056
Fife/District 10	533	2,907	331	3,771
Fircrest	133	2,306	175	2,614
Point Defiance	90	1,227	303	1,620
Total	7,632	64,904	15,673	88,209

An analysis of the fire risk distribution throughout our response area reveals the following:

High Risk

- The distribution of high-risk heavy industry and large commercial/retail structures follows main transport corridors, mostly railways, and interstate or state routes.
- High-risk large commercial, retail and multifamily structures are mostly located near a major arterial, highway or near downtown.
- Trends to watch in Upper Tacoma, South End, Eastside and Downtown planning zones:
 - Increasing vertical density in areas where older, single-family homes are being replaced by newer, multifamily structures which may or may not be sprinklered.
- Emerging risk:
 - Point Ruston: 800-900 residential units; combined single-family, multifamily, and high-rise in an area that lies partly in the TFD service area and partly outside of it in Ruston.
 - Continuing Port of Tacoma expansion carries with it the additional risk of decreased road access through the Tideflats planning zone.
 - The likely development of a natural gas production, cross load, and liquefaction facility along with significant bulk storage capability will provide a substantial new risk in the Tideflats zone.

- U.S. Oil & Refining has constructed a receiving system to simultaneously offload 100-unit rail tank car shipments of Bakken crude oil from the Midwest. They have also been expanding their storage capacity. Targa Sound Terminal has initiated a substantial expansion of their fuel mixing, distribution and storage facilities that now include rail delivery of petroleum products. These changes will increase the risk profile for both areas of the Tideflats zone.



Moderate Risk

- Two planning zones have emerging areas of high-density moderate risk
 - Fife/Fire District 10 with significant development of single-family homes in proximity to the high-risk Industrial planning zone.
- Continuing urbanization and the impact of the State's Growth Management Act have encouraged densification and infill of formerly single-family dwelling neighborhoods. This has resulted in more multi-story buildings with smaller clearances between them, closer placement to property lines, and parking limitations. All of these changes complicate the ability of TFD to respond to incidents in these areas.

Fire Risk Summary

Overall analysis of Fire risk was conducted according to the following criteria:

- Population
- Number of moderate (M) and high (H) risk structures
- Number of moderate (M) and high (H) risk fires
- Presence of--
 - Geographical and/or access issues (G/A)
 - Wildland/urban interface (W/U)
 - Critical infrastructure (CI)—utilities, transportation, health, education, government
 - Heavy industry (IND)
 - Potential for significant economic impact (EI)
 - Historical/cultural value (HV)

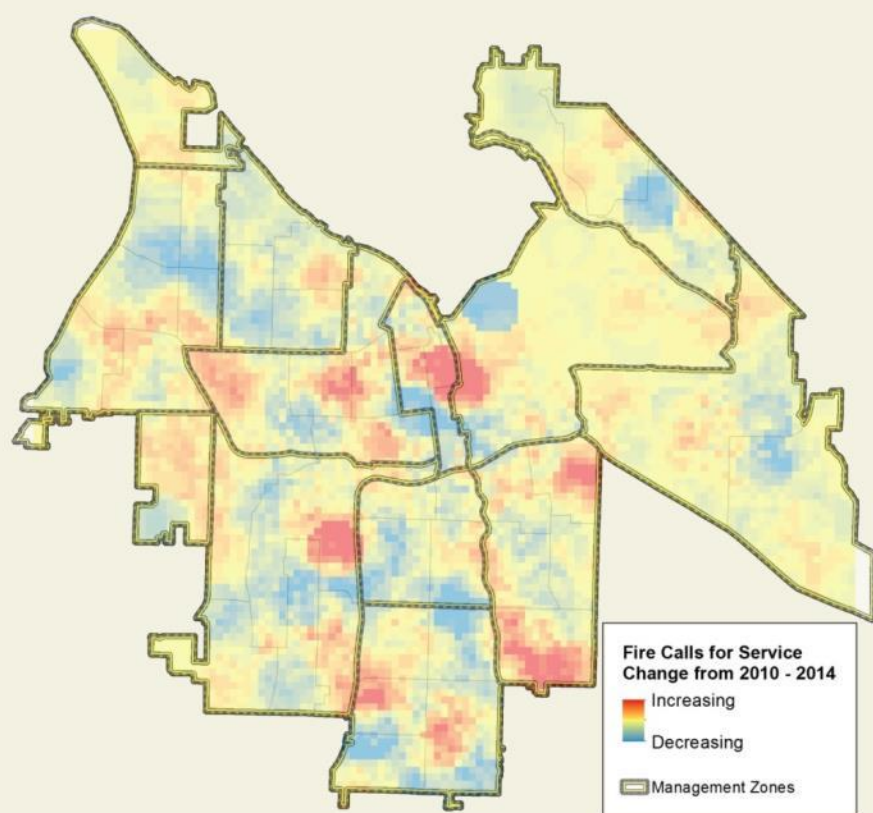
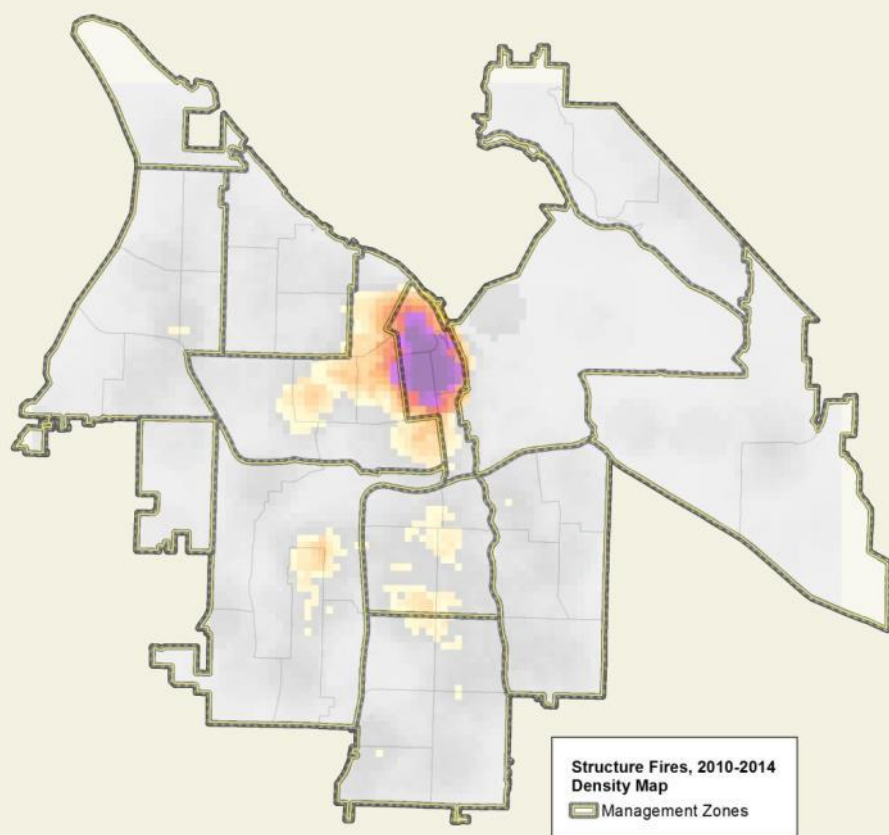
The zone-by-zone Fire risk analysis based on the above criteria is shown in Table 5.

Table 5—Zone-by-Zone Fire Risk Analysis

FMZ	Area	Pop	Density	Structures			Fires			Presence of				
	(sq. miles)		(pop/sq miles)	M	H	L	M	H	G/A	W/U	CI	IND	EI	HV
Downtown	1.52	11,964	7,871	986	1,412	466	29	246	X	---	X	---	X	X
Eastside	4.75	22,904	4,821	7,123	274	1,360	121	43	X	X	X	---	X	X
Fircrest	1.64	6,497	3,961	2,306	133	175	20	9	---	---	X	---	X	---
Fire District 10	8.61	11,190	1,299	2,907	533	331	28	50	X	X	X	X	X	---
North End	3.59	19,282	5,371	7,566	220	2,974	74	9	X	X	X	---	X	X
NE Tacoma	4.43	16,606	4,625	5,591	206	189	43	15	X	X	X	---	---	---
South Central	2.93	17,385	5,933	6,180	339	2,414	106	33	X	X	X	---	X	---
South End	5.02	28,348	5,647	8,659	421	1,935	132	52	X	X	--	---	---	X
South West	7.62	24,699	3,241	6,412	1,092	1,898	86	141	X	X	X	X	X	---
Tideflats	7.52	1,800	239	310	610	136	3	58	X	X	X	X	X	---
Upper Tacoma	4.88	25,816	5,290	8,346	977	2,722	136	106	X	---	X	---	X	---
West End	5.88	26,067	4,433	7,291	1,342	773	56	82	X	X	X	---	X	---
Point Defiance	1.97	3,357	1,704	1,227	90	303	13	2	X	X	---	---	---	X

Based on all of the preceding information, the following conclusions can be drawn regarding fire risk in the TFD service area:

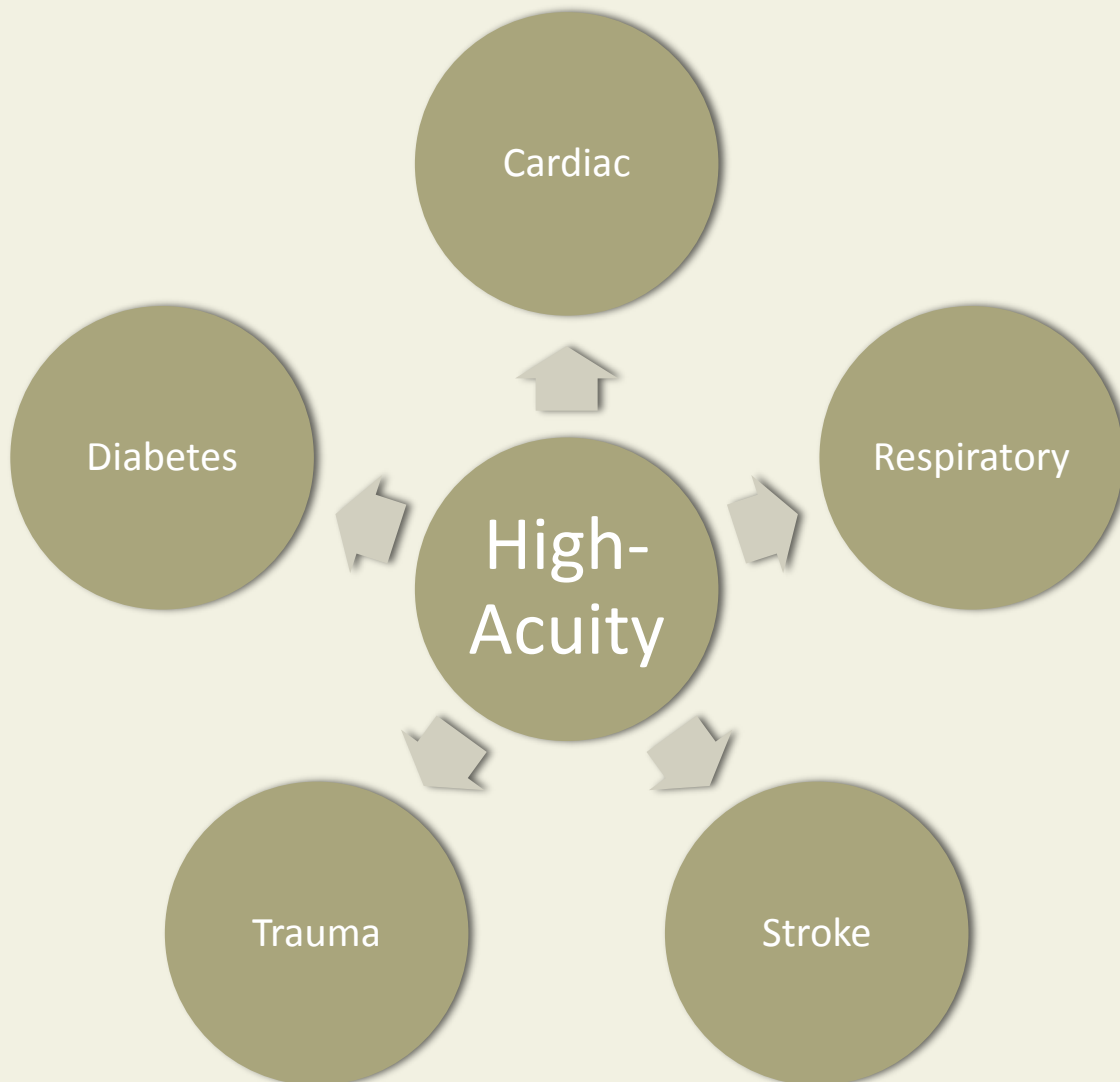
- Planning zones with the highest number of moderate and high-risk fires
 - Downtown
 - Upper Tacoma
 - South West
- Planning zones with highest fire risk based on presence of high-risk structures and other indicators
 - Tideflats—has 5 of 6 other risk indicators
 - Downtown—has 4 of 6 other risk indicators
- Areas to monitor for increasing fire risk based on number of incidents and/or presence of other risk factors
 - South West
 - Upper Tacoma
- Planning zones with lowest fire risk
 - Fircrest—has 2 of 6 other risk indicators
 - NE Tacoma—has 3 of 6 other risk indicators



Emergency Medical Services

EMS risk is defined as the correlation between the frequency of high-acuity medical conditions and community characteristics to determine the need for shorter times to treatment. The goal for EMS risk mitigation is to intervene before damage from the medical condition or traumatic injury becomes irreversible and to decrease the risk of mortality.

The high-acuity medical conditions considered for our community are:



Key contributing factors for EMS acuity include:

- Age of population
- Population density
- Per capita frequency

Table 6—EMS Risk Frequency All Incidents

Management Zone	2010	2011	2012	2013	2014	Total
South West	3,553	3,527	3,594	3,566	3,854	18,094
Downtown	3,314	3,319	3,376	3,592	3,849	17,450
West End	2,958	2,957	3,364	3,473	3,846	16,598
Upper Tacoma	3,218	3,190	3,198	3,329	3,500	16,435
South End	2,977	2,917	3,150	3,228	3,535	15,807
Eastside	2,700	2,698	2,902	2,820	2,867	13,987
South Central	1,991	2,058	2,028	1,904	1,969	9,950
Fife/District 10	1,331	1,399	1,450	1,582	1,617	7,379
North End	1,093	1,084	1,128	1,267	1,350	5,922
Northeast Tacoma	521	583	598	604	614	2,920
Tideflats	519	489	499	609	696	2,812
Point Defiance	401	393	473	442	480	2,189
Fircrest	421	437	397	428	424	2,107
Total	24,997	25,051	26,157	26,844	28,601	131,650

Table 7—EMS Risk Frequency—High-Acuity Incidents
(Cardiac, Stroke, Respiratory, Diabetes, Trauma)

Management Zone	2010	2011	2012	2013	2014	Total
South West	773	847	838	735	669	3,862
Upper Tacoma	760	846	803	687	695	3,791
West End	714	698	728	791	738	3,669
South End	759	792	794	663	607	3,615
Downtown	732	754	754	679	661	3,580
Eastside	671	726	781	641	546	3,365
South Central	457	501	482	418	327	2,185
Fife/District 10	298	272	320	343	303	1,536
North End	209	225	236	224	215	1,109
Northeast Tacoma	138	141	156	150	126	711
Tideflats	117	112	112	130	119	590
Point Defiance	88	101	116	84	85	474
Fircrest	92	101	88	102	69	452
Total	5,808	6,116	6,208	5,647	5,160	28,939

AGE OF POPULATION

The following table delineates the population by age groups throughout the FMZ's. The Point Defiance, Fircrest and West End FMZ's have the highest concentration of population over 65. The Eastside, South West and Fife/District 10 have the highest concentration of the population below age 5.

Table 8—Population Age Groups⁶

FMZ	Age 0-4	Age 5-14	Age 15-24	Age 25-49	Age 50-64	Age 65+	Total Pop
South End	2,220	3,788	4,162	9,899	5,137	3,142	28,348
% of total	7.8%	13.3%	14.7%	35%	18.1%	11.1%	100%
West End	1,426	2,631	3,230	8,262	5,461	5,057	26,067
	5.5%	10.1%	12.4%	31.7%	21%	19.3%	100%
Upper Tacoma	1,805	3,065	3,403	10,158	4,516	2,869	25,816
	6.7%	11.9%	13.2%	39.4%	17.5%	11.3%	100%
South West	2,165	3,370	4,120	9,402	3,722	1,920	24,699
	8.8%	13.6%	16.6%	38.1%	15.1%	7.8%	100%
Eastside	2,145	3,858	3,293	8,091	3,494	2,023	22,904
	9.4%	16.8%	14.4%	35.3%	15.3%	8.8%	100%
North End	1,068	1,917	3,767	6,440	4,123	1,967	19,282
	5.5%	9.9%	19.7%	33.3%	21.4%	10.2%	100%
South Central	1,305	2,260	2,216	6,794	3,174	1,636	17,385
	7.5%	13%	12.7%	39.1%	18.3%	9.4%	100%
Northeast Tacoma	1,000	2,440	2,194	5,827	3,583	1,562	16,606
	6%	14.7%	13.2%	35.1%	21.6%	9.4%	100%
Downtown	501	607	1,874	5,636	2,130	1,216	11,964
	4.2%	5.1%	15.6%	47.2%	17.7%	10.2%	100%
Fire District 10	972	1,495	1,543	4,688	1,699	793	11,190
	8.7%	13.3%	13.8%	41.9%	15.2%	7.1%	100%
Fircrest	368	829	718	2,063	1,332	1,187	6,497
	5.7%	12.7%	11.1%	31.8%	20.4%	18.3%	100%
Point Defiance	154	280	289	1033	733	868	3,357
	4.6%	8.4%	8.6%	30.8%	21.9%	25.7%	100%
Industrial	11	23	376	1057	247	86	1,800
	.6%	1.3%	20.8%	58.8%	13.7%	4.8%	100%

POPULATION DENSITY/PER CAPITA FREQUENCY

In order to compare EMS rates between the zones, a per capita analysis is necessary. When the EMS frequency of use per 1,000/population is observed in each FMZ and is compared with the high-acuity incidents, the Tideflats zone rises to the top of both tables. Additionally, the Tideflats zone leads significantly in the specific high-acuity risk categories of cardiac, stroke and trauma, whereas the Downtown zone leads in respiratory. However, it should be noted that the Tideflats and Point Defiance zones have the lowest population totals of all zones, and accurate per capita analysis becomes problematic with such a small number.

⁶ Census Data, 2010

Table 9—EMS Risk Frequency per 1,000 Resident Population—All Incidents

Zone	2010	2011	2012	2013	2014	Total
Tideflats	288	272	277	338	387	312
Downtown	277	277	282	300	322	292
South West	144	143	146	145	156	147
Fife/District 10	119	125	130	142	145	132
West End	113	113	129	133	148	127
Upper Tacoma	125	124	124	129	136	127
Eastside	118	118	127	123	125	122
South Central	115	118	117	110	113	114
South End	105	103	111	114	125	112
Point Defiance	98	96	115	108	117	107
Fircrest	65	67	61	66	65	65
North End	57	56	59	66	70	61
NE Tacoma	31	35	36	36	37	35
Grand Total	115	116	121	124	132	122

Table 10—EMS Risk Frequency per 1000 Resident Population/High-Acuity Incidents

Zone	CARD	DIAB	ENVIR	NEURO	RESP	TRAUMA	Total
Tideflats	33	3	1	9	7	15	12
Downtown	28	3	1	9	15	5	10
South West	11	2	0	5	9	3	5
Upper Tacoma	12	2	0	5	9	2	5
Eastside	11	3	0	4	9	2	5
West End	12	1	0	5	8	2	5
Fife/District 10	13	1	0	4	7	3	5
South End	9	2	0	4	8	2	4
South Central	9	2	0	4	8	3	4
Point Defiance	7	3	0	5	6	2	4
Fircrest	6	1	0	3	3	1	2
North End	4	1	0	3	3	1	2
Northeast Tacoma	3	1	0	2	2	1	1
Total	11	2	0	4	8	2	5

Analysis of EMS risk was conducted according to the following criteria:

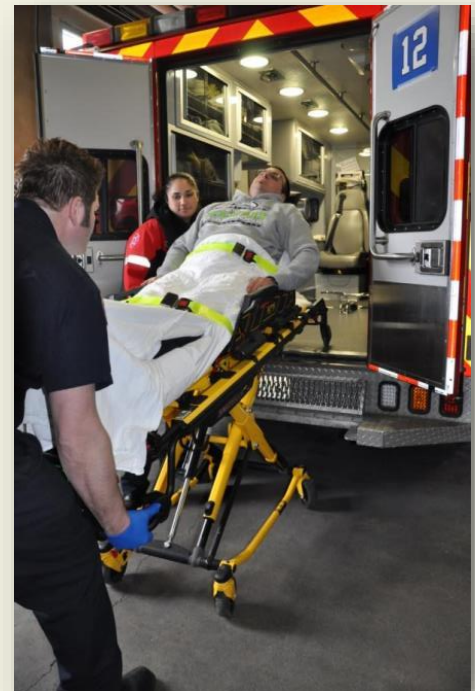
- Resident population
- Percentage of resident population over age 65
- High frequency: all EMS, high-acuity conditions
- Frequency per 1,000 resident population: all EMS, high-acuity conditions
- Consistent and emerging trends

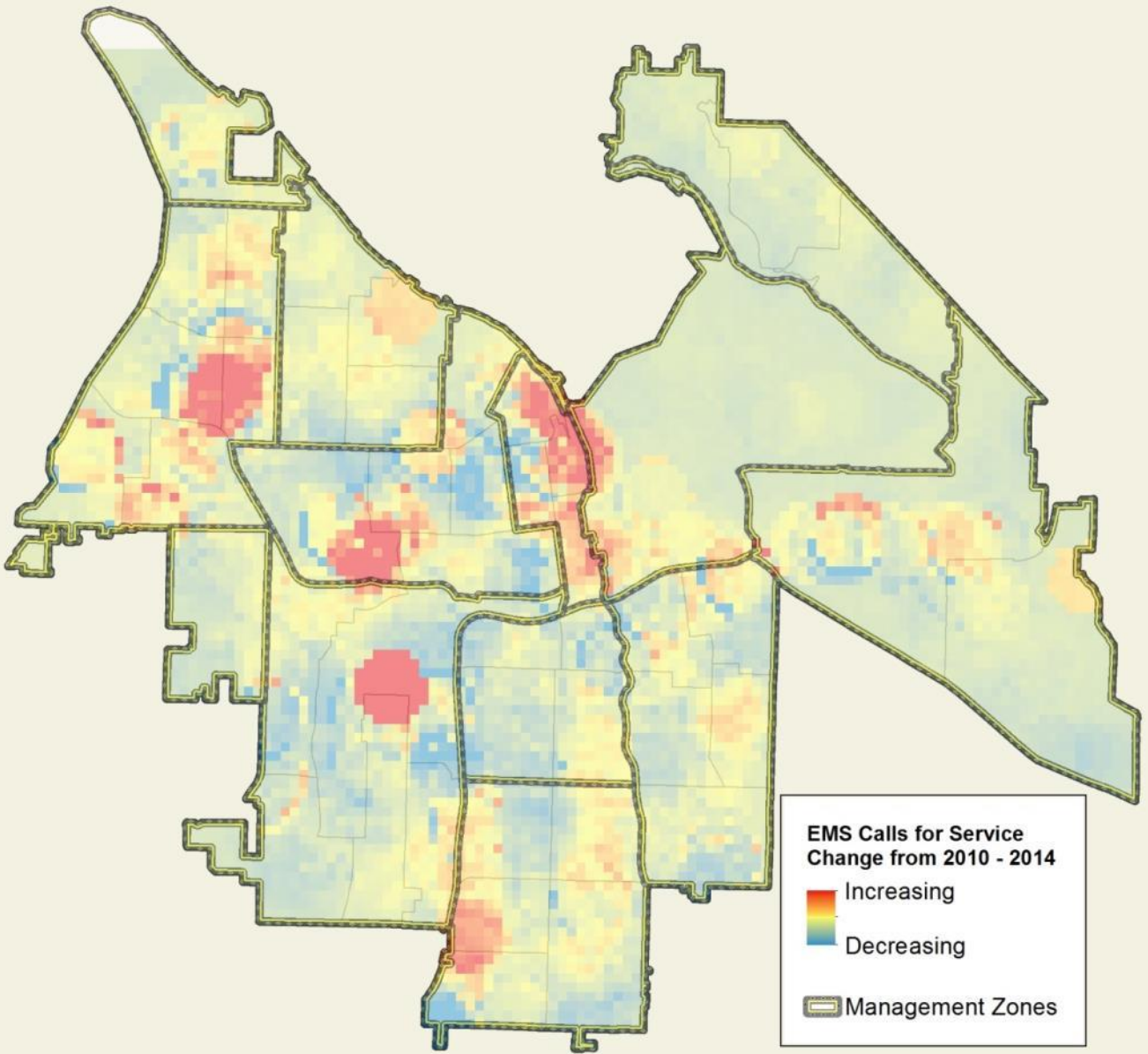
Table 11—Zone-by-Zone EMS Risk Analysis

Zone	Pop. Total	Pop. Density	% Age 65+	Frequency		Frequency		Frequency 1000	
				All EMS		High Acuity		All Calls	High Acuity
Downtown	11,964	7,871	17.7%	17,450	13.2%	3,580	12.3%	292	10
Eastside	22,904	4,821	8.8%	13,987	10.6%	3,365	11.6%	122	5
Fircrest	6,497	3,961	20.4%	2,107	1.6%	452	1.5%	65	2
Fife/District10	11,190	1,299	15.2%	7,379	5.6%	1,536	5.3%	132	5
North End	19,282	5,371	34.0%	5,922	4.4%	1,109	3.8%	61	2
NE Tacoma	16,606	4,625	21.6%	2,920	2.2%	711	2.4%	35	1
South Central	17,385	5,933	18.3%	9,950	7.5%	2,185	7.5%	114	4
South End	28,348	5,647	11.1%	15,807	12%	3,615	12.4%	112	4
South West	24,699	3,241	7.8%	18,094	13.7%	3,862	13.3%	147	5
Industrial	1,800	239	4.8%	2,812	2.1%	119	23%	312	12
Upper Tacoma	25,816	5,290	11.3%	16,435	12.4%	3,791	13%	127	5
West End	26,067	4,433	19.3%	16,598	12.6%	3,669	12.6%	127	5
Pt. Defiance	3,357	1,704	25.7%	2,189	1.6	474	1.6	107	4

The zone-by-zone EMS risk analysis based on the above criteria is shown in Table 11. Based on all of the preceding information, the following conclusions can be drawn regarding EMS risk in the TFD service area:

- FMZ's with the highest frequency of all EMS incidents:
 - South West
 - Downtown
 - West End
- FMZ's with the most high-acuity incidents per 1,000 incidents:
 - Tideflats
 - Downtown



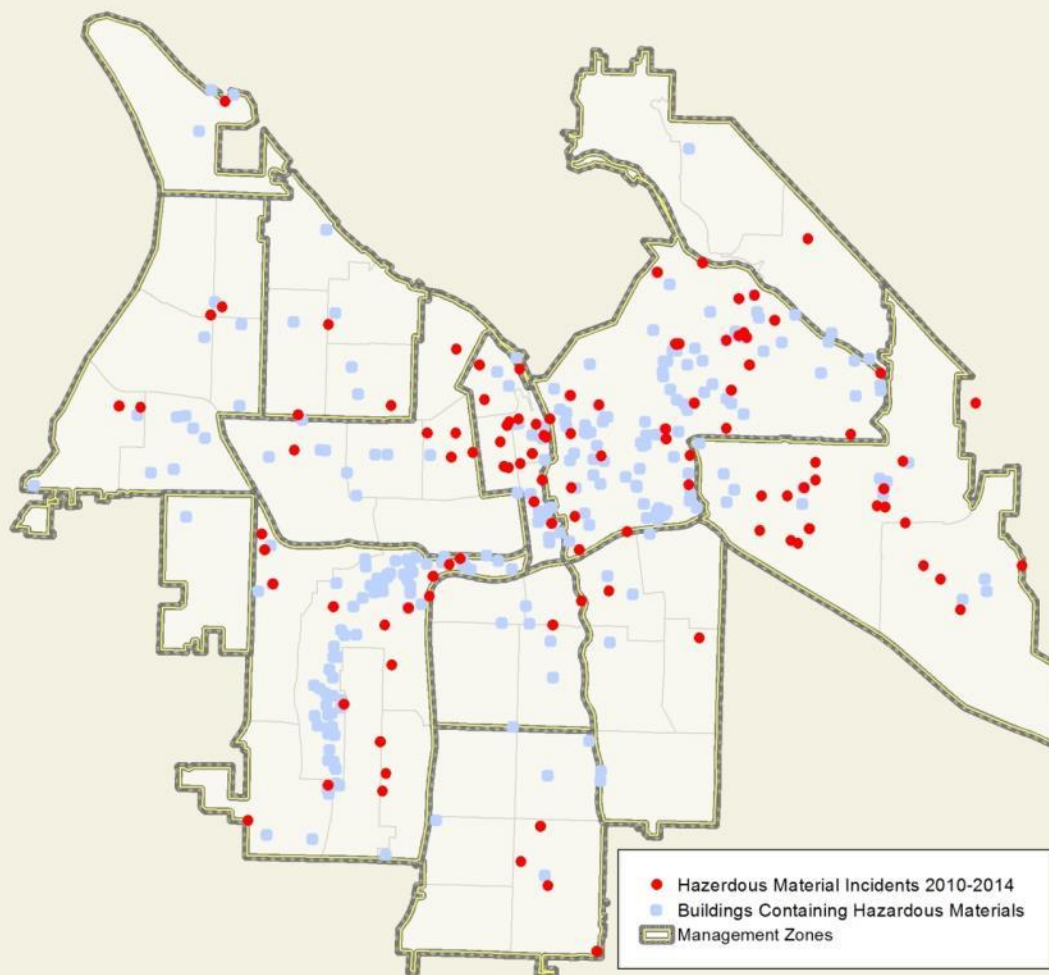


Specialty Risk

Specialty risk is defined as the structural and geographical characteristics of the community that over time persistently generate risk to life safety and/or the environment. The goal for specialty risk mitigation is to keep emergencies from escalating to prevent life and property loss and/or adverse impact on the environment. TFD provides specialty risk mitigation via its Hazardous Materials, Technical Rescue and Marine Firefighting and Rescue services.

HAZARDOUS MATERIALS

Any substance which may pose an unreasonable risk to health and safety of operating or emergency personnel, the public, and/or the environment if not properly controlled during handling, storage, manufacture, processing, packaging, use, disposal, or transportation.



TECHNICAL RESCUE

Defined as any operation that requires the use of specialized tools and skills to rescue patients and ensure the safety of first responders. For TFD, this includes rope rescue, structural collapse, confined space rescue, trench rescue and technical extrication.

MARINE

Marine risk is defined as the risks found in Commencement Bay and Port of Tacoma including but not limited to water rescue/evacuation, emergency medical services, ship/boat fires, oil/fuel spills, and ship-to-shore firefighting.

Table 12—Marine Firefighting and Rescue—All Incidents

Year	2010	2011	2012	2013	2014	Total
Incident Total	131	70	148	111	121	581

Overall analysis of special risk was conducted according to the following criteria:

- Population
- Number of specialty incidents
- Presence of:
 - Geographical and/or access issues (G/A)
 - Wildland/urban interface (W/U)
 - Critical infrastructure (CI): utilities, transportation, health, education, government
 - Heavy industry (IND)
 - Potential for significant economic impact (EI)
 - Historical/cultural value (HV)



The zone-by-zone specialty risk analysis based on the above criteria is shown in Table 13.

Table 13—Zone-by-Zone Specialty Risk Analysis 2010-2014

FMZ	Population	Density	Presence Of							
	(pop/miles)		Tech Rescue	Hazmat	G/A	W/U	CI	IND	EI	HV
Downtown	11,964	7,871	17	19	---	---	X	---	X	X
Eastside	22,904	4,821	23	2	X	X	X	---	X	X
Fircrest	6,497	3,961	6	0	---	---	X	---	X	---
Fire District 10	11,190	1,299	13	18	X	X	X	X	X	---
North End	19,282	5,371	18	4	X	X	X	---	X	X
Northeast Tacoma	16,606	4,625	6	0	X	X	X	---	---	---
South Central	17,385	5,933	12	3	X	X	X	---	X	---
South End	28,348	5,647	7	3	X	X	---	---	---	---
South West	24,699	3,241	29	20	X	X	X	X	X	---
Tideflats	1,800	239	62	42	X	X	X	X	X	---
Upper Tacoma	25,816	5,290	26	9	---	---	X	---	X	---
West End	26,067	4,433	19	4	X	X	X	---	X	---
Pt. Defiance	3,357	1,704	33	1	X	X	---	---	---	X

Based on all of the preceding information, the following conclusions can be drawn regarding specialty risk in the TFD service area:

- FMZs with the highest overall specialty risk
 - Tideflats
 - South West
- FMZs with highest HazMat risk based on number of incidents
 - Tideflats—also has 5 of 6 other risk indicators
 - South West—also has 5 of 6 other risk indicators
- FMZs with highest Tech Rescue risk based on number of incidents
 - Tideflats—also has 5 of 6 other risk indicators
 - Point Defiance—also has 3 of 6 other risk indicators
 - South West—also has 5 of 6 other risk indicators
- FMZs with lowest Specialty risk
 - Fircrest—has 2 of 6 other risk indicators
 - NE Tacoma—has 3 of 6 other risk indicators
- Marine fire risk
 - Possible emerging risk in Port of Tacoma area with proposed development



Natural & Technological

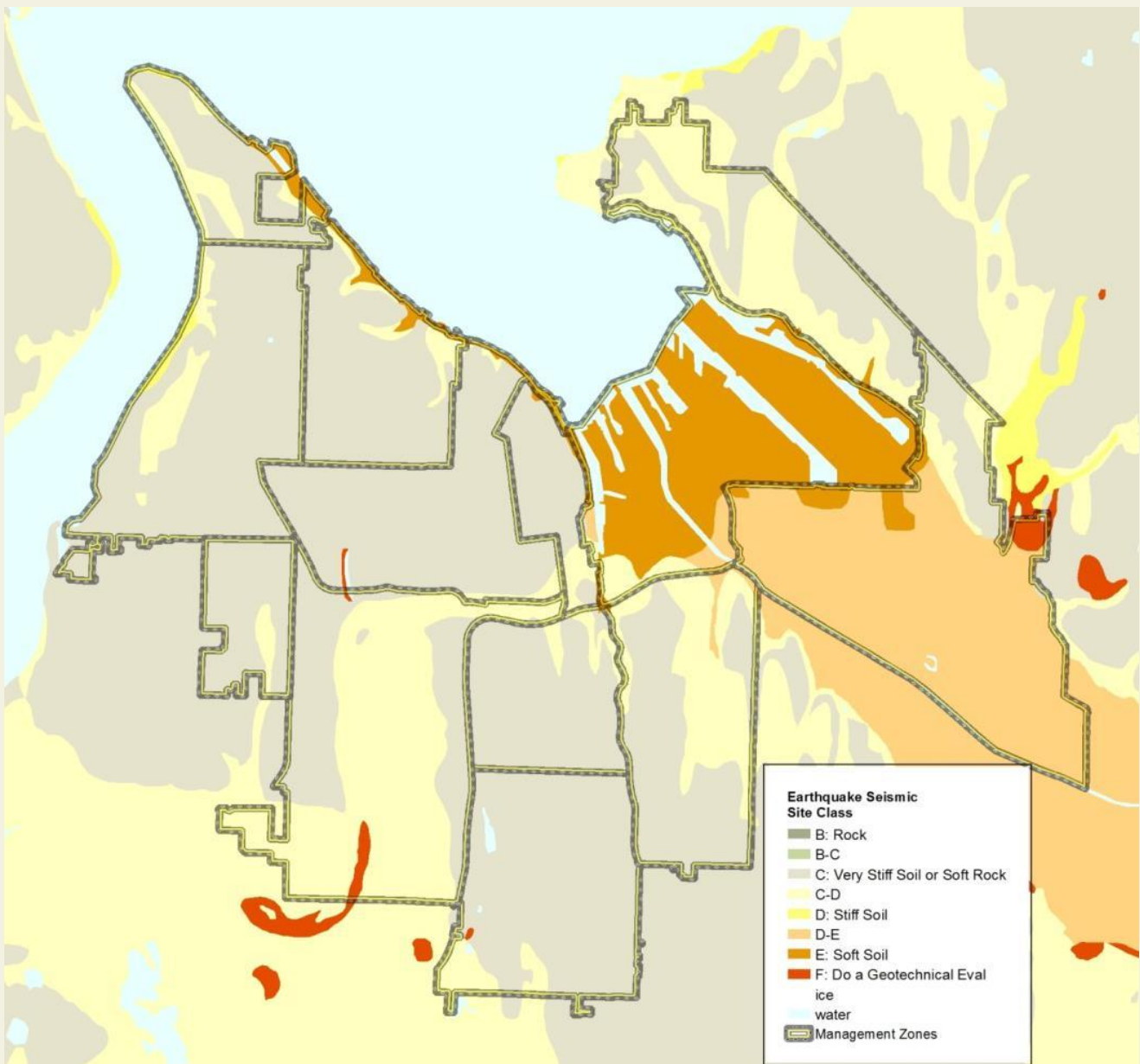
In addition to traditional risks that the department responds to, are natural and human-caused disasters. Given numerous stakeholders (Federal Emergency Management Association, local emergency managers, Universities, etc.) have conducted extensive research in most of these areas, references will direct the reader to a more in-depth analysis by subject matter experts.

GEOLOGICAL HAZARDS

This category identifies the major hazards that are typically associated with the movement of the earth's crust that pose a threat to life and property.

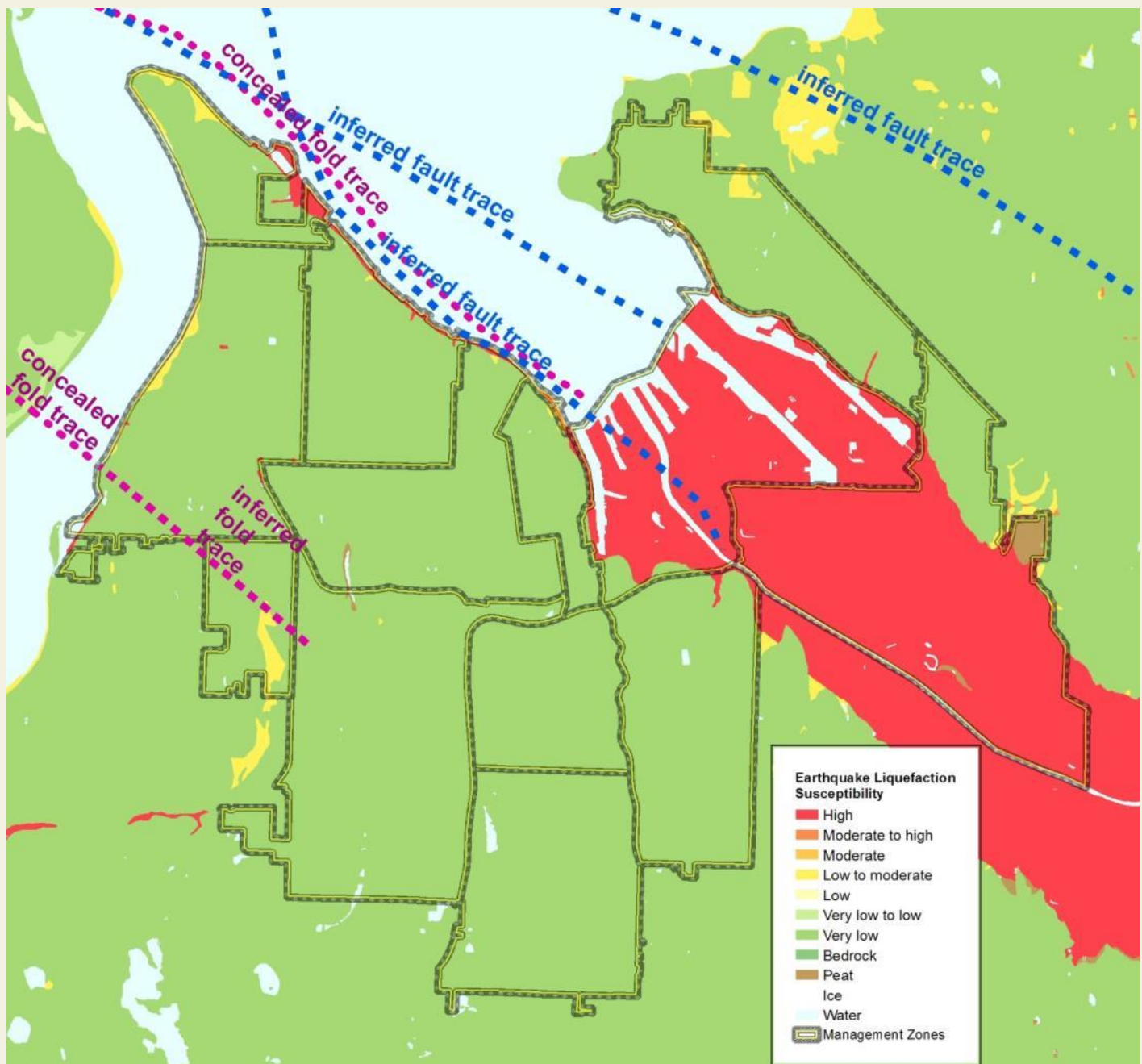
Earthquake/Liquefaction

Potentially the most catastrophic of all natural disasters, the threat of a significant seismic event in our response district is most prominent in the area identified on the map below. Type B (rock) having the least amplification and Type E (soft soil) the most.



Liquefaction

Soil liquefaction describes a phenomenon whereby a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress, usually earthquake shaking, causing it to behave like a liquid. This process has been responsible for tremendous amounts of damage in historical earthquakes around the world.

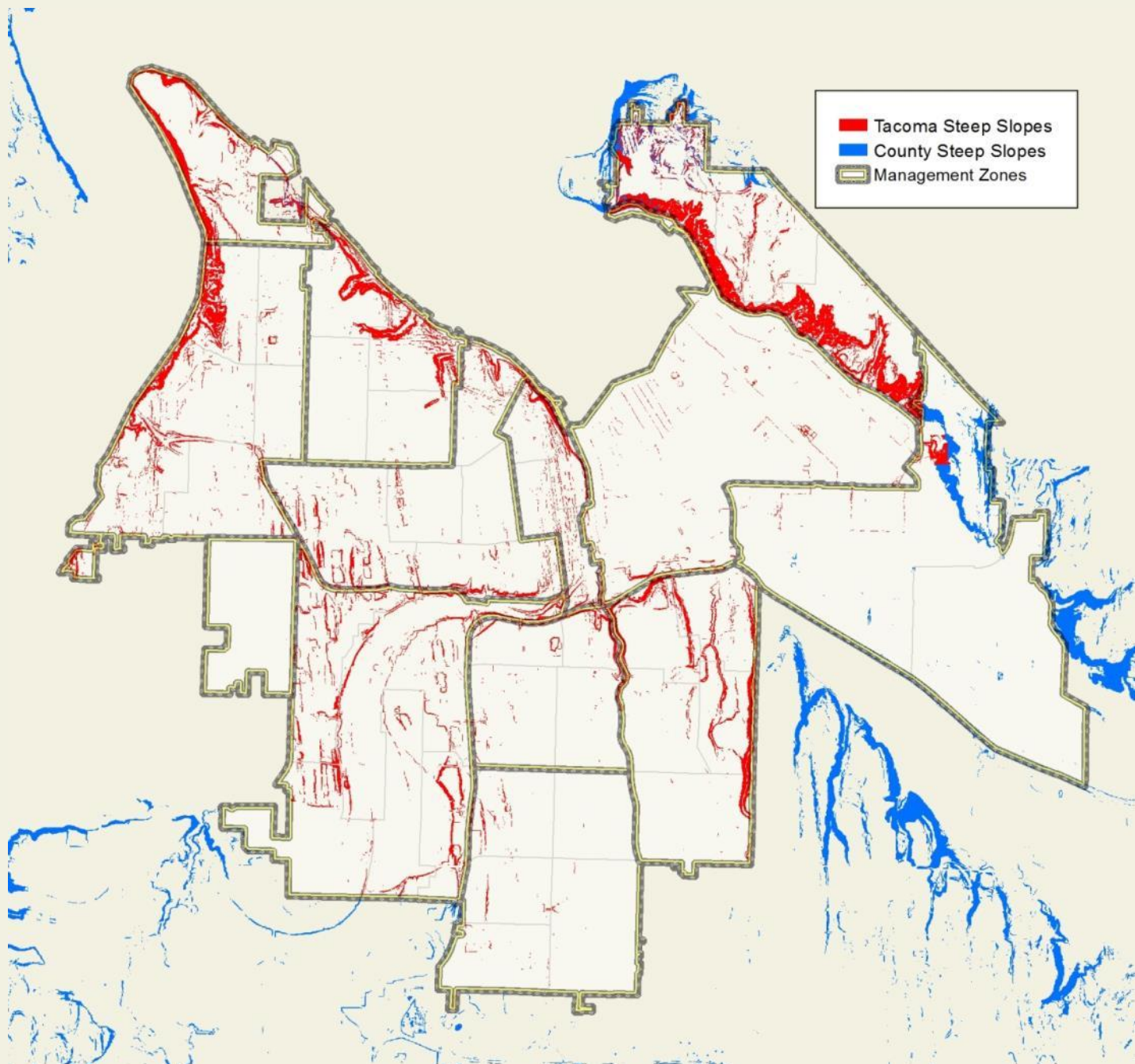


More details about Liquefaction are available from the University of Washington.

<http://www.ce.washington.edu/~liquefaction/html/main.html>

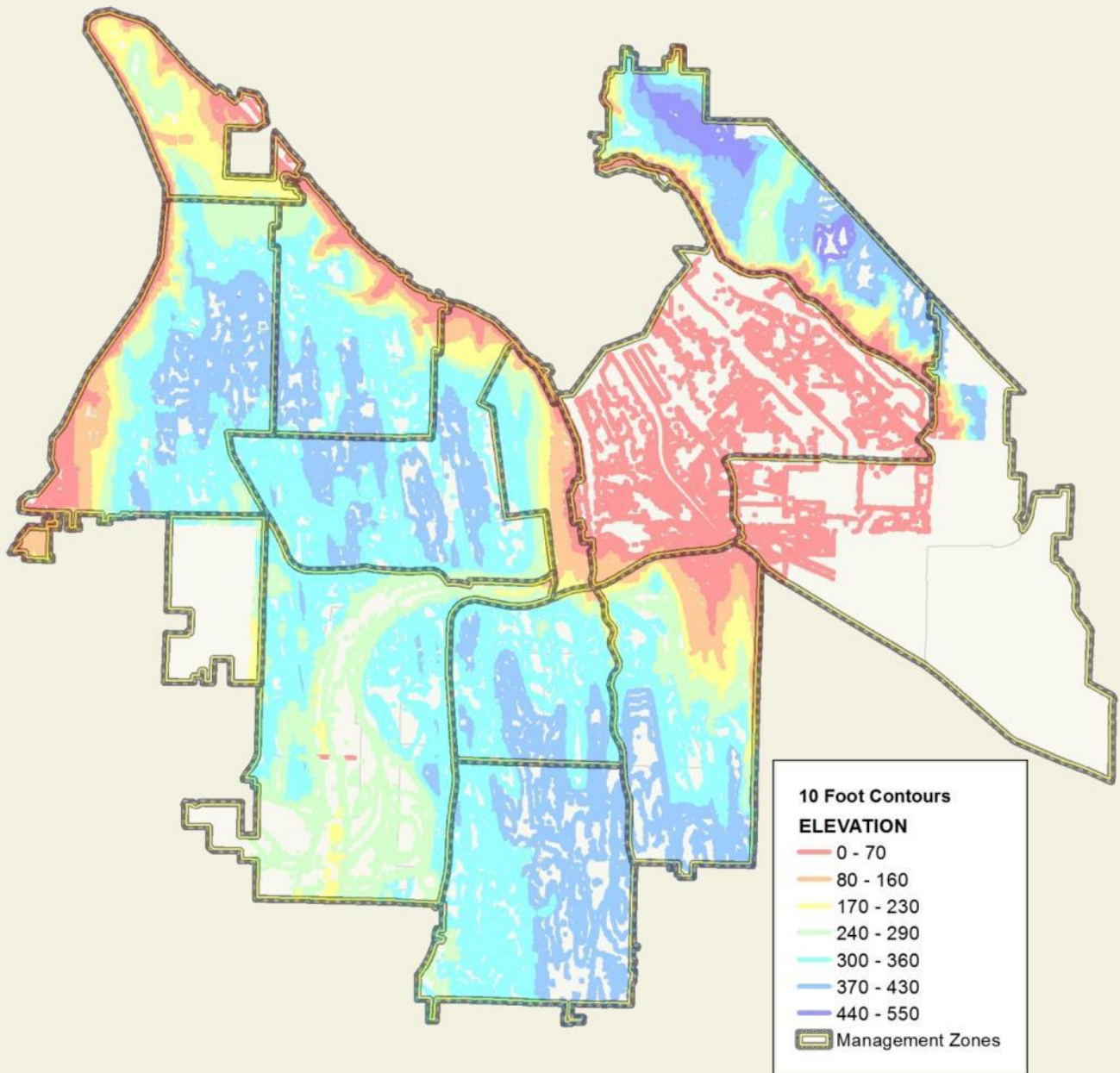
Steep Slopes

Our region's hilly terrain combined with high levels of rainfall could trigger significant landslides in the region.



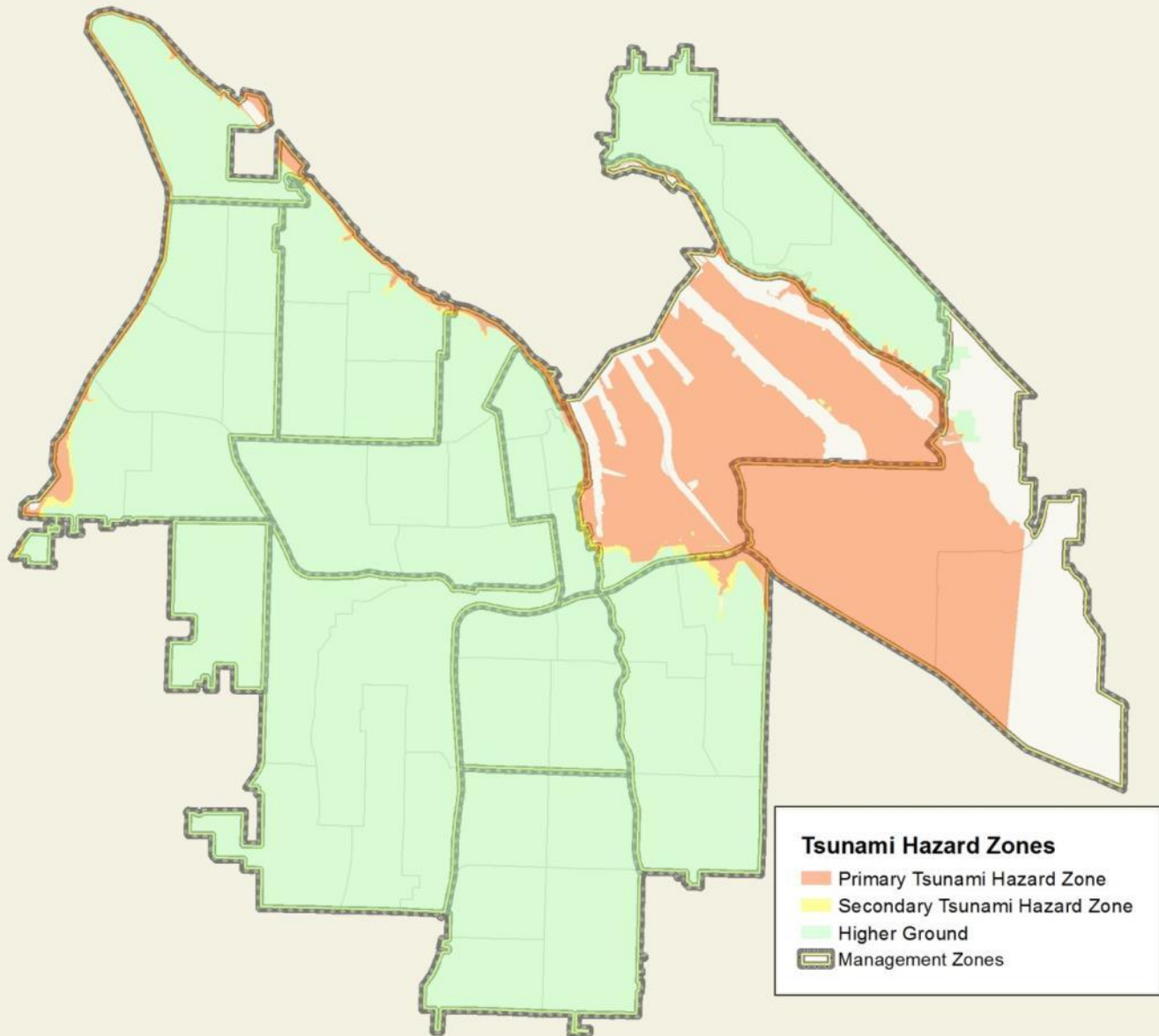
Contour Map

This map illustrates the various contours (hilly terrain and slopes) throughout and the service area.



Tsunami

Triggered by a seismic event, a tsunami is possible in the areas adjacent to Commencement Bay.



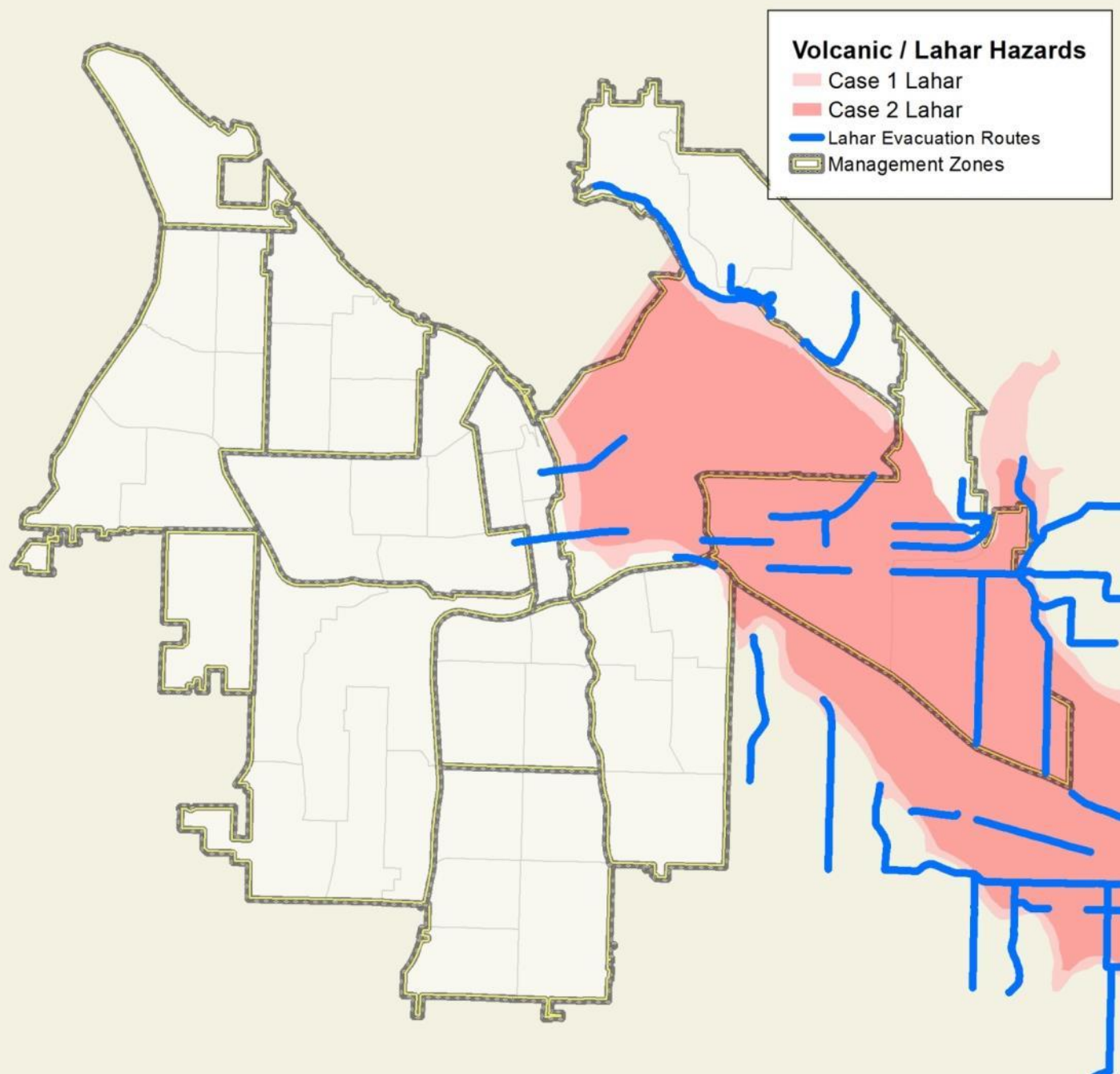
Detailed Tsunami information is available from the Washington State Department of Natural Resources.

<http://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/tsunamis>

Volcanic/Lahar

Proximity to Mt. Rainier, adds a threat of an eruption event that could cause a lahar in our response area.

A lahar is a type of mudflow or debris flow that typically follows a river valley.



Detailed information about Mt. Rainier and Lahar is available from Pierce County.

<http://www.piercecountywa.org/activevolcano>

METEOROLOGICAL

Weather events present several hazards in our response area. The impacts of global climate change have garnered much research in the last decade. Greenhouse gas scenarios have been developed by climate modeling centers for use in modeling global and regional climate impacts. Locally, predictions for the Puget Sound Region include:

- warming temperatures,
- heavy rainfall in terms of frequency and intensity that could exacerbate flood risks in many watersheds,
- rising sea level,
- a greater proportion of winter precipitation to fall as rain rather than snow,
- an increase in landslide risk, erosion, and sediment transport in fall, winter and spring,
- general flooding

For a detailed description of impacts please see the 2015 University of Washington College of the Environment report, “State of Knowledge: Climate Change in Puget Sound.” <https://cig.uw.edu/resources/special-reports/ps-sok/>

Drought and Wildland Urban Interface

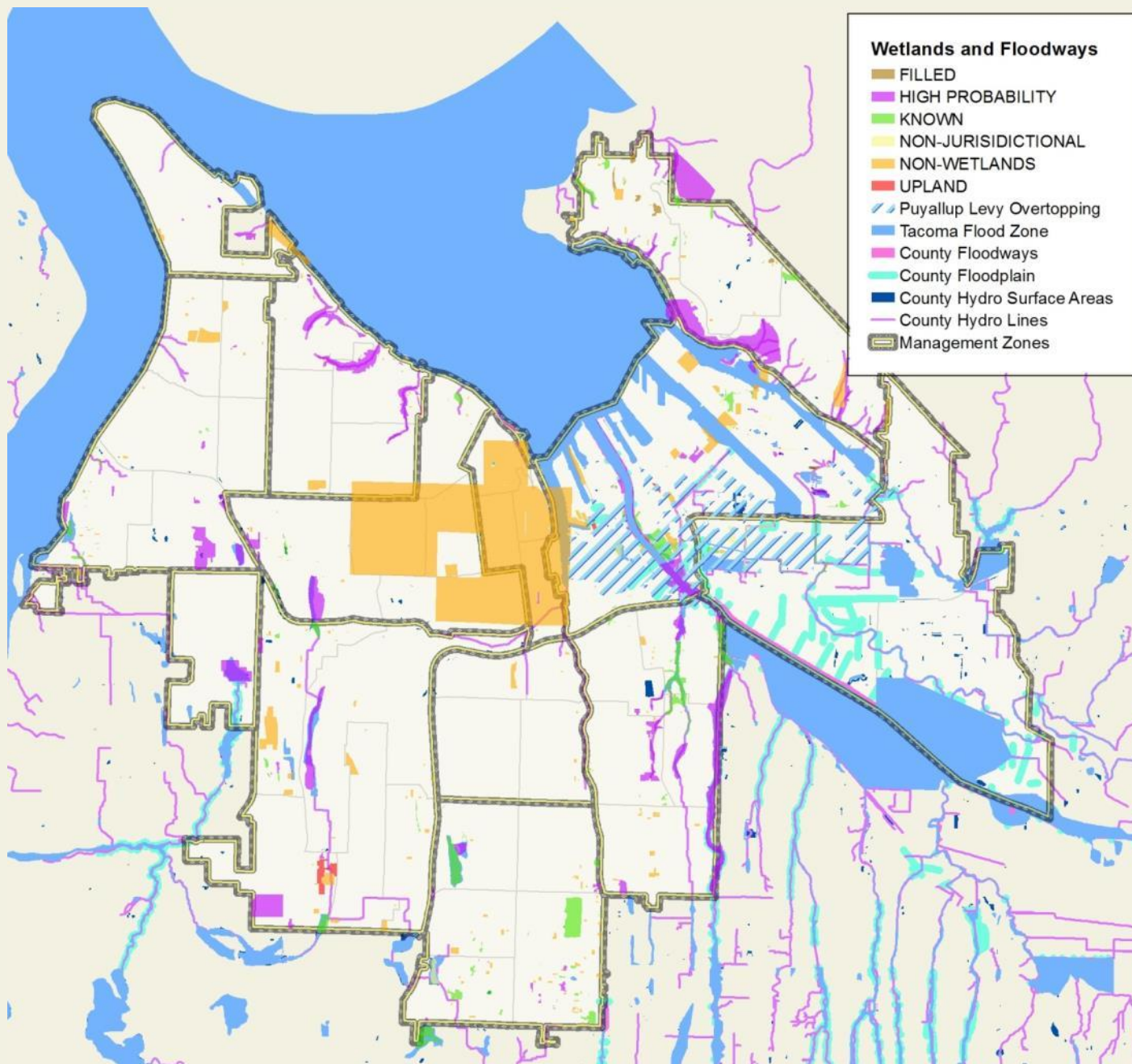
A sustained period without precipitation could increase the fire danger in our wildland-urban interfaces. The area’s most likely at risk are Point Defiance Park, Swan Creek Park, West Slope and NE Tacoma areas. As mentioned, climate change predictive models continue to point to hotter and dryer summers in our region that may lead to “Eastern Washington type wildfires” in Western Washington.



FIGURE 1 FIRE - SWAN CREEK PARK - AUGUST 12, 2015

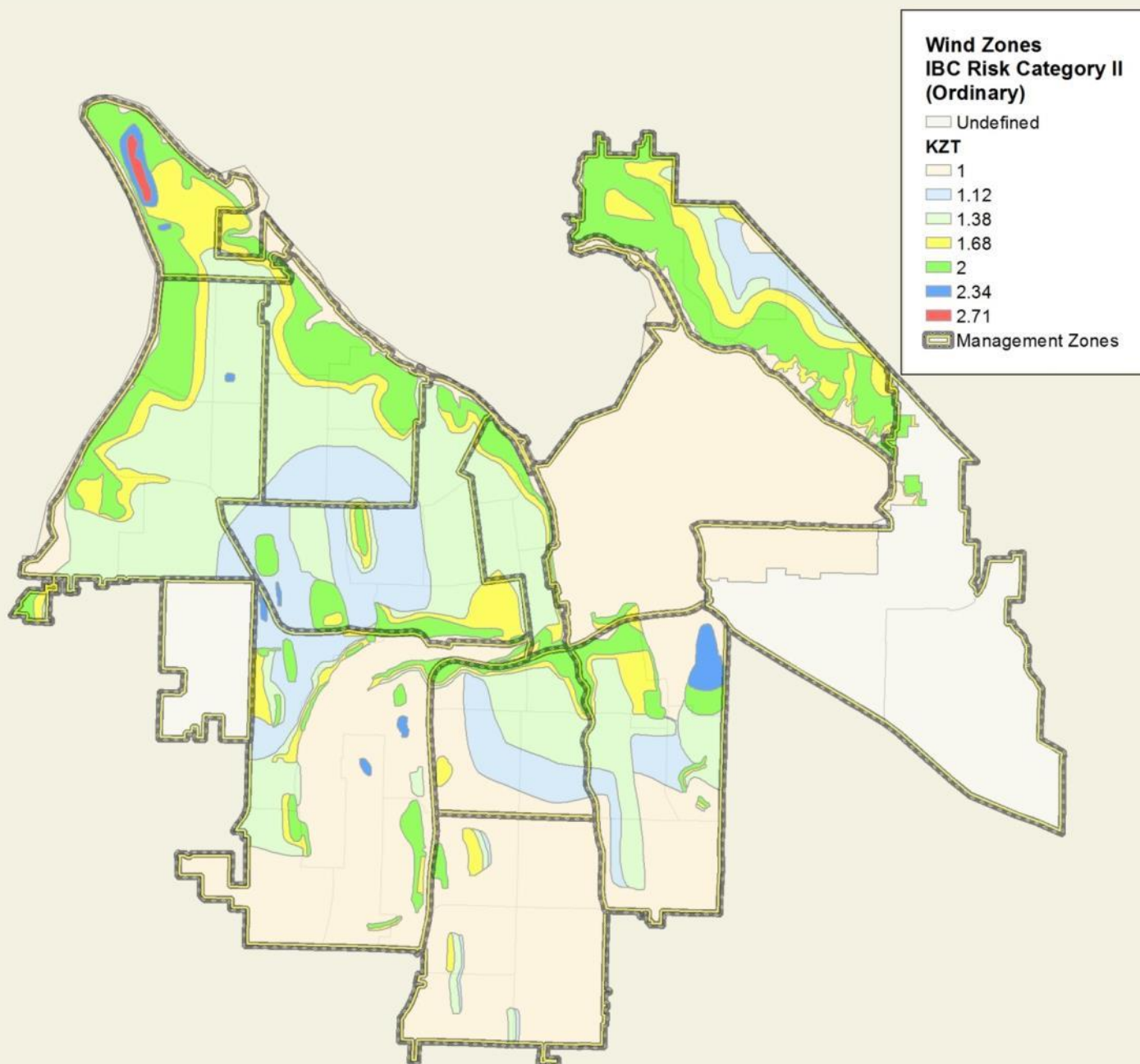
Flood

Floods are one of the most common meteorological threats occurring in our service area.



High Wind

As illustrated below, the northern portion of our response area is prone to higher wind loads. Wind storms often result in falling trees that knockout power, fall on structures/automobiles and create traffic hazards in our service area. "KZT" is a topographic wind speed-up factor.



TECHNOLOGICAL

There are some human-made disasters that can occur with some warning, such as knowing a dam is weak and, without proper mitigation, it will break releasing a flood. However, most of the serious human-caused disasters are the result of unexpected accidents or deliberate acts of terrorism.

Civil Disturbance

Forms of protest against society could result in a mass casualty incident.

Epidemic/Outbreak

Pandemic flu or another type of event could create a disaster for the community and first responders alike.

- Center for Disease Control—<http://www.cdc.gov/flu/pandemic-resources/>

Energy Emergency

The creation and transportation of energy-related products pose a threat in our service area.

Rail Lines

Increased transportation of crude oil by rail has developed as an emerging risk in our response area. The State Department of Ecology has several resources regarding this topic.

<http://www.ecy.wa.gov/programs/spills/OilMovement/index.html>



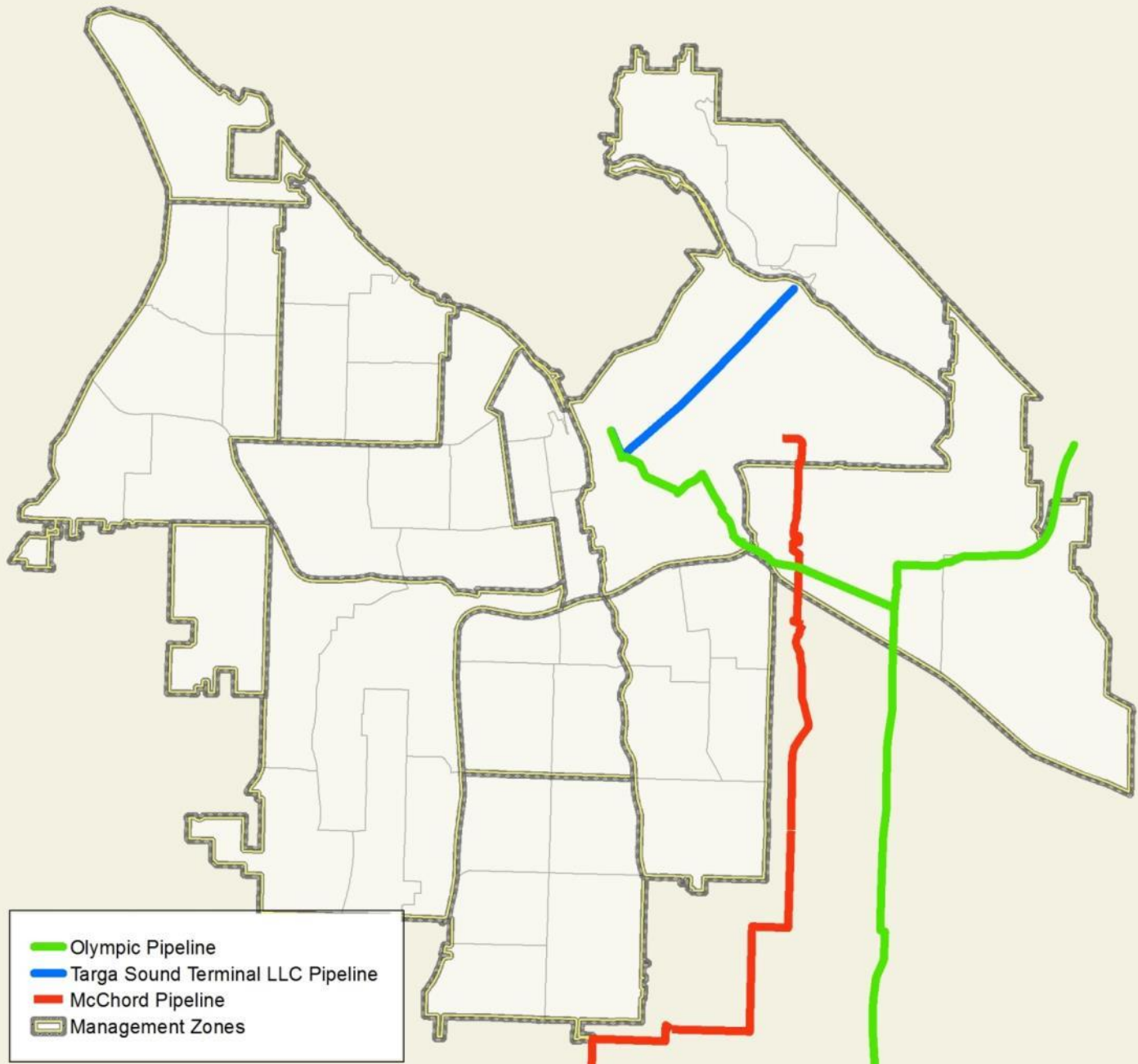
Pipelines

Pipelines are regulated by the Washington Utilities and Transportation Commission.

<http://www.utc.wa.gov/regulatedIndustries/transportation/pipeline/Pages/default.aspx>

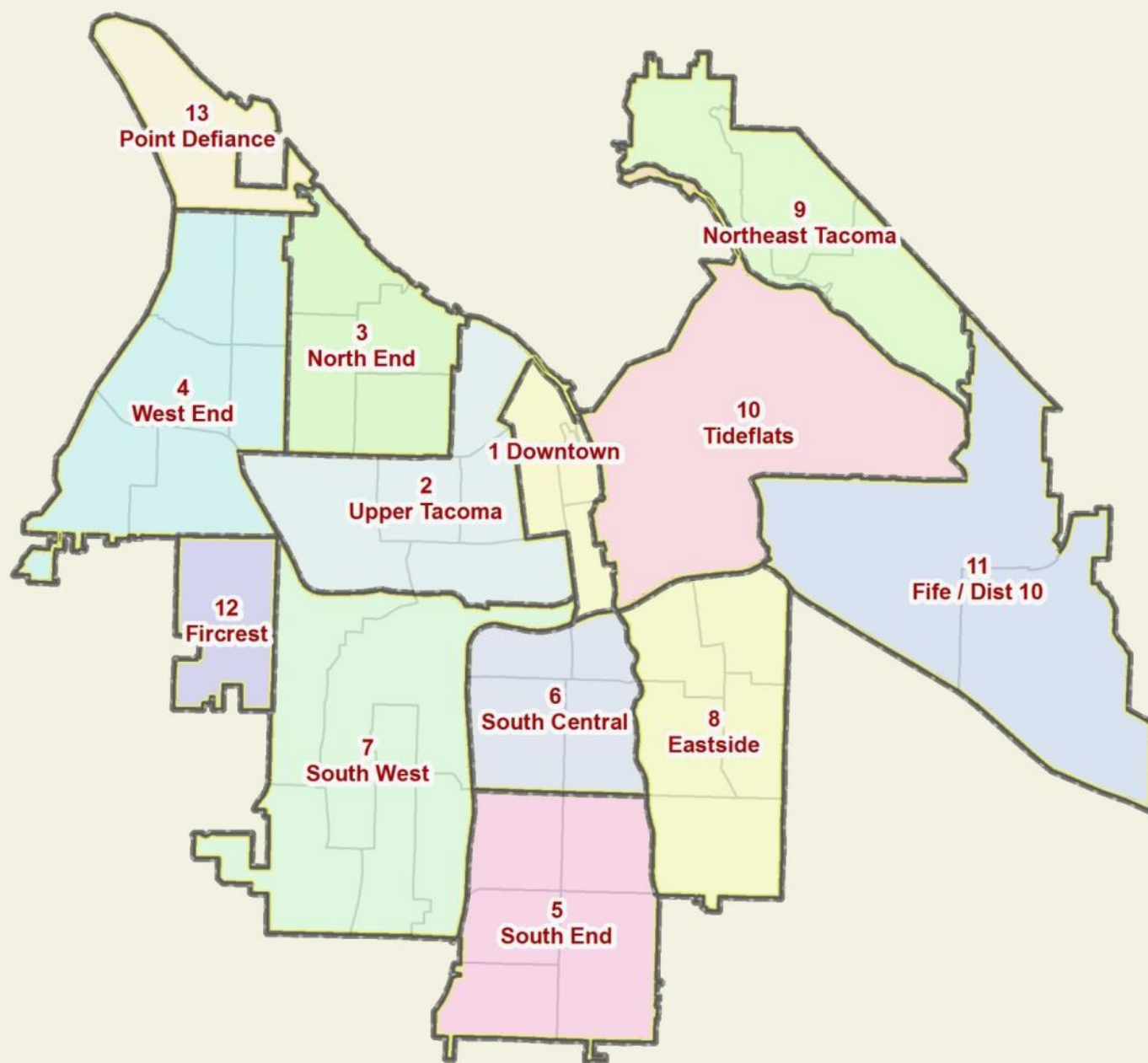
Olympic Pipeline—<http://www.olympicpipeline.com/>

McChord Pipeline—<http://www.mcchordpipeline.com/>

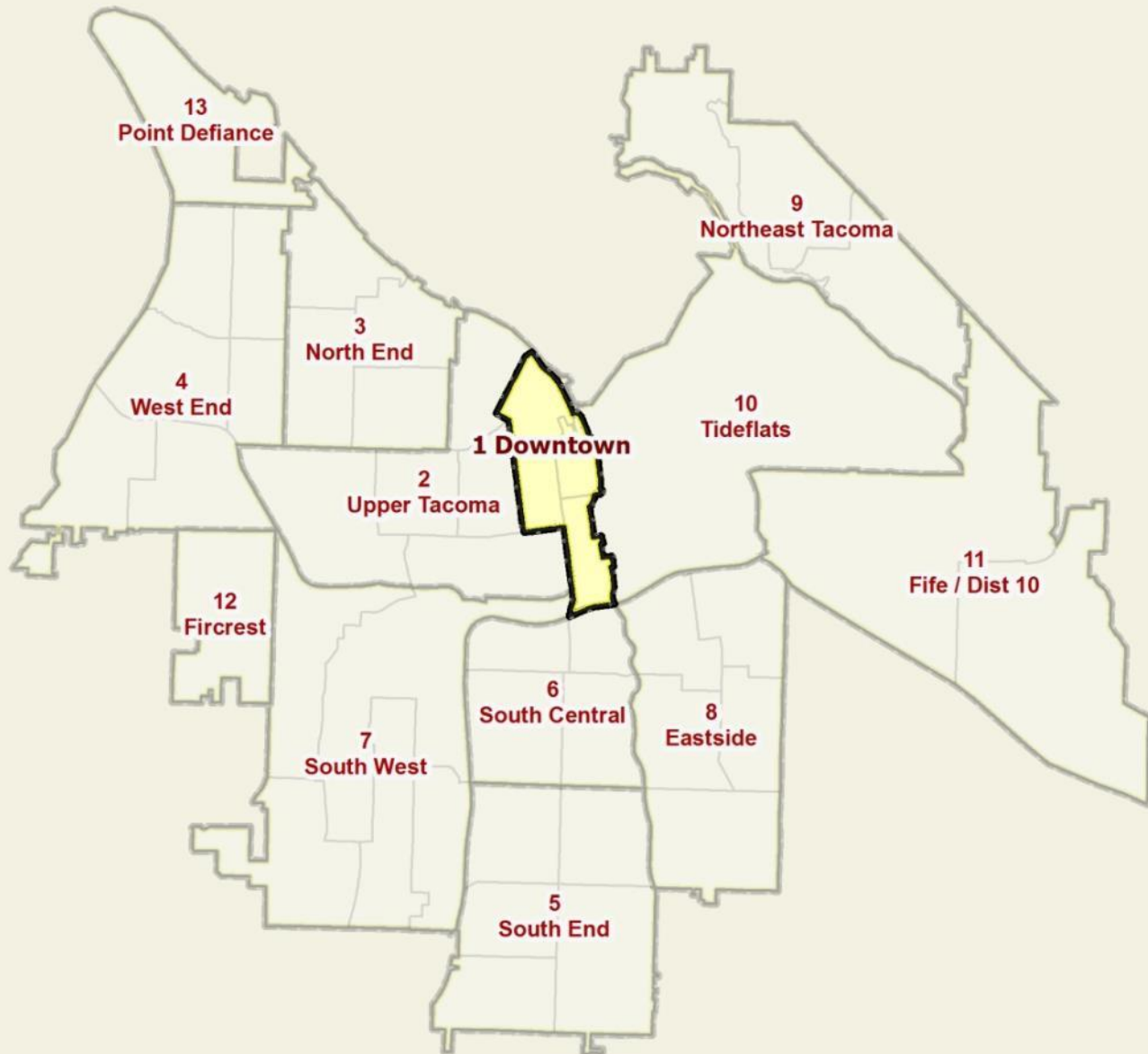


FIRE MANAGEMENT ZONE DETAILS

The following analysis will focus on the hazards specific to each of the FMZs.



Downtown Fire Management Zone



FMZ Demographic Snapshot

	Sub-zone	Response Area
Population estimate	11,964	215,915
Persons under 5	4.2%	7%
Persons 65 years and over	10.2%	11.3%
Female persons	43.8%	50.7%
Male persons	56.2%	49.3%
Homeownership rate	10.9%	54.1%
Renter rate	89.1%	45.9%
Average household size	1.58	2.45

TFD Resources

Station	Apparatus	Personnel
1	Engine 1/Ladder 1	6
2	Engine2/Battalion 2	4

DOWNTOWN FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> Concentration of high density unsprinklered condos and high- rise buildings Marinas and docks (west side of Foss Waterway) Low-rise sprawling complexes Large unsprinklered vacant buildings Concentration of high value older, historic homes along Yakima Ave going into Old Town Hotels 	<ul style="list-style-type: none"> Three hospitals Museums Government buildings UW Tacoma Convention Center Jail Historic Stadium High School Theater district Landmark Convention Center Grain elevator Railroad Electrical vaults Fire Communications Center SR 509 I-705 Qwest switch Historic buildings Bates Tech College 	<ul style="list-style-type: none"> Highest concentration of high-risk structures in the TFD service area High-value historic homes have access limited by narrow roads, hilly topography Several large assembly facilities in older buildings Presence of critical infrastructure; all of which require high fire flow—utilities, transportation, health care, public safety No water on elevated roadways (SR 509 and I-705) Large vacant buildings present life exposure risk to surrounding structure

EMS RISK (based on resident population)

	<ul style="list-style-type: none"> 2nd in frequency for all incidents 4th in frequency for all high-acuity incidents 2nd in frequency of ems per 1,000 1st in frequency per 1,000 for high-acuity risks of respiratory and stroke
--	---

SPECIALTY RISK

<ul style="list-style-type: none"> Construction sites Marinas Docks Grain elevator 	<ul style="list-style-type: none"> Three hospitals Museums Government buildings UW Tacoma Convention Center 	<ul style="list-style-type: none"> One of the highest risk for tech rescue; mostly steep angle, rope, and trench incidents
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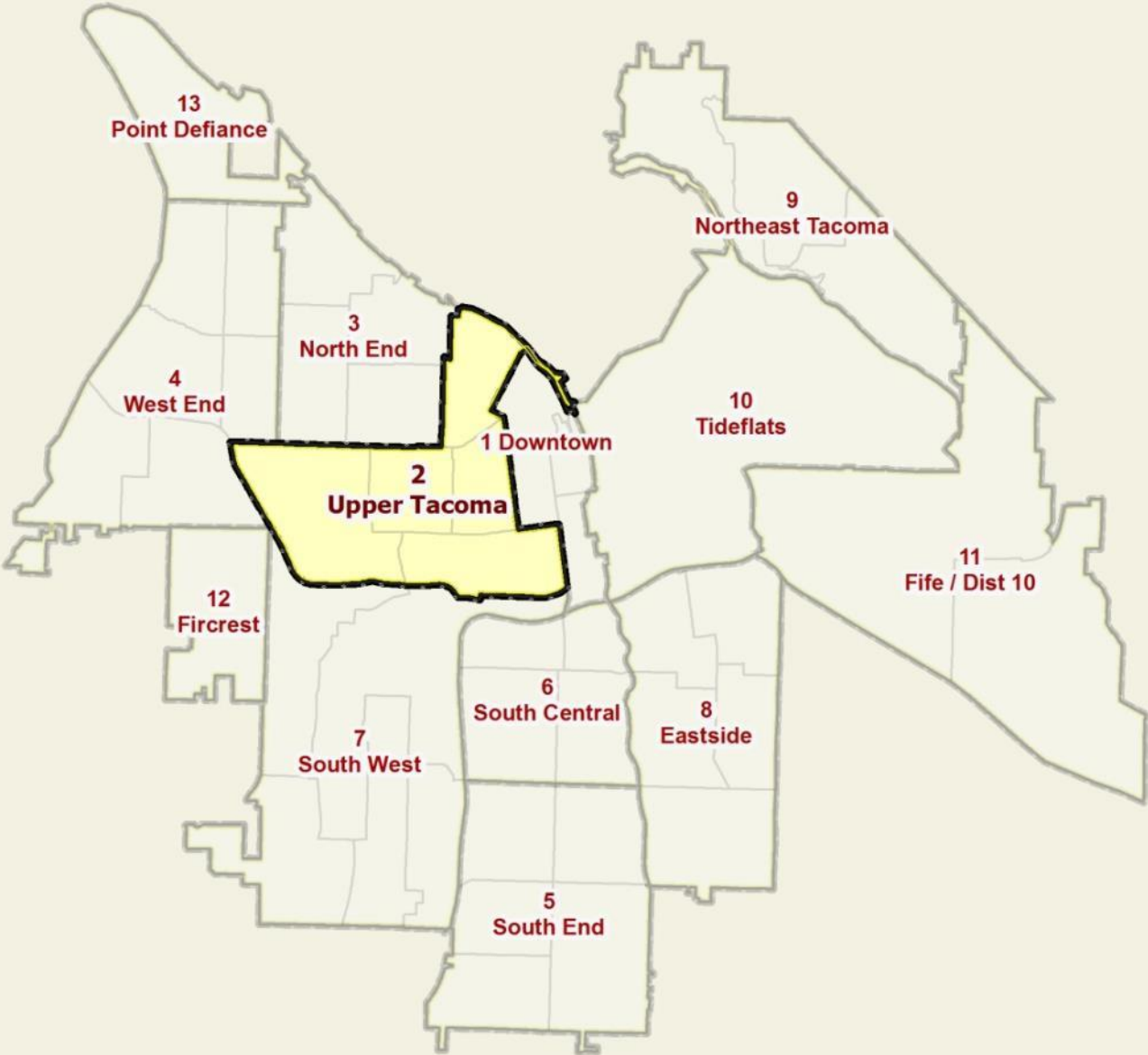
- Railroad
- Electrical vaults
- Large vacant buildings
- Low-rise sprawling complexes
- Concentration of high-density condos and high rise buildings
- Jail
- Historic Stadium High School
- Theater district
- Landmark Convention Center
- Jail
- Fire Communication Center
- SR 509 and I-705
- Qwest switch
- Historic buildings
- Bates Tech College
- Grain elevator
- Railroad
- Electrical vaults
- The risk remains consistent with ongoing construction activity in the zone
- The risk remains consistent with the topography in the zone

NATURAL AND TECHNOLOGICAL RISK

- Liquefaction
- Landslide
- Tsunami
- High wind
- Rail traffic
- Small portion of the FMZ along the Thea Foss is susceptible to the impacts from Liquefaction and Tsunami
- Steep slopes and high rainfall amounts have resulted in landslides in the Northeast portion of the zone around Schuster Parkway and Stadium High School



Upper Tacoma



FMZ

Demographic Snapshot

	Sub-zone	Response Area
Population estimate	25,816	215,915
Persons under 5	7%	7%
Persons 65 years and over	11.1%	11.3%
Female persons	51.8%	50.7%
Male persons	48.2%	49.3%
Homeownership rate	52.3%	54.1%
Renter rate	47.7%	45.9%
Average household size	2.35	2.45

TFD Resource List

Station	Apparatus	Personnel
4	Engine 4/Medic 4	5
9	Engine 9/ Battalion 1	4

UPPER TACOMA FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> Older, unsprinklered commercial development along Union Ave, 6th Ave Several older, unsprinklered residential high-rise buildings High density of older residential structures Life Center; church, school, residential Annie Wright; residential school Concentration of high value older homes In the glide path for McChord AFB 	<ul style="list-style-type: none"> Cheney Stadium Elks Lodge Historic homes Annie Wright School Allenmore Hospital Schools 	<ul style="list-style-type: none"> Higher concentration of schools Life Center primary residential structures unsprinklered Higher concentration of older construction multifamily residential; many are unsprinklered Concentration of high-value older and/or historic homes with limited access ("pie" between Division and 6th Avenue)

EMS RISK (based on resident population)

<ul style="list-style-type: none"> 4th in frequency for all ems incidents 5th in frequency per 1,000 for all ems incidents
--

SPECIALTY RISK

<ul style="list-style-type: none"> Commercial development along Union Ave, 6th Ave Residential high-rise buildings Detached single-family dwellings In the glide path for McChord AFB 	<ul style="list-style-type: none"> Cheney Stadium Elks Lodge Historic homes Allenmore Hospital Schools 	<ul style="list-style-type: none"> 4th highest frequency for calls for tech rescue; mostly steep angle and rope incidents Consistent with topography of the zone
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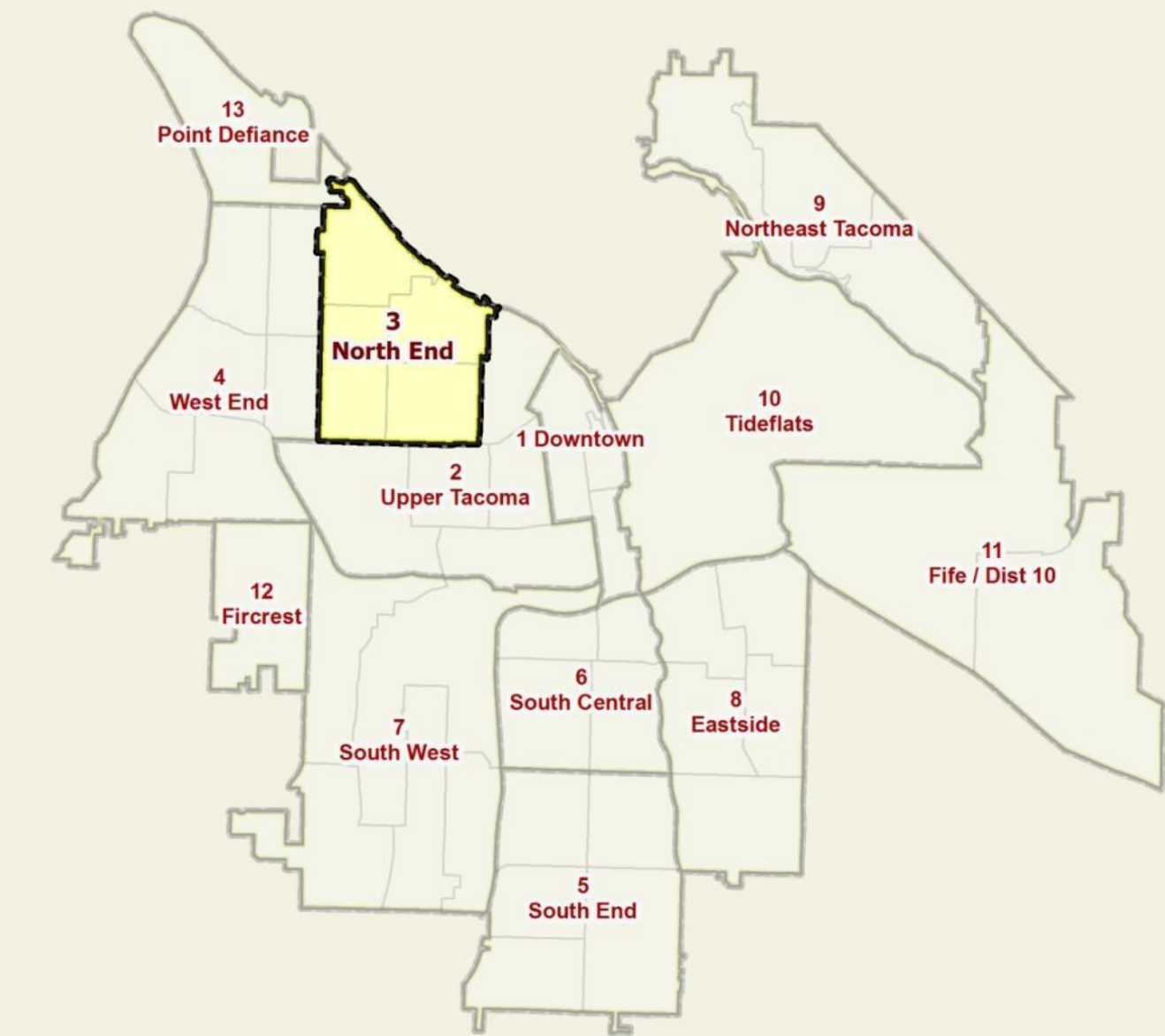
NATURAL AND TECHNOLOGICAL RISK

<ul style="list-style-type: none"> Tsunami High wind Rail traffic 	<ul style="list-style-type: none"> Tsunami risk along the northern portion of the FMZ where "Old Town" area meets Commencement Bay
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- Moderate risk to high wind events
- Rail traffic through populated area along Ruston Way/Schuster Parkway



North End



FMZ

Demographic Snapshot

	Sub-zone	Response Area
Population estimate	19,282	215,915
Persons under 5	5.5%	7%
Persons 65 years and over	10.2%	11.3%
Female persons	48%	50.7%
Male persons	52%	49.3%
Homeownership rate	73.3%	54.1%
Renter rate	26.7%	45.9%
Average household size	2.36	2.45

TFD Resource List

Station	Apparatus	Personnel
13	Squad13/Ladder 3	5
14	Engine 14	3

NORTH END FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> • Marinas • Nursing homes and retirement communities • Concentration of older, unsprinklered commercial buildings along 6th Ave, waterfront, Old Town, Proctor • Prospect Hill • In the glide path for McChord AFB • Hotel 	<ul style="list-style-type: none"> • Old Town • University of Puget Sound • Schools • Ferry dock • Railroad along waterfront • Railroad tunnel • Designated historic homes 	<ul style="list-style-type: none"> • High concentration of cultural and historical structures • High concentration of high-value and/or historic homes • Topographical challenges; high-value homes built on hillsides and/or narrow streets that limit access, some too steep for ladder access

EMS RISK (based on resident population)

<ul style="list-style-type: none"> • 5th in vulnerable population 65 and over

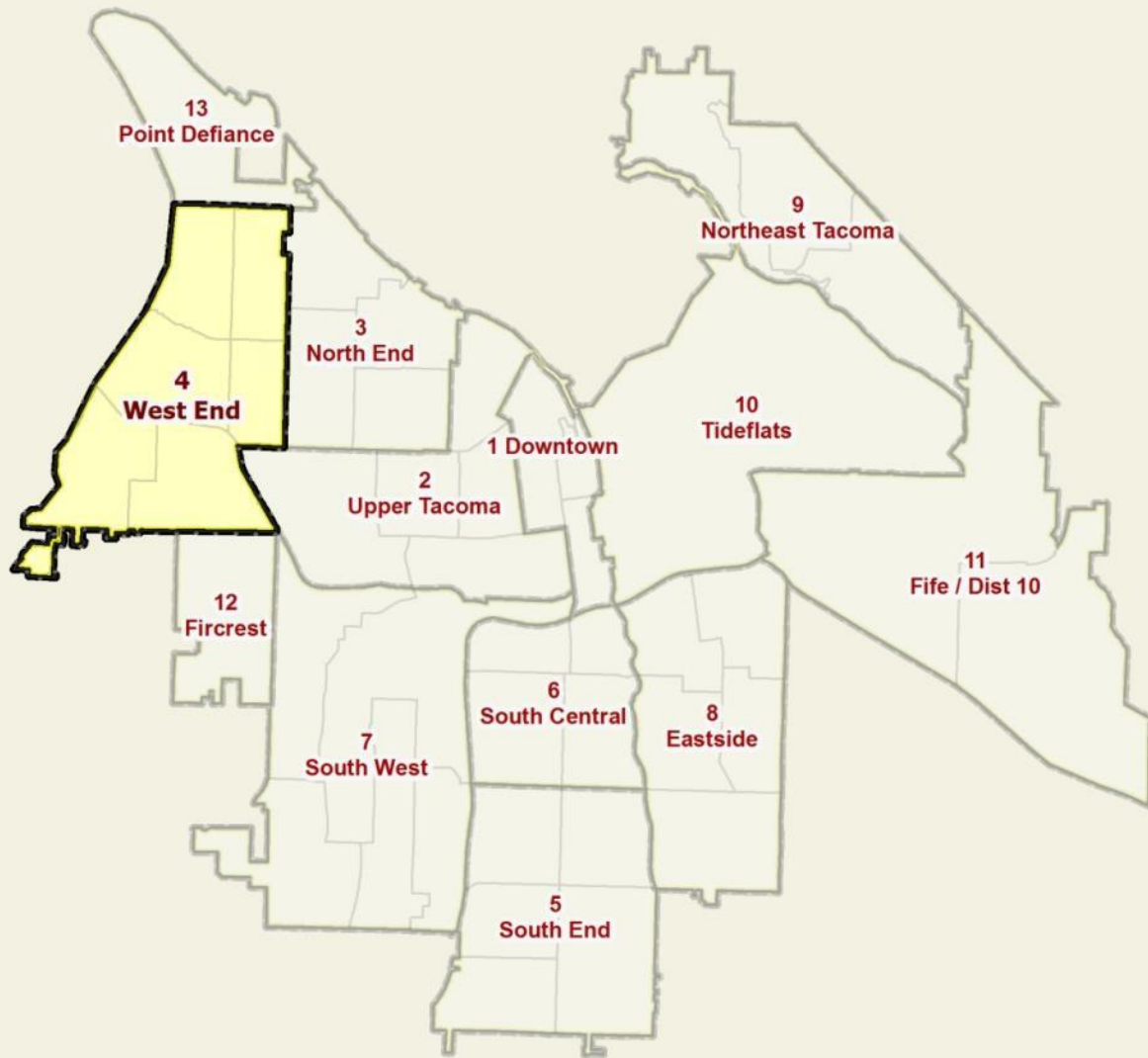
SPECIALTY RISK

<ul style="list-style-type: none"> • Commercial development along Union Ave, 6th Ave • Residential high-rise buildings • Detached single-family dwellings • In the glide path for McChord AFB 	<ul style="list-style-type: none"> • Cheney Stadium • Elks Lodge • Historic homes • Allenmore Hospital • Schools 	<ul style="list-style-type: none"> • Seventh highest frequency for calls for tech rescue; mostly steep angle and rope incidents • Consistent with topography of the zone
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NATURAL AND TECHNOLOGICAL RISK

<ul style="list-style-type: none"> • Stiff/soft soil/earthquake • Liquefaction • Tsunami • High wind 	<ul style="list-style-type: none"> • Liquefaction and stiff/soft soil in North portion of the FMZ near Commencement Bay • Tsunami risks near Commencement Bay • Moderate risk to high wind events
--	--

West End



FMZ Demographic Snapshot

	Sub-zone	Response Area
Population estimate	26,067	215,915
Persons under 5	5.5%	7%
Persons 65 years and over	19.4%	11.3%
Female persons	53%	50.7%
Male persons	47%	49.3%
Homeownership rate	52.1%	54.1%
Renter rate	47.9%	45.9%
Average household size	2.11	2.45

TFD Resource List

Station	Apparatus	Personnel
16	Engine 16/Medic 1	5

WEST END FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> • Several nursing homes and retirement communities • Marina • Several older, unsprinklered multifamily units • Commercial development • Juvenile detention facility • High-value homes • Narrows Bridges 	<ul style="list-style-type: none"> • Narrows Bridges • Schools • Tacoma Community College • Railroad along shoreline • Westridge Apartment Complex • Wildland/urban interface—hillside along shoreline 	<ul style="list-style-type: none"> • Risk dispersed overall; highest concentration along major arterials—Pearl St., 6th Ave. • Concentration of high-value homes overlooking water • Narrows Bridges are critical transportation and economic infrastructure; increased fire risk due to no water supply on the old bridge • Westridge—limited access, concentration of older, unsprinklered multifamily residences • 1 ladder has good access; 2nd ladder delayed response due to distance—increases risk for commercial response

EMS RISK (based on resident population)

	<ul style="list-style-type: none"> • 3rd in frequency of all ems incidents • Tied for 5th in frequency of high-acuity ems incidents • 5th in frequency per 1000 for all ems incidents • 4th in frequency per 1000 for high-acuity risk of cardiac
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SPECIALTY RISK

<ul style="list-style-type: none"> • Narrows Bridges • Railroad along shoreline • Marinas • Commercial development • Detached single-family dwellings 	<ul style="list-style-type: none"> • Narrows Bridges • Schools • Tacoma Community College • Railroad along shoreline • Wildland/urban interface—hillside along shoreline 	<ul style="list-style-type: none"> • Narrows Bridges represent critical transportation and economic infrastructure • 1st ladder has good access; 2nd ladder delayed response due to distance • Fireboat response for marinas, wildland/urban interface also
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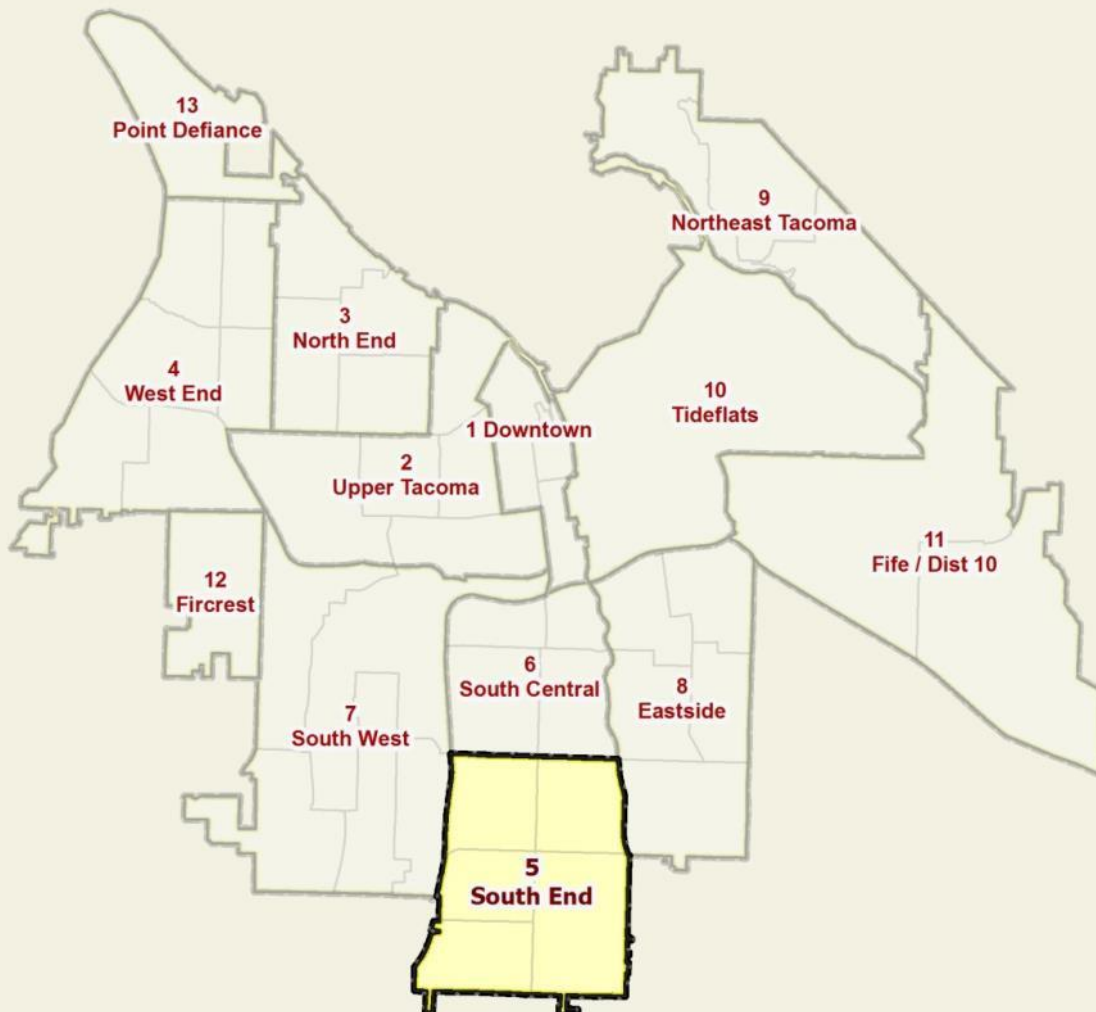
delayed due to distance and potentially to staffing

- Limited access to wildland urban interface areas

NATURAL AND TECHNOLOGICAL RISK

- Steep slopes/landslides
- Tsunami
- High wind
- Rail traffic
- Steep slopes along western portion of FMZ
- Higher risk for Tsunami impacts along Commencement Bay
- Moderate to high risk for high wind event
- Rail line travels length of the FMZ

South End



FMZ Demographic Snapshot

	Sub-zone	Response Area
Population estimate	28,348	215,915
Persons under 5	7.8%	7%
Persons 65 years and over	11.1%	11.3%
Female persons	51%	50.7%
Male persons	49%	49.3%
Homeownership rate	60.2%	54.1%
Renter rate	39.8%	45.9%
Average household size	2.75	2.45

TFD Resource List

Station	Apparatus	Personnel
10	Engine 10	3

SOUTH END FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> Commercial corridor with older construction along Pacific Ave, South Hosmer High density, older single and unsprinklered multifamily residential Nursing homes Large vacant buildings 	<ul style="list-style-type: none"> Wildland/urban interface along southern edge of zone 	<ul style="list-style-type: none"> Limited access to wildland/urban interface areas High concentration of older commercial and residential

EMS RISK (based on resident population)

	<ul style="list-style-type: none"> 5th in frequency for all ems incidents 4th in frequency for high-acuity incidents Tied for 4th in frequency per 1000 for high-acuity incidents of respiratory and trauma
--	---

SPECIALTY RISK

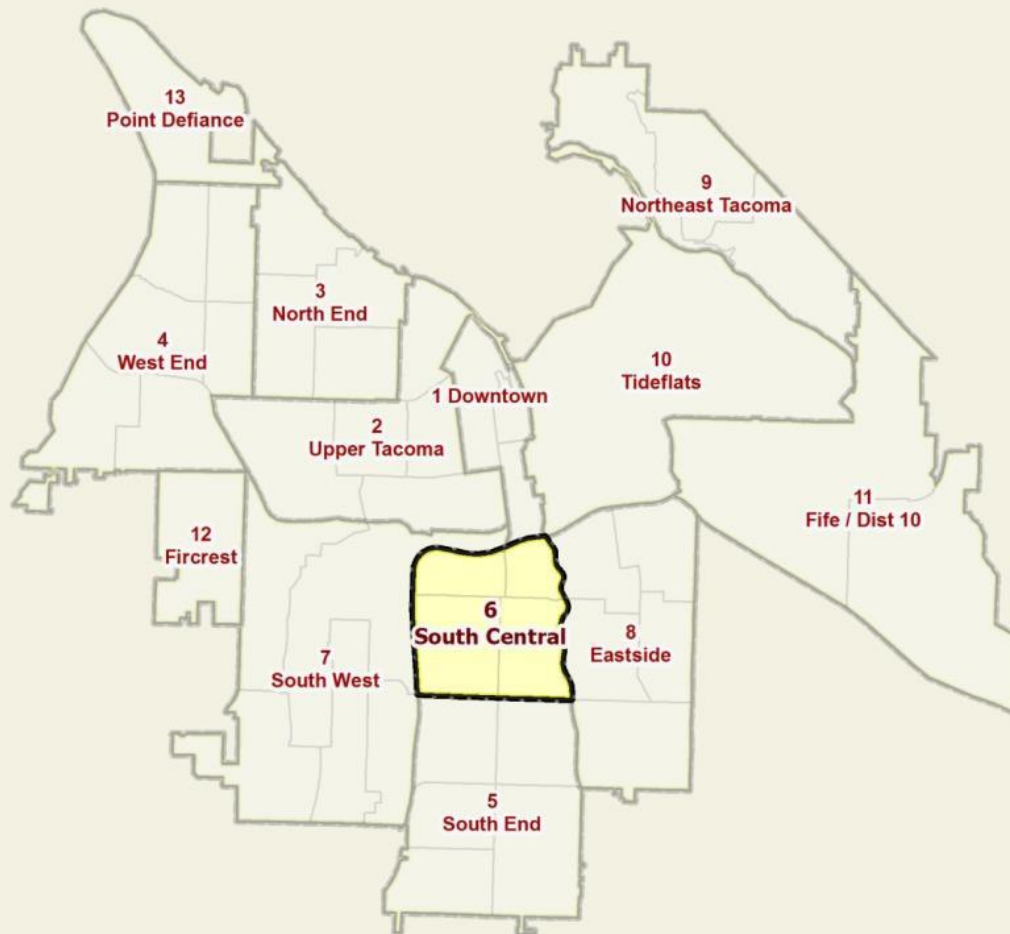
<ul style="list-style-type: none"> Detached single-family dwellings Commercial corridor along Pacific Ave, So. Hosmer Construction sites 	<ul style="list-style-type: none"> Wildland/urban interface along southern edge of zone 	<ul style="list-style-type: none"> Limited access to wildland urban interface areas
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- Railroad

NATURAL AND TECHNOLOGICAL RISK

- Stiff Soil/Earthquake
- Earthquake magnitude risk higher due to stiff soil in the Southwest area of the FMZ

South Central



FMZ Demographic Snapshot

	Sub-zone	Response Area
Population estimate	17,385	215,915
Persons under 5	7.5%	7%
Persons 65 years and over	9.4%	11.3%
Female persons	51%	50.7%
Male persons	49%	49.3%
Homeownership rate	61.9%	54.1%
Renter rate	38.1%	45.9%
Average household size	2.6	2.45

TFD Resource List

Station	Apparatus	Personnel
8	Engine 8/Ladder 2/Medic 2 Battalion 3/Tech Rescue	8

SOUTH CENTRAL FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> Concentration of high-density residential Commercial corridor along Pacific Ave., So. 38th Some high-rise 	<ul style="list-style-type: none"> Government buildings I-5 Railroad Wildland/urban interface—gulley along eastern border 	<ul style="list-style-type: none"> I-5 has limited access and water supply, tanker hazards High concentration of high-density residential structures Railroad has grade issues in this zone; brakes cause sparks which cause fire in dry season Limited access to wildland/urban interface areas

EMS RISK (based on resident population)

	<ul style="list-style-type: none"> 7th in frequency for all ems incidents and high-acuity incidents Tied for 3rd in high-acuity risk for trauma Tied for 2nd and 3rd in the high acuity risks of diabetes and respiratory
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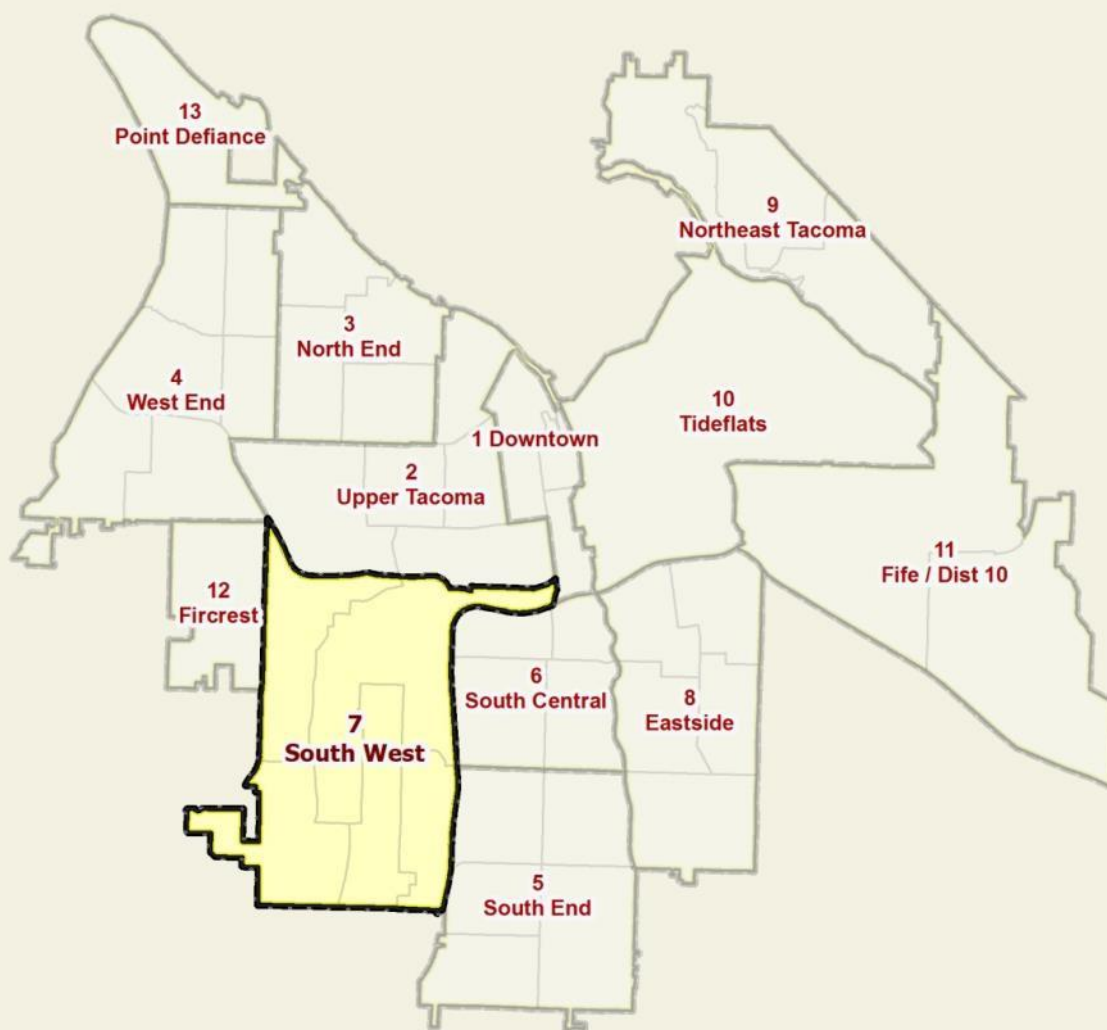
SPECIALTY RISK

<ul style="list-style-type: none"> Commercial corridor along Pacific, So. 38th Some high rise Construction sites Railroad Single-family dwellings 	<ul style="list-style-type: none"> Government buildings I-5 Railroad Wildland/urban interface—gulley along eastern border 	<ul style="list-style-type: none"> Concentration of high density single-family residential Limited access to wildland urban interface areas
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NATURAL AND TECHNOLOGICAL RISK

<ul style="list-style-type: none"> Stiff Soil/Earthquake Steep Slope/Landslide High Wind 	<ul style="list-style-type: none"> Stiff soil in the Northern portion of the FMZ Steep slopes along the North and North East portion of the FMZ Moderate risk high for high wind events
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South West



FMZ Demographic Snapshot

	Sub-zone	Response Area
Population estimate	24,699	215,915
Persons under 5	8.8%	7%
Persons 65 years and over	7.8%	11.3%
Female persons	51.3%	50.7%
Male persons	48.7%	49.3%
Homeownership rate	38.4%	54.1%
Renter rate	61.6%	45.9%
Average household size	2.51	2.45

TFD Resource List

Station	Apparatus	Personnel
1	Engine 7	3

SOUTH WEST FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> Tacoma Mall High-density multifamily residential Industrial and old retail structures along South Tacoma Way, through the Nalley Valley General Plastics Unsprinklered large vacant or storage buildings In the glide path for McChord AFB 	<ul style="list-style-type: none"> Tacoma Mall Schools Public Safety buildings Government buildings Tacoma Public Utilities building Railroad Bates Tech College I-5 Java Jive (historic restaurant) Wildland/urban interface—S. 35th to S. 56th and S. Tyler to South Tacoma Way 	<ul style="list-style-type: none"> Third highest concentration of high-risk structures; follow Nalley Valley and South Tacoma Way Concentration of critical infrastructure—public safety, government, transportation, utilities I-5 has limited access and water supply, tanker hazards Some high-density residential; multifamily residential has limited access Large vacant/storage buildings present life safety and/or exposure risk to surrounding structures Limited access to wildland/urban interface areas

EMS RISK (based on resident population)

	<ul style="list-style-type: none"> 1st in frequency for all ems incidents 1st in frequency of high-acuity incidents 3rd in frequency per 1000 for high-acuity incidents of stroke 2nd in frequency per 1000 for high-acuity incidents of respiratory
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SPECIALTY RISK

<ul style="list-style-type: none"> Tacoma Mall Industrial and retail structures along South Tacoma Way, through the Nalley Valley General Plastics 	<ul style="list-style-type: none"> Tacoma Mall Schools Public Safety Government buildings Tacoma Public Utilities building 	<ul style="list-style-type: none"> Second highest risk for HazMat Location of incidents follows the historical railway lines through the Nalley Valley
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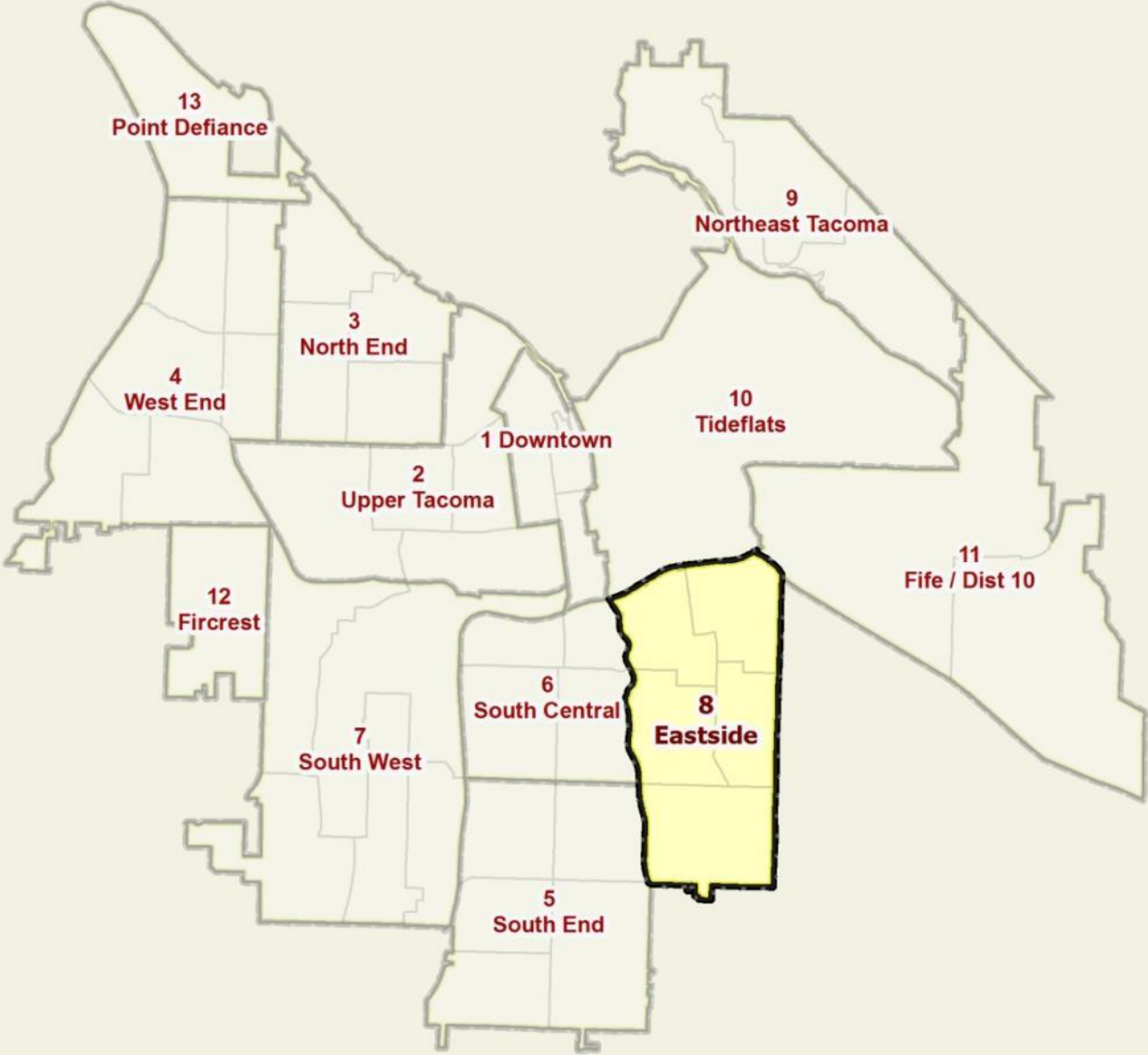
- Large vacant or storage buildings
- In the glide path for McChord AFB
- Railroad
- Multi-story multifamily dwellings with access challenges
- Railroad
- Bates Tech College
- I-5
- Java Jive
- Wildland/urban interface—S. 35th to S. 56th and S. Tyler to South Tacoma Way
- Mostly potential gas leaks and combustible flammable liquid spills/leaks
- Limited access to wildland urban interface areas

NATURAL AND TECHNOLOGICAL RISK

- Stiff Soil/Earthquake
- Steep Slopes/Landslide
- High Wind
- Rail Traffic
- Majority of the zone is Stiff Soil
- Steep Slopes throughout the FMZ
- Moderate risk for high wind event
- Rail line extends the length of the zone



Eastside



FMZ Demographic Snapshot

	Sub-zone	Response Area
Population estimate	22,904	215,915
Persons under 5	9.4%	7%
Persons 65 years and over	8.8%	11.3%
Female persons	50.6%	50.7%
Male persons	49.4%	49.3%
Homeownership rate	58.5%	54.1%
Renter rate	41.5%	45.9%
Average household size	3.1	2.45

TFD Resource List

Station	Apparatus	Personnel
11	Engine 11/Medic 5	5
15	Squad 15	2

EASTSIDE FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> • High density of older residential structures • High assembly occupant loads tent at Emerald Queen Casino • Champion Center • Older, unsprinklered commercial corridor • Older, unsprinklered multifamily residences • Retirement/nursing homes • Tribal Clinic 	<ul style="list-style-type: none"> • Buddhist Temple • Emerald Queen Casino • Schools • Railroad • Wildland/urban interface—gully with limited access • Railroad runs through gully • Tribal land 	<ul style="list-style-type: none"> • 4th highest population overall • Significant population for whom English is a second language; impacts problem identification and prevention efforts • Topography challenges create access issues • Tribal land is unregulated from fireworks code enforcement perspective

EMS RISK (based on resident population)

	<ul style="list-style-type: none"> • 6th in frequency for all ems incidents • 6th in frequency of high-acuity incidents • 6th in frequency per 1000 for ems incidents
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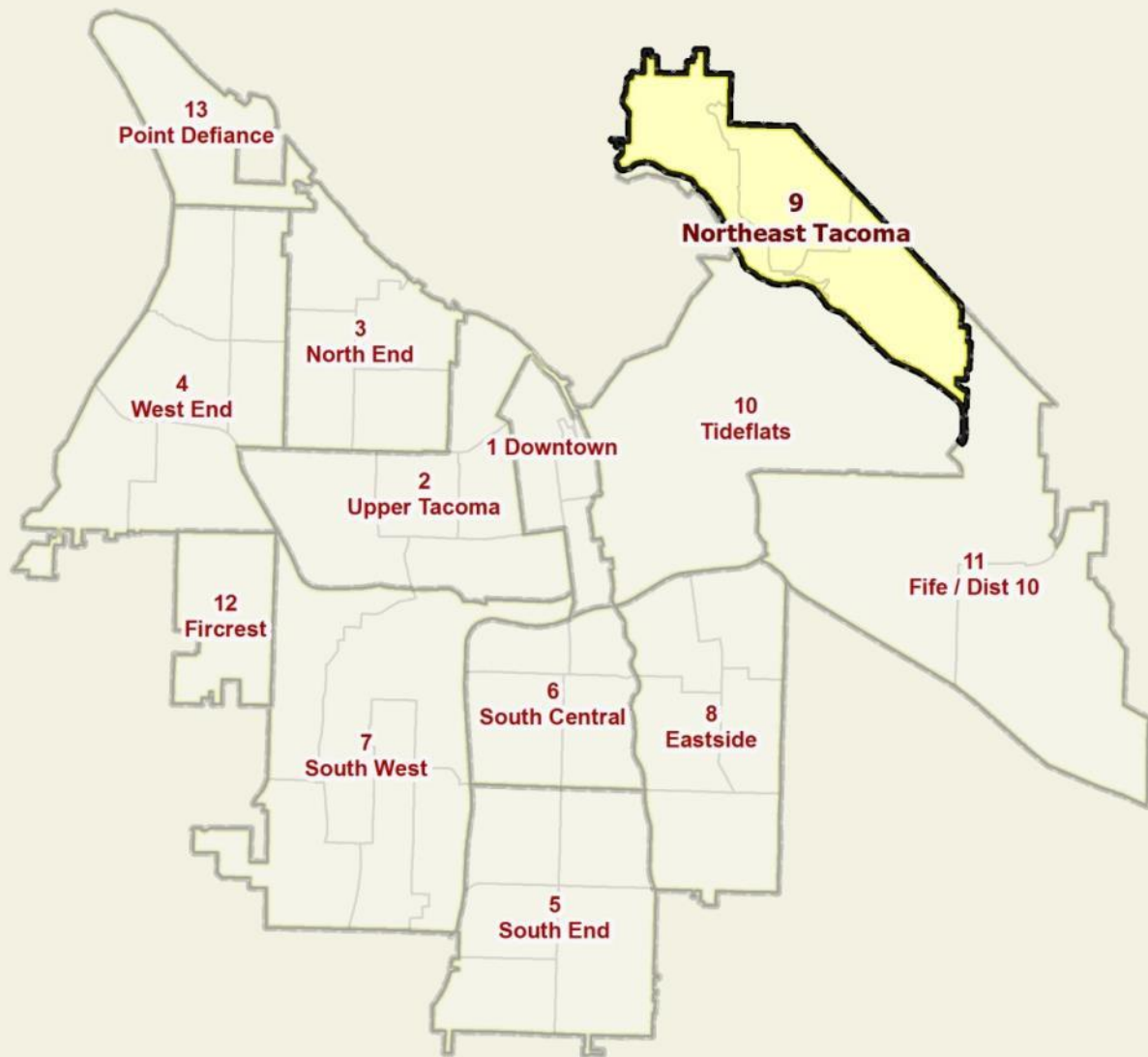
SPECIALTY RISK

<ul style="list-style-type: none"> • Construction sites • Railroad 	<ul style="list-style-type: none"> • Buddhist Temple • Emerald Queen Casino • Schools • Wildland/urban interface—gully with limited access • Railroad runs through gully 	<ul style="list-style-type: none"> • Topography challenges create access issues • High density of single-family dwellings and overall population
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NATURAL AND TECHNOLOGICAL RISK

<ul style="list-style-type: none"> • Soft Soil/Earthquake • Steep Slopes/Landslide • Flooding 	<ul style="list-style-type: none"> • Stiff/Soft soil conditions in central and east portion of the FMZ • Eastside of the FMZ susceptible to landslides • Flood hazards in NE portion of the FMZ
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Northeast



FMZ Demographic Snapshot

	Sub-zone	Response Area
Population estimate	16,606	215,915
Persons under 5	6%	7%
Persons 65 years and over	9.4%	11.3%
Female persons	50.9%	50.7%
Male persons	49.1%	49.3%
Homeownership rate	78.4%	54.1%
Renter rate	21.6%	45.9%
Average household size	2.77	2.45

TFD Resource List

Station	Apparatus	Personnel
3	Engine 3	3

NORTHEAST FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> • Unsprinklered multifamily residential structures • Center at Norpoint • Small commercial development • Ashley House; long-term care for critically ill children • Concentration of high-value, single-family homes 	<ul style="list-style-type: none"> • Center at Norpoint • Ashley House; long-term care for critically ill children • Schools • Wildland/urban interface • Tribal land • Seabury School 	<ul style="list-style-type: none"> • Bedroom community with irregular street grid; not the usual numbering system; makes it hard to locate incident sites, particularly for additional responding units • Most remote from City Center • Delayed response beyond the first-in company • Tribal land is unregulated from a fireworks code enforcement perspective

EMS RISK (based on resident population)

	<ul style="list-style-type: none"> • 10th lowest frequency for all ems incidents • The lowest frequency for high-acuity ems and per 1000 incidents of all zones
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SPECIALITY RISK

<ul style="list-style-type: none"> • Construction sites • Detached single-family dwellings • Small commercial development 	<ul style="list-style-type: none"> • Center at Norpoint • Ashley House (long-term care for critically ill children) • Schools • Wildland/urban interface 	<ul style="list-style-type: none"> • Slide prone area • Bedroom community with irregular street grid; not the usual numbering system; makes it hard to locate incident sites—particularly for additional responding companies • Most remote from City Center; access challenged by tideflats
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NATURAL AND TECHNOLOGICAL RISK

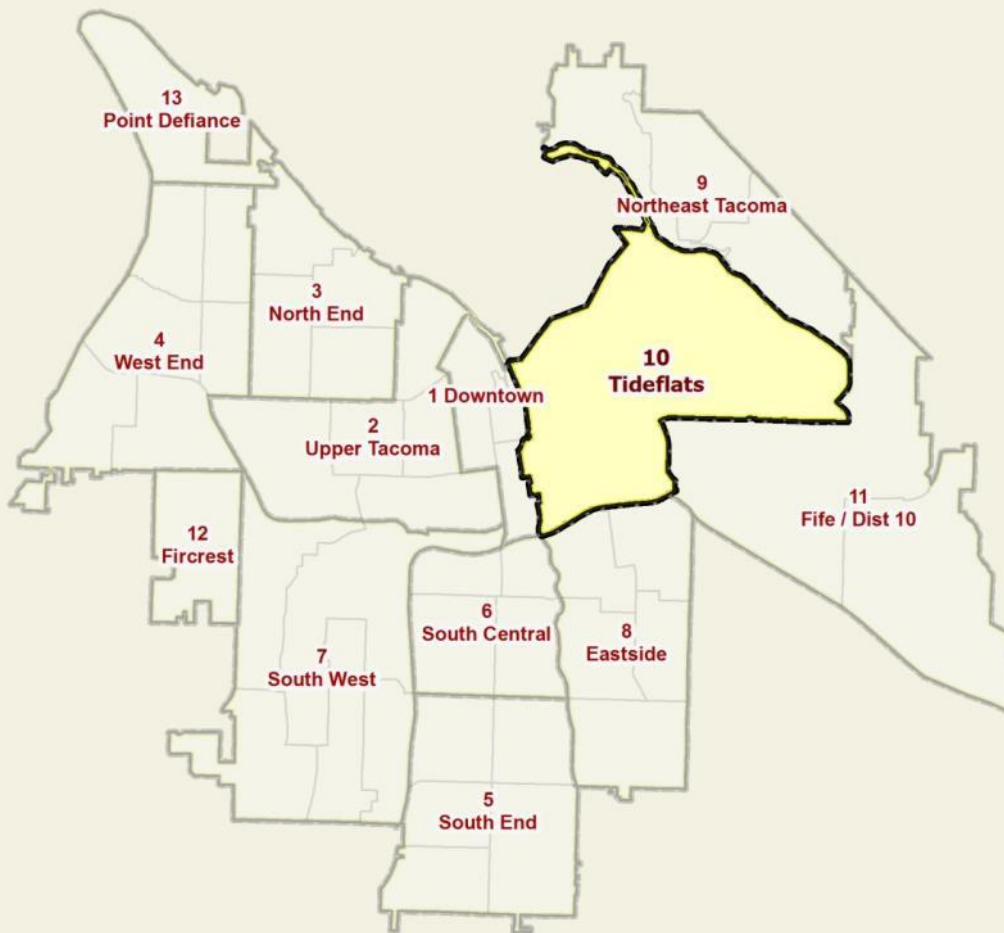
<ul style="list-style-type: none"> • Stiff/Soft soil/Earthquake • Steep Slopes/Landslide • Tsunami • Volcanic/Lahar 	<ul style="list-style-type: none"> • Large portion of the FMZ is Stiff soil • Landslide hazard along the southern and western portion of the FMZ
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- High Winds

- Tsunami and Lahar risk along the adjacent to Commencement Bay
- Moderate risk for high wind

Tideflats

This zone includes the Port of Tacoma and the area surrounding it.



FMZ Demographic Snapshot

	Sub-zone	Response Area
Population estimate	1,800	215,915
Persons under 5	.6%	7%
Persons 65 years and over	4.8%	11.3%
Female persons	19.9%	50.7%
Male persons	80.1%	49.3%
Homeownership rate	45.1%	54.1%
Renter rate	54.9%	45.9%
Average household size	1.69	2.45

TFD Resource List

Station	Apparatus	Personnel
0	0	0

TIDEFLATS FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> • Refineries • Piers/Docks • Marinas • Storage warehouses • Casino • Hotels • Shipyards • Industrial structures • Tank farm supplied by Olympic fuel pipeline from refineries • Pipeline from US Oil to McChord • Pipeline from Blair Waterway to US Oil • Older unsprinklered commercial structures along Puyallup Ave. • Stacked container and log yards • Indoor stacked boat storage • Low-rise sprawling complexes • Manufacturing structures • Material reclamation yards 	<ul style="list-style-type: none"> • Railroad, including commuter line • Crude oil by rail • Tacoma Dome • Port of Tacoma • Detention facility • Wildland/urban interface along Marine View Drive 	<ul style="list-style-type: none"> • Access to area limited by waterways, rail lines and failing bridge infrastructure • Low residential population but high daytime population • High concentration of large unsprinklered buildings/yards with high fire load • Dependent on private hydrants for water supply at the end of some waterways • Access to wildland/urban interface areas limited by topography; area is prone to landslides • Presence of pipelines increases risk of conflagration • Hard to shut off pipeline quickly, increased risk to the environment • Presence of gas with decreased ability to detect ignition source also increases fire risk • Potential for huge economic impact • Marinas in fairly remote location so land response is longer; not quickly or easily accessible by water routes either • Decreased water supply and presence of derelict vessels also increases fire risk • Limited access due to development and street closures

EMS RISK (based on resident population)

- 1st in frequency per 1000 for all high-acuity ems incidents
- 1st in frequency high-acuity risk of cardiac
- 1st in frequency high-acuity risk of diabetes, trauma, and stroke (note-this is likely due to the low resident population in the zone)

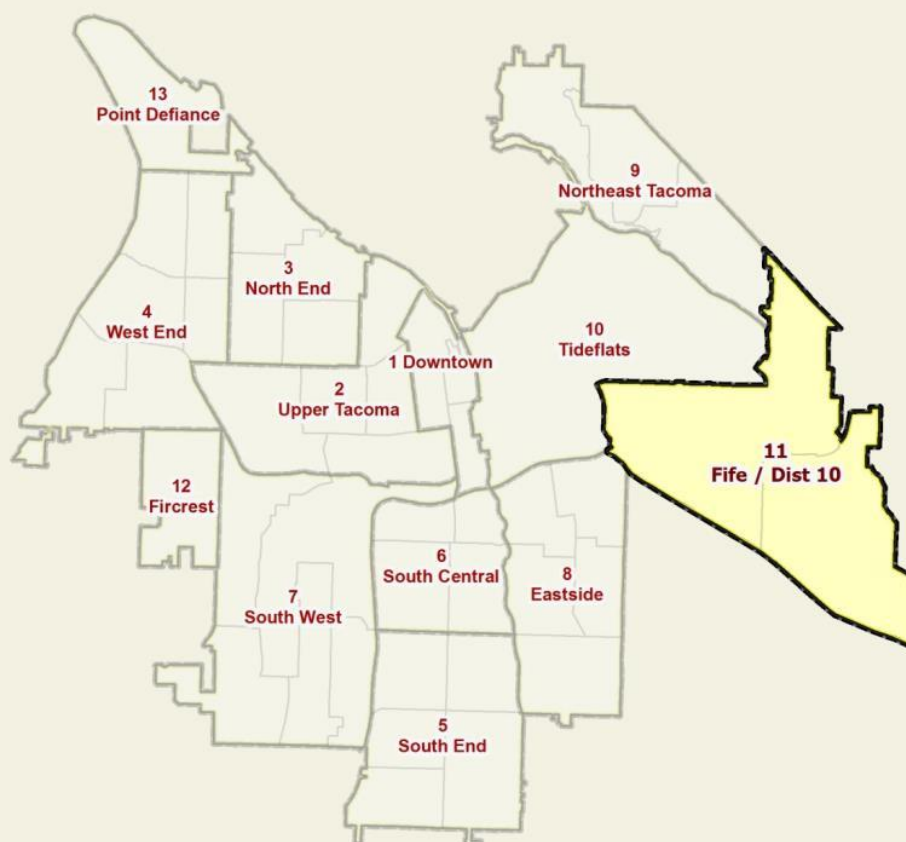
SPECIALTY RISK

- | | | |
|--|--|--|
| <ul style="list-style-type: none">• Construction sites• Railroad, including commuter line• Port of Tacoma• Marinas• Refineries• Piers/Docks• Marinas• Storage warehouses• Shipyards• Industrial structures• Tank farm supplied by Olympic fuel pipeline from refineries• Pipeline from US Oil to McChord• Pipeline from Blair Waterway to US Oil• Commercial structures along Puyallup Ave.• Low rise sprawling complexes• Manufacturing structures | <ul style="list-style-type: none">• Tacoma Dome• Detention facility• Railroad, including commuter line• Port of Tacoma• Casino• Hotels• Wildland/urban interface along Marine View Drive | <ul style="list-style-type: none">• Highest risk zone for HazMat incidents• Location of incidents spread out through entire zone• Risk and location consistent with industrial nature of the zone• Mostly chemical releases and combustible/flammable liquid spills/leaks• Access to area limited by waterways, rail• Low residential population but high daytime worker population• Access to wildland/urban interface areas limited by topography; area is prone to landslides• Presence of pipelines increases risk• Hard to shut off pipeline quickly, increased risk to the environment• Presence of gas with decreased ability to detect ignition source also increases fire risk• Potential for huge economic impact• Marinas in fairly remote location so land response is longer |
|--|--|--|

NATURAL AND TECHNOLOGICAL RISK

- Earthquake
- Liquefaction
- Tsunami
- Lahar
- Rail Traffic
- Pipeline
- Flood
- Detention Facility
- Large quantities of stored flammable liquids
- This FMZ has the most Natural and Technological hazards in TFD's service area

Fife/District 10



FMZ Demographic Snapshot

	Sub-zone	Response Area
Population estimate	11,190	215,915
Persons under 5	8.7%	7%
Persons 65 years and over	7.1%	11.3%
Female persons	49.5%	50.7%
Male persons	50.5%	49.3%
Homeownership rate	46.3%	54.1%
Renter rate	53.7%	45.9%
Average household size	2.55	2.45

TFD Resource List

Station	Apparatus	Personnel
12	Engine 12/Ladder 4 Medic 2/HazMat	8

FIFE/DISTRICT 10 FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> • Older, unsprinklered hotels/motels • Multifamily residential complexes; most unsprinklered • Large warehouses • Bulk oxygen producing plant • Multiple casinos • Fabulich Center; multi-story building • Olympic pipeline into the Industrial FMZ • Commercial corridor • Manufacturing • Stacked container yard 	<ul style="list-style-type: none"> • I-5 • Hwy. 99 • Railroad • Poodle Dog (historic restaurant) • Business corridor along Hwy 99 and 20th St. E. • Schools • Government buildings • Fife Heights • Wildland/urban interface • Rural residential development • Tribal land 	<ul style="list-style-type: none"> • Lower population density overall • Long response times due to topography (Fife Heights) and/or remoteness • Water supply challenges • Higher flood risks area • Rural residential developments have hundreds of homes with limited access; hard to get apparatus into them AND close spacing; essentially row houses from a firefighting perspective • Concentrated business district; huge economic impact • Tribal land is unregulated from a building and fireworks code enforcement perspective

EMS RISK (based on resident population)

- 8th in frequency of all incidents and in high-acuity incidents
- 3rd in population for ages 0-4

SPECIALITY RISK

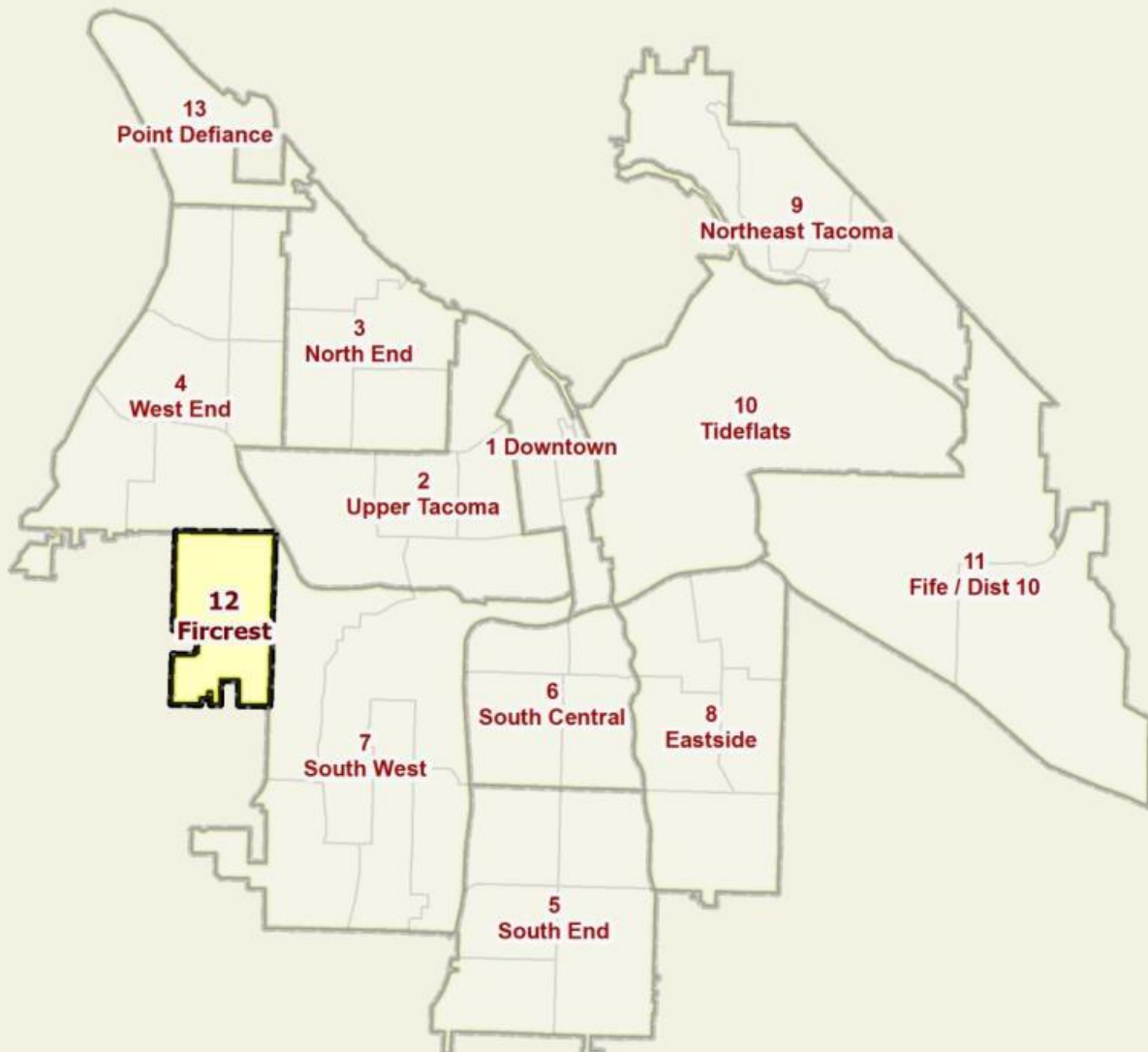
<ul style="list-style-type: none"> • Large warehouses • Bulk oxygen producing plant • Olympic pipeline into the Industrial zone • Manufacturing • Construction sites • Fabulich Center—multi-story building 	<ul style="list-style-type: none"> • I-5 and Hwy. 99 • Railroad • Business corridor along Hwy 99 and 20th St. E. • Schools • Government buildings • Wildland/urban interface 	<ul style="list-style-type: none"> • Higher flood risks area • 4th highest risk for HazMat • Incidents in area adjacent to the Tideflats zone • Mostly combustible flammable liquid release/spills • Long response times due to topography and/or remoteness
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- Rural residential developments have hundreds of homes—some with limited access
- Concentrated business district

NATURAL AND TECHNOLOGICAL RISK

- Earthquake
- Liquefaction
- Tsunami
- Lahar
- Rail traffic
- Pipeline
- Landslide
- Flood
- Second highest concentration of Natural and Technological risk in service area

Fircrest



FMZ Demographic Snapshot

	Sub-zone	Response Area
Population estimate	6,497	215,915
Persons under 5	5.7%	7%
Persons 65 years and over	7.1%	11.3%
Female persons	46.4%	50.7%
Male persons	53.6%	49.3%
Homeownership rate	69.4%	54.1%
Renter rate	30.6%	45.9%
Average household size	2.39	2.45

TFD Resource List

Station	Apparatus	Personnel
1	Engine 17	3

FIRCREST FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> Light commercial development along So. 19th and Regents Blvd. Some multifamily residential Predominately single family homes 	<ul style="list-style-type: none"> Schools Government buildings 	<ul style="list-style-type: none"> Primarily single-family residential; not too densely populated Highest risk concentrated along major corridors—So.19th, Regents Blvd.

EMS RISK (based on resident population)

<ul style="list-style-type: none"> 13th in frequency of all incidents 13th in high-acuity incidents

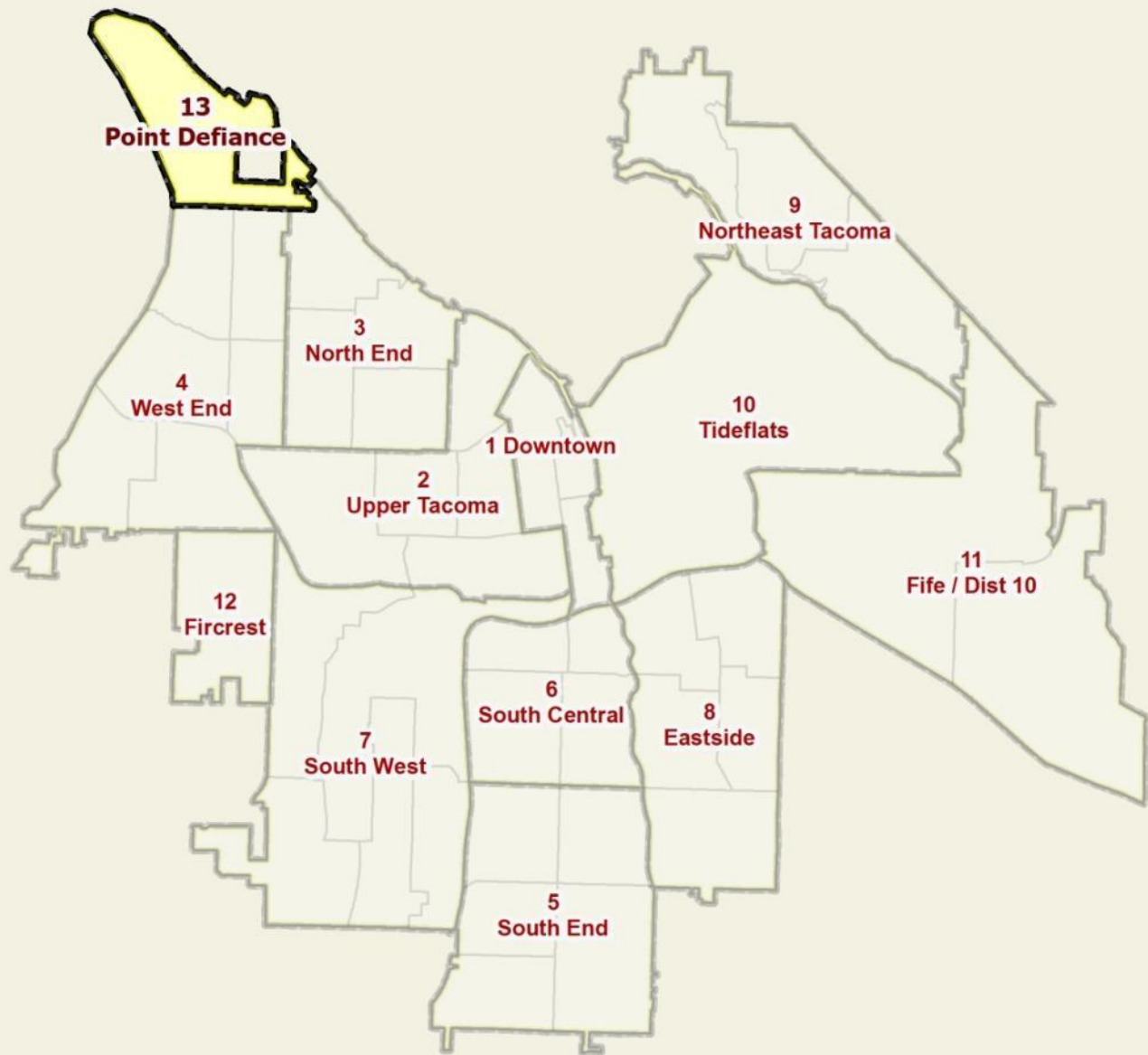
SPECIALTY RISK

<ul style="list-style-type: none"> Construction sites Schools Government buildings 	<ul style="list-style-type: none"> Primarily single-family residential; not too densely populated
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NATURAL AND TECHNOLOGICAL RISK

<ul style="list-style-type: none"> Stiff Soil/Earthquake 	<ul style="list-style-type: none"> Small portion of the central and south portion of the FMZ has stiff soil
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Point Defiance



FMZ Demographic Snapshot

	Sub-zone	Response Area
Population estimate	4,106	215,915
Persons under 5	4.6%	7%
Persons 65 years and over	25.9%	11.3%
Female persons	53%	50.7%
Male persons	47%	49.3%
Homeownership rate	65.5%	54.1%
Renter rate	34.5%	45.9%
Average household size	2.18	2.45

TFD Resource List

Station	Apparatus	Personnel
0	0	0

POINT DEFIANCE FIRE MANAGEMENT ZONE SUMMARY

FIRE RISK

HAZARDS	SPECIAL HAZARDS	RISK ANALYSIS
<ul style="list-style-type: none"> 760-acre natural park 	<ul style="list-style-type: none"> Old growth forest Point Defiance Zoo Marina 	<ul style="list-style-type: none"> Primarily single-family residential; not too densely populated Wildfire risks at the park. Improved water supply. Remote access.

EMS RISK (based on resident population)

	<ul style="list-style-type: none"> 12th in frequency of all incidents 12th in high-acuity incidents Emerging risk with the development of Point Ruston.
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SPECIALTY RISK

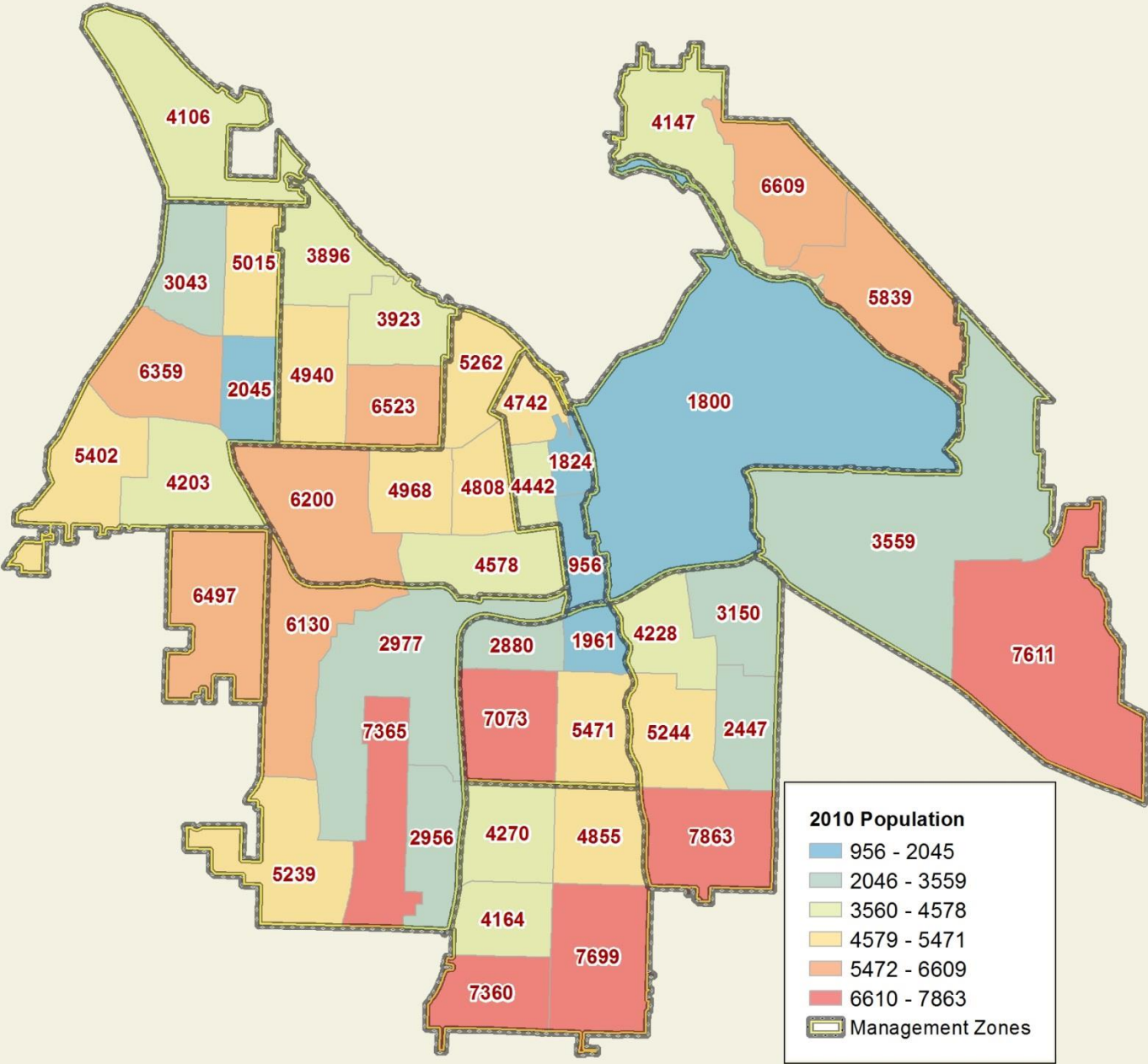
<ul style="list-style-type: none"> Wildland urban interface 	<ul style="list-style-type: none"> Point Defiance Park and Zoo Vertical bluffs up to 250 feet high in some places 	<ul style="list-style-type: none"> Second highest risk for tech rescue; mostly steep angle and rope incidents Consistent with topography of the zone 84 homes on Salmon Beach accessible only by two sets of 200+ step staircases, a dirt path or the water Ruston incorporated and heavily dependent on mutual aid Limited access to wildland urban interface
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NATURAL AND TECHNOLOGICAL RISK

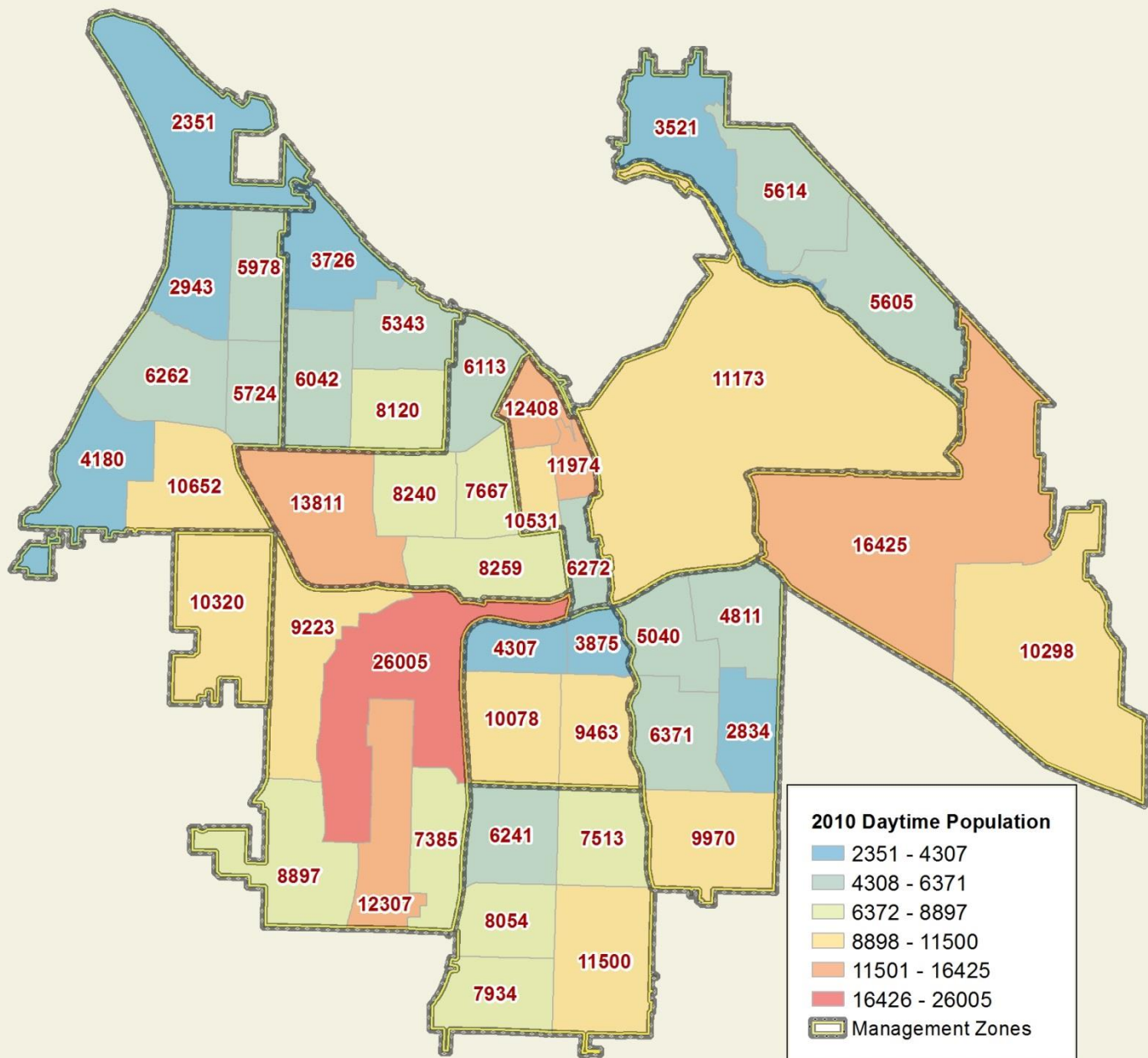
<ul style="list-style-type: none"> Liquefaction Steep Slopes/Landslides High Wind Tsunami Rail traffic 	<ul style="list-style-type: none"> Increased risk for Tsunami and liquefaction where land is adjacent to Commencement Bay Moderate to high risk for strong wind events Lengthy rail tunnel
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APPENDIX A—DEMOGRAPHIC DATA

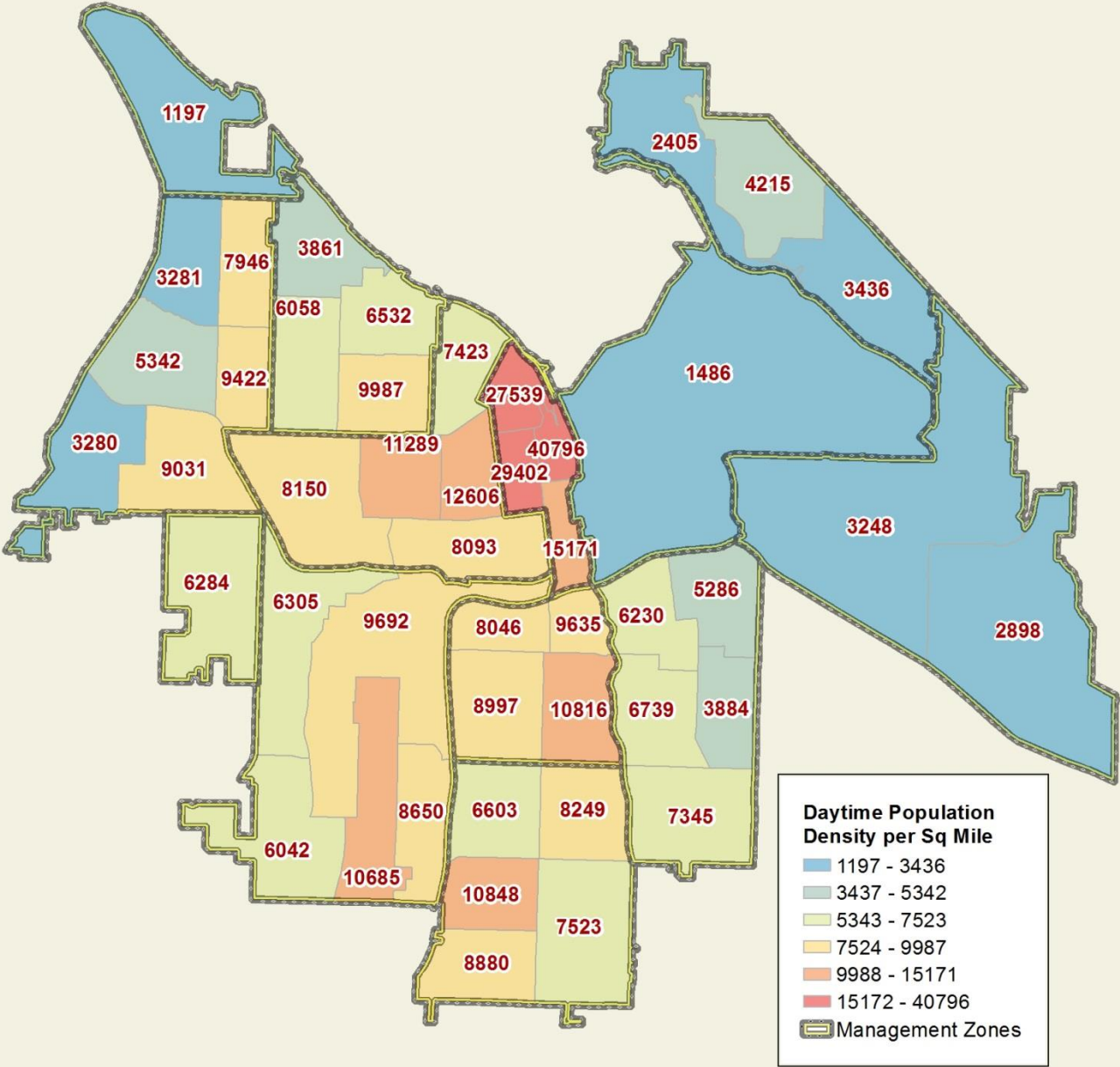
RESIDENT POPULATION BY SUB-ZONE



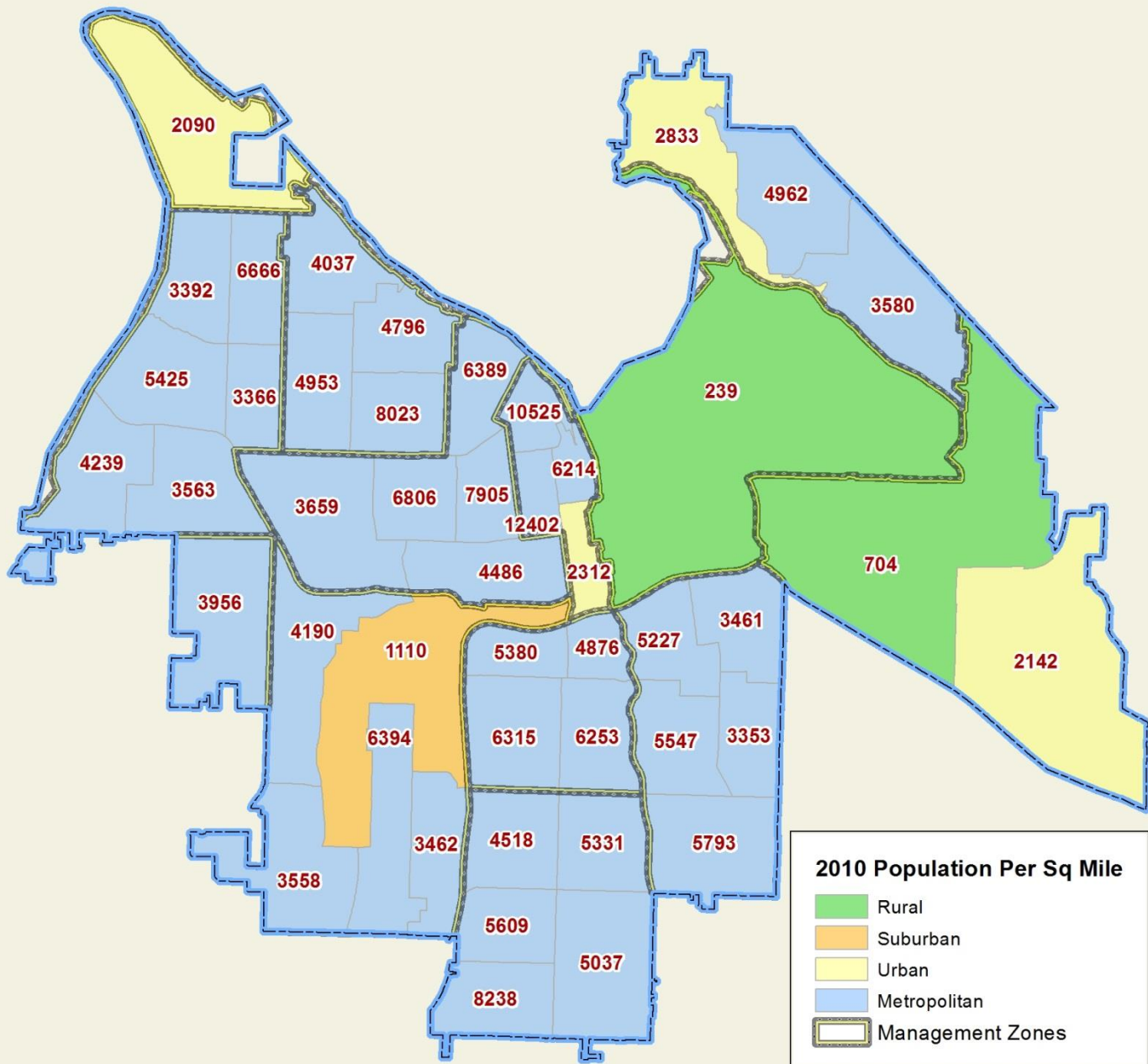
DAYTIME POPULATION ESTIMATE BY SUB-ZONE



DAYTIME POPULATION DENSITY PER SQUARE MILE



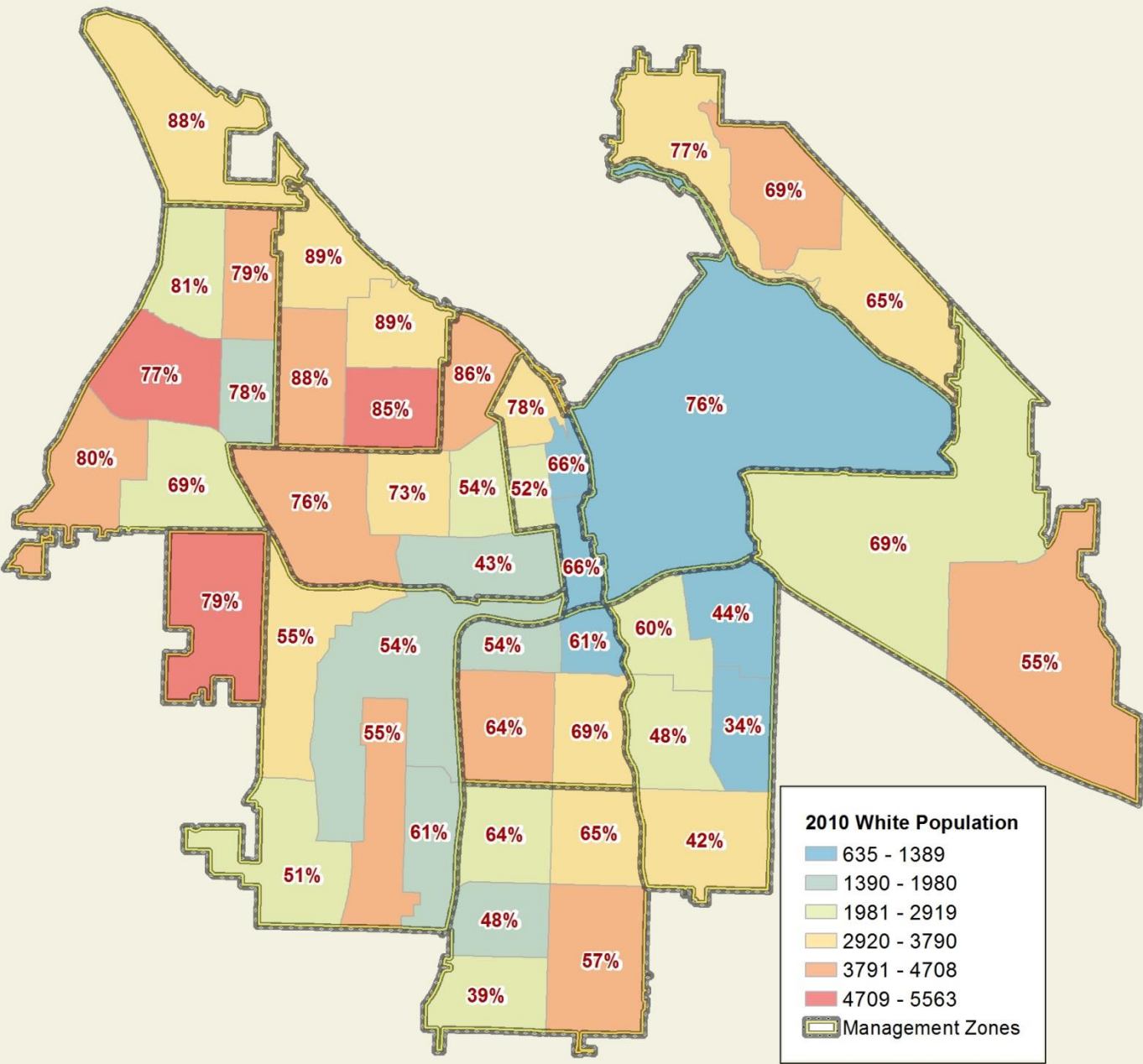
POPULATION DENSITY BASED ON THE COMMISSION ON FIRE ACCREDITATION INTERNATIONAL DESIGNATION



The Commission on Fire Accreditation International (FASSEM, 8th Edition) recommends dividing a jurisdiction into fire management zones based on population density. The following illustrates population density throughout our service area.

- Metropolitan: >3k per square mile
- Urban: >2k per square mile
- Suburban: 1k-2k per square mile
- Rural: 1k per square mile

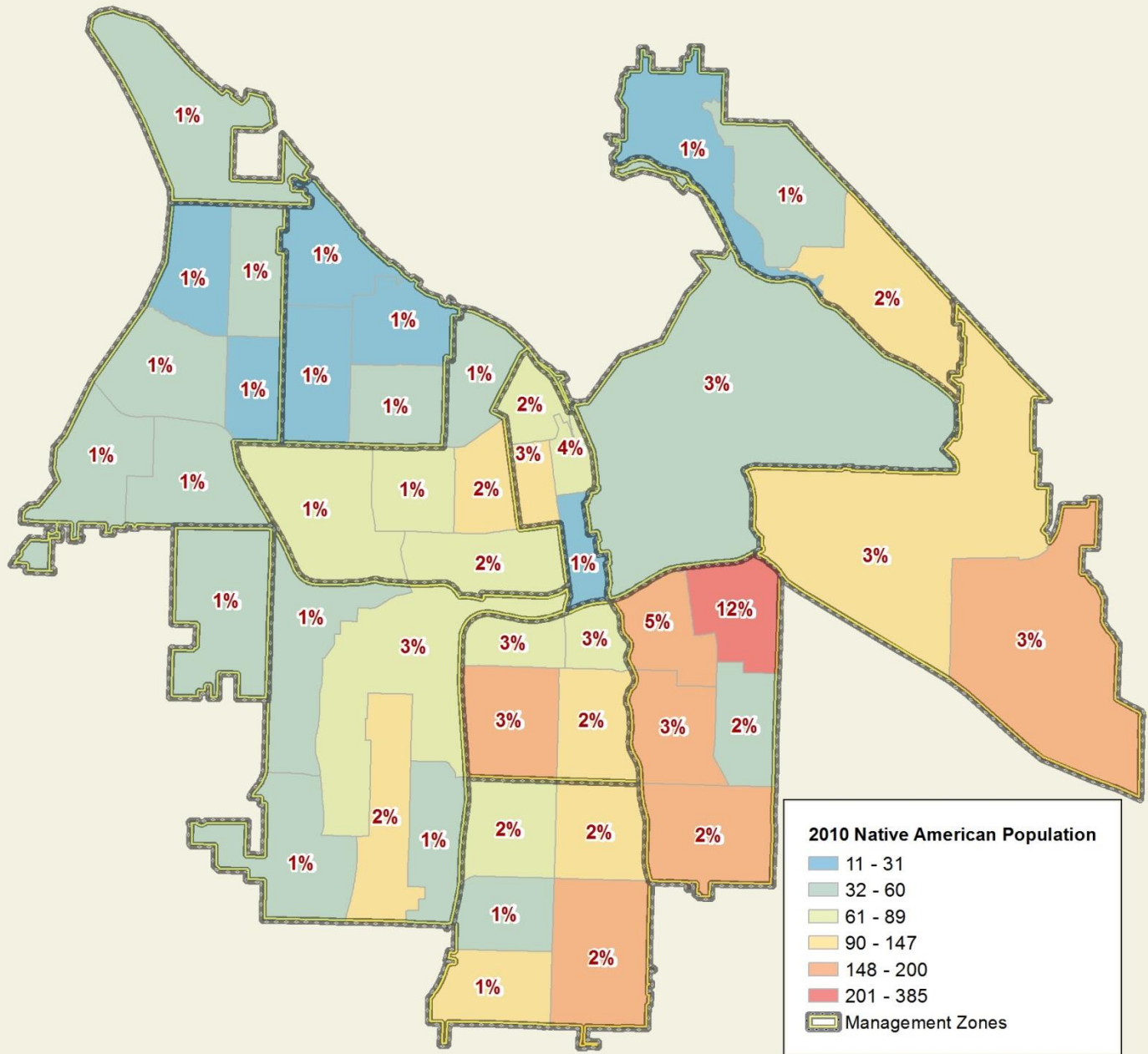
POPULATION DISTRIBUTION BY RACE—WHITE



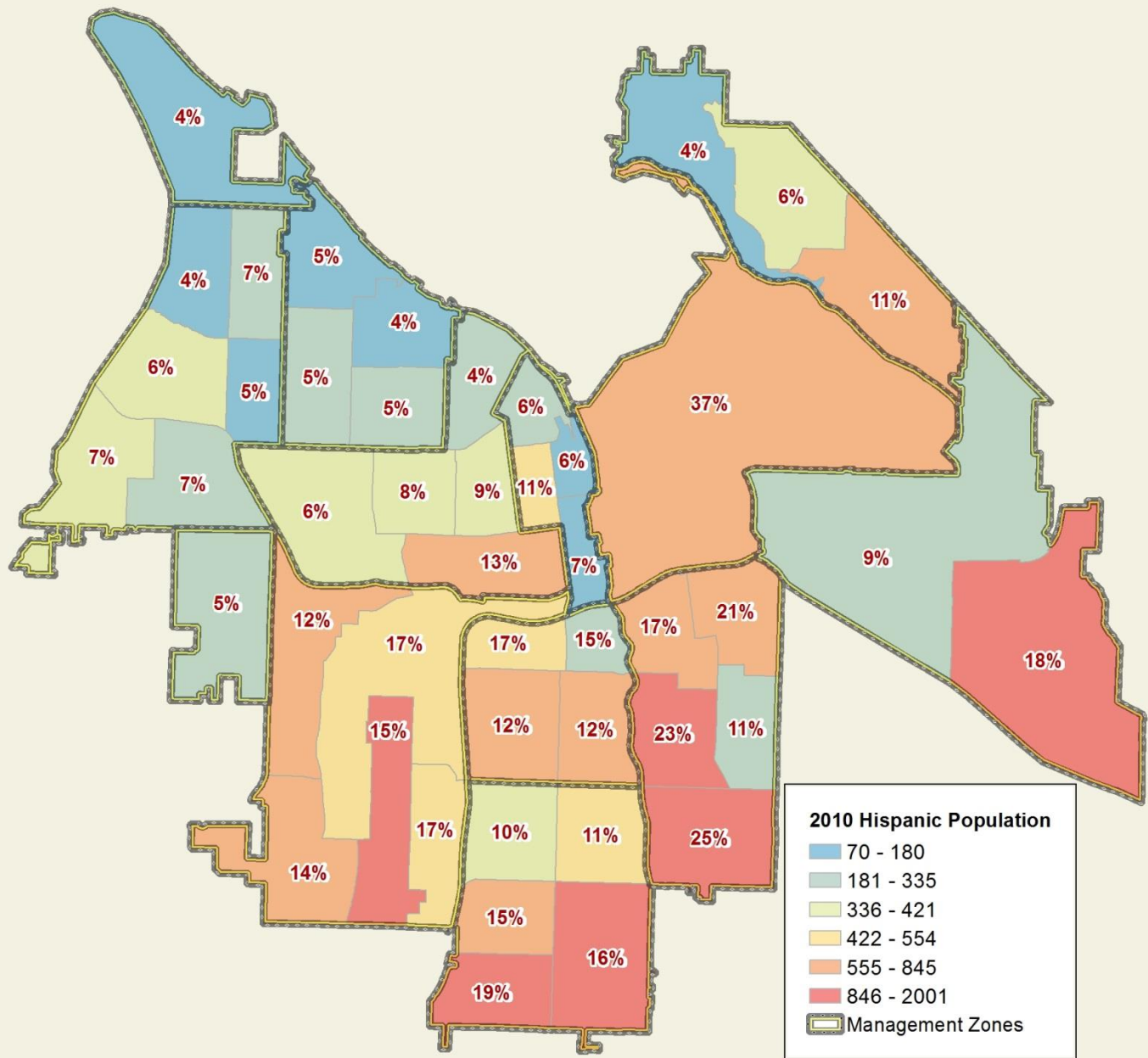
2010 Pacific Islander Population

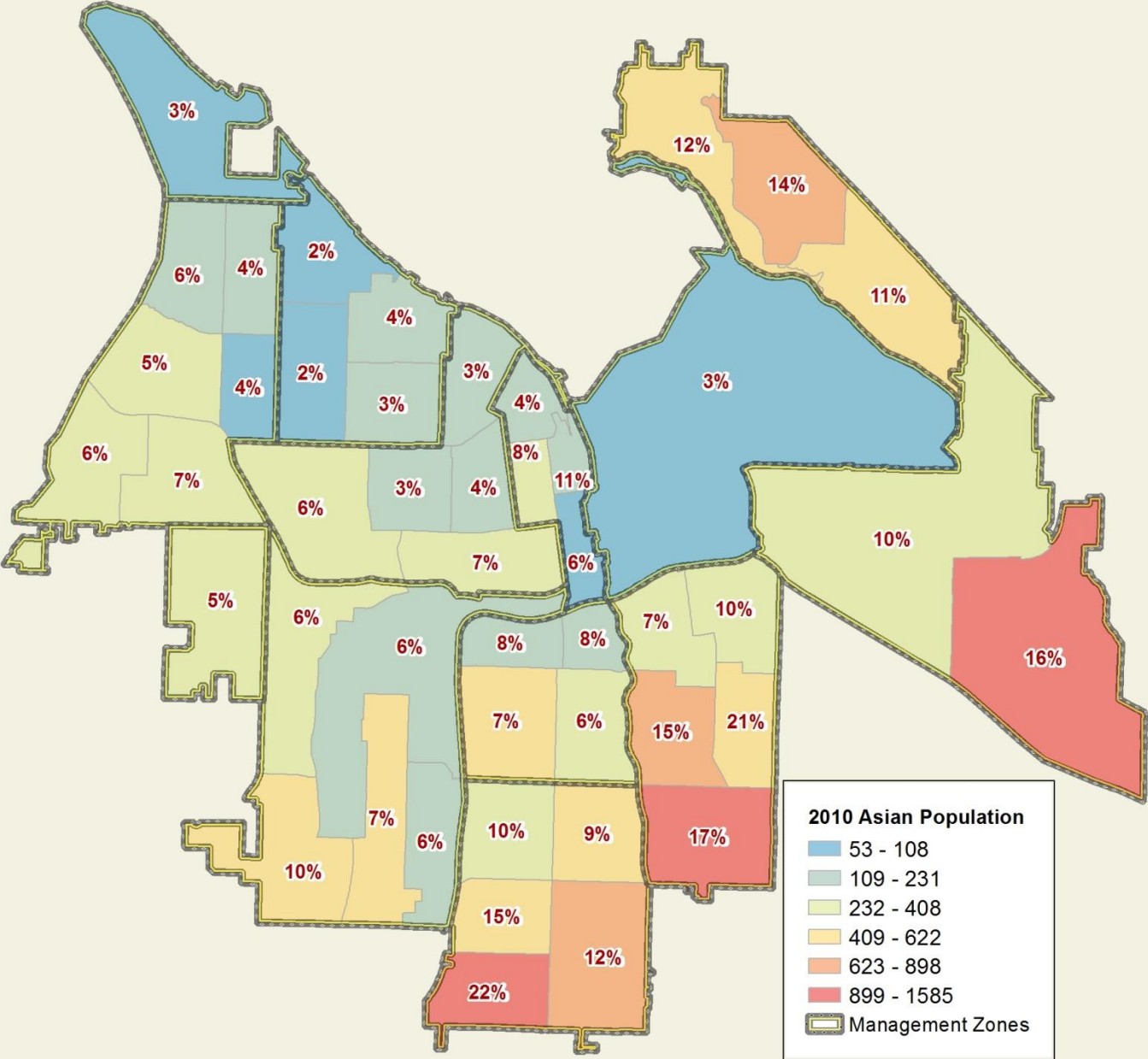
- 5 - 15
- 16 - 32
- 33 - 61
- 62 - 81
- 82 - 134
- 135 - 257
- Management Zones

NATIVE AMERICAN

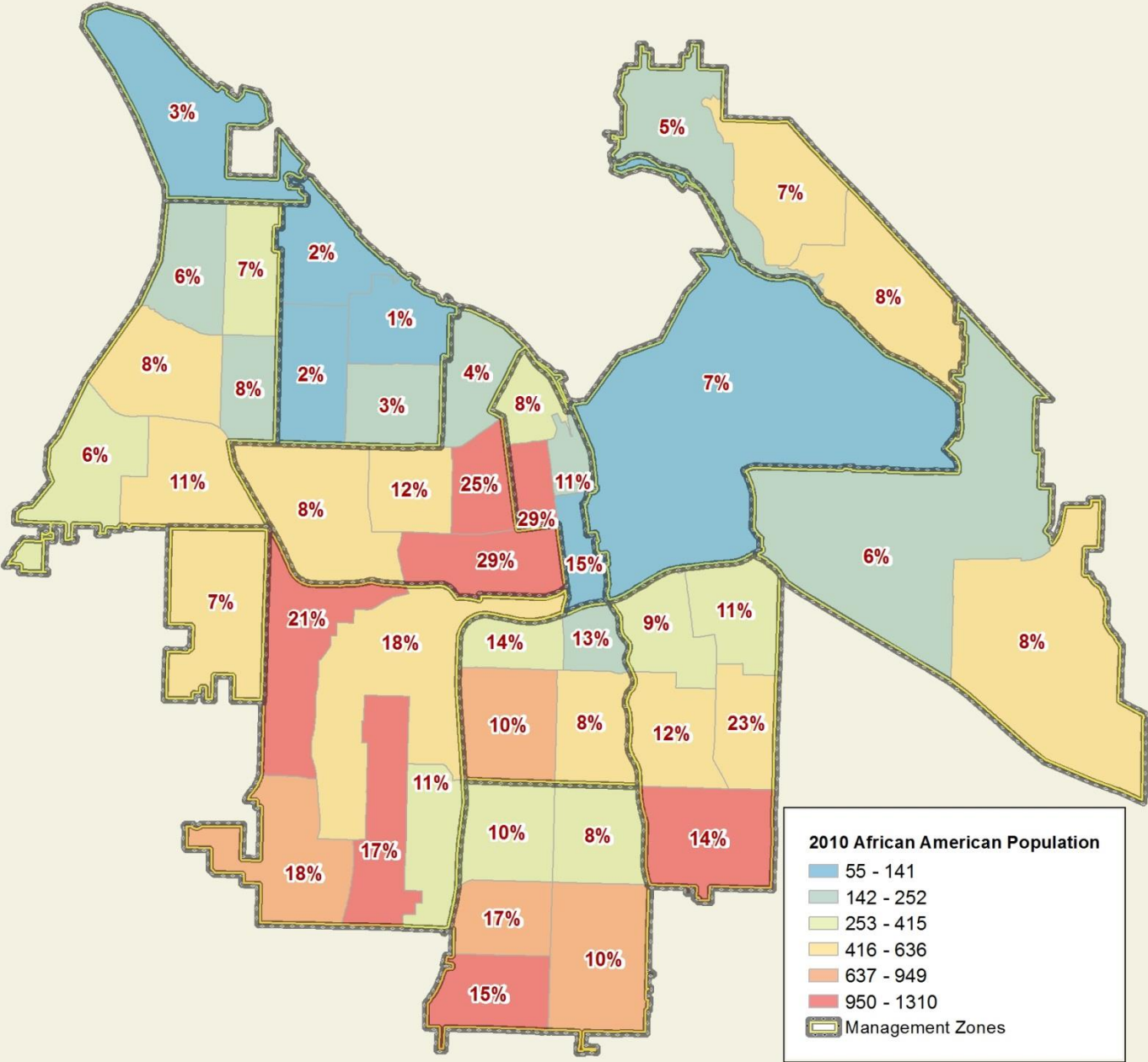


HISPANIC

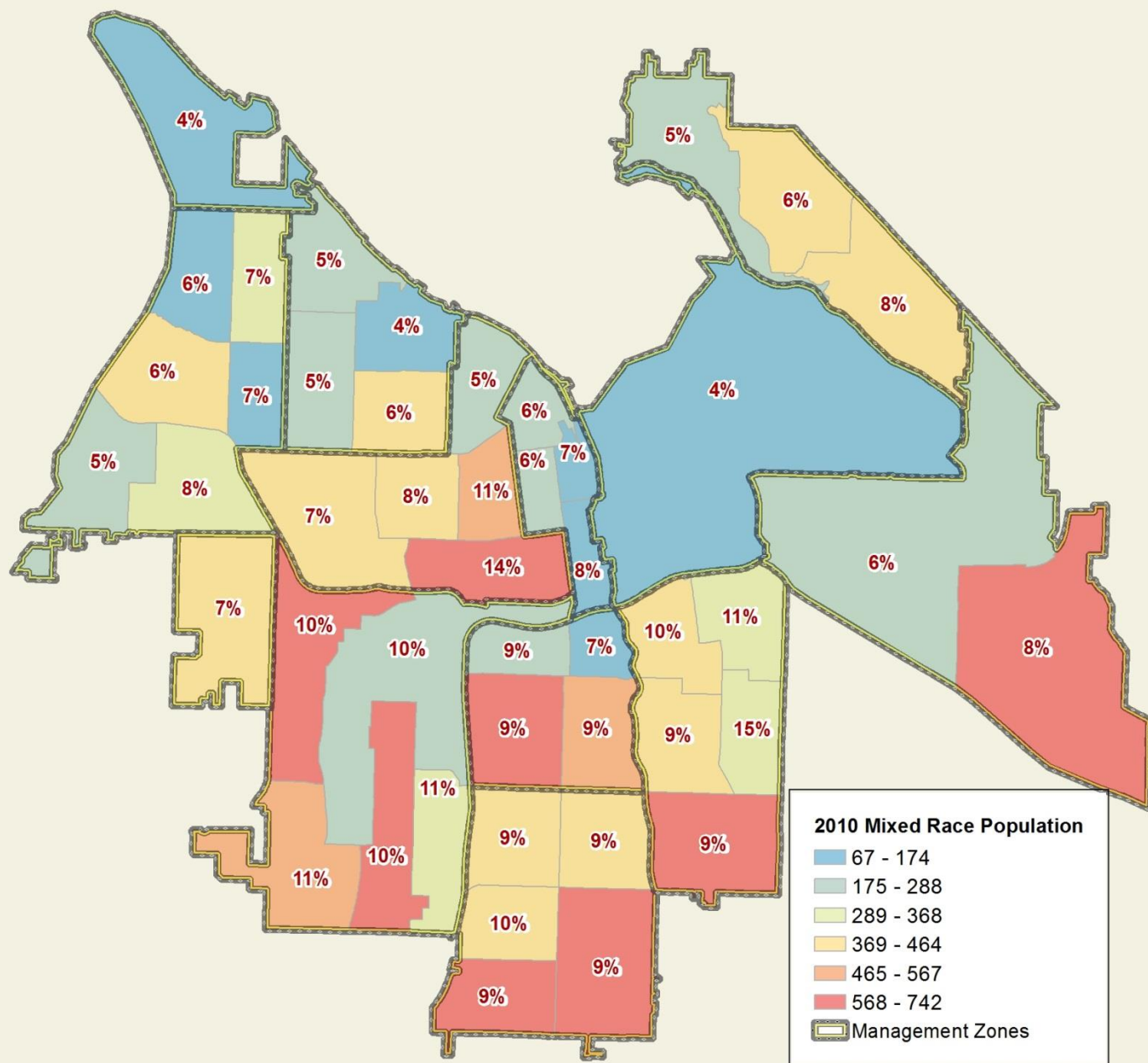




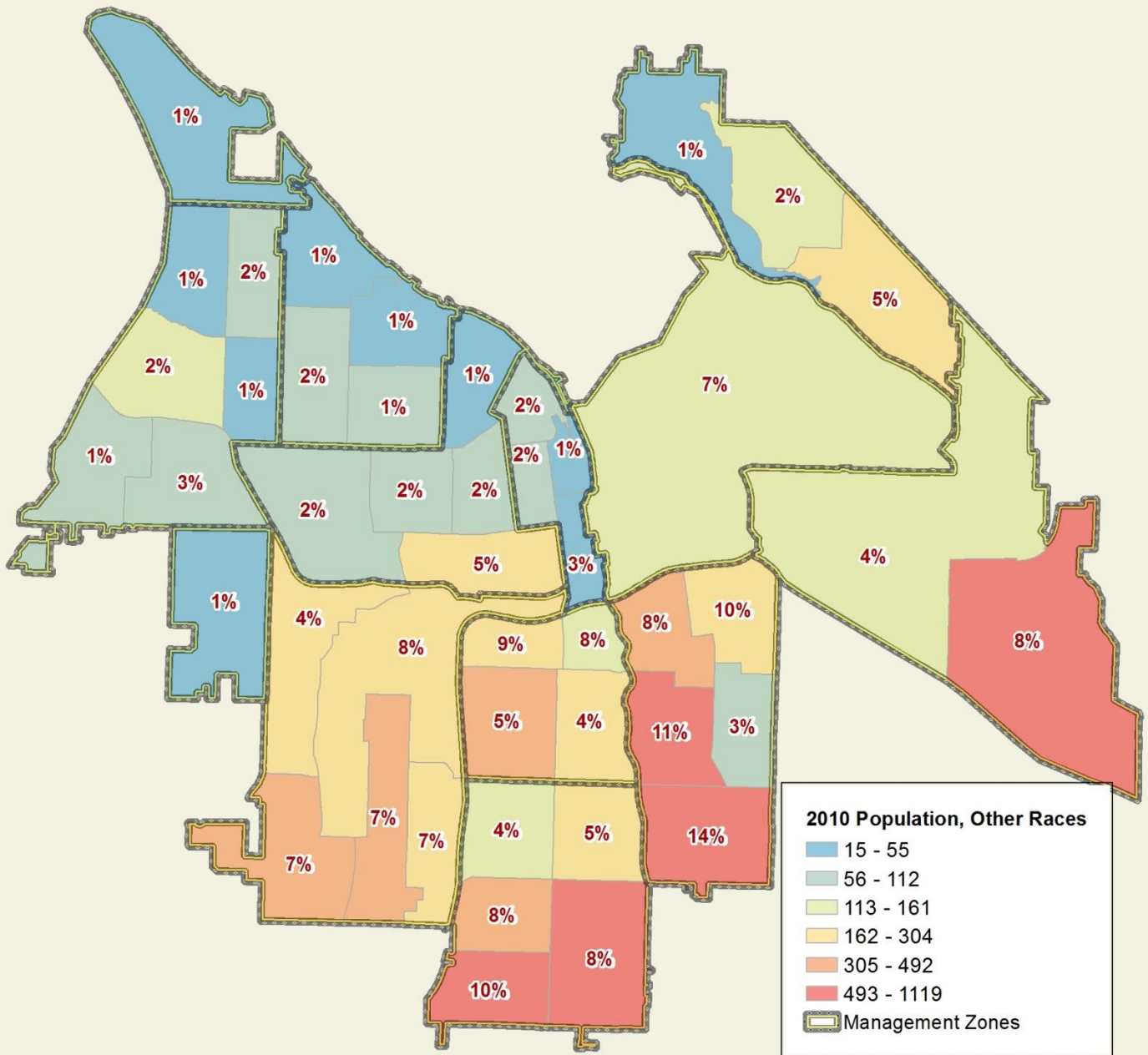
AFRICAN AMERICAN



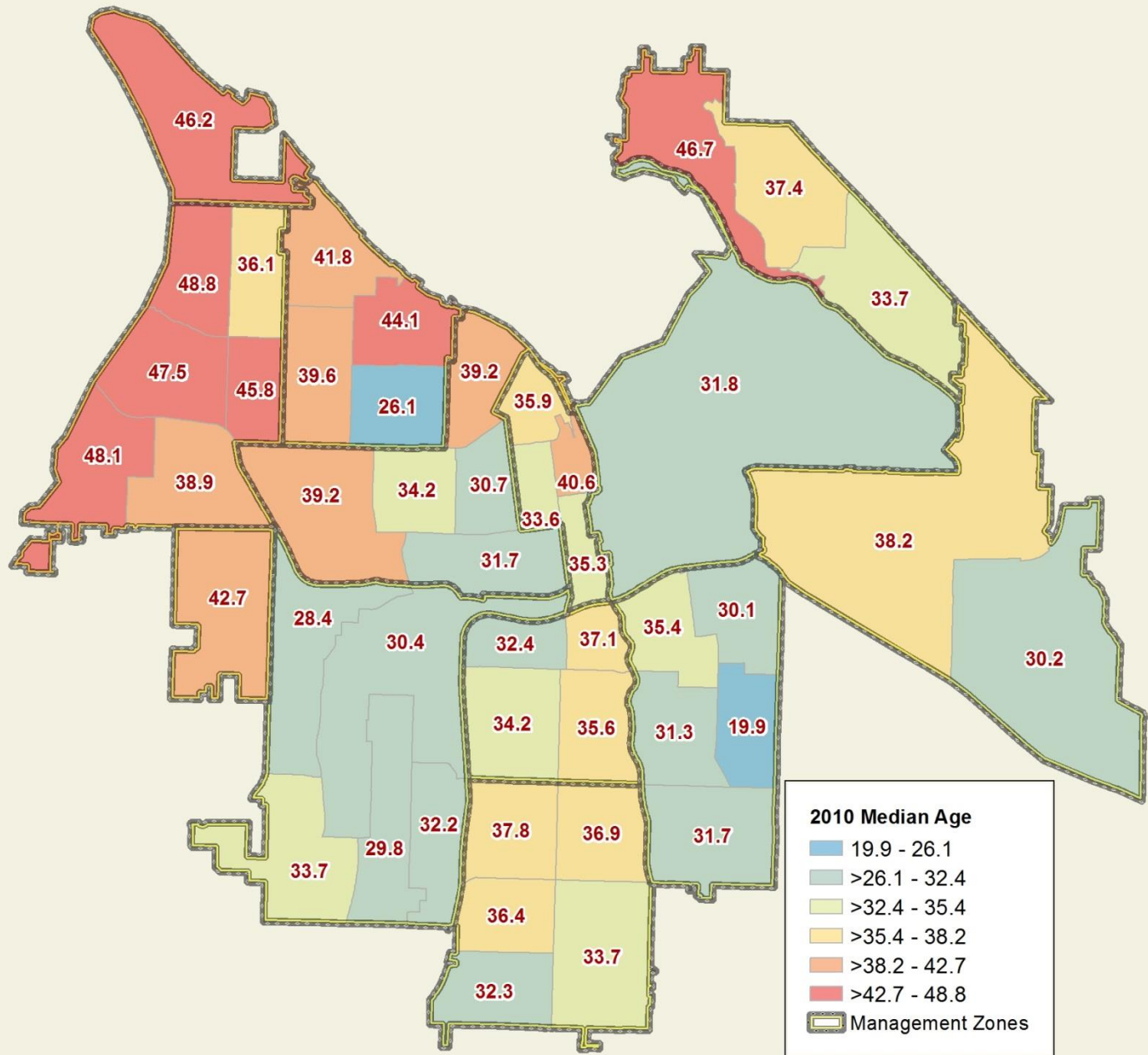
MIXED RACE



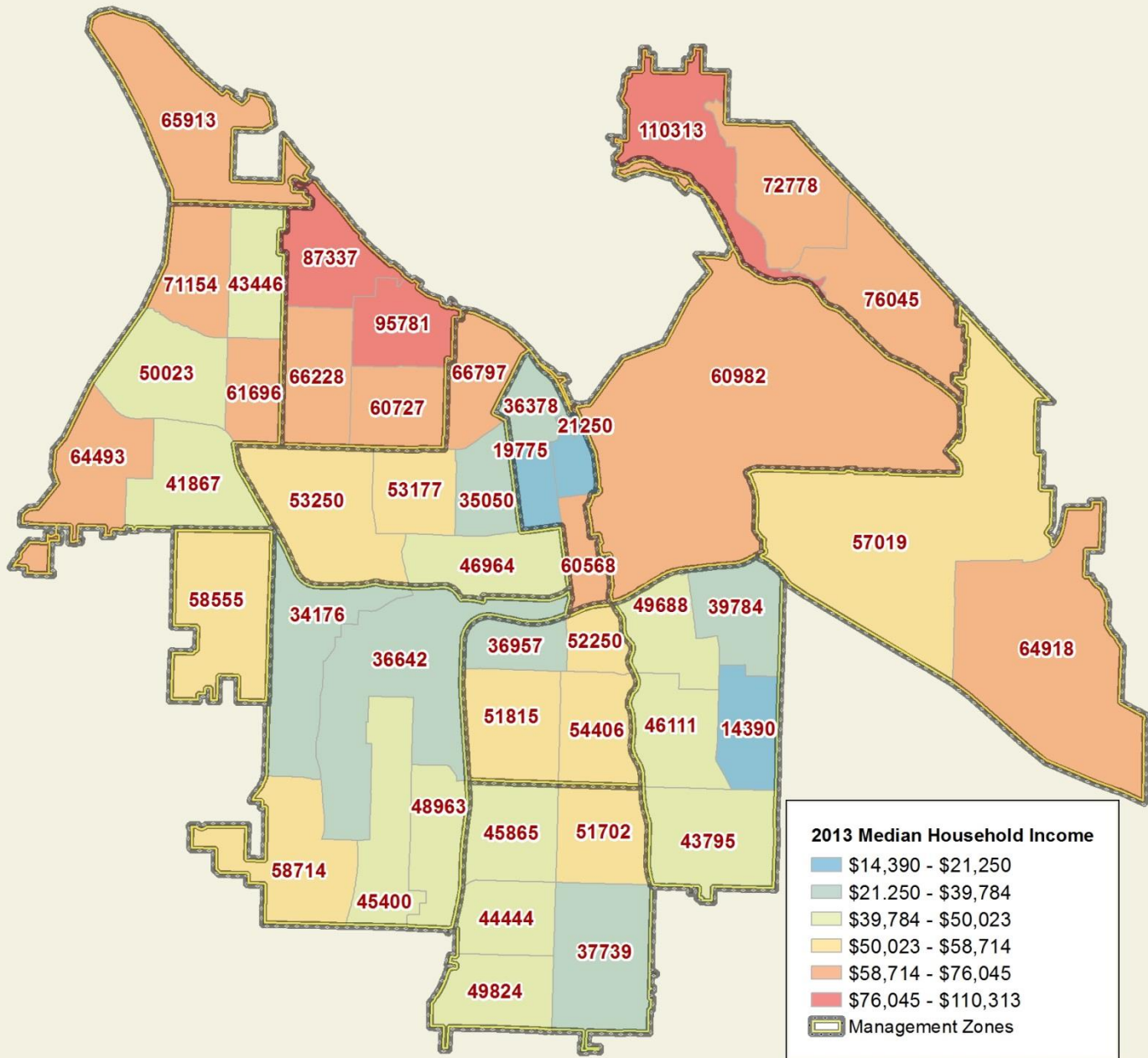
OTHER RACES



MEDIAN AGE BY SUB-ZONE

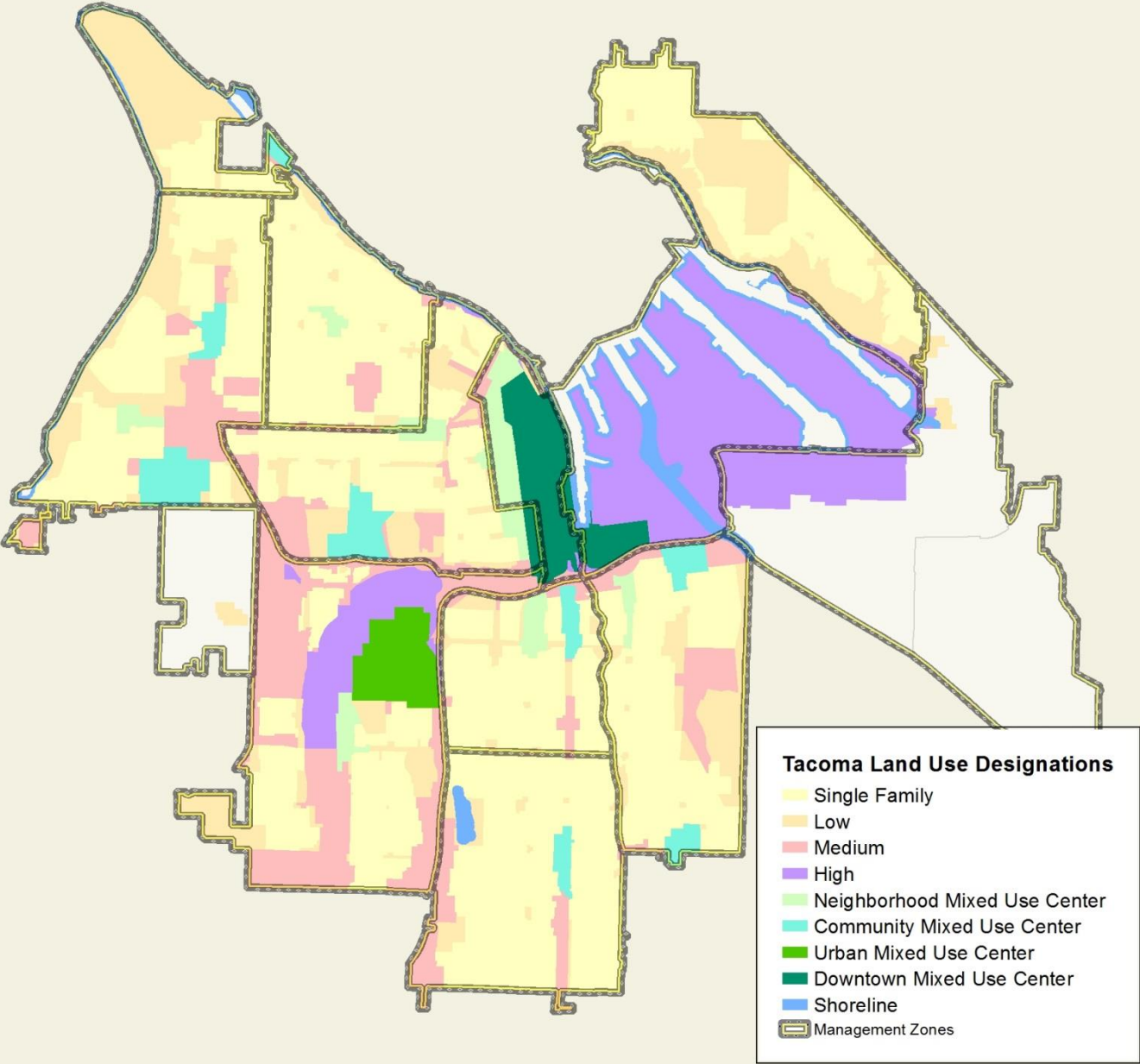


MEDIAN HOUSEHOLD INCOME BY SUB-ZONE (2013)

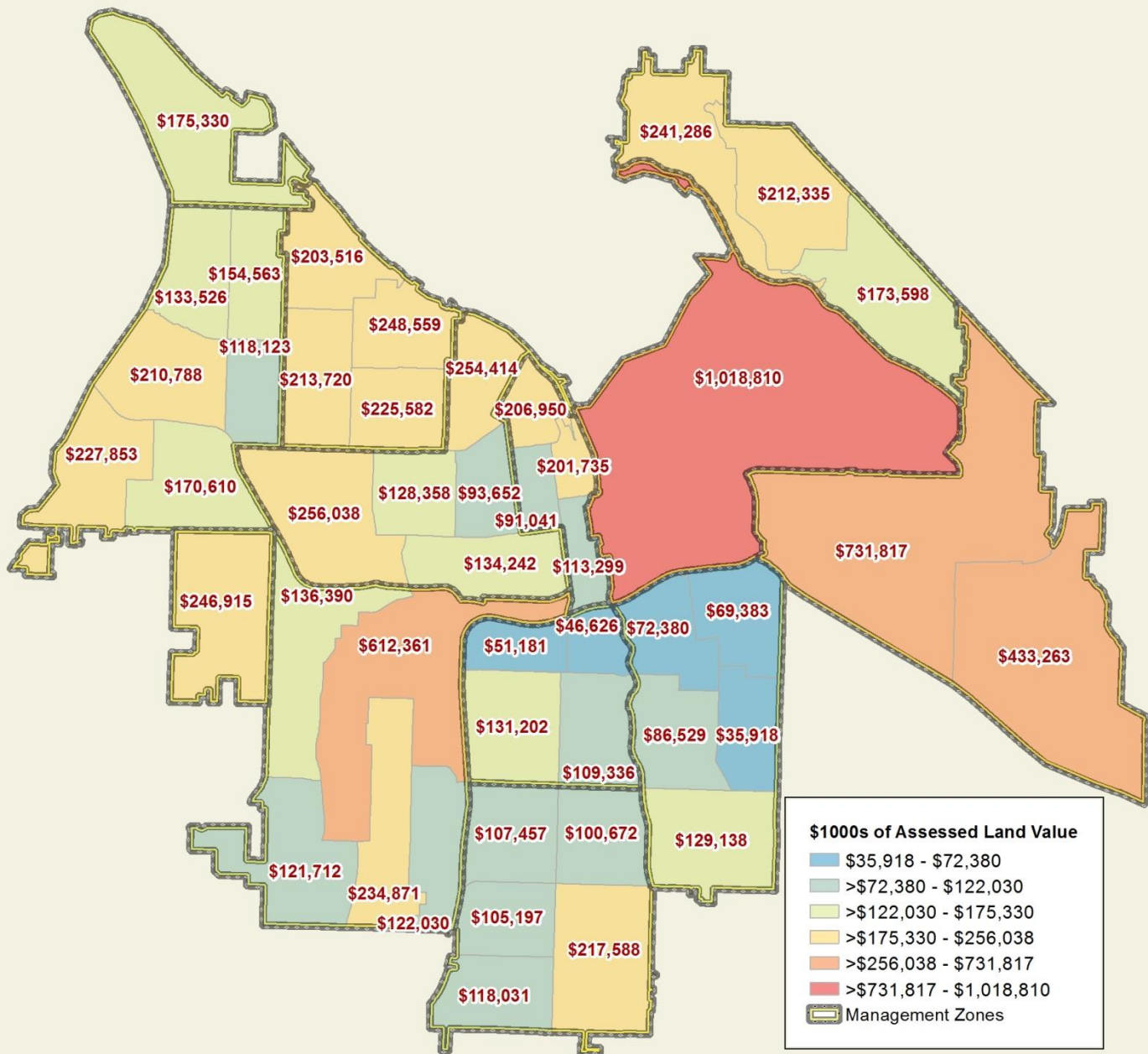


APPENDIX B—LAND USE/BORDERS/INFRASTRUCTURE

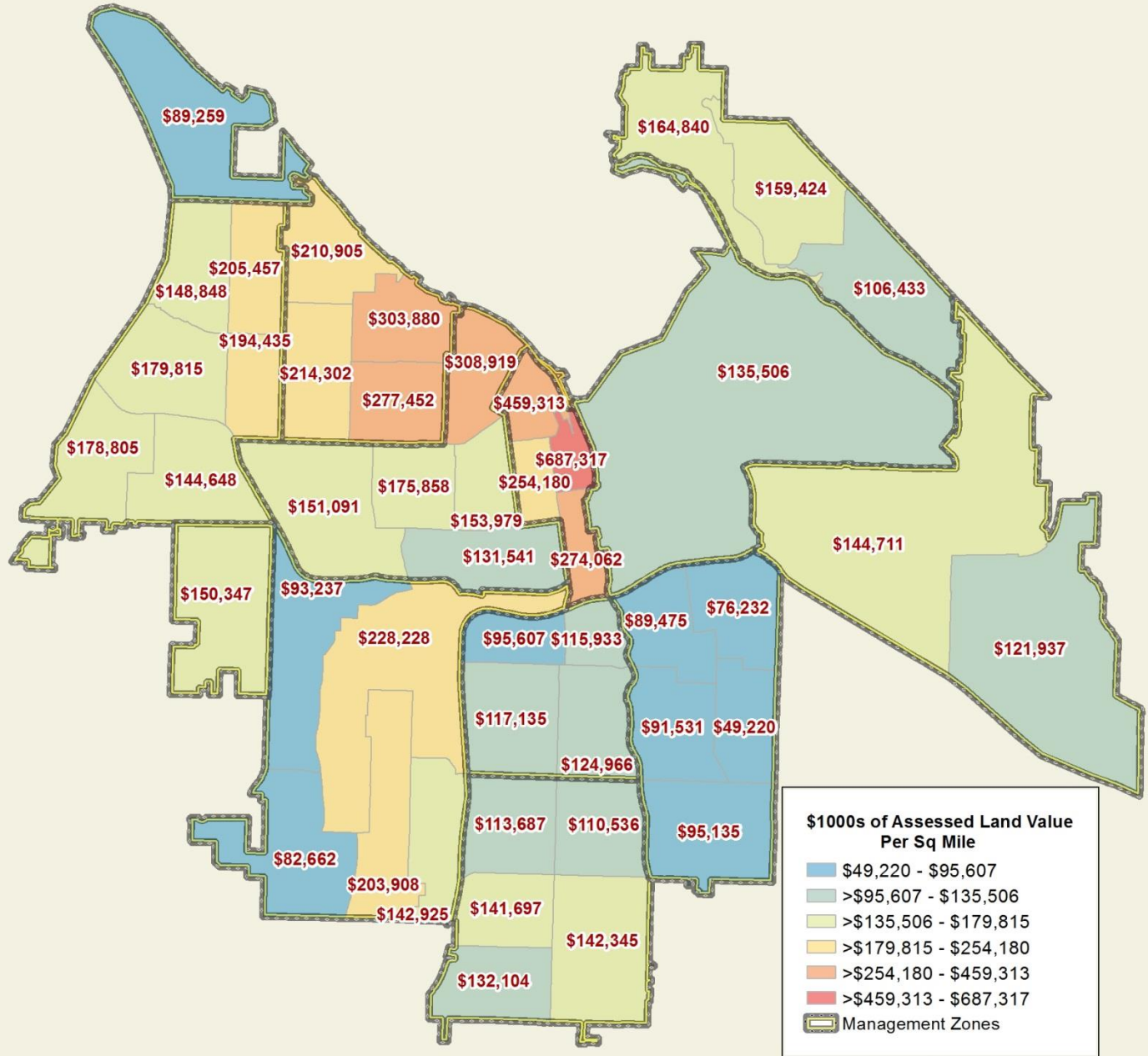
LAND USE



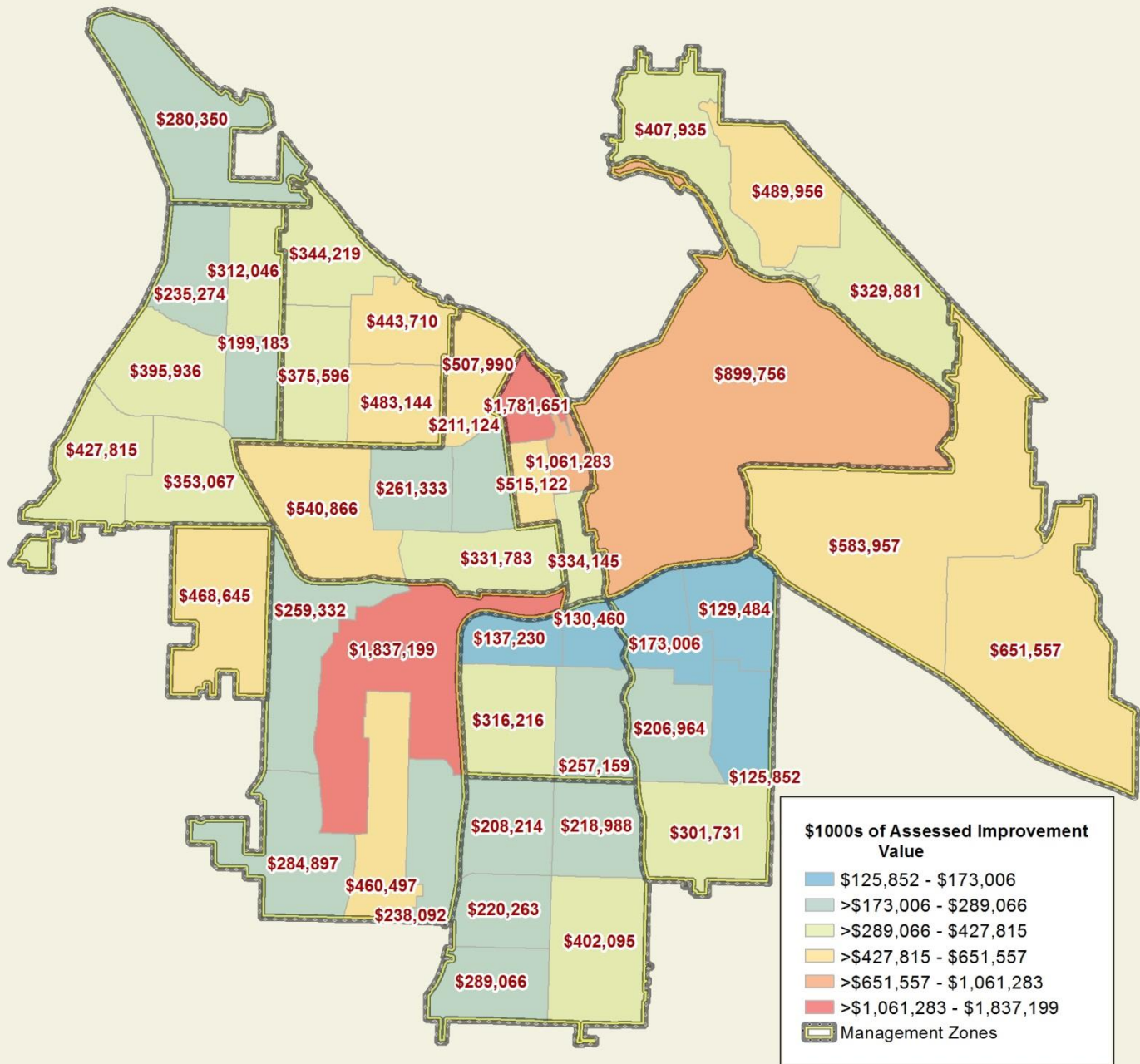
ASSESSED LAND VALUE



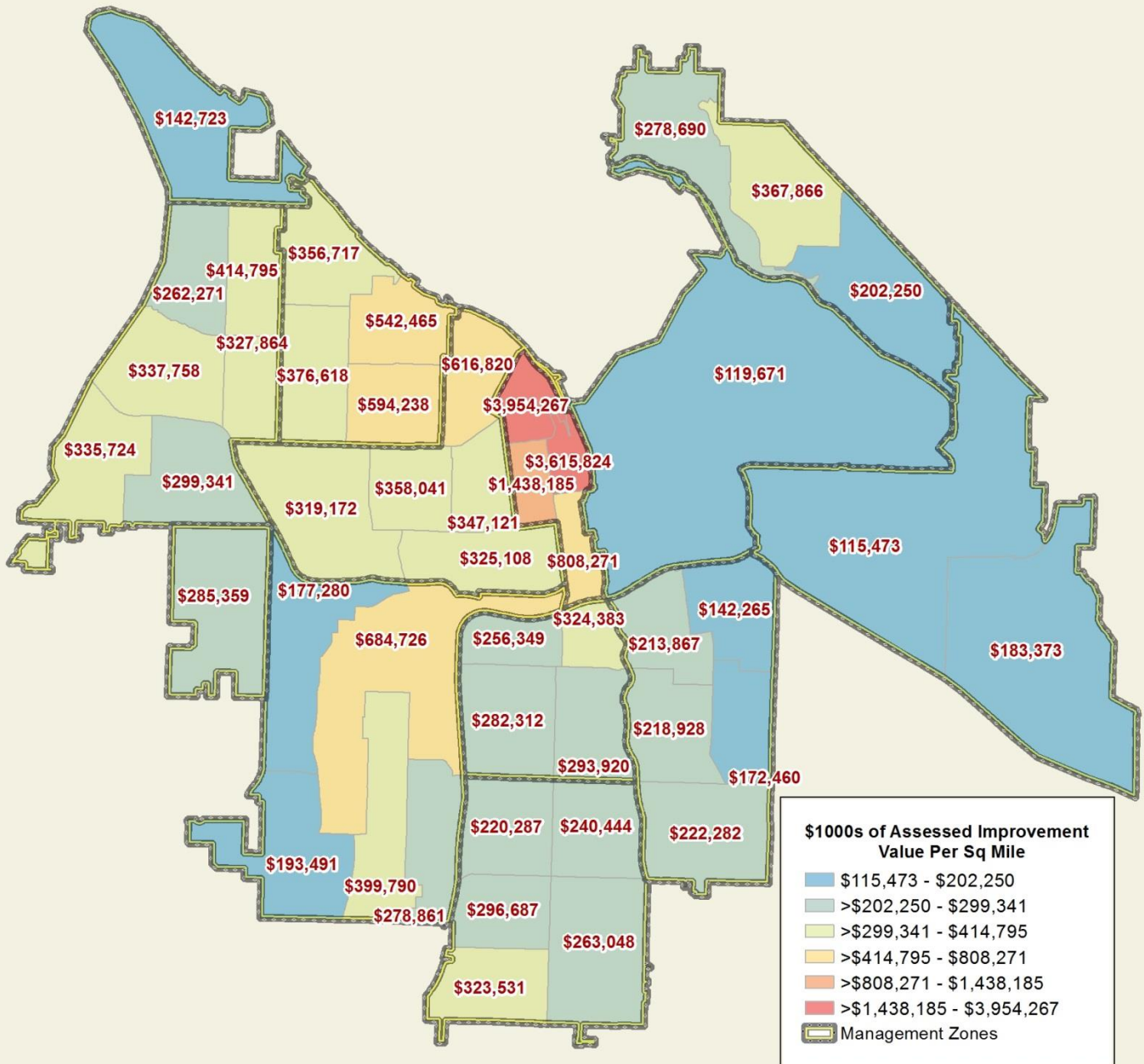
ASSESSED LAND VALUE DENSITY



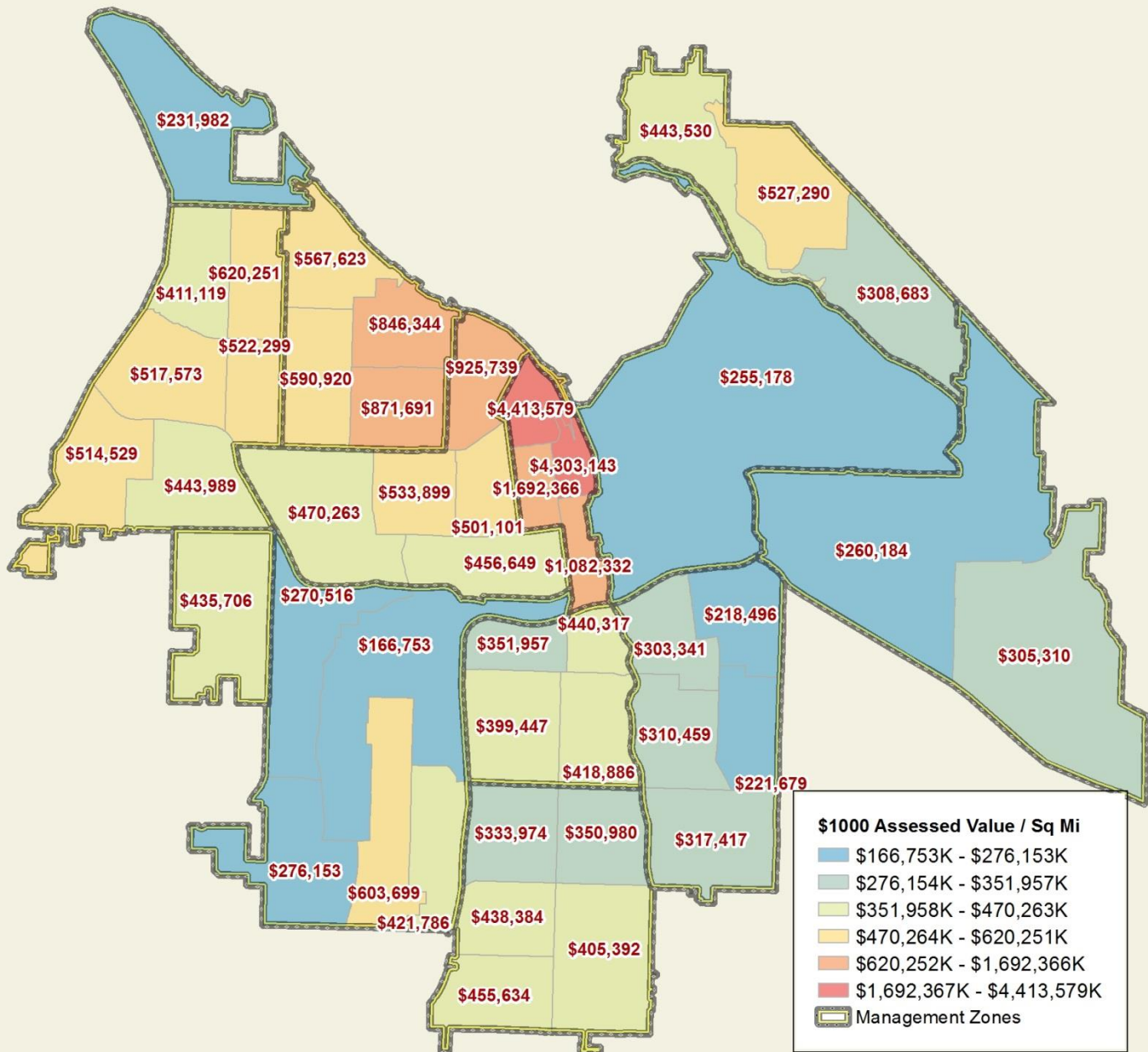
ASSESSED VALUE WITH IMPROVEMENTS



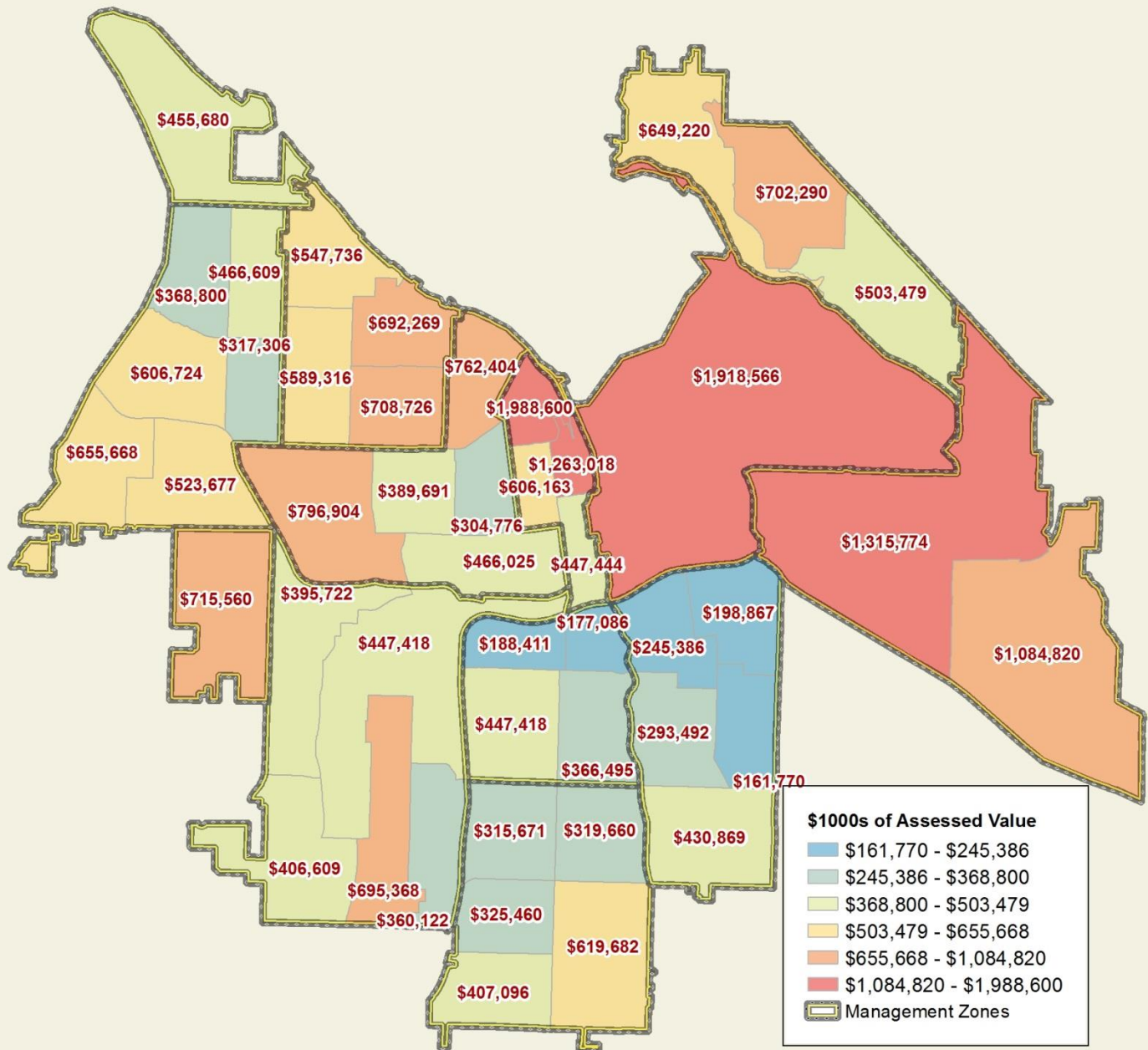
ASSESSED VALUE WITH IMPROVEMENTS BY DENSITY



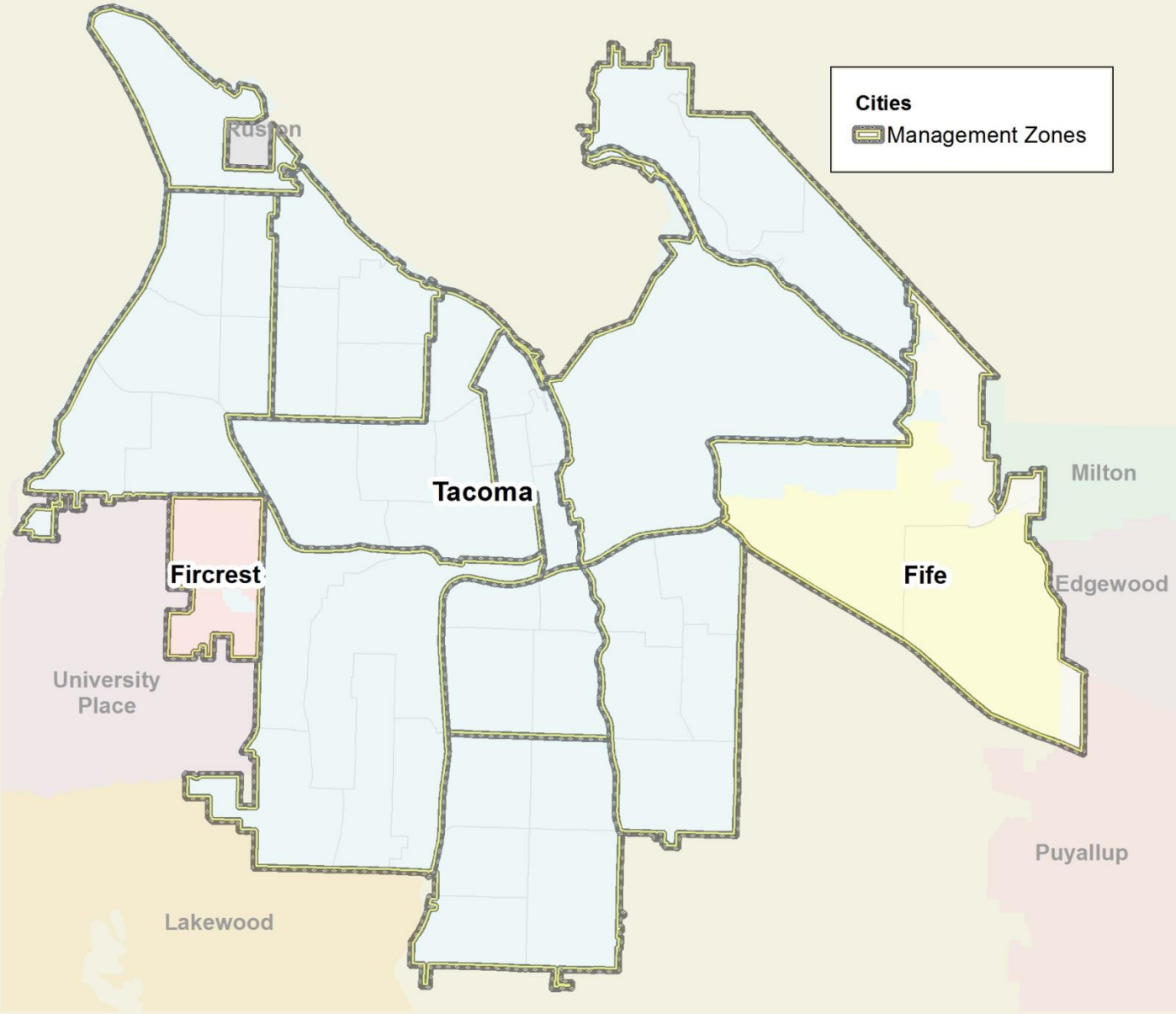
ASSESSED VALUE PER SQUARE MILE (IN 1,000'S)



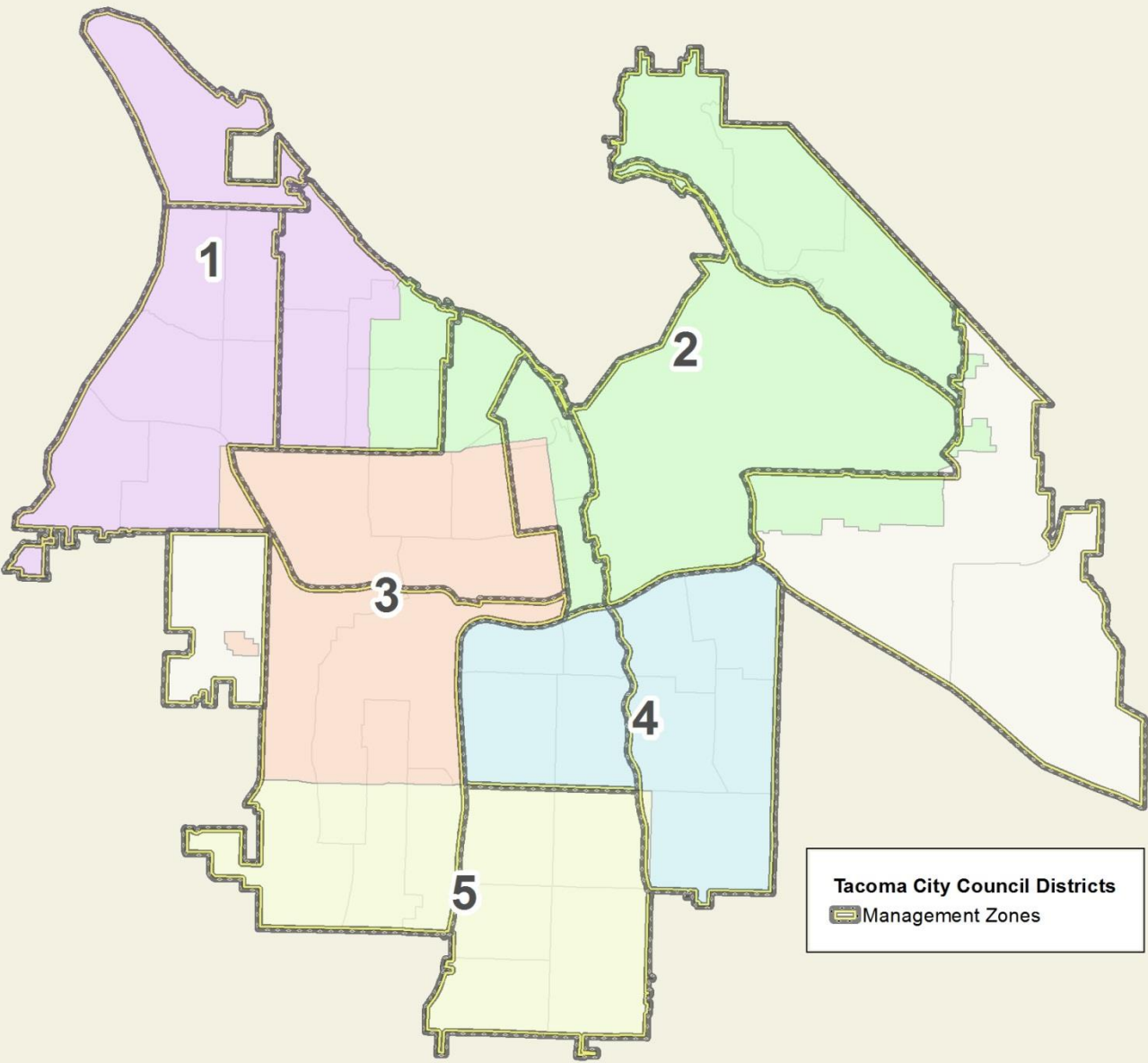
ASSESSED VALUE TOTAL

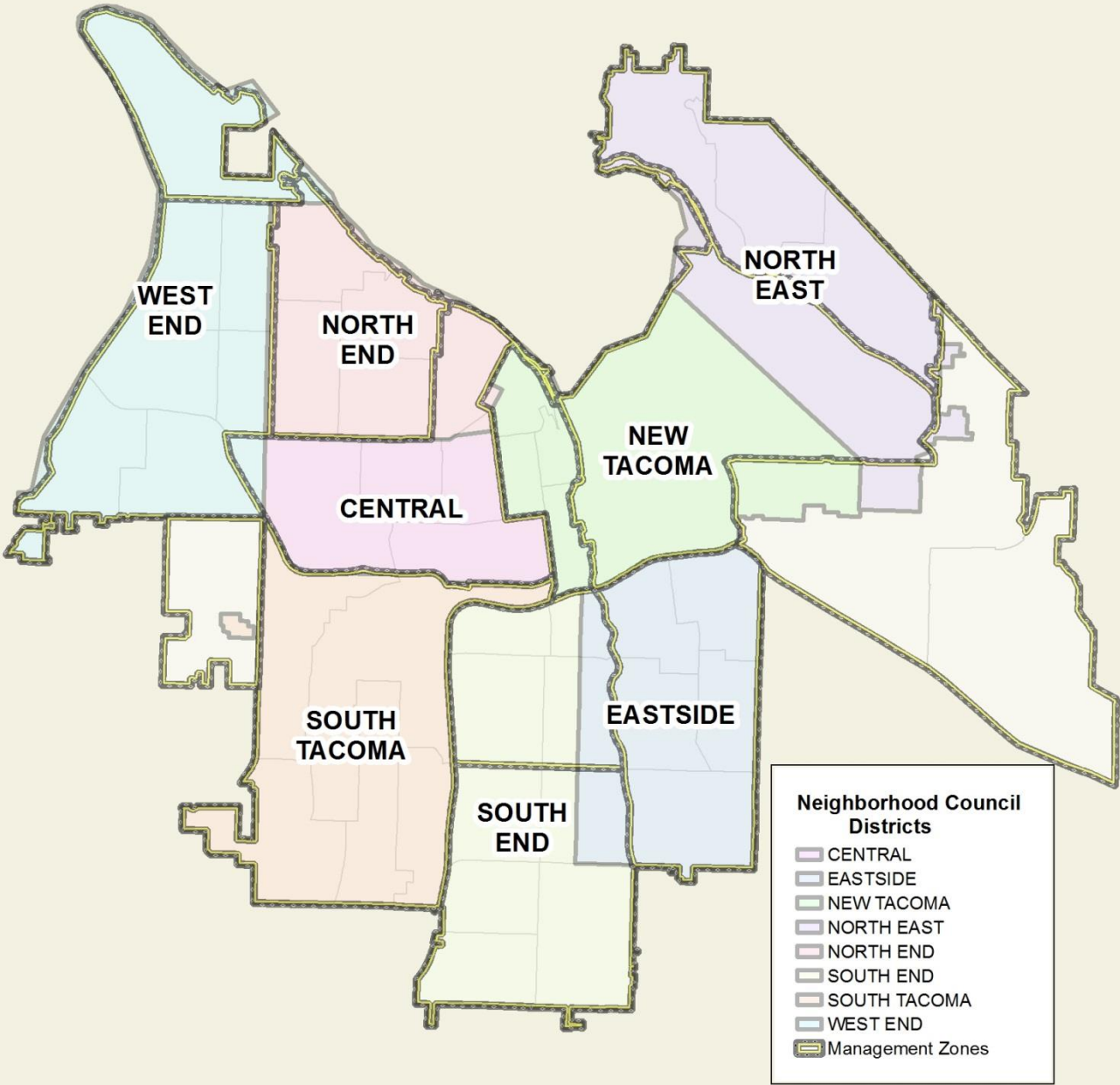


CITY BOUNDARIES

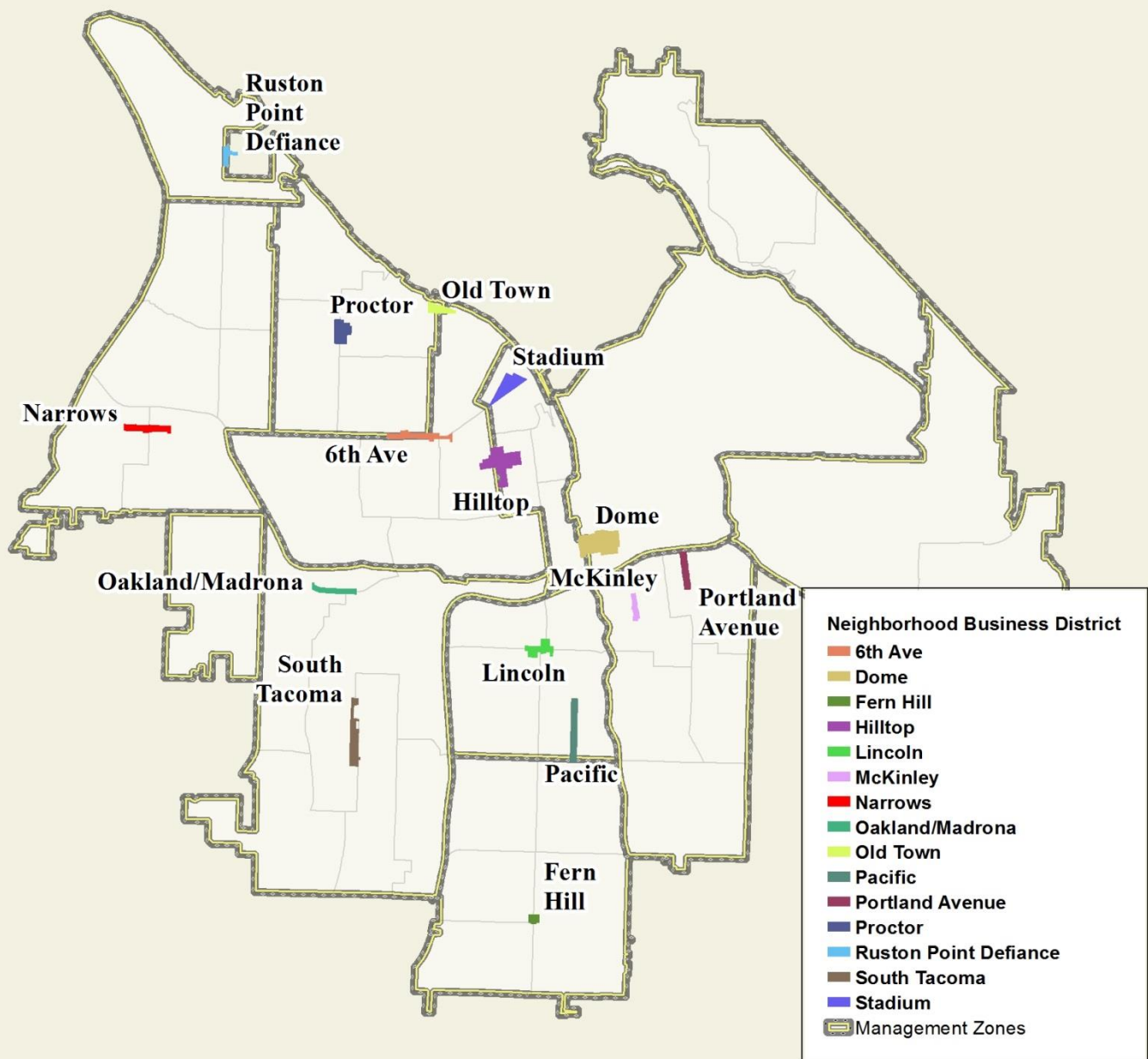


TACOMA CITY COUNCIL DISTRICTS

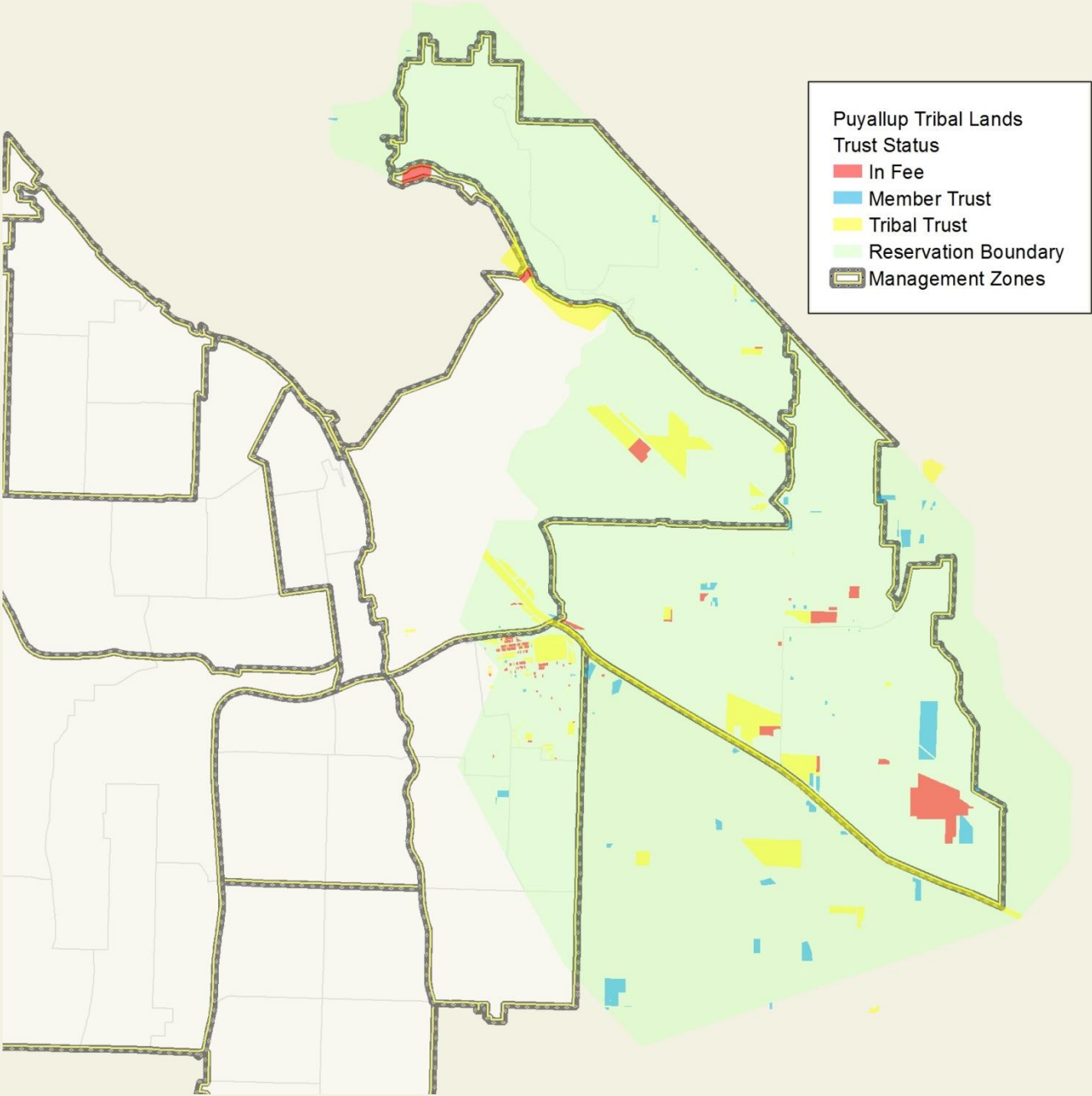


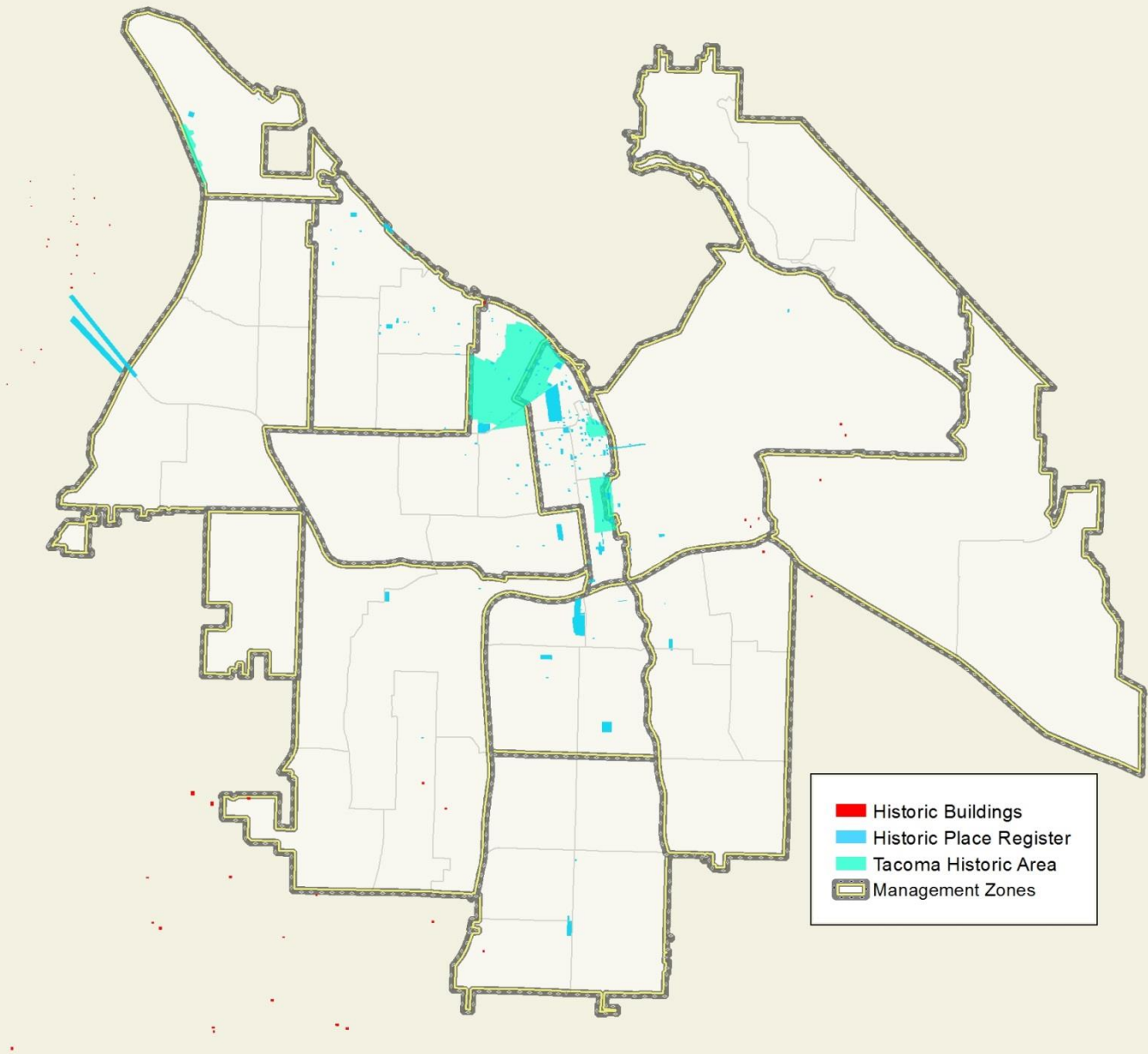


CITY OF TACOMA NEIGHBORHOOD BUSINESS DISTRICTS

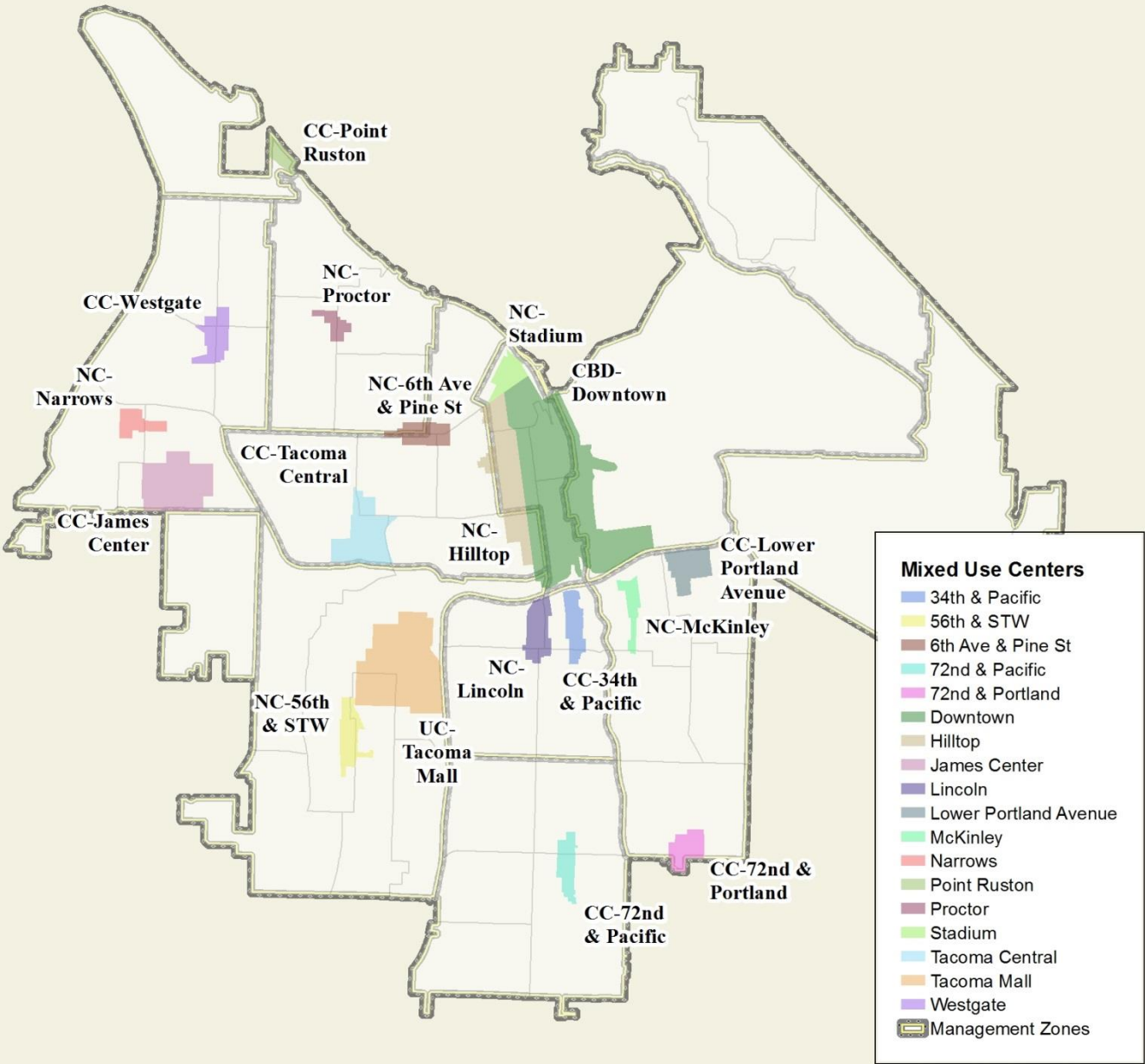


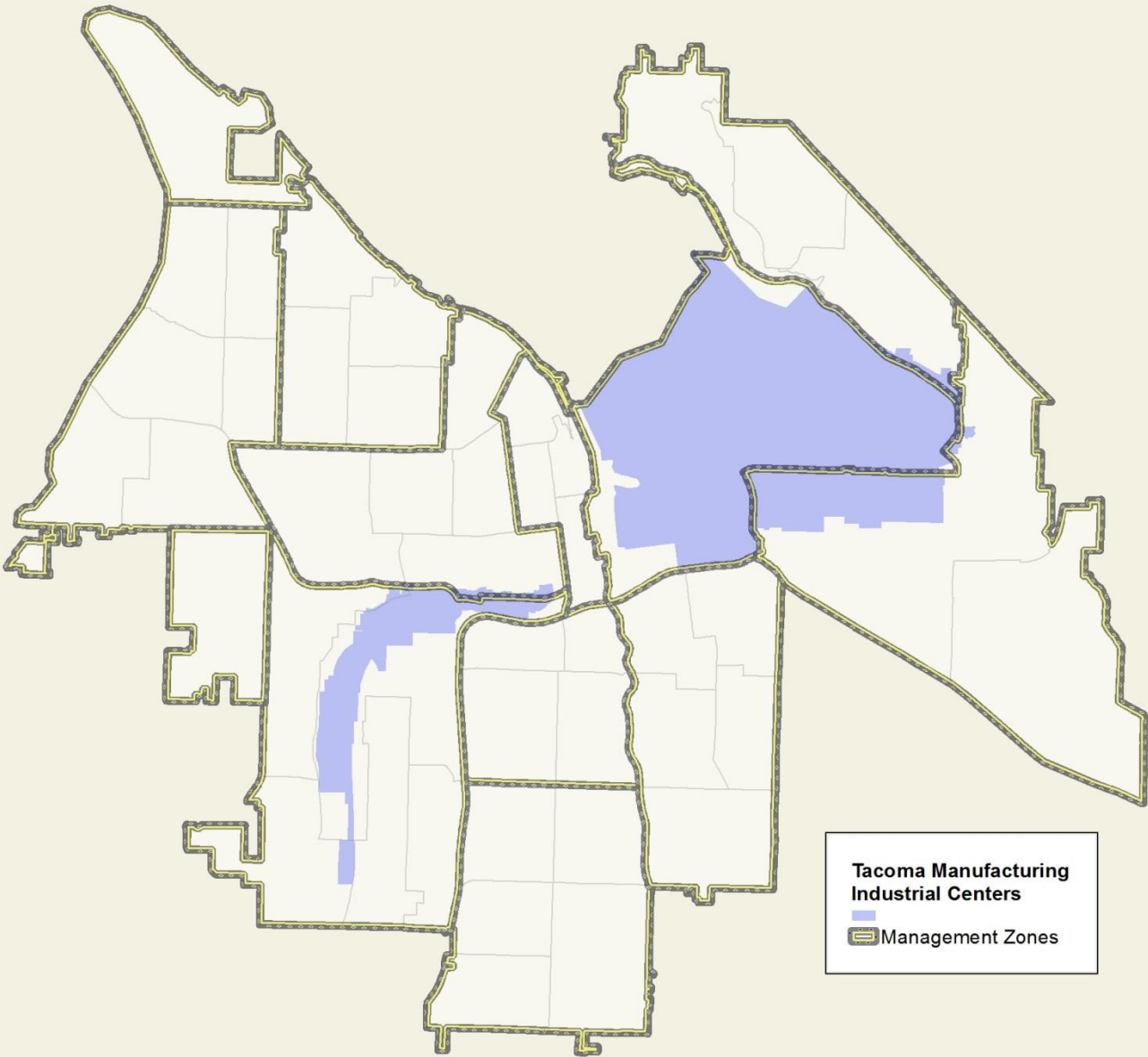
PUYALLUP TRIBAL LANDS



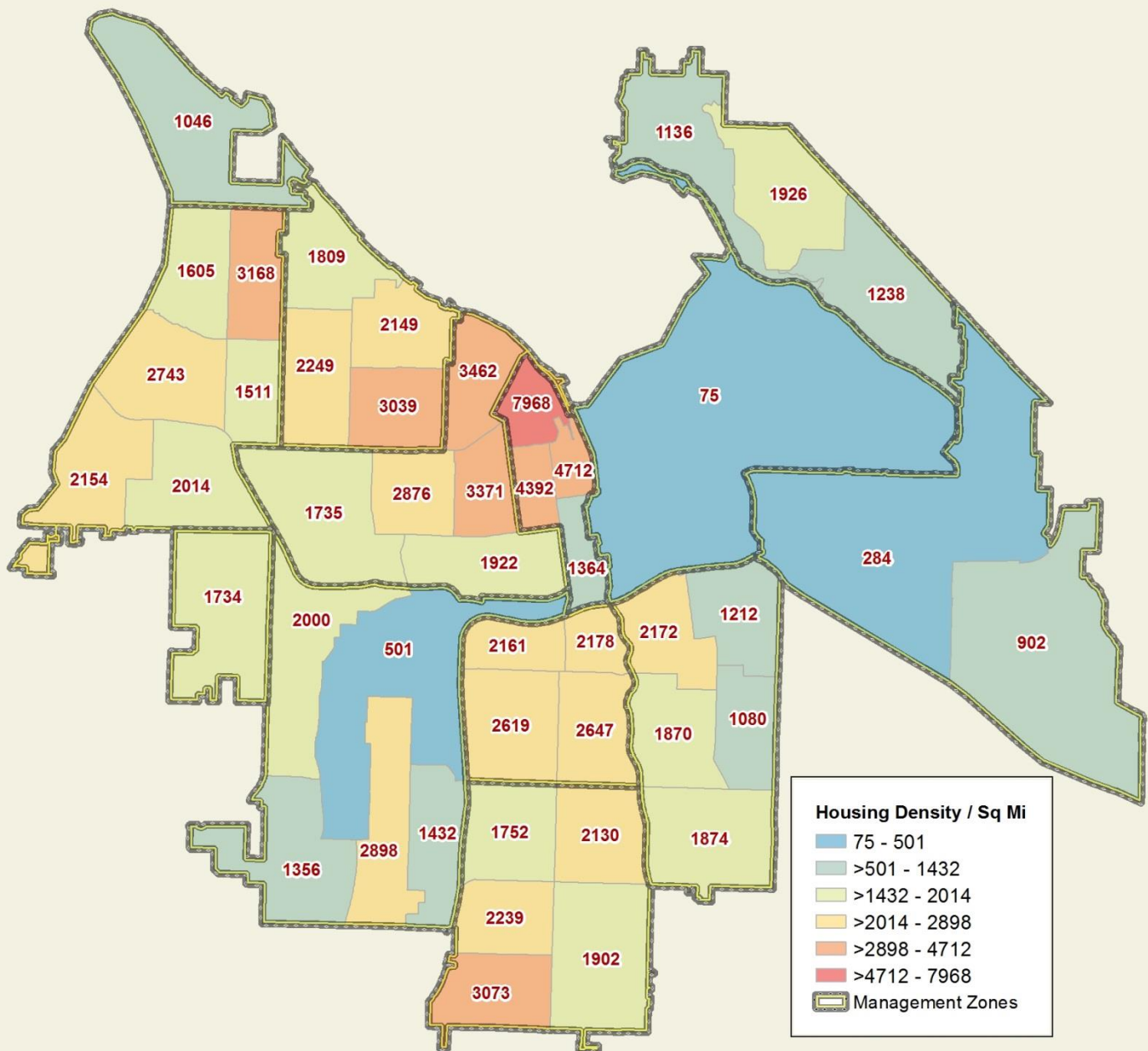


THE CITY OF TACOMA MIXED USE CENTERS

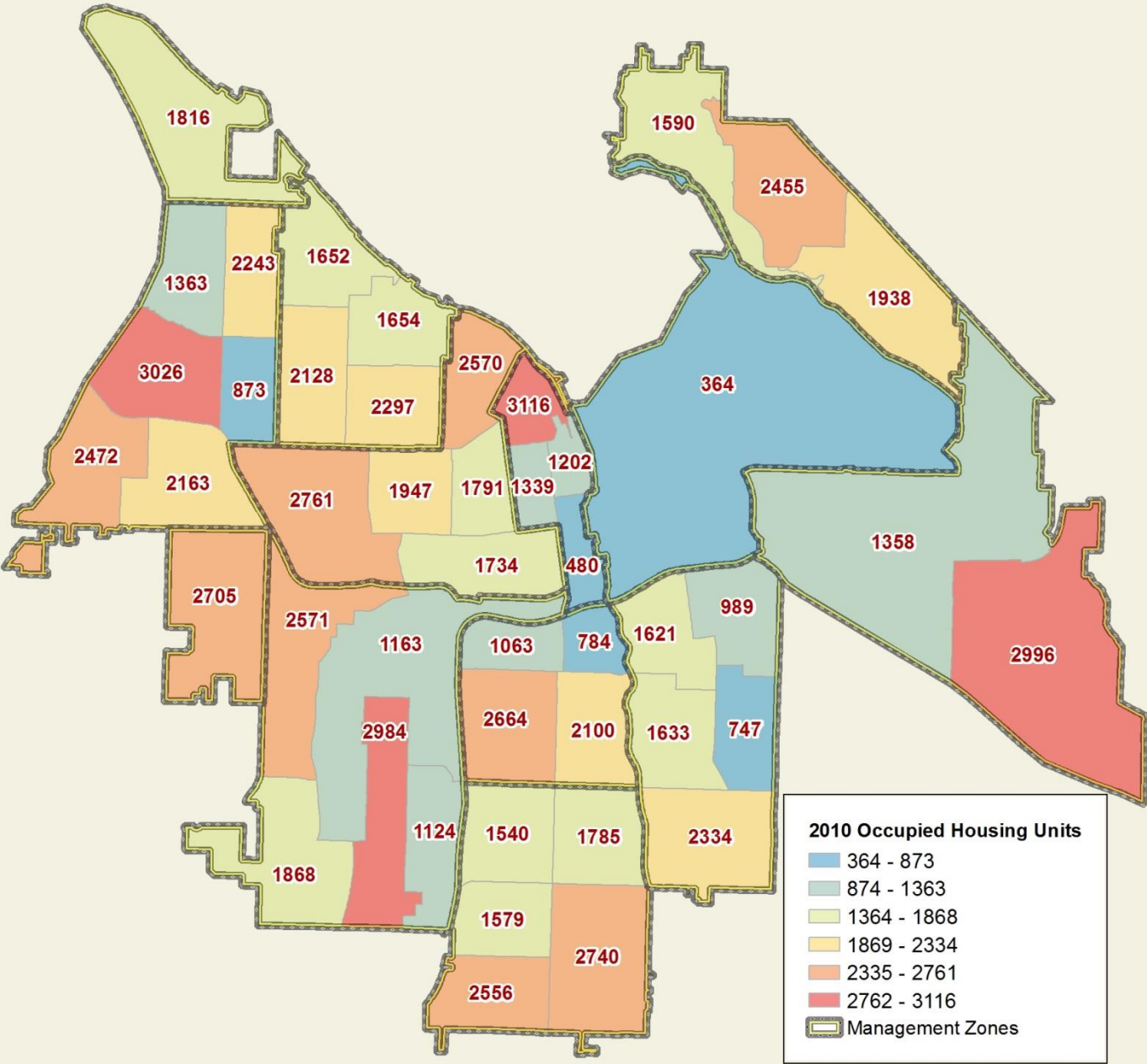




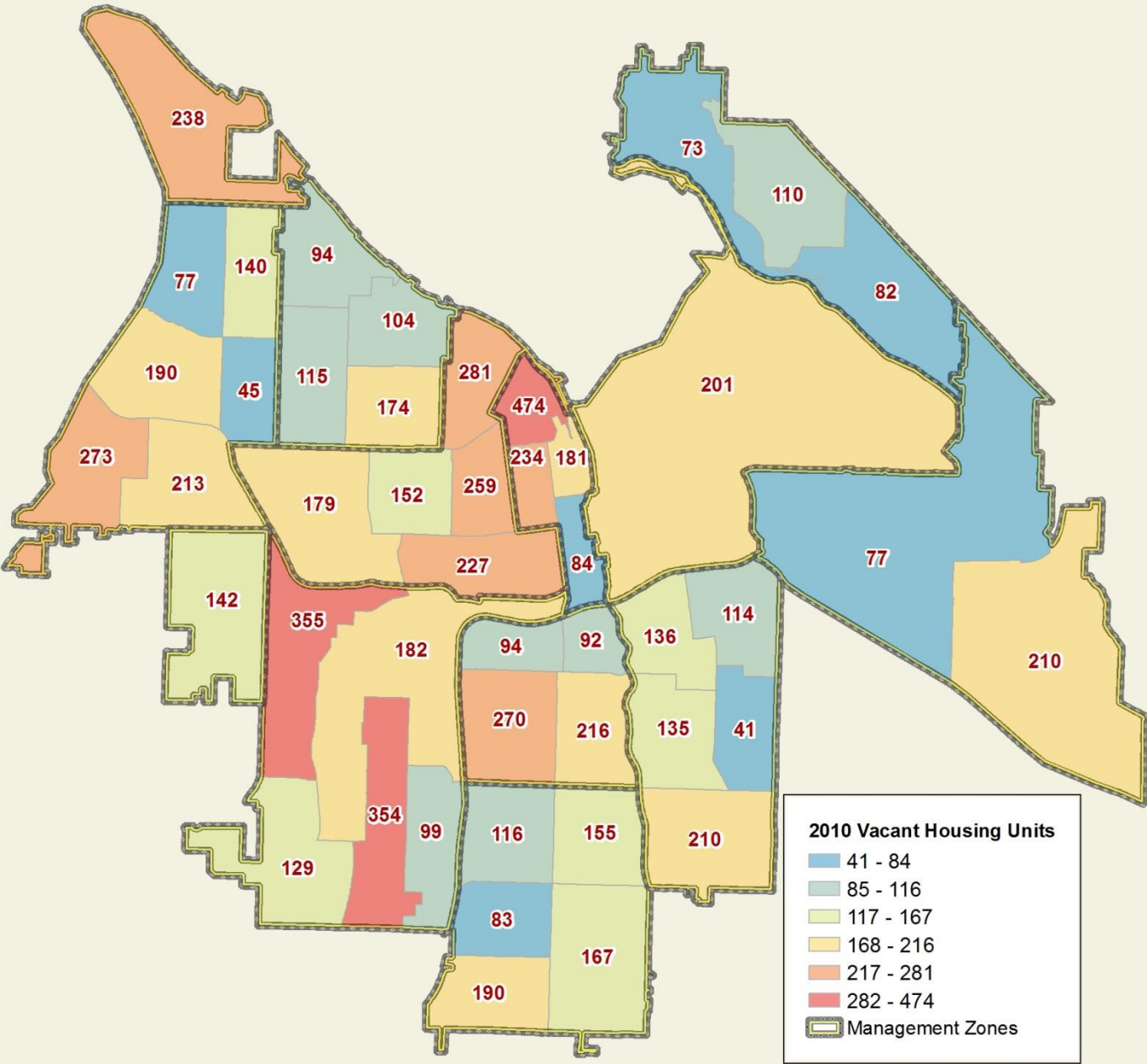
HOUSING DENSITY



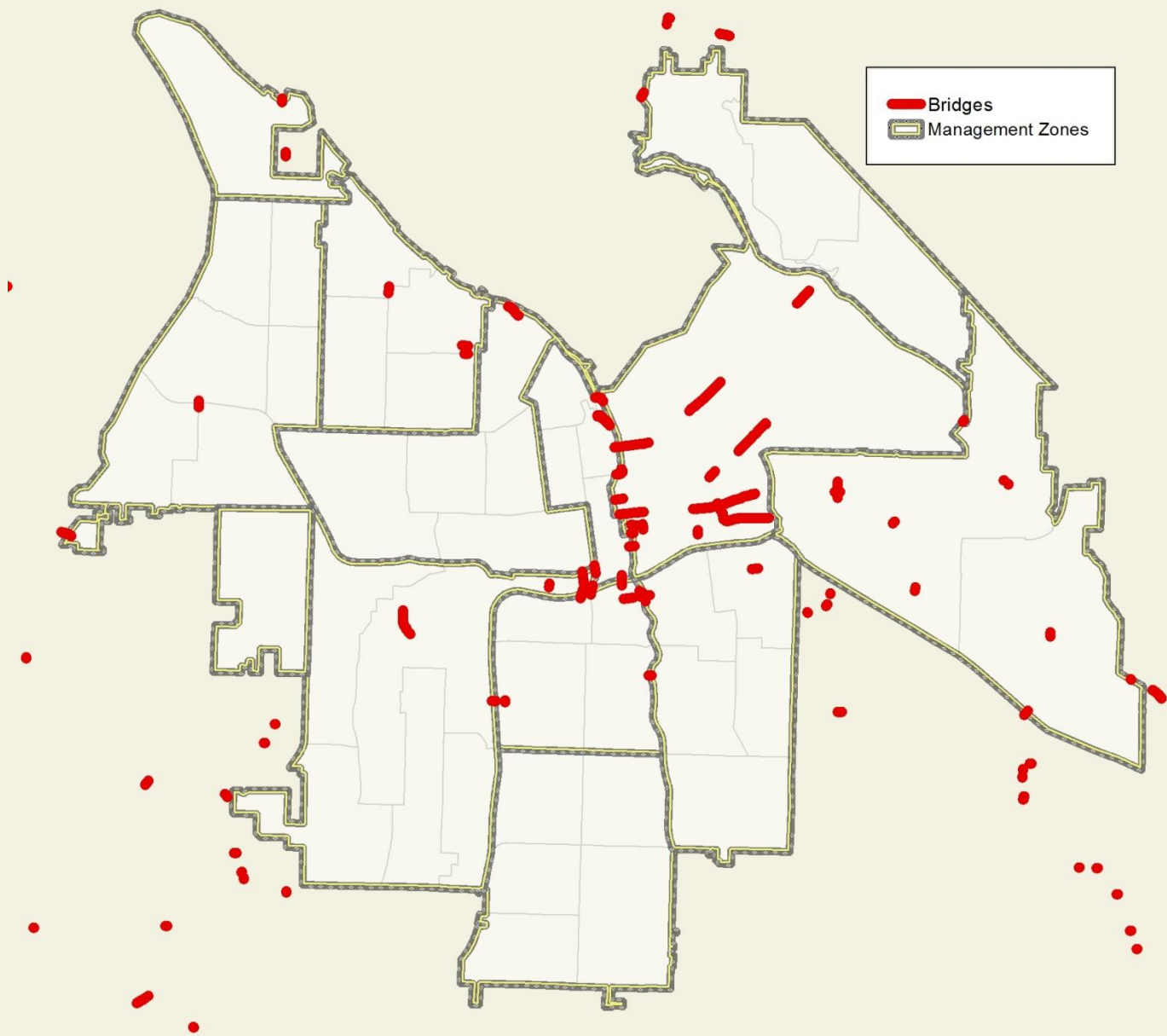
OCCUPIED HOUSING UNITS

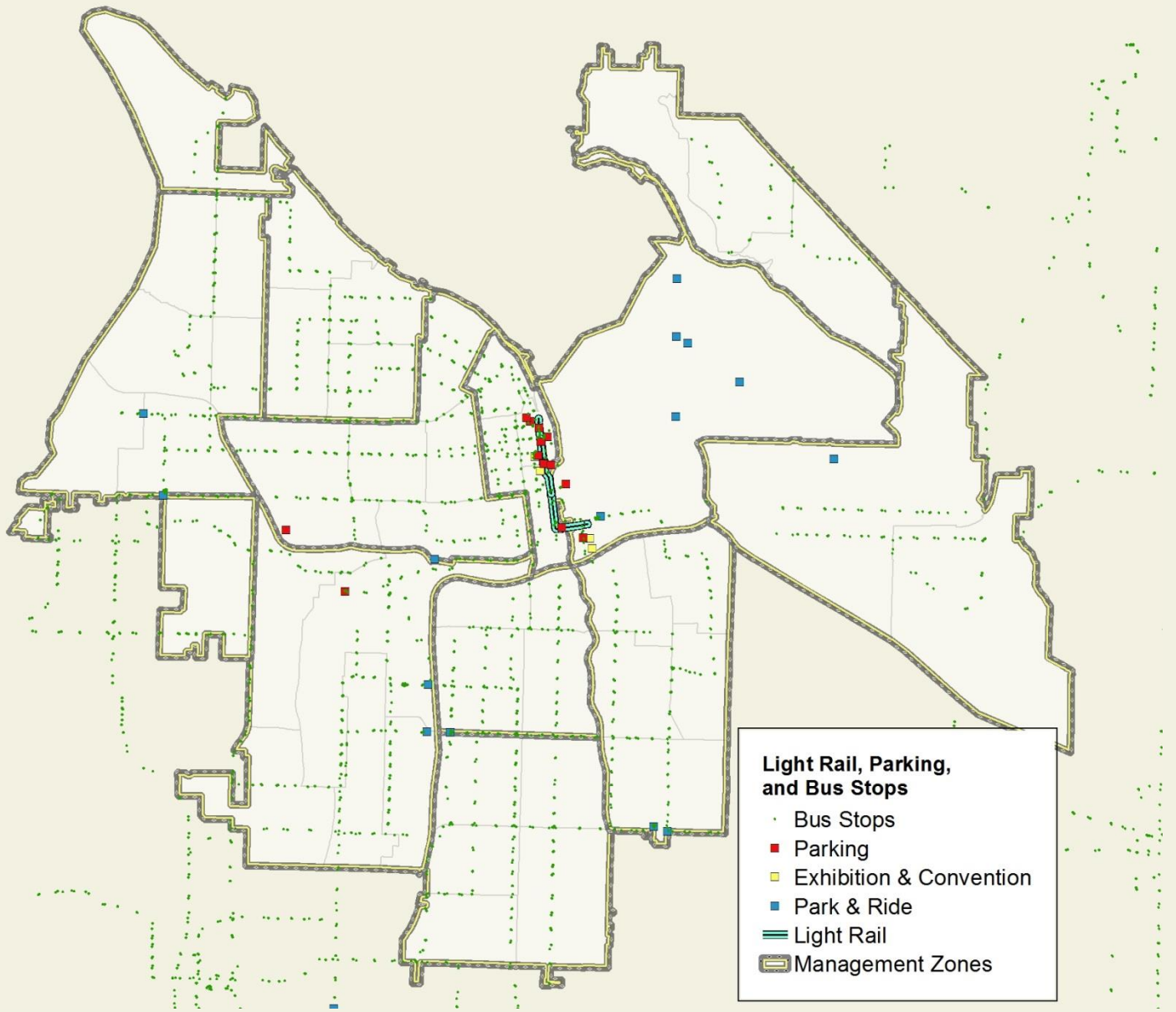


VACANT HOUSING UNITS

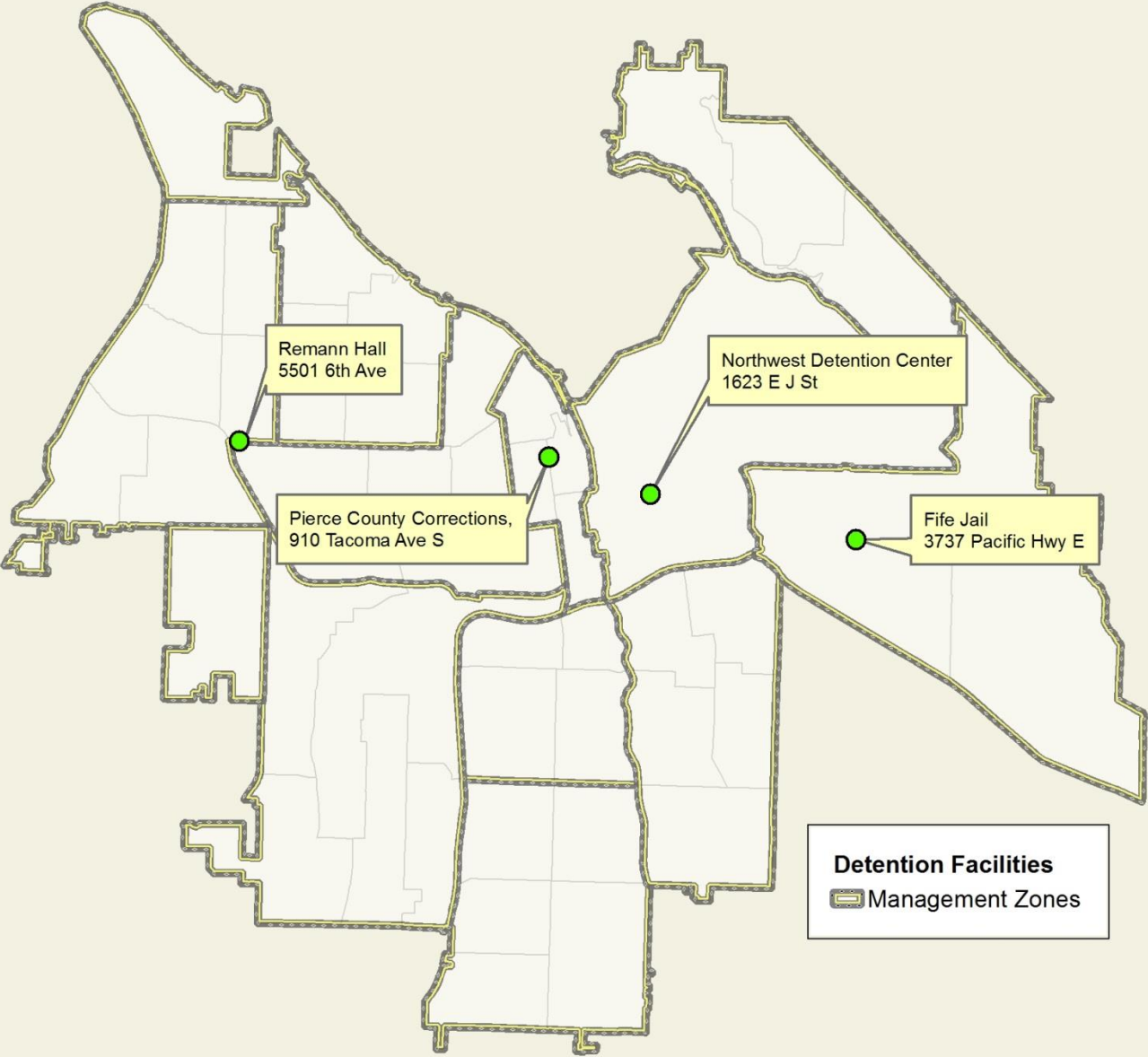


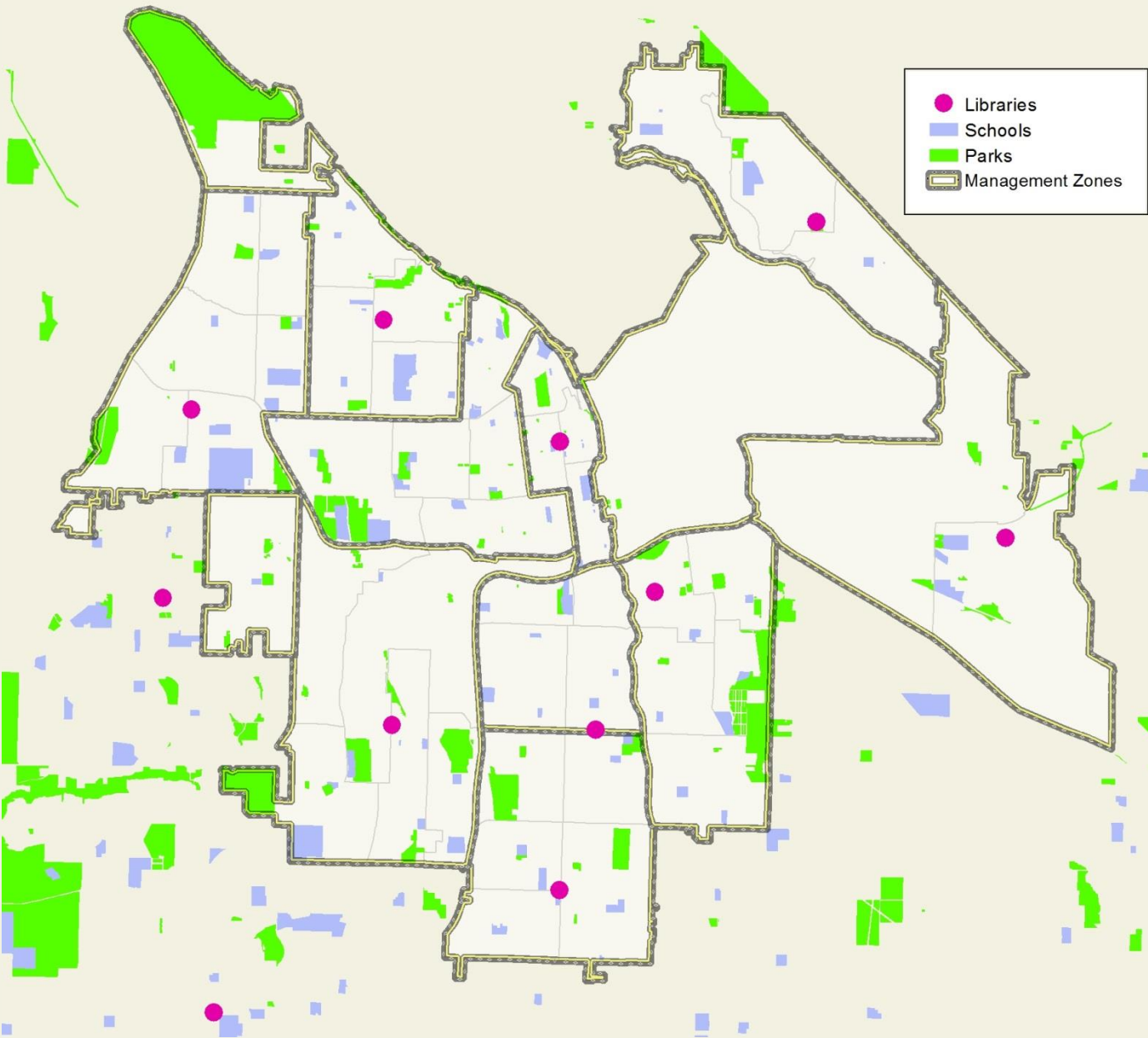
AREA BRIDGES



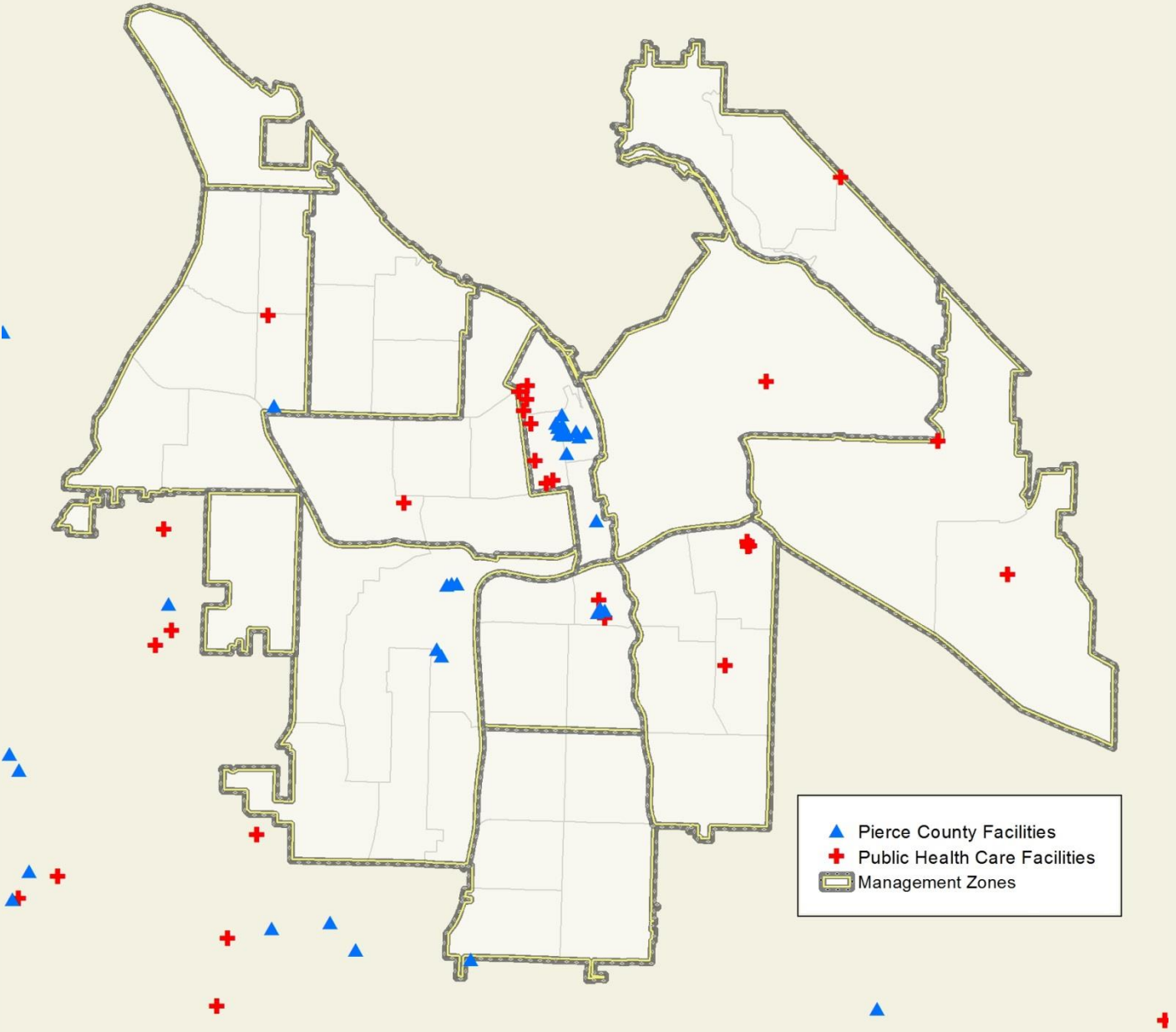


DETENTION FACILITIES



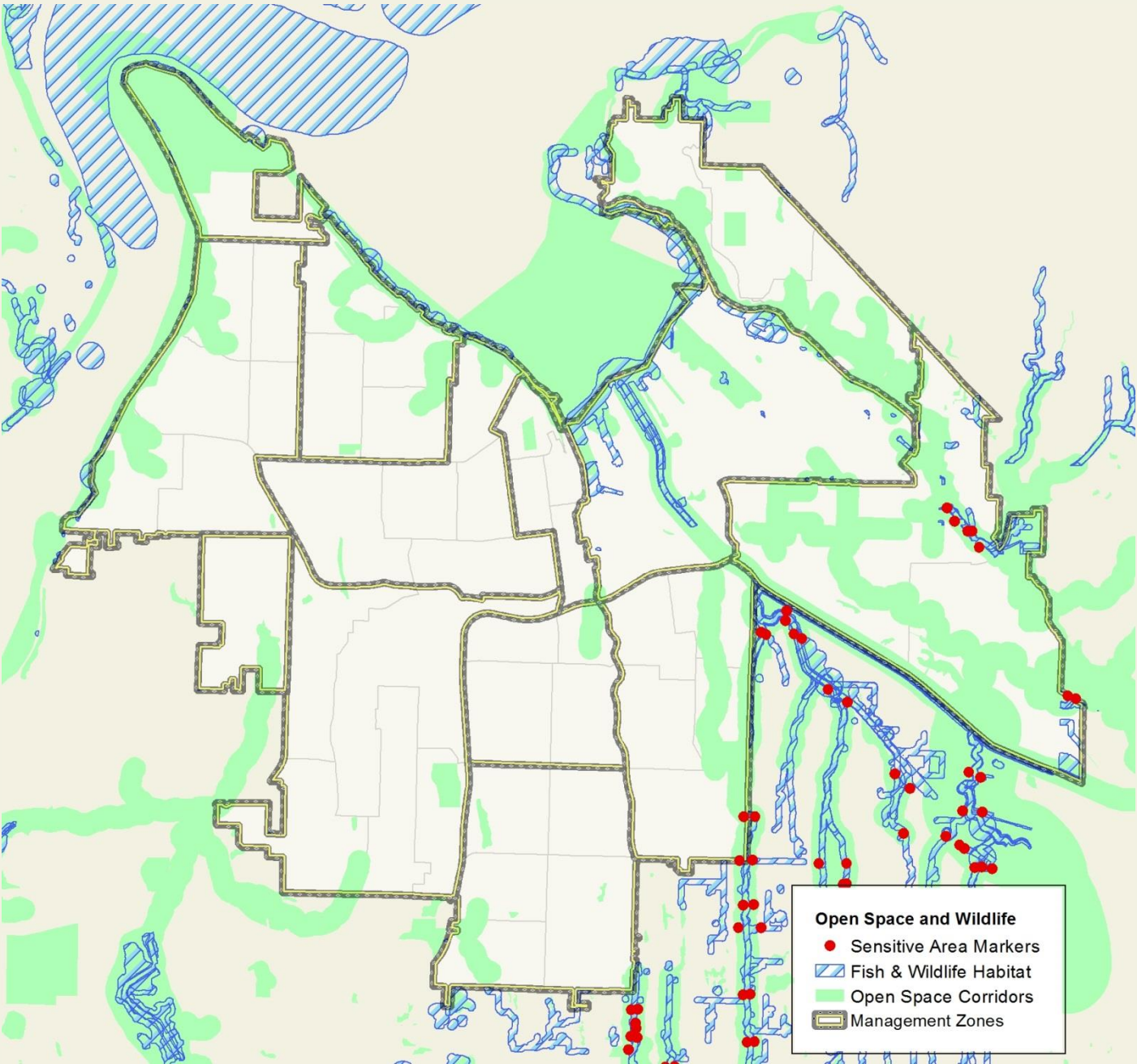


HEALTH CARE FACILITIES

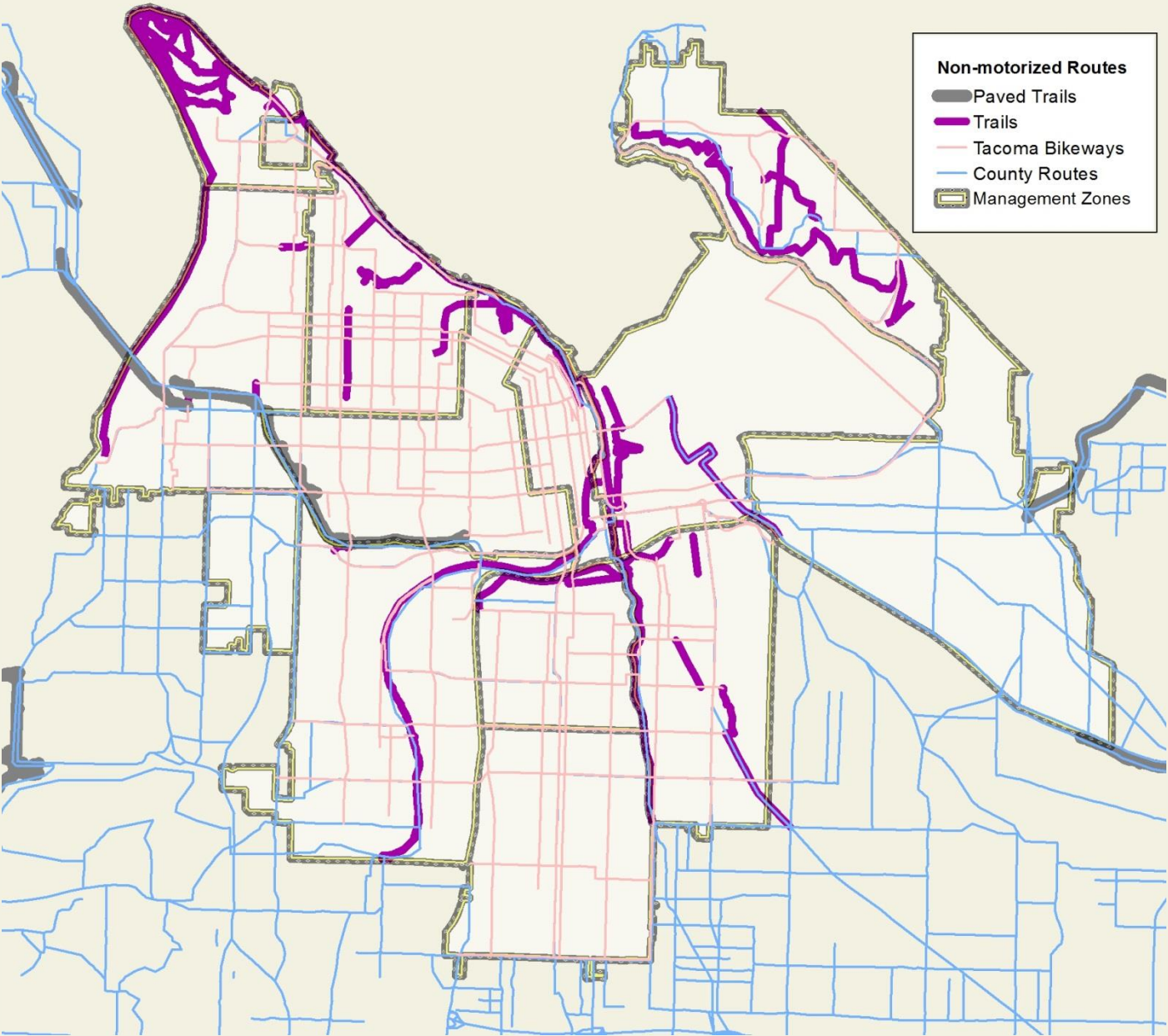


APPENDIX C—ADDITIONAL ENVIRONMENTAL CONDITIONS

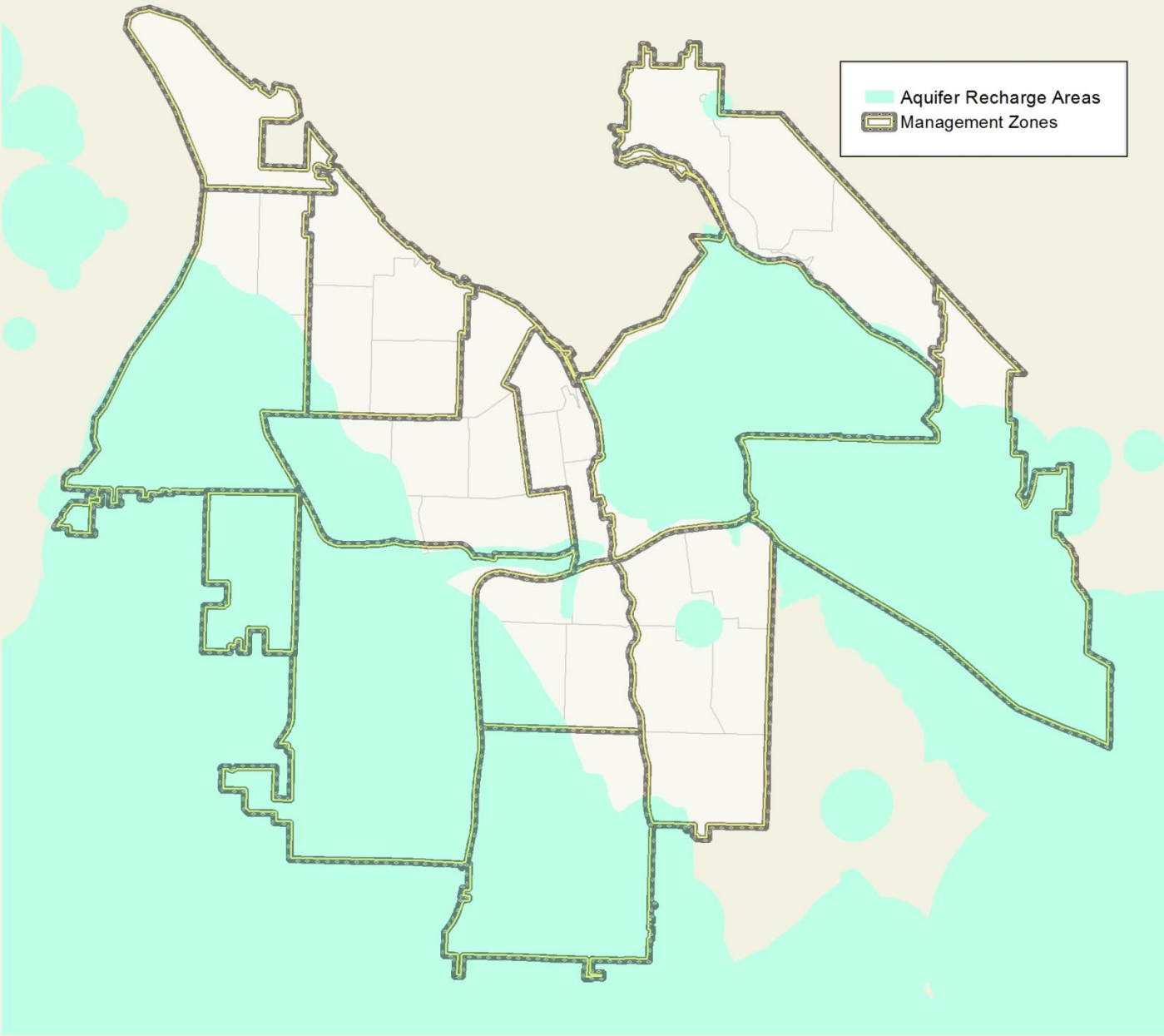
OPEN SPACES



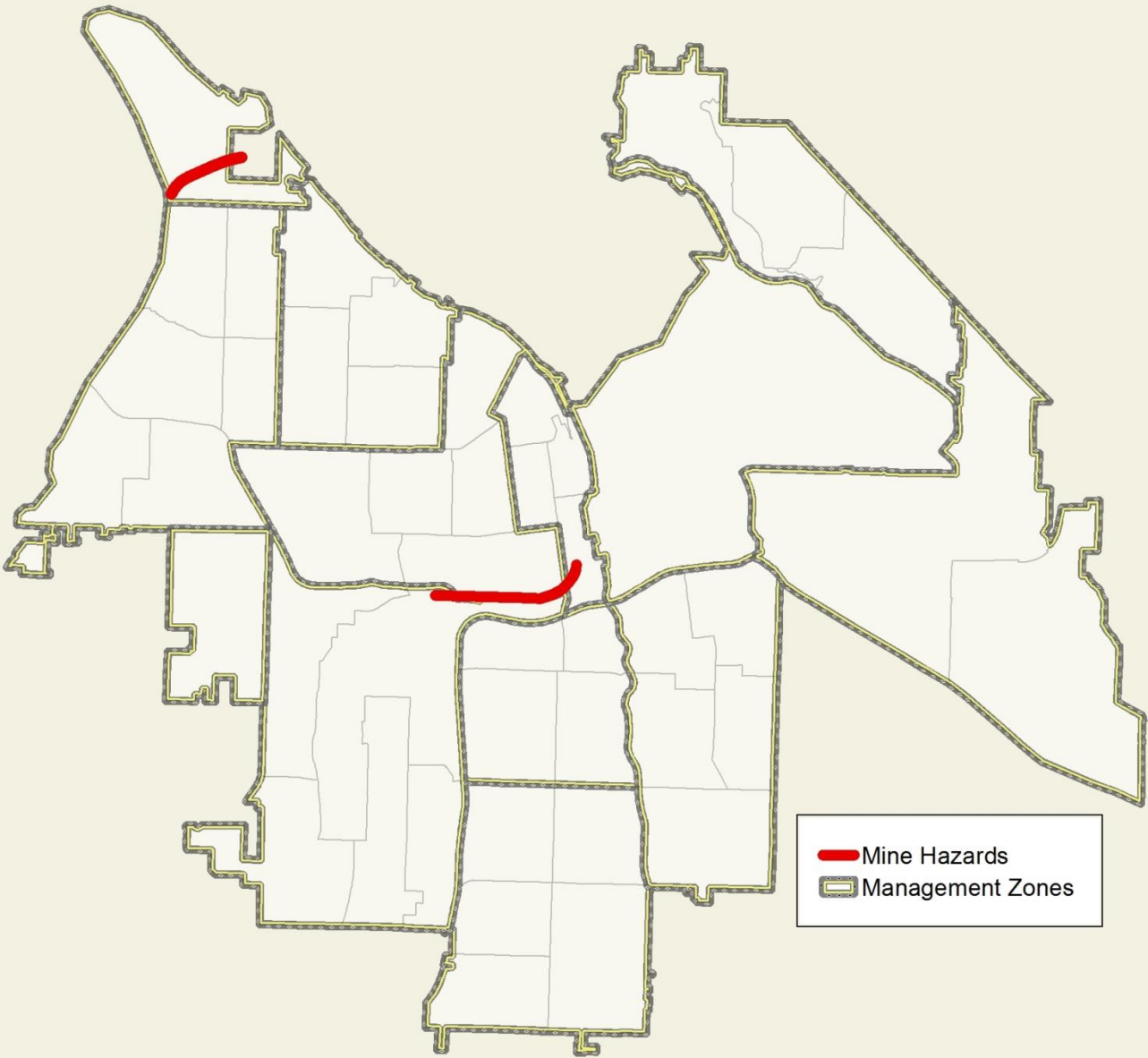
TRAILS



AQUIFER RECHARGE AREAS



UNDERGROUND HAZARDS



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Map	Page Number	Sources
10 Foot Contours, Elevation	31	City of Tacoma
2010 African American Population	79	US Census Bureau; Pierce County GIS Portal; Tacoma Fire Department Analysis
2010 Asian Population	78	US Census Bureau; Pierce County GIS Portal; Tacoma Fire Department Analysis
2010 Daytime Population	71	Puget Sound Regional Council preliminary estimates; Tacoma Fire Department Analysis to pro-rate counts by area
2010 Hispanic Population	77	US Census Bureau; Pierce County GIS Portal; Tacoma Fire Department Analysis
2010 Median Age	82	US Census Bureau; Pierce County GIS Data Portal
2010 Mixed Race Population	80	US Census Bureau; Pierce County GIS Portal; Tacoma Fire Department Analysis
2010 Native American Population	76	US Census Bureau; Pierce County GIS Portal; Tacoma Fire Department Analysis
2010 Occupied Housing Units	100	US Census Bureau; Pierce County GIS Data Portal; Tacoma Fire Department Analysis
2010 Pacific Islander Population	75	US Census Bureau; Pierce County GIS Portal; Tacoma Fire Department Analysis
2010 Population	8	US Census Bureau; Pierce County GIS Portal; Tacoma Fire Department Analysis
2010 Population, Other Races	81	US Census Bureau; Pierce County GIS Portal; Tacoma Fire Department Analysis
2010 Vacant Housing Units	101	US Census Bureau; Pierce County GIS Data Portal; Tacoma Fire Department Analysis
2010 White Population	74	US Census Bureau; Pierce County GIS Portal; Tacoma Fire Department Analysis
2013 Median Household Income	83	US Census Bureau; Pierce County GIS Data Portal
Aquifer Recharge Areas	109	Pierce County, WA, GIS Data Portal

Assessed Land Value	85	Pierce County Assessor GIS Parcels; Tax Account Table; TFD Management & Sub-Zones
Assessed Value Density per Square Mile	86	Pierce County Assessor GIS Parcels; Tax Account Table; TFD Management & Sub-Zones
Assessed Value Totals	11 & 89	Pierce County Assessor GIS Parcels; Tax Account Table; TFD Management & Sub-Zones
Assessed Value, Improvement Value	87	Pierce County Assessor GIS Parcels; Tax Account Table; TFD Management & Sub-Zones
Assessed Value, Improvement Value Per Sq. Mile Density	88	Pierce County Assessor GIS Parcels; Tax Account Table; TFD Management & Sub-Zones
Assessed Value, Land Value per Square Mile Density	90	Pierce County Assessor GIS Parcels; Tax Account Table; TFD Management & Sub-Zones
Bridges	102	Pierce County, WA, GIS Data Portal
Cities	91	Pierce County, WA, GIS Data Portal
Commission on Fire Accreditation International Population Density	73	Tacoma Fire Department
Daytime Population Density per Square Mile	72	Tacoma Fire Department Incident Database; Puget Sound Regional Council preliminary estimates; Tacoma Fire Department pro-rated area calculations
Daytime Population Estimates	9	Tacoma Fire Department Incident Database; Puget Sound Regional Council preliminary estimates; Tacoma Fire Department pro-rated area calculations
Earthquake Hazards Seismic Site Class	28	Washington State Department of Natural Resources, Liquefaction Susceptibility and Site Class Maps of Washington State, by County; Palmer, Magsino, Bilderback, Poelstra, Folger, and Niggemann; GER Portal Seismogenic Features
Earthquake Liquefaction Susceptibility	29	Washington State Department of Natural Resources, Liquefaction Susceptibility and Site Class Maps of Washington State, by County; Palmer, Magsino, Bilderback, Poelstra, Folger, and Niggemann; GER Portal Seismogenic Features
EMS Calls for Service, Change From 2010—2014	24	Tacoma Fire Department Incident Database

Fire Calls for Service, Change from 2010—2014	18	Tacoma Fire Department Incident Database
Hazardous Material Incidents 2010—2014	25	Tacoma Fire Department Incident Database
Historic Buildings, Historic Place Register, Tacoma Historic Area	96	City of Tacoma, Community & Economic Development Dept., Pierce County GIS Data Portal
Housing Density/Square Mile	99	US Census Bureau; Pierce County GIS Data Portal; Tacoma Fire Department Analysis
Jails	104	Tacoma Fire Department; Google
Libraries, Schools, Parks	105	Pierce County GIS Data Portal
Light Rail, Parking, and Bus Stops	103	City of Tacoma, Community & Economic Development Dept., Pierce County GIS Data Portal, Pierce Transit
Management Zones	5	Tacoma Fire Department
Mine Hazards	110	City of Tacoma, Community & Economic Development Dept.
Mixed Use Centers	97	City of Tacoma, Community & Economic Development Dept.
Neighborhood Business Districts	94	City of Tacoma, Community & Economic Development Dept.
Neighborhood Council Districts	93	City of Tacoma, Community & Economic Development Dept.
Oil Pipelines	38	City of Tacoma; Washington Utilities and Transportation Commission map on https://wutc.maps.arcgis.com/home/webmap/viewer.html?webmap=0d3ae3c8eff94a2bbe462e1a8eadd139
Open Space and Wildlife	107	Pierce County GIS Data Portal
Pierce County Facilities, Public Health Care Facilities	106	City of Tacoma, Community & Economic Development Dept., Pierce County GIS Data Portal, Pierce Transit
Puyallup Tribal Lands	95	Puyallup Tribe GIS & City of Tacoma, Community & Economic Development Dept.
Population by Sub-Zone (resident)	70	US Census Bureau; Pierce County GIS Portal; Tacoma Fire Department Analysis
Railroads	37	Port of Tacoma; Pierce County GIS Data Portal

Steep Slopes	30	City of Tacoma, Community & Economic Development Dept.; Pierce County GIS Data Portal
Structure Fires, 2010-2014, Density Map	18	Tacoma Fire Department Incident Database
Tacoma City Council Districts	92	City of Tacoma, Community & Economic Development Dept.
Tacoma Land Use Designations	84	City of Tacoma, Community & Economic Development Dept.
Tacoma Manufacturing Industrial Centers	98	City of Tacoma, Community & Economic Development Dept.
Total Housing Counts	13	US Census Bureau; Pierce County GIS Data Portal; Tacoma Fire Department Analysis
Trails	108	Pierce County, WA, GIS Data Portal
Tsunami Hazard Area maps	32	Tacoma Fire Department; Pierce County GIS Data Portal; NOAA http://www.pmel.noaa.gov/pubs/PDF/vent2981/vent2981.pdf ; Tacoma, Washington, Tsunami Hazard Mapping Project: Modeling Tsunami Inundation from Tacoma and Seattle Fault Earthquakes; Venturato, Arcas, Titov, Mofjeld, Chamberlin, and Gonzalez
Volcanic Hazards, Lahar Evacuation Routes	33	Pierce County GIS Data Portal
Wetlands and Floodways	35	City of Tacoma, Community & Economic Development Dept., Pierce County GIS Data Portal
Wind Zones	36	City of Tacoma, Online Permit Mapping, Scott Beard, Planning and Development Services. KZT is a topographic wind speed-up factor. IBC is the International Building Code.