SNOQUALMIE FIRE DEPARTMENT

January 2018

Standards of Coverage

Snoqualmie Fire Department, PO Box 987, Snoqualmie, WA 98065

This document is dedicated to all the volunteers who have served this remarkable community since 1939.

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SECTION 1: INTRODUCTION

The fire service, for many years, has wrestled with what is the best or appropriate level of service to provide to its communities. Fire related incidents, more specifically "structure fires" have decreased, contemporary building codes have improved life safety, emergency medical service (EMS) responses have increased, and new EMS prevention or avoidance programs are being added. But, the question of *what is the correct staffing level, what services should be provided, and where should these resources be located within a community,* continues to be debated.

Consensus standards exist that support the "why" of the fire service mission, but these standards can either be quickly dismissed by city administrations, or determined to be archaic and not applicable to any specific community. The National Fire Protection Association's "standard" 1710 or 1720 establishes a recommended conscious standard for apparatus deployment, but it's debated that little evidence supports these recommended levels of service. Additionally, the Insurance Services Organization (ISO) establishes a methodology to measure risk but is also debated because of the "one-size-fits-all communities" concept is not reasonable.

Those who live, work, and respond within these communities know the risks and history of fire, ems, rescue, and hazard threats that lie therein. Hazards exist in many forms and some of these hazards require specific approaches to address these risks. Is it sensible that we use the one-size-fits-all approach, or can we as a fire service do better?

In recent history, the fire service began looking to performance measures and performance indicators to tell the level-of-service story. More specifically, measuring elapsed-time to communicate level of service, is a newer fire service yardstick. The fire service, for many years has understood the following direct correlation on critical incidents like cardiac arrest and structure fires: *the more time that elapses before incident-mitigating efforts begin, the worse the outcome*. In these situations, the outcome is a decrease in chance of survival and the more property that is damaged. But does measuring a very small number of incidents within a system tell the whole story?

Critical evaluation of incident types, fire threat, and community risk, is measured through a hazard assessment. To address these hazards, a community risk assessment must be performed to establish a standard that can be used to respond to the likely emergencies within a community. Known as a Standard of Coverage, contemporary fire service agencies are now establishing a methodology that can be applied to their jurisdictions that are defined and catered to their community. This systematic and microscopic approach allows fire service agencies to:

- Identify and assess the existing risks within a community.
- Define benchmarks for service levels that meet the needs of a community.
- Establish standards that meet the needs of the community.
- Create a tool that can be applied to future growth to determine its emergency-service threats and service needs.
- Create a system that is reasonable, defined and defendable.

This document was written to critically evaluate the threats that are faced by the City of Snoqualmie Fire Department. This was done through historical research, critical evaluation of existing risks, and a retrospective analysis of incidents.

Professional sources were used to guide the processes established in this document. These include the National Fire Protection Association, American Heart Association, Center for Public Safety Excellence and the Washington Surveying and Rating Bureau. These sources created a generic and high-level approach that was used to guide the measurements that were adjusted to measure specific needs of the community. In the end, a custom approach was applied to meet the unique needs of the citizens within this community.

A city may not have a large fire or critical event every hour, but the threats that exist within a community do not go away. Creating a tool that is guided by existing, established and proven national standards that were built on a rich and longstanding history; while further refining a system that measures the idiosyncrasies of a community creates a tool that is customized to meet the needs of a community. This document creates this tool for the City of Snoqualmie, Washington.

The remainder of this document critically evaluates the City and creates metrics that are catered to the unique needs of the community. Additionally, the tools and metrics can be applied to future growth that is still unknown within the community. This document will guide current and future facets of the organization, and create a measurement that can be used into perpetuity. In the end, this tool will improve the levels of service that are provided by the Snoqualmie Fire Department, and create a “better” fire service model for the citizens of this incredible community.

1.1 Executive Summary

The City of Snoqualmie is home to approximately 13,000 residents, located 30 miles east of Seattle, WA in the foothills of the Cascade Mountain Range. This affluent community is sought after by many, because of its rural small-town feel, access to outdoor recreation, ease-of-commute into the metropolitan area, and safety within the community. These basic tannins have created a very high quality of life for its residents.

The foothills of the Cascade Range and the Puget Sound Region comes with many known risks. Primary risks that threaten this region include earthquakes, wind storms, snow events and flooding. The historic downtown area of the City was built on the shores of the Snoqualmie River. The city experiences localized flooding events (road closures) on an annual basis, and more significant flooding events (widespread downtown flooding) every five (5) to ten (10) years.

Hop farming on the fertile Snoqualmie Valley drove settlers to this area and, in 1909 the City of Snoqualmie was established (incorporated) as the City of Snoqualmie Falls. At that time and for the next century, the primary economy was created by the Snoqualmie Falls hydroelectric plant now operated by Puget Sound Energy, and a lumber mill later operated by Weyerhaeuser. With the closure of the Weyerhaeuser Mill, and the expansion of the master planned-community development known as Snoqualmie Ridge, the city is now home to nearly 13,000 residents.

The Snoqualmie Fire Department was established in 1939. Staffed by volunteers, the department evolved over time to include a partnership in the mid-1990s with a neighboring agency, then returning to the City where the department began hiring career firefighters. Today's minimum staffing is three career-firefighters on duty 24 hours a day, 7 days a week, and one additional firefighter on duty during the high-risk evening hours. This combination Fire Department staffs a type 1 engine and an aid unit from one centrally located fire station.

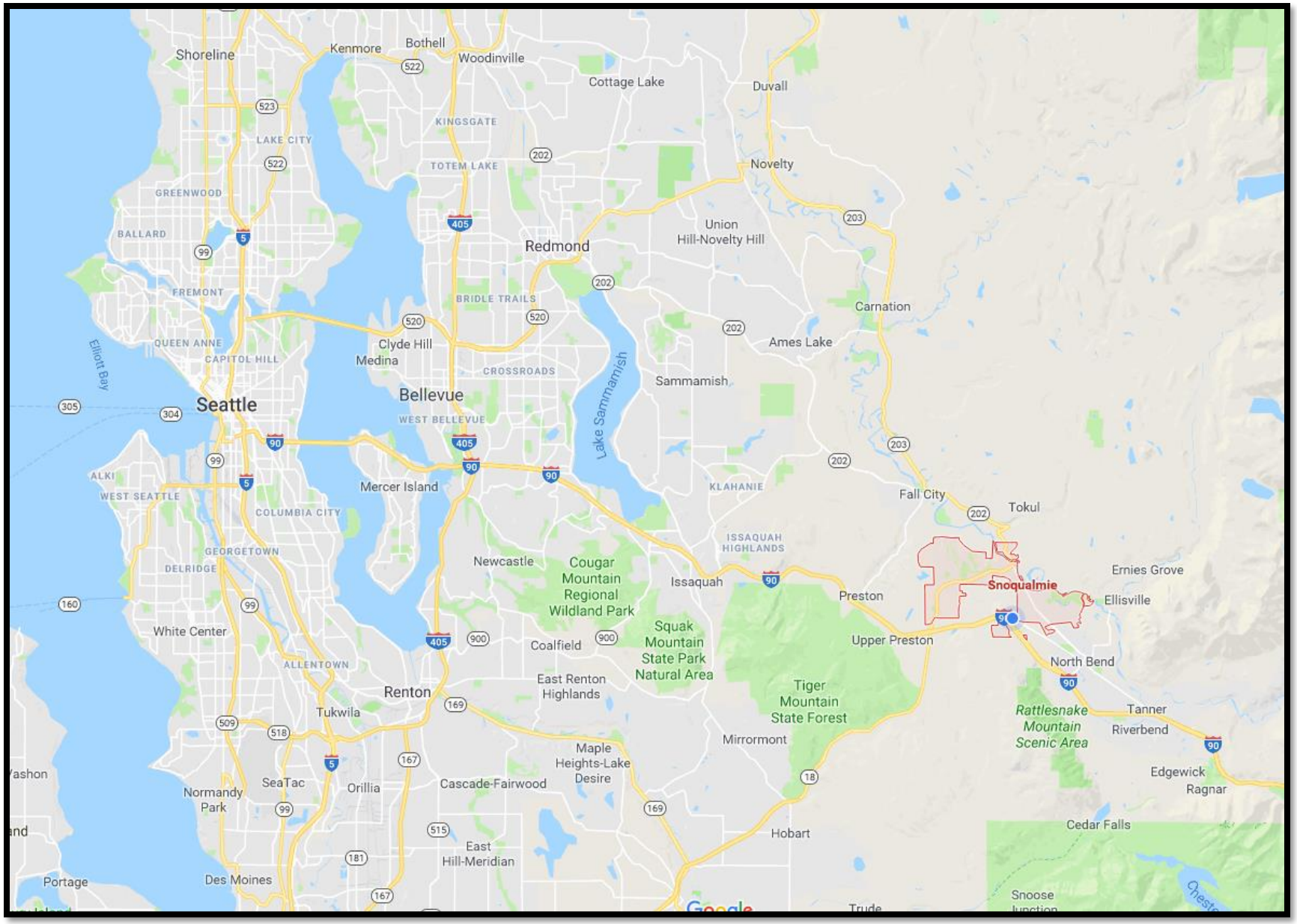
Incident volumes continue to rise and performance measures have been established by the department which have been subsequently adopted by the City Council. A community risk assessment has been performed identifying where the different levels of risk exist within the community. Additionally, retrospective incident analysis was performed and plotted on the community risk assessment map to look for probability-trends. These efforts will guide future fire service endeavors and be applied to future growth within the city limits.

1.1.1 The Community

The City of Snoqualmie is in Washington State and part of the Puget Sound Region. This region is home to many familiar large companies like Amazon, Microsoft, Starbucks, and Boeing.

More specifically, the City is in the upper Snoqualmie River Valley in the foothills of the Cascade Mountain Range, located in eastern King County. King County is the most populous county in Washington State with over 2.1 million people calling it home[1]. Unincorporated King County is mostly rural and home to farms, open space and wilderness areas. The City of Snoqualmie is neighbored by the City of North Bend. The following Map shows the location of the City in relation to Seattle.

[1] Census 2015: 11-14-2016 at 1600 http://www.census.gov/quickfacts/table/PST045215/53033



Map 1.1: City of Snoqualmie, Washington Map

The City of Snoqualmie is located 30 miles from Seattle, WA. Many people hope to reside in the city because of the 30-minute drive time along the I-90 interstate freeway to downtown Seattle, and 20-minute drive time to the Snoqualmie Mountain Pass. Snoqualmie is known as “Seattle’s back yard” by some because of the abundant outdoor activity such as skiing, hiking, and mountain biking. It is also home to the second most visited tourist attraction in Washington State known as Snoqualmie Falls; a majestic 268 foot waterfall.

The City of Snoqualmie is rich in local history. In 1889, the City was originally platted by Seattle Investors as the City of Snoqualmie Falls, and the city now known as North Bend was platted as the City of Snoqualmie. The City of Snoqualmie Falls was incorporated in 1903, and economically driven by the logging industry. In 1917, the second-in-the-United-States all-electric lumber mill opened across the Snoqualmie River from the City. This mill provided a stable economy for the City and upper Snoqualmie Valley for the first half of the last century. In the late 1980s the local logging mill began to close and milled its last piece of lumber in 2003. This ended a 100-year tradition of logging for the City.

In the mid-1990s, the City annexed 1300 acres of land to the west of the city and approved a multiphase residential planned community known as Snoqualmie Ridge. The development would bring over 4,000 homes, a business park, open space / parks, and The Players Club (TPC) PGA Golf Course. From 2000 to 2016, the City of Snoqualmie was the fastest growing community in Washington. During the development of the Ridge, the population within the community went from 2,150 in 2000 to an estimated 13,169 by 2015.

Snoqualmie Point Park is an 8-acre non-contiguous-border city park located south of the City. This site is located just off Interstate 90 and provides access to the very popular Rattlesnake Ridge hiking trail and mountain biking area. The park is home to a stage for concerts and other events, and is a very popular location for weddings because of its sweeping views of the Snoqualmie Valley and Mount Si.

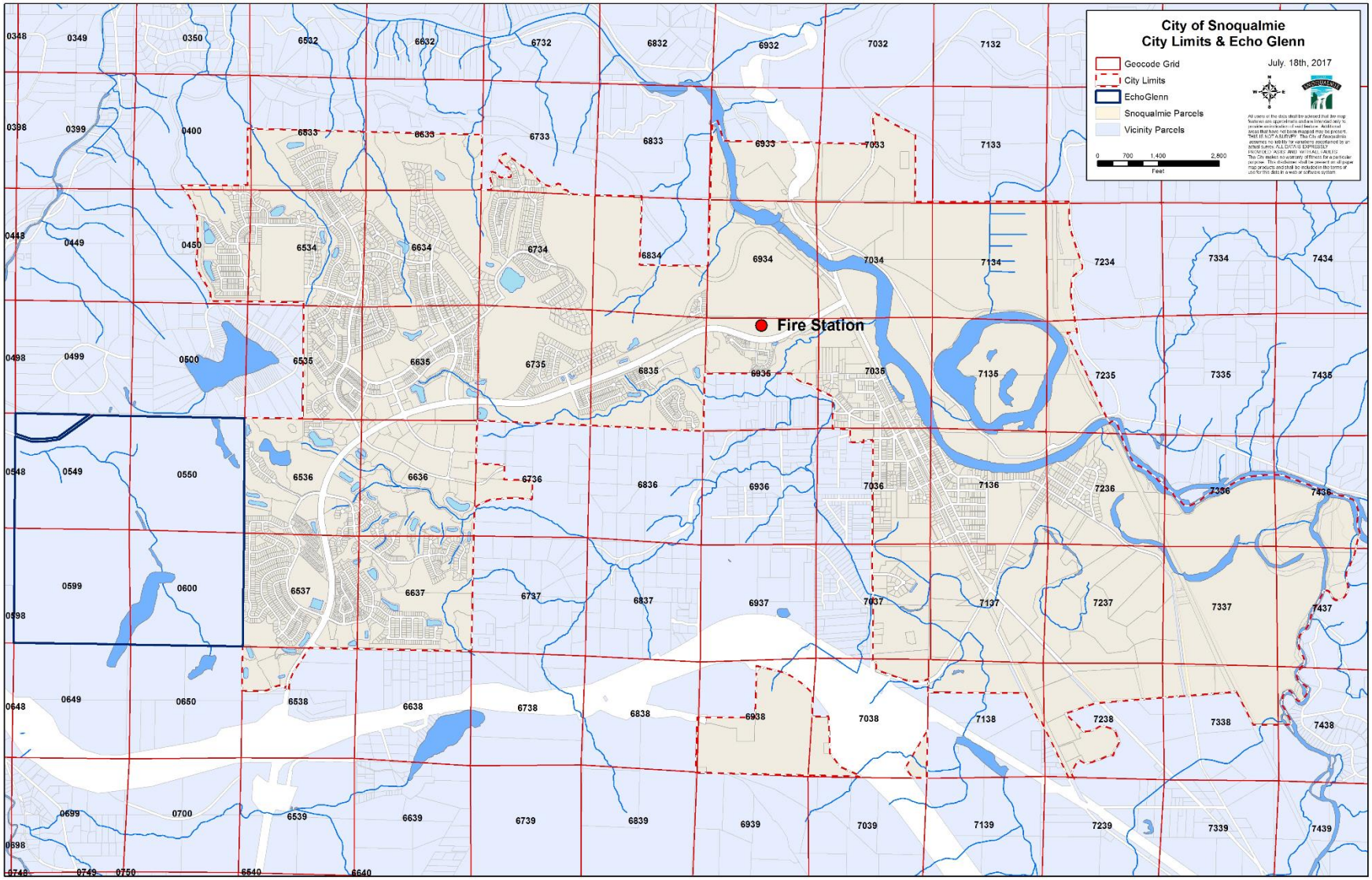
Snoqualmie Point Park

In 2012, the City annexed an additional 593 acres north of the City that was home to the Weyerhaeuser Lumber Mill. This site is located just north of the Snoqualmie River and was identified as part of the City's urban growth boundary. Current development agreements for this area known as the "Mill Site" will bring light industry / manufacturing.

Just east of the Mill Site is an area known by city staff as the Salish Expansion. This 53-acre site is under development agreements and could bring 175 houses, a 250-room hotel, a 570-seat restaurant, a 12,000-sq. ft. recreational facility and a 25,000-sq. ft. convention center. Preparations have begun for this site to include the straightening of access roads and the addition of a roundabout at one of the main intersections into this area of the community.

Although not part of the city's incorporated boundaries, the Fire Department also provides service to a contiguous 160-acre area owned by the Washington Department of Social and Health Services (DSHS). This site is home to the Echo Glen Children's Center; a children-detention-center for prosecuted minors. More detail about Echo Glen will be provided later in this document.

The following map shows the current incorporated city boundaries, and highlighted in blue (to the west) is Echo Glen:



Map 1.2: City Boundaries and Echo Glen Children's Center (response area) Map

1.1.2 Critical Infrastructure

This City is located within close proximity to abundant critical infrastructure. Transportation assets include two major roads that run through the community. First, State Route 202 (also known as Railroad Ave) is the largest east / west roadway. SR 202 is a two-lane highway that runs from SR 522 in Woodinville, through Snoqualmie, and ending at Interstate 90 in North Bend. In Snoqualmie, the road begins at the King County line on the west, through the historic downtown to the western border of the North Bend city limit.

The most prominent north / south road in the City is the Snoqualmie Parkway. This four-lane divided road runs from the King County line on the south end to Railroad Ave (SR 202) on the North. Known as the "Parkway" by locals, this road was added when the Snoqualmie Ridge development was built. The only city fire station is located on the Parkway at the 37600 Block.

Approximately 1/8th of a mile south of the King County Line off Snoqualmie Parkway is access to Interstate 90 (I-90). The I-90 freeway is a major interstate that runs just over 3,000 miles from the Interstate 5 in Seattle, WA to (MA) State Route 1A in Boston, MA. I-90 is a 70 MPH freeway that provides excellent east west access into and out of Seattle making Snoqualmie very attractive for professionals who commute to the Seattle metropolitan area. To the east on I-90 is the city of North Bend (est. pop. 5,731[2]), Snoqualmie Tribal area and Casino, and a large wilderness area managed by the United States Forest Service.

Just south of the I-90 interchange is State Route highway 18 (Hwy 18). Hwy 18 is a major north / south transportation corridor that runs from I-90 at the north to I-5 just north of Tacoma, WA. This road is heavily used by tractor-trailers carrying millions of dollars in commerce from Eastern Washington to the largest north-south interstate (I-5) on the west coast. Because of the speeds and vehicles that use I-90 and Hwy 18, the firefighters encounter many significant serious vehicle collisions that require the use of technical and heavy extrication equipment.

Other critical infrastructure includes the following City Buildings:

- Fire Station
- Police Station
- City Hall
- Public Works Building
- Water Systems Building
- Wastewater Treatment Plant

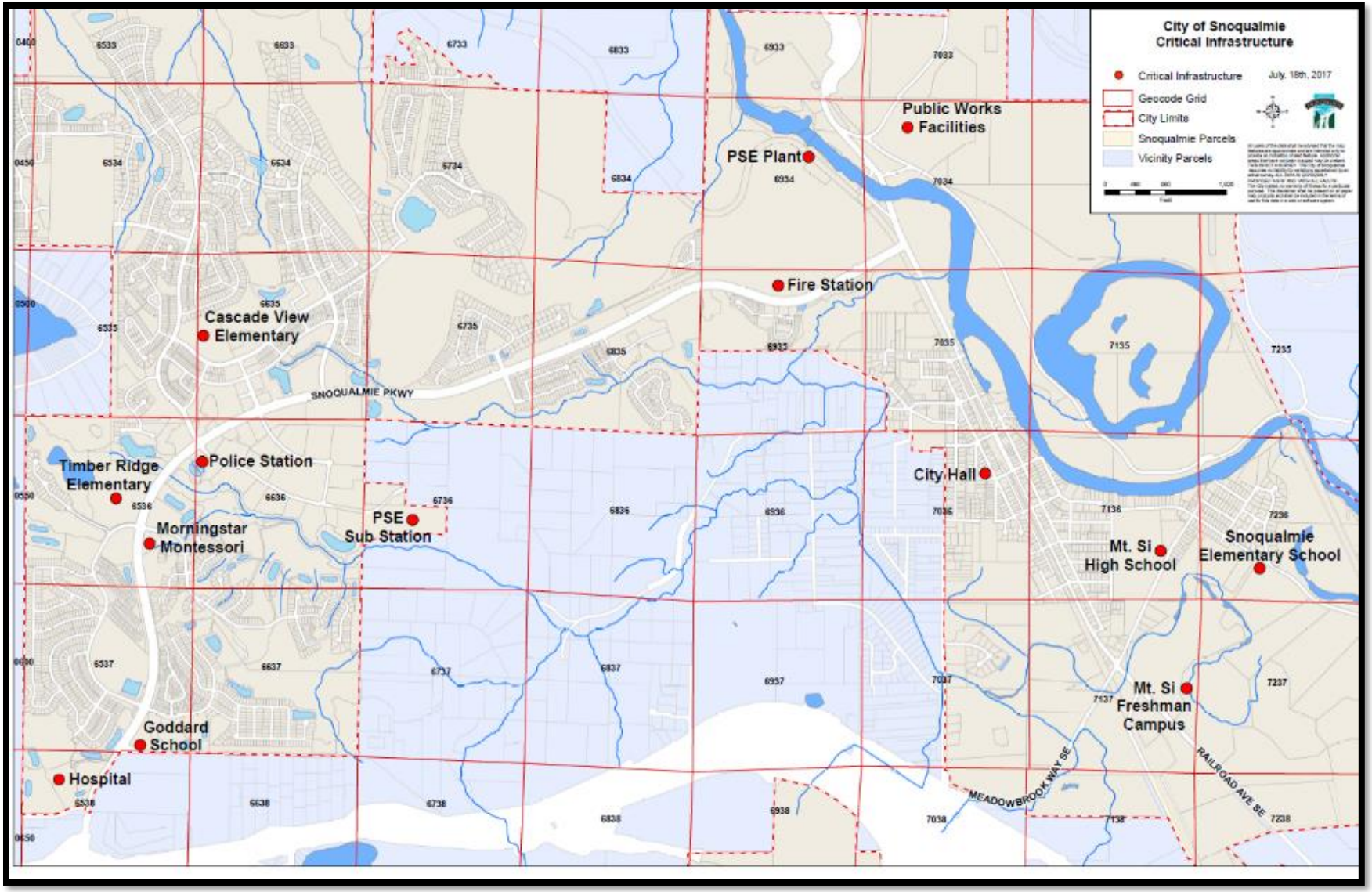
The city is home to three elementary schools, a freshman (9th grade) campus, and the one high school located within the Snoqualmie Valley School District (SVSD). The City is also home to the SVSD school-administration building.

[2] https://suburbanstats.org/population/washington/how-many-people-live-in-north-bend

Snoqualmie Valley Hospital also calls the city its home. This critical access hospital offers a 24-hour emergency department, Washington State level 2 cardiac center, and level 3 stroke center.

Puget Sound Energy (PSE) operates a hydro-electric plant within the city. This state of the art facility is located at the Snoqualmie Falls and was initially established in 1898 by blasting through the bedrock to a depth of 260 feet. In 1910, a second plant was built just downstream from the Falls. Both plants generate approximately 54 megawatts of power for the region.

The following map displays the critical infrastructure:



Map 1.3: Critical Infrastructure Map

1.1.3 Governance

The City is Snoqualmie is a non-charter, optional code city with a mayor-council form of government. City voters elect the Mayor who serves as the Executive Officer of the City. The Mayor oversees the day to day operations and services of the city with the assistance of the City Administrator. Also supporting the Mayor are six Director positions leading up the major departments within the city. These Director positions are:

- Fire Chief
- Police Chief
- Parks & Public Works Director
- Administrative Service Director
- Finance Director
- Information Technology Director
- Community Development Director

City directors serve at the pleasure of the Mayor and can be removed at any time without recourse.

Governing the policy of the City is the seven-person city council. Elected for at-large positions and serving for four-year overlapping terms, the Council establishes policy, municipal code, adopts the budget and confirms all appointments made by the Mayor. To assist with the work load, the Council has established multiple three-person council-committees:

- Public Safety
- Parks & Public Works
- Community Development
- Finance & Administration

The Fire Department briefs the Council through the Public Safety Committee.
The city provides a wide array of services to its residents to include fire, EMS, law enforcement, parks and recreations, building department / code enforcement, planning, and public works services. The City also has a robust utility department that provides water, storm water, and sewer services.

The City receives some services through contract / interlocal agreement, or through other taxing jurisdictions. Jail, court, and dispatch services are provided through an interlocal agreement. Library services are provided by the King County Library System, and hospital services are provided by King County Public Hospital District #4 (Snoqualmie Valley Hospital).

1.1.4 Topography

The City of Snoqualmie is in the Puget Sound region of Washington. More specifically, the City is in the foothills of the Cascade Mountain Range at 410 feet of elevation, with the Ridge section of the community reaching 875 feet. To the west, is the Puget Sound metropolitan region including the cities of Seattle and Bellevue. To the east is the Cascade Mountain Range. To the north and south are large wilderness areas that are

either used for growing and harvesting timber, or perpetual easements designed to protect the abundant natural resources and recreation areas.

The topography of the city is like other foothill-communities along mountain ranges, with ridges and hills along the southern side that ultimately lead to the valley-floor. Dividing the valley floor is the Snoqualmie River that leads to the Snoqualmie Falls – a 268-foot waterfall. The Snoqualmie River is fed by the North, Middle and South Fork rivers, plus multiple creeks throughout the region and are all subject to regular occurrence of flooding events.

Within the city limits are two primary and distinct areas of the community known as *Historic Downtown* and *Snoqualmie Ridge*. The Downtown area is located on the floor of the Snoqualmie River Valley adjacent to the Snoqualmie river, and the Ridge is located on the western hill (ridge) that separates the City from the unincorporated communities of Preston and Fall City.

The typical vegetation in the area is Douglas Fir, Western Cedar, Alders, and big leaf Maple trees. The area south of the ridge is undeveloped and has been placed into a non-developable perpetual conservation easement. These easements and other wilderness areas create a threat of wildland urban interface areas.

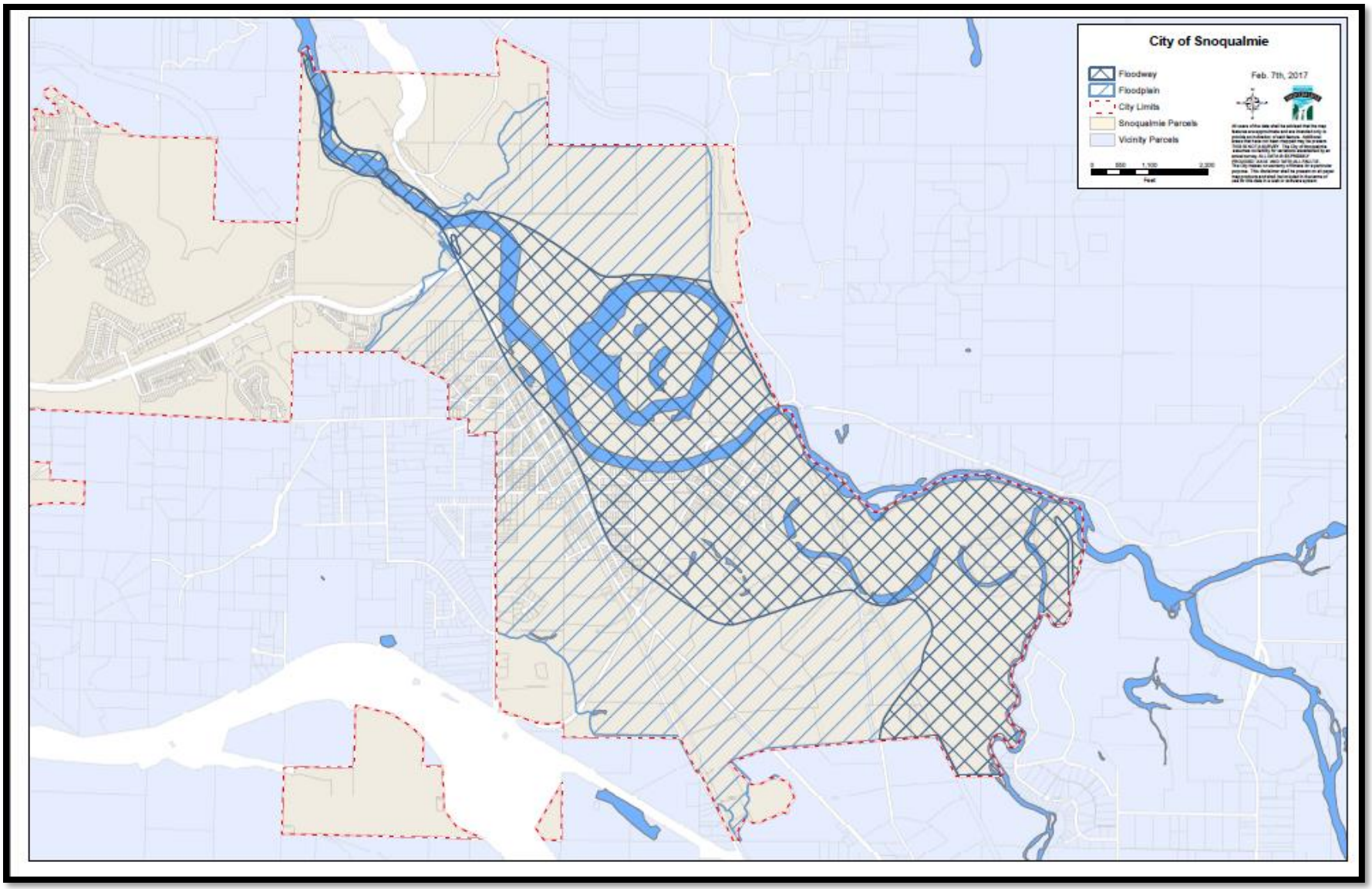
1.1.5 Climate

Eastern King County's climate is not for the faint at heart. The City sees an average of 67.1 inches of rain per year (US Average is 39.2), an average of 8 inches of snow, and an overall average of 186 days precipitation annually. The climate is temperate with an average July high of 75.2 degrees (F), and an average low in January of 35.5 degrees (F).[3]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average high in °F:	47	50	54	58	64	69	75	76	70	60	51	45
Average low in °F:	35	35	37	40	46	51	54	53	48	43	38	34
Average precipitation in inches:	8.86	5.43	6.26	4.8	4.02	2.95	1.38	1.3	2.83	5.71	10.12	8.46

Because of the heavy amounts of precipitation during the winter months, the Snoqualmie River Valley is prone to frequent flooding. The river cresting its banks and closing streets is not an uncommon practice as a large portion of the historic downtown is built on a flood plain and floodway. The following flood plain map shows the common flood area on the valley floor.

[3]Source: https://www.usclimatedata.com/climate/snoqualmie/washington/united-states/uswa0412



Map 1.4: Flood Plain Map

The City has seen flooding into its downtown area due to high stream flows (excess of 50,000 CFS at the Falls River gauge). Historic river levels were seen in 2015 (50,100 CFS), 2009 (60,700), 2006 (54,900), and its most-highest in recent history level in 1990 (78,800 CFS) [4].

In 2013, King County completed a project that removed additional rockery away from the Snoqualmie Falls. Based on 2014 and 2015 flood history, it is believed that this work allows for an additional 10,000 CFS to move through the river channel before major flooding is seen in the downtown core area[5].

In addition to flooding, on occasion, the City sees significant snowfalls. The Seattle metropolitan area experiences an average of 5.9 inches of snowfall per year. Historical snowfalls occurred in the area on December 31, 1968 (9.3 in.), January 27, 1969 (14.9 in.), and January 13, 1950 (20 inches followed by an additional 10 inches on January 27)[6].

The City is also prone to frequent windstorms in the fall and winter months. An average windstorm will bring wind-speeds between 20mph-30mph with gusts in excess of 45mph. These storms threaten lives and properties as they can break off or up-root trees causing them to fall unexpectedly.

Seismic activity is not uncommon to Snoqualmie. The City is at 147% greater risk for earthquakes than other US Cities. The most significant earthquake occurred on April 13,

[4] http://green2.kingcounty.gov/RiverGageData/gage-data.aspx?r=snoqualmie
[5] Based on experience from 2017 flooding event.
[6] http://www.seattleweatherblog.com/snow-stats/

1949 when 7.0 earthquake struck 36.4 miles from the city[7]. Much media attention has been giving to the possibility of a subduction type earthquake known as Cascadia Subduction. A subduction earthquake is a very large and long-lasting type earthquake that could hit the region in the future. These earthquakes measure greater than 8.0 In the Richter scale, and could last several minutes. The last subduction earthquake hit the region in the 1700s and typically occur every 300-600 years apart. An earthquake of this magnitude would create widespread damage and paralyze the region.

1.1.6 Population[8]

The city of Snoqualmie has seen steady but slow growth since its incorporation. In 1910 the population was 279 residents. By 1950, the city had grown to 806 people. In 1960 and after the advent of the lumber mill the population stabilized at 1,260 and grew at an average of 11 people per year until the turn of the century.

With the development of the Snoqualmie Ridge and from 2000 through 2015, the City became the fastest growing city in Washington. During this time frame, the City grew from 1,631 to an estimated 13,190 people.

[7] http://www.city-data.com/city/Snoqualmie-Washington.html
[8] https://en.wikipedia.org/wiki/Snoqualmie,_Washington

City of Snoqualmie Historical Population		
Census	**Pop.**	**%±**
1910	279	—
1920	450	61.3%
1930	752	67.1%
1940	775	3.1%
1950	806	4.0%
1960	1,216	50.9%
1970	1,260	3.6%
1980	1,370	8.7%
1990	1,546	12.8%
2000	1,631	5.5%
2010	10,670	554.2%
Est. 2016	13,190	23.6%

During this rapid growth, the city's demographic has changed as well. What was once a blue-collar lumber town through most of the 20th century, changed quickly to a white-collar affluent community within the first 15 years of the 21st century. The Planned Community attracted young, professional, well-compensated families. In the year 2000, the average household income in the City was $52,169. This grew to $132,000 in 2015.[9]

[9] http://www.city-data.com/city/Snoqualmie-Washington.html

The age demographic also changed with the rapid growth. In 2000, the population under the age of 18 made up 28% of city residents. By 2010, this same demographic made up 35%. This has created a young, vibrant, safe, affluent and family-friendly community that many like to call home[10].

1.1.7 Water Supply

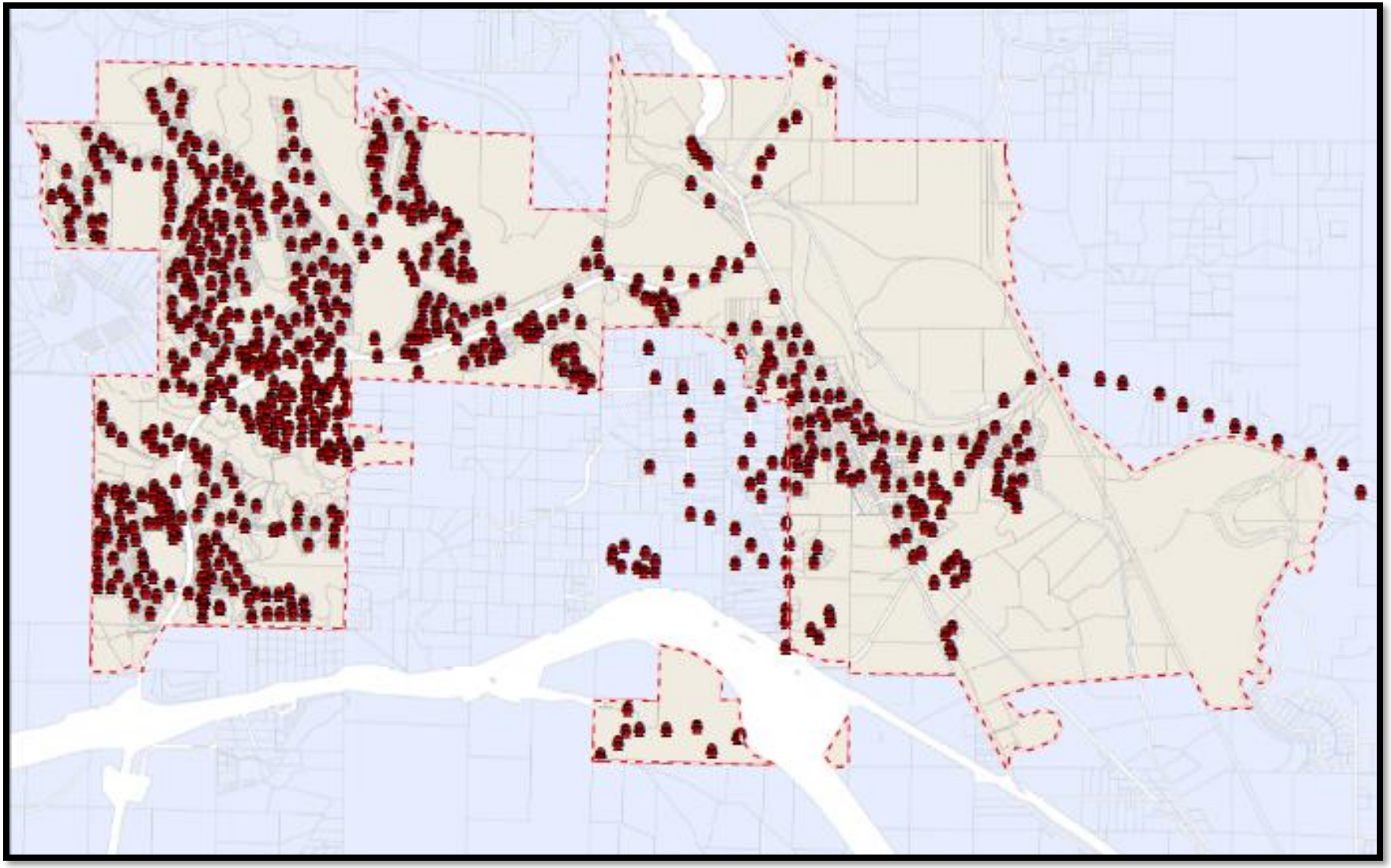
The water supply for the City comes from natural springs and wells located throughout the area. The three main sources of water come from Canyon Springs located in the North Fork of the Snoqualmie River's water shed area, three (3) wells known as the *North Well Field*, and two (2) additional wells known as the *South Well Fields*. These water sources fill a total of five (5) reservoirs ranging from 25,000 to 2-million gallons. The reservoirs fill via gravity or booster pumps. The water system also includes three chlorine-generation systems and two filtration treatment plants[11].

Because the majority of the City was a planned development, nearly all of the City has a contemporary water system designed to meet fire flow needs.

The City places (and replaces) hydrants in accordance with code requirements and best practices. The hydrants within the City and immediately outside the City boundaries are inspected by Fire Department personnel on an annual basis. In total, the city's water utility maintains over 800 fire hydrants. These hydrants and other fire suppression needs are supplied by 60+ miles of water mains ranging from 4" to 20", with the majority of the ridge-hydrants being supplied by an 8" main, and the historic downtown by 6" mains. These mains are looped together and valves can be adjusted to increase fire-flow-needs throughout the city. The following map displays hydrant locations throughout the City:

[10] http://www.city-data.com/city/Snoqualmie-Washington.html

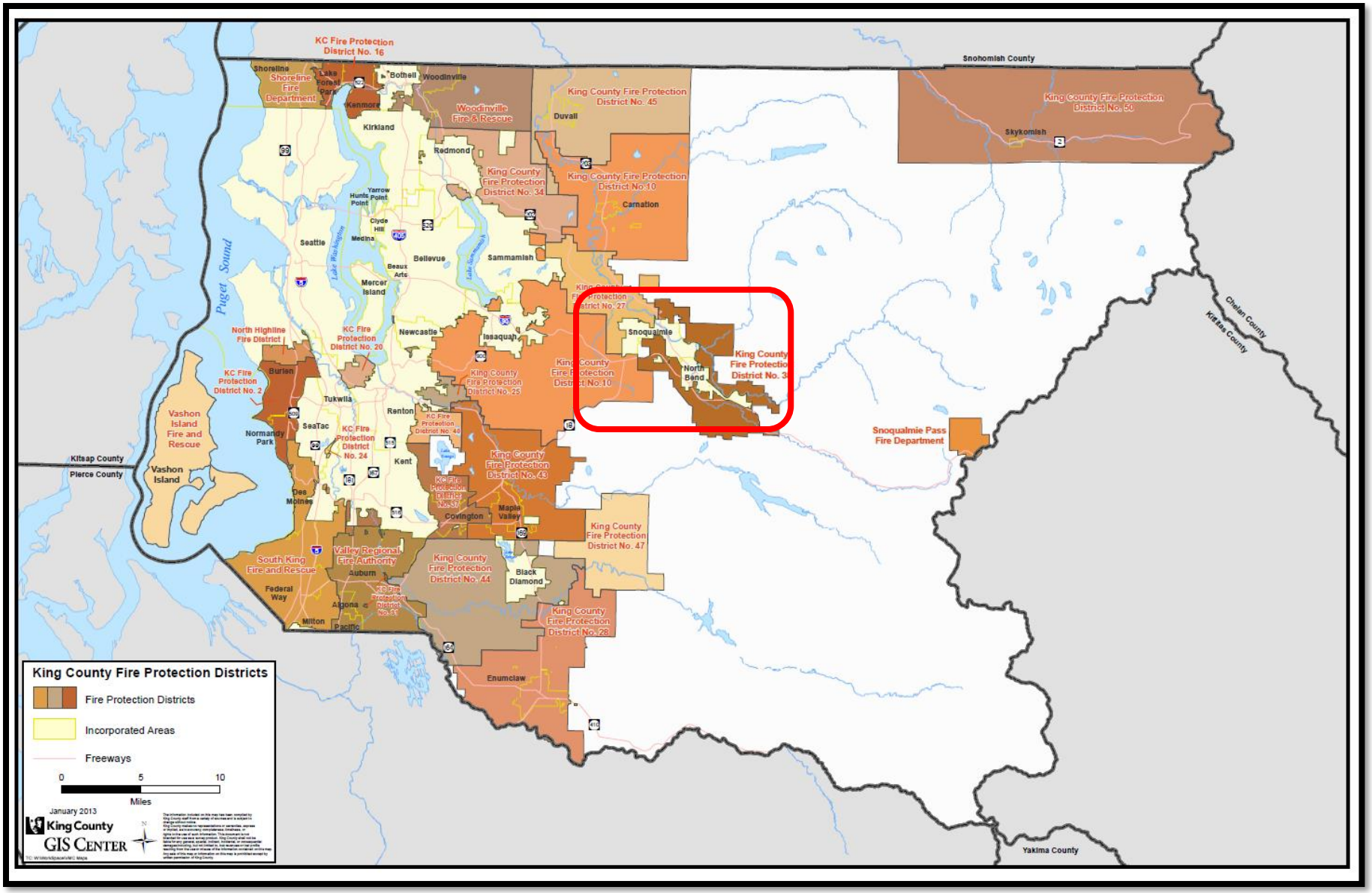
[11] Data received from interview with Water Department Supervisor Dustin Prosser



Map 1.5: Hydrant Map

1.1.8 Service Area

The City of Snoqualmie Fire Department's (SFD) serves the incorporated city limits which is 6.41 square miles. By interlocal agreement, the City also provides service to the State's Department of Social and Health Services juvenile reformatory / detention center known as Echo Glen. The area surrounding the City is the responsibility of three other fire service agencies. To the immediate west is King County Fire Protection District #27 serving Fall City and Lake Alice. To the north and south of the City is King County Fire District #38. To the south and southwest, is King County Fire District#10. To the east is the City of North Bend. Both King #10 and King #38 as well as the City of North Bend are part of fire service consortium known as Eastside Fire and Rescue. A snap-shot of the region would have Snoqualmie in the center, Eastside Fire and Rescue Service area to the north, east and south, and Fire District 27 to the west. The following map displays the dire service agencies surrounding the City:



Map 1.6: Fire Protection District Map

Because of mutual aid, fire station location and size of the City, many times throughout the year the Snoqualmie Fire Department will handle incidents in Eastside Fire's service area. Also, multi-unit incident response into Fire District 38, North Bend, and Fire District 27, will draw the City of Snoqualmie into their significant incident responses.

The City also participates in a mutual-aid system where we could respond anywhere in the region for a major incident in exchange for resources if the City were to have a major calamity.

The focus of this document will be for the Fire Department's primary response area (incorporated City of Snoqualmie and Echo Glen Children's Center).

1.1.9 City of Snoqualmie Fire Department

The town of Snoqualmie was incorporated on May 18, 1903 by the vote of the people and in accordance with the revised code of Washington (RCW) 35A. The City was platted in the late 1800 by Seattle developers and lots were being sold for $300 each. This price was very high, few lots were being sold and many buildings were being erected by squatters. The City incorporated to help manage this growth.

Occidental Hotel Fire: **June 12, 1908**

The two major economies in this region at the turn of last century was agriculture (more specifically - hops), and timber/logging. In 1917 and to the north across the Snoqualmie River, the second all-electric saw mill in the country began operating in the company-town known then as Snoqualmie Falls. This area was later incorporated by the City of Snoqualmie and is now known as the "mill site" which is slated for development in coming years.

The Snoqualmie Fire Department has a long-standing history of service to the City. The Fire Department was first established in 1939 by a group of concerned citizens volunteers. On November 6, 1940, Resolution #239 of the City of Snoqualmie adopted the Snoqualmie Volunteer Fire Department under the City government.

The department remained a volunteer department until 1992 when the City hired a full-time Fire Chief. Soon thereafter, the Chief hired a training officer to assist him in training the volunteers. In 1994, the City handed its fire service over to King County Fire Protection District #10 (King 10) through an interlocal agreement. The Fire Department remained under King 10 until 1999 when the City ended its short relationship with this District. It was at this point that the City hired a Deputy Fire Chief and six firefighters to staff its fire station under a Director of Public Safety who managed both police and fire. In 2000, the City established a stand-alone Fire Department, and promoted the Deputy Fire Chief to Fire Chief.

Major milestones for the Fire Department between 2000 through 2007 include the addition of three firefighters; In 2004 added an Administrative Assistant position; and in 2007 a Battalion Chief position was added to function as training officer and volunteer coordinator.

In 2005, the City opened a new fire station moving away from the flood plain area and closer to the Snoqualmie Ridge Development. This state of the art facility provided space for all apparatus, a fire administration office area on the lower level, and a hose drying tower that can also be used for technical rescue training.

Also in 2005, the City entered into an agreement with the Snoqualmie Tribe to provide fire and EMS services to the Snoqualmie Casino located just outside the City. Responses to the casino were predominantly EMS in nature and averaged approximately 180 incidents per year. This agreement was maintained until 2016 when it was terminated by both parties. The Casino is now served by Eastside Fire and Rescue.

In 2012, the City passed a public safety levy that added one additional firefighter bringing the staffing up to ten. In the same year the City implemented an EMS transport fee program that added the eleventh firefighter. This staffing level allowed the Fire Department to staff with three career firefighters during the day, and a minimum of two career firefighters and one volunteer during the evening hours.

Later in 2012, the Battalion Chief retired from the department, followed by the Fire Chief announcing his in 2013. On the heels of these announcements, the current Fire Chief was hired, and the Battalion Chief position was reclassified to Captain of Training, Health & Safety. The Fire Chief, Captain and Administrative assistant make up the current administrative staff for the department.

In 2016, the city passed a second successful tax initiative that added the twelfth firefighter to the ranks, allowing the City to increase its minimum staffing from three daytime firefighters and two in the evening, to three firefighters 24-hours-a-day seven-days-a-week. The long-standing tradition of volunteerism has remained in the Fire Department, with volunteer firefighters and EMS responders being used to increase staffing above minimum established levels.

Also in 2016, the Fire Department assumed fire and life safety inspection duties from the building department. Duties for this program include company-led inspections, and fire codes subject matter expert (Code SME) led inspections. Fire plans review are continuing to be maintained by the city's building department until adequate training and experience, or an alternative option is realized.

Snoqualmie Fire Station: **Circa 2006**

The Fire Department has been rated every five years by the Washington State Rating Bureau (WSRB), Washington's version of ISO. In 2013, the Department was rated a Class 4 Fire Department, an upgrade from Class 5 at its previous rating. The Department retained the Class 4 rating at its 2017 evaluation.

The history outlined changes that have occurred over time. Major milestones include the establishment of the department (1939), hiring of its first full time employee (1988), contracting fire and EMS services to King County Fire Protection District 10 (1994-1999), establishing a Public Safety Department (1999-2000), establishment of Fire Department as its own stand-alone department (2000), implementation of EMS transport billing to fund two additional firefighters (2015), and moving to a minimum of three-person staffing, twenty-four hours a day (2017).

The Fire Department has adequate human and physical assets to perform essential functions. The department currently staffs a minimum of three firefighters on duty 24-hours a day, and has a robust mutual aid system that is used to augment responses. All career firefighters, Lieutenants and Captain are represented by the International Association of Firefighters, and many of their working requirements are outlined in their collective bargaining agreement (CBA). The Administrative Assistant II is represented by the Teamsters and operates under their CBA requirements. The Fire Chief is an at-will, non-represented position, and the Volunteer firefighters and EMS responders serve at the pleasure of the Fire Chief.

Response-staff operates three shifts (A, B, and C) working 24-hour shifts. With the advent of two public safety levies and by implementing an EMS transport fee program, the department hired a total of 12 firefighters, assigning four to each of the three shifts. The Union contract allows one firefighter off at a time on vacation, holiday or Kelly day. The minimum staffing level for the department is a minimum of three firefighters on duty 24 hours a day. The full-time career staffing is augmented during the evening hours and on occasional daytime shifts when volunteer staffing is available.

The shift configuration of response staff is two, twenty-four hours shifts followed by ninety-six hours off-duty. This shift, known as 48/96, was introduced in 2015 and has been popular with the IAFF staff. Volunteer staffing augments career staffing by filling shifts during the evening and occasional day shift. Volunteers select a minimum of seven shifts per quarter with a minimum of one volunteer on duty per shift working between the hours of 1900 to 0700 hours. This allows for three firefighters on duty 24-hours a day with a staffing goal of 4 firefighters on duty during the higher-risk overnight hours.

Scheduling of firefighters is managed by the Fire Department administration. Scheduling of volunteer firefighters is coordinated with a senior volunteer and a calendar is published organizationally-wide as it updates. In 2017, the department moved to an online calendar program known as FireTrex. This allowed the organization to create some efficiencies through electronic automation.

On-duty personnel staff an engine company and/or an aid car. Crews respond on the appropriate apparatus depending on the incident type. Crews will also bring the Engine

to aid unit incidents so they can respond to fire related incidents if a second call is dispatched at the same time. The department is a basic-life-support (BLS) organization that is supported by paramedics from the King County Medic One Program. The primary paramedic unit responds from Eastside Fire Station #87 located in North Bend (approximately 6 miles away).

SECTION 2: SERVICES PROVIDED BY THE FIRE DEPARTMENT

1. *Emergency Response Services* - Response services: fire suppression, EMS (BLS) first response, EMS transport, hazardous materials operations level response.

2. *Rescue Services* - Rescue services include: auto extrication, high and low angle rope rescue (technician level) and swift-water rescue (technician level). Firefighters are also trained to the operations level of trench and confined space rescue level. The City also participates in the regional technical rescue consortium.

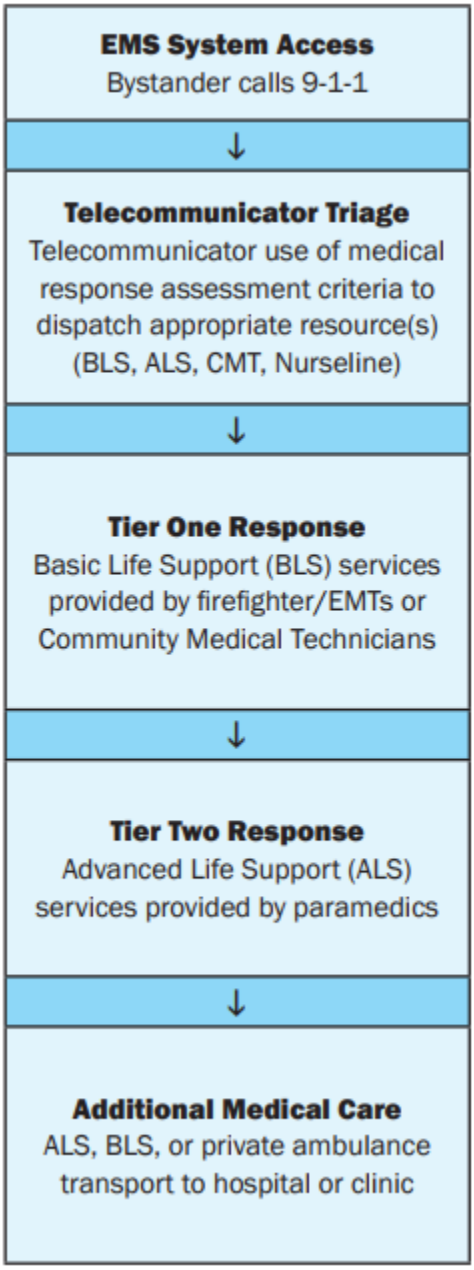
3. *Prevention Services* - fire prevention services include: Company-led fire inspections of all business storefronts; Code SME led inspection of complex commercial and target hazard inspections.

4. *Public Education* - public education services include school room visits, CPR and AED training, fire, EMS and life-safety prevention training, window-falls lock out device training and Community Emergency Response Training (CERT).

5. *Additional Services* - additional services include participation in the regional hazardous materials consortium. Being a participant in this program allows the Department access into these services if an event were to occur locally.

The city participates in the King County EMS System (KCEMSS). The KCEMSS system is a world-renowned healthcare system that provides outstanding care to those who access the 911 system. In 2015, the KCEMSS responded to 131,391 BLS responses and 31,328 ALS incidents throughout King County.

There are five major components to the KCEMSS:



1. *Universal Access*: A patient or bystander accesses the KCEMSS by calling 9-1-1.

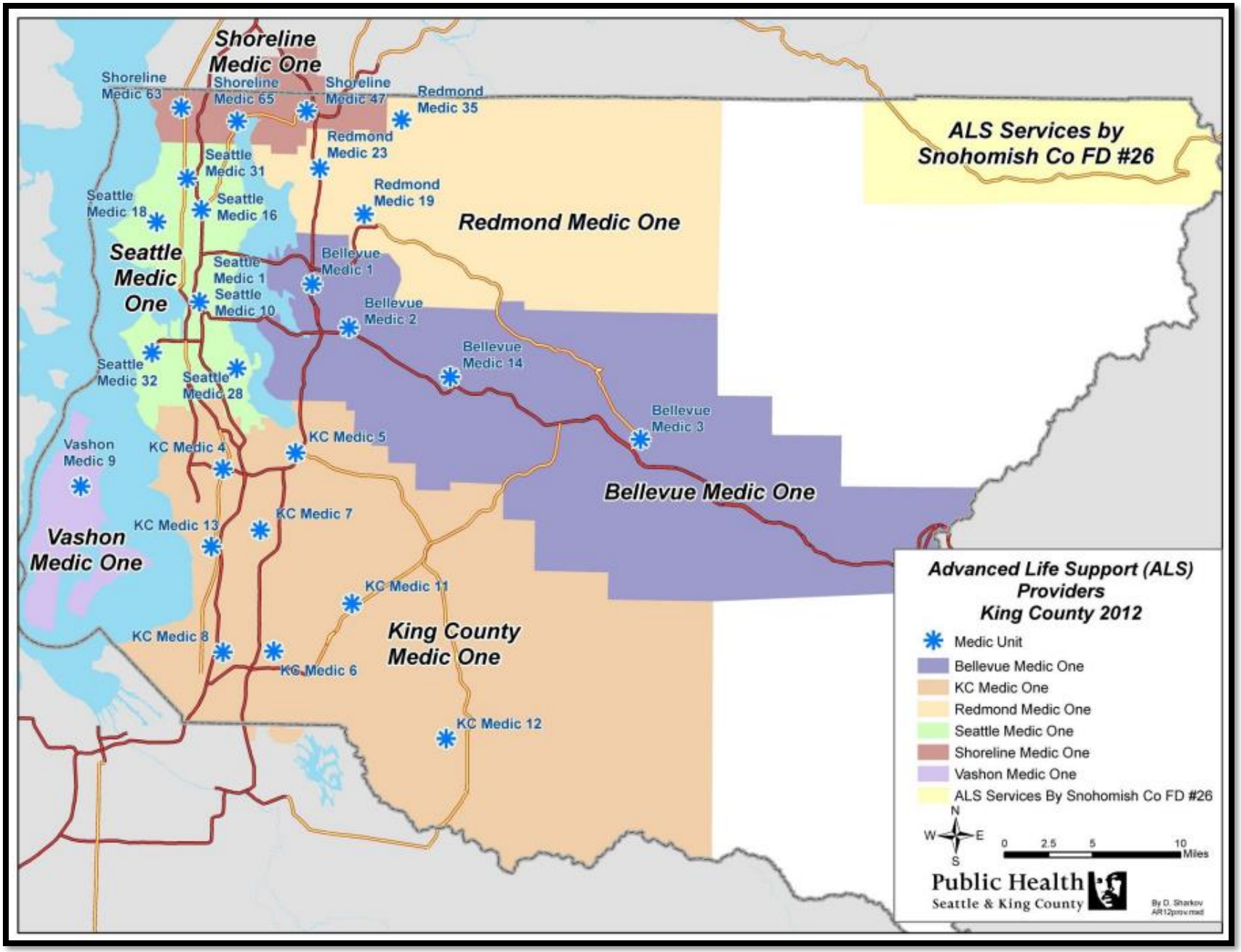
2. *Dispatcher Triage*: 9-1-1 calls are received by trained dispatchers who quickly identify the appropriate level of care and dispatch the closest and most appropriate unit to respond to the emergency. Calls are triaged and dispatched using the King County Criteria Based Dispatch (KC-CBD). Additionally, dispatchers are trained to provide life-saving treatment instructions to the caller.

3. *Tier 1 - Basic Life Support (BLS) Services*: BLS personnel are the "first emergency medical responder" to an incident to provide immediate and lifesaving care until an advance provider can arrive on scene. In Snoqualmie, all EMS providers (including

firefighters) are trained to Emergency Medical Technician level, and certified in the use of AEDs. They are also trained to measure, draw, an inject epinephrine for patients suffering from an allergic / anaphylactic reaction as well as being trained in the use of Naloxone. For lower acuity incidents, some 9-1-1 incidents are transferred to a nurse line where a certified registered nurse can provide medical direction. In 2016, the KCEMSS began beta testing the use of a community trained paramedic (CMT) to make house-visits to high system utilizers. It is hoped at some point that Snoqualmie will have access to a CMT to address any high system utilizers that we may encounter.

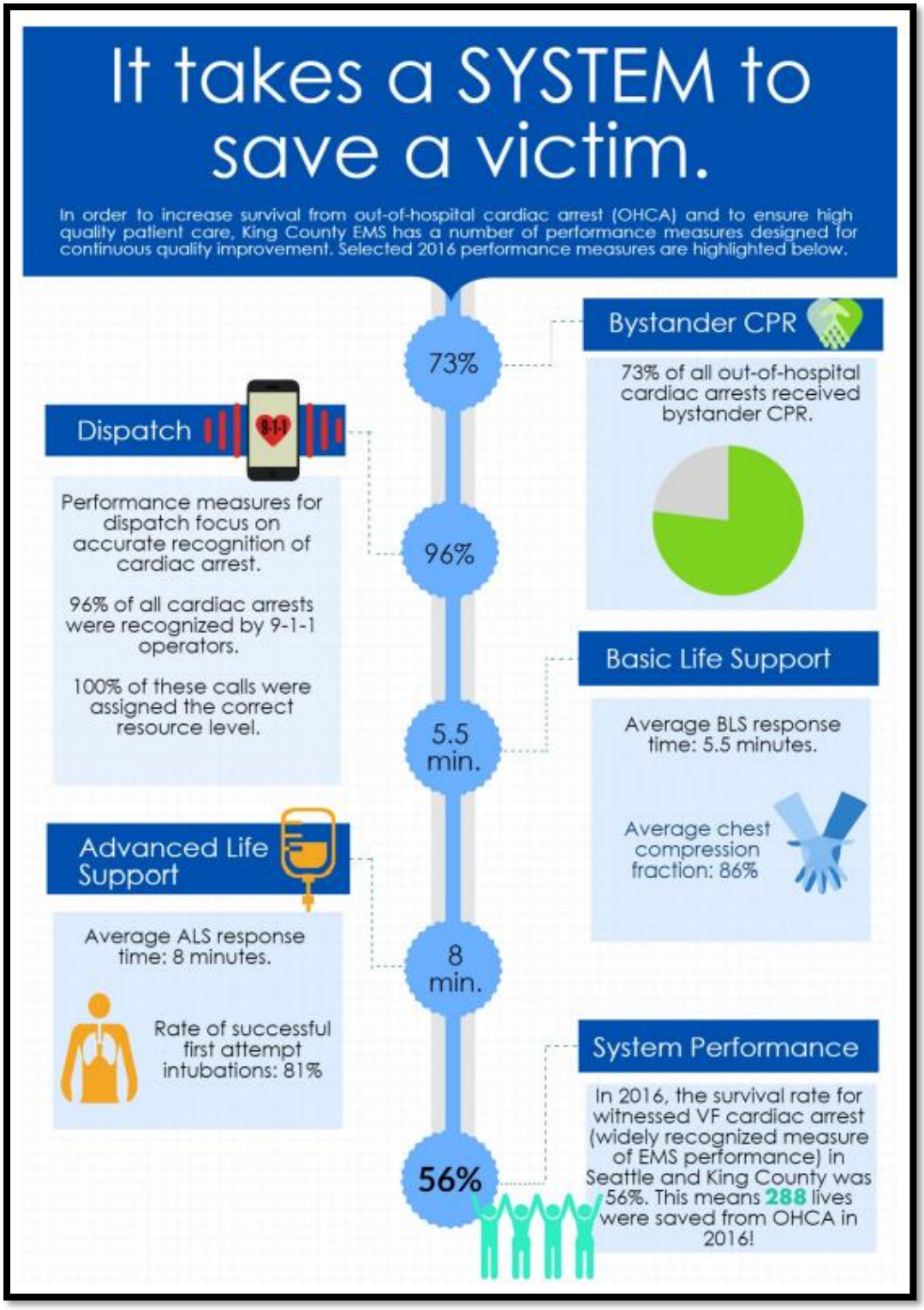
4. *Tier 2 - Advanced Life Support (ALS) Services* - ALS Personnel responders are highly skilled and trained personnel that provide advanced levels of care. These personnel are certified at the paramedic level and, to work in King County, must attend the KCEMS Medic One Training Program. The City of Snoqualmie receives its paramedic response from the Bellevue Fire Department. The closest ALS unit to Snoqualmie is located in the city of North Bend, with the next coming from Issaquah. The map below provides paramedic station location for the region.

5. *Definitive Medical Care* - After the patients are evaluated by the EMTs or Paramedics, and further medical care is needed, the patient will be transported to the appropriate definitive care facility.



Map 2.1: King County Paramedic Provider Map

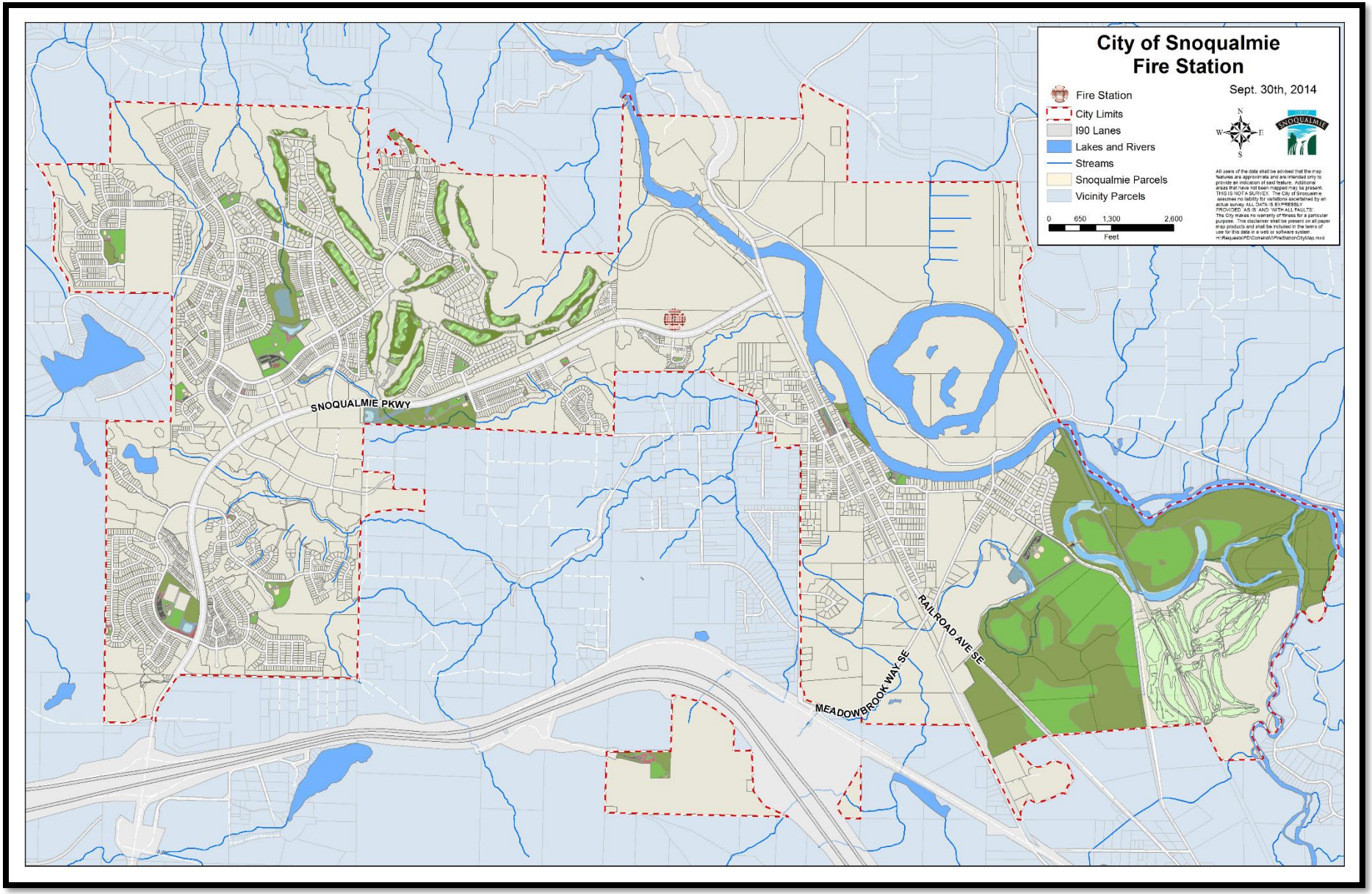
The KCEMSS provides remarkable EMS services, with the highest cardiac arrest survival rate in the nation. Consistently, the system boasts cardiac arrest survival rates of greater than 50%. In 2016, the survival rate throughout King County was 56%.



Data for KCEMS System: http://www.kingcounty.gov/depts/health/emergency-medical-services/~/media/depts/health/emergency-medical-services/documents/EMSAdvisoryTaskForceOverview.ashx

The City does not have an aviation, marine shipboard fire and rescue, or wildland program. The City does own a flood-water rescue boat that would be deployed in a flooding situation. Additionally, the Fire Department has red-card trained wildland firefighters that are used for fire mobilization to fight wildland fires outside the city.

Physical assets have also been established and maintained adequately to perform the function of a Fire Department. The Department has one fire station located along the Snoqualmie Parkway 1/8 of a mile south of SR202 (Railroad Ave). This station has four drive-through bays, a hose and training tower, community meeting rooms and a dedicated emergency operation center that is used during disaster situations. The Station is a modern facility with back-up generation power in the event power becomes unavailable. The facility is home to response firefighters who live and work on the main level and fire administration office, training room, and EOC on the lower level. Because of the slope where the station was built, ground level access is provided on both levels of the Station.



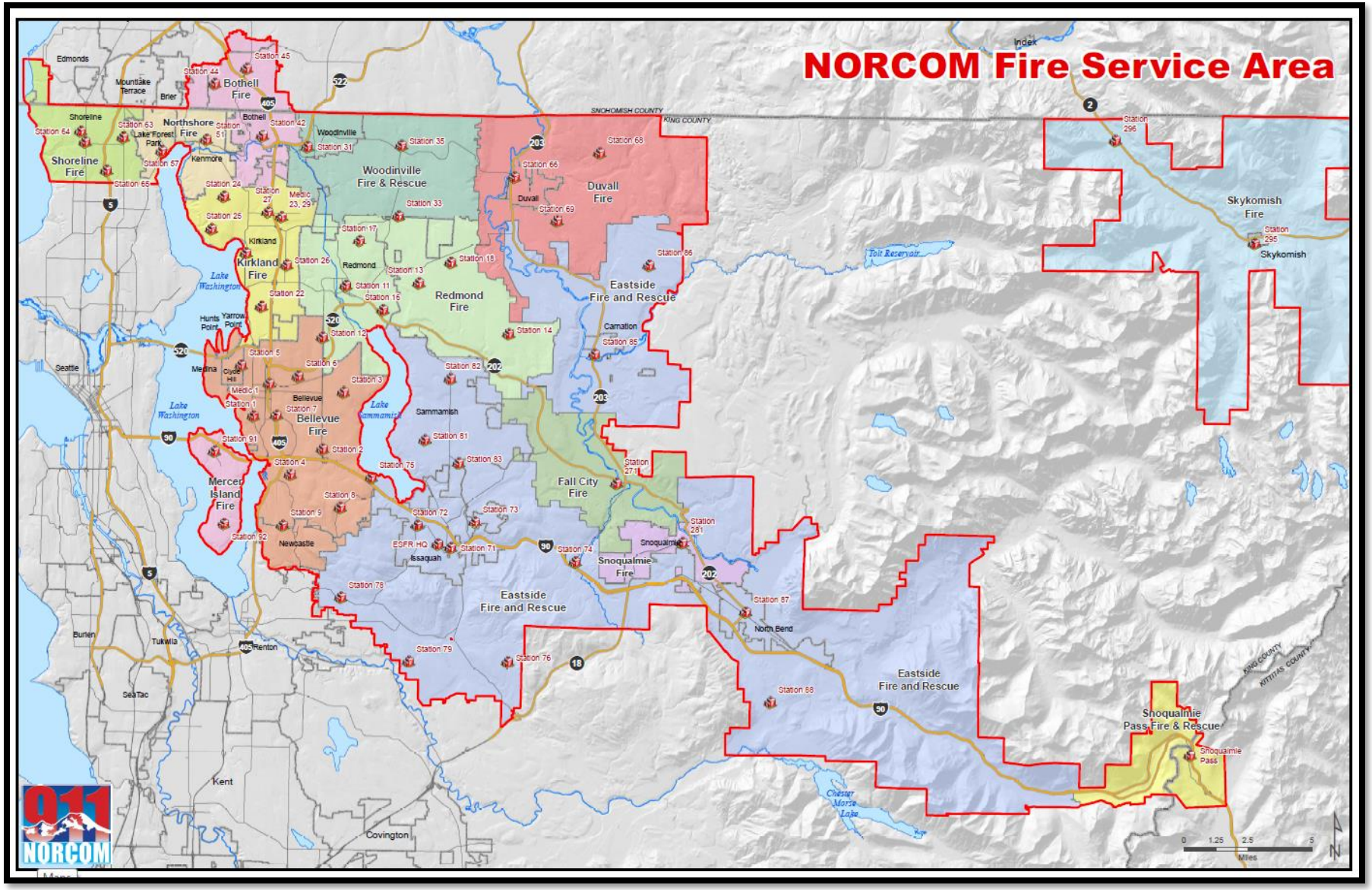
Map 2.2: City of Snoqualmie Fire Station Location Map

The department operates one frontline fire engine and one frontline aid (EMS) unit. The Department also has a backup fire engine and aid unit that maintains adequate equipment to complete the mission of the organization.

By Snoqualmie Municipal Code (SMC) the Department provides emergency response to the incorporated area of the city along with a Washington Department of Health and Human Services juvenile detention center known as Echo Glen Children's Center. Echo Glen is a 160-acre site that has a 172-maximum bed capacity in 47 buildings. The facility is located within the King County Fire District 27 taxing district, but state facilities are exempt from local taxes. This site can only be accessed through the city limits and is why the State has established an agreement for fire and EMS service with the City.

Because of the rural area around the City and fire station location, the City provides first response to Tokul, Johnson Heights and Williams Addition. These neighborhoods are part of unincorporated King County and within King County Fire District 38's response area. This service is provided under the King County mutual aid interlocal agreement.

The City of Snoqualmie is a partner agency in a regional PSAP and dispatch center in northern King County. The agency, known as NORCOM (Northeast King County Regional Public Safety Communication Agency), provides service to six cities and seven fire protection districts. In 2015, NORCOM dispatched 165,600 incidents; an average of 454 per day.



Map 2.3: Fire Station / NORCOM Dispatch Region Map

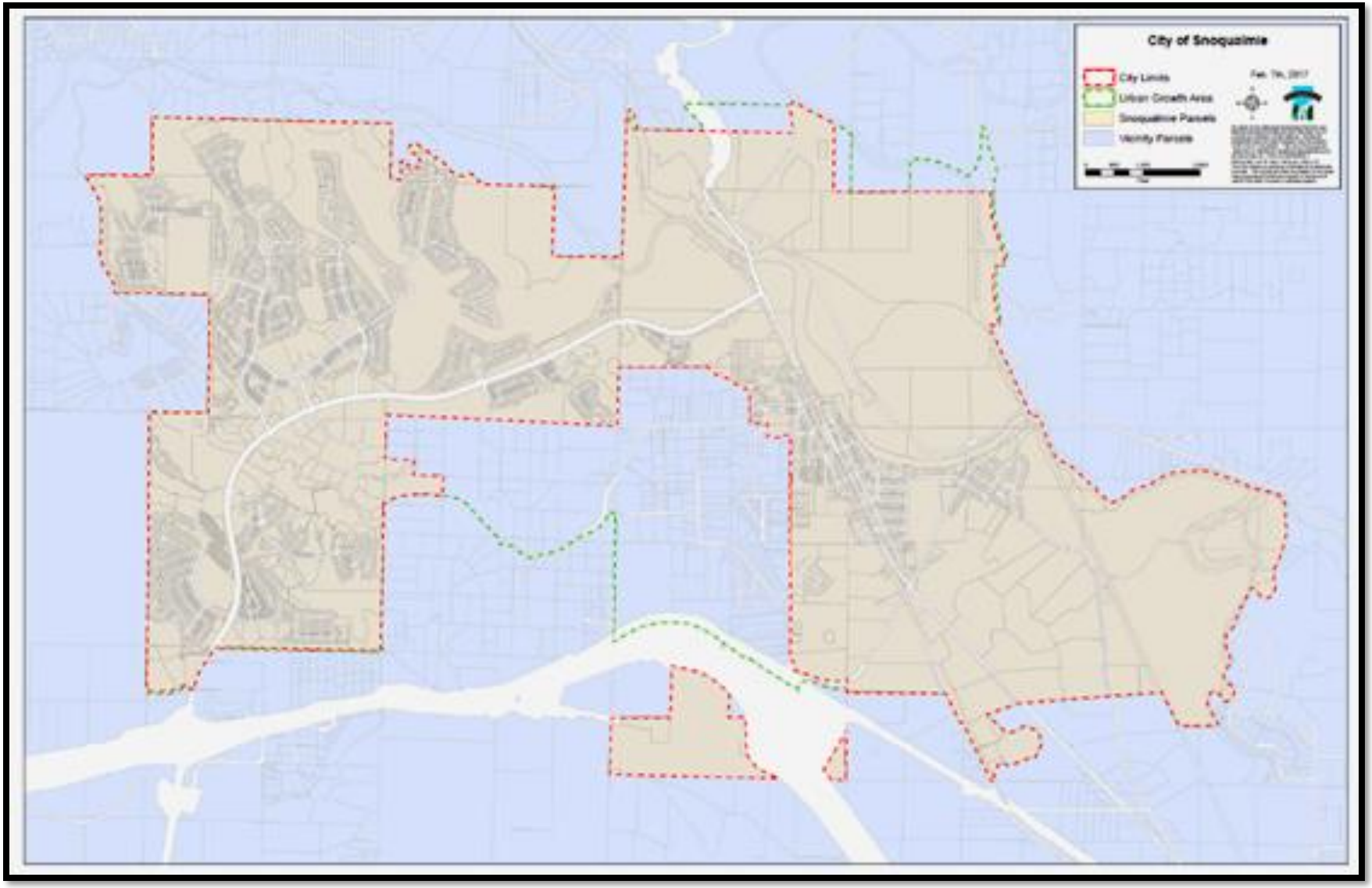
2.1 Population Density

The State of Washington manages population growth through the Growth Management Act (GMA). The GMA was adopted by the legislature in 1990 and provided a frame work for the State, County, and local government to manage population growth. Codified under RCW 36, the GMA required the identification of urban growth boundaries within counties, and assists with urban planning and population growth, while preventing urban sprawl.

In accordance with the RCW and GMA, the City has established urban growth areas that are larger than current city boundaries. The city also has a comprehensive plan that guides growth. This plan describes the city that residents wish to leave to future generations, goals and polices to guide that vision, provides a generalized land use plan for the city and its urban growth area, and provides a guide for city budgeting.

Along with growth boundaries, the comprehensive plan established future population growth. Because the city is nearly built out with all available land, the growth for this city is not expected to be exponential. Projected targets (highest target) is 14,224 by 2022, and 15,841 by 2032.

The following map shows the urban growth area for the City:



Map 2.4: Urban Growth Area (UGA) Map

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2.2 Community Expectations

Confidence and satisfaction has remained very high for fire and EMS services within the City. In May 2017, the City of Snoqualmie hired National Citizen Survey (NCS) to perform a statistically valid survey of city services. The survey was completed by telephone, and asked the respondents multiple questions about satisfaction of the citizens. One of the questions asked the respondents to rate the quality of the services provided by the city. Respondents ranked fire service at 97% positive and EMS at 94% positive. Both fire and EMS were ranked the highest, with police services being ranked third (91% positive).

In December of 2014, the city hired EMC Research to perform a telephone survey. This survey asked respondents the following questions:

"Question 10: I'm going to read you a list of services and the functions provided by the City. For each one, please tell me how well you think the city is doing in that area. Use an A through F grading scale where A is excellent, B is above average, C is average, D is below average and F is failing. If you are not sure, please just say so."

The following are the results for Fire, EMS and the next closest service:

SERVICE	A	B	C	D	F	DON'T KNOW	MEAN GPA
Fire	56%	17%	3%	2%	1%	22%	3.62
EMS	50%	17%	3%	1%	-	19%	3.64
Police	54%	24%	4%	2%	-	16%	3.55

Since 2005, the Fire and EMS services provided by the City scored the highest out of any other service being provided. Maintaining this level of confidence is a very high priority for the department.

The 2017, the contracted with National Research Center to complete the National Citizens Survey (NCS). The evaluation asked respondents about Fire Department goals. The following is an excerpt from this report:

The National Citizen Survey™

When evaluating the importance of Fire Department goals, almost all residents felt that maintaining quick response times, maintaining funding to support current service levels and maintaining safe and suitable equipment, fire apparatus and stations, as well as providing high-quality training, were essential or very important. Residents placed less importance on expanding prevention, public education and outreach activities.

Figure 10: Importance of Fire Department Goals

Please rate how important, if at all, you think it is for the Snoqualmie Fire Department to focus on each of the following goals in the next four years:

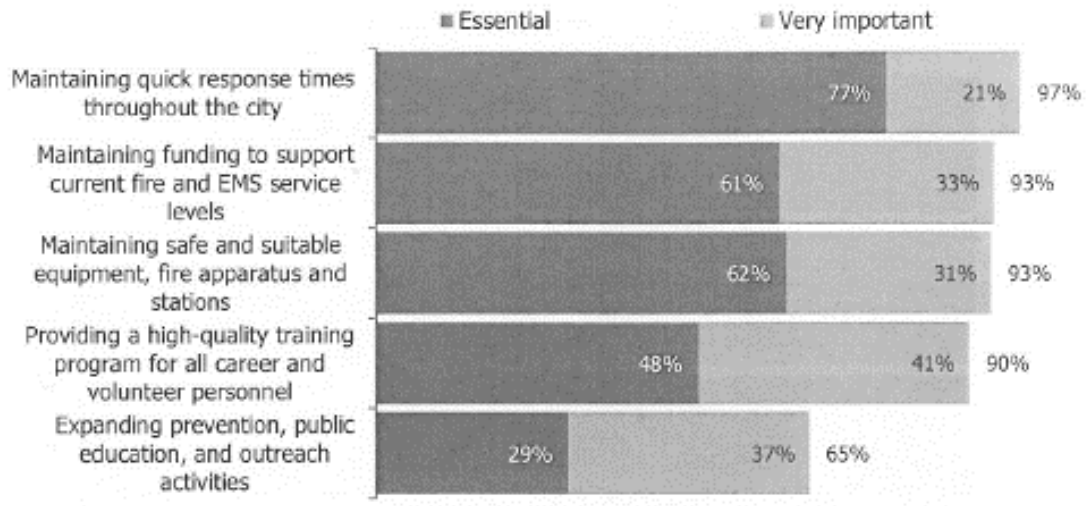


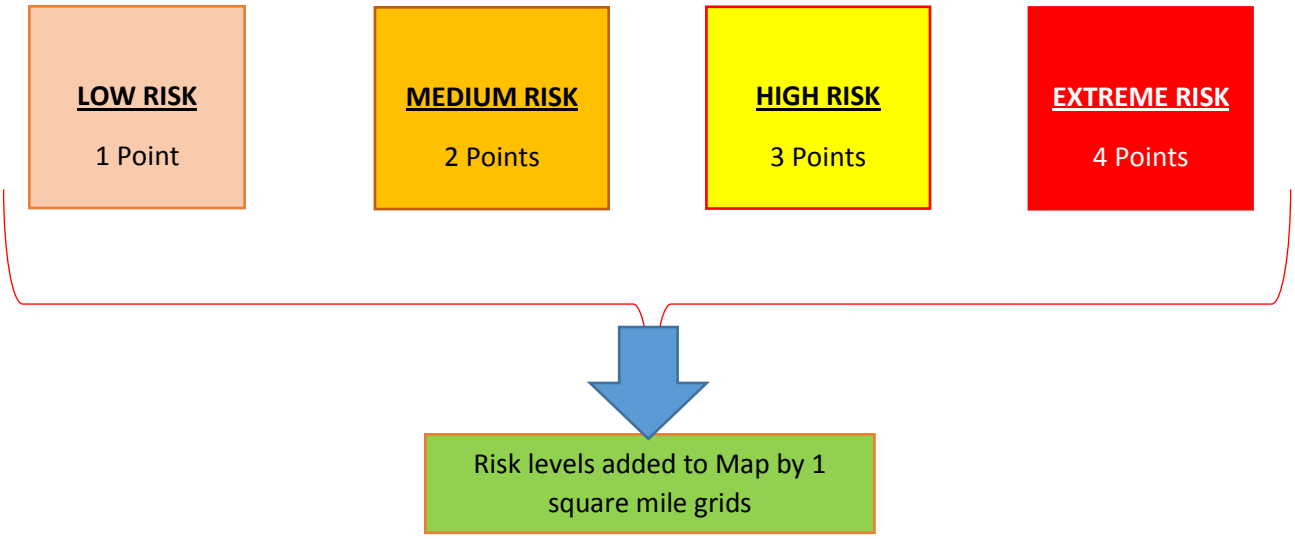
Figure 2.1: City of Snoqualmie NCS (2017)

The voters have also been very supportive of the Fire and EMS system over the years. In 2012, voters approved an excess levy that funded one additional firefighter (along with other City services). In 2016, the City went back to the voters asking for an additional firefighter (and two additional police officers) through another excess levy and was overwhelmingly supported with a 57.51 approval rating. This measure allowed the Department to establish a minimum staffing of three career-firefighters on duty twenty-four hours a day, seven days a week. In addition to the minimum of three on duty, volunteer firefighters and EMS personnel have increased staffing above these levels.

Utilizing approval ratings from historic surveys and successful levy passages, the conclusion is the community is supportive of the Fire Department, and have agreed with the recommended standards set forth by the city.

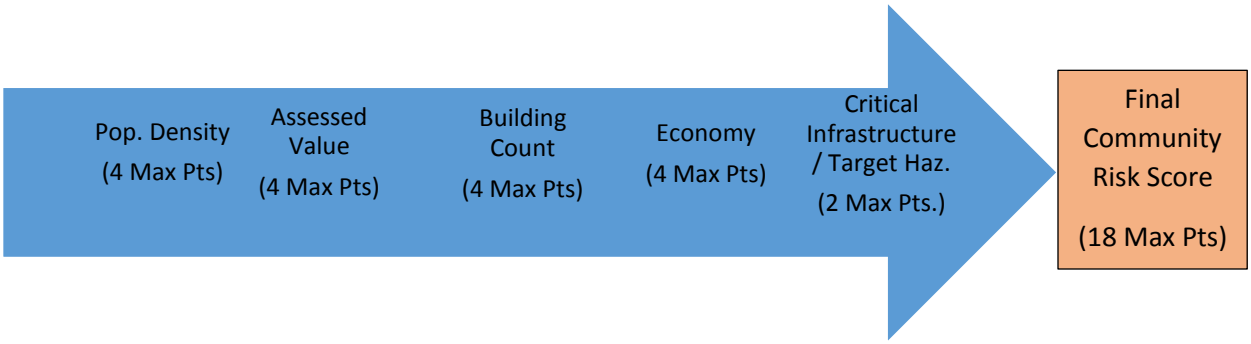
SECTION 3: COMMUNITY RISK ASSESSMENT

To best assess community risk, the Department centered its Community Risk Analysis (CRA) on the overarching principles of life, property, economy and environment. These categories were broken down even further, and a score was derived for each element. In the end, each geocode grid was scored and the highest-ranking grids were identified as having the most risk. Each element below was given a point value which is used in each.



Multiple elements were used to measure the risk in the Community, and all were placed into the one-quarter (1/4) square mile grids. These grids, known as geocodes, are commonly used within the Fire Department and were readily available in the City's GIS system. One challenge that was detected early in the analysis was how to measure and analysis a fair comparison between a full one-quarter-square-mile grid and a grid where the boundaries only make up a portion of the grid. To overcome this challenge, it was decided to measure each grid with a "per square acre" measurement. One square mile is equivalent to 640 acres. Grids with less than one-quarter-square mile were adjusted to a square acre measurement to make a better comparison. Example: Grid #1 has 400 buildings in it and Grid #2 has 300 buildings. Grid #1 is fully covered by the jurisdictional boundaries; and Grid #2 has only 50% of the jurisdictional boundary within it. This would equate to Grid #1 having a 0.62 building per square acre and Grid #2 having 0.94 buildings per square acre. It is believed that this approach is a more fair and reasonable approach that creates a more accurate measurement.

To determine maximum risk in each grid, each CRA element was added for a final CRA score. The maximum value a grid could total was eighteen (18) points; with the higher number translating to the more extreme risk associated with that specific grid. The following describes the approach:



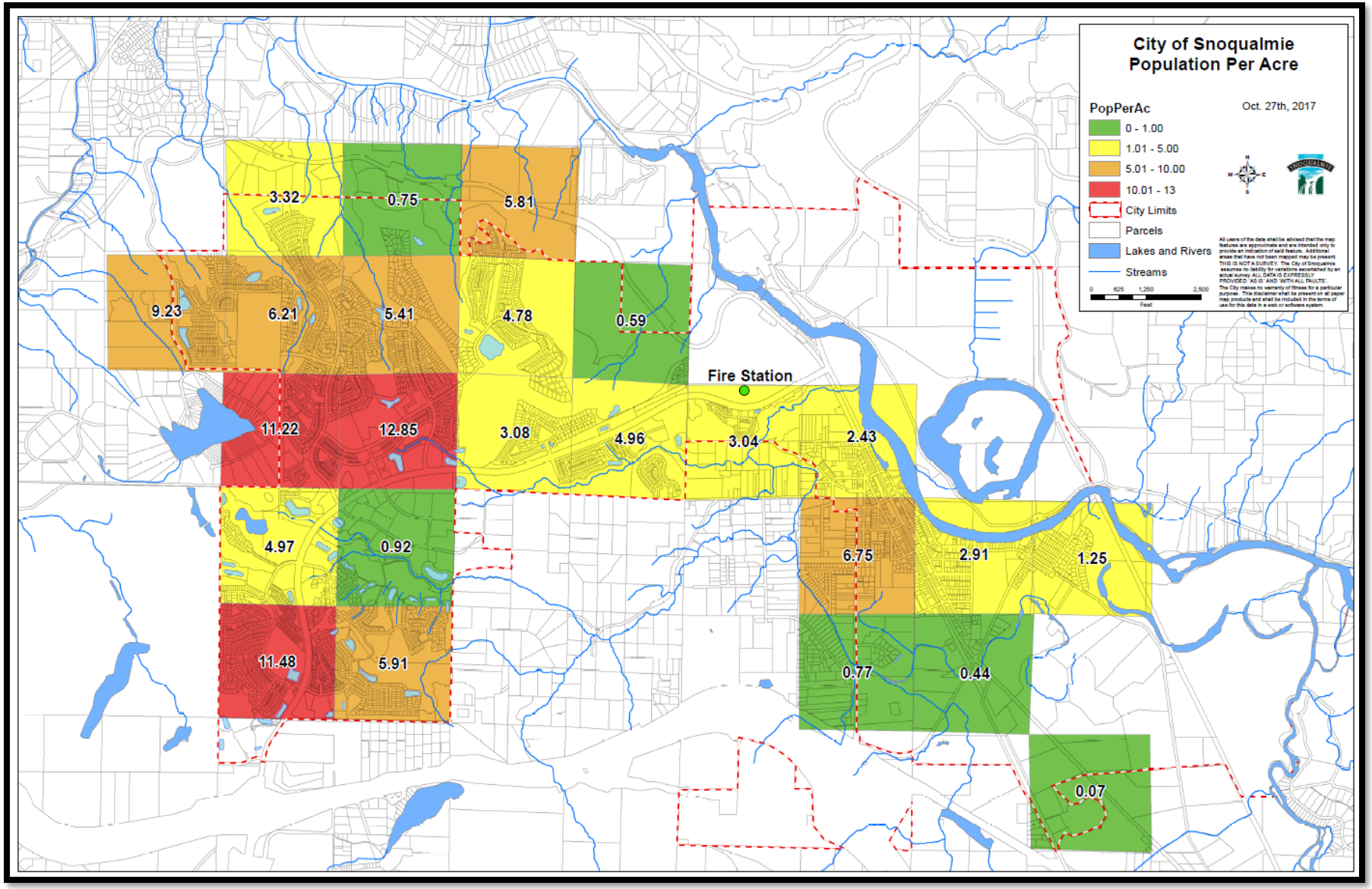
Lastly, the probability of response was evaluated by looking at samples of retrospective responses to specific areas. This evaluation looked at EMS, fire, rescue, and hazardous conditions responses. Incident totals were plotted on maps to look for density or hotspots of incidents. Sample size was adjusted to realize a more reasonable or telling probability. For example, if the City averages 10-11 structure fires per year, plotting one years' worth of data would not realize a good spatial example. Instead, looking at five-years (50-55 incidents) or even ten years (100-110 incidents) would highlight the hot-spots within the community more intensely potentially driving better results from the analysis.

3.1 CRA - Life

The first measurement used for the CRA was population density. Subject matter experts (SMEs) took the number of residents living in each square mile to equate the life hazard risk. Population densities were added to the GIS system, plotted on a map, and adjusted to a per-acre number. Next, natural breaks in the populations were used to determine risk value categories. The following displays these risk value categories:

- **Low Risk:** < 1 person per square acre
- **Medium Risk:** 1 person - 5.00 person per square acre
- **High Risk:** 5.0001 – 10.0 persons per square acre
- **Extreme Risk:** > 10.0001 person per square acre

A copy of the grid counts based on the analysis above can be found in Appendix A – Geocode Population Per Acre Count.



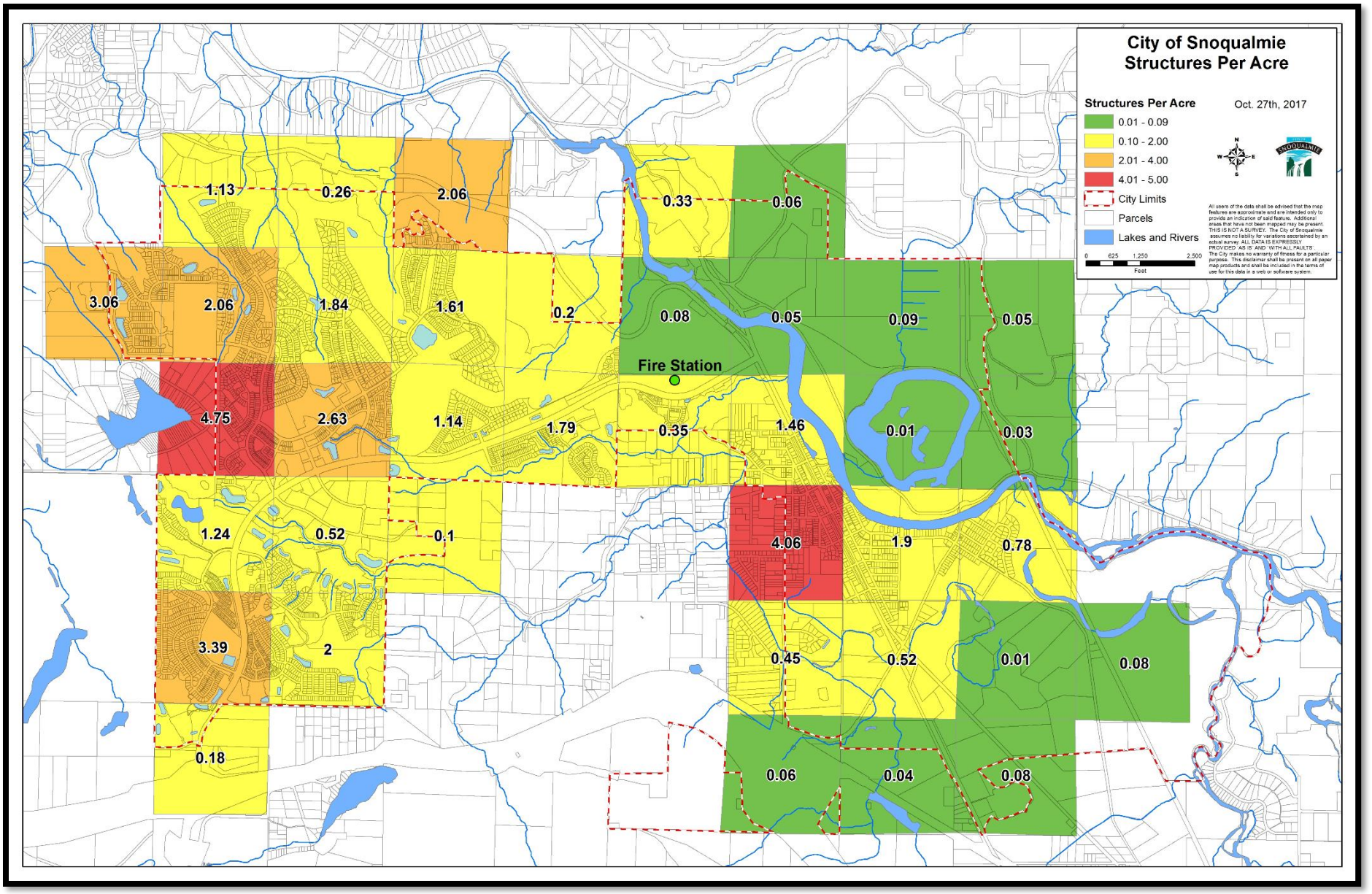
Map 3.1: CRA Population Per Acre

3.2 CRA - Property

To measure the City's property risk, subject matter experts (SMEs) looked at the number of structures in each grid. GIS tools were used to gather this data, and buildings with less than 120 square feet were excluded. This parameter was selected because it aligned with the building-permitting requirements. Number of structures by one-quarter-mile square grid was plotted onto a map, adjusted to a per-acre count, and natural breaks were found to determine risk values. The following building counts were used to measure this risk category:

- **Low Risk:** < 0.01 structures per acre
- **Medium Risk:** 0.01 – 2.000 structures per acre
- **High Risk:** 2.00001– 4.000 structures per acre
- **Extreme Risk:** > 4.00001

The following map displays the risk categories labeled above:

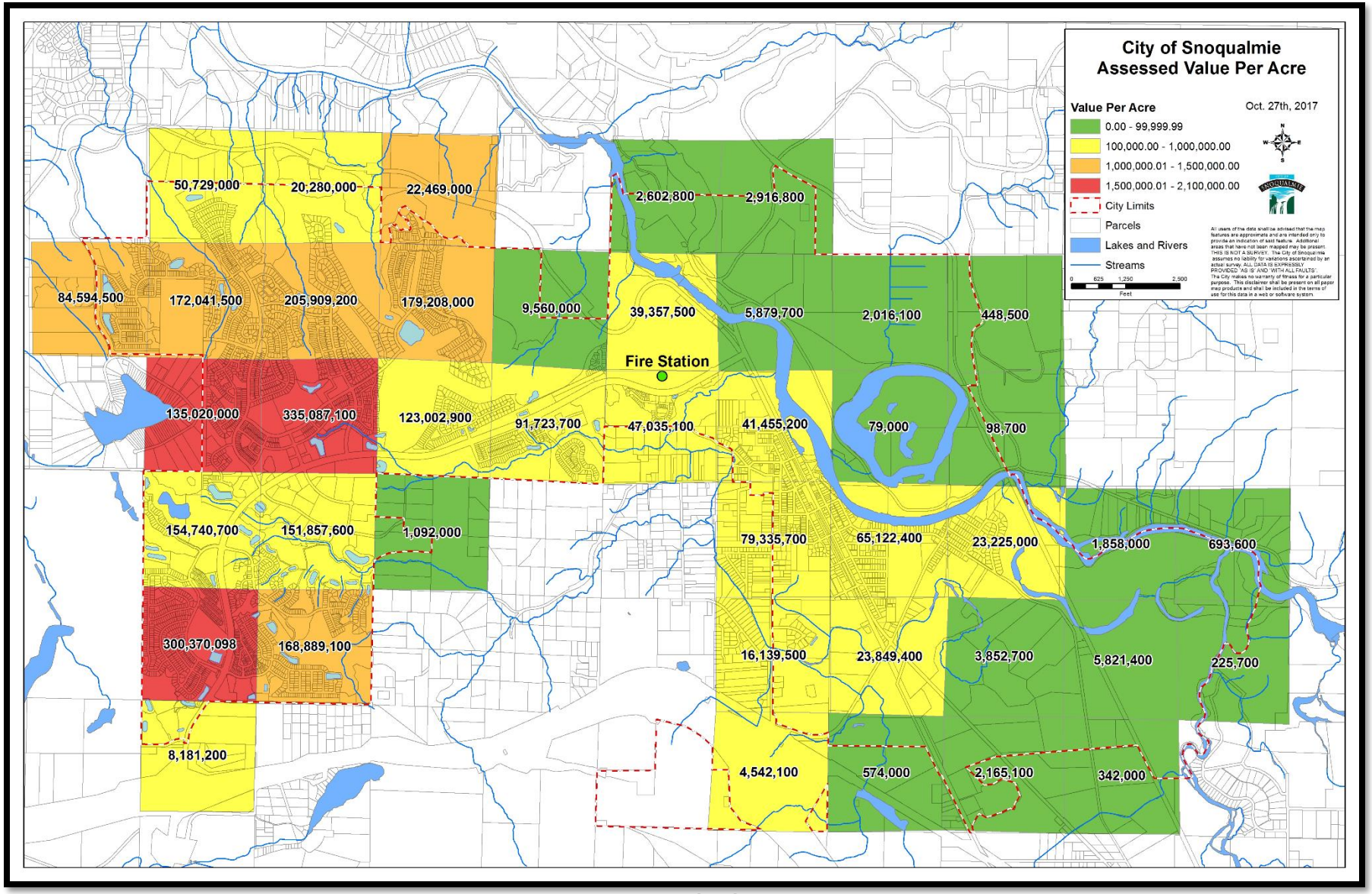


Map 3.2: CRA Structures Per Acre Map

Next, the SMEs evaluated the assessed valuation (AV) of the grids. The premise behind using AV as a measurement involves the risk associated with protecting greater property values, and the importance of protecting large value-sums of property. Property values were plotted using GIS, and adjusted to a per-square-acre system. Thresholds were established for each risk category and the risk level was plotted on a map. The following breaks out the assessed value by risk category:

- **Low Risk:** < $100 thousand per acre
- **Medium Risk:** $100,001 - $1 million per acre
- **High Risk:** $1,000,001 - $1.5 million
- **Extreme Risk:** > $1.5 million

The following map displays the risk categories labeled above:



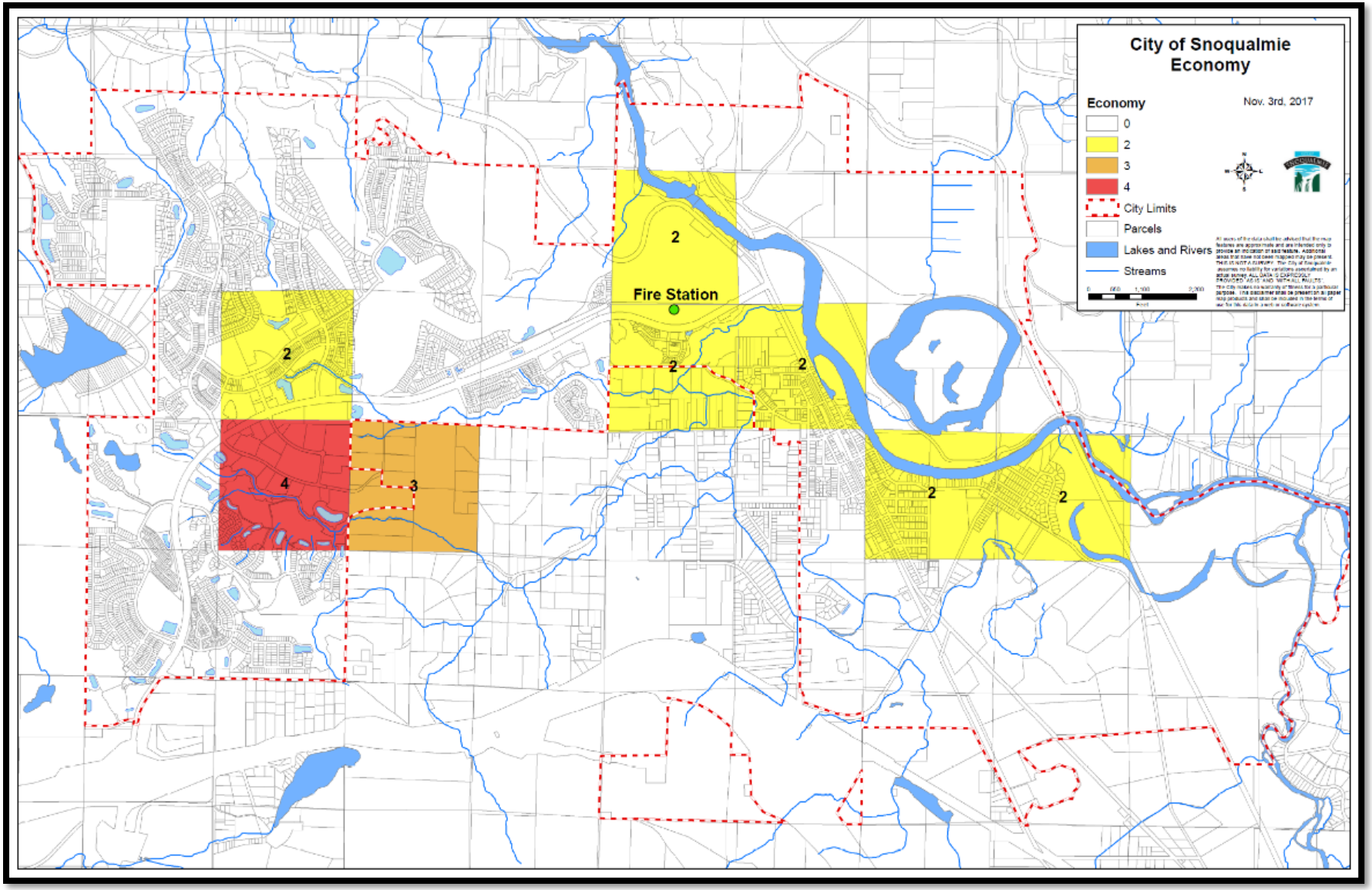
Map 3.3: CRA Assessed Value Per Acre Map

3.3 CRA - Economy

To measure the “economy” threat, the SMEs met with the City’s finance department to find a reasonable measurement. Because the City was a planned community, most of the economic drivers are in similar locations. Examples of this include the downtown business core and Snoqualmie Ridge Business park. Businesses and store fronts were measured based on fiscal worth and generation, and broken into risk categories based on the following breakdown:

- **Low Risk:** No business or economy
- **Medium Risk:** Retail
- **High Risk:** Light industry / warehouse
- **Extreme Risk:** Large employer / distributor

The following map displays the risk categories labeled above:

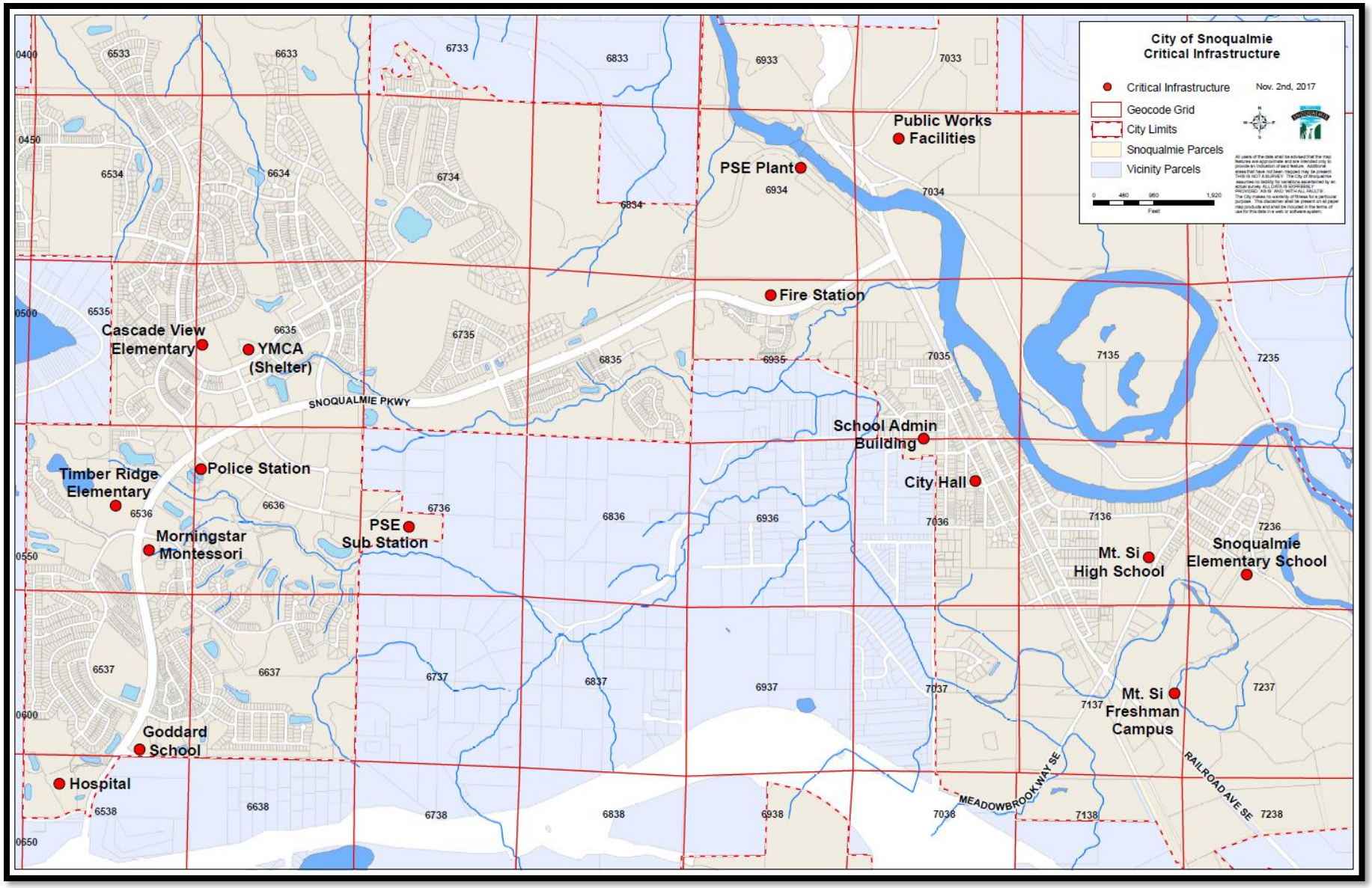


Map 3.4: CRA Economy Map

3.4 CRA - Other Measurements

Next, critical infrastructure and target hazards were added to a map and one (1) point was given to each unit of critical infrastructure with an additional one (1) point for each target hazard within the grid. The primary target hazard within the city (in addition to the critical infrastructure identified earlier in this document), is the Snoqualmie River. The river is a very dangerous site that many citizens visit for recreational purposes. The SMEs felt that this was an important element to include as it is a large risk. Supporting this perspective is the fact that two Medals of Valor have been given out since 2000 resulting from Snoqualmie River rescues. The Medal of Valor is an internal recognition reserved for firefighters who have taken an extreme risk, likely putting their own lives at risk, to rescue another person or firefighter.

The following map displays the target hazard and the Snoqualmie River:



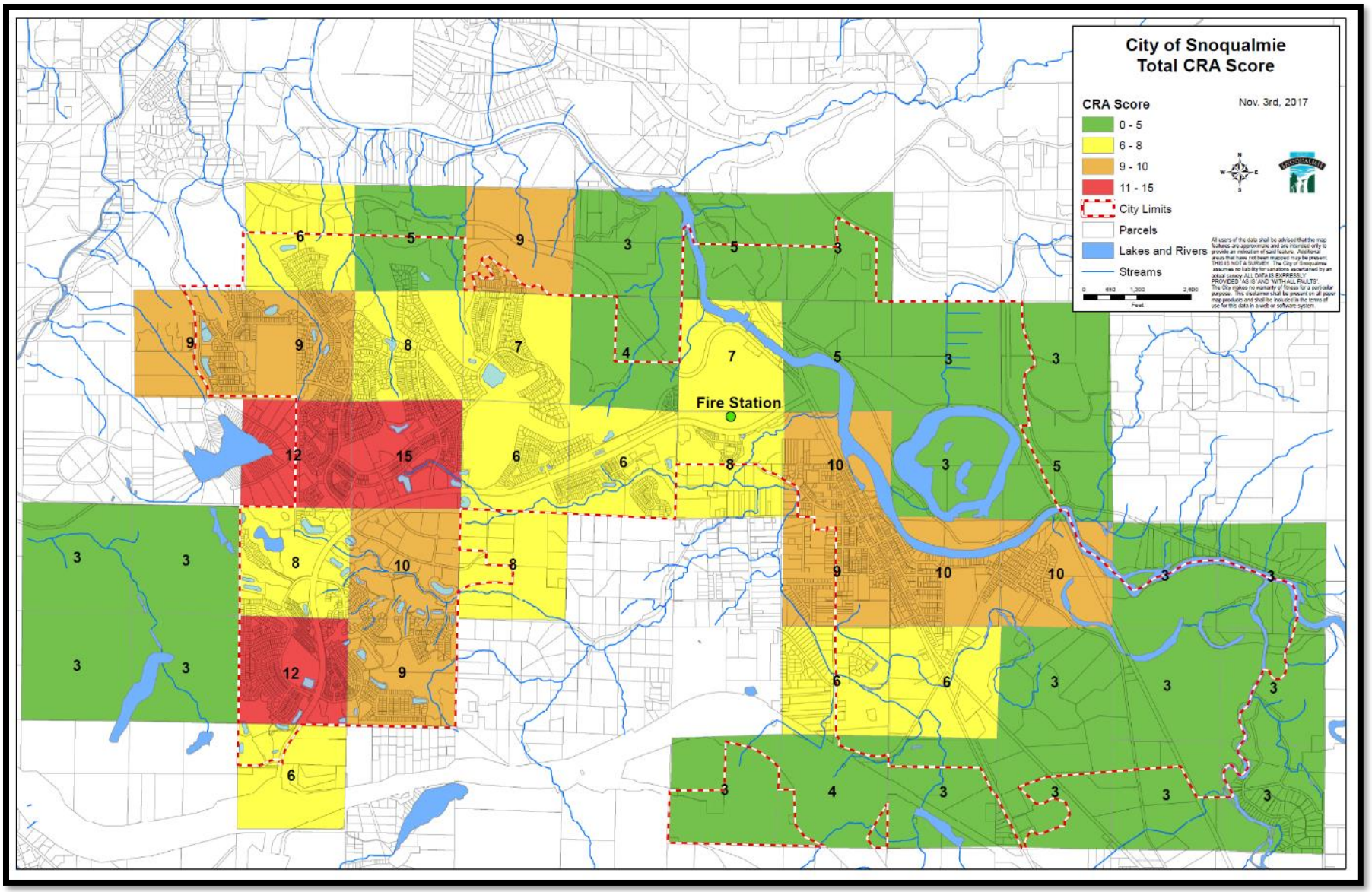
Map 3.5: CRA Critical Infrastructure Map

3.5 CRA – Final Total

Finally, all the CRA measurements were broken out by grid, totaled and broken out into final-risk-categories. The maximum amount of points a grid could receive was 18 points. Final scoring risk categories were broken down by point values as follows:

- Low Risk: Less than six (6) Points
- Medium Risk: Six (6) to eight (8) Points
- High Risk: Nine (9) to ten (10) Points
- Extreme Risk: Greater than ten (10) Points

The following map displays the final risk categories as determined by the CRA analysis.



Map 3.6: CRA Total Score Map

The following table shows the grids with their individual and final totals:

GEOCODE	StrucPerAc	Score	ValPerAc	Score	PopPerAc	Score	Economy	Target Hazards	TOTAL SCORE
6635	2.62963	3.0	2068438.88889	4.0	12.85185	4.0	2.0	2.0	15.0
6535	4.75309	4.0	1666913.58025	4.0	11.22222	4.0	0.0	0.0	12.0
6537	3.38994	3.0	1889120.11321	4.0	11.48428	4.0	0.0	1.0	12.0
6636	0.51534	2.0	931641.71779	2.0	0.92025	1.0	4.0	1.0	10.0
7035	1.45578	2.0	282008.16327	2.0	2.42857	2.0	2.0	2.0	10.0
7136	1.90123	2.0	401990.12346	2.0	2.90741	2.0	2.0	2.0	10.0
7236	0.78472	2.0	161284.72222	2.0	1.25000	2.0	2.0	2.0	10.0
0450	3.05714	3.0	1208492.85714	3.0	9.22857	3.0	0.0	0.0	9.0
6534	2.05556	3.0	1061984.56790	3.0	6.20988	3.0	0.0	0.0	9.0
6637	2.00000	3.0	1055556.87500	3.0	5.90625	3.0	0.0	0.0	9.0
6733	2.06250	3.0	1404312.50000	3.0	5.81250	3.0	0.0	0.0	9.0
7036	4.05882	4.0	933361.17647	2.0	6.75294	3.0	0.0	0.0	9.0
6536	1.23780	2.0	943540.85366	2.0	4.96951	2.0	0.0	2.0	8.0
6634	1.83537	2.0	1255543.90244	3.0	5.41463	3.0	0.0	0.0	8.0
6736	0.10000	2.0	54600.00000	1.0	0.00000	1.0	3.0	1.0	8.0
6935	0.35443	2.0	595381.01266	2.0	3.03797	2.0	2.0	0.0	8.0
6734	1.61250	2.0	1120050.00000	3.0	4.78125	2.0	0.0	0.0	7.0
6934	0.08280	1.0	250684.71338	2.0	0.00000	1.0	2.0	1.0	7.0
6533	1.13095	2.0	603916.66667	2.0	3.32143	2.0	0.0	0.0	6.0
6538	0.17857	2.0	292185.71429	2.0	0.00000	1.0	0.0	1.0	6.0
6735	1.13750	2.0	768768.12500	2.0	3.07500	2.0	0.0	0.0	6.0
6835	1.78616	2.0	576878.61635	2.0	4.96226	2.0	0.0	0.0	6.0
7037	0.45122	2.0	196823.17073	2.0	0.76829	1.0	0.0	1.0	6.0
7137	0.51515	2.0	144541.81818	2.0	0.43636	1.0	0.0	1.0	6.0
6633	0.26250	2.0	253500.00000	2.0	0.75000	1.0	0.0	0.0	5.0
6933	0.32911	2.0	32946.83544	1.0	0.00000	1.0	0.0	1.0	5.0
7034	0.04938	1.0	36294.44444	1.0	0.00000	1.0	0.0	2.0	5.0
7235	0.03390	1.0	1672.88136	1.0	0.00000	1.0	0.0	2.0	5.0
6834	0.19626	2.0	89345.79439	1.0	0.58879	1.0	0.0	0.0	4.0
7038	0.05556	1.0	126169.44444	2.0	0.00000	1.0	0.0	0.0	4.0
7033	0.06173	1.0	36009.87654	1.0	0.00000	1.0	0.0	0.0	3.0
7134	0.08696	1.0	12522.36025	1.0	0.00000	1.0	0.0	0.0	3.0
7135	0.01282	1.0	506.41026	1.0	0.00000	1.0	0.0	0.0	3.0
7138	0.04167	1.0	11958.33333	1.0	0.00000	1.0	0.0	0.0	3.0
7234	0.05128	1.0	11500.00000	1.0	0.00000	1.0	0.0	0.0	3.0
7237	0.00588	1.0	22662.94118	1.0	0.00000	1.0	0.0	0.0	3.0
7336	0.00000	1.0	23518.98734	1.0	0.00000	1.0	0.0	0.0	3.0
7337	0.07927	1.0	35496.34146	1.0	0.00000	1.0	0.0	0.0	3.0
7338	0.00000	1.0	6333.33333	1.0	0.00000	1.0	0.0	0.0	3.0
7436	0.00000	1.0	11560.00000	1.0	0.00000	1.0	0.0	0.0	3.0
7437	0.00000	1.0	3271.01449	1.0	0.00000	1.0	0.0	0.0	3.0
	< 0.1		>100K		< 1.0		X Small	1	<6
	0.1-2.0		100K-1.0M		1.0001-5.0		Small	2	6 TO 8
	2.0001-4.0		1.0-1.5M		5.0001-10.0		Med.	3	9 TO 10
	> 4.00001		> 1.5 M		> 10.0001		Large Man	4	> 10

FINAL SCORE	
Null	0
Low	<6
Med	6 TO 8
High	9 TO 10
Extreme	> 10

Figure 3.1: CRA Final Tabulation Chart

SECTION 4: EMERGENCY RESPONSE CAPABILITIES

4.1 Fire Suppression

The Snoqualmie Fire Department's main mission in 1939 was to create a suppression capable service. Although the Department has evolved over time, fire suppression has remained the central-service of the organization. With the advent of the Ridge development, the City has instituted rigid building codes for fire safety. Additionally, the Fire Department has provided a robust fire and EMS safety education program to the citizens. It is speculated that these are the two-primary means that have limited structural-fire-type responses to 3% over the past five years. Regardless of the limited fire related responses, the City recognizes the threat and risks associated with uncontrolled fire incidents and maintains response planning and levels at a very high priority.

4.2 Current Deployment

4.2.1 Station

The Fire Department responds from one centrally located point of distribution known as the Snoqualmie Fire Station. The City built this fire station in 2004 and opened it on 2005 as the planned Ridge development was partially completed. This site was selected as a "location between the ridge and historic downtown" areas. No formal fire station study or incident forecasting modeling was completed before the station was built. A fire station study should be performed in the future to align the replacement of the station with a less political and more objective determination of the location.

4.2.2 Personnel

The Fire Station houses both response personnel and administrative staff. Twenty-four hours a day, seven days a week the fire station is staffed with a minimum of three career firefighter/EMTs. As mentioned earlier in this document, the City staffs each shift with 4 people which allows for higher levels of staffing part of the time.

In addition to the minimum of three firefighters on duty twenty-four hours a day, at least one volunteer EMT or volunteer firefighter/EMT staffs the station during the overnight hours. These personnel work side-by-side with career staffing and provide Fire Department services to those we respond to. In 2016, volunteers staffed one additional position in the fire station 92% of the time.

During the day, fire administration includes two response-capable staff: Fire Chief and Training Captain. Both employees respond to incidents as needed, and are available twenty-four hours a day, seven days a week. They will provide first response to fire and EMS incidents, and incident command level response on significant areas throughout the area when available.

The City also uses a callback system for off-duty career staff and available volunteers. In the event of a significant incident, off-duty staff will be summoned though the City's dispatch system to staff the station or respond to an incident. The City pays for an Active 911 subscription so the notification will come to off-duty staff phones, preventing them from having to carry multiple devices.

4.2.3 Resources

The fire station houses the following emergency response apparatus:

- Two (2) type-1 pumpers (Engine 281 and Engine 282)
- Two (2) type-1 aid units [ambulances] (Aid 281 and Aid 282)
- A trailer that holds a flood water rescue rigid-hull inflatable boat and two inflatable kayaks
- A Command Vehicle (staffed by the City's amateur radio group)

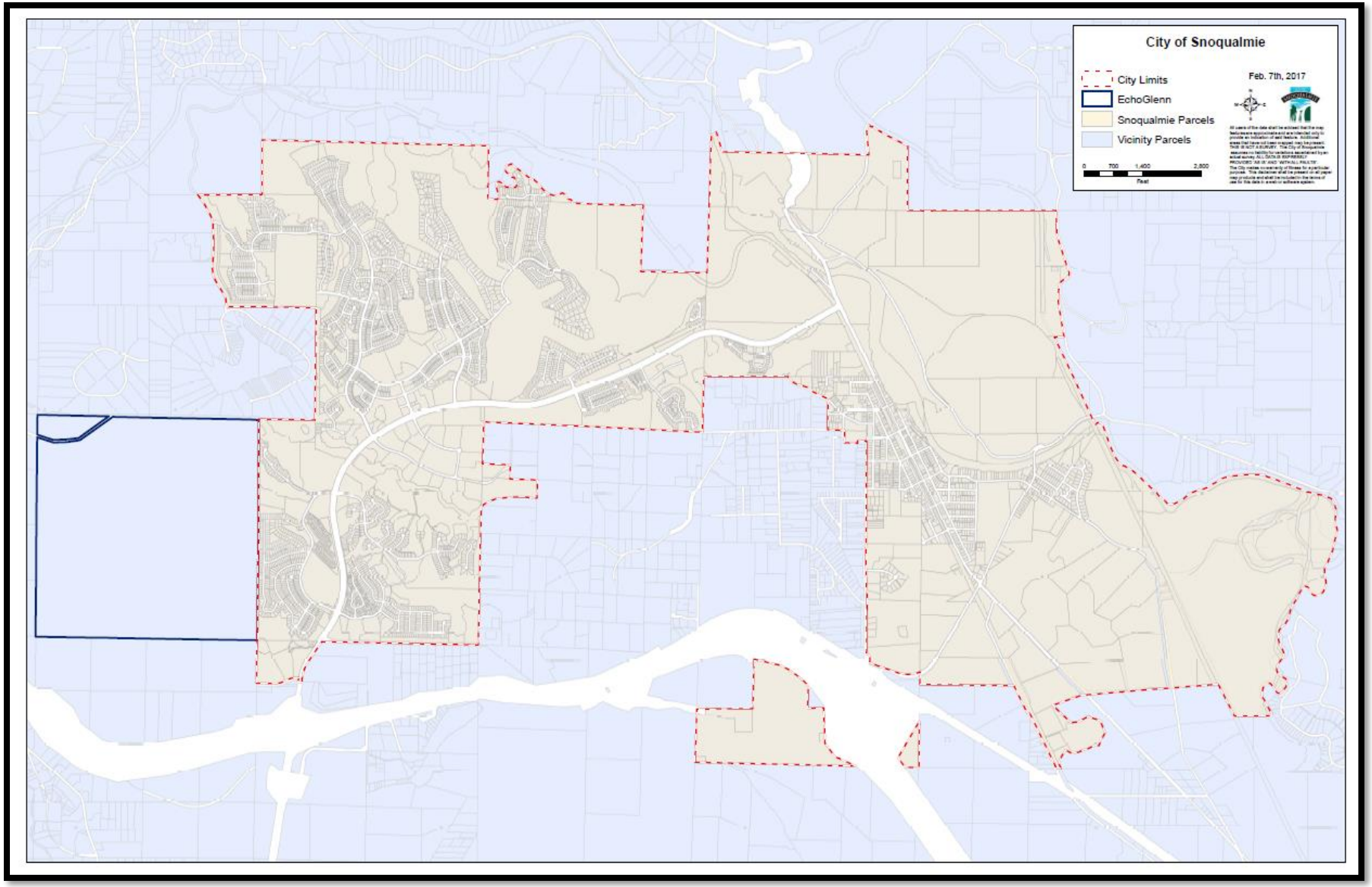
Daily, the response personnel will staff Engine 281 and Aid 281. If one of these resources goes out of service for repairs or maintenance, then the crew will staff either Engine 282 or Aid 282. Both the engines and aid units carry full compliments of equipment to respond to emergency events with a few exceptions. Efforts have been made to outfit all Fire Department apparatus with a full complement of equipment, but some of the higher-priced items have been delayed until they are replaced on the frontline apparatus.

4.2.4 Response Area

The Snoqualmie Fire Station is centrally located within the incorporated city limits of Snoqualmie. The geographical area of the City is 6.51 square miles and is broken into two commonly known areas: Historic Downtown, and Snoqualmie Ridge. These titles became prominent when the City embarked on the planned Snoqualmie Ridge development. Both areas of the City are a mix of commercial and residential.

The department by contract, also handles first response into the Echo Glen Children's (detention) Center. This area is in the southwest of Snoqualmie Ridge however, is located outside the city limits.

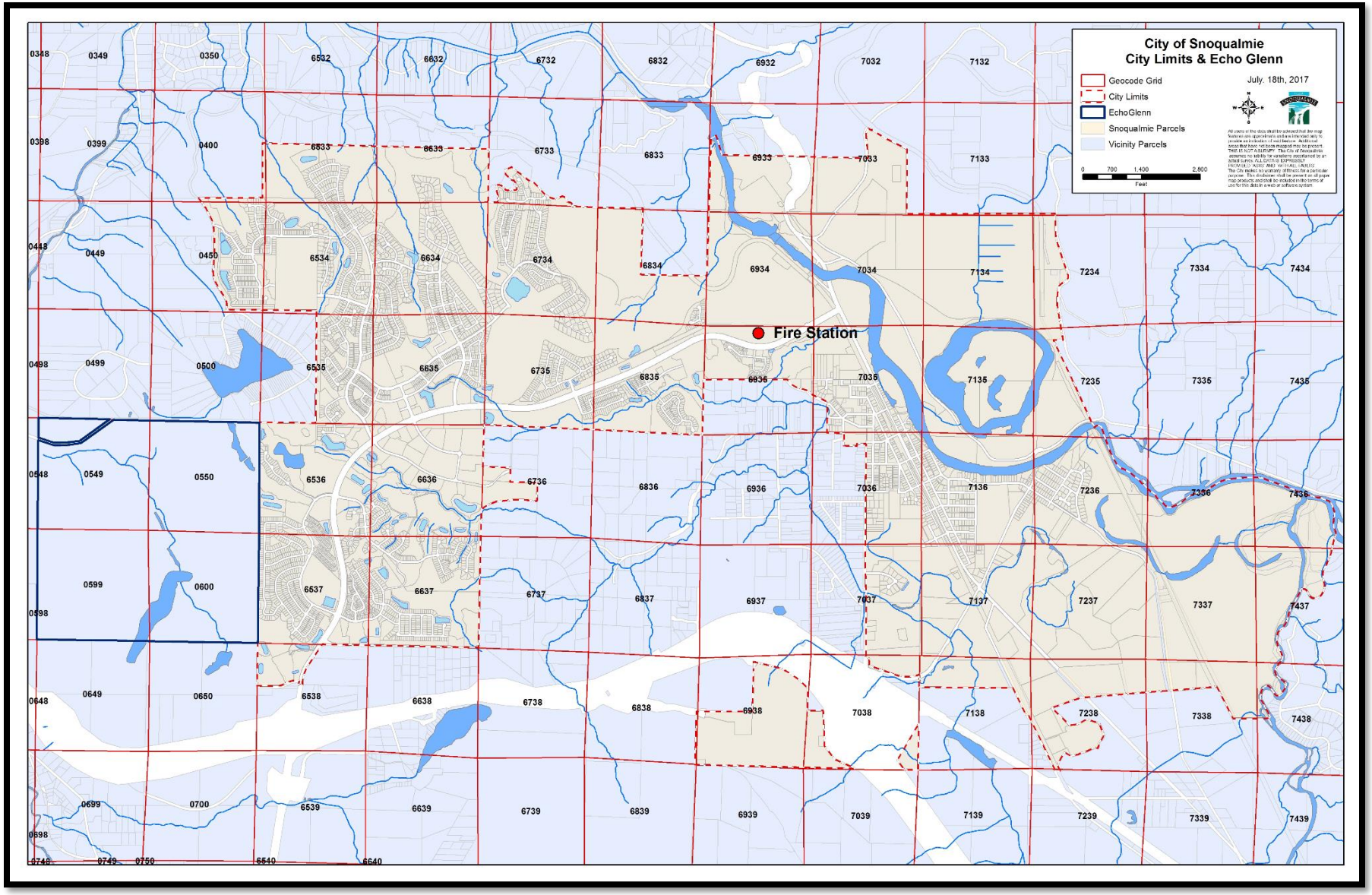
The following map shows the city boundaries and the Echo Glen Children's Center:



Map 4.1: Echo Glen Children's Center

For assessing community risk, further breaking down the response area into smaller and more manageable areas is beneficial. Geocode grids were used as the information was readily available and captured since the inception of the city's record management system. Geocode grids cover a one-quarter-square-mile area and is given a distinctive identification number.

To complete the community risk assessment, analysis was performed using geocode boundaries. Each geocode area was established a score based on the community risk scoring criteria. More information and analysis will be provided in the community risk section of this document. For the response area, the following map shows the geocode map for the response areas of the City of Snoqualmie:



Map 4.2: Geocode Map for Response Areas – City of Snoqualmie

4.3 Community Response History (Probability)

Snoqualmie Fire Department has maintained historical records of emergency response for over 12 years. For this document, a five-year retrospective analysis will be used as its standard.

The Snoqualmie Fire Department has seen rapid growth since the early 2000s and incident volume has followed suit. In 2015, the department responded to the most incidents in its history at 1,386 total volume. The following chart displays the incident totals by year:

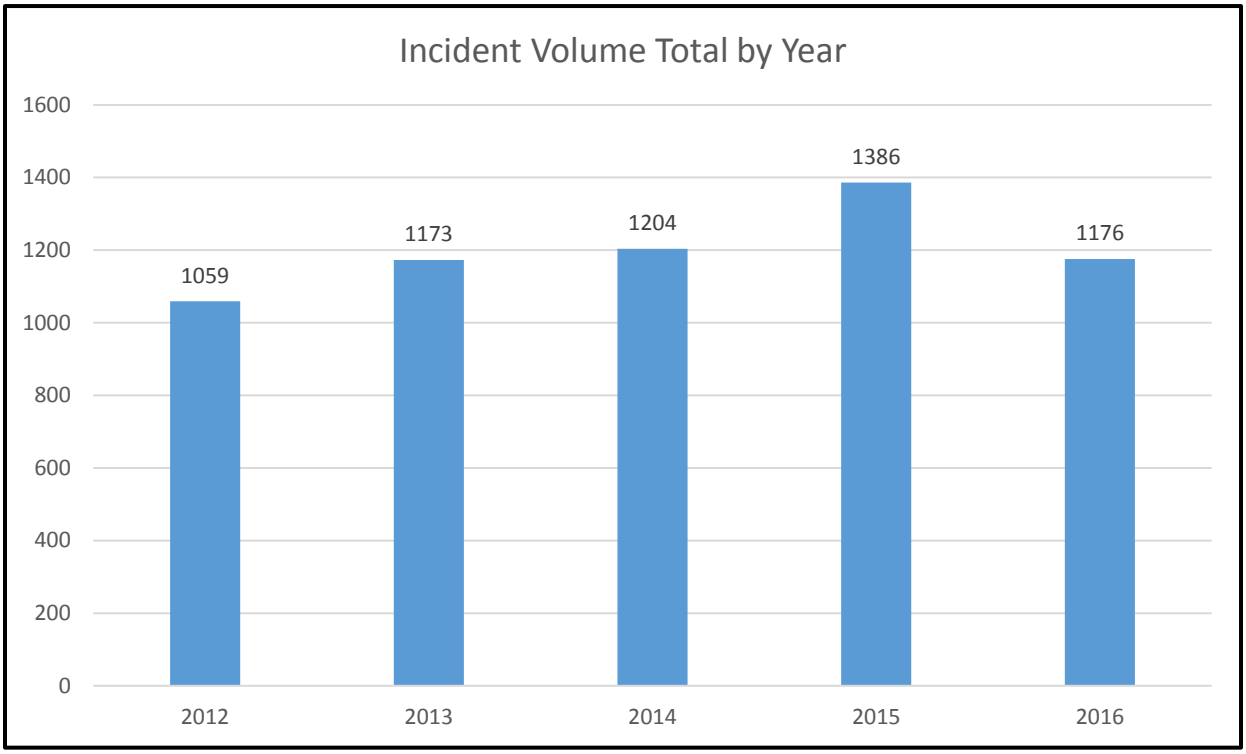


Figure 4.1: Incident Volume Totals by Years

The chart above displays the increase in incident volume until 2016 where there was a decline to 1176 total incidents. This decline is associated with the ending of a contract with the local tribal gaming facility known as the Snoqualmie Casino. The Snoqualmie Tribe contracted with the City for fire and EMS Services to their casino from 2006 through 2015. The Tribal Government ended the agreement with the City because of a strained relationship related to other city services. Historically, the department would respond to the casino approximately 230 times per year. The decrease in 2016 was 210 incidents and is in line with the loss of casino responses. It is speculated that incident volume will continue to increase until the City reaches its built-out-capacity. However, it is anticipated that incident volume will increase slower than past years due to slower managed growth.

Incident volumes by type have remained consistent. Similar to other contemporary Fire Departments, EMS makes up the majority of incidents for the organization. In 2016, EMS represented 63% of all incidents. The previous years have seen higher levels of EMS incidents (2012-68%, 2013-67%, 2014-66%, and 2015-66%). The percentage-changes

from 2015 to 2016 is a direct result of the loss of the tribal casino contract. The following chart compares incident volumes by type.

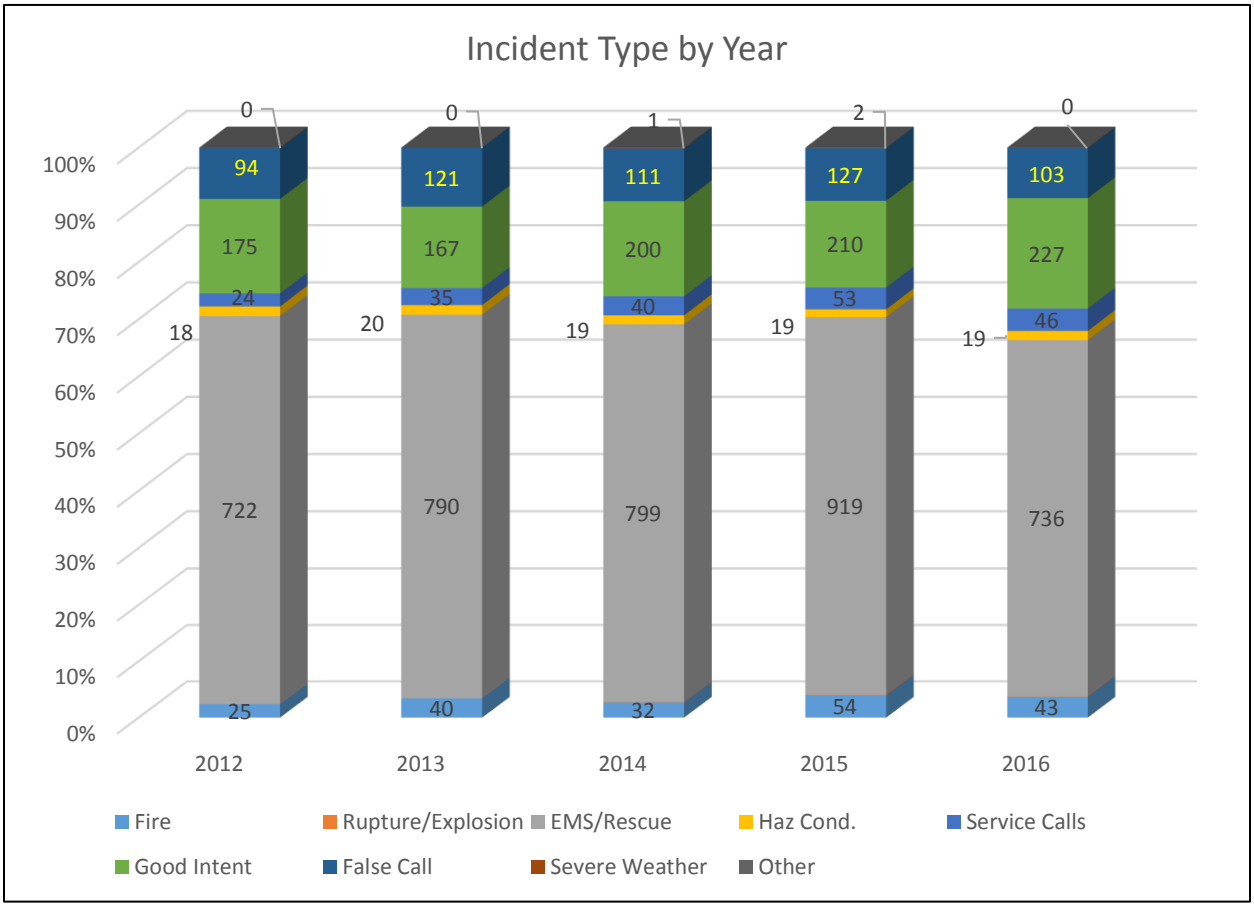


Figure 4.2 Incident Type by Year

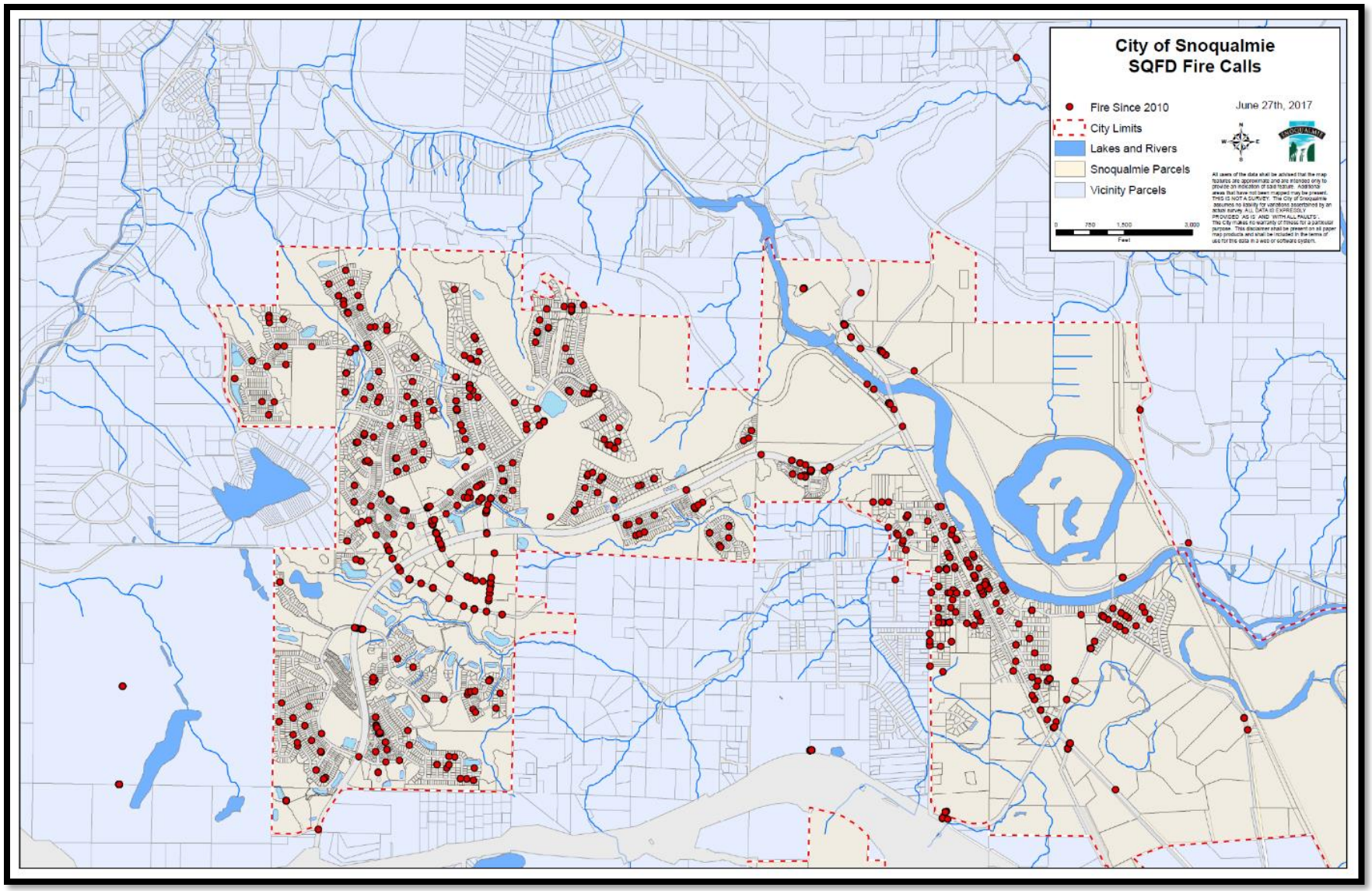
The following is the data table for the chart above:

	2012	2013	2014	2015	2016
Fire	25	40	32	54	43
Rupture/Explosion	0	0	1	2	1
EMS/Rescue	722	790	799	919	736
Haz Cond.	18	20	19	19	19
Service Calls	24	35	40	53	46
Good Intent	175	167	200	210	227
False Call	94	121	111	127	103
Severe Weather	1	0	1	0	1
Other	0	0	1	2	0
TOTAL	1059	1173	1204	1386	1176

To best measure probability, a deeper-dive was performed into the incident types listed earlier in this document. More specifically, incident types were broken into *Fire Suppression, EMS Response, Rescue Services, and Additional Services.* Because of data set sizes, some measurements used a single year of data. For incident types with fewer incidents multiple years' worth of data were collected to identify hot-spotting or areas where more incidents occur within a community. Additionally, all incident types were plotted to take a holistic view at incident totals. The following narrative and maps display this analysis:

4.3.1 Fire Suppression

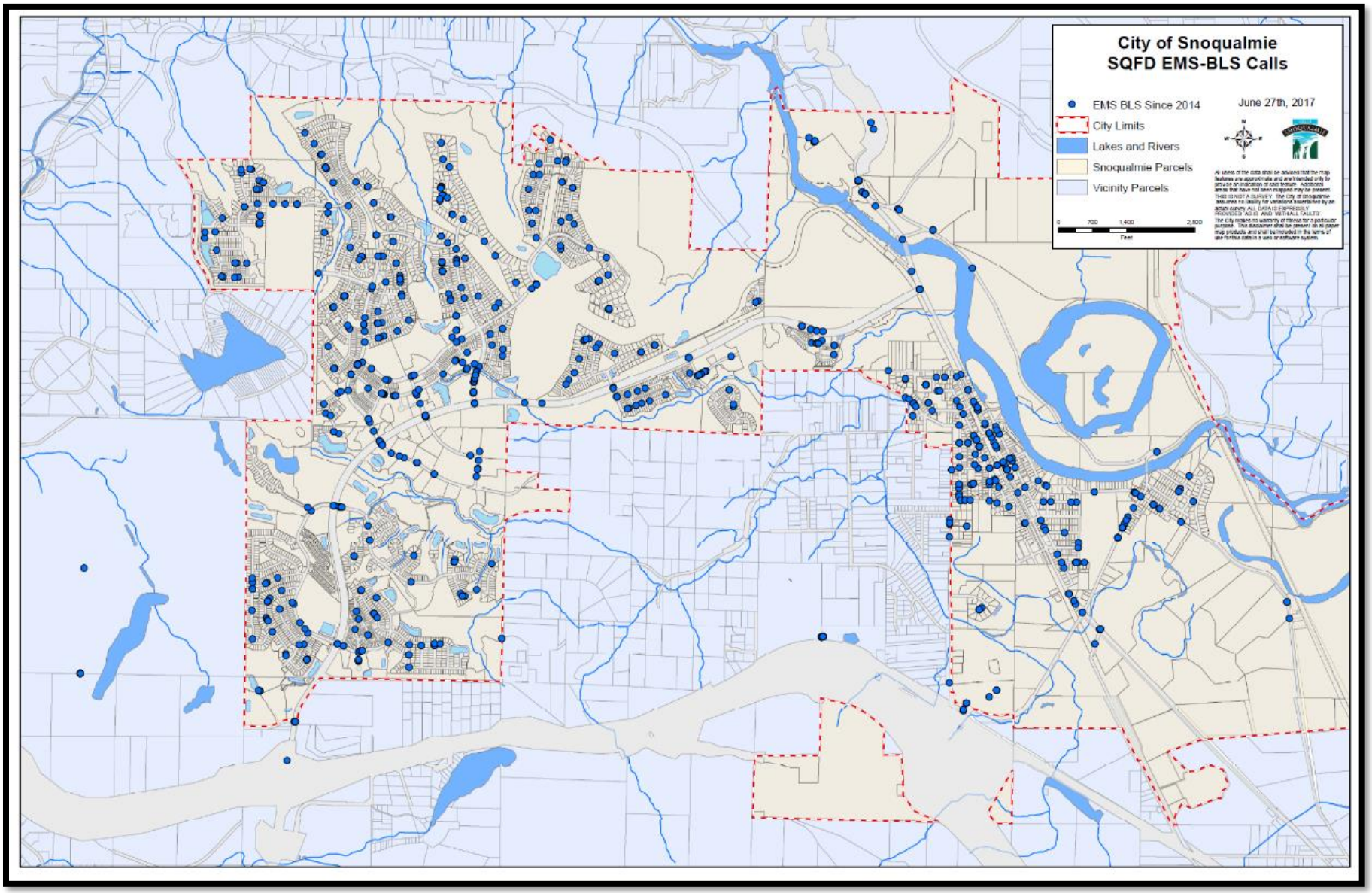
Fire incident types were plotted to look for fire-related trends. As mentioned earlier, because of low incident counts on an annual basis, multiple (six) years of data were used to look for trends or hot-spotting within the community. The following map displays fire related incident data plotted in red dots. One thing to highlight is the City of Snoqualmie has been one of the fastest growing communities in Washington State. Looking for trends throughout the City can be misleading because one area (historic downtown) may appear to have a high incident count where a different (newer) part may have a lower count. In fact, the map below could show a higher concentration on the east side while becoming sparser to the west. But, the development of the Ridge has been essentially in the middle of the western part of the City and then the southwestern part of the City. Keeping this in mind, a more accurate analysis of the fire map would be a diffuse spread of fire incidents across the community which would imply a similar or linear probability of fire threat across the entire city.



Map 4.3 Snoqualmie Fire Department Fire Calls Map

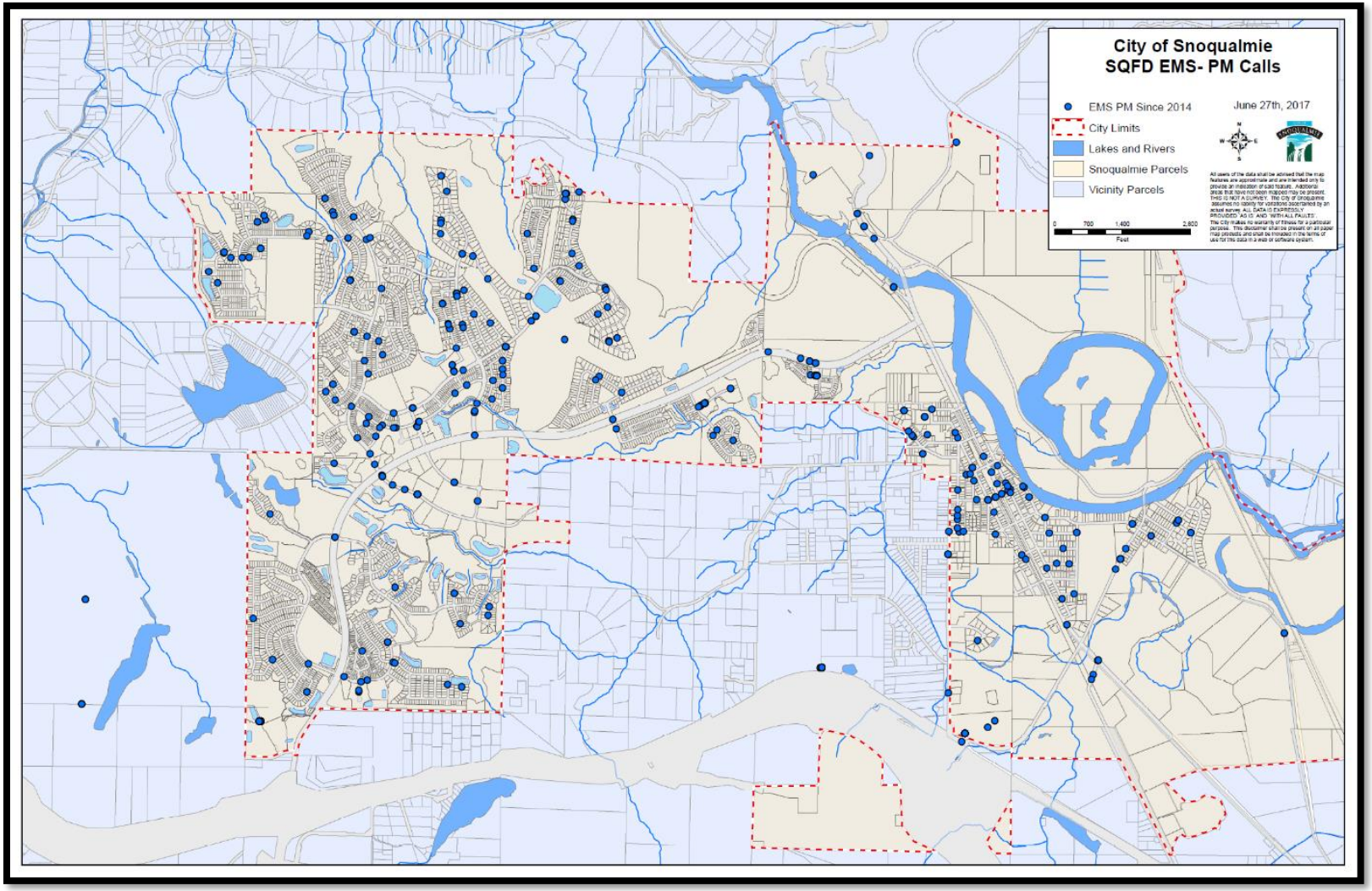
4.4 EMS Responses

For this analysis both basic life support (BLS) and ALS were analyzed separately. This action was done purposefully to look to EMS trends. As mentioned in the fire suppression section, a mindfulness of community growth was used when performing analysis. The following map utilizes two years' worth of incident data for all BLS responses within the City. And like the fire map, incidents occur in and around the City in a diffuse pattern with some hot-spotting in the historic downtown area.



Map 4.4 Snoqualmie Fire Department EMS-BLS Calls Map

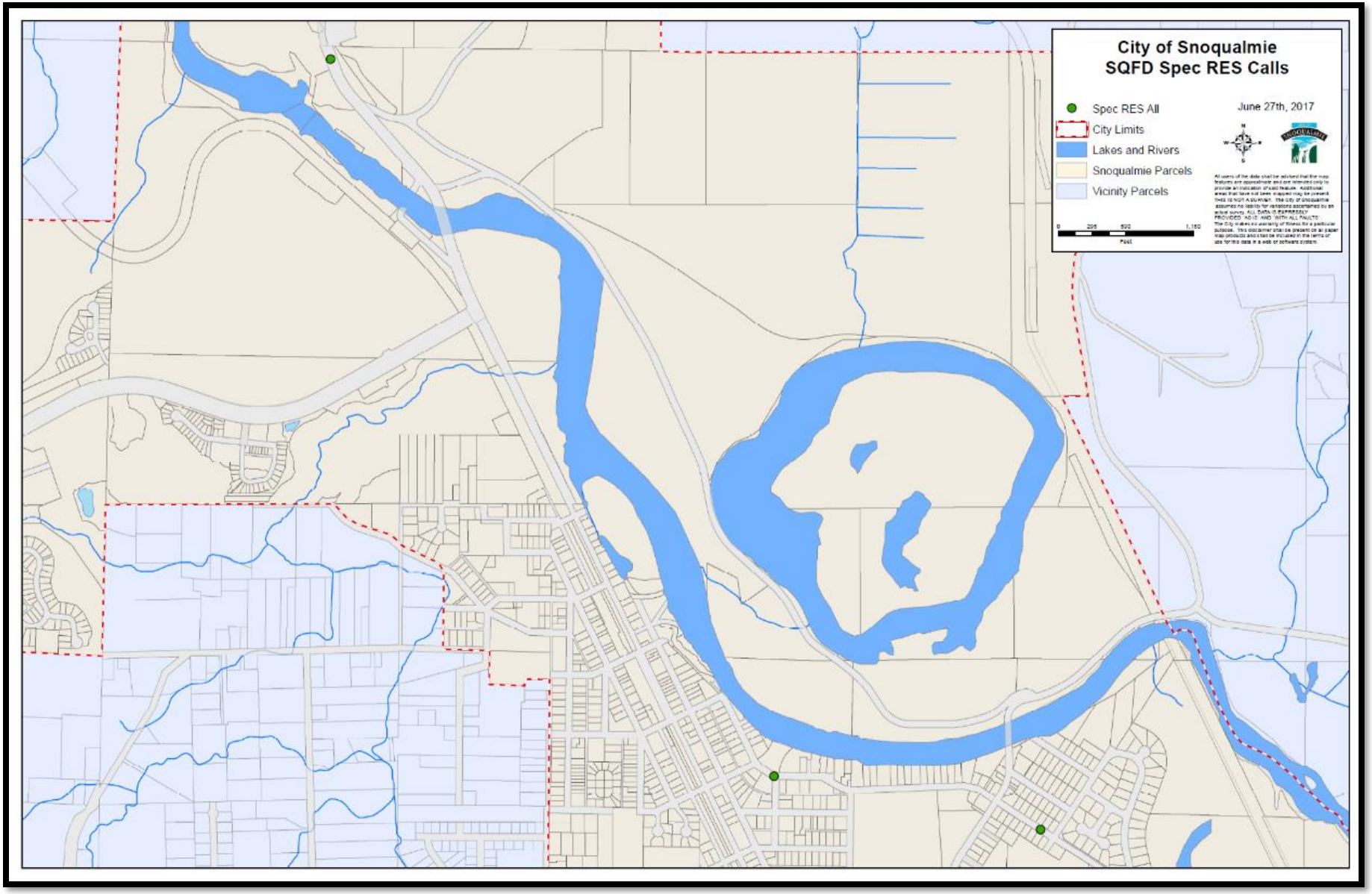
Advanced Life Support (ALS) incidents for the same period were plotted throughout the City. The following map displays ALS level incidents through the community without any apparent hot-spotting:



Map 4.5 Snoqualmie Fire Department EMS-PM Calls Map

4.5 EMS Rescue Services

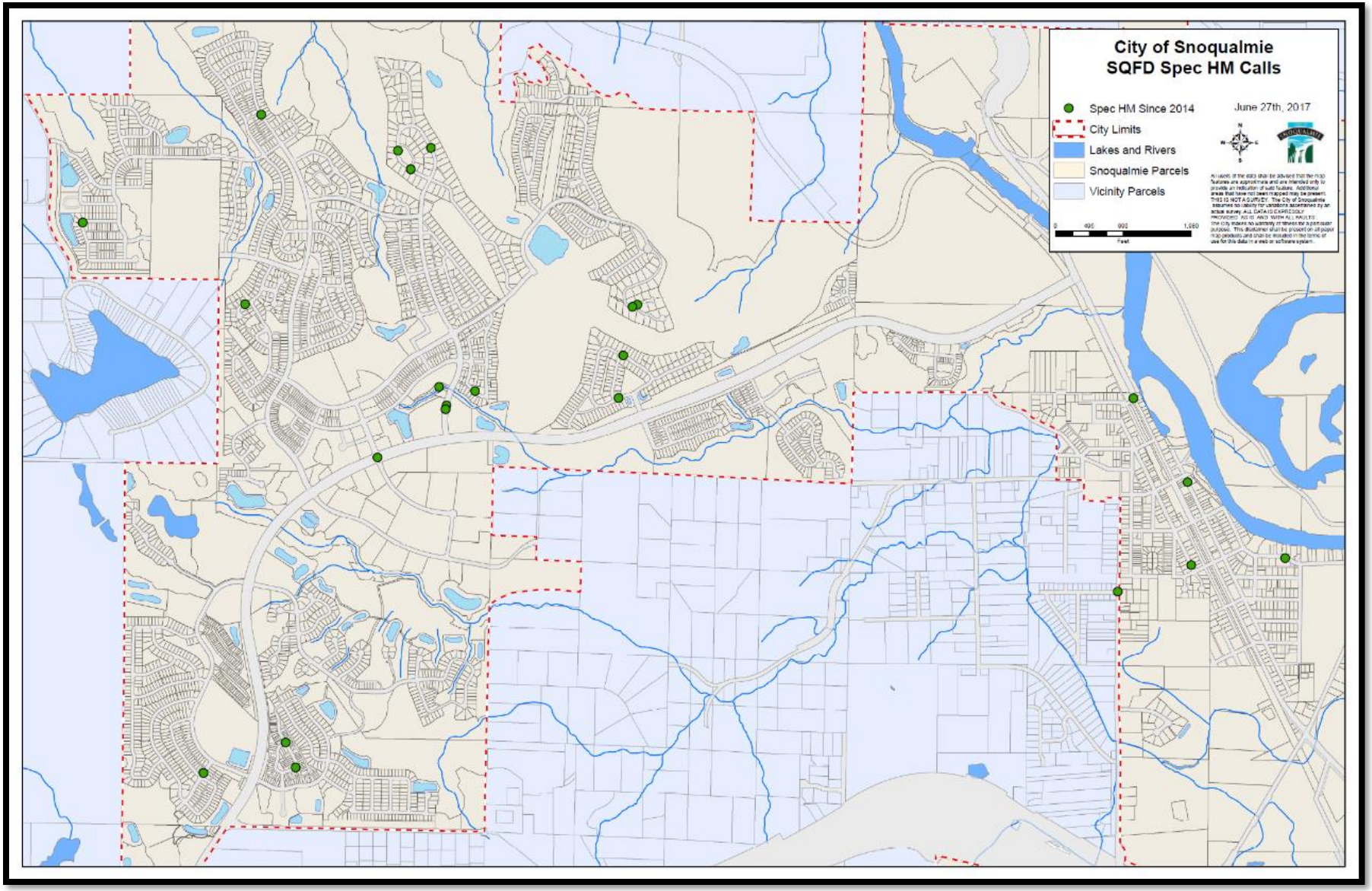
Swift water rescue events are the most common form of technical rescue responses for the department. One years' worth of data was plotted on the following map to display where on the river these incidents occur. GIS plotted these incidents in the middle of the roadway where the incident address was used. Access to the river can be found in many locations, and as shown below, swift water incidents can occur anywhere along the river.



Map 4.6 Snoqualmie Fire Department Specialized Rescue Calls Map

4.6 Additional Services

Hazardous incident types were plotted utilizing two years' worth of data. The Fire Department responds to very few of these types of incidents with many of them occurring in the homes. The probability of a hazmat incident occurring is very low, and the following map displays this in spatial format:

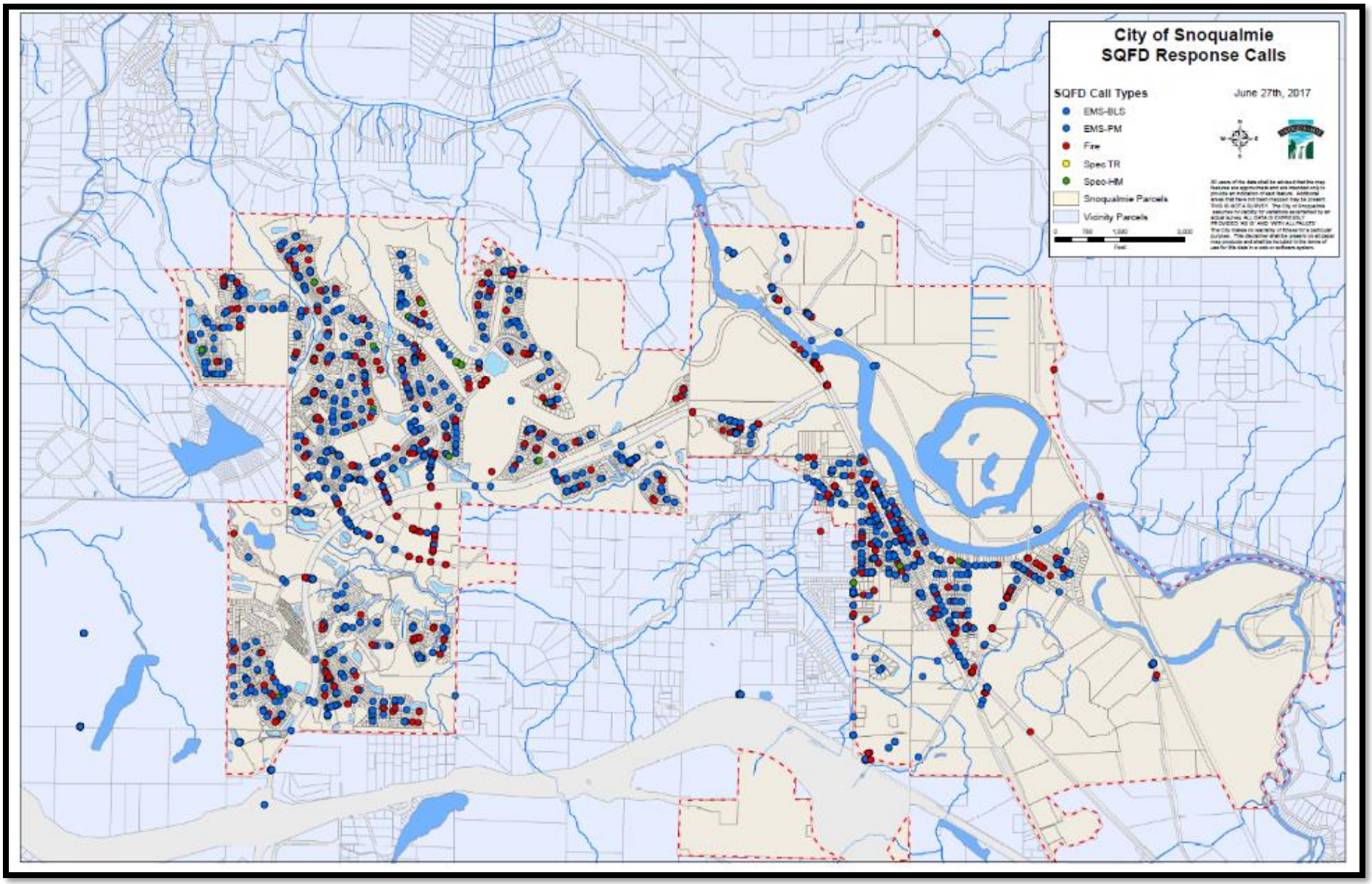


Map 4.7 Snoqualmie Fire Department Specialized Hazardous Materials Calls Map

4.7 All Incident Types

All incident types were plotted to look for hot-spotting trends in the City. The following map displays these incidents by color (red=fire, blue=EMS, green=hazmat and yellow=tech rescue). Incident volumes are dispersed throughout the city with more incidents occurring in higher risk areas. One issue to highlight about this map is parts of the community are newer and were un-populated when the maps were developed. To make a better comparison, future maps should be evaluated to affirm the probability of incidents are measured against the risk areas of the City to look for increased incident volumes or telling trends that need attention.

The following map displays all incident types:



Map 4.7 Snoqualmie Fire Department All Incident Types Map

SECTION 5: BENCHMARK AND BASELINE STANDARDS

Measuring time as a performance indicator has become one of the few measurements used by many fire service agencies in the modern world. More specifically, the time when someone completes the dialing of 911 on their phone to when a first alarm compliment of companies arrive on scene can be measured as a whole, or broken into multiple pieces to critically evaluate a response. Similarly, the actions taken by a Fire Department on emergency ground can be critically evaluated to determine the appropriate number of firefighters needed to affect the best outcome possible. The appropriate number of firefighters can vary depending on the tasks needing to be performed however, an agency can identify a standard set of tasks that will be performed on specific incident types.

The purpose of this section is to explain the critical tasks that are needed to mitigate structural firefighting, EMS, technical rescue, and additional services (hazmat) events. This will determine the appropriate minimum number of firefighters needed, and allow the department to build appropriate plans to send an effective response force based upon incident type. This section will also explain, evaluate, and compare the time-based measurements used by the Snoqualmie Fire Department and the agencies they rely on to assist them in response.

5.1 Effective Response Force

Effective response force is defined as *the minimum number of firefighters and equipment that must reach a specific emergency incident location within a maximum prescribed travel (driving) time*[12]. To determine effective force, each agency must evaluate an incident to determined specific tasks that must be performed to reach a desired outcome. In the fire service, approaches to mitigating an incident are standardized throughout the profession so determining these effective force levels is somewhat easy.

The Snoqualmie Fire Department participates in a regional response program that is guided by the King County Mutual Aid Agreement (KCMAA). The KCMAA defines how agencies exchange resources to support each other's needs, however does not define how and what resources are sent to a specific type of incident. Because the Snoqualmie Fire Department relies heavily on mutual aid at multi-unit responses, the historical practice has been to create identical response plans to the ones used by the neighboring agencies. With the creation of this document, adjustments will be made to the City's response plans to best support the needs of this unique community.

Response to specific risk levels is adjusted appropriately to establish an effective force on the emergency scene. For planning purposes, the following define the risk categories:

[12] Service Deployment: Assessing Community Risk Page 8

5.2 Fire Suppression

Fire Risk Response Levels			
Low Risk	Medium Risk	High Risk	Extreme Risk
Auto, Vegetation, dumpster, other single-engine-response	Outbuilding, Sprinkler water flow, High value Auto fire alarm	Single Family structural fire	Commercial and Multi-family structure fire, high value structure fire

The following tables explain the critical tasks that have been identified to determine effective response force on the incident type listed at the top of the table. Its important to highlight that the medium risk category was identical to the ERF in Low Risk before this document was created. After the community analysis was performed, an additional resource was added to the medium risk category. The following displays the ERF for each fire risk category:

LOW RISK FIRE	
TASK	STAFF COUNT
Incident Command / Safety	1
Fire Attack	1
Pump Operator / Water Supply	1
TOTAL	**3**

MEDIUM RISK FIRE	
TASK	STAFF COUNT
Investigation / Fire Attack / Tactical Command	2
Pump Operator / Water Supply	1
Back Up	2
Stand-pipe supply	1
TOTAL	**6**

HIGH RISK FIRE	
TASK	STAFF COUNT
Incident Command	1
Safety	1
Pump Operator	1
Water Supply	1
Fire Attack	2
Back up Team	2
Rapid Intervention Crew (RIC) / Soften Structure	3
Ventilation / Utilities	3

Search and Rescue (Primary)	3
TOTAL	**17**
EXTREME RISK FIRE	
TASK	STAFF COUNT
Incident Command	1
Safety	1
Pump Operator	1
Water Supply	1
Fire Attack	2
Back up Team	2
Rapid Intervention Crew (RIC) / Soften Structure	3
Ventilation	3
Search and Rescue (Primary)	3
TOTAL	**17**

The following table displays the Fire Department by risk category and associated response assets:

FIRE INCIDENT TYPE	ALARMS	RESOURCES	MINIMUM PERSONNEL
Low Risk Response	1	1-E	3
Medium Risk	1	2-E	6
High Risk Response	1	3-E, 1-L, 1-A or E, 1-MSO, 2-BC	17
	2	6-E, 2-L, 2-A or E, 2-MSO, 4-BC	34
	3	9-E, 3-L, 3-A or E, 2-MSO, 4-BC	48
Extreme Risk Response	1	3-E, 1-L, 1-A or E, 1-MSO, 2-BC	17
	2	6-E, 2-L, 2-A or E, 2-MSO, 4-BC	34
	3	9-E, 3-L, 3-A or E, 2-MSO, 4-BC	48

LEGEND

A = Aid Unit
BC = Battalion Chief
E = Engine
L = Ladder
M = Medic
MSO = Medical Services Officer

5.3 Emergency Medical Services Response

EMS incidents make up the supermajority of most contemporary Fire Departments. Snoqualmie is no different, and based upon 5 years of data, EMS incidents make up 65% of all responses. EMS incidents continue to increase over time and it is believed that this trend will continue. As mentioned earlier, the City is part of the King County EMS System. The County is currently evaluating the benefits of mobile integrated healthcare using community paramedics or nurses to combat high-system-utilizers. The City hopes to tap into these resources as the program expands in an effort to combat the rapid-rate-of-rise with EMS incidents.

5.3.1 EMS Resource Deployment

The following table provides a description of the deployment of resources to EMS incidents:

EMS Risk Response Levels			
Low Risk	Medium Risk	High Risk	Extreme Risk
BLS - Non-Code	BLS Code	ALS ALS Weapons MVC	Cardiac Arrest Cardiac Arrest-Weapons MVC-Medic MCI

The following tables explain the critical tasks that have been identified to determine effective response force on the EMS incident types:

LOW RISK EMS	
TASK	STAFF COUNT
Incident Command / Safety / Scribe	1
Patient assessment	1
Treatment	1
TOTAL	**3**

MEDIUM RISK EMS	
TASK	STAFF COUNT
Incident Command / Safety / Scribe	1
Patient Assessment	1
Treatment	1
TOTAL	**3**

HIGH RISK EMS-TRAUMA	
TASK	STAFF COUNT
Incident Command / Safety / Scribe	1
Patient Assessment	1
Treatment	1
ALS Evaluation / Assessment	1
ALS Treatment / Skills	1
TOTAL	**5**

HIGH RISK EMS-MVC	
TASK	STAFF COUNT
Incident Command / Safety	1
Patient Assessment	1
Treatment	1
Extrication (tools)	2
Blocking (Driver)	1
TOTAL	**6**

EXTREME RISK EMS	
TASK	STAFF COUNT
Incident Command / Safety / Scribe	1
Assessment	1
Treatment (Compressor)	1
Assessment (ALS)	1
Treatment (ALS)	1
Treatment Back-up (High Performance CPR)	3
TOTAL	**8**

EXTREME RISK EMS MVC	
TASK	STAFF COUNT
Incident Command / Safety /	1
Patient Assessment	1
Treatment	1
Assessment (ALS)	1
Treatment (ALS)	1
Extrication (tools)	2
Blocking (Driver)	1
Medical Group Sup.	1
Treatment back-up	3
TOTAL	**12**

EXTREME RISK EMS – MCI *	
TASK	STAFF COUNT
Incident Command	1
Safety	1
Medical Group Staff (Triage, Treatment, Transport, Morgue)	5
Treatment Area	2
Extrication / Patient Movement	2
MCI Support (Logistics supply)	1
TOTAL	**12**

**MCI response is adjusted according to King County MCI Plan as incident unfolds. The above tasks are initial assignments and additional resources would be dispatched as needed for the incident.*

The following table displays the Fire Department by risk category and associated response assets:

EMS INCIDENT TYPE	ALARMS	RESOURCES	MINIMUM PERSONNEL
Low Risk Response	1	1-A	3
Medium Risk	1	1-A	3
High Risk Response	ALS	1-A, 1-M	5
	ALS Weapons	1-A, 1-M	5
	MVC	1-E, 1-A	6
Extreme Risk Response	Car. Arrest / Car. Arr. Weapons	1-A, 1-M, 1-E	8
	MVC-Medic	2-E, 1-A, 1-M, BC, MSO	12
	MCI	2-E, 1-A, 1-M, MCI Unit, BC, MSO	12

LEGEND

A: Aid
BC: Battalion Chief
E: Engine
L: Ladder
M: Medic
MSO: Medical Services Officer
MCI: Regional response mass casualty incident supply unit

5.4 Rescue Services

The Snoqualmie Fire Department provides rescue services at both operations and technical level. One of the most predominant rescue services the City provides is Swift-Water rescue. The Snoqualmie River flows from the most eastern border to the most western border. The centerpiece of the river is a 268' water fall known as Snoqualmie Falls. This site is the second most visited tourist site in the state with over 1.5 million visitors per year. The falls viewing site has been identified as a target hazard as its location is on the rim of a very large and steep cavern where suicides occur at least once per year. This threat, and other steep terrain in the area has realized the need for technical-level training in rope rescue.

The river is also visited by many outdoor enthusiasts. Many people visit the site during the high-flow season to enjoy whitewater kayaking or stand-up paddle boarding. During the summer months when the river is at its lowest-flow, many visit the lower falls area to float the river to Fall City. Unfortunately, the activity is usually accompanied by alcohol and quite often these floaters get into trouble on the river requiring a call to 911 for assistance.

Swift-Water response is a very high-risk incident type to the personnel who respond. A Medal of Valor by policy is: *the highest award given by the Fire Department, reserved for those who put serviced before self, and take extreme risk to save a human life.* Two medal of valor awards have been given to Snoqualmie Firefighters and both were for swift-water events. For response planning purposes, the Department has identified these incident types as medium risk. This is because of the initial effective response force we send to these incidents. Over the next three years these events will be evaluated and appropriate adjustments will be made if needed.

The Department also responds to motor vehicle collisions that require the use of hydraulic rescue tools. Immediately outside the response jurisdiction is many rural roads and fire service roads, Interstate 90 (a 70 MPH freeway), and State Route Highway 18 (a bypass road that many tractor trailers use to travel from eastern Washington to the Tacoma area). These roads create many opportunities to use heavy rescue equipment; however, these roads are outside of the primary response area for the City.

Additionally, the City is trained to the operations level of response in trench rescue and confined space. Because of the lack of response for these disciplines, the City has chosen to only train to the operations level, but participate in the Zone 1 (regional) technical rescue response team. If an incident were to occur in one of these disciplines, the City would rely on a technical level of response from this regional resource centered out of the City of Bellevue.

Rescue Risk Response Levels			
Low Risk	Medium Risk	High Risk	Extreme Risk
Rescue – Minor Rescue -- Trail	Rescue Rope Rescue Swift-water (Initial Response)	MVC Rescue	Rescue Technical (Trench, Confined Space, USAR, Rope, Swiftwater)

LOW RISK RESCUE	
TASK	STAFF COUNT
Incident Command / Safety	1
Rescue Assessment	1
Rescue Back-up	1
Rescue Support	3
TOTAL	**6**

MEDIUM RISK RESCUE	
TASK	STAFF COUNT
Incident Command/Safety	1
Size-up / Assessment	2
Initial access / intervention	3
EMS Treatment/Transport	2
TOTAL	**8**

HIGH RISK RESCUE	
TASK	STAFF COUNT
Tactical IC / Safety	1
Patient Assessment (Initial)	1
Treatment (Initial)	1
Patient Assessment (ALS)	1
Patient Assessment (ALS)	1
Extrication (tools)	2
Blocking (Driver)	1
Medical Group Sup.	1
Treatment back-up	3
TOTAL	**12**

EXTREME RISK RESCUE	
TASK	STAFF COUNT
Incident Command/ Safety	1
Size-up / Assessment	1
Initial access / intervention	2
Rescue Systems (Technical)	3
Rescue Back-up (Technical)	3
Rescue Support (Technical)	3
TOTAL	**13**

The following table displays the Fire Department by risk category and associated response assets

EMS INCIDENT TYPE	ALARMS	RESOURCES	MINIMUM PERSONNEL
Low Risk Response	Rescue Minor	2-E	6
Medium Risk	MVC Rescue	2-E, 1-A, 1-M, 1-BC,	12
High Risk Response	Rescue Swiftwater	2-E, 1-A, BC	9
Extreme Risk Response	Rescue Technical*	3-E, 1-LF (Bellevue), 1-BC	13

** Rescue Technical includes confined space, machinery, structural collapse, trench, and surface water.*

LEGEND
A = Aid
BC = Battalion Chief
E = Engine
L = Ladder
M = Medic
MSO = Medical Services Officer
LF (Bellevue) = Light Force; Equipped with rescue capabilities

5.5 Additional Services

The City participates in the regional hazmat consortium as a voting member. This action allows access in the technical level hazardous materials response program. By policy, the Department trains its members to the hazmat operations levels as a minimum. In 2015, the City hired a firefighter from a large local fire brigade who was trained to the technician level. The Fire Department has supported this firefighter's training

requirements to maintain this level of certification. This person is identified as the department's technical expert in hazmat, develops procedures, provides training, and is a response member on the regional response team.

5.5.1 Additional Services Resource Deployment

The following table provides a description of the deployment of resources to additional-service-type incidents:

HazMat Risk Response Levels			
Low Risk	Medium Risk	High Risk	Extreme Risk
Haz (local Alarm)	Hazmat (hazardous substance)	Haz-Aid (local alarm with symptomology)	Confirmed Hazmat (hazardous substance) Full Response

LOW RISK HAZMAT	
TASK	STAFF COUNT
Incident Command / Safety	1
Size-up, recon	1
Air Monitoring	1
TOTAL	**3**

MEDIUM RISK HAZMAT	
TASK	STAFF COUNT
Incident Command / Safety	1
Size-up, recon	1
Air Monitoring	1
TOTAL	**3**

HIGH RISK HAZMAT	
TASK	STAFF COUNT
Incident Command / Safety	1
Size-up, recon	1
Air Monitoring	1
Patient Assessment	1
Treatment	1
TOTAL	**5**

EXTREME RISK HAZMAT	
TASK	STAFF COUNT
Incident Command / Scene Safety	1
Size-up / Assessment / Deny Entry	1
Initial access / intervention / Rescue	2
Site Safety	1
Medical Monitoring	1
Hazmat Chem. ID / Research (Technical)	2
Hazmat Entry (Technical)	2
Hazmat Stand-by (Technical)	2
TOTAL	**12**

The following table displays the Fire Department by risk category and associated response assets

EMS INCIDENT TYPE	ALARMS	RESOURCES	MINIMUM PERSONNEL
Low Risk Response	Haz-Alarm	1-E	3
Medium Risk	Haz (Substance)	1-E	3
High Risk Response	Haz Aid	1-E, 1-A	5
Extreme Risk Response	Haz Technical (Confirmed)	3-E, 1-HM (Bellevue), 1-BC, Haz Group Tone	12

** Rescue Technical includes confined space, machinery, structural collapse, trench, and surface water.*

LEGEND
A = Aid
BC = Battalion Chief
E = Engine
HM = Regional technician level hazmat unit
Haz Group = Notification to all available hazmat technicians within the Zone

5.6 Time Based Performance Measures

A response to an emergency has many elements. From the incident occurring to the incident being stabilized (or even returned to the property owner), each segment can be sectioned off to create measurable objectives. This is especially important when some elements of a response can be controlled in an effort to improve the overall response to an incident. The following diagram displays elements of a response, and areas where controls can occur:

<table>
<tr><td rowspan="4">EVENT OCCURS</td><td></td><td colspan="3">Controllable Time</td><td></td><td colspan="2">Controllable Time</td><td rowspan="4">Incident Under Control</td></tr>
<tr><td></td><td colspan="2">DISPATCH REACTION TIME</td><td>TURNOUT TIME</td><td>DRIVE TIME</td><td colspan="2">SCENE SET UP</td></tr>
<tr><td>911 called</td><td>Received at PSAP</td><td>Interrogation</td><td>Dispatched</td><td>Units Enroute</td><td>1st Unit Arrived</td><td>Effective Force arrives</td></tr>
<tr><td colspan="7">TIME</td></tr>
</table>

Critical evaluation can occur in both areas of the controllable times, to affirm the most efficient actions are being taken to reduce the overall time within an event. For elements early in the event, seconds can be removed through cultural shifts within an organization and technological fixes. The Snoqualmie Fire Department worked closely with its dispatch agency to affirm they are providing the most efficient services. The Department has also worked internally on technological and cultural shifts to improve turnout time. Additionally, efforts have been made through training to improve incident scene times. More focus on incident scene times will occur in the coming years.

Substitute House Bill 1756 was approved by the Washington Legislature in 2005, and codified (for cities) into Revised Code of Washington (RCW) 35.103. This RCW established definitions for response standards, and required predominantly career Fire Departments to establish performance objectives, adopt standards, and report them to the public on an annual basis. It also required that the measurements be established at a 90 percentile. Built from the Center for Public Safety Excellence Standards of Coverage model, and designed to reach NFPA 1710 staffing goals this was the State's first attempt at creating a uniform reporting standard for the public to measure its fire department's response to specific incidents.

In 2014, the City of Snoqualmie adopted its first standard of coverage and reports the adopted standard, a comparison to the previous year, the impacts associated if a standard is not met, and what the organization is doing to meet these standards.

RCW 35.103.030 identifies the following response elements for measurement standards:

- Turnout time
- Response time for arrival of the first arriving engine company at a fire suppression incident
- Response time for the deployment of a full first alarm assignment to a fire suppression event
- Response time for arrival of a unit with a first responder or higher to an EMS event
- Response time for arrival of an advanced life support unit at an EMS event (when provided by the Fire Department)

To comply with RCW 35.103 the Snoqualmie City adopted the following standard for the criterion listed above:

35.103.030 DEFINITION	ADOPTED 90% STANDARD
Turnout Time (alarm time to responding time)	1:30 (90 Sec)
Response time 1st engine (responding time to arrival time)	6:30
Response time Effective Force 1st alarm assignment to a fire event (responding time to arrival time)	17:45
Response time EMS unit (BLS) (responding time to arrival time)	6:30
Response time EMS Unit (ALS) (responding time to arrival time)	12:00*

**ALS response is provided by the Bellevue Fire Department and funded through a countywide EMS levy. The adopted standard is established by King County EMS. The Snoqualmie Fire Department is not required to report this standard, but chooses to as a best practice for its residents.*

Similar to the ALS resource measurement above, the Fire Department is not required to measure special operation incident types, but has adopted a *first arriving* and *effective force assembly* for both hazmat and technical rescue incidents.

The city participates in a regional dispatch consortium known as Northeast King County Regional Pubic Safety Communications (NORCOM). Monthly and annually, NOCROM provides dispatching statistics to their partner agencies. The organization has identified NFPA 1221, Standards for Installation, Maintenance, and Use of Emergency Services Communications Systems (version 2010) as their adopted performance measurement.

For call receipt and transmitting, the dispatch agency strives to dispatch incidents within 1:30 minutes 99% of the time, and 1:00 minute 90% of the time. Data is provided monthly and annually to agencies through the agency's monthly and annual report. The following displays a historical perspective of NORCOM's performance related to this standard:

% of Fire/EMS Calls under 90 Seconds Call Received to Dispatched
(NFPA 2010 - NORCOM Standard = 99%)

MONTH	GOAL	2013	2014	2015	2016
January	99%	96%	97%	97%	95%
February	99%	95%	97%	97%	96%
March	99%	96%	97%	97%	95%
April	99%	96%	97%	97%	95%
May	99%	95%	96%	97%	95%
June	99%	95%	96%	97%	94%
July	99%	95%	96%	97%	95%
August	99%	96%	96%	96%	96%
September	99%	96%	96%	97%	96%
October	99%	95%	97%	96%	96%
November	99%	96%	97%	96%	96%
December	99%	97%	97%	95%	95%
Average	-----	96%	97%	97%	95%

% of Fire/EMS Calls under 60 Seconds Call Received to Dispatched
(NFPA 2010 - NORCOM Standard = 90%)

MONTH	GOAL	2013	2014	2015	2016
January	90%	88%	89%	91%	84%
February	90%	87%	88%	91%	84%
March	90%	88%	90%	90%	85%
April	90%	87%	89%	90%	83%
May	90%	87%	88%	90%	84%
June	90%	86%	87%	88%	83%
July	90%	87%	87%	89%	83%
August	90%	88%	88%	85%	86%
September	90%	88%	89%	89%	87%
October	90%	87%	88%	86%	87%
November	90%	88%	90%	87%	87%
December	90%	89%	89%	86%	87%
Average	-----	88%	89%	88%	85%

Source: 2016 NORCOM Annual Report

The Snoqualmie Fire Department has an electronic records management system that collects incident response data. The time interval data is connected to the computer aided

dispatch system through an interface. This connection electronically transfers interval data to prevent re-entering of information (and for creating a more accurate data set). This information is used when creating response interval reports like the annual report.

The Fire Department also has a dashboard that is displayed in the station's work area. This dashboard provides real-time information on fire department performance for incidents that occur within the City. More specifically, the board shows the call breakdown by shift, turnout time (90th percentile), incident types, and historical drive time (average) for incidents occurring within the City. Keeping this information in front of the crews is designed to improve performance. This has proven positive as turnout times have improved each year since 2015. The following is a snapshot of the SFD Performance Dashboard:

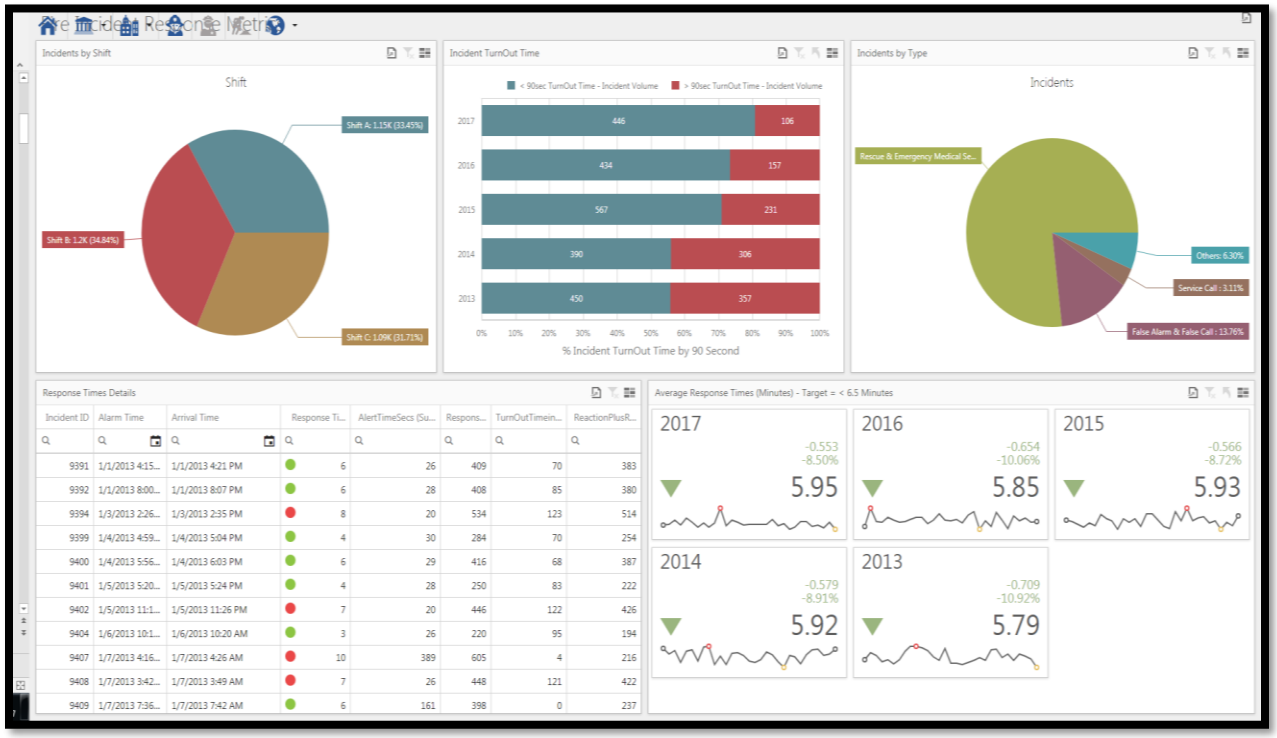


Figure 5.1: Snoqualmie Fire Department Dashboard

The Department also publishes an annual report with interval measurements that is compliant with RCW 35.103 (See previous page). These standards are not codified measurements, rather targets or goals the department uses to improve performance.

For accreditation purposes, the department data was broken out by each year and analyzed by incident type and risk category. Because of incident type / response plan overlap, some risk categories were combined for this report. An example of this is the Fire low risk and medium risk analysis. Currently, the Snoqualmie Fire sends a single-engine-response to both of these risk types. In 2018 and because of the Department's risk analysis, the Department began sending two engines to medium risk incidents and will break these categories out for the next report.

5.6.1 Fire Suppression

(Low/Medium Risk) Fire Suppression - 90th Percentile Times - Baseline Performance			2013-2017	2017	2016	2015	2014	2013
Alarm Handling	Pick-up to Dispatch	Suburban	1:45	1:27	1:39	2:07	1:31	2:01
Turnout Time	Turnout Time 1st Unit	Suburban	2:10	1:58	2:13	2:10	2:20	2:12
Travel Time	Travel Time 1st Unit **Distribution**	Suburban	7:22	7:28	8:50	7:36	6:56	6:04
	Travel Time ERF **Concentration**	Suburban	7:22	7:28	8:50	7:36	6:56	6:03
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Suburban	9:43	10:04	11:11	8:57	9:22	9:05
			n=1029	n=201	n=229	n=215	n=188	n=196
	Total Response Time ERF **Concentration**	Suburban	9:43	10:04	11:11	8:57	9:22	9:05
			n=1029	n=201	n=229	n=215	n=188	n=196

Figure 5.2: Low/Medium Risk Fire Suppression – 90th Percentile Times Baseline Performance

(High/Extreme Risk) Fire Suppression - 90th Percentile Times - Baseline Performance			2013-2017	2017	2016	2015	2014	2013
Alarm Handling	Pick-up to Dispatch	Suburban	1:06	0:48	1:10	1:26	0:51	1:15
Turnout Time	Turnout Time 1st Unit	Suburban	2:08	1:52	2:05	2:10	2:21	2:12
Travel Time	Travel Time 1st Unit **Distribution**	Suburban	4:30	3:02	2:26	4:48	4:22	7:56
	Travel Time ERF **Concentration**	Suburban	16:50	27:30	NRI	NRI	13:38	22:45
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Suburban	7:04	5:41	5:16	7:36	7:42	9:05
			n=13	n=3	n=1	n=2	n=5	n=2
	Total Response Time ERF **Concentration**	Suburban	15:49	43:48	NRI	NRI	22:45	0:00
			n=3	n=1	n=0	n=0	n=1	n=1

Figure 5.3: High/Extreme Risk Fire Suppression – 90th Percentile Times Baseline Performance

5.6.2 Emergency Medical Services

(Low/Med) EMS - 90th Percentile Times - Baseline Performance			2013-2017	2017	2016	2015	2014	2013
Alarm Handling	Pick-up to Dispatch	Suburban	1:35	1:07	2:17	1:58	1:34	1:03
Turnout Time	Turnout Time 1st Unit	Suburban	1:55	1:31	1:55	1:56	2:05	2:08
Travel Time	Travel Time 1st Unit **Distribution**	Suburban	6:38	6:40	7:26	7:07	6:15	5:42
	Travel Time ERF **Concentration**	Suburban	6:41	6:40	7:26	7:07	6:15	6:01
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Suburban	9:03	8:43	10:37	9:13	8:16	8:28
			n=3885	n=839	n=914	n=753	n=782	n=597
	Total Response Time ERF **Concentration**	Suburban	9:03	8:43	10:37	9:13	8:16	8:28
			n=3885	n=839	n=914	n=753	n=782	n=597

Figure 5.4: Low/Medium Risk EMS – 90th Percentile Times Baseline Performance

(High) EMS - 90th Percentile Times - Baseline Performance			2013-2017	2017	2016	2015	2014	2013
Alarm Handling	Pick-up to Dispatch	Suburban	2:19	2:13	2:14	2:37	2:11	2:20
Turnout Time	Turnout Time 1st Unit	Suburban	2:06	2:00	2:23	1:57	2:05	2:08
Travel Time	Travel Time 1st Unit **Distribution**	Suburban	6:38	6:40	7:26	7:07	6:15	5:42
	Travel Time ERF **Concentration**	Suburban	12:33	12:22	12:46	13:01	12:45	11:52
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Suburban	9:03	8:43	10:37	9:13	8:16	8:28
			n=634	n=141	n=91	n=138	n=130	n=134
	Total Response Time ERF **Concentration**	Suburban	16:21	16:12	15:25	17:38	16:10	16:23
			n=551	n=80	n=80	n=138	n=119	n=134

Figure 5.5: High Risk EMS – 90th Percentile Times Baseline Performance

5.6.3 Other Services

5.6.3.1 Rescue Services

During this reporting period the Department had not reportable low risk or extreme risk rescue incidents. From 2013 through 2017 the Fire Department responded to a total of three (3) medium risk technical rescue events. Three years (2013, 2014, and 2016) of the five years of analysis had no reportable incidents, with the highest year (2017) reporting two incidents.

(Medium Risk) Rescue- 90th Percentile Times - Baseline Performance			2013-2017	2017	2016	2015	2014	2013
Alarm Handling	Pick-up to Dispatch	Suburban	2:00	1:32	NRI	2:28	NRI	NRI
Turnout Time	Turnout Time 1st Unit	Suburban	1:25	0:54	NRI	1:57	NRI	NRI
Travel Time	Travel Time 1st Unit **Distribution**	Suburban	6:02	7:14	NRI	4:51	NRI	NRI
	Travel Time ERF **Concentration**	Suburban	7:54	8:13	NRI	7:36	NRI	NRI
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Suburban	9:42	8:13	NRI	11:12	NRI	NRI
			n=3	n=2	n=0	n=1	n=0	n=0
	Total Response Time ERF **Concentration**	Suburban	8:59	8:59	NRI	NRI	NRI	NRI
			n=1	n=1	n=0	n=0	n=0	n=0

Figure 5.6: Medium Risk Rescue – 90th Percentile Times Baseline Performance

5.6.4 *Hazardous Materials*

During this reporting period the department had no high risk or extreme risk hazardous materials incidents. The following charts break out the low risk incidents and medium risk incidents. As you can see by the sample size, hazardous materials is a very low occurring incident type within the City. Because of the threats located outside the City and training requirements, the department has adopted an Operations Level response. This level of training is appropriate for the threats found in the City and region.

(Low) Other-Hazardous Materials - 90th Percentile Times - Baseline Performance			2013-2017	2017	2016	2015	2014	2013
Alarm Handling	Pick-up to Dispatch	Suburban	0:54	0:59	1:16	0:37	1:01	0:37
Turnout Time	Turnout Time 1st Unit	Suburban	1:54	1:29	1:37	1:46	2:02	2:40
Travel Time	Travel Time 1st Unit **Distribution**	Suburban	7:03	4:45	7:31	11:42	6:45	4:33
	Travel Time ERF **Concentration**	Suburban	7:13	4:50	8:19	11:42	6:45	4:33
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Suburban	8:50	8:32	7:03	13:50	7:16	7:29
			n=30	n=6	n=4	n=5	n=12	n=3
	Total Response Time ERF **Concentration**	Suburban	10:09	11:53	10:21	13:50	7:16	7:29
			n=24	n=3	n=1	n=5	n=12	n=3

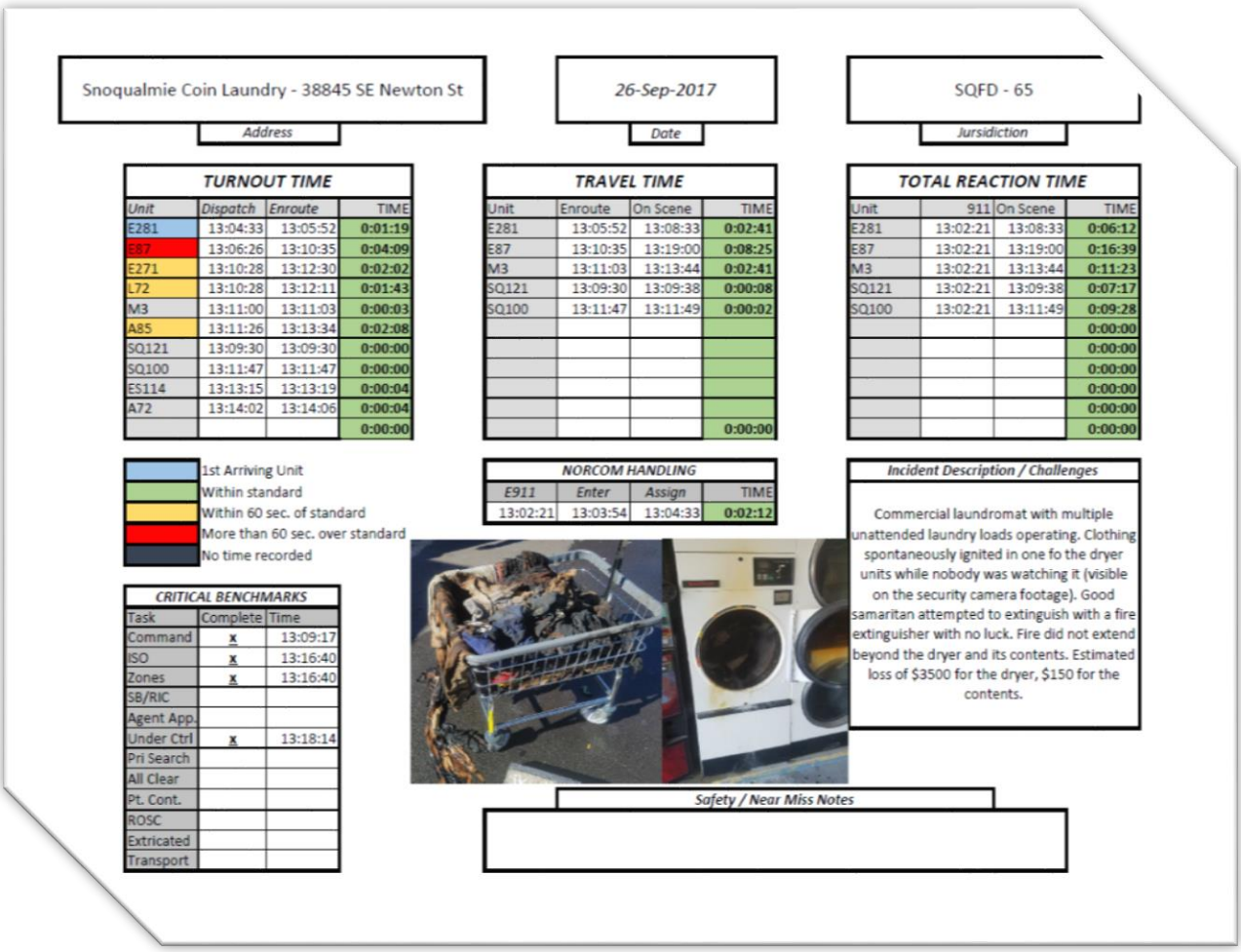
Figure 5.7: Low Risk Other Hazardous Materials – 90th Percentile Times Baseline Performance

(Med) Other-Hazardous Materials - 90th Percentile Times - Baseline Performance			2013-2017	2017	2016	2015	2014	2013
Alarm Handling	Pick-up to Dispatch	Suburban	0:37	0:57	0:00	0:54	NRI	NRI
Turnout Time	Turnout Time 1st Unit	Suburban	1:12	0:43	0:01	2:53	NRI	NRI
Travel Time	Travel Time 1st Unit **Distribution**	Suburban	2:34	2:05	3:07	2:32	NRI	NRI
	Travel Time ERF **Concentration**	Suburban	3:10	NRI	3:07	3:13	NRI	NRI
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Suburban	4:58	6:34	3:07	5:14	NRI	NRI
			n=3	n=1	n=1	n=1	n=0	n=0
	Total Response Time ERF **Concentration**	Suburban	4:37	NRI	3:07	6:07	NRI	NRI
			n=2	n=0	n=1	n=1	n=0	n=0

Figure 5.8: Medium Risk Other Hazardous Materials – 90th Percentile Times Baseline Performance

5.6.5 Other Reporting

On an ongoing basis, the Snoqualmie Fire Department also monitors the effective response force for significant incidents. After each significant incident, responding officers complete a Significant Incident Report Form that highlights specific performance indicators of the incident. This snap-shot allows for easy monitoring of performance on incidents. These forms are reviewed and critically evaluated at the Department's monthly officers meeting where operational changes may be made. The following is an example of a completed Significant Incident Form:



Snoqualmie Coin Laundry - 38845 SE Newton St

Address

26-Sep-2017

Date

SQFD - 65

Jursidiction

TURNOUT TIME

Unit	Dispatch	Enroute	TIME
E281	13:04:33	13:05:52	0:01:19
E87	13:06:26	13:10:35	0:04:09
E271	13:10:28	13:12:30	0:02:02
L72	13:10:28	13:12:11	0:01:43
M3	13:11:00	13:11:03	0:00:03
A85	13:11:26	13:13:34	0:02:08
SQ121	13:09:30	13:09:30	0:00:00
SQ100	13:11:47	13:11:47	0:00:00
ES114	13:13:15	13:13:19	0:00:04
A72	13:14:02	13:14:06	0:00:04
			0:00:00

TRAVEL TIME

Unit	Enroute	On Scene	TIME
E281	13:05:52	13:08:33	0:02:41
E87	13:10:35	13:19:00	0:08:25
M3	13:11:03	13:13:44	0:02:41
SQ121	13:09:30	13:09:38	0:00:08
SQ100	13:11:47	13:11:49	0:00:02
			0:00:00

TOTAL REACTION TIME

Unit	911	On Scene	TIME
E281	13:02:21	13:08:33	0:06:12
E87	13:02:21	13:19:00	0:16:39
M3	13:02:21	13:13:44	0:11:23
SQ121	13:02:21	13:09:38	0:07:17
SQ100	13:02:21	13:11:49	0:09:28
			0:00:00
			0:00:00
			0:00:00
			0:00:00
			0:00:00
			0:00:00

1st Arriving Unit
Within standard
Within 60 sec. of standard
More than 60 sec. over standard
No time recorded

NORCOM HANDLING

E911	Enter	Assign	TIME
13:02:21	13:03:54	13:04:33	0:02:12

Incident Description / Challenges

Commercial laundromat with multiple unattended laundry loads operating. Clothing spontaneously ignited in one fo the dryer units while nobody was watching it (visible on the security camera footage). Good samaritan attempted to extinguish with a fire extinguisher with no luck. Fire did not extend beyond the dryer and its contents. Estimated loss of $3500 for the dryer, $150 for the contents.

CRITICAL BENCHMARKS

Task	Complete	Time
Command	x	13:09:17
ISO	x	13:16:40
Zones	x	13:16:40
SB/RIC		
Agent App.		
Under Ctrl	x	13:18:14
Pri Search		
All Clear		
Pt. Cont.		
ROSC		
Extricated		
Transport		

Safety / Near Miss Notes

Figure 5.9: Significant Incident Form

Ongoing evaluation of incident trends and performance measurements is paramount to affirm quality of service is met and demands for service is not trending in a direction that is not sustainable. Critical and strategic evaluation is required to stay ahead of a changing environment. Annually, and as part of the 35.103 report, the department produces turnout time and drive times to look for these trends. Additionally, every three years this document will be updated with chronological appropriate information. Additional benchmarks will be added as needed to determine service levels.

The remainder of this document are appendices for charts and other supporting data.

APPENDIX A: GEOCODE POPULATION PER ACRE COUNT

GEOCODE	PopPerAc	Score
6635	12.85185	4.0
6537	11.48428	4.0
6535	11.22222	4.0
0450	9.22857	3.0
7036	6.75294	3.0
6534	6.20988	3.0
6637	5.90625	3.0
6733	5.81250	3.0
6634	5.41463	3.0
6536	4.96951	2.0
6835	4.96226	2.0
6734	4.78125	2.0
6533	3.32143	2.0
6735	3.07500	2.0
6935	3.03797	2.0
7136	2.90741	2.0
7035	2.42857	2.0
7236	1.25000	2.0
6636	0.92025	1.0
7037	0.76829	1.0
6633	0.75000	1.0
6834	0.58879	1.0
7137	0.43636	1.0
6538	0.00000	1.0
6934	0.00000	1.0
7038	0.00000	1.0
6736	0.00000	1.0
7034	0.00000	1.0
7033	0.00000	1.0
7337	0.00000	1.0
6933	0.00000	1.0
7336	0.00000	1.0
7237	0.00000	1.0
7134	0.00000	1.0
7138	0.00000	1.0
7436	0.00000	1.0
7234	0.00000	1.0
7338	0.00000	1.0
7437	0.00000	1.0
7235	0.00000	1.0
7135	0.00000	1.0
	< 1.0	
	1.0001-5.0	
	5.0001-10.0	
	> 10.0001	

APPENDIX B: GEOCODE ASSESSED VALUE PER ACRE COUNT

GEOCODE	ValPerAc	Score
6635	2068438.88889	4.0
6537	1889120.11321	4.0
6535	1666913.58025	4.0
6733	1404312.50000	3.0
6634	1255543.90244	3.0
0450	1208492.85714	3.0
6734	1120050.00000	3.0
6534	1061984.56790	3.0
6637	1055556.87500	3.0
6536	943540.85366	2.0
7036	933361.17647	2.0
6636	931641.71779	2.0
6735	768768.12500	2.0
6533	603916.66667	2.0
6935	595381.01266	2.0
6835	576878.61635	2.0
7136	401990.12346	2.0
6538	292185.71429	2.0
7035	282008.16327	2.0
6633	253500.00000	2.0
6934	250684.71338	2.0
7037	196823.17073	2.0
7236	161284.72222	2.0
7137	144541.81818	2.0
7038	126169.44444	2.0
6834	89345.79439	1.0
6736	54600.00000	1.0
7034	36294.44444	1.0
7033	36009.87654	1.0
7337	35496.34146	1.0
6933	32946.83544	1.0
7336	23518.98734	1.0
7237	22662.94118	1.0
7134	12522.36025	1.0
7138	11958.33333	1.0
7436	11560.00000	1.0
7234	11500.00000	1.0
7338	6333.33333	1.0
7437	3271.01449	1.0
7235	1672.88136	1.0
7135	506.41026	1.0
	>100K	
	100K-1.0M	
	1.0-1.5M	
	> 1.5 M	

APPENDIX C: GEOCODE STRUCTURES PER ACRE COUNT

GEOCODE	StrucPerAc	Score
6535	4.75309	4.0
7036	4.05882	4.0
6537	3.38994	3.0
0450	3.05714	3.0
6635	2.62963	3.0
6733	2.06250	3.0
6534	2.05556	3.0
6637	2.00000	3.0
7136	1.90123	2.0
6634	1.83537	2.0
6835	1.78616	2.0
6734	1.61250	2.0
7035	1.45578	2.0
6536	1.23780	2.0
6735	1.13750	2.0
6533	1.13095	2.0
7236	0.78472	2.0
6636	0.51534	2.0
7137	0.51515	2.0
7037	0.45122	2.0
6935	0.35443	2.0
6933	0.32911	2.0
6633	0.26250	2.0
6834	0.19626	2.0
6538	0.17857	2.0
6736	0.10000	2.0
7134	0.08696	1.0
6934	0.08280	1.0
7337	0.07927	1.0
7033	0.06173	1.0
7038	0.05556	1.0
7234	0.05128	1.0
7034	0.04938	1.0
7138	0.04167	1.0
7235	0.03390	1.0
7135	0.01282	1.0
7237	0.00588	1.0
7336	0.00000	1.0
7338	0.00000	1.0
7436	0.00000	1.0
7437	0.00000	1.0
	< 0.1	
	0.1-2.0	
	2.0001-4.0	
	> 4.00001	

APPENDIX D: GEOCODE ECONOMY MEASUREMENT COUNT

GEOCODE	Economy
6636	4.0
6736	3.0
6635	2.0
6935	2.0
7136	2.0
7035	2.0
6934	2.0
7236	2.0
6537	0.0
6535	0.0
6733	0.0
6634	0.0
0450	0.0
6734	0.0
6534	0.0
6637	0.0
6536	0.0
7036	0.0
6735	0.0
6533	0.0
6835	0.0
6538	0.0
6633	0.0
7037	0.0
7137	0.0
7038	0.0
6834	0.0
7034	0.0
7033	0.0
7337	0.0
6933	0.0
7336	0.0
7237	0.0
7134	0.0
7138	0.0
7436	0.0
7234	0.0
7338	0.0
7437	0.0
7235	0.0
7135	0.0
	X Small
	Small
	Med.
	Large Man

APPENDIX E: GEOCODE TARGET HAZARD COUNT

GEOCODE	Target Hazards
6635	2.0
7136	2.0
7035	2.0
7236	2.0
6536	2.0
7034	2.0
7235	2.0
6636	1.0
6736	1.0
6934	1.0
6537	1.0
6538	1.0
7037	1.0
7137	1.0
6933	1.0
6935	0.0
6535	0.0
6733	0.0
6634	0.0
0450	0.0
6734	0.0
6534	0.0
6637	0.0
7036	0.0
6735	0.0
6533	0.0
6835	0.0
6633	0.0
7038	0.0
6834	0.0
7033	0.0
7337	0.0
7336	0.0
7237	0.0
7134	0.0
7138	0.0
7436	0.0
7234	0.0
7338	0.0
7437	0.0
7135	0.0
	1
	2
	3
	4

APPENDIX F: GEOCODE FINAL TOTAL SCORE

GEOCODE	StrucPerAc	Score	ValPerAc	Score	PopPerAc	Score	Economy	Target Hazards	TOTAL SCORE
6635	2.62963	3.0	2068438.88889	4.0	12.85185	4.0	2.0	2.0	15.0
6535	4.75309	4.0	1666913.58025	4.0	11.22222	4.0	0.0	0.0	12.0
6537	3.38994	3.0	1889120.11321	4.0	11.48428	4.0	0.0	1.0	12.0
6636	0.51534	2.0	931641.71779	2.0	0.92025	1.0	4.0	1.0	10.0
7035	1.45578	2.0	282008.16327	2.0	2.42857	2.0	2.0	2.0	10.0
7136	1.90123	2.0	401990.12346	2.0	2.90741	2.0	2.0	2.0	10.0
7236	0.78472	2.0	161284.72222	2.0	1.25000	2.0	2.0	2.0	10.0
0450	3.05714	3.0	1208492.85714	3.0	9.22857	3.0	0.0	0.0	9.0
6534	2.05556	3.0	1061984.56790	3.0	6.20988	3.0	0.0	0.0	9.0
6637	2.00000	3.0	1055556.87500	3.0	5.90625	3.0	0.0	0.0	9.0
6733	2.06250	3.0	1404312.50000	3.0	5.81250	3.0	0.0	0.0	9.0
7036	4.05882	4.0	933361.17647	2.0	6.75294	3.0	0.0	0.0	9.0
6536	1.23780	2.0	943540.85366	2.0	4.96951	2.0	0.0	2.0	8.0
6634	1.83537	2.0	1255543.90244	3.0	5.41463	3.0	0.0	0.0	8.0
6736	0.10000	2.0	54600.00000	1.0	0.00000	1.0	3.0	1.0	8.0
6935	0.35443	2.0	595381.01266	2.0	3.03797	2.0	2.0	0.0	8.0
6734	1.61250	2.0	1120050.00000	3.0	4.78125	2.0	0.0	0.0	7.0
6934	0.08280	1.0	250684.71338	2.0	0.00000	1.0	2.0	1.0	7.0
6533	1.13095	2.0	603916.66667	2.0	3.32143	2.0	0.0	0.0	6.0
6538	0.17857	2.0	292185.71429	2.0	0.00000	1.0	0.0	1.0	6.0
6735	1.13750	2.0	768768.12500	2.0	3.07500	2.0	0.0	0.0	6.0
6835	1.78616	2.0	576878.61635	2.0	4.96226	2.0	0.0	0.0	6.0
7037	0.45122	2.0	196823.17073	2.0	0.76829	1.0	0.0	1.0	6.0
7137	0.51515	2.0	144541.81818	2.0	0.43636	1.0	0.0	1.0	6.0
6633	0.26250	2.0	253500.00000	2.0	0.75000	1.0	0.0	0.0	5.0
6933	0.32911	2.0	32946.83544	1.0	0.00000	1.0	0.0	1.0	5.0
7034	0.04938	1.0	36294.44444	1.0	0.00000	1.0	0.0	2.0	5.0
7235	0.03390	1.0	1672.88136	1.0	0.00000	1.0	0.0	2.0	5.0
6834	0.19626	2.0	89345.79439	1.0	0.58879	1.0	0.0	0.0	4.0
7038	0.05556	1.0	126169.44444	2.0	0.00000	1.0	0.0	0.0	4.0
7033	0.06173	1.0	36009.87654	1.0	0.00000	1.0	0.0	0.0	3.0
7134	0.08696	1.0	12522.36025	1.0	0.00000	1.0	0.0	0.0	3.0
7135	0.01282	1.0	506.41026	1.0	0.00000	1.0	0.0	0.0	3.0
7138	0.04167	1.0	11958.33333	1.0	0.00000	1.0	0.0	0.0	3.0
7234	0.05128	1.0	11500.00000	1.0	0.00000	1.0	0.0	0.0	3.0
7237	0.00588	1.0	22662.94118	1.0	0.00000	1.0	0.0	0.0	3.0
7336	0.00000	1.0	23518.98734	1.0	0.00000	1.0	0.0	0.0	3.0
7337	0.07927	1.0	35496.34146	1.0	0.00000	1.0	0.0	0.0	3.0
7338	0.00000	1.0	6333.33333	1.0	0.00000	1.0	0.0	0.0	3.0
7436	0.00000	1.0	11560.00000	1.0	0.00000	1.0	0.0	0.0	3.0
7437	0.00000	1.0	3271.01449	1.0	0.00000	1.0	0.0	0.0	3.0
	< 0.1		>100K		< 1.0		X Small	1	<6
	0.1-2.0		100K-1.0M		1.0001-5.0		Small	2	6 TO 8
	2.0001-4.0		1.0-1.5M		5.0001-10.0		Med.	3	9 TO 10
	> 4.00001		> 1.5 M		> 10.0001		Large Man	4	> 10

FINAL SCORE	
Null	0
Low	<6
Med	6 TO 8
High	9 TO 10
Extreme	> 10

APPENDIX G: TABLE OF MAPS

APPENDIX H: TABLE OF FIGURES