Consultant Report

2022

COMMUNITY RISK ASSESSMENT AND STANDARDS OF COVERAGE

Gresham Fire & Emergency Services,

Gresham, Oregon

2901 Williamsburg Terrace #G

Platte City, Missouri, 64079

Phone: 816-431-2600

www.fitchassoc.com

INTRODUCTION

The following document functions as Gresham Fire & Emergency Services (GFES) All Hazard Community Risk Assessment and Standards of Cover statement. The Commission on Fire Accreditation International (CFAI) defines the process, known as "deployment analysis," as a written procedure that determines the distribution and concentration of fixed and mobile resources of an organization. The purpose of completing such a document is to assist the Department in ensuring a safe and effective response force for fire suppression, emergency medical services (EMS), hazardous materials incidents, and technical rescues, and in facilitating activities for domestic preparedness, emergency planning, and disaster response.

Creating a Standards of Cover (SOC) document requires the research, study, and evaluation of a considerable array of community features. The following report will begin with a descriptive overview of GFES and the area that it serves. Following this overview, an all-hazards risk assessment provides an analysis of potential risks and describes activities the Department employs to mitigate those risks. Current deployment and performance were assessed to determine the capabilities and capacities that are available. Benchmark statements and baseline performance support GFES's ability to meet distribution and concentration metrics. The report concludes with plans for maintaining and improving capabilities, as well as policy recommendations to address gaps in performance or desired outcomes.

Competency or Performance Indi

ortant phrases or words underlin hasis.

Throughout the document, several "accreditation building blocks" will be highlighted, drawing a direct link between the community risk assessment-standards of coverage and the requirements of the fire department accreditation process as administered through CFAI.

This SOC is demonstrative of GFES's continued commitment to regular comm A). The Agency has adopted a formal process of reviewing and assessing risk as an annual process. GFES anticipates that regularly revisiting and revising the SOC and CRA will allow the agency to stay on top of changes in the community as well as enable staff to efficiently distribute and plan for resources allocated throughout the jurisdiction.

Gresham Fire & Emergency Services would like to thank all members for their continued dedication to the citizens and visitors of the jurisdiction and for the commitment to continuous improvement embodied by the accreditation process.

EXECUTIVE SUMMARY

Standards of Coverage Process

A Fire Department's Standards of Cover (SOC) document is defined by the Commission on Fire Accreditation International (CFAI) as the "adopted written policies and procedures that determine the distribution, concentration and reliability of fixed and mobile response forces for fire, emergency medical services, hazardous materials and other technical types of responses." For the elected body and city administrators to have confidence that their fire department is meeting the needs of the community, a complete assessment of the risks must be honestly undertaken. Only after the application of a proven and consistent risk assessment model is made can a fire department develop a SOC performance contract.

It is the responsibility of an agency to provide the city's decision-makers with an educated calculation of the expected risk, what resources are available to respond to that risk, and what outcomes can be expected. All these factors play a role in providing the community's emergency services. It is "best practice" that communities set response standards based on the identified risks within their jurisdictions. Fire departments that do not apply a valid risk assessment model to their community are not able to adequately educate their community leaders on their true needs. The application of a tested risk assessment model allows the fire department and elected officials to make educated decisions about the level of emergency service they desire.

Documentation of Area Characteristics

Gresham Fire & Emergency Services (GFES) is a full-service fire department providing fire suppression, emergency medical services (EMS), fire prevention, hazardous materials, and technical rescue services for over 150,000 full-time residents. In 2020, Gresham, OR, had a median age of 36.5 and a median household income of $58,250. Gresham is currently growing at a rate of 0.75% annually, and its population
as increased by 1.51% since the most recent census.

Description of Agency Programs and Services

The City of Gresham provides fire and emergency services to the cities of Troutdale, Fairview, and Wood Village, collectively called the "Three Cities," under the authority of ORS Chapter 190 through an Intergovernmental Agreement (IGA). Gresham, the "Three Cities," and Multnomah Rural Fire Protection District #10 have established a successful 25-year contract relationship for fire and emergency services while continuing to build upon the existing partnership.

Administration

Fire Administration maintains the department's day-to-day operations by providing overall management, leadership succession planning, mutual assistance plan development, public information, community outreach, contract and grant administration, cost recovery, financial models, and project management.

The primary activities of Fire Administration support the front-line functions of the department and include personnel management, development of policies and procedures, assurance that all legislative requirements are met, information concerning emergency events, administrative support, and departmental payroll and accounts payable.

Supervision of the Life Safety Division and maintaining Oregon OSHA compliance are the responsibility of the Fire Administration. Fire Administration also interacts with other City departments and provides coordination with other state and local government agencies.

Emergency Operations

The Emergency Operations Division is responsible for the initial response to calls for emergency medical or fire suppression services. Approximately 75% of all incidents that FES responds to are calls for emergency medical services (EMS). Because medical emergencies are often time-critical, it is important that EMS arrive as quickly as possible. All firefighters in the department are trained at the minimum level of Emergency Medical Technician (EMT), with many certified as paramedics, to provide patient care in the field. All Gresham engine companies are Advanced Life Support (ALS) units, meaning each has a firefighter/paramedic on board. The Emergency Operations Division provides fire suppression, emergency medical services, and the following specialized responses: technical rescue 99 (confined space, high and low angle rope rescue, and structural collapse), water rescue, hazardous materials response, and wildland fire.

Training and Safety

Training is provided to maintain response readiness and proficiency at all levels. Emergency medical technician and paramedic training are provided to maintain State certification. The Division also provides a new hire recruit academy as well an apparatus operations academy for personnel.

Life Safety

The Life Safety Division applies the fire codes to new construction to ensure appropriate fire suppression access and that the water supply and safety features, such as alarms and sprinkler systems, are code compliant. Fire investigation and determining causes are conducted for known arson fires, those involving significant fire loss and fire fatalities.

All-Hazard Risk Assessment of the Community

A comprehensive risk assessment analyzed the physical, economic, sociologic, and demographic aspects of the jurisdiction. The factors that drive the service needs were examined in a precise and scientific manner to determine the capabilities necessary to adequately address the risks that are present. Each of the major natural and manmade risks evaluated received a clearly defined probability and consequence ranking. Service areas that either had little quantitative data or did not require that level of analysis were evaluated through both retrospective analysis as well as structured interviews with department staff members. Final call types from the CAD data file were classified into the program areas of EMS, Fire, Hazmat, Other, and Technical Rescue based on Department leadership decisions and were assigned a risk classification based on Department leadership criteria.

Current Deployment and Performance

This section analyzed the emergency response history of the department by taking a systems level view of current performance, establishing formal benchmark (what GFES's strives to attain) performance measures, and analyzing actual (baseline) performance. Projected growth of the emergency call volume was also evaluated, along with an in-depth look at each first-due fire station area to identify areas of concern with elevated risks and lagging performance. Simultaneous calls (call concurrency), Distribution (first unit on scene), Concentration (arrival of the full effective response force), Reliability (how often a unit can answer their own calls), and several other measures were used to paint a clear picture of GFES's performance.

Evaluation of Current Deployment and Performance

It is imperative that the Fire Department continuously evaluate its actual performance (baseline performance) versus its established goals (benchmark performance). This section takes a detailed look at the gaps where performance could be improved (noted in red) or is currently exceeding established goals (in green). Important trends can be discerned based on the risk level (low, moderate, high, extreme) or where the incidents are occurring. Most performance gaps were minor in nature, allowing further refinement of the response system to achieve GFES's response time goals.

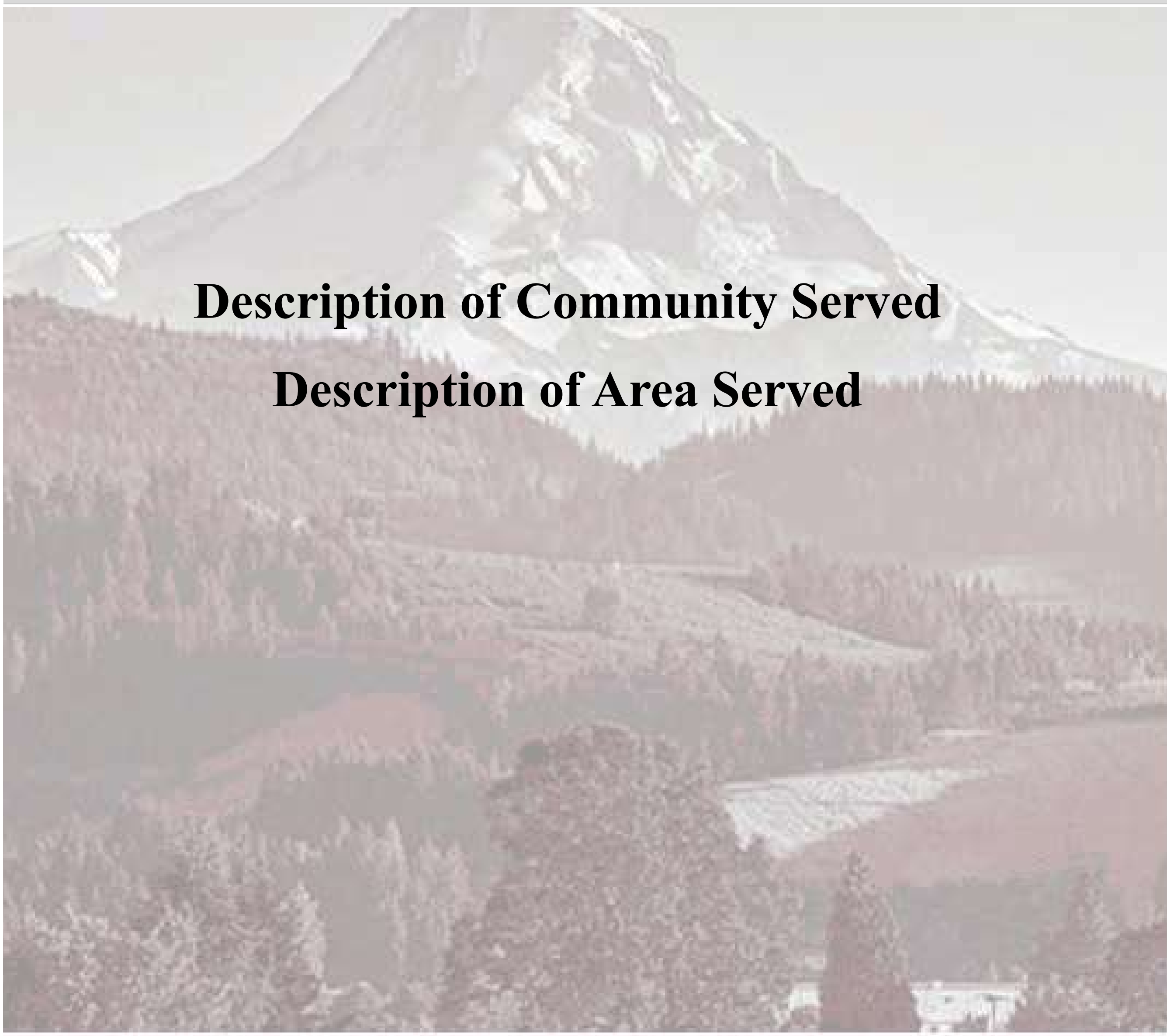
Conclusion and Recommendations

Gresham Fire and Emergency Services is an organization with a total authorized staff of 97-line personnel who are committed to saving lives, protecting property, safeguarding the environment, and taking care of their people. Overall, the department is performing well within the current system. The community enjoys high-quality services from a professional and well-trained department. The departments per unit workload is both reasonable (<13%) and well below the upper recommended threshold (<30%). In other words, the department has a robust deployment strategy, and the existing resources can absorb more work prior to reinvestment due to workload. This provides considerable cost avoidance and long-term expenditure sustainability within the current resource allocation.

The department's distribution and concentration delivery models are appropriately aligned with the department's unique risks. The quantity and locations of the fire stations are well-planned and perform well. However, there are areas that have been identified where the department could make incremental system adjustments to improve.

A succinct list of observations and recommendations can be found in this section, further aiding GFES in charting a path toward continuous improvement. The observations and recommendations address response time performance, station locations, move-up strategies, Rescue unit deployment, workload capacity, brown-out considerations, effective response forces, and automatic-aid agreements. All primary recommendations are presented in this section.

DOCUMENTATION OF AREA CHARACTERISTICS



Description of Community Served

Description of Area Served

DESCRIPTION OF COMMUNITY SERVED

This section provides legal and historical background pertinent to the delivery of emergency services within the jurisdiction of Gresham Fire and Emergency Services (GFES). This section includes reviews of the legal and governmental structure, an overview of the demographics and physical environment, and characteristics of areas for which the (GFES) provides service.

Introduction

Gresham Fire is a fast-paced Fire and EMS department that covers 60+ square miles and over 150,000 people with tourism fluctuations. They provide Advanced Life Support EMS first response, Technical Rescue, Regional Hazardous Materials Team, Rescue Swimmers and Rescue Divers, Boat, and swift water rescue, Wildland Urban Interface, Confined Space Entry and Rescue, USAR, Tactical Support Medics (SWAT). GFES answers over 16,000 calls from seven stations, while staff works on a 24/72, 48/72 ABC 1-3,2-3 schedule.

The agency collects and analyzes data specific to the departments characteristics of its legally defined service area(s) and applies the findings to organizational services and services development.

Gresham is a city located in Multnomah County, Oregon, in the United States of America, immediately east of Portland, Oregon. It is considered a suburb within the Greater Portland Metropolitan area. Though it began as a settlement in the mid-1800s, it was not officially incorporated as a city until 1905. Today, they are a full-service city that shares a border with Portland, Oregon, which puts them in the largest population center in Oregon. They are 2 hours from the Pacific Ocean, 2 hours from the high desert, and 1 hour from Mt. Hood and year-round snow skiing. Gresham is situated on the Columbia River.

Gresham Fire & Emergency Services (GFES) operates six fire stations within its service area. Through a unique Intergovernmental Agreement, they also provide service from Portland Fire Station 31, which is staffed jointly by the cities of Portland and Gresham (B shift only). Each station includes an engine company that is an Advanced Life Support unit and has a trained firefighter/paramedic assigned to the crew.
Gresham Fire units responded over 23,000 times for emergency-related incidents in 2021 while utilizing some of the best technology available to provide care to the sick and injured. Their overall cardiac arrest survival rate was 14.7% in 2019, which is a significant drop from nearly 20% in 2018 and getting closer to the national average of 10.4%.

Personnel

64 Paramedics
33 Emergency Medical Technicians (EMTs) Equipment
8 advanced life support apparatus, including:
1 truck company - 1 rescue - Each unit staffed with at least - 1 highly trained Paramedic

Legal Basis

The City's Charter establishes the framework for how the City government operates. Gresham's City Charter was adopted on May 2, 1978.

There is no language specifically in the Charter, nor any specific City Ordinance establishing the Fire Department.

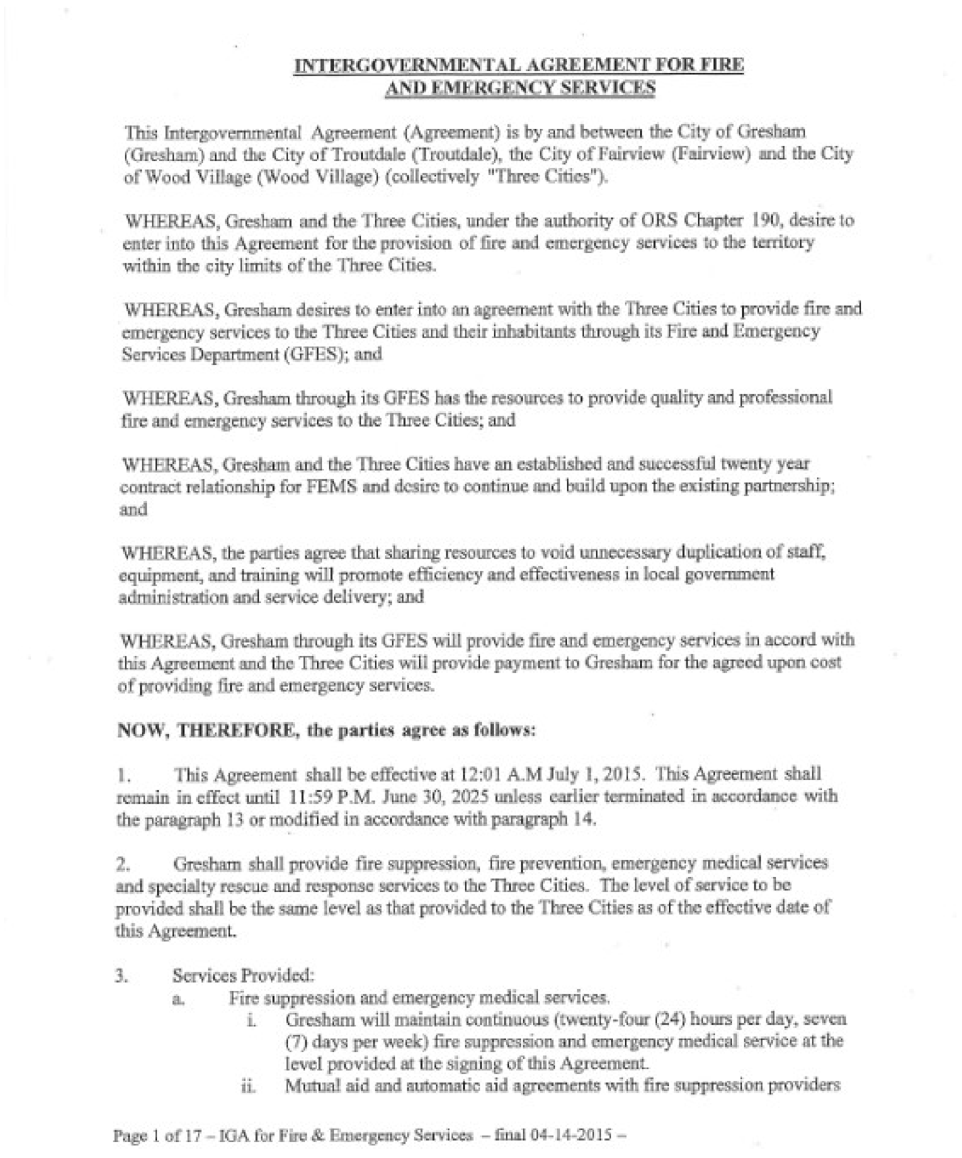
Performance Indicator 2A.1

Service area boundaries for the agency are identified, documented, and legally adopted by the authority having jurisdiction.

Per the Charter Section 20, the City Manager has broad authority as the administrative head of the government-including directing, organizing, and disbanding the various City departments.

History

The Fire Department was formed Officially in 1910, although it likely existed earlier in some fashion. We have original rosters from 1915, 1916, and 1917. The first fulltime paid employee was hired in 1967, and the last volunteer-staffed engine responded in 2002. The City of Gresham annexed a portion of Multnomah Rural Fire Protection District No. 10 in 1986, bringing fire station 74 into the Gresham Fire Department. In 1992, the cities of Fairview, Wood Village, and Troutdale contracted with the City of Gresham, and the first Contract for Fire Services was signed. At this time, Gresham Fire started to staff Station 75 on July 1, 1992. Two years later, the City entered another Fire Services Contract with Fire District 10 and started staffing Fire Station 76 in July of 1994. GFES started co-staffing Portland Fire Station 45, now station 31, in January of 2000. GFES staffed the station for five months, from January through May. Portland staffed the station from June through December. In 2012, GFES moved to the current methodology where GFES staffs the station on B-Shift and Portland Staffs A and C-Shift.



INTERGOVERNMENTAL AGREEMENT FOR FIRE AND EMERGENCY SERVICES

This Intergovernmental Agreement (Agreement) is by and between the City of Gresham (Gresham) and the City of Troutdale (Troutdale), the City of Fairview (Fairview) and the City of Wood Village (Wood Village) (collectively "Three Cities").

WHEREAS, Gresham and the Three Cities, under the authority of ORS Chapter 190, desire to enter into this Agreement for the provision of fire and emergency services to the territory within the city limits of the Three Cities.

WHEREAS, Gresham desires to enter into an agreement with the Three Cities to provide fire and emergency services to the Three Cities and their inhabitants through its Fire and Emergency Services Department (GFES); and

WHEREAS, Gresham through its GFES has the resources to provide quality and professional fire and emergency services to the Three Cities; and

WHEREAS, Gresham and the Three Cities have an established and successful twenty year contract relationship for FEMS and desire to continue and build upon the existing partnership; and

WHEREAS, the parties agree that sharing resources to void unnecessary duplication of staff, equipment, and training will promote efficiency and effectiveness in local government administration and service delivery; and

WHEREAS, Gresham through its GFES will provide fire and emergency services in accord with this Agreement and the Three Cities will provide payment to Gresham for the agreed upon cost of providing fire and emergency services.

NOW, THEREFORE, the parties agree as follows:

1. This Agreement shall be effective at 12:01 A.M July 1, 2015. This Agreement shall remain in effect until 11:59 P.M. June 30, 2025 unless earlier terminated in accordance with the paragraph 13 or modified in accordance with paragraph 14.

2. Gresham shall provide fire suppression, fire prevention, emergency medical services and specialty rescue and response services to the Three Cities. The level of service to be provided shall be the same level as that provided to the Three Cities as of the effective date of this Agreement.

3. Services Provided:
   a. Fire suppression and emergency medical services.
      i. Gresham will maintain continuous (twenty-four (24) hours per day, seven (7) days per week) fire suppression and emergency medical service at the level provided at the signing of this Agreement.
      ii. Mutual aid and automatic aid agreements with fire suppression providers

Page 1 of 17 – IGA for Fire & Emergency Services – final 04-14-2015 –

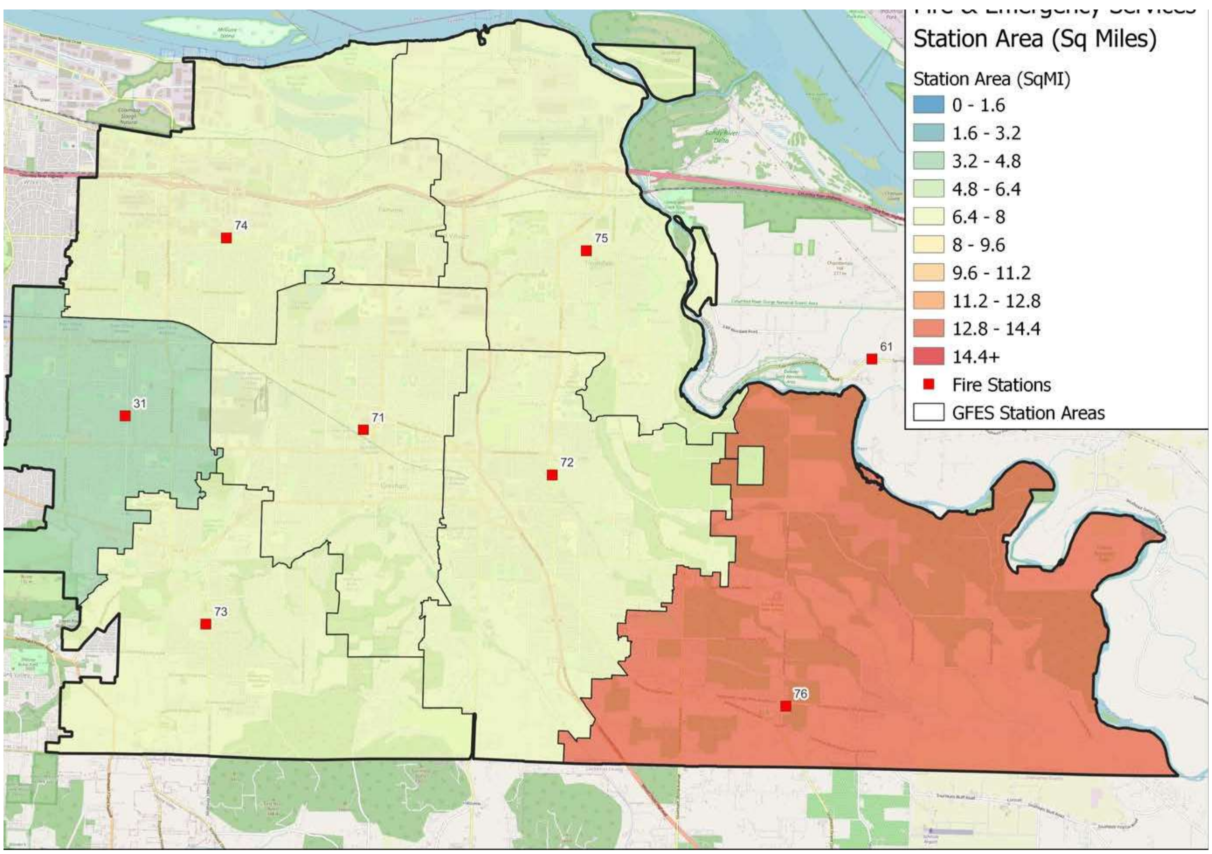
Jurisdiction

Gresham Fire and Emergency Services provide life safety services to the city residents and contract areas for residents living in the cities of Fairview, Troutdale, Wood Village, and areas of unincorporated Multnomah County.

Core Competency 2A.3

The agency has a documented and adopted methodology for organizing the response area(s) into geographical planning zones.

Figure 1: Gresham Fire & Emergency Services Jurisdiction Map



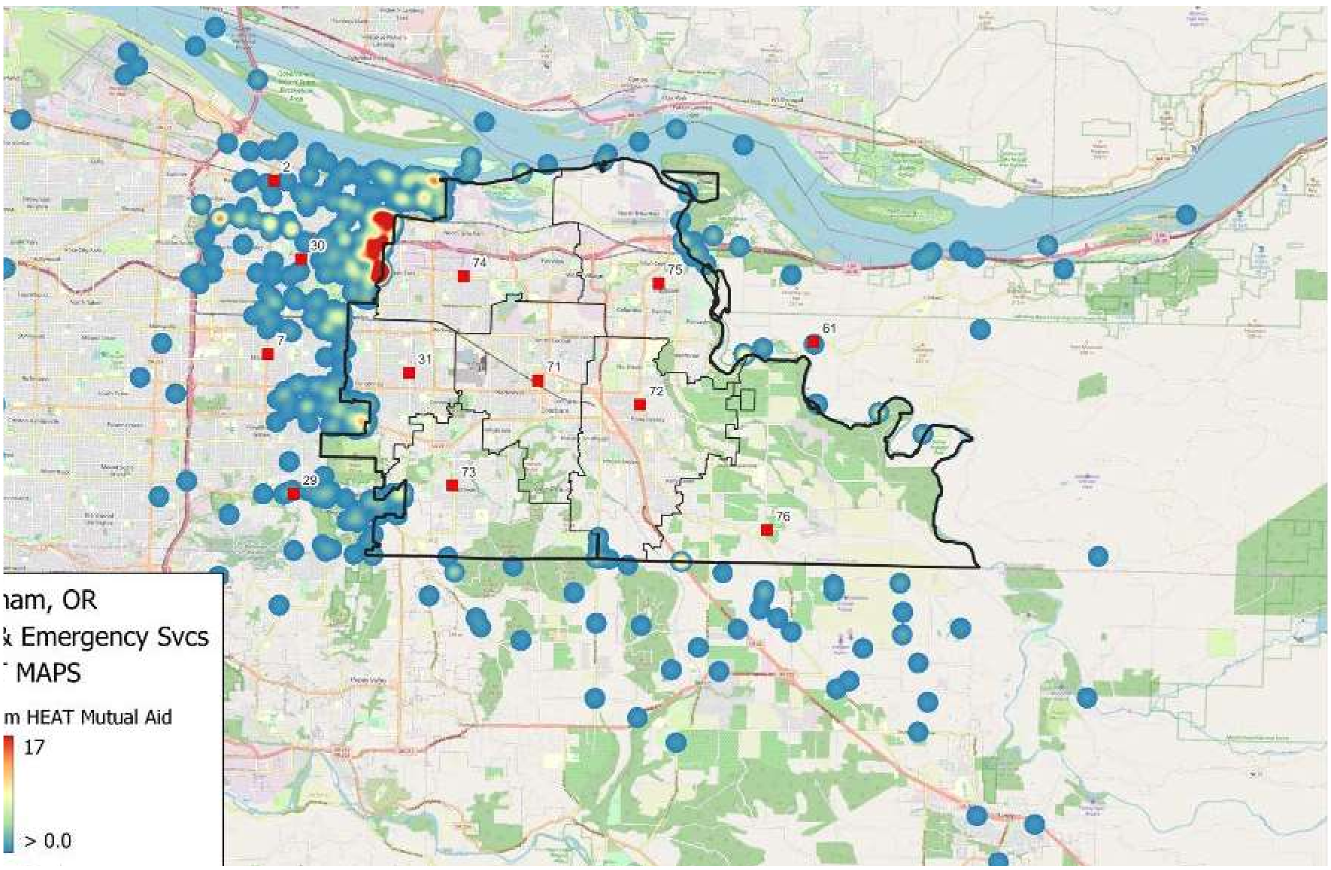
Auto/Mutual Aid

GFES maintains an active relationship with the surrounding agencies receiving automatic aid responses. GFES and the City of Portland Fire Department share Station 31 and staff it according to B shift only. This is a highly effective and innovative strategy. The associated heat map shows concentrated areas near around borde

Performance Indicator 2A.2

Boundaries for other service responsibility areas, such as automatic aid, mutual aid, and contract areas, are identified, documented, and appropriately approved by the authority having jurisdiction.

2:GFES Mutual Aid Heat Map



Population Overview and Density

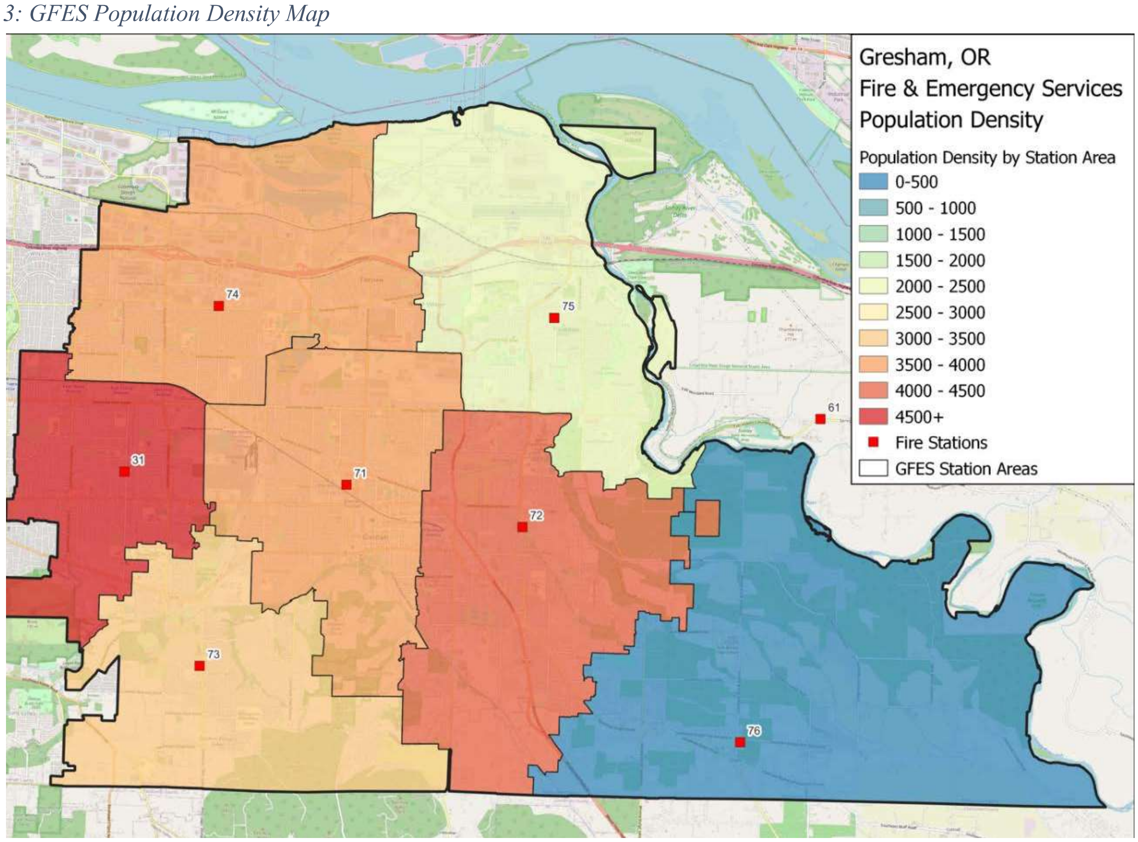
Core Competency 2A.4

The agency assesses the community by planning zone and considers the population density within planning zones and population are- as, as applicable, for the purpose of developing total response time standards.

Gresham is home to a population of 150k with tourism and seasonal visitors, of which 90.7% are citizens. As of 2020, 16.5% of Gresham, OR residents were born outside the country (18.2k people).

The most common educational levels obtained by the working population in 2020 were some college (878k), High School or Equivalent (788k), and Bachelor Degree's(661k). In 2020, the median household income of the 39.9k households in Gresham, OR, grew to $58,250 from the previous year's value of $54,084. The income inequality in Oregon was 0.464, according to the GINI calculation of the wage distribution. Income inequality had a 0.249% decline from 2019 to 2020, which means that wage distribution grew somewhat more even. The GINI for Oregon was lower than the national average of 0.478. In other words, wages are distributed more evenly in Oregon compared to the national average.
In Gresham, 16.1% of the population for whom poverty status is determined in Gresham, OR (17.6k out of 109k people) live below the poverty line, a number higher than the national average of 12.8%. The largest demographic living in poverty are Females 25 - 34, followed by Females 6 - 11 and then Females 35 - 44. The most common racial or ethnic group living below the poverty line in Gresham, OR, is White, followed by Hispanic and Two Or More.

Figure 3: GFES Population Density Map



Data Overview

In 2021, a total of 24,659 incidents occurred in the jurisdiction of Gresham or were responded to by the Gresham Fire and Emergency Services. Units from Gresham Fire and Emergency Services responded to a total of 18,504 calls, or 75% of the total.

EMS service requests totaled 20,018, accounting for 81.2% of the total number of incidents. The number of fire calls was 4,444, which accounted for 18.0% of the total incidents. The number of individual unit responses will be more reflective of the total workload since 60 percent of the calls resulted in multiple agencies or units being dispatched.

Performance Indicator 2A.5

Data that include property, life, injury, environmental and other associated losses, as well as the human and physical assets preserved and/or saved, are recorded for a minimum of three (initial accreditation agencies) to five (currently accredited agencies) immediately previous years.

4: 2021 GFES Incident Demand

ning Difficulty	2,167	5.9	8.8%
lose and Psychiatric	1,599	4.4	6.5%
	796	2.2	3.2%
nd Injury	3,975	10.9	16.1%
; and Other	6,148	16.8	24.9%
acility Transfer	445	1.2	1.8%
EMS Total	**20,018**	**54.8**	**81.2%**
ture Fire	273	0.7	1.1%
de Fire	162	0.4	0.7%
e Fire	130	0.4	0.5%
	1,040	2.8	4.2%
dous Condition	728	2.0	3.0%
ther	508	1.4	2.1%
Citizen	1,447	4.0	5.9%
Police	82	0.2	0.3%
e Incident	11	0.0	0.0%
ft Emergency	1	0.0	0.0%
al Aid	62	0.2	0.3%
Fire Total	**4,444**	**12.2**	**18.0%**
Hazmat	**142**	**0.4**	**0.6%**
Rescue	**55**	**0.2**	**0.2%**
Total	**24,659**	**67.6**	**100.0%**

	Number of Calls					Calls per Day				
Month	EMS	Fire	Rescue	Hazmat	Total	EMS	Fire	Rescue	Hazmat	Total
uary	1,631	315	5	15	1,966	52.6	10.2	0.2	0.5	63.4
oruary	1,482	426	3	26	1,937	52.9	15.2	0.1	0.9	69.2
rch	1,695	313	3	9	2,020	54.7	10.1	0.1	0.3	65.2
il	1,695	373	8	4	2,080	56.5	12.4	0.3	0.1	69.3
y	1,636	346	3	12	1,997	52.8	11.2	0.1	0.4	64.4
ie	1,747	387	7	9	2,150	58.2	12.9	0.2	0.3	71.7
/	1,717	434	5	8	2,164	55.4	14.0	0.2	0.3	69.8
gust	1,798	449	2	18	2,267	58.0	14.5	0.1	0.6	73.1
otember	1,654	377	9	14	2,054	55.1	12.6	0.3	0.5	68.5
tober	1,632	340	1	8	1,981	52.6	11.0	0.0	0.3	63.9
vember	1,656	309	4	5	1,974	55.2	10.3	0.1	0.2	65.8
tember	1,675	375	5	14	2,069	54.0	12.1	0.2	0.5	66.7
Total	**20,018**	**4,444**	**55**	**142**	**24,659**	**54.8**	**12.2**	**0.2**	**0.4**	**67.6**

DESCRIPTION OF AREA SERVED

Geography

Gresham is a city located in Multnomah County, Oregon, in the United States of America, immediately east of Portland, Oregon. It is considered a suburb within the Greater Portland Metropolitan area. Today, they are a full-service city that shares a border with Portland, Oregon, which puts them in the largest population center in Oregon. They are 2 hours from the Pacific Ocean, 2 hours from the high desert, and 1 hour from Mt. Hood and year-round snow skiing. Gresham is situated on the Columbia River. For the purposes of this report, the geographical coordinates for Gresham, Oregon, USA coordinates, are Latitude 45.510185, longitude -122.452385.

Performance Indicator 2A.6

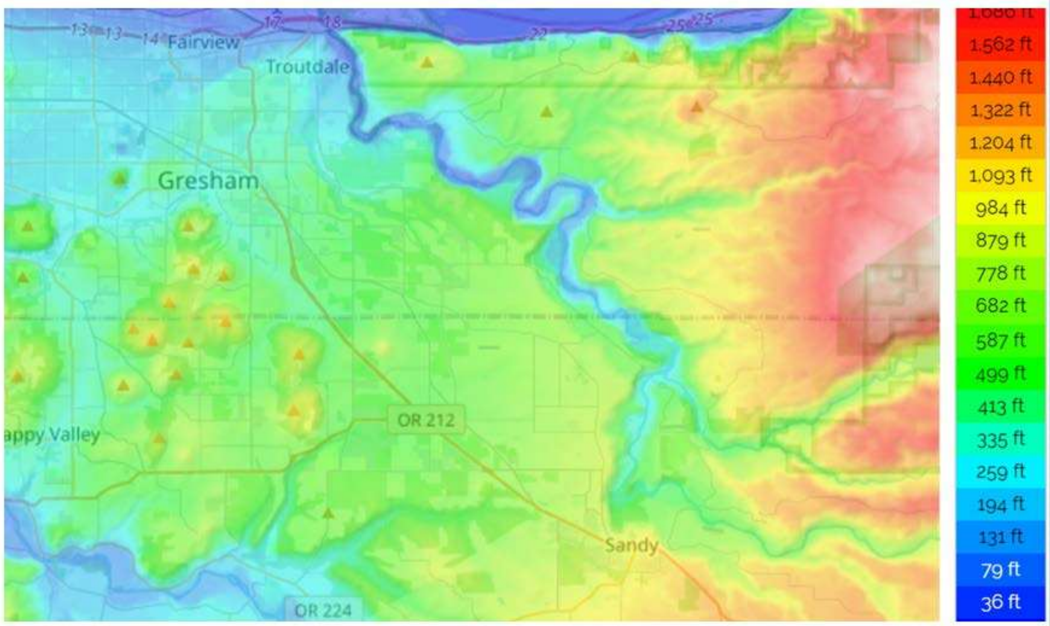
characteristics such as population, transportation systems, area land use, topography, geography, geology, physiography, climate, hazards, risks, and service provision capability demands.

Figure 6: Gresham, OR Geography Map

Topography

The topography of Multnomah County varies from flat to gently hilly terrain along the Willamette River and along the lower reaches of the Columbia River to hilly in Portland’s West Hills. Much of eastern Multnomah County from the Sandy River watershed eastward is hilly to mountainous. The highest location in Multnomah County is Buck’s Peak, near Lost Lake, with an elevation of 4,751 feet. Areas with steep slopes may be susceptible to landslides.

Figure 7: Gresham, OR Topography Map



Geology

Multnomah County is a geologically active area. There are several active earthquake faults within the county and many other faults nearby, including the Cascadia Subduction Zone. A Cascadia Subduction Zone earthquake of magnitude 8.0 or higher is projected for the Pacific Northwest, and its impact will be catastrophic. The county also is close to active volcanoes, including Mount Hood in Clackamas County, Oregon, and Mt. St. Helens in Washington State.

Climate

The climate across Gresham is moderate and consists of wet winters and dry summers. Several climactic factors contribute to hazard vulnerability in Multnomah County, particularly during the wet winter months. Heavy winter rains can result in flooding and contribute to landslide vulnerability. Cold snaps can result in ice and snowstorms. High winds often accompany winter storms. All these climactic events are regional in nature, typically affecting all of Multnomah County.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	3.9 °C (38.9) °F	4.5 °C (40.2) °F	6.5 °C (43.8) °F	9 °C (48.3) °F	12.7 °C (54.9) °F	15.6 °C (60.1) °F	19.4 °C (67) °F	19.9 °C (67.8) °F	16.6 °C (61.9) °F	11.3 °C (52.3) °F	6.6 °C (43.9) °F	3.6 °C (38.5) °F
Min. Temperature °C (°F)	1.3 °C (34.4) °F	1.4 °C (34.5) °F	2.7 °C (36.9) °F	4.6 °C (40.2) °F	7.9 °C (46.2) °F	10.7 °C (51.3) °F	13.6 °C (56.5) °F	14 °C (57.2) °F	11.4 °C (52.5) °F	7.4 °C (45.4) °F	3.9 °C (39) °F	1.3 °C (34.4) °F
Max. Temperature °C (°F)	7.8 °C (46.1) °F	9.3 °C (48.7) °F	12 °C (53.6) °F	14.9 °C (58.9) °F	18.7 °C (65.7) °F	21.8 °C (71.3) °F	26.8 °C (80.3) °F	27.5 °C (81.5) °F	23.6 °C (74.4) °F	16.7 °C (62.1) °F	10.7 °C (51.2) °F	7 °C (44.6) °F
Precipitation / Rainfall mm (in)	223 (8)	173 (6)	183 (7)	149 (5)	93 (3)	63 (2)	17 (0)	22 (0)	57 (2)	153 (6)	233 (9)	247 (9)
Humidity(%)	83%	82%	81%	75%	71%	69%	60%	58%	63%	78%	84%	84%
Rainy days (d)	13	12	13	12	9	7	3	3	5	11	13	14
avg. Sun hours (hours)	4.5	5.4	6.2	7.4	8.3	8.6	10.0	9.5	8.2	6.3	4.9	4.1

Physiography/Disaster Potentials

The Gresham jurisdiction is vulnerable to natural hazards of flooding, severe weather conditions, and landslides. In addition, the department is also vulnerable to technological (human-caused) hazards associated with pandemics, hazardous materials spill, terrorism, civil disturbances, and transportation accidents. A snapshot of the overall hazard probability is referenced in Figure 8 below. These specific hazards are discussed in detail in the Community Characteristics of Risk section.

> **All-Hazard Risk Assessment and Response Strategies as it relates to Criterion 2B**
>
> **The agency identifies and assesses the nature and magnitude of all hazards and risks within its jurisdiction. Risk categorization and deployment impact considers such factors as cultural, economic, historical, and environmental values, and operational characteristics.**

Figure 8: Gresham Natural and Manmade Hazard Profile

Natural Hazard Profiles	**Annual Probability**
Animal/Plant Disease Outbreak	0.5 to 1
Coastal Erosion	> 1
Drought/Extreme Heat	< 0.5
Epidemic/Pandemic Diseases	0.5 to 1
Flood	> 1.0
Freeze/Extreme Cold	0.5 to 1
Storm Surge Flooding	< 0.5
Sustained Wind (Tropical Cyclones)	0.5 to 1
Thunderstorm Winds/Lightening/Hail	> 1.0
Tornado	> 1.0
Wildfire	0.5 to 1
Manmade Hazard Profiles	**Annual Probability**
Aircraft Crash	< 0.5
Cyberattack	< 0.5
Hazardous Materials Release	< 0.5
Mass Casualty/Mass Fatality	< 0.5

HUMAN RELATED CHARACTERISTICS

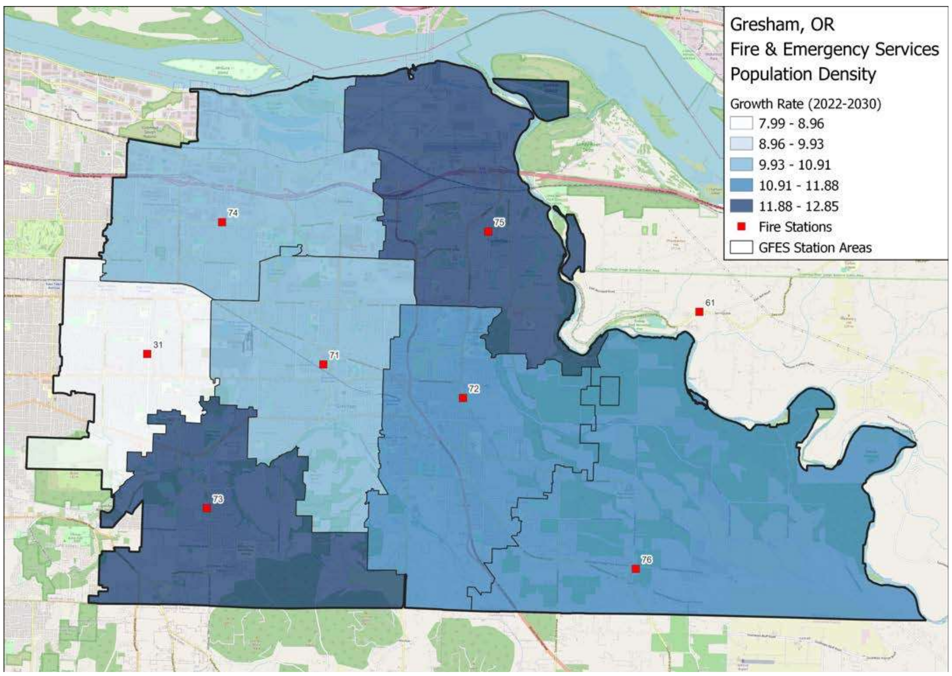
All-Hazard Risk Assessment and Response

The agency identifies and assesses the nature and magnitude of all hazards and risks within its jurisdiction. Risk categorization and deployment impact considers such factors as cultural, economic, historical, and environmental values, and operational characteristics.

Population Growth

Gresham is the fourth largest city in Oregon and the second largest in the Portland metropolitan area. The city has experienced rapid growth, has become a burgeoning urban center, and provides a high quality of life for its residents and business community. Gresham has a diverse population of longtime residents, young professionals, families, and new immigrant communities.

Figure 9: Gresham Projected Population Density Map (2022-2030)



Age Demographics

According to the United States Census Bureau, persons under five years of age account for 6.6 % of the population in the jurisdiction, persons under 18 account for 23.9% of the population, and persons over 65 for 14.1% of the population.

Older populations and young populations are most vulnerable to the frequency and incidents of fire. In addition, older populations historically utilize EMS services with greater frequency. It is important to understand what field crews often recognize intuitively, that the distribution of population risks while uniform across the jurisdiction can be affected by tourism.

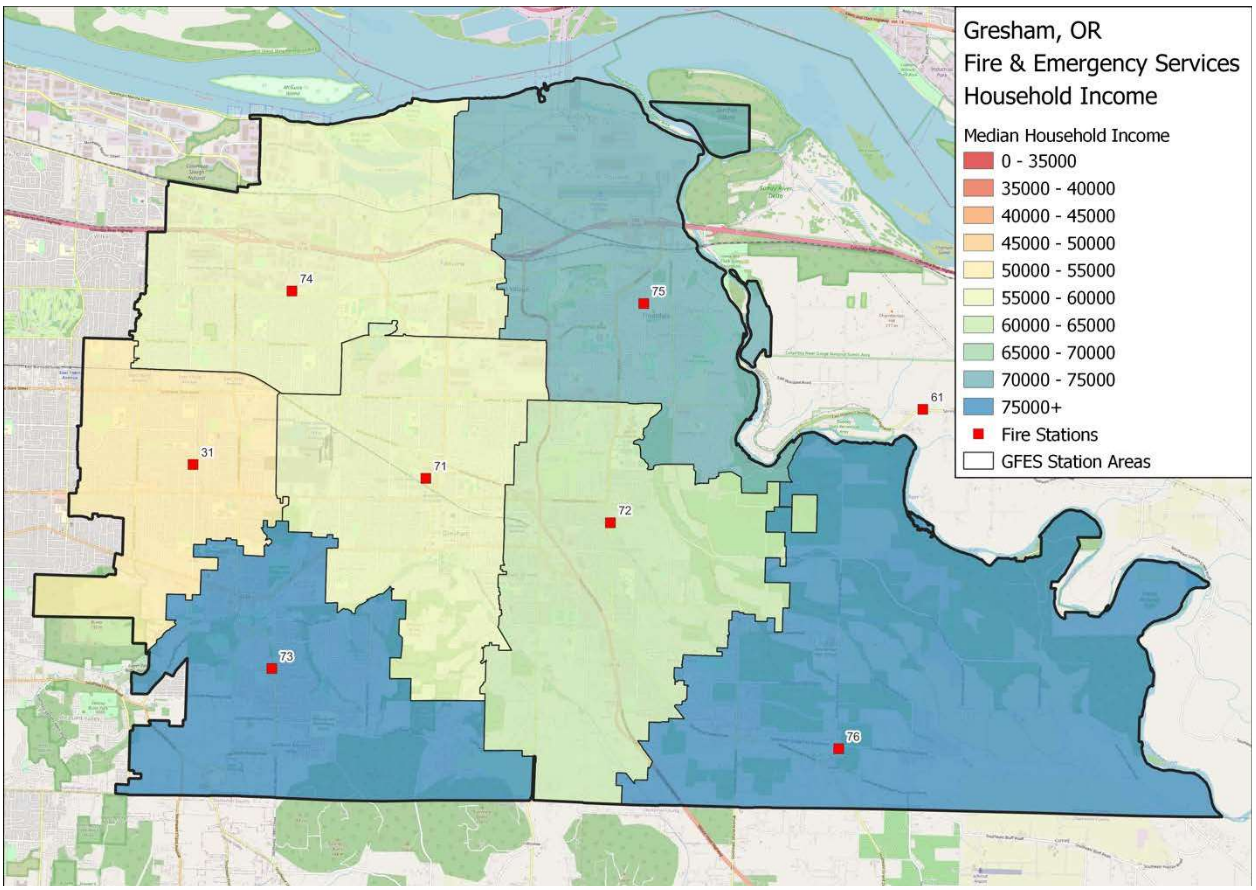
Socioeconomic Characteristics

Performance Indicator 2A.7

Significant socioeconomic and demographic characteristics for the response area are identified, such as key employment types and centers, assessed values, blighted areas, and population earning characteristics.

In the City, the growth and age of the population are not the sole variables that influence demand for services. Additional factors, such as socioeconomic and demographic factors, can have a greater influence on demand. For example, the median household income in the city was evaluated to determine to what degree the community has socioeconomically challenged populations. According to the latest data provided by the U.S. Census Bureau, the median household income in the jurisdiction is reported at $58,250.00, with approximately 16.1% of the inhabitants below the poverty level. The data further shows that 31% of the population makes between $50-100K, while 25% make 100K or more. These types of monetary variability can impact personal healthcare and prevention practices which impact department services.

Figure 10: Gresham Household Income Map



Diversity

Another cultural factor is Diversity. The population is 74.7% White alone, 4.3% African American, and 20.7 % Hispanic or Latino.

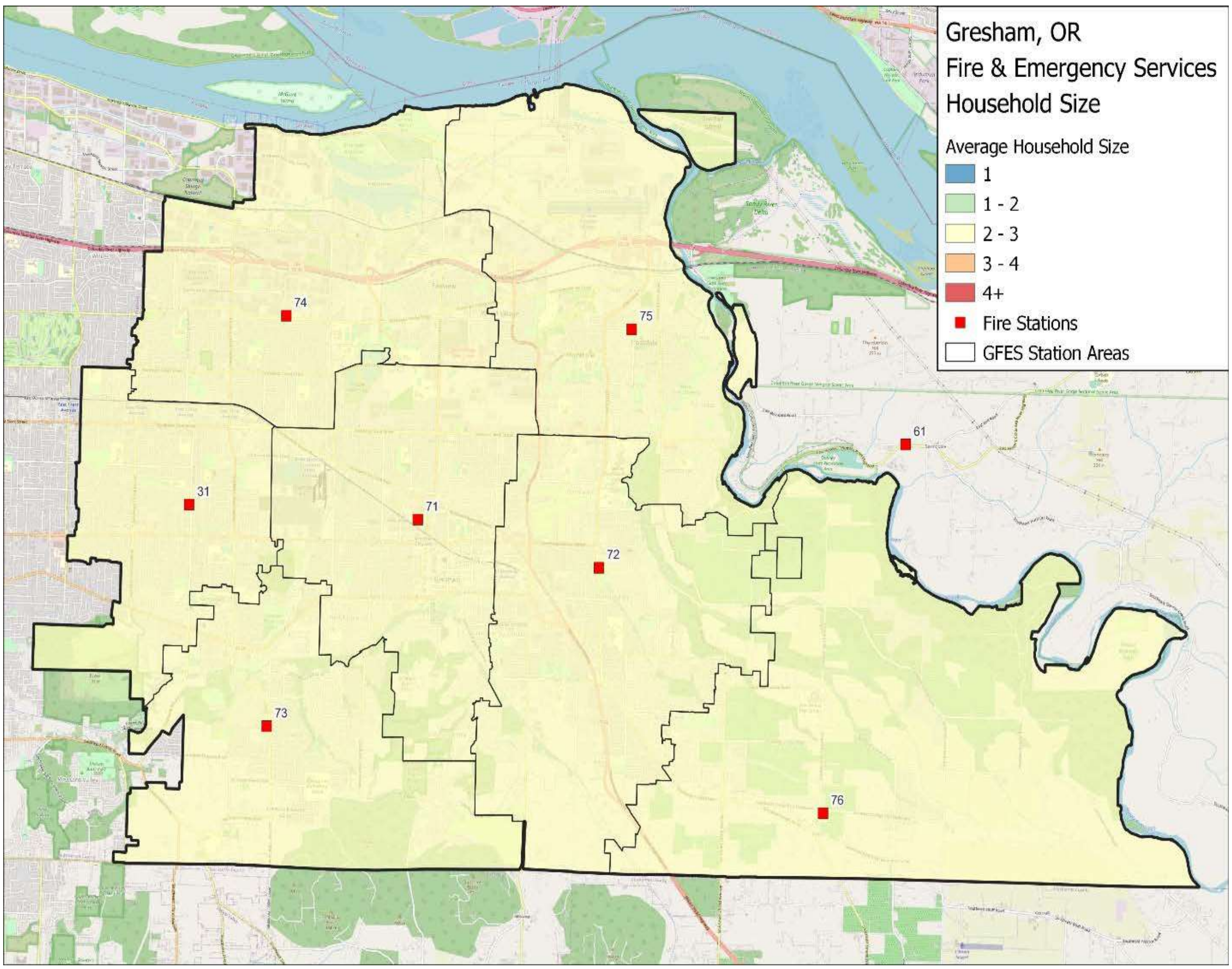
Performance Indicator 2A.7

Significant socioeconomic and demographic characteristics for the response area are identified, such as key employment types and centers, assessed values, blighted areas, and population earning characteristics.

Household Size

Household size is another socioeconomic factor, with more densely populated and inhabited areas often posing more life safety risks during certain types of emergencies. The department, in the latest Census Data, has 39,932 Households with an average family size of 2.72 across the department's population.

Figure 11: Gresham Household Size Map



Area Economics

Economic conditions have a direct impact on revenues and the demand for services. Therefore, the information presented in the financial statements is perhaps best understood when it is considered from the broader perspective of the specific economic environment around which the Department operates.

The City of Gresham offers a variety of incentives to encourage job creation and new investment by traded sector companies. From streamlined and responsive support for relocating or expanding companies to property tax abatement programs and lightning-fast land use review and approval, the Economic Development team stands ready to support traded sector business success in Gresham.

Gresham, Oregon, is the fourth largest city within the State. This dynamic and vibrant community attracts business owners due to the City's commitment to empowering growth by providing accurate information with a sense of urgency and support. Coupled with a healthy and well-planned infrastructure, businesses continue moving and starting in Gresham. As of November 2021, the City of Gresham has 2,893 registered businesses within the city employing over 26,000 people.

Gresham's Rapid Response Team is ready to assist with an expansion or relocation project. They work closely with your company from the very start of the project to ensure a smooth process and build a supportive partnership.

The City has a 66-day timeline for industrial land use review and approval for traded sector businesses. The staff is your advocate when your company expands or relocates. They document your project needs and immediately assemble our team of experts from all relevant City departments to streamline and simplify the land use review and permitting process, saving you valuable time.

- Team troubleshooting includes:
- Development and permit approvals
- Environmental regulations
- Land use guidelines
- Stormwater management
- System development charges
- Traffic impact fees
- Transportation and/or access issues
- Water and/or power quality and availability

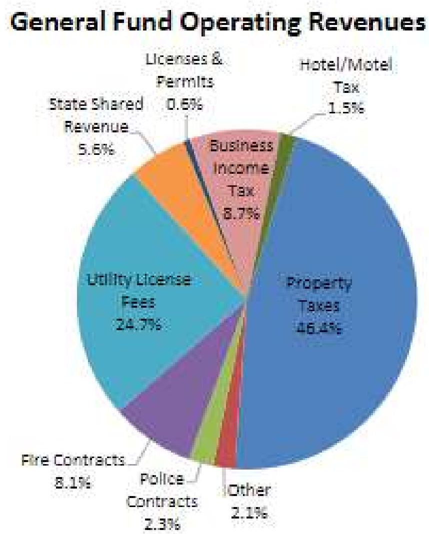
Revenue

In March, the federal government passed the American Rescue Plan Act, which included payments to many Americans and direct allocations at the state, county, and local levels.

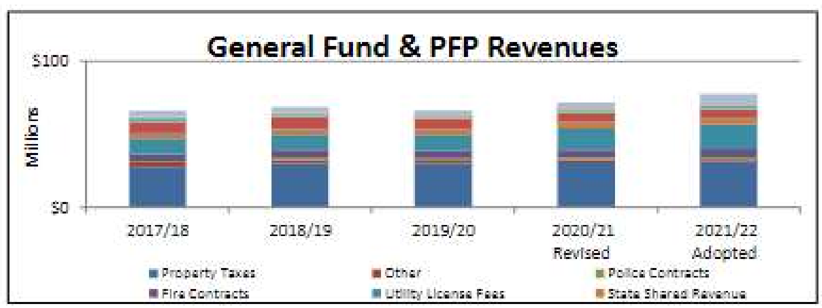
In addition to these direct allocations the City of Gresham will receive, there will be other resources dedicated to specific grant and project activities that Gresham and its citizens could benefit from. These direct allocation revenues have been acknowledged in the fiscal year 2021/22 budget and budgeted in a contingency in the Designated Purpose and CDBG/HOME funds, pending further Federal guidance regarding allowable usage and further conversations by City Council regarding priorities for these funds.

GENERAL FUND REVENUES

- General Fund revenues, including the PFP subfund are expected to total approximately $78.0 million for fiscal year 2021/22.
- Revenues for the current fiscal year are projected to be approximately 7% higher than budgeted primarily due to approved rate increases for the Police, Fire and Parks fee and Utility License Fees.
- Budgeted revenue for fiscal year 2021/22 is a 4% increase over the projected ongoing revenue for fiscal year 2020/21.



General Fund



Collectively, on-going General Fund revenues typically increase around 3% per year, with some areas performing above the trend and others lagging, depending on specific economic conditions, intergovernmental agreements, and state-shared revenues. Several larger one-time payments received in recent years temporarily bolstered revenue collections and provided an increased fund balance for a short time.

In the fiscal year 2020/21, the city received $3.94 million of CARES funding through the City of Portland, a significant portion of which was allocated to reimburse General Fund expenditures. Gresham City Council took several significant revenue actions effective during the fiscal year 2020/21 related to utility license fees and transient lodging tax.

General Fund expenses such as staffing costs, public safety dispatch, technology, vehicles, and specialized equipment necessary to respond and provide public safety services continue to increase faster than the associated revenue. In addition, as the City's population grows, the service demand increases as well. Considering this disparity between revenue growth and the increasing cost of service delivery and impacts of the COVID-19 pandemic, the fiscal year 2020/21 budget relied on existing fund balance and other one-time revenues. Additionally, one-time Community Service fee funds are being used to support economic development-related functions in fiscal years 2020/21 and 2021/22. Through significant efforts over the past 24 months to contain costs, redesign service delivery methods, and enhance certain revenues, financial policies are once again shown to be met for the fiscal year 2021/22 budget.

Continued work is needed to determine the desired approach to balancing on-going revenues and service level expectations since the cost-of-service delivery still outpaces ongoing revenues and maintaining services requires additional drawdown of the existing fund balance.

Police, Fire and Parks Sub-fund

This fund has been collecting revenue since February 2013 for the Police, Fire, and Parks fees implemented in December 2012. Effective January 1, 2021, the Police, Fire, and Park fee was increased by $7.50 per month for an 18-month period. While revenues increase slightly as new housing and other units are added within the City, fee revenue is forecast to grow at a rate well below one percent in the upcoming year outside of the fee increase.

The specific services budgeted within the Police, Fire, and Parks Fund have remained consistent since the inception of the fund. With the temporary fee increase, revenues are expected to fully cover the expenditures of the sub-fund only until June 30, 2022, when the temporary increase is set to expire.

Expenditure Controls and Restrictions

DEPARTMENT OPERATING PLAN FOR FISCAL YEAR 2021/22

Fire and Emergency Services will continue striving to deliver excellent customer service and emergency services. Service delivery methods will be continually evaluated to determine operational and administrative efficiencies.

Key challenges and work plan items for the fiscal year 2021/22:

- Increasing costs with limited resources.
- Some of the cost increases are outside of Gresham's control.
- Facilities – Multiple Fire stations are in immediate need of improvement.
- Increase staffing and increase the number of units.
- Meeting National Standards.

Capital Improvement Funds Issues and Changes

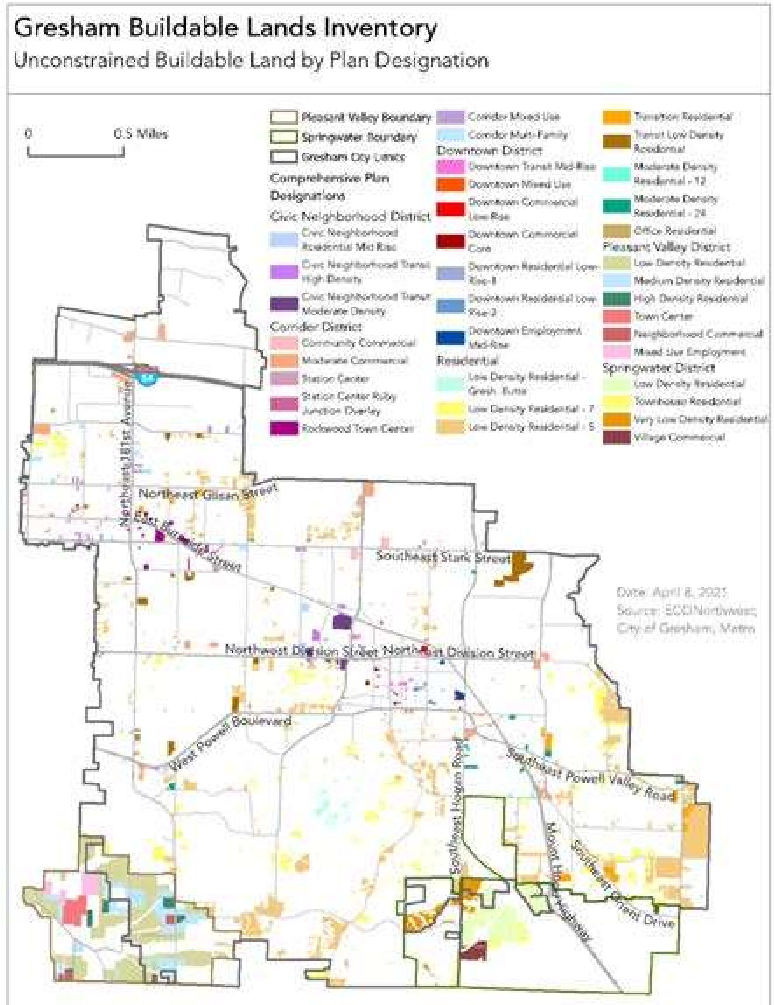
The City of Gresham adopts the Five-Year Capital Improvement Program as a separate document from the budget; however, the two documents are closely linked. The projects scheduled during the first year of the CIP are adopted as part of the City's annual budget. The Capital Improvement Program is updated on an annual basis. This process includes a Type IV Hearing with the Gresham Planning Commission.

City Facility Capital Fund – This fund accounts for capital expenditures related to the repair and maintenance of City-owned facilities such as City Hall, the Public Safety and Schools building, and fire stations. Revenues primarily come from operating departments. Expenditures are for maintenance and enhancements to city facilities.

Reserves and Future Planning

Development

The Economic Development team coordinates the efforts for Gresham to generate community wealth, protect property values, and foster regional links to create a balanced and diverse industry base that provides family-wage jobs.



The team has four major areas of focus:

- Business Retention and Expansion.
- Business Recruitment.
- Business Assistance.
- Development Assistance

Housing affordability is a challenge in most of the Portland Metro region, and Gresham is affected by these regional trends. Housing prices are increasing faster than incomes in Gresham and Multnomah County, which is consistent with state and national challenges. Gresham has a modest supply of multifamily housing, with over half of the renter households cost-burdened (64%). The households that are most likely to be cost-burdened are those with an income below 50% of Multnomah County's median family income (MFI) for a family of four ($46,100).

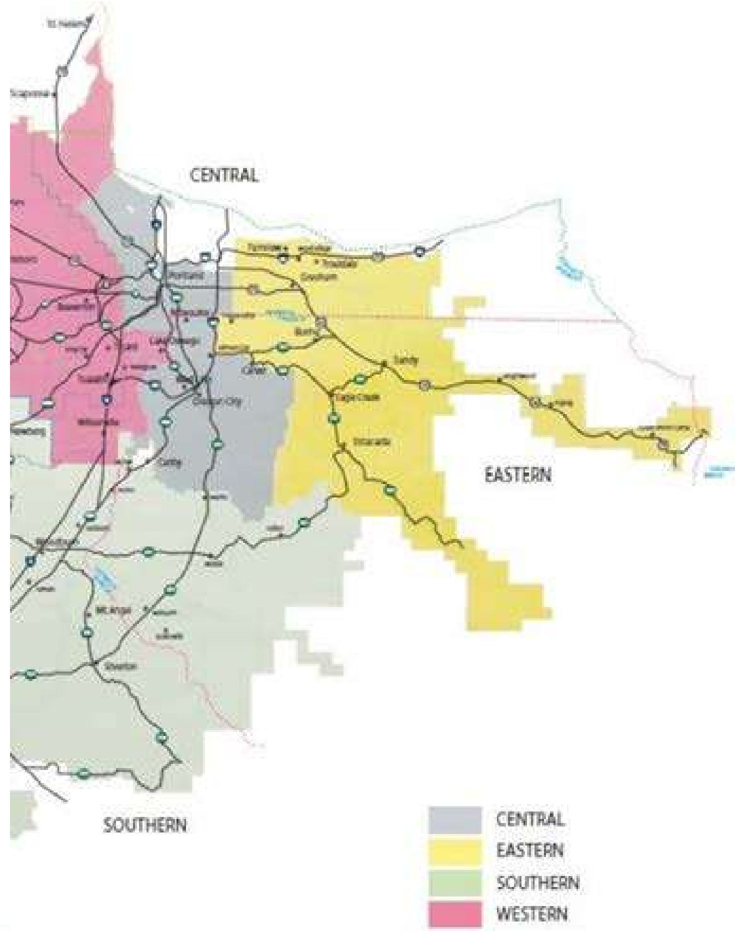
Gresham's key challenge over the next 20 years is providing opportunities for the development of relatively affordable housing. The challenges will affect households with an income below 60% of MFI ($55,300), who will need income-restricted housing, and households with incomes of 60% to 120% of MFI ($55,300 to $110,500), who can afford some market-rate housing. Also affected are lower-cost single-family housing, cottage housing, townhouses and duplexes, tri- and quadplexes, market-rate multifamily housing, and government-subsidized affordable multifamily housing.

About 44% of Gresham's households are cost burdened (paying 30% or more of their household income on housing costs). About 64% of Gresham's renters are cost-burdened, and about 28% of Gresham's homeowners are cost-burdened. Cost burden rates in Gresham are higher than those in Multnomah County. Because Gresham has affordable housing in comparison to other cities in the Portland Region, Gresham has a larger share of lower-income households, many of whom have trouble affording housing costs in Gresham and could not generally afford housing costs in other parts of the Portland Region.

INFRASTRUCTURE

Electric

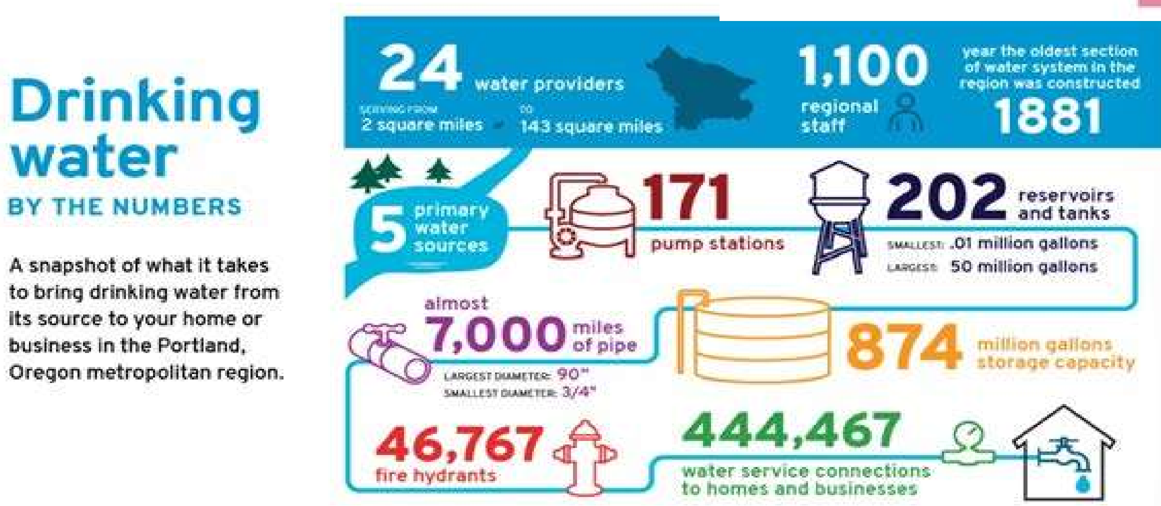
Portland General Electric's (PGE) service territory covers over 4,000 square miles and provides service to over 825,000 customers. PGE's service territory is confined within Multnomah, including Gresham, Washington, Clackamas, Yamhill, Marion, and Polk counties in northwest Oregon, as shown in Figure.



Water

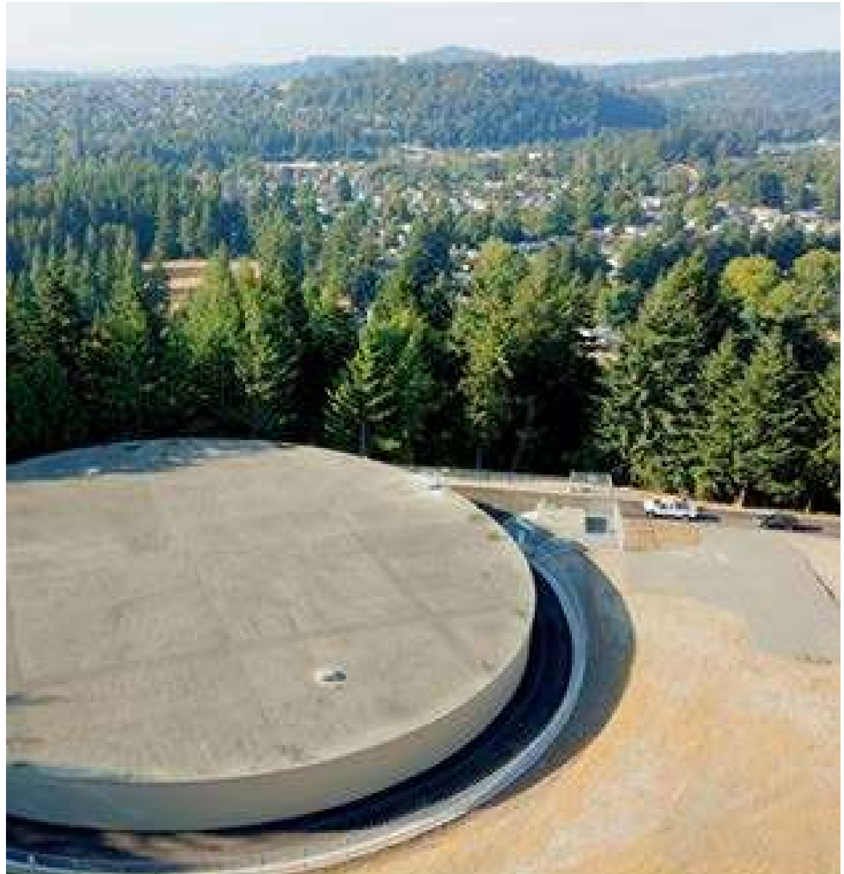
The Regional Water Providers Consortium provides leadership in the planning, management, stewardship, and resiliency of drinking water in the Portland, OR, metropolitan region.

The Consortium is comprised of 25 members who are in the Clackamas, Columbia, Multnomah, Washington, and Yamhill Counties



The Watershed and Stormwater Services

The Watershed and Stormwater program improves flood protection and water quality through the restoration of natural areas and the construction and maintenance of the City's public stormwater system. Staff works with the community on invasive weed control, native plants, and toxic reduction to protect local streams and wetlands.


The City of Gresham secured a $2.2M grant to update our most important and largest water storage facility, Grant Butte Reservoir (pictured), to withstand a large earthquake. This 3-year project was completed in 2021.

The Bull Run Watershed is Gresham's primary source of drinking water, located in the Mount Hood National Forest, 26 miles from Portland. The Portland Water Bureau and the U.S. Forest Service carefully manage the watershed to sustain and supply clean drinking water. In a typical year, the watershed receives an astounding 135 inches of precipitation (rain and snow), which flows into the Bull Run River and then into two reservoirs that store 10 billion gallons (about 37854100000 L) of drinking water. Source water assessments are completed to identify contaminants of concern for drinking water. The only contaminants of concern for the Bull Run are naturally occurring microorganisms, such as Giardia, Cryptosporidium, fecal coliform bacteria, and total coliform bacteria. The Portland Water Bureau regularly tests Bull Run water for these microorganisms that live in virtually all freshwater ecosystems.

Wastewater Services

Wastewater Services maintains 300 miles of sewer collection lines in Gresham, Fairview, and Wood Village. Wastewater is monitored and treated at the City's Wastewater Treatment Plant.

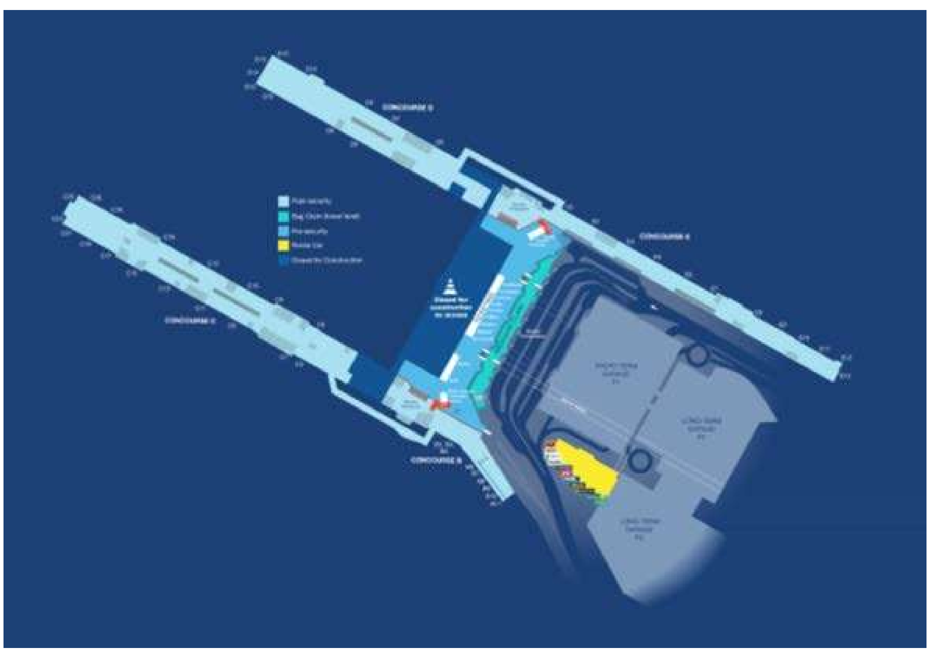
- Primary treatment: Wastewater enters the treatment plant, and flows through a screen, which removes large objects that could damage equipment. The remaining solids are minute particles that fall to the bottom of a sedimentation tank. The particles form a mass of solids called biosolids or sludge. This sludge is removed and converted to biogas to help create energy to power the treatment plant.
- Aeration: Aeration is an activated sludge process based on pumping air into a tank which promotes microbial growth in wastewater. The oxygen helps the bacteria break down organic matter and remove contaminants.

- Secondary clarification: The wastewater from the aeration basin is slowed down and any remaining sludge is separated and removed from the wastewater.
- Disinfection: The wastewater is then disinfected with sodium hypochlorite to remove any disease-causing organisms and ensure that water leaving the plant meets the water quality standards set by the Environmental Protection Agency (EPA).
- Plant effluent: Following the treatment, the water is discharged to the Columbia River.
- Energy Net Zero
- In 2015, the treatment plant reached energy net zero. The plant now produces more energy than it uses, saving the city an estimated $500,000 a year in electricity costs.
- Fats, oils, and grease are trucked to the plant from local food service establishments. The city collects a tipping fee for receiving and recycling this waste.

MAJOR TRANSPORTATION FEATURES

Airports

Portland International Airport is currently served by 13 international and domestic airlines offering more than 500 scheduled passenger arrivals and departures daily. Sixty U.S. cities offer nonstop flights to Portland, including Atlanta, Orlando, New York, Boston, and Chicago. Internationally, you can fly direct to PDX from Amsterdam, Calgary, Frankfurt, Guadalajara, London, Puerto Vallarta, Reykjavik, Tokyo, Toronto, and Vancouver, British Columbia.



Getting to and From the Airport

Portland Airport is located 9 miles (14.5 km) northeast of downtown and is conveniently connected to the city center via MAX light-rail train.

Light Rail

The MAX light rail Red Line is the easiest way to travel to and from the airport. Here are some quick facts:

- The trip between Portland Airport and downtown takes about 38 minutes.
- An adult ticket costs $2.50 (Youth / Honored Citizen $1.25
- You can roll your luggage on board.
- The first train of the day arrives at PDX at 4:45 a.m. The last train departs PDX at 11:50 p.m.

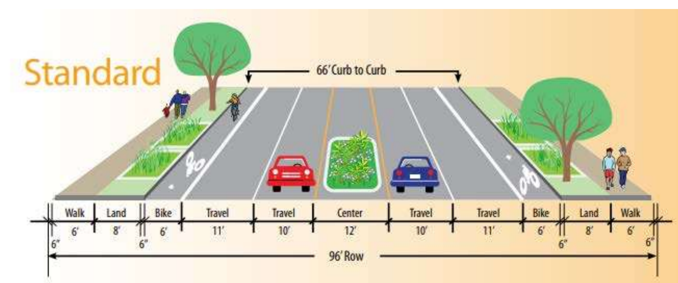
Roads

The functional classification system plan defines the function and design of the city's roadways to serve all travel modes, support existing and planned land uses, create aesthetic streets, and accommodate stormwater management. Gresham's preferred functional classification system plan was refined for the 2035 TSP through the lens of meeting three objectives:

• Ensure street function supports existing and future land uses.

• Ensure feasibility of development costs. The refinements also create consistency in planning for the transportation network throughout both the incorporated City areas and also the planned Pleasant Valley and Springwater Plan areas

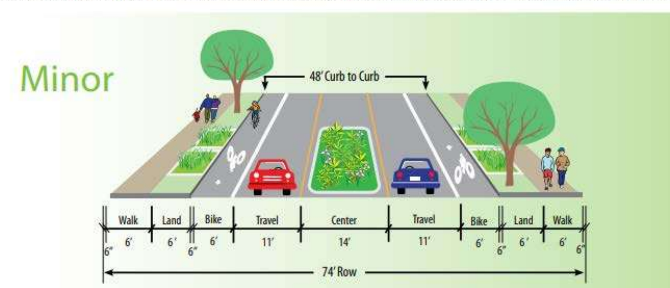
• Ensure street design is responsive to the community's needs and vision.



The standard arterial is designed to accommodate high traffic volumes at a community level scale. The standard arterial has one 10' interior and one 11' exterior travel lane in each direction and a 12' center lane for autos, 6' bicycle lanes, 8' planter strips, and 6' sidewalks. A raised median is preferred where functionally appropriate for travel safety and mobility. The narrower cross-section will support adjacent land uses but is more pedestrian friendly to cross and requires less right-of-way dedication from developments.

Minor Arterial

Minor arterials provide access between neighborhoods or from neighborhoods to the arterial system. Emphasis is on collection and distribution of trips within an arterial grid. Minor arterials consist of one 11' travel lane in each direction with a 14' center lane for a turn lane or planted median, 6' bicycle lanes, 6' planter strips, and 6'



CITY OF GRESHAM TRANSPORTATION SYSTEM PLAN 123

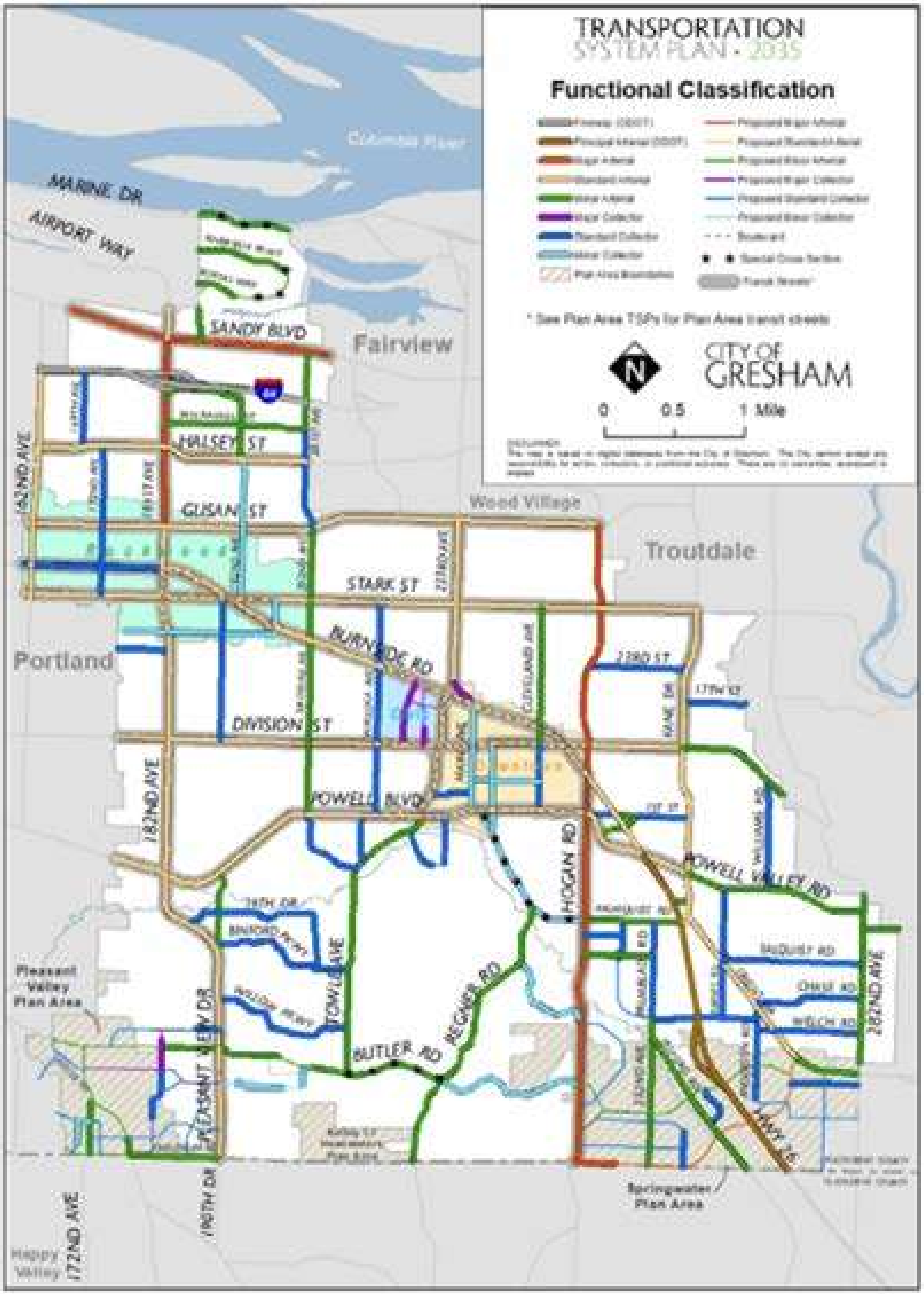
Freeways

Freeways are high-speed, high-volume corridors that facilitate through movements of regional, statewide, and interstate travel. They include grade-separated interchanges, four to eight travel lanes with median separation, and fully controlled property access. Volumes can be more than 60,000 vehicles per day. Interstate 84 is the only freeway facility in Gresham. It is within ODOT jurisdiction, and any improvements will be addressed through ODOT and Gresham coordination.

Principal Arterial

Principal arterials are high-speed, high-volume arterials that provide a high level of mobility for regional and inter-regional travel. Principal arterials include four to six travel lanes, raised medians and street intersections generally limited to signalized intersections with arterial and collector streets. Traffic volumes are typically between 35,000 and 50,000 vehicles per day and may be as high as 60,000 vehicles per day. Transit service will generally consist of regional or express bus service with relatively infrequent stops. On-street bicycle lanes are provided along with wide sidewalks separated from the street.

Figure 12: Gresham Public Transportation System Map

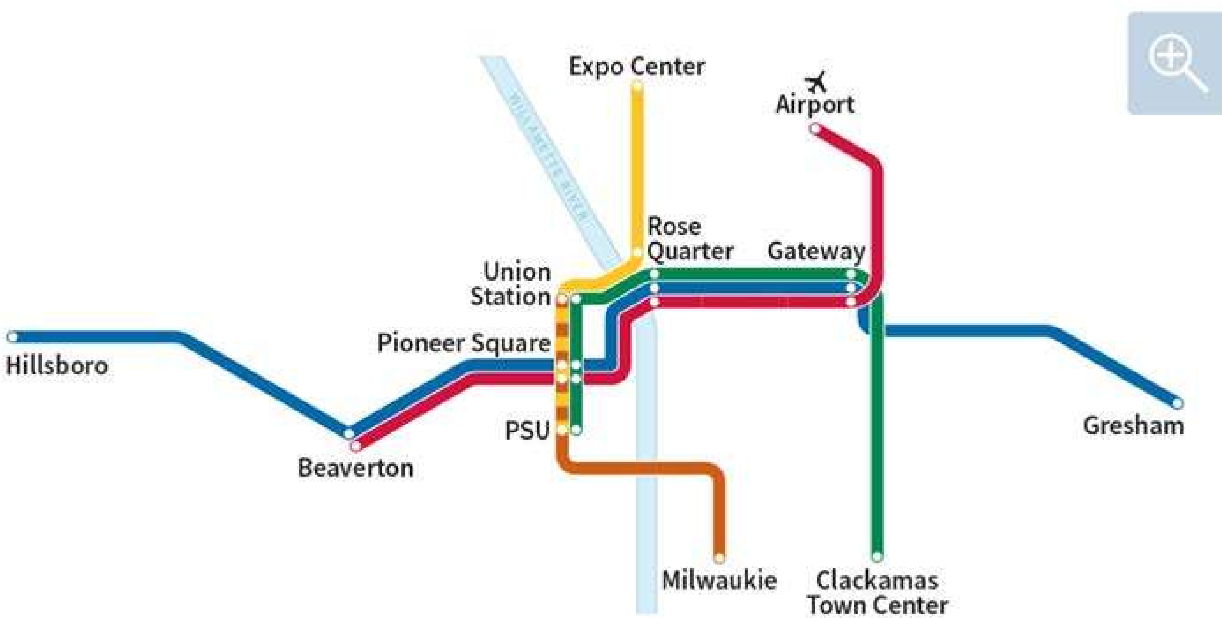


Rail

Looking back on the past year and a half, a clear picture emerges that people were (and are) still relying on transit. The number of people commuting to work dropped sharply in March and April 2020 as people followed the stay-home order and began working remotely.

Still, many riders continued to rely on TriMet to get to stores, appointments, and jobs when working from home wasn't possible. Throughout the pandemic, bus lines serving lower-income neighborhoods have lost the fewest number of trips overall. These areas include East Portland, East Multnomah County, Tualatin Valley Highway, Forest Grove/Cornelius, and Rivergate.

The pandemic ridership drop has given us the opportunity to reimagine where and how to provide service in the future. The projected ridership will continue to grow as people feel more comfortable going out and more destinations fully reopen. Also expected is that some people will continue working from home, at least part-time. As commuting and recreation trends evolve as the pandemic fades away—where people are riding and when a continual effort will need to be made to consider equity and the needs of those in transit-dependent areas as we continue to restore and hopefully grow service in the months and years ahead.



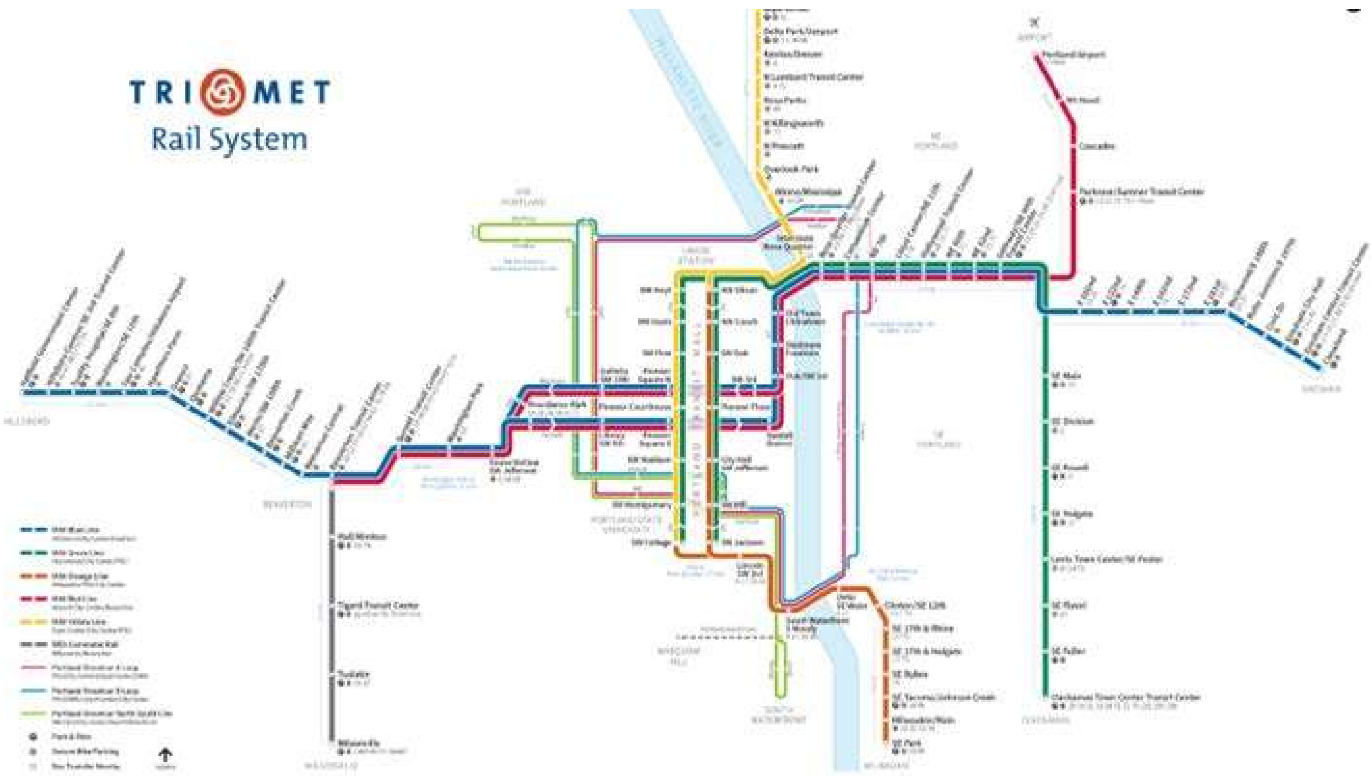
Public Transportation

Performance Indicator 2A.9

The agency defines and identifies infrastructure that is considered critical within each planning zone.

Gresham benefits from an extensive network of regional public transportation. TriMet's award-winning regional public transit system offers multiple transportation options for Gresham residents and visitors.

TriMet, the region's largest transit service provider, and Sandy Area Metro (SAM) are the two transit providers that serve Gresham. The transit network consists of a hierarchy of services designated to provide the highest possible service to Downtown, Civic Neighborhood and Rockwood, employment areas, and major regional arterials. Neighborhood access and circulation routes provide more flexible transit services to connect outlying low-density neighborhoods to the regional centers and other transit lines.



DESCRIPTION OF AGENCY PROGRAMS AND SERVICES

Organizational Overview

Service Delivery Programs

ORGANIZATIONAL OVERVIEW

Administration

Fire Administration maintains the department's day-to-day operations by providing overall management, leadership succession planning, mutual assistance plan development, public information, community outreach, contract and grant administration, cost recovery, financial models, and project management.

The primary activities of Fire Administration support the front-line functions of the department and include personnel management, development of policies and procedures, assurance that all legislative requirements are met, information concerning emergency events, administrative support, and departmental payroll and accounts payable.

Supervision of the Life Safety Division and maintaining Oregon OSHA compliance are the responsibility of the Fire Administration. Fire Administration also interacts with city departments and coordinates with state and local government agencies.

Emergency Operations

The Emergency Operations Division is responsible for the initial response to calls for emergency medical or fire suppression services. Approximately 75% of all incidents that FES responds to are calls for emergency medical services (EMS). Because medical emergencies are often time-critical, it is important that EMS arrive as quickly as possible. All firefighters in the department are trained at the minimum level of Emergency Medical Technician (EMT), with many certified as paramedics, to provide patient care in the field. All Gresham engine companies are Advanced Life Support (ALS) units, which means that each has a firefighter/paramedic on board. The Emergency Operations Division provides fire suppression, emergency medical services, and the following specialized responses: technical rescue 99 (confined space, high and low angle rope rescue, and structural collapse), water rescue, hazardous materials response, and wildland fire.

Training and Safety

Training is provided to maintain response readiness and proficiency at all levels. Emergency medical technician and paramedic training are provided to maintain State certification.

Life Safety

The Life Safety Division applies the fire codes to new construction to ensure appropriate fire suppression access and that the water supply and safety features, such as alarms and sprinkler systems, are code compliant. Fire investigation and determining causes is conducted for known arson fires, those involving significant fire loss and fire fatalities.

Physical Resources – Fire Stations

Station #71

Apparatus	Minimum Staffing
Truck 71	4 personnel
Engine 71	3 personnel
Battalion 1	1 personnel
Shift Fire Investigator	1 personnel
Heavy /Technical Rescue/ USAR	0 personnel – Cross staffed
Total Minimum Staffing	**9 personnel**

Station #72

Apparatus	Minimum Staffing
Engine 72	3 personnel
Haz MAT 3	0 personnel - Cross staffed
Total Minimum Staffing	**3 personnel**

Programs and Projects

Physical Fitness, Atmospheric Monitors
HazMat - Hazardous Materials Program
When Portland Fire and District 10 merged in 1984, Gresham Fire started its own HazMat team. Initially, this team provided hazmat responses for the states of Oregon and Washington.
In 1990, they assisted the Office of the State Fire Marshal with establishing the original 10, now 13, regional response teams. Gresham then became a HazMat 3 State Team.

Station #73

Apparatus	Minimum Staffing
Engine 73	3 personnel
Total Minimum Staffing	**3 personnel**

PROGRAMS AND PROJECTS

Self-Contained Breathing Apparatus (SCBA)- Repair and maintenance, testing

Station #74

Apparatus	Minimum Staffing
Engine 74	3 personnel
Rescue 74 (PU or SUV)	2 personnel
Brush 74	0 personnel – Cross Staffed
Total Minimum Staffing	**5 personnel**

Programs and Projects

Station 74 has a unique service area, as it serves Gresham, Fairview, and Wood Village with mutual aid from Portland Fire and Rescue. This station also neighbors the Gresham Fire Training Center. Station 74 maintains the critical hose and ladder equipment programs.

Station #75

Apparatus	Minimum Staffing
Engine 75	3 personnel
Water Rescue 75	0 personnel – Cross staffed
Total Minimum Staffing	**3 personnel**

Programs and Projects

Pre-plans

Water Rescue Program

The rivers and streams flowing through Gresham present serious hazards to the public and rescue personnel. Risk is historically high when residents underestimate:

- Water depth
- Temperature
- Waterpower
- Various hazards along the shore

The risk increases when rescuers do not have proper training or equipment when responding to these emergencies.

Station #76

Apparatus	Minimum Staffing
Engine 76	3 personnel
Brush 76	0 personnel – Cross-staffed
Total Minimum Staffing	**3 personnel**

Programs and Projects

Personal Protective Equipment (PPE)

Personal Protective Equipment is designed to protect firefighters from serious injuries or illnesses resulting from contact with chemical, radiological, physical, electrical, mechanical, or other hazards. It covers a variety of garments, such as turnout gear, gloves, helmets, and hoods.

Staffing Management

In collaboration with Telestaff technology, the program team works to ensure each station is staffed efficiently and meets the required staffing standards for each specialty and fleet found at each station.

Station #31

Apparatus	Minimum Staffing
Engine 31	**4 personnel – "B" Shift only**
Rescue 31	2 personnel**- "B" Shift only**
Water Tender	0 personnel- Cross staffed
Total Minimum Staffing	**6 personnel – Personnel B shift only**

Programs and Projects

Fire Cadet Program

Originally, Fire District 9 station was built in the 1950s. In the 1960s, Multnomah County Fire District 10 absorbed Fire District 9 and took over the station, renaming it Station 45. In the 1980s, the mid-Multnomah County Sewer Project connected homes and businesses and precipitated Gresham and Portland to annex mid-Multnomah County, encompassing areas of Fire District 10.

Annexation placed the boundary of the two cities immediately east of then Fire Station 45 and transferred the ownership of the station to the City of Portland. The Gresham/Portland agreement shares staffing and funding of the station. Portland Fire renumbered Station 31. A new station was rebuilt on the site, reopening in 2011. Today, Gresham Fire staffs one of three 24-hour shifts. The station and response vehicles are owned and maintained by Portland Fire and Rescue, covering mostly urban residential areas, churches and schools, access to the Powell Butte Nature Park, and commercial and industrial buildings.

SERVICE DELIVERY PROGRAMS

Fire Prevention and Services

Gresham Fire actively works in the community to engage and educate about fire safety and household fire prevention. Each member of our staff is dedicated to being an outstanding role model in public service for children and young adults seeking a career in the fire industry. The staff frequents community events like National Night Out, the Gresham Arts Festival, and City Fest in Gresham. In addition, Gresham Fire attends events and prevention meetings throughout the cities the department serves in East Multnomah County. In recent years, Gresham Fire has partnered with the Clackamas County Fire Department to showcase the importance of household smoke alarms and sprinklers with the use of a live demonstration burn trailer.

Life Safety Division

The goal of the Life Safety Division is to provide a safe community for our residents and firefighters. The Life Safety Division consists of six members for a growing population of over 150,000 people. A safe environment is provided through fire investigations, new construction plan reviews and inspections, inspecting new businesses, providing limited public education, and complaint-based referral inspections.

Fire prevention services are provided equally to the cities of Gresham, Troutdale, Wood Village, Fairview, and unincorporated Multnomah County through a fire service contract. The service area covers approximately 60 miles.

The response area includes over 4,000 businesses that can be inspected under a fee-based fire inspection program approved by the City Council in the early 2000s. Some of the businesses include: 102 schools and day cares, 431 apartment complexes, 218 places of assembly (churches, nightclubs, bars, etc.), and 314 storage warehouses.

Fire investigators are dispatched to fire scenes, including structures, vehicles, dumpsters, and miscellaneous fires. Investigators are both state and nationally certified, and some are also Evidence Collection Technicians. Investigators respond 24 hours a day, seven days a week. In 2019 the team responded to over 100 fires. The cause and origin of the fires are then used to help prevent future events.

Life Safety staff also provide new construction plan review and inspection services to cities and the county within the response area. This service verifies that the fire department has safe access to and within buildings of all occupancies. In 2019 they reviewed 1,519 construction plans and inspected 552 construction projects.

Life Safety staff conducts business and state license inspections to verify compliance with the Oregon Fire Code. They assist business owners in starting their business off with a fire-safe building. State license inspections require a fire inspection prior to the business being able to open its doors. Staff inspected 100+ businesses for licensing standards in 2019.

Operations

Description of Agency Programs and Services

Gresham Fire & Emergency Services (GFES) operates six fire stations within its service area and, through a unique Intergovernmental Agreement, also provides service from Portland Fire Station 31, which is staffed jointly by the cities of Portland and Gresham. Each station includes an engine company that is an Advanced Life Support unit and has a trained firefighter/paramedic assigned to the crew.

Emergency Services

Gresham Fire units responded nearly 20,000 times for medically related incidents in 2019 while utilizing some of the best technology available to provide care to the sick and injured. Our overall cardiac arrest survival rate is 14.7%, which is a significant drop from nearly 20% in 2018 and getting closer to the national average of 10.4%.

KEY HIGHLIGHTS AND WORK PLAN

- Technology includes the Life Pack 15 cardiac monitor and defibrillator.
- First in the region to have all units supplied with nine LUCAS mechanical CPR device and video laryngoscopy, a small video camera device used to place a breathing tube in a victim who is not breathing.
- Program provides medical training to all Gresham Fire staff, including continuing education for EMTs and Paramedics.
- Ensures Gresham Fire stays current on medical trends and community issue like influenza.

Fire Youth Academy

The Gresham Fire Department has homed the Fire Cadet program for nearly 30 years. Originally the program was considered an "explorer post" run in partnership with the Boy Scouts of America. As the program evolved and grew, the fire department took over the program in its entirety. Today 10% of the Gresham Fire staff started through an explorer program.

Gresham Fire & Emergency Services "Firefighter Cadet Program" is designed to provide teenagers and young adults ages 15-21 with opportunities in leadership, teamwork, career exploration, and responsibility as it relates to the fire service. Fire Cadets are taught basic firefighting skills, teamwork, and self-reliance. Once Cadets demonstrate their basic skills and knowledge proficiency, they can ride-a-long with career staff to experience the work that we do.

CARES Program

Gresham Fire frequently responds to people and facilities that call 911 as their primary means of health care. Often, these residents might have chronic health issues and face barriers to getting regular, preventative health care. Thanks to an innovative partnership with the OHSU School of Nursing, the Gresham Fire CARES program connects nursing students with residents in need.

Training

Gresham firefighters fill many different roles to protect the community. Firefighters are cross-trained in emergency medicine, including advanced life support paramedics, auto extrication techniques, rescue disciplines, fire control and suppression, and many other techniques to meet the community's needs.

Emergency Preparedness

Gresham Fire Department is committed to community emergency preparedness and offers several programs for the community to participate in partnering with Multnomah County, Oregon.

ALL HAZARD COMMUNITY RISK ASSESSMENT

Risk Assessment Process

Critical Tasking Methodology

Historical Service Demand and Probability Analysis

RISK ASSESSMENT PROCESS

The purpose of this section is to describe the process used in performing an analysis of the community served and its potential risks using real-world factors that are both physical and theoretical. To perform a comprehensive risk assessment, it was necessary to analyze the physical, economic, sociologic, and demographic aspects of the area served. The factors that drive the service needs are examined in a precise and scientific manner to determine the capabilities necessary to adequately address the risks that are present. The assessment of risk is critical for the determination of the number and placement of resources and the mitigation measures that are required by the community.

Response Strategies as it relates to

The agency identifies and assesses the nature and magnitude of all hazards and risks within its jurisdiction. Risk categorization and deployment impact considers such factors as cultural, economic, historical, and environmental values, and operational characteristics.

Core Competency 2B.1

Core Competency 2B.4

The agency's risk identification, analysis, categorization, and classification methodology has been utilized to determine and document the different categories and

The risks that the department faces can be natural or human-made and fall in various locations on the consequence, probability, and impact matrix. Where these risks are located on the matrix has a direct impact on how resources are located around the jurisdiction (distribution) and the overall number of resources required to mitigate the incident (concentration) effectively using the staffing and deployment model. Each of the major natural and humanmade risks evaluated received a clearly defined probability and consequence ranking. Service areas that either had little quantitative data or did not require that level of analysis were evaluated through both retrospective analysis as well as structured interviews with department staff members. "Call Type" variable entries from the 2018 to 2021 data file from Gresham Fire and Emergency Services were classified into the program areas of EMS, fire, hazmat, mutual aid, and rescue based on departmental leadership decisions. Records were additionally assigned a risk classification based on departmental leadership criteria depending upon available data. Risk classifications were assigned based on the determinant, when available, and based on call type when the determinant was not available.

Determinant[1]	Risk Classification
A	Low
B	Low
O	Low
C	Moderate
D	High
E	Maximum

Figure 13:2018-2021 GFES Incident Type with Risk Rating

		Number of Incidents					Percentage of Incidents[1]				
		Risk Rating					Risk Rating				
Reporting Period[2]	Program	Low	Moderate	High	Maximum	Total	Low	Moderate	High	Maximum	Total
2018	EMS	16,309	141	89	0	16,539	98.6	0.9	0.5	0.0	100.0
	Fire	3,209	10	134	0	3,353	95.7	0.3	4.0	0.0	100.0
	Hazmat	49	45	14	0	108	45.4	41.7	13.0	0.0	100.0
	Rescue	5	0	6	0	11	45.5	0.0	54.5	0.0	100.0
	Total	**19,572**	**196**	**243**	**0**	**20,011**	**97.8**	**1.0**	**1.2**	**0.0**	**100**
2019	EMS	17,829	158	72	0	18,059	98.7	0.9	0.4	0.0	100.0
	Fire	3,242	31	163	0	3,436	94.4	0.9	4.7	0.0	100.0
	Hazmat	52	47	25	0	124	41.9	37.9	20.2	0.0	100.0
	Rescue	21	0	12	0	33	63.6	0.0	36.4	0.0	100.0
	Total	**21,144**	**236**	**272**	**0**	**21,652**	**97.7**	**1.1**	**1.3**	**0.0**	**100**
2020	EMS	17,238	164	109	0	17,511	98.4	0.9	0.6	0.0	100.0
	Fire	3,496	34	170	0	3,700	94.5	0.9	4.6	0.0	100.0
	Hazmat	39	40	21	0	100	39.0	40.0	21.0	0.0	100.0
	Rescue	8	0	13	0	21	38.1	0.0	61.9	0.0	100.0
	Total	**20,781**	**238**	**313**	**0**	**21,332**	**97.4**	**1.1**	**1.5**	**0.0**	**100**
2021	EMS	12,859	2,929	237	3290	19,315	66.6	15.2	1.2	17.0	100.0
	Fire	3,810	14	217	0	4,041	94.3	0.3	5.4	0.0	100.0
	Hazmat	64	39	22	0	125	51.2	31.2	17.6	0.0	100.0
	Rescue	19	0	14	0	33	57.6	0.0	42.4	0.0	100.0
	Total	**16,752**	**2,982**	**490**	**3290**	**23,514**	**71.2**	**12.7**	**2.1**	**14.0**	**100**

Figure 14: GFES Risk Rating for All Incidents

		Number of Incidents					Percentage of Incidents[1]				
		Risk Rating					Risk Rating				
Reporting Period[2]	Program	Low	Moderate	High	Maximum	Total	Low	Moderate	High	Maximum	Total
All	EMS	64,235	3,392	507	3,290	71,424	89.9	4.7	0.7	4.6	100.0
	Fire	13,757	89	684	0	14,530	94.7	0.6	4.7	0.0	100.0
	Hazmat	204	171	82	0	457	44.6	37.4	17.9	0.0	100.0
	Rescue	53	0	45	0	98	54.1	0.0	45.9	0.0	100.0
	Total	**78,249**	**3,652**	**1,318**	**3,290**	**86,509**	**90.5**	**4.2**	**1.5**	**3.8**	**100**

Figure 15: GFES Effective Response Force for Risk Type

Effective Response Force (# of Units)				
Program	Maximum	High	Moderate	Low
EMS	9	2	1	1
Fire	7	6	3	1
Hazmat	9	7	4	1
Rescue	7	5	4	1

Community Risk Input Factors

Risk factors in the community were analyzed with historical and statistical data, and trending was established based on the type of call and location of the incident. General categories of risk included overall geospatial characteristics of the community, natural hazards, and humanmade hazards.

Core Competency 2B.6
The agency assesses critical infrastructure within the planning zones for capabilities and capacities to meet the demands posed by the risks.

Core Competency 2B.4
The agency's risk identification, analysis, categorization, and classification methodology has been utilized to determine and document the different categories and classes of risks within each planning zone.

Geospatial risk factors

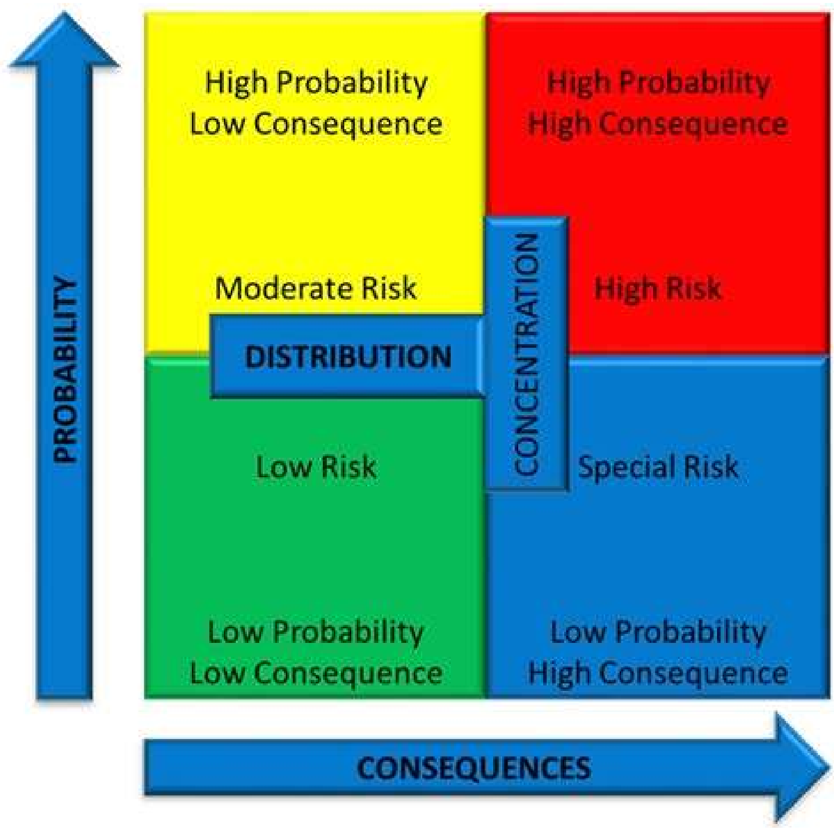
- Political Boundaries
- Growth Boundaries
- Construction Limitations
- Topography and Response Barriers
- Critical Infrastructure
- Electrical
- Water System
- Emergency Communications
- Rural Interface

Natural Hazards

- Tornado
- Flood
- Earthquake
- Contagious Diseases
- Wildfire
- Landslide

Human-made risk hazards

- Airport
- Passenger and Freight Rail Lines
- Road Networks
- Fires
- EMS
- Hazardous Materials
- Technical Rescue

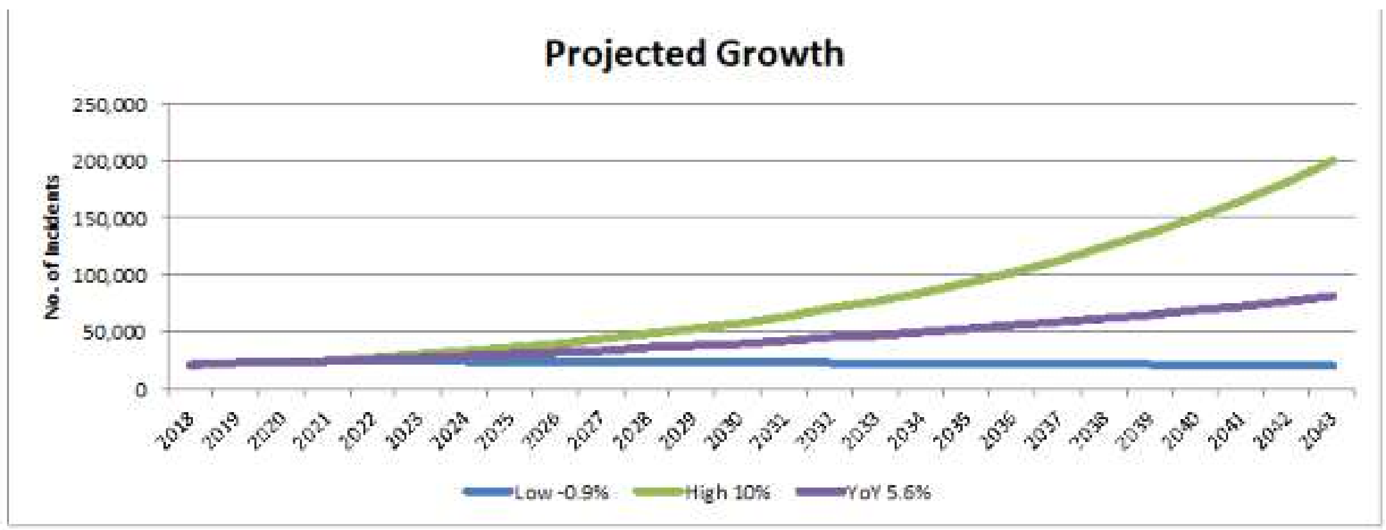


GEOSPATIAL RISK FACTOR

Low Risk Low Probability Low Consequence	Political and Growth Boundaries

Projected Growth

The available data set included five reporting periods of data, representing 2018 - 2021. From 2018-2021, calls for services increased from 21,139 to 24,659, with an average growth rate of 5.6% per year. The figure below depicts observed call volume during the last four-year reporting periods and various hypothetical growth scenarios for the next 20 years. These projections should be used with caution due to the variability in growth observed across prior calendar years. In all cases, data should be reviewed annually to ensure timely updates to projections and utilize a five-year rolling average.



Assuming that future demands may not be reasonably distributed across the various stations in the system, the system may ultimately require a redistribution of workload and ultimately reinvestment in resources to meet the growing demand. While the system should be evaluated continuously for performance and desired outcomes, the department should specifically re-evaluate workload and performance indicators for every 1,000-call increase to ensure system stability.

Low Risk

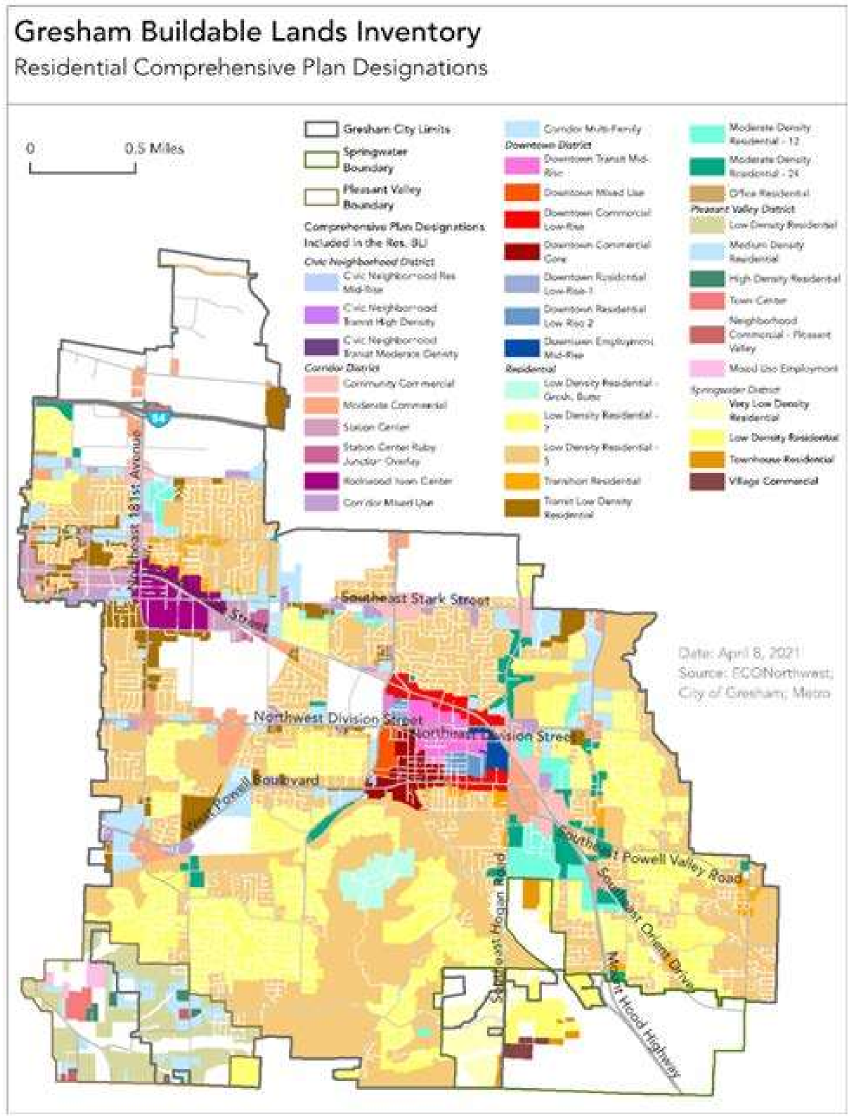
Low Probability

Low Consequence

Construction Limitations

Construction Limitations

[i]Changes in Gresham's demographics have presented a need for a greater variety of housing types. The City has changed considerably since the completion of its last HCA (previously Gresham Community Development Plan Volume 1: Findings 4.800 2021-2041 Housing Capacity Analysis (rev. 10/2021) 4.800-3 referred to as the Housing Needs Analysis) in 2013. Gresham grew from 105,594 people in 2010 to 113,409 people in 2020. This is an addition of 7,815 people or a 7% growth. Growth in Gresham slowed but did not stop during the 2007 to 2009 recession and its aftermath of very slow growth.



By 2015, Gresham's population was growing faster. During the 2015 to 2020 period, median housing prices in Gresham increased from about $259,000 in 2015 to $401,000 in 2020, a 55% increase consistent with sales price growth in Multnomah County and other cities such as Hillsboro, Troutdale, and Milwaukie. Gresham's cost burden rates increased from 34% in 2000 to 44% in the 2014-2018 American Community Survey (ACS) 5-year estimate period.

Moderate Risk

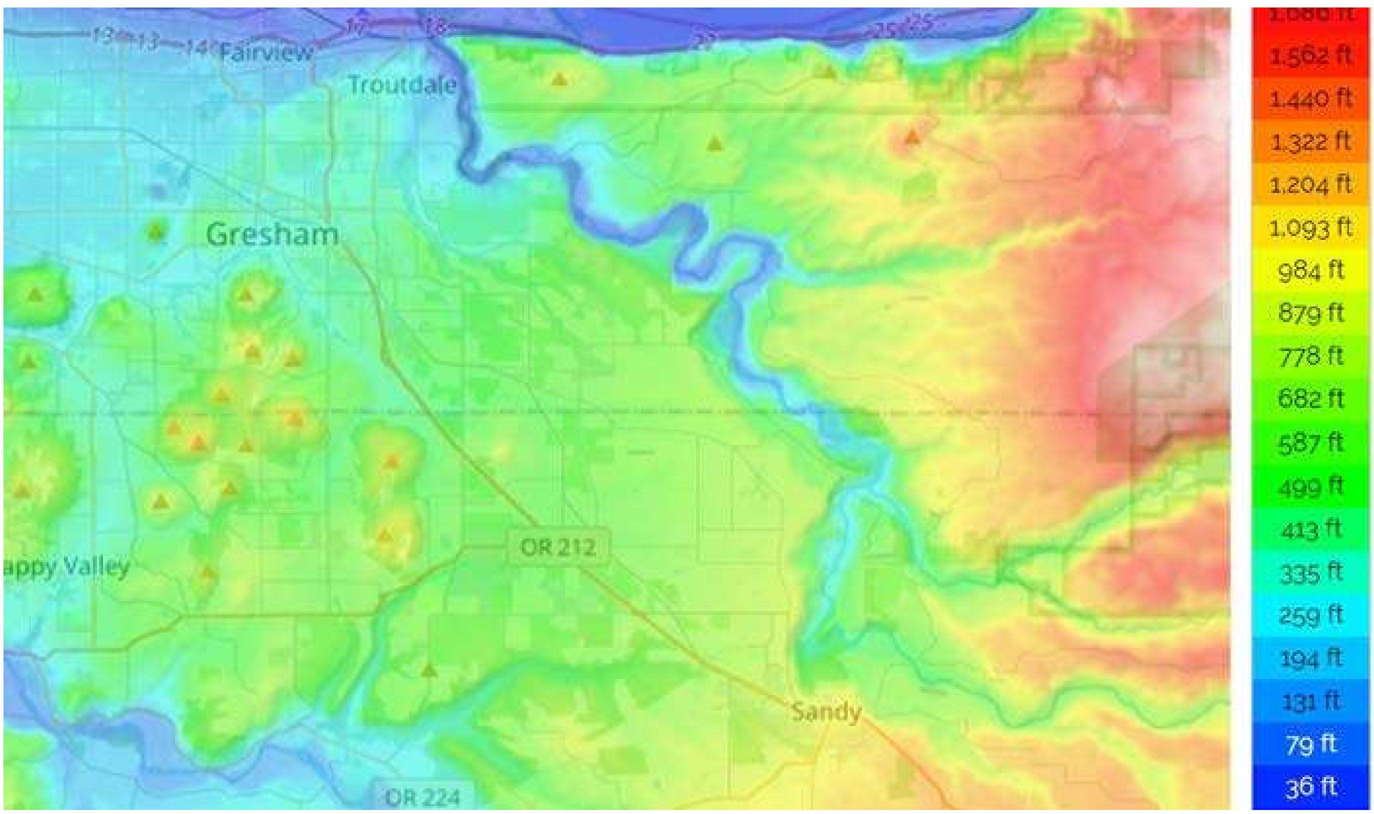
High Probability

Low Consequence

Topography—Response Barriers

Topography—Response Barriers

Primarily response barriers are associated with interaction with mountainous areas and foothills that can be inhibited during secondary events such as severe weather, flooding, and wildfire. The topography of Multnomah County varies from flat to gently hilly terrain along the Willamette River and along the lower reaches of the Columbia River to hilly in Portland's West Hills. Much of eastern Multnomah County from the Sandy River watershed eastward is hilly to mountainous. The highest location in Multnomah County is Buck's Peak, near Lost Lake, with an elevation of 4,751 feet. Areas with steep slopes may be susceptible to landslides.

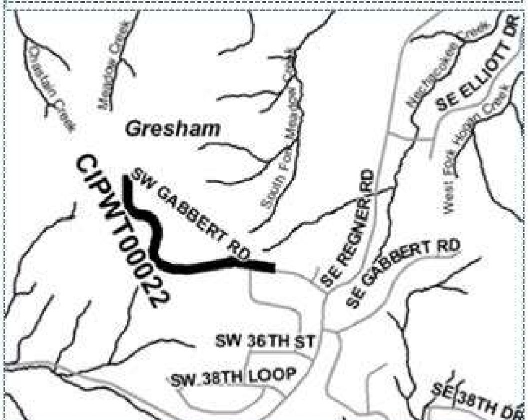


Moderate Risk High Probability Low Consequence	Critical Infrastructure

Critical Infrastructure

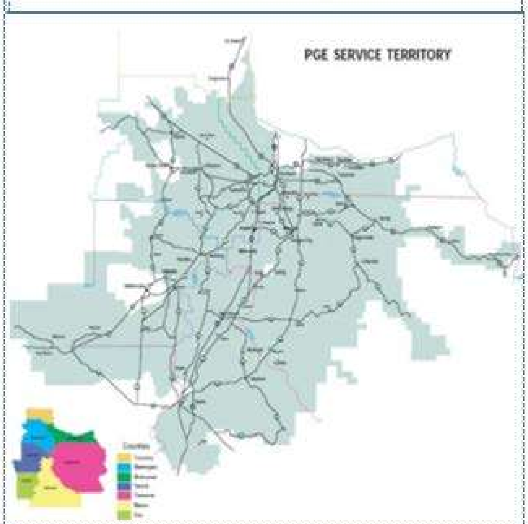
Failure of critical public or private utility infrastructure can result in a temporary loss of essential functions and/or services that last from just a few minutes to days or more at a time. Public and private utility infrastructure provides essential life-supporting services, such as electric power, natural gas, heating, and air conditioning, water, sewage disposal and treatment, storm drainage, communications, and transportation.

Water Distribution

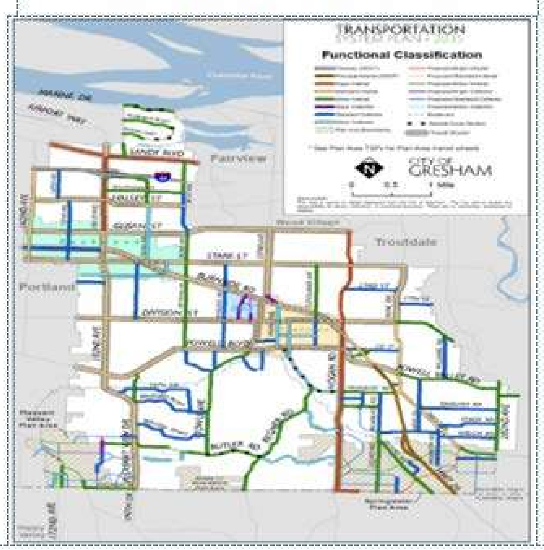


Water Treatment

Electric Service



Transportation—Major Roads



Moderate Risk High Probability Low Consequence	Water System

Water System

Watershed is Gresham's primary source of drinking water, located in the Mount Hood National Forest, 26 miles from Portland. The Portland Water Bureau and the U.S. Forest Service carefully manage the watershed to sustain and supply clean drinking water. In a typical year, the watershed receives an astounding 135 inches of precipitation (rain and snow), which flows into the Bull Run River and then into two reservoirs that store nearly 10 billion gallons of drinking water. Source water assessments are completed to identify contaminants of concern for drinking water. The only contaminants of concern for the Bull Run are naturally occurring microorganisms, such as Giardia, Cryptosporidium, fecal coliform bacteria, and total coliform bacteria. The Portland Water Bureau regularly tests Bull Run water for these microorganisms that live in virtually all freshwater ecosystems.

Wastewater Services

Maintains nearly 300 miles of sewer collection lines in Gresham, Fairview, and Wood Village. Wastewater is monitored and treated at the City's Wastewater Treatment Plant.

Primary treatment: Wastewater enters the treatment plant, and flows through a screen, which removes large objects that could damage equipment. The remaining solids are minute particles that fall to the bottom of a sedimentation tank. The particles form a mass of solids called biosolids or sludge. This sludge is removed and converted to biogas to help create energy to power the treatment plant.

Aeration: Aeration is an activated sludge process based on pumping air into a tank which promotes microbial growth in wastewater. The oxygen helps the bacteria break down organic matter and remove contaminants.

Secondary clarification: The wastewater from the aeration basin is slowed down, and any remaining sludge is separated and removed from the wastewater.

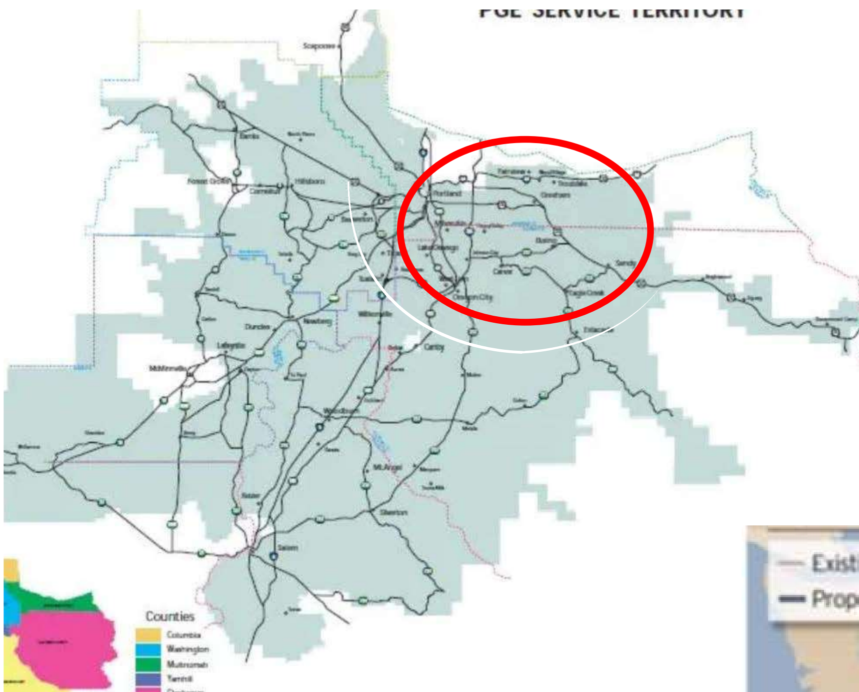
Disinfection: The wastewater is then disinfected with sodium hypochlorite to remove any disease-causing organisms and ensure that water leaving the plant meets the water quality standards set by the environmental Protection Agency (EPA).

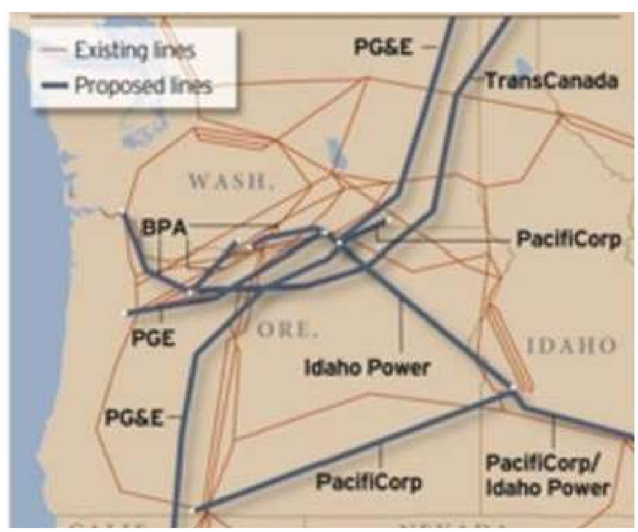
Plant effluent: Following the treatment, the water is discharged to the Columbia River.

Moderate Risk **igh Probability** **ow Consequence**	**Electrical Power Grid**

Electrical Power Grid

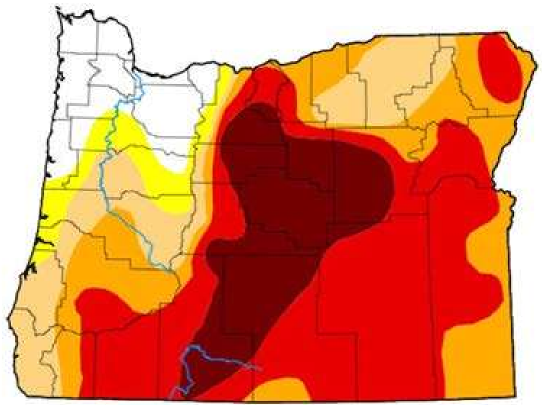
The Gresham falls within the Pacific Gas & Electric Service area (PG&E). The Service has been and could continue to be impacted. In California, fires are burning more intensely than ever, and some have become mega-fires that have destroyed entire neighborhoods. Some of the deadliest fires have been caused by the electrical grid. In general, all fires are burning more intensely because of climate change and an unhealthy forest landscape due to drought.





Low Risk **Low Probability** **Low Consequence**	**Rural Interface**

Rural Interface



Wild or undeveloped lands and any surrounding urban areas (WUI - wildland-urban interface) are most at risk of fires. Potential risks include the destruction of land, property, and structures, as well as injuries and loss of life. Although rare, deaths and injuries usually occur at the beginning stages of wildfires when sudden flare-ups occur from high wind conditions. In most situations, however, people could evacuate the area and avoid bodily harm. Financial losses related to wildfires include destroyed or damaged houses, private facilities and equipment, loss of commercial timber supplies, and local and State costs for response and recovery.

Scientists estimated that in 1990, 31 million homes were in "wildland-urban interface" (WUI) areas throughout the Unites States—with houses in or near wildland vegetation, which imparts a greater risk of wildfire due to the proximity to flammable vegetation. Twenty years later, in 2010, that number increased by 41 percent to 43 million homes. The increase is fueled by several factors, including urban sprawl and the hunt for a lower cost of living.

Multnomah County urban areas have escaped the recent large fire occurrences of other western Oregon counties. However, weather, fuel buildup, and climatic changes have created conditions conducive to a large fire event. This is especially true in unincorporated areas where residential development is heavily interwoven with forest land, vegetation is essentially continuous, and fire suppression resources are scarce. A relatively small fire in these areas would pose a significant risk to many residents and their homes. Strong east winds generated in the Columbia River Gorge are a driver of wildfire risk, particularly in October and November when northwest Oregon is historically at its peak for fire danger. High winds during the peak of the wildfire season place Troutdale at a moderate risk of wildfires.

Natural Risk Hazards

High Risk Low Probability High Consequence	**Fault Activity**

Fault Activity

Most earthquakes are caused by the sudden release of built-up stress along faults, fractures in the Earth's crust where large blocks of crustal rock move against one another. An earthquake's size can be measured by the amount of energy released by that movement. While scientists can't predict earthquakes, they are developing earthquake early warning systems that can provide seconds to minutes of warning when an earthquake occurs. Scientists can also estimate the likelihood of future quakes and use that information to design safer buildings and roads. In the United States, large earthquakes pose a substantial threat along the West Coast. A single event can be devastating.

Multnomah County is in a geologically active area. There are several active earthquake faults within the county and many other faults nearby, including the Cascadia Subduction Zone. A Cascadia Subduction Zone earthquake of a magnitude of 8.0 or higher is projected for the Pacific Northwest, and its impact will be catastrophic. The county also is close to active volcanoes, including Mount Hood in Clackamas County, Oregon, and Mt. St. Helens in Washington State.

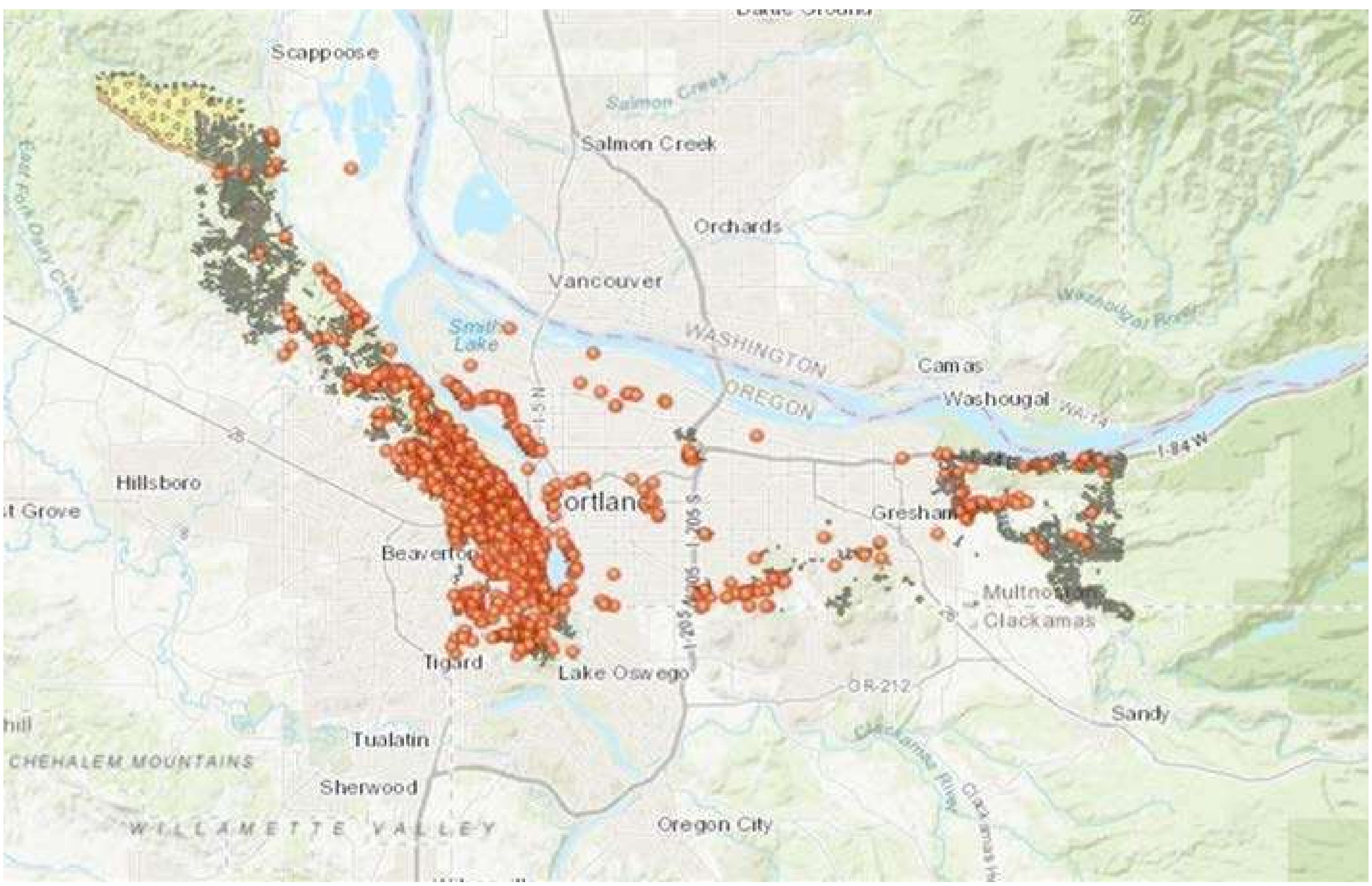

1 day ago 1.8 magnitude, 11 km depth
Morton, Washington, United States
1 day ago 2.3 magnitude, 12 km depth
Morton, Washington, United States
3 days ago 1.8 magnitude, 8 km depth
Cascade, Idaho, United States
1 week ago 1.9 magnitude, 7 km depth
Cascade, Idaho, United States
1 week ago 1.5 magnitude, 0 km depth
Springfield, Oregon, United States
1 week ago 2.0 magnitude, 8 km depth
Mill Plain, Washington, United States
1 week ago 1.9 magnitude, 3 km depth
Cascade, Idaho, United States
1 week ago 2.3 magnitude, 5 km depth
Cascade, Idaho, United States
1 week ago 2.6 magnitude, 4 km depth
Cascade, Idaho, United States
1 week ago 2.0 magnitude, 8 km depth
Cascade, Idaho, United States

High Risk High Probability High Consequence	**Landslides**

Landslides

Landslides are masses of earth, rock, or debris that move down slopes. Landslides are triggered by one event, but many causes can weaken slopes over time and make them more likely to fail when a triggering event occurs. These causes can be both natural and artificial. Landslides often occur in areas with oversteepened slopes, weak soils/bedrock, or de-vegetated slopes (whether by human deforestation or natural events such as wildfires). Some of the most damaging landslides are triggered by water, typically from intense short-term rainfall or long-term saturation of the slope. Both natural and human activities (such as irrigation or seepage) can saturate hillsides. Earthquakes and volcanic eruptions also cause damaging landslides.

Landslides are a serious geologic hazard common to almost every State in the United States. It is estimated that in the United States, they cause more than $1 billion in damages and from about 25 to 50 deaths each year. The jurisdictional are of Gresham, and the surrounding area is prone to potential Landslides and has had previous events requiring evacuation.

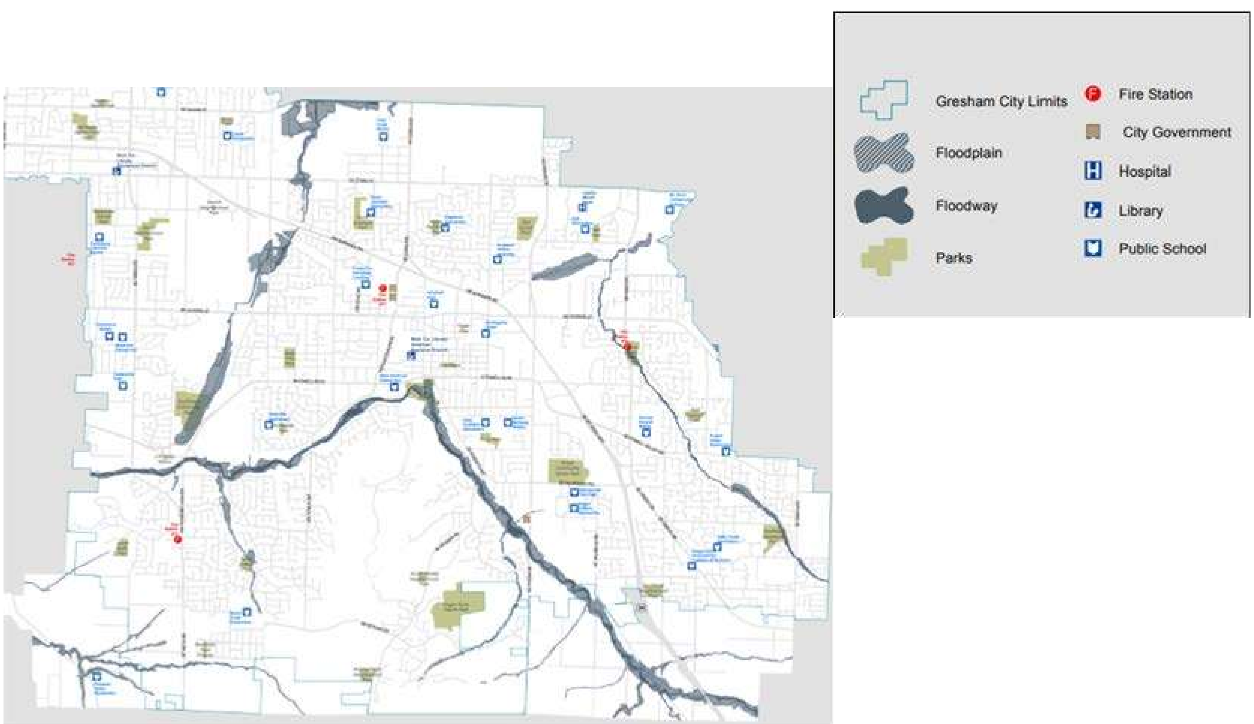


High Risk **High Probability** **High Consequence**	**Flooding**

Flooding

Flooding is a coast-to-coast threat to the United States and its territories in all months of the year. Flooding typically occurs when prolonged rain falls over several days, heavy rain falls over a short period, or when an ice or debris jam causes a river or streams to overflow into the surrounding area. The most common cause of the flooding is water due to rain and/or snowmelt that accumulates faster than soils can absorb it, or rivers can carry it away. Flooding can also result from the failure of a water control structure, such as a levee or dam. Approximately seventy-five percent of all Presidential disaster declarations are associated with flooding.

The two major rivers in Multnomah County are the Columbia River, which forms much of the county's northern boundary, and the Willamette River, which flows through Portland. There are levees on the Columbia River that protect the area from most flooding. The levees are in Multnomah County and are maintained by the Multnomah County Drainage District. The Sandy River, a tributary of the Columbia River, is another significant river in the county. There are floodplains mapped by the Federal Emergency Management Agency (FEMA) along these three rivers and along many smaller streams.



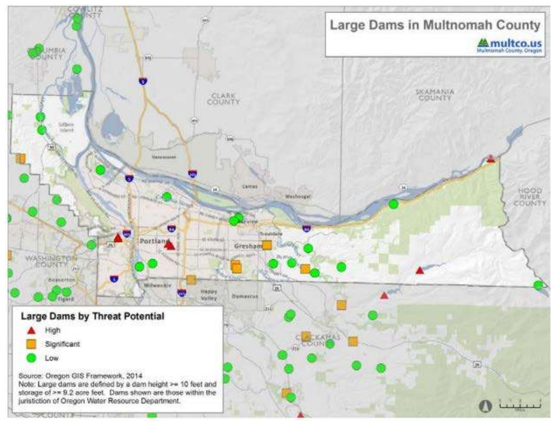
High Risk High Probability High Consequence	Critical Infrastructure

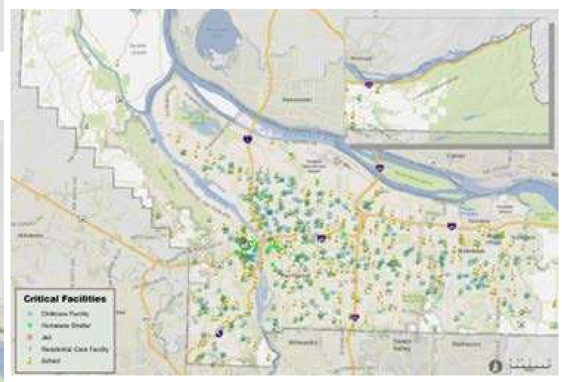
Critical Infrastructure

Failure of critical public or private utility infrastructure or facilities can result in a temporary loss of essential functions and/or services that last from just a few minutes to days or more at a time. Public and private utility infrastructure provides essential life-supporting services, such as electric power, natural gas, heating, and air conditioning, water, sewage disposal and treatment, storm drainage, communications, and transportation.

Critical Facilities

- AMR - Ambulance
- Camps/Recreation
- Churches
- Clinics
- County Owned Buildings
- Emergency Operations Centers
- Fire Stations
- Hospitals
- Libraries
- Police Stations
- Rest-Nursing-Group Homes
- Schools
- Sheriff Sub Stations





High Risk High Probability High Consequence	Expansive Soils

Expansive Soils

Each year in the United States, expansive soils cause billions of dollars in damage to buildings, roads, pipelines, and other structures. This is more damage than caused by floods, hurricanes, tornadoes, and earthquakes combined (FEMA 1997).

Expansive soils are generally clays or sedimentary rocks derived from clays, which experience volume changes because of moisture variation. The hazard that expansive soils create can be significant. Many of the expansive soils do not create large areas of destruction; however, they can disrupt supply lines (i.e., roads, power lines, railways, and bridges) and damage structures. The effects on structures can be dramatic if expansive soils supporting structures are allowed to become too wet or too dry. Lightly loaded one-story or two-story buildings, warehouses, residences, and pavements are especially vulnerable to damage because these structures are less able to suppress the differential heave of the swelling foundation soil than heavy, multistory structures. Patios, driveways, and walkways may also crack and heave as the underlying expansive soils become wet and swell. Expansive soils do not change size quickly; observing damage in real-time can sometimes be difficult. Although the damage might not occur in a matter of minutes, it still has the potential to severely damage structures and roads over a matter of time if not sufficiently mitigated.

Typically, the structures that experience problems with expansive soils are older homes, but newer homes (built within the last 15 years) may also experience problems due to expansive soils. The types of problems associated with expansive soils are generally not catastrophic, but the effects result in cracked foundations, cracked walls, cracked concrete slabs, cracks around windows and doors, as well as jammed windows and doors. Cracks to foundations might lead to additional problems if other catastrophic events were to occur (such as earthquakes).

Moderate Risk

High Probability

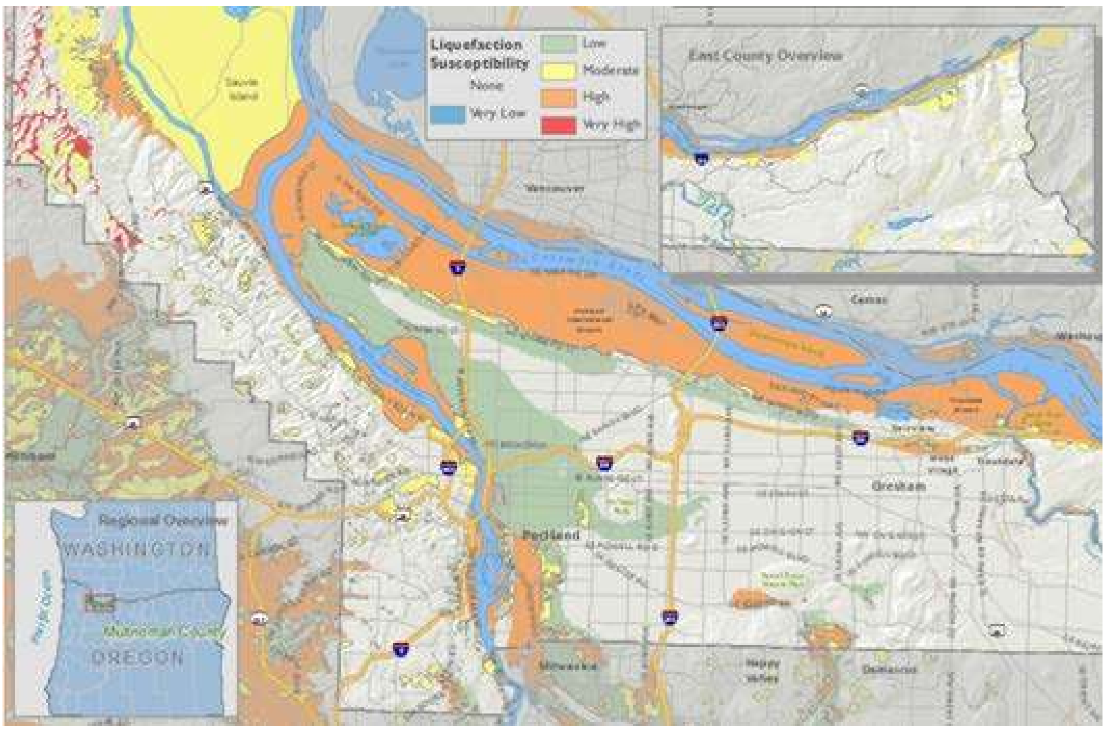
Low Consequence

Volcanoes

Volcanoes

There are five major volcanoes in the Cascades that are in relative proximity and pose a potential threat to the Planning Area: Mount St. Helens, Mount Hood, Mount Rainier, Mount Adams, and Mount Jefferson. All are known or suspected to be active, and most have geological records that indicate past histories of explosive eruptions with large ash releases. Mount Hood and Mount St. Helens pose the greatest threat to the communities in the Planning Area.

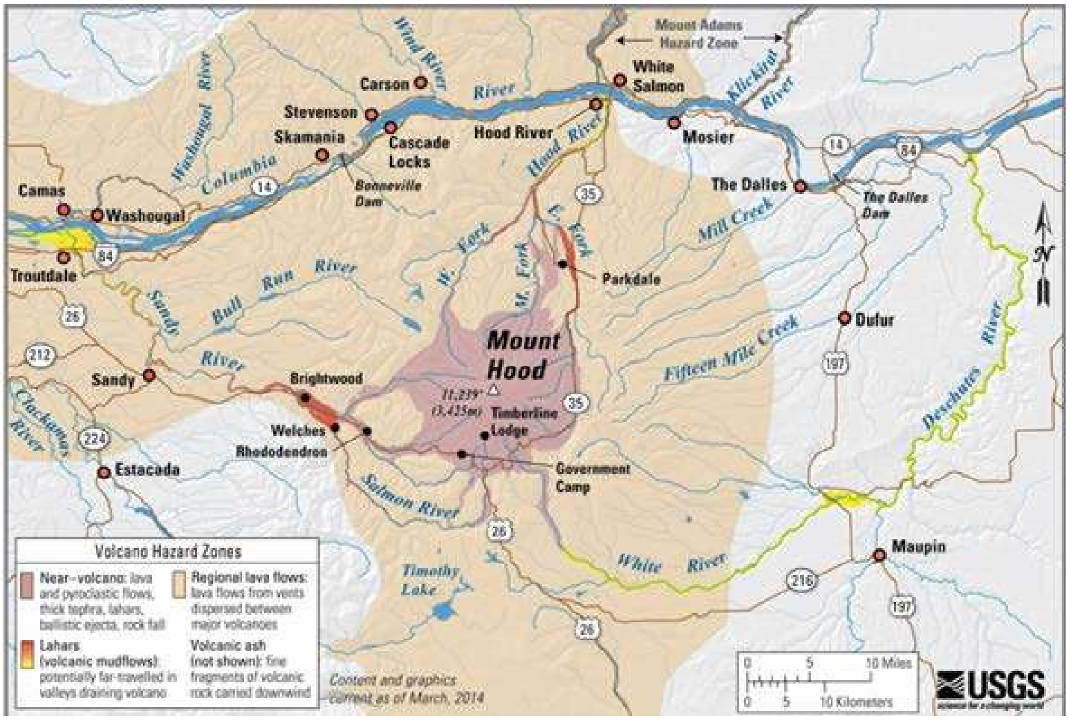
Types



The volcanoes in the Cascade Mountain Range differ markedly in their geological characteristics. The largest volcanoes, such as Mount Hood and Mount St. Helens, are stratovolcanoes. Stratovolcanoes tend to have explosive eruptions. These volcanoes may be active for tens of thousands to hundreds of thousands of years. In some cases, these large volcanoes may have explosive eruptions, such as Mount St. Helens in 1980 or Crater Lake about 7,700 years ago. More numerous among the Cascades are mafic volcanoes. Mafic volcanoes are typically active for much shorter time periods, up to a few hundred years. They generally form small craters or cones and erupt effusively as lava flows (U. S. Geological Survey [USGS], 2013) rather than large explosive events. It should be noted that the Cascades can be the source of and location of multiple hazards, such as volcanoes, landslides, floods, severe weather, wildfires, and earthquakes.

Mount Hood

Mount Hood continues to show signs that it is a functioning active volcano. Even when not erupting, Mount Hood produces frequent earthquakes and earthquake swarms, and steam and volcanic gases are emitted in the area around Crater Rock near the summit.



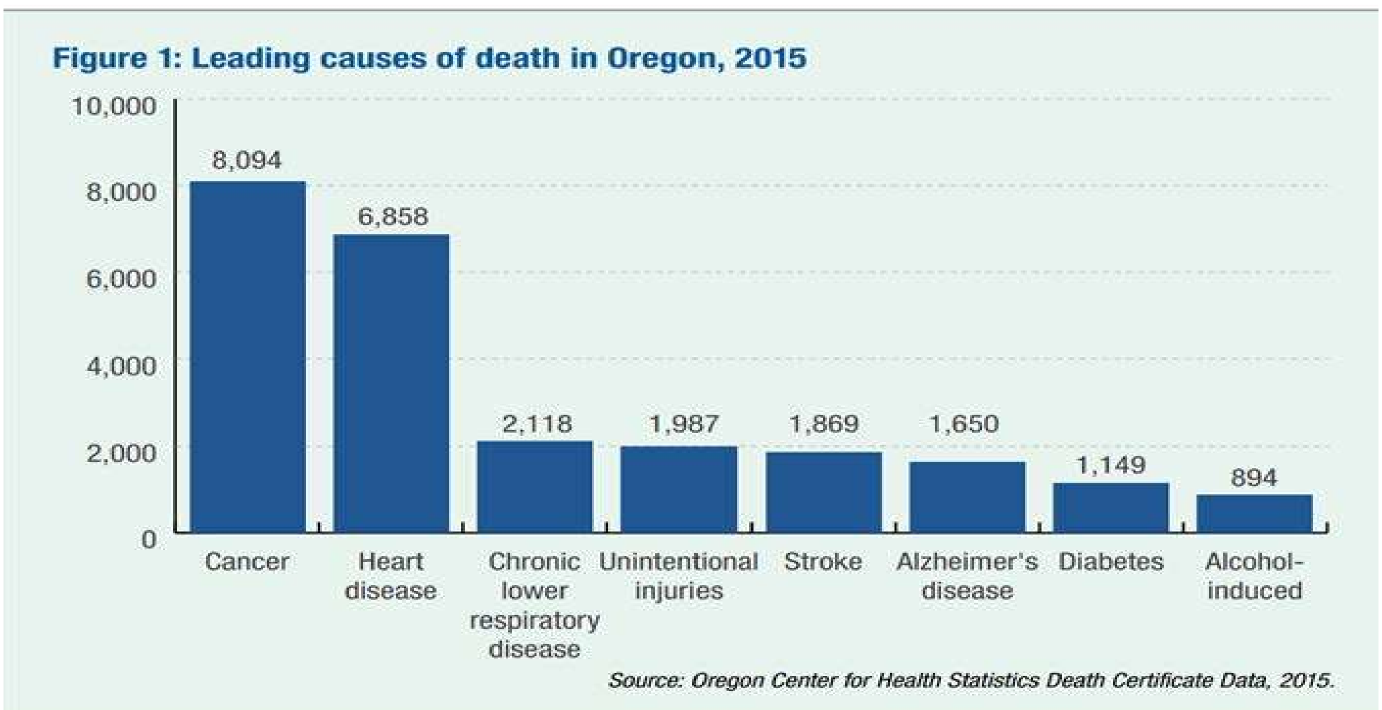
High Risk High Probability High Consequence	Communicable and Chronic Disease

Communicable Disease

The Division of Communicable Disease Control (DCDC) works to promptly identify, prevent, and control infectious diseases that pose a threat to public health, including emerging and re-emerging infectious diseases, vaccine-preventable agents, bacterial toxins, bioterrorism, and pandemics.

Chronic Disease

Chronic diseases, including heart disease, stroke, cancer, and diabetes, rank among the most common, costly, and preventable of all health problems throughout the United States. According to the CDC, nearly 1 out of every two adults has at least one chronic illness, and seven out of 10 deaths among Americans each year are due to chronic diseases. Access to high-quality and affordable prevention measures, including screening and appropriate follow-up care, are essential steps in disease prevention.



Moderate Risk **High Probability** **Low Consequence**	**Wildfires**

Wildfires

Each year, thousands of acres of wildland and many homes are destroyed by fires that can erupt at any time of the year from a variety of causes, including arson, lightning, and debris burning. Adding to the fire hazard is the growing number of people living in new communities built in areas that were once wildlands. This growth places even greater pressure on the state's wildland firefighters. As a result of this growth, fire protection has become everyone's responsibility. Drought conditions and other natural disasters increase the probability of wildfires by producing fuel in both urban and rural settings.

Adding to the danger is the frequency of large fires and wildfire damage which has increased in the U.S. since the 1980s, coinciding with increased drought and temperatures, particularly in the Western U.S. In parts of both the Eastern and Western U.S., fire seasons have increased in length in recent decades due to warming temperatures and drier conditions. Human activities provide ignition sources year-round, not just during the dry season or periods of intense lightning, which has expanded the fire season far beyond its historical length. U.S. federal agencies spent a record $2.9 billion on wildfire suppression activities during a particularly severe fire season in 2017.

Multnomah County has escaped other western Oregon counties' recent large fire occurrences. However, weather, fuel buildup, and climatic changes have created conditions conducive to a large fire event. This is especially true in unincorporated areas where residential development is heavily interwoven with forest land, vegetation is essentially continuous, and fire suppression resources are scarce. A relatively small fire in these areas would pose a significant risk to many residents and their homes. Strong east winds generated in the Columbia River Gorge are a driver of wildfire risk, particularly in October and November when northwest Oregon is historically at its peak for fire danger (Multnomah County, 2011). High winds during the peak of the wildfire season place Troutdale at a moderate risk of wildfires, such as when the Eagle Creek Fire occurred on September 2nd, 2017.

HUMAN-MADE RISK HAZARDS

Moderate Risk **High Probability** **Low Consequence**	**Transportation Network**

Transportation Network

Transportation Arteries

In addition to roadways, railways also pose a significant threat for hazardous materials release in that many of the same materials that are transported via roads are also transported by rail systems. Railways are generally classified as either heavy or light rail lines, the latter of which is primarily used for passenger transport. Heavy rail lines are often used for both passenger and freight transport, so these lines were identified and used for further analysis. It should be noted that some railways that have been classified as heavy rail lines, such as the Willamette Shore Trolley, Oaks Park Railroad, and Washington Park and Zoo Railway, were removed from this analysis because they were known to only carry passengers and would not pose a hazardous materials threat.

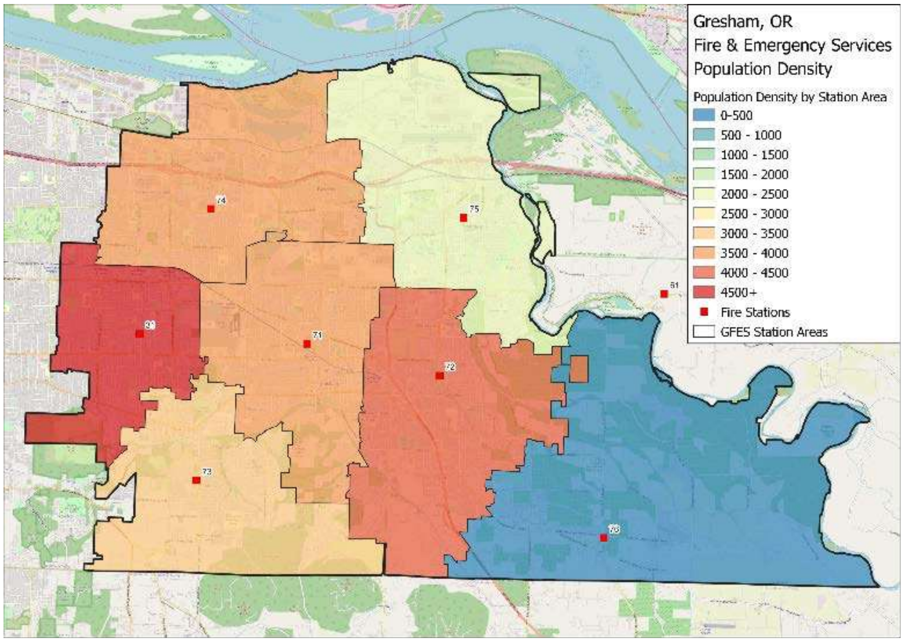
Roadway

Transportation accidents occur daily, but large-scale incidents that cause major disruptions to regional commerce or mass transit are uncommon. Nevertheless, these incidents can have significant impacts on the community. Multnomah County has previously experienced incidents involving airplanes, trains, naval vessels, and automobiles. It is notable that the occurrence of minor incidents happens relatively frequently and that events of significant impact are rare. The most common impacts of smaller events are generally on travel time and localized commerce. For larger events, impacts can be longer term on the economy and potentially cause higher fatalities and injuries.

Low Risk Low Probability Low Consequence	Population Growth

Population Growth

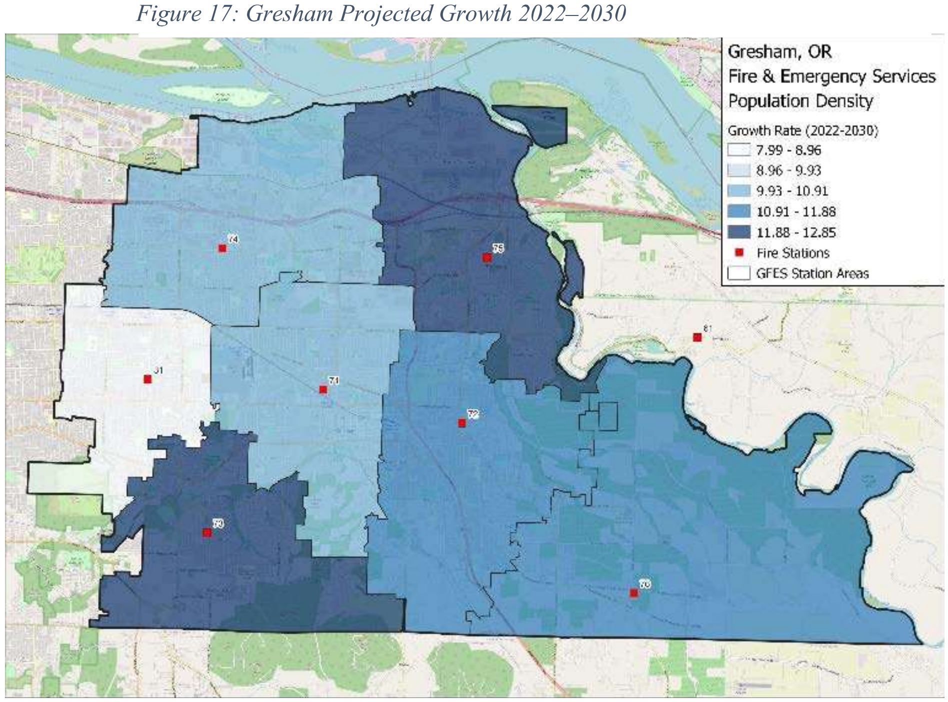
Figure 16: Gresham Population Density Map



Most census blocks sorted by station areas decreases in population densities as you move east through the jurisdiction. This is a critical factor to watch as population numbers continue to rise.

Conversely, we see that the growth is working at a higher rate in less dense areas, moving west to east across the response area. This is an important factor as unit reliability can be negatively affected quickly by this type of growth.

Figure 17: Gresham Projected Growth 2022–2030



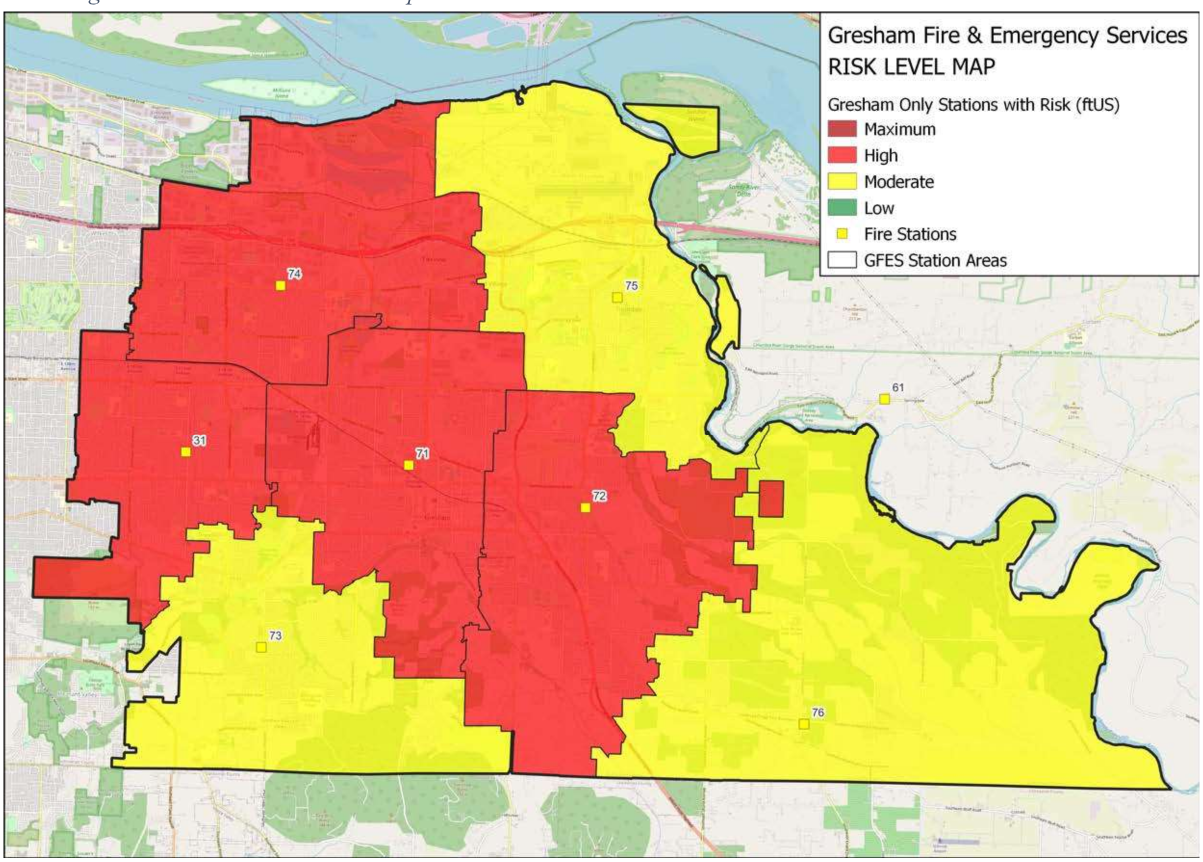
FIRST-DUE STATION AREA SUMMARY RISK RATING

Viewing risk at multiple levels is a best practice within the fire service. Much of the risk in this section is viewed at a jurisdictional level, then moving to first-due response areas as the main lens, turning to the most granular view; individual risk ratings for buildings located within a community.

Below is the First-due zone ratings for GFES, indicating that Stations 31, 71, 72, and 74 are considered high risk, and all other stations are considered moderate for the following factors:

- Population density
- Median household income
- Unemployment rate
- Square miles
- Median age
- Percentage of homes greater than 50 years old
- Number of moderate/high-risk occupancies,
- Community Demand
- Call concurrency rate

Figure 18: Gresham Risk Level Map



Risk Scoring by First-due Station

Once all first-due stations were assigned scores for all three variables—average census variables score or "Homogenized Risk (R)" score, "Community Demand (D)" score, and "Call Concurrency (C)" score, the values were placed into a formula to yield a final risk score, as follows:

Figure 19: Risk Scoring by First-due Station

Component Risk Scores for Census Variables									2018-2021 Call Data					Final Scoring	
First Due Station	Population Density	Square Miles	Median Age of Residents	Median Household Income	Unemployment Rate	Percentage of Homes > 50 Years Old	Census Average Value	Census Average Value Risk Score	Total Number of Calls	Average Number of Calls per Period	Demand Risk Score	Call Concurrency Rate	Call Concurrency Rate Risk Score	Final Risk Score	Final Risk Level
71	8	5	4	5	5	9	6.00	6	19,605	4,901.25	10	39.3	10	92.74	High
74	8	5	4	5	5	9	6.00	6	18,394	4,598.50	10	36.0	10	92.74	High
72	9	5	4	4	5	5	5.33	5	19,859	4,964.75	10	40.9	10	86.60	High
31	10	3	4	6	7	10	6.67	6	26,268	6,567	10	20.6	7	71.64	High
75	5	5	4	2	3	5	4.00	4	9,178	2,294.50	6	19.9	7	39.52	Moderate
73	7	5	5	1	5	4	4.50	4	8,021	2,005.25	5	19.8	7	34.71	Moderate
76	1	9	5	1	4	10	5.00	5	2,215	553.75	2	6.6	3	13.44	Moderate

HISTORICAL SERVICE DEMAND AND PROBABILITY ANALYSIS

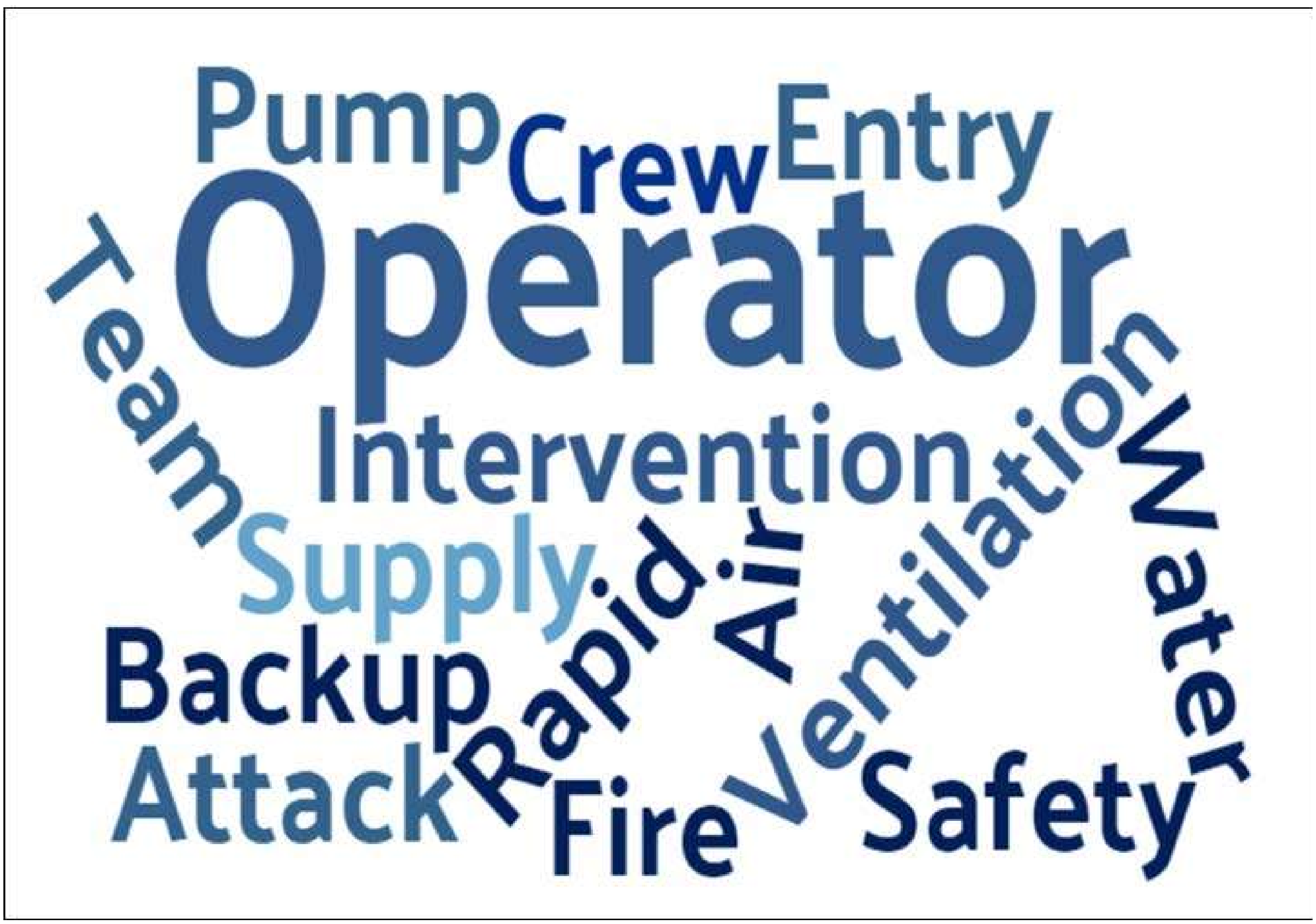
Critical Tasking Methodology for Fire, EMS, HazMat, and Technical Rescue

> **Core Competency 2C.4**
>
> A critical task analysis of each risk category and risk class has been conducted to determine first due and effective response force capabilities and a process is in place to validate and document the results.

The department utilizes annual risk assessment and critical tasking review meetings for the fire, EMS, hazardous materials, and technical rescue programs to determine and document categories and classes of risks throughout the department.

These meetings are also used to assess whether the current effective response force (ERF) can perform the critical tasking necessary to mitigate the hazards associated with each hazard and risk level. The department uses after-action reviews for structure fires, technical rescues, and hazardous material incidents to evaluate the effectiveness of first-due and initial assignments in achieving incident goals.

The EMS program evaluates hands-on training activities for critical tasking. It monitors metrics such as the return of spontaneous circulation (ROSC) to assess the effectiveness of initial assignments for cardiac arrest incidents. Changes to critical tasking and ERFs are documented in annual updates to the standards of cover. Dispatch recommendations are modified to reflect the state of the call identified as during the critical tasking reviews.

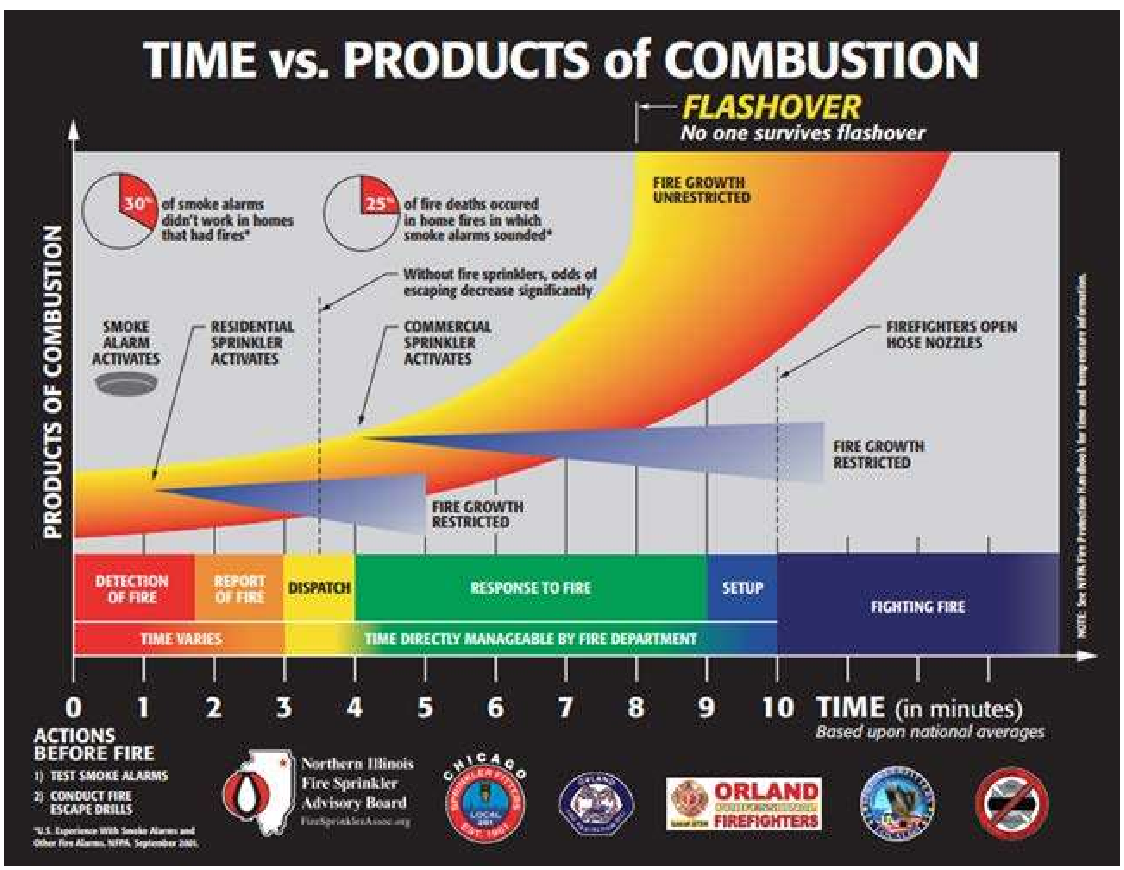


High Risk High Probability High Conse-	**Structure Fires**

Structure Fires

Fire suppression is one of the most visible response services a fire department provides at the very core of our existence. As evidenced by the flashover curve and exacerbated by modern furnishings and construction methods, fires are an extremely time-sensitive emergency.

The agency has classified the risk of fires into four levels of severity: low, moderate, high, and maximum. These rankings would be typically applied to individual occupancies and to areas of like-type buildings., however at this time, the department did not have sufficient data to complete occupancy-level analyses. Recent studies by Underwriter's Laboratories (UL) have found that flashover occurs within four minutes in a modern fire environment in compartment fires such as structure fires. In addition, the UL research has identified an updated time temperature curve due to fires being ventilation-controlled rather than fuel-controlled, as represented in the traditional time temperature curve. While this ventilation-controlled environment continues to provide a high risk to unprotected occupants to smoke and high heat, it does provide some advantages to property conservation efforts, as water may be applied to the fire prior to ventilation and the subsequent flashover.



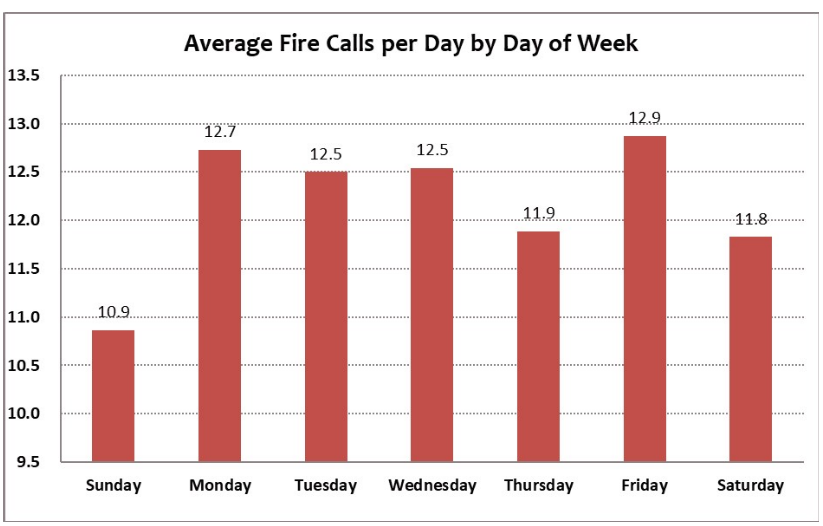
Fire Related Demand 2021

Figure 20: GFES Calls Per Month 2021

Month	Number of Calls	Calls per Day	Call Percentage
January	315	10.2	7.1
February	426	15.2	9.6
March	313	10.1	7.0
April	373	12.4	8.4
May	346	11.2	7.8
June	387	12.9	8.7
July	434	14.0	9.8
August	449	14.5	10.1
September	377	12.6	8.5
October	340	11.0	7.7
November	309	10.3	7.0
December	375	12.1	8.4
Total	**4,444**	**12.2**	**100**

Figure 21: Average Calls Per Day of the Week

Day of Week	Number of Calls	Calls per Day	Call Percentage
Sunday	565	10.9	12.7
Monday	662	12.7	14.9
Tuesday	650	12.5	14.6
Wednesday	652	12.5	14.7
Thursday	618	11.9	13.9
Friday	682	12.9	15.3
Saturday	615	11.8	13.8
Total	**4,444**	**12.2**	**100**



Heat Map for Fire Service Calls

The distribution and concentration of fire-related incidents are provided in the heat map presented below.

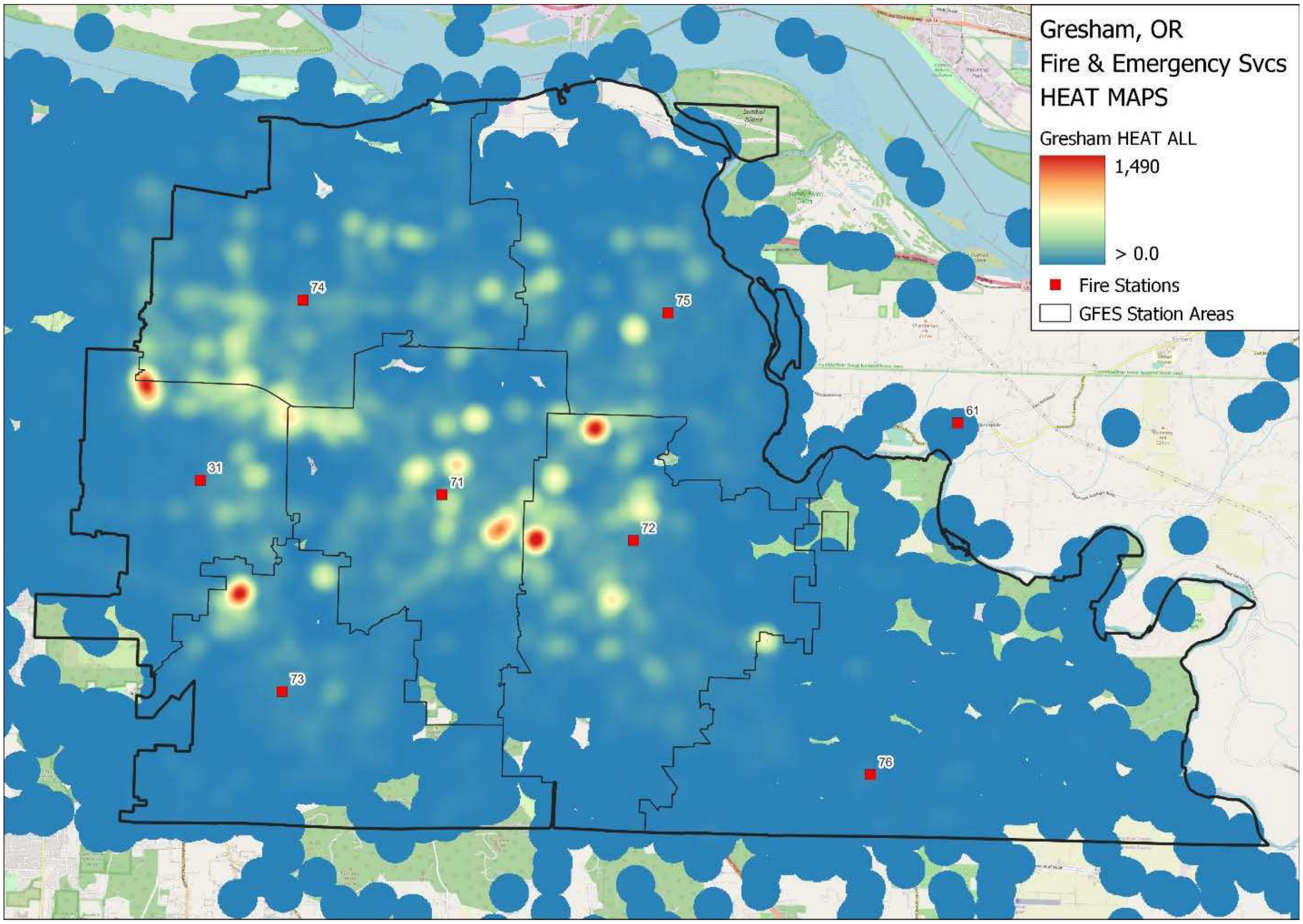
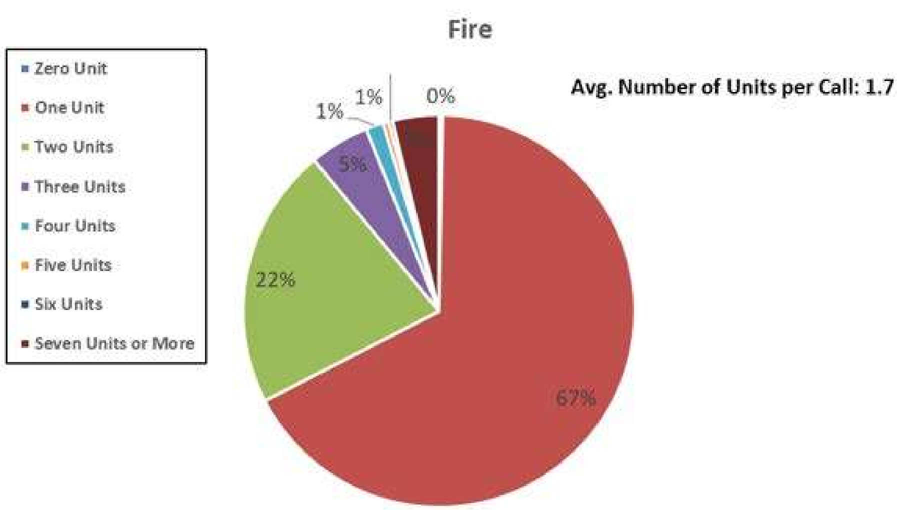


Figure 22: GFES Average Number of Overlapping Calls



Critical Tasking and Effective Response Forces for Fire Incidents

General Description - The agency approaches response to fires in a tiered fashion. Below is the description of low, moderate, high, and maximum risk, with corresponding critical tasking in the Effective Response Force for Fires table.

Low – This type of fire is a low-risk/value incident such as a dumpster, extinguished fire, an illegal burn, and other investigations to lower-level incidents. It requires a single unit with pumping capability and three personnel effectively responding and mitigating.

Moderate – This type of fire is typically a passenger vehicle fire typically responded to with multiple apparatus and seven personnel.

High – Fire calls within this level of risk include unconfirmed structure fires, large vehicle fires, and wildland fires. This type of risk receives an effective response force of 17.

Maximum – Fire calls within this level of risk include confirmed structure fires requiring additional personnel to accomplish multiple simultaneous tasks for high acuity incidents. This type of risk receives an ERF of 20 personnel.

Effective Response Force for Fire Incidents				
Task	**Maximum**	**High**	**Moderate**	**Low**
Command	0.5	0.5	0.5	1
Driver/Pump Operator	1	1	1	1
Fire Attack	2	2	2	1
Safety	0.5	0.5	0.5	0
Water Supply	0.5	0.5	1	
Back-up Line	3	3	2	
Rapid Intervention Team	2.5	2.5		
Ventilation	4	4		
Search	3	3		
Fire Attack Line 2	3			
ERF Personnel	20	17	7	3

Moderate Risk **High Probability** **Low Consequence**	**Emergency Medical Services**

Emergency Medical Services

Time is a critical element when responding to true medical emergencies, with the chance of survival for a cardiac arrest dropping precipitously with every passing minute.

The potential survival rate for cardiac arrests, one of the most severe medical emergencies an individual can experience, is only about 50% by the time a fire apparatus leaves the station, making prevention efforts a crucial piece of achieving positive patient outcomes.

When evaluating the steady rise in emergency medical calls over the last few decades, it is readily apparent that the workload demand for these calls will continue to rise. The agency is actively working with community partners to reduce or eliminate many lower-risk/severity calls for help by channeling the patient into a more appropriate method of care.

DETECTION OF COLLAPSE	REPORT OF ALARM 911 OR DIRECT	EMS/FIRE RESPONSE TIME			
		DISPATCH UNITS	TURN OUT	RESPONSE TIME	SET UP
TIME VARIES	TIME DIRECTLY MANAGEABLE				

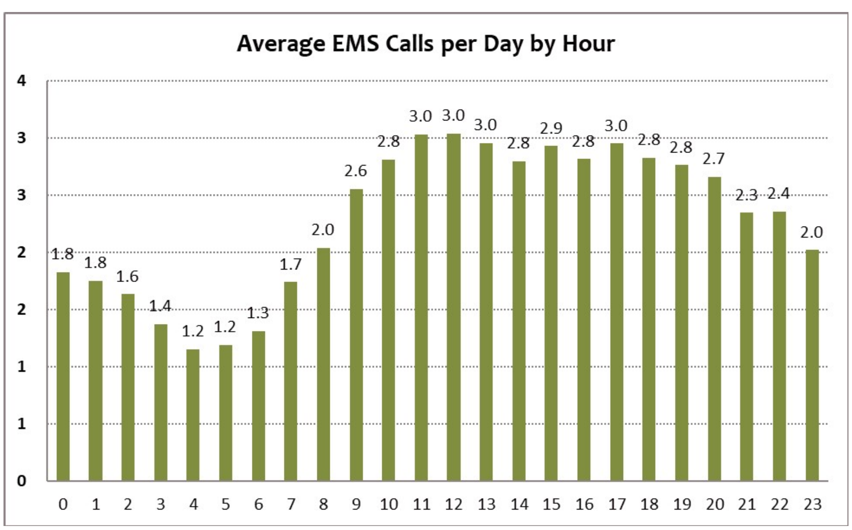
EMS Service Demand Calls 2021

Figure 23: GFES Emergency Medical Calls Per Month

Month	Number of Calls	Calls per Day	Call Percentage
January	1,631	52.6	8.1
February	1,482	52.9	7.4
March	1,695	54.7	8.5
April	1,695	56.5	8.5
May	1,636	52.8	8.2
June	1,747	58.2	8.7
July	1,717	55.4	8.6
August	1,798	58.0	9.0
September	1,654	55.1	8.3
October	1,632	52.6	8.2
November	1,656	55.2	8.3
December	1,675	54.0	8.4
Total	20,018	54.8	100

Figure 24: GFES Average Calls Per Day of the Week

Day of Week	Number of Calls	Calls per Day	Call Percentage
Sunday	2,759	53.1	13.8
Monday	2,914	56.0	14.6
Tuesday	2,884	55.5	14.4
Wednesday	2,830	54.4	14.1
Thursday	2,907	55.9	14.5
Friday	3,007	56.7	15.0
Saturday	2,717	52.3	13.6
Total	20,018	54.8	100



Heat Map for EMS Calls

The distribution and concentration of EMS related incidents are provided in the heat map presented below. The greatest density of EMS incidents occurs in Station 1s area.

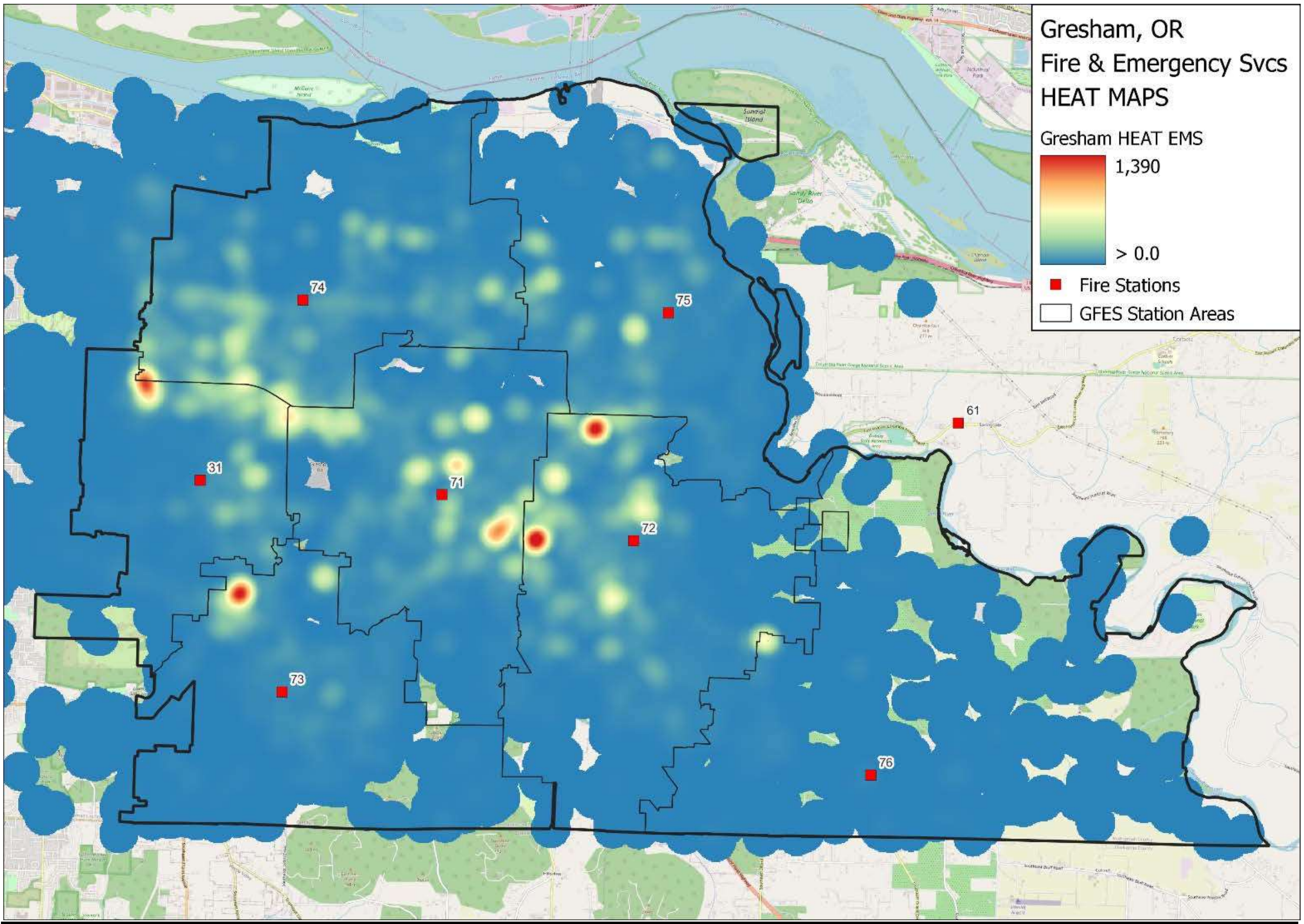
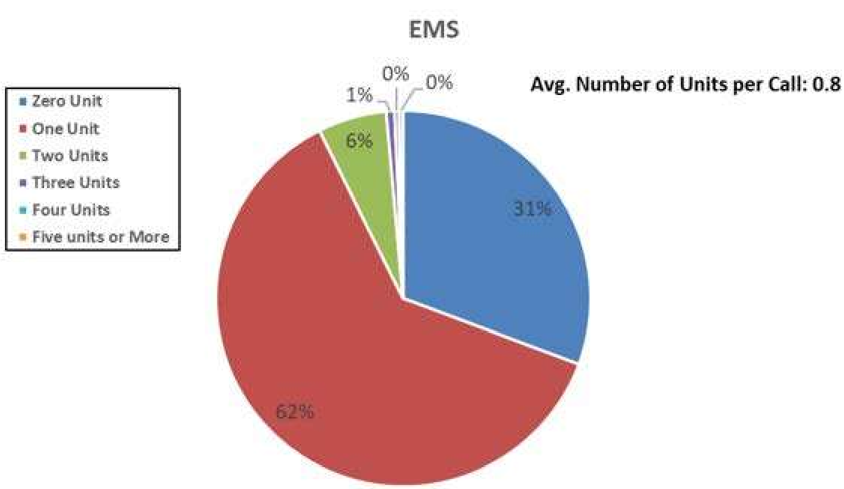


Figure 25: EMS Incident Overlapping Calls



Critical Tasking and Effective Response Forces for EMS Incidents

General Description - The agency approaches an emergency medical incident in a tiered fashion. Below is the description of what a low, moderate, high, and maximum response is, with corresponding critical tasking in the Effective Response Force for EMS table. Risk classifications were determined from the Medical Priority Dispatch System (MPDS) call determinants within the internationally researched call triage process.

Low – Incidents within the Alpha level of risk. This type of medical incident constitutes the lowest acuity incidents and could be a non-emergency response and consists of a minimum of two personnel.

Moderate – Incidents within the Bravo or Charlie level of risk. This type of medical incident includes breathing problems, chest pain discomfort, seizures, or diabetic problems without the loss of pulse or respirations. This would also include motor vehicle crashes without major trauma. Typically, this response is handled with three personnel.

High – Incidents within the Delta level of risk. This level of medical emergency includes cardiac chest pain and respiratory distress. Typical response is with a total of six personnel.

Maximum – Incidents within the Echo level of risk. This level of medical emergency includes cardiac or respiratory arrest. The ERF is 24 personnel.

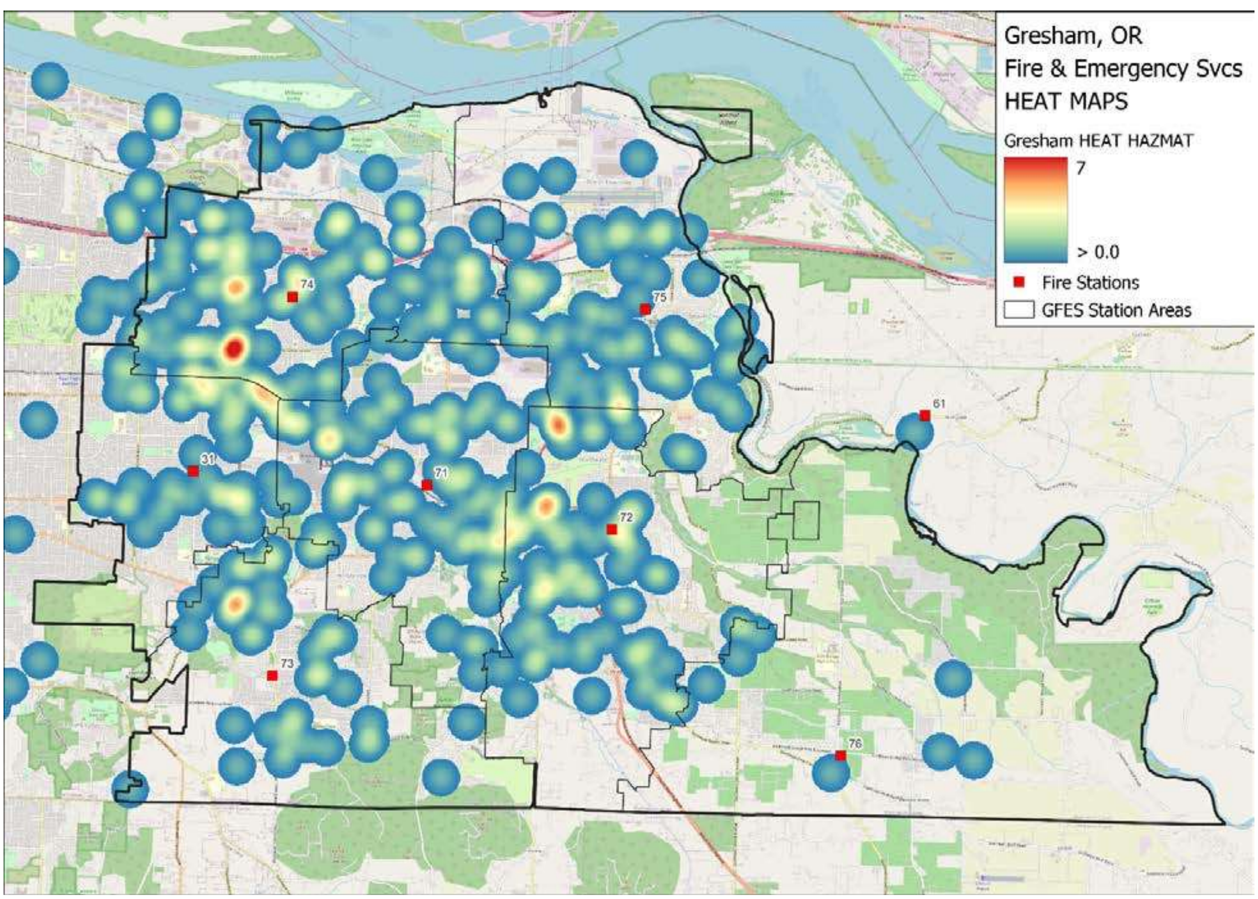
Effective Response Force for EMS Incidents				
Task	**Maximum**	**High**	**Moderate**	**Low**
Triage/Treatment	0	5	2	1
Documentation	0	1	1	1
Command	1	0	0	0
Medical Branch Leader	1	0	0	0
Triage Group	3	0	0	
Treatment Group	10	0	0	
Transport/RTF Group	1	0	0	
Incident Stabilization	7	0	0	
Safety	1	0		
ERF Personnel	**24**	**6**	**3**	**2**

<u>High Risk</u> High Probability High Consequence	**Hazardous Materials**

Hazardous Materials

Hazardous materials are chemical substances that, if released or misused, can pose a threat to people, property, or the environment. The potential release of hazardous materials exists wherever that material may be located. A higher potential for release coincides with storage sites at fixed facilities and along transportation routes, such as major roadways and rail lines. These chemicals are used in industry, agriculture, medicine, research, and consumer goods.

Each year, over 1,000 new synthetic chemicals are introduced. As many as 500,000 products pose physical or health hazards and can be defined as "hazardous chemicals." Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are most often released because of transportation accidents or chemical accidents in manufacturing plants. Hazardous materials are contained and used at fixed sites and are shipped by all modes of transportation, including transmission pipelines.



Critical Tasking and Effective Response Forces for HazMat Incidents

General Description - The agency approaches a hazardous materials response in a tiered fashion. Below is the description of a low, moderate, or high response, with corresponding critical tasking in the Effective Response Force table.

Low – Small spills of less than 5 gallons from a passenger-type vehicle of common hydrocarbon materials such as gasoline, fuel oil, or diesel fuel. The material can be diked or absorbed utilizing equipment normally carried on a first-due company. Small spills of antifreeze, transmission fluid, etc., at the scene of a motor vehicle accident would also fall under this category. The ERF is three personnel.

Moderate – Large spills over 5 gallons of common hydrocarbon materials such as gasoline, fuel oil, or diesel fuel from a large commercial vehicle and reported gas leaks. This level of response requires a total of 10 personnel.

High– High-risk hazardous materials responses are more technical and labor intensive. In total, an ERF of 20 personnel is required to mitigate this level of the event.

Maximum– Chemical, Biological, Radiological, Nuclear, or Explosive (CBRNE) incidents within the highest risk levels. Maximum risk events may be an escalated event from incidents by on-scene commanders. This level of call requires an ERF of 27 personnel.

Effective Response Force for HAZMAT Incidents				
Task	**Maximum**	**High**	**Moderate**	**Low**
Command	1	1	1	1
Hazard Mitigation	4	4	3	2
RIT/Decon	4	3	3	
Research	1	1	1	
Medical	3	3	2	
Safety/Operations	2	1		
Evacuation	3	3		
Perimeter Controls	4	4		
Containment	2			
Rehab	2			
Hazmat Branch Manager	1			
ERF Personnel	**27**	**20**	**10**	**3**

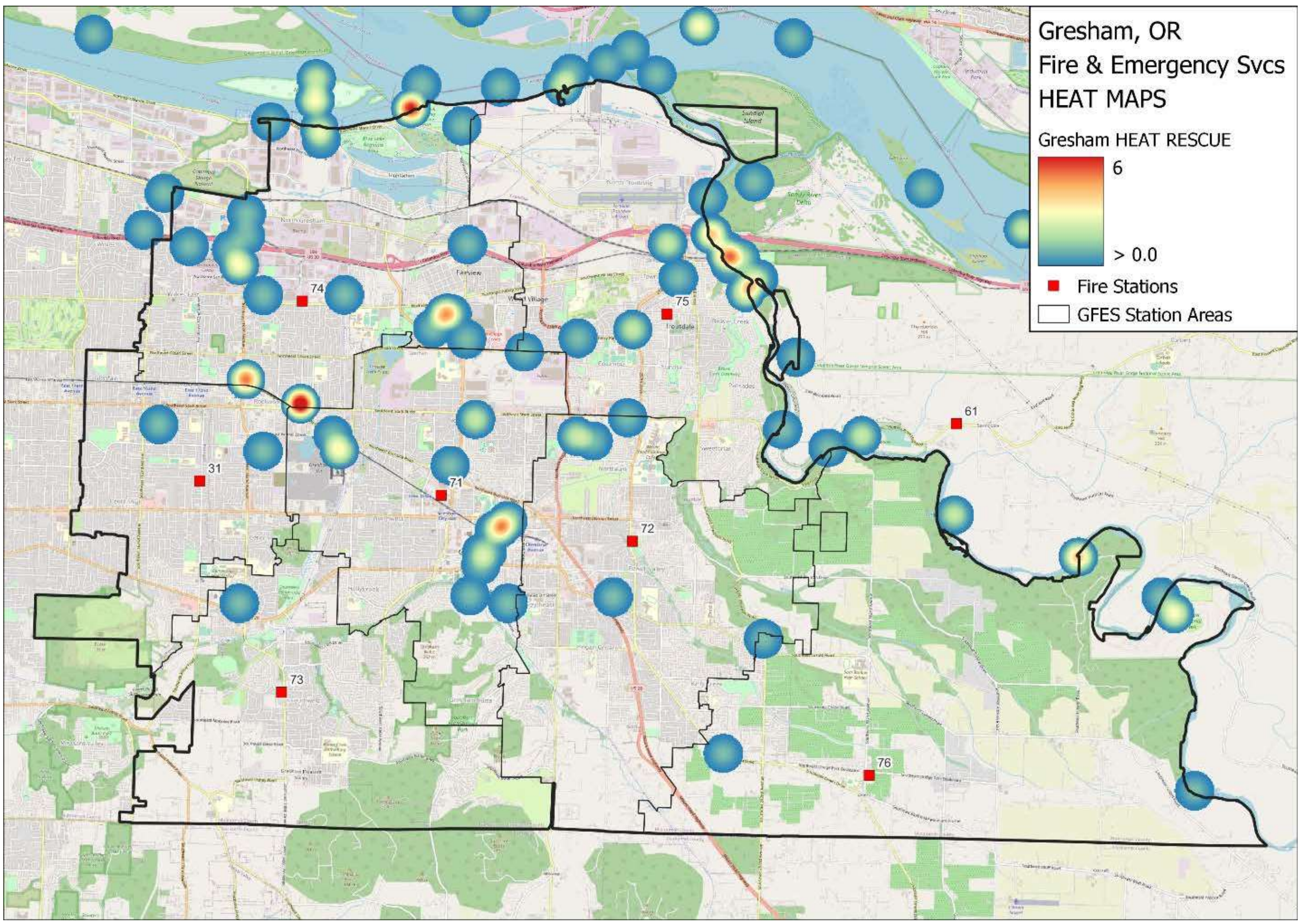
* For low and moderate risk incidents, the command, safety, and team leader tasks may be combined in one position. For high-risk incidents, team leaders may be combined in team total.

Special Risk Low Probability High Consequence	**Technical Rescue**

Technical Rescue

Technical rescue is a relatively broad term and includes responses to a wide variety of incidents, such as confined space rescue, high-angle rescues, and structural collapse. Like the analyses for hazardous materials, the demand for technical rescue services is low in relation to fire or EMS calls within the service area.

Heat Map for Technical Rescue Calls



Critical Tasking and Effective Response Forces for Rescue Incidents

General Description - The agency approaches a technical response incident in a tiered fashion. Below is the description of low, moderate, high, and maximum response, with corresponding critical tasking in the Effective Response Force table.

Low – Low-risk incidents may include elevator malfunctions with/without occupants inside, elevator alarms, and other simple low-risk investigations. This is responded to with three personnel.

Moderate – Moderate-risk incidents may include elevator incidents with an unknown situation, escalator incidents with no injuries, entrapment with unknown situation, high angle rescue with unknown situation, and other lower risk investigation level incidents. This is responded to by 11 personnel.

High – High-risk incidents may include incidents such as confined space and structural collapse with entrapment. This response requires an ERF of 14 personnel.

Maximum – Maximum risk incidents may include escalated incidents such as confined space and structural collapse with entrapment. This response requires an ERF of 20 personnel.

Effective Response Force for RESCUE Incidents				
Task	**Maximum**	**High**	**Moderate**	**Low**
Command	1	1	1	1
Rescue Team	7	7	4	2
Suppression Line	4	1	1	
Medical	2	2	2	
Hazard Abatement	2	2	2	
Pump Operator	2	1	1	
Water Supply	2			
ERF Personnel	20	14	11	3

The distribution and concentration of all incidents are provided in the heat map presented in Figure 26 below.

Figure 26: GFES All Incidents Heat Map

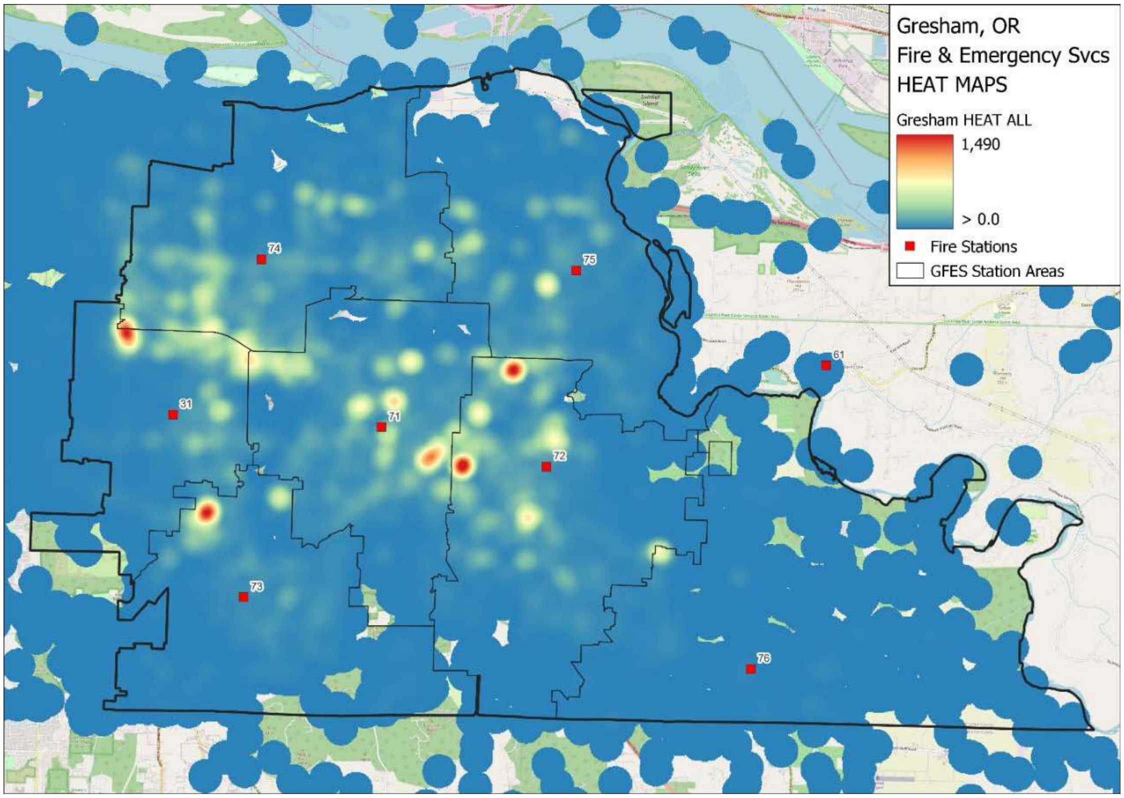
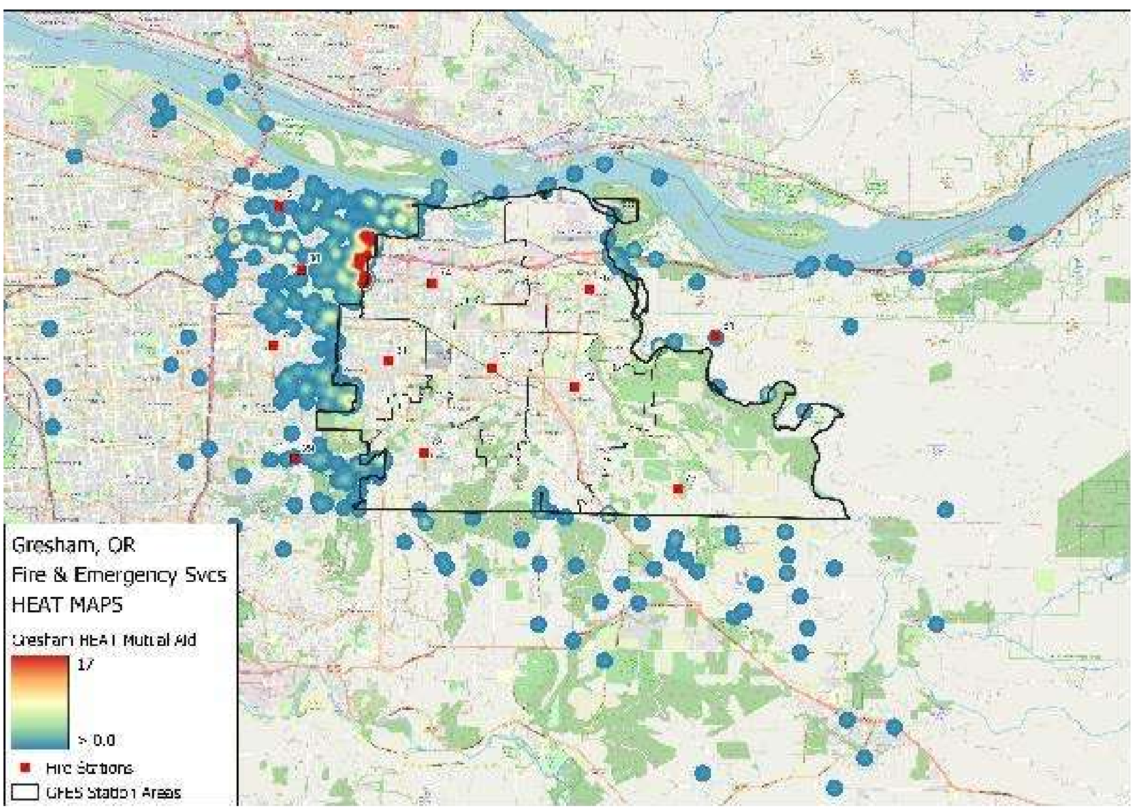


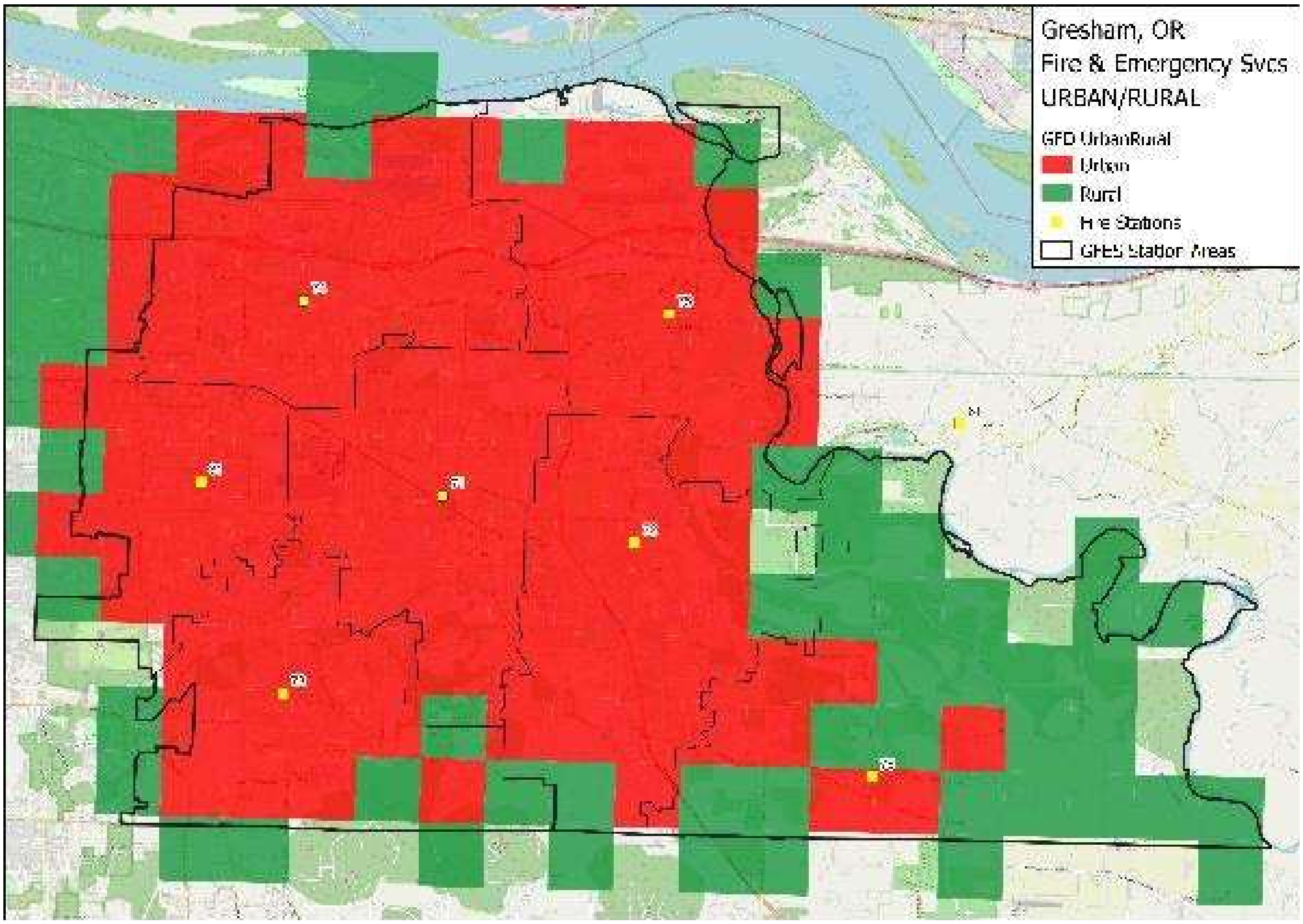
Figure 27: GFES Mutual Aid Heat Map



Urban and Rural Call Density Map

Additionally, we calculated call density based on the relative concentration of incidents based on approximately 0.5-mile geographic areas as well as the adjacent 0.5-mile areas. The results demonstrate an urban and rural designation based on call density for services and not based on population. The red areas are designated as urban service areas, and the green areas are designated as rural service areas. Any area that is not colored has less than one call every six months in the 0.5-mile area and the adjacent areas.

Figure 28: Gresham Urban/Rural Map



CURRENT DEPLOYMENT AND PERFORMANCE

Community Response History

Review of System Performance

Baseline and Benchmark Analysis

Projected Growth

First-due and Geographic Planning Zone Analysis

COMMUNITY RESPONSE HISTORY

Figure 1: Number of Incidents Dispatched by Program and Year

rogram	Number of Calls 2018	2019	2020	2021
	17,295	18,716	18,253	20,018
	3,691	3,722	4,075	4,444
at	127	132	112	142
le	26	46	43	55
Total	**21,139**	**22,616**	**22,483**	**24,659**
ls per Day	**57.9**	**62.0**	**61.4**	**67.6**

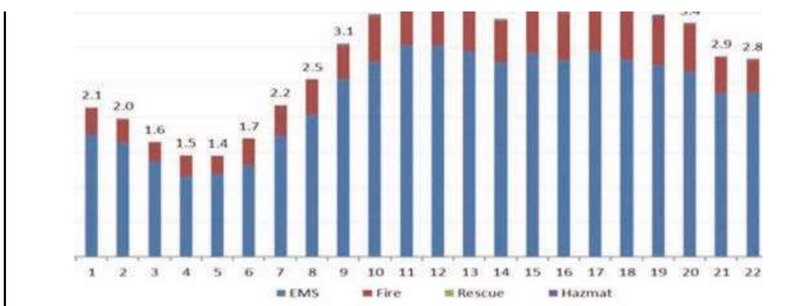
Community Response History Discussion

GFES answered over 24,659 emergency calls in 2021, a 10% increase over the previous year and 17% since 2018. Emergency calls averaged 67.6 calls per day. There was even dispersion regarding the call type and month or year. Saturdays and Sundays are the lowest call volume day for fires, EMS, and other calls. The peak period of the day is slightly over three calls per hour, with the majority being EMS.

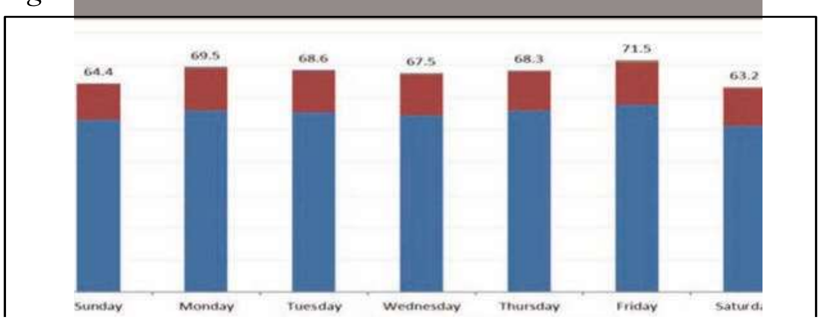
The historical emergency and nonemergency service demands frequency for a minimum of three

Immediate previous years and the future probability of emergency and nonemergency service demands, by service type, have been identified and

Figure 2: Overall: Average Calls per Day by Day of Week



Figur

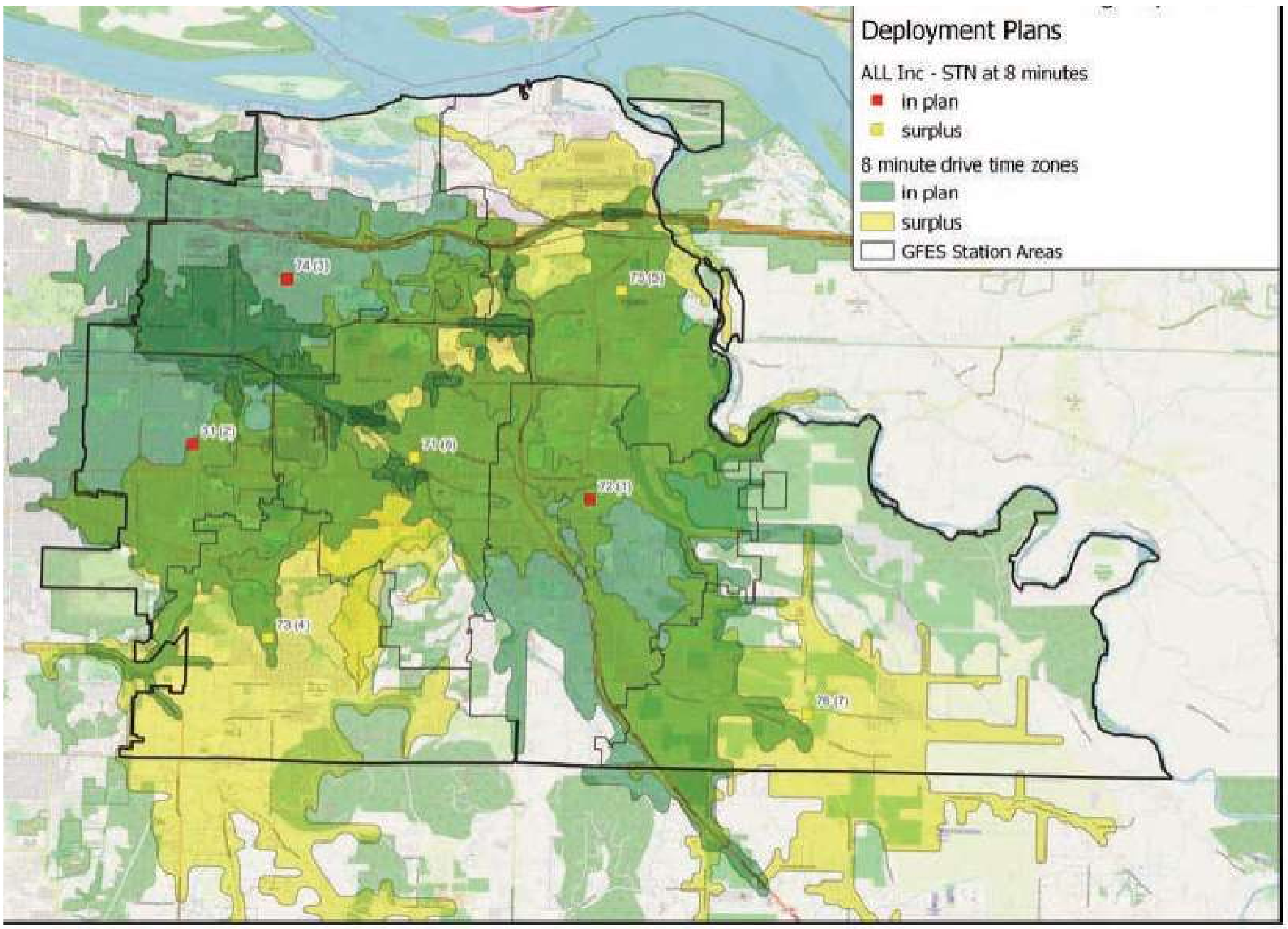


The agency identifies and documents the nature and magnitude of the service and deployment demands within its jurisdiction. Based on risk categorization and service impact considerations, the agency's deployment practices are consistent with jurisdictional expectations and with industry research. Efficiency and effectiveness are documented through quality response measurements that consider overall response, consistency, reliability, resiliency, and outcomes throughout all services areas. The agency develops procedures, practices, and programs to appropriately guide its resource deployment.

Distribution

Distribution – Geographical Drive Time Analysis shows an 8-minute drive time giving a good visual depiction of who can get where within a specified amount of time.

Figure 4: GFES 8-Minute Travel Time



Distribution – Percent of Incidents Captured by Station.

The historical performance demonstrated a 7:56 travel time at the 90th percentile (2021). A simulation was utilized to validate historical response data through a GIS marginal utility analysis at 8-minutes. Results validated that all seven (7) stations are required to capture 90% of all incidents within the jurisdiction 8-minutes. Therefore, all seven (7) stations are required to continue to meet current performance.

re Competency 2C.1

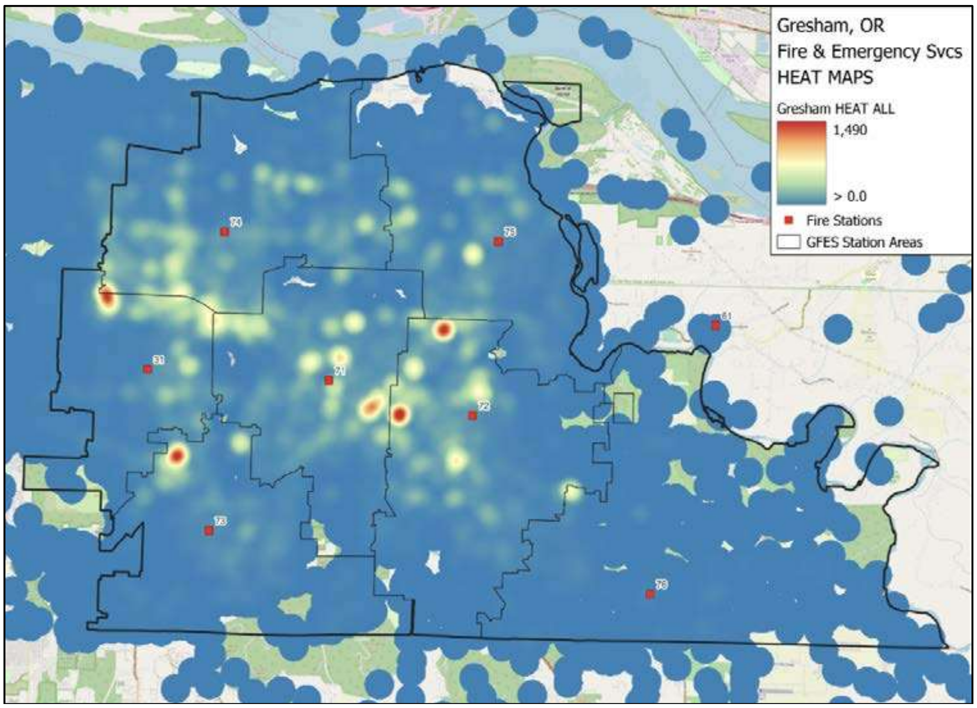
r

determined, documented, and adopted a methodology for the consistent provision of service levels in all service program areas through response coverage trategies.

Figure 5: Marginal Station Contribution for 8-Minute Travel Time – All Calls

Rank	Station	Drive Time	Station Capture	Total Capture	Percent Capture
1	72	8	77,979	77,979	42.24%
2	31	8	61,824	139,803	75.73%
3	74	8	26,493	166,296	90.09%
4	73	8	7,686	173,982	94.25%
5	75	8	2,470	176,452	95.59%
6	71	8	1,792	178,244	96.56%
7	76	8	1,120	179,364	97.17%

Table 6-GFES Heat map for frequency of incidents



Distribution-Heat Map Analysis Indicating Frequency of Incidents: Stations 71 72 and 74 have the most density of emergency incident as compared to neighboring cities.

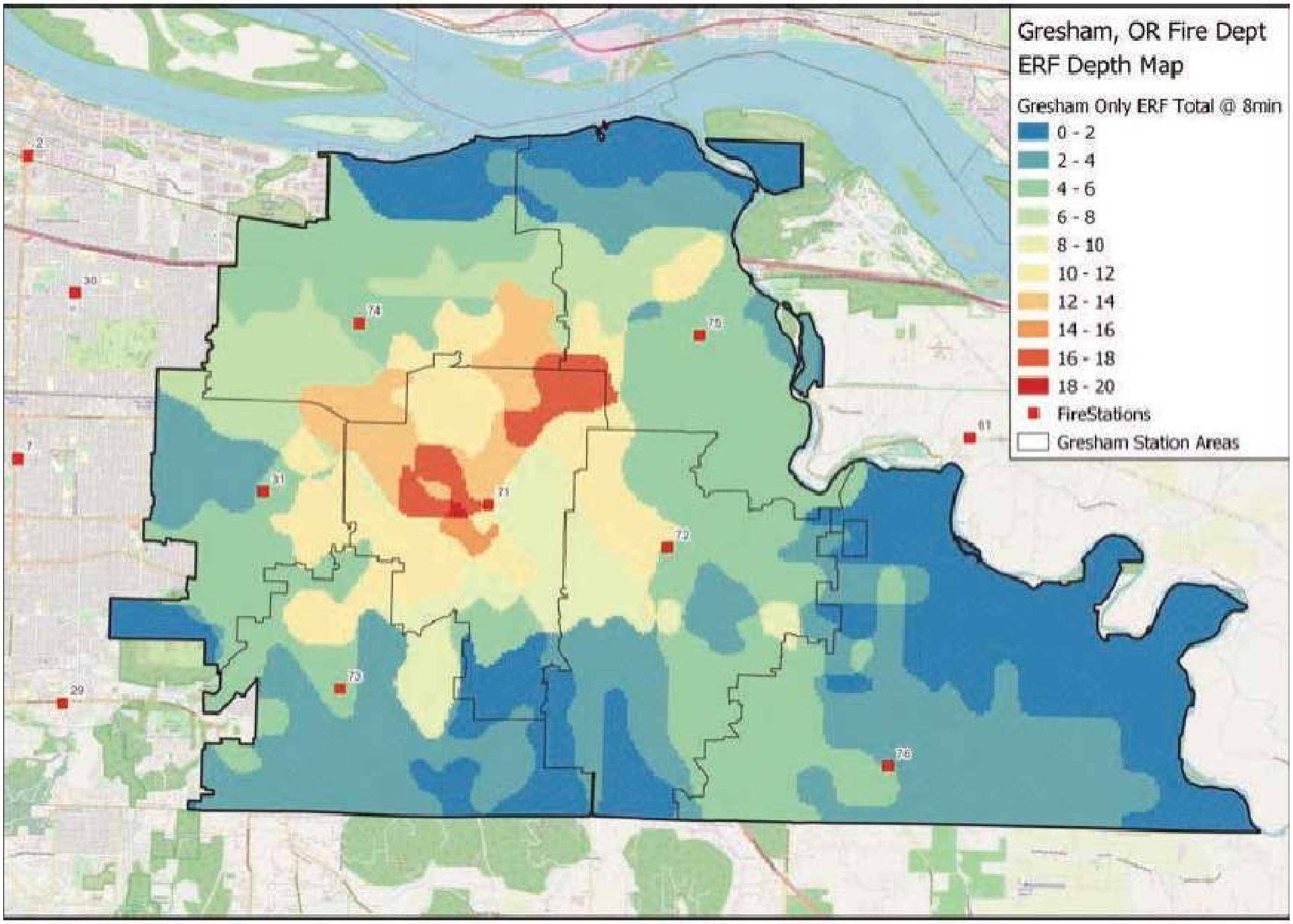
Concentration (Effective Response Force Analysis)

Figure 7: Comparisons of Effective Response Force Configurations – 17 Personnel

Travel Time Objective	Gresham Only	Gresham and Regional Aid
8-Minute	1.89%	1.89%
10-Minute	14.83%	19.47%
12-Minute	33.14%	45.02%
14-Minute	50.50%	62.35%
16-Minute	66.42%	79.85%
18-Minute	75.40%	85.98%
20-Minute	81.17%	89.76%

These analyses are modeled using GIS data in order to more accurately assess capabilities. The tabular data demonstrates the saturation for ERF at various travels times and geographic areas. The mapping is representative of the concentration of personnel within 18-mintues and includes automatic-aid.

Figure 8: GFES ERF Depth Chart



REVIEW OF SYSTEM PERFORMANCE

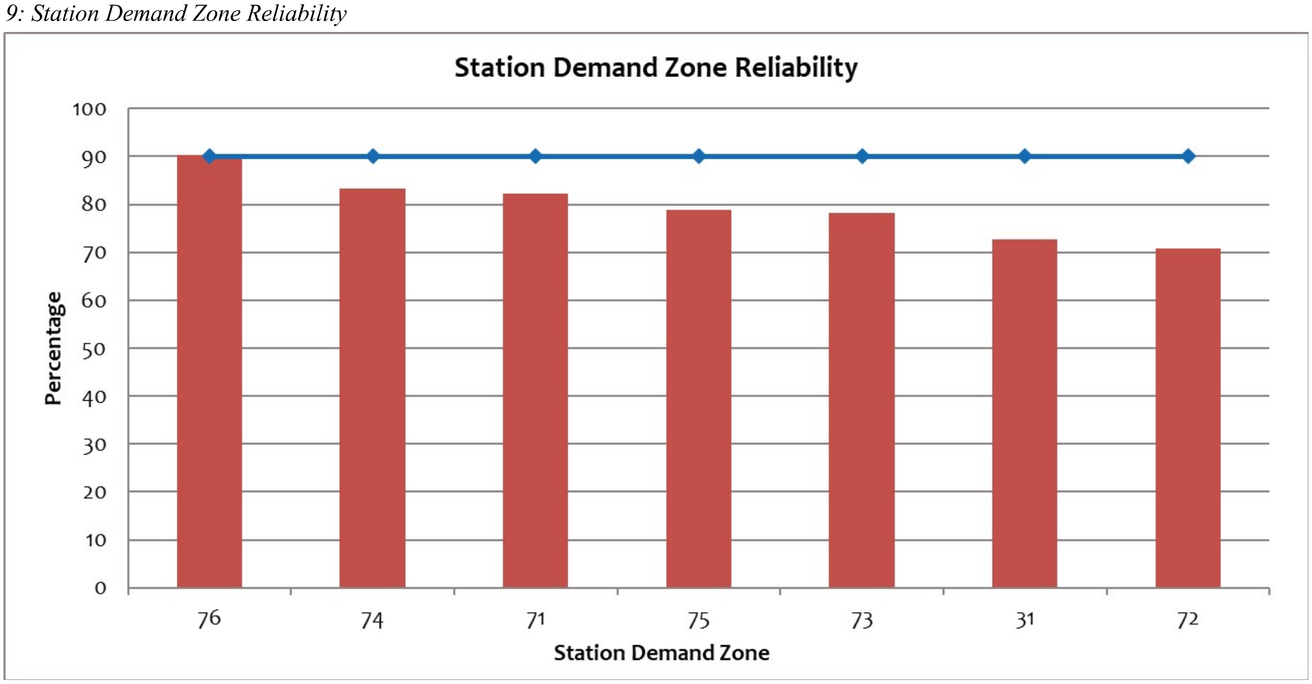
Reliability Analysis-City Wide

The first step in assessing the reliability of the deployment model or system performance is to understand the City's availability to handle service requests within the jurisdiction. **GFES is available to respond to 97.4% of the requests for service that are originating within the jurisdiction**, with a total of 347 incidents responded to by other agencies with no GFES units responding.

Reliability Analysis–First-due Area

The reliability of the distribution model is a factor in how often the response model is available and able to respond to the call within the assigned demand zone. In this analysis, calls that are solely responded to by AMR units are not included. If at least one unit from the first-due zone can respond to a call, we consider the station is able to respond to the call within the assigned demand zone. Utilizing the department's Fire Station Demand Zones (FDZ), analyses reveal that 76 can meet their demand for services at the 90th percentile. In other words, when a request for service is received, FDZ 76 is available to answer the call nine out of 10 times. Stations 31 and 72 had the lowest reliability.
It is considered both best practice and the most reliable measure to perform at the 90th percentile, as indicated by the "blue" line in the Figure below.

Figure 9: Station Demand Zone Reliability



Overlapped (Simultaneous) Incidents

Overlapped or simultaneous calls are defined as another call being received in a demand zone (or first-due station's area) while one or more calls are already ongoing for the same demand zone (or first-due station's area). For example, if there is an ongoing call in Station 31's demand zone wherein all units have not yet been cleared, and one or more requests for service subsequently occur in Station 31's demand zone, the subsequent call or calls would be captured as overlapping.

Understanding the percentage of overlapped calls may help to determine the number of units to staff for each station. In general, the larger the call volume for a demand zone, the greater the likelihood of overlapped calls occurring. The demand distribution throughout the day will impact the chance of overlapped calls. Additionally, the duration of a call plays a significant role; the longer it takes to clear a request, the greater the likelihood of having an overlapping request.

Station 72's demand zone experienced the highest percentage of overlapped calls during 2018-2021 at 40.9%, followed by Station 71's demand zone at 39.3%.

Figure 10: Overlapped Calls by First-due Zone

First-due Station	Overlapped Calls	Total Calls	Probability of Overlapped Calls Occurring	Duration (Minutes)
72	2,599	5,627	46.2%	53.2
71	2,173	5,155	42.2%	50.0
74	1,986	5,058	39.3%	47.2
73	536	2,310	23.2%	53.5
75	591	2,554	23.1%	48.5
31	527	2,498	21.1%	43.7
76	50	588	8.5%	61.4
Grand Total	**8,462**	**23,790**	**35.6%**	**50.0**

Figure 11: Probability of Overlapped Calls Occur by Station FDZ

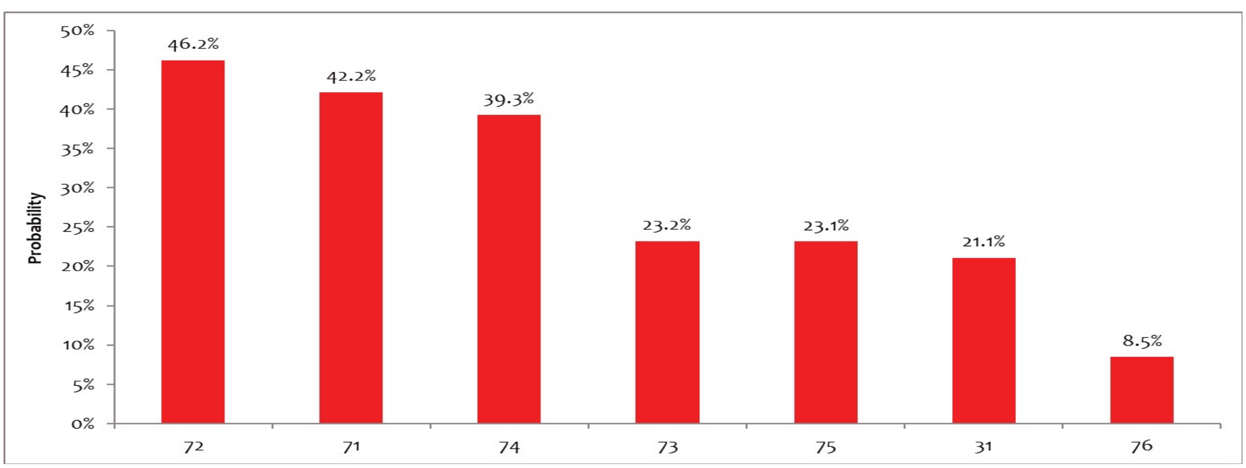


Figure 12: Percentage of Overlapped Calls

First Due Station	Total Number of Calls (2018-2021)	Average Number of Calls Per Reporting Period	Percentage of Overlapped Calls (2018-2021)
31	8,756	2,189.00	20.6
71	19,605	4,901.25	39.3
72	19,859	4,964.75	40.9
73	8,021	2,005.25	19.8
74	18,394	4,598.50	36.0
75	9,178	2,294.50	19.9
76	2,215	553.75	6.6

Workload Demand

Gresham units made a total of 23,947 responses, and the busy hours were 6,503. Stations 71, 72, and 74 were the top three busiest stations. E72, E71, E74, T71, and R74 were the top five utilized units; each made more than 2,000 responses in a year.

Figure 13: Overall Workload by Station

Station	Avg Busy Minutes per Run	Total Busy Hours	Number of Runs
71	15.8	1,800	6,849
74	16.4	1,475	5,408
72	16.2	905	3,353
31	14.1	633	2,696
73	18.0	572	1,906
75	18.1	565	1,874
HQ	16.1	278	1,037
76	20.0	275	824
Total	**16.3**	**6,503**	**23,947**

Figure 14: GFES Department Workload by Station Demand Zone

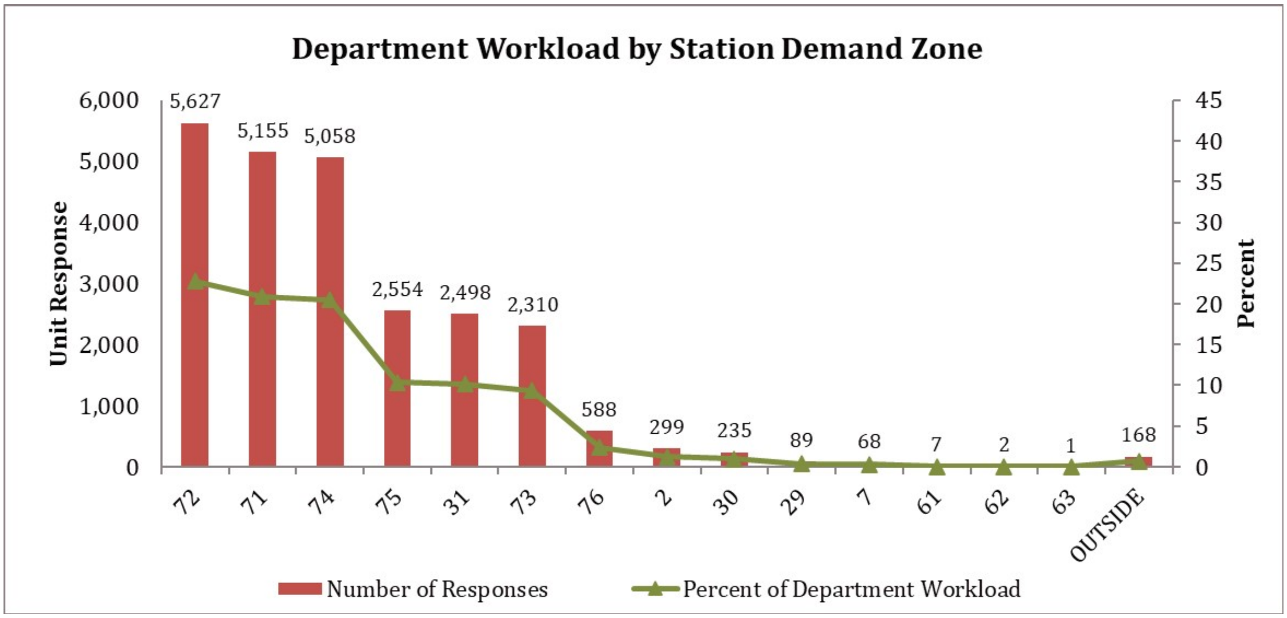


Figure 15: 2021 Incidents by FDA and Program

First-due Station	EMS	Fire	Hazmat	Rescue	Total Unit Responses
72	30,051	4,800	200	10	35,061
71	30,163	5,027	255	37	35,482
74	28,097	5,585	285	103	34,070
31	15,132	2,786	124	6	18,048
75	13,523	2,782	175	50	16,530
73	12,078	2,174	133	1	14,386
76	3,131	758	22	25	3,936
2	758	419	20	5	1,202
30	656	236	5	0	897
OUTSIDE	280	668	20	250	1,218
29	251	159	5	0	415
7	170	215	4	0	389
61	5	29	2	14	50
62	4	16	0	5	25
63	0	3	0	0	3
Total	**134,299**	**25,657**	**1,250**	**506**	**161,712**

As with most organizations, most emergency incidents are EMS related (83%).

Unique incident level demand, stratified by program area and risk severity, was evaluated. This specific analysis was restricted to the GFES jurisdiction for 2018-2021. Over the four-year reporting period, the predominant demand was for low-risk incidents between 97.8% and 71.2%, followed by moderate-risk events between 1.1% and 12.7%. High-risk incidents were between 1.2% and 2.1%. In all years, 94.7% of the fire risk were categorized as low risk.

Figure 16: Risk Rating for Incidents 2018-2021

Reporting Period[2]	Program	Number of Incidents Risk Rating Low	Moderate	High	Maximum	Total	Percentage of Incidents[1] Risk Rating Low	Moderate	High	Maximum	Total
2018	EMS	16,309	141	89	0	16,539	98.6	0.9	0.5	0.0	100.0
	Fire	3,209	10	134	0	3,353	95.7	0.3	4.0	0.0	100.0
	Hazmat	49	45	14	0	108	45.4	41.7	13.0	0.0	100.0
	Rescue	5	0	6	0	11	45.5	0.0	54.5	0.0	100.0
	Total	**19,572**	**196**	**243**	**0**	**20,011**	**97.8**	**1.0**	**1.2**	**0.0**	**100**
$2019	EMS	17,829	158	72	0	18,059	98.7	0.9	0.4	0.0	100.0
	Fire	3,242	31	163	0	3,436	94.4	0.9	4.7	0.0	100.0
	Hazmat	52	47	25	0	124	41.9	37.9	20.2	0.0	100.0
	Rescue	21	0	12	0	33	63.6	0.0	36.4	0.0	100.0
	Total	**21,144**	**236**	**272**	**0**	**21,652**	**97.7**	**1.1**	**1.3**	**0.0**	**100**
2020	EMS	17,238	164	109	0	17,511	98.4	0.9	0.6	0.0	100.0
	Fire	3,496	34	170	0	3,700	94.5	0.9	4.6	0.0	100.0
	Hazmat	39	40	21	0	100	39.0	40.0	21.0	0.0	100.0
	Rescue	8	0	13	0	21	38.1	0.0	61.9	0.0	100.0
	Total	**20,781**	**238**	**313**	**0**	**21,332**	**97.4**	**1.1**	**1.5**	**0.0**	**100**
2021	EMS	12,859	2,929	237	3290	19,315	66.6	15.2	1.2	17.0	100.0
	Fire	3,810	14	217	0	4,041	94.3	0.3	5.4	0.0	100.0
	Hazmat	64	39	22	0	125	51.2	31.2	17.6	0.0	100.0
	Rescue	19	0	14	0	33	57.6	0.0	42.4	0.0	100.0
	Total	**16,752**	**2,982**	**490**	**3290**	**23,514**	**71.2**	**12.7**	**2.1**	**14.0**	**100**
All	EMS	64,235	3,392	507	3,290	71,424	89.9	4.7	0.7	4.6	100.0
	Fire	13,757	89	684	0	14,530	94.7	0.6	4.7	0.0	100.0

Workload and Time on Task

From 2018 through 2021, the total number of responses to calls made by units assigned to GFES across all jurisdictions increased from 21,139 (57.9 responses per day) to 24,659 (an average of 67.6 responses per day). Total busy hours in 2021 were 24,012, averaging busy minutes of 32.6 minutes per response. Call duration was the least for outside of jurisdiction incidents. The table below presents community demand for the combined jurisdictions (ALL) and then for within GFES and AMR responses.

Figure 16:Number of Calls per Type of Incident

Program	Number of Calls			
	2018	2019	2020	2021
EMS	17,295	18,716	18,253	20,018
Fire	3,691	3,722	4,075	4,444
Hazmat	127	132	112	142
Rescue	26	46	43	55
Total	**21,139**	**22,616**	**22,483**	**24,659**
Calls per Day	**57.9**	**62.0**	**61.4**	**67.6**
YoY Growth		**7.0%**	**-0.9%**	**10.0%**

Figure 17: Number of Calls, Number of Responses, and Total Busy Time by Program

Program	Number of Calls	Number of Gresham and AMR Responses	Average Responses per Call	Total Busy Hours	Avg. Busy Minutes per Response	Average Calls per Day	Avg. Responses per Day	Avg. Busy Hours per Day
EMS	20,018	35,925	1.8	21,361	35.7	54.8	98.4	58.5
Fire	4,444	7,800	1.8	2,425	18.7	12.2	21.4	6.6
Hazmat	142	339	2.4	140	24.7	0.4	0.9	0.4
Rescue	55	188	3.4	87	27.7	0.2	0.5	0.2
Total	**24,659**	**44,252**	**1.8**	**24,012**	**32.6**	**67.6**	**121.2**	**65.8**

Figure 19: Department Workload by Demand Zone (First-due Zone)

First-due Station	Number of Calls	Calls per Day	Call Percentage
72	5,627	15.4	22.8
71	5,155	14.1	20.9
74	5,058	13.9	20.5
75	2,554	7.0	10.4
31	2,498	6.8	10.1
73	2,310	6.3	9.4
76	588	1.6	2.4
2	299	0.8	1.2
30	235	0.6	1.0
29	89	0.2	0.4
7	68	0.2	0.3
61	7	0.0	0.0
62	2	0.0	0.0
63	1	0.0	0.0
OUTSIDE	168	0.5	0.7
Total	**24,659**	**67.6**	**100.0**
31-76	**23,790**	**65.2**	**96.5**

Unique incidents, apparatus responses, and time on task were evaluated for each program area for 2021. This analysis is for all incidents regardless of jurisdiction. Once again, results demonstrate that EMS incidents are the most frequently requested demand from the community at 54.8 responses per day on average. Fire-related incidents averaged approximately 12 responses per day. The average duration of responses was approximately 35 minutes in 2021, which is well aligned with industry experience.

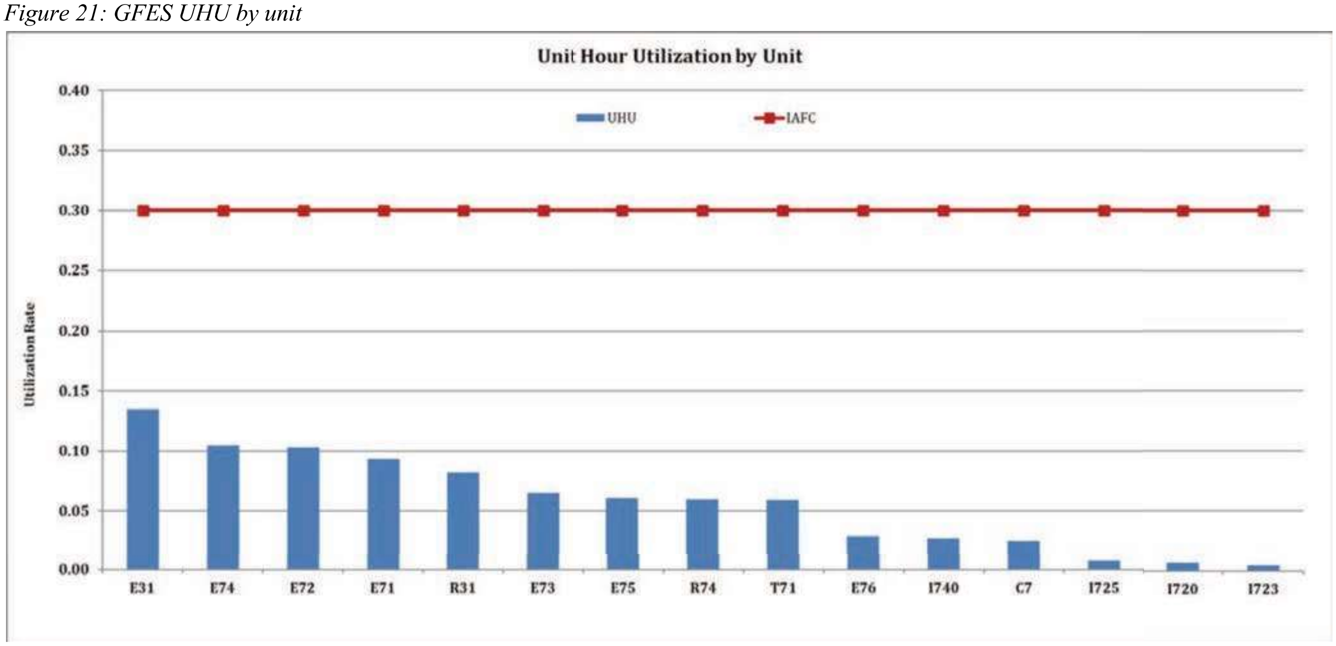
Unit Hour Utilization—Time on Task of Workload

Another measure of time on task is necessary to evaluate best practices in efficient system delivery and consider the impact workload has on personnel. Unit Hour Utilization (UHU) values represent the proportion of the work period (e.g., 24 hours) that is utilized to respond to requests for service. The International Association of Fire Fighters (IAFF) has historically recommended that 24-hour units utilize 0.30, or 30%, workload as an upper threshold. In other words, this recommendation would have personnel spend no more than 7.2 hours per day on emergency incidents. These thresholds take into consideration the necessity to accomplish non-emergency activities such as training, health and wellness, public education, and fire inspections. The 4th edition of the IAFF EMS Guidebook no longer specifically identifies an upper threshold. However, *FITCH* recommends that an upper unit utilization threshold of approximately 0.30, 0r 30%, would be considered best practice. In other words, units and personnel should not exceed 30%, or 7.2 hours, of their workday responding to calls.

Figure 2018: Unit Hour Utilization GFES

Station	Unit ID	Total Busy Hours	UHU	IAFC
31	E31	393	0.13	0.30
74	E74	919	0.10	0.30
72	E72	900	0.10	0.30
71	E71	822	0.09	0.30
31	R31	240	0.08	0.30
73	E73	570	0.07	0.30
75	E75	533	0.06	0.30
74	R74	525	0.06	0.30
71	T71	518	0.06	0.30
76	E76	252	0.03	0.30
71	I740	237	0.03	0.30
71	C7	219	0.02	0.30
HQ	I725	64	0.01	0.30
HQ	I720	59	0.01	0.30
HQ	I723	40	0.00	0.30

Figure 21: GFES UHU by unit



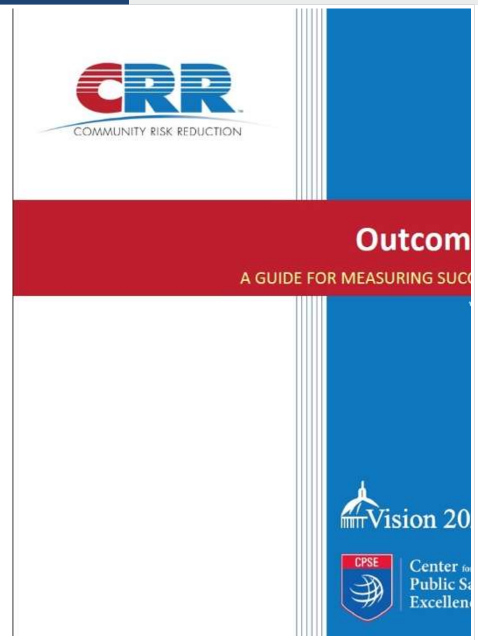
International Association of Firefighters. (1995). Emergency Medical Services: A Guidebook for Fire-Based Systems. Washington, DC: Author. (p. 11); Illinois Fire Chiefs Association. (2012). An Assessment of Deployment and Station Location: Rolling Meadows Fire Department.
Rolling Meadows, Illinois: Author. (pp. 54-55); Castle Rock Fire and Rescue Department. (2011). Community Risk Analysis and Standards of Cover. Castle Rock, Colorado: Author. (p. 58)

EVENT OUTCOMES

Performance Indicator 2B.3

**outputs and outcomes are assessed for three
l accrediting agencies) to five (currently
lited agencies) immediately previous years.**

safety have been reached by documenting changes in fire, EMS, hazmat, technical rescue, or community risk reductic efforts. As this is GFES's first formal Standards of Covera many of the outcome's measures are still in process. The ci utilized *CRR Outcomes: A guide for measuring success* published by Vision 20/20 and the Center for Public Safety Excellence as a guide to identify core measures in each ma program area. Refinement of the data to ensure accuracy is process and will be finalized as of the first annual



of the most visible outcomes of a fire and rescue ce is the percentage of property and contents saved ıg a structure fire. GFES is analyzing fire data for the three years including property and contents lost, erty and contents saved, and overall save rate 96%.

y factors contribute to the survival of out-of-ital cardiac arrest including EMS response experience/ case volume of the paramedic, erson CPR, age/health of patient, type of ım encountered, etc. However, one outcome enerally been accepted as a positive marker of system performance.

rn of Spontaneous Circulation (ROSC). Global of ROSC for out of hospital arrests hover just r 30%.

Iuch like hazardous materials incidents, rtunately technical rescue incidents are rare as ompared to EMS or fire calls, but usually people's ves are on the line during these low frequency, gh risk events. Over the past four years, GFES sponded to 170 technical rescue incidents, otentially saving numerous lives from injuries istained during these incidents.

nat

ınately, hazardous materials incidents are rally a relatively rare occurrence, although ı they do occur, the impacts can be devastating t only the people involved but the environment ell. GFES responded to 513 hazardous rials events over the last three years. GFES is ntly analyzing the gallons of product that were

ommunity Risk Reduction

here is not a single CRR measure that defines ogram success, but the number and severity of res (including dollar loss as measured above in the re outcome area) and injuries or deaths are the timate outcomes of a program. GFES is actively ıalyzing several measures for code compliance,