Fire Department Resource Allocation Study

NORMAN, OKLAHOMA

FINAL REPORT

January 31, 2025

matrix consulting group

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Introduction and Executive Summary

The City of Norman retained the Matrix Consulting Group to facilitate a Resource Allocation Study for the Fire Department. This document includes the project team's research and analysis of the Norman Fire Department (NFD) and community, which provides risk assessment, staffing, response capabilities, and deployment analysis.

Scope of Work

The scope of this study included assessing the current fire protection system operations, response capabilities, staffing, and other resources necessary for delivering services to the city. A review of services and the delivery of those services should be performed periodically to ensure needs are being met. This project focused on the emergency services system delivery that included:

- Response capabilities.
- Response time analysis.
- Resource locations.
- Available resources to serve the city.
- Staffing and workforce.

The approaches used in this study were comprehensive, as described below.

Approaches Utilized in the Study

The project team assessed the Fire Department to understand and evaluate the Department's service level and organizational issues. The principal approaches utilized by the project team in this study included, but were not limited to, the following:

- Internal Interviews—Project team members interviewed numerous city executives, management, and supervisory staff members.
- Data Collection – the project team collected a wide variety of external and internal data documenting the structure, operations, and organization, including:
    - Staffing and scheduling.
    - Documentation reflecting operations management.
    - Numerous output data points reflect services provided.
    - Various other performance information and indicators.

- This data was summarized in a 'descriptive profile' of the Norman Fire Department (NFD), which was reviewed and modified with input from Department staff to ensure we had a factual foundation for the study. This approach ensured that the project team understood the NFD appropriately.

Data was collected over the past several months and presented in interim deliverables. The project team reviewed facts, findings, and conclusions through these interim deliverables with the NFD throughout this process.

Executive Summary

The Norman Fire Department provides fire services to the city, with resources deployed from nine fire stations covering an area of about 189 square miles and an estimated population of 129,600 residents. The population also increases due to college residents, visitors to the city, and an unhoused population. The city has a diversified economy with significant contributions from education, government, healthcare, and a growing technology sector.

Among the challenges for the city and the fire department, the population has increased by about 17% over the past twelve years, with new residential and commercial developments coming soon. These include a mixed-use development in the southeastern region of the city, which includes 2,500 residential units. The University of Oklahoma also has ongoing discussions of additional development in this area. The northern region has a similar issue with development. The development is not a planned mixed-use style development but rather a slower build-out of residential units. The third area is further east, in the area of Lake Thunderbird. There have been discussions of two new turnpike roadways to be built. The East-West Connector is along the northern regions of the city and is parallel to the East Indian Hills Road, and a north-south turnpike would connect to Interstate 35. While the completion of these turnpikes is unknown, long-term planning for their completion should be established. Once the turnpikes are completed, it is highly anticipated that development will follow along these roadways.

Based on nationally recognized best practices, there are challenges for the city and the fire department related to the emergency response system. These challenges include the following:

- Improvements to call processing, turnout, and travel time.
- The addition of staffing for the Ladder Companies to improve the arrival of an effective response force and firefighter safety.
- The addition of staffing for the Rescue Company.

- Establishing benchmark performance objectives for response time and non-emergency activities.
- Improve recruitment programs to ensure a diverse candidate pool is available to fill vacancies.
- Developing operational standards that can be reinforced through educational and practical training.
- Additional fire stations and personnel should be added to address existing and future underserved residential and commercial development.

The Fire Department will need to develop a succession plan and mentoring program to support new officers and to ensure organizational continuity.

The fire department's existing facilities were toured to establish a baseline inventory of current facility and site conditions to determine each location's potential future use, expandability, deficiencies, and obsolescence. The following points are general observations of the facilities.

- Most facilities have non-operable apparatus exhaust systems in place. All apparatus bays should be equipped with apparatus exhaust systems to minimize exposure of personnel to carcinogens associated with diesel exhaust.
- Due to the age of the stations, most facilities have limited storage capacity, and staff turnout gear is stored in the apparatus bays. Only a few stations have extractors to clean staff’s gear after returning to the station.
- Staff at several stations referenced current and past challenges with mold in their facility.
- Staff quarters are generally shared or semiprivate, posing challenges for mixed-gender teams.
- There is an opportunity to standardize the approach to station access with keycard/badge access systems for each station.
- There is a future need to address the office accommodations related to Fire Prevention personnel to include adequate space for growth in this division and an area to house and shoreline their equipment and vehicles.

Based on the previous three years of response data, additional operational staffing is needed to meet the city's needs, including new development and growth and the expansion of Oklahoma University. The project team recommends a phased approach to

the improvements needed for the operational staffing of the Fire Department as there are significant unmet staffing needs currently, and proposed growth will continue to drive the need for additional fire stations and staffing in the future. Making these improvements using a planned approach to enhance service delivery and ease the city's financial burden, will help with risk management, recruitment, and subsequent training efforts.

Strategic Improvement Opportunities

The improvement opportunities were developed for the fire department through the analysis conducted during this study. Timelines are shown to provide guidance related to the anticipated completion of the strategic initiative. It is possible for some of the strategic initiatives to extend beyond the five-year target as funding or other outside influences impact the initiative and objectives. These suggested objectives can be adjusted, added to, or eliminated.

- Short-term: One to three years.
- Intermediate: longer than three years but less than five years.
- Long-term: more than five years.

The following detailed recommendations have been categorized based on the analysis provided in the report. Prioritizing the recommendations will not only assist the fire department with methodical implementation but also ensure there are no missed opportunities or gaps created through unintended consequences. For example, changes to emergency operations should trigger a review of the Standard of Cover and whether there is a negative or positive impact on the stated performance objectives.

- High Priority – These recommendations typically will have an immediate impact on the delivery of emergency services or organizational operations.
- Medium Priority – These recommendations may require additional planning to implement or will need additional time to acquire resources.
- Low Priority – These recommendations may require additional planning, may involve other city departments, or completed beyond 5 years.

As noted previously, the report itself should be reviewed to understand the factual basis behind each recommendation as well as the analysis leading to that recommendation. Operational and organizational changes need to be methodical to ensure the most innovative process or method is implemented.

It should also be noted opportunities for improvements may present themselves sooner rather than later. For example, the acquisition of property for a new station may present

itself sooner than 4 or 5 years. The City of Norman and the fire department should take advantage of these opportunities when and if they arise.

Organizational Opportunities

Medium Priority

- Establish a formal succession plan for the Fire Department.
- As staffing allows, establish a mentoring program to support new officers and Department staff.

Office of the Fire Chief

Medium Priority

- Upgrade the current part-time administrative technician to a full-time position.
- Add an additional part-time administrative technician to assist the full-time administrative technician and serve in the role during their absence.

Administration Division

High Priority

- Add a full-time data analyst position to the Fire Department.

Medium Priority

- Add a full-time position to serve as the Public Information Officer, coordinate social media efforts and serve as liaison with the University of Oklahoma School of Journalism.

Training Division

High Priority

- Fill the authorized but currently unfunded Health and Safety Officer position.
- Add full-time instructor positions to support the Training Division in the delivery of training programs and health and wellness programs and to improve the recruitment of the Fire Department workforce.

Medium Priority

- Add a full-time administrative support position to support the administrative needs of the training division.

Low Priority

- Provide additional aircraft crash training for emergency response personnel.
- As additional staff are hired, an additional full-time instructor position will be added to support the department's EMS training needs.

Fire Prevention Division

High Priority

- Establish a policy for the frequency of fire safety inspections based on the occupancy risk.
- The Department should establish a target for the inspection, investigation, and other workload conducted by Fire and Life Safety Personnel and develop a staffing plan to ensure the inspections and other required services are completed on a timely basis.
- Add a plan reviewer and three inspectors based on recommended workload targets for plan reviews, inspections, and fire investigations to ensure the workload targets are completed on a timely basis and continue to monitor the workload of Fire and Life Safety.

Medium Priority

- Add a full-time administrative support position to support the administrative needs of the Fire Prevention Division.
- Relocate Fire Prevention to a facility that can accommodate their increased staffing needs and provide a secure space for fire inspection and investigation vehicles and equipment.

Fire Suppression Operations

High Priority

- Norman should establish a benchmark performance objective for call processing of one minute for 90% of emergency calls.
- Norman should establish a benchmark performance objective for turnout times of one minute and thirty seconds for 90% of emergency calls.
- The Norman Fire Department should establish a 5-minute travel time benchmark performance objective for 90% of the emergency calls for service in the urban planning zones.

- The Norman Fire Department should establish a 6-minute and 30-second travel time benchmark performance objective for 90% of the emergency calls for service in the suburban planning zone.
- The Norman Fire Department should establish a 10-minute travel time benchmark performance objective for 90% of the emergency calls for service in the rural planning zones.
- Increase the minimum staffing of stations 8 and 9 by one personnel on each shift in the next three (3) years to a minimum daily staffing of five (5) to ensure adequate staffing for a position as a driver of the tender and brush units.
- Increase the minimum staffing of the two Ladder Companies from one personnel to four personnel over two years for a total of 24 additional personnel.
- Begin the design of Station 10 and construct and staff Fire Station 10 in the city's southern region. Staffing should include an Engine Company and a Ladder Company, each company scheduled staffing of five (5) personnel and a minimum staffing of four (4) personnel.
- Begin planning for the replacement of Station 5 and consider relocating the station north of Hwy. 9 on Clear Bay Avenue to improve travel time performance.
- Add a Battalion Chief to each shift with the completion and staffing of Stations 10 to assist with the command and control of the Operations Division.
- Construct and staff Fire Station 11 in the area of Tecumseh Road and 24th Avenue intersection after the completion of Station 10. Staffing should include an Engine Company with a scheduled staffing of five (5) personnel and a minimum staffing of four (4) personnel.

Medium Priority

- Staff the Rescue Company with a scheduled staffing of four (4) personnel and a minimum of three (3) personnel beginning in year three (3) of the staffing plan by adding personnel over a three (3) year period.
- Once the Rescue Company is fully staffed, relocate the Rescue to Station 2.

Low Priority

- Establish a workgroup with the Communications Center to improve the capture of time stamps for apparatus and data points to effectively measure the response time components.

- Work with the Communications Center to educate and establish call processing benchmark performance objectives.
- Ensure the Fire Department and Communications Center personnel communicate correctly to capture the time stamps and effectively measure performance.
- Establish standard operating procedure updates to promote improvements in turnout time to emergency calls for service, including a procedure of when to place the apparatus enroute to improve consistency and accuracy of turnout time capturing.
- Consider adding timers at the bay doors of the fire stations to indicate the time elapsed since the dispatch was received.
- Monitor the expansion of the East-West Connector and the South Extension Turnpikes and begin planning the addition of Fire Station 12 in the area of 108th NE and Franklin with their completion and the anticipated development. Initial staffing should include an Engine Company staffed with a scheduled staffing of five (5) personnel and a minimum staffing of four (4) personnel.
- Consider adding foam capabilities to existing or future apparatus at Station 7.

Facility Improvements

The following table summarizes each facility's general conditions, needs, and recommendations.

Facility	Overall Rating	0 – 5 Year Needs	5 – 10 Year Needs	Recommendation
All Stations		Repair / Replace	Maintenance	The exhaust extraction systems in the stations need to be evaluated, made operational and maintained.
Administration (HQ)	Excellent	Maintenance	Maintenance	Maintain the current facility and expand (or relocate) as needed in the future.
Station #1	Poor	Replace	Maintenance	The facility is a good candidate for replacement.
Station #2	Poor	Replace	Maintenance	The facility is a good candidate for replacement.
Station #3	Fair	Maintenance	Maintenance	This building should continue to be maintained through a preventive maintenance plan. Renovation is a low priority and should be budgeted for in approximately 10 years. The mold and tone issues should be addressed immediately.
Station #4	Fair	Renovation	Relocate / replace	This facility is a prime candidate for significant renovation in the near term. Consideration should be given to relocating this station and building a new fire station with modern design approaches and staff amenities.
Station #5	Extremely Poor	Relocate / Replace	Maintenance	The facility is a good candidate for immediate replacement. Relocating staff from this facility should be a high priority and occur immediately. Fire operations should be relocated to a new purpose-built and standalone facility.
Station #6	Good	Renovation	Maintenance	This facility is a prime candidate for renovation and expansion in the next five years. In the next six months, the Fire Department should work with Public Works staff to identify improvement opportunities to better identify the station's rear-drive access with signage and road markings.
Station #7	Good	Maintenance	Renovation	

Facility	Overall Rating	0 – 5 Year Needs	5 – 10 Year Needs	Recommendation
				The fire station and training classrooms should be renovated in approximately 10 years. The training tower and ancillary structures should be relocated. There is space to relocate the training tower to the west of the truck wash area. Alternatively, the city should consider options to place the new structure on adjacent vacant land currently owned by the University of Oklahoma and include a driving pad for public safety vehicle new driver training. Additional apparatus bay space is needed to house the existing apparatus.
Station #8	Excellent	Maintenance	Maintenance	Create and implement a preventive maintenance program and address the long-standing drainage issue in the kitchen. There is also a need to improve the accommodations for on-shift inspectors working from this station and the future construction of a new facility to house fire prevention personnel. A facility renovation should occur in 12 to 15 years if the preventive maintenance schedule is properly followed. More robust efforts should be put in place to address the rodent infestation on the site.
Station #9	Excellent	Maintenance	Maintenance	Create and implement a preventive maintenance program and continue monitoring the foundation issues. If the preventive maintenance schedule is properly followed, a facility renovation should occur in 15 years.

Norman Fire Department Organization

This section provides an overview of the general characteristics of the Norman Fire Department.

Background

Founded during the Land Run of 1889, Norman's history is deeply entwined with that of the state of Oklahoma. Initially a small settlement, it grew around the University of Oklahoma, established in 1890. The University of Oklahoma is a major draw for the city, known for its strong meteorology, engineering, law, and other academic programs. It also boasts cultural attractions like the Fred Jones Jr. Museum of Art and the Sam Noble Oklahoma Museum of Natural History.

Norman's diversified economy has significant education, government, and healthcare sectors. The University contributes to a dynamic economic environment, fostering innovation and providing a skilled workforce. Additionally, Norman has a growing technology sector, with startups and established companies contributing to the local economy.

Norman experiences a temperate climate, with hot summers, mild winters, and a fair amount of precipitation throughout the year. The city is in a region known as "Tornado Alley" and is no stranger to severe weather, including thunderstorms and tornadoes, particularly in the spring and early summer.

Norman uses a council-manager system of government. The council comprises eight members from the city's eight wards, plus the Mayor. The City Council appoints the City Manager, the city's principal executive officer. The manager's job is to carry out the policies and decisions of the City Council, manage the daily functions of the city government, and oversee city employees. The City Manager's responsibilities include making the budget, leading day-to-day operations, and hiring department heads.

Demographic Profile

The following table illustrates the demographic profile of the city and the changes that have occurred since 2010.

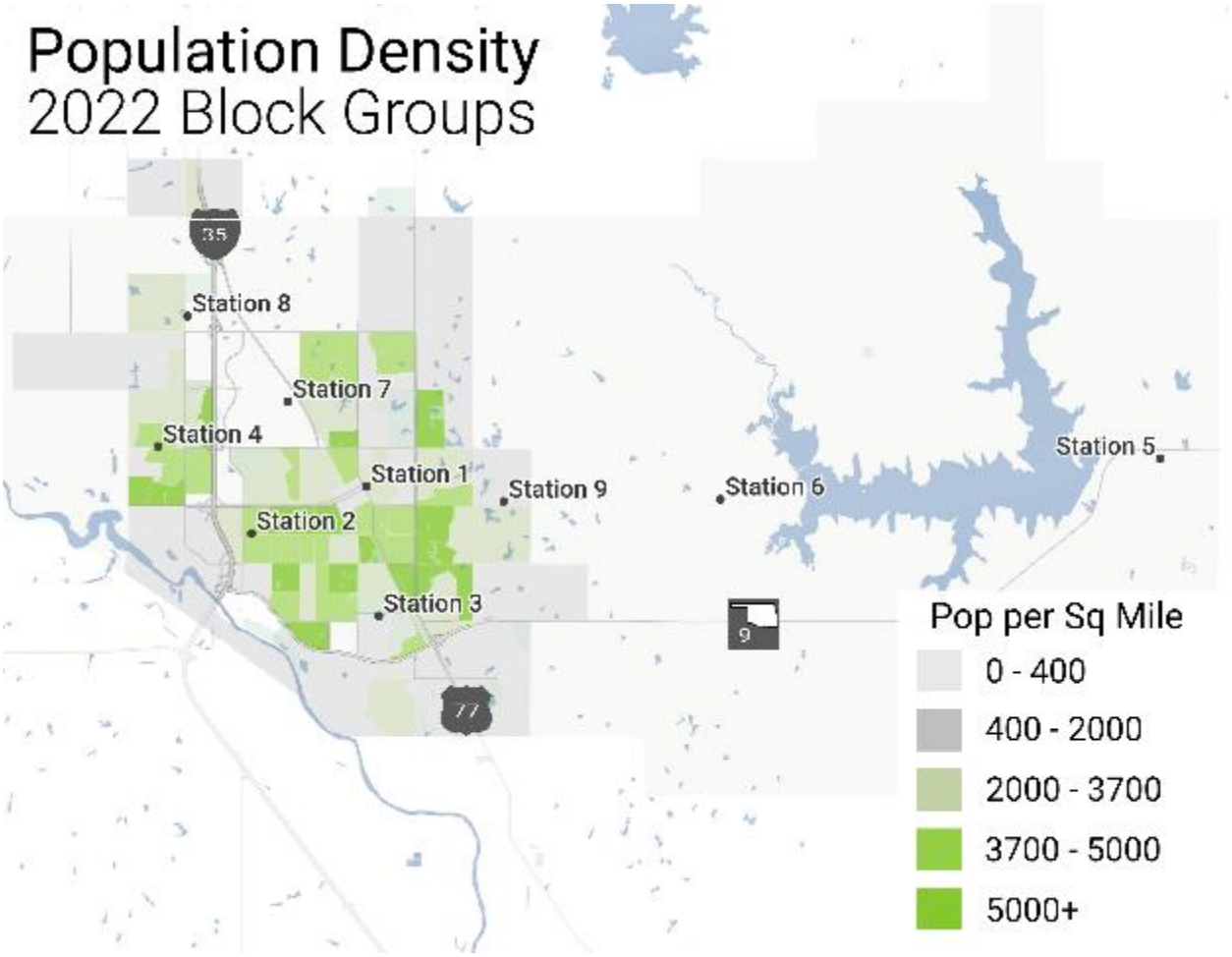
Table 1: City of Norman Demographics

US Census Bureau	2010	2015	2022
Estimated Norman Population	110,925	120,297	129,627
Median Age	30.4	30.9	31.0
Children Under Age 5	6.8%	4.7%	3.9%
Children Ages 5 to 19 years	18.6%	23.0%	20.5%
Persons Age 20 to 59 years	60.4%	58.5%	57.1%
Persons Age 60 and Over	14.2%	13.8%	18.5%
Families in Poverty	11.8%	10.7%	9.8%
Civilian Labor Force Unemployed	9.8%	4.6%	5.6%
Median Household Income	$43,020	$45,369	$52,844
Employment Sectors:			
Education, Health Care, Soc. Svc.	31.6%	31.8%	25.0%
Retail Trade	12.2%	11.5%	16.0%
Professional, Scientific, Mgmt.	9.3%	8.9%	11.8%
Finance, Insurance, Real Estate	5.4%	5.3%	5.5%
Entertainment, Recreation, Food	12.8%	12.5%	11.9%
Construction	4.4%	3.8%	4.0%
Manufacturing	4.8%	5.2%	5.4%
Transportation, Warehousing, Util.	2.8%	3.3%	4.6%
Public Administration	6.2%	5.2%	6.6%
Other Services	4.8%	4.9%	4.3%
Wholesale	2.1%	2.7%	1.6%
Information	2.1%	1.5%	1.9%
Agriculture, Forestry, Fishing	1.3%	3.4%	1.5%

Since 2010, the city has grown by about 17%, gaining about 18,700 more residents. The average age in the city rose from 30.4 in 2010 to 31.0 in 2022. Average household income has increased by about 23% in the last twelve years, and the number of families living in poverty has dropped by about 2%. There is also a growing unhoused population in the city and Cleveland County. Current estimates are that 213 people were homeless in 2023 compared to 133 in 2015 in Cleveland County.

The following map provides a view of population density by census blocks.

Figure 1: Population Density Map



As illustrated, there are population clusters throughout the city; however, there are open areas to the east for additional development.

Organization

The Fire Chief oversees five divisions: administration, emergency management, fire prevention, training, and operations. Each Division has a division head who leads the direct reports to accomplish the Division's mission.

Mission Statement

The Norman Fire Department is committed to the preservation of life and property by providing quality and efficient services to our citizens, businesses and visitors.

Authorized Personnel

The following table illustrates the fire department's authorized personnel (FTE).

Table 2: Fire Department Authorized Staffing

Unit / Position	Curr	Auth
Office of the Fire Chief		
Fire Chief	1	1
Administrative Tech IV	1	1
Administrative Tech III	1	1
Administrative Tech II	0.5	0.5
Total Office of the Fire Chief	3.5	3.5
Administration Division		
Assistant Chief	1	1
EMS Director	1	1
Total Administration Division	2	2
Training Division		
Training Officer	1	1
Health and Safety Officer*	0	1
Total Training Division	1	2
Fire Prevention		
Fire Marshal	1	1
Fire Inspector (Daytime)	1	1
Fire Inspector (Shift)	3	3
Planning Officer	1	1
Total Fire Prevention	6	6
Emergency Management Division		
Emergency Management Coordinator	1	1
Total Emergency Management Division	1	1
Fire Suppression Operations		
Deputy Chief	0	1
Assistant Chief	3	3
Battalion Chief	3	3
Captain	30	30
Driver Engineer	33	33
Firefighter	80	80
Total Fire Suppression Operations	149	150
Fire Department Total	**163.5**	**164.5**

*Authorized by the FY23 IAFF Contract

Figure 2: Norman Fire Department Organization Chart

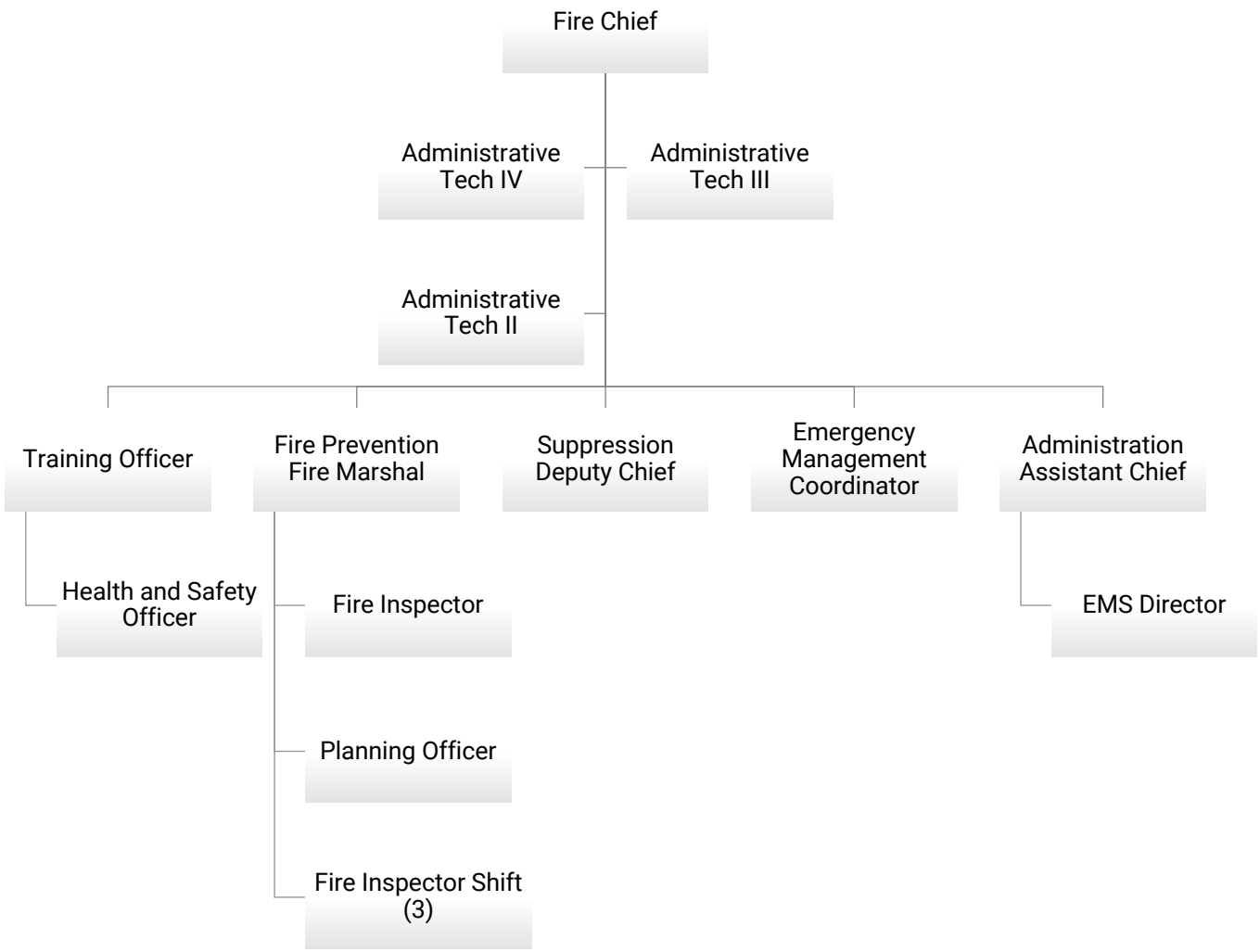
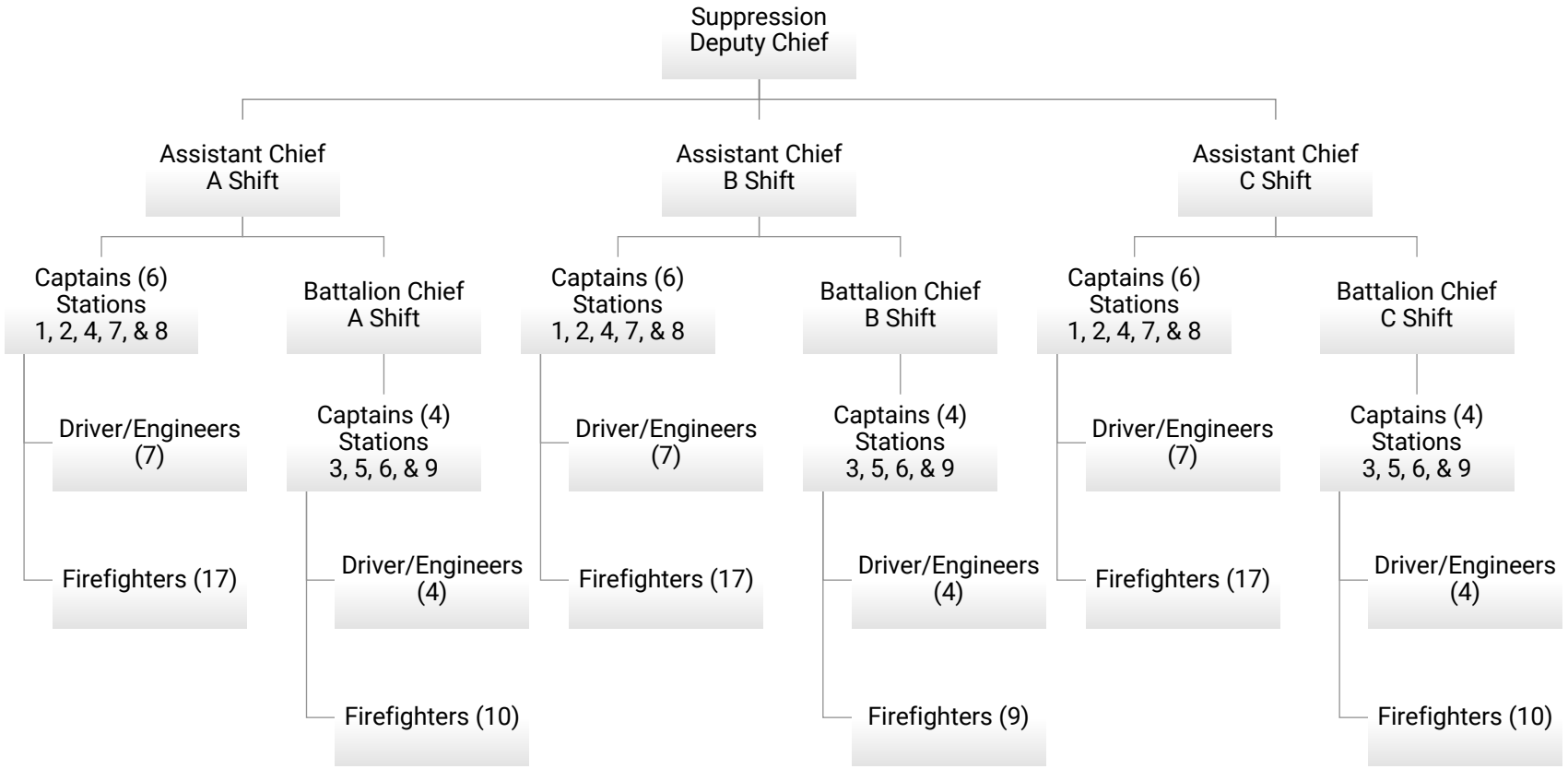


Figure 3: Norman Fire Department Suppression Operations Organization Chart



Leadership and Administration

The Office of the Fire Chief supervises all activities in the Fire Department. It is responsible for short—and long-range department planning, budget formulation and administration, personnel administration, and the assembly and effective distribution of all Fire Department resources.

Administration Division

The Administration Division supports short- and long-range department planning, budget formulation and administration, records management, and key aspects of daily operations based on department goals following state and federal laws. This Division is the liaison for IT, Human Resources, and other city departments and works with local public safety partners. This Division oversees all Emergency Medical Responses, including personnel training to the latest standards and maintaining licensure at the state and national levels.

Emergency Management Division

The Emergency Management Division maintains the plans for mitigation, preparedness, response, and recovery operations. It also plans and organizes emergency management training for the city and coordinates the Community Emergency Response Teams (CERT).

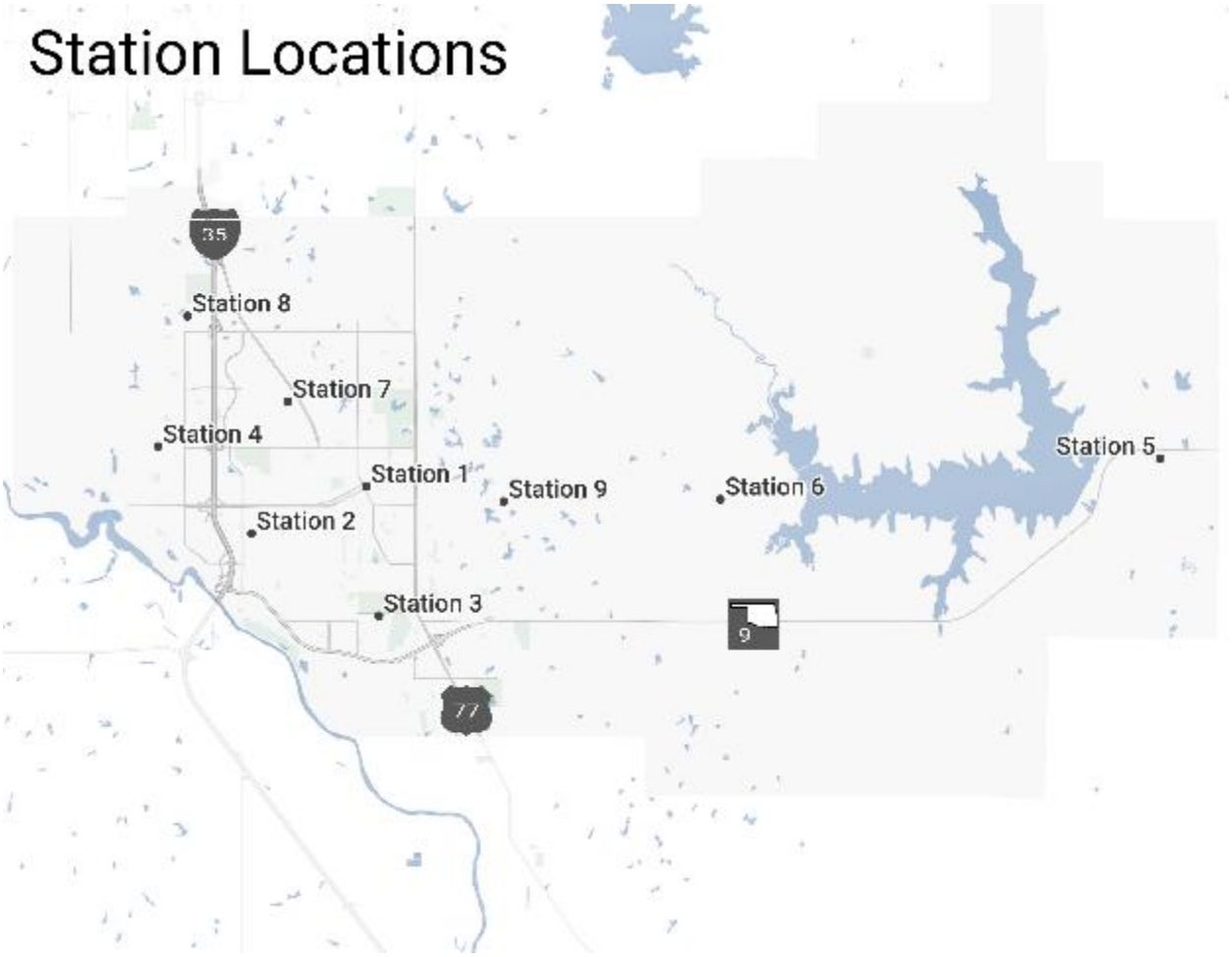
Operations

This section provides an overview of the emergency operations of the Norman Fire Department.

Physical Resources

Nine fire stations in the city currently provide service to the city. The following map illustrates the location of the fire stations.

Figure 4: Fire Station Location Map



Norman Fire Department has 150 career personnel assigned to shift operations, with 50 personnel authorized to be assigned to each shift. Currently, B Crew operates with 49 personnel. Operations personnel operate on a three-platoon system, working 24 hours on and 48 hours off duty. The daily minimum staffing is 40 personnel, including both Chief Officers.

The following tables outline the station's apparatus and staffing.

Station 1

411 East Main Street

Description of Use Apparatus Space	It serves the city's downtown area and is on the same campus as Fire Administration. Four drive-through style bays				
Assigned Apparatus	Unit ID	Year	Description	Type	Minimum Staffing
	Engine 1	2023	Sutphen Monarch	Type 1 Engine	4
	Ladder 1	2012	Pierce Velocity	Aerial	1
	Brush 1	2015	Ford F450	Type 6 Engine	Cross Staffed w/ E1
	Reserve Brush	2009	Ford F450	Type 6 Engine	
	Battalion 1	2021	Ford F250	Command	1

Station 2

2211 West Boyd

Description of Use Apparatus Space	It provides service to the southwest area of the city. Three drive-through style bays				
Assigned Apparatus	Unit ID	Year	Description	Type	Minimum Staffing
	Engine 2	2014	Pierce Arrow	Type 1 Engine	4
	Ladder 2	2017	Pierce Quantum	Aerial Ladder Platform	1
	Brush 2	2013	Ford F450	Type 6 Engine	Crossed Staffed w/ E2
	Haz-Mat 2	2006	Pierce-Lance	Haz-Mat	Crossed Staffed w/ E2
	Utility	2014	Ford F250	Support	

Station 3

500 East Constitution

Description of Use Apparatus Space	It is located in the city's southern section and on the south side of the Oklahoma University campus, providing service to the campus and the south section of the city. Three drive-through style bays				
Assigned Apparatus	Unit ID	Year	Description	Type	Minimum Staffing
	Engine 3	2015	Pierce Velocity	Type 1 Engine	4
	Brush 3	2015	Ford F450	Type 6 Engine	Crossed Staff w/ E3
	Reserve Engine	2009	Pierce Velocity	Type 1 Engine	
	Reserve Engine	2007	Pierce - Pumper	Type 1 Engine	
	Reserve Brush	2015	Ford F450	Type 6 Engine	

Station 4

4145 West Robinson

Description of Use Apparatus Space	It is located on the city's western side and serves the west central area. Two drive-through style bays				
Assigned Apparatus	Unit ID	Year	Description	Type	Minimum Staffing
	Engine 4	2014	Pierce Velocity	Type 1 Engine	4
	Tanker 4	2002	IHC Ferrera	Tender	Crossed Staffed w/ E4
	Brush 4	2015	Ford F450	Type 6 Engine	Crossed Staffed w/ E4

Station 5

1000 168th Avenue North East

Description of Use Apparatus Space	This station is located east of Lake Thunderbird and serves the far eastern areas of the city. Two back-in-style bays				
Assigned Apparatus	Unit ID	Year	Description	Type	Minimum Staffing
	Engine 5	2020	Pierce Arrow	Type 1 Engine	4
	Brush 5	2022	Ford F450	Type 6 Engine	Crossed Staffed w/ E5

Station 6

7405 Alameda Dr

Description of Use Apparatus Space	This station is on the west side of Lake Thunderbird, providing service to the east-central area. Two drive-through style bays				
Assigned Apparatus	Unit ID	Year	Description	Type	Minimum Staffing
	Engine 6	2019	Pierce Arrow	Type 1 Engine	4
	Brush 6	2017	Ford F450	Type 6 Engine	Crossed Staffed w/ E6
	Boat A	2015	Zodiac	Water Rescue	
	Boat C	2015	Zodiac	Water Rescue	
	Reserve Brush	2009	Ford F450	Type 6 Engine	

Station 7

2207 Goddard Avenue

Description of Use Apparatus Space	It provides service to the city's central section and is located adjacent to the airport. Two drive-through style bays				
Assigned Apparatus	Unit ID	Year	Description	Type	Minimum Staffing
	Squad 7	2018	Pierce Velocity	Type 1 Engine	4
	Rescue 7	2010	Pierce Contender	Rescue	Crossed Staffed w/ S7
	Brush 7	2015	Ford F450	Type 6 Engine	Crossed Staffed w/ S7
	Boat B	2015	Zodiac	Water Rescue	
	Bus 7	2016	Ford F550	Support	

Station 8

3901 36th Avenue North West

Description of Use Apparatus Space	It is located in the northern section, providing service to far north areas. Three drive-through style bays				
Assigned Apparatus	Unit ID	Year	Description	Type	Minimum Staffing
	Engine 8	2010	Pierce Velocity	Type 1 Engine	4
	Tanker 8	2015	Peterbilt PB367	Tender	Crossed Staffed w/ E8
	Brush 8	2013	Ford F450	Type 6 Engine	Crossed Staffed w/ E8
	Air and Light 8	2021	Peterbilt Air	Support	Crossed Staffed w/ E8
	Reserve Engine			Type 1 Engine	

Station 9

3001 East Alameda

Description of Use	It provides service to the east-central area of the city.				
Apparatus Space	Three drive-through style bays				
Assigned Apparatus	Unit ID	Year	Description	Type	Minimum Staffing
	Battalion 2	2018	Ford F250	Command	1
	Engine 9	2017	Pierce Arrow	Type 1 Engine	4
	Tanker 9	2015	Peterbilt PB367	Tender	Crossed Staffed w/ E9
	Brush 9	2017	Ford F450	Type 6 Engine	Crossed Staffed w/ E9
	Reserve Engine			Type 1 Engine	

Historical Workload

The Department responds to emergency and non-emergency calls for service. The following table illustrates the NFD's activities grouped by the type of call or details for calls responded to by the Department.

Table 3: Calls For Service 2021 – 2023

	2021	2022	2023	Total	Pct.
Auto Accidents	502	536	513	1,551	2.7%
Medical Calls	10,365	10,675	11,287	32,327	57.2%
Total Medical and Auto Accidents	10,867	11,211	11,800	33,878	59.9%
Fire Alarm - False	346	411	422	1,179	2.1%
Fire Alarm - Malfunction	243	200	177	620	1.1%
Fire Alarm - Activation	279	285	228	792	1.4%
Mutual Aid	3	5	3	11	0.0%
Other Type Fire	71	79	55	205	0.4%
Smoke Scare	238	237	222	697	1.2%
Structure Fire	74	58	49	181	0.3%
Overpressure/Rupture/Explosion	5	5	8	18	0.0%
Aircraft Fire	0	1	0	1	0.0%
Vegetation/Brush/Debris Fires	184	223	160	567	1.0%
Vehicle Fire	36	45	42	123	0.2%
All Fire Calls	1,479	1,549	1,366	4,394	7.8%
Rescue Calls - Extrication	9	9	8	26	0.0%
Rescue Calls - Elevator	17	9	22	48	0.1%
Rescue Calls - Search	3	2	3	8	0.0%
Rescue Calls - Technical	1	1	3	5	0.0%
Rescue Calls - Water	5	8	6	19	0.0%
Rescue Calls - Other	38	49	56	143	0.3%
All Rescue Calls	73	78	98	249	0.4%
Dispatched/Canceled	2,727	3,051	3,177	8,955	15.8%
Severe Weather	3	6	2	11	0.0%
Good Intent	649	894	853	2,396	4.2%
Hazardous Material	6	4	2	12	0.0%
Hazardous Conditions	423	396	443	1,262	2.2%
Service Calls	1,904	1,617	1,661	5,182	9.2%
Non-Coded Calls	80	110	22	212	0.4%
Other Types of Calls	5,792	6,078	6,160	18,030	31.9%
Total Calls for Service	**18,211**	**18,916**	**19,424**	**56,551**	

Medical calls represent about 57% of the call volume, with auto accidents accounting for an additional 2.7%. Other calls, including service calls, hazardous condition calls, and canceled calls, account for about 27% of the calls for service.

The following table displays the total number of calls for service handled by the Norman Fire Department by each hour and day of the week for the past three years. Both emergency and non-emergency calls were included to provide an overall view of the call demand on the emergency services system.

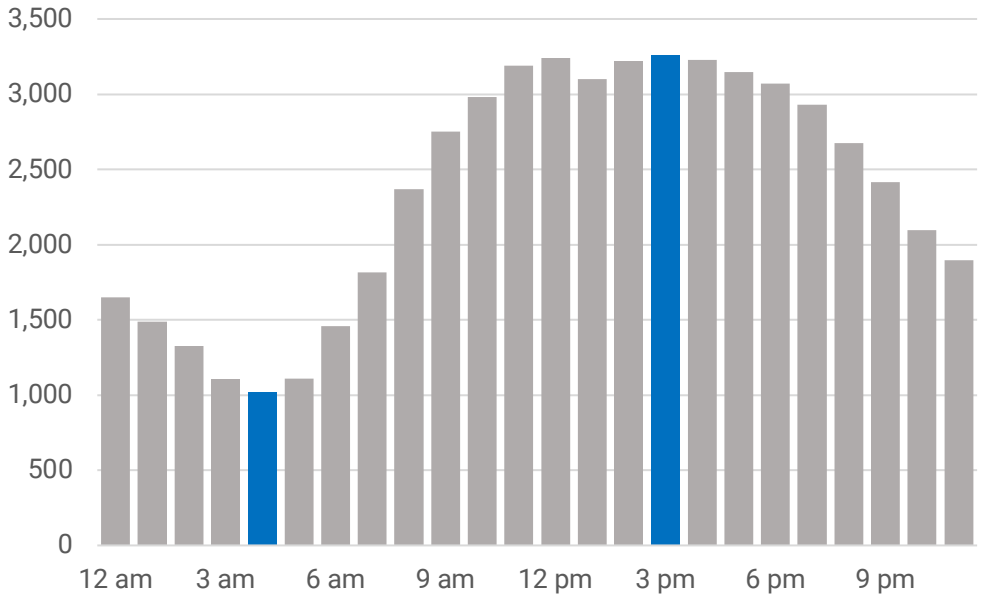
Table 4: 2019 – 2022 Calls for Service by Hour and Weekday

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total
12 am	303	210	199	222	207	233	276	1,650
1 am	291	174	175	197	180	212	258	1,487
2 am	258	179	145	172	172	189	210	1,325
3 am	173	152	142	155	127	149	211	1,109
4 am	173	134	132	144	126	147	163	1,019
5 am	164	166	145	154	130	176	176	1,111
6 am	185	219	218	201	222	202	212	1,459
7 am	206	271	310	295	252	262	219	1,815
8 am	243	342	393	395	341	383	271	2,368
9 am	341	412	418	435	414	388	345	2,753
10 am	375	434	463	438	454	435	380	2,979
11 am	372	479	511	485	462	452	430	3,191
12 pm	423	468	461	492	469	476	450	3,239
1 pm	367	472	450	464	475	493	380	3,101
2 pm	381	504	459	498	484	488	408	3,222
3 pm	363	470	526	538	469	480	416	3,262
4 pm	405	453	465	471	500	492	443	3,229
5 pm	406	451	477	463	444	454	454	3,149
6 pm	424	434	471	433	461	438	411	3,072
7 pm	373	400	416	435	421	441	444	2,930
8 pm	378	365	384	361	372	430	384	2,674
9 pm	334	343	309	346	328	372	382	2,414
10 pm	305	262	254	323	300	310	341	2,095
11 pm	227	271	264	229	250	321	336	1,898
Total	**7,470**	**8,065**	**8,187**	**8,346**	**8,060**	**8,423**	**8,000**	**56,551**

The call volume is heaviest during the middle part of the day, from mid-morning to the early evening, with every day of the workweek relatively even in terms of the number of calls. Calls for service varied by time of day and day of the week. The busiest hour of the day is 3 pm, with the slowest hour being 4 am.

The following chart further illustrates the calls for service by hour of the day.

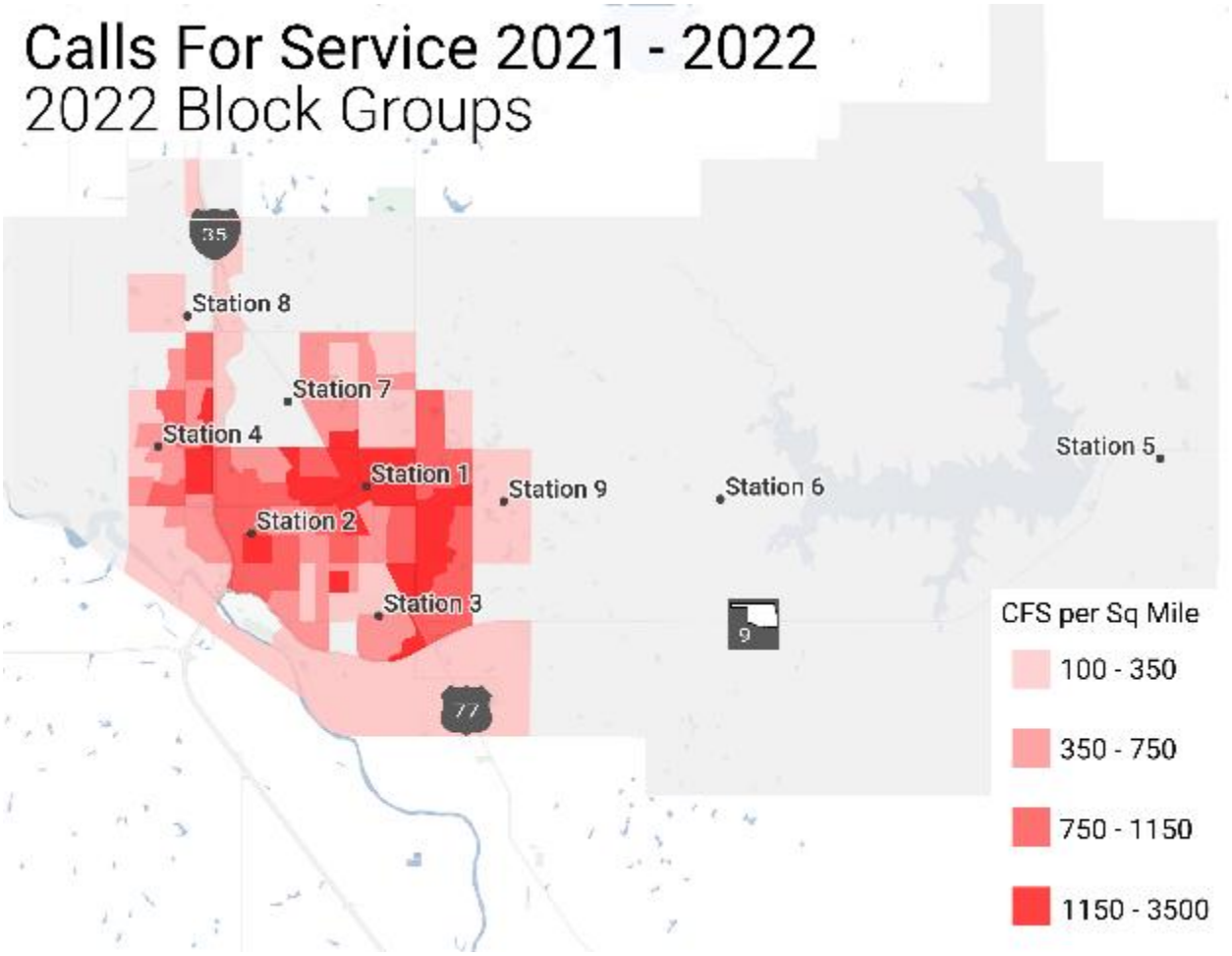
Figure 5: 2021 – 2023 Calls by Hour of the Day



As illustrated above, calls increase sharply at 8 a.m., peaking at 3 p.m., but remain relatively steady from 11 a.m. to 6 p.m. Calls gradually decline at 7 p.m. and continue to fall overnight, with 4 a.m. being the slowest hour of the day.

The following map illustrates the call demand based on the census blocks to outline the location of the calls.

Figure 6: Calls for Service Map



As illustrated, there is a significant clustering of calls near stations 1 and 2, with other pockets of calls throughout the city, mainly in the residential areas.

Training and Education

Provides for developing and maintaining essential job skills for all Fire Department members through modern and comprehensive training programs. Training also supports staff in all areas of human resource management and development.

The Training Division is managed by a Training Officer who reports to the Fire Chief. This Division provides training programs to develop and maintain job skills. This position supports other areas of the Department, including health and safety, communications, personal protective equipment inspections, and policy development.

Some shift training programs through Target Solutions use Internet-based training programs. This system provides significant didactic education and testing for various disciplines.

The following table illustrates the staff hours of training provided through the online system and training delivered as a part of shift operations.

Table 5: Staff Hours by Training Topics

Topic Area	2021	2022	2023
Administrative	627.8	457.5	377.2
Aircraft	64.0	81.5	34.0
Apparatus Operations	3,145.6	3,172.2	2,006.8
EMS	11,541.7	12,260.5	11,351.1
Fire	9,269.2	9,719.4	8,914.4
Hazardous Materials	1,188.0	1,790.8	1,996.9
Technical Rescue	1,042.5	935.8	1,515.1
Wildland	576.0	542.9	560.8
Total Person Hours	**27,454.8**	**28,960.7**	**26,756.3**

Based on the illustrated person-hours, there is an average of 156.5 hours per person in 2023.

Fire Prevention

Provides public fire safety and reduces the occurrence and effects of fires by reviewing and inspecting new/remodeled construction for code compliance; enforcing fire safety codes and ordinances through inspections and education; informing and educating citizens, businesses, and schools with effective safety practices; and investigating and analyzing fire cause and behavior, determining the nature and scope of the local fire issues and dynamics.

A Fire Marshal who works under the Fire Chief oversees Fire Prevention. This Division has one fire inspector for daytime inspections and one planning officer for plan review. Three inspectors on operations shifts do fire inspections and any activities at night, especially those related to OU.

The following table illustrates the plan review and new construction activity for the past three years.

Table 6: Fire Inspection Activity

Activity	2021 -2023
Number of Inspections	1,206
Citizen Complaints	22
Special Event Safety Inspections	33
Plan Check Reviews	933
Fire Protection Plan Reviews	313
New Construction Inspections	769

Fire investigations are part of the Fire Prevention Division's activities. The following table highlights the activity for 2023.

Table 7: Fire Investigation Activity

Activity	2023
Fire Investigations	145
Open Investigations	23
Closed Investigations	93
Investigations Cleared	21
Closed Investigations w/Arrest	3

The final component of the Fire Prevention Division is public education and fire prevention programs. The following table highlights the number of programs for 2023.

Table 8: Public Education Activity

Activity	2023
Safety Town	10
School and Public Safety Education	9
Station Tours	4
General Public Safety Events	35
Smoke Detector Installations	96
Extinguisher Classes	4

Financial Resources

Developing the City of Norman’s Annual Operating and Capital Budget is a comprehensive effort involving input from the Mayor, City Council, and all city departments and offices. The budget is prepared by the City Manager and the various departments and approved by the City Council. The city operates on a fiscal year ending June 30 of each year.

Revenue

Two primary funding sources for the city are sales and state use taxes, which have accounted for approximately 56% and 13% of the revenues in 2024, respectively. The following table summarizes the city's revenues for FY 2022 – 2024.

Table 9: General Fund Revenues

Line Item	FY 2022 Actual	FY 2023 Revised	FY 2024 Adopted
Sales Tax	$54,864,717	$54,097,700	$55,179,654
State Use Tax	$10,639,117	$12,000,000	$12,480,000
Franchise Fees	$7,294,416	$6,945,385	$7,153,746
Other Tax	$2,527,670	$2,400,000	$2,472,000
Fines/Forfeitures	$1,090,082	$1,184,080	$1,219,602
Interest/Investment Income	-$81,334	$189,425	$193,214
Other Revenues	$939,080	$2,641,621	$2,668,037
License/Permit Fees	$1,386,460	$991,565	$1,001,481
Service Fees and Charges	$1,406,822	$2,222,497	$2,234,872
Cost Allocation Charges	$4,268,404	$4,053,709	$5,815,832
Internal Charges	$6,251,135	$7,760,442	$7,798,924
Total Revenues	**$90,586,569**	**$94,486,424**	**$98,217,362**

In 2008, the citizens of Norman passed a one-half percent sales tax dedicated to public safety. Over the years, citizens have extended the sales tax to fund public safety initiatives. The following table illustrates the revenues generated by this tax.

Table 10: Public Safety Sales Tax Revenue

Line Item	FY 2022 Actual	FY 2023 Revised	FY 2024 Adopted
Sales Tax - Dedicated Public Safety	$11,927,112	$12,426,738	$12,675,272
State Use Tax - Dedicated Public Safety	$1,773,186	$1,800,341	$1,854,351
Franchise Fees	-$3,981	$50,000	$50,000
Total Revenues	**$13,696,317**	**$14,277,079**	**$14,579,623**

Expenditures

The following tables illustrate the operating expenditures for the Fire Department.

Table 11: General Fund Expenditures

Line Item	FY 2022 Actual	FY 2023 Revised	FY 2024 Adopted
Salaries and Benefits	$16,007,958	$15,484,862	$17,468,042
Supplies and Materials	$294,520	$323,458	$417,025
Services and Maintenance	$434,742	$472,793	$528,348
Internal Services	$522,369	$593,562	$923,599
Operational Expenditures	**$17,259,589**	**$16,874,675**	**$19,337,014**
Capital Equipment	$179,563	$66,008	$2,064,449
Total Fire Department Expenditures	**$17,439,152**	**$16,940,683**	**$21,401,463**

Table 12: Public Safety Sales Tax Expenditures

Line Item	FY 2022 Actual	FY 2023 Revised	FY 2024 Adopted
Salaries and Benefits	$3,707,980	$3,547,373	$3,827,637
Supplies and Materials	$179,975	$164,233	$133,736
Services and Maintenance	$48,562	$90,622	$86,693
Internal Services	$108,812	$118,846	$121,298
Operational Expenditures	**$4,045,329**	**$3,921,074**	**$4,169,364**
Capital Equipment	$568,155	$1,979,827	$2,124,486
Total Fire Department Expenditures	**$4,613,484**	**$5,900,901**	**$6,293,850**

The following table combines both funds to illustrate the cost of providing emergency services.

Table 13: Fire Department Expenditures (Both Funds)

Line Item	FY 2022 Actual	FY 2023 Revised	FY 2024 Adopted
Salaries and Benefits	$19,715,938	$19,032,235	$21,295,679
Supplies and Materials	$474,495	$487,691	$550,761
Services and Maintenance	$483,304	$563,415	$615,041
Internal Services	$631,181	$712,408	$1,044,897
Operational Expenditures	**$21,304,918**	**$20,795,749**	**$23,506,378**
Capital Equipment	$747,718	$2,045,835	$4,188,935
Total Fire Department Expenditures	**$22,052,636**	**$22,841,584**	**$27,695,313**

In 2023 and 2024, personnel salaries and benefits comprise 91% and 90% of the operating expenditures, respectively.

Strategic Initiatives

This section of the report provides the strategic initiatives and long-term goals developed for the fire department through the analysis conducted during this study. The following tables illustrate the goals and strategic initiatives (objectives) for each goal to allow progress to be tracked. These suggested objectives can be adjusted, added to, or eliminated.

- Short-term: One to three years.
- Intermediate: longer than three years but less than five years.
- Long-term: more than five years.

Timelines are shown to provide guidance related to the anticipated completion of the strategic initiative. It is possible for some of the strategic initiatives to extend beyond the five-year target as funding or other outside influences impact the initiative and objectives. The following strategic initiatives were developed through input from the community, internal employee interviews, and analysis of the current performance and workload of the fire department.

Strategic Initiative 1:	**Improve the call processing component of the total response time for emergency calls for service.**
Accountability:	
Overall Timeline:	Short Term 1 – 3 years
Objective 1A	Establish a call processing benchmark performance objective of one (1) minute for 90% of emergency calls.
Assigned To:	
Objective Timeline	12 months
Objective 1A	Establish a workgroup with the Communications Center to improve the capturing of time stamps for apparatus and data points to effectively and accurately measure and report the call processing time performance of the Center.
Assigned To:	
Objective Timeline	12 months
Objective 1B	Work with the Communications Center to educate and establish call processing benchmark performance objectives.
Assigned To:	
Objective Timeline	12 months
Objective 1C	Post the call processing time performance monthly so the staff can see their performance.
Assigned To:	
Objective Timeline	12 months
Objective 1D	Create a method to monitor and report incremental improvements to the call processing time component at least annually.
Assigned To:	
Objective Timeline	Ongoing

Strategic Initiative 2:	**Improve the turnout time component of the total response time for emergency calls for service.**
Accountability:	
Overall Timeline:	Short Term 1 – 3 years
Objective 2A	Formally establish a local turnout time benchmark performance objective of one (1) minute and thirty (30) seconds for 90% of emergency calls.
Assigned To:	
Objective Timeline	12 months
Objective 2A	Establish standard operating procedure updates to promote improvements in turnout time to emergency calls for service, including a procedure to place the apparatus enroute to improve accuracy.
Assigned To:	
Objective Timeline	12 months
Objective 2B	Ensure the Fire Department and Communications Center personnel communicate correctly to capture the time stamps and effectively measure performance.
Assigned To:	
Objective Timeline	12 months
Objective 2C	Consider adding timers at the bay doors of the fire stations to indicate the time elapsed since the dispatch was received.
Assigned To:	
Objective Timeline	24 months
Objective 2D	Post the monthly turnout time performance by station and shift at each station so the crews can see their performance.
Assigned To:	
Objective Timeline	12 months
Objective 2E	Create a reporting mechanism for excessive turnout times to allow for evaluation of the cause of turnout time delays.
Assigned To:	
Objective Timeline	12 months
Objective 2F	Create a method to monitor and report at least incremental annual improvements to the turnout time component.
Assigned To:	
Objective Timeline	Ongoing

Strategic Initiative 3:	**Formally establish travel time benchmark performance objective for the three demographic planning zones.**
Accountability:	
Overall Timeline:	Short Term 1 – 3 years
Objective 3A	Establish a 5-minute travel time benchmark performance objective for 90% of the emergency calls for service in the urban planning zones.
Assigned To:	
Objective Timeline	12 months
Objective 3B	Establish a 6 minute and 30 second travel time benchmark performance objective for 90% of the emergency calls for service in the suburban planning zone.
Assigned To:	
Objective Timeline	12 months
Objective 3C	Establish a 10-minute travel time benchmark performance objective for 90% of the emergency calls for service in the rural planning zones.
Assigned To:	
Objective Timeline	12 months
Objective 3D	Post the travel time performance monthly by station and shift at each station for the crews to see their performance.
Assigned To:	
Objective Timeline	12 months
Objective 3E	Create a method to monitor and report incremental improvements to the travel time component at least annually.
Assigned To:	
Objective Timeline	Ongoing

Strategic Initiative 4:	**Improve the availability and arrival of an effective response force to emergency calls for service based on nationally recommended best practices and the Community Risk Assessment.**
Accountability:	
Overall Timeline:	Short Term 1 – 3 years
Objective 4A	Increase the minimum staffing of the two Ladder Companies from one personnel to four personnel over two years for a total of 24 additional personnel.
Assigned To:	
Objective Timeline	12 – 24 months
Objective 4C	Increase the staffing of stations 8 and 9 by one personnel on each shift in the next three (3) years to serve as drivers of the tender and brush units. This will require hiring six (6) additional personnel.
Assigned To:	
Objective Timeline	12 – 36 months
Objective 4D	Add a Battalion Chief to each shift with the completion and staffing of Station 10 to assist with the command and control of the Operations Division.
Assigned To:	
Objective Timeline	24 – 36 months

Strategic Initiative 5:	**Improve the efficiency and effectiveness of the fire prevention programs in the city.**
Accountability:	
Overall Timeline:	Short Term 1 – 3 years
Objective 5A	Add a full-time administrative support position to support the administrative needs of the Fire Prevention Division
Assigned To:	
Objective Timeline	12 months
Objective 5B	Determine the number of buildings and occupancies that require fire safety inspections in the city.
Assigned To:	
Objective Timeline	12 months
Objective 5C	Establish the frequency of those inspections based on the building and occupancy.
Assigned To:	
Objective Timeline	18 months
Objective 5D	Establish a benchmark performance objective for completing fire safety inspections in the city.
Assigned To:	
Objective Timeline	18 months
Objective 5E	Add the appropriate number of staff based on the number of annual inspections to ensure the benchmark performance objective can be met.
Assigned To:	
Objective Timeline	24 months

Strategic Initiative 6:	**Improve the efficiency and effectiveness of the training programs in the city.**
Accountability:	
Overall Timeline:	Short Term 1 – 3 years
Objective 6A	Fill the authorized but currently unfunded Health and Safety Officer position.
Assigned To:	
Objective Timeline	12 months
Objective 6B	Add a full-time administrative support position to support the administrative needs of the training division.
Assigned To:	
Objective Timeline	12 months
Objective 6C	Add a full-time instructor position to support the Training Division in the delivery of training programs and health and wellness programs and to improve the recruitment of the Fire Department workforce.
Assigned To:	
Objective Timeline	12 - 24 months
Objective 6D	Provide additional aircraft crash training for emergency response personnel.
Assigned To:	
Objective Timeline	18 months
Objective 6E	As additional staff are hired, an additional full-time instructor position will be added to support the department's EMS training needs.
Assigned To:	
Objective Timeline	24 - 36 months

Strategic Initiative 7:	**Improve the efficiency and effectiveness of the administrative functions of the fire department**
Accountability:	
Overall Timeline:	Short Term 1 – 3 years
Objective 7A	Add a full-time data analyst position to the Fire Department.
Assigned To:	
Objective Timeline	12 months
Objective 7B	Add a full-time position to serve as the Public Information Officer, coordinate social media efforts and serve as liaison with the University of Oklahoma School of Journalism.
Assigned To:	
Objective Timeline	12 months
Objective 7C	Upgrade the current part-time administrative technician to a full-time position
Assigned To:	
Objective Timeline	12 - 24 months
Objective 7D	Add an additional part-time administrative technician to assist the full-time administrative technician and serve in the role during their absence.
Assigned To:	
Objective Timeline	12 months
Objective 7E	Establish a formal succession plan for the Fire Department.
Assigned To:	
Objective Timeline	18 - 30 months

Strategic Initiative 8:	**Improve the response time to emergency calls for services and the distribution of resources.**
Accountability:	
Overall Timeline:	Intermediate 3 – 5 years
Objective 8A	Begin the design of Station 10 and construct and staff Fire Station 10 in the city's southern region. Staffing should include an Engine Company and a Ladder Company, each with a scheduled staffing of five (5) personnel and a minimum staffing of four (4) personnel
Assigned To:	
Objective Timeline	FY25 – FY27
Objective 8B	Begin planning for the replacement of Station 5 and consider relocating the station north of Hwy. 9 on Clear Bay Avenue to improve travel time performance.
Assigned To:	
Objective Timeline	FY26 – FY27
Objective 8C	Construct and staff Fire Station 11 with the completion of Station 10. Staffing should include an Engine Company with a scheduled staffing of five (5) personnel and a minimum staffing of four (4) personnel.
Assigned To:	
Objective Timeline	FY27 – FY30

Strategic Initiative 9:	**Improve the availability of resources to emergency calls for service based on the Community Risk Assessment.**
Accountability:	
Overall Timeline:	Intermediate 3 – 5 years
Objective 9A	Staff the Rescue Company with a scheduled staffing of four (4) personnel and a minimum of three (3) personnel beginning in year three (3) of the staffing plan by adding personnel over a three (3) year period.
Assigned To:	
Objective Timeline	12 – 36 months
Objective 9B	Once the Rescue Company is fully staffed, reposition the unit to Station 2
Assigned To:	
Objective Timeline	FY29
Objective 9C	Consider adding foam delivery capabilities to the existing or future apparatus at Station 7.
Assigned To:	
Objective Timeline	FY29

Strategic Initiative 10:	**Improve the availability of resources to emergency calls for service based on the Community Risk Assessment.**
Accountability:	
Overall Timeline:	Long Term – 5 years or more
Objective 10A	Once the Rescue Company is fully staffed, reposition the unit to Station 2
Assigned To:	
Objective Timeline	FY30
Objective 10B	Consider adding foam delivery capabilities to the existing or future apparatus at Station 7.
Assigned To:	
Objective Timeline	FY30

Strategic Initiative 11:	**Improve the response time to emergency calls for services and the distribution of resources.**
Accountability:	
Overall Timeline:	Long Term – 5 years or more
Objective 11A	Monitor the expansion of the East-West Connector and the South Extension Turnpikes and begin the design, construction and plan for the staffing of Fire Station 12 with their completion and the anticipated development planned for that area of the city.
Assigned To:	
Objective Timeline	TBD

Community Risk Assessment

A Community Risk Assessment (CRA) is a systematic process to identify, analyze, and evaluate a community's risks. It is a critical step in risk reduction and management, aiming to understand the potential hazards (natural or manufactured), vulnerabilities of the community (such as socio-economic conditions, public infrastructure, and environmental factors), and the capacities or resources available to mitigate and respond to these risks. The main objectives of a community risk assessment include:

- **Identifying Hazards:** Determining the types of hazards (e.g., floods, earthquakes, droughts, industrial accidents) that can potentially impact the community.
- **Analyzing Vulnerabilities:** Understanding the factors that make the community susceptible to damage or harm from these hazards. These factors include examining population density, building structures, economic conditions, and environmental degradation.
- **Evaluating Capacities and Resources:** Identifying the strengths, resources, and capabilities that the community possesses to prevent, prepare for, respond to, and recover from disaster situations. These include local knowledge, infrastructure, social networks, and emergency services.
- **Risk Analysis:** Combining information on hazards, vulnerabilities, and capacities to assess the overall risk level to the community. These involve estimating the likelihood of different hazardous events and their potential impacts on the community.
- **Developing Strategies:** Based on the assessment, strategies and plans are designed to reduce vulnerabilities, enhance capacities, and mitigate risks. These may involve community-based planning, infrastructure improvements, policy changes, and education and awareness programs.
- **Implementation and Monitoring:** Putting the risk reduction strategies into action and continuously monitoring and updating the risk assessment to reflect changing conditions or new information.

Community risk assessment is a crucial component of risk reduction and management. The assessment will assist with the prioritization of resources, improve preparedness, and build resilience in the community.

Risk Factors and Categories

Risk is the possibility of loss, injury, or other unwelcome adverse circumstances or events. As a community, we try to reduce the effects of undesirable events through mitigation efforts before an emergency and using services such as police departments, public works, and fire departments to mitigate the incident once it occurs. Assessing a community's fire and non-fire risks provides the foundation to develop mitigation strategies and the resources needed should that incident happen. Components used in the risk assessment are further defined in the following sections.

Identification

The first step in assessing community risks is to look at the emergency services' responses, such as emergency medical calls and fires. Further identification of the types of emergency medical calls and fires will allow a more defined risk assessment. In addition to the types of response by the emergency services, natural and manufactured hazards also impact a community. These events range from earthquakes and floods to hazardous material incidents and acts of terrorism. These events may be less frequent than an emergency medical call, but they can have a lasting impact on the community.

Risk Evaluation

Risk assessment models typically used for a community risk assessment use a two-axis probability and consequences model to evaluate a designated risk. A three-axis risk categorization is a framework used to assess and classify risks based on three key dimensions or axes. Each axis represents a specific aspect or characteristic of risk, allowing for a more comprehensive understanding and analysis of potential threats. Here are three common examples of risk categorization axes:

- **Probability Axis:** The probability axis assesses the likelihood of an event occurring. It typically ranges from low to high or can be represented numerically from 1 to 5 or 1 to 10. A low probability suggests that the risk event is improbable, while a high likelihood indicates a greater chance of occurrence.
- **Consequence Axis:** This axis evaluates an event's potential consequences or impacts. It considers the severity, magnitude, or extent of harm or damage resulting from the event. The impact axis can also be represented on a scale, such as low to high or 1 to 5, reflecting the level of damage or disruption caused by the risk.
- **Emergency Services Axis:** The emergency services axis focuses on the extent to which effective response capabilities or mitigation strategies are in place to

manage the risk. The emergency services axis helps determine the level of preparedness and the ability to respond to and mitigate the identified hazards.

By combining these three axes, fire departments can assess and categorize risks based on their likelihood, impact, and the response capabilities in place. This categorization enables a more nuanced understanding of risks and facilitates prioritization and allocation of resources for risk management efforts.

Probability

Probability is the likelihood of an unwanted event occurring within a given period. Events that occur weekly are highly probable, while those that occur annually are less likely. The following matrix provides a method to score the probability of an event occurring. While there are various methods to quantify the probability, the following table was adapted from the Community Risk Assessment guide developed as a part of the Vision 20/20 project.[1]

Table 14: Probability

Probability Score	Descriptor	Description
2	Unlikely	• Events may only occur in exceptional circumstances. • Greater time than annually.
4	Possible	• It might occur at some time – annually. • There are no recent recorded incidents.
6	Probable	• Likely to or may occur/recur – quarterly. • Strong anecdotal evidence it will occur.
8	Highly Probable	• Likely to or may occur/recur – weekly. • High level of recorded incidents or strong anecdotal evidence.
10	Frequent	• It occurs at least daily or multiple times each day.

Consequence

Consequence measures a disparate outcome defined by loss of life, property, or historic values. There may also be additional economic considerations, such as loss of jobs and tax revenue. The following matrix provides a method to score the consequences to the community that an event may create.

[1] Community Risk Assessment https://strategicfire.org/

Table 15: Consequence

Consequence Score	Descriptor	Description
2	Insignificant	• 1 or 2 people affected, minor injuries/property damage • A small number are displaced, and little outside support is needed. • No environmental concerns.
4	Minor	• A small number (<10) of injuries but no fatalities. • Minor medical treatment is required. • Some displacement is possible (less than 24 hours) with minimal support needed. • No lasting environmental effects.
6	Moderate	• Limited number of people affected (11 – 50). • Some hospitalizations but no fatalities. • Dozens may be displaced for up to 24 hours and need outside support. • Some environmental impacts with short-term effects.
8	Significant	• More than 25 people are affected. • Multiple serious injuries and hospitalizations with possible multiple fatalities. • Large numbers are displaced, and there is a definite need for outside resources. • Significant environmental impact with long-term effects.
10	Catastrophic	• Large numbers of people (>100) are affected with multiple hospitalizations and fatalities. • Widespread, long-term displacement with a definite need for outside resources. • Damage to infrastructure and loss of critical services. • Significant long-term environmental impact, and the community needs long-term support.

Impact on Emergency Services

The risk assessment model being utilized is a three-axis model that allows a deeper look at how a community is affected by hazards. Norman Fire Department (NFD) is accountable for fire response, medical response, rescue response, wildfire response, and hazardous materials response. This third axis of the risk assessment scores the impact on the NFD to provide the services needed to the community during certain hazards.

The following matrix illustrates the impact score. The score is based on the percentage of on-duty staffing assigned to a call. For example, a moderate impact will utilize 40% to 59% of the on-duty resources.

Table 16: Impact on the Norman Fire Department

Impact Score	Descriptor	Description
2	Minimal	<20% of Resources Committed
4	Minor	20% to 39% Resources Committed
6	Moderate	40% to 59% of Resources Committed
8	Significant	60% to 79% of Resources Committed
10	Catastrophic	> 80% of Resources Committed

The scale in the previous table also highlights the resources left in the emergency response system. For example, if 40% of the on-duty resources are committed to the incident, 60% of the remaining resources are available for the next call. That would mean 24 personnel are available for Norman's next call.

Risk Assessment Methodology

Considering the three-axis model, Heron's Formula is used to calculate a score for the risk. The formula uses the scores from probability(P), consequence(C), and impact(I) to create the overall quantitative score.

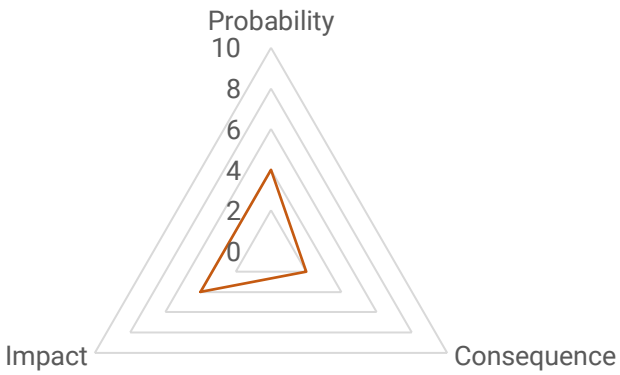
$$\text{Risk} = \sqrt{\frac{(PC)^2+(CI)^2+(IP)^2}{2}}$$

Using the score derived from the previous calculation provides a mechanism to rank the various risks faced by the community and the NFD. The following table highlights the level of risk based on the score.

Table 17: Risk Score

Score	Overall Level of Risk
0 – 24.99	Low
25 – 49.99	Moderate
50 – 74.99	High
74.99 – 100	Severe

The three-axis scores can be plotted on a graph to show each risk level, as shown in the following graph.



The call illustrated is scored as four (possible) for the probability, two (insignificant) for consequence, and four (minor) for the impact on service delivery. This graph provides an excellent visual representation of the risk and the impact on the fire department.

Natural Hazard Assessment

The Cleveland County Hazard Mitigation Plan[2] (CCHMP) included the City of Norman in its planning and development process. This plan is a good source of natural hazard identification, probability, and vulnerability of the various hazards that may impact the residents and businesses of Norman. The following table from the CCHMP illustrates the probability rating for each hazard identified.

Table 18: Natural Hazard Probability

Hazard	Probability Rating
Dam Failure	Very Low
Drought	High
Earthquake	Very Low
Extreme Heat	High
Flood	High
Hail	High
High Wind	High
Lightning	High
Tornado	High
Wildfire	High
Winter Storm	High

[2] https://www.normanok.gov/sites/default/files/documents/2020-07/Cleveland%20Co.%20HazMit%20FINAL%2005272020red.pdf

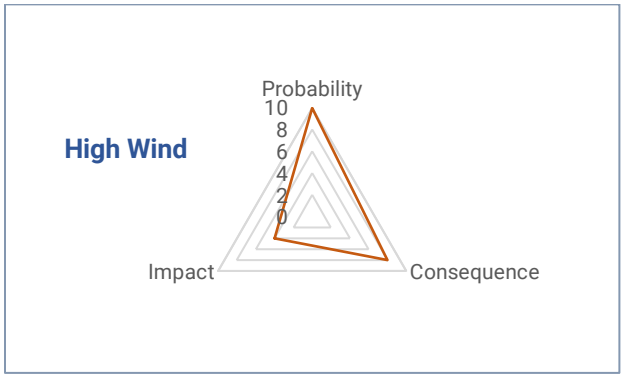
Those shown as a high probability are likely to occur once per year, while those shown as very low have a chance of occurring once in ten years.

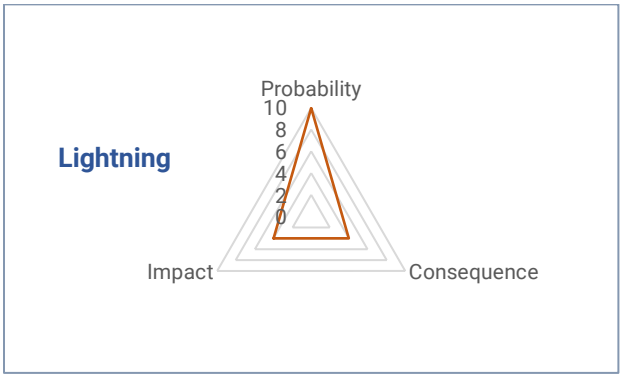
Atmospheric Hazards

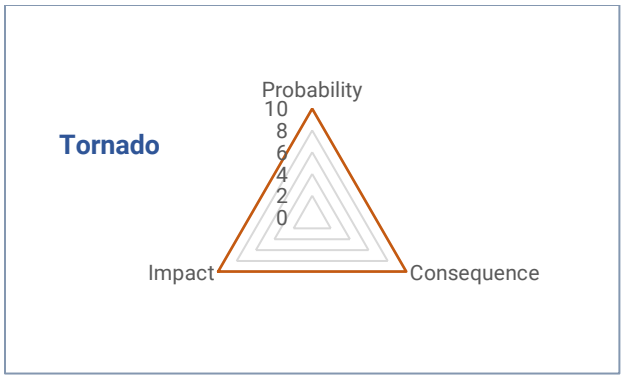
This category's hazards are high wind, lightning, tornados, hail, and winter storms. These are typically widespread events, meaning they will affect large areas of the city. Using the scores from the previous section and data in the CCHMP, the following charts provide a risk assessment score for the identified hazards.

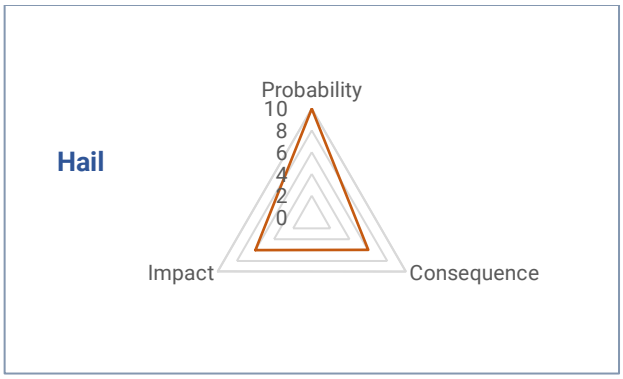
Table 19: Atmospheric Hazards Risk Score

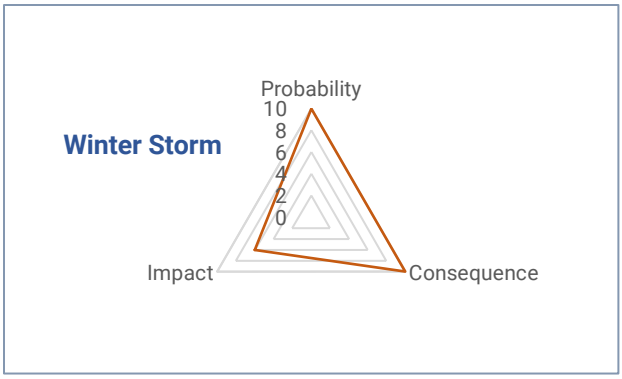
Event	High Wind			Lightning			Tornado			Hail			Winter Storm		
Risk Score	P	C	I	P	C	I	P	C	I	P	C	I	P	C	I
	10	8	4	10	4	4	10	10	10	10	6	6	10	10	6
Calculated Score	67.2			41.6			122.5			65.2			92.7		









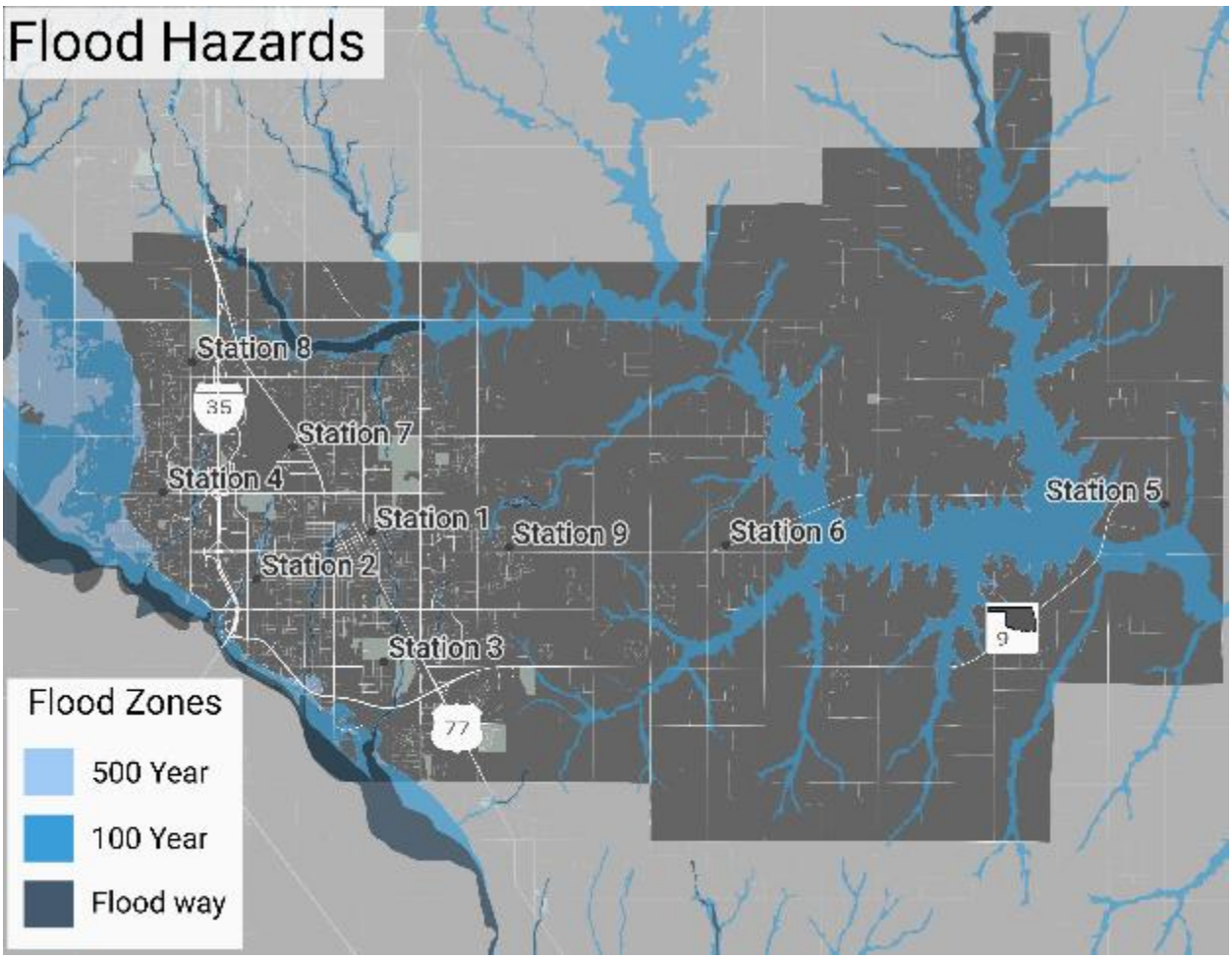


The probability for most of these events is high as many occur annually and are typically widespread across the community. The fire department response will vary depending on the damage but will likely be more for search and rescue operations.

Hydrologic Hazards

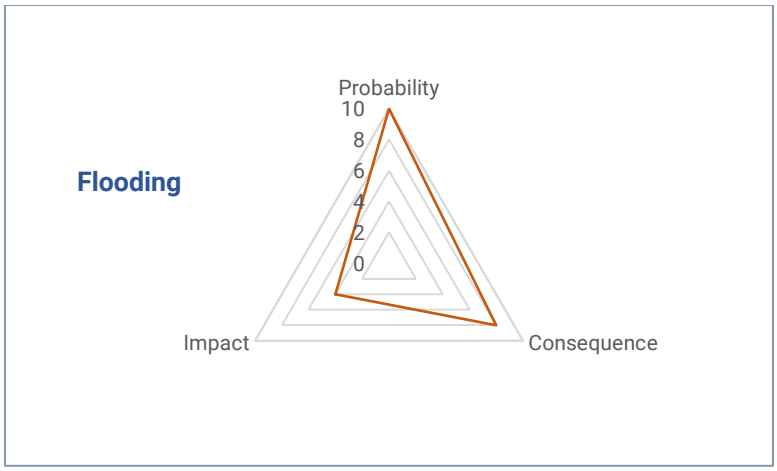
The primary hazard in these types of events is flooding. The following map illustrates the flood zones in the city. The following map illustrates the flood zones in the city.

Figure 7: Flood Hazards Map



Typically, flooding in these areas results from large-scale weather systems generating large amounts of rain over a prolonged period. Areas along the Canadian River and around Lake Thunderbird are more likely to experience flooding. The city has identified areas of potential repetitive losses due to flooding.

Using the scores from the previous section and data contained in the CCHMP, the following chart provides a risk assessment score for the flooding hazard.



Based on past occurrences, the probability of a flood event is likely within a year, with consequences limited to the floodways and flood zones. The fire department's response is to use special teams. Water rescues will likely require boats, other watercraft, and personnel trained to operate in these events. The risk score for this type of event is 67.2.

In addition to the flooding hazard, there is a very low probability of dam failures in the city. Most of the dams are located in the northeast area of the city.

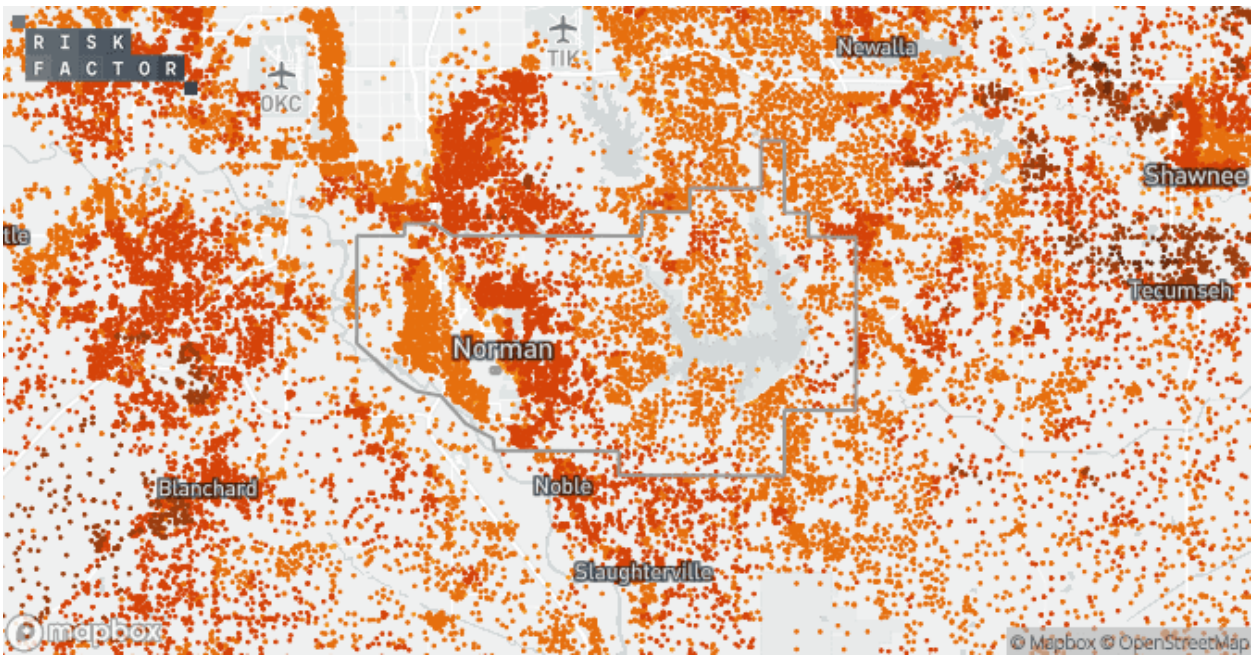
Wildland Urban Interface

As the population grows and expands towards the forested and grassy areas, an interface between the urban setting and the wildlands is established. This expansion can create a significant hazard to life and property due to wildland fires. Wildland fires are not limited to those western states with large, forested areas. Large grass and brush fires across the Midwest can be as destructive as those in the western United States.

Verisk, the parent company for the Insurance Services Office, reported in 2023 that Cleveland County is in a low to moderate hazard risk of a wildfire. The moderate range is in the eastern sections of the County. The following map from Riskfactor.com[3] The website also has a moderate hazard rating for the city for the next thirty years.

[3] https://riskfactor.com/city/norman-ok/4052500_fsid/fire

Figure 8: Wildland Urban Interface Risk Map

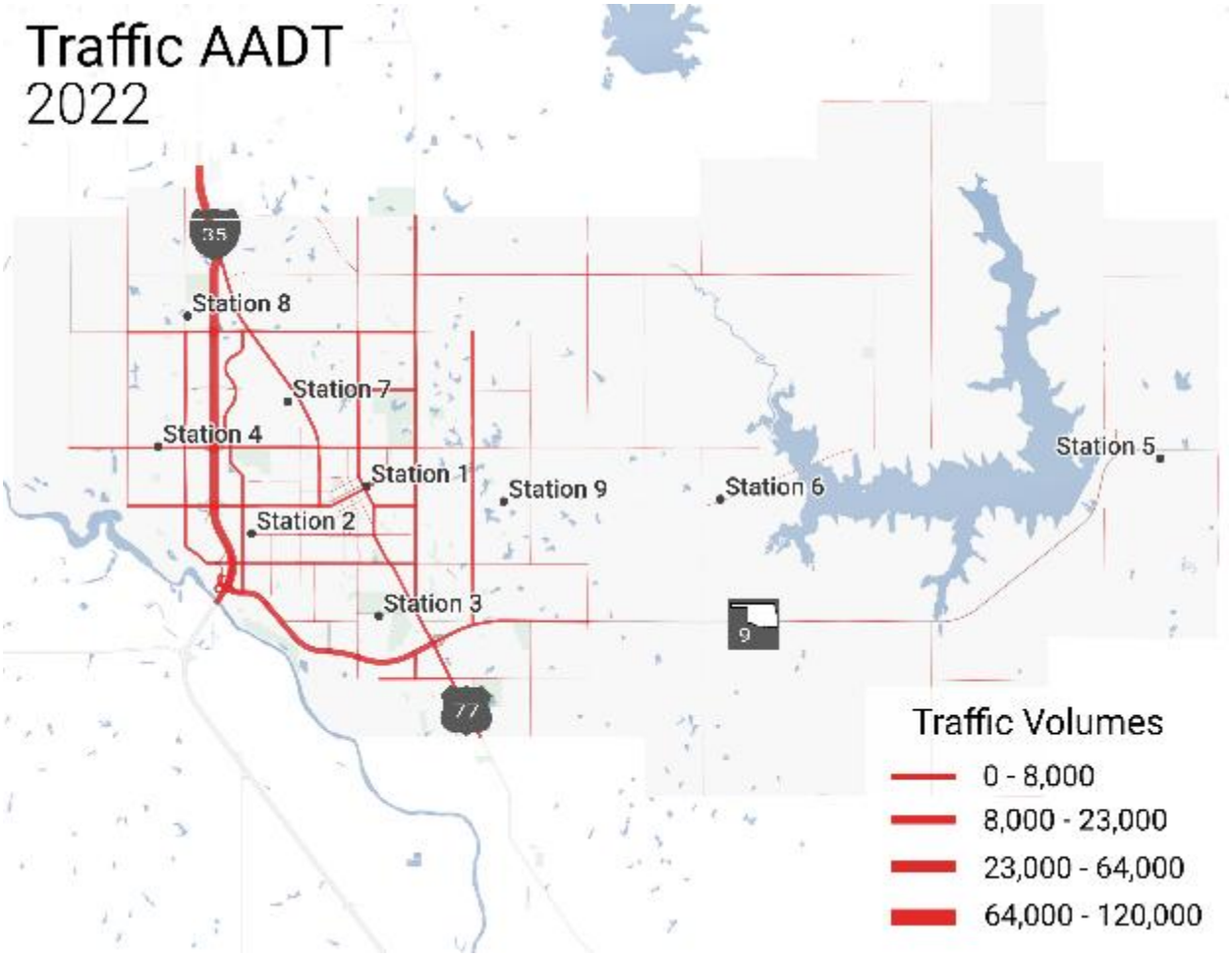


Drought conditions and high winds are primary drivers of wildland fires and the spread of these fires into urban areas.

Transportation Hazards

Several hazards are related to the transportation of people, freight, and other commodities within the city. Interstate 35 is a major highway that spans from Minnesota to the Mexican border, traversing the city along a north-south route in the western section. On the city's southern end, Oklahoma Route 9 provides an east-west corridor to Interstate 44 to the west and the Arkansas state border to the east. The following map illustrates the traffic counts at various points along these routes in the city.

Figure 9: Traffic Volume Map

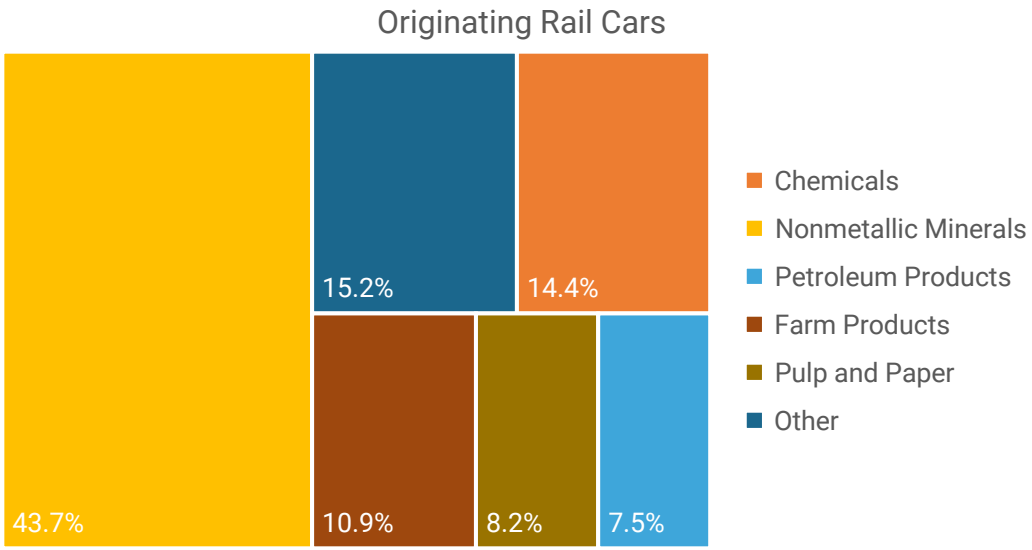


As expected, there are heavy traffic counts along Interstate 35, with heavier traffic along Oklahoma Route 9. Note that this is an annual average daily traffic count; this does not address peak traffic.

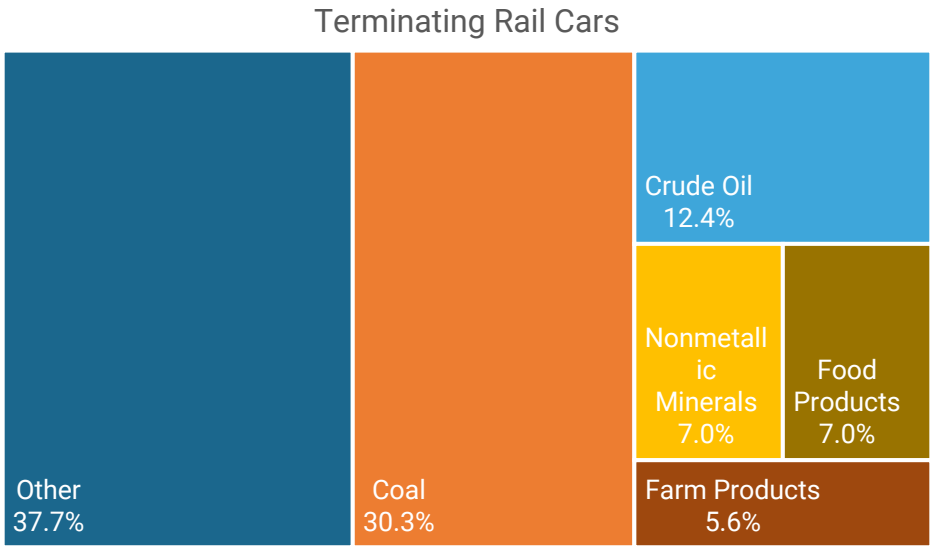
Regarding railroad transportation, BNSF Railway is Norman's primary rail carrier. The following map illustrates the primary rail line in the city.

Figure 10: Railways Map

In addition to the freight that moves through the city, Amtrak operates a daily passenger train, known as the Heartland Flyer, between Fort Worth, TX and Oklahoma City, OK. Rail freight is tracked as freight originating in Oklahoma and terminating in Oklahoma. The following charts illustrate the freight movement in Oklahoma.



The largest outbound freight is nonmetallic minerals, such as sand, gravel, limestone, clay, and marble.



The largest inbound freight is coal and those commodities that do not fit other categories, such as cars.

Supplemental Risk Factors

This section provides an overview and analysis of factors that can and will impact the delivery of services and the recovery of the community from emergency events.

Demographic Vulnerabilities

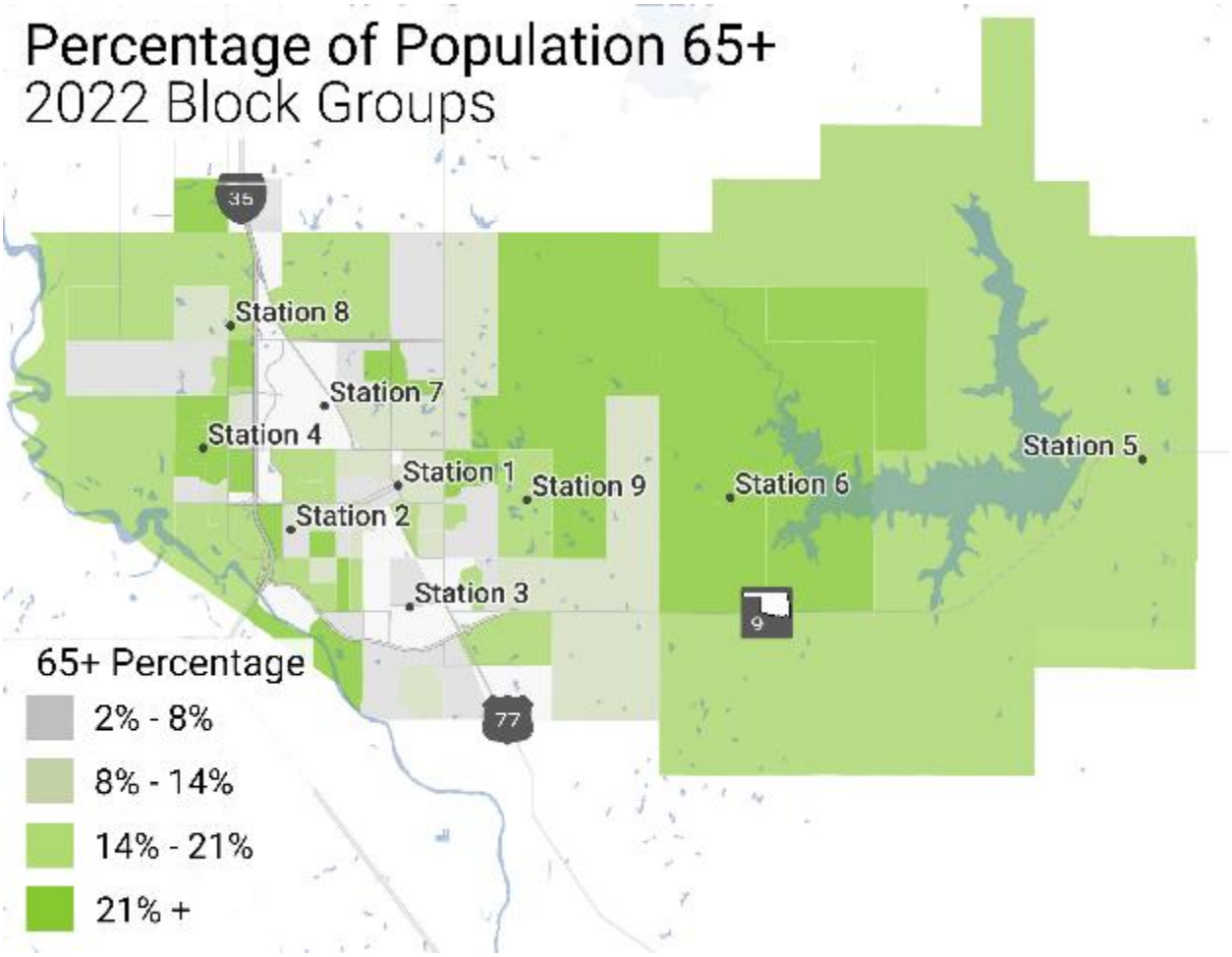
Aging Population

Like many other demographic groups, senior citizens may be vulnerable to physical, emotional, and financial challenges. It's important to note that vulnerability can vary significantly among individuals, and not all seniors will experience the same issues. Some common vulnerabilities for senior citizens include:

- Physical Health Issues
- Isolation and Loneliness
- Financial Vulnerability
- Elder Abuse
- Healthcare Access and Quality
- Housing Insecurity
- Nutrition and Health
- Technology and Digital Literacy
- Emergency Preparedness
- Legal and End-of-Life Issues

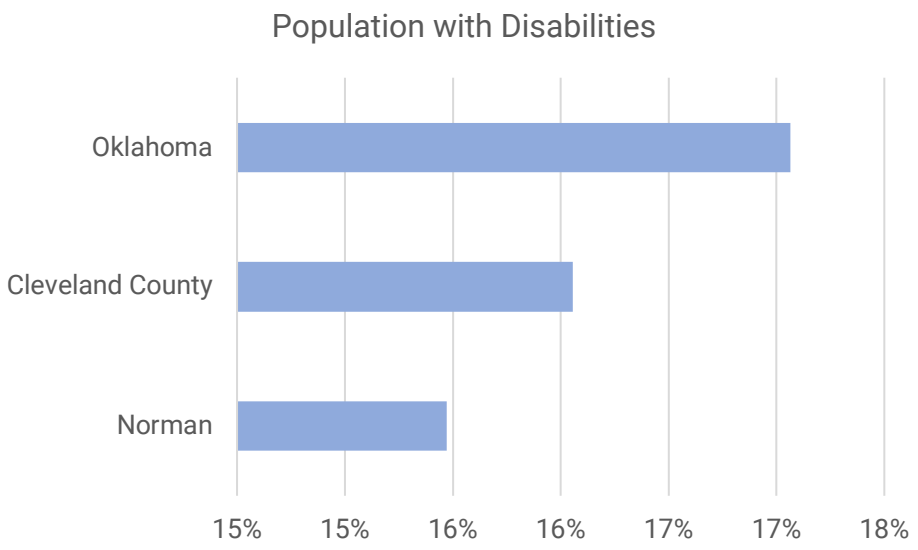
In the City of Norman, the senior citizen population is increasing. According to the US Census Bureau, residents over 60 were 14% of the population in 2010. In 2022, senior residents increased to approximately 18% of the total population. The following map illustrates the distribution of senior citizens in Norman.

Figure 11: Map of Senior Population

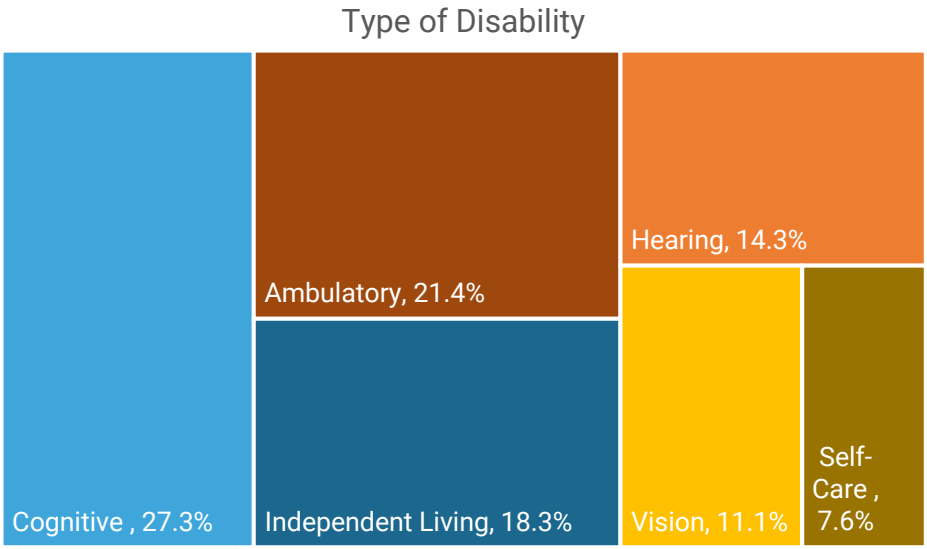


Population with Disabilities

Another population group that will likely require additional assistance is those with disabilities. Due to their disability, these people may need further medical services or be unable to self-evacuate from their homes or other buildings during an emergency. The following chart illustrates the percentage of the disabled population compared to Cleveland County and Oklahoma.



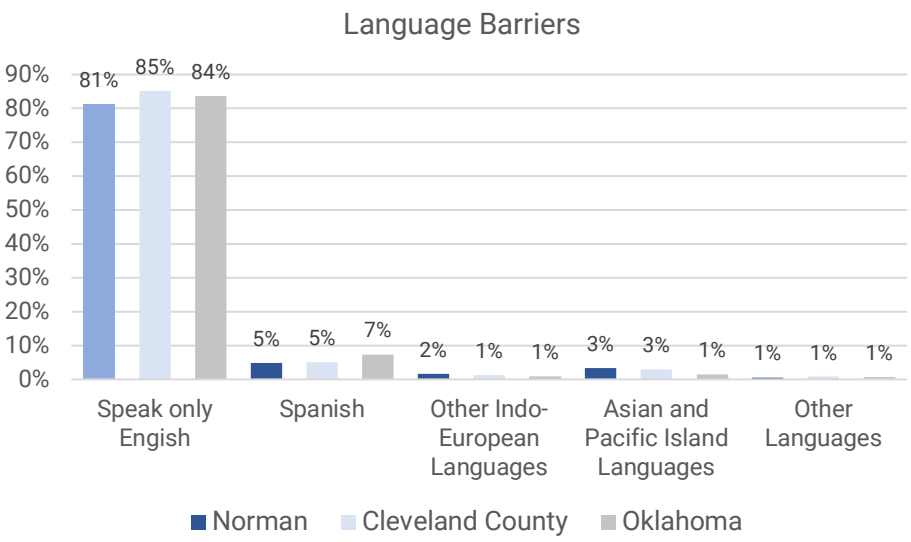
To further highlight the issue of disabilities, the following chart illustrates the types of disabilities in Norman.



Cognitive difficulty is the largest group, with ambulatory issues close behind.

Language Barriers

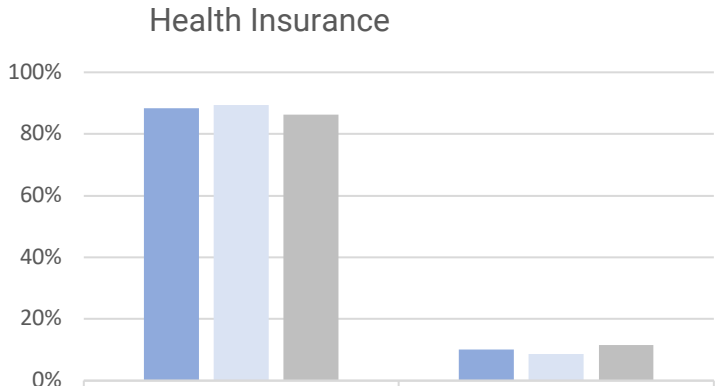
As more individuals and families come to the United States from other countries, the language barrier is also increasing. NFD personnel may encounter an individual or family needing another type of communication. These encounters could be on calls for service, public education events, or evacuation notices. The following chart highlights the percentage of people over five years of age who may have a language barrier based on the language spoken at home.



In Norman, approximately 10% of the population speaks a language other than English at home. These figures are similar to Cleveland County and Oklahoma.

Health Care Insurance

The lack of health care insurance can impact the community and NFD. Those with insurance can typically access healthcare services and will have a reduced financial burden. Insured individuals are less likely to use emergency rooms for non-emergency care and other emergency services. Lack of health insurance may affect lower-income populations at a higher rate since they cannot pay for medical visits.

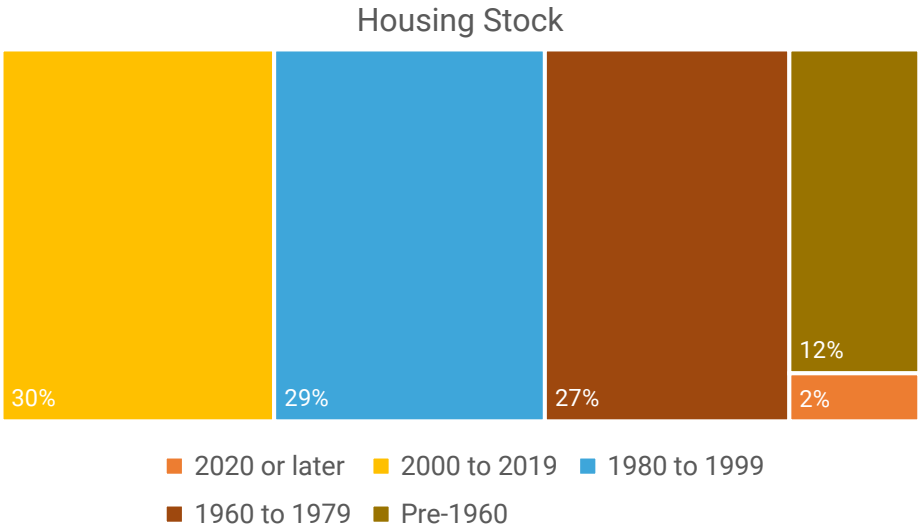


	Insured	Uninsured
Norman	88%	10%
Cleveland County	89%	9%
Oklahoma	86%	11%

In Oklahoma, approximately 11% of the population is without healthcare insurance, slightly higher than Norman, with about 10% uninsured.

Housing

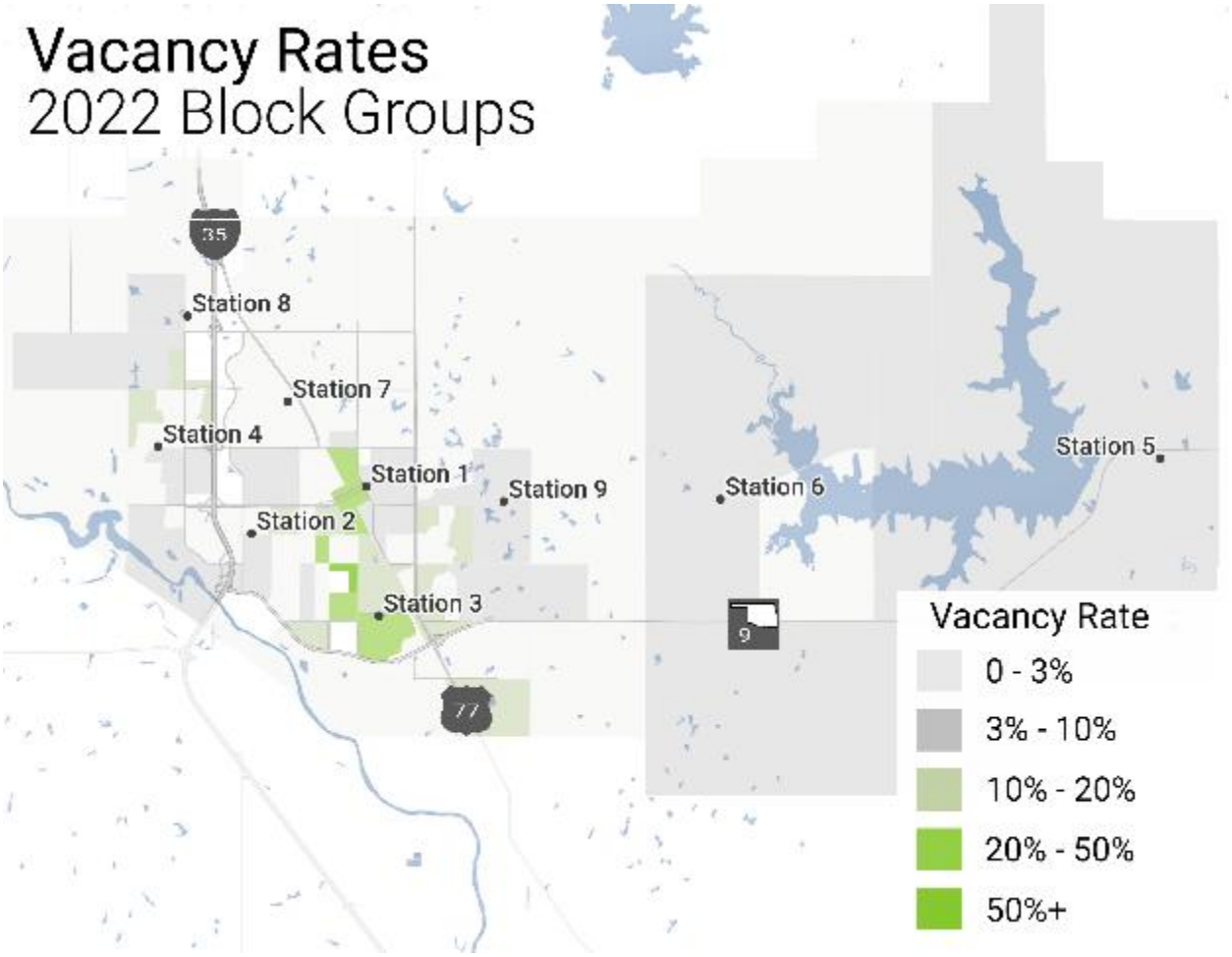
The US Census Bureau estimated approximately 56,702 housing units in Norman. Of the occupied housing units, about 66% are single-family residences, and the remaining are multi-family, with 8% in buildings with 20 or more units. Approximately 68% of these units were constructed before 2000.



The fire risk is more significant in older buildings with outdated building codes, which may have a building construction, type of materials, or wiring that increases the risk and spread of fire. Research from the National Fire Protection Association has also noted rental property as a factor in fatal and unsafe human behavior fires. In Norman, about 49% of the housing units are renter-occupied.

The National Fire Protection Association (NFPA) reports that from 2011 to 2015, fire departments responded to an average of 30,200 structure fires per year in vacant properties. According to the report, fires in vacant buildings are more likely to have been intentionally set and spread beyond the building than in other structures. The following map illustrates the vacant buildings by census tract, based on estimates from the US Census Bureau for 2022.

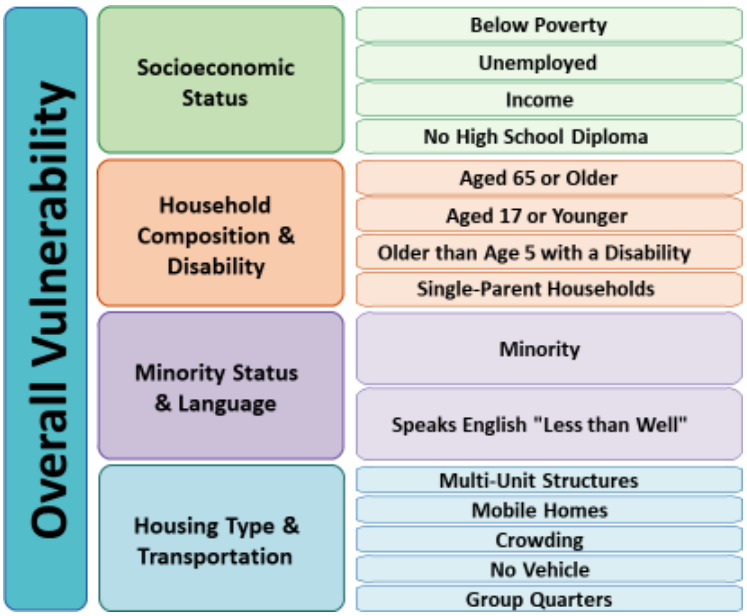
Figure 12: Vacancy Rates Map



The higher vacancy rate is in areas northwest and south of Station 3. This area is near the OU campus, which may explain the high rates. To the north and west of Station 1 are the historic business district, historical residential neighborhood, and some commercial properties.

Social Vulnerability

The Centers for Disease Control and Prevention (CDC) created the Social Vulnerability Index (SVI) to assist public health and emergency response organizations to identify and map the areas of a community that will most likely need support before, during, and after a hazardous event. The SVI is determined by examining socioeconomics, housing composition, and residents with disabilities. The following chart from the CDC illustrates the United States (US.) Census Bureau data was used to calculate the areas' SVI.



As noted, 15 social factors are grouped into four themes to create a vulnerability index. Each element receives a ranking that is combined into the overall theme. It is possible to have an area that has a lower ranking in terms of housing but has a higher ranking due to the age of the residents and the type of household, such as single-parent households. The intent is not to identify impoverished areas of a community but to identify areas that may require additional assistance following an emergency.

This tool helps public health officials and local planners prepare communities for emergencies such as extreme weather, floods, disease outbreaks, or chemical exposure by using information relevant to the social and spatial context.

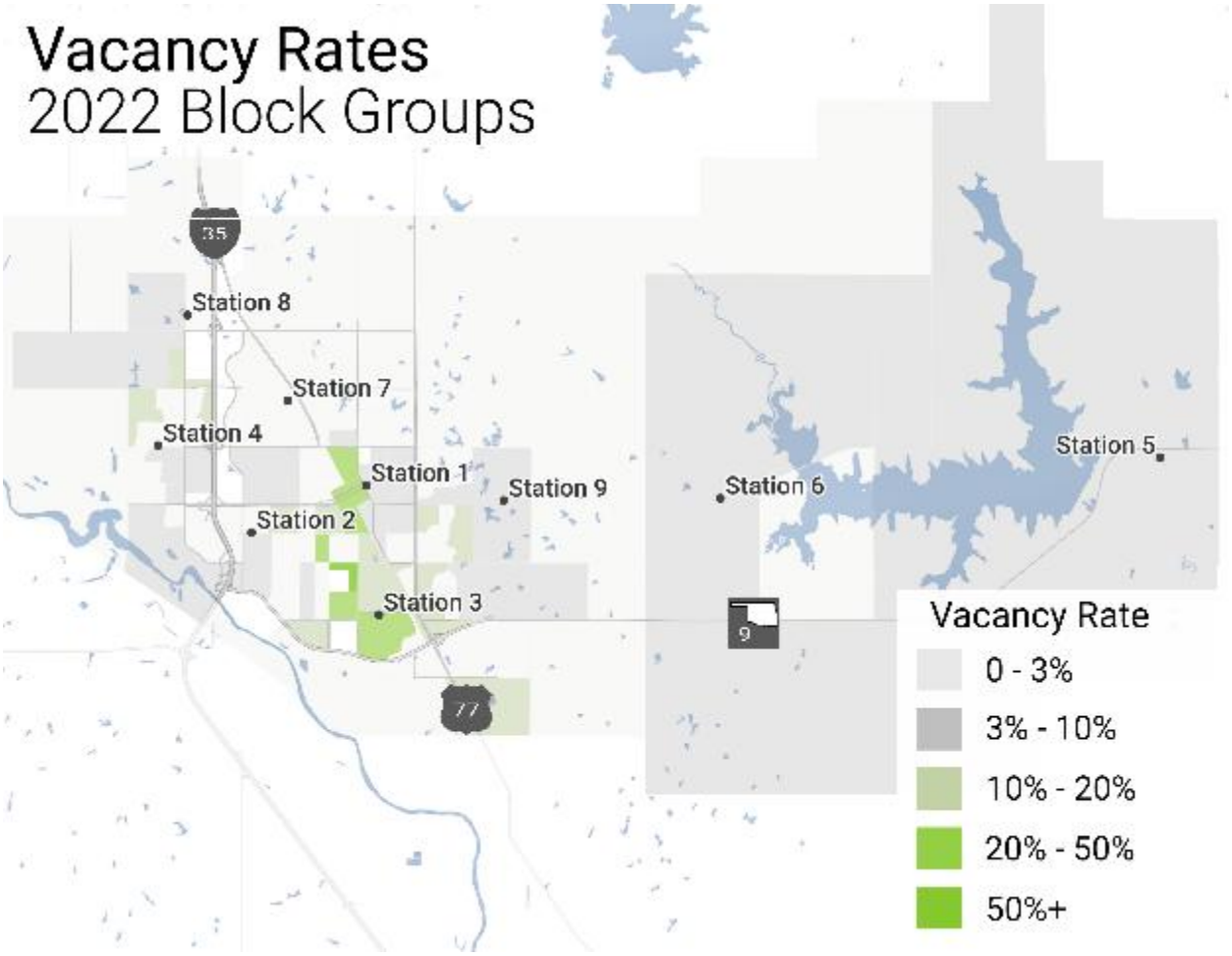
The tool can be used to:

- Allocate emergency preparedness funding by community need.
- Estimate the amount and type of needed supplies such as food, water, medicine, and bedding.
- Decide how many emergency personnel are required to assist people.
- Identify areas in need of emergency shelters.
- Create a plan to evacuate people, accounting for individuals with unique needs, such as those without access to transportation, those with limited mobility or medical requirements, or those with communication barriers such as language access.

- Identify communities needing continued support to recover following an emergency or natural disaster.

The following map illustrates the SVI score by census blocks for the city.

Figure 13: Social Vulnerability Index Map



The highest SVI scores are south of Station 3 and northwest of Station 1. The area near Station 3 is connected to the OU campus. This designation is not an indication these areas are deprived. It is an indication these areas will probably need additional assistance in the event of an emergency or other significant incident.

Physical Environment Hazard Assessment

Physical hazards are buildings or structures in the developed area that may pose a unique problem for the NFD. These buildings or structures are also called target hazards. The Federal Emergency Management Agency (FEMA) describes target hazards as any facilities that belong to either the public or private sector and that offer essential goods

and services to the public, are needed to maintain the well-being and standard of living in the community or have a critical role in public safety, emergency response, and/or disaster recovery functions.

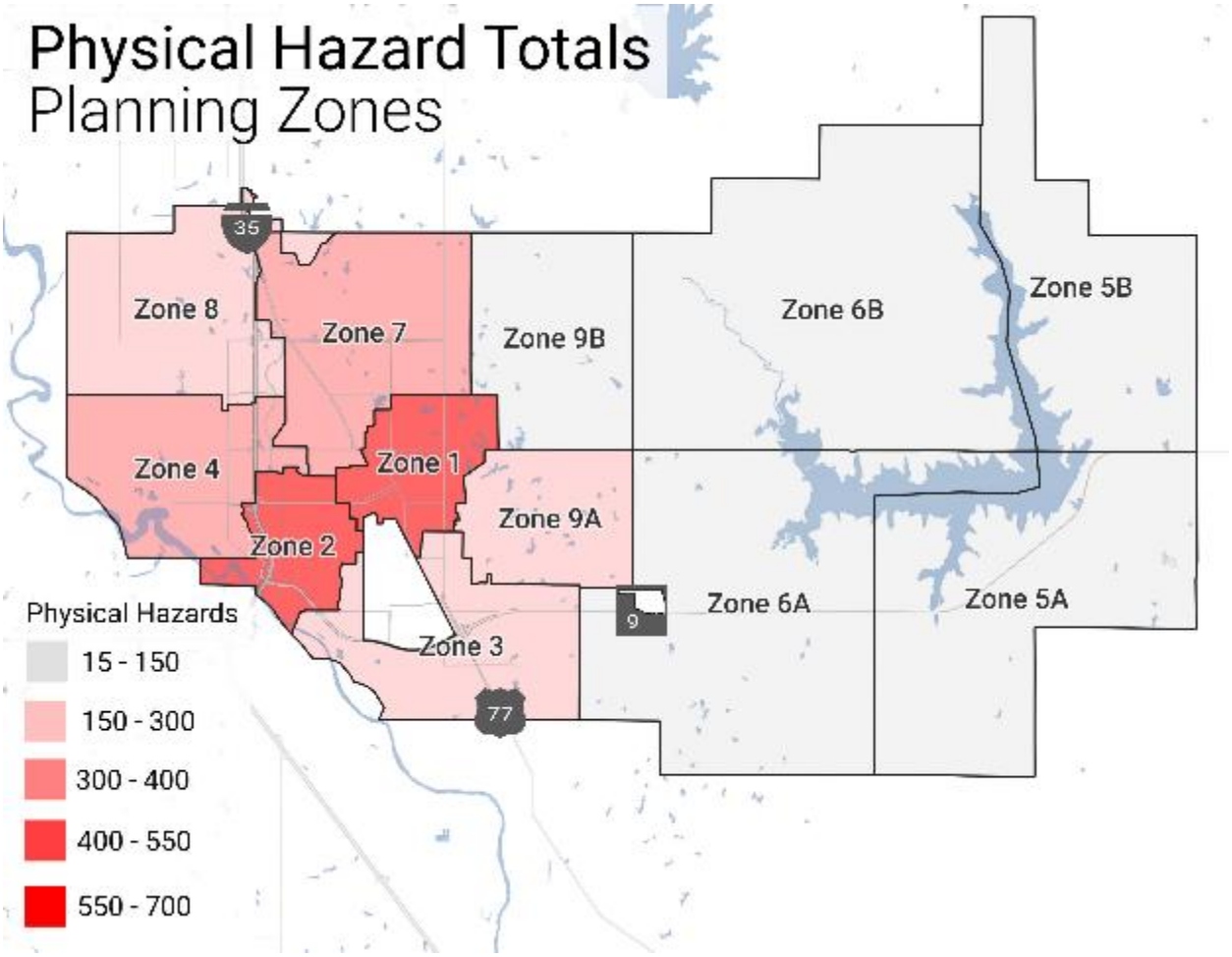
Each of these physical hazards presents a significant risk in varying ways, including terrorism/mass casualty incidents, loss of a business, loss of a cultural asset, or the loss of dwelling units. The following table illustrates the type and number of target hazards in the city.

Table 20: Physical Hazards by Type of Occupancy

Physical Hazard Type	Total Physical Hazards	Pct of the Total
Business	1,318	48.0%
Critical Infrastructure	30	1.1%
Day Care	64	2.3%
Education	43	1.6%
Hazardous Materials	4	0.1%
Hotel/Motel	24	0.9%
Industrial	48	1.7%
Assisted Living, Nursing Homes, Hospitals, Extended Care Facilities	32	1.2%
Mercantile	598	21.8%
Place of Assembly	338	12.3%
Residential	230	8.4%
Storage	16	0.6%
Total	**2,745**	

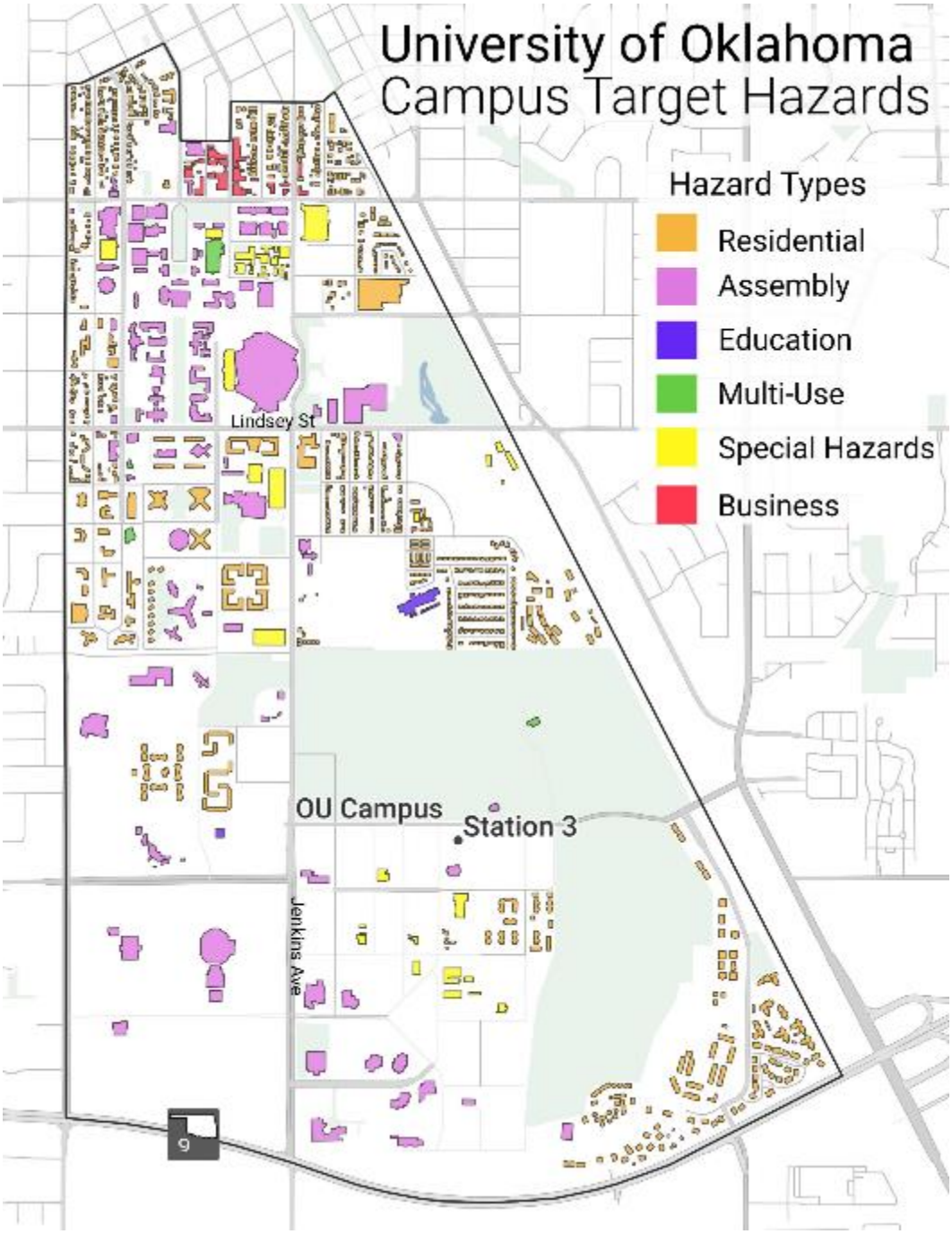
The largest segment of the physical hazards is places of business and mercantile-type businesses. As expected in a city with a large university, many places of assembly, including restaurants, places of worship, and nightclubs, are present. Additionally, several residential properties are associated with a large university. To further illustrate the physical hazards in the city, the following map highlights the location of these hazards.

Figure 14: Physical Hazards Map



As expected, there are many physical hazards in the city center. Note that Oklahoma University (OU) is not included in the previous table or map. The University presents a unique hazard and is best illustrated separately. The following map highlights the risks within the OU campus.

Figure 15: Physical Hazards for Oklahoma University Campus



Critical Task Analysis

Several tasks must co-occur to combat diverse types of fires adequately. The absence of adequate personnel to perform these tasks requires each task to be prioritized and completed chronologically. These fire ground tasks include command, scene safety,

search and rescue, water supply, fire suppression, pump operations, ventilation, backup, and rapid intervention.

An initial full alarm assignment should be able to provide personnel, an effective response force (ERF), to accomplish the following tasks:

- Establish incident command outside of the hazard area. This will allow coordination and direction of the incoming emergency response personnel and apparatus. A minimum of one person should be dedicated to this task.
- Establish an uninterrupted water supply of at least 500 gallons per minute for 30 minutes. Once established, the pump operator can maintain the supply line to ensure an uninterrupted water supply. At least one person is assigned to this task who can then assume a support role.
- Establish an effective water flow rate of 300 gallons per minute. This will be supplied to at least two hand lines, each operating at a minimum flow of 100 gallons per minute. Each hand line must have two individuals assigned, with one hand line as the suppression line and the other as a backup line.
- One support person will be provided to manage the hydrant hookup, utility control, and forcible entry and assist in deploying fire hose lines.
- Establish a search and rescue team. Each team will consist of a minimum of two personnel.
- Establish a ventilation team. Each team will consist of a minimum of two personnel.
- If an aerial ladder is used in the operations, one individual can function as the operator of the ladder on the aerial. Additional personnel are required to handle the other operational tasks such as establishing a water supply, pumping, ventilation, salvage and overhaul, etc.
- Establish an initial rapid intervention team (RIT). Each RIT team shall have at least two properly trained and equipped personnel.
- A total effective response force with a minimum of 16 (18 if an aerial ladder is in operation)

Critical tasks will vary depending on the size and nature of the incident. The previous list from NFPA 1710 and templates provided in the “Community Risk Assessment: Standards of Cover” manual from CPSE provided the basis for the following tables to illustrate the

minimum required personnel to mitigate the initial emergency response requirements by occupancy risk:

Table 21: Critical Tasks for the Effective and Efficient Control of Structural Fires

Critical Task	Maximum Risk	High Risk	Moderate Risk	Low Risk
Attack Line	4	4	4	2
Search and Rescue	4	2	2	0
Ventilation	4	2	2	0
Backup Line	2	2	2	2
Rapid Intervention	2	2	2	0
Pump Operator	1	1	1	1
Water Supply	1*	1*	1*	1*
Support (Utilities)	1*	1*	1*	1*
Command	1	1	1	1
Safety Officer	1	1	1	1
Salvage/Overhaul	2	2	0**	0
Command Aid	1	1	0	0
Operations Chief	1	1	0	0
Logistics	1	0	0	0
Planning	1	0	0	0
Staging Officer	1	1	0	0
Rehabilitation	1	1	0	0
Division Supervisors	2	1	0	0
High-rise Evacuation	10	0	0	0
Stairwell Support	10	0	0	0
Total Personnel	50 – 51	21 – 24	16 – 18	8 – 9

*Tasks can be performed by the same individual.
**Task can be performed by the attack crew

Adding to the critical tasks and staffing issues is the OSHA 1910.134(g)(4) requirement of two in – two out. These regulations state that if entry into an IDLH atmosphere is necessary, two firefighters must enter together and remain in contact with each other. In addition, two firefighters must be outside the IDLH atmosphere for potential rescue if needed. The two in – two out rule is mandatory unless life is in jeopardy. As illustrated above, both maximum risk and two concurrent high-risk incidents exceed current staffing levels, which further shows the need for appropriate automatic aid agreements with neighboring agencies.

The concept of an ERF carries through to other response types by the fire department. The tables below outline the critical tasks for an ERF for those response types.

Table 22: Critical Tasks for Hazardous Materials

Critical Task	High Risk	Low Risk
Command/Safety	2	1
Liaison	1	1
Decontamination	4	4
Research Support	2	1
Team Leader, Entry Team, Backup Team	6	6
Total Personnel	**15**	**13**

Table 23: Critical Tasks for Initial Wildland Urban Interface Fires

Critical Task	No Hydrants	With Hydrants
Command/Safety	1	1
Pump Operations	1	1
Attack Line	2	2
Structure Protection	3	2
Water Supply	1	0
Tender Operator	2	0
Exposure Lines	2	0
Total Personnel	**12**	**6**

Table 24: Critical Tasks for Technical Rescue Operations

Critical Task	Swift Water	High/Low Angle	Confined Space
Command/Safety	1	1	2
Rescue Team	3	2	2
Backup Team	2	2	2
Patient Care	2	2	2
Rope Tender	2	0	0
Upstream Spotter	2	0	0
Downstream Safety	2	0	0
Rigger	0	1	1
Attendant	0	1	1
Ground Support	0	4	4
Edge Person	0	1	0
Shoring	0	0	0
Total Personnel	**14**	**14**	**14**

The previous tables demonstrate the personnel requirements for handling simple incidents involving hazardous materials, wildland-urban interface fires, and technical search and rescue operations, while acknowledging the complexity of these incidents will

demand different staffing requirements. Each of the technical rescue incidents will require similar numbers of personnel or more depending on the complexity of the incident. Further, many positions require personnel to be certified in that discipline.

As with fire, hazardous materials, and technical search and rescue incidents, an ERF is needed to effectively and efficiently deliver EMS. A task analysis for emergency medical calls analyzes three types of calls or patient conditions. These three types of calls usually require the most effort from the response team. Other calls or patient types can generally be handled with two or three personnel. Many times, especially in trauma calls, there are multiple patients. The following table outlines the tasks for assisting these critical patients and the number of responders it may require for a successful outcome. It is important to note that the same personnel accomplish some tasks, so the total is not a simple addition to the positions stated.

Table 25: Critical Tasks for Effective Patient Care

Critical Task	Cardiac Arrest	Stroke	Multi-System Trauma
Patient Assessment	2 per patient	2 per patient	2 per patient
Airway Management/Intubation	2 per patient	2 per patient	2 per patient
Cardiac Defibrillation	1	N/A	N/A
CPR	1	N/A	N/A
EKG Monitoring	1	1	1
IV/Pharmacology	1	1	1
Splint/Bandage/Immobilization	N/A	N/A	1
Patient Lifting/Packaging	2 – 4	2 – 4	2 – 4
Medical Information Collection	1	1	1
Total per Patient	**6 - 8**	**5 - 7**	**6 - 8**

Emergency Services Delivery

As noted, the fire department is responsible for responding to and mitigating unwanted fires, emergency medical calls, hazardous materials, and wildfires; each incident presents different hazards and requires different responses to mitigate the incident.

Dispatching alarm assignments is an intricate process, considering many variables. The nature, location, and severity of the incident, combined with resources available at the time, create this complexity.

For dispatch purposes, the urban area is defined as east of 48th Avenue NW and west of 48th Street. The rural areas are those west of 48th Avenue NW and east of 48th Street. These designations allow the Fire Department to assign the appropriate resources and affect the initial assignments for auto accidents and brush and structure fires. For

example, rural areas will be assigned water tenders (water supply) that are not typically needed in urban areas. An additional engine company is assigned to a rural area as a squad, and rescue resources are not generally assigned to rural areas.

The cross-staffing of the apparatus also plays a role in the dispatching sequence. Some call types identify brush fire units, tenders (water supply), rescue, and hazmat units determined by the call's nature. Consequently, increased physical resources do not necessarily correlate to increased personnel due to cross-staffing. Therefore, some call types might have the same number of personnel as others with more physical resources. An example is aircraft rural vs urban, where the rural call type indicates an additional tender. Due to cross-staffing, personnel from a unit of that station are removed and placed on the tender. The following table illustrates the response matrix to provide the initial dispatch of resources.

Table 26: Dispatch Matrix

Type of Call	Command	Engine	Squad/Rescue	Ladder	Brush	Tender	Haz Mat	Personnel
Aircraft - Rural	2	1	1			2		10
Aircraft - Urban	2	1	1			1		10
Auto Accident - Urban[1]		1						4
Auto Accident - Urban High Mech[2]	1	1	1					9
Auto Accident - Rural	1	2						9
Auto Accident - Rural - Elevate[3]	1	2						9
Brush Fire - Urban	2	2			2			10
Brush Fire - Rural	1	2			2	1		9
Brush Fire - Elevated[4]	2	3			3	2		14
Brush Fire - Red Flag	1	3			3	2		13
EMS		1						4
Haz Mat	2	2					1	10
Single Engine		1						4
Structure Fire Commercial - Rural*	1	3				2		13
Structure Fire Commercial - Urban*	2	3	1	2				20
Structure fire Residential - Rural*	1	3				2		13
Structure Fire Residential - Urban*	2	2	1	2				16
Terrorism/Active Threat[5]	2	3						14
Two Engine Response	2	2						10
Vehicle Fire - Elevate	1	2						9
Vehicle Fire		1						4
Technical Rescue	2	1	1					10

The following notes provide additional information for the response and the terminology definitions used. The asterisked items indicate there are automatic aid resources available. Depending on the location of the incident, automatic aid resources are a mix of volunteer and career agencies. These resources are unreliable because they may not be available during an incident.

[1] Auto accidents in urban areas involve city streets without a high mechanism of injury (MOI) or entrapment.

[2] Auto accidents in the Urban area involving high MOI, entrapment, or highway.

[3] Per the AA agreement with the Little Axe Fire Department (LAFD), the LAFD rescue is added to this response.

[4] Elevate is an additional Engine and Brush response typically activated due to increased fire danger when wind speeds are elevated, and humidity is below 30%.

[5] Additional resources include the fire marshal, two fire inspectors, and the NFD EMS director. However, only one fire inspector is a guaranteed resource outside regular working hours.

The following table summarizes the risk scores used in the following sections.

Table 27: Risk Score Summary

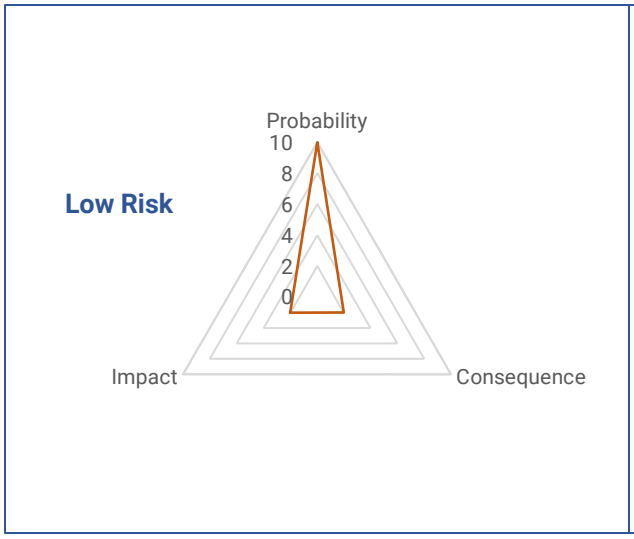
Score	Probability	Consequence	Impact
2	Annual or Greater	Minimal Consequence to Life/Property	<20% of Resources Committed
4	Quarterly	Impaired Life or Property	20% to 39% Resources Committed
6	Monthly	Single Life or Property Loss	40% to 59% of Resources Committed
8	Weekly	2 Lives or Multiple Property Loss	60% to 79% of Resources Committed
10	Daily	> 3 Lives or Major Property Loss	> 80% of Resources Committed

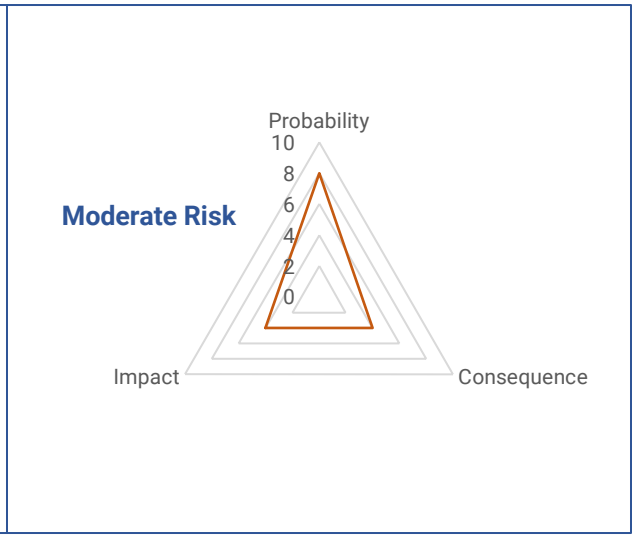
The following two sections focus on emergency medical and fire suppression calls for service, the most frequent type of calls for the fire department. Understanding the difference between the response assignment for the fire department and the critical task analysis is essential. For instance, a structure fire call is assigned 20 personnel, while the critical task analysis shows 22 personnel are required to handle the fire effectively. Besides the assigned personnel, the remaining on-duty personnel for the same structure fire incident have 20 personnel ready for other calls for service. In this case, 50% of the on-duty staff is free for another call.

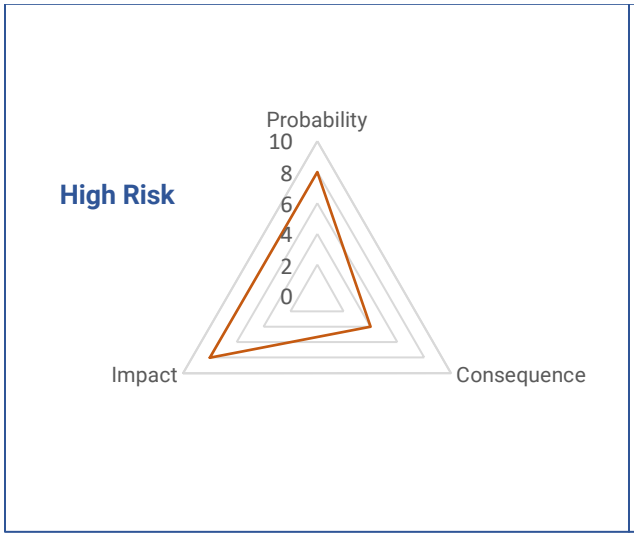
Emergency Medical Responses

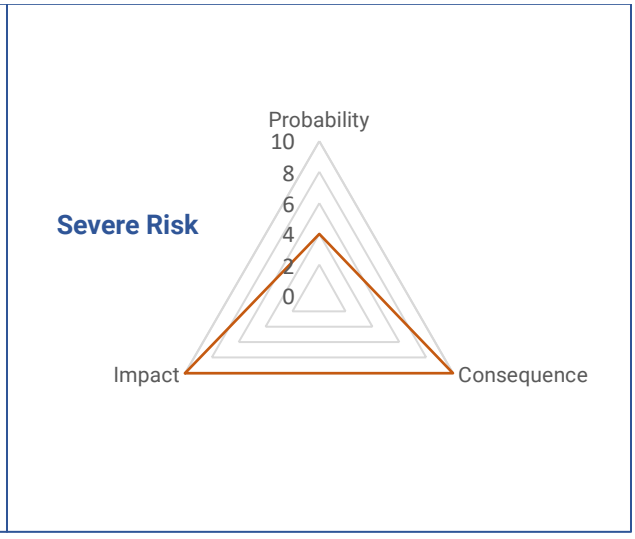
Table 28: Emergency Medical Risk Score

Risk Level	Low			Moderate			High			Severe		
Risk Score Range	0 - 24.99			25 - 49.99			50 - 74.99			75 - 100		
Event:	Chest Pain			Cardiac Arrest			Extrication			Multi-Casualty		
Risk Score	P	C	I	P	C	I	P	C	I	P	C	I
	10	2	2	8	6	2	8	4	8	4	10	10
Total Risk Score	**20.2**			**36.8**			**55.4**			**81.2**		
Effect on Staffing												
On-Duty Staffing:	40			40			40			40		
Response Assignment	4			4			9			25		
On-Duty Staff Remaining	36			36			31			15		
Critical Task Analysis	3			9			15			20		





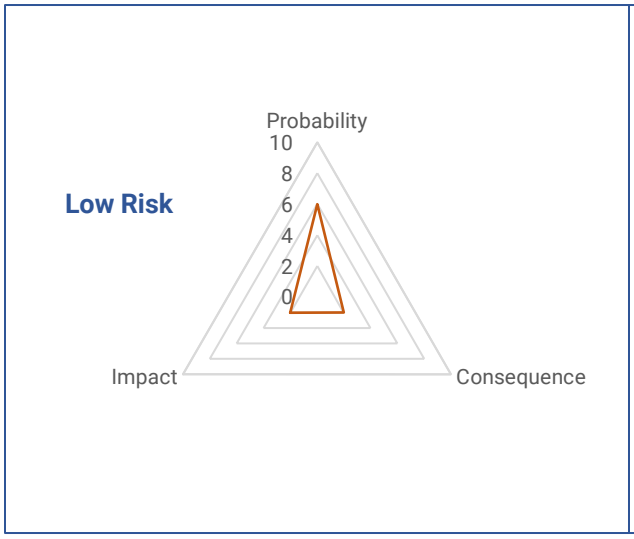


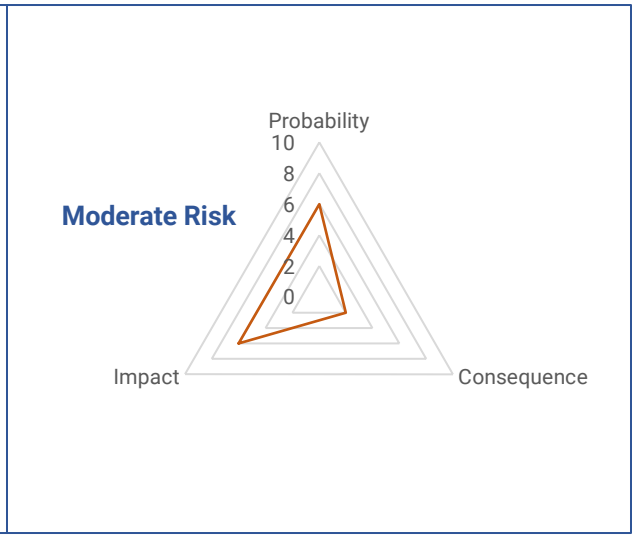


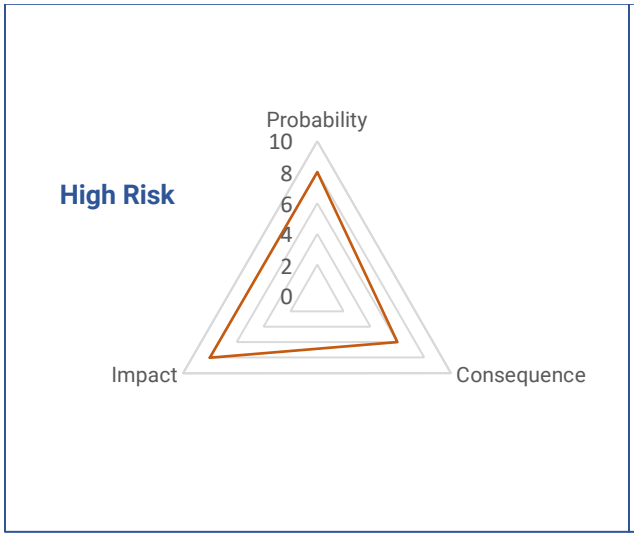
Fire Suppression Responses

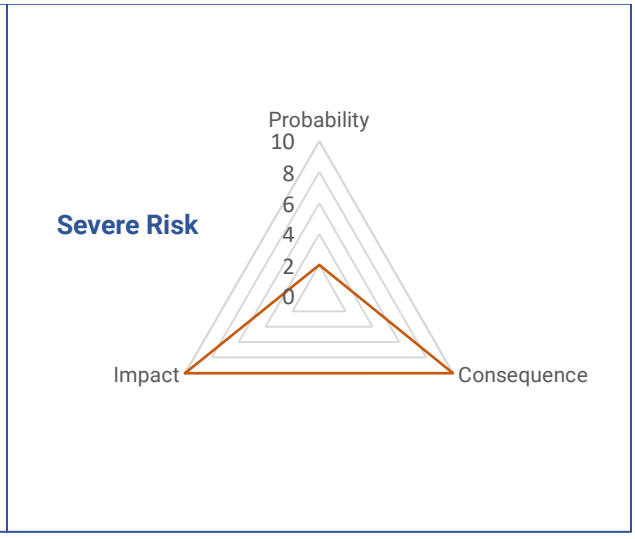
Table 29: Fire Suppression Risk Score

Risk Level	Low			Moderate			High			Severe		
Risk Score Range	0 - 24.99			25 - 49.99			50 - 74.99			75 - 100		
Event:	Vehicle Fire			Vegetation Fire			Structure Fire			Elevated Brush		
Risk Score	P	C	I	P	C	I	P	C	I	P	C	I
	6	2	2	6	2	6	8	6	8	2	10	10
Total Risk Score	**12.3**			**28.1**			**66.0**			**73.5**		
Effect on Staffing												
On-Duty Staffing:	40			40			40			40		
Response Assignment	4			14			20			35		
On-Duty Staff Remaining	36			26			20			5		
Critical Task Analysis	8			16			22			51		





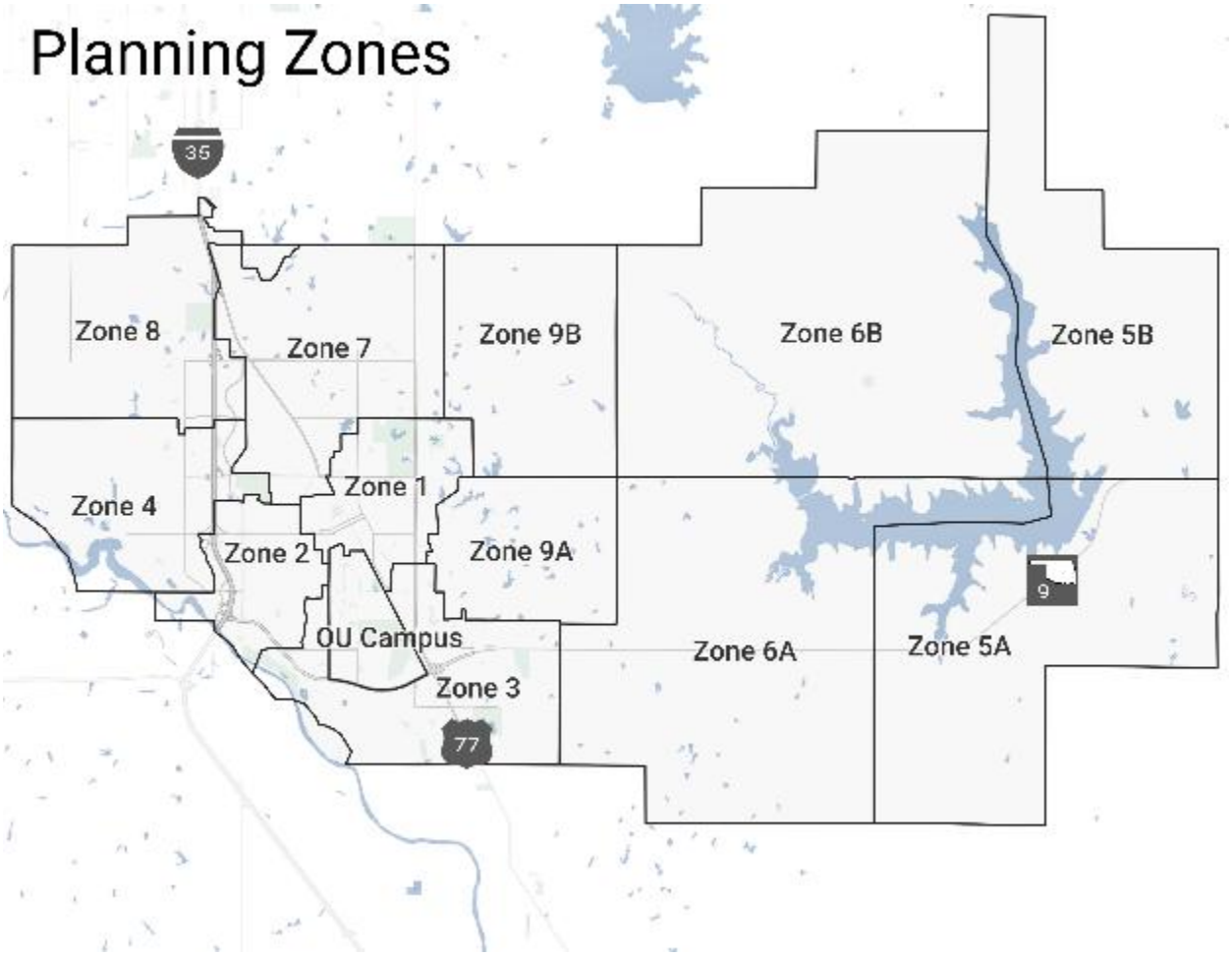




Planning and Assessment Zones

Using planning zones allows the fire department to document various categories and classes of risk. These areas will also be used in the response analysis using baseline and benchmark performance objectives to determine incident response distribution and resource allocations. The following map illustrates that the fire department has thirteen planning zones.

Figure 16: Planning Zone Map



These planning zones generally follow the station response areas. Three of the station response zones were divided further to provide a mechanism for future planning and demographics. The Oklahoma University Campus (OU Campus Zone) not only contains the campus but also a couple of blocks outside the campus to capture areas directly connected to the University. The following table provides an overview of the planning zones associated with the city.

Table 30: Planning Zones Overview

Planning Zone	Pct of Population	Pct of City Area	Pct of Physical Hazards	Pct of Total Calls for Service
1	12.1%	2.7%	25.4%	20.5%
2	11.2%	2.6%	20.8%	12.3%
3	18.9%	5.6%	10.2%	13.2%
4	13.5%	5.3%	15.2%	11.5%
5A	1.1%	13.3%	0.8%	1.3%
5B	1.0%	9.8%	0.6%	1.2%
6A	2.5%	16.4%	1.0%	1.7%
6B	3.0%	19.1%	0.5%	1.6%
7	10.4%	6.9%	12.4%	1.4%
8	6.3%	6.7%	6.8%	6.9%
9A	9.9%	4.1%	5.6%	6.3%
9B	1.4%	6.1%	0.8%	0.3%
OU	10.0%	1.5%	0.0%	5.7%

Planning Zone 3 has the most significant percentage of the population, while Planning Zone 1 has the higher percentage of calls for service. Both planning zones are adjacent to the OU Campus. The campus was considered a target hazard for the OU Zone based on the number and types of buildings and structures and the potential for other threats, such as terrorism.

The following designations identify the city's service areas based on the definitions in the NFPA 1710 document.

- **Urban** – Population density of over 1,000 per square mile.
- **Suburban** – Population density between 500 and 1,000 per square mile.
- **Rural** – Population density of less than 500 per square mile.

Using these definitions, NFD will be able to tailor services to the city's different planning zones and assist with planning the emergency services delivery system's future needs.

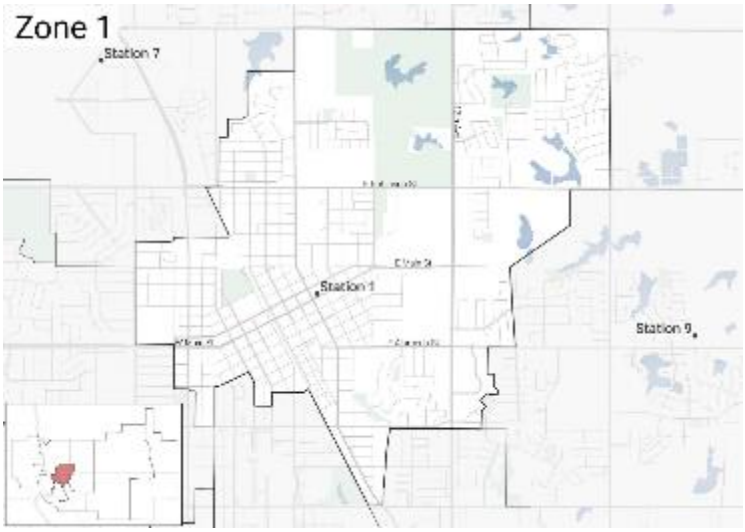
Table 31: Planning Zone Demographics

Planning Zone	Population Density	Demographic
1	3,098.1	Urban
2	2,936.7	Urban
3	2,314.6	Urban
4	1,741.2	Urban
5A	57.8	Rural
5B	71.8	Rural
6A	104.5	Rural
6B	108.8	Rural
7	1,039.7	Urban
8	646.9	Suburban
9A	1,666.3	Urban
9B	156.9	Rural
OU	4,660.1	Urban

Planning Zone 8 in the northwest section of the city that is not quite to the urban demographic. Areas to the east of 24th Avenue NE are the city's rural areas.

The following illustrations highlight significant points for each of the planning zones.

Figure 17: Planning Zone 1 Key Features

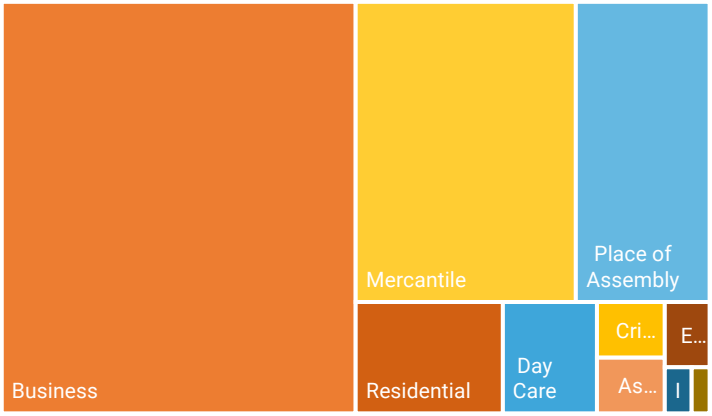


Population:	15,661
Housing Units:	7,311
Square Miles:	5.06
Density:	3,098.1

Calls for Service		
		Pct of Total
2021	3,745	20.6%
2022	3,658	19.3%
2023	3,987	20.5%

This zone is in the city's central section and includes the downtown area. This is the normal response area for Station One.

Target Hazards



Age Demographics

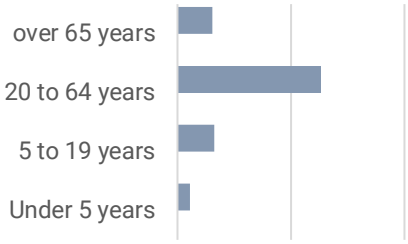
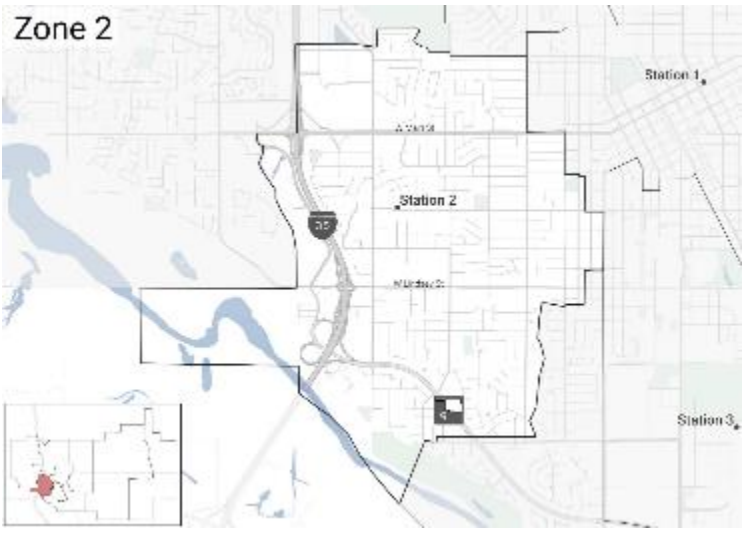


Figure 18: Planning Zone 2 Key Features

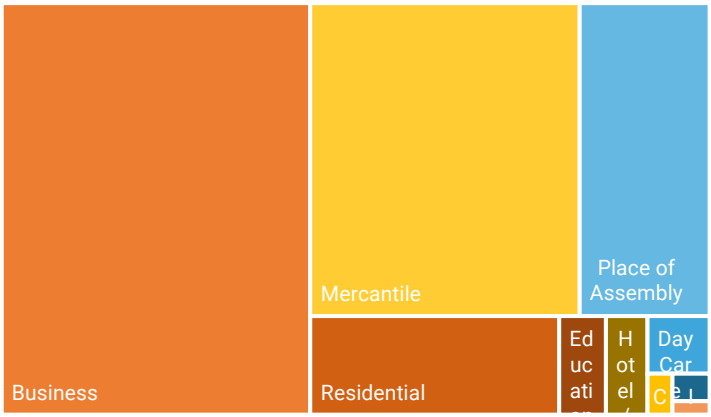


Population:	14,563
Housing Units:	6,986
Square Miles:	4.96
Density:	2,936.7

Calls for Service		
		Pct of Total
2021	2,521	13.8%
2022	2,318	12.3%
2023	2,380	12.3%

This zone is in the west-central section of the city adjacent to OU and the downtown area. This is the normal response area for Station Two.

Target Hazards



Age Demographics

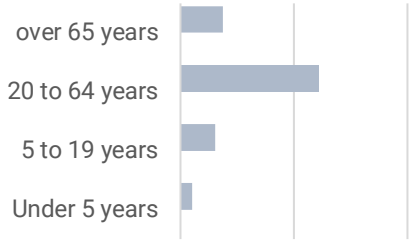


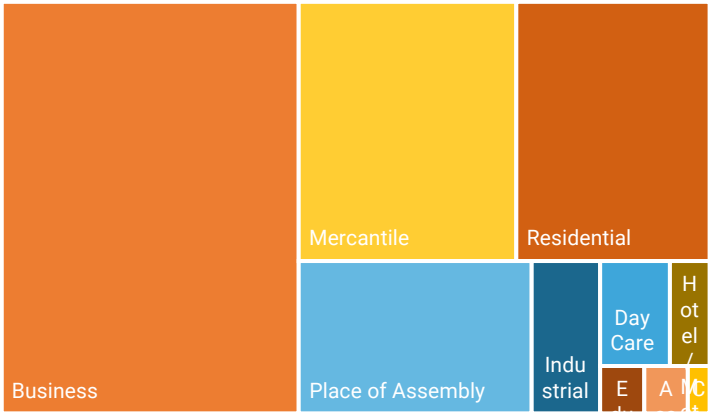
Figure 19: Planning Zone 3 Key Features

Population:	24,447
Housing Units:	11,579
Square Miles:	10.56
Density:	2,314.6

Calls for Service		
		Pct of Total
2021	2,724	15.0%
2022	2,710	14.3%
2023	2,556	13.2%

This zone is in the south-central section of the city. This is the normal response area for Station Three.

Target Hazards



Age Demographics

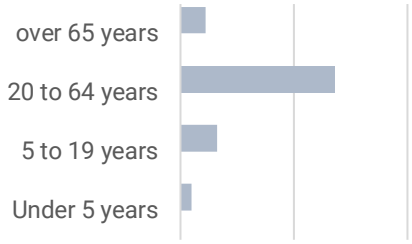


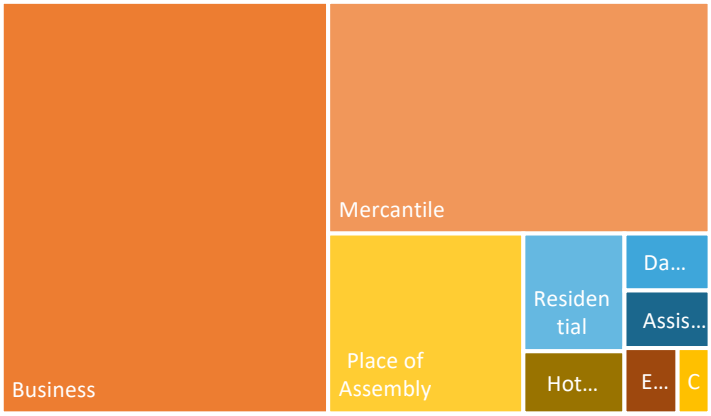
Figure 20: Planning Zone 4 Key Features

Population:	17,478
Housing Units:	8,397
Square Miles:	10.04
Density:	1,741.2

Calls for Service		
		Pct of Total
2021	2,207	12.1%
2022	2,227	11.8%
2023	2,228	11.5%

This zone is in the west-central section of the city. This is the normal response area for Station Four.

Target Hazards



Age Demographics

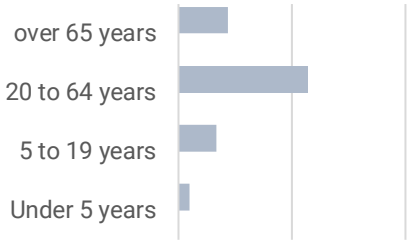


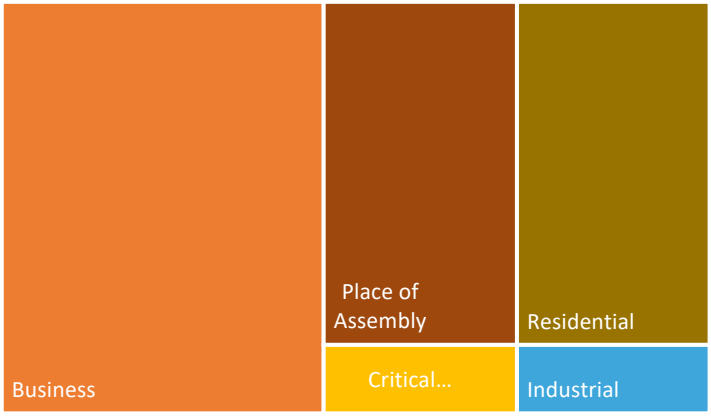
Figure 21: Planning Zone 5A Key Features

Population:	1,457
Housing Units:	621
Square Miles:	25.19
Density:	57.8

Calls for Service		
		Pct of Total
2021	266	1.5%
2022	264	1.4%
2023	260	1.3%

This zone is in the city's southeast section and includes the southern area of Lake Thunderbird. This is the normal response area for Station Five.

Target Hazards



Age Demographics

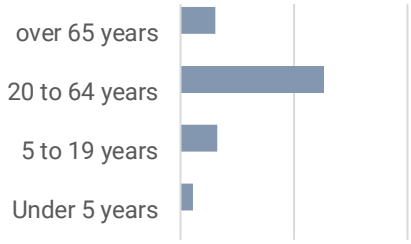
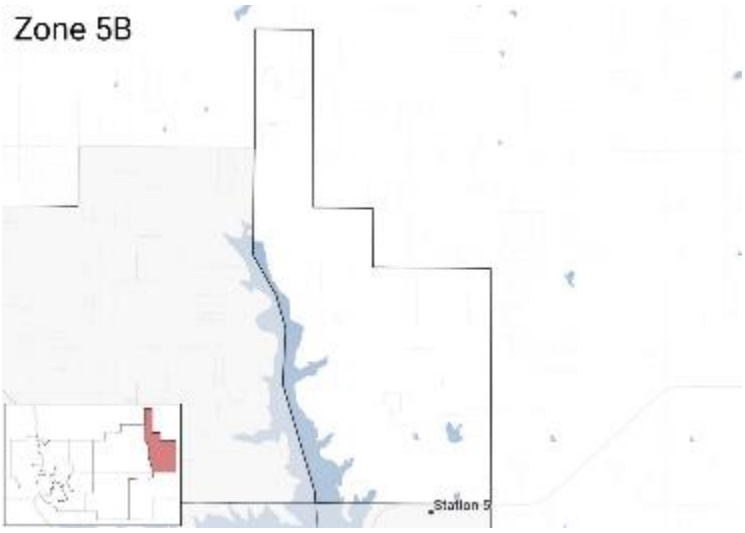


Figure 22: Planning Zone 5B Key Features

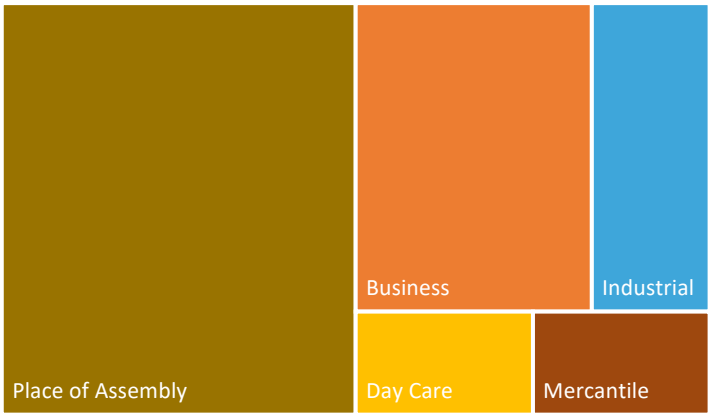


Population:	1,329
Housing Units:	529
Square Miles:	18.51
Density:	71.8

Calls for Service		
		Pct of Total
2021	206	1.1%
2022	237	1.3%
2023	241	1.2%

This zone is in the city's northeast section and includes Lake Thunderbird's northeast area. This is the normal response area for Station Five.

Target Hazards



Age Demographics

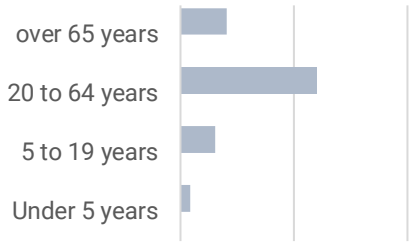
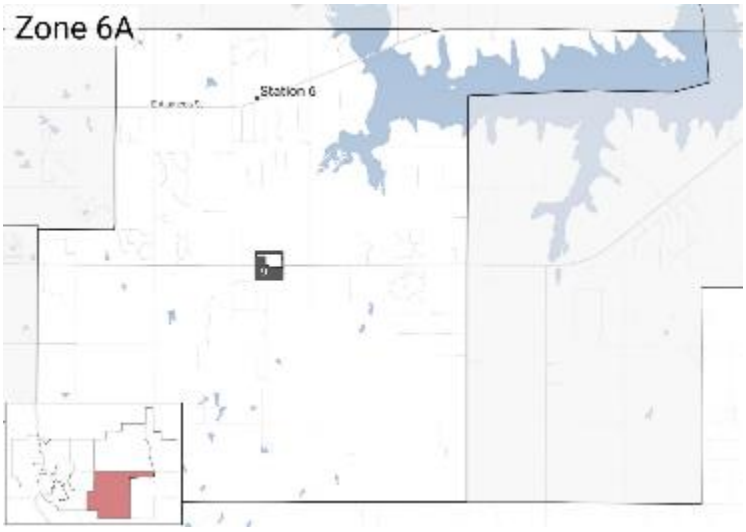


Figure 23: Planning Zone 6A Key Features

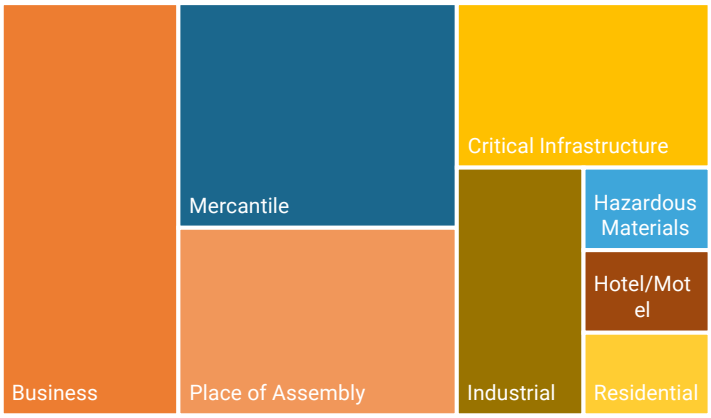


Population:	3,246
Housing Units:	1,352
Square Miles:	31.07
Density:	104.5

Calls for Service		
		Pct of Total
2021	328	1.8%
2022	384	2.0%
2023	334	1.7%

This zone is in the city's southeast central section, including the southwest areas of Lake Thunderbird. This is the normal response area for Station Six.

Target Hazards



Age Demographics

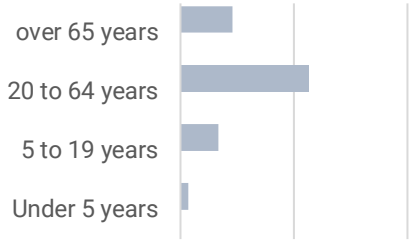
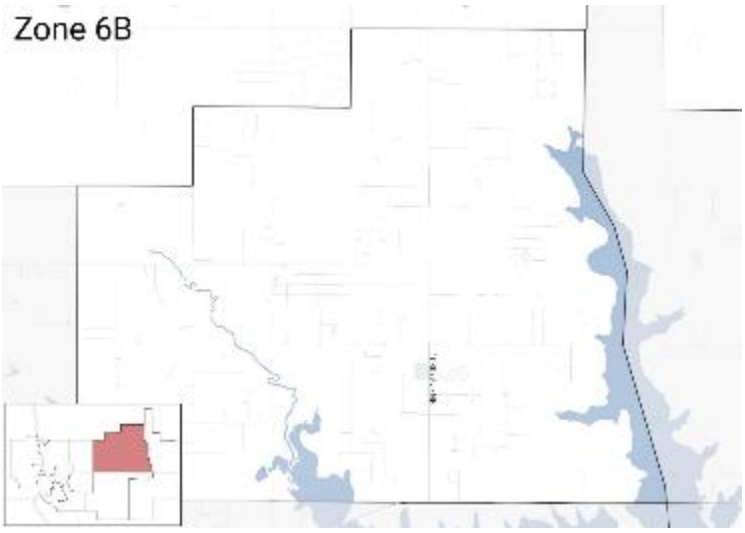


Figure 24: Planning Zone 6B Key Features

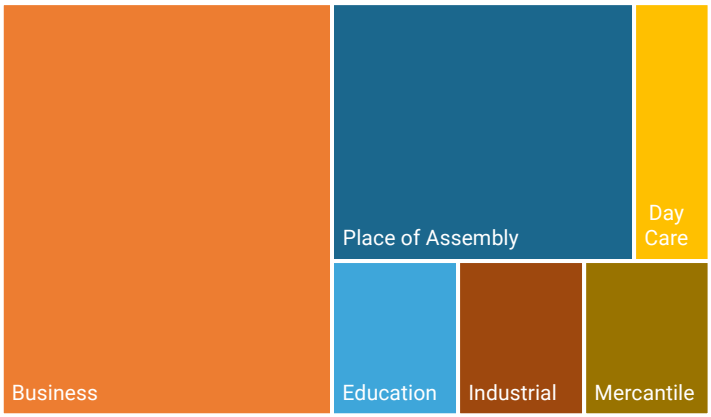


Population:	3,927
Housing Units:	1,586
Square Miles:	36.10
Density:	108.8

Calls for Service		
		Pct of Total
2021	274	1.5%
2022	325	1.7%
2023	308	1.6%

This zone is in the northeast central section of the city, including Lake Thunderbird's northwest areas. This is the normal response area for Station Six.

Target Hazards



Age Demographics

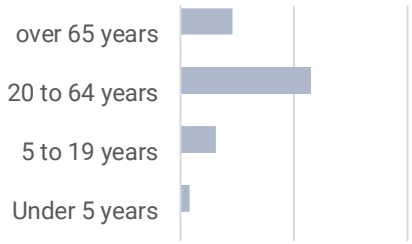
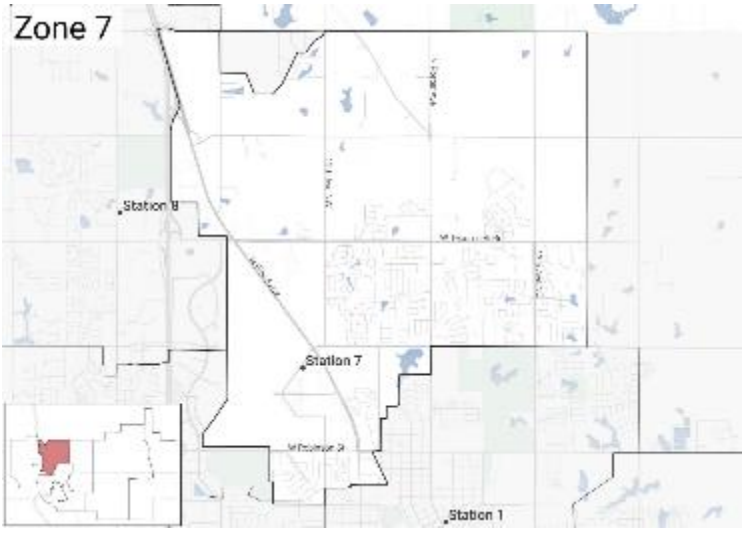


Figure 25: Planning Zone 7 Key Features

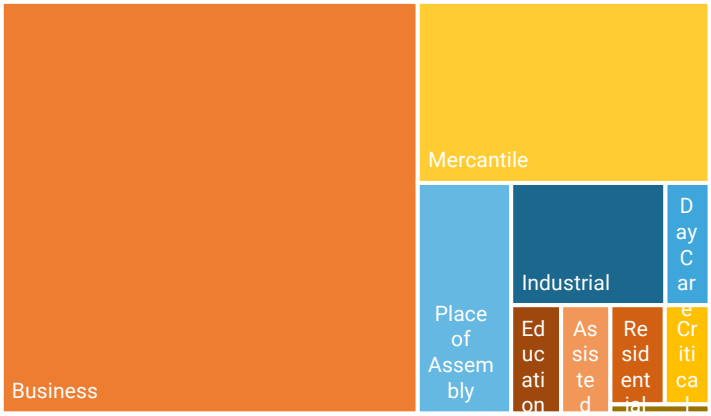


Population:	13,510
Housing Units:	5,699
Square Miles:	12.99
Density:	1,039.7

Calls for Service		
		Pct of Total
2021	1,525	8.4%
2022	1,779	9.4%
2023	1,759	9.1%

This zone is in the north-central section of the city just north of the downtown area. This is the normal response area for Station Seven.

Target Hazards



Age Demographics

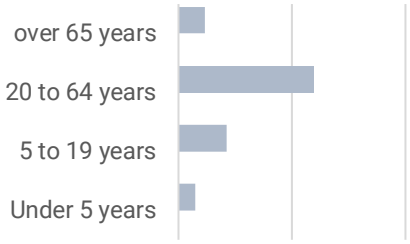


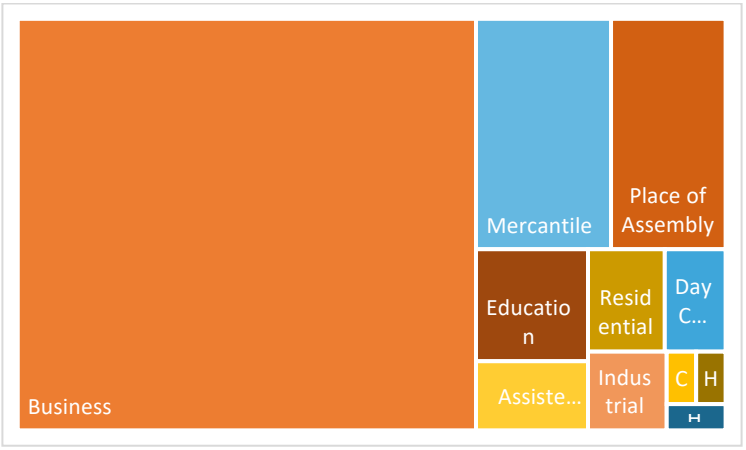
Figure 26: Planning Zone 8 Key Features

Population:	8,141
Housing Units:	3,392
Square Miles:	12.58
Density:	646.9

Calls for Service		
		Pct of Total
2021	1,047	5.7%
2022	1,233	6.5%
2023	1,339	6.9%

This zone is in the northwest section of the city. This is the normal response area for Station Eight.

Target Hazards



Age Demographics

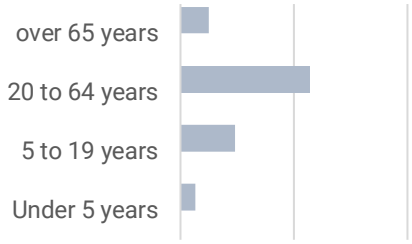


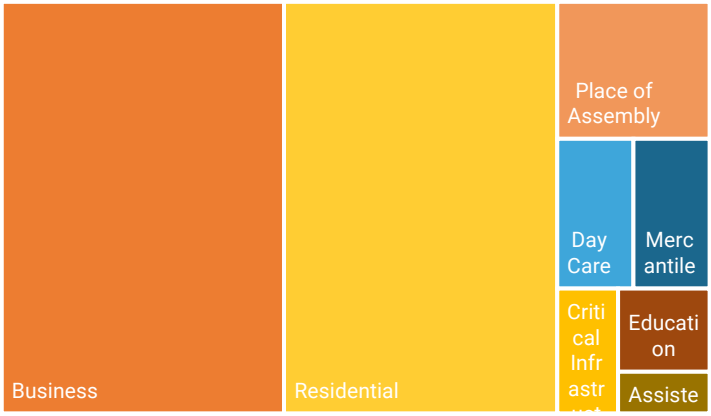
Figure 27: Planning Zone 9A Key Features

Population:	12,789
Housing Units:	5,779
Square Miles:	7.68
Density:	1,666.3

Calls for Service		
		Pct of Total
2021	1,592	8.7%
2022	1,345	7.1%
2023	1,225	6.3%

This zone is in the city's central section just east of downtown. This is the normal response area for Station Nine.

Target Hazards



Age Demographics

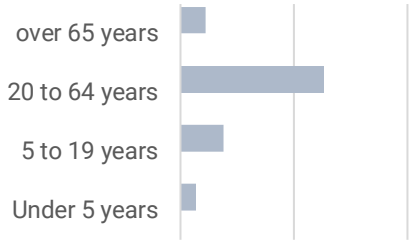
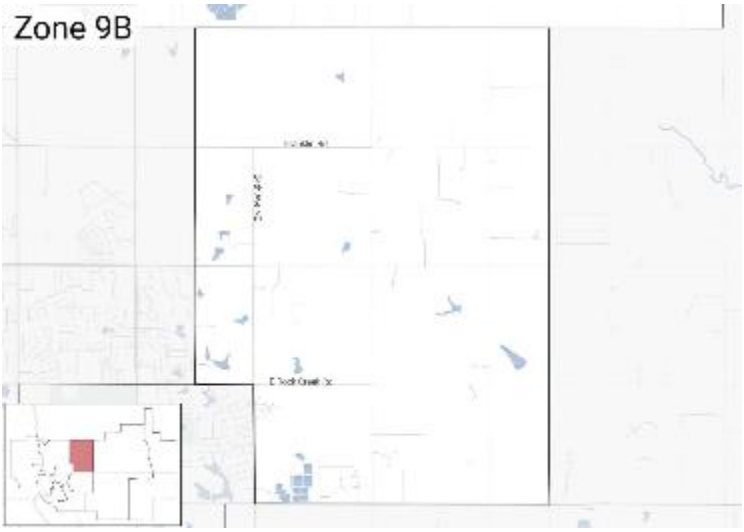


Figure 28: Planning Zone 9B Key Features

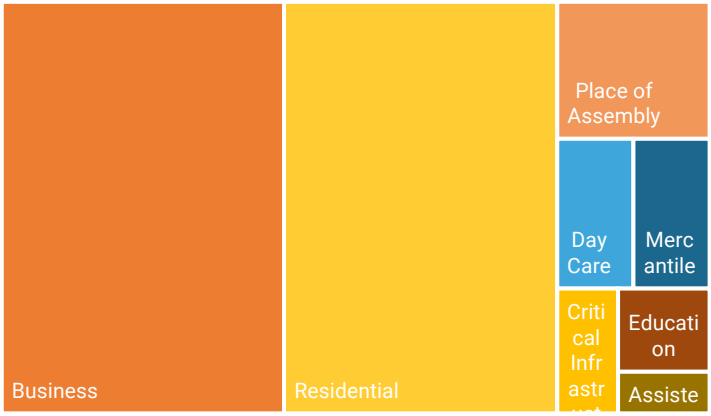


Population:	1,799
Housing Units:	756
Square Miles:	11.47
Density:	156.9

Calls for Service		
		Pct of Total
2021	85	0.5%
2022	98	0.5%
2023	66	0.3%

This zone is in the central section of the city northeast of the downtown area. This is the normal response area for Station Nine.

Target Hazards



Age Demographics

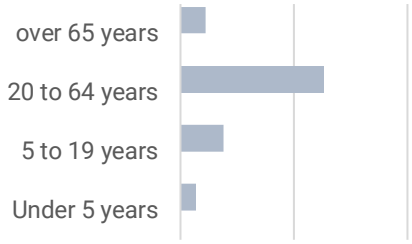
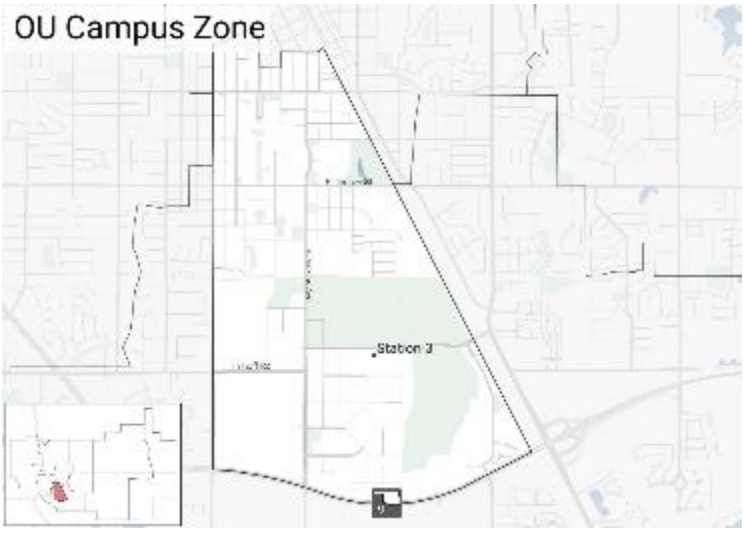


Figure 29: Planning Zone OU Key Features

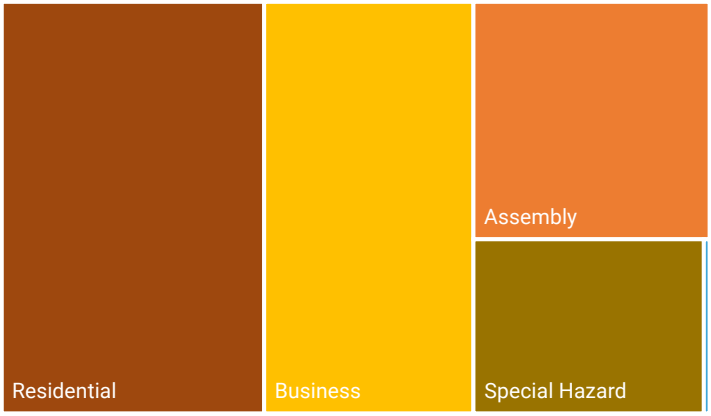


Population:	12,997
Housing Units:	3,766
Square Miles:	2.79
Density:	4,660.1

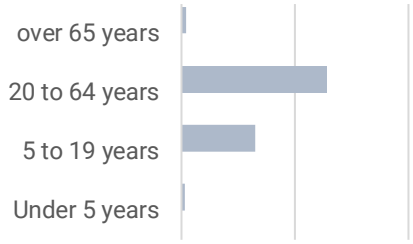
Calls for Service		
		Pct of Total
2021	1,211	6.6%
2022	1,158	6.1%
2023	1,106	5.7%

This zone is the OU Campus and includes a couple of blocks along the perimeter. This is the normal response area for Station Three.

Target Hazards



Age Demographics



Community Growth and Development

The following sections provide an overview of the anticipated growth within the city and a 10-year planning horizon to assess how Norman's growth and development will shape service needs and demand.

Introduction and Methodology

Our analysis considers several different data sources to provide a realistic simulation of how development activity will shape city growth and how that growth will affect service needs.

The basic foundation for our analysis is the current relationship between workload and population in Norman and a detailed understanding of anticipated developments. This is analyzed through:

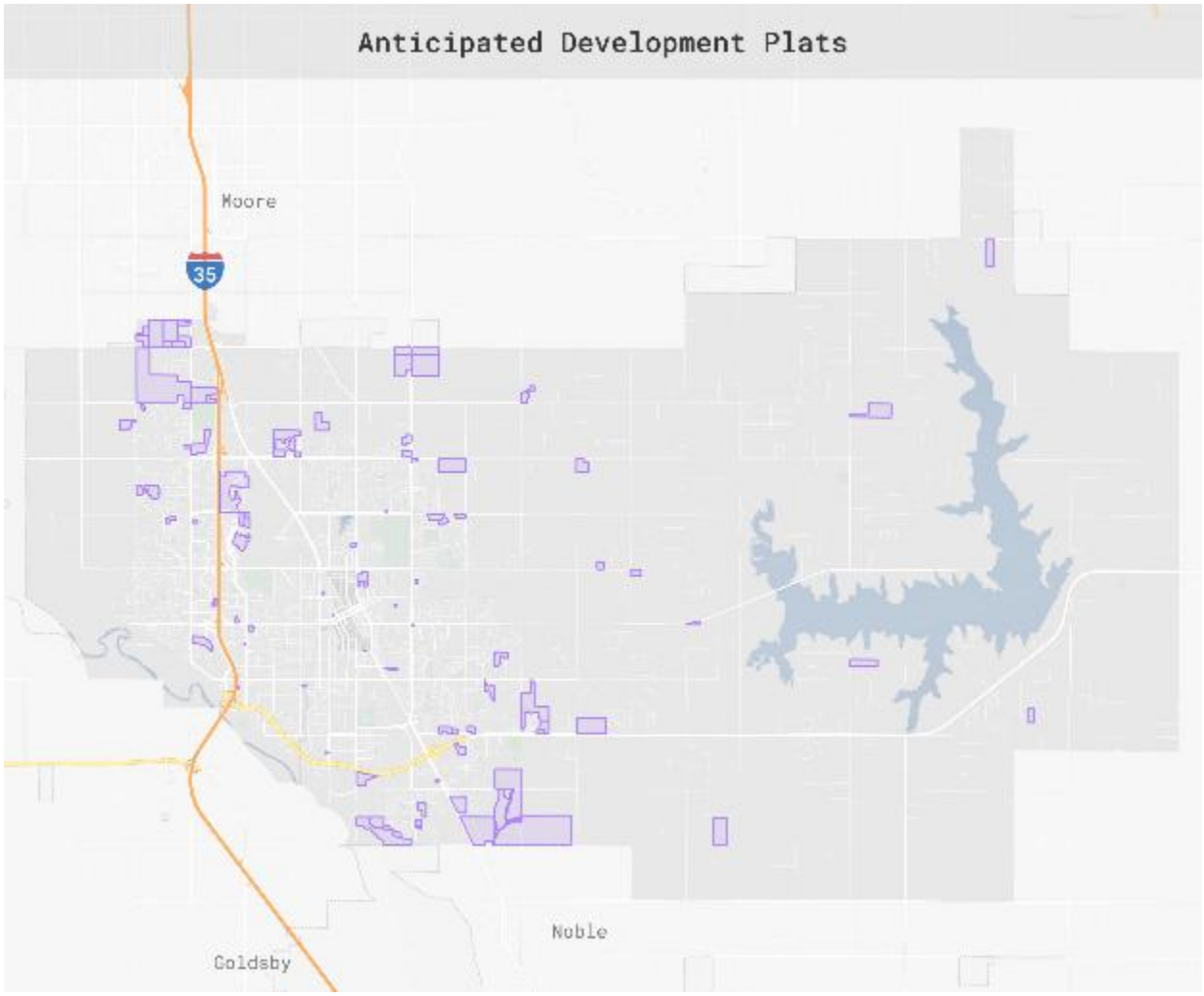
- Analysis of fire computer-aided dispatch data, including medical calls and all other department responses.
- 2020 Census data and more recent ACS (American Community Survey) estimates for population, housing units, household size, and occupancy.
- GIS data details the development plats' location, status, expected completion year, and magnitude.
- Additional research on each development, using the city's website, council meetings and planning documents, developer-created information, and any news articles with more recent information.

With the understanding of workload and population achieved through these data sources, the project team collected planning data on land use, anticipated development projects, and other relevant data. The data collected was augmented by additional research on the magnitude and location of each project, as well as any obstacles or conditionalities remaining toward a project being completed as planned or as originally conceptualized.

Overview of Development in Norman

Norman has seen a recent boom in proposed projects, which occupy a wide spectrum of different types of growth, including sprawling entertainment districts, multifamily infill projects, and expansive single-family residential developments. Importantly, the developments proposed or anticipated over the next decade are spread throughout the city, as shown in the following map:

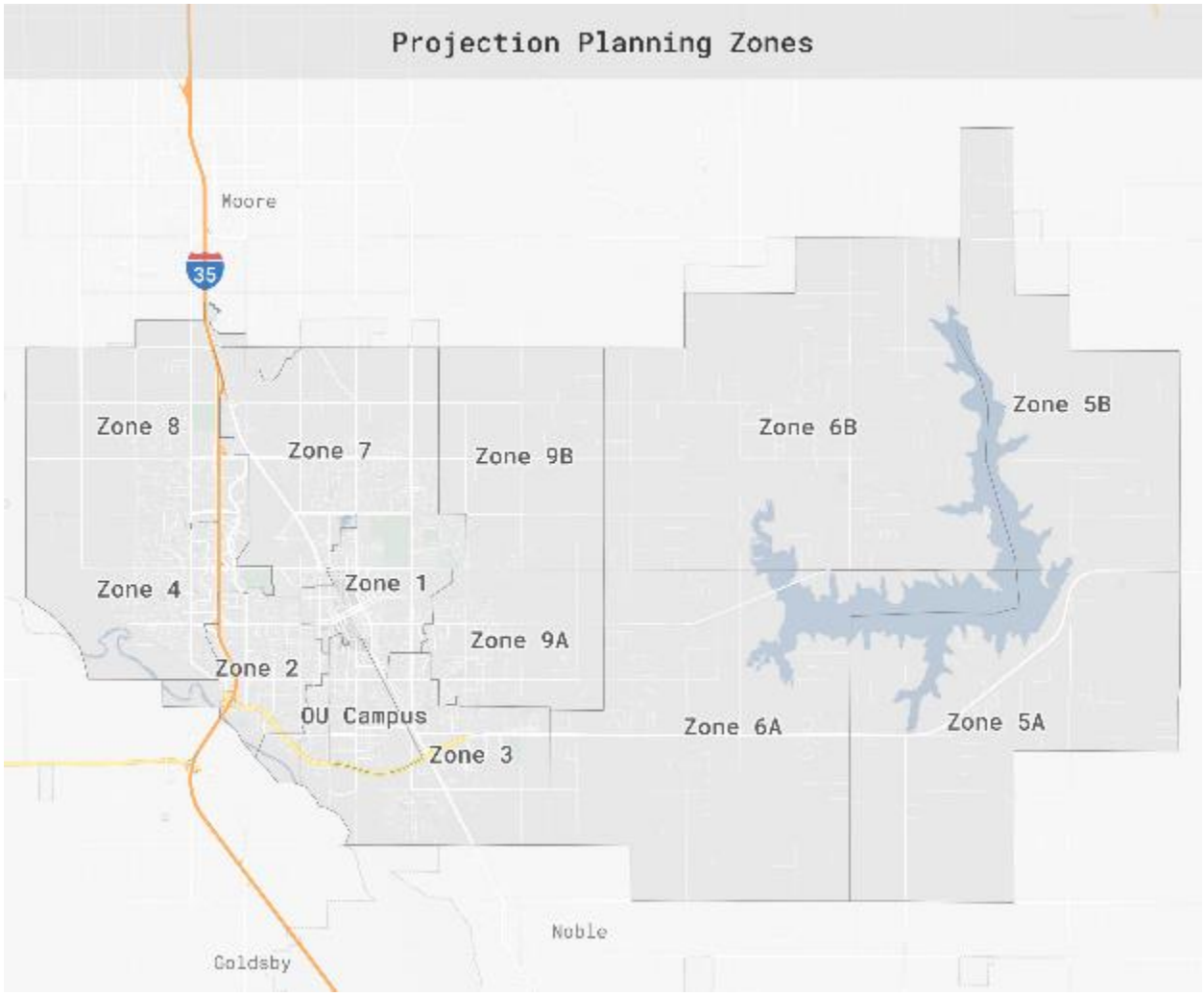
Figure 30: Anticipated Development Plats Map



The largest development, in terms of the number of units added exists east of US-77 and south of Hwy. 9. (above the label for Noble on the map).

Given that these developments are vastly different in scope and land use and occupy different areas of the city, it is critical that this analysis examine their impacts separately. To account for this, the project team divided Norman into 13 individual planning zones.

Figure 31: Projection Planning Zones Map



Note: The project team created the planning zones for this analysis, which are not city-defined.

The following table lists each project known to the project team that may be completed over the next 10 years, including:

- The number of units represented by each if the project is built to the fullest scope of plans, whether the project is currently permitted, preliminary, or entirely conceptual.
- An estimated timeframe for completion of construction.
- The project team's assessment of the likelihood of the project being completed based on any obstacles or conditionalities to development, as well as the project's timeframe (projects further out will generally have a lower probability).

  - A 100% probability is assigned to projects listed as having a 2023 or earlier completion date.
  - A 90% probability is assigned to all projected with a 2024 or later completion date.

- Expected value (EV) of units built, multiplying the number of units by the probability of completion. This represents an average scenario rather than a deterministic estimate.

Table 32: Anticipated and Potential Development Projects

Project	Zone	Units	Year	% Probability	EV
Carrington Place Addition	Zone 8	59	2021	100%	*59*
Siena Springs Addition	Zone 9A	81	2026	90%	*73*
Uplands Addition	Zone 8	256	2025	90%	*230*
Uplands Addition	Zone 8	2	2025	90%	*2*
Crimson Flats, SPUD	Zone 3	75	2025	90%	*68*
Cobblestone Creek Senior Community	Zone 3	57	2021	100%	*57*
Turtle Crossing (Revised	Zone 9A	146	2022	100%	*146*
NRHS East Campus Addition	Zone 3	1	2022	100%	*1*
Cinnamon Creek Addition	Zone 3	2	2023	100%	*2*
Destin Landing	Zone 3	301	2025	90%	*271*
Park Hill Mixed-Use Addition	Zone 7	3	2023	100%	*3*
SFP-2122-4 Powell Addition	Zone 2	1	2026	90%	*1*
Red Canyon Ranch East	Zone 7	28	2023	100%	*28*
Flint Hills Addition	Zone 7	577	2022	100%	*577*
Redlands	Zone 8	144	2030	90%	*130*
Belltona Addition	Zone 3	49	2022	100%	*49*
McCoop Abode Addition	Zone 2	2	2025	90%	*2*
Eagle Cliff West Addition	Zone 3	140	2025	90%	*126*
Revised Red Sky Ranch	Zone 8	10	2029	90%	*9*
Armstrong Bank Consolidation Project	Zone 3	11	2025	90%	*10*
Ashton Grove Addition	Zone 8	36	2022	100%	*36*
Franklin Woods Addition	Zone 8	47	2025	90%	*42*
Monte Vista Estates	Zone 9B	83	2025	90%	*75*
Bridgeview at Carrington	Zone 8	605	2024	90%	*545*
Wampler Estates SFP 2324-7	Zone 7	2	2026	90%	*2*
Hallbrooke Addition	Zone 1	54	2030	90%	*49*
Hallbrooke Addition	Zone 1	31	2030	90%	*28*
Whispering Trails Addition	Zone 8	22	2029	90%	*20*
Carroll Farm Addition	Zone 8	2	2026	90%	*2*
The Old Dairy Farm	Zone 3	2	2026	90%	*2*
H R Green	Zone 3	2,000	2029	90%	*1800*
Bob Moore Farms North LLC.	Zone 4	666	2032	90%	*599*

Project	Zone	Units	Year	% Probability	EV
Univ North Park / Rock Creek	Zone 8	811	2028	90%	*730*
Univ North Park / Rock Creek	Zone 8	123	2030	90%	*111*
Sooner Village	Zone 3	61	2029	90%	*55*
Brookhaven No. 45	Zone 4	32	2030	90%	*29*
Boyd Street Development (2)	OU Campus	7	2029	90%	*6*
Boyd Street Development (1)	OU Campus	5	2029	90%	*5*
Hampton Homes (1)	Zone 8	36	2027	90%	*32*
Hampton Homes (2)	Zone 1	12	2027	90%	*11*
Benchmark Acquisitions LLC	Zone 6A	422	2032	90%	*380*
The Ranch of Robinson	Zone 6A	10	2028	90%	*9*

The 42 projects combine for 7,014 total units, of which approximately 6,412 are expected to be built.

The expected value (EV) column represents the total number of units planned multiplied by the probability that the project is built – i.e., the 'average' scenario. It does *not* imply that for each project that does get built, the number of units will be reduced. For instance, units already entitled are more likely to be built.

Using the assumptions for probability, completion year, and the number of units by project, the development results in the following impact on the number of housing units in the city by milestone year (five-year increments following 2024):

Table 33: Projected Housing Units

Zone	2023	2024	2029	2034	11YR +/-
OU Campus	3,698	3,698	3,704	3,710	+0.3%
Zone 1	6,971	6,971	6,983	7,060	+1.3%
Zone 2	6,831	6,831	6,834	6,834	+0.0%
Zone 3	10,683	10,696	12,102	13,030	+22.0%
Zone 4	8,182	8,182	8,182	8,811	+7.7%
Zone 5A	636	636	636	636	+0.0%
Zone 5B	528	528	528	528	+0.0%
Zone 6A	1,269	1,269	1,276	1,658	+30.7%
Zone 6B	1,611	1,611	1,611	1,611	+0.0%
Zone 7	5,922	6,074	6,085	6,085	+2.8%
Zone 8	3,217	3,499	4,642	5,080	+57.9%
Zone 9A	6,217	6,254	6,327	6,327	+1.8%
Zone 9B	731	731	807	807	+10.4%
Total	**56,496**	**56,980**	**59,717**	**62,177**	**+10.1%**

Another important assumption is how quickly construction translates into a population, given that new apartment complexes are not instantly filled to maximum occupancy upon completion. Depending on many factors, such as the size of the building, pent-up demand, and any first-year incentives offered by property management, filling a multifamily project following construction completion can take time.

To account for this, occupancy for each project is assumed to be filled at 50% of units in the year in which construction is completed and all units occupied within a three-year timeline.

The population added by each unit is calculated by multiplying the 2020 (most recent US Census year) population per housing unit ratio individually for each planning zone. By stratifying the calculations by planning zone, the impacts on population from largely student housing within the OU Campus area are calculated differently from those in the city's eastern half, which are comprised primarily of single-family homes.

Table 34: Population Per Housing Unit

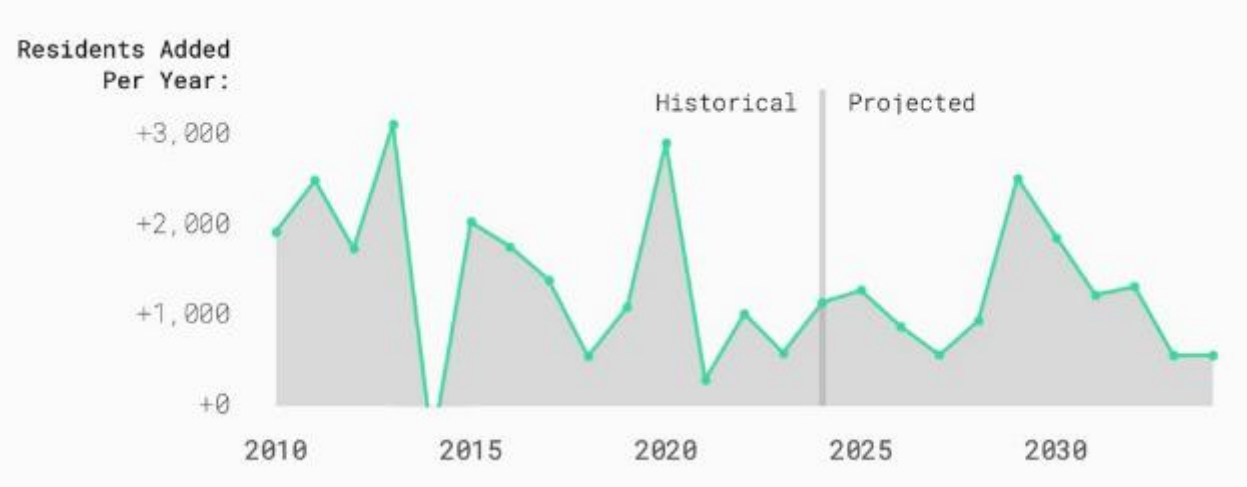
Planning Zone	2020
OU Campus	3.49
Zone 1	2.13
Zone 2	2.09
Zone 3	2.15
Zone 4	2.11
Zone 5A	2.36
Zone 5B	2.54
Zone 6A	2.58
Zone 6B	2.52
Zone 7	2.43
Zone 8	2.36
Zone 9A	2.17
Zone 9B	2.68
Overall	**2.30**

After factoring in the pace of occupancy for constructed housing units, the anticipated development results in the following population growth by milestone year:

Table 35: Population Projection by Zone

Zone	2023	2024	2029	2034	11YR +/-
OU Campus	12,902	12,902	12,923	12,944	+0.3%
Zone 1	14,875	14,875	14,901	15,065	+1.3%
Zone 2	14,306	14,306	14,312	14,312	+0.0%
Zone 3	23,017	23,045	26,075	28,074	+22.0%
Zone 4	17,261	17,261	17,261	18,588	+7.7%
Zone 5A	1,502	1,502	1,502	1,502	+0.0%
Zone 5B	1,341	1,341	1,341	1,341	+0.0%
Zone 6A	3,271	3,271	3,289	4,274	+30.7%
Zone 6B	4,062	4,062	4,062	4,062	+0.0%
Zone 7	14,369	14,738	14,765	14,765	+2.8%
Zone 8	7,591	8,257	10,954	11,988	+57.9%
Zone 9A	13,461	13,541	13,699	13,699	+1.8%
Zone 9B	1,962	1,962	2,166	2,166	+10.4%
Total	**129,920**	**131,063**	**137,250**	**142,780**	**+9.9%**

The following chart illustrates the variability and pace of this growth by showing the year-to-year population change over both the past 15 years as well as the next 10 years:



Development is expected to maintain a similar pace in absolute terms over the next decade as it has over the past 15 years, with an estimated 565 to 2,517 residents added each year.

Service needs are then projected for two different categories:

- Fire Department calls for service (CFS), **non-medical only**
- Fire Department calls for service, **medical only**

Each is calculated using the current (2023) data used for the staffing and operations analysis for Fire and is geolocated and mapped using GIS software. The service needs are then aggregated by planning zone and compared against the estimated population in 2023 to produce a rate of 0.149 service needs per capita. The rates for each category are then calculated against the projected population totals in each successive year thereafter to produce service need projects throughout the planning timeframe.

The calls for service, an approximately 7.8% increase is expected over the next decade (technically, 11 years, given that 2023 is used as the base year):

Table 36: Projected Calls for Service

Zone	2024	2025	2026	2027	2028	2029	2034	11YR +/-
OU Campus	1,208	1,208	1,208	1,209	1,209	1,209	1,210	0.2%
Zone 1	4,352	4,353	4,354	4,355	4,355	4,356	4,360	0.2%
Zone 2	2,598	2,598	2,598	2,598	2,598	2,598	2,598	0.0%
Zone 3	2,823	2,857	2,891	2,925	2,960	2,995	3,173	13.1%
Zone 4	2,432	2,432	2,432	2,432	2,432	2,432	2,432	0.0%
Zone 5A	286	286	286	286	286	286	286	0.0%
Zone 5B	264	264	264	264	264	264	264	0.0%
Zone 6A	365	365	365	366	366	366	367	0.6%
Zone 6B	337	337	337	337	337	337	337	0.0%
Zone 7	1,920	1,920	1,921	1,921	1,922	1,922	1,924	0.2%
Zone 8	1,506	1,551	1,596	1,644	1,692	1,742	2,582	32.6%
Zone 9A	1,399	1,412	1,426	1,440	1,454	1,467	1,475	1.1%
Zone 9B	73	73	71	73	73	73	77	10.6%
Total	**19,563**	**19,656**	**19,749**	**19,848**	**19,947**	**20,048**	**21,085**	

The following table illustrates the projected calls for service for fire-related incidents.

Table 37: Projected Fire-Related Calls for Service

Zone	2024	2025	2026	2027	2028	2029	2034	11YR +/-
OU Campus	474	474	474	474	475	475	475	0.20%
Zone 1	1,708	1,708	1,708	1,708	1,709	1,709	1,709	0.10%
Zone 2	1,020	1,020	1,020	1,020	1,020	1,020	1,020	0.00%
Zone 3	1,107	1,124	1,140	1,157	1,174	1,192	1,268	16.30%
Zone 4	955	955	955	955	955	955	955	0.00%
Zone 5A	112	112	112	112	112	112	112	0.00%
Zone 5B	104	104	104	104	104	104	104	0.00%
Zone 6A	143	143	144	144	144	144	144	0.65%
Zone 6B	132	132	132	132	132	132	132	0.00%
Zone 7	754	754	754	754	754	754	755	0.20%
Zone 8	584	594	604	614	624	635	682	18.60%
Zone 9A	526	526	527	527	528	528	531	1.10%
Zone 9B	29	29	29	29	30	30	31	10.60%
Total	**7,647**	**7,675**	**7,703**	**7,731**	**7,760**	**7,789**	**7,918**	

As shown, fire-related calls are expected to increase by about 3.5% over the next ten years. Medical calls are illustrated in the following table.

Table 38: Projected Medical Calls for Service

Zone	2024	2025	2026	2027	2028	2029	2034	11YR +/-
OU Campus	734	734	734	734	735	735	735	0.20%
Zone 1	2,646	2,650	2,653	2,656	2,659	2,662	2,676	1.33%
Zone 2	1,578	1,578	1,578	1,578	1,578	1,578	1,578	0.00%
Zone 3	1,724	1,754	1,785	1,816	1,847	1,879	2,021	19.10%
Zone 4	1,477	1,477	1,477	1,477	1,477	1,477	1,477	0.00%
Zone 5A	173	173	173	173	173	173	173	0.00%
Zone 5B	160	160	160	160	160	160	160	0.00%
Zone 6A	222	222	222	222	222	223	223	0.65%
Zone 6B	205	205	205	205	205	205	205	0.00%
Zone 7	1,167	1,167	1,167	1,167	1,167	1,168	1,169	0.20%
Zone 8	913	939	965	991	1,019	1,047	1,172	30.40%
Zone 9A	813	814	815	815	816	817	821	1.15%
Zone 9B	44	45	45	45	46	46	48	10.60%
Total	**11,857**	**11,917**	**11,979**	**12,041**	**12,105**	**12,171**	**12,459**	

As shown, medical calls are expected to increase by about 5.1% over the next ten years, slightly lower than fire-related calls.

Evaluation of the Norman Emergency Services System

This chapter compares and evaluates the current deployment and performance of the fire department.

Emergency Services System Dynamics

Nationally, the National Fire Protection Association (NFPA), Commission for Public Safety Excellence (CPSE), American Heart Association (AHA), United States Fire Administration (USFA), Underwriters Laboratories (UL), Factory Mutual (FM), National Institutes of Standards and Technology (NIST), and Insurance Services Office (ISO) have put considerable effort into data collection, analysis, and the eventual development of performance objectives for the delivery of fire and emergency medical services. This effort is critical for local governments to decide on the deployment and location of emergency resources. The objectives promoted for Fire/Rescue and EMS providers have their basis derived from research that has been conducted on these two critical issues:

- What is the impact of the passage of time on survivability for victims of cardiac arrest?
- What is the crucial point in a fire's "life" for gaining control of the blaze while minimizing the impact on the structure of origin and those around it?

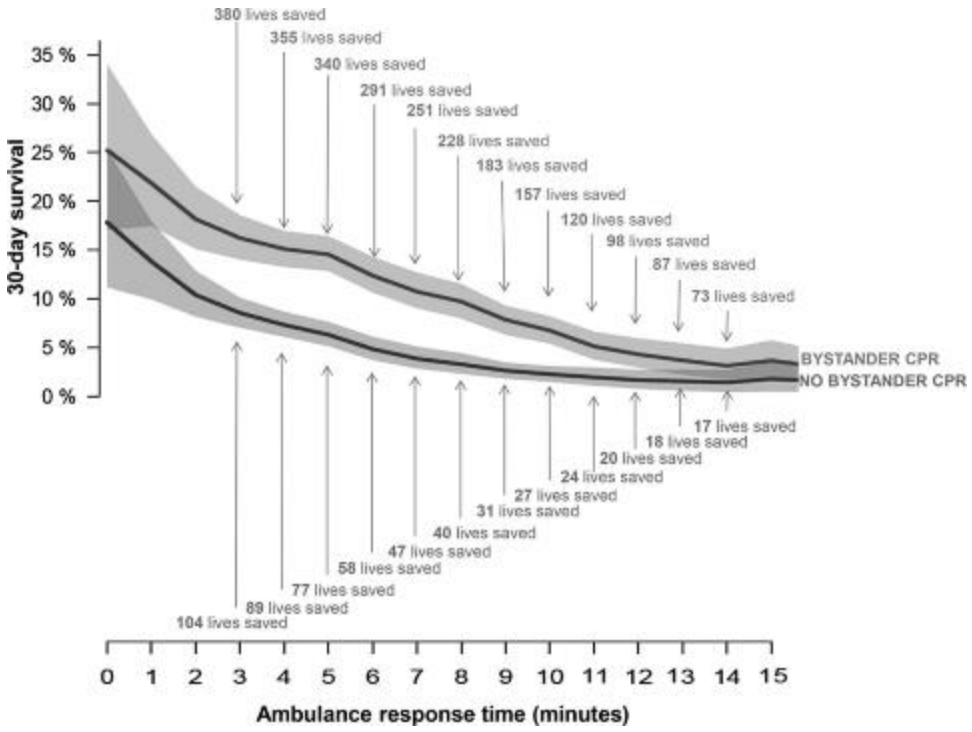
The following sections describe the decision points for these factors.

Emergency Medical Services

The delivery of emergency medical services is a function of the emergency services system that must be considered. Emergency medical calls are rising in the city, and the types of calls are wide-ranging. However, as a part of a community's healthcare system, one of the primary factors in the design of the emergency medical response is the ability to deliver basic CPR and defibrillation to victims of cardiac arrest. A recent study involving 7,623 out-of-hospital cardiac arrest patients examined survival rates based on bystander CPR and ambulance response times.[4] The study reinforces community-based CPR training and the response time for emergency services. The following chart illustrates the abrupt reduction in survival rates for each delayed minute.

[4] https://www.ahajournals.org/doi/full/10.1161/circulationaha.116.024400#:~:text=The%20contrast%20in%2030%2Dday,higher%20associated%20with%20bystander%20CPR.

Figure 32: Cardiac Arrest Survival Rates



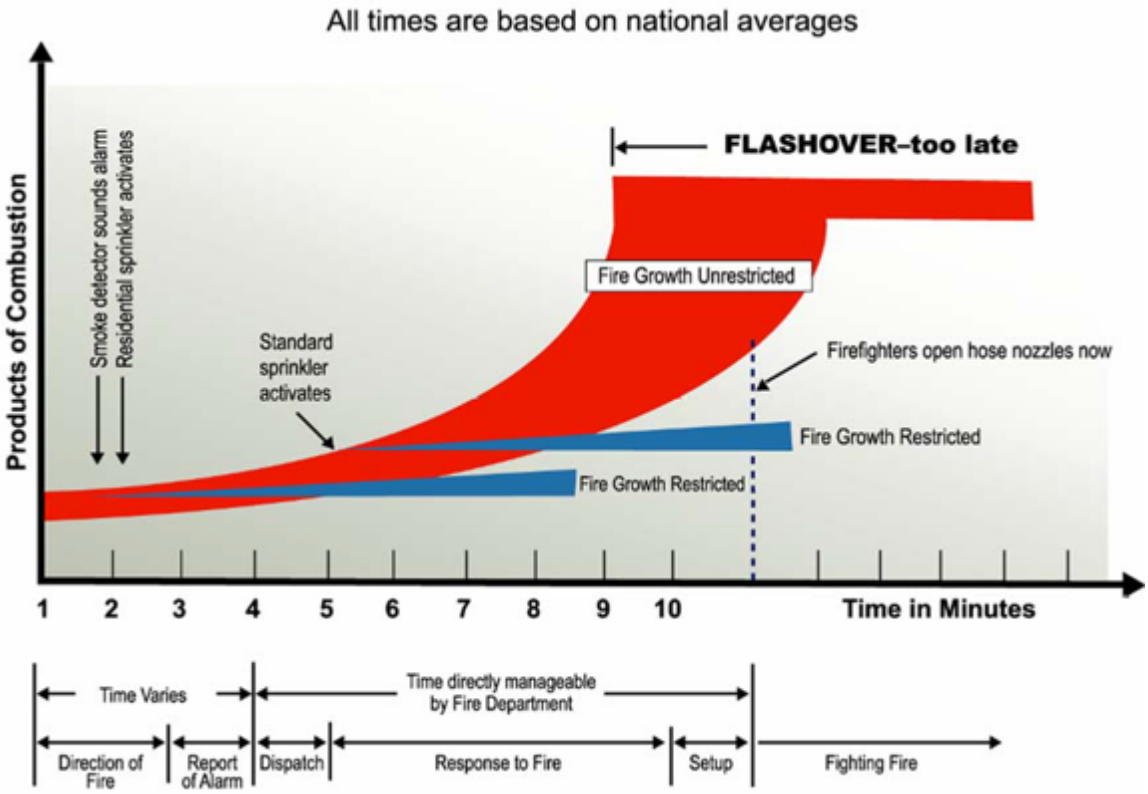
The importance of rapid response times in emergency medical services (EMS), particularly in cases of sudden cardiac arrest, includes the following key points:

- Survival rates for cardiac arrest decrease by approximately 10% for each minute that passes before CPR and/or defibrillation is initiated.
- The recommended response times are within 4 minutes for basic life support (BLS) and 8 minutes for advanced life support (ALS).
- EMS aims to provide BLS within 6 minutes and ALS within 10 minutes of an incident, including detection, dispatch, and travel time, forming the basis for a two-tier system where fire resources act as first responders, with additional ALS assistance provided by ambulance units.
- Recent research shows the significant impact of rapidly deploying automatic defibrillators (AEDs) to cardiac arrests, especially when combined with early CPR.
- However, these studies focus on a small fraction of EMS responses, as non-cardiac events make up most calls. The research does not address the need for rapid intervention in these cases.

Fire Suppression Services

The following chart shows a typical "flashover" curve for interior structure fires based on NFPA, ISO, and NIST data. The point in time represented by the occurrence of "flashover" is critical because it defines when a room's contents become involved in the fire. It is also the point at which a fire typically shifts from "room and contents" to a "structure" fire – involving a wider building area and posing a potential risk to the structures surrounding the fire's original location.

Figure 33: Flashover Time



Note that this illustration depicts a fire from the inception, not when a fire is detected or reported. It demonstrates the importance of early detection, fast reporting, and rapid dispatch of responding units. It also shows the critical need for a rapid (and sufficiently staffed) initial response – by quickly initiating the attack on a fire, "flashover" can be averted. Key points include:

- Flashover is a critical stage in a fire where it becomes fully developed, and every combustible object is subject to the full impact of the fire.

- After flashover, effective search and rescue end, and only larger diameter fire hoses can control the blaze. The fire also transitions from a “contents” fire to a “structure” fire, increasing the risk of structural collapse.
- Not every fire reaches flashover, and it can be prevented or delayed by a quickly responding fire crew using techniques such as using a master stream device, ventilating the room, or not ventilating under certain circumstances.
- Access to interior fires can be limited by safety requirements related to staffing levels. For example, OSHA standards require at least two firefighters on the exterior of a building before entry can be made to a fire-contaminated structure unless there is an immediate threat to life.
- The Insurance Services Office (ISO), the National Fire Protection Association (NFPA), and the Center for Public Safety Excellence (CPSE) provide information and guidelines for determining appropriate response objectives for communities. However, these guidelines must be adapted to each community's unique characteristics.

Response Time Criteria

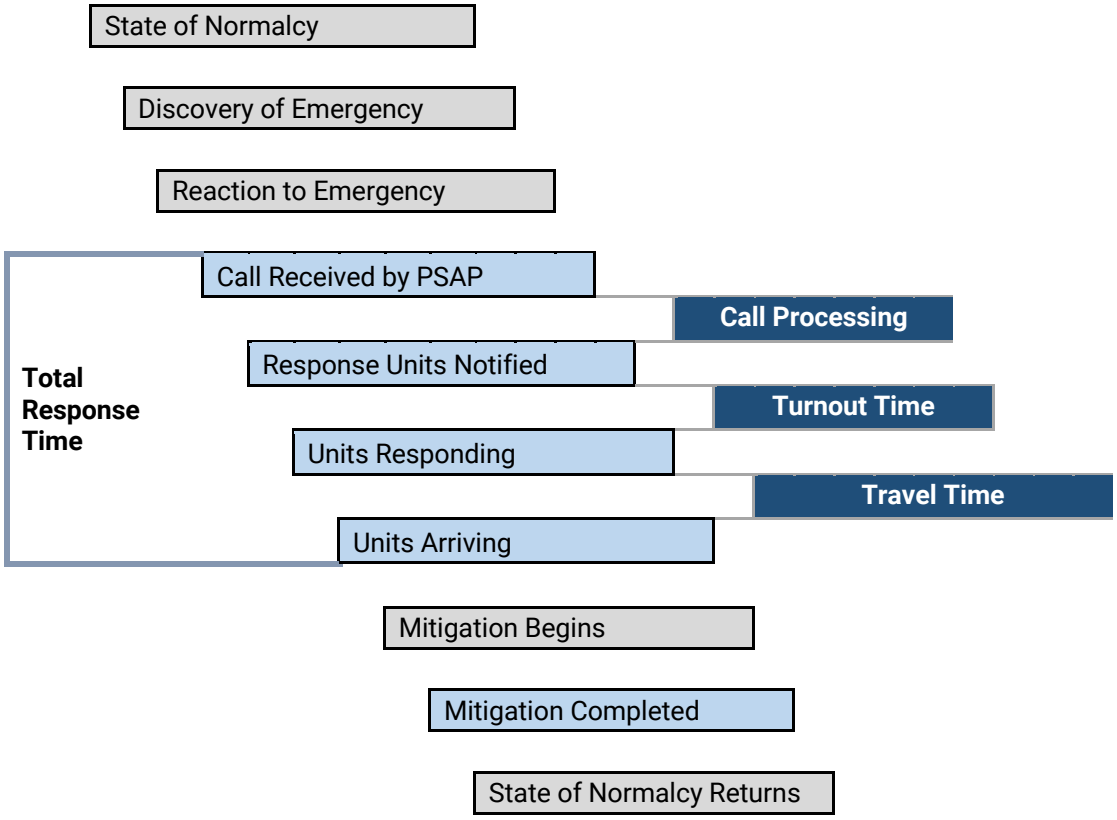
The expression of response time has evolved from being an average time, representing 50% performance, to a more accurate fractal time. Fractal time measures how often a department can perform within each response time component. The National Fire Protection Association (NFPA) and the Center for Public Safety Excellence (CPSE) use the 90th percentile as the standard for benchmark (industry best practice) and baseline (actual performance) measurements. Response time to emergencies is broken down into measurable and non-measurable segments, starting from when normalcy changes to a recognized emergency. The process involves a cascade of events, some of which are hard (quantitative) data, while others are soft (subjective) data.

Response time is divided into measurable segments: call processing, turnout, and travel time. Each component represents a different point in the response time continuum and can help identify areas for improvement.

- Call Processing begins when the call taker answers the call and ends with dispatching appropriate emergency services.
- Turnout Time begins when the emergency service receives the call and is on the apparatus responding.
- Travel Time begins when the apparatus and personnel begin the response and ends once at the emergency location.

The following chart outlines the cascade of events that occur once an emergency starts or is recognized. Those highlighted points represent hard, quantitative data versus soft data, which is subjective and unknown.

Figure 34: Response Time Continuum



Three models provide guidance to measure the performance of the emergency services system:

- NFPA 1710: Objective for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments. This document (NFPA 1710) was published in 2001 and updated in 2020.
- The Insurance Services Office (ISO) provides basic information regarding distances between fire stations. However, this "objective" does little to recognize the unique nature of every community's road network, population, calls for service, call density, etc.

- The American Heart Association (AHA) provides information on the response to cardiac events, the preferred methods of treatment, and the timing of the delivery of medical care and treatment.

A fourth model from the Center for Public Safety Excellence (CPSE) Fire and Emergency Service Self-Assessment Manual (FESSAM) is another resource for performance measurement. Before the 9th Edition FESSAM, CPSE provided benchmark and baseline performance objectives for response time. With the 9th Edition of the FESSAM, performance objectives were eliminated as the CPSE determined they were not a standard-setting organization. However, there is a significant body of work based on these objectives before their elimination from FESSAM.

Performance standards should be based on benchmark performance (the target level of performance for the agency) and baseline performance (what the agency can currently perform). Baseline performance is generally based on three to five years of data.

It is critical to note that Appendix A, contained in the NFPA 1710 document, provides additional information and background as it pertains to service delivery objectives for the jurisdiction as follows:

> *"There can be incidents or areas where the response criteria are affected by circumstances such as response personnel who are not on duty, unstaffed fire station facilities, natural barriers, traffic congestion, insufficient water supply, and density of population or property. The reduced level of service should be documented in the written organizational statement by the percentage of incidents and geographical areas for which the total response time criteria are achieved.*
>
> *Additional service delivery performance objectives should be established by the AHJ for occupancies other than those identified within the standard for benchmark single-family dwellings. Factors to be considered include specific response areas (i.e., suburban, rural, and wilderness) and occupancy hazards."*

This passage acknowledges the authority having jurisdiction (AHJ); in this case, the City of Norman is responsible for determining the level of service to be provided by the fire department. Considerations for the level of service include but are not limited to, the fire department's response, travel time, staffing, emergency calls versus non-emergency calls, roadways, financial resources, and those calls involving different occupancies. The service levels provided to the city should be written and documented so the city's residents know and understand the expectations of the emergency services system.

Call Processing

Performance Standards

The City of Norman Communications Division of the Police Department provides dispatching services for the Norman Fire Department.

The NFPA 1221 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems establishes the call processing benchmarks outlined in the chart below.

Table 39: NFPA 1221 Performance Objective

Component	Target	Performance
Calls Answered	Within 15 seconds	90%
	Within 20 seconds	95%
Call Processing	Within 60 seconds	90%
Call Processing for: * Language Translation * TTY/TDD Device Services * Hazardous Materials * Technical Rescue * Text Message * Calls Received during a Disaster * Unable to Determine location	These types of calls are exempt from the call processing time illustrated above.	

ISO uses the 60-second call processing time as a benchmark performance objective outlined in NFPA 1221 for their requirements.

System Performance

The alarm received and dispatch times were identical for most calls in the data provided. Because the date and time were identical, call processing performance could not be analyzed.

Turnout Time

Performance Standards

Turnout time is a measurable time segment that begins when the emergency service unit receives the call and is on the apparatus responding (wheels rolling). The following table compares the three models for benchmark performance objectives.

Table 40: Turnout Time – Benchmark Performance Objectives

Call Type	NFPA 1710	ISO	CPSE
Emergency Medical Calls	60 seconds or less 90% of the time	No Requirement	60 seconds or less 90% of the time
Fire or Special Operations Calls	80 seconds or less 90% of the time	No Requirement	80 seconds or less 90% of the time

System Performance

The following table illustrates the performance of the Norman Fire Department.

Table 41: Turnout Time Performance

All Emergency Calls – 90th Percentile Times			2021 - 2023	2021	2022	2023	NFPA Benchmark
Turnout Time	1st Unit	Medical Calls	2:17	2:10	2:19	2:19	1:00
		Fire Calls	2:16	2:08	2:19	2:20	1:20

All times shown are the 90th percentile for each of the three years. The performance objective time to the far right represents the turnout time following the NFPA 1710 Standard. For the three years, the emergency medical calls have been over the performance objective time by 1 minute and 17 seconds, and the fire-related calls have been over the performance objective by 56 seconds. It is important to note that the call processing time issue described earlier could be embedded in turnout time performance, resulting in longer than actual turnout time performance. The following table illustrates the turnout time for Individual units as documented in the CAD data received by the project team. It is important to restate the issue of inaccurate call processing times, which could negatively impact the recorded turnout time performance.

Table 42: Turnout Timer Performance by Unit

All Emergency Calls – 90th Percentile Times			2021-2023	2021	2022	2023	NFPA Benchmark
Turnout Time	Engine 1 Brush 1	Medical Calls	2:08	1:56	2:10	2:13	1:00
		Fire Calls	2:15	2:04	2:19	2:18	1:20
	Ladder 1	Medical Calls	1:28	1:11	1:51	1:27	1:00
		Fire Calls	2:39	2:46	2:52	2:14	1:20
	Engine 2 Hazmat 2	Medical Calls	2:18	2:13	2:22	2:16	1:00
		Fire Calls	2:22	2:15	2:32	2:20	1:20
	Ladder 2 Brush 2	Medical Calls	2:06	1:53	2:09	2:08	1:00
		Fire Calls	2:51	2:50	2:53	2:46	1:20
	Engine 3 Brush 3	Medical Calls	2:21	2:04	2:24	2:28	1:00
		Fire Calls	2:20	2:07	2:22	2:27	1:20
	Engine 4 Tanker 4 Brush 4	Medical Calls	2:12	1:58	2:15	2:16	1:00
		Fire Calls	2:11	1:58	2:14	2:16	1:20
	Engine 5 Brush 5	Medical Calls	2:10	2:16	2:02	2:10	1:00
		Fire Calls	2:31	2:44	2:27	2:24	1:20
	Engine 6 Brush 6	Medical Calls	1:59	1:58	2:15	1:33	1:00
		Fire Calls	2:29	2:35	2:22	2:30	1:20
	Squad 7 Rescue 7 Brush 7	Medical Calls	2:18	2:15	2:19	2:20	1:00
		Fire Calls	2:20	2:19	2:22	2:20	1:20
	Engine 8 Tanker 8 Brush 8	Medical Calls	2:12	2:09	2:18	2:11	1:00
		Fire Calls	2:18	2:16	2:24	2:16	1:20
	Engine 9 Tanker 9 Brush 9	Medical Calls	2:25	2:19	2:26	2:29	1:00
		Fire Calls	2:29	2:23	2:32	2:33	1:20

Distribution of Resources

Distribution is the measure of getting initial resources to an emergency to begin mitigation efforts. It is measured in various ways, including the percentage of square miles, percentage of road miles, and travel time. The Insurance Services Office (ISO) has used road miles for many years, advocating one and a half miles for an engine company and two and a half miles for a ladder company. With the advent of GIS technology and improved computer-aided dispatch (CAD) systems, the use of actual travel time is another more accurate measure for the distribution of resources.

Performance Standards

Travel time is a measurable time segment that begins when the apparatus and personnel begin the response (wheels rolling) and ends once at the emergency location (wheels

stopped). It is the most appropriate measurement available for the distribution of resources with a proven record of success.

Table 43: First Arriving Unit – Benchmark Performance Objectives

Demand Zone	Demographics	NFPA 1710	ISO	CPSE
Urban	Greater than 1,000 per sq. mile	4 minutes or less 90% of the time	1.5 road miles in the built-upon area	4 minutes or less 90% of the time
Suburban	500 - 1,000 per sq. mile	4 minutes or less 90% of the time	1.5 road miles in the built-upon area	5 minutes or less 90% of the time
Rural Area	Less than 500 per sq. mile	4 minutes or less 90% of the time	1.5 road miles in the built-upon area	10 minutes or less 90% of the time
Remote Area	Travel Distance greater than / equal to 8 miles	4 minutes or less 90% of the time	1.5 road miles in the built-upon area	No Requirement

System Performance

The following table illustrates the performance for the past three years.

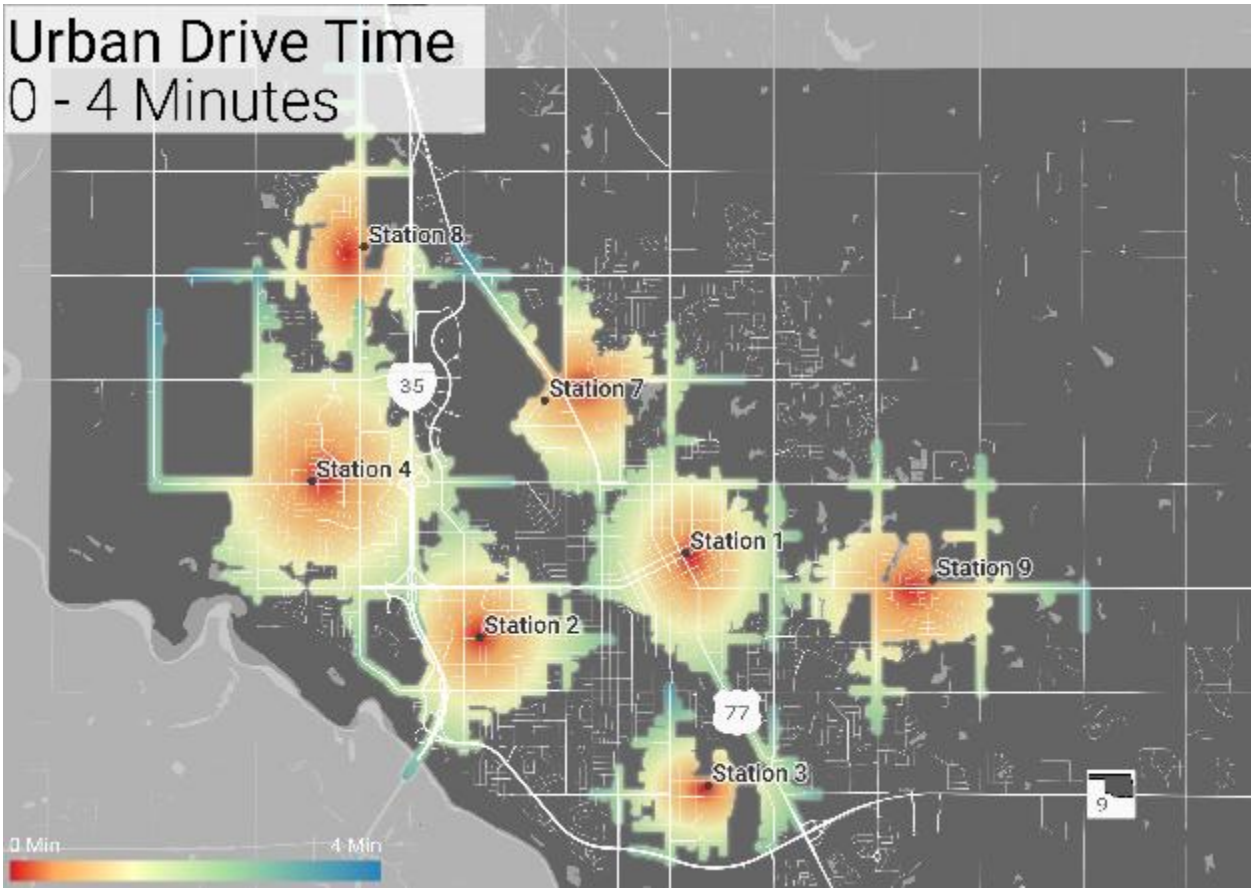
Table 44: Travel Time Performance

All Emergency Calls – 90th Percentile Times			2021 - 2023	2021	2022	2023	CPSE Benchmark
Travel Time	1st Unit – Distribution	Urban Zones	6:35	6:46	6:34	6:26	4:00
		Suburban Zone	6:41	6:29	6:47	6:45	5:00
		Rural Zones	9:27	9:18	9:31	9:30	10:00

All times shown are the 90th percentile for each of the three years. The performance objective time shown to the far right represents the travel time following the CPSE guidance. For the three years, the emergency calls are over the performance objective time by 2 minutes and 35 seconds in the urban zone and one minute and 41 seconds in the suburban zone. The suburban zone is the area in the far northwest region of the city. Travel time in the rural zones is under the CPSE guidance by 33 seconds. The rural zones are those in the far eastern region of the city.

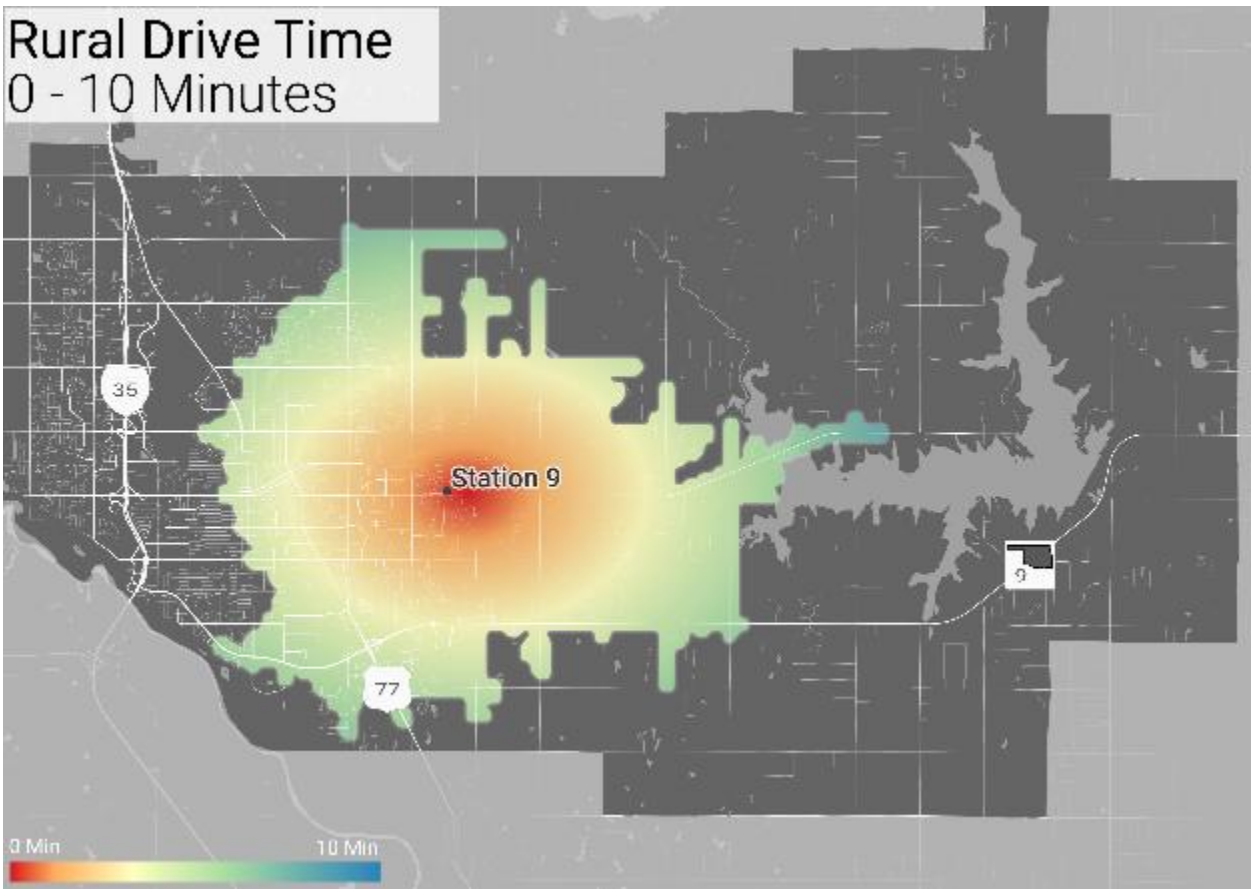
The following map illustrates the 4-minute travel time, which is the NFPA 1710 Benchmark Standard, using those stations in or near the urban zone.

Figure 35: Urban Travel Time Map



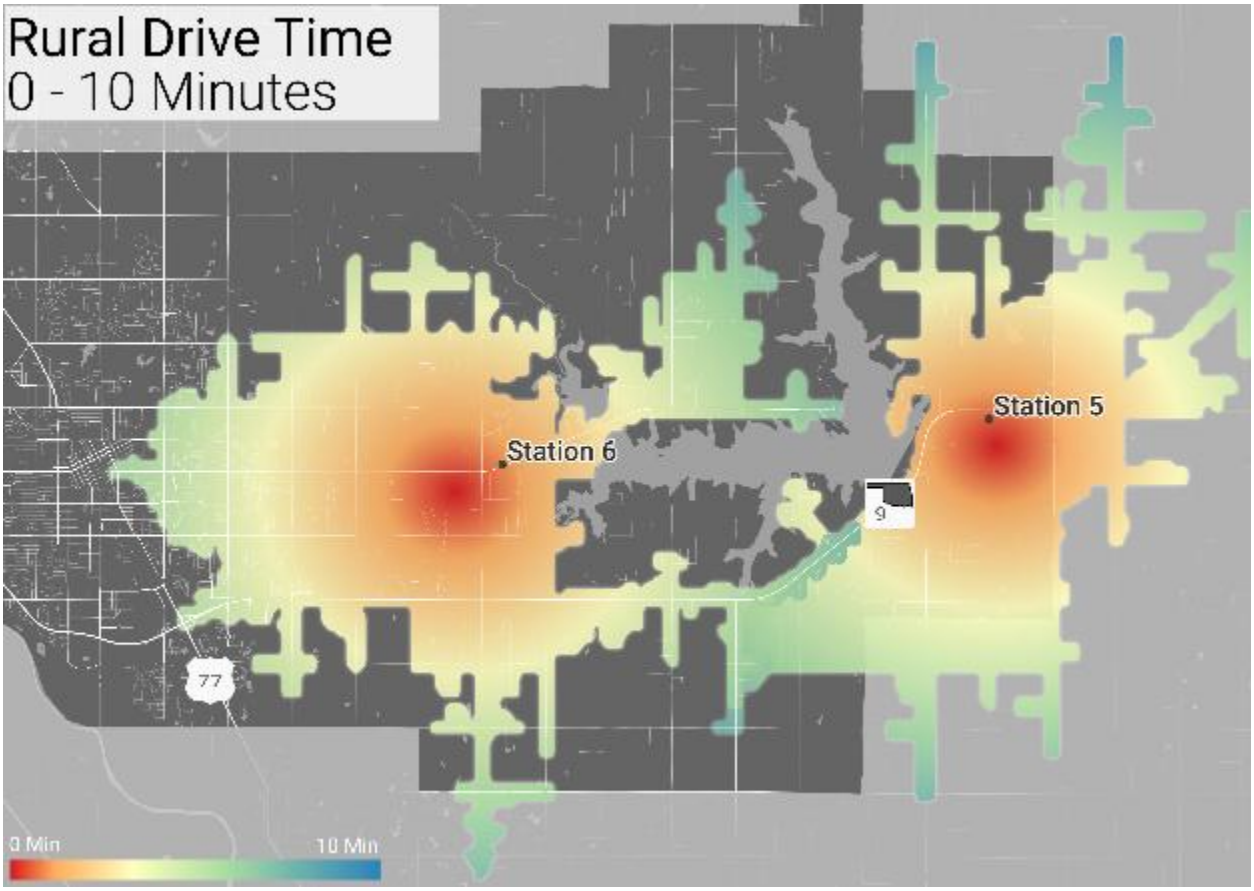
Significant gaps are noted in the center core of the city. Much of this area is the OU Campus, which does not have a well-gridded roadway network. The following map illustrates the 10-minute travel time using those stations in or near the rural zones.

Figure 36: Rural Travel Time Map



The location of Station Nine allows for a response into both the urban and rural zones. This map illustrates the travel time for Station Nine in the city's rural area. The following map illustrates the travel time for Stations Five and Six.

Figure 37: Rural Travel Time Map –East Region



Lake Thunderbird creates a natural barrier for Station Five and its response to the west. Station Six and Nine cannot respond first to the lake's east side.

Response Time – Distribution

Combining turnout time and travel time creates the response time for the Fire Department, which is 6 minutes for 90% of the emergency calls in the urban zones. The following table illustrates the performance of the Fire Department for the past three years.

Table 45: Distribution Response Time Performance

All Emergency Calls – 90th Percentile Times			2021 - 2023	2021	2022	2023	CPSE Guidance
Response Time	1st Unit – Distribution	Urban Zones	8:14	8:16	8:18	8:09	5:00
		Suburban Zone	8:11	7:54	8:15	8:17	6:00
		Rural Zones	11:16	11:14	11:14	11:20	11:00

All times shown are the 90th percentile for each of the three years. The performance objective time shown to the far right represents the benchmark performance response

time following the CPSE guidance. For the three years, the emergency calls are over the performance objective time by three minutes and 14 seconds in the urban zone and two minutes and 11 seconds in the suburban zone. For the rural zones, the emergency calls exceed the performance objective time by 16 seconds.

Total Response Time - Distribution

While travel time is essential and allows for evaluating station locations, the total response is equally important as that is what the customer witnesses. The customer does not necessarily understand the different agencies involved or what the Fire Department must do to provide service; they do understand that when they call for assistance, they expect the help to arrive promptly. The following table illustrates the performance of the fire protection system for the past three years.

Table 46: Distribution Total Response Time

All Emergency Calls – 90th Percentile Times			2021 - 2023	2021	2022	2023	CPSE Guidance
Total Response Time	1st Unit - Distribution	Urban Zones	8:31	8:44	8:30	8:22	6:00
		Suburban Zone	8:20	8:10	8:27	8:20	7:00
		Rural Zones	11:44	11:12	11:45	11:59	12:00

All times shown are the 90th percentile for each of the three years. The performance objective time shown to the far right represents the benchmark performance response time following the CPSE guidance. For the three years, the emergency calls are over the performance objective time by two minutes and 31 seconds in the urban zone and one minute and 20 seconds in the suburban zone. Emergency calls are under the performance objective time for the rural zones by 16 seconds.

Concentration of Resources

The concentration of resources is generally described as the ability of the fire protection system to get the appropriate number of personnel and resources to the scene of an emergency within a prescribed time to mitigate the incident effectively. This component has two parts: the first is providing an effective response force, and the second is the time needed to get those resources in place.

Performance Standards

As noted, there are two segments for the concentration of resources: the first uses travel time, and the second involves the number of personnel. Again, these two segments represent the most appropriate measurement available for the concentration of resources, and these measurements have proven successful.

The concentration segment has two travel time components that must be considered. The first is the travel time for the second arriving apparatus, and the second is the balance, travel time, and personnel of the first alarm assignment. The following table summarizes the differing viewpoints on the travel time of the second arriving Unit.

Table 47: Second Arriving Unit – Benchmark Performance Objectives

Demand Zone	Demographics	NFPA 1710	ISO	CPSE Guidelines
Urban	Greater than 1,000 per sq. mile	6 minutes or less 90% of the time	No time or mileage requirement	8 minutes or less 90% of the time
Suburban	500 - 1,000 per sq. mile	6 minutes or less 90% of the time	No time or mileage requirement	8 minutes or less 90% of the time
Rural Area	Less than 500 per sq. mile	6 minutes or less 90% of the time	No time or mileage requirement	14 minutes or less 90% of the time
Remote Area	Travel Distance greater than / equal to 8 miles	6 minutes or less 90% of the time	No time or mileage requirement	No time or mileage requirement

As noted in the previous table, NFPA 1710 has requirements for the second arriving apparatus; ISO is silent. The following table illustrates the travel time for the first alarm assignment.

First Alarm Assignment – Benchmark Performance Objectives

Demand Zone	Demographics	NFPA 1710	ISO	CPSE Guidelines
Urban	Greater than 1,000 per sq. mile	8 minutes or less 90% of the time	No time or mileage requirement	8 minutes or less 90% of the time
Suburban	500 - 1,000 per sq. mile	8 minutes or less 90% of the time	No time or mileage requirement	10 minutes or less 90% of the time
Rural Area	Less than 500 per sq. mile	8 minutes or less 90% of the time	No time or mileage requirement	14 minutes or less 90% of the time
Remote Area	Travel Distance greater than / equal to 8 miles	8 minutes or less 90% of the time	No time or mileage requirement	No time or mileage requirement

NFPA 1710 does not address any demographics regarding travel time in response to structure fires.

As mentioned above, the second part of the concentration of resources arrival time concerns the number of personnel arriving with the first alarm assignment. The following table summarizes NFPA, ISO, and CPSE standards for the number of personnel arriving for a first alarm assignment for a single-family dwelling.

First Alarm Assignment - Recommended Personnel

Demand Zone	Demographics	NFPA 1710	ISO	CPSE Guidelines
Urban	Greater than 1,000 per sq. mile	16 personnel	No specific requirement	16 personnel
Suburban	500 - 1,000 per sq. mile	16 personnel	No specific requirement	16 personnel
Rural	Less than 500 per sq. mile	16 personnel	No specific requirement	16 personnel
Remote	Travel Distance greater than / equal to 8 miles	16 personnel	No specific requirement	16 personnel

As illustrated, ISO does not specify the number of personnel expected or anticipated to arrive and instead provides points for the personnel, meaning the more on-duty personnel there are, the more points are added to the overall evaluation. NFPA 1710 bases the personnel requirements on creating an effective response force using critical tasking.

The following sections measure the Fire Department's performance against the current NFPA 1710 performance objectives.

Performance

Computer Aided Dispatch (CAD) data was used to evaluate resource concentration. To be considered for inclusion, the following conditions were required to be met:

- Calls for service designated as a structure fire.
- All the units dispatched must have a recorded arrival time. It was assumed that if the Unit did not arrive on scene, it was cancelled while enroute.

The data used were from 2021, 2022, and 2023. Engine companies are staffed with four personnel for apparatus staffing, and ladder/truck companies and chief officers are staffed with one personnel.

Second Arriving Apparatus

This part of the concentration model is slightly different because it only examines the travel time of a second suppression apparatus. This evaluation does not include a personnel component; however, the arrival of the second suppression unit would typically provide six personnel at the scene.

Benchmark performance objectives for the second arriving suppression unit are provided by NFPA 1710 and CPSE. In as much as NFPA 1710 only addresses the urban setting, the

CPSE Guidelines address the different demographics in Norman. The following table illustrates the performance of the second arriving apparatus.

Table 48: Second Arriving Unit Performance

Structure Fire Calls – 90th Percentile Times			2021 - 2023	CPSE Guidelines	Number of Calls	Percent Met
Travel Time	2nd Suppression Unit	Urban	5:32	6:00	119	92.4%
		Suburban	5:39	8:00	6	83.3%
		Rural	10:02	14:00	29	27.5%

Statistically, these travel times use a small data set and should be viewed skeptically.

The previous table combined three years of calls due to a smaller data set. The table provides two viewpoints. The first viewpoint is the travel time component, wherein the urban zone, the second arriving suppression unit, arrived at the scene in 5 minutes and 32 seconds for 90% of the calls examined. The second viewpoint is the percentage of time the second Unit met the travel time benchmark objective. Of the 119 calls examined in the urban zone, 92.4% met the travel time benchmark objective.

First Alarm Assignment

The following table summarizes the travel time of the first Unit and the remaining first alarm assignment for the Fire Department.

Table 49: First Alarm Assignment Performance

Structure Fire Calls – 90th Percentile Times			2021 - 2023	CPSE Guidelines	Number of Calls	Percent Met
Travel Time	1st Suppression Unit	Urban	5:04	4:00	129	81.4%
		Suburban	4:44	5:00	6	100.0%
		Rural	9:34	10:00	29	96.6%
	Effective Response Force	Urban	12:41	8:00	84	32.0%
		Suburban	16:59	10:00	5	33.3%
		Rural	49:19	14:00	27	5.3%

Statistically, these travel times use a small data set and should be viewed skeptically.

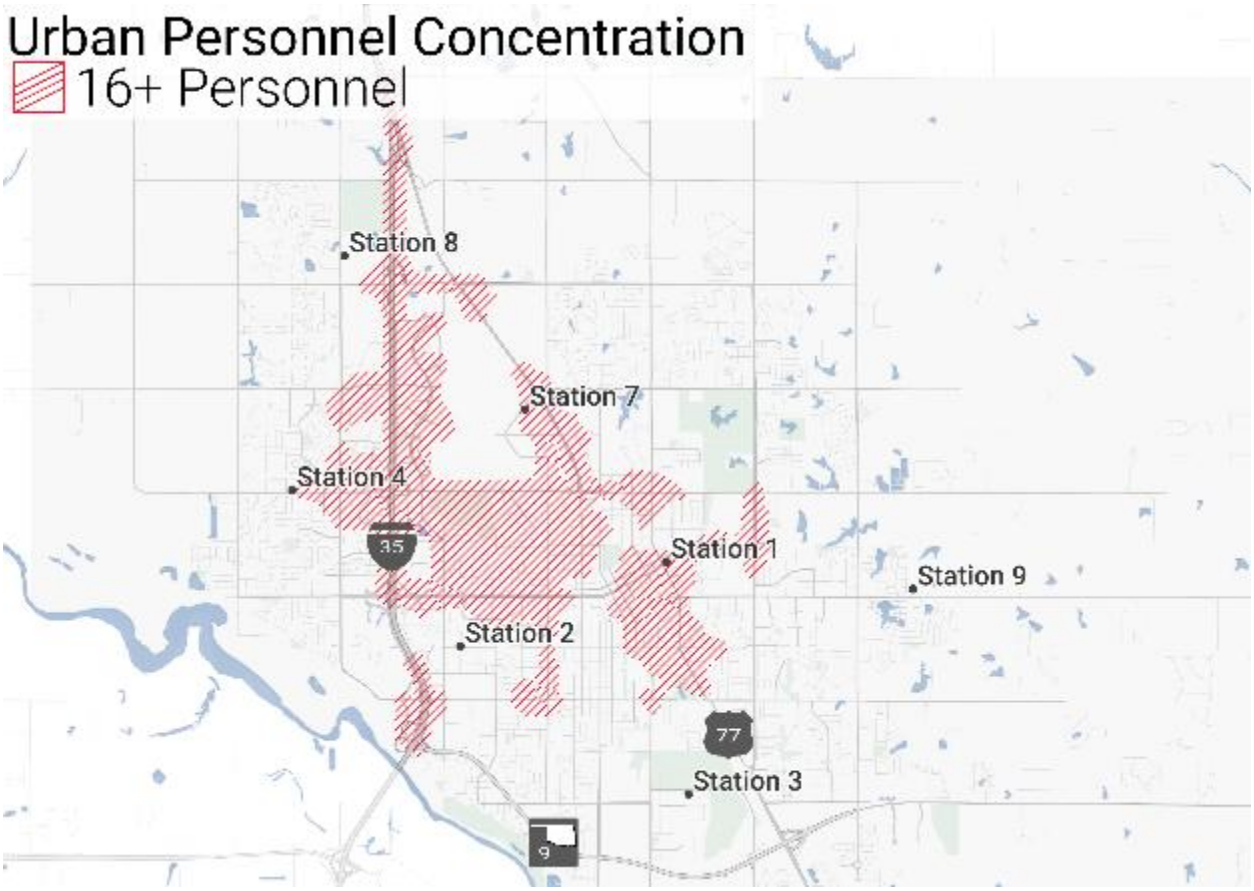
The previous table utilizes 16 personnel as the effective response force for a structural fire using the CPSE Guidelines travel time performance objectives.

The previous table combined three years of calls due to a smaller data set. Two viewpoints are provided in the last table. For the Fire Department, the first arriving Unit was at the scene in 5 minutes and 4 seconds for 90% of the urban calls examined. The second viewpoint illustrates that for the 129 calls evaluated, 81.4% of the calls met the 4-

minute travel time performance objective. The effective response force required a minimum of 16 personnel to arrive at the scene. For the Fire Department, an effective response force arrived at the scene in 12 minutes and 41 seconds for 90% of the urban calls examined, with 32% meeting the 8-minute travel time performance objective.

The following map illustrates an effective response force of 16 personnel that can arrive in 8 minutes of travel time for a structural fire.

Figure 38: Concentration – Eight-Minute Travel Time



The map is based on each station's staffing, assuming all units are responding from the station and are available to respond. Note that the rural area to the east is not shown, as this area cannot meet the 16-personnel effective response force performance objective based on the current staffing model.

With the staffing model for the eastern section of the city and the rural demographic, the following table illustrates the travel time for an effective response force (ERF) of eight personnel in this section.

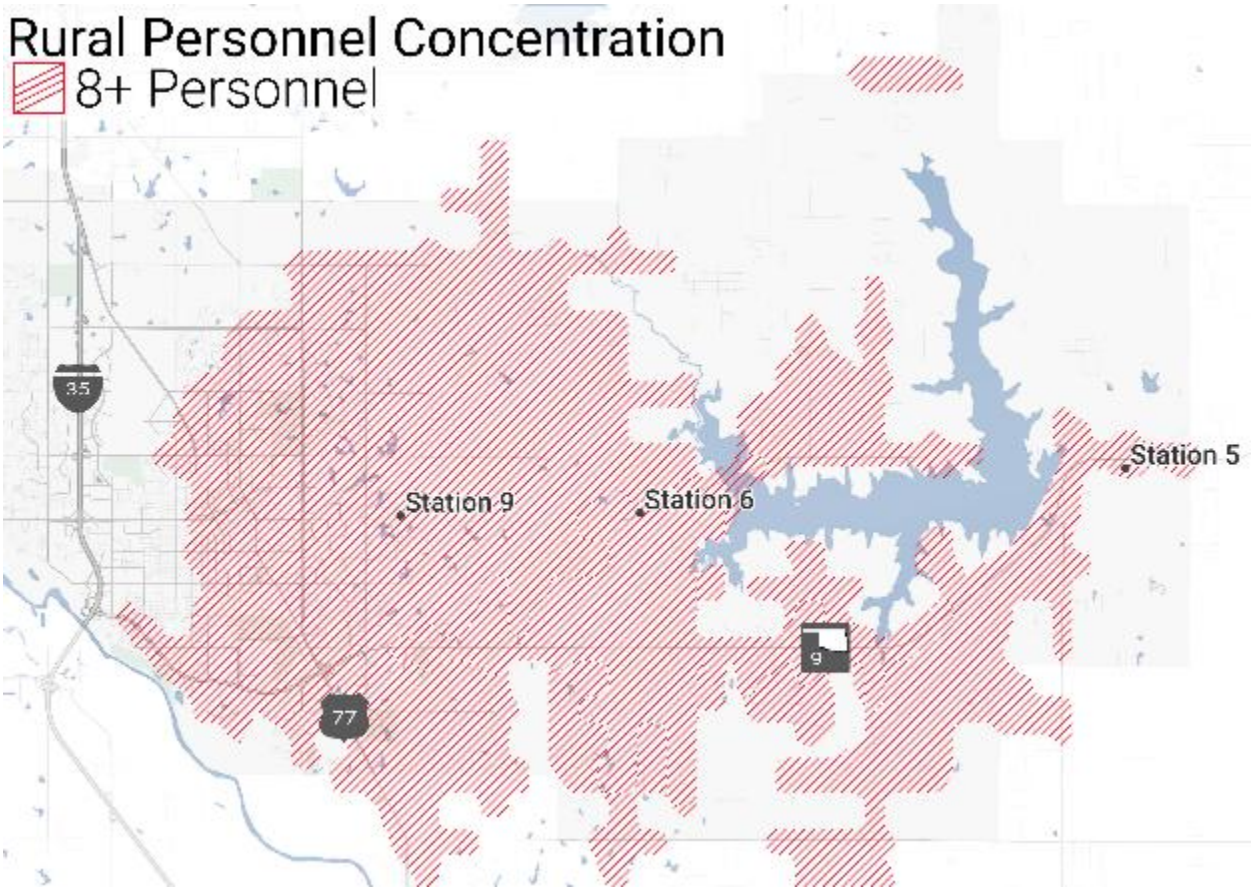
Table 50: Concentration – Rural Zone Performance

Structure Fire Calls – 90th Percentile Times			2021 - 2023	CPSE Guidelines	Number of Calls	Percent Met
Travel Time	Eight Personnel (ERF)	Rural	19:43	14:00	27	64.3%

Statistically, these travel times use a small data set and should be viewed skeptically.

The following map illustrates a response force of eight personnel that can arrive in a 14-minute travel time for a structural fire.

Figure 39: Concentration – Fourteen-Minute Travel Time



It is interesting to note the effect Lake Thunderbird has on the response and development of a response force. Notice the small area to the north end of the lake where a response force of eight personnel can be assembled in the 14-minute travel time.

System Reliability

Other contributing factors, including unit utilization and concurrent calls for service, can influence the concept of distribution and concentration of resources.

Unit Utilization

Unit utilization is another factor in determining whether there is an appropriate emergency services response. Unit utilization is calculated by dividing the total hours the Unit is committed to an incident by the total hours in a year. Expressed as a percentage, it identifies the amount of time the Unit is committed and, more importantly, the amount of time it is available. The available time can impact meeting that standard within the framework of the 80th and 90th percentile performance standards. If utilization rates are too high, the units are often unavailable for immediate response.

In 2016, Henrico County, Virginia, conducted a study of unit utilization. Through their research, they developed a scale to identify the community impact on travel time and availability of their emergency medical units.[5]

Table 51: Unit Utilization Scale

Factor	Indicator	Description
16% to 24%	Ideal Commitment Range	Personnel can maintain training requirements and physical fitness and can consistently achieve response time benchmarks. Units are available to the community more than 75 percent of the day. Units below 0.16 should be evaluated for more efficient use as additional operating capacity is available.
25%	System Stress	Community availability and unit sustainability are not questioned. First-due units are responding to their assigned community 75 percent of the time, and response benchmarks are rarely missed. At this level, agency leaders must understand that commitment factor increases are imminent. The community this Unit serves will begin to see increasingly longer response times as neighboring stations send apparatus during one out of four calls.
26% to 29%	Evaluation Range	In this range, the community served will experience delayed incident responses. Just under 30 percent of the day, first-due ambulances are unavailable; thus, neighboring responders will likely exceed goals. Agency leadership should immediately begin identifying funding sources to provide relief. At this range, commitment factors are only expected to increase.
30% or more	Line in the Sand	Not Sustainable: Commitment Threshold – shows our community has less than a 70 percent chance of timely emergency service and immediate relief is vital. Personnel assigned to units at or exceeding 0.3 may show signs of fatigue and burnout and may be at increased risk of errors. Required training and physical fitness sessions are not consistently completed.

[5] https://www.fireengineering.com/apparatus-equipment/how-busy-is-busy/#gref

The following table illustrates the apparatus's unit utilization for three (3) years.

Table 52: Norman Fire Department Unit Utilization Rates

Unit	2021			2022			2023		
	Duration	Pct. of Time	Avg.	Duration	Pct. of Time	Avg.	Duration	Pct. of Time	Avg.
Engine 1/Brush 1	1284:11:57	14.7%	0:19:55	1171:58:52	13.4%	0:17:22	1126:44:22	12.9%	0:16:17
Engine 9/Tanker 9/Brush 9	1295:41:44	14.8%	0:28:08	1142:18:29	13.0%	0:26:05	1022:34:36	11.7%	0:23:03
Engine 3/Brush 3	1192:37:36	13.6%	0:21:21	1106:45:16	12.6%	0:18:51	987:10:07	11.3%	0:17:54
Engine 2/Brush 2/HM 2	1036:17:44	11.8%	0:22:13	895:13:26	10.2%	0:20:15	866:13:04	9.9%	0:18:55
Squad 7/Rescue 7/Brush 7	885:23:56	10.1%	0:24:39	918:50:53	10.5%	0:23:55	847:26:24	9.7%	0:21:05
Engine 4/Tanker 4/Brush 4	888:06:29	10.1%	0:22:41	745:37:18	8.5%	0:18:43	768:57:51	8.8%	0:19:19
Engine 5/Brush 5	877:11:40	10.0%	1:03:06	773:01:17	8.8%	0:53:48	689:37:35	7.9%	0:48:34
Engine 8/Tanker 8/Brush 8	600:29:26	6.9%	0:27:51	597:59:09	6.8%	0:24:00	600:52:38	6.9%	0:23:07
Engine 6/Brush 6	842:41:59	9.6%	1:08:36	819:51:35	9.4%	0:56:02	572:00:45	6.5%	0:42:19
Ladder 1	195:52:46	2.2%	0:48:22	220:29:43	2.5%	0:52:17	262:58:14	3.0%	0:24:51
Ladder 2	235:32:50	2.7%	0:46:48	213:47:38	2.4%	0:56:31	180:58:21	2.1%	0:44:41

Based on the Henrico Study, no units are over-committed regarding unit hour utilization. Between 2021 and 2023, the utilization rates have decreased.

Concurrent Calls

It is common for a fire protection system to have multiple requests for service occurring simultaneously. The larger the system, the more frequently this will happen. With the appropriate resources, this can be handled efficiently. The following table summarizes the number of concurrent calls for the emergency services system for the past three years.

Table 53: Concurrent Calls

Calls	2021	2022	2023	Total	%
1	5,031	5,325	5,553	15,909	28.2%
2	5,550	5,856	6,120	17,526	31.1%
3	3,777	3,978	3,894	11,649	20.7%
4	1,897	1,968	2,074	5,939	10.5%
5	946	926	895	2,767	4.9%
6	453	419	422	1,294	2.3%
7	214	196	185	595	1.1%
8	111	69	86	266	0.5%
9	56	43	35	134	0.2%
10+	111	76	88	275	0.5%
Total	**18,146**	**18,856**	**19,352**	**56,354**	**100%**

Of the 19,352 calls for service in 2023, there were 6,120 instances where two calls for service occurred simultaneously. Likewise, there were 3,894 instances where three calls were happening simultaneously. Approximately 72% of the calls occurred with multiple calls occurring in the city. Two or three calls can occur simultaneously in different areas of the city, such as one in the far south region and one in the far north region, which may not influence the emergency services system. Another factor that is not captured is the back-to-back calls. For example, Squad 7 could respond to a call in the north section of their response area and clear that call only to receive a second call in the south section. It would not appear as a concurrent call, but it would extend the travel time for the second call. It should also be noted that a single call for service may require a significant number of resources that could impact the delivery of services.

Total Response Time

Previous sections in this chapter reviewed and evaluated the different response time components individually. Call processing and turnout time are two components that are controllable either by the dispatch center or the fire department. Travel time is less controllable as this utilizes a stationary location, a fire station, as the starting point, and the existing roadway network to arrive at the call for service. For this reason, this component is a primary source used for distributing and concentrating resources. The

following table illustrates the response time components for all emergency calls for service and the arrival of the first resource. The table includes response time and total response time for comparison.

Table 54: Total Response Time Performance

All Emergency Calls – 90th Percentile Times			2021 - 2023	2021	2022	2023	CPSE Guidance
Turnout Time	1st Unit	Medical Calls	2:17	2:10	2:19	2:19	1:00
		Fire Calls	2:16	2:08	2:19	2:20	1:20
Travel Time	1st Unit Distribution	Urban Zone	6:35	6:46	6:34	6:26	4:00
		Suburban Zone	6:41	6:29	6:47	6:45	5:00
		Rural Zone	9:27	9:18	9:31	9:30	10:00
Response Time	1st Unit - Distribution	Urban Zone	8:31	8:44	8:30	8:22	6:00
		Suburban Zone	8:20	8:10	8:27	8:20	7:00
		Rural Zone	11:44	11:12	11:45	11:59	12:00

In this table, response time represents the measurement of time from the time the call is dispatched to the initial arrival of resources. It illustrates the performance of the Fire Department as the Fire Department does not have control of the Communications Center. For the past three years, the response time for the first arriving resource has been 8 minutes and 31 seconds for 90% of the calls for service in the urban zone. The response time for the suburban and rural zones is also illustrated.

Deployment Improvement Opportunities

In the previous chapter, several gaps in service levels were illustrated, presenting opportunities to improve the deployment of services. Other factors are related to the changes in the community demographics, growth, and built upon area of the operational area. This chapter provides recommendations intended to improve the deployment of resources in the emergency services system within the operational area.

Performance Objectives

The City of Norman is responsible for determining the level of services to be provided by the fire department as is noted in NFPA 1710 Appendix A. Considerations for the level of service include but are not limited to, the fire department's response, travel time, staffing, emergency calls versus non-emergency calls, roadways, financial resources, and those calls involving different occupancies. Based on these considerations and in consultation with the leadership of the Fire Department, benchmark performance objectives for each demographic are illustrated in the following table.

Table 55: Recommended Norman Fire Department Performance Objectives

Time Component	Time Benchmark	Performance Benchmark
Call Processing	One minute	90% of all emergency calls for service
Turnout Time	1 minute 30 seconds	90% of all emergency calls for service
Travel Time - Distribution of Resources		
Urban Demographic	5 minutes	90% of all emergency calls for service
Suburban Demographic	6 minutes and 30 seconds	90% of all emergency calls for service
Rural Demographic	10 minutes	90% of all emergency calls for service
Travel Time - Concentration of Resources (Effective Response Force/All Resources Arrived)		
Urban Demographic	9 minutes	90% of all emergency calls for service
Suburban Demographic	10 minutes and 30 seconds	90% of all emergency calls for service
Rural Demographic	14 minutes	90% of all emergency calls for service

The performance objectives noted in the previous table will be used in the following sections for improvement opportunities related to the delivery of emergency services by the Fire Department.

Call Processing

As noted previously, The City of Norman Communications Division of the Police Department provides dispatching services for the Norman Fire Department. Call processing is an integral part of the total response time that affects the NFD response. During the analysis, the time stamps for the alarm time and the time dispatched are noted

to be identical. Due to the time stamp issues, a study of call processing time cannot be completed.

Recommendations:

> **Norman should establish a benchmark performance objective for call processing of one minute for 90% of emergency calls.**
>
> **Establish a workgroup with the Communications Center to improve the capture of time stamps for apparatus and data points to effectively measure the response time components.**
>
> **Work with the Communications Center to educate and establish call processing benchmark performance objectives.**
>
> **Ensure the Fire Department and Communications Center personnel communicate correctly to capture the time stamps and effectively measure performance.**

Turnout Time

Several factors, including the station layout, will influence the turnout time for emergency incident responses. Such considerations include stairs, detours to the restroom, policy for signaling enroute, opening the bay doors, policy for gathering response information, and the personal protective gear that must be donned.

Norman does not have a benchmark performance objective for department turnout time. This objective should be established to inform staff about the Fire Department's expectations for their performance, and it is typically outlined in the Standard of Cover document.

Improvement to the turnout time component can take several forms. Some departments have successfully improved turnout times by installing timers in the station at the apparatus bay doors, indicating the time elapsed since the dispatch was received. This allows the crews to see their turnout time performance instantly, and, according to some departments, it has helped to improve their turnout time. Many departments have also encouraged and required the on-duty crews to place their gear at or on the apparatus.

Other remedies include posting turnout times by station and shift. This allows the company officer to see the results and work to improve the turnout time of their units. Some departments have instituted a process to hold the company officer accountable for excessively long turnout times by creating a written report on why the turnout was excessive.

Another option is establishing a standard operating procedure for when a unit is to place itself enroute. For example, one shift will place themselves enroute from the living

quarters while another will place themselves enroute once they are on the truck. Still, another shift may wait until they have cleared the bay doors, all of which will vary the reported turnout time and possibly skew the data related to actual performance. Establishing a procedure will improve the accuracy of the data.

Recommendations

> **Norman should establish a benchmark performance objective for turnout times of one minute and thirty seconds for 90% of emergency calls.**
>
> **Establish standard operating procedure updates to promote improvements in turnout time to emergency calls for service, including a procedure of when to place the apparatus enroute to improve consistency and accuracy of turnout time capturing.**
>
> **Consider adding timers at the bay doors of the fire stations to indicate the time elapsed since the dispatch was received.**

Distribution of Resources

Travel time is the response time component that provides the basis for the distribution of resources and is typically measured using a fixed location, a fire station, to the scene of the call for service.

Planning Zones

In the Community Risk Assessment, the operational area was divided into planning zones loosely following the station response zones and incorporating the population density as a secondary measurement. Based on the population density, each planning zone can be identified as an urban, suburban, or rural area, allowing Norman to tailor the response to each area. The following tables highlight the travel time for the urban, suburban, and rural planning zones.

Table 56: Travel Time by Planning Zone

	2021 - 2023	2021	2022	2023
Urban Zones				
Planning Zone 1	5:40	5:52	5:38	5:27
Planning Zone 2	6:20	6:21	6:29	6:10
Planning Zone 3	7:26	7:39	7:11	7:27
Planning Zone 4	6:33	6:47	6:30	6:19
Planning Zone 7	7:09	7:27	7:12	6:47
Planning Zone 9A	6:29	6:22	6:31	6:34
OU Campus	6:23	6:32	6:17	6:18
Suburban Zone				
Planning Zone 8	6:41	6:29	6:47	6:45
Rural Zones				
Planning Zone 5A	9:36	9:29	9:34	9:48
Planning Zone 5B	8:56	8:27	8:50	9:28
Planning Zone 6A	8:41	8:37	8:43	8:30
Planning Zone 6B	10:01	9:59	10:03	9:57
Planning Zone 9B	9:27	8:28	9:40	9:01

The previous table illustrates the baseline performance within each planning zone. There is one zone that, by definition, is a suburban zone, while all others are defined as urban or rural zones. To customize the response to calls for service, the NFD will need to establish benchmark performance objectives based on the area's demographics. Neither NFPA 1710 nor NFPA 1720 offer any demographic data for their travel time requirements. Previously, the CPSE[6] defined benchmark response times for travel time based on the demographics. They have since determined they are not a standard-making organization and decided to leave the establishment of response time standards to others. However, their body of work is significant and has been used by numerous communities nationwide to determine what benchmark services should be for a community.

The City of Norman is responsible for determining the level of services to be provided by the fire department as is noted in NFPA 1710 Appendix A. Considerations for the level of service include but are not limited to, the fire department's response, travel time, staffing, emergency calls versus non-emergency calls, roadways, financial resources, and those calls involving different occupancies. Based on these considerations and in consultation with the leadership of the Fire Department, the travel time benchmark performance objectives for each demographic are illustrated in the following table.

[6] Fire and Emergency Service Self-Assessment Manual, 8th Edition

Table 57: Travel Time Performance Objectives

Demographic	Travel Time Benchmark	Performance Benchmark
Urban	5 minutes	90% of all emergency calls for service
Suburban	6 minutes and 30 seconds	90% of all emergency calls for service
Rural	10 minutes	90% of all emergency calls for service

The following maps illustrate the travel times highlighted in the previous table for urban and suburban demographics.

Figure 40: Urban Travel Time Map Norman Benchmark

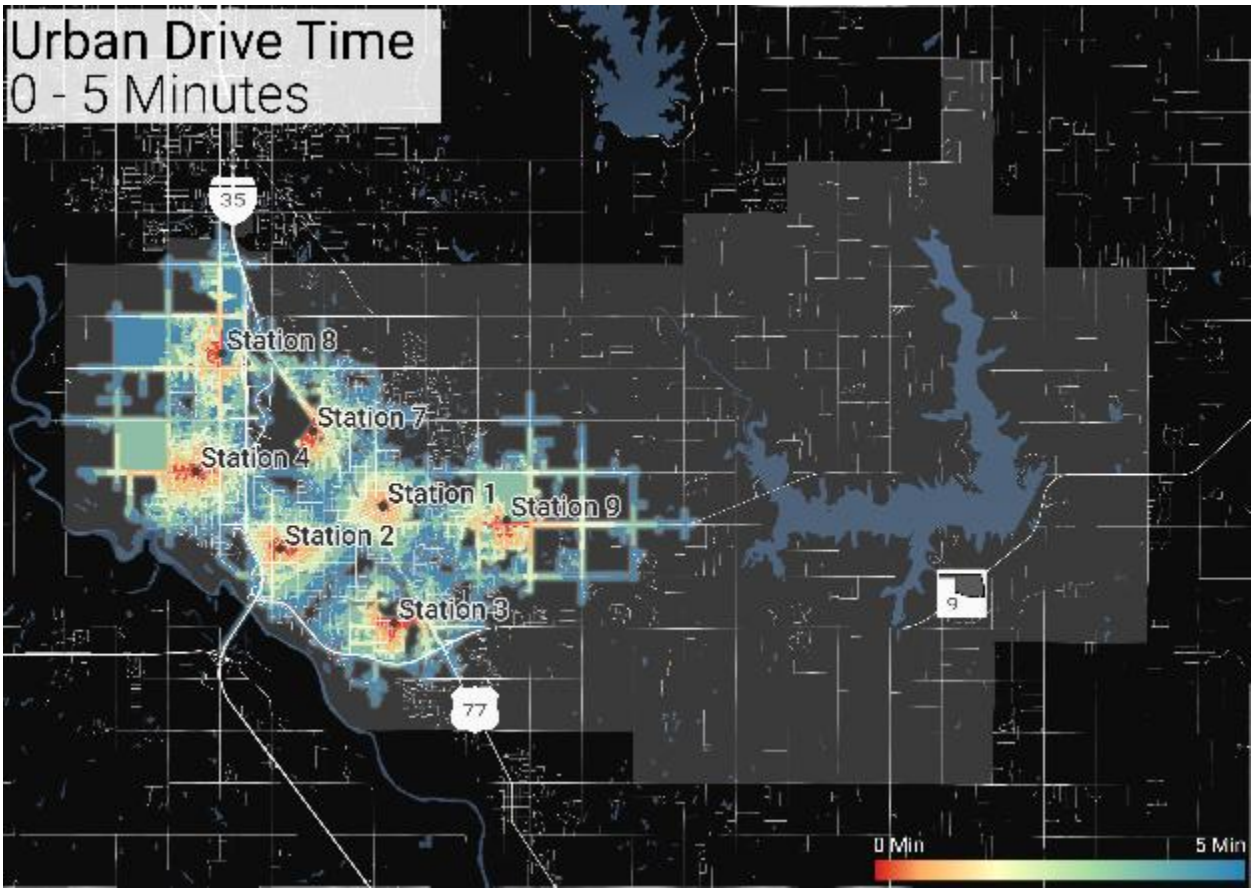
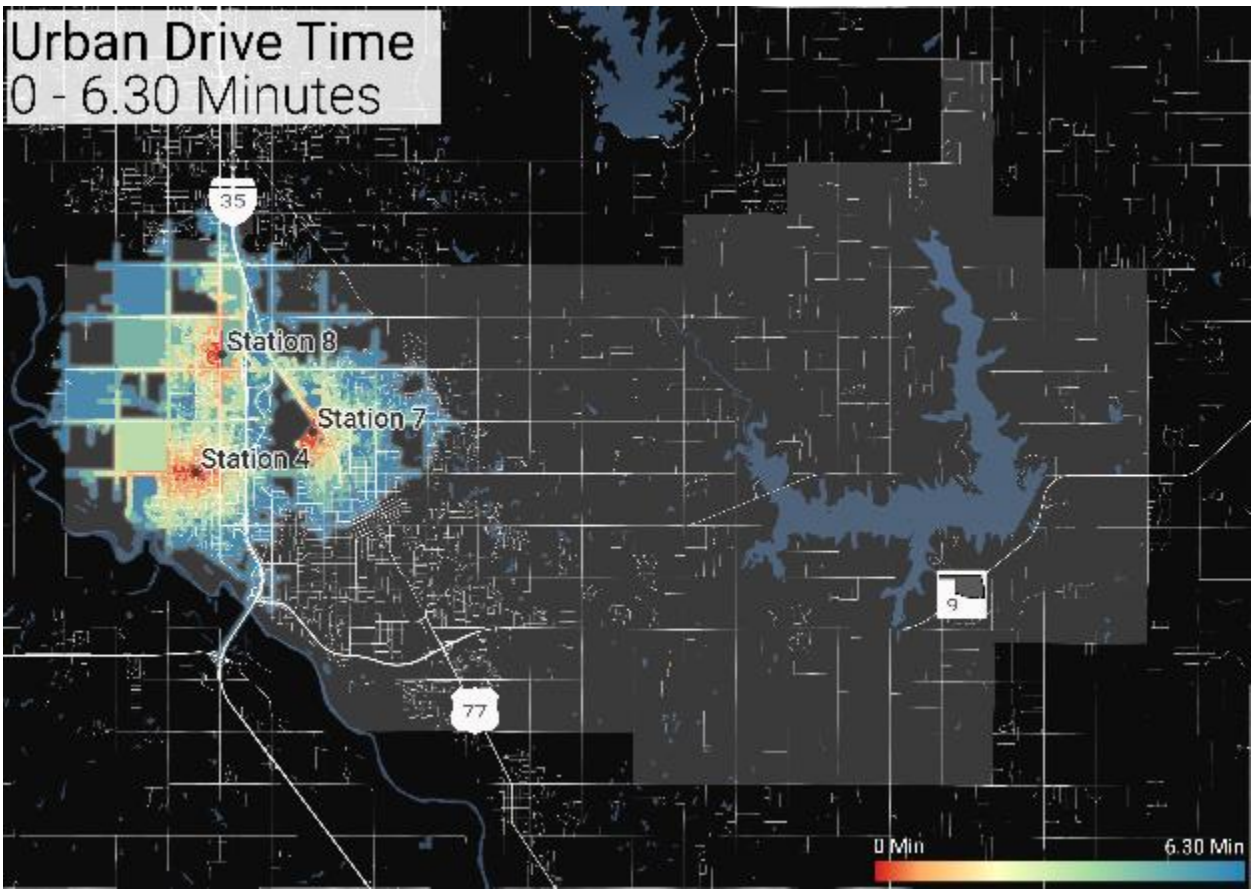


Figure 41: Suburban Travel Time Map Norman Benchmark



The performance objectives noted in the previous table will be used in the following sections for improvement opportunities related to the distribution of resources.

Recommendations

The Norman Fire Department should establish a 5-minute travel time benchmark performance objective for 90% of the emergency calls for service in the urban planning zones.

The Norman Fire Department should establish a 6 minute and 30 second travel time benchmark performance objective for 90% of the emergency calls for service in the suburban planning zone.

The Norman Fire Department should establish a 10-minute travel time benchmark performance objective for 90% of the emergency calls for service in the rural planning zones.

Additional Resources

Two planning zones have longer travel times. Planning Zone 3 is located in the city's southern region, a growing area. Plans are in place for a mixed-use development to include approximately 2,500 residential units. In the past three years, this zone has responded to about 15% of the fire department's total call volume. In the city's southern region, approximately one acre of land has been donated to the city for a fire station.

The mixed-use development is in the beginning stages of construction in the southeastern region of the city. This development covers 760 acres and is scheduled to include about 2,000 housing units with a population of approximately 6,000 residents.[7] OU is also discussing additional development in the area. Other factors will continue to drive growth, the largest of which is the economy. The design, construction, and staffing plan for Fire Station 10 should begin immediately.

The northern region has a similar issue with development. In this area, the development is not a planned mixed-use style development but rather a slower build-out of residential units. The area near Tecumseh Road and 12th Avenue NE is slowly building out of residential units. As this area builds, the population density increases, and the area will transition from rural to suburban demographics and eventually to an urban demographic. A fire station will be necessary as the area continues to develop. For discussion purposes, the intersection of East Tecumseh Road and 24th Avenue NE provides context to the distribution of resources. The design of Station 11 should begin once Station 10 is under construction. With the slower build-out of the area, the trigger for the construction of this station is the completion of Station 10 construction. This will allow the city to plan for a new facility, equipment, and staffing for the fire station.

The third area is further east in the area of Lake Thunderbird. There have been discussions of two new turnpike roadways to be built. The East-West Connector is along the northern regions of the city and is parallel to the East Indian Hills Road. The South Extension begins at the interchange with the East-West Connector near East Indian Hills Road and 84th Avenue NE. This section parallels 84th Avenue SE, connecting to I-35 in the south. The East-West connector from I-44 east to 24th Avenue NE is in the active design stage with some expectation of completion by 2028. The remaining sections of the East-West Connector and the South Extension are still shown as future development.

While the completion of these turnpikes is unknown, long-term planning for their completion should be established. Once the turnpikes are completed, it is highly anticipated the development will follow. Once the development is known, the plans for

[7] https://www.hrgreen.com/projects/norman-residential-development/

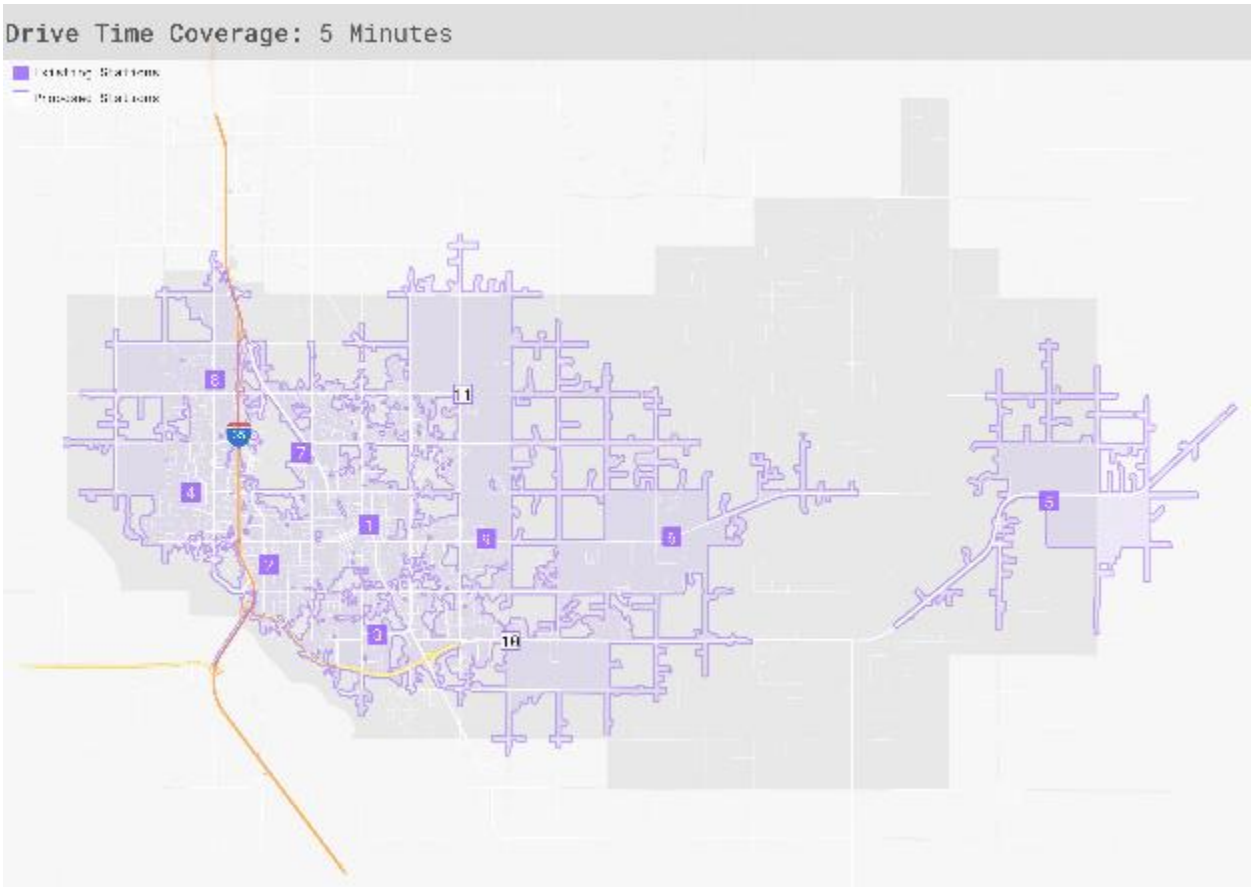
emergency services can be fully developed. Fire Station 12 is included in this plan to begin that process.

Relocating Station 5 would be another improvement, improving the overall coverage around Lake Thunderbird.

The following maps illustrate the improvements to the response system made by relocating Station 5 and constructing Stations 10, 11, and 12 over the next 10 years. Travel time performance is 5 minutes on each map.

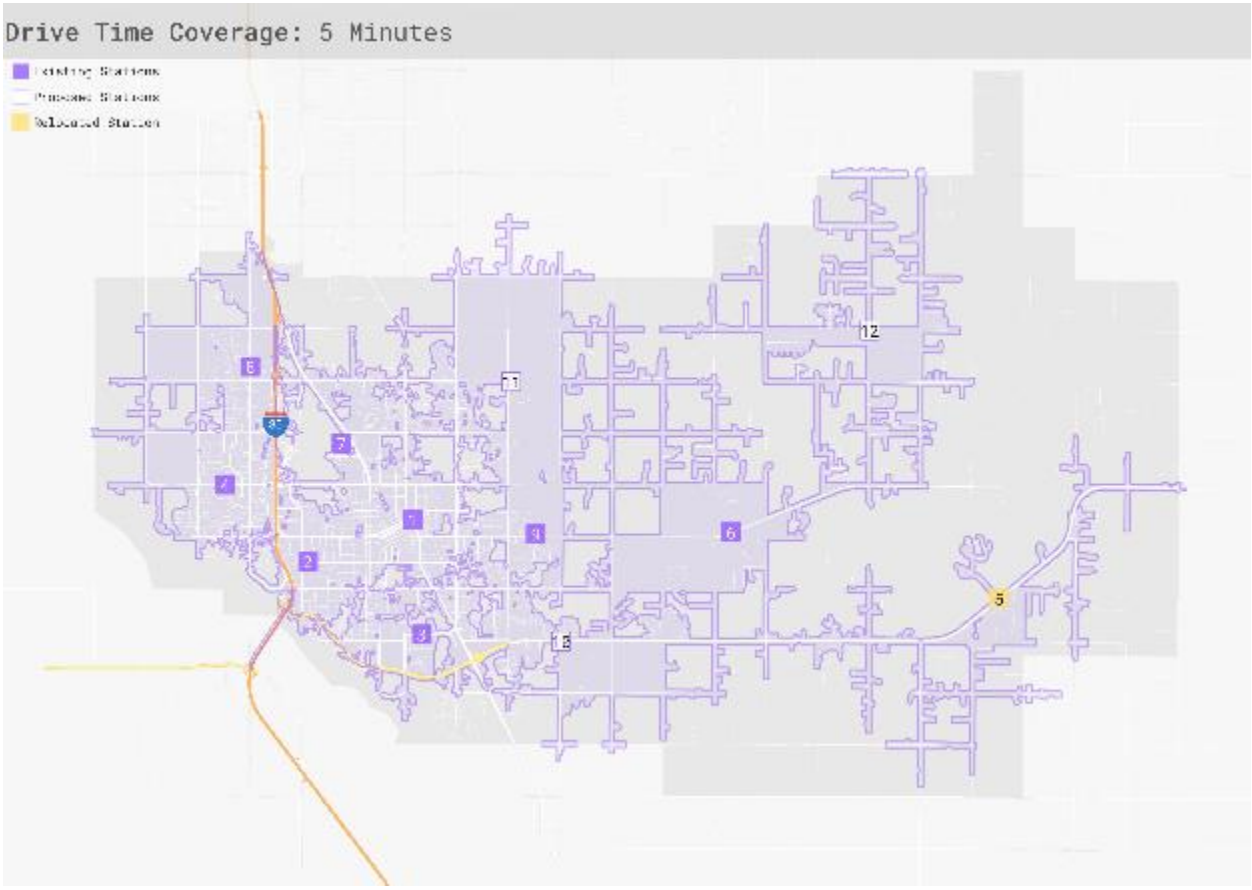
The first map illustrates the travel time coverage upon constructing stations 10 and 11, with Station 5 in its current location.

Figure 42: Travel Time with Stations 10 and 11



The next map illustrates the travel time expectations after completion of Stations 10, 11 and 12 and the proposed relocation of Station 5.

Figure 43: Travel Time with Stations 10, 11, 12, and Proposed Relocation of Station



Recommendations:

- **Begin the design of Station 10 and construct and staff Fire Station 10 in the city's southern region. Staffing should include an Engine Company and a Ladder Company, each scheduled staffing of five (5) personnel and a minimum staffing of four (4) personnel.**
- **Begin planning for the replacement of Station 5 and consider relocating the station north of Hwy. 9 on Clear Bay Avenue to improve travel time performance.**
- **Construct and staff Fire Station 11 in the area of the Tecumseh Road and 24th Avenue intersection the completion of Station 10. Staffing should include an Engine Company with a scheduled staffing of five (5) personnel and a minimum staffing of four (4) personnel.**
- **Monitor the expansion of the East-West Connector and the South Extension Turnpikes and begin planning the addition of Fire Station 12 in the area of 108th NE and Franklin with their completion and the anticipated development. Initial staffing should include an Engine Company staffed with a scheduled staffing of five (5) personnel and a minimum staffing of four (4) personnel.**

Concentration of Resources

The concentration of resources is generally described as the ability of the fire department to get the appropriate number of personnel and resources to the scene of an emergency within a prescribed time to mitigate the incident effectively. This component has two parts: the first is providing an effective response force, and the second is the time needed to get those resources in place.

Planning Zones

As noted in the distribution section, the operational area was divided into planning zones loosely following the station response zones and incorporating the population density as a secondary measurement. Each planning zone can be identified as an urban or suburban area based on the population density, allowing the NFD to tailor the response to each area. Unlike the distribution section, the number of structural fire calls in each planning zone may be very low, and a credible analysis of the individual planning zone may not be provided. This analysis is best when viewed as urban, suburban, and rural areas. The following table highlights the travel time for the arrival of an ERF. To evaluate the travel time, the project team only included calls that met the minimum ERF criteria for a moderate risk structure fire of 16 firefighters (18 if a ladder responds) arriving at the incident in urban (9 minutes) and suburban (10:30) zones and eight personnel in the rural (14 minutes) zones.

Table 58: Effective Response Force Travel Time by Planning Zone

2021 - 2023	Travel Time @ 90%	Number of Calls	Overall Percentage Met
Urban Zones (16 Personnel)			
Planning Zone 1	12:48	22	68.2%
Planning Zone 2	12:25	16	81.3%
Planning Zone 3	12:02	16	68.8%
Planning Zone 4	15:17	7	28.6%
Planning Zone 7	9:41	8	62.5%
Planning Zone 9A	10:12	10	70.0%
OU Campus	10:24	5	60.0%
All Urban Zones	12:41	84	66.7%
Suburban Zone (16 Personnel)			
Planning Zone 8	16:59	5	40.0%
Rural Zones (8 Personnel)			
Planning Zone 5A	13:38	5	80.0%
Planning Zone 5B	21:03	4	0.0%
Planning Zone 6A	13:00	11	100.0%
Planning Zone 6B	20:30	7	42.9%
Planning Zone 9B	0:00	0	0.0%
All Rural Zones	19:43	27	66.7%

The previous table combined three years of calls due to a smaller data set. The number of calls shown for each planning zone is the number of calls the effective response force arrived at the scene. The effective response force required a minimum of 16 personnel to arrive at the scene for urban and suburban planning zones. For example, in Planning Zone 1, an effective response force arrived at the scene in 12 minutes and 48 seconds for 90% of the calls examined, while 68.2% met the nine-minute travel time performance objective for an urban response zone.

The effective response force for the rural areas is eight personnel. In Planning Zone 5A, of the five calls meeting the effective response force criteria, 80% had a travel time of 14 minutes or less.

Staffing Improvements

Based on the previous three years of response data, additional operational staffing is needed to meet the needs of the city. New development and growth of the city, in addition to the Oklahoma University expansion, needs to be considered. The project team recommends a phased approach to the improvements needed for the operational staffing of the Fire Department as there are significant unmet staffing needs currently, and proposed growth will continue to drive the need for additional fire stations and staffing in the future.

To determine the appropriate staffing for the operations division of the Fire Department, the project team developed a relief factor based on the historical leave utilized by staff in operations. The relief factor is a number that accounts for different types of leave, such as vacation, sick leave, or other authorized leave. A relief factor helps guarantee adequate staff are on hand to fill shifts. The following table illustrates the relief factor for the Fire Department.

Table 59: Single Position Relief Factor

2,920.0	Hours for one Firefighter
150.7	Sick Leave
50.9	Injury Leave
11.0	Military Leave
189.0	Vacation Leave
26.0	Other Types of Leave
2,492.4	Hours Available to work
1.2	People to cover 2,920 hours.
3.5	People to cover 24 / 7 / 365

The hours for one firefighter are based on 121.6 shifts at 24 hours per shift, and the leave data is the average of actual data from 2023. This calculation creates a relief factor of 1.2, meaning that 1.2 people will be required to fill one position. For three positions, one for each shift will need 3.5 people to fill the position.

The cost for one position is shown in the following table based on the International Association of Firefighters Local No. 2067 (IAFF2067) agreement dated July 1, 2022, and information from the City of Norman Annual 2023 – 2024 Budget.

Table 60: Firefighter Position Cost

Base Salary	$56,316.00
Payroll Tax Expense	$4,308.17
Worker's Compensation	$563.16
Retirement	$7,884.24
Benefits	$8,447.40
Total Cost per Person	**$77,518.97**

In the previous table, benefits are based on 15% of the salary, Worker's Compensation is based on 1% of the salary, payroll tax is based on 7.65% of the salary, and retirement is based on 14% of the salary.

Effective Response Force Development

The development of an ERF begins with the arrival of the first and second suppression units. OSHA 1910.134(g)(4) states that if entry into an IDLH atmosphere is necessary, two firefighters must enter together and remain in contact with each other. In addition, two firefighters must be located outside the IDLH atmosphere for potential rescue if needed. This is a mandatory requirement unless life is in jeopardy.

In April 2010, the National Institute of Standards and Technology (NIST)[8] completed studies on the effectiveness and efficiencies of various crew sizes. Their work included numerous laboratory tests and actual field tests. The study used the response of three engine companies, a truck company, and a command officer with an aide for the field tests. They measured and timed twenty-two fire ground tasks using different crew sizes. The crews arrived at the scene staggered, much like what is common in communities across the country. The results of their sixty full-scale tests show that four-person crews were, on average, seven minutes faster than two-person crews at accomplishing the fireground tasks. Further, the four-person crews completed their tasks 5.1 minutes faster than the three-person crews. The field tests and tasks were performed using a typical one to two-family dwelling. The study concluded that adding a fifth person to the crews did not significantly impact the time on this type of occupancy. None of the tests performed used a one-person crew as this practice is considered unsafe and not a typical practice of career fire departments.

Skidmore College performed another component of the above-noted study on the physiological effects of crew size. The average peak heart rates for firefighters on the 1st engine were above 80% of age-predicted maximums when only two firefighters were deployed on structural fire scenarios. In fact, the driver had an average peak heart rate of nearly 90% of age-predicted maximums when only two firefighters were on the engine.[9]

The staffing model in Norman has a minimum staffing of four personnel for Engine Companies that allows the Fire Department to meet the OSHA requirement of two in – two out with a single Engine Company. However, the Department cross-staffs several units, splitting the crew across multiple apparatus and frequently leaving remaining apparatus in service with smaller crew sizes. For example, Engine 8 also staffs Tanker 8, Brush 8, and Air and Light 8. Should the tanker and brush unit be needed, the crew splits between them, essentially becoming a tandem apparatus response on a brush fire. If just the air truck is needed, the remaining personnel would staff any apparatus required on a

[8] Robertson, Bill. Report on Residential Fireground Field Experiments. National Institute of Standards and Technology. April 2010.

[9] Smith, Denise, Ph. D and Benedict, Ron. Effect of Deployment of Resources on Cardiovascular Strain of Firefighters. April 2010.

subsequent emergency call, resulting in a reduced response in terms of personnel responding. While cross-staffing is a common practice in the fire service, it is typically done to ensure the most appropriate vehicle can respond to an emergency. For example, an engine company cross staffing a ladder or rescue unit where all assigned personnel respond on the specialty apparatus needed. It is important to understand the response challenges faced with the tandem apparatus response practice currently used by NFD. This practice also leaves the engine and air and light vehicle unstaffed, which causes both turnout time and travel time delays if an engine response is needed concurrently due to another emergency call in the response area. For this reason, an additional position is recommended at stations 8 and 9 to serve as a driver for the tender and brush units and ensure there are still a minimum of 3 personnel for any concurrent responses on other apparatus. This will require a daily minimum staffing of five (5) personnel at these stations.

The staffing model used for Engine Companies does not carry through to the Ladder Companies that are staffed by one firefighter. The staffing model for Ladder Companies presents several challenges. First, the Ladder Company cannot operate as a single unit response with only one firefighter; it must respond in a tandem apparatus response. This limits the use of the Ladder Company for other calls for service. The second issue is the operation of the apparatus itself; many aerial apparatuses require several simultaneous operations, beyond just the ladder operator, to perform the required fireground activities associated with the ladder company (rescue, fire suppression, ventilation, salvage and overhaul, etc.). In this instance, personnel from other apparatus will be required to assist in aerial operations, taking those personnel from other tasks. Finally, it is a risk to the city and firefighters' safety when operating an aerial apparatus with one firefighter. As noted in the Skidmore study, there is an increased heart rate with two personnel deployed, let alone with one firefighter. This practice increases liability to the City of Norman and reduces the effectiveness and safety of the aerial response.

The project team recommends that the staffing model for aerial ladders should be the same as that used for Engine Companies. Ladder Companies should be staffed with a minimum of four (4) firefighters per shift. Using a phased approach to the improvements, the minimum staffing of the two Ladder Companies should be increased to a minimum of four (4) personnel. Based on a relief factor of 1.2 people to cover one shift, it will require the addition of 24 personnel to the operations of the Fire Department.

Table 61: Additional Ladder Company Staffing

2,920.0	Hours for one Firefighter
150.7	Sick Leave
50.9	Injury Leave
11.0	Military Leave
189.0	Vacation Leave
26.0	Other Types of Leave
2,492.4	Hours Available to work
1.2	People to cover 2,920 hours.
3.5	People to cover 24 / 7 / 365
Additional Personnel for Ladder Companies	
3	Number of Shifts to Cover
6	Additional Minimum Manning per Shift
12	People to cover - 24 / 7 / 365
24	Increased Department Shift Staffing

As illustrated, an additional 24 personnel will be required to staff the two Ladder Companies with a minimum of four (4) personnel daily.

Increasing the minimum staffing to four (4) personnel on the two Ladder Companies improves the arrival of an effective response force and firefighter safety. The following table illustrates the improvement.

Demographic	**Travel Time**	**Number of Calls**	**Percentage Met**
Existing Staffing Model			
All Urban Zones	12:41	84	66.7%
Suburban Zone	16:59	5	40.0%
All Rural Zones	19:43	27	66.7%
With Additional Staffing (4 personnel on Ladder Companies)			
All Urban Zones	9:04	105	86.5%
Suburban Zone	10:46	5	40.0%
All Rural Zones	19:43	27	66.7%

Using the same structure fire calls and adjusting the staffing for the Ladder Companies to four (4) personnel, there is an expected 23% improvement in the urban travel time, reducing it by almost three minutes. In the suburban zone, there is a six-minute reduction in travel time.

To allow the city to plan for the increase in cost and staffing, the increased staffing is phased in over two (2) years. The first year would take the minimum staffing to three (3) personnel; in year two, the minimum staffing would increase to five (5) to include the relief position.

Recommendation

Increase the minimum staffing of stations 8 and 9 by one personnel on each shift in the next three (3) years to a minimum daily staffing of five (5) to ensure adequate staffing for a position as a driver of the tender and brush units.

Increase the minimum staffing of the two Ladder Companies from one personnel to four personnel over two years for a total of 24 additional personnel.

Rescue Company

As noted previously, cross-staffing of apparatus is common in the fire service and in Norman. Most of the time, this is advantageous as specialized apparatuses are not always needed. In Norman, cross-staffing water tenders and brush trucks is a common practice. Station 7 houses a squad and a rescue that are cross staffed. The Rescue Company contains specialized equipment for various rescue scenarios, including technical rescue incidents such as trench rescue, water rescue, and extrication. The response matrix utilized by the NFD assigns this unit to certain types of calls, including rescue scenarios and structure fires. However, with the cross-staffing of this unit with Squad 7, it is not always available.

Staffing this unit would allow the equipment to be readily available and not rely on Squad 7's staff, which may or may not be available to respond. Adding staffing to this unit would allow Rescue 7 to respond to structure fires and become the designated Rapid Invention Team (RIT) to satisfy the OSHA 1910.134(g)(4) requirement of two-in, two-out with personnel entering an IDLH atmosphere. Additionally, the personnel could be used to provide support services at a structure fire, such as utility control.

In keeping with the staffing model for engine companies, the rescue company should be staffed with a minimum of four (4) firefighters per shift. Using a phased approach to the improvements, the minimum staffing of the Rescue Company should be increased to a minimum of three (3) personnel. Based on a relief factor of 1.2 people to cover one shift, the fire department's operations will require the addition of 12 personnel.

Table 62: Rescue Company Staffing

2,920.0	Hours for one Firefighter
150.7	Sick Leave
50.9	Injury Leave
11.0	Military Leave
189.0	Vacation Leave
26.0	Other Types of Leave
2,492.4	Hours Available to work
1.2	People to cover 2,920 hours.
3.5	People to cover 24 / 7 / 365
Additional Personnel for Rescue Company	
3	Number of Shifts to Cover
4	Additional Minimum Manning per Shift
11	People to cover - 24 / 7 / 365
12	Department Shift Staffing

As illustrated, an additional 12 personnel will be required to staff the Rescue Company with a minimum of three (3) personnel.

- Once the Rescue Company is fully staffed, relocate the Rescue to Station 2.

Recommendations

Staff the Rescue Company with a scheduled staffing of four (4) personnel and a minimum of three (3) personnel beginning in year three (3) of the staffing plan by adding personnel over a three (3) year period.

University of Oklahoma

Throughout this review, concerns have been expressed relative to the University of Oklahoma (OU) football season and the transition to the Southeastern Conference (SEC). With the transition to the SEC, there is anticipation that the crowds at the home football games will be larger, and the tailgating before the game will also become more expansive. In fact, OU has expanded the tailgating areas on campus at Boyd Lawn, Asp Avenue, and near the Oklahoma Memorial Union. The following table illustrates the responses to calls for service during home football games using the planning zones outlined in the risk assessment.

Table 63: OU Football Calls for Service

Planning Zone	2021	2022	2023	Total
OU Zone	60	45	42	147
Zones 1, 2, & 3	209	197	155	561
Total Calls	**269**	**242**	**197**	**708**
*** The totals do not include Bike Team deployment**				

The calls illustrated are those calls that occurred on home game days. The OU Zone is those calls that happened on the campus, and Zones 1, 2, and 3 are the three zones that border the OU Campus. About 21% of the calls occurred on the campus for the three years and the remaining 79% occurred around the campus. About 39% of the calls on the OU Campus were medical calls, and 35% were dispatched and canceled. In Zones 1, 2, and 3, about 56% were medical calls, and 18% were dispatched and canceled. Another point of view is the hour of the day these calls occur, as illustrated in the following table.

Table 64: OU Football Calls by Hour of the Day

Hour	OU Zone	Zones 1, 2, & 3
0	7	17
1	10	20
2	11	15
3	3	15
4	1	13
5	2	16
6	3	15
7	1	20
8	5	17
9	2	27
10	3	19
11	3	28
12	5	30
13	7	31
14	5	32
15	11	40
16	7	27
17	16	30
18	11	24
19	5	21
20	7	28
21	2	37
22	7	20
23	13	19
Total	**147**	**561**

On campus, the calls are heaviest in the very early hours of the morning and then later in the afternoon. Outside the campus, the calls are heaviest in the late afternoon. With the game predominately in the afternoon, the heavier calls occur presumably after the game. The following table illustrates the travel time at the 90th percentile for the planning zones on football game day and non-football game day.

Table 65: OU Football Game Day Travel Time 2021 - 2023

Planning Zone	Football Game Day	Non-Football Game Day
OU Zone	6:12	6:24
Zones 1, 2, & 3	6:05	6:31

As illustrated, there has been little difference between game day and non-game day travel time for the past three years.

Based on the historical data available, there is not enough workload or impact on the response system to warrant additional staffing or units during game day activities. The issue related to effective game day staffing is the current strain on the Department due to the current staffing levels and a low interest in personnel to work overtime on game days. With the change from the Big 12 Conference to the Southeastern Conference, there is an expected increase in attendance and related activities on game days. The previously outlined data points should be monitored to note any significant changes and address those changes as the season progresses and allow proper planning for the 2025 football season.

Max Westheimer Airport

A secondary concern is the Max Westheimer Airport owned and operated by the University of Oklahoma. The concerns surround the expanded airport use with the move to SEC. The airport is classified by the Oklahoma Aeronautics Commission as a Regional Business Airport and is designated by the Federal Aviation Administration (FAA) as a General Aviation Reliever Airport for Will Rogers World Airport in Oklahoma City.

The FAA mandates Aircraft Rescue and Fire Fighting (ARFF) operations at all airports that serve scheduled passenger air carriers. There is no mandate for general aviation airports like the Max Westheimer Airport. The type of operations that primarily determine the need for ARFF services at general aviation airports include factors such as:

- **Aircraft Size and Weight:** Larger and heavier aircraft pose more significant emergency risks. ARFF services are more critical for airports handling larger planes.

- **Fuel Type:** Aircraft using fuels like jet fuel or aviation gasoline have different fire risks. ARFF services are essential for airports with such aircraft.
- **Frequency of Operations:** Airports with frequent takeoffs, landings, and aircraft movements may require ARFF services to handle emergencies promptly.

According to the latest information, the airport has 120 aircraft, including single-engine, multi-engine, jets, and helicopters. The airport reports about 50,000 operations a year, an average of about 137 per day. A landing and a takeoff are considered operations, meaning a touch-and-go would be two operations. While there are no commercial flights into the airport, there are corporate flights with up to ten passengers, depending on the aircraft.

Since 1964, there have been 20 FAA-reported incidents, which is about one every three years. Three of those incidents were fatal.[10] The airport property includes NFD Fire Station 7, which has access to the airfield through a gate located across the street from the station. While there is no requirement for ARFF services at the airport, there is a considerable amount of activity from OU and the training classes that are being conducted at the facility.

Recommendations

Provide additional aircraft crash training for emergency response personnel.

Consider adding foam delivery capabilities to the existing or future apparatus at Station 7.

[10] https://www.ntsb.gov/Pages/ResultsV2.aspx?queryId=513e0308-b698-40cc-b9aa-ee6a45b728b4

Performance Objectives

There are two types of performance statements. The benchmark performance statement identifies the goal or target for the delivery of emergency services. The baseline performance statement identifies the actual performance of the fire department. The difference, or gap, between the two provides the fire department with a measurable objective for improvement.

For purposes of evaluation and analysis, the following times are recommended to be used in establishing the performance benchmark objectives for the NFD as recommended by the project team:

Call Processing – 60 seconds 90%.

Turnout Time – 1 minute for EMS calls 90%.

Turnout Time - 1 minute and 30 seconds for emergency fire calls for service 90%.

Travel Time Urban Zone (first arriving) – 5 minutes 90%.

Travel Time Suburban Zone (first arriving) – 6 minutes and 30 seconds 90%.

Travel Time Rural Zone (first arriving) – 10 minutes 90%.

Travel Time Urban Zone (ERF) – 9 minutes 90%.

Travel Time Suburban Zone (ERF) – 10 minutes and 30 seconds 90%.

Travel Time Rural Zone (ERF) - 14 minutes 90%.

Due to the lack of data to evaluate call processing, all response times in the following benchmark performance objective evaluation include call processing times as the data was embedded in either turnout or travel times but is included in the overall travel time performance.

Emergency Medical Services

Benchmark Performance Objectives

The benchmark (goal) performance of the NFD is that for 90 percent of all urgent emergency medical incidents located in the urban zone, the total response time for the arrival of the first Unit on scene, staffed with three firefighter/EMTs and an officer, shall be: 7 minutes. The first arriving Unit shall be capable of maintaining scene safety, establishing command, evaluating the need for additional resources, conducting initial patient assessment, and initiating basic life support care.

For 90 percent of all urgent emergency medical incidents located in the suburban zone, the total response time for the arrival of the first Unit on scene, staffed with three firefighter/EMTs and an officer, shall be: 8 minutes 30 seconds. The first arriving Unit shall be capable of maintaining scene safety, establishing command, evaluating the need for additional resources, conducting initial patient assessment, and initiating basic life support care.

For 90 percent of all urgent emergency medical incidents located in the rural zone, the total response time for the arrival of the first Unit on scene, staffed with three firefighter/EMTs and an officer, shall be: 12 minutes. The first arriving Unit shall be capable of maintaining scene safety, establishing command, evaluating the need for additional resources, conducting initial patient assessment, and initiating basic life support care.

Baseline Performance Objectives

The baseline (acceptable/current) performance objective is for 90 percent of all urgent emergency medical incidents located in the urban zone, the total response time for the arrival of the first Unit on scene, staffed with three firefighter/EMTs and an officer, is: 8 minutes. The first arriving Unit is capable of: maintaining scene safety, establishing command, evaluating the need for additional resources, conducting initial patient assessment, and initiating basic life support care.

For 90 percent of all urgent emergency medical incidents located in the suburban zone, the total response time for the arrival of the first Unit on scene, staffed with three firefighter/EMTs and an officer, is: 7 minutes and 54 seconds. The first arriving Unit is capable of: maintaining scene safety, establishing command, evaluating the need for additional resources, conducting initial patient assessment, and initiating basic life support care.

For 90 percent of all urgent emergency medical incidents located in the rural zone, the total response time for the arrival of the first Unit on scene, staffed with three firefighter/EMTs and an officer, is: 11 minutes and 27 seconds. The first arriving Unit is capable of: maintaining scene safety, establishing command, evaluating the need for additional resources, conducting initial patient assessment, and initiating basic life support care.

Performance Comparison

The following table illustrates the performance of the Fire Department from 2021 to 2023 compared to the performance benchmark objectives.

Emergency Medical Calls – 90th Percentile Times Total Response Time 2021 – 2023		Performance Benchmark	Performance Baseline	Performance Gap	Number of Calls
First Arriving Unit	Urban	7:00	8:00	1:00	26,391
	Suburban	8:30	7:54	0:36	1,995
	Rural	12:00	11:27	0:33	2,072

The performance gap noted in the previous table represents the difference between the benchmark and the baseline performance. The time in red is the time over the benchmark, and the green highlighted time represents the time under the benchmark performance. The Fire Department does not provide transport to a medical facility; additional resources are needed for this function and are not in control of the Fire Department. For emergency medical calls, the first arriving Unit also represents the effective response force from the Fire Department.

Fire Suppression Services

Benchmark Performance Objectives

For 90 percent of all urgent moderate-risk structure fire incidents located in the urban response zone, the response time for the arrival of the first Unit on scene, staffed with three firefighter/EMTs and an officer, shall be: 7 minutes and 30 seconds. The first-in Unit shall be capable of: conducting an incident size-up, establishing command, requesting additional resources, assigning incoming resources, securing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity, and initiating rescue or fire attack.

For 90 percent of all urgent moderate-risk structure fire incidents located in the suburban response zone, the total response time for the arrival of the first Unit on scene, staffed with three firefighter/EMTs and an officer, shall be: 9 minutes. The first-in Unit shall be capable of: conducting an incident size-up, establishing command, requesting additional resources, assigning incoming resources, securing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity, and initiating rescue or fire attack.

For 90 percent of all urgent moderate-risk structure fire incidents located in the rural response zone, the response time for the arrival of the first Unit on scene, staffed with three firefighter/EMTs and an officer, shall be: 12 minutes and 30 seconds. The first-in Unit shall be capable of: conducting an incident size-up, establishing command, requesting additional resources, assigning incoming resources, securing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity, and initiating rescue or fire attack.

For 90 percent of all urgent moderate-risk structure fire incidents in the urban zone, the response time for the arrival of the effective response force (ERF) of 16 personnel shall be: 11 minutes and 30 seconds. The ERF shall be capable of providing 4,500 gpm pumping capability, advancing an attack line and a backup line for fire control, establishing a rapid intervention crew, completing forcible entry, searching and removing victims from harm, providing medical care for the injured, ventilating the structure, securing utilities, and performing salvage/overhaul.

For 90 percent of all urgent moderate-risk structure fire incidents in the suburban zone, the response time for the arrival of the effective response force (ERF) of 16 personnel shall be: 13 minutes. The ERF shall be capable of providing 4,500 gpm pumping capability, advancing an attack line and a backup line for fire control, establishing a rapid intervention crew, completing forcible entry, searching and removing victims from harm, providing medical care for the injured, ventilating the structure, securing utilities, and performing salvage/overhaul.

For 90 percent of all urgent moderate-risk structure fire incidents in the rural zone, the response time for the arrival of the effective response force (ERF) of 16 personnel shall be: 16 minutes and 30 seconds. The ERF shall be capable of providing 4,500 gpm pumping capability, advancing an attack line and a backup line for fire control, establishing a rapid intervention crew, completing forcible entry, searching and removing victims from harm, providing medical care for the injured, ventilating the structure, securing utilities, and performing salvage/overhaul.

Baseline Performance Objectives

For 90% of all urgent moderate-risk structure fire incidents located in the urban response zone, the response time for the arrival of the first Unit on scene, staffed with three firefighter/EMTs and an officer, is: 8 minutes and 5 seconds. The first-in Unit is capable of: conducting an incident size-up, establishing command, requesting additional resources, assigning incoming resources, securing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity, and initiating rescue or fire attack.

For 90% of all urgent moderate-risk structure fire incidents in the urban zone, the response time for the arrival of the effective response force (ERF) of 16 personnel is: 14 minutes and 50 seconds. The ERF can provide 4,500 gpm pumping capability, advancing an attack line and a backup line for fire control, establishing a rapid intervention crew, completing forcible entry, searching and removing victims from harm, providing medical care for the injured, ventilating the structure, securing utilities, and performing salvage/overhaul.

For 90% of all urgent moderate-risk structure fire incidents located in a suburban response zone, the response time for the arrival of the first unit on scene, staffed with three firefighter/EMTs and an officer, is: 7 minutes and 8 seconds. The first-in unit is capable of: conducting an incident size-up, establishing command, requesting additional resources, assigning incoming resources, securing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity, and initiating rescue or fire attack.

For 90 percent of all urgent moderate-risk structure fire incidents in the suburban zone, the response time for the arrival of the effective response force (ERF) of 16 personnel is: 19 minutes and 27 seconds. The ERF can provide 4,500 gpm pumping capability, advancing an attack line and a backup line for fire control, establishing a rapid intervention crew, completing forcible entry, searching and removing victims from harm, providing medical care for the injured, ventilating the structure, securing utilities, and performing salvage/overhaul.

For 90 percent of all urgent moderate-risk structure fire incidents located in the rural response zone, the response time for the arrival of the first Unit on the scene, staffed with three firefighter/EMTs and an officer, is: 14 minutes and 12 seconds. The first-in Unit is capable of: conducting an incident size-up, establishing command, requesting additional resources, assigning incoming resources, securing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity, and initiating rescue or fire attack.

For 90 percent of all urgent moderate-risk structure fire incidents in the rural zone, the response time for the arrival of the effective response force (ERF) of 16 personnel is: 25 minutes and 43 seconds. The ERF can provide 4,500 gpm pumping capability, advancing an attack line and a backup line for fire control, establishing a rapid intervention crew, completing forcible entry, searching and removing victims from harm, providing medical care for the injured, ventilating the structure, securing utilities, and performing salvage/overhaul.

Performance Comparison

The following table illustrates the performance of the Fire Department from 2021 to 2022 compared to the performance benchmark objective.

Moderate Risk Structure Fire Calls – 90th Percentile Times Total Response Time 2021 – 2023		Performance Benchmark	Performance Baseline	Performance Gap	Number of Calls
First Arriving Unit	Urban	7:30	8:05	0:35	129
Effective Response Force	Urban	11:30	14:50	3:20	84
First Arriving Unit	Suburban	9:00	7:08	1:52	6
Effective Response Force	Suburban	13:00	19:27	6:27	5
First Arriving Unit	Rural	12:30	14:12	1:42	29
Effective Response Force	Rural	16:30	25:43	9:23	5

The performance gap noted in the previous table represents the difference between the benchmark and the baseline performance. The time highlighted in red is the time over the benchmark, and the time highlighted in green represents the time under the benchmark performance.

Essential Services

The primary purpose of the Norman Fire Department is to respond to and mitigate fire and medical emergencies within the city. Various other functions and responsibilities, such as fire prevention, investigation, and training, are assigned to the fire department to support the response capabilities. Historically, the fire service has been tasked only with fire suppression; however, in the past few decades, changes have entailed a fire protection system to provide service to the community.

Fire Prevention

Fire prevention and loss control are the first defense against unwanted fires. The goal of any fire prevention program is to prevent fires from occurring, prevent the loss of life, reduce the severity of a fire if one does happen, and enable the fire suppression forces to perform their tasks more effectively in the event of a fire. These goals are accomplished through pre-planning before construction, building inspections during and after construction, public education activities, and community risk reduction efforts specific to the risks present in a community.

Plan Review and New Construction

Plan reviews are conducted to ensure buildings are designed within fire safety regulations, and construction inspections are designed to ensure buildings, including additions, remodels, and new construction, are built according to the plans. The following table illustrates the staffing needs for the plan review and new construction function.

Table 66: Plan Review and New Construction Staffing Factor

Plan Reviews	Three Year Average	Target per Staff	Staff Needed
Plan Review	531	200	2.7
Fire Protection Reviews	104	200	0.5
New Construction Inspections	522	750	0.7
Total Plan Review Activities	**1,198**		**3.9**

The previous table utilizes the average number of plan reviews for the past three years. Using a target of 200 plan reviews annually for building and fire protection system plan reviews. Some new construction inspection types will require several individual inspections during the construction process for a single project. For example, a sprinkler system inspection typically requires a minimum of one rough-in inspection and a final acceptance test inspection that will take several hours to complete. Larger projects will take two rough-in inspections. This calculation uses a target of 750 new construction inspections annually. The planning officer also assists with public safety training,

occupancy updates, code complaints, public relations, the drone program, and the Knox box program and attends pre-development, pre-planning, and building condemnation meetings. These ancillary duties were factored into the target per staff calculations above. The current workload will require four (4) personnel to complete the required workloads in a timely manner. With the fluctuations in the workload and type of work, all the positions are cross trained to be able to fill in the gaps when they occur.

Fire and Life Safety Inspections

Fire and life safety inspections are those inspections that occur with an existing business or occupancy. By design, these inspections ensure the building systems remain operational as designed and the business processes comply with current codes and regulations. The following table illustrates the staffing needs for the fire and life safety inspection function.

Table 67: Fire and Life Safety Staffing Factor

Inspection Type/Activity	2023	Target per Staff	Staff Needed
Annual (Legacy) Inspection	1,449	500	1.9
Follow Up Inspection	362	1,000	0.4
Complaint	50	750	0.1
Special Event Safety Inspections	25	750	0.0
Fire Investigations	129	50	2.6
Inspection Activity Total	**1,881**	**600**	**5.0**

The previous table illustrates the workload for fire and life safety inspectors/investigators in 2023. It also includes follow-up inspections, fire investigations, and other inspection activities related to code violations, special events, and complaints. As illustrated, there is a sufficient workload to justify five (5) full-time inspectors/investigators in the Department.

The number of inspections completed for the past year is the data used to determine the staffing needed for the fire and life safety inspections. This may not necessarily be the number of occupancies and buildings required to be inspected. Currently, there are approximately 3,041 inspectable properties in the City of Norman. Another factor is the frequency of inspections occurring for different occupancies. The Fire Department has not developed a frequency schedule for inspections, but best practices recommend that occupancy risk drive the inspection frequency. The following table illustrates an example of the frequency of inspections recommended based on the occupancy risk.

Table 68: Fire Safety Inspection Frequency

Occupancy Risk	Example	Frequency
Mandatory	State Mandated Occupancies	Annual
High	Nursing Home, Place of Assembly, hospitals	Annual
Moderate	Stores or Shops	Biennial
Low	Offices	Triennial
Critical Infrastructure	City Hall, Fire Stations, Police Stations	Determined by AHJ

Recommendations

Establish a policy for the frequency of fire safety inspections based on the occupancy risk.

The Department should establish a target for the inspection, investigation, and other workload conducted by Fire and Life Safety Personnel and develop a staffing plan to ensure the inspections and other required services are completed on a timely basis.

Add a plan reviewer and three inspectors based on recommended workload targets for plan reviews, inspections, and fire investigations to ensure the workload targets are completed on a timely basis and continue to monitor the workload of Fire and Life Safety.

Add a full-time administrative support position to support the administrative needs of the Fire Prevention Division

Training and Education

A training division is a significant function in a fire department as personnel must maintain perishable skills and proficiently handle low-frequency – high consequence events.

The Training Officer position handles several duties and provides support for several functions within the Fire Department, including

- Health and Safety
- Recruitment of new employees
- Communications equipment and systems.
- Peer support program coordination.
- Assists with policy development

This is in addition to developing and delivering a 13-week training academy to new recruits. Managing and delivery of continuing education to existing personnel. Develop

the annual training budget and annual training plan and create new programs for tactical medics, officers, relief positions, etc.

While using an internet-based system to provide didactic programming helps with some of the training needs, practical training is also needed to reinforce the lessons.

A comprehensive training program for a fire department should include several components, some of which are illustrated in the following:

- Research the best practices and programs for a comprehensive training program.
- Develop a structured annual training plan that outlines training topics, schedules, and objectives. Ensure the plan covers various skills, including handling hazardous materials, rescue operations, structural firefighting, and emergency medical procedures.
- Incorporate community needs into the training plan by identifying specific risks and tailor the training plan accordingly.
- Provide specialized training based on roles (e.g., officers, engineers, emergency medical services) and specific tasks (e.g., technical rescue, hazardous materials response).

Norman Fire Department has many of the previously noted attributes. However, the staffing for this function needs to be enhanced.

Recruit Training

As noted, the recruit training process spans 13 weeks, and for the classroom portion, a single instructor can provide the necessary training. There are topics in which a subject matter expert (SME) can be utilized, which can be handled using overtime to conduct the training. With one person assigned to the Training Division, this means that for 13 weeks, the Training Officer is committed to the program with little or no time to accomplish other tasks and responsibilities required in the training division. These tasks include processing, importing and auditing training records and other administrative duties related to ensure compliance with training regulations.

In addition to the SMEs, any time there are practical sessions such as live fire exercises or vehicle extrication sessions, NFPA 1403 Standard on Live Fire Training Evolutions requires a student-to-instructor ratio of one instructor to five students. This ratio can be handled using overtime to provide additional instructors but causes shift shortages in operations during these exercises. With the potential to hire a significant number of recruits over the next several years, the effective administration, development and

conducting the 13-week recruit class could be problematic for the Training Officer to coordinate, while still ensuring the additional duties and responsibilities expected of the position are still able to be accomplished.

Recruitment and Retention

Recruiting the right personnel is a critical need of modern fire departments. This takes a focused effort, and currently, there is no concentrated attention to recruiting for the Fire Department to attract a diverse and qualified workforce.

The best way to reach diverse populations is with direct engagement, which requires more work and capacity that can be assigned to another position. Staffing in this area will allow the Department to focus targeted efforts, such as social media campaigns, neighborhood outreach, and identifying underrepresented populations to target recruitment efforts and events focused on these potential employees.

Retention of current personnel is another area that needs additional focus. Many of the programs noted previously can support this endeavor. Mentoring recruits and newly appointed officers can support these efforts. Offering outside training programs can provide incentives for those aspiring to move up in the organization. Open communications with the leadership team, streamlining administrative tasks, optimizing scheduling, and developing good health and wellness programs are all programs that will help to create a stable and effective workforce.

The City of Norman should consider adding a recruitment specialist to the Fire Department to improve this critical area and ensure a diverse candidate pool can be attracted to test for employment. In addition, this position can be used to support recruit training programs and retention programs to help train new personnel and ensure appropriate retention practices are in place in the Department. This position should report to the Training Officer and can assist with the onboarding of personnel and academy preparation.

Recommendation

> **Fill the authorized but currently unfunded Health and Safety Officer position.**
>
> **Add a full-time administrative support position to support the administrative needs of the training division.**
>
> **Add a full-time recruitment specialist to enhance the department's ability to attract and retain a diverse and qualified workforce.**
>
> **Add full-time instructor positions to support the Training Division in the delivery of training programs and health and wellness programs and to improve the recruitment of the Fire Department workforce.**

As additional staff are hired, an additional full-time instructor position will be added to support the department's EMS training needs.

Administrative Services

Supporting the emergency response and mitigation efforts is a function of the administrative model. In the city, human resources and financial support are provided by separate departments. Other administrative support functions and processes are part of the fire department and are evaluated in the following sections.

Organizational Structure

The design of an organizational structure to best meet the needs of an agency is not only predicated on the traditional command and control within the Fire Department but also to help define job duties and responsibilities, ensure efficient and effective workflow, establish a reporting hierarchy, and ultimately determine appropriate lines of authority and accountability. To accomplish this, the design of an organizational structure and placement of employees within the organization should be established on fundamental principles that provide the organizational cohesion necessary to achieve the primary mission of the Fire Department. These principles include:

- **Accountability and responsibility are clearly identified:** The organizational structure must be consistent with the concept that clear lines of authority and decision-making are essential for any organization to achieve excellence. Areas of responsibility are clearly delineated, and points of accountability are readily identifiable.
- **Span of control or communication is optimal:** Effective organizations are structured so that lines of communication are identifiable, and where there are multiple reporting relationships, responsibility for communication and control are clearly identified and understood.
- **Coordination of Work Efforts:** The organizational structure should facilitate communication and working relationships among staff and work units. Many functions need close or indirect alignment to maximize efficiency and effectiveness. The structure should also provide easy identification of job functions to people outside the Fire Department, including other Departments in the County and other fire service agencies.
- **Degree of Organizational Risk:** This relates to how much risk a function incurs if an activity is not performed or is performed poorly. Risk might involve tactical, financial, or political concerns. Generally, higher-risk functions have closer management oversight.

- **Supervisor and Management Span of Control:** This relates to whether supervisors are fully devoted to overseeing a select few primary activities or a broader set of duties and responsibilities. Appropriate spans of control are associated with the number of staff directly supervised and the complexity of activities overseen.

Nationally recognized best practice for a span of control in highly technical and professional positions is to limit direct reports typically to five or six positions, with nine direct reports considered the maximum to mitigate organizational risk.

Based on the current organizational chart and reporting structure, the current command structure for the Fire Department is satisfactory for an organization of this size and operation. With the addition of two fire stations, a second Battalion Chief should be added to assist with the command and control of the Operations Division.

Recommendations

> **Add a Battalion Chief to each shift with the completion and staffing of Stations 10to assist with the command and control of the Operations Division.**

Organization Continuity

Succession planning is a necessary function in every organization, regardless of size. It is a process whereby the organization develops employees to fill key roles. This ensures an employee is prepared to fill that key role if it opens. However, most organizations tend to plan informally or verbally for succession. Promotion of the most tenured people in the organization to positions that control the organization may not be the best use of this resource.

During interviews and discussion with departmental leadership, the project team learned there was no formal succession plan in place for the Fire Department, and the relief programs need to be revised as a relief factor for staffing had not been developed. Retirements are also occurring and will continue for the next several years. To facilitate the organization's continuity and provide succession planning, the project team recommends a formal succession plan to include education, training, and exposure to the Department's various functions. This plan could also provide a basis and background for any upcoming promotions.

In support of a continuity plan, mentoring for recruits and newly appointed officers would benefit the organization and the city. These programs allow the more tenured officer to pass on their expertise and encourage the development of leadership competencies. Promotions are always difficult, but none more so than promoting from a firefighter to an officer. As an officer and a front-line supervisor, the individual is now giving orders and

not following them, making this transition more difficult. A mentoring program for these promotions is essential to ensure the new officer gets started correctly. For the recruit, it provides an opportunity to learn and understand the workings of the Fire Department.

Administrative Workload and Functions

The Fire Department Administrative Division is responsible for budget development and management, account payables, purchasing, grant development and management, policy and protocol development and updates and health and wellness initiatives for the Department, including annual FIT testing of Self-Contained Breathing Apparatus face masks. The division also handles continual quality improvement reviews of fire and EMS reports, ordering of EMS supplies for emergency apparatus, public information requests, social media and disciplinary issues in the Fire Department.

As discussed previously in the report the availability and use of data for decision making in the Department is an issue as there is no dedicated personnel to focus on data analysis. This is compounded during times when Insurance Service Office audits occur.

To effectively handle these duties additional administrative support personnel are required.

Recommendations

- **Add a full-time data analyst position to the Fire Department.**
- **Add a full-time position to serve as the Public Information Officer, coordinate social media efforts and serve as liaison with the University of Oklahoma School of Journalism.**
- **Upgrade the current part-time administrative technician to a full-time position.**
- **Add an additional part-time administrative technician to assist the full-time administrative technician and serve in the role during their absence.**
- **Establish a formal succession plan for the Fire Department.**
- **As staffing allows, establish a mentoring program to support new officers and Department staff.**

Staffing Requirements and Forecasts

Two factors are driving the staffing needs of the emergency services system. First is the current deployment of resources that need to be improved based on standards of care. The staffing requirements are based on these needs to improve the level of service.

The second is related to the impact of growth and development. The service needs forecast provides the basis for the projection of staffing needs throughout the next decade, as the impacts of growth and development are modeled against the workload drivers of individual positions. Importantly, the staffing projections are based on needs to maintain the ***same level of service*** that is provided now.[11] Consequently, without making the staffing additions and assuming the growth impacts occur as projected, service levels would otherwise diminish due to said growth impacts.

The staffing projections are constructed position-by-position based on the isolated workload factors driving their staffing needs. To make the analysis more replicable in the future, the staffing methodologies used for each position are grouped into a series of categories, as follows:

[11] "Current" staffing levels are the levels that are commended to achieve an adequate level of service for current staffing levels. See previous sections of the current state assessment that recommend staffing to meet current staffing needs.

Table 69: Overview of Staffing Methodology Categories

Workload-Based	The staffing needs of many positions are directly tied to handling a measurable workload that scales with growth and development. For instance, plan review staffing is driven by the number of new plan submittals and timelines for turnaround of submitted plans. Example: Plan review positions are driven by the number of new construction plans that are generated for review.
Ratio-Based	Needs for the position form a direct relationship to another variable, whereby staffing can be expressed as a ratio. Example: Inspector staffing scales directly with the number of inspectable properties and the frequency of inspection.
Fixed Coverage	Staffing needs that are based on achieving a set level of deployment or coverage, as determined by a coverage objective, scheduling, and net availability factors. Example: Operations crew needs are based on the ability to meet established performance objectives and system reliability.
Non-Scaling	Positions that occupy a role that, within the general frame of the analysis, will not scale with growth. Many of these are unique positions, such as the fire chief, while others are driven by workloads that are not significantly impacted by growth and development. Example: The fire chief, as well as certain administrative support positions.
Span of Control	Supervisors scale based on the targeted number of direct reports for that function. Example: supervisory staffing is based on maintaining a span of control ratio.

Descriptions for the methodology used are added for each position in the department.

Comprehensive List of Staffing Projections

The following table presents the results of the staffing projection analysis, which builds upon the service need forecast to translate anticipated needs into staffing requirements. It should be noted that “Rec.” column refers to the staffing levels as recommended in this report for the year 2024, with successive projected years shown in five-year increments (through calendar year 2034).

Table 70: Comprehensive Staffing Projections

Unit/Division	Position	Scaling Factors	Auth.	Curr	2025	2026	2027	2028	2029	2034
Office of the Chief										
Administration	Fire Chief	Non-scalable Executive staff. Staffing does not scale directly with service needs.	1	1	1	1	1	1	1	1
	Administrative Tech IV	Non-scalable Unique role – staffing does not scale directly with service needs.	1	1	1	1	1	1	1	1
	Administrative Tech III	Non-scalable Unique role – staffing does not scale directly with service needs.	1	1	2	2	2	2	2	3
	Administrative Tech III	Non-scalable Unique role – staffing does not scale directly with service needs.	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total Office of the Chief			**3.5**	**3.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**5.5**

Unit/Division	Position	Scaling Factors	Auth.	Curr	2025	2026	2027	2028	2029	2034
Administration Division										
Administration	Asst. Chief	Non-scalable Executive staff. Staffing does not scale directly with service needs.	1	1	1	1	1	1	1	1
	EMS Director	Non-scalable Executive position. Staffing does not scale directly with service needs.	1	1	1	1	1	1	1	1
	Public Information Officer	Non-scalable Civilian position serving specific role	0	0	1	1	1	1	1	1
	Data Analyst	Non-scalable Civilian position serving specific role	0	0	1	1	1	1	1	1
Total Administration Division			**2**	**2**	**4**	**4**	**4**	**4**	**4**	**4**

Unit/Division	Position	Scaling Factors	Auth.	Curr	2025	2026	2027	2028	2029	2034
Operations Division										
Administration	Deputy Chief	Non-scalable Executive position. Staffing does not scale directly with service needs.	1	0	1	1	1	1	1	1
Operations	Assistant Chief	Non-scalable/Span of control Executive position. Staffing does not scale directly with service needs.	3	3	3	3	3	3	3	3
	Battalion Chief	Span of Control Based on the span of control ratio of 1 position per 7 reports.	3	3	3	6	6	6	6	6
	Captain	Fixed Coverage Scales in relation to the number of apparatus needed to meet service needs.	30	30	33	39	42	45	45	48
	Driver / Engineer	Fixed Coverage Scales in relation to the number of apparatus needed to meet service needs.	33	33	35	43	48	51	51	54
	Firefighter	Fixed Coverage Scales in relation to the number of apparatus needed to meet service needs.	80	80	89	119	119	131	134	143
Total Operations Division			**150**	**149**	**164**	**211**	**219**	**237**	**240**	**255**

Unit/Division	Position	Scaling Factors	Auth.	Curr	2025	2026	2027	2028	2029	2034
Fire Prevention										
Administration	Fire Marshal	Non-scalable Unique role – staffing does not scale directly with service needs.	1	1	1	1	1	1	1	1
	Administrative Tech III	Non-scalable Unique role – staffing does not scale directly with service needs.	0	0	1	1	1	1	1	1
Inspections	Inspector / Shift	Fixed Post Based on a ratio of 1 inspector per fire shift.	3	3	3	3	3	3	3	3
Inspections	Inspector / Daytime	Ratio-based Based on a ratio of 1 inspector per 200 inspections.	1	1	4	4	4	4	4	4
Plan Review	Planning Officer	Ratio-based Based on a ratio of 1 inspector per 500 plan reviews.	1	1	2	2	2	2	2	2
Total Fire Prevention Division			**6**	**6**	**11**	**11**	**11**	**11**	**11**	**11**

Unit/Division	Position	Scaling Factors	Auth.	Curr	2025	2026	2027	2028	2029	2034
Training Division										
Administration										
	Training Officer	Non-scalable Unique role – staffing does not scale directly with service needs.	1	1	1	1	1	1	1	1
	Health and Safety Officer	Non-scalable Unique role serving to assist with health and safety issues	1	1	1	1	1	1	1	1
	Administrative Tech III	Non-scalable Support position to assist with training administrative needs	0	0	1	1	1	1	1	1
	Recruiter	Non-scalable Position to assist with recruiting and training efforts	0	0	1	1	1	1	1	1
	Instructor	Scalable Position based on needs to train new and existing personnel	0	0	1	2	2	2	3	3
Total Training Division			**2**	**2**	**5**	**6**	**6**	**6**	**7**	**7**

Unit/Division	Position	Scaling Factors	Auth.	Curr	2025	2026	2027	2028	2029	2034
Emergency Management										
Administration										
	Emergency Management Coordinator	Non-scalable Unique role – staffing does not scale directly with service needs.	1	1	1	1	1	1	1	1
	Assistant EMC	Non-scalable Unique role – staffing to support emergency management functions	0	0	0	0	0	0	0	1
Total Emergency Management Division			**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**
Fire Department Total			**164.5**	**163.5**	**189.5**	**237.5**	**242.5**	**261.5**	**267.5**	**284.5**

Summary of Staffing Projections

The detailed projections outlined in the previous table amount to the total following staffing changes over the next decade, separated by sworn and civilian staffing categories:

Table 71: Summary of Staffing Recommendations (*Sworn*)

Division	Auth.	Curr	2029	2034	+/-
Operations Division	150	149	240	255	**+105**
Fire Prevention	6	6	10	10	**+4**
Office of the Chief	1	1	1	1	0
Administration Division	2	2	2	2	0
Training Division	1	1	6	6	**+5**
Total	160	159	260	275	**+114**

Table 72: Summary of Staffing Recommendations (*Civilian*)

Division	Auth.	Curr.	2029	2034	+/-
Operations Bureau	0	0	0	0	**0**
Fire Prevention	0	0	1	1	**+1**
Office of the Chief	2.5	2.5	3.5	4.5	**+2**
Administrative Division	0	0	2	2	**+2**
Training Division	0	0	1	1	**+1**
Emergency Management	1	1	1	2	**+1**
Total	3.5	3.5	8.5	9.5	**+7**

Over the next decade, 115 sworn positions are needed beyond the current staffing level of 160 personnel *to ensure appropriate service levels continue* as growth and development occur in the city. An additional seven (7) civilian positions are also needed in that timeframe.

Facility Assessment

The project team was tasked with conducting a walk-through evaluation of each Fire Department location. The project team toured each location with Fire Department personnel and was provided information on each facility's historical use, conditions, and general shortcomings. The goal of the evaluation was to establish a baseline inventory of current facility and site conditions to determine potential future use, expandability, deficiencies, and obsolescence for each location.

Facility Inventory and Condition Assessment

The project team conducted a "walk-through" assessment of the facility's exterior, interior, and technical systems for the facility evaluations in July 2024. Overall, building systems such as structural, mechanical, and electrical were assessed to the extent that they could be readily observed. All evaluations were supplemented by information provided by the user regarding the current conditions and any recent or planned improvements. The evaluations are not based on a detailed analysis but rather as a broad index of each facility's relative physical condition and viability. Conditions were rated on a scale of Excellent, Good, Fair, or Poor, as defined below.

- **Excellent** – conditions are newly renovated or constructed, and basic standards are met or exceeded.
- **Good -** conditions meet basic standards, and the potential exists for expansion or redevelopment at low expense.
- **Fair** - conditions may be reasonable for improvement or redevelopment at substantial expense.
- **Poor** - conditions do not meet basic standards and have little potential for improvement without significant effort and resources.

The following tables summarize the current conditions of the Norman Fire Department facilities.

Table 73: Facility Conditions Summary

Facility	Overall Rating	0 – 5 Year Needs	5 – 10 Year Needs
Administration (HQ)	Excellent	Maintenance	Maintenance
Station #1	Poor	Replace	Maintenance
Station #2	Poor	Replace	Maintenance
Station #3	Fair	Maintenance	Maintenance
Station #4	Fair	Renovation	Relocate/Replace
Station #5	Extremely Poor	Relocate/Replace	Maintenance
Station #6	Good	Renovation	Maintenance
Station #7	Good	Maintenance	Renovation
Station #8	Excellent	Maintenance	Maintenance
Station #9	Excellent	Maintenance	Maintenance

General Observation

While touring and assessing the facilities, several observations were noted that applied to most, if not all, of the facilities. These key themes include:

- Most facilities have non-operable apparatus exhaust systems in place. All stations should have functional exhaust extraction systems.
- Due to the age of the stations, most facilities have limited storage capacity, and staff turnout gear is stored in the apparatus bays. Only a few stations have extractors to clean staff's gear after returning to the station. There is an opportunity to implement additional operational procedures to address these challenges before adding/renovating the facilities to have separate and ventilated spaces and extractors for staff protective equipment.
- Staff at several stations referenced current and past challenges with mold in their facility. This was a significant concern for most staff.
- Staff quarters are generally shared or semiprivate, except for the Captain's office/sleeping area. This poses challenges with mixed-gender teams.
- There is an opportunity to standardize the approach to station access with keycard/badge access systems for each station. Each station is currently secured with a key, which may create issues during shift changes, and when staff works at other stations, they are not primarily assigned to. Implementing a keycard system for all Fire facilities will enhance security.

The following summarizes the overall facility condition and recommendation by station.

Fire Station #1 – 411 East Main Street

Description of Use	This facility is located at the NFD HQ. This station houses the Assistant Chief, Engine 31, and Brush 44. Reserve Brush 41 is also housed at this location.	
Year Constructed	1963	
Site Conditions	Parking Spaces:	9
	ADA parking spaces:	2
	Parking Lot:	Good
	Signage:	Good
	Access/ADA Issues:	None Identified
	Expansion Capability:	Limited (may expand toward headquarters)
	Security:	Poor
	Apparatus Accessibility:	Good
Building Exterior	Exterior Wall:	Good
	Roof:	Good
	Apparatus Accessibility:	Fair (drive through bays)
Building Interior	Structure:	Fair
	Access/ADA Issues:	None identified
	Code Compliance Issues:	None identified
	Layout:	Poor
	Renovation Suitability:	Good
	Staff Quarters Capacity:	10
	Storage Capacity:	Poor
Technical Systems	Plumbing:	Very Poor
	Mechanical (HVAC):	Very Poor
	Electrical:	Poor
	Lighting:	Fair
	SCBA System (Y/N):	Yes
General Comments	This facility could use a major renovation or replacement to improve mechanical, plumbing, and electrical systems. There are foundation issues in the apparatus bays. There are also opportunities to improve building security.	
Recommendations	The facility is a good candidate for replacement.	

Fire Station #2 – 2211 West Boyd

Description of Use	Houses Engine 26, Ladder 34, Brush 49, Haz-Mat 27, and Utility 6, includes a hose tower.	
Year Constructed	1970	
Site Conditions	Parking Spaces:	No defined spaces, approximately 10.
	ADA parking spaces:	0
	Parking Lot:	Good
	Signage:	Fair
	Access/ADA Issues:	No ADA spaces identified.
	Expansion Capability:	Fair
	Security:	Fair
	Apparatus Accessibility:	Good
Building Exterior	Exterior Wall:	Good
	Roof:	Poor
	Apparatus Accessibility:	Fair
Building Interior	Structure:	Fair
	Access/ADA Issues:	Fair
	Code Compliance Issues:	Fair
	Layout:	Poor
	Renovation Suitability:	Fair
	Staff Quarters:	Shared space
	Storage Capacity:	Poor
Technical Systems	Plumbing:	Poor
	Mechanical (HVAC):	Poor
	Electrical:	Poor
	Lighting:	Fair
	SCBA System (Y/N):	No
General Comments	Overall, this location is in poor shape. There are limited expansion opportunities on the west side of the building, but this expansion would negatively impact onsite parking. The HVAC system needs to be updated.	
Recommendations	The facility is a good candidate for replacement.	

Fire Station #3 – 500 East Constitution Street

Description of Use	Includes the following apparatus: Engine 24 and Brush 48. It also houses the reserve Engine 19, 22, and Brush 45. An ATV is also housed at this location.	
Year Constructed	2007	
Site Conditions	Parking Spaces:	4 public and 13 staff
	ADA parking spaces:	1
	Parking Lot:	Excellent
	Signage:	Good
	Access/ADA Issues:	None identified
	Expansion Capability:	Excellent
	Security:	Good
	Apparatus Accessibility:	Excellent
Building Exterior	Exterior Wall:	Excellent
	Roof:	Excellent
	Apparatus Accessibility:	Excellent
Building Interior	Structure:	Good
	Access/ADA Issues:	None identified
	Code Compliance Issues:	None identified
	Layout:	Good
	Renovation Suitability:	Good
	Staff Quarters:	Individual quarters
	Storage Capacity:	Good
Technical Systems	Plumbing:	Good
	Mechanical (HVAC):	Good
	Electrical:	Good
	Lighting:	Good
	SCBA System (Y/N):	No
General Comments	This is one of the newer fire stations and was built to more modern standards. There are issues with the sounding tones and there may be a mold issue.	
Recommendations	This building should continue to be maintained through a PM plan. Renovation is low priority should be budgeted for in approximately 10 years.	

Fire Station #4 – 4145 West Robinson

Description of Use	Station #4 houses Engine 32, Tanker 28, and Brush 47 and includes a hose tower. This is a sister station to Station #6.	
Year Constructed	1978	
Site Conditions	Parking Spaces:	6 (plus gravel area by water tower)
	ADA parking spaces:	0
	Parking Lot:	Poor
	Signage:	Poor
	Access/ADA Issues:	No ADA parking
	Expansion Capability:	Extremely Poor
	Security:	Poor
	Apparatus Accessibility:	Poor
Building Exterior	Exterior Wall:	Poor
	Roof:	Poor
	Apparatus Accessibility:	Poor
Building Interior	Structure:	Poor
	Access/ADA Issues:	Poor
	Code Compliance Issues:	None identified
	Layout:	Poor
	Renovation Suitability:	Fair
	Staff Quarters:	Shared space
	Storage Capacity:	Poor
Technical Systems	Plumbing:	Fair
	Mechanical (HVAC):	Fair
	Electrical:	Poor
	Lighting:	Poor
	SCBA System (Y/N):	No
General Comments	This facility is in fair condition. It has had periodic remodels (e.g., kitchen) but could use a significant renovation. There is no ability to expand without purchasing adjacent lots. The water tower is located close to the station.	
Recommendations	Consider relocating this station with modern design and amenities.	

Fire Station #5 – 1050 168th Avenue Northeast

Description of Use	This station deploys Engine 13 and Brush 22052. The station is attached to the Little Axe Community Center.	
Year Constructed	Unknown	
Site Conditions	Parking Spaces:	5 dedicated to Fire
	ADA parking spaces:	1 shared with Community Center
	Parking Lot:	Fair
	Signage:	Fair
	Access/ADA Issues:	None identified
	Expansion Capability:	Poor
	Security:	Poor
	Apparatus Accessibility:	Poor (back in only)
Building Exterior	Exterior Wall:	Fair
	Roof:	Poor
	Apparatus Accessibility:	Poor
Building Interior	Structure:	Poor
	Access/ADA Issues:	None identified
	Code Compliance Issues:	None identified
	Layout:	Poor
	Renovation Suitability:	Poor
	Staff Quarters:	Shared
	Storage Capacity:	Poor
Technical Systems	Plumbing:	Poor
	Mechanical (HVAC):	Poor
	Electrical:	Poor
	Lighting:	Poor
	SCBA System (Y/N):	No
General Comments	This building was not constructed to be a career fire station. The building is a tilt up concrete building that has no ability to expand. This building is beyond its useful life. The location adjacent to a community center with a shared parking lot poses issues with apparatus arriving and leaving the facility and this	

	is enhanced by the fact that apparatus must back into the bays. This building is also located off a narrow road that poses some challenges when meeting other vehicles. The proximity to Highway 9 is excellent.
Recommendations	Fire operations should be relocated to a new purpose-built facility. Relocating staff from this facility should be a high priority and occur immediately.

Fire Station #6 – 7405 East Alameda Drive

Description of Use	Station six houses Engine 35, Brush 42, Boat A&C, and reserve Brush 5043. This location also houses a fuel tank for city vehicles.	
Year Constructed	1981	
Site Conditions	Parking Spaces:	10 (no public spaces)
	ADA parking spaces:	0
	Parking Lot:	Fair
	Signage:	Poor
	Access/ADA Issues:	None identified
	Expansion Capability:	Excellent: Could be considered for locating an additional rescue unit in the eastern portion of the city after turnpike and highway expansion is complete and development plans occur to understand the risk factors due to growth in the area.
	Security:	Fair
	Apparatus Accessibility:	Good
Building Exterior	Exterior Wall:	Good
	Roof:	Fair
	Apparatus Accessibility:	Fair
Building Interior	Structure:	Fair
	Access/ADA Issues:	None identified
	Code Compliance Issues:	None identified
	Layout:	Poor
	Renovation Suitability:	Good
	Staff Quarters:	Shared
	Storage Capacity:	Poor
Technical Systems	Plumbing:	Poor (hot water issue)
	Mechanical (HVAC):	Fair
	Electrical:	Poor
	Lighting:	Poor
	SCBA System (Y/N):	No

General Comments	This facility is dated and could use a significant renovation. The site has significant ability to expand the existing building and parking areas. There is no public parking for the facility and visitors must park in the rear of the facility. The rear driveway access is close to the property line and the public often confuses the driveway for the adjacent Dollar General. Better signage should be placed at the end of the driveway and painted on the pavement to help reduce the number of turn arounds.
Recommendations	This facility is a prime candidate to be renovated and expanded in the next five years. With this expansion, the Fire Department should plan an expanded truck room to better house the rescue boat or consider moving to the new station 5. In the next six months, the Fire Department should work with Public Works staff to identify improvement opportunities to better identify the station's rear drive access with signage and road markings.

Fire Station #7 - 2207 Goddard Avenue

Description of Use	This station includes the Department's training space, including a fire tower, burn, and rescue areas. The station houses Squad 18, Rescue 21, Brush 46, Boat B, and Command Bus (37).	
Year Constructed	2001	
Site Conditions	Parking Spaces:	14 – Staff, 12 - Training
	ADA parking spaces:	2 total
	Parking Lot:	Good, but needs to be expanded by 28 to accommodate the student capacity of the training center.
	Signage:	Good
	Access/ADA Issues:	None identified
	Expansion Capability:	Excellent
	Security:	Poor, due to corporation yard exiting into staff parking lot
	Apparatus Accessibility:	Good
Building Exterior	Exterior Wall:	Good
	Roof:	Excellent
	Apparatus Accessibility:	Excellent
Building Interior	Structure:	Good
	Access/ADA Issues:	None identified
	Code Compliance Issues:	None identified
	Layout:	Good
	Renovation Suitability:	Excellent
	Staff Quarters:	Semiprivate
	Storage Capacity:	Good
Technical Systems	Plumbing:	Fair
	Mechanical (HVAC):	Fair
	Electrical:	Fair
	Lighting:	Good
	SCBA System (Y/N):	Yes
General Comments	The fire operations side of the building is generally in good shape and	

	preventive maintenance plan should be implemented. The training side of the building is mostly original with some A/V upgrades. The space works well as a training classroom. The parking area for the entire building is not sufficient when a large class is being held. Additional parking areas are needed to adequately park all vehicles and apparatus on training days. The site is adjacent to the city's corporation yard and the main road through the yard, can exit through the parking area of the Fire Station. While this is primary a one way through street for most staff, this poses challenges for fire personnel. Corporation yard traffic should not be filtered through the station's parking lot, except in emergency situations. The fire department training tower and rescue area is adjacent to the station in the secure portion of the corporation yard. The corrugated metal training facility is in good shape and should continue to serve the Department in the near term. The location of the training facility, approximately 150 feet from other city structures is a concern. It is now located between the truck wash and another building. This will limit the ability to expand the training center in the future.
Recommendations	The fire station and training classrooms should be renovated in approximately 10 years. The training tower and ancillary structures should be relocated. There is space to relocate the training tower to the west of the truck wash area. Alternatively, the city should consider options to place the new structure on adjacent vacant land that is currently owned by the University of Oklahoma. During any renovation, the addition of a public safety driving pad and additional storage space in the truck room should be considered.

Fire Station #8 – 3901 36th Avenue Northwest

Description of Use	This station houses Engine 30, Tanker 12, Brush 40, Air & Light 14, and reserve Engine 23. This station also has office space and quarters for fire prevention.	
Year Constructed	2011	
Site Conditions	Parking Spaces:	5 – public, 14 - staff
	ADA parking spaces:	1
	Parking Lot:	Excellent
	Signage:	Excellent
	Access/ADA Issues:	None Identified
	Expansion Capability:	Excellent
	Security:	Excellent
	Apparatus Accessibility:	Excellent
Building Exterior	Exterior Wall:	Excellent
	Roof:	Excellent
	Apparatus Accessibility:	Excellent
Building Interior	Structure:	Good
	Access/ADA Issues:	None identified
	Code Compliance Issues:	None identified
	Layout:	Good
	Renovation Suitability:	Excellent
	Staff Quarters:	Pods – semiprivate
	Storage Capacity:	Good
Technical Systems	Plumbing:	Poor (kitchen sink drain issues)
	Mechanical (HVAC):	Good
	Electrical:	Good
	Lighting:	Good
	SCBA System (Y/N):	Yes
General Comments	This facility is in good shape. The facility also includes a storm shelter and has dedicated storage areas. Fire prevention is located here with office and sleeping quarters. This office space will likely need to move with any additional staffing. There is a chronic issue with the kitchen sink and rodents.	

Recommendations	Create and implement a preventive maintenance program and address issues.	

Fire Station #9 – 3001 East Alameda Street

Description of Use	This is the newest fire station and is located on the same site as the public library. The station houses an Assistant Chief, Engine 20, Tanker 11, Brush 43, and reserve Engine 29. There is also a training space.	
Year Constructed	2013	
Site Conditions	Parking Spaces:	20
	ADA parking spaces:	2 spaces located in the library lot
	Parking Lot:	Excellent
	Signage:	Excellent
	Access/ADA Issues:	None identified
	Expansion Capability:	Excellent
	Security:	Excellent
	Apparatus Accessibility:	Excellent
Building Exterior	Exterior Wall:	Excellent
	Roof:	Excellent
	Apparatus Accessibility:	Excellent
Building Interior	Structure:	Fair
	Access/ADA Issues:	None identified
	Code Compliance Issues:	None identified
	Layout:	Excellent
	Renovation Suitability:	Excellent
	Staff Quarters:	Semiprivate space
	Storage Capacity:	Excellent
Technical Systems	Plumbing:	Excellent
	Mechanical (HVAC):	Excellent
	Electrical:	Excellent
	Lighting:	Excellent
	SCBA System (Y/N):	Yes
General Comments	This is the newest fire station and generally excellent shape. Since the initial construction there has been some challenges with the building's foundation.	

Recommendations	Create and implement a preventive maintenance program.

Administration – 415 East Main Street

Description of Use	This building serves as the Fire Department Headquarters and administration building. This building has the offices of the Chief, Deputy Chief, and administrative support staff. A combination of private offices and a public reception counter comprise this space. The building was recently renovated and shares a parking lot with Station #1.	
Year Constructed	1994	
Site Conditions	Parking Spaces:	16
	ADA parking spaces:	2
	Parking Lot:	Good
	Signage:	Good
	Access/ADA Issues:	None identified
	Expansion Capability:	Fair
	Security:	Fair
Building Exterior	Exterior Wall:	Good
	Roof:	Good
Building Interior	Structure:	Good
	Access/ADA Issues:	None identified
	Code Compliance Issues:	None identified
	Layout:	Good
	Renovation Suitability:	Excellent
	Storage Capacity:	Fair
Technical Systems	Plumbing:	Good
	Mechanical (HVAC):	Good
	Electrical:	Good
	Lighting:	Good
General Comments	The Administration building should be continued to be maintained and should not require renovation in the next 15 years. If the Department administrative staff grows, then the building may need to be expanded to best accommodate the future growth with additional parking provided. There is limited expansion capacity on the existing site without negatively impacting Fire Station #1.	
Recommendations	Maintain the current facility and expand (or relocate) as needed in the future. If relocation is sought, then this would free up more space for a station1	

	expansion. Additionally, relocation would be ideal as the Administration building could house Administration and Prevention in one facility.

Appendix A: Community Input

The Matrix Consulting Group (MCG) was retained by the City of Norman (OK) to complete a Resource Allocation Study of the Norman Police and Fire Departments. The scope of work included the deployment of a community survey to gauge the attitudes of the community members throughout the city and their opinions on NPD and NFD operations and overall public safety throughout the City of Norman.

Working alongside personnel within the Norman Police and Fire Departments, MCG project staff developed the topics and questions covered in this survey. Targeted outreach was then completed with the assistance of public information offices in both departments. In total, the public safety survey received a **total of 868 responses**.

Key Highlights

While many of these topics are expanded upon in the following sections, several key takeaways exist.

- Residents who have requested police and/or fire services in the past three years indicate that the timeliness of NPD or NFD response and their performance on the scene are significant factors in determining their overall satisfaction.
- Respondents indicated high levels of satisfaction regarding the overall performance of the police and fire departments.
- Norman residents expressed that maintaining quick response times and ensuring adequate staffing levels in both agencies are highly desired in the future.
- Despite these findings, almost half (47%) of respondents believe that public safety services in the past three years have declined by some level.

These findings are described further in the following sections of this report.

Community Survey Results

Responses are organized into sections based on question topics/themes.

Respondent Demographics and Background Information

Of the 868 respondents, more than half (58%) of the respondents have lived or worked in Norman for 21 years or more. Another 177 respondents (20%) have lived or worked in Norman between 11 and 20 years, followed by 16% of respondents (n=139) who have lived in the city between 3 and 10 years. New residents who have lived in the city for fewer

than 3 years accounted for 5% of the total respondent pool. A total of 9 respondents (1%) indicated that they did not live or work in Norman[12].

Length of Residency	%	#
Fewer than 3 years	5%	41
3 to 10 years	16%	139
11 to 20 years	20%	177
21 years or more	58%	502
I do not live or work in Norman.	1%	9
Total Respondents	*100%*	*868*

A majority of responding community members indicated that they were of White or Caucasian race, followed by American Indian or Alaskan Native respondents at approximately 6%. All other race/ethnic categories had less than a 5% representation in the respondent pool, while 84 respondents (10%) declined to say how they identified.

Race/Ethnicity	%	#
White or Caucasian	78%	673
Black or African American	2%	14
Hispanic or Latino	3%	25
Asian or Asian American	1%	5
Native American	6%	50
Native Hawaiian or another Pacific Islander	0%	1
Middle Eastern or North African	1%	5
Another race	1%	11
Decline to say	10%	84

Most respondents (54%) indicated that they identify as a female, followed by 40% of respondents who identify as a male, as shown below:

Gender Identity	%	#
Male	40%	343
Female	54%	464
Prefer Not to Answer	7%	60

The remaining 60 respondents (7%) declined to respond to the question.

[12] These respondents were excluded from all substantiative tables and analyses.

Perception of Public Safety in Norman

To gauge the perception of community members about the changing landscape of public safety in Norman, respondents were asked to respond to the following question:

> **"Overall, do you think that public safety in Norman has improved or declined compared to 3 years ago?"**

Responses yielded the following results:

Response	%	#
Has greatly improved	6%	47
Has somewhat improved	12%	100
Has stayed about the same	32%	256
Has somewhat declined	26%	210
Has greatly declined	21%	168
No opinion	3%	23

A large percentage of respondents (47%) feel that public safety services have declined to some degree while only 18% of respondents feel that public safety has improved and 32% believe that they are about the same. These findings were consistent across all demographic factors.

Public Opinions of the Norman Fire Department

The following sections provide findings on the public opinions of topics applicable to the Norman Fire Department.

Fire General Response

The following section provides aggregated responses to general questions relating to service levels, safety, and resources. The general topics section was asked to all respondents, regardless of previously indicated demographics.

Questions regarding these topics were asked in statement form, asking respondents to indicate their level of agreement or disagreement (i.e., Strongly Disagree (SD), Disagree (D), Agree (A), or Strongly Agree (SA)). Results are presented with a shading of blue in correlation with the level of agreement (or disagreement) with the statements listed. Results are presented in the table below:

#	Statement	SD	D	A	SA	NO
1	I am satisfied with the overall performance of the NFD.	4%	4%	46%	38%	8%
2	I am confident that NFD would respond in a timely manner.	2%	6%	46%	42%	4%
3	NFD has sufficient staffing to keep my community safe.	9%	19%	32%	13%	27%
4	NFD has sufficient resources to keep my community safe.	9%	18%	36%	15%	23%

Responding community members expressed high levels of agreement and, in turn, high levels of satisfaction with all topics covered in the matrix of questions above.

Fire Service Evaluation

As with the police department, to gauge public opinion on-field response, project staff included questions to gather opinions on their service levels from those who have requested fire department services in the past three years. Upon indicating that they have requested police services, respondents were asked to respond to corresponding topics such as timely response, service type requested, problem-solving, and an overall sufficiency of response rating.

Requested NFD Services	%	#
Yes	28%	217
No	72%	561

A total of 217 respondents have requested the services of the Norman Fire Department in the last three years. More specifically, most of these requests for services were emergency medical and fire services, as shown below:

Service Type Requested	%	#
Fire	34%	73
Emergency Medical Services	67%	145
Public Service[13]	23%	49
Business fire pre-planning inspections	6%	13

[13] Ex: Smoke detector check, fire station tour, fire safety education, etc.

A large majority of these respondents who have requested services from the Norman Fire Department indicated that NFD responded in a timely manner, as shown below:

Timely Response	%	#
Yes	94%	201
No	6%	12

Further, more respondents indicated that NFD addressed the problem while on scene.

Address the Problem	%	#
Yes	95%	206
No	5%	10

Fire Services Rating

Respondents who indicated that they had requested services from NFD in the past three years had the opportunity to provide an overall satisfaction rating of the Norman Fire Department. The average rating on behalf of respondents was 7.34. This rating indicates a high level of satisfaction with the Norman Fire Department.

To determine what might affect this overall rating scale, project staff conducted a regression analysis to determine whether the timely response of NFD personnel or the problem-solving abilities of NFD personnel had a statistically significant effect on community members' satisfaction rating.

The table below outlines the results of this analysis:

Norman Fire Department Regression Analysis Findings

Variable	Coefficient	Standard Error	z-value	P-value	95% Conf. Lower	95% CI Upper
FD Timely Response*	18.8938	5.453	3.465	0.001	8.144	29.644
FD Problem-Solving*	27.0319	6.496	4.161	0.000	14.226	39.837

**Indicates statistical significance @ 0.05.*

The findings presented above indicate that the timely response of NFD units and the problem-solving capabilities of responding NFD units has a statistically significant effect on the overall rating of the Norman Fire Department. For each unit increase in the Timely Response (i.e., changing from "No" to "Yes") of NFD, the overall NFD rating increases by approximately 18.89 points. Further, for each unit increase in the FD Problem-Solving (i.e., changing from "No" to "Yes") of NFD, the overall NFD rating increases by approximately 27.03 points. While both are statistically significant findings, the problem-solving

capabilities of NFD have the most considerable effect on the overall satisfaction levels of Norman community members.

Future Public Safety Considerations in Norman

To conclude the survey, respondents were allowed to prioritize the aspects of NFD services that were most important to them. These questions were asked to support NFD administration in determining how they can optimize strategic planning moving into the future. Respondents were able to select up to three of these choices.

Desirable Fire Services

The following table outlines the results of the bank of fire services provided to Norman community members:

Rank	Desirable Fire Practices	%	#
1	Quick response times	81%	619
2	Sufficient staffing levels	58%	446
3	Up-to-date training for personnel	49%	373
4	Advanced Life Support (ALS) capabilities for the entire city	46%	354
5	Professionalism and effective services to citizens	27%	204
6	Vision and plan for city growth in the future	15%	118
7	Timely fire inspections and investigations	15%	112
8	Increased community engagement	8%	61

The top two responses for desirable fire services are quick response times to emergency scenes and sufficient staffing levels. These topics resonate with Norman's valued community members. Further findings applicable to the fire department include a desire to emphasize up-to-date personnel training, as well as the expansion of Advanced Life Support (ALS) capabilities to the entire city.

Appendix B: Index of Tables and Figures

Tables

Figures