

Buffalo Grove Fire Department Community Risk Assessment and Standards of Cover

Fourth Edition

5/1/2024

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Chapter 1 - Documentation of Area Characteristics

Village Overview

The Village of Buffalo Grove, Illinois is located approximately 33 miles northwest of downtown Chicago and 10 miles north of O'Hare International Airport. The Village's land area is 9.3 square miles, with 21.7 percent of the area in Cook County and 78.3 percent in Lake County. Neighboring communities include Arlington Heights, Lincolnshire, Long Grove, Riverwoods, Vernon Hills, and Wheeling. A map of the Village's current legally adopted boundaries can be found in the appendix.

After being incorporated in 1958 with a population of 164 and an area of 58 acres at the northern edge of Cook County, the Village grew rapidly between 1970 and 1990. Today, Buffalo Grove has matured into a community of 41,000 residents covering an area of 9.3 square miles in Cook and Lake County. The Village's Comprehensive Plan projects the Village's land area could reach approximately 11.2 square miles with a total population of 48,000, while some outside projections indicate the Village's population could reach 54,000.

The Village has excellent transportation access for residents, businesses, employees, and visitors. The Village is served by the Metra North Central rail line connecting to downtown Chicago and O'Hare International Airport. Pace bus service provides access to adjacent communities, as well as the Metra Milwaukee District North rail line, and the Skokie Swift CTA Yellow Line. The regional road system serving the Village includes Aptakisic Road, Arlington Heights Road, Buffalo Grove Road, Lake Cook Road, and State Routes 21, 22, 45, 83, and 68, with direct links to Route 53 and Interstate 94.

The Village's commercial base includes several corporate business parks, a diverse retail sector, and a wide range of professional services, including medical facilities. The Village's residential areas include single-family neighborhoods, townhomes, condominiums, and apartments. The housing stock is very diverse, with units of different sizes and designs available at various price points to serve the community's population.

The Village is served by four elementary school districts and two high school districts, all of which consistently receive acknowledgement for providing high quality education for children and young adults in the community. Buffalo Grove is served by two library districts and two park districts.

Legal Basis

The Village of Buffalo Grove was incorporated in the State of Illinois on March 7, 1958. The Village is a Home Rule Unit by virtue of the provisions of the Constitution of the State of Illinois of 1970. Home Rule allows a community to take actions not specifically prohibited by the state statutes. Conversely, a non-home rule community can only undertake those actions specifically allowed for in the state statutes. Home rule enables a municipality or county to establish its own system of self-governance without receiving a charter from the state. Home rule shifts much of the responsibility for local government from the state legislature to the local community. The most significant powers granted to a home rule community include the ability to enact its own police powers (health, safety, morals and general welfare) and to issue bonds without referendum and exemption from property tax caps under the Property Tax Extension Law Limit (PTELL).



The Village operates under a council-manager form of government. The council-manager form is the system of local government that combines the strong political leadership of elected officials in the form of a council or board, with the strong managerial experience of an appointed local government manager. Policy making and legislative authority are vested with the Village Board, which consists of a President and a six-member Board of Trustees. The Village Board is responsible for passing ordinances and resolutions, adopting the annual budget, appointing committees, and hiring the Village Manager and Attorney. The Village Manager is responsible for carrying out the policies, ordinances, and resolutions of the Village Board, developing and presenting an annual budget, overseeing the day-to-day operations of the Village, and appointing department directors. All Village Board positions are elected to a four-year term and are elected at large. Board meetings are generally held on the first and third Monday of the month.

Financial Basis

Legal spending thresholds for the Village are established through the annual budget under the budget officer method as outlined in Section 8-2-9.3 of the Illinois Municipal Code and 2.08.043 of the Buffalo Grove Municipal Code. The Village's budget year corresponds with the calendar year and runs from January 1st to December 31st. The budget serves as the foundation for the Village's financial planning and as a management spending control document. All departments of the Village of Buffalo Grove are required to submit budget requests by a specified date each year. These requests serve as the starting point for budget development. The proposed budget is presented to the Village Board in November and adopted by ordinance in December concurrently with the property tax levy.

The Village Board is required to hold a public hearing on the budget document and must adopt a final budget no later than December 31st of each year. The budget is prepared by fund and department program. Department directors may make transfers of budget allocations within a department. However, transfers of budget allocations between fund/account groups require the approval of the Village Board. All budget adjustments must be approved by the Village Board to amend the legal spending thresholds.

Geographic Profile

The geographic profile of a community provides insight into the potential threats and impacts on day-to-day operations that a community's physical location can have.

Topography

The Village of Buffalo Grove is located within the northwestern Chicago suburbs and is situated on largely flat terrain. The Village has no major lakes but is home to several small creeks including Aptakisic Creek and Buffalo Creek, as well as numerous detention ponds that were created as the area developed. In addition, the Village is bordered along its eastern edge by the Des Plaines River. While the natural terrain does not impede fire or EMS responses, the presence of small bodies of water dispersed throughout the Village, as well as the nearby major river, require the maintenance and continuation of the Water Rescue Team program.

Geography

Buffalo Grove sits 682 feet above sea level and is generally located at 42°9'59"N 87°57'48"W. Buffalo Grove experiences a continental climate, with hot summers and cold winters and can experience rapid



fluctuations in climate conditions. The primary weather threats for the Village include heat and cold waves, as well as severe weather, up to and including tornadoes, particularly during the spring. Buffalo Grove receives an average of 35 inches of snow and 36 inches of rain each year. The Village experiences a wide range in temperature, from average lows of 13 degrees in January, to average highs of 82 degrees in July.¹

Physiography

Buffalo Grove consists of a largely built environment; however, there are some limited areas of wildland within the Village. A 2012 fire in Churchill Park demonstrated the hazards that can exist, even in small areas of the urban wildland interface. Similar areas of hazards exist within the ComEd powerline easement and the Buffalo Creek Nature Preserve. While wildland fire incidents are rare within these areas, it is important for the Department to be prepared. A detailed discussion of the Village's built environment can be found in Village Land Use and Development section of this document.

Geology

Buffalo Grove's location within northeastern Illinois places it at limited risk of earthquakes. The Village lies near the Sandwich Fault Zone and due to the geology of much of the Midwest, earthquakes that occur in fault lines further away, such as in the New Madrid Seismic Zone to the south, may also be felt within Buffalo Grove. While Illinois is identified as being at a higher risk for earthquakes by the U.S. Geological Survey's 2018 National Seismic Hazard Model, the Village's position within the State suggests that the risk for a major earthquake is low². In addition, the Village is not at risk of other major threats caused by geology, such as mudslides, due to its flat terrain.

¹ Buffalo Grove, IL Weather. Retrieved from <http://www.usa.com/buffalo-grove-il-weather.htm>

² Petersen MD, Shumway AM, Powers PM, et al. The 2018 update of the US National Seismic Hazard Model: Overview of model and implications. *Earthquake Spectra*. 2020;36(1):5-41. doi:10.1177/8755293019878199

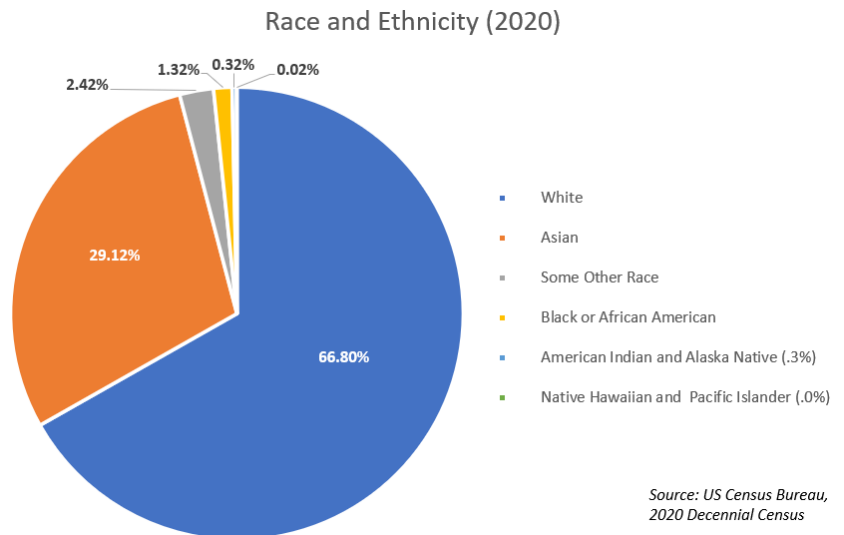


Population Characteristics

The characteristics of a community's population are important to consider in order to fully understand current and future service demands. Certain populations are generally at a higher risk of fire and EMS incidents. In addition, culture, language, and religion can impact a department's services.

Demographics

The Village experienced significant population growth between 1970 and 1990 when 24,628 residents were added. Since that time, the population of the Village has remained relatively stable. At the end of 2020, the Village's population was estimated at 40,792 people. The historic growth of population in the Village and related demographic projections are expanded upon in the charts and graphs located in the appendix. While Buffalo Grove's recent population growth fails to keep pace with the growth rate of the US, it is comparable to the State of Illinois and other mature northern Chicagoland suburbs. In the near future, Buffalo Grove's population growth rate is anticipated to remain flat. However, longer term projections by the Chicago Metropolitan Agency for Planning indicate significant growth after 2030, with the Village's population reaching 54,376 by 2040.



While 66.8% of the population consider themselves to be White, Buffalo Grove is home to a significant Asian population, with 29.12% of the total population identifying as such in the 2020 Decennial Census. Buffalo Grove's second largest minority demographic group, Hispanic or Latino, makes up 6.6% of the total population.³ 41.4% of Buffalo Grove residents speak a language other than English, and of those households, an estimated 31.4%, or approximately 5,267 residents, speak English less than "very well".⁴ Department personnel are aware of potential language barriers and utilize translation services as necessary. Given current and projected trends, it is expected that Buffalo Grove will continue to become more ethnically diverse.

Over the last few decades, the Village's median age has increased significantly, and today, 20.8% of the population is over the age of 65.⁵ Projections indicate that 24% of the Buffalo Grove's population will be 65 years or older by 2027. Research has shown that people above the age of 65 are twice as likely to be killed or injured by fires. In addition, an elderly population can contribute to higher EMS call volume. The Village has a higher median age than that of Cook County, Lake County, and the nation as a whole. In the

³ 2020 Decennial Census

⁴ 2021 American Community Survey, 5 Year Estimates

⁵ 2023 ESRI Community Profile, Buffalo Grove, IL



coming years, the percentage of the Village’s population 65 years or older is projected to continue to grow and have significant impacts on Department call volume.

Socioeconomics

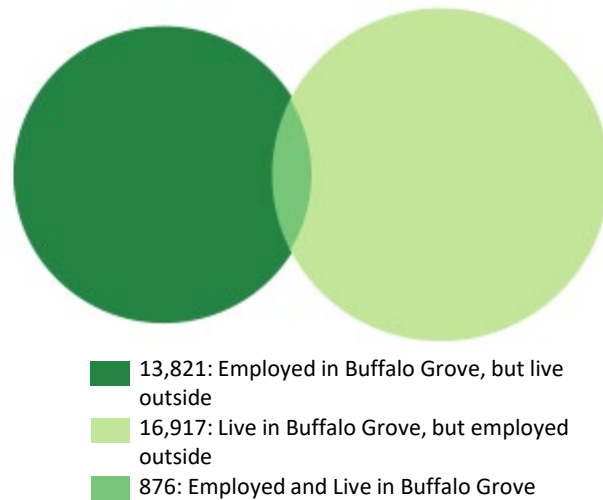
The Village’s population is generally well educated, with more than half of the population having received a bachelor’s degree or higher. The share of college-educated adults is more than twice the national, state, and Chicago Metropolitan Area Planning region’s averages, but is consistent with that of other affluent suburban communities within the northern Chicagoland region. Correspondingly, the Village has a high median income of \$115,951. Over 57.5% of households have an annual income of \$100,000 or more. However, it is important to note that despite its high median income, the Village has a poverty rate of 3.4% and that 8.5% of households make less than \$24,999 annually.⁶

The Center for Disease Control’s Social Vulnerability Index (SVI), which is a database designed to aid public health officials in supporting neighborhoods most likely to need additional aid during a public health emergency or natural disaster, indicates that nearly all of Buffalo Grove has a low level of vulnerability. One census tract located within the center of the Village has been identified as a low to medium level of vulnerability. SVI scores are developed using 16 U.S. Census variables such as poverty levels, age, minority status, and housing types.⁷

Employment

While the Village has remained attractive to businesses and private investment, the majority of workers who live in Buffalo Grove commute to other communities to work. In fact, more than 15% of Buffalo Grove’s working residents are employed within the City of Chicago, and more than 10% of those working in the Village reside in the City of Chicago. Approximately 6-8% of Buffalo Grove residents work within the community. Other significant employment destinations of Buffalo Grove residents include Arlington Heights, Schaumburg, Northbrook, Wheeling, Glenview, and Lincolnshire. Other significant residence locations of Buffalo Grove workers include Arlington Heights, Wheeling, and Palatine.

Inflow/Outflow Job Counts (2020)



Source: U.S. Census Bureau Longitudinal Employer Household Dynamics, 2020. <https://onthemap.ces.census.gov/>

The highest share of employment among Buffalo Grove workers consists of jobs within the education and healthcare sectors. This is followed by employment within the professional, scientific, and management, administrative, and waste management services. These jobs typically offer higher salaries

⁶ U.S. Census Bureau (2019). *Income in the Past 12 Months, 2019, American Community Survey 5-year estimates.*

⁷ Center for Disease Control (2020). *Social Vulnerability Index*, <https://www.atsdr.cdc.gov/placeandhealth/svi/index.html>



while requiring a skilled workforce, which reflects characteristics of many households in and around Buffalo Grove. The Village also has a considerable share of employment in retail and manufacturing, which reflects the commercial and research/light industrial activities that are present in Buffalo Grove. Overall, Buffalo Grove’s job composition, except in the professional fields, closely follows the general trend in the Chicago region, the state, and the nation.

Village Land Use and Development

Residential Development

Approximately 44% of the Village’s land area has been developed for the estimated 8,869 detached single-family homes that currently exist within the Department’s service area. Overall, single family detached homes make up approximately 52% of the Village’s housing stock. Single family attached homes (primarily townhomes) make up 22% of residential units, while approximately 24% are multifamily units. 78.4% of the Village’s housing units are owner occupied, 21.6% are renter occupied, and 4.2% are vacant. While the vacancy rate in Buffalo Grove is less than half that of Chicagoland region as a whole, vacant housing units can present a higher risk of fire, particularly if not regularly maintained. Average home prices within the Village are high, with the 2021 median home value at \$341,400. Nearly half of Buffalo Grove’s housing stock is listed between \$300,000 and \$499,999, with most recent single-family developments falling into this price range.⁸

Year Structure Built	Units Built	Percentage
Built 2020 or later	16	0.1%
Built 2010 to 2019	140	0.8%
Built 2000 to 2009	599	3.6%
Built 1990 to 1999	3256	19.7%
Built 1980 to 1989	5239	31.8%
Built 1970 to 1979	4,399	26.7%
Built 1960 to 1969	2079	12.6%
Built 1950 to 1959	550	3.3%
Built 1940 to 1949	3	0.0%
Built 1939 or earlier	206	1.2%

As shown in the chart in the upper right, nearly 75% of Buffalo Grove’s housing units are at least 30 years old. Only approximately 5% of units have been built within the last twenty years. Older homes may not be in compliance with modern fire prevention codes and as such, may be at a higher risk of fire.

⁸ U.S. Census Bureau (2021). *Comparative Housing Characteristics, 2021, American Community Survey 5-year estimates.*



Commercial Development

The Village is home to several significant retail developments. The retail spaces in Buffalo Grove tend to be clustered in shopping centers along the major retail corridors, primarily along Lake Cook Road and Buffalo Grove Road. Buffalo Grove shopping centers are anchored by grocery stores with smaller centers oriented to service businesses. Buffalo Grove does not have significant numbers of big box stores.

There are also several strong industrial areas within the Village. Manufacturing has remained the Village’s leading industry employer and generator of economic activity. Industrial zoning primarily exists on the east side of the Village along the WC – SOO Railway line. Major employers within the Village include Siemens Building Technology, I.S.I., ESS, Plexus Corporation, and Veritas Document Solutions.

Top Buffalo Grove Employers⁹

Employer	Employees	Percentage of Total Village Employment
Siemens Building Technologies	1,800	7.96%
ESS	550	2.43%
Plexus Corp	370	1.64%
Veritas Document Solutions	300	1.33%
Village of Buffalo Grove	214	0.95%
Vapor Bus International	200	0.88%
Crosscom National LLC	170	0.75%
Shultes Precision Manufacturing	170	0.75%
CORPTAX, Inc	160	0.71%

Recreation

The Village has over 800 acres of parks and open space, including two municipal golf courses and a substantial bike path and sidewalk network. Major parks include Willow Stream Park, Prairie Park, and Churchill Park. Amenities include basketball courts, tennis courts, playgrounds, baseball diamonds, pools, and soccer fields. Outdoor recreation has been, and will continue to be, a central focus for the Village. The majority of the Village’s parks are maintained and operated by the Buffalo Grove Park District.

Infrastructure

The physical infrastructure of a community can impact response times and capabilities and can change the amount of risk within the response area due to the risks inherent in the different types of structures.

Surface Road System

The Village has a fully developed street grid, and only three road extensions are necessary to complete the network of major and collector streets. The major streets and highways running through the Village are under the jurisdiction of agencies including the Illinois Department of Transportation (IDOT), the Cook County Highway Department and the Lake County Division of Transportation (LCDOT). IDOT designates four highways within the Village as Strategic Regional Arterials (SRA): Milwaukee Avenue (IL Route 21), Half Day Road (IL Route 22), McHenry Road (IL Route 83) and Lake Cook Road. In addition to these major routes, Dundee Road also acts as a major arterial through the region. With the exception of

⁹ Village of Buffalo Grove (2022). *Annual Comprehensive Financial Report, 2022, Principal Employers.*



McHenry Road, all of these roads have been improved to four lanes or wider. The Village’s major arterials carry traffic volumes ranging from 26,400 to 32,700 vehicles per day.

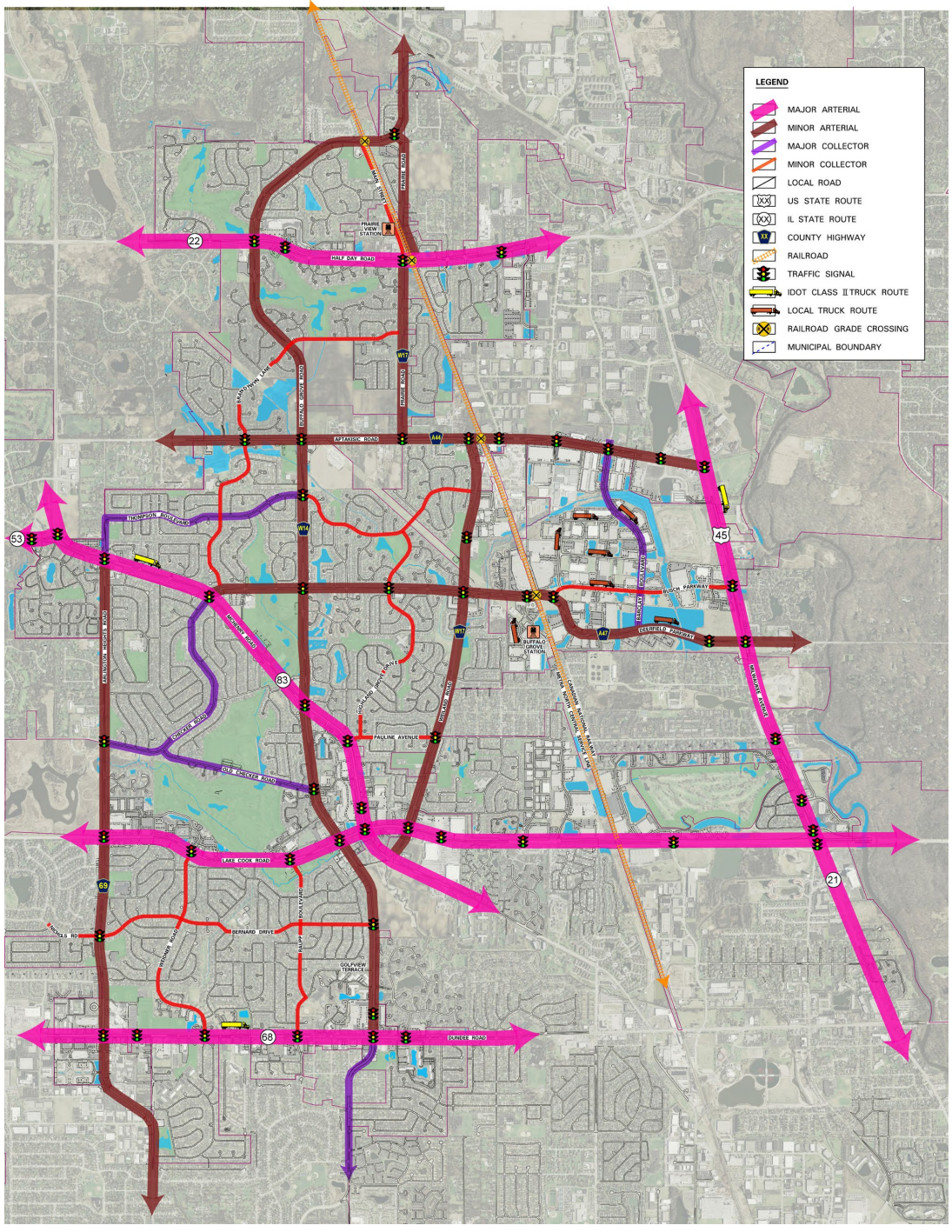
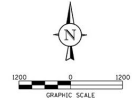
The Village also has several minor arterial roadways including Aptakisic Road, Arlington Heights Road, Buffalo Grove Road, Deerfield Parkway, Hicks Road, Prairie Road, and Weiland Road. The minor arterials are generally four-lane roadways and carry traffic volumes ranging from 6,400 to 23,700 vehicles per day.

The Buffalo Grove Police Department monitors the number of crashes along the Village’s surface road system on an annual basis and has identified the top crash locations to help target enforcement and education efforts. In total, 1,044 car crashes occurred in 2023 within the Village, resulting in 164 reported injuries and 2 fatalities. A summary of the top five vehicle crash locations can be found below.

2023 Top Five Crash Locations		
Ranking	Intersection	Number of Crashes
1	McHenry Road / Arlington Heights Road	57
2	Dundee Road / Buffalo Grove Road	45
3	Lake Cook Road / Arlington Heights Road	44
4	Dundee Road / Arlington Heights Road	31
5a	Lake Cook Road / McHenry Road	27
5b	McHenry Road/Deerfield Parkway/Checker Drive	27
Total		231



ROADWAY SYSTEM



LEGEND	
	MAJOR ARTERIAL
	MINOR ARTERIAL
	MAJOR COLLECTOR
	MINOR COLLECTOR
	LOCAL ROAD
	US STATE ROUTE
	IL STATE ROUTE
	COUNTY HIGHWAY
	RAILROAD
	TRAFFIC SIGNAL
	IDOT CLASS II TRUCK ROUTE
	LOCAL TRUCK ROUTE
	RAILROAD GRADE CROSSING
	MUNICIPAL BOUNDARY



Rail Service

The Village is divided into two parts along its eastern side by the WC – SOO railway line. On this railway, the Village is served by the Metra North Central commuter line, with passenger stations at Main Street in Prairie View and at Commerce Court/Deerfield Parkway. Prior to the COVID-19 pandemic, ridership levels at these passenger stations had been at all-time highs and were the busiest of any station along the North Central commuter line in terms of boarding.¹⁰ The pandemic caused a significant decline in the total ridership of all passenger rail lines. While Metra is projecting a gradual increase in ridership over the next five years, it is uncertain if ridership at the Prairie View and Commerce Court/Deerfield Parkway rail stations will return to pre-pandemic levels. By the end of August 2023, Metra weekday passenger trips marked only 55% of pre-pandemic levels.¹¹

The proximity of the Commerce Court Metra station and the Pace bus facility to the office/industrial area along Deerfield Parkway, Busch Parkway and Barclay Boulevard provides the opportunity for employees to use rail and bus transit to commute to jobs. The Metra North Central commuter line shares its tracks with the Canadian National Railroad, which operates a freight line through Buffalo Grove and has two rail spurs, providing freight service to two companies within the Village industrial park.

All three of Buffalo Grove’s fire stations are located on the western side of the rail line, and as such, access to the eastern portion of the Village is restricted should any of the three intersections that allow access be blocked due to a railway accident, rail repair or construction, or due to some other reason. Historically, when significant railway closures have occurred, the Combined Area Fire Training facility site has operated as a temporary station staffed with additional personnel and reserve vehicles for the duration of the closure.

Bus Service

Convenient bus service, particularly when linked to rail transit, provides substantial benefits to businesses and employees in reducing transportation costs and relieving congestion on surface roads. The Pace bus system services several areas within Buffalo Grove and is directly linked to the Park-N-Ride located at the Buffalo Grove Metra stop. There are five fixed bus routes within the Village, with four of the routes providing feeder service into the Metra system, one feeding into the Chicago Transportation Authority’s rapid transit system, and one connecting to the Pace Northwest Transportation Center in Schaumburg.

Air Transportation

The nearest regularly scheduled airline passenger services to the Village of Buffalo Grove are located in Chicago at O’Hare International Airport, approximately 10 miles south of the Village. The nearest public facility providing general aviation services is located in Wheeling at Chicago Executive Airport, approximately three miles southeast of the Village. Due to its proximity to both national and regional air

¹⁰ United States, Metra, Division of Strategic Capital Planning. (2019). *Commuter Rail System Station Boarding/Alighting Count Summary Results*.

¹¹ United States, Metra. [2024 Proposed Operating & Capital Program & Budget](#).



transportation hubs, significant amounts of air travel occur in the airspace above the Village. Historically there have been few incidents of commercial airplane failures which resulted in emergencies in the suburban communities; however, the risk remains. There have been three private plane failures in the Village in the last 40 years and five more in the neighboring towns.

Water Distribution System

The Village of Buffalo Grove's water supply is provided through the Northwest Water Commission (NWWC). The NWWC treats Lake Michigan water and supplies water through a fixed system to the Village of Buffalo Grove. The Village's fixed water system, consisting of 182 miles of mains and 2,500 hydrants, is a complete loop system, allowing the Utilities Division to isolate a segment or component needing replacement or repair while still providing adequate water supply to nearby areas. The Village's system operates on static pressure outputs that are automatically controlled by all lift stations and pumps. The system is balanced across the community using these set points as minimums to provide all levels of service, including fire flows. When additional demand hits the system, more pumps are called on automatically to meet that demand. Additionally, the Village owns and maintains four wells that could be utilized to supplement the water system if the supply of water from NWWC were to run short. Additionally, while the water distribution system operates using four distribution pumps set up in a loop system, the system is designed to distribute water at total capacity while only using two distribution pumps. This enables a reliable water supply even in cases of pump failure.

Other Significant Physical Infrastructure

ComEd, the regional electric utility, has several substations, as well as several high voltage power lines running along the northeast corner of the Village. The presence of this infrastructure presents unique risks when responding to fire or EMS calls and requires diligence and awareness for all parties involved to prevent serious injury or death. Nicor, a significant natural gas provider within the Chicago suburbs, also maintains natural gas transmission mains within the Village. If ruptured, these lines pose significant fire risk and demand specialized response protocols.

In addition to significant electric and gas lines, the Village of Buffalo Grove also maintains an array of underground stormwater and sewer pipes. These systems and their components are essential to the daily life of Buffalo Grove residents.



Fire Department Overview

History

In 1961, Buffalo Grove began running an all-volunteer ambulance service, with fire protection provided by the Wheeling Rural Fire Protection District. The service was discontinued after two years, and the Department became virtually inactive. In 1965, the Department was reactivated under the Wheeling Rural Fire Protection District. The Department began an extensive training program and began responding to calls along with the Wheeling Rural Fire Protection District.

In April of 1967, the Buffalo Grove Fire Department Inc., officially assumed responsibility for providing fire protection to Cook County Buffalo Grove. The first full time employee, Fire Chief Wayne Winter, was hired in 1969. By 1972, the Department had three full-time firefighters working eight-hour days Monday through Friday. Paid-on-call personnel slept at the station to respond to calls during the night.

In 1971, the State authorized the first paramedic program in Illinois, based at Northwest Community Hospital in Arlington Heights. After extensive training, the Buffalo Grove Fire Department graduated 14 paramedics. On December 1, 1972, the paramedic program went live, and the Buffalo Grove Fire Department responded on the first run at 8:01 A.M. In 1975, the station on Dundee Road was built as the main Station and headquarters, supplementing the station located in the lower level of the Buffalo Grove Village Hall.

On January 1, 1981, the Buffalo Grove Fire Department began providing service to all residents of Buffalo Grove. A new fire station was constructed on Busch Road (now Deerfield Parkway). It began operation on July 7, 1981. With Buffalo Grove rapidly growing in Lake County, it was eventually necessary to build a third fire station on Half Day Road (Route 22). With the construction of the third fire station in 1991, the Department's conversion to a fully paid fire department was completed. In 1993, the Department was awarded a Class 2 rating from the Insurance Services Office (ISO).

In 1993, an agreement between Buffalo Grove, Wheeling, and Long Grove began that led to the opening of the Combined Area Fire Training facility (CAFT) in 1998. Today, the site includes a four-story training tower with propane-fueled fire simulators, a Flashover Container, a railroad tanker for hazardous materials training, a bus, a below-ground confined-space training area, a pond for dive-rescue training, and an area for auto extrication.

In September 2000, a fire began in a third-floor apartment of a 66-unit condominium building. The fire at 1 Villa Verde eventually escalated to five alarms, with two special alarms, and at least 255 personnel from 40 fire departments responded. To date, the 1 Villa Verde fire remains the largest fire within Village boundaries in Department history.

Buffalo Grove began work on its first accreditation in 2019. After three years of self-assessment, analysis, and a review by a peer team, the Buffalo Grove Fire Department received Accredited Agency status with the Commission on Fire Accreditation International (CFAI) in 2023 for meeting the criteria established through the CFAI's voluntary self-assessment and accreditation program.



Legal Basis

The Department derives its legal authority from Chapter 2.50 of the Buffalo Grove Municipal Code, Article 11 of the Illinois Municipal Code, and the Emergency Medical Systems Act. Under the authority granted to the Department by the state and local governments, the Department has the primary responsibility to prevent and extinguish fires, as well as to provide Advanced Life Support, Basic Life Support, and emergency medical transportation to a healthcare facility.

Service Milestones

ISO Classification

The Insurance Services Office (ISO) regularly assesses fire departments nationwide based upon a variety of factors including quality of emergency communications and fire protection, water supply, and risk reduction efforts. This assessment culminates in the Public Protection Classification rating which is utilized by many homeowners' insurance companies to determine the level of fire risk for a particular home. ISO classifies departments on a scale of 1 (highest level of protection) to 10 (lowest level of protection). Since 1993, the Buffalo Grove Fire Department has maintained a Class 2 designation, placing the Department in the top 5% of ISO assessed fire departments nationwide.

Accredited Agency Status

Buffalo Grove began work on its first accreditation in 2019. After three years of self-assessment, analysis, and a review by a peer team, the Buffalo Grove Fire Department received Accredited Agency status with the Commission on Fire Accreditation International (CFAI) in 2023 for meeting the criteria established through the CFAI's voluntary self-assessment and accreditation program. The Department's status as an Accredited Agency will expire in 2028 and it is anticipated that the Department will appear before Commission on Fire Accreditation International for redesignation in Spring 2028.

Northwest Central Dispatch System

The Buffalo Grove Fire Department utilizes the Northwest Central Dispatch System (NWCDS) as its Public Safety Answering Point (PSAP). NWCDS is an intergovernmental consolidated emergency dispatch system, providing 9-1-1 services for several communities in northwest suburban Chicago. The combined population of the communities is nearly 500,000 covering over 170 square miles. NWCDS is accredited by the International Academies of Emergency Dispatch and is also the primary dispatch center for Mutual Aid Box Alarm System Division 1.

Programs and Services

Fire Suppression

The Department is responsible for responding to fires that may occur within the Village of Buffalo Grove including structure, vehicle, vegetation, and rubbish fires, among many others. To enable an effective response to fire calls, the Department maintains three frontline apparatus, including a quint, tower, and engine, as well as a reserve truck and two reserve engines. All Department firefighters are required to obtain Basic Operations Firefighter within six months of hire and Advanced Technician Firefighter within four years of hire.



Apparatus	Pumping Capacity	5" Hose	3" Hose	2.5" Hose
Engine	2000 GPM	800'	800'	400'
Tower	2000 GPM	500'	350'	300'
Quint	2000 GPM	500'	350'	300'

In accordance with the Illinois Fire Investigation Act and State Fire Marshal requirements, the Buffalo Grove Fire Department utilizes a National Fire Incident Reporting System (NFIRS) record management system to maintain and track records of all emergency responses created by the Northwest Central Dispatch System's Computer-Aided Dispatch (CAD) system. These reports provide nearly all of the performance statistics that aid in managing and analyzing the daily operations of the Department.



EMS

In 1972, the Department launched one of the first emergency medical response programs in the United States. Today, the Buffalo Grove Fire Department's EMS program is dedicated to increasing the likelihood of survival and reducing disability from out-of-hospital emergencies in the Village by providing the highest quality patient care in the pre-hospital setting. To accomplish this, EMS adheres to a philosophy of cooperative decision-making and the development of innovative strategic initiatives that address the demand for services and encourage system efficiencies. EMS is designed to enhance these efforts, which is developed through strong partnerships with other regional EMS agencies and remains in the forefront in the emergency medical field. The Department maintains a frontline fleet of 3 Advanced Life Support (ALS) ambulances, with an additional ALS ambulance in reserve. All firefighters within the Department are required to maintain Illinois paramedic licensures. All frontline fire apparatus are also ALS equipped, but lack transport capabilities.

The Department's EMS program operates under the auspices of Northwest Community Hospital. The Department's paramedics act as under the authority of a physician medical director and are able to provide emergency medical care as under the medical director's license. Department paramedics follow cutting edge Northwest Community Hospital protocols and can receive direct consultation from medical control.

Special Rescue Teams

The Department maintains a number of specially trained rescue teams including a hazardous materials team, technical rescue team, and a water rescue team. The hazardous materials team responds to incidents that result in the release of hazardous chemicals or other dangerous materials. Team members are trained to perform rescue operations under these conditions, as well as to take measures to alleviate and control the effects of a hazardous materials release. The Department's technical rescue team is qualified to respond to special rescue situations including trench collapse, structural collapse, confined space, as well as high and low angle rescues. The Village also operates a water rescue team that is trained to perform rescues and recoveries in a number of situations involving bodies of water. The Department is a part of Mutual Aid Box Alarm System Division 1 and is a secondary member of Division 4/5. As a result, the Department's special rescue teams may be dispatched to incidents outside of Buffalo Grove's immediate jurisdiction. Likewise, should a major incident that requires specialized rescue skills occur within Buffalo Grove, the Village can call upon outside resources to aid in rescue and containment.

Fire Prevention Bureau

The Fire Prevention Bureau has the responsibility and authority to enter, investigate, and perform routine fire inspections of all buildings, structures, and properties in the Village of Buffalo Grove with the exception of owner-occupied residential structures. It is the responsibility of the Fire Prevention Bureau to enforce the Illinois Life Safety Code, International Fire Code, International Building Code, local adopted codes, and amendments and other local fire safety regulations. This includes the inspection of all Life Hazard Use Properties such as gas stations, schools, nursing homes, daycare facilities, auto repair/auto body shops, places of assembly and large retail operations, and the inspection of all Non-Life Hazard businesses, offices and multi-family residences and other structures.



The Fire Department's Fire Prevention Bureau has historically maintained a strong focus on public education by conducting an open house and participating in Buffalo Grove Days as well other Village wide events. In addition to these large programs, the members of the Buffalo Grove Fire Department conducted school drills and attended many block parties and special events throughout the year. The Fire Prevention Bureau also regularly operates a smoke trailer at local elementary schools, which simulates fire conditions to educate grade school students on fire prevention and escape.

Public Education

The Department operates a public education program with a focus on teaching essential skills relating to medical emergencies, home safety, and fire safety. Annual programs including a fall Open House and a Halloween Drive Thru, as well as regular outreach to vulnerable populations such as seniors and school age children, helps to create opportunities for the transmission of potential lifesaving information. To coordinate these activities, the Department employs a part-time public educator. Additionally, the Department acts as an American Heart Association Training Center, teaching both Basic Life Support training for healthcare professionals and Heartsaver CPR AED for the general public.

Emergency Management

The Buffalo Grove Fire Department is responsible for the Village's Emergency Management Agency (EMA). EMA is responsible for reducing the effects of disasters before they occur, through mitigation planning and coordinating the operations and response to a disaster, managing resources and coordination of recovery efforts following a disaster, as well as providing public information during and after a disaster. The Fire Chief acts as the Director of EMA and the Department employs a part time Emergency Management Coordinator to aid in planning, training, and coordination of emergency preparedness programs. The Department also operates and maintains a mobile communications vehicle. MobileComm III is a specially built vehicle that operates as a mobile command center for large scale community events or disasters. MobileComm contains more than 20 radios, a 56' pneumatic mast with a series of cameras that can be used to monitor incidents, phone systems, a full office with computers, fax, copier, internet access, and video conferencing capabilities. When deployed, it is operated primarily by volunteers with ham radio expertise. MobileComm III is an invaluable resource in the case of a widespread emergency for the Village of Buffalo Grove and the region as a whole.

In addition, a part of the EMA is the Village's Emergency Operations Center (EOC). Activated during large-scale emergencies or special events, the EOC is a central location for senior officials from village, state, and federal agencies and relevant private entities to coordinate response efforts, make decisions, and gather and disseminate information. The EOC is also the central point for allocation and deployment of resources to support response and recovery efforts, such as vehicles, heavy equipment, fuel, and other emergency supplies.

The Fire Department also acts as the organizing and training center for the Village's Community Emergency Response Team program (CERT). CERT was created by the Federal Emergency Management Agency in 1993 as a means to train local volunteers to respond safely, responsibly, and effectively to emergency situations. CERT training is designed to cover topics such as disaster preparedness, fire suppression, disaster medical operations, light search and rescue, and disaster psychology.



Deployment

Personnel

The Buffalo Grove Fire Department has a staff of 62 including 57 full time sworn personnel, 4 full time nonsworn administrative positions, and 2 part time personnel. The 57 sworn personnel operate out of three fire stations, with one, Station 26, hosting the administrative offices. The Department operates utilizing three 24-hour shifts, with at least 14 personnel on each shift. Each shift is required to have a minimum of 1 battalion chief, 3 lieutenants, and 10 firefighter/paramedics. An organizational chart depicting the position of each employee within the Department can be found in the appendix.

Apparatus Minimum Staffing	
Tower 25	3
Engine 26	3
Quint 27	3
Squad 25	2
Ambulance 25	2
Ambulance 26	2
Ambulance 27	2
Battalion 4	1

Apparatus

The Department maintains a frontline fleet of 3 fire apparatus, 3 ALS ambulances, and a mobile command vehicle. In addition, a reserve fleet of 3 fire apparatus and 1 ambulance are available should a frontline vehicle need to be pulled from active service for repairs or preventative maintenance.


Station 27 Jump Company Program

When the shift's staffing is at 15 personnel or fewer, Station 27's company acts as a jump company in which one crew of three personnel (two firefighter/paramedics and 1 lieutenant) keeps both Quint 27 and Ambulance 27 in service. When an ambulance call is dispatched to Station 27, the crew responds with Ambulance 27 and Quint 27 is marked as unavailable for dispatch. Likewise, should a fire call be dispatched to Station 27, Quint 27 responds and Ambulance 27 in marked unavailable.




Stations

Station 25


Station 25	
	
Address	505 W Dundee Road, Buffalo Grove IL
Year Constructed	1975
Minimum Staffing	4 Firefighters, 1 Lieutenant
Apparatus	Tower 25, Ambulance 25
5-Year Annual Call Average*	3,981

Station 26

Station 26	
	
Address	109 Deerfield Parkway, Buffalo Grove IL
Year Constructed	1981
Minimum Staffing	4 Firefighters, 1 Lieutenant, 1 Battalion Chief
Apparatus	Engine 26, Ambulance 26, Battalion 4
5-Year Annual Call Average*	3,830



Station 27

Station 27	
	
Address	100 W. Half Day Road, Buffalo Grove IL
Year Constructed	1991
Minimum Staffing	2 Firefighters, 1 Lieutenant
Apparatus	Quint 27, Ambulance 27
5-Year Annual Call Average*	1,062

*Defined as the number of dispatches for frontline units (excluding Battalion 4) housed within the station between 1/1/19 and 12/31/23.

Station Response Districts

The Village is split into five primary response areas. While the response districts are not the only factor in determining the first due units, they do outline general areas of responsibility for each station. An overall map of the response districts can be found in the appendix.

District 25

This district includes all of the area in the Village of Buffalo Grove south of the center line of Checker Road from the west boundary of the Village to Buffalo Grove Road, everything west of the centerline of Buffalo Grove Road to Lake Cook Road and everything south of the centerline of Lake Cook Road to the eastern boundaries of the Village. Generally, Station 25 provides the first due resources within this response district.

District 26

This district includes all of the area in the Village of Buffalo Grove north of the center line of Checker Road to Buffalo Grove Road, east to the center line of Buffalo Grove Road to Lake Cook Road and north of the center line of Lake Cook Road to the Wisconsin Central Railroad tracks and south of Aptakisic Road. Generally, Station 26 provides the first due resources within this response district.

District 27

This district includes all of the area of the Village of Buffalo Grove north of and including Aptakisic Road. Generally, Station 27 provides the first due resources within this response district.

District 28

This district includes all of the area of the Village of Buffalo Grove east of the Wisconsin Central Railroad tracks. Generally, Station 26 provides the first due resources within this response district.



Mutual and Automatic Aid

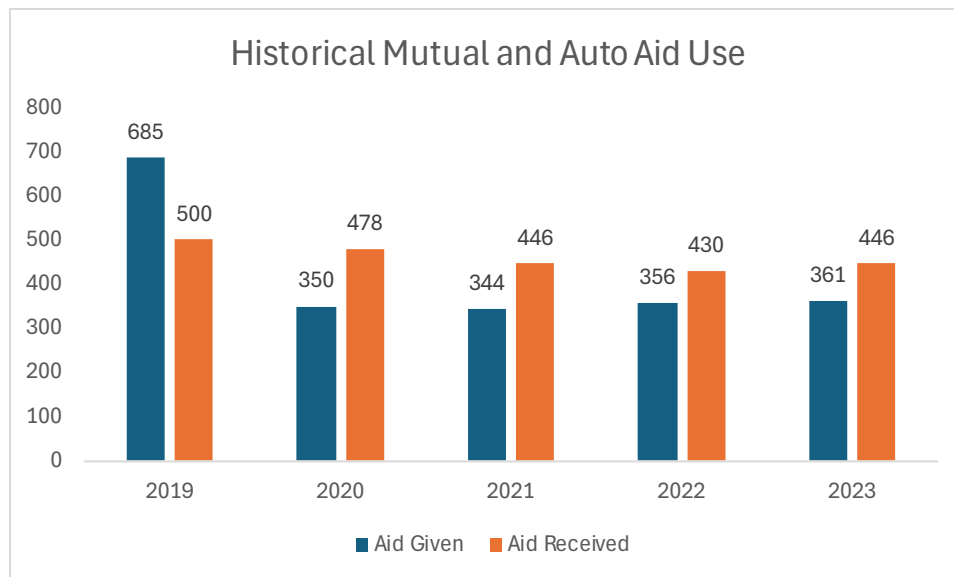
The Village of Buffalo Grove has mutual and automatic aid agreements with all of its immediately surrounding departments including Lincolnshire-Riverwoods, Wheeling, Arlington Heights, and Long Grove. These agreements help to ensure that the Village has immediate access to additional resources should an incident expand beyond Department capabilities.

Mutual Aid Box Alarm System (MABAS)

The Department is a member of MABAS Division 1. Since its beginning in 1968, MABAS now includes approximately 38,000 of Illinois' 40,000 firefighters. When joining MABAS, each community signs a formal written mutual aid agreement that requires the Department to send pre-determined resources to assist communities in need. Through its membership in MABAS, the Village ensures that in the case of a major incident or disaster, proper external aid can be obtained and relied upon, without concerns of liability or cost. Without a MABAS membership, the Village would need to coordinate agreements with each individual department prior to accepting aid.

Historical Use of Mutual and Automatic Aid

Due to the proficiency of automatic and mutual aid within the region, the Department's incident reports do not differentiate between the two types of aid. The Village's location within the northwestern Chicago suburbs, as well as the irregular boundaries of both the Village and surrounding fire agencies contribute to a high use of interagency aid. Historically, the Department has historically given aid more often than receiving it. However, beginning in 2019, area fire agencies began reducing the number of units due on fire alarms. This has led to a significant reduction in the amount of aid requested from Buffalo Grove.



Chapter 2 – Community Risk Assessment

Natural Disaster Risks

Methodology

To assess the risk of occurrence for natural disasters within the Village of Buffalo Grove, the Buffalo Grove Fire Department utilizes the recommendations of the 2018 Illinois Natural Hazard Mitigation Plan (INHMP) developed by the Illinois Emergency Management Agency.¹² The INHMP seeks to identify, profile, and assess natural hazards in the State of Illinois by county and to address mitigation techniques. The plan was the product of a cooperative effort by a number of state agencies and includes a lengthy analysis of historical incidents and their impact on life and property as well as the incorporation of numerous planning documents that identify the probability of future events. Due to Buffalo Grove’s location on the border of Lake and Cook counties, it is necessary to consider INHMP’s analysis for both counties.

There are two variations between INHMP’s risk assessment of Lake and Cook Counties: heat and severe winter weather. INHMP notes two major heat waves in the 1990s that resulted in major loss of life within the City of Chicago that contributed to the higher risk assessment for that category. While Lake County also experienced high temperatures during that period, the “heat island” effect contributed significantly to the impact of those heat waves. A heat island describes how an urban environment, constructed largely of concrete and asphalt, can amplify the effect of heat. Buffalo Grove’s suburban makeup ensures that it does not experience this effect to as high a degree, and as such is more in line with the INHMP’s assessment of Lake County.

Similarly, Buffalo Grove better fits into INHMP’s assessment of risk for severe winter storms in Lake County. During the 66-year period studied by the INHMP, Cook County experienced 27 severe winter storms and has an annual chance of 41% of experiencing a severe storm. During that same period, Lake County experienced 24 severe winter storms, and has an annual 36% chance of experiencing a severe winter storm. While it is difficult to determine which assessment best describes Buffalo Grove, the Department has chosen to utilize the INHMP’s assessment of severe winter storm risk for Lake County due to the more limited impact of a winter storm on Buffalo Grove when compared to a denser urban environment such as those found in Cook County.

Due to the differences between Lake and Cook County described above, as well as the presence of the majority of Buffalo Grove’s landmass within Lake County, the Department utilizes the risk categorizations developed by the INHMP for Lake County, IL, a summary of which can be seen below.

Buffalo Grove, IL Natural Disaster Risk Assessment						
Severe Storms	Tornado	Floods	Severe Winter Storms	Drought	Heat	Earthquake
Severe	High	Moderate	High	Low	Low	Low

¹² Illinois Emergency Management Agency. (2018). Illinois Natural Hazard Mitigation Plan. Accessed at https://www2.illinois.gov/iema/Mitigation/documents/Plan_ILMitigationPlan.pdf.



Risk Categorizations

INHMP's governing committee reviewed all of the natural hazards outlined for review within the Federal Emergency Management Agency's "State and Local Mitigation How-To Guide". After a technical review, the Committee separated the natural hazards into three categories: extremely unlikely to occur, limited impact and limited probability, and natural hazards that have previously occurred and are likely to occur in the future. With the latter category, severe storms, tornadoes, floods, severe winter storms, drought, heat, and earthquakes were identified for further analysis.

Severe Storms

Severe thunderstorms in the Midwestern portion of the United States are caused by the collision of a moist, warm air mass moving north from the Gulf of Mexico with a cold air mass moving east from the Rocky Mountains. The collision between the two fronts causes the warm air to rise rapidly, leading to the formation of the thunderstorms. While these storms can form in isolation, they can also create clusters or form along a line. Once developed, thunderstorms may linger within an area for a lengthy period of time or may move quickly to affect a wide area. Thunderstorms usually develop to be approximately 15 miles in diameter and produce heavy rain lasting from 30 minutes to an hour. Approximately 10% of all thunderstorms that form are classified as severe. As defined by the INHMP, severe storms are storms that either produce hail at least one inch in diameter, have winds of 58 miles per hour or higher, or produce a tornado. In Illinois, severe thunderstorms frequently occur in the late afternoon or evening and can bring heavy rain, strong winds, hail, lightning, and tornadoes. Due to the high probability and the high impact to life and property caused by severe storms, the risk associated with severe thunderstorms has been classified at the highest risk level, severe.

Wind

The heavy rains brought by thunderstorms can be accompanied by several types of damaging winds including downbursts and straight-line winds. Straight-line winds are winds without any rotation, whereas tornadoes are characterized by circular rotation. Straight-line winds can reach speeds of anywhere from 40-110 miles per hour (mph). Downbursts are created by falling rain and associated sinking air, resulting in winds that can reach speeds of 125 mph. Once the winds hit the ground, the air normally spreads out in all directions at speeds of 100-150 mph. Both types of non-tornadic winds can cause extreme damage including damaged roofs, overturned mobile homes, and the destruction of garages. The general path of damage can extend for up to hundreds of miles. While tornadoes are commonly recognized for their high potential for damage to property and loss of life, non-tornadic high wind events often prove more costly in terms of both damage and injuries.

Lightning

By definition, lightning occurs during all thunderstorms and is caused by the buildup of positive and negative charges within the storm clouds. When these charges have been released, the energy appears as a flash of light and energy between the clouds and the ground. The lightning bolt is accompanied by high temperatures, nearly reaching 50,000 degrees Fahrenheit. The rapid heating and cooling of the air near the lightning bolt causes thunder. Illinois experiences over 600,000 lightning strikes every year and ranks amongst the top states for lightning fatalities.



Hail

In addition to lightning and wind, thunderstorms can also produce hail. Hail can pose a unique threat as the balls of ice can reach sizes of over 2" in diameter, with the largest hail ever recorded in Illinois reaching over 5". Hail is formed when air currents within a thunderstorm carry raindrops into the extremely cold portions of the atmosphere, where the raindrops freeze. These newly formed ice crystals then fall back through the clouds. The process is repeated, with the hailstones continuing to grow with each repetition, until the hailstones are too heavy to be supported by updrafts. The balls of ice then fall to the ground and can cause injury and severe damage to crops, animals, and property.

Tornadoes

Northeast Illinois is located at the northern edge of tornado alley, one of the most tornado prone regions of the world. Illinois sees approximately 64 tornadoes each year, with most occurring between March and August. Tornadoes are created as a result of the collision between warm air traveling north from the Gulf of Mexico and cold air traveling east. In a tornado, a rotating column of air is in contact with both the ground and the storm cloud. Tornadoes are accompanied extremely strong winds, with wind speeds of 200 miles per hour or more. These high wind speeds can cause devastating damage to impacted areas. Due to Buffalo Grove's presence within tornado alley and the high impact of a tornado, the risk associated with tornadoes has been classified as high.

Floods

Floods are the second most common natural hazard within the United States, second only to fires. In Illinois, floods may occur along lakes, ponds, streams, creeks, or rivers. Over the last few decades, floods have caused millions in damages within Illinois alone and are major risks to both life and property. As previously noted, Buffalo Grove has two creeks, Buffalo Creek and Aptakisic Creek, is bordered along its eastern edge by the Des Plaines River, and is home to numerous manmade detention ponds. While detention ponds offer a low risk of flooding due to sufficient engineering at the time of construction, both creeks and the Des Plaines River do have potential for flooding. For a more complete depiction of flood risk within Buffalo Grove, a map of FEMA designated flood zones can be found in the appendix. In addition, as annual rain fall continues to increase, flooding is expected to increase as well. According to the US Environmental Protection Agency, annual precipitation has increased by 5-10% over the last fifty years in Illinois and rainfall during the wettest days of the year has increased by around 35%. Over the next century, these trends are expected to continue, leading to more flooding.

There are several different types of flooding including riverine floods, flash floods, overland floods, and urban flooding. Riverine flooding occurs over the course of a few days or weeks, often due to a period of heavy rains. Flash floods, on the other hand, develop quickly due to an intense rainfall. Overland floods happen away from ponds or creeks, and generally are recognized as ponding due to insufficient drainage. Finally, urban flooding occurs when water enters buildings through water backups or through openings such as doors, windows, walls, and floors.

Recent efforts have been undertaken to expand the capacity of the Buffalo Grove Reservoir to reduce the impacts of flooding within the Buffalo Creek Watershed. As a result, the impacts of a flood along Buffalo Creek have been significantly reduced. However, the Village continues to maintain plans to mitigate the effects of major floods along either Buffalo Creek or Aptakisic Creek. The Village has long maintained a focus on the effects of development on flooding and will continue to take this natural



hazard into consideration as new developments are proposed. Due to the continued threat posed by flooding, the risk has been classified as moderate.

Severe Winter Storms

In Illinois, the National Weather Service defines a severe winter storm as a storm which is accompanied by six inches or more of snowfall in 12 hours or less or eight inches or more of snow in 24 hours, a storm which leaves behind ice accumulation of ¼ inch or more, or a storm which brings sleet accumulation of ½ inch or more in depth.¹³ Severe winter storms are often characterized by numerous hazardous conditions including heavy snowfall, ice accumulation, extreme cold temperatures, and high winds. These factors create hazardous travel conditions and can lead to property damage from falling tree limbs. The INHMP estimates that Lake County has a 36% chance of experiencing a severe winter storm on any given year.

Severe winter storms can significantly impact Department operations and response. Heavy snowfall and ice accumulation can increase travel times, leading to reduced response capabilities. In addition, cold temperatures can freeze pumps and engine water lines, leading to a decreased ability to fight fires. To counteract these negative impacts, the Department often institutes overtime to allow for the operation of an additional ambulance to reduce response times according to Department SOP 101.22. In addition, the Department utilizes Squad 26 as an alternative response vehicle during periods of intense cold to limit the amount of the time each fire apparatus spends outside of the fire station bay. Overall, severe winter storms are classified as a high risk for Buffalo Grove. Over the past decade, the Village has experienced a number of severe winter storms and it is anticipated that similar weather events will occur in the future.

Droughts

The State of Illinois has seen a number of major droughts, including two within the last decade. According to the INHMP, there are four commonly used definitions for drought:

- Meteorological: Caused by a period of low precipitation over the course of a few months or years
- Agricultural: Caused by low levels of moisture within soil, leading to an inability to sustain crops
- Hydrological: Marked by low levels of stream flow and reservoir storage.
- Economic: Occurs when there is an insufficient supply of water to meet human and environmental needs

While Lake and Cook Counties have experienced a number of droughts in the last 60 years, due to a low level of agriculture, neither county has ever reported crop or property damage as the result of a drought. In addition, Buffalo Grove obtains its water from Lake Michigan rather than more drought sensitive sources such as aquifers or rivers. While the Great Lakes' water levels can be reduced due to a severe drought, the large quantity of water within the lakes ensures that Buffalo Grove's primary source of water is reliable. In addition, the Great Lakes Compact helps to ensure that the water source is

¹³ United States, National Weather Service, Chicago Weather Forecast Office. (n.d.). *Definition of NWS Chicago Warnings, Watches, and Advisories*. Retrieved from <https://www.weather.gov/lot/headlines>.



sustainable in the long term by preventing diversions outside of the Great Lakes watershed.¹⁴ For these reasons, the risk for drought within Buffalo Grove has been classified as low.

Heat

Extreme heat waves are generally recognized as a period of three or more days above 90 degrees Fahrenheit. Heat waves are one of many aspects expected to worsen with the effects of climate change. According to the First Street Foundation, a nonprofit organization dedicated to assessing and communicating risks associated with climate change, the Village of Buffalo Grove will experience a 100% increase in the number of extreme heat days in 30 years due to a changing climate.¹⁵ Heat poses a danger to human health due to a decreased ability to reduce body temperature, particularly in period of high humidity. High humidity prevents the human body from being able to cool itself by preventing the evaporation of sweat. Certain populations are particularly susceptible to heat and high humidity including young, elderly, sick, or overweight individuals. In addition, high heat poses a unique risk to firefighters during either medical or fire calls due to the high workload and protective gear, particularly during fire response. To prevent heat exhaustion or heat stroke, it is important for firefighters to maintain a strong focus on rehabilitation during incident response. To that end, the Department commonly implements a call back for one full crew to operate Squad 26 as an alternative response vehicle due to its capacity to provide air conditioning to multiple responders as outlined in SOP 101.22. In addition, SOP 102.16 outlines procedures for safety and the rehabilitation of firefighters during heat waves.

While the Department actively maintains plans to mitigate the risks associated with heat waves, the risk for a heat wave within Buffalo Grove has been classified as low. The Buffalo Grove area has experienced numerous heat waves over the last few decades, but the impacts of those heat waves have been minimal and the impact to the Department can be mitigated using the techniques outlined above.

Earthquakes

Earthquakes occur when the earth's tectonic plates collide and slide past one another. While the earth's plates are constantly moving, increased friction can cause the plates to get stuck. When the plates finally overcome that friction, it can lead to a massive release in energy. This energy travels through the ground and can cause significant shaking and destruction. Earthquakes are measured using magnitude and intensity. Magnitude measures the amount of energy that is released during the earthquake and is measured using seismographs. Intensity reflects the impact on the human environment and is based on after action reports from individuals who experienced the earthquake. An earthquake's intensity can vary dramatically based on distance from the epicenter and the soil types of the area.

In Illinois, most of the recorded earthquakes have occurred in the lower third of the state, however, 16 earthquakes have been recorded in or around Cook County and the collar counties of DuPage, Kane, Kendall, and Will. While earthquakes have occurred in Illinois in the last few centuries, few have caused any damages or injuries. As it relates to earthquakes, the primary hazard is the potential for large

¹⁴ Great Lakes--St. Lawrence River Basin Water Resources Compact. (2005). Chicago, IL: Council of Great Lakes Governors. Accessed at www.glscompactcouncil.org.

¹⁵ First Street Foundation. Buffalo Grove, Illinois Heat Risk Overview. Risk Factor. Retrieved May 1, 2023, from https://riskfactor.com/city/buffalo-grove-il/1709447_fsid/heat



earthquakes occurring in the New Madrid Seismic Zone. While the zone is south of Illinois, a major earthquake in that zone could affect nearly all parts of the state. Despite those potential impacts, the risk of an earthquake has been assessed as low due to the low probability of a major occurrence within the Village. In addition, should a major earthquake occur in the New Madrid Seismic Zone or elsewhere, Buffalo Grove's positioning in the northeastern portion of the State would mitigate the intensity and limit the impacts to life or property within the Village. For additional information, a map of Illinois fault lines can be found in the appendix.



Fire, EMS, Hazardous Materials, and Special Rescue Risks

Methodology

The Buffalo Grove Fire Department utilized a three-part risk calculation that incorporates an evaluation of an incident's probability, impact of the incident on the community, and the impact of the incident on the Department's resources and ability to respond to other incidents. Once numeric values were decided for probability and impacts for each incident type, a formula was used to determine the overall risk value.

To determine the numeric values for all incident types, a survey of all Battalion Chiefs, the Deputy Chief, and the Fire Chief was conducted for their understanding of probability of an incident, impact to the community, and impact to the Department. By gathering individual assessments of risk from senior command staff, the calculation of risk incorporated senior staff experiences and long-term Department knowledge, as well as a strong understanding of Department deployment techniques. Once the feedback from the Chiefs had been collected, aggregate numerical values were assigned and plotted along three corresponding axes. Overall risk scores were then generated utilizing Heron's Formula, modified for tetrahedrons. Risk scores were then categorized as follows:

- Special Risk: risk score of 75 or higher
- High Risk: risk score between 50 and 74.99
- Moderate Risk: risk score between 25 and 49.99
- Low Risk: risk score at or below 24.99

In order to mitigate the risks associated with each incident type, critical tasks, as well as the minimum number of staff needed to achieve those tasks, were identified for each risk level.

Once low, medium, high, and severe risk events and associated critical tasks were identified for each incident category, staff sought to geographically map the potential for risk within the Village. While it is impossible to predict when or where a specific event may occur, all incident categories are predicated on several foundational characteristics. These characteristics were identified for each incident category and plotted on a map of the Village.



Risk Categorizations

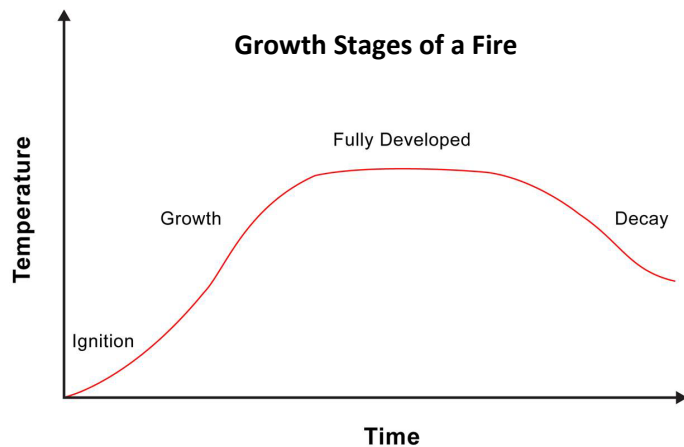
The Department has identified four primary categories of incidents that the Department is responsible for responding to: Fire, Emergency Medical Services, Hazardous Materials, and Special Rescue. As previously noted, all four incident types were analyzed to identify low, moderate, high, and special risk events.

Fire

As a fire burns, it progresses through a series of four developmental stages. While every fire would naturally move through these stages, intervention by firefighters interrupts a fire's natural lifecycle.

Ignition

In order for a fire to occur, there are three components that must be present: fuel, heat, and oxygen. When combined in sufficient quantities, a chemical reaction will occur. Fire is the visible sign of this chemical reaction. As long as all three components are present in adequate amounts, the fire will develop past the ignition state.



Growth

After ignition at the original source, a fire will grow to consume surrounding materials. The speed at which the fire will grow is determined by numerous factors including the amount and type of fuel in the affected area and environmental conditions. As the fire grows, the temperature of all objects within the general vicinity will continue to rise close to their respective ignition points.

Full Development

Full development occurs when the surfaces of all exposed fuel sources are heated to their ignition points. When this occurs, flammable gases are emitted and simultaneously ignite. The moment at which this occurs is commonly known as flashover. Once flashover occurs, temperatures reach their peak and oxygen is rapidly consumed. Combined, these two effects make survivability for both civilians and firefighters extremely unlikely. As such, one of the Department's primary objectives when responding to a structure fire is preventing full development and flashover by interrupting the fire's lifecycle through a reduction of oxygen or by cooling the temperature of the affected areas.

Decay

Decay occurs after the fire's full development stage has largely consumed all of the available fuel. While the fire is still extremely hot during this stage, the rate of combustion has slowed. During this stage, there is an inherent danger of a backdraft due to the combination of any remaining combustible fuels and the extremely high temperatures. If oxygen is reintroduced to the environment, the fire will reignite and rapidly expand.



Hazard Levels

After consideration of the effects of each incident type on the Department and on the Village as a whole, as well as the likelihood of occurrence, the Department has created the following designations for fire risk:

- Low Risk:** Low risk fires include small scale outdoor structures such as unattached storage sheds. These types of structures generally have limited exposures to life and property and require limited resources to mitigate. Likewise, most vehicle, rubbish, and vegetation fires fall into this category for a similar reasons.
- Moderate Risk:** Moderate risk fires are defined as those which occur within standard sized commercial structures and single-family homes. Fires in these structure types are marked by the potential for significant property loss and pose significant threats to life.
- High Risk:** Multifamily structure fires have been classified as high risk due to high occupancy levels. The corresponding high risk to life requires the commitment of high numbers of resources. In addition, due to population demographics and high-density levels, fires are more likely to occur within this structure type.
- Special Risk:** Large scale multi-family and commercial structure fires have been designated as a special risk. Due to the large size, complexity of interior designs, and high occupancies, these types of structures have been highlighted as the highest risk. In addition, these types of structure fires require significant resources, draining all Department resources and requiring dependence on mutual aid resources.



Critical Tasks Required

In order to mitigate the risks posed by fire incidents, there are numerous tasks that need to be undertaken. Each task requires a set number of personnel for safe and efficient completion which may be defined by federal law (OSHA) or recognized consensus standards (NFPA). When combined, the total number of personnel needed to complete the required tasks makes up the Effective Response Force (ERF) for the risk category. While each incident may require completion of additional or fewer of the listed tasks for its related risk category based upon the specifics of the incident, the tables below represent the general requirements for each risk category. The critical tasks for fire incidents focus primarily on three areas: fire ground safety, search and rescue operations, and extinguishment of the fire by cooling the environment.

Low Risk Fire Critical Tasks			
	Critical Task Description	Number of Personnel Needed	Recommended Unit
	Command/Safety	1	First Engine
	Fire Attack	1	
	Pump Operations	1	
Total	3 Tasks	3	1 Unit

Moderate Risk Fire Critical Tasks				
	Critical Task Description	Number of Personnel Needed	Recommended Unit	
Code 3	Scene Size Up/360	1	First Engine	
	Attack Line	1		
	Pump Operations	1		
	Water Supply/Standpipe Connection	1	Second Engine	
	Primary Search	2	First Ambulance	
	Initiate RIT	2		
	Ventilation	3		
	Incident Command	1		
		10 Tasks	12	5 Units
	Code 4 Minimum	Second Attack Line	2	Third Engine
Water Supply		1		
Assumption of Safety		1	Safety Chief Officer	
Rehabilitation/EMS		2	Second Ambulance	
Total	12 Tasks	18	8 Units	



High Risk Fire Critical Tasks			
	Critical Task Description	Number of Personnel Needed	Recommended Unit
Code 3	Establish Incident Command	1	First Engine
	Scene Size Up/360		
	Incident Safety		
	Attack Line	1	Second Engine
	Pump Operations	1	
	Water Supply/Standpipe Connection	1	
	Primary Search - Fire Floor	2	First Ambulance
	Backup Line/ Initiate RIT	2	Third Engine
	Primary Search - Floor Above Fire Floor	3	First Truck
	Ventilation	3	Battalion Chief
	Assumption of Incident Command	1	
11 Tasks	15	6 Units	
Code 4	Secondary Search - Fire Floor	3	Second Truck
	Second Attack Line	2	Fourth Engine
	Water Supply	1	
	Secondary Search - Floor Above Fire Floor	3	Fifth Engine
	Rehabilitation	2	First Squad/Second Ambulance*
	Control Utilities	3	Second Squad
	Assumption of RIT		
	Assumption of Safety	1	Safety Chief Officer
	Incident Command Structure	4	3rd - 4th Chief Officers
	Staging	3	Sixth Engine
	EMS	2	Third Ambulance
Total	22 Tasks	39	19 Units

*Second ambulance crew splits to pick up first squad to bring to scene. First squad is not manned with additional crew.

Incident Frequency

As indicated in the chart below, the frequency of fire events has remained relatively stable over the past five years, with a slight reduction in fire related calls occurring in 2019.

Fire Incident Type	2019	2020	2021	2022	2023
100 - Fire, Other	1	0	0	0	0
111 - Building fire	17	20	12	24	16
112 - Fires in structure other than in a building	3	0	0	1	1
113 - Cooking fire, confined to container	20	27	12	17	7
114 - Chimney or flue fire, confined to chimney or flue	2	2	1	0	0
115 – Incinerator overload or malfunction, fire confined	1	0	0	0	0
116 - Fuel burner/boiler malfunction, fire confined	0	0	1	1	0
118 - Trash or rubbish fire, contained	2	3	2	3	3
120 – Fire in mobile prop used as a fixed structure, other	0	0	1	0	0
123 - Fire in portable building, fixed location	1	0	0	0	1
130 – Mobile property (vehicle) fire, other	0	0	0	0	1
131 - Passenger vehicle fire	4	4	4	4	7



Fire Incident Type	2019	2020	2021	2022	2023
132 - Road freight or transport vehicle fire	1	0	0	0	1
138 – Off road vehicle or heavy equipment fire	1	0	0	0	0
142 - Brush or brush-and-grass mixture fire	0	0	4	0	3
143 - Grass fire	1	0	2	0	1
150 - Outside rubbish fire, Other	0	1	3	3	12
151 - Outside rubbish, trash, or waste fire	3	0	2	1	0
154 - Dumpster or other outside trash receptacle fire	2	3	6	4	5
160 - Special outside fire, Other	2	1	4	0	4
161 - Outside storage fire	0	0	0	0	1
162 - Outside equipment fire	1	3	0	3	1
210 - Overpressure rupture from steam, Other	0	0	0	1	0
211 - Overpressure rupture of steam pipe or pipeline	1	0	0	0	0
221 – Overpressure rupture of air or gas pipe/pipeline	0	0	1	1	0
223 - Air or gas rupture of pressure or process vessel	0	0	0	1	0
231 – Chemical reaction rupture of pressure vessel	0	0	0	0	1
251- Excessive heat, scorch burns with no ignition	1	4	2	1	2
440 - Electrical wiring/equipment problem, Other	13	11	17	21	10
441 - Heat from short circuit (wiring), defective/worn	0	0	0	0	1
442 - Overheated motor	7	3	2	2	2
443 - Breakdown of light ballast	0	1	1	0	0
444 - Power line down	5	14	23	6	6
445 - Arcing, shorted electrical equipment	10	7	16	8	16
460 - Accident, potential accident, Other	0	0	1	1	0
1001 - Fire Contained in Appliance	0	0	0	7	7
1114 – Building fire out of town	15	30	28	40	29
119 – Fire in an Appliance	0	0	0	0	1
1431 – Mulch fire	4	2	13	6	4
Total	118	136	158	156	143

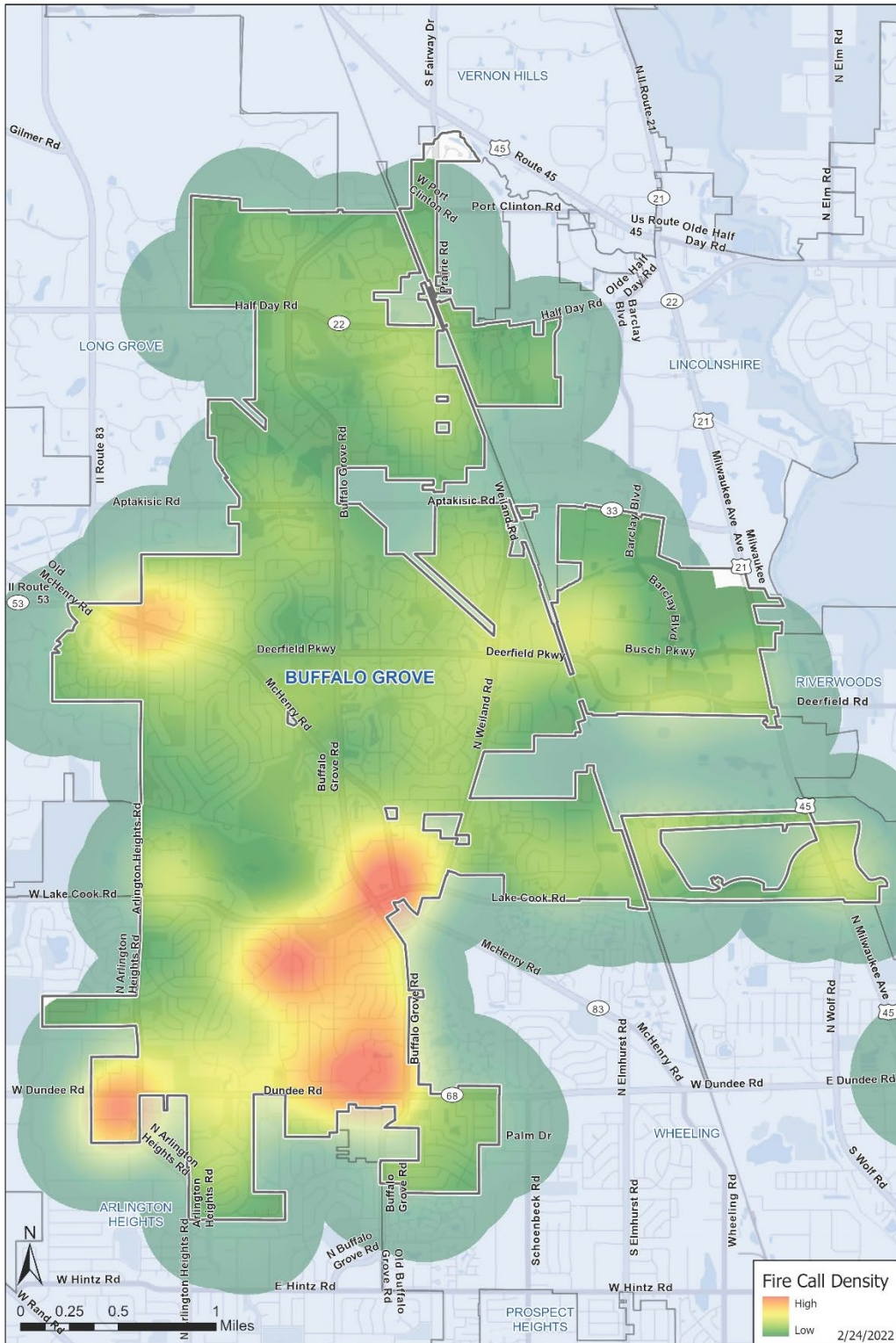


Incident Distribution



Fire Department Call Density 2017-2021

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Geospatial Analysis of Fire Risk

With each inspection, the Department's Fire Prevention Bureau assesses the risk associated with the commercial properties within the Village. The Bureau's risk assessment framework incorporates the following factors: type of building construction, occupancy characteristics, hazardous materials or processes, building size, and the presence of sprinklers and alarms. While a property may have several of these high-risk characteristics, a commercial property's presence on the high-risk property listing does not necessarily mean that the property has multiple high-risk characteristics. A property's risk classification is left up to the discretion of the Fire Prevention Bureau and is regularly reassessed.

Building Construction

Both commercial and residential properties have high levels of variation in the types and styles of construction. While modern construction has introduced techniques that have reduced construction costs and increased the use of synthetic materials, these innovations have altered fire behavior, and in some cases, have increased risk for firefighters. Building construction is classified by the Insurance Services Office (ISO) into six types: Frame Construction, Joisted Masonry, Light Noncombustible, Masonry Noncombustible, Modified Fire Resistive, and Fire Resistive. Each type has varying levels of fire resistance. Incident Commanders and firefighters alike must have a strong understanding of the behavior of each structure type under stress.

Elevated Occupancy Numbers/At Risk Occupancies

A commercial property's occupancy characteristics play a significant role in its associated level of risk. Properties which feature a high population density can pose significant risks to life should a fire incident occur. Ensuring that proper adherence to the fire code is maintained is crucial to preventing loss or injury. In addition, certain occupancy types are at a higher risk of injury or death in the case of fire incidents. These include properties with significant populations of individuals 65 or older or with significant concentrations of children, such as daycares and schools, as well as healthcare facilities.

Hazardous Materials or Processes

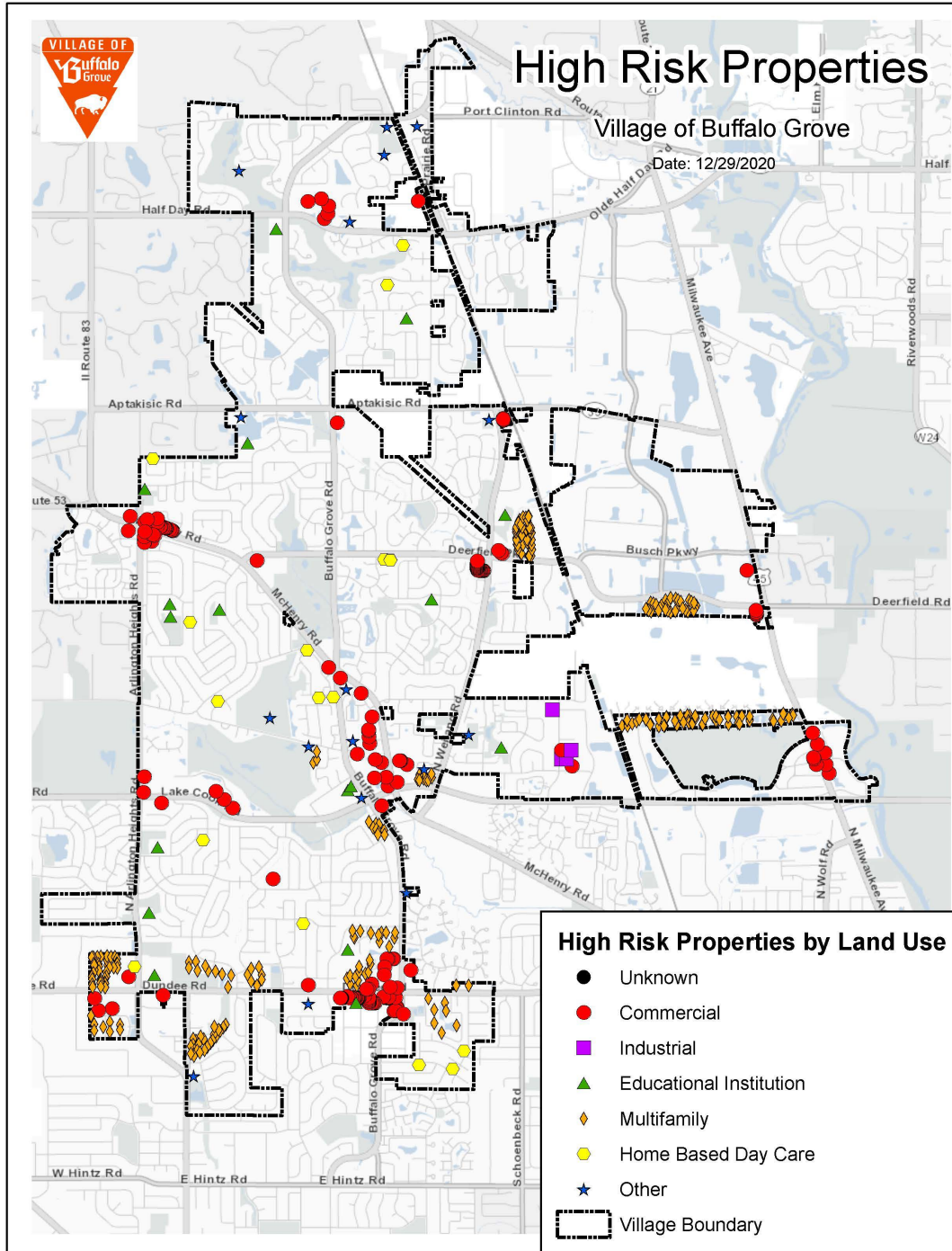
The Fire Department regularly monitors the hazardous materials and processes that take place within the Village and recognizes that the presence of these materials poses a unique danger to responding personnel and to civilians. The Emergency Planning and Community Right-to-Know Act of 1986 mandates businesses which utilize hazardous substances or chemicals inform the Department for planning purposes. In addition, in its assessment of fire risk, the Bureau considers the presence of highly combustible materials or materials which produce high energy release when burned. These materials can pose unique risks to life and property.

Lack of Sprinklers and Alarms

The presence of detection and extinguishment equipment can play a significant role in preventing and limiting the impact of a fire. Detection equipment enables early detection of the fire, allowing sufficient evacuation time for building occupants and early notification and dispatch of the fire department, corresponding with a limited period of time for the fire to grow unrestricted. Similarly, sprinklers or other extinguishment equipment act to limit the growth of a fire. By extending the amount of time a fire takes to grow, sprinklers increase the likelihood that firefighters can reach and begin to take action on a fire prior to flashover or major structural damage occurs. In addition, by limiting the growth of the fire, sprinklers may maintain lower temperatures within the structure and prevent oxygen from being consumed by the fire, allowing for additional time for building occupants to escape.



Utilizing the above characteristics, the Fire Prevention Bureau has identified and classified 341 addresses as high risk. It is important to note that each business can contain multiple structures, or that multiple businesses can occupy the same commercial structure. To mitigate the associated risk, these properties receive annual fire inspections, compared to the average 18-month inspection cycle for lower risk properties.



EMS

Emergency Medical Services (EMS) incidents make up the majority of the calls that the Department responds to, averaging roughly 72% of all calls in 2023. While the intensity and associated risk of these calls can be low, the high frequency of these calls requires a significant investment of Department resources. EMS calls tend to be strongly clustered in several key locations within the Village, particularly within commercial centers, as well as in assisted living facilities and multifamily housing complexes where higher population densities occur.

Hazard Levels

After consideration of the effects of each incident type on the Department and on the Village as a whole, as well as the likelihood of occurrence, the Department has created the following designations for EMS risk:

- Low Risk:** Despite their high frequency, minor medical incidents are considered to be low risk due to their minor impact on both the Department and the Village as a whole.
- Moderate Risk:** Motor vehicle accidents, cardiac arrests, and major trauma medical incidents have all been classified by the Department as moderate risk. While these incidents have limited impacts to the community as a whole, they require the commitment of numerous internal and external resources.
- High Risk:** Incidents which involve multiple casualties have been identified as high risk. These incidents involve significant commitment of resources and have a larger impact on the community as a whole. Vehicle extrication incidents pose a unique risk to responders due to the location of the incident (often a high traffic roadway). In addition, difficult extrications can lead to delayed care, increasing the risk to the civilian who was involved in the vehicle accident. The presence of several state routes and high traffic volume within the Village corresponds with a fairly high frequency of this event type. This combination of factors places vehicle extrications into the high-risk category.
- Special Risk:** Due to the extreme impact on the community and on regional resources, as well as the inherent risk to life for both first responders and civilians, active shooter events have been isolated into a special risk category.



Critical Tasks Required

EMS incidents can require a range of critical tasks in order to ensure a successful outcome. While medical incidents can vary widely in their severity and associated tasks, the tasks outlined below broadly illustrate the necessary steps to mitigate the risk posed by each incident.

Low Risk EMS Critical Tasks							
Critical Task Description	BLS/Treat no Transport		ALS-1		ALS-2*		
	Number of Personnel Needed	Recommended Unit	Number of Personnel Needed	Recommended Unit	Number of Personnel Needed	Recommended Unit	
Command/Safety/Family Liaison	PM 1	First Ambulance	LT	First Fire Company	LT	First Fire Company	
Patient Assessment	PM 2		PM 1	First Ambulance	PM 1	First Ambulance	
Paramedic In Charge/Documentation	PM 1		PM 1	First Ambulance	PM 1	First Ambulance	
Patient Movement/Transportation	PM 1/ PM 2		FFPM1/FFPM2	First Fire Company	FPM1/FPM2	First Fire Company	
BLS Treatments	PM 2		FFPM 1/ FFPM 2	First Fire Company	FPM 1/ FPM 2	First Fire Company	
General ALS Interventions			FFPM 1/ FFPM 2	First Fire Company	FPM 1/ FPM 2	First Fire Company	
IV Access			PM 2	First Ambulance	PM 2	First Ambulance	
Cardiac Monitor			PM 2	First Ambulance	PM 2	First Ambulance	
Airway Management (as necessary)					PM 1	First Ambulance	
C Spine (as necessary)					PM 1	First Ambulance	
Total	Up to 10 Tasks	2 Personnel	1 Unit	5 Personnel	2 Units	5 Personnel	2 Units

**Depending on the complexity of the ALS-2 Intervention, the fire company may be placed out of service to assist with ALS treatment during transport. In this situation, the Lieutenant and 1 FF/PM from the fire company ride in the rear of the ambulance, while the third member of the fire company returns the fire apparatus to the station.*

Moderate Risk EMS Critical Tasks			
Critical Task Description	Number of Personnel Needed	Recommended Unit	
Patient Assessment/Treatment*	2	First Ambulance	
Paramedic In Charge/Documentation			
Command/Safety/Family Liaison	3	First Fire Company	
Patient Movement/Transportation			
Patient Resuscitation/Stabilization			
Total	5 Tasks	5 Personnel	2 Units

*Critical Tasks Associated with Cardiac Arrest
 Performance and Transmission of a 12-Lead ECG
 Recognition of ST Elevation
 Transport to STEMI Receiving Center



High Risk EMS Critical Tasks			
	Critical Task Description	Number of Personnel Needed	Recommended Unit
	Incident Command	1	Battalion Chief
	Scene Safety	1	Safety Chief Officer
	EMS Division Command	1	1st Ambulance
	Triage	1	
	Treatment*	1	2nd Ambulance
	Transport*	1	
	Attack Line**	2	1st Engine
	Pump Operations**	1	
	Extrication Division Command	1	1st Truck
	Rescue/Extrication/General Patient Movement	2	
Total	10 Tasks	12 Personnel	6 Units
*Additional ambulance units dispatched as patient count increases			
**In cases of multiple patients without risk of fire, the first engine company would assist in triage and treatment, rather than deploy an attack line and initiate pump operations.			

Incident Frequency

As shown in the chart below, the number of EMS incidents between 2019 and 2022 has trended upwards. This is consistent with trend lines seen since approximately 2000. Over the last twenty years, EMS call volume has grown from approximately 2,200 calls a year to approximately 3,700 calls a year today. This trend of increased call volume and patient acuity is anticipated to continue as the Village's population continues to age.

EMS Incident Complaints by Dispatch - Top 25	2019	2020	2021	2022	2023
Fall	486	561	659	716	653
Sick Person	383	449	546	605	637
Transfer / Interfacility	450	400	147	100	104
Breathing Problem	181	238	271	303	310
Unconscious	164	187	198	205	214
Psychiatric / Behavior Problem	147	180	185	208	195
Chest Pain (Non-Traumatic)	156	133	203	206	213
Traffic / Transportation Incident	235	164	170	135	152
Motor Vehicle Crash	76	115	141	169	225
Abdominal Pain / Problem	77	76	108	89	98
Traumatic Injury	97	71	62	96	93
Hemorrhage / Laceration	50	68	72	106	89
Stroke / CVA	61	69	71	88	74
Convulsions / Seizure	65	62	64	69	76
Heart Problems / AICD	43	52	63	61	62
Cardiac Arrest / Death	37	46	40	51	47
Diabetic Problem	37	32	43	47	58
Allergic Reaction / Stings	32	27	42	31	50
Back Pain (Non-Traumatic)	29	34	32	29	40
Overdose / Poisoning / Ingestion	23	38	35	27	22



EMS Incident Complaints by Dispatch - Top 25	2019	2020	2021	2022	2023
Unknown Problem / Person Down	31	19	29	22	34
Headache	12	21	28	24	19
Medical Alarm	16	25	21	21	13
Well Person Check	8	11	26	36	20
Other	21	16	19	18	18
Pain	21	16	19	18	16
Total	2938	3110	3294	3480	3532

Primary Impression - Top 25	2019	2020	2021	2022	2023
No abnormal findings upon Exam (Z00)	384	352	391	403	394
Acute pain (G89.1)	270	218	172	202	187
Weakness (R53.1)	147	179	225	198	199
Chest pain (precordial) (R07.2)	134	101	129	104	102
Dyspnea / Other Respiratory Unspecified (J98.9)	65	102	105	154	139
Injury of head (S09.90)	87	92	96	140	128
Dizziness (R42)	93	88	110	105	137
Syncope (R55)	87	90	83	108	109
Altered mental status (R41.82)	79	92	92	111	120
Anxiety disorder (F41.9)	66	69	86	88	99
Stroke / Cerebral Infarction (I63.9)	73	67	68	72	85
Generalized abdominal pain (R10.84)	55	49	74	76	70
Acute abdomen (R10.0)	54	69	79	49	54
Suicidal ideations (R45.851)	60	59	67	55	49
Unspecified Convulsions / Seizure (R56.9)	58	54	54	55	54
Nausea and vomiting (R11)	47	55	41	58	62
Injury of hip (S79.91)	36	49	45	57	48
Feared Complaint Unfounded (Z71.1)	38	66	53	32	16
Headache (R51)	28	41	50	49	36
Cardiac arrhythmia (I49.9)	38	39	40	51	33
Alcohol use, with intoxication (F10.92)	28	57	37	39	60
Injury of wrist, hand and finger(s) (S69.9)	32	47	37	44	51
Chest pain (non-cardiac) (R07.89)	38	40	39	41	46
Fever, unspecified (R50.9)	35	44	30	45	38
Injury of face (S09.93)	34	31	45	42	40
Other	1023	1117	1254	1325	1421
Total	3089	3267	3502	3703	3777

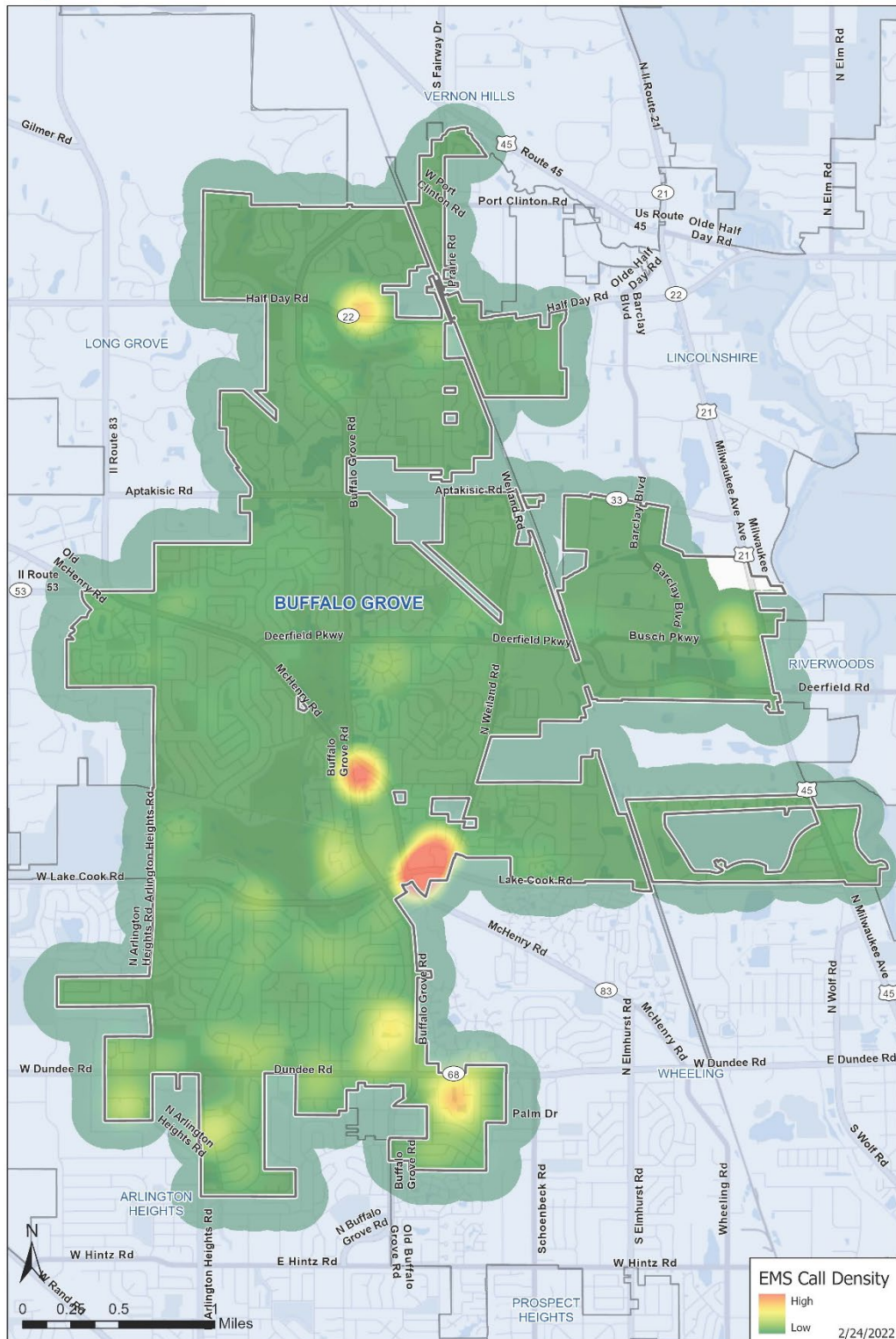


Incident Distribution



EMS Call Density 2017-2021

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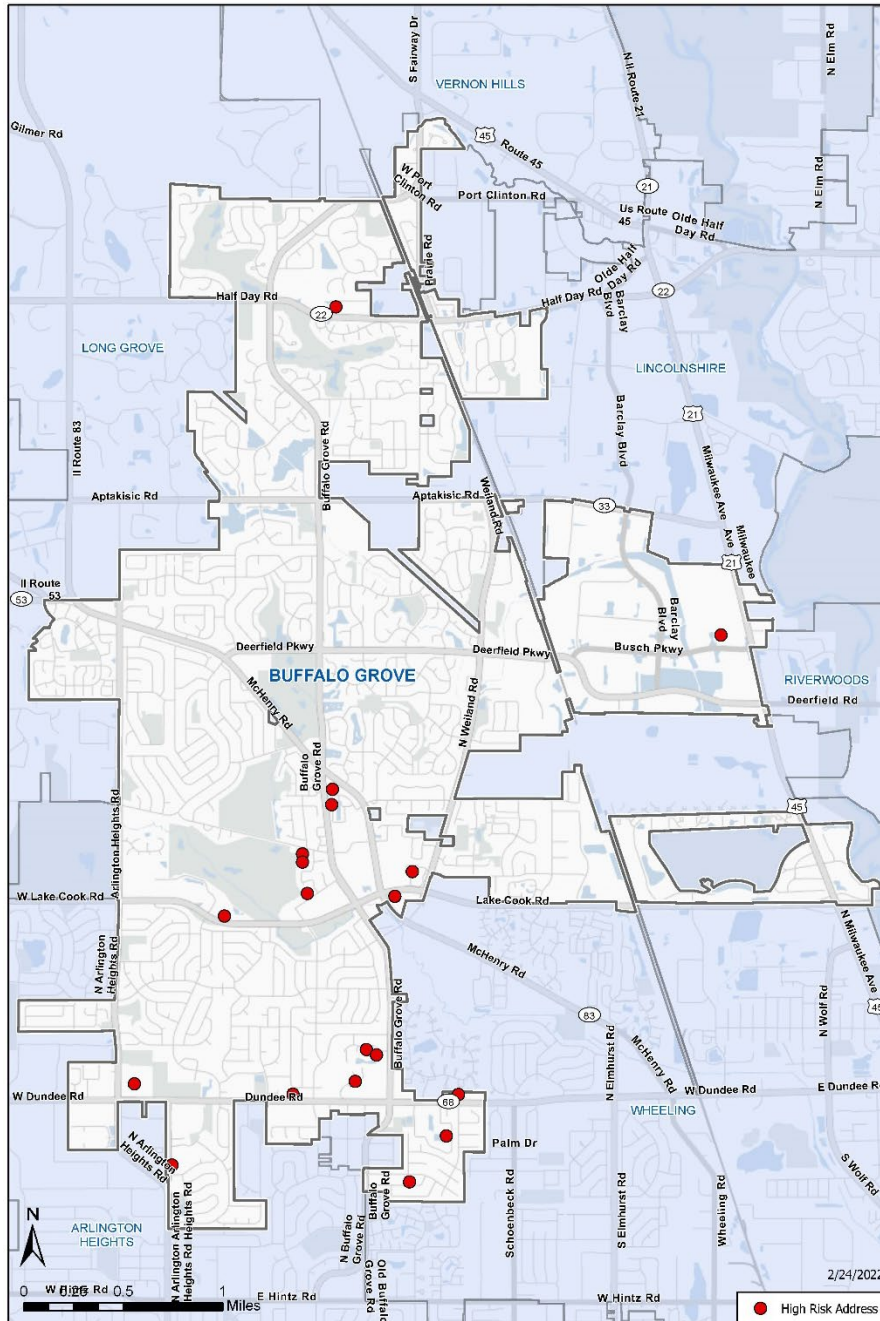
Geospatial Analysis of EMS Risk

As noted above, EMS calls make up the majority of the calls that the Buffalo Grove Fire Department receives. However, these calls are not evenly distributed amongst all addresses or address types. From 2017-2021, just 20 addresses of the Village's roughly 19,910 addresses have contributed 24% of the EMS call volume. These 20 addresses represent many of the risk factors for EMS calls including population density, age, and a concentration of self-reporting ill individuals. These 20 addresses have been identified as high risk due to the high level of occurrence and have been noted as such in the map below.



EMS Highest Risk Addresses

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Hazardous Materials

Hazardous materials incidents involve the release of a dangerous chemical. The chemicals involved can include a variety of household and industrial chemicals. The two most common types of hazardous materials incidents within the Village are gas leaks involving natural gas or liquefied petroleum gas and carbon monoxide incidents. While hazardous materials incidents make up a small percentage of the annual call volume for the Department, these incidents have the potential to have the largest impact on the community as a whole. Should an industrial release occur, it can rapidly impact a significant portion of the population.

Hazard Levels

After consideration of the effects of each incident type on the Department and on the Village as a whole, as well as the likelihood of occurrence, the Department has created the following designations for hazardous materials risk:

Low Risk: Activated carbon monoxide alarms, exterior chemical odors, small fuel/fluid spills and general hazardous material investigation have been identified as low risk events. While this category includes some of the most frequent hazardous materials calls within Buffalo Grove, the low impact to both the community and limited resources required to mitigate correspond with a low-risk rating.

Moderate Risk: Reports of indoor chemical odors, as well as localized active release of gas and carbon monoxide are characterized as moderate risk. Once verified, these incident types have the potential for significant harm to health and can require a moderate number of resources to mitigate.

High Risk: Due to their size and potential impact, large-scale hazardous materials releases have been identified as high risk. These types of releases would likely require the activation of the Hazardous Materials Special Team.

Critical Tasks Required

Low Risk HazMat Critical Tasks			
	Critical Task Description	Number of Personnel Needed	Recommended Unit
	Command/Safety	1	First Fire Company
	Investigation	2	
Total	2 Tasks	3 Personnel	1 Unit



Moderate Hazmat Critical Tasks			
	Critical Task Description	Number of Personnel Needed	Recommended Unit
	Incident Command	1	Battalion Chief
	Scene Safety	1	Safety Chief Officer
	Hazmat Division Officer	1	First Engine
	Investigation/Entry	2	
	Backup	3	First Truck
	Science/Research	1	Second Truck
	Decontamination	2	
	EMS/Treatment	2	First Ambulance
Total	8 Tasks	13 Personnel	6 Units

High Risk HazMat Critical Tasks			
	Critical Task Description	Number of Personnel Needed	Recommended Unit
	Incident Command	1	First Chief
	Scene Safety	1	Second Chief
	Operations Chief	1	Third Chief
	Staging Chief	1	Fourth Chief
	EMS Operations Group Supervisor	2	First Ambulance
	Rehab	2	Second Ambulance
	EMS Standby	6	Third - Fifth Ambulance
	Recon and Support	3	First Engine
	Valets	6	First and Second Trucks
	Decon Team	6	Second and third Engine
	HazMat Group Supervisor	1	MABAS Division 1 Hazardous Materials Regional Team*
	HazMat Safety	1	
	Entry Group Supervisor	1	
	Entry Team A	3	
	Entry Team B	3	
	Entry Team C	3	
	Decon Group Supervisor	1	
	Science and Information	2	
	Logistics	2	
Total	19 Tasks	46 Personnel	

*Traditional MABAS Division 1 Regional Team response is a minimum of twenty members with assorted HazMat Squad-type vehicles of varying design



Incident Frequency

As shown in the chart below, the number of hazardous materials since 2019 has experienced a slight reduction, with the majority of calls relating to a leak of natural or propane gas. While these calls are generally low risk events, each hazardous materials call has the potential to have significant impacts on life and property if not properly mitigated.

Hazardous Materials Incident Type	2019	2020	2021	2022	2023
400 - Hazardous Condition Other	2	0	0	0	0
410 - Combustible/flammable gas/liquid condition, other	5	5	3	3	0
411 - Gasoline or other flammable liquid spill	8	2	6	5	6
412 - Gas leak (natural gas or LPG)	95	77	83	72	72
413 - Oil or other combustible liquid spill	0	2	1	0	1
420 - Toxic condition, Other	0	0	0	1	1
421 - Chemical hazard (no spill or leak)	0	0	1	0	1
422 - Chemical spill or leak	5	4	4	3	1
424 - Carbon monoxide incident	20	25	20	21	17
451 – Biological hazard, confirmed or suspected	1	0	0	0	0
4201 – Carbon Dioxide Leak/Incident (CO2)	0	0	0	0	3
Total	136	115	118	105	102

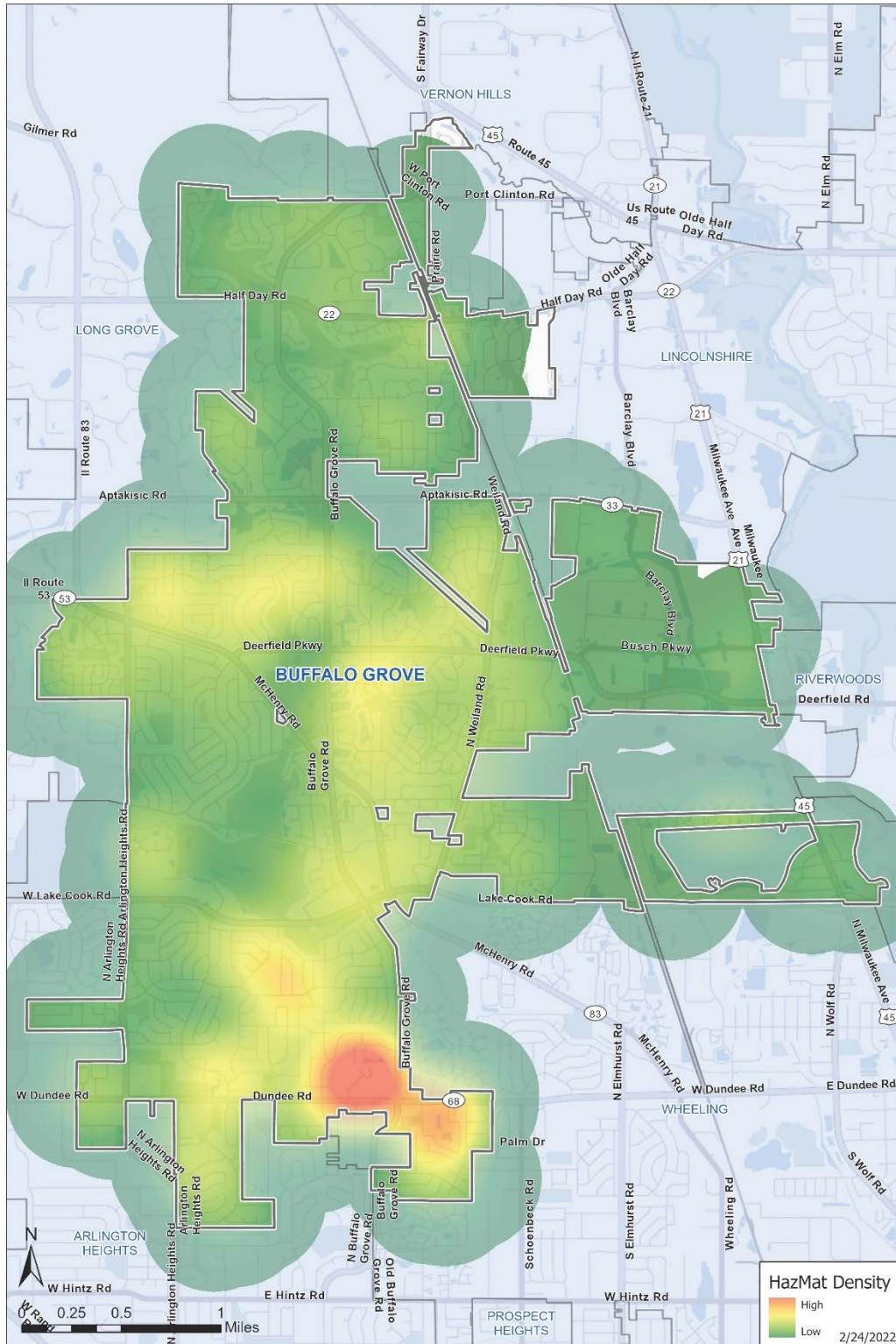


Incident Distribution



HazMat Call Density 2017-2021

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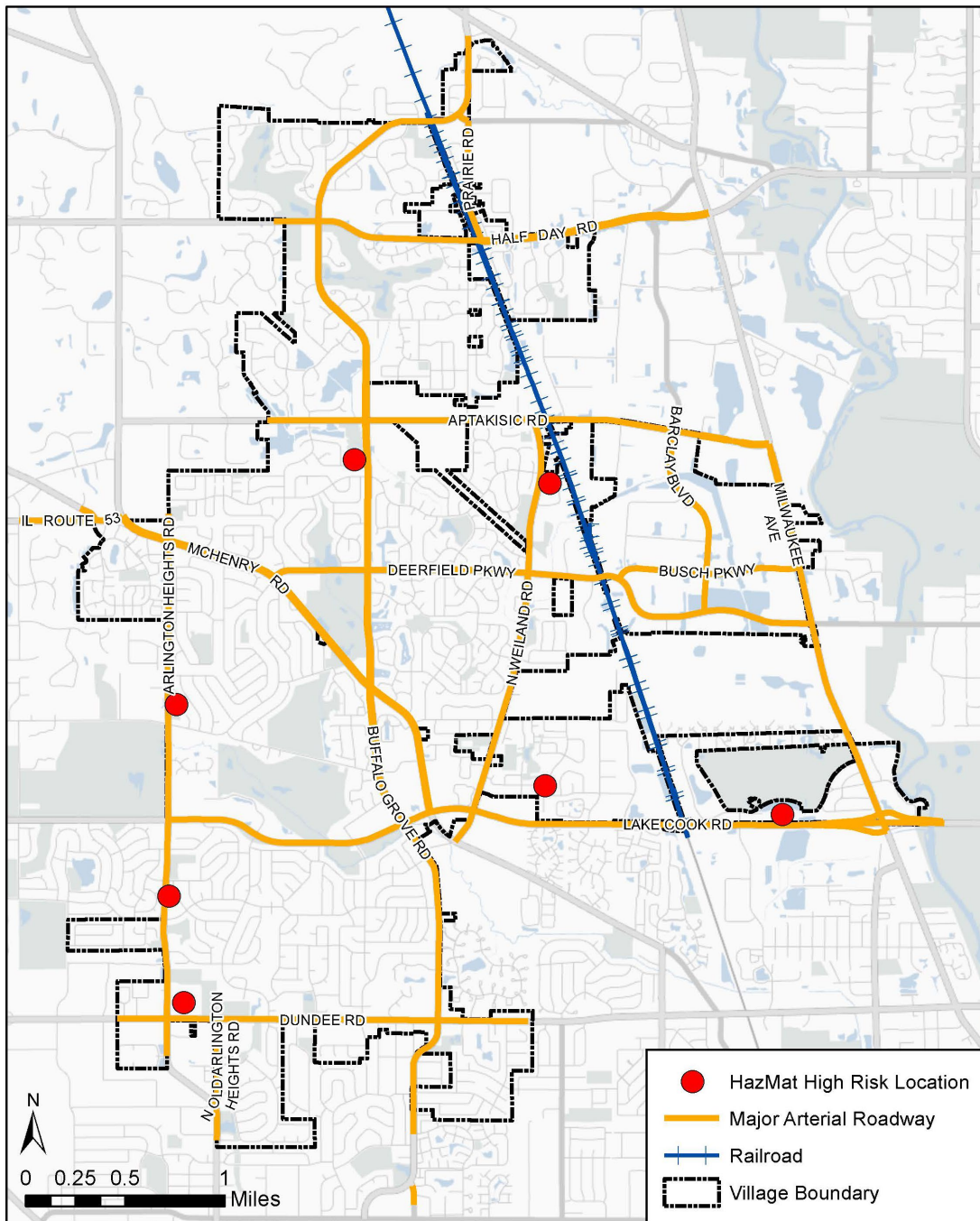
Geospatial Analysis of Hazardous Materials Risk

Unlike fire and EMS incidents, hazardous materials incidents have a limited history within the Village and are difficult to predict. However, certain locations within the Village such as known chemical storage sites, railway lines, and major arterials routes have been identified as high risk. Due to the constant physical presence or transportation of hazardous materials at these locations, they are naturally at a higher risk of an incident occurring.



HazMat High Risk Locations

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Special Rescue

The Buffalo Grove Fire Department has the ability to provide a number of special rescue services including trench collapse, structural collapse, confined space, and high and low angle rescue. While many of these rescue types are coordinated by the Buffalo Grove Technical Rescue Team, several, particularly elevator entrapment, are capable of being handled by the first responding units. Each special rescue incident type requires specific knowledge and training to safely execute the rescue.

Hazard Levels

After consideration of the effects of each incident type on the Department and on the Village as a whole, as well as the likelihood of occurrence, the Department has created the following designations for Special Rescue risk:

- Low Risk:** The Village's most frequent special rescue incidents, elevator entrapments and lock outs, have been defined as low risk. Both incidents have a limited impact to both the community and the Department.
- Moderate Risk:** The Department has determined low and high angle rescue, trench collapse, confined space rescue, cold water rescue, dive rescue, wires down incidents, and vehicle collisions with buildings to be moderate risk. Depending on the exact circumstances, these incident types may require activation of the relevant specialized rescue team and elevate the incident into a high-risk category. The associated critical tasks for the medium risk category are relevant to incidents which do not require activation of a specialized rescue team.
- High Risk:** Incidents which require the activation of a specialized rescue team have been defined as high risk due to their impact on Department resources and the safety risk to both the patient and personnel.

Critical Tasks Required

Low Risk Special Rescue Critical Tasks			
	Critical Task Description	Number of Personnel Needed	Recommended Unit
	Command/Safety	1	First Fire Company
	Rescue	2	
Total	2 Tasks	3 Personnel	1 Unit

Moderate Special Rescue Critical Tasks			
	Critical Task Description	Number of Personnel Needed	Recommended Unit
	Command	1	Battalion Chief
	Scene Safety	1	Safety Chief Officer
	Rescue Group Supervisor	1	First Engine
	Rescue Team	2	
	Backup Team	3	First Truck
	Valet/Equipment	3	Second Truck
	EMS/Treatment	4	First and Second Ambulance
Total	6 Tasks	15 Personnel	7 Units



High Risk Technical Rescue Critical Tasks			
	Critical Task Description	Number of Personnel Needed	Recommended Unit
	Incident Command	1	First Chief
	Scene Safety	1	Second Chief
	Ops Chief	1	Third Chief
	Staging Chief	1	Fourth Chief
	EMS Operations Group Supervisor	2	First Ambulance
	Rehab	2	Second Ambulance
	EMS Standby	6	Third - Fifth Ambulance
	Equipment and Rigging	6	First and Second Trucks
	Recon and Support	3	First Engine
	Decon Team	6	Second and Third Engine
	Rescue Group Supervisor	1	MABAS Division 1 Technical Rescue Regional Team*
	Rescue Safety	1	
	Entry Group Supervisor	1	
	Rescue Team A	3	
	Rescue Team B	3	
	Rescue Team C	3	
	Sonar Group Supervisor	1	
	Sonar Team	2	
	Logistics	2	
Total	19 Tasks	46 Personnel	

*Traditional MABAS Division 1 Regional Team response is a minimum of twenty members with assorted Squad-type vehicles of varying design

High Risk Dive/Water Rescue Critical Tasks			
	Critical Task Description	Number of Personnel Needed	Recommended Unit
	Incident Command	1	First Chief
	Scene Safety	1	Second Chief
	Ops Chief	1	Third Chief
	Staging Chief	1	Fourth Chief
	EMS Operations Group Supervisor	2	First Ambulance
	Rehab	2	Second Ambulance
	EMS Standby	6	Third - Fifth Ambulance
	Valets	6	First and Second Trucks
	Recon and Support	3	First Engine
	Decon Team	6	Second and Third Engine
	Dive Group Supervisor	1	MABAS Division 1 Dive Regional Team*
	Dive Safety	1	
	Entry Group Supervisor	1	
	Entry Team A	3	
	Entry Team B	3	
	Entry Team C	3	
	Sonar Group Supervisor	1	
	Sonar Team	2	
	Logistics	2	
Total	19 Tasks	46 Personnel	

*Traditional MABAS Division 1 Regional Team response is a minimum of twenty members with assorted Squad-type vehicles of varying design



Incident Frequency

Historically, there have been a low number of special rescue incidents within the Village. However, special rescue incidents are often accompanied by the high levels of risk for both the victim and for responding Department personnel and continued observation of call volume is necessary to ensure mitigation of the high risk associated with these events.

Special Rescue Incident Type	2019	2020	2021	2022	2023
331 - Lock-in	3	1	3	3	2
340 – Search for lost person, Other	1	1	0	0	0
341 – Search for person on land	0	0	1	0	0
342 - Search for person in water	6	2	3	2	6
343 - Search for person underground	0	0	0	0	0
350 - Extrication, rescue, Other	0	0	0	0	0
351 - Extrication of victim(s) from building/structure	0	0	0	0	0
353 - Removal of victim(s) from stalled elevator	12	7	22	20	11
354 - Trench/below-grade rescue	0	0	0	1	0
355 - Confined space rescue	0	0	0	0	0
356 - High-angle rescue	0	0	0	0	0
357 - Extrication of victim(s) from machinery	0	1	0	0	0
360 - Water & ice-related rescue, other	2	0	0	1	2
361 - Swimming/recreational water areas rescue	1	1	2	1	0
362 - Ice rescue	1	0	0	1	0
372 – Trapped by power lines	1	0	0	0	0
461 - Building or structure weakened or collapsed	6	1	0	4	1
Total	36	13	31	31	22

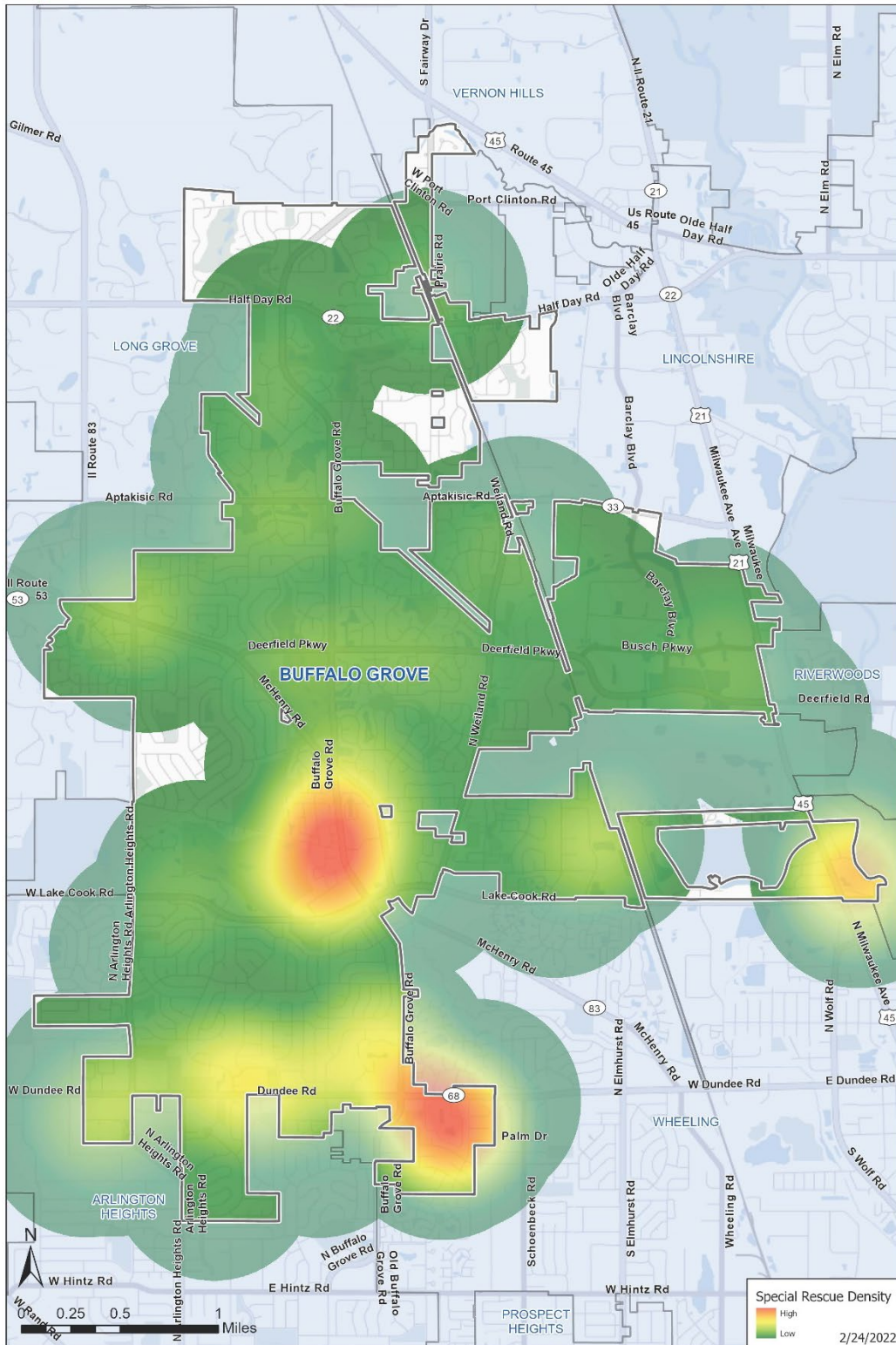


Incident Distribution



Special Rescue Call Density 2017-2021

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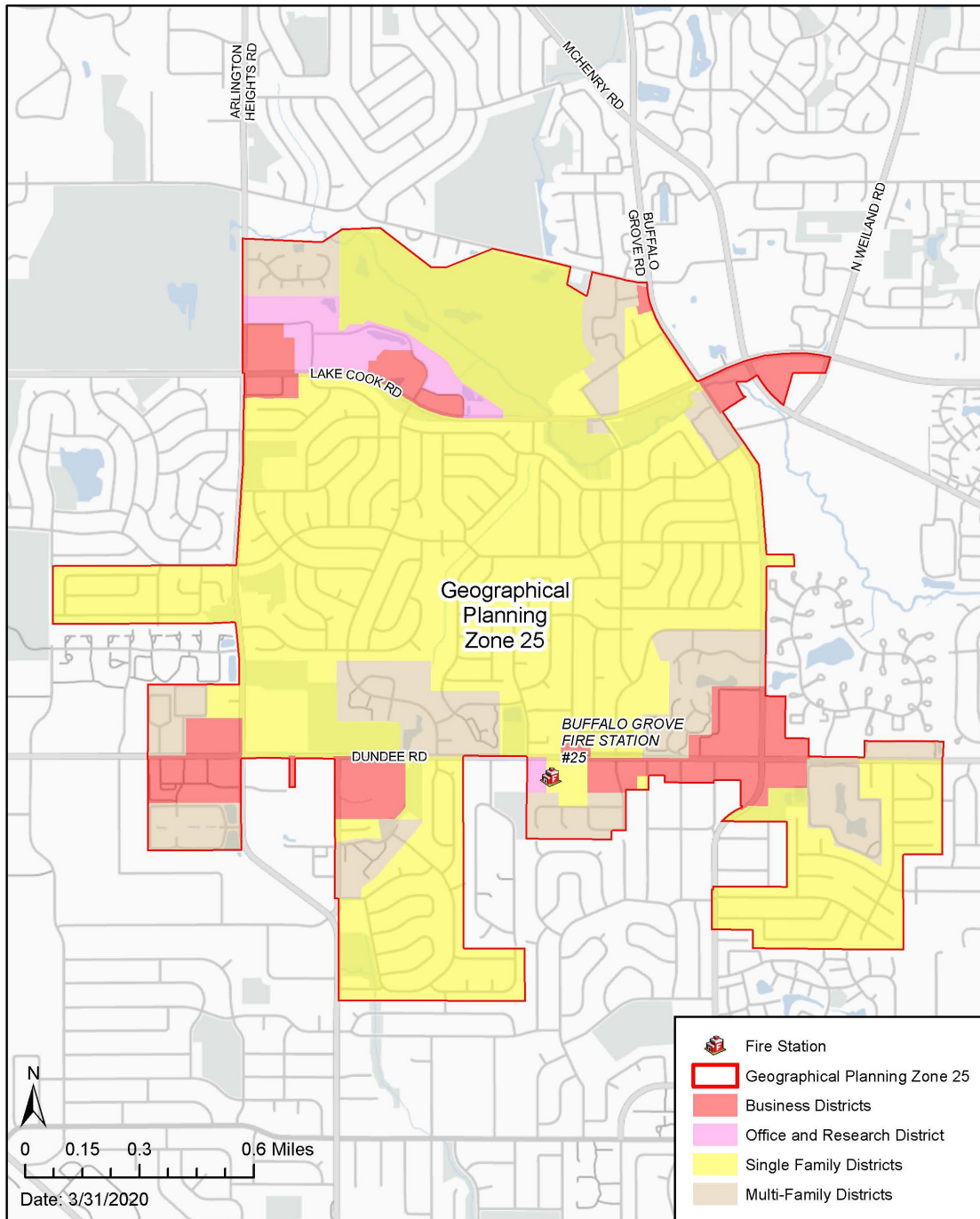
Risk Analysis by Geographical Planning Zone

The Buffalo Grove Fire Department analyzes risk utilizing geographical planning zones that correspond with the Department's station response districts. By analyzing risk in this manner, the Department can better understand the distribution of risk throughout the Village, as well its primary causal factors. In addition, by aligning its geographical planning zones with its response districts, the Department can better integrate accreditation concepts at the station level and can better manage agency performance.





Geographical Planning Zone 25 GIS Consortium



Geographical Planning Zone 25 is the southernmost planning zone within the Village and is served by Fire Station 25. Planning Zone 25 covers 2.5 square miles in the south of Buffalo Grove and an estimated population of 14,393. The zone is bordered in the southwest by Arlington Heights and in the southeast by Wheeling.



Socioeconomic Risk Factors

While the Village is fairly homogenous, Zone 25 contains high concentrations of the highest risk population categories for EMS and fire incidents, those 65 years or older. Cambridge on the Lake, a high-rise condominium community located in the southeast portion of the zone, has the highest density within the Village for this population subgroup.

Zoning and Land Use

Zone 25 has three major commercial hubs located at Arlington Heights Road and Dundee Road, Buffalo Grove Road and Dundee Road, and Lake Cook Road and Arlington Heights Road, with a fourth commercial hub located roughly at Buffalo Grove Road and Lake Cook Road on the border between Zone 25 and Zone 26. There is also a significant office complex beginning at Arlington Heights Road and Lake Cook Road and stretching east along Lake Cook Road.

Beyond the above-mentioned hubs, the zone is largely residential. Single family homes make up the vast majority of the land usage within the zone. On average, the homes and corresponding infrastructure within this portion of the Village are the oldest in Buffalo Grove, having developed in the Village's initial growth in 1970. There are also significant concentrations of multifamily buildings within Zone 25, particularly along the Dundee Road corridor.

Transportation Systems

Zone 25 contains two of the Village's major arterial routes, Lake Cook Road and Dundee Road. Dundee Road is also designated as one of the Village's two IDOT Class II truck routes.

Major Arterial	Vehicles Per Day*	Trucks Per Day*
Dundee Road	29,000	775
Lake Cook Road	29,400	-
Minor Arterial		
Buffalo Grove Road	15,400	-
Arlington Heights Road	16,100	-

* Traffic counts signify busiest portion of roadway within Zone.



Hazards and Risks

Zone 25 has the highest call volume in the Village, leading in nearly every call category. After several years of stability in the number of EMS calls, beginning in 2019, Zone 25 has seen a consistent increase in the total number of EMS calls. Should this trend continue, the demand for EMS response may outpace the currently available resources within Zone 25, leading to additional use of mutual aid and out of district Buffalo Grove ambulances.

	2019	2020	Year to Year Change	2021	Year to Year Change	2022	Year to Year Change	2023	Year to Year Change
Fire	32	35	9%	60	71%	37	-38%	38	3%
EMS	1409	1488	6%	1580	6%	1663	5%	1617	-3%
Hazardous Materials	57	38	-33%	49	29%	45	-8%	47	4%
Special Rescue	6	5	-17%	12	40%	12	-	8	-33%
Service Call	140	100	-29%	124	24%	125	1%	129	3%
Canceled, Good Intent	43	34	-21%	24	-29%	32	33%	49	53%
False Alarm	211	149	-29%	175	17%	191	9%	178	-7%
Other	1	0	0%	1	-	1	100%	0	0%
Total	1899	1849	-3%	2025	10%	2106	4%	2066	-2%

Significant Properties

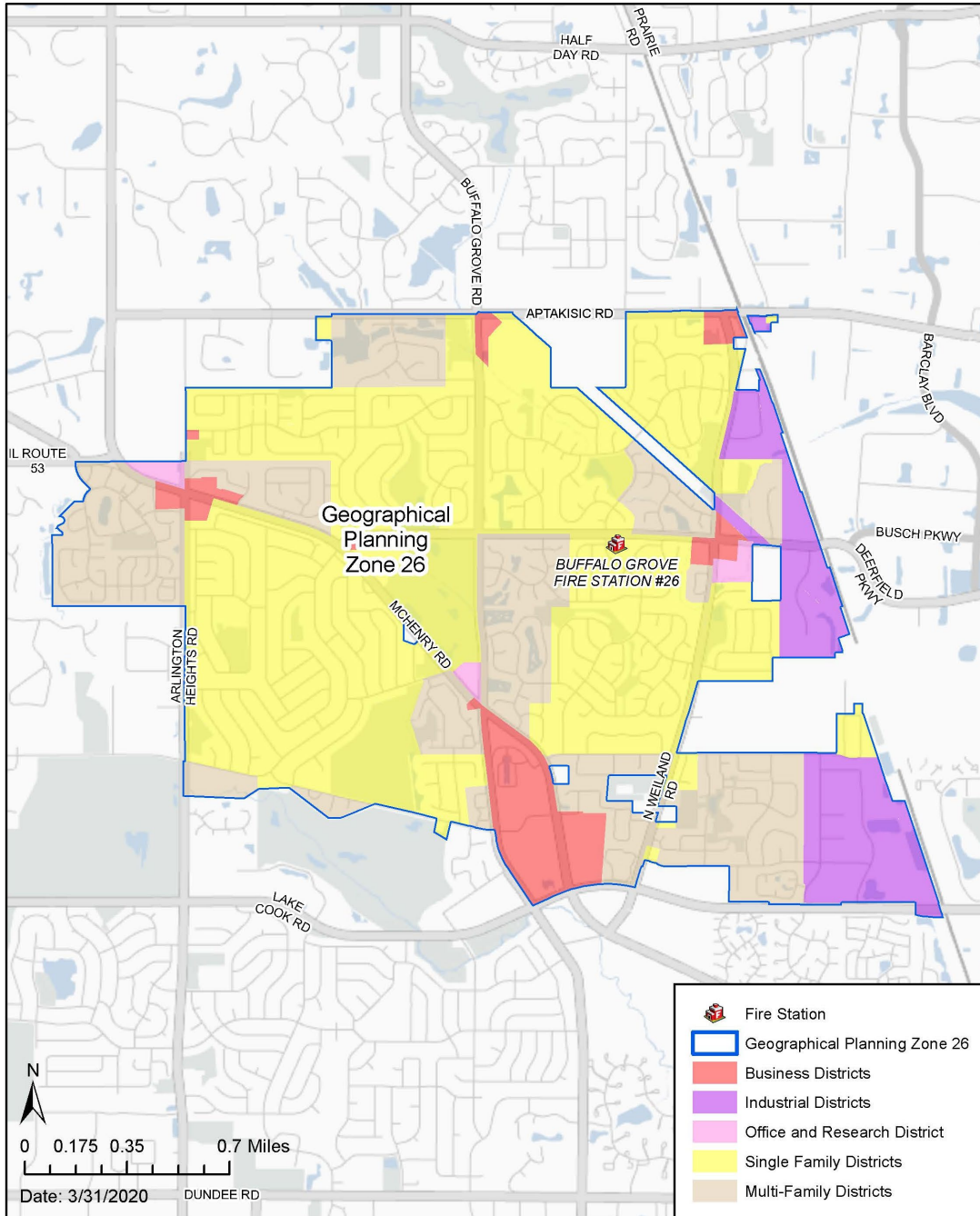
As previously noted, Cambridge on the Lake (0-250 Lake Blvd) poses a unique risk due to its high density of individuals 65 years or older and its high-rise construction. This corresponds with a high demand for EMS and a higher fire risk due to the size of the buildings and the inability of some residents to self-rescue during emergencies.





Geographical Planning Zone 26

GIS Consortium



Geographical Planning Zone 26 makes up the center of Buffalo Grove and matches the boundaries of Still District 26. Zone 26 covers an estimated population of 18,923 and 3.9 total square miles. The Zone is bordered on its north by Geographical Planning Zone 27, on the east by Geographical Planning Zone 28 and Lincolnshire, on the south by Wheeling and Geographical Planning Zone 25, and on the west by Arlington Heights and Long Grove.



Socioeconomic Risk Factors

Zone 26 lacks the clusters of high-risk populations that occur within the other geographical planning zones. The demographics of the study area largely match those of the Village as a whole. The Zone does have an area of significant density located in the residential area north of Lake Cook Road and east of Weiland Road. The Ridgewood Townhomes, located within this area, are a major contributor to the higher density levels in this area.

Zoning and Land Use

Zone 26 is largely residential, with a mix of single family and multifamily housing. In addition to residential units, Zone 26 is also home to a significant commercial center. With the exception of a large commercial hub generally located between the intersection of Buffalo Grove and McHenry Road and the intersection of Lake Cook Road and Buffalo Grove Road, most of the commercial within Zone 26 is located in smaller neighborhood focused commercial centers. These centers can be found at Arlington Heights Road and McHenry Road, Weiland Road and Deerfield Parkway, Aptakisic and Buffalo Grove Road, and at Weiland and Aptakisic Road. Zone 26 is also home to some industrial businesses located along the WC-SOO railway line.

Transportation

Zone 26 contains five minor arterial roadways, and is partially bordered by a major arterial roadway, Lake Cook Road, along its southern edge.

Minor Arterial	Vehicles Per Day*	Trucks Per Day*
Arlington Heights Road	26,700	-
Buffalo Grove Road	12,600	-
Deerfield Road	12,000	-
McHenry Road	19,700	750
Weiland Road	15,00	-

* Traffic counts signify busiest portion of roadway within Zone.

In addition to being home to significant roadways, Zone 26's the eastern border is defined by the WC – SOO railway line.



Hazards and Risks

While there has been some fluctuation, call volume has remained relatively stable within Zone 26. Zone 26 is the second busiest planning zone within the Village and has call type distributions similar to the Village overall, with the vast majority of calls being EMS related.

Due to the presence of the railway tracks along its eastern border, Zone 26 does have some risk of experiencing a train derailment of either a commuter or freight transport train. Should this type of incident occur, significant EMS, hazardous materials, and fire resources could be required.

	2019	2020	Year to Year Change	2021	Year to Year Change	2022	Year to Year Change	2023	Year to Year Change
Fire	26	34	31%	36	6%	36	-	33	-8%
EMS	1017	1032	1%	1093	6%	1229	12%	1346	10%
Hazardous Materials	49	49	-	45	-8%	36	-20%	37	3%
Special Rescue	6	1	-83%	9	900%	3	-67%	3	-
Service Call	137	97	-29%	94	-3%	117	24%	87	-26%
Canceled, Good Intent	37	25	-32%	26	4%	25	-4%	29	16%
False Alarm	170	154	-8%	158	3%	164	4%	154	-6%
Other	1	1	-	2	200%	3	50%	1	-67%
Total	1443	1393	-3%	1463	5%	1613	10%	1690	5%

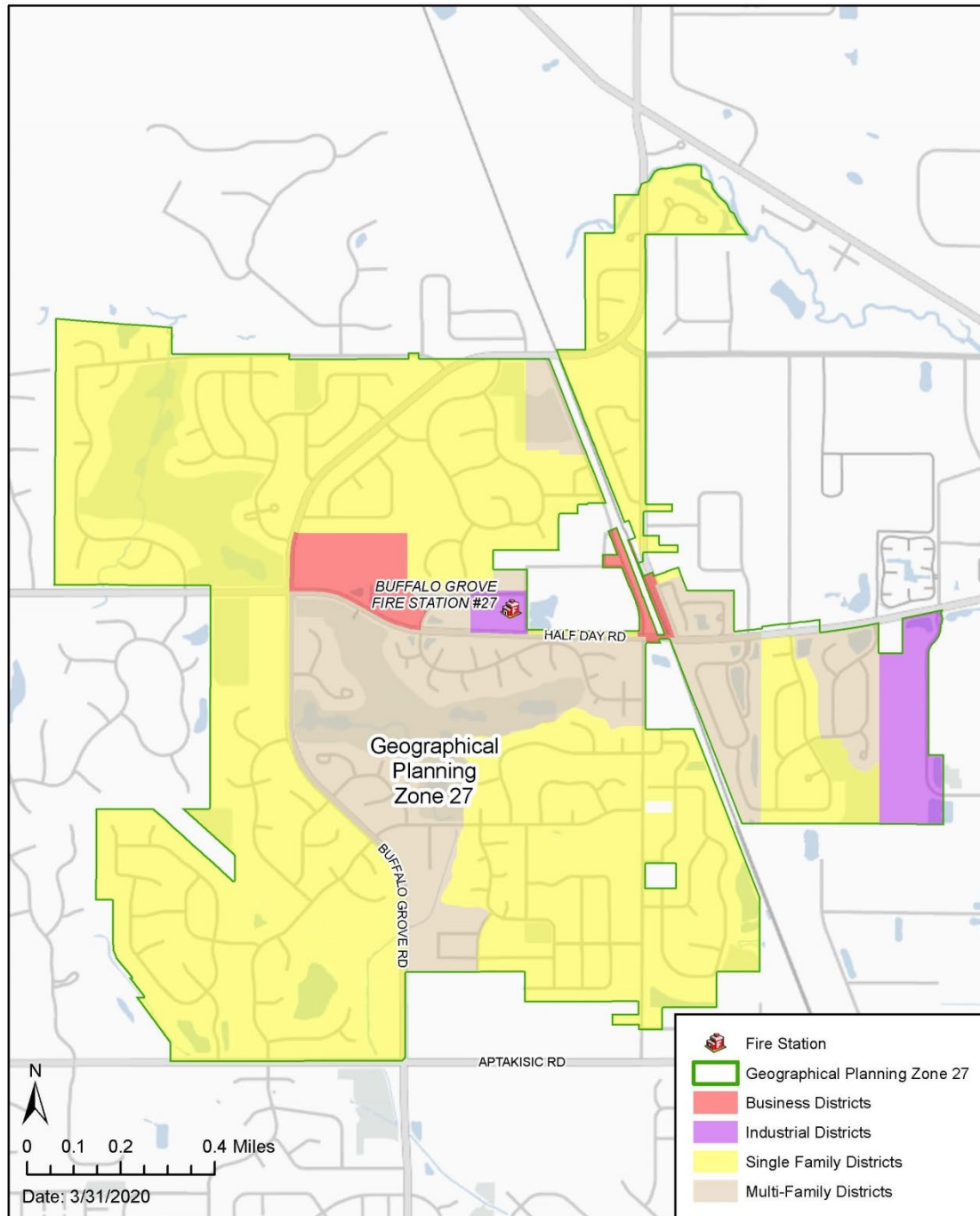
Significant Properties

Zone 26 is home to the Angus Chemical Company, located at 1500 E. Lake Cook. The chemical products on site at the Angus Chemical Company require modification of customary firefighting tactics which results in a higher fire risk.





Geographical Planning Zone 27 GIS Consortium



Geographical Planning Zone 27 is the northernmost planning zone in the Village. It is bordered by Long Grove to the west, in the north by Vernon Hills, in the east by Lincolnshire, and in the south by Zone 26. Zone 27 covers 1.94 square miles and an estimated population of 6,101.



Socioeconomic Risk Factors

The demographics of Zone 27 largely match those Village-wide. However, it is important to note that Tenerife, a subdivision of 148 townhomes in the eastern portion of Zone 27, is home to a high concentration of children under the age of 5. As previously noted, young children are a high-risk population for fires due to their limited ability to escape during dangerous situations.

Zoning and Land Use

Zone 27 is almost entirely made up of single family and multifamily housing, with a commercial center located at Half Day and Buffalo Grove Road and some industrial uses located in the eastern portion of the zone. In addition, Zone 27 contains the Prairie View Metra stop, which sees significant commuter traffic during the work week.

Transportation

Zone 27 contains four minor arterial roadways which see substantial amounts of commuter and local traffic.

Minor Arterial	Vehicles Per Day*
Aptaksic Road	13,300
Buffalo Grove Road	13,300
Half Day Road	19,100
Prairie Road	7,450

*Traffic counts signify busiest portion of roadway within Zone.

In addition to being home to significant roadways, Zone 27 is split into two parts on its eastern side by the WC – SOO railway line. The railway line sees significant levels of both commuter and freight traffic.



Hazards and Risks

Like most of the other planning zones within the Village, call volume has remained stable over the last five years within Planning Zone 27. Similarly, call type distributions largely mirror that of the rest of the Village. EMS calls make up the majority of calls, with The Sunrise of Buffalo Grove, a senior assisted living facility, acting as the primary contributor of EMS calls.

It is important to note that while the percentage of change from year to year may be high in some of the columns in the chart below, the low number of calls reduces the significance of these large percentage swings.

	2019	2020	Year to Year Change	2021	Year to Year Change	2022	Year to Year Change	2023	Year to Year Change
Fire	12	4	-67%	8	200%	15	88%	9	-40%
EMS	290	316	9%	354	12%	394	11%	379	-4%
Hazardous Materials	11	13	18%	9	-31%	10	11%	7	-30%
Special Rescue	0	1	100%	0	0%	0	-	0	-
Service Call	45	27	-40%	27	100%	45	-33%	28	-38%
Canceled, Good Intent	21	9	-57%	10	11%	14	40%	8	-43%
False Alarm	69	73	6%	65	-11%	68	5%	69	1%
Other	1	0	-	0	-	0	-	1	-
Total	449	443	-1%	473	7%	531	12%	501	-6%

Significant Properties

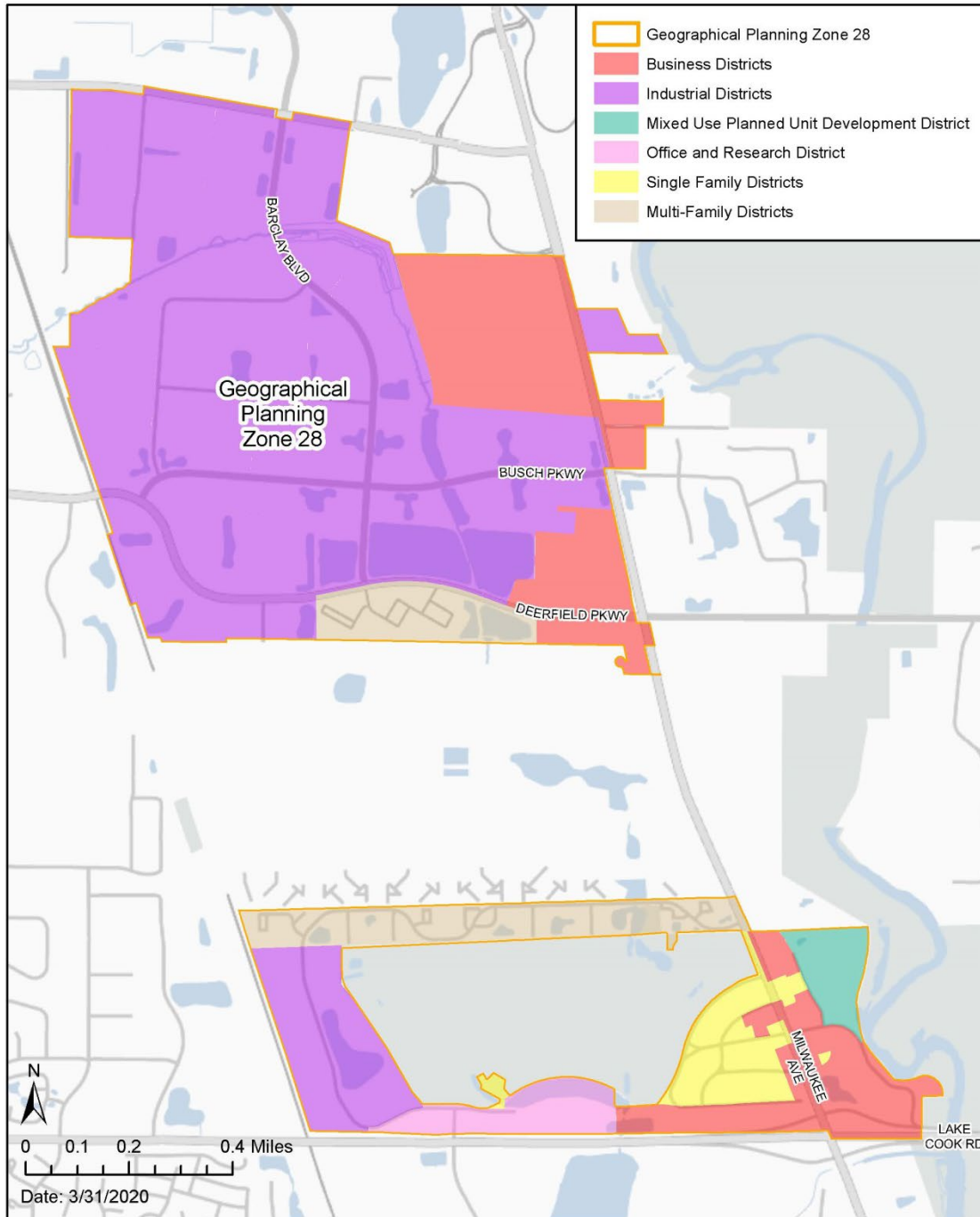
The Sunrise of Buffalo Grove, located 180 W Half Day Road, is a wood framed facility that houses an elderly population that is susceptible to small scale outbreaks from easily transmittable viruses. This is consistent with a higher EMS demand. Additionally, the limited mobility of the residents affects their ability to self-rescue and the building's wood framed construction make this property a higher risk fire.





Geographical Planning Zone 28

GIS Consortium



Geographical Planning Zone 28 makes up the eastern portion of the Village, south of Aptakisic Road. It is split into two distinct portions along Milwaukee Avenue, with a portion of unincorporated Lake County in between. Zone 28 is bordered by Zone 26 to the west and unincorporated Lake County to the east. It covers an estimated population of 1,919 and is made up of 1.24 square miles.



Socioeconomic Risk Factors

The demographics of Zone 28 are similar to the rest of the Village, however there are high concentrations of children under the age of 5 in two apartment complexes, the Wheatlands, located in the north of Zone 28 along Deerfield Road, and in the Greens at Chevy Chase, located along Johnson Drive in the south of Zone 28 along the Chevy Chase Golf Course.

Zoning and Land Use

Unlike other planning zones, Zone 28 is largely made up of industrial, commercial, and office uses. With the exception of the Wheatlands along Deerfield Road, the northern portion of Zone 28 is entirely made up of industrial and commercial uses. In both portions of Zone 28, commercial uses largely front Milwaukee Avenue. In the southern portion, some single family and multifamily housing can be found surrounding the Chevy Chase Golf Course.

Transportation

Zone 28 contains two major arterial roadways, Milwaukee Avenue and Lake Cook Road, as well as two minor arterial roadways.

Major Arterial	Vehicles Per Day*	Trucks Per Day*
Milwaukee Avenue	27,400	1700
Lake Cook Road	33,900	-
Minor Arterial		
Aptaksic Road	15,600	-
Deerfield Parkway	21,700	-

* Traffic counts signify busiest portion of roadway within Zone.

Zone 28 is separated from Buffalo Grove's other planning zones by the WC-SOO railway line, which sees significant amounts of commuter and freight traffic.

Hazards and Risks

While Zone 28 has the fewest number of calls due to its low levels of residential and commercial use, as noted above, Zone 28 has a high concentration of large industrial buildings. These buildings tend to be characterized by high square footage, complex manufacturing processes, and a variety of industrial materials that can contribute to fire load. These issues combine to lead to a general higher level of fire risk for the zone overall.

Another important characteristic of Zone 28 is its separation from Stations 25, 26, and 27. Zone 28 exists entirely east of the WC-SOO railway line, leading to potential delays in response should the Deerfield Parkway crossing be closed due to derailment, construction, or maintenance. To mitigate this risk, the Department operates a temporary station within Zone 28 during periods of planned closures.



	2019	2020	Year to Year Change	2021	Year to Year Change	2022	Year to Year Change	2023	Year to Year Change
Fire	10	17	70%	12	-29%	7	-42%	8	14%
EMS	249	211	-15%	221	5%	193	-13%	188	-3%
Hazardous Materials	1	5	500%	8	60%	7	-12%	3	-57%
Special Rescue	6	2	-67%	4	200%	6	50%	2	-67%
Service Call	11	12	9%	14	14%	10	-29%	6	-40%
Canceled, Good Intent	16	10	-37%	10	100%	3	-70%	7	233%
False Alarm	64	60	-6%	60	100%	46	-27%	59	28%
Other	0	0	-	0	-	0	-	0	-
Total	357	317	-11%	329	4%	272	-17%	273	-

Significant Properties

Woodman's Food Market, located at 1550 Deerfield Parkway, is a large square footage grocery store which contains various building systems including refrigeration and solar. The high variety of mechanical systems, combined with the large size of the building, contributes to a higher fire risk.



Chapter 3 – Deployment and Performance Analysis

Data Policy

Statement of Purpose

Data, particularly time performance measures, is one of the Buffalo Grove Fire Department’s most valuable strategic resources. To maintain the integrity of analyses conducted using time performance measures, it is necessary to establish a methodology for the treatment of outliers within Department datasets. The consistent use of the methodology throughout all performance analyses ensures the validity of the dataset and for the accurate identification of trends over time.

Data Exclusion Methodology

In order to ensure that any analysis conducted using the Department’s data is an accurate depiction of the Department’s performance, the Department has instituted an exclusion policy for the elimination of outliers within data sets. By consistently using the implemented exclusion policy, the Department ensures that regardless of the individual conducting the analysis, reliable conclusions can be logically reached without the influence of outliers.

The creation of data thresholds for incident times allows the Department to isolate and exclude data points identified as inaccurate or as outliers. Upper thresholds represent the highest value included in the analysis, while the lower threshold marks the lowest point included in the analysis. Any data outside of the upper and lower thresholds is removed from the dataset prior to analysis.

To determine appropriate lower thresholds for turnout, staff simulated the activities from the dispatch of the unit to the departure of the unit from the station under ideal circumstances. Using this simulation, staff determined that no turnout could logically take less than 15 seconds. Any time less than 15 seconds would likely depict an error in the report of the times or a situation in which turnout did not take place such as when the unit is dispatched while out of the station. While a worst-case turnout scenario is difficult to simulate, command staff determined that no accurate turnout time would exceed 4 minutes. Similarly, simulations of travel, response, and commitment activities are difficult to conduct to determine appropriate thresholds. Command staff determined that call times that fall outside of the outlined lower and upper thresholds likely reflect errors in the incident reports. It is important to note that Department staff believes the thresholds to be inherently conservative, as in all cases the upper threshold is substantially greater than two standard deviations above the mean.

Thresholds				
	Turnout	Travel	Response	Commit
Lower	0:00:15	0:00:30	0:00:30	0:00:00
Upper	0:04:00	0:12:00	0:20:00	4:00:00

For the analysis of data within the Standards of Cover, staff utilized incident data from 2019-2023. The effects of the implementation of the thresholds can be seen in the chart below. It is important to note that these thresholds were only applied to times associated with Buffalo Grove Fire Department units, as responding units from other jurisdictions likely have increased response times due to extended travel



times. Similarly, the Department lacks access to the performance data of other jurisdictions, making it impossible to accurately set thresholds for their performance.

Percent of Data Included after Exclusion of Outliers	
Turnout	95.80%
Travel	98.55%
Response	99.42%
Commit	99.74%

In addition to removing outliers through the use of thresholds as depicted above, the Department also removes any non-emergent responses and responses to addresses outside of Buffalo Grove from the dataset. By removing these responses, the analysis better represents the performance of the Department in providing its essential programs.



Current Deployment and Performance

The Department’s current and future performance will be analyzed using metrics relating to three concepts: distribution, concentration, and reliability. While each of these concepts measure particular aspects of the Department’s performance, the Department must balance its resources to ensure that it adequately mitigates the community’s risks without emphasizing one concept over another. The concepts described below serve as the basis of the Department’s performance metrics, their related baselines, and the creation of performance benchmarks.

While comparisons to like-sized fire agencies can allow for an analysis of performance, the Department has not included a comparison analysis between agencies due to uncertainty regarding the data policies and methodologies of external agencies. In addition, uncertainty surrounding the varying hazards and risks that drive deployment decisions for other fire agencies contributed to the decision to exclude an external analysis from the Standards of Cover.

Distribution

Distribution, which is defined as the physical location of first-due resources, seeks to measure the ability of first due resources to arrive on scene in time for effective initial mitigation of all hazards. Distribution locations (fire stations) have been created to allow for the effective deployment of distribution resources (apparatus and personnel). While numerous factors go into the site selection process for distribution locations, the ability of a location to allow for effective response to risk has been, and will continue to be, the primary factor in station placement decisions for the Department.

Descriptive Metric	Fire	EMS	Overall
Population per First-Due Resource	13,779	20,668	8,267
Square Miles per First-Due Resource	3.19	4.79	1.92
Road Miles per First-Due Resource	54	81	32.4

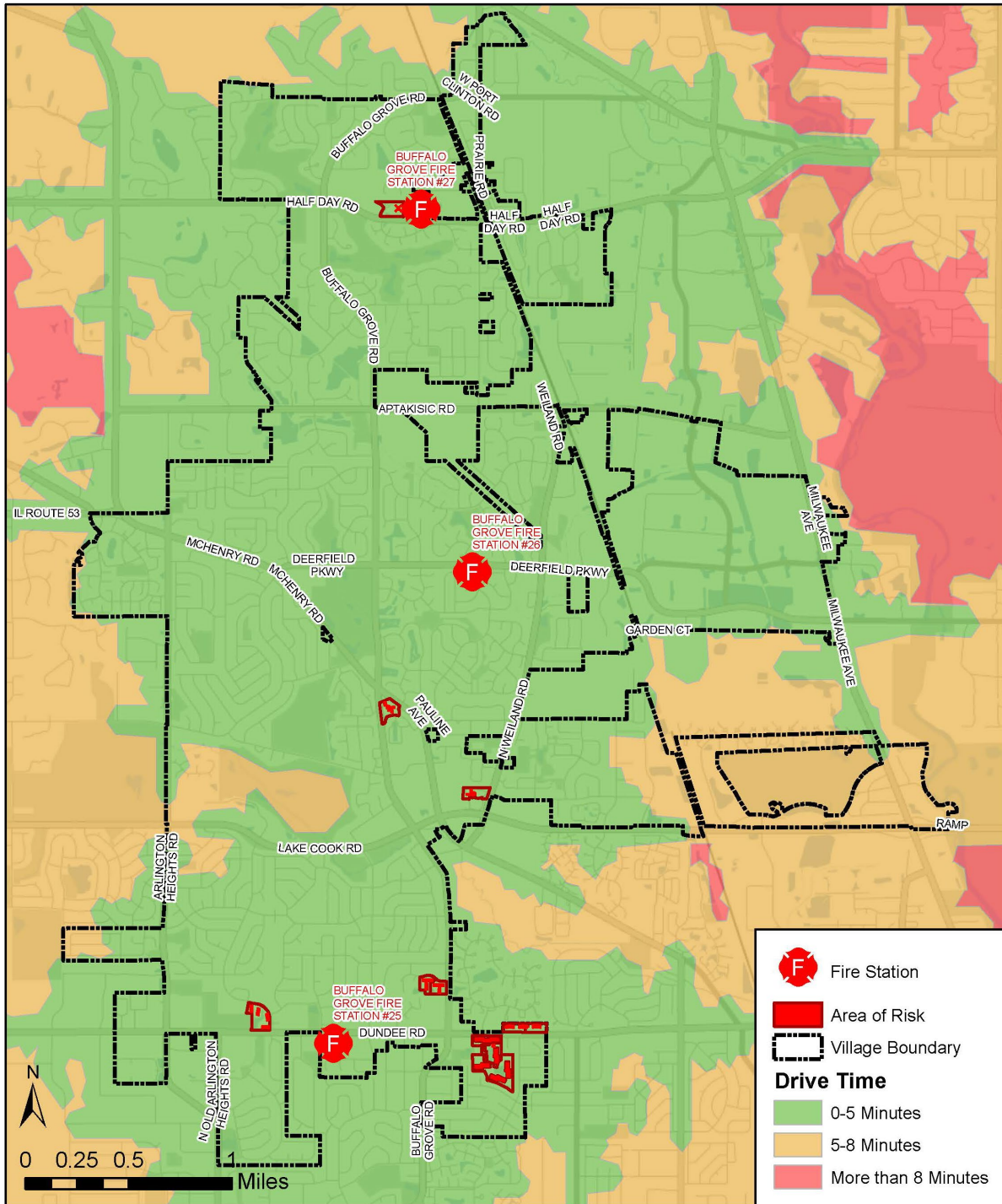
Measures of Distribution

In order to accurately assess the effectiveness of the Department’s resource distribution system, this analysis relies upon two measures: drive time analysis and system wide first due arrival times. These two measures create a clear understanding of how the positioning of the Department’s fire stations affects the Department’s ability to effectively prevent incidents from escalating through the rapid deployment of first due resources.



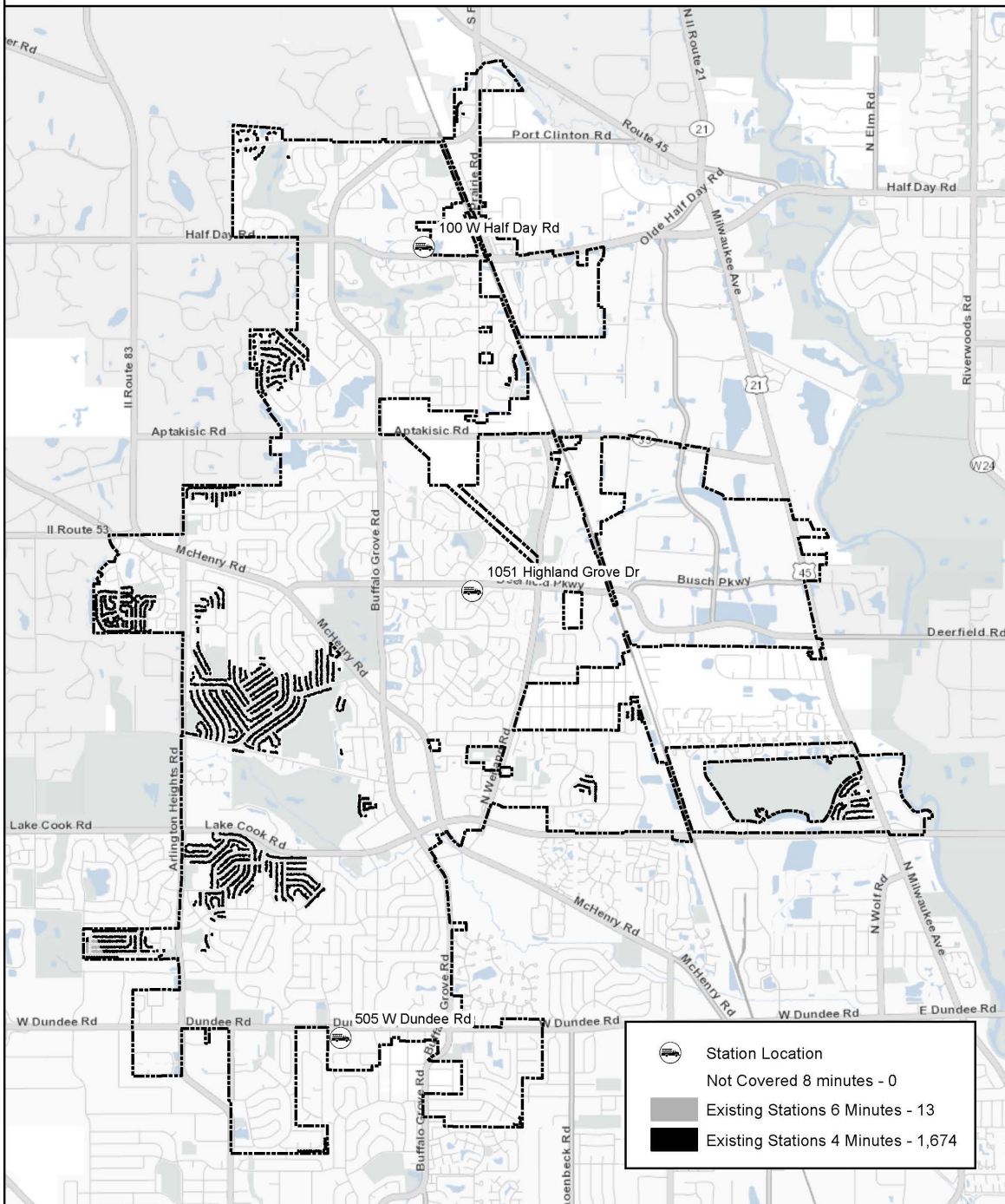
Drive Time Analysis

The below maps seek to illustrate the current ability of the resource deployment to effectively and quickly respond to the Department's service area. While instructive, it is important to note that these maps reflect non-emergent travel time for small automobiles and assumes adherence to all traffic laws. Despite this limitation, the below maps do sufficiently indicate the Department's coverage of its service area.





Single Family Homes Outside of Non-Emergent 4 Minute Travel Time



First Due Arrival Times

In order to measure the effectiveness of the Department’s resource distribution, first-due arrival times are considered to be the best available metric. First-due arrival times are defined as the difference between the receipt of the call at the dispatching center and the arrival of the first unit on scene.

In addition to allowing measurement of the Department’s distribution to provide for initial response, first-due arrival times can also provide for an analysis of equity between first-due districts. If resources are unevenly distributed, certain areas within the service area may experience longer response times. While certain areas of the Village may pose less risk, all residents within the Department’s service area expect equal levels of service.

2020-2023 90 th Percentile Performance Measurements					
	Zone 25	Zone 26	Zone 27	Zone 28	System Wide
Alarm Handling	2:38 N=6518	2:40 N=4956	2:38 N=1499	2:57 N=893	2:40 N=13873
Turnout Time	2:13 N=5644	2:20 N=4241	2:40 N=1298	2:19 N=754	2:19 N=11944
Travel Time	5:05 N=6423	4:55 N=4806	5:22 N=1467	6:35 N=877	5:11 N=13580
Total Response Time	6:28 N=6433	6:26 N=4873	6:53 N=1481	8:01 N=874	6:37 N=13668

As shown above, first due response times throughout the Department’s service area are relatively consistent, with the exception of Zone 28. As previously noted, Zone 28 is separated from the remainder of the service area by a railway line and is the only Zone without a resource deployment point. This negatively impacts travel times, leading to an overall increase in the total response times.



Concentration

Concentration is another metric by which to measure the overall system performance. Concentration can be defined as the physical placement and spacing of resources such as equipment and personnel. While distribution focuses on an even geographic spread of resources in order to have rapid response of first due resources, concentration focuses on the grouping of resources to enable the assembly of the entire effective response force. When a department has successfully balanced distribution and concentration, the resource network will be able to prevent further escalation of the incident, provide for safety and security of first responders and civilians, complete all critical tasks as quickly as possible, and allow for the creation of all necessary elements of the command structure, while still ensuring rapid response of first due units. In an effort to meet these requirements, the Department has concentrated and distributed resource types among its fire stations according to the risks and incident frequencies within each planning zone. It is important to note that as the potential for risk increases, concentration of resources should increase as well to allow for assembly of the effective response force required to prevent incidents from escalating and to bring incidents to a quick conclusion.

Measures of Concentration

Risk within the community increases with call volume, and as such, a geographical and time span analysis of call volume is a useful measure of concentration. As call volume increases, both within a specific time period and within a geographic area, it requires more resources to mitigate the risks posed by those calls. Resources should be placed in close proximity, as well as in sufficient amounts, to incident hotspots to allow for the rapid assembly of effective response forces. In addition to this analysis, the 90th percentile effective response force times outlined later in this document help to complete the study of Department's performance as it relates to concentration.



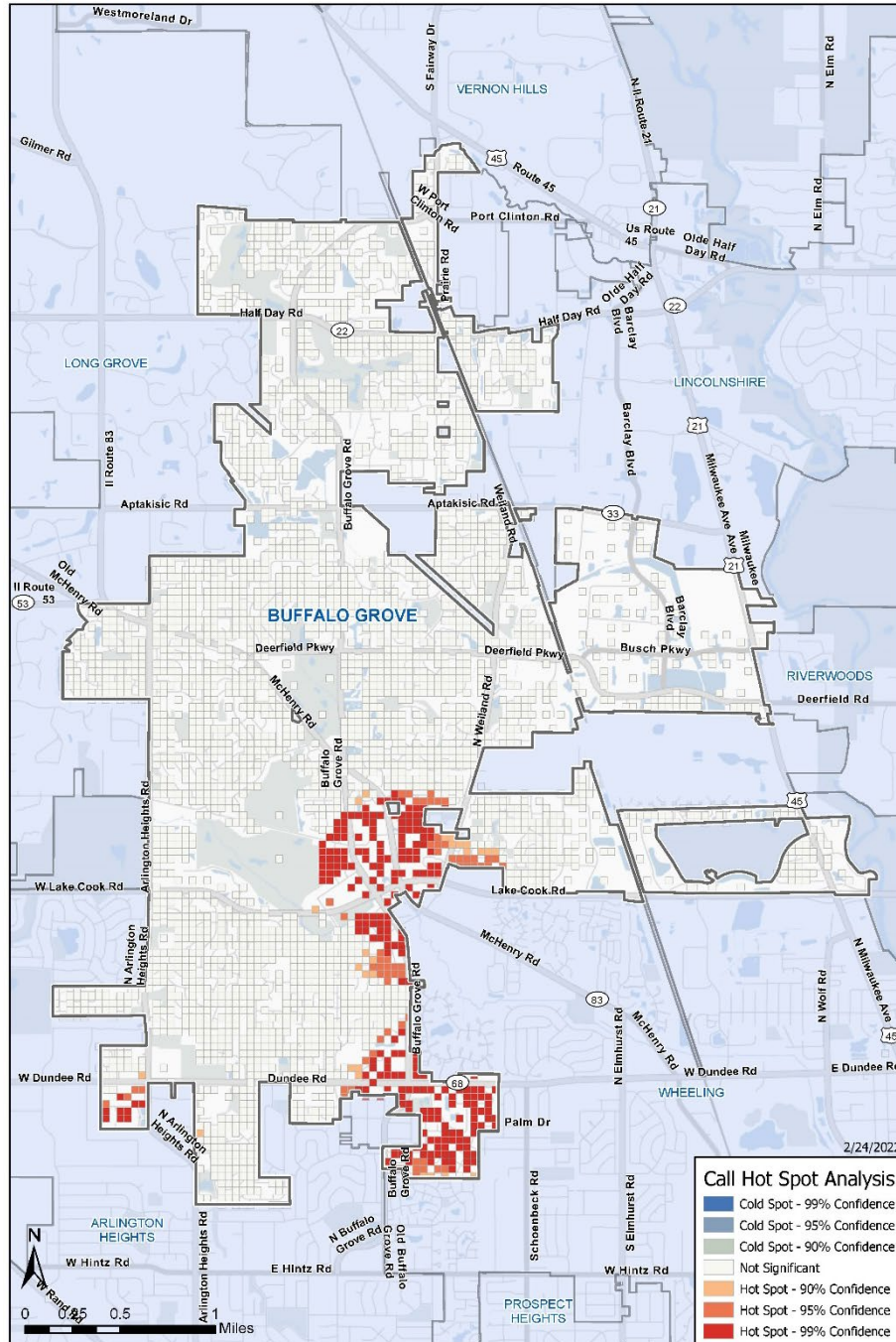
Call Volume Geographical Analysis

The Department has thoroughly examined the geographical density of call volume by risk type and relevant maps can be found within the Risk Assessment portion of this document. However, in addition to examining call density by risk type, the Department has also examined the overall density of calls, regardless of type. As shown in the map below, incidents tend to occur within specific hot zones, all well within reach of the current fire station positions.



Fire Department Call Hot Spot Analysis 2017-2021

GIS Consortium



Call Volume Time Span Analysis

As shown in the chart below, call volumes are heaviest between the hours of 07:00 and 22:00, with calls reducing in volume overnight. However, call volumes remain relatively constant regardless of the time of day and as such, the Department operates utilizing a 24-hour shift schedule to ensure personnel are available to respond at all hours of the day. While there is some variation among different days of the week, call volume largely remains consistent regardless of the day of week.

2019 - 2023 Call Volume by Day and Hour

		Day of Week						
		Sun	Mon	Tues	Wed	Thurs	Fri	Sat
Hour of Day	0	93	89	71	70	78	85	88
	1	84	64	72	64	74	70	65
	2	90	56	68	65	69	48	72
	3	67	65	61	46	55	67	69
	4	65	72	64	54	53	63	79
	5	55	87	55	62	57	73	56
	6	71	102	67	77	94	90	81
	7	93	99	126	131	117	139	86
	8	135	197	187	190	170	174	141
	9	176	213	218	241	188	209	156
	10	182	227	224	194	239	242	212
	11	191	230	228	197	224	219	198
	12	167	209	223	237	216	196	197
	13	191	224	219	224	232	230	197
	14	187	197	210	218	216	239	220
	15	197	218	215	195	222	209	208
	16	165	194	218	205	208	186	168
	17	182	213	224	202	193	173	202
	18	174	181	203	183	197	221	173
	19	184	195	184	189	196	199	194
	20	162	149	174	167	161	162	148
	21	139	155	128	145	155	149	154
	22	102	110	109	112	124	126	146
	23	105	93	93	107	105	106	116



Reliability

The third measure of system performance, reliability, is defined as the ability of Department resources to perform its essential functions in routine situations. Reliability seeks to measure the ability of the Department to quickly recover from incidents and to meet demand as needs evolve. Concurrent incidents can stretch a department's ability to respond and ultimately can force reliance upon external mutual aid resources. While external resources can effectively mitigate risk, they often do so with increased response times due to higher travel times. Analyzing the reliability of Buffalo Grove's resources allows the Department to better understand where and when higher risk levels may occur.

Measures of Reliability

The Department utilizes two primary measures of reliability: unit hour utilization and analysis of the frequency of overlapping calls. Both metrics seek to understand the overall level of use of Department resources, as well as the availability of a unit to respond as intended. While a lower level of utilization may improve a unit's ability to respond within its first due area, a significant investment of staff, apparatus, and monetary resources are required to subsidize that availability. As such, unit hour utilization and the availability of units must be balanced, and the Department must be aware of overvaluing one metric over the other.

Unit Hour Utilization

Unit hour utilization (UHU) seeks to measure the total amount of time that each Department vehicle is committed to an incident. This performance measure originates with private EMS services, which seek to maximize the workload of each ambulatory unit. There are several factors which preclude UHU from being utilized as an effective performance measure for the fire service, and in particular for the Buffalo Grove Fire Department. To meet the response requirements of an all-hazards industry, fire personnel are subject to significant mandated training demands far beyond the requirements of the private EMS industry. These high training requirements prevent the full utilization of the response units. In addition, Buffalo Grove responds to EMS incidents with both EMS and fire units in order to stabilize the scene and to provide the highest possible medical care. While EMS units may transport patients to the hospital, fire units are returned to quarters and made available for dispatch. This leads to a higher time commitment for EMS units on an average call. Another primary difference between the private EMS industry and the Buffalo Grove Fire Department's use of the UHU relates to resiliency. The Village places high value on first due unit availability and reliability. A high UHU reduces the likelihood that a unit will be available within its first due area for any given call, increasing response times and increasing the likelihood of negative outcomes.

While there are other numerous factors that prevent UHU from being an effective measure of efficiency for the Department, UHU does allow for an accurate measure of the use of the Department's services and of the availability of each unit to respond. Unit hour utilization is calculated utilizing the following formula:

$$\text{UHU} = \frac{\text{Total Amount of Time an Apparatus was Committed to a Call}}{\text{Number of Hours in Study Period}}$$

While there is no national standard for UHU, the Department has determined that a UHU exceeding 25% would begin to indicate system stress, which may correspond with higher occurrence of on the job



injuries and increased response times.¹⁶ The UHU for each of the Buffalo Grove Fire Department’s front line units can be found below.

Unit	2022 UHU
Ambulance 25	20.69%
Ambulance 26	22.26%
Ambulance 27	6.72%
Tower 25	8.42%
Engine 26	9.75%
Quint 27	2.21%

As seen in the chart above, Buffalo Grove EMS units are available to respond to emergency incidents approximately 79% of the time, while Buffalo Grove fire units are available to respond more than 90% of the time. As previously noted, fire apparatus UHU lags behind EMS UHU due to the shorter commitment times as a result of a lack of transport ability.

Overlapping Calls

An analysis of overlapping call provides insight to the levels of demand at peak times. Concurrent calls, defined as a calls that are dispatched prior to the conclusion of the previous call, cause an immediate drain on the Department’s available resources. This often causes the use out of district resources to respond, causing longer travel times to the scene of the emergency. The Department’s data for overlapping calls in 2022 can be found below.

Calls in Progress	Hours	Percent of Hours
0 Calls in Progress	7,666.36	87.52%
1 Call in Progress	846.19	9.66%
2 Calls in Progress	203.18	2.32%
3 Calls in Progress	35.4	0.40%
4 Calls in Progress	6.75	0.08%
5 Calls in Progress	1.82	0.02%
6 Calls in Progress	0.3	0%
Total	8,760	100%

¹⁶ *Fire and Emergency Medical Services Operations and Data Analysis Lake Zurich, IL* [PDF]. (2015, February). Washington, DC: Center for Public Safety Management, LLC.



Evaluation of Current Deployment and Performance

90th Percentile Benchmark and Baseline Performance

In order to promote continuous improvement, benchmark performance objectives have been created for each of the Department's major services. In the creation of the Department's performance benchmarks, or the goals to which the Department has committed to meet, the Department considered current capabilities, system demands, community risks, and community expectations. In addition, the Department considered its baseline performance, or the current performance of the Department, in the creation of its performance benchmarks.

Within each of the major performance categories listed below, performance data has been summarized in tables containing both historical performance as well as the Department's performance benchmarks. Within these tables, "n" refers to the number of incidents within each category. It is important to note this figure as small numbers of incidents can cause inaccurate inferences, and as such, drawing conclusions from the data should be cautioned. In cases where the total number of incidents within a particular risk type is less than 10, a reliable 90th percentile cannot be calculated. As such, these data points have been marked as not reportable (N/R).

Within the data tables, Effective Response Force (ERF) is referenced in conjunction with travel and total response time. The Buffalo Grove Fire Department defines the ERF as those resources necessary to address the life safety related tasks. A description of the number of resources and associated critical tasks can be found in the relevant risk analysis portion of this document. In all cases, incidents that took place outside of the Village of Buffalo Grove or were non-emergent were removed from the dataset to ensure that the data tables best reflect the Department's ability to respond to emergencies within its service area.



Fire Suppression

Benchmark Statement: For 90% of all emergent fire incidents, the first due apparatus shall arrive in less than 8 minutes, staffed with 2 firefighters and 1 officer. The first due unit shall be capable of providing 500 gallons of water and a 1500 GPM pumping capacity. Additionally, for moderate risk fires, the Effective Response Force shall arrive in less than 15 minutes with a minimum of 18 personnel. For high risk fire incidents, the effective response force shall arrive in less than 40 minutes with a minimum of 39 personnel.

Baseline Statement: For 90% of all fire incidents, the first due apparatus arrives in less than 9 minutes and 33seconds, staffed with 2 firefighters and 1 officer. The first due unit is capable of providing 500 gallons of water and a 1500 GPM pumping capacity. During the study period, effective response force times were recorded for less than 10 moderate or high-risk fire incidents. As such, this data has not been included in the baseline statement.



Low Risk Fire Suppression 90th Percentile Times – Baseline and Benchmark Performance			Department Benchmark	Department Baseline (2021-2023)	2023	2022	2021	2020*	2019*
Alarm Handling	Pick-up to Dispatch	Urban	2:00	2:19	2:20	2:17	2:16	2:47	3:11
Turnout Time	Turnout Time 1st Unit	Urban	2:15	2:14	2:06	2:14	2:21	2:43	2:28
Travel Time	Travel Time 1st Unit Distribution	Urban	5:00	5:43	5:08	5:54	5:43	6:38	6:25
	Travel Time ERF Concentration	Urban	6:15	5:43	5:06	5:43	5:52	6:10	6:24
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	8:00	9:32	8:24	9:36	9:39	9:57	9:10
				n=100	n=37	n=33	n=30	n=57	n=53
	Total Response Time ERF Concentration	Urban	8:00	9:37	8:24	9:32	9:55	9:37	9:10
				n=100	n=37	n=32	n=51	n=54	n=53

*Data methodology shifted after 2020.



Moderate Risk Fire Suppression 90th Percentile Times – Baseline and Benchmark Performance			Department Benchmark	Department Baseline (2021-2023)	2023	2022	2021	2020*	2019*
Alarm Handling	Pick-up to Dispatch	Urban	2:00	2:05	1:02	1:55	2:18	1:33	2:40
Turnout Time	Turnout Time 1st Unit	Urban	2:15	2:30	1:31	2:40	2:10	3:24	2:46
Travel Time	Travel Time 1st Unit Distribution	Urban	5:00	4:58	4:04	5:10	4:34	6:18	5:03
	Travel Time ERF Concentration	Urban	7:30	27:09	11:54	27:58	23:51	8:40	5:33
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	8:00	8:20	6:32	N/R	N/R	N/R	N/R
				n=15	n=2	n=9	n=4	n=4	n=2
	Total Response Time ERF Concentration	Urban	15:00	28:33	13:36	N/R	N/R	-	N/R
				n=8	n=1	n=7	n=3	n=1	n=2

*Data methodology shifted after 2020.



High Risk Fire Suppression 90th Percentile Times – Baseline and Benchmark Performance			Department Benchmark	Department Baseline (2021-2023)	2023	2022	2021	2020*	2019*
Alarm Handling	Pick-up to Dispatch	Urban	2:00	1:48	1:54	1:26	1:41	1:06	-
Turnout Time	Turnout Time 1st Unit	Urban	2:15	1:37	1:48	0:23	0:15	2:37	-
Travel Time	Travel Time 1st Unit Distribution	Urban	5:00	6:00	5:41	5:08	6:06	4:04	-
	Travel Time ERF Concentratio n	Urban	7:30	0:00	-	-	-	12:40	-
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	8:00	8:22	8:42	N/R	N/R	N/R	-
				n=7	n=3	n=3	n=1	n=6	n=0
	Total Response Time ERF Concentratio n	Urban	40:00	41:29	41:29	-	N/R	N/R	-
				n=1	n=1	n=0	n=0	n=4	n=0

*Data methodology shifted after 2020.



EMS

Benchmark Statement: For 90% of all emergent EMS incidents, the first due unit shall arrive in less than 7 minutes and 30 seconds, staffed with 2 firefighter/paramedics. The first due unit shall be capable of providing scene safety, an initial patient assessment, and advanced life support medical services. Additionally, for moderate risk EMS incidents, the Effective Response Force shall arrive in less than 11 minutes and 50 seconds with a minimum of 7 personnel. For high risk EMS incidents, the effective response force shall arrive in less than 20 minutes with a minimum of 12 personnel.

Baseline Statement: For 90% of all emergent EMS incidents, the first due unit arrives in less than 8 minutes and 47 seconds, staffed with at least 2 firefighter/paramedics. The first due unit is capable of providing scene safety, an initial patient assessment, advanced life support medical services, and transporting the patient to the appropriate medical facility. Additionally, for moderate risk EMS incidents, the Effective Response Force arrives in less than 13 minutes 14 seconds with a minimum of 7 personnel. For high risk EMS incidents, the effective response force arrives in less than 17 minutes and 21 seconds with a minimum of 12 personnel.



Low Risk EMS 90th Percentile Times – Baseline and Benchmark Performance			Department Benchmark	Department Baseline (2021-2023)	2023	2022	2021	2020*	2019*
Alarm Handling	Pick-up to Dispatch	Urban	2:00	2:39	2:36	2:39	2:43	0:03:02	0:02:58
Turnout Time	Turnout Time 1st Unit	Urban	2:05	2:17	2:19	2:16	2:18	0:02:21	0:02:12
Travel Time	Travel Time 1st Unit Distribution	Urban	5:00	5:11	5:01	5:07	5:28	0:05:00	0:05:06
	Travel Time ERF Concentration	Urban	5:00	5:11	4:59	5:07	5:28	0:05:01	0:05:07
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	7:30	8:46	8:36	8:42	9:06	0:08:36	0:08:27
				n=9,031	n=3,192	n=3,126	n= 2,713	n=2756	n=2637
	Total Response Time ERF Concentration	Urban	7:30	8:47	8:36	8:43	9:09	0:08:36	0:08:28
				n=9,036	n=3,194	n=3,127	n=2,715	n=2774	n=2634

*Data methodology shifted after 2020.



Moderate Risk EMS 90th Percentile Times – Baseline and Benchmark Performance			Department Benchmark	Department Baseline (2021-2023)	2023	2022	2021	2020*	2019*
Alarm Handling	Pick-up to Dispatch	Urban	2:00	2:08	1:54	2:22	2:04	3:20	3:24
Turnout Time	Turnout Time 1st Unit	Urban	2:05	2:24	2:21	2:26	2:21	2:22	2:30
Travel Time	Travel Time 1st Unit Distribution	Urban	5:00	5:25	5:13	5:13	5:55	5:10	4:54
	Travel Time ERF Concentration	Urban	6:45	7:34	7:00	7:40	7:46	7:51	7:42
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	7:30	8:24	8:04	8:45	8:35	8:47	8:19
				n=498	n=180	n=170	n=170	n=184	n=256
	Total Response Time ERF Concentration	Urban	11:50	10:31	9:32	11:40	10:48	15:39	12:44
				n=448	n=164	n=158	n=126	n=170	n=241

*Data methodology shifted after 2020.



High Risk EMS 90th Percentile Times – Baseline and Benchmark Performance			Department Benchmark	Department Baseline (2021-2023)	2023	2022	2021	2020*	2019*
Alarm Handling	Pick-up to Dispatch	Urban	2:00	2:22	2:22	2:15	2:26	0:02:38	0:01:42
Turnout Time	Turnout Time 1st Unit	Urban	2:05	2:19	2:29	2:25	2:12	0:02:33	0:01:38
Travel Time	Travel Time 1st Unit Distribution	Urban	5:00	5:27	5:22	5:26	5:25	0:03:53	0:04:08
	Travel Time ERF Concentration	Urban	9:00	10:19	10:07	10:20	9:25	0:05:45	0:04:58
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	7:30	8:26	8:12	8:15	8:27	0:10:07	0:05:47
				n=226	n=67	n=44	n=115	n=12	n=5
	Total Response Time ERF Concentration	Urban	20:00	27:01	27:09	27:22	N/R	0:12:53	0:09:11
				n=33	n=14	n=11	n=8	n=9	n=2

*Data methodology shifted after 2020.



Hazardous Materials

Benchmark Statement: For 90% of all emergent hazardous materials incidents, the first due unit shall arrive in less than 8 minutes, staffed with 2 firefighter/paramedics and 1 officer. The first due unit shall be capable of establishing command, maintaining scene safety, and an initial scene assessment. Additionally, for moderate risk hazardous materials incidents, the Effective Response Force shall arrive in less than 11 minutes and 50 seconds with a minimum of 13 personnel and be capable of making entry into the exclusion zone, providing decontamination, and EMS treatment. For high risk hazardous materials incidents, the effective response force shall arrive in less than 40 minutes with a minimum of 46 personnel and be capable of fielding three entry teams, rehabilitation, and EMS treatment.

Baseline Statement: For 90% of all emergent hazardous materials incidents, the first due unit arrives in less than 8 minutes and 55 seconds, staffed with 2 firefighter/paramedics and 1 officer. The first due unit is capable of establishing command, maintaining scene safety, and an initial scene assessment. Additionally, for moderate risk hazardous materials incidents, the Effective Response Force arrives in less than 22 minutes 2 seconds with a minimum of 13 personnel. During the study period, less than 10 high-risk hazardous materials incidents occurred. As such, this data has been not included in the baseline statement.



Low Risk HazMat - 90th Percentile Times – Baseline and Benchmark Performance			Department Benchmark	Department Baseline (2021-2023)	2023	2022	2021	2020*	2019*
Alarm Handling	Pick-up to Dispatch	Urban	2:00	2:17	2:26	2:18	2:04	3:21	2:47
Turnout Time	Turnout Time 1st Unit	Urban	2:15	2:25	2:33	2:50	2:16	2:38	2:37
Travel Time	Travel Time 1st Unit Distribution	Urban	5:00	6:04	6:04	5:52	5:57	2:41	6:06
	Travel Time ERF Concentration	Urban	6:15	6:16	6:13	5:26	6:43	2:38	6:10
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	8:00	9:56	9:50	9:31	9:49	7:02	9:39
				n=116	n=43	n=35	n=38	n=56	n=62
	Total Response Time ERF Concentration	Urban	8:00	9:37	8:59	9:11	10:23	7:02	9:36
				n=115	n=42	n=35	n=38	n=56	n=63

*Data methodology shifted after 2020.



Moderate Risk HazMat - 90th Percentile Times – Baseline and Benchmark Performance			Department Benchmark	Department Baseline (2021-2023)	2023	2022	2021	2020*	2019*
Alarm Handling	Pick-up to Dispatch	Urban	2:00	2:31	2:54	3:15	2:10	2:22	3:05
Turnout Time	Turnout Time 1st Unit	Urban	2:15	2:11	2:08	2:10	2:09	2:22	3:06
Travel Time	Travel Time 1st Unit Distribution	Urban	5:00	5:46	5:08	5:22	5:54	2:48	4:47
	Travel Time ERF Concentration	Urban	6:45	10:02	0:00	10:02	-	2:39	8:32
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	8:00	9:05	9:23	N/R	N/R	N/R	N/R
				n=21	n=8	n=5	n=8	n=4	n=6
	Total Response Time ERF Concentration	Urban	11:50	29:21	31:08	N/R	-	N/R	N/R
				n=3	n=2	n=1	n=0	n=4	n=1

*Data methodology shifted after 2020.



Special Rescue

Benchmark Statement: For 90% of all emergent special rescue incidents, the first due unit shall arrive in less than 8 minutes, staffed with 2 firefighter/paramedics and 1 officer. The first due unit shall be capable of establishing command, maintaining scene safety, and an initial scene assessment.

Additionally, for moderate risk special rescue incidents, the Effective Response Force shall arrive in less than 11 minutes and 50 seconds with a minimum of 15 personnel and be capable of providing a rescue team, backup team, and EMS treatment. For high risk special rescue incidents, the effective response force shall arrive in less than 40 minutes with a minimum of 46 personnel and be capable of fielding three rescue teams, rehabilitation, and EMS treatment.

Baseline Statement: For 90% of all emergent special rescue incidents, the first due unit arrives in less than 12 minutes and 22 seconds, staffed with 2 firefighter/paramedics and 1 officer. The first due unit is capable of establishing command, maintaining scene safety, and an initial scene assessment. During the study period, less than 10 moderate or high-risk special rescue incidents occurred. As such, this data has been not included in the baseline statement.



Low Risk Special Rescue - 90th Percentile Times – Baseline and Benchmark Performance			Department Benchmark	Department Baseline (2021-2023)	2023	2022	2021	2020*	2019*
Alarm Handling	Pick-up to Dispatch	Urban	2:00	3:30	-	0:06	3:53	1:29	4:15
Turnout Time	Turnout Time 1st Unit	Urban	2:15	1:16	-	1:16	-	1:35	2:00
Travel Time	Travel Time 1st Unit Distribution	Urban	5:00	7:17	-	2:16	7:51	1:09	7:43
	Travel Time ERF Concentration	Urban	6:45	7:17	-	2:16	7:51	1:09	7:43
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	8:00	11:05	-	N/R	N/R	N/R	N/R
				n=2	n=0	n=1	n=1	n=1	n=4
	Total Response Time ERF Concentration	Urban	8:00	11:05	-	N/R	N/R	N/R	N/R
				n=2	n=0	n=1	n=1	n=2	n=4

*Data methodology shifted after 2020.



Moderate Risk Special Rescue - 90th Percentile Times – Baseline and Benchmark Performance			Department Benchmark	Department Baseline (2021-2023)	2023	2022	2021	2020*	2019*
Alarm Handling	Pick-up to Dispatch	Urban	2:00	2:10	0:23	2:11	-	-	-
Turnout Time	Turnout Time 1st Unit	Urban	2:15	2:34	2:25	2:28	-	-	-
Travel Time	Travel Time 1st Unit Distribution	Urban	5:00	8:28	1:29	9:10	-	-	-
	Travel Time ERF Concentration	Urban	6:45	11:40	-	11:40	-	-	-
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	8:00	12:36	4:17	13:12	-	-	-
				n=4	n=1	n=3	n=0	n=0	n=0
	Total Response Time ERF Concentration	Urban	15:00	15:34	-	15:34	-	-	-
				n=2	n=0	n=2	n=0	n=0	n=0

*Data methodology shifted after 2020.



Benchmark to Baseline Performance Gaps

In nearly all cases, the Department has deliberately set the 90th percentile benchmarks below the 5-year baselines in order to promote continuous improvement and to create clear performance objectives. However, some performance gaps identified through the analysis and creation of the 90th percentile tables merit additional exploration.

All Risk Categories – Alarm Handling

In nearly all risk categories, the Department's 90th percentile alarm handling times exceed the Department's established benchmark. Upon further analysis, it became apparent that the use of priority-based dispatching by the Department's public safety answering point has led to extended alarm handling times. The Medical Priority Dispatch System and the Fire Priority Dispatch System are based upon scientifically validated call taking protocols and is regularly reevaluated by the International Academies of Emergency Dispatch to reflect the most recent scientific research. Priority based dispatching seeks to ensure responding crews have the information necessary to immediately mitigate risk once on scene, while also ensuring the appropriate resources are dispatched.

While the extended alarm handling times are accurate, the internationally recognized protocols have been locally validated as effective within the Department's service area. No negative impacts have occurred due to extended alarm times caused by additional lines of questioning required by the priority dispatching system. While the Department's public safety answering point for 911 calls is outside its immediate control, the Department will continue to monitor these performance times for gaps and work with Northwest Central Dispatch System to ensure response times are effectively balanced against the need for accurate dispatches and information for incoming emergency units

All Risk Categories – Turnout

Throughout all risk categories, the Department's turnout times for first due units exceed the established benchmarks. In reviewing its dataset, the Department has identified, and taken action to rectify, three primary problems involving turnout times. First, the Department has significant concerns regarding the accuracy of its turnout times. While emergency response crews can report becoming en route either by radio contact with the dispatcher or through the CAD computer, some extended en route times may be due to either a delayed response on the CAD computer by the officer or due to delayed recording of the timestamp by the dispatcher due to heavy radio traffic. With the continued implementation of automatic vehicle location by the Northwest Central Dispatch, it is a priority of the Department to continue to advocate for automatic timestamping of en route times based upon geolocation.

In addition, the Department has identified that there is an existing lack of transparency to the station crews regarding turnout times. Historically, turnout times have been identified within the fire reports, but extended turnout times have not required additional validation or explanation by officers. To encourage a greater level of awareness amongst the frontline crews, the Department has implemented a turnout countdown timer into its bay floor dashboards to encourage a strong focus on turnout times. In addition, the Department has instituted station specific alerting to further reduce turnout times. An analysis of these efforts will be conducted in the fall of 2023, and further opportunities for improvement will be identified.



All Risk Categories - Mutual Aid Units

Upon analysis of the data, it became evident that the historical record of the mutual aid unit times was inaccurate. The Department transitioned between record management software (RMS) vendors in April of 2019. Incident records created utilizing the previous RMS did not capture the response code of mutual aid units. For all performance data between 2017-2019, the Department has made the assumption that all mutual aid units have the response code of the previously responding Buffalo Grove unit. However, this has likely led to some non-emergent times being included in the data set, therefore leading to a high 90th percentile time in some cases. In addition, the previous RMS included change of quarters companies as part of the response force. These units would have responded non-emergent to individual Buffalo Grove stations and would not have conducted any critical tasks on the scene of the incident. Where these cases could be identified, these units were removed from the analysis. However, some change of quarters companies likely remain in the dataset, leading to an increase in 90th percentile times.

The effects described above are particularly evident in the 90th percentile table for moderate risk hazardous materials incidents. Nearly all of the hazardous materials incidents that were identified as moderate risk were reports of natural gas or carbon monoxide in multifamily housing or large commercial structures. These incidents would have required a significant investment of staff time to evacuate the building, identify the source of the hazardous material, and safely ventilate the building. Mutual aid units would have been requested to either backfill Buffalo Grove units through a change of quarters or to respond non-emergent to assist with ventilation. As such, the initial high baseline time for the effective response force's total response time was inaccurate and these calls were manually removed from the moderate risk dataset.



Performance Maintenance and Improvement Plans

In order to enable continuous improvement in the Department's service delivery, it is important to fully outline the necessary steps that will allow the Department to proactively identify emerging risks, assess program performance, and maintain and update the Department's Standards of Cover document.

Monitoring of Community Data

As new information regarding demographic change, new residential or commercial development, or community risks becomes available, the Department shall assess the information for new trends that may challenge the current deployment model and reduce performance. In particular, Census Bureau data releases and ESRI Business Analyst projections will be assessed on an annual basis and incorporated into the community risk assessment. If new trends are identified, potential changes to the resource deployment model may be needed.

Performance Reports

To ensure full implementation of the continuous improvement model, regular and transparent performance assessments are needed. The Buffalo Grove Fire Department has committed to the following three reports at varying intervals to ensure a consistent focus on the performance of the organization.

Weekly Performance Reports to Governing Body

On a weekly basis, the Department shall submit a weekly performance report to the Village Board including information such as call volume, distribution of incident types, and weekly response times. This information will be portrayed in a manner that enables a clear determination of the Department's current position relative to its performance goals.

Quarterly Performance Evaluations

In April, July, and October of each year, a performance report shall be submitted to the senior command staff of the Department summarizing Department performance over the previous three months. Performance data shall be broken down by shift, station, and unit to allow senior command staff to drill down to potential problem areas.

Annual Performance Report

At the beginning of each year, an Annual Performance Report shall be created to summarize Department actions and performance from the prior year. The report shall compare performance to the benchmarks outlined in the CRA-SOC and if necessary, propose recommendations to improve performance in the coming year.

Annual Review of CRA-SOC

The Department will review the CRA-SOC on an annual basis to ensure that all of the information contained within the document portrays an accurate reflection of current services. In the event that essential information regarding the Department's resource deployment or community risks has changed significantly, the CRA-SOC shall be revised.



Chapter 4 – Key Findings and Recommendations

Key Findings

Demographics

While the demographics and population size of the Department's service area have remained relatively stable, over the next few decades the Department's service population and housing stock is expected to continue to age. This may lead to an increase in EMS calls, as well as higher levels of fire risk. As incident volume and risk increases, additional strain will be placed on Department resources. Continued monitoring of the call volumes and population demographics will be essential to ensuring that the resource deployment system does not become stressed.

Incident Volume

Incident volume remains constant regardless of the season, time of day, or day of week. As such, the Department should continue to operate around the clock with at least 14 members on shift.

Staffing Levels

Department staffing levels, number of vehicles, and station locations are currently adequate to mitigate the levels of risk within the community. The Department is able to assemble an effective response force capable of completing the required critical tasks within a reasonable amount of time. In cases where the level of risk demands resource levels that exceed available in town resources, the Department has agreements in place to automatically dispatch additional units from surrounding fire and EMS agencies.

Performance Benchmarks

While Department performance has effectively met the challenge of mitigating risk regardless of incident type, the Department has created ambitious time performance benchmarks to continuously improve its services. In order to meet these benchmarks, adherence to the outlined Performance Maintenance and Improvement Plan will be necessary.



Recommendations

Risk Assessment: Pre-Planning

In order to strengthen the community risk assessment, particularly as it relates to fire and hazmat risk, the Department should evaluate and restructure its pre-planning process to allow for the electronic capture of essential risk data such as high concentrations of combustible or otherwise hazardous materials, property use, and number of daytime occupants. The incorporation of this data into the community risk assessment will allow for a more rigorous analysis and documentation of the risks present within the Department's service area.

Data Accuracy: Travel and Turnout Times

The Department's recorded performance times historically included an undetermined level of error as the time stamp for en route and on scene needs to be manually recorded by the unit's driver. In 2021, the Department's public safety answering point, Northwest Central Dispatch System, implemented a new Commuter Aided Dispatch system (CAD) which includes automatic vehicle location technology (AVL). AVL will be utilized to dispatch the nearest Buffalo Grove unit and has the ability to automatically time stamp any post-dispatch apparatus movement as en route. The Department should continue to take full advantage of the CAD update and ensure that AVL is used to the greatest extent possible to ensure rapid emergency response and data accuracy.

Data Visualization: External and Internal

To encourage transparency and the institutionalization of the continuous improvement model, the Department must re-examine ways in which it can communicate incident and performance data to its governing body, external stakeholders, and to its staff members.

Resource Distribution: Station 25

As Station 25 continues to age and the Village considers replacement or remodel of the current structure, a full analysis of the potential impact on response times and resource distribution should be considered prior to the final decision.

Station 25 Alternative Response Program

Traditionally, the Buffalo Grove Fire Department has responded to all EMS calls with an ambulance as well as a fire apparatus to assist with managing the scene and assisting with care. While paramedics from both units are essential, this can lead to high maintenance costs for the Department's most expensive units. In order to reduce annual maintenance costs on Station 25's tower ladder (Station 25's primary fire apparatus), the Department should consider alternative response protocols for all ambulance incidents in which Tower 25 would be due.

Quality Assurance for Fire Reporting

To ensure the validity of the Department's dataset, the Department must implement a formal Quality Improvement and Quality Assurance (QIQA) program for its fire reports. The Department has long been considered a leader on QIQA within its medical system for its patient care report review processes. The Department should implement a similar formal structure for the review of fire reports and their associated data.



Acknowledgements

This analysis drew on the outline provided by the Center for Public Safety Excellence's Quality Improvement through Accreditation seminar, the 10th edition Fire and Emergency Service Self-Assessment Manual, and the Quality Improvement for the Fire and Emergency Services publication. The 2018 Illinois Natural Hazard Mitigation Plan, Village of Buffalo Grove Comprehensive Plan and Village of Buffalo Grove Strategic Plan provided essential background information for the completion of the risk assessment, while internal Department documentation including fire investigation records and incident reports provided the performance data necessary to conduct a full system analysis.



Appendix A: Validation and Update Log

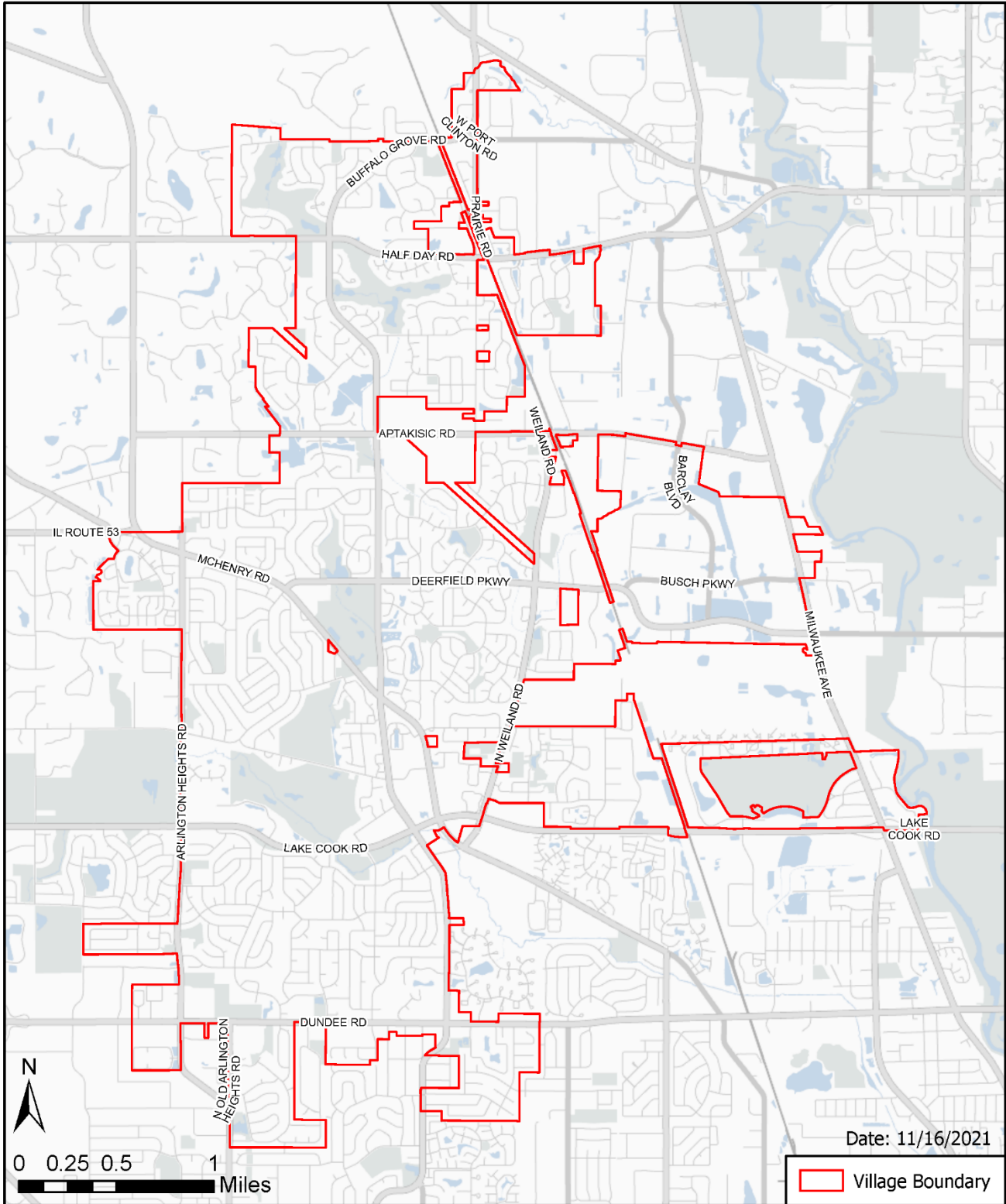
Description	Author	Version	Date
Initial Release	Grace	20-01	December 2020
2022 Update	Grace	22-01	March 2022
2022 Amendment	Grace	22-02	July 2022
2023 Update	Grace	23-01	August 2023
2024 Update	Grace	24-01	May 2024





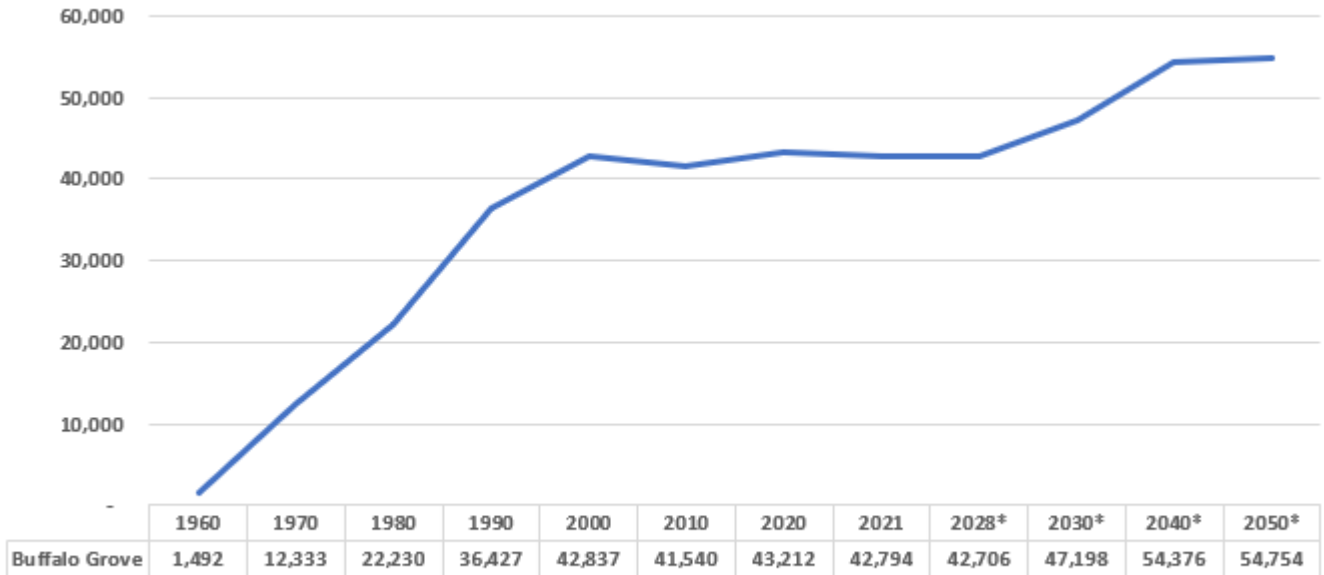
Village of Buffalo Grove

GIS Consortium



Appendix C: Demographic Projections

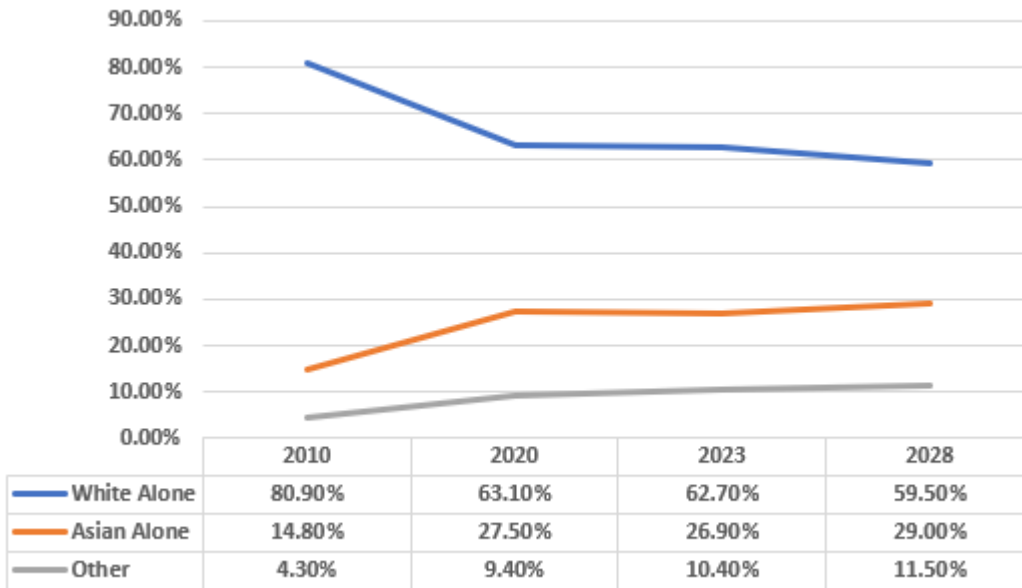
Buffalo Grove Historical and Projected Population Trends (1960-2050)



Source: 1980, 1990, 2000, 2010, 2020 Decennial Census;
 American Community Survey 5-Year Estimates (2015-2021);
 Chicago Metropolitan Area Planning Local Forecasts

*Projected figures from
 CMAP Local Forecasts,
 ESRI Business Analyst

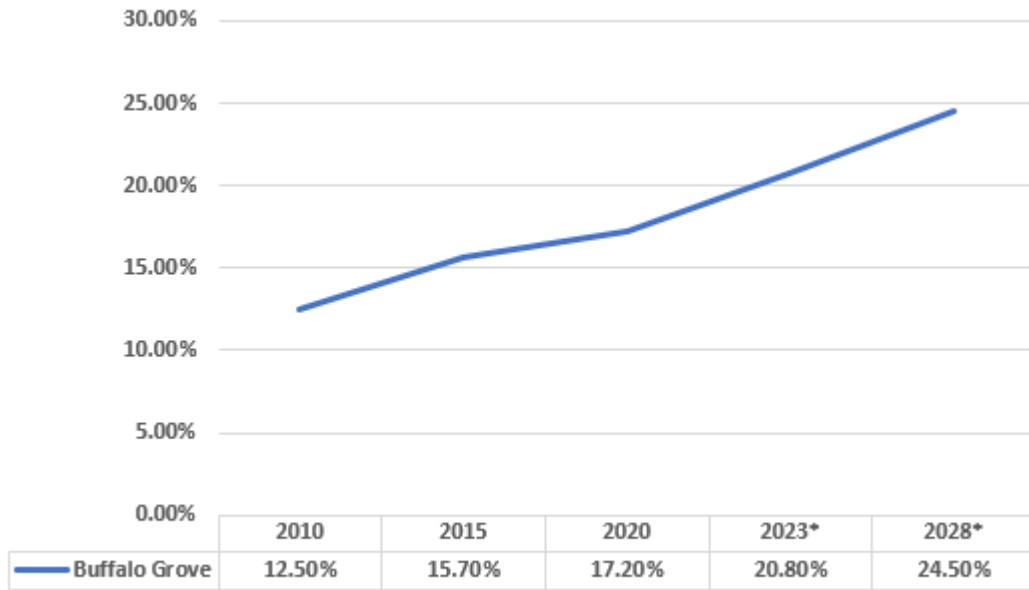
Race and Ethnicity (2010-2028)



Source: ESRI Business Analyst



Senior Citizen Share of Population (2010-2028)



Source: 2010, 2020 Decennial Census;
Community Survey 5-Year Estimates (2010-2015); ESRI Business Analyst

*Projected figures from
ESRI Business Analyst



Appendix D: Community Data Snapshot



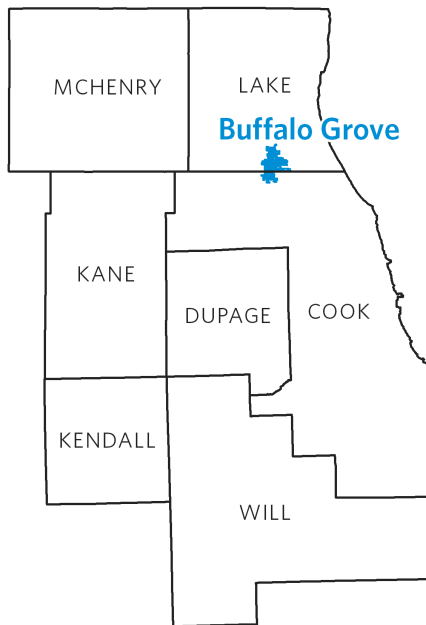


Buffalo Grove

Community Data Snapshot

Municipality Series

July 2023 Release



About the Community Data Snapshots

The Community Data Snapshots is a series of data profiles for every county, municipality, and Chicago Community Area (CCA) within the [Chicago Metropolitan Agency for Planning \(CMAP\)](#) seven-county northeastern Illinois region. The snapshots primarily feature data from the [American Community Survey \(ACS\) five-year estimates](#), although other data sources include the U.S. Census Bureau, Illinois Environmental Protection Agency (IEPA), Illinois Department of Employment Security (IDES), Illinois Department of Revenue (IDR), HERE Technologies, and CMAP itself.

CMAP publishes updated Community Data Snapshots annually to reflect the most recent data available. The latest version can always be found on the CMAP website at cmap.illinois.gov/data/community-snapshots. The data is also available in table format at the [CMAP Data Hub](#). Please direct any inquiries to info@cmap.illinois.gov.

To improve the Community Data Snapshots in the future, CMAP wants to hear from you! **Please take a quick survey** to describe how you use this data and what you would like to see in next year's snapshots.

User Notes

Definitions

For data derived from the ACS, the Community Data Snapshots uses terminology based on the [ACS subject definitions](#).

Margins of Error

The ACS is a sample-based data product. Exercise caution when using data from low-population communities, as the margins of error are often large compared to the estimates. For more details, please refer to the [ACS sample size and data quality methodology](#).

Regional Values

Regional values are estimated by aggregating ACS data for the seven counties that compose the CMAP region. These counties are Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will.

Median Values

The Census Bureau encourages users to aggregate small levels of geographies into larger areas to estimate median values for those areas. Median values for the aggregated geographies (CCAs and the CMAP region) are estimated from the [grouped frequency distributions](#) reported in the ACS.

Municipalities Located in Multiple Counties

County data is presented for the CMAP county containing the largest portion of the municipality's population, as of the 2020 decennial census.

Municipalities That Extend Beyond the CMAP Region

Values derived from CMAP analyses are generally restricted to geographies that fall within the CMAP regional boundaries. Specifically, values in the General Land Use, Equalized Assessed Value, Park Access, Transit Availability, Walkability, Water Supply, and ON TO 2050 Indicators tables only represent the portion of each municipality that falls within the seven-county CMAP region. This snapshot is for Buffalo Grove, which does *not* extend beyond the CMAP region.

Comparing ACS Data Across Past Community Data Snapshots

When using multiple releases of the CDS, please take care not to compare overlapping ACS 5-year estimates. The Census Bureau provides [specific guidance](#) for when it is appropriate to compare ACS data across time. Please contact CMAP staff at info@cmap.illinois.gov if you have additional questions.

Population and Households

The population and household tables include general demographic, social, and economic characteristics summarized for Buffalo Grove.

General Population Characteristics, 2020

	Buffalo Grove	Lake County	CMAP Region
Total Population	43,212	714,342	8,577,735
Total Households	16,404	253,386	3,266,741
Average Household Size	2.6	2.7	2.6
Percent Population Change, 2010-20	4.1	1.5	1.7
Percent Population Change, 2000-20	0.7	10.9	5.3

Source: 2000, 2010 and 2020 Census.

Race and Ethnicity, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
White (Non-Hispanic)	27,224	63.2	428,289	59.9	4,289,683	50.1
Hispanic or Latino (of Any Race)	2,793	6.5	159,640	22.3	2,005,239	23.4
Black (Non-Hispanic)	1,398	3.2	46,346	6.5	1,402,691	16.4
Asian (Non-Hispanic)	10,338	24.0	58,331	8.2	636,825	7.4
Other/Multiple Races (Non-Hispanic)	1,309	3.0	21,878	3.1	236,095	2.8

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Total population

Age Cohorts, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
Under 5	2,568	6.0	39,917	5.6	502,928	5.9
5 to 19	8,491	19.7	154,954	21.7	1,662,052	19.4
20 to 34	6,653	15.4	129,356	18.1	1,774,853	20.7
35 to 49	9,897	23.0	138,658	19.4	1,724,098	20.1
50 to 64	9,419	21.9	148,709	20.8	1,659,323	19.4
65 to 74	4,004	9.3	62,704	8.8	746,030	8.7
75 to 84	1,260	2.9	27,445	3.8	347,665	4.1
85 and Over	770	1.8	12,741	1.8	153,584	1.8
Median Age	41.2		38.5		37.9	

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Total population

Educational Attainment*, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
Less than High School Diploma	694	2.3	43,130	9.2	630,588	10.8
High School Diploma or Equivalent	2,842	9.6	94,568	20.1	1,303,071	22.2
Some College, No Degree	4,189	14.1	83,838	17.9	1,090,002	18.6
Associate's Degree	1,960	6.6	30,472	6.5	418,936	7.1
Bachelor's Degree	11,299	38.1	126,816	27.0	1,443,539	24.6
Graduate or Professional Degree	8,662	29.2	90,635	19.3	978,676	16.7

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Population 25 years and older

*Highest degree or level of school completed by an individual.

Nativity, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
Native	28,507	66.2	581,208	81.3	6,938,399	81.0
Foreign Born	14,555	33.8	133,276	18.7	1,632,134	19.0

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Total population

Language Spoken at Home and Ability to Speak English, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
English Only	23,738	58.6	477,010	70.7	5,533,398	68.6
Spanish	2,144	5.3	117,740	17.5	1,479,334	18.3
Slavic Languages	5,664	14.0	19,613	2.9	289,350	3.6
Chinese	1,375	3.4	7,894	1.2	90,587	1.1
Tagalog	338	0.8	6,761	1.0	73,710	0.9
Arabic	33	0.1	1,706	0.3	63,720	0.8
Korean	1,407	3.5	5,007	0.7	37,671	0.5
Other Asian Languages	2,470	6.1	11,445	1.7	113,684	1.4
Other Indo-European Languages	2,907	7.2	24,626	3.7	328,784	4.1
Other/Unspecified Languages	418	1.0	2,765	0.4	57,367	0.7
TOTAL NON-ENGLISH	16,756	41.4	197,557	29.3	2,534,207	31.4
Speak English Less than "Very Well"*	5,267	13.0	65,001	9.6	940,619	11.7

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Population 5 years and older

*For people who speak a language other than English at home, the ACS asks whether they speak English "very well," "well," "not well," or "not at all."

Household Size, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
1-Person Household	3,720	23.3	58,195	23.0	948,087	29.4
2-Person Household	4,595	28.8	83,739	33.1	993,509	30.8
3-Person Household	3,251	20.3	41,705	16.5	503,236	15.6
4-or-More-Person Household	4,416	27.6	69,092	27.3	775,919	24.1

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Occupied housing units

Household Type, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
Family	11,906	74.5	182,704	72.3	2,062,968	64.1
Single Parent with Child	896	5.6	19,068	7.5	257,853	8.0
Non-Family	4,076	25.5	70,027	27.7	1,157,783	35.9

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Occupied housing units

Household Income, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
Less than \$25,000	1,582	9.9	28,546	11.3	486,172	15.1
\$25,000 to \$49,999	1,403	8.8	35,725	14.1	532,670	16.5
\$50,000 to \$74,999	1,537	9.6	34,553	13.7	491,960	15.3
\$75,000 to \$99,999	2,031	12.7	30,814	12.2	407,959	12.7
\$100,000 to \$149,999	3,354	21.0	47,055	18.6	575,992	17.9
\$150,000 and Over	6,075	38.0	76,038	30.1	725,998	22.5
Median Income	\$121,212		\$97,127		\$81,102	
Per Capita Income*	\$55,906		\$49,440		\$43,128	

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Occupied housing units

*Universe: Total population

Household Computer and Internet Access, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
One or More Computing Devices	15,287	95.7	241,664	95.6	3,019,317	93.7
Smartphone(s) Only	463	2.9	14,179	5.6	240,075	7.5
No Computing Devices	695	4.3	11,067	4.4	201,434	6.3
Internet Access	15,289	95.7	237,827	94.1	2,935,545	91.1
Broadband Subscription	14,946	93.5	233,300	92.3	2,855,152	88.6
No Internet Access	693	4.3	14,904	5.9	285,206	8.9

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Occupied housing units

Housing Occupancy and Tenure, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
Occupied Housing Units	15,982	96.9	252,731	94.1	3,220,751	92.3
Owner-Occupied*	12,884	80.6	186,542	73.8	2,075,416	64.4
Renter-Occupied*	3,098	19.4	66,189	26.2	1,145,335	35.6
Vacant Housing Units	505	3.1	15,777	5.9	267,011	7.7

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Housing units

*Universe: Occupied housing units

Housing Costs as a Percentage of Household Income*, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
Less than \$20,000	767	5.0	17,930	7.2	315,268	10.1
Less than 20 Percent	9	0.1	624	0.3	7,772	0.2
20 to 29 Percent	127	0.8	1,130	0.5	22,358	0.7
30 Percent or More	631	4.1	16,176	6.5	285,138	9.1
\$20,000 to \$49,999	1,771	11.5	42,123	17.0	632,790	20.2
Less than 20 Percent	127	0.8	4,399	1.8	69,735	2.2
20 to 29 Percent	288	1.9	8,173	3.3	123,043	3.9
30 Percent or More	1,356	8.8	29,551	11.9	440,012	14.0
\$50,000 to \$74,999	1,512	9.8	34,110	13.8	486,707	15.5
Less than 20 Percent	379	2.5	9,517	3.8	139,609	4.5
20 to 29 Percent	580	3.8	12,656	5.1	171,702	5.5
30 Percent or More	553	3.6	11,937	4.8	175,396	5.6
\$75,000 or More	11,410	73.8	153,297	61.9	1,701,200	54.2
Less than 20 Percent	6,910	44.7	103,715	41.9	1,134,826	36.2
20 to 29 Percent	3,434	22.2	34,961	14.1	422,329	13.5
30 Percent or More	1,066	6.9	14,621	5.9	144,045	4.6

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Occupied housing units

*Excludes households with zero/negative income, and renting households paying no cash rent.

Housing & Transportation (H+T) Costs as a Percentage of Household Income*, 2012-2016

	Median-Income Family**	Moderate-Income Family***
Housing Costs	41	51
Transportation Costs	22	24
TOTAL H+T COSTS	63	75

Source: U.S. Department of Housing and Urban Development, [Location Affordability Index](#) (2012-2016).

*The purpose of the H+T Index is to isolate the effect of location on housing and transportation costs, and is reported for different household typologies. The values above represent the percent of household income that an average household of each type spends on housing and transportation. The standard threshold of affordability is 30% for housing costs alone, and 45% for housing and transportation costs combined.

**"Median-income family" assumes a 4-person, 2-commuter household with income equal to the regional median.

***"Moderate-income family" assumes a 3-person, 1-commuter household with income equal to 80% of the regional median.

Housing Characteristics

The housing characteristics tables include housing unit estimates by housing type, size, and age summarized for Buffalo Grove.

Housing Type, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
Single Family, Detached	8,870	53.8	179,154	66.7	1,745,022	50.0
Single Family, Attached	2,359	14.3	27,293	10.2	259,184	7.4
2 Units	163	1.0	7,056	2.6	239,727	6.9
3 or 4 Units	736	4.5	8,495	3.2	274,341	7.9
5 to 9 Units	743	4.5	9,693	3.6	270,594	7.8
10 to 19 Units	1,322	8.0	12,074	4.5	155,969	4.5
20 or More Units	2,217	13.4	20,154	7.5	513,327	14.7
Mobile Home/Other*	77	0.5	4,589	1.7	29,598	0.8

Source: 2017-2021 American Community Survey five-year estimates.
 *"Other" includes boats, recreational vehicles (RVs), vans, etc.

Universe: Housing units

Housing Size, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
0 or 1 Bedroom	1,716	10.4	23,819	8.9	566,228	16.2
2 Bedrooms	3,850	23.4	63,626	23.7	973,190	27.9
3 Bedrooms	4,955	30.1	91,059	33.9	1,156,700	33.2
4 Bedrooms	5,161	31.3	70,350	26.2	612,171	17.6
5 or More Bedrooms	805	4.9	19,654	7.3	179,473	5.1
Median Number of Rooms*	6.2		6.3		6.0	

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Housing units

*Includes living rooms, dining rooms, kitchens, bedrooms, etc., that are separated by built-in, floor-to-ceiling walls.
 Excludes bathrooms, porches, balconies, foyers, halls, and unfinished basements.

Housing Age, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
Built 2000 or Later	755	4.6	48,510	18.1	509,505	14.6
Built 1970 to 1999	12,894	78.2	133,264	49.6	1,189,334	34.1
Built 1940 to 1969	2,632	16.0	62,896	23.4	1,048,502	30.1
Built Before 1940	206	1.2	23,838	8.9	740,421	21.2
Median Year Built	1982		1981		1969	

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Housing units

Transportation

The transportation tables include vehicle availability by household, mode of travel to work, annual vehicle miles traveled, and transit availability for Buffalo Grove.

Vehicles Available per Household, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
No Vehicle Available	480	3.0	12,524	5.0	405,467	12.6
1 Vehicle Available	5,175	32.4	70,262	27.8	1,152,274	35.8
2 Vehicles Available	7,732	48.4	110,695	43.8	1,119,802	34.8
3 or More Vehicles Available	2,595	16.2	59,250	23.4	543,208	16.9

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Occupied housing units

Mode of Travel to Work, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
Work at Home*	4,388	19.2	45,081	12.6	486,188	11.5
Drive Alone	15,727	68.8	258,310	72.1	2,743,345	64.9
Carpool	1,119	4.9	29,443	8.2	321,231	7.6
Transit	1,261	5.5	13,453	3.8	465,784	11.0
Walk or Bike	109	0.5	8,012	2.2	151,257	3.6
Other	255	1.1	4,026	1.1	62,008	1.5
TOTAL COMMUTERS	18,471	80.8	313,244	87.4	3,743,625	88.5
Mean Commute Time (Minutes)	30.0		29.7		31.7	

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Workers 16 years and older

*Not included in total commuters or mean commute time.

Annual Vehicle Miles Traveled per Household*, 2021

	Buffalo Grove	Lake County	CMAP Region
Average Vehicle Miles Traveled per Year	17,252	19,459	15,653

Source: Chicago Metropolitan Agency for Planning analysis of 2021 Illinois Environmental Protection Agency, HERE Technologies, and U.S. Census Bureau data.

*Data not available for all communities in the CMAP region.

Transit Availability of Resident and Job Locations*, 2017

	Buffalo Grove	Lake County	CMAP Region
High Transit Availability	24.2%	13.1%	53.9%
Moderate Transit Availability	23.7%	34.9%	20.6%
Low Transit Availability	52.1%	51.9%	25.5%

Source: Chicago Metropolitan Agency for Planning analysis of the 2017 [Transit Availability Index](#).

*The CMAP Transit Availability Index is based on four factors: frequency of transit service, proximity to transit stops, activities reachable without a transfer, and pedestrian friendliness. This table reports the share of residents plus jobs whose home and workplace locations, respectively, are within each Transit Availability Index category.

Employment

The employment tables include general workforce characteristics for Buffalo Grove.

Employment Status, 2017-2021

	Buffalo Grove		Lake County		CMAP Region	
	Count	Percent	Count	Percent	Count	Percent
In Labor Force	24,020	70.1	386,409	68.4	4,614,158	67.3
Employed†*	23,256	96.8	355,739	92.1	4,306,443	93.3
Unemployed*	756	3.1	20,605	5.3	295,199	6.4
Not in Labor Force	10,254	29.9	178,248	31.6	2,237,246	32.7

Source: 2017-2021 American Community Survey five-year estimates.

Universe: Population 16 years and older

†Does not include employed population in the Armed Forces.

*Universe: In labor force

Private Sector Employment*, 2022

	Buffalo Grove		Lake County		6-County Region**	
	Count	Percent	Count	Percent	Count	Percent
Private Sector Employment	14,305	N/A	279,856	N/A	3,497,215	N/A
Job Change, 2012-22	-1,365	-8.7	7,020	2.6	235,962	7.2
Job Change, 2002-22	-2,697	-15.9	8,823	3.3	138,855	4.1
Private Sector Jobs per Household***	0.90		1.11		1.09	

Source: Illinois Department of Employment Security, Where Workers Work report (2022).

*Figures exclude employees not covered by unemployment insurance. Data not available for all communities in the CMAP region.

**Data is not available for Kendall County.

***Based on households from 2017-2021 American Community Survey five-year estimates.

Employment of Buffalo Grove Residents*, 2019

TOP INDUSTRY SECTORS	Count	Percent
1. Professional	2,772	13.2
2. Health Care	2,292	10.9
3. Manufacturing	2,151	10.2
4. Retail Trade	1,840	8.7
5. Finance	1,839	8.7
TOP EMPLOYMENT LOCATIONS		
1. Chicago	3,394	16.1
2. Buffalo Grove	1,252	5.9
3. Northbrook	823	3.9
4. Arlington Heights	815	3.9
5. Schaumburg	744	3.5

Employment in Buffalo Grove*, 2019

TOP INDUSTRY SECTORS	Count	Percent
1. Manufacturing	2,950	18.2
2. Professional	2,820	17.4
3. Retail Trade	1,396	8.6
4. Wholesale Trade	1,389	8.6
5. Administration	1,184	7.3
TOP RESIDENCE LOCATIONS		
1. Chicago	1,737	10.7
2. Buffalo Grove	1,252	7.7
3. Arlington Heights	675	4.2
4. Wheeling	535	3.3
5. Palatine	482	3.0

Source: U.S. Census Bureau, Longitudinal Employer-Household Dynamics program (2019).

*Excludes residents working outside of, and workers living outside of, the seven-county CMAP region.

Land Use

The land use tables include general land use composition, park access, and walkability for Buffalo Grove.

General Land Use, 2018

	Acres	Percent
Single-Family Residential	2,516.0	41.4
Multi-Family Residential	242.5	4.0
Commercial	491.4	8.1
Industrial	386.3	6.4
Institutional	227.0	3.7
Mixed Use	0.8	0.0
Transportation and Other	1,334.5	21.9
Agricultural	21.9	0.4
Open Space	687.5	11.3
Vacant	173.2	2.8
TOTAL	6,081.2	100.0

Source: Chicago Metropolitan Agency for Planning analysis of the 2018 [Land Use Inventory](#).

Park Access, 2015

	Buffalo Grove	Lake County	CMAP Region
Accessible Park Acreage per 1,000 Residents*	9.98	9.49	5.78

Source: Chicago Metropolitan Agency for Planning analysis of the 2015 [Park Access Layer](#).

*Neighborhood parks (smaller than 35 acres) are considered accessible for residents living within 0.5 miles; community parks (35 acres or larger) are considered accessible for residents living within 1 mile.

Walkability of Resident and Job Locations*, 2018

	Buffalo Grove	Lake County	CMAP Region
High Walkability	0.0%	5.1%	44.7%
Moderate Walkability	80.7%	28.1%	24.8%
Low Walkability	19.3%	66.8%	30.5%

Source: Chicago Metropolitan Agency for Planning analysis of the 2018 [Walkability Layer](#).

*The CMAP Walkability Layer is based on several factors: the presence/absence of sidewalks; the number of amenities within walking distance; population/employment density; bicycle/pedestrian crashes and fatalities; and physical characteristics (e.g., tree cover, block length). This table reports the share of residents plus jobs whose home and workplace locations, respectively, are within each Walkability Layer category.

Tax Base

The tax base tables include retail sales and equalized assessed values for Buffalo Grove.

General Merchandise Retail Sales, 2022

	Buffalo Grove	Lake County	CMAP Region
General Merchandise	\$826,249,448	\$13,737,052,234	\$137,918,287,566
Total Retail Sales	\$1,027,929,503	\$16,333,189,023	\$168,382,810,939
Total Sales per Capita*	\$23,871	\$22,860	\$19,647

Source: Illinois Department of Revenue, 2022.

*Per capita calculations based on population from 2017-2021 American Community Survey five-year estimates.

Equalized Assessed Value, 2021

Residential	\$1,395,918,824
Commercial	\$346,305,368
Industrial	\$5,803,116
Railroad	\$42,089
Farm	\$649,172
Mineral	\$0
TOTAL	\$1,748,718,569

Sources: Illinois Department of Revenue, 2021.

Change Over Time

The time series tables include comparisons of current 2017-2021 ACS estimates to historic year estimates from the 2000 Census and 2007-2011 ACS. Historic data may not be available for municipalities that were incorporated after 2000.

Race and Ethnicity, Over Time

	2000 Percent	2007-2011 Percent	2017-2021 Percent
White (Non-Hispanic)	86.5	76.1	63.2
Hispanic or Latino (of Any Race)	3.3	5.8	6.5
Black (Non-Hispanic)	0.7	0.7	3.2
Asian (Non-Hispanic)	8.4	15.2	24.0
Other/Multiple Races (Non-Hispanic)	1.0	2.3	3.0

Source: 2000 Census; 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Total population

Age Cohorts, Over Time

	2000 Percent	2007-2011 Percent	2017-2021 Percent
19 and Under	30.6	25.9	25.7
20 to 34	15.2	14.3	15.4
35 to 49	30.0	24.8	23.0
50 to 64	15.1	23.1	21.9
65 and Over	9.0	11.8	14.0
Median Age	37.4	41.6	41.2

Source: 2000 Census; 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Total population

Educational Attainment*, Over Time

	2000 Percent	2007-2011 Percent	2017-2021 Percent
Less than High School Diploma	4.7	4.1	2.3
High School Diploma or Equivalent	14.0	14.9	9.6
Some College, No Degree	19.3	15.6	14.1
Associate's Degree	6.2	5.3	6.6
Bachelor's Degree	35.4	35.5	38.1
Graduate or Professional Degree	20.5	24.6	29.2

Source: 2000 Census; 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Population 25 years and older

*Highest degree or level of school completed by an individual.

Nativity, Over Time

	2007-2011 Percent	2017-2021 Percent
Native	74.3	66.2
Foreign Born	25.7	33.8

Source: 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Total population

Language Spoken at Home and Ability to Speak English, Over Time

	2007-2011 Percent	2017-2021 Percent
English Only	68.0	58.6
Spanish	4.6	5.3
Slavic Languages	12.0	14.0
Chinese	2.7	3.4
Tagalog	0.9	0.8
Arabic	0.1	0.1
Korean	2.9	3.5
Other Asian Languages	3.3	6.1
Other Indo-European Languages	4.9	7.2
Other/Unspecified Languages	0.8	1.0
TOTAL NON-ENGLISH	32.0	41.4
Speak English Less than "Very Well"*	10.8	13.0

Source: 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Population 5 years and older

*For people who speak a language other than English at home, the ACS asks whether they speak English "very well," "well," "not well," or "not at all."

Household Size, Over Time

	2007-2011 Percent	2017-2021 Percent
1-Person Household	25.5	23.3
2-Person Household	31.8	28.8
3-Person Household	19.0	20.3
4-or-More-Person Household	23.7	27.6

Source: 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Occupied housing units

Household Type, Over Time

	2007-2011 Percent	2017-2021 Percent
Family	71.3	74.5
Single Parent with Child	4.6	5.6
Non-Family	28.7	25.5

Source: 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Occupied housing units

Household Income, Over Time

	2007-2011 (2021 Dollars)	2017-2021 (2021 Dollars)
Median Income	\$110,386	\$121,212

Source: 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Occupied housing units

Housing Occupancy and Tenure, Over Time

	2000 Percent	2007-2011 Percent	2017-2021 Percent
Occupied Housing Units	97.2	97.0	96.9
Owner-Occupied*	87.1	82.5	80.6
Renter-Occupied*	12.9	17.5	19.4
Vacant Housing Units	2.8	3.0	3.1

Source: 2000 Census; 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Housing units

*Universe: Occupied housing units

Housing Costs as a Percentage of Household Income*, Over Time

	2007-2011 Percent	2017-2021 Percent
Less than \$20,000	6.4	5.0
Less than 20 Percent	0.0	0.1
20 to 29 Percent	0.5	0.8
30 Percent or More	5.9	4.1
\$20,000 to \$49,999	17.7	11.5
Less than 20 Percent	1.6	0.8
20 to 29 Percent	2.9	1.9
30 Percent or More	13.2	8.8
\$50,000 to \$74,999	15.4	9.8
Less than 20 Percent	3.4	2.5
20 to 29 Percent	4.2	3.8
30 Percent or More	7.8	3.6
\$75,000 or More	59.9	73.8
Less than 20 Percent	29.3	44.7
20 to 29 Percent	17.8	22.2
30 Percent or More	12.8	6.9

Source: 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Occupied housing units

*Excludes households with zero/negative income, and renting households paying no cash rent.

Housing Type, Over Time

	2007-2011 Percent	2017-2021 Percent
Single Family, Detached	52.9	53.8
Single Family, Attached	17.1	14.3
2 Units	0.3	1.0
3 or 4 Units	3.6	4.5
5 or More Units	26.2	26.0
Mobile Home/Other*	0.0	0.5

Source: 2007-2011 and 2017-2021 American Community Survey five-year estimates.
 *"Other" includes boats, recreational vehicles (RVs), vans, etc.

Universe: Housing units

Housing Size, Over Time

	2007-2011 Percent	2017-2021 Percent
0 or 1 Bedroom	11.6	10.4
2 Bedrooms	24.9	23.4
3 Bedrooms	31.3	30.1
4 Bedrooms	27.5	31.3
5 or More Bedrooms	4.7	4.9
Median Number of Rooms*	6.3	6.2

Source: 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Housing units

*Includes living rooms, dining rooms, kitchens, bedrooms, etc., that are separated by built-in, floor-to-ceiling walls.
 Excludes bathrooms, porches, balconies, foyers, halls, and unfinished basements.

Housing Age, Over Time

	2007-2011 Percent	2017-2021 Percent
Built 2000 or Later	5.0	4.6
Built 1970 to 1999	79.8	78.2
Built 1940 to 1969	14.4	16.0
Built Before 1940	0.7	1.2
Median Year Built	1982	1982

Source: 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Housing units

Vehicles Available per Household, Over Time

	2007-2011 Percent	2017-2021 Percent
No Vehicle Available	4.6	3.0
1 Vehicle Available	29.1	32.4
2 Vehicles Available	49.0	48.4
3 or More Vehicles Available	17.3	16.2

Source: 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Occupied housing units

Mode of Travel to Work, Over Time

	2007-2011 Percent	2017-2021 Percent
Work at Home*	5.1	19.2
Drive Alone	85.3	68.8
Carpool	3.9	4.9
Transit	4.1	5.5
Walk or Bike	0.9	0.5
Other	0.7	1.1
TOTAL COMMUTERS	94.9	80.8
Mean Commute Time (Minutes)	29.5	30.0

Source: 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Workers 16 years and older

*Not included in total commuters or mean commute time.

Employment Status, Over Time

	2007-2011 Percent	2017-2021 Percent
In Labor Force	73.5	70.1
Employed ^{†*}	94.5	96.8
Unemployed*	5.5	3.1
Not in Labor Force	26.5	29.9

Source: 2007-2011 and 2017-2021 American Community Survey five-year estimates.

Universe: Population 16 years and older

[†]Does not include employed population in the Armed Forces.

*Universe: In labor force

Water Supply

CMAP supports an integrated approach to water resource management, and encourages communities to incorporate water supply and demand considerations into land use, transportation, and infrastructure investment decisions. Assessing demand, price, and loss trends of a community can inform decisions that strengthen regional water supply management, maintain drinking water infrastructure, and manage demand. CMAP's ON TO 2050 plan contains [more information](#) about how communities can coordinate and conserve our shared water supply resources.

Water Source and Demand Trends of Buffalo Grove*

Primary Water Source: Lake Michigan**

	2003 MGD***	2013 MGD***	Percent Change
Total Water Withdrawals****	4.82	3.87	-19.7
Residential Sector	3.81	3.07	-19.4
Non-Residential Sector	1.02	0.80	-20.9

Source: Analysis of Illinois Water Inventory Program water withdrawal data (2003-2013).

*Only available for municipalities with community water suppliers providing service to the majority of the community.

**The primary water source of a community is based on the source of the majority of withdrawals from all wells and intakes within the community, including community water suppliers and industrial and commercial businesses. The majority of withdrawals is calculated as an average from yearly data, given year to year fluctuations.

***Millions of gallons per day.

****Total includes all community water suppliers and industrial and commercial wells/intakes within a municipality; private residential wells are not included. Residential sector includes withdrawals identified as residential by community water suppliers. Non-residential sector includes withdrawals identified as non-residential by the community water suppliers and withdrawals from industrial and commercial wells/intakes.

Daily Residential Water Demand per Capita

	Buffalo Grove			CMAP Region		
	2003	2013	Percent Change	2003	2013	Percent Change
Residential* (GPCD**)	88.9	73.6	-17.2	104.2	87.5	-16.0

Source: Analysis of Illinois Water Inventory Program water withdrawal data (2003-2013).

*Residential sector includes withdrawals identified as residential by community water suppliers. The prevalence of private residential wells or community water suppliers that provide water outside of the municipal boundary could lead to artificially lower or higher GPCD values respectively.

**Gallons of water per capita per day (estimated unit use). Population values used in sector totals come from the U.S. Census.

Residential Water and Wastewater Price Trends*

MONTHLY COST PER 5,000 GALLONS**	2014 (2021 Dollars)	2020 (2021 Dollars)	Percent Change	Annualized Percent Change
Drinking Water	\$18.54	\$30.87	66.5	8.9
Sewer	\$4.64	\$7.33	58.1	7.9
Combined***	N/A	N/A	N/A	N/A

Source: Illinois-Indiana Sea Grant Water Rates Data for Northeastern Illinois, IISG19-RCE-RLA-031.

*Only available for communities with water utilities and that responded to data requests. Percent changes and prices were adjusted for inflation using the U.S. Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers (CPI-U).

**Monthly water bills are calculated as: $monthly\ base\ charge + ((5,000\ gallons - water\ provision\ included\ in\ base\ charge) \times \$/1,000\ gallons)$. Note that actual billing calculation practices may vary across communities.

***Some utilities combine drinking water and sewer prices, rather than separating them as two distinct rates.

Water Loss*

Reporting utility: Buffalo Grove

	2017
Nonrevenue Water (Millions of Gallons per Day)**	0.48
Annual Cost of Nonrevenue Water	\$468,052
Percent of Nonrevenue Water to Water Supplied***	12.8

Source: Illinois Department of Natural Resources, Lake Michigan Allocation Program, 2017.

*Data is only regionally available for Lake Michigan permittees; water losses from other communities and industrial and commercial businesses are not reported to the state.

**Nonrevenue water is the difference between net annual pumpage (water supplied) and billed, authorized consumption. Non-revenue water includes water that is lost from the system due to underregistration of meters, systematic data handling errors, leakage anywhere within the distribution system, unauthorized consumption, or unbilled authorized consumption.

***The threshold for permit compliance is less than 12% of water supplied in Water Year 2015, decreasing to no more than 10% by Water Year 2019 and all years thereafter. Permittees that exceed the threshold are required to submit a water system improvement plan.

ON TO 2050 Indicators

ON TO 2050 is the region’s long-range comprehensive plan, adopted by CMAP in 2018 and updated in 2022. The plan includes a set of indicators for quantifying its goals and measuring implementation progress. While many of these indicators can only be measured at a regional level, several can also be tracked at a local level. These have been laid out in the table below, with comparisons to the region’s current measure as well as the targets that the plan is aiming to reach by 2050. Visit cmap.illinois.gov/2050/indicators to learn more.

Plan Chapter	Indicator	Buffalo Grove	CMAP Region		Source
		Current	Current	2050 Target	
Community	Population located in highly walkable areas	0.0%	46.1%	53.6%	CMAP, 2018
	Jobs located in highly walkable areas	0.0%	41.9%	46.0%	CMAP, 2018
Prosperity	Population aged 25+ with an associate’s degree or higher	73.9%	48.4%	64.9%	ACS, 2017-2021
	Workforce participation rate among population aged 20-64	84.0%	81.2%	83.4%	ACS, 2017-2021
Environment	Population with park access of 4+ acres per 1,000 residents	79.4%	41.8%	65.0%	CMAP, 2015
	Population with park access of 10+ acres per 1,000 residents	45.9%	16.3%	40.0%	CMAP, 2015
	Impervious acres per household	0.18	0.19	0.17	USGS NLCD, 2019
	Daily residential water demand per capita (gallons)	73.6	87.5	65.2	ISWS IWIP, 2013
Governance	State revenue disbursement per capita	\$409.71	\$379.91*	N/A**	CMAP, 2021
	Is per capita disbursement at least 80% of regional median?	Yes	Yes for 79% of municipalities	Yes for 100% of municipalities	CMAP, 2021
Mobility	Population with at least moderately high transit availability	23.6%	53.2%	65.0%	CMAP, 2017
	Jobs with at least moderately high transit availability	25.3%	55.2%	58.0%	CMAP, 2017
	Percent of trips to work via non-single occupancy vehicle modes	30.1%	33.7%	37.3%	ACS, 2017-2021

*Median value of CMAP region’s 284 municipalities.

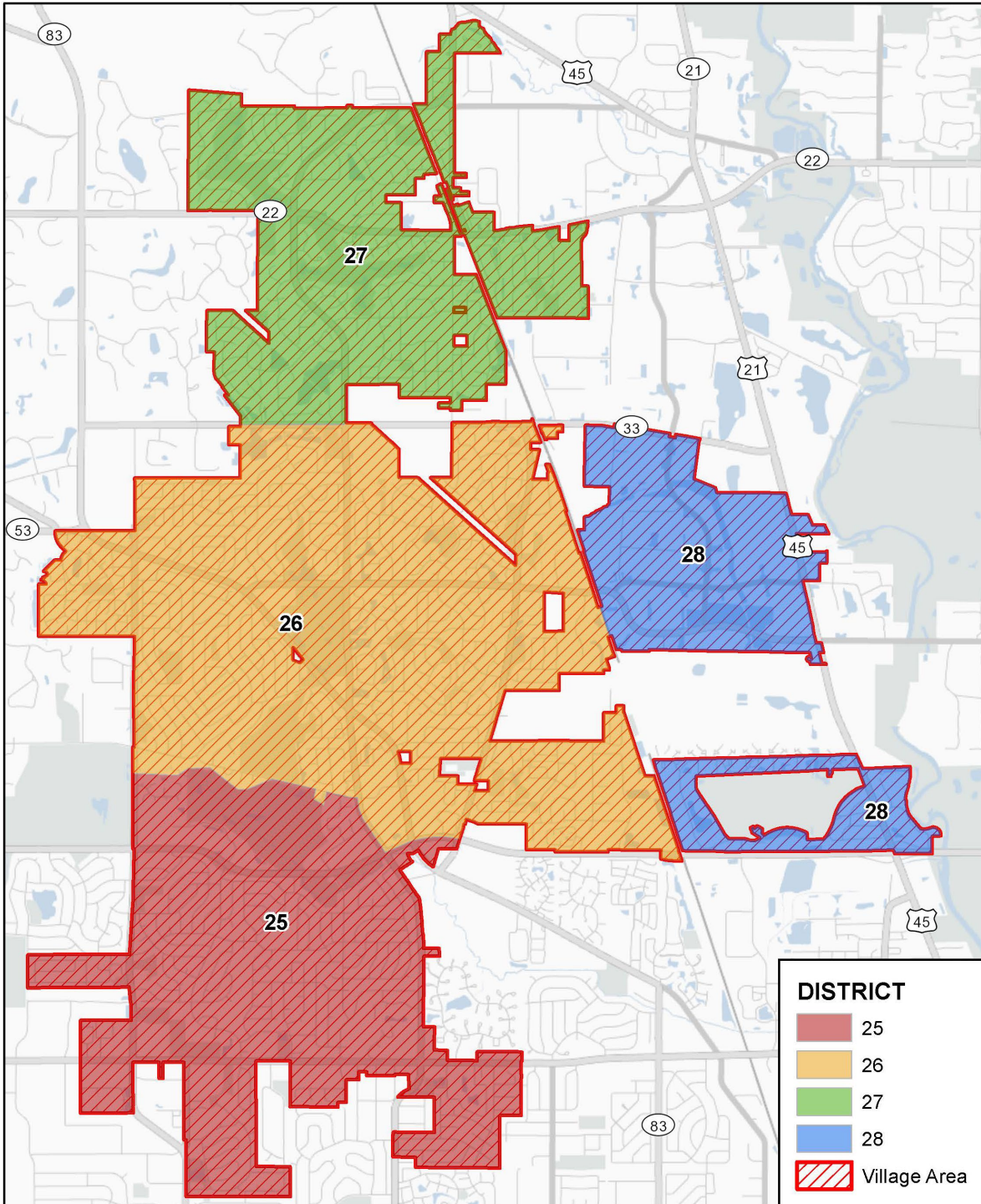
**ON TO 2050 does not have a target for state revenue disbursement per capita in dollars, but rather for the share of municipalities receiving at least 80% of the regional median. The dollar figures are presented as context for the next row.

Appendix E: Fire Districts



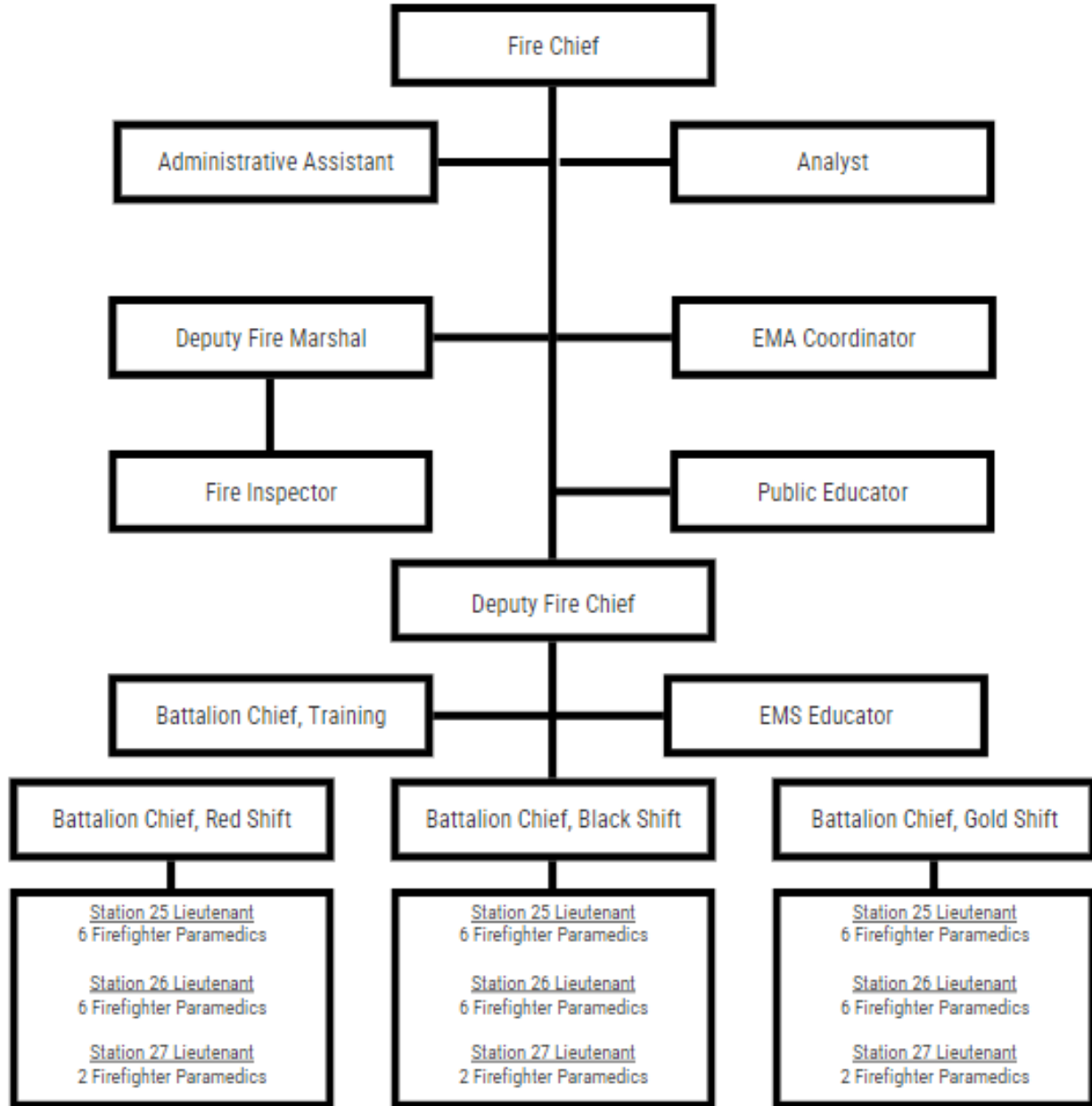
Buffalo Grove Fire Districts

GIS Consortium

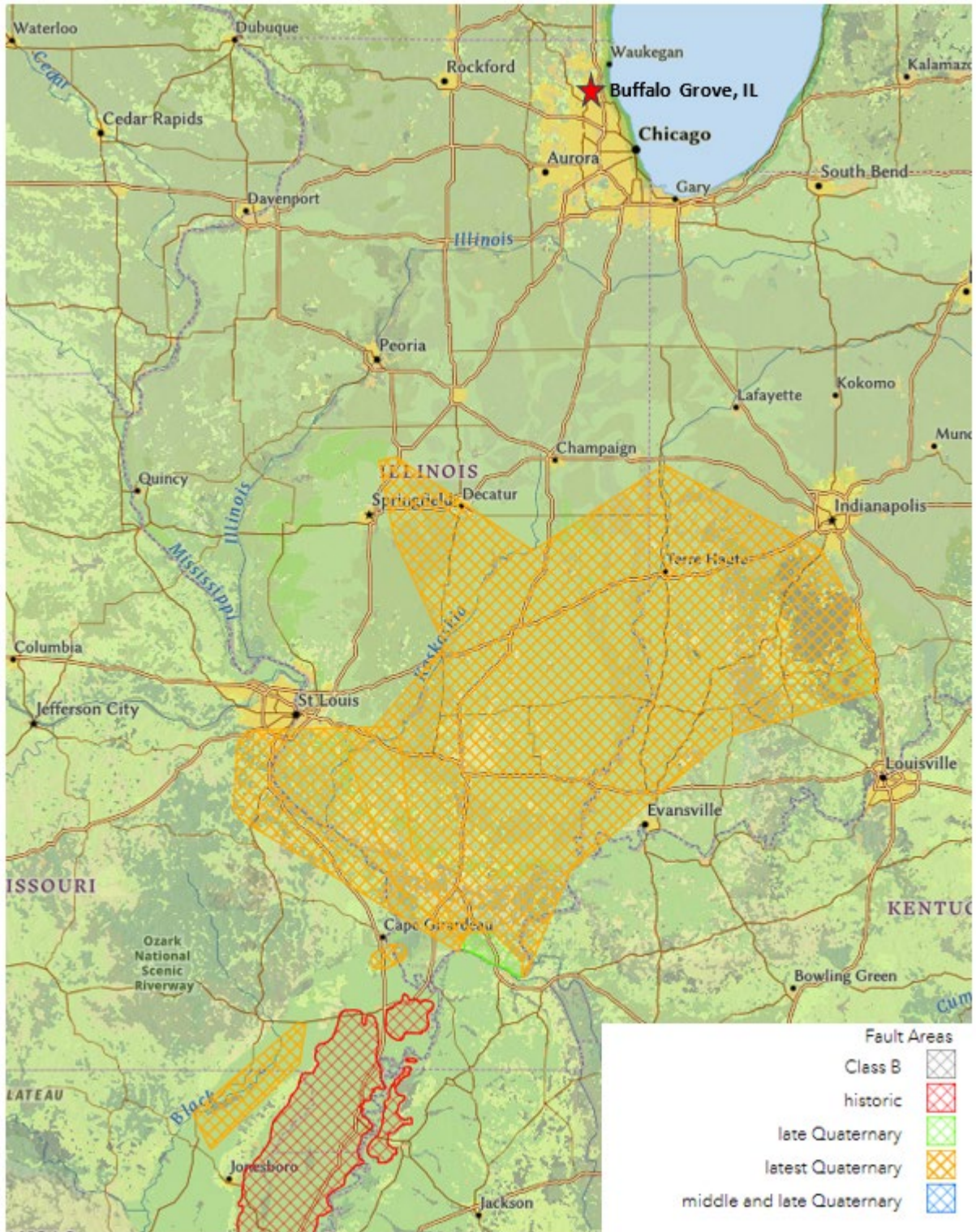


Appendix F: 2023 Organizational Chart

Buffalo Grove Fire Department 2023 Organizational Chart



Appendix G: Illinois Fault Areas



[U.S. Quaternary Faults, USGS Geological Hazards Science Center](#). Retrieved December 11, 2023.



Appendix H: Flood Hazard Map



Flood Hazards in Buffalo Grove GIS Consortium

