

# CLARK COUNTY FIRE AND EMERGENCY SERVICES REPORT

February 4, 2015



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# BACKGROUND

## Authority

Nevada Revised Statutes (NRS 278.160(m)) requires that Clark County prepare a Safety Plan. The Clark County Comprehensive Plan also includes other planning Elements, addressing areas such as conservation, economic issues, historic neighborhood and properties preservation, housing, population, public buildings, public facilities, and seismic safety. The Clark County Fire Department (CCFD) conducts operations that affect these areas as well. This chapter is a part of the County’s Safety Element and fulfills goals established in the Clark County Strategic Plan.

## Objectives

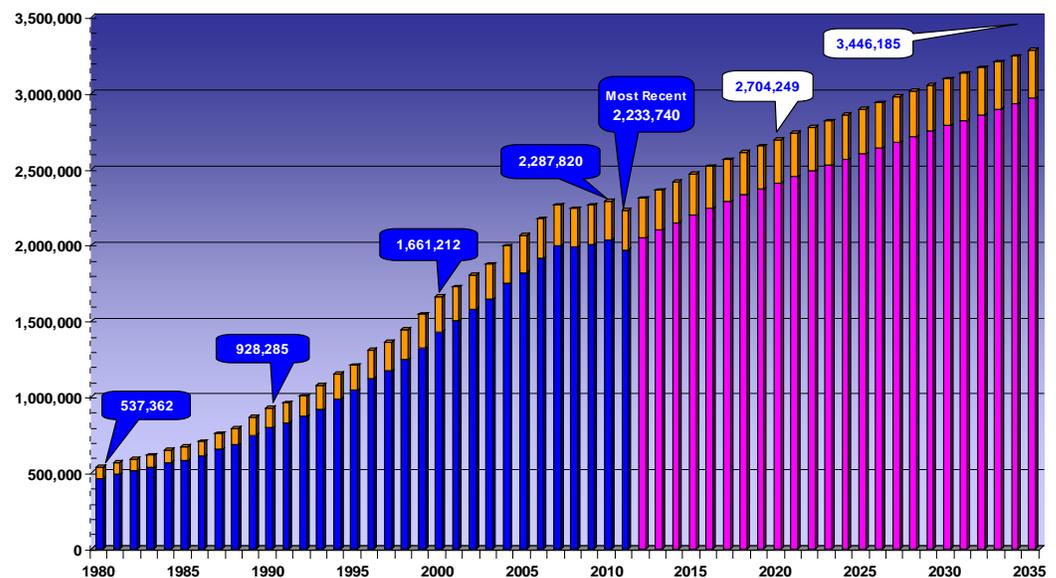
The Clark County Fire Report provides background, analysis, and recommendations that are the basis of the corresponding chapter of the Comprehensive Plan. The Fire Protection Chapter assists in guiding land use and policy decisions made by the Planning Commission and Board of County Commissioners.

## Overview

The CCFD, as required by County Code (Section 2.04), provides essential services to residents and visitors (see Figure 1 at right) designed to provide optimum fire protection services within the County.

Originally accredited in 2003 by the Commission of Fire Accreditation International (CFAI), the CCFD established a system to measure its fire and emergency services quality to achieve organizational and professional excellence through a strategic self-assessment model<sup>1</sup>.

Figure 1: Clark County Resident and Daily Visitor Population 1980 - 2035



<sup>1</sup>Center of Public Safety Excellence, Agency Accreditation, <http://publicsafetyexcellence.org>

The CFAI accreditation program leads to improved service delivery by helping fire departments:

- Determine community risk and safety needs.
- Evaluate the performance of the department.
- Establish a method for achieving continuous organizational improvement.

## **Physiographic Setting & Climate**

Clark County sits in a basin within the Mojave Desert in Southern Nevada. The basin consists primarily of desert vegetation surrounded by dry mountain ranges. The climate is an arid desert with hot, mostly dry summers and winters with temperatures low enough to have a negative effect on Fire and Emergency Services. It averages 300 sunny days per year and produces about 4.2 inches of rainfall annually. Clark County's July temperatures range from 56° to 117° Fahrenheit, while January temperatures range from 8° to 77° Fahrenheit. Freezing temperatures are a concern for the Fire Department, and the Fire Code requires freeze protection for water-based fire protection systems. Because Clark County is located in a desert basin, when precipitation occurs, flash flooding is a concern. The entertainment industry and the natural beauty of the valley are key elements that bring millions of visitors to the Las Vegas Valley every year. The high level of metropolitan, urban, and suburban uses imposed on the natural system can create conditions vulnerable to wildland and urban fires.

## **Defining the Framework**

For planning purposes, this report divides the structure for Fire Services into three **Major Service Areas**: **Fire Prevention (administered by the Building Department), Fire Suppression & Rescue, and Emergency Medical Services (EMS).**

**Fire Prevention:** Focuses on public safety of business operations and maintenance for a variety of development types and land uses. This service is provided through design review, inspection, complaint, business license, and code enforcement processes. This service area also conducts training for children and adults, such as “Stop, Drop, and Roll.”

**Fire Suppression & Rescue:** Provides optimum public safety with fire suppression and other technical services. Since 2010, CCFD has worked with the City of Las Vegas in providing technical services using a “regionalized” model.

**Emergency Medical Services (EMS):** Responds to medical emergencies and provides triage, pre-hospital treatment, and transport with emergency medical technicians and paramedics. The services provided include Advanced Cardiac Life Support (ACLS), Cardio Pulmonary Resuscitation (CPR), Defibrillation, and Pre-Hospital Trauma Life Support (PHTLS).

## **Service Demand Delivery**

The defined **Major Service Areas** “set the stage” for the services provided under the five **Functional Categories**: **Fire Responses, Medical Incidents, Vehicle Accidents, Technical Services, and Public Assistance** (further explained under “Response Types” on page 6), which provide emergency services to the resident and visitor population of Clark County. These categories form the basis of analyzing their relationship to existing population and the distribution of land use types by zoning categories.

## Fire Management Zones

As part of the Standards of Cover (SOC)<sup>2</sup> process, it is necessary for each of the fire management zones (includes visitors in addition to the permanent resident population) to be classified into one of the following service areas:

**Metropolitan** – areas with a population of over 200,000 people in total and/or a population density of over 3,000 people per square mile. These areas are distinguished by mid-rise and high-rise buildings, which can be interspersed with smaller structures (Laughlin is designated as a metropolitan area by this definition for Fire Suppression and Emergency Services planning purposes).

**Urban**– areas with a population of over 30,000 people and/or a population density of over 2,000 people per square mile.

**Suburban** – areas with a population of 10,000 to 29,999 people and/or a population density of 1,000 to 2,000 people per square mile.

**Rural** – areas with a population of less than 10,000 people, and/or a population density of less than 1,000 people per square mile.

## Operational Areas

The CCFD has primary responsibility for the Clark County (CC) Fire Service District, which includes Unincorporated Metropolitan, Urban, and Suburban areas within the Las Vegas Valley and Jean - see map on page 5, along with Laughlin and portions of the rural land area within the County. The Fire Department identifies Operational Areas based mainly on type of land use and population. Table 1 describes the typical conditions in each Operational Area. Federal and State agencies manage over 87% of the land in Clark County and they provide primary fire protection services to those rural areas (most wildfires in Clark County occur in these federally managed areas and the Fire Department assists federal agencies). In addition, the cities of Las Vegas, Henderson, North Las Vegas, Boulder City, and Mesquite have fire departments that provide primary fire protection within the boundaries of their jurisdictions. Clark County has mutual aid agreements with all of the agencies listed above and responds to many medical emergencies or fires throughout the County (see maps on pages 13 and 14).

**Table 1: CC Fire District Operational Area Factors**

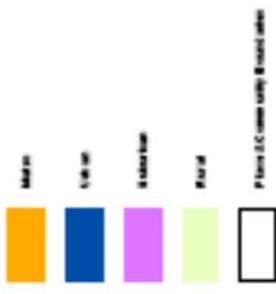
Factor	Operational Areas			
	Fire District Metro**	Fire District Urban	Fire District Suburban	Rural
<b>Building Height</b>	100 feet +	100 feet +	100 feet	35 feet
<b>Density</b>	High	High	Medium	Low
<b>Wildfire Risk</b>	Very Low	Very Low	Low	Medium to High
<b>Population per mile<sup>2</sup></b>	Over 3,000	Over 2,000	Over 1,000	Up to 1,000
<b>Water Supply*</b>	Hydrants	Hydrants	Hydrants, Wells	Wells, Tanks
<b>Staff</b>	Career	Career	Career	Volunteer
<b>Funding Source</b>	District	District	District	General Fund

\* Main water supply available for fire fighting

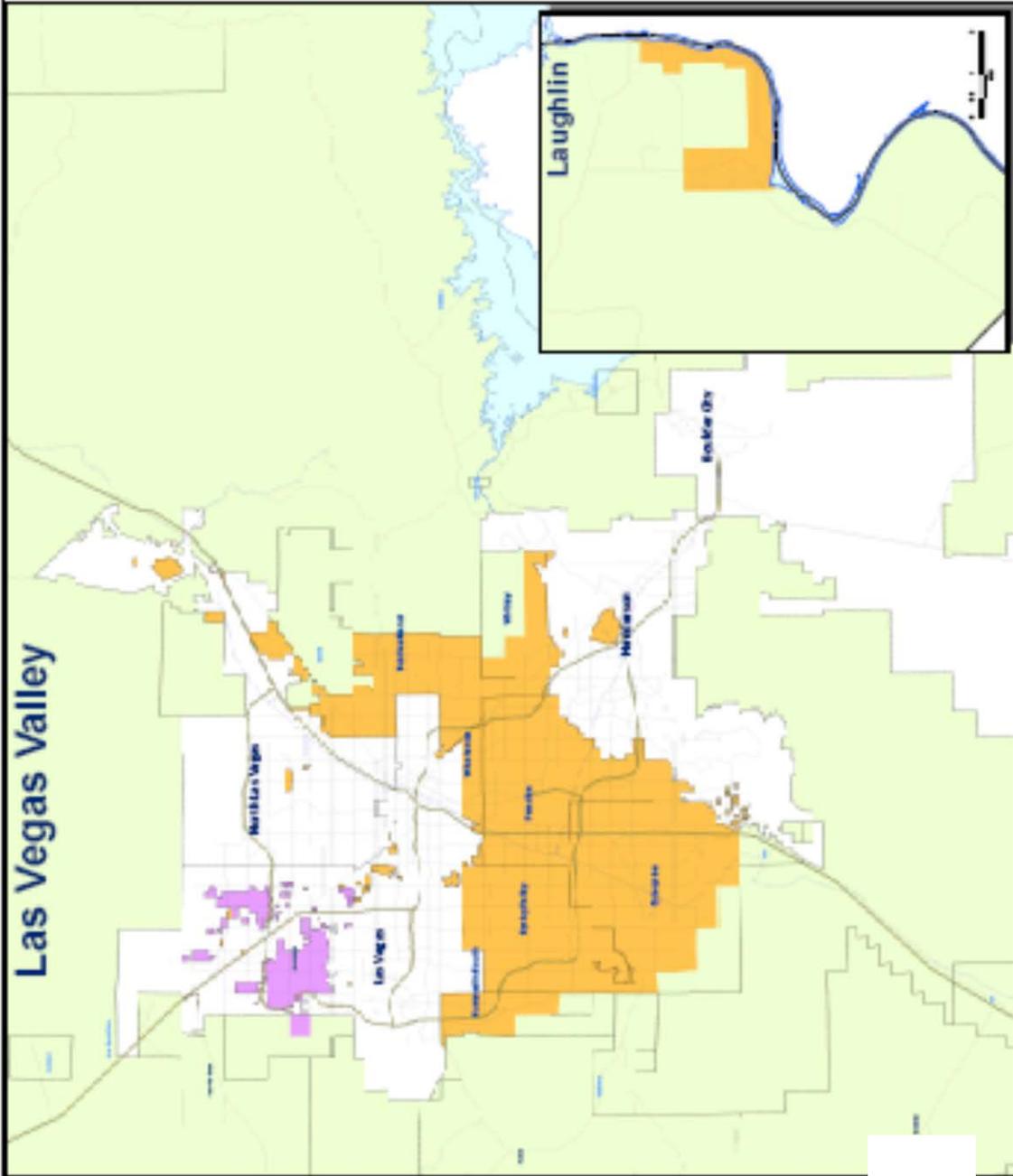
\*\* Metro designation includes Laughlin

<sup>2</sup> Commission of Fire Accreditation International (CFAI) Standards of Cover Manual, pp.20-21, 2008.

Comprehensive Planning  
Clark County  
Operating Area Types



Map created on 1 September 04, 2011  
 This document is unclassified  
 and is not to be used for security administration.



## Stations and Units

Public safety, fire, and emergency medical services are provided by *units*<sup>3</sup> that respond from fire stations strategically located throughout Clark County (see the Career Fire Stations map on page 16). Fire stations are staffed by career fire fighters in metropolitan, urban, and suburban areas and by volunteers in rural areas.

Table 2 lists the main unit types used by the department. The number and type of unit sent to an incident is based on response needs as determined by department staff and can be augmented by on-scene command. Units respond to fires such as structural, aircraft, vehicles, and medical emergencies. Fire crews also conduct hydrant inspections, training, pre-fire planning inspections, public education, equipment and facility maintenance checks, and other related duties. The Fire Department also has a number of specialty/support units and other equipment to provide services to the public. A variety of incidents requiring medical knowledge led the Fire Department to provide additional emergency medical training to its response staff. Advanced Life Support (ALS) certification is the highest level available on all fire department units.

**Table 2: CC Fire District Units**

Unit Types	Primary Uses
Engines	Fire Responses, EMS
Rescues	EMS
Ladder Trucks	Fire Responses, Public Assist
Specialty Units (i.e., Battalion Chief, Red Dog, Air Resource, Water Tender)	Support Units

Source: CCFD, 2014

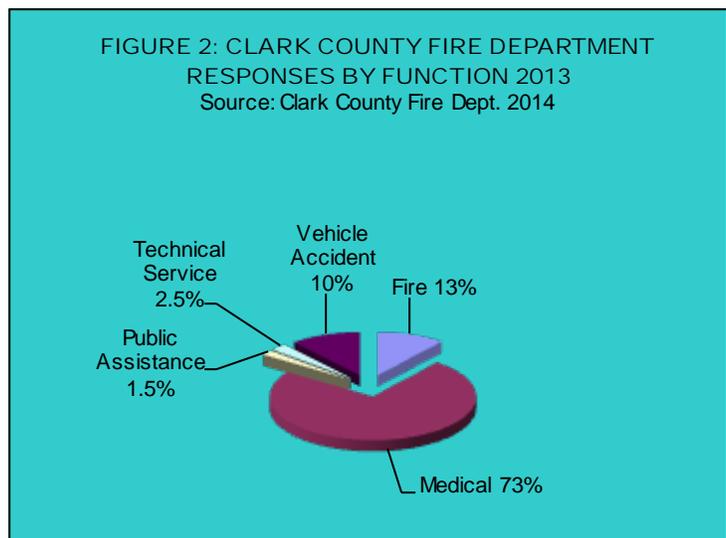
## Incidents and Responses

Any single fire, accident, or medical emergency is an “*incident*.” The Fire Department dispatches one or more units (engine, rescue, truck, or specialty/support unit) to an incident as needed by function. Each unit dispatched to an incident counts as a “*response*” by that unit and is one of the main measurements used in this report.

### Response Types

Figure 2 shows the percentage of Fire Department responses by function as provided by the three **Major Service Areas**. Responses are split into five **Response Categories**. The

Medical Category consists of health or trauma related incidents such as breathing problems, cardiac arrest, stroke, and victims of violence. The Fire Category reflects typical calls such as vehicle and building fires. Vehicle Accidents are any incidents that involve a collision between a vehicle and another object. Technical Services are incidents where specialized units are required to respond. Examples of these incidents include Hazardous Materials (HazMat) releases, structure collapses, rescues from elevators, swift water rescues, as well as rescues from high angles or confined spaces.<sup>4</sup> Public Assistance are incidents where residents, visitors, or any other agency requests non-emergency support. The resources dispatched to each of these response categories depend on the severity of each call.



<sup>3</sup> The term “Unit” or “Staffed Unit” as used in this report means an emergency vehicle such as a fire engine or a rescue.

<sup>4</sup> Since 2010, Technical Services are provided using a “regionalized” model provided in conjunction with the City of Las Vegas.

## **Resource Distribution**

Resource distribution is influenced by the geography of the community and travel time to incidents. Distribution is commonly measured by the percent of the fire management zone covered by the first unit due on the scene. The CCFD monitors siting deployment and distance recommendations from various sources such as the Insurance Service Office, National Fire Protection Association, and Commission of Fire Accreditation International. Response time is defined by CCFD as the time it takes for a unit to arrive at an incident after initial report is received by the Fire Department. Historically, the goal of the Department has been to ensure 7-minute response times are 90% of the time in the Metro, Urban, and Suburban areas to maintain public safety, reduce property damage, and minimize insurance costs to the public. In the rural and wilderness areas, response times vary and depend on volunteer availability, as well as distance to the scene.

## **Resource Concentration**

Resource concentration is also influenced by the geography of the community and the placement of multiple resources to assure that the minimum acceptable response force can assemble to engage a fire before flashover or stop the escalation of a health event before cardiac arrest or brain death occurs. Future fire station locations, deployment of apparatus, and staffing levels will determine the department's ability to deliver a reliable, effective on-scene emergency response force.

## **Water Supply**

Fire engines and truck companies have on-board water tanks that hold from 300 to 1200 gallons of water. This limited amount of water must be replaced quickly at serious fire incidents. Water is supplied by connecting the engine to a fire hydrant or water tender unit. Hydrants are preferred and provide high volumes of water for extended time periods.

Water tender units use 1200-4000 gallon tanks to shuttle water to an engine from a larger water source or hydrant. This method should not be a replacement for hydrant supply, as it can slow fire fighting due to lower water supply rates, requiring additional personnel and heavy equipment. Most rural areas use water tenders to deliver and maintain a supply of water at fire incidents. In growth areas, there is an immediate need to install fire hydrants to provide rapid and continued fire suppression, adequate pressures and flow rates, and fill water tenders quickly.

## **Funding**

### **Fire Districts and General Funds**

Funding for the Fire Department comes mainly from property assessments in established fire districts. The Clark County Fire District is the primary funding source for fire services in the Unincorporated Las Vegas Valley and Jean. In the rural areas, the Moapa Valley Fire District serves the communities of Logandale, Overton, and Moapa. The Mt. Charleston Volunteer Fire District serves both Kyle and Lee Canyons.

Rural communities such as Blue Diamond, Bunkerville, Cal-Nev-Ari, Indian Springs, Cold Creek, Goodsprings, Mountain Springs, Sandy Valley, and Searchlight have existing volunteer fire stations but are not within designated fire districts. These communities depend heavily on the County's General Fund.

Linking the provision of services to the development it serves is important for long-term financial sustainability. An important part of this concept is having an understanding of the costs of supplying fire protection services based upon the needs of development and risks in the community.

## Development Agreements

High Impact Projects, Major Development Projects, Amended Land Use Plans, and Non-conforming Zone Changes can have significant and sometimes unanticipated impacts on fire and emergency services. The impacts of other special uses, such as Alternative Energy Sites in more remote locations outside of the Las Vegas Valley, also underscore the need to analyze potential impacts and provision of service. The impacts of these plan changes and projects are typically greater than the original land use would dictate. Therefore, requiring Development Agreements and Public Facility Needs Assessments (PFNA) help ensure that there is a proportional mitigation of impacts on services and infrastructure until such time as there is sufficient tax base to cover the cost of provided services. The Fire Department actively participates in negotiations with project developers to mitigate impacts.

In developing areas, the Fire Department should continue to use the project assessment information developed from this report and any follow-up data to evaluate amended plan and project impacts. Fire Department response rates per land use acre are displayed in Table 3 below. Maps 2 and 3 on pages 12 and 13 show response data for emergencies. This information can assist in guiding decision makers as part of the development review process.

**Table 3: CC Fire District Response Rates per Land Use Acre**

<b>Land Uses</b>	<b>Responses<sup>1</sup></b>	<b>Acreage<sup>2</sup></b>	<b>Responses/Acre</b>
Single Family	44,395	84,637	0.52
Multi-Family	20,521	8,631	2.38
Resort Hotel/Hotel	36,118	6,612	5.46
Commercial	22,464	10,624	2.11
Manufacturing	5,620	11,046	0.51
Special Districts	11,182	21,463	0.52
City Jurisdictions	9,624	188,519	0.05
<b>Total</b>	<b>149,924</b>	<b>331,532</b>	

<sup>1</sup> CCFD Response Data, 2011. Miscellaneous equipment tests, along with Laughlin and Jean responses are not included in these figures.

<sup>2</sup> Clark County Comprehensive Planning, 2011 – LVV acreage includes Rights-of-Way.

# ANALYSIS

This section establishes a forecast model for future service needs based on past response rates.

## Past Responses

Table 4 depicts Clark County’s Permanent Resident, Daily Visitor, and Total Daily Population from 2009 to 2013. The Average Population in the Clark County Fire District for the four-year period displays as follows:

**Table 4: CC Fire District Area Population 2009 – 2013<sup>1</sup>**

Population	2009	2010	2011	2012	2013	Average
<b>Resident Population</b>	840,884	866,972	828,605	865,857	891,254	<b>858,715</b>
<b>Daily Visitor Population</b>	254,913	239,487	264,253	266,713	279,082	<b>260,890</b>
<b>Total Daily Population</b>	<b>1,095,797</b>	<b>1,106,460</b>	<b>1,092,859</b>	<b>1,132,570</b>	<b>1,170,336</b>	<b>1,119,604</b>

<sup>1</sup> Clark County Comprehensive Planning, 2014

Table 5 illustrates past responses in the Metropolitan, Urban, and Suburban Operational Areas of Unincorporated Las Vegas Valley and Jean as determined by the Fire Department. It also shows Average Annual Responses by functional area.

**Table 5: CC Fire District Responses per Year 2009 – 2013<sup>1</sup>**

Factor	2009	2010	2011	2012	2013	Average
<b>Medical</b>	103,261	108,975	114,563	122,521	129,434	<b>115,751</b>
<b>Fire Suppression</b>	18,775	18,624	18,744	21,164	23,076	<b>20,077</b>
<b>Vehicle Accidents</b>	17,765	16,883	17,217	17,070	17,861	<b>17,359</b>
<b>Technical Services</b>	4,386	3,863	3,812	4,573	4,418	<b>4,210</b>
<b>Public Assistance</b>	2,830	2,858	3,138	2,738	2,507	<b>2,814</b>
<b>Response Totals</b>	<b>147,017</b>	<b>151,203</b>	<b>157,474</b>	<b>168,066</b>	<b>177,296</b>	<b>160,211</b>

<sup>1</sup> CCFD Response Data, 2014.

Table 6 shows the Responses per Capita by function. The Responses per Capita are determined by dividing the Responses in Table 5 by the Total Daily Population from Table 4. Average responses are also shown for each function. This information is used to prepare the future forecast model shown in Table 7.

**Table 6: CC Fire District Responses per Capita 2009 - 2013**

Factor	2009	2010	2011	2012	2013	Average
<b>Medical</b>	0.0942	0.0985	0.1048	0.1082	0.1106	<b>0.1033</b>
<b>Fire Suppression</b>	0.0171	0.0168	0.0172	0.0187	0.0197	<b>0.0179</b>
<b>Vehicle Accidents</b>	0.0162	0.0153	0.0158	0.0151	0.0153	<b>0.0155</b>
<b>Technical Services</b>	0.0040	0.0035	0.0035	0.0040	0.0038	<b>0.0038</b>
<b>Public Assistance</b>	0.0026	0.0026	0.0029	0.0024	0.0021	<b>0.0025</b>
<b>Response Total</b>	<b>0.1341</b>	<b>0.1367</b>	<b>0.1442</b>	<b>0.1484</b>	<b>0.1515</b>	<b>0.1430</b>

# Forecast Model

Table 7 shows a 2015 through 2035 forecast model for the Metropolitan, Urban, and Suburban Operational Areas of Unincorporated Las Vegas Valley (LVV), and Jean. This calculation was determined by using the 5-year average response column from Table 5, as well as Daily Visitor Volume (DVV) from the Las Vegas Convention and Visitor’s Authority (LVCVA) for the Las Vegas Valley.

**Table 7: CC Fire District Response Forecast**

Factor/Function <sup>1</sup>	Average	2015	2020	2025	2030	2035
<b>Total Population<sup>2</sup></b>	<b>1,119,604</b>	<b>1,180,878</b>	<b>1,248,978</b>	<b>1,304,228</b>	<b>1,363,334</b>	<b>1,424,152</b>
Medical	<b>115,751</b>	122,086	129,126	134,838	140,949	147,237
Fire Suppression	<b>20,077</b>	21,176	22,397	23,388	24,448	25,538
Vehicle Accidents	<b>17,359</b>	18,309	19,365	20,222	21,138	22,081
Technical Services	<b>4,210</b>	4,440	4,697	4,904	5,126	5,355
Public Assistance	<b>2,814</b>	2,968	3,139	3,278	3,427	3,579
<b>Total Responses</b>	<b>160,211</b>	<b>168,979</b>	<b>178,724</b>	<b>186,630</b>	<b>195,088</b>	<b>203,790</b>

<sup>1</sup> CCFD response data, 2014.

<sup>2</sup> Resident and Daily Visitors from Clark County Comprehensive Planning based on UNLV-CBER REMI Population Forecast & LVCVA Visitor Survey, 2014; calculated as 42.83% X Clark County Final Population Forecast + 100% X DVV.

## Issues

### Demographic Trends

With the aging of the “baby boomer” generation, it is imperative to realize the increased impact expected on Emergency Medical Services. The proportion of fire suppression calls may also decrease as Building and Fire Codes become more effective in protecting structures. Thus, the mission of the Fire Department will need to evolve to reflect the associated risks and hazards assessed in the community.

### Additional Units

Determining the need for additional units (and stations) is a complex task. Factors to consider include community risk factors (i.e., high-risk occupancies, land use, etc.), number of emergency incidents, fire protection needs, population density, and response time performance. Finding a method for determining and forecasting the need for additional units and the ideal location for future stations is necessary. The Work Program developed by this Element provides for further study in this area.

### State and Federal Roads

Consideration should be given to alternative funding to support the Rural Operational Area responses that occur within state and federal rights-of-way. The main mission of the Fire Department is to protect people and property in local communities. Incidents that occur along the state and federal roads cause the units to travel well outside their main areas of responsibility.

## Service Range

There are a few private land uses lying far beyond the effective reach of any fire station. These are typically uses such as ranches, mining operations, or electrical transmission facilities. It is important for these remote uses to incorporate as many fire prevention measures as possible to minimize damage if fires occur.

## Support Staff

Each addition to operational staff, equipment, or facilities, places added stress on all support staff and increases workload. For instance, as the number of units deployed rises, so also do the number of preventive maintenance work orders, directly affecting a Fire Mechanic's workload. This holds true for each support staff position, which provides direct service to operational staff. Support staff must continue to cover the corresponding additional workload.

## Emergency Dispatch

Emergency dispatch receives calls that prompt responses to non-emergency situations. These responses divert critical resources from true emergencies. Further study involving all three departments, Clark County, City of Las Vegas, and City of North Las Vegas that comprise the City of Las Vegas' Fire Alarm Office will determine how to better address the non-emergency calls received.

## Water Availability

Recent studies stress a need for additional water storage (e.g. tanks or ponds) for fire fighting in rural communities. The needs come from a combination of wildfire potential and structural fire fighting needs. Table 8 shows these needs by community.

In the Suburban Operational Areas, some developments receive their drinking water from community wells. There are no hydrants in these areas and water tender units must supply engines the water needed for fighting fires.

## Meeting Service Demands

As Unincorporated Clark County's population exceeds one million residents and daily visitors, growth has led to some fundamental changes in the form, function and character of the urban area and put increased development pressures on rural communities. In the past, plans focused on geographic coverage and reserving public land for the construction of facilities. Today, the focus is on adequate service for more intense land uses and higher density populations. These community changes require a shift in fire service planning away from distance criteria and towards response time and volume based on land use, transportation, and population. Demand for service is based on population, which in turn is linked to building square footages. Research is needed to develop these links so more precise service demand estimates can be made.

**Table 8: Clark County Rural Area Water Storage Needs**

Community	Storage (gallons)
Goodsprings	50,000
Primm	5,000
Sandy Valley	50,000
Sloan	5,000
Trout Canyon	1,000

Nevada Community Wildfire Risk/Hazard Assessment Project, June 2005

## **Funding Districts**

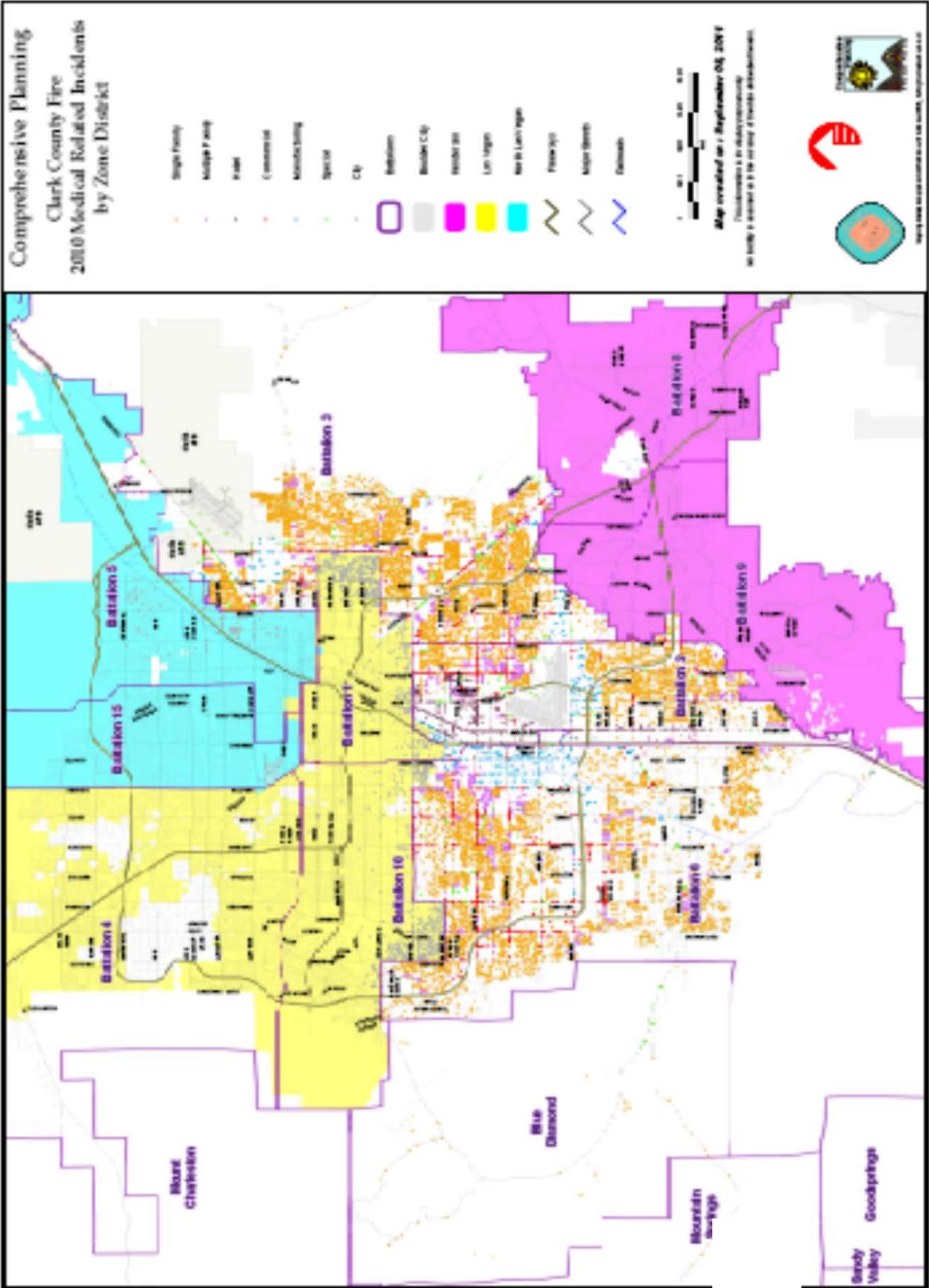
Geographic inconsistencies exist between the provision of fire service and funding methods for this service. Large areas of development in both the suburban and outlying areas are outside any designated fire district Town Advisory Board or Citizen Advisory Council area. This results in areas that do not contribute toward service costs, and follow-up analysis will assist to determine appropriate funding sources.

## **Station Timing**

Fire protection needs, land use, and funding should determine when additional services or facilities are required. This analysis is linked to the identification of long-term funding sources that considers operations and maintenance expenses.

## **Additional Sources**

Other sources of funding should be explored in the Work Program to support areas of growth, additional service demands, and in-state and federal transportation corridors.

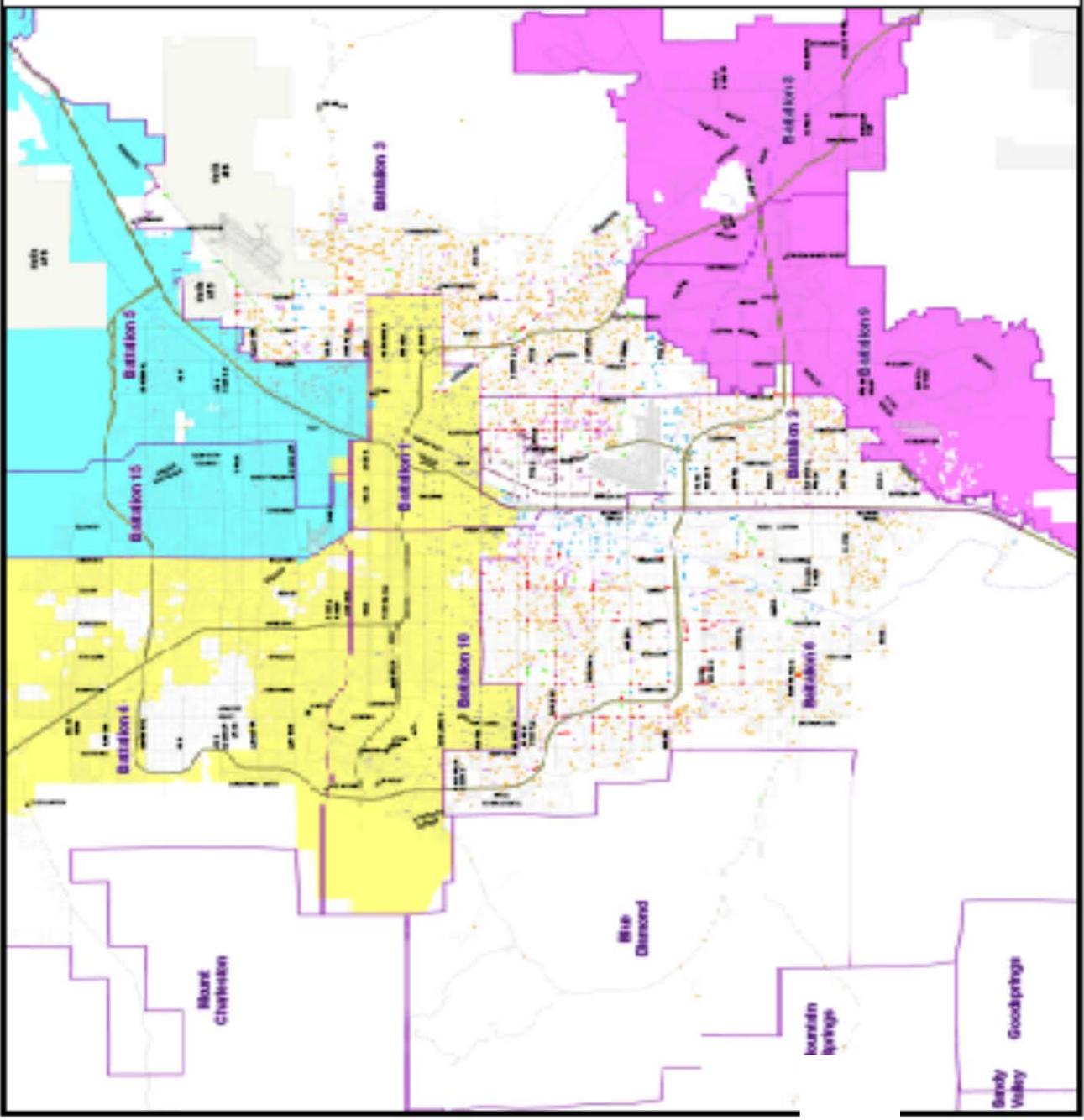


**Comprehensive Planning**  
**Clark County Fire**  
**2010 Fire Related Incidents**  
**by Zone District**

- Single Family
- Multiple Family
- Forest
- Commercial
- Manufacturing
- Special
- City
- Religious
- Mobile C.D.
- Mobile DM
- Lot Apts
- Mobile L.A. Apts
- Forest DM
- Major Streets
- Canal



Map created on 7 September 08, 2011  
 This document is not subject to public review.  
 No liability is assumed for errors or omissions.



# RECOMMENDATIONS

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## Policy Recommendations

The following policies are recommended for inclusion in the Comprehensive Plan:

### Existing Policies:

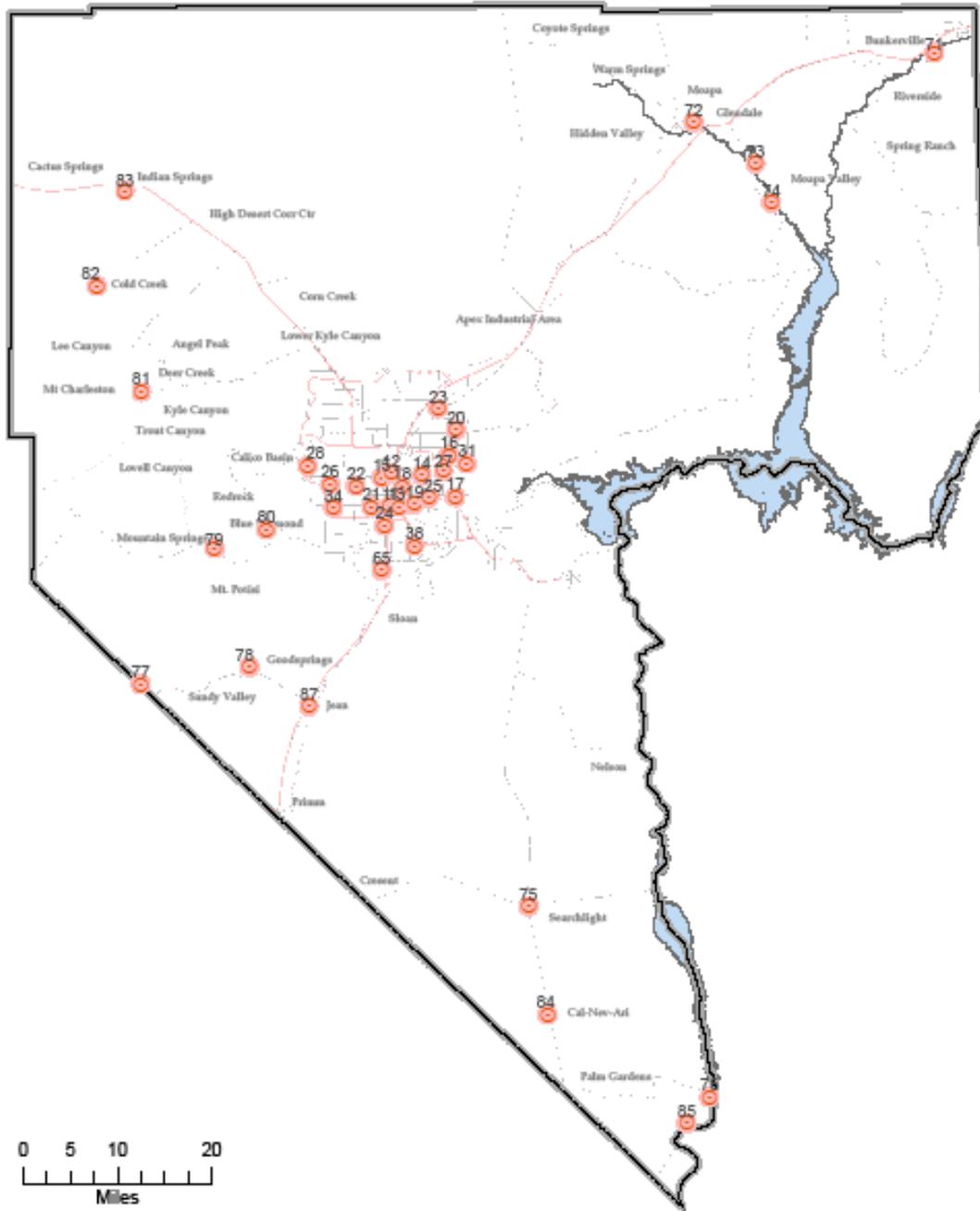
- All development located outside the Clark County Fire Service District must provide adequate emergency medical and fire protection services.
- New development in Rural Areas must address additional water storage needs for the community prior to approval.
- Work with federal and state agencies to develop alternative response plans and funding sources for responding to incidents on federal and state highways and lands.
- Ensure that emergency services are provided in Wildland Interface Areas through mission sensitive reciprocal agreements with federal and state agencies.

### New Policies:

- Ensure that all developments provide adequate access for fire and other emergency vehicles and equipment (including fire hydrants).
- Base the provision of services on fire protection needs, population, land use, and funding.

## Work Program Recommendations

1. Develop and maintain an impact assessment methodology and continue preparing Development Agreements to address High Impact Projects and Major Projects.
2. Include Fire Department plans and facilities in all County Land Use Plans.
3. Assess and update Title 30 and other codes to reduce the impacts of Fire, EMS, and Hazardous Materials incidents.
4. Continue the process of obtaining additional water storage facilities for Goodsprings, Primm, Sandy Valley, Sloan, and Trout Canyon.
5. Continue operational planning with the Nevada Division of Forestry, Bureau of Land Management, and other federal partners, and develop the agreements needed to ensure emergency services are provided in Wildland Interface Areas.
6. Continue to research and develop appropriate solutions to issues such as public educational programs, demographic changes in emergency responses, improved data collection for incidents, and code improvements.
7. Develop methods to reduce emergency responses to non-emergency calls.



### Clark County Fire Department Existing Fire Stations



Map Created On: June 26, 2007

This information is for display purposes only.  
No liability is assumed as to the accuracy of the data delineated hereon.



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