



OUR COMMUNITY

OUR FUTURE



AMENDED MAY 2020



COMPREHENSIVE PLAN Appendices

Appendix I – Clark County 2012 Multi-Jurisdictional Hazard Mitigation Plan

Clark County

2012 Multi-Jurisdictional Hazard Mitigation Plan

November 2012



City of Henderson
240 Water Street
Henderson, Nevada 89015



Clark County
Unincorporated Area
500 S. Grand Central Parkway
Las Vegas, Nevada 89155



City of Las Vegas
495 S. Main Street
Las Vegas, Nevada 89101



City of Mesquite
10 East Mesquite Boulevard
Mesquite, Nevada 89027



City of North Las Vegas
2250 Las Vegas Boulevard North
North Las Vegas, Nevada 89030

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1.1 OVERVIEW

This section provides a brief overview of the topic, an introduction to hazard mitigation planning, and a brief description of the Disaster Mitigation Act of 2000, grant programs with mitigation plan requirements, local participants, and the 2012 Hazard Mitigation Plan.

Clark County (the County) has developed this multi-jurisdictional Hazard Mitigation Plan (hereinafter referred to as the 2012 HMP) to assess risks posed by natural and human-caused hazards and to develop a mitigation strategy for reducing the County's risks. The County has prepared the 2012 HMP in accordance with the requirements of the Disaster Mitigation Act of 2000 (DMA 2000). The Clark County Office of Emergency Management and Homeland Security (OEM&HS) has coordinated the preparation of the 2012 HMP in cooperation with cities and special districts. The 2012 HMP replaces the HMP that the County prepared in 2007.

1.2 HAZARD MITIGATION PLANNING

As defined in Title 44 of the Code of Federal Regulations (CFR), Subpart M, Section 206.401, hazard mitigation is "any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards." As such, hazard mitigation is any work to minimize the impacts of any type of hazard event before it occurs. Hazard mitigation aims to reduce losses from future disasters. It is a process in which hazards are identified and profiled, the people and facilities at risk are analyzed, and mitigation actions to reduce or eliminate hazard risk are developed. The implementation of the mitigation actions, which include short and long-term strategies that may involve planning, policy changes, programs, projects, and other activities, is the end result of this process.

1.3 DISASTER MITIGATION ACT OF 2000

In recent years, local hazard mitigation planning has been driven by a new federal law, known as the Disaster Mitigation Act of 2000 (DMA 2000). On October 30, 2000, Congress passed the DMA 2000 (Public Law 106-390), which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Stafford Act) (Title 42 of the United States Code [USC] Section 5121 et seq.) by repealing the act's previous mitigation planning section (409) and replacing it with a new mitigation planning section (322). This new section emphasized the need for state, tribal, and local entities to closely coordinate mitigation planning and implementation efforts. This new section also provided the legal basis for the Federal Emergency Management Agency's (FEMA's) mitigation plan requirements for mitigation grant assistance.

To implement these planning requirements, FEMA published an Interim Final Rule in the Federal Register on February 26, 2002 (FEMA 2002) (44 CFR Part 201). On October 1, 2011 FEMA release the Local Mitigation Plan Review Guide, which is currently available for use, but becomes effective on October 1, 2012. The local mitigation planning requirements are identified in their appropriate sections throughout the 2012 HMP and in Appendix A, which includes the FEMA's Local Plan Review Tool.

1.4 GRANT PROGRAMS WITH MITIGATION PLAN REQUIREMENTS

Currently, five grant programs within FEMA's Hazard Mitigation Assistance program are available to participating jurisdictions that have FEMA-approved HMPs and are members of the National Flood Insurance Program (NFIP). Two of the grant programs are authorized under the

Stafford Act and DMA 2000, and the remaining three are authorized under the National Flood Insurance Act and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act.

Table 1-1. FEMA's Historic HMA Funding

FY	HMGP*	PDM	FMA	RFC	SRL
FY10	\$23,361,517	\$100,000,000	\$40,000,000	\$10,000,000	\$70,000,000
FY09	\$359,034,202	\$90,000,000	\$35,700,000	\$10,000,000	\$80,000,000
FY08	\$1,246,236,812	\$114,000,000	\$34,000,000	\$10,000,000	\$80,000,000
FY07	\$315,730,830	\$100,000,000	\$31,000,000	\$10,000,000	\$40,000,000
FY06	\$232,227,932	\$50,000,000	\$28,000,000	\$10,000,000	\$40,000,000

* HMGP funding amounts as of May 3, 2010. Funding amounts fluctuate based on the number and severity of declared disasters, as well as the applicable percentage of other assistance that is the basis for HMGP amounts (the current percentage has been in effect since October 2006)

Source: Hazard Mitigation Assistance Unified Guidance. June 1, 2010

1.4.1 Stafford Act Grant Programs

Hazard Mitigation Grant Program. The Hazard Mitigation Grant Program (HMGP) provides grants to state, local, and Tribal entities to implement long-term hazard mitigation measures after declaration of a major disaster. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Projects must provide a long-term solution to a problem (for example, elevation of a home to reduce the risk of flood damage rather than buying sandbags and pumps to fight the flood). Also, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The amount of funding available for the HMGP under a particular disaster declaration is limited. The cost-sharing for this grant is 75 percent federal and 25 percent nonfederal.

Pre-Disaster Mitigation Program. The Pre-Disaster Mitigation (PDM) Program provides funds to state, local, and Tribal entities for hazard mitigation planning and the implementation of mitigation projects before a disaster. PDM grants are awarded on a nationally competitive basis. Like HMGP funding, the potential savings of a PDM project must be more than the cost of implementing the project, and funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The total amount of PDM funding available is appropriated by Congress on an annual basis. The cost-sharing for this grant is 75 percent federal and 25 percent nonfederal, although cost-sharing of 90 percent federal and 10 percent nonfederal is available in certain situations.

1.4.2 National Flood Insurance Act Grant Programs

Flood Mitigation Assistance (FMA) Grant Program: The goal of the FMA Grant Program is to reduce or eliminate flood insurance claims under the NFIP. This program places particular emphasis on mitigating repetitive loss (RL) properties. The primary source of funding for this program is the National Flood Insurance Fund. Grant funding is available for three types of

grants: Planning, Project, and Technical Assistance. Project grants, which use the majority of the program's total funding, are awarded to local entities to apply mitigation measures to reduce flood losses to properties insured under the NFIP. In FY 2010, FMA funding totaled just over \$32 million. The cost-sharing for this grant is 75 percent federal and 25 percent nonfederal, although cost-sharing of 90 percent federal and 10 percent nonfederal is available in certain situations to mitigate severe repetitive loss (SRL) properties. As of June 2011, there are 18 RL properties located in Clark County including one SRL property. Information about RL properties in Clark County is provided in Section 5.6.

Repetitive Flood Claims Program: The Repetitive Flood Claims Program provides funding to reduce or eliminate the long-term risk of flood damage to residential and non-residential structures insured under the NFIP. Structures considered for mitigation must have had one or more claim payments for flood damages. In FY 2008, Congress appropriated \$10 million for the implementation of this program. All Repetitive Flood Claims grants are eligible for up to 100 percent federal assistance.

Severe Repetitive Loss Program: The SRL Program provides funding to reduce or eliminate the long-term risk of flood damage to residential structures insured under the NFIP. Structures considered for mitigation must have had at least four NFIP claim payments over \$5,000 each, when at least two such claims have occurred within any 10-year period, and the cumulative amount of such claim payments exceeds \$20,000; or for which at least two separate claims payments have been made with the cumulative amount of the building portion of such claims exceeding the value of the property, when two such claims have occurred within any 10-year period. The cost-sharing ratio for this grant is 75 percent federal and 25 percent nonfederal. As of June 2011, there is one SRL property located within Clark County.

1.5 COMMUNITY PROFILES

The following section describes the communities participating in the development and adoption of the 2012 HMP.

The participating jurisdictions represented in this multi-jurisdictional plan include:

- Clark County
- City of Henderson
- City of Las Vegas
- City of Mesquite
- City of North Las Vegas
- Clark County School District (CCSD)
- Clark County Water Reclamation District (CCWRD)

Neither the CCSD nor the CCWRD were participants in the 2007 HMP and are therefore new participants for the 2012 HMP effort.

In addition to the participants listed above, both the Southern Nevada Health District (SNHD - formerly known as the Clark County Health District) and the Clark County Regional Flood Control District (CCRFCD) were actively involved in the 2012 HMP effort. As active

stakeholders, representatives of SNHD and CCRFCD attended planning committee meetings, provided insight for the development of mitigation actions and reviewed drafts of the 2012 HMP. The following cities and special districts participated in the 2007 HMP, but did not participate in this 2012 HMP:

- City of Boulder City
- Moapa Valley Water District
- Regional Transportation Commission of Southern Nevada

1.5.1 Clark County

Location, Geography, and History: Clark County is on the southernmost tip of the State of Nevada and shares borders with Nye County and Lincoln County in Nevada. Interstate neighbors are California and Arizona. The majority of the County's metropolitan area is located in the valley (Las Vegas Valley), surrounded by several mountain ranges. Clark County is approximately 270 miles northeast of Los Angeles, CA and 280 miles northwest of Phoenix, AZ. The County covers an area of 8,091 square miles, approximately 180 square miles of which are covered by water and the remaining 7,910 square miles are covered by land.

Clark County is located in the high desert which means summer daytime temperatures typically soar over 100° F. Temperatures in the Las Vegas Valley hover 10 degrees or more above the average high temperature for the region, last for prolonged periods of time, and are often accompanied by humidity in the 18-43% range.

During these hot summer months, moist unstable air from the Gulf of Mexico is rapidly forced upward by hot air currents. The dynamics of this process often result in spectacular displays of lightning in the desert sky. They also sometimes cause severe thunderstorms with intense rainfall.

The majority of the population is located in the Las Vegas Valley, with the area being made up of unincorporated Clark County, City of Las Vegas, City of North Las Vegas, and City of Henderson. The City of Boulder City and the City of Mesquite are municipalities outside the valley. Clark County's towns range from the small Arizona border community of Laughlin, 95 miles south of Las Vegas, to the ranching and farming communities of the Virgin and Muddy River Valleys, 80 miles to the north.

Clark County was annexed in 1867 from the Arizona Territory to the State of Nevada as part of Lincoln County. Formed in 1909, the County is named after William Andrews Clark (1839-1925), who established the railroad that linked Los Angeles with Salt Lake City. Las Vegas was founded in 1905 after Clark's railroad, which made stops here, purchased land for a town site and sold lots by auction, creating downtown Las Vegas. Established at a population of 3,321, growth in Clark County remained slow until the Great Depression, when government projects such as construction of Hoover Dam drew laborers to Southern Nevada. After World War II, legalized gaming and the warm, dry climate continued to draw new residents to Southern Nevada.

Clark County includes five cities (Boulder City, Henderson, Las Vegas, Mesquite and North Las Vegas), an identified 32 relatively small communities and census-designated places.

Government: The Clark County is governed by a seven-member County Commission. Commission members are elected to serve staggered four-year terms in biannual partisan elections. After every election commissioners elect a chairperson who serves as the Commission's presiding officer. The Commission then hires a county manager who is responsible for administrative operations, dealing with the actual day-to-day operations.

Economy: Tourism is makes up the base of Clark County's economy. In 2009 tourism had an economic impact of \$35.2 billion dollars in Clark County, including \$8.8 billion spent on gaming. It therefore makes sense that the Leisure and Hospitality Industry employs almost a third of all industrial workers in Clark County. In 2011, according to the Nevada Department of Employment, Training and Rehabilitation, 32 percent of the industrial workforce was employed by the leisure and hospitality industry. The second largest industry is Trade, Transportation & Utilities, which in 2011 employed 17.7 percent of the industrial workforce.

Nevada's economy was hit hard by the recession, but the University of Nevada, Las Vegas Center for Business and Economic Research (UNLV CBER) has reported that Nevada and Southern Nevada can expect to see moderate economic improvements in 2012. As the base of the County's economy, the CBER Tourism Statistics illustrates this economic upturn. Tourism statistics were at a high in 2007 (visitor spending at \$41.58 billion), but fell in both 2008 and 2009 (\$38.05 billion and \$32.27 billion respectively). However, statistics show an increase for both 2010 and 2011, with visitor spending up to \$35.6 billion in 2010 and \$39.07 billion in 2011. Clark County's economy shows signs of slowing, but there are still mild improvements.

Demographics: According to the U.S. Census Bureau, Clark County's estimated 2011 population, including incorporated cities, was 1,969,975 people. Approximately 7 percent of the County's population was under the age of five, 63.5 percent was between 18 and 64 years old, and 11.7 percent was over the age of 65.

According to the 2006-2010 American Community Survey (now referred to as the ACS), the entire County's labor force was 1,005,374 people, 9.0 percent of whom were unemployed. The Nevada Department of Employment, Training and Rehabilitation (DETR) however, has reported unemployment at a much higher level. For 2010 DETR reported an unemployment rate of 14.1 percent. Currently, DETR reports an unemployment rate of 12.1 percent. The median household income was \$56,258, (for the U.S. as a whole that figure was \$51,914), while the median family income was \$63,888 (\$62,982 nationwide). 11.7 percent of the County residents were living below the poverty level, compared with 13.8 percent nationwide. The County's per capita income was \$27,422, while that for the U.S. was \$27,334.

Unincorporated Communities: Clark County contains 33 unincorporated communities and census designated places, as follows. Some are little more than place names from past history (often when they had their own Post Offices) and others are active communities as the present time.

- Census-Designated Places: Blue Diamond, Bunkerville, Cal-Nev-Ari, Crystal, Enterprise, Fort Mojave Indian Reservation (part), Goodsprings, Indian Springs, Laughlin, Moapa Town, Moapa Valley, Mount Charleston, Paradise, Sandy Valley, Searchlight, Spring Valley, Summerlin South, Sunrise Manor, Whitney and Winchester.

- Communities: Arden, Cactus Springs, Cottonwood Cove, Coyote Springs, Glendale, Jean, Logandale, Mountain Springs, Nelson, Overton, Primm, Sloan and Sutor.

1.5.2 City of Henderson

The City of Henderson is located adjacent to the County seat, about eight miles south/east of Las Vegas. The City has a total area of 107.73 square miles. The total population for 2010 was estimated at 257,729 (2011 Census estimate not available) people, 5.9 percent of which is under the age of 5 years, 63.1 percent is between the ages of 18 and 65, and 14.3 percent is 65 years or older.

According to the ACS there were 135,278 people in Henderson's labor force, 7.5 percent of whom were unemployed. The median household income was \$68,039 and the median family income was \$78,435. Per capita income for Henderson was reported at \$35,050 and 7.3 percent of the population was living below the poverty line.

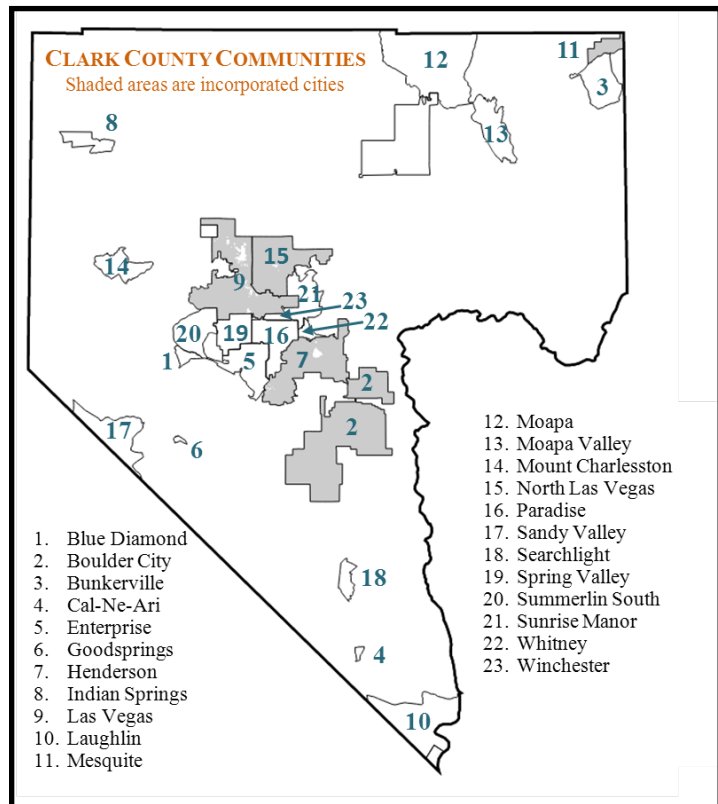
History: The Henderson community was established in World War II with the building of the Basic Magnesium Industries plants, and the sudden influx of 14,000 new jobs. However, in 1947, shortly after the war's end, magnesium production was no longer necessary for the war effort, and most of the employees moved away.

On March 27, 1947, the Nevada Legislature unanimously approved a bill giving the Colorado River Commission of Nevada the authority to purchase the industrial plants. With the help of local industry, the City of Henderson, Nevada, was officially incorporated on April 16, 1953, and comprised approximately 13 square miles and 7,410 residents. Although incorporated in 1953, the City of Henderson did not receive its charter from the Nevada State Legislature until 1965.

1.5.3 City of Las Vegas

The City of Las Vegas is the County seat and is located in central Clark County. Las Vegas covers 135.82 square miles. The total estimated population for 2010 is 583,756 people. 7.2 percent of the population is under the age of 5 years, 62.3 percent is between the ages of 18 and 65 and 12.0 percent is 65 years of age or older.

According to ACS there were 297,784 residents in the labor force, 9.8 percent of whom were employed. Las Vegas's median household income was \$54,334 and the median family income was \$62,355. Per capita income was \$26,993; 13.1 percent of Las Vegas residents were living below the poverty line.



History: Founded with a land auction on May 15, 1905, the community of Las Vegas originally consisted of 110 acres. Originally developed to support the railroad industry, early businesses in Las Vegas consisted largely of saloons, boarding houses, and stores to service railroad workers. By March 16, 1909, the date of its incorporation as a city, Las Vegas had grown to a population of 800 residents and covered an area of 19.18 square miles.

Within one month of the 1911 legalization of gambling in Nevada, Las Vegas issued its first six gambling licenses. In that same year, Nevada relaxed the requirements for divorces, allowing an expedited divorce after a short, six-week residency. The new divorce laws and legalized gambling spurred the development of the “dude ranch” industry in Las Vegas. These dude ranches were the forerunners of the hotel-casino and resort industries that would gain in popularity and dominance after 1945.

From the mid-1940s to present day, much of Las Vegas’ history has revolved around its tourism. During the 1950s and 60s, celebrity headliners and sporting events dominated local entertainment venues, giving Las Vegas a reputation as a glamorous destination. Nuclear testing exercises, conducted approximately 65 miles north of Las Vegas, also attracted tourists. In the 1970s, McCarran Airport opened to international flights, inviting an influx of overseas guests. The City began a redevelopment effort in Las Vegas’ downtown area (particularly Fremont Street) in the 1990s. The Las Vegas economy continues to depend heavily on gaming, entertainment, hotel, convention, and other tourism-related industries.

1.5.4 City of Mesquite

The City of Mesquite is located at the far north/east corner of Clark County, about on SR 65, about 80 miles northeast of the County seat. Mesquite covers 31.90 square miles of land and has an estimated 2010 population of 15,276 people. For 2010, 6.2 percent of the population was under the age of 5 years, 51.2 percent was between the ages of 18 and 65 and 28.6 percent was over the age of 65 years.

According to the ACS, of the 6,686 residents in the labor force, 9.3 percent were unemployed. The median household income in Mesquite was \$44,221 and the median family income was \$50,873. The City’s per capita income was \$26,489 and 11.9 percent of all residents were living below the poverty line.

History: Mesquite was first founded in 1880 by a small group of Mormon pioneers. The group attempted to irrigate and settle what was then known as the Mesquite Flats, but flash flooding and damage to the irrigation network drove these settlers away. In 1894, subsequent settlers were finally successful in founding a permanent town at the site. As the town grew, its name was shortened to Mesquite.

For much of its early history, Mesquite was primarily an agricultural town (dairies were particularly dominant for much of the late 1900s). Raisins, milk, and eggs were among the agricultural products exported from Mesquite. As automobiles became more popular and more widely used, Mesquite began to develop a tourism industry as well, opening campgrounds and hotels.

1.5.5 City of North Las Vegas

The City of North Las Vegas is located just north of the County seat, about five miles north of Las Vegas. North Las Vegas encompasses 101.35 square miles. North Las Vegas’s 2010

estimated population was 216,961 people of whom 9.0 percent are under the age of 5 years, 61.3 percent are between the ages of 18 and 65 and 7.1 percent are over the age of 65 years.

According to the ACS, the labor force in North Las Vegas consisted of 101,292 people, of which 8.7 percent were considered unemployed. The median household income in North Las Vegas is \$59,256, the median family income is \$62,337 and the per capita income is \$21,657. 12.2 percent of North Las Vegas residents are living below the poverty line.

History: The community that was to become North Las Vegas originally began as a 160-acre ranch settled by Conrad Kiel in 1884. Approximately 7 acres of this former ranch site has been considered for preservation within the city limits as an historic park.

The City of North Las Vegas was incorporated on May 1, 1946. At the time of its incorporation, North Las Vegas consisted of 2.5 square miles with a population of 2,875. As the city grew, it promoted economic diversification by permitting development projects to support not only gaming and tourism, but also light manufacturing, regional distribution, retail sales, and the high tech industry.

1.5.6 Clark County School District

The CCSD encompasses all of Clark County; under state law, each of Nevada's 17 counties has one school district responsible for K-12 education. CCSD operates 357 schools and serves over 300,000 students. CCSD schools are organized into four geographic Area Service Centers and three divisions that provide programs and services for students. This service areas and divisions include the following: Area one; Area two; Area three; Area 4; Superintendent's School Division, Education Services Division and Student Support Services Division.

The CCSD is governed by a seven member board of trustees elected from sections of the County. The Clark County Board of School Trustees is a dedicated group of community leaders who are elected to overlapping four-year terms and represent a specific geographic region of Clark County.

1.5.7 Clark County Water Reclamation District

The CCWRD is responsible for wastewater treatment and reclamation in all of the unincorporated areas of Clark County, including the outlying communities of Blue Diamond, Indian Springs, Laughlin and Moapa Valley and Searchlight. The CCWRD is governed by a seven-member board whose members also serve as the Board of County Commissioners.

The CCWRD was created by a decree of the District Court and authorized under Nevada Revised Statutes as a general improvement district on August 11, 1954. Prior to that time, the treatment of sewage in unincorporated Clark County was by means of cesspools, septic tanks and several small treatment plants operated by the hotels along Las Vegas Boulevard. The continuing growth of both the tourist and residential portions of the community pointed out the need for more sanitary and efficient means of treating the wastewater.

In early 1955, Clark County residents voted for the issuance of bonds for the construction of a collection system (pipelines) and wastewater treatment facility. On November 1, 1956, the District began receiving sewage from the community at the facility. In 1973, the Nevada Legislature expanded the District's service area responsibilities to include all unincorporated areas within Clark County. The District was originally named Clark County Sanitation District

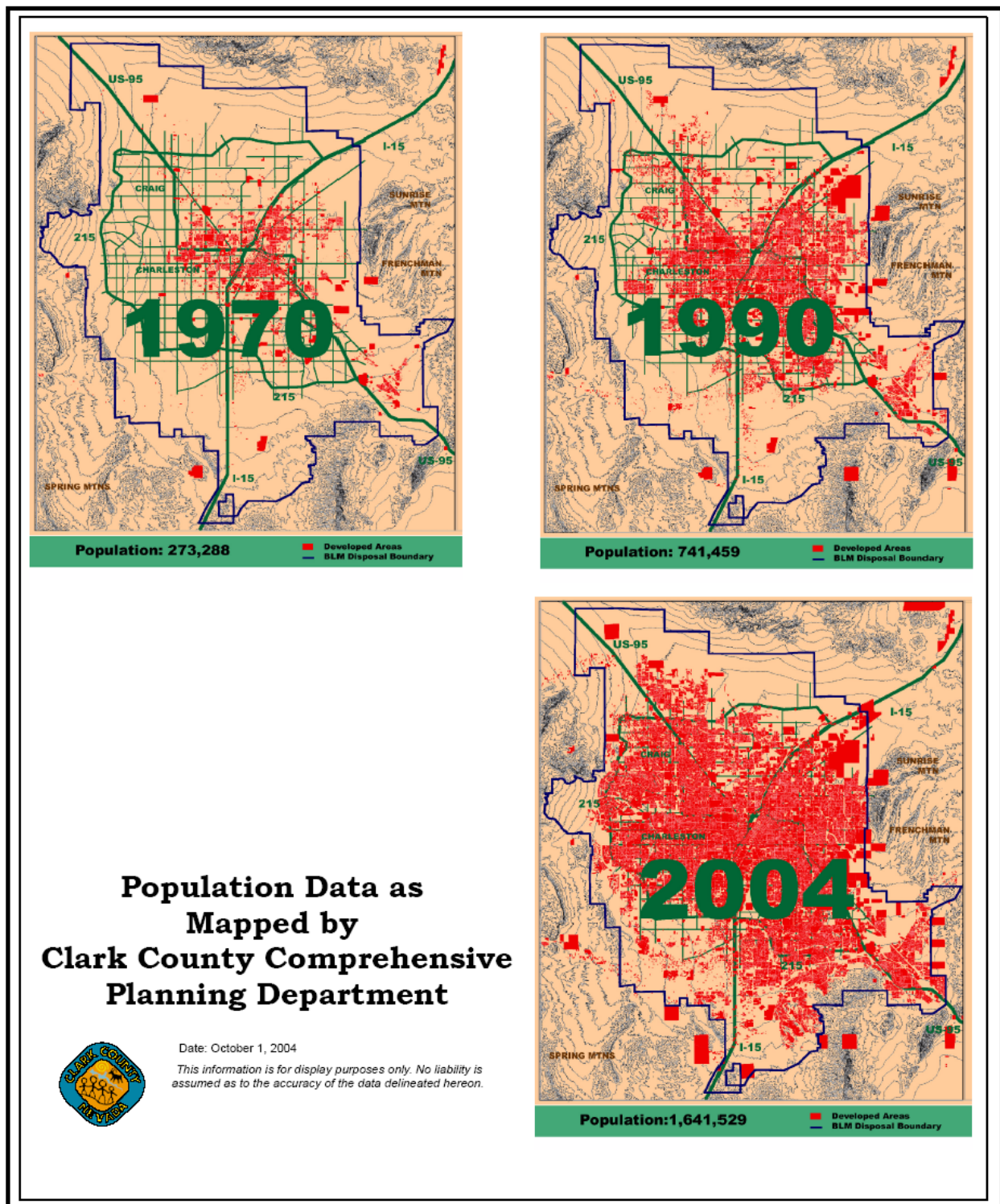
No. 1; after several name changes and mergers, the Sanitation District became the Clark County Water Reclamation District in 2003.

1.5.8 Development Trends and Land Use

From the 1970's through 2007 Clark County experienced rapid growth and for a number of years Clark County was one the fastest-growing region in the country. At the height of its growth Clark County had an average growth of just under 9,000 new residents per month. 2008 was the first year that Clark County saw a reduction in their population. Since then, Clark County's population has continued to grow, but closer to one percent per year.

Historic growth is illustrated by Figure 1-1, Clark County Population Growth; in 1970 Clark County had a recorded population of 273,288 and has grown by over 650 percent to about 1.8 million people. More recently, the largest population increase was experienced from 1999 to 2000, when the County's population increased by 8.14 percent.

Figure 1-1. Clark County Historic Population Growth



The majority of the growth is located in the Las Vegas Valley, with the area being made up of unincorporated Clark County, City of Las Vegas, City of North Las Vegas, and City of Henderson. The City of Boulder City and the City of Mesquite are municipalities outside the

valley. Clark County's towns range from the small Arizona border community of Laughlin, 95 miles south of Las Vegas, to the ranching and farming communities of the Virgin and Muddy River Valleys, 80 miles to the north.

The Las Vegas Valley is a highly urbanized region with a rich history that is reflected in its current development pattern and diverse mix of land uses, building types and styles, and neighborhoods.

Table 1-2. Clark County Land Uses

Land Status	Acres	Square Miles
Vacant*	4,707,487	7355.449
Single Family	94,431	147.548
Multi-Family	45,694	71.397
Industrial	14,324	22.381
Commercial	42,642	66.628
Non-profit Community Facilities	40,431	63.174
Agricultural, Ranching, Wildlife & Natural Resources	5,259	8.218
Transportation/Communications/Utilities	26,140	40.843
Right of Way	78,928	123.325
Water	115,405	180.320
Other	7,499	11.717
Total	5,178,240	8,091

* For all areas of Clark County as of November 2011

Source: Square mileage acquired from Assessor's Office GIS data

As shown in Figure 1-1, Clark County Population Growth, growth in the Las Vegas Valley continues to expand outward from the core metropolitan area. The highest levels of current land use growth are occurring along the Las Vegas Beltway from I-15 to the west, along the western beltway between Warm Springs Road and Centennial Parkway, and along the northern beltway between Hualapai Way and Camino al Norte. Master planned communities such as Rhodes Ranch, Southern Highlands, Sun City Anthem, and Aliante have been hard hit by the recent economic downturn, but remain centers of population growth upon the recovery of the economy.

The Southern Nevada Public Land Management Act was enacted to provide for the orderly disposal of certain federal lands in Clark County and to provide for the acquisition of environmentally sensitive lands in Nevada. The disposal of Federal lands will play a major role in the availability of developable land within the Las Vegas Valley.

In addition to growth expanding to outer-lying communities, the County is experiencing a great deal of in-fill building, which is increasing the population density and creating greater service loads on the existing infrastructure, including roads, water supply, sewer services, and storm drains.

1.6 DESCRIPTION OF THE HAZARD MITIGATION PLAN

The remainder of the 2012 HMP consists of the sections and appendices described below.

1.6.1 Section 2: Record of Adoption

Section 2 addresses the adoption of the 2012 HMP by the participating jurisdictions. The adoption resolutions are provided in Appendix B, Adoption Resolutions.

1.6.2 Section 3: Planning Process

Section 3 describes the planning process. Specifically, this section describes the plan development process and identifies key stakeholders, including members of the Hazard Mitigation Planning Committee (Planning Committee). This section also includes a description of the meetings held as part of the planning process (relevant documents are attached as Appendix D, Planning Team Meetings). Additionally, this section documents public outreach activities (attached as Appendix E, Public Outreach) and discusses the review and incorporation of relevant plans, reports, and other appropriate information.

1.6.3 Section 4: Hazard Analysis

Section 4 describes the process through which the Planning Committee identified, screened, and selected the hazards to be profiled in the 2012 HMP. The hazard analysis includes the nature, history, location, extent, and probability of future events for each hazard. Location and historical hazard figures are provided in Appendix C, Figures.

1.6.4 Section 5: Vulnerability Analysis

Section 5 identifies the methodology for analyzing potentially vulnerable assets—population, residential building stock, and critical facilities such as community services facilities, government buildings, public safety facilities, and public works facilities. This information was compiled by assessing the potential impacts from each hazard using Geographic Information System (GIS) data. The results of the analysis are provided in each jurisdiction-specific appendix, Appendices G – M.

1.6.5 Section 6: Capability Assessment

Section 6 identifies the component of a capability assessment. While not required by the DMA 2000, the State of Nevada requires the completion of capability assessments. These review the County's resources to identify, evaluate and enhance the capacity of those resources and are recognized as an important component of hazard mitigation planning. The assessment for each participating jurisdiction is provided in the jurisdiction-specific appendix, Appendices G – M.

In each appendix, the capability assessment evaluates the human and technical, financial, and legal and regulatory resources available for hazard mitigation for each participating jurisdiction. The results of the capability assessment in each appendix also list current, ongoing, and completed mitigation projects and programs for each participating jurisdiction.

1.6.6 Section 7: Mitigation Strategy

Section 7 provides a blueprint for reducing the potential losses identified in the vulnerability analysis. The Planning Committee reviewed mitigation projects identified in the 2007 HMP and revised the existing list to include only the most relevant and fundable mitigation projects. The Planning Committee also added new mitigation projects based upon the new hazards added to the 2012 HMP. Through a re-evaluation and re-prioritization process described in this section, each participating jurisdiction selected high-priority projects to include in the mitigation action plan.

1.6.7 Section 8: Plan Maintenance

Section 8 describes the formal plan maintenance process to ensure that the 2012 HMP remains an active and applicable document. The plan maintenance process consists of monitoring, evaluating, and updating the plan; monitoring mitigation projects and closeout procedures; implementing the plan through existing planning mechanisms; and achieving continued public involvement. Forms to assist in plan maintenance are found in Appendix F, Plan Maintenance.

1.6.8 Section 9: References

Section 9 includes references used to develop this document.

1.6.9 Appendices

Appendices A-F, provide supplementary documents and figures. Appendices G-M, provide jurisdiction specific information, including the vulnerability analysis, capability assessment and mitigation strategy.

- Appendix A - FEMA Local Plan Review Tool
- Appendix B - Adoption Resolutions
- Appendix C - Hazard Figures
- Appendix D - HMP Planning Committee Meetings
- Appendix E - Public Outreach
- Appendix F - Plan Maintenance Documents
- Appendix G - Clark County
- Appendix H - City of Henderson
- Appendix I - City of Las Vegas
- Appendix J - City of Mesquite
- Appendix K - City of North Las Vegas
- Appendix L - Clark County School District
- Appendix M - Clark County Water Reclamation District

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2.1 OVERVIEW

This section describes the prerequisite requirements for consideration of the 2012 HMP by the Federal Emergency Management Agency (FEMA).

2.2 ADOPTION DOCUMENTATION

The requirements for the adoption of the 2012 HMP by the participating local governing body, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: PREREQUISITES

Adoption by the Local Governing Body

Requirement §201.6(c)(5): [The local hazard mitigation plan **shall** include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has formally adopted the plan.

Element

- Does the new or updated plan indicate the specific jurisdictions represented in the plan?
- For each jurisdiction, has the local governing body adopted the new or updated plan?
- Is supporting documentation, such as a resolution, included for each participating jurisdiction?

Source: FEMA 2008.

Clark County, the City of Henderson, the City of Las Vegas, the City of Mesquite, the City of North Las Vegas, the CCSD and the CCWRD are the local jurisdictions represented in this 2012 HMP and meet the requirements of Section 409 of the Stafford Act and Section 322 of the DMA 2000.

Each local participant's governing body has adopted the 2012 HMP by resolution. A scanned copy of each resolution is included in Appendix B, Adoption Resolutions.

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3.1 OVERVIEW

This section describes the planning efforts involved in the preparation of the plan including:

- Summary of the original planning efforts
- Narrative of and schedule for the plan update process
- Planning Committee
- Public outreach efforts
- Review and incorporation of existing plans, studies, reports, and technical information

Additional information regarding the meetings and public outreach efforts is found in Appendix D, Planning Committee Meetings, and Appendix E, Public Outreach.

The requirements for the planning process, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: PLANNING PROCESS

Documentation of the Planning Process

Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
- (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Element

- Does the new or updated plan provide a narrative description of the process followed to prepare the plan?
- Does the new or updated plan indicate who was involved in the current planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, etc.?)
- Does the new or updated plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)
- Does the new or updated plan indicate that an opportunity was given for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?
- Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?
- Does the updated plan indicate for each section whether or not it was revised as part of the update process?

Source: FEMA 2008.

3.2 INITIAL PLANNING PROCESS, 2002 - 2007

As noted previously, the initial basis for this plan was the 2007 HMP. To prepare the HMP, the Clark County OEM&HS took the lead to coordinate with all five incorporated jurisdictions within the County as well as appropriate associated agencies, universities, private, non-profit, local, county, state and federal governments. The 2007 HMP development occurred from July

2002 to September 2006. The 2007 HMP was adopted by the Clark County Board of commissioners in September 2006 and on February 6, 2007 FEMA approved the adopted 2007 HMP.

3.3 PLAN UPDATE PROCESS, 2012

In March 2011, during the fourth year of the 2007 HMP, the Clark County OEM&HS kicked off the HMP update process. Table 3-1 below show the key planning tasks and the timeline associated with each task.

Table 3-1. 2012 HMP Schedule

Task	Mar 2011	April 2011	May 2011	June 2011	July 2011	Aug 2011	Sep 2011	Oct 2011	Nov 2011	Dec 2011	Jan 2012	Feb 2012	Mar 2012	April 2012	May 2012	June 2012	July 2012	Aug 2012	Sep 2012	Oct 2012
Step 1: Organize Resources	✓	✓																		
Project Kickoff	✓																			
Step 2: Plan for Public Involvement	✓	✓																		
Planning Committee Meeting		✓																		
Step 3: Identify the Hazards		✓	✓																	
Step 4: Assess Vulnerability				✓	✓	✓														
Step 5: Document the Planning							✓	✓												
Planning Committee Meeting								✓												
Step 6: Identify Goals and								✓												
Step 7: Develop Mitigation Actions								✓	✓											
Step 8: Monitor, Evaluate, and									✓											
Step 9: Draft and Review the Plan									✓	✓	✓	✓	✓	✓	✓					
Step 10: Adopt and Submit the Plan																✓	✓	✓	✓	✓

The Clark County OEM&HS determined that a reactivation of the previous planning committee will also serve as the 2012 HMPs planning committee. This includes several stakeholders in the field of emergency management, including representatives from the participating cities as well as representatives from appropriate special districts. An invitation was also extended to Nevada Division of Emergency Management (DEM). The 2012 HMP's Planning Committee is shown below in Table 3-2.

Table 3-2. Planning Committee

Name	Department or Agency
Clark County	
Irene Navis	Clark County, OEM&HS
Richard Brenner	Clark County, Fire Department (Hazmat)
Sabra Smith Newby	Clark County, County Manager's Office
Jamie McKeown	Clark County, GIS
Sharon Rice	Clark County, GIS
Henderson	
Al Jankowaik	City of Henderson, Public Works
Ryan Turner	City of Henderson, OEM
Las Vegas	
Richard Wells	City of Las Vegas, OEM&HS (GIS)
Rick Diebold	City of Las Vegas, OEM&HS
Lieutenant Jim Seebock	City of Las Vegas, Police Department - Fusion Center
Mesquite	
John Higley	City of Mesquite, Fire Department
North Las Vegas	
Daniel Lake	City of North Las Vegas, Police Department
Clark County School District	
Dimitri Theodorou	Clark County School District OEM&HS
Clark County Regional Flood Control District	
Andrew Trelease	Clark County Regional Flood Control District
Clark County Water Reclamation District	
Elaine Houser	Clark County Water Reclamation District
Southern Nevada Health District	
Jane Shunney	Southern Nevada Health District

The leads from each jurisdiction, as illustrated in Table 3-2 above, communicated and coordinated information from sources within the County, cities and agencies.

Professional planning consultants, URS Corporation (the consultant), also attended and facilitated meetings with the Planning Committee, and coordinated numerous activities to create the 2012 HMP. On April 6, 2011, the first Planning Committee meeting was held to begin the plan update process. At the kickoff meeting the following was explained: the objectives of the 2012 HMP planning process and the DMA 2000 requirements; why national emphasis was being placed on reducing potential future disaster losses; and types of mitigation funding available and

example projects. The plan development process and schedule were reviewed. The participation of additional agencies for future planning meetings was also discussed.

Emphasis was also placed on identifying the hazards that are most important to the committee and therefore should be analyzed for the County's 2012 HMP. All of the hazards in the 2007 HMP would remain in the 2012 HMP; the planning committee also decided to add the hazards of Dam Failure, Subsidence, Terrorism and Utility Failure to the 2012 HMP.

Finally, the capability assessment was discussed; the purpose of which is to identify and evaluate the resources each jurisdiction has available to assist in their mitigation efforts.

Over the next several months the consultant worked directly with Clark County GIS to develop all of the hazard maps. The consultant also worked directly with each jurisdiction to develop their capability assessments and to gather information regarding critical facilities. The consultant explained the types of facilities that are important to include and the information needed for each facility (city, county and special district facilities). Concurrently, Clark County GIS worked with the GIS departments for each local jurisdiction to gain data related to critical assets and facilities. Information regarding the hazard maps and the critical facilities was then combined to create the vulnerability analysis. The vulnerability analysis was circulated to the planning committee for their review. The purpose of and the methodology behind the vulnerability analysis was explained. Planning Committee members were asked to review the analysis for accuracy and completeness.

The second planning committee meeting was held on October 5, 2011. The Planning Committee was presented with the draft hazard profiles and maps and the initial update findings (Table 3-3). The emphasis of the meeting was the mitigation strategy. The Planning Committee was provided with the 2007 Mitigation Strategy and began the discussion of which mitigation actions had been completed (or begun) and which had not. The planning committee was then walked through the Mitigation Workbook, which is designed to guide each jurisdiction through the development of their jurisdiction specific Mitigation Strategy. The workbook has been designed to accomplish the following: familiarize the participants with eligible and ineligible FEMA mitigation actions; provide a list of potential mitigation actions for the participants to review and add additional mitigation actions, if necessary; and to select and prioritize mitigation actions to be included in each local participant's mitigation action plan. Participants were given a five week period to work with staff from other relevant departments and agencies within their jurisdiction to develop their jurisdiction specific mitigation action plan.

Table 3-3. Summary of Initial Update Findings

2007 HMP	Actions to Take for 2012 HMP
General - Formatting	Reformat the plan so that the 2012 HMP follows the following structure: Introduction, Prerequisites, Planning Process, Hazards Analysis, Vulnerability Analysis, Capability Assessment, Mitigation Strategy, Plan Maintenance, References and Appendices (App A-FEMA Compliance Documents, App B-Adoption Resolutions, App C-Figures, App D-Planning Committee, App E-Public Outreach and Stakeholder Involvement, App F-Plan Maintenance, App G-M jurisdiction specific appendices)
Executive Summary	Not necessary, the executive summary will be removed
Introduction	Introduction will be updated to include a brief description of DMA 2000 and grant programs with mitigation plan requirements Portion of this will become Section 3, "Planning Process"

Table 3-3. Summary of Initial Update Findings

2007 HMP	Actions to Take for 2012 HMP
Community Profiles	Will become a subsection of Section 1, "Introduction"
Risk Assessment	Rename as "Hazards Analysis" (Section 4) Add hazards, per discussion at Planning Committee meeting #1 and subsequent emails with Clark County OEM&HS Update hazards profiled in the 2007 HMP. Utilize various hazard data sources to determine recent historical events and new hazard areas Remap hazard areas in GIS
Vulnerability Assessment	Rename as "Vulnerability Analysis" (Section 5) Utilize GIS to develop the critical facility/asset list so that each facility is geocoded and can be used for further analysis. Include RL properties in vulnerability analysis Conduct vulnerability analysis, using updated critical facility/asset and hazard information, interpret analysis, and discuss new findings Meet with the Planning Team to discuss vulnerability analysis findings Map critical facility/asset locations in GIS Pull out jurisdiction specific information to create individual appendices for each participating jurisdiction (main body will focus on the County)
Mitigation Goals and Objectives	Rename as "Mitigation Strategy" (Section 7) A portion of this section will become Section 8, "Plan Maintenance" Meet with the Planning Team to determine if the 2007 HMP goals are still relevant Revise the list of mitigation actions in the 2007 HMP to be more mitigation-focused (rather than focused on response, recovery, and preparedness) Develop a new mitigation action evaluation/prioritization process Determine the mitigation action plan for selected mitigation actions
Appendix	A portion of this section will become Section 9, "References" Additional portions of this section will be added to the table of contents (list of figures and maps)
Adoption Resolution	Rename "Appendix B, Adoption Resolutions"
NA	Add new section, "Prerequisites" (Section 2) Adopt the 2012 HMP by each local participant's governing body
NA	Add new section, "Capability Assessment" (Section 6) Review and document all local legal and regulatory, administrative and technical, and financial resources available for hazard mitigation

GIS = Geographic Information System

HMP = Hazard Mitigation Plan

RL = repetitive loss

Based upon the discussion that occurred on the 2007 Mitigation Strategy, the Mitigation Workbook was updated and circulated electronically to the Planning Committee members for their completion. Over a two week period, each Planning Committee member worked with staff from other relevant departments and agencies from his/her jurisdiction to develop or update their mitigation action plan.

On October 27, 2011 the consultant prepared the Preliminary Draft 2012 HMP for the Planning Committee to review. The State of Nevada DEM requested to review the Initial Draft at the same time. The Planning Committee and Nevada DEM provided comments to the consultant to addresses as necessary. On June 4, 2012 the consultant prepared the Second Draft 2012 HMP for the Planning Committee to review. The Planning Committee took two weeks to review the Second Draft. The consultant addressed comments as necessary and on July 23, 2012 the consultant prepared the Final Draft 2012 HMP for a four week public comment period. During this time, Clark County OEM&HS sent the draft to Nevada DEM and FEMA for a courtesy review.

Copies of the agenda and meeting minutes for each of the Planning Committee meetings are provided Appendix D.

3.4 PUBLIC OUTREACH AND STAKEHOLDER INVOLVEMENT

Development of the 2012 HMP was advertised throughout the County and residents were asked to share their concerns about natural and human-caused hazards by completing a hazard mitigation questionnaire. Clark County Office of Emergency Management, in cooperation with the Clark County Office of Public Communications, provided a questionnaire and link to the 2012 HMP for comment by residents on the Clark County homepage. News of the availability of the 2012 HMP was also provided through various social media outlets, including Facebook and Twitter. A copy of the screen shot of the links to the questionnaire and plan as well as the Facebook posting and tweet are attached in Appendix E.

A City of Las Vegas Emergency Management Press Release went out to all local media which advertised the development of the 2012 HMP and encouraged residents to complete the hazard mitigation questionnaire that is publically accessible on the city's emergency management website, www.LVAlert.com. The news release about the hazard mitigation questionnaire also received mention on the local NBC affiliate, KSNV. A copy of the press release, a screen shot of the city's emergency management website and a screenshot of the KSNV coverage can be found in Appendix E.

The cities of Henderson and North Las Vegas have solicited information from their residents through the hazard mitigation questionnaire as well. The questionnaire has been provided on each city's website: [City of Henderson Hazard Mitigation Questionnaire](#) and [City of North Las Vegas Hazard Mitigation Questionnaire](#). Screen shots of the websites are found in Appendix E as well as a summary of the questionnaires received (at the time of this plan's production).

Upon completion of the Final Draft HMP, the Draft was made available to the public for their review and comment. Copies would be provided upon request to Clark County OEM&HS. Availability of the Final Draft HMP was again advertised on the city websites.

3.5 INCORPORATION OF EXISTING PLANS AND OTHER RELEVANT INFORMATION

During the planning process, the consultants reviewed and incorporated from existing plans, studies, and reports. Key local and state information sources integrated into this document are listed below, and additional references are provided in Section Nine.

Clark County, Department of Comprehensive Planning, *Clark County Utilities Element Report, December 2006*. This document is an update to the Clark County Comprehensive Plan. This document addresses the public utilities that serve residents, business and other users. In particular this document aided in the development of the Utilities Failure hazard profile.

Clark County, Office of Emergency Management, *Clark County Emergency Management Plan, August 2009*. This plan describes the organization and arrangements by which Clark County addresses emergency situations across the emergency management spectrum of mitigation, preparedness, response, and recovery. In particular this plan helped with the development of the Capability Assessments.

State of Nevada, Department of Public Safety, *Nevada Standard Hazard Mitigation Plan, 2010*. This second update of the original 2004 plan provides the basis for hazard mitigation planning in Nevada, provides an overview of hazards and risks, and a variety of directly related subjects. Of particular importance to the 2011 HMP were the Hazards, Risks Assessment, and the Local Coordination sections which helped guide prioritization and development.

Resource Concepts Inc., *Nevada Community Wildfire Risk/Hazard Assessment Project, Clark County, June 2005*. The Nevada Fire Safe Council contracted with Resource Concepts, Inc. (RCI) to assemble a project team of experts in the fields of fire behavior and suppression, natural resource ecology, and geographic information systems (GIS) to complete the assessment for each Clark County community listed in the Federal Register. The final report provides community risk and hazard assessment results, for the hazard of wildfire. This report was key in developing the profile hazard for wildfire.

Clark County, Department of Comprehensive Planning, *Clark County Comprehensive Plan, November 2010*. This plan is a policy document for the physical development of unincorporated Clark County. In particular the plan help guide the goals and objectives of the overall mitigation strategy.

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4.1 OVERVIEW

A hazard analysis includes identifying, screening, and then profiling each hazard. The hazard analysis encompasses natural, human-caused, and technological hazards. Natural hazards result from unexpected or uncontrollable natural events of significant size and destructive power. Human-caused hazards result from human activity and include technological hazards. Technological hazards are generally accidental or result from events with unintended consequences (for example, an accidental hazardous materials release).

Local mitigation planning requirements specify that this hazard analysis consist of the following two steps:

- Hazard identification and screening
- Hazard profiles

4.2 HAZARD IDENTIFICATION AND SCREENING

The requirements for hazard identification, as stipulated in the Disaster Mitigation Act of 2000 (DMA 2000) and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: RISK ASSESSMENT Identifying Hazards Requirement 44 CFR § 201.6(c)(2)(i): [The risk assessment shall include a] description of the type of all natural hazards that can affect the jurisdiction. Element ▪ Does the new or updated plan include a description of all of the types of all natural hazards that affect the jurisdiction? Source: FEMA 2008.
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As the first step in the hazard analysis, the 2012 Planning Committee reviewed and updated Table 4-1, Clark County Hazard Screening. This list of hazards was first developed for potential inclusion in the 2007 HMP. Hazards were included in the table based upon their inclusion in the following documents:

- State of Nevada Standard Hazard Mitigation Plan, 2004 (2010 version used for update)
- Clark County Emergency Operations Plan (Clark County Emergency Management Plan, 2009, used for update)
- FEMA How-To-Guide #2, Understanding Your Risks, Worksheet #1

Hazards were then reviewed and chosen for inclusion in the 2007 HMP based upon the following criteria:

- Likelihood of occurrence
- Potential area of impact should the disaster occur
- Magnitude of potential impact

- Is there a state or federal agency that is already committed to the development of all preparedness, planning, response and mitigation efforts, separate from this plan?

Based upon the screening process described above, the 2007 Hazard Mitigation Planning Team identified Drought, Earthquake, Epidemic, Flood and Flash Floods, and Wildfire as the hazards that posed the greatest threat to Clark County and would therefore be the hazards profiled in the 2007 HMP.

For the 2012 HMP update, the 2012 Planning Committee revisited Table 4-1 and decided that the hazards of Dam Failure, Subsidence, Terrorism and Utility Failure should be added to the 2012 HMP. The results of the screening are presented in the table below.

Table 4-1. Clark County Hazard Screening

Hazard	Hazard Discussions	Risk Priority	Include in 2007 HMP?	Include in 2012 Update?
Aircraft Incident	The impact of this hazard is high; great effort towards the preparedness, planning, response and mitigation of any aircraft incident is coordinated, maintained and exercised by local area airports, specifically McCarran International Airport along with area Fire Departments. The Federal Aviation Administration has authority over events from this hazard. As a result, this hazard will not be profiled in this iteration of the HM plan.	High Risk	No	No
Civil Disturbance	No historical record of a Local, State, or Federal declaration of emergency for this type of hazard in the County. However, in 1992 there was one incident requiring the activation of EOCs in multiple jurisdictions. All preparedness, planning, response and mitigation efforts pertaining to Civil Disturbance are jointly coordinated by area Law Enforcement agencies.	Moderate Risk	No	No
Dam Failure	There are no high hazard dams within Clark County per the Nevada Division of Water Resources.	Low Risk	No	Yes
Drought	The USDA issued statewide drought declarations in 2002 and 2004.	High Risk	Yes	Yes
Earthquake	Nevada is third in the nation for the occurrence of earthquakes. Several active fault zones pass through Clark County.	High Risk	Yes	Yes
Epidemic/ Infectious Disease	The Nevada Department of Agriculture requested the Nevada State Hazard Mitigation Hazard Mitigation Planning Team to consider the agricultural risks to the state. In turn, Clark County will also take agriculture risks in to consideration within the Disease section (for 2012 will be covered in a separate category, infestation).	Special Risk - High	Yes	Yes
Extreme Heat	Strategies for heat wave are not addressed in this plan and would be referred to the SNHD and/or the State of Nevada Health Department.	Moderate Risk	No	No
Flood and Flash Flooding	Flash floods and other flood events occur regularly throughout Nevada as well as within Clark County and have caused extensive property damage throughout the Las Vegas Valley.	High Risk	Yes	Yes

Table 4-1. Clark County Hazard Screening

Hazard	Hazard Discussions	Risk Priority	Include in 2007 HMP?	Include in 2012 Update?
HAZMAT Event	Clark County has several facilities that handle or process hazardous materials as well as those that are transported through the County. All preparedness, planning, response and mitigation efforts are coordinated through the countywide Local Emergency Planning Committee (LEPC). Clark County, to include the unincorporated area and the five incorporated communities, made the administrative decision not to duplicate the efforts of the LEPC. - Touched upon in Terrorism -	High Risk	No	No
Infestation	The Nevada Department of Agriculture requested the Nevada State Hazard Mitigation Hazard Mitigation Planning Team to consider the agricultural risks to the state. In turn, Clark County will also take agriculture risks in to consideration, for the 2012 update this will be covered in this new category, infestation.	Low Risk	No	Yes
Landslide/ Avalanche	Prior to the Winter of 2005 Mt. Charleston Avalanche, incurring one fatality, no historical record of this hazard existed in the County.	Low Risk	No	No
Large Venue Fires	The impact of this hazard is high; however the probability is lower. Clark County leads the nation in standards for building codes and inspection for this type of event – even though it is a high risk, the planning team agreed not to profile this hazard due to the great effort taken towards the preparedness, planning, response and mitigation of any large venue fire coordinated, maintained and exercised by local area Fire Departments.	High Risk	No	No
Radiological Incidences	The Clark County Hazard Mitigation Planning Team chose not to address nuclear or radiological incidence in this plan. All preparedness, planning, response and mitigation efforts pertaining to the Yucca Mountain, NV project are supported and funded separately from this plan through DOE.	No Risk Assigned	No	No
Severe Storms: Tornado and Wind	Hazards associated with severe storms occur regularly within Clark County where most damaging severe weather hazard is flood. Damages, injuries, deaths and cost associated with Tornado in low in Clark County as well as the State as a whole. Damaging winds do occur in Clark County and are usually associated with severe storms (flooding).	See Flood	No	No
Subsidence	Although subsidence and fissuring are of concern in parts of Nevada, there is no declared record of this hazard in Clark County. However, the north and northwest sections of the unincorporated portion of Clark County has had minor occurrence of fissures as a result of past groundwater discharge.	Moderate Risk	No	Yes
Terrorism (to include WMD)	Clark County, to include the unincorporated area and the five incorporated communities, made the administrative decision not to duplicate the efforts of the Nevada Homeland Security Commission, which has been appointed by the Governor to address all Terrorism/WMD issues.	No Risk Assigned	No	Yes

Table 4-1. Clark County Hazard Screening

Hazard	Hazard Discussions	Risk Priority	Include in 2007 HMP?	Include in 2012 Update?
Utility Failure (previously: Transportation, Pipelines, Power Outage, & Water System Failure)	The Clark County Hazard Mitigation Planning Team, in conjunction with the State of Nevada Standard Hazard Mitigation Plan - Risk Assessment, chose not to address energy issues in this plan. But rather, will refer any mitigation actions identified in this planning process that are hazardous materials in nature to the Clark County Local Emergency Planning Committee (LEPC).	Low Priority	No	Yes
Volcano / Ash Fall	No historical record of this hazard in the County.	Low Risk	No	No
Wildfire	Clark County experiences wildfires on a regular basis.	High Risk	Yes	Yes

As illustrated in Table 4-1, the 2012 Planning Committee determined that the following hazard groups pose the greatest threat to the County and should therefore be profiled in the 2012 HMP.

- Dam Failure
- Drought
- Earthquake
- Epidemic (human)/Infectious Disease
- Flooding
- Infestation (plant and animal)
- Subsidence
- Terrorism
- Utility Failure (to include transportation, pipelines, power outage and water system failure)
- Wildfire

The 2012 Planning Committee determined that the remaining hazards pose a lower threat to life and property in the County because of the low likelihood of occurrence and/or the low probability that life and property would be affected significantly. If the risk from these hazards increases, the 2016 HMP can be updated to incorporate a hazard analysis for these hazards.

Of the hazards chosen to be addressed in the 2012 HMP, Table 4-2 illustrates which hazards affect each participating jurisdiction.

Table 4-2. Hazards by Jurisdiction

Hazard	Clark County	City of Henderson	City of Las Vegas	City of Mesquite	City of North Las Vegas	Clark County School District	Clark County Water Reclamation District
Dam Failure	X						
Drought	X	X	X	X	X	X	X
Earthquake	X	X	X	X	X	X	X
Epidemic/Infectious Disease	X	X	X	X	X	X	X
Flood and Flash Flooding	X	X	X	X	X	X	X
Infestation	X	X	X	X	X	X	X
Subsidence	X	X	X		X		
Terrorism	X	X	X	X	X	X	X
Utility Failure	X	X	X	X	X	X	X
Wildfire	X			X		X	X

4.3 HAZARD PROFILES

The requirements for hazard profiles, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: RISK ASSESSMENT

Profiling Hazards

Requirement 44 CFR § 201.6(c)(2)(i): [The risk assessment shall include a] description of the location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Element

- Does the risk assessment identify the location (i.e., geographic area affected) of each natural hazard addressed in the new or updated plan?
- Does the risk assessment identify the extent (i.e., magnitude or severity) of each hazard addressed in the new or updated plan?
- Does the plan provide information on previous occurrences of each hazard addressed in the new or updated plan?
- Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the new or updated plan?

Source: FEMA 2008.

The hazards selected by the Planning Committee were profiled based on existing available information. The hazard profiling consisted of describing the nature of the hazard, disaster history, location of hazard, and extent and probability of future events. The sources of information are listed in Section 9 of this document.

The hazards profiled for Clark County are presented below in alphabetical order. The order does not signify level of risk.

4.3.1 Dam Failure

Nature: Dam failure is the structural collapse of a dam that releases the water stored in the reservoir behind the dam. A dam failure is usually the result of the age of the structure, inadequate spillway capacity used in construction, or structural damage caused by an earthquake or flood. When a dam fails, a large quantity of water is suddenly released with a great potential to cause human casualties, economic loss, and environmental damage. This type of disaster is especially dangerous because it can occur suddenly, providing little warning and evacuation time for the people living downstream. The flows resulting from dam failure generally are much larger than the capacity of the downstream channels and therefore lead to extensive flooding. Flood damage occurs as a result of the momentum of the flood caused by the sediment-laden water flooding over the channel banks and impact debris carried by the flow.

History: In Nevada, there have been no dam failure declarations;, however, the following incidents are on record:

- In 1984, the concrete liner of the Bishop Creek Dam in Elko County failed resulting in a 25 cubic feet per second seep. The seep eventually removed approximately 800 cubic yards of material from the toe of the dam (Association of State Dam Safety Officials, 2002).
- In 1985, a mine tailings dam owned by the Olinghouse Mining Company failed from an embankment collapse from saturation in Wadsworth, Nevada. Tailings were reported 1.5 km downstream.
- In 2005, rainfall runoff overtopped the Schroeder Dam in Beaver Dam State Park located in eastern Nevada by one foot. The top surface of the dam was not damaged, but the downstream face of the dam was severely eroded. Erosion in several of the gullies may have reached as far as the core material. The dam was an earth-fill dam with a thirty-five foot concrete spillway on the east side. Prior to this event the dam was considered a low-hazard dam; mitigation at this site is ongoing.
- In 2006, failure of the Rogers Dam occurred as a result of very high flows in the Humboldt River concrete control sections of the dam were undermined making it useless. The concrete portion of the dam was completely undercut by four to five feet allowing the river to flow underneath the dam, unimpeded. No one was injured and no property damage was reported. However, the main effect of the Rogers Dam failure was that the reservoir behind the dam is diverted into a canal which provides water to 60 percent of the ranches in the valley, representing about 20,000 acres of land.

Furthermore, many dams in Nevada suffer from poor design or encroachment of development into the potential floodplain below the dam. As a result, many dams fail to pass an Inflow Design Flood (IDF) inspection commensurate with their hazard potential and size (Association of State

Dam Officials, 2002). There however, is no record of dam failure for any dam located in or affecting Clark County.

Location: Clark County has two high-profile dams within its purview: Hoover Dam and Davis Dam. Hoover Dam is located about 36 miles southeast of Las Vegas, in the Black Canyon of the Colorado River. Davis Dam is located near the town of Laughlin, Nevada. Further downstream along the Colorado River, Parker Dam and its reservoir, Lake Havasu, are located in Arizona. In addition to these high-profile dams, several detention basins are scattered throughout Clark County to divert and contain seasonal flood waters. Mill ponds that serve to store large quantities of water from mining operations are also of significant concern. Breach of these structures could also present a threat to lives and property throughout the County.

Extent: The State of Nevada Division of Water Resources lists 95 dams in Clark County. Of these 29 are considered “low hazard,” 14 are considered “significant hazard,” and 52 are considered “high hazard.” A “high hazard” designation is assigned to a dam if there is reasonable potential for loss of life and/or excessive economic loss. A “significant hazard” designation is given when there is no reasonable potential for loss of life, but there is potential for appreciable economic loss. Lastly, a “low hazard” designation is assigned when there is no reasonable potential for loss of life and the economic loss is minor. Although the ratings provided by the Nevada Division of Water Resources at first glance may be somewhat alarming, it is extremely important to take into consideration that the hazard designation does not reflect the safety or condition of the dam. The rating is also determined at the time the dam design plans are reviewed; the hazard rating may be altered when downstream conditions change.

Hoover Dam is the highest (726 feet) and third largest concrete dam in the United States, with a storage capacity of 28,537,000 acre-feet. Lake Mohave is located downstream of Hoover Dam, and is the 1,818,300 acre-feet reservoir created by the 200 foot-high Davis Dam.

Davis Dam is located near the unincorporated town of Laughlin, at the southern end of Clark County. Further downstream along the Colorado River, Parker Dam and its reservoir, Lake Havasu, are located in Arizona. The County’s Emergency Operations Plan estimates that breach of the Davis Dam would occur within 3.3 hours of a Hoover Dam failure. Breach of either of the two upstream dams would have disastrous results on the town of Laughlin, Nevada, its immediate neighbor to the east, Bullhead City, Arizona, and, potentially, Parker Dam.

Probability of Future Events: Dam failure can result from numerous natural or human activities. Earthquakes, internal erosion, improper siting, structural and design flaws, or rising floodwaters can all result in the collapse or failure of a dam. A dam failure may also be a result of the age of the structure or inadequate spillway capacity. While it has been mentioned that a number of Dams have failed to pass an IDF inspection, the State has taken an active role in remediating the deficient dams.

As such, the probability of a future dam failure affecting Clark County is unknown. Therefore, it is considered possible but unlikely that a dam failure event will occur within the next ten years (a 1 in 10 years chance of occurring – $1/10 = 10$ percent). Event history is less than or equal to 10 percent likely per year.

4.3.2 Drought

Nature: Drought is a normal, recurrent feature of virtually all climatic zones, including areas of both high and low rainfall, although characteristics will vary significantly from one region to another. Drought differs from normal aridity, which is a permanent feature of the climate in areas of low rainfall. Drought is the result of a natural decline in the expected precipitation over an extended period of time, typically one or more seasons in length. Other climatic characteristics, such as high temperature, high wind, and low relative humidity, impact the severity of drought conditions.

Four common definitions for drought are provided as follows:

- Meteorological drought is defined solely on the degree of dryness, expressed as a departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
- Hydrological drought is related to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
- Agricultural drought is defined principally in terms of soil moisture deficiencies relative to water demands of plant life, usually crops.
- Socioeconomic drought associates the supply and demand of economic goods or services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall. It may also be referred to as a water management drought.

A drought's severity depends on numerous factors, including duration, intensity, and geographic extent as well as regional water supply demands by humans and vegetation. Due to its multi-dimensional nature, drought is difficult to define in exact terms and also poses difficulties in terms of comprehensive risk assessments.

Drought differs from other natural hazards in three ways. First, the onset and end of a drought are difficult to determine due to the slow accumulation and lingering of effects of an event after its apparent end. Second, the lack of an exact and universally accepted definition adds to the confusion of its existence and severity. Third, in contrast with other natural hazards, the impact of drought is less obvious and may be spread over a larger geographic area. These characteristics have hindered the preparation of drought contingency or mitigation plans by many governments.

Southern Nevada's water rights to the Colorado River were mandated in the early 1900's, and Nevada shares its water rights from this source with seven other states. Southern Nevada is allocated 300,000 acre-feet of water per year from the river; however, average water usage for a typical family is 326,000 gallons or 1- acre-foot per year. In consideration of the needs for a service population of nearly 2 million people, the Southern Nevada Water Authority (SNWA, the area's water purveyor) closely monitors the effects of drought on existing water supply resources.

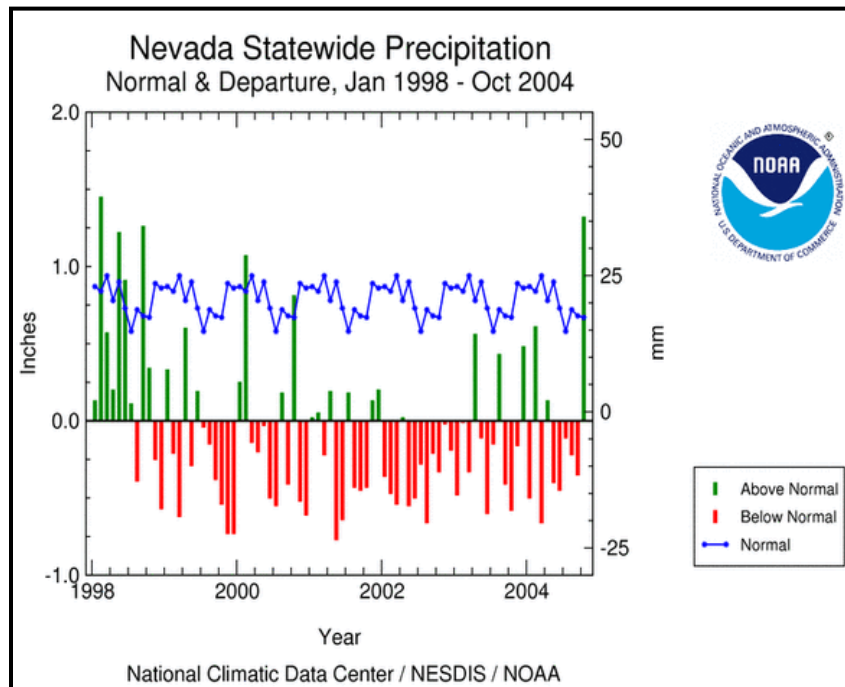
History: Nevada has experienced two statewide drought declarations since 2002. From 2002 through the beginning of 2010 Nevada, and Clark County, was in a prolonged period of drought. Implications from this drought include increased risk of wildfires and water shortages as reservoirs drop to their lowest recorded levels. Furthermore, insect infestations from the drought included an unusual bark beetle, called piñon ips that killed more than 3.1 million piñon pines in

Nevada in 2002 and 2003. This infestation further increased the fire hazard on 355,700 acres and reduced pine nut production.

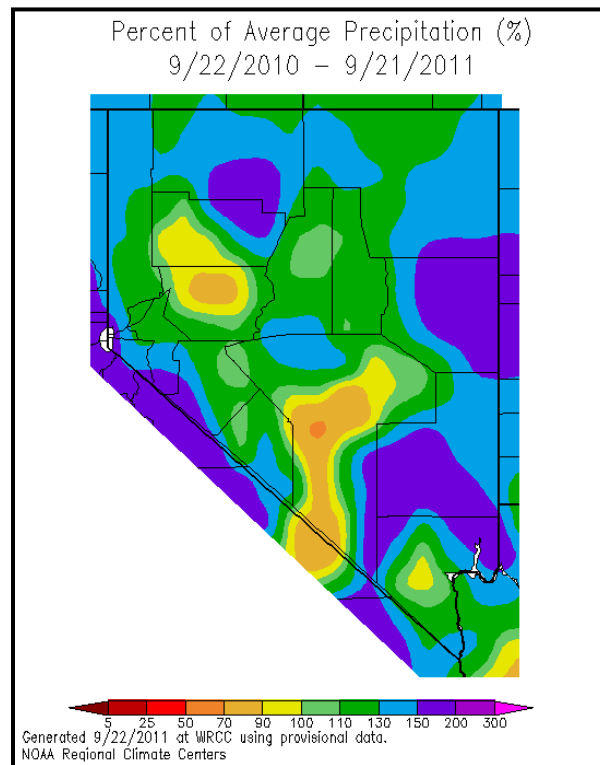
Drought conditions returned to northern Nevada in the fall of 2010, but Clark County retained “near normal” conditions. In 2011 Clark County experienced a number of weeks of more than normal precipitation, but for the majority of 2011 has maintained near normal conditions.

Data collected by the National Climatic Data Center, as shown in Figure 4-1 demonstrates the severity of the previous drought conditions across the state from 2002 - 2004. The following figure, Figure 4-2, illustrates the resumption of more normal precipitation levels in Nevada, especially Clark County.

Figure 4-1. Nevada Statewide Precipitation, 1998-2005



Source: National Climate Data Center, 2004.

Figure 4-2. Percent of Average Precipitation, 2010 - 2011

Source: NOAA Regional Climate Centers, 2011.

Location: The occurrence of drought is regional in nature and scope, which holds true for the Clark County planning area. In 2009, the SNWA published a Water Resources Plan to review water demands, conservation goals, water supply and resources, and drought response measures. Nearly 70 percent of Nevada's total water supply is derived from surface water, with 90 percent of water for the Las Vegas region coming from the Colorado River, despite the fact that Nevada only receives 1.8 percent of the water drawn from the river. The flows of the Colorado River are dependent on snowmelt and runoff in the Rocky Mountains of the Upper Colorado River Basin. Lake Mead and Lake Powell are the two primary storage reservoirs in the Colorado River system. Ground water provides the remainder of the water supply used in Nevada, and in Las Vegas, groundwater pumping occurs primarily in the summer months as a supplement to meet peak water use demands.

Below average snow pack in the Colorado Rocky Mountains result in below average runoff to the Colorado River. Over the past decade, precipitation in the Rocky Mountain region has declined due to drought. As a result, the Colorado River and other surface water sources have been drastically affected. The water level in Lake Mead has dropped more than 100 feet since 2000, which is a difference of approximately 5 trillion gallons.

The SNWA did not affiliate declaration of a drought condition to any single factor, but indicated that they would consider Lake Mead water levels, the community's conservation response, projected water demands, and other pertinent issues. Recommendations regarding drought level declarations would be formulated in partnership with the SNWA member agencies.

A component the SNWA Water Resources Plan is a response plan to “severe shortage” of water supplies, as indicated by water levels in Lake Mead. The response identifies strategies to offset potential impacts due to a reduction in water supply and ensure availability of resources to the community supplied by SNWA. A copy of the plan is available at:

http://www.snwa.com/assets/pdf/wr_plan.pdf.

Extent: The SNWA obtains 90 percent of its water needs from the Colorado River, and an additional 10 percent from groundwater wells located within Clark County to supply its service population. With such a heavy reliance on Colorado River water supplies, a drought affecting the river’s source water directly impacts the lives and economic welfare of Southern Nevadans.

Between 1999 and 2008, the average annual inflow to the system was 66 percent of normal. As a result, the combined storage of Lake Mead and Lake was 52 percent of the total combined capacity in early 2009. In 1999, the Colorado River Basin began to experience drought conditions that, from 2000 to 2004, became the worst five-year drought in the recorded history of the basin. These conditions were aggravated by several years of extremely dry soil conditions, which further reduced total runoff. As a result, water levels in the two primary storage reservoirs on the Lower Colorado River (Lake Mead and Lake Powell) declined to levels not observed since Lake Powell began filling in the early-1960s. Except for years 2005 and 2008, when the Colorado River Basin received slightly above-normal runoff (105 percent and 102 percent, respectively), drought conditions in the basin continued to persist.

Since 1999, the elevation of Lake Mead has declined by more than 75 feet, or approximately three water years of allocation for the state of California. Lake Powell is also at historic low levels, with only 40 percent of its water storage available. The last decade saw drought conditions reduce Colorado River system inflows to 69 percent of average and Lake Mead water storage has declined by more than 50 percent. At the conclusion of 2010, the agency prepared for declared shortages as declining lake levels hovered close to shortage thresholds.

The Upper Colorado River Basin (UCRB), which extends through five states (Colorado, Wyoming, Utah, Arizona, and New Mexico), encompasses approximately 17,800 square miles and is the primary water producer for the Colorado River due to runoff from snowmelt. Using historical stream flow records, drought indices, and tree ring data from the UCRB, a team of researchers from UNLV, and Scripps Institute of Oceanography concluded that the worst drought in this region’s history occurred at the end of the 16th century and was two and a half to four times worse than current conditions. Prior to the study, the current drought was considered to be the worst in the past 500 years.

The research team also concluded that the consequences of the current drought have been greatly exacerbated by increased water demand due to unprecedented population growth in the southwest United States. Conservation measures in the County have been enacted to limit the impacts of drought. Additionally, according to the SNWA Water Resource Plan, to mitigation any possible supply reductions, banked water resources will be used to meet near-term community water demands during times of declared shortage or severe shortage.

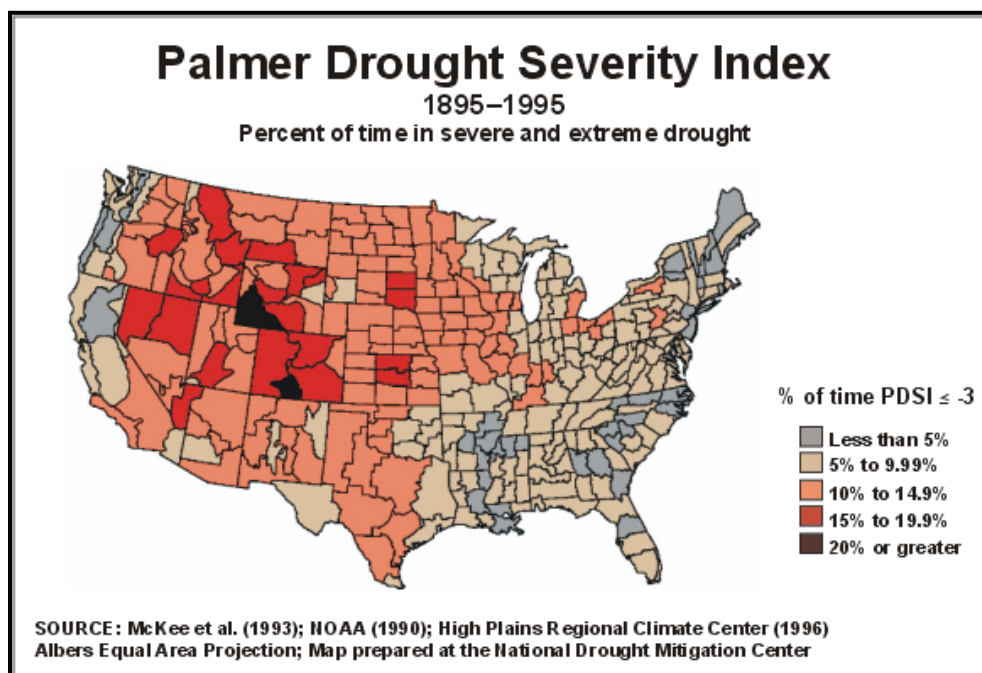
Furthermore, the SNWA has undertaken a project to dig a third pipeline from Lake Mead. The new intake is being built into the deepest part of Lake Mead and will keep water flowing into the Las Vegas Valley should the reservoir shrink low enough to shut down one of two existing straws. Work on the third straw has experienced some setbacks, but the project timeline

currently extends into summer of 2014. Once completed, this project will greatly reduce the extent of drought on the Las Vegas Valley.

Probability of Future Events: In Clark County, population growth and water shortages have combined to interact with the natural environment to inhibit both the replenishment of water supplies and the ability of the regional purveyor (the SNWA) to deliver water to county residents. In the past two decades the population served by the SNWA has more than doubled to approximately 1.7 million people. In addition, rainfall has been far below average in the Western States resulting in lower than normal flow in the lower Colorado River.

Drought severity is commonly measured utilizing the Palmer Drought Severity Index (PDSI) developed in 1965. The PDSI measures the departure of moisture from normal conditions by calculating estimated soil moisture from observed temperature and precipitation values. Based on Nevada's history with drought between 1895 and 2005, Clark County can expect severe or extreme drought at least 10 percent of the time (Figure 4-3).

Figure 4-3. Palmer Drought Severity Index 1895-1995



Source: National Climate Prediction Center, 2004.

4.3.3 Earthquake

Nature: An earthquake is a sudden motion or trembling caused by a release of strain accumulated within or along the edge of the earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. Earthquakes usually occur without warning and can cause massive damage and extensive casualties in a few seconds. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure. Ground motion is the vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter. Soft soils can amplify ground motions.

The Richter scale is often used to rate the strength of an earthquake and is an indirect measure of seismic energy released. The scale is logarithmic, with each 1-point increase corresponding to a 10-fold increase in the amplitude of the seismic shock waves generated by the earthquake. However, in actual energy released, each 1-point increase on the Richter scale corresponds to about a 32-fold increase in energy released. Therefore, a magnitude (M) 7 earthquake is 100 times (10×10) more powerful than an M 5 earthquake and releases 1,024 times (32×32) the energy.

The Modified Mercalli Intensity (MMI) scale is another way of rating earthquakes. This method attempts to quantify the intensity of ground shaking. Intensity in this scale is a function of distance from the epicenter (the closer a site is to the epicenter, the greater the intensity at that site), ground acceleration, duration of ground shaking, and degree of structural damage. The MMI rates the level of severity of an earthquake by the amount of damage and the perceived shaking, as shown in Table 4-3.

Table 4-3. Modified Mercalli Intensity Scale

MMI Value	Description of Shaking Severity	Summary Damage Description	Full Description
I	Micro	Little to None	Not felt.
II	Minor	Little to None	Felt by persons at rest, on upper floors, or favorably placed.
III	Minor	Hanging Objects Move	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
IV	Light	Hanging Objects Move	Hanging objects swing. Vibration like passing of heavy trucks or sensation of a jolt like a heavy ball striking the walls. Standing motorcars rock. Windows, dishes, doors rattle. In the upper range of IV, wooden walls and frames creak.
V	Light	Pictures Move	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.
VI	Moderate	Objects Fall	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., fall off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked.
VII	Strong	Nonstructural Damage	Difficult to stand. Noticed by drivers of motorcars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roofline. Fall of plaster, loose bricks, stones, tiles, cornices. Some cracks in masonry C. Small slides and caving in along sand or gravel banks. Concrete irrigation ditches damaged.
VIII	Very Strong	Moderate Damage	Steering of motorcars affected. Damage to masonry C, partial collapse. Some damage to masonry B, none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, and elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Cracks in wet ground and on steep slopes.

Table 4-3. Modified Mercalli Intensity Scale

MMI Value	Description of Shaking Severity	Summary Damage Description	Full Description
X	Very Violent	Extreme Damage	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land.
XI	Very Violent	Extreme Damage	Rails bent greatly. Underground pipelines completely out of service.
XII	Very Violent	Total Damage	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into air.
Sources: Association of Bay Area Governments 2003; USGS 2009. Masonry A: Good workmanship, mortar, and design; reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces. Masonry B: Good workmanship and mortar; reinforced, but not designed in detail to resist lateral forces. Masonry C: Ordinary workmanship and mortar; no extreme weaknesses like failing to tie in at corners, but neither reinforced nor designed against horizontal forces. Masonry D: Weak materials, such as adobe; poor mortar; low standards of workmanship; weak horizontally.			

In addition to ground motion, earthquakes can lead to secondary natural hazards, such as liquefaction. Liquefaction occurs when seismic waves pass through saturated granular soil, distorting its granular structure, and causing some of the empty spaces between granules to collapse. Pore water pressure may also increase sufficiently to cause the soil to behave like a fluid for a brief period and cause deformations. Liquefaction causes lateral spreads (horizontal movements of commonly 10 to 15 feet, but up to 100 feet), flow failures (massive flows of soil, typically hundreds of feet, but up to 12 miles), and loss of bearing strength (soil deformations causing structures to settle or tip). Liquefaction can cause severe damage to property.

Liquefaction is a new hazard for the Las Vegas Valley. Human activities in the valley have created a shallow groundwater table. Loose sands that were once dry are now saturated and have the potential to destabilize in an earthquake. The probability of liquefaction occurring during one of these episodes is high where the valley water table is 50 feet or less. Earthquake shaking often triggers an increase in water pressure. When liquefaction occurs, the soil strength decreases thus, reducing the ability of soil deposit to support the foundations of buildings and bridges.

History: Nevada is the third most seismically active state in the United States (after Alaska and California). According to the Nevada Bureau of Mines and Geology, the Las Vegas Valley has at least seven fissures, or fault zones. Nevada is ranked 7th nationally in estimated losses (\$77.8 million) on an annualized basis due to earthquakes, the Las Vegas Valley ranked 18th among metropolitan areas at an annualized loss of \$33.1 million. Table 4-4 illustrates the recent history and occurrence of significant earthquakes in/around Clark County; geologists estimate that earthquake activity along the known fault zones last occurred 1,000 to 15,000 years ago.

Table 4-4. History and Occurrence of Earthquakes

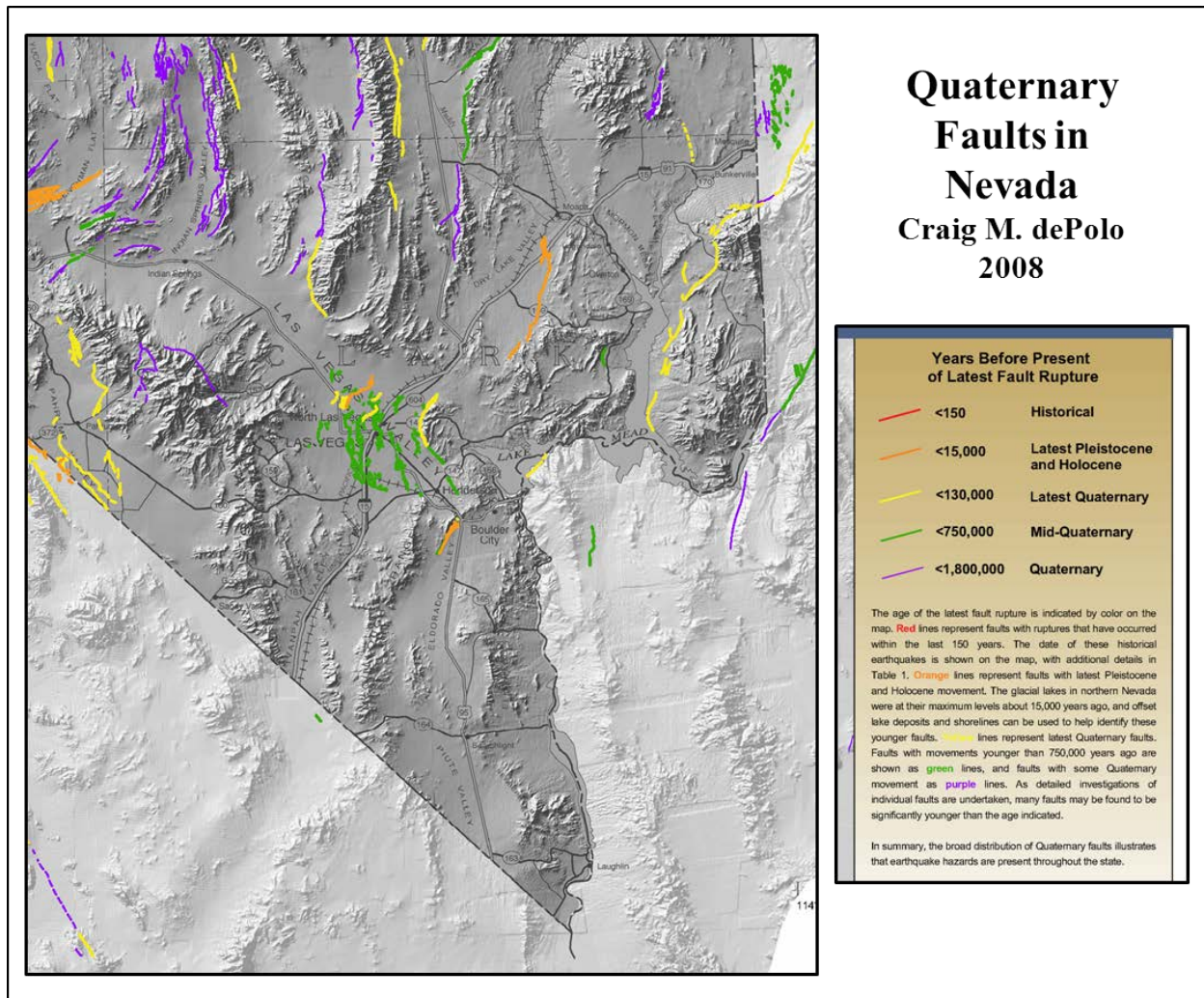
Date	Damage
June 2002	M 4.4 quake near Yucca Mountain, 75 miles northwest of Las Vegas. The quake was centered about 3 miles below the surface, causing concern over the proposed high-level nuclear waste repository that was under development at this site, at the time.
October 1999	M 4.2 quake in Utah just 15 miles southwest of Beaver, AZ. The trembler was felt in a Clark County Fire Department station. No damages reported.
October 1999	M 7.1 quake occurred along the Hector Mine fault in the Mohave Desert, just northwest of Twenty-nine Palms, CA. Tall buildings swayed in Las Vegas, and three pre-cast parking garage structures in Laughlin sustained structural damages, requiring repair.
August 1999	M 5.6 quake near the Nevada/California border struck, followed by a M 5.2 quake only 21 minutes later. Both quakes were centered 130 miles northwest of the Las Vegas Valley.

In addition to those listed above, several small seismic events have been recorded in Clark County, such as an M3.8 event in March 2001 just west of Las Vegas near Red Rock Canyon National Recreation Area. This tremor was felt throughout the valley. Several earthquakes of about a M5 are known to have occurred in the mid-1900s in the Boulder City area. Additionally, Nevada's most recent earthquakes occurred in 2008, a M6.0 earthquake (2/21/08) and a M5.0 earthquake (4/26/08) however, both were centered in the northern half of Nevada and their impact did not reach Clark County.

There is also a risk of ground shaking in the Las Vegas basin due to distant earthquakes in western and northern Nevada, southern California, or western Utah. Earthquakes in western and northern Nevada and western Utah ranging from M5-6 were widely felt throughout the basin in 1902, 1916, and 1966. Most recently, the 1992 Landers earthquake (M7.3) and the 1999 Hector mine earthquake (M7.1), which occurred more than 200 km away, were felt strongly throughout the valley.

Location: Figure C-3 illustrates the locations historic earthquakes in Clark County as well as the faults within the Las Vegas Valley. As Figure C-3 only maps the faults within the Las Vegas Valley (the data available to Clark County GIS at the time), it can appear that none of the historical earthquakes occurred on a fault line. However, Figure 4-4, illustrates the fault lines throughout all of Clark County. As identified in Figure C-3, the majority of earthquakes have epicenters closest to the city of Boulder City.

Figure 4-4. Quaternary Faults in Nevada - Clark County



Source: Nevada Bureau of Mines and Geology Open-File Report 09-9, <http://www.nbmng.unr.edu/dox/m167.pdf>.

Despite the large amount of seismic activity within Nevada, experts continue to identify Furnace Creek Fault in Death Valley California as the highest most likely seismic threat to Clark County. Should a magnitude 7.4 earthquake erupt along the Furnace Creek Fault, 90 miles northwest of Las Vegas, a seismic hazard to the Las Vegas Valley could occur with strong enough ground shaking to cause significant damage within the Las Vegas Valley.

Much of the Las Vegas area is also considered a high liquefaction area (Figure C-3) A neighboring system to Clark County, known as the Central Death Valley Fault, is capable of a magnitude 7.2 earthquake. Such strong earthquakes occur in Death Valley every 500 to 1,000 years and can cause liquefaction in the Las Vegas Valley.

Extent: The strength of an earthquake's ground movement can be measured by peak ground acceleration (PGA). PGA measures the rate in change of motion relative to the established rate of acceleration due to gravity ($g = 980$ centimeters per second, per second). PGA is used to project the risk of damage from future earthquakes by showing earthquake ground motions that have a specified probability (e.g., 10 percent, 5 percent, or 2 percent) of being exceeded in 50 years. The

ground motion values are used for reference in construction design for earthquake resistance and can also be used to assess the relative hazard between sites when making economic and safety decisions.

In 2008, the U.S. Geological Survey (USGS) updated the 2002 National Seismic Hazard Maps displaying earthquake ground motions for various probability levels across the United States. The updated maps incorporate new findings on earthquake ground shaking, faults, and seismicity and are currently applied in seismic provisions of building codes, insurance rate structures, risk assessments, and other public policy. PGA data from these maps have been used to determine the areas within Clark County that are at risk for earthquake hazards. Figure C-4 shows the PGA values in Clark County for the two percent probability of exceedance in 50 years. Moderate earthquake hazard areas are defined as areas with ground accelerations of less than .092g and Violent earthquake hazard areas have ground accelerations of .65g to 1.24g.

Clark County falls within the Strong to Severe ranges of the scale. Regions that reach the top end of the scale, violent, are often near major active faults. These regions will, on average, experience stronger earthquake shaking more frequently, with intense shaking that can damage even strong, modern buildings. Thus, based on historic activity and the PGA values shown in Figure C-4, all areas in Clark County will feel shaking from an earthquake, most are likely to experience Strong to Very Strong shaking from earthquakes.

Probability of Future Events: By determining when earthquakes occurred in the past, the average time between earthquakes along a specific fault can be established. Scientists have gathered information on some of the major faults in Nevada; large earthquakes on individual faults occur thousands of years to tens of thousands of years apart. While this is a long time between earthquakes there are hundreds of faults in Nevada. Based upon this information a large earthquake can be expected every few decades (a 1 in 30 years chance of occurring – $1/30 = 3.3$ percent). The probability of a future earthquake is roughly 3 percent chance per year.

4.3.4 Epidemic/Infectious Disease

Nature: A disease is a pathological condition of a part, organ, or system of a living organism resulting from various causes, such as infection or exposure to toxins, and characterized by an identifiable group of signs or symptoms. The major concern here is an epidemic, when a disease affects a disproportionately large number of individuals within a population, community, or region at the same time.

Of great concern are infectious diseases caused by the entry and growth of microorganisms in man. Infectious diseases are diseases caused by a pathogen which enters the body, triggering development of an infection. Such pathogens may include bacteria, viruses, fungi, prions, or protozoans. Infectious diseases can have a range of causes and are often contagious or communicable, meaning they can be passed from person to person. They can be transmitted through numerous modes, including direct contact (person-to-person, animal-to-person, or mother-to-unborn child), insect bites, food and water contamination, or airborne inhalation. Many infectious diseases can make the body vulnerable to secondary infections, which are caused by other organisms taking advantage of an already weakened immune system.

According to the Global Health Council, over 9.5 million people die each year from infectious diseases. Although progress has been made to control or eradicate many infectious diseases, humans remain vulnerable to many new emerging organisms, such as severe acute respiratory

syndrome (SARS) and the West Nile virus. In addition, previously recognized pathogens can evolve to become resistant to available antibiotics and other treatments. For example, malaria, tuberculosis, and bacterial pneumonias are appearing in new forms that are resistant to drug treatments. The spread of infectious diseases also increases with population growth and the ease of travel.

Human activities play an important role in the spread of infectious diseases. These activities can include:

- *Human behavior and demographics:* Human behavior and living conditions may contribute to emergence of infectious diseases by enhancing the opportunity for exposure to the pathogens causing disease. As the density of human population increases, the likelihood of contact also increases. Additionally, people living in close proximity with animals with poor sanitation can offer opportunities for emergence of new strains.
- *Agricultural changes:* As new crops are introduced, new crop pests and the microbes they carry can expose people to unfamiliar diseases, particularly in farming communities.
- *Technological advancement:* The invention of different modes of transportation and increasing technological advancement has led to accelerated spread of infectious diseases once they emerge. Millions of people move short and long distances around the globe for work or pleasure, enhancing the possibility of microbial encounters. Pathogens can be transported great distances before symptoms even appear.

The State of Nevada has established a list of over 60 communicable (infectious) diseases, which by law, must be reported by health providers to report to state or local public health officials. These diseases are those of public interest by reason of their communicability, severity, or frequency.

For the sake of this Plan the infectious diseases of concern are those that have the potential to have a serve effect on the County as a whole; infectious diseases which occur to the extent that normal public health operations cannot keep up with the demand caused by the disease. Based upon these concerns, the following are the infectious diseases most likely to threaten the United States over the next two decades include:

- *Tuberculosis (TB):* TB is an infectious disease which attacks the lungs and is caused by various strains of mycobacteria. The disease is spread through airborne droplets, when infected people cough, sneeze, or spit. TB has been exacerbated by new resistant strains and HIV/AIDS co-infection. The number of TB cases in the U.S. peaked in 1992 and has been declining ever since. The decline is almost entirely due to a reduction in the number of TB cases in U.S. born individuals; the number of TB cases in foreign-born individuals has remained at around 8,000 persons per year. The threat of spreading TB continues to be an issue with the spread of HIV and the steady number of foreign-born individuals infected by TB.
- *Methicillin-resistant staphylococcus aureus (MRSA):* MRSA is a kind of bacteria that is resistant to a family of antibiotics related to penicillin. Staphylococcus aureus (staph) are bacteria commonly carried on the skin or in the nose of healthy people. Most people carrying staph do not have skin infections. However, staph can sometimes cause infections, especially in people with weakened immune systems. Staph, including MRSA, can be

spread by direct skin-to-skin contact or by contact with items that have been touched by people with staph. In addition, MRSA is a major source of hospital-acquired infections.

- *More lethal variants of influenza:* Influenza is a contagious respiratory illness caused by influenza viruses. It can cause mild to severe illness and at times can lead to death. The flu is especially dangerous because it is spread through the air. The two main types of flu virus are Type A influenza and Type B influenza. These types are viruses that routinely spread in people (human influenza viruses) and are responsible for seasonal flu epidemics each year.
 - In April 2009, a new strain of the flu virus called swine flu (or H1N1 flu virus) emerged. The virus was first detected in the United States and has spread around the world. Swine flu spreads in much the same way that seasonal influenza viruses spread. Like seasonal flu, H1N1 in humans can vary in severity from mild to severe. Severe disease with pneumonia, respiratory failure, and death is possible with the H1N1 flu infection. In June 2009, the World Health Organization declared that a global pandemic of H1N1 flu is underway. By August 2010, the World Health Organization had announced that we had moved into the post-pandemic period.

History: The influenza pandemic of 1918 and 1919, known as the Spanish flu or swine flu, has been cited as the most devastating epidemic in recorded world history. More than 50 million persons were killed worldwide, some 500,000 of which were in the U.S. alone and it has been argued that some 500 million, or 27 percent of the world population, were infected by the disease. More recent incidents of major infectious diseases affecting people in the U.S. include the following:

- West Nile virus (WNV), a seasonal infection transmitted by mosquitoes, caused an epidemic with the number of cases increasing from an initial U.S. outbreak of 62 disease cases in 1999 to 4,156 reported cases, including 284 deaths, in 2002. Beginning in 2008, the U.S. saw a dramatic drop in the number of reported cases and as of November 2011 only 647 cases have been reported.
- SARS, which is estimated to have killed 916 and infected 8,422 worldwide by mid-August 2003. In the U.S., there were 33 reported, but no reported deaths.
- In April of 2009, novel H1N1 influenza virus started to circulate in Mexico. It soon spread to the United States and within 2 months of its first isolation the virus became a global pandemic. It is estimated that the 2009 virus caused about 61 million cases of influenza in the United States.

Table 4-5 provides an example of epidemics or outbreaks with potential severe consequences that have been recorded in Clark County since 1992.

Table 4-5. Recent Occurrences of Infectious Diseases Registered in Clark County

Date	Details
June 2011 - July 2011	Six guests of the ARIA Resort and Casino were diagnosed with, treated for, and recovered from Legionnaires' disease (a form of pneumonia caused by Legionella bacteria). As a result, about 18,000 people who stayed at the ARIA Resort and Casino from June 21 to July 4 were mailed letters, warning them about possible exposure to Legionella bacteria.
2009 - 2010	The novel H1N1 influenza virus became a global pandemic and in Nevada thousands of people were infected leading to 40 deaths.
2004 - 2008	In 2008, SNHD investigated the largest outbreak of healthcare-acquired hepatitis C in US history, with 115 cases identified and 63,000 people notified of their possible exposure (those notified were patients who received a particular treatment between March 2004 and January 11, 2008).
September 2005	A single food handler incident occurred where an infectious person, with Hepatitis A who had not yet developed symptoms, was serving food to the public during a large convention. Quick prophylactic actions were taken by Clark County Health District wherein a potential epidemic was prevented.
Spring 2000	Five cases of the measles confirmed. Outbreak identified and confirmed. Clark County Health District (now Southern Nevada Health District), Office of Epidemiology worked with the Immunization Clinic and the media to alert the community about the prevention of the spread of the disease.
February 1992	Cholera outbreak confirmed. At least 26 passengers from Aerolineas Argentina's Flight 386 that brought a cholera outbreak to Los Angeles traveled on to Las Vegas, where 10 showed symptoms of the disease. Cholera or cholera-like symptoms developed in 67 passengers of Flight 386.

Location: The entire County is susceptible to infectious diseases. Segments of the population at highest risk for contracting an illness from a pathogen are the very young, the elderly, or individuals who currently experience respiratory or immune deficiencies. These segments of the population are present throughout the planning area. Additionally, because of the communicable nature of these diseases, tourism centers or areas of high population density are considered more at risk. As a result the population in and around the Las Vegas strip may have an increased potential for exposure and spread of infectious diseases.

Extent: Each infectious disease has a different pathogenicity, which can affect the probability of occurrence. In addition, the spread of infectious diseases and the probability of their occurrence are affected by factors, such as environmental changes, human behavior and demographics, and technological advancement.

People who have weak immune systems are particularly vulnerable to infectious diseases. Infectious diseases can seriously affect those individuals who are infected with HIV or are receiving immunosuppressive therapy for cancer or organ transplants. Others who may be disproportionately affected by infectious diseases include the elderly; persons being cared for in institutional settings (such as hospitals and nursing homes); and persons with inadequate access to health care, such as the homeless, and others of low socioeconomic status. In addition, pregnant women and people who care for small children are generally at higher risk for acquiring infectious diseases.

Probability of Future Events: The probability and magnitude of an infectious disease occurrence is difficult to evaluate due to the wide variation in disease characteristics, such as rate of spread, morbidity and mortality, detection and response time, and the availability of vaccines and other forms of prevention. A review of the historical record (Table 4-5) indicates that disease

related disasters do occur in humans with some regularity and varying degrees of severity. There is growing concern, however, about emerging infectious diseases.

Infectious diseases constitute a significant risk to the population of Clark County. Minor outbreaks occur on the order of 30 times per year, every year (a 30 in 1 year chance of occurring - $30/1 \geq 100$ percent). The probability of a small future outbreak is 100 percent chance per year. The probability of a major infectious disease outbreak, with the potential of reaching the scale of an epidemic, however, is not nearly as common. Based upon past history, a major infectious disease outbreak occurs about once every 10 years (a 1 in 10 years chance of occurring - $1/10 = 10$ percent).

4.3.5 Flood and Flash Flooding

Nature: A flood occurs when the existing channel of a stream, river, canyon, or other watercourse cannot contain excess runoff from rainfall or snowmelt, resulting in overflow on to adjacent lands.

A floodplain is the area adjacent to a watercourse or other body of water that is subject to recurring floods. Floodplains may change over time from natural processes, changes in the characteristics of a watershed, or human activity such as construction of bridges or channels. River channels change as water moves downstream, acting on the channel banks and on the channel bottom. On the outside of a channel curve, the banks are subject to erosion as the water scours against them. On the inside of a channel curve, the banks receive deposits of sand and sediment transferred from the eroded sites. In areas where flow contains a high-sediment load, the course of a river or stream may shift dramatically during a single flood event.

As noted in the 2010 Nevada Standard Hazard Mitigation Plan, much of Nevada is part of the Great Basin (an area of internal drainage, in which streams are not connected to rivers that flow to the oceans), as a result flood waters will commonly drain into interior lakes, wetland areas or playas.

The following describes various types of flooding:

- Channel flooding is characterized by lateral channel migration during major flows, which results in abrupt changes in the horizontal alignment or location of the channel. Other characteristics include localized channel bed and bank-scour in addition to the potential for over-bank flow inundation.
- Sheet flooding is characterized by channel having minimal capacity, water flowing across broad areas at relatively shallow depths, and gently sloping terrain. Damage from these events includes localized scour and deposition of extensive amounts of sediments and debris typically associated with sheet flow. If the depth of the water is high enough, water may encroach into low-lying structures within the floodplain.
- Alluvial fan flooding refers to flooding occurring on the surface of an alluvial fan or similar landform characterized by high-velocity flows, active erosion processes, sediment transportation and deposition, and unpredictable flow paths. Flow depths with alluvial fan flooding are generally shallow with damage resulting from inundation, variable flow paths, localized scour and the deposition of debris. Alluvial flooding is potentially more dangerous than riverine flooding due to its unpredictable nature resulting in difficulties associated with threat identification.

- Flash flooding is characterized by the time scale in which it develops: a flash flood generally develops in less than 6 hours. Flash flood waters also move at very fast speeds and have the power to move boulders, tear out trees, and destroy both buildings and transportation infrastructure. During a flash flood, walls of water can reach heights of 10 to 20 feet. This combination of power and suddenness makes flash floods particularly dangerous. They are likely to occur in areas with steep slopes and sparse vegetation. These floods arise when storms produce a high volume of rainfall in a short period, over a watershed where runoff collects quickly as well as in the mountain areas resulting in the massive melting of the snow pack leading to heavy run off. They are likely to occur in areas with steep slopes and sparse vegetation. They often strike with little warning and are accompanied by high velocity flow.

Various factors determine the severity of floods such as rainfall intensity and duration, watershed conditions (slope, soil type, presence of vegetation) and the existence of flood control features, both natural and human-built.

History: Typically underestimated due to the arid climate, few perennial streams, and low precipitation, flooding is the most common hazard occurring in the state of Nevada. Recorded floods in Clark County date back almost one hundred years. From 1905-1975, there have been 184 different flooding events that resulted in damages to private property and public facilities. Since 1960, the area has experienced at least 11 floods costing more than a million dollars each. In that same period, 31 lives were lost in 21 separate flash flood events. Since 1965, four Presidential Disaster Declarations have been issued for flood events affecting Clark County. While floods can, and have occurred in almost every month of the year, the most damaging storms typically occur between July and September. The 2010 Nevada Standard HMP lists 88 “Major Floodings” that have affected Clark County tracing back to 1906. Table 4-6 provides some examples of the floods that have occurred in Clark County.

Table 4-6. Examples of Historic Floods in Clark County

Date	Damage
January 2005	A storm-related emergency January 11 was proclaimed for flooding conditions in the northeastern part of the county (much of which occurred in the City of Mesquite) and for avalanche conditions on Mount Charleston. Affected by the storms were 133 homes where two houses were destroyed, 37 suffered major damage, and 45 had minor damage. Additionally the flooding on the Virgin River lead to approximately 10 acres of Charles Hughes Middle School property being washed away. An estimated \$3.8 million in direct damage to public infrastructure roads, bridges, sewers, and storm-related expenses to local governments. State agencies reported another \$2 million in expenses to the Nevada Division of Wildlife resources, including nature preserves in the Moapa Valley area. Damage in Clark County exceeded \$5 million, which includes 52 ranches and farms affected.
August 2003	There were no reports of deaths or life-threatening injuries from the storm, which began around 4 p.m. and quickly overwhelmed flood control facilities. Authorities made nearly 60 rescues. Including police officers dangling from helicopter cables to save motorists, and in one case, firefighters, who were trapped atop their flooded fire engine. Mayor Oscar Goodman declared a local state of emergency, placing public safety officials on call and laying the groundwork for the city to seek federal aid. Approximately 3,000 homes in the northwest part of the valley lost power because of the storm. Service was restored by 7:30 p.m. Rain fell at such a rate near Gowan Road and U.S. Highway 95 that it overwhelmed the intakes to flood control basins in the area. Basins remained unfilled even as water cascaded through nearby streets. Small Business Administration loans were made to those who qualified.

Table 4-6. Examples of Historic Floods in Clark County

Date	Damage
September 1998	Severe weather moved through the Las Vegas Valley and northeast Clark County causing widespread drainage problems and other damages. The rainfall was accompanied by hail throughout much of the Las Vegas Valley as well as a tornado in the Henderson area. Flows in the Muddy River overtopped the SR-168 bridge in Glendale and washed out the low level crossing at Gubler Avenue in Logandale (Moapa Valley area). According to the damage assessment prepared by the American Red Cross, thirteen homes in the Overton area suffered major damages and flooding destroyed two mobile homes in the Glendale/Moapa area and 5 homes in Bunkerville suffered major flood damages. Clark County Public Works Department has estimated that the area suffered approximately \$400,000 in damages to roadways.
July 1998	The storm killed two, sweeping away mobile homes and flooding businesses. The National Weather Service typically alerts the city in the morning if any intense storms or flooding are expected that day. No such warning was issued this day. Unlike storms in the past where motorists got caught trying to navigate through flood waters, this flood occurred so quickly that it trapped drivers who minutes before were on dry land.
August 1981	Thunderstorm-related intense rains up to 6.5 inches in less than an hour fell on southern Nevada. The heaviest rain was concentrated over the California Wash, Logan Wash, Overton Wash, Valley of Fire Wash and the lower Muddy River and produced major flooding and record runoff. Record floods in the Moapa Valley area did the most serious damage. California Wash flooding heavily damaged Hidden Valley Ranch dairy farm, where approximately 500 cows drowned, and twenty mobile homes were destroyed or damaged. Muddy River at Glendale below California Wash overflowed the bridge by 5 to 6 feet. Tens of millions of dollars worth of damage occurred to the Moapa Valley, Overton, Lake Mead Recreation and Las Vegas areas.
July 1975	A flash flood swept through the Las Vegas area causing widespread damage and killing two men. Several hundred cars were damaged as flows in the Flamingo Wash roared through the parking lot of Caesar's Palace. Sewage plants were inundated and deactivated by mud and water. It was estimated that direct damage totaled \$4 to \$5 million. Additionally, local hotel industry reported large-scale room cancellations and a significant decrease in revenues when tourists decided that safety was not something they wanted to take a gamble on.
September 1974	A severe thunderstorm dumped upwards of 3" of rain over the Eldorado Canyon area, 40 miles southeast of Las Vegas. This flash flood claimed nine lives, destroyed a restaurant, completely destroyed five mobile homes, 38 vehicles, 23 boats, half of the boat dock, and gas dock. Damages exceeded \$1 million.

Location: Figure C-5 illustrates the locations of the 100 year and 500 year floodplains in Clark County. In the north-central and north-eastern portions of Clark County, many of the flood-prone areas are associated with the tributaries leading into Lake Mead, such as the Muddy River that flows through the communities of Overton and Logandale, and the Virgin River that runs along the southern boundary of the City of Mesquite (Note: In 1981 the communities of Overton and Logandale were officially merged into the unincorporated town of Moapa Valley; however, local residents still identify themselves with the previous community names and locale). In the desert basins of central and southern Clark County, natural runoff channels, or washes, focus the sheet flow across desert pavement. Because of these topographic phenomena the probability of floods occurring in Clark County communities is relatively high. Contributing to this dispersion type is an urbanization and sprawl pattern that has spread development onto the washes and sediment piedmonts. In addition, runoff from monsoon thunderstorms can quickly overtop a wash, thereby flooding adjacent areas.

Extent: The magnitude of flooding that is used as the standard for floodplain management in the United States is a flood with a probability of occurrence of 1 percent in any given year. This flood is also known as the 100-year flood or base flood. The most readily available source of information regarding the 100-year flood, as well as the 500-year flood (0.2 percent probability

of occurrence in any given year), is the system of Flood Insurance Rate Maps (FIRMs) prepared by FEMA. These maps are used to support the NFIP.

FEMA has prepared a digital FIRM (DFIRM), effective November 16, 2011, for the incorporated and unincorporated areas of Clark County. Table 4-7 lists the date of the initially mapped FIRM and the emergency/regular program entrance date into the NFIP.

Table 4-7. Date of Initially Mapped FIRM and Emergency/Regular Program Entrance Date into NFIP for Clark County and Cities

County/Community Name	Date of Initially Mapped FIRM	Emergency/Regular Program Entrance Date into NFIP	Number of Policies in Force (as of November 2011)
City of Boulder City	9/16/1981	6/28/1974	24
City of Henderson	6/28/1974	8/24/1981	519
City of Las Vegas	12/15/1983	12/3/1976	747
City of Mesquite	9/28/1984	11/1/1985	143
City of North Las Vegas	9/30/1982	1/16/1981	222
Clark County	9/29/1989	9/29/1989	2896

Sources: FEMA 2010b.

FIRM Flood Insurance Rate Maps
NFIP National Flood Insurance Program

Development in or near floodplains increases the likelihood of flood damage by adding additional structures and people in flood areas and altering surface water flows by diverting water to new courses or increases in the amount of water that runs off impervious pavement and roof surfaces.

It is important to note that official revisions to a FIRM can be issued by FEMA. A Letter of Map Revision (LORM) generally reflects changes to the 100-year floodplain or Special Flood Hazard Areas, in rare situations LORMs can also modify the 500-year floodplain boundaries. Conditional Letter of Map Revision (CLORM) can also be obtained. A CLORM is based upon proposed conditions and does not change the FIRM, but is a method used to let people know that projects, if constructed per the design submitted to and approved by FEMA, will likely lead to an official revision, a LORM.

Recent LORMs may not be reflected in the FEMA FIRMs, therefore, the extent of the flood hazard could be slightly different from what is illustrated in Figure C-5. For the most up-to-date information regarding specific floodplains speak directly with the jurisdiction's Floodplain Administrator.

Probability of Future Events: The desert southwest often experiences intense rainfall and subsequent flash floods. Floods can and have occurred in almost every month of the year, however, the most damaging storms typically occur between July and September, which has been designated as flash flood season. The rainwater runs off rapidly and concentrates in the urbanized areas at lower elevations. Flooding impacts can include road damage/obstruction, property damage, and deaths. The average rainfall in the Las Vegas Valley is 4.49 inches and this amount is nearly equally divided between summer and winter rainy seasons.

Flooding in Clark County is a regular occurrence. Looking at Clark County's more recent flooding history (the last 20 years) 15 major flooding incidents have occurred (a 15 in 20 years chance of occurring – $15/20 = 75$ percent), therefore, the probability of future flooding in Clark County is roughly a 75 percent chance per year.

4.3.6 Infestation

Nature: As defined by Federal Executive Order 13112 and invasive species is:

- 1) Non-native (or alien) to the ecosystem under consideration and
- 2) Whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Invasive species can be plants, animals, and other organisms (e.g., microbes). Human actions are the primary means of invasive species introductions.

Infestations impact Nevada's economy through the destruction of crops and natural resources which also impacts tourism. Some of the plant infestations are highly flammable and assist in the spread of wildfires. The infestations of greatest concern in Clark County include the following:

- Noxious Weeds: as defined by the US Department of Agriculture, noxious weeds are “species of plants that cause disease or are injurious to crops, livestock or land, and thus are detrimental to agriculture, commerce or public health.” Noxious weeds are considered invasive due to their ability to rapidly reproduce and spread, ultimately out-competing all other vegetation in an area. In reference to agriculture, invasive weeds affect crop production. In reference to natural or wildland areas, invasive weeds cause a drastic change in the composition, structure and function of ecosystems.

The Nevada Department of Agriculture has developed a list of 47 Noxious Weeds, divided into three categories (A, B and C):

- Category "A": Weeds not found or limited in distribution throughout the state; actively excluded from the state and actively eradicated wherever found; actively eradicated from nursery stock dealer premises; control required by the state in all infestations
- Category "B": Weeds established in scattered populations in some counties of the state; actively excluded where possible, actively eradicated from nursery stock dealer premises; control required by the state in areas where populations are not well established or previously unknown to occur
- Category "C": Weeds currently established and generally widespread in many counties of the state; actively eradicated from nursery stock dealer premises; abatement at the discretion of the state quarantine officer

Other invasive plants that are too widely distributed in Nevada to be included in the noxious weed list but present problems in Nevada include Cheatgrass and Red brome.

- Cheatgrass: Cheatgrass (*bromus tectorum* L.) It is an annual grass that forms tufts up to 2 feet tall with leaves and sheaths that are covered in short soft hairs. The flowers occur as drooping, open, terminal clusters that can have a greenish, red, or purple hue. These annual plants will germinate in the fall or spring and senescence usually occurs in summer.

Cheatgrass' invasive nature is due to its potential to completely alter the ecosystem in which it invades, completely replacing native vegetation and changing fire regimes.

- **Red Brome:** Red brome (*bromus rubens* L.) is a tufted, cool-season annual bunchgrass commonly found growing on shallow dry soil or poor textured, clayey soil. It becomes extremely competitive with other grasses and displaces native species. The accumulation of litter and necromass has the potential to increase fire frequency in the desert.

Clark County also experiences animal infestations; the following is a list of invasive species currently affecting the County:

- **Africanized Honey Bees**, known colloquially as "killer bees," are hybrids of the African honey bee, with various European honey bees. The term killer bee is a misconception because the sting of the Africanized Honey Bee is no more potent than a garden variety honey bee. However, Africanized bees are viewed as more dangerous because they are more easily provoked, quick to swarm, attack in greater numbers, and pursue their victims for greater distances. They affect the agriculture of an area because small swarms of Africanized bees are capable of taking over European honey beehives by invading the hive and establishing their own queen after killing the European queen.
- **Banded Elm Bark Beetle (BEBB)**: The BEBB (*scolytus schevyrewi*) infests and breeds in elm trees stressed by drought. This can lead to the weakening and/or the destruction of the infested tree. As of 1996 the beetle has attacked four species of elm trees: American, Siberian, English and rock elm. In addition to the direct destruction of trees, the beetle may be a vector of a new species of exotic tree-killing fungi, causing Dutch elm disease.
- **Quagga Mussels**: Quagga mussels (*Dreissena rostriformis bugensis*) reproduce quickly and in large numbers. They are biofoulers that obstruct pipes in municipal and industrial raw-water systems, requiring millions of dollars annually to maintain. They also produce microscopic larvae that float freely in the water column, and can therefore pass by screens installed to contain them. Quagga mussels are prodigious water filters, removing substantial amounts of phytoplankton and suspended particulate from the water. This includes planktonic algae that are the primary base of the food web, which in turn completely alters the ecology of the water bodies in which the Quagga mussels invade.
- **Asian Clam**: The primary impact of Asian clams (*corbicula fluminea*) is the billions of dollars in costs associated with clogged water intake pipes, their release of nitrogen and phosphorous into the lakes in which they live, resulting in algae blooms, and their contribution to the decline and replacement of highly vulnerable, already threatened native clams.
- **New Zealand Mudsail**: The New Zealand Mudsail (*Potamopyrgus antipodarum*) is tiny, (4-6 mm in length), but reproduces quickly and can completely cover a streambed. There expansive numbers crowd out native aquatic insects that provide food for native animals, altering the stream's ecosystem.

History:

- **Noxious Weeds**: Many non-native plants are introduced to new areas every year. Many are considered benign, but some species are classified as noxious because of their invasive nature; more than 500 weeds in North America are classified as noxious. The first widespread weed in Nevada considered to be invasive was a Russian thistle or tumbleweed

that was introduced in the late 1800s. The *Halogeton glomeratus* was the second invasive species to reach Nevada and was discovered in 1934.

- *Cheatgrass*: Cheatgrass is native to Europe and parts of Africa and Asia. It was first introduced into the United States accidentally in the mid-1800s and by the early 1900s was found throughout the Great Basin (includes Nevada, and parts of California, Idaho and Utah).
- *Red Brome*: The red brome is native to Europe and parts of Africa and Asia. It was brought to North American before 1800. In contrast to accidental introductions, red brome was seeded near the University of Arizona at Tucson from 1906 to 1908 for evaluation as a forage plant; this grass soon escaped and became established along the Santa Cruz River. It continued to spread and by the 1960s was found throughout Nevada.
- *Africanized Honey Bees*: Africanized honey bees were first found in the US in southern Texas in 1990. In 1998 their presence had been detected in Clark County and has since continued to spread into northern Nevada.
- *Banded Elm Bark Beetle (BEBB)*: The BEBB is native to northern China, Central Asia and Russia. The beetle was first detected in the United States in 2003 in Colorado and Utah. Since then the beetle has been collected in 21 states, including Nevada. However, the simultaneous detection across the country suggested that it was not a recent introduction and a survey of museum specimens established their presence in Denver Colorado in 1994.
- *Quagga Mussels*: Quagga mussels are native to Ukraine and were first sighted in the United States in 1989 in the Great Lakes. By 1995 quagga mussels were discovered outside of the Great Lakes basin and in January 2007 populations were discovered in Lake Mead near Boulder City.
- *Asian Clam*: The Asian clam is native to Asian and parts of Africa and was introduced into the United States in 1938. In 1959 the clam was discovered in Nevada in Lake Mead.
- *New Zealand Mudsnail*: The New Zealand Mudsnail is native to New Zealand and was first detected in the United States in 1987 in Idaho. No other populations were discovered until 1993 when they were found in Oregon. Since then their invasion has expanded and the New Zealand Mudsnail is currently found in all western states, except New Mexico.

Location: Infestations have occurred throughout Clark County.

- *Noxious Weeds*: Appendix L of the 2010 Nevada Standard HMP (http://www.nbmng.unr.edu/nhmpc/NV_plan_2010/index.html) provides maps of all Noxious weeds throughout the state, their presence is scattered throughout the County.
- *Cheatgrass and Red Brome*: Cheatgrass and Red brome prosper in similar habitats and are found particularly in areas of dry rangeland and shrub steppe habitats.
- *Africanized Honey Bees*: Africanized honey bees were first found in the US in southern Texas in 1990. In 1998 their presence had been detected in Clark County and has since continued to spread north, into Lincoln and Nye Counties Nevada.
- *Banded Elm Bark Beetle (BEBB)*: The BEBB is found in populations of elm trees throughout the County.

- *Quagga Mussels:* Quagga mussels have been found all along the southern border of Clark County, throughout the Colorado River, Lake Mead and Lake Mohave.
- *Asian Clam:* The Asian Clam has been found in Clark County in Lake Mead, primarily in the lake's north fork.
- *New Zealand Mudsnaill:* The New Zealand Mudsnaill has been found in along the southern border of Clark County in Lake Mead, in the north fork near Echo Bay and in the west fork near Las Vegas Bay

Extent: The extent of infestations in Clark County is based on many factors. Pests enter Clark County on commercial shipments of plants, food, and other materials. They may also be transported on vehicles, fruits, plants, seeds, or animals when travelers enter the County.

- *Noxious Weeds:* Noxious weeds have populated in much of Nevada however, the majority of infestations are further north of Clark County. Of the 47 noxious weeds listed by the State of Nevada, only 13 are found in Clark County. Additionally, of the 13 most do not have an overwhelming presence. Sarah Mustard (*brassica tournefortii*) is the exception, which extends throughout the eastern half and southern portion of the County. Additionally, for the State of Nevada, it is found almost exclusively in Clark County.
- *Cheatgrass and Red Brome:* Cheatgrass and Red brome have thrived in Nevada and cover about nine million acres of land in Nevada, about 13 percent of the State's total acreage. Because of their resilience without human intervention, their populations will continue to grow.
- *Africanized Honey Bees:* The Clark County Public Works Department notes that "the Africanized honey bee is well established in Las Vegas" and has recommended that residents "Stay Away From Honey Bee Colonies." In a report from February 2000 a state agriculturist said that the actual number of hives or swarms found in Las Vegas in 1999 was about 1,000, before 1998 there had been no reports of hives or swarms. Additionally the Agriculture Department estimated that 75 percent of all bees in the valley are Africanized.
- *Banded Elm Bark Beetle (BEBB):* The BEBB has invaded much of Nevada and the Western United States and the extent of its infestation continues to grow. Prior to the introduction of the BEBB a similar beetle, the European elm bark beetle (EEBB) was found in populations of elm trees. In a study to determine the relative abundance of the BEBB and the EEBB, presented at the annual USDA Interagency Research Forum on Invasive Species, beetle traps were set up in five states. In 2007 43% of the beetles caught in the Nevada traps were BEBB. The following year a similar study was set up and BEBB increased in abundance in Nevada to 68%. It seems that BEBB attacks standing trees more aggressively, may have displaced the EEBB and/or is better able to colonize regions beyond EEBB's range.
- *Quagga Mussels:* Quagga mussels were first discovered in Clark County in 2007 and continue to be found throughout the Colorado River. As an aquatic species their presence in Clark County has remained limited to the bodies of water along the Colorado River. However, since their introduction to Clark County, their presence has expanded to northern Nevada; in 2011 Quagga mussels were found in Lahontan Reservoir and Rye Patch Reservoir.
- *Asian Clam:* In 1959 the Asian Clam was discovered in Clark County, in Lake Mead. The Asian Clam is currently found in almost every state however, since it initially discovery in

Clark County the presence of Asian Clams in the County and in Nevada has not extended beyond Lake Mead.

- *New Zealand Mudsail:* The New Zealand Mudsail was found in Clark County in 2008 in Lake Mead, as recorded by a research effort associated with the Department of Ecology at Montana State University. For the time being the extent of the New Zealand Mudsail appears to be confined to Lake Mead, no new reports have been logged.

Probability of Future Events: The invasive species that are present in Clark County will likely exist for years to come. Clark County has taken steps to reduce the extent of infestations through laws, regulations and planning (such as the 2000 Nevada State Weed Plan and the Establishment of an Interior quarantine due to Africanized honey bees (May 2001)), but it is not likely that these infestations will ever be eradicated. Furthermore, due to the transient nature of the County invasive species controls are even more difficult to regulate.

Historically new invasive species appeared on average, every 10 years. However, when looking at more recent statistics, new infestations are occurring more frequently. In the last 20 years, four new invasive species have been introduced to Clark County. This is likely attributed to the more transient nature of the population, but also an increased ability to track/study invasive species. Based on recent, previous occurrences, future infestations are likely every five years (a 1 in 5 years change of occurring - $1/5 = 20$ percent), therefore, the probability of future infestations in Clark County is roughly a 20 percent chance per year.

4.3.7 Subsidence

Nature: In the southwestern United States, agricultural and urban areas that depend on ground water pumping are prone to land subsidence. Nonrecoverable land subsidence occurs when declining water levels lead to inelastic water compaction. A lesser amount of subsidence occurs with the recoverable compression of coarse-grained sands and gravel deposits. A common feature that accompanies subsidence is earth fissures, which are tension cracks in the sediment above the water table. Land subsidence can be caused by actions other than overdrafting of water. Mining, hydrocompaction, and underground fluid withdrawal (water, oil, or other fluid) can cause this hazard and result in land surface displacements and fissures.

History: Las Vegas naturally contained areas of a high water table and artesian springs, and was a stopping off point on the Old Spanish Trail. Land subsidence was first documented in the Las Vegas Valley in 1935 and over time has led to as much as 2 meter subsidence. Las Vegas has grown rapidly and now supports almost one million people. However, the Las Vegas Valley receives an average of 4.5 inches of rain annually. The Las Vegas Valley gets the majority of its water from Lake Mead, although, a minority of water users obtain water from wells. This groundwater withdrawal is the primary cause of land subsidence in the Las Vegas Valley. Since 1968, annual withdrawals have been gradually reduced and in 1991 the water district began re-injecting water into the subsurface; the rate of subsidence has remained relatively constant in recent decades.

Location: While a broad regional primary subsidence bowl occupies the central portion of the Las Vegas Valley, three localized secondary subsidence bowls are superimposed on this area, and are located in the central (downtown), southern (Las Vegas Strip) and the northwestern part of the valley. From 1963 to 1980 the primary bowl had subsided more than 49 cm and the

secondary bowls had subsided as much as 79 cm. Studies indicate that the same patterns and trends of movement have continued to occur since 1980.

Additionally, subsidence appears to not simply reflect the location of major pumping or the location of major water-level decline, but rather, preexisting geologic faults are the sites of preferred differential subsidence, making these faults zones of high subsidence risk.

Extent: The effects of subsidence tend to occur slowly, developing over weeks, months and years. While visual effects of subsidence (such as sink holes and ground collapse) in the Las Vegas Valley are minimal, subsidence has created some major issues. Subsidence has led to vertical aquifer-system deformation and earth fissuring which have caused millions of dollars of damage and might have altered boundaries of flood-prone areas.

To help mitigate this hazard, the Clark County building department has, as part of its building code, a requirement to conduct special geotechnical investigations near any earth fissures and faults to avoid building directly over these features. This does not reduce the effect subsidence has currently had on the Las Vegas Valley, but does work to reduce the extent of future effects.

Probability of Future Events: Clark County and the Las Vegas Valley is not growing at the speed that it once was, but land subsidence will continue to occur as long as the net annual groundwater withdrawal continues to exceed the net annual recharge. Importation of surface water is the most direct means of reducing or arresting subsidence, which the water district did begin in 1991. Even so, subsidence may continue for years after equilibrium is achieved because of a lag in sediment response.

Due to Nevada's history of development and pressures on water systems, the state will most likely see more subsidence problems. The rate of subsidence has remained relatively constant in recent years, but is still taking place. Therefore, the probability of future subsidence occurrence in Clark County is a 100 percent chance per year.

4.3.8 Terrorism

Nature: There is not a universally agreed upon definition of terrorism; however, the CFR defines terrorism as "... the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment hereof, in furtherance of political or social objectives" (28 C.F.R. Section 0.85). In general, terrorism is seen as violence against civilians to achieve a political or ideological objective through fear. Terrorism can occur in various forms: assassinations; kidnappings; hijackings; bomb scares and bombings; cyber-attacks (computer-based); and the use of chemical, biological, nuclear and radiological weapons.

Weapons used for terrorist activities are not always weapons produced by the terrorist, but can sometimes come in the form of one's own resources being used against them. An example of this is the targeting of a jurisdiction's hazardous materials facilities or transporters. Clark County has several facilities that handle or process hazardous materials as well as those that are transported through the County.

The Clark County Local Emergency Planning Committee (LEPC) has developed a Hazardous Materials Emergency Response Plan and all preparedness, planning, response and mitigation efforts are coordinated through the LEPC. The HMP planning made the administrative decision to not duplicate the efforts of the LEPC (additional information regarding the LEPC and the

Hazardous Materials Emergency Response plan can be found here:

http://www.clarkcountynv.gov/Depts/admin_services/oem/Pages/EmergencyPlans.aspx).

History: Attention to terrorist activity has grown as a result of the terrorist attacks on September 11, 2001, however, terrorist activity unfortunately has a long history in the United States. Table 4-8 provides some of the terrorist activity we have experienced in recent history in Clark County:

Table 4-8. History of Terrorism

Date	Location	Description
1998	Las Vegas	▪ Larry Wayne Harris arrested for attempted purchase of bubonic plague
2001	Las Vegas	▪ Records show that the perpetrators of the 9/11 attack were in Las Vegas prior to the event
2008	Las Vegas	▪ Ricin vial found at Las Vegas Motel – costs are unknown
2010	Las Vegas	▪ Lloyd D. George Federal courthouse shooting – costs are unknown

Location: The Department of Homeland Security’s National Planning Scenario identifies the possible terrorist strike locations it views as most plausible; places at risk include cities that have economic and symbolic value, places with hazardous facilities, and areas where large groups of people congregate, such as an office building or a sports arena. As such, the Las Vegas strip is a high profile target.

As one of 64 designated urban metropolitan areas, Las Vegas has been identified by the federal government as “high-threat, high-density” with regard to acts of terrorism. In addition to the Las Vegas strip, the following locations are viewed as potential targets in Clark County:

- Fremont Street (Las Vegas, Nevada)
- Individual Casinos
- Las Vegas Convention Center
- McCarran International Airport (Las Vegas, Nevada)
- Military Bases
- Dams

Extent: Standard models are available for estimating the effects of a nuclear, chemical, or biological release, including the area affected and consequences to population, resources, and infrastructure. However, due to the large number of factors involved, including the various types of terrorist events, and the factors of human decision and drive, the extent of a future terrorist attack in general Clark County is unknown.

Probability of Future Events: As described in the State of Nevada’s HMP, the overall magnitude and potential severity of the impacts of terrorism and weapons of mass destruction are considered high in Nevada. Based on the Homeland Security Threatened Level System, it is anticipated that terrorism will remain a high threat into the foreseeable future.

It has been well documented that five of the nineteen 9/11 hijackers spent time in Las Vegas in the time leading up to the attack. In 2002, police in Detroit and Spain seized video tapes from suspected al Qaeda operatives containing footage of multiple Las Vegas resorts. Therefore, there is a probability of a future terrorist event in Clark County. Too many factors, including the factors of human decision and drive, affect the probability of a future terrorist attack. No estimate is available for the probability of a future terrorist event in Clark County.

4.3.9 Utility Failure

For this Clark County HMP, the hazard of Utility Failure includes failure of the power, transportation, water and pipeline systems.

Power System Failure

Nature: A power outage is a short or long term loss of the power to an area. Electrical power or natural gas outages can be caused by a variety of incidents, such as fuel embargos and labor strikes, but are most often caused by either natural disasters, such as storms and flooding or an overtaxing of the system, such as extended periods of unusually hot weather. Most power outages last about fifteen minutes to one hour, but because society is very dependent upon electrical power a power outage can be incredibly disruptive.

There are three categories of electronic power outages:

- A **transient fault** is a momentary (a few seconds) loss of power typically caused by a temporary fault on a power line. Power is automatically restored once the fault is cleared.
- A **brownout or sag** is a drop in voltage in an electrical power supply. Brownouts can cause poor performance of equipment (such as dimming of lights) or even incorrect operation.
- A **blackout** refers to the total loss of power to an area and is the most severe form of power outage that can occur. Outages may last from a few minutes to a few weeks depending on the nature of the blackout and the configuration of the electrical network.

History: Minor power outages from time to time are inevitable. Most recently, in August 2011 nearly 1,500 customers in Las Vegas were without power for about six hours. NV Energy, who provides electricity to the majority of Clark County, was able to restore power to all customers has not released the cause of the outages, but has said that the outage was due to equipment failure.

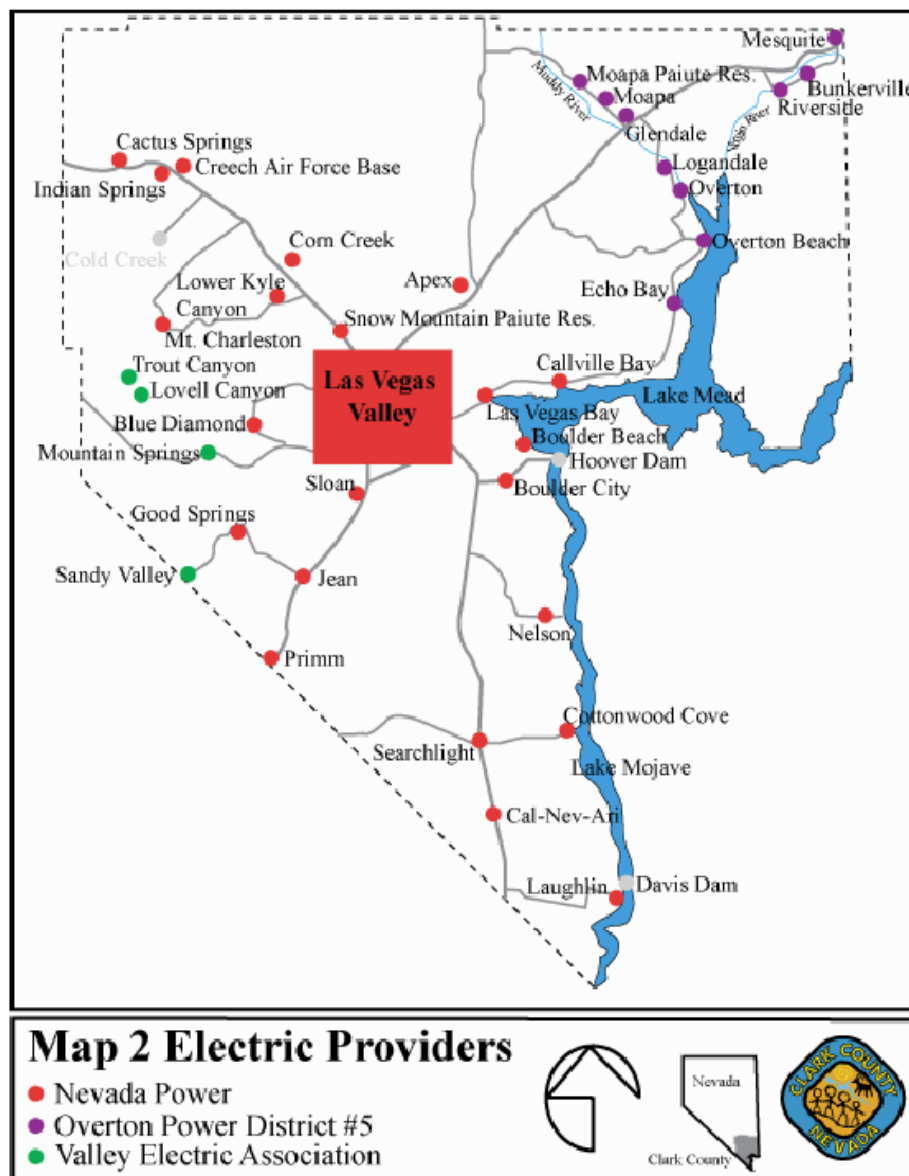
A more significant incident occurred in November 2010 when a power outage affected a middle school in southeast Las Vegas. The power outage was quickly resolved, but the affected middle school was a polling station for a national election, in Nevada key officials being elected were the state's U.S. Senator and Governor. The polls were set to close at 7pm PDT, but due to the power outage all voters who were in line at that site as of 7pm were allowed to cast their votes. The power outage not only affected that particular polling site, but caused a delay in all election results from polling stations in Nevada.

While Clark County was not affected, the blackout in September 2011 which affected Southern California is a notable incident. A widespread power outage led to controlled chaos throughout Southern California; more than 1.4 million people were without power for up to 15 hours.

Location: The entire County is susceptible to power outages. Minor power outages can affect a single neighborhood or area of a city, but because energy supplies tend to be generated and distributed in regional networks, an entire region can be affected should a major event occur. Clark County is served by three electrical companies (see Figure 4-5), Nevada Power (Las Vegas Valley and outlying Clark County), Overton Power District #5 (Northeast Clark County) and Valley Electric Association (West Clark County).

Extent: Since Clark County is served by three different electrical companies it is not expected that a major power outage will affect the entire County. However, it is likely that the power outage will extend to the entire region that a power company serves. The duration of any future events will be based on the cause and type of power outage.

Figure 4-5. Clark County Electrical Providers



Source: Clark County, Utilities Element Report. November 7, 2006.

Probability of Future Events: It is anticipated that Clark County will experience several minor power outages per year, but a major outage due to a power system failure is not expected. Therefore, it is unlikely a power system failure will occur in Clark County within the next ten years (a 1 in 10 years chance of occurring having a $1/10 = 10$ percent). History of events is less than or equal to 10 percent likely per year. The probability of future events is unknown.

Transportation System Failure

Nature: The hazard of transportation system failure is beyond the delays or minor detours caused by construction projects or special events, but is reserved for events that lead to closure of significant portions of the transportation network such as collapsed bridges or roads due to an earthquake; inaccessible roadways due to extreme flooding or grounded planes due to either weather conditions or security threats.

Our daily lives and the nation's economy are inextricably tied to our transportation infrastructure. Failure of a transportation system can involve a number of consequences:

- Direct loss of life due to collapse or structural failure of the lifeline
- Indirect loss due to an inability to respond to/access secondary catastrophes
- Delayed recovery operations
- Disruption of economic activity across the region as well as in the community directly affected

History: Traffic accidents and events causing minor delays occur on a regular basis in Clark County. However, there is no record of an event in Clark County which has led to failure of a significant portion of the transportation system.

Location: The entire County is susceptible to transportation system failure. However, larger cities, such as Las Vegas, which have more transportation infrastructure, also have more opportunities for transportation system failure.

Extent: Due to the large area covered by Clark County should an incident occur in one of outlying cities/jurisdictions it is likely the impact of the transportation system failure can be confined to that city/jurisdiction. However, should a transportation system failure event occur more central, such as in the City of Las Vegas, the effect of the event could spread to the entire County. Therefore, the extent of a transportation system failure event is unknown.

Probability of Future Events: Clark County has not experienced a transportation system failure event, therefore it is unlikely a transportation system failure will occur within the next ten years (a 1 in 10 years chance of occurring having a $1/10 = 10$ percent). The probability of a future transportation system failure is unknown.

Water System Failure

Nature: A water system can be affected in three ways: the amount of water available; the quality of the water; and the viability of the physical components of the distribution systems. Failure of a jurisdiction's water system can be the result of infrastructure degeneration, human acts (deliberate or accidental), and natural and manmade disasters. This can lead to the loss of water for cooking, cleaning and flushing toilets as well as contamination of the water supply. Failure of a water system can also affect fire hydrants.

Water system failure can also lead to secondary consequences. Failure for an extended period of time can lead to protests and civil disturbances. In addition water system failure can lead to other hazards such as flooding and sinkholes.

History: Recently two water system issues have been recorded in Clark County. In June 2010 a 24 inch water line running under a traffic intersection developed a leak. A crew was called to shut down the traffic lane under which the leak was found, but before it could be shut down a woman drove over the asphalt and it gave way. The size of the sinkhole increased overtime and appears to have had a diameter of about 12 feet. Following the development of the sinkhole, the water was shut down to two nearby neighborhoods to address the water line leak and traffic delays occurred for days while the street was repaired.

More recently, in August 2011 a water main broke flooding and forcing a shutdown of part of Cheyenne Avenue in North Las Vegas. There were concerns of a possible sink hold, but officials were able to gain a handle on the problem and the road was reopened a day later.

Location: Due to the variety of causes of water system failure, the entire County is susceptible to water system failure.

Extent: In terms of potable water, Clark County is served by a number of providers (nine major public water suppliers serve regionally throughout the County). Therefore, while each area of the County is susceptible to water system failure it is not likely that a water system failure will extend beyond a single water district.

Wastewater for the majority of Clark County is handled by the Clark County Water Reclamation District (CCWRD - service area includes all of the unincorporated areas of Clark County, much of the Las Vegas Valley and the communities of Blue Diamond, Indian Springs, Laughlin, Searchlight and Moapa Valley). Therefore, a failure of the water system in reference to wastewater could extend too much of Clark County.

Probability of Future Events: In terms of potable water, Clark County is served by a number of providers (nine major public water suppliers serve regionally throughout the County). Therefore, while each area of the County is susceptible to water system failure it is not likely that a water system failure will affect more than a single water district (a 1 in 10 years chance of occurring having a $1/10 = 10$ percent).

Pipeline System Failure

Nature: Pipelines are responsible for the transportation of a variety of goods across cities, counties and the nation. Most often pipelines carry liquids and gases such as oil, natural gases, biofuels, water and sewage. Pipeline failure can prevent the transport of the good in which it is carrying, but more worrisome is leakage of a hazardous material leading to environmental contamination or even to an explosion.

Pipeline failure can be due to natural deterioration, human error, and natural and manmade disasters. Pipelines can also be the target of vandalism, sabotage or even terrorist attacks.

History: From 2001 to 2010 the nation averaged 277 signification pipeline incidents a year, 119 of which were due to a hazardous liquid system and 158 of which were due to various gas systems (transmission, gathering and distribution). PHMSA designates an incident as a “significant incident,” when any one of the following occurs:

- Fatality or injury requiring in-patient hospitalization

- \$50,000 or more in total costs, measured in 1984 dollars
- Highly volatile liquid releases of five barrels or more or other liquid releases of 50 barrels or more
- Liquid releases resulting in an unintentional fire or explosion

However, over the same 10 year period, the State of Nevada averaged only one significant incident per year, with none being reported in 2010. Table 4-9 below provides details for all of the reported significant incidents in Nevada from 2001 to 2010.

Table 4-9. Nevada Pipelines, Significant Incidents Listing 2001 - 2010

Date	City					Operator			Cause			Fatalities	Injuries	Property Damage
	Henderson	Fallon Naval Air Station	Las Vegas	North Las Vegas	Reno	SFPP LP	Sierra Pacific Power Co	Southwest Gas Corp	Excavation Damage	Mat'l/Weld/Equip Failure	All Other Causes			
06/07/2001			X					X	X			0	0	\$606,083
12/20/2001			X					X	X			0	1	\$26,760
02/07/2002					X		X				X	0	0	\$102,267
08/06/2002	X							X	X			0	0	\$209,076
07/24/2003		X				X				X		0	0	\$185,847
08/03/2004	X							X	X			0	0	\$540,309
02/14/2006			X					X	X			0	1	\$9,379
10/02/2007					X	X				X		0	0	\$4,384,913
12/27/2007				X				X	X			1	0	\$2,621
04/09/2008				X				X			X	0	2	\$199,219
01/08/2009			X					X	X			0	0	\$95,913

Table extracted from: http://primis.phmsa.dot.gov/comm/reports/safety/IncDetSt_st_NV_flt_sig.html | Report generated on: 08/02/11

Location: The entire County is susceptible to pipeline system failure. Within the State of Nevada 37 percent of the gas and 54 percent of the liquid pipelines miles are located within Clark County. However, the Las Vegas, North Las Vegas and Nellis Air Force Base areas are the most susceptible to pipeline system failure. As described in the Clark County Utilities Element Report, the largest pipeline system in Nevada is the CALNEV Pipeline system. The CALNEV pipeline system provides Clark County, with over 130,000 barrels of gasoline, diesel and jet fuel per day (most of which is provided to McCarran International Airport and Nellis Air Force Base). The CALNEV pipeline runs directly through Las Vegas and North Las Vegas and

into Nellis Air Force Base. The CALNEV pipeline also runs along the western side border of the City of Henderson which increases its vulnerability to pipeline system failure.

Extent: The extent of pipeline system failure depends greatly upon the type of and the location of the pipeline system failure. Failures such as a minor crack, a leaking joint or a small puncture in a pipe can be patched and fixed relatively quickly with minor disruptions. However, larger failures can lead to complete replacement of portions within a system which can necessitate shut down of the system for an extended period of time. At the extreme, a pipeline system failure can lead to an explosion which is not likely to affect a high number of people, but will have a devastating effect of few.

Due to the variety of variables involved in pipeline system failure, the extent of a pipeline system failure is unknown.

Probability of Future Events: In the ten year period from 2001 to 2009 the State of Nevada averaged one severe pipeline incident per year; about 75% (8 out of a total of 11) of these incidents occurred in Clark County. Therefore Clark County can expect to experience roughly one pipeline system failure incident per year, a 100 percent chance per year.

4.3.10 Wildfire

Nature: A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. They often begin unnoticed and spread quickly. Wildfires can be human-caused through acts such as arson, campfires, or the improper burning of debris, or can be caused by natural events such as lightning. Wildfires can be categorized into four types:

- **Wildland fires** occur mainly in areas under federal control, such as national forests and parks, and are fueled primarily by natural vegetation. Generally, development in these areas is nonexistent, except for roads, railroads, power lines, and similar features.
- **Interface or intermix fires** occur in areas where both vegetation and structures provide fuel. These are also referred to as Wildland/Urban Interface (WUI) fires.
- **Firestorms** occur during extreme weather (e.g., high temperatures, low humidity, and high winds) with such intensity that fire suppression is virtually impossible. These events typically burn until the conditions change or the fuel is exhausted.
- **Prescribed fires and prescribed natural fires** are intentionally set or natural fires that are allowed to burn for beneficial purposes.

The following three factors contribute significantly to wildfire behavior and can be used to identify wildfire hazard areas.

- **Topography:** As slope increases, the rate of wildfire spread increases. South-facing slopes are also subject to more solar radiation, making them drier and thereby intensifying wildfire behavior. However, ridgetops may mark the end of wildfire spread because fire spreads more slowly or may even be unable to spread downhill.
- **Fuel:** Wildfires spread based on the type and quantity of available flammable material, referred to as the fuel load. The basic characteristics of fuel include size and shape, arrangement and moisture content.

- **Weather:** The most variable factor affecting wildfire behavior is weather. Important weather variables are temperature, humidity, wind, and lightning. Weather events ranging in scale from localized thunderstorms to large fronts can have major effects on wildfire occurrence and behavior. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildfire activity. By contrast, cooling and higher humidity often signals reduced wildfire occurrence and easier containment. Wind has probably the largest impact on a wildfire's behavior, and is also the most unpredictable. Winds supply the fire with additional oxygen, further dry potential fuel, and push fire across the land at a quicker pace. Also, since the mid-1980s, earlier snowmelt and associated warming due to global climate change has been associated with longer and more severe wildfire seasons in the western United States.

The frequency and severity of wildfires is also dependent upon other hazards, such as lightning, drought, and infestations (e.g., Pine Bark Beetle). In Nevada, these hazards combine with the three other wildfire contributors noted above (topography, fuel, weather) to present an on-going and significant hazard across much of Nevada.

If not promptly controlled, wildfires may grow into an emergency or disaster. Even small fires can threaten lives, resources, and destroy improved properties. It is also important to note that in addition to affecting people, wildfires may severely affect livestock and pets. Such events may require the emergency watering/feeding, shelter, evacuation, and even burying of animals.

Wildfires can have serious effects on the local environment, beyond the removal of vegetation. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and enhance siltation of rivers and streams, thereby enhancing flood potential, harming aquatic life, and degrading water quality. Lands stripped of vegetation are also subject to increased debris flow hazards, as described above. Wildfires can also greatly affect the air quality of the surrounding area.

History: Nevada averages 1,153 wildfires per year that consume over 242,056 acres. Nevada's fire regime is outside the range of historical variation which means that wildland fires have become larger, more destructive, and more frequent. In the past fifty years there have been eight large fire seasons in Nevada. Five of these fire seasons have occurred in the past nine years. Over the last 10 years, there have been more than 1,800 wildfires on federal lands within Clark County. The Spring Mountain Range, with the highest frequency of wild land fire incidents, is home to the communities of Cold Creek, Lee Canyon, Kyle Canyon and Mt. Charleston.

Table 4-10 provides examples of some of the major fires in Clark County's recent history.

Table 4-10. Major Wildfires in Clark County

Date	Damage
June - July 2005	Goodsprings Fire, started by lightning, burned 31,600 acres of land near Las Vegas. The fire burned past 60 evacuated homes in Mt. Potosi and threatened an additional 100 homes and three commercial properties in Mountain Springs.
July 2004	Robber's Fire lasted 5 days and burned 290 acres. The cause was a semi-truck accident on the downhill curve of State Route 1578 which ignited dry brush in the area. Fire fighters were able to prevent the spread of the fire to occupied residences. A temporary evacuation of the Spring Mountain Youth Camp Detention Center and several recreational camps was a precautionary measure.
July 2002	Lost Cabin Fire took over a week to contain. The fire, possibly sparked by lightning, ravaged over 4,300 acres before rain gave firefighters an advantage over it. It is estimated that \$900,000 in damages were sustained and containment costs were approximately \$1.4 million.
August 2000	Almost 3,000 acres of wild lands had burned since June. Twice that summer lightning had sparked major wildfires in the Spring Mountains west of Las Vegas, around Buck Springs and Trout Canyon. Governor Kenny Guinn asked the federal government to declare the State a disaster area so residents adversely affected by wild land fires can qualify for assistance.

Location: The extreme hazard communities in Clark County are all located at higher elevations within or adjacent to the Spring Mountains. The communities with the most hazardous conditions include Kyle Canyon, Lee Canyon, Mt. Springs, and Trout Canyon. Figure C-6 illustrates the location of high and very high wildfire potential areas.

Extent: Clark County has a history of a large number of fire ignitions every year, as illustrated in Table 4-11. However, it is important to recognize that the number of fire ignitions does not directly correlate to the extent of wildfires. Vegetation over the majority of the County is Mojave Desert scrub, which is typically too sparse to sustain large wildfires. Fires that start in the Spring Mountain Range are those that will most likely become large wildland fires.

Community specific information regarding wildfires can be found in the Nevada Community Wildfire Risk/Hazard Assessment Project reports. In 2003 the Healthy Forest Restoration Act was signed into law. The act creates provisions for expanding the activities outlined in the National Fire Plan. During this year the Nevada Fire Safe Council received National Fire Plan funding through the Department of Interior Bureau of Land Management to conduct a Community Risk/Hazard Assessment in at-risk communities across Nevada.

During 2004, field teams comprised of fire behavior specialists, foresters, rangeland fuels specialists, and field technicians visited communities to assess both the risk of ignition and the potential fire behavior hazard. With the use of procedures accepted by Nevada's wildland fire agencies, these specialists focused their analysis on the wildland urban interface areas where homes and wildlands meet. The reports generated by the Nevada Community Wildfire Risk/Hazard Assessment Project for Clark County may be viewed here: <http://www.rci-nv.com/reports/clark/>.

The assessment teams observed and recorded the factors that significantly influence the risk of wildfire ignition along the wildland-urban interface, and inventoried features that can influence hazardous conditions in the event of a wildfire. Five primary factors that affect potential fire hazard were assessed to arrive at the community hazard assessment score:

1. Community design

2. Construction materials
3. Defensible space
4. Availability of fire suppression resources
5. Physical conditions such as the vegetative fuel load and topography

The general results of the report are illustrated in Table 4-12 below, which includes the ignition risk and the overall hazard rating for each community studied.

Table 4-11. Summary of Fire Occurrence in Clark County and Estimated Acreage, 1980- 2003

Year	Number of Fire Ignitions	Total Fire Acreage
1980	115	9,288
1981	105	13,698
1982	149	7,444
1983	96	272
1984	91	301
1985	112	443
1986	112	166
1987	114	6,368
1988	91	770
1989	72	246
1990	75	15
1991	73	6
1992	53	16
1993	85	4,946
1994	57	8,261
1995	45	2,476
1996	49	3,072
1997	48	27
1998	67	571
1999	59	68
2000	67	8,737
2001	63	216
2002	49	4,307
2003	37	47
TOTAL	1,838	18,573
AVERAGE PER YEAR	73.52	742.92

Source: Nevada Community Wildfire Risk/Hazard Assessment Project - Clark County, June 2005

Table 4-12. Community Risk and Hazard Assessment Results

Community	Interface Condition	Interface Fuel Hazard Condition	Ignition Risk	Community Hazard Rating
High and Extreme Hazard Communities				
Cold Creek	Intermix	High to Extreme	Moderate	High
Kyle Canyon	Rural	Extreme	High	Extreme
Lee Canyon	Intermix	Extreme	High	Extreme
Mt. Springs	Intermix	High to Extreme	High	Extreme
Nelson	Intermix	Low to Moderate	Moderate	High
Torino Ranch	Classic	Low to Extreme	High	High
Trout Canyon	Intermix	Extreme	High	Extreme
Moderate Hazard Communities				
Cactus Springs	Classic	Low	Low	Moderate
Goodsprings	Classic	Moderate	Moderate	Moderate
Moapa	Classic	Low to High	Low	Moderate
Sandy Valley	Intermix	Low	Low	Moderate
Searchlight	Intermix	Low	Low	Moderate
Low Hazard Communities				
Arden	Occluded	Low	Low	Low
Blue Diamond	Intermix	Low	Low	Low
Boulder City	Classic	Low	Low	Low
Bunkerville	Classic	Low to High	Low	Low
CalNevAri	Classic	Low to Moderate	Low	Low
Cottonwood Cove	Classic	Low	Low	Low
Glendale	Classic	Low to High	Low	Low
Henderson	Classic	Low	Low	Low
Indian Springs	Classic	Low	Low	Low
Las Vegas	Classic	Low	Low	Low
Laughlin	Classic	Low	Low	Low
Logandale	Classic	Low to High	Low	Low
Mesquite	Classic	Low to High	Low	Low
North Las Vegas	Classic	Low	Low	Low
Overton	Classic	Low to High	Low	Low
Palm Gardens Estates	Classic	Low	Low	Low
Primm	Classic	Low	Low	Low
Sloan	Classic	Low	Low	Low

Source: Nevada Community Wildfire Risk/Hazard Assessment Project - Clark County, June 2005

Probability of Future Events: Based on historical events, multiple wildfires are expected to burn within Clark County each year. However, large wildfires (fires that consume more than 200 acres) tend to occur about twice every few years; history illustrates that 17 years, over a 24 year period, experienced large wildfires (17years out of 24 years, a $17-24 = 71$ percent). Therefore, it is highly likely that a wildfire event will occur within the calendar year impacting Clark County.

5.1 OVERVIEW

A vulnerability analysis predicts the extent of exposure that may result from a hazard event of a given intensity in a given area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage.

Per the local mitigation planning requirements, this vulnerability analysis consists of the following seven steps:

- Asset inventory
- Methodology
- Data limitations
- Exposure analysis
- RL properties
- Summary of impacts

Tables that support the asset inventory, exposure analysis, RL properties, summary of impacts, are located in Appendix G through Appendix M.

Due to a combination of a lack of adequate information and the lack of a standard methodology for a quantitative vulnerability analysis, vulnerability results have not been prepared for the following hazards: dam failure, drought, epidemic, infestation, subsidence, terrorism and utility failure. Thus, a quantitative vulnerability analysis has been prepared for the following hazards:

- Earthquake
- Flood and Flash Flooding
- Wildfire

5.2 ASSET INVENTORY

Assets that were included in the 2012 HMP's vulnerability analysis are as follows:

- Population (for the unincorporated area of Clark County and the participating cities)
- Residential building stock (for the unincorporated area of Clark County and the participating cities)
- RL properties
- Critical facilities and infrastructure:
 - Government facilities for Clark County and the participating cities
 - Community facilities, including libraries, community centers, and parks
 - County jails and detentions centers
 - Emergency response facilities, including police and fire stations
 - Public hospitals and medical clinics

- Public utilities, including wastewater facilities, sanitation facilities and river gages (including those used for emergency warnings)
- Educational facilities, including school buildings and district offices
- Transportation infrastructure, including airports, transit stations, and County-maintained bridges
- Tourism facilities, including hotels and convention centers (considered high profile facilities)

The total assets inventoried for all for participating local jurisdictions are located within the first table of each participating jurisdiction's appendix (Appendix G through Appendix M).

5.3 METHODOLOGY

A conservative exposure-level analysis was conducted to assess the risks associated with the identified hazards. This analysis is a simplified assessment of the potential effects of the hazards on values at risk without consideration of the probability or level of damage.

Population was derived from 2010 Census information, then a combination of spatial overlay and proportional analysis was used to determine the number of people located where hazards are likely to occur.

Using Census tract level residential building information a combination of spatial overlay and proportional analysis was used to determine the number of residential buildings located where hazards are likely to occur.

Using data provided by Clark County GIS and the city GIS departments, geocoded locations of physical assets were compared to locations where hazards are likely to occur. If any portion of an asset fell within a hazard area, it was counted as impacted. A spatial proportion was also used to determine the amount of linear assets, such as highways, within a hazard area. The exposure analysis for linear assets was measured in miles. Asset values could not be obtained, therefore, estimated replacement values are not provided.

For each physical asset located within a hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced). The aggregate exposure, based on average value, for each residential building was calculated, but no values were available for critical facilities and infrastructure. A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

5.4 DATA LIMITATIONS

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment as well as the use of approximations and simplifications that are necessary for a comprehensive analysis.

It is also important to note that the quantitative vulnerability assessment results are limited to the exposure of people, buildings, and assets to the identified hazards. It was beyond the scope of the 2012 HMP update to develop a more detailed or comprehensive assessment of risk (including annualized losses, people injured or killed, shelter requirements, loss of facility/system function, and economic losses). Such impacts may be addressed with future updates of the HMP.

5.5 EXPOSURE ANALYSIS

The recommendations for identifying structures and estimating potential losses, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 RECOMMENDATIONS: RISK ASSESSMENT

Assessing Vulnerability: Identifying Structures

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area.

Element

- Does the new or updated plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?
- Does the new or updated plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

Source: FEMA 2008.

Vulnerable population and existing structures, including residential buildings and critical facilities and infrastructure, at risk to each identified hazard are located in each local-participant-specific appendix (Appendix G through Appendix M). For Clark County and the participating cities the exposure analysis was prepared for population, residential buildings, and critical facilities and infrastructure. In addition, for Clark County and the City of Las Vegas RL properties were also included in each local participant's analysis.

DMA 2000 RECOMMENDATIONS: RISK ASSESSMENT

Assessing Vulnerability: Estimating Potential Losses

Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Element

- Does the new or updated plan estimate potential dollar losses to vulnerable structures?
- Does the new or updated plan reflect changes in development in loss estimates?
- Does the new or updated plan describe the methodology used to prepare the estimate?

Source: FEMA 2008.

The estimated potential dollar losses for residential buildings at risk to each identified hazard are shown in each local-participant-specific appendix (Appendix G through Appendix M). As noted previously, estimated values were not available for critical facilities and infrastructure. The methodology used to prepare the estimate is described in Section 5.3.

5.6 RL PROPERTIES

The requirements for addressing RL properties, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: RISK ASSESSMENT

Assessing Vulnerability: Addressing Repetitive Loss Properties

Requirement §201.6(c)(2)(ii): [The risk assessment] must address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.

Element

- Does the new or updated plan describe vulnerability in terms of the types and numbers of Repetitive Loss properties located in the identified hazard areas?

Source: FEMA 2008.

There are a total of 18 RL properties located in Clark County; 12 are located in the unincorporated area of Clark County and six in the City of Las Vegas. For the unincorporated area of Clark County there are three unmitigated RL properties, nine mitigated RL properties that are protected by a stormwater control or management project and no SRL properties. Additionally, there were two mitigated RL properties that have been demolished with funds from a local program. The City of Las Vegas has two unmitigated RL properties, three mitigated RL properties that are protected by a stormwater control or management project and one unmitigated non-residential SRL property. In addition, there was one mitigated RL property that has been demolished by the owner.

Information about each RL property, including occupancy type, flood zone, and number of losses, is located in the local-participant-specific appendix for Clark County (Appendix G) and the City of Las Vegas (Appendix I). A RL property map is provided in Appendix C, Figure C-10. This information was obtained using FEMA's SQANet, dated June 17, 2011.

5.7 SUMMARY OF IMPACTS

The requirements for an overview of the vulnerability analysis, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: RISK ASSESSMENT

Assessing Vulnerability: Overview

Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Element

- Does the new or updated plan include an overall summary description of the jurisdiction's vulnerability to each hazard?
- Does the new or updated plan address the impact of each hazard on the jurisdiction?

Source: FEMA 2008.

A summary of impacts (i.e., percentage at risk) for the population, residential buildings, and critical facilities and infrastructure for Earthquake, Flood and Flash Flooding, and Wildfire for

Clark County is provided below. Summaries for each specific jurisdiction, Clark County unincorporated and the incorporated cities, are provided in the accompanying jurisdiction-specific appendices (Appendices G through K). For the participating special districts, the CCSD and CCWRD, the analysis only includes the critical facilities that the districts own and maintain (Appendices L and M).

Overall, based on this 2012 HMP's vulnerability analysis, a summary of impacts includes the following:

- All of Clark County is vulnerable to shaking from an earthquake; 98.8 percent of the County is located within the strong to very strong shaking range for an earthquake and only 1.2 percent of the County, an area north east of North Las Vegas, is located in the severe shaking range. There however, are no residents or buildings in the area of severe shaking. Therefore should an earthquake occur, all city residents and County residents will feel the earthquake, objects will fall off of walls and shelves, windows, dishes and glassware will break and some furniture will break. Building damage will occur to weak materials, but the damage will be nonstructural.

University of Nevada Reno (UNR) has a contract with Advanced Data Solutions to inventory the un-reinforced masonry buildings within the State of Nevada. During the writing of this update the data was made available. The report showed that 2397 Commercial Buildings (15,089 acres) and 11,964 residential buildings (10,307 acres) have been constructed of un-reinforced masonry. These buildings will have significantly more damage during an earthquake than other buildings. Unreinforced masonry buildings accounted for 10,307 acres or \$52.08B (using \$116/sqft) in residential buildings and 15,089 acres or \$115B (using \$175/sqft) in commercial buildings. The data from the report can be used by the County to identify and target structures for reinforcement. UNR will be using the data to up-grade information for the HAZUS runs and it is recommended that the County identify these structures on a map for the next HM Plan update.

- Flooding effects 5.2 percent of Clark County and is concentrated along the Virgin, Muddy and Colorado Rivers, in the eastern and southern portions of the County. 15.2 percent of the total County population and 12.4 percent of the County's residential buildings is vulnerable to flooding.
- Wildfire threatens 17.6 percent of Clark County. The largest areas susceptible to wildfire are the areas just west and north of the Las Vegas Valley region. Additionally, communities with high and extreme fire hazard ratings are Cold Creek, Kyle Canyon, Lee Canyon, Mountain Springs, Nelson, Torino Ranch and Trout Canyon. Fortunately, the susceptible areas are not home to many residents and less than one percent of the County's population and residential buildings are in a wildfire hazard zone.

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6.1 OVERVIEW

A capability assessment is not required by the DMA 2000 for local jurisdictions and special districts. However, it is recommended by FEMA. A capability assessment identifies and evaluates the human and technical, financial, and legal and regulatory resources available for hazard mitigation, and describes the current, ongoing, and recently completed mitigation projects.

6.2 CAPABILITY ASSESSMENT RECOMMENDATIONS BY FEMA

The recommendations for developing a local capability assessment, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 RECOMMENDATIONS: LOCAL CAPABILITY ASSESSMENT

Local Capability Assessment

Requirement 44 CFR §201.4(c)(3)(ii): – Of the Federal Register Interim Final Rule 44 CFR Parts 201 and 206 states, “[The State mitigation strategy shall include] a general description and analysis of the effectiveness of local mitigation policies, programs, and capabilities.

Element

- Does the new or updated plan provide a description of the human and technical resources available within this jurisdiction to engage in a mitigation planning process and to develop a local hazard mitigation plan?
- Does the new or updated plan list local mitigation financial resources and funding sources (such as taxes, fees, assessments or fines) which promote mitigation within the reporting jurisdiction?
- Does the new or updated plan list local ordinances which affect or promote disaster mitigation, preparedness, response, or recovery within the reporting jurisdiction?
- Does the new or updated plan describe the details of in-progress, ongoing, or completed mitigation projects and programs within the reporting jurisdiction?

Source: FEMA 2008.

The 2007 HMP did not include a capability assessment. For the 2012 HMP a capability assessment has been added. The human and technical, financial, and legal and regulatory resources are discussed in each local-participant-specific appendix (Appendix G through Appendix M). In addition, the 2012 HMP lists the current, ongoing, and completed mitigation projects and programs. This information can also be found in each local-participant-specific appendix (Appendix G through Appendix M).

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7.1 OVERVIEW

A mitigation strategy includes the identification of mitigation goals and actions that will reduce the risks of each hazard and vulnerability to the local population and built environment for each local participant.

Per the local mitigation planning requirements, this mitigation strategy consists of the following four steps:

- Local hazard mitigation goals
- Identification and analysis of mitigation actions
- Implementation of mitigation actions
- Identification and analysis of mitigation actions for NFIP compliance

Revisions made from the mitigation strategy in the 2007 HMP to the mitigation strategy in the 2012 HMP are discussed below.

7.2 MITIGATION GOALS

The requirements for developing local hazard mitigation goals, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: MITIGATION STRATEGY

Local Hazard Mitigation Goals

Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Element

- Does the new or updated plan include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards?

Source: FEMA 2008.

Mitigation goals are defined as general guidelines that explain what a community wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing community-wide vision. To develop the goals for the 2012 HMP the Planning Committee first reviewed the goals established for the 2007 HMP. The Planning Committee agreed that the previous goals are still valuable and applicable and should therefore be included in the 2012 HMP.

In addition to the previous eight goals, four new goals were added to address the addition of hazards to the 2012 HMP (the 2007 goal relating to “infestations and disease” was divided into two separate goals for the 2012 HMP, “epidemic” and “infestation”). Table 7-1 shows the mitigation goals that were developed to reduce or avoid long-term vulnerability to each hazard included in the vulnerability analysis of the 2012 HMP, including: dam failure, drought, earthquake, epidemic, flooding, infestation, subsidence, terrorism, utility failure and wildfire.

Table 7-1. Mitigation Goals

Goal Number	Goal Description
1	Promote disaster-resistant future development.*
2	Promote public understanding, support and demand for hazard mitigation. *
3	Build and support local capacity to warn the public about emergency situations and assist in their response. *
4	Reduce the possibility of damages and losses due to dam failure.
5	Reduce the possibility of damages and losses due to drought. *
6	Reduce the possibility of damages and losses due to earthquake. *
7	Reduce the possibility of damages and losses due to epidemic. *
8	Reduce the possibility of damages and losses due to flooding. *
9	Reduce the possibility of damages and losses due to infestation. *
10	Reduce the possibility of damages and losses due to subsidence.
11	Reduce the possibility of damages and losses due to terrorism.
12	Reduce the possibility of damages and losses due to utility failure.
13	Reduce the possibility of damages and losses due to wildfire.*

*Also included in the 2007 HMP

7.3 IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIONS

The requirements for the identification and analysis of mitigation actions, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: MITIGATION STRATEGY	
Identification and Analysis of Mitigation Actions	
Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.	
Element	
- Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard? - Do the identified actions and projects address reducing the effects of hazards on new buildings and infrastructure? - Do the identified actions and projects address reducing the effects of hazards on existing buildings and infrastructure? - Does the mitigation strategy identify actions related to the participation in and continued compliance with the NFIP?	
Source: FEMA 2008.	

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Mitigation actions are usually grouped into six broad categories: prevention, property

protection, public education and awareness, natural resource protection, emergency services, and structural projects.

In the 2007 HMP, the Planning Committee developed a list of “Mitigation Goals, Objectives, and Potential Actions”. For each goal, one or more objectives were identified that provide strategies to attain the goal. Where appropriate, each jurisdiction then identified a range of specific actions to achieve the object and goal. Each jurisdiction then identified the top mitigation actions (approximately 10) that they felt could be met during the planning period and identified how the actions would be implemented and administered (through and “Implementation Strategy”).

To begin the 2012 HMP Mitigation Strategy development process, the Planning Committee reviewed the 2007 Potential Actions to identify which mitigation actions were completed, which were not suitable to be included in the 2012 HMP and which were not completed, but should be included in the 2012 list of potential mitigation actions. This process revealed that a number of the potential actions identified in the 2007 HMP were not suitable to be included in the 2012 HMP for the following reasons:

- Mitigation actions were completed and therefore no longer apply
- Mitigation actions were ineligible for FEMA funding (some mitigation actions ineligible for FEMA funding remain in the 2012 HMP, to provide potential mitigation actions for every hazard identified)
- Mitigation actions were emergency response, preparedness, and/or recovery focused rather than mitigation focused
- Mitigation actions were not well defined
- Mitigation actions were not stand-alone projects
- Mitigation actions were continued-compliance and/or maintenance focused

The review of the 2007 Potential Actions also revealed that of the 45 potential actions established for the 2007 HMP only 28 mitigation actions were chosen by jurisdictions for inclusion in their specific Implementation Strategy. Of those 28 mitigation actions, 21 were either completed or are considered ongoing projects. Table 7-2 provides details about the status of the 2007 Mitigation Actions.

Some of the key mitigation actions that have been completed since the 2007 HMP include fuel mitigation projects, flood reduction projects and CCSD will be applying for Pre-Disaster Mitigation grants for seismic retrofit and value replacement at schools. Additionally, International Building Code 2006 has been adopted, reducing the earthquake and flood risks for new development.

For the 2012 HMP, the consultant, with input from the Planning Committee, developed a list of 26 potential mitigation actions (see Table 7-3). This included new mitigation actions (based on the 2012 HMP’s hazard analysis, vulnerability analysis, and capability assessment) and the remaining, applicable 2007 mitigation actions (five actions). Criteria considered for the development of the new mitigation actions included the following:

- Mitigation action should be mitigation-focused (as opposed to response, recovery, and preparedness-driven)

- Mitigation action should meet the 2011 HMA Unified Guidance project criteria eligibility
- Mitigation action should address the DMA 2000 requirements for the identification and analysis of mitigation actions
- Mitigation actions should address the 2012 HMP vulnerability analysis results

In addition to the 26 potential mitigation actions developed for the local participants, the consultant asked each local participant add potential mitigations actions specific to their jurisdiction as they saw fit.

As shown in Table 7-3, for each potential mitigation action, the following information is listed: mitigation action description; mitigation action category; hazard(s) addressed; and type of development affected by mitigation action. As noted above, the first 26 potential mitigation actions were developed by the consultant and the Planning Committee. Additional mitigation actions added by a local participant are located in their jurisdiction-participant-specific appendix (Appendix G through Appendix M).

Table 7-2. 2007 HMP Mitigation Actions and Status

Action No. (2007 HMP)	Description	Hazard Addressed	Applicable Jurisdictions	Status
1.A.1	Review the existing County/City's comprehensive and master plans and zoning ordinances to determine how these documents help limit development in hazard areas. Recommend modifications with additional guidelines, regulations, and land use techniques as necessary within the limits of state statutes, while also respecting private property rights.	All - Disaster Resistant Future Development	Clark County and the cities of Boulder City*, Henderson, Las Vegas and Mesquite	Ongoing
1.A.2	Establish periodic monitoring and review of the County/City's comprehensive and master plans as well as zoning ordinances to determine effectiveness at preventing and mitigating hazards. Based on the results, recommend amendments as necessary.	All - Disaster Resistant Future Development	The city of Boulder City*	Unknown*
1.B.1	Review existing building codes to determine if they adequately protect new development in hazard areas. Where feasible and necessary, recommend modification of codes to help mitigate hazards imposed on such development within the limits of state statutes, while also respecting private property rights.	All - Disaster Resistant Future Development	The city of Boulder City*	Unknown*
1.C.2	Each jurisdiction's Office of Emergency Management will provide training to applicable County/City staff of the adopted hazard mitigation plan and its requirements.	All - Disaster Resistant Future Development	The city of Boulder City*	Unknown*
1.C.3	Continue coordination between each jurisdiction's Office of Emergency Management and their county/city departments to identify and mitigate hazards associated with new development.	All - Public Awareness	Clark County and the cities of Boulder City* and Mesquite	Ongoing
2.A.2	Encourage and seek regional mitigation planning and projects.	All - Public Awareness	Clark County and the cities of Henderson, Las Vegas and Mesquite	Ongoing
2.A.3	Educate county/city departments how to explore variety of funding sources.	All - Public Awareness	The city of Boulder City*	Unknown*
3.A.1	In coordination with Clark County Office of Emergency Management, test the ability of each jurisdiction's Office of Emergency Management to activate the Emergency Alert System (EAS) and emergency notification systems.	All - Public Warning	Clark County and the cities of Boulder City*, Henderson, Las Vegas, North Las Vegas and Mesquite	Ongoing
3.B.1	Develop a Mass Evacuation strategy for the County and each City to include the Regional Transportation Commission (RTC), Clark County School District as well as Nevada Department of Transportation (NDOT).	All - Public Warning	Clark County and the cities of Henderson, Las Vegas, North Las Vegas and Mesquite	Completed
3.B.2	Develop a Shelter-in-Place educational program for the County and each City.	All - Public Warning	The cities of Las Vegas and North Las Vegas	Completed

Table 7-2. 2007 HMP Mitigation Actions and Status

Action No. (2007 HMP)	Description	Hazard Addressed	Applicable Jurisdictions	Status
3.C.3	Create or supplement public information sheets on natural hazards to include suggested mitigation actions for each jurisdiction's Office of Emergency Management.	All - Public Warning	The city of North Las Vegas	Completed
3.C.4	Add mitigation actions to each jurisdiction's website.	All - Public Warning	The city of North Las Vegas	Completed
4.A.2	Support increased surveillance and development of more stringent requirements at high-risk facilities, (i.e., day-care centers, hospitals, nursing homes, schools, as well as restaurants, hotels/resorts and casinos located along "the strip".)	Infestation and Disease	Clark County and the city of Las Vegas	Ongoing
4.A.3	Participate and seek joint ventures and activities with multiple county/city departments and neighboring jurisdictions to develop exercises, training components and response procedures related to a bio-agent dispersal, communicable disease outbreaks and vector infestations, such as West Nile Virus and the mosquitoes that carry it, annual flu season, etc.	Infestation and Disease	Clark County and the cities of North Las Vegas and Las Vegas	Ongoing
5.A.1	Support all efforts by the Southern Nevada Water Authority to implement the drought response measures as defined in the SNWA Drought Plan 2005.	Drought	The cities of Henderson and Las Vegas	Completed
5.A.3	Where appropriate, mandate the use of xeriscaping or desert landscaping at County/City facilities and projects.	Drought	Clark County and the city of Mesquite	Completed
6.A.1	In coordination with appropriate agencies, local, state, and federal, obtain site-specific studies to ascertain whether the zoning has been brought in line with the hazard, and how the building stock, old and new, might fare if a credible earthquake were to occur with specific attention to lifelines: transportation corridors, buildings, and pipelines.	Earthquake	The city of Las Vegas	Not Completed - No Funding Available
6.C.1	Teach the general public how to prepare their households, in the event of an earthquake, by presenting preparedness information and attractive hands-on displays.	Earthquake	The city of North Las Vegas	Completed
6.C.2	Interface with public agencies within the state to optimize public awareness of earthquake hazard and risk and mitigation activities.	Earthquake	The city of North Las Vegas	Completed
6.C.3	Promote, coordinate, schedule, implement and conduct outreach activities to increase knowledge about earthquakes and enhance earthquake preparedness of the general public in southern Nevada.	Earthquake	The city of North Las Vegas	Completed
6.D.1	Continue to enforce the Uniform Building Code (UBC) provisions pertaining to grading and construction relative to seismic hazards.	Earthquake	Clark County and the city of Boulder City*	Ongoing

Table 7-2. 2007 HMP Mitigation Actions and Status

Action No. (2007 HMP)	Description	Hazard Addressed	Applicable Jurisdictions	Status
6.D.2	Continue to enforce UBC requirements for addressing liquefaction potential in the design of structures.	Earthquake	The city of Boulder City*	Unknown*
6.D.4	Encourage utility companies to evaluate the seismic risk to their high-pressure transmission pipelines and implement mitigation measures, such as automatic shut-off valves.	Earthquake	The city of Boulder City*	Unknown*
7.A.2	Require engineered floodplain and hydrologic analysis to be prepared for new development projects within or directly adjacent to 100-year floodplains.	Flooding	The cities of Henderson and Mesquite	Completed
7.A.3	Limit uses in floodways to those tolerant of occasional flooding, including but not limited to agriculture, outdoor recreation, and natural resource areas.	Flooding	Clark County and the city of Las Vegas	Completed
7.B.1	Clark County Public Works and the Moapa Valley Water District will work in concert to improve flood control measures within and adjacent to the unincorporated community of Moapa Valley, NV.	Flooding	Clark County	Completed
7.B.2	The City of Henderson Department of Utility Services will work to implement flood control measures to eliminate or limit the risk of flood damage to potentially vulnerable sewer and reclaimed water lines within its jurisdiction.	Flooding	The city of Henderson	Completed
8.A.2	Establish a standard safety zone of 30 feet around county/city-owned structures that are vulnerable to the effects of wildfire. Encourage private and commercial property owners to adopt the same.	Wildfire	Clark County and the cities of Henderson and Mesquite	Completed

*Boulder City participated in the 2007 HMP effort but was unable to participate in the 2012 HMP Update

Table 7-3. Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
1	Create a GIS-based pre-application review for new construction and major remodels of residential and/or non-residential structures in hazard areas, such high and/or very high wildfire areas.	Property Protection	All	New and Existing – Residential and non-residential buildings in hazard areas.
2	Integrate the Clark County HMP, in particular the hazard analysis and mitigation strategy sections, into local planning documents, including general plans, emergency operations plans, and capital improvement plans.	Property Protection	All	Not Applicable
3	Add mitigation actions to each jurisdiction's website*	Public Awareness	All	Not Applicable
4	Develop a public outreach program that informs property owners located in the dam inundation areas about voluntary flood insurance.	Public Awareness	Dam Failure	Existing – Residential buildings located within dam inundation areas.
5	Develop a drought contingency plan to provide an effective and systematic means of assessing drought conditions, develop mitigation actions and programs to reduce risks in advance of drought, and develop response options that minimize hardships during drought.	Prevention, Natural Resource Protection	Drought	New/Existing
6	Seismically retrofit or replace critical facilities that are necessary during and/or immediately after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Public works and/or emergency response facilities that are structurally deficient or located within a high ground shaking area.
7	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Nevada DOT, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Ramps and bridges identified by Nevada DOT as structurally deficient or located within an extreme ground shaking area.
8	Teach the general public how to prepare their households, in the event of an earthquake, by presenting preparedness information and attractive hands-on displays.	Public Awareness	Earthquake	Not Applicable
9	Implement better record keeping measures, as well as on the part of food processors and handlers.*	Prevention	Epidemic (Infectious Disease)	Not Applicable

Table 7-3. Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
10	To protect vulnerable populations from disease by conducting increased surveillance and development of more stringent requirements at high-risk facilities, (i.e., day-care centers, hospitals, nursing homes, schools, as well as restaurants, hotels/resorts and casinos).*	Prevention	Epidemic (Infectious Disease)	Not Applicable
11	Acquire, relocate, elevate, and/or flood proof critical facilities that are located within the 100-year floodplain.	Property Protection	Flood	Existing - Critical facilities located within the 100-year floodplain.
12	Reinforce County and local ramps, bridges, and roads from flooding through protection activities, including elevating the road and installing culverts beneath the road or building a higher bridge across the area that experiences regular flooding.	Property Protection, Structural Project	Flood	Existing – County and local ramps, bridges, and roads identified in the 100-year floodplain.
13	Work with FEMA Region IX to address any floodplain management issues that may have arisen/arise from the countywide Digital Flood Insurance Rate Map (DFIRM), Community Assessment Visits, and/or the Division of Water Resources.	All	Flood	New/Existing - Properties within the 100-year or 500-year floodplain.
14	Acquire, relocate, or elevate residential structures, in particular those that have been identified as Repetitive Loss (RL) properties that are located within the 100-year floodplain.	Property Protection	Flood	Existing – Residential structures, including RL properties, located within the 100-year floodplain.
15	Ensure that existing monitoring capabilities at the state and County level are integrated to provide an early warning of increased or new infestations.*	Natural Resource Protection	Infestation	Not Applicable
16	Implement an infestation public awareness and educational campaign.	Public Awareness	Infestation	Not Applicable
17	Reduce the net annual groundwater withdrawal to the level of net annual recharge. This can be accomplished either through a reduction of dependence upon groundwater (increase dependence upon surface water) or through an increase in the artificial recharge.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.

Table 7-3. Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
18	In already-built areas lying within high hazard zones, restrictions on the use of applied water may be necessary to prevent the enlargement of fissures. This may require the implementation of strict water conservation policies, such as no watering or desert landscaping ordinances in areas prone to fissuring.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.
19	Implement recommended Buffer Zone Protection measures for pre-designated critical facilities and infrastructure.*	Prevention	Terrorism	Existing - Critical facilities
20	Contact key businesses (such as gun shops, recycling businesses, beauty and drug supplies) to provide them with a point of contact should they have information or concerns to report, and to background them on how to spot potentially suspicious people and activities.*	Public Awareness, Prevention	Terrorism	Not Applicable
21	In coordination with appropriate agencies, local, state, and federal, obtain site-specific studies to ascertain whether the zoning has been brought in line with the hazard, and how the building stock, old and new, might fare if a credible earthquake were to occur with specific attention to lifelines: transportation corridors, buildings, and pipelines.*	Prevention	Utility Failure, Earthquake	New and Existing – Residential and non-residential buildings in earthquake hazard areas.
22	Implement a fuel reduction program, such as the collection and disposal of dead fuel, within open spaces and around critical facilities and residential structures located within a high and very high wildfire zones.	Prevention, Property Protection, Natural Resource Protection	Wildfire	Existing – Critical facilities and residential buildings located within high and very high wildfire zones.
23	Create a vegetation management program that provides vegetation management services to elderly, disabled, or low-income property owners who lack the resources to remove flammable vegetation from around their homes.	Property Protection	Wildfire	Existing – Residential buildings in high or very high wildfire zones.
24	Implement a fuel modification program, which also includes residential maintenance requirements and enforcement, plan submittal and approval process, guidelines for planting, and a listing of undesirable plant species. Require builders and developers to submit their plans, complete with proposed fuel modification zones, to the local fire department for review and approval prior to beginning construction.	Prevention, Property Protection	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.

Table 7-3. Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
25	Establish a standard safety zone of 30 feet around county/city-owned structures that are vulnerable to the effects of wildfire. Encourage private and commercial property owners to adopt the same.	Prevention	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.
26	Develop a community wildfire mitigation plan that identifies and prioritizes areas for hazard fuel reduction treatments, and recommend the types of methods of treatments.	Prevention, Property Protection	Wildfires	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas in the Local Responsibility Areas
27	Develop a process to determine damages and losses avoided after an event.	Property Protection	All	New and Existing - Residential and non-residential buildings in hazard areas.
28	Other?			
29	Other?			
* Mitigation action does not meet the 2011 HMA Guidance requirements for FEMA mitigation funding				

DFIRM = Digital Flood Insurance Rate Map

DOT = Department of Transportation

FEMA = Federal Emergency Management Agency

GIS = Geographic Information System

HMP = Hazard Mitigation Plan

RL = repetitive loss

7.4 IMPLEMENTATION OF MITIGATION ACTIONS

The requirements for the evaluation and prioritization of mitigation actions, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: MITIGATION STRATEGY

Implementation of Mitigation Actions

Requirement: §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Element

- Does the new or updated mitigation strategy include how the actions are prioritized? (For example, is there a discussion of the process and criteria used?)
- Does the new or updated mitigation strategy address how the actions will be implemented and administered? (For example, does it identify the responsible department, existing and potential resources, and timeframe?)
- Does the new or updated prioritization process include an emphasis on the use of a cost-benefit review to maximize benefits?

Source: FEMA 2008.

After the list of potential mitigation actions had been developed, each participant evaluated and prioritized each of the potential mitigation actions using the Mitigation Strategy Workbook to determine which mitigation actions would be that participant's mitigation action plan. The criteria considered for this evaluation process were as follows:

- A. A local jurisdiction department or agency champion currently exists or can be identified
- B. The action can be implemented during the 5-year lifespan of the HMP
- C. The action may reduce expected future damages and losses (a positive cost-benefit analysis appears likely)
- D. The action mitigates a high-risk hazard
- E. The action mitigates multiple hazards

Each participant's mitigation action plan is included in that participant's appendix (Appendices G through M). Each mitigation action plan consists of a description of each mitigation action; prioritization criteria for selecting each action; the potential facility or facilities to be mitigated by the action (if known); the department or agency responsible for implementing the action; and the implementation time frame for the action.

7.5 IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIONS: NFIP COMPLIANCE

The requirements for the identification and analysis of mitigation actions that comply with the NFIP, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: MITIGATION STRATEGY

Identification and Analysis of Mitigation Actions: NFIP Compliance

Requirement §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

Element

- Does the new or updated plan describe the jurisdiction(s) participation in the NFIP?
- Does the mitigation strategy identify, analyze, and prioritize actions related to continued compliance with the NFIP.

Source: FEMA 2008.

As noted in Section 4.3.5, Clark County and all of its incorporated cities participate in the NFIP. The initial FIRM for Clark County was completed in 1989 and the most recent FIRM was completed in 2011. See section 4.3.5, Flooding and Flash Flooding, for NFIP information specific to the cities of Clark County. Section 4, Table 4-7, lists the following for each NFIP participant: date of the initially mapped FIRM; emergency/regular NFIP entrance date; and number of flood policies in force.

Additionally, Clark County began participating in the Community Rating System (CRS) in 1992 and is rated as a Class 6 community. CRS is a program that was developed to provide incentives for communities to go beyond the minimum floodplain management requirements and develop extra measures to provide protection from flooding. Entrance into CRS gains the CRS community residents a discount on their flood insurance premiums.

Mitigation action #13 in Table 7-3 addresses the continued compliance with the NFIP. This action is analyzed using the criteria in section 7-4 and prioritized, as necessary, in the participant-specific mitigation action plans (Appendices G through M).

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8.1 OVERVIEW

This section describes a formal plan maintenance process to ensure that the 2012 HMP remains an active and applicable document. It includes an explanation of how the Clark County OEM&HS and Planning Committee intend to organize their efforts to ensure that improvements and revisions to the 2012 HMP occur in a well-managed, efficient, and coordinated manner.

The following three process steps are addressed in detail below:

- Monitoring, evaluating, and updating the HMP
- Implementation through existing planning mechanisms
- Continued public involvement

8.2 MONITORING, EVALUATING, AND UPDATING THE PLAN

The requirements for monitoring, evaluating, and updating the 2012 HMP, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: PLAN MAINTENANCE PROCESS

Monitoring, Evaluating and Updating the Plan

Requirement 44 CFR §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Element

- Does the new or updated plan describe the method and schedule for monitoring the plan? (For example, does it identify the party responsible for monitoring and include a schedule for reports, site visits, phone calls, and meetings?)
- Does the new or updated plan describe the method and schedule for evaluating the plan? (For example, does it identify the party responsible for evaluating the plan and include the criteria used to evaluate the plan?)
- Does the new or updated plan describe the method and schedule for updating the plan within the five-year cycle?

Source: FEMA 2008.

The 2012 HMP was prepared as a collaborative effort among Clark County OEM&HS, the Planning Committee, and the consultants. To maintain momentum and build on previous hazard mitigation planning efforts and successes, Clark County OEM&HS will make use of the Planning Committee to monitor, evaluate, and update the 2012 HMP. The Clark County OEM&HS will continue to coordinate all local efforts to monitor, evaluate, and update this document.

Similar to the plan maintenance procedures outlined in the 2007 HMP, the Planning Committee will have the opportunity to evaluate the plan annually. However, unlike the 2007 HMP, in which the Planning Committee did not convene, input from the Planning Committee will be obtained via email annually. Then, if the Clark County OEM&HS determines necessary, based on the Planning Committee feedback, the group will meet in person to discuss any revisions that may be necessary to the plan. As such, the Clark County OEM&HS and the Planning Committee have developed the following revised approach to the 2012 HMP plan maintenance.

- Every 12 months from plan adoption, the Clark County OEM&HS will email each member of the Planning Committee an Annual Review Questionnaire to complete. As shown in

Appendix F, the Annual Review Questionnaire will include an evaluation of the following: planning process, hazard analysis, vulnerability analysis, capability assessment, and mitigation strategy.

- The Clark County OEM&HS will collect all completed questionnaires and determine if the 2012 HMP needs to be updated to address new or more threatening hazards, new technical reports or findings, and new or better-defined mitigation projects. The Clark County OEM&HS will summarize these findings and email them out to the Planning Committee. If the Clark County OEM&HS believes that the 2012 HMP needs to be updated based on the findings, then a request will be made to the Planning Committee members to attend a formal HMP update meeting.

Additionally, mitigation actions will be monitored and updated through the use of the Mitigation Project Progress Report. During each annual review, each department or agency currently administering a mitigation project will submit a progress report to the Clark County OEM&HS to review and evaluate. For projects that are being funded by a FEMA mitigation grant, FEMA quarterly reports may be used as the preferred reporting tool. As shown in Appendix F, the progress report will discuss the current status of the mitigation project, including any changes made to the project, identify implementation problems, and describe appropriate strategies to overcome them. After considering the findings of the submitted progress reports, the Clark County OEM&HS may request that the implementing department or agency meet to discuss project conditions.

In addition to the Annual Review Questionnaire, Mitigation Project Progress Report or FEMA quarterly report, and any annual meetings, the Planning Committee will meet to update the 2012 HMP every 5 years. To ensure that this update occurs, within the first six months of the fourth year following plan adoption, the Planning Committee will undertake the following activities:

- Research funding available to assist in HMP update (and apply for funds that may take up to one year to obtain)
- Thoroughly analyze and update the risk of natural and human-made hazards in Clark County
- Complete a new Annual Review Questionnaire and review previous questionnaires
- Provide a detailed review and revision of the mitigation strategy
- Prepare a new implementation strategy
- Prepare a new draft HMP and submit it to the local governing bodies for adoption
- Submit an updated HMP to Nevada DEM and FEMA for approval

8.3 IMPLEMENTATION THROUGH EXISTING PLANNING MECHANISMS

The requirements for implementation through existing planning mechanisms, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: PLAN MAINTENANCE PROCESS**Incorporation into Existing Planning Mechanisms**

Requirement 44 CFR §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Element

- Does the new or updated plan identify other local planning mechanisms available for incorporating the requirements of the mitigation plan?
- Does the new or updated plan include a process by which the local government will incorporate the requirements in other plans, when appropriate?

Source: FEMA 2008.

After the adoption of the 2012 HMP, the Clark County OEM&HS and the Planning Committee will ensure that elements of the 2012 HMP are incorporated into other existing planning mechanisms. The processes for incorporating the 2012 HMP into various planning documents will occur as (1) other plans are updated and (2) new plans are developed.

Therefore, the 2012 HMP participants will undertake the some or all of the following activities:

- Activity 1: The County and cities will use information from the hazard analysis and mitigation strategy sections in the 2012 HMP to update the safety element in their respective general plans.
- Activity 2: The County, cities, and special districts will use information from the hazard analysis and vulnerability analysis sections in the 2012 HMP to update their respective emergency operation or emergency response plans.
- Activity 3: The County, cities, and special districts will use information from the vulnerability analysis section in the 2012 HMP to develop emergency preparedness public information and related outreach efforts.
- Activity 4: The County, cities, and special districts will refer to the mitigation strategy section in the 2012 HMP when updating their respective capital improvement plans.

8.4 CONTINUED PUBLIC INVOLVEMENT

The requirements for continued public involvement, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: PLAN MAINTENANCE PROCESS**Continued Public Involvement**

Requirement §201.6(c)(4)(iii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Element

- Does the new or updated plan explain how continued public participation will be obtained? (For example, will there be public notices, an ongoing mitigation plan committee, or annual review meetings with stakeholders?)

Source: FEMA 2008.

The Clark County OEM&HS and Planning Committee are dedicated to involving the public directly in the continual reshaping and updating of the 2012 HMP. Similar to the 2007 HMP, a downloadable copy of the 2012 HMP will be available on the Clark County OEM&HS website. Also, any proposed changes or updates will be posted on this website. The Clark County OEM&HS website will also contain an e-mail address and phone number to which people can direct their comments or concerns.

Additionally, copies of the plan will continued to be kept with all of the local participants. The existence and location of these copies will also be posted on the county Website.

Finally, a press release will be issued prior to the commencement of the 2017 HMP update. This will provide the public an outlet for which they can express their concerns, opinions, or ideas about any updates/changes that are proposed to the plan. The Clark County OEM&HS will be responsible for using county resources to publicize the press releases and maintain public involvement through public access channels, Web pages, and newspapers as deemed appropriate.

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Appendix A
FEMA Local Plan Review Tool

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APPENDIX A: LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: Clark County, City of Henderson, City of Las Vegas, City of Mesquite, City of North Las Vegas, Clark County School District, Clark County Water Reclamation District	Title of Plan: Clark County Multi-Jurisdictional Hazard Mitigation Plan (Final Draft Plan, June 2012)	Date of Plan: COURTESY REVIEW DRAFT, June 2012
Local Point of Contact: Irene Navis	Address: Emergency Management 500 South Grand Central Parkway, 6th Floor Las Vegas, Nevada 89155-4502	
Title: Emergency Manager		
Agency: Clark County Office of Emergency Management		
Phone Number: 702-455-5710	E-Mail: iln@ClarkCountyNV.gov	

State Reviewer:	Title:	Date:
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FEMA Reviewer:	Title:	Date:
Date Received in FEMA Region (insert #)		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

SECTION 1: REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
ELEMENT A. PLANNING PROCESS				
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Section 3, Table 3-2			
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 3.3 and 3.4			
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 3.4			
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 3.5			
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 8.4			
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Section 8.2			
<u>ELEMENT A: REQUIRED REVISIONS</u>				

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT				
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Subheaders "nature," "location" and "extent" for each of the following: 4.3.1 - Dam Failure 4.3.2 - Drought 4.3.3 - Earthquake 4.3.4 - Epidemic/ Infectious Disease 4.3.5 - Flood and Flash Flooding 4.3.6 - Infestation 4.3.7 - Subsidence 4.3.8 - Terrorism 4.3.9 - Utility Failure 4.3.10 - Wildfire			
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Subheaders "history" and "probability of future events" for each of the following: 4.3.1 - Dam Failure 4.3.2 - Drought 4.3.3 - Earthquake 4.3.4 - Epidemic/ Infectious Disease 4.3.5 - Flood and Flash Flooding 4.3.6 - Infestation 4.3.7 - Subsidence 4.3.8 - Terrorism 4.3.9 - Utility Failure 4.3.10 - Wildfire			
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Section 5.7 (overview only); Appendix G through Appendix M, plan-participant-specific summary tables			
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Section 5.6 (overview only), local-participant-specific appendix for Clark County (Appendix G) and the City of Las Vegas (Appendix I).			
ELEMENT B: REQUIRED REVISIONS				

Local Mitigation Plan Review Tool
A-3

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
ELEMENT C. MITIGATION STRATEGY				
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Section 6.2, Appendix G – M (local-participant-specific tables).			
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Section 7.5, Section 4.3.5 (Table 4-7)			
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 7.2 (Table 7-1)			
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Section 7.3 (Table 7-2) Appendix G – M (local-participant-specific tables).			
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Section 7.4, Appendix G – M (local-participant-specific tables).			
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Section 8.3			
ELEMENT C: REQUIRED REVISIONS				
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)				
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 1.5.8			
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 7.3, Appendix G-M, tables titled "[participant name], Current, Ongoing, and Completed Hazard Mitigation Projects and Programs" (tables numbers vary by participant)			
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Sections 7.2, 7.3 and 7.4			
ELEMENT D: REQUIRED REVISIONS				

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
ELEMENT E. PLAN ADOPTION				
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	No – draft plan for courtesy review only			
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	No – draft plan for courtesy review only			
<u>ELEMENT E: REQUIRED REVISIONS</u>				
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)				
F1. Requirement §201.4(c)(3)(ii): [The local mitigation strategy shall include] a general description and analysis of the effectiveness of local mitigation policies, programs, and capabilities.	Appendix G – M (local-participant-specific tables: human technical, financial, and legal & regulatory resources).			
F2.				
<u>ELEMENT F: REQUIRED REVISIONS</u>				

**SECTION 2:
PLAN ASSESSMENT**

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

- 1) *A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
- 2) *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
- 3) *A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*
- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- *Key problems identified in, and linkages to, the vulnerability assessment;*
- *Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;*
- *Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;*
- *An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);*
- *Specific mitigation actions for each participating jurisdictions that reflects their unique risks and capabilities;*
- *Integration of mitigation actions with existing local authorities, policies, programs, and resources; and*
- *Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.*

Element D: Plan Update, Evaluation, and Implementation (Plan Updates Only)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- *Status of previously recommended mitigation actions;*
- *Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;*
- *Documentation of annual reviews and committee involvement;*
- *Identification of a lead person to take ownership of, and champion the Plan;*
- *Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;*
- *An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);*
- *Discussion of how changing conditions and opportunities could impact community resilience in the long term; and*
- *Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.*

B. Resources for Implementing Your Approved Plan

Ideas may be offered on moving the mitigation plan forward and continuing the relationship with key mitigation stakeholders such as the following:

- *What FEMA assistance (funding) programs are available (for example, Hazard Mitigation Assistance (HMA)) to the jurisdiction(s) to assist with implementing the mitigation actions?*
- *What other Federal programs (National Flood Insurance Program (NFIP), Community Rating System (CRS), Risk MAP, etc.) may provide assistance for mitigation activities?*
- *What publications, technical guidance or other resources are available to the jurisdiction(s) relevant to the identified mitigation actions?*
- *Are there upcoming trainings/workshops (Benefit-Cost Analysis (BCA), HMA, etc.) to assist the jurisdictions(s)?*
- *What mitigation actions can be funded by other Federal agencies (for example, U.S. Forest Service, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA) Smart Growth, Housing and Urban Development (HUD) Sustainable Communities, etc.) and/or state and local agencies?*

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SECTION 3:
MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were ‘Met’ or ‘Not Met,’ and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require- ments
1	Clark County	County	Irene Navis, Emergency Manager	Clark County Fire Dept. Administrative Offices (Station 18) 575 East Flamingo Road Las Vegas, Nevada 89119	iln@ClarkCountyNV.gov	702-455-5710						
2	City of Henderson	City	Ryan Turner, Emergency Management Coordinator	Henderson Fire 240 Water Street Henderson, NV 89015	Ryan.Turner@cityofhenderson.com	702-267-2212						
3	City of Las Vegas	City	Rick Diebold, Office of Emergency Management	Las Vegas Fire & Rescue 500 N. Casino Center Blvd. Las Vegas, NV 89101	rdiebold@lasvegasnevada.gov	702-229-0067						
4	City of Mesquite	City	John Higley, Fire Chief/ Emergency Manager	Mesquite Fire & Rescue 10 East Mesquite Blvd. Mesquite, NV 89027	jhigley@mesquitenv.gov	702-633-2145						
5	City of North Las Vegas	City	Daniel F. Lake, Sergeant Homeland Security /Emergency Management	Police Headquarters Office of Emergency Management 1301 E. Lake Mead Blvd. North Las Vegas, NV 89030	LakeD@cityofnorthlasvegas.com	702-633-2145						
6	Clark County School District	School District	Dimitri Theodorou, Manager: Information, Records and Emergency Management	Facilities Division Administrative and Emergency Management 4170 McLeod Drive Las Vegas, NV 89121	djtheodorou@interact.ccsd.net	702-799-8710 X 5241						
7	Clark County Water Reclamation District	County District	Elaine Houser, Safety & Security Administrator	Clark County Water Reclamation District 5857 E. Flamingo Road Las Vegas, Nevada 89122	ehouser@cleanwaterteam.com	702-668-8031						

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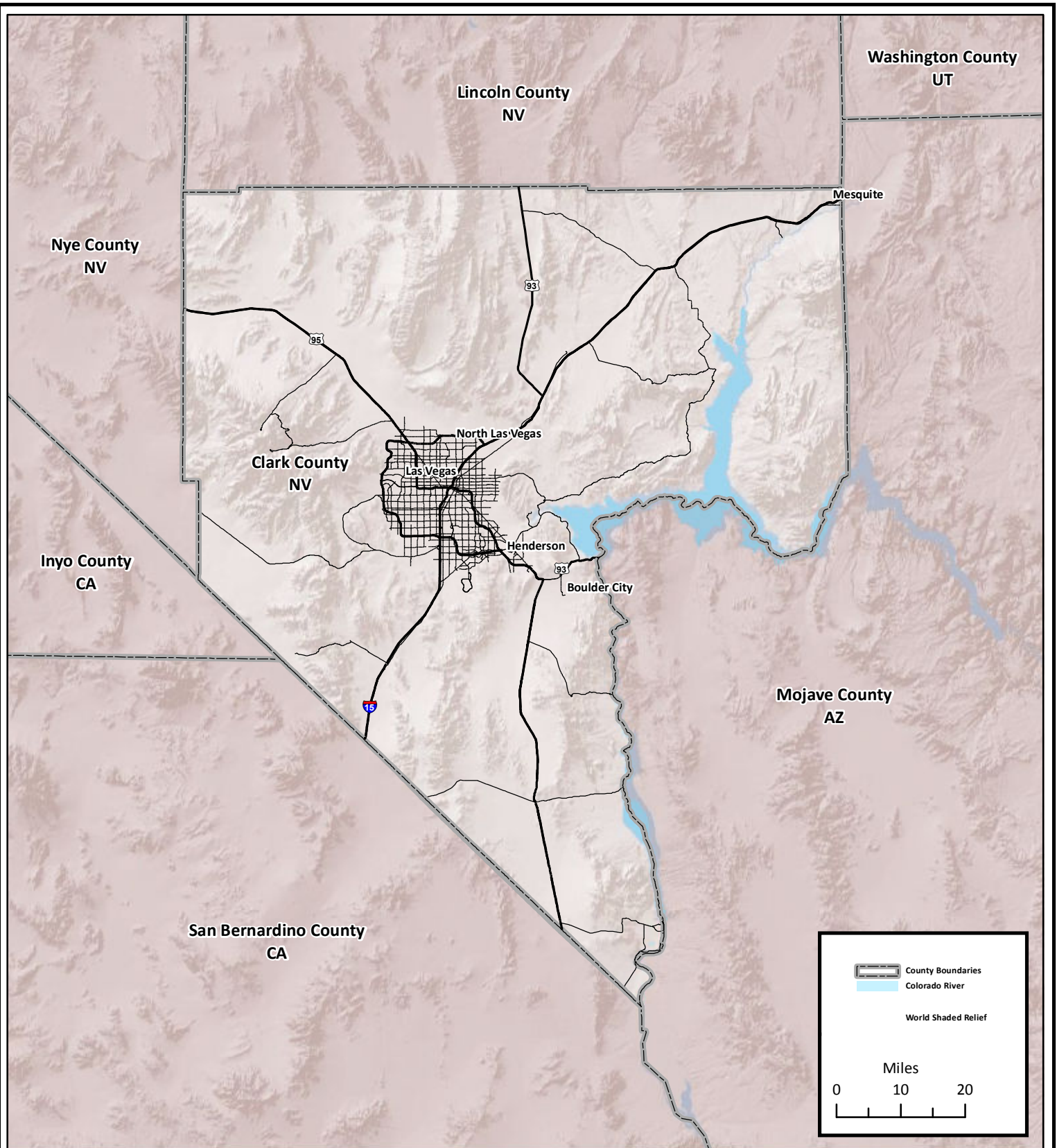
Appendix B
Adoption Resolutions
(to be inserted by jurisdictions into Final Plan)

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Appendix C

Hazard Figures

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GEOGRAPHIC
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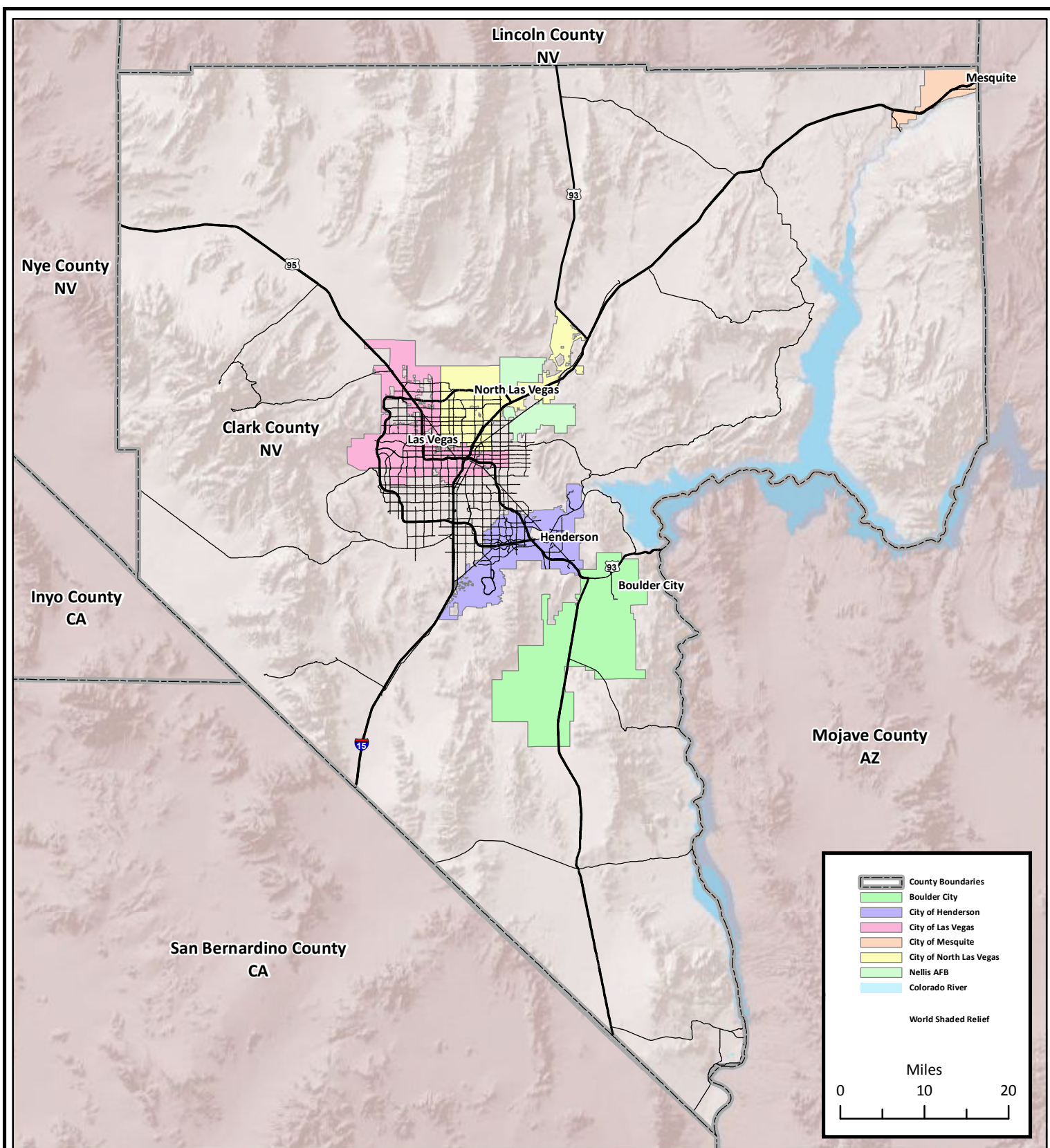
Clark County & Surrounding Counties



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Clark County, Nevada

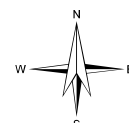
Date: 7/22/2011
Figure C-1



GEOGRAPHIC
INFORMATION
SYSTEMS



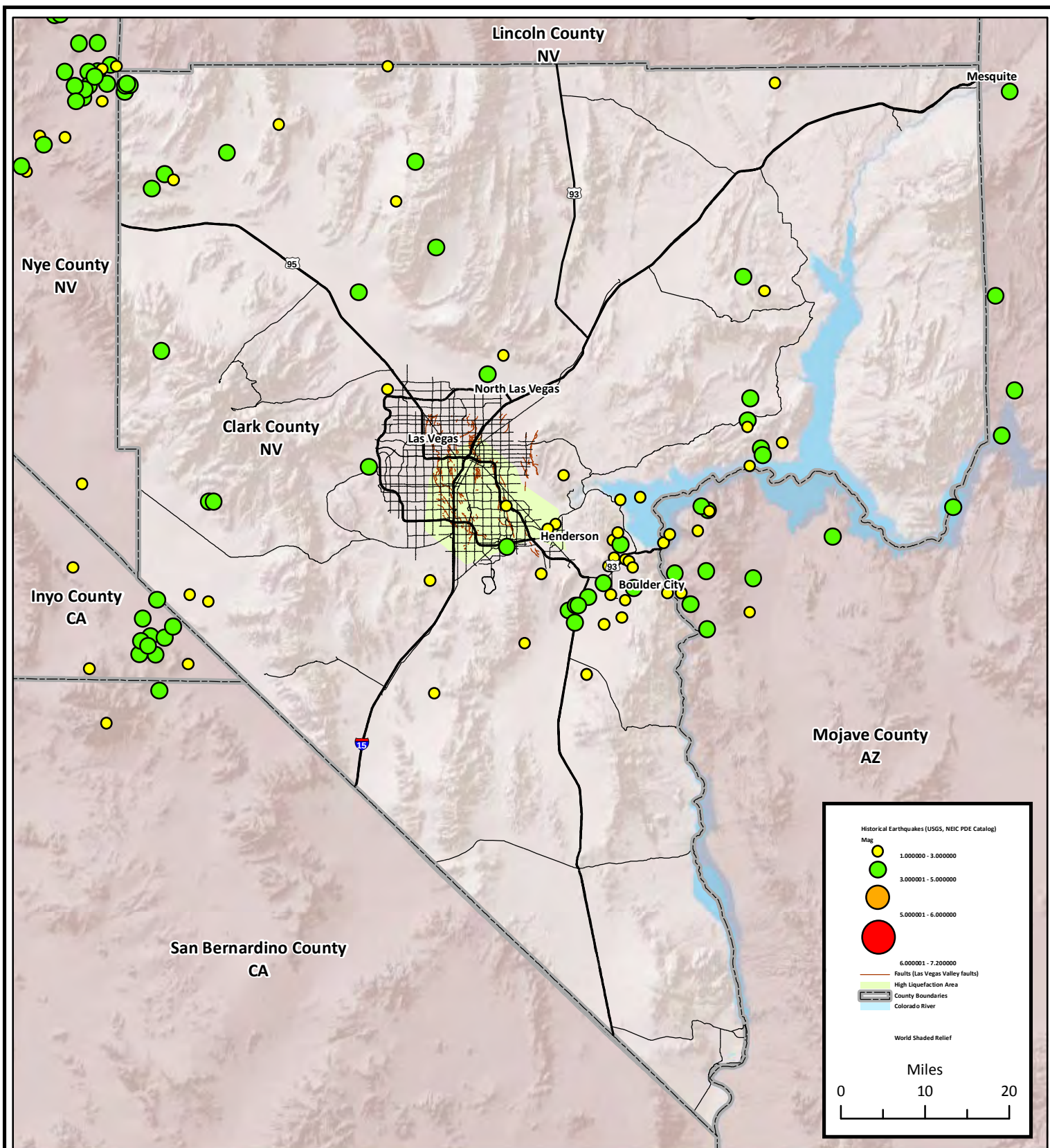
Clark County Jurisdiction Boundaries



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Clark County, Nevada

Date: 7/22/2011
Figure C-2



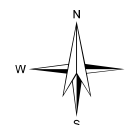
GEOGRAPHIC
INFORMATION
SYSTEMS



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Clark County Historical Earthquakes, Faults & High Liquefaction

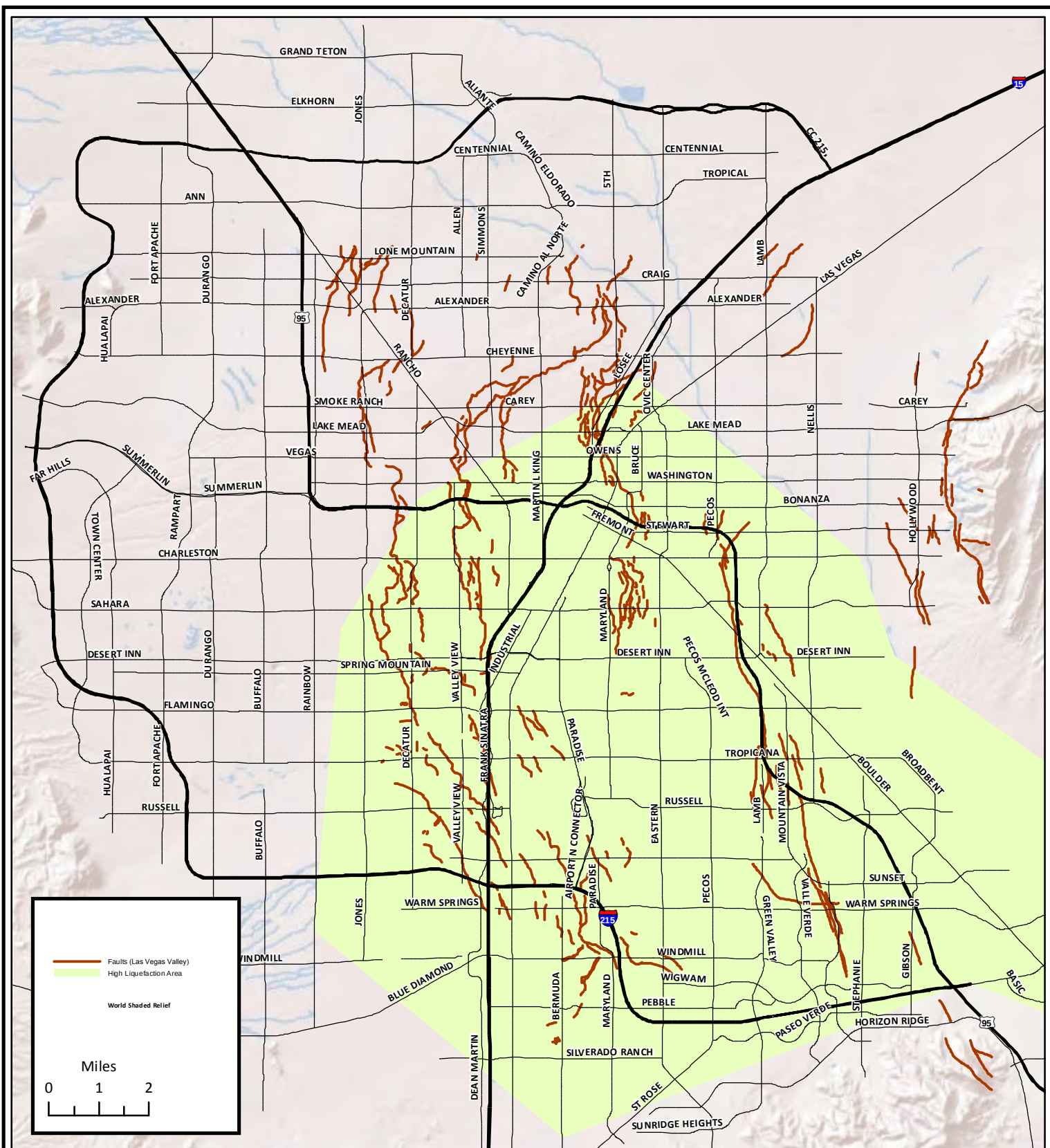
Clark County, Nevada



Date: 7/22/2011

Figure C-3

*See Figure 4-4 (Section 4 - Hazards Analysis) for Quaternary faults for all of Clark County



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Clark County Las Vegas Valley Faults & High Liquefaction Area

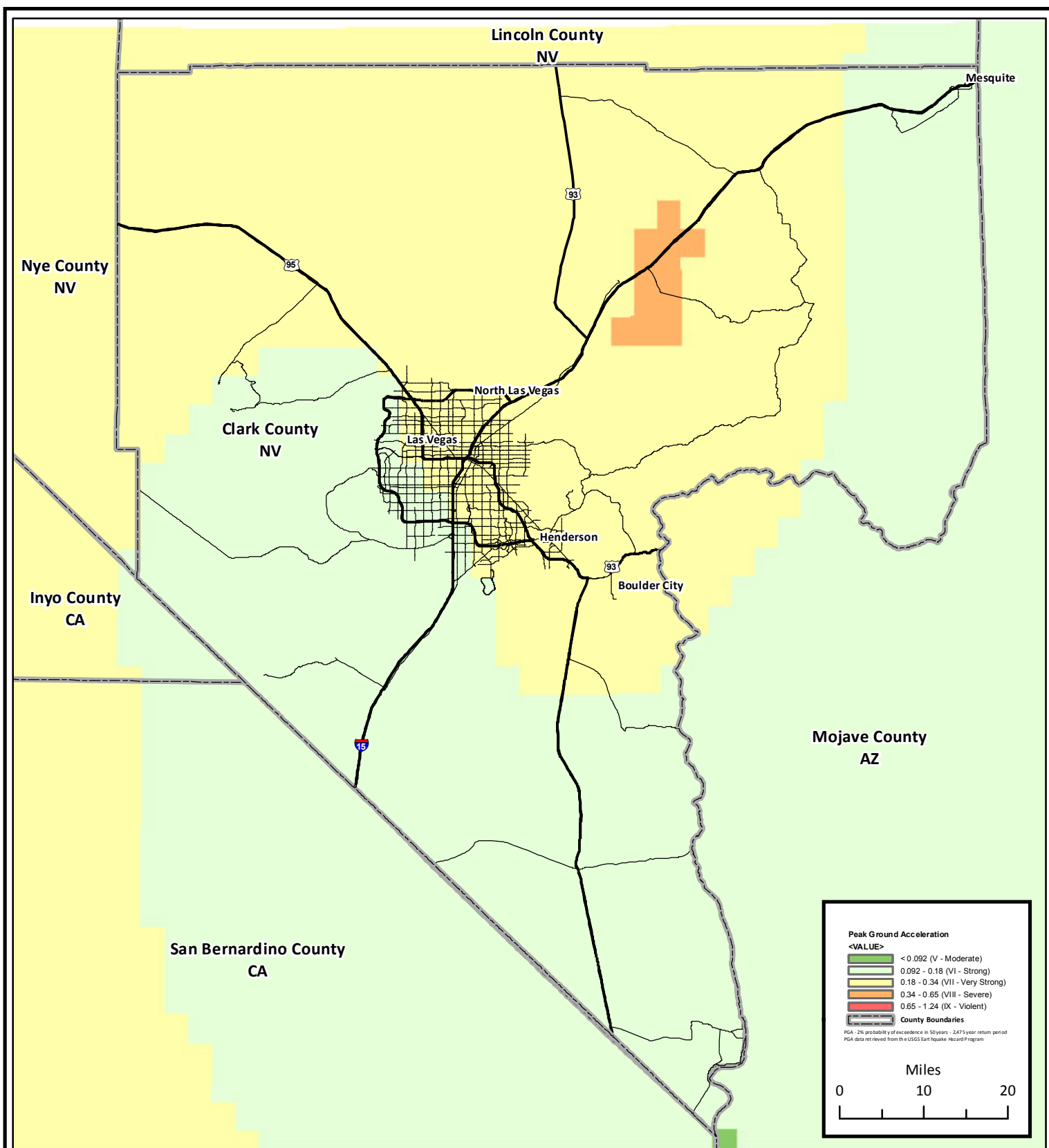
Clark County, Nevada



Date: 10/7/2011

Figure C-3a

*See Figure 4-4 (Section 4 - Hazards Analysis) for Quaternary faults for all of Clark County



GEOGRAPHIC
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Clark County Peak Ground Acceleration & Ground Shaking

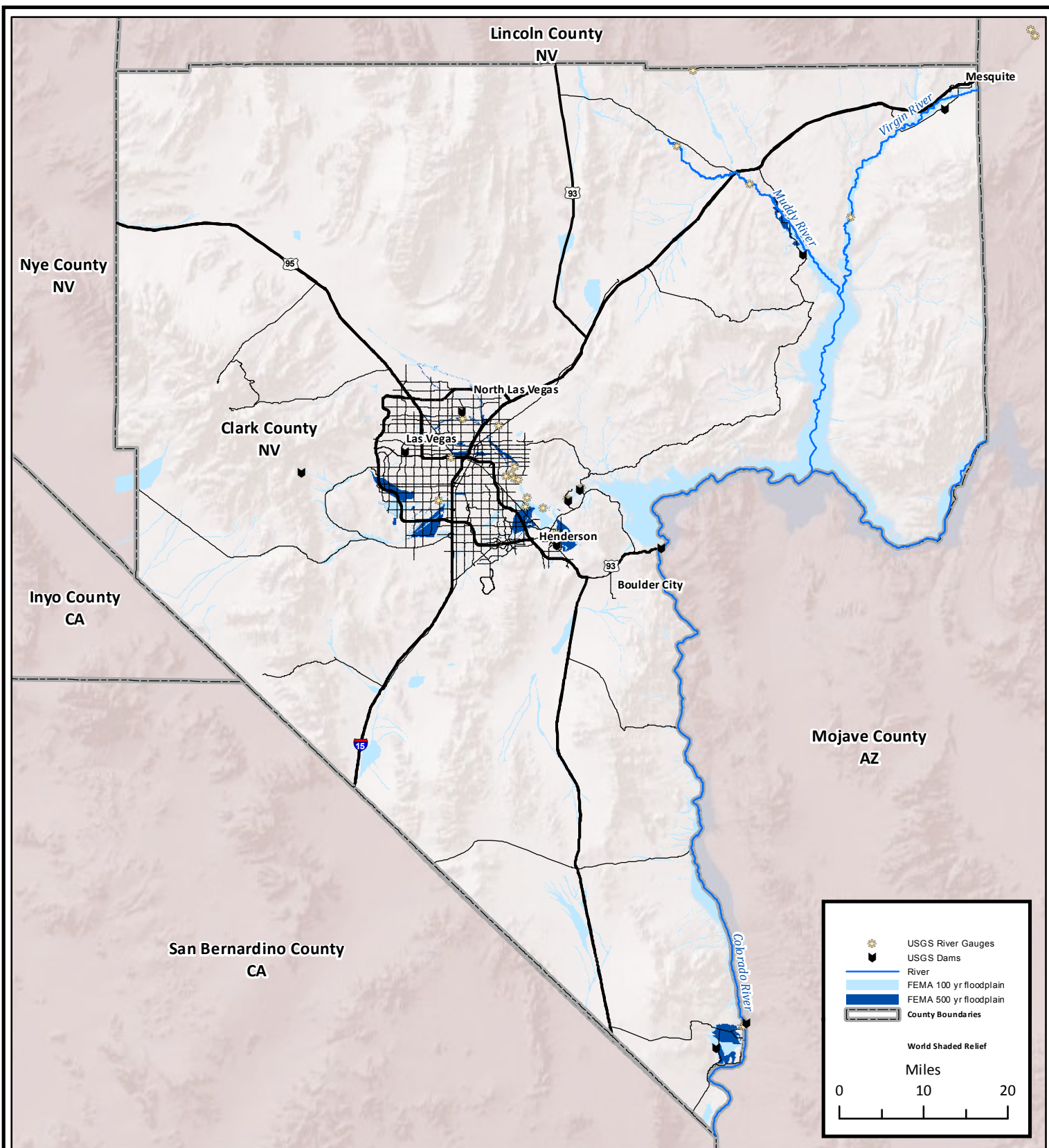
Clark County, Nevada



Date: 10/11/2011

Figure C-4

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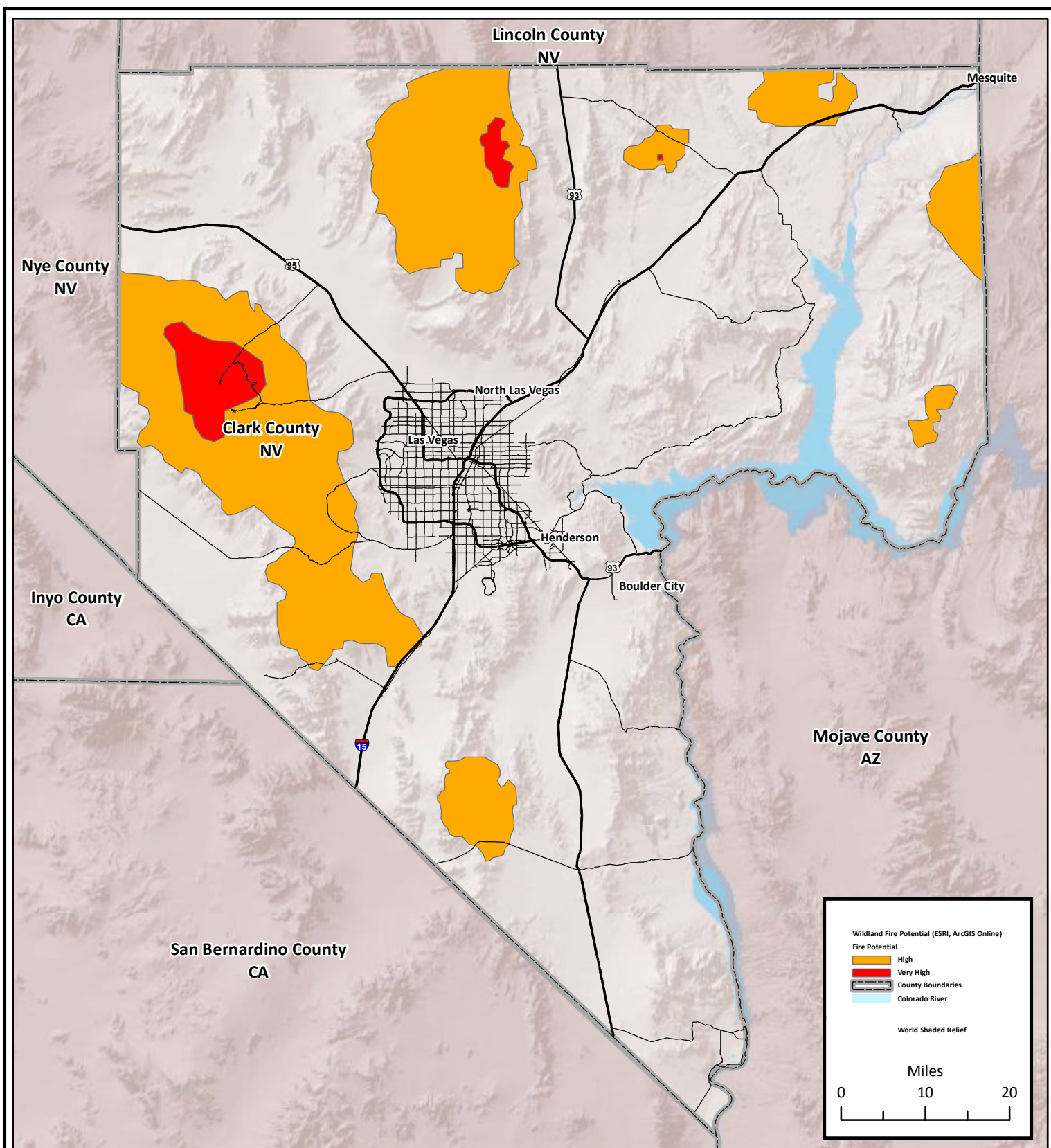
Clark County Flood Hazard Areas

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Clark County, Nevada



Date: 10/11/2011
Figure C-5



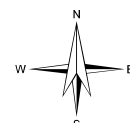
GEOGRAPHIC
INFORMATION
SYSTEMS



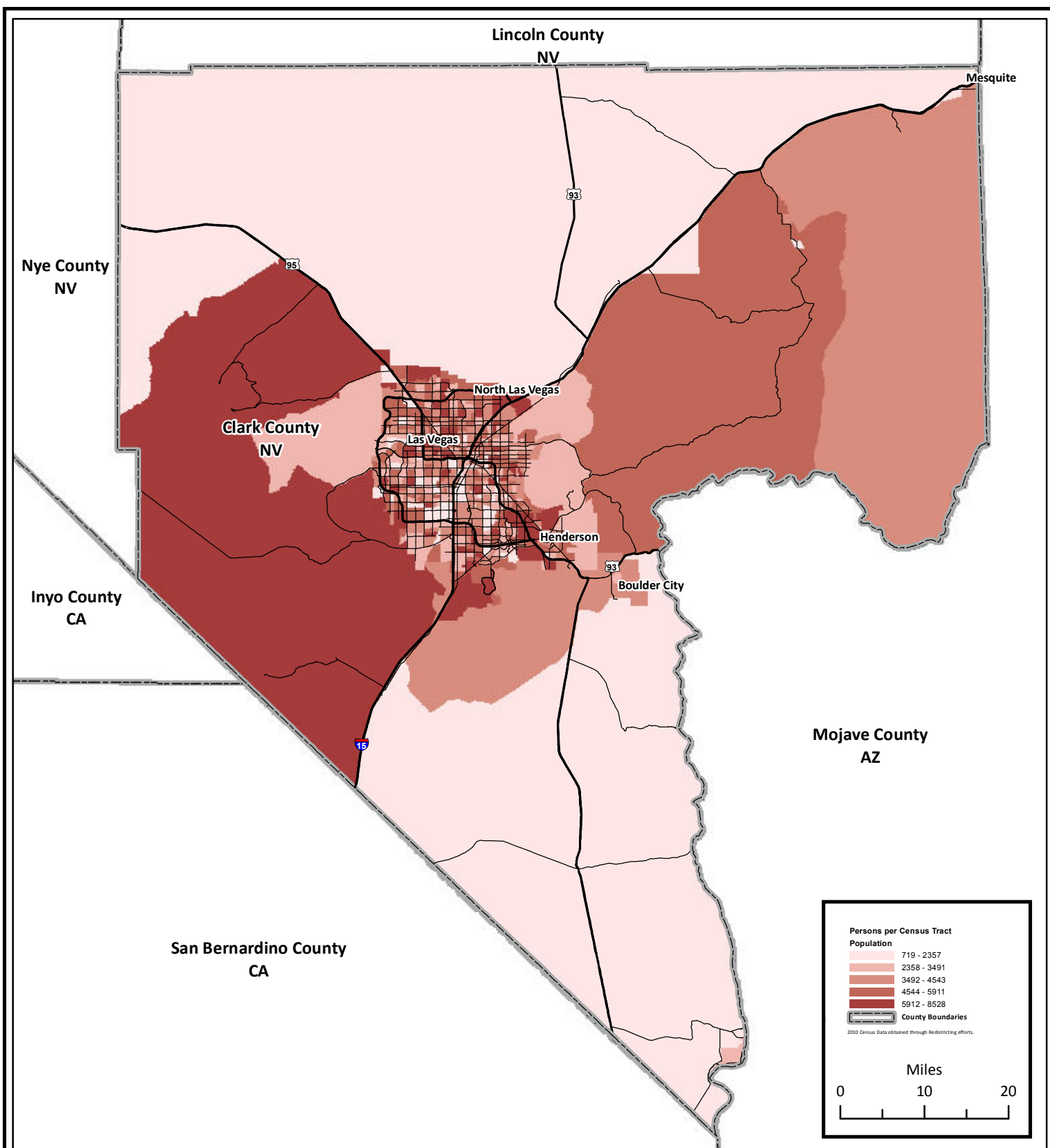
Clark County Wildfire Hazard Areas

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

Clark County, Nevada



Date: 7/22/2011
Figure C-6

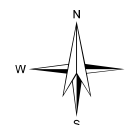


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Clark County Total Population by Tract 2010 Census Data

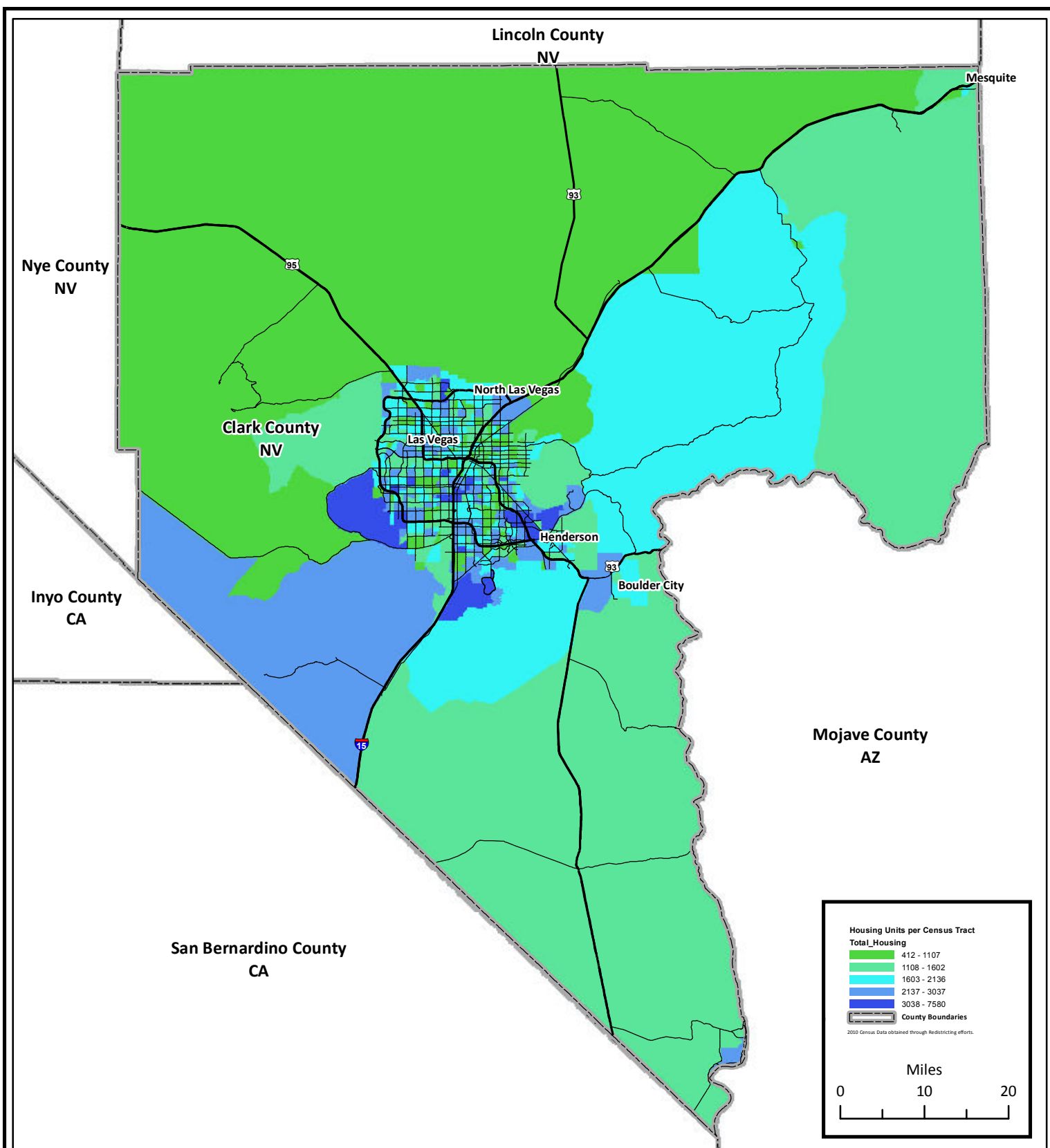
Clark County, Nevada



Date: 7/29/2011

Figure C-7

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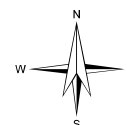


GEOGRAPHIC
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Clark County Total Housing Units by Tract 2010 Census Data

Clark County, Nevada

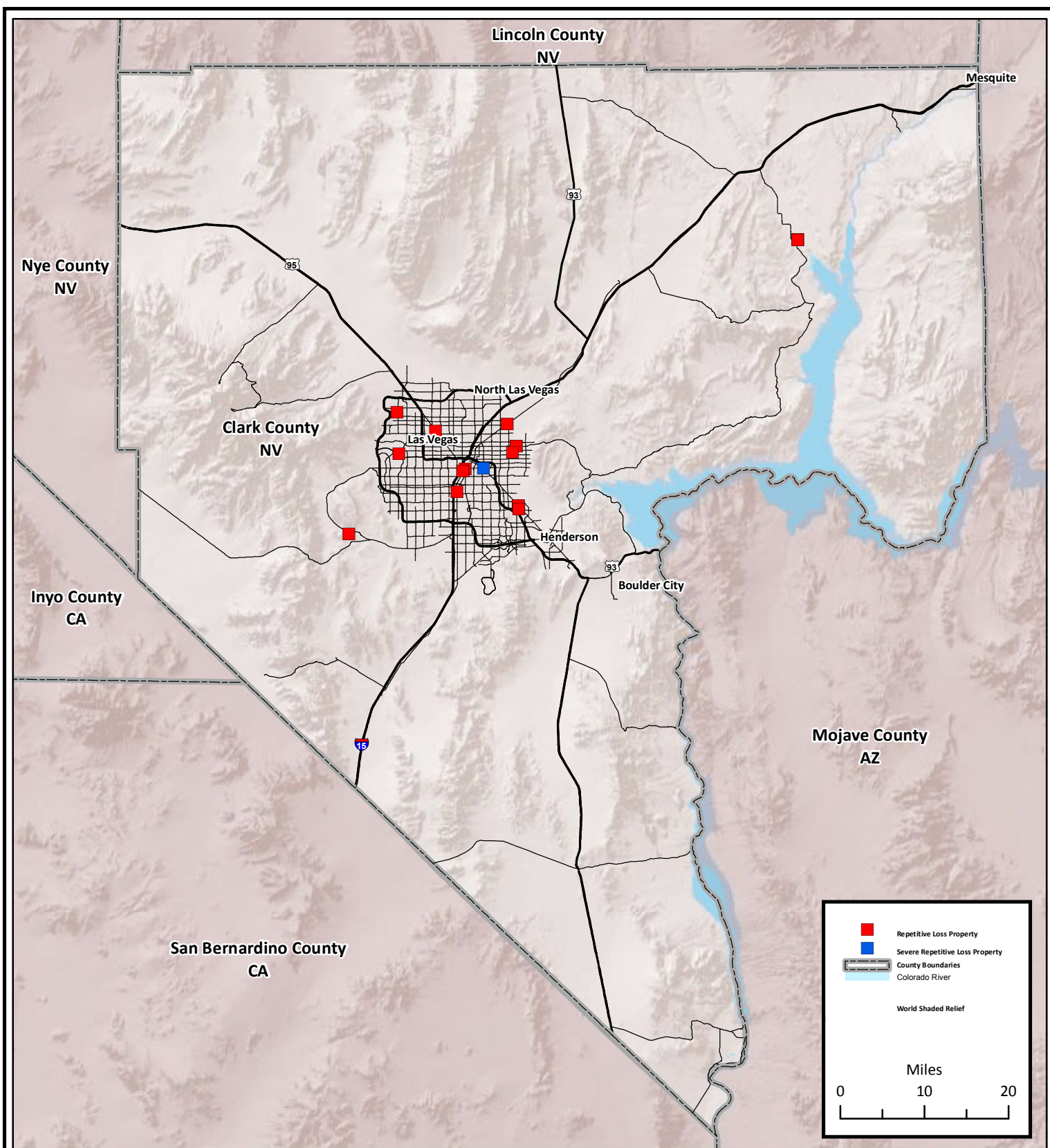


Date: 7/29/2011
 Figure C-8

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

Figure C-9. Clark County All Critical Facilities & Infrastructure**Figure C-9a. Clark County Critical Facilities: Government & Detention Centers****Figure C-9b. Clark County Critical Facilities: Public Works, Utilities & Transportation****Figure C-9c. Clark County Critical Facilities: Emergency Response & Health****Figure C-9d. Clark County Critical Facilities: Community & Education****Figure C-9e. Clark County Critical Facilities: Hotels, Convention Centers & Tourism**

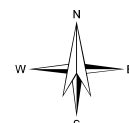
(Figures 9, 9a., 9b., 9c., 9d., and 9e. are provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)



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Clark County Repetitive Loss Properties



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Clark County, Nevada

Date: 7/29/2011
Figure C-10

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Appendix D
Planning Committee Meetings

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**2011 CLARK COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING 1
APRIL 6, 2011**



AGENDA

Introductions

Clark County Office of Emergency Management and Homeland Security
Clark County Geographic Information Systems Management Office
Clark County Local Emergency Planning Committee
URS

Hazard Mitigation Planning Overview

Disaster Management Act of 2000*
FEMA Mitigation Funding and Project Eligibility*
School and Special District Participation*

Plan Development

Plan Outline*
Plan Update Schedule*

Items to Address

Selection of Hazards to Profile
2005 MJHMP: drought; earthquake; epidemic; flood/flash flood; wildfire
(Table 8A: Summary of Hazard Identification Results, 2005 MJHMP, pg. 29)
Capability Assessments*

Next Steps

Planning Committee Meeting 2 (Hazard Analysis and Vulnerability Analysis Review)
Questions & Answers

* Handout

**2011 CLARK COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING 1
APRIL 6, 2011**



MEETING MINUTES

Introductions

Introductions for Clark County OEM, URS and introductions around the room

Hazard Mitigation Planning Overview

A Hazard Mitigation Plan (HMP) is a pre-disaster strategic plan written to guide how a community will lower its risk and exposure to disasters

Why Mitigation Planning?

- Leads to cost-effective selection of risk reduction actions
- Builds partnerships
- Contributes to sustainable communities
- Establishes funding priorities
- Maintains funding eligibility

Disaster Management Act of 2000

- Signed into law in October 2000 (PL 106-390)
- Section 322 requires a revitalized approach to hazard mitigation through State, tribal, and local planning
 - Paradigm shift from focus on response and recovery
- Interim Final Rule for planning provisions published in Federal Register on February 26, 2002
- Revised Interim Final Rule published on October 1, 2002, extending state and local plan adoption date to November 1, 2004
- Local jurisdictions must have a FEMA-approved plan to receive certain types of mitigation funding
- Local plans must be updated, adopted, and approved by FEMA every five years
- Local mitigation planning requirements are outlined in FEMA's July 1, 2008 Local Mitigation Planning Guidance and the "crosswalk"
(<http://www.fema.gov/library/viewRecord.do?id=3336>)

FEMA Mitigation Funding and Project Eligibility

Types of Funding

- Hazard Mitigation Assistance (HMA)
 - Hazard Mitigation Grant Program (HMGP)
 - Pre-Disaster Mitigation (PDM) Grant Program
 - Flood Mitigation Assistance (FMA) Grant Program
 - Repetitive Flood Claims (RFC) Program
 - Severe Repetitive Loss (SRL) Program

**2011 CLARK COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING 1
APRIL 6, 2011**



MEETING MINUTES

Types of Eligible Projects

- Prevention
- Property Protection
- Public Education and Awareness
- Natural Resource Protection
- Emergency Services
- Structural Projects

Stakeholder Involvement

Participating Jurisdiction

- Some participating jurisdictions may not be on the Planning Committee
- All participating jurisdictions need to provide jurisdiction specific input and review drafts
- All participating jurisdictions need to formally adopt the plan

Planning Committee Member

- More involved in the planning process
 - Must attend planning committee meetings
 - Will help guide the direction of the plan

School and Special District Participation

- Active Participation
 - Fully contribute in the planning process
 - Can adopt the MJHMP
 - After plan adoption, will be able to apply directly to FEMA for mitigation grant funding
- Passive Participation
 - Do not participate in the planning process
 - Do not adopt the MJHMP
 - Must apply for mitigation grant funding through a separate government entity

Plan Development

Plan Outline

- Basic Plan
 - Section 1: Introduction
 - Section 2: Prerequisites
 - Section 3: Planning Process

**2011 CLARK COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING 1
APRIL 6, 2011**



MEETING MINUTES

- Section 4: Hazard Analysis
- Section 5: Vulnerability Analysis
- Section 6: Capability Assessment
- Section 7: Mitigation Strategy
- Section 8: Plan Maintenance
- Section 9: References
- Appendices
 - FEMA "Crosswalk"
 - Adoption Resolution
 - Figures
 - Planning Committee Meeting Agendas & Minutes
 - Public Outreach
 - Plan Maintenance Documents
 - Jurisdiction and District-specific Information
 - ◊ Vulnerability Analysis
 - ◊ Capability Assessment
 - ◊ Mitigation Strategy

Plan Update Schedule

- Project Start-up: March 2011 - April 2011
- Plan Development: April 2011 - June 2011
- Draft Plan: June 2011
- Final Plan: July 2011 - August 2011

Items to Address

Selection of Hazards to Profile

- We need to decide which hazards we want included in the 2011 update of the HMP
 - The 2005 MJHMP included:
 - ◊ Drought
 - ◊ Earthquake
 - ◊ Epidemic (human, plant, animal)
 - ◊ Flood and Flash Floods
 - ◊ Wildfire

**2011 CLARK COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING 1
APRIL 6, 2011**



MEETING MINUTES

- Based upon comments from FEMA (on the 2005 plan) and previous conversations with Clark County OES two additional hazards for the 2011 MJHMP have already been identified:
 - Terrorism
 - Subsidence

Capability Assessments*

- State of Nevada Requirement
- The purpose of the capability assessment is to identify and evaluate the resources available to assist in mitigation efforts.
- Capability Assessment consists of 4: tables
 - Table 1: Human and Technical Resources
 - Table 2: Financial Resources
 - Table 3: Legal and Regulatory Resources
 - Table 4: Current and Ongoing Mitigation Actions
- This capability assessment worksheet will provided to you in electronic form as well
 - Portions of the worksheets are highlighted; these are the areas to focus on
 - The rest of the text has been filled in for you, but please edit as needed

Next Steps

- Capability Assessment due April 27th
- Develop Hazard Profiles
- Inventory Assets
- Planning Committee Meeting #2 - May 2011

Questions & Answers

* Handout was provided

**2011 CLARK COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING 2
October 5, 2011**



AGENDA

Introductions

Clark County Office of Emergency Management and Homeland Security
Clark County Geographic Information Systems Management Office
Clark County Local Emergency Planning Committee
URS

Recap of Hazard Mitigation Planning Process

Brief recap of what was covered at Meeting #1
What has been completed thus far
What still needs to be completed

Discussion of Hazard Maps and Profiles

Review current hazard maps developed by Clark County GIS
Hazard Profile text ready for your review
For each hazard the following is discussed: Nature, History, Location, Extent and Probability of Future Events

Vulnerability Analysis

Brief recap of process
Critical Facility List and Maps

Status/Review of Capability Assessment Worksheets

What Capability Assessment Worksheets are still needed
Questions regarding completion of or edit of Capability Assessments

Introduction and Discussion of the Mitigation Strategy

What is the Mitigation Strategy
Eligible vs. Ineligible Mitigation Activities*
Prioritizing Mitigation Actions
Mitigation Strategy Workbook*
Walk through/begin completion of Mitigation Strategy Workbook

Next Steps

Complete Draft Plan for Public Review
Courtesy Review Process
MHMP Adoption Process
Action Items - Deadlines*

Questions & Answers

* Handout

**2011 CLARK COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING 2
October 5, 2011**



MEETING MINUTES

Introductions

Introductions for Clark County OEM, URS, and introductions around the room

Recap of Hazard Mitigation Planning Process

Brief recap of what was covered at Meeting #1

- What is a Hazard Mitigation Plan (HMP)?
 - A pre-disaster strategic plan written to guide how a community will lower its risk and exposure to disasters
- Disaster Management Act of 2000
 - Per DMA 2000 certain Mitigation funds are available to those with an approved HMP (which must be updated every 5 years)
- HMP Components (in general): FEMA requirements, community descriptions, planning process, hazard profiles vulnerability assessment, mitigation strategies, plan maintenance, maps/figures, jurisdiction specific appendices and the FEMA crosswalk.
- Hazard Selection
 - Reviewed 2007 HMP and added the following:
 - ◊ Dam Failure
 - ◊ Subsidence
 - ◊ Terrorism
 - ◊ Utility Failure
 - The additional hazards are:
 - ◊ Drought
 - ◊ Earthquake
 - ◊ Epidemic
 - ◊ Flooding
 - ◊ Infestation (touched upon in the 2007 HMP, for 2011 this section has been expanded and separated into its own hazard)
 - ◊ Wildfire

What has been completed thus far:

- Introduction to HMPs - Completed
- Hazard Identification - Completed
- Hazard Analysis - Completed
- Assets Identification - Completed
- Vulnerability Analysis - Completed

**2011 CLARK COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING 2
October 5, 2011**



MEETING MINUTES

What still needs to be completed

- Capability Assessment - in progress
- Mitigation Strategies - October 2011
- Draft Plan - end of October 2011
- Final Plan - end of November 2011

Discussion of Hazard Maps and Profiles

We chose 10 hazards to profile, however all hazards are not mappable, such as infectious disease. The four hazard maps prepared by Clark County GIS include:

- Historic Earthquakes and Faults
 - This map is similar to the previous map in the 2007 HMP. Data is pulled from USGS
 - Planning Committee decided that in addition to this regional map we would like a map zoomed into the Las Vegas Valley area which also provides the names of the faults
- Peak Ground Acceleration
 - This is a new map, the information has been pulled from USGS.
 - Planning Committee requested that greater contrast between the current map colors be developed
- Flooding
 - This map illustrates the 100 year and 500 year floodplains
 - Planning Committee requested that greater contrast between the current floodplain and the Colorado River be developed
- Wildfire
 - This map illustrates the high and very high wildland fire zones
 - Planning Committee suggested looking into also mapping the susceptibility of the urban interface

Hazard Profile text ready for your review

- For each hazard the following is discussed: Nature, History, Location, Extent and Probability of Future Events
 - Please review for accuracy and inclusion of most up-to-date information

Vulnerability Analysis

The first step of the Vulnerability Analysis is to collect all critical facility & infrastructure data

- These include: County-owned, City-owned assets and critical facilities
 - Clark County GIS worked with the City GIS departments to develop a list of assets
 - ◊ This list has previously been provided for your review and edits
 - Critical Facility Locations were then geocoded and provided on maps

**2011 CLARK COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING 2
October 5, 2011**



MEETING MINUTES

- Planning Committee decided that Critical Facility & Infrastructure maps should be provided as a separate, For Official Use Only, piece of the HMP
- Next, the critical facility & infrastructure data as well as population and residential structure data was combined with hazard maps to produce the Vulnerability Analysis
 - This shows, by jurisdiction, which critical facilities & infrastructure fall in each hazard zone (the draft vulnerability analysis has also been circulated for your review and comment)

Status/Review of Capability Assessment Worksheets

What Capability Assessment Worksheets are still needed?

Questions regarding completion of or edit of Capability Assessments

Introduction and Discussion of the Mitigation Strategy

What is the Mitigation Strategy?

- The mitigation strategy is the heart of the document.
- The goal is to create a list of implementable, fundable actions to pull from when funding becomes available
 - We suggest a minimum of 2 mitigation actions per participant
 - Selected mitigation actions should be implementable over the next 5 years
- Mitigation actions are activities, measures, or projects that help achieve the goals of the HMP
 - There are six broad mitigation action categories:
 - Prevention
 - Property Protection
 - Public Education and Awareness
 - Natural Resource Protection
 - Emergency Services
 - Structural Projects

Eligible vs. Ineligible Mitigation Activities*

- Examples of Eligible Activities:
 - Relocation and elevation of structures
 - Structural and non-structural retrofitting
 - Dry floodproofing (non-residential structures)
 - Protective measures for utilities (e.g. electric and gas), water & sanitary sewer systems and/or other infrastructure (e.g. roads, bridges)
 - Vegetation management
 - Storm water management

**2011 CLARK COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING 2
October 5, 2011**



MEETING MINUTES

- Localized flood control projects
- Examples of Ineligible Activities
 - Flood studies or flood mapping and major flood control projects
 - Risk assessments, technical assistance, studies, or workshops not resulting in a FEMA approved HMP
 - Warning and alert notification systems
 - Studies that do not yield a project
 - Projects that solely address operations or maintenance (e.g. dredging, debris removal)
 - Any phase or part of a project that is dependent on another project

Review of the 2007 Mitigation Strategy

- The original HMP was adopted in 2007
- Review the previous Mitigation Goals/Objectives
 - As an update we must analyze the previous Mitigation Actions
 - ◊ Determine which were implemented and which were not
 - ◊ If not implemented explain why
 - ◊ If not implemented do they remain applicable and therefore should be included in the 2011 update?
 - The Planning Committee went through the list of 2007 Mitigation Goals and Objectives and decided which Goals and Objectives to keep and new Goals and Objectives to add.
 - The Planning Committee went through the list of 2007 Mitigation Actions and was able to check off some actions as “completed” and some as “no longer applicable”
 - ◊ Outside of this meeting, planning committee members were asked to look at the 2007 Mitigation Actions specific to their jurisdiction and complete the review/status update process

Potential Mitigation Actions

- For the 2011 HMP a list of potential mitigation actions to consider for future planning must be developed and must:
 - Identify at least one action per hazard profiled in the plan
 - Address new and existing construction
- Prior to this meeting the URS consultant developed a list of potential mitigation actions, comprised of both old mitigation actions (2007 HMP actions) and new mitigation actions
 - The Planning Committee then reviewed and edited this list (the revised list will be circulated in the Mitigation Workbook following this meeting)

**2011 CLARK COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING 2
October 5, 2011**



MEETING MINUTES

Mitigation Strategy Workbook*

- The County and each participating City and Special District must develop their own mitigation action plan (will be included in the jurisdiction-specific appendices)
- Each participating jurisdiction must evaluate and prioritize mitigation actions (from the list in Table 1)
 - To help with this process the URS consultant has prepared a Mitigation Strategy workbook that will guide each participant through the Mitigation Strategy process.
 - Table 1 in the workbook is the list of Potential Mitigation Actions (this is the list we edited a few minutes ago in this meeting)
 - Please review this list with those in your jurisdiction and if necessary add any additional mitigation actions that you would like to consider for your 2011 Mitigation Strategy
- Once the list of Potential Mitigation Actions is complete (Table 1), we must prioritize the mitigation actions
 - The following prioritization criteria are suggested to help guide your decision making process:
 - A local jurisdiction department or agency champion currently exists or can be identified
 - The action can be implemented during the 5-year lifespan of the HMP
 - The action may reduce expected future damages and losses (cost-benefit)
 - The action mitigates a high-risk hazard
 - The action mitigates multiple hazards
 - Using this criteria fill out Table 2 to develop your Mitigation Action plan
 - Start by filling in the column “prioritization criteria”
 - Then fill out the column “Selected (Y/N)” (for each mitigation action selected, enter “Y” into the “Selected” column)
 - Only mitigation actions that meet 3 or more prioritization criteria should be selected
 - Then for those actions specifically selected, fill out the remaining 3 columns “Facility to be Mitigated,” “Department or Agency” and “Timeframe to be Implemented”

Next Steps

Complete Draft Plan for Public Review

- To be completed by the end of October
- Will be available for public comment for at least 2 weeks
- To be posted on the County website and potentially the websites of participating jurisdictions as well
- Media release will announce posting of the public draft

**2011 CLARK COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING 2
October 5, 2011**



MEETING MINUTES

Courtesy Review Process

- First reviewed by Nevada DEM
- Nevada DEM provides comments on draft and forwards draft and comments to FEMA
- FEMA reviews the draft and comments
- FEMA makes final determination on whether or not the Final Draft complies with the DMA 2000
- FEMA will either request that the Final Draft be revised to reflect deficiencies or FEMA will approve the Final Draft pending adoption

2011 HMP Adoption Process

- Upon “approval pending adoption” notification from FEMA, Final HMP will be prepared
- Clark County must formally adopt the Final HMP
- Within 1 year each plan participant must adopt the Final HMP
- Each plan participant must submit a copy of the resolution to 1) Clark County OEM and 2) FEMA

Action Items - Deadlines*

Next Steps – HMP Completion	
Action	Due Date
Capability Assessment	October 12, 2011
Review of Hazard Profiles	October 14, 2011
Mitigation Strategies	October 19, 2011
Public Draft of Hazard Mitigation Plan	October 26, 2011 (URS)
Comments on Hazard Mitigation Plan	Mid November 2011
Final Draft of Hazard Mitigation Plan	End of November 2011 (URS)

Questions & Answers

* Handout was provided

Appendix E

Public Outreach

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CLARK COUNTY HAZARD MITIGATION QUESTIONNAIRE			
This questionnaire is designed to help the Clark County Office of Emergency Management identify the community's concerns about natural and human-caused hazards. The questionnaire should be completed by an adult, preferably the homeowner or the head of the household and returned to the address at the bottom of the page. All individual responses are strictly confidential and for research purposes only. Questions? Please call (702) 455-5710.			
GENERAL HOUSEHOLD INFORMATION			
1. RESIDENT (Y/N)? _____ # YEARS IN COUNTY? 0-1 ____ 2-5 ____ 6-10 ____ 11 or more ____			
2. Have you experienced any of the natural hazards listed below in Clark County?			
Natural		Human Caused	
☐ Dam Failure	☐ Flood	☐ Hazardous Materials Release	
☐ Drought	☐ Infestation	☐ Terrorism	
☐ Earthquake	☐ Subsidence	☐ Utility Failure	
☐ Health Alert/Epidemic	☐ Wildfire		
3. What is the most effective way for you to receive information about how to make your home safer from natural disasters? (Check all that apply)			
☐ Newspaper	☐ Internet	☐ Radio	☐ Public Meetings
☐ Television	☐ Utility Bill	☐ Mail	☐ Billboard
4. In the following list, please check those activities that apply.			
Have you or someone in your household:			Check all that apply
Attended meetings or received written information on natural disasters or emergency preparedness?			☐
Talked with family members about what to do in case of a disaster or emergency?			☐
Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?			☐
Prepared a "Disaster Supply Kit" (extra food, water, medications, batteries, first aid items and other emergency supplies)?			☐
In the last year, has anyone in your household been trained in First Aid or Cardio-Pulmonary Resuscitation (CPR)?			☐
5. Is your property located in or near a FEMA designated floodplain? Y/N/DK Do you carry flood insurance? Y/N/DK			
6. What modifications for earthquakes and/or floods have you made to your home? (Check all that apply)			
Nonstructural		Structural	
☐ Anchor bookcases, cabinets to wall	☐ Secure home to foundation	☐ Brace inside of cripple wall with sheathing	
☐ Secure water heater to wall	☐ Brace unreinforced chimney	☐ Brace unreinforced masonry & concrete walls and foundations	
☐ Install latches on drawers/cabinets	☐ Elevate home		
☐ Fit gas appliances with flexible connections			
☐ Flood proof			
Other _____ _____			

Communitywide Strategies		Check one
Development should be prohibited in these zones		
Development should be restricted in these zones.		
Development should be restricted only where "severe risk" exists		
Development should NOT be restricted in hazard zones		
I don't know.		

8. Please rank how prepared you feel you and your household are for the probable impacts of natural hazard events. Rank on a scale of **1 to 5** with 5 being the most prepared. _____

9. Other Comments:

EMAIL oem@ClarkCountyNV.gov MAIL @ Clark County Government Center, Office of Emergency Management,
500 S. Grand Central Pkwy. Las Vegas, NV 89155-1111

Clark County Hazard Mitigation Questionnaire Summary

Jurisdiction	# of Responses	Resident		# Years in County				Hazards Experienced											Communication Preferences								Disaster Preparedness Activities					In/Near Floodplain?			Flood Insurance?		
		Yes	No	0-1	2-5	6-10	11 or more	Dam Failure	Drought	Earthquake	Flood	Hazardous Materials Release	Health Alert/Epidemic	Infestation	Subsidence	Terrorism	Wildfire	Utility Fire	Newspaper	Television	Internet	Utility Bill	Radio	Mail	Public Meetings	Billboard	Attended mtgs/received written info	Talked with family members	Household/Family Emergency Plan	Disaster Supply Kit	First Aid or CPR	Yes	No	Not Sure	Yes	No	Not Sure
Henderson	9	9	--	--	2	4	3	--	3	4	1	1	1	2	1	--	2	1	1	4	8	3	3	4	--	--	5	8	6	3	2	--	4	2	1	4	1
Clark County	2	2	--	--	--	--	1 (55 yrs)	--	1	1	1	1	--	--	--	--	--	--	1	--	2	1	--	--	--	--	2	2	2	2	--	--	2	--	--	2	--
Overall	11	11	--	--	2	4	4	--	4	5	2	2	1	2	1	--	2	1	2	4	10	4	3	4	--	--	7	10	8	5	2	--	6	2	1	6	1

Clark County Hazard Mitigation Questionnaire Summary

Community Strategies (development in designated hazard zones)					Preparedness Average (1-5)	Comments			
Prohibit Development	Restrict Development	Restrict where "severe risk" exists	NO Restrictions	Don't Know					
3	4	1	--	2	2.78	The following modifications have been completed: - Secure water heater to wall - Fit gas appliances with flexible connections	We are aware of the need to be prepared, but limited to available money for preparations. We are actively stocking up on supplies. Dry goods, canned food, otc medicines, hygiene products and water	Member of Clark Co. Disaster Communications and NWS Skywarn	We appreciate you doing this survey as Henderson contiues to lead the State in taking care of its residents. We love living in Henderson for that reason.
--	1	1	--	--	3	The following modifications have been completed: - Anchor bookcases, cabinets to wall - Secure water heater to wall - Brace inside of cripple wall with sheathing - Elevate home	June 2011 Popular Science had a story about Solar Flares taking down the Grid. How will we function without power for a long time?		
3	5	2	--	2	2.82	NA			

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Tuesday, June 19, 2012

Committees

- Homeless Services
- Film Permits

Air Quality

Ozone	Carbon Monoxide	Dust / Smoke
6/23/2012	Moderate	Good
6/22/2012	Moderate	Good
6/21/2012	UNH - Sensitive	Good
6/20/2012	Moderate	Good

More Clark County News

- Firefighter/Firefighter Paramedic Application Process Opens Today**
Clark County will be accepting applications for firefighter and firefighter paramedic positions. Only the first 2,500 applications will be accepted. Submissions must be made online during the application period from June 19 through July 3. [More Information](#)
- Business Survey**
Clark County is seeking input from the business community on how to improve our services to help local businesses. Please take the time to fill out an online survey so we can better assess how we do business. [More Information](#)
- Survey on Hazard Mitigation Plan**
Clark County's Office of Emergency Management is seeking public input on the 2012 Multi-Jurisdictional Hazard Mitigation Plan through July 20. The plan and a questionnaire are posted online. [More Information](#)
- Commissioner Scow Neighborhood Meeting**
Commissioner Scow to Host Neighborhood Meeting at Sunset Park June 27, 6:30 p.m. [More Information](#)
- Apply for a County Board, Council or Committee**
The County is accepting applications for various boards. [More Information](#)

Open House at Station 66
Jun 23, 2012

[View All Events](#)

Service Spotlight

Lost Pets

[Lost Pets Read More](#)

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Wednesday, July 4, 2012

Clark County > Departments > Administrative Services > Emergency Management > Announcements > Survey on Hazard Mitigation Plan

Quick Look-up

I Want To...

Most Popular

Emergency Mgmt.

- Department Home
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- FAQ
- Contact Us
- About Us
- LEPC
- UAWG
- OEM Connection
- Training

Emergency Management

6/19/2012 - Survey on Hazard Mitigation Plan

Contact: Office of Emergency Management
Phone: (702) 455-5710
Email: OEM@ClarkCountyNV.gov

Clark County's Office of Emergency Management is working on a regional effort to create the 2012 Clark County Multi-Jurisdictional Hazard Mitigation Plan. Clark County is vulnerable to a number of hazards, including communicable disease, wildfires, flash floods, earthquakes, drought and river flooding. The plan provides the County and participating cities the necessary tools to prioritize future actions for reducing the damage from such disasters. The plan also will provide a framework for future requests for federal assistance to help reduce these risks. Regional partners in this effort include the cities of Henderson, Las Vegas, Mesquite and North Las Vegas, and special districts of Clark County Schools, Regional Flood Control, Southern Nevada Health and Water Reclamation.

A [draft](#) of the plan is available for public review and comment through **Friday, July 20, 2012**, and is posted on our website.

In addition we are seeking input from residents to identify concerns posed by natural and man-made hazards, and to find ways to reduce damage from those risks. Please provide your feedback by completing our [hazard mitigation questionnaire](#). The questionnaire should be completed by an adult, preferably the homeowner or head of household. Completed questionnaires can be emailed or sent to us by mail. To submit the form by email, first save the blank form on your computer, fill it out, and then email it to the Office of Emergency Management OEM@ClarkCountyNV.gov. The form also can be printed out and mailed to:

Clark County Office of Emergency Management
500 S. Grand Central Pkwy. Las Vegas, NV 89155-1212

Questions can be directed to the Office of Emergency Management at (702) 455-5710.

To view our various emergency plans, visit [this page](#).

Jobs | Site Map | Contact Us | Privacy Policy | © 2010 Clark County, NV | 500 S. Grand Central Pkwy., Las Vegas, NV 89155 (702) 455-0000

http://www.clarkcountynv.gov/Depts/admin_services/oem/Announcements/Pages/SurveyonHazardMitigationPlan.aspx

www.facebook.com/ClarkCountyNV?ref=ts

facebook Search for people, places and things

Clark County, Nevada Timeline Now Highlights Like

June 20

Wow! We've had 2,300 people apply for 60+ firefighter positions since we opened up the application period Monday. We are only accepting 200 more applications.

 **Human Resources**
www.clarkcountynv.gov

To be a model human capital organization committed to providing internal and external customers expert information, services, and products in a reliable, timely, consistent, and

Like · Comment · Share

2 people like this.

View all 4 comments

 **Jesus Garcia** Great new for them, at least the have the opportunity... So are any chance to start recall on public works inspectors layoff on Nov 10/2010? I learn some contractors are getting behind due no available inspectors..
June 20 at 11:56am via mobile · Like

 **Joseph Hawthorne** make sure they know the rules on sick leave, before you hire them
June 20 at 12:16pm · Like

Clark County, Nevada shared a link.
June 20

Clark County's Office of Emergency Management is working on a regional effort to create the 2012 Clark County Multi-Jurisdictional Hazard Mitigation Plan. The plan provides the County and participating cities the necessary tools to prioritize future actions for reducing damage from disasters. The plan also will provide a framework for future requests for federal assistance to help reduce these risks. Learn more...

Survey on Hazard Mitigation Plan
www.clarkcountynv.gov

Clark County's Office of Emergency Management is working on a regional effort to create the 2012 Clark County Multi-Jurisdictional Hazard Mitigation Plan. Clark County is vulnerable to a number of hazards, including communicable disease, wildfires, flash floods, earthquakes,

Like · Comment · Share

2 people like this.

 **Joseph Hawthorne** as long as the money goes towards its intended purpose, we wont have to put any more hazardous political leaders in jail.
June 20 at 12:13pm · Like

www.facebook.com/ClarkCountyNV?ref=ts





City of Las Vegas
 LasVegasNevada.gov
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Find Emergency Information - LVAAlert

Hazard Mitigation Questionnaire

The City of Las Vegas Office of Emergency Management (OEM), in cooperation with the Cities of Boulder City, Henderson, Mesquite and North Las Vegas; Clark County and special districts of Clark County Schools, Regional Flood Control, Southern Nevada Health and Water Reclamation, has launched a regional effort to review the risks posed by man-made and natural disasters and identify ways to reduce the damage from those risks. This will result in the development of the 2012 Clark County Multi-Jurisdictional Hazard Mitigation Plan (HMP).

Over the past months, the HMP planning committee has held meetings and provided information which has guided and aided in the development of the HMP. The HMP planning committee is also looking for feedback via the [hazard mitigation questionnaire](#), designed to allow you to provide Emergency Management with your concerns regarding natural and human-caused hazards.

Bee Swarming Season - May 1, 2012

March and April typically mark the beginning of swarming season for bees, a time when the bees will be moving from place to place. Warmer weather and increased outdoor activity leads to the increased possibility of bee encounters. For further information and safety tips regarding bees, view the recent [news release](#).

Sign Up To Receive Emergency Alerts

Southern Nevada cities and Clark County have launched a new emergency alert website that allows residents, businesses and visitors to receive free emergency alerts via their cellular phone and e-mail. Sign-up is quick and easy. Visit <https://sonevada.onthealert.com/> and enter up to three phone numbers and two e-mail addresses. You can also choose what kind of alert you want to receive including extreme temperatures, flash flooding, earthquakes, air quality advisories, winter storms and hazmat incidents.

Earthquake Preparedness And Safety

Earthquakes can strike at any time without warning. The best way to be prepared for an earthquake is to educate yourself with [safety tips](#) on what to do before, during and after the event.

Emergency Preparedness in Las Vegas

You should routinely review your state of personal emergency preparedness by ensuring the following:

- 1). Have a family disaster plan including a pre-determined meeting place if separated from your loved ones. Review this plan with everyone in your family.
- 2). Have a family communications plan. In case you can't get in touch with your family members pre-designate a person for everyone to call and check-in to let them know you're okay and where you are. Preferably this pre-designated person should reside out of the local area.
- 3). Have an emergency preparedness kit including non-perishable foods, water, medications, and basic necessities. Remember to include any required specialty items for infants, elderly persons and your [pets](#). You should have enough supplies to sustain yourself and your family members for 72-hours.
- 4). Severe weather/flash flooding can occur with little forecasted notice in Las Vegas. Be smart and remain alert for changing weather conditions. Avoid low-lying areas if it starts to rain, seek higher ground. Go indoors if you hear thunder or see lightning. Never drive vehicles through flooded roadways.
- 5). Sandbags. When rain and thunderstorms occur in Las Vegas people will often call the city looking for sandbags. If you think you might need to sandbag doorways and other areas around your home or business you should do it before it starts raining. It's usually too late to sandbag once flooding starts. In the city of Las Vegas empty sandbags are available at both the east and west service centers. Piles of sand for public access are located at the east and west service centers. People should bring their own shovels to fill the bags.

Northwest Service Center is located at 2900 Ronemus Drive (Cheyenne @ Buffalo)
 East Service Center is located at the corner of N. Mojave Road and Bonanza Road

#

If you believe you have any information on suspicious activity that would relate to a terrorist attack, please contact the Las Vegas Metropolitan Police Department by calling 3-1-1 or the local FBI office at 385-1281.

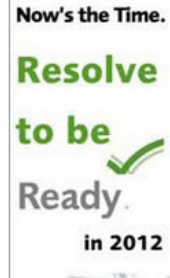
For police, fire and medical emergencies, please call 9-1-1.

Related Links

- [Nevada's Seven Signs Of Terrorism Video](#)
- [National Weather Service - Las Vegas](#)
- [Southern Nevada Health District](#)
- [Las Vegas Metropolitan Police Department](#)
- [Centers for Disease Control](#)
- [Emergency Alert System](#)
- [Las Vegas Office of Emergency Management](#)
- [CERT Course Schedules](#)

Related Links







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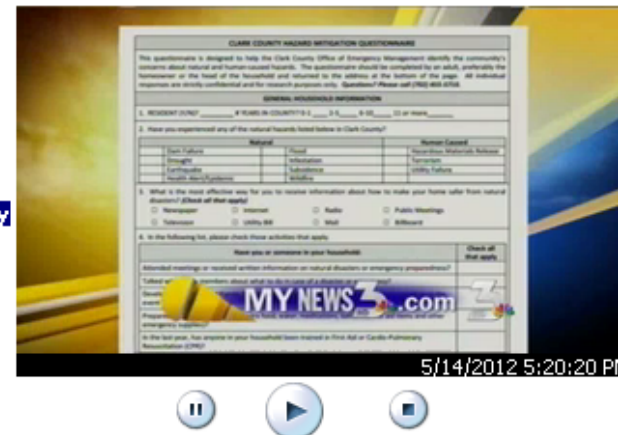
Transcript

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KSNV (NBC) - Las Vegas, NV
News 3 at Five

+ Local Market Viewership: 46,093
 Local Publicity Value: \$4,349.48 per 30s

KSNV 5/14/2012 5:20:07 PM: ...history of violence, he should be considered dangerous. if you see him, call crime stoppers. >>> all right thanks for the heads up. from natural disaster to human cause hazard city officials want to know what you are worried about. keep you up at night. City of las Vegas office of emergency management has posted on line question air. they are planning to use it to get feedback on your concern and those concerns will be used to update information to the federal government. that they use southern nevada needs their help to deal with disaster. go to our web site for a link. >> natural phenomenon of different kind. coming up this weekend. natural disaster. talking about the eclipse of course. >> getting inside of a week now. we'll talk about this and nothing to worry about in the weather today but kevin will tell us what to expect for the rest of the work week when we i'm barack obama, ...



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<http://mms.tveyes.com/Transcript.asp?StationID=4285&DateTime=5%2F14%2F2012+5%3A20%3A07+PM&Term=City+of+Las+Vegas&PlayClip=TRUE>

The screenshot shows the City of Henderson website. At the top, there is a navigation bar with links for GOVERNMENT, RESIDENTS, VISITORS, and BUSINESS. Below this is a secondary navigation bar with links for Home, How Do I..., Online Services, Calendar, Newsroom, Departments, Contact Us, and a Search box. The main content area is titled "Henderson Fire" and "Emergency Management". It contains text about the Office of Emergency Management seeking input from residents to identify community concerns about natural and human-caused hazards. It mentions a "hazard mitigation questionnaire" and provides instructions on how to submit it (via email or postal mail). It also provides contact information for Ryan Turner, Emergency Management Coordinator, at (702) 267-2212 or Ryan.Turner@cityofhenderson.com. On the left side, there is a sidebar menu with links to various services, including Hazard Mitigation Questionnaire, Public Information & Education, and more. At the bottom, there is a footer with copyright information and links to Privacy Policy, SSN Confidentiality, Feedback Form, and Site Help.

Select Language ▼

City of Henderson
Nevada

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▶ **Henderson Fire**
 ▶ Meet the Chief
 ▶ Purpose Statement
 ▶ Frequently Asked Questions
 ▶ Contact Us
 ▶ Organizational Chart

 ▶ Services
 ▶ Emergency Management
 ▶ Overview
 ▶ **Hazard Mitigation Questionnaire**
 ▶ Preparing Your Home
 ▶ Preparing Your Business
 ▶ Community Emergency Response Team

 ▶ Public Information & Education
 ▶ Event Request
 ▶ Customer Service Feedback
 ▶ Community Service Programs
 ▶ Station Locations Map
 ▶ HFD Careers
 ▶ Fire Codes, Permits & Inspections
 ▶ After the Fire is Out
 ▶ Fireworks Safety
 ▶ 2011 Annual Report
 ▶ Fire and Life Safety Websites

CONTACT HENDERSON

SONEVADA ONTHEALERT.COM

Adobe® Reader® is required to view PDF files.

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http://www.cityofhenderson.com/fire/hazard_mitigation_questionnaire.php



North Las Vegas, NV – The City's Office of Emergency Management is joining a regional effort to review the local risks posed by man-made and natural disasters and to identify ways of reducing damage from those risks.

As part of that effort, North Las Vegas officials want residents to share their concerns about natural and human-caused hazards by answering an online hazard mitigation questionnaire.

The questionnaire may be downloaded from one of the following links:

- [Questionnaire in PDF format](#)
- [Questionnaire in Microsoft Word format](#)

Information from the questionnaire will be included in the 2012 Clark County Multi-Jurisdictional Hazard Mitigation Plan.

North Las Vegas is updating its own hazard mitigation plan. Each city must have such a plan to be eligible to receive certain types of federal disaster assistance under the Federal Disaster Mitigation Act of 2000.

Southern Nevada is vulnerable to a wide range of disasters. Over the past 10 years, Clark County has received seven presidential disaster declarations following fires, flooding and severe winter storms. The hazard mitigation plan provides the county and participating cities the necessary tools to prioritize future actions for reducing the damage from such disasters. Additionally, the plan will provide a framework for future requests for federal assistance to help reduce these risks. A draft of the plan will be available and open for public comment in June. The plan also will be posted on the City's website.

Regional agencies participating in this effort are: Las Vegas, Boulder City, Henderson, Mesquite and Clark County and the special districts of Clark County schools, Regional Flood Control, Southern Nevada Health and Water Reclamation.

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[Meetings & Agendas](#) | [What's New](#) | [City Jobs](#) | [Text Navigation](#) | [Privacy Policy](#)

In support of the Americans with Disabilities Act, an accessible version of content can be requested for this web page by [clicking here](#), calling (800) 326-6868 for Telecommunications Device for the Deaf (TDD) access, or emailing the City's ADA Coordinator at ADA@cityofnorthlasvegas.com.

The City's draft Internet accessibility policy may be viewed at [this link](#).

<http://www.cityofnorthlasvegas.com/BantamFE/Entry.aspx?entryId=2833&folder=2012&departmentId=-1>

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Appendix F
Plan Maintenance Documents

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2012 Clark County HMP - Annual Review Questionnaire				
HMP Section	Questions	Yes	No	Comments
PLANNING PROCESS	Are there internal or external organizations and agencies that have been invaluable to the planning process or to mitigation action?			
	Are there procedures (e.g., meeting announcements, plan updates) that can be done differently or more efficiently?			
	Has the Planning Committee undertaken any public outreach activities regarding the HMP or a mitigation project?			
HAZARD ANALYSIS	Has the natural and/or human-caused disaster occurred in this reporting period?			
	Are there natural and/or human-caused hazards that have not been addressed in this HMP and should be?			
	Are additional maps or new hazard studies available? If so, what are they and what have they revealed?			
VULNERABILITY ANALYSIS	Do any new assets need to be added to the participants' asset lists?			
	Have there been changes in development trends that could create additional risks?			
CAPABILITY ASSESSMENT	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?			
MITIGATION STRATEGY	Should new mitigation actions be added? Should any existing mitigation actions be deleted?			

2012 Clark County HMP - Mitigation Project Progress Report		
Progress Report Period From (date):		To (date):
Project Title:		
Project ID:		
Description of Project:		
Implementing Agency:		
Supporting Agencies:		
Contact Name:		
Contact E-mail:		
Contact Number:		
Grant/Finance Administrator:		
Total Project Cost:		
Anticipated Cost Overrun/Underrun:		
Date of Project Approval:		
Project Start Date:		
Anticipated Completion Date:		
Summary of Progress of Project for this Reporting Period		
1. What was accomplished during this reporting period?		
2. What obstacles, problems, or delays did the project encounter, if any?		
3. How were the problems resolved?		

Appendix G
Clark County

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Table G-1. Clark County unincorporated, Total Population and Residential Buildings

Population ¹	Residential Buildings ²	Total Residential Building Value (2012) ³
878,044	272,384	\$30,997,299,200

¹Population data was derived from 2010 Census Redistricting efforts. Data was obtained and analyzed by Clark County and city GIS departments for the vulnerability analysis and may vary from information provided in Section 1.

²Residences based on assessor parcel data - one residence per parcel polygon; residences spanning two zones will be counted twice, once for each zone.

³Median structural value of residences for Clark County in 2012: \$113,800

Source: Zillow, home and real estate marketplace, May 2012. http://www.zillow.com/local-info/NV-Clark-County-home-value/r_445/

Table G-2. Clark County unincorporated, Total Critical Facilities and Infrastructure

(Table G-2. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table G-3. Clark County unincorporated, Vulnerable Population and Residential Buildings

Hazard	Population	Residential buildings	Total Residential Building Value
Earthquake - Very Strong Ground Shaking	517,425	143,395	\$16,318,351,000
Earthquake - Strong Ground Shaking	367,046	129,477	\$14,734,482,000
Earthquake - Liquefaction	424,332	136,046	\$15,482,034,800
Flood - 100 Year Floodplain	82,564	19,932	\$2,268,261,600
Flood - 500 Year Floodplain	118,858	35,477	\$4,037,282,600
Wildfire - High	1,960	838	\$95,364,400

Table G-4. Clark County unincorporated, Vulnerable Critical Facilities and Infrastructure

(Table G-4. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table G-5. Clark County unincorporated, RL Properties

Property Insured?	Property Mitigated?	Mitigation Action Taken	Mitigation Funding Source	Number of reported flood occurrences
No	No	---	---	2
Yes	No	---	---	2
Yes	No	---	---	2
No	Yes	E	V	2
No	Yes	E	V	3
Yes	Yes	E	V	2
No	Yes	E	V	2
Yes	Yes	E	V	4
No	Yes	E	V	2
No	Yes	E	V	2
No	Yes	E	V	2
No	Yes	E	V	2

E = Building was protected by flood control/stormwater management project

V = Local Program

Table G-6. Clark County unincorporated, Summary of Impacts for Population and Residential Buildings

Hazard	Population	% of Population	No. of Residential Buildings	% of Residential Buildings
Earthquake - Very Strong Ground Shaking	517,425	58%	143,395	52%
Earthquake - Strong Ground Shaking	367,046	42%	129,477	48%
Earthquake - Liquefaction	424,332	48%	136,046	50%
Flood - 100 Year Floodplain	82,564	9%	19,932	7%
Flood - 500 Year Floodplain	118,858	14%	35,477	13%
Wildfire - High	1,960	< 1%	838	< 1%

Table G-7. Clark County unincorporated, Summary of Impacts for Critical Facilities and Infrastructure

Hazard	No. of Critical Facilities and Infrastructure	% of Critical Facilities and Infrastructure
Earthquake - Very Strong Ground Shaking	563	63%
Earthquake - Strong Ground Shaking	301	34%
Earthquake - Liquefaction	487	55%
Flood - 100 Year Floodplain	156	18%
Flood - 500 Year Floodplain	102	11%
Wildfire - Very High	1	< 1%
Wildfire - High	23	3%

Table G-8. Clark County unincorporated, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Planner(s), engineer(s) and technical staff with knowledge of land development, land management practices, and human-caused and natural hazards.	Public Works Development Review	Develops and maintains the General Plan, including the Safety Element. Develops area plans based on the General Plan, to provide more specific guidance for the development of more specific areas. Reviews private development projects and proposed capital improvements projects and other physical projects involving property for consistency and conformity with the General Plan. Anticipates and acts on the need for new plans, policies, and Code changes. Applies the approved plans, policies, code provisions, and other regulations to proposed land uses.
Engineer(s), Building Inspectors/Code Enforcement Officers or other professional(s) and technical staff trained in construction requirements and practices related to existing and new buildings.	Clark County Building Department	Oversees the effective, efficient, fair, and safe enforcement of the Nevada Building Code.
Engineers, construction project managers, and supporting technical staff.	Clark County Public Works	Provides direct or contract civil, structural, and mechanical engineering services, including contract, project, and construction management.
Engineer(s), project manager(s), technical staff, equipment operators, and maintenance and construction staff.	Clark County Public Works	Maintains and operates of a wide range of local equipment and facilities as well as providing assistance to members of the public. These include providing sufficient clean fresh water, reliable sewer services, street maintenance, storm drainage systems, street cleaning, street lights and traffic signals.
Floodplain Administrator	Clark County Public Works Development Services & Clark County Regional Flood Control District	Reviews and ensures that new development proposals do not increase flood risk, and that new developments are not located below the 100 year flood level. In addition, the Floodplain Administrator is responsible for planning and managing flood risk reduction projects throughout the local jurisdiction or tribal area.

Table G-8. Clark County unincorporated, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Emergency Manager	Clark County Emergency Management	Maintains and updates the Emergency Operations Plan for the local jurisdiction. In addition, coordinates local response and relief activities within the Emergency Operation Center, and works closely with County, state, and federal partners to support planning and training and to provide information and coordinate assistance.
Procurement Services Manager	Purchasing and Contracts	Provides a full range of municipal financial services, administers several licensing measures, and functions as the local jurisdiction's Procurement Services Manager.
Comptroller	Comptroller's Office	Provides financial services including grant financial services.
District Attorney	District Attorney's Office	Provides legal services.
Fire Chief	Fire Department	Provides fire protection services including response, fire prevention, and mitigation activities.
Sheriff	Sheriff's Civil Division	Provides law enforcement services.

Table G-9. Clark County unincorporated, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Local	General Fund	Comptroller	Program operations and specific projects.	Variable.
	General Obligation (GO) Bonds	Comptroller/ Public Works	GO Bonds are appropriately used for the construction and/or acquisition of improvements to real property broadly available to residents and visitors. Such facilities include, but are not limited to, libraries, hospitals, parks, public safety facilities, and cultural and educational facilities.	Variable.
	Special Tax and Revenue Bonds	Comptroller	Revenue bonds are used to finance capital projects that (1) have an identified budgetary stream for repayment (e.g., specified fees, tax receipts, etc.), (2) generate project revenue but rely on a broader pledge of general fund revenues to reduce borrowing costs, or (3) finance the acquisition and installation of equipment for the local jurisdiction's general governmental purposes.	Variable.
	Property Tax and Sales Tax	Comptroller/ Special Districts	Voter approved taxes used for specific purposes (e.g. CCRFCD, water authority, fire department and police support)	Variable
	Public-Private Partnerships	Public Works	Includes the use of local professionals, business owners, residents, and civic groups and trade associations, generally for the study of issues and the development of guidance and recommendations.	Project-specific.
	Capital Improvement Plans and Impact Fees	Building Department	Assigns impact development fees to finance fire and flood control capital improvement programs	Variable.

Table G-9. Clark County unincorporated, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
State	Wildfire Emergency and Mitigation Funds	Nevada Division of Forestry	Administers funding from FEMA, BLM, and U.S. Forest Service for wildfire emergency and mitigation funding, except for HMGP and PDM	Project-specific.
	Earthquake Mitigation Funds	Nevada Earthquake Safety Council	Allocates FEMA money for earthquake mitigation efforts	Project-specific.
	Wildfire Mitigation Funds	Nevada Fire Safe Council	Administers state and federal money for wildfire mitigation efforts and promotes a grass-roots movement to protect the built-environment.	Project-specific.
	Water Preservation Funds	Southern Nevada Water Authority	Provides incentives to preserve water	Project-specific.
	All-Hazard	Nevada Division of Emergency Management (DEM)	Provide support and pass-through funding for activities to mitigate all-hazards	Project-specific.
Federal	Hazard Mitigation Grant Program (HMGP)	Federal Emergency Management Agency (FEMA)	Supports pre- and post-disaster mitigation plans and projects.	Available to Nevada communities after a Presidentially declared disaster has occurred in Nevada. Grant award based on specific projects as they are identified by eligible applicants.
	Pre-Disaster Mitigation (PDM) grant program	FEMA	Supports pre-disaster mitigation plans and projects.	Available on an annual basis as a nationally competitive grant. Grant award based on specific projects as they are identified (no more than \$3M federal share for projects).
	Flood Mitigation Assistance (FMA) grant program	FEMA	Mitigates repetitively flooded structures and infrastructure.	Available on an annual basis, distributed to Nevada communities by Nevada DEM. Grant award based on specific projects as they are identified.

Table G-9. Clark County unincorporated, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Federal (cont)	Assistance to Firefighters Grant (AFG) Program	FEMA/USFA (U.S. Fire Administration)	Provides equipment, protective gear, emergency vehicles, training, and other resources needed to protect the public and emergency personnel from fire and related hazards.	Available to fire departments and nonaffiliated emergency medical services providers. Grant awards based on specific projects as they are identified.
	Community Block Grant Program Entitlement Communities Grants	U.S. HUD (U.S. Department of Housing and Urban Development)	Acquisition of real property, relocation and demolition, rehabilitation of residential and non-residential structures, construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes.	Available to entitled cities. Grant award based on specific projects as they are identified.
	Community Action for a Renewed Environment (CARE)	U.S. Environmental Protection Agency (EPA)	Through financial and technical assistance offers an innovative way for a community to organize and take action to reduce toxic pollution (i.e., stormwater) in its local environment. Through CARE, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people's exposure to them.	Competitive grant program. Grant award based on specific projects as they are identified.
	Clean Water State Revolving Fund (CWSRF)	EPA	The CWSRF is a loan program that provides low-cost financing to eligible entities within state and tribal lands for water quality projects, including all types of non-point source, watershed protection or restoration, estuary management projects, and more traditional municipal wastewater treatment projects.	CWSRF programs provided more than \$5 billion annually to fund water quality protection projects for wastewater treatment, non-point source pollution control, and watershed and estuary management.
	Public Health Emergency Preparedness (PHEP) Cooperative Agreement.	Department of Health and Human Services' (HHS') Centers for Disease Control and Prevention (CDC)	Funds are intended to upgrade state and local public health jurisdictions' preparedness and response to bioterrorism, outbreaks of infectious diseases, and other public health threats and emergencies.	Competitive grant program. Grant award based on specific projects as they are identified. Madera would participate through the County's Public Health Department.

Table G-9. Clark County unincorporated, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Federal (cont)	Homeland Security Preparedness Technical Assistance Program (HSPTAP)	FEMA/DHS	Build and sustain preparedness technical assistance activities in support of the four homeland security mission areas (prevention, protection, response, recovery) and homeland security program management.	Technical assistance services developed and delivered to state and local homeland security personnel. Grant award based on specific projects as they are identified.

Table G-10. Clark County unincorporated, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans	Comprehensive Plan: Safety Element (2011)	Describes hazard areas and regulates current and future development based on known hazard areas.	Provides policies on both natural and manmade hazards	Mitigation & Preparedness	Yes
	Emergency Plan (2011)	Describes what the local jurisdiction's actions will be during a response to an emergency. Includes annexes that describe in more detail the actions required of the local jurisdiction's departments/agencies. Further, this plan describes the role of the Emergency Operation Center (EOC) and the coordination that occurs between the EOC and the local jurisdiction's departments and other response agencies. Finally, this plan describes how the EOC serves as the focal point among local, state, and federal governments in times of disaster.	Lists 12 natural hazards which are listed in the Hazard Mitigation Plan & manmade hazards	Response	No
	LEPC Hazardous Materials Response Plan (2008)	Describes response actions in the event of a hazardous materials release.	Hazardous Materials	Response	Yes
	Land Use Plans (2011)	Provides land use restrictions and planning for areas within Clark County	Provides policies on both natural and manmade hazards	Mitigation & Response	Yes
	CDBG 5 Year Plan (2011)	Five Year Capital Improvement Plan for Community Development Block Grant.	NA	Mitigation	Yes
	Water Quality Protection Plan (2011)	Water Quality Program is responsible for the protection, preservation, and enhancement of County's water resources for the benefit of present and future generations through pro-active long-term planning, real-time monitoring, community education, regulations, compliance assurance, and working together with the public, federal, state and local agencies.	Hazardous Materials	Mitigation	Yes

Table G-10. Clark County unincorporated, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans (cont)	Southern Nevada Water Conservation Plan 2009	Provides a plan for water resource management, planning and conservation	Drought	Mitigation	Yes
Policies	Building Administrative Code (2010) includes Building, Fire, Zoning	The purpose of this code is to establish the minimum requirements to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, stability, access to persons with disabilities, sanitation, adequate lighting and ventilation and energy conservation, and safety to life and property from fire and other hazards attributed to the built environment; to regulate and control the demolition of all buildings and structures, and for related purposes.	All	Mitigation, Preparedness, and Response	Yes
	Special purpose ordinances	Includes Floodplain management, storm water management, wildfire ordinances, and hazard set back requirements.	All	Mitigation, Preparedness & Response	Yes

Table G-11. Clark County unincorporated, Current, Ongoing, and Completed Hazard Mitigation Projects and Programs

Status (Current, Ongoing, or Completed)	Project / Program Name	Description	Year(s)
Completed and Ongoing	Building Codes	Continue to enforce current building codes and adopt current international building code. Action 6.D.1	2010
Ongoing	Research into earthquake hazard	UNR and the Nevada Earthquake Safety Council (NESC) continue to study earthquake hazard and risk in the Las Vegas Valley. Action 6.A.2	Ongoing
Ongoing	Wildfire Awareness	Public Awareness of threat of wildfire and actions to reduce the threat.	Ongoing
Ongoing	Flood Projects through the CCRFCD	Reduce the threat of flood and flash flooding through development of flooding facilities and public awareness. Goal 7	Ongoing
Ongoing	Drought Response Measures	Implement drought plan through changes to Building Codes, zoning and Comprehensive Plan requirements Southern Nevada Water Authority Conservation Plan 2009 activities. Action 5.A.1	Ongoing
Ongoing	Unreinforced Masonry (URM) Identification	Obtain site-specific studies to ascertain how the building stock, old and new, might fare if a credible earthquake were to occur with specific attention to lifelines; transportation corridors, buildings, and pipelines. Action 6.A.1 Review and refine the preliminary inventory listing of Unreinforced Masonry Buildings as prepared by the Nevada Bureau of Mines and Geology	Started in 2010

Table G-12. Clark County unincorporated, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
1	Create a GIS-based pre-application review for new construction and major remodels of residential and/or non-residential structures in hazard areas, such high and/or very high wildfire areas.	Property Protection	All	New and Existing – Residential and non-residential buildings in hazard areas.
2	Integrate the Clark County HMP, in particular the hazard analysis and mitigation strategy sections, into local planning documents, including general plans, emergency operations plans, and capital improvement plans.	Property Protection	All	Not Applicable
3	Add mitigation actions to each jurisdiction's website.*	Public Awareness	All	Not Applicable
4	Develop a public outreach program that informs property owners located in the dam inundation areas about voluntary flood insurance.	Public Awareness	Dam Failure	Existing – Residential buildings located within dam inundation areas.
5	Develop a drought contingency plan to provide an effective and systematic means of assessing drought conditions, develop mitigation actions and programs to reduce risks in advance of drought, and develop response options that minimize hardships during drought.	Prevention, Natural Resource Protection	Drought	New/Existing
6	Seismically retrofit or replace critical facilities that are necessary during and/or immediately after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Public works and/or emergency response facilities that are structurally deficient or located within a high ground shaking area.
7	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Nevada DOT, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Ramps and bridges identified by Nevada DOT as structurally deficient or located within an extreme ground shaking area.
8	Teach the general public how to prepare their households, in the event of an earthquake, by presenting preparedness information and attractive hands-on displays.	Public Awareness	Earthquake	Not Applicable
9	Implement better record keeping measures, as well as on the part of food processors and handlers.*	Prevention	Epidemic (Infectious Disease)	Not Applicable

Table G-12. Clark County unincorporated, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
10	To protect vulnerable populations from disease by conducting increased surveillance and development of more stringent requirements at high-risk facilities, (i.e., day-care centers, hospitals, nursing homes, schools, as well as restaurants, hotels/resorts and casinos).*	Prevention	Epidemic (Infectious Disease)	Not Applicable
11	Acquire, relocate, elevate, and/or flood proof critical facilities that are located within the 100-year floodplain.	Property Protection	Flood	Existing - Critical facilities located within the 100-year floodplain.
12	Reinforce County and local ramps, bridges, and roads from flooding through protection activities, including elevating the road and installing culverts beneath the road or building a higher bridge across the area that experiences regular flooding.	Property Protection, Structural Project	Flood	Existing – County and local ramps, bridges, and roads identified in the 100-year floodplain.
13	Work with FEMA Region IX to address any floodplain management issues that may have arisen/arise from the countywide Digital Flood Insurance Rate Map (DFIRM), Community Assessment Visits, and/or the Division of Water Resources (DWR).	All	Flood	New/Existing - Properties within the 100-year or 500-year floodplain.
14	Acquire, relocate, or elevate residential structures, in particular those that have been identified as Repetitive Loss (RL) properties that are located within the 100-year floodplain.	Property Protection	Flood	Existing – Residential structures, including RL properties, located within the 100-year floodplain.
15	Ensure that existing monitoring capabilities at the state and County level are integrated to provide an early warning of increased or new infestations.*	Natural Resource Protection	Infestation	Not Applicable
16	Implement an infestation public awareness and educational campaign.	Public Awareness	Infestation	Not Applicable
17	Reduce the net annual groundwater withdrawal to the level of net annual recharge. This can be accomplished either through a reduction of dependence upon groundwater (increase dependence upon surface water) or through an increase in the artificial recharge.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.

Table G-12. Clark County unincorporated, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
18	In already-built areas lying within high hazard zones, restrictions on the use of applied water may be necessary to prevent the enlargement of fissures. This may require the implementation of strict water conservation policies, such as no watering or desert landscaping ordinances in areas prone to fissuring.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.
19	Implement recommended Buffer Zone Protection measures for pre-designated critical facilities and infrastructure.*	Prevention	Terrorism	Existing - Critical facilities
20	Contact key businesses (such as gun shops, recycling businesses, beauty and drug supplies) to provide them with a point of contact should they have information or concerns to report, and to background them on how to spot potentially suspicious people and activities.*	Public Awareness, Prevention	Terrorism	Not Applicable
21	In coordination with appropriate agencies, local, state, and federal, obtain site-specific studies to ascertain whether the zoning has been brought in line with the hazard, and how the building stock, old and new, might fare if a credible earthquake were to occur with specific attention to lifelines: transportation corridors, buildings, and pipelines.*	Prevention	Utility Failure, Earthquake	New and Existing – Residential and non-residential buildings in earthquake hazard areas.
22	Implement a fuel reduction program, such as the collection and disposal of dead fuel, within open spaces and around critical facilities and residential structures located within a high and very high wildfire zones.	Prevention, Property Protection, Natural Resource Protection	Wildfire	Existing – Critical facilities and residential buildings located within high and very high wildfire zones.
23	Create a vegetation management program that provides vegetation management services to elderly, disabled, or low-income property owners who lack the resources to remove flammable vegetation from around their homes.	Property Protection	Wildfire	Existing – Residential buildings in high or very high wildfire zones.

Table G-12. Clark County unincorporated, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
24	Implement a fuel modification program, which also includes residential maintenance requirements and enforcement, plan submittal and approval process, guidelines for planting, and a listing of undesirable plant species. Require builders and developers to submit their plans, complete with proposed fuel modification zones, to the local fire department for review and approval prior to beginning construction.	Prevention, Property Protection	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.
25	Establish a standard safety zone of 30 feet around county/city-owned structures that are vulnerable to the effects of wildfire. Encourage private and commercial property owners to adopt the same.	Prevention	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.
26	Develop a community wildfire mitigation plan that identifies and prioritizes areas for hazard fuel reduction treatments, and recommend the types of methods of treatments.	Prevention, Property Protection	Wildfires	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas in the Local Responsibility Areas
27	Develop a process to determine damages and losses avoided after an event; Establish a policy, process, training, and exercises for Building Assessment Response Teams.	Property Protection	All	New and Existing - Residential and non-residential buildings in hazard areas.
* Mitigation action does not meet the 2011 HMA Guidance requirements for FEMA mitigation funding				

Table G-13. Clark County unincorporated, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
2	Y	Integrate the Clark County HMP, in particular the hazard analysis and mitigation strategy sections, into local planning documents, including general plans, emergency operations plans, and capital improvement plans.	B, C, D, E	Not applicable to specific facilities.	Clark County OEM&HS	1 year - ongoing
3	Y	Add mitigation actions to the Clark County website.*	B, D, E	Not applicable to specific facilities.	Clark County OEM&HS	1 year - ongoing
6	Y	Seismically retrofit or replace critical facilities that are necessary during and/or immediately after a disaster or emergency.	A, C, D	Countywide	Clark County Public Works	3-5 years (ongoing)
7	Y	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Nevada DOT, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	A, C, D	Roads and bridges	Clark County Public Works	3-5 years (ongoing)
8	Y	Teach the general public how to prepare their households, in the event of an earthquake, by presenting preparedness information and attractive hands-on displays.	B, C, D	Not applicable to specific facilities.	Clark County OEM&HS	1 year - ongoing
10	Y	To protect vulnerable populations from disease by conducting increased surveillance and development of more stringent requirements at high-risk facilities, (i.e., day-care centers, hospitals, nursing homes, schools, as well as restaurants, hotels/resorts and casinos).*	A, B, C	Not applicable to specific facilities.	SNHD	1 year - ongoing
11	Y	Acquire, relocate, elevate, and/or flood proof critical facilities that are located within the 100-year floodplain.	A, B, C, D	County Buildings in 100 year flood plain Private structures	Clark County Public Works	3-5 years

Table G-13. Clark County unincorporated, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
12	Y	Reinforce County and local ramps, bridges, and roads from flooding through protection activities, including elevating the road and installing culverts beneath the road or building a higher bridge across the area that experiences regular flooding.	A, B, C, D	County Bridges	Clark County Public Works	3-5 years
15	Y	Ensure that existing monitoring capabilities at the state and County level are integrated to provide an early warning of increased or new infestations.*	A, B, C, D	Not applicable to specific facilities.	Clark County OEM&HS	3 years
18	Y	In already-built areas lying within high hazard zones, restrictions on the use of applied water may be necessary to prevent the enlargement of fissures. This may require the implementation of strict water conservation policies, such as no watering or desert landscaping ordinances in areas prone to fissuring.	B, C, D	Buildings located within high subsidence areas.	Clark County Comprehensive Planning Department	3 years
22	Y	Implement a fuel reduction program, such as the collection and disposal of dead fuel, within open spaces and around critical facilities and residential structures located within a high and very high wildfire zones.	B, C, D	County Buildings, residences and businesses	Clark County Comprehensive Planning Department	1 year
23	Y	Create a vegetation management program that provides vegetation management services to elderly, disabled, or low-income property owners who lack the resources to remove flammable vegetation from around their homes.	B, C, D	County Buildings, residences and businesses	Clark County Comprehensive Planning Department	1 year

Prioritization Criteria

- A. Local jurisdiction department or agency champion
- B. Ability to be implemented during the 5-year lifespan of the HMP
- C. Ability to reduce expected future damages and losses (cost-benefit)
- D. Mitigates a high-risk hazard
- E. Mitigates multiple hazards

Appendix H
City of Henderson

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Table H-1. City of Henderson, Total Population and Residential Buildings

Population ¹	Residential Buildings ²	Total Residential Building Value (2012) ³
274,462	97,331	\$ 14,774,845,800

¹Population data was derived from 2010 Census Redistricting efforts. Data was obtained and analyzed by Clark County and city GIS departments for the vulnerability analysis and may vary from information provided in Section 1.

²Residences based on assessor parcel data - one residence per parcel polygon; residences spanning two zones will be counted twice, once for each zone.

³Median structural value of residences for the City of Henderson in 2012: \$151,800

Source: Zillow, home and real estate marketplace, May 2012. http://www.zillow.com/local-info/NV-Clark-County-home-value/r_445/

Table H-2. City of Henderson, Total Critical Facilities and Infrastructure

(Table H-2. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table H-3. City of Henderson, Vulnerable Population and Residential Buildings

Hazard	Population	Residential buildings	Total Residential Building Value
Earthquake - Very Strong Ground Shaking	272,961	96,640	\$14,669,952,000
Earthquake - Strong Ground Shaking	1,551	727	\$110,358,600
Earthquake - Liquefaction	150,966	48,207	\$7,317,822,600
Flood - 100 Year Floodplain	22,373	3,968	\$602,342,400
Flood - 500 Year Floodplain	27,540	8,323	\$1,263,431,400

Table H-4. City of Henderson, Vulnerable Critical Facilities and Infrastructure

(Table H-4. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table H-5. City of Henderson, Summary of Impacts for Population and Residential Buildings

Hazard	Population	% of Population	No. of Residential Buildings	% of Residential Buildings
Earthquake - Very Strong Ground Shaking	272,961	99%	96,640	99%
Earthquake - Strong Ground Shaking	1,551	< 1%	727	< 1%
Earthquake - Liquefaction	150,966	55%	48,207	50%
Flood - 100 Year Floodplain	22,373	8%	3,968	4%
Flood - 500 Year Floodplain	27,540	10%	8,323	9%

Table H-6. City of Henderson, Summary of Impacts for Critical Facilities and Infrastructure

Hazard	No. of Critical Facilities and Infrastructure	% of Critical Facilities and Infrastructure
Earthquake - Very Strong Ground Shaking	145	99%
Earthquake - Strong Ground Shaking	2	1%
Earthquake - Liquefaction	88	60%
Flood - 100 Year Floodplain	26	18%
Flood - 500 Year Floodplain	13	9%

Table H-7. City of Henderson, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Planner(s), engineer(s) and technical staff with knowledge of land development, land management practices, and human-caused and natural hazards.	Community Development Department	Develops and maintains the General Plan, including the Safety Element. Develops area plans based on the General Plan, to provide more specific guidance for the development of more specific areas. Reviews private development projects and proposed capital improvements projects and other physical projects involving property for consistency and conformity with the General Plan. Anticipates and acts on the need for new plans, policies, and Code changes. Applies the approved plans, policies, code provisions, and other regulations to proposed land uses.
Engineer(s), Building Inspectors/Code Enforcement Officers or other professional(s) and technical staff trained in construction requirements and practices related to existing and new buildings.	Public Works Department - Building & Fire Safety	Oversees the effective, efficient, fair, and safe enforcement of the Nevada Building Code
Engineers, construction project managers, and supporting technical staff.	Public Works Department – Engineering Services	Provides direct or contract civil, structural, and mechanical engineering services, including contract, project, and construction management.
Engineer(s), project manager(s), technical staff, equipment operators, and maintenance and construction staff.	Utility Services Department	Maintains and operates of a wide range of local equipment and facilities as well as providing assistance to members of the public. These include providing sufficient clean fresh water and reliable sewer services.
Engineer(s), project manager(s), technical staff, equipment operators, and maintenance and construction staff.	Public Works Department – Support Services	Maintains and operates of a wide range of local equipment and facilities as well as providing assistance to members of the public. These include providing street maintenance, storm drainage systems, street cleaning, street lights and traffic signals.
Engineer(s), project manager(s), technical staff, equipment operators, and maintenance and construction staff.	Public Works Department – Traffic Services	Maintains and operates of a wide range of local equipment and facilities as well as providing assistance to members of the public. These include providing street lights and traffic signals.

Table H-7. City of Henderson, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Floodplain Administrator	Public Works Department – Engineering Services	Reviews and ensures that new development proposals do not increase flood risk, and that new developments are not located below the 100 year flood level. In addition, the Floodplain Administrator is responsible for planning and managing flood risk reduction projects throughout the local jurisdiction or tribal area.
Emergency Manager	Fire Department – Emergency Management	Maintains and updates the Emergency Operations Plan for the local jurisdiction. In addition, coordinates local response and relief activities within the Emergency Operation Center, and works closely with County, state, and federal partners to support planning and training and to provide information and coordinate assistance.
Procurement Services Manager	Finance Department	Provides a full range of municipal financial services, administers several licensing measures, and functions as the local jurisdiction’s Procurement Services Manager.

Table H-8. City of Henderson, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Local	General Fund	Finance Department	Program operations and specific projects.	Variable.
	General Obligation (GO) Bonds	Finance Department	GO Bonds are appropriately used for the construction and/or acquisition of improvements to real property broadly available to residents and visitors. Such facilities include, but are not limited to, libraries, hospitals, parks, public safety facilities, and cultural and educational facilities.	Variable.
	Lease Revenue Bonds	Comptroller	Lease revenue bonds are used to finance capital projects that (1) have an identified budgetary stream for repayment (e.g., specified fees, tax receipts, etc.), (2) generate project revenue but rely on a broader pledge of general fund revenues to reduce borrowing costs, or (3) finance the acquisition and installation of equipment for the local jurisdiction's general governmental purposes.	Variable.
State	Wildfire Emergency and Mitigation Funds	Nevada Division of Forestry	Administers funding from FEMA, BLM, and U.S. Forest Service for wildfire emergency and mitigation funding, except for HMGP and PDM	Project-specific.
	Earthquake Mitigation Funds	Nevada Earthquake Safety Council	Allocates FEMA money for earthquake mitigation efforts	Project-specific.
	Wildfire Mitigation Funds	Nevada Fire Safe Council	Administers state and federal money for wildfire mitigation efforts and promotes a grass-roots movement to protect the built-environment.	Project-specific.
	Water Preservation Funds	Southern Nevada Water Authority	Provides incentives to preserve water	Project-specific.

Table H-8. City of Henderson, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
State (cont)	All-Hazard	Nevada Division of Emergency Management (DEM)	Provide support and pass-through funding for activities to mitigate all-hazards	Project-specific.
Federal	Hazard Mitigation Grant Program (HMGP)	Federal Emergency Management Agency (FEMA)	Supports pre- and post-disaster mitigation plans and projects.	Available to Nevada communities after a Presidentially declared disaster has occurred in Nevada. Grant award based on specific projects as they are identified by eligible applicants.
	Pre-Disaster Mitigation (PDM) grant program	FEMA	Supports pre-disaster mitigation plans and projects.	Available on an annual basis as a nationally competitive grant. Grant award based on specific projects as they are identified (no more than \$3M federal share for projects).
	Flood Mitigation Assistance (FMA) grant program	FEMA	Mitigates repetitively flooded structures and infrastructure.	Available on an annual basis, distributed to Nevada communities by Nevada DEM. Grant award based on specific projects as they are identified.
	Assistance to Firefighters Grant (AFG) Program	FEMA/USFA (U.S. Fire Administration)	Provides equipment, protective gear, emergency vehicles, training, and other resources needed to protect the public and emergency personnel from fire and related hazards.	Available to fire departments and nonaffiliated emergency medical services providers. Grant awards based on specific projects as they are identified.
	Community Block Grant Program Entitlement Communities Grants	U.S. HUD (U.S. Department of Housing and Urban Development)	Acquisition of real property, relocation and demolition, rehabilitation of residential and non-residential structures, construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes.	Available to entitled cities. Grant award based on specific projects as they are identified.

Table H-8. City of Henderson, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Federal (cont)	Community Action for a Renewed Environment (CARE)	U.S. Environmental Protection Agency (EPA)	Through financial and technical assistance offers an innovative way for a community to organize and take action to reduce toxic pollution (i.e., stormwater) in its local environment. Through CARE, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people's exposure to them.	Competitive grant program. Grant award based on specific projects as they are identified.
	Clean Water State Revolving Fund (CWSRF)	EPA	The CWSRF is a loan program that provides low-cost financing to eligible entities within state and tribal lands for water quality projects, including all types of non-point source, watershed protection or restoration, estuary management projects, and more traditional municipal wastewater treatment projects.	CWSRF programs provided more than \$5 billion annually to fund water quality protection projects for wastewater treatment, non-point source pollution control, and watershed and estuary management.
	Public Health Emergency Preparedness (PHEP) Cooperative Agreement.	Department of Health and Human Services' (HHS') Centers for Disease Control and Prevention (CDC)	Funds are intended to upgrade state and local public health jurisdictions' preparedness and response to bioterrorism, outbreaks of infectious diseases, and other public health threats and emergencies.	Competitive grant program. Grant award based on specific projects as they are identified. Madera would participate through the County's Public Health Department.
	Homeland Security Preparedness Technical Assistance Program (HSPTAP)	FEMA/DHS	Build and sustain preparedness technical assistance activities in support of the four homeland security mission areas (prevention, protection, response, recovery) and homeland security program management.	Technical assistance services developed and delivered to state and local homeland security personnel. Grant award based on specific projects as they are identified.

Table H-9. City of Henderson, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans	General Plan: Safety Element (2006)	Describes hazard areas and regulates current and future development based on known hazard areas.	Special Flood Hazard Area, Water Demand, Environmentally Sensitive Areas, Increase in Stormwater Runoff with Development	Mitigation & Preparedness	Yes
	Emergency Operations Plan (2012)	Describes what the local jurisdiction's actions will be during a response to an emergency. Includes annexes that describe in more detail the actions required of the local jurisdiction's departments/agencies. Further, this plan describes the role of the Emergency Operation Center (EOC) and the coordination that occurs between the EOC and the local jurisdiction's departments and other response agencies. Finally, this plan describes how the EOC serves as the focal point among local, state, and federal governments in times of disaster.	Aircraft Incident, Civil Disturbance, Earthquake, Explosive, Extreme Heat, Flood and Flash Floods, HAZMAT event, Landslide, Large Venue Fires, Radiological/Nuclear Incidents	Response	No
	Stormwater Quality Management Program (SWQMP) (2011)	Describes measures that the local jurisdiction will take to minimize stormwater pollution. The SWQMP is required by the National Pollutant Discharge Elimination System Phase II regulations, which became effective in March 2003.	Stormwater	Mitigation & Preparedness	Yes

Table H-9. City of Henderson, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies	Code of Ordinances	The purpose of this code is to establish the minimum requirements to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, stability, access to persons with disabilities, sanitation, adequate lighting and ventilation and energy conservation, and safety to life and property from fire and other hazards attributed to the built environment; to regulate and control the demolition of all buildings and structures, and for related purposes.	Flood, Fire, Seismic, Wind, Environmentally Sensitive Areas, Traffic	Mitigation, Preparedness, and Response	Yes

Table H-10. City of Henderson, Current, Ongoing, and Completed Hazard Mitigation Projects and Programs

Status (Current, Ongoing, or Completed)	Project / Program Name	Description	Year(s)
Complete	Street Sweeper Wash Down Site	Site where city street sweepers are cleaned. Runoff is conveyed to a drop inlet and pollutants are removed by a sand/oil separator. The flow is then discharged into the sanitary sewer system.	2003
Complete	C-1 Channel, Phase 2	Construction of the C-1 Channel between Burkholder Road and Drake Channel Confluence. Safely conveys stormwater runoff within channel, minimizing impacts to existing and proposed development. Funded by the Clark County Regional Flood Control District.	2004
Complete	Boulder Highway Channel	Construction of the C-1 Boulder Highway Channel between the Wagonwheel Interchange and Pueblo Boulevard. Safely conveys stormwater runoff within channel, minimizing impacts to existing and proposed development. Funded by the Clark County Regional Flood Control District.	2006
Complete	Mission Drive/Greenway Road Improvements	Included construction of storm drain system from the C-1 US95 Channel, south to Mission Drive, east to Greenway Road, and south to Paradise Hills Drive to safely convey stormwater. Funded by the Clark County Regional Flood Control District.	2007
Complete	Pittman Burns Channel Crossing at Boulder Highway	Construction of a culvert under Boulder Highway near Galleria to mitigate flooding across the highway during storm events. Funded by the Clark County Regional Flood Control District.	2008
Complete	Pittman MacDonald Ranch Channel	Construction of the Pittman MacDonald Ranch Channel from Arroyo Grande Road to approximately 500-feet south of Paseo Verde Drive. Funded by the Clark County Regional Flood Control District.	2009

Table H-10. City of Henderson, Current, Ongoing, and Completed Hazard Mitigation Projects and Programs

Status (Current, Ongoing, or Completed)	Project / Program Name	Description	Year(s)
Complete	Northeast C-1 Detention Basin and Outfall	Construction of the Northeast C-1 Detention Basin, Inflow structure, and outfall to attenuate the flow from the mountains and safely convey runoff to the C-1 Channel. Funded by the Clark County Regional Flood Control District.	2010
Complete	Pittman Railroad East Conveyance	Construction of the Pittman Railroad East Conveyance channel to safely convey flows under the UPRR Tracks near American Pacific Drive. Funded by the Clark County Regional Flood Control District.	2010
Complete	Equestrian Tributary Phase I	Construction of the Equestrian Tributary Phase I parallel to Equestrian Road between Appaloosa Drive and the Equestrian Detention Basin. Funded by the Clark County Regional Flood Control District.	2010
Complete	Pittman Pecos Sewer Protection Project	Lower an existing sewer line to be below the existing Pecos Legacy Channel at the Pittman Wash West of Green Valley Parkway. Funded by the Clark County Regional Flood Control District.	2011
Ongoing	Regional Flood Control Maintenance Work Program	Annual program to inspect and maintain Regional Flood Control District facilities to ensure the system conveys flows safely and efficiently. Funded by the Clark County Regional Flood Control District.	Annual Program
Ongoing	Drop Inlet Inspection and Maintenance Program	Annual program to inspect and maintain drop inlets to ensure the system conveys flows safely and efficiently.	Annual Program

Table H-11. City of Henderson, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
1	Create a GIS-based pre-application review for new construction and major remodels of residential and/or non-residential structures in hazard areas, such high and/or very high wildfire areas.	Property Protection	All	New and Existing – Residential and non-residential buildings in hazard areas.
2	Integrate the Clark County HMP, in particular the hazard analysis and mitigation strategy sections, into local planning documents, including general plans, emergency operations plans, and capital improvement plans.	Property Protection	All	Not Applicable
3	Add mitigation actions to each jurisdiction's website.*	Public Awareness	All	Not Applicable
4	Develop a public outreach program that informs property owners located in the dam inundation areas about voluntary flood insurance.	Public Awareness	Dam Failure	Existing – Residential buildings located within dam inundation areas.
5	Develop a drought contingency plan to provide an effective and systematic means of assessing drought conditions, develop mitigation actions and programs to reduce risks in advance of drought, and develop response options that minimize hardships during drought.	Prevention, Natural Resource Protection	Drought	New/Existing
6	Seismically retrofit or replace critical facilities that are necessary during and/or immediately after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Public works and/or emergency response facilities that are structurally deficient or located within a high ground shaking area.
7	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Nevada DOT, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Ramps and bridges identified by Nevada DOT as structurally deficient or located within an extreme ground shaking area.
8	Teach the general public how to prepare their households, in the event of an earthquake, by presenting preparedness information and attractive hands-on displays.	Public Awareness	Earthquake	Not Applicable
9	Implement better record keeping measures, as well as on the part of food processors and handlers.*	Prevention	Epidemic (Infectious Disease)	Not Applicable

Table H-11. City of Henderson, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
10	To protect vulnerable populations from disease by conducting increased surveillance and development of more stringent requirements at high-risk facilities, (i.e., day-care centers, hospitals, nursing homes, schools, as well as restaurants, hotels/resorts and casinos).*	Prevention	Epidemic (Infectious Disease)	Not Applicable
11	Acquire, relocate, elevate, and/or flood proof critical facilities that are located within the 100-year floodplain.	Property Protection	Flood	Existing - Critical facilities located within the 100-year floodplain.
12	Reinforce County and local ramps, bridges, and roads from flooding through protection activities, including elevating the road and installing culverts beneath the road or building a higher bridge across the area that experiences regular flooding.	Property Protection, Structural Project	Flood	Existing – County and local ramps, bridges, and roads identified in the 100-year floodplain.
13	Work with FEMA Region IX to address any floodplain management issues that may have arisen/arise from the countywide Digital Flood Insurance Rate Map (DFIRM), Community Assessment Visits, and/or the Division of Water Resources (DWR).	All	Flood	New/Existing - Properties within the 100-year or 500-year floodplain.
14	Acquire, relocate, or elevate residential structures, in particular those that have been identified as Repetitive Loss (RL) properties that are located within the 100-year floodplain.	Property Protection	Flood	Existing – Residential structures, including RL properties, located within the 100-year floodplain.
15	Ensure that existing monitoring capabilities at the state and County level are integrated to provide an early warning of increased or new infestations.*	Natural Resource Protection	Infestation	Not Applicable
16	Implement an infestation public awareness and educational campaign.	Public Awareness	Infestation	Not Applicable
17	Reduce the net annual groundwater withdrawal to the level of net annual recharge. This can be accomplished either through a reduction of dependence upon groundwater (increase dependence upon surface water) or through an increase in the artificial recharge.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.

Table H-11. City of Henderson, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
18	In already-built areas lying within high hazard zones, restrictions on the use of applied water may be necessary to prevent the enlargement of fissures. This may require the implementation of strict water conservation policies, such as no watering or desert landscaping ordinances in areas prone to fissuring.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.
19	Implement recommended Buffer Zone Protection measures for pre-designated critical facilities and infrastructure.*	Prevention	Terrorism	Existing - Critical facilities
20	Contact key businesses (such as gun shops, recycling businesses, beauty and drug supplies) to provide them with a point of contact should they have information or concerns to report, and to background them on how to spot potentially suspicious people and activities.*	Public Awareness, Prevention	Terrorism	Not Applicable
21	In coordination with appropriate agencies, local, state, and federal, obtain site-specific studies to ascertain whether the zoning has been brought in line with the hazard, and how the building stock, old and new, might fare if a credible earthquake were to occur with specific attention to lifelines: transportation corridors, buildings, and pipelines.*	Prevention	Utility Failure, Earthquake	New and Existing – Residential and non-residential buildings in earthquake hazard areas.
22	Implement a fuel reduction program, such as the collection and disposal of dead fuel, within open spaces and around critical facilities and residential structures located within a high and very high wildfire zones.	Prevention, Property Protection, Natural Resource Protection	Wildfire	Existing – Critical facilities and residential buildings located within high and very high wildfire zones.
23	Create a vegetation management program that provides vegetation management services to elderly, disabled, or low-income property owners who lack the resources to remove flammable vegetation from around their homes.	Property Protection	Wildfire	Existing – Residential buildings in high or very high wildfire zones.
24	Implement a fuel modification program, which also includes residential maintenance requirements and enforcement, plan submittal and approval process, guidelines for planting, and a listing of undesirable plant species. Require builders and developers to submit their plans, complete with proposed fuel modification zones, to the local fire department for review and approval prior to beginning construction.	Prevention, Property Protection	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.

Table H-11. City of Henderson, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
25	Establish a standard safety zone of 30 feet around county/city-owned structures that are vulnerable to the effects of wildfire. Encourage private and commercial property owners to adopt the same.	Prevention	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.
26	Develop a community wildfire mitigation plan that identifies and prioritizes areas for hazard fuel reduction treatments, and recommend the types of methods of treatments.	Prevention, Property Protection	Wildfires	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas in the Local Responsibility Areas
27	Develop a process to determine damages and losses avoided after an event.	Property Protection	All	New and Existing - Residential and non-residential buildings in hazard areas.
28	Acquire open space corridors to preserve in perpetuity for flood control conveyance and recreational purposes.	Prevention, Property Protection	Flood	New/Existing - Residential and non-residential buildings
* Mitigation action does not meet the 2011 HMA Guidance requirements for FEMA mitigation funding				

Table H-12. City of Henderson, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
1	Y	Create a GIS-based pre-application review for new construction and major remodels of residential and/or non-residential structures in hazard areas, such high and/or very high wildfire areas.	B, D, E	Not Applicable	Community Development, Public Works	5 yrs
2	Y	Integrate the Clark County HMP, in particular the hazard analysis and mitigation strategy sections, into local planning documents, including general plans, emergency operations plans, and capital improvement plans.	A, B, D, E	Not Applicable	Fire Department-Emergency Management	5 yrs
3	Y	Add mitigation actions to each jurisdiction's website.*	A, B, C, D	Not Applicable	Emergency Management, Public Works, Utilities	3-5 yrs
4	Y	Develop a public outreach program that informs property owners located in the dam inundation areas about voluntary flood insurance.	A, B, D	Not Applicable	Public Works	1-3 yrs
5	Y	Develop a drought contingency plan to provide an effective and systematic means of assessing drought conditions, develop mitigation actions and programs to reduce risks in advance of drought, and develop response options that minimize hardships during drought.	A, B, C, D	Not Applicable	Utilities	1-3 yrs
11	Y	Acquire, relocate, elevate, and/or flood proof critical facilities that are located within the 100-year floodplain.	B, C, D	Unknown	Public Works	3-5 yrs
12	Y	Reinforce County and local ramps, bridges, and roads from flooding through protection activities, including elevating the road and installing culverts beneath the road or building a higher bridge across the area that experiences regular flooding.	B, C, D	Unknown	Public Works	5 yrs

Table H-12. City of Henderson, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
13	Y	Work with FEMA Region IX to address any floodplain management issues that may have arisen/arise from the countywide Digital Flood Insurance Rate Map (DFIRM), Community Assessment Visits, and/or the Division of Water Resources (DWR).	B, C, D	Not Applicable	Public Works	3-5 yrs
28	Y	Acquire open space corridors to preserve in perpetuity for flood control conveyance and recreational purposes.	A, B, D	Not Applicable	Public Works	5 yrs

Prioritization Criteria

- A. Local jurisdiction department or agency champion
- B. Ability to be implemented during the 5-year lifespan of the HMP
- C. Ability to reduce expected future damages and losses (cost-benefit)
- D. Mitigates a high-risk hazard
- E. Mitigates multiple hazards

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Appendix I
City of Las Vegas

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Table I-1. City of Las Vegas, Total Population and Residential Buildings

Population¹	Residential Buildings²	Total Residential Building Value (2012)³
601,199	183,491	\$20,018,868,100

¹Population data was derived from 2010 Census Redistricting efforts. Data was obtained and analyzed by Clark County and city GIS departments for the vulnerability analysis and may vary from information provided in Section 1.

²Residences based on assessor parcel data - one residence per parcel polygon; residences spanning two zones will be counted twice, once for each zone.

³Median structural value of residences for the City of Las Vegas in 2012: \$109,100

Source: Zillow, home and real estate marketplace, May 2012. http://www.zillow.com/local-info/NV-Clark-County-home-value/r_445/

Table I-2. City of Las Vegas, Total Critical Facilities and Infrastructure

(Table I-2. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table I-3. City of Las Vegas, Vulnerable Population and Residential Buildings

Hazard	Population	Residential buildings	Total Residential Building Value
Earthquake - Very Strong Ground Shaking	456,402	129,595	\$14,138,814,500
Earthquake - Strong Ground Shaking	146,306	54,196	\$5,912,783,600
Earthquake - Liquefaction	154,101	31,600	\$3,447,560,000
Flood - 100 Year Floodplain	7,125	569	\$62,077,900
Flood - 500 Year Floodplain	29,236	6,192	\$675,547,200

Table I-4. City of Las Vegas, Vulnerable Critical Facilities and Infrastructure

(Table I-4. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table I-5. City of Las Vegas, RL Properties

Property Insured?	Property Mitigated?	Mitigation Action Taken	Mitigation Funding Source	Number of reported flood occurrences
Yes	No	---	---	2
Yes, SDF	*No	---	---	5
Yes	No	---	---	2
No	Yes	E	V	3
No	Yes	E	V	2
No	Yes	E	V	5

* = Severe Repetitive Loss Property

E = Building was protected by flood control/stormwater management project

SDF = insurance policy is at the Special Direct Facility

V = Local Program

Table I-6. City of Las Vegas, Summary of Impacts for Population and Residential Buildings

Hazard	Population	% of Population	No. of Residential Buildings	% of Residential Buildings
Earthquake - Very Strong Ground Shaking	456,402	76%	129,595	71%
Earthquake - Strong Ground Shaking	146,306	24%	54,196	30%
Earthquake - Liquefaction	154,101	26%	31,600	17%
Flood - 100 Year Floodplain	7,125	1%	569	< 1%
Flood - 500 Year Floodplain	29,236	5%	6,192	3%

Table I-7. City of Las Vegas, Summary of Impacts for Critical Facilities and Infrastructure

Hazard	No. of Critical Facilities and Infrastructure	% of Critical Facilities and Infrastructure
Earthquake - Very Strong Ground Shaking	185	76%
Earthquake - Strong Ground Shaking	61	25%
Earthquake - Liquefaction	98	40%
Flood - 100 Year Floodplain	11	4%
Flood - 500 Year Floodplain	12	5%

Table I-8. City of Las Vegas, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Planner(s), engineer(s) and technical staff with knowledge of land development, land management practices, and human-caused and natural hazards.	City of Las Vegas Department of Planning and Department of Public Works	Develops and maintains the General Plan, including the Safety Element. Develops area plans based on the General Plan, to provide more specific guidance for the development of more specific areas. Reviews private development projects and proposed capital improvements projects and other physical projects involving property for consistency and conformity with the General Plan. Anticipates and acts on the need for new plans, policies, and Code changes. Applies the approved plans, policies, code provisions, and other regulations to proposed land uses.
Engineer(s), Building Inspectors/Code Enforcement Officers or other professional(s) and technical staff trained in construction requirements and practices related to existing and new buildings.	City of Las Vegas, Department of Building and Safety	Oversees the effective, efficient, fair, and safe enforcement of the Nevada Building Code
Engineers, construction project managers, and supporting technical staff.	City of Las Vegas, Department of Building and Safety, Public Works, and All Departments with assigned Project Managers (i.e. Fire and Rescue)	Provides direct or contract civil, structural, and mechanical engineering services, including contract, project, and construction management.
Engineer(s), project manager(s), technical staff, equipment operators, and maintenance and construction staff.	City of Las Vegas, Department of Building and Safety, Public Works, Facilities, Field Operations and All Departments with assigned Project Managers.	Maintains and operates of a wide range of local equipment and facilities as well as providing assistance to members of the public. These include providing sufficient clean fresh water, reliable sewer services, street maintenance, storm drainage systems, street cleaning, street lights and traffic signals.

Table I-8. City of Las Vegas, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Floodplain Administrator	City of Las Vegas, Department of Public Works	Reviews and ensures that new development proposals do not increase flood risk, and that new developments are not located below the 100 year flood level. In addition, the Floodplain Administrator is responsible for planning and managing flood risk reduction projects throughout the local jurisdiction or tribal area.
Emergency Manager	City of Las Vegas Department of Administrative Services, office of Emergency Management	Maintains and updates the Emergency Operations Plan for the local jurisdiction. In addition, coordinates local response and relief activities within the Emergency Operation Center, and works closely with County, state, and federal partners to support planning and training and to provide information and coordinate assistance.
Procurement Services Manager	City of Las Vegas Department of Finance and Business Services, Purchasing and Contract Division	Provides a full range of municipal financial services, administers several licensing measures, and functions as the local jurisdiction's Procurement Services Manager.

Table I-9. City of Las Vegas, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Local	General Fund	Department of Finance	Program operations and specific projects.	Variable.
	General Obligation (GO) Bonds	Department of Finance	GO Bonds are appropriately used for the construction and/or acquisition of improvements to real property broadly available to residents and visitors. Such facilities include, but are not limited to, libraries, hospitals, parks, public safety facilities, and cultural and educational facilities.	Variable.
	Lease Revenue Bonds	Department of Finance	Lease revenue bonds are used to finance capital projects that (1) have an identified budgetary stream for repayment (e.g., specified fees, tax receipts, etc.), (2) generate project revenue but rely on a broader pledge of general fund revenues to reduce borrowing costs, or (3) finance the acquisition and installation of equipment for the local jurisdiction's general governmental purposes.	Variable.
	Public-Private Partnerships	Department of Finance	Includes the use of local professionals, business owners, residents, and civic groups and trade associations, generally for the study of issues and the development of guidance and recommendations.	Project-specific.
State	Wildfire Emergency and Mitigation Funds	Nevada Division of Forestry	Administers funding from FEMA, BLM, and U.S. Forest Service for wildfire emergency and mitigation funding, except for HMGP and PDM	Project-specific.
	Earthquake Mitigation Funds	Nevada Earthquake Safety Council	Allocates FEMA money for earthquake mitigation efforts	Project-specific.

Table I-9. City of Las Vegas, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
State (cont)	Wildfire Mitigation Funds	Nevada Fire Safe Council	Administers state and federal money for wildfire mitigation efforts and promotes a grass-roots movement to protect the built-environment.	Project-specific.
	Water Preservation Funds	Southern Nevada Water Authority	Provides incentives to preserve water	Project-specific.
	All-Hazard	Nevada Division of Emergency Management (DEM)	Provide support and pass-through funding for activities to mitigate all-hazards	Project-specific.
Federal	Hazard Mitigation Grant Program (HMGP)	Federal Emergency Management Agency (FEMA)	Supports pre- and post-disaster mitigation plans and projects.	Available to Nevada communities after a Presidentially declared disaster has occurred in Nevada. Grant award based on specific projects as they are identified by eligible applicants.
	Pre-Disaster Mitigation (PDM) grant program	FEMA	Supports pre-disaster mitigation plans and projects.	Available on an annual basis as a nationally competitive grant. Grant award based on specific projects as they are identified (no more than \$3M federal share for projects).
	Flood Mitigation Assistance (FMA) grant program	FEMA	Mitigates repetitively flooded structures and infrastructure.	Available on an annual basis, distributed to Nevada communities by Nevada DEM. Grant award based on specific projects as they are identified.
	Assistance to Firefighters Grant (AFG) Program	FEMA/USFA (U.S. Fire Administration)	Provides equipment, protective gear, emergency vehicles, training, and other resources needed to protect the public and emergency personnel from fire and related hazards.	Available to fire departments and nonaffiliated emergency medical services providers. Grant awards based on specific projects as they are identified.

Table I-9. City of Las Vegas, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Federal (cont)	Community Block Grant Program Entitlement Communities Grants	U.S. HUD (U.S. Department of Housing and Urban Development)	Acquisition of real property, relocation and demolition, rehabilitation of residential and non-residential structures, construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes.	Available to entitled cities. Grant award based on specific projects as they are identified.
	Community Action for a Renewed Environment (CARE)	U.S. Environmental Protection Agency (EPA)	Through financial and technical assistance offers an innovative way for a community to organize and take action to reduce toxic pollution (i.e., stormwater) in its local environment. Through CARE, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people's exposure to them.	Competitive grant program. Grant award based on specific projects as they are identified.
	Clean Water State Revolving Fund (CWSRF)	EPA	The CWSRF is a loan program that provides low-cost financing to eligible entities within state and tribal lands for water quality projects, including all types of non-point source, watershed protection or restoration, estuary management projects, and more traditional municipal wastewater treatment projects.	CWSRF programs provided more than \$5 billion annually to fund water quality protection projects for wastewater treatment, non-point source pollution control, and watershed and estuary management.
	Public Health Emergency Preparedness (PHEP) Cooperative Agreement.	Department of Health and Human Services' (HHS') Centers for Disease Control and Prevention (CDC)	Funds are intended to upgrade state and local public health jurisdictions' preparedness and response to bioterrorism, outbreaks of infectious diseases, and other public health threats and emergencies.	Competitive grant program. Grant award based on specific projects as they are identified. Madera would participate through the County's Public Health Department.
	Homeland Security Preparedness Technical Assistance Program (HSPTAP)	FEMA/DHS	Build and sustain preparedness technical assistance activities in support of the four homeland security mission areas (prevention, protection, response, recovery) and homeland security program management.	Technical assistance services developed and delivered to state and local homeland security personnel. Grant award based on specific projects as they are identified.

Table I-10. City of Las Vegas, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans	General Plan: Safety Element (2010)	Describes hazard areas and regulates current and future development based on known hazard areas.	Fire – Flood – Seismic- Noise – Hazardous Materials and Landslide	Mitigation & Preparedness	Yes
	Emergency Response Plan or Emergency Operations Plan [please select one, if applicable] (year)	Describes what the local jurisdiction's actions will be during a response to an emergency. Includes annexes that describe in more detail the actions required of the local jurisdiction's departments/agencies. Further, this plan describes the role of the Emergency Operation Center (EOC) and the coordination that occurs between the EOC and the local jurisdiction's departments and other response agencies. Finally, this plan describes how the EOC serves as the focal point among local, state, and federal governments in times of disaster.	Avalanche – Bomb Threat Explosion – Civil Disorder – Drought/Water Shortage – Earthquake-Fire-Flooding-Fuel Shortage and Utility Outages – Hazardous Materials-Radiological Incidents-Severe Weather – Terrorism and WMD Incidents-Tornados – Transportation Incidents/accident	Response	No
	Stormwater Quality Management Program (SWQMP) (2010)	Describes measures that the local jurisdiction will take to minimize storm water pollution. The SWQMP is required by the National Pollutant Discharge Elimination System Phase II regulations, which became effective in March 2003.	Stormwater	Mitigation & Preparedness	Yes

Table I-10. City of Las Vegas, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies	Code of Ordinances	The purpose of this <i>code</i> is to establish the minimum requirements to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, stability, access to persons with disabilities, sanitation, adequate lighting and ventilation and energy conservation, and safety to life and property from fire and other hazards attributed to the built environment; to regulate and control the demolition of all buildings and structures, and for related purposes.	Fire, Hazardous Materials, Flood	Mitigation, Preparedness, and Response	Yes

Table I-11. City of Las Vegas, Current, Ongoing, and Completed Hazard Mitigation Projects and Programs

Status (Current, Ongoing, or Completed)	Project / Program Name	Description	Year(s)
Ongoing	Bonneville Stormwater/Groundwater Pumping Station	Bonneville Underpass is constructed below the groundwater table, so constant groundwater dewatering is required to keep the underpass dry. Groundwater is contaminated and requires treatment before discharge into storm drain. The project is ongoing since 1992. The maintenance of pumping station costs approximately \$40,000 per year.	Ongoing

Table I-12. City of Las Vegas, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
1	Create a GIS-based pre-application review for new construction and major remodels of residential and/or non-residential structures in hazard areas, such high and/or very high wildfire areas.	Property Protection	All	New and Existing – Residential and non-residential buildings in hazard areas.
2	Integrate the Clark County HMP, in particular the hazard analysis and mitigation strategy sections, into local planning documents, including general plans, emergency operations plans, and capital improvement plans.	Property Protection	All	Not Applicable
3	Add mitigation actions to each jurisdiction's website.*	Public Awareness	All	Not Applicable
4	Develop a public outreach program that informs property owners located in the dam inundation areas about voluntary flood insurance.	Public Awareness	Dam Failure	Existing – Residential buildings located within dam inundation areas.
5	Develop a drought contingency plan to provide an effective and systematic means of assessing drought conditions, develop mitigation actions and programs to reduce risks in advance of drought, and develop response options that minimize hardships during drought.	Prevention, Natural Resource Protection	Drought	New/Existing
6	Seismically retrofit or replace critical facilities that are necessary during and/or immediately after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Public works and/or emergency response facilities that are structurally deficient or located within a high ground shaking area.
7	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Nevada DOT, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Ramps and bridges identified by Nevada DOT as structurally deficient or located within an extreme ground shaking area.
8	Teach the general public how to prepare their households, in the event of an earthquake, by presenting preparedness information and attractive hands-on displays.	Public Awareness	Earthquake	Not Applicable
9	Implement better record keeping measures, as well as on the part of food processors and handlers.*	Prevention	Epidemic (Infectious Disease)	Not Applicable

Table I-12. City of Las Vegas, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
10	To protect vulnerable populations from disease by conducting increased surveillance and development of more stringent requirements at high-risk facilities, (i.e., day-care centers, hospitals, nursing homes, schools, as well as restaurants, hotels/resorts and casinos).*	Prevention	Epidemic (Infectious Disease)	Not Applicable
11	Acquire, relocate, elevate, and/or flood proof critical facilities that are located within the 100-year floodplain.	Property Protection	Flood	Existing - Critical facilities located within the 100-year floodplain.
12	Reinforce County and local ramps, bridges, and roads from flooding through protection activities, including elevating the road and installing culverts beneath the road or building a higher bridge across the area that experiences regular flooding.	Property Protection, Structural Project	Flood	Existing – County and local ramps, bridges, and roads identified in the 100-year floodplain.
13	Work with FEMA Region IX to address any floodplain management issues that may have arisen/arise from the countywide Digital Flood Insurance Rate Map (DFIRM), Community Assessment Visits, and/or the Division of Water Resources (DWR).	All	Flood	New/Existing - Properties within the 100-year or 500-year floodplain.
14	Acquire, relocate, or elevate residential structures, in particular those that have been identified as Repetitive Loss (RL) properties that are located within the 100-year floodplain.	Property Protection	Flood	Existing – Residential structures, including RL properties, located within the 100-year floodplain.
15	Ensure that existing monitoring capabilities at the state and County level are integrated to provide an early warning of increased or new infestations.*	Natural Resource Protection	Infestation	Not Applicable
16	Implement an infestation public awareness and educational campaign.	Public Awareness	Infestation	Not Applicable
17	Reduce the net annual groundwater withdrawal to the level of net annual recharge. This can be accomplished either through a reduction of dependence upon groundwater (increase dependence upon surface water) or through an increase in the artificial recharge.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.

Table I-12. City of Las Vegas, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
18	In already-built areas lying within high hazard zones, restrictions on the use of applied water may be necessary to prevent the enlargement of fissures. This may require the implementation of strict water conservation policies, such as no watering or desert landscaping ordinances in areas prone to fissuring.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.
19	Implement recommended Buffer Zone Protection measures for pre-designated critical facilities and infrastructure.*	Prevention	Terrorism	Existing - Critical facilities
20	Contact key businesses (such as gun shops, recycling businesses, beauty and drug supplies) to provide them with a point of contact should they have information or concerns to report, and to background them on how to spot potentially suspicious people and activities.*	Public Awareness, Prevention	Terrorism	Not Applicable
21	In coordination with appropriate agencies, local, state, and federal, obtain site-specific studies to ascertain whether the zoning has been brought in line with the hazard, and how the building stock, old and new, might fare if a credible earthquake were to occur with specific attention to lifelines: transportation corridors, buildings, and pipelines.*	Prevention	Utility Failure, Earthquake	New and Existing – Residential and non-residential buildings in earthquake hazard areas.
22	Implement a fuel reduction program, such as the collection and disposal of dead fuel, within open spaces and around critical facilities and residential structures located within a high and very high wildfire zones.	Prevention, Property Protection, Natural Resource Protection	Wildfire	Existing – Critical facilities and residential buildings located within high and very high wildfire zones.
23	Create a vegetation management program that provides vegetation management services to elderly, disabled, or low-income property owners who lack the resources to remove flammable vegetation from around their homes.	Property Protection	Wildfire	Existing – Residential buildings in high or very high wildfire zones.
24	Implement a fuel modification program, which also includes residential maintenance requirements and enforcement, plan submittal and approval process, guidelines for planting, and a listing of undesirable plant species. Require builders and developers to submit their plans, complete with proposed fuel modification zones, to the local fire department for review and approval prior to beginning construction.	Prevention, Property Protection	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.

Table I-12. City of Las Vegas, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
25	Establish a standard safety zone of 30 feet around county/city-owned structures that are vulnerable to the effects of wildfire. Encourage private and commercial property owners to adopt the same.	Prevention	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.
26	Develop a community wildfire mitigation plan that identifies and prioritizes areas for hazard fuel reduction treatments, and recommend the types of methods of treatments.	Prevention, Property Protection	Wildfires	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas in the Local Responsibility Areas
27	Develop a process to determine damages and losses avoided after an event.	Property Protection	All	New and Existing - Residential and non-residential buildings in hazard areas.
* Mitigation action does not meet the 2011 HMA Guidance requirements for FEMA mitigation funding				

Table I-13. City of Las Vegas, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
1	Y	Create a GIS-based pre-application review for new construction and major remodels of residential and/or non-residential structures in hazard areas, such high and/or very high wildfire areas.	B, C, D, E	Unknown	Unknown	5 yrs
2	Y	Integrate the Clark County HMP, in particular the hazard analysis and mitigation strategy sections, into local planning documents, including general plans, emergency operations plans, and capital improvement plans.	A, B, D, E	Unknown	Unknown	5 yrs
3	Y	Add mitigation actions to each jurisdiction's website*	A, B, D, E	Unknown	Communications/ Emergency Management	3-5 yrs
5	Y	Develop a drought contingency plan to provide an effective and systematic means of assessing drought conditions, develop mitigation actions and programs to reduce risks in advance of drought, and develop response options that minimize hardships during drought.	B, C, D	Unknown	SNWA	3-5 yrs
6	Y	Seismically retrofit or replace critical facilities that are necessary during and/or immediately after a disaster or emergency.	B, C, D	Unknown	City Mgt Public Works	5 yrs
8	Y	Teach the general public how to prepare their households, in the event of an earthquake, by presenting preparedness information and attractive hands-on displays.	B, D, E	Unknown	Emergency Management	30 days
11	Y	Acquire, relocate, elevate, and/or flood proof critical facilities that are located within the 100-year floodplain.	B, C, D	Unknown	Emergency Management Public Works	3-5 yrs

Table I-13. City of Las Vegas, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
13	Y	Work with FEMA Region IX to address any floodplain management issues that may have arisen/arise from the countywide Digital Flood Insurance Rate Map (DFIRM), Community Assessment Visits, and/or the Division of Water Resources (DWR).	B, C, D	Unknown	Public Works	3-5 yrs
14	Y	Acquire, relocate, or elevate residential structures, in particular those that have been identified as Repetitive Loss (RL) properties that are located within the 100-year floodplain.	B, C, D	Unknown	Public Works	3-5 yrs
19	Y	Implement recommended Buffer Zone Protection measures for pre-designated critical facilities and infrastructure.	B, C, D	Emergency Management Facility	Emergency Management	2 yrs

Prioritization Criteria

- A. Local jurisdiction department or agency champion
- B. Ability to be implemented during the 5-year lifespan of the HMP
- C. Ability to reduce expected future damages and losses (cost-benefit)
- D. Mitigates a high-risk hazard
- E. Mitigates multiple hazards

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Appendix J
City of Mesquite

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Table J-1. City of Mesquite, Total Population and Residential Buildings

Population¹	Residential Buildings²	Total Residential Building Value (2012)³
20,518	8,434	\$1,165,578,800

¹Population data was derived from 2010 Census Redistricting efforts. Data was obtained and analyzed by Clark County and city GIS departments for the vulnerability analysis and may vary from information provided in Section 1.

²Residences based on assessor parcel data - one residence per parcel polygon; residences spanning two zones will be counted twice, once for each zone.

³Median structural value of residences for the City of Mesquite in 2012: \$138,200

Source: Zillow, home and real estate marketplace, May 2012. http://www.zillow.com/local-info/NV-Clark-County-home-value/r_445/

Table J-2. City of Mesquite, Total Critical Facilities and Infrastructure

(Table J-2. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table J-3. City of Mesquite, Vulnerable Population and Residential Buildings

Hazard	Population	Residential buildings	Total Residential Building Value
Earthquake - Strong Ground Shaking	20,518	8,434	\$1,165,578,800
Flood - 100 Year Floodplain	3,374	896	\$123,827,200
Flood - 500 Year Floodplain	3	2	\$276,400

Table J-4. City of Mesquite, Vulnerable Critical Facilities and Infrastructure

(Table J-4. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table J-5. City of Mesquite, Summary of Impacts for Population and Residential Buildings

Hazard	Population	% of Population	No. of Residential Buildings	% of Residential Buildings
Earthquake - Strong Ground Shaking	20,518	100%	8,434	100%
Flood - 100 Year Floodplain	3,374	16%	896	11%
Flood - 500 Year Floodplain	3	< 1%	2	< 1%

Table J-6. City of Mesquite, Summary of Impacts for Critical Facilities and Infrastructure

Hazard	No. of Critical Facilities and Infrastructure	% of Critical Facilities and Infrastructure
Earthquake - Strong Ground Shaking	34	100%
Flood - 100 Year Floodplain	9	26%

Table J-7. City of Mesquite, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Planner(s), engineer(s) and technical staff with knowledge of land development, land management practices, and human-caused and natural hazards.	City of Mesquite Richard Secrist 10 East Mesquite Blvd. Mesquite, NV 89027 (702) 346-2835 (702) 346-5382 (fax) rsecrist@mesquitenv.gov	Develops and maintains the General Plan, including the Safety Element. Develops area plans based on the General Plan, to provide more specific guidance for the development of more specific areas. Reviews private development projects and proposed capital improvements projects and other physical projects involving property for consistency and conformity with the General Plan. Anticipates and acts on the need for new plans, policies, and Code changes. Applies the approved plans, policies, code provisions, and other regulations to proposed land uses.
Engineer(s), Building Inspectors/Code Enforcement Officers or other professional(s) and technical staff trained in construction requirements and practices related to existing and new buildings.	City of Mesquite Dale Tobler 10 East Mesquite Blvd. Mesquite, NV 89027 702-346-5237 702-346-5382 (fax) dtobler@mesquitenv.gov	Oversees the effective, efficient, fair, and safe enforcement of the Nevada Building Code
Engineers, construction project managers, and supporting technical staff.	City of Mesquite Bill Tanner 10 East Mesquite Blvd. Mesquite, NV 89027 702-346-5237 702-346-5382 (fax) btanner@mesquitenv.gov	Provides direct or contract civil, structural, and mechanical engineering services, including contract, project, and construction management.

Table J-7. City of Mesquite, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Engineer(s), project manager(s), technical staff, equipment operators, and maintenance and construction staff.	City of Mesquite Bill Tanner 10 East Mesquite Blvd. Mesquite, NV 89027 702-346-5237 702-346-5382 (fax) btanner@mesquitenv.gov	Maintains and operates of a wide range of local equipment and facilities as well as providing assistance to members of the public. These include providing sufficient clean fresh water, reliable sewer services, street maintenance, storm drainage systems, street cleaning, street lights and traffic signals.
Floodplain Administrator	City of Mesquite Bill Tanner 10 East Mesquite Blvd. Mesquite, NV 89027 702-346-5237 702-346-5382 (fax) btanner@mesquitenv.gov	Reviews and ensures that new development proposals do not increase flood risk, and that new developments are not located below the 100 year flood level. In addition, the Floodplain Administrator is responsible for planning and managing flood risk reduction projects throughout the local jurisdiction or tribal area.
Emergency Manager	City of Mesquite John S. Higley 10 East Mesquite Blvd. Mesquite, NV 89027 702-346-2690 jhigley@mesquitenv.gov	Maintains and updates the Emergency Operations Plan for the local jurisdiction. In addition, coordinates local response and relief activities within the Emergency Operation Center, and works closely with County, state, and federal partners to support planning and training and to provide information and coordinate assistance.
Procurement Services Manager	City of Mesquite David Empey 10 East Mesquite Blvd. Mesquite, NV 89027 702-346-5295 702-346-2908 (fax) dempey@mesquitenv.gov	Provides a full range of municipal financial services, administers several licensing measures, and functions as the local jurisdiction's Procurement Services Manager.

Table J-8. City of Mesquite, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Local	General Fund	David Empey 10 East Mesquite Blvd. Mesquite, NV 89027 702-346-5295 702-346-2908 (fax) dempey@mesquitenv.gov	Program operations and specific projects.	Variable. CURRENTLY, \$16,142,700.00
	General Obligation (GO) Bonds	David Empey 10 East Mesquite Blvd. Mesquite, NV 89027 702-346-5295 702-346-2908 (fax) dempey@mesquitenv.gov	GO Bonds are appropriately used for the construction and/or acquisition of improvements to real property broadly available to residents and visitors. Such facilities include, but are not limited to, libraries, hospitals, parks, public safety facilities, and cultural and educational facilities.	Variable. No new debt is planned for this year.
	Lease Revenue Bonds	David Empey 10 East Mesquite Blvd. Mesquite, NV 89027 702-346-5295 702-346-2908 (fax) dempey@mesquitenv.gov	Lease revenue bonds are used to finance capital projects that (1) have an identified budgetary stream for repayment (e.g., specified fees, tax receipts, etc.), (2) generate project revenue but rely on a broader pledge of general fund revenues to reduce borrowing costs, or (3) finance the acquisition and installation of equipment for the local jurisdiction's general governmental purposes.	CURRENTLY NOT APPLICABLE
	Public-Private Partnerships	David Empey 10 East Mesquite Blvd. Mesquite, NV 89027 702-346-5295 702-346-2908 (fax) dempey@mesquitenv.gov	Includes the use of local professionals, business owners, residents, and civic groups and trade associations, generally for the study of issues and the development of guidance and recommendations.	Project-specific. Currently not being utilized.

Table J-8. City of Mesquite, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
State	Wildfire Emergency and Mitigation Funds	Nevada Division of Forestry	Administers funding from FEMA, BLM, and U.S. Forest Service for wildfire emergency and mitigation funding, except for HMGP and PDM	Project-specific.
	Earthquake Mitigation Funds	Nevada Earthquake Safety Council	Allocates FEMA money for earthquake mitigation efforts	Project-specific.
	Wildfire Mitigation Funds	Nevada Fire Safe Council	Administers state and federal money for wildfire mitigation efforts and promotes a grass-roots movement to protect the built-environment.	Project-specific.
	Water Preservation Funds	Southern Nevada Water Authority	Provides incentives to preserve water	Project-specific.
	All-Hazard	Nevada Division of Emergency Management (DEM)	Provide support and pass-through funding for activities to mitigate all-hazards	Project-specific.
Federal	Hazard Mitigation Grant Program (HMGP)	Federal Emergency Management Agency (FEMA)	Supports pre- and post-disaster mitigation plans and projects.	Available to Nevada communities after a Presidentially declared disaster has occurred in Nevada. Grant award based on specific projects as they are identified by eligible applicants.
	Pre-Disaster Mitigation (PDM) grant program	FEMA	Supports pre-disaster mitigation plans and projects.	Available on an annual basis as a nationally competitive grant. Grant award based on specific projects as they are identified (no more than \$3M federal share for projects).
	Flood Mitigation Assistance (FMA) grant program	FEMA	Mitigates repetitively flooded structures and infrastructure.	Available on an annual basis, distributed to Nevada communities by Nevada DEM. Grant award based on specific projects as they are identified.

Table J-8. City of Mesquite, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Federal (cont)	Assistance to Firefighters Grant (AFG) Program	FEMA/USFA (U.S. Fire Administration)	Provides equipment, protective gear, emergency vehicles, training, and other resources needed to protect the public and emergency personnel from fire and related hazards.	Available to fire departments and nonaffiliated emergency medical services providers. Grant awards based on specific projects as they are identified.
	Community Block Grant Program Entitlement Communities Grants	U.S. HUD (U.S. Department of Housing and Urban Development)	Acquisition of real property, relocation and demolition, rehabilitation of residential and non-residential structures, construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes.	Available to entitled cities. Grant award based on specific projects as they are identified.
	Community Action for a Renewed Environment (CARE)	U.S. Environmental Protection Agency (EPA)	Through financial and technical assistance offers an innovative way for a community to organize and take action to reduce toxic pollution (i.e., stormwater) in its local environment. Through CARE, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people's exposure to them.	Competitive grant program. Grant award based on specific projects as they are identified.
	Clean Water State Revolving Fund (CWSRF)	EPA	The CWSRF is a loan program that provides low-cost financing to eligible entities within state and tribal lands for water quality projects, including all types of non-point source, watershed protection or restoration, estuary management projects, and more traditional municipal wastewater treatment projects.	CWSRF programs provided more than \$5 billion annually to fund water quality protection projects for wastewater treatment, non-point source pollution control, and watershed and estuary management.
	Public Health Emergency Preparedness (PHEP) Cooperative Agreement.	Department of Health and Human Services' (HHS') Centers for Disease Control and Prevention (CDC)	Funds are intended to upgrade state and local public health jurisdictions' preparedness and response to bioterrorism, outbreaks of infectious diseases, and other public health threats and emergencies.	Competitive grant program. Grant award based on specific projects as they are identified. Madera would participate through the County's Public Health Department.

Table J-8. City of Mesquite, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Federal (cont)	Homeland Security Preparedness Technical Assistance Program (HSPTAP)	FEMA/DHS	Build and sustain preparedness technical assistance activities in support of the four homeland security mission areas (prevention, protection, response, recovery) and homeland security program management.	Technical assistance services developed and delivered to state and local homeland security personnel. Grant award based on specific projects as they are identified.

Table J-9. City of Mesquite, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans	General Plan: Clark County Hazard Mitigation Plan, 2005	Describes hazard areas and regulates current and future development based on known hazard areas.	All hazards approach	Mitigation & Preparedness	Yes
	Emergency Operations Plan, 2008	Describes what the local jurisdiction's actions will be during a response to an emergency. Includes annexes that describe in more detail the actions required of the local jurisdiction's departments/agencies. Further, this plan describes the role of the Emergency Operation Center (EOC) and the coordination that occurs between the EOC and the local jurisdiction's departments and other response agencies. Finally, this plan describes how the EOC serves as the focal point among local, state, and federal governments in times of disaster.	Earthquake; Fires and Explosions; Hazardous Materials Spills and Releases; Extended Utility Interruptions (power, natural gas, water, HTW); Floods; Mass Casualty Events; Terrorism; Tornadoes; Violence	Response	No
	Stormwater Quality Management Program (SWQMP), 2011	Describes measures that the local jurisdiction will take to minimize stormwater pollution. The SWQMP is required by the National Pollutant Discharge Elimination System Phase II regulations, which became effective in March 2003.	Storm water	Mitigation & Preparedness	Yes
Policies	Code of Ordinances	The purpose of this code is to establish the minimum requirements to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, stability, access to persons with disabilities, sanitation, adequate lighting and ventilation and energy conservation, and safety to life and property from fire and other hazards attributed to the built environment; to regulate and control the demolition of all buildings and structures, and for related purposes.	Fire, hazardous materials storage, sanitation	Mitigation, Preparedness, and Response	Yes

Table J-10. City of Mesquite, Current, Ongoing, and Completed Hazard Mitigation Projects and Programs

Status (Current, Ongoing, or Completed)	Project / Program Name	Description	Year(s)
Ongoing	Mesquite Town Wash	Assessment of wash, Inventory, inspection, cleaning and reshaping, vegetation control, species survey and removal, erosion control,	2011-2012
Ongoing	Abbott Wash Channel	Assessment of wash, Inventory, inspection, cleaning and reshaping, vegetation control, species survey and removal, erosion control,	2011-2012
Ongoing	Town Wash Detention Basin	Assessment of wash, Inventory, inspection, cleaning and reshaping, vegetation control, species survey and removal, erosion control,	2011-2012
Ongoing	Pulsipher Wash Channel	Assessment of wash, Inventory, inspection, cleaning and reshaping, vegetation control, species survey and removal, erosion control,	2011-2012
Ongoing	Abbott Wash Detention Basin	Assessment of wash, Inventory, inspection, cleaning and reshaping, vegetation control, species survey and removal, erosion control,	2011-2012
Ongoing	Pulsipher Wash Detention Basin	Assessment of wash, Inventory, inspection, cleaning and reshaping, vegetation control, species survey and removal, erosion control,	2011-2012

Table J-11. City of Mesquite, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
1	Create a GIS-based pre-application review for new construction and major remodels of residential and/or non-residential structures in hazard areas, such high and/or very high wildfire areas.	Property Protection	All	New and Existing – Residential and non-residential buildings in hazard areas.
2	Integrate the Clark County HMP, in particular the hazard analysis and mitigation strategy sections, into local planning documents, including general plans, emergency operations plans, and capital improvement plans.	Property Protection	All	Not Applicable
3	Add mitigation actions to each jurisdiction's website.*	Public Awareness	All	Not Applicable
4	Develop a public outreach program that informs property owners located in the dam inundation areas about voluntary flood insurance.	Public Awareness	Dam Failure	Existing – Residential buildings located within dam inundation areas.
5	Develop a drought contingency plan to provide an effective and systematic means of assessing drought conditions, develop mitigation actions and programs to reduce risks in advance of drought, and develop response options that minimize hardships during drought.	Prevention, Natural Resource Protection	Drought	New/Existing
6	Seismically retrofit or replace critical facilities that are necessary during and/or immediately after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Public works and/or emergency response facilities that are structurally deficient or located within a high ground shaking area.
7	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Nevada DOT, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Ramps and bridges identified by Nevada DOT as structurally deficient or located within an extreme ground shaking area.
8	Teach the general public how to prepare their households, in the event of an earthquake, by presenting preparedness information and attractive hands-on displays.	Public Awareness	Earthquake	Not Applicable
9	Implement better record keeping measures, as well as on the part of food processors and handlers.*	Prevention	Epidemic (Infectious Disease)	Not Applicable

Table J-11. City of Mesquite, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
10	To protect vulnerable populations from disease by conducting increased surveillance and development of more stringent requirements at high-risk facilities, (i.e., day-care centers, hospitals, nursing homes, schools, as well as restaurants, hotels/resorts and casinos).*	Prevention	Epidemic (Infectious Disease)	Not Applicable
11	Acquire, relocate, elevate, and/or flood proof critical facilities that are located within the 100-year floodplain.	Property Protection	Flood	Existing - Critical facilities located within the 100-year floodplain.
12	Reinforce County and local ramps, bridges, and roads from flooding through protection activities, including elevating the road and installing culverts beneath the road or building a higher bridge across the area that experiences regular flooding.	Property Protection, Structural Project	Flood	Existing – County and local ramps, bridges, and roads identified in the 100-year floodplain.
13	Work with FEMA Region IX to address any floodplain management issues that may have arisen/arise from the countywide Digital Flood Insurance Rate Map (DFIRM), Community Assessment Visits, and/or the Division of Water Resources (DWR).	All	Flood	New/Existing - Properties within the 100-year or 500-year floodplain.
14	Acquire, relocate, or elevate residential structures, in particular those that have been identified as Repetitive Loss (RL) properties that are located within the 100-year floodplain.	Property Protection	Flood	Existing – Residential structures, including RL properties, located within the 100-year floodplain.
15	Ensure that existing monitoring capabilities at the state and County level are integrated to provide an early warning of increased or new infestations.*	Natural Resource Protection	Infestation	Not Applicable
16	Implement an infestation public awareness and educational campaign.	Public Awareness	Infestation	Not Applicable
17	Reduce the net annual groundwater withdrawal to the level of net annual recharge. This can be accomplished either through a reduction of dependence upon groundwater (increase dependence upon surface water) or through an increase in the artificial recharge.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.

Table J-11. City of Mesquite, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
18	In already-built areas lying within high hazard zones, restrictions on the use of applied water may be necessary to prevent the enlargement of fissures. This may require the implementation of strict water conservation policies, such as no watering or desert landscaping ordinances in areas prone to fissuring.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.
19	Implement recommended Buffer Zone Protection measures for pre-designated critical facilities and infrastructure.*	Prevention	Terrorism	Existing - Critical facilities
20	Contact key businesses (such as gun shops, recycling businesses, beauty and drug supplies) to provide them with a point of contact should they have information or concerns to report, and to background them on how to spot potentially suspicious people and activities.*	Public Awareness, Prevention	Terrorism	Not Applicable
21	In coordination with appropriate agencies, local, state, and federal, obtain site-specific studies to ascertain whether the zoning has been brought in line with the hazard, and how the building stock, old and new, might fare if a credible earthquake were to occur with specific attention to lifelines: transportation corridors, buildings, and pipelines.*	Prevention	Utility Failure, Earthquake	New and Existing – Residential and non-residential buildings in earthquake hazard areas.
22	Implement a fuel reduction program, such as the collection and disposal of dead fuel, within open spaces and around critical facilities and residential structures located within a high and very high wildfire zones.	Prevention, Property Protection, Natural Resource Protection	Wildfire	Existing – Critical facilities and residential buildings located within high and very high wildfire zones.
23	Create a vegetation management program that provides vegetation management services to elderly, disabled, or low-income property owners who lack the resources to remove flammable vegetation from around their homes.	Property Protection	Wildfire	Existing – Residential buildings in high or very high wildfire zones.
24	Implement a fuel modification program, which also includes residential maintenance requirements and enforcement, plan submittal and approval process, guidelines for planting, and a listing of undesirable plant species. Require builders and developers to submit their plans, complete with proposed fuel modification zones, to the local fire department for review and approval prior to beginning construction.	Prevention, Property Protection	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.

Table J-11. City of Mesquite, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
25	Establish a standard safety zone of 30 feet around county/city-owned structures that are vulnerable to the effects of wildfire. Encourage private and commercial property owners to adopt the same.	Prevention	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.
26	Develop a community wildfire mitigation plan that identifies and prioritizes areas for hazard fuel reduction treatments, and recommend the types of methods of treatments.	Prevention, Property Protection	Wildfires	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas in the Local Responsibility Areas.
27	Develop a process to determine damages and losses avoided after an event.	Property Protection	All	New and Existing - Residential and non-residential buildings in hazard areas.
28	Develop a public outreach program that informs property owners located in floodplain areas about voluntary flood insurance via the CRS through mailings, news media, general PIA's.	Public Awareness	Flood	Existing - Properties within floodplains.
29	Work with the Regional Flood Control District to re-evaluate and re-designate local flood zones.	Public Awareness, Protection	Flood	New/Existing - Residential and non-residential buildings in and in potential floodplains.
30	Implement flood control measures included in the erosion control study of the Regional Flood Control Master Plan including flood walls and other control options.	Prevention, Protection	Flood	New/Existing - Properties within the 100-year or 500-year floodplain.
* Mitigation action does not meet the 2011 HMA Guidance requirements for FEMA mitigation funding				

Table J-12. City of Mesquite, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
8	Y	Teach the general public how to prepare their households, in the event of an earthquake, by presenting preparedness information and attractive hands-on displays.	A,B,C,	Not Applicable	Emergency Management/Planning and Development	1-2 years
21	Y	In coordination with appropriate agencies, local, state, and federal, obtain site-specific studies to ascertain whether the zoning has been brought in line with the hazard, and how the building stock, old and new, might fare if a credible earthquake were to occur with specific attention to lifelines: transportation corridors, buildings, and pipelines.*	A,B,C,D, E	Not Applicable	Planning and Development, Building Department	3-5 years
22	Y	Implement a fuel reduction program, such as the collection and disposal of dead fuel, within open spaces and around critical facilities and residential structures located within a high and very high wildfire zones.	A,B,C,D	Not Applicable	Fire, BLM, DWR	1-2 years
26	Y	Develop a community wildfire mitigation plan that identifies and prioritizes areas for hazard fuel reduction treatments, and recommend the types of methods of treatments.	A,B,C,D,E	Not Applicable	Fire Dept, BLM, DWR	1-2 years
28	Y	Develop a public outreach program that informs property owners located in floodplain areas about voluntary flood insurance via the CRS through mailings, news media, general PIA's.	A,B,C,	Not Applicable	Emergency Management/Planning and Development	Ongoing
29	Y	Work with the Regional Flood Control District to re-evaluate and re-designate local flood zones.	A,B,	Not Applicable	Public Services, RFCD	1-2 years

Table J-12. City of Mesquite, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
30	Y	Implement flood control measures included in the erosion control study of the Regional Flood Control Master Plan including flood walls and other control options.	A,B,C,D	Not Applicable	Public Services,	1-2 years

Prioritization Criteria

- A. Local jurisdiction department or agency champion
- B. Ability to be implemented during the 5-year lifespan of the HMP
- C. Ability to reduce expected future damages and losses (cost-benefit)
- D. Mitigates a high-risk hazard
- E. Mitigates multiple hazards

Appendix K
City of North Las Vegas

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Table K-1. City of North Las Vegas, Total Population and Residential Buildings

Population¹	Residential Buildings²	Total Residential Building Value (2012)³
222,273	66,506	\$6,397,877,200

¹Population data was derived from 2010 Census Redistricting efforts. Data was obtained and analyzed by Clark County and city GIS departments for the vulnerability analysis and may vary from information provided in Section 1.

²Residences based on assessor parcel data - one residence per parcel polygon; residences spanning two zones will be counted twice, once for each zone.

³Median structural value of residences for the City of North Las Vegas in 2012: \$96,200

Source: Zillow, home and real estate marketplace, May 2012. http://www.zillow.com/local-info/NV-Clark-County-home-value/r_445/

Table K-2. City of North Las Vegas, Total Critical Facilities and Infrastructure

(Table K-2. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table K-3. City of North Las Vegas, Vulnerable Population and Residential Buildings

Hazard	Population	Residential buildings	Total Residential Building Value
Earthquake - Very Strong Ground Shaking	222,273	66,506	\$6,397,877,200
Earthquake - Liquefaction	24,396	4,387	\$422,029,400
Flood - 100 Year Floodplain	5,725	1,266*	\$121,789,200*
Flood - 500 Year Floodplain	8,498	2,230	\$214,526,000
*The initial vulnerability analysis completed by GIS, as described in Section 5, established the number of vulnerable residential buildings in the City of North Las Vegas (CNLV) to be 1,266 residential buildings. Jennifer Doody, Supervisor of the CNLV Development & Flood Control Division, completed some additional analysis regarding residential buildings in the 100 year floodplain for the CNLV. Based upon the additional analysis the number of residential buildings in the 100 year floodplain is adjusted to only 26 buildings. The adjusted number of 26 reflects the following: - The flood map may not have reflected LOMRs in place; CNLV has a requirement that no construction is allowed in a flood zone so mitigation and CLOMR/LOMRs are required to remove the flood zone prior - There are a number of areas where the FIRM denotes that the flood zone is contained within channels and roadways that do not transfer to the GIS layers - A lot zoned as residential, does not always denote that a home is currently on that lot Taking into account the additional analysis, the number of residential buildings vulnerable to the 100 year floodplain is 26 buildings, with a total residential building value of \$2,501,200.			

Table K-4. City of North Las Vegas, Vulnerable Critical Facilities and Infrastructure

(Table K-4. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table K-5. City of North Las Vegas, Summary of Impacts for Population and Residential Buildings

Hazard	Population	% of Population	No. of Residential Buildings	% of Residential Buildings
Earthquake - Very Strong Ground Shaking	222,273	100%	66,506	100%
Earthquake - Liquefaction	24,396	11%	4,387	7%
Flood - 100 Year Floodplain	5,725	3%	1,266*	2%*
Flood - 500 Year Floodplain	8,498	4%	2,230	3%
* Taking into account the additional analysis provided by CNLV (described in the footnote of Table K-3), the summary of impacts establishes the number of impacted residential buildings as 26 buildings for a percentage of less than .01% of the residential buildings.				

Table K-6. City of North Las Vegas, Summary of Impacts for Critical Facilities and Infrastructure

Hazard	No. of Critical Facilities and Infrastructure	% of Critical Facilities and Infrastructure
Earthquake - Very Strong Ground Shaking	123	100%
Earthquake - Liquefaction	19	15%
Flood - 100 Year Floodplain	8	7%
Flood - 500 Year Floodplain	13	11%

Table K-7. City of North Las Vegas, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Planner(s), engineer(s) and technical staff with knowledge of land development, land management practices, and human-caused and natural hazards. Dale Daffern, P.E. Construction Services Manager 702-633-1325	City of North Las Vegas, Public Works.	Develops and maintains the General Plan, including the Safety Element. Develops area plans based on the General Plan, to provide more specific guidance for the development of more specific areas. Reviews private development projects and proposed capital improvements projects and other physical projects involving property for consistency and conformity with the General Plan. Anticipates and acts on the need for new plans, policies, and Code changes. Applies the approved plans, policies, code provisions, and other regulations to proposed land uses.
Engineer(s), Building Inspectors/Code Enforcement Officers or other professional(s) and technical staff trained in construction requirements and practices related to existing and new buildings. Gregory Blackburn, Building Official 702-633-2948	City of North Las Vegas, Department of Community Services and Development	Oversees the effective, efficient, fair, and safe enforcement of the Nevada Building Code
Engineers, construction project managers, and supporting technical staff. Randall E. DeVaul, P.E., Deputy Director of Engineering 702-633-2806	City of North Las Vegas, Public Works.	Provides direct or contract civil, structural, and mechanical engineering services, including contract, project, and construction management.

Table K-7. City of North Las Vegas, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Engineer(s), project manager(s), technical staff, equipment operators, and maintenance and construction staff. Jeff Herb, P.E., Traffic Engineer 702-633-1224 John Runiks, Manager of Roadway Operations, 6331267 Kirk Medina, Manager of Utilities, 633-1290	City of North Las Vegas, Public Works & Utilities.	Maintains and operates of a wide range of local equipment and facilities as well as providing assistance to members of the public. These include providing sufficient clean fresh water, reliable sewer services, street maintenance, storm drainage systems, street cleaning, street lights and traffic signals.
Floodplain Administrator Jennifer Doody, P.E., CFM, Development and Flood Control Supervisor 702-633-1223	City of North Las Vegas, Public Works.	Working with Nevada CCFD (Clark County Flood Control District), Reviews and ensures that new development proposals do not increase flood risk, and that new developments are not located below the 100 year flood level. In addition, the Floodplain Administrator is responsible for planning and managing flood risk reduction projects throughout the local jurisdiction or tribal area.
Daniel F. Lake, PhD Sergeant Homeland Security/Emergency Management Coordinator North Las Vegas Police Department/CNLV-OEM&HS (702) 633-2145 (702) 303-0315 laked@cityofnorthlasvegas.com	Emergency Manager	Maintains and updates the Emergency Operations Plan for the local jurisdiction. In addition, coordinates local response and relief activities within the Emergency Operation Center, and works closely with County, state, and federal partners to support planning and training and to provide information and coordinate assistance.
Procurement Services Manager, Ron Corbett	City of North Las Vegas, Admin Services.	Provides a full range of municipal financial services, administers several licensing measures, and functions as the local jurisdiction's Procurement Services Manager.

Table K-8. City of North Las Vegas, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Local	General Fund To be provided by Finance Department	Gerald Zochowski, 633-1426	Program operations and specific projects.	Variable.
	General Obligation (GO) Bonds To be provided by Finance Department	Debbie Barton 633-1460 ext. 3629 Financial Analyst I	GO Bonds are appropriately used for the construction and/or acquisition of improvements to real property broadly available to residents and visitors. Such facilities include, but are not limited to, libraries, hospitals, parks, public safety facilities, and cultural and educational facilities.	Variable.
	Lease Revenue Bonds To be provided by Finance Department	Debbie Barton 633-1460 ext. 3629 Financial Analyst I	Lease revenue bonds are used to finance capital projects that (1) have an identified budgetary stream for repayment (e.g., specified fees, tax receipts, etc.), (2) generate project revenue but rely on a broader pledge of general fund revenues to reduce borrowing costs, or (3) finance the acquisition and installation of equipment for the local jurisdiction's general governmental purposes.	Variable
	Public-Private Partnerships To be provided by Administrative Services Department	Ron Corbett 633-2814	Includes the use of local professionals, business owners, residents, and civic groups and trade associations, generally for the study of issues and the development of guidance and recommendations.	Variable
State	Wildfire Emergency and Mitigation Funds	Nevada Division of Forestry	Administers funding from FEMA, BLM, and U.S. Forest Service for wildfire emergency and mitigation funding, except for HMGP and PDM	Project-specific.
	Earthquake Mitigation Funds	Nevada Earthquake Safety Council	Allocates FEMA money for earthquake mitigation efforts	Project-specific.
	Wildfire Mitigation Funds	Nevada Fire Safe Council	Administers state and federal money for wildfire mitigation efforts and promotes a grass-roots movement to protect the built-environment.	Project-specific.

Table K-8. City of North Las Vegas, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
State (cont)	Water Preservation Funds	Southern Nevada Water Authority	Provides incentives to preserve water	Project-specific.
	All-Hazard	Nevada Division of Emergency Management (DEM)	Provide support and pass-through funding for activities to mitigate all-hazards	Project-specific.
Federal	Hazard Mitigation Grant Program (HMGP)	Federal Emergency Management Agency (FEMA)	Supports pre- and post-disaster mitigation plans and projects.	Available to Nevada communities after a Presidentially declared disaster has occurred in Nevada. Grant award based on specific projects as they are identified by eligible applicants.
	Pre-Disaster Mitigation (PDM) grant program	FEMA	Supports pre-disaster mitigation plans and projects.	Available on an annual basis as a nationally competitive grant. Grant award based on specific projects as they are identified (no more than \$3M federal share for projects).
	Flood Mitigation Assistance (FMA) grant program	FEMA	Mitigates repetitively flooded structures and infrastructure.	Available on an annual basis, distributed to Nevada communities by Nevada DEM. Grant award based on specific projects as they are identified.
	Assistance to Firefighters Grant (AFG) Program	FEMA/USFA (U.S. Fire Administration)	Provides equipment, protective gear, emergency vehicles, training, and other resources needed to protect the public and emergency personnel from fire and related hazards.	Available to fire departments and nonaffiliated emergency medical services providers. Grant awards based on specific projects as they are identified.
	Community Block Grant Program Entitlement Communities Grants	U.S. HUD (U.S. Department of Housing and Urban Development)	Acquisition of real property, relocation and demolition, rehabilitation of residential and non-residential structures, construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes.	Available to entitled cities. Grant award based on specific projects as they are identified.

Table K-8. City of North Las Vegas, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Federal (cont)	Community Action for a Renewed Environment (CARE)	U.S. Environmental Protection Agency (EPA)	Through financial and technical assistance offers an innovative way for a community to organize and take action to reduce toxic pollution (i.e., stormwater) in its local environment. Through CARE, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people's exposure to them.	Competitive grant program. Grant award based on specific projects as they are identified.
	Clean Water State Revolving Fund (CWSRF)	EPA	The CWSRF is a loan program that provides low-cost financing to eligible entities within state and tribal lands for water quality projects, including all types of non-point source, watershed protection or restoration, estuary management projects, and more traditional municipal wastewater treatment projects.	CWSRF programs provided more than \$5 billion annually to fund water quality protection projects for wastewater treatment, non-point source pollution control, and watershed and estuary management.
	Public Health Emergency Preparedness (PHEP) Cooperative Agreement	Department of Health and Human Services' (HHS') Centers for Disease Control and Prevention (CDC)	Funds are intended to upgrade state and local public health jurisdictions' preparedness and response to bioterrorism, outbreaks of infectious diseases, and other public health threats and emergencies.	Competitive grant program. Grant award based on specific projects as they are identified. Madera would participate through the County's Public Health Department.
	Homeland Security Preparedness Technical Assistance Program (HSPTAP)	FEMA/DHS	Build and sustain preparedness technical assistance activities in support of the four homeland security mission areas (prevention, protection, response, recovery) and homeland security program management.	Technical assistance services developed and delivered to state and local homeland security personnel. Grant award based on specific projects as they are identified.

Table K-9. City of North Las Vegas, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans	General Plan: Safety Element (2011)	Describes hazard areas and regulates current and future development based on known hazard areas.	Hazards addressed are listed in the CNLV local jurisdiction's General Plan	Mitigation & Preparedness	Yes
	Emergency Operations Plan 2011	Describes what the local jurisdiction's actions will be during a response to an emergency. Includes annexes that describe in more detail the actions required of the local jurisdiction's departments/agencies. Further, this plan describes the role of the Emergency Operation Center (EOC) and the coordination that occurs between the EOC and the local jurisdiction's departments and other response agencies. Finally, this plan describes how the EOC serves as the focal point among local, state, and federal governments in times of disaster.	Flooding, Earthquakes	Response	No
	Stormwater Quality Management Program (SWQMP) (2011)	Describes measures that the local jurisdiction will take to minimize stormwater pollution. The SWQMP is required by the National Pollutant Discharge Elimination System Phase II regulations, which became effective in March 2003.	Stormwater	Mitigation & Preparedness	Yes
Policies	Code of Ordinances	The purpose of this code is to establish the minimum requirements to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, stability, access to persons with disabilities, sanitation, adequate lighting and ventilation and energy conservation, and safety to life and property from fire and other hazards attributed to the built environment; to regulate and control the demolition of all buildings and structures, and for related purposes.	Hazards addressed in our local jurisdiction's code of ordinances are listed including address and schematics'	Mitigation, Preparedness, and Response	Yes

Table K-10. City of North Las Vegas, Current, Ongoing, and Completed Hazard Mitigation Projects and Programs

Status (Current, Ongoing, or Completed)	Project / Program Name	Description	Year(s)
In Construction	Craig Ranch Regional Park-Phase I & II	New community Park with full amenities.	2010-2013
Complete	WRF	New Treatment Plant	2011
In Construction	Lake Mead @ Pecos Bridge	New Bridge	2012
In Construction	North 5 th @ I-15 Over Pass	Over Pass	2011-2013
In Construction	CCFD NLV 2 Channel Project Las Vegas Wash Main Branch Improvements	Converting to lined channel	2012-2013
Complete	New City Hall	New Building	2011
In Construction	Freeway Channel - Owens to Miller Ave.	Construct diversion pipe to handle excess storm flow	2012-2013
Pending	Las Vegas wash Trails, I-15 Pedestrian Bridge	Pedestrian Bridge over I-15	TBD
Complete	Craig Ranch Maintenance Facility	Maintenance Facility	2012
Complete	Downtown Central Park Development	Park facility	2011
Complete	Fire Station 50	New Station	2012
Complete	Kiel Ranch Adobe Stabilization	Historical Site	2011
Complete	Sky Multi Generation Facility	Recreation Center	2011
Complete	Northeast Area Command Facility	Police Station	2011
Complete	Tropical Breeze Park	Park with amenities'	2011

Table K-11. City of North Las Vegas, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
1	Create a GIS-based pre-application review for new construction and major remodels of residential and/or non-residential structures in hazard areas, such high and/or very high wildfire areas.	Property Protection	All	New and Existing – Residential and non-residential buildings in hazard areas.
2	Integrate the Clark County HMP, in particular the hazard analysis and mitigation strategy sections, into local planning documents, including general plans, emergency operations plans, and capital improvement plans.	Property Protection	All	Not Applicable
3	Add mitigation actions to each jurisdiction's website.*	Public Awareness	All	Not Applicable
4	Develop a public outreach program that informs property owners located in the dam inundation areas about voluntary flood insurance.	Public Awareness	Dam Failure	Existing – Residential buildings located within dam inundation areas.
5	Develop a drought contingency plan to provide an effective and systematic means of assessing drought conditions, develop mitigation actions and programs to reduce risks in advance of drought, and develop response options that minimize hardships during drought.	Prevention, Natural Resource Protection	Drought	New/Existing
6	Seismically retrofit or replace critical facilities that are necessary during and/or immediately after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Public works and/or emergency response facilities that are structurally deficient or located within a high ground shaking area.
7	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Nevada DOT, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Ramps and bridges identified by Nevada DOT as structurally deficient or located within an extreme ground shaking area.
8	Teach the general public how to prepare their households, in the event of an earthquake, by presenting preparedness information and attractive hands-on displays.	Public Awareness	Earthquake	Not Applicable
9	Implement better record keeping measures, as well as on the part of food processors and handlers.*	Prevention	Epidemic (Infectious Disease)	Not Applicable

Table K-11. City of North Las Vegas, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
10	To protect vulnerable populations from disease by conducting increased surveillance and development of more stringent requirements at high-risk facilities, (i.e., day-care centers, hospitals, nursing homes, schools, as well as restaurants, hotels/resorts and casinos).*	Prevention	Epidemic (Infectious Disease)	Not Applicable
11	Acquire, relocate, elevate, and/or flood proof critical facilities that are located within the 100-year floodplain.	Property Protection	Flood	Existing - Critical facilities located within the 100-year floodplain.
12	Reinforce County and local ramps, bridges, and roads from flooding through protection activities, including elevating the road and installing culverts beneath the road or building a higher bridge across the area that experiences regular flooding.	Property Protection, Structural Project	Flood	Existing – County and local ramps, bridges, and roads identified in the 100-year floodplain.
13	Work with FEMA Region IX to address any floodplain management issues that may have arisen/arise from the countywide Digital Flood Insurance Rate Map (DFIRM), Community Assessment Visits, and/or the Division of Water Resources (DWR).	All	Flood	New/Existing - Properties within the 100-year or 500-year floodplain.
14	Acquire, relocate, or elevate residential structures, in particular those that have been identified as Repetitive Loss (RL) properties that are located within the 100-year floodplain.	Property Protection	Flood	Existing – Residential structures, including RL properties, located within the 100-year floodplain.
15	Ensure that existing monitoring capabilities at the state and County level are integrated to provide an early warning of increased or new infestations.*	Natural Resource Protection	Infestation	Not Applicable
16	Implement an infestation public awareness and educational campaign.	Public Awareness	Infestation	Not Applicable
17	Reduce the net annual groundwater withdrawal to the level of net annual recharge. This can be accomplished either through a reduction of dependence upon groundwater (increase dependence upon surface water) or through an increase in the artificial recharge.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.

Table K-11. City of North Las Vegas, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
18	In already-built areas lying within high hazard zones, restrictions on the use of applied water may be necessary to prevent the enlargement of fissures. This may require the implementation of strict water conservation policies, such as no watering or desert landscaping ordinances in areas prone to fissuring.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.
19	Implement recommended Buffer Zone Protection measures for pre-designated critical facilities and infrastructure.*	Prevention	Terrorism	Existing - Critical facilities
20	Contact key businesses (such as gun shops, recycling businesses, beauty and drug supplies) to provide them with a point of contact should they have information or concerns to report, and to background them on how to spot potentially suspicious people and activities.*	Public Awareness, Prevention	Terrorism	Not Applicable
21	In coordination with appropriate agencies, local, state, and federal, obtain site-specific studies to ascertain whether the zoning has been brought in line with the hazard, and how the building stock, old and new, might fare if a credible earthquake were to occur with specific attention to lifelines: transportation corridors, buildings, and pipelines.*	Prevention	Utility Failure, Earthquake	New and Existing – Residential and non-residential buildings in earthquake hazard areas.
22	Implement a fuel reduction program, such as the collection and disposal of dead fuel, within open spaces and around critical facilities and residential structures located within a high and very high wildfire zones.	Prevention, Property Protection, Natural Resource Protection	Wildfire	Existing – Critical facilities and residential buildings located within high and very high wildfire zones.
23	Create a vegetation management program that provides vegetation management services to elderly, disabled, or low-income property owners who lack the resources to remove flammable vegetation from around their homes.	Property Protection	Wildfire	Existing – Residential buildings in high or very high wildfire zones.
24	Implement a fuel modification program, which also includes residential maintenance requirements and enforcement, plan submittal and approval process, guidelines for planting, and a listing of undesirable plant species. Require builders and developers to submit their plans, complete with proposed fuel modification zones, to the local fire department for review and approval prior to beginning construction.	Prevention, Property Protection	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.

Table K-11. City of North Las Vegas, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
25	Establish a standard safety zone of 30 feet around county/city-owned structures that are vulnerable to the effects of wildfire. Encourage private and commercial property owners to adopt the same.	Prevention	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.
26	Develop a community wildfire mitigation plan that identifies and prioritizes areas for hazard fuel reduction treatments, and recommend the types of methods of treatments.	Prevention, Property Protection	Wildfires	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas in the Local Responsibility Areas
27	Develop a process to determine damages and losses avoided after an event.	Property Protection	All	New and Existing - Residential and non-residential buildings in hazard areas.
28	Notify homeowners in the shadow of above-ground detention basins and homeowners directly adjacent to drainage easements on the potential flood hazard and the availability of flood insurance.	Public Awareness	Flood	New/ Existing - Residential buildings located near above-ground detention basins and drainage easements.
29	Study the existing Oak Island flood zone and look at options to have the flood zone mitigated or reduced.*	Prevention	Flood	New/ Existing - Residential and non-residential buildings located in the current Oak Island flood zone
* Mitigation action does not meet the 2011 HMA Guidance requirements for FEMA mitigation funding				

Table K-12. City of North Las Vegas, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
2	Y	Integrate the Clark County HMP, in particular the hazard analysis and mitigation strategy sections, into local planning documents, including general plans, emergency operations plans, and capital improvement plans.	A, B, D, E	Not Applicable	Community Development	1-3 years
6	Y	Seismically retrofit or replace critical facilities that are necessary during and/or immediately after a disaster or emergency.	A, C, D	Unknown	Public Works	3-5 yrs
28	Y	Notify homeowners in the shadow of above-ground detention basins and homeowners directly adjacent to drainage easements on the potential flood hazard and the availability of flood insurance.	A, B, D	Residential structures located near above-ground detention basins and drainage easements.	Development and Flood Control Division	1-3 yrs
29	Y	Study the existing Oak Island flood zone and look at options to have the flood zone mitigated or reduced.*	NA	Not Applicable	Development and Flood Control Division	5 yrs

* Mitigation action does not meet the 2011 HMA Guidance requirements for FEMA mitigation funding

Prioritization Criteria

- A. Local jurisdiction department or agency champion
- B. Ability to be implemented during the 5-year lifespan of the HMP
- C. Ability to reduce expected future damages and losses (cost-benefit)
- D. Mitigates a high-risk hazard
- E. Mitigates multiple hazards

Appendix L
Clark County School District

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Table L-1. Clark County School District, Total Critical Facilities and Infrastructure

(Table L-1. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table L-2. Clark County School District, Vulnerable Critical Facilities and Infrastructure

(Table L-2. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table L-3. Clark County School District, Summary of Impacts for Critical Facilities and Infrastructure

Hazard	No. of Critical Facilities and Infrastructure	% of Critical Facilities and Infrastructure
Earthquake - Very Strong Shaking	254	78%
Earthquake - Strong Shaking	68	21%
Earthquake – Liquefaction	122	38%
Flood - 100 Year Floodplain	9	3%
Flood - 500 Year Floodplain	24	7%
Wildfire - High	2	< 1%

Table L-4. Clark County School District, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Paul Gerner, Associate Superintendent	Facilities Division Administration	Provides facilities resource capabilities for the construction of new and modernization of 350 existing schools plus approximately 100 office and facilities buildings
Rory Lorenzo, Administrative Manager Lisa Conner, Director Jan Villaire, Director Dimitri Theodorou, Manager Luci Davis, Manager	Administrative Management, Facilities Division Building Official (Inspection Services) Environmental and Equipment Safety Services Information and Records Management Services Contracts and Construction Certified Payroll	Manages all administrative issues associated with the Facilities Division. Conduct building inspections and ensures construction code compliance. Coordinates all environmental issues and ensures OSHA code compliance. Conduct equipment safety and provides equipment training. Manages all Facility Division Records and Retention Program. Prepare Architectural and Construction Contracts and ensure compliance with bid process and monitor compliance with construction certified payroll.
Tim Strucely, Director (Architects, Engineers, Construction Project Managers, and supporting technical staff.)	Capital Program Office, Facilities Division	Provides direct and/or contract architectural, civil, structural, electrical, and mechanical engineering services, including contract, project, and construction management. Manage new construction and modernization projects and ensure construction process and schedules are consistent with specifications and contractual agreement.
Randy Shingleton, Director Norman Dean Kiernan, Director Jimmy Brimmer, Director (Maintenance department engineers, facility service representatives, technical trades and staff, equipment operators, and maintenance and repairmen)	Maintenance Department	Maintain, conduct repairs, and operate a wide range of heavy duty equipment and all school, administrative and facility buildings in the district.

Table L-4. Clark County School District, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Rory Lorenzo, Director	Special Projects and Renovation Services	Conduct small construction projects for Facilities Division planning and design and construction teams. These are project specific that normally would cost the district more money if they had to hire expertise from outside private constructors. Conduct portable classroom and office relocations and connections. Operate a wide-range of heavy duty equipment.
Alan Paulson, Acting Director	Operations and Grounds and Landscaping Department	Conduct custodial services for all school, administrative and facility buildings in the district and provide new and maintain existing landscaping services to district property
Dick Cuppet, Director	Energy Department	Responsible for all utility billings and energy savings programs in the district.
Paul Gerner, Associate Superintendent of Facilities Division and Emergency Manager Dimitri Theodorou, Emergency Management Coordinator	CCSD Emergency Management, Facilities Division	Maintains and updates the Emergency Management Plan, Annex Plans, and Appendices to the Annex Plans including district Emergency Operations Plan and school crisis response plans. In addition, coordinates local response and relief activities within the Emergency Operation Center, and works closely with local response agencies, City, County, State, and Federal partners to support planning and training and to provide information and coordinate assistance.
Tamra Rose, Coordinator	Grants Department	Provide a full service of grant development and management for the Facilities Division and for the Office of Emergency Management.
Jeff Weiler, CFO Ruby Alston, Director	Operations, Finance and Accounting Capital Fund Financial Services	Oversee and manage all financial aspects of school district's general and capital funds
Brambi Tollen, Director Tom Nacos, Director	Purchasing and Warehousing Contracts	Manage all purchasing contracts; manage purchases, deliveries, and storage of all equipment and supplies in the district; and manage and provide reprographic services.
David Massy, Director	Risk Management	Conduct Safety and Risk Assessments of building and grounds, in order to minimize loss of life and damage to buildings.

Table L-5. Clark County School District, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Local	General Fund	Dwight Jones, Superintendent of Schools Jeff Weiler, CFO Operations & Finance	Education program operations and educational specific projects. Funding includes administrative, support staffing, educators, operations expenses, student support services, health services, transportation, food services, police services, maintenance, custodial operations services, technical and skill trades, risk management, legal, purchasing and warehousing, and other as required for the daily operations of the district.	Varies
	Capital Improvement Funds	Jeff Weiler, CFO Ruby Alston, Director Operations & Finance, and Capital Fund Financial Services	Can be used for future modernization, new construction, and hazard mitigation projects.	Varies (depending on the economic condition at the time of mitigated hazard, provided that there is a valid mitigated hazard and available capital improvement funding resources for matching allocations). Additionally, due to economic conditions and local and state cutbacks in the last three years, the present and future economic uncertainty, and the possibility of additional future cutbacks, the District cannot predict capital improvement fund sources.
	Internal Service Funds	David Massy, Director Risk Management	Provide some funding for safety improvements as they are associated with potential mitigated natural hazards.	The amount of funds may vary as the District encounters fewer insurance claims and makes more improvements associated with mitigated natural hazards that will reduce injuries, loss of life, damage to property, and loss of property.
State	Wildfire Emergency and Mitigation Funds	Nevada Division of Forestry	Administers funding from FEMA, BLM, and U.S. Forest Service for wildfire emergency and mitigation funding, except for HMGP and PDM	Project-specific.

Table L-5. Clark County School District, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
State (cont)	Earthquake Mitigation Funds	Nevada Earthquake Safety Council	Allocates FEMA money for earthquake mitigation efforts	Project-specific.
	Wildfire Mitigation Funds	Nevada Fire Safe Council	Administers state and federal money for wildfire mitigation efforts and promotes a grass-roots movement to protect the built-environment.	Project-specific.
	Water Preservation Funds	Southern Nevada Water Authority	Provides incentives to preserve water	Project-specific.
	All-Hazard	Nevada Division of Emergency Management (DEM)	Provide support and pass-through funding for activities to mitigate all-hazards	Project-specific.
Federal	Hazard Mitigation Grant Program (HMGP)	Federal Emergency Management Agency (FEMA)	Supports pre- and post-disaster mitigation plans and projects.	Available to Nevada communities after a Presidentially declared disaster has occurred in Nevada. Grant award based on specific projects as they are identified by eligible applicants.
	Pre-Disaster Mitigation (PDM) grant program	FEMA	Supports pre-disaster mitigation plans and projects.	Available on an annual basis as a nationally competitive grant. Grant award based on specific projects as they are identified (no more than \$3M federal share for projects).
	Flood Mitigation Assistance (FMA) grant program	FEMA	Mitigates repetitively flooded structures and infrastructure.	Available on an annual basis, distributed to Nevada communities by Nevada DEM. Grant award based on specific projects as they are identified.
	Community Block Grant Program Entitlement Communities Grants	U.S. HUD (U.S. Department of Housing and Urban Development)	Acquisition of real property, relocation and demolition, rehabilitation of residential and non-residential structures, construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes.	Available to entitled cities. Grant award based on specific projects as they are identified.

Table L-5. Clark County School District, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Federal (cont)	Community Action for a Renewed Environment (CARE)	U.S. Environmental Protection Agency (EPA)	Through financial and technical assistance offers an innovative way for a community to organize and take action to reduce toxic pollution (i.e., stormwater) in its local environment. Through CARE, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people's exposure to them.	Competitive grant program. Grant award based on specific projects as they are identified.
	Clean Water State Revolving Fund (CWSRF)	EPA	The CWSRF is a loan program that provides low-cost financing to eligible entities within state and tribal lands for water quality projects, including all types of non-point source, watershed protection or restoration, estuary management projects, and more traditional municipal wastewater treatment projects.	CWSRF programs provided more than \$5 billion annually to fund water quality protection projects for wastewater treatment, non-point source pollution control, and watershed and estuary management.
	Public Health Emergency Preparedness (PHEP) Cooperative Agreement.	Department of Health and Human Services' (HHS') Centers for Disease Control and Prevention (CDC)	Funds are intended to upgrade state and local public health jurisdictions' preparedness and response to bioterrorism, outbreaks of infectious diseases, and other public health threats and emergencies.	Competitive grant program. Grant award based on specific projects as they are identified. Madera would participate through the County's Public Health Department.
	Homeland Security Preparedness Technical Assistance Program (HSPTAP)	FEMA/DHS	Build and sustain preparedness technical assistance activities in support of the four homeland security mission areas (prevention, protection, response, recovery) and homeland security program management.	Technical assistance services developed and delivered to state and local homeland security personnel. Grant award based on specific projects as they are identified.

Table L-6. Clark County School District, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plan(s)	CCSD Emergency Management, Basic Plan	This Basic Plan provides guidance for the Clark County School District (CCSD) in coordination with the Clark County Office of Emergency Management outlines the concept of operations, organizational planning, and responsibilities for managing and coordinating the occurrence or immediate threat of severe damage, injury, loss of life or property resulting from any natural or man-made disasters This Emergency Management, Basic Plan consists of a series of Annex Plans (A-Z) and a series of Appendices associated with each of the Annex Plans. The format used in preparation is CPG 101, Version 2.0	All Hazards, Natural and Man-made	Mitigation, Preparedness, Response, and Recovery	No
	Direction Control and Coordination, Annex N	The, defines the organization, operational concepts, responsibilities, and procedures necessary to accomplish Direction, Control, and Coordination for the Clark County School District. This annex describes our concept of operations and organization by assigning responsibilities for tasks that must be carried out to perform Direction, Control, and Coordination functions.	All Hazards, Natural and Man-made	Mitigation, Preparedness, Response, and Recovery	No
	Emergency Operations Plan, Appendix N01	The district Emergency Operations Plan, Appendix N01 to the Annex N, Direction, Control and Coordination Plan describes what the special district's actions will be during a response to an emergency. Further, this plan describes the role of the Emergency Operation Center (EOC) and the coordination that occurs between the EOC and district resource departments, local response and emergency agencies, and other response agencies. Finally, this plan describes how the EOC serves as the focal point among local, state, and federal governments in times of disaster.	All Hazards, Natural and Man-made	Response	No

Table L-6. Clark County School District, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans (cont)	Protective Actions, Annex E	The plan provides for all district students and employees in a coordinated effort and/or actions required to protect themselves from harm.	All Hazards, Natural and Man-made	Response	No
	Instructional (School Based) and Non-Instructional (Office Based) Crisis Response Plans, Appendices E01 and E02	The Crisis Response Plans have been developed per NRS XXX for the purpose of exercising and practicing actions taken during specific emergencies, such as what to do during a fire, or during an earthquake, and conducting evacuations, lock downs, and shelter-in-place, etc. In addition, the Crisis Response Plan has been developed in accordance with NIMS –ICS standards in order for administrators to understand the process and responsibilities aligned within the Incident Command Structure. This includes understanding ICS – EOC interface. Introducing NIMS-ICS to the District will make first responders’ jobs easier during disasters.	All Hazards, Natural and Man-made	Response	No
	Other Annex and Appendix Plans	Various Annex and Appendix Plans have been assigned to other Departments such as Transportation, Food Services, School Police, Health Services, Risk Management, Legal, Public Information Office will develop within the next 12 months	All Hazards, Natural and Man-made	Mitigation, Preparedness, Protection, Prevention, Response, and Recovery	No

Table L-7. Clark County School District, Current, Ongoing, and Completed Hazard Mitigation Projects and Programs

Status (Current, Ongoing, or Completed)	Project / Program Name	Description	Year(s)
Current	Installation of Seismic Gas Valves (the grant application for this project issued in 2011)	This project requires the replacement all gas valves with new seismic gas valves on all school properties, administrative and facility buildings, for the prevention of fires, explosions as triggered by leak(s) in the piping system. Potential problems such as this one will most likely rise from earthquakes.	The work will be completed within 12 to 18 months of FEMA grant approval
Current	Installation of Seismic Bracing for the Las Vegas Academy Gym Building (the grant application for this project issued in 2011)	The Las Vegas Academy Gym was constructed in 1930s and considered as a Historical Building. This Historical Building is still being used during operational days housing approximately 100 and up to 600 students, faculty and parents during events. In order to prevent loss of life caused by an earthquake, maintain and preserve the building as the Las Vegas Valley's Historical Monument, it requires structural seismic bracing.	The work will be completed within 12 months of FEMA grant approval

Table L-8. Clark County School District, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
1	Create a GIS-based pre-application review for new construction and major remodels of residential and/or non-residential structures in hazard areas, such high and/or very high wildfire areas.	Property Protection	All	New and Existing – Residential and non-residential buildings in hazard areas.
2	Integrate the Clark County HMP, in particular the hazard analysis and mitigation strategy sections, into local planning documents, including general plans, emergency operations plans, and capital improvement plans.	Property Protection	All	Not Applicable
3	Add mitigation actions to each jurisdiction's website.*	Public Awareness	All	Not Applicable
4	Develop a public outreach program that informs property owners located in the dam inundation areas about voluntary flood insurance.	Public Awareness	Dam Failure	Existing – Residential buildings located within dam inundation areas.
5	Develop a drought contingency plan to provide an effective and systematic means of assessing drought conditions, develop mitigation actions and programs to reduce risks in advance of drought, and develop response options that minimize hardships during drought.	Prevention, Natural Resource Protection	Drought	New/Existing
6	Seismically retrofit or replace critical facilities that are necessary during and/or immediately after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Public works and/or emergency response facilities that are structurally deficient or located within a high ground shaking area.
7	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Nevada DOT, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Ramps and bridges identified by Nevada DOT as structurally deficient or located within an extreme ground shaking area.
8	Teach the general public how to prepare their households, in the event of an earthquake, by presenting preparedness information and attractive hands-on displays.	Public Awareness	Earthquake	Not Applicable
9	Implement better record keeping measures, as well as on the part of food processors and handlers.*	Prevention	Epidemic (Infectious Disease)	Not Applicable

Table L-8. Clark County School District, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
10	To protect vulnerable populations from disease by conducting increased surveillance and development of more stringent requirements at high-risk facilities, (i.e., day-care centers, hospitals, nursing homes, schools, as well as restaurants, hotels/resorts and casinos).*	Prevention	Epidemic (Infectious Disease)	Not Applicable
11	Acquire, relocate, elevate, and/or flood proof critical facilities that are located within the 100-year floodplain.	Property Protection	Flood	Existing - Critical facilities located within the 100-year floodplain.
12	Reinforce County and local ramps, bridges, and roads from flooding through protection activities, including elevating the road and installing culverts beneath the road or building a higher bridge across the area that experiences regular flooding.	Property Protection, Structural Project	Flood	Existing – County and local ramps, bridges, and roads identified in the 100-year floodplain.
13	Work with FEMA Region IX to address any floodplain management issues that may have arisen/arise from the countywide Digital Flood Insurance Rate Map (DFIRM), Community Assessment Visits, and/or the Division of Water Resources (DWR).	All	Flood	New/Existing - Properties within the 100-year or 500-year floodplain.
14	Acquire, relocate, or elevate residential structures, in particular those that have been identified as Repetitive Loss (RL) properties that are located within the 100-year floodplain.	Property Protection	Flood	Existing – Residential structures, including RL properties, located within the 100-year floodplain.
15	Ensure that existing monitoring capabilities at the state and County level are integrated to provide an early warning of increased or new infestations.*	Natural Resource Protection	Infestation	Not Applicable
16	Implement an infestation public awareness and educational campaign.	Public Awareness	Infestation	Not Applicable
17	Reduce the net annual groundwater withdrawal to the level of net annual recharge. This can be accomplished either through a reduction of dependence upon groundwater (increase dependence upon surface water) or through an increase in the artificial recharge.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.

Table L-8. Clark County School District, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
18	In already-built areas lying within high hazard zones, restrictions on the use of applied water may be necessary to prevent the enlargement of fissures. This may require the implementation of strict water conservation policies, such as no watering or desert landscaping ordinances in areas prone to fissuring.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.
19	Implement recommended Buffer Zone Protection measures for pre-designated critical facilities and infrastructure.*	Prevention	Terrorism	Existing - Critical facilities
20	Contact key businesses (such as gun shops, recycling businesses, beauty and drug supplies) to provide them with a point of contact should they have information or concerns to report, and to background them on how to spot potentially suspicious people and activities.*	Public Awareness, Prevention	Terrorism	Not Applicable
21	In coordination with appropriate agencies, local, state, and federal, obtain site-specific studies to ascertain whether the zoning has been brought in line with the hazard, and how the building stock, old and new, might fare if a credible earthquake were to occur with specific attention to lifelines: transportation corridors, buildings, and pipelines.*	Prevention	Utility Failure, Earthquake	New and Existing – Residential and non-residential buildings in earthquake hazard areas.
22	Implement a fuel reduction program, such as the collection and disposal of dead fuel, within open spaces and around critical facilities and residential structures located within a high and very high wildfire zones.	Prevention, Property Protection, Natural Resource Protection	Wildfire	Existing – Critical facilities and residential buildings located within high and very high wildfire zones.
23	Create a vegetation management program that provides vegetation management services to elderly, disabled, or low-income property owners who lack the resources to remove flammable vegetation from around their homes.	Property Protection	Wildfire	Existing – Residential buildings in high or very high wildfire zones.
24	Implement a fuel modification program, which also includes residential maintenance requirements and enforcement, plan submittal and approval process, guidelines for planting, and a listing of undesirable plant species. Require builders and developers to submit their plans, complete with proposed fuel modification zones, to the local fire department for review and approval prior to beginning construction.	Prevention, Property Protection	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.

Table L-8. Clark County School District, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
25	Establish a standard safety zone of 30 feet around county/city-owned structures that are vulnerable to the effects of wildfire. Encourage private and commercial property owners to adopt the same.	Prevention	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.
26	Develop a community wildfire mitigation plan that identifies and prioritizes areas for hazard fuel reduction treatments, and recommend the types of methods of treatments.	Prevention, Property Protection	Wildfires	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas in the Local Responsibility Areas
27	Develop a process to determine damages and losses avoided after an event.	Property Protection	All	New and Existing - Residential and non-residential buildings in hazard areas.
28	Installation of Seismic Bracing for the Las Vegas Academy Academic Building and Gym - The Las Vegas Academy Academic Building and the Gym were constructed in 1930s and considered as Historical Buildings. These Historical Buildings are still being used during operational days housing on the average 600 to 1000 students, faculty and visitors daily. In order to prevent loss of life caused by an earthquake, maintain and preserve the buildings as the Las Vegas Valley's Historical Monuments, they require structural bracing.	Property Protection, Prevention	Earthquake	Existing - the Las Vegas Academy Academic Building and the Gym
29	Installation of Seismic Sprinkler Bracing on all schools, administrative and facility buildings - This project requires the installation of seismic sprinkler bracing on all school properties, administrative & facility buildings, as it is related to potential earthquakes, explosions, and fire hazards.	Property Protection	Earthquake	Existing - All schools, administrative and facility buildings

Table L-8. Clark County School District, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
30	Construction of Flood Barriers and Flood Channels involving school district properties; schools, administrative, and facility buildings - Clark County and Cities have done a tremendous job building detention basins to protect county and city infrastructures from potential flooding. Las Vegas Valley is well known for El Nino and Monsoon weather that typically can flood an area within very short period of time. In looking at the flood zone map within the valley, certain detention basins are built at higher ground than district properties and there is a possibility that some of the district properties may flood if these detention basins overflow. To prevent such a disaster from happening, a study will be required to be conducted, to determine which school district properties are affected and identify potential solution(s) and costs associated with those solutions. . In addition to the regular flood areas, the 100 year flood zone areas, and heavy housing community and shopping center developments, some of which may have been constructed without proper and/or full study of flood channel development, potentially threaten our school facilities/sites of flooding.	Prevention, Property Protection	Flood	Existing - School district properties that are on lower ground than nearby detention basins
31	Roof Re-enforcement - Other than Earthquakes and Floods, the Las Vegas Valley – Clark County area is subjected to high winds of 50 and 70 plus miles per hour. A Study may need to be conducted to identify potential roof problems on school district building roofs that will require re-enforcement.	Property Protection, Prevention	High Winds	Existing - School district building in high wind areas
32	(Flood) Rip Rap Improvement for school district sites located near River and/or Washes - This would be to mitigate certain school district properties located nearby a river or a wash that have the potential of flooding and/or washing away school property during severe flooding or river/wash over-flooding. This includes schools that are near hills or mountains where soil and water potentially flood the school (s).	Property Protection, Prevention	Flood	Existing - School district sites located near River and or Washes, and Hills and Mountains.

Table L-8. Clark County School District, Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
33	Dried Vegetation Cleanout - This would mitigate potential fires by removing dried vegetation from surrounding school district property areas located in the LV valley's outskirts. This will require coordination with city, county, state and federal owners.	Property Protection, Prevention	Fire	Existing - School district sites located in the LV valley's outskirts
34	Soil liquefaction describes a phenomenon whereby a saturated soil substantially loses strength and stiffness in response to an applied stress, usually earthquake shaking or other sudden change in stress condition, causing it to behave like a liquid. - - - This would mitigate certain school properties that have the potential of "soil liquefaction" caused by an earthquake, a flood, or a combination of the two. Multiple studies may be required to identify schools that may potentially have this problem.	Property Protection, Prevention	Flood, Earthquake. And/or combination of the two	Existing - School district sites located near River and or Washes, Hills and Mountains, on lower grounds than nearby detention basins, and lower county and city level grounds where potentially can be flooded by heavy rains alone.
35	Installation of Seismic Gas Valves on all schools, administrative and facility buildings - This project requires the installation of seismic gas valves on all school properties, administrative & facility buildings, as it is related to potential earthquakes, explosions, and fire hazards as a result of those earthquakes.	Property Protection, Prevention	Earthquake and Fire	Existing - All schools, administrative and facility buildings
* Mitigation action does not meet the 2011 HMA Guidance requirements for FEMA mitigation funding				

Table L-9. Clark County School District, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
28	Y	Installation of Seismic Bracing for the Las Vegas Academy Academic Building and Gym - The Las Vegas Academy Academic Building and the Gym were constructed in 1930s and considered as Historical Buildings. These Historical Buildings are still being used during operational days housing on the average 600 to 1000 students, faculty and visitors daily. In order to prevent loss of life caused by an earthquake, maintain and preserve the buildings as the Las Vegas Valley's Historical Monuments, they require structural bracing.	B, C, D	Las Vegas Academy	CCSD Facilities Division and Emergency Management	Two years upon receipt of funding
29	Y	Installation of Seismic Sprinkler Bracing on all schools, administrative and facility buildings - This project requires the installation of seismic sprinkler bracing on all school properties, administrative & facility buildings, as it is related to potential earthquakes, explosions, and fire hazards.	B, C, D	All district schools and facility buildings	CCSD Facilities Division and Emergency Management	One year upon receipt of funding

Table L-9. Clark County School District, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
30	Y	Construction of Flood Barriers and Flood Channels involving school district properties; schools, administrative, and facility buildings - Clark County and Cities have done a tremendous job building detention basins to protect county and city infrastructures from potential flooding. Las Vegas Valley is well known for El Nino and Monsoon weather that typically can flood an area within very short period of time. In looking at the flood zone map within the valley, certain detention basins are built at higher ground than district properties and there is a possibility that some of the district properties may flood if these detention basins overflow. To prevent such a disaster from happening, a study will be required to be conducted, to determine which school district properties are affected and identify potential solution(s) and costs associated with those solutions. In addition to the regular flood areas, the 100 year flood zone areas, and heavy housing community and shopping center developments, some of which may have been constructed without proper and/or full study of flood channel development, potentially threaten our school facilities/sites of flooding.	B, C, D	Facilities/schools will be identified in the study report.	CCSD Facilities Division and Emergency Management	Dependent upon study findings. The more schools identified the more time it will take to complete.
31	Y	Roof Re-enforcement - Other than Earthquakes and Floods, the Las Vegas Valley – Clark County area is subjected to high winds of 50 and 70 plus miles per hour. A Study may need to be conducted to identify potential roof problems on school district building roofs that will require re-enforcement.	C, D	Facilities Division to identify potential schools that may require roof reinforcement.	CCSD Facilities Division and Emergency Management	Dependent upon the number of schools that require roof reinforcement, the more schools identified the more time it will take to complete.

Table L-9. Clark County School District, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
32	Y	(Flood) Rip Rap Improvement for school district sites located near River and/or Washes - This would be to mitigate certain school district properties located nearby a river or a wash that have the potential of flooding and/or washing away school property during severe flooding or river/wash over-flooding. This includes schools that are near hills or mountains where soil and water potentially flood the school (s).	C, D	Hughes MS, J Bowler ES, Canyon Springs HS, G Bowler ES, Lyon MS, Moapa Valley HS, and others as they may be identified as facilities for mitigation against natural hazards.	CCSD Facilities Division and Emergency Management	Dependent upon the number of schools that require flood type improvements. The more schools identified the more time it will take to complete.
33	Y	Dried Vegetation Cleanout - This would mitigate potential fires by removing dried vegetation from surrounding school district property areas located in the LV valley's outskirts. This will require coordination with city, county, state, and federal owners.	C, D	Facilities Division to identify potential schools on the outskirts of Las Vegas Valley that may require to cleanout dried vegetation.	CCSD Facilities Division and Emergency Management	Dependent upon the number of agencies involved and schools that will require dried vegetation cleanout
34	Y	Soil liquefaction describes a phenomenon whereby a saturated soil substantially loses strength and stiffness in response to an applied stress, usually earthquake shaking or other sudden change in stress condition, causing it to behave like a liquid. - - - This would mitigate certain school properties that have the potential of "soil liquefaction" caused by an earthquake, a flood, or a combination of the two. Multiple studies may be required to identify schools that may potentially have this problem.	C, D, E	Facilities/schools will be identified in the study report(s).	CCSD Facilities Division and Emergency Management	Unknown

Table L-9. Clark County School District, Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
35	Y	Installation of Seismic Gas Valves on all schools, administrative and facility buildings - This project requires the installation of seismic gas valves on all school properties, administrative & facility buildings, as it is related to potential earthquakes, explosions, and fire hazards as a result of those earthquakes.	B, C, D, E	All district schools and facility buildings	CCSD Facilities Division and Emergency Management	One year

Prioritization Criteria

- A. Local jurisdiction department or agency champion
- B. Ability to be implemented during the 5-year lifespan of the HMP
- C. Ability to reduce expected future damages and losses (cost-benefit)
- D. Mitigates a high-risk hazard
- E. Mitigates multiple hazards

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Appendix M
Clark County Water Reclamation District

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Table M-1. Clark County Water Reclamation District (CCWRD), Total Critical Facilities and Infrastructure

(Table M-2. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table M-2. Clark County Water Reclamation District (CCWRD), Vulnerable Critical Facilities and Infrastructure

(Table M-2. is provided separately as a Sensitive Document. Please contact Clark County Office of Emergency Management and Homeland Security for more information. oem@ClarkCountyNV.gov or 702-455-5710)

Table M-3. Clark County Water Reclamation District (CCWRD), Summary of Impacts for Critical Facilities and Infrastructure

Hazard	No. of Critical Facilities and Infrastructure	% of Critical Facilities and Infrastructure
Earthquake - Very Strong Shaking	3	43%
Earthquake - Strong Shaking	4	57%
Earthquake - Liquefaction	1	14%
Flood - 100 Year Floodplain	2	29%
Flood - 500 Year Floodplain	1	14%
Wildfire - High	1	14%

**Table M-4. Clark County Water Reclamation District (CCWRD),
Human and Technical Resources for Hazard Mitigation**

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Engineers, construction project managers, and supporting technical staff.	CCWRD	Provides direct or contract civil, structural, and mechanical engineering services, including contract, project, and construction management.
Engineer(s), project manager(s), technical staff, equipment operators, and maintenance and construction staff.	CCWRD	Maintains and operates of a wide range of local equipment and facilities as well as providing assistance to members of the public. These include providing sufficient clean fresh water, reliable sewer services, street maintenance, storm drainage systems, street cleaning, street lights and traffic signals.
Safety & Security Administrator	CCWRD	Maintains and updates the Emergency Operations Plan for the local jurisdiction. In addition, coordinates local response and relief activities within the Emergency Operation Center, and works closely with County, state, and federal partners to support planning and training and to provide information and coordinate assistance.
Purchasing & Procurement Services Supervisor	CCWRD	Provides municipal financial services and functions as the local jurisdiction's Procurement Services Supervisor.
Safety Officer, Safety & Security Specialist, Security Coordinator	CCWRD	Maintains chemical inventory, vulnerability assessments, Emergency Response Plans, security design standards, and surveillance system oversight.

Table M-5. Clark County Water Reclamation District (CCWRD), Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Local	Enterprise Fund	CCWRD	Program operations and specific projects.	Variable
	General Obligation (GO) Bonds	CCWRD	GO Bonds are appropriately used for the construction and/or acquisition of improvements to real property for the District.	Variable
	Public-Private Partnerships	CCWRD	Emergency planning, resource sharing, and communication. Includes partnerships with Nevada WARN, District Emergency Response Plan updates, LEPC, Silver Shield, DHS, and Las Vegas Fusion Center.	Variable
State	Earthquake Mitigation Funds	Nevada Earthquake Safety Council	Allocates FEMA money for earthquake mitigation efforts	Project-specific.
	All-Hazard	Nevada Division of Emergency Management (DEM)	Provide support and pass-through funding for activities to mitigate all-hazards	Project-specific.
Federal	Clean Water State Revolving Fund (CWSRF)	EPA	CCWRD applied and received loans from CWSRF for the purpose of new capital development for the Indian Springs Plant and the Central Plant's Membranes facilities.	Variable
	Homeland Security Preparedness Technical Assistance Program (HSPTAP)	FEMA/DHS	Physical Site Assistance visit and Cyber Resiliency Review	Variable

Table M-6. Clark County Water Reclamation District (CCWRD), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plan	CCWRD Written Emergency Management Plan	The written plan has all facets of the District's Emergency management outlined within to include mitigation, preparedness response and recovery. The written plan allows the staff to utilize information from mitigation to recovery phases of natural and manmade disasters. Within the response section of the overall plan the following hazards are addressed:	Loss of power, loss of major infrastructure, contamination of collection sewer system , security breach, loss of pressure of collection system, major hazardous spill, loss of personnel	All	Yes
Guidance	DHS Protective Measures for Wastewater Treatment Facilities	Document/guide to assist with protective measures against common vulnerabilities within wastewater facilities.	Terrorist activities	Preparedness	Yes
	EPA Security Guidelines to guard against security threats	Document/guide to assist with protective measures against common vulnerabilities within wastewater facilities.	Terrorist activities	Preparedness	Yes
	DHS- Chemicals of Interest	Document/guide to assist with protective measures against common vulnerabilities within wastewater facilities.	Terrorist activities	Preparedness	No
	WEF – Guidelines for Physical Security of Water Utilities	Document/guide to assist with protective measures against common vulnerabilities within wastewater facilities.	Terrorist activities	Preparedness	Yes
	DHS – Cyber Resilience Review	Document/guide to assist with cyber protective measures at wastewater facilities	Terrorist activities	Preparedness	No

**Table M-7. Clark County Water Reclamation District (CCWRD),
Current, Ongoing, and Completed Hazard Mitigation Projects and Programs**

Status (Current, Ongoing, or Completed)	Project / Program Name	Description	Year(s)
Current CCWRD Capital Improvement Program	CIP projects	Various projects to include erosion control, electrical upgrades, and rehab of infrastructure.	2011-2015

Table M-8. Clark County Water Reclamation District (CCWRD), Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
1	Create a GIS-based pre-application review for new construction and major remodels of residential and/or non-residential structures in hazard areas, such high and/or very high wildfire areas.	Property Protection	All	New and Existing – Residential and non-residential buildings in hazard areas.
2	Integrate the Clark County HMP, in particular the hazard analysis and mitigation strategy sections, into local planning documents, including general plans, emergency operations plans, and capital improvement plans.	Property Protection	All	Not Applicable
3	Add mitigation actions to each jurisdiction's website.*	Public Awareness	All	Not Applicable
4	Develop a public outreach program that informs property owners located in the dam inundation areas about voluntary flood insurance.	Public Awareness	Dam Failure	Existing – Residential buildings located within dam inundation areas.
5	Develop a drought contingency plan to provide an effective and systematic means of assessing drought conditions, develop mitigation actions and programs to reduce risks in advance of drought, and develop response options that minimize hardships during drought.	Prevention, Natural Resource Protection	Drought	New/Existing
6	Seismically retrofit or replace critical facilities that are necessary during and/or immediately after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Public works and/or emergency response facilities that are structurally deficient or located within a high ground shaking area.
7	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Nevada DOT, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	Property Protection, Structural Project	Earthquake	Existing – Ramps and bridges identified by Nevada DOT as structurally deficient or located within an extreme ground shaking area.
8	Teach the general public how to prepare their households, in the event of an earthquake, by presenting preparedness information and attractive hands-on displays.	Public Awareness	Earthquake	Not Applicable
9	Implement better record keeping measures, as well as on the part of food processors and handlers.*	Prevention	Epidemic (Infectious Disease)	Not Applicable

Table M-8. Clark County Water Reclamation District (CCWRD), Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
10	To protect vulnerable populations from disease by conducting increased surveillance and development of more stringent requirements at high-risk facilities, (i.e., day-care centers, hospitals, nursing homes, schools, as well as restaurants, hotels/resorts and casinos).*	Prevention	Epidemic (Infectious Disease)	Not Applicable
11	Acquire, relocate, elevate, and/or flood proof critical facilities that are located within the 100-year floodplain.	Property Protection	Flood	Existing - Critical facilities located within the 100-year floodplain.
12	Reinforce County and local ramps, bridges, and roads from flooding through protection activities, including elevating the road and installing culverts beneath the road or building a higher bridge across the area that experiences regular flooding.	Property Protection, Structural Project	Flood	Existing – County and local ramps, bridges, and roads identified in the 100-year floodplain.
13	Work with FEMA Region IX to address any floodplain management issues that may have arisen/arise from the countywide Digital Flood Insurance Rate Map (DFIRM), Community Assessment Visits, and/or the Division of Water Resources (DWR).	All	Flood	New/Existing - Properties within the 100-year or 500-year floodplain.
14	Acquire, relocate, or elevate residential structures, in particular those that have been identified as Repetitive Loss (RL) properties that are located within the 100-year floodplain.	Property Protection	Flood	Existing – Residential structures, including RL properties, located within the 100-year floodplain.
15	Ensure that existing monitoring capabilities at the state and County level are integrated to provide an early warning of increased or new infestations.*	Natural Resource Protection	Infestation	Not Applicable
16	Implement an infestation public awareness and educational campaign.	Public Awareness	Infestation	Not Applicable
17	Reduce the net annual groundwater withdrawal to the level of net annual recharge. This can be accomplished either through a reduction of dependence upon groundwater (increase dependence upon surface water) or through an increase in the artificial recharge.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.

Table M-8. Clark County Water Reclamation District (CCWRD), Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
18	In already-built areas lying within high hazard zones, restrictions on the use of applied water may be necessary to prevent the enlargement of fissures. This may require the implementation of strict water conservation policies, such as no watering or desert landscaping ordinances in areas prone to fissuring.	Prevention, Natural Resource Protection	Subsidence	New/ Existing – Residential and non-residential buildings located within high or very high subsidence areas.
19	Implement recommended Buffer Zone Protection measures for pre-designated critical facilities and infrastructure.*	Prevention	Terrorism	Existing - Critical facilities
20	Contact key businesses (such as gun shops, recycling businesses, beauty and drug supplies) to provide them with a point of contact should they have information or concerns to report, and to background them on how to spot potentially suspicious people and activities.*	Public Awareness, Prevention	Terrorism	Not Applicable
21	In coordination with appropriate agencies, local, state, and federal, obtain site-specific studies to ascertain whether the zoning has been brought in line with the hazard, and how the building stock, old and new, might fare if a credible earthquake were to occur with specific attention to lifelines: transportation corridors, buildings, and pipelines.*	Prevention	Utility Failure, Earthquake	New and Existing – Residential and non-residential buildings in earthquake hazard areas.
22	Implement a fuel reduction program, such as the collection and disposal of dead fuel, within open spaces and around critical facilities and residential structures located within a high and very high wildfire zones.	Prevention, Property Protection, Natural Resource Protection	Wildfire	Existing – Critical facilities and residential buildings located within high and very high wildfire zones.
23	Create a vegetation management program that provides vegetation management services to elderly, disabled, or low-income property owners who lack the resources to remove flammable vegetation from around their homes.	Property Protection	Wildfire	Existing – Residential buildings in high or very high wildfire zones.

Table M-8. Clark County Water Reclamation District (CCWRD), Potential Mitigation Actions

No.	Description	Mitigation Category	Hazard Addressed	New or Existing Construction
24	Implement a fuel modification program, which also includes residential maintenance requirements and enforcement, plan submittal and approval process, guidelines for planting, and a listing of undesirable plant species. Require builders and developers to submit their plans, complete with proposed fuel modification zones, to the local fire department for review and approval prior to beginning construction.	Prevention, Property Protection	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.
25	Establish a standard safety zone of 30 feet around county/city-owned structures that are vulnerable to the effects of wildfire. Encourage private and commercial property owners to adopt the same.	Prevention	Wildfire	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas.
26	Develop a community wildfire mitigation plan that identifies and prioritizes areas for hazard fuel reduction treatments, and recommend the types of methods of treatments.	Prevention, Property Protection	Wildfires	New/ Existing – Residential and non-residential buildings located within high or very high wildfire areas in the Local Responsibility Areas
27	Develop a process to determine damages and losses avoided after an event.	Property Protection	All	New and Existing - Residential and non-residential buildings in hazard areas.
28	Create a GIS based review for new construction and capital improvement projects of pipeline collection systems in extreme ground shaking areas.	Prevention, Property Protection	Earthquake	New/ Existing – Pipelines located within extreme ground shaking areas.
29	Implement recommended buffer zone protection measures for new wastewater facilities that have been deemed critical infrastructure.	Prevention, Property Protection	Terrorism	New wastewater treatment facilities
* Mitigation action does not meet the 2011 HMA Guidance requirements for FEMA mitigation funding				

Table M-9. Clark County Water Reclamation District (CCWRD), Mitigation Action Plan

No.	Selected (Y/N)	Description	Prioritization Criteria	Facility to be Mitigated (if known)	Department or Agency	Timeframe to be Implemented
28	Y	Create a GIS based review for new construction and capital improvement projects of pipeline collection systems in extreme ground shaking areas.	B, C, D	Collection System in the unincorporated Clark County Services area	CCWRD	3 years
29	Y	Implement recommended buffer zone protection measures for new wastewater facilities that have been deemed critical infrastructure.	B, C, D	New wastewater facilities in unincorporated Clark County	CCWRD	3 years

Prioritization Criteria

- A. Local jurisdiction department or agency champion
- B. Ability to be implemented during the 5-year lifespan of the HMP
- C. Ability to reduce expected future damages and losses (cost-benefit)
- D. Mitigates a high-risk hazard
- E. Mitigates multiple hazards