



# CLARK COUNTY UTILITIES ELEMENT REPORT

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by the  
Clark County Planning Commission

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by the  
Clark County Board of County Commissioners



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# EXECUTIVE SUMMARY

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The Clark County Utilities Element is an update to the Clark County Comprehensive Plan. This document addresses the public utilities that serve residents, businesses and other users. Included are providers of electric power, pipeline fuels, public water, sewer, and telecommunications.

The Clark County Utilities Report provides background, analysis, and recommendations to issues of providing public utilities. These issues include:

- Critical infrastructure as defined by the Department of Homeland Security
- Service provision with the Las Vegas Valley and Outlying Clark County
- Community design conflicts
- Alternative and distributed energy sources
- Ground-mounted solar energy sources
- Transmission corridors
- Transported fuels
- Cell tower and communication networks

The Utilities Report addresses issues of land use and facility location. The subject of Conservation in the Comprehensive Plan addresses conservation and provision of resources such as energy, potable water, or water quality.

## Benefits

- For the first time, all utility providers countywide have coordinated to provide participation and input to develop the final product.
- The plan ensures adequate public facilities are available to support planned development, and ensure that the public has reliable information about the location, availability, and timing of infrastructure expansion.
- New policies that achieve the following:
  - Recommendations for better site design in the protection of critical infrastructure.
  - Locate transmission lines and pipelines in existing Utility Corridors when feasible.
  - New Utility Corridors will be multi-use allowing for transmission lines and pipelines.
  - Encourage distributive energy, cogeneration, and alternative energy sources.
  - Encourage planning and implementation of a hydrogen economy.
  - Reduce visual impact of cell towers and equipment buildings.
  - Place equipment boxes outside sidewalk/clear zone to maintain pedestrian flow.
  - Underground utility services will be located within the sidewalk Amenity Zone.

## Deliverables

- A facility location map showing all utilities listed within the plan.
- A map locating cell tower sites throughout all of Clark County.
- Work Program
  - Develop an energy plan.



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# INTRODUCTION

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## **Authority**

In accordance with Nevada State Law, Clark County is required to prepare a master plan “for the physical development of the city, county or region” (Nevada Revised Statutes (NRS) §278.150). To assist with physical development of the County, the Master Plan may include elements that range from Community Design to Transportation. This Utilities Report and Element is in accordance with NRS §278.160 (1) (i) and is a part of the Clark County Comprehensive Plan.

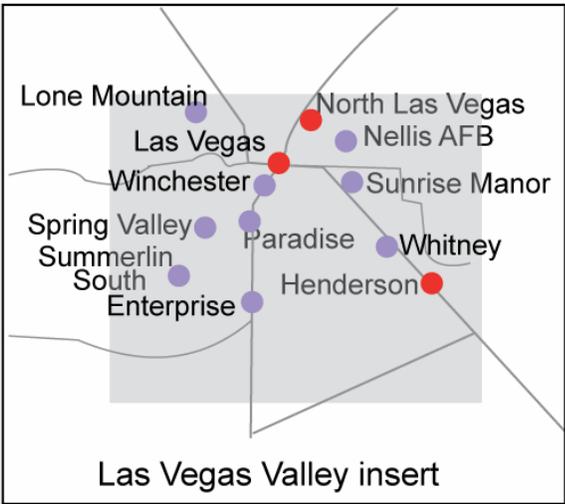
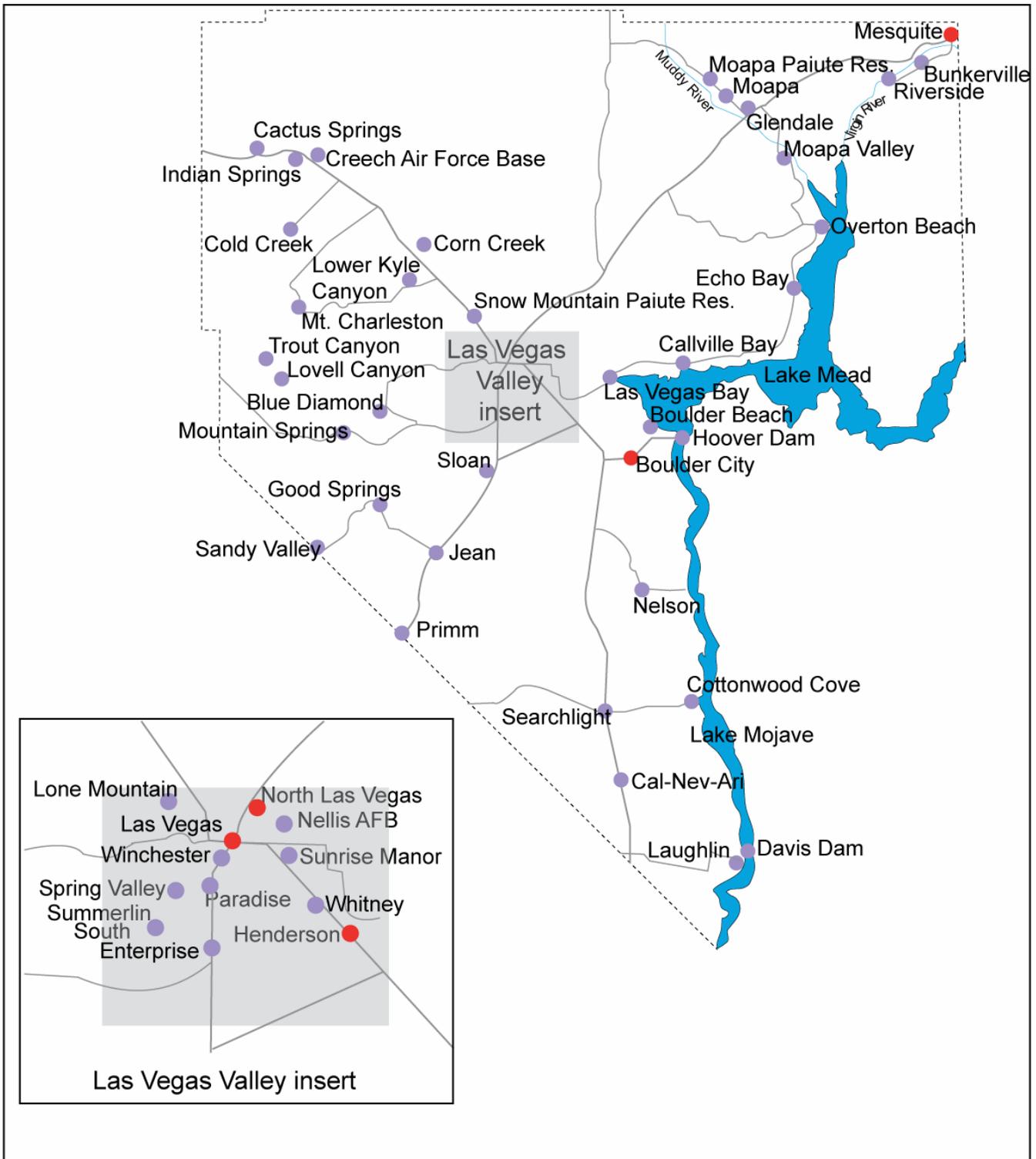
## **Purpose of the Utilities Report and Utilities Policies**

The Clark County Utilities Report is intended to provide the background, analysis, and recommendations that are the basis of the corresponding Policies. The Utilities Element assists in guiding land use and policy decisions made by Planning Commission (PC) and Board of County Commissioners (BCC). The Report gives general locations for various utility facilities to accommodate both current and future needs.

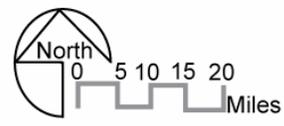
The types of utilities addressed in this report are electric, pipeline fuels, telecommunications, wastewater, and water. Electric utilities are further separated into electric providers, and electric generators. Electric providers supply electric service to individual customers. While, electric generators, generate electricity and sell it wholesale.

Topics within the report are separated by providers located in the Las Vegas Valley and those located in outlying Clark County. The Las Vegas Valley contains the largest percentage of population and growth within Clark County. The Las Vegas Valley is urban and contains three of the five incorporated cities in Clark County. In contrast, outlying Clark County is rural in nature. At present, outlying areas growth is slower, although, these communities are future development areas, not all of the services found in the Las Vegas Valley are available. Map 1 (page 2) illustrates the communities within the Las Vegas Valley and those within the outlying areas.

This report does not include all of the providers of services within Clark County. Many small providers, for example water providers, are not listed in the Element. These providers service very small areas and do not contribute to the overall service provision needed in formulating this report or element. Other service providers are also covered in other subject material in the Comprehensive Plan. Please refer to the introduction chapter of Volume One of the Comprehensive Plan to locate subject matter related to service providers not in this Element.



## Clark County Communities



- Incorporated City
- Unincorporated Clark County

# BACKGROUND

The following descriptions and maps indicate existing utilities service providers. The information used to create this chapter was obtained from published reports, internet web pages and interviews with service agency representatives. A map showing facilities of the service providers and related transmission corridors is located at the following web site:

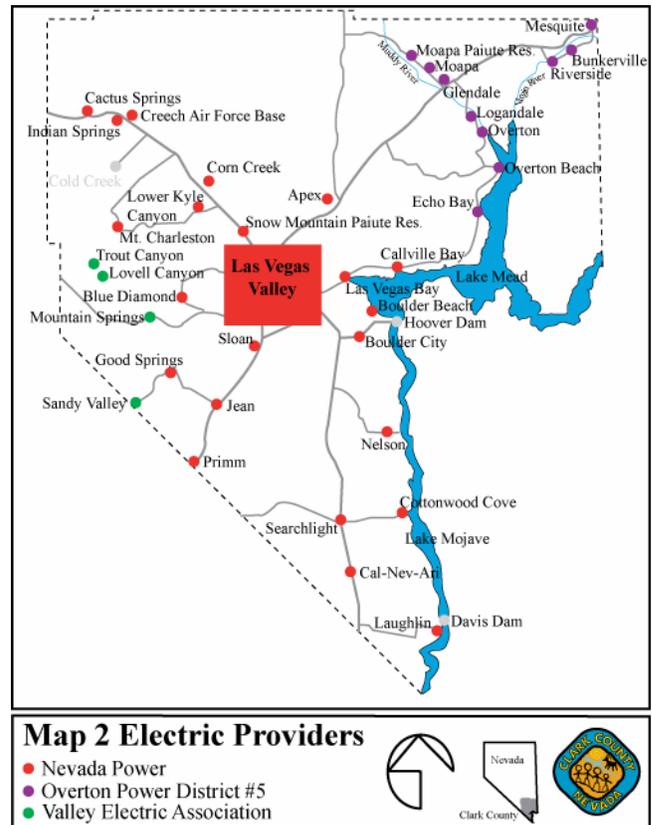
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## Electric (Transmission)

Companies that provide electrical service to Clark County are Nevada Power, Overton Power District #5, and Valley Electric Association.

### Nevada Power

Nevada Power Company (formerly Southern Nevada Power until 1961) provides electrical service to the Las Vegas Valley and outlying Clark County (see map 2.) Nevada Power Company has been serving the Valley since 1906. In 1937, Southern Nevada Power became the first utility to distribute electricity from newly completed Hoover Dam, the major source of power for Las Vegas for the next 18 years. Because the demand for power was exceeding supplies available from Hoover Dam, Southern Nevada Power started construction of its own steam turbine generators in the 1950s, beginning with Clark Station. Now the company operates six power plants and buys electrical power from various sources throughout Clark County.



### Overton Power District #5

Overton Power District #5 provides electrical service to Northeast Clark County. The District was formed and chartered in 1937 under Chapter 72 of the Nevada State Session Laws of 1935 Power District Statute 312. Currently the District operates under the General Improvements Law Statue 318 of the Nevada State Legislative Act of 1987.

The Overton Power District service area begins approximately 30 miles East of Las Vegas, Nevada, and encompasses approximately 1,932 square miles of Clark County, Nevada, including the City of Mesquite, and the unincorporated communities of Bunkerville, Moapa, Glendale, and Moapa Valley (Logandale and Overton.) The District provides services to approximately 10,000 customers, of whom approximately 86% are residential customers, the balance being irrigation and general service customers.

## Valley Electric Association

Valley Electric Association provides electrical service to communities in Northwest and South Clark County. This area includes the communities of Lovell Canyon, Mountain Springs, Sandy Valley and Trout Canyon. The Valley Electric Association is headquartered in Pahrump, Nevada, and serves Nye County.

## Western Area Power Association

Western Area Power Association is a Federal power marketing administration. The Association has three major substations located within Southern Clark County. The Association markets and delivers reliable, cost-based wholesale hydroelectric power and related services to local utilities.

## Electric Generators

The following companies listed below have power plants within Clark County. The energy generated serves various wholesale providers and electrical utility companies. Distribution of electrical energy by the electrical service generators is through major transmission lines throughout Clark County. These transmission lines are located largely on Bureau of Land Management (BLM) public lands. The BLM is responsible for utility corridor policy.

## California Edison

The Mohave Generating Station is located in Laughlin. The coal power plant consists of two 790-megawatt generating units. The plant closed on December 31, 2005. Plans are being developed to reopen the plant.

## Diamond Generating

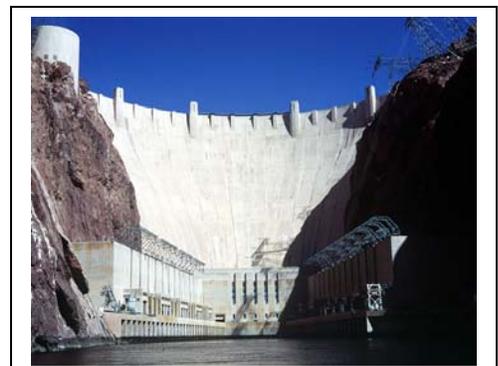
Diamond Generating, a wholly owned subsidiary of the Mitsubishi Corporation, is currently constructing a combined cycle power plant at Jean, Nevada. A combined cycle plant uses generated heat from initial electrical production to make steam and produce additional electricity. The plant will sell the energy produced to wholesalers. The company was planning to begin construction in first quarter of 2006 and complete construction in 2008.

## Davis Dam

Davis Dam provides regulation of the Colorado River, produces and transmits electrical energy, contributes to flood control, provides irrigation and municipal water supplies, improves navigation, provides recreation, and incorporates wild waterfowl protection and related conservation purposes. The Mexican Treaty of 1944 required the United States to construct Davis Dam for regulation of water to be delivered to Mexico. The reservoir formed by the dam, Lake Mohave, is used for that purpose through integrated operations of Hoover Dam and Davis Dam power plants.

## Hoover Dam

Hoover Dam provides generation of low-cost hydroelectric power for use in Nevada, Arizona and California. Hoover Dam alone generates more than 4 billion kilowatt-hours a year - enough to serve 1.3 million people. From 1939 to 1949, Hoover power plant was the world's largest hydroelectric installation; today, it is still one of the Country's largest. Clark County receives less than 5 percent of the electricity



**Hoover Dam**

Source: Bureau of Reclamation

generated by the dam. The Bureau of Reclamation performs the operation and maintenance of the power plant.

## **Nevada Power**

Nevada Power operates seven generating plants within Clark County. The Reid Gardner power plant is a coal fired power generation facility located West of Hidden Valley Road in Moapa in the northeast portion of Clark County. The Harry Allen power plant is located 35 miles northeast of Las Vegas. The Clark power plant is located in the southeast area of the Las Vegas Valley. The Chuck Lenzie power plant is located in Moapa Valley. The Silver Hawk plant is located in Apex. The Sunrise power plant is on the east side of the Las Vegas Valley in the Unincorporated Town of Whitney. The Harry Allen Unit 4 power plant is located north of Apex.

## **Reliant Energy**

Reliant Energy is a wholesale marketer of electricity. Reliant Energy currently operates the Bighorn generating facility. The generating facility serves power markets in Nevada and the West. Bighorn Generating Station is located in Southern Clark County near Primm, Nevada.

## **Sempra Energy**

Sempra Energy develops and operates power plants and energy infrastructure. Currently, the company is constructing a natural gas power plant. The 500-megawatt Copper Mountain Power Generating Station is being proposed for construction near Boulder City, Nevada. The project will be located next to the existing 480-megawatt El Dorado Energy power generation facility. The natural gas-fueled El Dorado Energy power plant is co-owned by Sempra Generation and Reliant Energy and has been in operation since May 2000.

## **Solargenix**

Solargenix Energy, LLC is a company with experience in energy, environmental engineering, solar design, and building construction. The primary strategic plan of Solargenix Energy is to design, market, manufacture, install and maintain a solar system capable of producing hot water, steam or electricity. The energy can be used for residential, industrial, institutional, commercial, or utility customers. The company is partnering with Nevada Power to construct a solar power plant in the Eldorado Valley, near Boulder City, Nevada. The 64-megawatt solar plant is expected to be completed in the fall of 2006.

## **Cogeneration Electricity Generators**

Cogeneration of electric power is produced by simultaneous generation of both heat and electricity. The heat generated through electric power generation is shared in an industrial application through heated air exchange or steam. Three companies cogenerate in Clark County; Las Vegas Cogeneration, Nevada Cogeneration, and Saguaro Power Company.

## **Las Vegas Cogeneration**

Las Vegas Cogeneration is owned by Black Hills Energy. A 224-megawatt facility, Las Vegas Cogeneration I and II are located in North Las Vegas. The company produces electricity and provides surplus heat to an adjoining green house. The electrical power produced is sold to Nevada Power.

## **Nevada Cogeneration**

Nevada Cogeneration Associates owns and operates two facilities in Clark County. Nevada Cogeneration Associate 1 is located in Apex. Georgia Pacific uses the plant's exhaust in the production of

gypsum to wallboard. Nevada Cogeneration Associate 2 is located approximately ten miles east of Hollywood and Lake Mead Blvd. The plant's exhaust is used by PABCO for wallboard production. Both plants generate 85 megawatts of electricity, which is supplied to Nevada Power.

## **Saguaro Power Company**

Saguaro Power is a locally owned power company that generates electricity through gas turbines and uses excess heat to generate steam. Pioneer Chlor Alkali Company and Ocean Spray use the steam for industrial applications. The company produces approximately 90-megawatt of electricity, which they sell to Nevada Power.

## **Pipeline Fuels**

Pipeline fuels include compressed natural gas, and other fuels transported by pipelines from refineries or compression stations to end users. Southwest Gas, Kern River Gas Transmission Company, and CALNEV Pipeline transport fuels within Clark County.

## **CALNEV Pipeline**

The CALNEV Pipeline is owned and operated by Kinder Morgan Energy Partners. The CALNEV pipeline is a 550-mile refined products pipeline system that spans from California to Clark County. The CALNEV system consists of two pipelines: an 8-inch and a 14-inch line. The pipeline system serves Clark County with over 130,000 barrels of gasoline, diesel and jet fuel per day. The pipeline dates back to 1956, and is the largest refined products pipeline in the West.

The buried pipeline moves jet fuel, diesel, and gasoline from refineries in California to McCarran International Airport and Nellis Air Force Base. Storage tanks are located at a few points along the pipeline, serving other military functions, including George Air Force Base near Victorville, California (now closed), and the Marine Corp Supply Depot at Yermo, outside Barstow California. Gasoline, jet fuel and diesel fuel are transported to terminals providing services such as storage and loading facilities for delivery trucks.

## **Southwest Gas**

Southwest Gas Corporation is principally engaged in the business of purchasing, transporting and distributing natural gas to residential, commercial and industrial customers in the southwestern United States. Southwest Gas provides natural gas service to all of unincorporated Las Vegas Valley and is one of the fastest-growing natural gas distribution companies in the nation (excluding mergers and acquisitions). Southwest Gas Corporation is an investor-owned utility; its shares are traded on the New York Stock Exchange and the Pacific Stock Exchange.

## **Kern River Gas Transmission Company**

Kern River owns and operates an interstate natural gas system, with facilities in several western states. Part of this system is a high-pressure pipeline that extends from the oil and gas producing fields of southwestern Wyoming through Utah and Clark County to the San Joaquin Valley near Bakersfield, California. The pipeline currently has a design capacity of more than 1.7 billion cubic feet per day. In 2003, Kern River completed a \$1.2 billion expansion of its natural gas transmission system by adding nearly 164,000 horsepower and installing 717-miles of 36-inch and 42-inch steel pipe or "loop" adjacent to its original 36-inch pipeline extending from Wyoming to California. Due to routing and permitting challenges associated with two approximate 25-mile segments near Salt Lake City and Las Vegas that could potentially affect the timing of placing the expansion facilities into service, pipe was not installed

in these segments. However, any future expansion of Kern River’s system will require the non-looped segments near Salt Lake City and Las Vegas to be completed.

## **Other Hydrocarbon fuels:**

### **Hydrogen:**

*The National Energy Policy (May 2001)*, is a report developed by the National Energy Policy Development Group (NEPD). The NEPD was established by President George W. Bush to develop a national energy policy designed to help the private sector, state, and local governments to promote dependable, affordable, and environmentally sound production and distribution of energy for the future.

The National Energy Policy Report states that hydrogen fuels show great promise as an alternative energy. Hydrogen as a fuel could have many uses, from industrial and power generation to fuel cells for vehicles. Hydrogen is plentiful and environmentally friendly. In February of 2002, the United States Department of Energy authored the report, “*A National Vision of America’s Transition to a Hydrogen Economy to 2030 and Beyond.*” The report presents a national vision for hydrogen to become a premier energy carrier. To reach this vision, the report states the steps needed to make hydrogen available to the public. Currently, the products that will use this energy are not readily available to consumers.

Hydrogen that is consumed on site is known as captive hydrogen, while hydrogen distributed via pipelines or trucks is known as merchant hydrogen. There are existing pipelines currently distributing hydrogen in the United States. These pipelines are located in Texas, Louisiana, California, and Indiana. For hydrogen to become a viable energy resource within Clark County, a system of pipelines, and distribution points for merchant hydrogen would have to be developed. Facilities that generate merchant hydrogen or facilities that can use captive hydrogen will also need to be planned and developed.

## **Telecommunications**

Telecommunications includes “land line” telephone, wireless telephone and cable service providers. There are numerous telecommunications services throughout Clark County. Some provide a variety of services (for example; internet, voice and data) while others specialize in services to business clients. As technology advances, a greater variety of additional services will be offered. Facilities to provide services differ somewhat from electric, natural gas, wastewater, and water. While these services may use lines or wires to provide telecommunications services, large support facilities such as reservoirs, pump stations and sub-stations are not needed. Instead, smaller more distributed facilities, such as poles, satellite dishes and service boxes are used.

### **Telephone Service**

Over twenty companies within the Las Vegas Valley provide telephone “land line” service. The majority of companies buy time from telephone companies that own and service lines within the County. There are four companies that own and service lines within the Las Vegas Valley. Embarq is the largest telephone company, and they own and service the majority of telephone lines in the Las Vegas Valley. Other companies that have lines within the Las Vegas Valley are Nevada Bell, Nextlink (XO Communications, and Idacomm (formerly Sierra Pacific Communications.)

Various companies provide telephone “land line” service in Outlying Clark County. In Moapa Valley (Logandale and Overton), the Moapa Valley Telephone owns and services telephone lines. In Bunkerville, Rio Virgin Telephone and Cablevision owns and services telephone lines. Each telephone company uses lines that are under and above ground to provide service.

## **Wireless Telephone Service**

A number of companies provide wireless telephone service. Each provides service that could be accessed from almost anywhere in the county or nation. The system works on communications towers that link to form a network. Towers are owned by individual companies and can also be leased to other companies for their network connections. Towers can be disguised to look like trees or flag poles so they can blend into a community. A map showing cell tower sites within Clark County can be located by viewing the following web site: [http://gisgate.co.clark.nv.us/gisplot\\_pdfs/cp/utilelemcell-lg.pdf](http://gisgate.co.clark.nv.us/gisplot_pdfs/cp/utilelemcell-lg.pdf)

## **Cable Service**

Cable service includes television, phone, and computer internet. Cable service is different from telephone service in that the company that owns and services the lines does not have to sell or lease time to another provider. Cable service is largely supplied by Cox Communications in the Las Vegas Valley. In outlying Clark County, various companies supply cable service. Bluebird Communications provides service in Indian Springs. Charter Communications provides service in Moapa Valley (Overton and Logandale) and Bunkerville. Clark Cablevision provides service to Laughlin and Searchlight. Eagle West provides cable service to Blue Diamond and Cal-Nev-Ari. Rio Virgin Telephone and Cablevision provide cable service to Bunkerville.

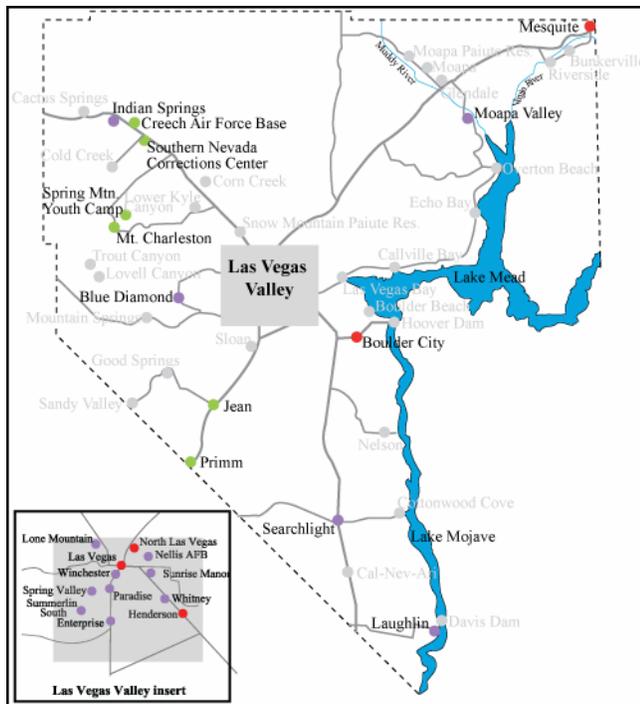
## **Other Wireless Services**

The demand for access to data and internet services have spawned the creation of public access “hotspots” that provide wireless local area networking (WLANs) in locations as diverse as coffee shops, airports, hotels, universities and other public locations. Laptops or other portable computing devices can access WLANs. The area currently covered in these hotspots is small (i.e.; providing the service from a single building to campus.) As the demand for wireless service increases, the number of available hotspots will grow. The infrastructure needed to supply this service is small (i.e.; requiring an antenna connected to a telecommunication source to provide service.) The impact to existing telecommunication facilities is negligible at present, but it could affect the community character if expanded to a community scale.

# Wastewater

## Clark County Water Reclamation District

Wastewater in the Las Vegas Valley is addressed through individual sewage disposal systems and wastewater treatment plants. Clark County Water Reclamation District (CCWRD) is responsible for the collection, treatment (to Federal Environmental Protection Agency Standards) and disposal of unincorporated Las Vegas Valley wastewater.



Clark County Water Reclamation District (CCWRD) is responsible for the collection, treatment (to Federal Environmental Protection Agency Standards) and disposal of unincorporated Las Vegas Valley wastewater. Incorporated cities within the Las Vegas Valley handle wastewater within their individual jurisdictions. Wastewater collected from homes and businesses is transported through pipelines to the Clark County Water Reclamation Treatment Facility. At the treatment facility, the wastewater undergoes physical, biological, and chemical treatment processes to remove solids, particles, chemicals, bacteria, and viruses. The treated effluent is either reused or is released to the Las Vegas Wash, where it eventually flows back to the Colorado River via Lake Mead. The CCWRD also provides service to Blue Diamond, Moapa Valley (Overton), Indian Springs and Searchlight (See Map 3).

## Other Wastewater Service Providers

Outlying areas in Clark County use septic systems, package plants, and wastewater treatment facilities to dispose of wastewater. Smaller package plants operated by the Mt. Charleston Water Company can be found at Mt. Charleston Hotel and at the Spring Mountain Youth Camp. Smaller package plants are

also located at hotels in Jean and Primm, Creech Air Force Base (formerly Indian Springs Auxiliary Field,) and Southern Desert Corrections Center.

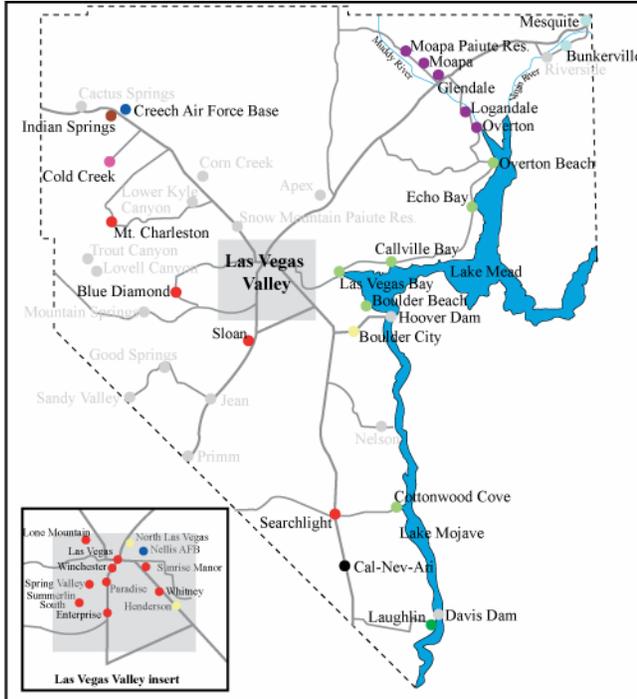
Clark County develops water quality management plans that examine how wastewater flows, projected populations, future growth, infrastructure needs, and development will influence surface water and ground water quality.

Water quality management plans cover all of Clark County. These plans can be viewed by going to the Clark County Air Quality and Environmental Management web site at:

<http://www.accessclarkcounty.com/daqem/index.html>

## Water (Potable)

A major public water supplier is defined as a system having at least 60 connections and supplies more than a single family housing or mobile home development with potable water. Information on public water suppliers can be found at Nevada State Health Division Bureau of Health Protection Services. Map 4 shows potable water service within Clark County.



**Map 4 Water Providers**

- Big Bend Water District
- Cold Creek Water Users Association
- Indian Springs Water Company
- Las Vegas Valley Water District
- Moapa Valley Water District
- National Park Service
- Spirit Mountain Utility Company
- United States Air Force
- Virgin Valley Water District
- Incorporated city water system



### Southern Nevada Water Authority

In 1991, the Southern Nevada Water Authority (SNWA) was formed by a cooperative agreement among seven water and wastewater agencies in Southern Nevada:

- Big Bend Water District (Laughlin)
- City of Boulder City
- City of Henderson
- City of Las Vegas
- City of North Las Vegas
- Clark County Water Reclamation District
- Las Vegas Valley Water District.

The SNWA is the wholesale potable water provider to municipal water agencies in the Las Vegas Valley. In addition to its wholesale water treatment and delivery responsibilities, the SNWA acquires and manages long-term water resources for Southern Nevada.

### Las Vegas Valley Water District

The Las Vegas Valley Water District (LVVWD) is a not-for-profit agency that began providing potable water to the Las Vegas Valley in 1954. The LVVWD provides water to the City of Las Vegas and all the unincorporated areas within the Las Vegas Valley. The district serves over 1.2

million people through over 309,000 connections. The LVVWD uses both Lake Mead and ground water as resources to provide potable water. The LVVWD provides water to the Valley through 26 reservoirs and 7 tanks with more than 700 million gallons of storage capacity, 41 pumping stations, 86 wells capable of producing 180 million gallons per day, approximately 3,800 miles of water transmission pipelines and 4 facilities that will receive electricity from on-site solar array panels in the future. The Las Vegas Valley Water District also provides services to the communities of Blue Diamond, El Dorado Valley, Jean, Kyle Canyon (Mt. Charleston), and Searchlight.

The City of North Las Vegas supplies water to portions of unincorporated Clark County, while the cities of Boulder City and Henderson supply water only within city limits.

## **Cold Creek Water Users Association**

Cold Creek Water Users Association supplies water to residents within the community of Cold Creek. The Association has 62 connections and serves a population of about 100 people. The system incorporates two community wells and one water tank. The Cold Creek system is designed for 50,000 gallons per day or 56 acre feet per year and is operated by Water Utility Services, a private company.

## **Indian Springs Water Company**

Indian Springs Water Company provides water to the community of Indian Springs. The Indian Springs Water Company has 195 connections and serves about 600 people. The system has two primary wells and two smaller wells and has total water rights over 235 million gallons per year or 724 acre feet per year.

## **Moapa Valley Water District**

Moapa Valley Water District has approximately 3,000 service connections and has an estimated service area population in excess of 8,000 people. Moapa Valley Water District provides water service to Glendale, Moapa, and Moapa Valley (Logandale and Overton.) Water is derived from artesian springs and wells located in the Warm Springs/Arrow Canyon Area.

## **National Park Service**

The National Park Service provides water to the communities of Callville Bay, Echo Bay, Boulder Beach and Las Vegas Bay. The system has a total of 405 connections serving over 1,600 people. Water is derived from individual wells located within each community.

## **Spirit Mountain Utility Company**

Spirit Mountain Utility Company provides water to the Community of Cal-Nev-Ari. The system incorporates two community wells and four water tanks. Spirit Mountain Utility Company is a privately owned company with 117 connections and serves 300 people.

## **United States Air Force**

The United States Air Force 99th Civil Engineer Squadron provides water to Nellis Air Force Base. The system at Nellis Air Force Base has 2,019 connections and serves a population of over 6,200 people.

The United States Air Force 99th Civil Engineer Squadron also provides water to Creech Air Force Base (formerly Indian Springs Auxiliary Air Field), Point Bravo and Silver Flag Alpha (Nellis Bombing Range.) The total system has 89 connections and serves a population of 89 people. The system operates on wells. The 99th Civil Engineer Squadron designs and constructs new facilities, and maintains and repairs existing facilities and utility systems. The squadron is headquartered out of Nellis Air Force Base.

## **Virgin Valley Water District**

Virgin Valley Water District (VVWD) provides water to the communities of Mesquite and Bunkerville. The VVWD was formed by the Nevada Legislature on May 10, 1993. The district incorporated the existing water system of Mesquite with the Bunkerville Water User's Association and the Mesquite Farmstead Water Association. The VVWD has 5,150 connections and serves about 17,000 people.

## **Minor Water Providers**

Clark County has other Public Water Providers. By state regulation, a Public Water Provider is listed as a water source of 15 connections or more. These usually are defined as community wells providing water to a limited area. This element does not address these smaller providers; information about these providers can be obtained through the Nevada State Health Division Bureau of Health Protection Services.

# ANALYSIS

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Clark County is one of the fastest growing counties in the United States. Over the last fifteen years Clark County has maintained a population growth rate of 5.65 percent a year. At present over 5,700 people are added to the Clark County population every month. By the year 2010, the population of Clark County is projected to be over two million. In the year 2005, 23,308 new building permits were issued in Clark County, an increase of 6,583 permits over a five-year period. Population estimates, projections and related population information can be found by viewing the Clark County website: [http://www.co.clark.nv.us/comprehensive\\_planning/05/Demographics.htm](http://www.co.clark.nv.us/comprehensive_planning/05/Demographics.htm)

The rate and amount of growth in Clark County places strains on providing utility services. Maintaining and providing new service throughout Clark County takes a coordinated effort of government agencies, developers and service providers.

This chapter is divided into future expansion, strengths, challenges, and issues for utilities within Clark County and possible conflicts and solutions for utility development.

## Future Expansion

### Electric Generators

Table 1 lists the three requests to the Public Utilities Commission of Nevada for new power generating plants in outlying Clark County.

**Table 1: Future Electric Generation Plants**

<b>Name/Owner</b>	<b>Construction Date</b>	<b>Proposed Online Date</b>
Boulder City Solar Project Solargenix Energy	Mid-2005	Fall 2006
Ivanpah Energy Center Diamond Generating	First quarter 2006	2008
Copper Mountain Power Sempra Energy	Summer 2005	Summer 2007

Source: Public Utilities Commission of Nevada, April 2005

Nevada Power is developing a coal-fired power facility in White Pine County. The first of two 750-megawatt plants is expected to become operational in 2011, with the second following three years later. In addition, are 250 miles of transmission lines that will tie Sierra Pacific and Nevada Power together, unifying the state's electrical system.

Distributed electric generation using photovoltaic technology can play an important role in Clark County's electrical energy future. Photovoltaic systems can be small. They are installed on homes, businesses, schools, and public buildings. As the price of electrical energy increases and the cost of the technology decreases, the use of these individual systems will likely be more cost effective. As more individual systems are built the greater the possibility of meeting demand at times of peak power consumption.

Additionally, the Las Vegas Valley Water District (LVVWD) initiated the development of a 3.1-megawatt photovoltaic (PV) solar energy project in October 2004 at the Springs Preserve. The PV solar energy project will be one of the largest ever built by a public agency in the United States.

The LVVWD's Distributed Solar Array Project will generate approximately 5.3 million kilowatt-hours of clean electricity per year. The project is being developed in partnership with Nevada Power Company and PowerLight Corporation. The Distributed Solar Array project will not use water to generate electricity and will not create emissions. The solar electricity generated at the Water District solar facilities will support on-site operations. A solar array panel planned for the Springs Preserve project will double as a shaded parking structure.

Microturbines are small combustion turbines with outputs of 25 kilowatt to 1,000 kilowatt. Microturbines can also contribute to future electrical production in Clark County. Using a variety of fuels including natural gas, liquid fuels, and waste fuels of variable quality, microturbines can be an effective distributed energy option in cogeneration applications.

Another future source for electric generation within Clark County could be wind power. In a recent Department of Interior Survey, Nevada was ranked second in wind power potential. The study predicts that Nevada could generate 701 megawatts of wind energy by 2025. One location for wind turbines could be at Table Mountain in Sandy Valley.

## **Pipeline Fuels**

Due to growth and increasing demand for natural gas, Kern River plans to complete the pipeline “loop” of Las Vegas. The pipeline would be installed substantially within the Bureau of Land Management’s established Utility Corridor.

The proposed Las Vegas Loop would begin at a point near Apex Industrial Park and continue southeast, east of the Las Vegas Dunes National Recreation Area, before crossing the Sunrise Mountain Instant Study Area. Continuing south, the pipeline would cross under the Las Vegas Wash immediately west of the community of Lake Las Vegas and adjacent to the eastern boundary of the City of Henderson, before crossing under U.S. 93/95 near Railroad Pass. The pipeline would then cross south into the El Dorado Valley before crossing the North McCullough Pass and entering the Ivanpah Valley. Continuing in a westerly direction, the pipeline would then cross the Ivanpah Valley north of the proposed Ivanpah Airport, and terminate at Kern River’s Goodsprings Compressor Station.

Kern River has considered several alternative routes for its Las Vegas Loop. One variation of the pipeline, would tie into Kern River’s existing pipelines immediately north of the Las Vegas Speedway (located west of Nellis Air Force Base.) This route would continue south, cross Interstate 15 and skirt around the Las Vegas Speedway area. The pipeline would then cross Nellis Air Force Base, heading south, before running under Los Feliz Street. The pipeline would eventually run parallel to, and north of the Las Vegas Wash before crossing under the Wash at a point immediately west of the community of Lake Las Vegas, joining the preferred route.

The CALNEV Pipeline is reaching its capacity. Efforts to expand or to develop another pipeline line are in the planning stages. Gasoline, diesel, and jet fuel demands are expected to increase as development in Clark County continues. Concerned that the capacity to bring fuel into the Las Vegas Valley is inadequate to accommodate future growth, the Clark County Commission appointed a Blue-Ribbon Panel to study the matter and recommend solutions. The panel will address solutions for short-term

(zero to two years), intermediate (two to five years) and long-term (five and more years) time periods. The panel is comprised of community stakeholders including members of the Department of Aviation, Las Vegas Convention and Visitors Authority, State of Nevada, United States Air Force, business owners, resort representatives, fuel distributors, and the Nature Conservancy. The panel projects completion of the study by September of 2006.

## **Telecommunications Services**

The demand for telecommunication connectivity continues to grow. To meet this demand, wireless local area networking (WLANs) and other forms of providing service will increase. Service providers are exploring emerging technologies to expand telecommunication connectivity, including the use of broadband power lines, expansion of WLANs, satellite, fiber optic and other technologies to address future demands. Future technology advances are unpredictable, with advancements and new industries constantly emerging. Current and future systems will probably not need large support facilities to provide service, but will use small service boxes at the street level within the service area.

## **Wastewater Services**

As the Las Vegas Valley continues to grow, there will be a need to provide additional wastewater treatment services. The Clark County Water Reclamation District will continue to provide services to newly developed areas and extend services to existing communities not currently using the District's facilities. Focus on expansion of services will be in the west and south part of the valley. Expansion of existing facilities, along with possible satellite treatment facilities, will be needed to ensure water quality.

Community growth has impacted the management of wastewater in many outlying communities including Bunkerville, Indian Springs, Moapa Valley (Logandale and Overton) and Searchlight. Future land use and growth trends could determine the need for additional facilities within these areas.

Community growth within Moapa Valley (Overton and Logandale) has placed serious strains on wastewater management. The community is at capacity for individual septic systems. As residential growth continues, the expansion of the existing treatment facilities or the addition of package plants will have to be implemented. The current wastewater system needs to be upgraded, and within that process, expansion of the system would be developed.

Expansion of operations at Creech Air Force Base will focus on community growth issues in Indian Springs. The United States Air Force is performing a feasibility study/cost-benefit analysis regarding maintaining wastewater treatment facilities at Creech Air Force Base. It is the preference of the Department of Defense and the Air Force to have these services provided by an outside source. Clark County Water Reclamation District has become the wastewater provider for Indian Springs as of April 2005 and is planning an upgrade of the current facilities. This upgrade could provide service to both Creech Air Force Base and the community of Indian Springs.

The Ivanpah Airport near Jean and major project developments such as Coyote Springs will require wastewater management facilities. Future wastewater treatment needs for Clark County are addressed in the County's water quality management plans found at:

<http://www.accessclarkcounty.com/daqem/index.html>

## Water Services

As Clark County continues to grow, there will be a need to provide or enhance potable water services. Along with the supply of potable water to residents, water for fire fighting might be required. Recent studies of outlying fire fighting needs suggest additional water storage within the communities and additional suggested water storage. Table 2 shows outlying fire storage needs by community and amount in gallons needed.

**Table 2: Outlying Fire Water Storage Needs**

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

Source: Nevada Community Wildlife Risk/Hazard Assessment Project, April 2005

The Moapa Valley Water District (MVWD) is expected to see significant growth in its service area during the upcoming decade. This growth has precipitated the need for MVWD to develop additional water resources to meet anticipated demands. Water resources presently being considered are ground waters from the Coyote Springs Project, and Meadow Valley Wash area, secondary use of non potable water, conversion of surface irrigation water, and the development of a surface water treatment plant.

In addition to the development of additional water resources, MVWD will be expanding and enhancing its distribution system through expanded water storage facilities and transmission mains to facilitate the planned growth.

## Strengths and Challenges

During the development of the Utilities Element, input was received from service providers; and appointed and elected officials. Challenges and strengths were identified to formulate policies, which, in turn provided a framework for the development of the Utilities Element. The following list summarizes the challenges and strengths that were identified as being specific to this element.

### Strengths:

- Service providers participate in Technical Advisory Groups when updating Clark County's Land Use Plans. When land use plans are updated, the providers can identify and plan for providing services where appropriate.
- Continued communication between service providers and the Department of Comprehensive Planning can ensure service is available when community growth occurs.
- Southern Nevada Regional Planning Coalition communicates the effects of major developments and projects of regional significance.
- Currently utility services can be provided within all portions of Clark County.

## Challenges:

- Inclusion of utilities into the Federal Department of Homeland Security as critical infrastructure through the federal publications: *The National Plan for Research and Development In Support of Critical Infrastructure Protection*, and *Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings, December 2003*, needs to be addressed .
- Some established neighborhoods are not served by certain public facilities (these may include public water, natural gas, electric and wastewater facilities).
- As outlying Clark County communities grow, the use of septic systems will be unacceptable. The transition of these communities to sanitary sewerage or wastewater facilities needs to be addressed.
- As land uses become denser and mixed use development occurs within the Las Vegas Valley, there will be a demand to increase service capacity within established neighborhoods.
- Conflicts between service/equipment boxes and pedestrian flow occur when the equipment is placed within the pedestrian connection and/or sidewalk/clear zones.
- Technological advances in energy production and telecommunications may have impacts to community character.
- Growth will demand significant utility infrastructure (transmission lines, substations, etc.) to increase service capacity.
- Pipeline fuel distribution for diesel, gasoline, jet fuel and natural gas are all reaching capacity.
- The growing demand of cellular telephone use and the requirement for networking may impact community character.
- Reduce the controversy of cell tower placement in land use approvals.

## Issues

Performing an analysis of challenges brings to light issues. Issues may incorporate more than one challenge and are not listed in priority.

## Homeland Security

The Department of Homeland Security and the Federal Emergency Management Agency (FEMA) recognized the utilities within this report constitute critical infrastructure and must be protected against possible terrorist actions. Two reports, “*The National Plan for Research and Development in Support of Critical Infrastructure Protection (2004)*, and *Risk Management Series Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings (December 2003)*” outline possible actions to minimize damage caused by a terrorist or natural incident. The Risk Management Series suggests site and layout design guidance for facilities of critical infrastructure as follows:

- **Land Use Considerations:** The external aspects and the characteristics of the surrounding land uses within the area of the critical infrastructure should be considered. These include; construction type, occupancies, and intensity of adjacent land use activities to enhance protection of the facility.
- **Site Planning:** Conflicts may arise between security site design and conventional site design.
- **Layout and Form:** These include building placement, building orientation and open space.
- **Vehicular and Pedestrian Circulation:** Including roadway network design and parking.
- **Infrastructure and Lifelines:** These include power, gas, water, wastewater and telecommunications services to the site.
- **Landscape and Urban Design:** These include orientation and type of landscape material, and the use of streetscape security elements to provide security to the facility.

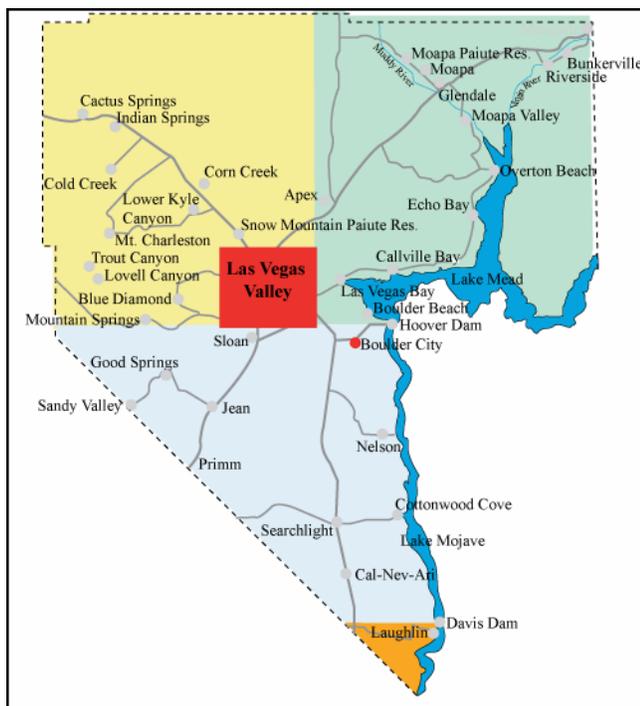
**Issues/ Homeland Security (continued):**

- Stand-Off Distance: The distance required for minimizing the effects of a threat to a given facility.
- Controlled Access Zones: Controlling access points to a facility to enhance security.
- Physical Protective Barriers: These include various techniques of control from fencing (chain link to triple-standard concertina wire) to street closure.
- Anti-ram Vehicle Barriers: Including passive barriers (bollards) and plinth wall systems.
- Signage: loading docks and service access; physical security lighting and site utilities.

Homeland Security measures to protect critical infrastructure may conflict with established setbacks and/or lot coverage. In addition, access to the existing sites and proposed new facilities may call for road closures or barriers not usually permitted under Title 30 or the Transportation Element. A review of current regulations and those suggested in the Reference Manual could prevent possible conflicts for new or redeveloped facilities.

**Service Provision**

As Clark County continues to grow, the need to provide utilities will increase. Coordination of electricity, telecommunications, transported fuel, wastewater and water is essential in maintaining a good quality of life for all Clark County citizens. The issue of service provision can be separated into geographical areas, the urban Las Vegas Valley and the rural areas of Outlying Clark County. Issues pertaining to each geographical are listed below.



**Las Vegas Valley**

Urbanization within the Las Vegas Valley presents particular challenges. The Valley is beginning to reach the edges of where growth can occur. This in turn has promoted a vertical expansion of the Valley. The County uses various tools to accommodate growth and provide orderly development. These include various plans and ordinances such as, the County’s land use plans, Major Projects and Mixed Use Development ordinances.

Each of these tools can increase density within a designated area. Currently, Comprehensive Planning staff coordinates with representatives from utility services in the review of land use plans and areas of development concerns for input and direction. This communication should be continued to ensure

service provision is maintained. In addition, meetings dealing directly with service providers on a yearly basis to discuss issues, strengths, and challenges should be encouraged and hosted by Comprehensive Planning or appropriate organizations.

The rapid expansion of the Las Vegas Valley has left areas within the Valley under-serviced. These areas lack either wastewater or some other service provided within the Valley. As land use plans are updated, these areas should be highlighted and communicated to the service providers for possible solutions. This provides an opportunity for community growth, while providing services to all areas of the urbanized Valley.

### **Outlying Clark County and Laughlin**

Outlying Clark County is divided into separate planning areas. These include the Northeast, Northwest, South Planning and Laughlin Planning areas. Map 5, shows these planning areas and the communities the areas cover. Within each planning area issues of either water or wastewater service can be found. As these communities grow, demands for increased or new services will occur. Potable water service issues will more likely occur in the South and Northwest Planning Areas as development increases in those areas. Private individual well systems will eventually give way to semi or public systems as land use densities increase. Future water acquisition is handled by the Southern Nevada Water Authority (SNWA) and will be reflected in plans developed by that agency. To view SNWA plans and reports refer to their web page at

[http://www.snwa.com/html/wr\\_index.html](http://www.snwa.com/html/wr_index.html)

Wastewater service is an issue in the Northeast and Northwest Clark County planning areas as stated in the Future Expansion of Wastewater Services. Future wastewater and treatment demands are covered in Water Quality Plans and the Clark County Water Reclamation District.

To view plans and reports on water quality refer to the Clark County Department of Air Quality and Environmental Management web page at

[http://www.accessclarkcounty.com/daqem/epd/epd\\_index.html](http://www.accessclarkcounty.com/daqem/epd/epd_index.html). To review plans and reports on water reclamation refer to Clark County Water Reclamation District web site at

<http://www.cleanwaterteam.com/home.html>.

As Land Use Plans are updated, continued communications with the service providers for review of possible areas for expansion or new service is essential. As these areas grow, additional opportunities to provide services that are now found in urbanized areas might become available. Including all the service providers in review of both urban and outlying plans could help make a smoother transition for these service opportunities.

## Community Design

Conflicts between telecommunication service/equipment boxes and pedestrian flow occur when the equipment is placed within the pedestrian connection and/or sidewalk/clear zones. Illustration 1 shows how equipment conflicts with pedestrian movement when placed within a sidewalk clear zone. Equipment placed within the Amenity Zone does not impede pedestrian flow.

Equipment boxes that are located outside the sidewalk/clear zone maintain pedestrian flow. Equipment boxes should also blend into surrounding landscape area as much as possible. This can be achieved by color, or use of materials that complement the landscaped area.

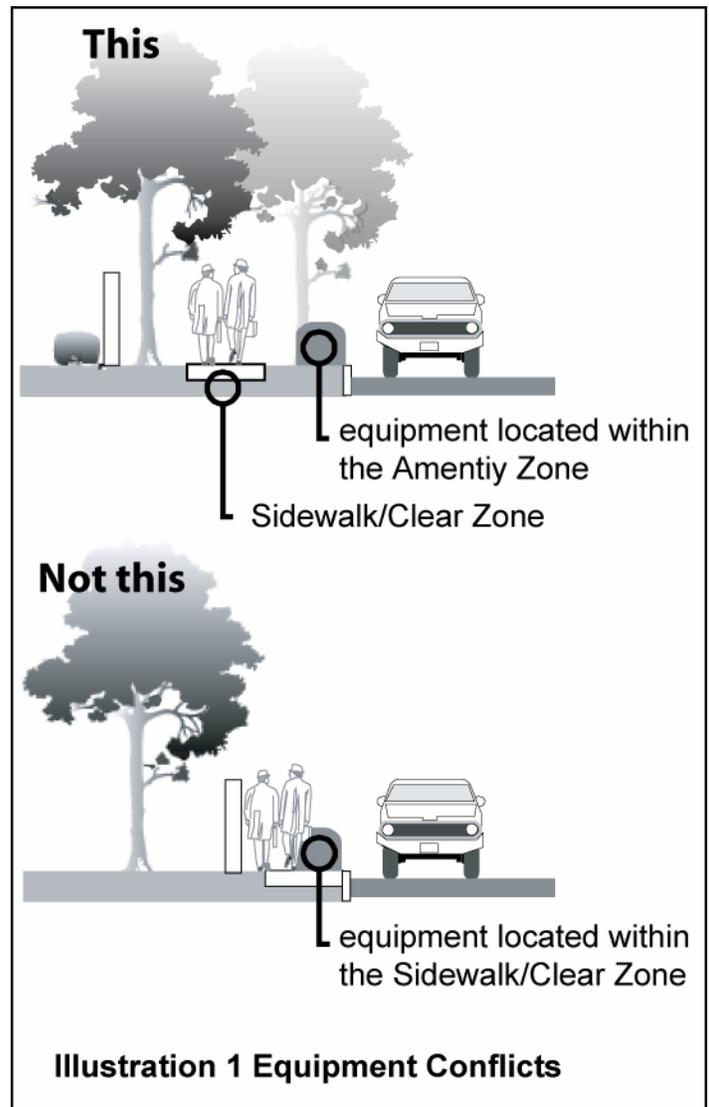
## Alternative and Distributed Energy Sources

As energy prices increase, alternative sources for the production of energy look more attractive. As such, distributed electrical sources are being used to offset peak hours of electrical use. In addition, these sources can contribute to the power grid in off-peak times.

Distributed energy is defined as production sources in close proximity to use, including building-integrated, ground-mounted and off-grid production sources. These production sources can occur within designated land uses from residential to public facilities and are considered an accessory use within Clark County's Title 30 (Table 30.44-1).

Building-integrated sources are usually solar and applied to the building's facade or roof. The material used for these solar sources differ from the actual building material. The difference in materials should have a minimal impact on the host building or to the character of the community as possible.

Off-grid (for definition see glossary) production sources provide energy to a single source and are not connected to a conventional energy-delivery infrastructure. Off-grid production occurs in both urban and rural settings. Off-grid production can be achieved through wind or solar devices. Off-grid production of energy is appropriate in both urban and rural settings. Off-grid production has a greater impact on community character in urban settings than in rural.





Ground-mounted solar energy source

## Ground-mounted Solar Energy Sources

Ground-mounted solar energy sources are normally non-building integrated sources. These sources contribute to or supplement the main generating source and are generally connected to conventional energy-distribution systems.

Ground-mounted solar energy sources could cause a greater impact to community character in urban single family residential designated land uses and should have a restrictive code enforcement design criterion. Ground-mounted sources in rural residential density,

industrial or commercial designated land use areas may have less restrictive design criterion.

## Transmission Corridors

Because of growing Clark County energy demands and the County's location as a potential route between energy supply and demand sources, there is a need to expand or add additional transmission corridors. Transmission lines cross expanses of public lands. The United States Bureau of Land Management (BLM) is responsible for utility corridor policy. The BLM provides public lands for energy transmission purposes through policies listed in the *Management Framework Plan* (MFP). The MFP calls for common use of right-of-ways wherever feasible to minimize environmental impacts and avoid corridor proliferation.

Transmission lines are also found in urbanized portions of the Las Vegas Valley. These corridors are within easements found throughout the Valley. The easements are adjacent to various land uses and right-of-ways. With the introduction of denser mixed-use development occurring throughout the Valley, there may be conflicts between the large scale transmission poles and the projects that are adjacent to them. Most major transmission lines and pipelines are considered projects of regional significance and are coordinated through the Southern Nevada Regional Planning Coalition.

## Transported Fuels

Transported Fuel pipelines that carry gasoline, diesel, and jet fuel need to be expanded. In addition, as the nation moves to a hydrogen economy, the need for merchant hydrogen pipelines to connect facilities and supply the new energy resource will be needed. Recommendations by the Clark County Blue Ribbon Commission to Improve the Reliability of Southern Nevada's Fuel Supply will need to be implemented.

## Cell Towers and Communication Networks

As cellular communications grow, the need for cell towers will continue. The towers are unsightly and have an impact on community character. As these towers constructed, all efforts should be made within the land use approvals and conditions of approval to ensure cell towers blend or are compatible to community character.

# RECOMMENDATIONS

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Recommendations are divided into categories. Included are: Title 30; Land Use and other Comprehensive Plan; Coordination; Work Program; and Policy Recommendations. The recommendations are in no particular order of priority.

## **Title 30 Recommendations**

- A comprehensive review of Title 30 to ensure availability of distributed and other alternative energy sources while preserving community character might be needed.
- Conduct a review of Title 30 to ensure Zoning Districts do not conflict with federal guidelines for security and protection.
- Review Title 30 to determine if a community design section is appropriate.
- Review Title 30 to determine if additional design requirements for addressing issues of transmission corridors are needed.
- Ongoing monitoring of Title 30 to ensure availability of new technologies while preserving community character will be needed.
- In design review or as a condition for a development application, encourage disguising cell tower poles. Methods can include disguising the towers to look like palm trees, or pine trees, or incorporating them into the architecture or other appropriate solutions in residential areas.
- In design review or as a condition for a development application, encourage hiding or incorporating into the main architecture, equipment buildings for cell towers.

## **Land Use and Other Comprehensive Plan Recommendations**

- Provide opportunities in the land use plans for site selections for new utility sites to have enough acreage to ensure the facility can meet guidelines recommended by the Federal Government.
- The Transportation Element of the Comprehensive Plan (Volume 2) should be used to determine impacts and when street vacations are appropriate when reviewing applications for critical infrastructure.
- A new set of policies should be developed that will address the issues of the development of utility facilities within unincorporated Clark County.
- Ensure compatibility among Comprehensive Plan Elements and updates that promote policies stated in the Utilities Element.

## **Coordination Recommendations**

- In coordination with Las Vegas Valley and outlying Clark County utility service providers, Bureau of Land Management and other community stakeholders, encourage communication between land use planning and service provision. Continue to include utility providers on technical advisory groups during the major update process of land use plans.
- Include a process for comments by service providers for the approval of Mixed Use Development Projects.
- Conduct a study to determine cost effectiveness of expanding a pipeline fuel system by using existing utility corridors to include Creech Air Force Base and Ivanpah Airport. Include the Department of Aviation, United States Air Force, and other State and local stakeholders.
- Coordinate whenever appropriate, with adjoining cities, counties and states for timing, funding and connects for infrastructure improvements.
- Promote the implementation of the findings and recommendations of the Blue Ribbon Commission to Improve the Reliability of Southern Nevada's Fuel Supply.

## **Work Program Recommendations**

- Conduct a study to determine the size and requirements for accommodating both existing and plan energy sources to ensure compatibility with existing natural gas, and electric lines. The inclusion of merchant hydrogen pipelines within utility corridors might be a conclusion of that study.
- The BCC should direct staff to develop an Energy Plan for Unincorporated Clark County. The plan should include strategies for conservation, use of natural power (solar and wind) and community development standards to encourage developers to achieve Leadership in Energy and Environmental Design Green Building System (LEED) ratings of silver and higher.

## **Policy Recommendations**

- Promote the protection of critical infrastructure as defined by the Department of Homeland Security.
- Encourage the planning and implementation of Multi-Use Utility Corridors within Clark County that address electricity, natural gas, hydrocarbon fuels and hydrogen within a corridor where technically feasible.
- Pursue the development and use of distributed energy, cogeneration and alternative energy resources.
- Continue to disguise cell towers and associated equipment. Methods should include; making the towers appear like pine or palm trees, incorporating them into the architecture and other appropriate solutions.

## **Utility Element Implementation**

The Clark County Utilities Element is intended to guide growth and development within Clark County. Clark County will implement the policies of this Element through various current and future programs, processes and regulations. The following indicates some of the implementation methods that could be used alone or in combination with policies defined in this element.

### **Administrative Procedures**

Monitor and evaluate Utility development to ensure the Element is effective and responsive to changing conditions, new technologies, development innovations, and evolving community needs and desires of various neighborhoods.

### **Strategic Planning**

Continue to participate in the annual update of the Clark County Comprehensive Planning Strategic Plan and reflect any changes in the Board of County Commissioners' strategic priorities which are established annually. Also, identify and consider linkages with other County departments' strategic planning.



# APPENDICES

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Glossary

Utility addresses and emails

## Glossary

### **Broadband Power Line**

A Broadband power line (BPL) is the term coined by the Federal Communication Commission for new modems (BPL modems) used to deliver IP-based broadband services on electric power lines. Using inductive couplers to connect the BPL modems to a medium voltage power line, a communication signal can be wrapped around the line, without directly connecting to the line. BPL modems use silicon chips designed to send signals over electric power lines, much like cable and DSL modems use silicon chips designed to send signals over cable and telephone lines.

*Source:* Wave Report <http://www.wave-report.com/tutorials/bpl.htm>

### **Cell (Cellular) Tower (Communication Tower)**

A freestanding structure designed to accommodate one or more communication antennas. Communication towers shall be considered to mean the tower plus the antenna(s) to be affixed to the tower.

*Source:* Title 30: Clark County Unified Development Code

### **Coal Fired Power Generators**

Power plants that use coal or coal gas to produce electric energy for continuous use and distribution across a wide geographic area.

**Cogeneration** (also **combined heat and power** or **CHP**) is the use of a power station to simultaneously generate both heat and electricity. Conventional power plants emit the heat created as a byproduct of electricity generation into the environment through cooling towers, as flue gas, or by other means. CHP captures the excess heat for domestic or industrial heating purposes, either very close to the plant, or - especially in eastern Europe - distributed through steam pipes to heat local housing ("district heating").

*Source:* <http://en.wikipedia.org>

**Distributed generation** is a new trend in electric power generation. The concept permits the electricity "consumer", who is generating electricity for their own needs to send their surplus electrical power back into the power grid.

*Source:* <http://en.wikipedia.org>

### **Fiber Optics**

An optical fiber is a transparent thin fiber, usually made of glass or plastic, for transmitting light. Fiber optics is the branch of science and engineering concerned with such optical fibers. The optical fiber can be used as a medium for telecommunication and networking because it is flexible and can be bundled as cables.

*Source:* <http://en.wikipedia.org>

### **“The Grid”**

A power transmission system is sometimes referred to colloquially as a "grid"; however, for reasons of economy, the network is rarely a true grid. Redundant paths and lines are provided so that power can be routed from any power plant to any load center, through a variety of routes, based on the economics of the transmission path and the cost of power. Off-grid refers to energy produced outside the network.

*Source:* <http://en.wikipedia.org>

### **Hydraulic Power**

Hydraulic power, also called fluid power, is energy that is transmitted by pressurizing and controlling a contained fluid. The fluid may be a liquid as in hydraulics, or a gas as in pneumatics.

**Source:** <http://en.wikipedia.org>

### **Natural Gas Power Plant**

Power plants that use natural gas to produce electric energy for continuous use and distribution across a wide geographic area.

**Photovoltaic (solar cell) systems** convert sunlight directly into electricity. A solar or PV cell consists of semi conducting material that absorbs the sunlight. The solar energy knocks electrons loose from their atoms, allowing the electrons to flow through the material to produce electricity. PV cells are typically combined into modules that hold about 40 cells. About 10 of these modules are mounted in PV *arrays*. PV arrays can be used to generate electricity for a single building or, in large numbers, for a power plant. A power plant can also use a *concentrating solar power system*, which uses the sun's heat to generate electricity. The sunlight is collected and focused with mirrors to create a high-intensity heat source. This heat source produces steam or mechanical power to run a generator that creates electricity.

**Source:** Wikipedia, <http://en.wikipedia.org>

### **Plinth Wall System**

Plinth Wall System is a continuous low wall constructed of reinforced concrete with a buried foundation. The plinth wall is designed by equating the kinetic energy of the vehicle at impact with the strain energy absorbed by the barrier and the vehicle.

**Source:** <http://www.fema.gov/>

### **Steam Turbine Generator**

A steam turbine extracts the energy of pressurized superheated steam as mechanical movement. The turbine generates rotary motion, which makes it particularly suited to be used to drive an electrical generator.

**Source:** <http://en.wikipedia.org>

### **Streetscape Security**

Streetscape security is the design and construction of less fortress type built environments that reduce cost and liability, promote transparent security controls, and ultimately improves the quality of life.

**Source:** <http://www.fema.gov/>

### **Telecommunication**

Telecommunication refers to communication over a distance. 'Telecommunication' covers all forms of distance and/or conversion of the original communications, including radio, telegraphy, television, telephony, data communication and computer networking.

**Source:** <http://en.wikipedia.org>

### **Transmission Corridor**

Transmission corridor is a tract of land forming a passageway for the delivery of energy from the source to the populated area.

**Source:** <http://dictionary.com>, <http://en.wikipedia.org>

## Utility addresses and emails

Clark County Water Reclamation District  
5857 E. Flamingo Road  
Las Vegas, NV 89122  
434-6677  
<http://www.cleanwaterteam.com>

Cold Creek Water Users Association  
HCR Box 819  
Las Vegas, NV 89124  
(702) 295-6548

Diamond Generating Corporation  
333 S Grand Ave  
Suite 1570  
Los Angeles, CA 90071  
(213) 473-0080

Indian Springs Water Company  
PO Box 585  
Indian Springs, NV 89018  
(702) 879-3728

Kern River Gas Transmission Company  
2755 East Cottonwood Parkway  
Salt Lake City, UT 84121  
P.O. Box 71400  
Salt Lake City, UT 84171-0400  
(801) 937-6000  
<http://www.kernrivergas.com>

Las Vegas Valley Water District  
1001 South Valley View Boulevard  
Las Vegas, NV 89153  
870-2011  
<http://www.lvwwd.com/html/index.html>

Moapa Valley Water District  
PO Box 257  
Logandale, NV 89021  
(702) 397-6893  
<http://www.moapawater.com>

National Park Service  
601 Nevada Way  
Boulder City, NV 89005  
293-8984  
<http://www.nps.gov/>

Nevada Power  
P.O. Box 98910  
Las Vegas, NV 89151-0001  
367-5555  
<http://www.nevadapower.com/>

Overton Power District #5  
P.O.Box 395  
615 N. Moapa Valley Blvd.  
Overton, NV 89040- 0395  
(702) 397-2512  
<http://www.opd5.com>

Reliant Energy  
P.O. Box 4932  
Houston, TX 77210-4932  
(713) 497-3703  
<http://www.reliant.com>

Sempra Energy  
Sempra Generation  
Executive Offices  
101 Ash St.  
San Diego, CA 92101-3017  
(877) SEMPRA1

Solargenix Energy  
8275 South Eastern  
Suite 220  
Las Vegas, NV 89123  
(702) 990-8393  
<http://www.solargenix.com>

Southwest Gas Corporation  
4300 West Tropicana Avenue  
Las Vegas, NV 89103-5414  
365-1555  
<http://www.swgas.com/>

Spirit Mountain Utility Company  
PO Box 430  
Cal-Nev-Ari, NV 89046  
(702) 297-9289

Southern Nevada Water Authority  
1001 S. Valley View Blvd.  
Las Vegas, NV 89153  
258-3939  
<http://www.snwa.com/>

United States Air Force  
99 CES  
4700 Las Vegas Blvd Suite 2419  
Nellis AFB, NV 89191  
652-1110  
<http://www.nellis.af.mil>

Valley Electric Association Inc.  
800 E. Hwy 372  
Pahrump, NV 89048  
(775) 727-5312  
<http://www.valleyelectric.org>

Virgin Valley Water District  
500 Riverside Road  
Mesquite, NV 89027  
(702) 346-5731  
<http://www.vvh2o.com>