



PALMDALE GENERAL PLAN

Infrastructure + Public Utilities

SPRING 2020 | FINAL REPORT



Envision
PALMDALE 2045
a complete community

Chapter 9: Infrastructure + Public Utilities

The Infrastructure and Public Utilities chapter identifies existing utilities and service systems in and around Palmdale, California. Public utilities in the project area include water, wastewater, storm water, electrical, telecommunications, and natural gas conveyance facilities. The goal of the City of Palmdale General Plan Update regarding infrastructure is to ensure adequate services and community facilities to support projected growth in the city

Key Findings

- Water suppliers depend heavily on highly variable imported water supply and face newly imposed restrictions on groundwater pumping.
- Groundwater banking, water transfers, and exchanges will be necessary to meet projected supply deficiencies under drought conditions, which are anticipated as early as 2020.
- Water purveyors are committed to diversifying the region's water supply portfolio by focusing on water banking projects and expanding the city's recycled water infrastructure.
- Water suppliers and the City implement a variety of policies and programs targeting water conservation, including water waste prevention ordinances, a water efficient landscape ordinance, phased water use restrictions, and public outreach initiatives.
- The City of Palmdale's sewer system consists of nearly 400 miles of sewer which are operated almost entirely by gravity, having only two small pump stations.

Water

Suppliers

Palmdale is predominantly served by two water suppliers: Palmdale Water District (PWD) and Los Angeles County Waterworks District 40, which generally serves portions of the city east and west of State Route (SR) 14, respectively. Other water suppliers in and around Palmdale include Quartz Hill Water District, Littlerock Irrigation District, various small mutual water companies, and private wells. These suppliers generally serve small portions of the city or areas adjacent to city limits. Figure 9.1 presents service areas for water suppliers in the Palmdale area.

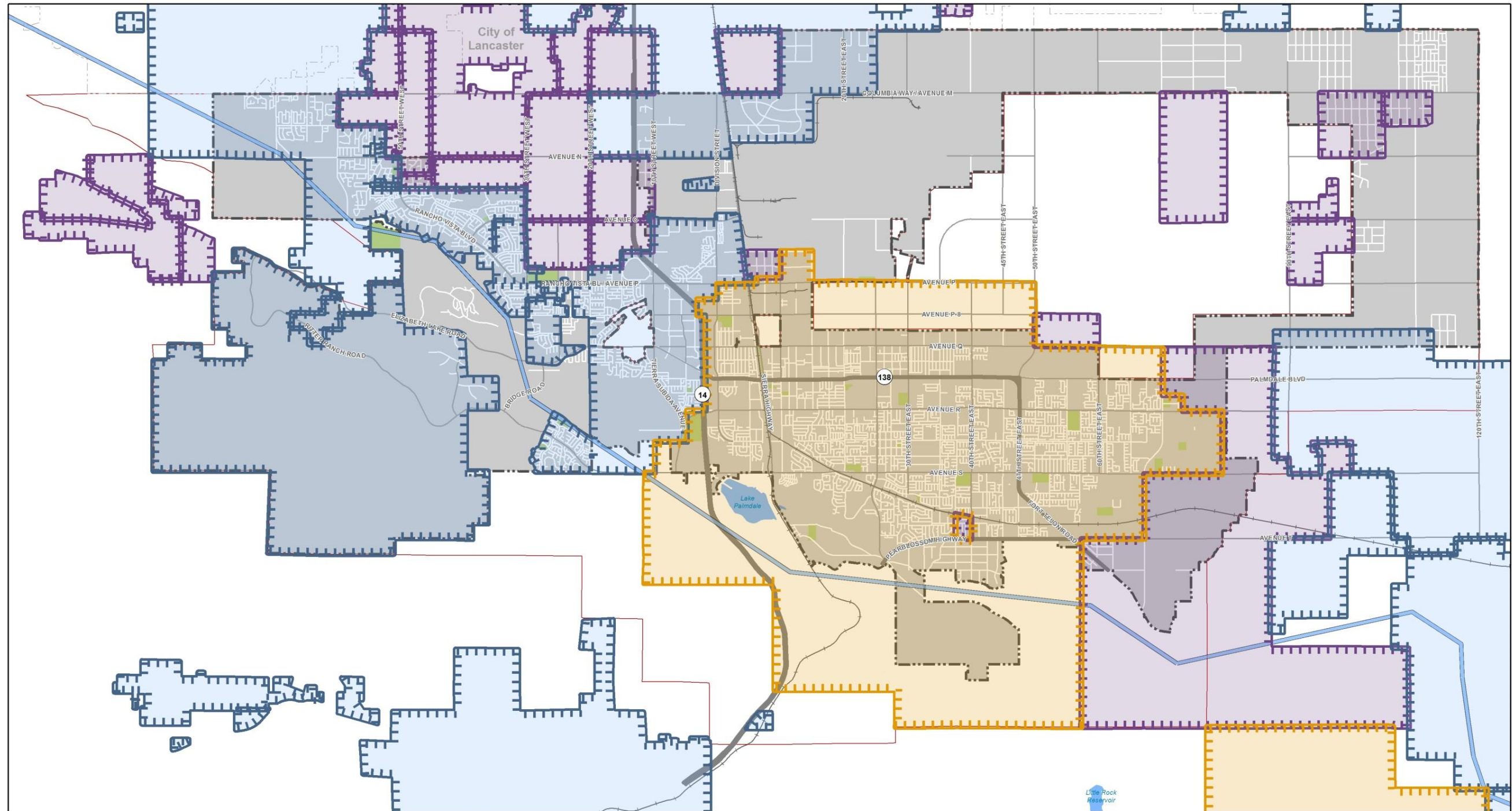
Palmdale Water District

PWD serves a population of approximately 118,227 people through over 26,500 municipal connections. The District's primary service area spans approximately 46 square miles of the southern Antelope Valley, including the central and southern portions of Palmdale. Originally established as the Palmdale Irrigation District in 1918 to provide retail water service for agricultural uses in the region, PWD now almost exclusively serves residential users. In 2015, 96 percent of PWD's municipal connections were residential, with 3 percent of connections being commercial and 1 percent providing water for landscape irrigation. PWD's supplies draw primarily from imported water, groundwater, and surface water stored in Littlerock Dam Reservoir. PWD facilities include approximately 400 miles of distribution pipeline, wells, booster pump stations, storage tanks totaling 50 million gallons of capacity, and a 35-million gallon per day (MGD) treatment plant (PWD 2016).












Los Angeles County Waterworks District 40

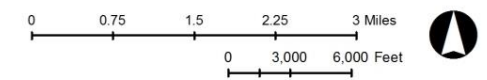
Los Angeles County Waterworks District 40, Antelope Valley ("LACWD 40") serves a population of approximately 208,068 people through over 56,600 active municipal connections. LACWD 40 is comprised of eight separate regions spanning across the Antelope Valley/northeastern Los Angeles County. Most of the District's connections (approximately 88 percent) are in LACWD 40's Region 4 and 34, which include portions of the cities of Lancaster and Palmdale. As with PWD, LACWD 40 primarily serves residential customers, with single-family and multi-family residences accounting for over 70 percent of 2015 demand. Primary sources of water for LACWD 40 include imported water purchased from the Antelope Valley-East Kern Water Agency (AVEK) and groundwater. LACWD 40 facilities include approximately 1,050 miles of distribution pipe and transmission mains and 50 wells. Water supplied by LACWD 40 is treated at AVEK's 65-MGD Quartz Hill and 10-MGD Eastside Water Treatment Plants (County of Los Angeles 2017; n.d.).

Figure 9.1 Water Supplier Service Areas in the Palmdale Area



Palmdale Water Suppliers

- | | | |
|--|---|--|
|  Palmdale Water District |  City of Palmdale Boundary |  Major Highway/Arterial |
|  LA County Water Works |  Sphere of Influence |  Railroad |
|  Private Mutual Water Company |  Other City Boundary |  Park |
| | |  Water Body |
| | |  California Aqueduct |



Data Sources: City of Palmdale GIS data; Los Angeles County, 2019.

Produced by Rincon Consultants, Inc.
June 2019

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Water Sources

Antelope Valley Groundwater Basin¹

The Antelope Valley Groundwater Basin is in the western Mojave Desert. The Basin (DWR Basin Number 6-44) encompasses 1,580 square miles in Los Angeles, Kern and San Bernardino counties (DWR, 2004). Approximately two-thirds of the basin lies in Los Angeles County, with small portions extending into San Bernardino County, and the remainder in southeastern Kern County.

The Antelope Valley adjudication was finalized in December 2015. The goal of the adjudication was to bring management to the basin and to limit further subsidence. The adjudication provides a framework to sustainably manage the basin and reduce groundwater level declines and subsidence. To administer the judgment, the court directed appointment of the Watermaster (a five-member board). The Antelope Valley Watermaster (established 2016) is charged with administering adjudicated water rights and managing groundwater resources within the adjudicated portion of the Antelope Valley. The judgment and physical solution for the Antelope Valley groundwater adjudication represents more than 15 years of complex proceedings among more than 4,000 parties including public water suppliers, landowners, small pumpers and non-pumping property owners, and the federal and state governments. Through four phases, the adjudication defined the boundaries of the basin, considered hydraulic connection throughout the basin, established the safe yield, and quantified groundwater production. The judgment identified a state of overdraft, established respective water rights among groundwater producers, and ordered a ramp-down of production to the native basin safe yield.

State Water Project

Imported water is delivered to the Antelope Valley via the 700-mile State Water Project (SWP). Palmdale Water District (PWD) is one of 29 water agencies throughout the state holding a SWP Water Supply contract with the California Department of Water Resources (DWR). LACWD 40 purchases imported SWP water from the Antelope Valley–East Kern Water Agency (AVEK). The AVEK, PWD and the Little Rock Irrigation District are SWP contractors. The SWP contractors are allocated a maximum amount of imported water, which they may receive in a given year, known as their “Table A” water allocation. PWD and AVEK have annual Table A allocations of 21,300 acre-feet (AF) and 144,844 AF, respectively (PWD 2016; County of Los Angeles 2017). The actual amount of SWP water received annually by contractors varies depending on availability. Between 2005 and 2015, PWD received 41-77 percent of its Table A allocation (PWD 2016).

Between 2011 and 2015, imported water accounted for 26 to 66 percent of PWD’s water supply (PWD 2016). The LACWD 40 has a right to purchase up to 61,000 AF per year (AFY) from AVEK in a normal year. In 2015, LACWD 40 purchased 20,361 AF

¹ <https://avwatermaster.net/>

from AVEK, constituting approximately 53 percent of its actual supplies that year (County of Los Angeles 2017).

Groundwater

Palmdale overlies the Antelope Valley Groundwater Basin (AVGB) (Basin 6-44), a 1,580-square mile aquifer with an estimated storage of 68 million AF (DWR 2004). The AVGB spans portions of northern Los Angeles, southern Kern, and western San Bernardino counties and is bordered by the Tehachapi Mountains and Garlock fault zone to the northwest, the San Gabriel Mountains and San Andreas fault zone to the southwest, and groundwater divides formed by ridges and low hills to the north and east. The basin is characterized by high desert landscape, with ground surface elevations ranging from 2,500 to 3,500 feet above sea level and annual rainfall ranging from 5 to 10 inches (DWR 2004). Rain and snowmelt runoff from the surrounding mountains serve as the primary source of recharge to the basin. The AVGB is divided into 12 sub-basins, with Palmdale overlying the Lancaster, Buttes, and Pearland sub-basins. Figure 9.2 displays locations of groundwater wells and features in the Palmdale region.

The AVGB is comprised of an unconfined upper aquifer and a deep aquifer confined by clay layers. Groundwater quality is considered suitable for municipal, irrigation, and most industrial uses. Potential contaminants of concern in the basin include total dissolved solids (TDS), nitrate, arsenic, and chromium-6. However, baseline concentrations for each of these constituents meet water quality management goals for the basin (County of Los Angeles *et al.* 2014).

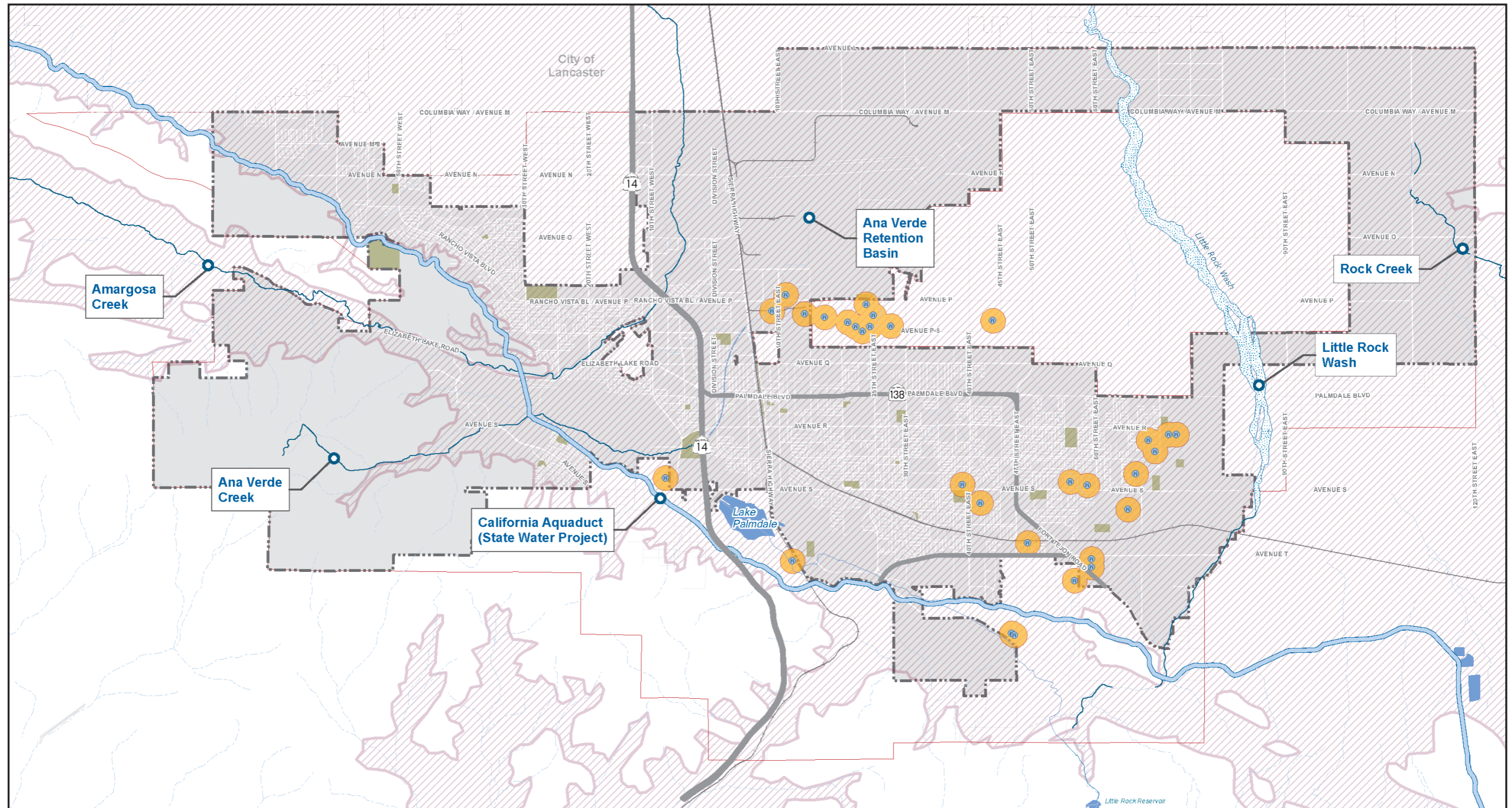
Groundwater from the AVGB has historically served as the primary supply source for PWD and a secondary source for LACWD 40. In 2015, groundwater from the basin accounted for approximately 64 percent of PWD's supply and 47 percent of LACWD 40's supply. Table 9.1 summarizes groundwater pumping in the AVGB by both water agencies.

Groundwater Sources

At the southern end of Cheseboro Road, and south of Mount Emma Road, lies the Littlerock Reservoir. Littlerock Reservoir is fed by natural run-off from the snowpack in the San Gabriel Mountains and from rainfall. Littlerock and Big Rock Creek flowing north out of the San Gabriel Mountains are the principal tributary streams to the Palmdale area. Along with various intermittent streams, they flow north into Antelope Valley and toward Rosamond and Rogers dry lakebeds, within Edwards Air Force Base north of Lancaster. Littlerock Dam Reservoir has a storage capacity of 3,500-acre feet or 1.1 billion gallons of water. Water from the reservoir is transferred to Palmdale Lake via a pipeline.

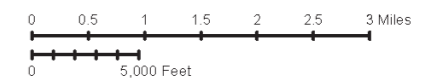
During periods of heavy rainfall or periods of melting snowpack at higher elevations, several creeks and washes carry surface water from the San Gabriel Mountains northward to the dry playa lakes. During heavy rain, many areas of the Antelope Valley experience sheet flow, but tend to remain dry throughout the rest of the year. The largest of the creeks include the Amargosa Creek, Anaverde Creek, Little Rock Wash, and Big Rock Wash.

Figure 9.2 Groundwater in Palmdale



Ground Water

- Groundwater Well
- Groundwater Well Protected Area
- California Aqueduct
- River/Creek (intermittent)
- River/Creek (perennial)
- Antelope Valley Groundwater Unit
- City Boundary
- Sphere of Influence
- Water Body



Data Sources: City of Palmdale GIS data, World Terrain Base, 2015 ESRI, USGS, NOAA.

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 March 2019

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Amargosa Creek collects runoff from the Sierra Pelona Mountains and the Portal and Ritter Ridges. The creek begins at the mouth of San Francisquito Canyon and travels the length of Leona Valley. It emerges from the Leona Valley and turns north and flows across the Antelope Valley toward Rosamond Dry Lake. At Avenue K, Amargosa Creek is divided into a western and eastern flow. The western flow is concentrated at 10th Street West and Avenue J in an engineered channel and flows into a retention basin located near the intersection of Avenue G and 20th Street West. The retention basin collects storm runoff from small to moderate storms. Larger storms can overflow the basin resulting in storm runoff reaching Piute Ponds. The eastern flow generally follows a northerly course between the Union Pacific Railroad and 10th Street East. At Avenue E, water flowing in the eastern and western branches of Amargosa Creek merges with water flowing in Anaverde Creek. The combined flows then continue in a northeasterly direction, terminating at Piute Ponds north of Lancaster.

Anaverde Creek collects runoff from the Sierra Pelona Mountain range and drains easterly through the Anaverde Valley. The creek flows northerly along Sierra Highway and onto U.S. Air Force Plant 42, where the flow is collected in the Lockheed drainage channel and held in a retention basin. Overflow water flows north along 20th Street East and 30th Street East, eventually merging with Amargosa Creek at Avenue E.

Little Rock Wash collects runoff from the San Gabriel Mountains in Little Rock Canyon. It flows just west of Littlerock through the east side of the city of Palmdale and the center of the L.A. World Airports (LAWA) property. Little Rock Wash starts off in a relatively well-defined channel. Near Avenue L, the wash becomes less defined. Further north, there is no defined channel, and the flow is best described as sheet flow.

Rock Wash collects runoff from Pallett and Big Rock Creeks in the San Gabriel Mountains. It then flows northerly from Holcomb Ridge through Pearblossom. In its northern reaches, it is divided by Alpine, Lovejoy, and Piute Buttes. The channel becomes undefined, and north of Avenue N, it becomes sheet flow.

Table 9.1 Historic Groundwater Basin Pumping by Palmdale Water Suppliers

Year	Palmdale Water District	Los Angeles County Waterworks District 40
2011	7,000	17,114
2012	7,500	20,361
2013	9,400	19,964
2014	12,400	25,982
2015	11,200	18,049
Average	9,500	20,294

Note: All values in acre-feet per year (AFY). Table describes groundwater pumping in the Antelope Valley Groundwater Basin (AVGB) by two primary water service providers to the City of Palmdale. Table is not representative of total groundwater extraction occurring in the AVGB.

Source: PWD 2016 (Table 3-2); County of Los Angeles 2017 (Table 5-3)

Groundwater levels throughout the basin have varied, with both increasing and declining levels noted during a 1975 to 1998 monitoring window (DWR 2004). However, portions of the basin along SR 14, including the Palmdale area, experienced declining levels during the latter portion of the 20th century. Groundwater extraction rights for the AVGB were adjudicated under a December 2015 stipulated judgment entered by the Superior Court of California. The judgment requires restrictions on groundwater pumping to meet the basin's safe yield and end what the court determined to be a 61-year period of overdraft.

Both PWD and LACWD 40 are currently adjusting their annual groundwater extraction to comply with their adjudicated groundwater production rights under the 2015 judgment. Pumping restrictions will be fully implemented by 2023 following a seven-year ramp-down period that commenced in 2016. In 2023, PWD will be restricted to a 2,770 AFY (approximately 29 percent of its 2011-2015 average) pumping right. LACWD 40 will have rights to extract 23,005 AFY from the basin (approximately 113 percent of its 2011-2015 average), pursuant to the judgment and a lease agreement with AVEK².

Storage Tanks and Groundwater Wells

Storage tanks and groundwater wells are in various spots throughout the city. The groundwater wells have varying buffers restricting development. The buffers range from 0.2-mile to about 0.5-mile.

Water Banking

Due to the highly variable nature of imported water supply, water purveyors in the Palmdale area are pursuing water banking strategies to store imported SWP water in local aquifers. PWD is currently pursuing development of the Palmdale Regional Groundwater Recharge and Recovery Project, which includes creation of a 160-acre recharge site in the northeastern portion of the city as well as construction of conveyance channels from the SWP, recovery wells, and potable and recycled water pipelines. PWD certified the Final Environmental Impact Report for the project in June 2016 (PWD 2016b). Other water banks in the region include the Antelope Valley Water Bank, which at full buildout would cover an 18-square mile area and provide up to 500,000 AF of storage (County of Los Angeles 2017).

Recycled Water

In 2012, the City of Palmdale and PWD created the Palmdale Recycled Water Authority (PRWA) through a Joint Exercise of Powers Agreement. The PRWA oversees recycled water planning, installation, and development throughout a majority of Palmdale, generally east of SR 14. To date, recycled water infrastructure in the city is limited to a recycled water transmission line connecting the Palmdale Water Reclamation Plant to McAdams Park for delivery

² While LACWD 40's extraction right of 23,005 AFY is higher than its 2011-2015 average volume pumped from the basin, pumping has historically exceeded 23,005 AFY, including in 20014 when LACWD 40 pumped 25,982 AFY.

of irrigation water supply. However, the City has an existing agreement with the Los Angeles County Sanitation District for up to 2,000 AFY.

In 2015, PRWA published the Recycled Water Facilities Master Plan, calling for construction of approximately 70,000 linear feet of recycled water pipeline and a variable horsepower pump station over a 10-year period. The first phase of the Master Plan, a 24-inch diameter pipe extending from the Palmdale Water Reclamation Plant south to Avenue R, has already been constructed (PRWA 2015). Additionally, an Antelope Valley Recycled Water Backbone System has been partially constructed, connecting the Lancaster Water Reclamation Plant and the Palmdale Water Reclamation Plant to source recycled water for both facilities for use throughout the region. The backbone system will be implemented by a partnership of eight agencies, including but not limited to LACWD 40, PWD, and the City of Palmdale.

Water Demand

Palmdale Water District Demand Projections

PWD's 2015 Urban Water Management Plan projects water demand through 2040 based on factors including historical and current demands and population projections. Table 9.2 summarizes projected water demands in the PWD service area through 2040. Demand trends include steady growth of potable water deliveries in line with projected population growth in the region, as well as anticipated rapid growth in non-potable demand between 2020 and 2025 due to planned expansion of the recycled water system.

Table 9.2: Projected PWD Normal Year Water Demand, 2020-2040

Water Use Sector	2020	2025	2030	2035	2040
Potable Deliveries					
Single-family	14,500	15,200	15,900	16,600	17,300
Multi-family	1,800	1,900	2,000	2,100	2,200
Commercial	1,200	1,300	1,300	1,400	1,400
Industrial	2,200	2,300	2,400	2,500	2,600
Landscape	1,000	1,100	1,200	1,200	1,300
Other ¹	100	100	100	100	100
Total Potable Deliveries	20,800	21,900	22,900	23,900	24,900
Non-Potable Demands					
Recycled Water	2,500	5,000	5,500	6,000	6,000
Potable and Non-Potable Demand²	23,300	26,900	28,400	29,900	30,900

Note: Values are rounded. All values in acre-feet per year (AFY). Projections assume water demands will grow at approximately 2 percent annually over the 20-year planning horizon, in line with the population projections used in the Urban Water Management Plan. While the horizon year of the General Plan Update is 2045, PWD UWMP demand projections extend to 2040.

¹Other uses include water for street sweeping and other limited use meters at City and school facilities. ²The PWD does not anticipate substantial changes in demand during single or multiple dry-year conditions due to the region's arid climate and implementation of demand management/conservation measures on irrigation during drought.

Source: PWD 2016 (Tables 2-10 and 6-1)

According to the PWD UWMP, projected demand would exceed supplies under single dry-year conditions beginning in 2020, and multiple dry-year conditions beginning in 2030. However, PWD anticipates currently underway groundwater banking projects coupled with water transfer and exchange opportunities will allow the District to meet all future demands under all hydrologic conditions.

Los Angeles County Waterworks District 40 Demand Projections

LACWD 40’s 2015 Urban Water Management Plan projects growth in water demand through 2035 using land use-based demand factors and applying those factors to vacant land currently planned for redevelopment within the District’s service area, which includes portions of Palmdale, Lancaster, and unincorporated areas of the Antelope Valley. Table 9.3 summarizes LACWD 40’s anticipated demand through 2035. Projections call for a substantial increase in single-family potable demand and non-potable recycled water. The decrease in commercial and institutional/governmental demand is attributable to increased availability of recycled water to serve these land uses.

Table 9.3: Projected Los Angeles County Waterworks District 40 Normal Year Demand, 2020-2035

Water Use Sector	2020	2025	2030	2035
Potable & Raw Demand				
Single-family	66,400	74,300	82,200	90,000
Multi-family	3,600	4,000	4,400	4,900
Commercial	5,100	4,500	3,800	3,200
Industrial	5,400	6,000	6,700	7,300
Institutional/Governmental	1,700	1,500	1,300	1,100
Losses ¹	6,200	6,800	7,400	8,000
Total Potable Deliveries	88,400	97,100	105,800	114,500
Non-Potable Demand				
Recycled Water	8,200	10,900	13,600	16,300
Potable and Non-Potable Demand²	96,600	108,000	119,400	130,800

Note: All values in acre-feet per year (AFY). While the horizon year of the General Plan Update is 2045, LACWD 40’s UWMP demand projections extend to 2035.

¹Assumed to be 7 percent of projected water demand.

²LACWD 40’s UWMP does not anticipate any changes in demand between normal, single-dry year, and multiple-dry years.

Source: County of Los Angeles 2017 (Tables 2-10 and 6-1)

LACWD 40 does not anticipate any supply deficiencies under normal, single-dry, or multiple-dry year conditions, largely due to the availability of banked groundwater supplies.

Water Conservation

Conservation and water use efficiency play an integral role in water supply management in the Palmdale area. Per capita water use in the area is low compared to other desert communities. In 2015, PWD and LACWD 40 maintained per capita water use rates of 128 gallons per capita per day (gpcd) and 165 gpcd, respectively. Both major water purveyors are in compliance with water conservation targets established pursuant to Senate Bill (SB) X7-7. Furthermore, per capita use in the area remains well below the average rate of 258 gpcd in the South Lahontan Hydrologic Region, in which Palmdale is located.

Despite the Palmdale area's relatively low per capita water use rates, the region is largely dependent on highly variable imported water supplies. As a result, water suppliers and the City of Palmdale implement a variety of regulatory demand management mechanisms to ensure water consumption can be effectively curtailed in times of limited supply.

PWD enforces a Water Waste Prevention Ordinance, which prohibits wasteful and unreasonable water use at all times. Prohibited activities include application of potable water to outdoor landscaping in a manner causing runoff or hosing of hardscaped surfaces unless necessary for health and safety reasons. LACWD 40 enforces similar restrictions under its Water Waste Ordinance, codified in Chapter 11 of the Municipal Code for Los Angeles County.

In addition to permanent restrictions on water end uses, both major water suppliers in the Palmdale area implement phased water conservation measures. PWD's Water Shortage Contingency Planning implements voluntary and mandatory reduction goals in response to federal, state, or local water shortage declarations. Water shortage declarations are activated by the PWD General Manager and Board of Directors and increase in severity from Stage I to Stage V, with associated restrictions becoming more stringent to meet demand reduction goals. LACWD 40 implements a similar Phased Water Conservation Plan, wherein restrictions on activities such as landscape irrigation and construction dust control become progressively restrictive.

The City of Palmdale also facilitates water use efficiency through Chapter 14.05 of the Palmdale Municipal Code, which contains the City's Water Efficient Landscape ordinance. The ordinance requires project applicants to submit a landscape documentation package detailing total landscape area, water budget calculations, a soil management report, landscape design plan, and irrigation plan.

Water conservation activities in Palmdale are not limited to regulatory mechanisms. As water conservation becomes increasingly critical in the region, water suppliers and the City are engaging in public outreach and education efforts, using price-based tools such as tiered water rate structures, and investing in new technology such as meter upgrades to manage demand.

Public-Private Infrastructure and Utilities

Wet Utilities

The infrastructure related to water includes pipelines, storage tanks, pumps, and groundwater wells in locations throughout the city. In addition, existing flood control facilities include engineered channels and retention basins on Amargosa Creek. There is also a flood retention basin along Anaverde Creek, protecting areas in the vicinity of 20th Street East, and 30th Street East.

Sewers

Most sewers in Palmdale are within Los Angeles County Sanitation District (LACSD) 20, which covers most of the southern half of Palmdale. These sewers carry wastewater for treatment at the Palmdale Water Reclamation Plant. Some of the sewers in the northern portion of Palmdale discharge to LACSD trunk sewers that convey flow to the Lancaster Reclamation Plant within LACSD District 14. The discharge from sewers on-site at USAF Plant 42 is split between LACSD District 20 and LACSD District 14.

There are also approximately 2,726 septic tanks served by the system, of which approximately 1,000 are within Palmdale city limits.

The City of Palmdale Sewer system consists of 396 miles of sewers, operated almost entirely by gravity, having only two small pump stations. The sewer system consists of clay pipe and is relatively new with 86 percent of the pipes installed after 1980. The average service life of clay pipe is estimated to be 80 to 100 years.

The Los Angeles County Sanitation District owns and operates 48 miles of large diameter trunk sewers that convey city wastewater to the Palmdale Wastewater Reclamation Plant and the Lancaster Wastewater Reclamation Plant. An additional nine miles of small diameter sewers serving unincorporated areas are owned and operated by the Consolidated Sewer Maintenance District (a part of the Los Angeles County Department of Public Works). These additional sewers hydraulically interconnected with the Palmdale sewer system but are maintained by the Consolidated Sewer Maintenance District, not the City of Palmdale.

The system includes two existing pump stations—the Avenue S Pump Station and the Pelona Vista Pump Station. A third pump station to serve the Ritter Ranch development is pending.

The City of Palmdale published a Sewer Master Plan in 2009 (prepared by RMC) which evaluates the condition of the sewer system. A hydraulic capacity analysis covered 142 miles of the largest sewers in Palmdale, including all the LACSD trunk sewers. Inspections showed that the City's system is in excellent condition, with one segment of city sewer (along 45th Street East) and a second segment (near 30th Street West serving the Joshua Ranch development) projected to have capacity deficiency. However, several LACSD trunk sewers are indicated to be

deficient. Please see the City of Palmdale Sewer Master Plan Final Report (September 2009) for additional details.

The 2018 Ten-Year Capital Improvement Plan from the Palmdale Department of Public Works addresses many of these deficiencies. But the bulk of the money allocated to watershed resources/utilities is for the (\$28 million) North Los Angeles/Kern County Regional Recycled Water Project. The project would provide the primary backbone system for distribution of recycled water to end-users in the Antelope Valley. There is currently no regional recycled water distribution system to convey treated water from Palmdale to locations where it can be used. Locally, at least one park uses recycled water for landscaping purposes. Local water is provided through groundwater extraction, surface water from Little Rock Reservoir, and water imported from the State Water Project (California Aqueduct). The proposed project would help meet expected growth in Palmdale, which cannot be met with existing sources of water.

Other large expenditures are planned for the Upper Amargosa Creek Flood Control, Recharge, and Habitat Restoration Project (\$11.6 million), the Barrel Springs Flood Control Basin (\$11.3 million), and the Palmdale Power Plant Recycled Water Back Bone Project (\$10 million).

Water Treatment

Figure 9.3 illustrates the various location of the water and wastewater treatment facilities in Palmdale.

The **Palmdale Water Treatment Plant** is also known as the Leslie O. Carter Treatment Plant and is located at 700 E. Avenue S, along the shores of Lake Palmdale. It can treat 35 million gallons per day. Water from Lake Palmdale is conferred to the treatment plant via a pipeline along East Avenue S.

The **Palmdale Water Reclamation Plant**, north of Palmdale, provides primary, secondary, and tertiary treatment for 12 million gallons of wastewater per day. Effluent is reused for irrigation of trees and fodder crops on the City of Los Angeles airport property, and for parks in the city of Palmdale.

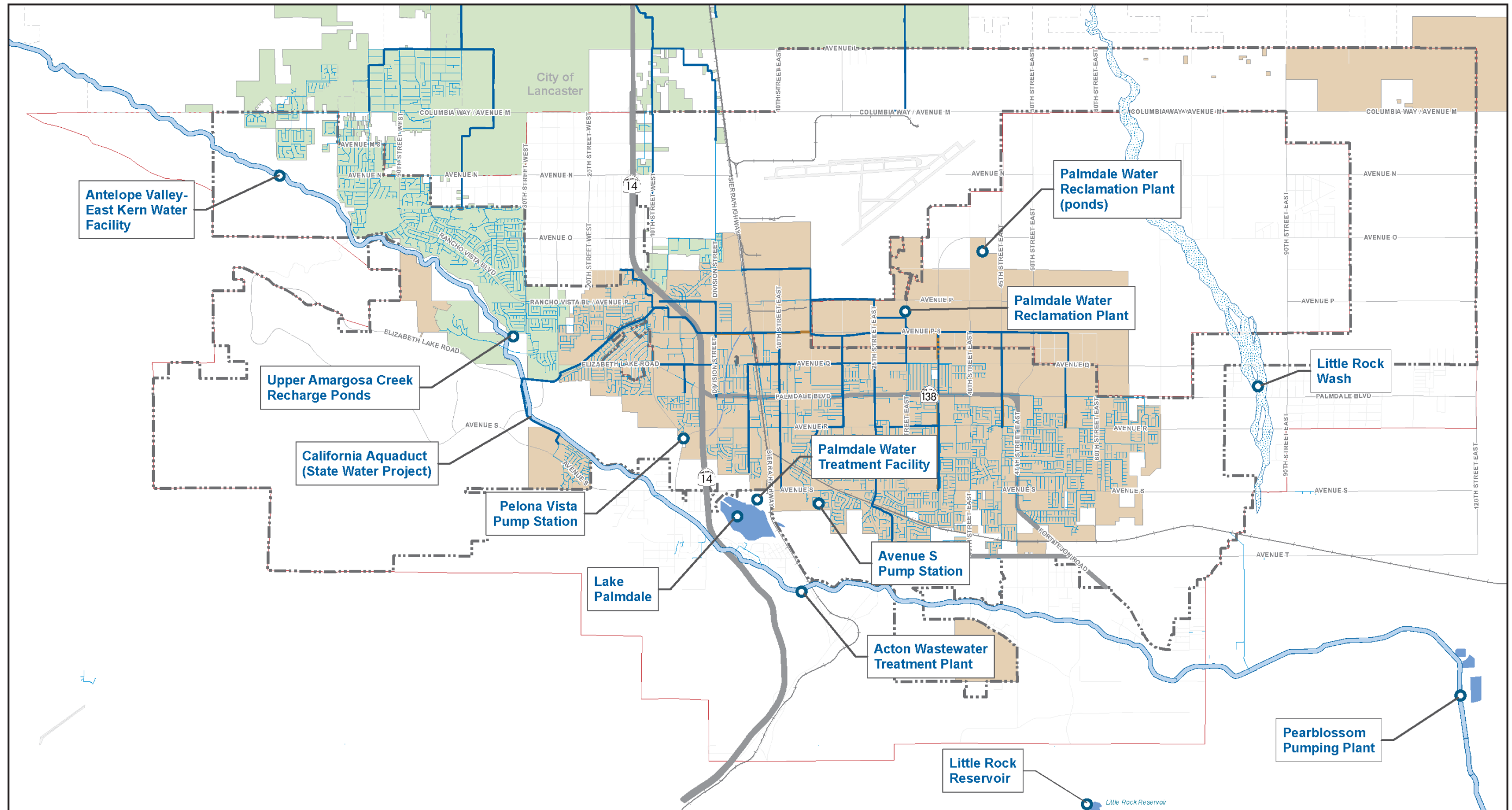
The **Acton Water Treatment Plant** treats water from the SWP and is operated by the Antelope Valley-East Kern Water District. This water is pumped via pipeline from the plant site near Barrell Springs Road, to Vincent Hill Summit. From there it is pumped into the Los Angeles County Waterworks pipeline for transport to the Acton area.

The **Antelope Valley/East Kern Water Agency (AVEK)** treatment plant is located west of Palmdale off West Avenue N, near the California Aqueduct. As a water wholesaler, AVEK is a SWP contractor who obtains all its water from the California Aqueduct to supply the Antelope Valley with potable water and untreated agricultural water.

The **Eastside Water Treatment Plant** is operated by AVEK and is located between Littlerock and Pearblossom.

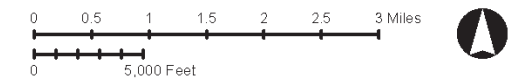
The ***Littlerock Reservoir*** is formed behind the Littlerock Dam, south of Palmdale in the San Gabriel Mountains. The capacity of the Littlerock Reservoir is 3,270-acre feet. Water travels to the Palmdale Water Treatment Plant through an earthen channel called Palmdale Ditch.

Figure 9.3 Water and Wastewater Facilities in Palmdale



Water & Wastewater

- Sewers
- Sewer (Trunk)
- LACSD District 14
- LACSD District 20
- California Aqueduct
- City Boundary
- Sphere of Influence



Data Sources: City of Palmdale GIS data; World Terrain Base, 2015 ESRI, USGS, NOAA.

Produced by Raimi + Associates
March 2019

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Recharge Ponds

The Upper Amargosa Creek Recharge Ponds project off Lake Elizabeth Road, close to the crossing with the California Aqueduct, provides groundwater recharge for the aquifer underlying the Palmdale area.

Storm Drainage and Flood Protection

Portions of Palmdale adjacent to the Amargosa Creek and the Ana Verde Creek, along the southwestern portion of Palmdale, are classified by FEMA as Zone A, AE, or AO—areas subject to inundation by the 1-percent-annual-chance flood. A wide swath along the Little Rock Wash in the eastern portion of Palmdale (and currently occupied by mining operations) is also classified as Zone A.

Storm water mitigation in the city of Palmdale consists mostly of a network of flood control channels and culverts maintained by the Los Angeles County Flood Control District. Floodwaters are restricted by catch basins feeding into a network of 396 miles of gravity flow sewer mainlines and 2,790 feet of forced flow mainlines. There are approximately 172 catch basins within the Palmdale city limits. Two pump stations operate within Palmdale.

The Los Angeles County Flood Control District also maintains three debris retention basins along the southern edge of the city.

The Upper Amargosa Creek Recharge Project provides flood control along with erosion protection for housing developments along Elizabeth Lake Road and 25th Street West. This project provides groundwater recharge and protection of buried utilities in addition to flood control.

Dry Utilities

Landfill

The Antelope Valley Recycling and Disposal facility is operated by Waste Management and located off City Ranch Road, west of State Route 14. Onsite facilities include a weigh station and a liquefied natural gas fueling station. There is an operations facility, and facilities for green waste recycling and electronic waste recycling.

Additional places in Palmdale to bring materials for recycling.

- Alameda Metals
- Allen Company Recycling Center
- 75th Street Quarry & Recycling
- Genesis Recycling
- Granite Materials
- Vulcan Materials

Electricity

Southern California Edison is responsible for the distribution of electricity in the Palmdale area. Several substations are located throughout the city of Palmdale (see Figure 9.4).

High voltage electrical transmission lines (220 kilovolts and greater) cross the Palmdale area along the western border and along the base of the San Gabriel Mountains in the south. The high voltage transmission lines converge on the Vincent Substation south of Palmdale.

Standard electrical distribution lines run along existing street right-of-way throughout the city.

Substations are located along the electrical distribution lines.

Other sites associated with electrical distribution include the Southern California Edison Antelope Valley Service Center, located on 10th Street West in Lancaster.

The Lockheed Energy Plant, located at a Lockheed facility on US Air Force Plant 42, produces power for Lockheed Martin and other users, using a single axis photovoltaic system that racks the sun and converts direct current (DC) to alternating current (AC), before it goes to the grid.

Streetlights

The City of Palmdale owns 18,060 LS-2 streetlights (City-owned pole with Southern California Edison owned wiring) and LS-3 streetlights (City owned pole and wiring). With an additional 661 Southern California Edison owned lights. Approximately 12,770 of those streetlights are in residential areas and have recently been retrofitted to LED lights. The City has 103 fully actuated traffic signals that include safety lighting for crosswalks. In addition, 17 fully actuated signals are shared with Los Angeles County. Safety lighting for crosswalks are not included in overall streetlight counts, and mileage of City-maintained wiring isn't currently tracked.

Gas

At the time of preparing this document, the City has been in the early phases of establishing a Community Choice Aggregation (CCA) Program. The CCA Program allows the local utility (Southern California Edison in Palmdale) to continue to provide the infrastructure needed to serve a location, but the CCA will produce the energy on behalf of rate payers. This will allow the City to have better control over greenhouse gas emissions and where the City's renewable and non-renewable energy will come from.

Natural gas is distributed by Southern California Gas. The distribution lines are located throughout the Palmdale area. A 30-inch main gas transmission pipeline runs through the southern portion of Palmdale, roughly along an easement on the south side of West Avenue S and East Avenue S.

Telecommunications

Cell phone towers, microwave towers and other telecommunication equipment are located throughout the city. Cell phone, fiber optic, and microwave towers are owned by AT&T, CenturyLink, Direct TV, Dish Network, Excede Satellite Internet, Frontier Communications, HughesNet, Sprint, Time Warner, Verizon, and Viasat Satellite. Television/radio towers are in the foothills of the San Gabriel Mountains.

Figure 9.5 illustrates the locations of major telecommunications equipment in and around Palmdale.

Impacts to Utilities

Palmdale covers 106.2 square miles and includes multiple utilities, as can be seen in the previous maps. Any land development or roadway improvements will impact the existing utility systems.

Utility Conflicts

Utility conflicts identified at the end of the design period or during construction can extend construction time, pose safety concerns, and increase costs. Locating, protecting, and relocating underground utilities creates significant delays to construction and utility services.

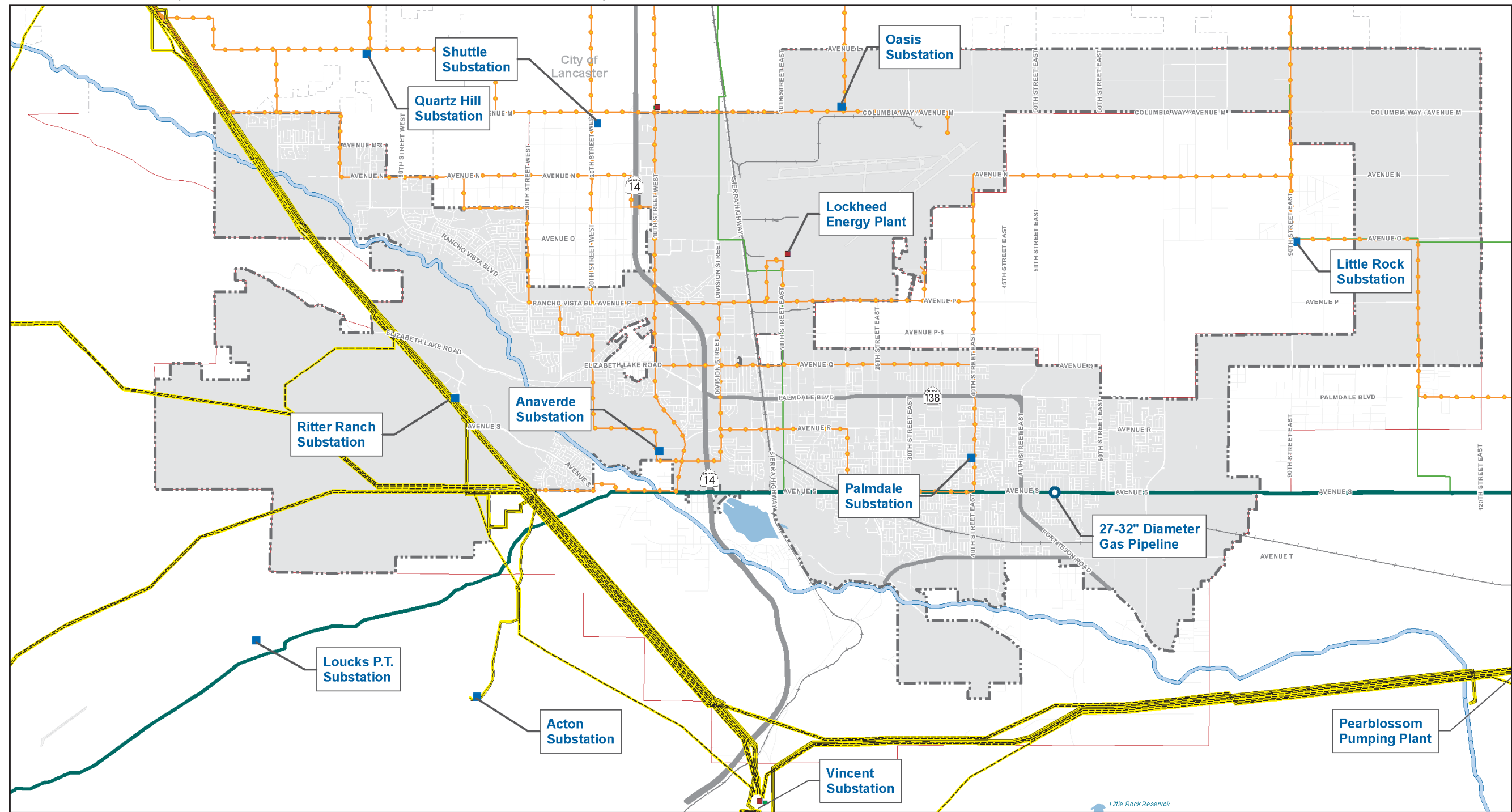
All utility information must be verified with each corresponding utility agency prior to any construction. In order to minimize impacts during construction, detailed relocation requirements must be developed in the final design phase after the scope of the relocation has been defined.

Implementation of standard conditions of approval and close coordination with the affected utilities would further minimize impacts to utilities and facilities. The following avoidance measures would lessen utility conflicts.

- Land developers should coordinate with all affected private and public service utilities during the design stage to identify any potential conflicts with existing utilities. This process would include evaluation of ways to avoid utility relocations by refining the project design and/or protecting existing utilities in place. After seeking approval from utility providers, final relocation/protection in place measures would be incorporated into the final plans and specifications. Per Caltrans requirements, all linear underground utilities within Caltrans' right-of-way (ROW) would be encased from ROW to ROW in either steel or concrete.
- All construction activities should adhere to the Los Angeles Department of Water and Power's Standard Conditions for Construction.
- The proposed project work should be coordinated with the emergency service providers in the area. Contractors should work closely with the City and California Highway Patrol (CHP) to determine the best time for closures and detours and if necessary, utilizing Sheriff Department or CHP officers for traffic control, potential temporary speed reductions, and proper signage as needed.

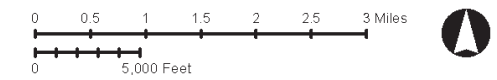
Considering that access to data is becoming more and more of a necessity and the “Digital Divide” is creating an impact in people’s lives; the City is looking at treating data/fiber optics access as a utility versus a luxury. This policy may encompass more than requiring new developments to provide fiber access, but to potentially implement a “dig once” policy, where fiber will be installed when other utility repairs or installations occur.

Figure 9.4 Locations of Electricity and Gas Transmission/Distribution in the Palmdale Vicinity



Electric and Gas Distribution

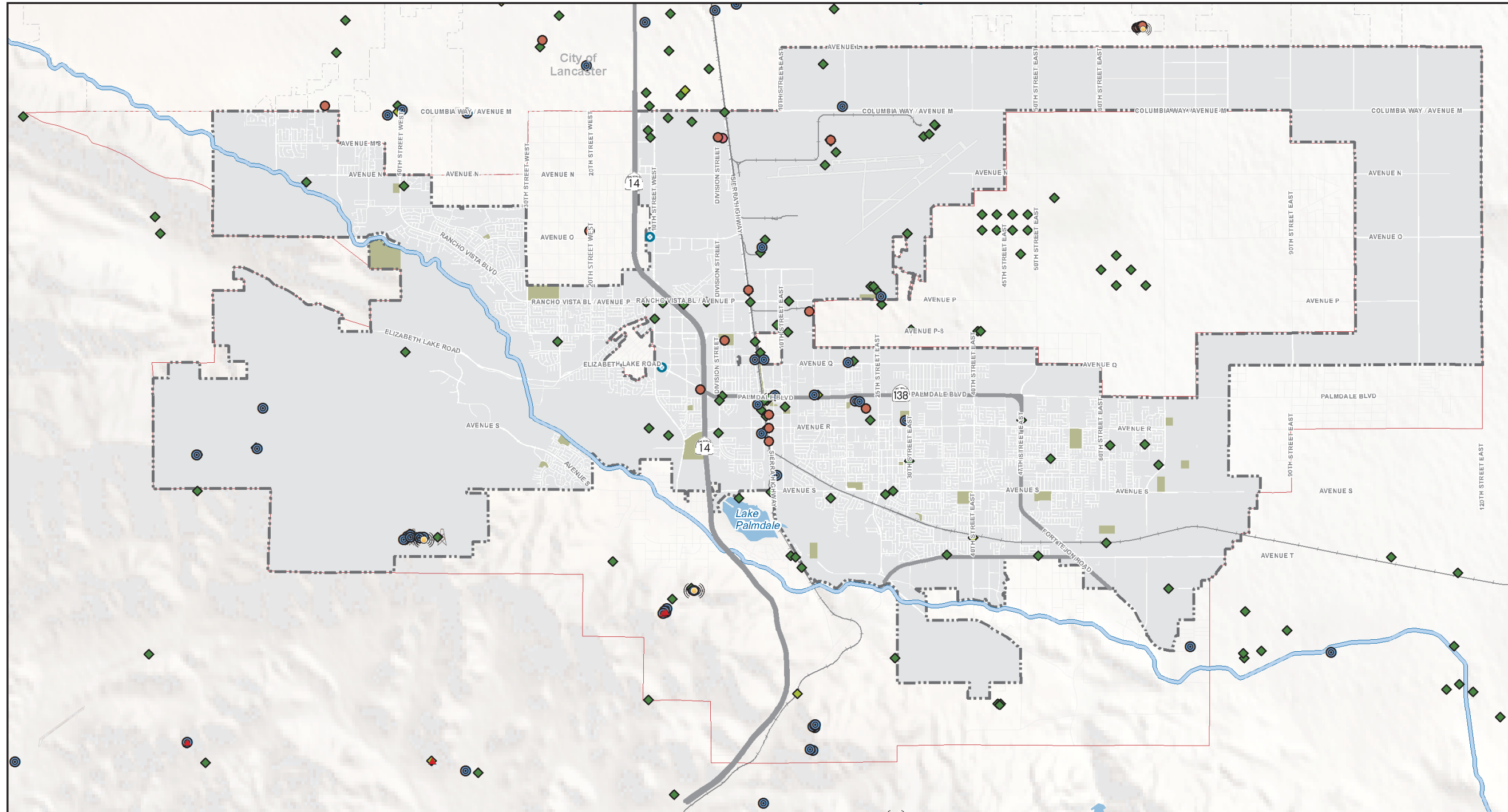
- Substations
- Other Sites
- Electric Transmission
- Hi-Voltage Transmission
- Hi-Voltage Transmission
- Natural GAS Distribution
- California Aqueduct
- City Boundary
- Sphere of Influence



Data Sources: City of Palmdale GIS data, World Terrain Base, 2015 ESRI, USGS, NOAA.

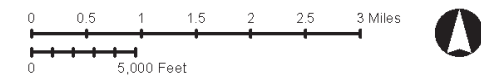
Produced by Raimi + Associates
March 2019

Figure 9.5 Locations of Telecommunications Equipment in the Palmdale Vicinity



Telecommunications

- | | | |
|---------------------|-------------------------------|---------------------|
| NTSC TV | Internet Exchange Points | California Aqueduct |
| AM Antennas | Internet Service Providers | City Boundary |
| Cellular Towers | Land Mobile Commercial Towers | Sphere of Influence |
| FM Antennas | Land Mobile Private | Water Body |
| IT Portal Locations | Microwave Towers | |



Data Sources: City of Palmdale GIS data, World Terrain Base, 2015 ESRI, USGS, NOAA.

Produced by Raimi + Associates
March 2019

Summary of City of Palmdale Watershed Resource and Utility Projects

The City of Palmdale develops, implements and manages an ongoing Ten-Year Capital Improvement Program which includes improvement projects throughout the City, such as landscaping, beautification and signage; street widening, rehabilitation, resurfacing and sealing; sidewalks, bikeways and trails; Americans with Disabilities Act (ADA) improvements; traffic signals and safety improvements; transportation facilities and transit amenities; water resource and drainage systems; parks, recreation and athletic facilities; public offices and buildings; overhead utility undergrounding; drainage projects; and environmental mitigation.

Table 9.4 provides a summary of funding for the Watershed Resources/Utility projects included with the 2018–2028 Capital Improvement Plan. Individual projects are listed on Table 9.5 and the locations of these projects are illustrated on Figure 9.6.

Table 9.4 City of Palmdale 2018–2028 Watershed Resources/ Utility Project Summary *(thousands of dollars)*

Fund Source	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-28	Estimated Total*
Developer contributions	\$ -	\$ -	\$3,200	\$16,291	\$13,805	\$ 33,296
Drainage fee	\$ 1,790	\$380	\$1,830	\$ 8,470	\$13,710	\$ 26,180
Gas tax	\$ -	\$ 50	\$ 50	\$ 50	\$ 350	\$ 500
Grant funding	\$ 6,500	\$ -	\$ -	\$ -	\$ -	\$ 6,500
Park development fund	\$ -	\$ -	\$ -	\$ 185	\$ -	\$ 185
Recycled water fund	\$ -	\$500	\$1,500	\$ 1,685	\$34,400	\$ 38,085
Sewer maintenance	\$ 2,495	\$ 50	\$ 50	\$ 50	\$ 345	\$ 2,990
Sewer upgrade fund	\$ 850	\$ -	\$ -	\$ 800	\$ 1,255	\$ 2,905
Water agencies	\$ 4,420	\$ -	\$ -	\$ -	\$ -	\$ 4,420
TOTALS	\$16,055	\$980	\$6,630	\$27,531	\$63,865	\$115,061

Table 9.5 City of Palmdale 2018–2028 Watershed Resources/Utility Project List (*thousands of dollars*)

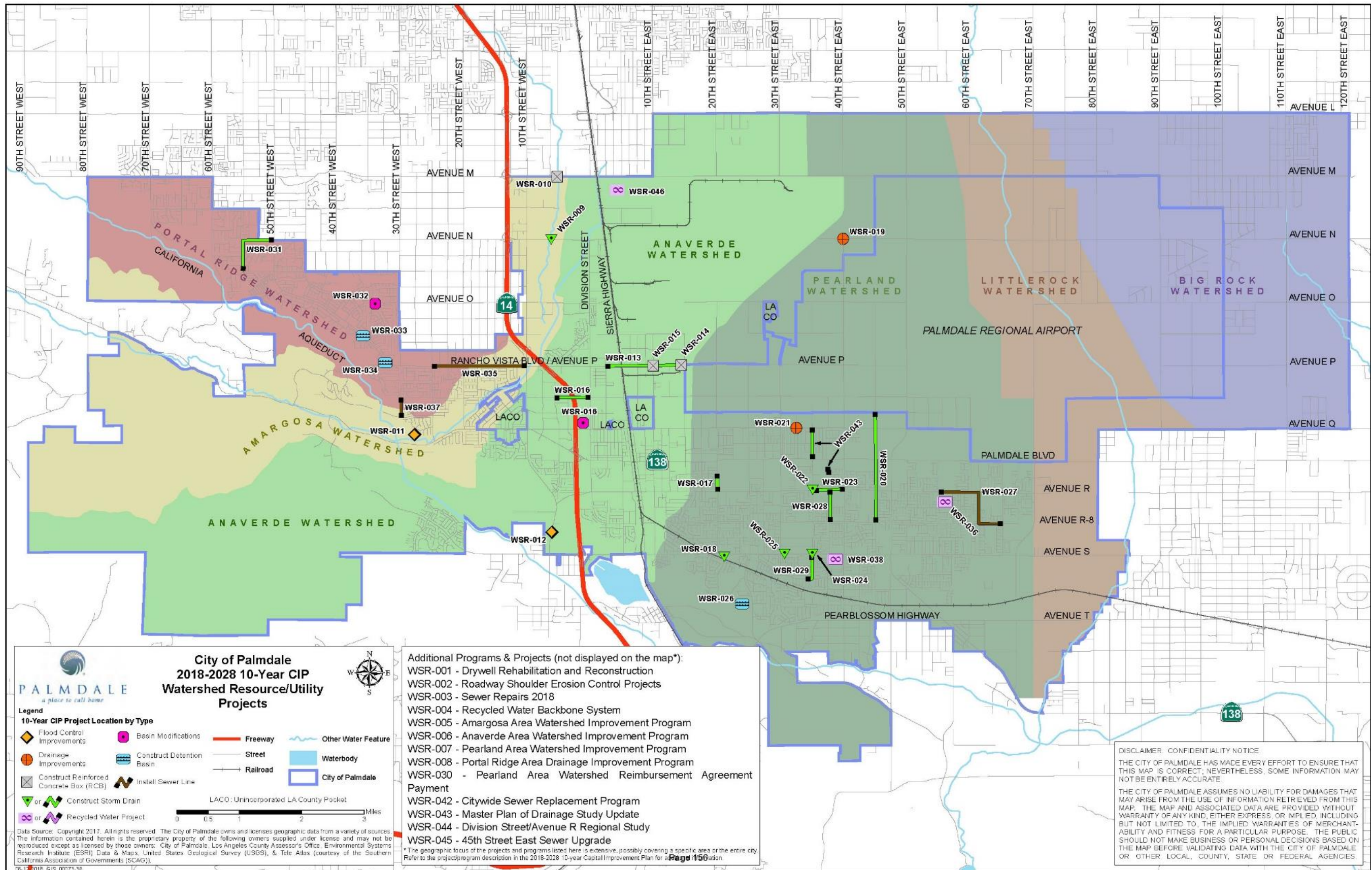
Project No.	Title	Est. Total
WSR-1	Drywell Rehabilitation and Reconstruction	\$ 500
WSR-2	Roadway Shoulder Erosion Control Projects	\$ 500
WSR-3	Sewer Repairs 2018	\$ 2,990
WSR-4	Recycled Water Backbone System	\$ 27,900
WSR-5	Amargosa Area Watershed Improvement Program	\$ 200
WSR-6	Anaverde Area Watershed Improvement Program	\$ 200
WSR-7	Pearland Area Watershed Improvement Program	\$ 200
WSR-8	Portal Ridge Area Drainage Improvement Program	\$ 200
WSR-9	Amargosa Creek at Avenue N Storm Drain	\$ 2,900
WSR-10	Lower Amargosa Creek Flood Control Improvements	\$ 2,700
WSR-11	Upper Amargosa Creek Flood Control, Recharge and Habitat Restoration Project	\$ 11,630
WSR-12	Anaverde Creek Culvert at Tierra Subida Avenue	\$ 3,971
WSR-13	Rancho Vista Blvd. Storm Drain System—3rd Street E. to 15th Street E.	\$ 8,790
WSR-14	Rancho Vista Blvd and 15th Street E. Box Culvert	\$ 2,750
WSR-15	Rancho Vista Blvd at 10th Street E. Storm Drain	\$ 1,160
WSR-16	Technology Drive (Avenue P-8) Storm Drain	\$ 810
WSR-17	20th Street E. Storm Drain—North	\$ 930
WSR-18	20th Street E. Storm Drain—South	\$ 380
WSR-19	40th Street E. and Avenue N Drainage Improvements	\$ 310
WSR-20	45th Street E. Storm Drain—Avenue R to Palmdale Blvd	\$ 3,310
WSR-21	Avenue Q Drainage Improvements—30th Street E. to 35th Street E.	\$ 280
WSR-22	Avenue R at 35th Street E. Storm Drain	\$ 280
WSR-23	Avenue R Storm Drain at 37th Street E.	\$ 1,260
WSR-24	Avenue S at 40th Street E. Storm Drain	\$ 500
WSR-25	Avenue S at 30th Street E. Storm Drain	\$ 500
WSR-26	Barrel Springs Flood Control Basin	\$ 11,390
WSR-27	Eastside Sanitary Sewer System Upgrades	\$ 3,000
WSR-28	Janus Dr. N/O Avenue R-8 to Avenue R Storm Drain	\$ 820
WSR-29	Jenna Lane at Fairfield Avenue Storm Drain	\$ 670
WSR-30	Pearland Area Watershed Reimbursement Agreement Payment	\$ 2,000
WSR-31	55th Street W. and Avenue N Storm Drain	\$ 1,230
WSR-32	Fulham Basin Modifications	\$ 270
WSR-33	Rancho Vista Blvd at Heathrow Dr Detention Basin	\$ 810
WSR-34	Rancho Vista Blvd at 30th Street W. Detention Basin	\$ 330
WSR-35	Rancho Vista Blvd Sewer Upgrade 25th Street W. to 10th Street W.	\$ 1,650
WSR-36	Palmdale Oasis Parks Recycled Water Conversion	\$ 370

Table 9.5 City of Palmdale 2018–2028 Watershed Resources/Utility
Project List (*thousands of dollars*)

Project No.	Title	Est. Total
WSR-37	30th Street W. Sewer Upgrade from Avenue P-8 to Joshua Ranch Road	\$ 810
WSR-38	Oasis Park Basin Upgrade	\$ 370
WSR-39	Avenue Q Basin Expansion	\$ 750
WSR-40	30th Street East Storm Drain Extension	\$ 3,130
WSR-41	30th Street E/Jojoba Terrace Basin Upgrade	\$ 130
WSR-42	Joshua Ranch Road/25th Street W. Basin Bypass	\$ 130
WSR-43	Master Plan of Drainage Study Update	\$ 500
WSR-44	Division Street/Avenue R Regional Study	\$ 250
WSR-45	45th Street E Sewer Upgrade (Avenue R–Avenue S)	\$ 850
WSR-56	Palmdale Power Plant Recycled Water Back Bone	\$ 10,000
	TOTAL	\$115,061

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Figure 9.6 Ten-Year CIP Watershed Resource/Utility Projects



Source: 2018 Ten-Year Capital Improvement Plan, Department of Public Works, City of Palmdale, October 2, 2018

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Policy Guidance

1993 General Plan, Environmental Resources Element

Palmdale's 1993 General Plan, Environmental Resources Element provides guidance for the management, conservation, and protection of water resources. Policies include protecting natural recharge areas from pollutants or building coverage which could degrade water quality or inhibit infiltration, promoting water-conserving landscape techniques, and encouraging recycled water use and water banking. Additionally, Policy ER4.2.4 states that the City shall coordinate with local water agencies to monitor groundwater levels, SWP allocations, and development approvals to assure that development does not outpace long-term water availability.

1993 General Plan, Public Services Element

Palmdale's 1993 General Plan, Services Element contains goals, objectives, and supporting policies targeting water distribution and infrastructure in the city. Policies include requiring new development to obtain adequate water service to meet its increased service needs, promoting water conservation in all phases of development planning and construction, and supporting water suppliers and other jurisdictions in efforts to study the current status and projected needs for water supply and delivery. Furthermore, Policy PS2.2.10, adopted via General Plan Amendment 09-04 in 2010, encourages working with the Sanitation District to identify users for reclaimed water and supporting plans for its treatment and distribution.

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