

CRANE CROSSING AND SIERRA POINTE SPECIFIC PLANS

Water Supply Assessment

Prepared for
City of Oakdale

December 2013



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WATER SUPPLY ASSESSMENT

Crane Crossing and Sierra Pointe Specific Plans

1.0 Introduction

The California legislature passed Senate Bill (SB) 610 (Chapter 643, Statutes of 2001) and SB 221 (Chapter 642, Statutes of 2001) to improve the link between water supply availability information and certain land use decisions. Under SB 610, water assessments must be prepared and provided to local lead agencies as part of the environmental documentation for certain projects subject to the California Environmental Quality Act (CEQA). The plan should evaluate water supply reliability and include water supply needs for any anticipated growth. SB 221 requires any development having more than 500 parcels or units to have a complete water supply plan prior to approval for development. Review and approval of these documents fall to the local governing board, rather than the State of California.

Together, SB 610 and SB 221 are meant to support collaborative water supply planning efforts between cities or counties and the water purveyors that serve them. SB 610 requires completion of a water supply assessment for projects, as specified in Water Code Section 10912(a). SB 221 mandates that in order for a city or county to approve certain residential subdivisions, written verification of sufficient water supply is required. This document contains a Water Supply Assessment (WSA), prepared in accordance with SB 610. This WSA relies on the available water supplies and anticipated demands discussed in the Crane Crossing Specific Plan (CCSP), the Sierra Pointe Specific Plan (SPSP), and the associated Environmental Impact Report (City of Oakdale, 2012a; City of Oakdale, 2013).

1.1 Site Background

The following WSA considers anticipated water demand and available water supply for two specific plan areas: the CCSP, and the SPSP. Both specific plans are considered within the Oakdale 2030 General Plan. The CCSP area is located along the northwestern edge of the City of Oakdale (City), approximately two miles west of Downtown along Highway 108/West F Street. The Plan Area consists of two separate geographic areas, linked by Crane Road. Planning Area 1, the “North Area,” is approximately 171 acres and is located to the north of Pontiac Street, east of its intersection with Crane Road. Planning Area 3, the “South Area,” is approximately 92 acres and is located along the north side of Highway 108/West F Street, at the intersection with Crane Road. The SPSP is located along the eastern edge of the City, approximately 1½ miles east of the Downtown district along Highway 120/ East F Street. The SPSP area is generally bounded by Highway 120 to the north, South Stearns Road to the east, Orsi Road to the west, and Sierra Avenue to the south.

Existing land uses within the CCSP and SPSP areas are currently dominated by agriculture and associated uses, with some rural and single family residential. Proposed uses are discussed in detail in the CCSP, the SPSP (City of Oakdale, 2012b; City of Oakdale, 2012c), and the associated EIR (City of Oakdale, 2012a; City of Oakdale, 2013), but would generally include:

For the CCSP:

- 676 additional single family dwelling units and 259 additional multi-family dwelling units
- 710,450 square feet of commercial/office space

For the SPSP:

- 529 additional single family dwelling units and 187 additional multi-family dwelling units
- 611,032 square feet of commercial space
- 268,711 square feet of office space
- 238,326 square feet of public/semi-public space

1.2 Existing Water Supply and Infrastructure

The CCSP and SPSP areas are located almost entirely outside of the City's existing water supply service area and existing City infrastructure within the CCSP and the SPSP areas is limited. As such, existing water supply within the CCSP and the SPSP areas is provided by a combination of residential groundwater wells, agricultural wells, and irrigation and rural potable water supplies provided by Oakdale Irrigation District (OID).

Currently, for areas within its service area, the source of potable water for the City of Oakdale is exclusively from groundwater resources. The City of Oakdale owns and operates eight wells with a total production capacity of 15,200 gpm¹ and approximately 500,000 gallons of active storage in one steel storage tank. The City's water system is operated under a permit originally granted by the California Department of Health Services on August 20, 1964. The permit was amended in March 1989 to include Wells 5A and 6. In January 1997, the permit was again amended to add Wells 7 and 8. The City's water systems service area is generally bounded by the current City limits, which is approximately six square miles and generally borders Crane Road on the west, Stearns Road on the east, the Stanislaus River on the north, and Warnerville Road to the south. Also included within the City's water systems service area are the Belsera (northeast Oakdale, accessed from Stearns Road) and Sunset Park (northwest Oakdale, accessed from Oak Avenue) subdivisions, which are located outside of the City limits.

In 2004, the Governor of California signed Assembly Bill (AB) 2572, which requires that water meters be installed on all new potable water service connections. In addition, AB 2572 requires that all existing municipal and industrial service connections have meters installed by January 1, 2025. The City currently has 6,869 metered connections and only 18 un-metered connections. All new water services are required by the City to have a water meter installed.

¹ City of Oakdale Urban Water Management Plan, 2009, Page 3-5.

The City's water distribution system is divided into two pressure zones with approximately 40 pounds per square inch (psi) in the main pressure zone. A boosted pressure zone serves the residential area of Burchell Hill, the industrial area in the southern portion of the City, and the J Street area including the Bridle Ridge subdivision and areas within the eastern portion of the City.

The current transmission mains consist of 2 to 16 inch pipes. The water system network was developed incrementally as the City expanded. Many of the pipes, especially in the older parts of town, are 4 inches or smaller, and while the pipe sizes may be adequate for domestic water flow demands, the pipes will not deliver the required fire flows to these areas. These mains will be replaced with 8 inch minimum diameter mains as planning and funding allow.

There is a 500,000 gallon water storage tank located near Well No. 3, in the northeast area of the City. The tank is 48 feet in diameter, 40 feet high and constructed of steel. The bottom of the tank is set at an elevation of 211 feet MSL (mean sea level). The tank is of sufficient size to serve as pressure equalization for all areas, except the higher pressure zone. It also provides reserve capacity during an emergency such as fire protection.

1.3 Hydrogeology

In April 1994, six agencies covering the Modesto Groundwater Subbasin formed the Stanislaus and Tuolumne River Groundwater Basin Association to provide a forum for coordinated planning and management of the subbasin. The six agencies are: The City of Modesto, the Modesto Irrigation District (MID), the City of Oakdale, OID, the City of Riverbank and Stanislaus County.

The Modesto subbasin lies between the Stanislaus River to the north and Tuolumne River to the south and between the San Joaquin River on the west and the Sierra Nevada foothills to the east. Average annual precipitation for the subbasin is 9 to 15 inches, increasing eastward. The specific plan areas are located along the northern margin of the subbasin.

The primary hydrogeologic units in the Modesto subbasin include both consolidated and unconsolidated sedimentary deposits. Groundwater occurs under unconfined, semi-confined, and confined conditions. The unconfined water body occurs in the unconsolidated deposits above and east of what is known as the Corcoran Clay, which underlies the southwestern portion of the subbasin at depths ranging from 150 to 250 feet (DWR, 2004). Where clay lenses restrict the downward flow of groundwater, semi-confined conditions occur. The confined water body occurs in the unconsolidated deposits below the restricting Corcoran Clay and extends downward to the base of fresh water. Note, however, that while the Corcoran Clay extends under portions of Modesto and Manteca, the formation does not extend under the City of Oakdale (DWR, 1981).

Groundwater recharge occurs primarily from deep percolation of applied irrigation water and canal seepage from MID and OID facilities. Seepage from the Modesto Reservoir is also significant. Lesser recharge occurs as a result of subsurface flows originating in the mountains and foothills along the east side of the subbasin, losses from minor streams, and from percolation of direct precipitation (DWR, 2004).

Groundwater levels have fluctuated over the last 40 years within approximately 20 feet of the 1970 levels. Water level declines have been more severe in the eastern portion of the subbasin, but have also risen faster there than any other portion of the subbasin. A rough groundwater budget for the subbasin can be described as follows: natural recharge is estimated to be 86,000 acre-feet per year (AFY), applied recharge is estimated to be 92,000 AFY, urban extraction is estimated to be 81,000 AFY, and agricultural extraction is estimated to be 145,000 AFY (DWR, 2004). Summing these values indicates an apparent net annual groundwater deficit of approximately 48,000 AFY. These values are, however, rough estimates of approximate average annual values. Due to uncertainty associated with the actual rates of recharge and pumping in the subbasin, and also due to recent and ongoing changes in groundwater basin management actions that have been taken or are in process within the subbasin, these values need to be further constrained before any conclusions regarding groundwater overdraft can be made. Conversely, the City's recent well monitoring data sets show higher groundwater depths in comparison to 2000 levels. (City of Oakdale, 2009, See Figures 2-1 to 2-4, *infra*.)

1.4 Groundwater Quality

The groundwater in this basin is of a calcium bicarbonate type in the eastern subbasin to a calcium-magnesium bicarbonate or calcium-sodium bicarbonate type in the western portion. Total dissolved solid (TDS) values are reported by the California Department of Health Services, which monitors Title 22 water quality standards, in 88 wells ranging from 60 to 860 mg/L, with an average value of 295 mg/L. The City of Oakdale's TDS range was 142-220 mg/L for the monitoring period of January 1 through December 31, 2008.

There are areas of hard groundwater and localized areas of high chloride, boron, DBCP, nitrate, iron, and manganese. Some sodium chloride waters of high TDS values are found along the east side of the subbasin.

Within the City of Oakdale, the high quality of the groundwater has made treatment to comply with drinking water regulations unnecessary. However, current and future Safe Drinking Water Act Amendment (SDWA) regulations may require a more in depth analysis of water quality characteristics of both the source water and the delivered product water. While unexpected at this time, treatment of groundwater may become a requirement in the future, which might lead to a shift toward use of surface water sources.

1.5 Crane Crossing Specific Plan

The following text reviews the proposed CCSP, including proposed development and proposed water infrastructure.

1.5.1 Proposed Development

Existing land uses in the CCSP area include orchards, ranch style/rural residential homes, residential properties containing barn structures, fields, pasturelands for grazing, and abandoned orchards. Proposed land uses within the CCSP include residential, parks, and neighborhood-serving commercial and/or office uses. The CCSP area will need to be annexed into the City of Oakdale as

part of the specific plan processes. At buildout, the CCSP is planned to provide for approximately 1,039 dwelling units (includes existing units), ultimately housing an estimated 2,837 residents, and adding approximately 710,000 square feet of neighborhood-serving commercial and/or office uses as shown in **Table 1-1**. For additional detail including descriptions of the proposed land use designations for the CCSP, please refer to the CCSP or the associated EIR (City of Oakdale, 2012a; City of Oakdale, 2013).

**TABLE 1-1
CCSP PROPOSED LAND USE SUMMARY**

Land Use Designation	Gross Acres	Dwelling Units (du)/ Square Feet (sf)	% of Total Units
Residential Neighborhood Uses			
Very Low Density Residential (VLDR)	45.9 ac.	131 du	12.6%
Low Density Residential (LDR)	93.8 ac.	496 du	47.7%
Medium Density Residential (MDR)	22.4 ac.	192 du	18.5%
High Density Residential (HDR)	5.3 ac.	106 du	10.2%
Subtotal	167.4 ac.	925 du	89.0%
Mixed Use Corridor Uses			
Flex Use/Med. Density Res. (FLEX/MDR)	9.5 ac.	114 du	11.0%
General Commercial (GC)	29.9 ac.	390,602 sf	
Flex Use/General Commercial (FLEX/GC)	24.5 ac.	319,904 sf	
Subtotal	63.9 ac.	114 du/ 710,507 sf	11.0%
Parks & Open Space Uses			
Park (P)	13.8 ac.		
Open Space (OS)	4.8 ac.		
Subtotal	18.6ac.		
Other			
Right of Way (ROW)	12.6 ac.		
TOTAL	262.5 ac.	1,039 du/ 710,506 sf	100%

Unit and square footage yields for Flex Uses are calculated assuming their primary use. Flex Uses are also designated a secondary use and may develop as the primary use, the secondary use, or as a mix of the primary and secondary uses.

1.5.2 Water Infrastructure

In the northern portion of the CCSP area, a looped system of 12 inch diameter pipe is planned to connect with the existing water system at the intersections of Pontiac Street and Crane Road, Pontiac Street and Reed Road, and Poplar Street and Lee Avenue. Off-site improvements are also to be included consisting of either replacing an existing 8 inch main in Poplar Street (approximately 400 linear feet of pipe west of Lee Avenue) or installing a parallel 12 inch main along this same segment of street (City of Oakdale, 2012b).

In the southern portion of the CCSP area, connections to existing water infrastructure are planned at the intersections of Highway 108 and Crane Road, and Pontiac Street and Crane Road. Other service mains and connections points may be 8 inch or 10 inch per City direction as individual parcels develop and are evaluated as part of the tentative subdivision map review process. **Table 1-2**

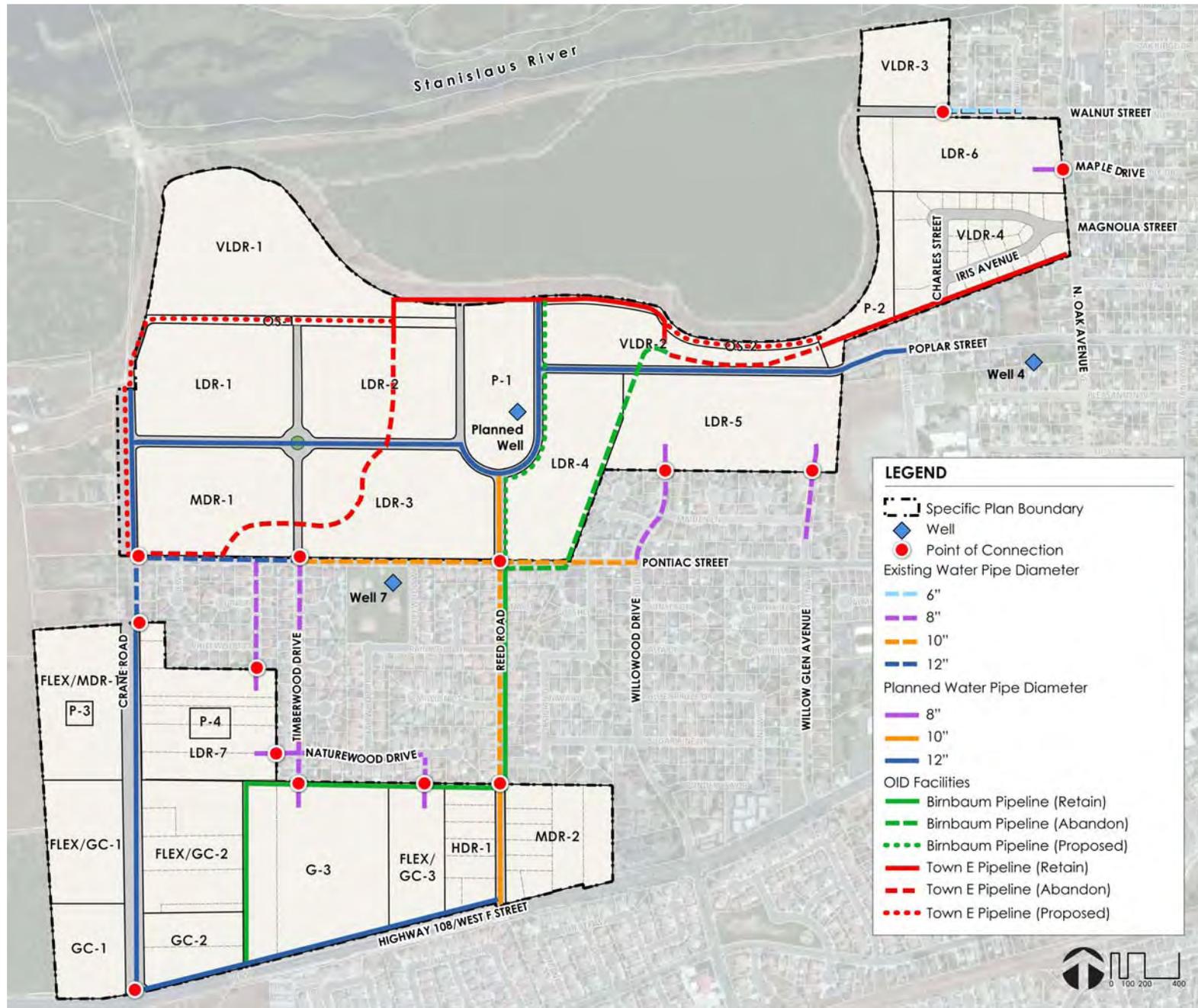
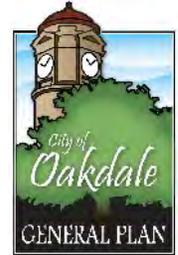
provides additional details regarding water supply pipelines that would be installed under the CCSP. In order to support water supply within the CCSP area, one new water supply well would also be installed within the CCSP area (City of Oakdale, 2012b).

OID maintains easements for two irrigation pipelines located in the CCSP area, the Town E Pipeline and the Birnbaum Pipelines (see **Figure 1-1 Backbone Potable Water Infrastructure**). OID has indicated that the Town E pipeline must be maintained in perpetuity with an east/west connection between Oak Avenue and Crane Road. To that end, the CCSP land use plan designates both park and linear open space parcels in the northern portion of the Plan Area to accommodate the relocation of this pipeline. OID has indicated that the Birnbaum Pipeline can be abandoned. Should development proceed prior to the ability to abandon the Birnbaum Pipeline, individual projects will be required to coordinate with OID regarding construction activity near the pipeline and/or relocation of the facility. As existing landowners in the CCSP area connect to the City water system, existing wells will be required to be sealed per Stanislaus County Department of Environmental Resources regulations.

**TABLE 1-2
CCSP PROPOSED IMPROVEMENTS**

CCSP Improvement Number	Description
NW1	Connect to existing 10 inch and 12 inch water transmission lines along Pontiac Street, Crane Road and Poplar Street.
NW2	Install 12 inch main in Crane Road from Pontiac Street to northern terminus of Crane Road.
NW3	Install 12 inch main in Signature Streets running east-west to connect at Crane Road and offsite to Poplar Street/N. Lee Ave.
NW4	Install 12 inch main in Signature Street along the east side of Parcel P-1 to the northern boundary of the North Phase for connection to the Future Specific Plan Area.
NW5	Install 10 inch main in Signature Street from Pontiac Street and Reed Road north to Parcel P-1, connecting to the 12 inch bisecting line.
NW6	Relocate the OID Birnbaum Pipeline beginning at the southern corner of Parcel P-2 and ending at the intersection of Pontiac Street and Reed Road.
NW7	Relocate portions of the OID Town E Pipeline along the northern boundary of the North Phase, then south along Crane Road to connect to the existing pipeline at Pontiac Street.
SW1	Connect 8 inch line to existing water transmission line at Stonewood Lane.
SW2	Connect 8 inch line to existing water transmission line at Naturewood Drive.
SW3	Connect 8 inch line to existing water transmission line at Timberwood Drive.
SW4	Connect 8 inch line to existing water transmission line at Brownwood Lane.
SW5	Install 12 inch main in Crane Road from the connection point at SR 108/West F Street north to the connection point south of Pontiac Street.
SW6	Install 12 inch main along the northerly frontage of SR 108/West F Street from Crane Road to Reed Road.
SW7	Install 10 inch main from the intersection of SR 120/West F Street and Reed Road north to the connection point in Reed Road.

SOURCE: City of Oakdale, 2012b



Source: Stanislaus County, 2009; ESRI, 2011; City of Oakdale, 2008; Atkins, 2011; and ESA, 2012
Date Revised: June 26, 2012



1.6 Sierra Pointe Specific Plan

The following text reviews the proposed SPSP, including proposed development and proposed water infrastructure.

1.6.1 Proposed Development

Existing land uses in the SPSP area include rural homes, modular homes, single-family homes, agricultural land, orchards, pasture land, and barns. Proposed land uses within the SPSP include residential, parks, commercial, office, and educational. The SPSP area will need to be annexed into the City of Oakdale as part of the specific plan processes. At buildout, the SPSP is planned to accommodate approximately 901 dwelling units (including existing units), ultimately housing an estimated 2,487 residents, and adds about 1.1-million square feet of commercial, office, and educational uses as shown in **Table 1-3**. For additional detail including descriptions of the proposed land use designations for the SPSP, please refer to the SPSP or the associated EIR (City of Oakdale, 2012a; City of Oakdale, 2013).

**TABLE 1-3
SPSP PROPOSED LAND USE SUMMARY**

Land Use Designation	Gross Acres	Dwelling Units (du)/ Square Feet (sf)	% of Total Units
Residential Neighborhood Uses			
Very Low Density Residential (VLDR)	52.16 ac.	142 du	15.8%
Low Density Residential (LDR)	71.69 ac.	359 du	39.8%
Medium Density Residential (MDR)	28.33 ac.	227 du	25.2%
High Density Residential (HDR)	10.82 ac.	173 du	19.2%
Subtotal	163.00 ac.	901 du	100%
Mixed Use Corridor Uses			
General Commercial (GC)	27.04 ac.	353,359 sf	
Flex Use/General Commercial (FLEX/GC)	19.72 ac.	257,701 sf	
Office (OFF)	20.56 ac.	268,678 sf	
Public Semi-Public (PSP)	18.24 ac.	238,361 sf	
Subtotal	85.56 ac.	1,118,099 sf	
Parks & Open Space Uses			
Park (P)	12.59 ac.		
Open Space (OS)	4.70 ac.		
Subtotal	17.29 ac.		
Other			
Right of Way (ROW)	31.50 ac.		
Total	297.35 ac.	901 du/1,118,069 sf	100%

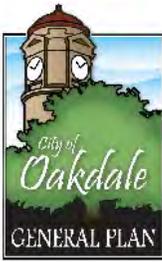
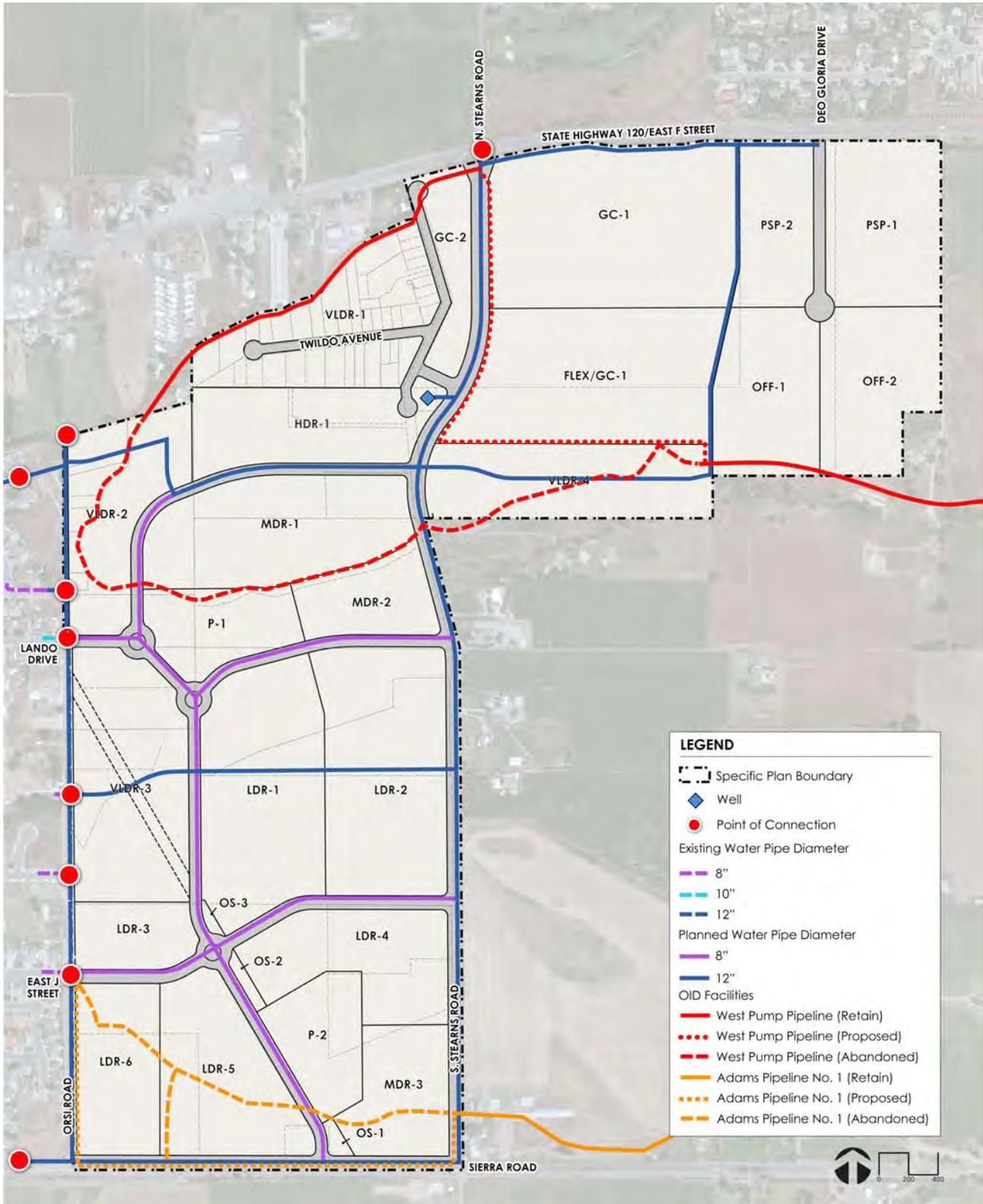
Note: Unit and square footage yields for Flex Use/General Commercial (FLEX/GC) calculated assuming its primary use. FLEX/GC is also designated a secondary use of HDR and may develop as the primary use, the secondary use, or as a mix of the primary and secondary uses.

1.6.2 Water Infrastructure

A looped system of 12 inch diameter pipe is planned to connect with the existing water system at the intersections of South Stearns Road and Highway 120/East F Street, East G Street and Orsi Road, and Sierra Road and Orsi Road. Other service mains and connection points may be 8 inch or 10 inch as directed by the City at the time of development. SPSP offsite improvements include infrastructure extension from the intersection of Sierra Road and Orsi Road to connect to the 12 inch main in Sierra Road.

OID maintains easements for two pipelines located within the SPSP area, which includes the West Pump Pipeline and the Adams Pipeline #1 (see **Figure 1-2** Backbone Potable Water Infrastructure). OID has indicated that both pipelines must continue to supply water in perpetuity, but that they may be relocated to accommodate development of the SPSP.

A portion of the West Pipeline will be relocated into a linear open space parcel along the eastern edge of South Stearns Road. Upon relocation, this pipeline will maintain its connection to the north of Highway 120/East F Street providing irrigation water to the Oakdale Golf and Country Club. The Adams Pipeline #1 will be relocated to linear open space parcels along the western edge of South Stearns Road and the northern edge of Sierra Road. Upon relocation, this pipeline will continue to provide irrigation water to properties south of Sierra Road. OID has indicated that the western-most segment of this pipeline from its southern spur to Orsi Road can be abandoned. Should development proceed prior to the ability to relocate and abandon the existing alignment of either pipeline, individual projects will be required to coordinate with OID regarding construction activity near the pipelines and/or the relocation of the facilities. As existing landowners in the plan area connect to the City water system, existing wells will be required to be sealed per Stanislaus County Department of Environmental Resources regulations. **Table 1-4** provides additional details regarding water supply pipelines that would be installed under the SPSP. In order to support water supply within the SPSP area, one new water supply well would also be installed within the CCSP area (City of Oakdale, 2012c).



Source: Stanislaus County, 2009; ESRI, 2011; City of Oakdale, 2008; Atkins, 2011; and E&A, 2012
Date Revised: June 26, 2012

City of Oakdale
SPSP BACKBONE POTABLE WATER INFRASTRUCTURE
Figure 1-2

**TABLE 1-4
SPSP PROPOSED IMPROVEMENTS**

SPSP Improvement Number	Description
RNW1	Install 12 inch main in Parcel VLDR-4 to close loop between 12 inch main in South Stearns Road and 12 inch main in Mixed Use Corridor Phase.
RNW2	Install 12 inch main in Orsi Road between Sierra Road and J Street.
RNW3	Install 12 inch main in Orsi Road between Lando Drive and the north SPSP area boundary.
RNW4	Connect to existing 12 inch line in Orsi Road at J Street, Adams Creek Way, Lando Drive, East G Street and near the Sierra Road and Orsi Road intersection.
RNW5	Install 12 inch line in South Stearns Road between the northern boundary of Parcel VLDR-4 and Potential NCC Phase boundary.
RNW6	Connect to existing 8 inch line at Cow Creek Drive.
RNW7	Install portion of 12 inch main in Sierra Road between the connection point just west of Orsi Road and eastern edge of Residential Neighborhood Phase.
RNW8	Install north 12 inch main between Orsi Road and South Stearns Road.
RNW9	Install portion of south 12 inch main between Orsi Road and South Stearns Road that is within the Residential Neighborhood Phase.
RNW10	Install north 8 inch main between Orsi Road and South Stearns Road.
RNW11	Install portion of south 8 inch main between Orsi Road and South Stearns Road that is within the Residential Neighborhood Phase.
RNW12	Install 8 inch lines in north-south Signature Street within Residential Neighborhood Phase.

SOURCE: City of Oakdale, 2012b

1.7 Applicability of SB 610

SB 610, passed in 2001, requires completion of a WSA for certain categories of development projects. Projects subject to WSA requirements are identified in Water Code Section 10912, and include projects that fall under the following categories:

- Residential development of more than 500 dwelling units;
- Shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
- Commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
- Hotel and/or motel having more than 500 rooms;
- Industrial, manufacturing, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area;
- A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project.

As discussed above, the CCSP would involve 935 new housing units and 710,450 square feet of commercial/office space. Therefore, the CCSP is subject to SB 610 requirements. Similarly, the SPSP

would involve 716 new housing units and 611,032 square feet of commercial space. Therefore, the SPSP is subject to SB 610 requirements.

1.8 Water Rights

California's system of water rights, which is promulgated by the State Water Resources Control Board (SWRCB), focuses primarily on surface water. Therein, surface water rights are defined as, "a legal entitlement authorizing water to be diverted from a specified source and put to beneficial, non-wasteful use" (SWRCB, 2013). Surface water rights are categorized as either riparian rights, which are generally available to the owners of land parcels that are located adjacent to a natural surface water body, and appropriative rights, which provide access to water based on a hierarchy of priorities and permitting system. The City does not maintain surface water rights.

Groundwater in California may be classified as subterranean streams, underflow of surface water, or percolating groundwater. The former two categories are subject to regulation by the State Water Resource Control Board as surface water, whereas California maintains only limited regulations over the third category. Landowners whose property overlies a percolating groundwater aquifer may use it on an equal and correlative basis. Non-overlying groundwater pumpers are subject to a hierarchy of priorities. Generally, limits on percolating groundwater pumping are only applicable to groundwater basins that have undergone an adjudication process. Within adjudicated basins, groundwater rights of all groundwater users are determined by court order. However, the groundwater basin underlying the specific plan areas has not been adjudicated. State law permits the City to use water from the groundwater basin subject to overlying groundwater pumpers use and priority of non-overlying groundwater pumpers..

2.0 City of Oakdale Urban Water Management Plan

The Urban Water Management Act, as amended, requires urban water suppliers providing water to more than 3,000 customers or supplying more than 3,000 acre-feet per year of water, to prepare and adopt an Urban Water Management Plan (UWMP)/update every five years. In January 2009, the City completed an UWMP pursuant to these requirements, which describes and evaluates the existing water system and historical and projected water use, evaluates current and projected water supply reliability, evaluates demand management measures, and provides water shortage contingency plans.

SB 610 requires the water supplier to make a determination of the sufficiency of the groundwater from the basin to be used to supply the project. If a determination that includes the project was included in an UWMP, no further data is required. With respect to the CCSP and SPSP, water demand for these plan areas was not explicitly calculated within the City's 2009 UWMP. While the CCSP and SPSP were not explicitly named in the UWMP, the growth assumptions of the UWMP are consistent with the General Plan and both specific plans. Thus, the UWMP accounts for sufficient water supply to meet demands of both specific plans, in addition to other commitments identified in the General Plan.

2.1 UWMP Identified Water Supply

As discussed in the 2009 UWMP, City water supplies are drawn solely from groundwater from the Modesto Groundwater Subbasin, which is not currently adjudicated. Based on information contained in the 2009 UWMP, groundwater contours that were developed from Spring 2000, identify a generally east to west groundwater flow direction within the subbasin, with recharge occurring between the Stanislaus and Tuolumne Rivers. The UWMP presents some evidence that groundwater levels may have been declining in the past, however more recent data , shows groundwater level recovery and overall stability. (City of Oakdale, 2009)

The City does not purchase or distribute surface water or other water supplies within its service area. Under current and projected planning, including implementation of the proposed specific plans, the City does not plan to implement any purchase or other supply of surface water in support of its municipal water deliveries. Therefore, only groundwater supplies are considered in this analysis. **Table 2-1** provides a summary of existing groundwater wells maintained by the City.

**TABLE 2-1
CITY OF OAKDALE GROUNDWATER WELLS AND CAPACITIES**

Well Number	Status	Well Capacity (gpm)
1	Destroyed	
2	Active; Season	600
3	Active; Year Round	1,800
4	Active; Year Round	1,600
5A	Active; Year Round	2,000
6	Active; Year Round	2,100
7	Active; Year Round	2,100
8	Active; Year Round	3,000
9	Inactive	2,000
Total		15,200

SOURCE: 2009 UWMP

Table 2-2 provides a summary of the City’s sole water supply source, which is groundwater.

**TABLE 2-2
SUMMARY OF HISTORIC AND ANTICIPATED FUTURE WATER
SUPPLY SOURCES TO THE CITY OF OAKDALE**

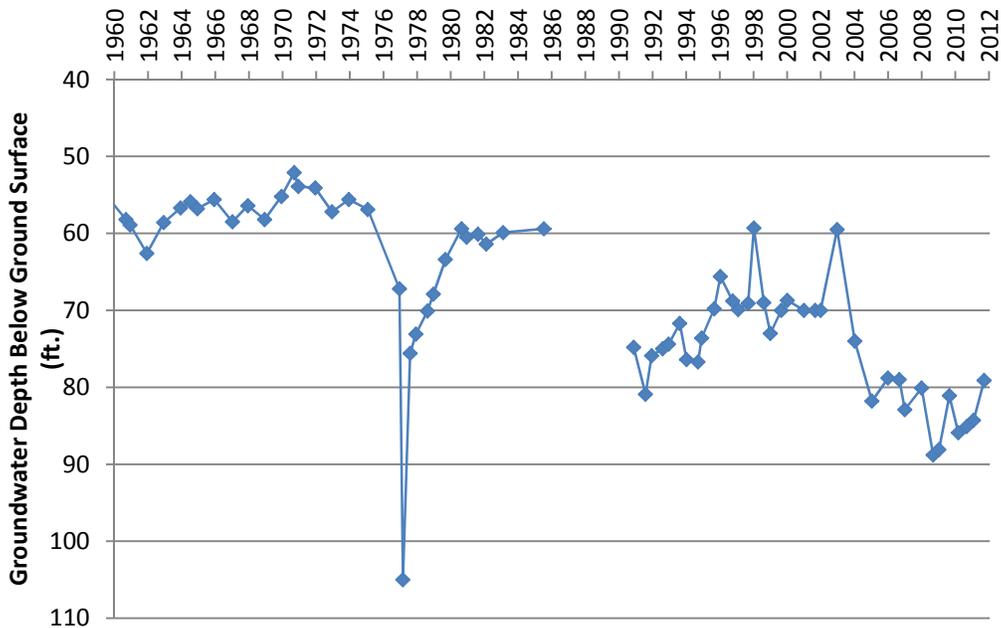
Water Source	Water Area	Supply	Facility Type	Water Permit/	Right/ License	Annual Maximum Entitlement	Supply	Historic Maximum Yield (AF/Y)
Pumped Groundwater	City of Wells	Oakdale	Groundwater Wells	N/A		N/A		5,530

DWR tracks groundwater levels via a series of monitoring wells located in and around the City. A review of available well data indicates that groundwater levels located south of the Stanislaus

River have shown a general decline over the last 20 years. For example, as shown in **Figure 2-1**, groundwater levels along the southern portion of the City have generally declined from 50 to 60 feet below ground surface (bgs) during the 1960s and 1970s (except for during 1977, a critically dry year, when levels temporarily dropped to 106 feet bgs), to approximately 80 to 90 feet bgs during the last decade. Near the CCSP area, at the northwest corner of the intersection of Crane Road and Patterson Road, the situation is similar. As shown in **Figure 2-2**, until the mid-1980s, groundwater levels fluctuated but generally rebounded to around 75 feet bgs, but have decreased to below 90 feet bgs during recent years, dropping to as low as 108 feet bgs in 2010, but again rebounding to nearly 90 bgs in 2012. Data sets from other wells are less complete, but most show similar trends and confirming a stable groundwater system.

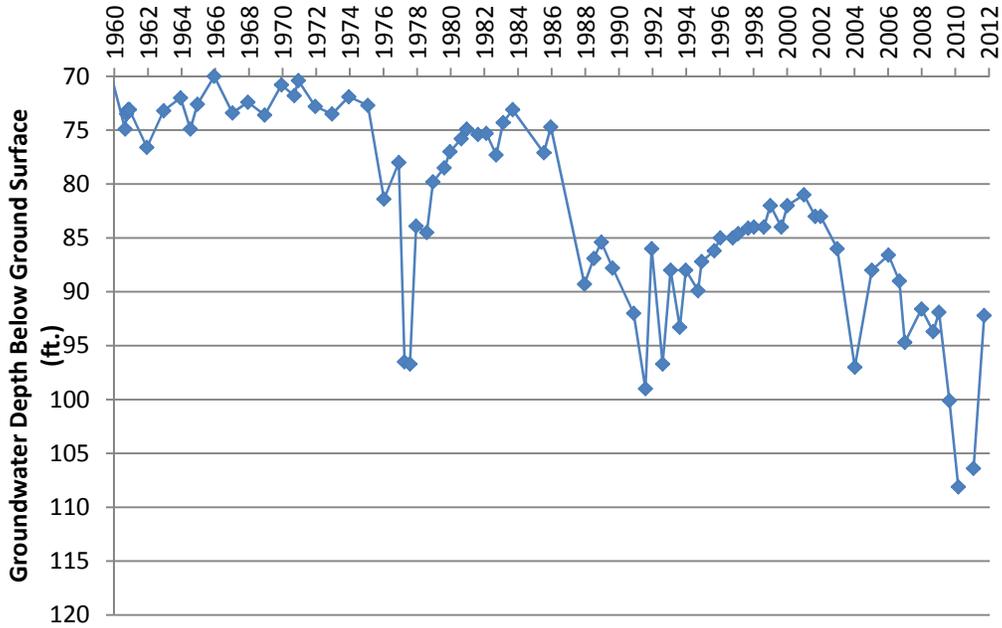
Travelling north, the decline in groundwater levels appears to be muted to non-existent. For example, immediately north of the Stanislaus River at the southern end of Libirini Ave., groundwater levels have remained relatively constant since 1995, between about 18 and 28 feet bgs. (**Figure 2-3**). Further north, along River Oaks Drive, at about the midpoint between Oak View Drive and Rodden Road, groundwater levels show fluctuation but overall have tended to rebound after periods of drawdown, generally remaining between 95 and 105 feet bgs with a handful of outliers (**Figure 2-4**).

Based on the most current data, the groundwater levels within the subbasin relied upon by the City are relatively stable. The City General Plan also requires an implementation program that regularly updates and adheres to the groundwater management plan for the City and surrounding area and agencies. (City of Oakdale, 2012)



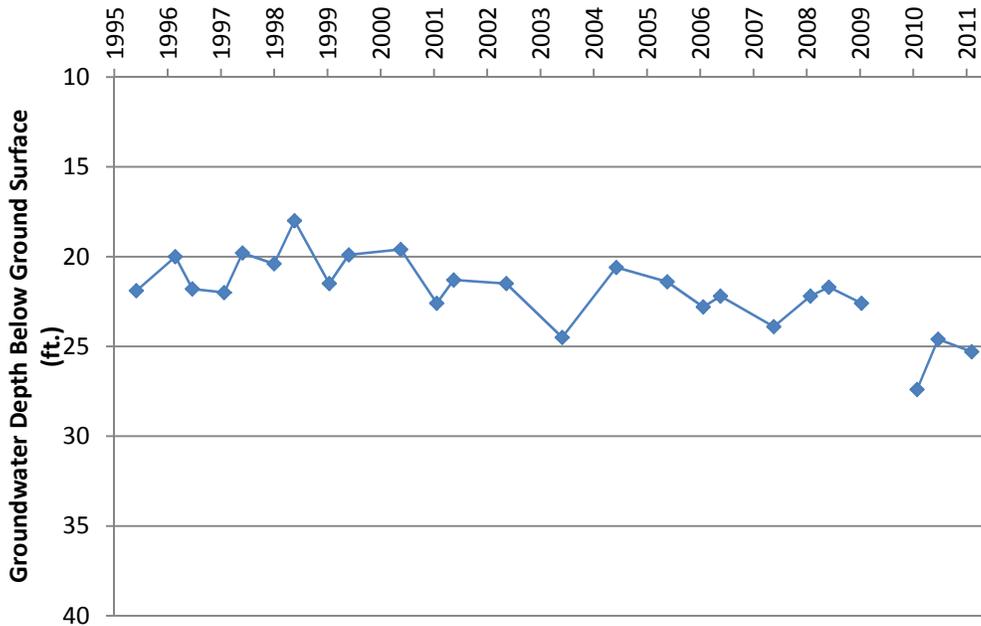
Source: DWR, 2012; Well No. 02S10E22A001M

Figure 2-1
Groundwater Levels South of the Stanislaus River, Southwest of Intersection of Greger Street and Kaufman Road



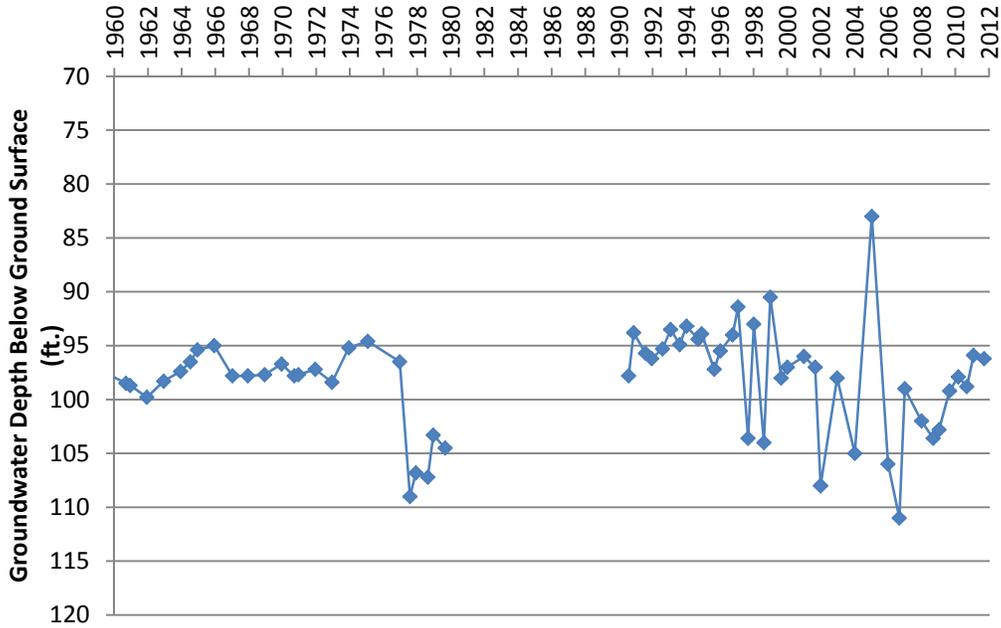
SOURCE: DWR, 2012, Well No. 02S10E28E001M

Figure 2-2
Groundwater Levels South of the Stanislaus River, Northwest Corner of Crane Road and Patterson Road



SOURCE: DWR, 2012, Well No. 02S10E10M002M

Figure 2-3
Groundwater Levels Immediately North of the Stanislaus River, Southern End of Libirini Ave



SOURCE: DWR, 2012, Well No. 02S10E01E001

Figure 2-4
Groundwater Levels North of the Stanislaus River, River Oaks Drive Between Oak View Drive and Rodden Road

Note that treated effluent from the City’s WWTP is discharged into groundwater percolation basins, which support recharge into the underlying aquifer. As identified in the 2009 UWMP, the volume of treated wastewater percolated to the subsurface in 2005 was 1,950 AFY. This was projected to increase to 3,760 AFY by 2023. However, direct reuse of recycled water is not presently being considered by the City in order to supplement existing groundwater supplies. While this volume of water is expected to contribute to recharge of the aquifers underlying and in the vicinity of the City, recycled water is not anticipated to be utilized within the planning horizon considered for the proposed project. Therefore, recycled water is not considered as an existing or potential water supply source to the City.

Table 2-3 provides a summary of historic water (i.e., groundwater) use for the City of Oakdale. Water usage values are provided for the last five years where data are available, in accordance with California Government Code Section 65352.5. This data was provided by the City, based on historic pumping and distribution records, to the extent that such records were available. Pumping records were available for all years shown, however, distribution records were available only for 2007 and 2010. Therefore, distribution volumes for other years have been estimated based on pumped groundwater volume and anticipated distribution system losses of approximately 6.3%. As shown, water supply and delivery varied annually, with total groundwater extraction ranging from 3,898 AFY in 2007, to 5,530 AFY in 2006. Similarly, total water deliveries ranged from 3,584 AFY in 2007 to 5,181 AFY in 2006.

**TABLE 2-3
HISTORIC WATER SUPPLY AND DELIVERY VOLUMES, 2005-2010 (AF/Y)**

Category	2005	2006	2007	2008	2009	2010
Water Supply: Groundwater Wells	4926	5530	3898	5257	4662	4714
Water Delivery ¹ (Total)	4615	5181	3584	4926	4368	4499

1. Water delivery data were available for 2007 and 2010 only, based on City records and state filings. Water delivery data were therefore estimated based on expected average distribution loss ratios for remaining years.

2.2 UWMP Adequacy of Supply

The City's UWMP included a reliability assessment that discussed potential variability in the City's water supplies caused by water quality and climatic factors. The City's water supply, as identified in the 2009 UWMP, is based on the total capacity of the City's existing wells. As such, there is not expected to be a reduction in the City's normal water supplies for any condition including normal, dry, or multiple dry water years. **Table 2-4** summarizes current and anticipated future water supply and demand as identified in the 2009 UWMP. As shown, available capacity is anticipated to be sufficient to meet future demands during normal, single dry, and multiple dry year periods.

Note that while the UWMP did not explicitly include the CCSP or the SPSP, it did implicitly include growth that is proposed in the specific plans through the General Plan Assumptions. More specifically, the supplies identified in the UWMP are in excess of anticipated water demand within the City, based on current planning forecasts and also including the CCSP and the SPSP. The City's 2009 UWMP provides water demand estimates on a five year increment, based on a 3% annual population growth rate. The water use projections contained in the UWMP assume per capita water usage of 0.228 acre-feet per year. As noted previously, while the CCSP and SPSP were not explicitly named in the UWMP, the growth assumptions of the UWMP are consistent with the 2030 General Plan and both specific plans. Thus, the UWMP accounts for sufficient water supply to meet demands of both specific plans, in addition to other commitments identified in the General Plan.

The UWMP relies on higher population projections for calculating water demand than those included in the General Plan, which are the current projected growth rates. Based on a General Plan buildout population of 40,445, and assuming a per capita water usage consistent with that assumed for the UWMP, water use upon 2030 General Plan and CCSP/SPSP buildout would be 9,240 AFY. This is approximately 1,410 AFY less than the total water supply identified in the UWMP (10,650 AFY; refer to **Table 2-4**). However, additional pump capacity has come online since completion of the UWMP, as discussed below for the demand and supply analysis.

**TABLE 2-4
UWMP RELIABILITY ASSESSMENT**

Year	Water Year Scenario	Demand, AFY	Supply, AFY	Surplus, AFY	Surplus as Percent of Supply	Surplus as Percent of Demand	Supply as Percent of Normal
2005	Normal	4,930	10,650	5,720	54%	116%	100%
	Single Dry	4,930	10,650	5,720	54%	116%	100%
	Multiple Dry Year Period Starting in 2006						
	2006	5,087	10,650	5,563	52%	109%	100%
	2007	5,244	10,650	5,406	51%	103%	100%
	2008	5,401	10,650	5,249	49%	97%	100%
	2009	5,558	10,650	5,092	48%	92%	100%
2010	2010	5,715	10,650	4,935	46%	86%	100%
	Normal	5,715	10,650	4,935	46%	86%	100%
	Single Dry	5,715	10,650	4,935	46%	86%	100%
	Multiple Dry Year Period Starting in 2011						
	2011	5,897	10,650	4,753	45%	81%	100%
	2012	6,079	10,650	4,571	43%	75%	100%
	2013	6,261	10,650	4,389	41%	70%	100%
2015	2014	6,443	10,650	4,207	40%	65%	100%
	2015	6,625	10,650	4,025	38%	61%	100%
	Normal	6,625	10,650	4,025	38%	61%	100%
	Single Dry	6,625	10,650	4,025	38%	61%	100%
	Multiple Dry Year Period Starting in 2016						
	2016	6,836	10,650	3,814	36%	56%	100%
	2017	7,047	10,650	3,603	34%	51%	100%
2020	2018	7,258	10,650	3,392	32%	47%	100%
	2019	7,469	10,650	3,181	30%	43%	100%
	2020	7,680	10,650	2,970	28%	39%	100%
	Normal	7,680	10,650	2,970	28%	39%	100%
	Single Dry	7,680	10,650	2,970	28%	39%	100%
	Multiple Dry Year Period Starting in 2021						
	2021	7,925	10,650	2,725	26%	34%	100%
2025	2022	8,170	10,650	2,480	23%	30%	100%
	2023	8,415	10,650	2,235	21%	27%	100%
	2024	8,660	10,650	1,990	19%	23%	100%
	2025	8,905	10,650	1,745	16%	20%	100%

SOURCE: 2009 UWMP

3.0 Specific Plan Demand and Supply Analysis

Two additional groundwater wells would be installed, one under each specific plan, to augment the existing system and alleviate the need for operation at higher well capacities, as well as storage facilities, distribution pipelines, monitoring equipment and backup power generators. Agricultural and other existing and planned land uses will also require reliable water supplies for crops, food

processing and other non-domestic use. New or expanded water supplies and facilities as discussed above will be required to provide reliable water supplies for implementation of the CCSP and SPSP.

The City of Oakdale's groundwater supplies are finite but renewable. The long term sustainability of these supplies is dependent upon both natural conditions (e.g. climate, soil permeability, topography and hydrogeology) and water supply management practices aimed at the distribution, conservation, reuse, and enhancement of supplies, including groundwater recharge efforts and implementation of best management practices (BMP). As discussed above, buildout of the CCSP and the SPSP, when combined with other built-out, planned growth, would result in a total annual water demand of approximately 9,240 AFY. This volume of water represents approximately 87% of the total water supply capacity that is currently available to the City: 10,650AF/Y. This volume of water would be available to the City during all water year types, including normal, single-dry year, and multiple-dry years. Within this context, water demand and supply is discussed for the CCSP and the SPSP areas below.

3.1 Crane Crossing Specific Plan Proposed Water Supply and Demand

This WSA assumes that existing on-site water wells and OID supply systems would be abandoned in accordance with City policy, as development of the CCSP area occurs. All water would be supplied to the CCSP area by existing and proposed City infrastructure. Implementation of the CCSP will require construction of additional water infrastructure, as described previously, to adequately serve the proposed uses. New facilities include backbone infrastructure ranging from 8 inch to 12 inch and an additional groundwater well to be located in the CCSP area. The proposed water infrastructure will connect to existing pipelines that range from 6 inch to 12 inch in diameter. Existing OID facilities will also be abandoned, retained, and realigned as buildout of CCSP occurs. The proposed infrastructure system has been designed to adequately serve the proposed uses in the CCSP. An offsite improvement for implementation of CCSP includes either replacing an existing 8 inch main in Poplar Street or installing a parallel 12 inch main along this same segment of street.

The total volume of water supply identified above (10,650 AFY) would be sufficient to meet the demands of the CCSP, within the framework and context of the 2030 General Plan, including General Plan buildout through 2030. For example, the CCSP would result in approximately 2,659 new residents, or 607 AF/Y based on the 2009 UWMP demand projection rates (City of Oakdale, 2009). Together, this and buildout of the SPSP would require a total of approximately 1,150 AFY of water. Together with other planned growth, total demand would reach 9,240 AFY through 2030, or approximately 4,500 AFY over current water demand levels. These volumes are within the identified total water supply available through 2030, of 10,650 AFY, as discussed above.

3.2 Sierra Pointe Specific Plan Proposed Water Supply and Demand

This WSA assumes that existing on-site water wells and OID supply systems would be abandoned in accordance with City policy, as development of the SPSP area occurs. All water would be supplied to the SPSP area by existing and proposed City infrastructure. Implementation of the SPSP will require

construction of new water infrastructure, as described previously. New facilities will include new 6 inch to 12 inch water pipelines, as well as an additional groundwater well for the northern neighborhood park site, are proposed. Existing OID facilities will also be abandoned, retained, and realigned as buildout of SPSP occurs.

The total volume of water supply identified above (10,650 AFY) would be sufficient to meet the demands of the SPSP, within the framework and context of the 2030 General Plan, including General Plan buildout through 2030. For example, the SPSP would result in approximately 2,378 new residents, or 543 AF/Y, based on demand projection rates contained in the 2009 UWMP. Together, this and the CCSP would require approximately 1,150 AF/Y of water, upon full buildout. Together with other planned growth, total demand would reach 9,240 AFY through 2030, or approximately 4,500 AFY over current water demand levels. These volumes are within the identified total water supply available through 2030, of 10,650 AFY, as discussed above.

4.0 Adequacy of Supply

As discussed previously, SB 610 requires the City (i.e., the water supplier) to make a determination regarding the sufficiency of groundwater from the basin to be used to supply the proposed specific plans. As discussed in the 2009 UWMP, historic basin declines have been identified, however, recent well monitoring data sets show higher groundwater depths in certain areas, as compared to 2000 (see prior discussion and **Figure 2-1** through **2-4**). Monthly well monitoring is ongoing, and the UWMP identifies various recommended actions to secure a more complete understanding of local groundwater hydrology. However, based on available information including historic pumping and available groundwater level data, the City finds that groundwater supplies identified above would be sufficient to meet demand for the CCSP and SPSP areas through buildout, in 2030. During single and multiple dry years, no reduction in groundwater supply would occur as groundwater supplies may range in depth depending on water year type but is not vulnerable to dry year conditions such as experienced with surface water supplies. Sufficient groundwater supply would be available to meet demands of the specific plan areas. As shown in **Table 4-1**, a surplus of at least 1,140 AFY would be available during all water years, including normal, single dry, and multiple dry water years. Additionally, two new wells would be installed, one within each specific plan area, which would further increase water supply available to the City, and support increased reliability including during normal and dry periods.

**TABLE 4-1
ADEQUACY OF SUPPLY, BASED ON BUILDOUT WATER SUPPLY AND DEMAND**

Year	Water Year Scenario	CCSP Demand, AFY	SPSP Demand, AFY	Total General Plan + Specific Plan Demand, AFY	Supply, AFY *	Surplus, AFY
Buildout	Normal	607	543	9,510	10,650	1,140
	Single Dry**	546	489	8,559	10,650	2,091
	Multiple Dry**	516	462	8,084	10,650	2,566

* Represents minimum anticipated available supply. Additional proposed wells, one within the CCSP area and one within the SPSP area, would contribute additional supply beyond this identified level.

** Single dry year demands assume 10% reduction in water demand in comparison to normal conditions, due to conservation measures deployed during dry year conditions. Multiple dry year demands assume 15% reduction in water demand in comparison to normal conditions, due to conservation measures deployed during dry year conditions.

5.0 Conclusions

The CCSP and SPSP propose that these planning areas be developed so as to support new residential, commercial, office, and park and open space uses. Maximum additional demand imparted by buildout of the CCSP and SPSP would amount to 607 AFY and 543 AFY, respectively. These demands would be served by the City's existing water supply wells, which have a supply capacity of 10,650 AFY, as identified in the 2009 UWMP (City of Oakdale, 2009). The City's supply would be further enhanced by installation of one new well within the CCSP area and a second new well within the SPSP area. The City determines that existing and anticipated groundwater supplies would be sufficient to meet demand for the CCSP and SPSP areas through buildout, in 2030 during normal, single dry, and multiple dry years.

6.0 References

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