Water Infrastructure Plan Update

CAMINO REAL REGIONAL CRUA UTILITY AUTHORITY

Camino Real Regional Utility Authority

Doña Ana County, NM

FINAL PLAN

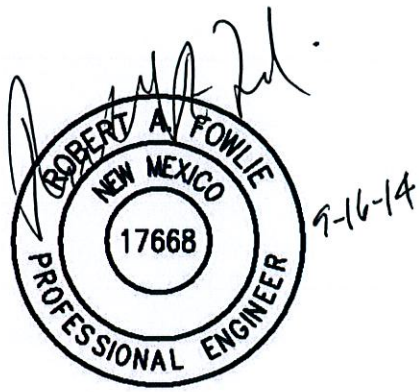
September 16, 2014

CDM Smith

FINAL PLAN

Water Infrastructure Plan Update

Camino Real Regional Utility Authority
Doña Ana County, NM



September 16, 2014

CDM Smith

CDM Smith

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Albuquerque, NM 87110
tel: 505 243-3200
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September 16, 2014

Kurt Moffatt
Operations Manager
Camino Real Regional Utility Authority
PO Box 429
Sunland Park, NM 88063

Subject: Final Camino Real Regional Utility Authority Water Infrastructure Plan Update,
CDM Smith Project No.: 36207-101831

Dear Mr. Moffatt:

CDM Smith Inc. (CDM Smith) is pleased to submit the Final CRRUA Water Infrastructure Plan Update for your use. The Water Infrastructure Plan Update contains an evaluation of CRRUA's existing water system and its ability to meet existing and future water demands in 20 years. The hydraulic model was updated to reflect system modifications since the original Water Infrastructure Plan and model was prepared in 2011 and to add the Border Service Area to the model.

The list of recommended projects and estimated total project costs included in the plan is intended to guide CRRUA in planning for future water infrastructure improvements. Additionally, the updated water model should be used as a tool to evaluate the impacts of proposed developments on the water system and to evaluate operational issues (low pressure or flow) that may arise.

We appreciate the opportunity to assist CRRUA in planning for their future water needs. Please contact CDM Smith at (505)243-3200 if you have any questions or concerns.

Sincerely,

Robert Fowlie, P.E.
Principal, Senior Project Manager
CDM Smith Inc.

Sarah C. Tuite, P.E.
Project Engineer
CDM Smith Inc.

cc: File
Steven Deal, P.E., NMED CPB

Executive Summary

The Camino Real Regional Utility Authority (CRRUA) provides water and wastewater service to over 18,000 people scattered over an area of 36 square miles in southern Doña Ana County from Santa Teresa to the border with Mexico. This Water Infrastructure Plan discusses the current state of CRRUA's water system and needs to ensure a reliable water supply into the future.

CRRUA's service area population is projected to increase from over 18,000 in 2010 to over 45,000 by 2034 due to planned residential and mixed use developments. The purpose of the Water Infrastructure Plan (Plan) is to evaluate the existing combined water system for its ability to meet existing and future water demands in 20 years (2034). The Plan includes the development of a hydraulic model of the existing water system to identify problem areas and enable sizing of future water system facilities. The Plan also presents a list of projects that CRRUA should undertake to meet existing and future demands, cost estimates, and a priority list of projects.

This Water Infrastructure Plan (Plan) is intended to be a planning tool for CRRUA. This document will assist CRRUA in indentifying future infrastructure needs for maintaining and improving their water system and for developing a capital improvement budget for the utility. This is meant to be a living document; therefore, the water model and Plan should be reviewed approximately every five years or when significant population growth or infrastructure developments have occurred in the water system.

Existing Water Systems

CRRUA's combined water system is made up of four separate service areas:

- City of Sunland Park
- Santa Teresa Community
- Santa Teresa Industrial Park (STIP)
- Border Area

For the purposes of this study, "existing system" is described as infrastructure that is in place during preparation of this Plan as well as capital improvement projects (CIP) that are under engineering design and/or construction and will be operational within the next five years. Based on the reported production capacity of CRRUA's operational wells, the water system currently has a total average day production capacity of 3.0 MGD and a peak day capacity of 8.9 MGD. Currently, Wells 4, 8A, and 30 are out of service. When these three wells are put back into service and when the new Well 14 is constructed, the average and peak day production capacities will increase to 4.3 MGD and 12.2 MGD, respectively.

All of the wells in the system have arsenic levels exceeding the EPA maximum contaminant level of 10 parts per billion (ppb). Since 2008, CRRUA has been working toward meeting requirements outlined in both the City of Sunland Park's Stipulated Final Order and Administrative Compliance Order (AO) issued by the New Mexico Environment Department to bring wells within the City of Sunland Park, Santa Teresa Industrial Park, and Santa Teresa Community into compliance with the Arsenic Rule.

The *CRRUA Treatment Facilities Preliminary Engineering Report* (CDM, 2009) outlined a plan to construct three arsenic treatment facilities to bring all of the wells into compliance with the EPA Arsenic Rule. Two regional arsenic treatment facilities located in Sunland Park and the Santa Teresa Industrial Park have been constructed to date. A third regional facility, located in the Santa Teresa Community service area will be under construction within the next year.

There are eight ground storage tanks in the water system that provide a total of 6.3 MG of storage. An additional 2.0 MG storage tank will be constructed as part of the Santa Teresa Community ATF project within the next year. A large portion of the storage capacity in the Santa Teresa Community and Santa Teresa Industrial Park Service Areas is reserved for fire storage, which limits storage for other uses.

CRRUA has three booster stations that are the main sources of supply for the Santa Teresa Industrial Park and Border Service Areas. The Santa Teresa Industrial Park Well 5 Booster Station has a total domestic pumping capacity of 750 gpm (1.1 mgd). The Santa Teresa Industrial Park Well 6 Booster Station was replaced in 2014 and has a new pumping capacity of 750 gpm. Both booster stations have fire pumping capacity of 2250 and 3000 gpm, respectively. The Border Service Area Booster Station provides domestic and fire supply to the entire Border Service Area.

CRRUA has over 60 miles of water mains in the water system. The Sunland Park Service Area is the largest system with approximately 40 miles of water main and the Santa Teresa Community Service Area has approximately 13.4 miles of mains. Most of the mains in the Sunland Park and Santa Teresa Community Service Areas are 6-inch and 8-inch mains and are PVC. The Santa Teresa Industrial Park Service Area is comprised of 10-inch and 12-inch mains due to the large fire flow requirements.

The service areas are currently interconnected through the following pipelines:

- The 8-inch main in NM 273 connects the Santa Teresa Community Service Area with the Sunland Park Service Area. A larger main would be better hydraulically to provide water to Sunland Park.
- The 12-inch main in Pete Domenici Hwy connects the Santa Teresa Industrial Park Service Area with the Santa Teresa Community Service Area.

Water System Modeling and Evaluation

A hydraulic model of CRRUA's existing water system was developed utilizing InfoWater to evaluate the existing water system and provide recommendations for improving the system to meet existing and future water demands. The hydraulic model includes the major system facilities such as wells, storage tanks, pressure reducing valves, and the main water transmission lines in CRRUA's water system.

Water demands used in the model were based on actual water supply data for 2013, as well as land use and parcel information. Future demands include the proposed developments of Rialta Mesa and Villa Valencia.

The results of the water system modeling and evaluation are as follows:

Water Production

- The current total MDD is 3,940 gpm. An additional 1,415 gpm production capacity is required for the overall CRRUA system including the Border service area to meet the current MDD with the largest well in each service area out of service.
- The City of Sunland Park Service Area is not capable of meeting existing MDD and cannot meet the existing ADD or MDD with the largest well out of service (firm capacity).
- Currently in the Santa Teresa Community, Well 19 has collapsed and has been installed with a temporary 400 gpm well pump. If the two existing wells remain operational and without considering CIP projects, this service area is able to meet the MDD. With all CIP projects considered, replacing Wells 30 and 19 and replacing the Well 8A control building; the Santa Teresa Community will meet the MDD with the largest well (Well 30) out of service.
- The Santa Teresa Industrial Park Service Area has a production deficiency of 524 gpm at MDD with the largest well out of service. This service area can meet existing MDD with the CIP project well 14 and the largest well out of service.
- The Border Service Area has a surplus supply of 640 gpm. This system is not currently connected to the other services areas within CRRUA's system.
- The projected total MDD in 2034 is 6,865 gpm. An additional 1,040 gpm production capacity is required for the overall CRRUA system to meet the projected future MDD with the largest well in each service area out of service (assumes all CIP projects have been implemented).
- The greatest production deficiency is in the Santa Teresa Industrial Park Service Area. This service area will require an additional 1,317 gpm of well production capacity to meet the projected MDD in 2034.
- The Sunland Park Service Area will require an additional 1,135 gpm in 2034. This could either come from additional wells or from the Santa Teresa Community Service Area. If wells are provided for the additional supply requirements; two wells each with a minimum capacity of 600 gpm are required to meet the projected MDD in 2034.
- With the addition of Wells 8A, Well 30, and replacement Well 19; the Santa Teresa Community system will have a surplus of 832 gpm in 2034. This surplus may be used to supplement the deficiency in the Sunland Park Service Area.

Water Storage

- The existing combined system currently has sufficient storage capacity to meet current demands based on the storage tank operations and fire reserve; however, additional storage is required for the Santa Teresa Industrial Park, Sunland Park, and Border Service Areas in 2034.
- The Sunland Park Service Area is showing a slight storage deficit of 0.22 MG to meet future needs in 2034.
- The Santa Teresa Community Service Area has approximately 0.56 MG of surplus storage during 2034 conditions.

- The new Santa Teresa Industrial Park ATF 2.0 MG storage tank has addressed the existing storage deficit in this service area; however, the service area has approximately 0.9 MG of storage deficit in 2034.
- The Border Service Area has sufficient storage capability for existing and future operational demands; however, additional 0.4 MG storage or supplemental fire flow from the Santa Teresa Industrial Park Service Area is necessary for fire protection in the Bi-National Industrial Park.

Booster Stations

- The Santa Teresa Industrial Park Well 6A Booster Station is capable of meeting existing and future PHD with the largest pump out of service. During peak hour times the storage tanks will be required to meet existing demands for the service area.
- The existing Santa Teresa Industrial Park Well 5 Booster Station is not capable of meeting existing or future PHD or future MDD with the largest pump out of service. As development occurs the capacity required for Well 5 Booster Station needs to be evaluated with respect to the proposed tank in the Santa Teresa Industrial Park and completed CIP projects to determine ultimate booster station capacity requirements.
- Additional information is required to further analyze the Border Booster Station; however, it currently meets the needs of existing demands and will meet foreseeable future demands.

Distribution System

- Install a 16-inch line along Airport Rd between Pete Domenici Highway and the Airport Road PRV station to connect the Santa Teresa Industrial Park and Santa Teresa Community Service Areas.
- Install a 12-inch transmission main loop through the future portion of Villa Valencia and connect the Edgemont subdivision to the 8-inch main in McNutt Rd (the majority of this project should be constructed by Villa Valencia developers).
- Replace the existing 8-inch line in Feather Moon Drive with a 12-inch line.
- Install a 12-inch main in Teresa Paseo Drive between Trevino Road and Country Club Road to alleviate pressure problems in the Casas Bellas neighborhood.
- Install a 12-inch line in 1st Street between Linda Vista Drive and the west end of 1st Street.
- Upsize the 8-inch main in McNutt Road between Laura Court and Aspen Drive.

Recommended Projects

Based on the hydraulic modeling and evaluation of CRRUA's water system, the following projects are recommended in order of priority:

1. Replace Well 30 in Santa Teresa Community
2. Replace Well 8A pump building and return well to service in Santa Teresa Community
3. Replace Well 19 in Santa Teresa Community

4. Replace Well 14 in Santa Teresa Industrial Park
5. Replace Well 4 in the City of Sunland Park
6. Install the 16-inch Airport Road water main
7. Install the 12-inch Villa Valencia loop line
8. Connect the 10-inch line at McNutt Road and the Edgemont subdivision
9. Replace the existing 8-inch line in Feather Moon Drive with a 12-inch line
10. Install a 12-inch line in Teresa Paseo Dr between Trevino Road and Country Club Road
11. Install a 12-inch line in 1st Street between Linda Vista Dr and the 12-inch main on the west end of 1st Street
12. Drill one new well in the Sunland Park Service Area
13. Drill two new wells in the Santa Teresa Industrial Park Service Area
14. Install a new 2.0 MG storage tank in the Santa Teresa Industrial Park Service Area
15. Upsize approximately 8,500 ft of 8-inch line in McNutt Road to a 12-inch line (from approximately Laura Court to Aspen Drive)

The estimated total construction costs include the estimated cost of construction and a 20 percent construction contingency. The estimated total project costs include the construction costs as well as engineering, permitting, administrative costs, fees, and NMGRT.

Table ES-1 Opinion of Probable Construction Costs

Description	Est. Raw Construction Costs	Construction Contingency (20%)	Est. Total Construction Costs	Engineering, Permitting, Administration, and Fees (18%)	Est. Total Project Costs (Includes NMGRT 6.375%)
1. Replace Well 30	$1,000,000	$200,000	$1,200,000	$216,000	**$1,510,000**
2. Replace Well 8A Pump Building	$410,000	$82,000	$490,000	$88,200	**$620,000**
3. Replace Well 19	$1,000,000	$200,000	$1,200,000	$216,000	**$1,510,000**
4. Replace Well 14	$1,200,000	$240,000	$1,440,000	$259,200	**$1,810,000**
5. Replace Well 4	$1,000,000	$200,000	$1,200,000	$216,000	**$1,510,000**
7. 16" Airport Road Line (8,000 LF)	$520,000	$104,000	$620,000	$111,600	**$780,000**
7A. 12" Villa Valencia Loop (9,100 LF)	**This line and crossing will be installed by the developer**				
7B. 12" Villa Valencia Loop (1,000 LF)	$60,000	$12,000	$70,000	$12,600	**$90,000**
8. 10" Connection to McNutt (2,000 LF)	$120,000	$24,000	$140,000	$25,200	**$180,000**
9. 12" Feather Moon Drive (5,500 LF)	$330,000	$66,000	$400,000	$72,000	**$500,000**
10. 12" Teresa Paseo Line (3,000 LF)	$180,000	$36,000	$220,000	$39,600	**$280,000**
11. 12" 1st Street Line (2,200 LF)	$132,000	$26,400	$160,000	$28,800	**$200,000**
12. Drill 1 new well in Sunland Park	$1,000,000	$200,000	$1,200,000	$216,000	**$1,510,000**
13. Drill 2 new wells in the STIP	$2,000,000	$400,000	$2,400,000	$432,000	**$3,010,000**
14. 2.0 MG Storage Tank in STIP	$1,100,000	$220,000	$1,320,000	$237,600	**$1,660,000**
15. 12" McNutt Road (8,500 LF)	$510,000	$102,000	$610,000	$109,800	**$770,000**
Total	**$10,562,000**	**$2,112,400**	**$12,670,000**	**$2,280,500**	**$16,000,000**

Contents

Appendices

Figures

Tables

Section 1
General

1.1 Background

The Camino Real Regional Utility Authority (CRRUA) provides and maintains the water production, treatment, storage, and distribution infrastructure to customere located in a 36 square mile area in southern Doña Ana County from Santa Teresa to the Texas and Mexican borders. CRRUA's water system is comprised of four smaller service areas that have been combined into one large regional utility. The service areas include:

- Santa Teresa Community,
- Sunland Park,
- Santa Teresa Industrial Park (STIP), and the
- Border Area.

The approximate service area population is currently over 18,000 people. The service area population is expected to grow over the next 20 years due to the recent construction of the Union Pacific Intermodal Facility, increased growth in the Industrial Parks, and increased residential and mixed use developments in the Santa Teresa and Sunland Park. Since the 2011 Water Infrastructure Plan was prepared by CDM Smith in 2011, CRRUA has constructed two regional arsenic treatment facilities (ATF) (Sunland Park ATF and Santa Teresa Industrial Park ATF) and will construct a third regional facility in 2014-2015 (Santa Teresa Community ATF) to comply with the EPA Arsenic Rule and Administrative Compliance orders issued by the New Mexico Environment Department (NMED).

1.2 Report Objectives

This Water Infrastructure Plan (Plan) is intended to be a planning tool for CRRUA. This document will assist CRRUA in indentifying future infrastructure needs for maintaining and improving their water system and for developing a capital improvement budget for the utility. This is meant to be a living document; therefore, the water model and Plan should be reviewed approximately every five years or when significant population growth or infrastructure developments have occurred in the water system.

The Plan is to update the 2011 Water Infrastructure Plan to include developments and infrastructure that have been constructed since 2011, add the Border Service area to the water model, and to evaluate the existing water system for its ability to meet existing and future water demands in 2034. The hydraulic model developed for the 2011 Plan has been updated to reflect the existing water system to identify problem areas and identify potential solutions to water production, distribution, and storage deficiencies. The Plan also presents a list of recommended projects to meet existing and future demands, cost estimates, and a priority list of projects.

1.3 Report Organization

The Plan is organized into the following sections:

Section 1 General: This section presents the project background, objectives of the report, and report organization.

Section 2 Project Planning Area: This section describes the project planning area and presents population projections for the 20-year planning period.

Section 3 Existing Facilities: This section describes the existing water system, including the water supply wells, storage facilities, and booster stations. This section also includes water usage, and future projected water demands at the end of the 20-year planning period.

Section 4 Water System Modeling: This section presents the results of the hydraulic analysis of the water system to meet existing and future demands. The section contains an evaluation of the water production, storage, booster station, and distribution system.

Section 5 Recommended Improvements: This section presents the recommended water system projects based on the results of the hydraulic model and evaluation in Section 4. This section also contains estimated construction and project costs and a priority list of projects.

1.4 Acronyms and Abbreviations

ADD	Average Daily Demand
AO	Administrative Compliance Order
ATF	Arsenic Treatment Facility
AWWA	American Water Works Association
CIP	Capital Improvement Projects
CRRUA	Camino Real Regional Utility Authority
DAC	Doña Ana County
DWB	Drinking Water Bureau
EPA	Environmental Protection Agency
EPEC	El Paso Electric Company
fps	Feet per Second
gpd	Gallons per Day
MCL	Maximum Contaminant Level
MDD	Maximum Day Demand
MG	Million Gallons
MGD	Million Gallons per Day
NMED	New Mexico Environment Department
PHD	Peak Hour Demand
ppb	Parts per Billion
PRV(s)	Pressure Reducing Valve(s)
psi	Pounds per Square Inch
PVC	Polyvinyl Chloride
STIP	Santa Teresa Industrial Park
UPRR	Union Pacific Railroad
WWTP	Wastewater Treatment Plant

Section 2
Project Planning Area

2.1 Project Location

CRRUA provides water service to customers within the City of Sunland Park, Santa Teresa Community, Santa Teresa Industrial Park (also referred to as Logistics Industrial Park or Intermodal Park), and the Bi-National Industrial Park and Border Crossing area located at the Santa Teresa Border Crossing into Mexico. CRRUA's total service area is made up of four smaller service areas: the Santa Teresa Community Service Area; Santa Teresa Industrial Park Service Area, City of Sunland Park Service Area, and Border Service Area. The location of CRRUA's service area is shown on **Figure 2-1**.

2.1.1 Planning Period

A 20-year planning period has been used for this study. This study will evaluate current and future water system requirements of the CRRUA water system.

2.1.2 Planning Area

The proposed planning area is CRRUA's service area as shown on **Figure 2-2**. The entire service area encompasses approximately 36 square miles.

2.2 Growth Areas and Population Trends

2.2.1 Growth Areas

Multiple residential and commercial developments are proposed in the CRRUA service area, The majority of the proposed developments are located in the Santa Teresa Industrial Park and and Santa Teresa Community Service Areas. The proposed developments [(1)] located within CRRUA's water system include:

The proposed **Rialta Mesa Development** is located northwest of the intersection of Pete Domenici Hwy and Hwy 9 (Colombus Rd) and includes 5,017 residential units. Water service for this propsoed development will be provided by the Santa Teresa Industrial Park System in combination with water infrastructure constructed by the developer. ATF. The developer, IDI Gazeley (formerly Verde Realty) has estimated a density of 3.2 residents per dwelling for this development.

[(1)]BHI, 2014

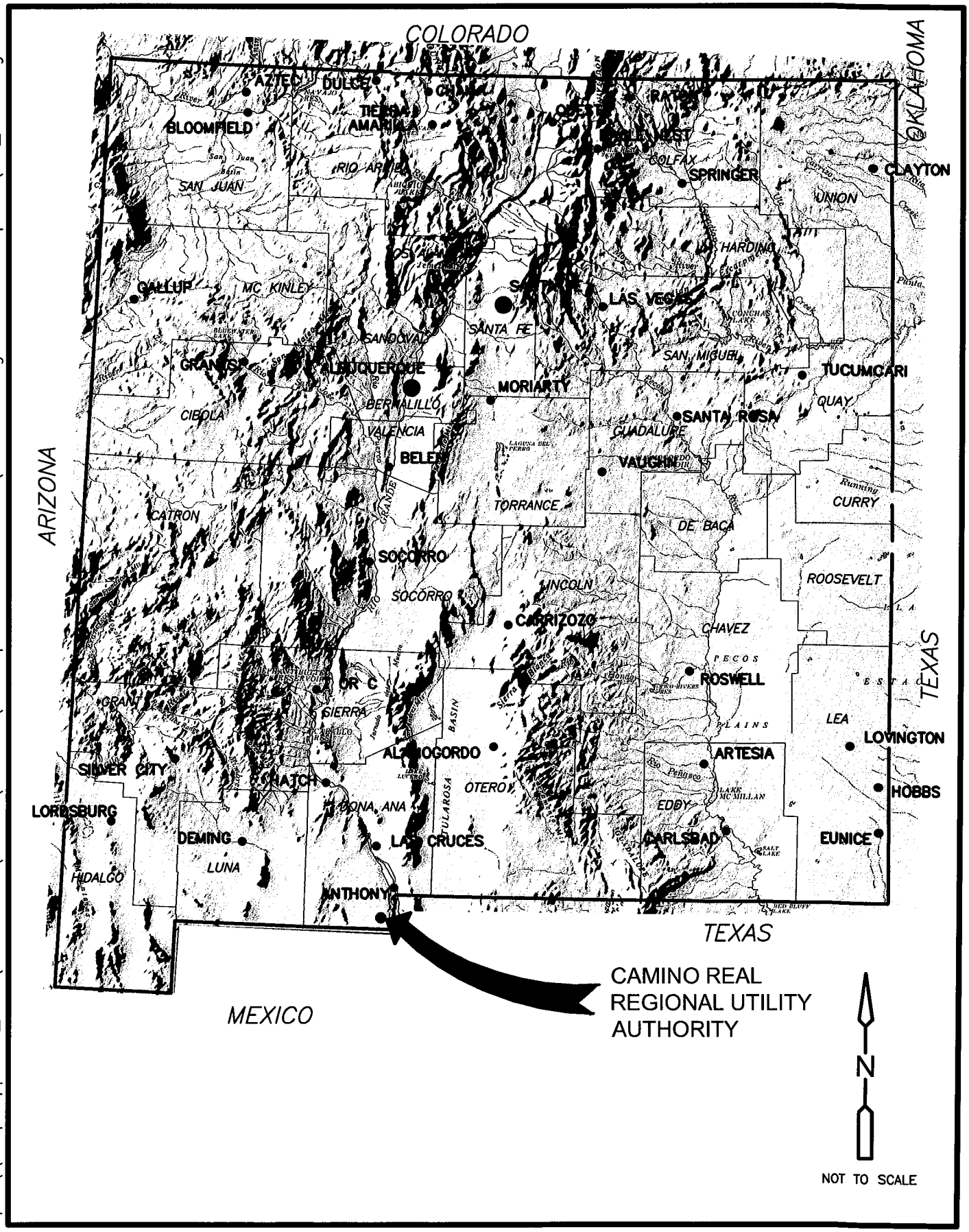

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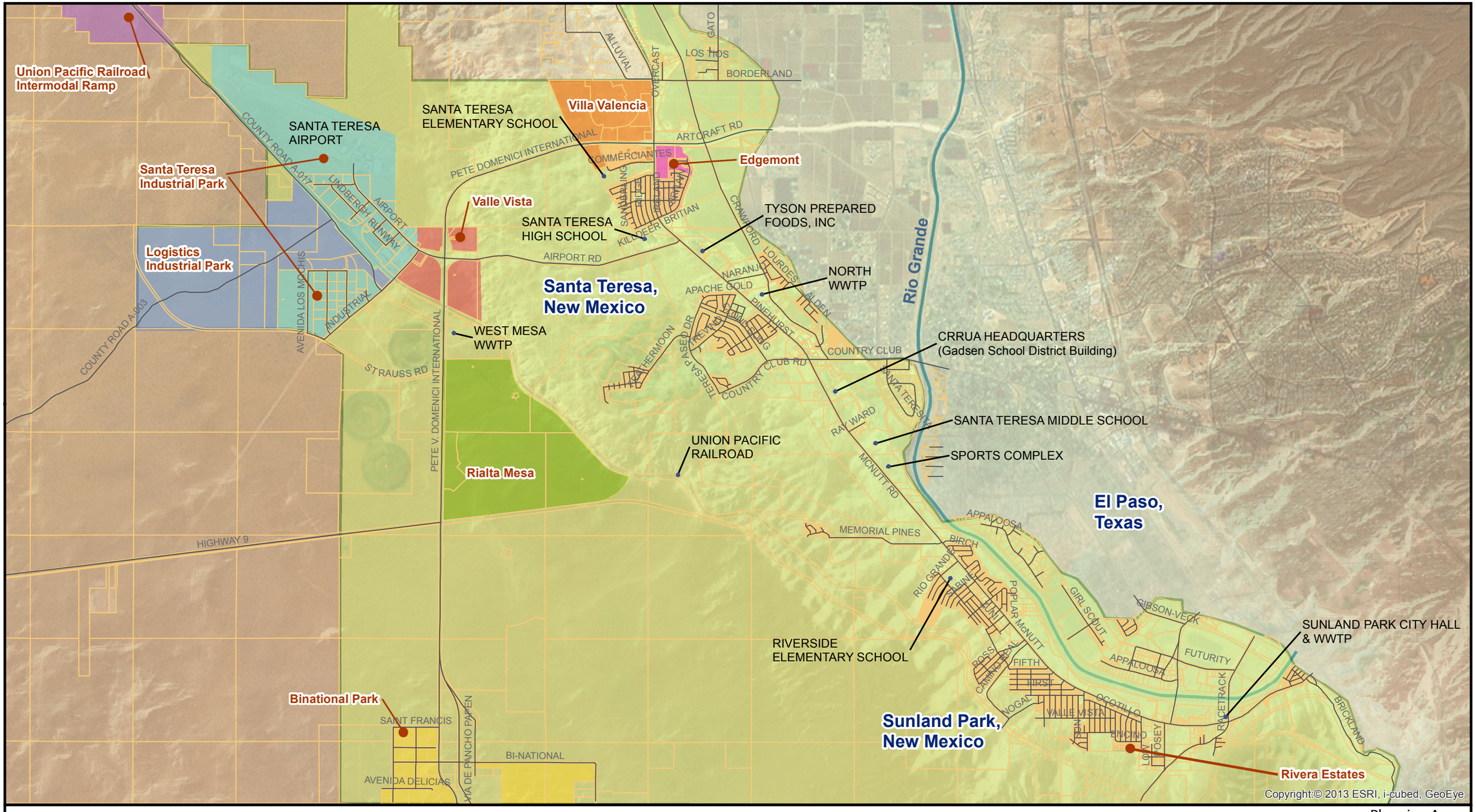
Figure No. 2-1
Project Location Map



Legend

- Parcels
- Planning Area Boundary

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Camino Real Regional Utility Authority
Water Infrastructure Plan

Planning Area
Figure 2-2

0 2,500 5,000 Feet

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The **Villa Valencia Development** is located on all four corners of the intersection of McNutt and Pete Domenici Hwy. Villa Valencia is broken down into smaller subdivisions including Valencia Hills Units 1 and 2 and Valencia Park Units 1, 2, 3, and 4, Water for this area is currently supplied by the Santa Teresa Industrial Park Service Area; however, portions can be served by the Santa Teresa Community Service Area if existing infrastructure is improved. Population density for Villa Valencia is assumed to be the same as Rialta Mesa at 3.2 persons per dwelling. The Villa Valencia Development includes the following:

- NW Quadrant – 1,043 residential lots, 600 multi-family units, and 232,000 sq ft of commercial as well as a school and 8 acres of parks.
- NE Quadrant – 147,900 sq ft of commercial.
- SW Quadrant – 375 residential lots, 54,000 sq ft of commercial and 1.23 acres of parks. To date, many of the residental lots have already been developed in this quadrant.
- SE Quadrant – 600 multi-family units. To date, many of the residental lots have already been developed in this quadrant.

The proposed **Logistics Industrial Park** is located west of the Santa Teresa Industrial Park includes 2,400,000 sq ft of industrial warehousing/manufacturing. This development will be served by the Santa Teresa Industrial Park Service Area.

Valle Vista Commercial Park (located at the corner of Pete Domenici Hwy and Airport Rd) includes 1,150,000 sq ft of commercial development. Valle Vista will aso be served by the Santa Teresa Industrial Park Service Area.

The **Bi-National Industrial Park** is located at the Border Crossing and includes 2,460,000 sq ft of industrial manufacturing. The Border Service Area will serve this industrial development.

The impacts that these proposed developments will have on the service area population are discussed in the following section.

2.2.1.1 Census Population Data

Four US Census Tracts (17.01, 17.05, 17.06, and 17.07) make up CRRUA's service area as shown on **Figure 2-3**. For each of the corresponding US Census Tracts, the 2000 and 2010 US Census populations, annual growth rates, and corresponding water service area are presented in **Table 2-1**.

The 2010 Census estimates the average household size in Sunland Park and Santa Teresa Community to be 3.63 and 2.88 persons per dwelling, respectively. The average household size for the the proposed Rialta Mesa and Villa Valencia developments is 3.2 persons per dwelling. At full build out, the Rialta Mesa and Villa Valencia communities will have estimated populations of 16,054 and 8,337, respectively, by the end of the planning period of 2034. Although the Logistics Industrial Park, Valle Vista Commercial Park, and Bi-National Industrial Park are commercial/industrial and will not contribute to increased residential population they will contribute to additional water demand.

As shown in **Table 2-1**, the population of the CRRUA service area increased by 2,542 from 2000-2010. This corresponds to an average annual growth rate of 1.6 percent for the entire service area.

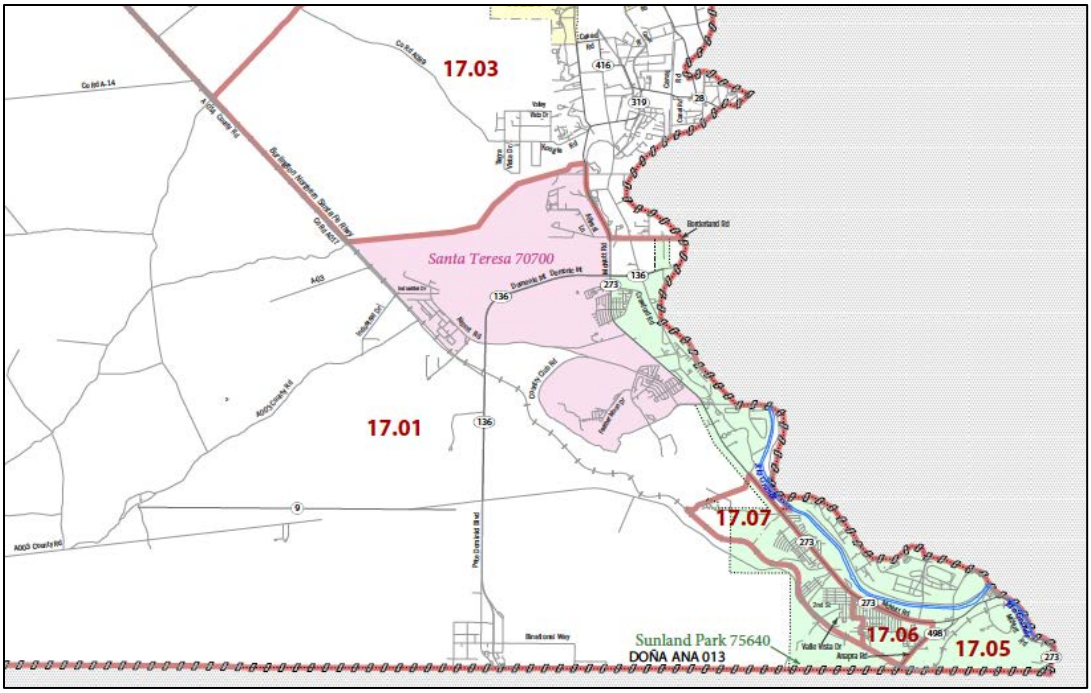

Figure 2-3 Census Tract Map Covering CRRUA's Water System (Source: US Census)

Table 2-1 Service Area Population 2000–2010

Census Tract [1]	2000 Census Population	2010 Census Population	Annual Growth Rate (%)	Corresponding Water Service Area
17.01	3,234	5,842	6.1	Sunland Park ST Community ST Industrial Park
17.05	3,491	3,192	-0.9	Sunland Park
17.06[2]	9,265	3,749	0.3	Sunland Park
17.07[2]		5,749		Sunland Park
Total Population and Average Growth Rate	**15,990**	**18,532**	**1.6**	
Doña Ana County (unincorporated)	75,349	84,305	1.13	
State of New Mexico	1,819,04	2,162,33	1.74	

1 – Source: US Census 2000 and 2010
2 – Tracts 001706 and 001707 were combined in the 2000 Census.

The highest annual growth rate from 2000 to 2010 occurred in Census Tract 17.01, which includes the Santa Teresa Community and the northern portion of the City of Sunland Park. This growth is largely due to residential development at the intersection of Pete Domenici Highway and McNutt Road (Hwy 273). Growth rates in the area of Sunland Park south of Country Club Drive show a decline in

population in Census Tracts 17.05 and minimal growth in Tracts 17.06 and 17.07.

In order to estimate future service area population that reflects current conditions, but also accounts for reasonable growth projections for the next 20 years, the following methodology was used:

1. The population of the City of Sunland Park and the Santa Teresa Community Service Areas (which includes portions of all four Census Tracts) are projected to grow at a 0.5 percent per year growth rate.

2. Separate components for population growth for the Rialta Mesa and Villa Valencia developments will be calculated based on full build out within the 20-year planning period. These projected populations were included in the projected service area population of the Santa Teresa Industrial Park Service Area.

3. Industrial developments including Logistics Industrial Park, Valle Vista Commercial Park, and Bi-National Industrial Park will only include additional commercial/industrial businesses which support residential population increases. These developments will also contribute to increased water demand through commercial/industrial water use.

The projected population of the CRRUA's service area in 2034 is presented in **Table 2-2** and graphically on **Figure 2-4**.

Table 2-2 Projected Service Area Population 2034

Year	City of Sunland Park	Santa Teresa Community[2]	Santa Teresa Industrial Park[1]	Total Projected Population
2034	20,388	17,003	7,910	45,302

1 – Villa Valencia (2,618 residential units with 3.2 persons per unit)
2 – Rialta Mesa (5,017 residential units with 3.2 persons per unit)

By 2034, the estimated population of the CRRUA service area will be approximately 45,000. The projected water demands associated with increased population and industrial/commercial development are discussed in Section 3.

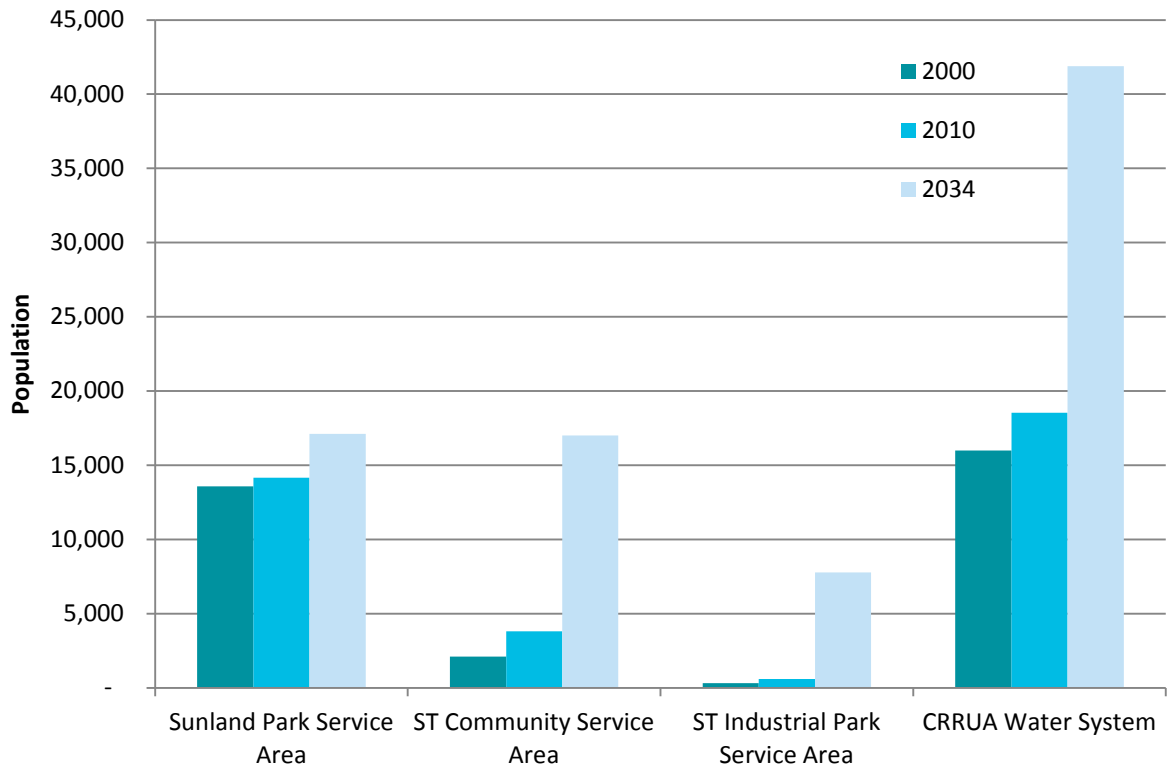

Figure 2-4 Population of Each Service Area in 2000, 2010, and 2034

The large population increases observed in the Santa Teresa Community and Santa Teresa Industrial Park Service Areas and the overall water system in 2034 are due to build out of the Rialta Mesa development. Plans for development in the Rialta Mesa area exist; however, to date none of the subdivisions have been constructed. It is not known when the land owner plans to begin construction and development. It is recommended that this plan be updated every 3-5 years to account for new growth patterns in the water system, especially in the Rialta Mesa area.

2.2.1.2 Estimated Interim Water System Population

Census data is only available every 10 years; however, in order to compare water consumption per capita (see Section 3.8) on a more frequent basis, the water system population for interim years 2008 and 2013 were estimated.

The population data for 2008 is based on the 2011 plan data provided by Sunland Park and the Santa Teresa Community. The population for 2013 was extrapolated using the following information:

- Geographically located residential water connections from Sunland Park AMR System and Water Meter Replacement Project (total connections from project: 4,606)
- Sunland Park 2012 U.S. Census Population Estimate
- Santa Teresa 2010 U.S. Census Population Estimate
- Sunland Park 2012 U.S. Census Population Estimate: people per household (3.6)

- Estimate of Villa Valencia population based on parcels in currently developed areas (not included in connections from AMR project)

Table 2-3 Estimated Interim Service Area Population, 2008 and 2013

Year	City of Sunland Park Service Area	Santa Teresa Community Service Area	Santa Teresa Industrial Park Service Area	Total Estimated Population
2008	12,501	4,396	-	16,897
2013	12,275	3,596	4,261	20,132

2.3 References

Bohannan Huston Inc. and Aegean Consulting LLC. 2014. *Draft West Mesa Wastewater Treatment Plant Preliminary Engineering Report.*

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Section 3
Existing Water System

CRRUA's water system is comprised of four separate service areas; the City of Sunland Park, Santa Teresa Community, Santa Teresa Industrial Park, and Border Area. **Currently, CRRUA's entire water system operates under Water System Number NM3502507**.

Figure 3-1 shows the locations of the service areas and existing infrastructure in CRRUA's system.

3.1 History and Description of Existing Systems

A description of each service area is provided in the following subsections. The existing infrastructure including treatment facilities, wells, tanks, booster stations, and planned Capital Improvement Projects (CIP) are identified for each service area. CIP are projects that were identified in the 2011 Water Infrastructure Plan and are expected to be constructed in the next five years.

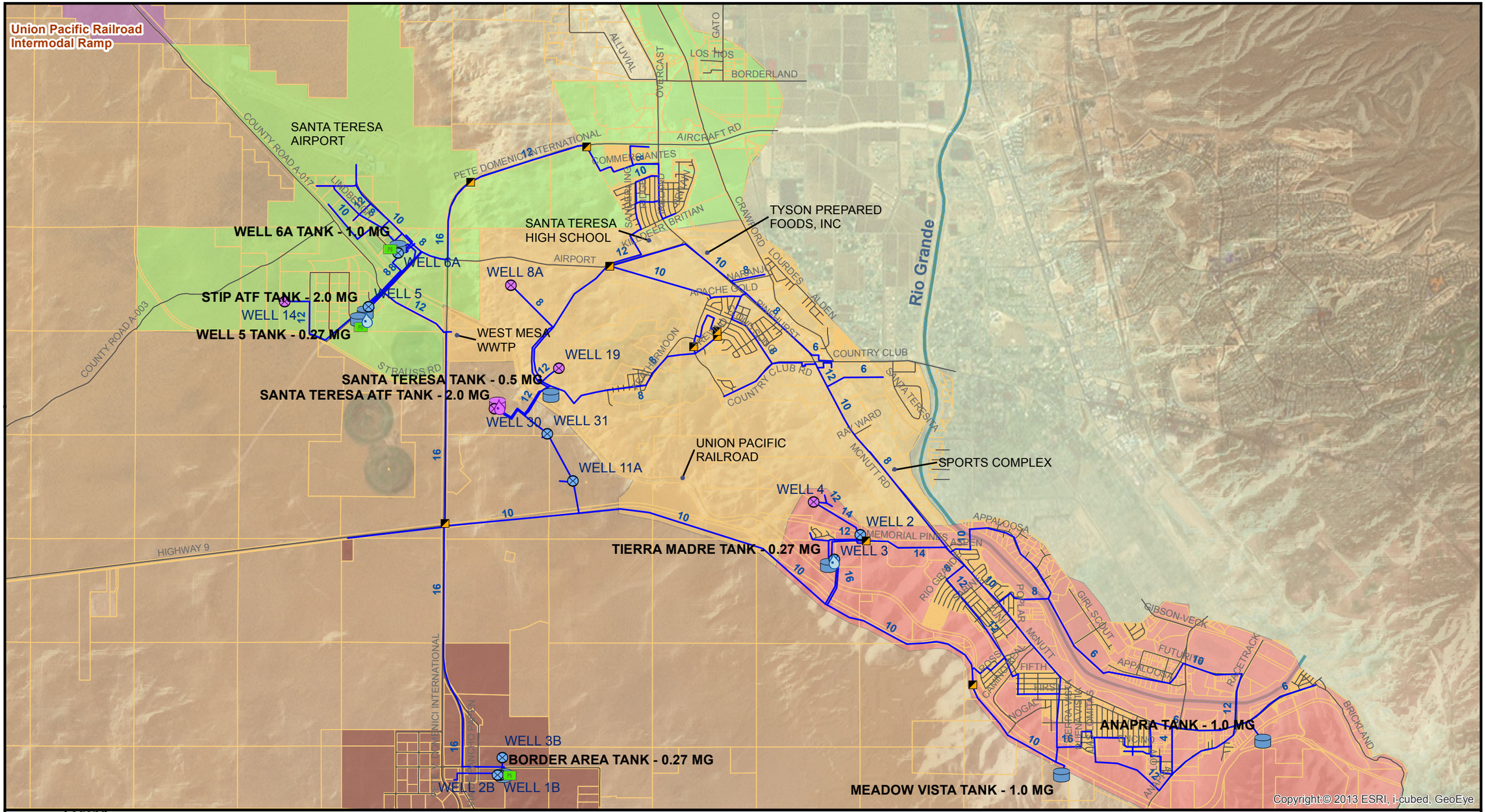
3.1.1 City of Sunland Park Service Area

As shown on **Figure 3-1**, the City of Sunland Park Service Area extends south along NM 273 from Memorial Pines Lane to the Anapra Tank. The City of Sunland Park Service Area (previous water system number NM3511807) consists of the following infrastructure:

- **Sunland Park Arsenic Treatment Facility** – Treatment capacity 2.7 MGD
- **Production Wells** – Well 2, Well 3, Well 4 (out of service), and Well 11A; total reported production capacity of 1,775 gallons per minutes (gpm) or 2.56 million gallons per day (MGD)
- **Storage Tanks** – Meadow Vista, Anapra, and Tierra Madre; total storage capacity of 2.27 million gallons (MG)
- **Planned CIP** – Well 4 Replacement

Well 4 Currently Out of Service

Well 11A and Santa Teresa Community Well 31 can serve both the Sunland Park and Santa Teresa Community Service Areas. During peak demand periods in the summer, CRRUA operates valves on the discharge lines of both wells to direct flow to each system. CRRUA does not meter how much water flows from each well into each service area but CRRUA estimates that 80 percent of Well 11A and 20 percent of Well 31 flow to Sunland Park.



Legend

- Active Existing Well
- Proposed CIP Well
- Existing Tank
- Proposed CIP Tank
- Booster Station
- Existing Arsenic Treatment Facility
- Proposed CIP Arsenic Treatment Facility
- PRV
- Existing Pipe
- Parcels
- Industrial Park/Dona Ana Community
- Santa Teresa Community
- Sunland Park
- Border Area

Camino Real Regional Utility Authority
Water Infrastructure Plan

Existing Water System
Figure 3-1

0 2,500 5,000 Feet

CAMINO REAL REGIONAL CRUA UTILITY AUTHORITY

CDM Smith

LarsonRL L:\CRRUA WIP Modeling\GIS\1 Figure MXDs\FIG 3-1_11x17_20140619.mxd 9/12/2014

3.1.2 Santa Teresa Community Service Area

The Santa Teresa Community Service Area (previous water system number NM3542007) currently serves the area along McNutt Road north of Memorial Pines Lane and south of Airport Road. The Santa Teresa Community System was originally designed to serve the area north of Airport Road but the loss of Well 8A and the limited capacity of the existing storage tank prevent CRRUA from supplying this area. The area north of Airport Road is currently supplied by the Santa Teresa Industrial Park Service Area.

The Santa Teresa Community Service Area consists of the following infrastructure:

- **Production Wells** – Well 8A, Well 19, Well 30, and Well 31; total reported production capacity of 2000 gpm (2.88 MGD)
- **Storage Tanks** – 0.5 MG Santa Teresa Community Tank
- **Capital Improvement Projects –** Santa Teresa Community Arsenic Treatment Facility; 2.0 MG Finished Water Storage Tank; Well 30 Replacement; Well 19 Replacement; Well 8A Rehabilitation

Well 31 in the Santa Teresa Community Service Area

Sunland Park Well 11A is also capable of providing water to the Santa Teresa Community by opening a valve on the well discharge line. Based on information provided by CRRUA, approximately 20 percent of the production from Well 11A flows to the Santa Teresa Community Service Area. As noted in the previous section, Well 31 can also serve Sunland Park.

Wells 8A and 30 are not currently in service which reduces the total available production capacity to 1,000 gpm (1.44 MGD). Well 8A is not in service due to elevated levels of uranium and arsenic and the well has been physically disconnected from the system. Well 30 has not been in operation since 2006 and will be replaced by the summer of 2015. Well 19 is currenlty operating at partial capacity due to a collapse of the lower portion of the well casing.

System pressure and storage for the Santa Teresa Community Service Area is provided by a 500,000-gallon storage tank located on the mesa above the Santa Teresa Country Club. Flow from the 500,000-gallon tank into the Santa Teresa Community system is controlled by the Gate 4 PRV Station located south of Airport Road and west of McNutt Road. The Gate 4 PRV Station consists of two PRVS and a series of manually operated gate valves that allow CRRUA to reduce pressure in the system and supply water into the area along McNutt Road between Airport Road and Pete Domenici Highway or allow the Santa Teresa Community System to be supplied from the Santa Teresa Industrial Park service area. The existing 500,000-gallon storage tank does not have adequate storage capacity to serve the entire Santa Teresa Community Service Area. A new 2.0 MG storage tank will be constructed as part of the Santa Teresa Community Arsenic Treatment Facility in 2015 to provide additional storage in the system and give CRRUA multiple sources of supply for the Santa Teresa Community Service Area.

The area along McNutt Road between Airport Road and Pete Domenici Highway is currently supplied by the 2.0 MG storage tank at the Santa Teresa Industrial Park Arsenic Treatment Facility in the Santa Teresa Industrial Park Service Area. A 16-inch gravity transmission main conveys water from the tank to the 12-inch transmission main in Pete Domenici Highway. The12-inch main in Pete Domenici supplies all of the water to the area between Pete Domenici Highway and Airport Road, which includes the Santa Teresa High School and Elementary School and Villa Valencia and Edgemont subdivisions. The 12-inch transmission main will also serve the proposed Villa Valencia developments at the northwest and southwest corners of Pete Domenici Highway and McNutt Road.

3.1.3 Santa Teresa Industrial Park (STIP) Service Area

The Santa Teresa Industrial Park Service Area (previous Santa Teresa Industrial Park water system number NM3594007 and part of Doña Ana County Utilities water system number NM3501107) includes the Santa Teresa Industrial Park, the Santa Teresa International Airport, UPRR Intermodal Facility, and currently includes development located on McNutt Road between Pete Domenici Highway and Airport Road.

The Santa Teresa Industrial Park Service Area includes Well 6A and associated storage tank and booster station and a portion of the former Doña Ana County Utilities Water System Service Area including Well 5 and associated storage tank and booster station. When the Santa Teresa Industrial Park Arsenic Treatment Facility was placed into operation in 2013, infrastructure was installed so that Well 5 could also supply the Santa Teresa Industrial Park Service Area (via the new 2.0 MG tank). The Well 5 Booster Station does not serve the Santa Teresa Industrial Park Service Area; it currently serves the Logistics Industrial Park, the UPRR Intermodal Facility, and the West Mesa WWTP on Pete Domenici Highway.

The service area consists of the following infrastructure:

- **Santa Teresa Industrial Park Arsenic Treatment Facility** – Treatment capacity 3.6 MGD
- **Production Wells** – Well 5 and Well 6A. Total reported production capacity of 1300 gpm (1.87 MGD), Well 14 (future)
- **Storage Tanks** – Well 5 0.27 MG tank, STIP Arsenic Treatment Facility 2.0 MG tank, and Well 6A 1.0 MG tank; total storage capacity of 3.27 MG
- **Booster Pump Stations** – Well 5 Booster Pump Station, Well 6A Booster Pump Station, and Santa Teresa Industrial Park Pump Station (transfer pump station)
- **Capital Improvement Projects** –Well 14

Santa Teresa Industrial Park Arsenic Treatment Facility and 2.0 MG Tank

Water produced from Well 5 and Well 6A is treated at the Santa Teresa Industrial Park Arsenic Treatment Facility and stored in the 2.0 MG and 0.27 MG tanks located adjacent to the Arsenic Treatment Facility. Water produced from future Well 14 will also be treated at the Arsenic Treatment Facility and will provide a redundant well for the system. The Well 5 Booster Station pumps treated water into a 16-inch main on Industrial Drive and provides water to the Logistics Industrial Park, the UPRR Intermodal Facility, and the West Mesa WWTP on Pete Domenici Highway. The Santa Teresa Industrial Park Booster Pump Station transfers finished water from the 2.0 MG tank to the 1.0 MG storage tank located next to Well 6A.

The Well 6A Booster Station discharges into a 10-inch main on Airport Road and serves the Santa Teresa Industrial Park and Airport. The distribution systems served by the Well 5 and Well 6A Booster Stations are not interconnected.

3.1.4 Border Service Area

The Border Service Area (formerly part of the Doña Ana County Utilities Water System No. NM3501107) serves industrial and commercial customers located at the border crossing between the United States and Mexico. There are no residential service connections in this service area; therefore, it has been historically classified as a transient non-community water system. The Border Service Area is interconnected with the STIP Service Area through a 16-inch main in Pete Domenici Highway. The interconnection was installed to provide additional fire flow to the Bi-National Industrial Park in an emergency situation. A pressure sustaining valve located at Columbus Highway controls how much water can be supplied by the Santa Teresa Industrial Park Service Area to the Border Service Area.

Border Area Tank and Booster Station

The system consists of the following infrastructure:

- **Production Wells** –Well 1, Well 2, and Well 3; total reported production capacity of 2200 gpm (3.17 MGD)
- **Storage Tanks** – Border area 0.27 MG tank; total storage capacity of 0.27 MG
- **Booster Pump Stations** – Border Area Booster Pump Station

The three production wells operate based on the level in the Border Area Tank. The booster station pumps directly from the tank into a 16-inch transmission main that supplies the Border Crossing Area, the Bi-National Industrial Park and the Border Patrol Station located on Columbus Road (Highway 9) approximately 1 mile west of Pete Domenici Highway.

3.2 Well Production Capacity

Table 3-1 presents the reported production capacity of CRRUA's existing wells. The reported production capacities of the wells that are currently not in service are also shown in **Table 3-1** and are included in the calculation of the average and peak day production capacity. Replacement Wells 14 and 30 have already been designed and the proposed design production capacities of these wells are included in the tables.

Table 3-1 Reported Well Pumping Capacity

Well	Reported Capacity	Average Day Capacity[1]		Peak Day Capacity[2]		Comments
	(gpm)	(gpm)	(MGD)	(gpm)	(MGD)	
Sunland Park Service Area						
2	525	315	0.26	525	0.76	
3	350	210	0.18	350	0.50	
4	250	150	0.13	250	0.36	Not in Service
11A	650	390	0.33	650	0.94	Also Serves Santa Teresa
TOTAL	**1775**	**1065**	**0.89**	**1775**	**2.56**	For All Wells
Santa Teresa Community Service Area						
8A	500	300	0.25	500	0.72	Not in Service
19	400[3]	240	0.20	400	0.58	Replacement Well Design Capacity is approximately 800 gpm (Not Yet Constructed)
30	1000	600	0.50	1000	1.44	Replacement Well Design Capacity (Not Yet Constructed)
31	750	450	0.38	750	1.08	
TOTAL	**2650**	**1590**	**1.34**	**2650**	**3.82**	
Santa Teresa Industrial Park Service Area						
5	550	330	0.28	550	0.79	
6A	750	450	0.38	750	1.08	
14	700	420	0.35	700	1.01	New Well Design Capacity (Not Yet Constructed)
TOTAL	**2000**	**1200**	**1.01**	**2000**	**2.88**	
Border Service Area						
DAC 1	200	120	0.10	200	0.29	
DAC 2	500	300	0.25	500	0.72	
DAC 3	1500	900	0.76	1500	2.16	
TOTAL	**2200**	**1320**	**1.11**	**2200**	**3.17**	
COMBINED SYSTEM TOTAL		**3705**	**3.1**	**6175**	**8.9**	**Operational Wells Only**
COMBINED SYSTEM TOTAL[4]		**5175**	**4.3**	**8625**	**12.4**	**All wells in CRRUA Water System**

1-Assumes well is operating at 60 percent capacity and 14 hours per day
2-Assumes well is operating 100 percent capacity and 24 hours per day
3-Well pumping capacity determined in flow testing August 2009. Substantially lower than what had been reported previously
4- Assumes all wells are in operation

Based on the reported production capacity of the operational wells, CRRUA's system currently has a total average day production capacity of 3.1 MGD and a peak day capacity of 8.9 MGD. When Wells 4, 8A, and 30 are put back into service and when Well 14 is constructed, the average and peak day production capacities will increase to 4.3 MGD and 12.4 MGD, respectively.

3.3 Water Quality

Water quality of the CRRUA wells is presented in **Table 3-2**. It should be noted that the data was compiled from numerous studies and sampling events in 2008-2010 as part of CRRUA's arsenic treatment project. Also, the arsenic concentrations shown in the table exceed the Drinking Water Standard for arsenic (10 parts per billion) and do not reflect the treatment plants that have been constructed. CRRUA has been proactive in bringing the wells into compliance with the arsenic standard by constructing two arsenic treatment plants in the City of Sunland Park and in the Santa Teresa Industrial Park. A third plant to treat the wells in the Santa Teresa Community will be constructed in 2015. The history of CRRUA's compliance with the arsenic standard is presented below.

In September 2008, the City of Sunland Park was issued a Stipulated Final Order by the NMED that required the City to bring the wells in the City of Sunland Park and the STIP into compliance with the EPA Arsenic Rule by December 2010. Additionally, an Administrative Order (AO) was issued in December 2009 for the wells in the Santa Teresa Community System. The AO required the City to be in compliance with the EPA Arsenic Rule by February 2013.

The Sunland Park Arsenic Treatment Facility (treating water from Wells 2, 3, 4, and 11A) was completed in 2011 and the STIP Arsenic Treatment Facility (treating water from Well 5 and Well 6A) was completed in 2013. Construction of the Santa Teresa Community Arsenic Treatment Facility (treating water from Wells 8A, 19, 30, and 31) will begin in the fall of 2014 and will be operational in late 2015.

Finished water produced by the Sunland Park Arsenic Treatment Facility and the Santa Teresa Industrial Park Arsenic Treatment Facility is analyzed by NMED DWB on a quarterly basis. The most current arsenic data available was collected by the NMED DWB on February 18, 2014. The arsenic concentration at the Sunland Park Arsenic Treatment Facility was less than 10 ppb (non-detect with a reporting limit of 10 ppb) and at the Santa Teresa Industrial Park Arsenic Treatment Facility was 5.6 ppb (reporting level of 1 ppb).

The Border Service Area is classified as a transient non-community system. A transient non-community water system does not regularly serve at least 25 of the same persons over six months per year. Since it is a transient system, it is not required to meet the Drinking Water Standard for arsenic. Arsenic concentrations in samples collected by the NMED DWB for the Border Water System (Storage Tank #1) over the last four quarters (March 2013 – February 2014) ranged from 12-17 ppb with an average concentration of 13.8 ppb. If the Border Service Area was to serve a larger population and become a public water system, it would have to comply with the Drinking Water Standard for arsenic. This could be achieved through treatment, or possibly by blending with a water source low in arsenic.

Well 8A was taken offline in 2008 due to arsenic and uranium concentrations above the MCL. Once the Santa Teresa Community Arsenic Treatment Facility and 2.0 MG storage tank are constructed, arsenic and uranium concentrations will be reduced below the MCL by treatment and finished water blending, respectively. Additional information on the arsenic treatment facilities is provided in Section 5.

Table 3-2 Water Quality Data

Parameter	City of Sunland Park[1]			Santa Teresa Community				Industrial Park		Border Area Tank #1
	Well 2	Well 3	Well 11A	Well 8A	Well 19	Well 30	Well 31	Well 6A	Well 5	(Wells 1, 2, 3)[8]
Total arsenic, ppb	14.4[6]	17[3]	16[3]	25	13.6[4]	12	15[6]	39[3]	42[3]	17*
Chloride, mg/L	300	85	290	105	350	NT	195	195	82	46
Fluoride, mg/L	1.09	0.3	0.85	1.5	1.02	NT	1.19	1.16	1.6	1.1*
Iron, mg/L	0.01[6]	0.06[5]	0.06[5]	<0.03	0.02[5]	NT	0.03[7]	0.8[3]	0.109[3]	<0.02
Manganese, mg/L	0.013[6]	0.04	0.025	<0.005	<0.005	NT	0[7]	<0.005	<0.002	<0.002
Nitrate (NO3),mg/L	0.187	0.224	1.92	1.16	1.09	NT	2.46	0.025	0.1	<1.0*
Nitrite (NO2), mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	NT	<0.01	<0.01	<0.01	<0.1
Phosphate, mg/L	ND	ND[3]	ND[3]	0.02	ND[3]	NT	0.02	ND[3]	ND[3]	NA
pH	8.3[6]	7.68[3]	7.49[3]	7.73[3]	7.38[3]	NT	8.03[7]	7.79[3]	7.94[3]	7.75
Silica, mg/L	35[3]	31[3]	42[3]	36.4	37[3]	NT	33.2[3]	49[3]	50[3]	NA
Sulfate, mg/L	288[3]	136[3]	184[3]	115	401[3]	NT	388[3]	183[3]	163[3]	55.0
TDS, mg/L	820	872	672	520	1092	NT	844	664	667	NA
TOC, mg/L	2.8	1.3	1.7	<1	<1	NT	<1	<1	<1	NA
Alkalinity, mg/L	60	64	65	278	86	NT	109	298	292	NA
Aluminum, mg/L	<0.05	0.08	<0.05	<0.05	<0.05	NT	<0.05	<0.05	0.002	<0.02
Calcium, mg/L	64.1		55.8	15.6	66.9	NT	72.7	22.1	80.5	NA
Magnesium, mg/L	1.71	4	9.56	5.25	14.1	NT	7.79	6.91	3.92	NA
Turbidity, NTU	0.69	0.69	0.69	0.69	0.69	NT	0.69	0.69	1	NA
Hardness	60	178	174	70	242		196	74	70	NA
Uranium, ppb	1[3]	1.9[3]	2.3[3]	37	2.4[3]	0	7	18[3]	21[3]	NA
Vanadium, ppb	15[3]	20[3]	21[3]		12[3]	1.1		7[3]	6[3]	NA

1 - Ref: Table 5-1, "City of Sunland Park, New Mexico and Doña Ana County, New Mexico Arsenic Removal Study", Molzen-Corbin and Associates, April 2007, except where noted.
2 - Ref: Table 7.1, "Santa Teresa, Doña Ana County New Mexico Well No.5 Arsenic Treatment Facility Preliminary Engineering Report", Brown and Caldwell, August 15, 2007, except where noted.
3 - Results from December 2008 Testing
4 - Results from NMED Compliance Testing 2009
5 - Results from March 2010 sampling by City
6 - Results from March 2010 Pilot Testing by Layne Christensen
7 - Results from March 2010 Pilot Testing by Layne Christensen
8 – Results from most current NMED Compliance Sampling 2/19/2013 and 2/18/2014(*) (https://eidea.nmenv.state.nm.us)
NT = No Test Results Available
ND = Not Detected

3.4 Storage

There are eight existing ground storage tanks in CRRUA's system. The storage capacity of the existing tanks is 6.3 MG. The addition of the 2.0 MG tank at the Santa Teresa Community Arsenic Treatment Facility will increase available storage to 8.3 MG. The existing storage tanks, overflow elevations, and service area that they serve are presented in **Table 3-3**.

Table 3-3 Existing Storage Tanks

Service Area	Current Storage Capacity (MG)	Overflow Elevation (ft)
Sunland Park		
Meadow Vista	1.0	3949
Anapra	1.0	3949
Tierra Madre	0.27	4084
Total	**2.27**	
Santa Teresa Community		
Santa Teresa Community	0.5	4092
Santa Teresa Community ATF (CIP Project)	2.0	4128
Total	**2.50**	
Santa Teresa Industrial Park		
Well 5 Tank	0.27	4137
Well 6A Tank	1.0	4145
ATF Tank	2.0	4137
Total	**3.27**	
Border		
Border Area Tank	0.27	4134
Total	**0.27**	
Total Water System Storage (MG)	**6.3**	

The Sunland Park Service Area uses the water level in the Tierra Madre tank (located adjacent to the Sunland Park Arsenic Treatment Facility) to control Sunland Park Wells 2, 3, and11A.

Water flows from the Tierra Madre Tank into two transmission lines: a 10-inch main in the old Southern Pacific Railroad bed and a 12–inch transmission main in Memorial Pines Lane. The 10-inch main supplies the Meadow Vista Tank while the 12-inch main supplies the distribution system along McNutt Road and eventually fills the Anapra Tank at the southern end

of the system. PRVS are located on each transmission main to reduce the pressure from Tierra Madre tank, which is 143 feet higher than the Meadow Vista and Anapra tanks.

Wells 8A, 19, 30 and 31 are designed to fill the existing 0.5 MG tank in the Santa Teresa Community Service Area. As previously noted, this service area is lacking in water storage. However, a new 2.0 MG tank will be constructed as part of the Santa Teresa Community Arsenic Treatment Facility project and the existing 0.5 MG tank will be abandoned. All of the Santa Teresa Community wells, once replaced or refurbished, will operate based off of the level of the Santa Teresa Community Arsenic Treatment Facility Tank.

The 2.0 MG Santa Teresa Industrial Park Arsenic Treatment Facility tank and the 0.27 MG are filled by Wells 5 and 6. These two tanks are connected and have the same high water level. The 0.27 MG tank serves as a clear well for the Well 5 Booster Station. The 2.0 MG tank serves the following area:

- The Santa Teresa Industrial Park and Airport (water is pumped from the 2.0 MG tank to the 1.0 MG tank in the Santa Teresa Industrial Park)
- The area along McNutt Road between Pete Domenici Highway and Airport Road (water flows from the tank through a gravity main)

The 2.0 MG tank was constructed serve future growth on top of the mesa and is currently being used to supply water to customers in the valley, primarily at the northern end of the Santa Teresa Community Service Area. Once the 2.0 MG tank at the Santa Teresa Community Arsenic Facility is constructed, it is expected that more water will be available to serve future development on the mesa.

More than half of the Well 6A 1.0 MG storage tank capacity is reserved for fire flow for Foamex, an industrial-usage customer located immediately east of Well 6A. CRRUA maintains a pre-existing agreement with Foamex to provide additional fire storage. In addition, two-thirds of the 0.27 MG Well 5 storage tank capacity is reserved for fire storage.

The Border Area tank has a capacity of 0.27 MG and acts as a clear well for the booster station which pumps to the distribution system. Wells 1, 2 and 3 fill the Border Area tank.

3.5 Booster Stations

The Santa Teresa Industrial Park and Border Service Areas are supplied by booster stations. The Santa Teresa Industrial Park and Border booster stations are described below.

- **Santa Teresa Industrial Park Well 5 Booster Station** – This booster station is located west of the Santa Teresa Industrial Park Arsenic Treatment Facility on Industrial Drive. The Well 5 Booster Station is supplied by the existing 0.27 MG and 2.0 MG tanks and pumps into a 16-inch main in Industrial Drive. The booster station was constructed in 2000 and is equipped with three pumps to meet domestic demand: a 50 gpm jockey pump; a 200 gpm pump, and a 500 gpm pump for a total domestic pumping capacity of 750 gpm. The domestic pumps are designed to maintain 75 psi in the system. The pump station is also equipped with two fire pumps with a total capacity of 2250 gpm. If demand exceeds 750 gpm, the fire pumps are signaled to operate and take over providing water to the system.
- **Santa Teresa Industrial Park Well 6A Booster Station** – CRRUA constructed a new booster station and fire pumps to serve the Santa Teresa Industrial Park and Airport in 2014. The new booster station has a domestic pumping capacity of 750 gpm and is equipped with a low flow

(50 gpm) jockey pump and three 375 gpm service pumps (2 primary, one back-up). The fire pumping capacity is 3000 gpm and is provided by 1000 gpm fire pumps. System pressure at the booster station is approximately 80 psi and the fire pumps operate when the pressure in the system drops below 60 psi.

- **Border Booster Station** – This booster station is located adjacent to the 0.27 MG Border Area tank and provides domestic and fire supply to the entire Border Service Area including the Border Patrol Station west of Pete Domenici Highway on Columbus Road. The booster station discharges into a 10-inch main in Binational Ave and connects to the 16-inch main in Pete Domenici Highway.

3.6 Distribution System

There are over 60 miles of water mains in the CRRUA's service area. The Sunland Park Service Area is the largest system with approximately 40 miles of main. The Santa Teresa Community Service Area is the next largest with over 13 miles of mains. The Santa Teresa Industrial Park and Border Service Areas are relatively small systems with approximately 7 miles of main in the two systems.

The distribution system is comprised primarily of 6-inch and 8-inch mains. The Santa Teresa Industrial Park and Border Service Areas have larger mains (10-inch and 12-inch) since they primarily serve industrial customers with large fire flow requirements. Most of the mains are primarily PVC and were installed in the 1970s and 1990s in the older areas of the water system and the 1990s and 2000s in the newer areas. Many of the PVC mains in the Sunland Park and Santa Teresa Community Service Areas are ASTM D-2241 and not C900, which is the current standard for PVC pipe. Pipe meeting ASTM D-2241 tends to have thinner walls than C900 and is less resistant to higher pressures.

The system also has 10-inch, 12-inch, 14-inch, and 16-inch mains that are used for transmission. The most critical of these transmission mains are the 10-inch line that connects the Tierra Madre Tank with the Meadow Vista Tank and the 12-inch main in Pete Domenic Highway that supplies the area at Pete Domenici Highway and McNutt Road. The distribution system is equipped with a number of pressure reducing valves (PRVs), which are used to reduce the pressure in the system. The locations and settings of the PRVS are presented in **Table 3-4**.

Table 3-4 Existing Pressure Reducing Valve Settings

Location	Setting (psi)
Sunland Park	
10-inch transmission main to Meadow Vista Tank	22
Memorial Pines Lane – 12" finished water main from arsenic treatment facility	22
Santa Teresa Community	
Trevino	45
El Mirador 1	45
El Mirador 2	68
Gate 4	32
Doña Ana County Utilities	
Pete Domenici #1	22
Pete Domenici # 2	50
Santa Teresa Industrial Park	None

3.7 System Interconnections

The City of Sunland Park and Santa Teresa Community Service Areas are interconnected by an 8-inch main in McNutt Road. It should be noted that an 8-inch main has limited capacity and is typically considered a distribution main, not a transmission main. A larger main, such as a 12-inch main would be better hydraulically to supply water to Sunland Park.

The Santa Teresa Community and Santa Teresa Industrial Park Service Areas are interconnected by the 12-inch main in Pete Domenici Highway. The 12-inch main in Pete Domenici Highway was installed in 2006 to provide water to the Santa Teresa Elementary School. According to the record drawings for this main, it has a capacity of 2000 gpm. In addition to the elementary school, the main currently provides water to the Santa Teresa High School and to residences along McNutt Road between Pete Domenici Highway and Airport Road.

The Border Service Area is connected to the Santa Teresa Industrial Park Service Area by the 16-inch main in Pete Domenici Highway. As previously noted, the 16-inch main was installed primarily to provide additional fire flow to the Border Service Area.

3.8 Water Production and Population Summary

Total water production and population for CRRUA's water system for the period 2008-2013 is shown in **Figure 3-2**. Water production and population have been increasing steadily over time with overall production per capita staying between 140 and 150 gallons per capita per day (gpcd). Prior to 2012, CRRUA's Border Service Area was not included in the production totals because this service area was not included in the 2011 Plan. A slight increase in production from 2011-2013 can be attributed to adding the Border Service Area into the total water system production.

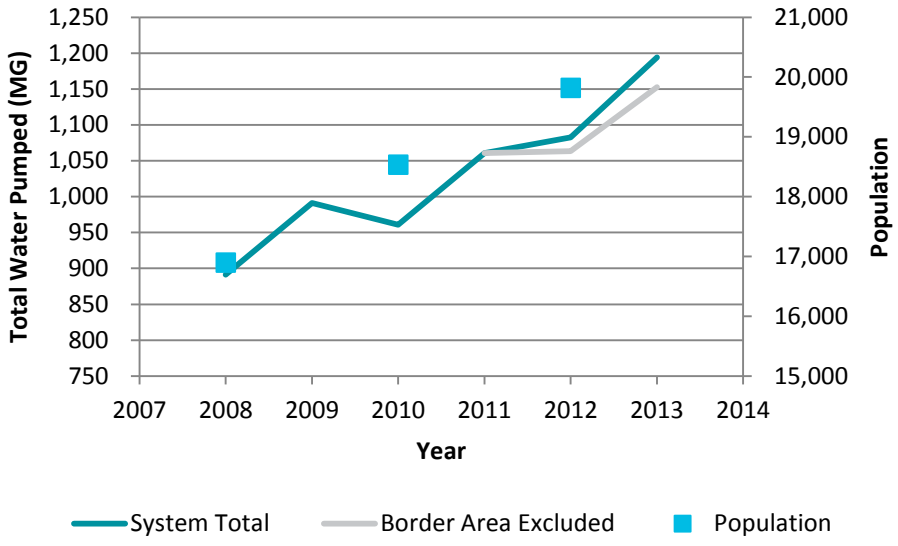


Figure 3-2 Total Water System Production and Population, 2008-2013

Total water production by each service area from 2011-2013 is displayed in **Figure 3-3.** Production by service area for previous years is not shown because the service areas were slightly redefined and the Border Service Area was added in this updated plan. The Sunland Park Service Area production stayed fairly constant during this time period while the Santa Teresa Community and the Industrial

Park Service Areas show opposite trends in water production. The increase in production for the Santa Teresa Industrial Park Service Area is due to the increased water demand due to development at the intersection of McNutt Road and Pete Domenici Highway. The decrease in production for the Santa Teresa Community Service Area is caused by losing Well 31 and significant capacity in Well 19.

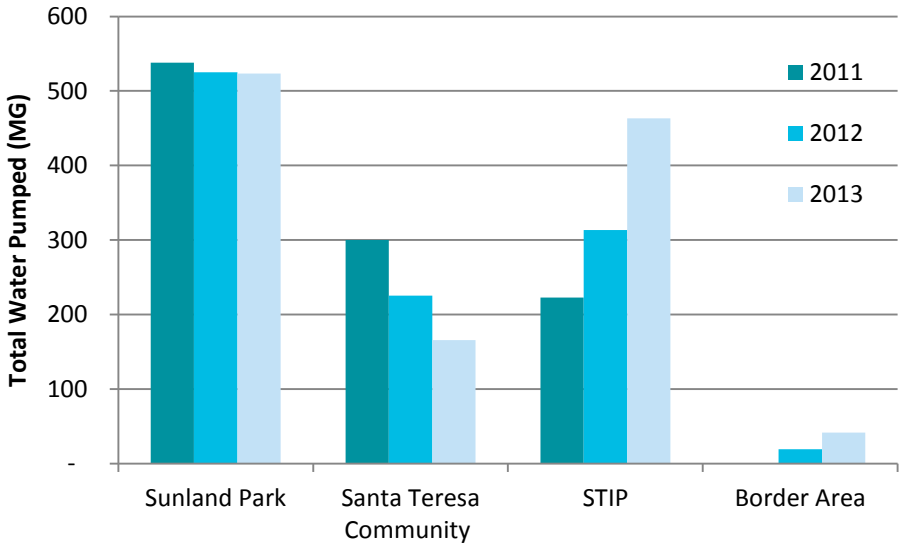


Figure 3-3 Water Production by Service Area, 2011-2013

Section 4
Water System Modeling and Evaluation

4.1 Existing Water System Configuration

CRRUA's water system consists of four service areas: the City of Sunland Park, Santa Teresa Community, Santa Teresa Industrial Park, and Border Area. Existing infrastructure in each service area including water production wells, storage tanks, booster pump stations, and ATFs were described in Section 3. This section discusses hydraulic modeling and the evaluation that was performed on the water system.

4.2 Hydraulic Modeling

The hydraulic model of CRRUA's water system, created as part of the 2011 Plan, was updated to evaluate current water supply capacity, pumping capacity, and storage capacity. The model was used to provide recommendations for infrastructure improvements in the service areas to meet existing and future water demands.

The hydraulic model was originally developed and updated utilizing InfoWater v10.0 (an Innovyze product). Updates to the facility information in the model were based on available record drawings, Geographic Information Systems (GIS) data, sketches/schematics provided by CRRUA, and drawings of planned developments provided by local developers. The model projection uses the NAD 1983 State Plane New Mexico Central coordinate system. The hydraulic model includes the major water system facilities such as storage tanks, PRVs, flow control valves, and major water transmission and distribution pipelines for the CRRUA's service areas. Modeled facilities include:

- 63 miles of water transmission and distribution pipelines
- 10 existing active wells
- 8 existing water storage reservoirs
- 3 booster pump stations
- 9 PRVs and 1 flow control valve

Proposed wells and facilities that were included in the 2011 Plan were included in the hydraulic model, but they were set as inactive for the purpose of evaluating the existing system.

Pump curves were provided by CRRUA for the operating wells in the City of Sunland Park, Santa Teresa Community, and Santa Teresa Industrial Park and were used during model

development. Available information for the three wells in the Border Service Area was limited to the rated capacity of the pumps and the depth of the wells.

4.3 Existing Water Demand

Existing water demand in the model was distributed using water production by service area, parcels, residential water connections, and information on large water users. Water production data was used to model water demand to ensure that non-revenue water is accounted for in the overall demand. Non-revenue water is water that is not billed and includes losses from the system (e.g. leaks, main breaks) and municipal uses that are not billed. Information concerning new development in areas such as Villa Valencia, Logistics Industrial Park, and Valle Vista Commercial Park was also used to update the water demands. In the absence of any other specific information water demand was allocated according to an assumed increase in population where the number of parcels increased between 2010 and 2013.

Table 4-1 summarizes average annual water produced, population, and water demand per service area. The per capita demand is calculated by dividing the average well production by the number of days in the year and the estimated population.

Table 4-1 Existing Water Demand Summary

Service Area	Average Total Water Produced 2011-2013 (MG)	Estimated Service Area Population 2013	Per Capita Demand (gpcd)
City of Sunland Park	555	12,275	124
Santa Teresa Community	204	3,596	155
Santa Teresa Industrial Park	382	4,261	246
Border Area	30	NA	NA
Total	**1,171**	**20,132**	**159**

1 –Production data includes large water demand from construction, which was nearly 250 gpm in 2013.

The City of Sunland Park Service Area has the lowest per capita water demand while the Santa Teresa Industrial Park Service Area has the highest per capita water demand. The low per capita demand in the City of Sunland Park Service Area is most likely a result of the community being well established and the volume of new development is very low in comparison with other areas in the system. The high per capita demand in the Santa Teresa Industrial Park Service Area is expected because the water demand is high due to the commercial/industrial users and the system serves residential customers along McNutt Road between Airport Road and Pete Domenici Highway.

The average daily demand (ADD) in the water system was calculated as follows:

$$ADD = (Total\ Water\ Produced\ (gallons)/(365\ days/year)*1440\ min/day$$

Peaking factors are used to calculate the maximum day demand (MDD) and peak hour demand (PHD) from the ADD. MDD peaking factors for each service area were calculated by dividing the average summer month usage (June-August) by the average winter month usage (November-February) over the period of 2006-2013 (**Table 4-2**). The average MDD peaking factor over CRRUA's entire water system is 1.9; however, the MDD calculated for the Santa Teresa Industrial Park Service Area is slightly

higher at 2.0. The high MDD observed in the Border Service Area is due to a large fluctuation in a relatively small usage. A MDD peaking factor of 2.0 was selected for use in modeling.

Table 4-2 Calculated MDD Peaking Factors

	Sunland Park Service Area	Santa Teresa IP Service Area	Santa Teresa Community Service Area	Border Service Area	CRRUA Water System	Modeled Value
Maximum Day Demand (MDD)	1.6	2.0	1.9	4.0	1.9	**2.0**

Peak hour demand is calculated by multiplying the MDD by 1.5 which is based on a typical region with similar residential and commercial demographics. The peaking factors used in this study are:

$$MDD = 2.0 \; X \; ADD$$

$$PHD = 1.5 \; X \; MDD$$

Information on existing large water users and developed parcels were also used to determine the locations of the water demands. **Table 4-3** shows a list of the large water users, the service area where each is located, and their average annual water demand for 2013.

Table 4-3 Large Water Users

Large Use Customer	Service Area	2013 Average Demand (gpm)
Prepared Foods	Santa Teresa Community	169.1
Santa Teresa Terrace Apartments	Santa Teresa Industrial Park	43.5
Omega Wire Inc.	Santa Teresa Industrial Park	33.8
Santa Teresa High School	Santa Teresa Community	22.8
Santa Teresa Middle School and Sports Complex	Sunland Park	21.7
Riverside Elementary	Sunland Park	20.7
Track/Field	Sunland Park	18.5
Stergenics U.S	Santa Teresa Industrial Park	17.6
Desert View Elementary	Sunland Park	17.0
Vista Corrugated	Santa Teresa Industrial Park	15.8
Santa Teresa Elementary School	Santa Teresa Industrial Park	13.4
Sunland Park Elementary	Sunland Park	11.9
Verde Realty (irrigation)	Santa Teresa Industrial Park	10.5
Other Border Area Demands	Border Area	10.3
Racetrack and Casino	Sunland Park	10.1
City Hall/Wastewater Treatment	Sunland Park	8.8
Santa Teresa Country Club	Santa Teresa Community	8.4
ZTEX Construction	Border Area	7.9

Table 4-3 Large Water Users

Large Use Customer	Service Area	2013 Average Demand (gpm)
Memorial Pines	Sunland Park	7.5
CF Jordan Construction	Santa Teresa Industrial Park	7.0
Western Playland	Sunland Park	7.0
T.E. Connectivity (irrigation)	Santa Teresa Industrial Park	6.8
Verde Border One & Two, LLC	Border Area	6.2
Taurus Investment	Santa Teresa Industrial Park	6.1
Northwire Inc.	Santa Teresa Industrial Park	5.0
Verde Border One & Two, LLC IRRIGATION	Border Area	4.9
Reference: This list of large users was generated by CRRUA's billing staff in March 2014.		

4.3.1 Existing System Capacity and Demand

Each service area's current water production capacity, firm production capacity, ADD, and MDD are summarized in **Table 4-4**. The firm production capacity is defined as the production capacity of the service area with the largest well out of service.

Table 4-4 Current System Production Capacity and Demands

Service Area	2013 Water Production Capacity (gpm)	2013 Water Production Firm Capacity[1] (gpm)	Average Day Demand[2,4] (gpm)	Maximum Day Demand[3,4] (gpm)
Sunland Park	1,525	875	943	1,886
Santa Teresa Community	1,150	400	460	920
Santa Teresa Industrial Park	1,300	550	537[4]	1,074
Border	2,200	700	30	60
Total	**6,175**	**2,525**	**1,970**	**3,940**

1-Capacity with the largest well out of service
2-Average well production from 2011 to 2013
3-Maximum day demand assumed to be 2.0 times average day demand
4-This includes a large water demand from construction, which was nearly 250 gpm in 2013.

As shown in **Table 4-4**, each service area has the ability to meet the ADD when all wells are functioning. With the largest well out of service, only the Border and Santa Teresa Industrial Park Service Areas can meet the ADD. Only the Border Service Area can meet the MDD with the largest well out of service. If a well goes down in the City of Sunland Park, Santa Teresa Community, or Santa Teresa Industrial Park Service Areas, CRRUA must rely on storage in the tanks and interconnections between systems to supply water.. The following paragraphs discuss the ability for each service area to meet ADD and MDD.

The **City of Sunland Park Service Area** has adequate production capacity to meet ADD using all of the existing operational wells. However, this service area does not have the capacity to meet the MDD with all of the existing operational wells and the system does not have the capacity to meet existing ADD or MDD with its largest well out of service. This situation has been experienced on more than one occasion when Well 11A has been out of service due to mechanical failure and during the summer of 2013 when multiple wells have been out of service. Well pump failure is common due to extended

use (pumping 24 hours per day) and the age of the equipment. Well 11A is also susceptible to receiving "dirty power" from El Paso Electric Company (EPEC). Dirty power is a term used to describe power with an inconsistent voltage, which can adversely affect the pump motor and possibly cause it to fail prematurely. The instances of dirty power appear to coincide with periods of high electricity demand in the summer, which occur at the same time water demand is at its highest. In 2013, CRRUA worked with EPEC to determine the voltages at Well 11A and EPEC made adjustments at the substation that provides power to the area. The voltage adjustments appear to have helped; however CRRUA must operate the pumps 24/7 in the summer to meet demand.

The **Santa Teresa Community Service Area** is capable of meeting the current ADD but cannot meet the MDD of its customers using the two operational wells (19 and 31). However, if the largest operational well (Well 31) is out of service, the system is not able to meet the ADD or the MDD. In the fall of 2013, Well 19 failed. CRRUA had the well pump contractor video the well casing and discovered that the casing screens were corroded and in very poor condition and the well needed to be replaced. CRRUA installed a temporary pump to produce approximately 400 gpm until the well can be replaced by summer 2015.

The Santa Teresa Community Service Area has approximately 1,000 gpm (1.4 MGD) of production capacity from Wells 8A and 30, which are currently not in operation. When those wells are brought back into production, the system will be able to meet the MDD of its customers with the largest well out of service and could potentially supply water to the City of Sunland Park Service Area to help that system meet its MDD.

Due to the loss of production from non-operational wells, an estimated 40 percent of the population in the Santa Teresa Community is supplied by the existing 12-inch main in Pete Domenici Highway that is connected to the 2.0 MG storage tank in the Santa Teresa Industrial Park.

The **Santa Teresa Industrial Park Service Area** can meet the ADD and the MDD with all wells operational. The service area cannot meet the MDD with the largest well out of service. If this occurs, water can be supplied to the residential area along McNutt Road between Airport Road and Pete Domenici Highway by opening valves at the Gate 4 PRV Station to allow water to flow from the Santa Teresa Community system. However, the available supply is limited in the Santa Teresa Community Service Area until additional storage is constructed in the Santa Teresa Community System and Wells 8A and 30 are returned to operation.

The **Border Service Area** has three operational wells and currently has the ability to meet the ADD and MDD even with the largest well out of service.

4.3.2 Future Water Demand

Water system facilities are sized to meet residential, commercial and industrial water demands and to meet fire protection requirements. The demand scenarios that are used to evaluate and size water facilities are:

1. ADD – The average day demand is based on the average daily usage of water over a year.
2. MDD – The maximum day demand is the maximum water usage during a 24-hour period. MDD usually occurs in the summer months of June and July.

3. PHD - The peak hour demand is the peak flow during a one-hour period on the day of maximum demand.

4. Fire flows are higher than the normal demands of customers and are set by local fire department officials and/or specified in the Uniform Fire Code.

The projected future water demands in 20 years (2034) were calculated for each of the service areas. The assumptions for allocating future water demands are summarized below:

- Specific information on future developments was first used to develop future demands in the model. Demand was calculated for each service area based on development information provided. Those demands are presented below in **Table 4-5**. *Note that the demands presented in **Table 4-5** represent future demand only and do not include demands associated with already existing portions of the developments.*

- Additional future water demands were calculated by increasing the existing water demands by 0.5 percent per year, which is the population growth rate of existing areas used in Section 2.

- Demand calculated based on the growth rate was distributed in the model based on the locations of large parcels that are assumed to be divided up and developed in the future.

Table 4-5 Projected Water Demands for Future Developments

Future Developments	Service Area	Average Day Demand (gpm)
Villa Valencia	Santa Teresa Industrial Park	745
Rialta Mesa (Will be addressed in the future)	Santa Teresa Industrial Park	1042
Logistics Industrial Park	Santa Teresa Industrial Park (Well 5 Booster Station)	31
Santa Teresa Industrial Park (Immediate New Business)	Santa Teresa Industrial Park (Well 6A Booster Station)	50
Union Pacific Strauss Yard Intermodal Facility	Santa Teresa Industrial Park	12
Bi-National Park	Border System	32
Valle Vista Commercial Area	Santa Teresa Industrial Park	188
Edgemont Subdivision	Santa Teresa Industrial Park	14

Santa Teresa Industrial Park (Immediate New Business)

There are new businesses that are expected immediately in and around the Santa Teresa Industrial Park. Water demands were estimated for these businesses based on the descriptions provided. The estimated demand is 50 gpm.

Union Pacific Railroad Strauss Yard Intermodal Facility

The Union Pacific Railroad (UPRR) completed a new Intermodal Facility in the Santa Teresa Industrial Park Service Area in 2014. The facility is located on County Road 17 (CR17) northwest of the Santa Teresa Industrial Park. CRRUA's existing Well 5 Booster Station will provide water to the Strauss Yard storage tank. A 12-inch water main was constructed along Strauss Road from the distribution system fed by the Well 5 Booster Station.

Based on information provided in 2014 by UPRR's engineer (Wilson and Co.), the Strauss Yard will have a water demand of 35,000-50,000 gallons per day (24-35 gpm). Strauss Yard will have a fire flow demand of 2,000 gpm for 2 hours; however, fire flows will be supplied by their own on-site 0.3 MG tank and fire pump system.

The existing system was evaluated to determine its ability to meet existing and future water system demands using four demand scenarios: a) ADD, b) MDD, c) PHD, and d) MDD plus Fire Flow. The existing and projected water demands for each water service area are presented in **Table 4-6**.

Table 4-6 Future Demands by Service Area

Service Area	Existing Demands, 2014 (gpm)			Future Demands 2034		
	ADD	MDD[(1)]	PHD[(1)]	ADD	MDD	PDH
Sunland Park	943	1,886	2,829	1,130	2,260	3,390
Santa Teresa Community	460	920	1,380	609	1,218	1827
Santa Teresa Industrial Park	537	1,074	1,611	1,628	3,267	4,901
Border Area	30	60	90	60	120	180
Total Water System (gpm)	**1,970**	**3,940**	**5,910**	**3,427**	**6,865**	**10,298**
Total Water System (MGD)	**2.84**	**5.67**	**8.51**	**4.93**	**9.89**	**14.83**

As shown in **Table 4-6**, the water demand in the Sunland Park Service Area is projected to increase by only about 10 percent over the next 20 years. The Border Service Area shows an increase of about 100 percent, which is due mostly to the development of the Bi-National Park. Demands in the Santa Teresa Industrial Park and Santa Teresa Community Service Areas are projected to increase significantly when Villa Valencia are fully developed. The increased water demand in these two systems will require improvements to the existing supply and transmission infrastructure to meet these future demands.

4.3.3 Hydraulic Performance Criteria

Four hydraulic performance criteria were used to evaluate the existing water system to identify deficiencies and determine the required improvements:

- Water Supply
- System Storage
- Hydraulic Pumping Capacity
- Distribution System Pressure and Pipe Velocity

The performance criteria presented herein are based in part on the NMED Recommended Standards for Water Facilities and the current American Water Works Association (AWWA) guidelines for water system operation. The recommended guidelines incorporate system reliability and emergency considerations for supply, conveyance, and storage in the system.

Each of the four categories of hydraulic performance criteria are described in detail below.

4.3.3.1 Water Supply Criteria

To meet the desired system performance, the water supply from all sources must be sufficient to adequately meet the MDD of all customers, while meeting the minimum pressure requirements with the largest well out of service (firm capacity of the system). The combined flow from the supply source(s) and the associated water storage must be adequate to supply PHD.

4.3.3.2 System Storage Criteria

The volume of storage required in a water system is made up of three components: operational storage, fire reserve storage, and emergency storage. These components are defined below:

1. Operational Storage or the Equalizing/Balancing Storage: The volume of water required to meet daily fluctuations in demand in excess of the water supply production capacity on the maximum day. For CRRUA's combined water distribution system, an operational storage of 25-percent of the MDD is recommended.

2. Fire Reserve Storage: The amount of storage volume necessary to supply fire flow for the most critical land use within a pressure zone. The fire reserve storage should also be available for fire protection to every part of the distribution system at all times. The fire flow criteria used in this evaluation is a residential fire flow of 1,000 gpm for 2 hours which meets the current Doña Ana County Fire Marshal requirements.

3. Emergency Storage: The volume of water required to supply the service area during planned or unplanned equipment outages, power outages, or well shut-down periods, such as during unexpected mechanical difficulties or water quality interruptions. This storage should be sufficient to provide a reasonable level of uninterrupted service under such circumstances. One ADD of emergency storage is recommended.

4.3.3.3 Hydraulic Pumping Capacity Criteria

Booster pump stations are used in the Santa Teresa Industrial Park and Border Service Areas to supply domestic and fire flows. The booster stations provide firm pumping capacity or supply capacity to the distribution systems to meet the MDD. Firm pumping capacity is defined as the pumping capacity with the largest booster pump not in service. For service areas with storage, the fire reserve storage as defined above is provided from the tank, not the booster station.

4.3.3.4 Distribution System Pressures and Pipe Velocity Criteria

Distribution system mains should be sized to accommodate the pressure requirements in the system, or minimum of 6-inches in diameter, whichever is larger. It is assumed that the flow velocities within the distribution system are not to exceed a maximum of 5 fps under MDD flow conditions.

The assumed headloss within the pipeline is 5 feet per 1,000 feet under MDD to a maximum of 10 feet per 1,000 feet for PHD. A maximum of 10 feet per 1,000 feet under any non-fire demand condition is equivalent to 4.3 pounds per square inch (psi) pressure loss per 1,000 feet of pipe. Typically, high velocities and/or high headlosses within the system results in a reduction in water pressure. In addition, high velocities and corresponding high headlosses may result in water hammer within the system.

AWWA Standards require that each distribution system be operated in a manner to assure that the minimum operating pressure in the water main at the user service line connection is not less than 20

psi at all times throughout the distribution system. This minimum pressure criterion also applies for fire flow and other emergency conditions, such as temporary outages of pumping facilities.

AWWA Standards also require that each new distribution system that expands existing service connections by 20 percent or more, or that may otherwise adversely affect distribution system pressure, be designed to provide a minimum normal operating pressure throughout the new distribution system of not less than 40 psi at all times (excluding fire flow or other emergency conditions). Finally, the Uniform Plumbing Code requires individual pressure reducing valves if pressures exceed 80 psi for new installations

4.4 Hydraulic Evaluation

The results of the hydraulic evaluation of the system under existing and future conditions are presented in the following sections.

4.4.1 Water Production Analysis

The production capacity of the existing active wells and potential future wells were compared with existing and future demands. The evaluation of the well production capacity also took into account emergency water supply and system redundancy.

4.4.1.1 Existing Production

CRRUA's water system is supplied from 10 existing wells that have a combined reported production capacity of 6,175 gpm (8.9 mgd). Five additional wells have been identified as CIP projects, (Well 4, 19, 14 and 30 replacements, Well 8A rehabilitation). Completion of these projects will add approximately 3,000 gpm (4.3 mgd) of production to CRRUA's system.

4.4.1.2 Water Production Evaluation

The evaluation of existing and future water production requirements are presented in **Table 4-7**. The results of the evaluation presented in **Table 4-7** are discussed below.

4.4.1.3 Existing Production Conditions

- The **City of Sunland Park Service Area** is not capable of meeting existing ADD and MDD with the largest well out of service. This service area currently has a production deficiency of 1,011 gpm at MDD with the largest well out of service. The additional production capacity from future wells in the Santa Teresa Community Service Area (Wells 8A, Well 30, Well 19) could be used to offset the existing lack of production in Sunland Park.

- The **Santa Teresa Community Service Area** cannot meet the existing ADD and MDD with the largest well out of service. If both existing wells remain operational, and without considering CIP projects, the service area is able to meet the ADD and MDD. Replacing Well 30, Well 19, and rehabilitating Well 8A will allow the Santa Teresa Community will meet the MDD with the largest well (Well 30) out of service.

- The **Santa Teresa Industrial Park Service Area** can only meet existing MDD with the CIP project well 14 and the largest well out of service.

- The **Border Service Area** has a surplus supply of 640 gpm. This system is not currently connected to the other services areas within CRRUA's system. The current and future estimated demands for this area are well below the production capability.

Table 4-7 Existing and Future Water Production Requirements

Existing Conditions, 2014[1]							
Service Area	ADD (gpm)	MDD (gpm)	Required Supply (gpm)	Supply from Active Wells: Total Number of Wells	Supply from Active Wells: Total Well Capacity (gpm)[1]	Supply from Active Wells: Firm Well Capacity (gpm)[4]	Additional Supply Required (gpm)[4]
Sunland Park	943	1,886	1,886	3	1,525	875	1,011
Santa Teresa Community	460	920	920	2	1,150	400	520
Santa Teresa Industrial Park	537	1,074	1,074	2	1,300	550	524
Border Area	30	60	60	3	2,200	700	(640)
Total	**1,970**	**3,940**	**3,940**	**10**	**6,175**	**2,525**	**1,415**

Existing Conditions with CIP Projects, 2014[1]							
Service Area	ADD (gpm)	MDD (gpm)	Required Supply (gpm)	Supply from Active Wells: Total Number of Wells	Supply from Active Wells: Total Well Capacity (gpm)[1]	Supply from Active Wells: Firm Well Capacity (gpm)[4]	Additional Supply Required (gpm)[4]
Sunland Park	943	1,886	1,886	4	1,775	1,125	761
Santa Teresa Community	460	920	920	4	3,050	2,050	(1,130)
Santa Teresa Industrial Park	537	1,074	1,074	3	2,000	1,250	(176)
Border Area	30	60	60	3	2,200	700	(640)
Total	**1,970**	**3,940**	**3,940**	**14**	**9,025**	**5,125**	**(1,185)**

Future Conditions, 2034[1,2]							
Service Area	ADD (gpm)	MDD (gpm)	Required Supply (gpm)	Supply from Active and Inactive Wells: Total Number of Wells	Supply from Active and Inactive Wells: Total Well Capacity (gpm)	Supply from Active and Inactive Wells: Firm Well Capacity (gpm)[3]	Additional Supply Required (gpm)[4]
Sunland Park	1,130	2,260	2,260	4	1,775	1,125	1,135
Santa Teresa Community	609	1,218	1,218	4	3,050	2,050	(832)
Santa Teresa Industrial Park	1,628	3,267	3,267	3	2,000	1,950	1,317
Border Area	60	120	120	3	2,200	700	(580)
Total	**3,427**	**6,865**	**6,865**	**14**	**8,925**	**5,675**	**1,040**

(1) Includes all CIP projects (Wells 4, 8A, 14, 19, and 30)
(2) Future demand (20-year build-out, year 2034) include proposed Verde Realty future developments: Check Point, and Logistics Park
(3) Firm Capacity for the combined system equals total well capacity including all wells for the four systems, assuming the largest well is not in service.
(4) Numbers inside of parenthesis represent a surplus of supply available.

4.4.1.4 Future Production Conditions

The projected total MDD in CRRUA's water system in 2034 is 6,865 gpm. The combined production capability all existing wells including the five CIP project wells will have a projected total production capacity of 8,925 gpm or firm capacity of 5,675 gpm with the largest well in each service area out of service.

- The **City of Sunland Park Service Area** will require an additional 1,135 gpm of water production. This could either come from new wells or from a combination of surplus supply from the Santa Teresa Community Service Area and a new well in Sunland Park. Two new wells with a minimum capacity of 600 gpm each, could be installed to meet the projected MDD in 2034 without considering supply from Santa Teresa Community Service Area. Alternatively, the Sunland Park Service Area would only require one well with a minimum capacity of 400 gpm if water was transferred from the Santa Teresa Community Service Area.
- The **Santa Teresa Community Service Area** will have excess production of approximately 830 gpm once the three CIP projects have been completed. As previously mentioned, this surplus can be used to supplement production deficit in Sunland Park.
- The greatest production deficiency is in the **Santa Teresa Industrial Park Service Area**. This system will require an additional 1,320 gpm of well production capacity to meet the projected MDD in 2034. Well 29A, located at the SW corner of Anapra Road and Pete Domenici Highway could be placed into service as a municipal production well to meet a portion of the projected future demand; however, a hydrogeologic evaluation and well location study are necessary to determine the locations of future wells.

4.4.2 System Storage Evaluation

4.4.2.1 Existing System Storage

CRRUA's combined system has eight storage tanks with a total capacity of 6.3 MG.

One new storage tank is proposed for CRRUA's system: a 2.0-MG tank that will be constructed as part of the Santa Teresa Community Arsenic Treatment Facility. This tank is intended to replace the existing 0.5 MG tank in the Santa Teresa Community Service Area. A new 2.0 MG tank was constructed in the Santa Teresa Industrial Park Service Area in 2012. The additional storage provided by these two tanks is included as existing storage in the evaluation of future storage requirements in 2034.

4.4.2.2 Storage Evaluation Summary

Operational, emergency, and fire reserve storage requirements were evaluated using the following parameters:

- Operational storage = 25 percent of MDD
- Emergency storage = 100 percent of ADD
- Fire reserve = 1000 gpm for 2 hours in residential areas and 3000 gpm for 3 hours in industrial areas

The results of the storage evaluation presented in **Table 4-8**.

4.4.2.3 Existing Storage Requirements

Each individual service area currently has sufficient storage capacity to meet current demands based on the above storage tank operation and fire reserve criteria.

4.4.2.4 Future Storage Requirements

The existing combined system does not have the storage capacity to meet future storage requirements in 2034. The total required future storage in the combined system is 8.85 MG and the existing storage capacity is 7.81 MG. An additional 1.04 MG of storage capacity is required.

- Additional storage tanks are required to meet the fire flow storage in the City of Sunland Park, Santa Teresa Industrial Park, and Border Service Areas. The required storage capacities are as follows:
- The **Sunland Park Service Area** has a future storage deficiency of 0.22 MG. Either additional storage or the ability to supplement fire flow from the Santa Teresa Community Service Area is required.
- The **Santa Teresa Community Service Area** has approximately 0.56 MG of surplus storage during future operational and fire flow conditions.
- The **Santa Teresa Industrial Park Service Area** requires an additional 0.91 MG of storage to meet the future demands. A new 1.0 MG storage tank will provide adequate storage and allow for future expansion in the industrial and residential areas serviced by the Santa Teresa Industrial Park.
- The **Border Service Area** has a water storage deficit of 0.4 MG due to high industrial fire storage requirements; however, a pipeline from the Santa Teresa Industrial Park exists along Pete Domenici Highway that provide supplemental water to the Bi-National Industrial Park during an emergency situation.

Currently, CRRUA does not utilize backup generators at well sites; it may be feasible to install generators on the largest wells in each service area to provide for additional safety during fire emergency events.

Table 4-8 Storage Evaluation Summary

Existing Conditions, 2014								
Water System	Average Day Demand (gpm)	Maximum Day Demand (gpm)	Storage Requirements (MG)			Total Storage Required (MG)	Total Existing Storage[1] (MG)	Additional Storage Required (MG)
			Operational (at 25% of Max Day Demand)	Emergency (as one Avg Day Demand)	Fire Reserve			
Sunland Park	943	1,886	0.7	1.4	0.12	2.16	2.27	-0.11
Santa Teresa Community	460	920	0.3	0.7	0.12	1.11	2.0	-0.88
Santa Teresa Industrial Park	537	1,074	0.4	0.8	0.66[4,5]	1.86	3.27	-1.41
Border Service Area	30	60	0.02	0.04	0.54[4]	0.60	0.27	-0.15
Total	**1,990**	**3,940**	**1.4**	**2.9**	**1.02**	**5.70**	**7.81**	**-2.49**

Future Conditions, 2034[2]								
Water System	Average Day Demand (gpm)	Maximum Day Demand (gpm)	Storage Requirements (MG)			Total Storage Required (MG)	Existing Storage (MG)	Additional Storage Required (MG)
			Operational (at 25% of Max Day Demand)	Emergency (as one Avg Day Demand)	Fire Reserve			
Sunland Park	1,130	2,260	0.8	1.6	0.12[3]	2.56	2.27	0.29
Santa Teresa Community	609	1,218	0.4	0.9	0.12[3]	1.44	2.0	-0.56
Santa Teresa Industrial Park	1,628	3,267	1.2	2.3	0.66[3,4]	4.18	3.27	0.91
Border Service Area	60	120	0.04	0.1	0.54[4]	0.67	0.27	0.40[6]
Total	**3,427**	**6,865**	**2.4**	**4.9**	**1.44**	**8.85**	**7.81**	**-0.51**

Notes:

Negative storage required indicates that a storage surplus is available.

(1) Includes all CIP projects (2.0 ATF Tank).
(2) Future demand (20-year build-out, year 2034) include proposed future developments: Villa Valencia, and Logistics Park.
(3) Fire reserve based on Residential Fire Flow of 1,000 gpm for 2 hours
(4) Fire reserve based on Industrial Fire Flow of 3,000 gpm for 3 hours
(5) Sunland Park, and the Santa Teresa Community are interconnected and storage can be transferred between the two areas depending on demand requirements.
(6) Water can be transferred from the Santa Teresa Industrial Park to the Bi-National Park in the Border Service Area to supplement fire flow

4.4.3 Existing Booster Station Evaluation

CRRUA has three existing booster stations in the water system: the Santa Teresa Industrial Park Well 5 Booster Station, the Santa Teresa Industrial Park Well 6A Booster Station, and the Border Region Booster Station. The Santa Teresa Industrial Park Well 5 Booster Station is located adjacent to Well 5, and has a total domestic pumping capacity of 750 gpm and a firm capacity of 250 gpm. The booster station is also equipped with two fire pumps with a total capacity of 2,250 gpm. If demand exceeds 750 gpm, the fire pumps are signaled to operate and provide water to the system.

The Santa Teresa Industrial Park Well 6A Booster Station is located at the Well 6A site and was replaced in 2014. The domestic pumping capacity of this booster station is 750 gpm and fire pumping capacity is 3,000 gpm. System pressure at the booster station is approximately 80 psi and the fire pumps are set to operate when the pressure drops below 60 psi.

The Border Booster Station is equipped with two domestic pumps and two fire pumps to serve as potable water and fire supply. Currently, no information is available on the domestic pumps within this booster station. The fire pumps are rated for 1500 gpm at 95 psi.

A new booster station was constructed as part of the Santa Teresa Industrial Park ATF project. The new booster station is located adjacent to the ATF and pumps finished water from the ATF 2.0 MG tank to the 1.0 MG storage tank at Well 6A. The booster station pumping capacity is 800 gpm. This booster station will not be used to maintain pressure in the distribution system or supply customers; therefore, it is not included in this evaluation.

4.4.3.1 Booster Pumping Capacity Evaluation Summary

The pumping capacities of the existing booster stations were compared with existing and future projected MDD and PHD. It is good operational practice for a booster station to meet the PHD of the system unless there is another source of supply in the system such as a gravity storage tank. Since there is no other source of supply for the existing Santa Teresa Industrial Park Service Area, the PHD was used for evaluating the booster stations under existing conditions. A summary of the evaluation of the existing booster stations to meet existing and future domestic demands is presented in **Table 4-9**.

Table 4-9 Booster Station Pumping Capacity Evaluation

Pump Station Description				
Booster Pump Station	**Pumping From**	**From HGL (ft)**	**Pumping To**	**To HGL (ft)**
Santa Teresa Industrial Park Well 6A Booster Station	Well 6A Existing Tank	4,145	Santa Teresa Industrial Park and ST Airport	4,336
Santa Teresa Industrial Park Well 5 Booster Station	Well 5 Storage Tanks	4,137	Logistics Industrial park, UPRR Facility, and West Mesa WWTP	4,310
Border Booster Station	Border Area Tank	4,134	Border Area	4,111

Existing Conditions							
Booster Pump Station	**Demands (gpm)**		**Demand Condition (gpm)**	**Existing Total Capacity (gpm)**	**Existing Firm Capacity[2] (gpm)**	**Required Firm Capacity (gpm)**	**Meets Required Capacity**
	Existing MDD[1]	**Existing PHD**					
Well 6A Booster Station	400	600	PHD	1,200	600	600	Yes
Well 5 Booster Station	674	960	PHD	750	250	674	**No**
Border Booster Station	30	60	PHD	TBD	TBD	TBD	TBD

Future Conditions 2034							
Booster Pump Station	**Demands (gpm)**		**Demand Condition (gpm)**	**Existing Total Capacity (gpm)**	**Existing Firm Capacity[1] (gpm)**	**Required Firm Capacity (gpm)**	**Meets Required Capacity**
	Future MDD[3]	**Future PHD**					
Santa Teresa Industrial Park Well 6A Booster Station	400	600	PHD	1,200	600	600	Yes
Well 5 Booster Station	2,593	3,890	MDD	750	250	3,890	**No**
Border Booster Station	120	180	PHD	TBD	TBD	TBD	TBD

(1) Firm Capacity: pump station capacity assuming the largest pump is out of service

The results of the storage evaluation presented in **Table 4-9** are as follows:

- The Well 6A Booster Station is capable of meeting existing peak hour demands with the largest pump out of service.
- The Well 5 Booster Station is not capable of meeting existing or future peak hour demands with the largest pump out of service.
- Additional information is required to further analyze the Border Service Area Booster Station; however, it currently meets the needs of existing demands and will meet foreseeable future demands.

4.4.3.2 Future Pumping Requirements

- The Santa Teresa Industrial Park Well 6A Booster Station has adequate pumping capacity to meet future PHD with the largest pump out of service.
- The Santa Teresa Industrial Park Well 5 Booster Station does not have adequate capacity to meet future MDD with the largest pump out of service nor does it have the capacity to meet future demands with all of the existing pumps in operation. As development occurs the capacity required for Well 5 Booster Station needs to be evaluated to determine ultimate booster station capacity requirements.

4.4.4 Distribution System Capacity Evaluation

The combined system includes approximately 60 miles of transmission mains (ranging from 8-inch to 20-inch). These pipes were modeled, and velocities and system pressures were compared to the acceptable ranges listed in the hydraulic performance criteria listed above in Section 4.2.2 to identify low pressure areas or undersized mains based on existing and future demands.

As previously noted, the Santa Teresa Industrial Park Service Area currently supplies a portion of the Santa Teresa Community Service Area through a 16-inch gravity main from the 2.0 MG tank at the Santa Teresa Industrial Park ATF to the 12-inch main in Pete Domenici Highway. The Santa Teresa Community and City of Sunland Park Service Areas are connected by an 8-inch main in McNutt Road and the existing 10-inch main in the abandoned Southern Pacific right-of-way.

The Santa Teresa Community Service Area will have a supply surplus of approximately 1,300 gpm when Wells 8A, 30, and 19 are replaced/returned to service. The existing mains that connect the Santa Teresa Community Service Area to the City of Sunland Park Service Area were evaluated to determine if they were capable of conveying the additional flow from the Santa Teresa Community Service Area to Sunland Park. The Santa Teresa Community will provide additional water to the City of Sunland Park and will be redistributed via McNutt Road and the railroad waterline.

The Sunland Park Service Area does not have a dedicated transmission main that connects the Meadow Vista and Anapra tanks. The Anapra tank is filled by a 12-inch main in Memorial Pines Lane that connects to a 12-inch main in McNutt Road that eventually connects to the Anapra tank. There are numerous connections off of the 12-inch main to distribution system that makes it difficult to fill the Anapra tank. The cost associated with a new transmission line between these tanks make this project impractical. An alternative to the new transmission line would be to service the high elevation communities from different areas to reduce the demand on the tanks.

The two main low pressure areas in Sunland Park are the Casa Bellas community and the residential area south of Camino Real Dr. These two areas are the higher areas of Sunland Park, with Casa Bellas at 3880 feet and Camino Real Dr. at 3,850 feet. Both of these areas are primarily from the McNutt Road connection which is at an average elevation of 3,800 feet which causes pressure issues when the storage tank volumes are lower during maximum day demand conditions. To solve the pressure issues in the Casa Bellas area, it is recommended to install a 12-inch line on Teresa Paseo Dr. between Trevino Road and Country Club Road. This would allow the main on Feather Moon Dr. to provide adequate pressure to this area and further connect the Sunland Park and Santa Teresa Communities. To alleviate pressure issues in the vicinity of Camino Real Dr., it is recommended to install a 12-inch diameter line that completes the loop between the McNutt waterline and the waterline that extends to the west of 1st through 5th Streets.

The existing 12-inch main in Pete Domenici Highway is not large enough to supply the Santa Teresa Community Service Area and future demands from the proposed Villa Valencia development. Based on the record drawings for the existing main, the main was designed for a flow of 2,000 gpm, including a fire flow of 1,000 gpm. The future combined MDD plus fire demand from the Santa Teresa Community and the proposed Villa Valencia development are estimated to be 2,600 gpm. To provide the additional capacity required, a 16-inch transmission main should be installed between the 2.0 MG tank at the Santa Teresa Industrial Park ATF and the Airport Road PRV station. This would provide redundancy to the line in Pete Domenici Highway by connecting another transmission main to the 2.0 MG storage tank at the Santa Teresa Industrial Park ATF. This waterline would also allow the Pete Domenici Highway line to function as it is currently designed and to allow for the additional 600 gpm required in the Villa Valencia development to come from the existing Airport Road PRV station.

To provide the area at the intersection of Pete Domenici Highway and McNutt Road with operational redundancy, a 12-inch main should be extended through the Villa Valencia community to connect with the existing 10-inch main in McNutt Road at Pete Domenici Highway. The existing 10-inch main in McNutt Road will need to be extended to Pete Domenici Highway and new section of main will need to be installed in McNutt from Airport Road to Killdeer Road

Section 5
Recommended Improvements

5.1 Introduction

The hydraulic analysis presented in Section 4 identified improvements in water production, storage, booster pumping, and transmission to meet existing and future water demands. This section presents the recommended projects by service area, estimated construction and total project costs, and a list of projects by priority.

5.2 Sunland Park Service Area

Water Production

The main concern in the City of Sunland Park Service Area is water production. The service area currently has a water production deficit of 361 gpm with all of the currently operational wells operating and 1,011 gpm with the largest well out of service (firm capacity). The projected water demands in 2034 increase the supply deficiency to approximately 885 gpm with all of the existing wells operating and 1,135 gpm with the largest well out of service. When the largest well in the City of Sunland Park (Well 11A) goes out of service, customers complain of water pressure problems and CRRUA has difficulty in keeping the Meadow Vista and Anapra tanks full. To make up for the loss of Well 11A, CRRUA uses Well 31 in the Santa Teresa Community Service Area to supplement the water supply in Sunland Park. Well 31 is one of two operational wells in the Santa Teresa Community Service Area and if this well goes down, both systems suffer.

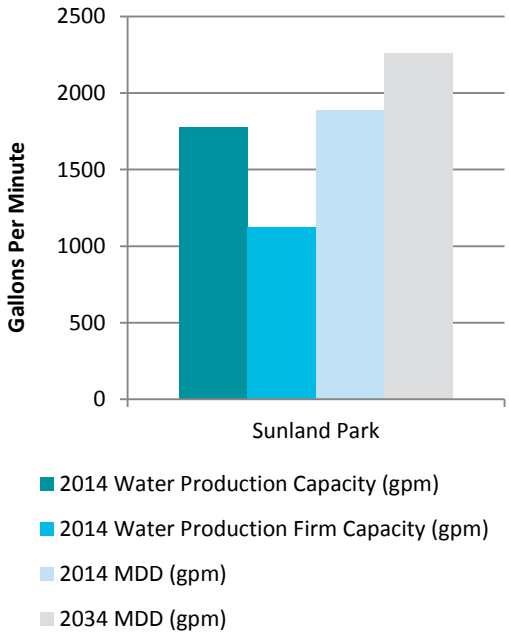


Figure 5-1 Water Production and Demand in the City of Sunland Park Service Area

To increase water production in the Sunland Park Service Area, CRRUA should replace Well 4. While the production of the old well is fairly low (250 gpm), it is expected that a new well drilled to modern standards will produce significantly more flow than 250 gpm. CRRUA applied for Colonias funding in 2014 to replace the well. The project was not selected for funding, primarily because CRRUA had not expended the Colonias funding it received in 2013 to replace Well 30. Well 4 should be replaced after Wells 19, 30, and 8A are replaced in the Santa Teresa Community Service Area.

CRRUA will need an additional 1,135 gpm of production capacity including production from a new Well 4 to meet future water demands in 2034. Approximately 400 gpm will be available to transfer from the Santa Teresa Community Arsenic Treatment Facility to the City of Sunland Park. Based on the hydraulic evaluation, this water transfer will reduce the demand deficit low enough so that Sunland Park will only require one additonal well. The locations of future wells will require a hydrogeologic evaluation and well siting study. It may be possible to replace existing Crowder wells that are in the vicinity of existing infrastructure in the City of Sunland Park. The need for additional wells should be re-evaulated if; the system has pressure and supply issues, after the current CIP projects are in place, and as construction progresses and actual demands are better defined.

New supply wells that are constructed in the City of Sunland Park Service Area may contain arsenic exceeding the MCL of 10 ppb. All of the existing wells in the City of Sunland Park currently contain arsenic that exceeds the MCL and water from the existing wells is treated at the City of Sunland Park Arsenic Treatment Facility. The treatment capacity of the arsenic treatment facility is 2.7 mgd (1,875 gpm). New wells in the City's system may require treatment or may be blended with treated water from the arsenic treatment facility. The need for treatment and the possibility of blending will be determined during development of new supply well(s).

The recommended water production improvements for the City of Sunland Park are:

1. Replace Well 4 within 100 ft of the existing well.
2. Drill one new well that has a minimum capacity of 500 gpm at a location to be determined.

Water Storage

The City of Sunland Park Service Area is able to meet existing water storage requirements. This service area will require 0.29 MG of additional storage to meet the future demands in 2034. The Santa Teresa Community Service Area will have a surplus storage that can be used for the City of Sunland Park once the CIP projects are completed and the service areas are interconnected. This will eliminate the need for additional tanks in the City of Sunland Park based on the current demand projections.

Booster Pumping Stations

The Sunland Park Service Area is a gravity system and does not have any booster stations.

Distribution and Transmission Mains

One major improvement to the Sunland Park transmission system is recommended:

1. Installation of a 12-inch water line in 1st Street from McNutt to western end of 1st Street.
2. Replace 8-inch line in McNutt Road with a 12-inch line.

A 12-inch main within 1st Street will provide a direct connection between the Meadow Vista Tank and the community south of Camino Real Drive. Prior to this installation, service was provided to this community via the Tierra Madre tank. The line from Tierra Madre provides service to several areas and connects to the McNutt Road line before reaching the community south of Camino Real Dr. During the 2034 MDD scenario, this area experiences pressures below 35 psi. This connection will allow for the Meadow Vista tank to provide water at a pressure greater than 35 psi. This waterline would also serve as a link between the McNutt Road waterline and the waterline that extends south from Mt Cristo Rey which would improve the overall reliability of the system.

Currently the 8-inch transmission main along McNutt Road between Country Club Road and Memorial Pines Lane is sufficiently sized to provide water with the proposed improvements. It is recommended that the 8-inch line in McNutt Road be replaced with a 12-inch line to improve overall transmission within the Sunland Park Service Area.

2034 Fire Flow Conditions

The City of Sunland Park has three low pressure areas based on the hydraulic analysis of the 2034 peak hour fire flow demand scenario. The residential area around Brickland Road is serviced by 4,000 feet of 6-inch waterline. The hydraulic analysis shows a deficiency in available pressure during fire flows in this area caused by the high head losses through the 6-inch waterline. It is recommended that a fire flow test be conducted in this area to determine if this is an actual concern or an issue with how the system is modeled.

Vicinity of McNutt Rd and Country Club Rd

The other two areas are east of McNutt Road and have similar issues with long lengths of small diameter waterlines. When these waterlines are analyzed under fire flow conditions, the headloss through the 8-inch and 6-inch waterlines is high enough to cause pressure deficiencies. It is recommended that fire flow tests be conducted in the vicinity of Country Club Road east of McNutt Road.

5.3 Santa Teresa Community Service Area

Water Production

The main issue in the Santa Teresa Community Service Area is water production. Two of the wells in the system (Wells 8A and 30) are out of service and Well 19 is partially collapsed, operating on a temporary submersible pump until the well is replaced. The service area is currently fed only by Well 31, the temporary pump in Well 19, and supplemented by Well 11A in Sunland Park.

CRRUA is planning to replace Wells 30 and 19 and has plans to reconnect Well 8A to the system. The existing system cannot meet existing MDD. Replacing Wells 30 and 19 and returning Well 8A to service will provide the system with a total production capability of approximately 3,050 gpm. This production capacity will exceed the existing demands with the largest well out of service. When all of the wells are returned to

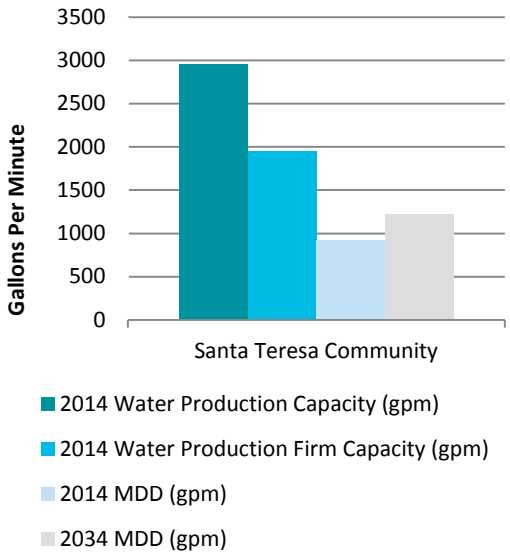


Figure 5-2 Water Production and Demand in the Santa Teresa Community Service Area

service, the system will have a firm capacity that is capable of meeting future demands and providing the City of Sunland Park with an estimated 800 gpm of water.

The Santa Teresa Community Service Area will produce an additional 832 gpm of capacity for the projected MDD in 2034 with the largest well out of service. A new well has not been proposed for the Santa Teresa community. One of the recommended projects is to install a 16-inch line in Airport Road between Pete Domenici Highway and the existing Airport Road PRV station.

The recommended water production improvements for the Santa Teresa Community Service Area are:

1. Repair and/or replace Wells 8A, 19, and 30

Water Storage

The Santa Teresa Community Service Area will have sufficient storage when the 2.0 MG tank comes into service when the arsenic treatment facility is constructed in 2015. In the 2034 MDD scenario the Santa Teresa Community will have an estimated 0.58 MG of surplus storage available.

Booster Pumping Stations

The Santa Teresa Community Service Area is a gravity system and does not have any booster stations.

Distribution and Transmission Mains

The major improvements to the Santa Teresa Community transmission system are recommended:

1. Install a new 12-inch waterline along Teresa Paseo Dr between Trevino Road and Country Club Road
2. Installation of a 10-inch waterline in McNutt Road between Killdeer Road and Airport Road
3. Upsize the 8-inch waterline along Feather Moon Dr to a 12-inch line

The Casas Bellas community currently receives water from the Tierra Madre tank or through the PRV station at Airport Road. During the 2034 MDD neither of these connections are capable of providing this community with sufficient water pressure. Installing an 8-inch main between McNutt Road and Feather Moon Drive will allow the new 2.0 MG tank at the Santa Teresa Community Arsenic Treatment Facility to provide water service to this area. The water from the Santa Teresa Community Arsenic Treatment Facility will provide service to this area at pressures greater than 35 psi. Additionally, this connection will allow for future buildout in this area, reduce the demand on the Tierra Madre tank, and provide the system with improved reliability.

To complete the connection to Villa Valencia, a 10-inch waterline will also be installed in McNutt between Airport Road and Killdeer Road.

Vicinity of McNutt Rd and Naranjo Rd

2034 Fire Flow Conditions

There are two areas in the Santa Teresa Community that the hydraulic analysis has identified as pressure deficient during fire flows conditions. One of the areas is east of McNutt near Naranjo Rd. There is only one 8-

inch waterline that services this area from McNutt. This line is approximately 1,800 feet long and is not capable of providing 1,000 gpm at 20 psi for the required 2 hours. It is possible that there is one or more additional small waterlines that serve this area that re not included in the water model. If no additional waterlines service this area, a fire flow and pressure test should be conducted to determine if sufficient pressure is available.

There is a high elevation area along Feather Moon Drive that the hydraulic analysis revealed a future issue with fire flow pressure. The low pressures along Feather Moon Drive during fire flow conditions are due to the segment of 8-inch waterline that services the Country Club Community. It is recommended to upgrade the 8-inch waterline to a 12-inch line along Feather Moon Drive. This new waterline would be capable of providing adequate pressures during the 2034 peak hour fire flow demands to all areas in eastern Santa Teresa. This 12-inch waterline will also allow additional flow from the Santa Teresa Community Arsenic Treatment Facility to transfer through McNutt to the City of Sunland Park.

Vicinity of Feather Moon Dr

5.4 Santa Teresa Industrial Park Service Area

Water Production

The Santa Teresa Industrial Park Service Area is currently served by Wells 5 and 6A. A new source of supply for the Santa Teresa Industrial Park Service Area is Well 14, which has been designed. This well will allow the Santa Teresa Industrial Park Service Area the ability to meet current MDD with the largest well out of service. Currently, if either Well 5 or Well 6A is out of service, there is only one well to supply the area.

Water from Well 5, Well 6A, and the future Well 14 will be treated for arsenic removal at the Santa Teresa Industrial Park Arsenic Treatment Facility. The Santa Teresa Industrial Park Service Area will require an additional 1,317 gpm to meet future MDD in 2034. The majority of the increased demand is from the buildout in Villa Valencia area.

All demands associated with the Rialta Mesa development will be addressed when the project is closer to construction and the demands are better defined.

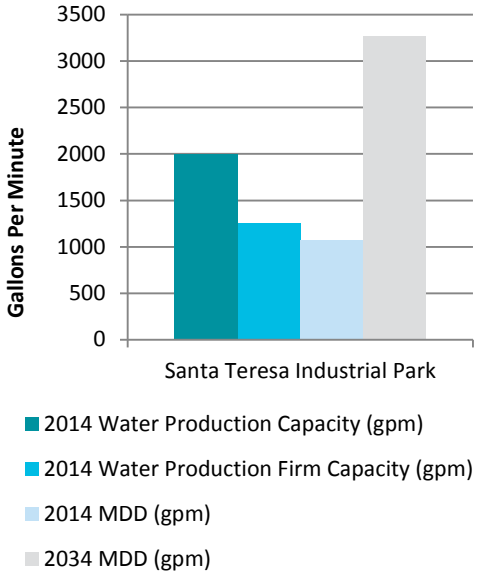


Figure 5-3 Water Production and Demand in the Santa Teresa Industrial Park Service Area

The recommended water production improvements for the Santa Teresa Industrial Park Service Area are:

1. Construct and connect Well 14 to the system.
2. Drill 2 or 3 new wells to meet future MDD with a minimum total supply of 1,400 gpm.

It is likely that any new wells in the Santa Teresa Industrial Park Service Area will require arsenic treatment. The Santa Teresa Industrial Park Arsenic Treatment Facility was designed to treat 3.6 MGD of flow and currently treats water from Wells 5 and 6A. There is additional treatment capacity at the arsenic treatment facility for additional wells. Blending with treated water is a possibility for future wells if treatment capacity is not available at the arsenic plant.

Water Storage

The 2 MG storage tank adjacent to the Santa Teresa Industrial Park Arsenic Treatment Facility provides adequate storage to meet requirement in the Santa Teresa Industrial Park Service Area. The 2.0 MG tank currently supplies a portion of the Santa Teresa Community Service Area between Airport Road and Pete Domenici Highway; however, the tank was not intended to serve this area. The tank was intended to provide storage for future development in the Santa Teresa Industrial Park and surrounding areas but since the water demand has not increased, the tank is used to solve a supply problem in the Santa Teresa Community. The demand from the Santa Teresa Community on the 2 MG Santa Teresa Industrial Park tank is expected to decrease once the 2 MG tank is constructed at the Santa Teresa Community Arsenic Treatment Facility.

The existing Well 5 storage tank has a capacity of 0.27 MG but a portion of the storage is reserved for fire storage in the system. Similarly, the existing Well 6 storage tank has a capacity of 1.0 MG but over half of the storage is reserved for fire storage for industrial businesses. The Santa Teresa Industrial Park system requires an additional 0.91 MG of storage to meet future storage demands.

The recommended storage improvement in the system to meet future demands is:

1. Construct a new 2.0 MG storage tank near the existing Well 6A storage tank.

Booster Pumping Stations

The existing Santa Teresa Industrial Park Well 5 Booster Station does not have the pumping capacity to meet current PHD with all pumps in service. Additionally, the existing Well 5 Booster Station does not have the pumping capacity to meet future MDD and PHD in 2034. When demands in the Santa Teresa Industrial Park Service Area increase, similar to those experienced recently with the UPRR construction project, the domestic pumps cannot meet demand which cause the fire pumps to operate. At the time this plan was written, information on future development in the Logistics Industrial Park and the surrounding areas was not available. However, the domestic pumps will need to be increase in size to meet the future domestic demand and it is quite possible that the fire pumps will need to be increased in size to meet required fire flows. Additional evaluation on this booster station shall be performed in the future.

The Santa Teresa Industrial Park Well 6A Booster Station was replaced in 2014 and has the pumping capacity to meet current and future peak hour demands and fire flows with the largest pump out of service. The new booster station is operating as designed and no improvements are recommended.

Distribution and Transmission Mains

The one major improvement to the Santa Teresa Industrial Park transmission system is as follows:

1. Installation of a 16-inch waterline in Airport Road from the existing PRV station to Pete Domenici Highway.

Hydraulic modeling showed that the existing 12-inch main in Pete Domenici Highway does not have adequate capacity to meet the projected water demands of the both the Santa Teresa Community Service Area and the proposed Villa Valencia development. The demand in the Santa Teresa Community will be supplemented by a 16-inch main along Airport Road that will connect the tank at Well 6 to the Airport Road PRV station. The existing main will also be supplemented with the loop installed around Villa Valencia.

2034 Fire Flow Conditions

The current water distribution system including the Airport Road connection will not be able to provide fire flows at sufficient pressure to the Villa Valencia area once buildout is complete. In order to supply 1,000 gpm at 20 psi to the residential Villa Valencia area, CRRUA should evaluate adjusting PRV settings in the PRVs along Pete Domenici Highway and the PRV station in Airport Road to determine if additional flow to this area can be achieved without causing any damage to the existing infrastructure. Alternatively, additional storage may be required. The location of this tank should be near the connection of the Airport Road and Pete Domenici Highway lines. This tank is required to meet the 2034 storage requirements and will allow fire flow at sufficient pressure to reach the Villa Valencia area during 2034 peak hour fire flow scenarios.

5.5 Border Service Area

Water Production

The Border Service Area has a water production capacity of 2,200 gpm and a firm capacity of 700 gpm with the largest well out of service. This service area is able to meet current and future ADD and MDD.

The demand in this service area is very small; therefore, there is potential to use this water in another service area. All of the wells in this system have arsenic concentrations slightly higher than the MCL. If the Border Service Area was connected to another service area system, the following questions would need to be evaluated:

1. Does the Santa Teresa Industrial Park Arsenic Treatment Facility or Santa Teresa Community Arsenic Treatment Facility have additional treatment capacity? The Sunland Park Arsenic Treatment Facility is at capacity.

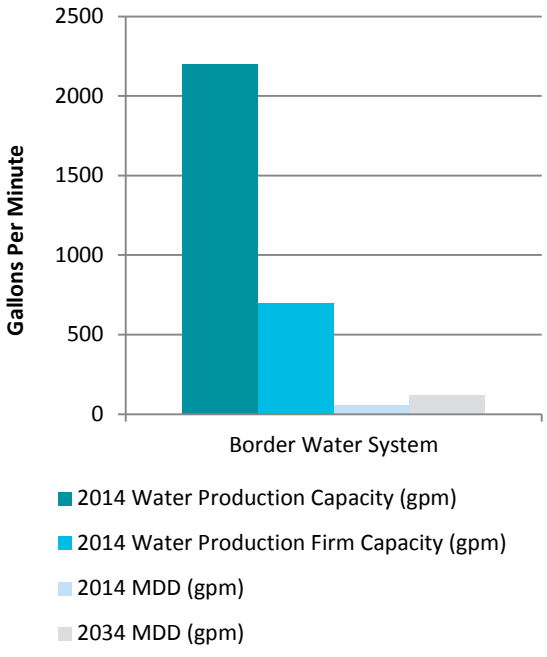


Figure 5-4 Water Production and Demand in the Border Service Area

2. Can the water be blended with low arsenic finished water from one of the arsenic treatment facilities?

3. Is a new arsenic treatment facility required to treat water from the Border Service Area?

The 16-inch main in Pete Domenici Highway was installed in 2012 to provide additional fire flow to the Bi-National Industrial Park from the Santa Teresa Industrial Park Service Area. The existing 0.27 MG storage tank has limited storage capacity and may not be able to provide adequate storage to meet fire flow requirements for large warehouse type structures. Constructing a larger storage tank at the Border may be a better solution and the 16-inch main could be used for other transmission purposes.

Water Storage

The 0.27 MG storage tank in the Border Service Area provides adequate storage capacity during normal operation; however, does not have enough storage to meet fire flows of 3000 gpm for 3 hours required for the Bi-National Industrial Park Service Area. This service area would require additional flow from the Santa Teresa Industrial Park in the event of a fire.

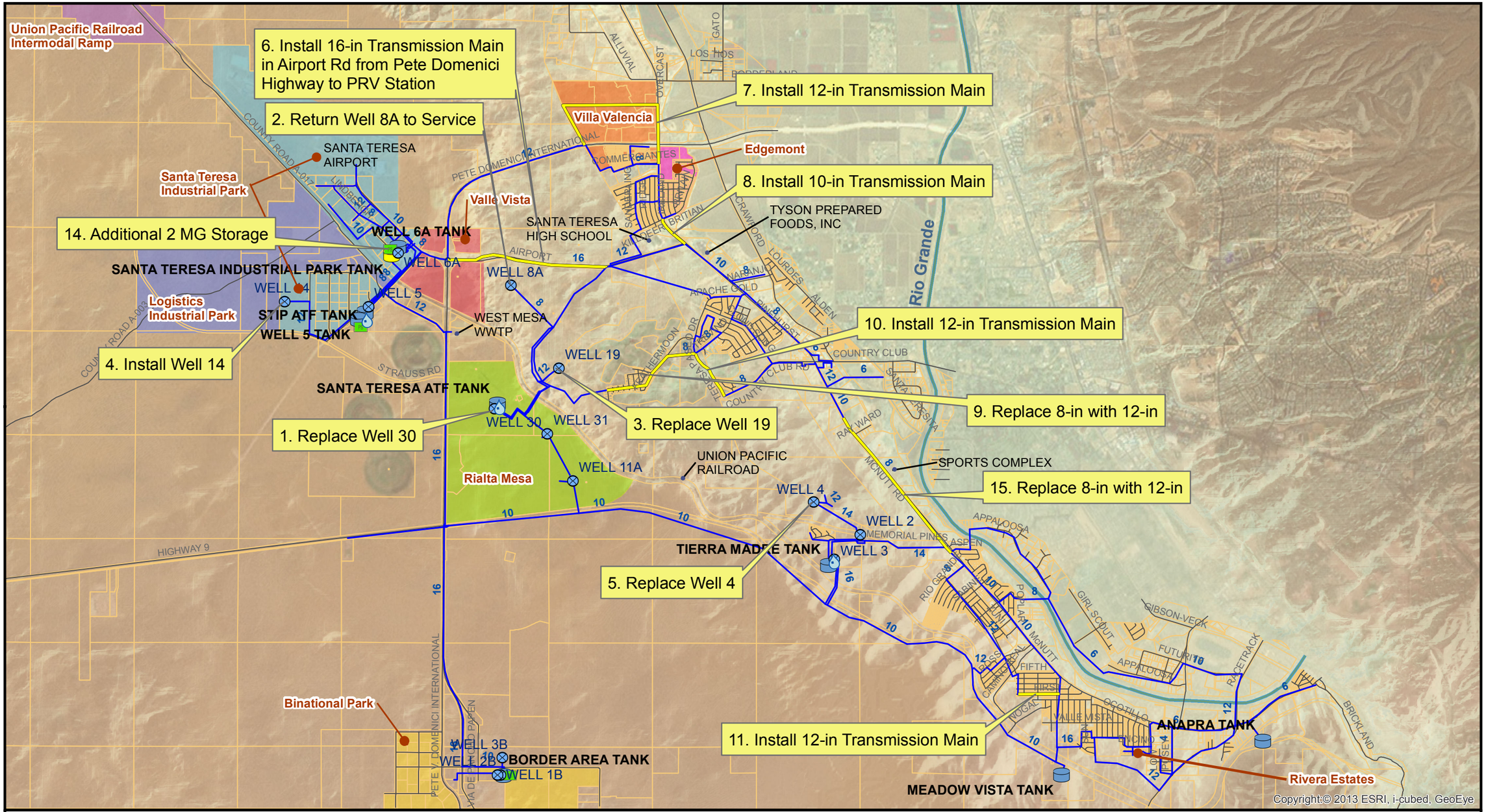
Booster Pumping Stations

The Border Booster Station provides adequate distribution and fire flow capacity with the additional flow from the Santa Teresa Industrial Park Service Area.

Distribution and Transmission Mains

No distribution and transmission improvements are recommended for the Border Service Area.

All recommended distribution system improvements to CRRUA's water system are shown on **Figure 5-5**.



Legend

- Existing and Proposed CIP Well
- Existing Tank
- Proposed Future Tank
- Booster Station
- Existing and Proposed CIP ATF
- Existing Pipe
- Proposed Future Pipe
- Parcels

Camino Real Regional Utility Authority
Water Infrastructure Plan

Recommended Improvements
Figure 5-5

0 2,500 5,000 Feet

CAMINO REAL REGIONAL CRUA UTILITY AUTHORITY

CDM Smith

LarsonRL L:\CRRUA WIP Modeling\GIS\1 Figure MXDs\FIG 5-1_11x17_20140912.mxd 9/16/2014

5.6 Opinion of Probable Construction Costs

A conceptual opinion of probable construction cost was prepared for each of the recommended improvements described above and shown in **Table 5-1**. The opinion of probable construction costs includes the following assumptions:

- Costs for new wells include drilling and equipping the well, construction of a well control building, and disinfection with chlorine gas. Costs for possible arsenic treatment of the new wells are **not** included in the estimate.
- Construction contingency of 20 percent
- Allowance for engineering, permitting, administrative costs, and fees at 18 percent of estimated total construction cost
- Total Project Cost includes NMGRT at 6.375 percent

The estimated construction costs for the recommended water system improvements are presented in **Table 5-1**. Detailed cost estimates are provided in **Appendix D**.

Table 5-1 Opinion of Probable Construction Costs

Description	Est. Raw Construction Costs	Construction Contingency (20%)	Est. Total Construction Costs	Engineering, Permitting, Administration, and Fees (18%)	Est. Total Project Costs (Includes NMGRT 6.375%)
1. Replace Well 30	$1,000,000	$200,000	$1,200,000	$216,000	**$1,510,000**
2. Replace Well 8A Pump Building	$410,000	$82,000	$490,000	$88,200	**$620,000**
3. Replace Well 19	$1,000,000	$200,000	$1,200,000	$216,000	**$1,510,000**
4. Replace Well 14	$1,200,000	$240,000	$1,440,000	$259,200	**$1,810,000**
5. Replace Well 4	$1,000,000	$200,000	$1,200,000	$216,000	**$1,510,000**
7. 16" Airport Road Line (8,000 LF)	$520,000	$104,000	$620,000	$111,600	**$780,000**
7A. 12" Villa Valencia Loop (9,100 LF)	**This line and crossing will be installed by the developer**				
7B. 12" Villa Valencia Loop (1,000 LF)	$60,000	$12,000	$70,000	$12,600	**$90,000**
8. 10" Connection to McNutt (2,000 LF)	$120,000	$24,000	$140,000	$25,200	**$180,000**
9. 12" Feather Moon Drive (5,500 LF)	$330,000	$66,000	$400,000	$72,000	**$500,000**
10. 12" Teresa Paseo Line (3,000 LF)	$180,000	$36,000	$220,000	$39,600	**$280,000**
11. 12" 1st Street Line (2,200 LF)	$132,000	$26,400	$160,000	$28,800	**$200,000**
12. Drill 1 new well in Sunland Park	$1,000,000	$200,000	$1,200,000	$216,000	**$1,510,000**
13. Drill 2 new wells in the STIP	$2,000,000	$400,000	$2,400,000	$432,000	**$3,010,000**
14. 2.0 MG Storage Tank in STIP	$1,100,000	$220,000	$1,320,000	$237,600	**$1,660,000**
15. 12" McNutt Road (8,500 LF)	$510,000	$102,000	$610,000	$109,800	**$770,000**
Total	**$10,562,000**	**$2,112,400**	**$12,670,000**	**$2,280,500**	**$16,000,000**

(1) The cost for STIP wells assumes that 2 wells can meet the future supply requirements.
(2) This cost is only for 1 well and assumes that the additional water demand requirement will be provided by Santa Teresa.

5.7 Project Priority and Phasing

As described in Section 4, water production and storage are the two areas that require immediate attention. The Santa Teresa Community Arsenic Treatment Facility project will alleviate storage issues in the Santa Teresa Community Service Area and also allow two existing wells to be placed back into service, which will help both the Santa Teresa Community and Sunland Park Service Areas to address existing deficits in water production. However, the following improvements need to be implemented to address production, storage, and transmission deficiencies in other systems. The projects are listed in order of priority:

1. Replace Well 30 in Santa Teresa Community
2. Replace Well 8A pump building and return well to service in Santa Teresa Community
3. Replace Well 19 in Santa Teresa Community
4. Replace Well 14 in Santa Teresa Industrial Park
5. Replace Well 4 in the City of Sunland Park
6. Install the 16-inch Airport Road water main
7. Install the 12-inch Villa Valencia loop line to alleviate pressure issues (majority of this project will be constructed by Villa Valencia developers)
8. Connect the 10-inch line at McNutt Road and the Edgemont subdivision
9. Replace the existing 8-inch line in Feather Moon Drive with a 12-inch line
10. Install a 12-inch line in Teresa Paseo Dr between Trevino Road and Country Club Road
11. Install a 12-inch line in 1st Street between Linda Vista Dr and the 12-inch main on the west end of 1st Street
12. Drill one new well in the Sunland Park Service Area
13. Drill two new wells in the Santa Teresa Industrial Park Service Area
14. Install a new 2.0 MG storage tank in the Santa Teresa Industrial Park Service Area
15. Upsize approximately 8,500 ft of 8-inch line in McNutt Road to a 12-inch line (from approximately Laura Court to Aspen Drive)

5.8 Proposed Arsenic Treatment Facilities

CRRUA has designed three regional Arsenic Treatment Facilities (Camino Real Regional Utility Authority Arsenic Treatment Facilities Preliminary Engineering Report, CDM, March 24, 2009), two of which have been constructed. The third Arsenic Treatment Facility will be constructed in the Santa Teresa Community, near the existing Well 30 site. The Sunland Park Arsenic Treatment Facility and Santa Teresa Industrial Park Arsenic Treatment Facility are currently operational.

5.8.1 Sunland Park Arsenic Treatment Facility

The Sunland Park Arsenic Treatment Facility has been in operation since 2011 and is located adjacent to Well 3 off of Memorial Pines Ln. The facility has a treatment capacity of 2.7 MGD (1,875 gpm) and was designed to treat water from Wells 2, 3, 4, and 11A. Well 4 is currently out of service and the facility will initially treat 2.34 MGD (1,625 gpm). When Well 4 is returned to service, this arsenic treatment facility will be at maximum capacity; however, the facility has a bypass line which will allow CRRUA to blend raw and finished water at a ratio of 75/25 so that the concentration of arsenic in the finished water is less than 8 ppb.

Finished water fills the Tierra Madre tank which fills the Meadow Vista and Anapra Tanks. The Tierra Madre Tank is 135 feet higher than the Meadow Vista and Anapra tanks and two PRVs are required to reduce the pressure from the Tierra Madre Tank in the Sunland Park Service Area. One PRV will be located on the 12-inch finished water pipeline in Memorial Pines Ln that connects to the existing 14-inch transmission main. The second PRV is on the existing 10-inch main in the abandoned Southern Pacific Railroad right-of-way upstream of the Meadow Vista Tank.

5.8.2 Santa Teresa Industrial Park Arsenic Treatment Facility

The Santa Teresa Industrial Park Arsenic Treatment Facility has been operational since 2013. The Santa Teresa Industrial Park Arsenic Treatment Facility is located next to the Well 5 Booster Pump Station and storage tank facilities on Industrial Drive. The facility has a treatment capacity of 3.6 mgd (2,500 gpm) and treats raw water from Well 5, Well 6A, and future Well 14. The facility currently treats 1.8 mgd and the remaining capacity is reserved for future Well 14. Blending is not an option at this facility due to the high arsenic concentrations in Wells 5 and 6A.

Finished water from the arsenic treatment facility fills the existing 0.27 MG storage tank and the new 2.0 MG storage tank. A dedicated transfer (booster) station is used to pump finished water from the 2.0 MG storage tank back to the existing 1.0 MG tank located near Well 6 through an 8-inch finished water transmission main.

5.8.3 Santa Teresa Community Arsenic Treatment Facility

The Santa Teresa Community Arsenic Treatment Facility will be located adjacent to Well 30 in an undeveloped area approximately 1.5 miles east of Pete Domenici Highway. The proposed arsenic treatment facility will have a treatment capacity of 4.5 mgd (3,125 gpm) and will treat Wells 8A, 19, 31, and 30 with capacity for Well 11A from Sunland Park. Wells 8A and 30 are currently out of service and Well 30 is being replaced around the time of construction of the arsenic treatment facility. Well 8A is expected to be brought back on line shortly after the arsenic treatment facility is completed. Treated water will be blended with raw water at a ratio of 75/25 so that the concentration of arsenic in the finished water is less than 8 ppb.

Raw water from Wells 8A and 19 will be directed to the proposed arsenic treatment facility through new raw water transmission mains. Raw water from Wells 31 and 30 will be directed to the arsenic treatment facility through existing well discharge lines. Finished water will be stored in a new 2.0 MG storage tank included in the project. The 2.0 MG storage tank will eliminate the existing storage deficiency in the system and provide storage to meet existing demands. Finished water will flow by gravity through a new 12-inch transmission main from the new storage tank to the connection from the existing 0.5 MG storage tank which controls the pressure in the Santa Teresa Community Service Area.

Appendix A
Large Maps

Appendix A includes Figure 3-1 and Figure 5-5 provided as 22”x34” maps. These maps are only included in the hard copies of the report.

Appendix B
Full Available Well Production Data

Appendix B
Well Production Data

Year	Month	Sunland Park Well 2	Sunland Park Well 3	Sunland Park Well 4	Sunland Park Well 11/11A	STIP Well 5	STIP Well 6/6A	Santa Teresa Community Well 8/8A	Santa Teresa Community Well 31	Sunland Park/Santa Teresa Well 19	Sunland Park/Santa Teresa Well 30	Border Area Well 1	Border Area Well 2	Border Area Well 3	Total All Wells	Total Sunland Park 2, 3, 11A	Total Santa Teresa Community 8A, 19, 30, 31	Total STIP 5, 6A	Total Border Area 1, 2, 3
		gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	**gallons pumped**	gallons pumped	gallons pumped	gallons pumped	gallons pumped
	LRG #	**3695-S**	**3695-S-2**	**LRG-6307-S-3**	**3695-S-3**	**9356-S-3**	**3150-POD38**	**LRG-3695-S-3**	**3150-S-30**	**3150-S-18**	**LRG-3150-S-29**	**9,356**	**9356-S**	**9356-S-2**					
2006	January	28,590,500	0	0	365,200	788,000	3,560,600	19,884,600	72,600	0	1,240,500				**54,502,000**	28,897,180	21,256,220	4,348,600	0
2006	February	24,615,500	0	0	681,300	1,111,000	2,012,100	20,802,000	0	0	2,094,800				**51,316,700**	25,160,540	23,033,060	3,123,100	0
2006	March	27,644,400	0	0	5,122,300	5,136,000	5,108,600	22,982,400	727,400	0	7,758,100				**74,479,200**	31,887,720	32,346,880	10,244,600	0
2006	April	21,643,200	0	0	13,301,500	6,241,000	8,144,800	23,060,900	11,487,200	0	3,840,000				**87,718,600**	34,581,840	38,750,960	14,385,800	0
2006	May	24,671,300	0	0	15,275,600	3,281,000	10,170,900	19,639,400	6,291,000	0	1,785,500				**81,114,700**	38,149,980	29,512,820	13,451,900	0
2006	June	24,352,300	17,693,700	0	14,811,900	0	14,120,400	21,110,800	9,973,300	36,447,300	220,300				**138,730,000**	55,890,180	68,719,420	14,120,400	0
2006	July	21,560,600	9,131,400	0	14,040,000	3,328,000	10,763,800	22,218,200	11,080,800	22,106,500	0				**114,229,300**	44,140,160	55,997,340	14,091,800	0
2006	August	26,529,300	11,151,000	0	11,140,400	2,151,000	7,091,300	18,469,500	6,358,700	10,308,000	0				**93,199,200**	47,864,360	36,092,540	9,242,300	0
2006	September	24,811,100	0	0	17,280,000	1,261,000	7,387,600	15,266,700	6,617,900	14,172,800	0				**86,797,100**	39,958,680	38,189,820	8,648,600	0
2006	October	25,638,100	0	0	6,912,000	1,701,000	6,088,100	7,864,700	8,173,000	17,445,200	0				**73,822,100**	32,802,300	33,230,700	7,789,100	0
2006	November	23,760,000	0	0	2,880,000	1,208,000	4,055,000	8,700,800	7,852,300	19,541,500	0				**67,997,600**	27,634,460	35,100,140	5,263,000	0
2006	December	22,783,200	0	0	1,952,500	1,940,000	2,766,200	0	3,426,100	21,081,000	0				**53,949,000**	25,030,420	24,212,380	4,706,200	0
	TOTAL 2006	**296,599,500**	**37,976,100**	**0**	**103,762,700**	**28,146,000**	**81,269,400**	**200,000,000**	**72,060,300**	**141,102,300**	**16,939,200**	**0**	**0**	**0**	**977,855,500**	**431,997,820**	**436,442,280**	**109,415,400**	**0**
2007	January	23,764,100	0	0	1,472,700	588,000	0	0	0	0	0				**25,824,800**	24,942,260	294,540	588,000	0
2007	February	22,211,000	0	0	0	852,000	0	0	0	0	0				**23,063,000**	22,211,000	0	852,000	0
2007	March	24,590,700	0	0	7,620,700	895,000	0	0	0	0	0				**33,106,400**	30,687,260	1,524,140	895,000	0
2007	April	23,797,400	0	0	23,141,700	1,163,000	0	0	0	0	0				**48,102,100**	42,310,760	4,628,340	1,163,000	0
2007	May	23,963,000	0	0	20,386,900	1,304,000	0	0	0	0	0				**45,653,900**	40,272,520	4,077,380	1,304,000	0
2007	June	26,854,500	15,607,000	0	27,972,000	3,357,000	0	0	0	0	0				**73,790,500**	64,839,100	5,594,400	3,357,000	0
2007	July	12,214,100	8,532,900	0	26,300,000	2,106,000	9,965,700	492,300	7,740,900	18,576,300	0				**85,928,200**	43,335,180	30,521,320	12,071,700	0
2007	August	3,576,300	644,700	0	28,021,200	1,997,000	8,649,200	18,218,700	8,769,600	18,662,400	0				**88,539,100**	28,391,880	49,501,020	10,646,200	0
2007	September	5,326,800	387,200	0	28,889,000	1,847,000	8,141,400	7,863,100	11,259,700	18,511,500	0				**82,225,700**	31,077,140	41,160,160	9,988,400	0
2007	October	3,932,000	387,200	0	29,833,000	1,487,000	5,883,200	2,716,900	8,622,700	16,953,400	0				**69,815,400**	29,910,140	32,535,060	7,370,200	0
2007	November	12,162,700	0	0	26,521,500	1,100,000	2,980,100	0	0	19,681,500	0				**62,445,800**	33,379,900	24,985,800	4,080,100	0
2007	December	7,723,300	0	0	25,895,600	767,000	2,127,600	0	0	19,261,400	0				**55,774,900**	28,439,780	24,440,520	2,894,600	0
	TOTAL 2007	**190,115,900**	**25,559,000**	**0**	**246,054,300**	**17,463,000**	**37,747,200**	**29,291,000**	**36,392,900**	**111,646,500**	**0**	**0**	**0**	**0**	**694,269,800**	**419,796,920**	**219,262,680**	**55,210,200**	**0**
2008	January	13,666,800	1,615,200	0	15,542,900	1,052,000	2,376,100	2,384,500	0	18,723,300	0				**55,360,800**	27,716,320	24,216,380	3,428,100	0
2008	February	11,131,200	0	0	1,818,500	1,527,000	2,078,500	0	0	17,233,400	0				**33,788,600**	12,586,000	17,597,100	3,605,500	0
2008	March	20,925,100	0	0	15,097,000	1,191,000	3,839,000	0	0	16,942,000	0				**57,994,100**	33,002,700	19,961,400	5,030,000	0
2008	April	26,372,000	0	0	28,541,800	3,836,000	4,705,600	7,827,600	0	12,179,500	0				**83,462,500**	49,205,440	25,715,460	8,541,600	0
2008	May	27,529,900	2,224,100	0	27,873,700	4,833,000	256,400	19,733,700	0	10,223,000	0				**92,673,800**	52,052,960	35,531,440	5,089,400	0
2008	June	35,452,100	15,269,900	0	27,415,400	13,822,000	6,825,100	12,716,500	0	14,241,200	0				**125,742,200**	72,654,320	32,440,780	20,647,100	0
2008	July	17,402,100	14,190,200	0	24,149,500	10,755,000	7,364,000	0	1,950,700	15,011,400	0				**90,822,900**	51,302,040	21,401,860	18,119,000	0
2008	August	19,171,700	6,854,400	0	29,222,600	11,477,000	8,683,900	0	2,555,200	14,379,900	0				**92,344,700**	49,915,220	22,268,580	20,160,900	0
2008	September	4,714,600	8,122,300	0	26,801,800	9,623,000	7,104,500	0	3,993,000	11,667,800	0				**72,027,000**	35,076,940	20,222,560	16,727,500	0
2008	October	977,400	10,683,300	0	25,591,600	9,193,000	5,645,000	0	6,253,900	10,532,800	0				**68,877,000**	33,384,760	20,654,240	14,838,000	0
2008	November	12,589,500	3,670,000	0	16,319,400	8,813,000	4,927,900	0	6,857,900	8,806,900	0				**61,984,600**	30,686,600	17,557,100	13,740,900	0
2008	December	29,277,100	657,800	0	1,059,900	6,616,000	2,371,600	0	8,369,000	7,733,900	0				**56,085,300**	32,456,620	14,641,080	8,987,600	0
	TOTAL 2008	**219,209,500**	**63,287,200**	**0**	**239,434,100**	**82,738,000**	**56,177,600**	**42,662,300**	**29,979,700**	**157,675,100**	**0**	**0**	**0**	**0**	**891,163,500**	**480,039,920**	**272,207,980**	**138,915,600**	**0**
2009	January	21,883,700	3,800	0	0	6,994,000	2,269,800	0	12,503,500	5,582,300	0				**49,237,100**	24,388,200	15,585,100	9,263,800	0
2009	February	22,309,300	4,299,600	0	0	8,886,000	2,406,400	0	5,546,200	10,355,900	0				**53,803,400**	27,718,140	14,792,860	11,292,400	0
2009	March	22,811,000	8,223,500	0	7,877,900	9,542,000	4,532,000	0	10,521,000	3,852,800	0				**67,360,200**	39,441,020	13,845,180	14,074,000	0
2009	April	24,875,900	12,526,300	0	6,012,100	10,035,000	5,366,500	0	18,680,400	7,152,900	0				**84,649,100**	45,947,960	23,299,640	15,401,500	0
2009	May	23,451,100	11,439,600	0	27,506,000	14,859,000	7,547,400	0	18,862,500	3,875,300	0				**107,540,900**	60,668,000	24,466,500	22,406,400	0
2009	June	24,639,800	9,217,800	0	28,509,700	13,253,000	8,340,100	0	131,900	7,038,300	0				**91,130,600**	56,691,740	12,845,760	21,593,100	0
2009	July	24,351,700	13,109,200	0	29,428,500	13,479,000	9,083,600	0	2,786,300	9,712,300	0				**101,950,600**	61,560,960	17,827,040	22,562,600	0
2009	August	26,608,200	12,488,900	0	30,632,500	17,352,000	8,442,400	0	18,752,900	3,174,800	0				**117,451,700**	67,353,680	24,303,620	25,794,400	0
2009	September	20,567,100	5,793,300	0	28,123,500	9,589,000	7,665,800	0	17,507,600	2,143,000	0				**91,389,300**	52,360,720	21,773,780	17,254,800	0
2009	October	15,587,900	3,773,600	0	29,628,000	9,491,000	5,421,200	0	3,248,200	11,757,000	0				**78,906,900**	43,713,540	20,281,160	14,912,200	0
2009	November	12,980,300	3,434,100	0	18,817,800	7,719,000	3,250,800	0	5,928,800	9,245,100	0				**61,375,900**	32,654,400	17,751,700	10,969,800	0
2009	December	20,992,100	1,744,500	0	37,487,000	5,930,000	2,788,100	0	4,640,900	12,837,200	0				**86,419,800**	53,654,380	24,047,320	8,718,100	0
	TOTAL 2009	**261,058,100**	**86,054,200**	**0**	**244,023,000**	**127,129,000**	**67,114,100**	**0**	**119,110,200**	**86,726,900**	**0**	**0**	**0**	**0**	**991,215,500**	**566,152,740**	**230,819,660**	**194,243,100**	**0**

Appendix B
Well Production Data

Year	Month	Sunland Park Well 2	Sunland Park Well 3	Sunland Park Well 4	Sunland Park Well 11/11A	STIP Well 5	STIP Well 6/6A	Santa Teresa Community Well 8/8A	Santa Teresa Community Well 31	Sunland Park/Santa Teresa Well 19	Sunland Park/Santa Teresa Well 30	Border Area Well 1	Border Area Well 2	Border Area Well 3	Total All Wells	Total Sunland Park 2, 3, 11A	Total Santa Teresa Community 8A, 19, 30, 31	Total STIP 5, 6A	Total Border Area 1, 2, 3
		gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	gallons pumped	**gallons pumped**	gallons pumped	gallons pumped	gallons pumped	gallons pumped
2010	January	3,401,100	0	0	28,736,900	7,478,000	2,990,300	0	3,258,500	14,962,300	0				**60,827,100**	27,042,320	23,316,480	10,468,300	0
2010	February	13,828,300	43,200	0	14,943,000	5,962,000	2,427,800	0	6,571,600	9,568,300	0				**53,344,200**	27,140,220	17,814,180	8,389,800	0
2010	March	19,856,400	1,396,100	0	11,524,000	9,901,000	3,036,900	0	20,021,800	1,723,100	0				**67,459,300**	34,476,060	20,045,340	12,937,900	0
2010	April	20,908,500	644,200	0	34,611,900	10,189,000	4,456,000	0	12,378,500	4,757,200	0				**87,945,300**	51,717,920	21,582,380	14,645,000	0
2010	May	26,137,700	10,743,400	0	31,563,400	1,221,000	19,991,900	0	3,697,900	4,757,200	0				**98,112,500**	62,871,400	14,028,200	21,212,900	0
2010	June	26,472,200	6,887,700	0	27,126,400	202,000	25,456,700	0	18,366,800	2,953,600	0				**107,465,400**	58,734,380	23,072,320	25,658,700	0
2010	July	25,833,600	12,034,100	0	12,845,100	6,428,000	21,646,700	0	13,972,200	15,163,300	0				**107,923,000**	50,938,220	28,910,080	28,074,700	0
2010	August	25,452,900	10,961,600	0	27,710,200	7,933,000	23,289,400	0	943,100	15,035,300	0				**111,325,500**	58,771,280	21,331,820	31,222,400	0
2010	September	21,325,800	2,635,900	0	29,129,900	5,635,000	22,993,200	0	8,848,200	6,863,100	0				**97,431,100**	49,035,260	19,767,640	28,628,200	0
2010	October	8,217,500	6,849,600	0	0	616,000	18,390,200	0	19,154,100	200	0				**53,227,600**	18,897,920	15,323,480	19,006,200	0
2010	November	0	9,522,300	0	20,105,000	972,400	14,891,500	0	7,318,100	7,380,500	0				**60,189,800**	27,069,920	17,255,980	15,863,900	0
2010	December	0	3,323,800	0	23,308,800	2,166,000	12,470,000	0	797,500	13,627,600	0				**55,693,700**	22,130,340	18,927,360	14,636,000	0
TOTAL 2010		**191,434,000**	**65,041,900**	**0**	**261,604,600**	**58,703,400**	**172,040,600**	**0**	**115,328,300**	**96,791,700**	**0**	**0**	**0**	**0**	**960,944,500**	**488,825,240**	**241,375,260**	**230,744,000**	**0**
2011	January	-	6,377,600		31,569,200		10,895,000		-	11,134,600					**59,976,400**	31,632,960	17,448,440	10,895,000	0
2011	February	34,800	1,360,800		25,207,800		16,453,000		11,327,000	7,124,900					**61,508,300**	23,827,240	21,228,060	16,453,000	0
2011	March	31,300,100	1,176,100		45,800		23,626,700		19,013,300	10,227,200					**85,389,200**	36,315,500	25,447,000	23,626,700	0
2011	April	10,798,900	2,359,600		28,414,900		20,969,000		19,195,300	15,818,900					**97,556,600**	39,729,480	36,858,120	20,969,000	0
2011	May	20,428,600	9,028,900		16,594,200		21,372,300		19,467,500	15,886,700					**102,778,200**	46,626,360	34,779,540	21,372,300	0
2011	June	25,173,200	17,988,500		13,603,500		20,709,200		13,622,800	15,149,800					**106,247,000**	56,769,060	28,768,740	20,709,200	0
2011	July	20,778,600	14,389,800		30,568,700		26,757,800		21,830,300	14,616,400					**128,941,600**	63,989,420	38,194,380	26,757,800	0
2011	August	19,050,500	15,351,700		29,074,000		27,210,600		13,861,600	13,782,500					**118,330,900**	60,433,720	30,686,580	27,210,600	0
2011	September	18,552,100	13,896,300		24,366,100		24,320,800		20,111,200	12,006,600					**113,253,100**	55,963,520	32,968,780	24,320,800	0
2011	October	7,107,200	16,875,700		25,778,400		7,336,100		-	5,277,600					**62,375,000**	44,605,620	10,433,280	7,336,100	0
2011	November	844,300	16,654,200		25,618,700		10,028,200		-	11,213,100					**64,358,500**	37,993,460	16,336,840	10,028,200	0
2011	December	1,515,800	15,426,400		29,056,200		13,070,700		-	1,084,100					**60,153,200**	40,187,160	6,895,340	13,070,700	0
TOTAL 2011		**155,584,100**	**130,885,600**	**0**	**279,897,500**	**0**	**222,749,400**	**0**	**138,429,000**	**133,322,400**	**0**	**0**	**0**	**0**	**1,060,868,000**	**538,073,500**	**300,045,100**	**222,749,400**	**0**
2012	January	141,400	16,747,700		18,063,100		11,014,900		-	11,828,000					**57,795,100**	31,339,580	15,440,620	11,014,900	0
2012	February	800,500	15,194,200		25,140,500		12,278,800		-	11,496,500					**64,910,500**	36,107,100	16,524,600	12,278,800	0
2012	March	10,619,200	14,402,100		29,935,100	148,700	14,937,100		-	12,770,200		436,900	413,600	-	**83,662,900**	48,969,380	18,757,220	15,085,800	850,500
2012	April	19,363,800	10,139,300		22,468,300	9,187,000	12,185,300		-	11,698,600		654,700	1,214,000	-	**86,911,000**	47,477,740	16,192,260	21,372,300	1,868,700
2012	May	17,130,700	14,288,100		22,183,800	9,786,000	25,235,900		9,889,100	11,699,000		576,100	1,851,700	-	**112,640,400**	51,143,660	24,047,040	35,021,900	2,427,800
2012	June	20,025,400	11,093,600		27,343,900	11,465,000	24,386,700		20,476,600	10,615,200		412,300	1,976,400	-	**127,795,100**	57,089,440	32,465,260	35,851,700	2,388,700
2012	July	15,829,400	12,492,300		25,240,500	13,679,000	22,599,500		2,709,800	9,207,100		513,900	1,894,900	-	**104,166,400**	49,056,060	16,423,040	36,278,500	2,408,800
2012	August	18,017,900	11,475,600		24,054,300	9,064,600	28,377,900		-	10,051,400		376,800	2,743,400	-	**104,161,900**	48,736,940	14,862,260	37,442,500	3,120,200
2012	September	10,987,700	11,613,600		21,962,900	932,600	20,662,200		21,105,800	2,042,300		205,500	2,327,600	-	**91,840,200**	44,392,780	23,319,520	21,594,800	2,533,100
2012	October	10,524,300	14,818,700		16,766,600	3,681,000	26,356,600		21,155,300	770,000		94,200	1,019,100	927,466	**96,113,266**	42,987,340	21,047,560	30,037,600	2,040,766
2012	November	9,601,700	13,542,700		10,070,800	6,605,000	21,661,400		17,351,300	-		41,800	454,600	72,533	**79,401,833**	34,671,300	15,895,200	28,266,400	568,933
2012	December	7,356,700	16,319,800		9,040,500	7,657,000	21,386,600		10,614,000	-		69,600	778,100	-	**73,222,300**	33,031,700	10,299,300	29,043,600	847,700
TOTAL 2012		**140,398,700**	**162,127,700**	**0**	**252,270,300**	**72,205,900**	**241,082,900**	**0**	**103,301,900**	**92,178,300**	**0**	**3,381,800**	**14,673,400**	**999,999**	**1,082,620,899**	**525,003,020**	**225,273,880**	**313,288,800**	**19,055,199**
2013	January	15,189,700	15,790,300		14,200	8,359,000	19,722,400		10,815,200	-		104,000	694,900	1,141,001	**71,830,701**	33,154,400	8,655,000	28,081,400	1,939,901
2013	February	15,295,400	13,253,900		2,734,800	8,491,000	21,137,600		11,804,000	-		93,100	287,300	397,400	**73,494,500**	33,097,940	9,990,160	29,628,600	777,800
2013	March	18,604,500	14,115,700		13,116,400	16,361,000	23,751,200		7,639,100	910,100		29,100	412,100	452,800	**95,392,000**	44,741,140	9,644,660	40,112,200	894,000
2013	April	17,840,500	13,308,300		25,358,100	18,984,000	23,664,200		-	3,138,800		56,200	590,500	696,700	**103,637,300**	51,435,280	8,210,420	42,648,200	1,343,400
2013	May	20,579,300	15,204,600		26,897,500	22,469,000	28,539,800		-	7,643,700		189,700	2,170,400	1,121,700	**124,815,700**	57,301,900	13,023,200	51,008,800	3,481,800
2013	June	19,284,100	15,471,500		20,800,900	22,013,000	26,670,400		18,632,800	6,876,400		74,200	949,500	9,089,500	**139,862,300**	55,122,880	25,942,820	48,683,400	10,113,200
2013	July	12,658,700	7,181,100		30,175,800	17,958,000	25,770,200		17,199,000	3,401,300		-	-	8,950,900	**123,295,000**	47,420,240	23,195,660	43,728,200	8,950,900
2013	August	4,322,200	13,591,500		27,472,900	19,920,000	23,097,000		19,675,800	4,045,400		-	1,246,000	3,790,000	**117,160,800**	43,827,180	25,280,620	43,017,000	5,036,000
2013	September	17,866,700	13,209,800		11,419,600	21,098,000	16,168,400		16,661,500	2,171,500		-	534,200	2,480,000	**101,609,700**	43,544,480	17,784,620	37,266,400	3,014,200
2013	October	15,253,300	12,395,800		18,172,500	24,718,000	16,287,800		9,811,600	1,000		-	899,900	1,390,000	**98,929,900**	44,149,420	11,484,780	41,005,800	2,289,900
2013	November	3,114,000	11,840,500		23,104,700	17,735,000	15,280,500		3,445,100	-		-	381,000	1,920,000	**76,820,800**	34,127,280	7,377,020	33,015,500	2,301,000
2013	December	-	16,128,100		24,364,100	21,721,000	3,464,600		51,100	-		46,000	868,100	610,000	**67,253,000**	35,629,600	4,913,700	25,185,600	1,524,100
TOTAL 2013		**160,008,400**	**161,491,100**	**0**	**223,631,500**	**219,827,000**	**243,554,100**	**0**	**115,735,200**	**28,188,200**	**0**	**592,300**	**9,033,900**	**32,040,001**	**1,194,101,701**	**523,551,740**	**165,502,660**	**463,381,100**	**41,666,201**

Appendix C
Detailed Cost Estimates

Well 30 Replacement						
Well, Pump, Building, Disinfection System	Lump Sum	$1,000,000	2014	2015		
Allowance for contingency	20%	$200,000				
Escalation factor	3%	per year		$36,000		
Total Planning Level Cost			**$1,200,000**	**$1,240,000**		

Well 8A Building						
Well, Pump, Building, Disinfection System	Lump Sum	$410,000	2014	2015	2016	
Allowance for contingency	20%	$82,000				
Escalation factor	3%	per year	$0	$14,700	$15,000	
Total Planning Level Cost			**$490,000**	**$500,000**	**$520,000**	

Well 19 Replacement						
Well, Pump, Building, Disinfection System	Lump Sum	$1,000,000	2014	2015	2016	
Allowance for contingency	20%	$200,000				
Escalation factor	3%	per year		$36,000	$37,200	
Total Planning Level Cost			**$1,200,000**	**$1,240,000**	**$1,280,000**	

Well 14 and Transmission Main						
Well, Pump, Building, Disinfection System	Lump Sum	$1,200,000	2014	2015	2016	2017
Allowance for contingency	20%	$240,000				
Escalation factor	3%	per year		$43,200	$44,400	$45,600
Total Planning Level Cost			**$1,440,000**	**$1,480,000**	**$1,520,000**	**$1,570,000**

Well 4 Replacement						
Well, Pump, Building, Disinfection System	Lump Sum	$1,000,000	2014	2015	2016	2017
Allowance for contingency	20%	$200,000				
Escalation factor	3%	per year		$36,000	$37,200	$38,400
Total Planning Level Cost			**$1,200,000**	**$1,240,000**	**$1,280,000**	**$1,320,000**

1 Future Well in Sunland Park													
Well, Pump, Building, Disinfection System	Lump Sum	$1,000,000	2014	2015	2013	2014	2015	2016	2017	2018	2019	2020	2021
Allowance for contingency	20%	$200,000											
Escalation factor	3%	per year		$36,000	$37,200	$38,400	$39,600	$40,800	$42,000	$43,200	$44,400	$45,600	$47,100
Total Planning Level Cost			**$1,200,000**	**$1,240,000**	**$1,280,000**	**$1,320,000**	**$1,360,000**	**$1,400,000**	**$1,440,000**	**$1,480,000**	**$1,520,000**	**$1,570,000**	**$1,620,000**

2 Future Wells in the Santa Teresa Industrial Park													
Well, Pump, Building, Disinfection System	Lump Sum	$2,000,000	2014	2015	2013	2014	2015	2016	2017	2018	2019	2020	2021
Allowance for contingency	20%	$400,000											
Escalation factor	3%	per year		$72,000	$74,100	$76,200	$78,600	$81,000	$83,400	$85,800	$88,500	$91,200	$93,900
Total Planning Level Cost			**$2,400,000**	**$2,470,000**	**$2,540,000**	**$2,620,000**	**$2,700,000**	**$2,780,000**	**$2,860,000**	**$2,950,000**	**$3,040,000**	**$3,130,000**	**$3,220,000**

2.0 MG Ground Tank in STIP													
Ground Reservoir, Foundation	Lump Sum	$1,100,000	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Allowance for contingency	20%	$220,000											
Escalation factor	3%	per year	$0	$39,600	$40,800	$42,000	$43,200	$44,400	$45,600	$47,100	$48,600	$50,100	$51,600
Total Planning Level Cost			**$1,320,000**	**$1,360,000**	**$1,400,000**	**$1,440,000**	**$1,480,000**	**$1,520,000**	**$1,570,000**	**$1,620,000**	**$1,670,000**	**$1,720,000**	**$1,770,000**

Note: Planning level cost includs bonds, insurance, mobilization, demobilization to construct one 2.0 MG welded steel ground reservoir primed and coated with ring footing, underdrain, site preparation, yard piping and overflow and security fence.

Airport Road 16" Pipeline- 8,000 LF															
16" PL, valves, fittings complete	Cost Per Foot	$65	8,000 LF	**$520,000**	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Allowance for contingency	20%			$104,000											
Escalation factor per year	3%	per year				$18,600	$19,200	$19,800	$20,400	$21,000	$21,600	$22,200	$22,800	$23,400	$24,000
Total Planning Level Construction Cost - 16" PL					**$620,000**	**$640,000**	**$660,000**	**$680,000**	**$700,000**	**$720,000**	**$740,000**	**$760,000**	**$780,000**	**$800,000**	**$820,000**

Villa Valencia 10" Pipeline[2]															
10" PL, valves, fittings complete	Cost Per Foot	$60	9,100 LF	**$607,250**	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Allowance for contingency	20%			$121,450											
Escalation factor	3%	per year				$21,900	$22,500	$23,100	$23,700	$24,300	$24,900	$25,500	$26,400	$27,300	$28,200
Total Planning Level Construction Cost - 10" PL					**$730,000**	**$750,000**	**$770,000**	**$790,000**	**$810,000**	**$830,000**	**$850,000**	**$880,000**	**$910,000**	**$940,000**	**$970,000**

Villa Valencia 10" Pipeline															
10" PL, valves, fittings complete	Cost Per Foot	$60	1,000 LF	**$60,000**	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Allowance for contingency	20%			$12,000											
Escalation factor per year	3%	per year				$2,100	$2,100	$2,100	$2,100	$2,100	$2,100	$2,100	$2,100	$2,100	$2,100
Total Planning Level Construction Cost - 10" PL					**$70,000**	**$70,000**	**$70,000**	**$70,000**	**$70,000**	**$70,000**	**$70,000**	**$70,000**	**$70,000**	**$70,000**	**$70,000**

Connection of McNutt and Villa Valencia 10" Pipeline															
12" PL, valves, fittings complete	Cost Per Foot	$60	2,000 LF	**$120,000**	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Allowance for contingency	20%			$24,000											
Escalation factor per year	3%	per year				$4,200	$4,200	$4,200	$4,200	$4,200	$4,200	$4,200	$4,200	$4,200	$4,200
Total Planning Level Construction Cost - 10" PL					**$140,000**	**$140,000**	**$140,000**	**$140,000**	**$140,000**	**$140,000**	**$140,000**	**$140,000**	**$140,000**	**$140,000**	**$140,000**

Upsize 8-inch line to 12" along Feather Moon Drive - 5,500 LF of 12" Pipeline															
12" PL, valves, fittings complete	Cost Per Foot	$60	5,500 LF	**$330,000**	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Allowance for contingency	20%			$66,000											
Escalation factor per year	3%	per year				$12,000	$12,300	$12,600	$12,900	$13,200	$13,500	$13,800	$14,100	$14,400	$14,700
Total Planning Level Construction Cost - 12" PL					**$400,000**	**$410,000**	**$420,000**	**$430,000**	**$440,000**	**$450,000**	**$460,000**	**$470,000**	**$480,000**	**$490,000**	**$500,000**

Install 12" Line in Teresa Paseo from Trevino Rd to Country Club Rd															
12" PL, valves, fittings complete	Cost Per Foot	$60	3,000 LF	**$180,000**	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Allowance for contingency	20%			$36,000											
Escalation factor per year	3%	per year				$6,600	$6,900	$7,200	$7,500	$7,800	$8,100	$8,400	$8,700	$9,000	$9,300
Total Planning Level Construction Cost - 8" PL					**$220,000**	**$230,000**	**$240,000**	**$250,000**	**$260,000**	**$270,000**	**$280,000**	**$290,000**	**$300,000**	**$310,000**	**$320,000**

Connection Between McNutt and Mt Cristo Rey Blvd - 2,200 LF of 12" Pipeline															
12" PL, valves, fittings complete	Cost Per Foot	$60	2,200 LF	**$132,000**	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Allowance for contingency	20%			$26,400											
Escalation factor per year	3%	per year				$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800
Total Planning Level Construction Cost - 12" PL					**$160,000**	**$160,000**	**$160,000**	**$160,000**	**$160,000**	**$160,000**	**$160,000**	**$160,000**	**$160,000**	**$160,000**	**$160,000**

Upsize 8-inch line to 12" along McNutt Street - 8,500 LF of 12" Pipeline															
12" PL, valves, fittings complete	Cost Per Foot	$60	8,500 LF	**$510,000**	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Allowance for contingency	20%			$102,000											
Escalation factor per year	3%	per year				$18,300	$18,900	$19,500	$20,100	$20,700	$21,300	$21,900	$22,500	$23,100	$23,700
Total Planning Level Construction Cost - 12" PL					**$610,000**	**$630,000**	**$650,000**	**$670,000**	**$690,000**	**$710,000**	**$730,000**	**$750,000**	**$770,000**	**$790,000**	**$810,000**

Notes:

1. Planning level cost includes bonds, insurance, mobilization and demobilization to furnish and install potable water pipeline, isolation butterfly valves, combination air/vacuum valves and blow-off valves, fittings, thrust restraint, protection against corrosion, testing and disinfection, trench safery, excavation, bedding and backfilling and compaction, tie-ins at either end of the pipeline complete and in place by a utility contractor.

2. This project will be installed by the developer at no cost to CRRUA.

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