CITY OF ELOY
POTABLE WATER
SYSTEM MASTER PLAN

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Prepared by:

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1.0 MASTER WATER PLAN OVERVIEW

1.1 Purpose

Due to the recent rapid growth witnessed within Pinal County and in the surrounding communities, and in preparation for future potential growth, the City of Eloy, land owners and development interests have created a stakeholder Consortium. The Consortium is not organized under governmental authority, but shares the common goal with the City of Eloy to develop a standardized and equitable method to expand the City's water system to meet future demands.

The Master Water Plan presented herein was developed under the direction of the City Engineer with input from stakeholders, including landowners and development interests. This document, along with the associated City of Eloy Water System Design Standards, provides the financial and engineering mechanisms for water system expansion and development.

1.2 Service Area Overview

1.2.1 Existing Water Service Area

The City of Eloy provides domestic and water service and fire protection to approximately 10,500 residential customers as well as numerous commercial and industrial customers in and near the Eloy city limits. The current service area extends as far north as Cornman Road and south to Milligan Road. The eastern and western limits of the current system are La Palma Road and Sunland Gin Road, respectively.

1.2.2 Master Water Planning Boundary

The Master Water Planning Boundary area, as shown on Figure 1, is generally parallel but not coincident with the current City of Eloy corporate limits. The limits of the planning area are not intended to create or imply a political subdivision or water service area boundary. The limits as shown are based primarily on anticipated projects as presented by developers, and represents the first phase of an effort that will be modified, expanded and updated as growth occurs and the primary areas for that growth are identified. Additionally, future development outside of the Phase I boundary will be subject to the same standards as outlined in this document.

As the dynamics of water system expansion are much different than that for sewer service, the planning boundary shown herein is not identical to the planning boundary for the master sewer planning effort that is occurring coincident with the preparation of this document.

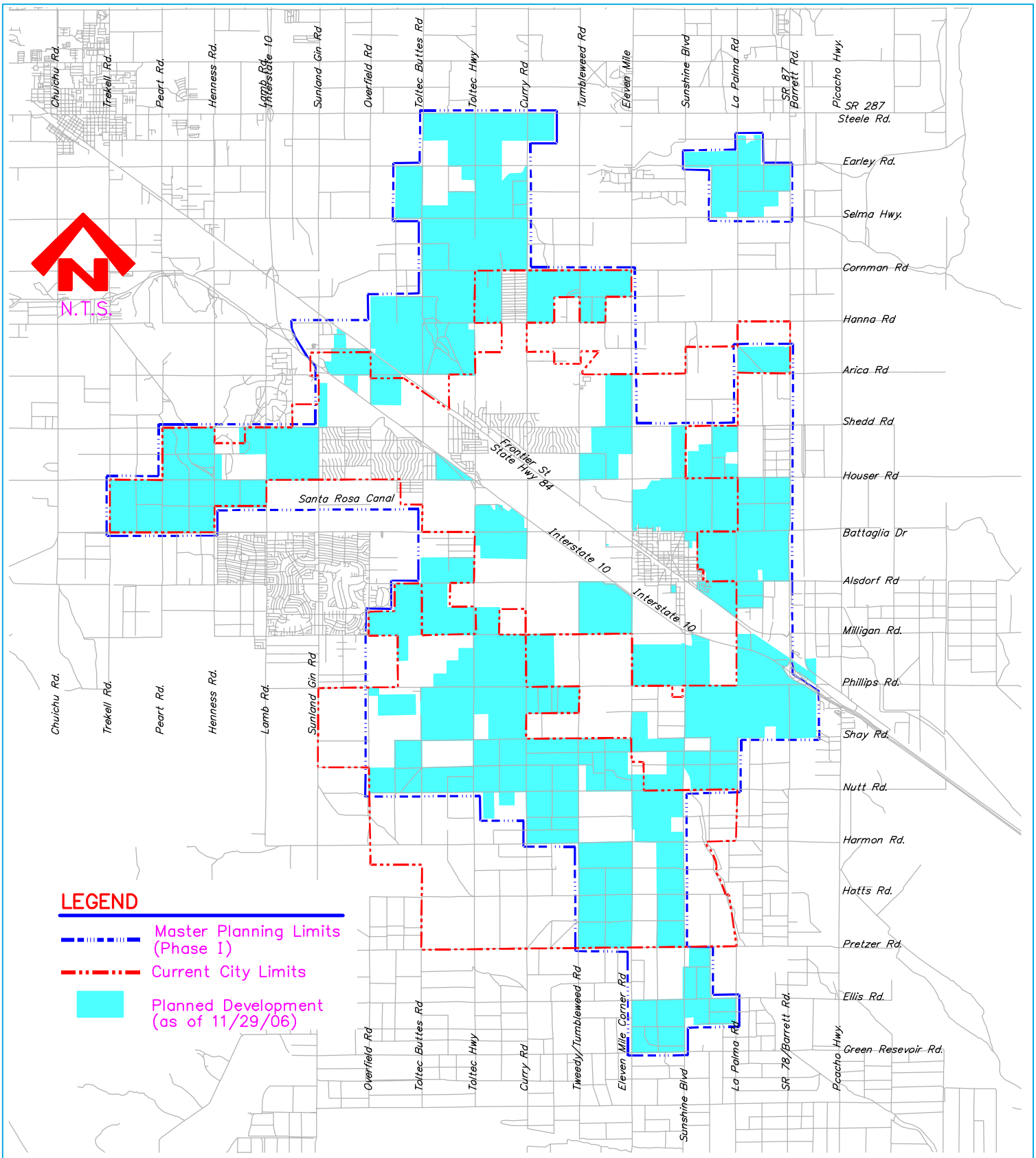

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FIGURE 1

PROJECT LOCATION MAP

CITY OF ELOY, PINAL COUNTY, ARIZONA

ELOY, ARIZONA

1.3 Development of New Water Resources

1.3.1 Water Wells

Deep groundwater wells are expected to provide the domestic and commercial water needs of the community. As part of the Phase I Assured Water Supply application process, adequate water for developments participating in a Developer consortium funding that effort has been recognized by ADWR. Additional modeling and reports will be required to further expand the City's designation to serve those additional properties that may wish to participate in a Phase II consortium effort. The installation of production wells will be required as part of a Phase II effort to demonstrate the physical availability of groundwater and verify aquifer parameters.

1.3.2 Central Arizona Project

The City of Eloy has rights to a nominal amount of Central Arizona Project (CAP) Water. It is not presently anticipated that this finite water right will be expanded, or that there will be treatment of CAP water for domestic consumption.

1.3.3 Water Re-Use

Direct effluent re-use is currently not implemented by the City of Eloy with all effluent being recharged at the treatment facility. However, the City is in the process of completing an effluent re-use feasibility study to determine if and how a re-use program should be implemented.

1.3.4 Conservation

In a similar fashion to water re-use, the conservation of the available limited water resources will serve to preserve groundwater for potable uses. The City of Eloy anticipates that Developments will voluntarily provide water conservation measures which will be described in the Specific Plan and other planning documents. The Developer should provide for the inclusion of Xeriscape landscaping, water harvesting where possible, and other water saving measures.

The City of Eloy will develop or enforce water-wasting prevention ordinances and plumbing codes, as well as employ emergency water conservation measures for the protection of the customers during emergency outages or during short term and long term drought.

1.4 System Expansion

1.4.1 General

It is anticipated that the expansion of the City of Eloy water system and service area will occur primarily in response to new development. The City is prepared to accommodate this expansion and the additional water customers. This Master Plan and its provisions, as well as development specific agreements will provide the framework for expansion of the system on a regional basis as well as for the fair allocation of the associated costs.

1.4.2 Costs

Unless other specific arrangements exist, the development community, and not the existing customer, will bear the burden of funding and constructing the infrastructure needed to meet future demands. Like many smaller communities facing the prospect of explosive growth, the City of Eloy does not have the means to finance system expansion. As the City grows and its ability to finance infrastructure improves, development fees and other funding mechanisms may be used to construct new water infrastructure as part of a Capital Improvement Program.

1.4.3 Production Wells

Design, construction, and capacity requirements for new water wells are provided in the Water System Development Standards. Wells will be constructed at the expense of those who require the new source to meet the needs of their development.

1.4.4 Reservoirs

Water storage reservoirs will represent a significant component of new water production facilities and will be the main factor in determining the effective service area for a regional water facility. New development will bear the cost to construct the storage required to meet the needs created by new demands.

1.5 Applicable Regulatory Requirements and Standards

1.5.1 Arizona Department of Environmental Quality

The United States Environmental Protection Agency (USEPA) Safe Drinking Water Act (SDWA) of 1974 and the 1986 re-authorization of the SDWA provide the basis for the regulatory requirements governing drinking water systems in the United States. The State of Arizona has primacy, or authority to act for, the USEPA, and the Arizona Department of Environmental Quality implements the State statutes, through enforcement of the Administrative Code.

The State of Arizona Administrative Code (AAC) provides rules that regulate public and private water companies. AAC Title 18 includes multiple chapters that directly or indirectly govern water quality. These include, but are not limited to Chapter 4 – Safe Drinking Water, Chapter 5 – Environmental Reviews and Certification, Chapter 9 – Water Pollution Control, and Chapter 11 – Water Quality Standards.

1.5.2 Regulatory Storage Requirements

Each expansion of the water system, in terms of connections or demand, will have a definable impact on storage, which must be met with new constructed potable water storage facilities. AAC R18-5-502 Minimum Design Criteria and R18-5-503 Storage Requirements provide minimum requirements for sizing of storage facilities. However, individual water providers may elect to exceed these requirements based on individual needs and the level of redundancy within the system.

Storage may be considered to have three components, one being operational or equalization volume, and the others fire protection volume and emergency volume. The operational volume plus emergency volume shall be equal to the average daily demand during the peak month, which is also considered to be equal to 1.5 times the average daily demand for the year. As the system grows and redundancy is established through the interconnection of regional facilities, storage requirements may be reduced on a case-by-case basis as approved by the City Engineer.

For each regional facility, the storage provided for fire suppression will be based on the largest fire flow and duration that the City of Eloy has committed to meet. In the absence of commercial or industrial fire flows, residential fire protection of 1000 gallons per minute for a two-hour duration has be assumed based on input from Eloy Fire District.

1.5.3 Arizona Department of Water Resources

As provided for in AAC R12-15, the Arizona Department of Water Resources (ADWR) is the permitting authority for all new production wells within the state and also sets minimum design standards for groundwater wells. All water well drilling contractors in Arizona must be licensed with ADWR.

1.5.4 Groundwater Management Code / Assured Water Supply

In addition to regulating the permitting and construction of new groundwater wells, ADWR regulates and oversees the usage of surface water and of ground water in the State. The 1980 Groundwater Management Code established a system of water rights, including ground water rights and the ability to hold or release rights for beneficial use to others. Under the Code, ground water withdrawals are reported on an annual basis. Also, new developments are required to prove or demonstrate an assured and adequate water supply. Additionally, Active Management Areas (AMA) and Irrigation Non-Expansion Areas have been defined. Within an AMA, the long-term ground water withdrawals are not allowed to exceed replenishment by either natural or artificial means.

Prior to completion of this master planning effort, a consortium consisting of land owners and individuals with development interests was formed to secure an Assured Water Supply Designation from the Arizona Department of Water Resources. This consortium funded the preparation of an “Application for a Modification of a Designation of Assured Water Supply,” hereafter known as the Phase I Application for Assured Water which was submitted by the City of Eloy and subsequently approved by ADWR.

The City of Eloy can therefore provide assured and adequate water supply to participants of the Phase I Application for Assured Water within the water service area. Those who request water service within the water service area that were not participants in the original Application for Assured Water may receive water service after they demonstrate through an Application for a Water Adequacy Report, an assured and adequate water supply.

This report will be prepared by and at the expense of the developer. In addition to demonstrating physical, continuous, and legal availability, the City of Eloy may require that the applicant convey any water rights to the City of Eloy to increase the City of Eloy's Designation of Assured Water Supply.

1.5.5 City of Eloy Requirements

The City of Eloy has a council-manager form of government, and owns and operates the public water system. The Council of the City of Eloy shall have the immediate control and management of all things pertaining to the City water system and shall perform, or cause to be performed, all acts that may be necessary for the prudent, efficient and economical management and protection of said water system.

The City Engineer, an appointee of the City Council through the City Manager, manages daily operations of the water utility. As such, the City Engineer is duly authorized to make decisions for and in behalf of the City owned Water Utility. Additionally, a Water Department Superintendent with appropriate certifications oversees the water production and distribution system, up to and including the individual water meters. The customer shall be solely responsible for the installation and maintenance of adequate water facilities on premises downstream of the water meter.

City of Eloy Ordinance – Waters and Sewers Chapter 19

§19-1 through §19-77 provide for Water System Administration under the direction of the City of Eloy. Power and authority to prescribe rates and enter into contracts is specifically stated in these sections, along with all other responsibilities associated with the management of the water utility.

The City shall have all the powers, functions, rights, privileges and immunities possible under the Constitution and general laws of Arizona as fully as though they were specifically enumerated in this charter, and all of the powers, functions, rights, privileges, and immunities granted or to be granted, either expressly or by implication, to charter cities and to cities and towns incorporated under the provisions of Article 13, Arizona State Constitution and of Title 9, Arizona Revised Statutes.

Additionally, the City shall have the power to own and operate any public utility, to construct and install all facilities that are reasonably needed, and to lease or purchase any existing utility properties used or useful to public service. The City may also furnish service to adjacent and nearby territories that may be conveniently and economically served by the municipally owned and operated (water) utility, subject to the limitations of the provisions of the general laws of this state.

Subdivision Design Standards

The City of Eloy Subdivision Design Standards provide for and accommodate public water system expansion. Sections 6.11.A through 6.11.H are hereby replaced with the City of Eloy Water System Development Standards.

Water System Design Standards

As a component of this Water Master Plan, the City Engineer will enforce requirements set forth under the City of Eloy Water System Development Standards. Construction Specifications found under City Code §19-14 are supplemented by the Water System Development Standards.

1.5.6 Fire District Requirements

New development will be required to demonstrate that the proposed water system expansions will be able to meet minimum fire flow requirements as required by the local Fire District. Eloy Fire District currently serves the northern portion of the Phase I planning area and would likely serve the remainder of the area through annexation into the District. The current Eloy Fire District boundaries are shown on Figure 2.

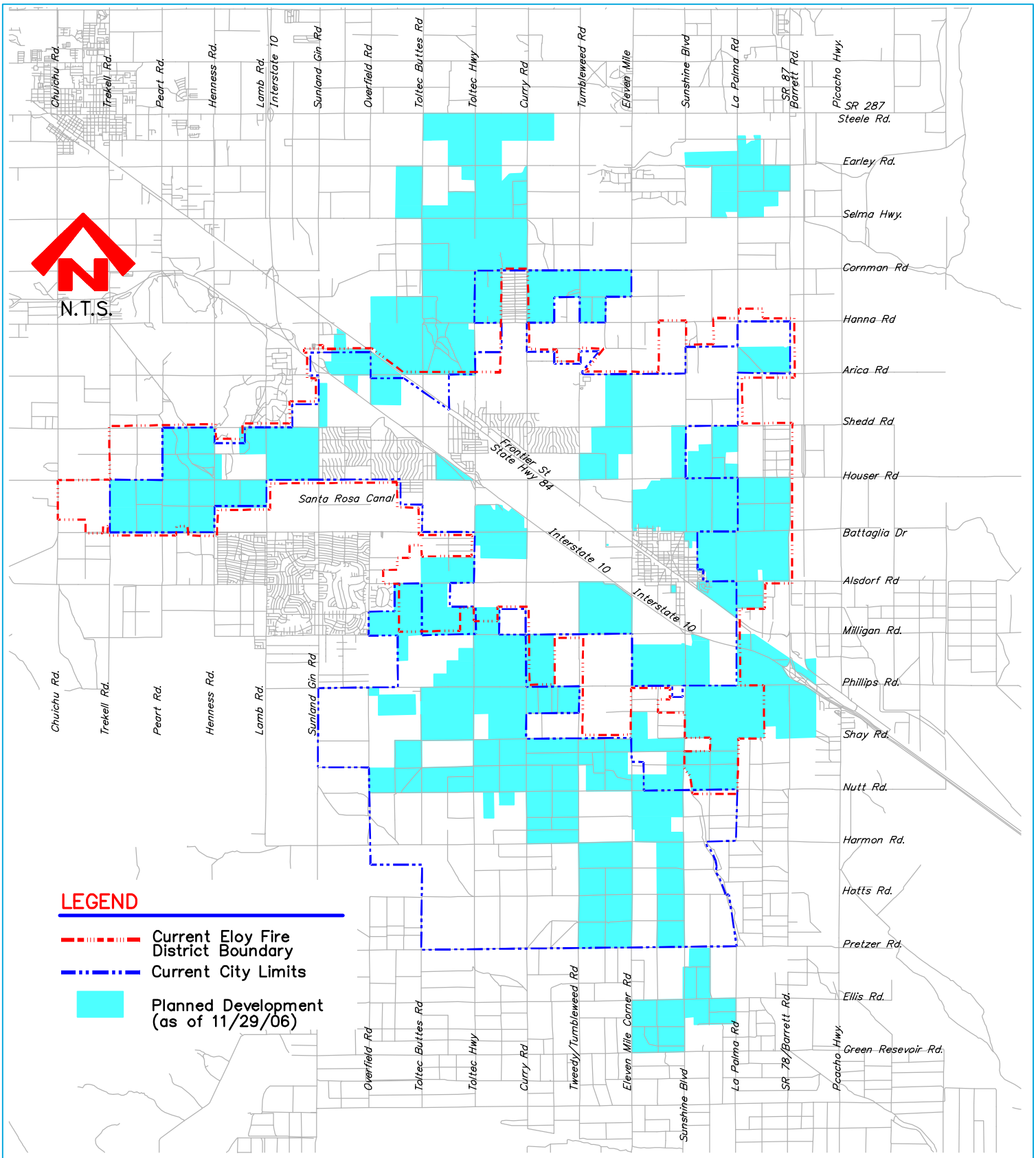

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FIGURE 2

EXISTING ELOY FIRE DISTRICT BOUNDARY

CITY OF ELOY, PINAL COUNTY, ARIZONA

ELOY, ARIZONA

2.0 EXISTING SYSTEM ANALYSIS

2.1 Overview of Existing Water System

The City of Eloy currently provides domestic and commercial water service to a residential population of approximately 10,500 along with numerous businesses and industrial companies. There are currently two pressure zones within the water service area. These zones have been established to allow the City to deliver water to customers at between 40 psi and 70 psi during average day conditions. The zone boundary is roughly separated by the 1535-foot contour. Each zone is served by a single booster facility and above ground storage. Individual elements of the existing system are discussed below. Figure 3 shows the locations of the existing wells, storage and booster facilities, as well as the alignment of the existing reservoir fill lines.

2.1.1 Production and Booster Facilities

Currently, water production is achieved through three deep groundwater wells equipped with vertical turbine pumps. A fourth well is available for use during emergencies or maintenance of the primary wells. The current system configuration allows the option of pumping New Well #3, Old Well #3 and Well #6 to either of two storage tank locations as discussed below. Well #5 can only be pumped to the "Public Works" facility. Table 1 provides a summary of existing production well characteristics.

TABLE 1
EXISTING PRODUCTION WELL SUMMARY

City of Eloy Well ID	Status	ADWR Well No.	Year Installed	Casing Diameter (in)	Well Depth (ft)	Motor Size (hp)	Pump Capacity (gpm)
New Well #3	Active	55-591447	5/02	16	1100	300	1050
Old Well #3	Emergency	55-605452	1/81	16	1115	125	500
Well #5	Active	55-605454	Unknown	16	1000	200	700
Well #6	Active	55-605455	11/80	16	1100	200	1100

The existing system contains a single booster station located in each of the two pressure zones. The first booster station (Public Works) is located in the upper pressure zone and consists of three 60 HP electric pumps with a total pumping capacity of approximately 3000 gpm at 64 psi. The facility is equipped with a natural gas powered engine for emergencies that has an approximate pumping capacity of 2000 gpm.

The second booster station (Blue Tank) is located in the lower pressure zone and consists of three 60 HP electric pumps with a total pumping capacity of approximately 3000 gpm at 64 psi. The station contains a fourth propane driven pump that turns on in the event of a power failure and has an estimated capacity of 2000 gpm.

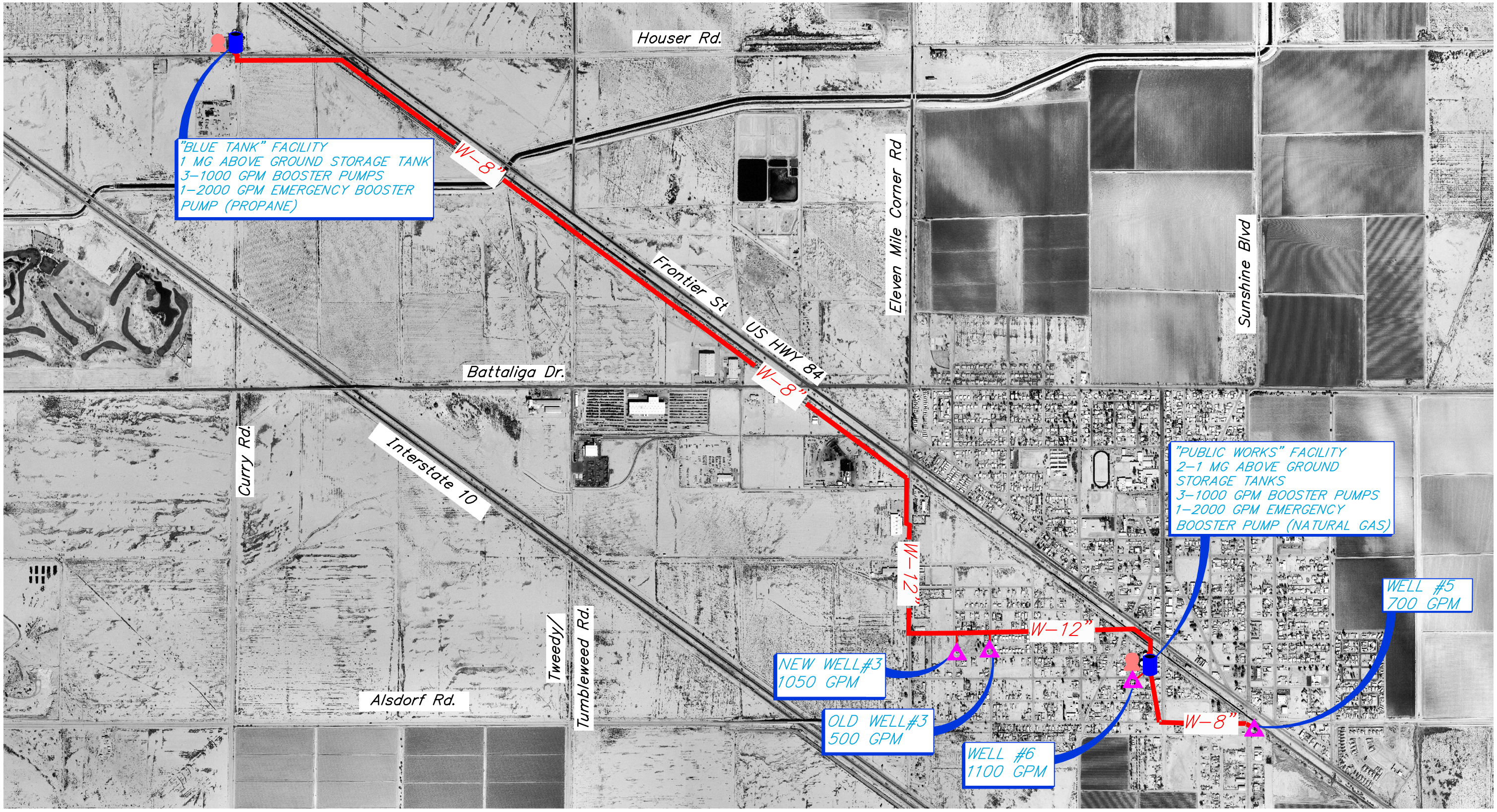

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FIGURE 3

EXISTING WATER PRODUCTION SYSTEM

CITY OF ELOY, PINAL COUNTY, ARIZONA

ELOY, ARIZONA

SCALE: 1" = 1500'

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Interconnects between the two zones have been constructed to allow for operational flexibility during an emergency or routine maintenance. The Public Works booster has the ability to temporarily serve both zones but requires throttling of the zone boundary valve to avoid excessive pressures in the lower elevations of the Blue Tank service area. A pressure reducing valve (PRV) should be installed at the zone boundary interconnect as the practice of valve throttling is not recommended.

Blue Tank booster cannot currently serve the entire service area in the event of a failure or maintenance at the Public Works facility. This is due to excessively high pressures in the lower areas that result from having to increase operating pressures to serve the higher areas in the Public Works facility pressure zone. Construction of a PRV at a key location may be needed if additional operational flexibility is desired.

2.1.2 Storage Facilities

Above ground steel storage reservoirs have been constructed at both the Blue Tank and Public Works facilities to provide operational and emergency storage. Storage at the Public Works consists of dual one million gallon steel storage tanks. The Blue Tank booster and storage facility contains a single one million gallon steel storage tank.

As shown on Figure 3, the current reservoir fill system allows both tanks to be filled from any of the active wells, with the exception of Well #5, which can only pump to the Public Works facility.

The current amount of storage provides approximately 2.0 times the Maximum Day volume for the current service area based on utility meter records. A typically accepted volume is 1.0 to 1.5 times the Average Day Demand depending on the municipality and the level of redundancy in the system.

2.1.3 Distribution Water Mains

The City of Eloy water system consists of public water mains ranging from 2 to 12 inches in diameter. Of the approximately 125 miles of existing water main, 95% is comprised of roughly equal amounts of asbestos cement pipe (AC) and polyvinyl chloride pipe (PVC) according to available record drawings.

2.1.4 Treatment Facilities

Water treatment within the existing facilities is limited to chlorination at the wellheads.

2.1.5 Electrical, Controls and SCADA

An assessment of the existing electrical and controls system was completed by a registered electrical engineer with an extensive background in water system electrical and controls design. A memorandum detailing the results of the existing conditions assessment was prepared and is included as Appendix A.

2.2 Existing System Base Mapping

Detailed base mapping of the existing City of Eloy water system was completed using a combination of record drawings supplied by City staff, and the results of a detailed GPS based survey of existing fire hydrants and water valves. A total of 1062 valves and 210 fire hydrants were surveyed in State Plane Coordinates, which will allow for direct geo-referencing into a GIS database. Water base sheets at a scale of 1"=200' were created for the entire existing system. A half-size set of these sheets is provided in Appendix B.

2.3 Existing Water System Modeling

A detailed hydraulic model of the existing system was assembled in order to assess current system performance and allow for the simulation of future scenarios with regards to expansion and modification of the system. A summary of the effort is provided below. A detailed explanation of the existing conditions analysis, including model input, output, and system layout, is provided under separate cover in the Technical Memorandum entitled *City of Eloy Existing Conditions Water System Hydraulic Modeling.*

2.3.1 Existing System Model Layout

An existing system model was created using the new system base mapping and the H_2ONet model distributed by MWH Software. A total of 670 nodes were incorporated into the model. However, for convenience purposes, a subset of 180 nodes was created at fire hydrant locations to facilitate model calibration against hydrant flow test data. Elevations at pressure nodes were estimated from USGS quadrangle maps as more detailed elevation data was not available at the time of this report. A base Hazen-Williams roughness coefficient (C) of 135 was used which is a reasonable average value for aged PVC and AC pipe. This value was adjusted in some pipes to assist in calibration of the model as discussed below. As previously discussed, PVC and AC constitute the vast majority of the existing system according to available record drawings. Future modeling of proposed developments shall utilize a "C" value of 140.

2.3.2 Existing System Demands

The magnitude and distribution of existing demands within the existing system were derived from meter data provided by the City. The period of time examined was for the month of July 2006, which represents a peak month. The monthly usage data was compiled for discreet areas (or demand nodes) and translated into Average Daily Demand and Maximum Day Demand using appropriate peaking factors. The total volume for the period of interest as reported in the meter data was compared against the combined totalizer data for both the Blue Tank and Public Works booster stations. There was a significant difference between the two values. The average demand from the meter data

was approximately 1290 gpm, while the totalizer data indicated a value of approximately 896 gpm. The discrepancy is most likely the result of low totalizer readings due to poor instrument calibration. The meter data was utilized in the water system model.

2.3.3 Model Calibration

The existing system model was calibrated by comparing model results with static pressures recorded during fire hydrant flow tests. These tests were completed by the Eloy Fire District at locations throughout the existing system. The first stage of calibration was to compare test pressures under static hydrant conditions with the assumption of average day demand. The pressures from this model run were generally within 6 psi or less at most node locations with no adjustment of the base "C" values.

The second stage of calibration consisted of a fire flow simulation using the observed flow values reported in the fire hydrant test data sheets. Base flow for the run was assumed to be Average Day Demand. The model results of this analysis matched the observed residual pressures closely in most areas with some minor "C" value adjustments. However, there were some areas that displayed significant deviation from the actual flow test results. Some potential causes of the deviation could be poor testing protocol, partially closed valves, or inaccurate record mapping with regards to pipe size. Continued calibration of the model and verification of the system layout should be part of routine model maintenance and updates.

2.3.4 System Simulations and Results

Steady state simulations using the water model were completed for both the Peak Hour Demand and Maximum Day Demand plus Fire Flow scenarios to estimate residual pressures throughout the system during these high demand situations.

Simulation 1 – Peak Hour Demand

The existing water system was modeled to verify the City's ability to meet existing domestic needs during Peak Hour Demand, which is defined in this report as 3.5 times the Average Daily Demand. This demand typically occurs in the morning between the hours of about 6:00 am and 9:00 am, and in the evening between the hours of approximately 5:00 pm and 8:00 pm. Peak domestic demands generally do not coincide with peak usage times for commercial development. The Peak Hour Demand was calculated using the manipulated meter data. The results of the analysis indicate that the existing system can meet the Peak Hour Demand throughout the current service area with adequate residual pressure.

Simulation 2 – Maximum Day Demand Plus Fire Flow

The 2000 International Fire Code requires a minimum 1000 gallons per minute for a period of two hours for typical residential construction less than 3,600 square feet. Fire flow for commercial buildings is a minimum of 1500 gpm and increases to more than 2500 gpm depending on the type and size of the building as well as the presence of fire sprinklers. The Arizona Department of Environmental Quality requires that a public

water system supply pressure in excess of 20 pounds per square inch (R18-5-502) during peak demand conditions, which are generally considered the greater of Peak Hour Demand or Maximum Day Demand plus Fire Flow.

The results of the analysis indicate there are significant portions of the existing system that cannot meet the minimum residential fire flow criteria of 1000 gpm due to pipe diameter and distance from the booster facilities. This conclusion is supported by the fire hydrant flow analysis data provided by Eloy Fire District. For commercial fire flow, a separate analysis should be completed for each facility or development based on location of the demand and the actual required fire flow as mandated by Eloy Fire District.

2.4 Augmentation to the Existing System

In most cases, new development will be served by facilities constructed by those who will require the additional system capacity. However, in some cases it may be more practical to connect to the existing system either for complete service, or to provide the required redundancy which would otherwise be provided by an additional well. In these cases, the Developer will be required to fund the improvements to the existing facilities needed to provide for the additional demand. These improvements could include, but are not limited to, additional storage, booster station upgrades, and distribution main augmentation.

3.0 FUTURE SYSTEM ANALYSIS

Water system infrastructure planning and development is dependent upon identification of the current and projected water demands. In a primarily urban and suburban community with nominal industrial and commercial activities, water demand may be considered primarily a function of population. The future population is projected and the future water demand extrapolated, allowing the water system to be laid out and sized using the following information and methodology.

3.1 Population Projections

3.1.1 Census

The 2000 Census for the City of Eloy estimates the population at 10,375. The 2004 pre-census estimate for the City was 10,695, implying an annual growth in the City of 0.76%. Extending this growth rate to present date, the 2006 estimated population is estimated to be 10,859. This data is considered unreliable for planning purposes as Eloy, like surrounding communities, is likely to experience growth at rates not observed in previous years.

3.1.2 Developer Planning Documents

Important sources for estimating growth and the associated increase in water demands for the City of Eloy include development specific plans and development specific water master plans. Other documents addressing specific development issues submitted to the City of Eloy for consideration can also provide valuable information regarding planned densities, development locations, and project configurations.

Table 2 provides projected populations within the Phase I planning area for both planned developments and for adjacent lands where development could occur, although no interest had been expressed to the City at the time of this document. Developments where specific planning data has been provided are highlighted. For developments and parcels where no specific data was provided, development density has been assumed to be 2.6 residential units per acre (RAC) with 3.0 persons per unit. The RAC and the persons per residence are consistent with master sewer planning values and are planning figures accepted for similar communities in Pinal and Pima Counties.

3.1.3 Assured Water Supply Application

On behalf of the City of Eloy and certain participating landowners, an application for a modification of designation of assured water supply for the City of Eloy was submitted to the Arizona Department of Water Resources. The application has been subsequently approved. The future population cited for the City of Eloy in this application was 217,242 persons.

The total water demand and actual population may be significantly less than or greater than the amount specified in the Assured Water Supply Application. The requirements for total water delivery will be a function of the population served.

3.1.4 Unforeseen Developments

The criteria, guidelines and development fees presented in this Water Master Plan are applicable to developments outside of the Phase I planning boundary as well as those within a reasonable distance from the Eloy City limits that may have not been previously identified.

3.2 Future System Demands

3.2.1 Population Based Demand Projections

Since future demands will be primarily associated with residential customers, the calculation of this demand is accomplished by determining the appropriate per capita water consumption for the area and multiplying by the projected population. Where proposed land uses are known, demands for commercial developments are then added using a per acre factor in the absence of more detailed data.

The per capita water usage to be employed for projecting residential water system demands is 125 gallons per capita per day (gpcd). This value is consistent with the Phase I Application for Assured Water Supply. Overall demand shall be based on the assumption of 3.0 persons per single family dwelling. The persons per dwelling criteria may only be reduced for age-restricted developments and with the approval of the City Engineer. Maximum Daily Demand shall be calculated as 2.0 times ADD. Table 2 presents projected demands for each planned development known at the time of this report, as well as for the balance of developable land within the Phase I planning boundary. Developments with previously identified densities, either through Specific Plans or a development specific Master Water Plan have been highlighted. The balance of the area was assumed to develop at 2.6 RAC. As discussed in Section 3.3, the overall planning area has been divided into service sub-areas, which have been reflected in Table 2.

3.2.2 Development Master Water Plans

Development specific Master Water Plans are used to assist developers with forecasting demands and the costs to provide water service to their development. For larger “block plat” type projects, the development specific Master Water Plan will typically provide and identify the “spine” water conveyance system, water production, and water storage facilities required to accommodate domestic water demands and fire protection. For smaller projects, or individual blocks or phases of a larger project, the Master Plan will typically include the overall distribution system. By submitting the development specific Master Water Plan to the Water Utility, City personnel have the opportunity to assure that the Developer’s plan is appropriately coordinated with the City’s long range plans.

Table 2
Projected Demands by Water Service Sub-Area

	Area (acres)	Population	Annual Use (Acre Ft./Yr.)	Average Daily Demand (gpm)	Peak Day Demand (gpm)	Storage Required (MG)
SA-1	4525.00					
Annexation Case No. A05-36C	3647.00	28447	3983	2469.32	4938.65	5.33
Total Planned Development	3647.00	28447	3983	2469.32	4938.65	**5.33**
(non-specified development w/i WSA)	878.00	6848	959	594.48	1188.96	**1.28**
SA-2	1357.00					
Early & La Palma	1146.90	8946	1253	776.55	1553.09	1.68
Total Consortium by WSA	1146.90	8946	1253	776.55	1553.09	**1.68**
(non participating w/i WSA)	210.10	1639	229	142.26	284.51	**0.31**
SA-3	5570.00					
Annexation Case No. A05-36A	1521.00	11864	1661	1029.84	2059.69	2.22
Annexation Case No. A05-36B	595.90	4648	651	403.47	806.95	0.87
Desert Greens	622.50	4856	680	421.48	842.97	0.91
Talon Mountain	320.00	2496	350	216.67	433.33	0.47
Total Planned Development	3059.40	21367	2992	1854.80	3709.60	**4.47**
(non-specified development w/i WSA)	2510.60	19583	2742	1699.89	3399.77	**3.67**
SA-4	7662.00					
Edgewater	806.00	6287	880	545.73	1091.46	1.18
Major General Plan Amendment	979.60	7641	1070	663.27	1326.54	1.43
Eagle West Headend	0.70	5	1	0.47	0.95	0.00
Total Planned Development	1786.30	13933	1951	1209.47	2418.95	**2.61**
(non-specified development w/i WSA)	5875.70	45830	6418	3978.34	7956.68	**8.59**
SA-5	7305.00					
G.C. Del Sol	159.10	1241	174	107.72	215.45	0.23
ISOM Ranch	509.00	3970	556	344.64	689.27	0.74
Silver Reef	1613.70	12587	1763	1092.61	2185.22	2.36
I-10 & Sunland Gin	80.70	629	88	54.64	109.28	0.12
Sierra Vista	816.90	6372	892	553.11	1106.22	1.19
Toltec Business Park	93.90	732	103	63.58	127.16	0.14
Total Planned Development	3273.30	25532	3575	2216.30	4432.59	**4.79**
(non-specified development w/i WSA)	4031.70	31447	4403	2729.80	5459.59	**5.90**

Note: Values in green indicate specific planning data was available.

Table 2 (Continued)
Projected Demands by Water Service Sub-Area

	Area (acres)	Population	Annual Use (Acre Ft./Yr.)	Average Daily Demand (gpm)	Peak Day Demand (gpm)	Storage Required (MG)
SA-6	10624.00					
Esperanza	1248.80	9102	1275	865.56	1731.11	1.87
Fink Property	10.00	78	11	6.77	13.54	0.01
La Palma Ranch	155.90	1216	170	135.80	271.60	0.29
Campos La Palma	327.80	2557	358	221.95	443.90	0.48
Langley Sunshine Park	287.30	2241	314	194.53	389.05	0.42
Palmilla	886.10	6912	968	599.96	1199.93	1.30
Roberts Resorts	659.20	5142	720	446.33	892.67	0.96
Picacho Heights	48.80	381	53	33.04	66.08	0.07
Picacho Peak West	168.20	1312	184	113.89	227.77	0.25
Picket Property	195.00	1521	213	132.03	264.06	0.29
Allied Unversal Corp.	0.20	2	0	0.14	0.27	0.00
CCA's Expancion	305.20	2381	333	206.65	413.29	0.45
Total Planned Development	4292.50	22447	3143	1948.51	3897.02	**6.39**
(non-specified development w/i WSA)	6331.50	49386	6915	4286.95	8573.91	**9.26**
SA-7	13702.00					
Eloy Valley	3702.30	62244	8716	6179.17	12358.33	13.35
Eloy 120	215.00	1677	235	145.57	291.15	0.31
Eloy 160	277.00	2161	303	187.55	375.10	0.41
Eloy Valley 3	578.50	4512	632	391.69	783.39	0.85
Eloy Valley Annexation	1527.90	11918	1669	1034.52	2069.03	2.23
Eloy Valley 2 See Comman & Hanna	311.50	2430	340	210.91	421.82	0.46
Picacho View I	493.70	7815	1094	678.39	1356.77	1.47
Picacho View II	1002.00	7816	1094	678.44	1356.88	1.47
Grand Valley Estates	305.60	2384	334	206.92	413.83	0.45
The Villages of Santa Cruz Valley	313.90	2448	343	212.54	425.07	0.46
Overfield Property	43.80	342	48	29.66	59.31	0.06
Annexation by Jordan Rose	342.60	2672	374	231.97	463.94	0.50
Total Planned Development	9113.80	108418	15181	10187.31	20374.63	**22.00**
(non-specified development w/i WSA)	4588.20	35788	5011	3106.59	6213.19	**6.71**
SA-8	8037.00					
Rancho Del Sol Brillante	1747.90	13634	1909	1659.03	3318.06	3.58
Daybreak at Picacho	1465.00	11427	1600	991.93	1983.85	2.14
Blue Beacon	0.50	4	1	0.34	0.68	0.00
Shay Landing	176.00	1373	192	119.17	238.33	0.26
Sunshine 539	547.80	4273	598	370.91	741.81	0.80
Sunshine City	609.30	4753	665	412.55	825.09	0.89
Total Planned Development	4546.50	35463	4966	3553.91	7107.83	**7.68**
(non-specified development w/i WSA)	3490.50	27226	3812	2363.36	4726.72	**5.10**

Note: Values in green indicate specific planning data was available.

Table 2 (Continued)
Projected Demands by Water Service Sub-Area

	Area (acres)	Population	Annual Use (Acre Ft./Yr.)	Average Daily Demand (gpm)	Peak Day Demand (gpm)	Storage Required (MG)
SA-9	5979.00					
Major General Plan Amendment 2	2351.60	18342	2568	1592.23	3184.46	3.44
Steven Farms	664.00	5179	725	449.58	899.17	0.97
Sunshine Estates	891.40	6953	974	603.55	1207.10	1.30
Total Planned Development	3907.00	30475	4267	2645.36	5290.73	**5.71**
(non-specified development w/i WSA)	2072.00	16162	2263	1402.92	2805.83	**3.03**
SA-10	1989.00					
Major General Plan Amendment 2	1240.00	9672	1354	839.58	1679.17	1.81
Total Planned Development	1240.00	9672	1354	839.58	1679.17	**1.81**
(non-specified development w/i WSA)	749.00	5842	818	507.14	1014.27	**1.10**
Grand Total			**120709**			**107.43**

Note: Values in green indicate specific planning data was available.

3.3 Future System Sizing and Requirements

3.3.1 Service Sub-Areas

As discussed in Section 1, the Phase I Master Water Planning limits constitute a planning area and not a political subdivision or service limit. Within the overall Phase I planning limits, service sub-areas have been established to make the planning effort more manageable. The delineation of sub-areas was performed with regard to physical constraints, such as proposed development boundaries, grouping of planned developments, barriers such as Interstate 10, and water service pressure zone boundaries. The extents of each service sub-area, as well as the estimated demands per area are provided on Figure 4.

Each development will create identifiable and quantifiable requirements for water facilities and for water resources, including well production and storage. Developments will typically construct the required infrastructure to provide for the demand that they impose on the water system. These improvements will typically include the development of new water system infrastructure, and in some cases an offsite interconnect to the existing system. Each service sub-area will contain 100% of the infrastructure required to provide water service and fire protection with a degree of redundancy as described in the Water System Development Standards. Water systems may require oversizing to accommodate known or anticipated development of property adjacent or near to the subject development, or to provide redundancy to adjacent service sub-areas. Specific developments are referenced to service sub-areas in Table 2.

The Phase I planning boundary is flexible and is intended to easily adapt to include other interested properties inside or outside of the boundary for the purpose of obtaining water service from the City. The service sub-areas may also be adjusted depending on additional information and constraints that may be presented by developers.

3.3.2 Regional Facilities

In an effort to provide water production facilities that are versatile and serve the long-term needs of both the Developer and the City, it has been determined that regional plants will be constructed as opposed to facilities designed based on the needs of an individual development.

The regional water production facilities that will serve each service sub-area are sized to be self contained, meaning that wells, storage, boosters, and mains are sufficient to meet the demands resulting from the complete build-out of all developable land within a predetermined radius of influence.

A typical regional facility will consist of the following:

- Transmission mains on section lines or within spine roads, minimum 16 inch diameter.
- An appropriate water facility site, meeting the minimum dimensional and standard layout requirements presented in the City of Eloy Water System Development Standards.
- Water storage (4 million gallons total storage typical) with phased construction of two 2-million gallon tanks.
- Multiple wells with fill lines to deliver pumped well water to a common reservoir(s).
- Booster station capable of meeting peak demands and fire flow requirements.
- Electrical controls, including motor control centers and SCADA

The typical production facility will serve approximately four square miles at an assumed density of 2.6 RAC and 3.0 persons per residence. At 4.0 RAC, this area decreases to approximately 2.6 square miles with the same storage volume.

In addition to the requirements set forth in both the Master Water Plan and the Water System Development Standards, the planning and siting of regional water production facilities will necessitate the following:

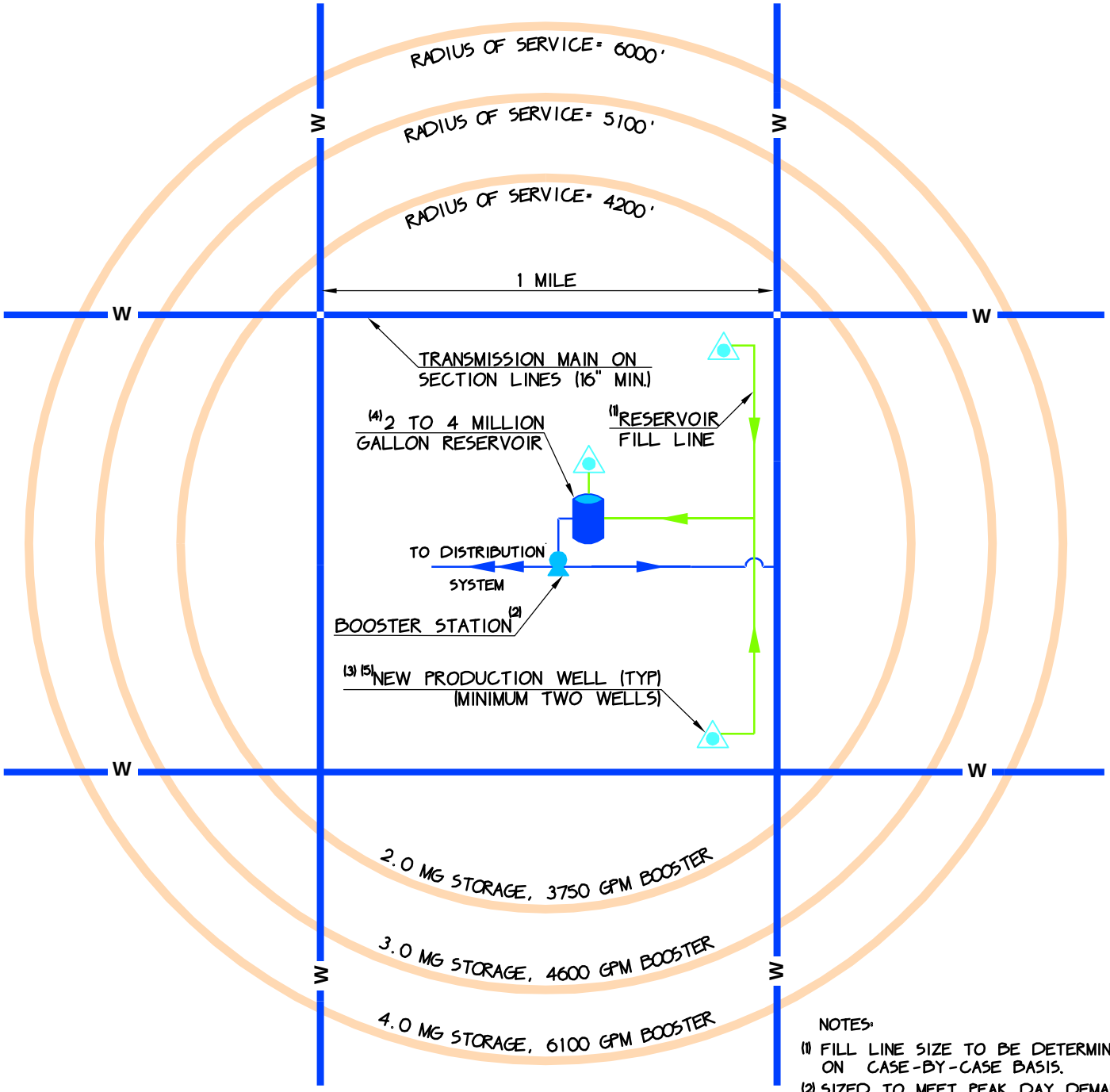
- Partnership(s) between developments of varying degree to coordinate the development of regional facilities, and
- Coordination with the Eloy City Engineer to determine how source, storage, and booster capacity can be made available through a combination of improvements, including interconnects and construction and equipping of production wells.

Typical schematics for a regional water production system are provided as Figures 5a and 5b. The location and configuration of the wells will be determined by a qualified hydrogeologist under the employ of the Developer, and in cooperation with the Eloy City Engineer. The number and phasing of new water wells required may vary depending on the sustained yield of the wells and the degree of redundancy that can be provided through approved interconnections to the existing City water distribution system.

It is not the intention of this document to site new water infrastructure with any degree of accuracy or certainty. Locations for the regional water production facilities will be primarily proposed by Development interests, and agreed upon bilaterally by the landowner and the City. However, the proposed locations for these sites will be assessed within the context of the regional facility philosophy and long-term master planning process. Spacing for typical regional facilities will be approximately one and a half to two miles where the assumed residential density is 2.6 RAC and the ultimate total storage will be four million gallons. This spacing decreases as development density increases.

In no case shall approval be granted to water system improvement plans without written consent from the local fire suppression authority and without an executed Water Service Agreement from the City of Eloy Engineer describing how public water infrastructure will be built and ultimately dedicated to the City.

FIGURE 5A
TYPICAL REGIONAL WATER PRODUCTION FACILITY
(AVG. DEVELOPMENT DENSITY = 2.6 RAC)



SUMMARY OF REQUIRED WELL CAPACITY

Total Storage (MG)	Development Density (RAC)	Maximum Service Area (AC)	Avg. Daily Demand (Gal.)	Minimum Well Production Capacity (gpm)
2.0	2.6	1270	670	1005
3.0	2.6	1875	1300	1950
4.0	2.6	2600	1750	2625

ASSUMPTIONS

3.0 PERSONS PER RESIDENCE
125 GALLONS PER CAPITA PER DAY
FIRE FLOW = 2000 GPM

NOTES:

(1) FILL LINE SIZE TO BE DETERMINED ON CASE-BY-CASE BASIS.

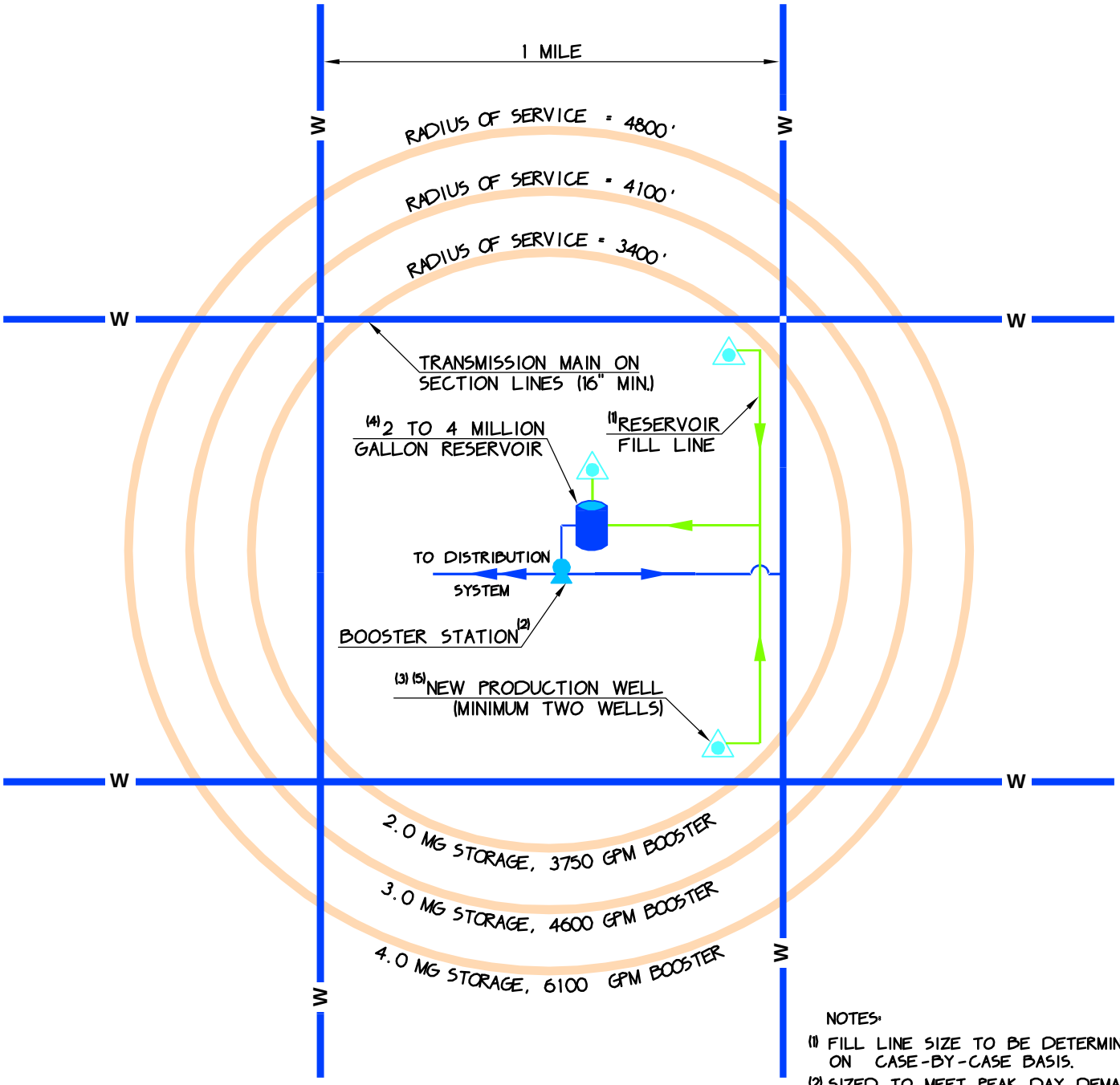
(2) SIZED TO MEET PEAK DAY DEMAND PLUS FIRE FLOW OR PEAK HOUR DEMAND, WHICHEVER IS GREATER.

(3) AT THE DISCRETION OF THE CITY ENGINEER, A SINGLE WELL MAY BE USED AS PART OF PHASED DEVELOPMENT IF A SUITABLE INTERCONNECT TO THE EXISTING SYSTEM IS COMPLETED.

(4) TO BE PHASED IN TWO TANKS, 1 TO 2 MILLION GALLONS EACH

(5) PRODUCTION PER WELL ASSUMED TO BE 750 GPM TO 1000 GPM

FIGURE 5B
TYPICAL REGIONAL WATER PRODUCTION FACILITY
(AVG. DEVELOPMENT DENSITY = 4.0 RAC)



SUMMARY OF REQUIRED WELL CAPACITY

Total Storage (MG)	Development Density (RAC)	Maximum Service Area (AC)	Avg. Daily Demand (Gal.)	Minimum Well Production Capacity (gpm)
2.0	4.0	830	670	1005
3.0	4.0	1200	1300	1950
4.0	4.0	1660	1750	2625

ASSUMPTIONS

3.0 PERSONS PER RESIDENCE
125 GALLONS PER CAPITA PER DAY
FIRE FLOW = 2000 GPM

NOTES:

(1) FILL LINE SIZE TO BE DETERMINED ON CASE-BY-CASE BASIS.

(2) SIZED TO MEET PEAK DAY DEMAND PLUS FIRE FLOW OR PEAK HOUR DEMAND, WHICHEVER IS GREATER.

(3) AT THE DISCRETION OF THE CITY ENGINEER, A SINGLE WELL MAY BE USED AS PART OF PHASED DEVELOPMENT IF A SUITABLE INTERCONNECT TO THE EXISTING SYSTEM IS COMPLETED.

(4) TO BE PHASED IN TWO TANKS, 1 TO 2 MILLION GALLONS EACH

(5) PRODUCTION PER WELL ASSUMED TO BE 750 GPM TO 1000 GPM

3.3.3 Production Well Sizing

At the present time, it is anticipated that all potable water delivered to domestic users will be the product of ground water pumping from production wells within the City of Eloy service area. This is consistent with the recent approval by the Arizona Department of Water Resources of the Application of the City of Eloy for a Designation as Having an Assured Water Supply.

Existing City of Eloy domestic water wells have an average depth of 1000 feet. New water production wells are expected to be similar in depth. Production rates in the current wells range from 500 to 1100 gpm. For planning purposes, a conservative value of 750 gpm has been assumed for new wells. The design of new wells will be consistent with the Water System Development Standards and will be completed by a qualified hydrogeologist. Conversion of existing agricultural wells to domestic usage will not be permitted.

Individual developments will be responsible for providing a continuous quantity of well water equal to a minimum of 1.5 times the Average Daily Demand (ADD) created by the development. Using the assumptions described above, and using the previously mentioned typical residential density, the average well spacing for a standard 750 gallon per minute well is one every 530 acres of developed land at a density of 2.6 RAC. This area decreases to 345 acres at a development density of 4.0 RAC.

As a Community Water System per Arizona Administrative Code, the City of Eloy must have an Emergency Operations Plan which addresses what facilities and operational methods are in place to ensure continuation of service during a loss of source, loss of power, component failure, and a number of other potential emergency situations. To assist in meeting this requirement, a minimum of two production wells (each capable of producing 1.5 times Average Daily Demand) shall be required in areas where a suitable interconnect to the existing water system is not available. The suitability of a proposed interconnect to the existing system will be evaluated on a case-by-case basis by the City Engineer. The results of the evaluation must demonstrate adequate pressure at the proposed development as well as no significant impacts to the existing customers during Maximum Day Demand plus fire flow conditions.

3.3.4 Storage Facility Sizing

The proper identification and sizing of system storage will allow the City of Eloy to provide a constant level of service during varying demand conditions, including Peak Hour Demand and Maximum Day Demand plus fire flow. There shall also be a reserve volume to assure continuous service during emergencies.

Various documents and reports exist that provide legitimate guidelines for the sizing of storage facilities. The *Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers,* also known as the 10 States Standards, provides the following:

> "The minimum storage capacity (or equivalent capacity) for systems not providing fire storage shall be equal to the average daily consumption. This requirement may be reduced when the source and treatment facilities have sufficient capacity with standby power to supplement peak demands in the system. Fire flow requirements established by the appropriate state Insurance Services Office should be satisfied where fire protection is provided…"

The Arizona Department of Environmental Quality provides brief regulatory guidelines for the required water storage for a water system. Refer to AAC R18-5-502 Minimum Design Criteria, and R18-5-503 Storage Requirements for information concerning minimum storage requirements.

There are various components to the required storage volume. Although the components are not physically separated, it may be useful to consider the required volumes as falling under the following categories:

1. Equalization volume (supply volume)
2. Fire protection volume (fire volume)
3. Volume for other emergencies, such as power outages or water main breaks in supply lines (reserve volume)

The following guidelines shall be applied when sizing water storage facilities:

- Equalization volume shall be 1.0 times the average daily demand. Where the sub-service area is large, and there are two or more storage facilities on line, the equalization volume may be reduced with approval by the City Engineer.
- Volume for fire protection shall be determined on a case-by-case basis. Residential requirements for fire suppression may be a little as 1000 gallons per minute for a two-hour duration. For a regional storage facility of 4 million gallons or greater, this volume may be considered coincident with the equalization and emergency storage volumes.
- For fire suppression requirements higher than this, the incremental increase in volume above 1000 gallons per minute for a two-hour duration must be added to the total required volume. For storage facilities that are not regional, and are less than 4 million gallons, the greatest fire flow and duration determined by the fire suppression authority must be included in its entirety in the total storage volume.
- Volume for other emergencies shall be 0.5 times the average daily demand.

Therefore, storage attributable to domestic demand shall be 1.5 times the average daily water demand. The storage required for fire protection shall be the product of the required flow and duration as determined by the local fire suppression authority. Storage volumes may be reduced if adequate redundancy exists within the system as determined by the City Engineer.

All storage facilities are expected to be regional, and conform to this Master Plan. As the facilities described herein are required for built-out conditions, but the immediate need may not warrant installation of the ultimate size storage facility, phasing may be allowed. Even though phasing is permitted, a footprint for the ultimate storage facility will be designed and shown as a condition of plan approval.

Opportunities for installation of gravity storage will be considered on a case-by-case basis. Ultimate booster station sizing may be decreased if gravity storage is incorporated.

3.3.5 Booster Station Capacity

The majority of the storage facilities described above will be at or near ground level and will require boosting of the water into the distribution system. The total capacity of the booster station shall meet or exceed the greater of the following two demand scenarios:

- Peak Hour Demand as determined by the City Engineer and in accordance with the recommendations of this report. Peak Hour is defined as 3.5 times the Average Daily Demand.
- Maximum Daily Demand plus fire flow, as determined by the City Engineer and in accordance with the recommendations of this report.

All storage booster stations are expected to be regional, and conform to this Master Plan. The booster station shall be designed to accommodate all water demand conditions with reasonable efficiency, ranging from low flows at night to peak hour flows or maximum day plus fire flow. For a regional plant with a 4 million gallon storage reservoir, the complimentary booster capacity is 6100 gallons per minute. Other combinations of storage and booster capacities can be found in Figures 5a and 5b.

Booster Pumps

Individual pumps will be designed to turn on and off and perform in parallel with adjacent pumps to meet system demands. It may be necessary to phase the individual pumps at a booster station to meet demands that are significantly lower than at projected build-out.

While the booster station piping and electrical motor control centers are sized to accommodate full build-out, the individual pumps shall be hydraulically sized to handle projected demands through ten years from the date of installation of the booster station. Interim remedies addressing operational concerns shall be provided where demands are projected to remain low for an extended period of time.

3.3.6 Sizing of Water Mains

The water conveyance system shall consist of transmission mains, distribution mains and reservoir fill lines. All distribution and transmission main lines will operate at system pressure, which is to say at the high water for the pressure zone.

Reservoir fill lines shall be sized in conjunction with the well pump to allow for efficient delivery of the full well capacity to the designated storage reservoir. As with transmission mains, velocities shall be limited to minimize the required pump head to deliver full well pump capacity.

The friction loss in pipe limits the City of Eloy's ability to deliver water to service connections remote from the centralized water production facilities. The losses in the pipe increase as an exponent of the flow rate, also know as Q. The head loss, which is indicative of the energy required to move water is defined as a constant times $Q^{1.85}$ ($h_l=k*Q^{1.85}$).

Criteria for head loss in pipe shall be that velocity shall not exceed five feet per second during Maximum Day Demands. There is no specific velocity criteria for the Maximum Day Demand plus Fire Flow, but the required 20 psi minimum residual pressure must be met throughout the system. The primary purpose of this limit is to mitigate head loss due to friction in the pipe, resulting in improved pressure at water services and at fire hydrants. This limit is also provided in order to increase the life of the water system. Table 3 provides a summary or water main sizing criteria based on headloss.

3.3.7 Power and Back-Up Power

All well and booster facilities will require three-phase power from an entity that bi-laterally agrees with the City of Eloy to provide service. All booster facilities shall include a completely redundant power source, whether that is from natural gas generators, diesel engine generators, or an approved second circuit from the power company. Sizing of the back-up power source shall accommodate all electrical loads at full production capacity of the booster station within the service factor recommended by the manufacture of the generator.

Selected well sites shall also include a completely redundant power source as described above. Within the service area of each regional facility, there shall be a sufficient number of wells with back-up power to produce 1.5 times the Average Daily Demand under all conditions. The minimum number of wells in any given service sub-area without an interconnect to an adjacent regional facility with adequate back-up power shall be two.

Table 3
Water Main Sizing Criteria
Based on Friction Headloss

Pipeline Sizing Criteria (5 Feet/Second, Based on Hazen Williams constant C=140)		
Size (inches)	Capacity (gallons per minute)	Headloss (Ft./1000 Ft.)
6	440	14.3
8	780	10.1
12	1750	6.3
16	3100	4.5
24	7000	2.8
30	10,900	2.2

3.4 Future Conditions Hydraulic Modeling

Hydraulic modeling was used to evaluate required pipe sizes for transmission mains and water service sub-area interconnections. The modeling was based on an expansion of the existing conditions hydraulic model discussed in Section 2. Additional pipes and pressure nodes were added to expand service into undeveloped areas. Demands for the future conditions model were taken from Section 3.2, Future System Demands.

A water service sub-area will be self-supporting at build-out and require no additional external supply. However, to provide the level of redundancy desirable in a public water system, a 16-inch pipe has been determined for planning purposes to be the typical size that will serve as the interconnecting main between adjacent service sub-areas. As the system grows, and the issue of service sub-area interconnections arises, a revised hydraulic model will be run based on actual development densities to determine if a larger or smaller pipe may be warranted.

The water system model will be used in the future to evaluate proposed infrastructure within individual developments. It will also be used to assess the suitability of interconnects to the existing system which could provide system redundancy for new developments.

3.5 Future System Capital Improvements

The following capital improvements are based on an understanding that the Development community will become a stakeholder along with the City of Eloy in expanding the water system to accept and accommodate new water customers.

3.5.1 Production Wells

The City of Eloy desires to serve customers that apply for service and are located so as to have reasonable access to the distribution system. For every 1000 new 5/8"x 3/4" meters, approximately 250 gallons per minute of well capacity is required; 3000 new meters will warrant 750 gpm, and so on. As discussed in Section 4, a single 5/8" x 3/4" meter is often referred to as an Equivalent Dwelling Unit (EDU). For most new developments, and especially those outside of the current system limits, this demand will be accommodated by the construction of new production wells funded by the Developer.

3.5.2 Alternative Water Source Development

While exploring alternative water sources has not been mentioned previously in this section, serious consideration should be given to procuring or leasing rights to Central Arizona Project (CAP) water through the Central Arizona Groundwater Replenishment District (CAGRD).

During original allocations made for CAP water, smaller communities discovered that the allocation process was involved and that larger water utilities applied for and the Native American tribes were given all available resources from the Colorado River. Presently, smaller water utilities and municipalities are in the process of entering negotiations to re-apportion or lease rights to the CAP from others.

Water rights investigations and acquisitions should be considered for inclusion into the City of Eloy's capital program to assure continued rights to accept new customers.

3.5.3 Service Area Interconnects

The service sub-area interconnect mains and the on-section line transmission mains are intended to describe similar improvements that are required to provide system redundancy between regional facilities and service sub-areas. These mains may also serve as a spine water line for developments, depending on their configuration. This redundancy and ability to move water throughout the system will assure more reliable and uninterrupted water service for all customers.

The developers will install said transmission mains when their development straddles a section line or when a spine road alignment may serve the same purpose. It is anticipated that much of the interconnecting transmission main system will be installed by the City using unds derived from water system development fees (see Section 4 – Infrastructure Cost and Financing).

The regional facilities that develop first will drive the timeline for construction of the transmission mains and system interconnects. The priority will be to first make significant interconnections to the central water system, and then to connect between regional facilities with the most highly developed wells and most constructed storage to the lesser-developed areas.

3.5.4 Storage

The 4 MG regional water storage described in Section 3.3.2 will accommodate approximately 7111 EDU connections. Construction of water storage reservoirs is primarily the responsibility of the development community. However, there will be instances where a development is of insufficient size to be capable of financing and constructing a regional storage facility. In these instances, the City will first attempt to coordinate the smaller developments with the larger so that the storage needs of both developments can be met while also accommodating equitable cost sharing.

If this coordination is not possible, a portion of the system's slightly oversized facilities may be used to provide interim service, while the ultimate storage needs are addressed, including financing and construction. This method is generally undesirable, as the storage needs described under Section 3.3.5 may become compromised, which could result in loss of service during fire flows or during other emergencies.

The number and location of future regional storage facilities has not been determined. The result of this approach to system planning is that facility locations will be chiefly development driven. Likewise, the time-line for planning and financing the improvements will be difficult to determine.

3.5.5 SCADA Modernization

In order for the existing central water system, and its associated SCADA (supervisory control and data acquisition) to continue to serve its intended purpose, it will be necessary to reconstruct the base SCADA equipment. The Public Works facility will likely be the centralized base location for water and sewer SCADA equipment and operations. This upgrade is necessary to allow City personnel to operate both systems in the most economic manner possible. All future regional facilities will require SCADA systems constructed in accordance with the Water System Development Standards.

4.0 INFRASTRUCTURE COST AND FINANCING

4.1 Infrastructure Cost Projection

The total cost to design and construct a regional facility is based on the current value of all production related items including transmission mains, water storage reservoirs, production wells, and booster stations. This cost is divided by the number EDUs within the service area of a regional facility to obtain the per EDU water system development fee. A summary of costs as well as the projected per EDU development fee is presented in Table 4.

Development interests will be primarily responsible for financing and implementing the water system expansions necessary to serve an expanded customer base. In this section, the costs for installation of regional facilities are developed, and a logical and equitable approach for the assignment of costs is presented.

4.1.1 Water Mains

Distribution water lines will be constructed by Developers and builders to accommodate the increase in customer base created by the construction of new homes and businesses within a specific development. The costs associated with construction of the distribution system will not be reimbursed with the exception of where mains are oversized to provide additional capacity for adjacent developments or for system redundancy in adjacent service sub-areas. The costs for construction of distribution mains will not be included in this section.

The transmission mains on section lines and the regional facility interconnecting mains will be constructed by Developers when the subject development straddles a section line, or when a spine road alignment may be reasonably substituted to serve the same purpose. Construction of transmission mains may also be accomplished as part of the City of Eloy Capital Improvement Program (CIP) using water system development fee revenues.

The present day cost of installing 16-inch transmission pipe is approximately $95.00 per lineal foot. This cost represents labor, materials, engineering design, standard valve spacing, no fire hydrants, moderate traffic control, and placement outside of existing pavement.

4.1.2 Reservoirs

The base cost for new storage will be based on use of at-grade steel tanks ranging in size from a single 2 MG to tank to a combination of two 2 MG tanks. The unit cost for storage was estimated at $0.65 to $0.85 per gallon. An average value of $0.75 per gallon has been used for the purpose master planning.

Walls and piping and other ancillary equipment associated with water production facilities are included under booster stations.

It is the Developer's option to provide other configurations, including alternative construction materials, special landscaping, below grade siting, or special architectural features to enhance the aesthetics of the property. These special enhancements are considered discretionary and will not affect the assessed value of the improvements to the City water system, even though the cost may be higher than what is required by minimum standards.

4.1.3 Production Wells

Water production wells are to be drilled and equipped per the City of Eloy Water System Development Standards. These standards require use of rotary drilling with reverse circulation of the drilling fluid. This is specialized work, and will be performed by a qualified contractor with demonstrated experience in drilling using the specified methods and in installing production wells in central and southern Arizona.

The cost to drill and fully equip a production well to the meet City standards is estimated to be $950,000 per well. Well production cannot be completely predicted prior to actual construction and pump testing of the well. Therefore, the production value of a well for the purpose of master planning is based on a conservative value of 750 gallons per minute sustained capacity.

The conversion of agricultural wells into domestic wells will not be permitted.

4.1.4 Booster Stations

The chosen method for delivering well water to customers is to have all wells pump to a common or regional water storage tank, and then boosted into the distribution system. This provides a single point source for water quality reporting purposes, and allows wells to cycle less, prolonging the well pump and motor life. The booster station will typically be comprised of multiple vertical turbine pumps drafting from a storage reservoir and delivering at the required system high water.

The ultimate capacity of a given booster station will be designed to meet the peak demands of the service sub-area that it is intended to serve. This will include Peak Hour Demand, or Maximum Day Demands plus fire flow, which ever is greater.

The cost to construct a regional booster station, including pumps, motors, motor control center, piping, walls, and all ancillary equipment and features is estimated at $600,000 for an approximately 6000 gallon per minute facility.

4.1.5 Ancillary Improvements and Equipment

Additional infrastructure such as monitor wells, well fill lines, and back up power generators are required to complete a regional water production facility. These additional items and associated costs, along with the other line items and associated costs, are listed in Table 4 below. These sum of these items represent the total cost of a typical regional water production facility meeting minimum City standards.

4.1.6 Engineering, Contingencies, and Inflation

Engineering fees may be estimated at 15% of the total constructed cost. Actual fees will vary depending on the complexity of the plant and on market conditions. Contingencies are used to compensate for fluctuations in construction costs, inflation, and to compensate for uncertainties associated with cost estimates.

As construction conditions, material availability and labor vary and affect the bidding climate, price fluctuations are to be expected. Variables that affect the unit costs are not evaluated in detail in this report. In an effort to index the present cost to construct water production and transmission facilities, the ENR October 2006 Construction Index is noted to be 7882.53 at the time of publication of this Master Water Plan. Cost estimates may be re-indexed periodically using new cost indices to adjust the estimate of costs to construct regional facilities. Additional adjustments should be considered as bid tabulations for City of Eloy work become available, allowing a more precise cost estimate.

Table 4
Estimated Construction Cost for a
Regional Water Production Facility

FACILITY COMPONENT	QUANTITY	UNIT	ESTIMATED UNIT COST	EXTENDED COST
Storage (steel)	4,000,000	gallons	$0.75	$3,000,000
Booster Station	1	each	$600,000	$600,000
Production Well	4	each	$950,000	$3,800,000
Monitor Well	1	each	$75,000	$75,000
Real Property	4.0	acres	$50,000	$200,000
Off-Site Interconnect Transmission	27,500	feet	$95.00	$2,612,500
Well Fill Line	10,000	feet	$60.00	$600,000
Back Up Power (Well)	2	each	$120,000	$240,000
Back Up Power (Well and Booster)	1	each	$150,000	$150,000
Engineering Design	15 percent	each	$1,405,875	$1,691,625
Contingency	10 percent	each	$1,092,838	$1,296,913
GRAND TOTAL				**$14,266,038**
DEVELOPMENT FEE PER EDU				**$2006.19**

4.2 Development Fees and Rates

4.2.1 Intent

It is the intent of the City of Eloy that all augmentation to the water system that is required to provide reliable water service to new development be planned, financed, designed, and constructed at no cost to the existing water customers or to residents of the City of Eloy. Therefore, development will bear the total cost of providing the required water infrastructure to accommodate growth.

The water system expansion required to provide service to new residential and commercial customers may include, but is not limited to, construction of production wells, boosters, water storage tanks, well fill lines, distribution mains, and transmission mains. The majority of the construction of these facilities is expected to be accomplished by Developers as a condition of providing water service to new residents or tenants.

It is assumed that the development community will finance the installation of the infrastructure necessary to serve its interests either through direct construction of the required facilities or by payment of development fees to be used for the sole purpose of expanding the water system. Through the Master Water Plan process, the City Engineer will identify needs for facilities whose ultimate capacity or size exceeds those requirements of the individual development for which they are proposed. On such occasions, the City Engineer will direct that facilities be oversized, and the City will provide credit or reimbursement for the incremental difference in construction cost between the Developer's requirements and the oversized requirements as requested by the City of Eloy.

In addition to production facilities, development fees will also be used to finance the design and construction of interconnecting transmission mains along section lines or spine roads of major developments.

Discussion regarding development fees shall not be construed to imply that the City is under obligation to construct regional facilities on behalf of development interests. These fees do not include the cost for City of Eloy Water Department staff to make taps, install meters, or otherwise establish a new account for service.

4.2.2 Overview of Water System Development Fees

The right to establish fees to offset a negative financial impact to the public due to development related growth and the associated water system expansion costs is established by the often cited Arizona Revised Statute 9-463.05, unofficially restated as follows:

A. A municipality may assess development fees to offset costs to the municipality associated with providing necessary public services to a development.

B. Development fees assessed by a municipality under this section are subject to the following requirements:
   1. Development fees shall result in a beneficial use to the development.
   2. Monies received from development fees assessed pursuant to this section shall be placed in a separate fund and accounted for separately and may only be used for the purposes authorized by this section. Interest earned on monies in the separate fund shall be credited to the fund.
   3. The schedule for payment of fees shall be provided by the municipality. The municipality shall provide a credit toward the payment of a development fee for the required dedication of public sites and improvements provided by the Developer for which that development fee is assessed. The Developer of residential dwelling units shall be required to pay development fees when construction permits for the dwelling units are issued.
   4. The amount of any development fees assessed pursuant to this section must bear a reasonable relationship to the burden imposed upon the municipality to provide additional necessary public services to the development. The municipality, in determining the extent of the burden imposed by the development, shall consider, among other things, the contribution made or to be made in the future in cash or by taxes, fees or assessments by the property owner towards the capital costs of the necessary public service covered by the development fee.
   5. If development fees are assessed by a municipality, such fees shall be assessed in a non-discriminatory manner.
   6. In determining and assessing a development fee applying to land in a community facilities district established under title 48, chapter 4, article 6, the municipality shall take into account all public infrastructure provided by the district and capital costs paid by the district for necessary public services and shall not assess a portion of the development fee based on the infrastructure or costs.

C. A municipality shall give at least sixty days' advance notice of intention to assess a new or increased development fee and shall release to the public a written report including all documentation that supports the assessment of a new or increased development fee. The municipality shall conduct a public hearing on the proposed new or increased development fee at any time after the expiration of the sixty day notice of intention to assess a new or increased development fee and at least fourteen days prior to the scheduled date of adoption of the new or increased fee by the governing body. A development fee assessed pursuant to this section shall not be effective until ninety days after its formal adoption by the governing body of the municipality. Nothing in this subsection shall affect any development fee adopted prior to July 24, 1982.

D. Each municipality that assesses development fees shall submit an annual report accounting for the collection and use of the fees. The annual report shall include the following:
   1. The amount assessed by the municipality for each type of development fee.

2. The balance of each fund maintained for each type of development fee assessed as of the beginning and end of the fiscal year.
3. The amount of interest or other earnings on the monies in each fund as of the end of the fiscal year.
4. The amount of development fee monies used to repay:
   (a) Bonds issued by the municipality to pay the cost of a capital improvement project that is the subject of a development fee assessment.
   (b) Monies advanced by the municipality from funds other than the funds established for development fees in order to pay the cost of a capital improvement project that is the subject of a development fee assessment.
5. The amount of development fee monies spent on each capital improvement project that is the subject of a development fee assessment and the physical location of each capital improvement project.
6. The amount of development fee monies spent for each purpose other than a capital improvement project that is the subject of a development fee assessment.

E. Within ninety days following the end of each fiscal year, each municipality shall submit a copy of the annual report to the city clerk. Copies shall be made available to the public on request. The annual report may contain financial information that has not been audited.

F. A municipality that fails to file the report required by this section shall not collect development fees until the report is filed.

4.2.3 Fee Structures

There are three broadly recognized structures for development fees:

- **System Buy-In (or Reimbursement Fee) Approach.** Based on existing facilities and costs. Under this approach, new customers are required to "buy in" to existing system facilities at a rate that reflects either the prior investment per existing customer (investment buy-in), or the unit cost of the existing capacity (system equity or capacity buy-in)
- **Capacity Expansion (or Improvement Fee) Approach.** Based on the projection of capacity enhancing system costs during the planning horizon (typically 10 to 20 years), along with expected capacity/demands of growth during this period.
- **Combined Approach.** Considers both existing and planned future facilities and costs.

The above-mentioned financing structures can be categorized as either "forward looking" or "backward looking." Since the existing system generally lacks the capacity and infrastructure to serve proposed development, the proposed fees structure will be considered "forward looking", using the above mentioned terminology, and will be based on the cost to construct new water facilities.

Additionally, the American Water Works Association (AWWA) indicates in Manual M1 Principles of Water Rates, Fees and Charges that the five types of water utility capital financing are:

- pay-as-you-go financing through user rates
- debt financing
- system development charges (SDC's)
- up-front reimbursement from Developers
- stock issuance

Using this set of terms, the charge under consideration would be referred to as an SDC.
It is recommended that guidelines presented in the AWWA Manual M1 be reviewed and integrated by the City of Eloy Chief Financial Officer in matters related to capital-related costs, revenue requirements, and allocation of costs. Those items requiring capitalization have been previously summarized in Section 4.1 Infrastructure Cost Projection.

4.2.4 City of Eloy Capital Water Works Projects

The City of Eloy has previously relied on utilization of its own capital to construct water production facilities. The development community has traditionally been financially responsible for providing the necessary on site water distribution amenities, such as water lines, meters, and fire hydrants. Offsite improvements to serve developments have previously been arranged on a case-by-case basis, with occasional funding for mains through grants.

Relevant to development driven water system expansion, it is anticipated that the City will complete capital projects primarily associated with the interconnecting of regional facilities and service sub-areas. This will occur once densities increase, and reasonable build-out has taken place. It is anticipated that these projects will utilize the funds discussed below.

4.2.5 Projected Funds from Development Fee

The total funds collected from water system development fees will be a simple function of the number new connections to the water system. The near term potential for new growth is not addressed in this report. The rate of growth will be primarily market driven, and should be monitored by City Planning Staff.

Figure 6 illustrates annual projected revenue for growths rates ranging from 2% to 10% annually.

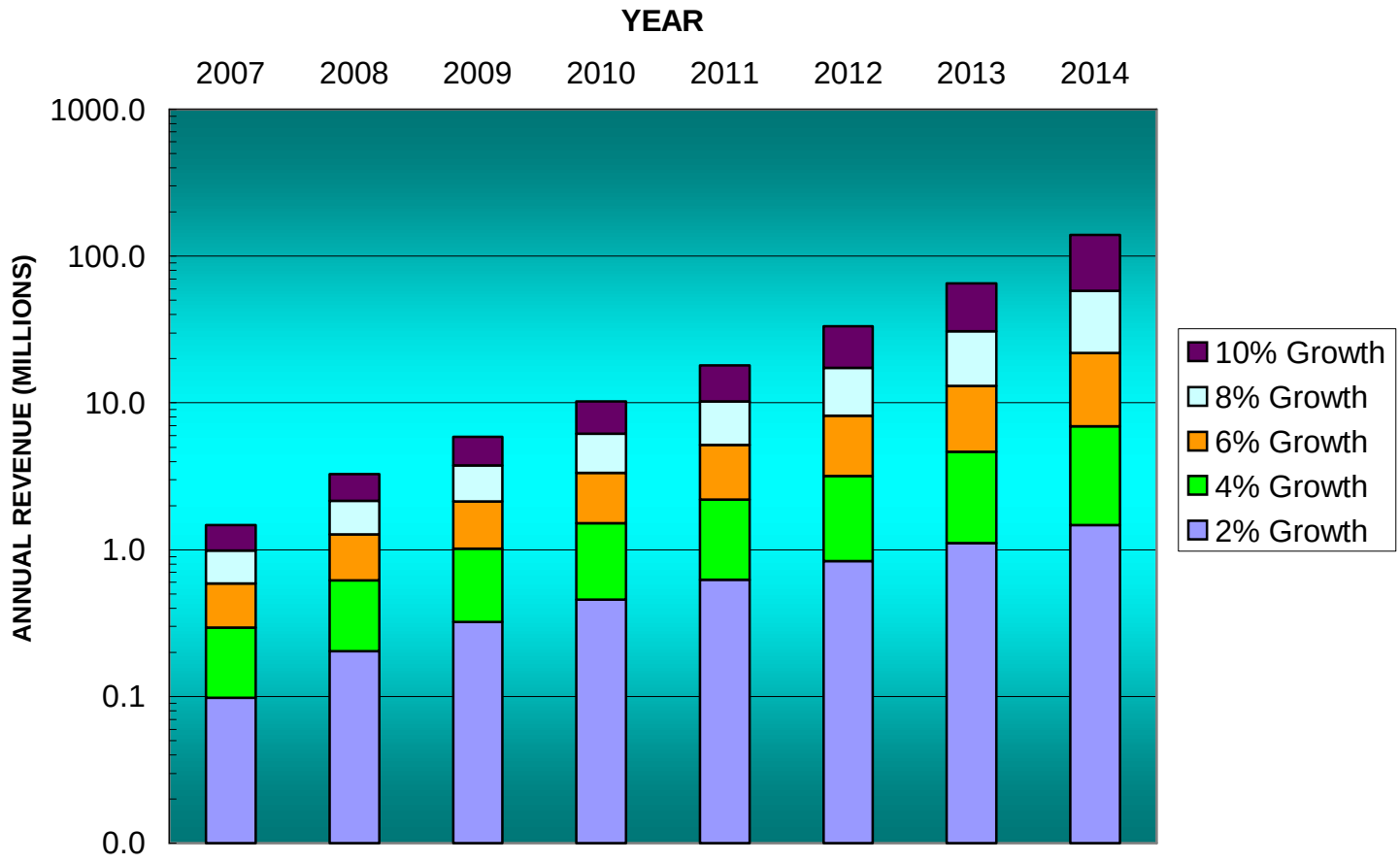


Figure 6
Projected Development Fee Revenue

4.2.6 Facility Hookup Fee Schedule

The development fee as presented above is a function of each new EDU (or 5/8" X 3/4" meter set). The cost developed for the single service is based on proportioning the regional facility cost over the total number of new services that a regional facility can accommodate. Where a larger water service is required to accommodate greater average daily demands or high peak demands, it becomes necessary to re-proportion the number of available connections based on increased meter capacities. Reference is made to the adjustment of meter capacity by ratio in AWWA Manuals M1, M6, and M26. These ratios were applied to the base EDU cost presented in Table 4.

The ratios used for meters from 3/4" up to 6" are as stated in Table 5. The cost for service sizes 3/4" through 6" is multiplied by the factor provided for an adjusted cost for larger services.

Table 5
Meter Factors for Equivalent Dwelling Units

REGIONAL FACILITY COST	WATER SERVICE SIZE	NUMBER OF CONNECTIONS TO REGIONAL FACILITY BASED ON SIZE	EDU factor	COST PER CONNECTION BASED ON METER SIZE
$14,266,038	5/8x3/4	7,111	1.0	$2,006
	3/4"	5,926	1.2	$2,407
	1"	2,844	2.5	$5,015
	1-1/2"	1,422	5.0	$10,031
	2"	808	8.8	$17,654
	3"	474	15.0	$30,093
	4"	284	25.0	$50,155
	6"	142	50.0	$100,310

4.3 Water Service Agreements

It shall be the philosophy of the City of Eloy to enter into water service agreements that will cause development interests to construct the complete regional facilities to serve the projected customer base with no cost or impact to existing water customers or residents. Said agreement will be a condition of water service and of allowing construction of water production facilities. At the appropriate time, an agreement for water service will be created and agreed to bilaterally by authorized City representatives and the Developer. The typical agreement will include of the following elements:

- State legal authorization, such as code, ordinance, or statute, for the City of Eloy to enter into agreement
- State willingness of the City to accept the water facilities and permit them to be connected and become a part of the public water system
- Define improvements, including distribution lines, fire hydrants, water meters, transmission mains, water storage, booster stations, and all plant
- State legal authority for individual acting on behalf of Developer
- Provide legal description of project or property where work will occur
- Provide sufficient definitions regarding terms used in the agreement, including "Water Facilities", "Oversizing", etc.
- Describe the bilaterally agreed upon improvements, including plans, specifications, testing, and phasing

- State that work shall be performed by a Contractor licensed in the State of Arizona that possess all proper licensing and authorities to perform the work
- Contractor shall pay all fees related to permitting, and inspection
- Design shall be subject to all applicable City of Eloy standards, and all regulatory standards including Arizona Administrative Code *Title 18, Environmental Quality, Chapter 4, Department of Environmental Quality, Safe Drinking Water*
- Construction shall be subject to full inspection authority by the City, and all defective work shall be corrected to the satisfaction of the inspector and of the Eloy City Engineer
- Establish hours of operation (construction), accounting for normal work week and holiday schedule
- Establish pre-construction meeting, state what permits are required, establish availability of construction water, indicate all environmental clearances required, and list all fees requiring payment.
- Establish protocol for submittals and shop drawing approval
- State that Contractor shall comply with all requirements of the Occupational Safety and Health Act, and as implemented by the State of Arizona
- State timeline for completion and dedication, and associated damages and penalties if not met
- Developer to provide recordable easements and the required surveying as may be necessary to serve all parcels
- State that facilities will be delivered for ownership to the City of Eloy clear of all liens, claims, charges or encumbrances
- State guarantee of workmanship and materials for two years
- Provide required insurance with the City of Eloy endorsed as an "additional insured thereon
- Provide indemnifications as agreed to bilaterally both parties' legal counsel
- Provide for Attorney fees, cancellation, severability, legal jurisdiction
- Establish successors and assigns

In order for the Developer to accommodate oversizing required by the City Engineer, there may be a need to reimburse the Developer by some predetermined mechanism for the approved incremental cost above that which is directly attributable to the water system infrastructure required to serve that development.

The incremental cost, or oversizing cost, will be determined on a case-by-case basis. The approved methods by which the incremental cost will be determined by the Developer and approved by the City Engineer will be one of the following, or a combination thereof:

- Present bid tabulations from public agencies that reflect the material cost difference between what was required to deliver water to the subject property and what was requested to enhance/oversize the water system for future growth

- § Qualified cost estimator with demonstrated experience with horizontal construction and mechanical estimating shall present detailed estimate for material cost difference between what was required to deliver water to the subject property and what was requested to enhance/oversize the water system for future growth
- § A contractor may present for consideration relevant bid proposals, whether the bid was successful or not, that detail material cost difference between what was required
- § to deliver water to the subject property and what was requested to enhance/oversize the water system for future growth
- § All bid tabs or bid proposals mentioned above may be re-indexed to more accurately reflect the current cost of construction.

The component of the agreement known as "Oversizing of Water Facilities under Private Contract" shall consist of the following elements:

- § State the incremental cost agreed upon by the Developer and the Eloy City Engineer to design, construct, and test the water facilities at a greater size or capacity than what the development requires, including exhibits to demonstrate methods, unit costs, cost differentials, and extended costs
- § State whether or not additional real property is required to accomplish construction of oversized facilities
- § Provide legal description of project or property where oversizing will occur
- § State the method that the City shall use to reimburse the Developer

The above mentioned information shall be arranged professionally with accurate information and recitals.

4.4 Implementation

Fund maintenance will be overseen by the City of Eloy Chief Financial Officer (CFO) and reserved for use by the City of Eloy Water Utility. The Development Fee will not be disbursed to supplement the General Fund and will be tracked separately from monies generated by monthly water service rates and charges. Funds will be used by the City for the purposes stated herein and in accordance with all State laws pertaining to impact and development fees generated for use within the Water Utility.

4.4.1 Fee Assessment and Collection

Upon application for water service, the Water System Development Fee shall be paid in full to the City of Eloy for each water meter applied for. The amount due will reflect the total number of water services in terms of EDU's applied for times the established cost per EDU.

The Development Fee due may be partially or wholly offset by earned credits for the Developer's participation in the installation of regional facilities. The total infrastructure required for a regional facility will be compared to the total infrastructure installed by the

Developer on a per EDU basis, less any oversizing required by the City. The calculated ratio will be used to reduce the Development Fee due.

Upon application for water service, other fees may be required for establishment of a water service account, setting of water meter, etc. These fees do not apply to, or serve as a credit against the Development Fee discussed herein.

4.4.2 Eligibility and Conditions for Reimbursement

Development Fee funds will be held in reserve for construction of qualified projects or payment to qualifying parties that have constructed oversized infrastructure. Fund disbursement shall be subject to fund availability. Credits will be documented and tracked in accordance with accepted accounting procedures.

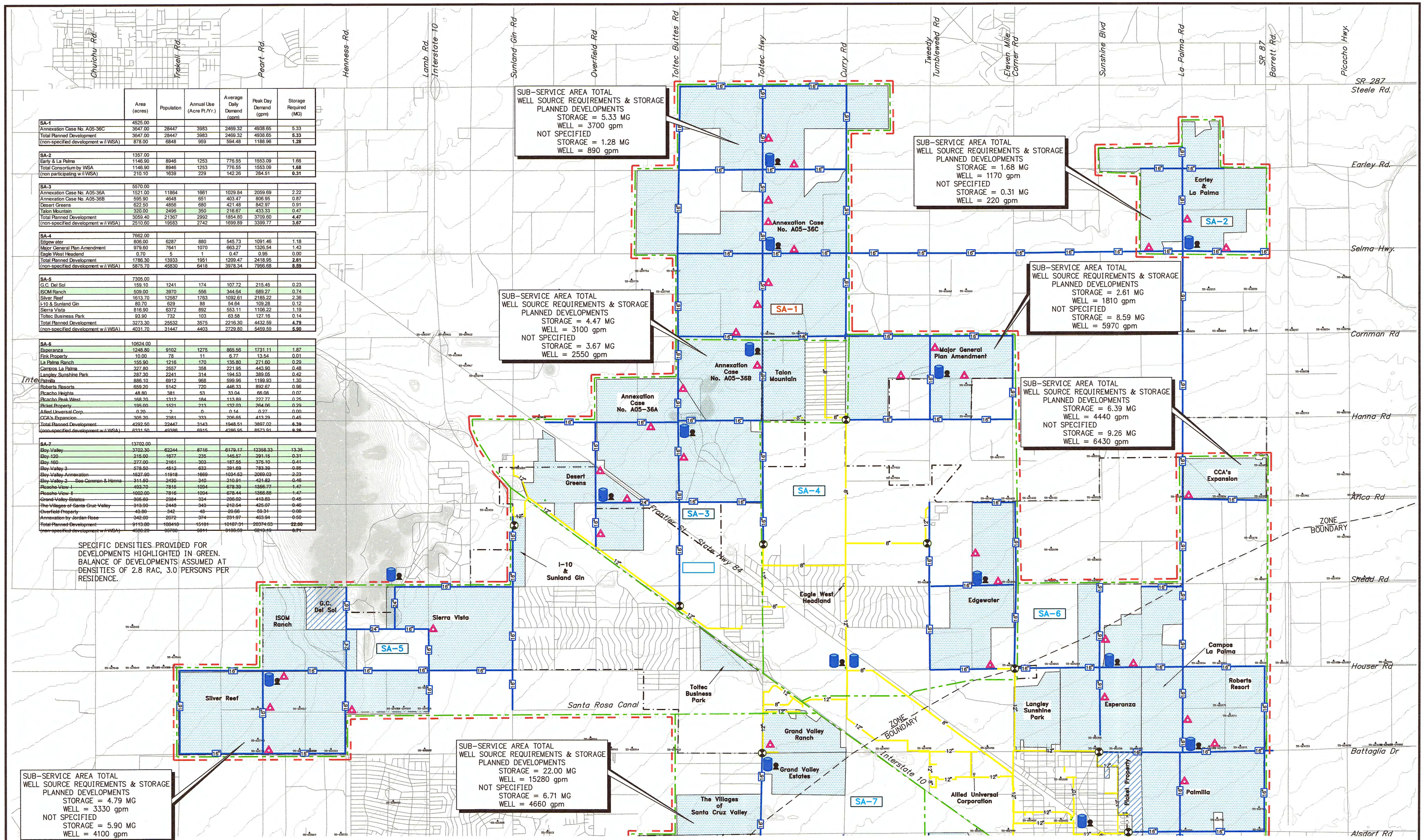
Reimbursements to the Developer or Builder in the form of credits are considered fully transferable for water works related improvements and toward water system Development Fees encountered in other geographic areas within the Eloy Water Utility service area.

Cash reimbursements and credits will be posted, or written denial provided, within 10 business days of application. This time shall allow for verification of availability of funds and confirmation of eligible credit(s). Reimbursements will be made reflecting no interest earned on Development Fees collected.

Following final acceptance of all water system improvements, both regional water production and distribution, disbursement of credits against system hookup fees will commence. The exact terms of credit will be outlined in the Development Agreement. However, it is anticipated that total amount to be reimbursed will be apportioned equally to all proposed lots within a development (or phase of a development) as opposed to full credit being given on the first lots to request water service.

	Area (acres)	Population	Annual Use (Acre Ft./Yr.)	Average Daily Demand (gpm)	Peak Day Demand (gpm)	Storage Required (MG)
SA-1	4525.00					
Annexation Case No. A05-36C	3647.00	28447	3983	2469.32	4938.65	5.33
Total Planned Development	3647.00	28447	3983	2469.32	4938.65	**5.33**
(non-specified development w/i WSA)	878.00	6848	959	594.48	1188.96	**1.28**
SA-2	1357.00					
Early & La Palma	1146.90	8946	1253	776.55	1553.09	1.68
Total Consortium by WSA	1146.90	8946	1253	776.55	1553.09	**1.68**
(non participating w/i WSA)	210.10	1639	229	142.26	284.51	**0.31**
SA-3	5570.00					
Annexation Case No. A05-36A	1521.00	11864	1661	1029.84	2059.69	2.22
Annexation Case No. A05-36B	595.90	4648	651	403.47	806.95	0.87
Desert Greens	622.50	4856	680	421.48	842.97	0.91
Talon Mountain	320.00	2496	350	216.67	433.33	0.47
Total Planned Development	3059.40	21367	2992	1854.80	3709.60	**4.47**
(non-specified development w/i WSA)	2510.60	19583	2742	1699.89	3399.77	**3.67**
SA-4	7662.00					
Edgew ater	806.00	6287	880	545.73	1091.46	1.18
Major General Plan Amendment	979.60	7641	1070	663.27	1326.54	1.43
Eagle West Headend	0.70	5	1	0.47	0.95	0.00
Total Planned Development	1786.30	13933	1951	1209.47	2418.95	**2.61**
(non-specified development w/i WSA)	5875.70	45830	6418	3978.34	7956.68	**8.59**
SA-5	7305.00					
G.C. Del Sol	159.10	1241	174	107.72	215.45	0.23
ISOM Ranch	509.00	3970	556	344.64	689.27	0.74
Silver Reef	1613.70	12587	1763	1092.61	2185.22	2.36
I-10 & Sunland Gin	80.70	629	88	54.64	109.28	0.12
Sierra Vista	816.90	6372	892	553.11	1106.22	1.19
Toltec Business Park	93.90	732	103	63.58	127.16	0.14
Total Planned Development	3273.30	25532	3575	2216.30	4432.59	**4.79**
(non-specified development w/i WSA)	4031.70	31447	4403	2729.80	5459.59	**5.90**
SA-6	10624.00					
Esperanza	1249.80	9102	1275	865.56	1731.11	1.87
Fink Property	10.00	78	11	6.77	13.54	0.01
La Palma Ranch	155.90	1216	170	135.80	271.60	0.29
Campos La Palma	327.80	2557	358	221.95	443.90	0.48
Langley Sunshine Park	287.30	2241	314	194.53	389.05	0.42
Palmilla	886.10	6912	968	599.96	1199.93	1.30
Roberts Resorts	659.20	5142	720	446.33	892.67	0.96
Picacho Heights	48.80	381	53	33.04	66.08	0.07
Picacho Peak West	168.20	1312	184	113.89	227.77	0.25
Picket Property	195.00	1521	213	132.03	264.06	0.29
Allied Universal Corp.	0.20	2	0	0.14	0.27	0.00
CCA's Expansion	305.20	2381	333	206.65	413.29	0.45
Total Planned Development	4292.50	22447	3143	1948.51	3897.02	**6.39**
(non-specified development w/i WSA)	6331.50	49386	6915	4286.95	8573.91	**9.26**
SA-7	13702.00					
Eloy Valley	3702.30	62244	8716	6179.17	12358.33	13.35
Eloy 120	215.00	1677	235	145.57	291.15	0.31
Eloy 160	277.00	2161	303	187.55	375.10	0.41
Eloy Valley 3	578.50	4512	632	391.69	783.39	0.85
Eloy Valley Annexation	1527.00	11918	1669	1034.52	2069.03	2.23
Eloy Valley 2 - See Comman & Hanna	311.80	2430	340	210.91	421.82	0.46
Picache View I	493.70	7815	1094	678.39	1356.77	1.47
Picache View II	1002.00	7816	1094	678.44	1356.88	1.47
Grand Valley Estates	305.60	2384	334	206.92	413.83	0.45
The Villages of Santa Cruz Valley	313.00	2440	343	212.54	425.07	0.46
Overfield Property	43.80	342	48	29.66	59.31	0.06
Annexation by Jordan Rose	342.60	2672	374	231.97	463.94	0.50
Total Planned Development	9113.80	100410	15101	10197.31	20374.63	**22.00**
(non-specified development w/i WSA)	4588.20	35798	5014	3108.59	6210.19	**6.71**

SPECIFIC DENSITIES PROVIDED FOR DEVELOPMENTS HIGHLIGHTED IN GREEN. BALANCE OF DEVELOPMENTS ASSUMED AT DENSITIES OF 2.8 RAC, 3.0 PERSONS PER RESIDENCE.



LEGEND

- PLANNED DEVELOPMENTS
- TYPICAL 4 MG REGIONAL WATER STORAGE RESERVOIR
- BOOSTER STATION
- ELOY CITY LIMITS
- WELL LOCATIONS
- EXISTING WATER MAIN
- FUTURE WATER MAIN
- WATER SERVICE SUB-AREA
- INTERCONNECT TO EXISTING DISTRIBUTION SYSTEM
- PRODUCTION WELL ASSUMED 750 GPM (FILL LINE TO RESERVOIR, ALTERNATIVE DIRECT FEED TO SYSTEM)
- SA-10 WATER SERVICE SUB-AREA NUMBER
- MASTER WATER PLAN BOUNDARY (PHASE 1)

SERVICE AREA AND WATER SYSTEM MAP
FOR
CITY OF ELOY

N W E S

0 1/2 1 2

ELOY, ARIZONA

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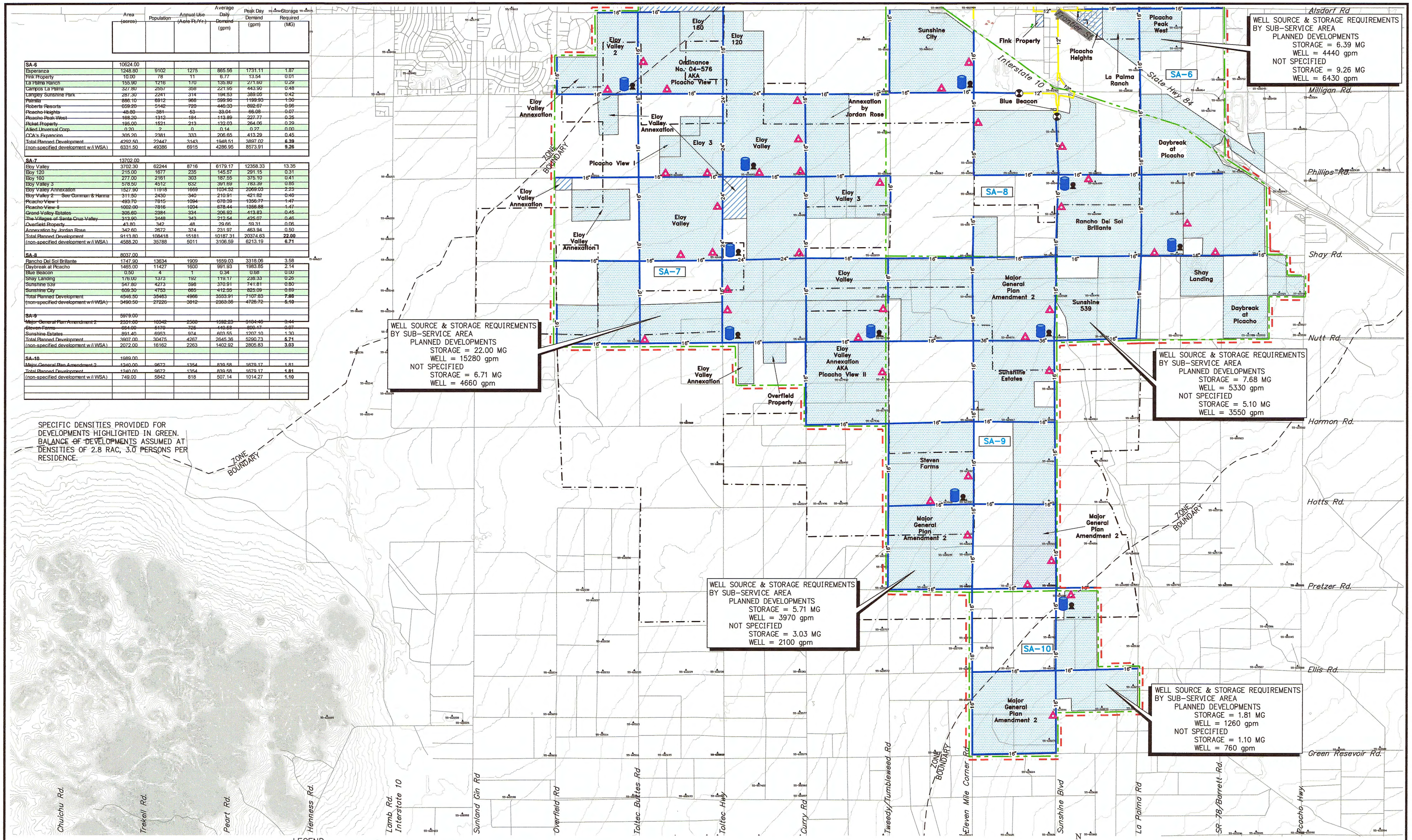
FIGURE 4

	Area (acres)	Population	Annual Use (Acre Ft/Yr.)	Average Daily Demand (gpm)	Peak Day Demand (gpm)	Storage Required (MG)
SA-6	10624.00					
Esperanza	1248.80	9102	1275	865.56	1731.11	1.87
Fink Property	10.00	78	11	6.77	13.54	0.01
La Palma Ranch	155.90	1216	170	135.80	271.60	0.29
Campos La Palma	327.80	2557	358	221.95	443.90	0.48
Langley Sunshine Park	287.20	2241	314	194.33	389.00	0.42
Palmilla	886.10	6912	968	599.96	1199.93	1.30
Roberts Resorts	659.20	5142	720	446.00	892.67	0.96
Picacho Heights	48.90	381	53	33.04	66.08	0.07
Picacho Peak West	168.20	1312	184	113.89	227.77	0.25
Picket Property	195.00	1521	213	132.03	264.06	0.29
Allied Universal Corp.	0.20	2	0	0.14	0.27	0.00
COA's Expansion	305.20	2381	333	206.65	413.29	0.45
Total Planned Development	4292.50	22447	3143	1948.51	3897.02	**6.39**
(non-specified development w/i WSA)	6331.50	49386	6915	4286.95	8573.91	**9.26**
SA-7	13702.00					
Eloy Valley	3702.30	62244	8716	6179.17	12358.33	13.35
Eloy 120	215.00	1677	235	145.57	291.15	0.31
Eloy 160	277.00	2161	303	187.55	375.10	0.41
Eloy Valley 3	578.50	4512	632	391.69	783.39	0.85
Eloy Valley Annexation	1527.90	11918	1669	1034.52	2069.03	2.23
Eloy Valley 2 - See Corman & Hanna	311.50	2430	340	210.91	421.82	0.46
Picacho View I	493.70	7815	1094	678.39	1356.77	1.47
Picacho View II	1062.00	7816	1094	678.44	1356.88	1.47
Grand Valley Estates	305.60	2384	334	206.92	413.83	0.45
The Villages of Santa Cruz Valley	313.90	2448	343	212.54	425.07	0.46
Overfield Property	43.90	342	48	29.66	59.31	0.06
Annexation by Jordan Rose	342.60	2672	374	231.97	463.94	0.50
Total Planned Development	9113.80	109418	15181	10187.31	20374.63	**22.00**
(non-specified development w/i WSA)	4588.20	35788	5011	3106.59	6213.19	**6.71**
SA-8	8037.00					
Rancho Del Sol Brillante	1747.90	13634	1909	1659.03	3318.06	3.58
Daybreak at Picacho	1465.00	11427	1600	991.93	1983.85	2.14
Blue Beacon	0.50	4	1	0.34	0.68	0.00
Shay Landing	176.00	1373	192	119.17	238.33	0.26
Sunshine 539	547.80	4273	598	370.91	741.81	0.80
Sunshine City	609.30	4753	665	412.35	825.09	0.89
Total Planned Development	4546.50	35463	4965	3553.91	7107.83	**7.68**
(non-specified development w/i WSA)	3490.50	27226	3812	2363.36	4726.72	**5.10**
SA-9	5979.00					
Major General Plan Amendment 2	2551.00	19942	2590	1582.23	3164.46	3.44
Steven Farms	854.90	6170	735	446.68	893.17	0.97
Sunshine Estates	891.40	6953	974	603.55	1207.10	1.30
Total Planned Development	3997.00	30475	4267	2645.36	5290.73	**5.71**
(non-specified development w/i WSA)	2072.00	16162	2263	1402.92	2805.83	**3.03**
SA-10	1989.00					
Major General Plan Amendment 2	1240.00	9672	1354	839.58	1679.17	**1.81**
Total Planned Development	1240.00	9672	1354	839.58	1679.17	**1.81**
(non-specified development w/i WSA)	749.00	5842	818	507.14	1014.27	**1.10**

SPECIFIC DENSITIES PROVIDED FOR DEVELOPMENTS HIGHLIGHTED IN GREEN. BALANCE OF DEVELOPMENTS ASSUMED AT DENSITIES OF 2.8 RAC, 3.0 PERSONS PER RESIDENCE.



LEGEND

- PLANNED DEVELOPMENTS
- TYPICAL 4 MG REGIONAL WATER STORAGE RESERVOIR
- BOOSTER STATION
- ELOY CITY LIMITS
- WELL LOCATIONS
- 12" EXISTING WATER MAIN
- 12" FUTURE WATER MAIN
- WATER SERVICE SUB-AREA
- INTERCONNECT TO EXISTING DISTRIBUTION SYSTEM
- PRODUCTION WELL ASSUMED 750 GPM (FILL LINE TO RESERVOIR, ALTERNATIVE DIRECT FEED TO SYSTEM)
- SA-10 WATER SERVICE SUB-AREA NUMBER
- MASTER WATER PLAN BOUNDARY (PHASE 1)

SERVICE AREA AND WATER SYSTEM MAP
FOR
CITY OF ELOY

N W E S

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ELOY, ARIZONA

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FIGURE 4
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