

ORIGINAL

WEST END WATER CO.



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January 4, 2006

Docket Control
Arizona Corporation Commission
1200 W. Washington Street
Phoenix, Arizona 85007

AZ CORP COMMISSION
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Re: West End Water Company – Application for Extension of its Certificate of Convenience and Necessity (CC&N) Docket No. W-01157A-05-0706

Dear Madam/Sir:

The purpose of this letter is to address the issues raised in Ms. Blessing N. Chukwu's letter dated November 4, 2005, regarding the above named docket. The responses are numbered to correspond to Ms. Chukwu's numbered issues.

1. West End Water Company ("West End") retained ARICOR Water Solutions LC to prepare a water master plan for its service area located south of Grand Avenue (the "Master Plan"). The Master Plan is enclosed as Exhibit 1. The Master Plan presents West End's plan for expansion of the West End water system to allow it to serve its existing customer base, the proposed Walden Ranch development (including the 443 proposed connections in the requested CC&N expansion area) and additional growth anticipated in the portion of the West End service area south of Grand Avenue. The Master Plan details provisions for additional wells, a new storage and booster pumping facility and necessary backbone piping.
2. The Master Plan includes preliminary plans for the planned additions to the West End water system. Design plans have not yet been prepared.
3. The Master Plan includes an estimate of the cost of the facilities proposed to serve the existing customer base, the proposed Walden Ranch development (including the 443 proposed connections in the requested CC&N expansion area) and additional growth anticipated in the portion of the West End service area south of Grand Avenue. The cost for Off-Site Facilities is estimated at \$1,969 per dwelling unit (See Appendix 4, Table A4.1). The cost for On-Site Facilities in Walden Ranch is estimated at \$2,967 per dwelling unit (See Appendix 4, Table A4.2). Accordingly, the total cost for serving the 443 units in the requested CC&N expansion area is estimated to be \$4,936 per dwelling unit or \$2.187 million in total.

The new water facilities, as proposed in the Master Plan, will be financed through a combination of developer advances and West End-provided funding. It is anticipated the developer of Walden Ranch will provide, as an advance in aid of construction, that portion of the planned facilities required to serve the Walden Ranch project, including the requested CC&N expansion area.

4. The requested CC&N expansion area represents approximately 30% of the proposed Walden Ranch development. The remaining 70% of the development is within the existing CC&N of West End. With 70% of the development within its CC&N, West End is able to integrate the water system for the requested CC&N expansion area with the water system for the remainder of

the Walden Ranch development and the water system planned for the entire West End CC&N located south of Grand Avenue. This integrated water system provides significant economies of scale benefiting West End customers in the requested CC&N extension area and the existing West End CC&N, as well as the developer of Walden Ranch. If the proposed expansion area was served by Beardsley Water Company, West End would not be able to integrate the water system for the requested CC&N expansion area with the remainder of the development, causing a loss of economies of scale and the related benefits to West End, its customers, future water customers in the proposed CC&N expansion area and the developer of Walden Ranch.

5. West End has two water systems. Its main system is the Wittmann system, ADEQ ID# 07-067. West End also operates the Wheat system, ADEQ ID# 07-167, serving 15 customers in the far southeast portion of its CC&N.
6. The Water Use Data Sheet submitted for the application is for the Wittmann system that will be expanded to serve the requested CC&N expansion area.
7. The developer of Walden Ranch is currently conducting the necessary hydrogeological studies in advance of preparing an application for Certificate of Assured Water Supply for the Walden Ranch development including the requested CC&N expansion area.
8. A request for service is attached as Exhibit 2.
9. Construction documents have not yet been prepared for water facilities for the requested CC&N expansion area. Accordingly, Approvals to Construct have not been requested or received from the Arizona Department of Environmental Quality or its designee in Maricopa County, the Maricopa County Environmental Services Department. Approvals to Construct will be obtained when the construction documents are prepared.
10. West End has filed a franchise extension application with Maricopa County.
11. West End believes that the Master Plan submitted herewith provides sufficient information for the Commission to approve the requested CC&N expansion.

Cordially,



Marvin E. Collins

MEC:ks

Enclosures: Exhibit 1: ARICOR Water Solutions Master Plan
Exhibit 2: Request for Service letter

ARICOR **Water Solutions**

WEST END WATER CO. WATER SYSTEM MASTER PLAN

**For
Water Service Area
Located South of Grand Avenue**

January 3, 2006

Prepared for:
West End Water Co.
9098 W. Pinnacle Peak Road
Peoria, AZ 85383

Prepared By:
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TABLE OF CONTENTS

1. Executive Summary 1

2. Introduction 2

 2.1 Scope of Work 2

 2.2 Study Area..... 2

 2.3 Topographic Conditions 4

 2.4 Growth and Development 4

 2.5 Existing Water System 4

3. Planning Criteria..... 5

 3.1 Demands..... 5

 3.1.1 Existing Water Service Area..... 5

 3.1.2 New Developments..... 6

 3.2 Fire Flows..... 6

 3.3 Pressure & Flow 7

 3.4 Storage 7

 3.5 Booster Pumps..... 8

 3.6 Wells..... 8

4. Projected Demands 9

 4.1 Projected Customer Growth..... 9

 4.2 Projected Demand..... 9

5. Proposed Facilities..... 11

 5.1 Storage, and Booster Pumping 11

 5.2 Wells..... 11

 5.3 Distribution System 12

 5.4 Cost Estimates 12

6. Conclusions..... 13

LIST OF TABLES

Table 2.1 – Wittmann Booster Station Facilities 4

Table 2.2 – Wheat Booster Station Facilities 4

Table 3.1 – Annual Average Day, Existing Service Area 5

Table 3.2 – Maximum Month Average Day, Existing Service Area 5

Table 3.3 – Estimated Peak Day, Existing Service Area 5

Table 3.4 – Planning Factors, Existing Service Area..... 6

Table 3.5 – Population and Demand Factors, New Developments 6

Table 3.6 – Peaking Factors, New Developments 6

Table 3.7 – Fire Flow Requirements, New Developments 6

Table 3.8 – Pressure Standards 7

Table 3.9 – Pressure Zones..... 7

Table 3.10 – Pipeline Velocity Standards 7

Table 3.11 – Storage Criteria 8

Table 4.1 – Build-Out Dwelling Units and Population 9

Table 4.2 – Non-Residential Planning Data 9

Table 4.3 – Projected Demands by Area..... 10

Table 4.4 – Projected Demand by Pressure Zone 10

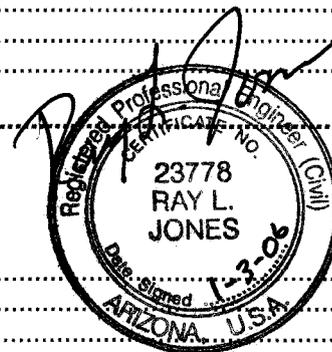


Table 5.1 – Sizing and Phasing of Storage and Booster Pumping Facilities..... 11
Table 5.2 – Well Requirement for Walden Ranch Booster Station 12

LIST OF FIGURES

Figure 1.1 - Study Area and Vicinity Map..... 3

- Appendix 1** - Detailed Planning Area Maps
- Appendix 2** - Detailed Planning and Demand Calculations
- Appendix 3** - Results of RBF Consulting Distribution System Modeling
- Appendix 4** - Cost Estimates

1. Executive Summary

The intent of this report is to provide a regional water master plan to support planned growth and development in the portion of West End Water Co.'s certificated area south of Grand Avenue. The report recommends locations and sizing of regional water supply, storage and booster pumping facilities and incorporates distribution system analysis performed by RBF Consulting for the proposed Walden Ranch and Rancho Maria developments.

Planning criteria were established for West End Water Co. based on analysis of existing usage patterns and through comparison to neighboring water providers. Adopted planning factors allow detailed estimation of demand considering varying residential development densities, commercial, school and park development. Peaking factors of 1.8 for the peak day flow and 3.0 for the peak hour flow were adopted. The 2003 International Fire Code was used as the basis for fire flow requirements. Adopted fire flows are 1,750 gallons per minute for residential development and 3,000 gallons per minute for commercial development. Standards for well capacity, storage, booster pumping and distribution system pressure and flow were adopted in order to provide dependable service with appropriate levels of redundancy.

At build-out, the Study Area is projected to contain 4,561 homes with a population of 13,683 people. The annual average day demand is projected to be 1.983 million gallons with a peak day of 3.570 million gallons. At least four new wells will be required to provide a redundant supply for the peak day. Additional wells may be required depending upon the aquifer yield. Booster pumps will be sized to meet the peak day plus fire flow of 5,615 gallons per minute. Total water storage will be 2.046 million gallons, providing 540,000 gallons of fire storage and 1.506 million gallons for operational and emergency uses.

Two pressure zones have been established. West End Water Co.'s existing Wittmann Booster Station will pump into the upper pressure zone. The new Walden Ranch Booster Station will provide service to the upper and lower zones. The Walden Ranch Booster Station will have 1.6 million gallons of storage and 5,500 gallons per minute of firm pumping capacity. A minimum of three wells with a firm capacity of 1,040 gallons per minute will supply the Wittmann Booster Station. The Wittmann Booster Station will be expanded through the addition of a 250,000-gallon storage tank and 400 gallons per minute of booster pumping capacity. One additional 325 gallon per minute well will be constructed to pump to the Wittmann Booster Station.

Distribution system improvement will be evaluated as actual development occurs using the criteria established in this report. Rancho Maria and Walden Ranch Development will install a 12" looped backbone piping system to serve those developments.

Cost estimates have been prepared showing that backbone facilities will cost approximately \$1,969 per dwelling unit. On-site facilities for the Rancho Maria and Walden Ranch developments are projected to be \$3,942 and \$2,967, respectively.

2. Introduction

2.1 Scope of Work

West End Water Co. (West End) retained ARICOR Water Solutions LC to prepare a regional water master plan to support planned growth and development in the portion of its certificated area south of Grand Avenue. The report evaluates regional water supply, storage and booster pumping capacities required at build-out of the study area. The report recommends locations and sizing of regional water supply, storage and booster pumping facilities. The report incorporates distribution system analysis performed by RBF Consulting for the proposed Walden Ranch and Rancho Maria developments.

2.2 Study Area

The study area is within Sections 11, 12, 13, 14, 24 and 25 of Township 5 North, Range 3 West and Section 19 of Township 5 North, Range 2 West and is detailed on Figure 1.1. The Study Area contains:

1. The existing water service area of West End, located both north and south of Grand Avenue.
2. That portion of the existing West End water certificated area located south of Grand Avenue.
3. The proposed expansion of West End water certificated area (CC&N Expansion Area) consisting of approximately 160 acres located in the northwest quarter of Section 25, T5N, R3W.

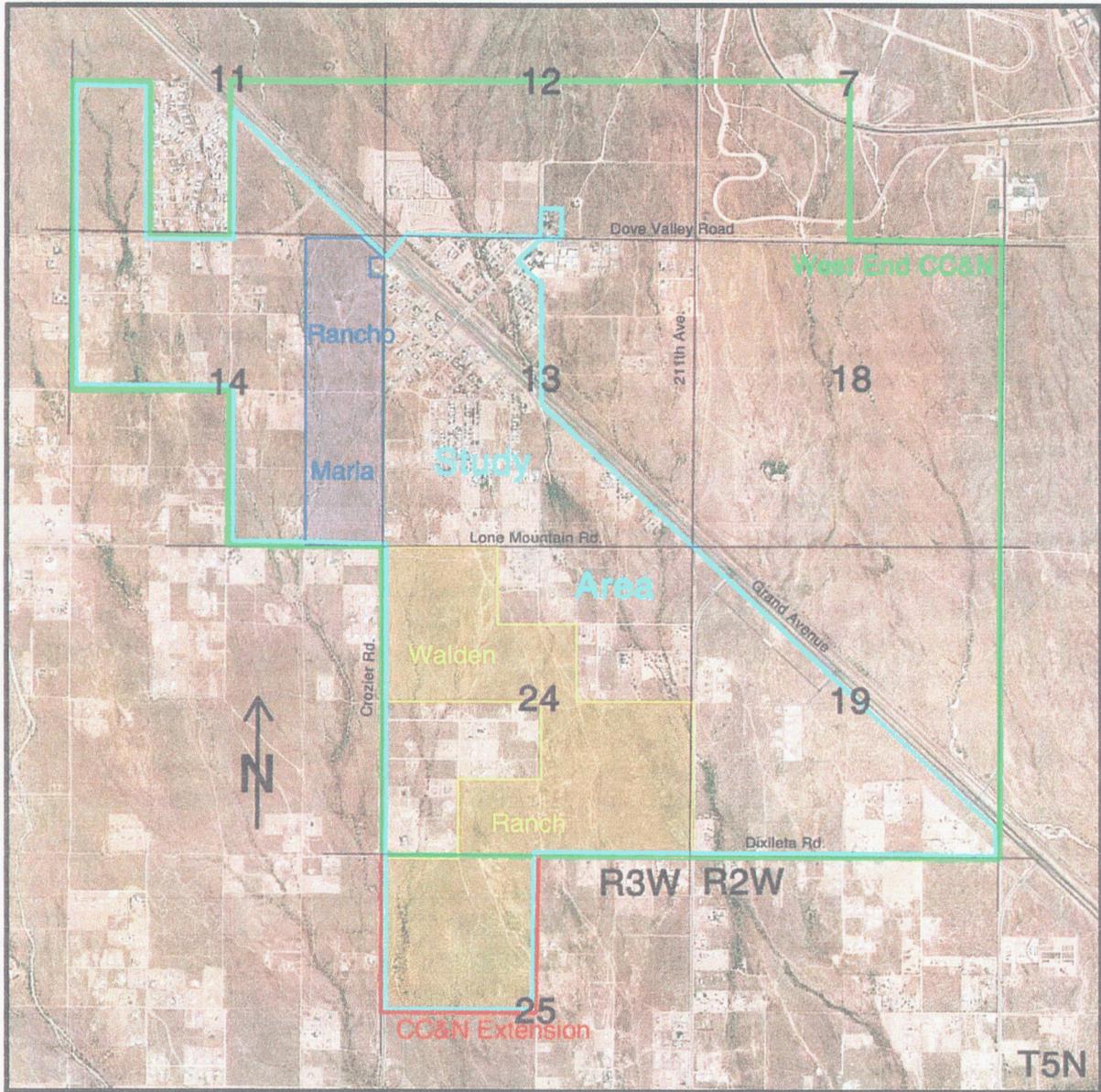


Figure 1.1 - Study Area and Vicinity Map

2.3 Topographic Conditions

The Study Area slopes generally from the northwest to the southeast. The highest elevation in the Study Area is approximately 1,740 ft at the extreme northwest corner of the Study Area. The lowest elevation is approximately 1,584 ft at the southeast corner of the proposed CC&N Expansion Area. The total elevation change is approximately 156 feet across the study area.

2.4 Growth and Development

The existing West End water certificated area is of a rural nature and largely undeveloped. The developed areas consist of single-family homes on both subdivided lots and varying acreages. Most of the homes within the West End certificated area are provided water service by West End. However, significant numbers of homes are served by private wells. Historically, West End has experienced slow growth, averaging approximately one new connection per year.

Two new master planned subdivisions are planned in the Study Area. Rancho Maria covers approximately 140 acres and is planned for 383 single-family homes with 23 acres of commercial development. Walden Ranch covers approximately 520 acres and is planned for 1,685 single-family homes, and elementary school, park and 17.5 acres of commercial development. With the addition of Rancho Maria and Walden Ranch developments to the West End water service area, West End is expected to experience rapid growth in the future.

2.5 Existing Water System

West End's existing water system consists of the components detailed in Table 2.1 known as the Wittmann Booster Station, the components detailed in Table 2.2 known as the Wheat Booster Station, and a water distribution system consisting of pipelines ranging from 6" in diameter to 1" in diameter.

Table 2.1 – Wittmann Booster Station Facilities

Item	Quantity	Capacity Each	Total Capacity
8" Well	1 ea.	250 gpm	250 gpm
Booster Pump	2 ea.	80 gpm	160 gpm
Booster Pump	1 ea.	240 gpm	240 gpm
Hydropneumatic Tank	1 ea.	5,000 gal.	5,000 gal.
Storage Tank	2 ea.	100,000 gal.	200,000 gal.

Table 2.2 – Wheat Booster Station Facilities

Item	Quantity	Capacity Each	Total Capacity
6" Well	1 ea.	25 gpm	gpm
Booster Pump	1 ea.	40 gpm	40 gpm
Booster Pump	1 ea.	20 gpm	20 gpm
Hydropneumatic Tank	1 ea.	6,000 gal.	6,000 gal.
Storage Tank	1 ea.	10,000 gal.	10,000 gal.

3. Planning Criteria

3.1 Demands

3.1.1 Existing Water Service Area

Water usage data for the twelve-month period from August 2004 through July 2005 was reviewed to establish usage patterns for the existing West End water service area. The annual average day data and maximum month average day data is presented in Table 3.1 and Table 3.2, respectively.

Table 3.1 – Annual Average Day, Existing Service Area

Year	Total Production (gallons)	Customers		Average Day (gpd)	
		Year-End	Average	System	Customer
8-04/7-05	25,836,000	215	215	70,784	329

Table 3.2 – Maximum Month Average Day, Existing Service Area

Month/Yr	Peak Month Total Production	Customers		Max Month Avg Day (gpd)	
		Month-End	Average	System	Customer
7/05	3,325,000	215	215	107,258	499
Max Month Average Day / Annual Average Day =					1.52

West End does not maintain daily water usage records, requiring the peak day demand to be estimated. A factor of 1.25 times the maximum month average day is often used to estimate the peak day demand. Table 3.3 presents the estimated West End peak day demand using the 1.25 factor.

Table 3.3 – Estimated Peak Day, Existing Service Area

	System (gpd)	Customer (gpd)
Max Month Average Day	107,258	499
Assumed Peak Day / Maximum Month Average Day	1.25	1.25
Estimated Peak Day	134,073	624
Calculated Peak Day / Annual Average Day =	1.89	

The water use data and peaking factors for West End presented above are typical for a small water system serving a rural population. The annual average day is somewhat below what would be expected in a newer urban subdivision, which can be expected to have larger homes and more intensive landscaping. The calculated peak day is slightly above the normally expected peaking factor of 1.8, likely due to the small size of the water system. The peak day factor can be expected to drop as the system grows.

West End does not maintain hourly flow records needed to determine and actual peak day water demand. Many water systems use 3.0 times the annual average day to estimate the peak hour demand. The 3.0 factor appears to be consistent with the West End water use data.

Based on the above data and discussion, the factors presented in Table 3.4 will be used to estimate the water demand from current and future customers within the existing service area of West End.

Table 3.4 – Planning Factors, Existing Service Area

Annual Average Day =	330	gallons per dwelling unit
Peak Day Factor =	1.8	times annual average day
Peak Hour Factor =	3.0	times annual average day

3.1.2 New Developments

Based upon the planned Rancho Maria and Walden Ranch developments, it is expected that future developments within the West End water service area will include urban subdivisions consistent with those constructed throughout the City of Surprise. Table 3.5 presents planning factors that will be used to estimate annual average day water demand from new developments within the West End water service area. The factors are typical of those used by other water provides in the Surprise area.

Table 3.5 – Population and Demand Factors, New Developments

Land Use	Description	Housing Density (du/Acre)	Pop Density (capita/DU)	Demand (per day)		
				Gallons Per Capita	Gallons Per	Unit
EXIST WE	Existing West End Service Area	0.8	3.0	-	330	Dwelling Unit
LDR	New Low Density SF Homes	2.0	3.0	150	450	Dwelling Unit
MDR	New Medium Density SF Homes	3.0	3.0	150	450	Dwelling Unit
DRY LOT	Homes Served by Private Wells	0.8	3.0	-	-	Dwelling Unit
COMM	Commercial Development			-	1,700	Acre
SCHOOL	Elementary School				3,000	Acre
PARK	Park with Turf				4,000	Acre
EMP	Employment Based Development				1,700	Acre

Table 3.6 presents peaking factors that will be used to estimate maximum day and peak day water demands from new developments within the West End water service area. The factors are typical of those used by other water provides in the Surprise area.

Table 3.6 – Peaking Factors, New Developments

1.8 = Peak Day Factor (PDF)	Peak Day = PDF * Annual Average Day
3.0 = Peak Hour Factor (PHF)	Peak Hour = PHF * Annual Average Day

3.2 Fire Flows

West End does not have an established fire flow requirement and much of the existing water system is not sufficiently sized to provide fire flows. It is estimated that limited portions of the existing water distribution system could support fire flows of up to 500 gallons per minute. However, current booster pumping capacity limits fire flow to a maximum of 250 gpm.

Table 3.7 presents fire flow requirements that will be used for new developments. The requirements are based on 2003 International Fire Code as adopted by the City of Surprise.

Table 3.7 – Fire Flow Requirements, New Developments

Requirement	Flow	Duration
Commercial	3,000 gpm	3 hours
Residential	1,750 gpm	2 hours

3.3 Pressure & Flow

In order to provide reliable water service that meets customer expectations and regulatory standards the pressure standards shown in Table 3.8 will be used.

Table 3.8 – Pressure Standards

Condition	Minimum	Maximum
Static	55 psi	80 psi
Average Day Flow	55 psi	80 psi
Maximum Day Flow	55 psi	80 psi
Peak Hour Flow	50 psi	80 psi
Max Day plus Fire	20 psi	80 psi

The maximum pressure requirement of 80 psi may be increased to 100 psi provided that individual pressure reducing valves are provided all water services where the pressure exceeds 80 psi.

Due to the elevation change across the Study Area, two pressure zones will be established to meet the pressure standards. Lone Mountain Road lies at approximately 1,650 ft elevation and represents a natural division between the pressure zones. Using Lone Mountain Road as the pressure zone boundary results in the pressure zones detailed in Table 3.9.

Table 3.9 – Pressure Zones

	HGL	Low Elevation	High Elevation	Low Pressure	High Pressure	80 psi Elevation
Zone 1 (High Zone)	1870	1636	1740	56.4	101.4	1685
Zone 2 (Low Zone)	1780	1584	1650	56.4	85.0	1595

In order to reduce the risk of pipeline damage due to water hammer, flow rates shall be limited in accordance with Table 3.10.

Table 3.10 – Pipeline Velocity Standards

Scenario	Requirement
Maximum Day Flow	< 5 fps
Peak Hour Flow	< 7 fps
Max Day plus Fire	< 10 fps

3.4 Storage

As a small rural system with a single well, West End's current storage is sized for compliance with A.A.C. R18-5-503, which requires that storage capacity be equal to the average daily demand during the peak month (Maximum Month Average Day) less firm well capacity¹. Due to growth expected from the planned Rancho Maria and Walden Ranch developments, West End will quickly grow into a significantly sized system. As systems increase in size, it is prudent to install multiple wells, providing a redundant or firm source of supply for the peak day demand. Under this scenario, the minimum storage required by A.A.C. R18-5-503 is reduced to zero.

The storage requirement for multiple well water systems with firm peak day capacity is typically designed to buffer the wells from demand variation over the course of the peak day. Storage is sized to deliver demand flow in excess of the peak day flow rate (peak hour flows) from storage. Storage is refilled during periods when demands are below the peak day flow rate. In addition to this equalization storage,

¹ Total daily production capacity minus the production from the largest producing well.

the entire design fire flow is typically retained in storage and a provision for emergency needs is often added.

The required storage volume for West End will be calculated based on the storage criteria listed in Table 3.11.

Table 3.11 – Storage Criteria

Function	Requirement
Equalization	30% of Maximum Day
Emergency	10% of Maximum Day
Fire	3,000 gpm x 3 hours

3.5 Booster Pumps

Booster pumps must be able to meet both normal system demands and fire flows on a reliable basis. The largest normal system demand is the peak hour demand. Fire flows could occur at any system demand, however for planning and design purposes they are considered to occur at the peak day flow rate.

The required booster pump capacity will be calculated as the larger of the peak hour flow or the peak day plus fire flow, with the largest booster pump at each pumping station out of service.

3.6 Wells

Wells must be able to reliably produce the peak day flow. Required well capacity for West End will be the peak day demand with the largest well out of service.

4. Projected Demands

4.1 Projected Customer Growth

The West End water certificated area is largely undeveloped with significant numbers of existing homes being served by private wells. In order to project future growth in the certificated area, the Study Area was divided into planning areas. Each planning area was placed into one of the following five categories in consideration of its location, the terrain and the current usage:

- Existing West End Water Service Area
- Projected Low Density Residential Development
- Projected Medium Density Residential Development
- Dry Lot (Homes served by private wells)

Rancho Maria and Walden Ranch were treated as separate planning areas using the actual density and land development data for each project.

For the existing West End service area, based on examination of aerial photography, it is estimated that 100 additional customers will be added at build-out of the service area. For the new growth areas, the housing density and population density factors in Table 3.5 were used to project build-out dwelling units and population for the unplanned areas with the actual planning data being used for the Rancho Maria and Walden Ranch developments.

Detailed maps showing the planning areas are presented in Appendix 1. Appendix 2 presents projected units and population by planning area. Table 4.1 summarizes the residential planning data and Table 4.2 summarizes the non-residential planning data.

Table 4.1 – Build-Out Dwelling Units and Population

Pressure Zone	Land Use	Acres	Dwelling Units / Other	Pop Density (capita/DU)	Population
Zone 1	Residential	675	1,827	60	5,482
Zone 2	Residential	1,036	2,734	27	8,201
	TOTALS	1,711	4,561		13,683

Table 4.2 – Non-Residential Planning Data

Summary Non-Residential		
Parcel	Land Use	Acres
Rancho Maria	COMM	23.0
Walden Ranch	COMM	17.5
Walden Ranch	PARK	7.5
Walden Ranch	SCHOOL	12.0
	TOTALS	60.0

4.2 Projected Demand

Projected water demands for the Study Area are presented in Table 4.3 and Table 4.4. The demands were determined using the planning criteria discussed in Chapter 3 of this report and the land use data detailed above. Appendix 2 presents detailed calculations of projected water demand by planning area.

Table 4.3 – Projected Demands by Area

Parcel	Demands			Demands				Storage	
	Avg Day	Peak Day	Peak Hour	Avg Day	Peak Day	Fire	Peak Hour	Operational	Fire
	(gpd)			(gpm)				(gallons)	
Existing Areas	108,900	196,020	326,700	76	136	-	227	78,408	-
Growth Areas	1,983,450	3,570,210	5,950,350	1,377	2,479	3,000	4,132	1,428,084	540,000
TOTALS	2,092,350	3,766,230	6,277,050	1,453	2,615	3,000	4,359	1,506,492	540,000
						Peak Day + Fire:	5,615	Total Storage:	2,046,492

Table 4.4 – Projected Demand by Pressure Zone

Pressure Zone	Demands			Demands				Storage	
	Avg Day	Peak Day	Peak Hour	Avg Day	Peak Day	Fire	Peak Hour	Operational	Fire
	(gpd)			(gpm)				(gallons)	
Zone 1	790,600	1,423,080	2,371,800	549	988	3,000	1,647	569,232	540,000
Zone 2	1,301,750	2,343,150	3,905,250	904	1,627	3,000	2,712	937,260	540,000
	2,092,350	3,766,230	6,277,050	1,453	2,615	3,000	4,359	1,506,492	540,000
						Peak Day + Fire Zone 1	3,988	Total Storage	2,046,492
						Peak Day + Fire Zone 2	4,627		

5. Proposed Facilities

5.1 Storage, and Booster Pumping

Water storage and booster pumping will be provided on a regional basis for the Study Area. Two existing facilities, the Wittmann Booster Station and the Wheat Booster Station, are detailed in Table 2.1 and Table 2.2. The Wittmann Booster Station is located in Pressure Zone 1 will be expanded and remain a part of the regional storage and booster pumping solution. The Wheat Booster Station is located in Pressure Zone 2 and will be abandoned when the small Wheat distribution system is interconnected with the regional distribution system.

A new storage and booster station is planned on to be located within the Walden Ranch project to provide service to the Rancho Maria and Walden Ranch developments. This new facility, the Walden Ranch Booster Station, will be planned and sized to supply water not only to the Rancho Maria and Walden Ranch developments, but also to serve as a regional facility.

The Walden Ranch Booster Station will pump to both pressure zones from common storage. Fire and peaking booster pump capacity will be shared between the two pressure zones. This will be accomplished by providing fire and peaking capacity in Pressure Zone 1 with a pressure-reducing valve between the two zones to allow the capacity to be used in either pressure zone.

Pressure Zone 2 will have independent booster pumping capacity to meet approximately 90% of the peak day demand. During fire or peak flows above this level, water will be supplied through pressure reducing valve from the Pressure Zone 1 boosters.

Table 5.1 details the recommended sizing and phasing of the Wittmann and Walden Ranch Booster Stations to meet these requirements.

Table 5.1 – Sizing and Phasing of Storage and Booster Pumping Facilities

	Zone 1		Zone 2			All Zones	
	Booster Pump Capacity	Firm Pumping Capacity	Booster Pump Capacity	Zone 1 PRV Capacity	Firm Pumping Capacity	Firm Pumping Capacity	Storage
Wittmann Booster Station							
Existing Facilities	400	160				160	200,000
Future Phase	400	400				400	250,000
Total	800	560				560	450,000
Walden Ranch Booster Station							
Phase I	5,000	3,500	500	3,200	3,700	4,000	800,000
Phase II	500	500	1,000	-	1,000	1,500	800,000
Sub-Total	5,500	4,000	1,500	3,200	4,700	5,500	1,600,000
Study Area Total	6,300	4,560	1,500	3,200	4,700	6,060	2,050,000

5.2 Wells

Wells will be provided at each of the booster station sites and at remote locations connected by transmission pipelines to the booster stations. The total well capacity with the largest well out service must meet the peak day demand. Well capacity should be distributed roughly proportional to the storage capacity at each booster station with the redundant well connected to the larger Walden Ranch Booster Station.

In conjunction with expansion of the Wittmann Booster Station, a second well with a minimum capacity of 325 gpm should be constructed and connected to the Wittmann Booster Station. This will provide a total well capacity of 575 gpm or 22% of the peak day demand. This is approximately equivalent to the percentage of storage provided at the Wittmann Booster Station.

The Walden Ranch Booster Station should be developed with a total firm well capacity of 2,040 gpm. The number of wells required will vary depending upon aquifer yield. Table 5.2 provides the number of wells required to provide 2,040-gpm firm capacity at various well capacities.

Table 5.2 – Well Requirement for Walden Ranch Booster Station

Well Capacity	Wells Required
1000 gpm	3
900 gpm	4
800 gpm	4
700 gpm	4
600 gpm	5
500 gpm	5

5.3 Distribution System

Distribution system improvements should be evaluated as actual development occurs using the criteria presented in this report.

RBF Consulting (RBF) has recommended a looped 12" piping system to serve Rancho Maria and Walden Ranch. RBF modeled the system using MWHsoft's H2Omap Water GIS Suite 5.0. The results of the RBF modeling, demonstrating compliance with the planning requirements presented in this report, are attached as Appendix 3.

Since both the existing Wittmann system and Wheat system are served by single wells, the distribution system to be constructed to serve Rancho Maria and Walden Ranch should be interconnected with the existing distribution systems at the earliest practical date.

5.4 Cost Estimates

Detailed cost estimates for the required storage, booster pumping and well facilities (off-site facilities) are contained in Appendix 4, Table A4.1. The total estimated cost is \$8,528,650 or \$1,969 per new dwelling unit.

Detailed cost estimates for the on-site facilities required for the Rancho Maria and Walden Ranch developments are contained in Appendix 4, Table A4.2.

6. Conclusions

The West End water system currently meets requirements for serving its small rural customer base. Significant new urban developments are planned in and near the West End Certificated area. These new developments will have water demands, including fire flow demands, in excess of those currently experienced by West End. The existing West End facilities will be inadequate to serve the new developments.

In order to meet the increased water demands of the new developments, including a proposed expansion to the West End certificated area, West End should develop a regional water storage and booster station in the Walden Ranch Development capable of pumping to both West End Pressure Zones. The new booster station should be planned and designed to provide fire flows in accordance with the 2003 International Fire Code adopted by the City of Surprise.

Since, significant growth is expected in the remaining undeveloped portions of the West End certificated area, The Walden Ranch Booster Station should be sized so that it will be able to serve the expected build-out of the Study Area. The existing Wittmann Booster Station should be expanded to accommodate the expected infill growth in and around the existing distribution system. Once the Wheat distribution system is interconnected with the main West End distribution system, the Wheat well and booster station may be abandoned.

The distribution system proposed by RBF Consulting is adequate to serve the proposed Rancho Maria and Walden Ranch developments and meets West End requirements. Future extensions to the distribution system should be planned and designed using the criteria presented in this report.

APPENDIX 1

Detailed Planning Area Maps

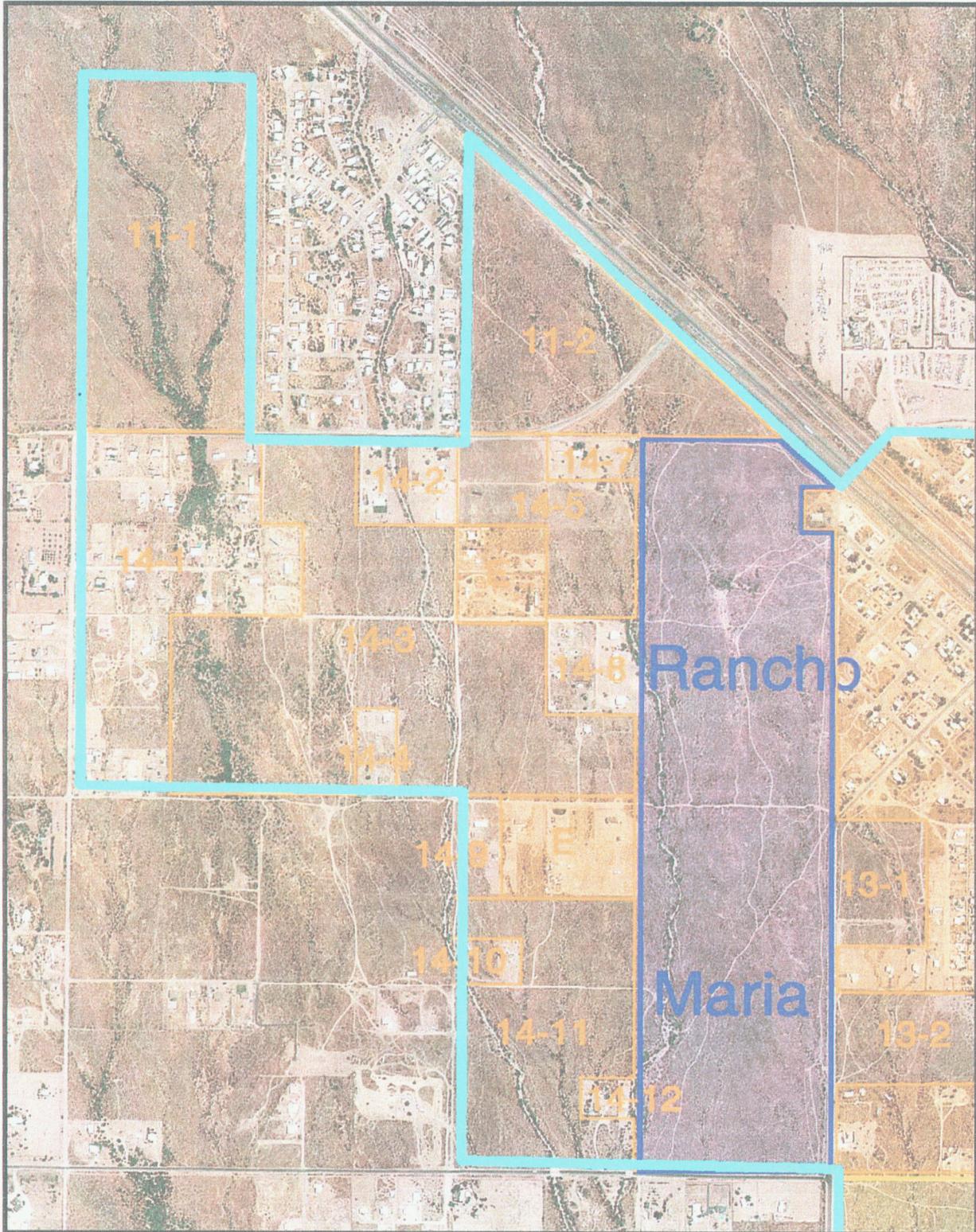


Figure A1.1 – Study Area Detail

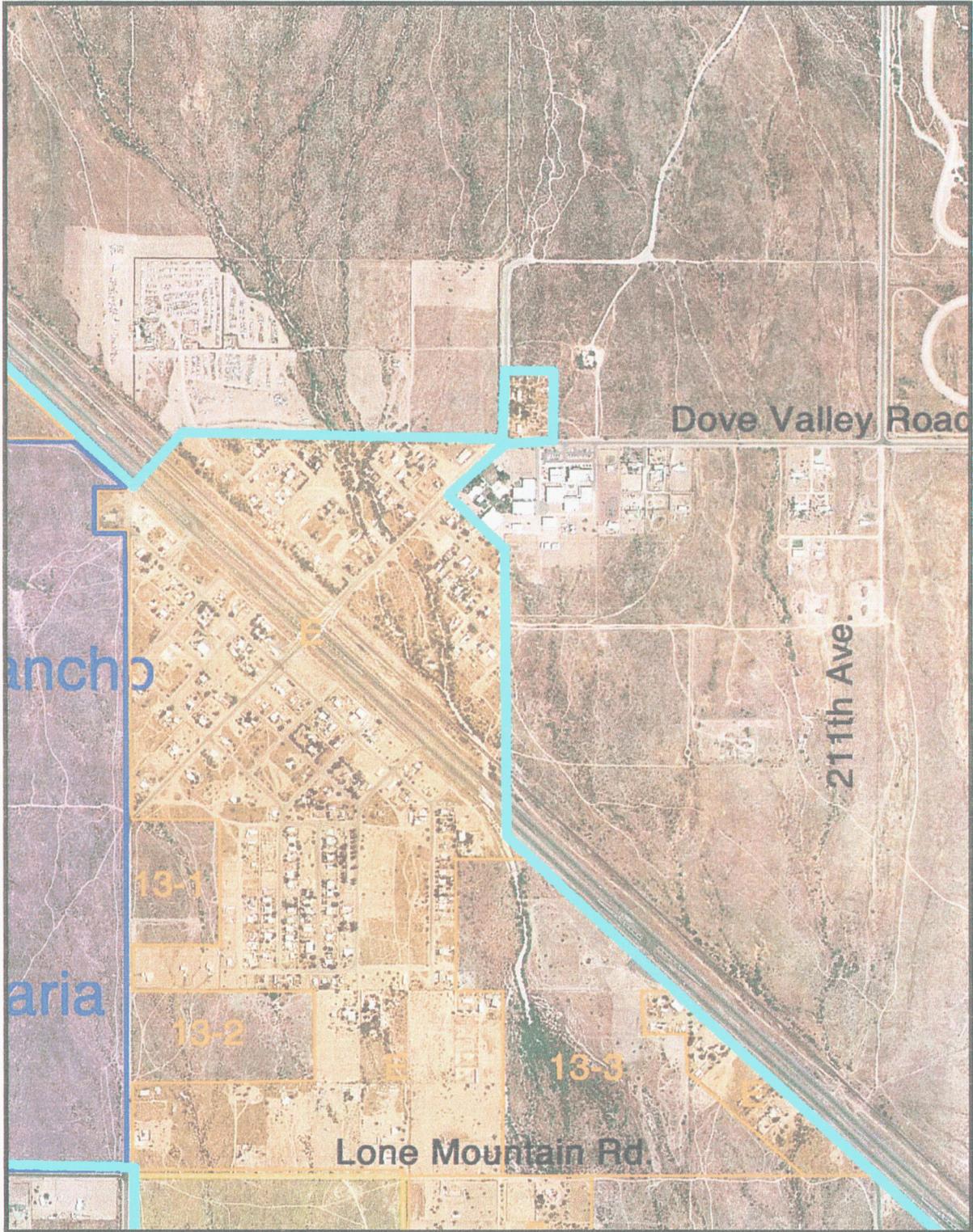


Figure A1.2 – Study Area Detail

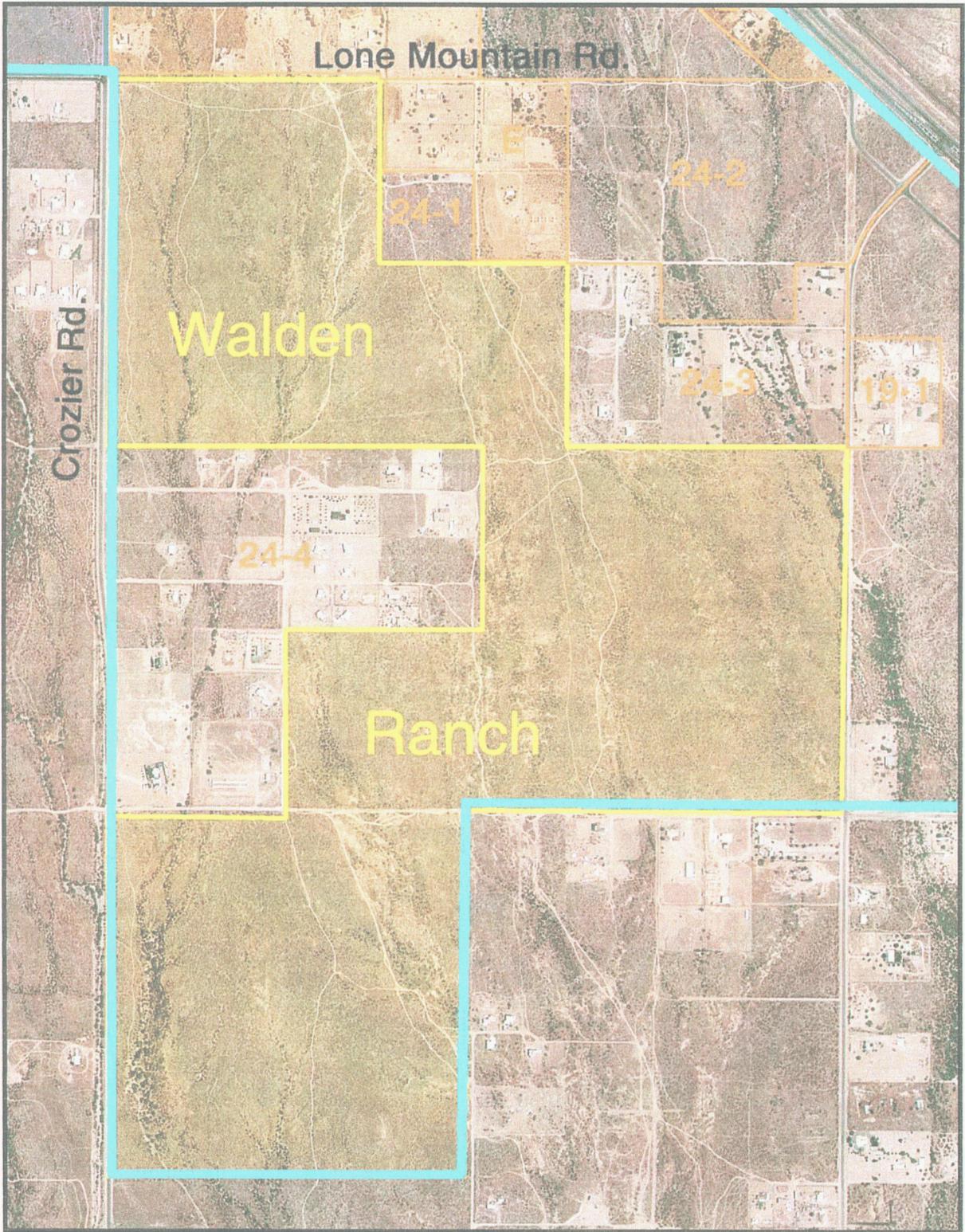


Figure A1.3 – Study Area Detail

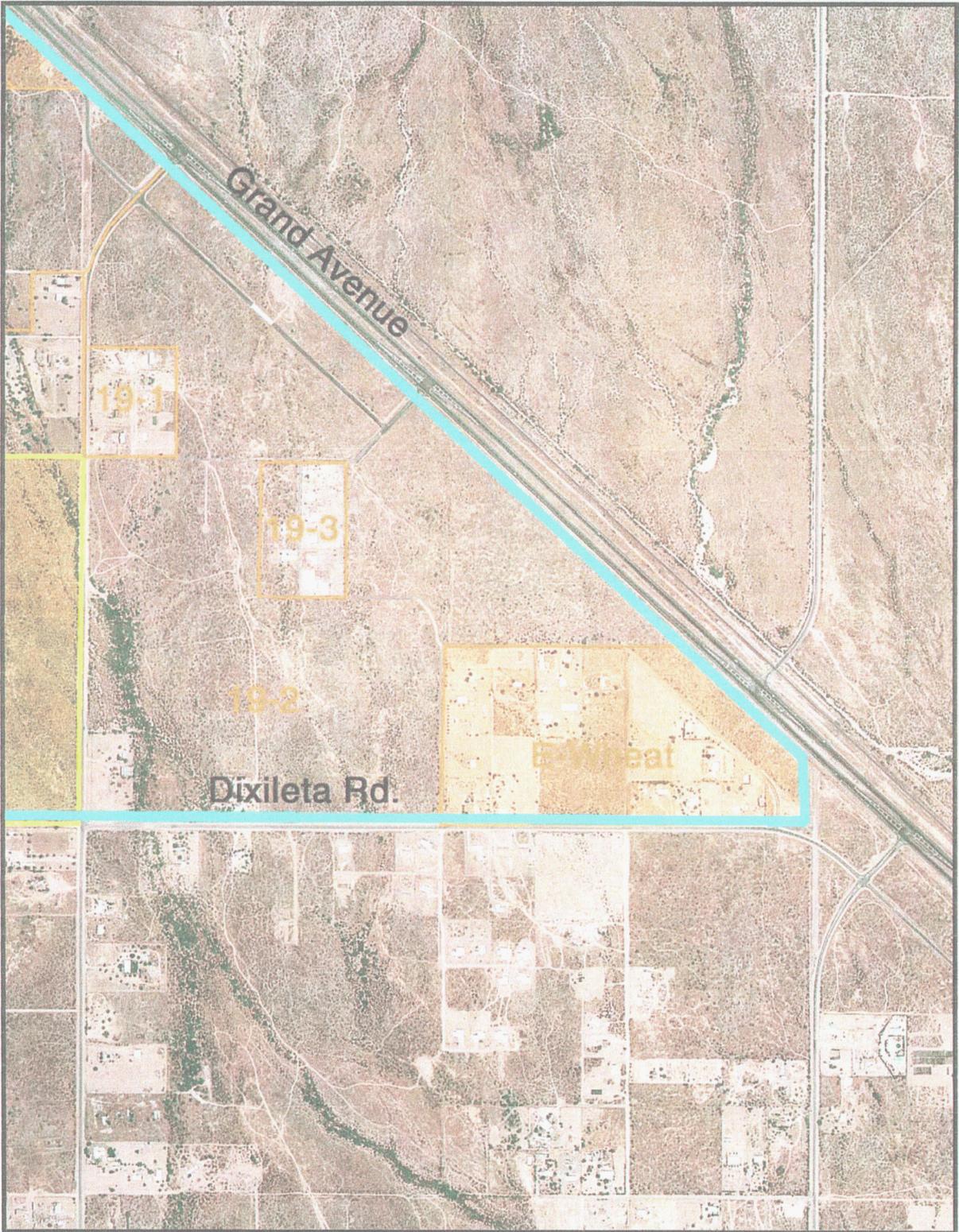


Figure A1.4 – Study Area Detail

APPENDIX 2

Detailed Planning and Demand Calculations

Table A3.3 Analysis of Growth Areas																		
Parcel	Pressure Zone	Land Use	Acres	Dwelling Units/ Other	Pop Density (capita/DU)	Population	Demand Per Capita	Demand Per Other	Demands			Demands			Storage			
									Avg Day	Peak Day	Peak Hour	Avg Day	Peak Day	Peak Hour	Operational	Fire		
11-1	1	LDR	80	160	3.0	480	150	-	72,000	129,600	216,000	50	180	1,750	150	51,840	210,000	
11-2	1	MDR	62	93	3.0	186	150	-	87,750	137,250	235,250	61	110	1,750	163	63,160	210,000	
14-1	1	DRY LOT	10	6	3.0	18	-	-	-	-	-	-	-	-	-	-	-	
14-2	1	DRY LOT	10	6	3.0	18	-	-	-	-	-	-	-	-	-	-	-	
14-3	1	DRY LOT	80	160	3.0	480	150	-	72,000	129,600	216,000	50	180	1,750	150	51,840	210,000	
14-4	1	DRY LOT	5	3	3.0	9	-	-	-	-	-	-	-	-	-	-	-	
14-5	1	MDR	25	75	3.0	225	150	-	33,750	60,750	101,250	23	42	1,750	70	24,300	210,000	
14-6	1	MDR	30	90	3.0	270	150	-	40,500	72,000	121,500	28	51	1,750	84	28,160	210,000	
14-7	1	DRY LOT	10	6	3.0	18	-	-	-	-	-	-	-	-	-	-	-	
14-8	1	DRY LOT	10	6	3.0	18	-	-	-	-	-	-	-	-	-	-	-	
14-9	1	DRY LOT	5	3	3.0	9	-	-	-	-	-	-	-	-	-	-	-	
14-10	1	DRY LOT	4	3	3.0	10	-	-	-	-	-	-	-	-	-	-	-	
14-11	1	DRY LOT	3	3	3.0	9	-	-	-	-	-	-	-	-	-	-	-	
14-12	1	DRY LOT	53	106	3.0	318	150	-	47,700	85,680	143,100	33	60	1,750	99	34,344	210,000	
Rancho Maria	1	MDR	117	351	3.0	1,026	150	-	172,350	310,230	517,050	120	215	1,750	359	124,092	210,000	
Rancho Maria	1	COMM	23	345	15.0	345	1,700	1,700	39,100	70,380	117,300	27	49	3,000	81	28,452	540,000	
15-1	1	MDR	15	45	3.0	135	150	-	20,250	36,450	60,750	14	26	1,750	42	14,580	210,000	
15-2	1	MDR	20	60	3.0	180	150	-	27,000	48,600	81,000	19	34	1,750	56	19,440	210,000	
15-3	1	MDR	55	165	3.0	495	150	-	74,250	133,650	222,750	52	93	1,750	155	53,460	210,000	
24-1	2	MDR	10	30	3.0	90	150	-	13,500	24,300	40,500	9	17	1,750	28	9,720	210,000	
24-2	2	MDR	75	225	3.0	675	150	-	101,250	182,250	303,750	70	127	1,750	211	72,900	210,000	
24-3	2	DRY LOT	60	7	3.0	21	-	-	-	-	-	-	-	-	-	-	-	
24-4	2	DRY LOT	120	30	3.0	90	-	-	-	-	-	-	-	-	-	-	-	
24-5	2	MDR	465	1,395	3.0	5,055	150	-	759,250	1,364,850	2,274,750	527	946	1,750	1,580	545,940	210,000	
Walden Ranch	2	COMM	10	1,885	188.5	1,885	1,700	1,700	17,000	30,600	51,000	12	21	3,000	35	12,240	540,000	
Walden Ranch	2	COMM	10	1,885	188.5	1,885	1,700	1,700	17,000	30,600	51,000	12	21	3,000	35	12,240	540,000	
Walden Ranch	2	PARK	7.5	7.5	1.0	7.5	4,000	4,000	30,000	54,000	90,000	21	36	3,000	63	21,600	540,000	
Walden Ranch	2	SCHOOL	12	12	1.0	12	3,000	3,000	36,000	64,800	108,000	25	45	3,000	75	25,920	540,000	
16-1	2	DRY LOT	8	6	3.0	18	-	-	-	-	-	-	-	-	-	-	-	
16-2	2	MDR	243	729	3.0	2,187	150	-	328,050	590,490	984,150	228	410	1,750	683	236,196	210,000	
16-3	2	DRY LOT	8	6	3.0	18	-	-	-	-	-	-	-	-	-	-	-	
TOTALS			1,711	4,231		12,693			1,983,450	3,570,210	5,950,350	1,377	2,479	3,000	4,132	1,428,084	540,000	
																		1,866,084

Table A3.4 Summary West End Service Area																		
Parcel	Land Use	Acres	Dwelling Units/ Other	Pop Density (capita/DU)	Population	Demand Per Capita	Demand Per Other	Demands			Demands			Storage				
								Avg Day	Peak Day	Peak Hour	Avg Day	Peak Day	Peak Hour	Operational	Fire			
Existing Areas		330	330	3.0	990	-	-	108,900	186,020	326,700	76	136	227	78,408	-	-	-	
Growth Areas		1,711	4,231	12.693	13,683	-	-	1,983,450	3,570,210	5,950,350	1,377	2,479	3,000	4,132	1,428,084	540,000		
TOTALS		1,711	4,561	13.683	13,683	-	-	2,092,350	3,756,230	6,277,050	1,453	2,615	3,000	4,359	1,506,492	540,000		
																		2,046,492

Table A3.5 Summary West End Service Area																		
Pressure Zone	Land Use	Acres	Dwelling Units/ Other	Pop Density (capita/DU)	Population	Demand Per Capita	Demand Per Other	Demands			Demands			Storage				
								Avg Day	Peak Day	Peak Hour	Avg Day	Peak Day	Peak Hour	Operational	Fire			
Zone 1		675	1,827	60	5,482	-	-	760,600	1,423,080	2,371,800	549	988	3,000	1,647	569,232	540,000		
Zone 2		1,036	2,734	27	8,201	-	-	1,301,750	2,343,150	3,905,250	904	1,627	3,000	2,712	937,260	540,000		
TOTALS		1,711	4,561	13.683	13,683	-	-	2,092,350	3,756,230	6,277,050	1,453	2,615	3,000	4,359	1,506,492	540,000		
																		2,046,492

APPENDIX 3

Results of RBF Consulting Distribution System Modeling

Exhibit - A
Walden Ranch and Rancho Maria Water System Map



NTS

- Junction
- Pipe
- Proposed Storage Tank Location
- Well Site



PLANNING DESIGN CONSTRUCTION

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07/26/05



Appendix B

Average Day Demands H2Omap Water Results

**Scenario: Average Day Demand
Steady State Analysis
Junction Report**

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
10	4.44	1,605.81	1,796.22	82.50
102	26.00	1,619.81	1,796.75	76.67
106	0.00	1,640.00	1,803.94	71.04
108	0.00	1,640.00	1,796.99	68.02
114	0.00	1,640.44	1,798.84	68.63
116	0.00	1,639.42	1,798.72	69.02
12	8.88	1,605.07	1,796.31	82.87
120	0.00	1,652.38	1,803.95	65.68
14	0.00	1,599.08	1,796.41	85.50
16	0.00	1,617.14	1,796.65	77.78
18	0.00	1,626.64	1,796.99	73.81
20	0.00	1,625.91	1,796.99	74.13
22	13.33	1,649.94	1,800.28	65.14
24	13.02	1,653.97	1,849.93	84.91
26	0.00	1,590.15	1,796.25	89.30
28	0.00	1,655.98	1,849.88	84.02
30	0.00	1,678.42	1,849.83	74.27
32	26.90	1,695.00	1,849.81	67.08
34	0.00	1,700.00	1,849.82	64.92
36	0.00	1,678.59	1,849.84	74.20
38	8.88	1,584.42	1,796.27	91.80
40	133.11	1,610.03	1,796.21	80.67
42	48.89	1,605.98	1,796.25	82.44
44	27.56	1,607.23	1,796.21	81.89
46	10.70	1,599.69	1,796.23	85.16
48	40.22	1,603.79	1,796.32	83.42
50	46.22	1,602.78	1,796.34	83.87
52	20.83	1,601.76	1,796.37	84.32
54	49.00	1,611.69	1,796.54	80.10
56	109.42	1,614.71	1,796.51	78.78
58	32.22	1,609.27	1,796.40	81.08
60	31.33	1,631.12	1,797.40	72.05
62	51.56	1,635.93	1,798.03	70.24
64	35.11	1,640.00	1,803.94	71.04
66	43.77	1,642.09	1,799.06	68.01
68	7.11	1,659.92	1,849.87	82.31
70	9.78	1,669.04	1,849.85	78.35
72	5.78	1,663.89	1,849.84	80.57
74	11.56	1,666.66	1,849.84	79.37
76	11.11	1,671.21	1,849.83	77.40
78	10.22	1,674.10	1,849.83	76.14
80	8.44	1,675.42	1,849.83	75.57
82	11.11	1,685.00	1,849.83	71.42
84	13.33	1,680.89	1,849.82	73.20

**Scenario: Average Day Demand
Steady State Analysis
Junction Report**

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
86	16.00	1,683.51	1,849.82	72.06
88	12.00	1,686.94	1,849.81	70.57
90	7.11	1,691.17	1,849.81	68.74
92	16.44	1,694.91	1,849.81	67.12
94	16.00	1,700.57	1,849.81	64.67
96	16.00	1,697.78	1,849.81	65.88
98	76.89	1,654.15	1,801.61	63.90
10	4.44	1,605.81	1,796.22	82.50
102	26.00	1,619.81	1,796.75	76.67
106	0.00	1,640.00	1,803.94	71.04

Appendix C

Peak Day Demand H2Omap Water Results

**Scenario: Peak Day Demand
Steady State Analysis
Junction Report**

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
10	0.00	1,605.81	1,793.72	81.42
102	46.80	1,619.81	1,795.21	76.00
106	0.00	1,640.00	1,799.48	69.10
108	0.00	1,640.00	1,799.42	69.08
114	0.00	1,640.44	1,797.14	67.90
116	0.00	1,639.42	1,797.05	68.30
12	15.98	1,605.07	1,793.99	81.86
120	0.00	1,652.38	1,801.97	64.82
14	0.00	1,599.08	1,794.25	84.57
16	0.00	1,617.14	1,794.94	77.04
18	0.00	1,626.64	1,795.90	73.34
20	0.00	1,625.91	1,798.36	74.72
22	23.99	1,649.94	1,798.36	64.31
24	23.44	1,653.97	1,849.81	84.85
26	0.00	1,590.15	1,793.80	88.24
28	0.00	1,655.98	1,849.64	83.91
30	0.00	1,678.42	1,849.48	74.12
32	48.42	1,695.00	1,849.44	66.92
34	0.00	1,700.00	1,849.46	64.76
36	0.00	1,678.59	1,849.52	74.06
38	15.98	1,584.42	1,793.88	90.76
40	239.60	1,610.03	1,793.70	79.59
42	88.00	1,605.98	1,793.80	81.38
44	49.60	1,607.23	1,793.71	80.80
46	19.26	1,599.69	1,793.74	84.08
48	72.40	1,603.79	1,794.00	82.42
50	83.20	1,602.78	1,794.06	82.88
52	37.50	1,601.76	1,794.13	83.36
54	88.20	1,611.69	1,794.62	79.27
56	196.96	1,614.71	1,794.55	77.93
58	42.00	1,609.27	1,794.24	80.15
60	56.39	1,631.12	1,796.13	71.50
62	92.80	1,635.93	1,796.52	69.58
64	63.20	1,640.00	1,799.71	69.20
66	78.79	1,642.09	1,797.31	67.25
68	12.80	1,659.92	1,849.61	82.19
70	17.60	1,669.04	1,849.56	78.22
72	10.40	1,663.89	1,849.54	80.44
74	20.80	1,666.66	1,849.52	79.23
76	20.00	1,671.21	1,849.50	77.26
78	18.40	1,674.10	1,849.49	76.00
80	15.20	1,675.42	1,849.49	75.43
82	20.00	1,685.00	1,849.49	71.27
84	24.00	1,680.89	1,849.47	73.05

**Scenario: Peak Day Demand
Steady State Analysis
Junction Report**

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
86	28.80	1,683.51	1,849.46	71.90
88	21.60	1,686.94	1,849.45	70.41
90	12.80	1,691.17	1,849.44	68.58
92	29.60	1,694.91	1,849.44	66.95
94	28.80	1,700.57	1,849.44	64.50
96	28.80	1,697.78	1,849.44	65.71
98	138.40	1,654.15	1,799.54	63.00

Appendix D

Peak Hour Demand H2OMap Water Results

**Scenario: Peak Hour Demand
Steady State Analysis
Junction Report**

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
10	0.00	1,605.81	1,797.95	83.25
102	26.00	1,619.81	1,798.38	77.38
106	0.00	1,640.00	1,804.14	71.12
108	0.00	1,640.00	1,798.58	68.71
114	0.00	1,640.44	1,800.09	69.18
116	0.00	1,639.42	1,799.99	69.58
12	0.00	1,605.07	1,798.04	83.61
120	0.00	1,652.38	1,804.15	65.76
14	0.00	1,599.08	1,798.11	86.24
16	0.00	1,617.14	1,798.30	78.50
18	0.00	1,626.64	1,798.58	74.50
20	0.00	1,625.91	1,798.58	74.82
22	0.00	1,649.94	1,801.26	65.56
24	0.00	1,653.97	1,849.96	84.92
26	0.00	1,590.15	1,797.98	90.05
28	0.00	1,655.98	1,849.91	84.03
30	0.00	1,678.42	1,849.87	74.29
32	0.00	1,695.00	1,849.87	67.10
34	0.00	1,700.00	1,849.87	64.94
36	0.00	1,678.59	1,849.88	74.22
38	0.00	1,584.42	1,798.01	92.55
40	133.11	1,610.03	1,797.94	81.42
42	48.89	1,605.98	1,797.98	83.19
44	27.56	1,607.23	1,797.94	82.64
46	10.70	1,599.69	1,797.96	85.91
48	31.33	1,603.79	1,798.04	84.17
50	32.89	1,602.78	1,798.06	84.62
52	20.83	1,601.76	1,798.08	85.07
54	49.00	1,611.69	1,798.21	80.82
56	109.42	1,614.71	1,798.19	79.50
58	23.33	1,609.27	1,798.10	81.82
60	18.00	1,631.12	1,798.93	72.71
62	51.56	1,635.93	1,799.43	70.84
64	35.11	1,640.00	1,804.14	71.12
66	33.56	1,642.09	1,800.27	68.54
68	7.11	1,659.92	1,849.90	82.32
70	9.78	1,669.04	1,849.89	78.36
72	5.78	1,663.89	1,849.89	80.59
74	11.56	1,666.66	1,849.88	79.39
76	11.11	1,671.21	1,849.88	77.42
78	10.22	1,674.10	1,849.88	76.16
80	8.44	1,675.42	1,849.87	75.59
82	11.11	1,685.00	1,849.87	71.44
84	13.33	1,680.89	1,849.87	73.22

**Scenario: Peak Hour Demand
Steady State Analysis
Junction Report**

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
86	16.00	1,683.51	1,849.87	72.08
88	12.00	1,686.94	1,849.87	70.59
90	7.11	1,691.17	1,849.87	68.76
92	16.44	1,694.91	1,849.86	67.14
94	16.00	1,700.57	1,849.87	64.69
96	16.00	1,697.78	1,849.86	65.90
98	76.89	1,654.15	1,802.29	64.19

Appendix F

Fire Flow Analysis H2OMap Water Results

Note: The available flows in this section are not representative. The actual system will only be able to supply a flow equal to the capacity of the booster pump(s) that are running at the time of the fire event.

**Scenario: Fire Flow Analysis
Junction Report**

ID	Static Demand (gpm)	Static Pressure (psi)	Fire Flow Demand (gpm)	Residual Pressure (psi)	Available Flow @ Hydrant (gpm)	Available Flow Pressure (psi)
10	0.00	81.42	3,000.00	24.49	3,148.32	20.10
102	46.80	76.00	3,000.00	38.86	3,992.04	20.16
106	0.00	69.10	3,000.00	45.87	4,895.73	20.24
108	0.00	69.08	3,000.00	45.62	4,863.19	20.24
12	15.98	81.86	3,000.00	35.84	3,662.49	20.13
14	0.00	84.57	3,000.00	36.85	3,649.30	20.13
16	0.00	77.04	3,000.00	33.10	3,553.83	20.13
18	0.00	73.34	3,000.00	41.49	4,233.71	20.18
20	0.00	74.72	3,000.00	47.67	4,753.10	20.23
22	23.99	64.31	3,000.00	39.50	4,431.33	20.19
24	23.44	84.85	3,000.00	80.13	13,192.21	21.73
26	0.00	88.24	3,000.00	29.22	3,288.92	20.11
28	0.00	83.91	3,000.00	71.68	7,638.10	20.58
30	0.00	74.12	3,000.00	58.93	6,217.70	20.39
32	48.42	66.92	3,000.00	45.47	4,736.88	20.22
34	0.00	64.76	3,000.00	43.68	4,606.59	20.21
36	0.00	74.06	3,000.00	59.53	6,363.88	20.40
38	15.98	90.76	3,000.00	34.43	3,485.42	20.12
40	239.60	79.59	3,000.00	25.86	3,447.39	20.10
42	88.00	81.38	3,000.00	30.76	3,490.77	20.12
44	49.60	80.80	3,000.00	26.02	3,257.85	20.10
46	19.26	84.08	3,000.00	25.90	3,208.65	20.10
48	72.40	82.42	3,000.00	35.18	3,672.73	20.13
50	83.20	82.88	3,000.00	35.03	3,667.10	20.13
52	37.50	83.36	3,000.00	35.47	3,635.74	20.13
54	88.20	79.27	3,000.00	33.42	3,630.62	20.13
56	196.96	77.93	3,000.00	36.82	3,964.38	20.14
58	42.00	80.15	3,000.00	36.30	3,739.63	20.14
60	56.39	71.50	3,000.00	40.27	4,242.92	20.18
62	92.80	69.58	3,000.00	39.46	4,270.60	20.17
64	63.20	69.20	3,000.00	46.95	5,105.99	20.25
66	78.79	67.25	3,000.00	39.32	4,329.26	20.18
68	12.80	82.19	3,000.00	69.21	7,293.93	20.53
70	17.60	78.22	3,000.00	64.10	6,721.40	20.45
72	10.40	80.44	3,000.00	65.79	6,722.98	20.45
74	20.80	79.23	3,000.00	64.29	6,589.84	20.43
76	20.00	77.26	3,000.00	62.01	6,399.62	20.41
78	18.40	76.00	3,000.00	60.64	6,299.21	20.39
80	15.20	75.43	3,000.00	60.05	6,263.55	20.39

**Scenario: Fire Flow Analysis
Junction Report**

ID	Static Demand (gpm)	Static Pressure (psi)	Fire Flow Demand (gpm)	Residual Pressure (psi)	Available Flow @ Hydrant (gpm)	Available Flow Pressure (psi)
82	20.00	71.27	3,000.00	55.96	6,017.62	20.36
84	24.00	73.05	3,000.00	56.48	5,867.48	20.34
86	28.80	71.90	3,000.00	54.27	5,595.31	20.31
88	21.60	70.41	3,000.00	51.52	5,280.82	20.28
90	12.80	68.58	3,000.00	48.54	4,988.69	20.25
92	29.60	66.95	3,000.00	46.23	4,816.25	20.23
94	28.80	64.50	3,000.00	43.17	4,593.57	20.21
96	28.80	65.71	3,000.00	44.62	4,695.00	20.22
98	138.40	63.00	3,000.00	42.53	5,055.14	20.24

APPENDIX 4

Cost Estimates

West End Water Co.
Off-Site Facilities Cost Estimate
January 3, 2005

Table A4.1 - Off-Site Water System Cost Estimate

System Component	Size	Quantity	Unit	Unit Cost	Cost	Total Cost (1)
Wittmann Booster Station						
Storage Tank	250,000 gallon	1	ea	\$ 187,500	\$ 187,500	\$ 243,750
Booster Pump	200 gpm	2	ea	\$ 7,500	\$ 15,000	\$ 19,500
Electrical / Controls		1	lot	\$ 15,000	\$ 15,000	\$ 19,500
Subtotal						\$ 282,750
Wittmann Well						
Well Drilled and Cased	12"	1	ea	\$ 405,000	\$ 405,000	\$ 526,500
Well Pump and Equip.	325 gpm	1	ea	\$ 75,000	\$ 75,000	\$ 97,500
Well Site Electrical		1	lot	\$ 75,000	\$ 75,000	\$ 97,500
Site Work		1	lot	\$ 40,000	\$ 40,000	\$ 52,000
Land		1	lot	\$ 20,000	\$ 20,000	\$ 26,000
Well Transmission Main	6" diameter	2,100	lf	\$ 30.00	\$ 63,000	\$ 81,900
Subtotal						\$ 881,400
Walden Ranch Booster Station						
Storage Tank	800,000 gal	2	ea	\$ 425,000	\$ 850,000	\$ 1,105,000
Hydropneumatic Tank	10,000 gal	2	ea	\$ 40,000	\$ 80,000	\$ 104,000
3-Phase Service Entrance		1	lot	\$ 125,000	\$ 125,000	\$ 162,500
Electrical and Controls		1	lot	\$ 200,000	\$ 200,000	\$ 260,000
Generator		1	ea	\$ 75,000	\$ 75,000	\$ 97,500
Booster Pump	1,500 gpm	3	ea	\$ 22,000	\$ 66,000	\$ 85,800
Booster Pump	500 gpm	5	ea	\$ 12,000	\$ 60,000	\$ 78,000
Chlorination Equipment		1	ea	\$ 40,000	\$ 40,000	\$ 52,000
Piping		1	lot	\$ 500,000	\$ 500,000	\$ 650,000
Site Work and Fencing		1	lot	\$ 200,000	\$ 200,000	\$ 260,000
Subtotal						\$ 2,854,800
Walden Ranch Wells						
Well Drilled and Cased	16"	3	ea	\$ 600,000	\$ 1,800,000	\$ 2,340,000
Well Pump and Equip.	1,000 gpm	3	ea	\$ 200,000	\$ 600,000	\$ 780,000
Well Site Electrical		3	lot	\$ 150,000	\$ 450,000	\$ 585,000
Site Work		3	lot	\$ 120,000	\$ 360,000	\$ 468,000
Land		1	lot	\$ 25,000	\$ 25,000	\$ 32,500
Well Transmission Main	12" diameter	5,200	lf	\$ 45.00	\$ 234,000	\$ 304,200
Subtotal						4,509,700.00
(1) Includes 30% for Engineering Overhead and Contingency				Total Estimate Off-Site Cost		\$ 8,528,650
				Total Estimated New Dwelling Units		4,331
				Estimated Cost per Dwelling Unit		\$ 1,969

West End Water Co.
On-Site Facilities Cost Estimate
Rancho Maria and Walden Ranch Developments
January 3, 2005

Table A4.2 - On-Site Water System Cost Estimate

System Component	Size	Quantity	Unit	Unit Cost	Cost	Total Cost (1)
Rancho Maria Development						
Backbone Mains	12" Diameter	13,464	ea	\$ 45	\$ 605,880	\$ 787,644
Subdivison Mains	per lot	383	lots	\$ 850	\$ 325,550	\$ 423,215
Services	per lot	383	lots	\$ 200	\$ 76,600	\$ 99,580
Meters and Meter Installations	per lot	383	lots	\$ 200	\$ 76,600	\$ 99,580
Hydrants	per lot	383	lots	\$ 200	\$ 76,600	\$ 99,580
Subtotal						\$ 1,509,599
Estimated Cost per Dwelling Unit						\$ 3,942
Walden Ranch Development						
Backbone Mains	12" Diameter	31,152	ea	\$ 45	\$ 1,401,840	\$ 1,822,392
Subdivison Mains	per lot	1,685	lots	\$ 850	\$ 1,432,250	\$ 1,861,925
Services	per lot	1,685	lots	\$ 200	\$ 337,000	\$ 438,100
Meters and Meter Installations	per lot	1,685	lots	\$ 200	\$ 337,000	\$ 438,100
Hydrants	per lot	1,685	lots	\$ 200	\$ 337,000	\$ 438,100
Subtotal						\$ 4,998,617
Estimated Cost per Dwelling Unit						\$ 2,967

WITTMAN 510, LLC
8501 N. Scottsdale Road, Suite 165
Scottsdale, Arizona 85253
(480) 947-5900 Phone (480) 947-5900 Fax

EXHIBIT 2

March 03, 2005

Marvin E. Collins
West End Water Co.
9098 W. Pinnacle Peak Rd.
Peoria, AZ 85383

RE: Request for Water Service

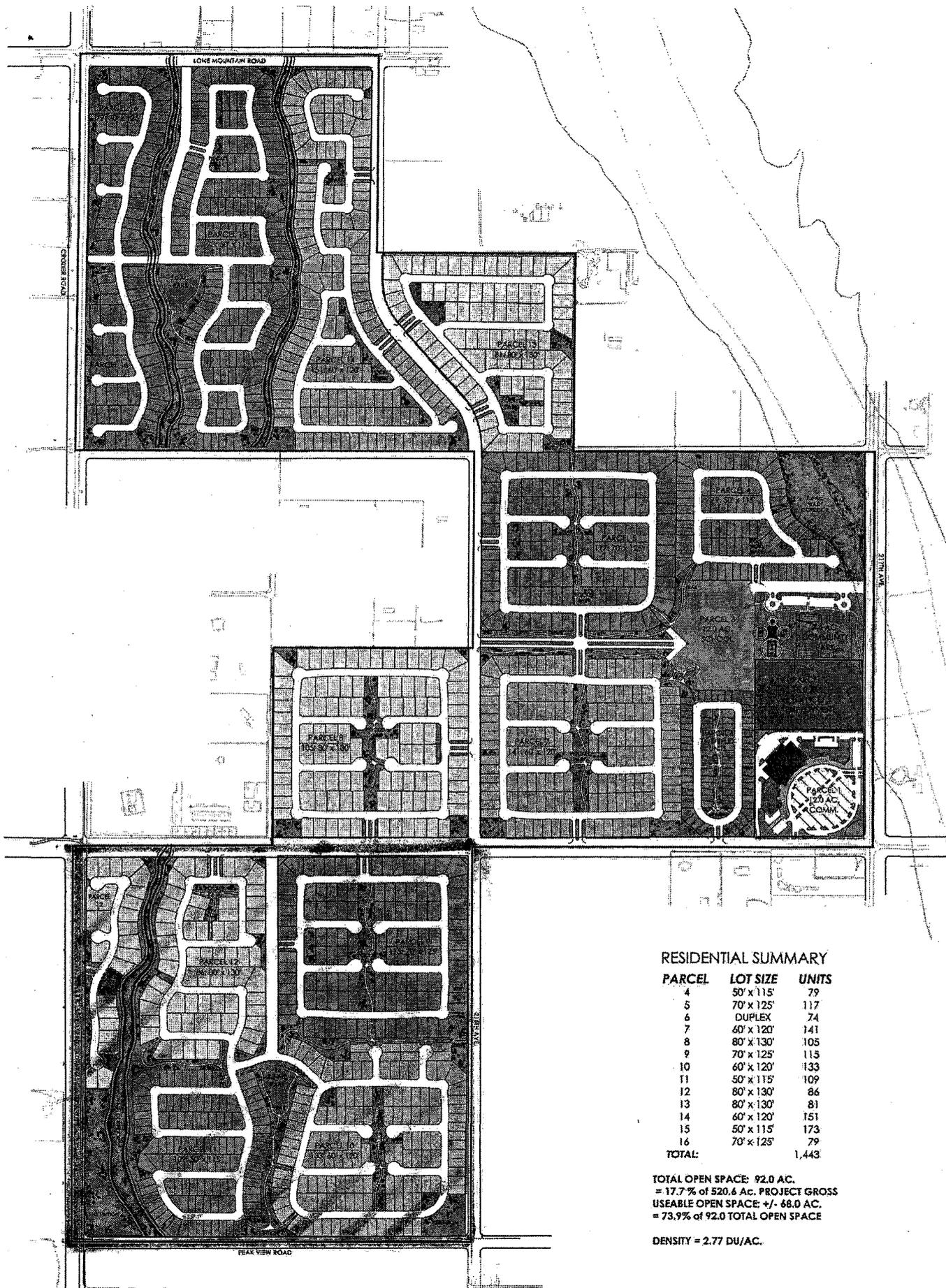
Dear Marvin,

Wittman 510 L.L.C., along with the other developers we met with last week, will be initiating the master water studies for service within your certificated service area for our projects. Please have this letter serve as our request for water service for the area referenced on the attached exhibit contiguous to your service area and currently outside to your existing service area.

Sincerely,



Gary K. Jones
602-625-9052



RESIDENTIAL SUMMARY

PARCEL	LOT SIZE	UNITS
4	50' x 115'	79
5	70' x 125'	117
6	DUPLEX	74
7	60' x 120'	141
8	80' x 130'	105
9	70' x 125'	115
10	60' x 120'	133
11	50' x 115'	109
12	80' x 130'	86
13	80' x 130'	81
14	60' x 120'	151
15	50' x 115'	173
16	70' x 125'	79
TOTAL:		1,443

TOTAL OPEN SPACE: 92.0 AC.
 = 17.7% of 520.6 AC. PROJECT GROSS
 USEABLE OPEN SPACE +/- 68.0 AC.
 = 73.9% of 92.0 TOTAL OPEN SPACE

DENSITY = 2.77 DU/AC.

WALDEN RANCH

CONCEPTUAL LOTTING PLAN

March 3, 2005

SCALE: 1" = 200'
 AUGUST 30, 2004
 CREEK/PICKETT