2017 WATER IMPACT FEE INFRASTRUCTURE IMPROVEMENT PLAN

Town of Marana

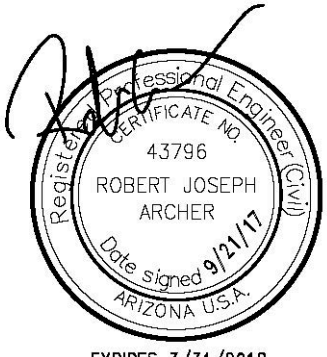
Prepared for:

MARANA AZ
WATER

Town of Marana Water Department
5100 West Ina Road
Marana, Arizona 85743

Project Number: 527.101

September 2017



EXPIRES 3/31/2018

WestLand Resources

WestLand Resources, Inc. • 4001 E. Paradise Falls Drive • Tucson, Arizona 85712 • 520•206•9585

TABLE OF CONTENTS

TABLES

FIGURES

(follow text)

APPENDICES

1. INTRODUCTION

The Town of Marana (Town) through Marana Water serves water to the area shown in blue in **Figure 1**. In addition, the Town provides renewable water resources to reconcile water use in several areas served by Tucson Water through an Intergovernmental Agreement (IGA) (**Figure 1**).

Currently, Marana Water relies on groundwater (most of it derived from renewable resources) for its potable water supply. Marana Water is seeking additional renewable sources of supply such as Central Arizona Project (CAP) water and recharged effluent to ensure an assured and adequate water supply set forth by the Arizona Department of Water Resources (ADWR).

The water system is categorized into seven independent water service areas as shown in **Figure 2**. Each service area is further defined by water pressure zones (**Figure 2)** so that all customers receive water at a reasonable pressure (between approximately 40 and 85 pounds per square inch [psi]).

The purpose of the infrastructure improvement plan is to determine the capital improvements and renewable water resource acquisitions required to meet the demands associated with the next 10 years of growth, and to estimate the costs of those improvements and acquisitions.

2. BENEFIT AREAS

Benefit Areas are areas that derive benefit from unused existing capacity or proposed capacity improvements to the water system including water rights acquisition. Seven benefit areas are used in this IIP (**Figure 3**). Five of the seven benefit areas are the same as the service areas, the Twin Peaks Benefit Area is the combination of the Twin Peaks Service Area and the Picture Rocks Service Area, and the IGA Benefit Area is the combination of all the areas that are served by Tucson Water through an IGA between the Town and Tucson Water.

As part of the infrastructure proposed in this IIP, the Twin Peaks Service Area and the Picture Rocks Service Area will be connected. Connecting the two service areas will benefit growth in both systems by alleviating storage deficiencies in the Picture Rocks Service Area, and alleviating fire flow deficiencies in the Twin Peaks Service Area distribution system.

Some improvements will benefit multiple areas. For example, the acquisition of renewable water resources benefits development in all seven benefit areas.

3. LEVEL OF SERVICE

This section describes the level of service of the water supply, storage, and distribution system for each of the benefit areas, and for existing and future customers.

3.1. LEVEL OF SERVICE FOR EXISTING CUSTOMERS

The level of service for existing customers is generally

- Storage Capacity > 1.5 times the average day demand (ADD) plus fire flow storage requirement, where the fire flow storage requirement is equal to the fire flow rate requirement times the fire flow duration requirement. For example, if the fire flow rate requirement is 1,000 gpm and the fire flow duration requirement is 2 hours (120 minutes), then the fire flow storage requirement is 1,000 gpm times 120 minutes, or 120,000 gallons.
- Well Capacity > peak day demand (PDD) with the largest well out of service, unless otherwise noted for specific zones. PDD = 2 times ADD.
  - The Picture Rocks Service Area is interconnected with the Tucson Water delivery system; however, the receipt of water from Tucson Water may be limited based on Tucson Water operating constraints and water quality. Since this interconnection can be used if a well is out of service, the well requirement for the Picture Rocks Service Area is that the total well capacity must be greater than PDD.
  - The Twin Peaks Service Area is interconnected with the Oro Valley Water Utility, and since this interconnection can be used if a well is out of service, the well requirement for the Twin Peaks Service Area is that the total well capacity must be greater than PDD.
  - The well capacity requirement for the Palo Verde and Falstaff Service Areas, and the North Marana Y1 Zone is that the well capacity be greater than PDD; there is no requirement for redundant well capacity at this time.
- Booster Capacity
  - For a pressure zone or zones without gravity storage, the booster requirement is the greater of (PDD + the fire flow rate requirement) or peak hour demand (PHD), where PHD = 3.5 times ADD if ADD <= 1,000 gpm, and 3.0 times ADD if ADD > 1,000 gpm.
  - For pressure zones with gravity storage sufficient to meet the greater of PDD + fire flow or PHD, the booster capacity requirement is PDD. Under existing conditions, only the Twin Peaks Y1 and Z1 pressure zones have sufficient gravity capacity to supply PDD + fire flow.
- Distribution System Capacity
  - During normal flow conditions, customers should receive water at between approximately 40 psi and 85 psi pressure.
  - The potable water distribution system must be capable of providing peak flow throughout the system while maintaining a minimum of 20 psi pressure throughout the system. Peak flow is the greater of PHD or PDD plus fire flow. If PDD plus fire flow is used, the system is modeled assuming an appropriate fire flow at all points in the system.

The fire flow rate and duration requirements are set by the fire marshal and are based on the International Fire Code (IFC) for each new development. The fire flow for a specific pressure zone is equal to the greatest individual fire flow/duration requirement within the pressure zone. If multiple pressure zones share a resource, such as storage, then the fire flow requirement is based on the largest fire flow/duration requirement within the connected pressure zones. **Table 1** shows the fire flow requirements for specific zones for the existing water system.

Table 1. Fire flow requirements for existing customers

Water System	Water Pressure Zone	Fire Flow (gpm)	Fire Flow Duration (hours)
North Marana	W+	2,500	2
	X1a	1,000	2
Picture Rocks	CR	2,875	3
	PR	700	2
	Y3	2,500	2
Twin Peaks	Y1	1,500	2
	Z1	1,000	2
Airline/Lambert	X1b	2,000	2
Palo Verde	X1c	0	0
Airport	X1c	2,750	2
Falstaff	X1d	0	0

3.2. LEVEL OF SERVICE FOR FUTURE CUSTOMERS

The level of service in terms of water system engineering design criteria will be the same as stated above for all service areas. The Town will not address the lack of redundant well capacity or change the level of service for the Falstaff and Palo Verde Service Areas, and there is no growth projected for these areas. At this time there is no redundant well requirement for the North Marana Y1 Zone.

Fire flow rate and duration requirements for new development are set by the fire marshal and based on the IFC. The requirement is a function of building size, construction type, and whether or not the structure(s) will have interior sprinkler systems. It is anticipated that some new developments will have higher fire flow/duration requirements than the existing requirements. These increased fire flow rates and durations will result in increased requirements for storage and booster capacity. **Table 2** shows the anticipated fire flow/duration requirements based on the projections of growth and type of growth.

Table 2. Anticipated fire flow requirements for future customers

Water System	Water Pressure Zone	Fire Flow (gpm)	Fire Flow Duration (hours)
North Marana	W+	2,500	2
	X1a	1,000	2
	X1d	2,500	2
	Y1	1,750	2
Picture Rocks	CR	2,875	3
	PR	700	2
	Y3	2,500	2
Twin Peaks	A+	1,500	2
	A	1,500	2
	Y1	4,000	4
	Z1	1,500	2
Airline/Lambert	X1b	2,000	2
Palo Verde	X1c	0	0
Airport	X1c	2,750	2
Falstaff	X1d	0	0

4. 10-YEAR LAND USE ASSUMPTIONS

The Town provided land use assumptions for the 10-year study period (Schladweiler 2017). The 10-year study period runs from 2018 to 2027. **Table 3** shows each development area, the number of dwelling units projected over the next 10 years, the area of commercial development over the next 10 years, and the number of equivalent dwelling units (EDUs) projected for the next 10 years, where one EDU represents the demand resulting from one residential dwelling unit or one-quarter acre of commercial[1] area. **Figure 4** shows the location of each development area described in **Table 3**. The last column of **Table 3** shows the benefit area associated with each growth area.

[1] In this IIP, "commercial" represents any non-residential demand, such as retail, offices, industrial, government, or schools.

Table 3. Projected growth in Equivalent Dwelling Units by development area

Development Area	Dwelling Units	Commercial Acres	EDUs	Benefit Area
Airport	0	29	116	Airport
Barrios de Marana	0	4	16	North Marana
Camino de Oeste	144	0	144	Twin Peaks
Cascada	322	17	390	Twin Peaks
Continental Ranch	0	10	40	Twin Peaks
Cortaro Crossing	0	13	52	Twin Peaks
Cypress Gardens	165	0	165	North Marana
De Anza	265	0	265	Twin Peaks
Fianchetto Farms	103	0	103	North Marana
Gladden Farms	527	14	583	North Marana
Gladden Farms II	211	0	211	North Marana
Hartman 59	32	0	32	Twin Peaks
Lazy K	180	0	180	Twin Peaks
Linda Vista Village	312	5	332	Twin Peaks
Marana Main St.	0	14	56	North Marana
Marana Mercantile	0	12	48	North Marana
Marana Spectrum	0	35	140	Twin Peaks
Marana Technology Center	0	10	40	North Marana
Pima Farms	0	6	24	Twin Peaks
Pima Farms North	0	8	32	Twin Peaks
Preserves at Twin Peaks	195	0	195	Twin Peaks
Rancho Marana Town Center	0	5	20	North Marana
Saguaro Bloom	1,229	0	1,229	Saguaro Bloom
San Lucas	24	0	24	North Marana
Sanders Grove	113	0	113	North Marana
Tangerine Business Park	0	18	72	North Marana Y-zone
Tangerine Commerce Park	0	45	180	North Marana
Tangerine Ridge	197	0	197	IGA/WA
Tortolita Vista	85	0	85	IGA/WA
Twin Peaks & Oasis	74	0	74	Twin Peaks
Twin Peaks Estates	25	0	25	Twin Peaks
Twin Peaks Plaza	0	11	44	Twin Peaks
Twin Peaks Vista	29	0	29	Twin Peaks
Uptown at Marana	0	6	24	North Marana
Vanderbilt Farms	391	0	391	North Marana
The Villages of Tortolita	293	0	293	North Marana
Whitney Farms	12	0	12	North Marana
Willow Ridge Commercial	0	4	16	Twin Peaks
Willow Vista	55	0	55	Twin Peaks
Total	**4,983**	**266**	**6,047**	

Table 4 shows the 10-year projected growth in EDUs for each of the benefit areas.

Table 4. 10-year projected growth by benefit area

Benefit Area	Projected 10-year Growth (EDU)
Airport	116
Twin Peaks	2,069
IGA	282
North Marana	2,351
Saguaro Bloom	1,229
Total	**6,047**

Table 5 shows the projected annual growth in EDUs for each benefit area. The annual growth is based on the number of existing EDUs and 5- and 10-year projected EDUs provided by the Town (Schladweiler 2017). The growth rate for intermediate years was estimated using a quadratic curve through the existing EDUs and the 5- and 10-year projected EDUs.

Table 5. Projected annual growth for each benefit area

Year	Airport	Twin Peaks	North Marana	Saguaro Bloom	IGA	Total
2018	5	140	151	118	56	470
2019	7	155	169	119	49	499
2020	8	170	188	120	43	529
2021	9	185	207	121	37	559
2022	11	200	226	122	31	590
2023	12	214	244	123	25	618
2024	14	229	263	124	19	649
2025	15	244	282	125	13	679
2026	17	259	301	126	7	710
2027	18	273	320	131	2	744

5. EXISTING CAPACITY REQUIREMENTS

In this section, the storage, well, and booster capacities are compared to existing demands. The existing water infrastructure is shown in **Figure 5**.

The following assumptions are used to calculate the flows generated from each EDU.

- Each EDU represents 2.7 persons per dwelling unit (ppdu) of equivalent population.
- The average demand per person or equivalent person is 100 gallons per capita per day (gpcd).
- The ADD per EDU is 2.7 ppdu times 100 gpcd or 270 gpd/EDU.
- The peak day demand (PDD) is 2 times ADD or 540 gpd/EDU.

- The peak hour demand is 3.5 times ADD or 945 gpd/EDU if ADD is <= 1,000 gpd, and 3.0 times ADD or 810 gpd/EDU if ADD > 1,000 gpd. For some areas, the PHD is based on an instantaneous demand requirement for the pressure zone.

Unless otherwise noted, the system requirements are

- Storage capacity > 1.5*ADD + fire flow storage.
- Well capacity > PDD with the largest well out of service or PDD if interconnected with another water system.
- Booster capacity (without gravity storage) greater of PDD + fire flow or PHD. Booster capacity (with gravity storage) is equal to PDD.
- During normal flow conditions, customers should receive water at between approximately 40 psi and 85 psi pressure.
- The distribution system must be capable of providing peak flow while maintaining 20 psi throughout the system.

Table 6 shows the existing EDUs in each water Service Area and pressure zone.

Table 6. Existing Equivalent Dwelling Units

Service Area	Zone	Existing EDUs
North Marana	W+	3,687
	X1a	195
Picture Rocks	CR	2,043
	PR	233
	Y3	110
Twin Peaks	Y1	840
	Z1	595
Airline/Lambert	X1b	381
Palo Verde	X1c	60
Airport	X1c	44
Falstaff	X1d	1
	Total	**8,189**

5.1. EXISTING DEMANDS

Based on historical flow data, the average demand for the Marana water system is approximately 270 gpd per EDU. **Table 7** shows the existing ADD, PDD, and PHD for the system broken down by service area and pressure zone.

Table 7. Existing demands

Service Area	Zone	Average Day Demand (gpd)	Peak Day Demand (gpm)	Peak Hour Demand (gpm)
North Marana	W+	995,490	1,383	2,420
	X1a	52,650	73	128
Picture Rocks	CR	551,610	766	1,341
	PR	62,910	87	153
	Y3	29,700	41	173[1]
Twin Peaks	Y1	226,800	315	551
	Z1	160,650	223	390
Airline/Lambert	X1b	102,870	143	250
Palo Verde	X1c	16,200	23	145[1]
Airport	X1c	11,880	17	127[1]
Falstaff	X1d	270	<1	20[1]

[1] PHD based on maximum instantaneous demand.

5.2. EXISTING STORAGE CAPACITY

The required minimum storage reservoir requirement is equal to 1.5 times ADD plus the fire flow/duration requirement. The fire flow requirement is equal to flowrate times duration which results in a volume of water. For example, 1,000 gpm for 2 hours (120 minutes) is 120,000 gallons. The Palo Verde Service Area and the Falstaff Service Area do not have a fire flow requirement.

If storage is shared by two or more zones, the highest fire flow requirement of the zones is used to calculate the storage requirement.

Table 8 shows the fire flow requirement (flow and duration), the current storage reservoir requirement, the existing reservoir capacity, and the amount of excess capacity for each pressure zone. Excess storage in a red font and parenthesis indicate a negative value, which means a deficiency in storage.

Table 8. Existing storage capacity

Service Area	Zone	Fire Flow (gpm)	Fire Flow Duration (hours)	Required Storage (gallons)	Existing Storage (gallons)	Excess Storage (gallons)
North Marana	W+	2,500	2	1,872,210	2,075,000	202,790
	X1a	1,000	2			
	Y1	1,750	2	0[1]	500,000	500,000
Picture Rocks	CR	2,875	3	1,439,280	1,250,000	(189,280)
	PR	700	2			
	Y3	2,500	2	344,550	1,000,000	655,450
Twin Peaks	Y1	1,500	2	761,175	2,285,000	1,523,825

Service Area	Zone	Fire Flow (gpm)	Fire Flow Duration (hours)	Required Storage (gallons)	Existing Storage (gallons)	Excess Storage (gallons)
	Z1	1,000	2			
Airline/Lambert	X1b	2,000	2	394,305	1,940,000	1,545,695
Palo Verde	X1c	N/A[2]	N/A[2]	24,300	45,000	20,700
Airport	X1c	2,750	2	347,820	500,000	152,180
Falstaff	X1d	N/A[2]	N/A[2]	405	10,000	9,595

[1] North Marana Y1 Zone has no connections at this time.
[2] Palo Verde and Falstaff Service Areas do not have a fire flow requirement.

All of the zones have excess storage capacity except for the Picture Rocks CR zone, which has a deficiency of 189,280 gallons.

5.3. EXISTING WELL CAPACITY

The minimum required well capacity is equal to PDD with the largest well out of service; however, the North Marana Y1 Zone, the Palo Verde Service Area, and the Falstaff Service Area do not require redundant well capacity and each is served by a single well. **Table 9** shows the current well capacity requirement, the existing well capacity, and the amount of excess capacity for each pressure zone. Currently, there are no source well deficiencies.

Table 9. Existing well capacity

Service Area	Zone	Required Well Capacity (gpm)	Total Existing Well Capacity (gpm)	Largest Well (gpm)	Net Well Capacity (gpm)	Excess Well Capacity (gpm)
North Marana	W+	1,383	2,572	921	1,651	195
	X1a	73				
	Y1	0[1]	85	N/A[2]	85	85
Picture Rocks	CR	766	2,425	N/A[3]	2,425	1,530
	PR	87				
	Y3	41				
Twin Peaks	Y1	315	2,419	N/A[4]	2,419	1,881
	Z1	223				
Airline/Lambert	X1b	143	1,736	1,126	610	467
Palo Verde	X1c	23	277	N/A[2]	277	255
Airport	X1c	17	4,156	2,000	2,156	2,140
Falstaff	X1d	0.38	59	N/A[2]	59	59

[1] North Marana Y1 Zone has no demands at this time.
[2] Currently no requirement for redundant well capacity.
[3] No requirement for redundant well capacity because of connection to Tucson Water system.
[4] No requirement for redundant well capacity because of connection to Oro Valley Water Utility system.

5.4. EXISTING BOOSTER CAPACITY

The booster capacity requirement is the greater of PHD or PDD plus fire flow. If the pressure zone is served by gravity storage (Twin Peaks Y1 and Z1), then the booster capacity requirement is PDD. **Table 10** shows the required booster capacity, the existing booster capacity, and the excess booster capacity for each zone. Currently, there are no booster capacity deficiencies.

Table 10. Existing booster capacity

Service Area	Zone	Required Booster Capacity (gpm)	Existing Booster Capacity (gpm)	Excess Booster Capacity (gpm)
North Marana	W+	3,883	6,720	2,837
	X1a	1,073	1,300	227
	Y1	0[1]	1,850	1,850
Picture Rocks	CR	3,641	3,750	109
	PR	787	2,380	1,593
	Y3	2,541	3,100	559
Twin Peaks	Y1	315[2]	2,100	1,785
	Z1	223[2]	1,300	1,077
Airline/Lambert	X1b	2,143	5,080	2,937
Palo Verde	X1c	145	300	155
Airport	X1c	2,767	4,500	1,734
Falstaff	X1d	20	120	100

[1] North Marana Y1 Zone has no demands at this time.
[2] Booster requirement is equal to PDD because booster is part of gravity storage system.

6. PROJECTED CAPACITY REQUIREMENTS AND UTILIZATION OF EXISTING FACILITIES

This section includes the projected capacity requirements and utilization of existing infrastructure over the 10-year study period ending in 2027. Water system infrastructure requirements are based on the level of service noted in **Section 3.2**.

6.1. PROJECTED 10-YEAR EDUS

The future land use from **Table 3** in **Section 4** was combined with the water service areas and water pressure zones from **Figure 2**. The results were combined with the existing EDUs from **Table 6** in **Section 5** to get the total EDUs by water pressure zone. The results are presented in **Table 11**.

Table 11. Projected Equivalent Dwelling Units

Service Area	Zone	Existing EDUs	10-year Growth (EDUs)	2027 EDUs
North Marana	W+	3,687	2,052	5,739
	X1a	195	7	202
	X1d	0	220	220
	Y1	0	72	72
Picture Rocks	CR	2,043	200	2,243
	PR	233	0	233
	Y3	110	101	211
Twin Peaks	A	0	29	29
	A+	0	195	195
	Y1	840	1,291	2,131
	Z1	595	253	848
Airline/Lambert	X1b	381	1,229	1,610
Palo Verde	X1c	60	0	60
Airport	X1c	44	116	160
Falstaff	X1d	1	0	1

6.2. PROJECTED DEMANDS

Table 12 shows the projected 2027 demands for each water pressure zone. Projected demands are ADD, PDD, and PHD.

Table 12. Projected demands.

Service Area	Zone	Average Day Demand (gpd)	Peak Day Demand (gpm)	Peak Hour Demand (gpm)
North Marana	W+	1,549,530	2,152	3,228
	X1a	54,540	76	133
	X1d	59,400	83	144
	Y1	19,440	27	47
Picture Rocks	CR	605,610	841	1,472
	PR	62,910	87	153
	Y3	56,970	79	173[1]
Twin Peaks	A	7,830	11	19
	A+	52,650	73	128
	Y1	575,370	799	1,398
	Z1	228,960	318	557
Airline/Lambert	X1b	434,700	604	1,057
Palo Verde	X1c	16,200	23	145[1]
Airport	X1c	43,200	60	127
Falstaff	X1d	270	0.38	20[1]

[1] Peak-hour demand based on instantaneous flow requirement.

6.3. PROJECTED STORAGE CAPACITY

The minimum storage reservoir requirement is equal to 1.5 times ADD plus fire flow. There are no plans to add fire flow requirements to the Palo Verde and Falstaff service areas. If storage is for more than one zone, the highest fire flow requirement of the multiple zones is used to calculate the storage requirement.

Table 13 shows the fire flow requirement (flow and duration), the projected storage reservoir requirement, the existing reservoir capacity, and the amount of excess capacity for each pressure zone. Excess storage in a red font and parenthesis indicate a negative value, which means a deficiency in storage. It is projected that by 2027, the North Marana W+, X1a, and X1d Zones will have a 704,005-gallon storage deficiency, and the Picture Rocks CR and PR Zones will have a 270,280-gallon storage deficiency.

Table 13. Projected storage capacity

Service Area	Zone	Fire Flow (gpm)	Fire Flow Duration (hours)	Required Storage (gallons)	Existing Storage (gallons)	Excess Storage (gallons)
North Marana	W+	2,500	2	2,779,005[1]	2,075,000	(704,005)
	X1a	1,000	2			
	X1d	2,500	2			
	Y1	1,750	3	223,360[1]	500,000	244,640
Picture Rocks	CR	2,875	3	1,520,280	1,250,000	(270,280)
	PR	700	2			
	Y3	2,500	2	385,455	1,000,000	614,545
Twin Peaks	A	1,500	2	2,257,215	2,285,000	27,785
	A+	1,500	2			
	Y1	4,000	4			
	Z1	1,500	3			
Airline/Lambert	X1b	2,000	2	892,050	1,940,000	1,047,950
Palo Verde	X1c	N/A[2]	N/A[2]	24,300[3]	45,000	20,700
Airport	X1c	2,750	2	394,800	500,000	105,200
Falstaff	X1d	N/A[2]	N/A[2]	405[3]	10,000	9,595

[1] The Marana Technology Campus is in the X1d zone, but is supplied from the Tangerine Business Park Reservoir; therefore, the storage component is included in the North Marana Y1 zone requirement.
[2] Palo Verde and Falstaff Service Areas do not have a fire flow requirement.
[3] Required storage is equal to 1.5 times ADD.

6.4. PROJECTED WELL CAPACITY

The minimum required well capacity is equal to PDD with the largest well out of service; however, the North Marana Y1 Zone, the Palo Verde Service Area, and the Falstaff Service Area will not require redundant well capacity by 2027. **Table 14** shows the projected well capacity requirement, the existing

well capacity, and the projected excess capacity for each pressure zone. Excess well capacity in a red font and parenthesis indicates a negative value, which means a deficiency in well capacity. The North Marana Service Area is projected to have a well capacity deficiency of 644 gpm by 2027.

Table 14. Projected well capacity

Service Area	Zone	Required Well Capacity (gpm)	Total Existing Well Capacity (gpm)	Largest Well (gpm)	Net Well Capacity (gpm)	Excess Well Capacity (gpm)
North Marana	W+	2,152	2,572	921	1,651	(644)
	X1a	76				
	X1d	68[1]				
	Y1	42[1]	85	N/A[2]	85	43
Picture Rocks	CR	841	2,425	N/A[3]	2,425	1,417
	PR	87				
	Y3	79				
Twin Peaks	A	11	2,419	N/A[4]	2,419	1,218
	A+	73				
	Y1	799				
	Z1	318				
Airline/Lambert	X1b	604	1,736	1,126	610	6
Palo Verde	X1c	23	277	N/A[2]	277	255
Airport	X1c	60	4,156	2,156	2,000	1,940
Falstaff	X1d	0.38	59	N/A[2]	59	59

1 The Marana Technology Campus is in the X1d zone, but is supplied from the Tangerine Business Park Reservoir; therefore, the well component is included in the North Marana Y1 zone requirement.
2 System only has one well. No requirement for redundant well capacity at this time.
3 No requirement for redundant well capacity because of connection to Tucson Water system.
4 No requirement for redundant well capacity because of connection to Oro Valley Water Utility system.

6.5. PROJECTED BOOSTER CAPACITY

The booster capacity requirement is the greater of PHD or PDD plus fire flow. If the pressure zone is served by gravity storage (Twin Peaks Y1 and Z1), then the booster capacity requirement is PDD. **Table 15** shows the projected required booster capacity, the existing booster capacity, and the excess booster capacity for each zone. Excess booster capacity in a red font and parenthesis indicates a negative value, which means a deficiency in well capacity.

It is projected that the North Marana X1d Zone will have a 2,568 gpm deficiency by 2027.

Table 15. Projected Booster Capacity.

Service Area	Zone	Fire Flow (gpm)	Required Booster Capacity (gpm)	Existing Booster Capacity (gpm)	Excess Booster Capacity (gpm)
North Marana	W+	2,500	4,652	6,720	2,068
	X1a	1,000	1,076	1,300	224
	X1d	2,500	2,568	0	(2,568)
	Y1	1,750	1,792	1,850	58
Picture Rocks	CR	2,875	3,716	3,750	34
	PR	700	867	2,380	1,514
	Y3	2,500	2,579	3,100	521
Twin Peaks	A	1,500	1,584[1]	1,850	266
	A+				
	Y1	4,000	799[2]	2,100	1,301
	Z1	1,500	318[2]	1,300	982
Airline/Lambert	X1b	2,000	2,604	5,080	2,476
Palo Verde	X1c	N/A[3]	145	300	155
Airport	X1c	2,750	2,810	4,500	1,690
Falstaff	X1d	N/A[3]	20	120	100

[1] Twin Peaks A+ Zone booster supplies water to both the A+ Zone and the A Zone through a pressure reducing valve (PRV) in this area.
[2] Booster capacity is for PDD only because zones are part of gravity storage system.
[3] No fire flow requirement.

6.6. Other Distribution System Deficiencies

In addition to having adequate storage capacity, well capacity, and booster capacity, the distribution system must have adequate capacity to move water to the projected development areas while maintaining a minimum of 20 psi throughout the system.

There are projected distribution system deficiencies in the North Marana and Twin Peaks Service Areas. It is projected that the North Marana Service Area will require a larger connection between the San Lucas area east of Interstate 10 and the rest of the North Marana Service Area, and connecting the southern and northern portions of the North Marana Service Area along Sanders Road.

The hydraulic model of the Twin Peaks Service Area shows a deficiency when delivering fire flow plus PDD while maintaining a minimum 20 psi pressure throughout the service area.

6.7. Additional Renewable Resource Acquisitions

An average of 270 gpd (approximately 0.3 acre-feet/year) of renewable water resources is required for each EDU added to the water system to offset groundwater withdrawals. **Table 16** shows the projected

additional renewable water resource required for each benefit area. Projected growth over the next 10 years will require approximately 1,829 acre-feet of additional renewable water resource acquisitions.

Table 16. Projected additional renewable resources required for 2027

Benefit Area	Projected Growth (EDU)	Renewable Resource (acre-feet)
Airport	116	35
IGA	282	85
North Marana	2,351	711
Twin Peaks	2,069	626
Saguaro Bloom	1,229	372
Total	**6,047**	**1,829**

6.8. SUMMARY OF PROJECTED CAPACITY DEFICIENCIES

Table 17 contains a summary of the projected infrastructure deficiencies in storage, well, and booster capacity for each benefit area. In addition to the infrastructure deficiencies shown in **Table 17**, 1,829 acre-feet of renewable water resources will be required to offset the ADWR safe yield requirements.

Table 17. Summary of projected capacity deficiencies by service area.

Service Area	Storage Capacity Deficiency (gallons)	Well Capacity Deficiency (gpm)	Booster Capacity Deficiency (gpm)	Other Deficiencies
North Marana	704,005	644	2,568	Note 1
Twin Peaks				Note 2
Picture Rocks	270,780			
Airline/Lambert				
Palo Verde				
Airport				
Falstaff				

[1] North Marana does not meet the 20-psi pressure requirement for all flow conditions.
[2] Twin Peaks does not meet the 20-psi pressure requirement for all flow conditions.

7. CAPITAL INFRASTRUCTURE IMPROVEMENTS

Figure 7 shows the location of the seven capital projects that are intended to make up the projected deficiencies discussed in **Section 6**. Five of the projects affect development in the North Marana Benefit Area, and two of the projects affect the Twin Peaks Benefit Area. **Appendix A** contains conceptual site layouts for each project. Projects that are associated with water resources acquisition are presented in **Section 8**. **Table 18** shows each project, the benefit area benefiting from each project, and the projected EDUs affected by the project. See **Section 3** for the level of service associated with each benefit area.

Table 18. Proposed capital facilities

Affected Benefit Areas	Capital Facilities	Projected Affected EDUs
North Marana	San Lucas Interconnect	2,351
	W+ to X-zone 3,000-gpm booster station	
	Marana Park 650-gpm well	
	Marana Park 750,000-gallon storage reservoir	
	Sanders 24-inch pipeline	
Twin Peaks	24-inch Twin Peaks/Continental Reserve Interconnect	2,069
	Picture Rocks Interconnect	

7.1. SAN LUCAS INTERCONNECT

The proposed San Lucas Interconnect is a 16-inch diameter pipe that crosses Interstate 10 to connect development on the east side of Interstate 10 to the rest of the North Marana Service Area. The proposed San Lucas Interconnect alleviates projected distribution system deficiencies, and allows the movement of water during peak flow events, while maintaining a minimum 20-psi pressure throughout the system.

7.2. W+ TO X ZONE 3,000-GPM BOOSTER STATION

The proposed W+ to X Zone 3,000-gpm booster station booster station will move water from the North Marana W+ Zone to the North Marana X1d Zone. A pressure reducing valve (PRV) will allow water to move by gravity from the X1d Zone to the W+ zone. The proposed booster station will alleviate the projected 2,568-gpm booster station deficiency.

7.3. MARANA PARK 650-GPM WELL

The proposed Marana Park 650-gpm well will provide groundwater to the North Marana Service Area, and will alleviate the projected 644-gpm well deficiency.

7.4. MARANA PARK 750,000-GALLON RESERVOIR

The proposed Marana Park 750,000-gpm storage reservoir will address the 704,005-gallon storage deficiency in the North Marana Service Area.

7.5. SANDERS ROAD 24-INCH PIPELINE

The proposed Sanders Road 24-inch Pipeline will alleviate projected distribution system deficiencies in the North Marana Service Area. The improvement will allow the movement of water from source wells and storage reservoirs to and from new development areas during peak use periods, while maintaining a minimum 20-psi pressure throughout the system.

7.6. TWIN PEAKS/CONTINENTAL RESERVE INTERCONNECT

The proposed 24-inch Twin Peaks/Continental Reserve Interconnect will connect the Twin Peaks and Picture Rocks Service Areas. The proposed improvement will alleviate the projected 270,280-gallon storage deficiency in the Picture Rocks Service Area, and the projected distribution system deficiency in fire flow in the Twin Peaks Service Area

7.7. PICTURE ROCKS INTERCONNECT

The proposed Twin Peaks/Continental Reserve Interconnect will require a change in the pressure zone boundary between the Picture Rocks CR and PR pressure zones as the majority of the CR pressure zone becomes a Y pressure zone. With the connection of the two areas, the water pressure of about 222 existing customers would fall below the 40-psi minimum pressure during normal flow conditions. The proposed Picture Rocks Interconnect is required to maintain the existing level of service for existing customers that would be affected by the proposed Twin Peaks/Continental Reserve Interconnect.

8. COST OF CAPITAL IMPROVEMENTS AND WATER RESOURCE ACQUISITIONS

This section covers costs associated with infrastructure, water rights acquisitions, and Section 23 fees.

8.1. INFRASTRUCTURE

The discussion of infrastructure costs is divided into three sections: 1) the cost associated with planning for growth, 2) reimbursements for existing infrastructure, 3) and the costs associated with the capital infrastructure improvements presented in **Section 7**.

8.1.1. Planning

An update of the 2010 Potable Water Master Plan of the Marana water system will be completed in 2018 at an estimated cost of $75,000. Master planning is performed periodically to plan for future growth.

8.1.2. Reimbursements

There are existing reimbursements required for the construction of infrastructure in the Saguaro Bloom and Twin Peaks Benefit Areas. In the Saguaro Bloom Benefit Area, developer-financed water system infrastructure was constructed with the agreement that the developers will be refunded as the area was developed. In the Twin Peaks Benefit Area, infrastructure was financed by the Town and there are debt service payments required during the 10-year impact fee period. **Table 19** shows the annual reimbursement for each benefit area.

Table 19. Annual reimbursement for Twin Peaks and Saguaro Bloom benefit areas

Year	Twin Peaks Benefit Area	Saguaro Bloom Benefit Area
2018	$254,135	$97,967
2019	$254,055	$97,972
2020	$253,973	$97,972
2021	$253,889	$97,972
2022	$253,802	$97,972
2023	$253,712	$97,972
2024	$253,620	$97,972
2025	$253,525	$97,972
2026	$253,428	$97,972
2027	$253,327	$97,972
Total	**$2,537,466**	**$979,715**

8.1.3. Infrastructure

This section contains the estimated capital costs for projects affecting the North Marana Benefit Area and the Twin Peaks Benefit Area. **Appendix A** contains a detailed cost breakdown for each capital improvement with the exception of the San Lucas Interconnect. The cost for the San Lucas Interconnect is based on the existing contract amount to complete the project. **Table 20** shows the estimated costs and timing for infrastructure improvements in the North Marana Benefit Area.

Table 20. North Marana Benefit Area capital improvement costs

Year	San Lucas Inter-connect	W+ to X-zone Booster Station	Marana Park 650-gpm Well	Marana Park 750,000-gal Reservoir	Sanders 24-inch Pipeline	Total
2018	$324,000					$324,000
2019						
2020			$675,000			$675,000
2021		$934,875		$1,269,000		$2,203,875
2022					$2,227,770	$2,227,770
Total	**$324,000**	**$934,875**	**$675,000**	**$1,269,000**	**$2,227,770**	**$5,430,645**

Table 21 shows the estimated costs and timing for the proposed capital infrastructure improvements in the Twin Peaks Benefit Area.

Table 21. Twin Peaks Benefit Area capital improvement costs

Year	24-inch Twin Peaks/Continental Reserve Interconnect	Picture Rocks Interconnect	Total
2018		$1,344,600	$1,344,600
2019	$1,736,910		$1,736,910
Total	**$1,736,910**	**$1,344,600**	**$3,081,510**

8.1.4. Summary of Costs Related to Infrastructure Improvements

Table 22 is a summary of the costs related to the infrastructure improvements. The costs include planning, reimbursements for existing infrastructure capacity, and proposed infrastructure improvements. The Reimbursements and Infrastructure are broken down by benefit area.

Table 22. Summary of infrastructure improvement costs by benefit area

Year	Planning	Reimbursements		Proposed Infrastructure		Total
		Twin Peaks	Saguaro Bloom	North Marana	Twin Peaks	
2018	$75,000	$254,135	$97,967	$324,000	$1,344,600	$2,095,702
2019		$254,055	$97,972		$1,736910	$2,088,937
2020		$253,973	$97,972	$675,000		$1,026,945
2021		$253,889	$97,972	$2,203,875		$2,555,736
2022		$253,802	$97,972	$2,227,770		$2,579,544
2023		$253,712	$97,972			$351,684
2024		$253,620	$97,972			$351,592
2025		$253,525	$97,972			$351,497
2026		$253,428	$97,972			$351,400
2027		$253,327	$97,972			$351,299
Total	**$75,000**	**$2,537,466**	**$979,715**	**$5,430,645**	**$3,081,510**	**$12,104,336**

8.2. Renewable Water Resource Acquisitions

There are three sources of renewable water resources foreseen in the next 10 years: Central Arizona Project (CAP) Non-Indian Agricultural Reallocation (NIA), Avra CAP M&I, and recharged wastewater. Costs for recharged wastewater include the cost to build recharge basins and one-half the cost to purchase and upgrade the Marana Water Reclamation Facility (WRF).

Water Resource impact fees are applied to new development in all of the benefit areas including the IGA Benefit Area. The projected growth for all of the benefit areas is 6,047 EDUs.

Table 23 shows the water required and the renewable water resource available due to the projects included in the IIP for each year from 2018 through 2027. NIA provides 515 acre-feet of water each year and Avra CAP provides 808 acre-feet of water each year. The amount of water recharged at the Marana WRF depends on the number of EDUs connected to the sewer system, and is projected to be about 577 acre-feet in 2018 and to increase to about 1,085 acre-feet in 2027. The final column shows the remaining renewable resource required to offset projected demand for all Marana Water customers and responsibilities.

Table 23. Renewable resource requirements and sources for impact fee period

Year	Projected EDUs Served by Marana Water	Projected EDUs Served by Marana WRF	Water Required (acre-feet)	Reclaimed Water (acre-feet)	Non-Indian Agricultural Reallocation (acre-feet)	Avra CAP M&I (acre-feet)	Remaining Renewable Resource Required (acre-feet)
2018	8,660	3,646	2,619	577	515	808	720
2019	9,161	3,924	2,771	621	515	808	827
2020	9,692	4,222	2,931	668	515	808	941
2021	10,252	4,539	3,101	718	515	808	1,060
2022	10,842	4,876	3,279	771	515	808	1,185
2023	11,462	5,233	3,467	828	515	808	1,316
2024	12,111	5,609	3,663	887	515	808	1,453
2025	12,789	6,005	3,868	950	515	808	1,595
2026	13,498	6,421	4,083	1,016	515	808	1,744
2027	14,236	6,856	4,306	1,085	515	808	1,898

The Marana WRF and designated management area was acquired from Pima County to assist the Town in meeting its renewable water resource demands. Existing customers have already paid for capacity in the plant, and future customers will pay for unused existing capacity. Although the headworks and secondary treatment were limited to about 0.5 mgd, there is unused capacity in several areas. The existing WRF has a permitted capacity of 3.5 mgd, a tertiary treatment capacity of 3.5 mgd, and has the land area required for the treatment of 4.5 mgd. Since the Marana WRF was acquired primarily for water resource recovery, future water customers will pay for one-half the cost of the acquisition debt service, and future sewer customers will pay for one-half the acquisition debt service. **Table 24** shows the plant acquisition debt service and the portion of the acquisition debt service devoted to new water customers over the next 10 years.

Table 24. Debt service for acquisition of the Marana WRF.

Year	Plant Acquisition Debt Service	Portion of Plant Acquisition Debt Service Devoted to New Water Customers
2018	$1,809,925	$904,963
2019	$1,809,925	$904,963
2020	$1,810,550	$905,275
2021	$1,807,150	$903,575
2022	$1,812,350	$906,175
2023	$1,810,750	$905,375
2024	$1,806,750	$903,375
2025	$1,810,250	$905,125
2026	$1,810,750	$905,375
2027	$1,808,250	$904,125
Total	**$18,096,650**	**$9,048,326**

A 1.5 million gallon per day (mgd) expansion to the Marana WRF is currently being constructed. The expansion includes replacement of the existing 0.5 mgd Biolac secondary treatment system with a 1.5 mgd activated sludge treatment system, replacement of the 0.5 mgd headworks with 1.5 mgd headworks, and replacement of the existing biosolids handling system with new larger capacity biosolids handling system. Since the Marana WRF was acquired primarily for water resource recovery, future water customers will pay for one-half the cost of the expansion debt service, and future sewer customers will pay for one-half the expansion debt service. **Table 25** shows the plant expansion debt service and the portion of the plant expansion debt service devoted to new water customers over the next 10 years.

To account for the contributions made by the current customer base toward the existing utilized capacity in the Biolac secondary treatment system and acquisition of the WRF, the Town will contribute approximately $3.2 million toward the cost of debt to finance the expansion. This funding provided by the Town is not included in the debt servicing shown in **Table 25** below and will not be reimbursed by new customers through impact fees. Additionally, while the Biolac will not be utilized as part of the secondary treatment process in the current expansion of the WRF, it will not be clean closed at the time of the expansion to allow further consideration for its proposed future use.

Table 25. Debt service for Marana WRF 1.5 mgd upgrade.

Year	Plant Expansion Debt Service	Portion of Plant Expansion Debt Service Devoted to New Water Customers
2018	$815,091	$407,546
2019	$680,819	$340,409
2020	$680,819	$340,409
2021	$680,819	$340,409
2022	$680,819	$340,409
2023	$680,819	$340,409
2024	$680,819	$340,409
2025	$680,819	$340,409
2026	$680,819	$340,409
2027	$680,819	$340,409
Total	**$6,942,462**	**$3,471,227**

Recharge basins are currently under construction for the Marana WRF. The recharge basins will allow purified water to be recharged, and to then become available as groundwater recharge credits to offset groundwater pumping. **Table 26** shows the debt service for the new recharge basins.

Table 26. Debt service for construction of recharge basins

Year	Recharge Basin Debt Service
2018	$153,544
2019	$128,250
2020	$128,250
2021	$128,250
2022	$128,250
2023	$128,250
2024	$128,250
2025	$128,250
2026	$128,250
2027	$128,250
Total	**$1,307,794**

Other sources of renewable water resource for the Town are the purchase of Non-Indian Agricultural (NIA) Central Arizona Project (CAP) at $78,530 spread over 5 years, and Avra CAP M&I, which is a one-time cost of $692,970 in 2018.

Table 27 is a summary of the effluent and CAP related renewable resources required to offset the increased groundwater withdrawals required to support growth over the impact fee period.

Table 27. Summary of costs associated with water rights acquisitions

Year	Portion of Plant Acquisition Debt Service	Portion of WRF Upgrade Debt Service	Recharge Basin Debt Service	Non-Indian Agricultural Reallocation	Avra CAP M&I	Total
2018	$904,963	$407,546	$153,544	$15,706	$692,970	$2,174,729
2019	$904,963	$340,409	$128,250	$15,706		$1,389,328
2020	$905,275	$340,409	$128,250	$15,706		$1,389,640
2021	$903,575	$340,409	$128,250	$15,706		$1,387,940
2022	$906,175	$340,409	$128,250	$15,706		$1,390,540
2023	$905,375	$340,409	$128,250			$1,374,034
2024	$903,375	$340,409	$128,250			$1,372,034
2025	$905,125	$340,409	$128,250			$1,373,784
2026	$905,375	$340,409	$128,250			$1,374,034
2027	$904,125	$340,409	$128,250			$1,372,784
Total	**$9,048,326**	**$3,471,227**	**$1,307,794**	**$78,530**	**$692,970**	**$14,598,847**

8.3. SECTION 23 FEES

Pursuant to an IGA between Marana and Oro Valley dated April 3, 2001 (Marana Resolution 2001-36), Marana and Oro Valley share an overlapping service area. The area of overlap is shown in **Appendix B**, and is located within a portion of Section 23, Township 12 South, Range 12 East. Connections in the overlap area pay a fee in addition to the Twin Peaks Benefit Area impact fee. The additional fee was $750 per EDU in 2001, and has increased by 3 percent per year every year thereafter. **Table 28** shows the fee over the next 10 years to the nearest dollar.

Table 28. Additional Section 23 fees by year

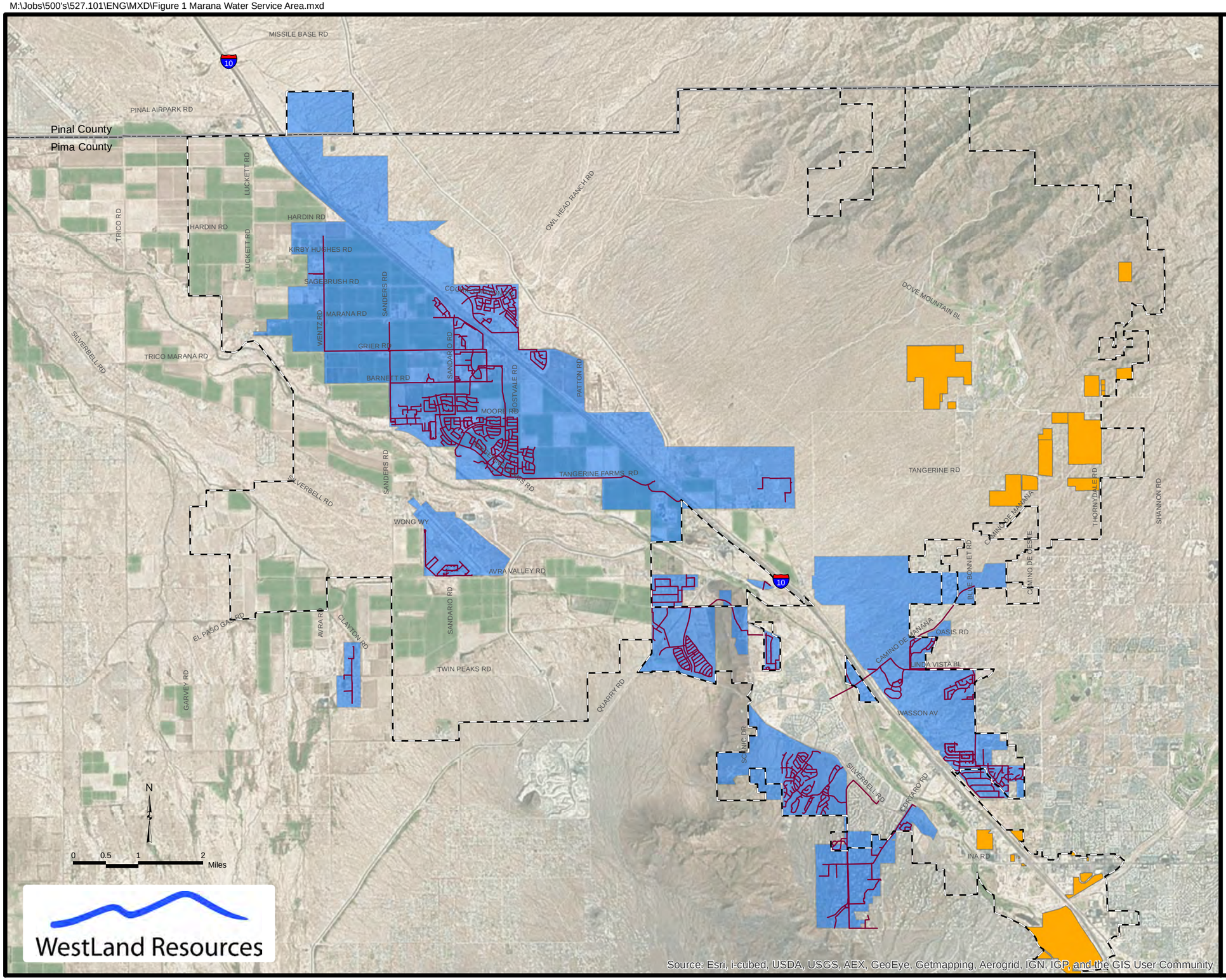
Year	Section 23 Fee	Year	Section 23 Fee
2018	$1,240	2023	$1,437
2019	$1,277	2024	$1,480
2020	$1,315	2025	$1,525
2021	$1,355	2026	$1,570
2022	$1,395	2027	$1,617

9. REFERENCES

Schladweiler, Scott. 2017. Email: Infrastructure Improvement Plans. Attachment: 5-10 year projections 4-20-17.xlsx. To: Robert Archer, WestLand Resources, Inc. April 22, 2017.

FIGURES

M:\Jobs\500's\527.101\ENG\MXD\Figure 1 Marana Water Service Area.mxd



Legend

- Marana Town Limits
- Pima/Pinal County Line
- Existing Water Mains
- Marana Water Service Area
- Tucson Water IGA

WestLand Resources

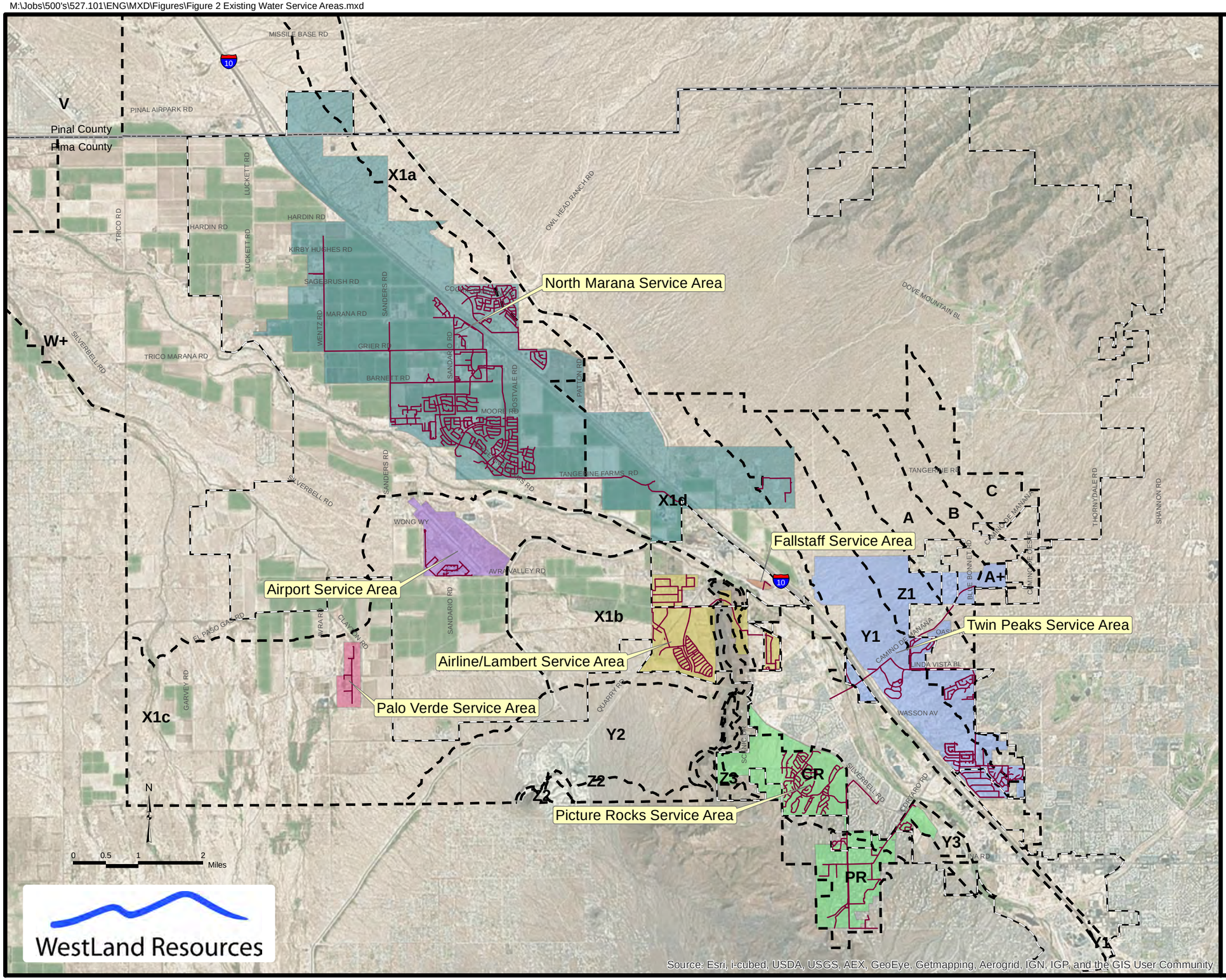
MARANA AZ
WATER

2017 WATER IMPACT FEE INFRASTRUCTURE IMPROVEMENT PLAN

Figure 1

Marana Water Service Area

M:\Jobs\500's\527.101\ENG\MXD\Figures\Figure 2 Existing Water Service Areas.mxd



Legend

- Marana Town Limits
- Pima/Pinal County Line
- Existing Water Mains
- Pressure Zone Boundaries

Marana Water Service Areas

- Airport
- Picture Rocks
- Falstaff
- North Marana
- Palo Verde
- Airline/Lambert
- Y1 Twin Peaks
- Water Pressure Zone

WestLand Resources

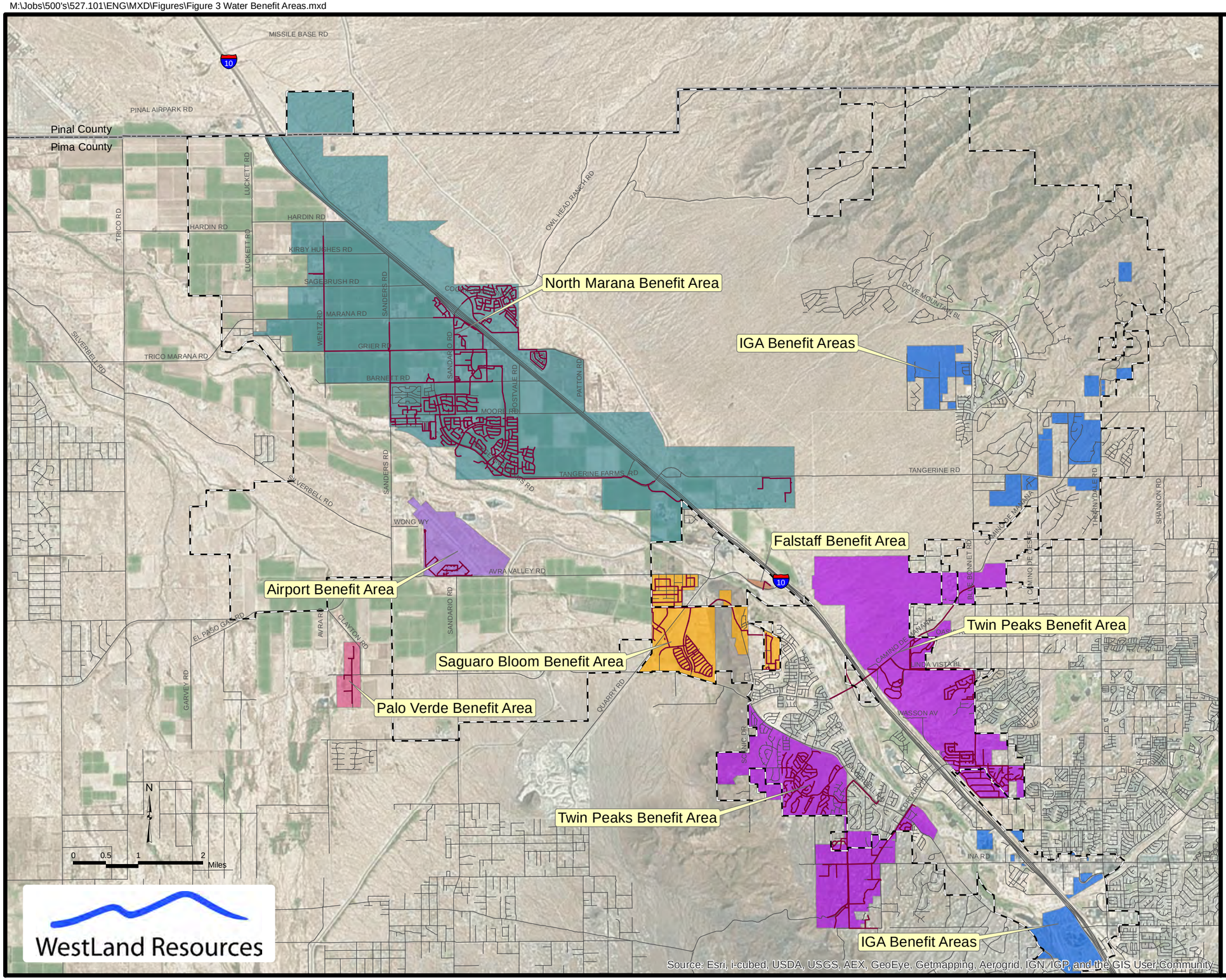
MARANA AZ WATER

2017 WATER IMPACT FEE INFRASTRUCTURE IMPROVEMENT PLAN

Figure 2

Water Service Areas and Water Pressure Zones

M:\Jobs\500's\527.101\ENG\MXD\Figures\Figure 3 Water Benefit Areas.mxd



Legend

- Marana Town Limits
- Pima/Pinal County Line
- Existing Water Mains

Water Benefit Areas

- Airport
- Falstaff
- North Marana
- Palo Verde
- Saguaro Bloom
- Twin Peaks
- IGA

Note: IGA - Intergovernmental Agreement with Tucson Water

WestLand Resources

MARANA AZ
WATER

2017 WATER IMPACT FEE INFRASTRUCTURE IMPROVEMENT PLAN

Figure 3

Water Benefit Areas

M:\Jobs\500's\527.101\ENG\MXD\Figures\Figure 4 Water Development Areas.mxd

Pinal County
Pima County

The Villages of Tortolita
Sanders Grove
Marana Mercantile
San Lucas
Uptown at Marana
Barrios de Marana
Marana Main St.
Rancho Marana Town Center
Cypress Gardens
Vanderbilt Farms
Fianchetto Farms
Gladden Farms II
Gladden Farms
Marana Technology Campus
Tangerine Business Park
Tortolita Vistas
Casa Sevilla
Tangerine Ridge
Tangerine Commerce Park
Airport
Cascada
Twin Peaks Vista
Preserves at Twin Peaks
Continental Ranch
Saguaro Bloom
Twin Peaks & Oasis
Oasis Hills I & II
Marana Spectrum
Linda Vista Village
Twin Peaks Plaza
Hartman 59
Twin Peaks Estates
De Anza
Pima Farms North
Cortaro Crossing
Camino de Oeste
Willow Ridge Commercial
Lazy K
Pima Farms
Willow Vista
Continental Reserve
Continental Ranch

MISSILE BASE RD
PINAL AIRPARK RD
HARDIN RD
KIRBY HUGHES RD
SAGEBRUSH RD
MARANA RD
GRIER RD
TRICO MARANA RD
BARNETT RD
MOORE RD
TANGERINE FARMS RD
TANGERINE RD
WONG WY
AVRA VALLEY RD
TWIN PEAKS RD
WASSON AV
INA RD
OWL HEAD RANCH RD
DOVE MOUNTAIN BL
LUCKETT RD
TRICO RD
SANDERS RD
SILVERBELL RD
SANDARIO RD
POSTVALE RD
FLEIN RD
THORNYDALE RD
SHANNON RD
BLUE BONNET RD
CAMINO DE MANANA
LINDA VISTA BL
EL PASO GAS RD
AVRA RD
CLAYTON RD
GARVEY RD
SILVERBELL RD

N
0 0.5 1 2 Miles

Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

WestLand Resources

Legend

- Marana Town Limits
- Pima/Pinal County Line
- Existing Water Mains

Development Areas

- Continental Ranch
- Airport
- Barrios de Marana
- Camino de Oeste
- Cascada
- Continental Reserve
- Cortaro Crossing
- Cypress Gardens
- De Anza
- Fianchetto Farms
- Gladden Farms
- Gladden Farms II
- Hartman 59
- Lazy K
- Linda Vista Village
- Marana Main St.
- Marana Mercantile
- Marana Spectrum
- Marana Technology Campus
- Oasis Hills I and II
- Pima Farms
- Pima Farms North
- Preserve at Twin Peaks
- Vanderbilt Farms
- Rancho Marana Town Center
- Saguaro Bloom
- San Lucas
- Sanders Grove
- Tangerine Business Park
- Tangerine Commerce Park
- Tangerine Ridge
- Tortolita Vistas
- Twin Peaks and Oasis
- Twin Peaks Plaza
- Twin Peaks Vista
- Uptown at Marana
- The Villages of Tortolita
- Whitney Farms
- Willow Ridge Commercial
- Willow Vista

MARANA AZ
WATER

2017 WATER IMPACT FEE INFRASTRUCTURE IMPROVEMENT PLAN

Figure 4
Development Areas

M:\Jobs\500's\527.101\ENG\MXD\Figures\Figure 5 Existing Infrastructure.mxd

San Lucas Water Plant
Storage: 1.0 MG
Well: 921 gpm
Booster: 2,250 gpm

San Lucas W to X Zone Booster
Booster: 1,300 gpm

Marana Park Water Plant
Storage: 1.0 MG
Booster: 3,200 gpm

Sandario Well Site
Well: 550 gpm

Honea West Water Plant
Storage: 50,000 gal
Well: 321 gpm
Booster: 550 gpm

Gladden Farms Well Site
Well: 550 gpm

Honea East Water Plant
Storage: 25,000 gal.
Well: 230 gpm
Booster: 720 gpm

Tangerine Business Park Water Plant
Storage: 500,000 gal.
Well: 85 gpm
Booster: 1,850 gpm

Lambert Water Plant
Storage: 30,000 gal.
Well: 150 gpm
Booster: 350 gpm

Airport West Water Plant
Storage: 500,000 gal.
Well: 2,156 gpm
Booster: 4,500 gpm

Airline Water Plant
Storage: 20,000 gal.
Well: 168 gpm
Booster: 230 gpm

Falstaff Water Plant
Storage: 10,000 gal.
Well: 59 gpm
Booster: 120 gpm

Twin Peaks Water Plant
Storage: 1.0 MG
Booster: 1,850 gpm

Airport East Well Site
Well: 2,000 gpm

Twin Peaks Well Site
Well: 1,018 gpm

Hartman Vistas Water Plant
Storage: 1.1 MG
Booster: 1,300 gpm

Saguaro Bloom Water Plant
Storage: 1.87 MG
Well: 1,126 gpm
Booster: 3,000 gpm

Palo Verde Water Plant
Storage: 45,000 gal.
Well: 277 gpm
Booster: 400 gpm

La Puerta Water Plant
Storage: 20,000 gal.
Well: 292 gpm
Booster: 1,200 gpm

Pioneer Well Site
Well: 900 gpm

Cortaro Ranch Water Plant
Storage: 150,000 gal.
Well: 300 gpm
Booster: 1,750 gpm

Willow Vista Booster
Booster: 1,700 gpm

Continental Reserve Water Plant
Storage: 1.0 MG
Wells: 2,425 gpm
Booster: 3,750 gpm

Oshrin Water Plant
Storage: 35,000 gal.
Wells: 201 gpm
Booster: 350 gpm

Picture Rocks Booster
Booster: 660 gpm

The Springs Water Plant
Storage: 1.0 MG
Booster: 3,100 gpm

Picture Rocks Water Plant
Storage: 250,000 gal.
Booster: 1,000 gpm

Legend

- Other Infrastructure
- Existing Water Mains
- Marana Town Limits
- Pima/Pinal County Line

Label Colors

- North Marana Service Area
- Picture Rocks Service Area
- Twin Peaks Service Area
- Airline/Lambert Service Area
- Palo Verde Service Area
- Airport Service Area
- Falstaff Service Area

N

0 0.5 1 2 Miles

WestLand Resources

Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

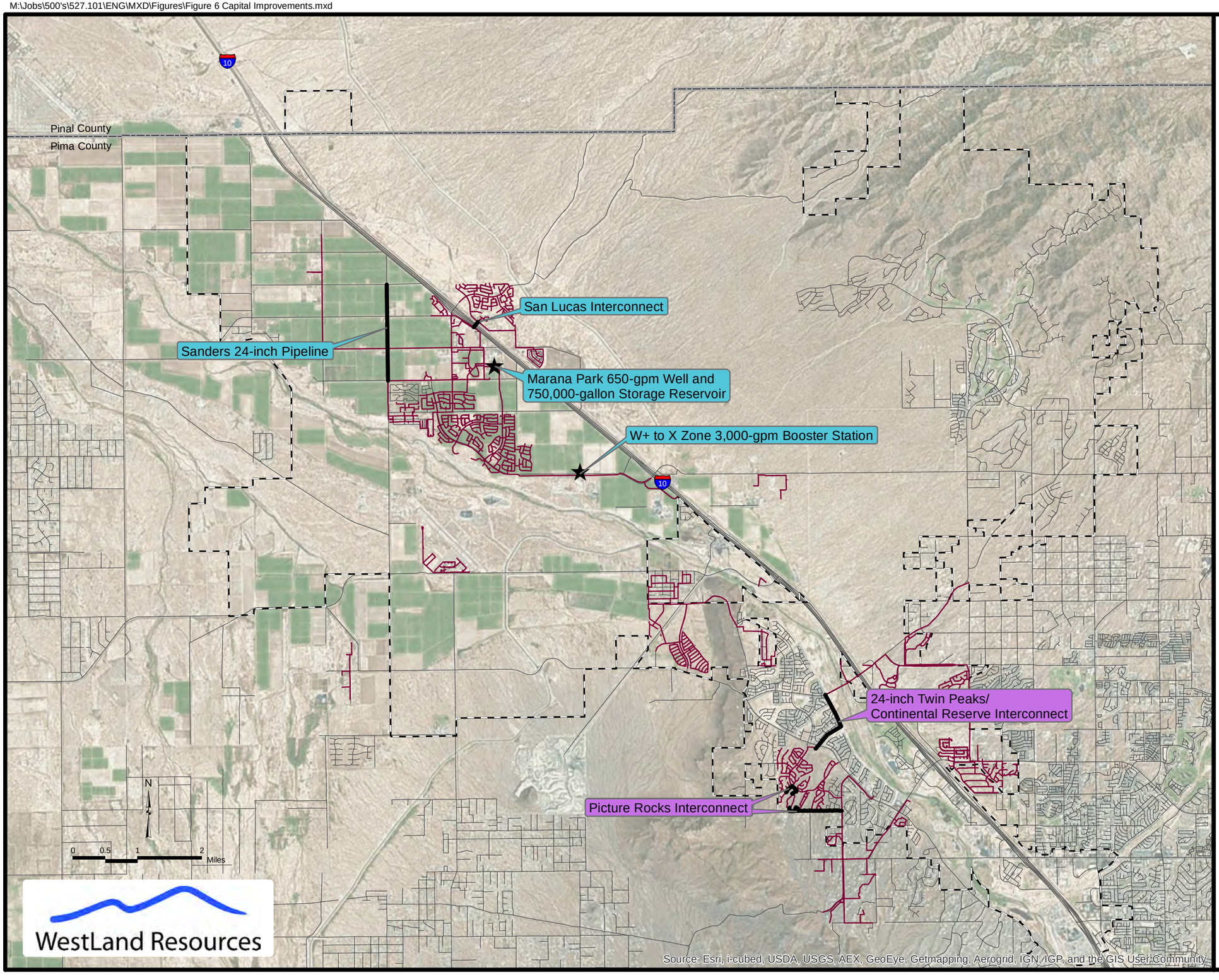
MARANA AZ WATER

2017 WATER IMPACT FEE INFRASTRUCTURE IMPROVEMENT PLAN

Figure 5

Existing Infrastructure

M:\Jobs\500's\527.101\ENG\MXD\Figures\Figure 6 Capital Improvements.mxd



WestLand Resources

Legend

- CapitalImprovements
- Capital Improvements (Linear)
- Existing Water Mains
- Pima/Pinal County Line
- Marana Town Limits

MARANA AZ
WATER

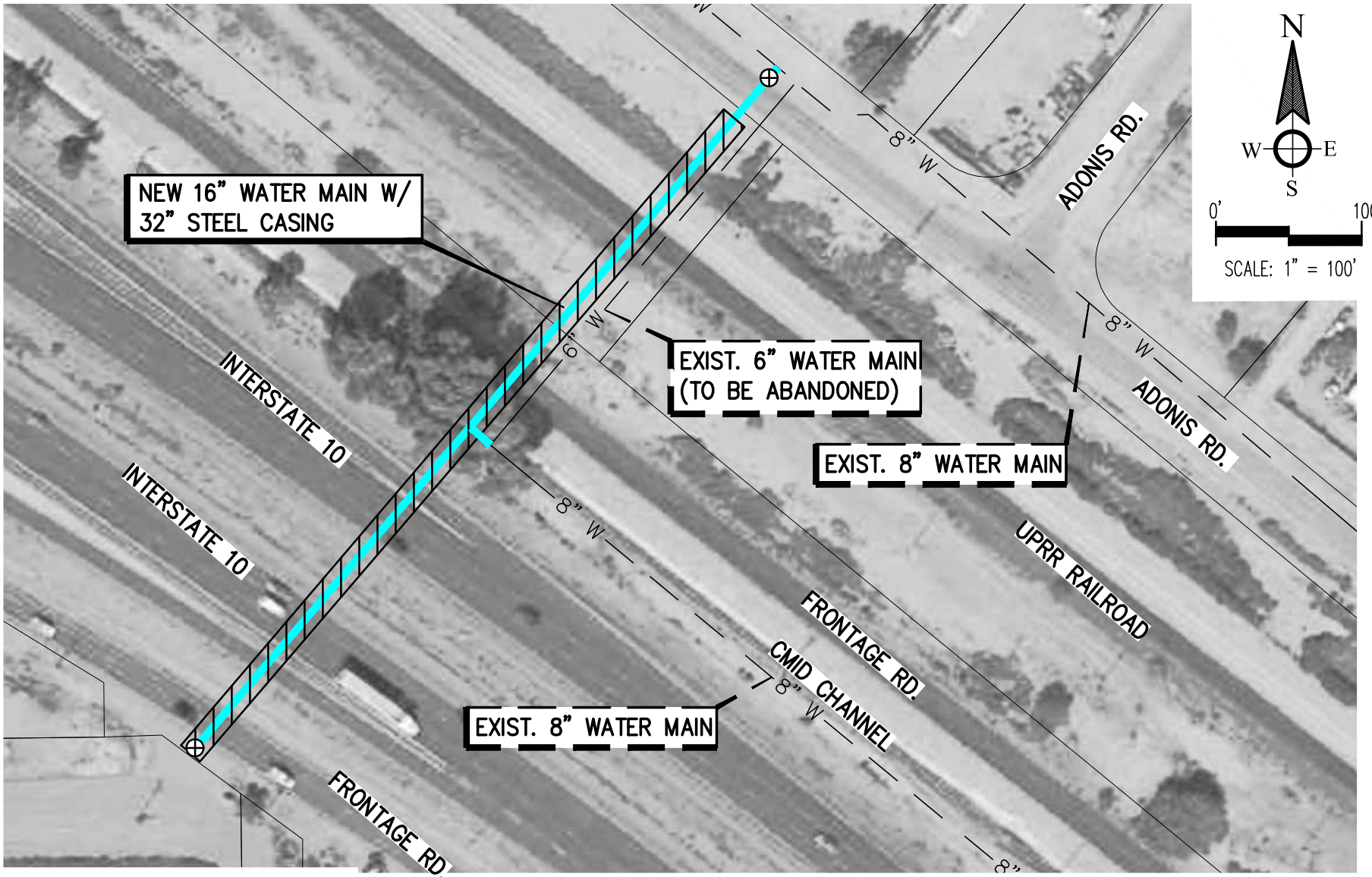
2017 WATER IMPACT FEE INFRASTRUCTURE IMPROVEMENT PLAN

Figure 6

Capital Improvements

APPENDIX A

Opinions of Probable Construction Cost and Site Plans

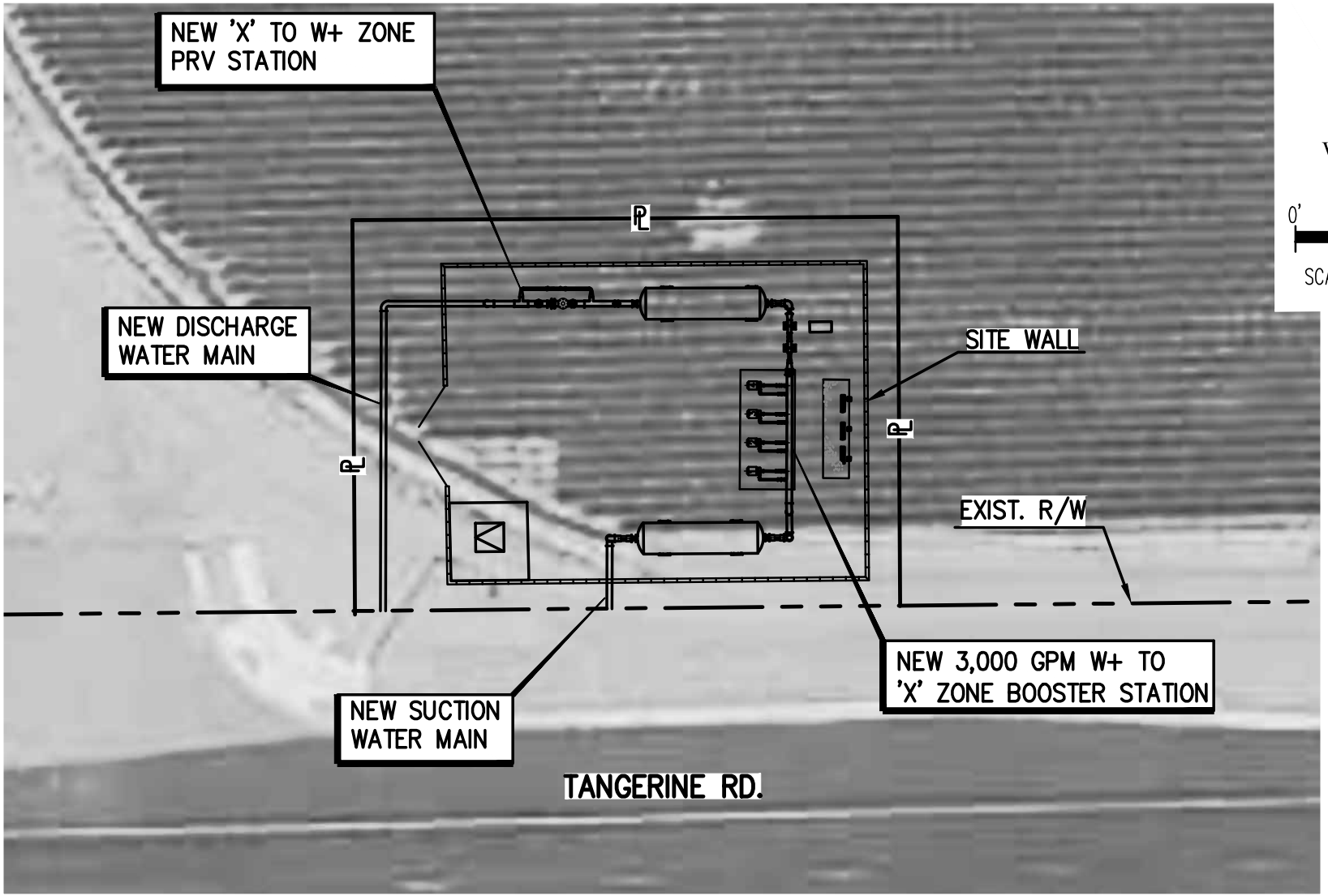


W+ ZONE 1–10
SAN LUCAS
16" INTERCONNECT
WATER MAIN LAYOUT EXHIBIT

APRIL 14, 2017

WestLand Resources, Inc.
Tucson • Phoenix • Flagstaff
4001 E. Paradise Falls Drive
Tucson, Arizona 85712 (520) 206-9585

M:\Jobs\500's\527.01\2013\16-INCH INTERCONNECT.dwg



TANGERINE W+ TO 'X' ZONE BOOSTER STATION AND PRV STATION

SITE LAYOUT EXHIBIT

APRIL 14, 2017

WestLand Resources, Inc.
Tucson • Phoenix • Flagstaff
4001 E. Paradise Falls Drive
Tucson, Arizona 85712 (520) 206-9585

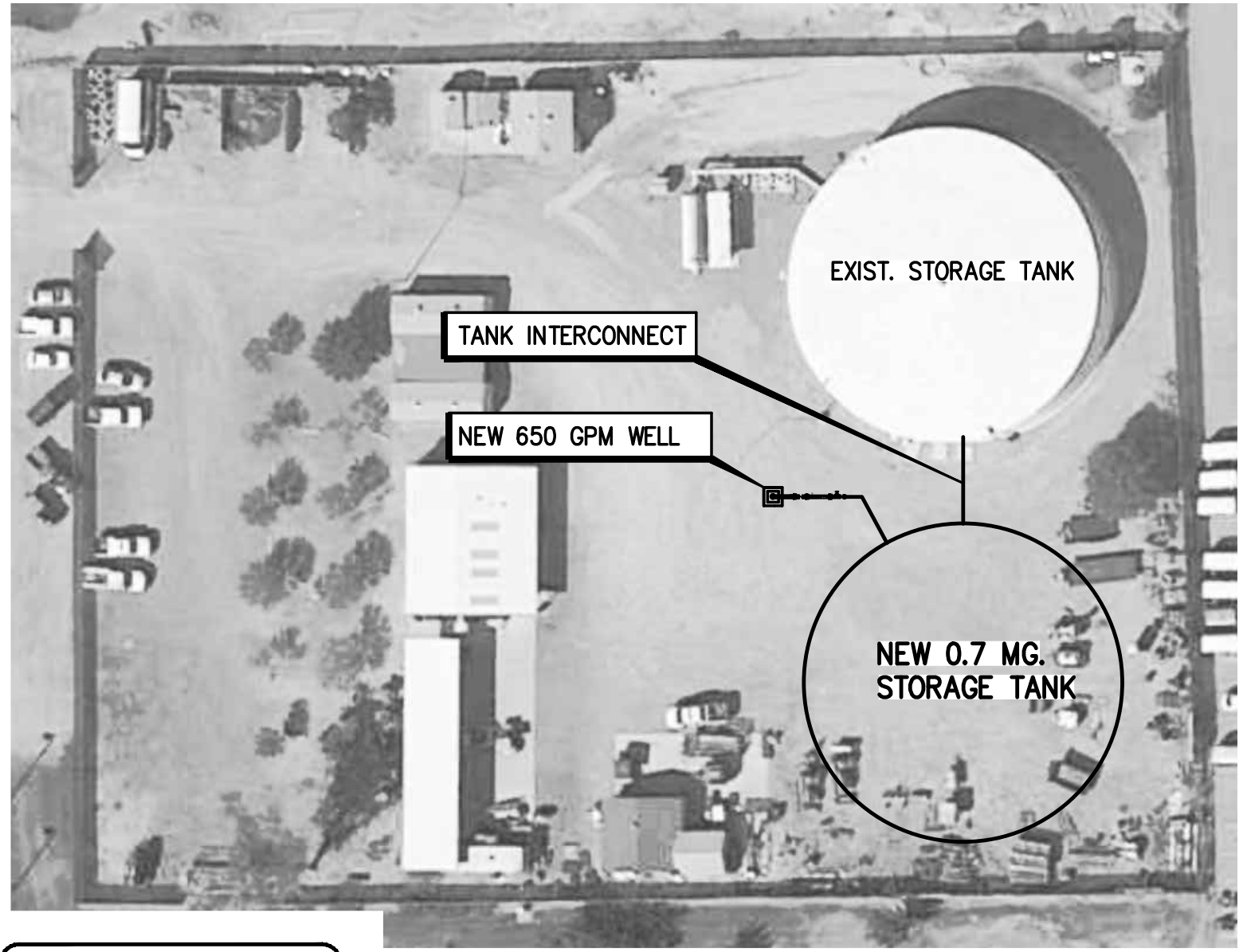
M:\Jobs\500's\527.01\2013\TANGERINE PRV.dwg

WestLand Resources, Inc.

Engineering and Environmental Consultants

Project Name:	Town of Marana 2017 Impact Fees	**Prepared by:**	OON	**Date:**	5/17/2017
Project No.:	527.101	**Checked by:**	EDC	**Date:**	5/17/2017
Location:	Marana, Arizona	**Client:**	Town of Marana		
Description:	Tangerine W+ Zone to X Zone Booster Sation and PRV Station				

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
1	1,500 Grundfos Booster Pump Station	EA	1	$350,000	$350,000	Including concrete pad
2	Bladder Tank	EA	2	$3,500	$7,000	
3	Site Piping	LS	1	$40,000	$40,000	
4	PRV Station	LS	1	$75,000	$75,000	
5	Electical and Controls and Telemetry	LS	1	$180,000	$180,000	
6	Site Wall	LF	270	$150	$40,500	Block wall and gate
	Subtotal				**$692,500**	
	Contingencies (20%)				$138,500	
	Design and Construction Management (15%)				$103,875	
	TOTAL PROJECT COSTS				**$934,875**	



N
W E
S
0' 50'
SCALE: 1" = 50'

WestLand Resources, Inc.
Tucson • Phoenix • Flagstaff
4001 E. Paradise Falls Drive
Tucson, Arizona 85712 (520) 206-9585

MARANA PARK
RESERVOIR AND WELL LAYOUT EXHIBIT

APRIL 14, 2017

M:\Jobs\500's\527.01\2013\marana park.dwg

WestLand Resources, Inc.

Engineering and Environmental Consultants

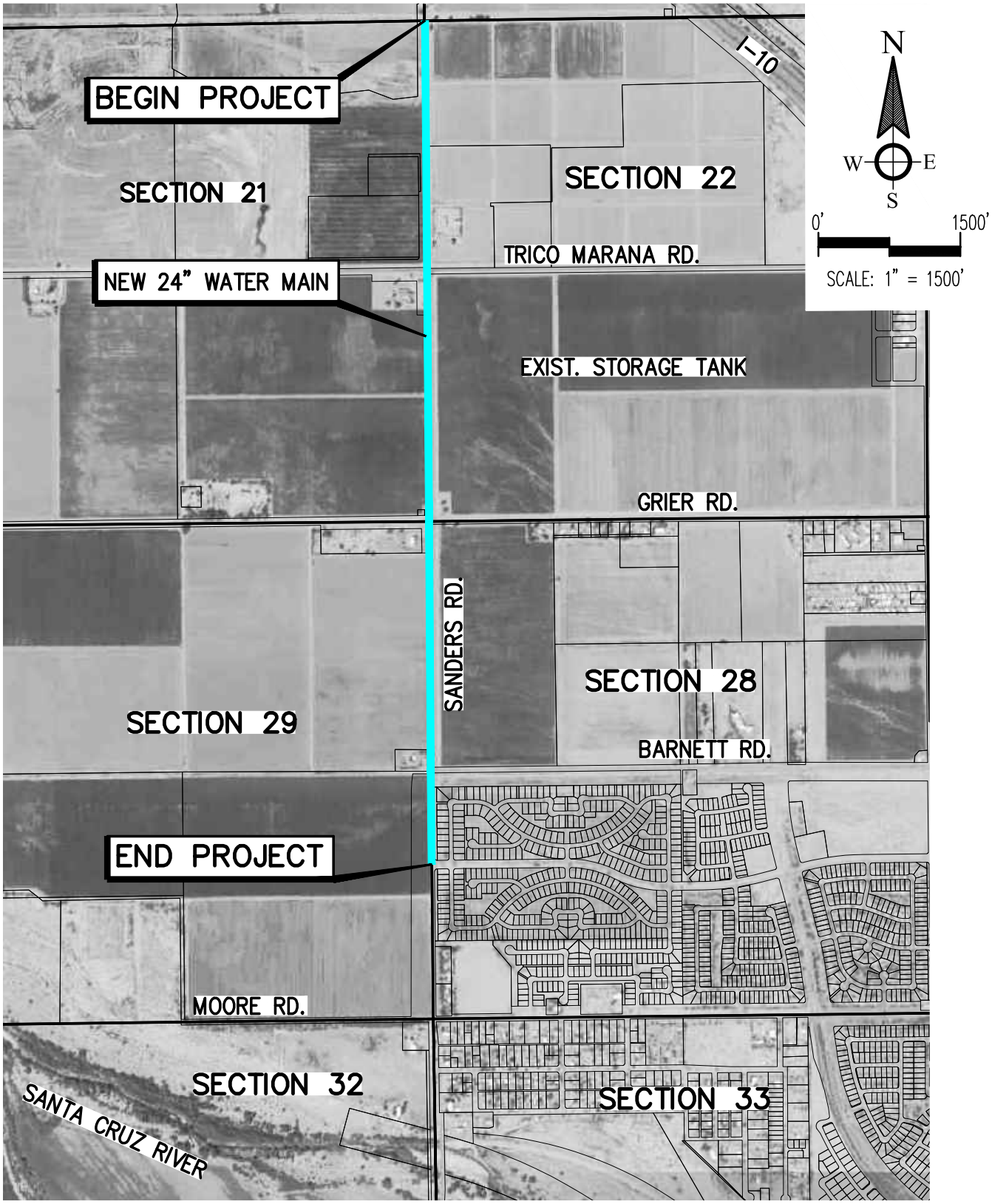
Project Name:	Town of Marana 2017 Impact Fees	**Prepared by:**	OON	**Date:**	5/17/2017
Project No.:	527.101	**Checked by:**	EDC	**Date:**	5/17/2017
Location:	Marana, Arizona	**Client:**	Town of Marana		
Description:	Marana Park Well				

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
1	650 gpm Well	EA	1	$350,000	$350,000	
2	Site Piping	LS	1	$50,000	$50,000	
3	Electrical Instrumentation and Controls	LS	1	$100,000	$100,000	
	Subtotal				**$500,000**	
	Contingencies (20%)				$100,000	
	Design and Construction Management (15%)				$75,000	
	TOTAL PROJECT COSTS				**$675,000**	

WestLand Resources, Inc.
Engineering and Environmental Consultants

Project Name:	Town of Marana 2017 Impact Fees	**Prepared by:**	OON	**Date:**	5/17/2017
Project No.:	527.01	**Checked by:**	EDC	**Date:**	5/17/2017
Location:	Marana, Arizona	**Client:**	Town of Marana		
Description:	Marana Park Reservoir				

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
1	0.75 MG Welded Steel Reservoir	EA	1	$860,000	$860,000	
2	Site Piping	LS	1	$50,000	$50,000	
3	Electrical Instrumentation and Controls	LS	1	$30,000	$30,000	
	Subtotal				**$940,000**	
	Contingencies (20%)				$188,000	
	Design and Construction Management (15%)				$141,000	
	TOTAL PROJECT COSTS				**$1,269,000**	



WestLand Resources, Inc.
Tucson • Phoenix • Flagstaff
4001 E. Paradise Falls Drive
Tucson, Arizona 85712 (520) 206-9585

SANDERS ROAD
24" WATER MAIN
LAYOUT EXHIBIT

APRIL 14, 2017

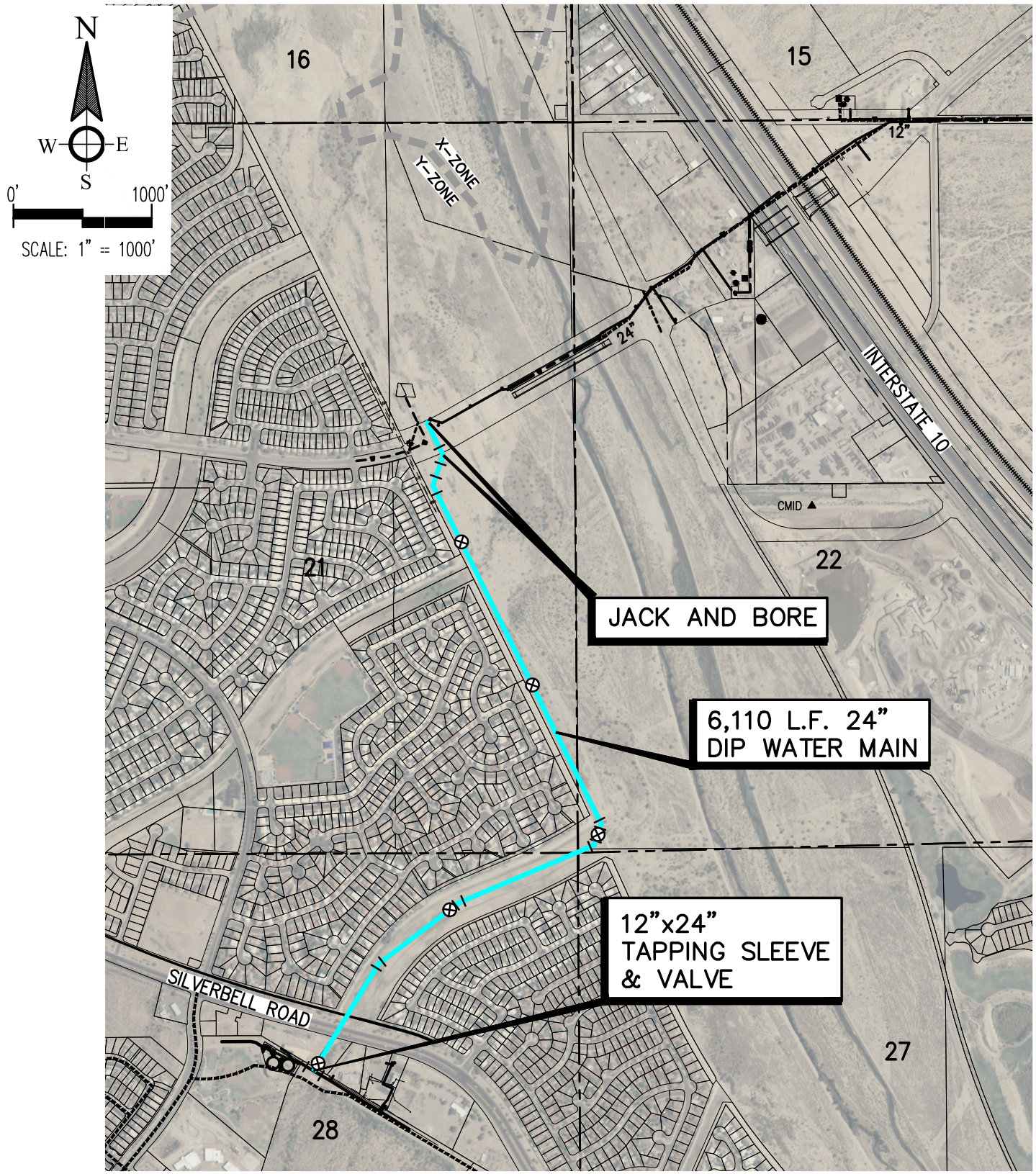
M:\Jobs\500's\527.01\2013\SANDERS.dwg

WestLand Resources, Inc.

Engineering and Environmental Consultants

Project Name:	Town of Marana 2017 Impact Fees	**Prepared by:**	OON	**Date:**	5/17/2017
Project No.:	527.101	**Checked by:**	EDC	**Date:**	5/17/2017
Location:	Marana, Arizona	**Client:**	Town of Marana		
Description:	Sanders Road 24" Water Main				

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
1	24" DIP Water Main	LF	8,920	$185	$1,650,200	
	Subtotal				**$1,650,200**	
	Contingencies (20%)				$330,040	
	Design and Construction Management (15%)				$247,530	
	TOTAL PROJECT COSTS				**$2,227,770**	



WestLand Resources, Inc.
Tucson • Phoenix • Flagstaff
4001 E. Paradise Falls Drive
Tucson, Arizona 85712 (520) 206-9585

24" TWIN PEAKS/ CONTINENTAL RESERVE INTERCONNECT

APRIL 14, 2017

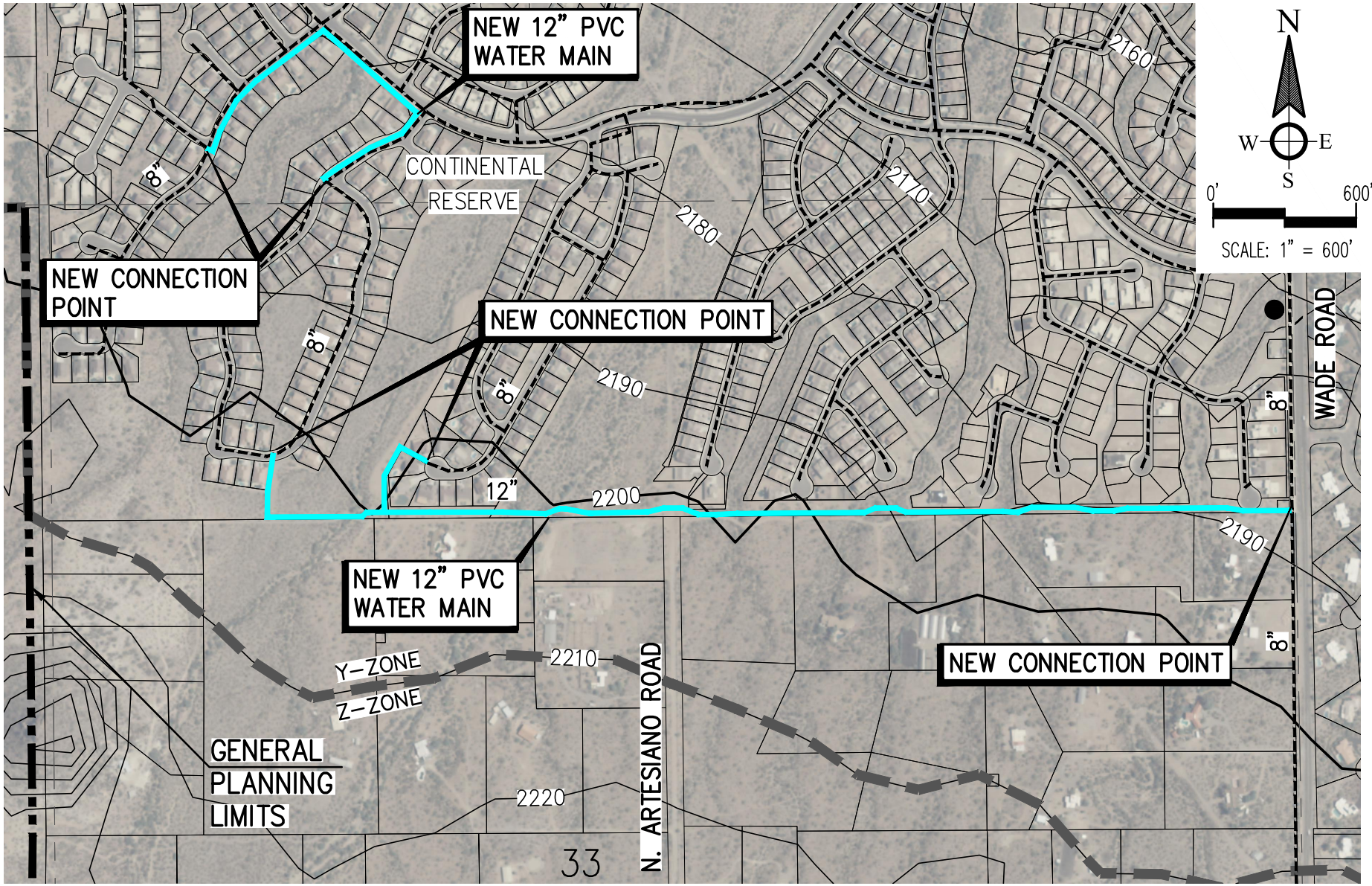
M:\Jobs\500's\527.01\2013\CONT-RESERVE-24IN-WL-EXHB.dwg

WestLand Resources, Inc.

Engineering and Environmental Consultants

Project Name:	Town of Marana 2017 Impact Fees	**Prepared by:**	OON	**Date:**	5/17/2017
Project No.:	527.101	**Checked by:**	EDC	**Date:**	5/17/2017
Location:	Twin Peaks Blvd to Silverbell Rd.	**Client:**	Town of Marana		
Description:	Twin Peaks/Continental Reserve Interconnect				

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
1	General Conditions	LS	1	$20,000	$20,000	Mobilization and demobilization, construction management, survey, ect.
2	24" D.I.P Water Main with Restrained Joints	LF	6,110	$185	$1,130,350	
3	24" Valve, Box and Cover	EA	4	$13,000	$52,000	
4	2" Air Release Valve	EA	2	$1,500	$3,000	
5	Jack and Bore	LF	125	$650	$81,250	Beneath existing Twin Peaks Blvd.
	Subtotal				**$1,286,600**	
	Contingencies (20%)				$257,320	
	Design and Construction Management (15%)				$192,990	
	TOTAL PROJECT COSTS				**$1,736,910**	



WestLand Resources, Inc.
Tucson • Phoenix • Flagstaff
4001 E. Paradise Falls Drive
Tucson, Arizona 85712 (520) 206-9585

PICTURE ROCKS INTERCONNECT

APRIL 14, 2017

M:\Jobs\500's\527.01\2013\CONTINENTAL RESERVE-TIE-IN.dwg

WestLand Resources, Inc.

Engineering and Environmental Consultants

Project Name:	Town of Marana 2017 Impact Fees	**Prepared by:**	GGF	**Date:**	5/23/2017
Project No.:	527.101	**Checked by:**	RJA	**Date:**	5/23/2017
Location:	Marana, Arizona	**Client:**	Town of Marana		
Description:	Picture Rocks Interconnect				

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
1	12-inch water main including valves, air release valves, and appurtanances - South Portion	LF	5,050	$95	$479,750	
2	12-inch water main including valves, air release valves, and appurtanances - North Portion	LF	1,850	$100	$185,000	
3	Tie-in to existing water main	EA	4	$4,500	$18,000	
4	Pavement and curb removal and replacement	LS	1	$2,000	$2,000	
5	Pavement removal and replacement	SY	825	$50	$41,250	
6	Mitigation Requirements	Ac	3.0	$90,000	$270,000	
	Subtotal				**$996,000**	
	Contingencies (20%)				$199,200	
	Design and Construction Management (15%)				$149,400	
	TOTAL PROJECT COSTS				**$1,344,600**	

APPENDIX B

Marana and Oro Valley Water Service Overlap Area

EXHIBIT A