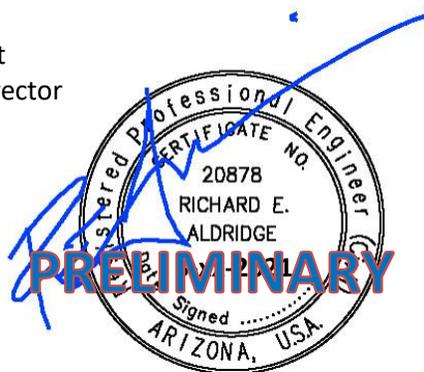


**Integrated Water Master Plan and Capital Improvement Plan for Old Home Manor (DRAFT)  
Town of Chino Valley, AZ**



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**Date:** March 10 2021

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## GENERAL PROJECT OVERVIEW

The Town of Chino Valley desires to create an integrated water resources, water, wastewater and reclaimed water master plan (IWMP) and capital improvement plan (CIP) for Chino Valley’s Old Home Manor (OHM) property.

The goal of this plan is to identify the best opportunities to develop the property, determine resources/infrastructure needs, and create a 5-year CIP implementation strategy. This IWMP will ensure the Old Home Manor infrastructure is integrated seamlessly into a Chino Valley-wide utility system.

This IWMP includes the following general Phases for the overall development of the plan and will serve as the approach and outline for preparation of the final Master Plan documents and CIP implementation.

### Phase 1 – PLANNING

Data Collection, Meetings, Workshops, Field Survey and Technical Memorandums

### Phase 2 - INTEGRATION (WATER-WASTEWATER-RECLAIMED WATER)

System Sizing, Meetings, Technical Memorandum

### Phase 3 - CAPITAL IMPROVEMENTS PLAN (CIP)

System Needs, Recommendations, Prioritization & Costs, Technical Memorandum and 5-Year Implementation Plan

### Phase 4 - LANDSCAPE REQUIREMENTS

Landscape Design Elements, Technical Memorandum, Workshop, Daft Landscape Ordinance

### Phase 5 - PROJECT ADMINISTRATION

Meetings, Master Plan Draft & Final Reports, CIP Plan and Technical Memorandum, Water/Sewer Modeling, Document Management

## LOCATION:

Figure 1 below shows the Assessor Parcel Numbers for the Old Home Manor site and surrounding parcels. The Old Home Manor development area is located within portions of Section 12, T 16 N, R 02 W and Section 07, T 16 N, R 01 W of the Gila and Salt River Base and Meridian, Yavapai County, Arizona.

The project site is east of SR89 and north of Perkinsville Road, bounded by E. Perkinsville Road to the South, Jerome Junction to the west, the extension of Road 4 North to the East and Santa Fe Trail to the east. The Yavapai College Chino Valley campus, APN 306-02-001V, lies within the overall parcel area as shown on Figure 2.

Site Data	Latitude	Longitude	Section Location
OLD HOME MANOR APPROXIMATE CENTROID	34d 46' 58.4" N	112d 25' 2.2" W	SW 1/4, SW 1/4, NE 1/4 of Section 12, Township 16 North, Range 02 West and Section 07, Township 16 North, Range 01 West

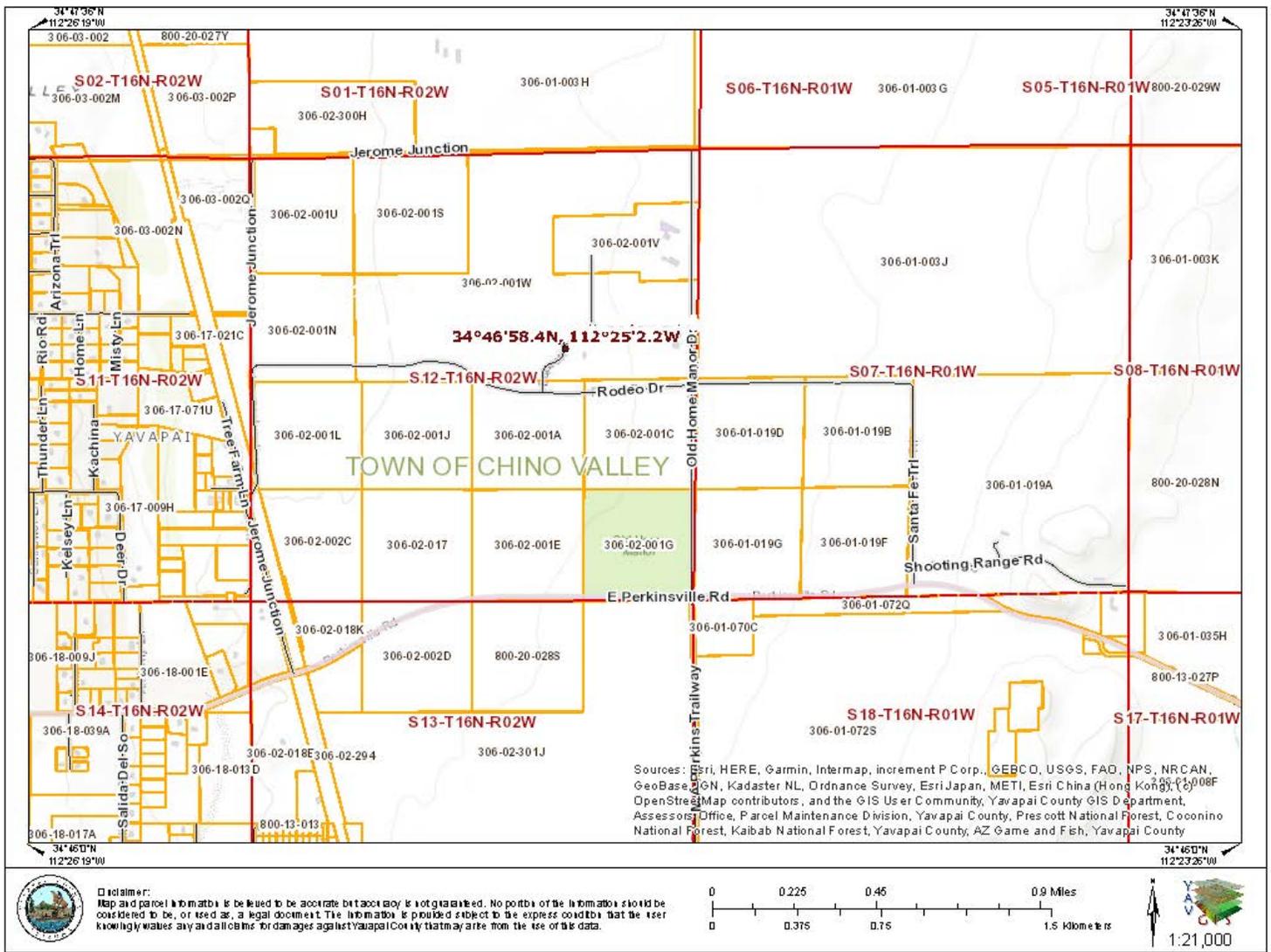


Figure 1 Old Home Manor Parcel Location Map

The project location is shown on the included vicinity maps *Figure 1* and *Figure 2* and includes the following 15 Assessor's parcel numbers and associated acreage:

**ASSESSOR PARCEL NUMBERS FOR OLD HOME MANOR AND CURRENT ZONING (MAY, 2020)**

PARCEL	ZONING	LAND USE	GIS DATA ACRES
APN 306-02-001A	PL	RV PARK	39.89
APN 306-02-001E	PL	RV PARK	20.00
APN 306-02-001C	PL	PARKS & RECREATION	40.00
APN 306-02-001G/E	PL	BALL FIELDS	60.00
APN 306-02-001J	BP	BUSINESS PARK	40.00
APN 306-02-001L	BP	BUSINESS PARK	40.00
APN 306-02-001N	BP	BUSINESS PARK	40.00
APN 306-02-001S	BP	BUSINESS PARK	40.00
APN 306-02-001U	BP	BUSINESS PARK	39.59
APN 306-02-001W	PL	EQUESTRIAN PARK	129.08
APN 306-02-001W	PL	PUBLIC WORKS	40.00
APN 306-01-019A	PL	SHOOTING RANGE/AIRPARK	160.00
APN 306-01-019B	PL	RAPID INFILTRATION BASINS	40.00
APN 306-01-019D	PL	UNDETERMINED	36.63
APN 306-01-019G	PL	PARKS & RECREATION	36.72
APN 306-01-019F	PL	PARKS & RECREATION	40.00
		<b>TOTAL OLD HOME MANOR AREA</b>	<b>841.80</b>
		<b>ROUNDED TOTAL OLD HOME MANOR DEVELOPMENT AREA</b>	<b>842</b>

*Figure 2 Old Home Manor Parcel Numbers, Zoning and Acreage*

\* APN 306-02-001W is a single assessor parcel number comprised of 169.08 acres. For the purpose of the IWMP, it has been apportioned into two separate parcels for the land uses shown on Figure 5.

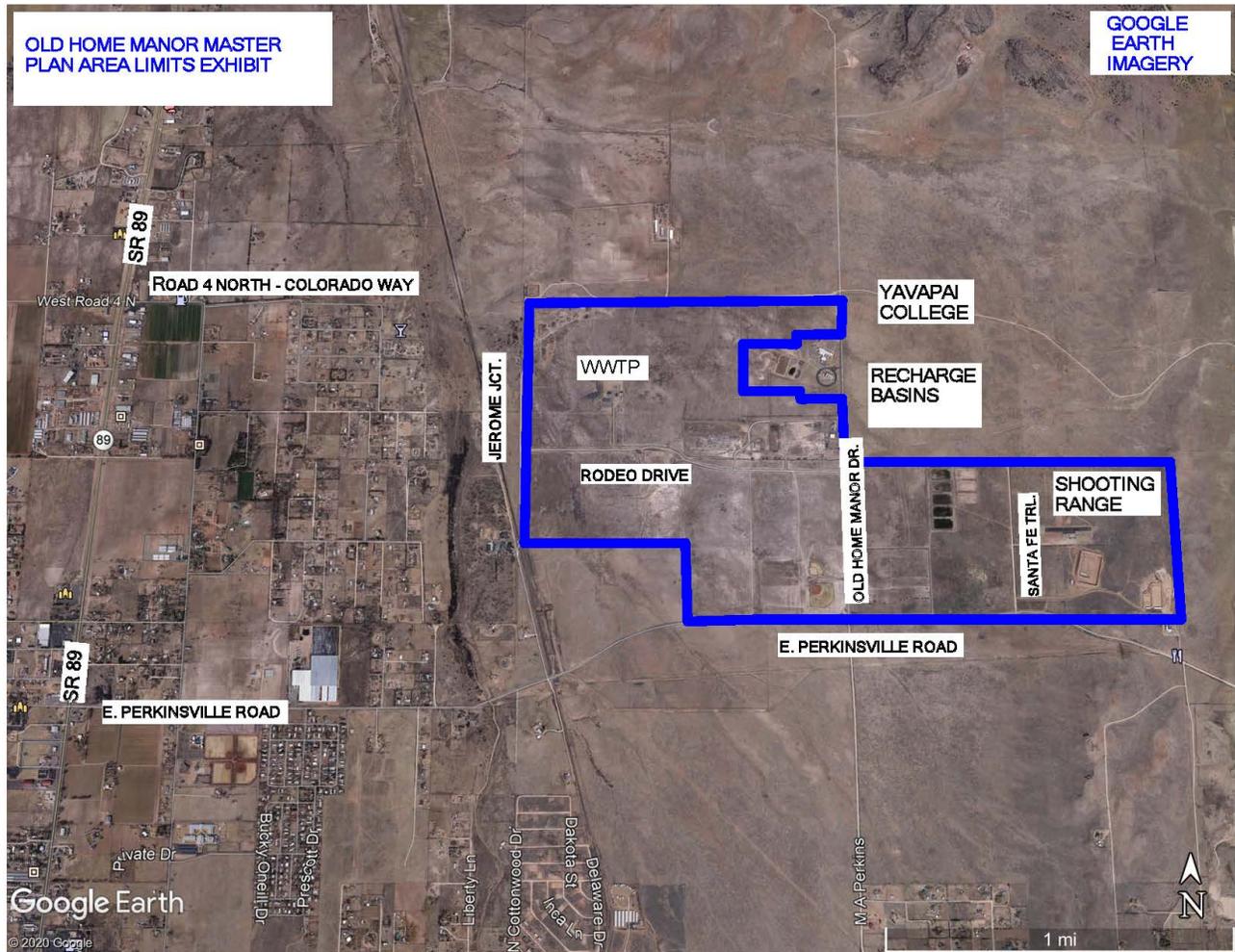


Figure 3 Old Home Manor Master Plan Area Limits

**GENERAL SITE INFORMATION**

**Overall Site Area:** Total Acreage: 842 (Rounded to the nearest acre)

**Overall Site Zoning:** PL and BP (Reference Fig 3) - Commercial with Industrial Overlay, no residential

Reference Figure 4 for the planned parcel land uses

<b>BUSINESS PARK (BP) ZONING TOTAL OF 5 PARCELS (ACRES)</b>	<b>200</b>
<b>NORTH</b>	40
<b>NORTHEAST</b>	40
<b>CENTER</b>	40
<b>SOUTH</b>	40
<b>SOUTHEAST</b>	40

<b>PUBLIC LAND/PL ZONING (ACRES)</b>	<b>642</b>
BALLFIELDS	60
EQUESTRIAN PARK	129
PARKS & RECREATION	116
RAPID INFILTRATION BASINS	40
PUBLIC WORKS-WWTP	40
RV PARK	60
NOT CLASSIFIED - UNDETERMINED	37
SHOOTING RANGE - MODEL AIRPARK	160

The Old Home Manor property is owned by the Town of Chino Valley. The surrounding parcel ownership has been identified and is shown on the following parcel ownership exhibit, Figure 3.

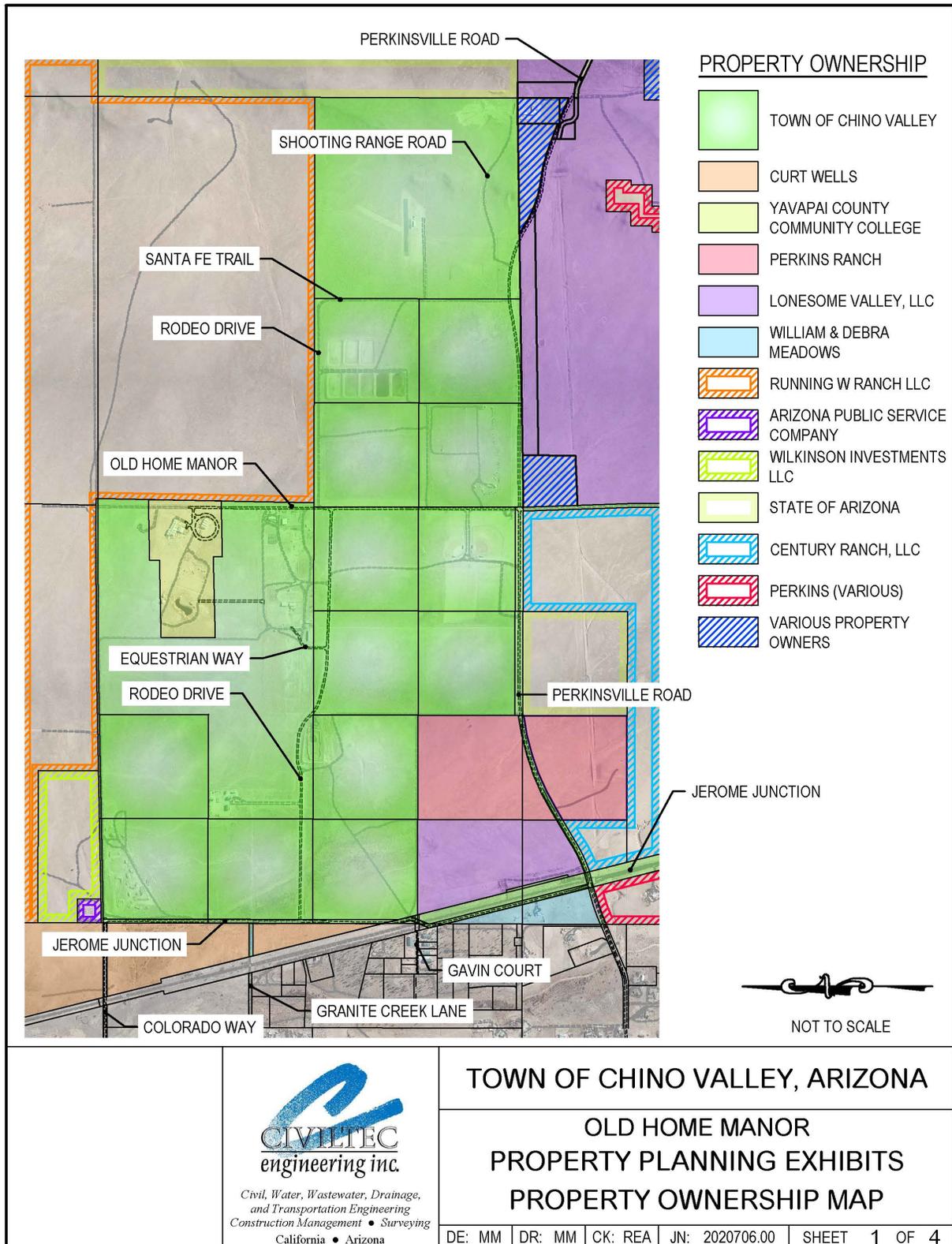


Figure 4 Old Home Manor Master Plan Property Ownership Exhibit

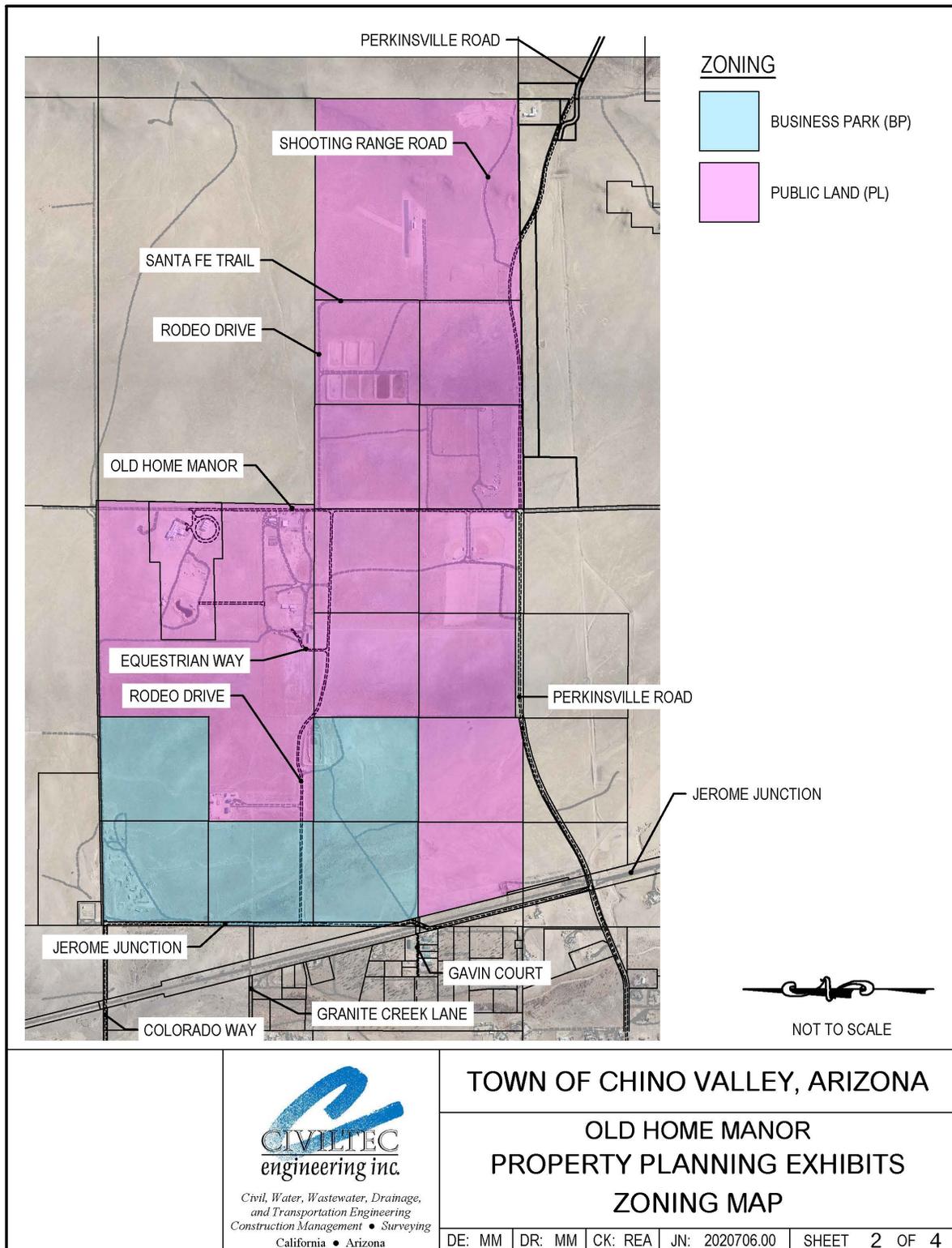


Figure 5 Old Home Manor Master Plan Zoning Exhibit

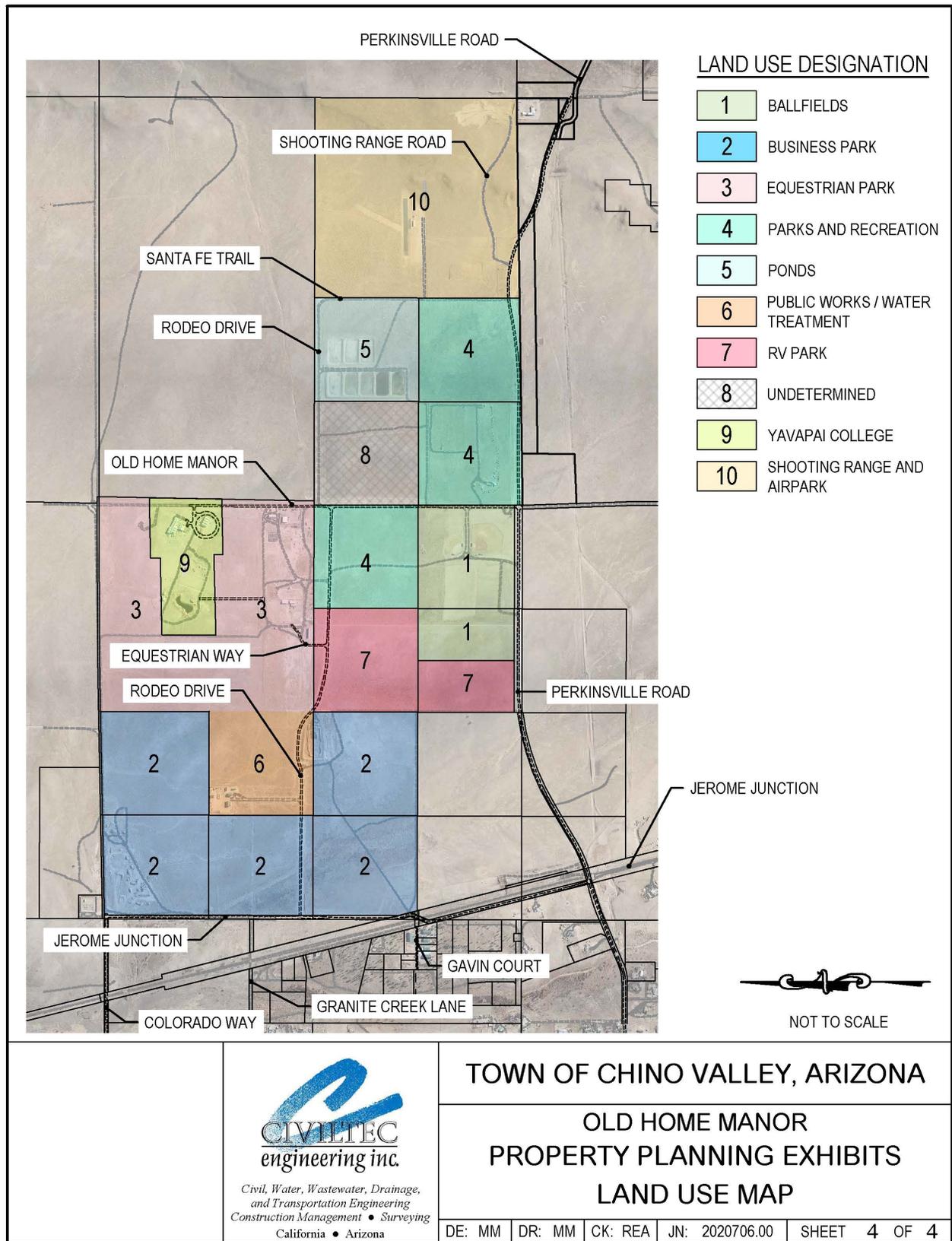


Figure 6 Old Home Manor Master Plan Land Use Exhibit

**FEMA Information:** No portion of the site lies within a FEMA designated flood area. The FEMA FIRM panel associated with Old Home Manor is 04025C1320G, effective September 3, 2010, as shown on Fig 5 for general floodway information..

**General Site Drainage:** Stormwater in Old Home Manor generally consist of shallow sheet flows from southeast to north west. A significant quantity of stormwater runs southeast to northwest from the drainage areas south of Perkinsville Road, which will affect the overall development of the Old Home Manor roadway and utility infrastructure. The channel crosses Rodeo Drive via several small culverts and flows to an existing Box Culvert structure (4 Cell, 10' wide x 6' high) under Jerome Junction. The box culvert was sized for a Q100 flow of approximately 2,800 cfs, which discharges to the adjacent Santa Cruz Wash. Roadways, including Rodeo Drive, will need to incorporate significant structures to accommodate these stormwater flows.

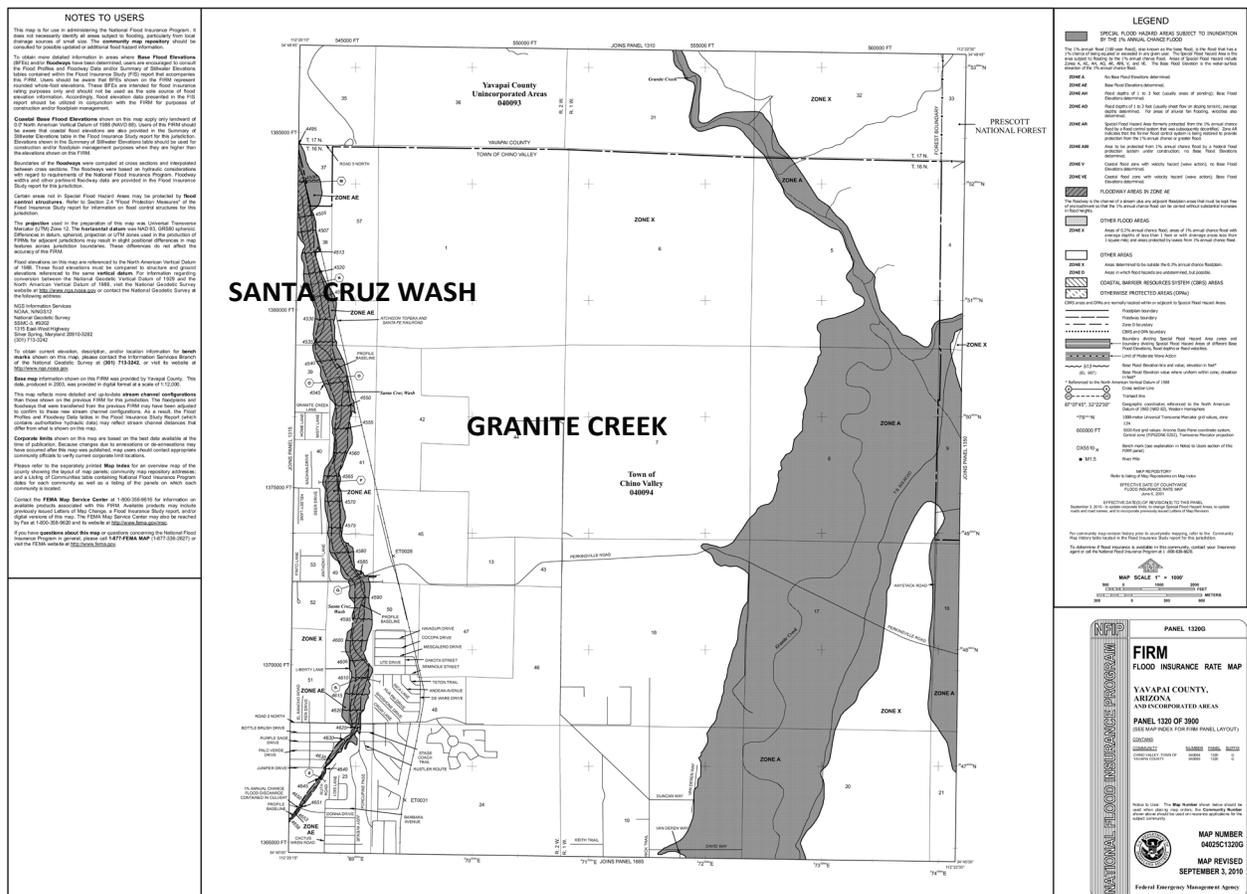


Figure 7 Old Home Manor FEMA FIRM Panel

**Transportation Overview:** The Town owns all the property in Old Home Manor, so separate roadway Rights-of-Ways are not anticipated to be created. Parcels are assumed to be leased based on general legal descriptions that would meet the need of the individual users.

Civiltec has created an overall roadway system layout based on the previous work done for the Business Park and other prior planning documents for the Equestrian Center, general land uses, an RV Park and other parcels generally following the section lines and other existing roads and parcel boundaries.

The following transportation exhibit will be used for roadway and utility infrastructure planning and as a basis for utility distribution and CIP planning.

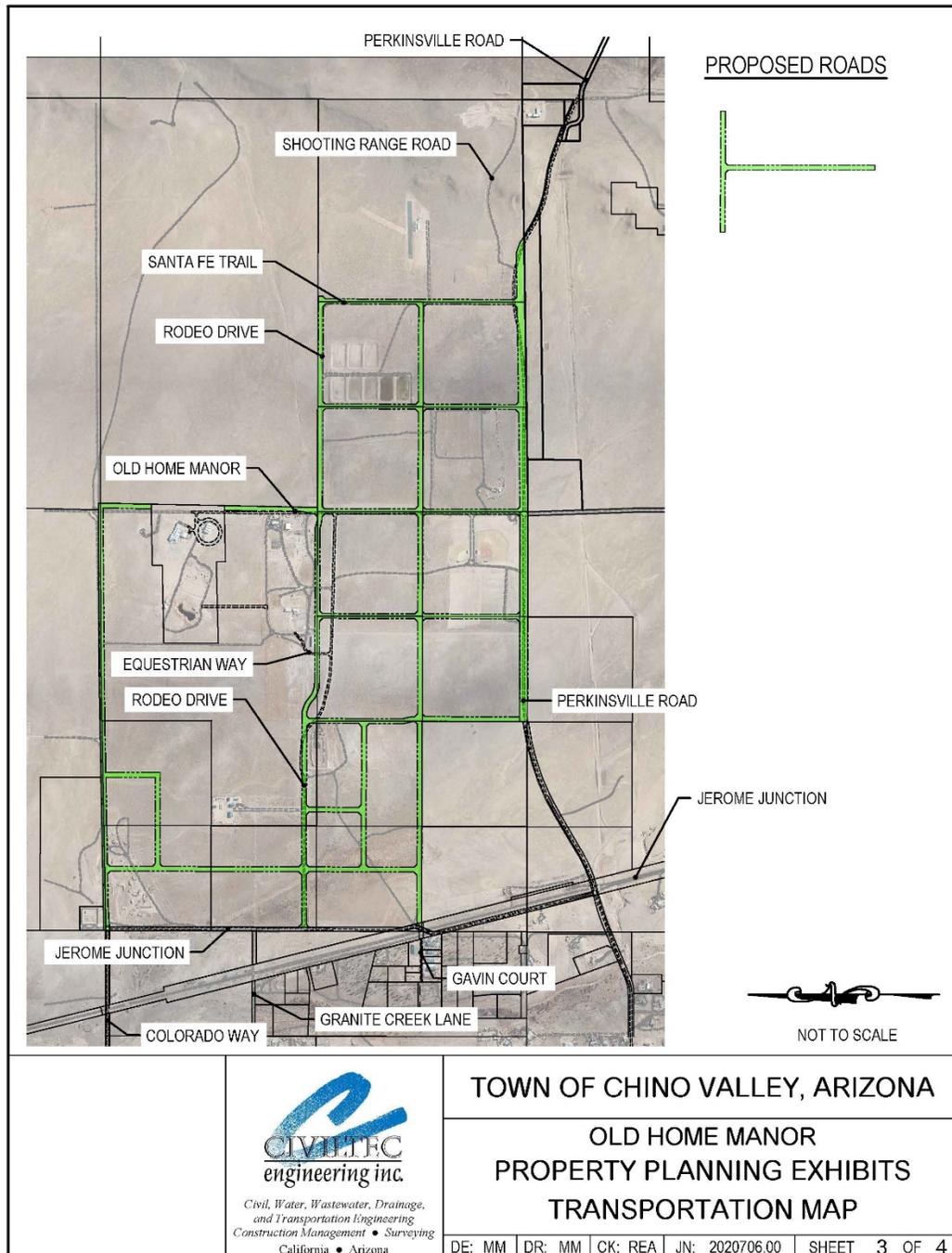


Figure 8 Old Home Manor Transportation Exhibit

**PROJECT CONTACT INFORMATION:**

The primary contacts for the Town of Chino Valley and for the Civiltec Engineering, Inc. team are as follows:

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*Figure 9 Old Home Manor Project Contacts Information*

Information upon which this report has been prepared was provided by the Town of Chino Valley and the Civiltec Engineering design team for use in developing this Integrated Water Master Plan and Capital Improvements Plan report.

# 1 PHASE 1 – PLANNING

## 1.1 TASK 1 - GROWTH PROJECTIONS

Based on calls, emails and coordination with Town Staff, the information below in regard to the anticipated population growth projections for Chino Valley was received on May 20, 2020 and July 28, 2020 as noted below. In addition to the Esri projections, we also reviewed the US Census Bureau data for the same general time frame and local population growth data from the Town Planning Department.

The planning horizons will include the immediate 5-year buildout for anticipated development as well as 10-year and ultimate build out projections. Civiltec consulted with the Economic Development Director and the Town Planner for establishment of the projections noted below as well as current land uses and recent development opportunities within the Old Home Manor area.

**GENERAL POPULATION GROWTH RATE PROJECTIONS:  
 US Census Bureau population Estimates for Chino Valley, Arizona**

PEOPLE	
<b>Population</b>	
<b>Population estimates, July 1, 2019, (V2019)</b>	<b>12,375</b>
Population estimates base, April 1, 2010, (V2019)	10,817
Population, percent change - April 1, 2010 (estimates base) to July 1, 2019, (V2019)	14.4%
Population, Census, April 1, 2010	

**DATA FROM THE TOWN OF CHINO VALLEY PLANNING DEPARTMENT, MAY 20, 2020:**

Population projection for Chino Valley 86323 – Source: ESRI Data

2019 Population	18,206
2024 Projected Population	28,094 (54% increase)

The Esri population numbers may include an area greater than Chino Valley as noted by the Planning Department. These numbers are provided only for reference.

**DATA FROM THE TOWN OF CHINO VALLEY PLANNING DEPARTMENT, JULY 28, 2020:**

Population projection for Chino Valley – Source: Town Planning Department

Geographic Area	Population Estimate – 2010 to 2019									
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Chino Valley, AZ	10,810	10,796	10,808	10,880	10,972	11,047	11,203	11,703	11,991	12,375
Population Increase		-14	12	72	92	75	156	500	288	384
Pop Increase %		0%	0%	1%	1%	1%	1%	4%	2%	3%
<a href="https://www.census.gov/data/datasets/time-series/demo/popest/2010s-total-cities-and-towns.html">https://www.census.gov/data/datasets/time-series/demo/popest/2010s-total-cities-and-towns.html</a>										
Geographic Area	Population Estimate – 2020-2029									
Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Chino Valley, AZ	12,623	12,875	13,132	13,395	13,663	13,936	14,215	14,499	14,789	15,085
Pop Increase %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

The US Census Bureau and the Esri estimates are provided for general information only and the actual growth projections used in this report are based on the Town’s Planning Department projected **2% growth** in population per year. The building permits information was also used as an additional reference on the population growth estimates.

Using the OHM IWMP planning horizon of 5 years and the most recent 2% growth projections provided by the Town, the annual yearly growth projection for this report would be as shown in the following table showing a 15 year horizon to full buildout (2020 to 2035):

The general growth rates and population density included in the table below will be used for general Town-wide anticipated growth projections for various water, wastewater and reclaimed systems. The projections are estimated for a 15 year planning horizon which will be extended with future Master Plan updates.

<b>TOWN-WIDE POPULATION PROJECTIONS</b>				
<b>Population Projections Per Year</b>				
<b>Year</b>	<b>Population (Residents)</b>	<b>Annual % Change</b>	<b>Population Increase Per Year</b>	<b>Planning Horizon Year</b>
2019	12,375		PER TOWN	<b>0</b>
2020	12,623	2.00	248	<b>1</b>
2021	12,875	2.00	252	<b>2</b>
2022	13,132	2.00	257	<b>3</b>
2023	13,395	2.00	263	<b>4</b>
2024	13,663	2.00	268	<b>5</b>
2025	13,936	2.00	273	<b>6</b>
2026	14,215	2.00	279	<b>7</b>
2027	14,499	2.00	284	<b>8</b>
2028	14,789	2.00	290	<b>9</b>
2029	15,085	2.00	296	<b>10</b>
2030	15,387	2.00	302	<b>11</b>
2031	15,694	2.00	308	<b>12</b>
2032	16,008	2.00	314	<b>13</b>
2033	16,329	2.00	320	<b>14</b>
2034	16,655	2.00	327	<b>15</b>

Note that the population numbers for 2019, 2024 and 2029 match those included in the Town’s data summary above. The table above includes projected population growth through 2034, the 15-year planning horizon.

**ANNUAL BUILDING PERMITS**

In addition to the US Census Bureau and the Esri data growth estimates, we reviewed the Town’s building permit growth percentage over the period from 2015 to 2019. 2015 was used as the base line for the annual percent increase in issued permits. The following table presents the number of building permits issued per year and the associated annual percent increase.

<b>BUILDING PERMIT DATA FROM TOWN OF CHINO VALLEY</b>		
<b>YEAR</b>	<b>PERMITS ISSUED</b>	<b>ANNUAL % INCREASE PER YEAR</b>
2015	39	BASE LINE
2016	65	67%
2017	125	92%
2018	130	4%
2019	160	23%
<b>TOTAL</b>	<b>519</b>	
<b>AVERAGE % INCREASE PER YEAR</b>		<b>47%</b>

The 47% average increase in building permits issued per year approximates the ESRI total growth projections estimate of 54% over 5 years. It is well in excess of the annual population growth estimates and is provide for general information only.

### POPULATION GROWTH SUMMARY

The following table reflects the population growth from 2019 to 2034 for overall Town population planning using the 2% growth rate established for the Master Plan.

POPULATION GROWTH SUMMARY		
Planning Horizon (Year)		
Year	Total Population Increase	Total Population
2010	Base Year	10,810
2019	1,565	12,375
2024	1,288	13,663
2034	2,992	16,655

*Figure 10 Town-wide Population Growth Summary for the IWMP*

The Town-wide population is projected to grow by approximately 35% from 2019 through 2034.

### BUSINESS PARK COMMERCIAL GROWTH RATE PROJECTIONS:

The Old Home Manor Business Park area growth rates were developed in harmony with Town Staff estimates of the potential business development opportunities for Old Home Manor. The projections are based on the first 405,000 square feet of commercial development building space be constructed within the initial 5-year planning horizon beginning 2021, with full buildout of the remaining 2,295,000 square feet of space achieved within the following 10 year period as shown in Figure 11 .

The 405,000 SF of building space represents 15% of the total potential building space anticipated for the Business Park. It is equivalent to approximately 30 acres of development within the 200 acre Business Park zoning.

PARCEL/ZONING	TOTAL SF ESTIMATE AT FULL BUILDOUT	5 YEAR TOTAL SF PROJECTION FOR 15% GROWTH FOR FIRST 5 YEARS	ANNUAL GROWTH RATE (SF/YR FOR THE FIRST 5 YEARS)
<b>BUSINESS PARK/ BP (SQUARE FEET)</b>	<b>2,700,000</b>	405,000	81,000

YEAR	SF OF NEW DEVELOPMENT PER YEAR	CUMULATIVE TOTAL BUILDING SPACE DEVELOPED	% OF TOTAL AVAILABLE BUILDING SPACE DEVELOPED
2021	81,000	81,000	3%
2022	81,000	162,000	6%
2023	81,000	243,000	9%
2024	81,000	324,000	12%
2025	81,000	405,000	15%
<b>5-YR BUILDOUT TOTALS</b>	<b>405,000</b>	<b>15 % OF TOTAL DEVELOPABLE SF AREA</b>	
2026	229,500	634,500	24%
2027	229,500	864,000	32%
2028	229,500	1,093,500	41%
2029	229,500	1,323,000	49%
2030	229,500	1,552,500	58%
2031	229,500	1,782,000	66%
2032	229,500	2,011,500	75%
2033	229,500	2,241,000	83%
2034	229,500	2,470,500	92%
2035	229,500	2,700,000	100%
<b>ADDITIONAL 10-YRS TO FULL BUILDOUT TOTALS</b>	<b>2,295,000</b>	<b>100% OF TOTAL DEVELOPABLE SF AREA</b>	<b>FULL BUILDOUT AT 2,700,000 SF OF BUSINESS PARK DEVELOPMENT</b>

Figure 11 Old Home Manor Business Park Development Rate Summary

**PUBLIC LAND GROWTH RATE PROJECTIONS:**

The public land zoning allows for the general development standards as the Business Park. Uses anticipate an Equestrian Center, RV Park, Parks and Recreation, Public Works/Sewer Plant, Rapid Infiltration Basins, Shooting Range/Airpark and Undetermined Space. A total of 642 Acres of Public Land are included in the Old Home Manor overall project area.

The total development projection period used for the IWMP is 15-years, realizing that the overall projections will be reviewed and updated periodically to maintain a 15-year rolling development outlook horizon.

The current uses for the Public Land zoning and associated acreage are included in the following table. Note that the acreage from the County GIS parcel data has been rounded to the nearest acre for use within this IWMP.

PUBLIC LAND - PL ZONING IN (ACRES)	
PARCEL PLANNED USE	PARCEL TOTAL ACREAGE
BALLFIELDS	60
EQUESTRIAN PARK	129
PARKS & RECREATION	116
RAPID INFILTRATION BASINS	40
PUBLIC WORKS-WWTP	40
RV PARK	60
NOT CLASSIFIED	37
SHOOTING RANGE-MODEL AIRPARK	160
<b>TOTAL ALL PARCELS</b>	<b>642</b>

Due to the diverse uses associated with the Public Land zoning designation and planned use exhibit, an annualized percent of development would not be practicable. For the purpose of growth projections used in this report, in harmony with Town Staff consultation and recommendations, the following facility buildout year assumptions are provided for each land use designation as follows:

PUBLIC LAND - PL ZONING IN (ACRES)	
PARCEL PLANNED USE	DEVELOPMENT ASSUMPTION – APPROXIMATE BUILDOUT YEAR
BALLFIELDS (Currently at 50%)	BUILDOUT IN 2025
EQUESTRIAN PARK (Currently at 20%)	BUILDOUT IN 2027
PARKS & RECREATION	BUILDOUT IN 2030
RAPID INFILTRATION BASINS	BUILDOUT IN 2035
PUBLIC WORKS-WWTP	BUILDOUT IN 2035
RV PARK	BUILDOUT IN 2025
NOT CLASSIFIED	BUILDOUT IN 2030
SHOOTING RANGE-MODEL AIRPARK	BUILDOUT IN 2035
<b>TOTAL ALL PARCELS</b>	<b>642</b>

Based on the general assumptions for buildout above and rounding of the acreage to match the assumptions, the following chart represents the anticipated Public Lands (non-Business Park) parcel development build out

schedule by acres per year. The planned buildout year is highlighted in green on the chart. While the summary in *Figure 12* anticipates development within all the parcels that comprise Old Home Manor, the included CIP addresses the specific priorities for development based on the anticipated infrastructure required to stimulate development within the initial 5-year plan.

ANTICIPATED PARCEL DEVELOPMENT	BALL FIELDS	EQUESTRIAN PARK	PARKS & RECREATION	RAPID INFILTRATION BASINS	PUBLIC WORKS-WWTP	RV PARK	NOT CLASSIFIED	SHOOTING RANGE-MODEL AIRPARK	TOTAL ALL PARCELS
<b>DEVELOPMENT YEAR / ACREAGE</b>	<b>60</b>	<b>129</b>	<b>116</b>	<b>40</b>	<b>40</b>	<b>60</b>	<b>37</b>	<b>160</b>	<b>642</b>
2020-2021 (Existing or Planned)	20	15	12	8	5	20	4	20	104
2022	10	19	12	2	3	10	4	20	80
2023	10	19	12	2	3	10	4	10	70
2024	10	19	12	2	3	10	4	10	70
2025 - INITIAL 5-YR HORIZON	10	19	12	2	3	10	4	10	70
2026		19	12	2	3		4	10	50
2027		19	12	2	3		4	10	50
2028			12	2	3		4	10	31
2029			10	3	3		3	10	29
2030			10	3	2		2	10	27
2031				3	3			10	16
2032				3	2			10	15
2033				2	2			10	14
2034				2	1			5	8
2035				2	1			5	8
15-YR FULL BUILDOUT TOTALS	60	129	116	40	40	60	37	160	642

Figure 12 Old Home Manor Public Lands Overall Development Rate Summary

2021 is the beginning of the 15 year buildout summary.

The highlighted cells are the projected final year of development for each parcel to achieve full buildout.

## 1.2 TASK 2 - WATER RESOURCES MASTER PLAN

Matrix New World Engineering, Land Surveying and Landscape Architecture, PC (Matrix) was contracted by Civiltec Engineering, Inc. to provide water resources and recharge services on the *Town of Chino Valley Integrated Water Master Plan (IWMP) Civiltec # 2000706.00 project.*

The work included evaluation of the current and potential water resources available to the town through various water rights, as identified by the Town. Each source was evaluated for physical availability, legal availability and reliability over the planning horizon. Work included the analysis of available data provided by the Town and obtained from published sources. No field work was performed.

The results of the available water resources and recharge capabilities with the Town are described in detail in the Water Resources Technical memorandum attached to this IWMP report.

Excerpts from the report are as follows:

### **GROUNDWATER MODEL:**

The Town of Chino Valley lies within the Prescott Active Management Area (PrAMA), one of five areas delineated by 1980 Groundwater Management code as dependent on mined groundwater and subject to regulation under by ADWR. To carry out its management responsibilities ADWR has developed groundwater flow models of each AMA, including the PrAMA. The PrAMA groundwater flow model is based on the hydrogeologic conditions as discussed in previous sub-sections and is updated periodically by ADWR to reflect increases in pumping and new hydrogeologic data. The last update was in March 2014; ADWR expects to release a further update in 2021.

The PrAMA model is utilized to determined physical availability in response to an application for Assured Water Supply and was used to support the Town's August 2020 Application for Assured Water Supply for Old Home Manor

### **GROUNDWATER RIGHTS:**

Withdrawal and use of groundwater from non-exempt wells in Arizona's Active Management Areas is subject to various water rights and permits. An exempt well is a well that produces 35 gallon per minute (GPM) or less, is limited to 10 AFA, must be drilled 100' or more from a septic system and is not subject to metering or reporting requirements. Some cities, towns and private water companies prohibit the drilling of new exempt wells within their service areas. Utilization or drilling of new non-exempt wells, those that pump more than 35 GPM requires a permit or water right (A.R.S. 45-599).

The Town of Chino Valley utilizes several types of groundwater rights. These groundwater rights and the Town's ownership are summarized in the following sub-sections.

#### **Type 1 Non-Irrigation Grandfathered Rights**

Retirement of previously irrigated lands identified in an Irrigation Grandfathered Right for non-irrigation purpose gives rise to Type 1 rights. Examples include dairy farms, parks and golf courses. This right is attached

with the land, meaning the water must be used on a particular piece of land. The Town of Chino Valley has the following Type 1 Rights:

- 58-101602.0012 for 15.83 AFA on Appaloosa Meadows Open Space Park
- 58-101753.0008 for 13.95 AFA on OHM Ball Park.

The Town's Type 1 Non-Irrigation Grandfathered Rights total 29.78 AFA.

### **Type 2 Non-Irrigation Grandfathered Rights**

These rights come from an historic Non-Irrigation use between 1975-1979. This right is mobile, in that it can be used for any Non-Irrigation use anywhere within the AMA from which it was issued. Type 2 Rights can also be bought and sold. There are a limited number of Type 2 Rights.

The Town of Chino Valley has the following three Type 2 Rights: for 11.20 AFA, 15.20 AFA and 6.40 AFA

- 58-120028.0001 for 11.20 AFA
- 58-108314.0002 for 15.20 AFA
- 58-111958.0001 for 6.40 AFA

The Towns total of 32.8 AFA of Type 2 Non-Irrigation Grandfathered Rights.

### **Extinguishment Credits**

Extinguishment credits are generated when a grandfathered groundwater right is extinguished by the right holder. The extinguished right can never be used again for its original purpose.

Credits generated may be pledged to an application for a Certificate of Assured Water Supply for new residential subdivision to meet the "consistency with management goal" requirement for groundwater supplies. In the Prescott Active Management Area the management goal is safe yield by 2025.

With the Town's recent purchase of 375 extinguishment credits in January 2021, the Town now has 5 Certificates of Extinguishment Credits for a total of 7,912.54 AF of unpledged credits within the Prescott Active Management Area. These credits could be pledged toward an 100 year assured water supply with ADWR.

### **Historically Irrigated Acres within the Big Chino Sub-basin**

Municipal water providers in the Prescott Active Management Area have the statutory authority to import groundwater from historically irrigated acres (HIA) in the Big Chino Sub-basin from outside of the Prescott AMA for use within the AMA. There are several issues surrounding the importation of this supply, including potential costs, environmental impacts and whether other water users could be adversely affected. The timing of the construction of infrastructure may also be an issue if new development is dependent on this imported groundwater supply to proceed.

The Town of Chino Valley has two Big Chino Transportation Authorizations with ADWR which identify the following Historically Irrigated Acres (HIA):

- Chino Grande 748.26 HIA for 2,244.78 AFA
- Wine Glass Ranch 216.14 HIA for 648.42 AFA

The Town’s Big Chino HIA water totals 2,983.20 AFA. The withdrawal of this water is tied to a well (55-603912) located on the Wine Glass Ranch property.

Access to this water will require the development of infrastructure (pipelines, pumping stations, power and associated controls), and addressing issues associated with potential environmental impacts to Upper Verde River springs and perennial streamflow. The Town has entered into a partnership with The Nature Conservancy to understand and address these issues (Chino Valley, 2021).

### Service Area Rights

Cities, towns and private water companies within Active Management Areas utilize Service Area Rights. The Town of Chino Valley’s Service Area Right allows the Town to withdraw and transport groundwater to serve current and new customers not requiring Certificates of Assured Water Supply.

The annual volume of water for a Service Area Right is not quantified or fixed. A Service Area Right allows the Town to increase the amount of groundwater withdrawn and delivered to customers, to install larger pumps on existing wells or drill new wells to serve increased water demands of new customers.

The Town of Chino Valley’s current service area is defined as 660 ft on either side of a distribution line serving municipal water customers. The area can be expanded to meet new customer demands for municipal water.

Cities, towns and private water companies that utilize a Service Area Right are required to file Annual Groundwater Withdrawal and Use reports with ADWR.

### TOWN OF CHINO VALLEY WATER SUPPLY

The Town is dependent groundwater per the table below and no renewable surface water source is available to the Town. The Town does treat and recharge effluent for future recovery, the source of the water is groundwater from wells.

Well Name	55 #	Type	Well Depth (ft)	Casing Depth (ft)	Casing Diameter (in)	Construction Date	Capacity (GPM)
Sycamore Vista 1	604725	Non-Exempt	401	260	20	9/4/1947	3000
Sycamore Vista 2	604724	Non-Exempt	413	201	20	9/4/1947	3300
CW Backup	595220	Non-Exempt	410	406	6	12/31/2002	60
CW #1	621557	Non-Exempt	433	200	12	9/1/1948	500
Highlands Ranch	800688	Non-Exempt	551	216	14	12/19/1947	1000
	514309	Non-domestic exempt	255	255	8	5/14/1986	30
	504619	Non-Exempt	585	325	10	6/1/1983	200
	606300	Non-Exempt	644		8	4/14/1941	118
OHM Potable (Roads)	606298	Non-Exempt	300	300	8	5/8/1905	50
Yavapai College	606295	Non-Exempt	960	700	20	10/27/1946	2000
OHM Ball Park	606294	Non-Exempt	744	250	20	1/1/1947	3200
Prescott College	606297	Exempt				1/1/1978	35
Perkinsville Stock Tank	606296	Non-Exempt	800	300	20	1/1/1946	1200
Cat Lady Park	902298	Non-Exempt	426	426	6	1/1/2005	30
Bright Star Well	219691	Non-Exempt	723	720	12	4/6/2010	1100
<b>OHM Potential Water Supply Wells</b>							<b>6,603</b>
<b>Service Area Wells</b>							<b>2,660</b>
<b>All Wells</b>							<b>15,823</b>

Wells within the OHM are highlighted in light blue and wells within the current Town Service Area are highlighted in yellow. Well capacity values are as reported by Town.

Ten of the wells are “pre-code” meaning they were installed prior to the passage of the Groundwater Management Act of 1980. These wells do not have ADWR assigned maximum pumping rates, although the annual pumping volume may be limited by the well’s legal status, eight of the wells were installed prior to 1950 and are more than 70 years old.

Water demands are expected to grow and will require expansion of the Town’s water supply through additional well capacity and distribution pipelines. As currently projected, the maximum daily 2030 demands will exceed the Town’s current operational well capacity without the addition of a new well source supply.

**RECHARGE RAPID INFILTRATION BASINS**

The Town owns and operates the Old Home Manor Recharge Project (OHMUSF) under Arizona Department of Water Resources (ADWR) Underground Storage Facility (USF) Permit No. 71-595206.0002 and Water Storage (WS) Permit 73-595206.0000. These permits expire on March 3, 2025.

The water to be recharged is effluent from the Town’s Chino Valley Water Reclamation Facility (WRF) which operates under an Arizona Department of Environmental Quality (ADEQ) Aquifer Protection Permit (APP) No. P-1041236, LTF 28493, Place ID 17668 dated September 7, 2004. The facility is permitted to treat up to a maximum monthly volume of 5.0 million gallons per day (MGD). The plant is currently designed for 1.0 MGD and will be expanded over time to meet future demand. All the WRF effluent is sent to the OHMUSF, no reuse is permitted under the APP.

The OHMUSF is permitted to recharge up to 1,120 ac-ft (1.0 MGD) annually. The permit allows a total of 12 1-acre infiltration basins, 8 of which have been constructed. Of the constructed basins only 5 are connected to the system and are in operation. Annual effluent volumes delivered to the OHMUSF for the past five years are included below.

**OHMUSF Annual Recharge Volume (AF)**

Year	2015	2016	2017	2018	2019
Delivered	277.4	270.44	283.68	279.88	309.3
Net of Evaporation	270.8	263.8	277.1	273.3	NA

**Notes:** AF = Acre-feet  
 NA = Not Available

The amount of long-term recharge credits in account number LTSC 70-421127.0000 through 2018 totaled 2,748.27 acre-feet (ADWR, 2020).

The average reported basin infiltration rate for the 2014-2018 period is included below.

**OHMUSF Basin Infiltration Rates (ft/day)**

Year	2014	2015	2016	2017	2018
Rate	0.7	0.74	0.72	0.76	0.75

**Notes:** ft/day = Feet per day

Reported basin infiltration rates have remained stable over the 5-year period and averaged 0.73 ft/day.

The facility operates by rotating basins on a daily basis, keeping at least one basin wet on any day with an average number of wetted days per basin per month of about 6 days. Basins are ‘ripped’ annually to maintain infiltration capacity.

The OHMUSF is operating below its permitted capacity. In 2018 the facility recharged 273.88 ac-ft or about 24% of its 1,120 ac-ft permitted annual volume. The facility has the capacity to double its annual recharge volume without construction of additional basins or related infrastructure (Bovee, 2020).

**REGULATORY ISSUES**

As noted in the Technical Memorandum , the Town’s water system deliveries exceeded 250 AFA in 2019 and are projected to grow to 1,500 AFA by 2305 (Civiltec, 2020). Under the PrAMA Fourth Management Plan the Town will move from a Small Municipal Provider to a Large Municipal Provider.

As a new large provider, the Town of Chino Valley will be regulated under the Non-Per Capita Conservation Program (NPCCP) described in section 5-705 of the Prescott Active Management Area Fourth Management Plan (4MP). The Town will be required to submit a Provider Profile containing the information described in section 5-705(B)(1) of the 4MP within six months after receiving written notice of its conservation requirements from the director of ADWR.

The provider must begin complying with the NPCCP upon approval of the Provider Profile pursuant to section 5-705(B)(2) or (B)(3) of the 4MP.

As a New Large Municipal Provider the Town will be required to implement the following programs:

- Basic Public Information Program
- Best Management Practices (BMP)
- Annual Conservation Efforts Report
- Provide Water Rate Structure
- Comply with 5-year Records Retention
- Compliance with Individual User Requirements
- Compliance with Distribution System Requirements
- Compliance with Monitoring and Reporting Requirements

## 1.3 TASK 3 - WATER DEMAND PROJECTIONS

### WATER SYSTEM OVERVIEW

The existing supply for this area of Chino Valley consists of a Production, Storage, and Pressure Facility (PSPF) No. 1 and 2. PSPF No. 1 (Community Water System) is the primary production facility for the system and consists of one production well capable of producing 1100 GPM or 1.584 mgd. The water produced from this well is pumped into a 1 mg steel above ground storage reservoir. The reservoir feeds to a Flowtronex booster station capable of producing 2500 gpm under certain head conditions and has a set point for 6 variable speed pumps of 60 psi. Well No. 1 which is associated with PSPF No. 1 is the primary production well and is equipped with a 125 HP submersible pump able to produce 1100 gpm. PSPF No. 1 is located southwest of the Bright Star development (south of Road 2 North and east of the Peavine Trail). Distribution piping main lines from this facility exists throughout Bright Star, and continues west along Road 2 North, southwest along Lake Shore Drive, west along Juniper Drive, north along Road 1 East, and east along Perkinsville Road and north along Tree Farm Lane to an end at Rodeo Road. The distribution piping main lines described are 12 inch and 16-inch diameter mains.

PSPF No. 2, the Country West Water Production Facility is a secondary production facility for the system and consists of one production well with a 50 HP Gould submersible pump model 8RJLC capable of producing 500 gpm or 720,000 gallons per day (gpd). The water produced from this well is pumped to a 165,000-gallon storage tank which feeds a 30HP triplex booster station also set at 60 psi. Well No. 2 is the secondary well and is equipped with a 5 HP submersible pump. PSPF No. 2 is considered in the analyses herein but well no. 2 of PSPF No. 2 is not due to its primary use as a redundant system and limited capacity and size.

A visual depiction of the existing water system is included on the Water System Schematic in Section 1.9. The Highlands Ranch well site is shown, and although it is constructed, it is not in service at this time.

### WATER SYSTEM DEMANDS

Existing system demands primarily consist of residential, commercial and park demands. System production characteristics for the Bright Star and Country West facilities have been analyzed based on daily and monthly metering reports for the past 5 years as provided by Town staff. Particular attention was applied to the past three years of metering results. Average daily demands and maximum daily demands were analyzed for residential, commercial, and other applications associated with the planned facilities at Old Home Manor. Turf watering demands for the Chino Valley Community Center were analyzed separately due to their volume percentage being a large portion of maximum daily demands. Historical production for the Chino Valley Community Water System (CWS) which is made up of the Bright Star and Country West Facilities for the past 5 years are shown in the table below.

**CWS Historical Production**

Year	Bright Star Total (GPY)*	Bright Star ADD (GPD)	Bright Star MDD (GPD)**	CW Total (GPY)*	CW ADD (GPD)	CW ADMM (GPD)***
2015	65,681,100	179,948	428,639	6,598,094	18,077	37,825
2016	70,318,500	192,653	428,833	4,641,198	12,716	27,475
2017	76,924,400	210,752	578,360	3,941,111	10,798	21,745
2018	76,796,600	210,402	463,198	3,764,400	10,313	15,365
2019	76,919,200	210,738	412,528	5,189,500	14,218	21,881

\*From Monthly Metering Reports

\*\*From Daily Production Reports

\*\*\*Average Daily Production during Maximum Month

**DEMANDS BY CLASSIFICATION**

**RESIDENTIAL DEMANDS**

Average daily residential demands were calculated on a per-lot basis based upon existing Town metering data, ADWR adopted rate values, ADEQ rate values, City of Prescott rate values and Engineering Bulletin No. 10 rate values. The results are included in the table below.

**Residential Demands**

	Chino Valley Meters	ADWR Rate	ADEQ Rate	Bulletin 10 Rate	City of Prescott Rate	Average
<b>GPD per Lot</b>	132.8	218	240	250	240	216

Using an average of 2.5 persons per Lot, this results in a GPCPD rate of 86.

**COMMERCIAL (BUSINESS PARK) DEMANDS**

Average daily commercial demands were calculated on a gallons-per-day per acre (GPD/AC) basis based upon existing Town metering data, ADWR adopted rate values, ADEQ rate values, City of Prescott rate values, and EPA values. See results in the following table..

**Commercial Demands**

	Chino Valley Meters	ADWR Rate	ADEQ Rate	City of Prescott Rate	EPA Rate	Average
<b>GPD per Acre</b>	743	1040	1452	518	740	899

The average GPD/Ac rate of 899 was compared to an annual AF/Ac rate of 1.0 (893 GPD/Ac) and the value of 893 GPD/Ac was used for the purposes of this report.

**TURF WATERING DEMANDS**

During summer months of larger demands, metered turf usage for the Community Center ballfields was analyzed separately in order to derive a general percentage of maximum monthly flows utilized by turf irrigation. Town staff provided metered turf watering demands during summer months of high demand for 2017, 2018 and 2019. Results are shown in Table 3-4. Average daily demands for turf watering were modeled, however due to unbalanced demands throughout the year (summer month watering vs. winter month watering) a large maximum day to average day peaking factor was used. See Section 3.6 for Peaking factors. Average annual use for 2017, 2018 and 2019 was 12,091,871 gallons for 8.7 acres watered. This yields 3808 gpd/ac average daily demand for turf irrigation (365 days) (4.2 AFY/Ac) which is utilized for the purposes of this report.

**Turf Watering Demands**

Mo/Year	Turf Usage (Community Center)	Bright Star Mo. Production	CW Mo. Production	Total Mo. Production	% Used for Turf
Aug. 2017	2,361,535	8,782,500	460,500	9,243,000	26%
Aug. 2018	2,228,006	7,648,000	368,300	8,016,300	28%
Jul. 2019	2,377,498	10,780,700	646,000	11,426,700	21%

For the planning horizons considered in this memorandum, a factor of 0.20(MDD) or 20% of maximum daily demand was used as the maximum daily design flow for turf usage at the existing Community Center ballfields and proposed turf portions of ballfields planned at Old Home Manor.

**R.V. PARK DEMANDS**

RV Park demands were calculated based on a gallons-per-day per RV space and converted to gallons-per-day per Acre basis using a constant rate of 6 RV spaces per acre density. They were derived from the ADEQ rate of 100 gal/space/day wastewater production and increased 20% to account for other water use demands

such as clubhouse needs, campsite needs, and common recreational area needs. The City of Prescott rates of gallons-per-day per RV space of 120 for RV Parks.

Low water use landscaping demands have been added to these demands at a rate of 442 GPD/Ac. (33% of 1.5 AFY/Ac).

Results are shown as follows.

**RV Park Demands**

	ADEQ Rate (GPD/Space)	City of Prescott Rate (GPD/Space)	Average GPD/Space	Spaces/AC	GPD/AC	Landscaping	Total
<b>GPD per Acre</b>	100+20	120	120	6	720	442	1162

**OTHER DEMANDS ASSOCIATED WITH OLD HOME MANOR**

Other demands associated with the future development of Old Home Manor include ballfields, equestrian park, parks and recreation, rapid infiltration basins, public works/wastewater treatment and shooting range demands. Average daily demands for these categories are based upon calculations described as follows:

**BALLFIELDS**

It is assumed that the 60-acre parcel identified as ballfield use will be comprised of approximately 15 acres of parking, 15 acres of ballfield turf, and 30 acres of low-water use area. It is also assumed that the parking areas will utilize low-water use irrigation therefore we have assigned 25% turf at 4.2 AFY/AC and 75% low-water use area at 1.5 AFY/AC.

$0.25(4.2)+.75(1.5) = 2.18 \text{ AFY/AC} = 1956 \text{ GPD/Ac}$  Average Daily Demand.

**EQUESTRIAN PARK**

Equestrian park average daily demands were calculated using an annual rate of 1.0 AFY/AC (very low-water use). This amounts to an average daily demand of 893 gallons-per-day per acre.

**PARKS AND RECREATION**

Parks and recreation average daily demands were calculated on a weighted basis, assuming 90 percent of the land area for this category would be low-water use and 10% potentially turf.  $0.9(1.5)+0.1(4.2)=1.77 \text{ AFY/AC}$  or 1586 gallons-per-day per acre.

**RAPID INFILTRATION BASINS**

This category is assumed to have an extremely low-water demand rate. A rate of 0.5 AFY/AC was utilized to account for management, cleaning, scarifying, and maintenance which amounts to an average daily demand of 446 gallons-per-day per acre.

**PUBLIC WORKS/WATER TREATMENT**

An annual demand of 1.0 AFY/AC was assigned to the public works facility portion of this category which is the same rate as commercial or business park use. It was increased by 50% in order to account for demands

associated with the wastewater treatment facility which is considered as the remaining part of this category resulting in an average annual demand of 1.5 AFY/AC or 1339 gallons-per-day per acre.

**UNDETERMINED**

There is a 36.6-acre parcel in Old Home Manor which the use category has not been determined. In discussions with Town staff, it has been assigned the same average daily demand rate as the RV park category of 1162 gallons-per-day per acre.

**SHOOTING RANGE/AIRPARK**

This category is assumed to have a very low water demand rate. A rate of 1.0 AFY/AC was utilized to account for the possible demands for cleaning, maintenance and low water use type demands which amount to an average daily demand of 893 gallons-per-day per acre.

**FIRE FIGHTING DEMANDS**

According to the Central Arizona Fire and Medical Authority, buildings with a floor area greater than 5,000 square feet require fire sprinklers. The Authority adheres to the requirements set forth in the 2018 International Fire Code. Code requires a fire flow rate of 2,000 gpm for a two-hour duration for Type V commercial structures between 4801 and 6200 square feet (Table B105.1(2)). When fire sprinklers are utilized, minimum fire flow rates can be reduced to 25% of the value in Table B105.1(2) as referenced in Table B105.2. However, this reduced rate cannot be less than 1,000 gpm. Therefore, for the purposes of this report, we have analyzed the system characteristics with a fire flowrate of 2,000 gpm for a 2 hour duration. Minimum system residual pressures cannot be less than 20 psi.

**PEAKING FACTORS USED FOR MODELING**

**NON-TURF**

Due to the large percentage of turf watering usage on an annual basis, it was subtracted from the annual production volumes for Bright Star and Country West production facilities and non-turf maximum daily demands were divided by non-turf average daily demands to result in a non-turf associated peaking factor. These peaking factors were averaged over a 3-year period being 2017, 2018 and 2019.

Year	Avg. Day non-turf demands	Max. Day non-turf demands	MDD/ADD Factor	Average MDD/ADD Factor
2017	187,091	471,132	2.53	2.09
2018	189,158	368,344	1.93	
2019	191,585	349,214	1.82	

Engineering Bulletin 10 suggests the use of 2.0 for an MDD to ADD peaking factor. The City of Prescott suggests use of 1.8. For the purposes of this report and model, a peaking factor of 2.0 was used.

**TURF**

Turf watering peaking factor was determined by dividing the maximum daily turf watering demand by the average daily turf watering demand. The average daily demand was spread out over a 365-day annual basis even though the turf watering months are typically less than year-round. This yields a relatively high peaking factor which accurately represents actual demand conditions.

Maximum daily turf demands were calculated based on 20% of the total maximum daily demand being attributed to turf watering.

Total MDD*	20% of Total MDD	Turf ADD	Peaking Factor
511,143	102,229	33,128	3.09

\*Avg. 2017-2019

### COMMERCIAL AND OLD HOME MANOR

The hydraulic model has been configured to point out improvements at the phased buildout of the Old Home Manor project through 2035. Horizon years modeled were 2021, 2025, 2030 and 2035. The various categories for the development of Old Home Manor are expected to be variable, for example it is anticipated that the Ballfields will be developed by 2025 yet the business park will not be fully developed until 2035. It is expected that the existing (current) commercial demands on the CWS will not change, but the main cause of commercial and park-type demands on the system will result in the development of Old Home Manor. See the table on the following page for construction of facilities at Old Home Manor along with their associated time frames:

### Old Home Manor Planned Construction Timetable:

Category	Avg. GPD/AC	Total Acreage	2021 Acreage (Avg. GPD)	2025 Acreage (Avg. GPD)	2030 Acreage (Avg. GPD)	2035 Acreage (Avg. GPD)
Business Park	893	199.6	6.0 (5,358)	30.0 (26,790)	115.8 (103,409)	199.6 (178,243)
Ballfields	1956	60.0	20.0 (39,120)	60.0 (117,360)	60.0 (117,360)	60.0 (117,360)
Equestrian	893	129.0	15.0 (13,395)	91.0 (81,263)	129.0 (115,197)	129.0 (115,197)
Parks/Rec	1586	116.0	12.0 (19,032)	60.0 (95,160)	116.0 (183,976)	116.0 (183,976)
R.I.B.'s	446	40.0	8.0 (3,568)	16.0 (7,136)	28.0 (12,488)	40.0 (17,840)
Public Works	1339	40.0	5.0 (6,695)	17.0 (22,763)	31.0 (41,509)	40.0 (53,560)
RV Park	1162	60.0	20.0 (23,240)	60.0 (69,720)	60.0 (69,720)	60.0 (69,720)
Non Cl.	1162	37.0	4.0 (4,648)	20.0 (23,240)	37.0 (42,994)	37.0 (42,994)
Shoot Rg.	893	160.0	20.0 (17,860)	70.0 (62,510)	120.0 (107,160)	160.0 (142,880)
Totals		841.6	110 (132,430)	424.0 (504,322)	696.8 (791,745)	841.6 (919,702)

Existing annual metered commercial use was observed at 16,500,000 gallons or an average daily demand of 45,206 GPD.

Reference the Water System Technical memo for water modeling results.

### 1.4 TASK 4 - WASTEWATER LOAD PROJECTIONS

Wastewater demand projections for the 5-year and longer term CIP horizon used in this report were based on lift station data, WRF flow records and other available sources for estimating future flow projections and wastewater model calibration. The demands are being used to provide a basis for the development of Old Home Manor for both the 5-year CIP development and for estimating future demands.

As with the water system demands, the existing sewer system loading primarily consists of residential, commercial and park loads. System flow characteristics for 2019 were provided by Town staff.

The table below indicates monthly flowrates measured at the lift station. In 2019, the average daily flow sent to the treatment plant from the lift station was 272,265 GPD or 0.272 MGD or 0.42 cfs.

Month	Pumped (GPD)*	Pumped (MGD)	Pumped (cfs)
Jan	271,497	0.271	0.420
Feb	269,866	0.270	0.417
Mar	266,031	0.266	0.411
Apr	273,992	0.274	0.424
May	264,327	0.264	0.409
Jun	267,366	0.267	0.413
Jul	273,714	0.274	0.423
Aug	273,542	0.274	0.423
Sept	273,564	0.274	0.423
Oct	272,386	0.272	0.421
Nov	275,030	0.275	0.425
Dec	285,871	0.285	0.442
<b>Average</b>	<b>272,265</b>	<b>0.272</b>	<b>0.421</b>

\*From Daily Metering Reports

### RESIDENTIAL LOADING

Average daily residential flows were calculated on a per-lot basis based upon existing Town metering data, existing population served and an assumed percentage of 90% of total flows being attributed to residential usage. The table below provide a summary of the Residential Loads.

#### Residential Loads

Year	Population Served	Total pumped	90% of Total Pumped	Persons per Lot	Avg. GPD per person	Average GPD per lot
2019	3270	272,265 GPD	245,000 GPD	2.5	75	187

For comparative purposes, the current City of Prescott engineering standards and Title 18 of the Arizona Administrative Code cite a general flowrate of 80 GPD per person.

### COMMERCIAL LOADING

Average daily commercial loading was calculated as 90% of the average water-use rate for commercial properties in Chino Valley.  $0.90(893) = 803.7$  GPD per acre rounded to 800 GPD per acre was utilized for the purposes of this report.

### RV PARK LOADING

RV Park loading was calculated based on a gallons-per-day per RV space and converted to gallons-per-day per Acre basis using a constant rate of 6 RV spaces per acre density. They were derived from the ADEQ rate of 100 gal/space/day wastewater production. The City of Prescott rates of gallons-per-day per RV space of 120 for RV Parks. For the purposes of this report, 600 GPD per Acre was used for RV park loading. Results are shown in the table below.

#### RV Park Demands

	ADEQ Rate (GPD/Space)	City of Prescott Rate (GPD/Space)	GPD/Space used	Spaces/AC	GPD/AC
GPD per Acre	100	120	100	6	600

### OTHER LOADS ASSOCIATED WITH OLD HOME MANOR

Other demands associated with the future development of Old Home Manor include ballfields, equestrian park, parks and recreation, rapid infiltration basins, public works/wastewater treatment and shooting range loads. Average daily flows for these load categories are based upon calculations described as follows:

### **BALLFIELDS**

A value of 250 GPD per acre loading for park-type use was utilized for this report.

### **EQUESTRIAN PARK**

A value of 250 GPD per acre loading for park-type use was utilized for this report.

### **PARKS AND RECREATION**

A value of 250 GPD per acre loading for park-type use was utilized for this report.

### **RAPID INFILTRATION BASINS**

It is not anticipated that the rapid infiltration basins will be equipped with facilities that produce wastewater flows, therefore, a value of 0 GPD per acre loading was utilized for this report.

### **PUBLIC WORKS/WATER TREATMENT**

It is anticipated that the public works facilities will be comprised of some commercial type uses as well as storage yards, garage facilities, and other low wastewater production uses. This combined with the wastewater treatment plant have been combined to result in a value of 500 GPD per acre utilized for this report.

### **UNDETERMINED**

There is a 36.6-acre parcel in Old Home Manor which the use category has not been determined. In discussions with Town staff, it has been assigned the same average daily demand rate as the RV park category of 600 GPD per acre.

### **SHOOTING RANGE/AIRPARK**

This category is assumed to have a low wastewater loading rate. A rate of 100 GPD per acre loading was utilized to account for the possible demands for a small restroom facility, cleaning, and maintenance.

### **YAVAPAI COLLEGE**

A loading rate of 700 GPD per acre was used for school type purposes and adjusted due to the fact that the college parcel is large in area in comparison to the portion used as classroom and administrative uses. Since this is an agricultural extension facility, a large portion of the parcel is open space, therefore the loading rate was adjusted to 350 GPD per acre

### **PEAKING FACTORS**

For modeling analysis purposes, average daily flowrates were multiplied by a peaking factor associated with estimated peak daily loading and inflow/infiltration. The ADEQ peaking factor table, Arizona Administrative Code R18-9-E301-4.01.D was used by taking the average daily projected flows in 2021, 2025, 2030 and 2035 of and dividing by 100 GPD/person to obtain respective equivalent populations of 3,420, 4,944, 6,600, and 7,980. This yields an average dry-flow peaking factor of 2.0. An additional 10% was applied to this factor to result in a total wet-flow peaking factor of 2.2 which has been used for the purposes of this model and report.

## 1.5 TASK 5 - RECLAIMED WATER FLOW PROJECTIONS

The Town owns and operates the Old Home Manor Recharge Project (OHMUSF) under Arizona Department of Water Resources (ADWR) Underground Storage Facility (USF) Permit No. 71-595206.0002 and Water Storage (WS) Permit 73-595206.0000. These permits expire on March 3, 2025.

The OHMUSF is permitted to recharge up to 1,120 ac-ft (1.0 MGD) annually. The permit allows a total of 12 1-acre infiltration basins, 8 of which have been constructed. Of the constructed basins only 5 are connected to the system and are in operation. Annual effluent volumes delivered to the OHMUSF for the past five years are given in the table below.

### OHMUSF Annual Recharge Volume (AF)

Year	2015	2016	2017	2018	2019
Delivered	277.4	270.44	283.68	279.88	309.3
Net of Evaporation	270.8	263.8	277.1	273.3	NA

**Notes:** AF = Acre-feet  
 NA = Not Available

The average reported basin infiltration rate for the 2014-2018 period is included as follows.

### OHMUSF Basin Infiltration Rates (ft/day)

Year	2014	2015	2016	2017	2018
Rate	0.7	0.74	0.72	0.76	0.75

**Notes:** ft/day = Feet per day

Reported basin infiltration rates have remained stable over the 5-year period and averaged 0.73 ft/day. The facility operates by rotating basins on a daily basis, keeping at least one basin wet on any day with an average number of wetted days per basin per month of about 6 days. Basins are ‘ripped’ annually to maintain infiltration capacity.

The OHMUSF is operating below its permitted capacity. In 2018 the facility recharged 273.88 ac-ft or about 24% of its 1,120 ac-ft permitted annual volume. The facility has the capacity to double its annual recharge volume without construction of additional basins or related infrastructure (Bovee, 2020).

***For the purpose of the IWMP and system integration, no improvements are required to the Rapid Infiltration Basins within the 15-year planning horizon.***

## **1.6 TASK 6 - PREPARE WATER INTEGRATED RESOURCE PLAN**

A summary of the Town's existing water demands was prepared from information provided by the Town, including well production, meter readings, historical data. and provide a comparison against the available supplies. A planning strategy will be identified to update the Town's water portfolio for future supplies.

## **1.7 TASK 7 - WATER RESOURCES WORKSHOP**

A combined water resources and recharge workshop was conducted with Town Staff and Council representatives on January 12, 2021. The minutes of the workshop were distributed to Town Staff to document the results of the meeting. The following summarizes the Items covered:

- The Town overlies a very productive aquifer referred to as the lower Volcanic Unit (LVU). The aquifer is capable of supporting wells with a capacity of 1,000 gpm or more.
- Water quality is good with total dissolved solids ranging from 233 to 355 ppm, drinking water standards are met without treatment
- Water level in the OHM area is approximately 145 ft bls. Water level decline from 1995 to 2018 is 1.3 to 1.6 ft/yr.
- The Town owns 15 wells capable of producing water for most uses. Four of the wells are within the Towns Service Area. The OHM property contains six water supply wells. Ten of the wells are more than 70 years old. Matrix did not inspect the wells, it may be desirable to inspect and test the wells to determine their condition and reliability.
- The town's water portfolio contains Service Area rights, Type 1 Non-Irrigation Grandfathered Rights (29.78 afa), Type 2 Non-Irrigation Grendfathered Rights (32.8 afa), Extinguishment Credits (7,912.54 af) and Historically Irrigated Acres (2,983.20 afa) located outside the AMA.
- The Town has recently applied for a Certificate of Assured Water Supply with ADWR for the OHM property.
- In 2018 the Town's delivered water exceeded 250 afa for the first time. This will result in the Town moving from a Small Water Supplier to a Large Water Supplier under ADWR rules and will be regulated under the Prescott AMA 4<sup>th</sup> Management Plan. This will require greater monitoring and reporting of water use and increase conservation requirements.

The Town should evaluate new Grandfathered rights that become available in order to acquire as many as possible to build the Town's water portfolio.

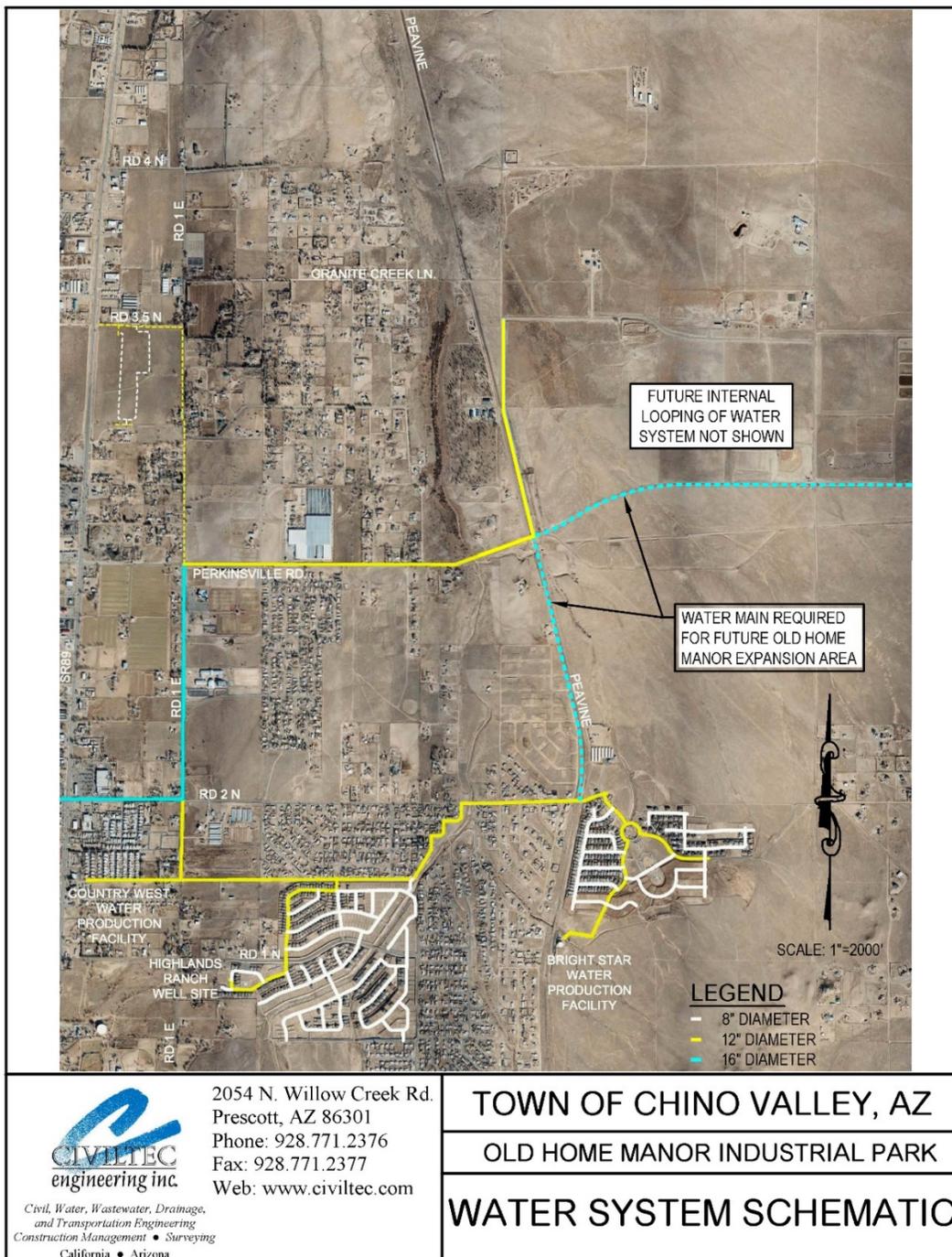
Importing water as allowed under the AMA was also discussed with the goal to begin water importation as soon as possible. Obtaining additional water rights by the Town is a high priority.

## **1.8 TASK 8 - WATER RESOURCES TECHNICAL MEMORANDUM**

A combined water resources and recharge workshop Technical Memorandum was prepared for the IWMP after the Water Resources and Recharge workshop. It is included as an attachment to this report.

## 1.9 TASK 9 - WATER SYSTEM OPERATIONAL DATA COLLECTION

The water system operational data was collected from various sources, primarily from the Town of Chino Valley and was used as the basis for the performance evaluation, creation of the water demand rates, water modeling and infrastructure planning as included in the Water System Technical Memorandum and supporting documents. The Water System Schematic below provides an overview of the existing system.



## **1.10 TASK 10 - DEVELOP WATER SYSTEM PERFORMANCE CRITERIA**

The water system performance criteria was analyzed from the operational data and was used as the basis for the performance evaluation, creation of the water demand rates, water modeling and infrastructure planning as included in the Water System Technical Memorandum and supporting documents.

## **1.11 TASK 11 - EXISTING WATER SYSTEM EVALUATION & MODELING**

Complete results of the water system evaluation and modeling through the 15-year Old Home Manor development period is included in the Water System Technical Memorandum through the year 2035. Recommendations for system improvements based on the water system modeling , including “what if” scenarios are included in the Memo.

## **1.12 TASK 12 - WATER QUALITY DOCUMENTATION & REQUIREMENTS**

The following is a compilation of the Federal and State regulations and guidelines as they affect the Town’s drinking water system and operation.

### **DESIGN:**

The State of Arizona guidelines for potable water infrastructure design, storage and distribution requirements are codified in the following document references:

- Arizona Code, Title 18. Environmental Quality, Chapter 5 for minimum design criteria, dated March 31, 2005.
- Engineering Bulletin No. 10 “Guidelines for the Construction of Water Systems, issued by the Arizona Department of Health Services, May 1978 with no future editions.
- Engineering Bulletin No. 10 “Guidelines for the Construction of Water Systems, issued by the Arizona Department of Health Services, May 1978 with no future editions, Chapter 1.R.2. General Service Requirements.
- Table 1, Unit Design Flows, Arizona Administrative Code, Department of Environmental Protection, Sewage Collection System Snippet, dated September 30, 2005. Note that this table is for sewer design flows and is generally also used for water system demands based on types of developments and/or uses.
- ADEQ Application for Approval to Construct Drinking Water Facilities, dated January 22, 2016, provides the minimum required design and construction plan requirements for obtaining an Approval to Construct from ADEQ or Yavapai County under their Delegation Authority for construction plan approvals.
- ADEQ Approval of Construction – Engineers Certificate of Completion Drinking Water Facilities, revised January, 2020, provides the necessary documentation of the completion of public water facility construction, testing, chlorination, bacteriological testing and as-built plan preparation. It is the Engineer’s certification that the work was completed, inspected, tested and was constructed in conformance with the approved plans and specifications. Water system improvements require issuance of the Approval of Construction by ADEQ prior to being placed into service for public use.

- Arizona Department of Water Resources is the governing authority for new well drilling, development and permitting for potable as well as other wells being constructed. New well source testing is required for any well being incorporated into a public system.
- General minimum water storage requirements for a community system must be equal to the average daily demand during the peak month of the year. It is based on the existing consumption and can be phased as the water system expands per AAC R18-5-503.

The referenced general guidelines were used along with the Town's historical water use, demands and peaking factors, in the compilation of the Water System Technical Memo attached to this IWMP report.

#### **SYSTEM OPERATIONS:**

Public water systems operations are governed by the same ADEQ requirements as generally noted for Design. Additionally, water system monitoring and testing for water quality is required on a regularly scheduled basis for each type of facility.

Testing can include system and water storage tank chlorination testing, bacteriological testing, annual organic and inorganic elements testing, well head monitoring as well as other testing requirements necessary to ensure the public health and safety.

### **1.13 TASK 13 - FUTURE SYSTEM NEEDS ASSESSMENT & MODELING**

The Town's existing water system and the planned improvements for Old Home Manor were evaluated and modeled under various demand scenarios. The Technical Memorandum prepared for the water system identifies the potential deficiencies in the system with recommendations for improvements in the overall supply, storage and distribution systems.

Booster station pumping upgrades, improvements for supply to pending developments, pipe sizing, incorporation of new wells, storage facilities, pump stations and pressure zones were reviewed and modeled. Capacity needs were developed for the water system using the water model for infrastructure sizing. Reliability issues were identified for long-term water development strategies, including opportunities for redundancy in the system. Recommendations for improvements to reduce water shortages due to well failure, periods when storage facilities are out of service for maintenance, and for pumping system emergencies. The included Water System Technical Memorandum discusses these issues in detail.

### **1.14 TASK 14 - WATER SYSTEM WORKSHOP**

A water workshop was conducted with Town Staff and the Members of the Water Commission on September 24, 2020. The results of the modeling effort, including many "what if's" were presented. The workshop and modeling included an overview of the Old Home Manor development and the Town general water supply and delivery systems in the area, including the Bright Star production facility (well, storage and pumping systems), the Country West water production facility (well, storage and pumping systems), the potential Highlands Ranch well and various other components available to develop Old Home Manor.

The most significant development that was discussed at the workshop was the potential to create a separate Old Home Manor pressure zone. The benefits of the separate pressure zone would be the potential to develop a water storage facility Tank Farm near the Airpark at the Santa Fe Trail and Perkinsville Road intersection. The service area would provide water to the areas west and north of Old Home Manor, expanding the available service area for the Town. Large wells in Old Home Manor could be developed as a significant water

supply to the Town, including the ability to construct a water booster pump station that could service the Bright Star service area for emergency supply and redundancy in the Town's overall system.

### **1.15 TASK 15 - WATER SYSTEM TECHNICAL MEMORANDUM**

The water system technical memorandum has been an evolution of the various supply, storage and distribution systems evaluated and modeled over the course of the development of the IWMP. It is included as an attachment to this report.

As a result of the system modeling and required pressures for Old Home Manor, it is recommended to development the west portion of Old Home Manor (Business Park) as a separate pressure zone. This allows for not only serving the immediate development requirements of the Business Park and Public Lands, but also provides flexibility in the operations of the Towns overall water supply and distribution systems. This recommendation is consistent with previous water system studies done for the Town.

### **1.16 TASK 16 - WASTEWATER SYSTEM OPERATIONAL DATA COLLECTION**

The existing wastewater collection system is comprised of eight-inch through twelve-inch diameter underground gravity mains primarily serving the residential subdivisions of Bright Star, Chino Meadows (various phases), and Highlands Ranch. There are also twelve-inch diameter mains in Perkinsville Road, Road 2 North, and Center Street which serve commercial properties which are mostly located just east of State Route 89. These residential and commercial gravity mains discharge into an existing 18-inch diameter trunk main known as the "Santa Cruz Wash Interceptor Main" which conveys raw flows from south to north, in the general vicinity of the wash, to a lift station on Granite Creek Lane, just west of the Peavine Trail and west of Old Home Manor. The lift station pumps the raw flows to the existing wastewater treatment plant north of Rodeo Road and once treated, the effluent is pumped to a series of rapid infiltration basins (R.I.B.'s) located further to the east in Old Home Manor. The existing collection system, lift station, force mains, treatment plant, and R.I.B.'s are owned and maintained by Town forces.

Town Staff provided flow data, sewage lift station data, WWTP flow data and other information necessary to evaluate the wastewater collection, pumping and treatment systems for the Town. The collected data served as the basis for performance evaluation and infrastructure planning based on the projected Town-wide population growth rates.

With all of the Town's wastewater flows being collected and pumped to the WWTP from the regional lift station adjacent to Santa Cruz Wash, the comparison of the pumping rates and WWTP quantity of flow were used for validation of the provided information.

Refer to the Sanitary Sewer System / Old Home Manor Technical Memorandum for detailed information on the existing system, operational requirements, a schematic of the Town's overall wastewater collection infrastructure, system modeling and recommendations and for improvements.

### **1.17 TASK 17 - DEVELOP WASTEWATER SYSTEM PERFORMANCE CRITERIA**

The existing wastewater collection, pumping and treatment system historical records for the last 5 years were reviewed with Town Staff to develop the performance, and operational criteria for developing the system model. The systems are currently operating within ADEQ guidelines and no immediate improvements are required for the 5-year CIP planning horizon other than as described in Section 1.20 of this report.

## 1.18 TASK 18 - EXISTING WASTEWATER SYSTEM EVALUATION & MODELING

The Town's collection system was reviewed and an overall model of the system prepared for analyzing the existing and future capacities of the infrastructure. Service boundaries may be expanded where possible and economically feasible to provide additional sewer flow to the regional lift station and existing WWTP up to its current permitted capacity.

A wastewater model was prepared for use with the development of the Master Plan for both residential and commercial flows. Commercial user sewer flows were not specifically identified and Civiltec prepared estimates of commercial contributions for system modeling.

The results of the evaluation and modeling are included in the Wastewater Technical Memorandum included with the IWMP report. Generally, the current collection, pumping and treatment systems are within operational requirements and are not anticipated to require significant improvements during the initial 5-year Old Home Manor Capital improvements Plan horizon. Section 1.20 includes recommendations for system improvements that are currently under consideration by Town Staff.

## 1.19 TASK 19 - WASTEWATER QUALITY DOCUMENTATION & REQUIREMENTS

The wastewater technical memorandum includes the design flow rate parameters used by ADEQ, the City of Prescott and the Town's historical flow rates for developing the wastewater system model. An overview of the Federal and State regulations and guidelines as they affect the Town's wastewater system and operation are noted below.

Similar to the water system design and submittal requirements, public sewer system design is governed by the following documents:

### DESIGN:

The State of Arizona guidelines for sewage infrastructure design, treatment and collection requirements are codified in the following document references:

- Arizona Code, Title 18. Environmental Quality, Chapter 9 Department of Environmental Quality Water Pollution Control for aquifer protection permits for minimum design criteria, dated March 31, 2005.
- Table 1, Unit Design Flows, Arizona Administrative Code, Department of Environmental Protection, Sewage Collection System Snippet, dated September 30, 2005.
- ADEQ Notice of Intent to Discharge Sewage Collection System (4.01 GP), Revised April, 2020, provides the application form and the minimum design and construction plan requirements for obtaining an Approval to Construct from ADEQ or Yavapai County for sewage collection systems under their Delegation Authority for construction plan approvals.
- ADEQ Approval of Construction Drinking Water Facilities, dated November 2018, provides the necessary documentation of the completion of public water facility construction, testing, chlorination, bacteriological testing and as-built plan preparation. It is the Engineer's certification that the work was completed, inspected, tested and was constructed in conformance with the approved plans and specifications. Water system improvements require issuance of the Approval of Construction by ADEQ prior to being placed into service for public use.
- Arizona Department of Water Quality is the source for new well drilling, development and permitting for potable as well as other wells being constructed. New well source testing is required for any well being incorporated into a public system.

- General minimum water storage requirements for a community system must be equal to the average daily demand during the peak month of the year. It is based on the existing consumption and can be phased as the water system expands per AAC R18-5-503.

#### **SYSTEM OPERATIONS:**

Wastewater system monitoring and testing for water quality is required on a regularly scheduled basis for each type of facility.

Testing can include treatment plant daily or monthly monitoring reports, system chlorination testing, bacteriological testing, annual organic and inorganic elements testing, well head monitoring as well as other testing requirements necessary to ensure the public health and safety.

*The Town's wastewater treatment plant is currently in compliance with ADEQ requirements for testing, monitoring and plant operations.*

### **1.20 TASK 20 - FUTURE SYSTEM NEEDS ASSESSMENT & MODELING**

The Town's existing wastewater system was evaluated under various demand scenarios in order to identify deficiencies and make recommendations for general improvements and upgrades to the lift station pumping system and WWTP. System modeling was performed for various scenarios for the initial 5-Year CIP budgeting and additional 5 year increments up to the final 15 year planning horizon. Modeling included Old Home manor specific and Town-wide flow projections and proposed infrastructure to meet future requirements. Recommendations were provided in the Wastewater System Technical Memorandum for required system improvements based on the estimated date each improvement needs to be placed into service.

Expansion of the existing WWTP from its currently construction 0.5 million gallon per day of treatment capacity to its design capacity of 1.0 MGD is not being considered at this time. The Town is reviewing the potential for the construction of a flow equalization basin at the headworks to the plant to accommodate the daily peak flows and provide for a more consistent flow rate through the plant.

The expansion of the regional sewage lift station at Santa Cruz Wash has the space available to expand the wet well and pumping capacity via an additional wet well and installation of larger pumps. An expansion of the lift station is not currently under consideration by the Town.

### **1.21 TASK 21 - WASTEWATER SYSTEM WORKSHOP**

Wastewater issues were discussed with Town Staff on several occasions via teleconferences, meetings and emails. A separate Wastewater Workshop was not conducted, but the requirements and results of the various meetings are included in the Wastewater System Technical Memorandum.

### **1.22 TASK 22 - WASTEWATER SYSTEM TECHNICAL MEMORANDUM**

The wastewater system technical memorandum includes the results of the system modeling and recommendation for improvements to the regional sewer lift station. Town-wide growth rates were used in the preparation of the sewer system modeling.

Recommendations were provided for phased improvements to accommodate the Town-wide growth and the site specific Old Home Manor area contributions to the system.

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### **1.23 TASK 23 – RAPID INFILTRATION BASINS SYSTEM OPERATIONAL DATA COLLECTION**

The Town owns and operates the Old Home Manor Recharge Project (OHMUSF) under Arizona Department of Water Resources (ADWR) Underground Storage Facility (USF) Permit No. 71-595206.0002 and Water Storage (WS) Permit 73-595206.0000. These permits expire on March 3, 2025.

Meetings, workshops, review of agency permits and other communications with Town Staff were used to collect the necessary information and data relating to the recharge operations and current obligations for reclaimed water supply. Data collection extended to the as-built physical basin configuration, permitting, historical flows and capacity of the basins for future growth.

As-built plans for the WWTP and the Recharge Basin mechanical systems, pipelines and basin construction prepared by Aqua Engineering in 2003 were reviewed as a part of the data collection process. The system consisted of two 700 gpm vertical turbine treated effluent pumps with expansion to accommodate an additional 2 pumps, 12" pipelines to the basins, and the construction of the basin system. The booster pumps were designed for 700 gpm each @ 110' of head and 31 HP motors for transport of the treated effluent to the recharge basins.

Based on the pump sizing and using only one pump with the second pump in reserve, up to 1.0 MGD can be pumped to the Rapid Infiltration Basins system. At a current WWTP historical treatment and discharge rate of 0.28 to 0.32 MGD, the existing facility can accommodate the existing and future demands up to the 1.0 MGD design capacity of the existing WWTP.

### **1.24 TASK 24 - EXISTING RECHARGE WATER SYSTEM EVALUATION**

Based on the data collected and the information provided in the combined Water Resources and Recharge Technical Memorandum, the recharge system was determined to meet existing and future demands up to the currently design 1.0 MGD WWTP and the existing 0.5 MGD constructed plant capacity. When the WWTP is ultimately designed and constructed to its permitted capacity of 5.0 MGD, the existing recharge pumping system would be re-evaluated.

### **1.25 TASK 25 - RECHARGE WATER QUALITY DOCUMENTATION & REQUIREMENTS**

The water pumped to the rapid infiltration basins is treated effluent from the Town's Chino Valley Water Reclamation Facility (WRF) which operates under an Arizona Department of Environmental Quality (ADEQ) Aquifer Protection Permit (APP) No. P-1041236, LTF 28493, Place ID 17668 dated September 7, 2004. The facility is permitted to treat up to a maximum monthly volume of 5.0 million gallons per day (MGD). The plant is currently designed for 1.0 MGD, was constructed to 0.5 MGD and will be expanded over time to meet future demand. All the WRF effluent is sent to the OHMUSF, no reuse of the treated effluent is permitted under the APP.

The APP defines the operational requirements for the WWTP and the permitted recharge available to the basins. Operational flows are described in more detail in Section 1.26 below.

## **1.26 TASK 26 - EVALUATE RECHARGE & RECOVERY STRATEGIES**

The OHMUSF is operating below its permitted capacity. In 2018 the facility recharged 273.88 ac-ft or about 24% of its 1,120 ac-ft permitted annual volume. The facility has the capacity to double its annual recharge volume without construction of additional basins or related infrastructure.

As the Town's sewer system expands and inflow to the WWTO increases, the current WWTP facility will need to expand with the higher loadings, creating additional recharge flows to the Rapid Infiltration Basins. The existing recharge water pumping facility at the WWTP, as noted in Section 1.23, is sized to deliver treated effluent flow to the basins up to the currently designed capacity of the WWTP.

## **1.27 TASK 27 - RECLAIMED WATER FUTURE SYSTEM NEEDS**

As noted in the technical memorandum, the best use of the treated WWTP effluent is for the direct infiltration for recharge credits to the Town. The existing pump station, waterlines and basins are adequate to accommodate a 100% increase in the treated effluent flow from the WWTP without any necessary improvements.

***For the purpose of the IWMP and system integration, no improvements are required to the Rapid Infiltration Basins within the 15-year planning horizon.***

## **1.28 TASK 28 - RECLAIMED WATER SYSTEM WORKSHOP**

A combined Water Resources and Recharge Water workshop was conducted with Town Staff and members of the Water Commission on January 12, 2021. The results of the workshop are documented in the meeting minutes and included in the Technical Memorandum included with the IWMP. The discussion generally included the following topics related to the recharge facilities:

- Overview of the Recharge Water permit
- Basin capacities
- Upcoming permit expiration on March 3, 2025;

It was noted that budgeting for renewing the recharge permit has already been set aside and the process will begin soon.

## **1.29 TASK 29 - RECLAIMED WATER SYSTEM TECHNICAL MEMORANDUM**

A combined Water Resources and Recharge Technical Memorandum was prepared for the IWMP after the water resources and recharge workshop. It is included as an attachment to this report.

## **1.30 TASK 30 - FIELD SURVEY**

Civiltec performed a field survey of the existing WWTP primary lift station adjacent to Santa Cruz Wash, just west of the WWTP, for validation of the existing conditions and wet well configuration. That data has been incorporated into the wastewater analysis for the existing and planned improvements.

## 2 PHASE 2 - INTEGRATION (WATER-WASTEWATER-RECLAIMED WATER)

### 2.1 TASK 1 - TOWN-WIDE INTEGRATION IMPROVEMENT RECOMMENDATIONS

A Systems Integration Technical Memorandum was prepared for the IWMP based on the collective individual Technical Memorandums and summarizes the 5-Yr CIP planned improvements and recommendations for additional system-wide improvements. It is included as an attachment to this report.

Generally, the following recommendations are noted:

#### **WATER RESOURCES:**

The available water supply, without new improvements, will allow development of Old Home Manor through 2025 but will require new water source development at year 2030. It is recommended that a new supply well and infrastructure be developed as soon as possible to provide redundant supply to the Community Water System in case of failure of the Bright Star primary production well.

#### **WATER SUPPLY AND DISTRIBUTION:**

The development of Old Home Manor from Jerome Junction to the RV Park is limited by the necessity for construction of the Peavine Trail waterline in year 2 of the CIP program. Development to the north and south of Rodeo Drive can be accomplished with the existing infrastructure if construction of the Peavine Trail waterline is postponed.

#### **WASTEWATER COLLECTION, PUMPING AND TREATMENT:**

The current WWTP, collection system and lift station can accommodate development at Old Home Manor and Town-wide up to the year 2025 with its current infrastructure. Planning needs to be started soon for expanding the constructed capacity of the plant to its design flow of 1.0 MGD by the year 2025.

#### **RAPID INFILTRATION BASINS (RECHARGE SYSTEM)**

For the purpose of the IWMP and system integration, no improvements are required to the Rapid Infiltration Basins or the treated effluent pumping station within the 15-year planning horizon.

#### **SYSTEM DEFICIENCIES AND RECOMMENDATIONS**

The lack of redundancy in the Town's water production and distribution systems is a significant issue to address as the Town and the Old Home Manor anticipated population growth drive the need for a more robust Community Water production and distribution system. The following is a list of items that need consideration by the Town over the next 15 years:

- Addition of a Lift Station bar rack and/or comminutor (grinder) for prescreening and reducing the size of the effluent particles entering the wet wells in order to reduce the clogging of the existing pumps. This is a project that can be undertaken at any time in the near future.

- Addition of a second lift station wet well and pump upsizing to increase the capacity of the lift station to pump raw effluent to the WWTP. This will be necessary by 2035.
- Install an equalization basin at the WWTP to regulate the peak flows through the plant to delay the need for the plant expansion.
- Expand the WWTP by year 2030 to its design capacity of 1.0 MGD as effluent flows approach the currently constructed 0.5 MGD capacity. Planning and permitting for the additional construction should be started well in advance of the actual need for the increased capacity.
- Due to the Community Water System's high level of dependency on the Bright Star supply well, it is recommended to drill an additional well at the Bright Star or Country West production facilities. As an option, the existing well at Highlands Ranch could also be rehabilitated or a new well drilled and placed into service at that location.
- Develop the Old Home Manor pressure zone, including putting into service one of the Old Home Manor high production wells and creation of a potable water storage tank farm near the Model Airplane Park/Shooting Range to service the Old Home Manor and portions of the Town located west and north of Old Home Manor. This would create a service area providing Town water to the northerly limits of the community.
- Installation of an additional 500,000 potable water storage tank by 2030 to supplement the system demands.

## **2.2 TASK 2 - TOWN -WIDE SYSTEMS SIZING**

On a Town-wide basis, the recommendations included in Section 2.1 above should be considered as improvements to be implemented as funding becomes available. High priority improvements would consist of:

1. Immediate improvements to the lift station to reduce maintenance of the pump systems
2. Construction of a new well to support the Bright Star main water production facility
3. Construction of the Peavine Trail 16" waterline
4. Provide an equalization basin at the treatment plant headworks to regulate the flow of raw sewage through the plant
5. Initiate permitting and construction of the expanded WWTP facility to its design capacity by 2025.

## **2.3 TASK 3 - TOWN-WIDE INTEGRATION WORKSHOP**

The results of the individual Technical Memorandums have been compiled into the Systems Integration Technical Memorandum. As with the sewer planning, an Integration Workshop was not conducted. Based on the results of the Town review of this DRAFT IWMP report, a workshop may be scheduled prior to completion of the final report.

## **2.4 TASK 4 - TOWN-WIDE INTEGRATION TECHNICAL MEMORANDUM**

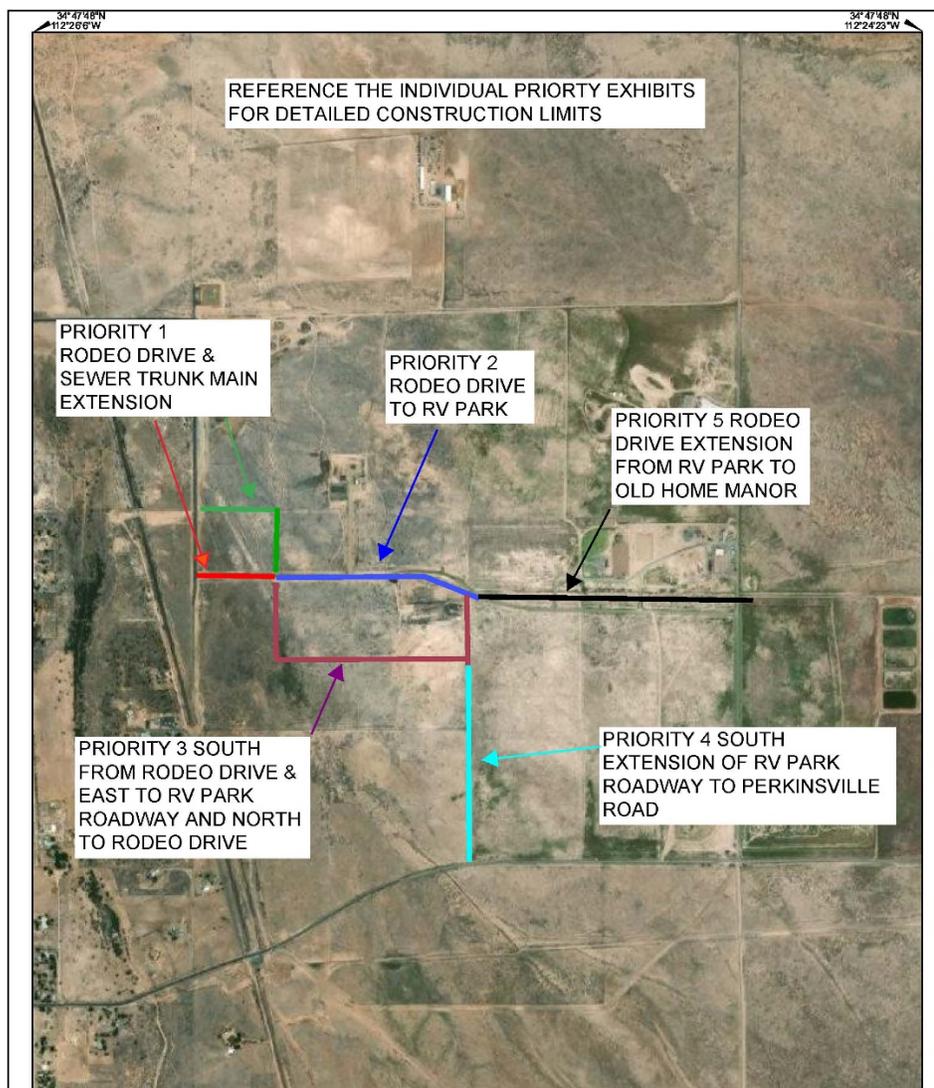
A Systems Integration Technical Memorandum that summarizes the needed improvements is attached to this IWMP report for reference.

### 3 PHASE 3 - CAPITAL IMPROVEMENTS PLAN (CIP)

#### 3.0 TASK 1 - CIP IMPROVEMENT PROJECTS RECOMMENDATIONS

Civiltec met with Town on November 23, 2002 to discuss the IWMP project development priorities and phasing with the primary focus to be on the development of the Business Park parcels adjacent and south of Rodeo Drive. Also discussed was the provision of access and utilities to the RV Park in the initial 5-Year CIP plan.

The general locations of the projects are shown on the following 5-Year CIP phasing exhibit map. Individual project location maps are included in the CIP Plan attached to this IWMP report.



**5-YEAR CIP OVERALL PHASING EXHIBIT  
OLD HOME MANOR DEVELOPMENT AREA**

### **Priority 1, Business Park Development – Rodeo Drive:**

Priority 1 would be to construct the Rodeo Drive construction plans that are currently at 99% complete and be ready to bid the project in the spring of 2021. The improvements include a significant box culvert structure similar to the existing structure under Jerome Junction, provide approximately 780 LF of fully developed 28' wide commercial roadway with curbs, sidewalks, asphalt pavement, waterlines, sewer line and pad grading for one of the Business Park parcels as shown on the current construction plans. Additionally, the initial 12" sewer line backbone system would be constructed north of Rodeo Drive east toward the WWTP/Maintenance Facilities, then south back to Rodeo Drive. This is a deep sewer connecting to the existing 12" sewer line in Jerome Junction, which flows to the existing sewer lift station adjacent to Santa Cruz Wash and is then pumped to the WWTP.

Priority 1 anticipates up to 81,000 SF of Business Park development based on the overall Business Park growth projections included in IWMP. The square footage represents 3% of the 2,700,000 square feet of planned Business Park development. It is equivalent to 6 acres of the available 200 acres included in the Business Park zoning.

***It is recommended that an additional well and associated piping, valving and controls be brought on-line to supplement the Bright Star primary production and storage facility to provide redundancy in the system in case of a Bright Star well failure.***

### **Priority 2, Rodeo Drive to the RV Park Development (north end):**

Phase 2 would be to complete the design and construction of Rodeo Drive to the north end of the RV Park Roadway, including roadway, drainage, and utility extensions that will provide service to additional Business Park development and approximately 40 acres of the planned RV Park area. **To serve the RV Park with adequate fire flow and residual water pressure, the Peavine Trail 16" waterline would need to be included with the Priority 2 development.**

The roadway rural section would include a 24' wide asphalt roadway (4" AC/9" ABC, matching the Jerome Junction and 1<sup>st</sup> Phase Rodeo Drive pavement section) with 5' asphalt shoulders (3" AC/6" ABC). The curves would be softened near the RV Park to a smoother realignment of Rodeo Drive.

The 12" water and 12" sewer mains would be extended east on Rodeo Drive within the roadway prism to serve the Business Park and RV Park.

An additional 81,000 sf to 160,000 sf of Business Park growth and 10 acres of RV Park development would be accommodated by the year 2 improvements.

***The construction of the Peavine Trail 16" waterline could be delayed if the Business Park was developed to the north and south of Rodeo Drive up to the limits of the WWTP ground elevations.***

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**Priority 3, Business Park South Loop Roadway:**

Priority 3 would include construction of the South Roadway Loop including 12" water and 12" sewer utilities south from the Phase 1 Rodeo Drive intersection, then east to the RV Park Roadway and then north to complete the RV Park Roadway loop back to Rodeo Drive Priority 2 extension.

These improvements would provide for an additional 81,000 sf to 162,000 sf of Business Park development and provide a looped connection to the 12" water main in Rodeo Drive to RV Park Road and north to Rodeo Drive, completing the 12" looped waterline. 12" sewer mains would also be provided to serve the same development area. An additional 10 acres of RV Park could potentially connect to the new water and sewer improvements.

**Priority 4, RV Park Roadway South Extension to Perkinsville Road:**

Phase 4 would include the completion of the RV Park Road from the South Loop Roadway to Perkinsville Road with 12" water and sewer mains and drainage improvements.

This phase allows for an additional 81,000 sf of Business Park development and the remaining 10 acres of RV Park for full development of the 60 acres.

**Priority 5, Rodeo Road Extension to Old Home Manor Road:**

Phase 5 would complete the construction of Rodeo Drive east from the RV Park Roadway to Old Home Manor Road including the extensions of the roadway, drainage and utilities from the Priority 1, 2 & 3 Rodeo Drive improvements. This primarily provides water and sewer service to the Parks and Recreation 40 acre parcel adjacent to the east boundary of the RV Park and approximately 20 acres of the planned Equestrian Center-Parks development. The alignment of Rodeo Drive would be modified to match the intersection at Old Home Manor.

### **3.1 TASK 2 - CIP PROJECTS SYSTEM NEEDS**

The system improvements required for the initial 5-Year CIP program are noted as follows:

**Priority 1, Business Park Development – Rodeo Drive:**

This 2021 work does not require any immediate system improvements.

**Priority 2, Rodeo Drive to the RV Park Development (north end):**

The Peavine Trail waterline will need to be constructed with Priority 2 to provide adequate fire flows and pressures at the RV Park. The waterline construction could be delayed if the focus of the CIP plan changed to promote development in the Business Park to the north and south of Rodeo Drive. The elevation limits for adequate water supply would be at a point near the WWTP ground surface elevation limits.

**Priority 3, Business Park South Loop:**

No system improvements would be necessary, assuming the Peavine Trail Waterline has been constructed prior to Priority 3.

**Priority 4, RV Park Roadway South Extension to Perkinsville Road:**

No system improvements would be necessary, assuming the Peavine Trail Waterline has been constructed prior to Priority 3.

**Priority 5, Rodeo Road Extension to Old Home Manor:**

No system improvements would be necessary, assuming the Peavine Trail Waterline has been constructed prior to Priority 3.

### **3.2 TASK 3 - CIP PROJECTS PRIORITIZATION & COSTS BY YEAR**

The capital improvements required for each year are identified, prioritized and the associated total costs for each Priority is included for the planned build-out of the 5-year plan.

Construction budgeting for the 5-year CIP for Old Home Manor is ultimately dependent on realistic funding expectations to determine the construction of the improvements for each phase of the CIP plan. Funding sources could include:

- Debt service;
- CIP set asides;
- General fund expenditures;
- Enterprise Zones
- Land Sales

All these sources can be evaluated by the Town in harmony with planned or anticipated opportunities for economic growth, available revenue sources and outside agency funding availability for development of Old Home Manor.

### **3.3 TASK 4 - CIP WORKSHOP**

A meeting workshop was conducted with Town Staff on November 23, 2020, the results of which are attached to this IWMP report.

### **3.4 TASK 5 – CAPITAL IMPROVEMENTS PLAN AND TECHNICAL MEMORANDUM**

The combined Capital Improvements Plan and Technical Memorandum is attached to this IWMP report.

## 4 PHASE 4 - LANDSCAPE REQUIREMENTS

### 4.1 TASK 1 - DEVELOP OUTDOOR LANDSCAPE DESIGN

As a part of the IWMP, the services of Sketch Landscape Studio were provided to develop landscape means and methods for decreasing the use of potable water in the Old Home Manor area as well as throughout the Town of Chino Valley. In addition to the information provided below, a Landscape Technical Memorandum and Draft Landscape Ordinances are attached to this IWMP report.

#### OBJECTIVE

To greatly decrease landscape water use by utilizing native low water plant material and applying green stormwater strategies including passive and active rainwater harvesting. This will be achieved by:

1. Requiring the installation of native low water plants appropriate for the Town of Chino Valley
2. Encourage the use of passive and active rainwater harvesting systems to supplement irrigation
3. Maintain high landscape requirements and standards regulated by the landscape ordinance

#### REVIEW OF EXISTING CONDITIONS

##### Elevation and Precipitation Rates

Chino Valley sits at an average elevation of 4,700 Feet and is designated as Grassland (G) by the Arizona Department of Water Resources (ADWR). It receives an average annual rainfall of 10–14 inches per year with the majority of the precipitation between July and August.

PRESCOTT AMA ZONES		
Zone	Description	Average Annual Rainfall (in inches)
Zone 1	Grassland (G): 4,400 – 5,000 Ft	10 - 14
Zone 2	Transition (T): 4,400 – 6,000 Ft Pinyon/Juniper, Chaparral, Oak Woodland	12 - 16
Zone 3	Ponderosa (P): 5,500 – 7,800 Ft Mountain	16 - 20

*Chino Valley falls within Zone 1 (Grassland) and part of Zone 2 (Transistion)*

The elevation at Old Home Manor tops at 4,807 ft at the southeast corner with a low point of 4,566 ft at the northwest corner and has, dropping 241 Ft with an average slope of 2%.

#### Existing Landscape Requirements for New Development

The current landscape requirements are found in the Town Unified Development Ordinance (UDO), Section 4.26 Landscape Requirements, and supplemented under UDO Section 3.19, BP – Business Park. A general summary of the landscape requirements is provided below:

**Size of Plant Material- Size and Patterns (buffer-yards & Parking Perimeter)**

Size		Pattern
<b>Trees</b>		
75%	15 gallon	(1) tree per (20) linear feet
15%	24" box or larger	
<b>Shrubs</b>		
100%	5 gallon or better	(4) shrubs per 400 square feet

**Street Trees**

Location	Requirements
Residential Subdivisions	(1) Shade Tree every 30 FT on Center <i>(does not designate specific size)</i>
Business Park	(1) 2" caliper tree every 30-feet on center (3) shrubs per tree

**Sidewalk Design and Landscape Parkway (residential Subdivisions)**

Arterial/Collector Streets	(6) foot wide sidewalk, separated from the roadway by a landscape parkway of at least 8 feet
Local Streets	(5) foot wide sidewalk, separated from the roadway by a landscape parkway of at least 8 feet

**Buffer-yards (all areas)**

<b>Multi-family, Office, Commercial and Industrial development</b>	
Front Yard (street frontage)	10 foot wide landscape strip
Front yard adjacent to Hwy 89	20 foot wide landscape strip
Front Yard- Business Park	50 foot setback
Side and rear yard (when adjacent to zoning other than single-family residential)	(5) foot wide landscape strip
Side and rear yard (when adjacent to single-family residential)	10% of lot width or depth, whichever is applicable No less than (10) feet in width No more than (20) feet in width
Side Yard: Business Park	To be in compliance with UDO Section 4.26 *(5) Foot Wide landscape strip 50 foot setback when adjacent to all other districts

**Parking Islands**

General	(1) curbed island for each (15) parking stalls in each row
	50% planted with live plant material, such as shrubs or groundcover <i>(does not designate that trees are required)</i>

**Existing Facilities And Landscape Maintenance Operations**

The TOCV Parks Department actively maintains just over 120 acres of property including Town offices, parks and ball fields. The grass at Memory Park and the Community Center ball fields consume nearly 30 acres while 83 acres is designated as non-grass area, consisting of decorative landscape rock, trees, shrubs and drip irrigation.

Location	Total (Acres)	Non-Grass (Acres)	Grass (Acres)
Center Street Park	5.74	5.74	0
Community Center Park	36.9	10.5	23.8
Memory Park	15	1.5	5.2
Appaloosa Meadows	6	6	0
Town Hall	4.85	4	0
OHM- Mud Run	36.72	36.72	0
OHM- Ball Fields	18.45	18.45	0
	<b>123.66</b>	<b>82.91</b>	<b>29</b>

### Existing Parks Staff Model

Quantity	Position/Title	Average Salary	Requirement
1	Supervisor	\$55,000	Full Time
1	Parks Maintenance Worker - Senior	\$45,000	Full Time
1	Parks Maintenance Worker	\$31,000	Full Time
2	Parks Maintenance Worker - Seasonal	\$12.00 Per Hour	6 Months per Year

### Existing Weed Control

Per the Parks Department Supervisor, weed removal and maintenance on the 83 acres is the most time consuming responsibility. The current conditions require the following minimums:

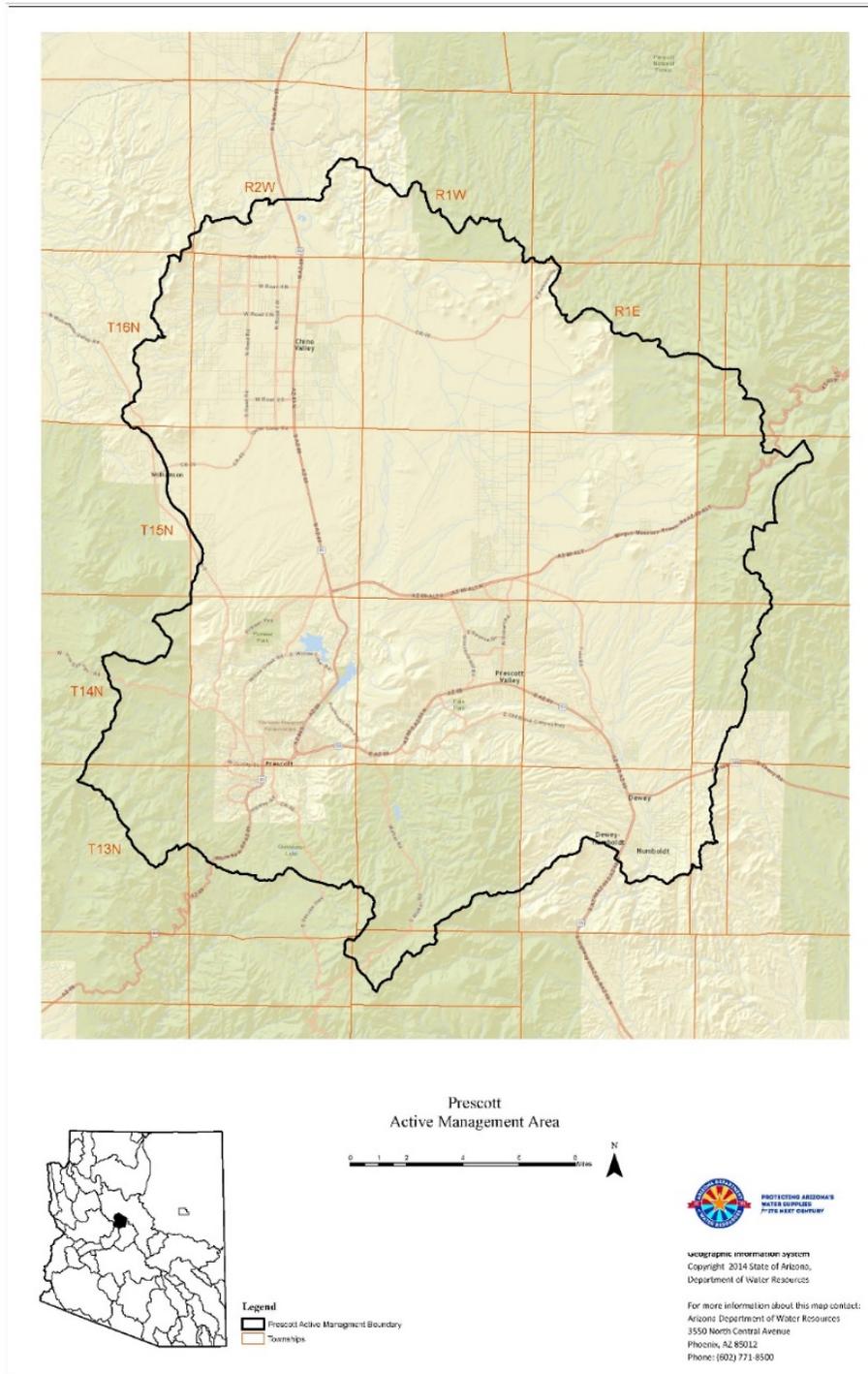
- 5 to 6 weeks continuous maintenance (4 person team, 2.5 continuous weeks, 2 times per year)
- 10 to 12 weeks in the off season (off-season requires intermediate methods including a 2-person team averaging 1 week each month)

### Cost of Existing Weed Control

Item	Cost
Personnel	\$42,600 to \$50,000 per year
Supplies - Annual	\$3,000 to \$5,000 per year
Supplies – 2021 Budget: 150 Gallon Tank with Boom Attachment	\$10,000
Supplies – 2021 Budget: 1,000 Gallon Stationary Mixer and Induction Unit	\$7,000
<b>Total Estimated Cost of Weed Control for 2021</b>	<b>\$62,600 to \$72,000</b>

The Arizona Department of Water Resources has developed a low water use plant list for the Prescott Active Management Area (AMA). This list includes native and drought tolerant plant material that is sustainable under the average area accumulated rainfall for the area.

**NATIVE PLANT MATERIAL**



The use of native plant material is key to mitigate stormwater run-off, lower landscape maintenance costs, and reduce water use associated with outdoor landscape areas. On average a native landscape installation can cost around 35% more than a traditional landscape install (non-native plants, grass, landscape rock and weed fabric). This is because the success of native landscape areas comes from planting large quantities of native species (prairie grasses, perennials, shrubs and groundcover). The mass planting restricts weed growth and slows stormwater run-off, helping to filter impurities and re-charge the aquifer.

Although the upfront cost can be off-putting to developers, the long term advantages far exceed the initial expense. Well-designed native landscapes:

- Provide wildlife habitat
- Reduce energy consumption
- Minimize urban heat islands (created by parking lots and rooftops)
- Improve human health (air quality)
- Greatly reduce landscape water use after established

### Water Use

Supplemental water is additional water required for plants survival above the average annual rainfall. The ADWR has further designated the plant material into the following categories based off of supplemental water needs:

Supplemental Water Use	
1	0 - 4 inches
2	5 – 8 inches
3	9 – 12 inches

To minimize supplemental water use for outdoor landscape areas it is recommended that the majority of plant material selections for Old Home Manor be limited to varieties listed as Zone 1 and 2 with a supplemental water use of 1 ( 0 – 4 inches).

The following tables show two significant advantages of installing native plants:

1. Cost savings associated tree and shrub pruning maintenance

2. The substantial elimination of water use after the plants have been established

**Costs Savings**

**Resource Conserving Landscaping Cost Calculator**



<b>Conventional Landscape (after established)</b>	<b>Low Cost Estimate</b>	<b>High Cost Estimate</b>
Gallons of Water Used Annually	154,070	462,210
Annual Water Cost Due to Irrigation	\$501	\$1,502
Annual Shrub and Ground Cover Maintenance	\$9,750	\$16,500
Annual Tree Maintenance	\$1,250	\$4,750
Annual Maintenance Cost	\$11,000	\$21,250

<b>Low Water Landscape (after established)</b>	<b>Low Cost Estimate</b>	<b>High Cost Estimate</b>
Gallons of Water Used Annually	0	0
Annual Water Cost Due to Irrigation	\$0	\$0
Annual Shrub and Ground Cover Maintenance	\$8,250	\$15,000
Annual Tree Maintenance	\$750	\$4,250
Annual Maintenance Cost	\$9,000	\$19,250

**Water Savings**

<b>Average Cost of Landscape</b>	<b>Units</b>	<b>Low Estimate</b>	<b>High Estimate</b>
Landscape Materials and Installation Cost	\$/Sq. Foot	\$2.20	\$4.00

<b>Irrigation Requirements</b>	<b>Units</b>	<b>Low Estimate</b>	<b>High Estimate</b>
Regular Watering Zone (Grass)	Irrigations/Month	4	8
Occasional Watering Zone	Irrigations/Month	1	3
Natural Rainfall Zone	Irrigations/Month	0	0

<b>Maintenance Data</b>	<b>Units</b>	<b>Low Estimate</b>	<b>High Estimate</b>
Flower Bed Maintenance Cost	\$/Sq. Foot/Year	\$1.84	\$3.79
Turf Maintenance Base Cost	\$/Sq. Foot/Year	\$0.04	\$0.10
Turf Maintenance Additional Cost	\$/Sq. Foot/Year/Mo. of grow season	\$0.014	\$0.014
Shrub Maintenance Cost With Pruning	\$/Sq. Foot/Year	\$0.11	\$0.20
Tree Maintenance Cost With Pruning	\$/Sq. Foot/Year	\$0.03	\$0.17
Tree and Shrub Cost Without Pruning	\$/Sq. Foot/Year	\$0.01	\$0.01
Base Visit Cost for Private Landscaping Firms	\$/Visit/Hour Traveled	\$75.92	\$75.92
Profit for Private Landscaping Firms	% of Total Cost	10%	25%

Note(s): The “Natural Rainfall Zone” and “Tree and Shrub Costs Without Pruning” refer to areas that are landscaped with native plant material. After plants are established (3 to 5 years) these plant zones require little to no water and minimal maintenance.

**How to Offset Cost**

The cost of additional plant material and rainwater harvesting equipment can be offset by allowing the developer to:

- Install (1) gallon shrubs and perennials in place of the required (5) gallon size
- Replace landscape rock and weed fabric with native hydroseed  
(On average, decorative **landscape rock costs 80 percent more** than native hydroseed applications)

**Current Requirements**

Unit	Item	Cost per Unit	Total Cost
<b>Irrigation: parking and buffer zones</b>			
50,000	SF Irrigation- Hardwire, pipes, fittings	\$ 0.50	\$ 25,000.00
0	Rainwater Harvesting Tank (\$5,000 - \$25,000)	\$ 15,000.00	\$ -
1	3/4" Landscape Meter- Impact Fee	\$ 7,000.00	\$ 7,000.00
<b>Groundcover: Parking, Buffer and Open space</b>			
100,000	SF Decorative Landscape Rock with weed fabric	\$ 0.62	\$ 62,000.00
0	SF Native Hydroseed	\$ 0.12	\$ -
<b>Planting: Parking- 10 Landscape Islands, (1) tree and (2) shrubs per island</b>			
10	24" Box Trees (are trees required?)	\$ 250.00	\$ 2,500.00
20	5 Gal Shrubs and Groundcover	\$ 30.00	\$ 600.00
<b>Planting: Street Frontage (Utilizing 1,000 Linear Feet at 50 feet wide)</b>			
33	24" Box Trees (30-feet on center)	\$ 250.00	\$ 8,250.00
100	5 Gal Shrubs (3 per tree)	\$ 30.00	\$ 3,000.00
<b>Open space: No Planting Required</b>			
			<b>\$ 108,350.00</b>

**Proposed: Green Infrastructure**

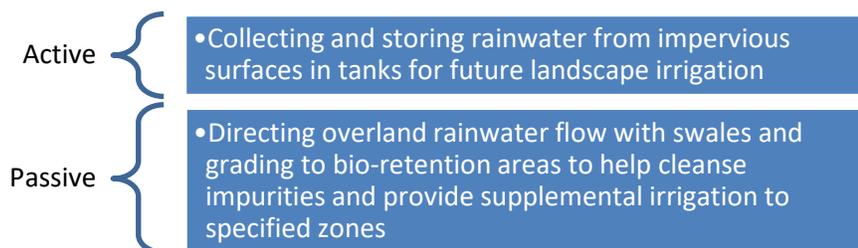
Unit	Item	Cost per Unit	Total Cost
<b>Irrigation: Parking, Buffer Zones, and Open space</b>			
100,000	SF Irrigation- Hardwire, pipes, fittings	\$ 0.50	\$ 50,000.00
1	Rainwater Harvesting Tank (\$5,000 - \$25,000)	\$ 15,000.00	\$ 15,000.00
1	3/4" Landscape Meter- Impact Fee (temporary)	\$ 7,000.00	\$ 7,000.00
10,000	SF Landscape Rock (no weed fabric)	\$ 0.50	\$ 5,000.00
90,000	SF Native Hydroseed	\$ 0.12	\$ 10,800.00
<b>Planting: Parking- 10 Landscape Islands, (1) tree and (2) shrubs per island</b>			
10	24" Box Trees	\$ 250.00	\$ 2,500.00
20	5 Gal Shrubs and Groundcover	\$ 30.00	\$ 600.00
<b>Planting: Street Frontage (utilizing COP standards: 1 per 25 LF, (4) Shrubs per 250 SF)</b>			
33	24" Box Trees (30-feet on center)	\$ 250.00	\$ 8,250.00
400	5 Gal Shrubs and Groundcover (1 per 50 SF)	\$ 30.00	\$ 12,000.00
400	1 Gal Shrubs and Groundcover (1 per 50 SF)	\$ 12.00	\$ 4,800.00
<b>Open space/Side Yards: Planting: (1) tree per 2,300 SF, (1) shrub per 50 SF = 4 trees/200 shrubs</b>			
1	24" Box Tree (30% required to be 24 inch box)	\$ 250.00	\$ 250.00
3	5 Gal Tree (30% required to be 24 inch box)	\$ 60.00	\$ 180.00
960	1 Gal shrubs/groundcover/perennials	\$ 12.00	\$ 11,520.00
			<b>\$ 127,900.00</b>

**Native Hydroseed**

TOWN OF CHINO VALLEY NATIVE FLORA			
Botanical Name	Common Name	Seed/Lb	Rate/Acre – PLS (Pure Live Seed)
Aristida purpurea	Purple Three-awn	250,000	6.0
Bouteloua gracilis	Blue Grama	825,000	2 to 3
Koeleria macrantha	Prairie Junegrass	2,315,400	1 to 2
Mulenbergia wrightii	Spike Muhly	1,000,000	1 to 3
Festuca arizonica	Arizona Fescue	500,000	2.0
Sitnian hystrix	Squirrel Tail	192,000	4.0
Sporobolus cryptandrus	Sand Dropseed	5,298,000	1 to 2
Bouteloua curtipendula	Sideoats grama	191,000	5 to 9
Elymus elymoides	Bottlebrush squirreltail	220,000	6 to 10
Elymus glaucus	Blue wildryl	134,500	12
Pascopyrum smittii	Western Wheatgrass	110,000	8 to 16
Poa fendleriana	Muttongrass	890,000	2 to 3
Sporobolus airoides	Alkalia Sacaton	1,758,000	2 to 3
Forbs/Herbs (Wildflowers)			
Heliomeris multiflora	Showy Goldeneye	1,055,000	1 to 2
Lupinus succulentus	Arroyo lupine	15,600	20 to 30
Penstemon eatonii	Eaton’s Penstemon	400,000	1 to 3
Oenothera elata	Yellow Evening Primrose	1,300,000	1

**GREEN INFRASTRUCTURE: RAINWATER HARVESTING**

Green Infrastructure refers to passive and active stormwater solutions that help supplement landscape irrigation, mitigate stormwater flows and recharge the aquifer. This is achieved by immediately directing and capturing stormwater through swales, bio-retention zones and rainwater harvesting tanks.



In addition to providing supplemental irrigation, stormwater infrastructure is less costly when designed with green infrastructure solutions. Costs saving include: [3]

- Reduced built capital (equipment, installation) costs
- Reduced land acquisition costs
- Reduced external costs (offsite costs imposed on others)
- Reduced operation costs
- Reduced repair and maintenance costs
- Reduced infrastructure replacement costs

Per the TOCV 2014 General Plan rainwater harvesting is encouraged:

*The Town encourages the harvesting of precipitation on individual and regional levels. It participated in a demonstration project in 2010 in which a 620 gallon catchment tank was installed along with site grading for rain water detention swales and low water use landscaping at the Town Hall-Library complex at Palomino/Rd1W. In 2012, the Town entered into an agreement with the Upper Verde River Protection Coalition, a regional governmental organization, for a rainwater harvesting pilot project, providing use of property at Old Home Manor near the Town's recharge facility for up to 5 years.*

*- Town of Chino Valley 2014 General Plan, Water Resources/Environment Element, page 7*

Achieving this goal is further explained on page 8:

*2. Expand indoor / outdoor water conservation, rain catchment, through education to existing home and business owners, and regulations for all new construction*

*- Town of Chino Valley 2014 General Plan, Water Resources/Environment Element, page 8*

### **Active Rainwater Harvesting**

For the purpose of this report an arbitrary usable roof area of 10,000 SF has been used

## Rainwater Collection Calculator

Enter Your Roof Area \*

Enter the Total Annual Rainfall For Your Area \*

Look up your area's average annual rainfall totals [here](#). For central Texas, the average annual rainfall is 32 inches.

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Total Rainwater Collection Potential (gallons):

<https://www.watercache.com/resources/rainwater-collection-calculator>

The above calculation leaves us with a potential average supplemental irrigation amount of 74,760 gallons per year, 6,230 gallons per month.

Supplemental Water Use per plant		
1	0 - 4 inches	0 – 2.48 gal
2	5 – 8 inches	2.48 – 4.96 gal
3	9 – 12 inches	5.58 – 7.44 gal
0.62 gallons = one inch of precipitation on one SF of soil		

In most cases a 2,000 – 3,000 gallon rainwater harvesting tank will be sufficient to provide supplemental irrigation to selective plant zones.

**Passive Rainwater Harvesting**

PASSIVE STORMWATER MANAGEMENT STRATEGIES FOR INDIVIDUAL LOTS	
Type	Description
Landscape Islands	<ul style="list-style-type: none"> <li>-curb cut-out or eliminate curbs at landscape islands</li> <li>-24" depression</li> <li>-6-inch pipes connected to main detention/retention basins "first flush"</li> <li>-2-4 inch landscape rock</li> </ul>
Designated Landscape Areas	<ul style="list-style-type: none"> <li>-drainage channel at curbs or eliminate curbs</li> <li>-24" depression</li> <li>-6-inch pipe for overflow to main detention/retention</li> <li>-amended soil to allow for water retention</li> </ul>
Site Detention/Retention Basins	<ul style="list-style-type: none"> <li>- overall management of site stormwater</li> <li>- linked to all bio-retention areas</li> <li>- vegetated with native low water plant material and hydroseed</li> </ul>

**Summary and Conclusions**

The preliminary analysis presented herein provide a summary of the best landscape management practices to achieve the Town’s goal of greatly reducing landscape water use at Old Home Manor. In addition, the recommended design methods will mitigate stormwater run-off, provide supplemental irrigation opportunities and boost the overall aesthetics of the property. These benefits decrease stormwater infrastructure cost and enhance property value.

The reduction and/or elimination of landscape material will produce negative long term effects. Moderated plant zones require higher maintenance associated with weed removal, resulting in ongoing expenses. They also intensify stormwater runoff flows causing unsightly erosion and costly underground infrastructure systems.

The higher costs of the native landscape areas and green infrastructure (passive and active rainwater harvesting) can be offset by amending the current landscape ordinance. Reducing the required container size and encouraging the use of native hydroseed applications will significantly decrease overhead costs of typical landscape materials. The native areas also produce substantial long term savings from reduced water and maintenance requirements.

## LANDSCAPE ORDINANCE

During the development of the IWMP, suggested revisions to the Town of Chino Valley Landscape Section of the Uniform Development Ordinance (UDO) were provided for Town Staff review and comment. As a result of the cooperative effort between the Town and the Civiltec Team, a draft set of ordinances with suggested revisions, deletions, and explanation of the changes is included as an attachment to this IWMP.

### 4.2 TASK 2 - OUTDOOR LANDSCAPE DESIGN WORKSHOP

Two workshops were conducted with the Town Staff and members of the Water Commission during the course of the development of the Landscape design concepts and draft ordinances. In addition to the workshops, separate submittals and meetings were conducted with Staff for review of the draft Landscape Ordinance.

The initial workshop was conducted with Town Staff on December 9, 2020 and a second combined Water Resources and Recharge workshop that included an overview of the prior workshop was conducted with Town Staff and Council representatives on January 12, 2021. The minutes of the workshops were distributed to Town Staff to document the results of the meetings. The following summarizes the Items covered:

#### 1. IWMP Landscaping Concepts Review

- The need to install native low water planting:
  - Review of Prescott AMA approved plant list with revisions for a Chino Valley Plant List
  - Review of native plant images
- Rainwater harvesting: Passive and Active
- Review of proposed concepts for OHM – plan

#### 2. Town of Chino Valley Draft Landscaping Ordinances Review

- Review of the exiting landscape ordinances
- Proposed revisions
- Draft OHM Landscape Standards

### 4.3 TASK 3 - OUTDOOR LANDSCAPE PLAN TECHNICAL MEMORANDUM

A Landscape Technical Memorandum was prepared for the IWMP identifying general landscape and water use issues to greatly reduce landscape water use for new development in the Old Home Manor area. Information in regard to the existing climatic conditions and data for the Town, a summary of the existing landscape requirements for new developments, presentation of landscape costs, native landscape plant recommendations, identification of green infrastructure stormwater solutions for irrigation, and landscape standards were included. The Technical Memorandum is included as an attachment to this report.

## 5 PHASE 5 - PROJECT ADMINISTRATION

### 5.1 TASK 1 - PROJECT MEETINGS & WORKSHOPS ADMIN

The project started with a kick-off meeting in March of 2020 and included multiple project status and progress meetings, video conferences, email correspondence, teleconferences and video/in person workshops for obtaining Town Staff and Committee input. Presentations were made to the Water & Utility Subcommittee via work sessions and/or meetings to review the results and recommendations for the IWMP. A summary of interim submittals and formal meetings is as follows:

- Kick-off Meeting on March 10, 2020
- RV Park Zoom Video conference on March 24, 2020
- Old Home Manor IWMP Draft Planning Exhibits for Review on May 26, 2020
- Progress Meeting on June 25, 2020
- Draft IWMP Master Plan Report for Review on July 16, 2020
- Progress Meeting Zoom Video conference on August 18, 2020
- Water System Workshop on September 24, 2020
- Recharge Basins Zoom Video conference on September 30, 2020
- Draft Old Home Manor RV Park DCR for review on October 12, 2020
- Final Old Home Manor RV Park DCR on October 19, 2020
- Water Resources Zoom Video conference on November 9, 2020
- Water Pressure Zones TEAMS Video conference on November 19, 2020
- Capital Improvements Plan Priorities Meeting on November 23, 2020
- Landscape and Ordinances Workshop on December 9, 2020
- Water Resources and Recharge Workshop with Landscape Review Zoom Video conference on January 12, 2021

In addition to the items noted above, the team has assisted the Town in the development of the assured water supply submittals to ADWR for Old Home Manor.

The minutes of all the formal meetings are included as attachments to this IWMP. It should be noted that due to the COVID 19 pandemic workplace restrictions that started in March/April of 2020, the project completion extended beyond the originally final submittals anticipated in late November of 2020.

### 5.2 TASK 2 - MASTER PLAN REPORT - STAND ALONE EXECUTIVE SUMMARY

A color brochure style executive summary of the completed Master Plan will be provided for distribution to the Town Council, Town Leadership/Staff, stakeholders and the general public as a part of the final documents for the project. A draft summary will be provided to Town Staff for review and comment prior to issuance of the final executive summary. Thirty (30) copies of the preliminary and final executive summary will be provided along with digital versions of the documents.

### **5.3 TASK 3 - INTEGRATED WATER MASTER PLAN DRAFT REPORT**

Fifteen (15) copies of the complete draft IWMP report will be provided to the Town for review and comment.

### **5.4 TASK 4 - INTEGRATED WATER MASTER PLAN FINAL REPORT**

Fifteen (15) copies of the IWMP report will be provided to the Town as our final IWMP deliverable. Digital versions of the documents will also be provided.

### **5.5 TASK 5 - CIP DRAFT REPORT**

Fifteen (15) copies of the draft CIP report will be provided to the Town for review and comment.

### **5.6 TASK 6 - CIP FINAL REPORT**

Fifteen (15) copies of the final CIP report will be provided to the Town as our final CIP deliverable. Digital versions of the documents will also be provided.

### **5.7 TASK 7 - MASTER PLAN MODEL DELIVERY**

The newly developed and completed Town water and wastewater hydraulic models and supporting documents will be provided to the Town under separate cover.

### **5.8 TASK 8 - DIGITAL DOCUMENT MANAGEMENT**

Final deliverables for this study will include printed materials and support documents in an indexed and searchable PDF file format. Electronic copies of all the final documents in the Master Plan will be furnished in MS Word and Excel formats as appropriate. Final furnished maps shall be in a GIS file format compatible with the Town's GIS systems.

## **6 SUMMARY & ATTACHMENTS LIST**

The Old Home Manor area is an integral part of the future of commercial and industrial growth within the Town of Chino Valley. This Integrated Water Master Plan and Capital Improvement Plan will serve as a guide to provide the utility infrastructure requirements necessary for the of the Old Home Manor area as the community continues to grow and provide opportunities for development within the Town.

The report is a snapshot in time and is anticipated to be updated based on the actual development that occurs in the Old Home Manor area over time and as development priorities change. The current CIP anticipates development to occur in the southerly portion of the Business Park and within the RV Park area.

---

**ATTACHMENTS:**

The following attachments are included and made a part of this IWMP for the Old Home Manor development area:

**Technical Memorandums:**

- Water System Technical Memorandum
- Sewer System Technical Memorandum
- Water Resources and Recharge Water Combined Technical Memorandum
- Integration Technical Memorandum
- Landscape and Draft Ordinances Technical Memorandum
- 5-Year Capital Improvements Plan and Technical Memorandum

**Meeting Minutes:**

- Kick-off Meeting on March 10, 2020
- Progress Meeting on June 25, 2020
- Progress Meeting Zoom Video conference on August 18, 2020
- Water System Workshop on September 24, 2020
- Recharge Basins Zoom Video conference on September 30, 2020
- Water Resources Zoom Video conference on November 9, 2020
- Water Pressure Zones TEAMS Video conference on November 19, 2020
- Capital Improvements Plan Priorities Meeting on November 23, 2020
- Landscape and Ordinances Workshop on December 9, 2020
- Water Resources and Recharge Workshop with Landscape Review Meeting on January 12, 2021

# Community Water System / Old Home Manor Technical Memorandum

## Chino Valley, AZ



**For:** Town of Chino Valley

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TOWN OF CHINO VALLEY, AZ  
OLD HOME MANOR INDUSTRIAL PARK  
WATER SYSTEM SCHEMATIC

**PRELIMINARY**

  
**CIVILTEC**  
engineering inc.

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## 1 INTRODUCTION

This report was commissioned by the Town of Chino Valley Public Works Department. Its purpose is to study and report on hydraulic characteristics of the main Chino Valley Water supply and distribution system for planning purposes related to serving areas of Old Home Manor with domestic and fire flows of potable water for development purposes. Old Home Manor is an area of Chino Valley lying east of Jerome Junction, and north of Perkinsville Road. Old Home Manor is mostly vacant land and contains the location of the Chino Valley wastewater treatment plant, recharge basins, park facilities, and Yavapai College extension. See Figure 1-1.

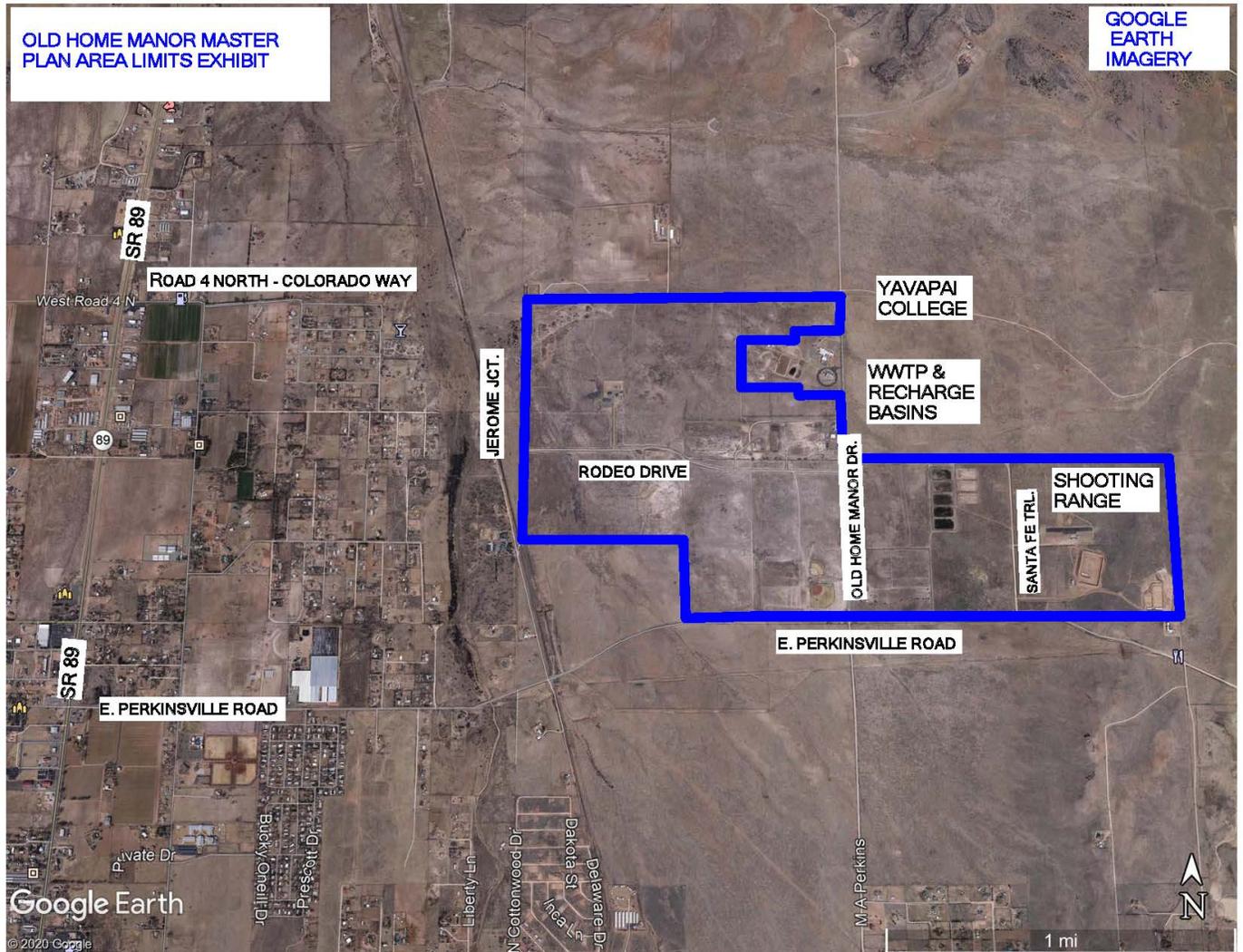


Figure 1-1 Old Home Manor Area

The Town has provided a concept plan showing proposed land use for the various portions of Old Home Manor. Planned uses include ballfields, business park, equestrian park, RV park, parks and recreation, infiltration basins, public works/wastewater treatment plant, undetermined, Yavapai College Agricultural

Community Water System and Old Home Manor Water System Technical Memorandum

Extension, and a shooting range with model airport. See Figure 1-2. The main function of this memorandum is to report on model results and analyze the existing potable water system in this vicinity, and the effects of extending this system in order to serve Old Home Manor as shown on the Land Use Plan. The primary focus at this point is to identify current and future water system demands for the Chino Valley Community Water System (CWS), analyze associated system flows and pressures, and report on future infrastructure needs associated with a timed-buildout of the Old Home Manor complex.

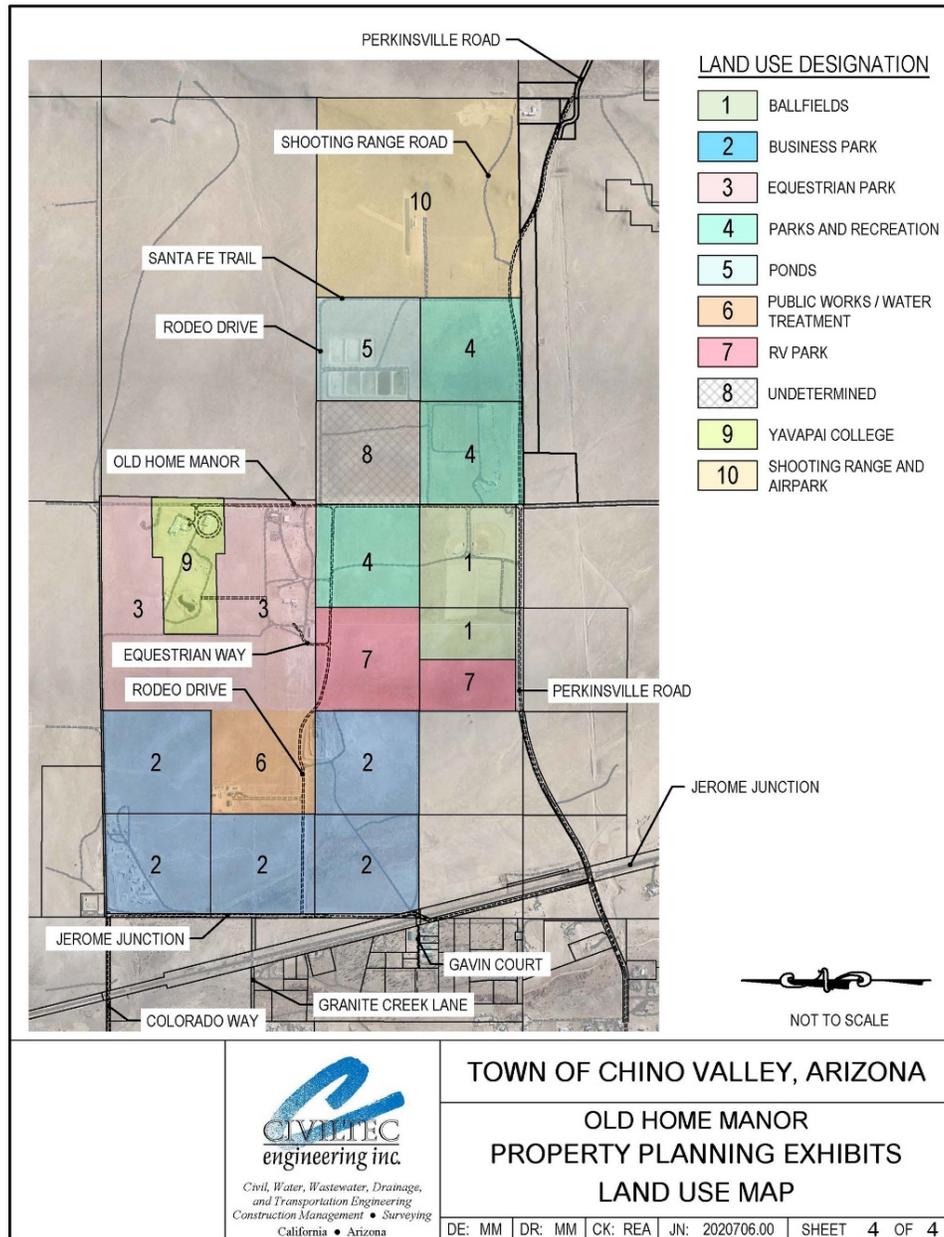


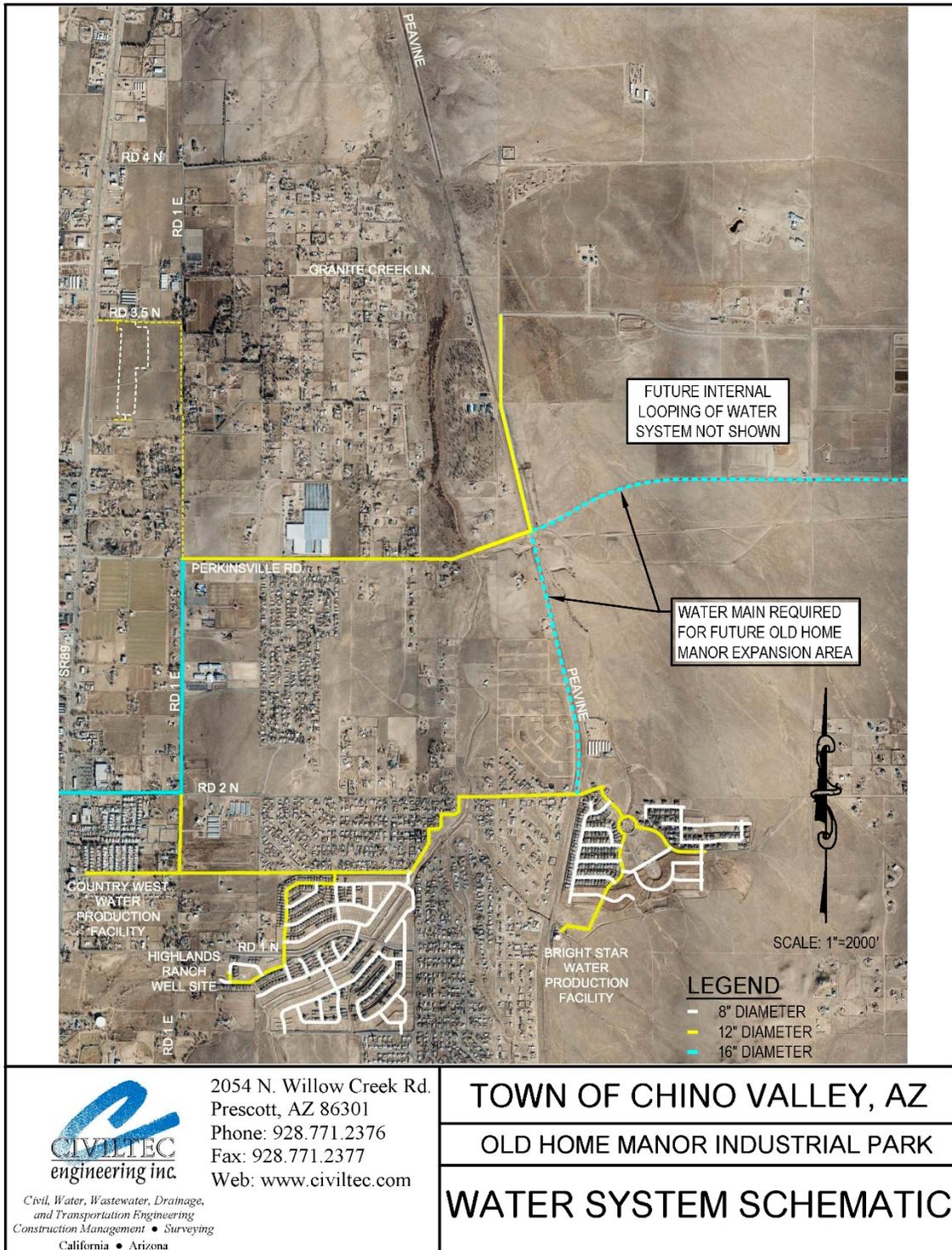
Figure 1-2 Old Home Manor Land Use Concept

## 2 SYSTEM OVERVIEW

The existing supply for this area of Chino Valley consists of a Production, Storage, and Pressure Facility (PSPF) No. 1 and 2. PSPF No. 1 (Community Water System) is the primary production facility for the system and consists of one production well capable of producing 1100 GPM or 1.584 mgd. The water produced from this well is pumped into a 1 mg steel above ground storage reservoir. The reservoir feeds to a Flowtronex booster station capable of producing 2500 gpm under certain head conditions and has a set point for 6 variable speed pumps of 60 psi. Well No. 1 which is associated with PSPF No. 1 is the primary production well and is equipped with a 125 HP submersible pump able to produce 1100 gpm. PSPF No. 1 is located southwest of the Bright Star development (south of Road 2 North and east of the Peavine Trail). Distribution piping main lines from this facility exists throughout Bright Star, and continues west along Road 2 North, southwest along Lake Shore Drive, west along Juniper Drive, north along Road 1 East, and east along Perkinsville Road and north along Tree Farm Lane to an end at Rodeo Road. The distribution piping main lines described are 12 inch and 16-inch diameter mains.

PSPF No. 2, the Country West Water Production Facility is a secondary production facility for the system and consists of one production well with a 50 HP Gould submersible pump model 8RJLC capable of producing 500 gpm or 720,000 gallons per day (gpd). The water produced from this well is pumped to a 165,000-gallon storage tank which feeds a 30HP triplex booster station also set at 60 psi. Well No. 2 is the secondary well and is equipped with a 5 HP submersible pump. PSPF No. 2 is considered in the analyses herein but well no. 2 of PSPF No. 2 is not due to its primary use as a redundant system and limited capacity and size.

See Figure 2-1 for a visual schematic of the location of PSPF No. 1 and emanating distribution mains. The Highlands Ranch well site is shown on Figure 2-1, and although it is constructed, it is not in service at this time.



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**TOWN OF CHINO VALLEY, AZ**  
**OLD HOME MANOR INDUSTRIAL PARK**  
**WATER SYSTEM SCHEMATIC**

Figure 2-1 Water System Schematic

### 3 SYSTEM DEMANDS

Existing system demands primarily consist of residential, commercial and park demands. System production characteristics for the Bright Star and Country West facilities have been analyzed based on daily and monthly metering reports for the past 5 years as provided by Town staff. Particular attention was applied to the past three years of metering results. Average daily demands and maximum daily demands were analyzed for residential, commercial, and other applications associated with the planned facilities at Old Home Manor. Turf watering demands for the Chino Valley Community Center were analyzed separately due to their volume percentage being a large portion of maximum daily demands. Historical production for the Chino Valley Community Water System (CWS) which is made up of the Bright Star and Country West Facilities for the past 5 years are shown in Table 3-1.

Table 3-1 CWS Historical Production

Year	Bright Star Total (GPY)*	Bright Star ADD (GPD)	Bright Star MDD (GPD)**	CW Total (GPY)*	CW ADD (GPD)	CW ADMM (GPD)***
2015	65,681,100	179,948	428,639	6,598,094	18,077	37,825
2016	70,318,500	192,653	428,833	4,641,198	12,716	27,475
2017	76,924,400	210,752	578,360	3,941,111	10,798	21,745
2018	76,796,600	210,402	463,198	3,764,400	10,313	15,365
2019	76,919,200	210,738	412,528	5,189,500	14,218	21,881

\*From Monthly Metering Reports

\*\*From Daily Production Reports

\*\*\*Average Daily Production during Maximum Month

#### 3.1 RESIDENTIAL DEMANDS

Average daily residential demands were calculated on a per-lot basis based upon existing Town metering data, ADWR adopted rate values, ADEQ rate values, City of Prescott rate values and Engineering Bulletin No. 10 rate values. See results in Table 3-2.

Table 3-2 Residential Demands

	Chino Valley Meters	ADWR Rate	ADEQ Rate	Bulletin 10 Rate	City of Prescott Rate	Average
GPD per Lot	132.8	218	240	250	240	216

Using an average of 2.5 persons per Lot, this results in a GPCPD rate of 86.

### 3.2 COMMERCIAL (BUSINESS PARK) DEMANDS

Average daily commercial demands were calculated on a gallons-per-day per acre (GPD/AC) basis based upon existing Town metering data, ADWR adopted rate values, ADEQ rate values, City of Prescott rate values, and EPA values. See results in Table 3-3.

Table 3-3 Commercial Demands

	Chino Valley Meters	ADWR Rate	ADEQ Rate	City of Prescott Rate	EPA Rate	Average
GPD per Acre	743	1040	1452	518	740	899

The average GPD/Ac rate of 899 was compared to an annual AF/Ac rate of 1.0 (893 GPD/Ac) and the value of 893 GPD/Ac was used for the purposes of this report.

### 3.3 TURF WATERING DEMANDS

During summer months of larger demands, metered turf usage for the Community Center ballfields was analyzed separately in order to derive a general percentage of maximum monthly flows utilized by turf irrigation. Town staff provided metered turf watering demands during summer months of high demand for 2017, 2018 and 2019. Results are shown in Table 3-4. Average daily demands for turf watering were modeled, however due to unbalanced demands throughout the year (summer month watering vs. winter month watering) a large maximum day to average day peaking factor was used. See Section 3.6 for Peaking factors. Average annual use for 2017, 2018 and 2019 was 12,091,871 gallons for 8.7 acres watered. This yields 3808 gpd/ac average daily demand for turf irrigation (365 days) (4.2 AFY/Ac) which is utilized for the purposes of this report.

Table 3-4 Turf Watering Demands

Mo/Year	Turf Usage (Community Center)	Bright Star Mo. Production	CW Mo. Production	Total Mo. Production	% Used for Turf
Aug. 2017	2,361,535	8,782,500	460,500	9,243,000	26%
Aug. 2018	2,228,006	7,648,000	368,300	8,016,300	28%
Jul. 2019	2,377,498	10,780,700	646,000	11,426,700	21%

For the planning horizons considered in this memorandum, a factor of 0.20(MDD) or 20% of maximum daily demand was used as the maximum daily design flow for turf usage at the existing Community Center ballfields and proposed turf portions of ballfields planned at Old Home Manor. Figure 3-1, Figure 3-3 and Figure 3-2 show historical turf irrigation vs total production rates for the CWS on a monthly basis for 2017, 2018 and 2019.

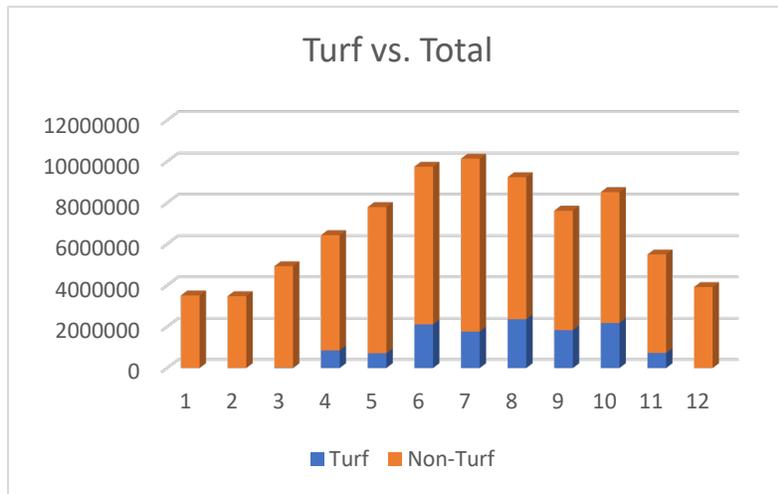


Figure 3-1 - 2017

Community Water System and Old Home Manor Water System Technical Memorandum

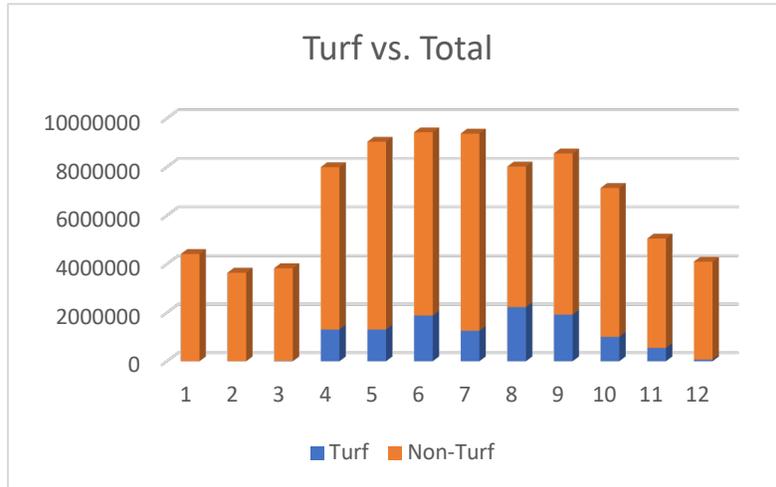


Figure 3-3 - 2018

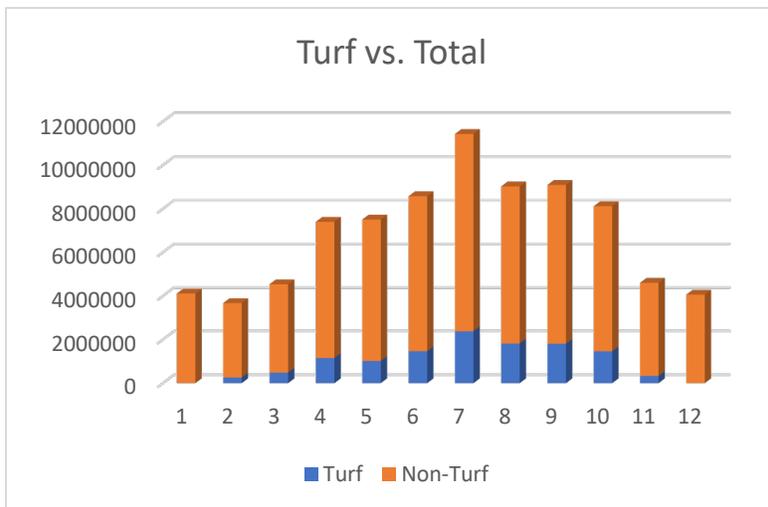


Figure 3-2 - 2019

### 3.4 R.V. PARK DEMANDS

RV Park demands were calculated based on a gallons-per-day per RV space and converted to gallons-per-day per Acre basis using a constant rate of 6 RV spaces per acre density. They were derived from the ADEQ rate of 100 gal/space/day wastewater production and increased 20% to account for other water use demands such as clubhouse needs, campsite needs, and common recreational area needs. The City of Prescott rates of gallons-per-day per RV space of 120 for RV Parks.

Low water use landscaping demands have been added to these demands at a rate of 442 GPD/Ac. (33% of 1.5 AFY/Ac).

Results are shown in Table 3-5.

Table 3-5 – RV Park Demands

	ADEQ Rate (GPD/Space)	City of Prescott Rate (GPD/Space)	Average GPD/Space	Spaces/AC	GPD/AC	Landscaping	Total
GPD per Acre	100+20	120	120	6	720	442	1162

### 3.5 OTHER DEMANDS ASSOCIATED WITH OLD HOME MANOR

Other demands associated with the future development of Old Home Manor include ballfields, equestrian park, parks and recreation, rapid infiltration basins, public works/wastewater treatment and shooting range demands. Average daily demands for these categories are based upon calculations described as follows:

#### 3.5.1 BALLFIELDS

It is assumed that the 60-acre parcel identified as ballfield use will be comprised of approximately 15 acres of parking, 15 acres of ballfield turf, and 30 acres of low-water use area. It is also assumed that the parking areas will utilize low-water use irrigation therefore we have assigned 25% turf at 4.2 AFY/AC and 75% low-water use area at 1.5 AFY/AC.

$$0.25(4.2)+.75(1.5) = 2.18 \text{ AFY/AC} = 1956 \text{ GPD/Ac Average Daily Demand.}$$

### **3.5.2 EQUESTRIAN PARK**

Equestrian park average daily demands were calculated using an annual rate of 1.0 AFY/AC (very low-water use). This amounts to an average daily demand of 893 gallons-per-day per acre.

### **3.5.3 PARKS AND RECREATION**

Parks and recreation average daily demands were calculated on a weighted basis, assuming 90 percent of the land area for this category would be low-water use and 10% potentially turf.

$0.9(1.5)+0.1(4.2)=1.77$  AFY/AC or 1586 gallons-per-day per acre.

### **3.5.4 RAPID INFILTRATION BASINS**

This category is assumed to have an extremely low-water demand rate. A rate of 0.5 AFY/AC was utilized to account for management, cleaning, scarifying, and maintenance which amounts to an average daily demand of 446 gallons-per-day per acre.

### **3.5.5 PUBLIC WORKS/WATER TREATMENT**

An annual demand of 1.0 AFY/AC was assigned to the public works facility portion of this category which is the same rate as commercial or business park use. It was increased by 50% in order to account for demands associated with the wastewater treatment facility which is considered as the remaining part of this category resulting in an average annual demand of 1.5 AFY/AC or 1339 gallons-per-day per acre.

### **3.5.6 UNDETERMINED**

There is a 36.6-acre parcel in Old Home Manor which the use category has not been determined. In discussions with Town staff, it has been assigned the same average daily demand rate as the RV park category of 1162 gallons-per-day per acre.

### **3.5.7 SHOOTING RANGE/AIRPARK**

This category is assumed to have a very low water demand rate. A rate of 1.0 AFY/AC was utilized to account for the possible demands for cleaning, maintenance and low water use type demands which amount to an average daily demand of 893 gallons-per-day per acre.

### **3.5.8 FIRE FIGHTING DEMANDS**

According to the Central Arizona Fire and Medical Authority, buildings with a floor area greater than 5,000 square feet require fire sprinklers. The Authority adheres to the requirements set forth in the 2018 International Fire Code. Code requires a fire flow rate of 2,000 gpm for a two-hour duration for Type V commercial structures between 4801 and 6200 square feet (Table B105.1(2)). When fire sprinklers are utilized, minimum fire flow rates can be reduced to 25% of the value in Table B105.1(2) as referenced in Table B105.2. However, this reduced rate cannot be less than 1,000 gpm. Therefore, for the purposes of this report, we have analyzed the system characteristics with a fire flowrate of 2,000 gpm for a 2 hour duration. Minimum system residual pressures cannot be less than 20 psi.

### 3.6 PEAKING FACTORS

#### 3.6.1 NON-TURF

Due to the large percentage of turf watering usage on an annual basis, it was subtracted from the annual production volumes for Bright Star and Country West production facilities and non-turf maximum daily demands were divided by non-turf average daily demands to result in a non-turf associated peaking factor. These peaking factors were averaged over a 3-year period being 2017, 2018 and 2019.

Year	Avg. Day non-turf demands	Max. Day non-turf demands	MDD/ADD Factor	Average MDD/ADD Factor
2017	187,091	471,132	2.53	2.09
2018	189,158	368,344	1.93	
2019	191,585	349,214	1.82	

Engineering Bulletin 10 suggests the use of 2.0 for an MDD to ADD peaking factor. The City of Prescott suggests use of 1.8. For the purposes of this report and model, a peaking factor of 2.0 was used.

#### 3.6.2 TURF

Turf watering peaking factor was determined by dividing the maximum daily turf watering demand by the average daily turf watering demand. The average daily demand was spread out over a 365-day annual basis even though the turf watering months are typically less than year-round. This yields a relatively high peaking factor which accurately represents actual demand conditions. Maximum daily turf demands were calculated based on 20% of the total maximum daily demand being attributed to turf watering.

Total MDD*	20% of Total MDD	Turf ADD	Peaking Factor
511,143	102,229	33,128	3.09

\*Avg. 2017-2019

## 4 BOOSTER STATION CAPACITY

The main Community Water System booster station is located just east of the Peavine Trail, south of the Bright Star subdivision. It is also known as the Bright Star Water Production and Booster Station Facility. The booster station is equipped with a 3 HP jockey pump, twin 25 HP VFD domestic supply pumps, a 50 HP VFD domestic supply pump and three 75 HP VFD's for fire flow pumping purposes. All pumps are Gould, and motors are 460-volt, 3 phase power, 3500 RPM. A stand-by generator exists on site. Table 4-1 describes the pump particulars for this booster station.

*Table 4-1 Booster Station Pump Characteristics*

<b>Pump</b>	<b>Model No.</b>	<b>Impeller Dia.</b>	<b>Motor HP</b>	<b>Outlet Pressure*</b>	<b>Flowrate*</b>
Jockey	2SVB1H2G0	3.75"	3	95.2 psi	25 gpm
Domestic 1	46SVBC22P3DA	5.19"	25	95.7 PSI	250 gpm
Domestic 2	16BF1S2B0	7.69"	50	95.7 psi	502 gpm
Fire	12BF1U2J0	8.31"	75	95.2 psi	750 gpm

\*at Duty Point

The modeling characteristics in this report utilize the 25 HP pumps for Average Daily Demands, the 50 HP pump for Maximum Daily Demands, and the 75 HP pumps for fire flow demands. See respective pump characteristic curves for all pumps.

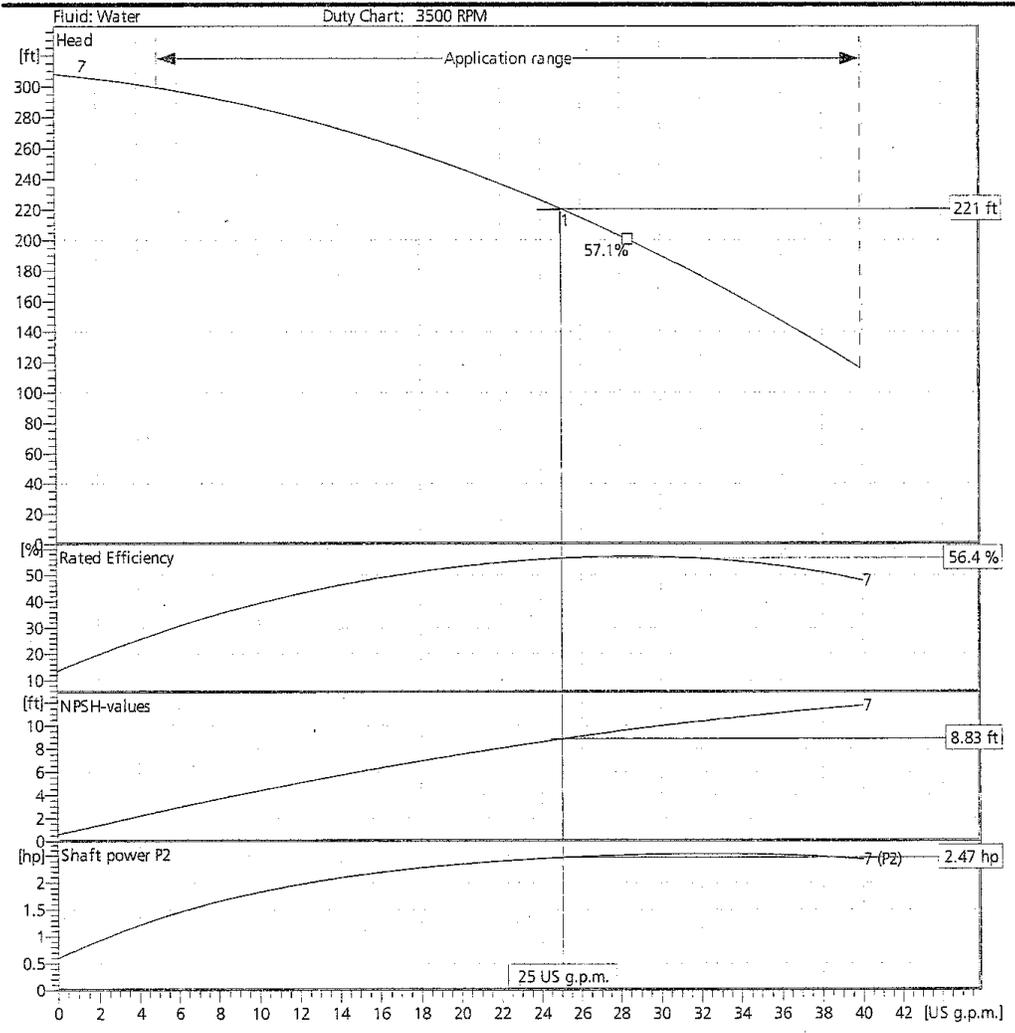
The secondary Community Water System booster station is located just east of SR89 between Road 2 North and Road 1 North. It lies at the southwest corner of the Country West housing complex. It is known as the Country West Water Production and Booster Station Facility. The booster station is equipped with three 30 HP Goulds 3656/3756 pumps with a maximum output of 1200 gpm. The Country West booster station is a backup system yet runs daily to maintain continuous movement of water through its well and pipe network.

# Performance Data

**SSVB 304SS**  
 Vertical Multi-stage  
**MODEL : 2SVB1H2G0**

Hydraulic Data				Motor Data		SSV	Quantity
Maximum Flow	Flow at Duty Point	Maximum TDH	TDH at Duty Point	NPSH <sub>R</sub>	Voltage / Phase / Enclosure	Model	
40 US g.p.m.	25 US g.p.m.	308 ft	220 ft	9 ft	460V 3PH ODP	2SVB1H2G0	1

Submittal Prepared for: \_\_\_\_\_ Job: \_\_\_\_\_  
 Engineer: \_\_\_\_\_ Contractor: \_\_\_\_\_  
 Submittal Prepared by: \_\_\_\_\_ Company: \_\_\_\_\_  
 Submittal Date: 4/1/2008 Approved by: \_\_\_\_\_ Date: \_\_\_\_\_



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Figure 4-1 Existing Bright-Star Jockey Pump Curve

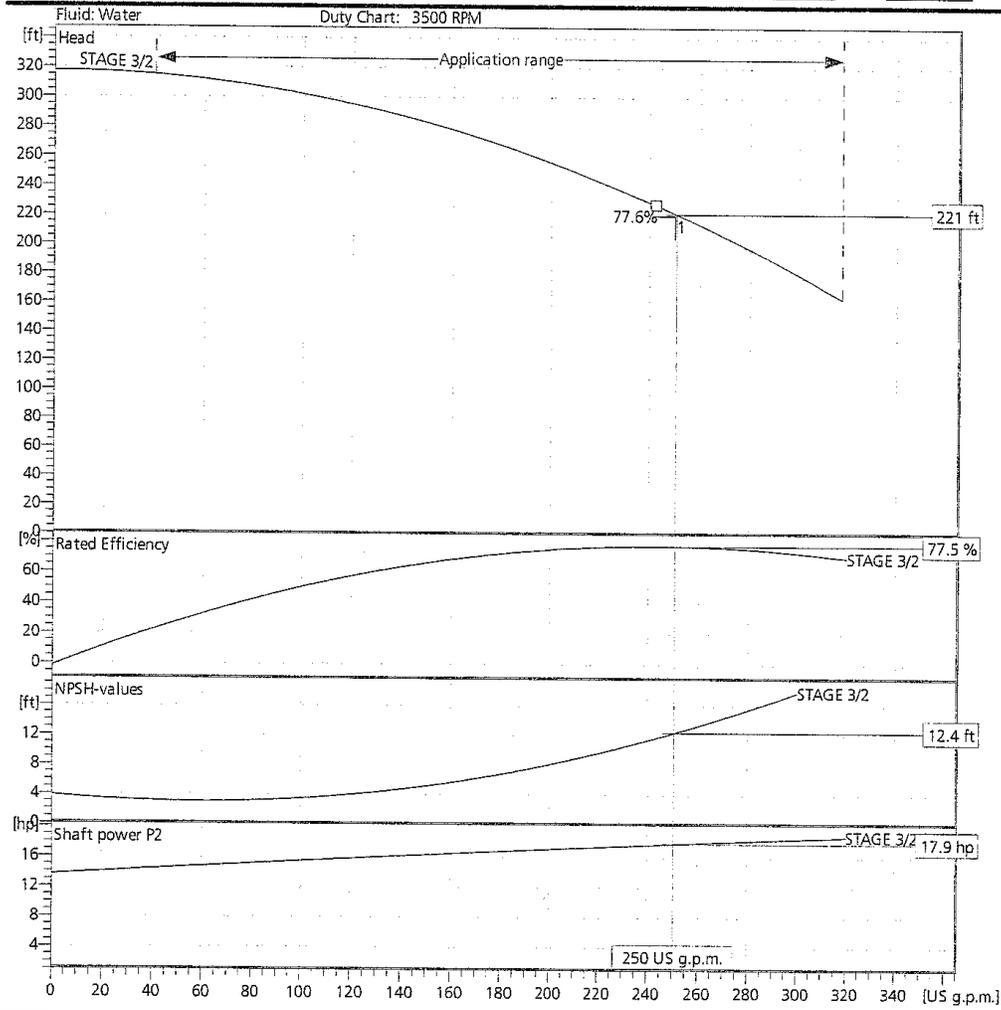


# Performance Data

**SVB CI/316SS ANSI CI 250**  
 Vertical Multi-stage  
**MODEL : 46SVBC22P3DA**

Hydraulic Data					Motor Data	SSV Model	Quantity
Maximum Flow	Flow at Duty Point	Maximum TDH	TDH at Duty Point	NPSH <sub>R</sub>	Voltage / Phase / Enclosure		
318 US g.p.m.	250 US g.p.m.	318 ft	220 ft	12 ft	460V 3PH ODP	46SVBC22P3DA	1

Submittal Prepared for: \_\_\_\_\_ Job: \_\_\_\_\_  
 Engineer: \_\_\_\_\_ Contractor: \_\_\_\_\_  
 Submittal Prepared by: \_\_\_\_\_ Company: \_\_\_\_\_  
 Submittal Date: 4/1/2008 Approved by: \_\_\_\_\_ Date: \_\_\_\_\_



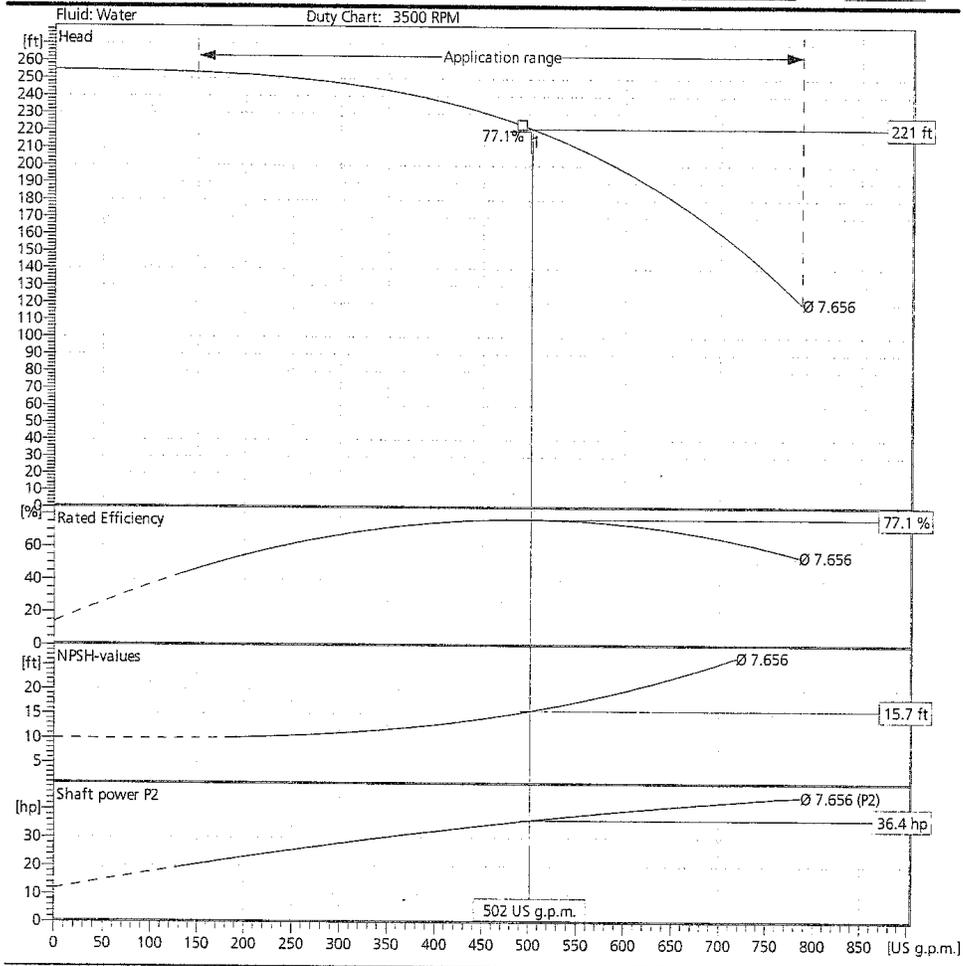
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Figure 4-2 Existing Bright-Star 25 HP Domestic Pump

## 3656 M&L Bronze Fitted End Suction Performance Data MODEL : 16BF1S2B0

Hydraulic Data					Motor Data		3656/3756 M L Group	Quantity
Maximum Flow	Flow at Duty Point	Maximum TDH	TDH at Duty Point	NPSH <sub>R</sub>	Voltage / Phase / Enclosure	Model		
787 US g.p.m.	500 US g.p.m.	255 ft	220 ft	16 ft	460V 3PH ODP	16BF1S2B0		1

Submittal Prepared for: \_\_\_\_\_ Job: \_\_\_\_\_  
 Engineer: \_\_\_\_\_ Contractor: \_\_\_\_\_  
 Submittal Prepared by: \_\_\_\_\_ Company: \_\_\_\_\_  
 Submittal Date: 4/1/2008 Approved by: \_\_\_\_\_ Date: \_\_\_\_\_



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Figure 4-3 Existing Bright-Star 50 HP Domestic Pump

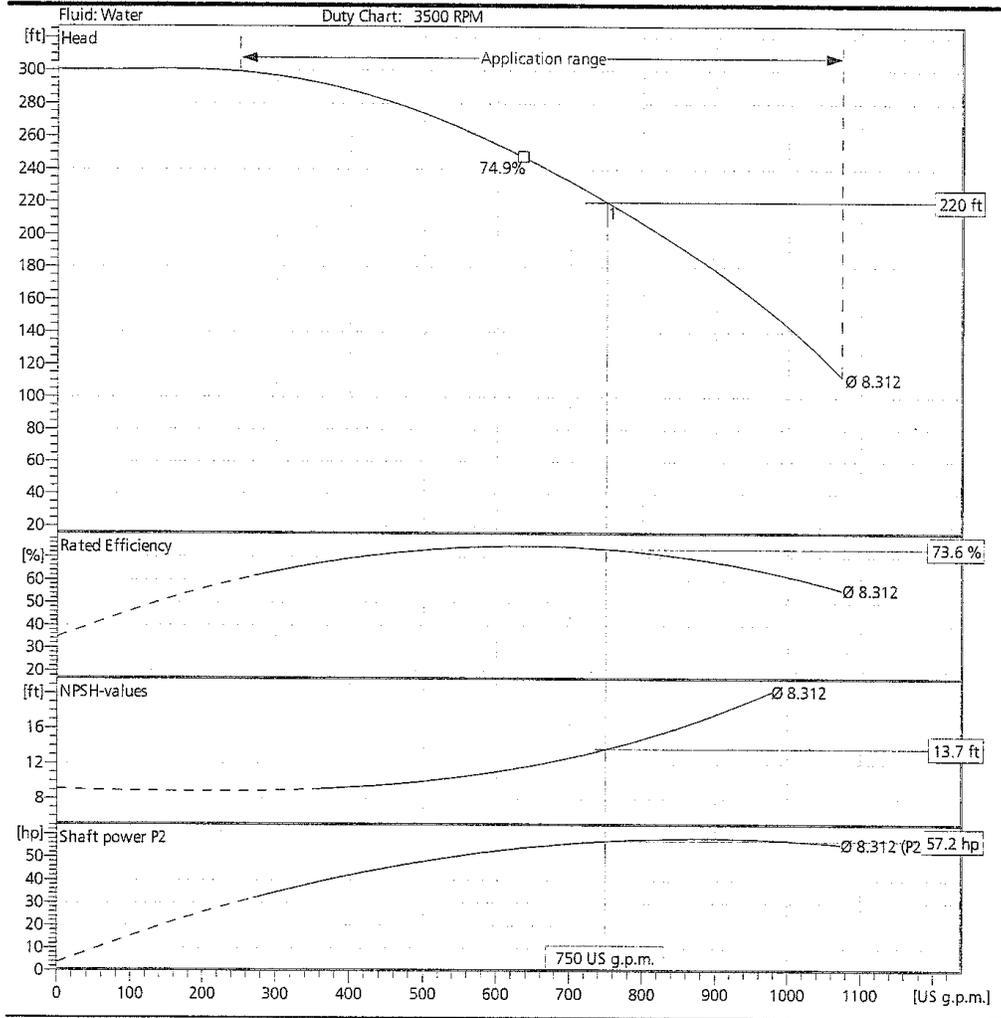


# Performance Data

**3656 M&L Bronze Fitted  
End Suction  
MODEL : 12BF1U2J0**

Hydraulic Data				Motor Data		3656/3756 M L Group	Quantity
Maximum Flow	Flow at Duty Point	Maximum TDH	TDH at Duty Point	NPSH <sub>R</sub>	Voltage / Phase / Enclosure	Model	
1,078 US g.p.m.	750 US g.p.m.	301 ft	220 ft	14 ft	460V 3PH ODP	12BF1U2J0	1

Submittal Prepared for: \_\_\_\_\_ Job: \_\_\_\_\_  
 Engineer: \_\_\_\_\_ Contractor: \_\_\_\_\_  
 Submittal Prepared by: \_\_\_\_\_ Company: \_\_\_\_\_  
 Submittal Date: 4/1/2008 Approved by: \_\_\_\_\_ Date: \_\_\_\_\_



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Figure 4-4 Existing Bright-Star 75 HP Fire Capacity Pumps

## 5 SYSTEM SUPPLY

The current Community Water System is supplied by three wells. The main production well is located in the Bright Star facility. It is registered as a non-exempt well with registration no. 55-219691. It is 723 feet deep and equipped with a 100 HP Gould submersible pump capable of delivering 1100 gpm.

The second and third wells are located at the Country West facility. One is a main production well and the other is a backup supply. The production well is registered as a non-exempt well with registration no. 55-621557. The backup is also non-exempt with registration no. 55-595220. The production well is 433 feet deep with a 50 HP Gould submersible pump model no. 8RJLC capable of delivering 500 gpm. The backup well is 410 feet deep with a capacity of 60 gpm.

A fourth well exists at Highlands Ranch and was drilled in 1947. It is 551 feet deep and is not in service due to misalignment. According to information provided by Town staff, this well would have a production capacity of approximately 1,000 gpm.

Section 8.3 illustrates the current system's high level of dependency on the Bright Star well for supply. If this well is out of service, the system will experience supply levels below maximum daily demands. It is recommended that an additional redundant well be provided in the system that can be utilized if the Bright Star well goes down. The redundant well can be used in an alternating sequence in order to provide rest-time for the Bright Star well and as a backup supply source in case of the Bright Star well being out of service. If in compliance with ADWR well placement requirements, the redundant well could be in the vicinity of Bright Star, Highlands Ranch or other areas near the Bright Star production facility.

If a new well is provided in the Highlands Ranch vicinity, and existing distribution piping network is used to supply the system, it could be connected directly to the distribution system and used to fill the Bright Star tank by inclusion of a pressure sustaining valve bypass set at a higher pressure than the target pressure for the Bright Star pump station. This would allow for tank filling without continuous recycling of distribution system flows through the tank. Another alternative would be to construct a low-pressure transmission main from the Highlands Ranch area directly to the Bright Star tank (inlet side) for re-filling.

If a redundant well is positioned near the existing Bright Star facility, a physical connection could be made directly to the inlet line for the tank.

## 6 STORAGE

The principal function of system storage is to provide reserve supply for operational (domestic) demands, fire suppression reserves, and emergency needs. Operation storage is intended to make up the difference between the consumer's peak demands and the system's available supply. Fire storage is the amount of stored water required to provide a specified fire flow for as specified duration. Emergency storage is the volume of water recommended to meet demand during emergency situations such as line breakage.

Required storage can be expressed as follows in Equation 1:

*Equation 1 Storage Volume*

$$SR = NFF + ES + OS$$

Where:

SR = storage required

NFF = needed fire flow storage volume

ES = emergency storage volume

OS = operational storage volume

## **6.1 FIRE FLOW (NFF)**

As stated previously, the fire flow demand utilized for this analysis is 2,000 gallons per minute for a 2-hour minimum duration.

The needed fire flow volume (NFF) for this scenario is  $2000(2)(60) = 240,000$  gallons.

## **6.2 EMERGENCY STORAGE (ES)**

Emergency or reserve storage capacity is an additional volume of water that is held in the reservoir to meet various emergency conditions such as facility outages or line breaks. The amount of emergency storage that a utility should plan for is largely based on judgment and is influenced by a number of factors such as power outage history, line break frequency, and overall supply redundancy. Customarily, emergency storage can range from 10 percent of maximum daily demand to 100 percent of maximum daily demand. Adopting this customary range and a maximum daily demand of 663,000 gal which utilizes residential demands of 216 GPD/lot, emergency storage would range between 66,000 gallons and 663,000 gallons. For the purposes of this study, we have used a value of 15%  $0.15(MDD)$  or 100,000 gallons for emergency storage. As mentioned, the Country West water production facility has additional system storage of 165,000 gallons which can augment the Bright Star storage volume of 1,000,000 gallons.

## **6.3 OPERATIONAL STORAGE (OS)**

Operational storage is storage capacity to meet diurnal demand fluctuations and is the volume of water required to meet the peak hour demands exceeding the maximum day demand rate. For storage volume planning, a value of 25 percent of maximum day demand is used to account for diurnal fluctuation.  $OS = 0.25(663,000) = 166,000$  gallons.

$$SR_1 = 240,000 + 100,000 + 166,000 = 506,000 \text{ gallons.}$$

At this point in time, the existing storage at the Bright-Star facility is more than adequate for storage needs, with the existence of additional storage at the Country West facility adding even more redundancy.

It is estimated that additional system storage be provided as the year 2030 approaches. This is based on system modeling and estimated demands due to population growth and development of Old Home Manor. Total storage required in 2030 is estimated to be 1,251,000 gallons and 1,400,000 in 2035. The system has been modeled with an additional 500,000 gallon tank provided in 2030.

## 7 PRESSURE ZONES

Currently, the CWS consists of one pressure zone. As previously mentioned, the Bright Star and Country West production facilities serve the zone with a set pressure of 60 psi. This yields a static hydraulic gradeline of 4847 for the existing zone. Old Home Manor can be served by this zone, however, high system pressures (up to 110 psi) will be experienced in the western portion of the property which is in the business park area.

It is anticipated that the set pressure for the Bright Star and Country West production facilities will be increased to approximately 80 psi when the future (higher elevation) portions of the Bright Star development are in need of service. When this pressure modification takes place, it is recommended that the current single zone be divided into two pressure zones. The zonal divide would be located along the east line of the business park and public works parcels within Old Home Manor. At this time, it is recommended that an additional well and storage tank be provided at the northeast corner of Perkinsville Road and Santa Fe Trail to serve the new lower zone which would include the business park and public works parcels as well as other future needs north and west of these parcels. See Figure 7-1 for a conceptual representation of the two zones. The upper zone would have a hydraulic gradeline of 4890 and the lower zone would have a hydraulic gradeline of 4745. A parallel transmission main would need to be provided in Perkinsville Road (or the future east-west street north of Perkinsville Road) in order to serve the lower zone. The upper-elevation portions of Old Home Manor consisting of the RV park, parks, ballfields, rapid infiltration basins, shooting range, equestrian facility and Yavapai College extension parcels would be served by the upper (Bright Star) zone.

The lower zone can be supplied by two sources. One being the new well and tank previously discussed, and another via a connection to the upper (Bright Star) zone through a pressure reducing station. This would yield a redundant supply to the lower zone. The lower zone could serve the upper zone for redundancy by virtue of a booster pump station if desired.

Division of the existing single zone would also be triggered by the need for additional system storage anticipated to be needed in 2030. Therefore, a two-zone system should be planned around the modification to a higher pressure setting (80+- psi) for the Bright Star and Country West facilities, or the year when additional storage is needed.

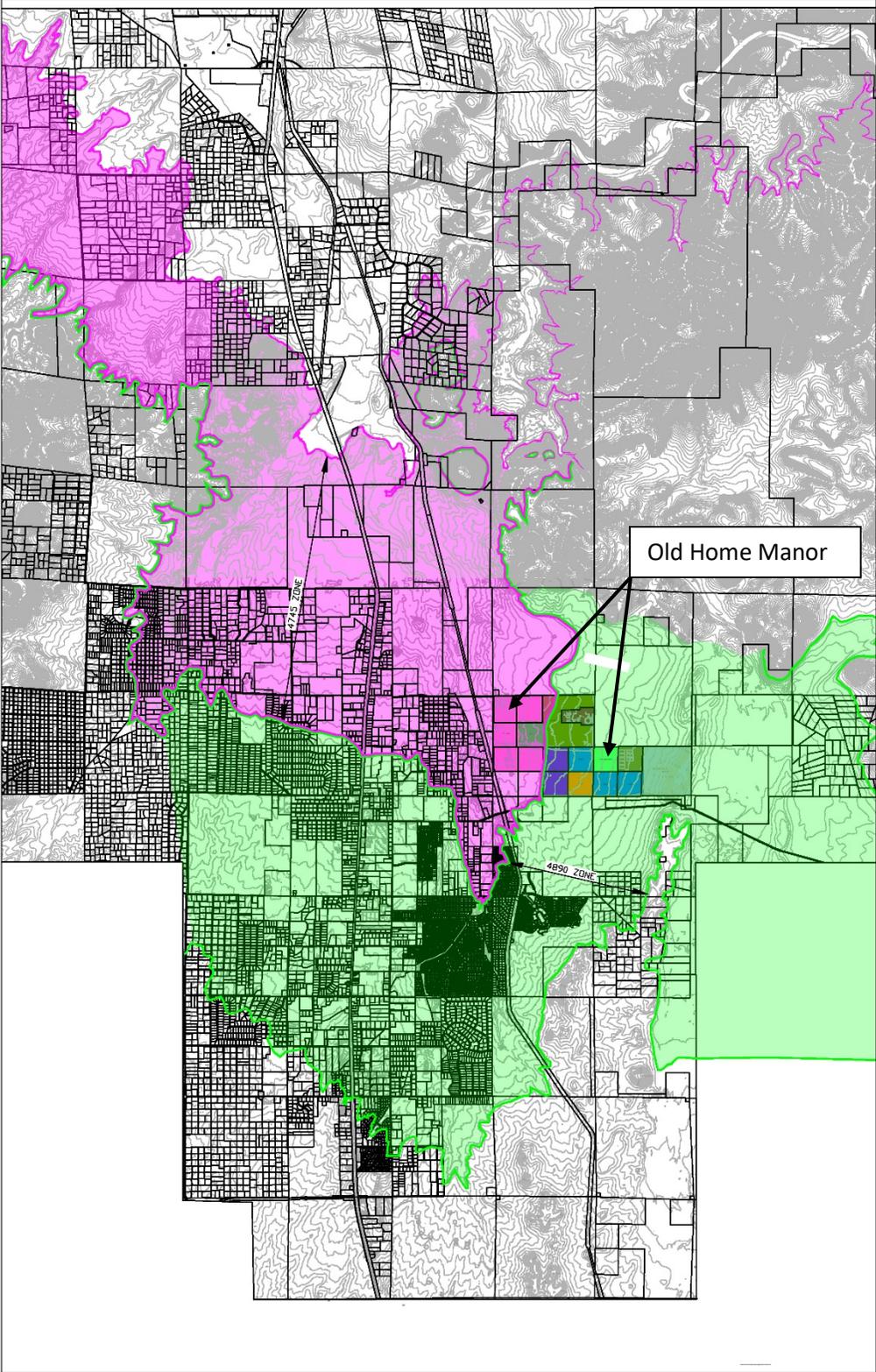


Figure 7-1 Pressure Zones

## 8 SYSTEM PLANNING OVER TIME

System planning was approached with modeling analyses for the years 2021, 2025, 2030 and 2035. Population growth factors for expected residential demands on the Community Water System used for modeling purposes are as follows:

<b>Time Span</b>	<b>Annual Growth Rate</b>
2019-2024	9%
2025-2034	3%
After 2034	3%

The 9% used for the time span 2019-2024 is due to the Town's desire to increase the number of users for the Community Water System more aggressively in the near term.

## 8.1 RESIDENTIAL

Using 216 GPD per lot, 2.5 persons per lot and the growth rates shown. Table 8-1 summarizes expected residential demands on the Community Water System:

Table 8-1 – Residential Demands

Year	Population served by CWS	No. of Lots served	Residential ADD (GPD)
2020	2,223	969	209,304
2025	3,423	1,369	295,783
2030	3,969	1,587	342,894
2035	4,061	1,840	397,508

## 8.2 COMMERCIAL AND OLD HOME MANOR

The hydraulic model has been configured to point out improvements at the phased buildout of the Old Home Manor project through 2035. Horizon years modeled were 2021, 2025, 2030 and 2035. The various categories for the development of Old Home Manor are expected to be variable, for example it is anticipated that the Ballfields will be developed by 2025 yet the business park will not be fully developed until 2035. It is expected that the existing (current) commercial demands on the CWS will not change, but the main cause of commercial and park-type demands on the system will result in the development of Old Home Manor. See Table 8-2 for planned construction of facilities at Old Home Manor along with their associated time frames:

Table 8-2 – Old Home Manor Planned Construction Timetable

Category	Avg. GPD/AC	Total Acreage	2021 Acreage (Avg. GPD)	2025 Acreage (Avg. GPD)	2030 Acreage (Avg. GPD)	2035 Acreage (Avg. GPD)
Business Park	893	199.6	6.0 (5,358)	30.0 (26,790)	115.8 (103,409)	199.6 (178,243)
Ballfields	1956	60.0	20.0 (39,120)	60.0 (117,360)	60.0 (117,360)	60.0 (117,360)
Equestrian	893	129.0	15.0 (13,395)	91.0 (81,263)	129.0 (115,197)	129.0 (115,197)
Parks/Rec	1586	116.0	12.0 (19,032)	60.0 (95,160)	116.0 (183,976)	116.0 (183,976)

Community Water System and Old Home Manor Water System Technical Memorandum

R.I.B.'s	446	40.0	8.0 (3,568)	16.0 (7,136)	28.0 (12,488)	40.0 (17,840)
Public Works	1339	40.0	5.0 (6,695)	17.0 (22,763)	31.0 (41,509)	40.0 (53,560)
RV Park	1162	60.0	20.0 (23,240)	60.0 (69,720)	60.0 (69,720)	60.0 (69,720)
Non Cl.	1162	37.0	4.0 (4,648)	20.0 (23,240)	37.0 (42,994)	37.0 (42,994)
Shoot Rg.	893	160.0	20.0 (17,860)	70.0 (62,510)	120.0 (107,160)	160.0 (142,880)
Totals		841.6	110 (132,430)	424.0 (504,322)	696.8 (791,745)	841.6 (919,702)

Existing annual metered commercial use was observed at 16,500,000 gallons or an average daily demand of 45,206 GPD.

### 8.3 PLANNING NEEDS AND WHAT IF'S

This exercise is to provide information related to planning needs for the system in 2021, 2025, 2030 and 2035 and identify system needs for redundancy in case of production failures. Maximum daily demand values were utilized to define system characteristics related to storage, well production and tank drain times in the event of supply failures.

Table 8-3 – Maximum Daily Demands

Category	Maximum Daily Demand (GPM)			
	2021	2025	2030	2035
Existing Commercial	63	63	63	63
Residential	291	411	476	552
Old Home Manor	193	746	1,145	1,323
Existing Turf	71	71	71	71
Totals	617	1,290	1,755	2,009

Table 8-4 Storage Analyses - Based on details discussed in Section 6.1.

<b>Storage Analysis</b>				
	<b>2021</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
<b>Storage Required (Gal)</b>	595,416	983,319	1,250,702	1,397,312
<b>Storage Provided (Gal)</b>	1,165,000	1,165,000	1,165,000	1,165,000
<b>Additional Storage Needed (Gal)</b>	0	0	85,702	232,312

Table 8-5 Production Deficits - Based on the desire for production to meet MDD.

<b>Production Scenario</b>				<b>Production Deficit</b>			
<b>Production (GPM)</b>	<b>B.S. Well</b>	<b>C.W. Well 1</b>	<b>Total</b>	<b>2021</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
<b>Normal Production</b>	1100	500	1600	0	0	155	409
<b>Bright Star Well Down</b>	0	500	500	117	790	1255	1509
<b>C.W. Well Down</b>	1100	0	1100	0	190	655	909

Table 8-6 Tank Drain Times – Using MDD, assuming current volume 1,165,000 gal.

<b>Production Scenario</b>				<b>Tank Drain Time (hours)</b>			
<b>Production (GPM)</b>	<b>B.S. Well</b>	<b>C.W. Well 1</b>	<b>Total</b>	<b>2021</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
<b>Normal Production</b>	1100	500	1600	N/A	N/A	126	47
<b>Bright Star Well Down</b>	0	500	500	166	25	15	13
<b>C.W. Well Down</b>	1100	0	1100	N/A	102	30	21

### **8.3.1 SYSTEM PLANNING NEEDS**

Based on modeling results, the initial improvements at Old Home Manor in the lower elevations of the Business Park area combined with the projected population growth utilizing the Community Water System can supply, store, and distribute water to users with no upgrades needed. If, however, the Bright Star well is out of service, a shortage of supply will be noticed during maximum daily demand situations. Also, the current system is highly dependent upon the Bright Star pump station for fire-fighting flows and if it should fail, fire flow demands cannot be met. Due to the single water main in Road 1 East and Perkinsville Road servicing Old Home Manor, it is recommended that a second, redundant main be installed in Peavine Trail.

In order to provide service to the portions of Old Home Manor that are expected to develop in 2021 and 2022, the following improvements should be constructed:

- Construction of a redundant well to supply the Bright Star and Country West production facilities
- Construction of pressure sustaining valve in Bright Star pump station bypass line or separate low-pressure transmission line to Bright Star tank inlet or other supply line from other well location
- Construction of 4500 feet of 16" diameter (or greater) Peavine Trail water main from Road 2 North to Perkinsville Road

### **8.3.2 2030 – 2035 PLANNING NEEDS**

System improvements modeled for 2030 primarily support the continued development of Old Home Manor. We have modeled a looped 12-inch diameter backbone water-main system within the conceptual road alignments for the project. Improvements include the following:

- Create the lower pressure zone to serve the lower elevations of Old Home Manor
- Construction of a 0.50 MG (minimum) Santa Fe Trail (lower zone) storage tank which will meet storage needs past 2035 along with controls
- Construct 2000 gpm well and appurtenances or investigate possible use of the 3200 gpm well no. 606294 along with appurtenant controls and connections
- Extension of a 16-inch main in Perkinsville Road running easterly and a series of backbone 12-inch diameter water mains configured in loops throughout the developed areas of Old Home Manor
- Construction of parallel transmission mains from the proposed lower zone storage tank to serve the newly developed lower pressure zone

## 8.4 BRIGHT-STAR SUBDIVISION FUTURE DEVELOPMENT

The boundary of the Bright-Star subdivision includes areas of elevations in the up to 4800 feet above MSL. If homes are constructed in these higher-elevation areas, they will have static pressures of 15 to 20 psi and residual pressures during fire-flow events of 14 to 19 psi which are both below minimum established pressures. If these areas are developed, it is anticipated that the solution would be to adjust the set-point pressure to approximately 80 psi at the Bright-Star production facility. If this adjustment occurs before 2030, provisions should be made for pressure-reducing stations downstream of the Bright-Star development. This would allow the users in the lower elevations to continually be served by the Bright-Star facility while supporting a zonal pressure equal to the hydraulic gradeline as defined by the previous production facility setting of 60 psi.

## 9 HYDRAULIC MODELING

A hydraulic model was constructed of the system using Bentley's WaterGEMS water system modeling software. The purpose of model construction was to analyze system characteristics for average daily demand, maximum daily demand, and maximum daily demand + fire flow at critical locations of the entire area as affected by development of the Old Home Manor industrial park and population growth characteristics discussed above.

Scenarios were modeled for years 2021, 2025, 2030 and 2035 as follows...

Community Water System:

- Average Daily Demand
- Maximum Daily Demand
- Maximum Daily Demand + Fire Flow

See Table 9-1 through Table 9-6 for a synopsis of system modeling results.

Table 9-1 Modeling Results - 2021

Demand Description	Demand	Fire Flow Demand	Total Demand	Minimum System Pressure	Maximum System Pressure
Average Daily	289 gpm	-	289 gpm	50 psi	110 psi
Max. Daily	617 gpm	-	617 gpm	49 psi	109 psi
Max Day + Fire	617 gpm	2000 gpm	2617 gpm	38 psi	-

Table 9-2 Modeling Results - 2025

Demand Description	Demand	Fire Flow Demand	Total Demand	Minimum System Pressure	Maximum System Pressure
Average Daily	611 gpm	-	611 gpm	49 psi	110 psi
Max. Daily	1290 gpm	-	1290 gpm	47 psi	109 PSI
Max Day + Fire	1290 gpm	2000 gpm	3290 gpm	34 psi	-

Table 9-3 Modeling Results – 2030 (Upper pressure zone)

Demand Description	Demand	Fire Flow Demand	Total Demand	Minimum System Pressure	Maximum System Pressure
Average Daily	717 gpm	-	717 gpm	40 psi	123 psi
Max. Daily	1505 gpm	-	1505 gpm	39 psi	122 psi
Max Day + Fire	1505 gpm	2000 gpm	3505 gpm	26 psi	-

Table 9-4 Modeling Results – 2030 (Lower pressure zone)

Demand Description	Demand	Fire Flow Demand	Total Demand	Minimum System Pressure	Maximum System Pressure
Average Daily	154 gpm	-	154 gpm	39 psi	64 psi
Max. Daily	307 gpm	-	307 gpm	39 psi	64 psi
Max Day + Fire	307 gpm	2000 gpm	2307 gpm	30 psi	-

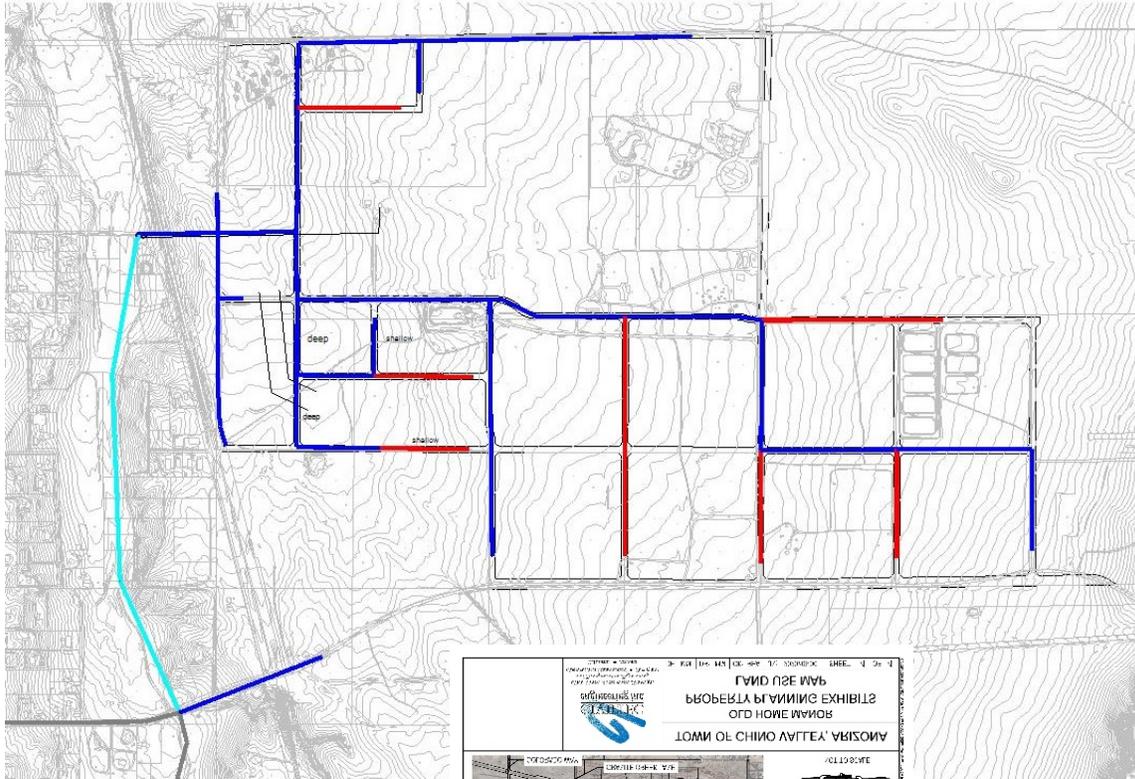
Table 9-5 Modeling Results – 2035 (Upper pressure zone)

<b>Demand Description</b>	<b>Domestic Demand</b>	<b>Fire Flow Demand</b>	<b>Total Demand</b>	<b>Minimum System Pressure</b>	<b>Maximum System Pressure</b>
Average Daily	835 gpm	-	835 gpm	39 psi	122 psi
Max. Daily	1739 gpm	-	1739 gpm	39 psi	121 PSI
Max Day + Fire	1739 gpm	2000 gpm	3739 gpm	20 psi	-

Table 9-6 Modeling Results – 2035 (Lower pressure zone)

<b>Demand Description</b>	<b>Domestic Demand</b>	<b>Fire Flow Demand</b>	<b>Total Demand</b>	<b>Minimum System Pressure</b>	<b>Maximum System Pressure</b>
Average Daily	168 gpm	-	168 gpm	39 psi	64 psi
Max. Daily	335 gpm	-	335 gpm	39 psi	64 PSI
Max Day + Fire	335 gpm	2000 gpm	2335 gpm	34 psi	-

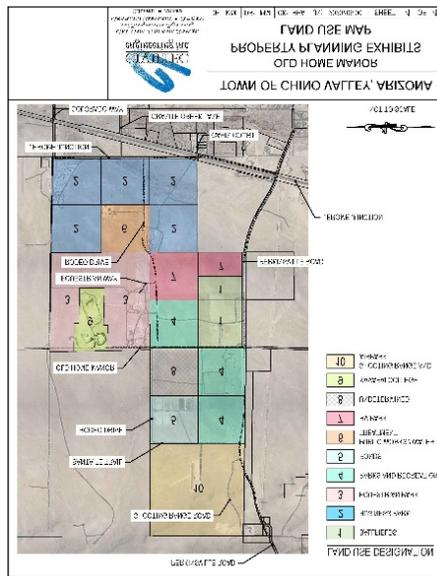
# Sanitary Sewer System / Old Home Manor Technical Memorandum Chino Valley, AZ



## PRELIMINARY

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# 1 INTRODUCTION

This report was commissioned by the Town of Chino Valley Public Works Department. Its purpose is to study and report on hydraulic characteristics of the Chino Valley wastewater collection system for planning purposes related to serving areas of Old Home Manor with future sewer mains and the associated effects on the sewage lift station, force main, wastewater treatment plant, and Rapid Infiltration Basins (R.I.B.'s). Old Home Manor is an area of Chino Valley lying east of Jerome Junction, and north of Perkinsville Road. It is mostly vacant land and contains the location of the Chino Valley wastewater treatment plant, recharge basins, park facilities, and Yavapai College extension. See Figure 1-1.

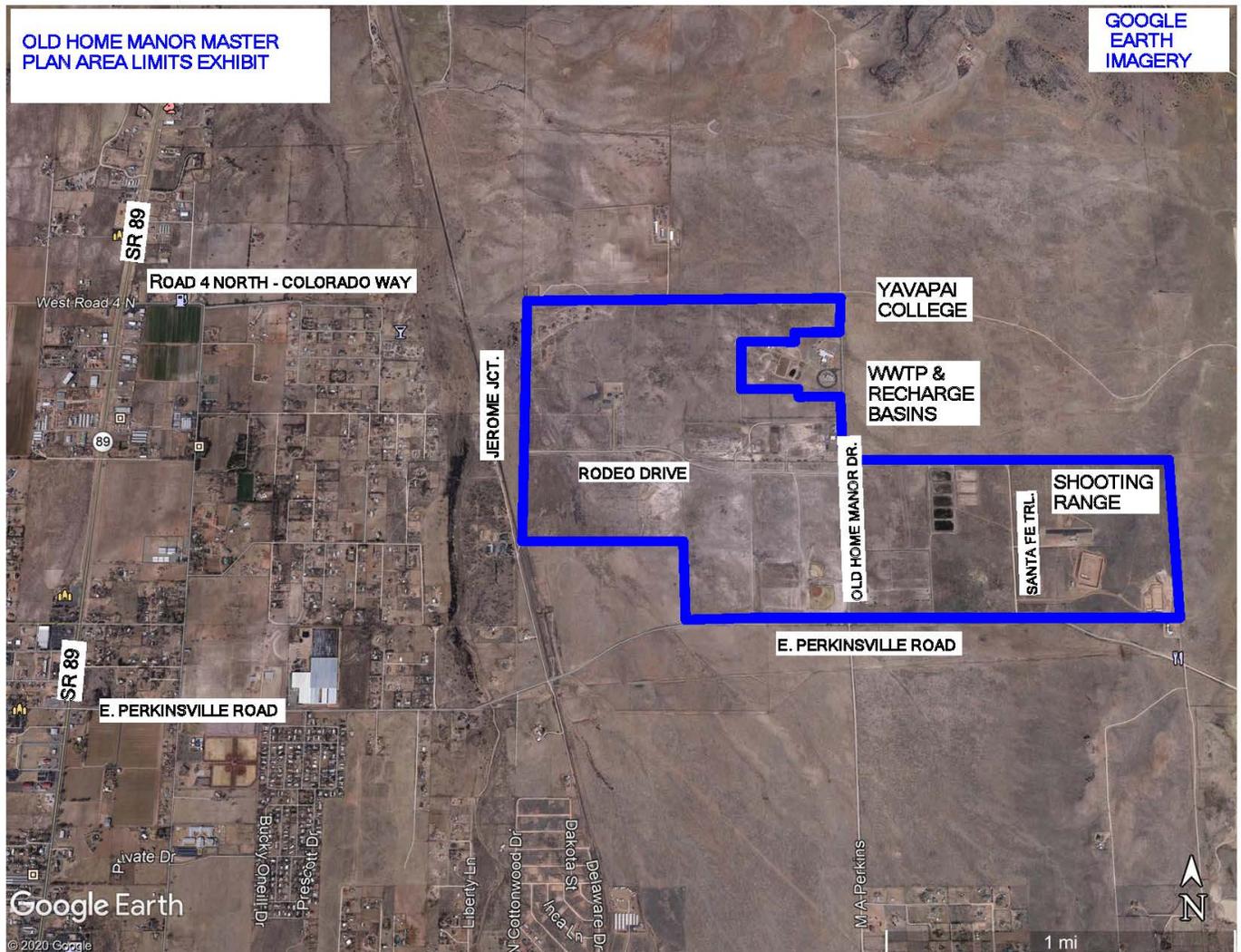


Figure 1-1 Old Home Manor Area

The Town has provided a concept plan showing proposed land use for the various portions of Old Home Manor. Planned uses include ballfields, business park, equestrian park, RV park, parks and recreation,

infiltration basins, public works/wastewater treatment plant, undetermined, Yavapai College Agricultural Extension, and a shooting range with model airport. See Figure 1-2. The main function of this memorandum is to report on sewer system model results and analyze the existing system in this vicinity, and the effects of extending this system in order to serve Old Home Manor as shown on the Land Use Plan. The primary focus at this point is to identify current and future system loading characteristics and report on future infrastructure needs associated with a timed-buildout of the Old Home Manor complex.

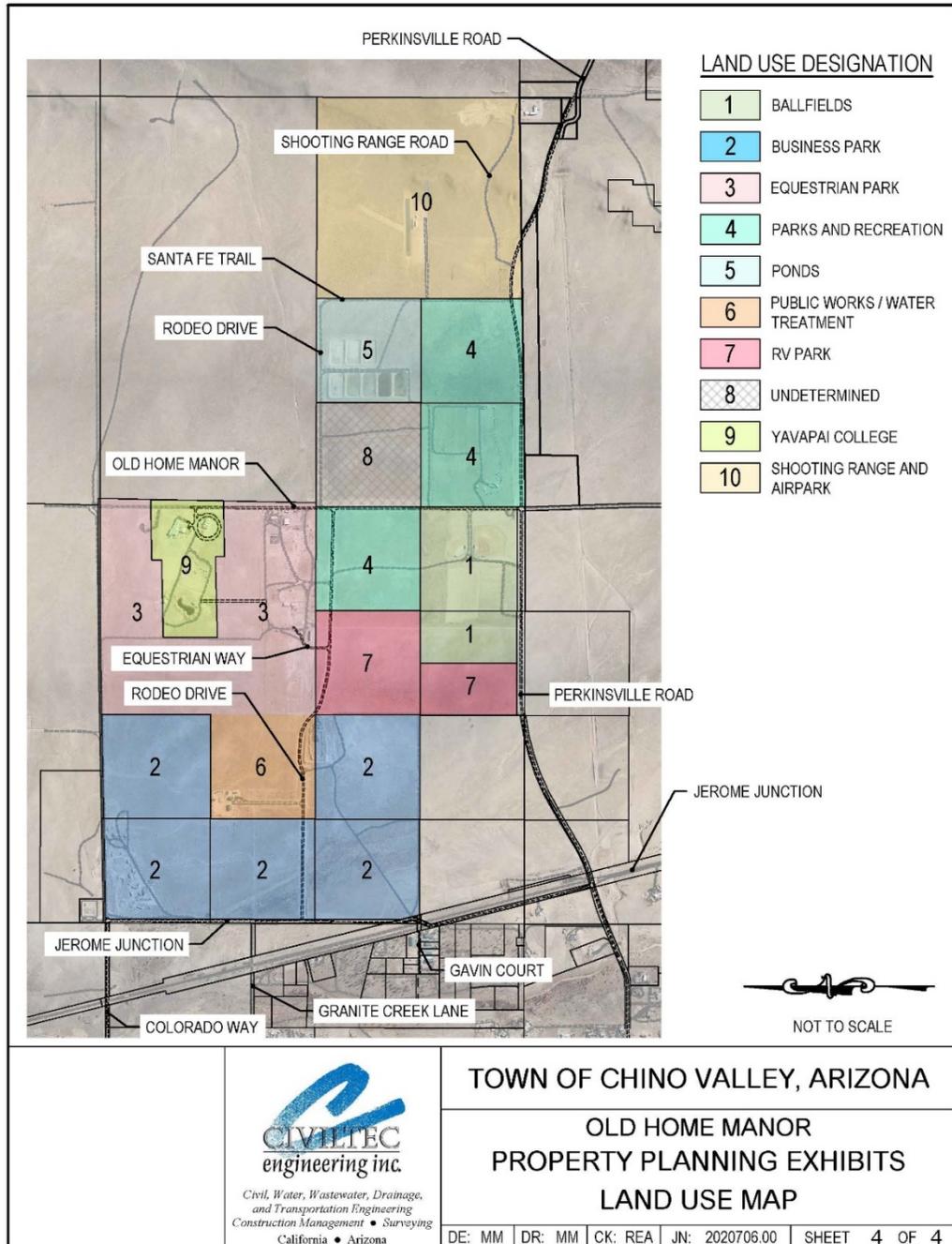


Figure 1-2 Old Home Manor Land Use Concept

## 2 SYSTEM OVERVIEW

The existing wastewater collection system is comprised of eight-inch through twelve-inch diameter underground gravity mains primarily serving the residential subdivisions of Bright Star, Chino Meadows (various phases), and Highlands Ranch. There are also twelve-inch diameter mains in Perkinsville Road, Road 2 North, and Center Street which serve commercial properties which are mostly located just east of State Route 89. These residential and commercial gravity mains discharge into an existing 18-inch diameter trunk main known as the “Santa Cruz Wash Interceptor Main” which conveys raw flows from south to north, in the general vicinity of the wash, to a lift station on Granite Creek Lane, just west of the Peavine Trail and west of Old Home Manor. The lift station pumps the raw flows to the existing wastewater treatment plant north of Rodeo Road and once treated, the effluent is pumped to a series of rapid infiltration basins (R.I.B.’s) located further to the east in Old Home Manor.

The existing collection system, lift station, force mains, treatment plant, and R.I.B.’s are owned and maintained by Town forces.

See Figure 2-1 for a visual schematic of the existing wastewater system.

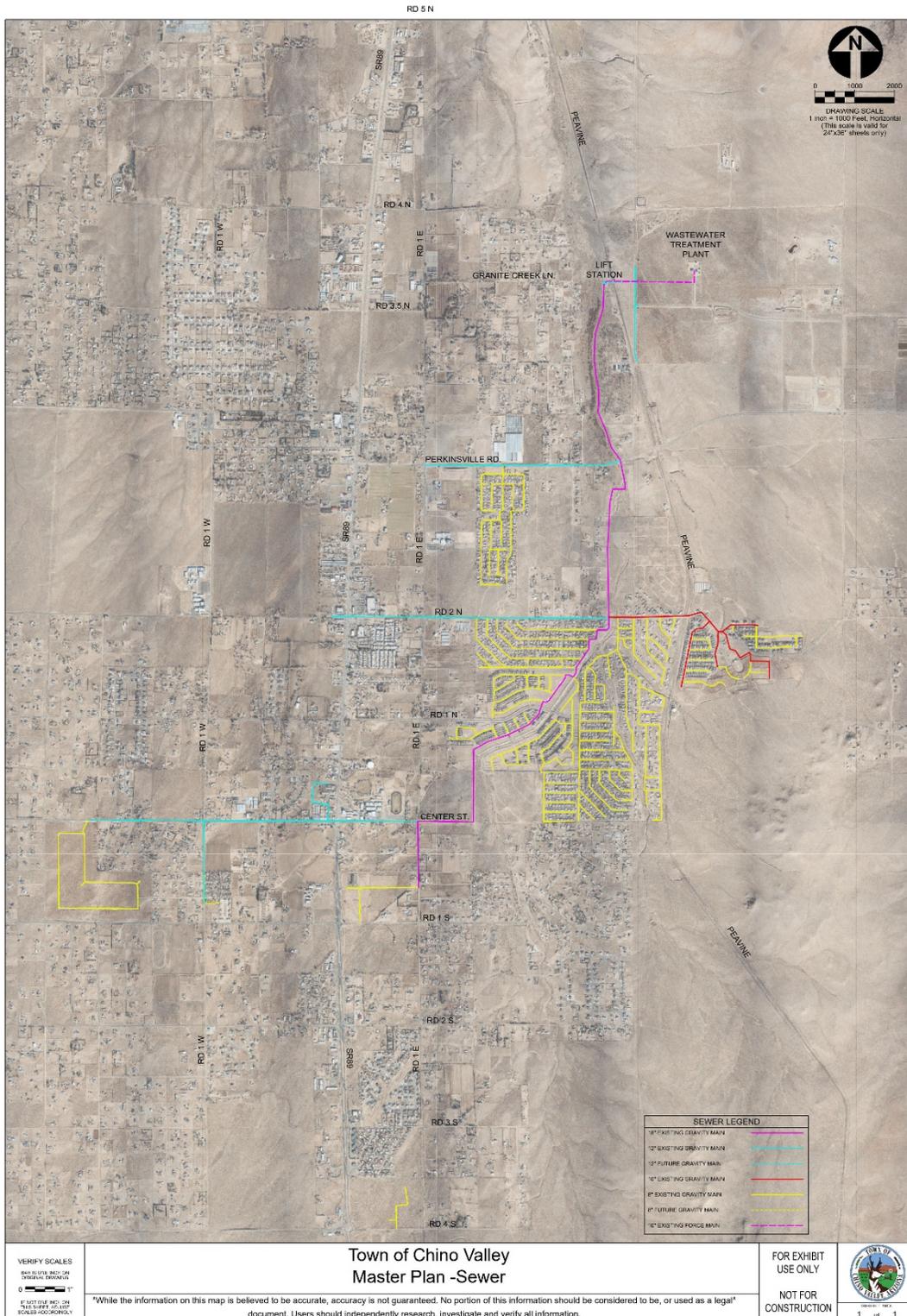


Figure 2-1 Wastewater System Schematic

### 3 SYSTEM LOADING

Existing system loading primarily consist of residential, commercial and park loads. System flow characteristics for 2019 were provided by Town staff.

Table 3-1 indicates monthly flowrates measured at the lift station. In 2019, the average daily flow sent to the treatment plant from the lift station was 272,265 GPD or 0.272 MGD or 0.42 cfs.

Month	Pumped (GPD)*	Pumped (MGD)	Pumped (cfs)
Jan	271,497	0.271	0.420
Feb	269,866	0.270	0.417
Mar	266,031	0.266	0.411
Apr	273,992	0.274	0.424
May	264,327	0.264	0.409
Jun	267,366	0.267	0.413
Jul	273,714	0.274	0.423
Aug	273,542	0.274	0.423
Sept	273,564	0.274	0.423
Oct	272,386	0.272	0.421
Nov	275,030	0.275	0.425
Dec	285,871	0.285	0.442
<b>Average</b>	<b>272,265</b>	<b>0.272</b>	<b>0.421</b>

Table 3-1 2019 Lift Station Flows

\*From Daily Metering Reports

### 3.1 RESIDENTIAL LOADING

Average daily residential flows were calculated on a per-lot basis based upon existing Town metering data, existing population served and an assumed percentage of 90% of total flows being attributed to residential usage. See results in Table 3-2.

Table 3-2 Residential Loads

Year	Population Served	Total pumped	90% of Total Pumped	Persons per Lot	Avg. GPD per person	Average GPD per lot
2019	3270	272,265 GPD	245,000 GPD	2.5	75	187

For comparative purposes, the current City of Prescott engineering standards and Title 18 of the Arizona Administrative Code cite a general flowrate of 80 GPD per person.

### 3.2 COMMERCIAL LOADING

Average daily commercial loading was calculated as 90% of the average water-use rate for commercial properties in Chino Valley.  $0.90(893) = 803.7$  GPD per acre rounded to 800 GPD per acre was utilized for the purposes of this report.

### 3.3 R.V. PARK LOADING

RV Park loading was calculated based on a gallons-per-day per RV space and converted to gallons-per-day per Acre basis using a constant rate of 6 RV spaces per acre density. They were derived from the ADEQ rate of 100 gal/space/day wastewater production. The City of Prescott rates of gallons-per-day per RV space of 120 for RV Parks. For the purposes of this report, 600 GPD per Acre was used for RV park loading.

Results are shown in Table 3-3.

Table 3-3 RV Park Demands

	ADEQ Rate (GPD/Space)	City of Prescott Rate (GPD/Space)	GPD/Space used	Spaces/AC	GPD/AC
GPD per Acre	100	120	100	6	600

### **3.4 OTHER LOADS ASSOCIATED WITH OLD HOME MANOR**

Other demands associated with the future development of Old Home Manor include ballfields, equestrian park, parks and recreation, rapid infiltration basins, public works/wastewater treatment and shooting range loads. Average daily flows for these load categories are based upon calculations described as follows:

#### **3.4.1 BALLFIELDS**

A value of 250 GPD per acre loading for park-type use was utilized for this report.

#### **3.4.2 EQUESTRIAN PARK**

A value of 250 GPD per acre loading for park-type use was utilized for this report.

#### **3.4.3 PARKS AND RECREATION**

A value of 250 GPD per acre loading for park-type use was utilized for this report.

#### **3.4.4 RAPID INFILTRATION BASINS**

It is not anticipated that the rapid infiltration basins will be equipped with facilities that produce wastewater flows, therefore, a value of 0 GPD per acre loading was utilized for this report.

#### **3.4.5 PUBLIC WORKS/WATER TREATMENT**

It is anticipated that the public works facilities will be comprised of some commercial type uses as well as storage yards, garage facilities, and other low wastewater production uses. This combined with the wastewater treatment plant have been combined to result in a value of 500 GPD per acre utilized for this report.

#### **3.4.6 UNDETERMINED**

There is a 36.6-acre parcel in Old Home Manor which the use category has not been determined. In discussions with Town staff, it has been assigned the same average daily demand rate as the RV park category of 600 GPD per acre.

#### **3.4.7 SHOOTING RANGE/AIRPARK**

This category is assumed to have a low wastewater loading rate. A rate of 100 GPD per acre loading was utilized to account for the possible demands for a small restroom facility, cleaning, and maintenance.

### **3.4.8 YAVAPAI COLLEGE**

A loading rate of 700 GPD per acre was used for school type purposes and adjusted due to the fact that the college parcel is large in area in comparison to the portion used as classroom and administrative uses. Since this is an agricultural extension facility, a large portion of the parcel is open space, therefore the loading rate was adjusted to 350 GPD per acre.

### **3.5 PEAKING FACTORS**

For modeling analysis purposes, average daily flowrates were multiplied by a peaking factor associated with estimated peak daily loading and inflow/infiltration. The ADEQ peaking factor table, Arizona Administrative Code R18-9-E301-4.01.D was used by taking the average daily projected flows in 2021, 2025, 2030 and 2035 of and dividing by 100 GPD/person to obtain respective equivalent populations of 3,420, 4,944, 6,600, and 7,980. This yields an average dry-flow peaking factor of 2.0. An additional 10% was applied to this factor to result in a total wet-flow peaking factor of 2.2 which has been used for the purposes of this model and report.

## **4 LIFT STATION CHARACTERISTICS**

The existing sewage lift station located in an easement adjoining Granite Creek Lane just west of the Peavine Trail consists of two parallel submersible pumps in a circular wet well. It was designed by Aqua Engineering, Inc. in 2003. The lift station receives flows from the 18-inch diameter interceptor trunk main running south to north in Santa Cruz wash. It will also receive future flows directly from Old Home Manor via a 12-inch diameter main in Granite Creek Lane. This 12-inch diameter main was constructed in 2017. The lift station is equipped with an 8-inch diameter flow meter in a separate vault just downstream of the pumps on the force main. The force main is a 10-inch diameter PVC pipe flowing to the east and north to the wastewater treatment plant located in Old Home Manor. The pumps are manufactured by KSB Pumps. One is a 36 HP pump that produces 720 gpm and the second is a 31 HP pump that produces 550 gpm. The pumps are equipped with float switches that cause them to turn on in a cascading fashion depending upon the depth of liquid in the wet well. There is an existing generator on site. The existing wet well is 8 feet in diameter, and approximately 25.6 feet deep. The invert of the existing 18-inch diameter inlet main is 18.50 feet below the manhole rim. Pump 1 appears to turn on at a depth of 17.20 feet below the manhole rim and turn off at a depth of 21.20 feet below the manhole rim resulting in 4.0 feet of working water. These depths suggest a flow back-up in the 18-inch diameter main of approximately 1.30 feet prior to pump 1 engaging. Pump 1 "on" elevation was adjusted in the model to turn on 1.5 feet below the invert elevation of the 18-inch inlet main and pump 2 to turn on 0.50 feet below said main.

The existing wet well is not equipped with a bar rack or comminutor. The Aqua Engineering plans provide for placement of an additional wet well and pump station directly to the north of the existing system to accommodate future increases in flows. It may be desirable to ultimately plan the future lift station as a larger pumping facility, equipped with a larger wet well, pumps, bar racks and/or comminutor, and interconnect the existing 8-foot diameter wet well to serve as additional storage volume only.

See Figure 4-1 and Figure 4-2 for excerpt of plans prepared by Aqua Engineering.



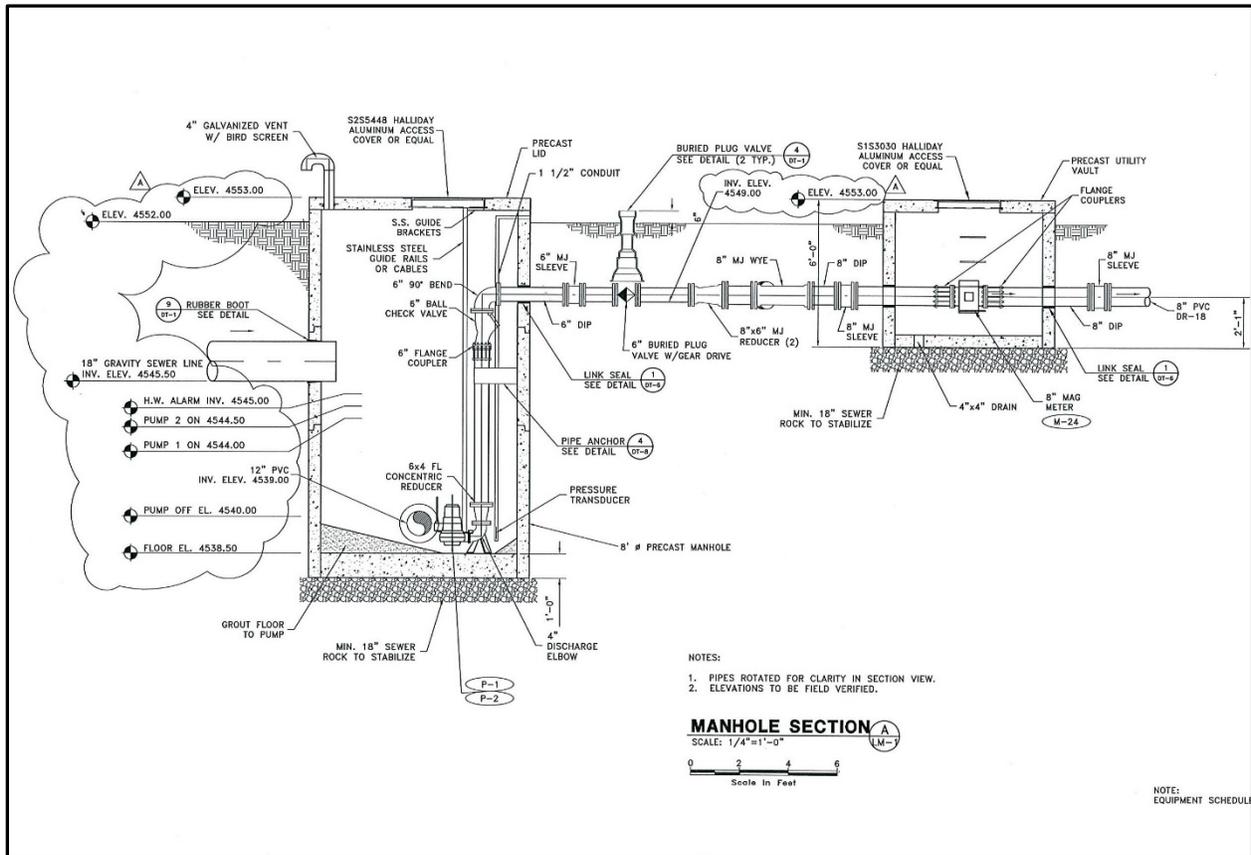


Figure 4-2 Existing Lift Station Plans

## 5 SYSTEM PLANNING OVER TIME

System planning was approached with modeling analyses for the years 2021, 2025, 2030 and 2035. Population growth factors for expected residential loading on the system are based on a constant 3% rate.

### 5.1 RESIDENTIAL

Using 75 GPD per person Average loading, 2.5 persons per lot and the growth rates shown, Table 5-1 summarizes expected residential loads on the system:

Table 5-1 Residential Populations

Year	Population served	No. of Lots served	Residential Avg. (GPD)
2021	3,431	1,372	257,290
2025	3,977	1,591	298,270
2030	4,610	1,844	345,777
2035	5,345	2,138	400,850

## 5.2 COMMERCIAL AND OLD HOME MANOR

The hydraulic model has been configured to point out improvements at the phased buildout of the Old Home Manor project through 2035. Horizon years modeled were 2021, 2025, 2030 and 2035. The various categories for the development of Old Home Manor are expected to be variable, for example it is anticipated that the Ballfields will be developed by 2025 yet the business park will not be fully developed until 2035. It is expected that the existing (current) commercial loads will not change to a large degree, but the main cause of commercial and park-type loads on the system will result in the development of Old Home Manor. See Table 5-2 for planned construction of facilities at Old Home Manor along with their associated time frames:

Table 5-2 Old Home Manor Planned Construction Timetable

Category	Avg. GPD/AC	Total Acreage	2021 Acreage (Avg. GPD)	2025 Acreage (Avg. GPD)	2030 Acreage (Avg. GPD)	2035 Acreage (Avg. GPD)
Business Park	800	199.6	6.0 (4,800)	30.0 (24,000)	115.0 (92,640)	199.6 (159,680)
Ballfields	250	60.0	20.0 (5,000)	60.0 (15,000)	60.0 (15,000)	60.0 (15,000)
Equestrian	250	129.0	15.0 (3,750)	91.0 (22,750)	129.0 (32,250)	129.0 (32,250)
Parks/Rec	250	116.0	12.0 (3,000)	60.0 (15,000)	116.0 (29,000)	116.0 (29,000)
R.I.B.'s	0	40.0	8.0 (0)	16.0 (0)	28.0 (0)	40.0 (0)
Public Works	500	40.0	5.0 (2,500)	17.0 (8,500)	31.0 (15,500)	40.0 (20,000)
RV Park	600	60.0	20.0 (12,000)	60.0 (36,000)	60.0 (36,000)	60.0 (36,000)

Non Cl.	600	37.0	4.0 (2,400)	20.0 (12,000)	37.0 (22,200)	37.0 (22,200)
Shoot Rg.	100	160.0	20.0 (2,000)	70.0 (7,000)	120.0 (12,500)	160.0 (16,000)
Total Ac.		841.6	106.0	424.0	696.0	841.6
Yav. Coll.	350	65	65 (22,750)	65 (22,750)	65 (22,750)	65 (22,750)
Total		906.6	171.0 (55,808)	489.0 (163,016)	761.0 (276,728)	906.6 (352,920)

### 5.3 TOTAL LOADINGS

The total average day design loads for existing commercial, residential and Old Home Manor are summarized in the following *Table 5-3*. The total peak loads are summarized in the following *Table 5-4*.

*Table 5-3 Total Average Daily Loading (MGD)*

Category	Average Daily Loading (MGD)			
	2021	2025	2030	2035
Existing Commercial	0.029	0.033	0.038	0.045
Residential	0.257	0.298	0.346	0.401
Old Home Manor	0.056	0.163	0.277	0.353
Totals	0.342	0.494	0.661	0.798

*Table 5-4 Total Peak Daily Loading (GPM)*

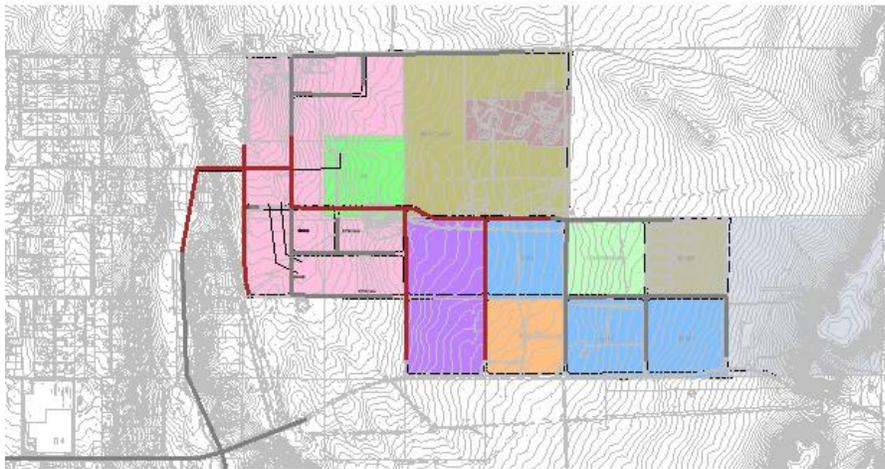
Category	Peak Daily Loading (GPM)			
	2021	2025	2030	2035
Existing Commercial	44	51	59	68
Residential	393	456	528	612
Old Home Manor	85	249	423	539
Totals	522	755	1010	1220

## 5.4 SYSTEM PLANNING NEEDS

This exercise is to provide information related to planning needs for the system in 2021, 2025, 2030 and 2035. As Old Home Manor develops, the gravity sewer infrastructure will need to be extended to the various areas in need of service. A general outline of the expansion of the system is illustrated on the following schematics.

### 5.4.1 2021 PLANNING NEEDS

#### Scenario: 2021 Average



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2/2/2021

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27 Siemon Company Drive Suite 200 W Watertown, CT 06795 USA  
+1-203-755-1666

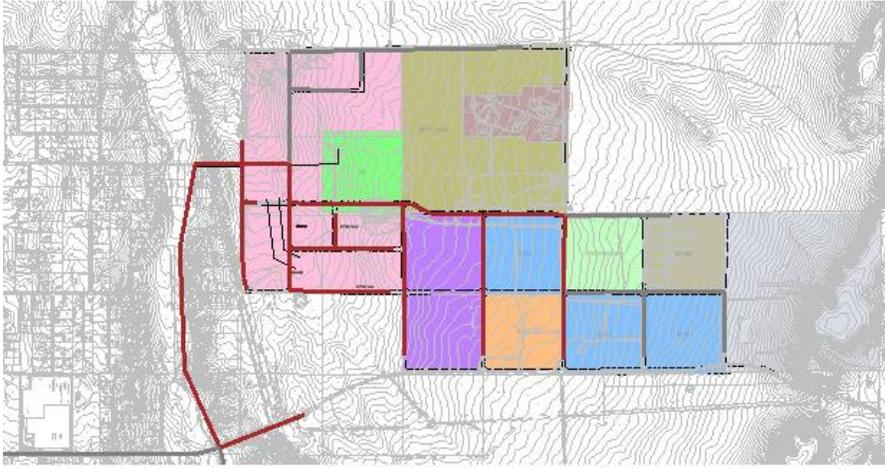
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Page 1 of 1

*Figure 5-1 2021 Expansion Schematic*

It is anticipated that the existing lift station characteristics will suffice for the peak flowrate of 522 gpm in 2021. The lift station, however, can be equipped with a bar rack and/or comminutor to reduce maintenance issues associated with pump clogging. The wastewater treatment facility is permitted to treat up to a maximum monthly volume of 5.0 MGD. The plant is currently designed to treat up to 1.0 MGD and equipped to treat up to 0.5 MGD. In 2021, the average daily flows to the wastewater treatment plant are anticipated to be 0.342 MGD which is below its current constructed capacity of 0.5 MGD. It is recommended that the constructed capacity of the treatment plant be increased to 1.0 MGD when the flowrate into the plant reaches approximately 0.40 MGD which can be anticipated within the next year or two.

## 5.4.2 2025 PLANNING NEEDS

### Scenario: 2025 Average



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27 Siemon Company Drive Suite 200 W Watertown, CT 06795 USA  
+1-203-755-1666

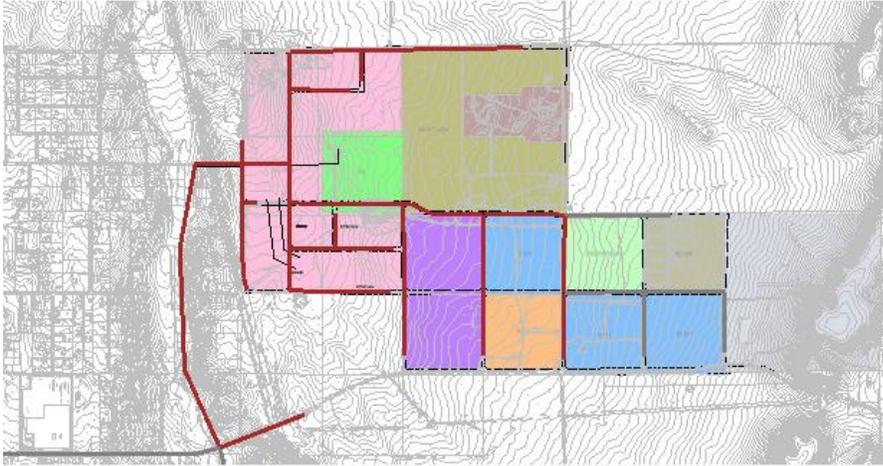
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*Figure 5-2 2025 Expansion Schematic*

The duty pump(s) in the lift station should be capable of pumping 800 gpm. At this time, or when peak flows reach approximately 750 gpm, the lift station should be upgraded, and the wet well size increased to the equivalent of an eight-foot diameter plus ten-foot diameter size in order to reduce pump cycling time. If variable speed pumps are supplied, the storage volume in the wet well can be significantly reduced. The average daily flows to the wastewater treatment plant are anticipated to be 0.494 MGD which is just below its current capacity of 0.5 MGD and if the plant has been upgraded to increase its capacity to 1.0 MGD as mentioned in 5.4.1, will be running at approximately 50% capacity.

### 5.4.3 2030 PLANNING NEEDS

#### Scenario: 2030 Average



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27 Siemon Company Drive Suite 200 W Watertown, CT 06795 USA  
+1-203-755-1666

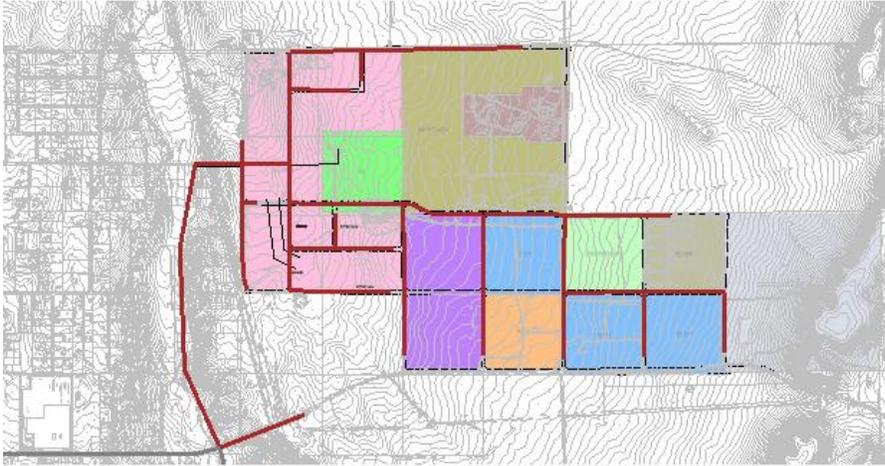
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*Figure 5-3 2030 Expansion Schematic*

The duty pump(s) in the lift station should be capable of pumping 1000 gpm. The average daily flows to the wastewater treatment plant are anticipated to be 0.661 MGD which is over its current constructed capacity of 0.5 MGD and if the plant has been upgraded to increase its capacity to 1.0 MGD as mentioned in 5.4.1, will be running at approximately 66% capacity.

## 5.4.4 2035 PLANNING NEEDS

### Scenario: 2035 Average



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27 Siemon Company Drive Suite 200 W Watertown, CT 06795 USA  
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Figure 5-4 2035 Expansion Schematic

The duty pump(s) in the lift station should be capable of pumping 1200 gpm. The average daily flows to the wastewater treatment plant are anticipated to be 0.798 MGD which is over its current capacity of 0.5 MGD and if the plant has been upgraded to increase its capacity to 1.0 MGD as mentioned in 5.4.1, will be running at approximately 80% capacity. The plant will be approaching the generally accepted engineering practice of 85% of capacity when expansion is needed. Engineering design, permitting, and construction of improvements should commence in order to accommodate increased future inflows.

## 6 HYDRAULIC MODELING

A hydraulic model was constructed of the system using Bentley's SewerGEMS sewer system modeling software. The purpose of model construction was to analyze system characteristics for average daily flows and peak flows of the entire area as affected by development of the Old Home Manor facility and population growth characteristics discussed above. Scenarios were modeled for years 2021, 2025, 2030 and 2035 as follows...

Sewer System:

- Average Daily loading
- Peak Daily Demand with 10% Inflow and Infiltration

## 6.1 MAIN SYSTEM COMPONENTS

The focus of this section is to report on the existing 18-inch interceptor trunk main just upstream of the lift station, the 12-inch diameter main in Granite Creek Lane just upstream of the lift station (emanating from Old Home Manor), and the operational characteristics of the lift station assuming increases in constant speed pump sizes and wet well volume. See Table 6-1 through Table 6-4 for a synopsis of system modeling results and *Figure 6-1* through *Figure 6-4* for wet well cycling graphs.

Table 6-1 Modeling Results 2021

Element Description	Peak Flow	Full Flow Capacity	Percent Full
18" Trunk Main	431 gpm	4,120 gpm	23%
12" Main	81 gpm	1,728 gpm	16%
Lift Station	507 gpm		

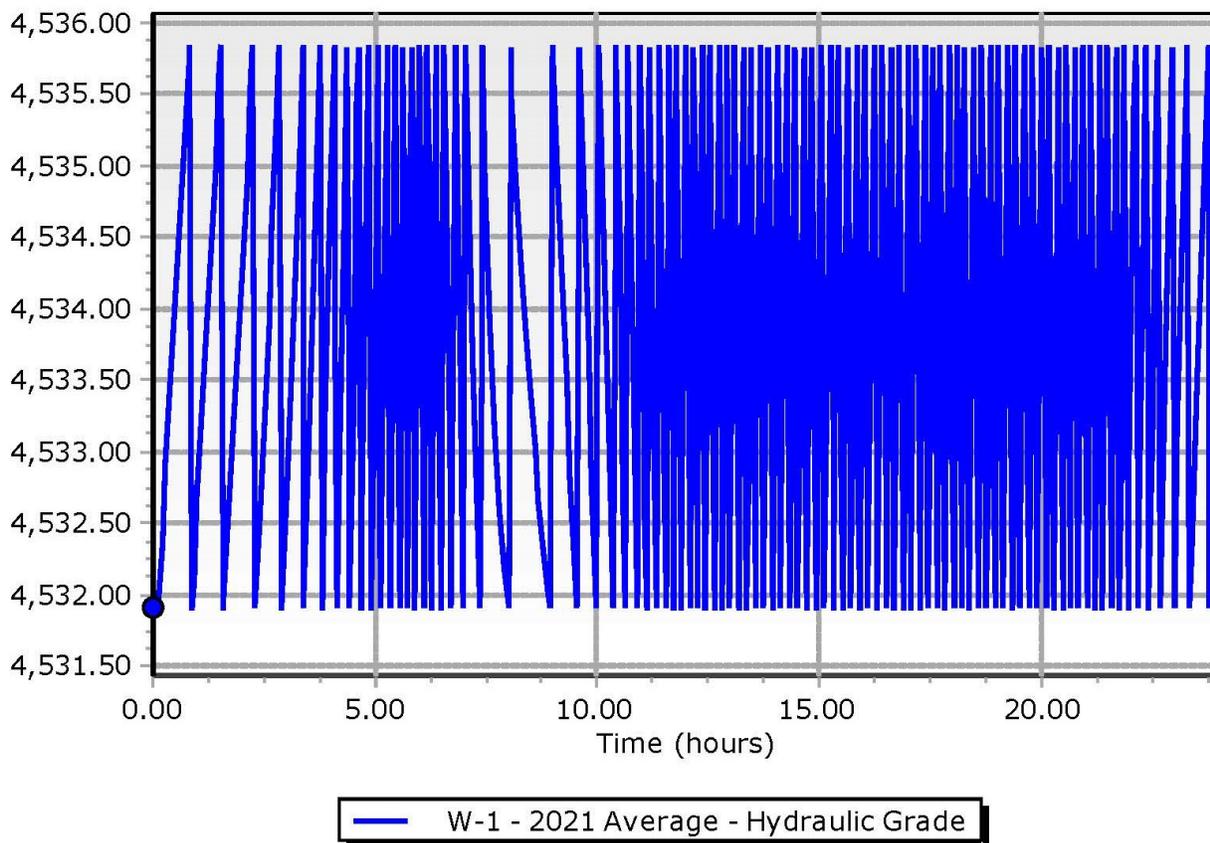


Figure 6-1 2021 Wet Well Cycling Graph

Table 6-2 Modeling Results 2025

Element Description	Peak Flow	Full Flow Capacity	Percent Full
18" Trunk Main	498 gpm	4,120 gpm	25%
12" Main	233 gpm	1,728 gpm	27%
Lift Station	727 gpm		

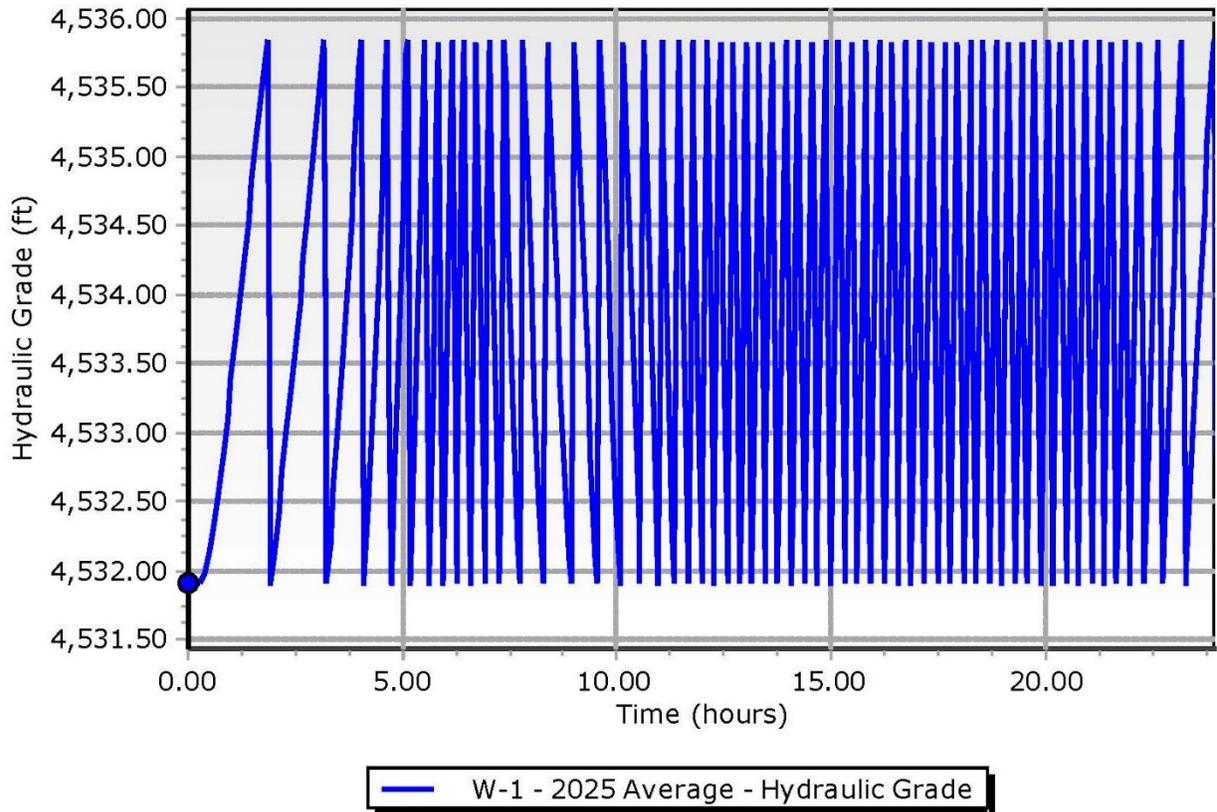


Figure 6-2 2025 Wet Well Cycling Graph

Table 6-3 Modeling Results 2030

Element Description	Peak Flow	Full Flow Capacity	Percent Full
18" Trunk Main	575 gpm	4,120 gpm	27%
12" Main	431 gpm	1,728 gpm	38%
Lift Station	1000 gpm		

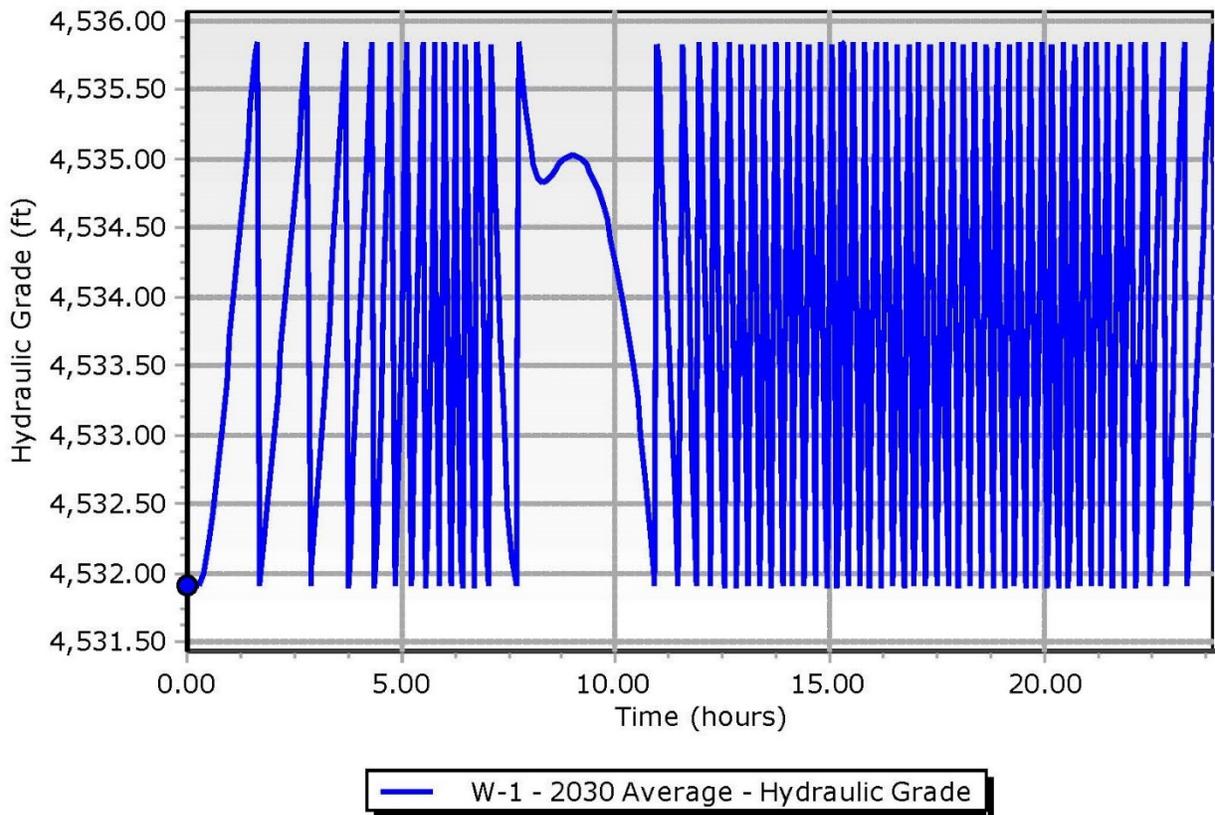


Figure 6-3 2030 Wet Well Cycling Graph

Table 6-4 Modeling Results 2035

Element Description	Peak Flow	Full Flow Capacity	Percent Full
18" Trunk Main	674 gpm	4,120 gpm	29%
12" Main	543 gpm	1,728 gpm	42%
Lift Station	1208 gpm		

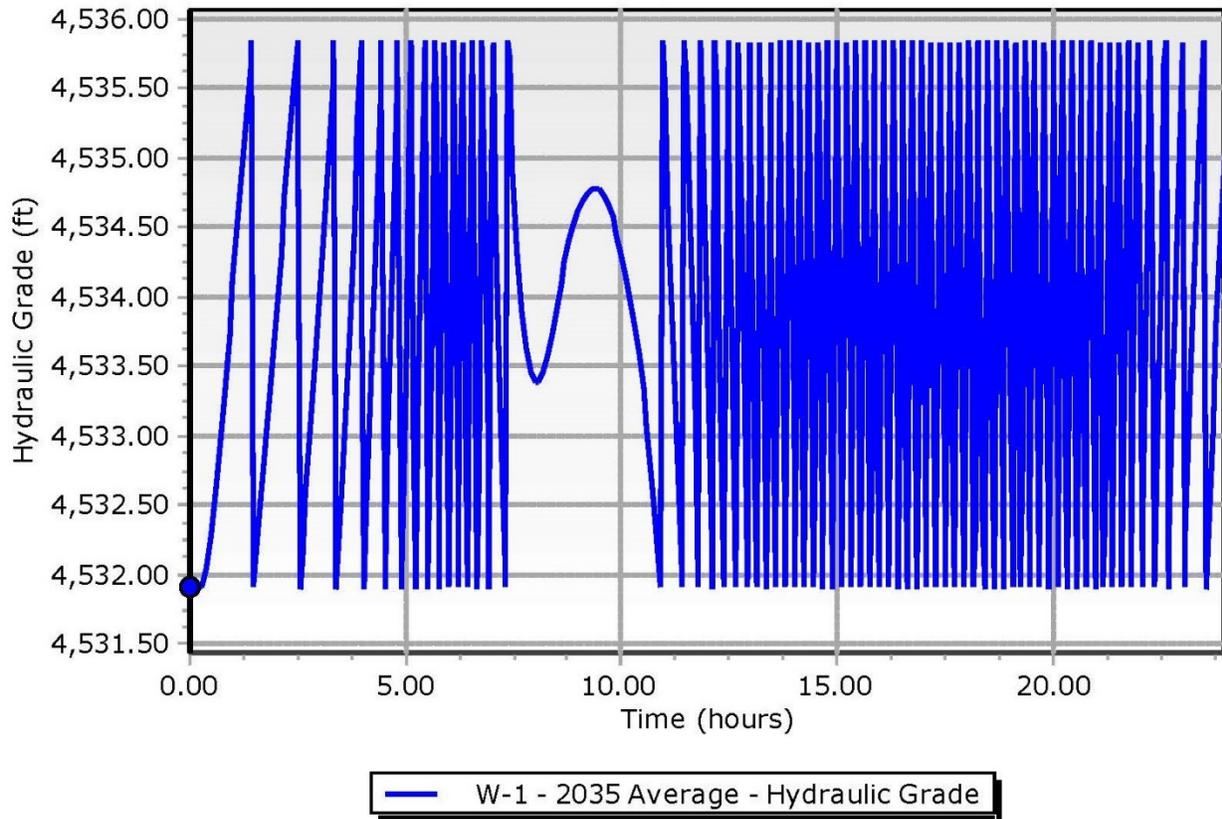


Figure 6-4 2035 Wet Well Cycling Graph

## 6.2 GRAVITY MAINS IN OLD HOME MANOR

Gravity main diameters and construction slopes have been modeled for Old Home Manor. Minimum slopes modeled for 12-inch diameter pipes are 0.30% and 0.50% for 8-inch diameter pipes. Minimum full-flow velocities for gravity mains are 2.0 feet per second. For modeling purposes, 12-inch diameter gravity mains have been used for the backbone system with higher connection counts, and 8-inch diameter gravity mains used for local collection system areas with lower connection counts. See Figure 6-5 for modeled gravity main sizes.

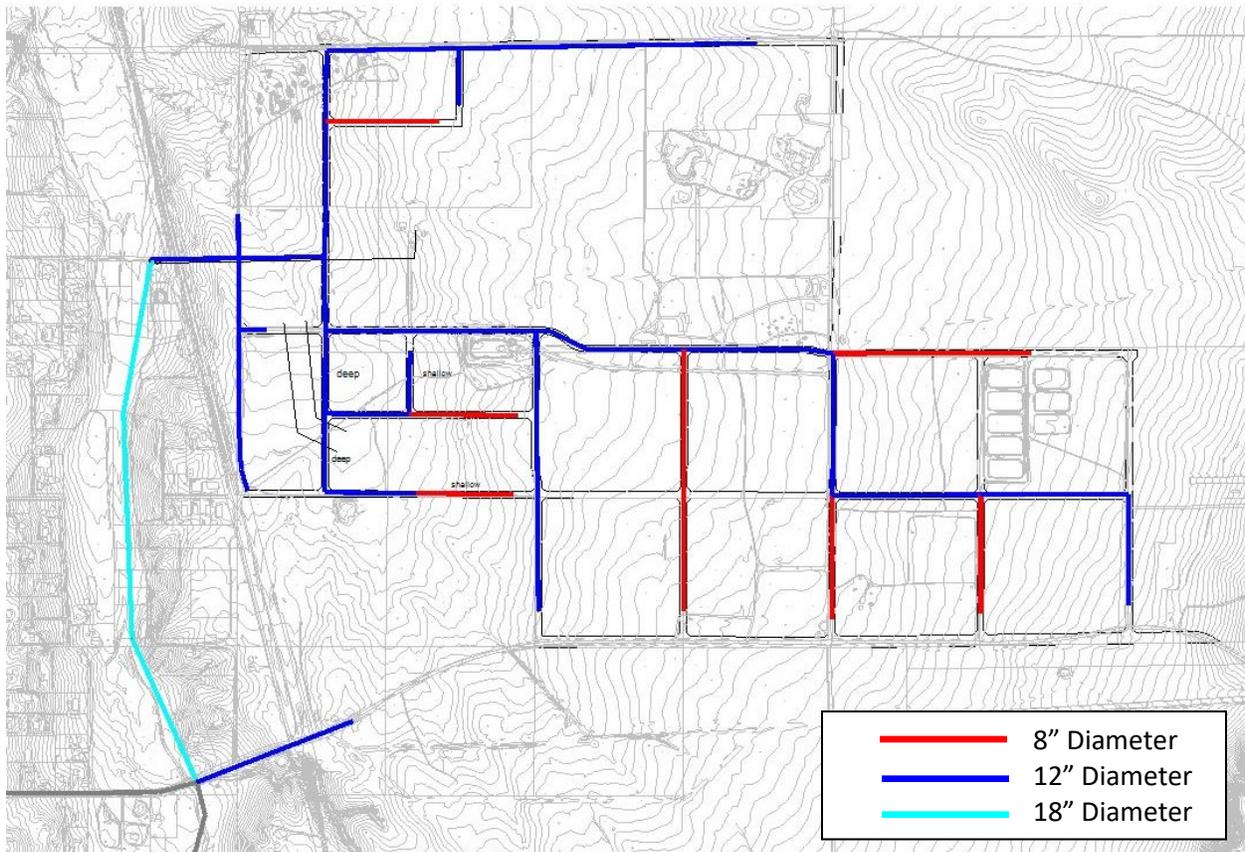


Figure 6-5 Gravity Main Size Schematic

### 6.3 LIFT STATION FORCE MAIN

The lift station force main runs east of the lift station for approximately 2200 feet, then north for approximately 300 feet to the wastewater treatment plant. It is a 10-inch diameter PVC pipe. See Table 6-5 for hydraulic characteristics.

*Table 6-5 Force Main Hydraulic Characteristics*

Year	Peak Flow	Peak Flow Velocity	Headloss (ft/100 ft)
2021	1.2 cfs	2.2 fps	0.200
2025	1.9 cfs	3.5 fps	0.472
2030	2.2 cfs	4.1 fps	0.628
2035	2.7 cfs	4.9 fps	0.865

The results shown indicate no hydraulic issues for the force main within the design period.

### 6.4 RAPID INFILTRATION BASINS

The Old Home Manor Underground Storage Facility is permitted to recharge up to 1,120 acre-feet per year which equates to 1.0 MGD. The permit allows a total of twelve 1-acre basins, 8 of which have been constructed. Of the constructed basins, only five are currently in operation. Town staff has indicated that in general, the existing recharge rate is approximately 1.0 acre-feet per day per basin. See Table 6-6 for basin characteristics.

*Table 6-6 R.I.B. Characteristics*

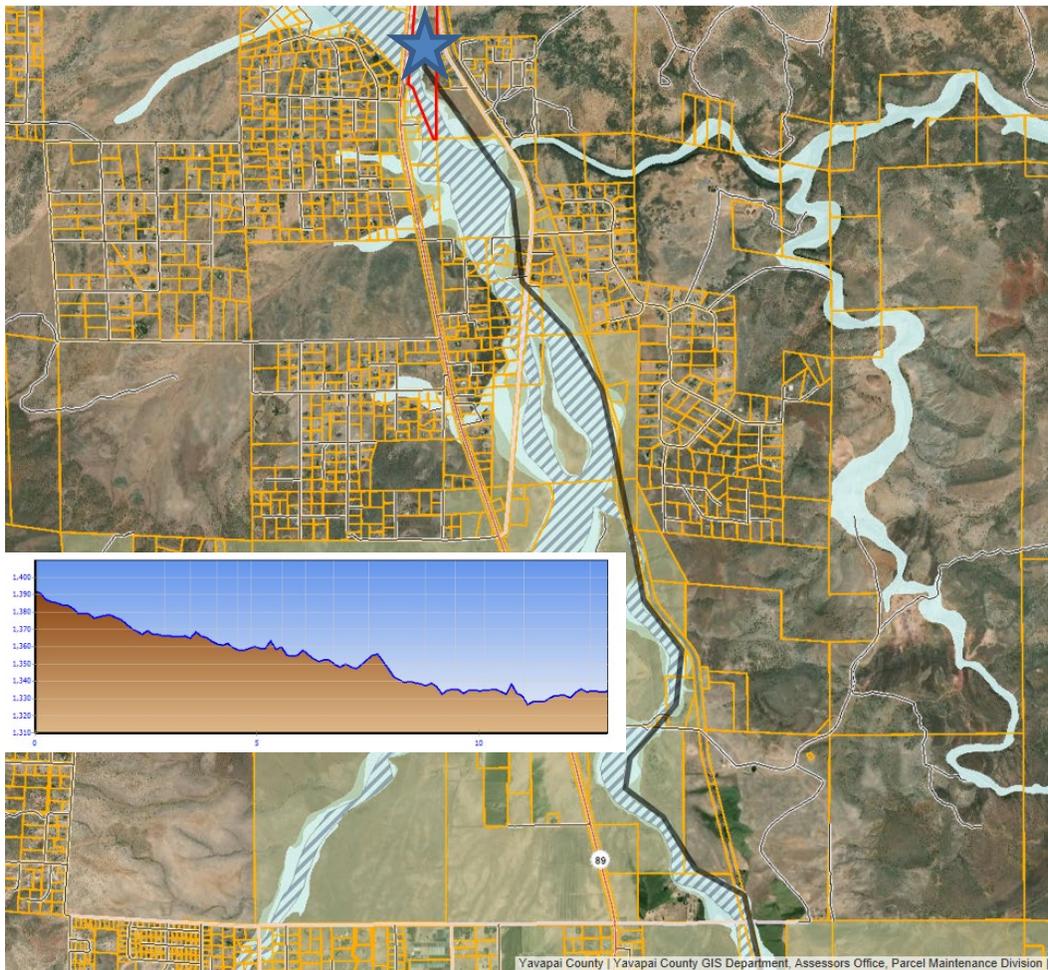
Category	Design Year			
	2021	2025	2030	2035
Average Daily Loading (MGD)	0.342	0.494	0.661	0.798
Daily infiltration (MGD) per basin	0.326	0.326	0.326	0.326
Number of basins required	2	2	3	3

The number of basins required assumes constant infiltration rates and does not consider evaporation or redundant basin use needed for resting or maintenance.

## 6.5 TREATMENT PLANT RELOCATION CONCEPT

Town staff requested a conceptual overview of the possible idea of placing treatment facility in the vicinity of Sullivan Lake, approximately 5.5 miles north of the existing lift station. The attached schematic shows a concept of placement of a gravity main within the approximate location of the Peavine Trail and Santa Cruz Wash to a point 5.6 miles north of Granite Creek Lane. The purpose of this study was to conclude whether a gravity main would be a possibility. No additional studies were performed such as land ownership, easement needs, types of treatment, recharge capabilities, power, environmental, capacity or floodplain characteristics.

As shown on Figure 6-6, a 7 mile long gravity trunk main from Granite Creek Lane to Sullivan Lake would have a vertical relief of about 184 feet, resulting in a pipe-slope between 0.5% and 0.6% which exceeds minimum pipe slopes of 0.11% to 0.17% (based on an 18" diameter main size) required by ADEQ/AAC requirements.



*Figure 6-6 – Conceptual Alignment of Trunk Main to Sullivan Lake area*

**DRAFT WATER RESOURCES TECHNICAL  
MEMORANDUM TOWN OF  
CHINO VALLEY INTEGRATED  
WATER MASTER PLAN FOR  
OLD HOME MANOR**

PREPARED FOR:

**Town of Chino Valley**  
1020 W. Palomino Road  
Chino Valley, AZ 86323

PREPARED BY:

**MATRIX**NEWORLD

**Matrix New World Engineering, Land Surveying  
and Landscape Architecture, PC**  
3033 North 44 Street, Ste 120  
Phoenix, AZ 85018

DATE:

February 12, 2021

MATRIX PROJECT NO.:

20-322

**DRAFT WATER RESOURCES TECHNICAL  
MEMORANDUM TOWN OF  
CHINO VALLEY INTEGRATED  
WATER MASTER PLAN FOR  
OLD HOME MANOR**

PREPARED FOR:

**Town of Chino Valley**  
1020 W. Palomino Road  
Chino Valley, AZ 86323

DATE:

February 12, 2021



**DRAFT**

February 12, 2021

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William M. Greenslade, PE, RG  
Principal Hydrogeologist  
Matrix New World Engineering

Date

**DRAFT**

February 12, 2021

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James H. Holt  
Consultant  
Holt LLC

Date

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## 1.0 INTRODUCTION AND SCOPE

Matrix New World Engineering, Land Surveying and Landscape Architecture, PC (Matrix) was contracted by Civiltec Engineering, Inc. to provide water resources services on the *Town of Chino Valley Integrated Water Master Plan (IWMP) Civiltec # 2000706.00 project*.

The scope of work included evaluation of the current and potential water resources available to the town through various water rights, as identified by the Town. Each source was evaluated for physical availability, legal availability and reliability over the planning horizon. Work included the analysis of available data provided by the Town and obtained from published sources. No field work was performed.

A virtual workshop was conducted with Town staff, mayor, vice mayor and a councilmember on January 17, 2021. The results of the water resource analysis were presented and discussed. This Technical Memorandum details the results of the analysis and will provide the basis for information presented in the IWMP Report.

## 2.0 HYDROGEOLOGY

### 2.1 OVERVIEW

The Town of Chino Valley (TOCV) is located in north-central Arizona within the Little Chino sub-basin (LIC) of the Prescott Active Management Area (PRAMA). The LIC is generally defined by a groundwater divide that roughly parallels U.S. Highway 89A on the south, the Coyote Fault system on the east, Precambrian rock suites on the west, and the Sullivan Buttes and up-faulted Precambrian rocks on the north. The sub-basin is a down-dropped series of fault blocks that have been subsequently filled with inter-bedded sedimentary and volcanic deposits. Three distinct units appear to be present in the LIC as described in the following sections.

#### 2.1.1 Upper Alluvial Unit (UAU)

The shallowest hydrogeologic unit beneath the Town is the upper alluvial unit (UAU) that consists of poorly-sorted alluvium comprised of sand, silt, clay, and widely scattered volcanic deposits. In the western portion of the LIC, near Granite Mountain, as well as in the northern portion near Del Rio Springs, the UAU appears to be thin to non-existent. Based on the Log of Well for 55-606295 (Yavapai College) [B(16-02) 12ADD], the UAU under the OHM is approximately 600 feet thick. Groundwater occurs in the UAU under water table conditions and is about 120 ft bls.

#### 2.1.2 Lower Volcanic Unit (LVU)

The lower volcanic unit (LVU) is a sequence of volcanic rocks and sediments that underlies the UAU. The LVU consists of a thick accumulation of Tertiary age basaltic and andesitic lava flows that are inter-bedded with layers of pyroclastic and alluvial material (Corkhill and Mason, 1995). The volcanic sequence was discovered to be a prolific aquifer in the early stages of groundwater development in the LIC. Artesian conditions water level above the top of the LVU exist from approximately the center of the Town of Chino Valley, northward to Del Rio Springs where the piezometric surface intersects the land surface. Groundwater movement is controlled by primary fractures and along bedding planes.

Review of area Well Driller Logs indicate that groundwater is stored in and produced by the LVU in a zone of weathered volcanic rocks (conglomerate) that is underlain by a series of basalt flows (typ. fractured). Based on the log of 55-606300 [B(16-02)12CAC]) the LVU likely is present up to 615 ft bls.

#### 2.1.3 Lower Alluvial Unit (LAU)

The Log of Well 55-606025 (City of Prescott) describes three distinct geologic units to have been penetrated during drilling, the bottom unit being approximately 70 + feet of clay and gravel found beneath the volcanic sequence. A similar stratigraphic sequence has been reported for wells drilled elsewhere

within the Prescott AMA provides evidence that the LIC likely contains a basal alluvial unit up to 500 feet in thickness or more, although its presence and thickness beneath the OHM is unknown (Corkhill and Mason, 1995).

#### 2.1.4 Bedrock

Aeromagnetic and gravity data suggests bedrock in area of OHM is about 800 ft bls and is generally described as Precambrian metasedimentary rock.

### 2.2 AQUIFERS

The principal aquifers in the study area are UAU and LVU. The UAU is considered unconfined; the LVU is considered semi-confined to confined in the LIC (Nelson and Yunker, 2014). Recharge to the regional aquifers occurs at mountain fronts, and along perennial and ephemeral stream beds (Corkhill et al., 1993).

For the purposes of this study, aquifer characteristics have been evaluated using data obtained from ADWR's PrAMA Groundwater Flow Model that includes estimations of unit thickness, hydraulic conductivity, and storage coefficient for half mile sided grid cells in the model area Hydraulic conductivity of the UAU (Layer 1) beneath the OHM is generally 2.92 ft/d; the modeled hydraulic conductivity of the LVU (Layer 2) is 272 ft/d. The specific yield in the vicinity of the Project is 0.9 but can range up to 0.16 in the UAU in some recharge areas of the PrAMA (Nelson and Yunker, 2014).

### 2.3 WATER LEVELS

Water levels in wells in the Town of Chino Valley have been declining since at least the 1950's. Well 55-606295 (Yavapai College) on OHM declined at a rate of 2 to 3 ft/yr from 1950-1975 then stabilized before declining again at a rate of about 1.3 to 1.6 ft/yr from 1995 through 2018. Depth to water in 2018 was 144 ft bls.(M&A, 2020).

### 2.4 GROUNDWATER QUALITY

Groundwater quality in the LIC is generally good with occasional exceedances of arsenic. The 95% confidence interval of key drinking water parameters in the Little Chino Sub-basin (LIC) are given in **Chart 1** (ADEQ, 2000).

**Chart 1 LIC Groundwater Quality**

95% CONFIDENCE INTERVAL LIC KEY DRINKING WATER PARAMETERS (mg/L) 1997-1998 BASELINE GROUNDWATER SAMPLING	
Fluoride	0.9 – 0.120
Nitrate (as Nitrogen)	1.38 - 2.98
Arsenic - Total	0.031 – 0.120
Total Dissolved Solids	233 - 355

**Notes:** mg/L = All results are reported in milligrams per liter

**2.5 PRESCOTT ACTIVE MANAGEMENT AREA GROUNDWATER FLOW MODEL**

The Town of Chino Valley lies within the Prescott Active Management Area (PrAMA), one of five areas delineated by 1980 Groundwater Management code as dependent on mined groundwater and subject to regulation under by ADWR. To carry out its management responsibilities ADWR has developed groundwater flow models of each AMA, including the PrAMA. The PrAMA groundwater flow model is based on the hydrogeologic conditions as discussed in previous sub-sections and is updated periodically by ADWR to reflect increases in pumping and new hydrogeologic data. The last update was in March 2014; ADWR expects to release a further update in 2021.

The PrAMA model is utilized to determined physical availability in response to an application for Assured Water Supply and was used to support the Town’s August 2020 Application for Assured Water Supply for Old Home Manor (See Section 4.1.2).

### 3.0 TOWN OF CHINO VALLEY WATER SUPPLY

The Town is dependent groundwater, no renewable surface water source is available to the Town. The Town does treat and recharge effluent for future recovery, the source of the water is groundwater from wells.

#### 3.1 WATER PRODUCTION WELLS

Town water production wells are listed in **Chart 2**. Location of the wells are presented on **Figure 2**.

**Chart 2 Chino Valley Water Production Wells**

Well Name	55 #	Type	Well Depth (ft)	Casing Depth (ft)	Casing Diameter (in)	Construction Date	Capacity (GPM)
Sycamore Vista 1	604725	Non-Exempt	401	260	20	9/4/1947	3000
Sycamore Vista 2	604724	Non-Exempt	413	201	20	9/4/1947	3300
CW Backup	595220	Non-Exempt	410	406	6	12/31/2002	60
CW #1	621557	Non-Exempt	433	200	12	9/1/1948	500
Highlands Ranch	800688	Non-Exempt	551	216	14	12/19/1947	1000
	514309	Non-domestic exempt	255	255	8	5/14/1986	30
	504619	Non-Exempt	585	325	10	6/1/1983	200
	606300	Non-Exempt	644		8	4/14/1941	118
OHM Potable (Roads)	606298	Non-Exempt	300	300	8	5/8/1905	50
Yavapai College	606295	Non-Exempt	960	700	20	10/27/1946	2000
OHM Ball Park	606294	Non-Exempt	744	250	20	1/1/1947	3200
Prescott College	606297	Exempt				1/1/1978	35
Perkinsville Stock Tank	606296	Non-Exempt	800	300	20	1/1/1946	1200
Cat Lady Park	902298	Non-Exempt	426	426	6	1/1/2005	30
Bright Star Well	219691	Non-Exempt	723	720	12	4/6/2010	1100
<b>OHM Potential Water Supply Wells</b>							<b>6,603</b>
<b>Service Area Wells</b>							<b>2,660</b>
<b>All Wells</b>							<b>15,823</b>

Wells within the OHM are highlighted in grey. Wells within the current Town Service Area are highlighted in yellow. Well capacity values are as reported by Town, Matrix has not inspected the well sites or conducted any tests of the wells. Ten of the wells are “pre-code” meaning they were installed prior to the passage of the Groundwater Management Act of 1980. These wells do not have ADWR assigned maximum pumping rates, although the annual pumping volume may be limited by the well’s legal status, as discussed in Section 3.3. Eight of the wells were installed prior to 1950 and are more than 70 years old.

In 2005, a 10-hour pumping test was completed at the Town’s Highland Ranch Well (55-800688) located approximately 1.5-miles south of the OHM (Figure 2). The well was pumped at rates ranging from 500 gpm to 1,400 gpm. The pump company reported that the static water level in the well was 173 ft bls, and

the pumping water level varied between 182 and 193 ft bls. Based on this information the specific capacity (SC) of the well is estimated to be approximately 70 gpm/ft. The SC and production rate of properly designed wells in the LVU at OHM can be expected be similar to the Highland Ranch well. However, the Highland Ranch well itself is no longer in service; the well was constructed in 1947 and is not currently operational.

As noted previously Matrix has not inspected the exiting Town production wells given in Chart 1. Given the age of the many of the wells Matrix recommends a program of well evaluation and testing. The Capital Improvement Plan (CIP) in the IWMP report will outline a schedule and cost for conducting the evaluation and testing program.

### 3.2 RECHARGE

The Town owns and operates the Old Home Manor Recharge Project (OHMUSF) under Arizona Department of Water Resources (ADWR) Underground Storage Facility (USF) Permit No. 71-595206.0002 and Water Storage (WS) Permit 73-595206.0000. These permits expire on March 3, 2025.

The water to be recharged is effluent from the Town’s Chino Valley Water Reclamation Facility (WRF) which operates under an Arizona Department of Environmental Quality (ADEQ) Aquifer Protection Permit (APP) No. P-1041236, LTF 28493, Place ID 17668 dated September 7, 2004. The facility is permitted to treat up to a maximum monthly volume of 5.0 million gallons per day (MGD). The plant is currently designed for 1.0 MGD and will be expanded over time to meet future demand. All the WRF effluent is sent to the OHMUSF, no reuse is permitted under the APP.

The OHMUSF is permitted to recharge up to 1,120 ac-ft (1.0 MGD) annually. The permit allows a total of 12 1-acre infiltration basins, 8 of which have been constructed. Of the constructed basins only 5 are connected to the system and are in operation. Annual effluent volumes delivered to the OHMUSF for the past five years are given in **Chart 3**.

**Chart 3 OHMUSF Annual Recharge Volume (AF)**

Year	2015	2016	2017	2018	2019
Delivered	277.4	270.44	283.68	279.88	309.3
Net of Evaporation	270.8	263.8	277.1	273.3	NA

**Notes:** AF = Acre-feet  
 NA = Not Available

The amount of long-term recharge credits in account number LTSC 70-421127.0000 through 2018 totaled 2,748.27 acre-feet (ADWR, 2020).

The average reported basin infiltration rate for the 2014-2018 period is given in **Chart 4**.

**Chart 4 OHMUSF Basin Infiltration Rates (ft/day)**

Year	2014	2015	2016	2017	2018
Rate	0.7	0.74	0.72	0.76	0.75

**Notes:** ft/day = Feet per day

Reported basin infiltration rates have remained stable over the 5-year period and averaged 0.73 ft/day.

The facility operates by rotating basins on a daily basis, keeping at least one basin wet on any day with an average number of wetted days per basin per month of about 6 days. Basins are ‘ripped’ annually to maintain infiltration capacity.

The OHMUSF is operating below its permitted capacity. In 2018 the facility recharged 273.88 ac-ft or about 24% of its 1,120 ac-ft permitted annual volume. The facility has the capacity to double its annual recharge volume without construction of additional basins or related infrastructure (Bovee, 2020).

**3.3 LEGAL AVAILABILITY**

Withdrawal and use of groundwater from non-exempt wells in Arizona’s Active Management Areas is subject to various water rights and permits. An exempt well is a well that produces 35 gallon per minute (GPM) or less, is limited to 10 AFA, must be drilled 100’ or more from a septic system and is not subject to metering or reporting requirements. Some cities, towns and private water companies prohibit the drilling of new exempt wells within their service areas. Utilization or drilling of new non-exempt wells, those that pump more than 35 GPM requires a permit or water right (A.R.S. 45-599).

The Town of Chino Valley utilizes several types of groundwater rights. These groundwater rights and the Town’s ownership are summarized in the following sub-sections.

**3.3.1 Type 1 Non-Irrigation Grandfathered Rights**

Retirement of previously irrigated lands identified in an Irrigation Grandfathered Right for non-irrigation purpose gives rise to Type 1 rights. Examples include dairy farms, parks and golf courses. This right is attached with the land, meaning the water must be used on a particular piece of land. The Town of Chino Valley has the following Type 1 Rights:

- 58-101602.0012 for 15.83 AFA on Appaloosa Meadows Open Space Park
- 58-101753.0008 for 13.95 AFA on OHM Ball Park.

The Town's Type 1 Non-Irrigation Grandfathered Rights total 29.78 AFA. Location of these rights are shown on **Figure 1** and **Figure 2**.

### 3.3.2 Type 2 Non-Irrigation Grandfathered Rights

These rights come from an historic Non-Irrigation use between 1975-1979. This right is mobile, in that it can be used for any Non-Irrigation use anywhere within the AMA from which it was issued. Type 2 Rights can also be bought and sold. There are a limited number of Type 2 Rights.

The Town of Chino Valley has the following three Type 2 Rights: for 11.20 AFA, 15.20 AFA and 6.40 AFA

- 58-120028.0001 for 11.20 AFA
- 58-108314.0002 for 15.20 AFA
- 58-111958.0001 for 6.40 AFA

The Towns total of 32.8 AFA of Type 2 Non-Irrigation Grandfathered Rights.

### 3.3.3 Extinguishment Credits

Extinguishment credits are generated when a grandfathered groundwater right is extinguished by the right holder. The extinguished right can never be used again for its original purpose.

Credits generated may be pledged to an application for a Certificate of Assured Water Supply for new residential subdivision to meet the "consistency with management goal" requirement for groundwater supplies. In the Prescott Active Management Area the management goal is safe yield by 2025.

With the Town's recent purchase of 375 extinguishment credits in January 2021, the Town now has 5 Certificates of Extinguishment Credits for a total of 7,912.54 AF of unpledged credits within the Prescott Active Management Area. These credits could be pledged toward an 100 year assured water supply with ADWR.

### 3.3.4 Historically Irrigated Acres within the Big Chino Sub-basin

Municipal water providers in the Prescott Active Management Area have the statutory authority to import groundwater from historically irrigated acres (HIA) in the Big Chino Sub-basin from outside of the Prescott AMA for use within the AMA. There are several issues surrounding the importation of this supply, including potential costs, environmental impacts and whether other water users could be adversely affected. The timing of the construction of infrastructure may also be an issue if new development is dependent on this imported groundwater supply to proceed.

The Town of Chino Valley has two Big Chino Transportation Authorizations with ADWR which identify the following Historically Irrigated Acres (HIA):

- Chino Grande 748.26 HIA for 2,244.78 AFA
- Wine Glass Ranch 216.14 HIA for 648.42 AFA

The Town's Big Chino HIA water totals 2,983.20 AFA. The withdrawal of this water is tied to a well (55-603912) located on the Wine Glass Ranch property. Location of the Wine Glass Ranch HIA lands relative to the Town boundaries is shown on **Figure 3**. Access to this water will require the development of infrastructure (pipelines, pumping stations, power and associated controls), and addressing issues associated with potential environmental impacts to Upper Verde River springs and perennial streamflow. The Town has entered into a partnership with The Nature Conservancy to understand and address these issues (Chino Valley, 2021).

### 3.3.5 Service Area Right

Cities, towns and private water companies within Active Management Areas utilize Service Area Rights. The Town of Chino Valley's Service Area Right allows the Town to withdraw and transport groundwater to serve current and new customers not requiring Certificates of Assured Water Supply.

The annual volume of water for a Service Area Right is not quantified or fixed. A Service Area Right allows the Town to increase the amount of groundwater withdrawn and delivered to customers, to install larger pumps on existing wells or drill new wells to serve increased water demands of new customers.

The Town of Chino Valley's current service area is shown on **Figure 2**. The Service Area boundary is defined as 660 ft on either side of a distribution line serving municipal water customers. The area can be expanded to meet new customer demands for municipal water.

Cities, towns and private water companies that utilize a Service Area Right are required to file Annual Groundwater Withdrawal and Use reports with ADWR.

## 4.0 ASSURED WATER SUPPLY

Before recording plats or selling newly subdivided parcels within an AMA, developers of sub-divisions (as defined in ARS 32-2101(56) and (57) must obtain either a water supply from a Designated Water Provider or a Certificate of Assured Water Supply (CAWS) from ADWR. The Town of Chino Valley is not a Designated Water Provider. An applicant for a CAWS must demonstrate all of the criteria below, including the demonstration of a 100-year physical water availability.

### 4.1 CAWS CRITERIA

The criteria for obtaining a Certificate of Assured Water Supply (CAWS) in the PrAMA are given below.

- **Physical Water Availability**

Sources of water have specific requirements for demonstration of physical availability. In the Prescott Active Management Area the maximum depth to groundwater after 100 years cannot exceed 1,000 below land surface. Additional specific requirements can be found in the Arizona Administrative Code (See: A.A.C. R12-15-716).

- **Continuous Water Availability**

Water providers or developers must demonstrate that the water supply is uninterrupted for the 100-year period, or that sufficient backup supplies exist for any anticipated shortages (See: A.A.C. R12-15-717).

- **Legal Water Availability**

An applicant must demonstrate legal rights to all water supplies included in the application (See: A.A.C. R12-15-718).

- **Water Quality**

Proposed sources of water must satisfy existing state water quality standards and any other quality standards applicable to the proposed use after treatment (See: A.A.C. R12-15-719).

- **Financial Capability**

Water providers or developers must demonstrate financial capability to construct the water delivery system and any storage or treatment facilities. Financial capability for developers is typically considered through the local government's subdivision review process. A demonstration is also required that adequate delivery, storage, and treatment works will be available to the applicant or the applicant's customers for 100 years (See: A.A.C. R12-15-720).

- **Consistency with the Management Plan**

Each AMA's Management Plan prescribes water conservation requirements for municipal water providers. Water demand associated with proposed subdivisions is evaluated in accordance with these conservation requirements (See: A.A.C. R12-15-721).

- **Consistency with the Management Goal**

Applicants must demonstrate consistency with the management goals of each AMA. For the Prescott Active Management Area the management goal is safe yield by 2025 (See: A.A.C. R12-15-722).

#### 4.2 TOWN OF CHINO VALLEY WATER SUPPLY AND SUB-DIVISION DEVELOPMENT

While the Town is not a Designated Water Provider, it can exercise some control over subdivision development by agreeing (or not) to be the Water Service Provider and by providing access to some of the Town's water rights. This could include:

- Agreeing to be the Water Service Provider satisfies the continuous availability, a portion of the financial capability and consistency with the management plan criteria.
- In 2020 the Town of Chino Valley contracted with Montgomery & Associates (M&A) to prepare a report to support an application for a Physical Availability Determination (PAD) with the Arizona Department of Water Resources (ADWR). The report identified 4,605 AF/YR of groundwater that is physically available within the Town's service area for 100 years and could be used by a developer to satisfy the physical availability criterion.
- The Town could pledge some or all of its extinguishment credits to a development to assist in meeting the legal availability criterion.

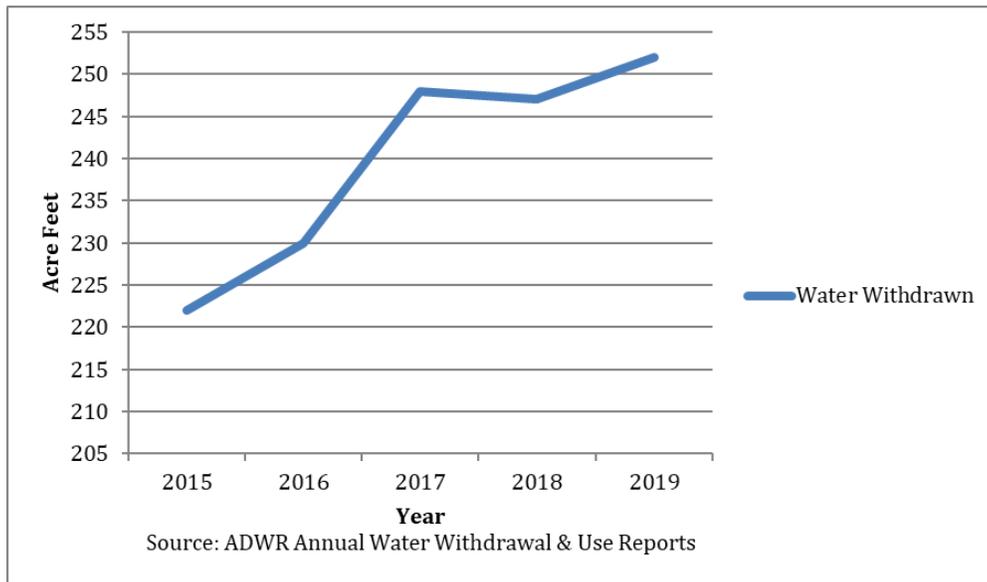
In August 2020, the Town submitted application for an assured water supply determination of 1,637.20 AF/YR for 100 years for the development of Old Home Manor (OHM). The OHM development plan does not include residential development but does anticipate a business park that could fall under the definition of a sub-division under Arizona Department of Real Estate rules. Having an AWS will allow the Town to maximize development of the OHM property. The Town awaits ADWR's final decision and orders regarding this application.

## 5.0 WATER DEMAND

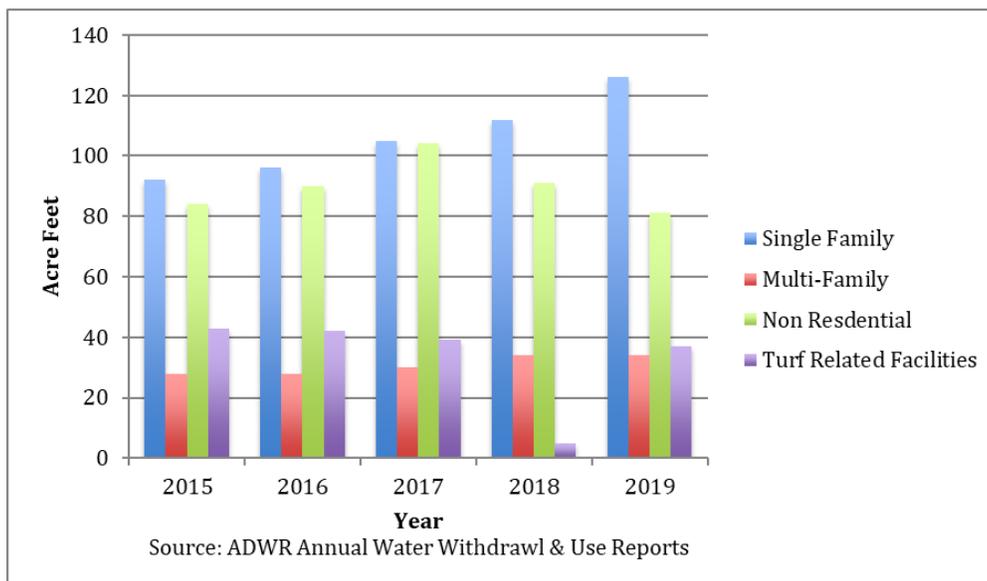
### 5.1 HISTORIC WATER DEMAND

The Town’s groundwater withdrawals to meet the water system demand over the last 5 years is given in **Chart 5**. The distribution of the water by use is given in **Chart 6**.

**Chart 5 5-Year Water System Demand**



**Chart 6 Water Demand by Use**



Water for single and multifamily development has risen steadily while water for non-residential and turf related uses have varied or remained relatively constant

## 5.2 FUTURE WATER DEMAND

Future water demands have been projected through 2035 on an average and maximum daily basis and are summarized in **Chart 7** (Civiltec, 2020).

**Chart 7 Future Water Demand by Use**

Category	Average Daily Demand (GPM)			
	2021	2025	2030	2035
Existing Commercial	31	31	31	31
Residential	145	205	238	276
OHM	89	351	551	640
Existing Turf	23	23	23	23
<b>Totals</b>	<b>288</b>	<b>610</b>	<b>843</b>	<b>970</b>
Category	Maximum Daily Demand (GPM)			
	2021	2025	2030	2035
Existing Commercial	63	63	63	63
Residential	291	411	476	552
OHM	193	746	1145	1323
Existing Turf	71	71	71	71
<b>Totals</b>	<b>618</b>	<b>1291</b>	<b>1755</b>	<b>2009</b>

As noted, demands are expected to grow and will require expansion of the Town’s water supply through additional well capacity and distribution pipelines. As currently projected, the maximum daily 2030 demand (1,755 gpm) will exceed the Town’s current operational well capacity (1,660 gpm without Highland Ranch well).

## 5.3 REGULATORY ISSUES

As noted in **Chart 5** and **Chart 7**, the Town’s water system deliveries exceeded 250 AFA in 2019 and are projected to grow to 1,500 AFA by 2305 (Civiltec, 2020). Under the PrAMA Fourth Management Plan the Town will move from a Small Municipal Provider to a Large Municipal Provider.

As a new large provider, the Town of Chino Valley will be regulated under the Non-Per Capita Conservation Program (NPCCP) described in section 5-705 of the Prescott Active Management Area Fourth Management Plan (4MP). The Town will be required to submit a Provider Profile containing the

information described in section 5-705(B)(1) of the 4MP within six months after receiving written notice of its conservation requirements from the director of ADWR.

The provider must begin complying with the NPCCP upon approval of the Provider Profile pursuant to section 5-705(B)(2) or (B)(3) of the 4MP.

As a New Large Municipal Provider the Town will be required to implement the following programs:

- Basic Public Information Program
- Best Management Practices (BMP)
- Annual Conservation Efforts Report
- Provide Water Rate Structure
- Comply with 5-year Records Retention
- Compliance with Individual User Requirements
- Compliance with Distribution System Requirements
- Compliance with Monitoring and Reporting Requirements

## 6.0 REFERENCES

ADEQ, 2000. Ambient Water Quality of Prescott Management Area, A 1997-1998 Baseline Study. ADEQ Open-file Report 00-01, May 2000.

ADWR, 2020 [https://new.azwater.gov/sites/default/files/media/2019%20LTSA%20Summary%2010-30-2020\\_0.pdf](https://new.azwater.gov/sites/default/files/media/2019%20LTSA%20Summary%2010-30-2020_0.pdf).

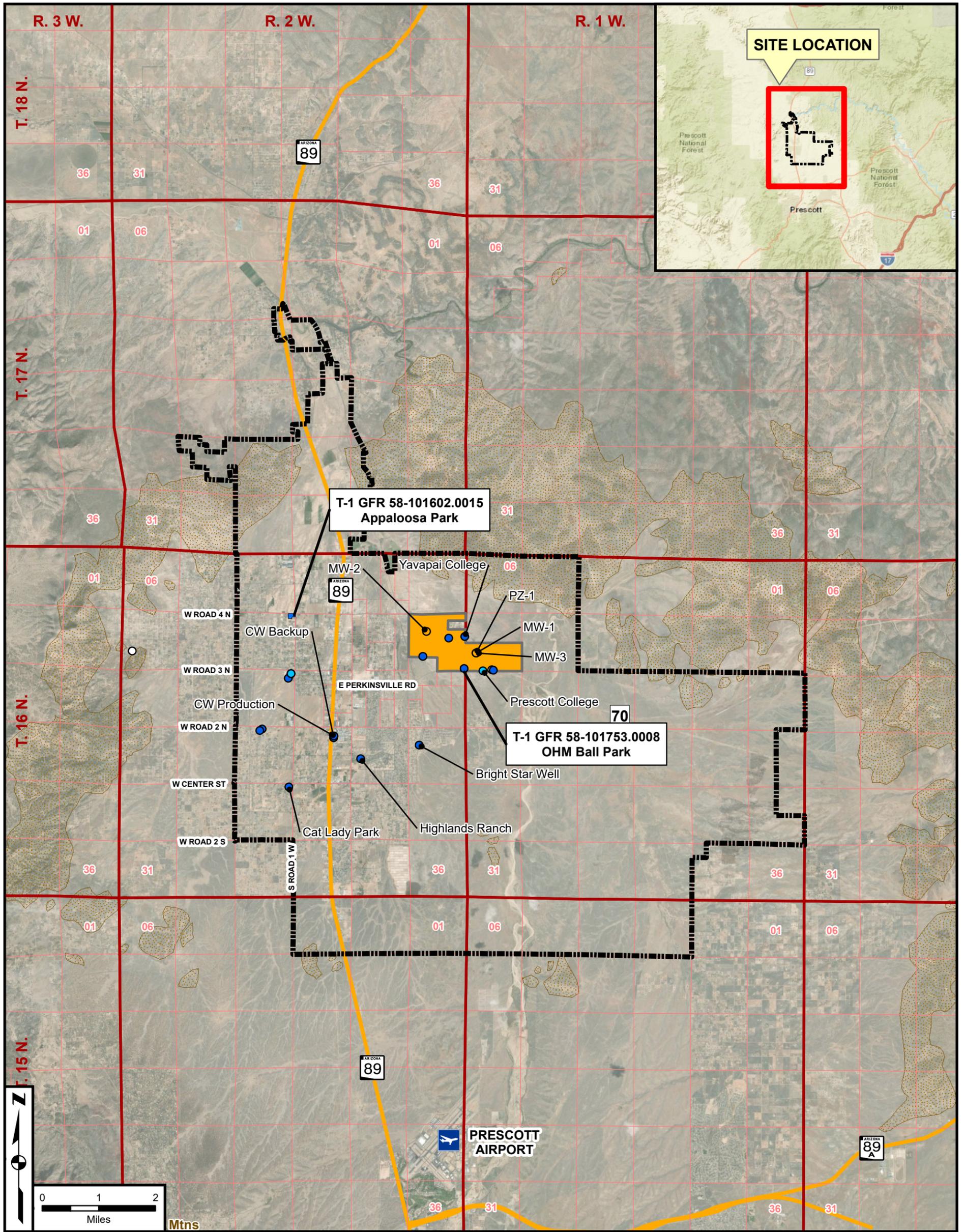
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M&A, 2020. Groundwater Physical Availability Determination for the Town of Chino Valley Wells and Area of Impact for Old Home Manor Underground Storage Facility, Yavapai County, Montgomery & Associates, July 17, 2020.

Chino Valley, 2021. Partnership Opportunity, A presentation to Town Council, January 2021.

## FIGURES



**EXPLANATION**

**ADWR Registered Well**

- Water Production - Exempt
- Water Production - Non-Exempt
- Cancelled
- Other

- Town of Chino Valley
- Old Home Manor
- Hardrock Outcrop

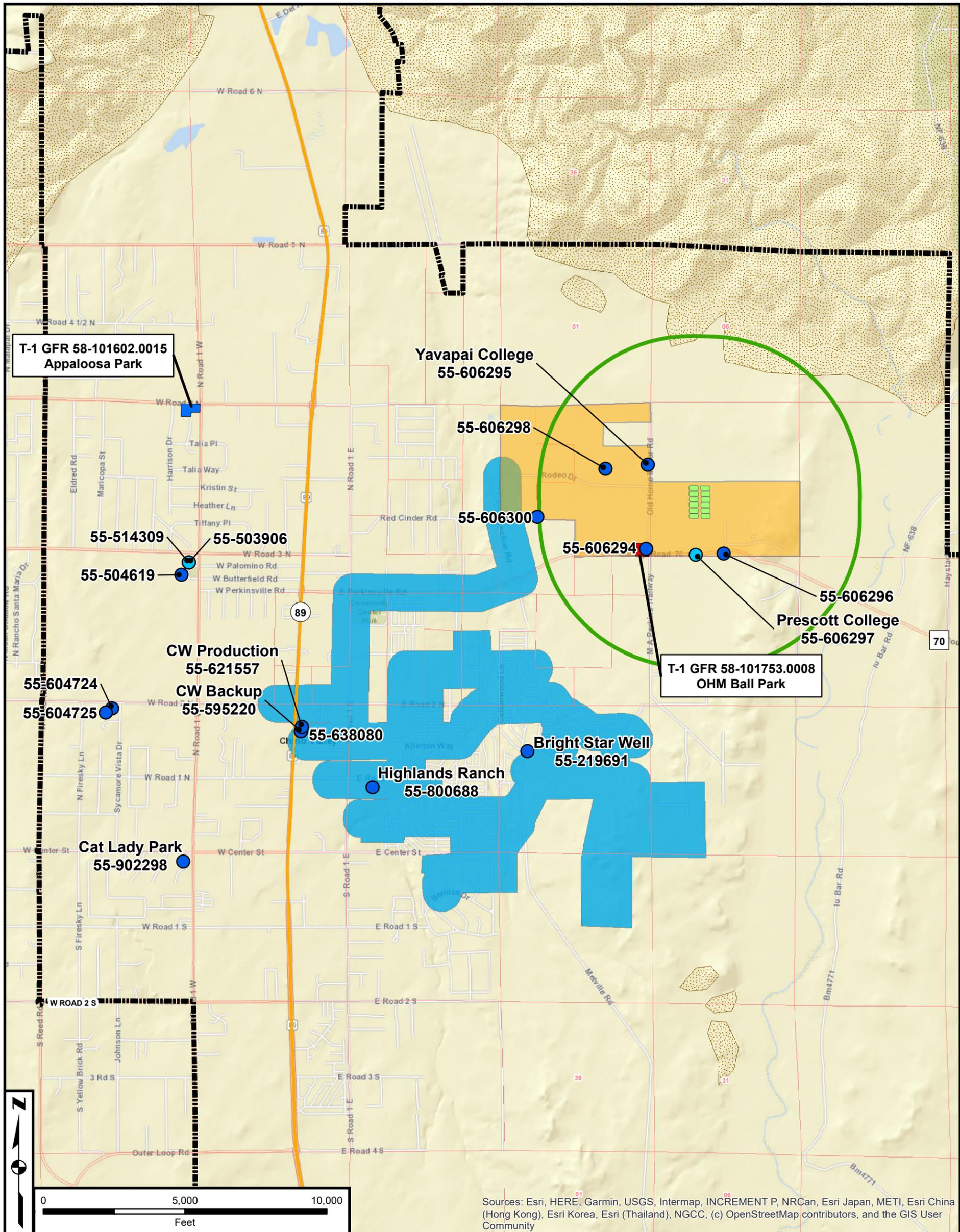
**Groundwater Use Right 58 (Type 1)**

- 58-101602.0015 (15.83 acre-feet)
- 58-101753.0008 (13.95 acre-feet)

**Notes**  
 Data Sources  
 - Esri aerial imagery basemap  
 - Esri streets basemap  
 - ADWR  
 - AZGS

S:\MyDocs\SGC\PRJ\2020\20-322 Chino Valley\OHM\IWM\p\figs\Map\Figure 1\_Site\_Location.mxd

<p><b>OLD HOME MANOR          INTEGRATED WATER MASTER PLAN          CHINO VALLEY, YAVAPAI COUNTY, ARIZONA</b></p>	<p><b>MATRIXNEWORLD</b>          Engineering Progress</p>		<p><b>PROJECT LOCATION MAP</b></p>		<p>FIGURE NUMBER:  <b>1</b></p>
	<p>Matrix New World Engineering, Land Surveying and Landscape Architecture, P.C.          3033 North 44th Street, Suite 120          Phoenix, AZ 85018          WBE / DBE</p>		<p>TEL: 602.955.5547          FAX: 602.955.7585</p>	<p>PROJECT NUMBER: 20-322</p>	
	<p>www.matrixnewworld.com</p>		<p>DATE: 11-20-2020</p>	<p>DATE: 11-20-2020</p>	



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

**EXPLANATION**

**ADWR Registered Well**

- Water Production - Exempt
- Water Production - Non-Exempt
- Cancelled
- Other

- OHM Recharge Project
- 1-mile Safe Harbor
- Town of Chino Valley
- Old Home Manor
- Hardrock Outcrop

**Town Service Area**

**Groundwater Use Right 58 (Type 1)**

- 58-101602.0015 (15.83 acre-feet)
- 58-101753.0008 (13.95 acre-feet)

**Notes**

- Data Sources
- Esri aerial imagery basemap
- Esri streets basemap
- ADWR
- AZGS

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**OLD HOME MANOR  
INTEGRATED WATER MASTER PLAN  
CHINO VALLEY, YAVAPAI COUNTY, ARIZONA**

**MATRIXNEWORLD**  
Engineering Progress

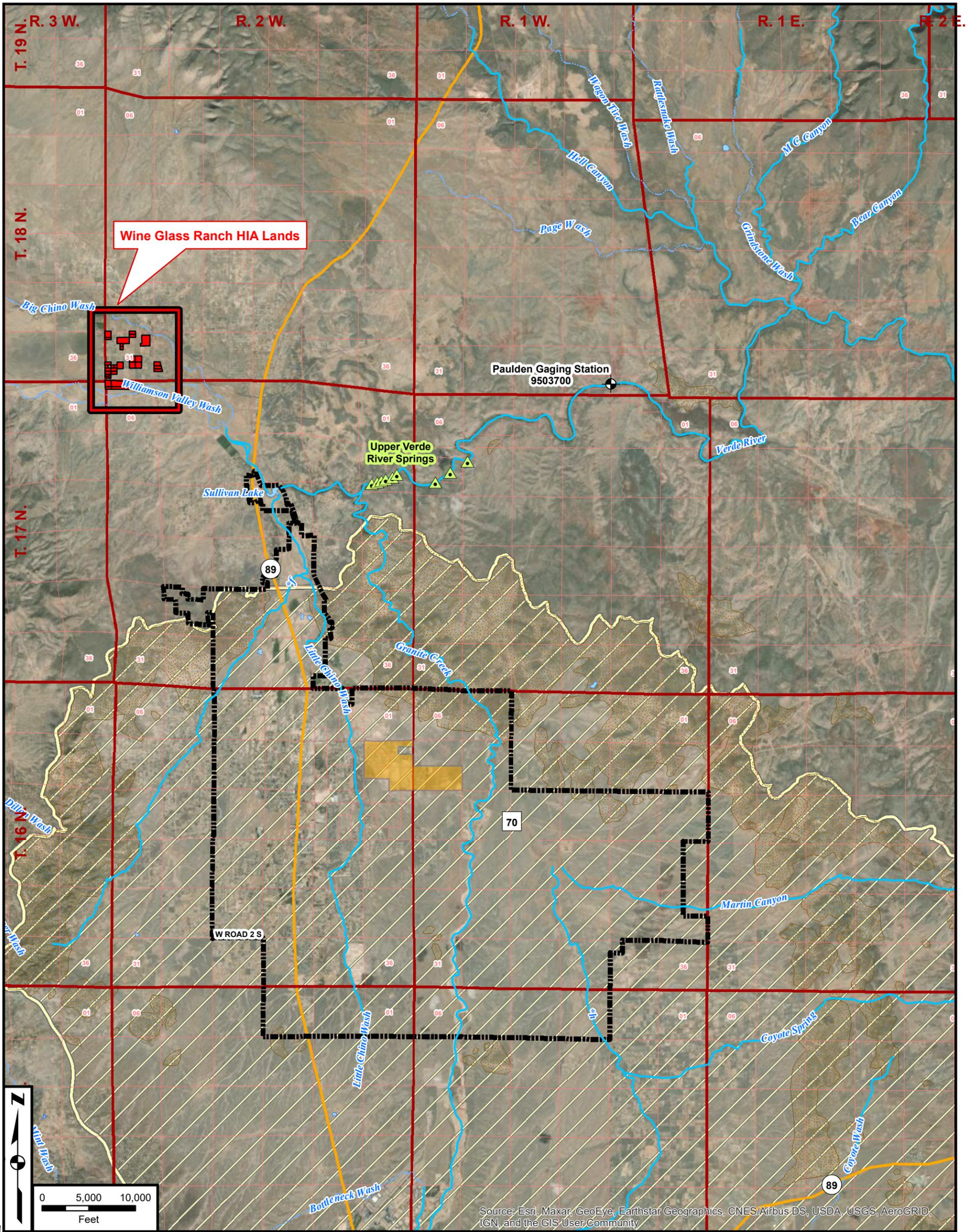
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WELL LOCATION MAP

DRAWN BY: JJ	APPROVED BY: HB	PROJECT NUMBER: 20-322
DATE: 01-25-2021	DATE: 01-25-2021	

FIGURE NUMBER:

**2**



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**EXPLANATION**

- Upper Verde River Springs
- Paulden Gaging Station
- Wine Glass Ranch HIA Lands
- Old Home Manor
- Town of Chino Valley
- Prescott Active Management Area
- Lakes
- Hardrock Outcrop

**Notes**  
 Data Sources  
 - Esri aerial imagery basemap  
 - Esri streets basemap  
 - ADWR  
 - AZGS

**OLD HOME MANOR  
 INTEGRATED WATER MASTER PLAN  
 CHINO VALLEY, YAVAPAI COUNTY, ARIZONA**

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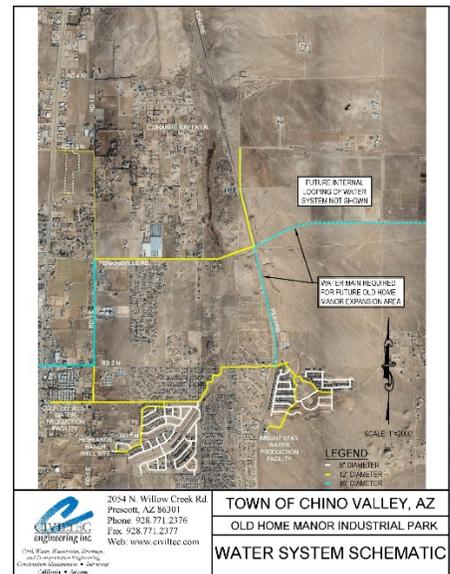
**LOCATION MAP  
 WINE GLASS RANCH HIA**

DRAWN BY: JJ	APPROVED BY: HB	PROJECT NUMBER: 20-322
DATE: 11-20-2020	DATE: 11-20-2020	

FIGURE NUMBER:

**3**

# Systems Integration - Old Home Manor Technical Memorandum Chino Valley, AZ



**For:** Town of Chino Valley  
1020 W. Palomino Road  
Chino Valley, AZ 86323



**By:** Civiltec Engineering, Inc.  
2054 N. Willow Creek Rd.  
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## 1 INTRODUCTION

Old Home Manor is an 842 acre area of Chino Valley lying east of Jerome Junction, and north of Perkinsville Road. Of the 842 acres, 200 acres are zoned as Business Park and the remaining 642 acres are zoned as Public Land. It is mostly vacant land and contains the location of the Chino Valley wastewater treatment plant, recharge basins, park facilities, Public Works facilities, Yavapai College, the Equestrian Center, the WWTP Rapid infiltration basins, model airplane park and the Town's shooting range. See Figure 1-1 for an aerial image the the potential Old Home Manor development area.

The purpose of the Systems Integration Technical Memorandum is to present the overall integration of the available water resources, capacity of the rapid infiltration basins, water system improvements, sewer system improvements and the 5-year Capital Improvements Plan. The initial 5 year CIP program is intended to provide the backbone infrastructure required for development of the Town owned property that has been identified by Town Staff to be developed first.

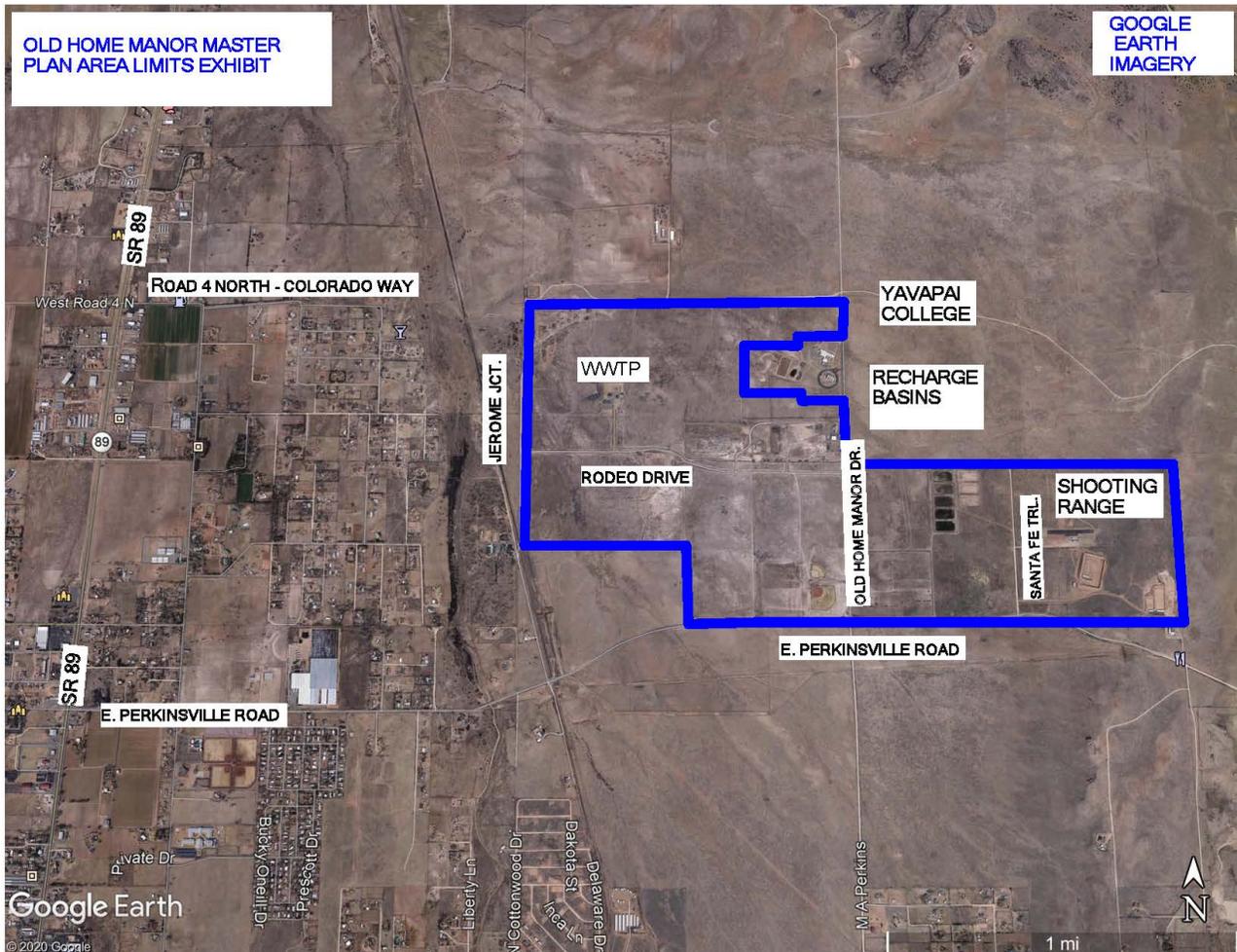


Figure 1-1 Old Home Manor Area

Systems Integration Technical Memorandum

The general Land Use Plan for the various portions of Old Home Manor is shown on Figure 1-2. Planned uses include ballfields, business park, equestrian park, RV park, parks and recreation, infiltration basins, public works/wastewater treatment plant, as yet undetermined parcel development, Yavapai College Agricultural Extension, and a shooting range with model airplane airport.

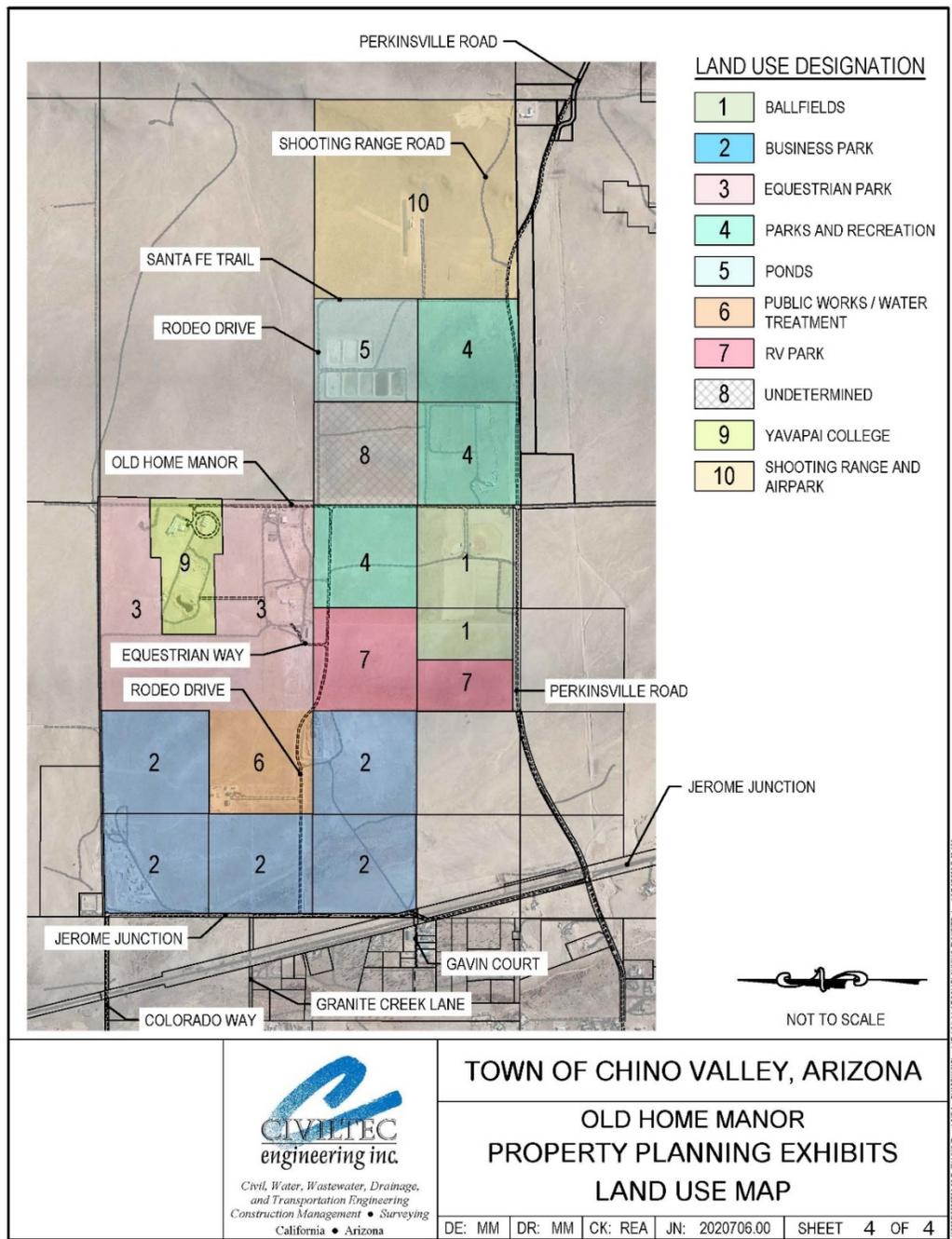


Figure 1-2 Old Home Manor Land Use Concept

## 2 INTEGRATION COMPONENTS

In developing the IWMP report for Old Home Manor, the following components were analyzed:

1. Availability of water resources;
2. Capacity of the existing water supply and distribution network;
3. Capacity of the existing wastewater treatment plant, collection system and regional sewage lift station;
4. Capacity of the existing treated effluent Rapid Infiltration Basins;
5. Deficiencies in the exiting systems;
6. Required improvements to the various systems to supply the necessary infrastructure for the development of Old Home Manor.
7. Landscape Planning and Draft Landscape Ordinances for implementation in Old Home Manor

This Integration memo was developed from the individual Technical Memorandums for the IWMP report addressing the components noted above.

### 2.1 WATER RESOURCES

The current and potential water resources available through various water rights were identified by the Town and evaluated as a part of the IWMP. Each source was evaluated for physical availability, legal availability and reliability over the planning horizon. Work included the analysis of available data provided by the Town and obtained from published sources. The complete evaluation is included in the Water Resources and Recharge Technical Memorandum included in the IWMP.

Future water demands have been projected through 2035 on an average and maximum daily basis and are summarized in Figure 2-1.

#### Future Water Demand by Use

Category	Average Daily Demand (GPM)			
	2021	2025	2030	2035
Existing Commercial	31	31	31	31
Residential	145	205	238	276
OHM	89	351	551	640
Existing Turf	23	23	23	23
<b>Totals</b>	<b>288</b>	<b>610</b>	<b>843</b>	<b>970</b>
Category	Maximum Daily Demand (GPM)			
	2021	2025	2030	2035
Existing Commercial	63	63	63	63
Residential	291	411	476	552
OHM	193	746	1145	1323
Existing Turf	71	71	71	71
<b>Totals</b>	<b>618</b>	<b>1291</b>	<b>1755</b>	<b>2009</b>

Figure 2-1 Old Home Manor Future Water Demand

The Town has sufficient water rights for complete development of Old Home Manor, but as noted in Figure 2-1, demands are expected to grow and will require expansion of the Town's water supply through additional well capacity and distribution pipelines by 2030. As currently projected, the maximum daily 2030 demand (1,755 gpm) will exceed the Town's current operational well capacity (1,660 gpm without Highland Ranch well) or other new well source development.

***In summary, the available water supply, without new improvements, will allow development of Old Home Manor through 2025 but will require new water source development at year 2030. It is recommended that a new supply well and infrastructure be developed as soon as possible to provide redundant supply to the Community Water system in case of failure of the Bright Star primary production well.***

## **2.2 WATER SUPPLY AND DISTRIBUTION**

Water supply and distribution infrastructure was discussed in the Water System Technical Memorandum in detail. Development of Old Home Manor is limited by the existing network of 12" and 16" lines from the Bright Star production and storage facility.

Development of Old Home Manor for the initial construction of Rodeo Drive in 2021 (Priority 1 of the 5-Yr CIP program) can be achieved without new offsite supply lines. At year 2022 which includes the extension of Rodeo Drive to the RV Park, the planned Peavine Trail 16" waterline will need to be constructed to provide sufficient fire flow to the RV Park with residual pressures over 20 psi.

As an alternative, development of the westerly portion of the Business Park to the north and south of Rodeo Drive can be serviced by the existing water distribution network without constructing the Peavine Trail waterline due to the lower elevations in this region providing increased water pressures.

***In summary, the development of Old Home Manor from Jerome Junction to the RV Park is limited by the necessity for construction of the Peavine Trail waterline in year 2 of the CIP program. Development to the north and south of Rodeo Drive in areas of lower elevations can be accomplished with the existing infrastructure.***

## **2.3 WASTEWATER COLLECTION, PUMPING AND TREATMENT**

The existing and future wastewater system infrastructure was discussed in the Sewer System Technical Memorandum in detail. Existing and planned improvements were identified based on 5-year system needs.

The existing wastewater collection system is comprised of eight-inch through twelve-inch diameter underground gravity mains primarily serving the residential subdivisions of Bright Star, Chino Meadows (various phases), and Highlands Ranch. There are also twelve-inch diameter mains in Perkinsville Road, Road 2 North, and Center Street which serve commercial properties which are mostly located just east of State Route 89. These residential and commercial gravity mains discharge into an existing 18-inch diameter trunk main known as the "Santa Cruz Wash Interceptor Main" which conveys raw flows from south to north, in the general vicinity of the wash, to a regional lift station on Granite Creek Lane, just west of the Peavine Trail and west of Old Home Manor.

The lift station pumps the raw flows to the existing wastewater treatment plant north of Rodeo Road and once treated, the effluent is pumped to a series of rapid infiltration basins (R.I.B.'s) located further to the east in Old Home Manor.

The existing collection system, lift station, force mains, treatment plant, and R.I.B.'s are owned and maintained by Town forces. All of the Old Home Manor sewer collection system will convey sewage to the lift station and ultimately to the WWTP and Rapid Infiltration Basins.

It is anticipated that the existing lift station characteristics will suffice for the peak flowrate of 522 gpm in 2021. It is recommended that the lift station be equipped with a bar rack and/or comminutor to reduce current maintenance issues associated with pump clogging. The wastewater treatment facility is permitted to treat up to a maximum monthly volume of 5.0 MGD. The plant is currently equipped to treat up to 0.5 MGD. In 2021, the average daily flows to the wastewater treatment plant are anticipated to be 0.342 MGD which is below its current capacity of 0.5 MGD.

By the year 2025, the duty pump(s) in the lift station should be capable of pumping 800 gpm. At this time, or when peak flows reach approximately 750 gpm, the lift station should be upgraded, and the wet well size increased to the equivalent of an eight-foot diameter plus ten-foot diameter size in order to reduce pump cycling time. If variable speed pumps are supplied, the storage volume in the wet well can be significantly reduced.

The average daily flows to the wastewater treatment plant are anticipated to be 0.494 MGD which is just below its current capacity of 0.5 MGD, but is nearing the constructed capacity of the existing plant. Expansion of the plant to its currently designed capacity of 1.0 MGD should be started well in advance of the 2025 year threshold.

***In summary, the current WWTP, collection system and lift station can accommodate development at Old Home Manor and Town-wide up to the year 2025 with its current infrastructure. Planning needs to be started soon for expanding the constructed capacity of the plant to its design flow of 1.0 MGD.***

## **2.4 RAPID INFILTRATION BASINS**

The water to be recharged is effluent from the Town's Chino Valley Water Reclamation Facility (WRF) which operates under an Arizona Department of Environmental Quality (ADEQ) Aquifer Protection Permit (APP) No. P-1041236, LTF 28493, Place ID 17668 dated September 7, 2004. The facility is permitted to treat up to a maximum monthly volume of 5.0 million gallons per day (MGD). The plant is currently designed for 1.0 MGD and will be expanded over time to meet future demand. All the WRF effluent is sent to the OHMUSF, no reuse is permitted under the APP.

The OHMUSF is permitted to recharge up to 1,120 ac-ft (1.0 MGD) annually. The permit allows a total of 12 1-acre infiltration basins, 8 of which have been constructed. Of the constructed basins only 5 are connected to the system and are in operation. Annual effluent volumes delivered to the OHMUSF for the past five years are given in *Figure 2-2* below.

**OHMUSF Annual Recharge Volume (AF)**

Year	2015	2016	2017	2018	2019
Delivered	277.4	270.44	283.68	279.88	309.3
Net of Evaporation	270.8	263.8	277.1	273.3	NA

**Notes:** AF = Acre-feet

NA = Not Available

*Figure 2-2 OHMUSF Annual Recharge Volume (AF)*

The average reported basin infiltration rate for the 2014-2018 period is included in Figure 2-3.

**OHMUSF Basin Infiltration Rates (ft/day)**

Year	2014	2015	2016	2017	2018
Rate	0.7	0.74	0.72	0.76	0.75

**Notes:** ft/day = Feet per day

*Figure 2-3 OHMUSF Basin Infiltration Rates (ft/day)*

Reported basin infiltration rates have remained stable over the 5-year period and averaged 0.73 ft/day. The facility operates by rotating basins on a daily basis, keeping at least one basin wet on any day with an average number of wetted days per basin per month of about 6 days. Basins are ‘ripped’ annually to maintain infiltration capacity.

The OHMUSF is operating below its permitted capacity. In 2018 the facility recharged 273.3 ac-ft or about 24% of its 1,120 ac-ft permitted annual volume. The facility has the capacity to double its annual recharge volume without construction of additional basins or related infrastructure (Bovee, 2020).

***For the purpose of the IWMP and system integration, no improvements are required to the Rapid Infiltration Basins within the 15-year planning horizon.***

**2.5 SYSTEM DEFICIENCIES AND RECOMMENDATIONS**

As noted in the previous sections, the development of Old Home Manor beyond 2022 will necessitate the construction of the Peavine Trail 16” waterline and improvements to the Sewer lift station and WWTP beyond 2025.

The lack of redundancy in the Town’s water production and distribution systems is a significant issue to address as the Town and the Old Home Manor anticipated population growth drive the need for a more robust Community Water production and distribution system. The following is a list of items that need consideration by the Town over the next 15 years:

## Systems Integration Technical Memorandum

- Addition of a Lift Station bar rack and/or comminutor (grinder) for prescreening and reducing the size of the effluent particles entering the wet wells in order to reduce the clogging of the existing pumps. This is a project that can be undertaken at any time in the near future.
- Addition of an additional lift station wet well and pumps to increase the capacity of the lift station to pump effluent to the WWTP. This is anticipated to occur when wet well volume increases (by 2025) requiring pump upgrades as flows exceed the pump capacities.
- Install an equalization basin at the WWTP to regulate the peak flows through the plant to delay the need for the plant expansion.
- Expand the WWTP by year 2025 to its design capacity of 1.0 MGD as effluent flows approach the currently constructed 0.5 MGD capacity. Planning and permitting for the additional construction should be started well in advance of the actual need for the increased capacity.
- Due to the Community Water System's high level of dependency on the Bright Star supply well, it is recommended to drill and equip an additional well near the Bright Star or Country West production facilities, including piping, valving and controls. As an option, the existing well at Highlands Ranch could also be rehabilitated or a new well drilled and placed into service at that location.
- Develop the Old Home Manor pressure zone, including putting into service one of the Old Home Manor high production wells and creation of a potable water storage tank farm near the Model Airplane Park/Shooting Range to service the westerly portion of Old Home Manor and portions of the Town located west and north of Old Home Manor. This would create a service area providing Town water to the northerly limits of the community.
- Installation of an additional 500,000 potable water storage tank by 2030 to supplement the system demands and provide an independent storage facility for the Old Hoe Manor pressure zone.

### 3 CIP SPECIFIC 5-YEAR PLAN

Civiltec met with the Town on November 23, 2020 to prioritize the first 5-years of potential projects within Old Home Manor in order to meet the current development concepts and opportunities that were being considered by the Town.

The primary focus of the CIP plan was to provide the infrastructure for the development of the Business Park area adjacent to Rodeo Drive and the RV Park parcels as shown on Figure 3-1. This would include approximately 15% of the Business Park planned square footage developed within the first 5 years, or approximately 30 acres of the available 200 acres. The project priorities were established for the initial 5-year plan as shown on the following exhibits.

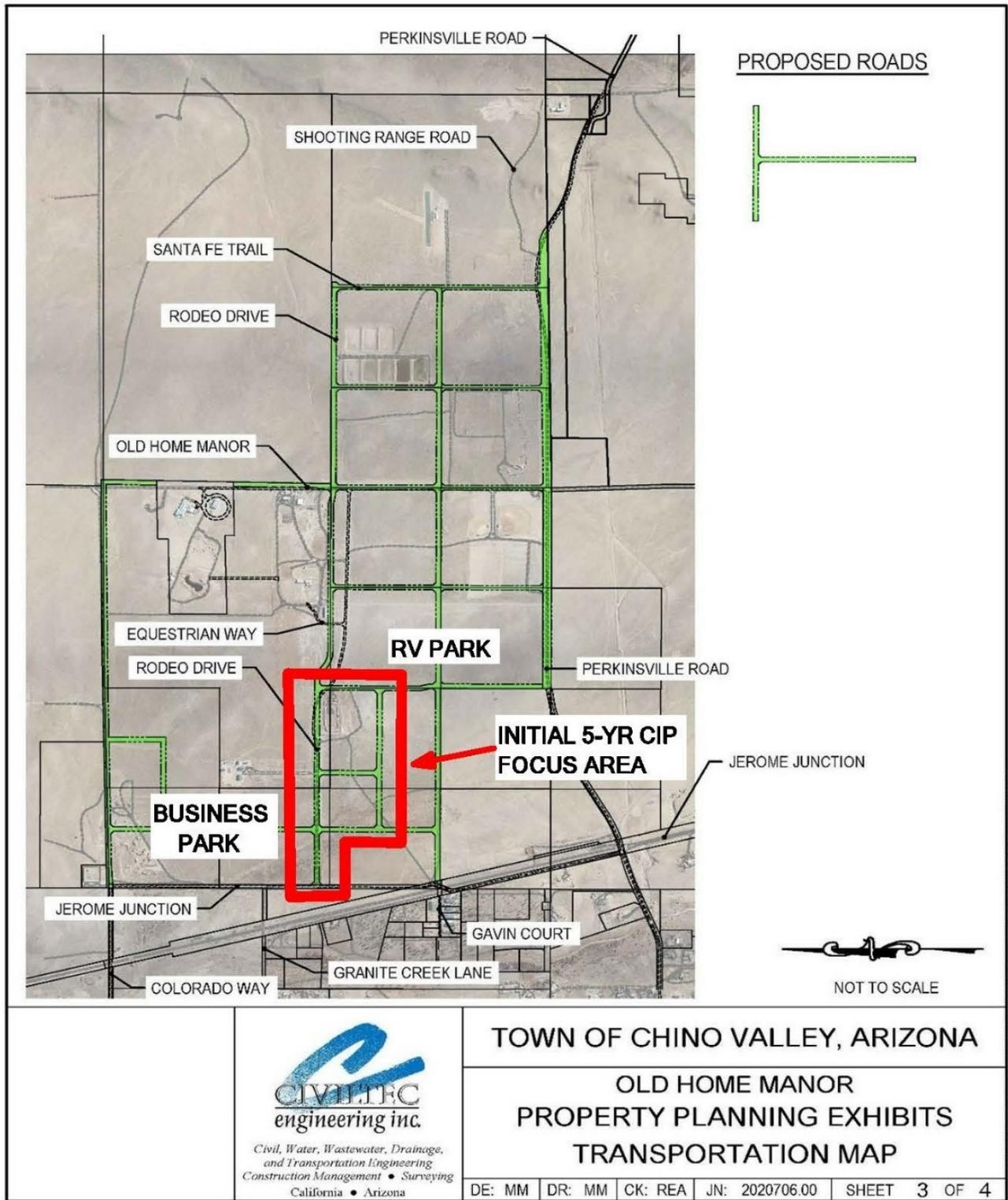
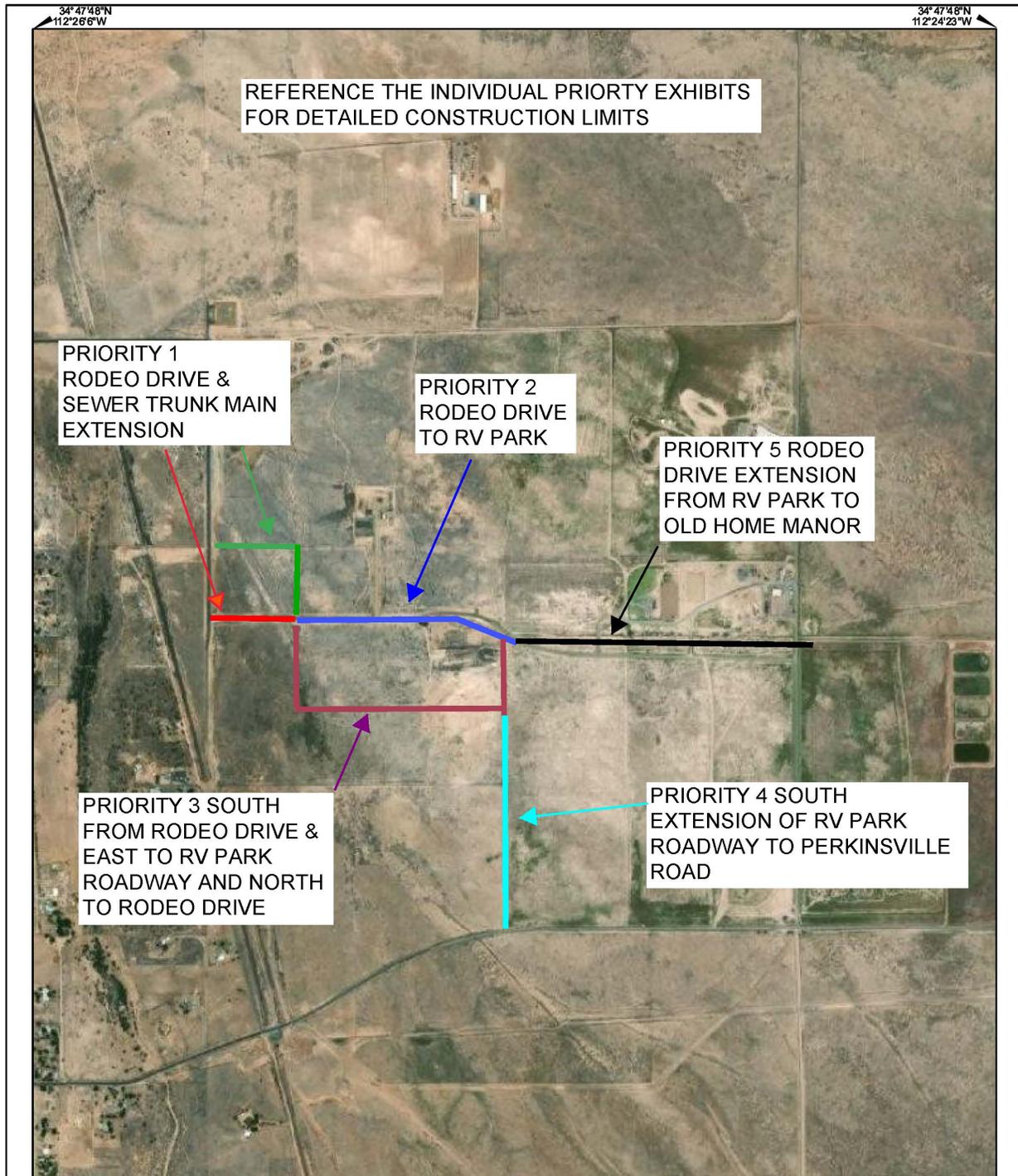


Figure 3-1 Transportation Map



## 5-YEAR CIP OVERALL PHASING EXHIBIT OLD HOME MANOR DEVELOPMENT AREA

Figure 3-2 CIP Overall Phasing Exhibit

### Priority 1 (Year 1), Business Park Development – Rodeo Drive:

Priority 1 would be to construct the Rodeo Drive construction plans that are currently at 99% complete and be ready to bid the project in the spring of 2021. The improvements include a significant box culvert structure similar to the existing structure under Jerome Junction, provide approximately 780 LF of fully developed 28' wide commercial roadway with curbs, sidewalks, asphalt pavement, waterlines, sewer line and pad grading for one of the Business Park parcels as shown on the current construction plans. Additionally, the initial 12" sewer line backbone system would be constructed north of Rodeo Drive east toward the WWTP/Maintenance Facilities, then south back to Rodeo Drive. This is a deep sewer connecting to the existing 12" sewer line in Jerome Junction, which flows to the existing sewer lift station adjacent to Santa Cruz Wash and is then pumped to the WWTP.

Priority 1 anticipates up to 81,000 SF of Business Park development based on the overall Business Park growth projections included in IWMP. The square footage represents 3% of the 2,700,000 square feet of planned Business Park development. It is equivalent to 6 acres of the available 200 acres included in the Business Park zoning.

***It is recommended that an additional well and associated piping, valving and controls be brought on-line to supplement the Bright Star primary production and storage facility to provide redundancy in the system in case of a Bright Star well failure.***

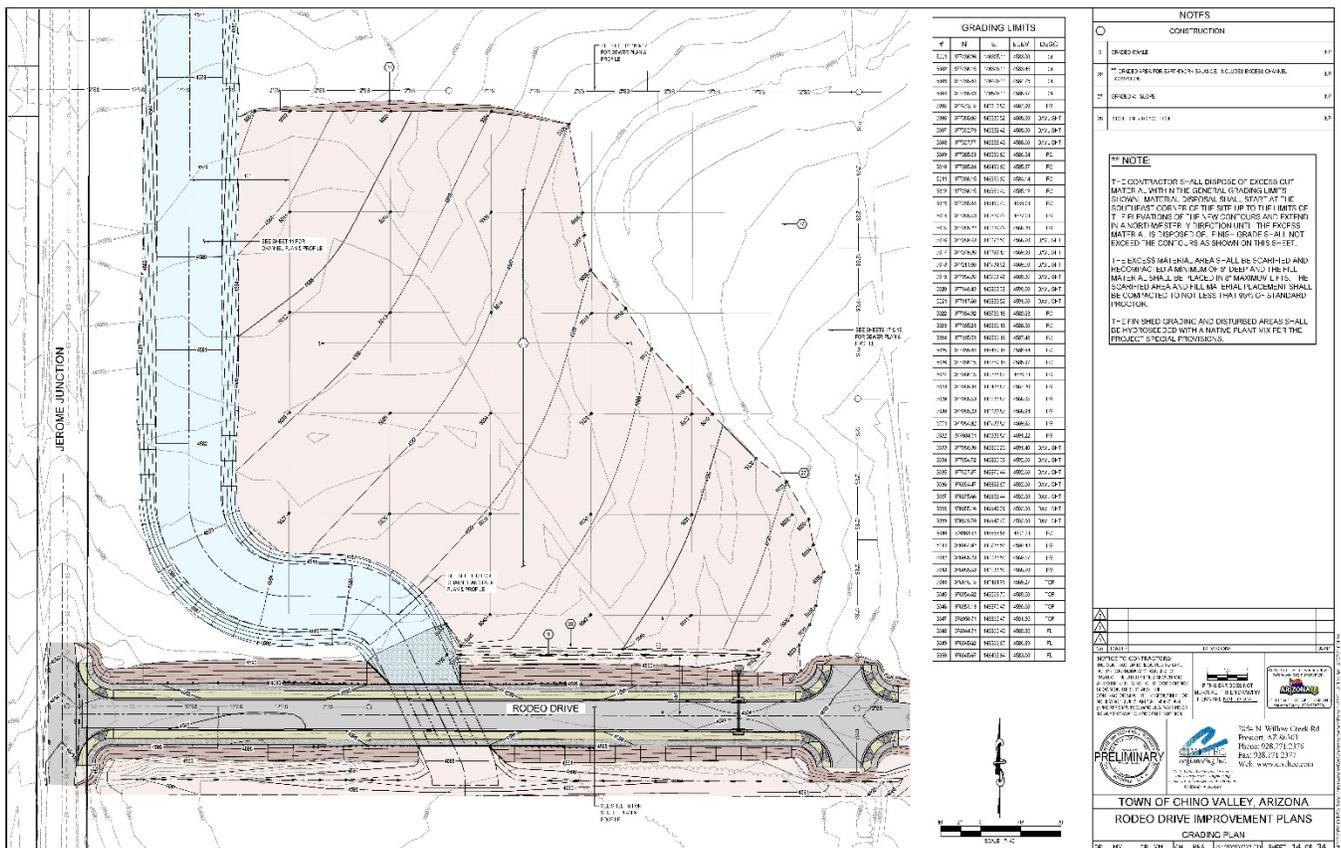


Figure 3-3 CIP Priority 1 – Rodeo Drive Improvements

## Priority 2 (Year 2), Rodeo Drive to the RV Park Development (North End):

Phase 2 would be to complete the design and construction of Rodeo Drive to the north end of the RV Park Roadway, including roadway, drainage, and utility extensions that will provide service to additional Business Park development and approximately 40 acres of the planned RV Park area. **To serve the RV Park with adequate fire flow and residual water pressure, the Peavine Trail 16" waterline would need to be included with the Priority 2 development.**

The roadway rural section would include a 24' wide asphalt roadway (4" AC/9" ABC, matching the Jerome Junction and 1<sup>st</sup> Phase Rodeo Drive pavement section) with 5' asphalt shoulders (3" AC/6" ABC). The curves would be softened near the RV Park to a smoother realignment of Rodeo Drive.

The 12" water and 12" sewer mains would be extended east on Rodeo Drive within the roadway prism to serve the Business Park and RV Park.

An additional 81,000 sf to 160,000 sf of Business Park growth and 10 acres of RV Park development would be accommodated by the year 2 improvements.

***The construction of the Peavine Trail 16" waterline could be delayed if the Business Park was developed to the north and south of Rodeo Drive up to the limits of the WWTP ground elevations.***

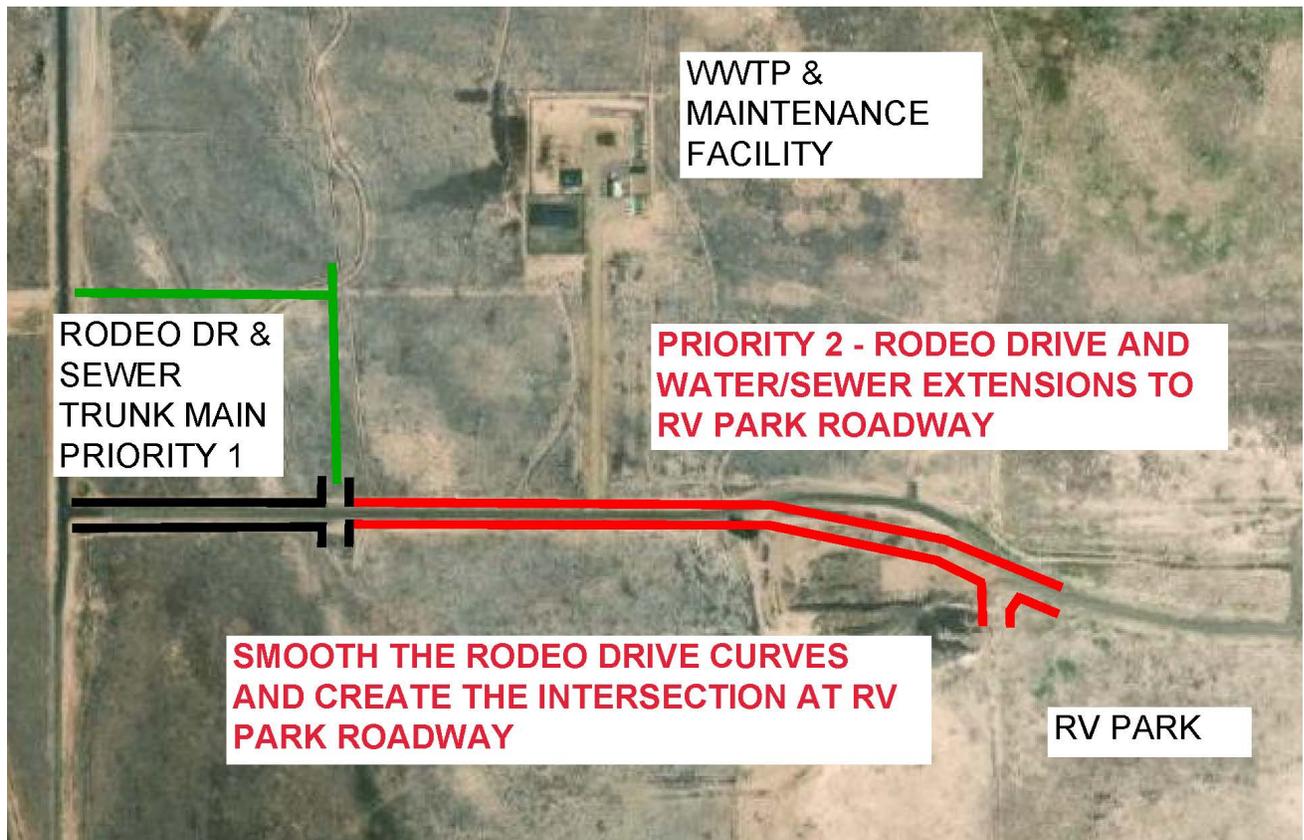


Figure 3-4 CIP Priority 2 – Rodeo Drive Improvements

### Priority 3 (Year 3), Business Park South Loop Roadway:

Priority 3 would include construction of the South Roadway Loop including 12" water and 12" sewer utilities south from the Phase 1 Rodeo Drive intersection, then east to the RV Park Roadway and then north to complete the RV Park Roadway loop back to Rodeo Drive Priority 2 extension.

These improvements would provide for an additional 81,000 sf to 162,000 sf of Business Park development and provide a looped connection to the 12" water main in Rodeo Drive to RV Park Road and north to Rodeo Drive, completing the 12" looped waterline. 12" sewer mains would also be provided to serve the same development area. An additional 10 acres of RV Park could potentially connect to the new water and sewer improvements.

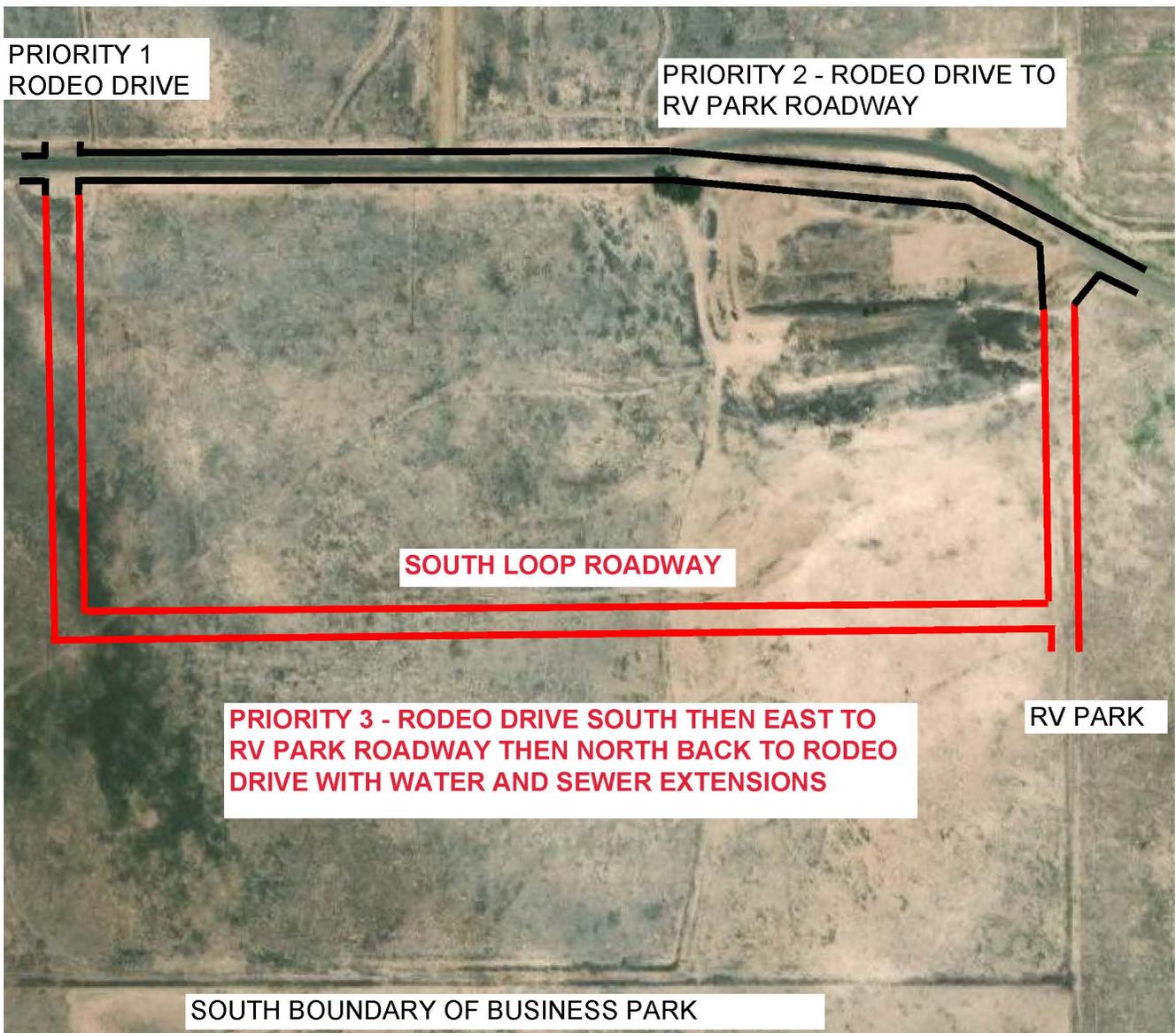
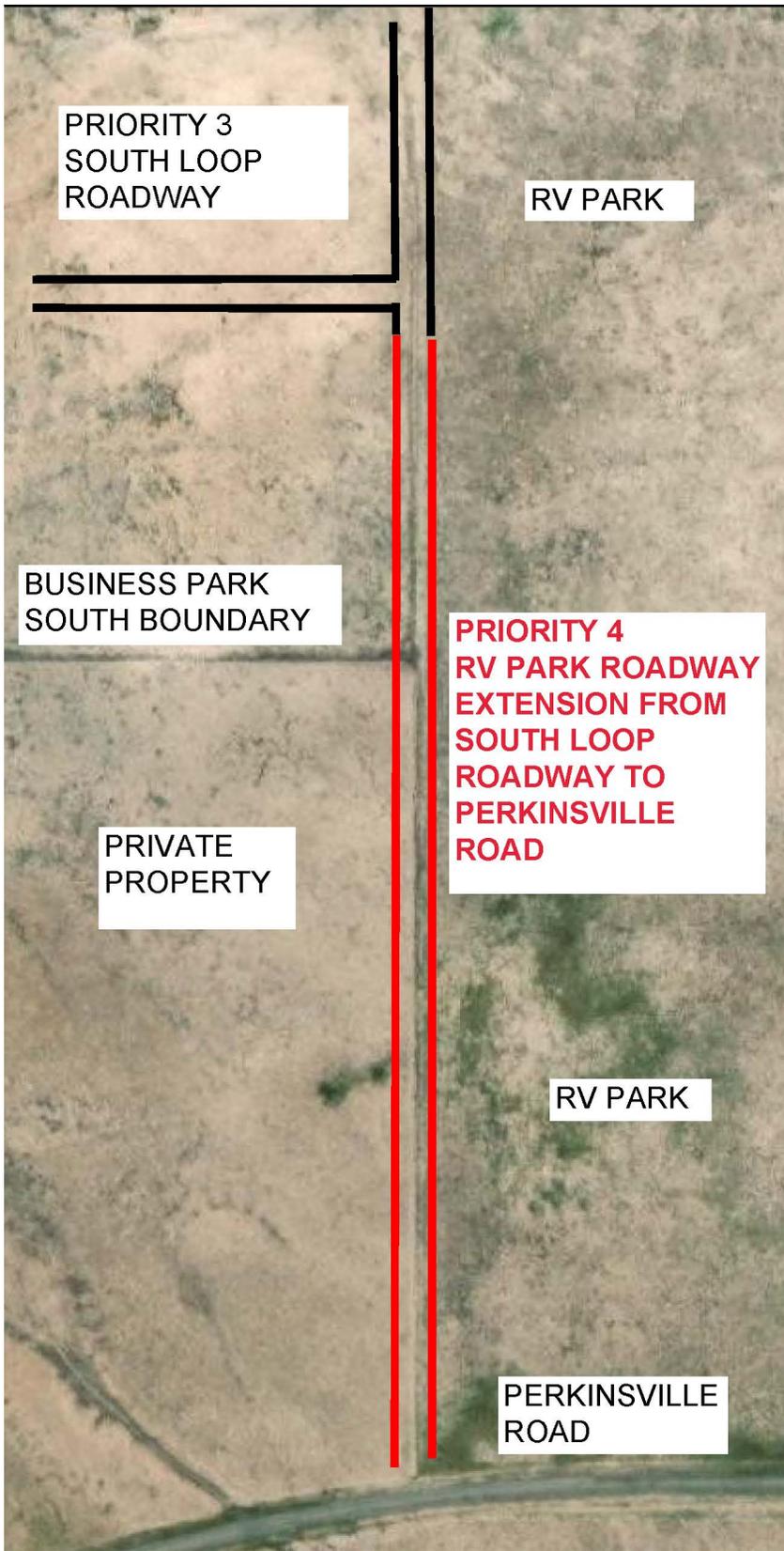


Figure 3-5 CIP Priority 3 – South Loop Roadway



**Priority 4 (Year 4), RV Park Roadway South Extension to Perkinsville Road:**

Phase 4 would include the completion of the RV Park Road from the South Loop Roadway to Perkinsville Road with 12" water and sewer mains and drainage improvements.

This phase allows for an additional 81,000 sf of Business Park development and the remaining 10 acres of RV Park for full development of the 60 acres.

Figure 3-6 CIP Priority 4 – RV Park Roadway to Perkinsville Road

### Priority 5, Rodeo Road Extension from RV Park Roadway to Old Home Manor Road:

Phase 5 would complete the construction of Rodeo Drive east from the RV Park Roadway to Old Home Manor Road including the extensions of the roadway, drainage and utilities from the Priority 1, 2 & 3 Rodeo Drive improvements. This primarily provides water and sewer service to the Parks and Recreation 40 acre parcel adjacent to the east boundary of the RV Park and approximately 20 acres of the planned Equestrian Center-Parks development. The alignment of Rodeo Drive would be modified to match the intersection at Old Home Manor.

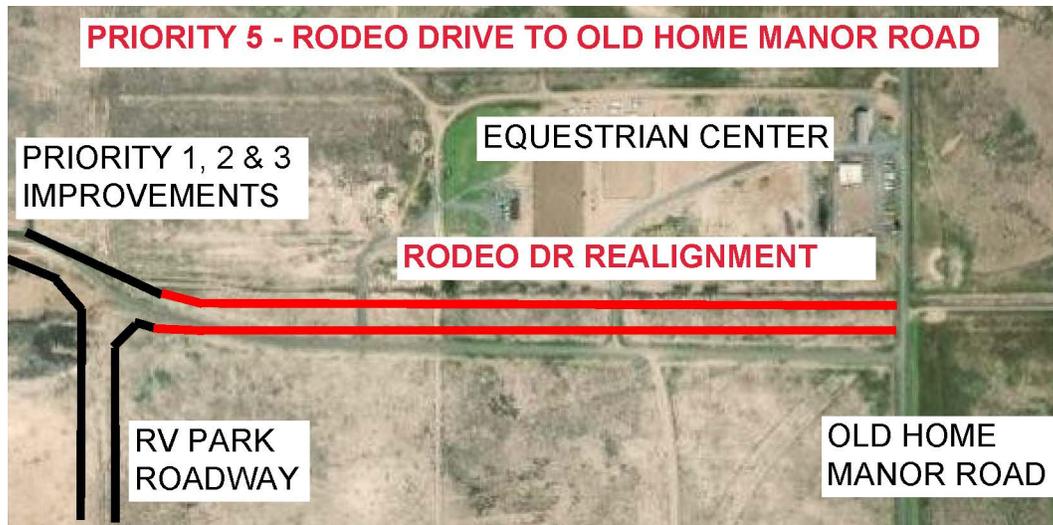


Figure 3-7 CIP Priority 5 – Rodeo Road to Old Home Manor

The development Priorities for the first 5 years are summarized as follows:

ANTICIPATED PARCEL DEVELOPMENT	BUSINESS PARK AC (SF)	EQUESTRIAN PARK (AC)	PARKS & RECREATION (AC)	RV PARK (AC)	TOTAL ALL PARCELS (AC)
<b>DEVELOPMENT PER YEAR</b>					
2021 (Existing or Planned)	6 (81,000 SF)				6
2022	6 (81,000 SF)			10	46
2023	6 (81,000 SF)			40	16
2024	6 (81,000 SF)		40	10	56
2025 – INITIAL 5-YR HORIZON	6 (81,000 SF)	20			26
5-YR TOTALS	30 (405,000 SF)	20	40	60	150

Figure 3-8 CIP 5-Year Buildout Summary

## LANDSCAPE TECHNICAL MEMORANDUM- DRAFT

**PROJECT:** Town of Chino Valley, Arizona - Old Home Manor  
**DATE:** March 5, 2021  
**TO:** The Town of Chino Valley, Arizona  
**FROM:** Celia van der Molen, Landscape Architect | Sketch Landscape Architecture Studio, LLC  
**RE:** Landscape Review and Analysis

---

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### Objective

To greatly reduce landscape water use at any new development that will be located within Old Home Manor (OHM). The new developments currently proposed at OHM include a 200 acre business park and a 40 acre Recreational Vehicle (RV) Park.

### Existing Conditions and Data for the Town of Chino Valley

#### **Elevation and Precipitation Rates**

Chino Valley sits at an average elevation of 4,700 Feet and is designated as Grassland (G) by the Arizona Department of Water Resources (ADWR). It receives an average annual rainfall of 10–14 inches per year with the majority of the precipitation between July and August. [1]

#### **Existing Landscape Requirements For New Development**

The current landscape requirements are found in the Town Unified Development Ordinance (UDO), Section 4.26 Landscape Requirements, and supplemented under UDO Section 3.19, BP – Business Park. A general summary of the landscape requirements is provided below:

#### **Size of Plant Material- Size and Patterns (buffer-yards & Parking Perimeter)**

Size		Pattern
<b>Trees</b>		
75%	15 gallon	(1) tree per (20) linear feet
15%	24" box or larger	
<b>Shrubs</b>		
100%	5 gallon or better	(4) shrubs per 400 square feet

#### **Street Trees**

Location	Requirements
Residential Subdivisions	(1) Shade Tree every 30 FT on Center <i>(does not designate specific size)</i>
Business Park	(1) 2" caliper tree every 30-feet on center (3) shrubs per tree

#### **Sidewalk Design and Landscape Parkway (residential Subdivisions)**

Arterial/Collector Streets	(6) foot wide sidewalk, separated from the roadway by a landscape parkway of at least 8 feet
Local Streets	(5) foot wide sidewalk, separated from the roadway by a landscape parkway of at least 8 feet

**Buffer-yards (all areas)**

<b>Multi-family, Office, Commercial and Industrial development</b>	
Front Yard (street frontage)	10 foot wide landscape strip
Front yard adjacent to Hwy 89	20 foot wide landscape strip
Front Yard- Business Park	50 foot setback
Side and rear yard (when adjacent to zoning other than single-family residential)	(5) foot wide landscape strip
Side and rear yard (when adjacent to single-family residential)	10% of lot width or depth, whichever is applicable No less than (10) feet in width No more than (20 feet in width
Side Yard: Business Park	To be in compliance with UDO Section 4.26 *(5) Foot Wide landscape strip 50 foot setback when adjacent to all other districts

**Parking Islands**

General	(1) curbed island for each (15) parking stalls in each row
	50% planted with live plant material, such as shrubs or groundcover <i>(does not designate that trees are required)</i>

**Landscape Requirement Comparisons**

The Town of Chino Valley landscape requirements are far below average compared to adjacent cities and planned communities. The City of Prescott and the Town of Prescott Valley require 50 percent or greater live landscape coverage within open space areas. A general breakdown is provided below:

<b>City of Prescott (LDC Article 6.5, Landscape and Screening)</b>	
<b>Location</b>	<b>Quantity Requirements</b>
General (buffer-yards and street frontage and all undeveloped area*)	(1) tree per 25 linear feet (4) shrubs per 250 square feet
Landscape Islands	(1) for every (10) parking spaces (1) tree and (2) shrubs per island
Foundation planting*	(1) tree and (4) shrubs per 50 linear feet

<b>Town of Prescott Valley (Town Code, Chapter 13, Article 13-26 Site Development Standards)</b>	
<b>Location</b>	<b>Quantity Requirements</b>
General (buffer-yards and street frontage)	(1) 15 gallon tree per 30 linear feet (1) 5 gallon shrubs & (4) 1 gallon shrubs per 100 square feet
On Site (open space/undeveloped areas)*	(1) Tree per 500 square feet (1) 5 gallon shrubs per 100 square feet
Landscape Islands	(1) island for every (12) Parking spaces (1) tree and (2) 5 gallon shrubs per island

<b>City of Prescott – Deep Well Ranch Landscape Standards (example)</b>	
<b>Location</b>	<b>Quantity Requirements</b>
Open space	(1) tree per 2,300 SF (1) plant (shrub, groundcover, perennial) per 50 square feet
Plant Sizes	30% of trees to be 24 inch box - Remainder shall be 5-10 gallon 50% of shrubs to be 5 gallon, 50% to be 1 gallon

*\*The TOCV does not have a requirement for this location*

### Existing Facilities and Landscape Maintenance Operations

The TOCV Parks Department actively maintains just over 120 acres of property including Town offices, parks and ball fields. The grass at Memory Park and the Community Center ball fields consume nearly 30 acres while 83 acres is designated as non-grass area, consisting of decorative landscape rock, trees, shrubs and drip irrigation.

Location	Total (Acres)	Non-Grass (Acres)	Grass (Acres)
Center Street Park	5.74	5.74	0
Community Center Park	36.9	10.5	23.8
Memory Park	15	1.5	5.2
Appaloosa Meadows	6	6	0
Town Hall	4.85	4	0
OHM- Mud Run	36.72	36.72	0
OHM- Ball Fields	18.45	18.45	0
	<b>123.66</b>	<b>82.91</b>	<b>29</b>

### Existing Parks Staff Model

Quantity	Position/Title	Average Salary	Requirement
1	Supervisor	\$55,000	Full Time
1	Parks Maintenance Worker - Senior	\$45,000	Full Time
1	Parks Maintenance Worker	\$31,000	Full Time
2	Parks Maintenance Worker - Seasonal	\$12.00 Per Hour	6 Months per Year

### Existing Weed Control

Per the Parks Department Supervisor, weed removal and maintenance on the 83 acres is the most time consuming responsibility. The current conditions require the following minimums:

- 5 to 6 weeks continuous maintenance (4 person team, 2.5 continuous weeks, 2 times per year)
- 10 to 12 weeks in the off season (off-season requires intermediate methods including a 2-person team averaging 1 week each month)

### Cost of Existing Weed Control

Item	Cost
Personnel	\$42,600 to \$50,000 per year
Supplies - Annual	\$3,000 to \$5,000 per year
Supplies – 2021 Budget: 150 Gallon Tank with Boom Attachment	\$10,000
Supplies – 2021 Budget: 1,000 Gallon Stationary Mixer and Induction Unit	\$7,000
<b>Total Estimated Cost of Weed Control for 2021</b>	<b>\$62,600 to \$72,000</b>

Note(s):

*-Current weed control methods are unsatisfactory and require more time and materials.*

*-Consideration of responsible parties for the landscape maintenance within the OHM Business Park and RV Park is being considered. If the Town absorbs this responsibility, and standard landscape installation methods are implemented, current time and materials for maintenance operations may double.*

**Average Costs of Landscape Installation** [2]

For reference, the average cost of new landscape install and annual maintenance is provided below:

Average Cost of Landscape	Units	Low Estimate	High Estimate
Landscape Materials and Installation Cost	\$/Sq. Foot	\$2.20	\$4.00

Irrigation Requirements	Units	Low Estimate	High Estimate
Regular Watering Zone (Grass)	Irrigations/Month	4	8
Occasional Watering Zone (Plants that require supplemental water)	Irrigations/Month	1	3
Natural Rainfall Zone	Irrigations/Month	0	0

Maintenance Data	Units	Low Estimate	High Estimate
Flower Bed Maintenance Cost	\$/Sq. Foot/Year	\$1.84	\$3.79
Turf Maintenance Base Cost	\$/Sq. Foot/Year	\$0.04	\$0.10
Turf Maintenance Additional Cost	\$/Sq. Foot/Year/Mo. of grow season	\$0.014	\$0.014
Shrub Maintenance Cost With Pruning	\$/Sq. Foot/Year	\$0.11	\$0.20
Tree Maintenance Cost With Pruning	\$/Sq. Foot/Year	\$0.03	\$0.17
Tree and Shrub Cost Without Pruning	\$/Sq. Foot/Year	\$0.01	\$0.01
Base Visit Cost for Private Landscaping Firms	\$/Visit/Hour Traveled	\$75.92	\$75.92
Profit for Private Landscaping Firms	% of Total Cost	10%	25%

**Note(s):**

-The "Natural Rainfall Zone" and "Tree and Shrub Costs Without Pruning" refer to areas that are landscaped with native plant material. After plants are established (3 to 5 years) these plant zones require little to no water and minimal maintenance.

**Recommendations for Old Home Manor Landscape**

The following methods are recommended in order to greatly reduce landscape water use, mitigate stormwater runoff, minimize maintenance costs and increase land value at OHM:

1. Require the use of native plants acclimated to the current elevation and rainfall
2. Implement green stormwater infrastructure solutions
3. Maintain high quality landscape requirements and standards
4. Require separate irrigation water meter

The benefits of the above recommendations are described below:

**Recommendation 1: Require the use of Native Plants Acclimated to the Current Elevation and Rainfall**

The use of native plant material is key to mitigate stormwater run-off, lower landscape maintenance costs, and reduce water use associated with outdoor landscape areas. On average a native landscape installation can cost around 35% more than a traditional landscape install (non-native plants, grass, landscape rock and weed fabric). This is because the success of native landscape areas comes from planting large quantities of native species (prairie grasses, perennials, shrubs and groundcover). The mass planting restricts weed growth and slows stormwater run-off, helping to filter impurities and re-charge the aquifer.

Although the upfront cost can be off-putting to developers, the long term advantages far exceed the initial expense. Well-designed native landscapes:

- Provide wildlife habitat
- Reduce energy consumption
- Minimize urban heat islands (created by parking lots and rooftops)
- Improve human health (air quality)
- Greatly reduce landscape water use after established

The following tables show two significant advantages of installing native plants:

1. Cost savings associated tree and shrub pruning maintenance
2. The substantial elimination of water use after the plants have been established

**Resource Conserving Landscaping Cost Calculator**



<b>Conventional Landscape (after established)</b>	<b>Low Cost Estimate</b>	<b>High Cost Estimate</b>
Gallons of Water Used Annually	154,070	462,210
<i>Annual Water Cost Due to Irrigation</i>	\$501	\$1,502
Annual Shrub and Ground Cover Maintenance	\$9,750	\$16,500
Annual Tree Maintenance	\$1,250	\$4,750
<i>Annual Maintenance Cost</i>	<i>\$11,000</i>	<i>\$21,250</i>

<b>Low Water Landscape (after established)</b>	<b>Low Cost Estimate</b>	<b>High Cost Estimate</b>
Gallons of Water Used Annually	0	0
<i>Annual Water Cost Due to Irrigation</i>	<i>\$0</i>	<i>\$0</i>
Annual Shrub and Ground Cover Maintenance	\$8,250	\$15,000
Annual Tree Maintenance	\$750	\$4,250
<i>Annual Maintenance Cost</i>	<i>\$9,000</i>	<i>\$19,250</i>

### **Recommendation 2: Implement Green Infrastructure Stormwater Solutions**

Green Infrastructure refers to passive and active stormwater solutions that help supplement landscape irrigation, mitigate stormwater flows and recharge the aquifer. This is achieved by immediately directing and capturing stormwater through swales, bio-retention zones and rainwater harvesting tanks.

In addition to providing supplemental irrigation, stormwater infrastructure is less costly when designed with green infrastructure solutions. Costs saving include: [3]

- Reduced built capital (equipment, installation) costs
- Reduced land acquisition costs
- Reduced external costs (offsite costs imposed on others)
- Reduced operation costs
- Reduced repair and maintenance costs
- Reduced infrastructure replacement costs

### **Recommendation 3: Maintain High Quality Landscape Standards**

Multiple studies have shown significant costs savings associated with well-designed native landscapes, including:

- Native landscapes use **77 percent less water, produce 66 percent less waste and require 68 percent less labor** than a traditional landscape install [4].
- Commercial offices that provide desirable landscape areas that include shade from trees and structures bring **7% higher rental rates** [5].
- For every dollar invested in urban trees there is a return between **\$1.37 to \$3.09 in benefits** from energy savings and increased real estate value [6].

### **Recommendation 4: Require Separate Irrigation Water Meter at Each Property**

A separate irrigation meter will allow the Town to gather necessary data to help show the positive effects of native landscapes and green stormwater methods to residents and future developers.

#### **How to offset cost:**

The cost of additional plant material and rainwater harvesting equipment can be offset by allowing the developer to:

- Install (1) gallon shrubs and perennials in place of the required (5) gallon size
- Replace landscape rock and weed fabric with native hydroseed  
(On average, decorative **landscape rock costs 80 percent more** than native hydroseed applications)

The cost comparison of the current landscape requirements versus native landscape areas utilizing green infrastructure is provided in the following example:

**Example:**

100,000 SF Total landscape area, averaging 50% for buffer-yards and 50% for open space

**Current Requirements**

Unit	Item	Cost per Unit	Total Cost
<b>Irrigation: parking and buffer zones</b>			
50,000	SF Irrigation- Hardwire, pipes, fittings	\$ 0.50	\$ 25,000.00
0	Rainwater Harvesting Tank (\$5,000 - \$25,000)	\$ 15,000.00	\$ -
1	3/4" Landscape Meter- Impact Fee	\$ 7,000.00	\$ 7,000.00
<b>Groundcover: Parking, Buffer and Open space</b>			
100,000	SF Decorative Landscape Rock with weed fabric	\$ 0.62	\$ 62,000.00
0	SF Native Hydroseed	\$ 0.12	\$ -
<b>Planting: Parking- 10 Landscape Islands, (1) tree and (2) shrubs per island</b>			
10	24" Box Trees (are trees required?)	\$ 250.00	\$ 2,500.00
20	5 Gal Shrubs and Groundcover	\$ 30.00	\$ 600.00
<b>Planting: Street Frontage (Utilizing 1,000 Linear Feet at 50 feet wide)</b>			
33	24" Box Trees (30-feet on center)	\$ 250.00	\$ 8,250.00
100	5 Gal Shrubs (3 per tree)	\$ 30.00	\$ 3,000.00
<b>Open space: No Planting Required</b>			
			<b>\$ 108,350.00</b>

**Proposed: Green Infrastructure**

Unit	Item	Cost per Unit	Total Cost
<b>Irrigation: Parking, Buffer Zones, and Open space</b>			
100,000	SF Irrigation- Hardwire, pipes, fittings	\$ 0.50	\$ 50,000.00
1	Rainwater Harvesting Tank (\$5,000 - \$25,000)	\$ 15,000.00	\$ 15,000.00
1	3/4" Landscape Meter- Impact Fee (temporary)	\$ 7,000.00	\$ 7,000.00
10,000	SF Landscape Rock (no weed fabric)	\$ 0.50	\$ 5,000.00
90,000	SF Native Hydroseed	\$ 0.12	\$ 10,800.00
<b>Planting: Parking- 10 Landscape Islands, (1) tree and (2) shrubs per island</b>			
10	24" Box Trees	\$ 250.00	\$ 2,500.00
20	5 Gal Shrubs and Groundcover	\$ 30.00	\$ 600.00
<b>Planting: Street Frontage (utilizing COP standards: 1 per 25 LF, (4) Shrubs per 250 SF)</b>			
33	24" Box Trees (30-feet on center)	\$ 250.00	\$ 8,250.00
400	5 Gal Shrubs and Groundcover (1 per 50 SF)	\$ 30.00	\$ 12,000.00
400	1 Gal Shrubs and Groundcover (1 per 50 SF)	\$ 12.00	\$ 4,800.00
<b>Open space/Side Yards: Planting: (1) tree per 2,300 SF, (1) shrub per 50 SF = 4 trees/200 shrubs</b>			
1	24" Box Tree (30% required to be 24 inch box)	\$ 250.00	\$ 250.00
3	5 Gal Tree (30% required to be 24 inch box)	\$ 60.00	\$ 180.00
960	1 Gal shrubs/groundcover/perennials	\$ 12.00	\$ 11,520.00
			<b>\$ 127,900.00</b>

## Summary and Conclusions

The preliminary analysis presented herein provide a summary of the best landscape management practices to achieve the Town's goal of greatly reducing landscape water use at Old Home Manor. In addition, the recommended design methods will mitigate stormwater run-off, provide supplemental irrigation opportunities and boost the overall aesthetics of the property. These benefits decrease stormwater infrastructure cost and enhance property value.

The reduction and/or elimination of landscape material will produce negative long term effects. Moderated plant zones require higher maintenance associated with weed removal, resulting in ongoing expenses. They also intensify stormwater runoff flows causing unsightly erosion and costly underground infrastructure systems.

The higher costs of the native landscape areas and green infrastructure (passive and active rainwater harvesting) can be offset by amending the current landscape ordinance. Reducing the required container size and encouraging the use of native hydroseed applications will significantly decrease overhead costs of typical landscape materials. The native areas also produce substantial long term savings from reduced water and maintenance requirements.

## References

- [1] A. D. o. W. Resources, "Low Water Use/ Drought Tolerant Plant List for the Prescott Active Management Area," 14 May 2014. [Online]. Available: [www.azwater.gov](http://www.azwater.gov).
- [2] U. E. P. Agency, "GreenScapes Tools," EPA, [Online]. Available: <https://archive.epa.gov/wastes/conserve/tools/greenscapes/web/html/index-2.html>. [Accessed 25 January 2021].
- [3] t. W. E. F. t. A. S. o. L. A. a. E. A Joint Report by American Rivers, "Banking on Green: A Look at How Green Infrastructure Can Save Municipalities Money and Provide Economic Benefits Community-wide," 2012.
- [4] "Designing Our Future: Sustainable Landscapes - Garden/Garden — A Comparison in Santa Monica," The American Society of Landscape Architects, [Online]. Available: <https://www.asla.org/sustainablelandscapes/gardengarden.html>. [Accessed 21 January 2021].
- [5] "The influence of trees and landscaping on rental rates at office buildings," *Journal of Arboriculture*, vol. 29(5), pp. 281-290, 2003.
- [6] G. J. R. S. P. J. P. S. E. M. a. Q. X. McPherson, "Municipal forest benefits and costs in five U.S. cities," *Journal of Forestry*, vol. 103(8), pp. 411-416, 2005.

## LANDSCAPE ORDINANCE - DRAFT

**PROJECT:** Town of Chino Valley, Arizona - Old Home Manor  
**DATE:** March 5, 2021  
**TO:** The Town of Chino Valley, Arizona  
**FROM:** Celia van der Molen, Landscape Architect | Sketch Landscape Architecture Studio, LLC  
**RE:** Suggested revisions to the existing TOCV UDO - Landscape Section

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The Landscape Ordinance Draft includes recommendations for revisions and/or additions to the existing Town of Chino Valley Landscape Ordinance(s). The suggestions are noted by the following methods:

- **Revisions:** are shown in blue text and highlighted in yellow - **Sample**
- **Deletions:** are shown in red text with a strikethrough - ~~Sample~~
- **Explanation:** may be noted in orange italic text - *Sample*

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### 4.26 LANDSCAPE REQUIREMENTS

#### 4.26.1 INTENT

The intent of this Section is to create a strong and well defined framework of landscaping in **public/private** property, consistent with the character of the **Town** as defined by the **Town's General Plan** protect and increase property values by requiring landscaping treatments around **buildings, roadways and parking areas** in residential, **commercial** and **industrial** areas; to provide buffers between residential/**commercial /industrial uses**; and to provide shade and variation of the landscaping, these standards emphasize the retention of native trees, shrubs, rock formations, and other natural site features.

(Ord. 06-678, passed 11-9-2006; Ord. 10-729, passed 7-22-2010)

#### 4.26.2 LANDSCAPE PLANS: WHEN REQUIRED UNLESS MODIFIED BY THE ZONING ADMINISTRATOR

- A. New multi-**family** and nonresidential developments are subject to the requirements of this Section.
- B. Change of **use** from residential to **commercial** .
- C. All new **subdivisions** shall provide landscaping in the **public** open spaces as required by this Section.
- D. Expansion, remodeling, and renovation of existing **buildings**, or a stand-alone parking **lot** shall provide an amount of landscaping and screening proportionate with the degree of the **improvements**.

(Ord. 06-678, passed 11-9-2006; Ord. 10-729, passed 7-22-2010)

#### 4.26.3 LANDSCAPING REQUIREMENTS, GENERAL

##### 1. Landscape Plan Required, Unless Modified by the **Zoning Administrator**

A landscape plan showing the following information shall be submitted with the Site Plan at the time of application for **building permit** and/or with a **subdivision plat** where applicable:

- a. Designer name and address
- b. North arrow, scale, date of preparation and revisions;

- c. Name of project and address
- d. Vicinity map
- e. Sheet numbers
- f. Location of all proposed and existing **buildings, structures** and pavement;
- g. Location and dimensions of all **property lines**;
- h. Location of all existing or proposed water features and drainage facilities;
- i. Location of the one-hundred (100)-year floodplain on the site, if applicable;
- j. Location, size and common name of any existing trees or shrubs to remain on site;
- k. Location of all landscaping proposed for the site ~~(drawn at one-half (1/2) of mature size)~~ **(drawn at mature size)** including trees, shrubs, groundcover, ornamental grasses or flowerbeds;

*Explanation: Industry standards typically show plant material at full size*

- l. Location of all existing or proposed **signs, walls, fences**, earthen berms (drawn at one (1)-foot contour interval), site furniture, lights, fountains, and/or sculptures on the site;
- m. **Sight visibility triangles** as described in Section 4.7;
- n. Location of all existing or proposed **sidewalks**, bike trails, pedestrian paths, etc. on the site;
- o. Plant list for all existing or proposed trees or shrubs on the site, including:
  - i. Symbol
  - ii. Botanical Name
  - iii. Common Name
  - iv. Quantity
  - v. Installation Size
  - vi. Height/Width at Maturity
- p. Location of all existing or proposed curb lines and curb cuts for **streets, alleys**, parking **lots** and parking **lot** islands;
- q. Any additional information as determined by the **Zoning Administrator** to be necessary for approval of the proposed plan.
- r. Proposed inert ground cover/dust control

## 2. Installation of Materials

A landscape plan must be approved by the **Zoning Administrator** prior to the installation of required landscaping.

## 3. Certificate of Occupancy

All landscaping must be installed and inspected prior to the issuance of a Certificate of Occupancy.

## 4. Performance Standards

All landscaping shall be required to perform in accordance with the following provisions:

a. Safety

i. Landscaping shall not hinder the vision of motorists and pedestrians necessary for safe movement into, out of, and within

the site. All landscaping materials shall comply with all **sight visibility triangle** requirements as described in **Section 4.7**.

(section included for reference and revision) 4.7 Height Limitations at Corner Lots Within a sight visibility triangle formed by the street front and side lot lines and a line connecting these lot lines at points measured along these lot lines a distance of twenty-five (25) feet from their intersection, ~~no fixtures, construction, hedges, shrubbery and other planting shall obstruct the view of intersecting streets to a degree greater than fifty (50) percent visibility.~~ No fixtures, construction, signs, trees, or other vertical elements are permitted within the sight visibility triangle. Shrubs, groundcover and boulders shall not exceed 18 inches in height at maturity. In no event shall an obstruction exist which creates a hazard to passing motorists.)

ii. Landscaping materials shall be selected and placed in such a manner that they do not interfere with or damage existing or proposed utilities or drainage facilities.

iii. Landscaping materials shall be selected and placed so that the safe and enjoyable use of surrounding properties is not inhibited.

iv. Landscaping materials shall be selected and placed with sensitivity toward the ultimate size that will be achieved over time.

v. Landscaping with thorns, berries and other harmful plant characteristics shall be carefully placed and pruned to avoid potential harm to people or property on and off-site.

vi. Weak-wooded trees shall only be used where limb breakage will not cause harm to property, utility lines, or life.

b. Maintenance

i. The owner of the premises shall be responsible for the watering, maintenance, repair and replacement of all landscaping, irrigation systems, **fences** and walls, and other visual barriers including refuse disposal area screens which have died (in the case of plant material) or fallen into disrepair (in the case of **fences** or walls).

ii. All required plant materials shall be maintained in a healthy, vigorous growing condition, and neat and orderly appearance. They shall be replaced as necessary, or as directed by the **Zoning Administrator**, and shall be kept free of refuse and debris.

iii. All **fences**, walls and other barriers shall be maintained in good repair, meaning structurally sound and attractive in appearance. All **fences**, required or otherwise, shall have the finished face directed toward lower intensity zoned property, where a single-family residential property is located **adjacent** to or across from multiple-**family** residential or non-residential sites.

c. Size of Plant Material

All plant materials required by this **Ordinance** shall be selected from the ADWR drought tolerant/low water use plant lists, and include only species that are designated as Water Use 1 (0-4 inches) and noted as Grassland (G) (4,400 – 5,000 ft. average annual rainfall 10-14 inches). Shade trees may be selected from the ADWR Water-Use Zone 2, and meet The following minimum sizes are required at the time of planting:

i. Trees: 75% of trees must be a minimum of 15 gallon. 25% must be 24" box or larger.

ii. Shrubs: ~~Minimum 5 gallon or better.~~ 50% of shrubs must be a minimum of 1 gallon. 50% of shrubs must be 5 gallon or larger.

d. Mulching, Ground Covers and **weed** control

i. ~~All required shrubs and trees shall be mulched and maintained with shredded hardwood bark, cypress, or gravel mulch. Plant groupings shall be mulched in a continuous bed.~~ The use of native hydroseed is encouraged in all open-space landscape areas including: bio-retention areas, stormwater detention/retention ponds (basins and slopes greater than 4:1), and yards. Decorative landscape rock may be used within parking lot islands, adjacent to the building and along pedestrian pathways. The landscape rock mulch color shall match as closely as possible to the native groundcover and be separated from hydroseed areas with an approved edging material.

ii. Rock mulch shall be applied so as to prevent or retard **weed** growth and be kept free of **weeds**.

iii. Ground covers **planted on slopes 3:1 or greater** shall be planted together in continuous beds and spaced to achieve a substantially continuous groundcover within two (2) years of the issuance of a Certificate of Occupancy. The ground covers must be ~~mulched or~~ placed in **1 inch or greater angular** decorative rock **or rip-rap** until substantially continuous coverage is achieved.

e. Penalty for Noncompliance

A property owner, upon notification by the **Town**, shall have a period of not less than fifteen (15) days to restore, replace or repair plant material, **fences** or other screening found to be in violation of the Performance Standards set forth herein. If the violation is not corrected within the specified time, it will be considered a violation of this **Ordinance**. In the case of landscaping that performs poorly, Alternative Compliance may be utilized pursuant to Section 4.26.5. No fine shall be levied during the time that an Alternative Compliance proposal to remedy the problem situation is being reviewed by the

**Development Services Department .**

5. Approval of the Public Works Director is required prior to placing landscaping and other **improvements** in the rights-of-way

(Ord. 06-678, passed 11-9-2006; Ord. 10-729, passed 7-22-2010)

**4.26.4 DETERMINATION OF REQUIREMENTS UNLESS MODIFIED BY THE ZONING ADMINISTRATOR**

1. Residential **Subdivisions**

a. Arterial/**collector street** Trees

As a component of **plat** approval, residential **subdivisions** in the **Town** shall be required one (1) shade tree a minimum of every thirty (30) linear feet on center, within the **public** arterial/collector.

b. Arterial/**collector street** Design

Arterial and **collector streets** shall have a minimum six (6) foot wide **sidewalk**, separated from the **roadway** by a landscaped parkway of at least eight (8) feet.

c. Local **Street** Design

Local **streets** shall have a minimum four (4) foot wide **sidewalk**, separated from the **roadway** by a landscaped parkway of at least six (6) feet.

d. Preservation/Salvation Credit

Where there exists native vegetation, the property owner may substitute existing trees for required trees, subject to the Alternative Compliance provisions of this Section.

2. Multiple-**family, Office, Commercial** and **Industrial** Districts

All **lots** improved with multi- **family** residential, **office, commercial** and **industrial** development shall be required to provide landscaping as set forth herein. (See paragraph 4. c. for a reduction to this requirement).

- a. Front **yard** Landscaping. A ten (10) foot wide landscape strip is required along the properties **street** frontage. For properties **adjacent** to SR 89, a twenty (20) foot wide landscape strip is required along the property's **street** frontage.
- b. Side and rear **yard** landscaping: when **adjacent** to zoning other than multi - single **family** residential zoning, a five (5) foot wide landscape strip is required along the property's **street frontage property line** (?)
- c. Corner **Lot**: Corner **lots** shall be required to provide front **yard** landscaping on all sides fronting on a **public street** or highway.
- d. Refuse Disposal Areas: Refuse disposal areas shall be screened on all sides, including a solid gate for access, by a privacy **fence**, wall, or equivalent material with a minimum height of six (6) feet and not greater than seven (7) feet. The finished face of the **fence** shall face away from the refuse disposal area.
- e. Mechanical Equipment: All roof top and ground level mechanical equipment and utilities shall be fully screened from view of the centerline of any **street** or the nearest boundary of a single- or two-**family** residence district as seen from a height six (6) feet above the finished floor level of the **building** it services.

3. Buffer **yards** (Side and Rear **yard** Landscaping When **adjacent** to Single **family** Residential "SR" Zoning)

a. Buffer **yard** Required

Whenever a side or rear **yard** in any non-single-**family** residential, **commercial** , or **industrial zones** abuts, or in the absence of an **alley** would abut any single **family** residential district, a buffer **yard** shall be required.

b. Depth of **yard**.

The buffer **yard** shall be ten (10) percent of the **lot** width or depth, whichever is applicable, provided that no buffer **yard** shall be less than ten (10) feet in width, and no buffer **yard** shall be required to be more than twenty (20) feet in width. For property located on a corner **lot** where both the **rear lot line** and the interior **side lot line** abut property in the single-**family** residential districts, the buffer **yard** depth for both required buffer **yards** may be determined by the lesser dimension of the **lot** width or **lot depth**.

4. Minimum Landscaping Pattern. The minimum landscaping pattern shall include the following frequency:

- a. One (1) tree per ~~twenty (20)~~ **twenty-five (25)** linear feet.
- b. Four (4) shrubs per ~~400~~ **200** square feet of required landscaped area. Clustering of trees and shrubs is encouraged.
- c. Berm. Where a semi-continuous berm measuring a minimum of three (3) feet and a maximum of four (4) feet in vertical height and not having a slope greater than ~~3:4~~ **4:1** on either side is provided, required buffer **yard** landscaping requirements may be reduced by twenty (20) percent. Slopes may be increased ~~above to~~ **3:1** where retaining walls are used, subject to approval under the Alternative Compliance provisions of this section. No individual section of the berm may measure more than forty (40) feet in length. The berm should be integrated into the overall landscaping plan, including landscaping on the berm where practical.
- d. Prohibited **Use**. All driveways, refuse containers, storage areas, aisle ways, vehicular maneuvering areas, mechanical equipment and **structures** are prohibited within the required buffer **yard**. A **sidewalk** or paved trail may be located within a buffer **yard** when used as a connection to other pedestrian and/or recreational corridors. A concrete PAD for emergency exits from a **building** shall be permitted in the buffer **yard** provided that the Building Code requires it.
- e. **Utility Areas**. All on-site **utility areas** located within twenty-five (25) feet of a required buffer **yard** shall be screened by a **fence**, wall, berm, evergreen planting or combination thereof such that a substantially solid visual barrier of six (6) feet in height is attained. **fences** or walls, when provided, must be located between the activity area and the buffer**yard**. **Utility areas** shall include refuse containers/dumpsters; storage; display of materials or merchandise; loading or unloading goods, production assembly, processing or demolition of goods. Plantings provided to screen **utility areas** shall not count toward required landscaping.

5. Parking **lot** landscaping perimeter requirements, unless modified by the **Zoning Administrator**. Parking **lots** in all zoning districts are subject to the following requirements. The landscape width may be reduced provided the minimum width requirement, when averaged, is maintained overall. One (1) tree per twenty (20) linear feet and four (4) shrubs per four hundred (400) 200 square feet of required landscaped area. Clustering of trees and shrubs is encouraged.

a. State Route 89 **street** frontage shall be landscaped with a minimum width of twenty (20) feet.

b. All other **street** frontages shall be landscaped with a minimum width of ten (10) feet.

c. Other parking perimeters all other **lot lines adjacent to parking areas** shall be landscaped with a five (5) foot wide landscape strip.

d. Island: ~~Where internal landscaping of the parking lot is required, there shall be a minimum of one (1) curbed island provided for each fifteen (15) parking stalls in each row. The minimum area for planting all types of trees within parking lots shall not be less than one hundred eighty (180) square feet. Shade trees and intermediate trees shall not be planted in any area with a width of less than ten (10) feet. Shrubs shall not be planted in an area of less than two (2) feet in width.~~

~~Measurements of width and area shall be from the inside edge of the curb(s). A minimum of fifty (50) percent of every landscape island shall be planted with live plant material, such as shrubs, or ground cover.~~

Parking lots with more than 50 spaces shall provide landscaped parking islands according to the following standards:

i. All landscape parking islands shall be a minimum of 8 feet wide and contain a minimum of 160 square feet in area;

ii. A minimum of 1 tree and 3 shrubs for every 10 parking spaces shall be planted within the parking lot

e. Curb materials. Parking **lot** islands and medians shall be curbed with concrete or a functionally equivalent material that must be approved by the **Zoning Administrator**. The following materials are not considered functionally equivalent to concrete curbs and are therefore unacceptable for use as curbs: asphalt, landscape timbers, railroad ties, wood or lumber, and concrete wheel stops.

6. Open Space: Open space refers to any additional landscape area above the yard, set-back and parking requirements. Open space areas may include detention ponds and bio-retention zones. These areas shall be landscaped with a minimum of (1) 15 gallon tree per 2,300 square feet and (1) 1 gallon shrub per 50 square feet.

(Ord. 06-678, passed 11-9-2006; Ord. 10-729, passed 7-22-2010)

#### 4.26.5 ALTERNATIVE LANDSCAPE PLANS

1. Where unique situations complicate the provision of required landscaping, applicants may choose to follow the requirements described herein or submit an alternate landscape plan to the **Zoning Administrator** that illustrates how the intent of **UDO** Section 4.26 will be fulfilled in an alternative manner. The **Zoning Administrator** may approve, approve with modifications, or deny the alternative landscape plan based on his or her determination as to meeting the intent of the **UDO** landscape requirements and the unique characteristics and challenges of the property at issue.

2. If an applicant submits an alternative landscape plan which is not approved by the **Zoning Administrator**, the applicant may **appeal** the **Zoning Administrator's** decision to the **Board of Adjustment**.

(Ord. 06-678, passed 11-9-2006; Ord. 10-729, passed 7-22-2010; Ord. 15-798, passed 6-23-2015)

#### 4.26.6 PRESERVATION OF EXISTING LANDSCAPING

1. Incentive. Existing landscaping that is in a vigorous growing condition and is not specifically prohibited by this **Ordinance** may count toward meeting the requirements of this **Ordinance**.

2. Protection during construction. Trees that are to be preserved under the provisions of this **Ordinance** shall be **fenced** around the drip line of the tree and marked to be saved during construction. Care shall be taken to prevent damage to the tree and its root **structure** during construction.

(Ord. 06-678, passed 11-9-2006; Ord. 10-729, passed 7-22-2010)

### 3.19"BP" - BUSINESS PARK (*landscape section only*)

#### G. PERFORMANCE STANDARDS

2. LANDSCAPING: In the BP district, all required **yards and open space** shall be landscaped in compliance with UDO Section 4.26 (LANDSCAPE REQUIREMENTS), in addition to the following requirements:

a. Maintenance: The perimeter shall be landscaped and maintained by the business park developer/HOA **and shall include**

b. Minimum Plant Requirements: one (1) 2" caliper tree spaced every 30-feet on center and (3) 5 gallon shrubs per tree shall be spaced aesthetically along each **street** frontage. **All other landscape areas located within the 50 foot setback(s) shall be landscaped in accordance with UDO Section 4.26.4.6 Open Space.**

c. Multi-Use Trail: a 6 foot wide minimum compacted decomposed granite multi-use trail shall be included in the 50 foot street frontage setback and effectively connect to trails located on adjacent developed properties. Meandering of the trail is encouraged. (suggest inserting standards detail)

d. Trees must be offset a minimum of 6 feet from back of curb or trail.

e. Bio-Retention: The use of bio-retention areas to help mitigate stormwater runoff is encouraged within setbacks, open space areas and/or parking lot islands. Bio-retention areas must be designed by, or in collaboration with, the site civil engineer to ensure accurate distribution of stormwater. A minimum depression area of 12 inches is required. High volume areas may be treated with a 3-6 inch size landscape rock or rip-rap per Stormwater Best Management Practices.

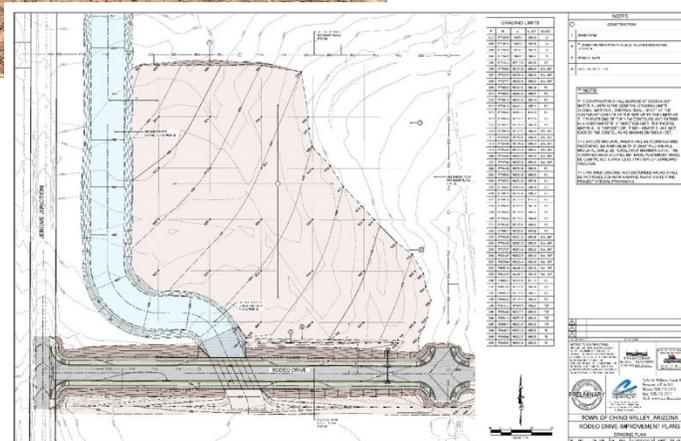
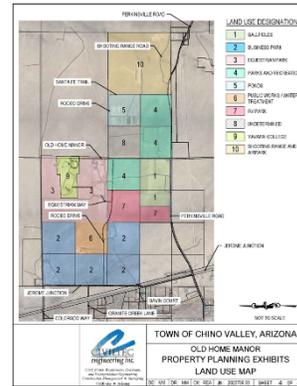
d. Irrigation: All required landscape areas shall be irrigated with an underground water irrigation system controlled by an EPA WaterSense approved programmable timer. Mainlines shall be schedule 40 PVC and lateral lines shall be 3/4 inch poly or better. The system shall be supplied with a separate irrigation landscape meter until plants are established (3 to 5 years minimum). Shade trees requiring supplemental water should have a permanent irrigation source. The use of an approved rainwater harvesting tank for supplemental irrigation is encouraged. The rainwater harvesting tank is permitted to collect run-off from roof tops and/or parking lot surfaces, overland flow may not be used.

---

#### **Suggestions:**

- The inclusion of a standard details for the multi-use trail (if implemented) will ensure consistency between parcels.
- Requiring a specific landscape rock size and color will ensure consistency between parcels.
- An approved native seed mix and rates consistent with the Town's native flora should be included as a standard for all hydroseed applications.
- Offer a rebate to encourage homeowners and existing businesses to convert their outdoor spaces to a low water native landscape.

# 5-Year Capital Improvements Plan and Technical Memorandum Old Home Manor Chino Valley, AZ



**For:** Town of Chino Valley  
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**PRELIMINARY**

**CIVILTEC**  
engineering inc.

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## 1 INTRODUCTION

Old Home Manor is an 842 acre area of Chino Valley lying east of Jerome Junction, and north of Perkinsville Road. Of the 842 acres, 200 acres are zoned as Business Park and the remaining 642 acres are zoned as Public Land. It is mostly vacant land and contains the location of the Chino Valley wastewater treatment plant, recharge basins, park facilities, Public Works facilities, Yavapai College, the Equestrian Center, the WWTP Rapid infiltration basins, model airplane park and the Town's shooting range. See Figure 1-1 for an aerial image the the potential Old Home Manor development area.

The purpose of the Capital Improvements Plan (CIP) is to study and develop a 5-year CIP to serve areas of Old Home Manor with the roadway and utility improvements necessary to provide the infrastructure required for initial development. This first 5 years of construction is intended to provide the backbone infrastructure required for development of the Town owned property.

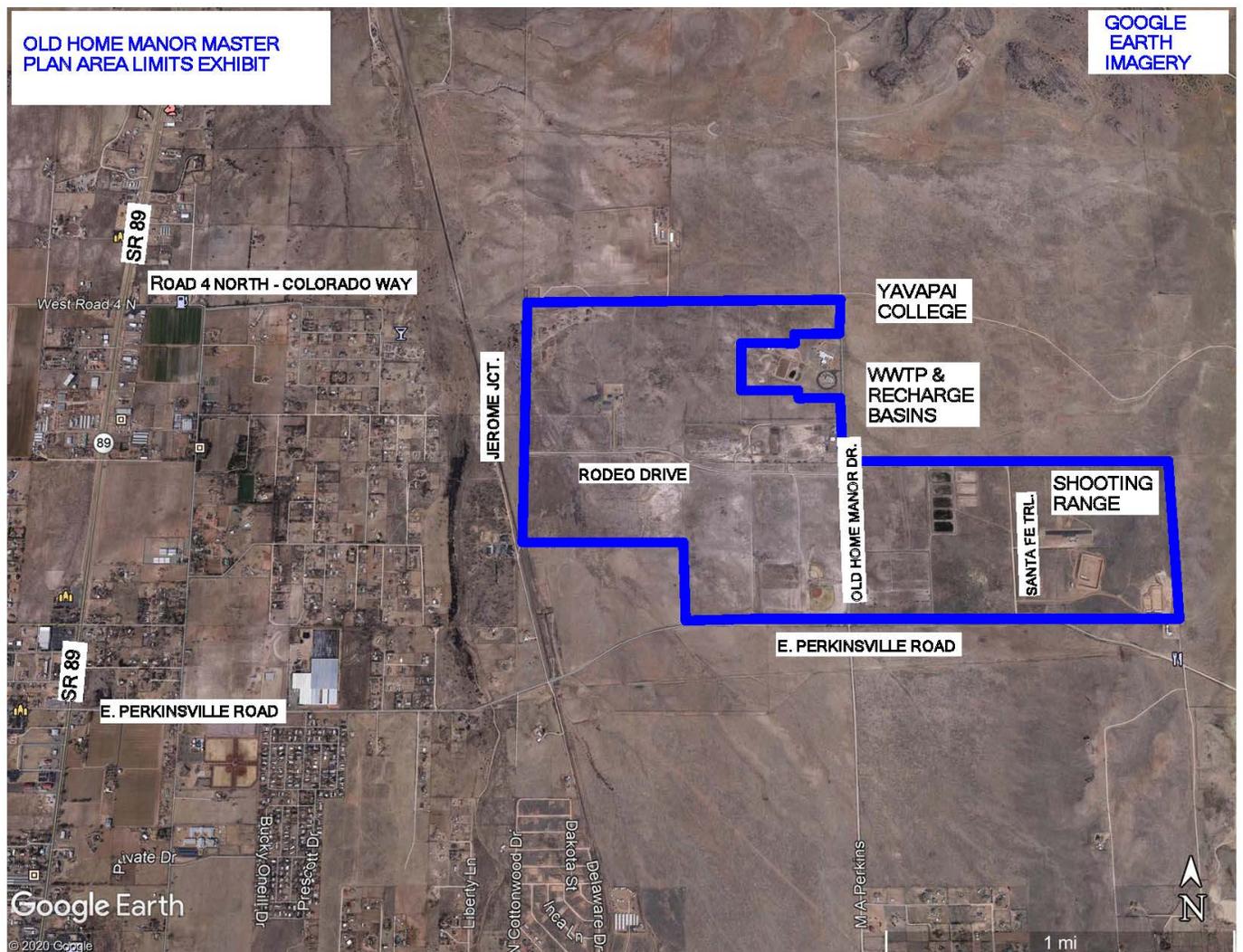


Figure 1-1 Old Home Manor Area

## 5-Year Capital Improvements Plan and Technical Memorandum

The Land Use Plan for the various portions of Old Home Manor is shown on Figure 1-2. Planned uses include ballfields, business park, equestrian park, RV park, parks and recreation, infiltration basins, public works/wastewater treatment plant, as yet undetermined parcel development, Yavapai College Agricultural Extension, and a shooting range with model airplane airport.

The primary focus of the initial 5-year CIP is to identify the infrastructure required for development of the Old Home Manor area in harmony with the priorities as established by the Town during CIP development meetings.

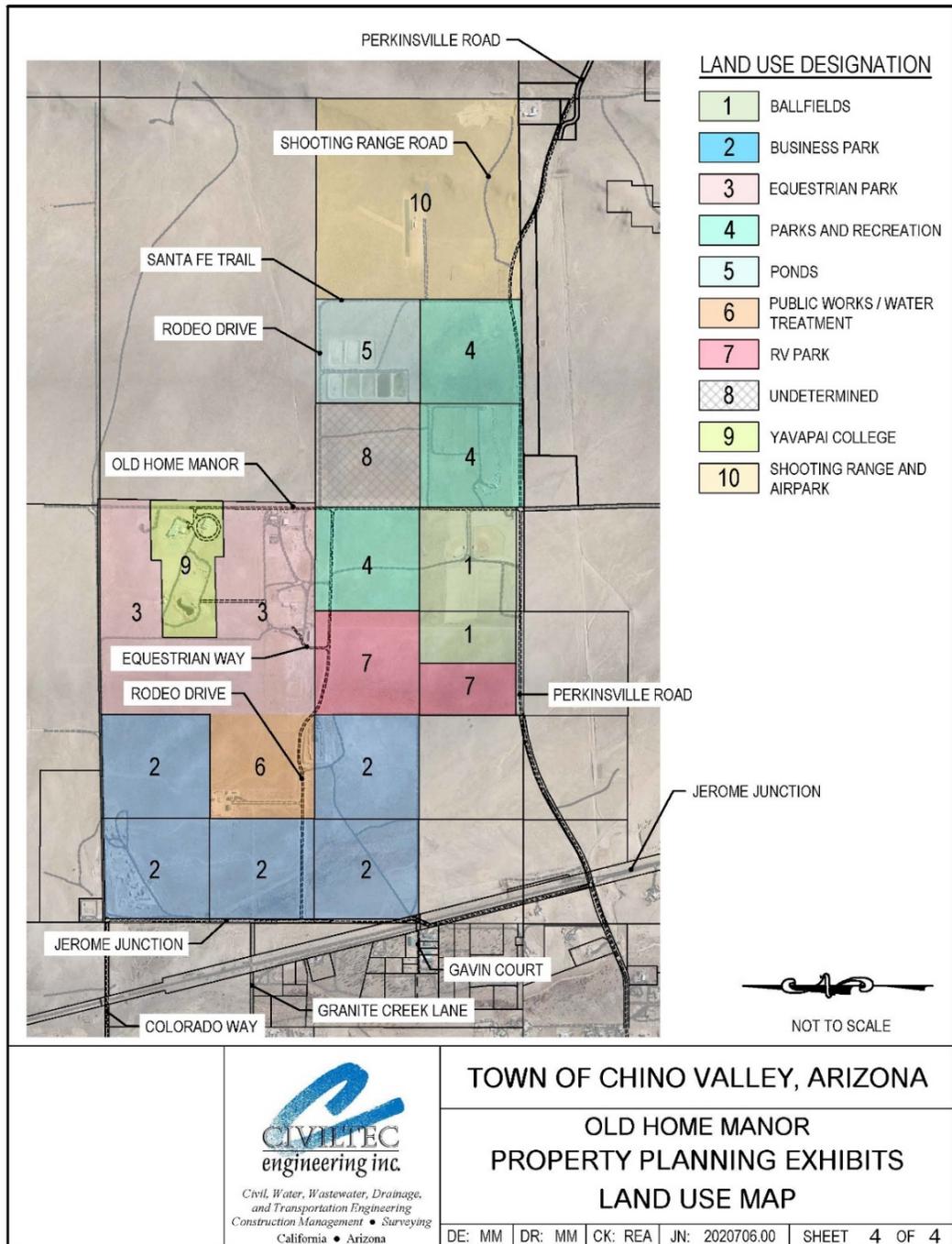


Figure 1-2 Old Home Manor Land Use Concept

## 2 CIP PLANNING

The overall Old Home Manor growth projections and water and sewer development considered phased development for all parcels within the service area. The development schedules were developed in the Phase 1 – Planning portion of the IWMP report. The Phase 1 projections are very broad-brush in nature while the 5-year Capital Improvements Plan focuses on current development priorities and opportunities.

The following table from Phase 1 represents the projected buildout of the Business Park area over the first 5-years and the subsequent development through the 15 year development horizon.

### BUSINESS PARK DEVELOPMENT SCHEDULE

PARCEL/ZONING	TOTAL SF ESTIMATE AT FULL BUILDOUT	5 YEAR TOTAL SF PROJECTION FOR 15% GROWTH FOR FIRST 5 YEARS	ANNUAL GROWTH RATE (SF/YR FOR THE FIRST 5 YEARS)
BUSINESS PARK/ BP (SQUARE FEET)	2,700,000	405,000	81,000

YEAR	SF OF NEW DEVELOPMENT PER YEAR	CUMULATIVE TOTAL BUILDING SPACE DEVELOPED	% OF TOTAL AVAILABLE BUILDING SPACE DEVELOPED
2021	81,000	81,000	3%
2022	81,000	162,000	6%
2023	81,000	243,000	9%
2024	81,000	324,000	12%
2025	81,000	405,000	15%
<b>5-YR BUILDOUT TOTALS</b>	<b>405,000</b>	<b>15 % OF TOTAL DEVELOPABLE SF AREA</b>	
2026	229,500	634,500	24%
2027	229,500	864,000	32%
2028	229,500	1,093,500	41%
2029	229,500	1,323,000	49%
2030	229,500	1,552,500	58%
2031	229,500	1,782,000	66%
2032	229,500	2,011,500	75%
2033	229,500	2,241,000	83%
2034	229,500	2,470,500	92%
2035	229,500	2,700,000	100%
<b>ADDITIONAL 10-YRS TO FULL BUILDOUT TOTALS</b>	<b>2,295,000</b>	<b>100% OF TOTAL DEVELOPABLE SF AREA</b>	<b>FULL BUILDOUT AT 2,700,000 SF OF BUSINESS PARK DEVELOPMENT</b>

Figure 2-1 Business Park 15-yr Development Schedule

## 5-Year Capital Improvements Plan and Technical Memorandum

The public land zoning allows for the general development standards as the Business Park. Uses anticipate an Equestrian Center, RV Park, Parks and Recreation, Public Works/Sewer Plant, Rapid Infiltration Basins, Shooting Range/Airpark and Undetermined Space. A total of 642 Acres of Public Land are included in the Old Home Manor overall project area.

Based on the general assumptions for buildout from Phase 1 and rounding of the acreage to match the development assumptions, the following chart represents the anticipated Public Lands (non-Business Park) parcel development build out schedule by acres per year. The planned buildout year is highlighted in green on the chart. over the first 5-years and the subsequent development through the 15 year development horizon.

### PUBLIC LAND DEVELOPMENT SCHEDULE:

ANTICIPATED PARCEL DEVELOPMENT	BALL FIELDS	EQUESTRIAN PARK	PARKS & RECREATION	RAPID INFILTRATION BASINS	PUBLIC WORKS FACILITIES & WWTP	RV PARK	NOT CLASSIFIED	SHOOTING RANGE & MODEL AIRPARK	TOTAL ALL PARCELS
<b>DEVELOPMENT YEAR / ACREAGE</b>	<b>60</b>	<b>129</b>	<b>116</b>	<b>40</b>	<b>40</b>	<b>60</b>	<b>37</b>	<b>160</b>	<b>642</b>
2020-2021 (Existing or Planned)	20	15	12	8	5	20	4	20	104
2022	10	19	12	2	3	10	4	20	80
2023	10	19	12	2	3	10	4	10	70
2024	10	19	12	2	3	10	4	10	70
2025 - INITIAL 5-YR HORIZON	10	19	12	2	3	10	4	10	70
2026		19	12	2	3		4	10	50
2027		19	12	2	3		4	10	50
2028			12	2	3		4	10	31
2029			10	3	3		3	10	29
2030			10	3	2		2	10	27
2031				3	3			10	16
2032				3	2			10	15
2033				2	2			10	14
2034				2	1			5	8
2035				2	1			5	8
15-YR FULL BUILDOUT TOTALS	60	129	116	40	40	60	37	160	642

Figure 2-2 Public Land 15-yr Development Schedule

2021 is the beginning of the 15 year buildout summary. The highlighted cells are the projected final year of development for each parcel to achieve full buildout.

### 3 CIP SPECIFIC 5-YEAR PLAN

Civiltec met with the Town on November 23, 2020 to prioritize the first 5-years of potential projects within Old Home Manor in order to meet the current development concepts and opportunities that were being considered by the Town. The primary focus of the CIP plan was to provide the infrastructure for the development of the Business Park area adjacent to Rodeo Drive and the RV Park parcels as shown on Figure 3-1. This would include approximately 15% of the Business Park planned square footage developed within the first 5 years, or approximately 30 acres of the available 200 acres. The project priorities were established for the initial 5-year plan as shown on the following exhibits.

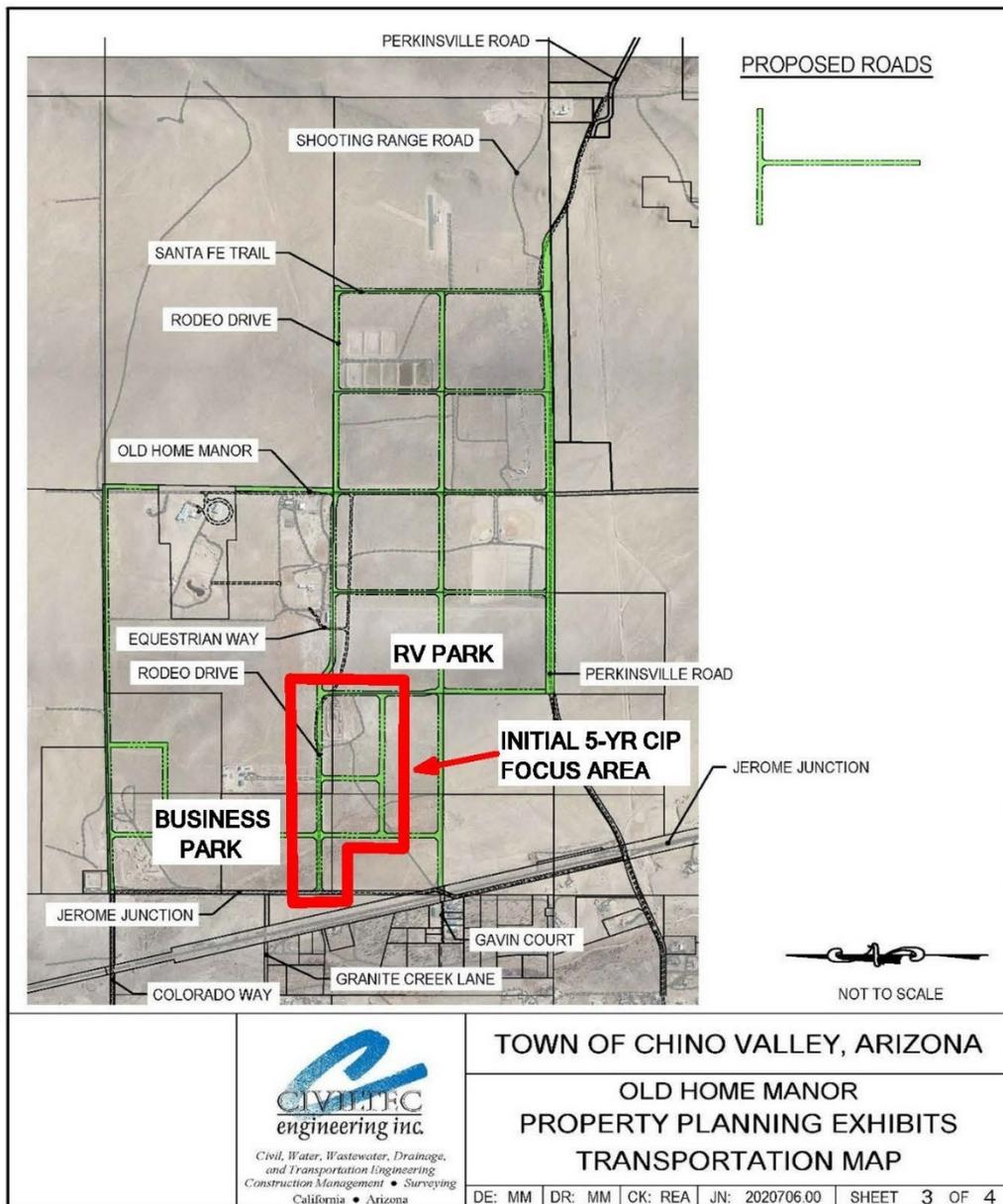
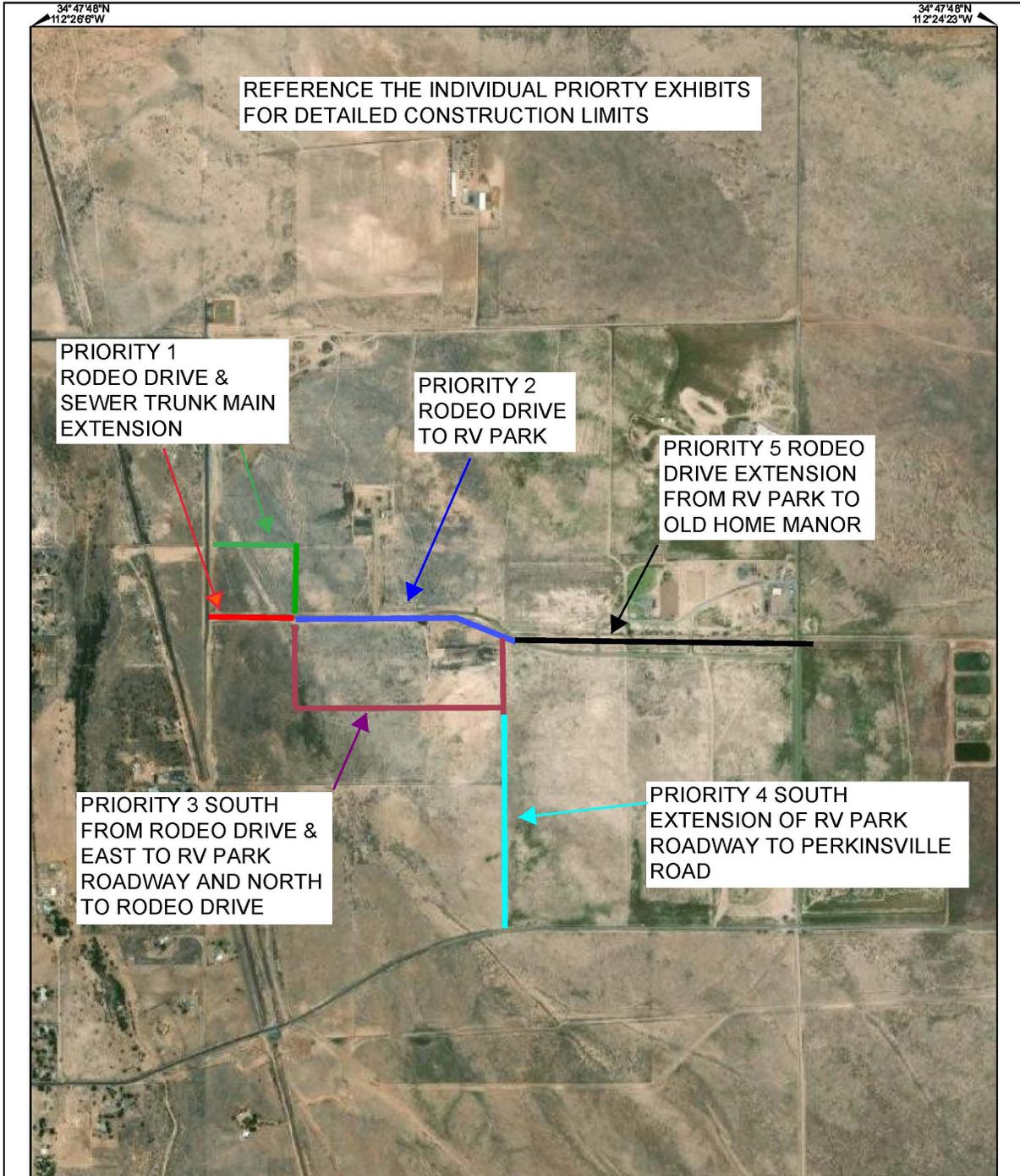


Figure 3-1 Transportation Map



## 5-YEAR CIP OVERALL PHASING EXHIBIT OLD HOME MANOR DEVELOPMENT AREA

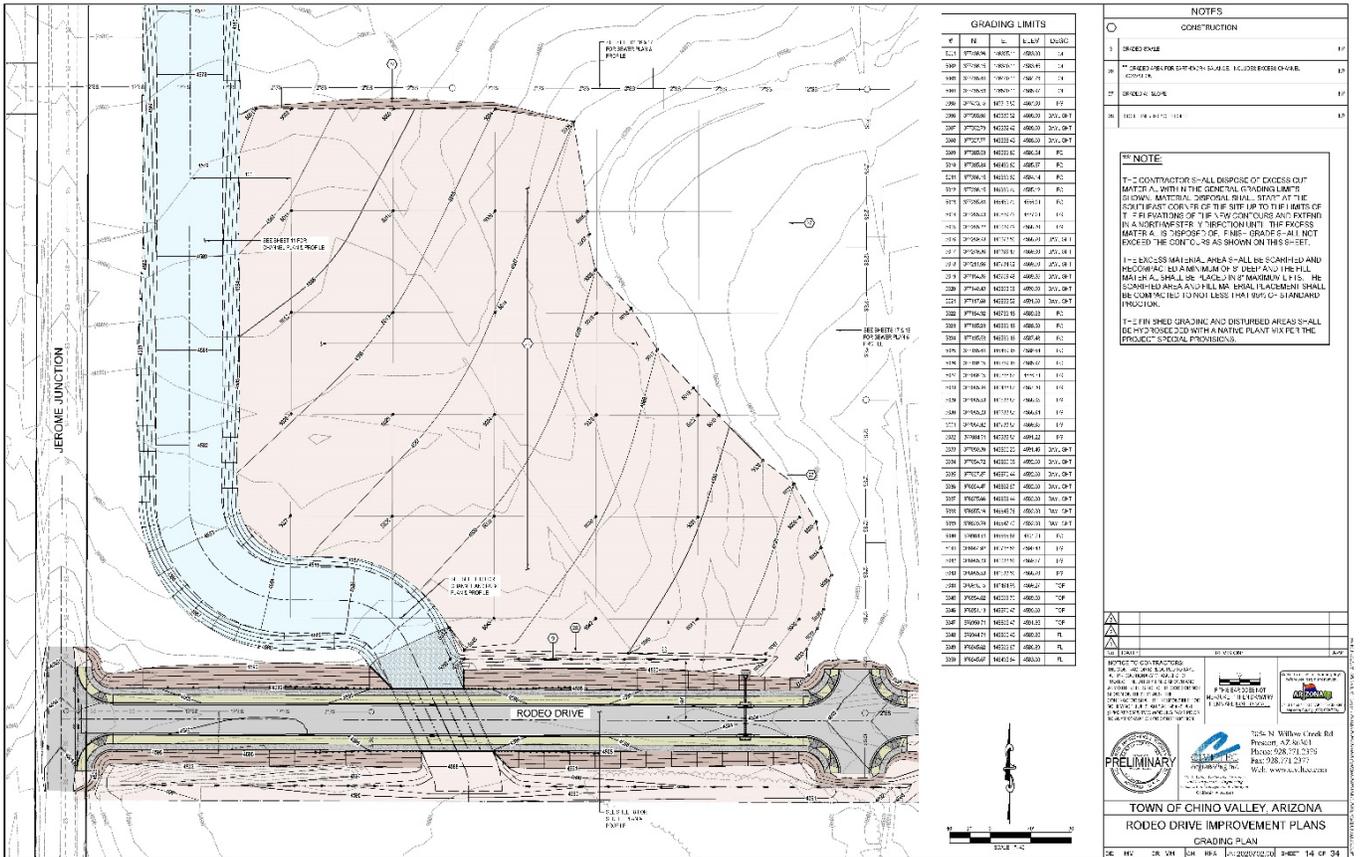
Figure 3-2 CIP Overall Phasing Exhibit

### Priority 1 (Year 1), Business Park Development – Rodeo Drive:

Priority 1 would be to construct the Rodeo Drive construction plans that are currently at 99% complete and be ready to bid the project in the spring of 2021. The improvements include a significant box culvert structure similar to the existing structure under Jerome Junction, provide approximately 780 LF of fully developed 28' wide commercial roadway with curbs, sidewalks, asphalt pavement, waterlines, sewer line and pad grading for one of the Business Park parcels as shown on the current construction plans. Additionally, the initial 12" sewer line backbone system would be constructed north of Rodeo Drive east toward the WWTP/Maintenance Facilities, then south back to Rodeo Drive. This is a deep sewer connecting to the existing 12" sewer line in Jerome Junction, which flows to the existing sewer lift station adjacent to Santa Cruz Wash and is then pumped to the WWTP.

Priority 1 anticipates up to 81,000 SF of Business Park development based on the overall Business Park growth projections included in IWMP. The square footage represents 3% of the 2,700,000 square feet of planned Business Park development. It is equivalent to 6 acres of the available 200 acres included in the Business Park zoning.

***It is recommended that an additional well and associated piping, valving and controls be brought on-line to supplement the Bright Star primary production and storage facility to provide redundancy in the system in case of a Bright Star well failure.***



## Priority 2 (Year 2), Rodeo Drive to the RV Park Development (North End):

Phase 2 would be to complete the design and construction of Rodeo Drive to the north end of the RV Park Roadway, including roadway, drainage, and utility extensions that will provide service to additional Business Park development and approximately 40 acres of the planned RV Park area.

The roadway rural section would include a 24' wide asphalt roadway (4" AC/9" ABC, matching the Jerome Junction and 1<sup>st</sup> Phase Rodeo Drive pavement section) with 5' asphalt shoulders (3" AC/6" ABC). The curves would be softened near the RV Park to a smoother realignment of Rodeo Drive.

The 12" water and 12" sewer mains would be extended east on Rodeo Drive within the roadway prism to serve the Business Park and RV Park.

An additional 81,000 sf to 160,000 sf of Business Park growth and 10 acres of RV Park development would be accommodated by the year 2 improvements.

***The construction of the Peavine Trail 16" waterline would be required to provide fire flow to the RV Park.***

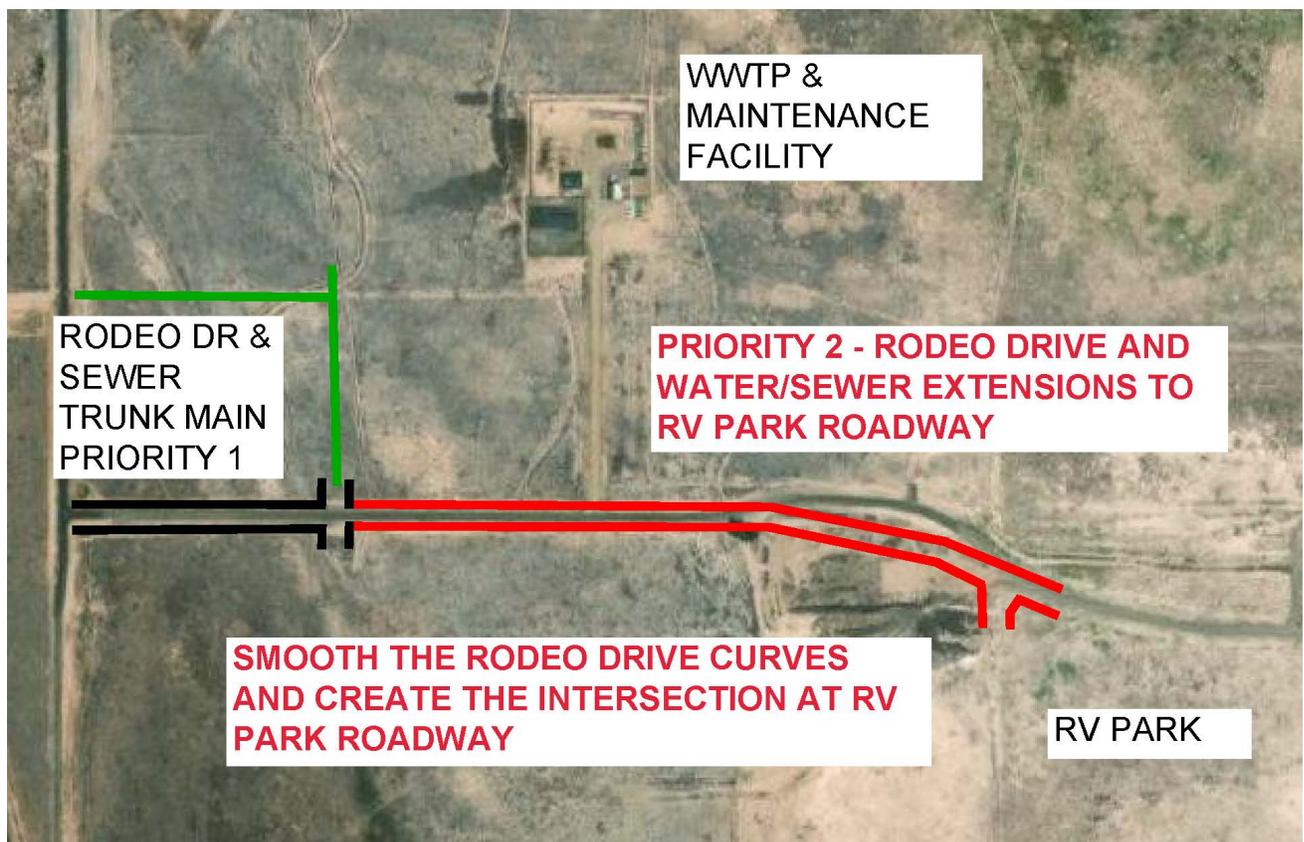


Figure 3-4 CIP Priority 1 – Rodeo Drive Improvements

### Priority 3 (Year 3), Business Park South Loop:

Priority 3 would include construction of the South Roadway Loop including 12" water and 12" sewer utilities south from the Phase 1 Rodeo Drive intersection, then east to the RV Park Roadway and then north to complete the RV Park Roadway loop back to Rodeo Drive Priority 2 extension.

These improvements would provide for an additional 81,000 sf to 162,000 sf of Business Park development and provide a looped connection to the 12" water main in Rodeo Drive to RV Park Road and north to Rodeo Drive, completing the 12" looped waterline. 12" sewer mains would also be provided to serve the same development area. An additional 10 acres of RV Park could potentially connect to the new water and sewer improvements.

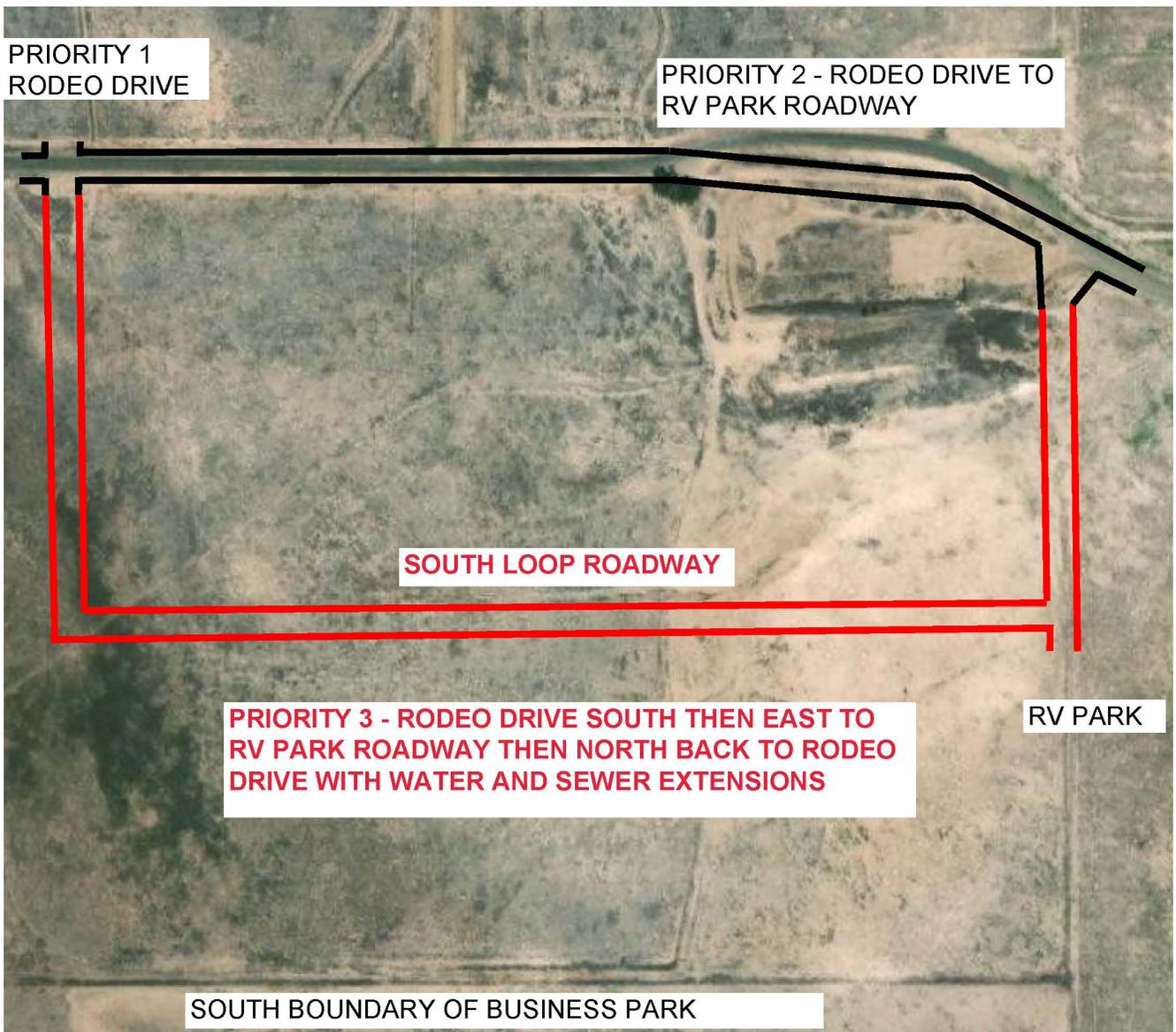
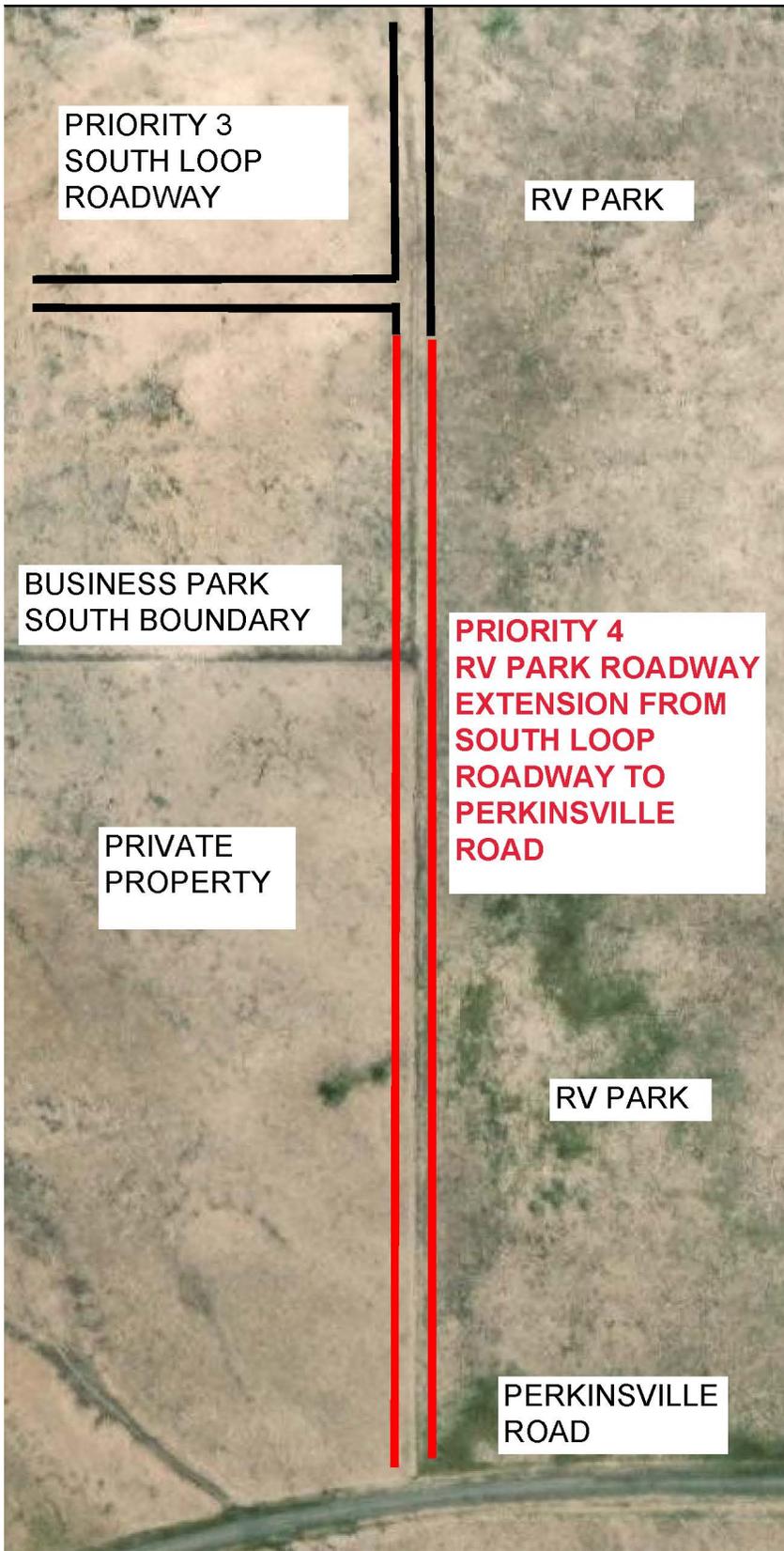


Figure 3-5 CIP Priority 3 – South Loop Roadway



**Priority 4 (Year 4), RV Park Roadway South Extension to Perkinsville Road:**

Phase 4 would include the completion of the RV Park Road from the South Loop Roadway to Perkinsville Road with 12" water and sewer mains and drainage improvements.

This phase allows for an additional 81,000 sf of Business Park development and the remaining 10 acres of RV Park for full development of the 60 acres.

Figure 3-6 CIP Priority 4 – RV Park Roadway to Perkinsville Road

**Priority 5, Rodeo Road Extension from RV Park Roadway to Old Home Manor Road:**

Phase 5 would complete the construction of Rodeo Drive east from the RV Park Roadway to Old Home Manor Road including the extensions of the roadway, drainage and utilities from the Priority 1, 2 & 3 Rodeo Drive improvements. This primarily provides water and sewer service to the Parks and Recreation 40 acre parcel adjacent to the east boundary of the RV Park and approximately 20 acres of the planned Equestrian Center-Parks development. The alignment of Rodeo Drive would be modified to match the intersection at Old Home Manor Road.

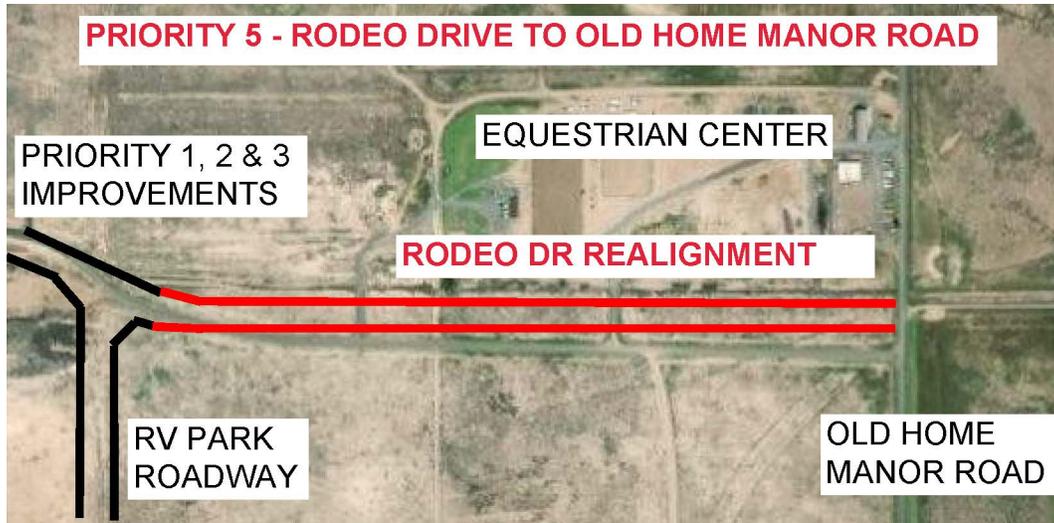


Figure 3-7 CIP Priority 5 – Rodeo Road to Old Home Manor Road

The development Priorities for the first 5 years are summarized as follows:

ANTICIPATED PARCEL DEVELOPMENT	BUSINESS PARK AC (SF)	EQUESTRIAN PARK (AC)	PARKS & RECREATION (AC)	RV PARK (AC)	TOTAL ALL PARCELS (AC)
<b>DEVELOPMENT PER YEAR</b>					
2021 (Existing or Planned)	6 (81,000 SF)				6
2022	6 (81,000 SF)			10	46
2023	6 (81,000 SF)			40	16
2024	6 (81,000 SF)		40	10	56
2025 – INITIAL 5-YR HORIZON	6 (81,000 SF)	20			26
5-YR TOTALS	30 (405,000 SF)	20	40	60	150

Figure 3-8 CIP 5-Year Buildout Summary

## 4 CIP 5-YEAR PLAN CONSTRUCTION COST ESTIMATES

Using the information and estimates from the Rodeo Drive (Priority 1) current improvement plans and the RV Park Design Concept Report prepared by Civiltec in October of 2020, the cost to construct each of the 5 priorities was based on the following roadway, water and sewer generalized costs per liner foot.

<b>FULLY DEVELOPED ROADWAY</b>	<b>COST PER LF</b>
28' AC PAVEMENT+ EARTHWORK + CURBS, GUTTERS & SIDEWALKS + DRAINAGE, CONTINGENCIES + ADMIN	\$1,140.00
<b>PARTIALLY DEVELOPED ROADWAY</b>	<b>COST PER LF</b>
24' AC PAVEMENT WITH 5' AC SHOULDERS, DRAINAGE, EARTHWORK, CONTINGENCIES + ADMIN	\$690.00
<b>WATER AND SEWER UTILITIES</b>	<b>COST PER LF</b>
WATER	\$125.00
SEWER	\$125.00
<b>FULLY DEVELOPED ROADWAY TOTAL COST/LF</b>	<b>\$1,390.00</b>
<b>PARTIALLY DEVELOPED ROADWAY TOTAL COST/LF</b>	<b>\$940.00</b>

Figure 4-1 Roadway and Utility General Costs

The estimated development costs for each of the 5 priorities noted previously are as follows:

### PRIORITIZED CIP DEVELOPMENT COSTS

PRIORITY NO.	LENGTH	ROADS COST/LF	UTILITIES COST/LF	TOTAL PER LF	TOTAL ROADS & UTILITIES	ADDITIONAL COST *	TOTAL COST
*PRIORITY 1	780	\$1,140.00	\$250.00	\$1,390.00	\$1,084,200.00	\$490,000.00	\$1,574,200.00
*PRIORITY 2	2,000	\$690.00	\$250.00	\$940.00	\$1,880,000.00	\$787,500.00	\$2,667,500.00
PRIORITY 3	3,560	\$690.00	\$250.00	\$940.00	\$3,346,400.00	****	\$3,346,400.00
PRIORITY 4	1,800	\$690.00	\$250.00	\$940.00	\$1,692,000.00		\$1,692,000.00
PRIORITY 5	2,450	\$690.00	\$250.00	\$940.00	\$2,303,000.00		\$2,303,000.00

\*PRIORITY 1 INCLUDES THE BOX CULVERT IMPROVEMENTS

\*PRIORITY 2 INCLUDES THE OFF-SITE PEAVINE TRAIL 16" WATERLINE IMPROVEMENTS

\*\*\*\* POTENTIAL REDUNDANT WELL, PIPING, VALVING, CONTROLS

Figure 4-2 Prioritized CIP Development Costs

## 5 OTHER FUTURE IMPROVEMENT CONSIDERATIONS

The water and sewer modeling and development plan includes future modifications to the Old Home Manor development area into a separate pressure zone. This is discussed in detail in the Water Technical Memorandum. Other utility improvements that should be considered for the Old Home Manor area could include:

## 5-Year Capital Improvements Plan and Technical Memorandum

- Installing a small potable water storage tank to be located at the College Well site for additional supply to the Equestrian Center. This is currently being considered by the Town;
- Development of one or more of the available high production wells in the Old Home Manor area for increased potable water supply to the Town and for system redundancy;
- Planning for and construction of a potable water storage tank farm near the Perkinsville Road/Santa Fe Trail intersection for additional Town water storage serving the northerly portion of Chino Valley;
- Construction of a water booster pumping station near the Jerome Junction/Perkinsville Road intersection to provide a redundant potable water supply from Old Home Manor to the Bright Star service area in an emergency situation.
- Expansion of the Town's water service area to the north and west due to the creation of the new Old Home Manor pressure zone, wells and storage tank farm.

Future sewer system improvements could include

- Construction of a flow equalization basin to attenuate the peak sewage flows at the headworks to the Wastewater Treatment Plant (WWTP). This is currently being considered by the Town;
- Expansion of the Wastewater treatment plant to accommodate Town-wide growth;
- Expansion of the sewer lift station at Santa Cruz wash including bar racks and/or comminutor (grinder) and pump upsizing;
- Expansion of the Town's sewage collection system;
- Construction of a new North WWTP near Sullivan Lake to allow sewage from points north of the existing WWTP to be serviced by a gravity sewer system.

A potential Old Home Manor Water Storage Tank Farm location near the Airpark includes an abundance of gently sloping terrain that is ideal for construction of a series of large water storage tanks serving the Town. Gravity lines from the Tank Farm could service points north and west of Old Home Manor and a regional pump station could provide potable water to the higher elevation zones, including a redundant system for the Bright Star service area.

With the potential to create a new water pressure zone for the westerly portion of Old Home Manor, opportunities exist to expand to new service areas beyond Old Home Manor based on the pressure zone(s) created. The evolution of the Old Home Manor IWMP could extend beyond the Old Home Manor area to include a Town-wide evaluation of the existing water and sewer systems, including the potential for new service areas.

## 6 CIP FUNDING SOURCES

Construction budgeting for the 5-year CIP for Old Home Manor is ultimately dependent on realistic funding expectations to determine the construction of the improvements for each phase of the CIP plan. Funding sources could include:

- Debt service;
- CIP set asides;
- General fund expenditures;
- Enterprise Zones
- Land Sales

All these sources can be evaluated by the Town in harmony with planned or anticipated opportunities for economic growth, available revenue sources and outside agency funding availability.

TOWN OF CHINO VALLEY  
Integrated Water Master Plan and Capital Improvements Plan  
for Old Home Manor  
Civiltec Project No. 2020706



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**KICK OFF MEETING MINUTES**

**Meeting Date:** March 10, 2020  
**Meeting Time:** 10:30 AM  
**Meeting Location:** Town of Chino Valley Public Works Conference Room  
**Meeting Name:** IWMP Kickoff Meeting  
**Prepared By:** Richard Aldridge, PE, Civiltec Branch Manager

**1. Introductions and Roles**

Project Directory Attached

**2. General Project Overview**

The Town of Chino Valley desires to create an integrated water resources, water, wastewater and reclaimed water master plan (IWMP) and capital improvement plan (CIP) for Chino Valley's Old Home Manor property. The goal of this plan is to identify the best way to develop property, determine resources/infrastructure needs, and create a 5-year CIP implementation strategy. This IWMP will ensure the Old Home Manor infrastructure is integrated seamlessly into a Chino Valley-wide utility system

**3. Scope of Work**

The Civiltec Engineering, Inc. design team scope of work will include the following general Phases as defined in the original project RFP and the project final scope of work:

**PHASE 1 – PLANNING** (planning, water resources, data collection, modeling, workshops and technical memorandums)

**PHASE 2 - INTEGRATION (WATER-WASTEWATER-RECLAIMED WATER)** (develop recommendations for integrating the improvements and water resources for planning horizons and overall buildout)

**PHASE 3 - CAPITAL IMPROVEMENTS PLAN (CIP)** (evaluate system needs, provide recommendations for system infrastructure improvements, prepare cost estimates and a hierarchical plan for implementation)

**PHASE 4 - LANDSCAPE REQUIREMENTS** (develop outdoor landscape design and components for stormwater recapture and develop draft landscape ordinances for Town consideration)

**PHASE 5 - PROJECT ADMINISTRATION** (meetings, workshops and final Master Plan preparation and final documentation)

**4. Project Schedule**

1. The preliminary design schedule is attached to this Agenda.
2. Generally, the work will kick off on March 10 and will be complete by November, 2020

**5. General Discussion and Initial Tasks**

1. Civiltec will prepare a document request for submittal to the Town
2. Schedule a meeting with the Town Staff to determine growth projections and for determination of potential uses within Old Home Manor.
3. Prepare a water resources availability list for potential and currently available water rights. The Town will provide the Town portfolio and are looking at permitting for importation of Chino Ranch water.
4. Review existing WWTP processed recharge water documents and permits.
5. Obtain the main treatment plant sewer pump station flow data for at least 12 months to establish a Town-wide sewage production base line being processed by the WWTP.
6. Obtain water production flow data for the system to establish a base line for current water demands. The Town will furnish current meter counts and their spreadsheets of wells and production.
7. Review existing landscape requirements. Stormwater capture and reuse will be reviewed.
8. Establish our water, wastewater and reclaim water models.

**6. Other Comments:**

1. The Town will provide the 2007 Conceptual Old Home Manor Master plan
2. Civiltec to provide recommendations for system efficiencies.
3. Anticipate up to 12 each, 1-ac recharge basins – they currently has a 1' per day recharge capacity – consider dry wells potential.
4. Provide recommendations on sewer expansion for increased reclaim production using 300 ac/ft per year.
5. Review recharge wells potential
6. Economic Development driving the WWTP expansion schedule – expansion increases recharge availability
7. Landscape to consider just on-site reuse or detention
8. The WWTP expansion is currently on hold – designed to 500 MGD – permitted at 1.0 MGD- currently at about 280,000 per day typical flow

## Integrated Water Master Plan and Capital Improvements Plan for Old Home Manor

Kick Off Meeting Minutes

Civiltec #2020706.00

Page 3



9. Consider ADWR recharge and storage requirements
10. Town is seeing about 100 single family homes built per year
11. Landscape ordinance to include calc's, consider roof impermeability, provide plant list to minimize or eliminate outdoor uses
12. Anticipate a Town Council study session presentation of the report
13. Time is of the essence on the water balance budget and the physical availability being done by Montgomery
14. Town will send Civiltec the previous water budget for Old Home Manor
15. Section UD52 is the applicable Town Code
16. Town will send the Business Park zoning requirements. The same requirements are anticipated for the Public Lands portion of Old Home Manor.

### **END OF MEETING MINUTES**

**Prepared by** Richard Aldridge, PE, Project Manager

A handwritten signature in blue ink, appearing to read 'Richard Aldridge', is written over a faint rectangular box.

### **ATTACHMENTS:**

- Sign-in Sheet
- Town Infrastructure Exhibit
- Project Directory
- Preliminary Schedule

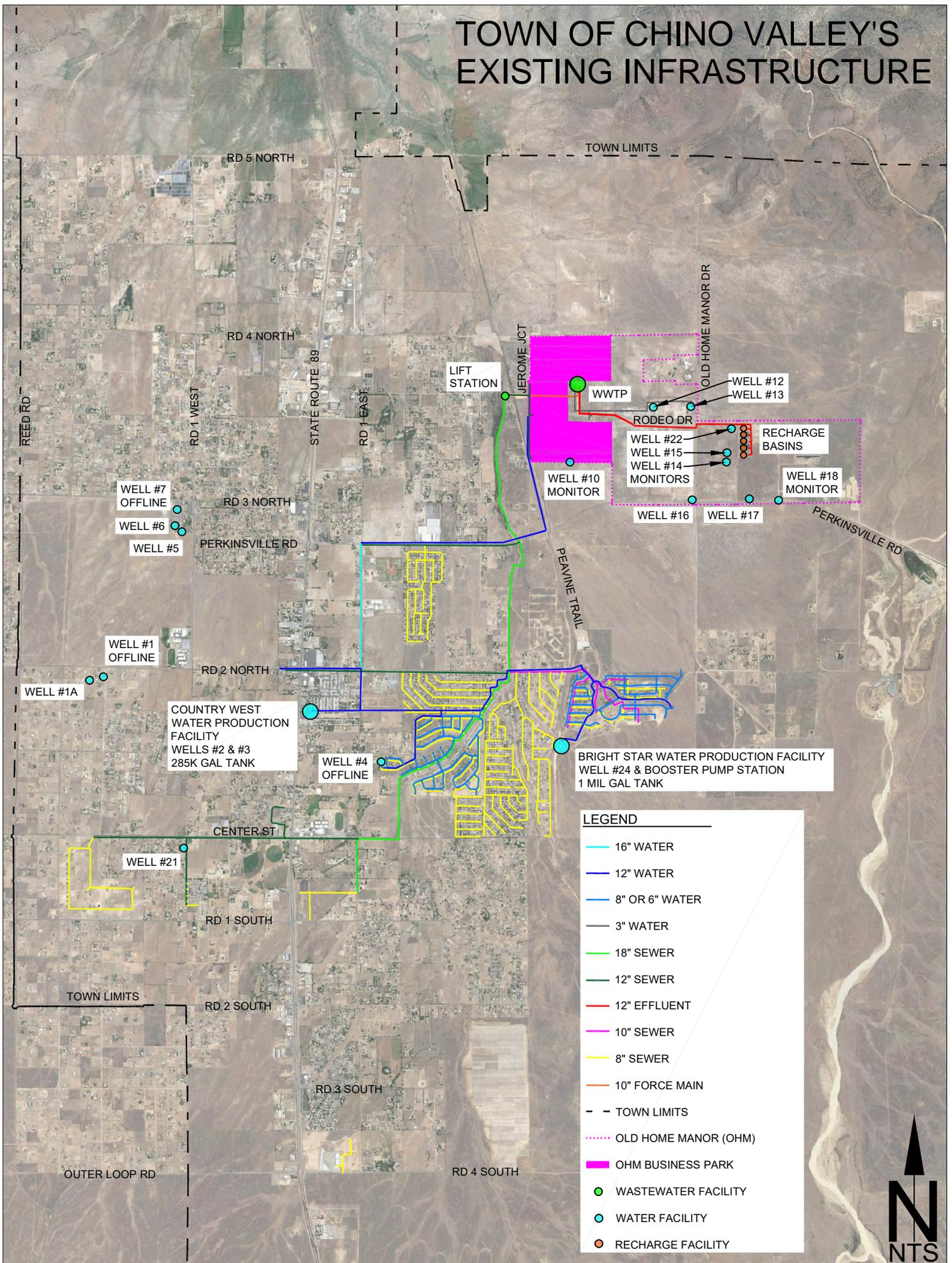
**KICK OFF MEETING - SIGN IN SHEET**  
**Town of Chino Valley Public Works**



**Integrated Water Master Plan and Capital Improvements Plan for Old Home Manor**  
**Tuesday, March 10, 2020 - 10:30 AM**  
 Civiltec Engineering Proj. Number 2020706.00

Company	Representative's Name	Present
Mark Holmes, LLC	Mark Holmes, PG, Town Project Manager	<i>MAH</i>
Town of Chino Valley	Frank Marbury, PE, Public Works Director	<i>FM</i>
Town of Chino Valley	Steve Sullivan, PE, Assistant Town Engineer	
Town of Chino Valley	Mike Bovee, Utilities Manager	
Town of Chino Valley	Maggie Tidabeck, Economic Development Project Manager	
Town of Chino Valley	Josh Cook, Development Services Director	
Town of Chino Valley	Joe Duffy, Finance Director	
Civiltec Engineering	Richard Aldridge, PE, Project Manager	<del>RA</del>
MATRIX/Southwest Groundwater	William Greenslade, PE, RG, Project Manager	<i>WLG</i>
MATRIX/Southwest Groundwater	James Holt, Project Consultant	<i>JH</i>
Sketch Landscape Architecture Studio	Celia van der Molen, LA, Project Manager	<i>CVDM</i>

# TOWN OF CHINO VALLEY'S EXISTING INFRASTRUCTURE



**LEGEND**

- 16" WATER
- 12" WATER
- 8" OR 6" WATER
- 3" WATER
- 18" SEWER
- 12" SEWER
- 12" EFFLUENT
- 10" SEWER
- 8" SEWER
- 10" FORCE MAIN
- - - TOWN LIMITS
- ..... OLD HOME MANOR (OHM)
- OHM BUSINESS PARK
- WASTEWATER FACILITY
- WATER FACILITY
- RECHARGE FACILITY



# Town of Chino Valley Integrated Water Master Plan and Capital Improvements Plan for Old Home Manor

PROJECT DIRECTORY

March 10, 2020

Civiltec Project No: 2020706.00



Name	Organization	Title	Land Line	Cell Phone	Email
<b>TOWN OF CHINO VALLEY CONTACTS</b>					
Mark Holmes, PG	Mark Holmes, LLC	Town Project Manager	928-277-5253		<a href="mailto:mark.holmes.llc@gmail.com">mark.holmes.llc@gmail.com</a>
Frank Marbury, PE	Town of Chino Valley	Public Works Director	928.636.2646 ext. 1226		<a href="mailto:fmarbury@chinoaz.net">fmarbury@chinoaz.net</a>
Steve Sullivan, PE	Town of Chino Valley	Assistant Town Engineer	928.636.2646 ext. 1308		<a href="mailto:ssullivan@chinoaz.net">ssullivan@chinoaz.net</a>
Mike Bovee	Town of Chino Valley	Utilities Manager	928.636.2646		<a href="mailto:mbovee@chinoaz.net">mbovee@chinoaz.net</a>
Maggie Tidbeck	Town of Chino Valley	Economic Development Proj Migr	928.636.2646 ext. 1201	928.899.2559	<a href="mailto:mtidback@chinoaz.net">mtidback@chinoaz.net</a>
Josh Cook	Town of Chino Valley	Development Services Director	928.636.4427		<a href="mailto:jcook@chinoaz.net">jcook@chinoaz.net</a>
Joe Duffy	Town of Chino Valley	Finance Director	928.636.2646		<a href="mailto:jduffy@chinoaz.net">jduffy@chinoaz.net</a>
<b>CIVILTEC TEAM CONTACTS</b>					
Rick Shroads	Civiltec	Principal In Charge	928.771.2376 x210	928.308.0777	<a href="mailto:rshroads@civiltec.com">rshroads@civiltec.com</a>
Richard Aldridge	Civiltec	Branch Manager/Principal Engr	928.771.2376 x213	928.679.0014	<a href="mailto:raldridge@civiltec.com">raldridge@civiltec.com</a>
Raymond Buettner	Civiltec	Project Designer	928.771.2376 x202	928.308.0772	<a href="mailto:rbuettner@civiltec.com">rbuettner@civiltec.com</a>
William Greenslade, PE, RG	MATRIX/SWG	Project Manager	602.955.5547		<a href="mailto:wgreenslade@swgroundwater.com">wgreenslade@swgroundwater.com</a>
James Holt	MATRIX/SWG	Project Consultant	928.771.0610		<a href="mailto:jholt@swgroundwater.com">jholt@swgroundwater.com</a>
Celia van der Molen	Sketch Landscape Arch	Project Manager	928.277.7336		<a href="mailto:celia@sketch-la.com">celia@sketch-la.com</a>

## MAILING ADDRESSES

**Town of Chino Valley Public Works**  
1982 Voss Drive, #201, Chino Valley, AZ 86323

**Civiltec Engineering, Inc.**  
2054 N. Willow Creek Road, Prescott, AZ 86301

**Town of Chino Valley Town Hall**  
202 N State Route 89, Chino Valley 86323

**MatrixNewworld/SWG**  
3033 N. 44<sup>th</sup> Street, Ste 120, Phoenix, AZ 85018-7226  
123 E. Goodwin Street, Ste 200, Prescott, AZ 86303

**Sketch Landscape Architecture Studio**  
PO Box 240, Chino Valley, Arizona 86323

TOWN OF CHNIO VALLEY  
OLD HOME MANOR IWMP - PROPOSAL SCHEDULE

ID	Task Name	Duration	Start	Finish
1	<b>OVERALL PROJECT PRELIMINARY SCHEDULE</b>	<b>173 days</b>	<b>Wed 2/26/20</b>	<b>Fri 10/23/20</b>
2	<b>Task 1 – Kick-off Meeting - Notice to Proceed</b>	<b>5 days</b>	<b>Wed 2/26/20</b>	<b>Tue 3/3/20</b>
3	Kick-off Meeting	5 days	Tue 3/3/20	Mon 3/9/20
4	<b>Task 2 – Draft IWMP Plan</b>	<b>95 days</b>	<b>Tue 3/10/20</b>	<b>Mon 7/20/20</b>
5	Data Acquisition, Establish Planning Criteria, Systems Analysis, Identification of Water, Sewer and Reclaimed Water Sources and Availability, Landscape Design, Systems Modeling, Review of Regulatory Requirements, Topo Survey and Other Identified Tasks	66 days	Tue 3/10/20	Tue 6/9/20
6	Workshops, Meetings, Draft Technical Memorandums and Preparation of the Draft IWMP Plan	29 days	Wed 6/10/20	Mon 7/20/20
7	<b>Task 3 – Final IWMP Plan</b>	<b>50 days</b>	<b>Tue 7/21/20</b>	<b>Mon 9/28/20</b>
8	Continued Data Acquisition, Establishment of Planning Criteria, Systems Analysis, Identification of Water, Sewer and Reclaimed Water Sources and Availability, Landscape Design, Systems Modeling, Review of Regulatory Requirements and Other Identified Tasks	30 days	Tue 7/21/20	Mon 8/31/20
9	Workshops, Meetings, Draft Technical Memorandums and Preparation of the Final IWMP Plan	20 days	Tue 9/1/20	Mon 9/28/20
10	<b>Task 4 – Draft Capital Improvements Plan (CIP)</b>	<b>65 days</b>	<b>Tue 6/9/20</b>	<b>Mon 9/7/20</b>
11	Identify Costs, Planned Improvement, Basis of Costs, Infrastructure Replacement Requirements, Construction Phasing, Short and Long Term Cost Elements	50 days	Wed 6/10/20	Tue 8/18/20
12	Meetings, Workshops and Prepare Draft CIP	15 days	Wed 8/19/20	Tue 9/8/20
13	<b>Task 5 – Final CIP</b>	<b>35 days</b>	<b>Wed 9/9/20</b>	<b>Tue 10/27/20</b>
14	Final Identification of Costs, Planned Improvement, Basis of Costs, Infrastructure Replacement Requirements, Construction Phasing, and Short and Long Term Cost Elements	20 days	Wed 9/9/20	Tue 10/6/20
15	Meetings, Workshops and Submit Final Draft CIP Plan	15 days	Wed 10/7/20	Tue 10/27/20
16	<b>Task 6 – Final Report and Deliverables</b>	<b>6 days</b>	<b>Wed 10/28/20</b>	<b>Wed 11/4/20</b>
17	Submit Final IWMP, CIP Plan and Project Deliverables	6 days	Wed 10/28/20	Wed 11/4/20

TOWN OF CHINO VALLEY  
Integrated Water Master Plan and Capital Improvements Plan  
for Old Home Manor  
Civiltec Project No. 2020706



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**MEETING MINUTES**

**Meeting Date:** June 25, 2020  
**Meeting Time:** 9:00 AM  
**Meeting Location:** Civiltec Prescott Office Conference Room  
**Meeting Name:** IWMP Progress Meeting  
**Prepared By:** Richard Aldridge, PE, Civiltec Branch Manager

**1. General Project Status Overview**

The last several months have been focused on information gathering, data analysis, establishment of the water and sewer models and data input, growth projections, exhibit preparation and initial IWMP report preparation.

- Draft IWMP in progress
- Water and Sewer Modeling in Progress
- Landscape Sections in Progress
- Water Resources Sections in Progress

**2. IWMP Review and Decisions**

The latest draft of the IWMP will be reviewed at the meeting. The following issues will be reviewed:

- Growth Projections to be incorporated into the modeling and report were reviewed and considered reasonable for population, business park and public land uses. The Esri and Census Bureau discrepancies were discussed and the Esri information provided by the Town will be used for the population growth calculations.
- Old Home Manor public lands development projections included in the draft report will be incorporated into the model.
- The review of Planning Exhibits included in the report (Ownership, Zoning, Land Use, Transportation) will require revisions for the next draft report for the roadway layout and the addition of acreages to the parcels.
- Civiltec provided a review of water/sewer modeling and the general design concepts being incorporated into the modeling.

**3. Project Schedule**

- Generally, the project kicked off on March 10 and is scheduled to be complete by mid-November, 2020
- Due to the workplace inefficiencies associated with the Covid-19 pandemic, the project is a few weeks behind the original schedule. Our goal is to meet the original mid-November completion date as planned.

## Integrated Water Master Plan and Capital Improvements Plan for Old Home Manor

Progress Meeting Minutes

June 25, 2020

Page 2 of 2



### **MEETING COMMENTS SUMMARY:**

1. Civiltec to verify parcel acreages for Old Home Manor – add assessors acreage to parcel map exhibit
2. Town will provide original purchase agreement.
3. Anticipate 12-1 acre basins for recharge area – permit is in process for renewal by 2026 – potential for drywells to be constructed.
4. For ‘undetermined’ designation, Civiltec will use RV Park density per acre.
5. The land north of the College is “undetermined” –Town will provide lease information
6. College has their own non-potable well
7. The ball fields have a Type 1, non irrigation water right
8. The Town will provide 5 years of building permit data to determine the average growth in permits – 75 to 100 permits/year was typical
9. The City of Prescott water service area extends from R4S to R4N – there is an IGA with the Town.
10. Anticipated 500 RV spaces total – growth would be 20% per year for buildout out over 5 years (100 spaces per year)
11. When the Bright Star well goes down, when does curtailment kick in – include “what if’s” in the water CIP plan
12. Town will provide the maximum day data for water consumption including the daily reports for maximum months 2015 – 2019 (5 years of data)
13. Regarding Turf areas, restriction on use are in the AMA – design to maximum allowable consumption
14. Town will provide business names and addresses, tied to parcels for commercial meter data
15. Old Home Manor water system CIP to include cost benefits for wells, tanks and redundant system improvements
16. The sewer lift station has a 22’ deep wet well as measured by the Town – Town will furnish the existing pump data at the lift station
17. Consider the gallon per minute kick-in for lift station and wet well improvements in the 5 year CIP
18. Town will provide the Montgomery study for physical availability as soon as available
19. Focus on the Business park land uses provide by the Town – use conservative values
20. Civiltec will assist the Town with the ADWR spreadsheet calculator for the Assured Water Supply application by the Town

**END OF MEETING MINUTES**

**Prepared by Richard Aldridge, PE, Project Manager**

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**ATTACHMENTS:** Sign in Sheet, 6-25-2020

**PROGRESS MEETING - SIGN IN SHEET**  
**Town of Chino Valley Public Works**



**Integrated Water Master Plan and Capital Improvements Plan for Old Home Manor**  
**Thursday, June 25, 2020 - 9:00 AM**  
 Civiltec Engineering Proj. Number 2020706.00

Company	Representative's Name	Present
Mark Holmes, LLC	Mark Holmes, PG, Town Project Manager	MAH
Town of Chino Valley	Frank Marbury, PE, Public Works Director	FM
Town of Chino Valley	Steve Sullivan, PE, Assistant Town Engineer	
Town of Chino Valley	Mike Bovee, Utilities Manager	
Town of Chino Valley	Maggie Tidabeck, Economic Development Project Manager	MT
Town of Chino Valley	Josh Cook, Development Services Director	
Town of Chino Valley	Joe Duffy, Finance Director	
Civiltec Engineering	Richard Aldridge, PE, Project Manager	RA
Civiltec Engineering	Richard Shroads, PE, Founder, Water/Wastewater	RS
MATRIX/Southwest Groundwater	William Greenslade, PE, RG, Project Manager	WG

**TOWN OF CHINO VALLEY**  
**Integrated Water Master Plan and Capital Improvements Plan**  
**for Old Home Manor**  
**Civiltec Project No. 2020706**



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**MEETING MINUTES**

**Meeting Date:** August 18, 2020  
**Meeting Time:** 2:00 PM  
**Meeting Location:** Civiltec Prescott Office & Town Council Chambers  
**Meeting Name:** IWMP Progress Meeting – Video Conference  
**Prepared By:** Richard Aldridge, PE, Civiltec Branch Manager  
**Attendees:** Mark Holmes, TOCV Project Manager  
Joshua Cook, AICP, TOCV Development Services Director  
Maggie Tidabeck, TOCV, Economic Development Project Manager  
Richard Shroads, PE, RLS Civiltec Founder  
Richard Aldridge, PE, MBA Civiltec Project Manager

**MEETING COMMENTS SUMMARY:**

1. The Town may want to incentivize business development in Old Home Manor.
2. The Town needs to take a good look at what they want in the way of development.
3. The draft Technical Memo for the water system was presented for review by Rick Shroads out to 2035 based on our current development and population growth projections. It was our observation that the Town had a desire to increase the water users within their system.
4. Old Home Manor development will drive the CIP through the initial 5-year planning horizon.
5. The growth rates were discussed and it was agreed to use an accelerated growth rate for the first few years. The 3% population growth rates recommended by Joshua are being incorporated into the report and the Business Park rate will be revised to approximately 15% development in the first 5 years, followed by an equal (consistent) growth rate through 2035 to complete the buildout.
6. The potential revenue from the RV Park lease payments was discussed. Staff will meet internally to review economic potential for funds that could be used to develop Old Home Manor infrastructure.
7. A table of Old Home Manor infrastructure for utilities should be included with the 5-year CIP report. Roads will also be noted in the program as appropriate.
8. The Town may request Civiltec to do a Design Concept Report (DCR) for development of Rodeo Road and the infrastructure to provide improvements that would allow certain development to occur in Old Home Manor in the near term.
9. Revise the RV Park development acreage to 60 acres (currently at 80 ac) and the Ballfields to 60 acres (currently 40 ac). The 20 acres for the ball fields would come from the east 20 acres of the RV Park, south parcel.
10. Split the south RV Park parcel on a north-south line developing the west ½ (20 acres) along the frontage of the road from Rodeo Road to Perkinsville, followed by the development of the north RV 40 ac parcel.
11. The Town was considering a \$2.5 million budget for providing water and sewer to the RV Park for funding purposes.

**END OF MEETING MINUTES**

A handwritten signature in blue ink, appearing to read 'Richard Aldridge', is written over the 'END OF MEETING MINUTES' text.

**Prepared by Richard Aldridge, PE, Project Manager**

TOWN OF CHINO VALLEY  
Integrated Water Master Plan and Capital Improvements Plan  
for Old Home Manor  
Civiltec Project No. 2020706



**MINUTES**

**Meeting Date:** September 24, 2020  
**Meeting Time:** 3:00 PM  
**Meeting Location:** Town of Chino Valley Council Chamber  
**Meeting Name:** IWMP Water System Workshop  
**Prepared By:** Richard Aldridge, PE, Civiltec Branch Manager

**1. General Project Status Overview**

- Several Draft IWMP reports have been prepared, distributed for review and used for staff discussions in regard to population growth and the associated Old Home Manor water demands and build out projections.
- Water Modeling has been constructed and is ready for discussion
- Landscape Sections in Progress
- Water Resources Sections in Progress

**2. IWMP Review**

A general overview of the latest draft of the IWMP was discussed at the meeting. The following issues were reviewed:

- Growth projections summary – the growth projections used for the water modeling were reviewed based on the final accepted rates previously determined by Town Staff and Civiltec. Those projects were generally used in the model development with a slightly more accelerated rate used for CIP planning.
- Old Home Manor development projections – the area development projections used for the water modeling and overall development planning were reviewed based on the prior accepted rates determined by Town Staff and Civiltec. Those development area projections were also used in the model development to determine infrastructure sizing.
- An Overview of the Water Modeling was presented with the following highlights:
  - Old Home Manor – the system was modeled using the growth and development projections previously determined with Town Staff. The modeling extended to the Bright Star well/pump station as well as other contributory wells and storage locations.
  - System Redundancy – the modeling looked at a water line in the Peavine Trail from Bright star, addition of a water storage tank in Old Home Manor, incorporation of existing wells within Old Home Manor, by pass waterlines at Bright Star, new transmissions mains, pressure zones for backfilling the Bright Star area from Old Home Manor, pressure reducing stations where necessary, and many other factors to be included in the final technical memo.

- Fire Flow determination for Modeling – a discussion in regard to fire flow rates, tank draw down and fire reserve storage, zoning affects on fire flow requirements, consistency with adjacent municipalities, and a reasonable fire flow rate to use in the system modeling. Currently, the Civiltec modeling includes a 2,000 gpm fire flow for sizing the infrastructure and tank storage.
- Bright Star and other Sources & Storage – a review of the Bright Star area pressure zones and pumping/storage facilities was presented. For modeling purposes, the current tank draw down and storage rates will be evaluated based on potential filling of the Bright Star tank from other wells (Country West), evaluate by-pass lines at the pump station for direct filling of the existing tank from other sources, provide recommendations in the final technical memo for the Bright Star system being out of service, new transmission mains and final pressure zones which will be discussed in a future meeting with Staff.
- Draft CIP recommended water improvements as Incorporated into the Model – a preliminary CIP plan was presented looking at the necessary improvements to meet the growth projections and buildout rates based on current assumptions. An updated draft of the WIMP and CIP plan was presented as well as the draft Water System Technical Memo. All documents will be updated to include the comments from this Workshop.

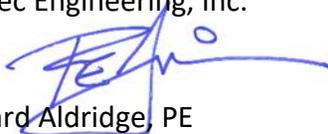
**3. Other Issues:**

- The Town Staff are scheduled to discuss a business strategy for the development of Old Home Manor with the Town Council on October 20, 2020.
- Copies of the materials presented at today’s workshop will be forwarded to the Town Clerk for the meeting minutes.

**4. Attachments - the following attachments were forwarded to the Town after the meeting and are included with these meeting minutes:**

- Sign in Sheet for the meeting Attendees, 9-24-2020
- IWMP Water System Workshop Agenda, 9-24-2020
- IWMP Master Plan Draft Report – Water System Workshop, 9-24-2020
- Draft Water System Technical Memo, 9-24-2020 (word.doc format)
- Network Preview for 2035 MDD, 9-24-2020
- Fig 5 – TOCV Planning Exhibits – Land Use Map, Sheet 4 of 4, 9-24-2020

Prepared by:  
Civiltec Engineering, Inc.



Richard Aldridge, PE  
Prescott Office Branch Manager

**WATER SYSTEM WORKSHOP - SIGN IN SHEET**  
Town of Chino Valley



**Integrated Water Master Plan and Capital Improvements Plan for Old Home Manor**  
**Thursday, September 24, 2020 - 3:00 PM**  
Civiltec Engineering Proj. Number 2020706.00

Company	Representative's Name	Present
Mark Holmes, LLC	Mark Holmes, PG, Town Project Manager	X
Town of Chino Valley	Frank Marbury, PE, Public Works Director	X
Town of Chino Valley	Steve Sullivan, PE, Assistant Town Engineer	
Town of Chino Valley	Mike Bovee, Utilities Manager	
Town of Chino Valley	Maggie Tidabeck, Economic Development Project Manager	X
Town of Chino Valley	Josh Cook, Development Services Director	X
Town of Chino Valley	Joe Duffy, Finance Director	
Civiltec Engineering	Richard Aldridge, PE, Project Manager	X
Civiltec Engineering	Richard Shroads, PE, Founder, Water/Wastewater	X
Town of CV.	Jack Miller	X
"	Corey Mendoza	X
"	Cecilia Griffithman	X
TOCV	Joshua Cook	X
"	Lon Turner	

Zoom

TOWN OF CHINO VALLEY  
Integrated Water Master Plan and Capital Improvements Plan  
for Old Home Manor  
Civiltec Project No. 2020706



**MINUTES**

**Meeting Date:** September 30, 2020  
**Meeting Time:** 10:00 AM  
**Meeting Location:** Microsoft TEAMS Video Conference  
**Meeting Name:** IWMP Rapid Infiltration Basins and Water Resources Meeting  
**Prepared By:** Richard Aldridge, PE, Civiltec Branch Manager

**This was a video conference meeting with the following attendees:**

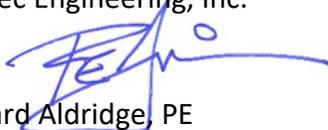
Mark Holmes, Town Project Manager	William Greenslade, Project Manager, MATRIX
Mike Bovee, Town Utilities Manager	James Holt, Project Consultant, MATRIX
Craig Wilson, Town WWTP Manager	Rick Shroads, Civiltec Founder
	Richard Aldridge, Civiltec Prescott Branch Manager

**Meeting Comments Summary:**

1. Recharge Basins are based on 120 to 270 Ac-Ft per year of capacity.
2. 12 Basins are permitted, 5 are operational and 3 additional basins were constructed in 2006 and are not being used.
3. The 5 operational basins are filled daily via manually operated valves on a 5 day rotation schedule.
4. Basins are not rotated on weekends.
5. The three basins constructed in 2006 are not plumbed to receive recharge water but are ready to be placed in service when needed.
6. The existing Recharge Permit allows for drywell construction in the basins to enhance infiltration into higher transmissivity zones.
7. The Basins were percolation tested at a rate of 1' per day of infiltration.
8. Consider additional WWTP located to the north of the existing plant, near the Del Rio Springs/Sullivan Lake area.
9. Consider timing on moving the WWTP north for gravity sewer – broad-brush look at a northerly WWTP in report.
10. Mark will send parcel data for a potential WWTP site to the north – approximately ½ of the parcel is located in a floodplain.

11. Mark is sending a new recovery well application to the State – the well will be located in the safe harbor area.
12. Mark will send a list of dual recovery and production well sites.
13. The water portfolio will be reviewed for extinguishment credits for partnering with developers – the Town spreadsheet has Town control/purchase parcel data and the Town will verify acquisitions.
14. The Town has a water transportation permit for the Wine Glass Ranch area.
15. The WWTP has a planned expansion but no design at this point. Consideration is being given to a flow equalization basin for regulating inflow to the treatment process.
16. The current WWTP includes the following parameters:
  - A. Permitted for 5.0 MGD
  - B. Designed for 1.0 MGD
  - C. Constructed to 0.5 MGD
  - D. Currently processes an operational flow of approximately 0.28 MGD.

Prepared by:  
Civiltec Engineering, Inc.



Richard Aldridge, PE  
Prescott Office Branch Manager

TOWN OF CHINO VALLEY  
Integrated Water Master Plan and Capital Improvements Plan  
for Old Home Manor  
Civiltec Project No. 2020706



**MINUTES**

**Meeting Date:** November 9, 2020  
**Meeting Time:** 11:00 AM  
**Meeting Location:** ZOOM Video Conference  
**Meeting Name:** Water Resources Meeting  
**Prepared By:** Richard Aldridge, PE, Civiltec Branch Manager

**This was a ZOOM video conference meeting with the following attendees:**

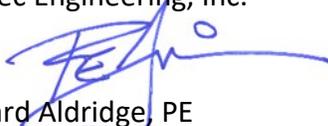
Mark Holmes, Town Project Manager	William Greenslade, Project Manager, MATRIX
Mike Bovee, Town Utilities Manager	James Holt, Project Consultant, MATRIX
Frank Marbury, Town Public Works Director	Rick Shroads, Civiltec Founder
Steve Sullivan, Assistant Town Engineer	Richard Aldridge, Civiltec Prescott Branch Manager

**Meeting Comments Summary:**

1. The meeting was conducted by William Greenslade.
2. The Town's water portfolio spreadsheet was reviewed. Mark will update the spreadsheet for some of the missing or unknown information.
3. MATRIX will update the Old Home Manor (OHM) property lines on their preliminary exhibits and the Town will provide the GIS layers for the site.
4. Mark will review the Town's service boundary limits and a GIS image will be provided by the Town to MATRIX.
5. Retired Water Rights are to be included on the service area maps.
6. Well numbers will be updated by Mark for the missing well data on the water rights spreadsheet.
7. Small Municipal Providers (SMP) were discussed with Mark noting that there was no limit on providing water within the service area via an SMP.
8. ADWR was questioning the Town's recovery well permit application withdrawal authority, the Town anticipates a letter in the near future from ADWR for clarifications.
9. The Yavapai College well has a historical pumping rate of 3,500 to 4,000 gpm; this is a potential source for OHM water supply.
10. The spreadsheet reviewed during the meeting needs to split Column D for permitted rights (Type I and II) and a well capacity column added.

11. Mark noted that replacement wells can be installed within 660' of an existing well, keeping the same withdrawal rules. Replacement wells located beyond the 660' limit are considered new wells.
12. Bill will send the MATRIX spreadsheet to Mark for editing today.
13. Mark will send an update with a complete summary of the wells.
14. The Water Resources workshop anticipates Town Staff, Water and Utility Subcommittee, and the Mayor. The presentation should be more general in nature to provide an overview of the resources but a more detailed discussion may be required.
15. Mark will update the water import information in regard to the Big Chino area.
16. MATRIX will do an outside evaluation of the Town water portfolio.
17. The Old Home Manor Phase 1 will be the start of the planning process to meet growth of the OHM area and will lay the groundwork for looking to a future Town-wide development plan for areas including Del Rio and Road 4 South – this will be a continuous planning effort.
18. Subdivision requirements versus leased parcels water provision and assured water supply was discussed. Currently the Town does not intend to subdivide OHM.
19. Mark noted that if certified water is required, the Town's portfolio would be insufficient to meet the OHM demands.

Prepared by:  
Civiltec Engineering, Inc.



Richard Aldridge, PE  
Prescott Office Branch Manager

**TOWN OF CHINO VALLEY**  
**Integrated Water Master Plan and Capital Improvements Plan**  
**for Old Home Manor**  
**Civiltec Project No. 2020706**



**MINUTES**

**Meeting Date:** November 19, 2020  
**Meeting Time:** 11:00 AM  
**Meeting Location:** Microsoft TEAMS Video Conference  
**Meeting Name:** Water Pressure Zones Meeting  
**Prepared By:** Richard Aldridge, PE, Civiltec Branch Manager

**This was a TEAMS video conference meeting with the following attendees:**

Mark Holmes, Town Project Manager	Rick Shroads, Civiltec Founder
Mike Bovee, Town Utilities Manager	Richard Aldridge, Civiltec Prescott Branch Manager
Frank Marbury, Town Public Works Director	
Steve Sullivan, Assistant Town Engineer	

**Meeting Comments Summary:**

1. Rick provided an overview of the pressure zones using contour lines based on potential pressures from the Bright Star pumping facility and the area of Old Home Manor (OHM).
2. Several options were presented using various combinations of Bright Star pump settings, static elevation pressures, potential PRV's in OHM, storage tank elevations in OHM, backfeeding potential from a new tank at OHM to the lower zones of Bright Star, and potential service area expansion to the north and west of OHM with a new lower pressure zone similar to other studies.
3. Other options included the installation of a booster pump station at OHM that could pump back to the Bright Star pressure zones if necessary.
4. The incorporation of the existing wells in OHM for use as a new supply was also discussed.
5. The potential for a new water storage tank farm at the westerly edge of the shooting range/air park parcel could be developed using a lower pressure zone in OHM.
6. If a pressure zone split were to be utilized in Bright Star subdivision, a Town contribution to the development of Bright Star upper pressure zone to service the higher, currently undeveloped areas within the subdivision was also discussed.
7. Benefits of the preferred option 3 included the following:
  - A. A significantly increased service area defined with the high and low pressures for associated with splitting OHM into two pressure zones.
  - B. The potential to develop a water storage tank farm near the shooting range for substantially increase community storage.

- C. The ability to install a booster pump station that could backfeed and serve the Bright Star area from the OHM potential water storage tanks and wells.
8. It was the general consensus of the attendees that the development of an additional lower pressure zone in OHM, with distinct higher and lower pressure zones, the higher zone being compatible with Bright Star was the preferred alternate. This was option 3 in the presentation (slide 4 of 7).
9. Rick will update the Zonal Extents and Master Map for the 4835 and 4890 zones and provide them to Frank and other attendees for a closer look at the pressure zone options.

Prepared by:  
Civiltec Engineering, Inc.

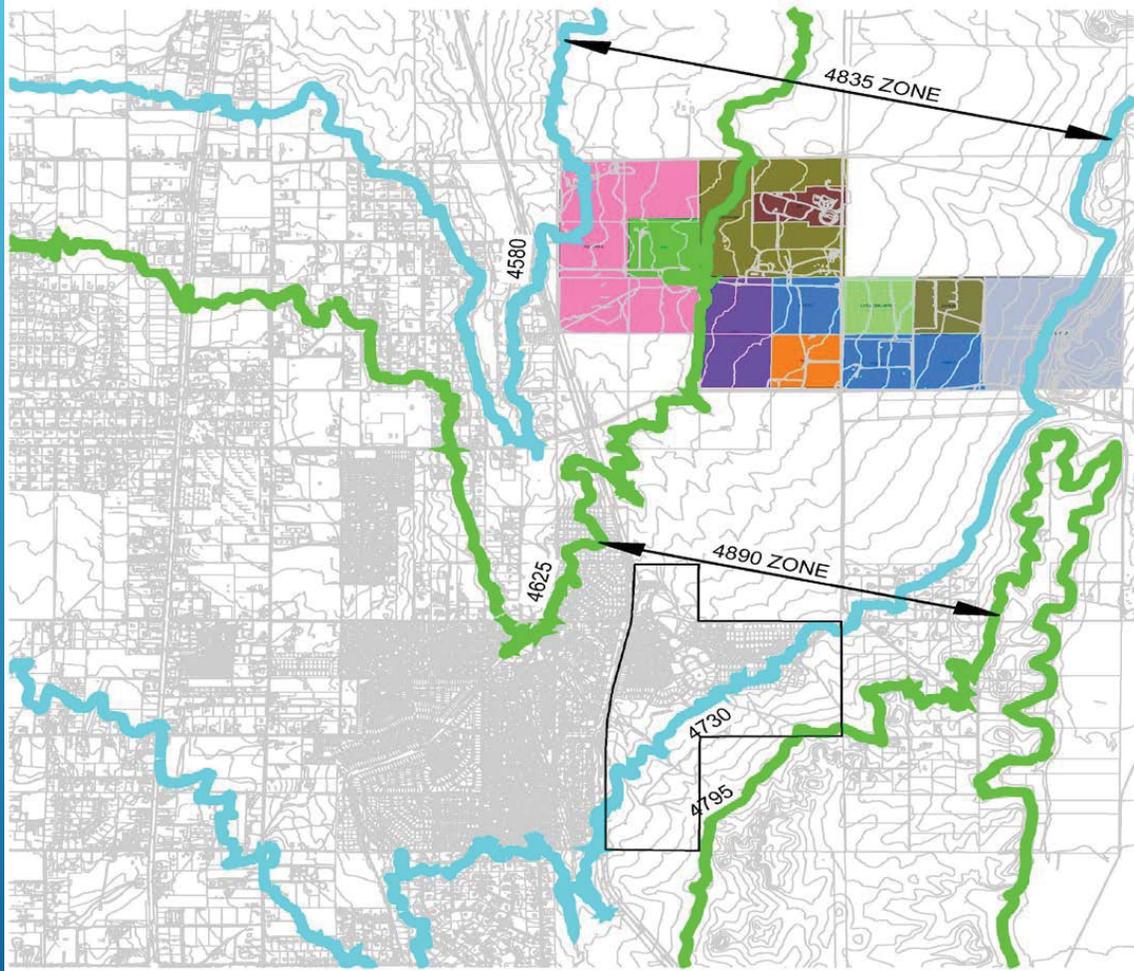


Richard Aldridge, PE  
Prescott Office Branch Manager

## **ATTACHMENTS**

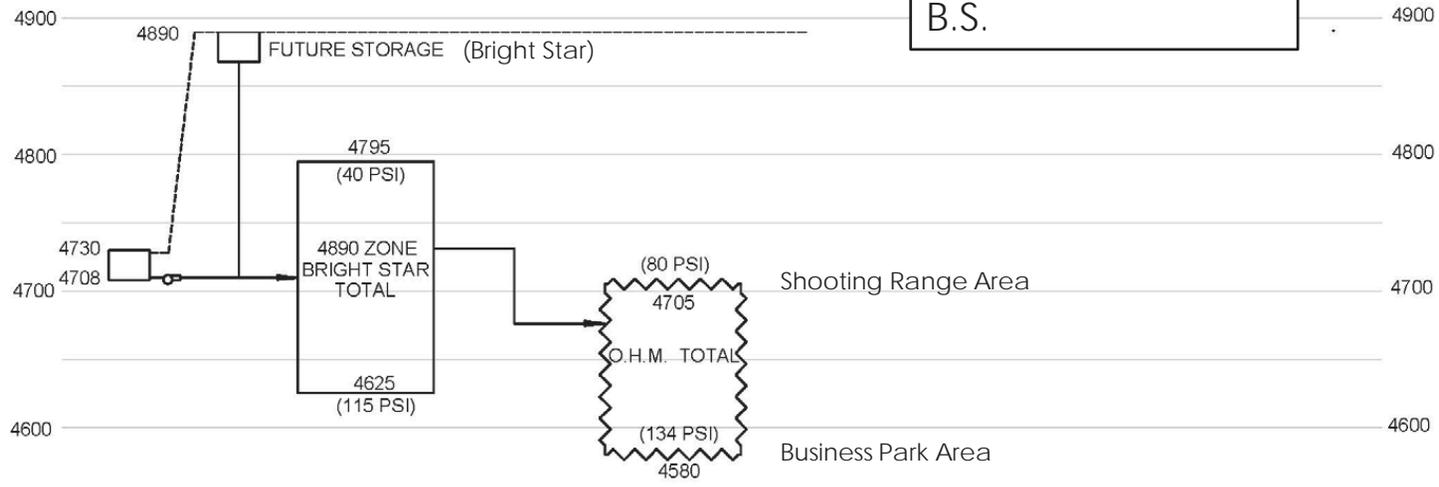
- Pressure Zone Meeting Exhibit – Power Point Slides for Pressure Zone Options

Map of 4835 & 4890 Zonal Extents



4890 Zone Only

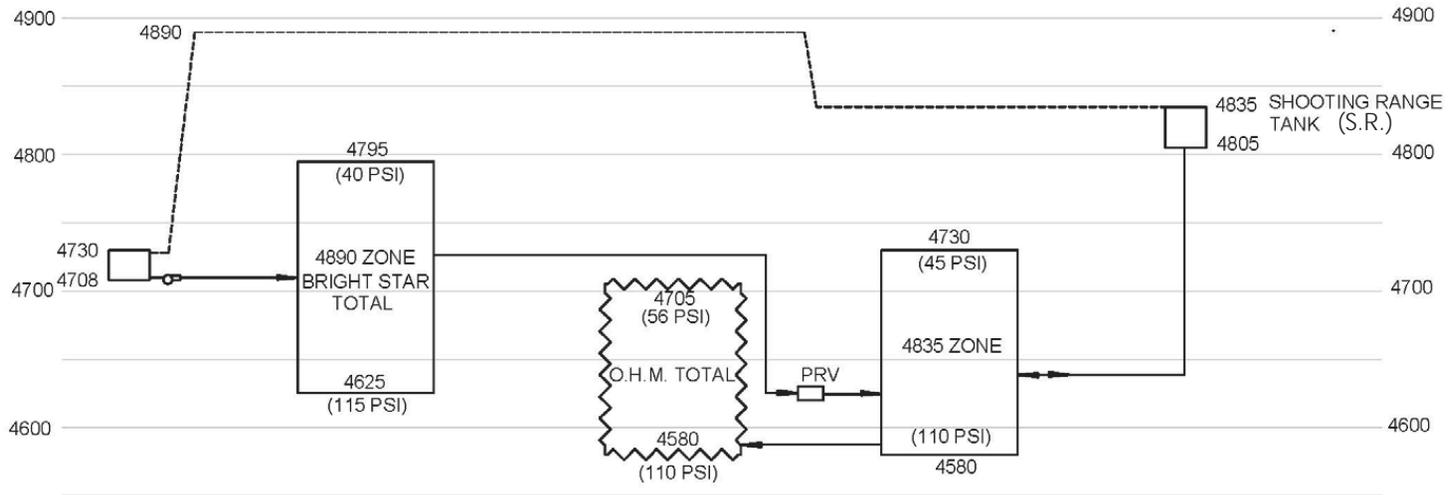
Zone Configuration Controlled around B.S.



2008 Planned Zone (4890)  
No Storage or Supply @ OHM  
High Pressures in Lower OHM  
OHM relies on B.S. P.S. until new high tank built  
All Supply & Storage near B.S.  
Long distance to move water to OHM  
No Parallel Pipes

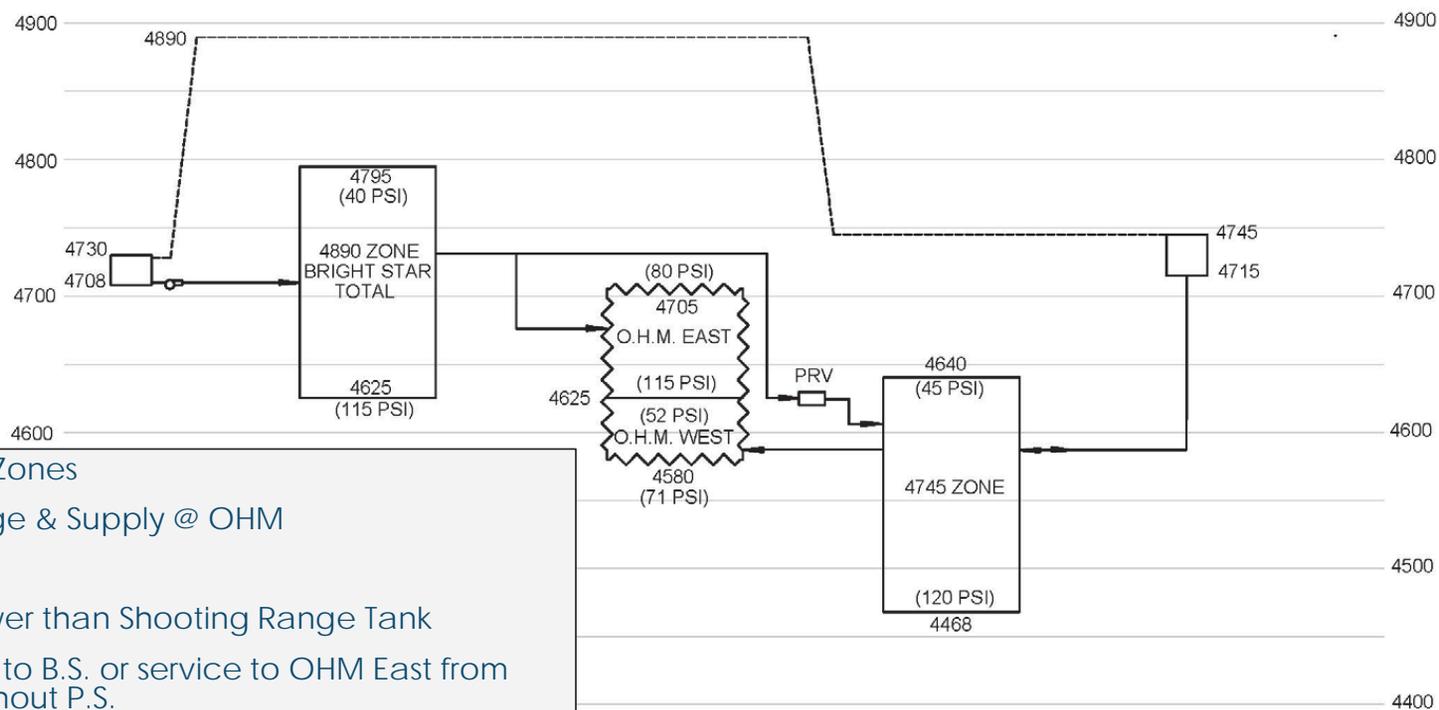


4890 and "Special" 4835  
OHM Zones



- Creates "Special" 4835 Zone for OHM
- Creates Storage & Supply @ OHM
- Requires PRV
- Can Back-Feed BS from OHM with PRV Bypass
- S.R. Tank Exercised Fairly Well
- OHM Does not Rely Entirely on B.S. Pump Station
- No Parallel Pipes

## Split Zones in OHM



### Planned 2008 Zones

Creates Storage & Supply @ OHM

Requires PRV

OHM Tank Lower than Shooting Range Tank

No Back-Feed to B.S. or service to OHM East from OHM West without P.S.

Maximizes Zonal Divisions

OHM Tank Exercised Well

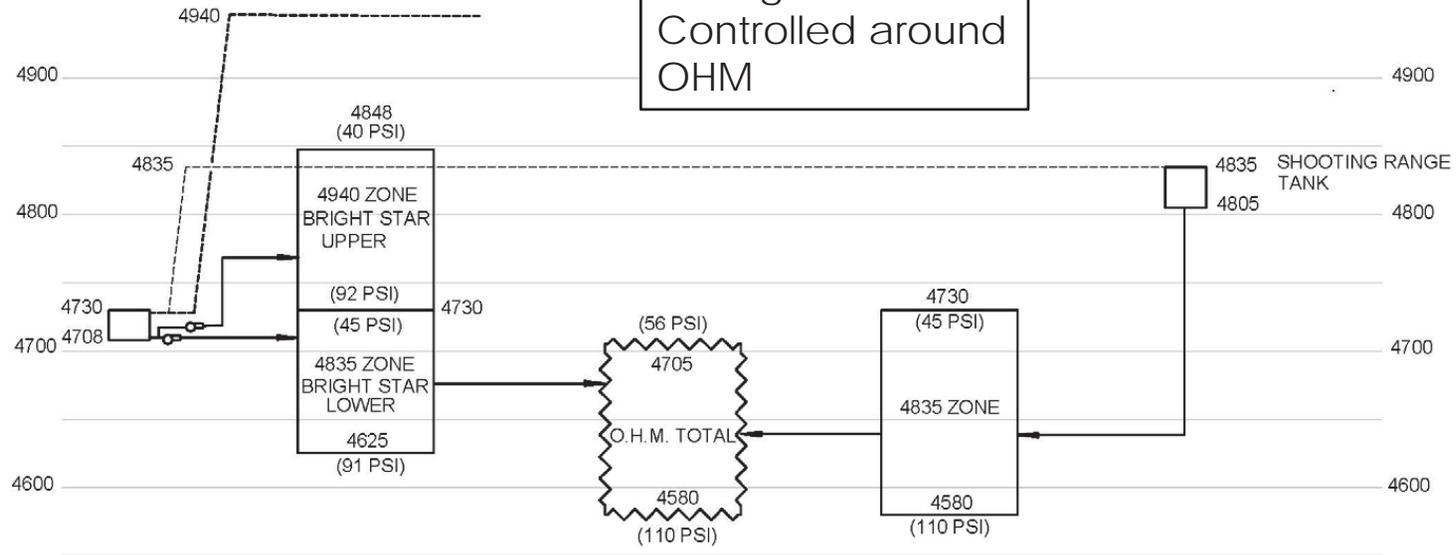
OHM East Relies Entirely on B.S. Pump Station

Requires Parallel Pipes in OHM

3

# Split Zones in Bright Star

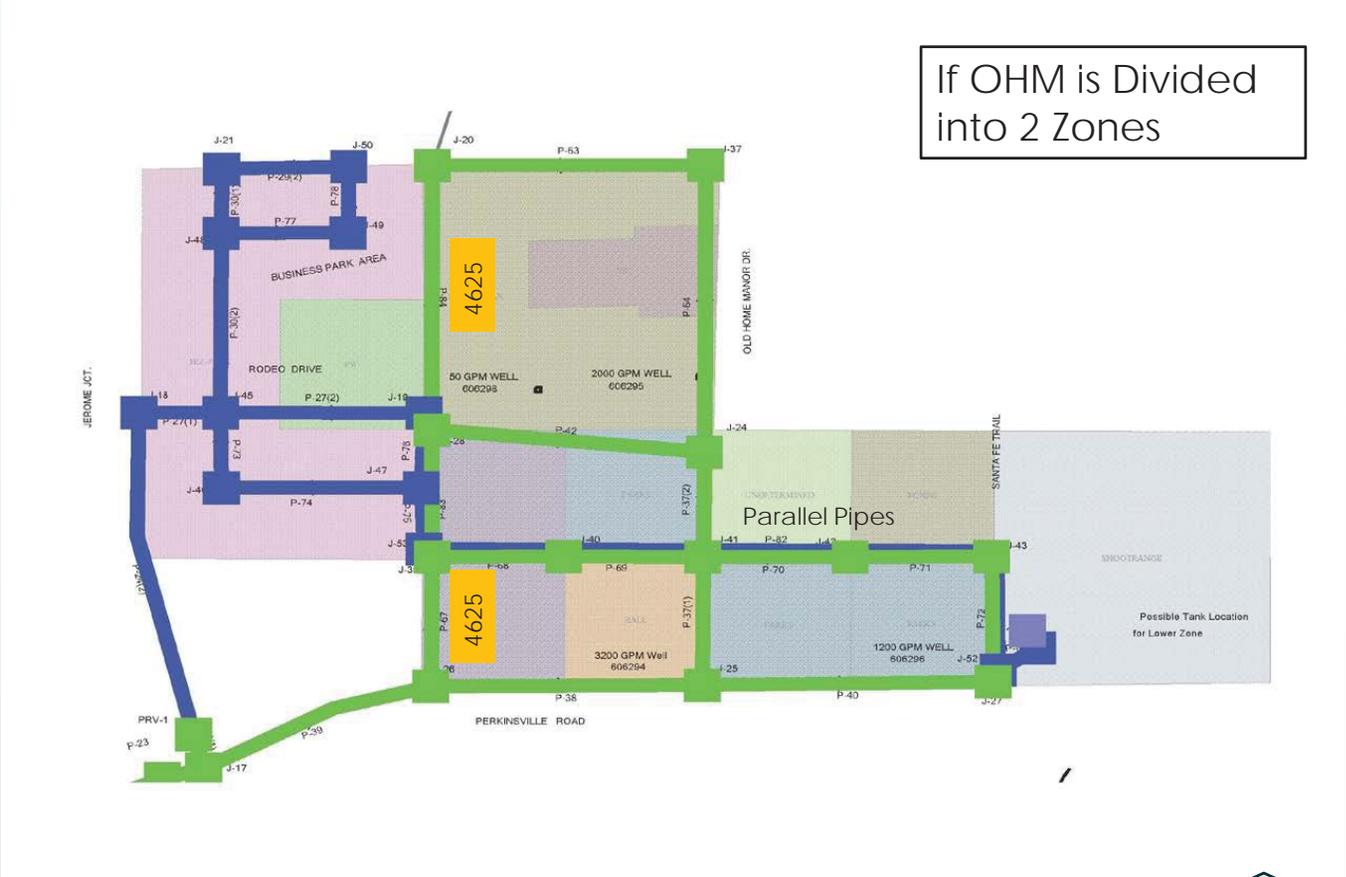
Zone Configurations Controlled around OHM



- Creates 2 Zones in B.S.
- Creates Higher Zone (4940) for Higher El. Development
- Creates Storage & Supply @ OHM
- Requires New P.S. in B.S.
- Can Back-Feed BS from OHM
- S.R. Tank Exercised Fairly Well
- OHM Does not Rely Entirely on B.S. Pump Station
- Requires Parallel Pipes in B.S.

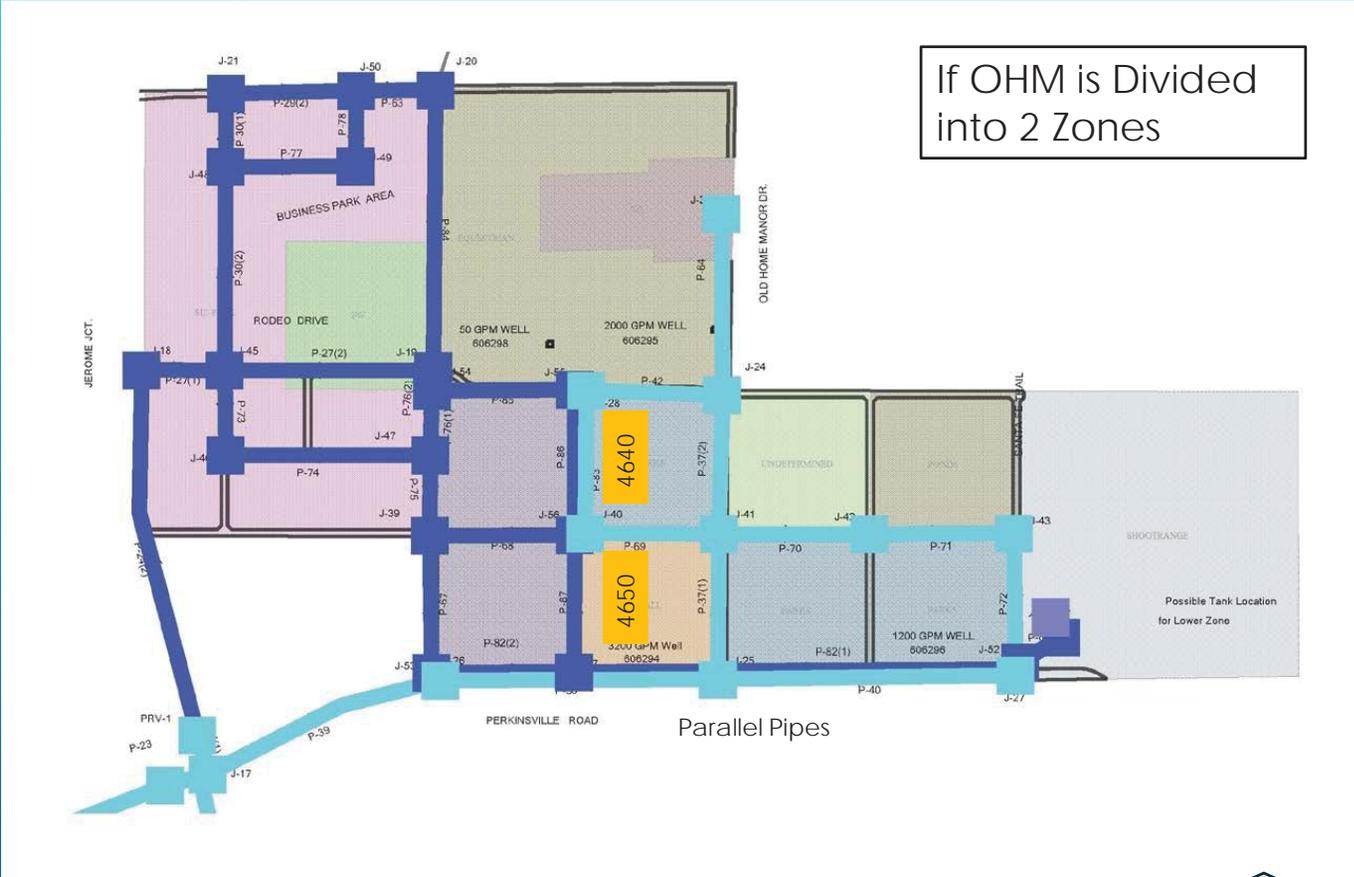
Zone Boundary @ 4625

If OHM is Divided into 2 Zones



Zone Boundary @ 4640 ~ 4650

If OHM is Divided into 2 Zones



TOWN OF CHINO VALLEY  
Integrated Water Master Plan and Capital Improvements Plan  
for Old Home Manor  
Civiltec Project No. 2020706



**MINUTES**

**Meeting Date:** November 23, 2020  
**Meeting Time:** 10:00 AM  
**Meeting Location:** Town of Chino Valley Council Chambers  
**Meeting Name:** CIP Development Priorities Meeting  
**Prepared By:** Richard Aldridge, PE, Civiltec Branch Manager

**This was a site meeting with the following attendees:**

Mark Holmes, Town Project Manager Frank Marbury, Town Public Works Director	Richard Aldridge, Civiltec Prescott Branch Manager
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**Meeting Comments Summary:**

**Purpose:** To discuss the IWMP project priorities and phasing with the primary focus to be on the development of the Business Park parcels adjacent and south of Rodeo Drive and to provide access and utilities to the RV Park in the initial 5-Year CIP plan.

The creation of a special district for the development of Old Home Manor is currently being considered by the Town. Note that the "RV Park Roadway" is the roadway adjacent to the west RV Park boundary between Rodeo Drive and Perkinsville Road.

**Priority 1, Business Park Development – Rodeo Drive:**

Phase 1 would be to complete the Rodeo Drive construction plans that are currently at 60% and be ready to bid the project in mid-January 2021.

**Priority 2, RV Park Development (north end):**

Phase 2 would be to complete the design and construction of Rodeo Drive to the north end of the RV Park Roadway, including roadway, drainage, and utility extensions that will provide service to the RV Park. The roadway rural section would include a 24' wide asphalt roadway (4" AC/9" ABC, matching the Jerome Junction and 1<sup>st</sup> Phase Rodeo Drive pavement section) with 5' asphalt shoulders (3" AC/6" ABC). The curves would be softened near the RV Park to a smoother realignment of Rodeo Drive. This would also include the off-site sewer extension from Jerome Junction following the sewer force main east toward the WWTP, then south to Rodeo Drive.

All roadway designs, with the exception of the currently designed Rodeo Drive (Priority 1) that includes curbs and sidewalks, will be designed to the rural section described above.

**Priority 3, Business Park South Loop:**

Phase 3 would include construction of the roadway, water and sewer utilities south from the Phase 1 Rodeo Drive intersection, then east to the RV Park Roadway and then north to complete the RV Park Roadway loop back to Rodeo Drive.

**Priority 4, RV Park Roadway South Extension to Perkinsville Road:**

Phase 4 would include the completion of the RV Park Road from the south loop to Perkinsville Road with utilities and drainage improvements. The rural section would continue to be used for this construction.

**Priority 5, Rodeo Road Extension to Old Home Manor:**

Phase 5 would include construction of Rodeo Drive east from the RV Park to Old Home Manor including the roadway, drainage and utilities from the Phase 2 & 3 Rodeo Drive intersection. This also anticipates using the rural section.

**Other Items:**

Civiltec to discuss the annual construction budgets for Old Home Manor improvements with Joe Duffy, Finance Director, for realistic funding expectations to use in preparation of the phased CIP plan for the project. Funding could include debt service, CIP set asides and general fund expenditures.

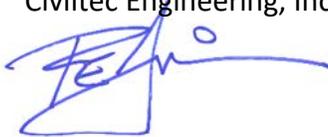
The Town is considering a small potable water storage tank to be located at the College Well site for additional supply to the Equestrian Center.

The College Well would be tied to the new IWMP water tank being planned near the air park/shooting range.

The CIP plan will include exhibits based on the final phased development plan.

Other report recommendations should consider the potential service areas beyond Old Home Manor based on the pressure zones created and the evolution of an IWMP that extends beyond the Old Home Manor area for a Town-wide evaluation of the water system.

Prepared by:  
Civiltec Engineering, Inc.



Richard Aldridge, PE  
Prescott Office Branch Manager

TOWN OF CHINO VALLEY  
Integrated Water Master Plan and Capital Improvements Plan  
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Civiltec Project No. 2020706

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**MINUTES**

**Meeting Date:** December 9, 2020  
**Meeting Time:** 3:00 PM  
**Meeting Location:** Town of Chino Valley Council Chamber  
**Meeting Name:** IWMP Landscaping & Draft Ordinances Workshop  
**Prepared By:** Richard Aldridge, PE, Civiltec Branch Manager

**Attendance:**

Mark Holmes, Mark Holmes, LLC  
Frank Marbury, Town of Chino Valley  
Josh Cook, Town of Chino Valley  
Rick Shroads, Civiltec Engineering, inc.  
Celia van der Molen, Sketch Landscape Architecture Studio, LLC

**Agenda Items:**

**1. General Project Status Overview**

- Workshops and miscellaneous meetings and video conferences have been completed for the water system, water resources, recharge basins and operation, CIP planning, water pressure zone planning and general project meetings for Town growth rates, overall OHM development planning and the RV Park conceptual utilities and roadway planning.
- Development of the Old Home Manor IWMP draft report continues.
- Landscaping and Draft Ordinances are being discussed today.

**2. IWMP Landscaping Concepts Review**

- The need to install native low water planting:
  - Review of Prescott AMA approved plant list
  - Revised for Chino Valley Plant List
  - Review of native plant images
- Rainwater harvesting: Passive and Active
- Review of proposed concepts for OHM – plan

**3. Town of Chino Valley Draft Landscaping Ordinances Review**

- Review of exiting landscape ordinance
- Proposed revisions
- OHM Landscape Standards- draft

## **OLD HOME MANOR LANDSCAPE WORKSHOP MINUTES**

### **Agenda Item 1:**

- A general review of the overall project status was made.
- Celia presented the overall plan showing the current concept overlays of the business park, equine center and RV park for general review and discussion (Image A)

### **Agenda Item 2: IWMP Landscape Concept Review**

- The need to install native low water planting was discussed. Celia presented the current ADWR Plant List (List 1) and the recommended modified for Chino Valley plant list (List 2)
  - a. Celia reviewed the water use zones and local zones listed on page 3 of the ADWR list. The importance of implementing plant material that is low water (Zone 1) and is appropriate for Chino Valley (Local Zone G- Grassland) was discussed. Images showing plants included in this group were show (Images B,C &D)
  - b. Josh expressed concerns about using Junipers due to high pollen/allergies.
  - c. Celia explained that Junipers are native to the grassland zone and one of the few trees listed under Zone 1 (low water). She discussed that if the goal is to lower and/or eliminate water use associated with landscape then it is important to only select plants from this category.
  - d. Josh discussed the idea of eliminating landscape completely.
  - e. Celia explained that the removal of all plant material is actually has a higher maintenance cost due to the continuous methods required for weed removal. She explained that little to no maintenance is required after native plant material is reintroduced and established. She also stated that native plant material has many benefits for local wildlife.
  - f. Josh asked for a detailed cost comparison showing the benefits of native landscape versus no landscape.
- Review of Rainwater Harvesting: Passive and Active
  - a. Celia presented the idea of including zones that would allow for higher use plant material located within the interior of the property (Diagram 1). Zone 1 would be limited to native low water use plant material that could be removed from irrigation after 3 to 5 years. Zone 2 could include plant material that requires higher amount of supplemental water, if it is fed by a rainwater harvesting system.
  - b. Celia presented an image showing typical passive and active rainwater harvesting methods (Image E) and an image of typical plant material that could be located within the interior zone (Image F)
  - c. Mark discussed that underground tanks may be preferred so they are not an eye sore.

- d. Josh expressed concerns that more detail was needed on the benefits of rainwater harvesting. He suggested including cost comparisons for landscape plan material, maintenance and irrigation equipment.
  - e. Celia discussed the importance of installing an automatic irrigation system when for all plant material until plants are established (3 to 5 years). After they are established the plants can be removed from the system. Interior plants requiring higher water supplemental water would be fed from both passive and active rainwater harvesting systems.
  - f. Frank discussed the benefits of installing a separate irrigation meter which would allow the Town to more easily monitor landscape water use.
- Review of Proposed Concepts for OHM
    - a. The overall concept map (Image A) was again reviewed and discussed to show the current overland flow, elevation change and adjacent land uses.

**Agenda Item 3:**

Town of Chino Valley Draft Landscape Ordinance Review

- Review of existing landscape Ordinance
  - a. Celia presented the existing TOCV Landscape Ordinance (List 3) and a list of proposed revisions (List 4) including a proposed bufferyard section (Image G)
  - b. Josh stated that there is a separate landscape ordinance specific to the business park, found under UDO Chapter 3, 3.18, that already includes the large bufferyards and screening methods
  - c. Celia asked how the separate landscape ordinances with be addressed when adjacent to other land uses within OHM (i.e., equestrian park next to business park)
  - d. Rick suggested a possible overlay
  - e. Mark suggested eliminating the landscape ordinance for the business park and establishing a landscape requirements specific to OHM
  - f. The group discussed the importance of keeping the landscape ordinance and/or standards simple and easy to establish
- OHM Landscape Standards Draft
  - a. Celia presented a quick review of the proposed landscape standards for OHM
  - b. Mark stated that Josh made multiple comments on the document and that he and would send to Celia for review and coordination

## **OTHER COMMENTS**

1. The water/sewer subcommittee was not in attendance. An overview of the meeting will be included with the Water Resources Workshop.
2. Frank mentioned he would like to see water quality examples, pilot/demonstration projects in Old Home Manor for the public to see. Possibly elements of the park areas or RV park areas. This could include first-flush treatment basins, bioswales, filtration devices or other BMP's.
3. Business park area – developers will have landscaping requirements for external areas (such as ribbon areas surrounding a building/parking area) that will require very low water use and plant species that would be irrigated for about 3 years, then be able to survive without irrigation after that period. Identified as zone 1 on Figure 1. The plants would need to be category 1 water use (0-4 inches annually). Rainwater harvesting will be utilized more in zone 2 on Figure 1 and be both passive and active. Passive harvesting will help supplement and partially replace drip irrigation systems. It is planned that these zone 2 plantings would also be able to be self-sufficient after approximately 3 years.
  - a. Zone 1 (strip areas) typically would be comprised of grasses and native trees/accents. Josh mentioned junipers historically have been somewhat troublesome due to high pollen loads affecting allergies, and high maintenance needs. Celia mentioned they are good candidates for low water use trees, and since they are native to the Chino Valley area, maintenance can be minimal.
  - b. Hydroseeded areas would be for greenbelt type areas, and not irrigated.
  - c. A discussion ensued regarding who would be responsible for installing and maintaining landscape areas within the Business park. Possibilities include :
    - i. Town installs, maintains, irrigates
    - ii. Town installs, lessee maintains, irrigates
    - iii. Lessee installs, maintains, irrigates
    - iv. Or other combinations

The ultimate decision relative to this question will be discussed by staff with legal advice from Town Counsel.

- d. Discussed having dedicated irrigation meters (separate from building supply meters) for the Business park area. Frank verified that current irrigation meters do have meter fees (connection fees and monthly fees) associated with them. There was a suggestion to investigate the possibility of waiving these fees for Old Home Manor. Having separate landscape irrigation meters would allow for accurate assessments of use – valuable from a quantification and planning point of view.
- e. Discussed preparation of a cost/benefit analysis for rainwater harvesting systems and landscaping vs. no landscaping. Celia mentioned that landscaped areas require less maintenance than if not landscaped due to weed growth. Mark asked that both of these elements be supported by a C/B ratio analysis.
- f. Current requirements say 65% of water used by business park type areas must go to sewer system recharge basins.

4. Discussed how this exercise would fit/dovetail with the existing requirements outlined in the UDO. The findings for this exercise should not conflict with any element of the UDO requirements.
5. Discussed how these requirements could be enforced. Possibly create a landscape overlay (ordinance?) for Old Home Manor that is referenced in the UDO to point developers (or Town) to this document for requirements which may be stricter (but not less strict) than current UDO requirements.
6. Discussed allowing the use of 1-gallon plants instead of current requirement of 5-gallon plants. This would require modification to the existing UDO. Celia said some plant types take hold better when planted smaller and some plants do better when planted more fully grown. If 1- gallon plants are considered, it would have a direct effect on the Cost/Benefit study for landscaping.
7. Mark brought up the idea of having a Town-generated handout (that the Town follows as an example-setter) for a simplified method of providing information to developers subject to the Old Home Manor requirements. Josh mentioned that landscaping site plans will be subject to approval by Town Staff and checked for adherence when installation occurs.
8. Mark mentioned landscaping should not be “linear” but undulated and mimic natural conditions relative to berm construction, plant placement etc.

#### **END OF OLD HOME MANOR LANDSCAPE WORKSHOP MINUTES**

#### **ATTACHMENTS**

Not all attachments from the meeting are included. The Technical Memo will include plant lists, water use zones, rainfall harvesting methods and other exhibits as modified based on the results of the meeting and Town Staff review comments.

#### **Attachments Included with these Minutes:**

- Image A, Overall Concept Plan for Old Home Manor (1 Page, includes RV Park and Equestrian Park)
- Draft Landscape Standards, 12-8-2020 (11 Pages)
- Draft Revisions to Landscape Ordinance, 12-7-2020 (3 pages)
- Street Frontage Bufferyard Exhibits (1 page)
- Chino Valley Modified ADWR Low Water Plant List for the Prescott AMA (2 pages) – this was not discussed at the meeting but is attached for reference.



# CONCEPTUAL PLAN OVERLAY REVIEW



## PROPOSED LANDSCAPE STANDARDS FOR OLD HOME MANOR (DRAFT)

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- A. Purpose
- B. About
- C. Grading
- D. Planting
- E. Buffer-yards
- F. Plant Material Sizes and Quantities
- G. Groundcover Treatments
- H. Temporary Irrigation and Rain Water Harvesting
- I. Maintenance
- J. Use of Pesticides and Herbicides

### Appendixes:

- A. Modified for Chino Valley Plant List
- B. Hydroseed Applications and Requirements

## NARRATIVE

### Landscaping History, Conflicts and Solution

#### History

On average, outdoor landscapes are responsible for consuming nearly 70 percent of the water used on an individual property. Land owners have become accustomed to installing plant material and lawns that are unsuitable for our region. The Arizona Department of Water Resources (ADWR) has worked to develop a detailed and specific low water use and drought tolerant plant list for the Prescott Active Management Area. This list has been adopted by the local governments and has become a key resource for landscape architects designing throughout the quad-city areas.

#### The Conflict

Although this is an important step in the right direction, previous experience has demonstrated that most jurisdictions take a cursory review of the landscape construction documents and fail to follow through with inspecting the plant material and irrigation post installation. This can allow the developers and/or landscape contractors to make convenient yet inappropriate plant species and irrigation equipment substitutions during the construction process. The exchanged material is often not selected from the approved list resulting in the need of a permanent irrigation source.

#### The Solution

In this early stage of economic development The Town of Chino Valley has the ability to set a valuable landscape precedent for any new construction. It must be understood that requiring the installation of low water native plant material is **simple and cost effective**. In addition, it has the ability to support thoughtful growth while protecting Chino Valley's sense of place and desired rural image.

### **A. Purpose**

The purpose of the Old Home Manor Landscape Design Ordinance is to establish landscape standards that will protect and enhance the natural beauty of Chino Valley while greatly reducing and/or eliminating high water use associated with outdoor landscape areas. This objective will be achieved by utilizing the following methods:

- a. Greatly reduce outdoor water usage by utilizing a restricted plant palette that reflects and compliments the native plant material of our area;
- b. Require that native plants be placed on temporary irrigation and self-sustainable within 3 to 5 years
- c. Encourage the use of passive and active rainwater harvesting systems to irrigate plant zones that may require supplemental irrigation during extend droughts;
- d. Establish buffer-yard requirements that:
  - a. Enhance the rural image desired by Chino Valley
  - b. Screen unsightly elements such as large parking lots and utilities
  - c. Allow for passive rainwater harvesting opportunities
- e. Simplify the design process to help eliminate developer and owner budgetary concerns that may be incurred with alternative landscape plans and irrigation methods

### **B. About**

Chino Valley sits at an average elevation of 4,700 Feet and is designated as Grassland (G) by the ADWR. It receives an average annual rainfall of 10–14 inches per year with the majority of the precipitation between July and August, during the monsoon.

### **C. Grading**

Prior to grading operations taking place the developer/site contractor shall remove and stockpile the top 4-inch layer of existing native topsoil. This topsoil is full of organic material that is necessary for the survival of native hydroseed application required for retention basins and open space areas. Native topsoil not utilized for the site shall be donated to the Town of Chino Valley for use in parks and public open space located throughout Old Home Manor.

### **D. Planting**

The selection of proper plant material is key in eliminating landscape water use. Native plant material also provides a beautiful and colorful landscape that offers homes and food to the local wildlife.

The majority of landscape areas, including open space and buffer-yards should be reflective of Chino Valley's natural surroundings. It should feel like the building was simply dropped into the existing environment.

Plants within these areas should be selected from the modified for Chino Valley ADWR Plant List, provided at the end of this section. These plants have been selected because they are;

1. Native species found throughout the grassland and transition (4,400 to 6,000 Ft) areas
2. Require little to no supplemental irrigation during the dry season

Some built environments, such as parking lots and courtyards, may require species that are not on the modified list. These species have slightly higher water-use demands and include appropriate shade trees and shrubs that are more desirable for these applications. In these instances, plants can be selected from the full ADWR Low Water/Drought Tolerant Plant List for the Prescott Active Management Area. [http://www.prescott-az.gov/wp-content/uploads/2016/07/plant\\_list.pdf](http://www.prescott-az.gov/wp-content/uploads/2016/07/plant_list.pdf)

Two planting zones are proposed for any new development:

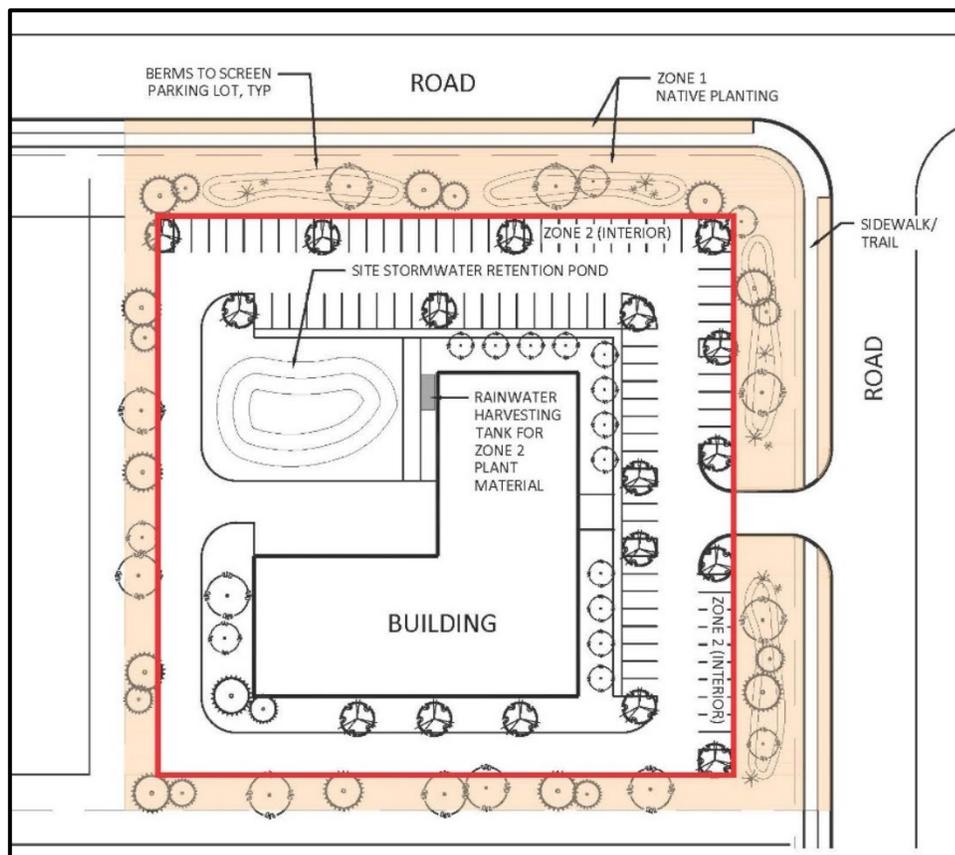
**Zone 1: Exterior landscape areas including street frontage, buffer-yards and open space**

- a. Plant material to be selected from the Modified for Chino Valley Plant list
- b. Plant material shall be temporarily irrigated with an automatic system for 3 to 5 years, becoming 100% sustainable thereafter. (Refer to Irrigation and Rainwater Harvesting Section)

**Zone 2: Interior landscape areas including parking lot islands, courtyards and entries**

- c. Plant material to be selected from the complete ADWR Prescott AMA list
- d. Plant material shall be temporarily irrigated with an automatic system for 3 to 5 years, and supplemented with an approved rainwater harvesting system thereafter. (Refer to Irrigation and Rainwater Harvesting Section)

**Figure 1: Planting Zones**



**E. Buffer-yards**

Buffer-yards are designated landscape areas located between the property line and/or public-right-away (ROW) and the built environment (buildings, parking lots, drives).

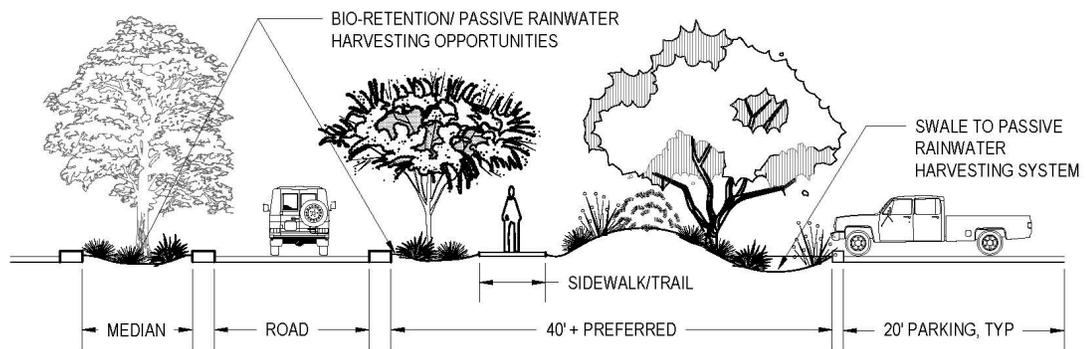
Deeper buffer-yards play a significant role in maintaining a rural atmosphere. They allow for adequate earth berms and vegetation which aid in screening undesirable view associated with commercial developments.

Buffer-yards are designated as **Zone 1** and should be planted with native plant material and be self-sustaining within 3 to 5 years.

Buffer-yards should include earth berms to screen parking lots and drives from public roads, trails and sidewalks. The desired berm height is 3 ft with a slope of 4:1 or less and a maximum slope of 3:1. Slopes greater than 3:1 are not permitted.

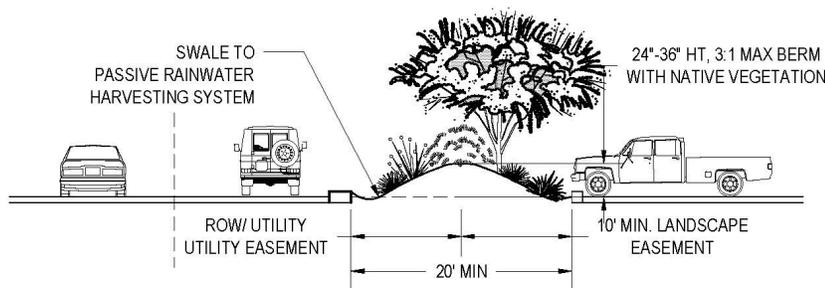
When space allows, buffer-yards should include passive rainwater harvesting methods to provide supplement water to plant material.

**Figure 2: Buffer-yards**



**STREET FRONTAGE BUFFERYARD WITH TRAIL**

NOT TO SCALE



**STREET FRONTAGE BUFFERYARD WITHOUT TRAIL**

NOT TO SCALE

**F. PROPOSED Plant Material Sizes and Quantities**

Plant material quantities and sizes for OHM are as follows:

Planting Quantities and Sizes		
Location	Trees	Shrubs
Street Frontage/ ROW	(1) 24 inch box per 20 LF	(1) 5 gallon per 50 SF
Interior Landscapes including	(1) 15 gallon per 2,300 SF	(1) 1 gallon per 50 SF
Parking Islands	(1) 24 inch box per island	(2) 5 gallon per island

**Plant Calculation Tabulation:**

The plant material tabulation shall be completed by the landscape architect/designer and included on the cover sheet of the landscape plans for review and approval.

Plant Material Calculations				
Total SF Landscape Area:				
Total LF Street Frontage:				
Location	Trees Required	Trees Provided	Shrubs Required	Shrubs Provided
Street Frontage/ ROW				
Interior Landscape				
Parking Islands				

**G. Groundcover Treatments**

Consistent groundcover materials are important to the overall aesthetic look of a space. Groundcover application for OHM is as follows:

1. Open Space and Retention Ponds  
Open space areas and retention basins shall be treated with the Town of Chino Valley Native Hydroseed Mix (Appendix B) and have a 4-inch base layer of native topsoil excavated from the site (see Section C: Grading). Natural weed removal methods must be used for this application (see Section I: Maintenance, and Section J: Use of Pesticides and Herbicides)
2. Buffer-yards  
Buffer-yard shall be treated with a 2-inch thick layer of “Native Varnish” consisting of a 3-inch minus landscape rock **{insert approved color}**
3. Interior landscape areas/ Zone 2  
Interior landscape areas associated with Zone 2 shall be treated with a 2-inch thick layer of 1-inch screened decorative landscape rock **{insert approved color}**

**Note: weed fabric and/or pesticides are not permitted within retention ponds, open space areas, buffer-yards or bio-retention areas.**

## H. Temporary Irrigation and Rainwater Harvesting

Landscape irrigation should be designed with the intent that all plant material can satisfy the following conditions:

1. Self-sustainable after 3 to 5 years
2. Require only supplemental irrigation from rainwater harvesting techniques thereafter

### Temporary Irrigation

- All irrigation demands shall be minimized through drought tolerant plant selection and appropriately timed application schedules.
- Initial plant irrigation shall be supplied by potable water until plants are established. These temporary irrigation systems shall include a separate irrigation backflow prevention device and include an automatic controller with rain-sensor and automatic drip irrigation valves.

*Developments applying for a separate irrigation water meter will qualify for a water meter impact fee refund once plants are established and the irrigation water meter use is deemed unnecessary.*

### Rainwater Harvesting

The State of Arizona allows rainwater that is collected from rooftops and parking lots to be stored and redistributed for irrigation purposes.

Rainwater harvesting shall be required for any development selecting plants for **Zone 2** from the full ADWR list. These methods include:

1. Active Rainwater Harvesting by use of rainwater harvesting tank and pump
2. Passive Rainwater Harvesting by means of bio-retention

Both practices are encouraged to supplement both Zone 1 and Zone 2 landscape areas.

Notes:

Turf areas used for parks, playing areas or sports fields shall be supplementally irrigated by harvested rainwater, unless it is not available, in which case the use of potable water is allowed

### I. Maintenance Required

1. Maintenance of all landscaping shall be the responsibility of the applicant, lessee, heirs, assigns, agent, homeowners' association, or other liable entity of the property and shall consist of regular watering, pruning, mowing, fertilizing, weed removal, and the removal and replacement of dead plants, broken or unusable irrigation equipment and landscape features. **This shall include maintenance of approved landscaping in the public right-of-way.**
2. Native plant material shall be kept in its natural form and shall not be sheared or trimmed in an unnatural appearance such as a box or hedge. Plant material that is inappropriately maintained will be required to be replaced by the Owner at the Owner's expense.
3. The applicant or liable entity in control of any private premises shall at all times maintain the premises free of litter and weeds in compliance with the *Town Code*.
4. Maintenance of approved landscaping in rights-of-way, including street trees, shall be maintained in compliance with *the Town Code*.

## **J. Use of Pesticides and Herbicides**

### **General**

If pesticides and herbicides are used in landscape areas, organic pest control methods are preferred over synthetic pesticide use. Pesticides shall be applied in compliance with the Arizona Department of Environmental Quality (ADEQ) "Groundwater Protection List" and the "Best Management Practices" for pesticide and herbicide application. Pesticides are not permitted within areas treated with hydroseed.

### **Riparian corridor watercourse, wetland, or storm water drainage**

Pesticides, herbicides, and fertilizers shall not be applied within 50 feet of a riparian corridor watercourse, wetland, or stormwater drainage except as allowed by the Director for the following circumstances and when pesticide or herbicide applications will be done by a City approved applicator:

1. The State or local Health Department recommends or directs their use to address a threat to public health;
2. A county, state, or federal agency with jurisdiction directs their use for control of a State-listed noxious weed or plant pests covered by the Arizona State Department of Agriculture plant pest program and non-chemical alternatives have been evaluated and deemed ineffective;
3. The Director finds that the use of pesticides and herbicides will have no adverse impact to fish and wildlife. Such a determination may be in the form of best management practices or an integrated pest management plan;
4. The use of a herbicide to control invasive plants would have less overall environmental impact than other control strategies; or
5. There is a serious threat to public safety, health, or the environment.

**APPENDIX A: PROPOSED PLANT LIST FOR OLD HOME MANOR**

The following list is a modified version of the ADWR Low Water Use/Drought Tolerant Plant List for the Prescott Active Management Areas. This list contains native and naturalized plant material which require little to no water after established and that are reflective of the grasslands of Chino Valley. The full list can be viewed at [http://www.prescott-az.gov/wp-content/uploads/2016/07/plant\\_list.pdf](http://www.prescott-az.gov/wp-content/uploads/2016/07/plant_list.pdf)

<b>Water Use</b>	<b>Botanical Name</b>	<b>Common Name</b>	<b>Local Zone</b>	<b>Origin</b>
<b>Native Trees</b>				
1	<i>Celtis occidentalis</i>	Western Hackberry	G,T,P	W U.S.
1	<i>Chilopsis linearis</i>	Desert Willow	G	SW U.S.
1	<i>Juniperus deppeana</i>	Alligator Juniper	G,T,P	SW U.S.
1	<i>Juniperus monosperma</i>	One-seed Juniper	G,T,P	SW U.S.
1	<i>Juniperis osteosperma</i>	Utah Juniper	G,T,P	SW U.S.
1	<i>Juniperus scopulorum</i>	Rocky Mountain Juniper	G,T,P	SW U.S.
1	<i>Quercus arizonica</i>	Arizona White Oak	T,P	SW U.S.
1	<i>Quercus emoryi</i>	Emory Oak	T,P	SW U.S.
<b>Shrubs</b>				
1	<i>Acacia greggii</i>	Catclaw	G,T	W U.S.
1	<i>Arctostaphylos</i> spp.	Manzanita	T,P	W U.S.
1	<i>Artemisia frigida</i>	Fringed Sage	G,T,P	W U.S.
1	<i>Artemisia ludoviciana</i>	Prairie Sage	G,T,P	W U.S.
1	<i>Artemisia 'Powis Castle'</i>	Powis Castle	G,T,P	Hybrid
1	<i>Artemisia tridentata</i>	Big Sagebrush	G,T,P	W U.S.
1	<i>Atriplex canescens</i>	Four-wing Saltbush	G,T,P	W U.S.
1	<i>Caesalpinia gilliesii</i>	Mexican Bird of Paradise	G,T	S Am
1	<i>Caragana arborescens</i>	Siberian Peashrub	G,T,P	Asia
1	<i>Ceanothus fendleri</i>	Fendler's Buckbrush	T,P	W U.S.
1	<i>Ceanothus greggii</i>	Mohave Buckbrush	G,T,P	W U.S.
1	<i>Cercocarpus betuloides</i>	Mahogany	G,T,P	W U.S.
1	<i>Ceanothus integerrimus</i>	Deer Brush	G,T,P	W U.S.
1	<i>Cercocarpus ledifolius</i>	Curl-leaf Mountain Mahogany	G,T,P	W U.S.
1	<i>Cercocarpus montanus</i>	Mountain Mahogany	G,T,P	W U.S.
1	<i>Chamaebatiaria millefolium</i>	Fernbush	G,T,P	W U.S.
1	<i>Ericameria nauseosa (Chrysothamus)</i>	Gray Rabbit Brush	G,T,P	W U.S.
1	<i>Elaeagnus pungens</i>	Silverberry	G,T	Asia
1	<i>Ephedra vividis</i>	Mormon Tea	G,T	SW U.S.
1	<i>Ericameria laricifolia</i>	Turpentine Brush	G,T	SW U.S.
1	<i>Fallugia paradoxa</i>	Apache Plume	G,T,P	SW U.S.
1	<i>Krascheninnikovia lanata</i>	Winterfat	G,T,P	W U.S.
1	<i>Garrya wrightii</i>	Wright's Silk Tassel	T,P	SW U.S.
1	<i>Maclura pomifera</i>	Osage Orange	G,T,P	S U.S.
1	<i>Mahonia fremontii</i>	Fremont Barberry	G,T	SW U.S.

1	<i>Purshia mexicana</i>	Cliffrose	G,T,P	SW U.S
1	<i>Quercus turbinella</i>	Scrub Live Oak	G,T,P	SW U.S
1	<i>Rhamnus californica</i>	California Buckthorn	G,T,P	SW U.S
1	<i>Rhamnus crocea</i>	Hollyleaf Buckthorn	G,T	SW U.S
1	<i>Rhus aromatica</i>	Gro-low Fragrant Sumac	G,T,P	E U.S.
1	<i>Rhus glabra</i>	Smooth Sumac	G,T,P	N Am
1	<i>Rhus trilobata</i>	Three Leaf Sumac	G,T,P	SW U.S
1	<i>Robinia neomexicana</i>	New Mexico Locust	G,T,P	SW U.S.
1	<i>Spartium junceum</i>	Spanish Broom	G,T,P	Med

#### Accents

1	<i>Agave parryi</i>	Parry Agave	G,T,P	SW U.S
1	<i>Dasyllirion wheeleri</i>	Desert Spoon	G,T,P	SW U.S.
1	<i>Hesperaloe parviflora</i>	Red or Yellow Yucca	G,T,P	N Mex
1	<i>Nolina microcarpa</i>	Beargrass	G,T,P	SW U.S.
1	<i>Optunia spp</i>	Native Prickly Pear	G,T,P	SW U.S.
1	<i>Yucca Spp</i>	Yucca		

#### Groundcover

1	<i>Mahonia repens</i>	Creeping Oregon Grape	T,P	W U.S.
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#### Grasses - Cool Season (prefer supplemental irrigation January - March)

1	<i>Aristida purpurea</i>	Purple Three-awns	G,T,P	SW U.S.
1	<i>Festuca glauca</i>	Blue Fescue	G,T,P	Eurasia
1	<i>Koeleria cristata</i>	Junegrass	G,T,P	W U.S.
1	<i>Nassella tenuissima</i>	Mexican Feather Grass	G,T,P	SW U.S.
1	<i>Pascopyrum smithii</i>	Western Wheatgrass	G,T,P	W U.S.

#### Grasses - Warm Season (Prefer supplemental irrigation June - August)

1	<i>Bothriochloa barbinodis</i>	Cane Beardgrass	G,T,P	SW U.S.
1	<i>Bouteloua curtipendula</i>	Side-Oats Grama	G,T,P	SW U.S.
1	<i>Bouteloua gracilis</i>	Black Grama	G,T,P	SW U.S.
1	<i>Bouteloua hirsuta</i>	Hairy Grama	G,T,P	SW U.S.
1	<i>Eragrotis intermedia</i>	Plains Lovegrass	G,T,P	SW U.S.
1	<i>Helictrotrichon sepmervirens</i>	Blue Oat Grass	G,T,P	Eurasia
1	<i>Andropogon scoparius</i>	Little Bluestem	G,T,P	N Am
1	<i>Lycurus phleoides</i>	Wolftail	G,T,P	SW U.S.
1	<i>Muhlenbergia capillris 'Regal Mist'</i>	Regal Mist Deergrass	G,T,P	SE U.S.
1	<i>Muhlenbergia emersleyi</i>	Bullgrass	G,T,P	SW U.S.
1	<i>Muhlenbergia lindeimeri 'Autumn Glow'</i>	Autumn Glow Muhly	G,T,P	SW U.S.
1	<i>Muhlenbergia rigens</i>	Deergrass	G,T,P	SW U.S.
1	<i>Sporobolus airoides</i>	Alkali Dropseed	G,T,P	SW U.S.

1	<i>Sporobolus cryptandrus</i>	Sand Dropseed	G,T,P	SW U.S.
1	<i>Sporobolus contractus</i>	Spike Dropsees	G,T,P	SW U.S.

**Perennials**

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1	<i>Gutierrezia sarothrae</i>	Snakeweed	G,T,P	SW U.S.
1	<i>Linum lewisii</i>	Blue Flax	G,T,P	SW U.S.
1	<i>Mirabilis multiflora</i>	Giant 4 O'Clock	G,T,P	SW U.S.
1	<i>Penstemon</i> spp	Penstemon	G,T,P	SW U.S.
1	<i>Perovskia atriplicifolia</i>	Russian Sage	G,T,P	SW U.S.
1	<i>Tetrandeum acaulis</i>	Angelita Daisy	G,T,P	SW U.S.
1	<i>Verbena rigida</i>	Verbena	G,T,P	SW U.S.
1	<i>Zinnia grandiflora</i>	Desert Zinnia	G,T,P	SW U.S.

**APPENDIX B: HYDROSEED APPLICATIONS AND REQUIREMENTS**

<b>TOWN OF CHINO VALLEY NATIVE HYDROSEED MIX</b>			
<b>Botanical Name</b>	<b>Common Name</b>	<b>Seed/Lb</b>	<b>Rate/Acre – PLS</b>
Aristida purpurea	Purple Three-awn	250,000	6.0
Bouteloua gracilis	Blue Grama	825000	2 to 3
Koeleria macrantha	Prairie Junegrass	2,315,400	1 to 2
Mulenbergia wrightii	Spike Muhly	1,000,000	1 to 3
Festuca arizonica	Arizona Fescue	500,000	2.0
Sitnian hystrix	Squirrel Tail	192,000	4.0
Sporobolus cryptandrus	Sand Dropseed	5,298,000	1 to 2
Bouteloua curtipendula	Sideoats grama	191,000	5 to 9
Elymus elymoides	Bottlebrush squirreltail	220,000	6 to 10
Elymus glaucus	Blue wildryl	134,500	12
Pascopyrum smittii	Western Wheatgrass	110,000	8 to 16
Poa fendleriana	Muttongrass	890,000	2 to 3
Sporobolus airoides	Alkalia Sacaton	1,758,000	2 to 3
<b>Forbs/Herbs (Wildflowers)</b>			
Heliomeris multiflora	Showy Goldeneye	1,055,000	1 to 2
Lupinus succulentus	Arroyo lupine	15,600	20 to 30
Penstemon eatonii	Eaton’s Penstemon	400,000	1 to 3
Oenothera elata	Yellow Evening Primrose	1,300,000	1

**HYDROSEED REQUIREMENTS**

1. HYDROSEEDING CONSISTS OF SCARIFYING THE SURFACE OF DISTURBED AREAS AND APPLYING A MIXTURE OF FIBER, SEED, FERTILIZER, AND STABILIZING EMULSION. CONTRACTOR / DEVELOPER SHALL UTILIZE THE TOCV APPROVED SEED MIX NOTED FOR RESTORATION UNLESS OTHERWISE DIRECTED BY THE ZONING ADMINISTRATOR.
2. PRIOR TO THE START OF CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL SALVAGE AND STOCKPILE A MINIMUM 4” LAYER OF EXISTING TOPSOIL TO BE DISTRIBUTED AT ALL SPECIFIED HYDROSEED LOCATIONS PRIOR TO HYDROSEED APPLICATION.
3. THE TOCV INSPECTOR SHALL BE NOTIFIED WHEN HYDROSEEDING WILL BE PERFORMED AND BY WHOM AT LEAST 48 HOURS IN ADVANCE. THE INSPECTOR, AT HIS/HER OPTION, MAY WITNESS APPLICATION TO VERIFY PROCEDURES ARE BEING FOLLOWED CORRECTLY.
4. THE DEVELOPER/CONTRACTOR IS RESPONSIBLE FOR PROVIDING CERTIFICATION OF SEED MIX TO THE CITY INSPECTOR DURING WITNESS ACTIVITIES OR IF NO WITNESS OCCURS, PRIOR TO PUNCH LIST INSPECTION PERFORMED BY THE CITY.
5. STABILIZING EMULSION AND FERTILIZER MIX SHALL BE DETERMINED BY THE CONTRACTOR TO INSURE GERMINATION AT THE RATES SPECIFIED BY THE TOWN.
6. ACCEPTANCE CRITERIA SHALL BE 70% SEED GERMINATION WITHIN A ONE YEAR PERIOD. AREAS NOT EVIDENCING A MINIMUM OF 70% GERMINATION WITHIN THE ONE YEAR PERIOD, AS DETERMINED BY THE TOCV, SHALL BE RE-SEED AT NO COST TO THE TOWN. WHEN ACCEPTABLE FINAL STABILIZATION HAS BEEN DETERMINED, IF REQUIRED, A NOTICE OF TERMINATION SHALL BE FILED BY THE CONTRACTOR.
7. THE SEED MIX SHALL BE DISPERSED AT A MINIMUM OF 8 POUNDS PER ACRE.

4.26.3.3 Certificate of Occupancy

	Existing Requirement:	Proposed New Requirement and/or additions:	Notes:
	All landscaping must be installed and <b>inspected</b> prior to the issuance of a Certificate of Occupancy.	No change however, inspection should be a requirement to ensure no plant substitutions outside of the modified for Chino Valley ADRW Low Water Use Plant List	

4.26.3.4. Performance Standards

a.	Existing Requirement:	Proposed New Requirement and/or additions:	Notes:
Safety	<p>i. Landscaping shall not hinder the vision of motorists and pedestrians necessary for safe movement into, out of, and within the site. All landscaping materials shall comply with all (1) <b>sight visibility triangle</b> requirements as described in Section 4.7. <i>(4.7 Height Limitations at Corner Lots Within a sight visibility triangle formed by the street front and side lot lines and a line connecting these lot lines at points measured along these lot lines a distance of twenty-five (25) feet from their intersection, no fixtures, construction, hedges, shrubbery and other planting shall obstruct the view of intersecting streets to a degree greater than fifty (50) percent visibility. In no event shall an obstruction exist which creates a hazard to passing motorists.)</i></p>	<p>1. Corner Lot: 45 ft x 45 ft from back of curb (BOC)                  2. Intersections on main roadways: Adopt COP Detail 611P</p>	See Diagrams

b.	Existing Requirement:	Proposed New Requirement and/or additions:	Notes:
Maintenance	<p>i. The owner of the premises shall be responsible for the watering, maintenance, repair and replacement of all landscaping, (1) <b>irrigation systems</b>, fences and walls, and other visual barriers including refuse disposal area screens which have died (in the case of plant material) or fallen into disrepair (in the case of fences or walls). ii. All required plant materials shall be maintained in a healthy, vigorous growing condition, and <b>(2) neat and orderly</b> appearance. They shall be replaced as necessary, or as directed by the Zoning Administrator, and shall be kept free of refuse and debris.</p>	<p>(1) including rainwater harvesting tanks, pumps and all other equipment,                  (2) change terminology to natural appearance (not to be hedged)</p>	

c.	Existing Requirement:	Proposed New Requirement and/or additions:	Notes:
Size of Plant Material	<p>All plant materials required by this Ordinance shall be selected from the (1) <u>ADWR drought tolerant/low water use plant lists</u> and meet the following minimum sizes at the time of planting:</p> <p>i. Trees: 75% of trees must be a minimum of 15 gallon. 25% must be 24" box or larger.</p> <p>(2) <u>ii. Shrubs: Minimum 5 gallon or better.</u></p>	<p>(1) ADWR drought tolerant plant list, modified for the Town of Chino Valley,(insert plant list location)</p> <p>(2) Suggest reducing to a minimum of 1 gallon or better (see suggested quantity additions 4.26.4.3.b)</p>	

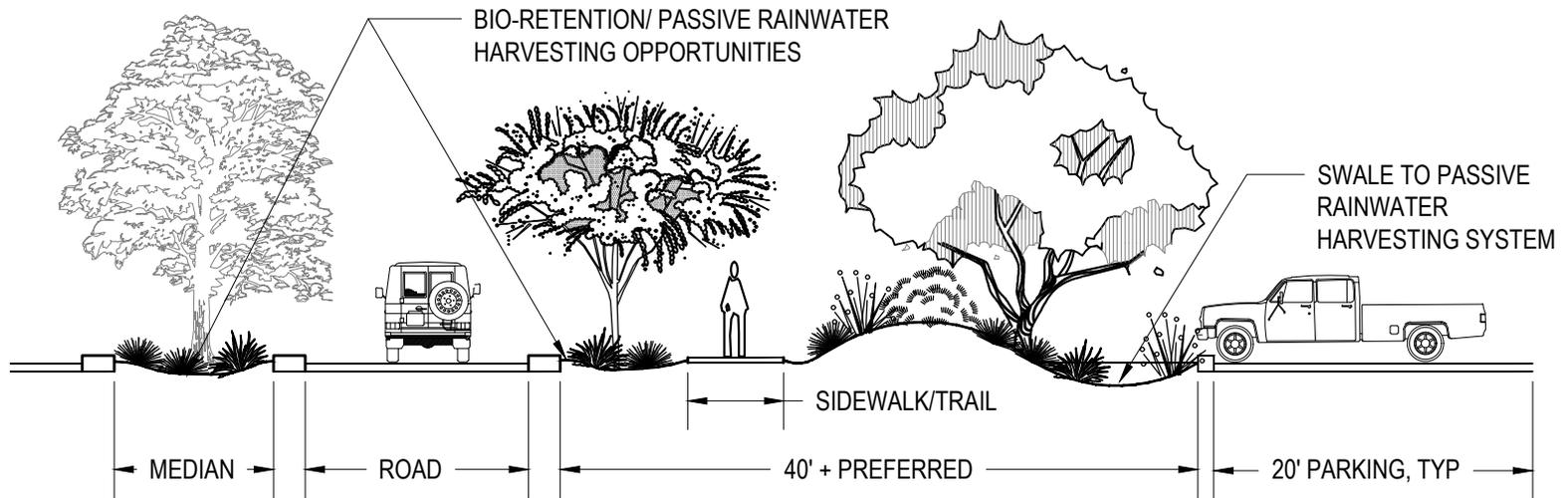
d.	Existing Requirement:	Proposed New Requirement and/or additions:	Notes:
Mulching, Ground Covers and weed Control	<p>d. Mulching, Ground Covers and weed control</p> <p>i. All required shrubs and trees shall be mulched and maintained with <u>shredded hardwood bark, cypress, or gravel mulch.</u></p> <p>Plant groupings shall be mulched in a continuous bed.</p>	<p><u>Open Space/Retention Ponds:</u> Native Hydroseed over 2- 4 inch Layer of site salvaged topsoil</p> <p><u>Buffer/Perimeter Zones:</u> "Native Varnish"</p> <p><u>Interior Zones:</u> 1-inch screened Saddleback Brown (or TOCV approved equal color).</p>	<p><b>Native Varnish:</b> consists of 3-Inch Minus Material reflective of the native high desert landscape</p> <p><b>Landscape Rock Note:</b> Continuity of materials between properties is key to establishing a cohesive look. Separate selections of landscape rock color make a development unnatural and choppy</p>

4.26.4 DETERMINATION OF REQUIREMENTS UNLESS MODIFIED BY THE ZONING ADMINISTRATOR

	Existing Requirement:	Proposed New Requirement and/or additions:	Notes:
2. Multiple-family, Office, Commercial and Industrial Districts	<p>a. Front yard Landscaping. (1) <u>A ten (10) foot wide landscape strip is required along the properties street frontage.</u> For properties adjacent to SR 89, a twenty (20) foot wide landscape strip is required along the property's street frontage.</p> <p>b. Side and rear yard landscaping: when adjacent to zoning other than multi - single family residential zoning, a five (5) foot wide landscape strip is required along the property's street frontage.</p>	<p>(1) Increase size as per diagrams</p>	

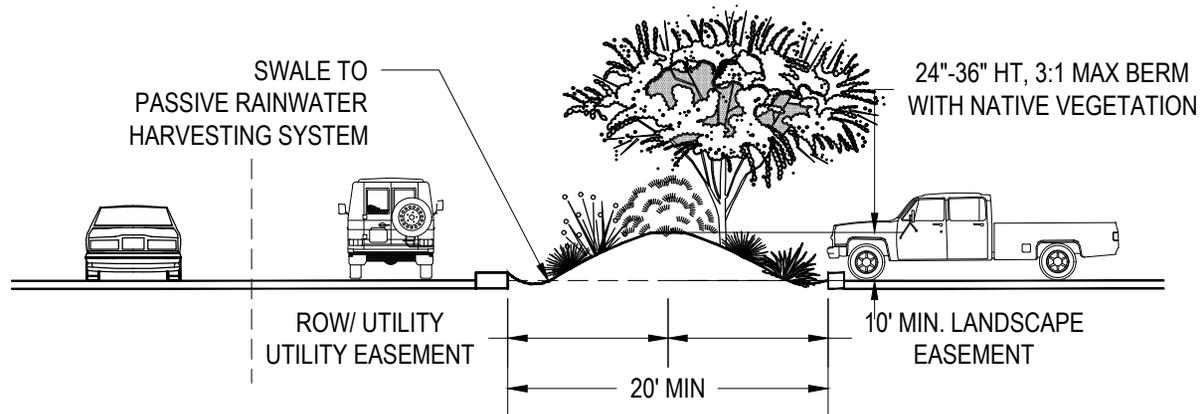
4.26.4 DETERMINATION OF REQUIREMENTS UNLESS MODIFIED BY THE ZONING ADMINISTRATOR

	Existing Requirement:	Proposed New Requirement and/or additions:	Notes:
4. Minimum Landscaping Pattern. The minimum landscaping pattern shall include the following frequency:	a. <u>One (1) tree per twenty (20) linear feet.</u> b. <u>Four (4) shrubs per 400 square</u> feet of required landscaped area. Clustering of trees and shrubs is encouraged.	Change to: (1) Tree per 2,300 SF; (1) Shrub per 50 SF	
c.	Berm. Where a semi-continuous berm measuring a minimum of three (3) feet and a maximum of four (4) feet in vertical height and not having a slope greater than 3:1 on either side is provided,(1) <u>required buffer yard landscaping requirements may be reduced by twenty (20) percent.</u> Slopes may be increased (2) <u>above 3:1 where retaining walls are used</u> , subject to approval under the Alternative Compliance provisions of this section.	(1) Don't allow reduction- berms to be required on all buffer yards as per diagram (2)Remove note	slopes over 3:1 are difficult to plant on and require unsightly erosions control methods such as an erosion control mat or rip-rap
5. Parking Lots	d. Islands. Where internal landscaping of the parking lot is required,(1) <u>there shall be a minimum of one (1) curbed island provided for each fifteen (15) parking stalls in each row.</u> The minimum area for planting all types of trees within parking lots shall not be less than one hundred eighty (180) square feet. Shade trees and intermediate trees shall not be planted in any area with a width of less than ten (10) feet. Shrubs shall not be planted in an area of less than two (2) feet in width. Measurements of width and area shall be from the inside edge of the curb(s). A minimum of fifty (50) percent of every landscape island shall be planted with live plant material, such as shrubs, or ground cover.	(1) Change to (1) curbed island provided for each (10) parking spaces include planting quantity requirement of (1) tree and (2) shrubs per island	Typical amount required by most jurisdictions



## STREET FRONTAGE BUFFERYARD WITH TRAIL

NOT TO SCALE



## STREET FRONTAGE BUFFERYARD WITHOUT TRAIL

NOT TO SCALE

## Modified for Chino Valley

### ADWR Low Water Plant List for the Prescott Active Management Area

G = Grassland: 4,400 - 5,000 Ft | T = Transition: 4,400 - 6,000 Ft

Supplemental Water Use 1 (0 to 4 inches)

  Plant material that is readily available at local nurseries

Water Use	Botanical Name	Common Name	Local Zone	Origin
<b>Native Trees</b>				
1	<i>Celtis occidentalis</i>	Western Hackberry	G,T,P	W U.S.
1	<i>Chilopsis linearis</i>	Desert Willow	G	SW U.S.
1	<i>Juniperus depeana</i>	Alligator Juniper	G,T,P	SW U.S.
1	<i>Juniperus monosperma</i>	One-seed Juniper	G,T,P	SW U.S.
1	<i>Juniperis osteosperma</i>	Utah Juniper	G,T,P	SW U.S.
1	<i>Juniperus scopulorum</i>	Rocky Mountain Juniper	G,T,P	SW U.S.
1	<i>Quercus arizonica</i>	Arizona White Oak	T,P	SW U.S.
1	<i>Quercus emoryi</i>	Emory Oak	T,P	SW U.S.
<b>Shrubs</b>				
1	<i>Acacia greggii</i>	Catclaw	G,T	W U.S.
1	<i>Arctostaphylos</i> spp.	Manzanita	T,P	W U.S.
1	<i>Artemisia frigida</i>	Fringed Sage	G,T,P	W U.S.
1	<i>Artemisia ludoviciana</i>	Prairie Sage	G,T,P	W U.S.
1	<i>Artemisia 'Powis Castle'</i>	Powis Castle	G,T,P	Hybrid
1	<i>Artemisia tridentata</i>	Big Sagebrush	G,T,P	W U.S.
1	<i>Atriplex canescens</i>	Four-wing Saltbush	G,T,P	W U.S.
1	<i>Caesalpinia gilliesii</i>	Mexican Bird of Paradise	G,T	S Am
1	<i>Caragana arborescens</i>	Siberian Peashrub	G,T,P	Asia
1	<i>Ceanothus fendleri</i>	Fendler's Buckbrush	T,P	W U.S.
1	<i>Ceanothus greggii</i>	Mohave Buckbrush	G,T,P	W U.S.
1	<i>Cercocarpus betuloides</i>	Birch Leaf Mountain Mahogany	G,T,P	W U.S.
1	<i>Ceanothus integerrimus</i>	Deer Brush	G,T,P	W U.S.
1	<i>Cercocarpus ledifolius</i>	Curl-leaf Mountain Mahogany	G,T,P	W U.S.
1	<i>Cercocarpus montanus</i>	Mountain Mahogany	G,T,P	W U.S.
1	<i>Chamaebatiaria millefolium</i>	Fernbush	G,T,P	W U.S.
1	<i>Ericameria nauseosa (Chrysothamus)</i>	Gray Rabbit Brush	G,T,P	W U.S.
1	<i>Elaeagnus pungens</i>	Silverberry	G,T	Asia
1	<i>Ephedra vividis</i>	Mormon Tea	G,T	SW U.S.
1	<i>Ericameria laricifolia</i>	Turpentine Brush	G,T	SW U.S.
1	<i>Fallugia paradoxa</i>	Apache Plume	G,T,P	SW U.S.
1	<i>Krascheninnikovia lanata</i>	Winterfat	G,T,P	W U.S.
1	<i>Garrya wrightii</i>	Wright's Silk Tassel	T,P	SW U.S.
1	<i>Maclura pomifera</i>	Osage Orange	G,T,P	S U.S.
1	<i>Mahonia fremontii</i>	Fremont Barberry	G,T	SW U.S.
1	<i>Purshia mexicana</i>	Cliffrose	G,T,P	SW U.S.
1	<i>Quercus turbinella</i>	Scrub Live Oak	G,T,P	SW U.S.
1	<i>Rhamnus californica</i>	California Buckthorn	G,T,P	SW U.S.
1	<i>Rhamnus crocea</i>	Hollyleaf Buckthorn	G,T	SW U.S.
1	<i>Rhus aromatica</i>	Gro-low Fragrant Sumac	G,T,P	E U.S.
1	<i>Rhus glabra</i>	Smooth Sumac	G,T,P	N Am
1	<i>Rhus trilobata</i>	Three Leaf Sumac	G,T,P	SW U.S.
1	<i>Robinia neomexicana</i>	New Mexico Locust	G,T,P	SW U.S.
1	<i>Spartium junceum</i>	Spanish Broom	G,T,P	Med

**Accents**

1	Agave parryi	Parry Agave	G,T,P	SW U.S.
1	Dasyliion wheeleri	Desert Spoon	G,T,P	SW U.S.
1	Hesperaloe parviflora	Red or Yellow Yucca	G,T,P	N Mex
1	Nolina microcarpa	Beargrass	G,T,P	SW U.S.
1	Optunia spp	Native Prickly Pear	G,T,P	SW U.S.
1	Yucca Spp	Yucca		

**Groundcover**

1	Mahonia repens	Creeping Oregon Grape	T,P	W U.S.
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**Grasses - Cool Season (prefer supplemental irrigation January - March)**

1	Aristida purpurea	Purple Three-awns	G,T,P	SW U.S.
1	Festuca glauca	Blue Fescue	G,T,P	Eurasia
1	Koeleria cristata	Junegrass	G,T,P	W U.S.
1	Nassella tenuissima	Mexican Feather Grass	G,T,P	SW U.S.
1	Pascopyrum smithii	Western Wheatgrass	G,T,P	W U.S.

**Grasses - Warm Season (Prefer supplemental irrigation June - August)**

1	Bothriochloa barbinodis	Cane Beardgrass	G,T,P	SW U.S.
1	Bouteloua curtipendula	Side-Oats Grama	G,T,P	SW U.S.
1	Bouteloua gracilis	Black Grama	G,T,P	SW U.S.
1	Bouteloua hirsuta	Hairy Grama	G,T,P	SW U.S.
1	Eragrotis intermedia	Plains Lovegrass	G,T,P	SW U.S.
1	Helictotrichon sepmervirens	Blue Oat Grass	G,T,P	Eurasia
1	Andropogon scoparius	Little Bluestem	G,T,P	N Am
1	Lycurus phleoides	Wolftail	G,T,P	SW U.S.
1	Muhlenbergia capillris 'Regal Mist'	Regal Mist Deergrass	G,T,P	SE U.S.
1	Muhlenbergia emersleyi	Bullgrass	G,T,P	SW U.S.
1	Muhlenbergia lindeimeri 'Autumn Glow'	Autumn Glow Muhly	G,T,P	SW U.S.
1	Muhlenbergia rigens	Deergrass	G,T,P	SW U.S.
1	Sporobolus airoides	Alkali Dropseed	G,T,P	SW U.S.
1	Sporobolus cryptandrus	Sand Dropseed	G,T,P	SW U.S.
1	Sporobolus contractus	Spike Dropseeds	G,T,P	SW U.S.

**Perennials**

1	Gutierrezia sarothrae	Snakeweed	G,T,P	SW U.S.
1	Linum lewisii	Blue Flax	G,T,P	SW U.S.
1	Mirabilis multiflora	Giant 4 O'Clock	G,T,P	SW U.S.
1	Penstemon spp	Penstemon	G,T,P	SW U.S.
1	Perovskia atriplicifolia	Russian Sage	G,T,P	SW U.S.
1	Tetaneuris acaulis	Angelita Daisy	G,T,P	SW U.S.
1	Verbena rigida	Verbena	G,T,P	SW U.S.
1	Zinnia grandiflora	Desert Zinnia	G,T,P	SW U.S.

TOWN OF CHINO VALLEY  
Integrated Water Master Plan and Capital Improvements Plan  
for Old Home Manor  
Civiltec Project No. 2020706

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**MINUTES**

**Meeting Date:** January 12, 2021  
**Meeting Time:** 3:00 PM  
**Meeting Location:** Town of Chino Valley Council Chamber via Zoom Video Conference  
**Meeting Name:** IWMP Water Resources & Recharge Workshop w/Landscape Review  
**Prepared By:** Richard Aldridge, PE, Civiltec Branch Manager  
**Attendance:** See Attached Attendance Sheet

**AGENDA ITEM:**

**1. General Project Status Overview**

- Workshops and miscellaneous meetings and video conferences have been completed for the following IWMP elements:
  - 1) Water system workshop and progress meetings,
  - 2) Water resources planning meeting
  - 3) Recharge basins and operation planning meeting
  - 4) CIP planning and priorities meeting
  - 5) Water pressure zone planning meeting
  - 6) Landscaping component and draft landscape ordinances workshop
  - 7) General project meetings for Town growth rates, overall OHM development planning, the RV Park conceptual utilities and Design Concept Report and roadway planning.
  - 8) Progress reviews of the overall IWMP document
- Development of the Old Home Manor IWMP draft report is ongoing.

**2. Landscape Workshop Review**

- Overview of the December 9, 2020 Workshop

**3. IWMP Water Resources & Recharge Presentation**

- Power Point Presentation by MATRIX/New World

**OLD HOME MANOR WATER RESOURCES WORKSHOP MINUTES**

**Agenda Item 1:**

- A general review of the overall project status was made by Richard. Mark noted that this was the last workshop that would be held with the Water Commission for the project.

**Agenda Item 2: Landscape Workshop Review**

- Celia provided a general overview of the landscaping workshop that was held December 21, 2020 for the commissioner's information including plantings, draft ordinances and other relevant information. She noted that she was working with Josh Cook on the ordinances review and was meeting with the Parks Department for maintenance costs. Celia will also be preparing the cost/benefit analysis for native landscape versus no landscaping. Additional information will be included in the Technical Memorandum.
- Note that the Landscape Workshop meeting minutes and attachments were provided to the Town on January 11, 2021 and are not attached to these Water Resources Workshop minutes.

**Agenda Item 3: IWMP Water Resources & Recharge Presentation**

- An overview of the Town's available water resources and recharge basins was presented by William Greenslade, PE/RG from MATRIX/New World and James Holt, James Holt LLC, via a Power Point Presentation.
- Slides included:
  - A summary of the Town's water wells;
  - Existing Service Area;
  - Overview of the Recharge Water permit, basin capacities and upcoming permit expiration on March 3, 2025;
  - Water Demands and supply – noting that the Town's current wells would not be able to meet the maximum daily demand after 2030 without the Highland Ranch Well or other water sources being developed;
  - Groundwater rights – noting the Grandfathered, Type 1 and Type II rights existing for the Town as well as the Town's extinguishment credits;
  - Big Chino Sub-Basin for potential imported water supply;
  - Small Water Supplier to Large Municipal Provider transition. 2019 water supply exceeded 250 acre-feet, placing the Town of Chino Valley into a Large Municipal Provider (LMP) classification. This new classification requires additional administrative requirements on the Town;
- There was a discussion on what the Town's administrative and reporting activities are in relation to the new requirements of an LMP. Mike indicated that the Town is currently

performing about 50% of the new requirements and will be proactive in meeting all the new requirements in anticipation of an official notice from ADWR of the new classification.

- Mark noted that the Town should evaluate new Grandfathered rights that become available in order to acquire as many as possible to build the Town's water portfolio.
- Importing water as allowed under the AMA was also discussed with the goal to begin water importation as soon as possible. Mark noted there was no better investment than the Town obtaining additional water rights. Excess availability could be offered to developers;
- Mark noted that budgeting for renewing the recharge permit has already been set aside and the process will begin soon.

#### **END OF OLD HOME MANOR WATER RESOURCES & RECHARGE WORKSHOP MINUTES**

#### **ATTACHMENTS**

- ❖ Water Resources and Recharge Workshop Attendance Sheet, January 12, 2021
- ❖ Power Point Presentation, 20 slides, dated January 12, 2021 by Matrix NEWORLD-Southwest Groundwater/Civiltec Engineering

**WATER RESOURCES-RECHARGE WORKSHOP - ATTENDANCE LIST**

**Town of Chino Valley  
Water and utility Subcommittee Meeting**



**Integrated Water Master Plan and Capital Improvements Plan for Old Home Manor  
January 12, 2021, 3:00 PM**

Civiltec Engineering Proj. Number 2020706.00

<b>Company</b>	<b>Representative's Name</b>	<b>Present</b>
Town of Chino Valley	Jack Miller, Mayor	X
Town of Chino Valley	Corey Mendoza, Vice Mayor	X
Town of Chino Valley	Lon Turner, Town Council	X
Town of Chino Valley	Frank Marbury, PE, Public Works Director	X
Town of Chino Valley	Steve Sullivan, PE, Assistant Town Engineer	X
Town of Chino Valley	Josh Cook, Development Services Director	
Town of Chino Valley	Joe Duffy, Finance Director	
Town of Chino Valley	Erin Deskins, Town Clerk	X
Town of Chino Valley	Traci Lavelle, Deputy Town Clerk/Records Technician	X
Town of Chino Valley	Mike Bovee, Utilities Manager	
Town of Chino Valley	Maggie Tidabeck, Economic Development Project Manager	
Mark Holmes, LLC	Mark Holmes, PG, Town Project Manager	X
Civiltec Engineering	Richard Shroads, PE, Founder	X
Civiltec Engineering	Richard Aldridge, PE, Project Manager	X
MATRIX/Southwest Groundwater	William Greenslade, PE, RG, Project Manager	X
MATRIX/Southwest Groundwater	James Holt, Project Consultant	X
Sketch Landscape Architecture Studio	Celia van der Molen, LA, Project Manager	X

# TOWN OF CHINO VALLEY

## INTEGRATED WATER MASTER PLAN AND CAPITAL IMPROVEMENTS PLAN FOR OLD HOME MANOR CIVILTEC PROJECT No. 2020706

### IWMP Water Resources & Recharge Workshop

William Greenslade, P.E., R.G.  
Principal Hydrogeologist  
Matrix New World Engineering/  
Southwest Groundwater

James Holt  
Consultant  
James Holt LLC

January 12, 2021

3:00 PM

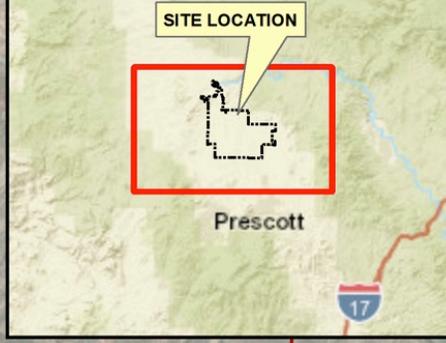
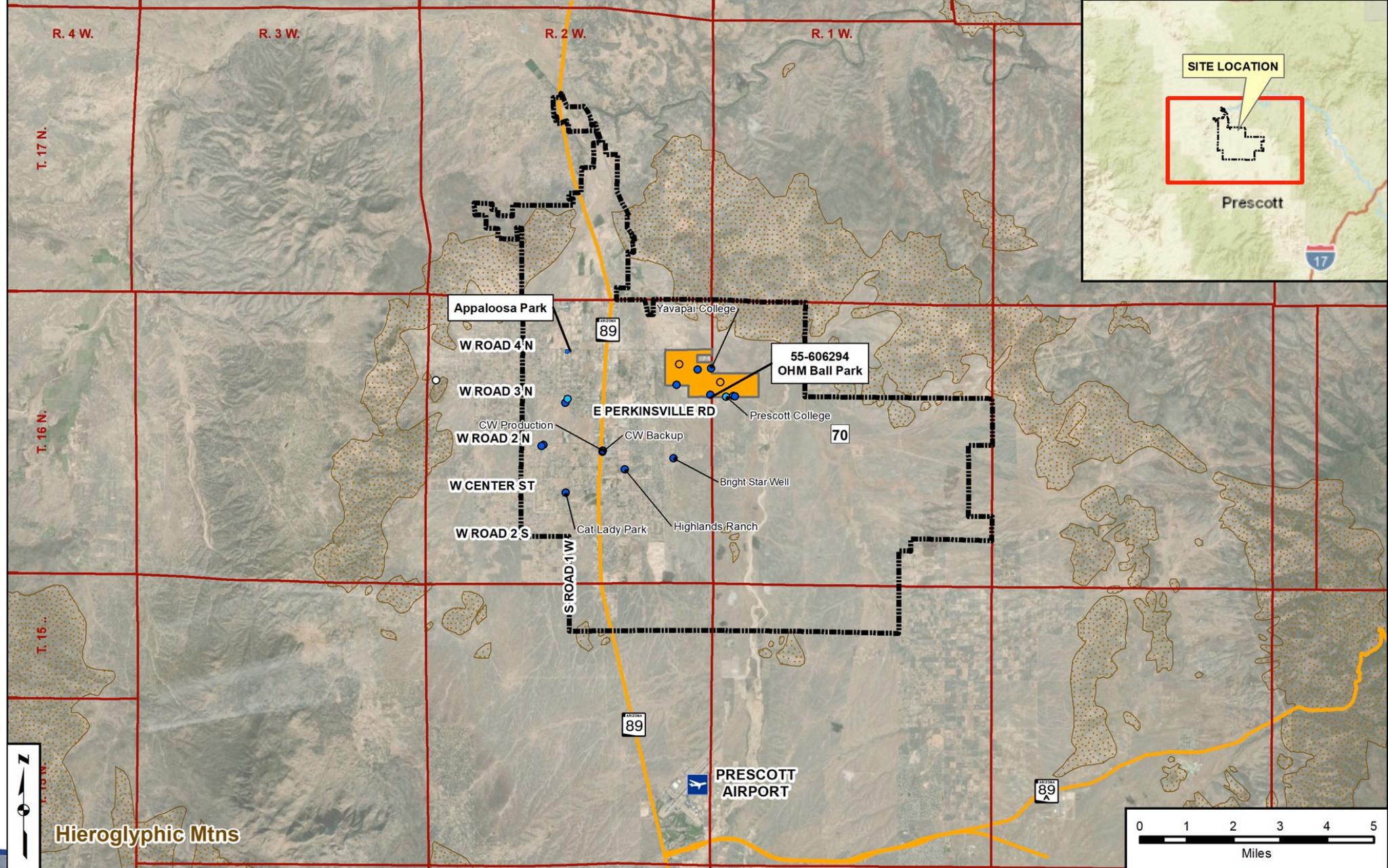
Town of Chino Valley Council Chambers



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# OVERVIEW



# WATER RESOURCES FOR OLD HOME MANOR

- Water Supply
  - Groundwater

Well Name	55 #	Associated Rights	Type	Well Depth (ft)	Casing Depth (ft)	Casing Diameter (in)	Construction Date	Capacity (GPM)	On Line
Sycamore Vista 1	604725		Non-Exempt	401	260	20	9/4/1947	3000	No
Sycamore Vista 2	604724		Non-Exempt	413	201	20	9/4/1947	3300	Yes
CW Backup	595220	56-003022.0001	Non-Exempt	410	406	6	12/31/2002	60	Yes
CW #1	621557	56-003022.0001	Non-Exempt	433	200	12	9/1/1948	500	Yes
Highlands Ranch	800688	56-003022.0001	Non-Exempt	551	216	14	12/19/1947	1000	No
	514309		Non-domestic exempt	255	255	8	5/14/1986	30	Yes
	504619	58-111958.0001	Non-Exempt	585	325	10	6/1/1983	200	Yes
	606300		Non-Exempt	644		8	4/14/1941	118	Yes
OHM Potable (Roads)	606298		Non-Exempt	300	300	8	5/8/1905	50	Yes
Yavapai College	606295		Non-Exempt	960	700	20	10/27/1946	2000	Yes
OHM Ball Park	606294	58-101753.0008; 58-120028.0001	Non-Exempt	744	250	20	1/1/1947	3200	Yes
Prescott College	606297		Exempt				1/1/1978	35	Yes
Perkinsville Stock Tank	606296		Non-Exempt	800	300	20	1/1/1946	1200	Yes
Cat Lady Park	902298	58-120028.0001	Non-Exempt	426	426	6	1/1/2005	30	Yes
Bright Star Well	219691	56-003022.0001	Non-Exempt	723	720	12	4/6/2010	1100	Yes
<b>OHM Potential Water Supply Wells</b>								<b>6,603</b>	
<b>Service Area Wells</b>								<b>2,660</b>	
<b>All Wells</b>								<b>15,823</b>	

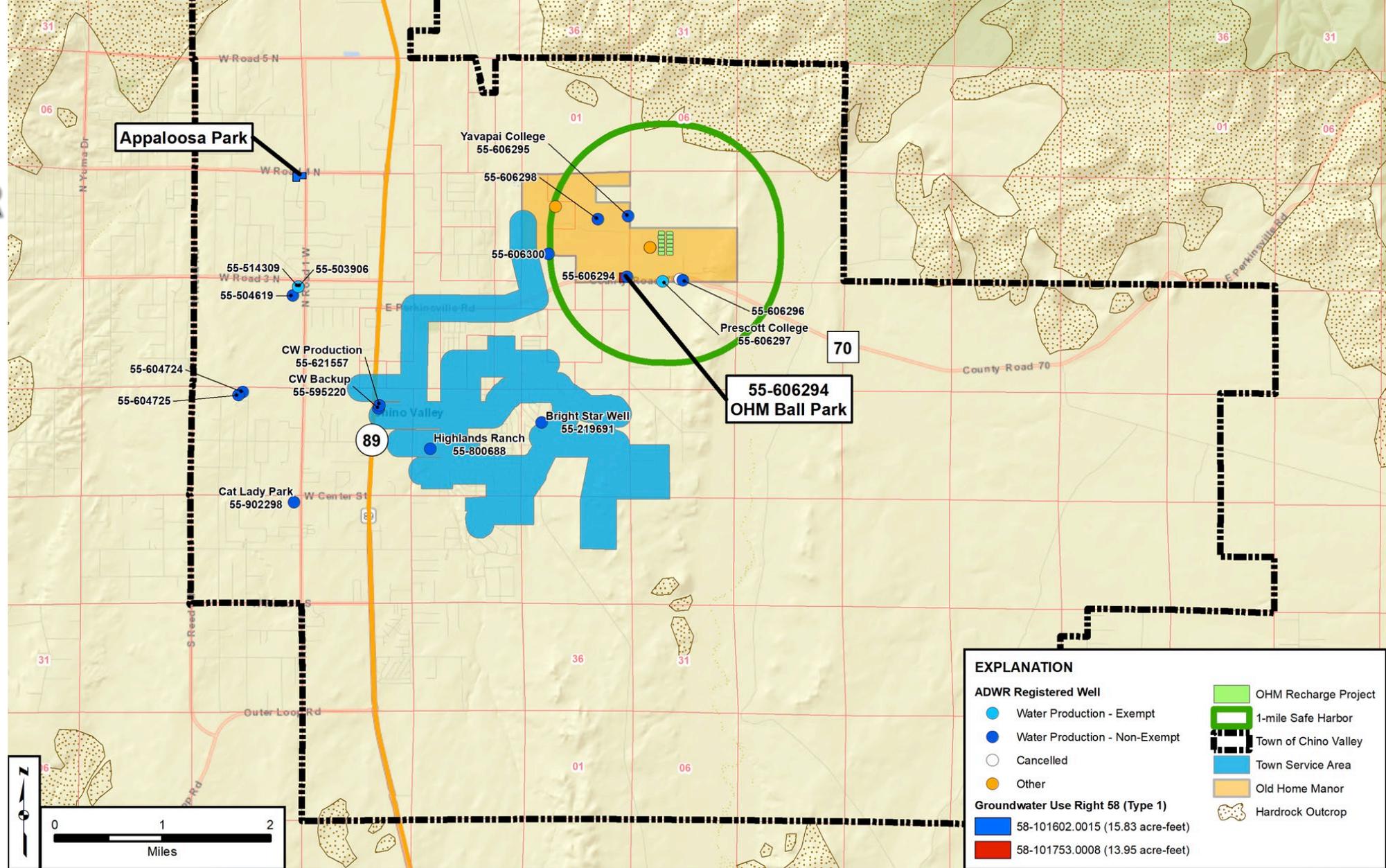


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# WATER RESOURCES FOR OLD HOME MANOR

- Water Supply
  - Groundwater



# WATER RESOURCES FOR OLD HOME MANOR

- Water Supply
  - Recharge & Recovery
- The Town owns and operates the Old Home Manor Recharge Project (OHMUSF) under ADWR permits which will expire on March 3, 2025.
- Recharged water is from the Town's Chino Valley Water Reclamation Facility (WRF) which operates under ADEQ Aquifer Protection Permit. The facility is permitted to treat up to a maximum monthly volume of 5.0 million gallons per day (MGD). The plant, while currently designed to treat 1 MGD, will be expanded over time to meet future demand. All WRF effluent is sent to the OHMUSF, no reuse is permitted under the APP.
- The OHMUSF is permitted to recharge up to 1,120 ac-ft (1.0 MGD) annually. The permit allows a total of 12 1-acre basins, 8 of which have been constructed. Of the constructed basins only 5 are currently connected to the system and are in operation.



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# WATER RESOURCES FOR OLD HOME MANOR

- Water Supply
  - Recharge & Recovery

## Annual Recharge Volume (AF) OHMUSF

Year	2015	2016	2017	2018	2019
Delivered	277.4	270.44	286.68	279.88	309.3
Net of Evaporation	270.8	263.8	277.1	273.3	N/A

ADWR Long Term Storage Account 70-421127.0000

2018 Account Balance            2,748.27 AF



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# WATER RESOURCES FOR TOWN

- Water Demand

Category	Average Daily Demand (GPM)			
	2021	2025	2030	2035
Existing Commercial	31	31	31	31
Residential	145	205	238	276
OHM	89	351	551	640
Existing Turf	23	23	23	23
<b>Totals</b>	<b>288</b>	<b>610</b>	<b>843</b>	<b>970</b>
Category	Maximum Daily Demand (GPM)			
	2021	2025	2030	2035
Existing Commercial	63	63	63	63
Residential	291	411	476	552
OHM	193	746	1145	1323
Existing Turf	71	71	71	71
<b>Totals</b>	<b>465</b>	<b>1291</b>	<b>1755</b>	<b>2009</b>

- Current Supply

- Service Area Wells – All - 2,680 GPM (Slide 3)  
Without Highland Ranch – 1,660 GPM
- Able to meet ADD but not MDD after 2030 without Highland Ranch
- No redundancy



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# WATER RESOURCES FOR THE TOWN OF CHINO VALLEY

- Water Supply
  - Groundwater
    - Service Area Right
- Cities, towns and private water companies within Active Management Areas (AMAs) utilize Service Area Rights.
- The Town's Service Area Right allows the Town to withdraw and transport groundwater to serve current and new customers not requiring CAWS.
- The annual volume of water for a Service Area Right is not quantified or fixed.
- A Service Area Right allows the Town to increase the amount of groundwater withdrawn and to install larger pumps on existing wells or drill new wells to serve increased water demands of its customers.



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# WATER RESOURCES FOR THE TOWN OF CHINO VALLEY

- Water Supply
  - Groundwater
    - Grandfathered Groundwater Rights
      - Type I Non-Irrigation Grandfathered Rights  
The Town of Chino Valley has 2 Type I Rights for 15.83 AFA and 13.95 AFA for total of 29.78 AFA
      - Type II Non-Irrigation Rights  
The Town of Chino Valley has 3 Type II Rights for 11.20 AFA, 15.20 AFA and 6.40 AFA for a total of 32.8 AFA
    - Type I Rights: Retirement of previous Irrigation Right for non-irrigation purpose. Examples include dairy farms, parks and golf courses. This right stays with the land.
    - Type II Rights: Historic Non-Irrigation use between 1975-1979. It can be used for any Non-Irrigation use anywhere in the AMA from which it was issued and can also be bought and sold. There are a limited number of Type 2 Rights.



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# WATER RESOURCES FOR THE TOWN OF CHINO VALLEY

- Water Supply
  - Groundwater
    - Extinguishment Credits

Extinguishment credits are generated when a grandfathered groundwater right is extinguished by the right holder. The extinguished right can never be used again.

Credits generated may be pledged to an application for a Certificate of Assured Water Supply for new residential subdivision to meet the "consistency with management goal" requirement for groundwater supplies.

The Town of Chino Valley has four Certificates of Extinguishment with a balance of 7,537.54 AF of unpledged credits in the Prescott AMA.

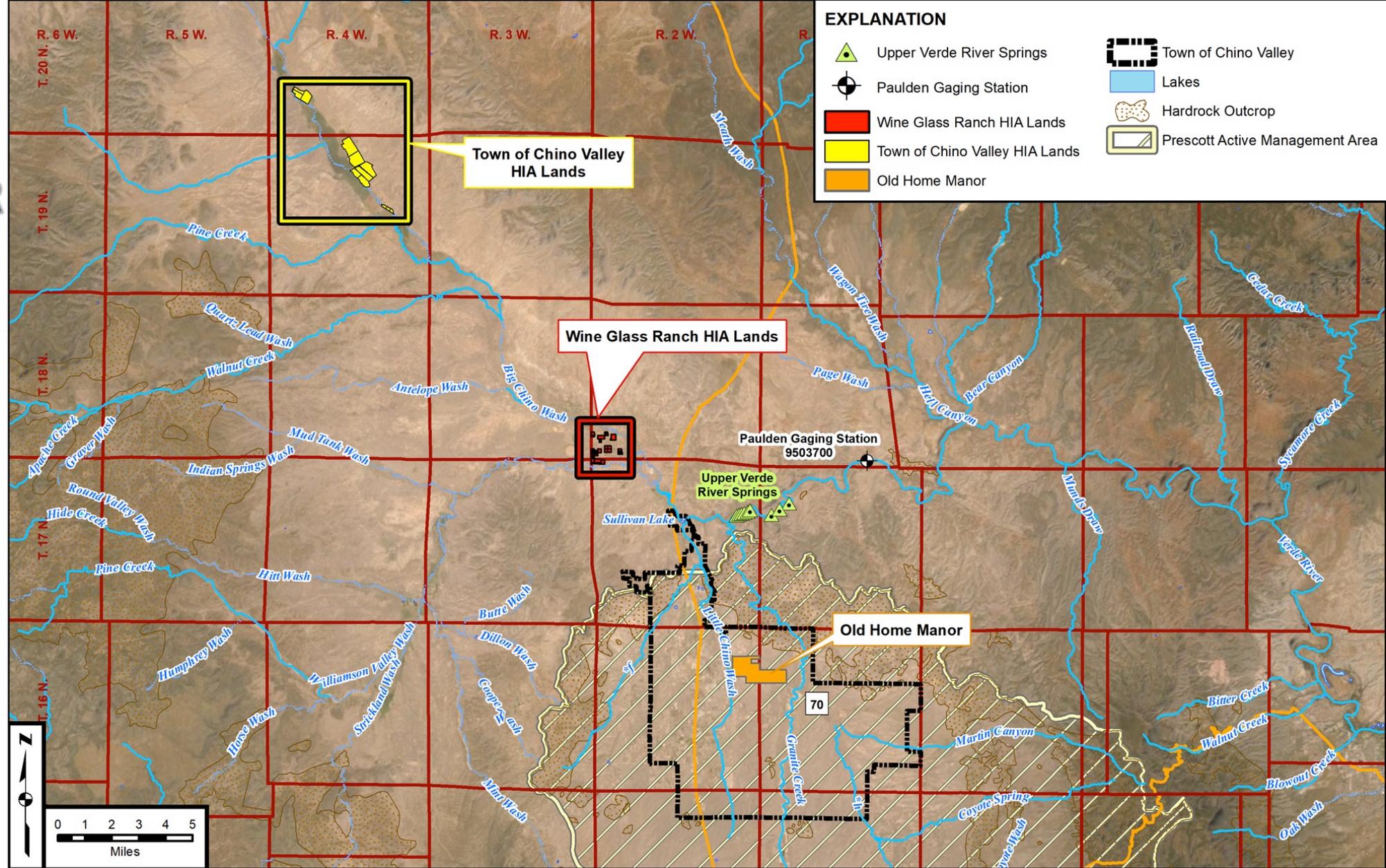


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# WATER RESOURCES FOR THE TOWN OF CHINO VALLEY

- Water Supply
  - Groundwater
    - Big Chino Sub-Basin
    - Imported Groundwater



## EXPLANATION

- Upper Verde River Springs
- Paulden Gaging Station
- Wine Glass Ranch HIA Lands
- Town of Chino Valley HIA Lands
- Old Home Manor
- Town of Chino Valley
- Lakes
- Hardrock Outcrop
- Prescott Active Management Area



# WATER RESOURCES FOR THE TOWN OF CHINO VALLEY

- Water Supply
  - Groundwater
    - Big Chino Sub-Basin Imported Groundwater
    - Municipal water providers in the Prescott AMA have the statutory authority to import groundwater from the Big Chino Sub-basin outside of the Prescott AMA. There are several issues surrounding the importation of this supply, including potential costs, environmental impacts and whether other water users could be adversely affected.
    - The timing of the construction of infrastructure may be an issue if new development is dependent on that supply to proceed.
    - The Town of Chino Valley has two Big Chino Transportation Authorizations with ADWR which identify Historically Irrigated Acres:
      - Chino Grande 748.26 HIA for 2244.78 AFA
      - Wine Glass Ranch 216.14 HIA for 648.42 AFA

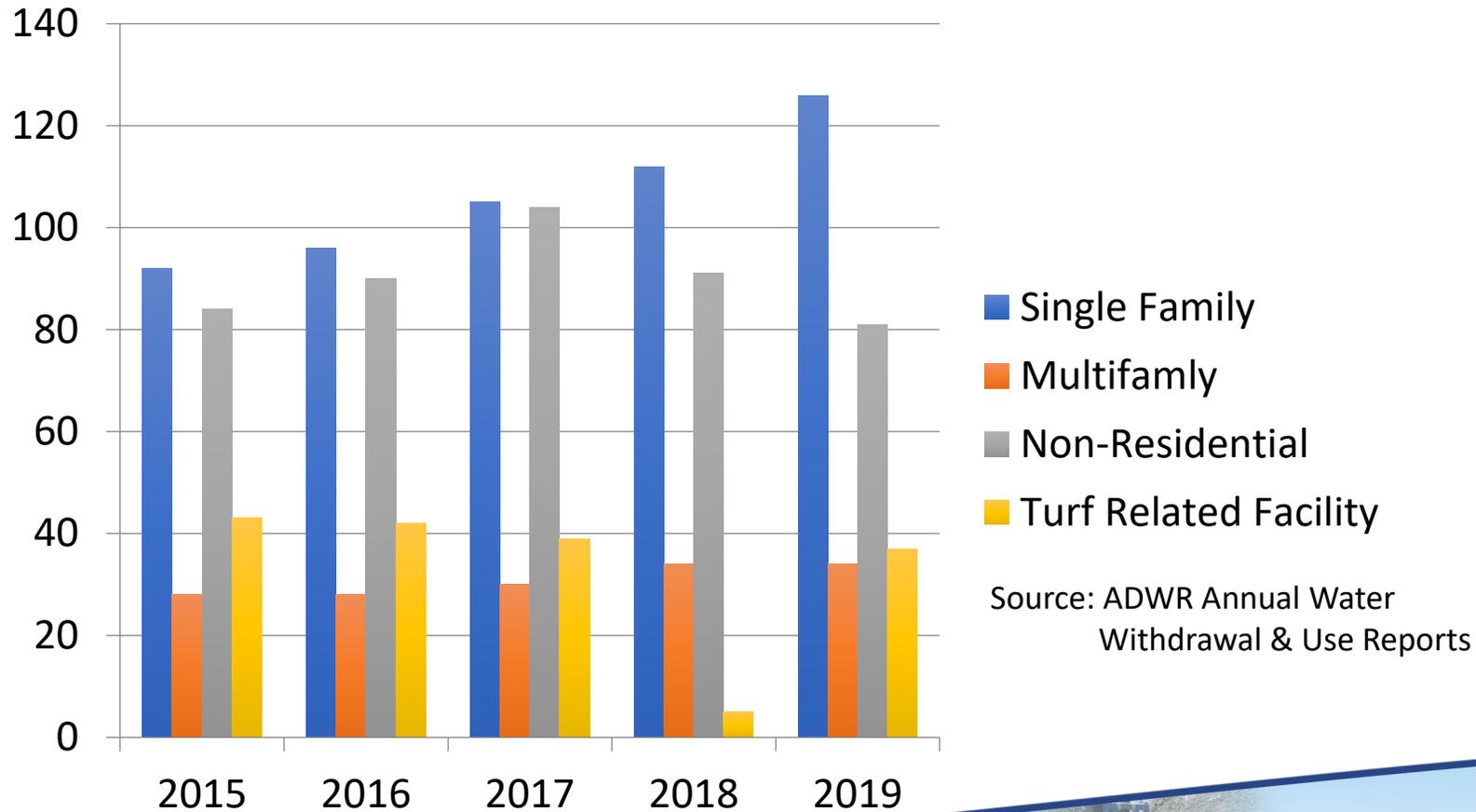


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# HISTORIC GROWTH IN WATER DEMAND BY SECTOR

## TOWN OF CHINO VALLEY AFA



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# FUTURE WATER RESOURCE RELATED ISSUES

- Redundancy in well system
  - Loss of either one of the two current production wells results in a deficit in supply no later than 2025
  - New well in the OHM Recharge Facility AOI has benefits (exempt from MP Goals)



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# FUTURE WATER RESOURCE RELATED ISSUES

- Transition from Small Municipal Provider to Large Municipal Provider

“New large municipal provider” is defined as a city, town, private water company, or irrigation district that begins supplying in excess of 250 acre-feet of water for non-irrigation use per year after the date of adoption of the 4<sup>th</sup> Management Plan (4MP).

The Town of Chino began supplying in excess of 250 acre-feet in 2019.

As a new large provider the Town of Chino Valley will be regulated under the Non-Per Capita Conservation Program (NPCCP) described in section 5-705 of the 4MP.

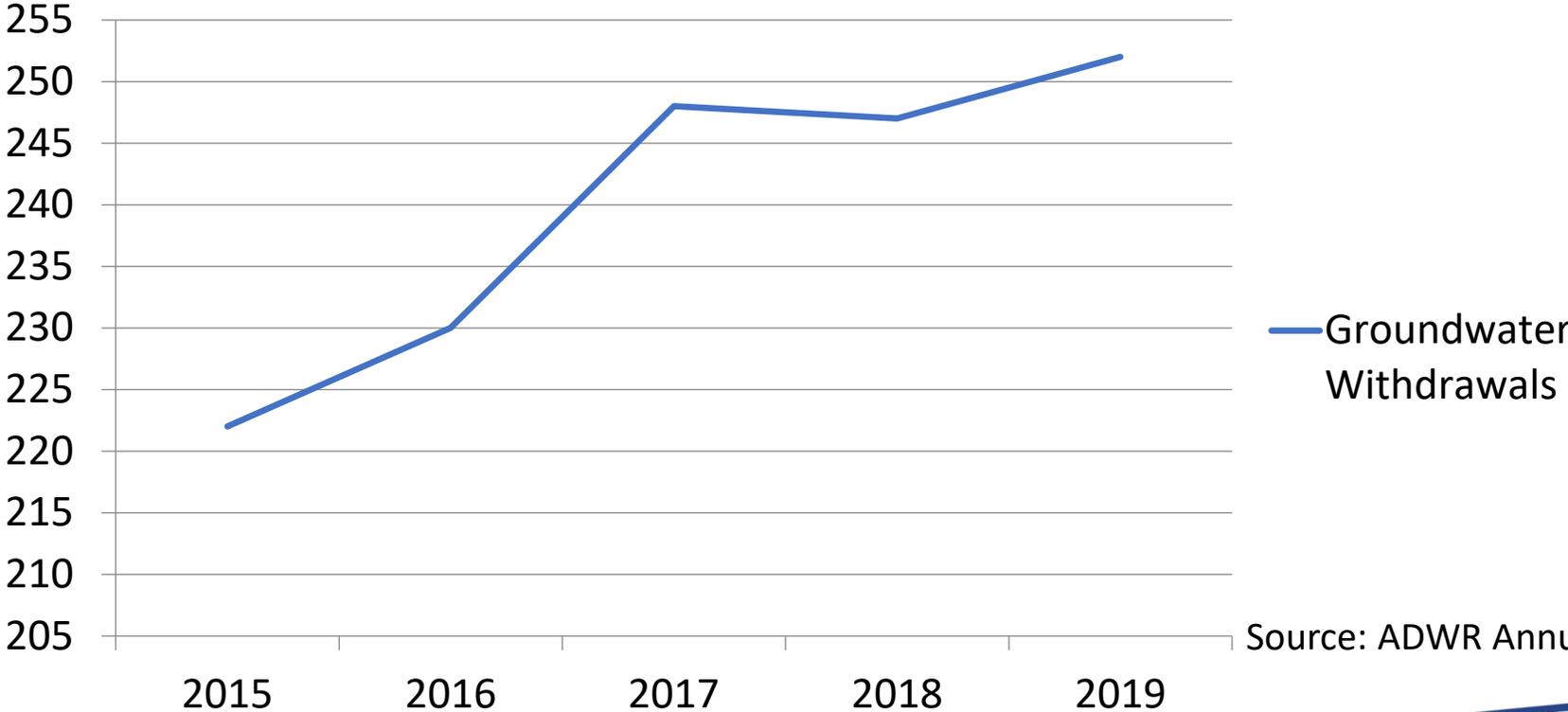


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# GROWTH IN TOTAL ANNUAL GROUNDWATER WITHDRAWAL-TOWN OF CHINO VALLEY ACRE FEET

## Groundwater Withdrawals



Source: ADWR Annual Water Withdrawal Reports



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# FUTURE WATER RESOURCE RELATED ISSUES

- Transition from Small Municipal Provider to Large Municipal Provider

The provider will be required to submit a Provider Profile containing the information described in section 5-705(B)(1) within six months after receiving written notice of its conservation requirements from the director.

The provider must begin complying with the NPCCP upon approval of the Provider Profile pursuant to section 5-705(B)(2) or (B)(3).



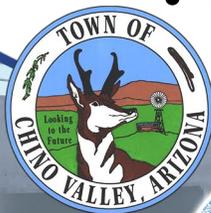
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# FUTURE WATER RESOURCE RELATED ISSUES

As a New Large Municipal Provider in the Prescott AMA in the NPCCP program the Town will be required to implement the following programs:

- Basic Public Information Program
- Best Management Practices (BMP)
- Annual Conservation Efforts Report
- Provide Water Rate Structure
- Comply with 5-year Records Retention
- Compliance with Individual User Requirements
- Compliance with Distribution System Requirements
- Compliance with Monitoring and Reporting Requirements



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# FUTURE WATER RESOURCE RELATED ISSUES

- Residential Growth of Newly Subdivided Land Requiring Certificates of Assured Water Supply
  - Must demonstrate physical, legal, continuous supply
  - Town can encourage desired development by:
    - Providing PAD analysis (M&A)
    - Pledging recharge, extinguishment or HIA credits
    - Agree to be Water Provider



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# DISCUSSION/QUESTIONS



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