

**NITROGEN MANAGEMENT AREA –
PRELIMINARY DESIGNATION REPORT
PAYSON WATER – EAST VERDE ESTATES
PAYSON, ARIZONA**

PREPARED FOR:

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Groundwater Protection Unit
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A ADWR 55- Wells

1.0 INTRODUCTION

The Arizona Department of Environmental Quality (ADEQ) is proposing to designate the East Verde Estates community, serviced by the Payson Water Company – East Verde Estates community water system (CWS), as a Nitrogen Management Area (NMA) in accordance with the Arizona Administrative Code (A.A.C.) R18-9-A317. The designation of a site as an NMA serves to regulate and reduce existing or potential nitrate groundwater contamination caused by sources of nitrogen that are not monitored post permit issuance, primarily on-site wastewater treatment systems, also known as septic systems. A septic system can pose a threat to the public health and water quality by contributing to the nitrate in groundwater if not properly designed, constructed, or operated.

Nitrate is the most widespread groundwater contaminant in Arizona, and nitrogen sources continue (or threaten) to pollute groundwater with nitrate. The United States Environmental Protection Agency (EPA) established a maximum contaminant level (MCL) of 10 milligrams per liter (mg/L) for nitrate as nitrogen. This is based on the acute health effects, specifically the risk of methemoglobinemia (sometimes referred to as “blue baby syndrome”), in which blood lacks the ability to carry sufficient oxygen to the individual body cells (Uhlman and Artiola, 2011). ADEQ has adopted the same nitrate limit (10 mg/L) as an aquifer water quality standard (AWQS) to protect the quality of groundwater, a vital source of drinking water for many in Arizona. Private well owners are not required to monitor their drinking water quality and the cost of addressing nitrate contamination in groundwater used as a drinking water source can be extremely high. As such, prevention is the most affordable solution for managing the discharge of nitrogen pollution.

The purpose of this report is to provide a discussion of each rule outlined in the A.A.C.¹ to the mayors and members of the Board of Supervisors of all towns, cities, and counties and the directors of all sanitary districts affected by the proposed designation. Should ADEQ move forward with the designation of East Verde Estates as an NMA, the use of nitrogen removal technologies may be required for new septic systems that are installed and existing failed septic systems that may require replacement. Additionally, ADEQ may choose to implement other nitrogen control provisions appropriate to the area. These provisions will have a regulatory basis and may include such things as corrective actions, mitigation measures, and/or establishment or modification of best management practices.

For areas where existing conditions or trends in nitrogen loading to an aquifer will cause or contribute to an exceedance of the AWQS for nitrate, the A.A.C. outlines 10 criteria ADEQ will use to evaluate the

¹ A.A.C. R18-9-A317(A)(1)

appropriateness of designating an area as an NMA (**Chart 1**). Each of these criteria are discussed in specific sections of this report.

Chart 1 Criterion for a Nitrogen Management Area Designation

Arizona Administrative Code	Criterion	Report Section Number
R18-9-A317(A)(1)(a)	Population of the area	3.0
R18-9-A317(A)(1)(b)	The degree to which the area is unsewered	3.1
R18-9-A317(A)(1)(c)	Gross areal nitrogen loading, calculated as the amount of nitrogen discharged into the subsurface by use of on-site wastewater treatment facilities (septic systems), divided by the land area under consideration for designation as a NMA.	3.2
R18-9-A317(A)(1)(d)	Population growth rate of area	3.0
R18-9-A317(A)(1)(e)	Existing contamination of groundwater by nitrogen species	5.0
R18-9-A317(A)(1)(f)	Existing and potential impact to groundwater by sources of nitrogen other than on-site wastewater treatment facilities (septic systems)	6.0
R18-9-A317(A)(1)(g)	Characteristics of the vadose zone and aquifer	2.0
R18-9-A317(A)(1)(h)	Location, number, and areal extent of existing and potential nitrogen sources	6.0
R18-9-A317(A)(1)(i)	Location and characteristics of existing and potential drinking water supplies	4.0
R18-9-A317(A)(1)(j)	Any other information relevant to determining the severity of actual or potential nitrogen impact on the aquifer	6.1

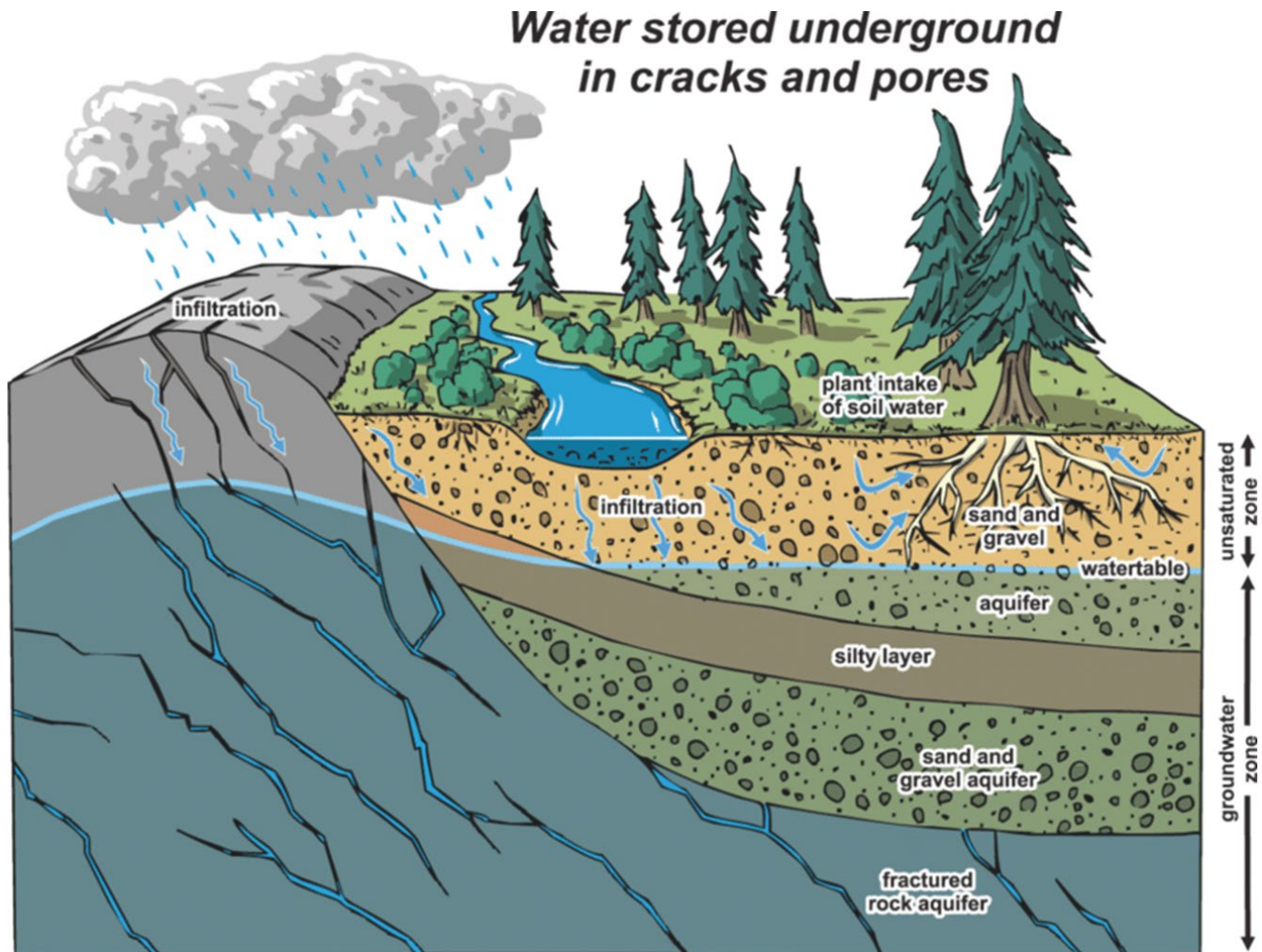
1.1 SITE BACKGROUND

The East Verde Estates community is located approximately 6 miles northwest of the Town of Payson west of State Highway 87 along the East Verde River in Gila County, Arizona (**Figure 1**). Based on 2020 census data, the population of East Verde Estates is 151; however, the population of the community is likely significantly greater due to short-term residences and rental properties in the area. The community currently has 222 residential parcels and local residences operate 210 individual septic systems (**Figure 2**). Water is supplied to the community via three production wells operated by Payson Water Company – East Verde Estates CWS. Since 2017, nitrate concentrations (as nitrogen) in groundwater at the East Verde Estates CWS have been steadily increasing and are currently above the AWQS of 10 mg/L.

2.0 CHARACTERISTICS OF THE SUBSURFACE

The subsurface at the East Verde Estates consists of a vadose zone and aquifer(s). An aquifer is a zone of saturated rock or sediment that stores and transports groundwater within voids and fractures. The top of the aquifer represents the water table or shallowest depth to groundwater beneath land surface. The vadose zone, also referred to as the unsaturated zone, is the area from ground surface to the top of the water table. The vadose zone can be either dry or partially saturated when recharging the aquifer during the infiltration of surface waters. **Chart 2** below depicts how an aquifer in fractured rock (left side of **Chart 2**) may look in comparison to an aquifer in a sedimentary basin consisting of sand, gravel, silt, and clay (right side of **Chart 2**).

Chart 2 Basic Diagram of Hardrock versus Basin Aquifer (Brubacher, 2015)



At East Verde Estates, aquifers exist within fractured zones of a granite rock unit. These fractured zones are highly variable, creating complex groundwater conditions, where depths to groundwater measured in one location may be quite different from another location a short distance away. This variability in

groundwater elevations is discussed in **Section 2.2**. The vadose zone at East Verde Estates consists of the same rock unit as the aquifer, similar to the depiction on the left side of **Chart 2**. There are unconsolidated sediments present on the ground surface and up to approximately 5 feet below ground surface sourced from erosion of the surrounding rocks. Unconsolidated sediments are loose materials like sand, clay, or gravel that have not been compacted into solid rock. The sand and gravel aquifer and silty layer represented on the right side of **Chart 2** are not representative of the hard rock aquifer system at the East Verde Estates. Surface waters from the East Verde River and precipitation are able to infiltrate into the vadose zone, where it migrates downwards into the aquifers.

Recent geologic mapping in the vicinity of East Verde Estates is presented in **Figure 3**. In order to evaluate and depict the subsurface characteristics in the vicinity of East Verde Estates, a hydrogeologic cross-section was developed along the East Verde River through East Verde Estates (**Figure 4**) based on a review of drillers logs and geologic maps of the area. The cross sections show the general subsurface geology with the latest depth to water measurements and known nitrate concentration data along with inferred structural features.

2.1 LOCAL HYDROLOGY

The permeability, or the ease of which water will pass through a material, is extremely low within the rocks present beneath East Verde Estates. Fracturing, jointing, and faulting, also referred to as secondary porosity, create additional paths within the rocks which groundwater can be transported and stored. As such, the greater the secondary porosity, the greater the potential for a productive aquifer within rock units. The groundwater in the vicinity of East Verde Estates is likely recharged from flow in the East Verde River through fractures in both the sedimentary and igneous rock units.

2.2 GROUNDWATER LEVELS

The depth to groundwater in the vicinity of East Verde Estates can vary significantly depending on the distance from the East Verde River and the time of year. Based on our review of records, only three wells within the community have recorded depth to groundwater measurements; well 55-589307, on the south side and adjacent to the East Verde River, had a measured depth to groundwater of 70 feet below ground surface (ft bgs) in 2002; well 55-500743, on the north side and adjacent to of the East Verde River, had a measured depth to groundwater of 17 ft bgs in 1981; and well 55-221574, located approximately 1,000 feet north of the East River, had a measured depth the groundwater of 174 ft bgs in 2012 (**Figure 4**).

To better understand fluctuations in depth to groundwater measurements in the vicinity of East Verde Estates, three Arizona Department of Water Resources (ADWR) wells having significant historical data were identified near East Verde Estates (**Figure 5**); one well located near Pine AZ (55-635775), one well

located near Payson (55-62087), and one well located just south of the Mogollon Rim (55-521343) (ADWR, 2025b). Observed depth to groundwater measurements for each well are plotted in **Figure 6**. The trends for these three wells show the depth to groundwater becoming shallower (rising) between 0.47 and 8.50 feet per year (ft/yr) since 2014.

- Well 55-635775 (A[12-08] 26DAC2) located in Pine, approximately 9 miles northwest of the Site, show seasonal depth to groundwater fluctuations from approximately 102.8 ft bgs in July 1989 to 95.5 ft bgs in December 2024.
- Well 55-620877 (A[11-10] 27CCB) located in Payson, approximately 4 miles southeast of the Site, show seasonal depth to groundwater fluctuations ranging from 109.21 ft bgs in April 1993 to 213.5 ft bgs in May 1996.
- Well 55-521343 (A[12-10] 26CAA) located just south of the Mogollon Rim, approximately 10 miles northeast of the Site, show fluctuating depth to groundwater that range from 198.1 ft bgs in April 2023 to 272.3 ft bgs in April 2022.

Regionally, groundwater flows to the south (**Figure 5**). This interpretation is based on depth to groundwater measurements and ground surface elevations from the USGS topographic base maps and the location given by each well record. The groundwater contours are parallel to the Mogollon Rim. Locally in the vicinity of East Verde Estates groundwater flow directions are variable and show southeast flow components from the Mogollon highlands toward the East Verde River and northwest flow components from the Payson Area toward the East Verde River (Owen-Joyce and Bell, 1983; Weitzman, 2002).

3.0 POPULATION AND POPULATION GROWTH RATE

The population growth rate, along with the historic, current, and projected population, was evaluated for the East Verde Estates community. This information provides important context for evaluating the likelihood of nitrogen loading from residential sources. Additionally, the current and potential growth in population aids in determining current or reasonably foreseeable uses of the groundwater, predominantly how it relates to drinking water use. Population and housing data were obtained from the U.S. Census Bureau 2010 and 2020 Decennial Census reports. Census blocks that contained the East Verde Estates residential area were identified and selected to determine populations in 2010 and 2020 (**Figure 7**).

Based on the populations of these blocks, the population and population growth rate of East Verde Estates was as follows:

- Population 2010: 97
- Population 2020: 151
- Population growth rate: 55.7% per decade

Based on the Arizona Safe Drinking Water Information System (SDWIS), the Payson Water – East Verde Estates CWS services a population of 375. This population is significantly higher than the census data population from 2020 (151) and may account for renters and part-time residents (e.g., vacation homes) that are not included in the census data.

Due to the number of lots in the area, there is potential for the population to increase; however, there is uncertainty regarding the expected population growth as some of the homes in East Verde Estates may not be primary residences.

3.1 DEGREE TO WHICH THE AREA IS UNSEWERED

The East Verde Estates community is not currently served by a public sewer system and relies on septic systems for wastewater management. In East Verde Estates there are 222 parcels and 210 individual septic systems over approximately 97 acres, more than two septic systems per acre (2.2 septic systems per acre; **Figure 2**). A review of the parcels identified 212 lots that can potentially be developed based on lot size and ownership. In accordance with the East Verde Park Owner’s Handbook (East Verde Park, Inc., 2021), 163 of the parcels are residences, including a mix of full-time and part-time residents and renters (including vacation and short-term renters). Based on the number of residential lots, there are potentially one or more septic systems per lot (1 to 1.3 septic systems per residential lot). Based on the number of residential parcels and septic systems in the East Verde Estates community, the area has a high density of septic systems.

3.2 NITROGEN LOADING

The gross areal nitrogen loading is a value that estimates how much nitrogen is being released by septic systems into the subsurface at East Verde Estates, which then has the ability to enter into the aquifer. This was calculated as the amount of nitrogen discharged into the subsurface by use of on-site wastewater treatment facilities (septic systems), divided by the land area under consideration for designation as an NMA. To calculate the nitrogen loading, both the population from the census data (151) as well as the population reported by the Payson Water – East Verde Estates CWS (375) was used to provide a lower- and upper-bound estimate to account for changes in loading during certain times of the year due to part-time residents or short-term / vacation renters. The gross areal nitrogen loading due on-site wastewater treatment facilities (septic systems) at East Verde Estates is presented in **Chart 3**.

Chart 3 Gross Areal Nitrogen Loading – East Verde Estates

	Lower-Bound Estimation	Upper-Bound Estimation
Total Nitrogen per Day per Person ²	0.0333 lbs (15 g)	0.0333 lbs (15 g)
Population	151	375
Total Nitrogen per Day	5.03 lbs (2,265 g)	12.5 lbs (5,625 g)
Acres	97	97
Gross Areal Nitrogen Loading	0.0518 lbs (23.4 g)	0.129 lbs (58.0 g)

Notes: lbs = Pounds
 g = grams

Notably, the total nitrogen loading from the on-site wastewater treatment facilities (septic systems) to groundwater based on the upper-bound population of 375 is significantly higher than the criteria of 0.088 pounds (39.9 grams) of total nitrogen per day per acre³.

² Due to raw sewage based on A.A.C. R18-9-A309(A)(8)(c)(ii)

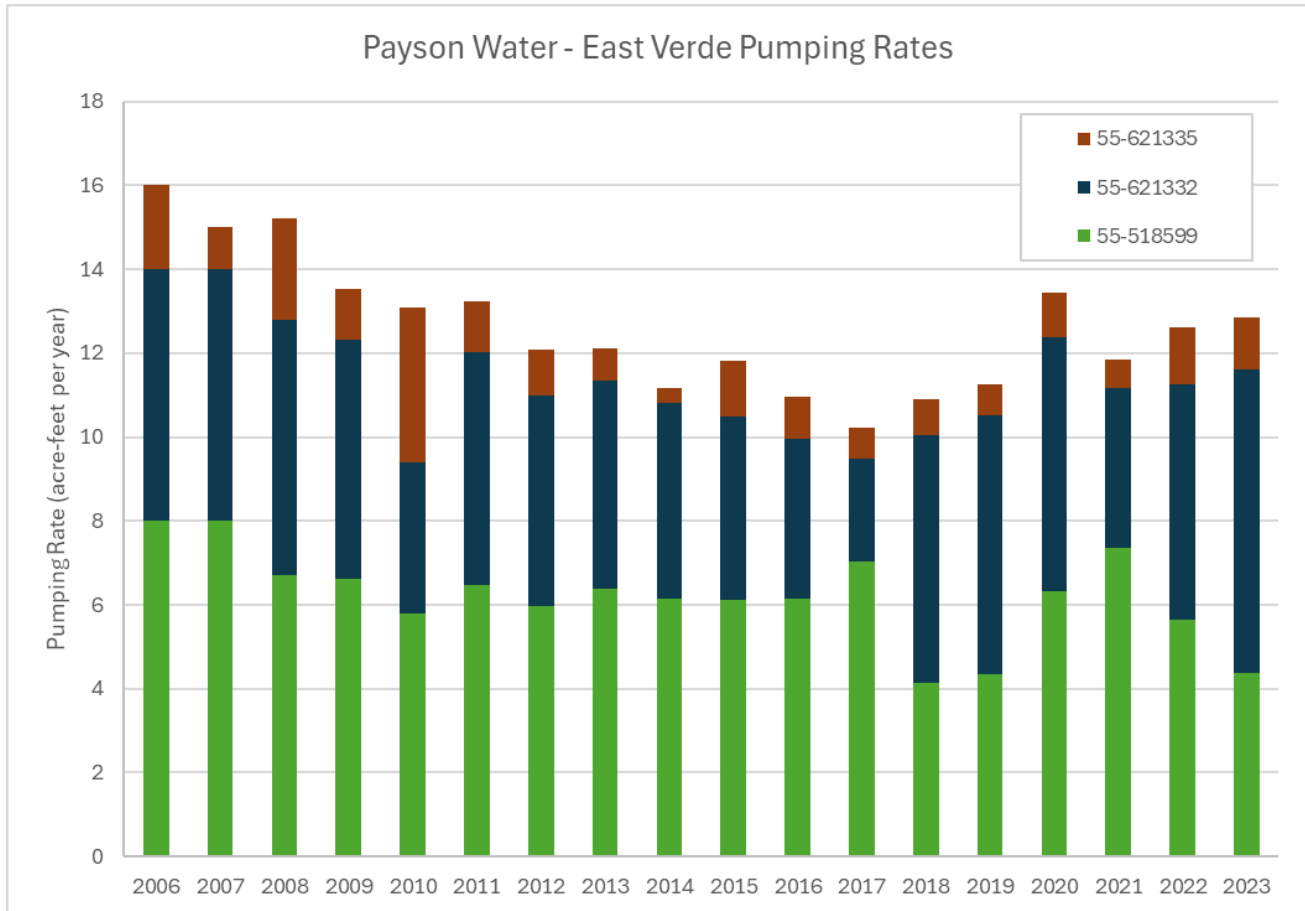
³ Ibid

4.0 EXISTING AND POTENTIAL DRINKING WATER SUPPLIES

A search of ADWR registered wells was performed to determine the number, location and characteristics of existing and potential drinking water wells installed within the East Verde Estates (ADWR, 2025a). Similar to the current and projected future population, this information is critical to projecting the degree of impact from the nitrate contamination on the community's drinking water source. A local well inventory, including the ADWR well registration number, well use, well owner, static depth to groundwater, and construction details (where available), is provided in **Appendix A**. Of the 31 wells that were identified, three were cancelled (55-522799, 55-577466, and 55-573969) and four wells (55-500743, 55-518599, 55-621335, and 55-621332) are owned by the Payson Water Company, three of which (55-518599, 55-621335, and 55-621332) are used to supply water to the East Verde Estates community. The remaining 24 wells are registered for domestic use purposes and are tied to individual parcels (**Figure 8**).

Annual groundwater withdrawal rates for the three East Verde Estates production wells are presented on **Chart 4**. From 2006 to 2017, the annual groundwater withdrawal decreased from 16 to 10.2 acre-feet. From 2017 to 2023, the annual groundwater withdrawal began increasing again and in 2023, the total volume of water produced was 12.8 AF.

Chart 4 East Verde Estates Production Well Pumping Rates



5.0 EXISTING CONTAMINATION OF GROUNDWATER BY NITROGEN SPECIES

Soil can contain many forms of nitrogen, including both organic forms and inorganic forms. When compared to other forms of nitrogen, nitrate is very mobile in the subsurface as it is easily soluble in water and does not “stick” to soil. Additionally, other forms of nitrogen can quickly transform into nitrate (Uhlman and Artiola, 2011). As such, nitrate is typically used instead of other forms of nitrogen (such as total nitrogen or ammonia) as an indicator of groundwater contamination for sources such as fertilizers, septic tanks, and WWTPs.

The Payson Water – East Verde Estates CWS collects samples of water from the distribution system at locations called entry points, which are located prior to the connections to end water users. These samples are used for compliance purposes and to understand the quality of the water provided to the community. General well construction details for the East Verde Estates CWS production wells and their associated distribution system entry point (EPDS) IDs are presented on **Chart 5**.

Chart 5 East Verde Estates Production Well Construction Details

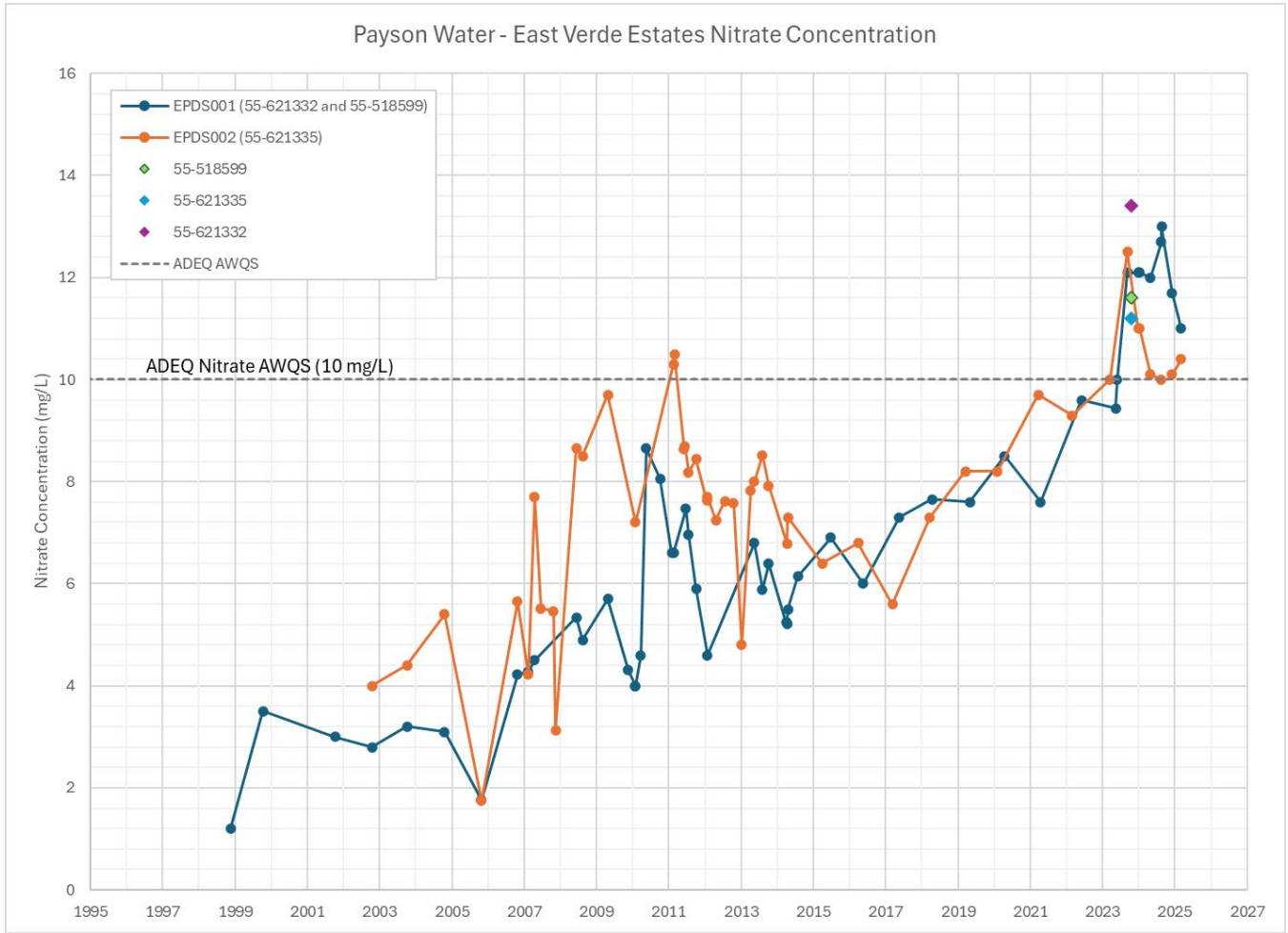
Community	Well ID	Surface Elevation (ft amsl)	EPDS	Well Depth (ft bgs)	Casing Depth (ft bgs)	Screen Interval (ft bgs)
East Verde Estates	55-621332	4,508	EPDS001	90	80	Not Available
	55-518599	4,490		100	100	40-60 80-100
	55-621335	4,520	EPDS002	165	40	Not Available

Notes: EPDS = Entry point to the distribution system
 ft bgs = feet below ground surface
 Not Available = information is not available on Arizona Department of Water Resources (ADWR) imaged records

The Payson Water – East Verde Estate CWS entry point identified as EPDS001 receives groundwater from production wells 55-621332 and 55-518599, where EPDS002 receives groundwater from production well 55-621335 (**Figure 9**). Historical nitrate concentrations for EPDS001 and EPDS002 are presented on **Chart 6**.

Prior to 2007, concentrations of nitrate remained relatively low, below 6 mg/L. Overall nitrate concentrations in the East Verde Estates point of entries show increasing trends. Since 2015, nitrate concentrations have been gradually increasing. The most recent nitrate concentrations from samples collected in March 2025 were 11.0 mg/L in EPDS001 and 10.4 mg/L in EPDS002, both exceeding the AWQS of 10 mg/L. The trends suggest that the high concentrations of nitrate are not naturally occurring and there is a nitrogen source either within the East Verde Estates community or upgradient from the community that is contributing to the increase in nitrate concentrations in groundwater.

Chart 6 Historical Nitrate Concentrations – Payson Water – East Verde Estates



6.0 POTENTIAL SOURCES OF NITROGEN

High levels of nitrate in groundwater are typically caused by anthropogenic sources, such as wastewater treatment plants, on-site wastewater treatment (i.e., septic tanks), fertilized lawns, agricultural activities, runoff from animal manure storage areas, and industrial discharges (EPA, 2024). Additionally, quarries are known to be sources of nitrate pollution of groundwater due to the use of ammonium nitrate fuel-oil (ANFO) (Doyle, 2024). The location, number, and areal extent of existing and potential sources of nitrogen in the vicinity of East Verde Estates are presented on **Chart 7**.

Based on an evaluation of current land use as well as historical aerial imagery there has been minimal to no agricultural activities within or upgradient of East Verde Estates. Additionally, there are no wastewater treatment plants (WWTP), landfills, or facilities that discharge treated water onto the surface or into the subsurface under an ADEQ permit within 3 miles of East Verde Estates (**Figure 10**). The closest upgradient landfill is 3.5 miles northwest (Buckhead Mesa Landfill). No WWTPs were identified upgradient of East Verde Estates. The closest WWTP is 4.1 miles down gradient and south (Northern Gila County Sanitary District – American Gulch) of East Verde Estates. The Northern Gila County Sanitary District – American Gulch has a permit associated with the facility that allows the discharge of treated water into the subsurface.

Chart 7 Potential Sources of Nitrogen – East Verde Estates

Name	Location	Description	Areal Extent (acres)	Potential Source of Nitrogen in community?*	Notes
East Verde Picnic Area	~0.2 miles east-northeast from East Verde Estates community	Day use area with a toilet building	1.4	Minimal	Dependent on type of toilet building (vault or septic) and usage
Flowing Spring Recreation Area	~1 mile northeast of East Verde Estates	Day use area with a vault toilet	<1	No	--
Flowing Springs community	~1.5 miles northeast along East Verde River	Community with 41 septic systems and livestock	106	Minimal	Concentrations of nitrate in the community groundwater wells are below 2 mg/L.
Beaver Valley community	~4.2 miles northeast along East Verde River	Community with 352 septic systems	118	No	Concentrations of nitrate in the community groundwater wells are below 1 mg/L
Whispering Pines community	~6.5 miles northeast along East Verde River	Community with 227 septic systems	163	No	Concentrations of nitrate in the community groundwater wells are below 1 mg/L
Former gravel pit	Northeast corner of East Verde Estates community	Sand and gravel pit for construction and maintenance.	2.75	No	Appears to be currently non-operational
Buckhead Mesa Landfill	~3.5 miles northwest	Regulated landfill	58	No	No known releases, not likely hydraulically connected to groundwater under East Verde Estates
Northern Gila County Sanitary District – American Gulch	~4.1 miles south	Regulated WWTP	6	No	No known releases, located downgradient from East Verde Estates
East Verde River	Flows through East Verde Estates	Infiltration of surface water into the aquifer	NA	No	Concentration of nitrate in the surface water samples are less than 1 mg/L.

Notes: * = Presumed level of impact from the source on the nitrogen concentration in the groundwater under the East Verde Estates community based on evaluation provided in the East Verde Estates Conceptual Site Model (Matrix, 2025) and the Sankey Diagram presented in **Section 6.1.**

mg/L = milligrams per liter

NA = Non-applicable

WWTP = Wastewater Treatment Plant

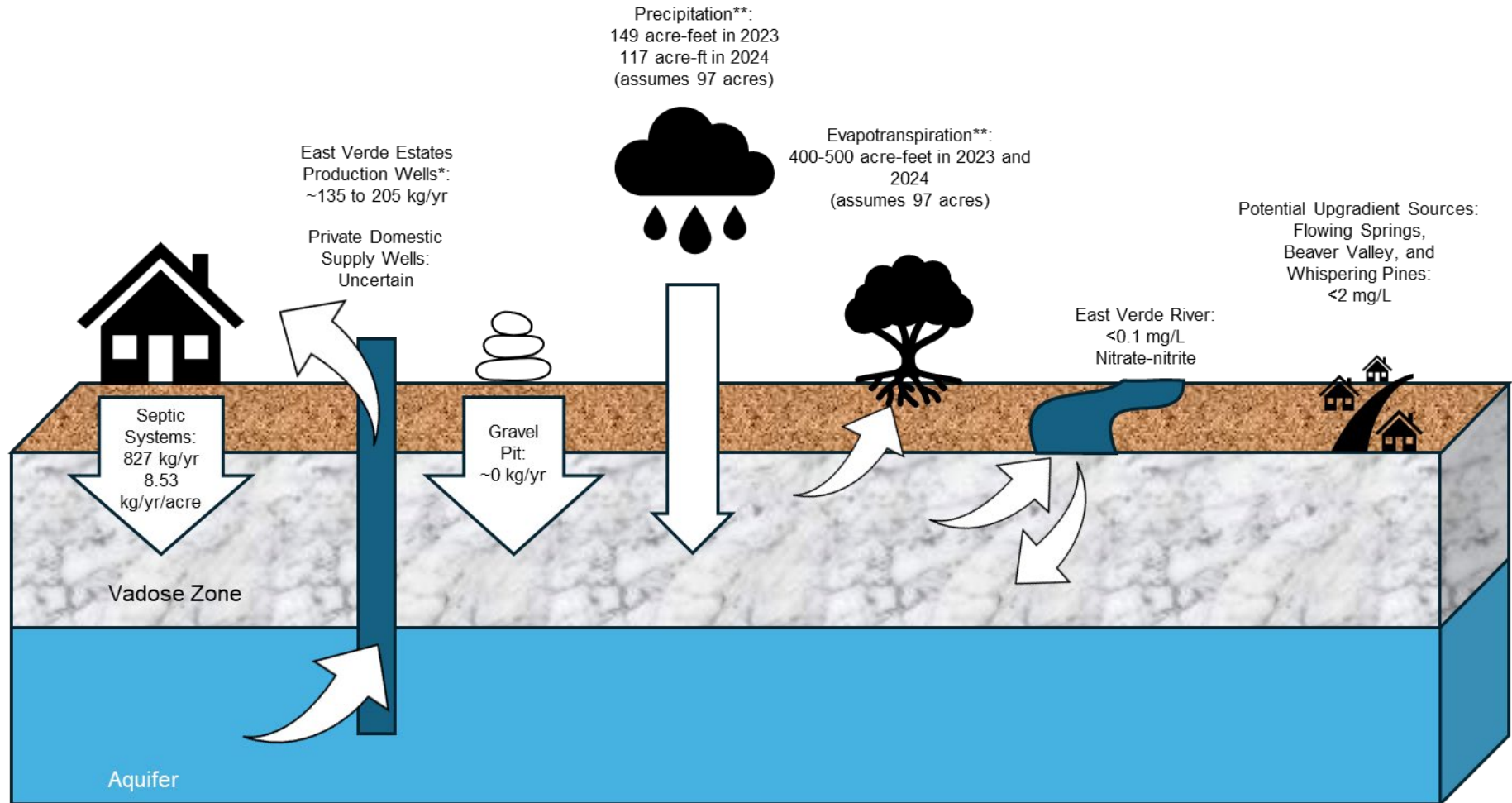
6.1 SANKEY DIAGRAM

A Sankey diagram was prepared to visually present the data provided herein and provided in the East Verde Estates Conceptual Site Model (Matrix, 2025), including potential sources of nitrogen in the groundwater in the vicinity of East Verde Estates (**Chart 8**). While the East Verde Estates CWS production wells withdraw an estimated 135 to 205 kilograms per year (kg/yr) of nitrate from the groundwater, the calculated load from septic systems is significantly higher at an estimated 827 to 2,053 kg/yr. This suggests that some of the nitrogen released from the septic systems either remains within the subsurface, is withdrawn from private wells within the community, or is discharged into the East Verde River. This unaccounted-for nitrogen poses an additional risk to the environment and public health.

The diagram further illustrates that the other nitrogen sources within and upgradient from the East Verde Estates community have a minimal impact on the nitrate concentration at the East Verde Estates CWS (**Chart 8**). Nitrate was not detected in the surface water samples collected from the East Verde River, and concentrations of nitrate in the upgradient communities of Flowing Springs, Beaver Creek, and Whispering Pines were below 2 mg/L (well below the AWQS of 10 mg/L). These communities are potentially contributing low levels of nitrate to the groundwater at the East Verde Estates community; however, the impact is expected to be minimal.

The estimated recent precipitation in the community ranged from 149 acre-feet in 2023 to 117 acre-feet in 2024; however, the estimated water loss due to plant intake and evaporation (a term known as evapotranspiration) was much greater at approximately 400 to 500 acre-feet per year. This data suggests that the groundwater under East Verde Estates is primarily recharged from sources from outside of the community, such as springs, groundwater flow from outside of the community, and/or the East Verde River.

Chart 8 Sankey Diagram – East Verde Estates



*Using groundwater withdrawal rates from 2023 and nitrate concentrations from 2023 and 2024

**Based on data obtained from the AZMET gauge in Payson

7.0 CONCLUSIONS

This preliminary designation report provided an evaluation of the criteria outlined in the A.A.C⁴. to support the designation of the East Verde Estates community as an NMA. **Chart 9** summarizes the data presented herein.

Chart 9 Summary of Nitrogen Management Area Designation Determination

Criterion	Determination
Population of the area	Population estimates range from 151 (based on census data) to 375 (based on SDWIS); some renters and part-time residents
The degree to which the area is unsewered	100% unsewered; more than two septic systems per acre; one or more septic systems per residential lot.
Gross areal nitrogen loading, calculated as the amount of nitrogen discharged into the subsurface by use of on-site wastewater treatment facilities (septic systems), divided by the land area under consideration for designation as an NMA.	Ranges from 0.0518 lbs (23.4 g) to 0.129 lbs (58.0 g)
Population growth rate of area	55.7% over one decade based on census data from 2010 (97) to 2020 (151)
Existing contamination of groundwater by nitrogen species	10.4 mg/L to 11.0 mg/L in March 2025; exceeding the AWQS of 10 mg/L
Existing and potential impact to groundwater by sources of nitrogen other than on-site wastewater treatment facilities (septic systems)	Minimal to no potential impact
Characteristics of the vadose zone and aquifer	Hardrock vadose zone and aquifer; groundwater transported via secondary porosity; depth to water ranging across site from 17 ft bgs to 174 ft bgs
Location, number, and areal extent of existing and potential nitrogen sources	Nine potential sources, seven located upgradient or along the East Verde River (Figure 10)
Location and characteristics of existing and potential drinking water supplies	28 existing or potential drinking water supplies identified (Appendix A and Figure 8)
Any other information relevant to determining the severity of actual or potential nitrogen impact on the aquifer	Sankey Diagram

Notes: lbs = Pounds
 g = grams
 mg/L = milligrams per liter
 ft bgs = feet below ground surface
 SDWIS = safe drinking water information system
 AWQS = aquifer water quality standards

⁴ A.A.C. R18-9-A317(A)(1)

The existing conditions in nitrogen loading to the aquifer has caused an exceedance of the AWQS for nitrate in the groundwater at East Verde Estates. As such, based on the data presented herein and the criteria outlined in the A.A.C.⁵, it is appropriate to designate the East Verde Estates CWS as an NMA.

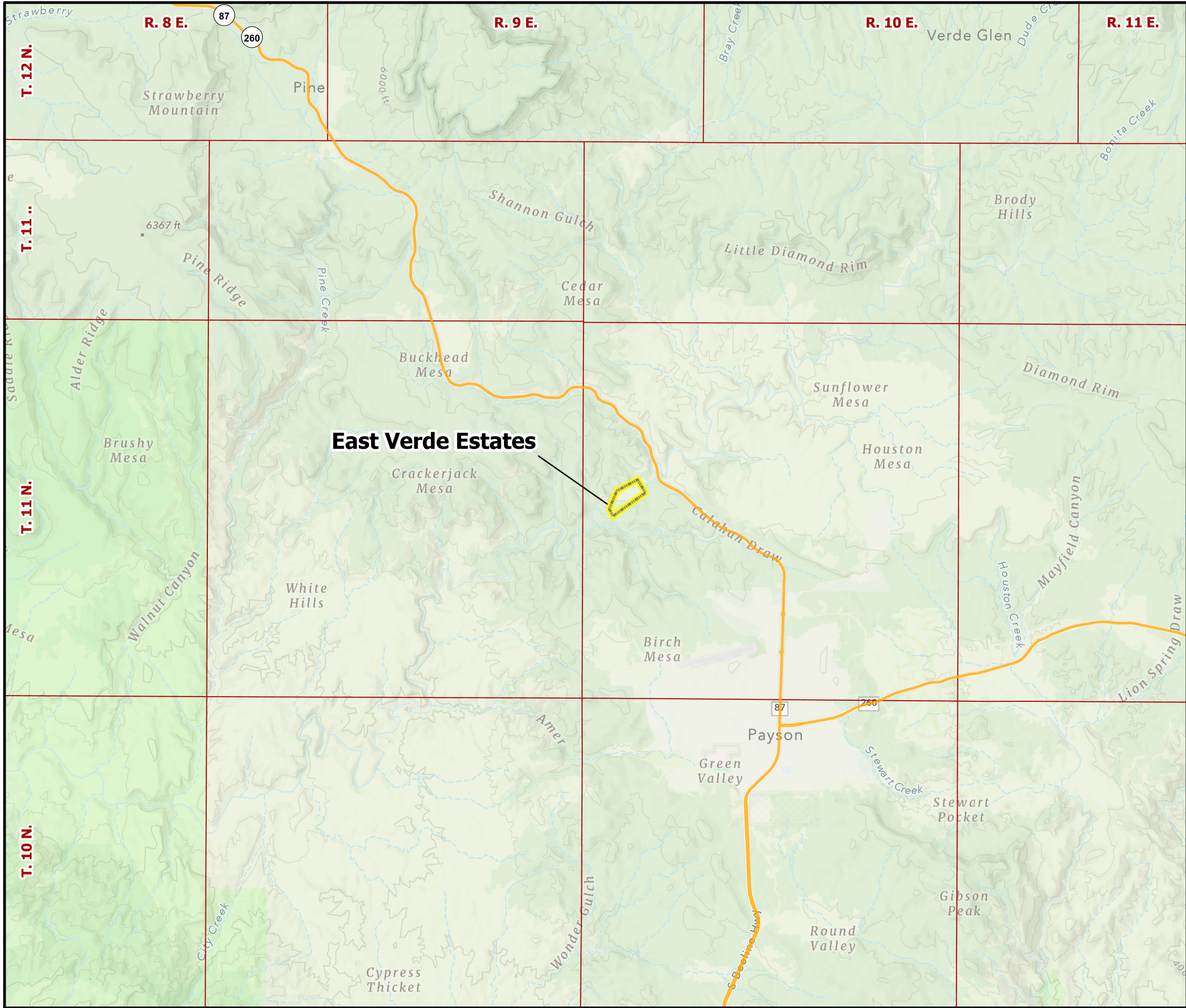
⁵ A.A.C. R18-9-A317(A)(1)

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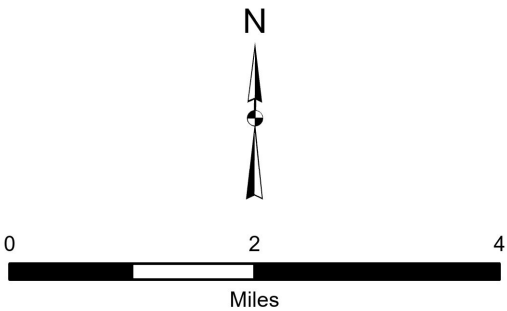
FIGURES

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EXPLANATION

- Township
- Community Water System**
- Payon Water - East Verde Estates



Notes
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REGIONAL LOCATION MAP

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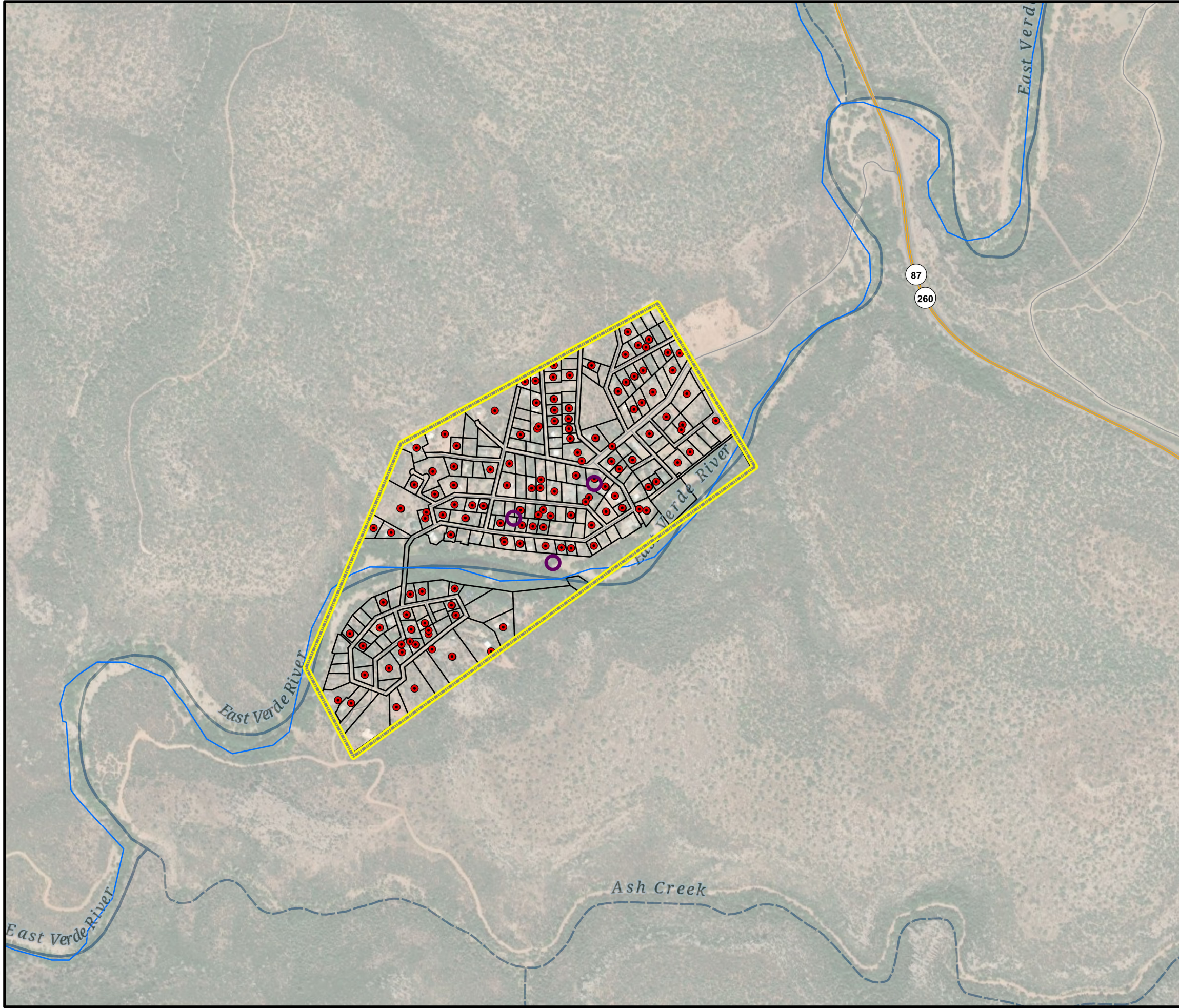
**ADEQ NITROGEN MANAGEMENT AREA
 PRELIMINARY DESIGNATION
 PAYSON WATER - EAST VERDE ESTATES**

FIGURE NUMBER:

1

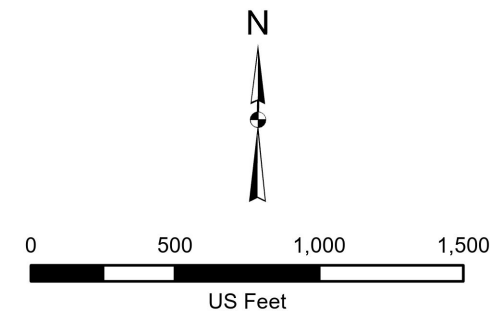
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EXPLANATION

- Septic System Location
 - EPDS Well
 - Assessed Streams, 2024
 - Gila County Parcel (Total: 222)
- Community Water System**
- Payon Water - East Verde Estates



Notes
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 World Imagery: Maxar, AZGS, ADWR

EPDS - Entry Point Distribution System

EAST VERDE ESTATES
SITE LOCATION MAP

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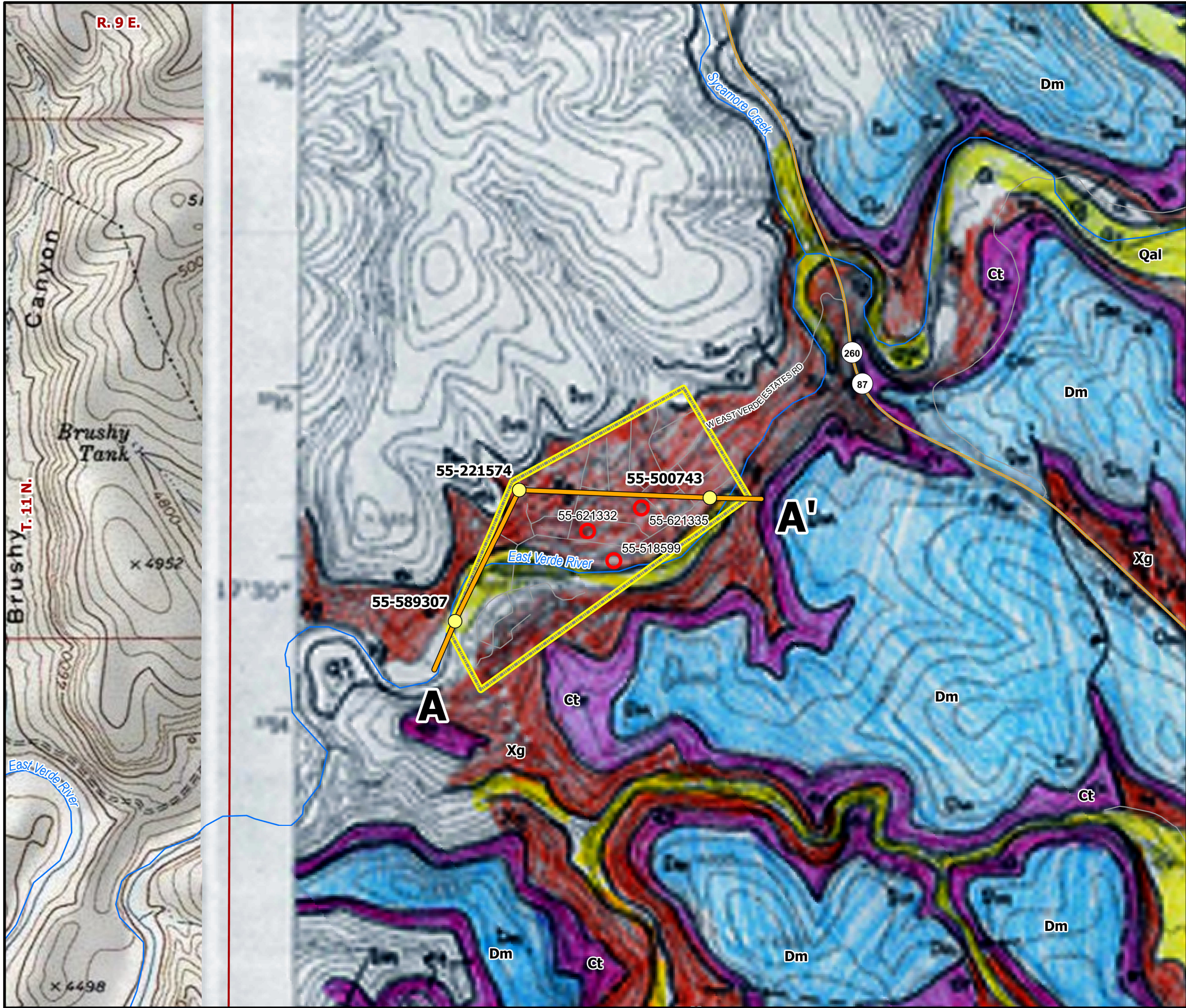
ADEQ NITROGEN MANAGEMENT AREA
PRELIMINARY DESIGNATION
PAYSON WATER - EAST VERDE ESTATES

FIGURE NUMBER:

2

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TU	BH	24-0921
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EXPLANATION

- EPDS Well
 - Cross Section Well
 - Line of Cross Section
 - ~ Assessed Streams (2024)
 - Township
- Community Water System**
- Payon Water - East Verde Estates

Surficial Geology

- Xg = Precambrian Payson Granite
- Ct = Cambrian Tapeats Sandstone
- Dm = Devonian Martin Formation
- Qal = Quaternary Alluvium

Notes
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 Surficial Geology - Provided by Skotniki
 EPDS - Entry Point Distribution System

SURFICIAL GEOLOGY MAP	
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DATE:	DATE:
06/18/2025	06/18/2025

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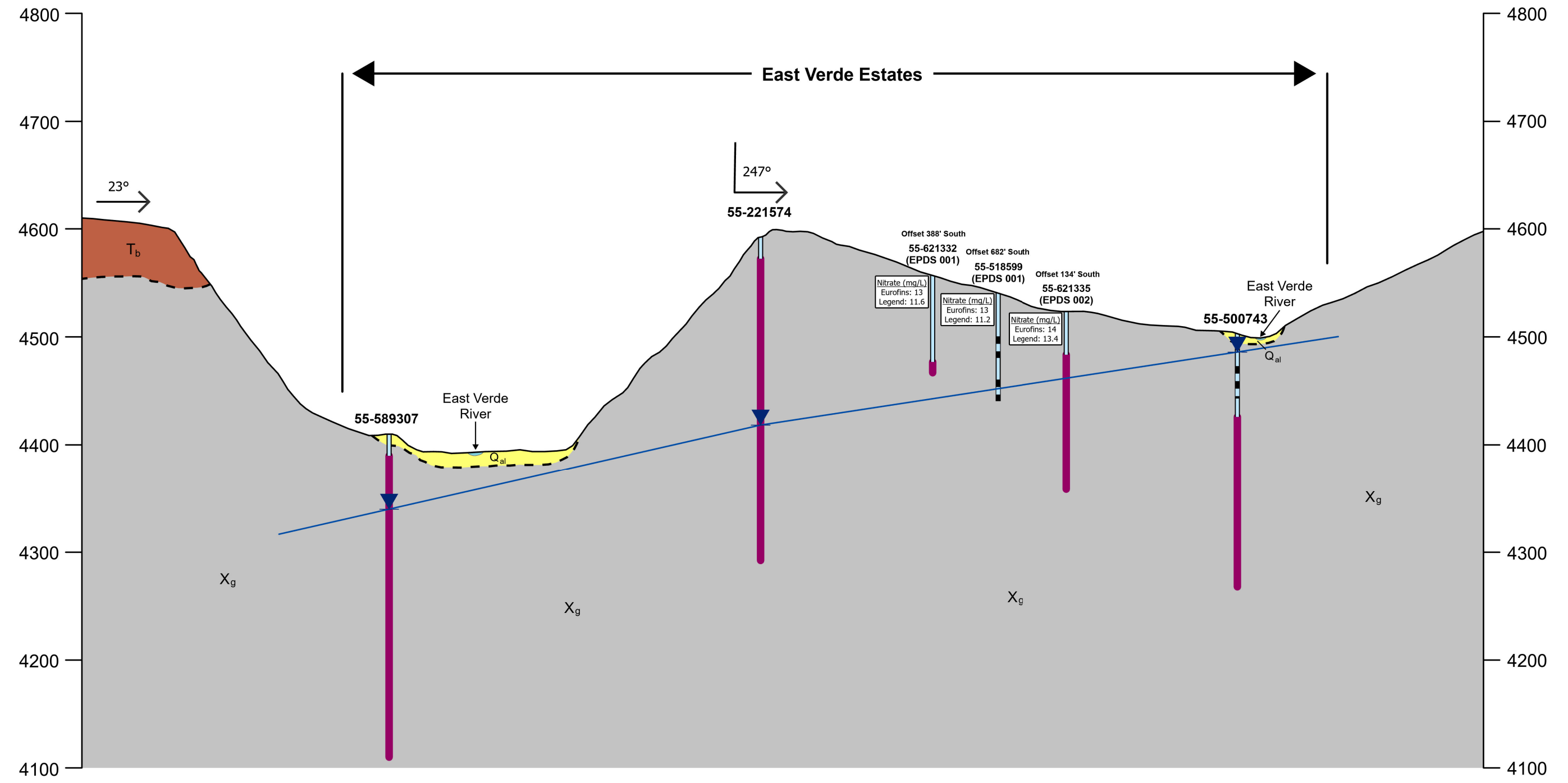
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**ADEQ NITROGEN MANAGEMENT AREA
 PRELIMINARY DESIGNATION
 PAYSON WATER - EAST VERDE ESTATES**

FIGURE NUMBER:
3

A
SOUTHWEST

A'
NORTHEAST



EXPLANATION

- Groundwater Elevation
- Open Borehole
- Blank Well Casing
- Well Screen Interval
- 180° Bend in Cross Section with Azimuth Direction
- Ground Surface
- Inferred Geologic Contact

STRATIGRAPHIC UNIT GENERAL DESCRIPTIONS

PRECAMBRIAN GRANITE	TERTIARY BASALT	QUATERNARY ALLUVIUM
X _g	T _b	Q _{al}

SCALE
HORIZONTAL: 1 in = 400 ft
VERTICAL: 1 in = 100 ft

CROSS SECTION A-A'

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**NITROGEN MANAGEMENT AREA
PAYSON, GILA COUNTY, ARIZONA**

FIGURE NUMBER:

4

PROJECT NUMBER:
24-0921

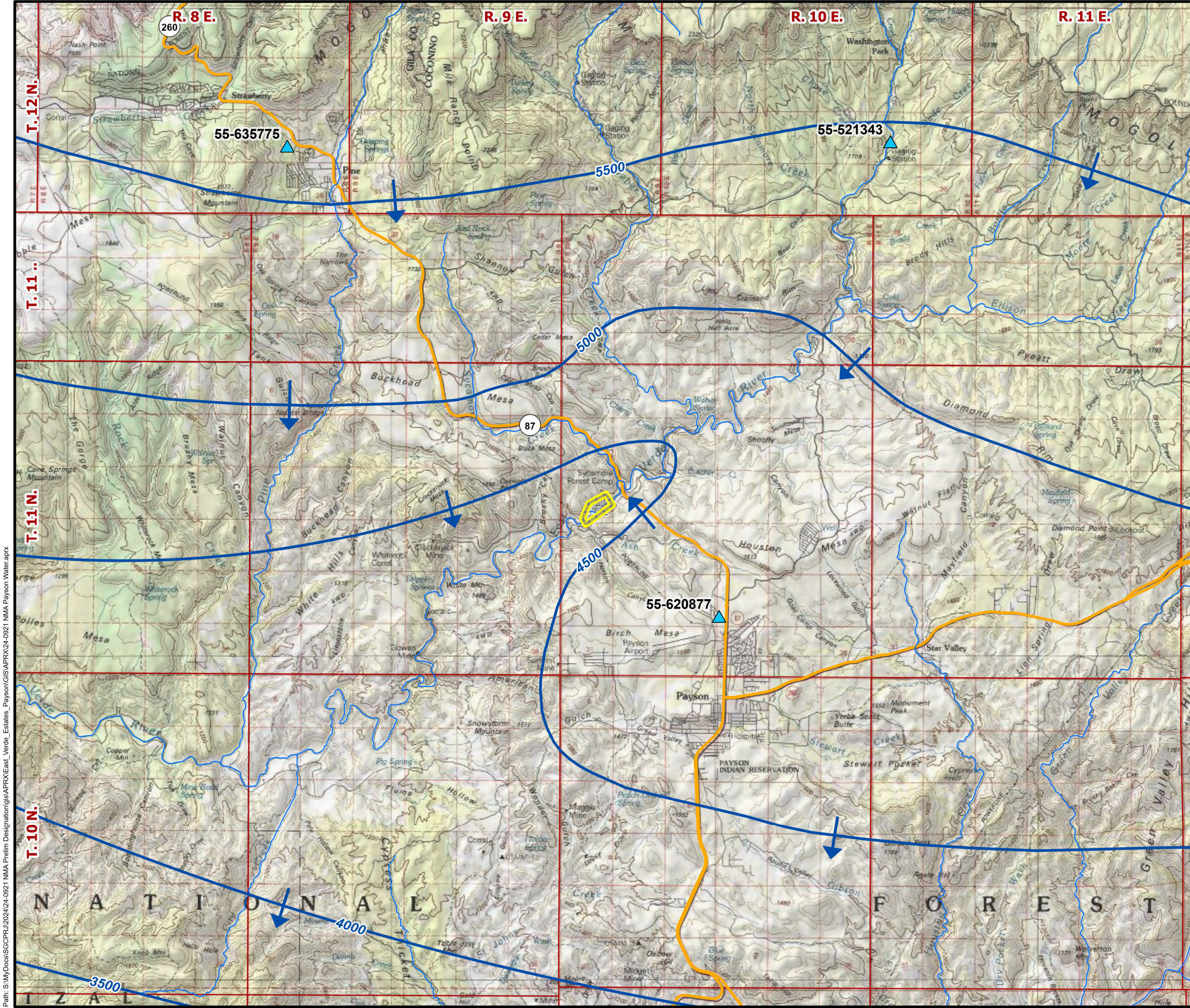
APPROVED BY:
HB

DATE:
06/18/2025

DRAWN BY:
AA

DATE:
06/18/2025

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EXPLANATION

- Township
- ▲ Hydrograph Well
- ~ Assessed Streams (2024)

Community Water System

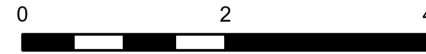
- Payon Water - East Verde Estates

Model Groundwater Elevation

- ~ Contour (ft amsl)
- ~ Contour Interval - 500 feet
- ➔ Model Groundwater Flow Direction



N



0 2 4
Miles

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 Model contour data sourced from Car Ramp Model
 ft amsl - Feet Above Mean Sea Level

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GROUNDWATER ELEVATION MAP

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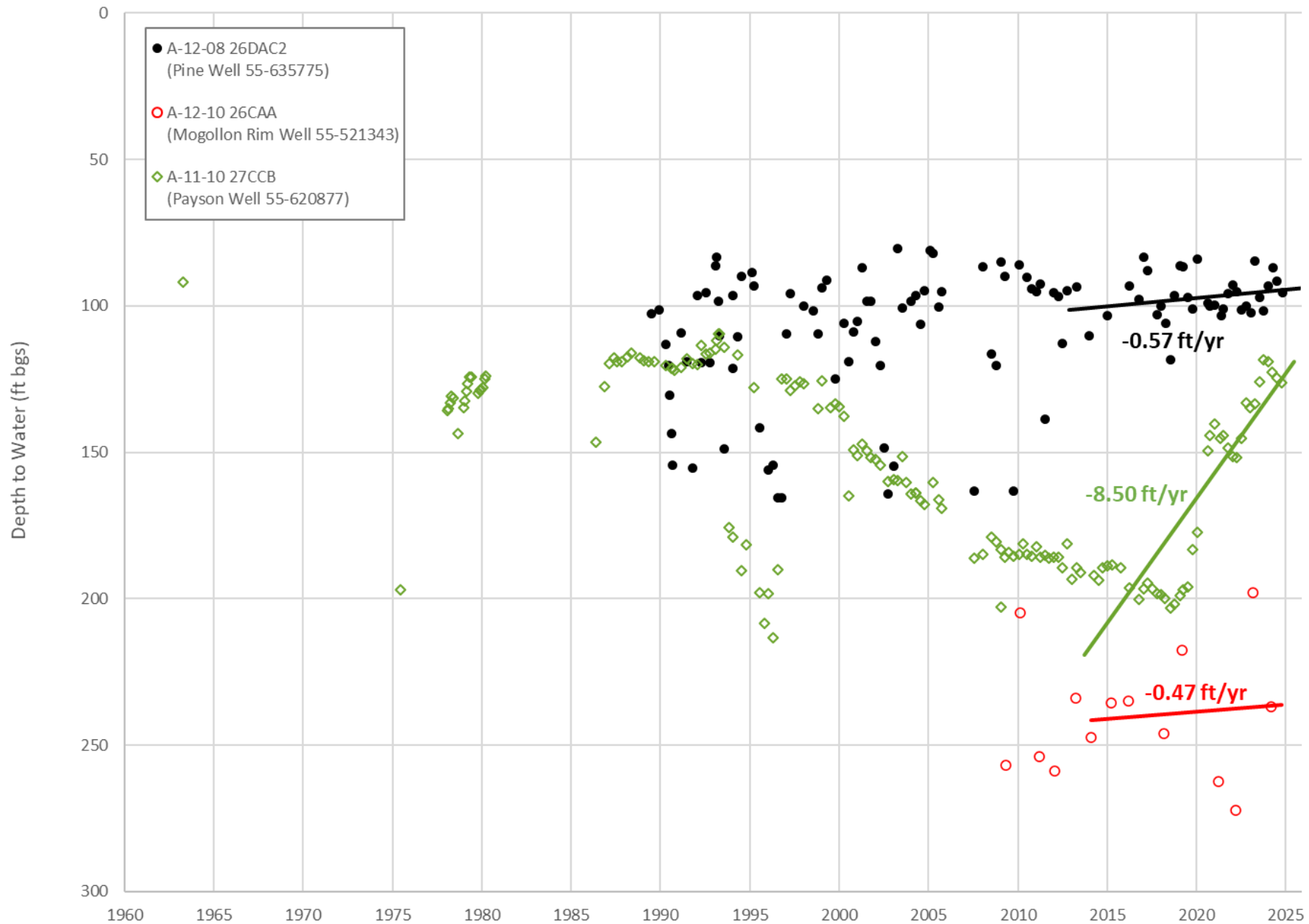
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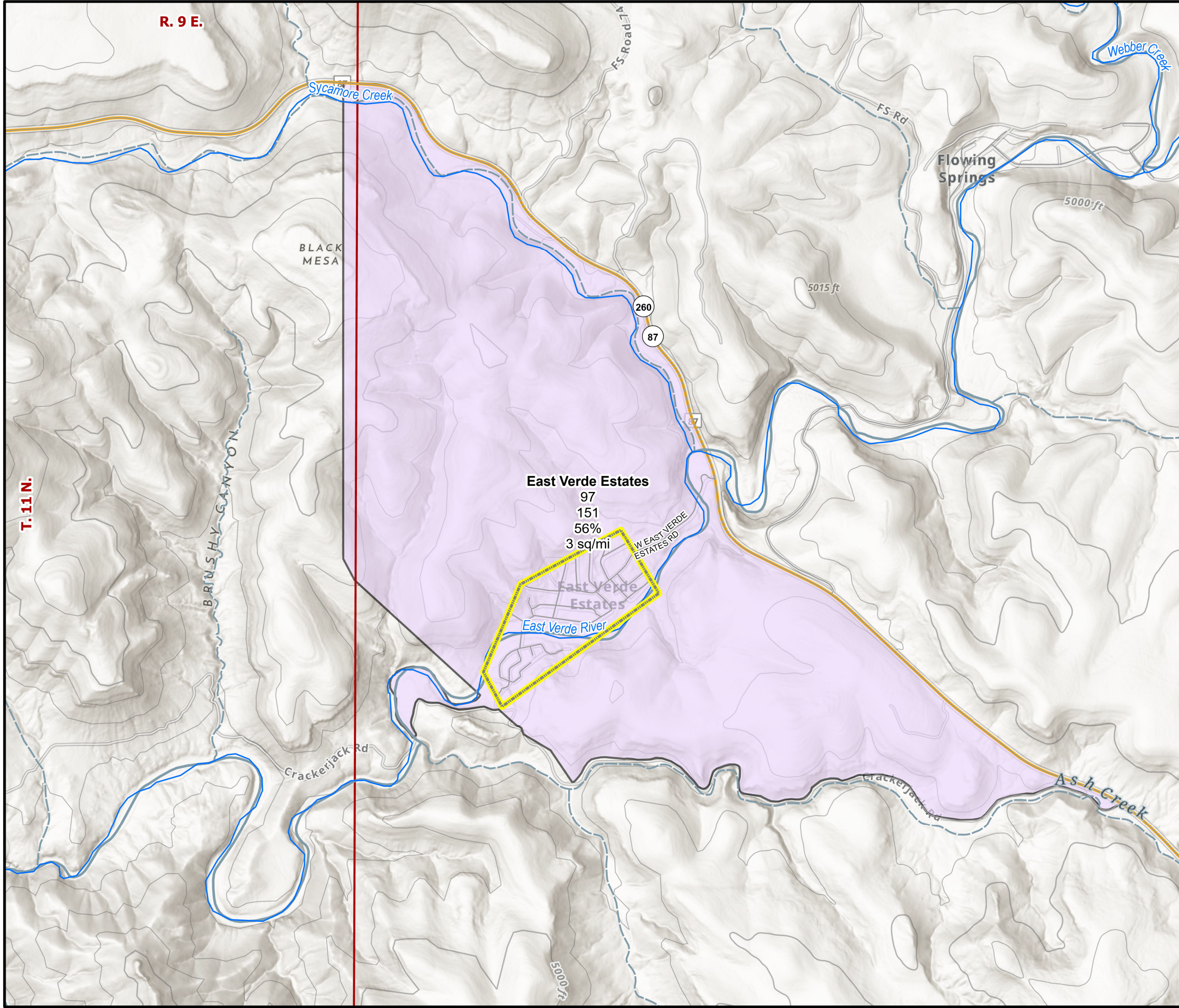
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**ADEQ NITROGEN MANAGEMENT AREA
PRELIMINARY DESIGNATION
PAYSON WATER - EAST VERDE ESTATES**

FIGURE NUMBER:
5

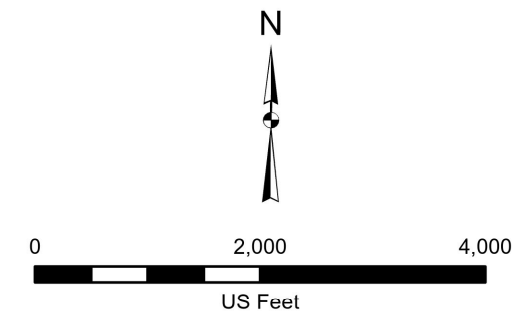


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EXPLANATION

- Assessed Streams (2024)
- Township
- Community Blocks With Population**
 - 2010 Population
 - 2020 Population
 - Percent Change
 - Area in Square Miles
- Community Water System**
 - Payson Water - East Verde Estates



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 PRELIMINARY DESIGNATION
 PAYSON WATER - EAST VERDE ESTATES**

FIGURE NUMBER:
7

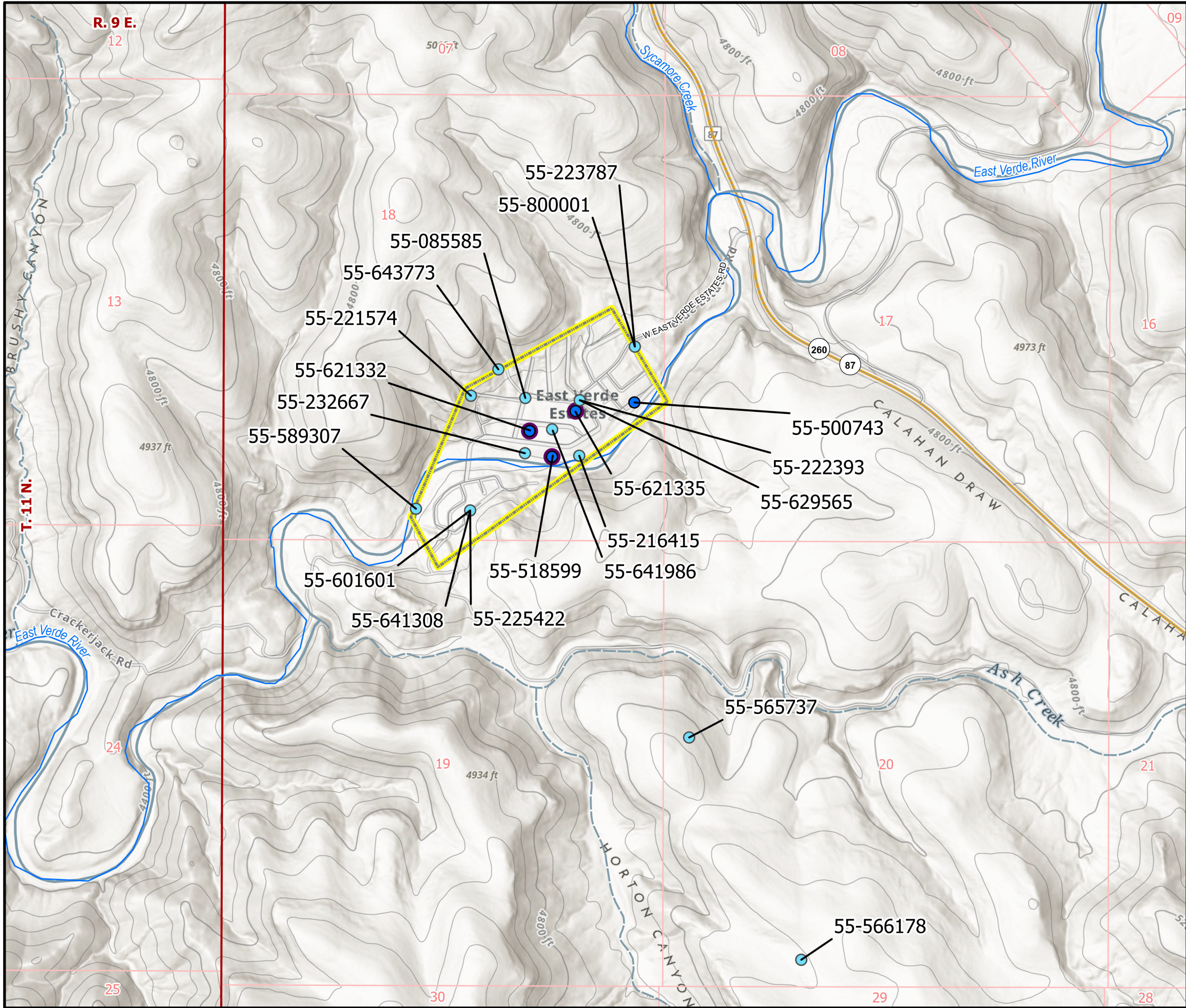
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COMMUNITY BLOCKS WITH POPULATION

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APPROVED BY:	BH	DATE:	06/18/2025

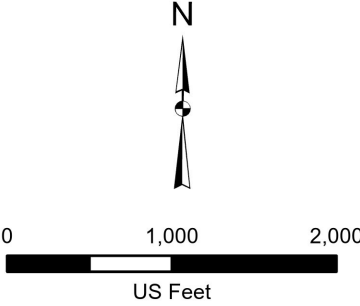
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EXPLANATION

- EPDS Well
- Assessed Streams (2024)
- Section
- Township
- Community Water System**
- Payson Water - East Verde Estates
- Payson Well by Water Use**
- Domestic
- Municipal Use



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 EPDS - Entry Point Distribution System

WELL LOCATION MAP

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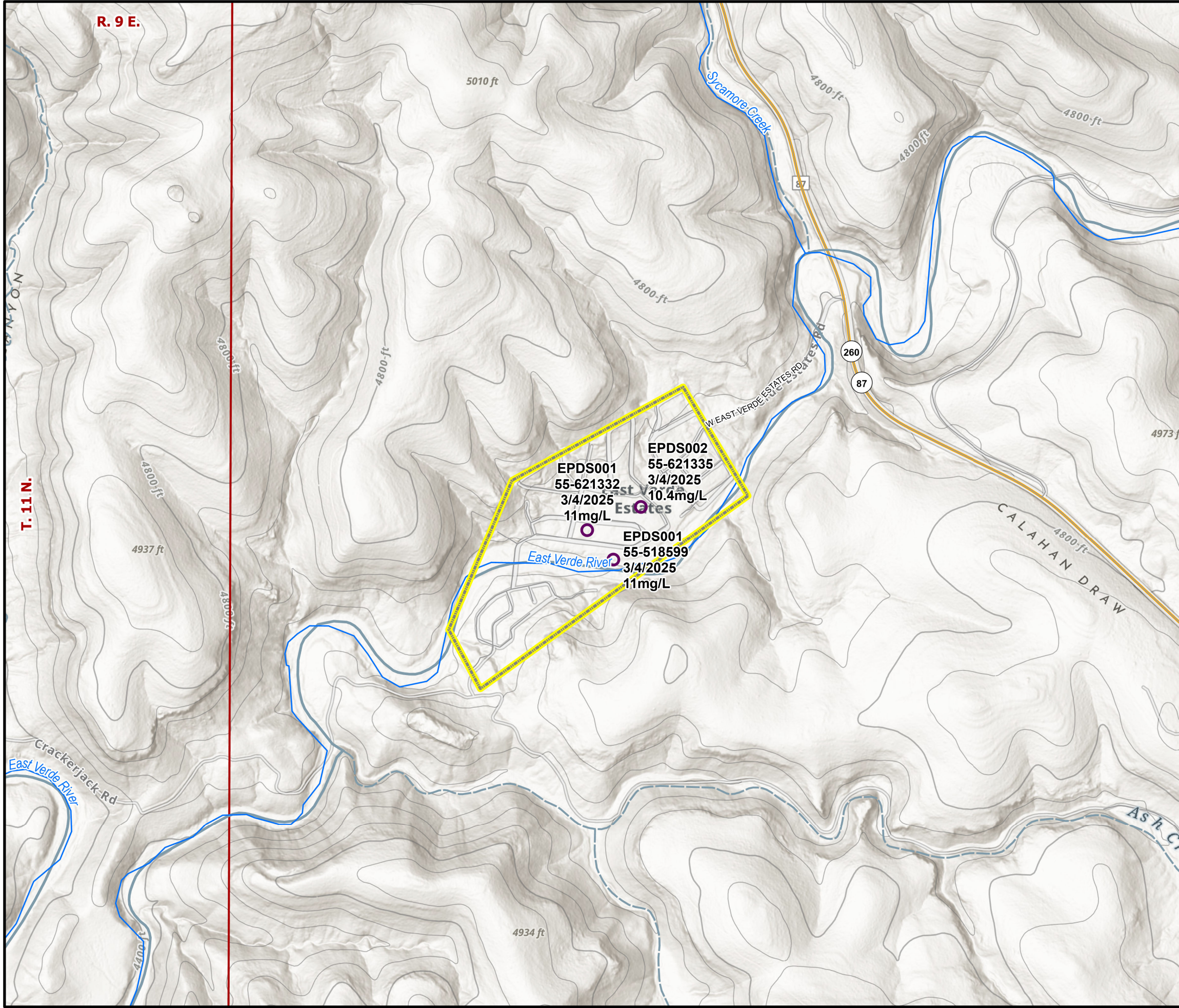
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 PAYSON WATER - EAST VERDE ESTATES

FIGURE NUMBER:

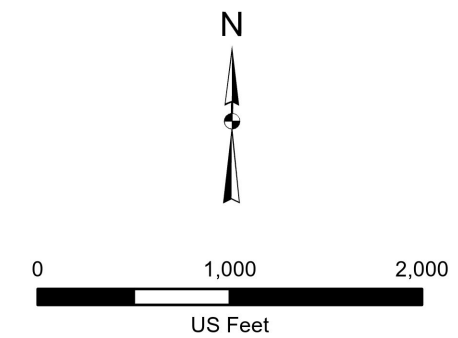
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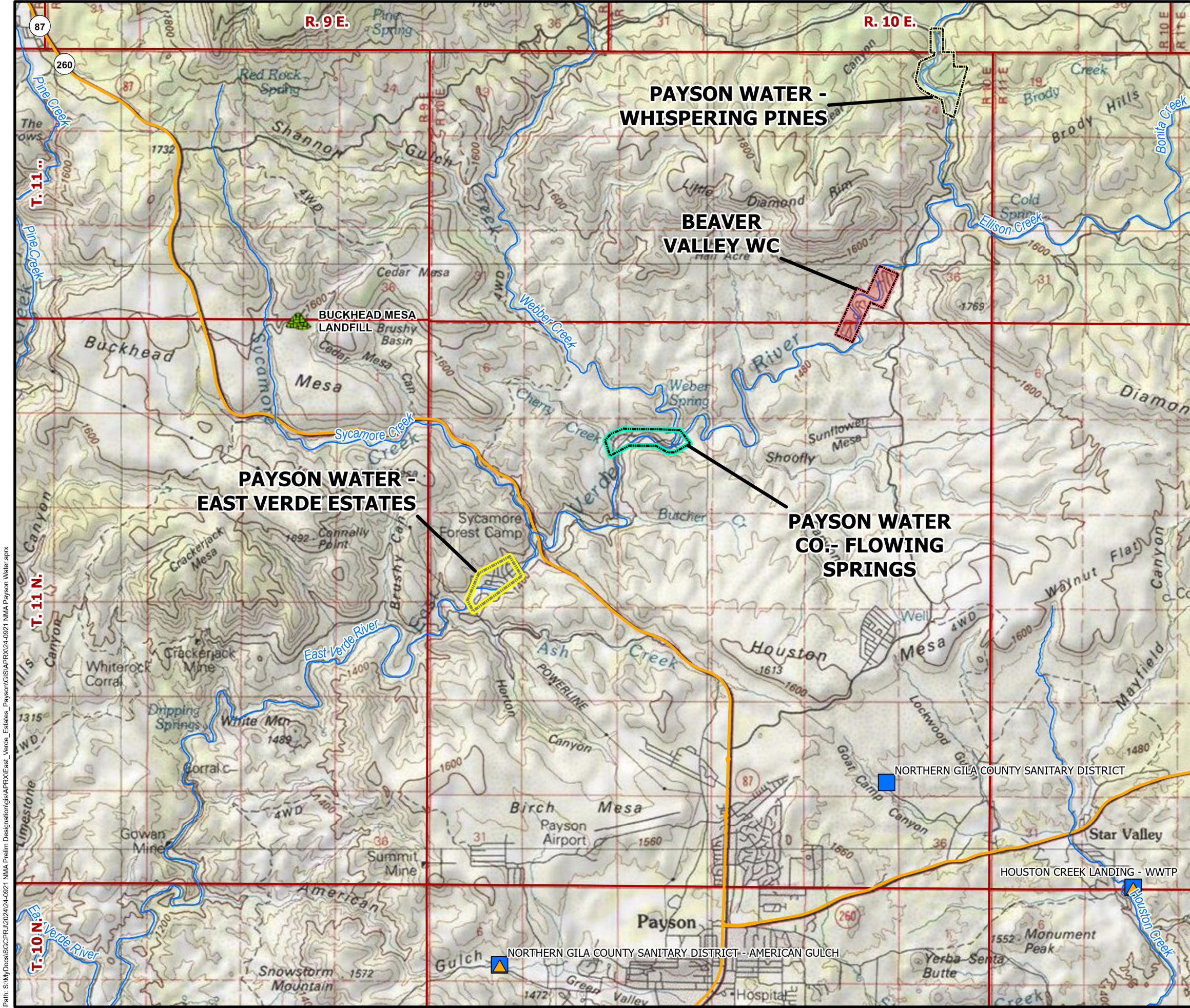
EXPLANATION

- Payson EPDS Well**
 - AWDR Registry ID
 - Sample Date
 - Nitrate Concentration in mg/L
- Assessed Streams (2024)
- Township
- Community Water System**
 - Payson Water - East Verde Estates



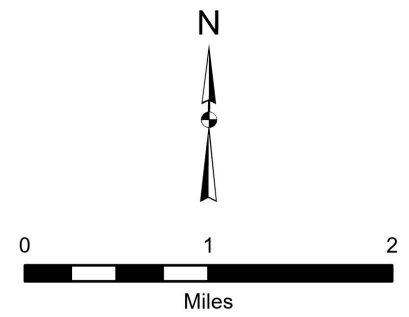
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 , AZGS, ADWR
 mg/L - milligrams per liter

MATRIX NEWORLD <small>A TRUE ENVIRONMENTAL COMPANY</small>	PAYSON WATER - EAST VERDE ESTATES COMMUNITY WATER SYSTEM MAP		APPROVED BY: TU BH DATE: 06/18/2025	PROJECT NUMBER: 24-0921
	ADEQ NITROGEN MANAGEMENT AREA PRELIMINARY DESIGNATION PAYSON WATER - EAST VERDE ESTATES		FIGURE NUMBER: 9	



EXPLANATION

- Aquifer Protection Individual Permits
- Wastewater - Treatment Plants
- Municipal Landfills
- Assessed Streams (2024)
- Township
- Community Water System**
- BEAVER VALLEY CWS
- PAYSON WATER - EAST VERDE ESTATES
- PAYSON WATER - WHISPERING PINES
- PAYSON WATER CO. - FLOWING SPRINGS



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 Hybrid Reference Layer: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, AZGS, ADWR
 WWTF - Waste Water Treatment Facility
 WWTP - Waste Water Treatment Plant
 CWS - Community Water System

POTENTIAL SOURCES OF NITROGEN		APPROVED BY:	PROJECT NUMBER:
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DATE:		APPROVED BY:	DATE:
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 PRELIMINARY DESIGNATION
 PAYSON WATER - EAST VERDE ESTATES**

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10

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APPENDICES

APPENDIX A

ADWR 55- Wells

APPENDIX A
Registered Wells Near East Verde Estates
Nitrogen Management Area - Preliminary Designation Report
Payson Water - East Verde Estates, Payson, Arizona

ADWR Reg No.	Legal Location	Water Use	Well Type	Date Installed	Total Depth (ft)	Water Level (ft bgs)	Casing Depth (ft)	Casing Diameter (in)	Perf Interval (ft bgs)	Pumping Rate (gpm)	Owner
55-589307	A(11-10)18 CDD	Domestic	Water Production - Exempt	3/1/2002	300	70	0	0	--	0	PATRICIA HERMOSILLO
55-641986	A(11-10)18 D00	Domestic	Water Production - Exempt	1/1/1975	65	0	0	6	--	8	ROBERT PERSON
55-807704	A(11-10)18 D00	--	Water Production - Exempt	--	0	0	0	0	--	0	MARK L & PATRICIA K BORTON
55-800001	A(11-10)18 DAA	Domestic	Water Production - Exempt	1/1/1978	100	38	40	4	--	7	MILLER, ROSS,M
55-223787	A(11-10)18 DAA	Domestic	Water Production - Exempt	--	180	50	180	4	140-180	0	CARI GAIL
55-222393	A(11-10)18 DAC	Domestic	Water Production - Exempt	7/26/2013	160	55	160	5	120-160	10	JERRY & CAROL O'FARRELL
55-629565	A(11-10)18 DAC	Domestic	Water Production - Exempt	1/1/1977	110	30	40	5	0-110	15	OSTH,V
55-500743	A(11-10)18 DAD	Municipal Uses	Water Production - Non-Exempt	9/19/1981	235	17	77	8	30-60	0	PAYSON WATER COMPANY INC
55-643773	A(11-10)18 DB0	Domestic	Water Production - Exempt	--	65	22	30	4	--	12	WILLIAMS,W
55-221574	A(11-10)18 DBC	Domestic	Water Production - Exempt	--	300	174	0	0	160-200	0	STEVEN CONLEY
55-085585	A(11-10)18 DBD	Domestic	Water Production - Exempt	1/1/1980	100	28	100	5	40-80	0	BROOKS,D A
55-917359	A(11-10)18 DBD	Domestic	Water Production - Exempt	--	180	82	180	5	200-300	0	LOU MANGANIELLO
55-916498	A(11-10)18 DBD	Domestic	Water Production - Exempt	2/24/2014	360	56	360	5	160-260, 260-360	7	TIANA KA'ANOHIOKALA PRICE
55-232667	A(11-10)18 DCA	Domestic	Water Production - Exempt	--	200	70	23	6	120-160	0	LESLIE AND JULIE BROWN RAND
55-518599	A(11-10)18 DCB	Municipal Uses	Water Production - Non-Exempt	9/4/1987	100	15	100	6	40-60, 80-100	20	PAYSON WATER COMPANY INC
55-522799	A(11-10)18 DCB	Domestic	Cancelled	12/8/1988	100	0	0	6	--	0	HAGLIN, FRANK,
55-641308	A(11-10)18 DCC	Domestic	Water Production - Exempt	1/12/1976	170	51	86	5	--	8	THE DOCKTER FAMILY LIVING TRUST
55-225422	A(11-10)18 DCC	Domestic	Water Production - Exempt	11/12/2015	220	55	220	5	180-220	0	LORI PFUNDHELLER TRUST
55-601601	A(11-10)18 DCC	Domestic	Water Production - Exempt	8/1/1976	150	51	54	5	0-150	20	WESLEY & VERLA DOCKTER, TRUSTEES
55-631107	A(11-10)18 DCC	Domestic	Water Production - Exempt	1/1/1976	80	40	10	5	--	9	SCOTT AND TONI DENNERLINE
55-216415	A(11-10)18 DDB	Domestic	Water Production - Exempt	--	0	0	0	0	120-160	0	GERALDINE DIPPLE LIVING TRUST

APPENDIX A
Registered Wells Near East Verde Estates
Nitrogen Management Area - Preliminary Designation Report
Payson Water - East Verde Estates, Payson, Arizona

ADWR Reg No.	Legal Location	Water Use	Well Type	Date Installed	Total Depth (ft)	Water Level (ft bgs)	Casing Depth (ft)	Casing Diameter (in)	Perf Interval (ft bgs)	Pumping Rate (gpm)	Owner
55-621335	A(11-10)19 000	Utility (Water Co)	Water Production - Exempt	1/1/1955	165	65	40	8	--	5	PAYSON WATER COMPANY INC
55-621332	A(11-10)19 000	Utility (Water Co)	Water Production - Exempt	1/1/1958	90	30	80	8	--	15	PAYSON WATER COMPANY INC
55-500432	A(11-10)19 ABB	Domestic	Water Production - Exempt	--	290	70	60	5	--	0	PAYSON WATER COMPANY INC
55-577466	A(11-10)20 BAD	Domestic	Cancelled	12/30/1899	0	0	0	0	--	0	MARK BJORKMAN
55-565737	A(11-10)20 BCC	Domestic	Water Production - Exempt	--	465	240	20	7	--	0	JOSEPH BROWN
55-922502	A(11-10)20 CCA	Domestic	Water Production - Exempt	6/15/2019	365	168	365	5	200-365	5	EOL INVESTMENTS, LLLP
55-566178	A(11-10)20 CDC	Domestic	Water Production - Exempt	3/7/1998	385	150	20	7	285-385	400	DUTCH POW WOW LLC.
55-573969	A(11-10)20 DAB	Domestic	Cancelled	12/30/1899	0	0	0	0	--	0	KERRY GORMAN
55-905939	A(11-10)20 DAD	Domestic	Water Production - Exempt	--	0	0	0	0	--	0	JOE BROWN
55-544457	A(11-10)22 BBC	Domestic	Water Production - Exempt	2/18/1995	320	210	320	6	200-220, 300-320	4	MARTIN, JOSEPH,J

Notes: All data are from the ADWR Wells 55 CD
Bold/Shade - Wells that supply water to the Community Water Systems