City of Woodland's Aquifer Storage and Recovery: Well 31 Project

Bureau of Reclamation
WaterSMART Drought Response Program Grant Application
Notice of Funding Opportunity No. R25AS00013

October 7, 2024

Applicant: City of Woodland
Project Manager: Matt Cohen, Associate Engineer
300 First Street Woodland, CA 95695
Matt.Cohen@cityofwoodland.gov, 530.661.5973

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EXECUTIVE SUMMARY

The City of Woodland presents the following executive summary of the ***City's Aquifer Storage and Recovery Well 31 Project***.

Applicant. The City of Woodland is the applicant, located in Yolo County, California, submitting the application on October 7, 2024. The City is a Category A Applicant.

Task. The City is applying under *Task A - Increasing the Reliability of Water Supplies Through Infrastructure Improvements* and *Task B - Increasing the Reliability of Water Supplies Through Groundwater.*

Funding Group. The City is applying for Funding Group II.

Summary. The City of Woodland's (City) *Aquifer Storage and Recovery (ASR) Well 31 Project (Project),* located in Yolo County, California, will construct an ASR well on City property as part of a comprehensive program to increase groundwater recharge and improve the City's drinking water system reliability during droughts. The Project will replace lost capacity from the failure of a traditional well and increase the City's drought resilience with an additional ASR well to store treated Sacramento River water in an underground aquifer during the winter when surface water is plentiful and municipal demand is lower. The Project will provide residents of a disadvantaged and low-income area with a reliable, potable source of drinking water, as well as provide additional citywide resiliency to future droughts. The City partnered with the City of Davis and the U.S. Bureau of Reclamation (Bureau) to construct a new intake on the Sacramento River in 2016 to divert surface water using newly purchased water rights; the City will divert water during the winter to storage using ASR Well 31. The last two multi-year droughts in California (2013-2016 and 2020-2022) severely impacted the City's water supplies, including an 82% cut to the Woodland-Davis Clean Water Agency's Sacramento River Settlement Contract (CVP) water right from April 14 to December 7, 2022. The City's 2020 Urban Water Management Plan (UWMP), and the 2015 UWMP, identified the Project as a critical future project. The Project is also a priority in the 2022 Yolo Subbasin Groundwater Sustainability Plan as it will increase the reliability of the City's water supply during droughts, ensure water quality standards are met, and provide the State of California and the Bureau additional flexibility to manage important surface water supplies on the Sacramento River.

Length of time and estimated completion date. If awarded, the City will build the well within 27 months from date of execution of the grant agreement (construction start date estimated as October 2025 and completion date estimated as December 2027).

Federal lands or Federal facility. The project is not located on Federal land or a facility.

Applicant background information. The City is an incorporated city of approximately 61,000 residents in Yolo County, California. The city provides water, wastewater, waste management, parks and recreation, and other municipal services.

Water supplies. Table 1 shows the City's 10-year average annual water supply from 2014 to 2023 (in acre-feet). The City supplies surface water from the Sacramento River through the City's wholesale water supplier, the Woodland Davis Clean Water Agency (WDCWA). The City supplies groundwater through native groundwater wells. The City supplies recycled municipal and industrial water through tertiary treatment of wastewater, made possible by the improved water quality after the surface water transition in 2016 and the establishment of a recycled water utility. Other sources represent water supplied by the City's ASR wells.

Table 1. 10-year Average Annual Water Supply 2014-2023 (Acre-Feet, AF)

Year	Surface Water Total (AF)*	WDCWA Groundwater (AF)	Recycled M&I Water (AF)	Other (AF)	Total (AF)
2014	0	10,500.72	0	0	10,500.72
2015	0	8,563.56	0	0	8,563.56
2016	5,028	3,906.44	0	0	8,934.51
2017	9,508	5.16	438	0	9,950.92
2018	11,122	192.14	468	0.48	11,782.64
2019	11,041	0.09	452	594	12,087.60
2020	9,207	1.87	151	1,144	10,504.15
2021	7,487	948.62	124	1,534	10,093.74
2022	8,458	61.62	493	967	9,979.22
2023	10,757	1.46	364	154	11,276.79
				2014-2023 Total Annual Water Supply (AF) =	103,673.83
				Average Annual Water Supply = 10,367.38 AF (Divide Total Supplies for 2014-2023 above by 10)	

*Include water transfers and exchanges that occur on a long-term basis. Exclude single year transfers.

PROJECT LOCATION

The Project is located at 929 Sixth Street in Woodland, CA, at Everman Park on a parcel owned by the City of Woodland with adequate space to replace the failed existing well with an ASR well. The City of Woodland is in Yolo County, California. The well site is near the corner of Sixth Street and Cottage Drive. The project latitude is 38.666500 and the longitude is -121.767880. The coordinates in DMS (degrees, minutes, seconds) are: latitude is 38°39’59.4”N and longitude is 121°46’4.368”W. **Figure 1** below shows the project location and vicinity within the City. **Figure 2** below depicts an overall site plan at the tentative ASR Well 31 site location.

Figure 1: Vicinity Map and Project Site Location

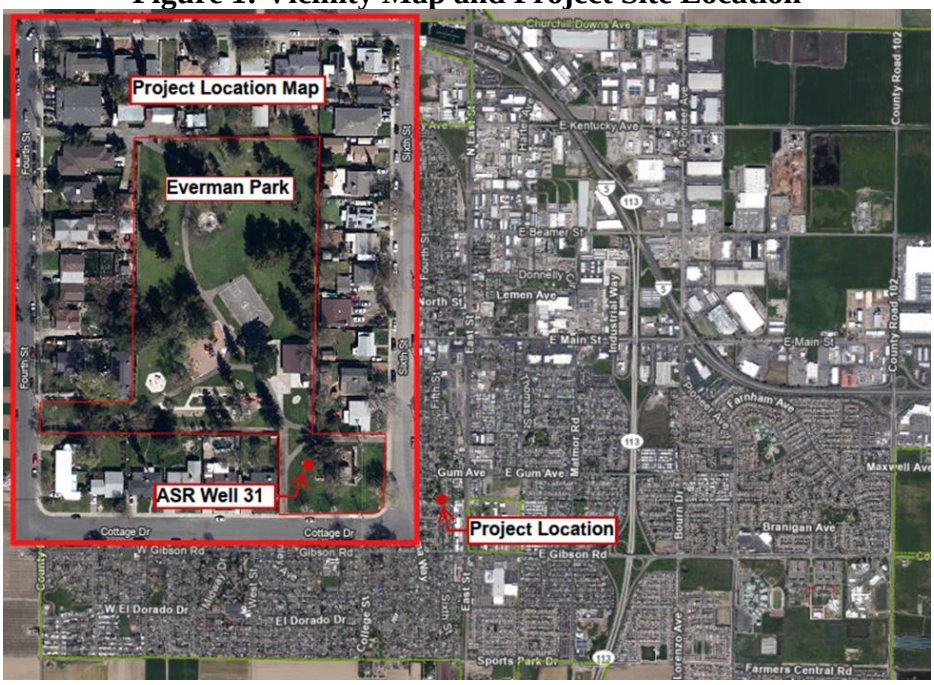
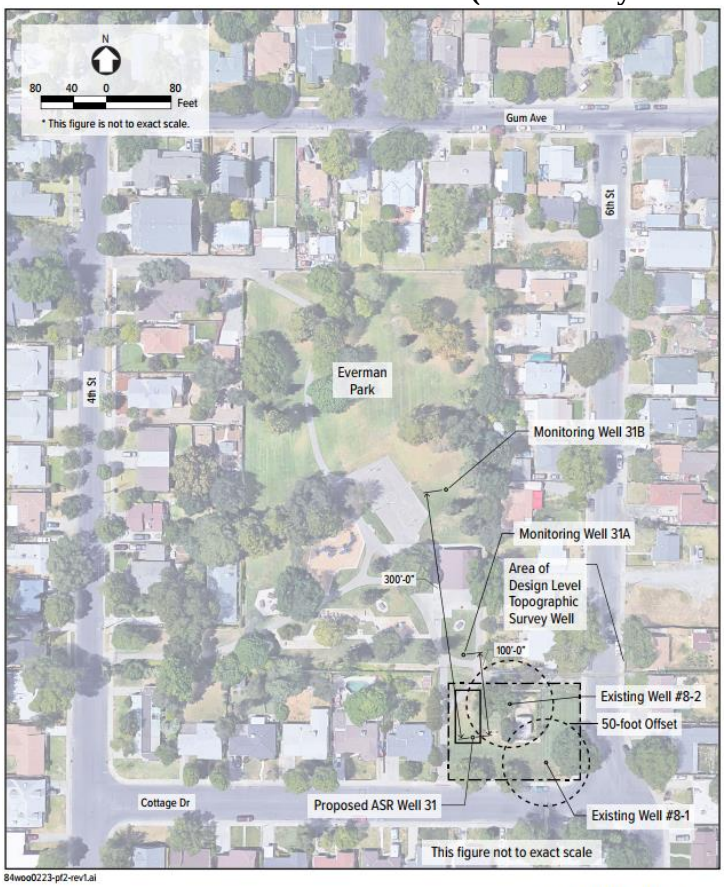


Figure 2: ASR Well 31 Overall Site Plan (Preliminary Site Location)



PROJECT DESCRIPTION

The following sections describe the technical aspects of the City's Project:

Goals and Objectives. The goal of the Project is to construct a new aquifer storage and recovery (ASR) well with an injection rate of 1,000 gallons per minute (gpm) and a pumping rate of 1,800 gpm. The Project's eight objectives are:

- **Objective 1:** Inject and store over 600 AF per year of treated surface water in the aquifer in winter months for drinking water in summer months to prepare for droughts and improve water system resiliency.
- **Objective 2:** Store water over multiple years to increase the drought resiliency of the City's drinking water system.
- **Objective 3:** Offset lost pumping capacity due to the catastrophic failure of a City well in 2021 and water quality restrictions that severely limit pumping of the City's backup groundwater wells because of the new California hexavalent chromium maximum contaminant limit of 10 parts per billion (ppb).
- **Objective 4:** Offset pumping costs, greenhouse gas emissions, and other environmental contaminants by generating electricity during injection with an in-line micro-hydro system and solar energy through photovoltaic panels on the roof building.
- **Objective 5:** Reduce dependence on supplemental water transfers for drinking water during summer months from the Sacramento River during Term 91 surface water right curtailment (which shuts off WDCWA's primary water rights entirely) and Shasta Critical Year designations (which reduce WDCWA's secondary water rights by 25%).
- **Objective 6:** Reduce dependence on supplemental water transfers in winter months when Term 91 extends past October 31 and WDCWA has no ability to divert from the Sacramento River (WDCWA's secondary water rights are not applicable from Nov 1 – March 31).
- **Objective 7:** Improve distribution system water quality by storing and pumping higher quality surface water as an alternative to lesser quality native groundwater.
- **Objective 8:** Monitor Project performance through construction of two monitoring wells.

Work. The City will construct the ASR well with at least a 16- or 18-inch-inner-diameter casing to accommodate injection/pumping facilities capable of 1,800 gpm production. The City will screen the ASR well in the same zone as the City's existing three ASR Wells to ensure the City is using the same aquifer layer for storage, which is located 450 to 500 feet below the surface. This aquifer layer is 50 feet thick, is composed of sand and small gravel, and is bounded by over 100 feet of clay soils above and below. The well functions similarly to a traditional well but has additional piping and valving to allow injection of water. The City will inject the water into the confined aquifer zone and store the water there until needed for subsequent extraction and use. The City will use the same ASR well equipment the City will use for injection to recover the stored water and pump it back to the distribution system for municipal uses. Other than restoring a chlorine disinfection residual, no additional treatment is required for the recovered drinking water. The Project will include the following components:

1) **Masonry Block Building**. The City will construct the building with a metal standing seam roof like the other ASR wells in Woodland.

2) **SCADA.** The Project will include Supervisory Control and Data Acquisition (SCADA) and integration of this ASR well into the City's SCADA system.

3) **Pump and Other Equipment.** The Project will include a well pump and motor, discharge piping and valves, gates and fences, HVAC for individual rooms inside the buildings, electrical lineups including Variable Frequency Drive (VFD) and renewable energy components, instrumentation, underground piping connecting the existing distribution system, storm drain system, sewer system to the well site, pavement and vehicle travel surface placement, monitoring wells, sample analyzers for chloride and conductivity, chemical storage tanks and dosing systems, security systems and lighting, associated electrical items, and other miscellaneous appurtenances.

4) **Monitoring Wells.** The work will also include construction of two, four-inch diameter monitoring wells approximately 100 feet and 300 feet away from the new ASR well. Monitoring wells will be equipped with level transducers for water level data and probes for water quality data collection.

Approach. The City will use the same approach the City has used to construct the previous ASR wells which serve the City's water system. Specifically, the City will construct the ASR well in two phases as follows:

1) **Well Drilling Phase (Below Ground).** The City will complete the design for well drilling prior to execution of the grant agreement so the Project is shovel ready upon award of the grant. Well design of the drilling phase will include geotechnical investigations to inform pump type and sizing. The City will conduct borehole geophysical logging to obtain additional hydrogeologic information to improve design of the screen assembly, slot sizing, and gravel pack (Silibeads) sizing. Geophysical logging will also include an electric log, caliper log, natural gamma log, and a lithologic log. The City will release the well drilling bid package for construction of the downhole well components, execute a contract with the contractor, and construct the downhole phase of the Project.

2) **Well Equipping Phase (Above Ground).** The City will release a separate bid package for the well equipping phase but use the same engineering designer and construction inspector for Project continuity. The benefit of a separate phase for well equipping is because the well equipping design will depend on important data collection during the well drilling phase, so the City cannot design the well equipping improvements until the City completes well drilling. Well equipping improvements consist of civil, architectural, structural, mechanical, electrical, controls, instrumentation, security systems, and restoration of landscaping disturbed by the Project footprint.

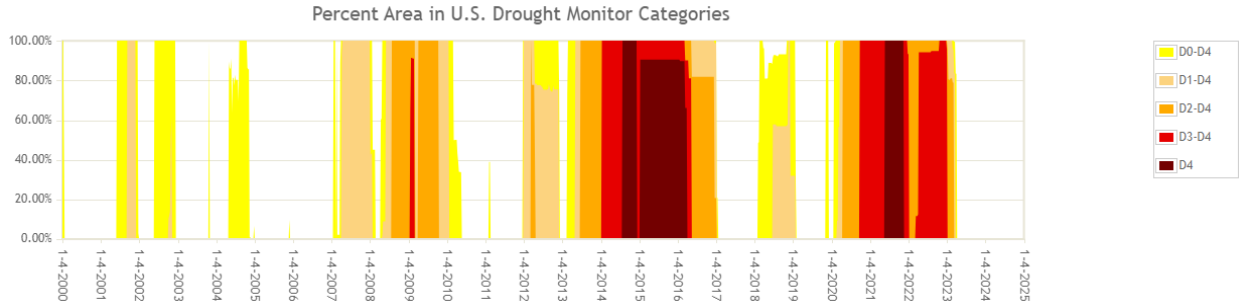
APPLICANT CATEGORY AND ELIGIBILITY OF APPLICANT

Woodland is a Category A Applicant since it is a local governmental water supplier located in California.

EVALUATION CRITERIA

CRITERION A – Severity of Drought or Water Scarcity and Impacts

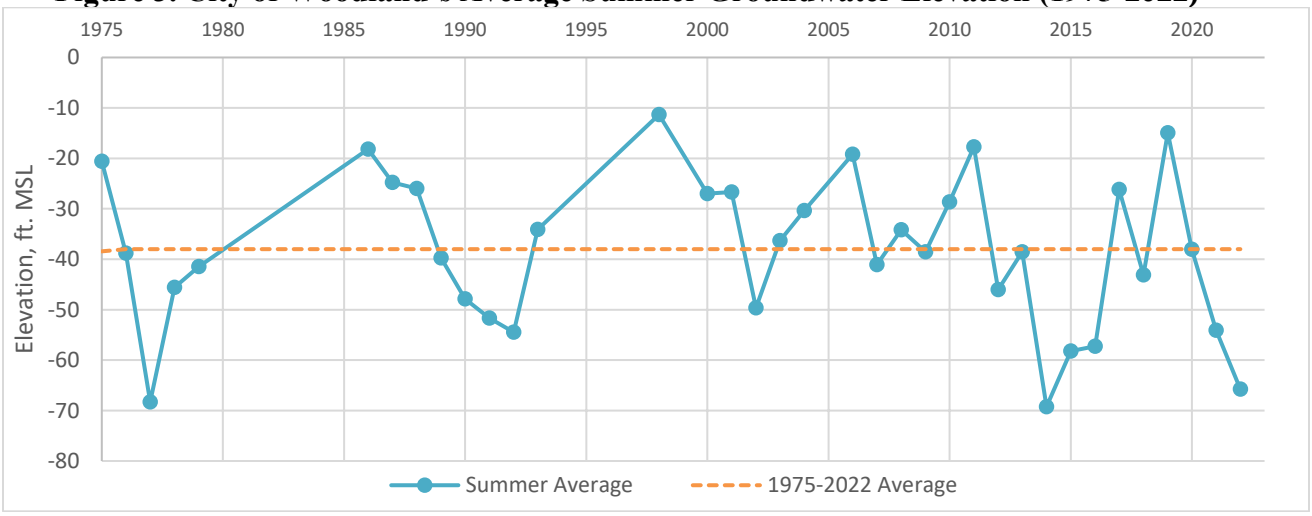
Recent Drought Conditions. The WDCWA and the City experienced severe drought conditions most recently during the 2020-2022 drought that impacted much of the western United States. According to the U.S. Drought Monitor, Yolo County experienced exceptional drought conditions (D4) during June through October of 2021. Impacts from the 2020-2022 drought were especially acute because it began just three years after another historic drought period that lasted from 2012 until late 2016 and a minor drought in 2018. Nearly the entirety of Yolo County was under exceptional drought conditions (D4) from August 2014 to May 2016. Prior to 2020, such a short gap between exceptional drought periods was unprecedented.



Source: https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?fips_06113
Evaluated Area: Yolo County, California

Historically, Woodland has been accustomed to occasional drought conditions that would persist for one or two years before heavy rains returned and brought water supplies back to normal. Figure 3 shows the yearly average summer groundwater elevation in the City's supply wells, representing the seasonal low point in groundwater levels each year. Prior to 2014, the worst drought period was from 1976-1977, during which groundwater levels reached their lowest point on record and recovered back to near average in 1979. After 1979, drought conditions returned periodically, but conditions were not as severe as those experienced in 1976-1977. Additionally, drought frequency during this period (1980-2010) was much less than in the past decade.

Figure 3. City of Woodland's Average Summer Groundwater Elevation (1975-2022)



WDCWA and Woodland currently have gaps in available water rights that threaten to leave them with inadequate water supply in drought years. The original plan, at the onset of the surface water transition, was to use the CVP water right (10,000 AF, subject to a Shasta Critical year of reduction by 25%) as backup to the primary water right during Term 91 curtailments. Historically, the Term 91 curtailment would typically last three to four months in summer and did not extend into November, but in several recent years Term 91 curtailment has extended into November. Woodland experiences water supply shortages from WDCWA during summer months when the Term 91 curtailment lasts longer than four months and especially during a Shasta Critical Year. Water deliveries from WDCWA become reduced to less than 50% of Woodland's daily water demands and the ASR wells or expensive water transfers are necessary to meet demand even with water conservation measures in place. The ASR Well 31 Project is necessary to mitigate this shortage.

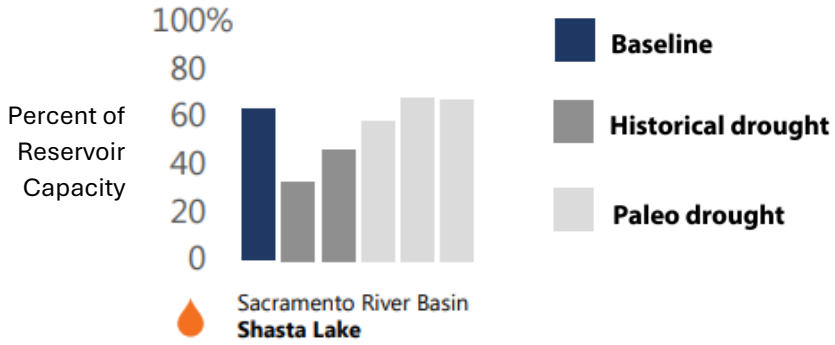
The CVP water right is only valid from April 1 to October 3, leaving Woodland without adequate water supply for years in which Term 91 curtailments are in effect November 1 through March 31. When Term 91 is implemented, Woodland is not allowed to pump water from the Sacramento River under the primary water right, effectively shutting off use of WDCWA if the CVP water rights are also restricted (Shasta Critical Year) or if it's outside the timeframe of applicability (past October 31 and before April 1). Therefore, if Term 91 is in effect at all in the months of November through March, WDCWA has no ability to continue supplying water to Woodland without expensive and unreliable water transfers. The ASR program helps mitigate this lapse in coverage, but currently lacks sufficient capacity to meet demand in drought years without a fourth ASR well.

Winter Term 91 designations were viewed as rare during the planning phase of Woodland's transition to surface water and it was considered a minor risk for Term 91 curtailments to persist past October 31. From 1984 to 2012, Term 91 extended past October 31 in only one year. However, these curtailments have extended past October 31 more frequently in recent years (2013- 2015, 2018, 2020, and 2022). Furthermore, the standards governing Term 91 have evolved so that the post-October curtailments will be more likely going forward. In the decade since 2013, Term 91 has extended past October 31 in more years than not, proving that Woodland should consider it as routine water availability and manage accordingly.

Projected Change in Drought Frequency/Severity. Climate change impacts are expected to further reduce already dwindling water supplies for reservoirs in the Western United States as California's Sustainable Groundwater Management Act (SGMA) will simultaneously drive water suppliers towards surface water. Woodland has recently experienced delayed rainfall relative to historical conditions. This has resulted in an extension of the state-mandated surface water flow [Term 91] curtailment in 6 out of the previous 10 years since 2013. With projections of increased temperatures and decreased precipitation, WDCWA is likely to see lower reservoir levels and continued curtailments of surface water flows. Under these conditions, WDCWA could experience periods in which there would be insufficient water to meet demand.

The Bureau's "Water Reliability in the West – 2021 SECURE Water Act Report" corroborates the predictions City staff has gathered from other climate analyses. As demonstrated in the SECURE Water Act Report, average drought duration periods are projected to increase in both

the lower scenario and higher scenarios. The following table shows average reservoir storage as a percentage of capacity on Sept 30 for the historical baseline (dark blue), historical drought events (gray), and paleo drought events (light gray; based on paleo-reconstructed streamflow modeling, which includes analyses derived from tree rings). As shown, the historical drought impacts in the Sacramento River Basin watershed, which supplies surface water to Woodland, is more impacted than the baseline reservoir storage.



Source: https://www.usbr.gov/climate/secure/docs/2021secure/2021SECUREReport.pdf

Public Health Concerns. The WDCWA surface water right curtailments, Term 91 and Shasta Critical Year designations have limited the City's ability to provide high quality treated surface water to customers on a year-round basis. The City currently has three ASR wells to store treated surface water and provide supplemental supply capacity. The WDCWA water supply and use of the three existing ASR wells was not sufficient to meet demand in the critically dry years of 2021 and 2022. Woodland required customers to conserve water with a goal of a 20% reduction and supplemented the water supply with 950 AF of native groundwater pumping from May through October 2021 to mitigate the severe surface water curtailments. Woodland's native groundwater has exceeded MCLs for nitrate and hexavalent chromium and is high in hardness and salinity. As a result, customers suffered degraded water quality in 2021, and many considered installing water softeners or water purification devices.

Environmental Impacts. No environmental impacts to endangered, threatened or candidate species, or habitat arising from water availability have been identified within the City. However, the project is expected to have positive environmental benefits for endangered and threatened species in the Yolo Bypass, Sacramento River, and San Francisco Bay Delta by reducing selenium, nitrate, and salinity in Woodland's treated wastewater effluent, which travels through those water bodies towards the Pacific Ocean. These positive environmental impacts are discussed in more detail in the Ecological Benefits section (Sub-Criterion B.3.b.).

Economic Losses. The WDCWA has a 10,000 AF CVP water right for use during Term-91 curtailments, but it is subject to a Shasta Critical year designation, which can severely limit water availability. Contractually, WDCWA's CVP water right can be curtailed by 25% during a Shasta Critical designation. However, in 2022 the right was curtailed by 82%, leaving Woodland with only 1,800 AF of withdrawals from the Sacramento River while the City's primary water right was shut off entirely (see the March 2022 letter from USBR providing the Second Update to Notification of Critical Year to WDCWA included in **Appendix A**). To cover the shortfall, WDCWA entered into water transfer agreements for the rights to pump 7,300 AF at a cost of

over $5,000,000. Additionally, Woodland still needed to pump native groundwater supply due to lack of sufficient surface water purchases and stored water in existing ASR wells. Given the dramatic increase in probability of Woodland being without sufficient water rights to maintain surface water year-round, WDCWA has had to incorporate purchasing of supplemental water rights into the budget, resulting in increased water rates for customers.

Other Impacts.
Continued reliance on expensive water transfers to meet municipal demands may not always be an option. As water becomes scarcer, permitting, water availability, and water cost will limit the use of transfers. Had the most recent drought continued another year, there would likely not have been water available to purchase. When water is available, permits must be obtained from several state and federal agencies. Additionally, during 2022, the cost of water transfers became prohibitively expensive in parts of the Central Valley with some water districts paying upwards of $3,000/AF. Water transfer costs of this magnitude would greatly affect water rate payers and the disadvantaged community in Woodland.

CRITERION B – Project Benefits

Total Project Water Yield (AFY)	475-1,425
City's Average Annual Water Supply (AFY)	10,367
Percentage Yield	4.6-13.7%

Estimated Quantity of Additional Supply

The storage capacity of ASR Well 31 is physically indeterminate, as the water is stored between two confining clay layers on top and bottom, but unconfined horizontally. The WDCWA's State Water Resources Control Board (SWRCB) water right (45,000 AF per year) is sufficiently large that it is also not a limiting factor. The limiting factor for water storage capacity of ASR Well 31 is the injection capacity as a function of time in which Term 91 is not in effect. At 1,000 gallons per minute (gpm) injection rate, the City can inject 135 AF/month to storage through ASR Well 31 (calculated as the injection rate in AF/day for 5 months of injection). The injection window is subject to Term 91 curtailments, but it is reliably five months in duration, outside of drought years. Whereas the maximum injection window is from November 1 – April 30 (6 months), 5 months is a conservative estimate that accounts for Term 91 more frequently extending into the injection timeframe. ASR Well 31 can therefore be assumed to store approximately 675 AF/year, or 6,750 AF total injection over a decade.

Operationally, ASR Well 31 will be needed when it is a dry or Shasta Critical Year, and its use will depend on the City's summer demand and Term 91 conditions. During a dry year, the well would operate for two to six months. Operating at 1,800 gpm for two months results in an additional water supply of 475 AF of water supply and operating at that same pumping rate for six months results in an additional 1,425 AF of water supply. When ASR Well 31 is used, there would be direct savings to the groundwater of approximately 475 AF and 1,425 AF in a two- and six-month period, respectively.

Over a 10-year period, the Project is expected to pump on average 600 AF/year for water supply. ASR Well 31 will be used for emergency supply and peak day demand in all year types in addition to providing sustained resiliency during droughts. Given the severity of drought over the past decade and climate change projections, the calculation includes 4 years of drought pumping within the decade. During each drought year, the well would likely pump for six months at 1,800 gpm, yielding 1,432 AF per year, or 5,728 AF over four years. A total of 272 AF is expected in the remaining six years, as the ASR Well will be used for supplemental supply during peak demand and when Term 91 curtailment extends past October. Therefore, the City estimates about 6,000 AF of water supply from the Project over a 10-year period, equating to an annual average of 600 AF per year.

The net average recharge (surface water injected minus surface water extracted) of ASR Well 31 is estimated as 75 AF per year after the formation of the buffer zone. The buffer zone typically requires two winters of injection to form; it is a mixed layer of surface water and groundwater quality not meant to be recovered but meant to buffer the stored surface water quality from the native groundwater outside the storage bubble. The buffer zone will be formed through injection of approximately 460 AF, adding to the net recharge. The 10-year net recharge, after accounting for buffer zone formation and expected annual injection/recovery volumes, is calculated to be 1,210 AF over the first 10-year period of operation (460 AF + 75 AF/year * 10 years).

Percentage of Total Water Supply that the Project Water Yield Represents

The project's water yield range of 475 to 1,425 AF during drought years represents 4.6% to 13.7% percent of the City's total water supply (the City's 10-year average annual water supply is 10,367 AF per year). Over a 10-year period with a mix of water year types, the Project's water yield is on average 5.8% of the total water supply (6,000 AF / 103,674 AF of supplied water per decade).

The project's expected 675 AF annual injection volume represents approximately 6.5% of the annual water supply.

Project Builds Long-Term Drought Resilience

By enhancing storage capacity and water portfolio, the Project ensures long-term resilience for the City. The Project allows storage of excess winter flows from Sacramento River for use in critical dry years. There are no intended interruptions in water storage; however, the ability to store water in ASR Well 31 will be dependent on the availability of excess winter water. The City can store water in the ASR wells when the Term 91 curtailment is not in effect. In most years, the Project will store water for at least 7 months of the year and in drought years, the Project will store water for at least 4 months. Additionally, variability in the use of ASR Well 31 will be driven by the hydrology and availability of regular surface water supplies.

Years the Project will Provide Benefits

Benefits will be provided for the life of the Project, which is estimated as 50 years. ASR Well 31 will be used extensively in dry years after water has been stored or as needed in any year type, for peak demand and emergency supply. The Project will provide benefits to the aquifer in wet years when the surface water is stored and recharges the aquifer. In dry years when surface water is limited, the Project will provide benefits to the City and water users that rely on consistent

supply. In drought years, the Project will reduce water transfer costs. For example, in 2022, WDCWA and the City paid $700/AF for water; had ASR Well 31 been operational and provided 1,432 AF of water, costs would have been reduced by $1,002,400. The water cost impacts all rate payers equally, including disadvantaged communities.

Qualitative Description of the Significance of Benefits

By allowing the City to enhance their water storage capacity, the Project ensures the City has resilient water supplies and can independently operate during dry or critical water years when surface water supplies are limited. Recent years have seen longer Term 91 curtailments and more frequent multi-year droughts. Future droughts may result in significantly more expensive water, or water transfers may not be available. Furthermore, the Project allows for greater regional flexibility to ensure adequate water supplies in neighboring cities. Since the City, Davis, and UC Davis share water produced by WDCWA, the City can preferentially use the ASR wells and transfer water capacity via WDCWA to Davis and UC Davis.

By optimizing the use of excess winter water and storing it in ASR Well 31, the City will conserve winter water supply for use in summer when water supplies are limited. This project positions the City to manage to extremes and store excess winter water for dry-year extraction, conserving a precious resource for access at a critical time.

When compared to other methods of high-volume water storage, such as above ground tanks and reservoirs, ASR presents order of magnitude cost savings.

Projects Ability to Buffer Against Water Shortages

The Project will increase the City's storage capacity by 675 AF per year, significantly enhancing the water portfolio and allowing Woodland to be properly prepared for surface water shortages in dry years. The Project will store water over multiple winters, building a large storage volume to use in drought years. Additionally, if there are emergency issues with the City's main water supply during non-drought years, ASR Well 31 provides the City with a portion of needed water supply. Cities are required by the SWRCB to maintain sufficient backup water supplies to meet peak demands and emergency redundancy of ASR Well 31 will allow the City to meet peak demands and minimize degrading water quality.

SUB-CRITERION B.3. –Additional Project Benefits

The Project is expected to have a plethora of additional benefits beyond the primary groundwater recharge and potable water supply benefits discussed in sub-criterion B.1. These additional benefits include improved water quality, resiliency, renewable energy generation, flexibility for State Water Project (SWP) and Central Valley Project (CVP) operation, groundwater monitoring, and aesthetics (the well building will look pretty). These benefits are discussed in more detail in the paragraphs below. Climate change and ecological benefits are discussed in further detail in Sub-Criterion B.3.a. and B.3.b., respectively.

SUB-CRITERION B.3.a. – Climate Change

Natural Hazard Risk Reductions

The City and WDCWA completed risk and resiliency assessments and updated their emergency response plans in 2021 as required by America's Water Infrastructure Act. During this process, the City and WDCWA evaluated hazard risks associated with earthquakes, flooding, severe weather, wildfire, and drought. As climate change impacts intensify over time, the risk of flooding, severe weather, and wildfire impacts to critical facilities in the basin increases. The Project provides resiliency and reduces risk to the water system for these natural hazards.

When flood risk is highest in winter months, the Project will store excess surface water, mitigating flood impacts downstream. Specifically, the Project will store about 675 acre-feet (AF) per year of treated surface water in the aquifer in wet conditions. The Project would provide redundancy to support operations if there is a disruption to other critical water supply facilities.

Renewable Energy

The Project includes renewable energy components to offset greenhouse gas emissions and reduce electrical operational costs. The Project will generate electricity during injection with an in-line micro-hydroelectricity system and solar energy year-round via solar photovoltaic panels (solar array) on the building's roof.

The in-line micro-hydro electricity generation would produce electricity during ASR injection in winter months. The system is expected to produce 67 megawatt-hours (MWh) of electricity each injection cycle, as calculated below. The turbine is estimated to have an efficiency of 78%. The injection flowrate is assumed to be 1,000 gpm, which equates to 0.063 cubic meters per second. The water pressure at the site is assumed to be 55 psi, equal to 379,212 Pa. Using the power equation, P (watts) = pump efficiency * Q (flowrate in cubic meters per second) * Pressure (in Pascals), the in-line micro-hydro turbine is calculated to produce 18,634 watts during use, or 18.6 kilowatts (kW). For a 5-month injection cycle per year, which equates to approximately 3,650 hours, the turbine is expected to produce 66,988 kWh/year, or 67 MWh/year.

The solar array is expected to produce 21.7 MWh per year, based on the following assumptions. The calculation assumes installing solar panels on half of the roof (the other half will have a roof hatch for crane access). That half of the roof is 50 ft in length and 15.8 ft in height, or about 775 square feet. Accounting for fire setbacks, that area can accommodate a 13.5 kW solar array, assuming 330-watt panels taking up 18.3 square feet per panel. Woodland receives about 5.5 peak sun hours per day, resulting in 21,726 kWh/year of electricity generation at a 32-degree pitch, the pitch of the City's existing ASR well buildings.

The combined renewable energy generation of the project, including the in-line micro-hydroelectricity generation during injection and year-round solar energy (especially concentrated in the summer), will be approximately 88.7 MWh of renewable electricity per year. For comparison, the City's ASR Well 30 used 345.5 MWh of electricity over a 12-month period from February 2020 – January 2021, a timeframe representing typical use during a drought year. Thus, annual renewable energy generation from existing ASR Well 30 represents approximately 25% of the ASR well's energy use during a typical drought year. In a typical non-drought year, an ASR well uses about 110 MWh/year, meaning the renewable energy generation of an ASR Well can produce as much as 80% or more of the electricity usage in a non-drought year.

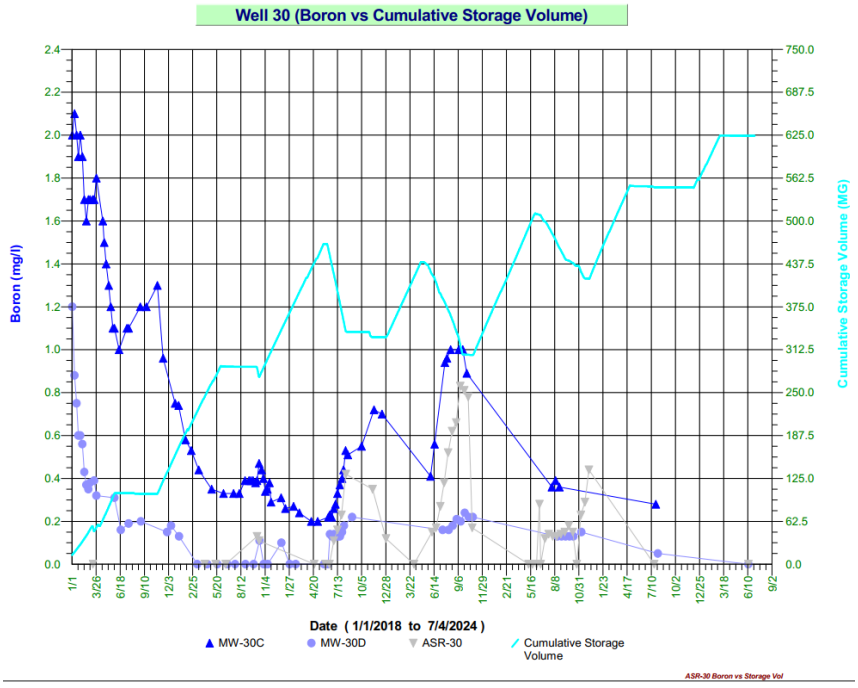
Sustainable Infrastructure

The Project itself is sustainable infrastructure that will improve community climate resilience to drought. The Project will support both short- and long-term community needs and sustainability goals. The Project is consistent with section 4A of the City's 2017 Climate Action Plan, which outlines the goals for renewable electricity production through solar and other means. The Project will be designed and constructed generally following LEED principles. The Project will incorporate a high-efficiency pump and motor as well as efficient lighting and air conditioning. ASR Well 31 will function as a rechargeable potable water battery and renewable energy generating station, improving the community's resiliency to the effects of climate change and reducing greenhouse gas emissions associated with water supply.

Reduce and Mitigate Air and Water Pollution

The Project will provide a new source of high-quality drinking water to a disadvantaged community currently relying on water supply from backup groundwater wells with levels of hexavalent chromium in exceedance of the MCL. The Project will improve groundwater quality by providing stored surface water lower in nitrates, chromium (hexavalent chromium and total chromium), salinity, and selenium compared to native groundwater, and in offsetting the need to pump groundwater to meet customer demand. Figure 4 is the City's water quality tracing for ASR Well 30 illustrating reduced boron concentrations over time with additional storage.

Figure 4. City of Woodland's ASR Program Water Quality Tracing – Boron



Improving potable water quality also improves wastewater treatment effluent quality, which flows through the Yolo Bypass, Sacramento River, and San Francisco Bay and Sacramento-San Joaquin River Delta. The reductions in selenium, nitrate, and salinity provide benefits to ecosystems dependent on these water bodies, as discussed further in the Ecological Benefits section.

The Project will mitigate air pollutants through renewable energy generation, reducing greenhouse gas emissions as well as nitrous oxides, sulfur oxide, particulate matter, VOCs, and other pollutants associated with natural gas and biomass powerplants.

Conservation or Management Component to Protect Water Supplies

From the beginning, water *conservation* has been an essential component of the larger project to convert to water supplied by WDCWA and develop the ASR well program. A key driver of "right sizing" ASR well facilities was to incorporate permanent conservation measures. The Project is predicated on protecting water supplies for other beneficial uses. Whereas the water system paradigm before the City's conversion to surface water in 2016 involved declining groundwater levels and declining groundwater quality, the ASR program has supported groundwater recharge and improved groundwater quality. In the old paradigm, the City had to lower pumps at traditional groundwater wells during the 2013-2016 drought. Since 2016, the City has demolished groundwater wells that were declining in water quality (increasing nitrates and hexavalent chromium levels over time) and has been improving groundwater quality through net recharge of the aquifer with ASR Wells, thereby diluting nitrate, chromium, salinity, etc. Net recharge and reduced dependence on native groundwater pumping has improved water levels and helped stave off lowering of pumps for nearby groundwater users. The Project protects water supplies in the Sacramento River by taking advantage of excess winter flows, storing the water for later use, and thereby reducing dependence on Sacramento River water pumping during critical time periods, providing flexibility for State and Federal management of water dependent ecosystems.

Additionally, the Project will increase flexibility of water *management* in the region and reduce dependency on surface water and groundwater supplies, ultimately protecting water supplies and associated uses. The Project will improve the City's water management flexibility twofold: first, allowing the City to collect and store surface water underground in wet periods for future use in dry conditions and second, diversifying the City's water supply portfolio, thus increasing the City's resilience to climate change impacts on water supply.

The Project's SCADA system and monitoring wells will support effective and flexible water management to protect water supply in the Subbasin. The SCADA system on the ASR well will enable the City to monitor and manage the well in real time and in synergy with other local infrastructure. The Project will also allow the WDCWA to support emergency water transfers to other areas of concern in the region, such as the City of Davis due to Woodland's decreased dependence on surface water during curtailments. The SCADA system will provide critical data to inform adaptive management actions in alignment with State and federal surface water operations tied to the Sacramento River, such as the State Water Project or the Central Valley Project. When the City pumps water from the ASR well in dry conditions rather than relying on surface water, the Project can support additional instream flow in the Sacramento River during critical periods, further protecting surface water supply. When the City injects and stores surface water in the ground in wet conditions, the Project is supporting recharge efforts to reduce negative impacts on water supply and land associated with subsidence.

Other Contributions to Climate Change Resiliency

The City and WDCWA served as a "water and wastewater planning for resilience" case study for the EPA's Climate Resilience Evaluation and Awareness tool (CREAT) (see **Appendix A**). WDCWA and the City used CREAT to assist with climate change related city planning, scenario

development, review of consequences and assets, adaptation planning, and risk assessments. The tool helped the City evaluate its existing and potential adaptation measures, including implementation of another ASR well, to prepare for a hotter, drier, more variable climate future.

The City's ASR program is nationally regarded for its drought mitigation and climate change resiliency, as discussed in FEMA's Level Up Audio Project episode "Mitigating Drought with the City of Woodland, CA." Beyond the climate resiliency benefits described above, City staff is committed to teaching other water utilities about the City's climate resiliency and drought mitigation techniques. The City is paving the way for other water utilities to adopt innovative sustainable infrastructure by advertising climate change evaluation tools like CREAT and promoting collaboration and information sharing through hazard mitigation media like FEMA's podcast. City staff frequently respond to drought mitigation inquiries from other water utilities, supporting wider adoption of climate resilient practices and projects. The City and project partners expect ASR Well 31 to be a cutting-edge example of how to weave renewable energy generation into ASR well development. The Project will provide proof of concept and demonstrate how other water utilities can offset pumping costs and reduce GHG emissions.

SUB-CRITERION B.3.b. – Ecological Benefits

Ecological resiliency in the face of climate change

Implementation of the Project will improve the ecological resiliency of the Sacramento River and the Bay Delta in the face of climate change. Climate change is expected to reduce average carryover storage for reservoirs in the Sacramento River hydrologic region by approximately 7%, or 700,000 AF on an annual basis, according to the Findings section of California's Department of Water Resources (DWR) "From Climate Traces to Climate Insights: Future Scenarios Analysis for the California Central Valley" (October 2023). Studies suggest that by the late 21st century, river flows could decrease by 10-20% (CMIP5 climate model framework). Surface water temperatures will continue to increase, threatening endangered species such as Chinook Salmon and Delta Smelt, and increasing the occurrence of harmful algal blooms. In addition, sea level rise is predicted to exacerbate existing salinity issues in the Bay Delta, which will require additional Delta outflows to dilute the brackish Delta water and meet environmental standards.

The Project will augment Woodland's water supply during critical drought periods, offsetting the need to pump river from the Sacramento River during dry years. The Project is expected to prevent 475 – 1,425 AF of pumping from the Sacramento River during drought years. The Bureau and DWR are exploring operational changes in the Sacramento River system to address temperature to benefit salmon runs and for Delta salinity management. The result will likely be changes to water storage in reservoirs and additional outflows through the Delta that will reduce water available for diversion in certain year types (dry and drought years). These changes may also affect the ability to execute water transfer agreements and would increase the cost of water transfers. The Project will allow WDCWA and Woodland to utilize stored water to partially meet water supply needs, which would reduce dependency on water transfers and allow that water to remain in the Sacramento River.

Ecological benefits from project implementation

The Project will result in environmental benefits for endangered and threatened species in the Yolo Bypass, Sacramento River, and San Francisco Bay Delta by improving treated wastewater effluent that flows through them. This is because the potable water quality becomes the basis for wastewater quality. Upon transition to surface water, the City's wastewater quality significantly improved. The City's selenium concentration was greatly reduced in both potable water and wastewater in 2016 when switching from groundwater to surface water. The same is true for nitrate and salinity concentrations since the native groundwater concentration is higher.

The surface water supplied by WDCWA is typically non-detect for selenium and nitrate, or negligibly small if detected (such as 0.32 ppm for Nitrate, reported in the 2019 Consumer Confidence Report (CCR)). Woodland's native groundwater has seen selenium results around 5 ppb, with an upper range around 25 ppb. Woodland's native groundwater was cited at 5.7 ppm for nitrate (as nitrogen) in the 2021 CCR (a year in which native groundwater was supplied due to drought), whereas it was not detected in WDCWA-supplied surface water. In 2011, before the conversion to surface water, Woodland reported a range of 1.9 – 42 ppm for nitrate (as nitrate) for native groundwater supplied, which corresponds to 0.4 – 9.7 ppm nitrate (as nitrogen). Concentrations of nitrate in Woodland's groundwater have increased over time, though the wells that exceeded nitrate compliance levels have been demolished since then. In aggregate since conversion to surface water and construction of the existing ASR wells, salinity in Woodland's wastewater effluent decreased by over 50%, and selenium decreased by 99%.

The proposed Project will further reduce native groundwater pumping, in turn improving water quality of wastewater effluent that flows through the Yolo Bypass, Sacramento River, and Bay Delta towards the Pacific Ocean. Since ASR Well 31 will reduce concentrations of nitrate, salinity, and selenium in wastewater effluent, this is expected to have positive environmental benefits for Chinook-Salmon (winter run), Steelhead Trout, and Delta Smelt, three endangered species affected by degrading water quality. The Project is also expected to improve water quality for threatened species in the Sacramento River and Bay Delta such as Chinook Salmon (spring run) and Green Sturgeon. During drought years, ASR Well 31 is estimated to provide 4.6% to 13.7% of Woodland's annual water supply overage, which corresponds to a range of 155 AF – 460 AF of wastewater effluent discharged (4.7% to 13.7% of 3,374 AF of treated wastewater effluent discharged to the environment in 2022).

Selenium can bioaccumulate in the food chain and cause reproductive harm. Salmon and Steelhead Trout are particularly sensitive to selenium pollution. Selenium is also toxic to birds (feeding on fish and aquatic organisms exposed to selenium), as it can cause teratogenic effects, reducing reproductive success. In areas like the Yolo Bypass and Sacramento River, selenium pollution can affect efforts to restore wetlands and maintain healthy ecosystems. The California Least Tern is an endangered bird that inhabits the Yolo Bypass, Sacramento River, and Bay Delta and is affected by selenium. Threatened birds that inhabit these areas include the Western Snowy Plover, Swainson's Hawk, and Greater Sandhill Crane.

The Project would also reduce nitrate and salinity in Woodland's wastewater effluent by replacing native groundwater (high in nitrate and salinity) with stored ASR water (lower in nitrate and salinity). Nitrate in wastewater effluent contributes to eutrophication, causing harmful algal blooms, resulting in hypoxia for aquatic species. The Project is expected to have a positive environmental benefit for Chinook Salmon, Delta Smelt, Western Snowy Plover, and California

Least Tern by reducing nitrate loading in the Yolo Bypass, Sac River, and Bay Delta. Elevated salinity concentrations disrupt freshwater habitats, interfering with osmoregulatory systems, thereby reducing reproductive rates. Salinity impacts the Delta Smelt, Chinook Salmon, Greater Sandhill Crane, Green Sturgeon, and Western Snowy Plover. Nitrate has been reduced by 91-99% since conversion to surface water, as nitrate concentrations in the native groundwater range from 2.7 – 9.7 mg/L (as nitrogen) in remaining wells, whereas surface water is non-detect or generally below 0.23 mg/L in surface water. Woodland's remaining native groundwater wells frequently test over half the MCL for Nitrate and have been increasing in concentration over time. Salinity (measured as specific conductance) dropped almost 80%, from around 925 µS/cm in native groundwater to around 200 µS/cm in surface water.

The benefit is directly proportional to the water supplied by the ASR well, as it displaces native groundwater that will otherwise be used. As the Project is estimated to supply 6% of Woodland's total water supply on average, that corresponds to 200 AF of wastewater effluent per year that will be reduced to near-zero concentration of undesirable chemicals such as selenium and nitrate, and 80% reduction in salinity for the ASR Well 31 portion of water supply that be returned as wastewater and discharged to the environment after treatment. The wastewater treatment plant process does not reduce selenium or salinity.

Improvements for listed species

Several listed species depend on the quality and quantity of flows in the Sacramento River and Bay-Delta, including endangered species such as the Sacramento River Winter-run Chinook Salmon, Delta Smelt, and California Least Tern, as well as numerous threatened species such as spring-run Chinook Salmon, Green Sturgeon, and Greater Sandhill Crane. By reducing demand on the system, the Project will allow the Bureau increased flexibility to manage flows in the river and support the recovery of these species. Additional streamflow, especially during drought periods, is critical to maintaining suitable temperature and salinity in the Sacramento River and the Bay-Delta and preventing further ecological decline.

SUB-CRITERION B.3.c. – Other Benefits

Benefits to multiple sectors

The Project will benefit multiple sectors, including:

- Municipal & industrial: The Project's main objective is to increase the reliability & quality of the water supplied to the City of Woodland. When implemented, it will allow the City to supply 100% high-quality surface water year-round, rather than relying on low-quality native groundwater to augment supplies. Additionally, Woodland can help supply the City of Davis and UC-Davis by using stored ASR water and allowing them to take a greater share of water produced by WDCWA.
- Agriculture: Woodland would be less reliant on Sacramento River diversions in dry years resulting in not needing to transfer water from an agricultural diverter.
- Environmental: The Project will reduce the City's demand for Sacramento River flows during critically dry years, allowing more flows to become available for environmental needs.
- Rural Domestic: The Project will support the reliability of rural domestic water supply by reducing the City's groundwater extraction. There are approximately 161 rural residential households within 2 miles of the City that rely on groundwater for drinking water and

domestic use (DWR OSWCR database). Reducing the City's groundwater extraction will lessen the impacts of drought on these vulnerable wells.

Larger sustainability initiatives

The Project will support the implementation of the 2022 Yolo Subbasin Groundwater Sustainability Plan (Yolo Subbasin GSP), which plans for the future of water supplies in Yolo County and the preservation of the groundwater resource. Decreased reliance on groundwater is a central tenet of the plan, and this Project is a high-priority project named in the plan to support this goal.

The Project ties into and benefits larger regional sustainability efforts on the Sacramento River and Bay Delta, including both the *Agreements to Support Healthy Rivers and Landscapes* and the Bay-Delta Water Quality Control Plan Update. WDCWA's water rights and Woodland's water supplies are greatly impacted by these efforts. These efforts are expected to result in a reduction in water availability from the Sacramento River in certain year types to allow for more instream environmental flows. The Project would benefit these efforts by offsetting between 475 to 1,425 AF of water diverted from the Sacramento River when additional water is needed in the Sacramento River and Delta. In combination with the other three ASR wells, WDCWA's impact on the Sacramento River would be offset by over 2,400 AF of stored ASR water.

Water-related conflict

Tensions over water in the Yolo Subbasin are increasing due to recent severe droughts, uncertain climate change impacts, and increasing demand for water. In the past two droughts, 2014-2016 and 2020-2022, declining groundwater levels resulted in several wells either going dry or needing the pumps lowered. By decreasing the City's reliance on groundwater supplies, the Project will help to prevent further water-related conflict in the area.

CRITERION C – Planning and Preparedness

Plan Description and Objective

The City of Woodland Urban Water Management Plan (UWMP) is a long-term planning tool developed to ensure reliable water supply and efficient use of water resources. The plan was first developed in 1990 and is updated every five years. The UWMP assesses current and future water demands over a 20-year planning horizon, considering population growth, climate variability, drought susceptibility, and other factors affecting water availability. It also evaluates the water system's water rights and supplies to ensure drought preparedness, sustainability, conservation, and legal compliance. The plan serves approximately 17,000 service connections or approximately 60,700 people within the urban limits of Woodland.

The UWMP analyzes water supply availability for long-term reliability and resilience to drought and climate change. It conducts a drought risk assessment in Chapter 7, including a five consecutive dry-year water reliability assessment. The Water Shortage Contingency Plan ordinance was updated and included in Chapter 8 (see Chapters 7 and 8 of the 2020 UWMP in **Appendix A**). The drought risk assessment concluded "reductions in primary water right availability as a long-term annual average is expected to be on the order of 700 AF for 2020

demand conditions, increasing to around 1,000 AF for 2040 demand conditions." However, recent water rights curtailments have been more severe than planned for in the UWMP. In 2022, the drought resulted in an unprecedented 82% cut to WDCWA's CVP water rights, which reduced Woodland's water supply by 4,300 AF.

The UWMP and Drought Risk Assessment guide the City's decision-making process, project prioritization, and regional collaboration. The 2020 UWMP evaluation of water service reliability identified the need to expand recycled water use, construct two additional ASR wells (for a total of 5), and implement demand management measures during emergency drought situations. In response, the City expanded its recycled water system (constructed in 2016, expanded in 2024) and updated and implemented its water shortage contingency plan. The City still needs to construct the Project to ensure water service reliability during drought, manage groundwater sustainably, and offset expensive water transfer purchases in all water-year types.

Plan Development Process

The City's 2020 UWMP and 2015 UWMP reflect the collaborative process that led Woodland, Davis, and UC Davis to transition from groundwater systems to surface water systems in 2016. The City developed the UWMP in collaboration with WDCWA and the City of Davis because these agencies can share water supplies. Using DWR's guidance, the UWMP is submitted to DWR for approval and evaluation of the alignment with State objectives.

The UWMP was developed in coordination with regional partners and serves as the updated planning document to decades-long backbone planning that went into the transition away from groundwater. Prior to the regional transition to surface water in 2016, the Cities of Woodland and Davis evaluated current and future water demands, availability from the Sacramento River, various water treatment plant capacities, and how ASR wells could assist in meeting the City's water supply needs until 2035. The City's ASR program was seriously considered and planned development served as a vital assumption for appropriately sizing the regional water treatment facility (serving Woodland, Davis, and UC Davis). The planning effort to convert to treated Sacramento River water and develop the ASR program was closely coordinated with the Woodland Utility Advisory Committee (WUAC) and their input helped to "right size" the City's capacity of the WDCWA facilities and implement the ASR program.

The regional planning reflected in the 2015 UWMP considered alternatives for water treatment plant capacity and water rights and identified the optimal number of ASR wells for meeting the City's water supply needs over a 20-year planning horizon (2016 – 2035). Early planning indicated the City should construct seven ASR wells before 2035, however subsequent evaluations and updates resulted in the 2020 UWMP calling for two additional ASR wells with one ASR well (the proposed Project) to be constructed and operational by 2025. The drought elements of the regional coordination considered a future with declining groundwater levels and less surface water supply available in summer months, and identified the most effective solution was to optimize the use or storage of excess winter supply for access during dry periods, as opposed to more expensive options such as constructing a larger capacity surface water treatment plant or purchasing additional supplemental water rights.

The urban water management planning led to the formation of the WDCWA, a joint powers authority wholesale surface water supplier. The WDCWA coordinated with partner Cities and their councils, UC Davis, as well as Woodland's community and WUAC. The WDCWA, Cities, and UC Davis detailed the plan together with a focus on "right sizing" the WDCWA facilities, balancing water supplies from the Sacramento River with ASR wells in Woodland and deep aquifer wells in Davis, water conservation, and managing water rates for customers. The WUAC included a large cross section of the Woodland community representing both residential and commercial interests. Of the residential stakeholders, a large cross section was represented including different age groups, ethnicities and disadvantaged community members. The WUAC hosted public meetings and was heavily involved in reviewing and informing City Council as to priorities in the transition to surface water. Additionally, during plan development, the WDCWA consulted with relevant state and federal agencies. Beginning in 2010, WDCWA and partners, analyzed water demand, surface water rights, curtailments (Term 91 and Shasta Critical Year reductions), groundwater supplies, existing and upcoming regulations, ASR injection potential, and other possible surface water supply options to determine the best path forward. Subsequent climate change analysis (water vulnerability assessments in 2021) concluded that WDCWA's existing water rights are not sufficient for anticipated changes to Sacramento River watershed hydrology and that the City would need to rely on ASR wells and water transfers in the future. Increasing Woodland's ASR capacity has important ramifications for Davis and UC Davis, as additional surface water storage allows a greater share of WDCWA's surface water rights and capacity to be reserved for Davis's water supply needs and reduces their dependence on deep groundwater wells for supplemental supply.

The City also coordinated with and shared information with neighboring cities and water agencies via regional partners such as the Water Resources Association of Yolo County (WRA), the Groundwater Resources Association of California (GRA), Yolo Subbasin Groundwater Agency (YSGA), and the Westside-Sacramento Integrated Regional Water Management (IRWM) Coordinating Committee. These partner organizations supported Woodland's transition to surface water. The Project benefits groundwater and surface water resources for nearby beneficial uses, so these organizations listed the Project as a priority for funding needs and they sought and have continued to seek funding opportunities for the proposed Project.

Plan Support for Projects

The proposed Project is identified for drought relief and climate adaptation in the City's 2015 and 2020 UWMPs. The City's 2015 UWMP coincided with the City's transition from a groundwater system to a surface water system and discussed the ASR program in the context of the water source switch. The 2015 UWMP documented developing five ASR wells before 2020 (***Table 6-9. Retail: Expected Future Water Supply Projects or Programs – DWR Table 6-7***) in the Future Water Project Section (Section 6.9).

Table 6-9. Expected Future Water Supply Projects or Programs (DWR Table 6-7 Retail)

☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Supplier* *This may be a range*
	Drop Down List (y/n)	*If Yes, Supplier Name*				
Add additional rows as needed						
ASR Wells	No		Development of 2 ASR wells	One well by 2025 and one well by 2045	All Year Types	2,940 - 3,900
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Volumes are in AF per year. The City expects to inject treated surface water between 120 and 180 days per year depending on how long Term 91 is in effect during the winter, leaving 185 days to 245 day for extraction. Assuming that two future ASR wells would each have an injection capacity of 1,000 gpm, the City would be able to inject between 1,060 AF to 1,590 AF of additional high quality surface water per year. Assuming the future ASR wells have an extraction capacity of 1,800 gpm, the expected increase in extracted water supply ranges from 2,940 AF to 3,900 AF with 185 days to 245 days of extraction per year respectively. Pumping beyond the stored surface water capacity would result in diminished water quality relative to the surface water but in the worst-case scenario (if Term 91 were in effect 365 days/year during the fifth year of drought, for example), the ASR wells could be pumped 365 days of the year 1,800 gpm each, resulting in up to 5,810 AF per year of additional supply from the two new ASR wells.						

ASR Well 31 is identified specifically in the 2020 UWMP. The System Supplies Chapter of the UWMP (Chapter 6) discusses the criticality of Woodland's ASR program and documents the need for a fourth ASR Well (ASR Well 31 Project) by 2025 to mitigate drought impacts and improve resiliency and water quality for customers. ASR Wells are a vital component of the Future Water Projects section of the UWMP (Section 6.2.10) and the subsection on ASR Wells (Section 6.2.10.2) identifies ASR Well 31 as planned for operation by 2025.

Other water resiliency strategies are evaluated in the UWMP, but only the ASR program expansion adds to the water supply portfolio, since the other measures only offset potable demand. The other resiliency measures evaluated include recycled water and water conservation, which were equated to construction of a new ASR well.

In implementing the UWMP, the City has made considerable progress towards reduction of demand through water recycling and water conservation. The City recently completed an expansion of recycled water and now delivers approximately 700,000 gallons per day to industrial and landscape irrigation uses. The UWMP established a water conservation goal of a 20% reduction in per capita demand by 2020. In reality, Woodland achieved a per capita water demand of 152 gallons per capita per day (gpcd) in 2020, a dramatic 47.5% reduction from the 290 gpcd Woodland average between 1995 and 2005.

Construction of a new ASR is now the highest priority in implementation of the UWMP. Woodland's water system has lost capacity totaling 16 million gallons per day in recent years due to the retirement of eight water supply wells. Although the City continues to improve water

recycling and conservation, the proposed Project remains a higher priority for resiliency, potable water quality, and for reducing the need for WDCWA supplemental water rights purchasing.

CRITERION D – Readiness to Proceed and Project Implementation

ASR Well 31 Implementation Plan

The implementation plan for construction of ASR Well 31 is comprised of the following tasks and is scheduled to occur between November 2024 and December 2027.

Table 2. Project Implementation Plan - Task Schedule

Tasks	Estimated Start Date	Estimated Date of Completion
Task 1. Design ASR Well 31 Drilling Bid Package	Nov. 2024	June 2025
Task 2. Bid ASR Well 31 Drilling Project	June 2025	Sept. 2025
Task 3. Construct ASR Well 31 Drilling Project	Sept. 2025	Dec. 2025
Task 4. Design ASR Well 31 Equipping Bid Project	Nov. 2024	Jan. 2026
Task 5. Bid ASR Well 31 Equipping Project	Jan. 2026	Mar. 2026
Task 6. Construct ASR Well 31 Equipping Project	Mar. 2026	June 2027
Task 7. Post-Construction ASR Well 31 Development	Apr. 2027	Dec. 2027

Task 1 – Design ASR Well 31 Drilling Bid Package

Design for the ASR Well 31 drilling phase bid package will include geotechnical investigations to characterize the subsurface conditions of the well site for design by drilling two borings. A geotechnical report will be prepared and include the following findings and recommendations:

- Site seismicity and seismic hazards
- Treatment of geotechnical constraints
- Analysis of potential total and differential settlement due to liquefaction and consolidation.
- Conceptual measures to mitigate hazards, geotechnical constraints, and predicted settlements.
- Site grading recommendations, including fill placement recommendations, utility backfill, and recommendations for site drainage.
- Foundational design recommendations and 2019/2022 CA Building Code seismic criteria.
- Depth to groundwater

Additionally, Task 1 will include utility potholing, surveying and mapping, preliminary design reports, permitting planning, and final project plans and specifications for well drilling bidding.

Deliverables –

- Project plans and specifications for well drilling

Task 2 – Bid ASR Well 31 Well Drilling Project

The City will conduct a public bid opening and execute a contract with the lowest responsible, responsive bidder.

Deliverables –

- Well drilling contract

Task 3 – Construct ASR Well 31 Drilling Project

The contractor will drill the ASR well borehole and two monitoring well boreholes about 100 feet and 300 feet away from the ASR well. Oversight will include monitoring of cuttings, drilling fluid characteristics, and penetration rates during borehole drilling. Borehole geophysical logging will be conducted to obtain hydrogeologic information related to screen assembly and slot sizing and will include an e-log, caliper log, natural gamma log, and lithologic log.

Deliverables –

- Construct downhole portion of the ASR well
- Construct two monitoring wells

Task 4 – Design ASR Well 31 Equipping Project

The engineering consultant will design the ASR Well 31 above-ground equipping improvements including site civil, architectural, structural, mechanical, landscaping, electrical, controls, instrumentation, and security systems. Milestones will include a 50%, 90%, and 100% (bid set) submittal of plans, specifications, and construction cost estimates for the ASR well equipping. The design will include the new ASR well, installation of a new motor control center (MCC) and related electrical facilities, a CMU building to house the ASR well, MCC, and variable frequency drive (VFD). Design will also include ancillary siting, civil, piping, and mechanical improvements. The well building design will be like the existing ASR Wells 29 and 30.

Deliverables –

- Project plans and specifications for the ASR Well 31 Equipping Project

Task 5 – Bid ASR Well 31 Equipping Project

The City will conduct a public bid opening and execute a contract with the lowest responsible, responsive bidder, for the ASR Well 31 building and equipping phase of the project.

Deliverables –

- ASR well building and equipping project contract
- Inspection contract for ASR well building and equipping phase

Task 6 – Construct ASR Well 31 Equipping Project

Construction of the ASR Well 31 above-ground equipping improvements including civil, architectural, structural, mechanical, electrical, controls, instrumentation, security systems, and

landscaping will be included in Task 6. A CMU building will be constructed around the ASR well and a new MCC will be installed. A VFD will be incorporated to allow the well to pump at various flowrates. The only additional hardware needed for in-line micro-hydro electricity generation is a DC to AC regeneration module that connects to the VFD, which can be incorporated into the VFD. Solar panels will be installed on half of the building's roof.

The well building and equipping construction phase will also include SCADA/PLC programming and integration into the City's existing SCADA system with the assistance of electrical subconsultants in the design contract. City staff will integrate ASR Well 31 into data management proprietary software used for water quality tracking and regulatory compliance.

Deliverables –

- Construct above-ground portion of the ASR well

Task 7 – Post-Construction ASR Well 31 Development

The ASR Well 31 will take two injection cycles to establish the buffer zone and achieve a storage volume sufficient for recovering stored surface water to the City's distribution system. Specific capacity of injection and recovery will be tracked to prevent screen clogging. Water quality will be tracked for internal purposes as well as for regulatory compliance. Title-22 water quality sampling will be conducted for the first four quarters of operation as required for a new municipal well in operation, and routinely sampled during future operations.

An update to the City's existing ASR Operations Manual will be prepared and operations staff will be trained in operations and maintenance of the well, though O&M will be very similar to existing ASR Wells 29 and 30, which staff are already trained and experienced in operating.

Deliverables –

- ASR Operations Manual update
- Title-22 water quality sampling results

Permits or Approvals Required

Completed Permits or Approvals

The preliminary planning, engineering, and permitting tasks have been completed for the City's ASR Well Program, which included completing feasibility studies, environmental documentation, necessary permitting applications, and an amended water right. A summary of permitting and approvals that have already been completed are listed below.

Table 3. List of Completed Permits

Project Phase	Start Date	End Date	Additional Details
Conceptual WDCWA/ASR program planning	2009	2013	Completed evaluation of ASR as long-term solution
Planning ASR Program - Feasibility Studies	May 2013	Sept. 2013	Completed aquifer modeling and ASR well siting

Permitting (EPA, RWQCB)	May 2013	Dec. 2014	RWQCB injection well permit (2012-0010-DWQ)
CEQA Environmental Impact Report (EIR)	Jan. 2015	Sept. 2015	Supplemental to WDCWA EIR filed with State Clearinghouse (2015012062)
Water Right Amendment (SWRCB)	June 2015	Nov. 2017	Amendment to water right permit 20281 (Application 30358) for long term storage
CEQA – Categorical Exemption	Nov. 2021	Nov. 2021	Filed NOE with State Clearinghouse (20211110259)

Completed Environmental Documentation

The WDCWA Supplemental Environmental Impact Report (SEIR), State Clearinghouse No. 2015012062, was completed July 2015 and WDCWA certified the SEIR on September 17, 2015. The supplemental SEIR was a supplement to the Davis-Woodland Water Supply Project (DWWSP) Final Environmental Impact Report (SCH No. 2006042175), which was certified and adopted by the City of Woodland in December 2007. The SEIR provides CEQA coverage for the ASR program at large, for up to seven ASR wells in Woodland.

The environmental permitting work is already complete. A Notice of Exemption for the Project Site was filed with Yolo County and the State Clearinghouse in November 2021. The Project received a Categorical Exemption since it replaces an existing well/building on the same parcel. The State Clearinghouse number is 20211110259.

Completed Permitting

The ASR program is permitted through the WDCWA. The California Regional Water Quality Control Board (RWQCB) issued the Notice of Applicability in January 2014 for the ASR program to be regulated under Water Quality Order 2012-0010-DWQ, as the project qualified for coverage under the General Waste Discharge Requirements for ASR Projects that inject Drinking Water into Groundwater (the SWRCB General Order). The City was assigned 2012-0010-DWQ-RB5S-0003 for implementation of the ASR pilot test for multiple ASR wells. Temporary authorization for operation of the City's ASR wells was provided on July 24, 2018 for Public Water System 5710006. The amendment to the domestic water supply permit for the City of Woodland became effective on April 18, 2019 via Permit Amendment No 01-09-19-004.

Completed Water Rights

WDCWA completed the amendment to water right permit 20281 (application 30358) to appropriate water from the Sacramento River in Yolo County in November 2017. The amended water right allows for WDCWA to redivert surface water to underground storage in the Yolo Subbasin in up to seven ASR wells. The amended permit allows for up to 5,700 acre-feet/year indefinitely with a maximum diversion rate to underground storage of 15.6 cubic feet/second.

Permitting that Still Needs to be Completed

The anticipated primary permitting requirements for activities related to the construction of ASR Well 31 are as follows:

- **Well Drilling Permits with Yolo County:** The City will submit a new municipal well application for construction of ASR Well 31 with the Yolo County Environmental Health Division (YCEHD). The wells are to be constructed (or demolished) by a C-57 certified driller under supervision of a California-registered PE or PG, and in compliance with California Department of Water Resources (DWR) Bulletins 74-81 and 74-90. Permit requirements typically include water quality testing. After drilling, the State Well Completion report will be submitted to the YCEHD within 60 days of completion of well construction. The timeline to issuance is about one month from submittal of the well drilling application.

- **Municipal Water Supply Permit Amendment with State Water Resources Control Board:** The City's Domestic Water Supply permit will need to be amended to include ASR Well 31. It will include a Drinking Water Source Assessment and Protection (DWSAP) analysis of the new well to update the City's existing DWSAP assessments. ***This is a notification to SWRCB after completion of construction***.

- **Waste Discharge Requirement (WDR) Amendment with U.S. Environmental Protection Agency (USEPA):** The existing WDR will be amended to register ASR Well 31 with USEPA as a Class V injection well. This is a notification to USEPA to register the well in the EPA database. The notification will be submitted during the well drilling design phase and before the well drilling project is bid.
    - *Note: A NPDES permit or WDR will NOT be required for test pumping of the well because the water from well test pumping will discharge to the City's sanitary sewer and not to the storm drain system or waters of the U.S.

- **Air Quality Permit from the Yolo-Solano Air Quality Management District**: A permit application for the backup generator will be submitted during the well equipping design phase. The ASR well will operate with grid power from PG&E and the generator is a backup power supply. The well equipping engineering design needs to be at least 60% to submit the permit application and the required generator size needs to be known. ***The permit is not needed until after construction is completed and generally sets operational restrictions on the generator. The timeline can be a few months from the submittal of the application but is not needed for construction or operation.***

<u>Engineering or Design Work in Support of the Proposed Project</u>

After a thorough Request for Qualifications (RFQ) for design and engineering services for ASR Wells and Monitoring Wells, the City selected a consultant to provide an engineering design proposal for designing ASR Well 31. The City intends to award the design contract in Fall 2024.

The well drilling bid package is expected to be completed and in bid phase (June 2025) prior to the anticipated award date (September 2025). The project will be shovel ready to construct the well drilling phase of the ASR Well 31 project upon federal award.

The design for the well building and equipping phase of the project will be at 30% design at the time of federal award (September 2025), and 100% design is expected to be completed by January 2026. The design of the well equipping and building is informed by test pumping of the newly drilled well and therefore cannot progress too far ahead of well drilling. The bidding for the well building and equipping project is expected to occur between January and March 2026 with construction starting around May 2026. The well equipping project is expected to take approximately 13 months.

Land Purchases Required

No land purchases are necessary as part of the ASR Well 31 Project since the City is the current landowner. The site is located at 929 Sixth Street in Woodland at Everman Park. The Project would construct ASR well 31 at the same site but adhere to all rules and regulations such as locating the new borehole at least 50 feet from the previous borehole of the older well on site.

Applicability to Federal Land or a Federal Facility

The Project site is not located on federal land or at a federal facility.

New Policies or Administrative Actions Required for Implementation

No new policies or manuals are needed for operation of ASR Well 31. The City has an established operations and maintenance (O&M) Manual already in place, which will be updated to include ASR Well 31. Operations staff will be trained in operations and maintenance of the well, though O&M will be very similar to existing ASR Wells 29 and 30.

CRITERION E – Presidential and Department of the Interior Priorities

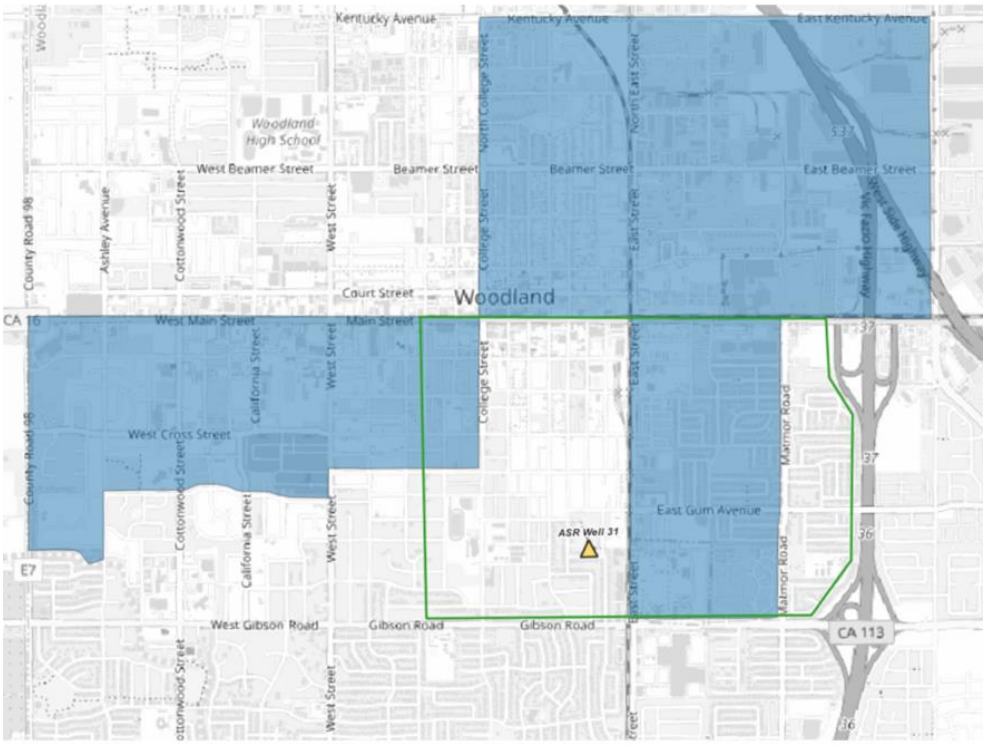
Disadvantaged Community Benefits. The White House Council on Environmental Climate and Economic Justice Screening Tool (CEJST) identified three disadvantaged communities which will benefit from the Project: 06113011001, 06113011102, and 06113010800 (see Figure 5 and **Appendix A** for additional details). The Project will directly serve and benefit the 16,200 residents living in the three identified disadvantaged communities by addressing water quality issues and adding new water supplies.

The City estimates that 75% of the customers to be served by the Project have median household incomes below 80% of the State's average median household income.

The City's groundwater is high in nitrate, hexavalent chromium, and other constituents that pose health and safety risks. The Project will inject high-quality treated surface water into an underground aquifer to provide an alternative to the groundwater typically used to serve these disadvantaged communities. The Project also will increase the amount of water available during summer months for these disadvantaged communities because the City can use the stored surface water to provide an additional source of summer water, therefore increasing drought resiliency. By minimizing the need for expensive water transfers, the Project should reduce the potential for inflated water rate increases to customers over time.

Tribal Benefits. The Project will not directly serve or benefit a Federally Recognized Tribe.

Figure 5: Disadvantaged Communities Map from CEJST and ASR Well 31 Project



(Blue represents Census Tracts that included disadvantaged communities that experience burdens; Yellow triangle is the location of the City's proposed Project: ASR Well 31)

CRITERION F – Nexus to Reclamation

Nexus Between the Proposed Project and a Reclamation Project or Reclamation Activity
The City of Woodland is a partner in the Woodland-Davis Clean Water Agency (WDCWA) and receives almost 100% of the City's water supply from WDCWA. WDCWA holds a Sacramento River Settlement Contract, contract number: 14-06-200-7422X and diverts water from the Sacramento River under Licenses 904A and 5487A with a maximum diversion amount of 10,000 AFY. The water right is subject to a 25% cut during a declared Shasta Critical Year. WDCWA also diverts water under a junior appropriative SWRCB water right that is restricted by the Term 91 curtailment. WDCWA diverts water under the Licenses 904A and 5487A when the Term 91 curtailment is in effect. Woodland stores water in the ASR wells under the SWRCB water right and utilizes the stored water in the ASR wells to supplement water during the Term 91 curtailment when diverting under Licenses 904A and 5487A. WDCWA retains water rights ownership of the water stored in Woodlands ASR wells under the SWRCB water right. Woodland owns 52.1% of the 10,000 AF and additional water is necessary to meet Woodlands needs, especially during a Shasta Critical Year. The ASR wells are used to meet Woodland's drinking water needs when adequate diversions from the Sacramento River are not available.

The proposed work will not directly benefit a Reclamation project area or activity. The applicant is not a Tribe.

CRITERION G – Stakeholder Support for Proposed Project

The City's stakeholders of approximately 17,000 residential and commercial connections (or approximately 64,000 people) will benefit from the Project and as such support its implementation. Additionally, the City has substantial agriculture basis in its economy and is surrounded by agricultural land producing corn, tomatoes, alfalfa, safflower, and wheat. The City and stakeholders are committed to building a resilient long-term water supply for the area to continue to support residents and businesses inside the City, and to protect and bolster groundwater supplies for neighboring areas. The Project is a critical initiative to ensure a reliable and long-term water supply for all residents of Woodland, including the low-income regions.

The Project is solely a City venture and there are no other cost-share contributions. The City has collaborated with a variety of regional partners on intended sustainability/resiliency projects such as the Project and received letters of support from Woodland's Chamber of Commerce, Congressman Mike Thompson, Northern California Water Association (NCWA), Yolo Subbasin Groundwater Agency (YSGA), and the WDCWA.

The Chamber of Commerce acknowledges the importance of the Project for water quality and mitigation of issues such as groundwater depletion and subsidence. Congressman Thompson emphasizes the value of the Project for the regional drought resiliency throughout Yolo County, the Sacramento River, and the Bay-Delta. NCWA supports the Project's collaboration from interdisciplinary teams including farmers, municipal water suppliers, and environmentalists, balancing the needs of all water users in the watershed. For WDCWA, the Project represents an essential improvement to the regional water delivery system to maintain reliable water quality and supply. The YSGA strongly supports the Project because ASR Well 31 is a prioritized project in the 2022 Yolo Subbasin Groundwater Sustainability Plan for early implementation and is critical to the Yolo Subbasin achieving sustainability goals into 2042.

PERFORMANCE MEASURES

Project benefits will be quantified primarily with flow monitoring equipment installed at the well that is used to calculate net groundwater recharge. The City records pumping and injection rates at the three ASR wells currently in operation and intends to continue collecting this data once the Project is completed. With this data, the City can determine the net recharge achieved by subtracting the amount of water pumped from the amount of water injected into the aquifer, with the overall goal of injecting more water into the aquifer than extracted.

Net aquifer recharge and reduced groundwater pumping will positively affect the Yolo Subbasin water balance. Since the YSGA is a supporter of the Project, the impacts of the Project will be reflected in groundwater sustainability parameters such as water levels, water quality, and subsidence mitigation that are evaluated in the YSGA's annual report. The City will also be able to show decreased pumping from the Sacramento River during Term 91 curtailments and Shasta Critical Years, which will be reflected in the City's electronic annual report to the SWRCB as well as the WDCWA's monthly reporting.

Benefits to potable water quality will be reflected in Woodland's annual water quality report, the Consumer Confidence Report. Concentrations of nitrate, hardness, conductivity (salinity), and hexavalent chromium will be reduced.

Renewable energy generation will be monitored through net-energy metering statements and electricity bills and reported to the Water-Energy Nexus Registry, a collaborative registry that empowers California's water agencies to measure, track, and mitigate their water-related emissions.

PROJECT BUDGET

Funding Plan

The City has already budgeted for local cost share. The ASR Well 31 Project is Capital Improvement Project (CIP) 17-05, funded through the City's Water Enterprise Fund. The capital improvement project already contains $5.5 million with an additional $1.555 million earmarked for transfer to the project. The fund transfer of $1.555 million to CIP 17-05 will be executed prior to award of this grant, meaning the Project currently has more than $7 million in local cost share available. The City intends to transfer any additional funding needs from the Water Enterprise Fund after completion of the well drilling and design work for the well equipping project. There will be no in-kind contribution from other parties

Budget Proposal

The total cost of the Project is estimated to be **$11,083,370** as shown in Tables 4 and 5. The Project funding sources are **$8,083,370** from the City and **$3,000,000** from the Bureau.

Tables 4 and 5 provide additional details on the estimated budget breakdown. A "Budget Narrative" is also attached to this application and provides information on each item included in Standard Form 424-C, which is also included as part of this grant application.

Table 4. Total Project Cost

SOURCE	AMOUNT
Cost to reimbursed with the requested Federal funding	$3,000,000
Cost to be paid by applicant	$8,083,370
Value of third-party contributions	$0
REQUESTED RECLAMATION FUNDING	**$11,083,370**

Table 5. Detailed Budget Proposal

BUDGET DESCRIPTION	COMPUTATION $/Unit	COMPUTATION Quantity	QUANTITY TYPE	TOTAL COST
Personnel				
Project Manager, Matt Cohen Associate Engineer	$53.00	1000	Hours	$53,000
Principal Utilities Civil Engineer	$75.00	250	Hours	$18,750
Fringe Benefits				
Project Manager, Matt Cohen Associate Engineer	$19.82	1000	Hours	$19,820
Principal Utilities Civil Engineer	$28.00	250	Hours	$7,000
Travel/Equipment/Supplies				
N/A				
Contractual/Construction				
Well Drilling				
Mobilization, Demobilization, and Site Cleanup	560,000	1	LS	$560,000
Pilot Borehole Drilling and Logging	165,000	1	LS	$165,000
Well Construction	805,000	1	LS	$805,000
Well Development and Testing	200,000	1	LS	$200,000
Water Quality Zone Testing	85,000	1	LS	$85,000
Well Equipping				
Sitework	290,000	1	LS	$290,000
Masonry Building	710,000	1	LS	$710,000
Coating System	85,000	1	LS	$85,000
Equipment, Piping, Valves, etc.	1,065,000	1	LS	$1,065,000
Mechanical (including Generator)	1,620,000	1	LS	$1,620,000
Monitoring Well Equipping	75,000	1	LS	$75,000
Electrical	2,300,000	1	LS	$2,300,000
Subtotal Well Drilling and Well Equipping				**$7,960,000**
Contingency (15%)				$1,194,000
Total Well Drilling and Well Equipping				**$9,154,000**
Design/Engineering (20%)				**$1,830,800**
Total Contractual/Construction Costs				**$10,984,800**
TOTAL ESTIMATED PROJECT COSTS				**$11,083,370**

Environmental and Cultural Resources Compliance

Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)?

The Project is not expected to have any significant impacts on the environment. The Project involves well construction activity at the location of a previous well that is no longer in operation. The location has undergone past construction and does not serve as suitable habitat for

species. Construction will generate dust, which will be controlled with best management practices. The Project will not impact water quality or quantity or animal habitat.

Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area?

There are no species listed or proposed to be listed as a Federal threatened or endangered species or designated critical habitat in the Project area.

Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States"?

There are no wetlands or other surface waters inside the Project boundaries that fall under CWA jurisdiction as "Waters of the United States."

Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)?

The proposed Project will not result in any modifications or effects to individual features of an irrigation system.

Are any buildings, structures, or features in the project area listed or eligible for listing on the National Register of Historic Places?

There are no buildings, structures, or features in the Project area listed or eligible for listing on the National Register of Historic Places.

Are there any known archeological sites in the proposed area?

There are no known archeological sites in the proposed area.

Will the proposed project have an adverse and disproportionate effect on communities with environmental justice concerns (as discussed in E.O. 14096)?

The Project will not have a disproportionate effect on communities with environmental justice concerns. This Project will provide residents in disadvantaged communities with access to improved drinking water.

Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on Tribal lands?

The Project will not limit access to ceremonial use of Indian sacred sites or result in other impacts on Tribal lands. There are no sacred sites or Tribal lands in the Project area.

Will the proposed project contribute to the introduction, continued existence or spread of noxious weeds or non-invasive species known to occur in the area?

The Project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-invasive species known to occur in the area.

Required Permits or Approvals

Required permits are discussed in detail in Criterion D. Readiness to Proceed and Project Implementation section. The Project does not involve work in or around a watercourse and does not trigger permitting pursuant to California Fish and Game Code 1600 et seq. or the federal Clean Water Act. The Project does not require any new water rights. The environmental permitting work for the Project is already complete.

Overlap or Duplication of Effort Statement

There is no overlap between the proposed Project and any other active or anticipated proposals or Projects in terms of activities, costs, or commitment of key personnel. The Project submitted for consideration does not duplicate any proposal or Project that has been submitted for funding consideration to any other potential funding source at this time. If duplicative funding is sought or awarded, the City will notify reclamation.

Conflict of Interest Disclosure Statement

There are no conflicts of interest regarding this application or potential award. No City employees, including subrecipient and contractor personnel, are related to, married to, or have a close personal relationship with any Federal employee in the Federal funding program or who otherwise may be involved in the review and selection of the award.

Uniform Audit Reporting Statement

The City of Woodland acknowledges and will comply with the requirements for a Single Audit report if expending $750,000 or more in Federal award funds.

Certification Regarding Lobbying

The authorized official's signature on the appropriate SF-424 form also represents the applicant's certification of all statements in 43 CFR 18 Appendix A.

Letters of Project Support

Letters of Project support were provided by Congressman Mike Thompson, Woodland Chamber of Commerce, Woodland-Davis Clean Water Agency, Northern California Water Association, and Yolo Subbasin Groundwater Agency. Copies of these letters are attached as **Appendix B**.

Official Resolution

The City of Woodland City Council adopted Resolution 8386 on September 3, 2024 directing staff to prepare and submit an application and enter into an agreement with the Bureau to receive federal reimbursement and complete the Project. A copy of the adopted resolution is attached as **Appendix C**.

City of Woodland's Aquifer Storage and Recovery: Well 31 Project Appendix A - References

Bureau of Reclamation
WaterSMART Drought Response Program Grant Application
Notice of Funding Opportunity No. R25AS00013

October 7, 2024

Applicant: City of Woodland
Project Manager: Matt Cohen, Associate Engineer
300 First Street Woodland, CA 95695
Matt.Cohen@cityofwoodland.gov

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CHAPTER 7
Water Service Reliability and Drought Risk Assessment

This chapter describes the long-term reliability and vulnerability of the City's water supplies through 2045. It also provides a rational basis for future decision-making related to supply management, demand management, and project development. The City's planned and implemented water management tools for increasing the reliability of water supplies are also addressed. In assessing the City's water supply reliability, a comparison of projected water supplies and projected water demand in normal, single-dry, and five consecutive dry years is provided. A Drought Risk Assessment (DRA) that enables the City to evaluate its risk under a severe drought period lasting for the next five consecutive years are included in this chapter. Other short-term reliability planning that may require immediate action, such as a short-term drought or a catastrophic supply interruption, is addressed in Chapter 8.

Where applicable, each section in this chapter addresses groundwater, surface water, ASR, and recycled water in a separate sub-section. The groundwater sub-section refers to the City's current supplies from the Yolo Sub-basin, the surface water sub-section refers to WDCWA's water rights to Sacramento River water (as described in Chapter 6), the ASR water sub-section refers to the surface water from WDCWA that the City injects in the ground for storage for later recovery and use, and the recycled water sub-section refers to the current and future recycled water produced from the City's WPCF.

7.1 WATER SERVICE RELIABILITY ASSESSMENT

The City's water supply reliability reflects its ability to meet the needs of its water customers with its various water supplies under varying conditions. Details from Chapter 4, which describes the City's water demand characteristics, and Chapter 6, which describes the City's water supply characteristics, are incorporated in this chapter to conduct the assessment. Conclusions from this assessment affect the City's water management decisions.

7.1.1 Constraints on Water Sources

The City's water supply currently consists of local groundwater, surface water from WDCWA, ASR water, and recycled water.

The types of constraints on the City's water supplies include environmental, regulatory, and water quality. The factors and constraints specific to each of the City's individual water supplies are described in Chapter 6.

This section addresses potential effects on the reliability of water supply sources through the year 2045.

Constraints on water resources for specific communities are addressed by CWC section 10631(c)(2) and section 10634, which state the following:

> *CWC 10631(c)(2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand in management measures, to the extent practicable.*
>
> *CWC 10634 The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.*

The City has the following sources of water supply:

- Groundwater
- Treated surface water
- ASR water and
- Recycled water

The major constraints on each of these supplies are discussed in the following sections:

- Environmental constraints
- Legal constraints and
- Water quality constraints

7.1.1.1 Environmental Constraints

Environmental factors can limit the reliability of surface water supplies in the event that dry year supply reductions are necessary to maintain the health of aquatic species and the environment in general.

Given the fragile state of many of California's ecosystems, environmental concerns inevitably arise during the water planning process. The delicacy of these systems can, in turn, cause a lack of supply due to the enforcement of environmental legislation. The recent legal actions involving the Endangered Species Act in the Delta are an example of the clash between environmental concerns and water supply. To ensure reliability of the City's water supply, during unexpected environmental constraints that may be placed on WDCWA's water rights, the City will use local groundwater, ASR water, or recycled water in place of surface water.

A further concern is the potential for overdraft and diminished water quality of the Yolo Sub-basin, which prompted the City to seek an alternative primary water supply (i.e., surface water). However, for the purposes of this UWMP, the concern of overdraft is considered a long-term groundwater basin issue rather than a supply inconsistency. The City's 2011 GMP includes actions to address cooperative management of groundwater to prevent further overdraft and the new Yolo Subbasin SGMA process, of which the City is taking part, will address overdraft prevention in its GSP in 2022.

7.1.1.2 Legal Constraints

Legal issues, including place of use and water rights issues, are not expected to limit supply reliability for the City.

7.1.1.2.1 Groundwater

The Yolo Sub-basin is not an adjudicated groundwater basin, as defined by DWR. Therefore, there are no defined legal pumping rights for the City, and there are no legal constraints on groundwater pumping. In California, the State is not currently authorized by the Water Code to manage groundwater. California landowners have a correlative right to extract groundwater for beneficial use. As a municipal water supplier, the City acts on behalf of the overlying landowners, who rescind their water rights to the City when the land is annexed into the City.

The implementation of SGMA, described in Section 6.2.2 of Chapter 6, has introduced provisions whereby the state can step in to manage a groundwater basin if a local GSA does not properly implement sustainable groundwater management. While the information included in this section is current as of early 2021, conditions may change between the writing of this UWMP and the adoption of the 2020 UWMP.

7.1.1.2.2 Surface Water

Through the WDCWA, the City is purchasing treated Sacramento River water from the Davis Woodland Water Supply Project. As mentioned in Chapter 6, WDCWA holds Water Right Permit 20281 (Application 30358), its primary water right, which entitles WDCWA to divert up to 45,000 AF annually from the Sacramento River, which equates to an annual average flow rate of approximately 40 mgd. The constraints on this water supply are that the water right cannot be fully utilized unless and until the RWTF is expanded and this water right is unavailable when Term 91 curtailments are in effect. As discussed in Chapter 6, WDCWA has made the following general conclusions regarding Term 91:

- Term 91 curtailments are predicted to occur approximately 15 to 20 percent more frequently under ROConLTO COS conditions as compared to DWR Baseline conditions.
- October is predicted to see the largest increase in Term 91 curtailment frequency, with October curtailments expected to occur 70 to 80 percent more often under ROConLTO COS conditions versus DWR Baseline conditions.
- Increases in the frequency of Term 91 curtailments are otherwise expected to be somewhat more common during the months of May through August under ROConLTO COS conditions versus DWR Baseline conditions.
- Term 91 curtailments during the month of November are not predicted to change significantly under ROConLTO COS conditions as compared to DWR Baseline conditions.
- While an overall increase in Term 91 curtailments is predicted during the months of December through April under ROConLTO COS conditions versus DWR Baseline conditions, such curtailments are expected to remain rare, with curtailment frequencies predicted to occur in less than 5 percent of years.

Given these general conclusions, the reductions in primary water right availability as a long-term annual average are expected to be on the order of 700 AF for 2020 demand conditions, increasing to around 1,000 AF for 2040 demand conditions, as summarized in Chapter 6 Table 6-12.

In anticipation of Term 91 curtailments, WDCWA purchased portions of water right licenses 904A and 5487A from the Conaway Preservation Group in 2010 (collectively referred to as the secondary water rights). These secondary rights are only used by WDCWA when Term 91 curtailments are in effect. The WDCWA secondary water rights entitle WDCWA to 10,000 AF of Sacramento River water during the April through October period, but are reduced by 25 percent to 7,500 AF during Lake Shasta critical years. No secondary water right water is available at all to WDCWA during the period of November through March.

To supplement its surface water supplies when the primary and secondary water rights are insufficient, WDCWA purchases surface water from other agencies with more senior water rights. For the previous three years, WDCWA had an annual agreement with the City of West Sacramento to acquire 2,000 AF of surface water under West Sacramento's Central Valley Project water-service contract. This surface water was available for transfer to WDCWA during Term 91 curtailments in the November through February period. However, the available surface water was well below the total demands of the Project Participants during that period and was also not be available for any Term 91 curtailments in March.

7.1.1.2.3 ASR Water

As described in Chapter 6, the City has developed an ASR program that increases reliability by injection of treated surface water from the distribution system into the groundwater aquifer. This injection capability allows the City to take surface water sources when they are available, treat them and then inject into the aquifer for later use. The City currently has three wells with ASR capabilities and has plans to construct two more ASR wells by 2045. No major legal issues associated with constructing additional ASR wells or utilizing stored water from the existing ASR wells are anticipated.

7.1.1.2.4 Recycled Water

As described in Chapter 6, the City plans to continue, and hopefully enhance, the use of recycled water produced at the City's WPCF. Future expansion of recycled water facilities must be pursuant to the requirements set forth in its SWRCB Order WQ 2016-0068-DDW (https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2016/wqo2016_0068_ddw.pdf). No major legal issues associated with recycled water facility expansion are anticipated.

7.1.1.3 Water Quality Constraints

The City does not anticipate water quality factors to affect the reliability of recycled water or purchased water within the planning horizon of this UWMP.

Prior to 2016, the City had relied on shallow and intermediate-depth native groundwater wells as its primary water supply throughout its history. Increasingly stringent drinking water quality and wastewater discharge regulations obligated the City to seek other supplies, which resulted in the City's participation in the DWWSP. The potential for wastewater discharge exceedances for such constituents as selenium, boron, and salinity (measured as electrical conductivity, or EC) has been largely eliminated through the addition of surface water supplies under the DWWSP. However, drinking water regulations and concerns remain a constraint on native groundwater usage. Because of this, three of the City's existing intermediate aquifer wells are configured to tie directly into the surface water transmission main that serves the southern portion of the city, such that the extracted water can be blended with treated surface water. The constituent that places the greatest constraints on the City's native groundwater supply is nitrate. Hexavalent Chromium was previously one of the City's major groundwater supply constraints until the Maximum Contaminant Level (MCL) was rescinded by court order in September 2017. Hexavalent Chromium, however, continues to be a contaminant of concern as a new MCL may be issued for the constituent in the near future. It is the City's policy that, to the extent possible, the blended surface water to groundwater ratio must never be lower than 3-to-1 at any point in the system due to the aesthetic differences between surface water and intermediate aquifer groundwater. This blending also helps minimize potential water quality problems posed by the City's wells.

7.1.1.3.1 Nitrates

The drinking water limit for nitrate [as N] is 10 mg/L. Due to a long history of agricultural operations in the immediate vicinity of Woodland, certain native groundwater supply wells have high levels of nitrate. In recent years, the City has carefully managed supplies from the higher-nitrate wells to ensure that nitrate limits are not exceeded. Since the RWTF came online in 2016, the City retired those wells for anything other than emergency or landscape irrigation purposes. The City continues to regularly monitor nitrate contamination in its water supplies.

7.1.1.3.2 Hexavalent Chromium

Several of the City's native groundwater supply wells exhibit hexavalent chromium concentrations that periodically exceed the old drinking water MCL of 10 µg/L which was in effect from July 1, 2014 through September 2017. The City continues to regularly monitor Hexavalent Chromium contamination in its water supplies in anticipation that the state will likely establish a new MCL for Hexavalent Chromium.

7.1.2 Year Type Characterization

Water supply reliability is assessed based on the characteristics of the City's water supplies during various water year types which are provided in this section.

7.1.2.1 Types of Years

CWC §10635(a) requires that the City's water service reliability be assessed based on the following three water year types:

1. Normal Year – This condition represents the water supplies the City considers available during normal conditions. Although there is rarely a "normal" year in California, the normal year condition could be a single year or averaged range of years in the historical sequence that most closely represents the median or average water supply available. Because the City has seen some permanent water demand reductions in the past 5 years and the City's supplies have changed significantly in the past 5 years, historical data prior to 2015 would not accurately represent future conditions. Therefore, the City has chosen the year 2019, the year with the median water production in the past 5 years, to represent a Normal Year for the City. This year represents the City's typical year where all of its combined water supply sources are available to meet demands.
2. Single Dry Year – This condition represents the year with the lowest water supply availability to the City. The year 2015, which was the lowest year of water use in the City for the past 30 years, represents the Single Dry Year for the City.
3. Five-Consecutive-Year Drought – This condition represents a five-consecutive year dry period such as the lowest average water supply available to the Supplier for five years in a row since 1903. The years 2015 through 2019 represent the Five-Consecutive-Year Drought years for the City. This five-year period was the lowest consecutive five-year period of water use in the past 30 years.

The basis of the water year data is provided in Table 7-1 (DWR Table 7-1) for the City's supply.

Table 7-1. Basis of Water Year Data (DWR Table 7-1)

Year Type	Base Year If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	Available Supplies if Year Type Repeats	
		☐	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available *	% of Average Supply
Average Year	2019	9,795	100%
Single-Dry Year	2015	8,564	82%
Consecutive Dry Years 1st Year	2015	8,564	82%
Consecutive Dry Years 2nd Year	2016	9,011	86%
Consecutive Dry Years 3rd Year	2017	9,639	92%
Consecutive Dry Years 4th Year	2018	9,988	96%
Consecutive Dry Years 5th Year	2019	9,680	93%

Supplier may use multiple versions of Table 7-1 if different water sources have different base years and

***Units of measure (AF, CCF, MG**) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes in AF.
Volume available for average year reflects the 5-year average from 2016-2020. The actual water usage in 2019 was actually 9,680 AF but 2019 was the year with usage closest to the average.

7.1.3 Water Service Reliability

In this section, the City's Normal, Single-Dry, and Five-Consecutive-Year Drought projected supplies and demands are integrated and compared. Projected water demands are detailed in Chapter 4 and projected water supplies are detailed in Chapter 6. Under the various water year types, the total annual water supply sources available to the City are compared to the total annual projected water use from 2025 to 2045 in five-year increments. For the water supply and demand assessment, demand projections for the period of 2025 through 2040 and 2045 are taken from Tables 4-4 and 4-5 (DWR Table 4-3) in Chapter 4 of this document. The supply projections are assumed to equal the sum of the surface water and groundwater (including ASR extractions). Recycled water supplies are shown in separate tables to distinguish this non-potable water source from potable supplies.

7.1.3.1 Water Service Reliability – Normal Year

The City's expected use of potable water supplies in Normal Years is described in detail in Chapter 6 and summarized below:

- 0 AF (year 2025-2045) of groundwater from the City's wells in the Yolo Sub-basin; and
- 20,160 AF (year 2025) – 24,440 AF (year 2045) of surface water from WDCWA.

While available, groundwater supplies are shown as zero as the City would not expect to use groundwater in Normal Years but reserves groundwater for use in years when surface water is in short supply.

The City's expected use of recycled water in Normal Years is described in Chapter 6 and summarized below:

- 602 AF (year 2025) – 677 AF (year 2040) of recycled water from the City's WPCF.

The City's Normal Year demands are described in detail in Chapter 4 and 6 and are summarized below:

- 12,807 AF (year 2025) – 15,908 AF (year 2045) of potable water demands from the City's projected population of 64,139 (year 2025) – 79,735 (year 2045) and associated residential and CII accounts; and
- 602 AF (year 2025) – 677 AF (year 2040) of recycled water demand from various sources.

As shown in Table 7-2 and Table 7-3 (DWR Table 7-2), the City's Normal Year supplies for both potable and non-potable water are adequate to meet projected Normal Year demands. The City's primary potable water sources in the future will be surface water from the Sacramento River, ASR water, and local groundwater. ASR and groundwater supply will be used conjunctively with the surface water supplies to meet increased water demands primarily in the summer months. If necessary, the City plans to meet any additional demand through increased groundwater pumping (including both ASR and native groundwater), ensuring the City will maintain 100% supply reliability. In short, no potable water supply shortage is anticipated during Normal Years through 2045. Likewise, no non-potable water supply shortage is anticipated in Normal Years through 2040 as the ample supply of treated wastewater is more than enough to meet all recycled water demands.

Table 7-2. Normal Year Supply and Demand Comparison – Potable (DWR Table 7-2)

	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	20,160	20,160	20,160	24,440	24,440
Demand totals *(autofill from Table 4-3)*	12,596	13,298	14,038	14,820	15,646
Difference	7,564	6,862	6,122	9,620	8,794
NOTES: Volumes are in AF.					

Table 7-3. Normal Year Supply and Demand Comparison – Non-Potable (DWR Table 7-2)

	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	602	677	677	677	
Demand totals *(autofill from Table 4-3)*	602	677	677	677	
Difference	0	0	0	0	
NOTES: Volumes are in AF.					

7.1.3.2 Water Service Reliability – Single Dry Year

The City's water supplies and demands for a Single Dry Year are assumed to be equivalent to those for a Normal Year. As described above, the City's single dry year supply is anticipated to be 20,160 AFY from a combined surface water, native groundwater, and ASR water through 2035. The RWTF is anticipated to be expanded to full capacity and additional ASR wells constructed once the RWTF is expanded in 2040 which increases the anticipated single dry year supply to 24,440 AFY for 2040 and 2045.

As shown in Table 7-4 and Table 7-5 (DWR Table 7-3), the City's Single Dry Year supplies are adequate to meet projected Single Dry Year demands. If necessary, the City plans to meet any additional potable demand through increased groundwater pumping (including both ASR and native groundwater), ensuring that the City will maintain 100 percent supply reliability. Additionally, if there is any disruption in surface water supply, the City will increase groundwater pumping to compensate.

No non-potable water supply shortage is anticipated in Normal Years through 2040 as the ample supply of treated wastewater will be more than enough to meet all recycled water demands.

Table 7-4. Single Dry Year Supply and Demand Comparison – Potable (DWR Table 7-3)

	2025	2030	2035	2040	2045 (Opt)
Supply totals*	20,160	20,160	20,160	24,440	24,440
Demand totals*	12,596	13,298	14,038	14,820	15,646
Difference	7,564	6,862	6,122	9,620	8,794
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: Volumes are in AF.					

Table 7-5. Single Dry Year Supply and Demand Comparison – Non-Potable (DWR Table 7-3)

	2025	2030	2035	2040	2045 (Opt)
Supply totals*	602	677	677	677	
Demand totals*	602	677	677	677	
Difference	0	0	0	0	
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: Volumes are in AF.					

7.1.3.3 Water Service Reliability – Five Consecutive Dry Years

The City's water supplies and demands for five consecutive dry years are assumed to be equivalent to those for a Normal Year and Single Dry Year. To be conservative, the City has assumed that demands would remain constant between normal, single dry, and a five consecutive dry year period. It is likely that by the third, fourth, and fifth year of an extended dry period, customers would ramp up conservation activities and effectively reduce the demands below normal year conditions. The City's five consecutive dry year potable supply is anticipated to be 20,160 AFY from combined surface water, native groundwater, and ASR water through 2035. The RWTF is anticipated to be expanded to full capacity and additional ASR wells constructed once the RWTF is expanded in 2040 which increases the anticipated multiple dry year supply to 24,440 AFY for 2040 and 2045.

As shown in Table 7-6 and Table 7-7 (DWR Table 7-4), the City's five consecutive dry year supplies are adequate to meet projected five consecutive dry year demands. If necessary, the City plans to meet any additional potable demand through increased groundwater pumping (including both ASR and native groundwater) and water conservation, ensuring that the City will maintain 100% supply reliability. Additionally, if there is any disruption in surface water supply, the City will increase groundwater pumping to compensate. In this scenario, potable supplies will remain reliable but water quality consistency will suffer as water from the City's native groundwater wells is much less palatable than the surface water. However, this aesthetic water quality issue is considered acceptable in an extreme scenario such as a 5-year drought.

Table 7-6. Five Consecutive Dry Years Supply and Demand Comparison – Potable (DWR Table 7-4)

		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	20,160	20,160	20,160	24,440	24,440
	Demand totals	12,596	13,298	14,038	14,820	15,646
	Difference	7,564	6,862	6,122	9,620	8,794
Second year	Supply totals	20,160	20,160	20,160	24,440	24,440
	Demand totals	12,596	13,298	14,038	14,820	15,646
	Difference	7,564	6,862	6,122	9,620	8,794
Third year	Supply totals	20,160	20,160	20,160	24,440	24,440
	Demand totals	12,596	13,298	14,038	14,820	15,646
	Difference	7,564	6,862	6,122	9,620	8,794
Fourth year	Supply totals	20,160	20,160	20,160	24,440	24,440
	Demand totals	12,596	13,298	14,038	14,820	15,646
	Difference	7,564	6,862	6,122	9,620	8,794
Fifth year	Supply totals	20,160	20,160	20,160	24,440	24,440
	Demand totals	12,596	13,298	14,038	14,820	15,646
	Difference	7,564	6,862	6,122	9,620	8,794

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes are in AF.

Table 7-7. Five Consecutive Dry Years Supply and Demand Comparison – Non-Potable (DWR Table 7-4)

		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	602	677	677	677	
	Demand totals	602	677	677	677	
	Difference	0	0	0	0	
Second year	Supply totals	602	677	677	677	
	Demand totals	602	677	677	677	
	Difference	0	0	0	0	
Third year	Supply totals	602	677	677	677	
	Demand totals	602	677	677	677	
	Difference	0	0	0	0	
Fourth year	Supply totals	602	677	677	677	
	Demand totals	602	677	677	677	
	Difference	0	0	0	0	
Fifth year	Supply totals	602	677	677	677	
	Demand totals	602	677	677	677	
	Difference	0	0	0	0	

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes are in AF.

Based on an analysis presented in the WDCWA 2020 Water Supply Risk and Alternatives Evaluation report, Woodland's existing and planned ASR capacity appears to be adequate to address average annual, maximum annual, and maximum month surface water shortfalls for all future demand scenarios analyzed in the report (2020, 2030, 2040). For peak day surface water shortfall conditions (expected to occur in November), the program would address between 84 and 98 percent of shortfalls, depending on the demand scenario. It should be noted that the peak day surface water shortfall condition represents a scenario that is both rare and somewhat conjectural (i.e., a brief high-temperature period in early November during a Term 91 curtailment). Even in these rare peak day surface water shortfall conditions, the City would be able to meet demands with native groundwater. The ability of the City to supply

demands is not anticipated to be a problem. The more significant concern is the change in water quality with switching to a higher percentage of groundwater. However, for such a rare peak condition, the aesthetic water quality change is considered to be acceptable.

If necessary, the City may also initiate a water shortage emergency stage to extend available water supplies, as described in Chapter 8.

7.2 DROUGHT RISK ASSESSMENT

CWC §10635(b) requires that the City prepare a DRA which evaluates the risk of a severe drought occurring for the next five consecutive years (2021-2025). Supply conditions for the DRA are based on the five driest consecutive years on record, with adjustments to consider plausible changes in climate, regulations, and other locally applicable criteria. This analysis requires the City to consider management of its water supplies in relation to variations in customer water use. It also provides the City the opportunity to use its WSCP response actions described in Chapter 8 and understand the degree of response necessary in managing its water supplies. This evaluation may help identify risks and assist in planning for steps to address them.

This section reviews the data and methods used to define the DRA water shortage condition and evaluates each water source's reliability under the proposed drought condition. Finally, total water supplies during the five-year drought are compared to projected demands, accounting for any applicable supply augmentation or demand reduction measures available to the City.

7.2.1 Data, Methods, and Basis for Water Shortage Condition

The water shortage condition for the DRA is the same as the five-year drought described in Section 7.1.3.3. Since the DRA can be updated outside of the UWMP five-year plan cycle, the narrative description of the data and basis for the water shortage condition is repeated in this section.

To estimate supplies during a five-year drought, it was assumed that 2015 was the first year of a five-year drought. While surface water supplies could be cut back in dry years, it was assumed that groundwater supplies would not be reduced in dry years. Based on the operational yield estimates for the Yolo Subbasin, it was assumed that groundwater supplies could provide up to 12,596 AFY, the projected demand in 2025, throughout a five-year drought if necessary to supplement surface water supplies that may be unavailable.

7.2.2 DRA Water Source Reliability

The City's multiple dry year potable supplies include:

- Projected base purchased surface water supplies from WDCWA (with no reduction from normal year WDCWA supplies during the first dry year but a 10 percent reduction in each successive dry year); and
- Groundwater pumping (including ASR and from the City's local groundwater basins).

Table 7-8 summarizes the available supplies for each year of the DRA.

Table 7-8. Projected Supplies for Drought Risk Assessment

Supply Source	Available Supply, AFY				
	2021	2022	2023	2024	2025
WDCWA[(a)]	20,160	18,144	16,128	14,112	12,096
Groundwater (ASR and Native Groundwater)	12,596	12,596	12,596	12,596	12,596
Total	**32,756**	**30,740**	**28,724**	**26,708**	**24,692**

(a) Projected supplies from WDCWA are reduced 10 percent from normal in the second dry year and an additional 10 percent in subsequent dry years.
(b) Based on operational yield estimates for the Yolo Subbasin it is assumed the groundwater supply will not be reduced in dry years.

7.2.3 Total Water Supply and Use Comparison

As shown in Table 7-9 and Table 7-10 (DWR Table 7-5), during a five-year drought beginning in 2021, the City's supplies are adequate to meet both potable and non-potable projected demands through 2025, even without water conservation. For the total non-potable supplies, all available WPCF effluent is considered recycled water supply.

Table 7-9. Five-Year Drought Risk Assessment Potable Table to Address Water Code Section 10635(b) (DWR Table 7-5)

2021	Total
Total Water Use - *Potable*	12,596
Total Supplies - *Potable*	32,756
Surplus/Shortfall w/o WSCP Action	20,160
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	20,160
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use [Use Worksheet]	12,596
Total Supplies [Supply Worksheet]	30,740
Surplus/Shortfall w/o WSCP Action	18,144
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	18,144
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use [Use Worksheet]	12,596
Total Supplies [Supply Worksheet]	28,724
Surplus/Shortfall w/o WSCP Action	16,128
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	16,128
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use [Use Worksheet]	12,596
Total Supplies [Supply Worksheet]	26,708
Surplus/Shortfall w/o WSCP Action	14,112
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use [Use Worksheet]	12,596
Total Supplies [Supply Worksheet]	24,692
Surplus/Shortfall w/o WSCP Action	12,096
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	12,096
Resulting % Use Reduction from WSCP action	0%

Table 7-10. Five-Year Drought Risk Assessment Non-Potable Table to Address Water Code Section 10635(b)
(DWR Table 7-5)

2021	Total
Total Water Use - Non-potable	602
Total Supplies	3,909
Surplus/Shortfall w/o WSCP Action	3,307
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	3,307
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use [Use Worksheet]	602
Total Supplies [Supply Worksheet]	3,909
Surplus/Shortfall w/o WSCP Action	3,307
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	3,307
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use [Use Worksheet]	602
Total Supplies [Supply Worksheet]	3,909
Surplus/Shortfall w/o WSCP Action	3,307
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	3,307
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use [Use Worksheet]	602
Total Supplies [Supply Worksheet]	3,909
Surplus/Shortfall w/o WSCP Action	3,307
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	3,307
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use [Use Worksheet]	602
Total Supplies [Supply Worksheet]	3,909
Surplus/Shortfall w/o WSCP Action	3,307
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	3,307
Resulting % Use Reduction from WSCP action	0%

7.3 REGIONAL SUPPLY RELIABILITY

Requirements for water supply and demand assessment are addressed in CWC section 10620(f), which states the following:

> *CWC 10620(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.*

The City is both currently implementing and has plans to implement a variety of water management tools/activities to reduce reliance on imported water. These include extensive demand management measures (documented in Chapter 9 of this report), increased use of recycled water (documented in Section 6.2.7 of this report), and possible conversion of some existing shallow/intermediate aquifer supply wells to dedicated landscape irrigation use.

CHAPTER 8
Water Shortage Contingency Plan

This chapter describes the City's WSCP, seismic risk to the City facilities, and WSCP adoption procedures. The WSCP establishes actions and procedures for managing water supply and water demand during water shortages. The WSCP's purpose is to minimize non-essential uses of water and conserve remaining supplies for the benefit of the public.

8.1 WATER SHORTAGE CONTINGENCY PLANNING BACKGROUND

A water shortage may occur due to a number of reasons, such as population growth, climate change, drought, and catastrophic events. Drought, regulatory action constraints, and natural and manmade disasters may occur at any time. A water shortage means that the water supply available is insufficient to meet the normally expected customer water use at a given point in time. A WSCP presents how an urban water supplier plans to act in response to an actual water shortage condition and helps prevent catastrophic service disruptions.

In 2018, the California State Legislature enacted two policy bills, (SB 606 (Hertzberg) and AB 1668 (Friedman)) (2018 Water Conservation Legislation), to establish a new foundation for long-term improvements in water conservation and drought planning to adapt to climate change and the resulting longer and more intense droughts in California. The 2018 Water Conservation Legislation set new requirements for water shortage contingency planning. The City's WSCP has been updated to be consistent with these requirements.

8.2 CITY WATER SHORTAGE CONTINGENCY PLAN

The City's WSCP is included in this UWMP as Appendix I. The WSCP describes the City's strategic plan in preparation for and responses to water shortages. The WSCP includes water shortage stages and associated shortage response actions that will be implemented in the event of a water supply shortage. As part of the WSCP, the City's legal authorities, communication protocols, compliance and enforcement, and monitoring and reporting are included. Woodland Municipal Code (WMC) Chapter 13.16 Water Service and Chapter 13.32 Water Conservation supports the City's WSCP actions.

The City intends for its WSCP to be dynamic so that it may assess response action effectiveness and adapt to foreseeable and unforeseeable events. It may also be updated to conform to State legislative and regulatory requirements. The City's WSCP is included as Appendix I so that it may be updated outside of the UWMP preparation process.

When an update to the WSCP is proposed, the revised WSCP will undergo the process described in Section 8.4.

8.3 SEISMIC RISK ASSESSMENT AND MITIGATION PLAN

CWC §10632.5(a) requires that the UWMP include a seismic risk assessment and mitigation plan to assess and mitigate the vulnerability of the City's water system. Local or Multi-Jurisdictional Hazard Mitigation Plans (HMPs) may be incorporated in this UWMP to address this requirement if it addresses seismic risk. The *Yolo Operational Area Multi-Jurisdictional HMP* (Yolo HMP, updated in December 2018), addressed seismic risk and is found here: https://www.yolocounty.org/home/showpublisheddocument/55805/636796131647430000.

In accordance with America's Water Infrastructure Act (AWIA), the City completed a Risk and Resilience Assessment (RRA) of its water system in December 2020. The RRA systematically evaluated the City's assets, threats, and risks, and evaluated countermeasures that might be implemented to minimize overall risk to the system. Vulnerability to natural hazards, including earthquakes, was assessed based on the City's level of preparation/resilience, active response capability, and ability to recover. The Environmental Protection Agency (EPA) provides guidance on countermeasures for retrofitting tanks. It recommends anchoring tanks to foundations, strengthening tank walls, replacing non-flexible pipe connections, and improving roof structures over large reservoirs. Automatic shutoff valves at tanks are also suggested.

To ensure the security of the City's water system, the RRA is retained by the City as a confidential document.

8.4 WATER SHORTAGE CONTINGENCY PLAN ADOPTION, SUBMITTAL, AND AVAILABILITY

The City's WSCP (Appendix I) is adopted concurrently with the City's 2020 UWMP, by separate resolution. Prior to adoption, a duly noticed public hearing was conducted. A hard copy of the WSCP will be submitted to DWR within 30 days of adoption, along with an electronic copy.

No later than 60 days after submittal to DWR, a copy of this WSCP will be available at the City's offices. A copy will also be provided to Yolo County. An electronic copy of the WSCP will also be available for public review and download on the City's website.

The City's WSCP is an adaptive management plan. It is subject to refinements as needed to ensure that the City's shortage response actions and mitigation strategies are effective and produce the desired results. When a revised WSCP is proposed, the revised WSCP will undergo the process described in this section for adoption by City Council and distribution to Yolo County, the City's customers, and the general public.

8.5 REFERENCES

Yolo County Office of Emergency Services (Yolo County OES). Yolo Operational Area Multi-Jurisdictional *Hazard Mitigation Plan*. December 2018.

WOODLAND-DAVIS CLEAN WATER AGENCY (WDCWA)
WOODLAND, CALIFORNIA

Background

The Woodland-Davis Clean Water Agency (WDCWA) is a joint powers authority responsible for managing a sustainable, high-quality water supply for the City of Woodland, City of Davis, and UC Davis. Until the completion of the regional surface water supply project in 2016, the Cities of Woodland and Davis had relied on groundwater for 100 percent of their drinking water supplies. The original water supply systems were built decades ago, when the quality and quantity of the water was adequate to meet needs. Faced with declining groundwater quality and increasingly strict water quality regulations, the Cities partnered in 2009 to develop a new water supply from the nearby Sacramento River.

Challenges

WDCWA has faced extreme drought conditions in recent years, including registering the lowest rainfall levels on record from 2013-2015. The area has also recently experienced delayed rainfall starts relative to historical conditions. This has resulted in an extension of the state-mandated surface water flow curtailment nearly every year since 2014. With projections of increased temperatures and decreased precipitation, WDCWA could see lower reservoir levels and continued curtailments of surface water flows. Under these conditions, WDCWA could experience periods in which there would be insufficient water to meet demand.

Planning Process

To better understand the vulnerability of the agency's infrastructure and operations, WDCWA assessed potential climate impacts using the U.S. Environmental Protection Agency (EPA) CREAT application. CREAT assists water utilities in identifying future extreme weather and other environmental threats, assessing risks from these threats, and evaluating and comparing measures to adapt to these threats. The CREAT assessment brought together individuals from the City of Woodland, the City of Davis, and EPA to think critically about potential climate impacts, prioritize assets, consider possible adaptation options, and compare monetized risk reduction across plans and climate scenarios.

Resilience Strategies and Priorities

Based on its previous experience with drought, WDCWA has already taken action to improve its overall resilience. These measures have included installing automated meters, providing real-time automated meters for the consumers, a purchase agreement for 2,000 acre-feet of additional water, and building three aquifer storage and recovery (ASR) wells. Using the results of the CREAT assessment, WDCWA was able to evaluate the performance and costs of several drought management strategies that, if implemented, could further strengthen the operational resilience of the system. The current measures as well as the potential adaptive measures shown below reflect those undertaken by WDCWA or by the cities supplied by the agency.

Type	Resilience Strategies
Current Measures	Purchase Agreement for 2,000 Acre-feet of Additional Water; Short-term
	Build Three Aquifer Storage and Recovery (ASR) Wells with 1.2 Billion Gallons of Storage
	Install Automated Meters
	Update Water Conservation Outreach
	Replace/Install Automated Meters for the City
	Provide Real-Time Metering for Consumers
	Implement Conservation Ordinance
Potential Adaptive Measures	Purchase Long-Term Agreement for 2,000 Acre-feet of Additional Water; 10 Years
	Water Security Supply Analysis Study
	Add One ASR Well
	Expand Recycled Water Use
	Solar Array
	Feasibility Study for ASR Wells as Part of Water Supply Portfolio
	Install Recycled Water Infrastructure
	Create Conservation Campaigns Based on New Irrigation Demand Requirements

Contact Information

For more information regarding the Woodland-Davis Clean Water Agency's resilience planning, contact Tim Busch, WDCWA General Manager, at Tim.Busch@cityofwoodland.org, and Stan Gryczko, WDCWA Operations Manager, at SGryczko@cityofdavis.org.

MEMORANDUM

To: Tim Busch, City of Woodland
Matt Cohen, City of Woodland
Kristin Sicke, Yolo Subbasin Groundwater Agency

From: Petrea Marchand, Consero Solutions
Frank Schneegas, Consero Solutions

RE: Disadvantaged Communities in the City of Woodland based on the WaterSMART Drought Response Program Climate and Economic Justice Screening Tool

Date: July 15, 2024

The City of Woodland (City) asked Consero on June 20, 2024 to research areas of the City the WaterSMART Drought Response Program's Climate and Economic Justice Screening Tool (CEJS Tool) identifies as disadvantaged. This information will inform the City's decision to apply for the U.S. Bureau of Reclamation's WaterSMART Drought Response Grant.

Background

Criterion D, Presidential and DOI Priorities, of the WaterSMART Drought Response grant guidelines is worth up to 15 points. Points for Criterion D are awarded based on how the proposed project will serve or benefit a disadvantaged or underserved community identified using the CEJS Tool. The CEJS Tool contains eight burdens (climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development) used to determine if a census tract is disadvantaged. A census tract is considered disadvantaged if it meets more than one burden threshold and the burden's associated socioeconomic threshold.

FINDINGS

The thee census tracts in the City considered disadvantaged are: 06113011001, 06113011102, and 06113010800.

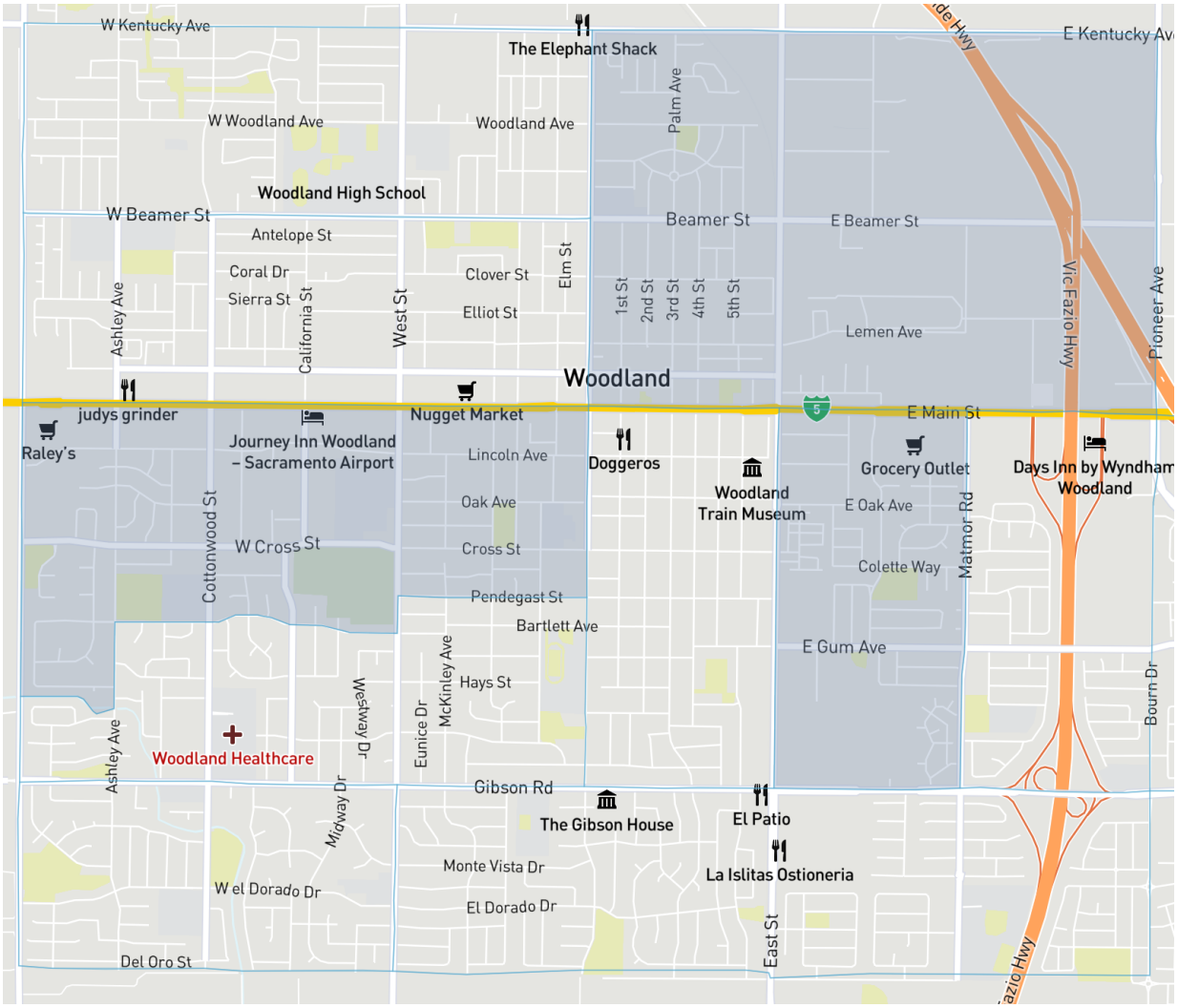
1) Census tract 06113011001 meets the CEJS Tool's energy and housing burden thresholds.
    - Meets the energy burden threshold by being in the 94th percentile for the level of inhalable particles 2.5 micrometers or smaller in the air.
    - Meets the housing burden threshold by being in the 95th percentile for share of homes without indoor kitchens or plumbing.
    - Meets the associated socioeconomic threshold for both the energy and housing burden of being low income.

2) Census tract 06113011102 meets the CEJS Tool's climate change, energy, and housing burden thresholds.

- Meets the climate change burden by being in the 98th percentile of properties with risk from projected floods from tides, rain, riverine, and storm surges within 30 years.
- Meets the energy burden by being in the 95th percentile for the level of inhalable particles 2.5 micrometers or smaller in the air.
- Meets the housing burden by being in the 91st percentile for the share of households making less than 80% of the area median family income and spending more than 30% of income on housing.
- This census tract meets the associated socioeconomic threshold for the climate change, energy, and housing burden of being low income.

3) Census tract 06113010800 meets the CEJS Tool's climate change, energy, and workforce development burden thresholds.
    - Meets the climate change burden by being in the 93rd percentile of properties with risk from projected floods from tides, rain, riverine, and storm surges within 30 years.
    - Meets the energy burden by being in the 94th percentile for the level of inhalable particles 2.5 micrometers or smaller in the air.
    - Meets the workforce development burden by being in the 90th percentile of linguistic isolation in which the share of households where no one over the age of 14 speaks English very well.
    - Meets the associated socioeconomic burdens for climate change and energy by being low income and the associated socioeconomic burden for workforce development by 19% of the population ages 25 years and older having an education less than a high school diploma.

The image below is a snapshot of the City of Woodland using the CEJS Tool (https://screeningtool.geoplatform.gov/en/#13.85/38.68158/-121.77842). Census tract 06113011001 is highlighted south of Main Street and to the west of College Street. 06113011102 is highlighted south of Main Street and between East Street and Matmor Road. 06113010800 is highlighted north of Main Street.


W Kentucky Ave
The Elephant Shack
E Kentucky Ave
W Woodland Ave
Woodland Ave
Palm Ave
Woodland High School
W Beamer St
Beamer St
E Beamer St
Antelope St
Coral Dr
Sierra St
Clover St
Elliot St
Elm St
1st St
2nd St
3rd St
4th St
5th St
Ashley Ave
California St
West St
Lemen Ave
Vic Fazio Hwy
Pioneer Ave
Woodland
judys grinder
Nugget Market
E Main St
Raley's
Journey Inn Woodland – Sacramento Airport
Lincoln Ave
Doggeros
Grocery Outlet
Days Inn by Wyndham Woodland
Oak Ave
Woodland Train Museum
E Oak Ave
Cottonwood St
W Cross St
Cross St
Matmor Rd
Colette Way
Pendegast St
Bartlett Ave
E Gum Ave
McKinley Ave
Hays St
Bourn Dr
Eunice Dr
Westway Dr
Woodland Healthcare
Gibson Rd
Midway Dr
The Gibson House
El Patio
Monte Vista Dr
La Islitas Ostioneria
W el Dorado Dr
El Dorado Dr
East St
Del Oro St

United States Department of the Interior
BUREAU OF RECLAMATION
Northern California Area Office
16349 Shasta Dam Boulevard
Shasta Lake, CA 96019-8400

IN REPLY REFER TO:
NC-442
2.2.4.22

April 14, 2022

VIA ELECTRONIC MAIL

Tim Busch
General Manager
Woodland-Davis Clean Water Agency
855 County Road 102
Woodland, California 95776

Subject: Second Update to Notification of Critical Year (Our letter of March 14, 2022)

Dear Mr. Busch:

On March 14, 2022, Reclamation sent a letter to all Sacramento River Settlement (SRS) Contractors providing an update to the February 15, 2022, Notification of Critical Year. In that letter, we notified you that Reclamation was analyzing the March 1 data and assessing the impacts to our Critical Year Notification. Also in our letter of March 14, 2022, we asked that you plan for considerably less water than you have done in prior Critical Years; and we committed to communicate with you in the coming months. The purpose of this letter is to inform you of the persistent conditions that are affecting hydrology and water available for diversion under your contract. In addition, Reclamation is offering flexibility on certain contract provisions, so you can most efficiently manage water available to you.

Despite a promising start to the water year, April storage in Shasta Reservoir is predicted to be at or about 1.8 million acre-feet and forecasted inflow into the reservoir is well below the Critical Year level of 4.0 million acre-feet for 2022 (predicted to be *less than 3.0 million acre-feet).* Water supply conditions this year do not allow for full diversions under the SRS Contracts. For all SRS Contractors, Reclamation estimates water available from Shasta Reservoir releases to be approximately 18% of the Contract Total, unless otherwise notified by Reclamation.

However, we estimate for most SRS Contractors sufficient tributary flows and natural accretion exists upstream of the SRS Contractors' point(s) of diversion and is available for diversion under the SRS Contracts through the end of April 2022 while not affecting Shasta operations. Beginning May 1, there may be no additional water available for diversion and the 18% of Contract Total will be in effect. In recognition of the limited supply available for diversion under the SRS Contracts and in furtherance of maximizing flexibility to meet the multiple

beneficial purposes of the CVP, for contract year 2022 only, Reclamation agrees to account for water diverted under your SRS Contract, May 1 through October 31, 2022, as follows:

1. If the water is used within the service area depicted on Exhibit B of your SRS Contract, it will be treated as Base Supply. Reclamation will waive the requirement of Articles 8(a), 3(c)(1) and 3(c)(2)(ii).

2. If the water is transferred out to another in-basin CVP contractor in accordance with the Accelerated Water Transfer Program, it will be treated as Project Water; and the Rate, Restoration Charge, and Trinity PUD Assessment will be applicable. Reclamation will waive the requirement of Article 8(a).

3. The provisions in 1. and 2. above will not apply in the event that total diversions, including any water transferred out, under your SRS Contract exceed 18% of the Contract Total.

4. Diversions exceeding 18% of the Contract Total will be considered as exceeding the amount available and will be handled on a case-by-case basis.

Should additional water become available during the May 1 through October 31 period, Reclamation will notify you; and such water will be additive to the 18% of Contract Total.

In accordance with Article 3(c) of your SRS Contract and consistent with the limits on diversions described above, please submit a schedule as soon as possible, but no later than May 1, 2022, indicating the Contract Total to be diverted each month, to the Bureau of Reclamation, Northern California Area Office, 1140 West Wood Street, Willows, CA 95988. Please note, this schedule can be updated at any time, and we kindly ask you to do so as communication will be key to successfully managing through this difficult and trying year. Also, please be advised that in accordance with the State Water Resources Control Board's (SWRCB) April 4, 2022, Temporary Urgency Change Order, Reclamation will submit updated monthly water year operations outlook reports to the SWRCB identifying the amounts scheduled for diversion under your Settlement Contract each month.

The challenges ahead of us are difficult and the available water supply is extremely limited. We will continue to communicate the progress of any drought relief funding and its availability. Please reach out to Jake Berens at 530-892-6203, or jberens@usbr.gov, if you have any questions regarding the above matter.

Sincerely,

Donald Bader
Area Manager

City of Woodland's Aquifer Storage and Recovery: Well 31 Project Appendix B – Letters of Support

Bureau of Reclamation
WaterSMART Drought Response Program Grant Application
Notice of Funding Opportunity No. R25AS00013

October 7, 2024

Applicant: City of Woodland
Project Manager: Matt Cohen, Associate Engineer
300 First Street Woodland, CA 95695
Matt.Cohen@cityofwoodland.gov

MIKE THOMPSON
4TH DISTRICT, CALIFORNIA

COMMITTEE ON WAYS AND MEANS
SUBCOMMITTEE ON TAX POLICY
RANKING MEMBER
SUBCOMMITTEE ON HEALTH

CONGRESS OF THE UNITED STATES
HOUSE OF REPRESENTATIVES
WASHINGTON, DC 20515

DISTRICT OFFICES:
2721 NAPA VALLEY CORPORATE DRIVE
NAPA, CA 94558
(707) 226-9898

2300 COUNTY CENTER DRIVE, SUITE A100
SANTA ROSA, CA 95403
(707) 542-7182

622 MAIN STREET
SUITE 106
WOODLAND, CA 95695
(530) 753-5301

CAPITOL OFFICE:
268 CANNON HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-3311

WEB: http://mikethompson.house.gov

September 26, 2024

M. Camille Calimlim Touton
Commissioner
United States Bureau of Reclamation
1849 C Street NW
Washington, DC 20240

Dear Commissioner Touton:

I am writing to urge full and fair consideration for the City of Woodland's Aquifer Storage & Recovery (ASR) Well 31 Project. Our drought-prone region continues to face significant challenges with respect to our limited water supply. The lack of reliable surface water throughout the year emphasizes the need to invest in innovative solutions to safeguard our water supply systems.

The proposed fourth ASR Well in Woodland will help the city diversify its water supply and increase its water resiliency by reducing dependence on the San Francisco Bay Delta and the Sacramento River, the city's primary freshwater sources. An additional ASR Well will provide the city the flexibility to draw from its diverse water supply portfolio in the case the water source from the Sacramento River and the San Francisco Bay Delta is low.

This project will help protect public health and safety by expanding uninterrupted access to clean water, particularly during emergencies such as wildfires and other natural disaster. Furthermore, by reducing reliance on the Sacramento River and expensive water rights purchases, this project will help our city save cost while creating local job opportunities and fostering economic growth.

Again, I request full and fair consideration for grant funding from the U.S. Bureau of Reclamation WaterSMART Drought Response Program funding opportunity. Should you have any questions, please do not hesitate to contact my Woodland Office at (530) 753-5301.

Sincerely,

Mike Thompson

MIKE THOMPSON
Member of Congress

NCWA
Northern California Water Association

#SourcingOurSustainableFuture
455 Capitol Mall, Suite 703
Sacramento, CA 95814-4496
(916) 442-8333
www.norcalwater.org

September 19, 2024

M. Camille Calimlim Touton
Commissioner
United States Bureau of Reclamation
1849 C Street NW
Washington, DC 20240

Subject: Support for the **City of Woodland's** Aquifer Storage & Recovery Well 31 Project

Dear Commissioner Touton,

On behalf of the Northern California Water Association (NCWA), we strongly support the City of Woodland's WaterSMART grant application, including the ASR Well 31 Project (Project), the latest phase of Woodland's water sustainability and resiliency planning.

The Project, and Woodland's aquifer storage and recovery program in general, supports our vision for the Sacramento Valley and enhances Northern California's vibrant way of life. Sustainable management of water resources requires collaboration from interdisciplinary teams including farmers, municipal water suppliers, and environmentalists. We are fortunate to have forward thinking and collaborative water agencies like Woodland advancing these types of projects to benefit the region.

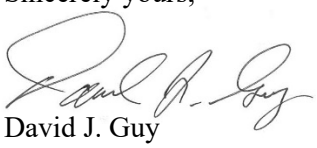
The ASR Well 31 Project would allow Woodland to make better use of surface water and groundwater resources, improving the City's flexibility and resiliency to meet customer demand while maintaining high quality supply for all water users, even in the toughest of droughts or surface water rights curtailments. In turn, Woodland's improved flexibility helps reduce water stress of the Sacramento River, boosting supply for others during California's most water-scarce summers and prolonged droughts. Doing so preserves precious surface water supplies for other beneficial uses including productive farmland, wildlife refuges and managed wetlands, rivers and creek that support fisheries, and for cities and communities downstream of Woodland's water intake on the Sacramento River.

The Woodland Davis Clean Water Agencies (WDCWA) surface water conversion plan and Woodland's associated ASR program and recycled water utility have supported NCWA's goals every step of the way. The transition to surface water has reduced dependence on aquifer pumping, which is paying dividends for the regions subbasin and groundwater balance. The new surface water intake has a state-of-the-art fish screen to protect the Sacramento River's aquatic habitat. The WDCWA plan allowed Woodland to start a recycled water utility in 2017, which has been expanding recently what a phase-2 expansion, offsetting potable demand with recycled water for non-potable purposes such as irrigation and power plant electricity production. The ASR program helps Woodland balance supply and demand, allowing Woodland the flexibility to meet its water supply needs without compromising Northern California's other beneficial uses.

I commend Woodland for its leadership and commitment to advancing initiatives that benefit Northern California. Woodland has been a tremendous partner in Northern California and we thus strongly support Woodland and its ASR Well 31 Project.

If you require any additional information or would like to discuss our enthusiastic support, please feel free to contact me at (209) 275-7867.

Sincerely yours,



David J. Guy
President

Yolo Subbasin Groundwater Agency
Groundwater Sustainability Agency

34274 State Highway 16 Woodland, CA 95695 530.662.3211 www.yologroundwater.org

October 4, 2024

U.S. Bureau of Reclamation
Attn: WaterSMART – Drought Response Program (NOFO Team)
Denver Federal Center – Bldg. 67, Rm. 152
6th Avenue and Kipling Street
Denver, CO 80225

Re: Letter of Support for City of Woodland's ASR Well 31 Project

Dear Drought Response Program Review Committee,

The Yolo Subbasin Groundwater Agency (YSGA) fully supports the City of Woodland's Drought Resiliency application for financial assistance to construct the Aquifer Storage and Recovery (ASR) Well 31 Project and enhance the City's ASR Well Program.

The YSGA is committed to planning for and investing in projects and management actions to build drought resiliency. As a newly formed Groundwater Sustainability Agency (GSA) that has diverse representation from 26 members, we are strong supporters of additional funding to assist in the implementation of the Yolo Subbasin Groundwater Sustainability Plan (GSP). The City's ASR Well 31 Project is in the adopted 2022 Yolo Subbasin GSP and the YSGA has prioritized the Project as a critical regional project for ensuring long-term groundwater sustainability for the region. The City's ASR Program is an innovative, multi-benefit groundwater recharge program that optimizes conjunctive management and plans for managing California's extremes.

Without these funds, the City will not be able to build long-term drought relief, which is critical to sustaining the area's economy and livelihood of its residents, and properly preparing the Yolo Subbasin for long-term independence and resiliency. We urge you to award the City with the funding required to construct the ASR Well 31 Project, and we appreciate your time in reviewing the application.

Sincerely,

Kristin Sicke
Executive Officer
Yolo Subbasin Groundwater Agency

WOODLAND-DAVIS
Clean Water Agency

October 4, 2024

Ken Hiatt, City Manager
City of Woodland
300 First Street
Woodland, CA 95695

Subject: Letter of Support for the City of Woodland Aquifer Storage and Recovery Well 31 Project

Dear Mr. Hiatt,

Thank you for your continued leadership in Woodland, the City of Trees, and your efforts to ensure the success of its residents and businesses amid water-scarce years and rising temperatures.

I write to you today regarding the increase in long-term drought frequency affecting the City of Woodland and the State of California. On behalf of the Woodland-Davis Clean Water Agency (WDCWA), I want to express our wholehearted endorsement of Woodland's Aquifer Storage and Recovery Well 31 Project ("Project"). WDCWA supports the City in its endeavor to obtain funding for this water resiliency project and recommends the U.S. Bureau of Reclamation consider this critical and novel water infrastructure Project for grant funding.

As the sole drinking water purveyor for Woodland, WDCWA has worked closely with City staff and can attest to their commitment to water supply reliability and sustainability, especially through the operation of Woodland's existing three Aquifer Storage and Recovery Wells. The proposed ASR Well 31 Project will provide additional underground banking capacity for Woodland's 61,400 residents and will include innovative renewable energy design using in-line micro turbines and solar power generation. Not only does the Project demonstrate an engineering-with-nature approach to water storage and drought resilience via the underground banking, but it will also reduce power demand on the region's power grid. This future-oriented planning for climate change impacts aligns perfectly with regional water resilience goals and is markedly important given the persistent and increased frequency of long-term droughts faced by Yolo County.

We applaud Woodland as it serves the needs of the Yolo County, California community and encourage the U.S. Bureau of Reclamation to consider this critical infrastructure project and allocate the necessary resources in support. Please do not hesitate to reach out to the Board Secretary, Michele Mitchell, at secretary@wdcwa.com or (530) 379-4027 if you need anything further.

Sincerely,

Tim Busch, PE
General Manager

October 1, 2024

City of Woodland
300 First Street
Woodland, CA 95695

Re: Letter of Support for the City of Woodland Aquifer Storage & Recovery Well 31 Project

To Whom it May Concern,

On behalf of the Woodland Chamber of Commerce, I am writing to express our support for the City of Woodland's Aquifer Storage & Recovery Well 31 Project.

As an integral part of the community, we recognize the importance of ensuring the reliability of critical water infrastructure, such as the Woodland Davis Clean Water Agency's (WDCWA's) newly-constructed surface water treatment plant (2016) and Woodland's aquifer storage & recovery (ASR) wells. The project will ensure excellent water quality in Woodland by providing a higher quality water source than existing groundwater, keeping water quality consistent with the surface water supply from WDCWA. By storing treated surface water during times of plenty and drawing from it during times of scarcity, the City will offset its need for native groundwater supply that is higher in hardness, nitrates, hexavalent chromium, and other undesirable constituents.

The WaterSMART Drought Response Program has the opportunity to support Woodland's construction of a fourth aquifer storage and recovery well, which supports the Chamber's broader objectives of sustainability, resilience, and economic vitality.

With respect to sustainability, the ASR program mitigates issues such as groundwater depletion, subsidence, and declining groundwater quality for the community at large. It also seeks to generate renewable electricity to improve air quality. Furthermore, it prevents supplemental withdrawals from the Sacramento River during critical low flow time periods and improves the quality of Woodland's wastewater effluent, thereby supporting the health of the community's rivers and waterway.

The project will improve Woodland's water supply resiliency. As described in the Podcast episode that made Woodland's water system famous (bit.ly/LevelUpAudioS3E5FEMA), the ASR program is critical to the resiliency of the water system, particularly in times of drought.

Water quality and resiliency are vital to a community's economic vitality. As representatives of local businesses and community members, we stand ready to support and advocate for initiatives that promote the well-being and prosperity of our community. We believe that investing in resilient infrastructure, such as the proposed ASR Well 31 project, is essential for ensuring the long-term sustainability and prosperity of our region.

In summary, the Woodland Chamber of Commerce fully endorses the project and pledges its support to facilitate its successful implementation. We look forward to continuing our collaboration with the City of Woodland and other stakeholders to advance initiatives that benefit our community. We urge U.S. Bureau of Reclamation to award funding to this project.

Please do not hesitate to reach out if you require any further assistance or information.

Sincerely,

Cynthia Evans
Executive Director
Woodland Chamber of Commerce

City of Woodland's Aquifer Storage and Recovery: Well 31 Project Appendix C – Official Resolution

Bureau of Reclamation
WaterSMART Drought Response Program Grant Application
Notice of Funding Opportunity No. R25AS00013

October 7, 2024

Applicant: City of Woodland
Project Manager: Matt Cohen, Associate Engineer
300 First Street Woodland, CA 95695
Matt.Cohen@cityofwoodland.gov

RESOLUTION NO. 8386

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF WOODLAND, CALIFORNIA AUTHORIZING AND DIRECTING THAT AN APPLICATION BE SUBMITTED TO OBTAIN A GRANT UNDER THE UNITED STATES BUREAU OF RECLAMATION WATERSMART DROUGHT RESPONSE GRANT PROGRAM AND AUTHORIZING TO PROVIDE ASSURANCES AND ENTER INTO AN AGREEMENT RELATED TO THE GRANT FOR AQUIFER STORAGE AND RECOVERY WELL 31 PROJECT

WHEREAS, the Bureau of Reclamation released its Funding Opportunity No. R25AS00013 soliciting applications for the WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025; and

WHEREAS, the City of Woodland (City) Aquifer Storage and Recovery Well 31 (Project) is an eligible project under the funding opportunity; and

WHEREAS, the City proposes to implement the next phase of its Aquifer Storage and Recovery (ASR) Program through implementation of the Project to improve short term drought resiliency and long term water supply reliability during all water year types; and

WHEREAS, the City's proposed Project will benefit disadvantaged areas within the City and in the vicinity of the ASR Well 31 project site with approximately 75% of the customers to be served by the Project classified as disadvantaged with median household incomes (MHI) below eighty percent of the State's average MHI; and

WHEREAS, the Project involves drilling and above-ground construction of a new municipal ASR well to replace lost capacity from obsolete groundwater wells, with designed capacity of at least 1,800 gallons per minute and a renewable energy component; and

WHEREAS, the Project is included in the Yolo Subbasin Groundwater Agency Sustainability Plan, and will help meet the measurable objectives in the Yolo Subbasin Groundwater Sustainability Plan, including the facilitation of groundwater recharge by injecting treated surface water into the sand/gravel layer approximately 500 feet below land surface when surplus Sacramento River water is available during winter months;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Woodland:

SECTION 1. City staff are directed to prepare and submit an application to the United States Bureau of Reclamation WaterSMART Drought Response Grant Program for the Aquifer Storage and Recovery Well 31 Project, and enter into an agreement with the Bureau to complete the project in accordance with the Bureau grant guidelines, if awarded; and

SECTION 2. The City Manager is authorized to execute the application, assurances, and agreements required by the Bureau to secure the grant; and

SECTION 3. City Staff are directed to take all action necessary to carry out the purposes of this Resolution.

PASSED APPROVED AND ADOPTED by the City Council of the City of Woodland at a regular meeting held on the 3rd day of September 2024, by the following vote:

AYES: Members Lansburgh, Stallard, Vega and Mayor Garcia-Cadena
NOES: None
ABSENT: Fernandez
ABSTAIN: None

Tania Garcia-Cadena, Mayor

ATTEST:

Sarah Lansburgh, CMC, City Clerk