

MokeWISE Program Scope of Work:
Project 2b: Woodbridge Winery Wastewater Reuse

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Problem Statement and MokeWISE Stakeholder Interests

Water agencies are charged with the timely delivery and affordable supply of high quality surface water for their customers and are committed to maintaining that responsibility. Some water agencies are not in favor of using recycled water for agricultural purposes due to concerns about quality, cost, and transmission of recycled water resources, for primary users as well as any possible secondary and tertiary effects experienced by anyone in the district as a result of using recycled water. These agencies understand and are respectful that other entities may not share this view towards recycled water and do not have an official position either in favor or in opposition to other entities that may be interested in the funding and building of particular infrastructure for recycled water, and including general exploration of opportunities to use recycled water.

The environmental stakeholders in the MokeWISE process are interested in encouraging the recycling and reuse of water of every kind (graywater, process water, blackwater) when and where ever possible. Recycled water is the single largest source of additional water in California. In 2012, about 670,000 acre feet of treated wastewater was put to beneficial use in California, but this is still only a small part of the 5 million acre feet of treated wastewater produced annually in the state.

Recycled water provides a reliable and plentiful supply, and its use can enable the recharge of overdrawn aquifers and preserve the vitality of California's rivers and the Sacramento-San Joaquin Delta. State-of-the-art recycling facilities such as the Edward C. Little West Basin plant in Los Angeles currently produce recycled water types tailored to specific end uses. The state is preparing standards for potable reuse of recycled water. Santa Clara Valley's recently completed Advanced Water Purification Center expects to supply drinking water at some point.

Environmental stakeholders want to ensure that the potential role of recycled water as a present and future water source for the Mokelumne Watershed is not overlooked due to insufficient information or inaccurate assumptions. They would like to see a comprehensive survey of wastewater and graywater availability, and water end uses in the MokeWISE area, including the EBMUD service area, including what water qualities are needed for those purposes. The study would seek to match available sources of wastewater and treatment levels to potential users.

Specifically, environmental stakeholders are interested in how this project would impact Mokelumne flows in all year types. The Woodbridge Winery currently produces 300 AFY of wastewater, which must be blended with 100 AFY of Mokelumne river water to reduce dissolved salts before it is reused or discharged. At present Woodbridge uses its senior riparian rights on the Mokelumne as the source of the blending water. The project proposes to increase the amount of blended water from 400 AFY up to 4000 AFY in wet years, and to a range of 1000 AFY to 2000 AFY in dry years. This blended water would be made available to

other nearby wineries. In wet years, the blending water would come from NSJWCD's junior water rights on the Mokelumne, and would require up to 1000 AFY of Mokelumne water. In dry years, the blending water would come from Woodbridge's senior water rights, and would require from 250 to 500 AFY of Mokelumne water. The environmental stakeholders are particularly concerned with the potential increase in use of Mokelumne water in dry years, and are additionally concerned that the Mokelumne water may be used inappropriately in dry years, when flows on the river are already critically low, to irrigate land not covered by Woodbridge Winery's riparian rights.

Other entities see that when municipal wastewater is recycled for irrigation and groundwater recharge, it broadens the spectrum of beneficial uses that the water serves. For instance, spreading ponds may also meet year-round and seasonal wildlife habitat needs for resident and migrating birds, and other wildlife. If the pond area has walking and bird watching trails for the public, it could meet recreational needs. Recycled water can also offset Mokelumne River supplies, which can be left in the river to perform in-stream functions or put towards other beneficial uses. Using recycled water for groundwater recharge conserves the natural resource that is the aquifer, while forgoing Mokelumne River water. The recycling project promotes economic benefits by avoiding the costs imposed upon others from alternative water supply projects, like additional dams. If the water recycling project hires local contractors, it can help to improve the economy in the district. The recycling project can help to avoid the divisiveness caused by water supply projects that are geographically inequitable. That is, projects that impose costs in one area (e.g. dams upcountry), while providing benefits to another area (San Joaquin County, Alameda County, etc.)

The Woodbridge Winery Wastewater Reuse Project will expand the distribution of treated wastewater from Woodbridge Winery to the NSJWCD's distribution system for use by other entities within NSJWCD's service area. Implementing this project would require connecting the NSJWCD's non-potable water conveyance system to Woodbridge Winery's treated wastewater system, and connecting the NSJWCD's 4th diversion point from the Mokelumne River this joint conveyance system for blending. The project would include developing a conceptual design report that would include an assessment of feasibility. Pending feasibility, final design and environmental documentation will be conducted and necessary permits will be secured. Implementation will include site preparation, construction, testing. Costs for this project are estimated to be \$16.16 million, with \$35,000 for the conceptual design report, \$100,000 for securing the Waste Discharge Report permit, \$25,000 for securing funding, and \$16 million for construction. Construction costs could vary greatly depending on the alternative selected.

Background Information

Woodbridge Winery, owned by Constellation Wines US, Inc., is located along the northern bank of Mokelumne River in San Joaquin County, northwest of the City of Lodi. The winery has riparian water rights to the Mokelumne River and uses groundwater for winery processes.

Water Use

Woodbridge Winery is one of many wineries in San Joaquin County, and uses a combination of groundwater, treated wastewater, and raw water from the Mokelumne River for irrigation of approximately 55 acres of grapes. One acre of grapes requires approximately 1.5 AFY for irrigation, or 82.5 AFY for Woodbridge Winery's total acreage of grapes. Additional water use occurs for cleaning of equipment and winemaking processes. Water that is not consumed in these processes become wastewater. For Woodbridge Winery, this amounts to approximately 300 AFY of non-domestic wastewater.

Many of the wineries in the region use a combination of water supply sources, including groundwater, surface water, and irrigation water supplied by the North San Joaquin Water Conservation District (NSJWCD), which also serves other agricultural users. Groundwater is an important water supply, and is the primary supply source for many of the communities in the area. The high quality of the groundwater makes it a valuable municipal supply. The region is seeking to reduce groundwater pumping for agricultural irrigation to help conserve groundwater for municipal and other water supplies, as recycled and reused water is generally acceptable for irrigation purposes, provided salinity is controlled.

Wastewater

Woodbridge Winery owns and operates a wastewater collection and treatment system on-site that is able to accommodate a peak flow of 1.5 mgd during crushing season. The treatment system include solids screening and removal; equalization tanks; Mobilized Film Technology (MFT) that includes preconditioning; MFT bioreactors that include biogas processing with energy capture, and Dissolved Air Flotation (DAF); three 3.3 mg aeration ponds (Upper Ponds); and Lower Ponds. Solids removed from the treatment system are hauled and either landfilled or processed for reuse off-site. The Lower Ponds primarily serve as stormwater detention facilities, and are subject to inundation from the Mokelumne River during flood events (Regional Board, 2012).

Wastewater flows peak in August through October, during the crush period, and are approximately twice the average flow rate for the rest of the year. Stormwater from a portion of the winery is also collected via the wastewater system due to the open nature of the facilities, though excessive stormwater generally results in diversion to the Lower Ponds, bypassing much of the treatment system. Treated wastewater is discharged to on-site Land Application Areas (Regional Board, 2012).

Domestic wastewater (e.g., sewage) is collected in a separate system and discharged to a septic system. This waste stream is not reused (Regional Board, 2012).

Water Quality

Treated wastewater is generally high in salts, as shown in **Table 1**, which summarizes treated wastewater effluent quality from 2010.

Table 1: Treated Wastewater Effluent Quality (2010)

	Annual Mean Result (mg/L)								
	BOD	Sulfate	NO3 as N	TKN	TN	TDS	VDS	FDS	pH
2010 Annual Average	53	13	36	4	40	1,580	574	1,006	8.8

Source: Regional Board 2012

Notes: BOD = Biological Oxygen Demand; NO3 as N = Nitrate as Nitrogen; TKN = Total Kjehldhal Nitrogen; TN = Total Nitrogen; TDS = Total Dissolved Solids; VDS = Volatile Dissolved Solids; FDS = Fixed Dissolved Solids

The salt of greatest concern is potassium, although salinity controls are implemented to reduce these during the treatment process. According to the Woodbridge Winery’s Waste Discharge Permit, FDS levels must be 775 mg/L or lower for application to crops (Regional Board, 2012).

Wastewater Reuse

Treated wastewater is disposed of via land application areas on-site at the winery. Dispersal methods include flood irrigation (currently used on the vineyards) and sprinkler irrigation (used on cropped land). Due to the high levels of FDS, treated wastewater must be blended with raw water to dilute salts prior to use for irrigation. Woodbridge Winery treats approximately 300 AFY of wastewater, which is blended with approximately 100 AFY of raw water from the Mokelumne River.

Project Information

Project Description

The Woodbridge Winery Wastewater Reuse Project (Project) proposes to expand the distribution of treated wastewater from Woodbridge Winery to the NSJWCD’s distribution system for use by other wineries within NSJWCD’s service area. To address the salinity of the treated wastewater, blending would continue to be necessary. During dry years, blending would be accomplished using Woodbridge Winery’s senior riparian water rights and groundwater, as is the current practice. During normal and wet years, blending would utilize NSJWCD’s junior water rights to the Mokelumne River. The maximum amount of water would be diverted during normal and wet years, to increase the availability of non-potable water for irrigation. During normal and wet years, wineries receiving this water would be encouraged

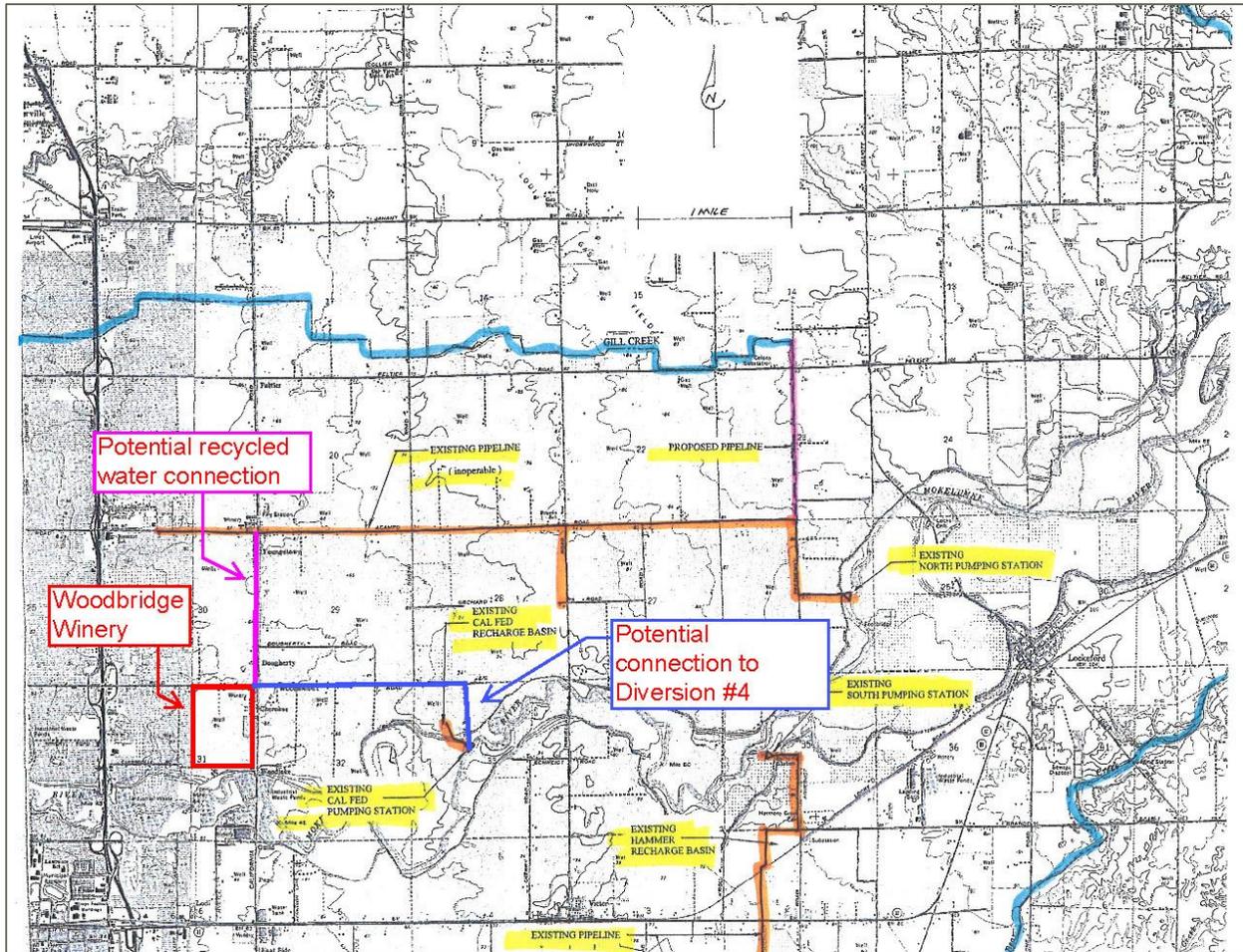
to intentionally over-irrigate their crops, which would provide groundwater recharge. Implementing this project would require connecting the NSJWCD's non-potable water conveyance system to Woodbridge Winery's treated wastewater system, and connecting the NSJWCD's 4th diversion point from the Mokelumne River this joint conveyance system for blending.

It is anticipated that between 2,000 and 4,000 AFY of blended water would be available during wet years, with approximately half used by crops and half anticipated to recharge to the groundwater basin. Approximately half this amount would be available during dry years, all of which would be used for irrigation. For all years, this Project would reduce groundwater pumping in the area, thereby helping to protect groundwater levels.

Project Location

The Woodbridge Winery Wastewater Reuse Project would be located at the Woodbridge Winery, in Acampo, and within the North San Joaquin Water Conservation District (NSJWCD) service area. **Figure 1** indicates the general location of the Project.

Figure 1: Proposed Project



Source: NSJWCD, n.d.

Project Sponsor

Woodbridge Winery is the project sponsor for the *Woodbridge Winery Wastewater Reuse Project*, in partnership with North San Joaquin Water Conservation District (NSJWCD) and North Eastern San Joaquin County Groundwater Basin Authority (GBA).

Scope of Work

Implementing this Project would require design, permitting, funding, and construction, along with approvals from the governing bodies of the three project partners.

Task 1. Conceptual Design Report

A Conceptual Design Report would be developed to identify the preliminary project components and refine the project sufficiently to acquire appropriate approvals and outside funding. The Conceptual Design task will include:

- 1) A feasibility study that will identify potential wastewater reuse projects for the winery and recommend a project;
- 2) A conceptual design and cost estimate for the recommended project.

These two deliverables combined make up the “Conceptual Design Report” to be developed under this task. The Conceptual Design Report should include a conceptual layout of facilities, estimate of potential water yields, cost estimates, benefit analysis, identification of potential hurdles, schedule, environmental impacts, and permit requirements. The Conceptual Design Report should be detailed enough to provide the basis for applying for funding opportunities.

Should blending occur at the Woodbridge Winery site, both the intake pipeline and the conveyance pipeline would need to connect to the winery. It is estimated that connecting the Woodbridge Winery to NSJWCD’s existing Diversion #4 would require approximately 1.5 miles of pipeline, and connecting Woodbridge Winery to the existing NSJWCD’s pipelines would require an additional 1 mile pipeline, assuming the blended water would connect to the nearest NSJWCD pipeline at Acampo Rd. and Kennefick Rd. The Conceptual Design Report will assess the feasibility of using the NSJWCD’s Acampo Rd. pipeline, as it may be inoperable. Should blending occur at a different location, or the Acampo Rd. pipeline is inoperable, pipelines may need to be longer than assumed in this scope.

Task 2. Funding

Project Partners will seek outside funding wherever possible to fund implementation of the Project. Such funding sources could include State Revolving Fund grants and loans, Integrated Regional Water Management (IRWM) grants, or other grant and loan opportunities. Generally, these funds require preliminary design, sometimes require completion of environmental documentation (see Task 3), and feasibility and/or facilities plans. This task would include preparation of materials to support applications for identified funding opportunities. To the extent practicable, these efforts should be completed by NSJWCD, GBA, and/or the MokeWISE group. The target funding opportunity for this effort will be a California Department of Water Resources IRWM grant, although other opportunities would also be pursued.

Task 3. Final Design

Upon completion of the Conceptual Design Report, approval from appropriate governing bodies, and securing funding, final design will be completed, building on the work completed under Task 1.

Task 4. Environmental Documentation

Upon completion of design, environmental documentation must be completed for the project. It is anticipated that this project would need to undergo analysis under CEQA. Should federal permitting or funding be necessary or pursued by this Project, environmental documentation should be consistent with both CEQA and NEPA.

Task 5. Permitting

Project permits would be required from a variety of entities for construction, water reuse, and potentially changes to diversions. Potential permits that may be necessary for the project are listed in **Table 2**. This list is a preliminary list and should not be considered exhaustive. Formal agreements should be obtained under this subtask should the Recommended Project identify a need for any. Additional permits or agreements should be identified during design of the Project.

Table 2: Potential Permits for Recommended Project

Agency	Permit
Regional Water Quality Control Board	Waste Discharge Requirements
	NPDES Permit
	Recycled Water Master Permit
Local Municipalities and San Joaquin County	Conditional Use
	Construction Permit
	Encroachment Permit
	Tree Removal Permit

Task 6. Construction

Construction of the Project can be divided into the following subtasks:

- Subtask 6.1 Site Preparation
- Subtask 6.2 Construction
- Subtask 6.3 Testing

Subtask 6.1 Site Preparation

Site preparation activities include setting up staging areas, assembling materials and equipment, and clearing ground for construction activities. This subtask should also include

an assessment of the Acampo Rd. pipeline, if it is selected for the Project and if it is inoperable prior to the project.

Subtask 6.2 Construction

Construction activities for the Project would include excavation for pipelines, pump stations and other conveyance appurtenances. Additional construction could be required for the blending facility (e.g., mixing tank). Should NSJWCD's Acampo Rd. pipeline be the chosen conveyance route, and be inoperable prior to implementation of the Project, construction activities could include rehabilitation of the pipeline, such as lining, cleaning, or replacing sections. It is assumed that pipelines would be constructed within roadway right-of-ways to the extent feasible, and that any disturbance from excavation activities would be restored to before-project conditions following installation of the pipeline. It is assumed that potential users of the water created by the Project are existing NSJWCD customers, and no additional connections are necessary.

Subtask 6.3 Testing

Prior to delivery of blended treated wastewater to NSJWCD customers, all facilities and project components will be tested. Following completion of successful testing and demobilization of equipment and construction sites, construction would be complete and blended, treated wastewater deliveries could commence.

Budget

The budget for this project is estimated to be \$16.16 million, but could vary substantially depending on the construction needs of the project (e.g., pipeline lengths, size of mixing facility), or any other considerations. Costs for implementation will be developed and refined under Task 1 Conceptual Design Report. Costs associated with the project can be broken down as follows:

- Conceptual Design Report: \$35,000
- WDR Permit: \$100,000
- IRWM Funding Application: \$25,000
- Construction/Implementation: \$16,000,000
 - Assumes reuse for vineyard irrigation, which includes 25,500 linear feet of pipeline, a pump station, contractor costs, professional services, and a 25% construction contingency.
- **Total Project Cost: \$16,160,000**

References

North San Joaquin Water Conservation District (NSJWCD). No date (n.d.). Maps. Accessed 26 February 2015. Available: <http://www.nsjgroundwater.org/MAPS-Reduced.pdf>

Regional Water Quality Control Board (Regional Board). 2012. Waste Discharge Requirements Constellation Brands U.S. Operations, Inc. dba Woodbridge Winery, Woodbridge Winery, San Joaquin County (Order No. R5-2012-0103).