CHAPTER 6
Recycled Water Opportunities and Constraints

This Chapter provides a summary of existing and potential future uses (market opportunities) for recycled water in and near the West County Study Area, focused on the following topics:

- Purpose of This Analysis
- Summary of Initial Recycled Water Findings
- Potential Recycled Water Opportunities
- Recycled Water Market Analysis
- Return of Exported Water
- Allowable Discharge Flows in Dry Years

6.1 PURPOSE OF THIS ANALYSIS

Recycled water is an important component of the Feasibility Study because the Regional Water Board's *Water Quality Control Plan for the North Coast Region* (hereinafter Basin Plan) prohibits point source waste discharges for the Russian River and its tributaries during the period of May 15 through September 30. In the first phase of the Feasibility Study, eight potential alternatives were developed and screened to define five preferred alternatives. For this first phase, recycled water opportunities were evaluated based on information provided by each wastewater agency, as is described in Chapter 2. In the second phase of the Feasibility Study, the five preferred alternatives were further evaluated with respect to the infrastructure required to incorporate flows from unsewered community clusters. To support this second phase of analysis, additional assessment of the recycled water market opportunities was completed.

During the first phase of the evaluation, alternatives that involved export to the Windsor WWTP and Laguna WWTP were evaluated. As part of this effort, Windsor staff expressed interest in potentially sending recycled water back to the West County area for reuse due to limited availability for reuse in their region, and Santa Rosa staff had expressed concerns about needing to expand the Santa Rosa recycled water storage should they receive additional influent flows. Therefore, an assessment of potential recycled water infrastructure needs related to expansion of the recycled water use areas for these two agencies by connecting them to the existing FWD/GCSD recycled water system was also evaluated.

Finally, the Basin Plan also mandates that the receiving stream's flow must be at least 100 times greater than the waste discharge flow unless an exception to the requirement is granted by the Regional Water Board. In the first phase of the analysis, the water balance analyses relied on average year river flows with 100-year annual rainfall conditions to provide a conservative estimate of the storage and recycled water land application needs for each alternative. However, due to the flow restrictions during the discharge period, it is also prudent to consider extremely dry years when flow in the Russian River could limit discharge to confirm this condition does not push the need for additional recycled water infrastructure.

6.2 SUMMARY OF INITIAL RECYCLED WATER FINDINGS

As mentioned above, the first phase of the Feasibility Study presented an initial recycled water analysis based on information provided by each wastewater agency (as described in Chapter 2). A summary of the major assumptions and findings for the initial analysis of the preferred alternatives is provided below.

6.2.1 Alternative 1a

Major assumptions applied to the RRCSD WWTP recycled water analysis were as follows:

1. Reuse on the Northwood Golf Course would accommodate about 50 AFY, distributed in accordance with historical monthly average values.
2. Disposal capacity of the forested District property surrounding the WWTP of 105 AFY, including:
   - 75 AFY of percolation based on estimated percolation rates of 0.6 and 0.3 inches per day for the Upper and Lower portions, respectively; and
   - 30 AFY of irrigation demand for the overlying grass during a 100-year rainfall year.
3. Storage is limited to current available recycled water storage capacity of 3.5 MG (10.7 AF).
4. Surface water discharge would continue up to a maximum monthly flow rate of no more than 1 percent of Russian River flow.
5. RRCSD would be able to accommodate additional irrigation areas on either the existing forested District property or on the additional 394-acre forested property acquired in August 2024.

The following conclusions were drawn from the RRCSD WWTP recycled water analysis:

- Existing storage and disposal capacities are adequately sized to accommodate current RRCSD flows.
- To accommodate projected RRCSD flows, an additional 5 acres of land application area (on either the existing forested District property or on the additional 394-acre forested property) would be needed to accommodate 8 AFY of water.[1]

Major assumptions applied in the analysis of recycled water needs for the combined FWD/GCSD WWTPs were as follows:

- The combined FWD/GCSD facility would have zero surface water discharge, thus requiring a recycled water system that could accommodate all recycled water generated by the two agencies.
- The 300 acres of vineyards currently served by GCSD and FWD would accommodate up to 440 AFY for recycled water during a 100-year rainfall year based on information provided by the agencies.
- The existing 24 acres of turf and landscaped areas serviced by FWD would accommodate up to about 50 AFY during a 100-year rainfall year based on information provided by the agencies.

[1] The amount of land application area could potentially be decreased if storage capacity were increased.

- The existing 20.5-acre GCSD land application area would be repurposed to provide additional storage and would no longer be available for land application.
- The existing GCSD 22.9 MG (70.3 AF) recycled water storage pond is available.
- The existing FWD 2.3 MG (7.1 AF) storage capacity would be filled so the area could be used to construct new treatment facilities.

The following conclusions regarding recycled water needs for the combined FWD/GCSD WWTPs were as follows:

- The existing irrigation reuse sites would be able to accommodate the combined recycled water flow generated.
- 310 AF of additional storage volume would be required.
- New recycled water storage ponds would need be at least 15-feet deep to allow for construction within the 20.5-acre land application area owned by GCSD.

6.2.2 Alternative 1c

Major assumptions applied in the analysis of recycled water needs for the new combined WWTP at the FWD site were as follows:

- RRCSD flows would be exported to the FWD site and reuse at the RRCSD site would be eliminated.
- The combined facility would discharge to a new outfall in Russian River in the winter months up to a maximum monthly flow rate of no more than 1 percent of Russian River flow.
- The 300 acres of vineyards currently served by GCSD and FWD would accommodate up to 440 AFY for recycled water during a 100-year rainfall year based on information provided by the agencies.
- The existing 24 acres of turf and landscaped areas serviced by FWD would accommodate up to about 50 AFY during a 100-year rainfall year based on information provided by the agencies.
- The existing 20.5-acre GCSD land application area would accommodate land application of up to about 40 AFY during a 100-year rainfall year.
- The existing GCSD 22.9 MG (70.3 AF) storage capacity is available.
- The existing FWD 2.3 MG (7.1 AF) storage capacity would be filled so the area could be used to construct new treatment facilities.

The conclusions drawn from the analysis recycled water needs for the new combined WWTP at the FWD site were as follows:

- The existing irrigation reuse sites would be able to accommodate the combined recycled water flow generated.
- No additional storage volume would be required.

6.2.3 Alternatives 2a and 2b

For the first phase of the analysis, it was assumed that wastewater directed to the Windsor and Santa Rosa treatment facilities would be used within the recycled water systems operated by the respective agency. Therefore, these alternatives were assumed to result in the elimination of the existing recycled water uses in the West County Study Area.

6.2.4 Alternative 3b

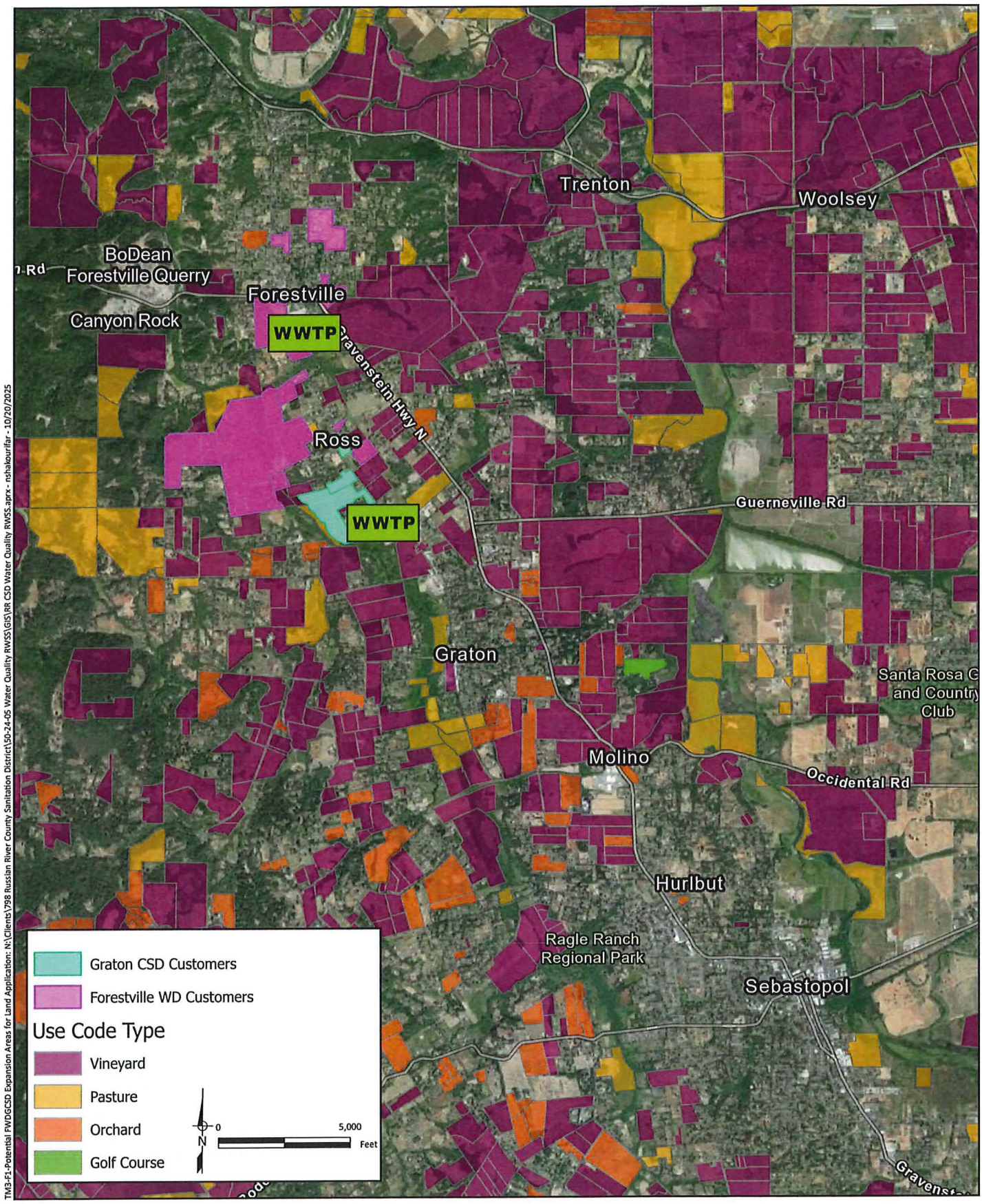
The alternative combined elements of Alternative 1a and 2a. Therefore, the analysis and findings were the same as described above.

6.3 POTENTIAL RECYCLED WATER OPPORTUNITIES

GIS agricultural land use data developed by Sonoma County was reviewed to identify potential recycled water users near the FWD/GCSD facilities. This land use information is shown on Figure 6-1 along with the existing recycled water use areas within the FWD/GCSD system. As shown, vineyards comprise almost all (about 95 percent) of the agricultural land near the FWD/GCSD sites that is not already receiving recycled water. Based on this information, a major expansion of the FWD/GCSD recycled water system will likely need to depend largely on reuse at larger vineyard sites.

Figure 6-1 also shows locations of two rock quarries that could also serve as future recycled water customers. Given their proximity to the FWD WWTP site, these potential uses have been evaluated further. Other uses that could be considered near the FWD/GCSD are expansion of municipal reuse (i.e., irrigation of parks and public open spaces). However, given the relatively limited population of the Graton and Forestville communities, opportunities for additional municipal reuse are limited. If significant expansion of the recycled water system were required, FWD/GCSD could consider partnering with the City of Sebastopol to provide recycled water for municipal uses within that community. However, assessment of this option is beyond the effort of this current Feasibility Study.

Figure 6-2 provides the agricultural land use information near the RRCSD WWTP. As shown, no major agricultural demands exist near the RRCSD WWTP site. Similar to the FWD/GCSD areas, there are limited options for municipal reuse in this area due to the relatively small population. For these reasons, expansion of land application on the existing forested District property or on the 394-acre forested property acquired in August 2024 are likely the best options for accommodating additional flows through the Russian River CSD WWTP.



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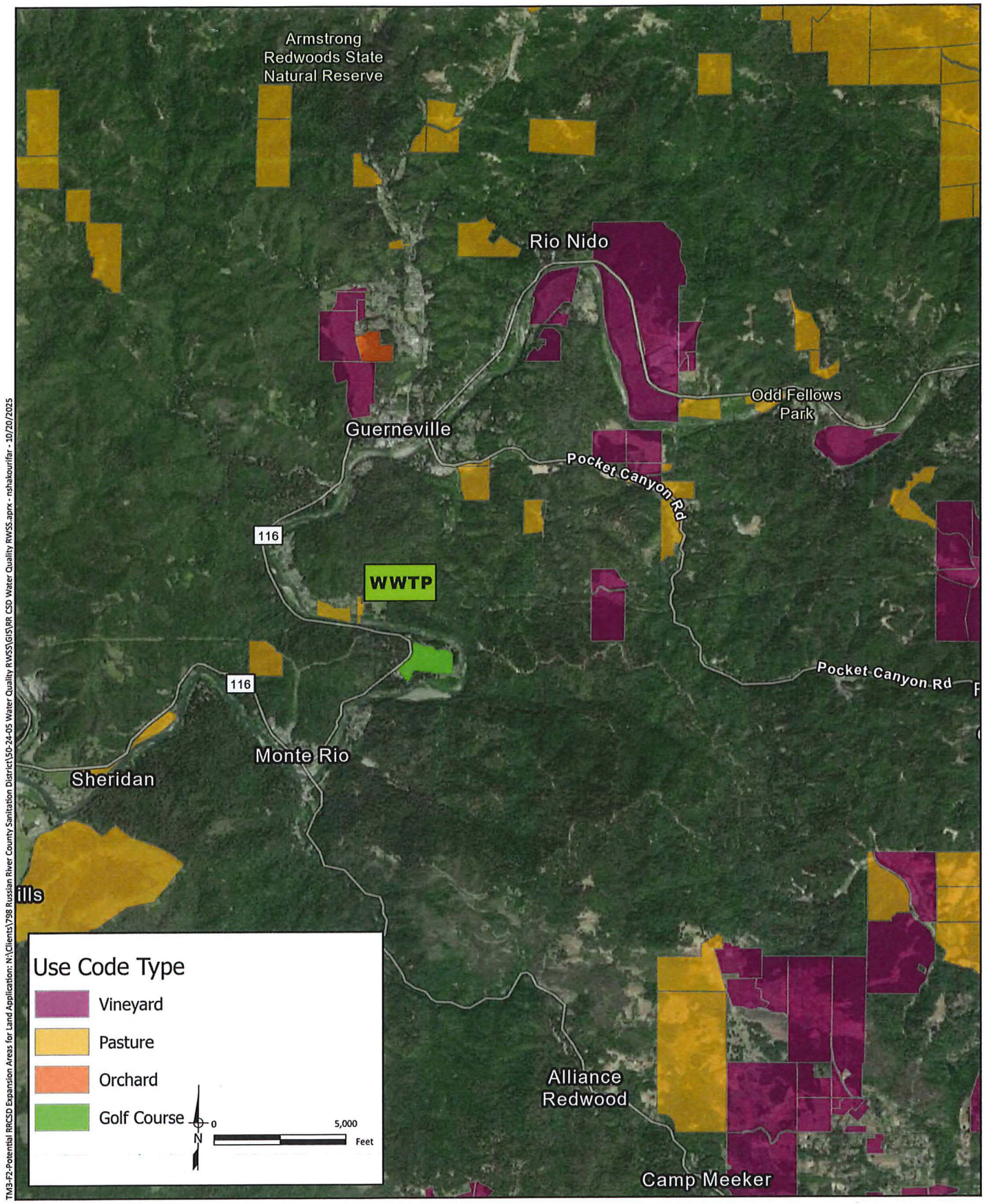
Potential FWD/GCSD Expansion Areas for Land Application

DRAFT **Figure 6-1**



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Potential RRCSD Expansion Areas for Land Application

DRAFT **Figure 6-2**

6.4 RECYCLED WATER MARKET ANALYSIS

A recycled water market analysis was completed to identify and confirm the demands for recycled water near the FWD/GCSD service areas. The results of this analysis are presented under the following headings:

- Vineyard Water Demands
- Rock Quarry Demands
- Other Demands near the FWD/GCSD Service Area

Notes captured from these discussions are provided in Appendix D.

6.4.1 Vineyard Water Demands

Discussions with existing vineyards served by the FWD/GCSD recycled system have confirmed that these users are effectively at capacity for recycled water use. They indicated that there may be some years or conditions where additional recycled water would be useful, but in most years, they are able to meet their water supply needs with current recycled water deliveries.

Discussions with representatives from Santa Rosa Junior College's Shone Farm, which is a working farm and college campus north of Forestville, also indicate that vineyards in the area need very little water. The Shone Farm team indicated that vineyards use no more than about 4.5 inches per acre of irrigation water during the irrigation season of May to September, which translates to a crop coefficient of 0.16 for defining vineyard demands, based on a local reference evapotranspiration for those months of 28 inches. The Shone Farm staff also noted that many vineyards in the County are not currently being regularly pruned, planted, or otherwise productive due to economic pressures on the wine industry.

A comparison of current water demands for the vineyards served by the FWD/GCSD recycled system to the theoretical demands provided by Shone Farms demonstrates that the demands generally match the estimates provided by Shone Farms. Based on this information, the 300 acres of vineyards currently served by GCSD and FWD should only accommodate 65 AFY for recycled water during a 100-year rainfall year[2] instead of the 440 AFY reported by GCSD and FWD.

6.4.2 Rock Quarry Water Demands

Two rock quarries are located about two miles west of the FWD WWTP: Canyon Rock Quarry and BoDean Forestville Quarry. The Canyon Rock Quarry currently receives potable water from FWD.

The following findings were identified based on discussions with Canyon Rock Quarry staff:

- Approximately 10.6 MG per year (33 AFY) of potable water is used; and approximately 80 percent of this could be offset by a recycled water supply (8.5 MG per year).
- Approximately 18 MG per year of stormwater is captured in an onsite pond and used for aggregate wash water. All this water could be offset by a recycled water supply.

[2] In a 1-in-100 rainfall year, rainfall would contribute a portion of the estimated 4.5 inches per acre demand.

Based on these findings, it was determined that 26.5 MG per year of recycled water could potentially be used by this quarry. Monthly distribution of the demands is assumed to follow the pattern of recent years' water usage as reported by FWD.

The following findings were identified based on discussions with BoDean Forestville Quarry staff:

- They mostly rely on stormwater runoff also captured in an onsite pond, with groundwater well water as a supplemental water supply.
- Approximately 4 MG per year (12 AFY) of stormwater is captured in an onsite pond and used for washing rocks and primarily dust suppression and dust abatement. They do not envision any of the stormwater use being offset by recycled water.
- Approximately 0.075 MG per year (0.23 AFY) of groundwater is used onsite as supplemental source for the operational water use. Potentially all of this water could be offset by a recycled water supply.

Based on these findings, it was determined that 0.075 MG per year (0.23 AFY) of recycled water could potentially be used by this quarry. Although this is a relatively small amount, it is assumed that the cost to deliver recycled water to this site would be minimal given it is located across the road from the Canyon Rock facility.

Both quarry sites are also noted as having significant stormwater storage onsite that could potentially serve as recycled water storage. Further investigations could consider whether this storage could be used to offset other recycled water storage needs. Such investigations are beyond the effort of this Feasibility Study.

6.4.3 Other Demands near the FWD/GCSD Service Area

A local sports youth park in the FWD service area currently irrigates about 3 acres with recycled water and reported they could potentially double their current usage. With this change the irrigation demand will increase by approximately 2 MG a year (6 AFY) in a 1-in-100 rainfall year. Although this is a relatively small amount, it is assumed that this expansion would occur since the site is already receiving recycled water.

6.5 RETURN OF EXPORTED WATER FROM POTENTIAL REGIONAL FACILITIES

As noted previously, Windsor and Santa Rosa staff both expressed concerns related to having adequate capacity to recycle the wastewater generated within the West County Study Area. Regional Water Board staff also raised concerns related to elimination of existing recycled water uses in the region. Therefore, analysis has been completed to define the feasibility of returning recycled water from either Windsor or Santa Rosa for use in the area of FWD/GCSD existing recycled water facilities.[3]

[3] Due to both the distance and limited potential for water recycling in the area, returning recycled water to the Russian River CSD service area/recycled water customers is not recommended.

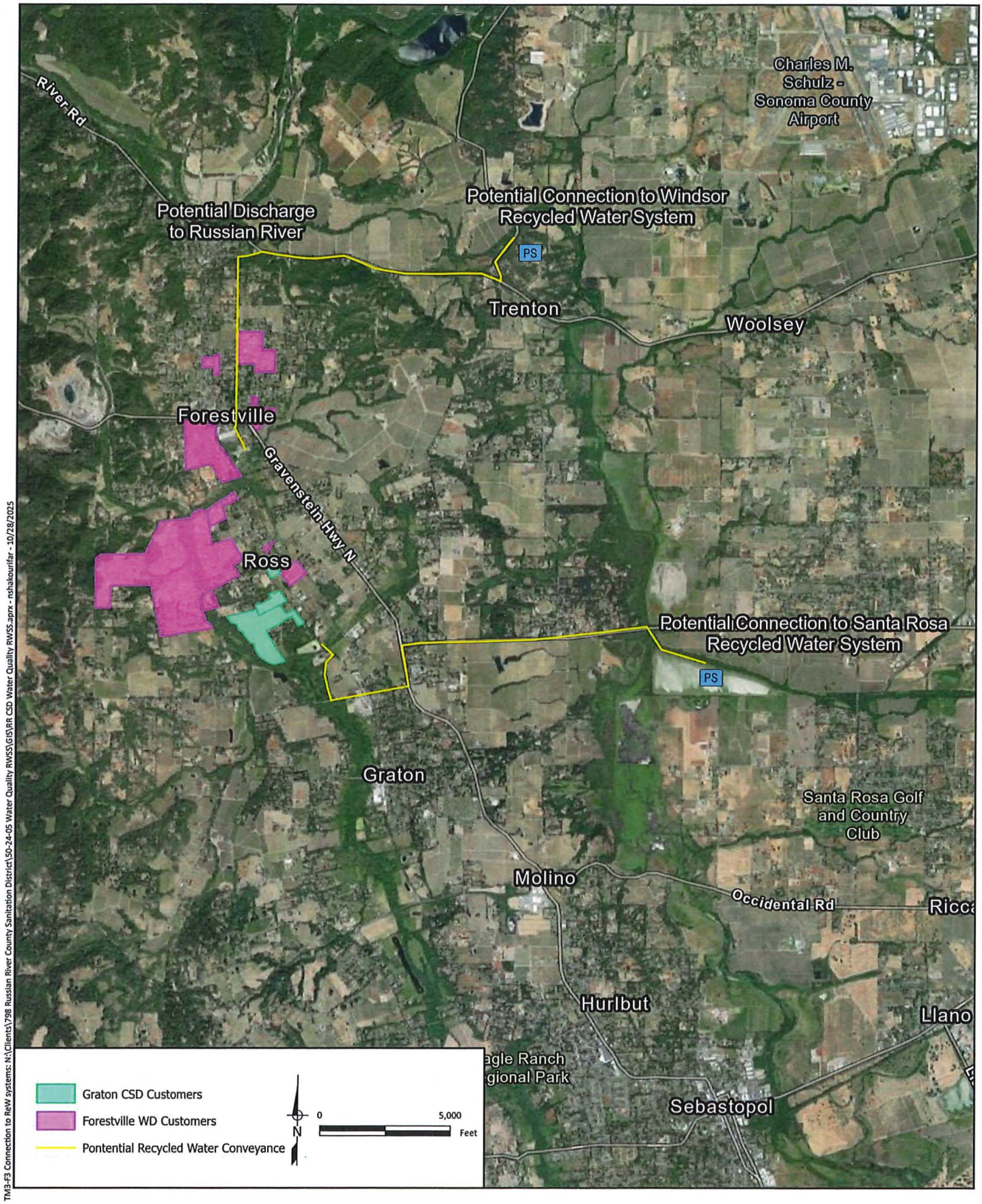
For Windsor, the current discharge location for the WWTP is into Mark West Creek at the Trenton-Healdsburg Road Bridge, which is approximately three miles from the FWD WWTP. Discussions with Windsor also indicate that relocating their discharge from Mark West Creek to the Russian River would be beneficial if they were to become a regional facility due to the 100 to 1 dilution requirements for surface water discharge to the Russian River and all Russian River tributaries. If a pump station and pipeline were constructed to relocate the Windsor WWTP outfall to Russian River, another relatively small segment of pipeline could be constructed to bring treated effluent to the existing FWD WWTP, where it could then be pumped to the FWD/GCSD recycled water system.

For Santa Rosa, their existing recycled water system includes a storage facility located along Santa Rosa Creek near Guerneville Road which is approximately two miles directly west of the Graton CSD WWTP. If a pump station and pipeline were constructed to transfer recycled water from this storage facility to the Graton CSD WWTP site, the transferred recycled water could be supplied to the FWD/GCSD recycled water system.

Figure 6-3 provides an overview of the facilities that would be required to incorporate the existing GSCD/FWD recycled water system into a regional project with either Santa Rosa or Windsor. A summary of these infrastructure needs is also summarized as follows:

- For the Windsor system (Alternatives 2a and 3b):
  - A 3.0 mgd pump station located near the existing outfall in Mark West Creek, to accommodate estimated peak day recycled water flow.
  - A 3.7-mile pipeline that extends southward down Trenton-Healdsburg Road from the bridge, then turns westward along River Road to Trenton Road,[4] then along Trenton Road to Covey Road, and then southward along Covey Road/Forestville Street, terminating at the FWD WWTP recycled water pump station wet well.
- For the Santa Rosa system (Alternative 2b):
  - A 3.0 mgd pump station located near the existing recycled water storage pond adjacent to Santa Rosa Creek, to accommodate estimated peak day recycled water flow.
  - A 3.6-mile pipeline that extends westward to reach Guerneville Road, then continues westward along Guerneville Road to Highway 116, then loops down Highway 116, along Green Valley Road, and up the West County trail, terminating at the GCSD recycled storage ponds.

[4] The new Windsor outfall to Russian River could be accommodated at this location but is not assumed to be included in this analysis. If a regional project were to be implemented with Windsor, construction of a new outfall and the associated recycled water extension should be evaluated. Windsor staff have noted that if an outfall were to be constructed as part of the project, these costs could potentially offset some of the connection fees that have been identified by the Town.



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Potential Conveyance to FWD WWTP from Windsor and Santa Rosa Recycled Water Systems

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6.6 ALLOWABLE DISCHARGE FLOWS IN DRY YEARS

In accordance with the Basin Plan, the current discharge permits for the West County agencies limit surface water discharges to no more than one percent of the receiving water flow between October 1 and May 15. (No surface water discharges are allowed between May 15 and September 30.) In the first phase of the analysis, the water balance combined average year river flows with 100-year annual rainfall conditions[5] to provide a conservative estimate of the total storage and recycled water land application needs to accommodate these discharge restrictions for each alternative.

Due to the flow restrictions during the discharge period (October 1-May 14), it is also prudent to consider whether the identified storage is adequate during extremely dry years when flow in the Russian River could limit discharge. Data from the Russian River gauge at the Hacienda Bridge[6] - located upstream of the RRCSD WWTP about halfway between Guerneville and Forestville - was used to evaluate allowable discharges during dry years. The total annual Russian River flow volumes in each Water Year[7] are presented on Figure 6-4. The figure shows the following information:

- The average annual Russian River volume measured at the gauge is 509,000 MG.
- The driest year on record was in Water Year 1977, where the total annual volume was about 20,000 MG.
- The second driest year on record was in Water Year 2021, where the total annual volume was about 50,000 MG.
- The third driest year on record was Water Year 1976, where the total annual volume was 90,000 MG.

The ability to discharge during these three driest years was evaluated using a water balance assuming average year rainfall. The goal of this analysis was to determine if extreme dry conditions could impact the wet-year water balance conclusions regarding storage needs. The analysis shows that for the driest and second driest water years, the limitations on discharge to the Russian River would require a significant expansion of the recycled water storage facilities (and subsequently irrigation areas). However, application of the third driest year did not result in the need for additional recycled water infrastructure over what was identified in the initial analysis of wet year conditions. For this analysis, it has been assumed that the Regional Water Board would allow for exceptions to the prohibitions on discharge flow rates above one percent of the receiving water flow rate in extremely dry years, such that the recycled water infrastructure would not need to be sized for these extreme conditions.

[5] The Regional Board requires that water balances be developed under 100-year rainfall conditions to define the storage needed during years when the least amount of irrigation water is required.

[6] Daily flow data from this gauge is available starting from October 1939, the start of Water Year 1940.

[7] The Water Year is defined as October 1 through September 30.

Figure 6-4. Water Year Annual Total Volumes of Russian River Flow, Water Years 1940-2024