CHAPTER 2
Service Area and Wastewater Characterization

This Chapter provides service area and wastewater characteristics for the four wastewater districts of interest. The topics addressed are as follows:

- Information Sources
- RRCSD
- GCSD
- FWD
- OCSD
- Combined Flows and Loads

2.1 INFORMATION SOURCES

The information presented in this Chapter was derived from the information summarized below by agency. In addition to this information, the Sonoma County Hazard Mapping Tool[1] was used to identify potential hazards for each of the three WWTPs of interest.

2.1.1 RRCSD

- Data:
  - West Yost visit (June 7, 2024) to the RRCSD WWTP site
  - Subsequent communications with RRCSD/Sonoma Water staff
  - California Integrated Water Quality System Project (CIWQS) Self-Monitoring Report (SMR) data
  - U.S. Decennial Census Data
- Documents (plans, reports):
  - CIWQS Violation Reports and Sanitary Sewer Overflow (SSO) Reports
  - National Pollutant Discharge Elimination System (NPDES) Waste Discharge Requirements Order No. R1-2021-0002 for the RRCSD WWTP (discharge permit)
  - RRCSD 2023 Annual Recycled Water Report
  - RRCSD 2021 Title 22 Recycled Water Engineering Report
  - 2022 RRCSD Land Discharge/Recycled Water Operations and Management Plan
  - 2024 Median Household Income (MHI) Survey by RCAC Community & Environmental Services
  - RRCSD Spring 2024 Newsletter
  - 2024 Ordinance No. 6485 – 94 RRCSD (sewer rate ordinance)
- May 2024 *Technical Memorandum 2. Russian River Treatment Plant Asset Management Plan* (Asset Management Plan) by Carollo
- January 2025 Regulatory Analysis and Flow and Loads Analysis reports for RRCSD WWTP Master Plan by Woodard & Curran and HDR (RRCSD Treatment Plant Master Plan)
- August 2025 Capacity Assessment draft report for RRCSD Treatment Plant Master Plan

[1] https://experience.arcgis.com/experience/64d531fc0e654c19a40a172a074a5640/ page/Hazard-Mapping-Tool

- As-built drawings:
  - 1979 RRCSD WWTP (original construction)
  - 2005 Third Unit Processes Project
  - 2013 Biological Nutrient Removal (BNR) Project

2.1.2 GCSD

- Data:
  - West Yost visit (June 18, 2024) to the GCSD WWTP site
  - Subsequent communications with GCSD/Sonoma Water staff
  - CIWQS SMR data
  - U.S. Decennial Census Data
- Documents (plans, reports):
  - CIWQS Violation Reports SSO Reports
  - NPDES Permit Waste Discharge Requirements Order No. R1-2018-0001 for the GCSD WWTP
  - Tentative NPDES Permit Waste Discharge Requirements Order No. R1-2024-0001 for the GCSD WWTP
  - GCSD 2023 Title 22 Recycled Water Engineering Report
  - 2022 Occidental to Graton Wastewater Pipeline Feasibility Study by Brelje & Race Consulting Engineers
  - GCSD Fiscal Year 2023/2024 Budget
  - 2025 *Sewer Rate Study for the GCSD Draft Report* by Lechowicz + Tseng Municipal Consultants

2.1.3 FWD

- Data:
  - West Yost visit (June 18, 2024) to the FWD WWTP site
  - Subsequent communications with FWD/Sonoma Water staff
  - CIWQS SMR data
  - U.S. Decennial Census Data
- Documents (plans, reports):
  - CIWQS Violation Reports and SSO Reports
  - NPDES Permit Waste Discharge Requirements Order No. R1-2024-0004 for the FWD WWTP
  - FWD 2023 Title 22 Recycled Water Engineering Report
  - FWD Fiscal Year 2023/2024 Budget
  - 2022 FWD Resolution No. 421
  - 2024 FWD Ordinance Number 83
- 2001 FWD WWTP Upgrade As-Built Drawings

2.1.4 OCSD

- Data:
  - West Yost visit (June 7, 2024) to the OCSD WWTP site
  - Subsequent communications with OCSD/Sonoma Water staff
  - OCSD truck hauling and pond water depth data
  - CIWQS SMR data
  - California Irrigation Management Information System (CIMIS) weather data
  - U.S. Decennial Census Data
- Documents (plans, reports):
  - CIWQS Violation Reports and SSO Reports
  - 2022 Occidental to Graton Wastewater Pipeline Feasibility Study by Brelje & Race Consulting Engineers
  - 2017 Project study for wastewater transport to Airport/Larkfield/Wikiup Sanitation Zone (Airport) WWTP
  - 2015 WWTP Reclaimed Water Project Alternatives Analysis by Stantec Consulting Services
  - OCSD Budgets for Fiscal Years 2021-2025
  - 2024 Ordinance No. 6484 – 100 OCSD (sewer rate ordinance)
- As-built drawings:
  - 1969 OCSD Water Quality Control Facility Expansion No. 1
  - 1985 OCSD Wastewater System Improvements
  - 2017 OCSD Wastewater Transport Compliance

2.2 RRCSD SERVICE AREA AND FACILITIES

This section details the RRCSD service area and wastewater facilities, focused on the following topics:

- Service area overview
- Regulatory requirements
- Wastewater characteristics
- Treatment facilities
- Recycled water operations
- Opportunities and constraints

The RRCSD is currently in the process of completing the RRCSD Treatment Plant Master Plan, and information developed as part of that effort has been used to the extent possible to complete this section.

2.2.1 RRCSD Service Area Overview

RRCSD provides wastewater collection, treatment and disposal for portions of the unincorporated communities of Rio Nido, Vacation Park, Guerneville and Guernewood Park. Sonoma Water manages and operates the RRCSD facilities. The 2,700-acre RRCSD service area and RRCSD collection system are shown on Figure 2-1.

The RRCSD collection system consists of the following facilities:

- 35 miles of gravity pipe
- Five miles of pressurized force main
- 11 lift stations

The collection system extends along both sides of the Russian River and crosses the river in two locations. During periods of high rainfall and flooding, the lift stations often become inundated. RRCSD has reported 12 SSOs since January 2019.

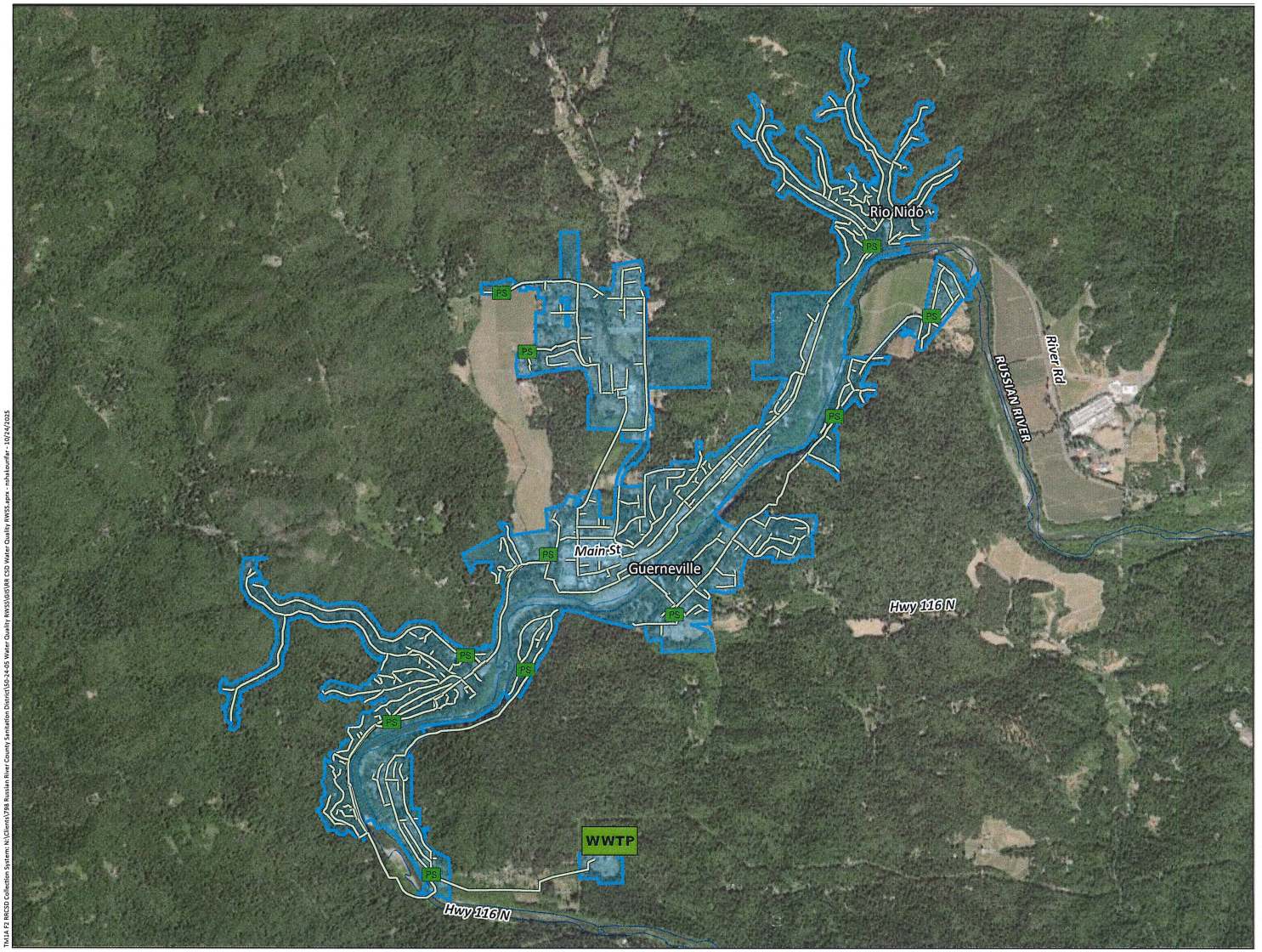
Pending funding availability, preferably grant funding, RRCSD plans to replace three force mains and upgrade the lift stations to improve seismic and flood resiliency and address aging-related deficiencies. However, high peak influent flows to the WWTP are expected to continue, as these collection system improvements are not specifically focused on reducing inflow and infiltration (I&I).

The service area currently serves a population of 7,305 residents, comprising 3,213 equivalent single-family dwellings (ESDs)[2] including commercial and institutional customers and 2,503 connections. Between 2010 and 2020, Guerneville's residential population grew an average of less than 0.1 percent per year, based on U.S. census data. As part of the RRCSD Treatment Plant Master Plan currently under development for RRCSD, a growth rate of 0.6 percent per year is anticipated over the next 20 years. This would result in an additional 408 new ESDs or an increase of 13 percent.

The RRCSD service area has been classified in the past as a DAC, allowing RRCSD to be eligible for certain California State Water Resources Control Board (State Water Board) funding programs. The 2024 MHI Survey found the service area MHI was 81 percent of the 2022 California statewide MHI, putting RRCSD just over the 80 percent threshold to be considered a DAC. RRCSD staff anticipate RRCSD may be reclassified as a DAC once the Statewide MHI is updated.

The American Community Survey 5-year data, which is used to calculate the Statewide MHI, was last updated to include 2023 data in December 2024. Based on that update, RRCSD is classified as a small DAC through March 31, 2026. The statewide MHI for the 2019 to 2023 period is $96,334. According to the income survey conducted on March 28, 2024, RRCSD's MHI is $74,625, which is 77 percent of the statewide MHI. While not an official determination, it is anticipated the RRCSD will continue to qualify as a small DAC annually through the year 2029, when the income survey data expires - provided there are no significant changes to the RRCSD's boundaries, demographics or other factors that might prompt the California Division of Financial Assistance to request a new income survey. This projection also assumes that the statewide MHI continues to increase each year.

[2] RRCSD defines an ESD as having sewer flow of 120 gallons per day and BOD and TSS concentrations of 200 mg/L (Exhibit A of RRCSD rate ordinance (2024 Ordinance No. 6485 – 94 RRCSD)).

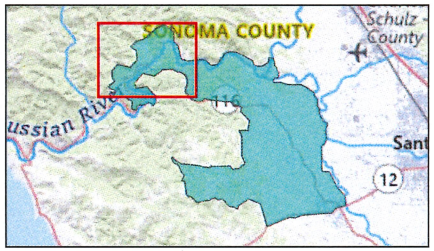


Service Area

Collection System

PS Pump Station

WWTP Wastewater Treatment Plant



Prepared by:

WEST YOST

0 0.5 1 Miles

N

Prepared for:

Russian River County Sanitation District
Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

RRCSD Service Area and Collection System

DRAFT **Figure 2-1**

T:\124 F2 RRCSD Collection System\ N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality AWSS\GIS\RR CSD Water Quality AWSS.aprx - richeborffer - 10/24/2025

The annual service rate for RRCSD customers for Fiscal Year 2023/2024 was $2,104 per ESD, which was increased from the previous year by 8.9 percent. Rates increased another 8.9 percent for Fiscal Year 2024/2025 to $2,292 per ESD. According to the RRCSD Fiscal Year 2024/2025 budget, rate increases will be necessary for several years to cover the cost of upgrading aging infrastructure.

2.2.2 RRCSD Regulatory Requirements

RRCSD produces disinfected tertiary effluent, which is permitted for discharge to the Russian River from October 1 through May 14. Between May 15 and September 30, discharge to Russian River is not allowed, and RRCSD uses treated wastewater for golf course irrigation and land disposal on its own property. Effluent limits for receiving water discharge and recycled water use listed in the RRCSD NPDES Permit are presented in Table 2-1.

Table 2-1. RRCSD Effluent Limitations from Current Discharge Permit

Parameter	Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Surface Water Discharge (October 1 – May 14)[a,b,c]					
BOD, mg/L	10	15	-	-	-
TSS, mg/L	10	15	-	-	-
Total Coliform, MPN/100 mL	-	2.2	23	-	240
Aluminum, µg/L[d]	200	-	606	-	-
pH[e]	-	-		6.5	8.5
Turbidity, NTU	-	-	2/5[f]	-	10
Recycled Water Discharge to Golf Course (May 15 – September 30)[b,g]					
Nitrate, Total (as N), mg/L	10	20	-	-	-
Total Coliform, MPN/100 mL	-	2.2	23	-	240
Turbidity, NTU	-	-	2/5[f]	-	10
Land Disposal (May 15 – September 30)[b,f]					
Nitrate, Total (as N), mg/L	10	20	-	-	-
Sodium, mg/L	60	-	-	-	-
Aluminum, mg/L	1.0	-	-	-	-
pH	-	-	-	6.0	9.0
Turbidity, NTU	-	-	2/5[f]	-	10

(a) Discharges to the Russian River also cannot exceed one percent of river flow.
(b) Ammonia effluent monitoring is required for all final discharge locations, but no ammonia limits are in place.
(c) The BOD, TSS limits apply year-round to storage pond discharge.
(d) The Russian River is impaired for aluminum based on the California secondary maximum contaminant level, so effluent limits for aluminum are required.
(e) More relaxed pH limits (6.0-9.0) apply upstream of storage. The pH limits shown apply prior to river discharge regardless of whether effluent is stored or directly discharged.
(f) Effluent turbidity cannot exceed 2 NTU on average during any 24-hour period or 5 NTU more than 5 percent of the time during any 24-hour period.
(g) BOD, TSS and surface discharge pH limits (6.5-8.5) also apply when direct discharge (i.e., bypassing storage ponds) occurs to recycled water use/land disposal.
NTU = nephelometric turbidity unit

The WWTP is designed to provide BNR. Accordingly, the permit documents that the discharge does not demonstrate reasonable potential to cause or contribute to an in-stream excursion above the U.S. Environmental Protection Agency's Freshwater Criteria for ammonia-nitrogen of 1.8 milligrams per liter (mg/L) and the Maximum Contaminant Level for nitrate-nitrogen of 10 mg/L. The permit also does not include limits for ammonia or nitrate but does require monitoring for these in the discharges to the Russian River to ensure the facility continues to meet the ammonia and nitrate standards.

2.2.3 RRCSD Wastewater Characteristics

The RRCSD Treatment Plant Master Plan has defined current and projected (2042/2043) flow and load statistics for the WWTP, including for biological oxygen demand (BOD) and total suspended solids (TSS) loads. The current and projected flows of interest are presented in Table 2-2, and current and projected loads of interest in Table 2-3.

Table 2-2. RRCSD Current and Projected Influent Flows, mgd

Flow Statistic	Current[a]	Anticipated Flow from New Connections[b]	Projected[a]
Average Dry Weather Flow (ADWF)	0.34	0.04	0.38
Annual Average Flow (AAF)	0.59	0.07	0.66
Maximum 30-Day Flow	2.0	0.16	2.16
Maximum 7-Day Flow	3.29	0.36	3.65
Equalized Peak Day Flow (PDF)	3.5[c]	0	4.2/5.0[c]
Peak Day Flow	3.7	0.4	5.2

(a) Current and projected values based on January 2025 Flow and Loads Analysis report for the RRCSD Treatment Plant Master Plan prepared by Woodard & Curran and HDR.
(b) Flow values for new connections are calculated as the difference between the RRCSD Treatment Plant Master Plan current and projected values. The RRCSD Treatment Plant Master Plan envisions no increase in PDF with new connections, as shown here.
(c) Equalized peak day flow was developed as part of the RRCSD Treatment Plant Master Plan.
mgd = million gallons per day

Table 2-3. RRCSD Current and Projected Influent Loads

Water Quality Statistic	Current[a]		Projected
	Average	Maximum	
Influent Water Quality			
BOD Concentration, mg/L	300	330	--
BOD Load, pounds per day (lb/day)	830	4,880	1,310[b]
TSS Concentration, mg/L	290	320	--
TSS Load, lb/day	830	4,310	1,310[b]
30-Day Influent Water Quality[c]			
30-Day Maximum BOD Load, lb/day	1,660		2,620
30-Day Maximum TSS Load, lb/day	1,660		2,620

(a) Current values based on January 2025 Flow and Loads Analysis report for the RRCSD Treatment Plant Master Plan, except as noted.
(b) These are projected average annual loads from the RRCSD Treatment Plant Master Plan report.
(c) Maximum 30-day BOD and TSS loads reported in the January 2025 Flow and Loads Analysis report appear to be influenced by high outlier and possible unrepresentative BOD and TSS data. For this TM, the maximum 30-day BOD and TSS loads have been calculated as two times the average annual loads from the January 2025 report.

For projected Maximum 30-Day Loads, a peaking factor of two times the Average Annual Loads has been used instead of using the RRCSD Treatment Plant Master Plan values (which applied peaking factors of 3.3 and 3.4 for BOD and TSS, respectively). This approach was selected for the following reasons:

- A typical maximum month BOD/TSS peaking factor is 1.2 to 1.5. So, a peaking factor of 2 is still a conservative value.
- The peak 30-day loads defined in the RRCSD Treatment Plant Master Plan are based on four weekly samples collected per month and if one daily value is incorrectly measured with an unusually high concentration (which could be the case), the 30-days values are overstated.
- The RRCSD WWTP experiences significant I&I, which should cause a decrease in BOD/TSS concentrations due to this diluting effects of this flow contribution to the sewer system. However, samples with elevated BOD/TSS concentrations have been collected during wet weather events. While higher flows could cause some increase in loads if a significant amount of material is resuspended in the sewer system, it is not likely that resuspension of material would cause a load increase by a factor of three or more.
- If overly conservative BOD/TSS loads are applied for this Draft Feasibility Study, it could result in an over-estimate of the treatment facilities required to support regionalization.

The RRCSD Treatment Plant Master Plan also identifies these same concerns, stating that the maximum month BOD and TSS loads are significantly higher than previous projections and recommending that Sonoma Water initiate additional monitoring of the wet weather conditions over multiple years and update flow and load projections accordingly. The RRCSD Treatment Plant Master Plan further acknowledges that adjustments to the RRCSD WWTP Capital Improvement Program may be required following this effort, as the analysis completed using the elevated load values demonstrates that a third treatment basin would be needed to accommodate planned growth within the RRCSD service area.

2.2.4 RRCSD Treatment Facilities

The RRCSD WWTP, located on the south end of the collection system, was constructed in 1979. A site layout is presented on Figure 2-2. The tertiary treatment process, as shown schematically on Figure 2-3, includes the following:

- Headworks with two coarse screens;
- Aerated grit chamber;
- Two, 0.4 million gallon (MG) biological treatment basins;
- One, 0.4 MG equalization (EQ) basin;
- Three secondary clarifiers (one, 60-ft diameter and two, 40-ft diameter);
- Two Aquadisk cloth media filters; and
- Ultraviolet light (UV) disinfection.

In 2013, RRCSD retrofitted two of three existing aeration basins for BNR. The basins are configured to operate in multiple modes, including with an anaerobic selector for phosphorus removal. RRCSD is currently operating in Nitrification/Denitrification mode. Waste solids from the basins are thickened by a belt filter press and hauled to a landfill for disposal.

TM1A F3 RRCSD WWTP Layout: N:\Client\1798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - nshakourifar - 10/24/2025

Prepared by:

WEST YOST

N

0 100 200 Feet

Prepared for:

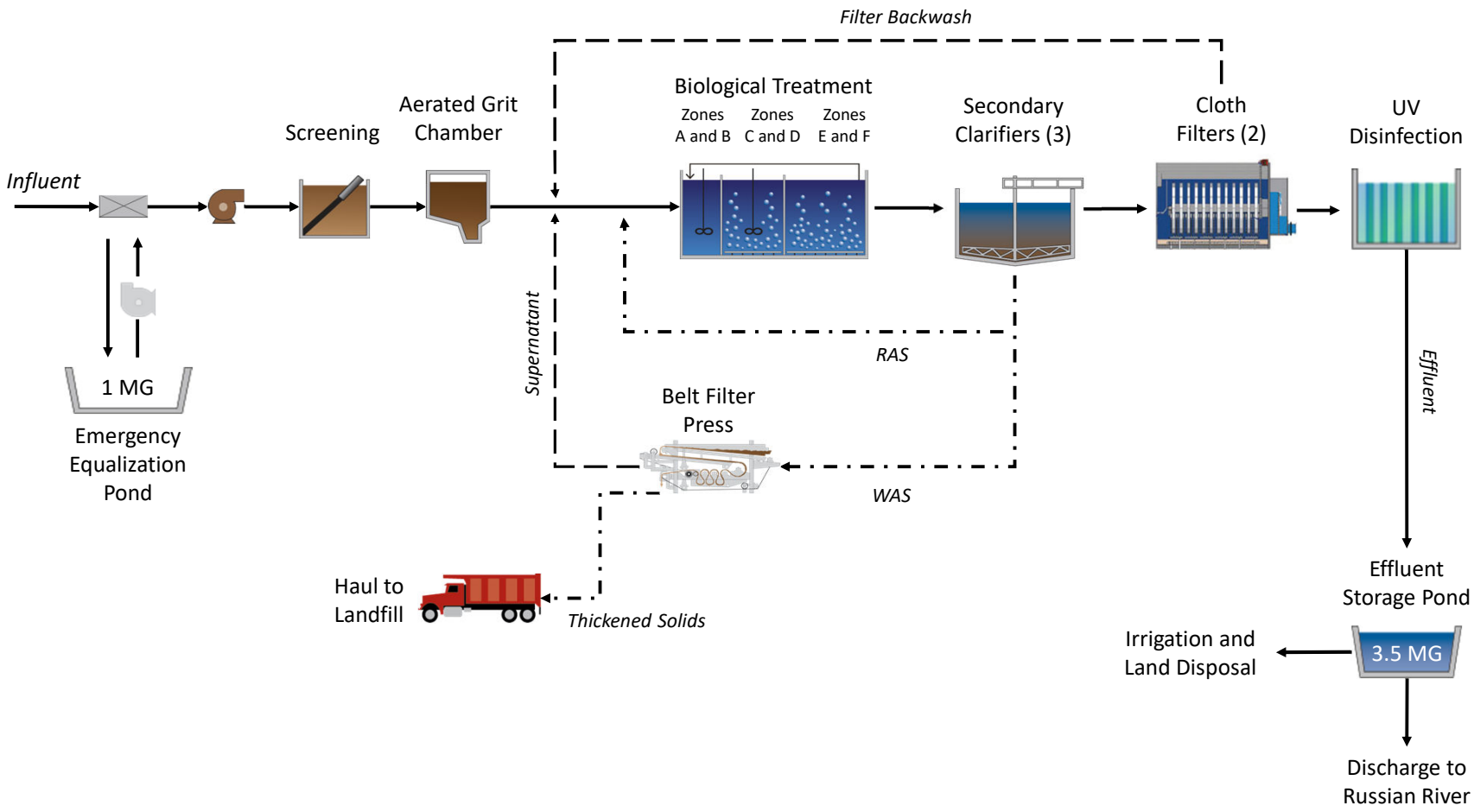
Russian River County Sanitation District
Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

RRCSD WWTP Site Layout

Figure 2-2

Figure 2-3. RRCSD WWTP Process Schematic



Treated effluent is sent to the 3.5-MG effluent storage pond, from where it is either discharged to the Russian River or directed to the irrigation reuse/land disposal sites. A 1-MG emergency storage pond is used for influent EQ during periods of high influent flow or treated effluent not meeting permit limits and requiring retreatment. A third, unused aeration basin provides an additional 0.4 MG of EQ storage.

Several condition-related projects have been identified for RRCSD WWTP in the 2024 Asset Management Plan. Of these improvements the following major projects are included in this analysis:

- Equipment replacements:
  - Aeration basin propeller mixer
  - Aeration basin mixed liquor transfer pumps
  - Secondary clarifier mechanism and drive
  - Tertiary filters
  - UV disinfection modules and various valving
  - Other pumps: waste activated sludge (WAS), tertiary system
  - Pond liner
  - UV air scour blower
- Major rehabilitation projects:
  - Emergency generator
  - Coating/repainting

RRCSD also recently completed design of headworks improvements to replace the influent flow meter, the two bar screens, and the grit washing and dewatering unit; to add a screenings washer/compactor; and to improve efficiency of the aerated grit tank.

The RRCSD Treatment Plant Master Plan included an assessment of the WWTP capacity-related improvements needed to process the anticipated 2035 flows and loads. However, that analysis also acknowledged the need to collect additional influent water quality data during peak flow events to confirm the recommendations. A summary of the findings from the RRCSD Treatment Plant Master Plan along with a discussion of the identified improvements that have been included in the analysis presented in this Feasibility Study is provided in Table 2-4.

Table 2-4. Comparison of RRCSD Treatment Plant Master Plan Capacity Findings to Feasibility Study Approach

Process	Findings from Treatment Plant Master Plan for Equalized Peak Flow of 5.0 mgd	Approach for Feasibility Study
Influent EQ	• No additional EQ storage needed to equalize flow to a peak flow of 4.2 mgd[(a)] if the existing 0.4 MG EQ basin is available (and not required for biological treatment.) • No additional EQ storage needed to equalize to a peak flow of 5.0 mgd if the existing 0.4 MG EQ basin is not available.	Assume 0.4 MG EQ basin is not required for treatment and can be used for influent flow equalization. Therefore, the WWTP should be able to accommodate an additional 0.8 mgd of peak flow through the facility.
Influent Screens	Existing capacity of 5.5 mgd adequate for projected equalized peak flows.	No expansion required.
Grit Removal	Existing capacity of 4.1 mgd inadequate for peak flow.	The Grit system would be partially bypassed if flows exceed 4.1 mgd or the higher flows will be pushed through the system. Additional evaluation of grit system performance at peak flows should be completed to confirm expansion needs.
Aeration Basins	Capacity of third basin may be needed by Year 2033. However, additional influent monitoring recommended to confirm peak loads.	Expansion of the aeration basins in not included in the Feasibility Study. Projected peak loads presented in the Master Plan are likely unrepresentative and this Feasibility study assumes a 2.0 maximum month BOD load peaking factor. Projected 2033 loads from the Master Plan confirm the two basins should be able to adequately treat a maximum month load of 3,650 lb/day, which is significantly lower than the projected RRCSD maximum month load defined for this Feasibility Study (see Table 2-3). Additional data collection is needed to confirm these assumptions.
Aeration Basin Blowers	Existing blowers will approach end of useful life by Year 2033. Replacement recommended.	Aeration blower replacement has been included in the condition-related improvements costs. Additional data collection is needed to confirm blower sizing.
Secondary Clarifiers	Existing capacity adequate.	No expansion required.
Floc Tank	Inadequate detention time. New dosing point recommended.	Project can likely be implemented by staff and is not include in the facility improvement costs.
Tertiary Filters (2 units with 8 disks each)	At the manufacturers recommended loading rate of 6.5 gpm/sf, filters have a firm capacity of 4.0 mgd.	At a flow rate of 4.2 mgd, the filter loading would be 6.8 gpm/sf, which is about 5 percent higher than the manufacturers recommended rate but significantly lower than the 22 gpm/sf loading rates approved by California Division of Drinking Water (DDW). A new filter is assumed to not be required. Additional stress testing should be completed to confirm the 6.8 gpm/sf rating.
UV Disinfection	No treatment capacity concerns. Recommendation to upsize 12-inch segments of UV effluent piping to 18-inch.	Hydraulic capacity improvements have been included.
Belt Filter Press	The capacity of the presses will need to be increased to handle the projected loads. However, additional influent monitoring recommended to confirm peak loads.	Expansion/upsizing the presses is not included in the Feasibility Study. Similar to the aeration basin approach, the projected peak loads presented in the Master Plan are likely unrepresentative. Additional data collection is needed to confirm this approach.
Miscellaneous Conveyance Infrastructure	Various hydraulic improvements needed: • Mixed Liquor pump station and pipe(a) • Flow structure needs new 10-inch secondary effluent pipe	Replacement of the mixed liquor transfer pumps was already included in the condition-related improvements costs. Replacement mixed liquor piping and secondary effluent piping has been included in the improvement needs for the facility.

EQ = equalization
gpm/sf = gallons per minute per square foot
MG = million gallons
mgd = million gallons per day

(a) Following evaluation of the 5.0 mgd equalized peak flow condition, the RRCSD Treatment Plant Master Plan team verified that the flow can be equalized to 4.2 mgd with the use of the 0.4 mgd EQ basin.

As shown in Table 2-4, the analysis performed for the Master Plan indicates that Peak Day flows through the WWTP can be equalized to 5.0 mgd with use of existing Emergency Storage Pond. If 0.4 MG EQ basin is also available, flows can be equalized to 4.2 mgd. However, these findings may need additional study to identify what factors led to a recent (January 2026) spill event at the WWTP. The Master Plan does, however, identify the following hydraulic capacity-related improvements:

- Upsize 12-inch sections of the UV effluent piping to 18 inches
- Upsize the mixed liquor transfer piping.
- Install a second 10-inch secondary effluent pipeline for discharge from the secondary effluent flow structure

In addition, based on the findings from the RRCSD Treatment Plant Master Plan, replacement of the aeration basin blowers has been added to the condition-related improvement list

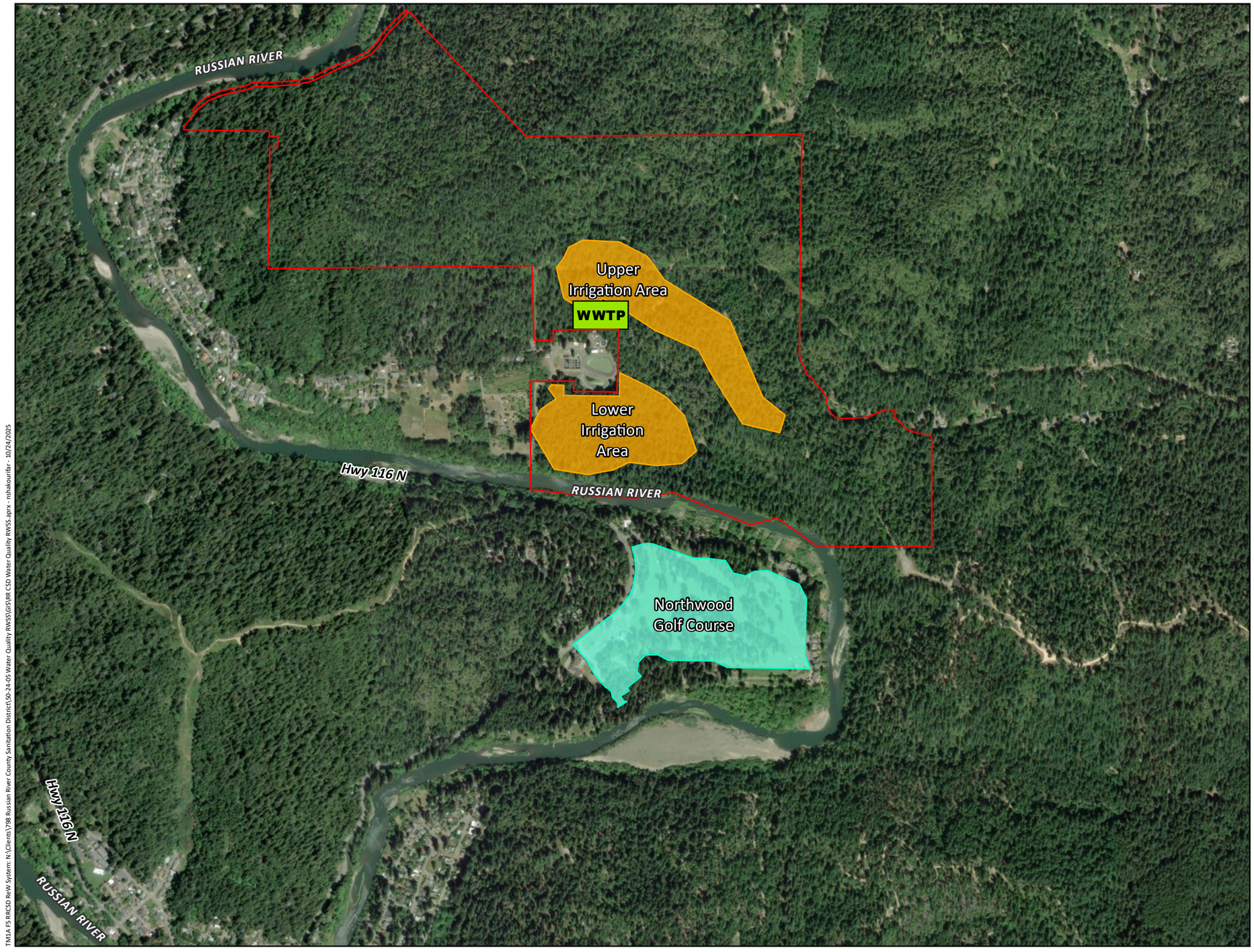
2.2.5 RRCSD Recycled Water Operations

Between May 15 and September 30, RRCSD disposes or beneficially reuses all treated wastewater via irrigation as disinfected tertiary recycled water conforming to Section 60301.230 of Title 22 California Code of Regulations. The recycled water is applied on the following properties:

- 39-acre Northwood Golf Course, located south of the WWTP (beneficial reuse)
- 17 acres of wooded area surrounding the WWTP (land disposal)

These irrigation areas and vicinity are shown on Figure 2-4. Recycled water is conveyed by purple pipe for on-demand irrigation because the golf course has no onsite storage. From 2019 to 2023, an average of 49 acre-feet per year (AFY) of recycled water was applied to the golf course during the irrigation season. The remainder of RRCSD's irrigation season effluent – an average of 73 AFY – is applied to the 17-acre wooded irrigation area.

RRCSD is also currently assessing the potential for additional recycled water disposal on a 394-acre forested property that surrounds the WWTP and was acquired by Sonoma County and transferred to the RRCSD in August 2024. This site does include a conservation easement limiting uses of the site, and the topography of the site also presents challenges for installing new irrigation infrastructure. Nevertheless, use of about 3 percent of this site for recycled water applications may be possible.



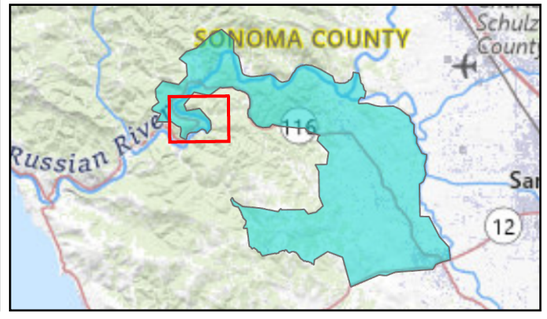
Upper and Lower Irrigation Areas.

Northwood Golf Course

WWTP Wastewater Treatment Plant

Potential Irrigation Area

Note:
Highlighted property boundaries are approximate.



TM1A F5 RRCSD ReW System: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - nshakourifar - 10/24/2025

Prepared by:

WEST YOST

N

0 1,000 2,000 Feet

Prepared for:

Russian River County Sanitation District
Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

RRCSD Recycled Water Users

Figure 2-4

2.2.6 RRCSD Regionalization Opportunities and Constraints

RRCSD has several opportunities that could be beneficial to potential regionalization strategies and/or acceptance of additional wastewater from neighboring unsewered communities, including:

- The RRCSD Treatment Plant Master Plan indicates that maximum month influent BOD loads could increase to approximately 3,650 lb/day[3] over the next 20 years, and the WWTP could likely process influent loads that are greater than these projections.
- The RRCSD Treatment Plant Master Plan indicates that equalized peak day flows could increase to 5.0 mgd with only the use of existing Emergency Storage Pond. If the 0.4 MG EQ basin is also available, peak day flows can be equalized to 4.2 mgd[4].
- Up to approximately 3 percent of the recently acquired 394-acre forested property surrounding the WWTP could offer potential for additional recycled water disposal.
- The RRCSD WWTP is less than two miles north of the currently unsewered Monte Rio/Villa Grande communities, which are currently investigating options for sewer system connection, and could potentially accept their flows.
- The existing RRCSD service area includes and has other nearby unsewered parcels that are likely good candidates for expanded service.

RRCSD also faces some constraints, as follows:

- The site is constrained on all sides, and an expansion of the facility's footprint is not likely to be feasible. Therefore, it is assumed that all treatment and storage must occur within the footprint of the existing facilities.
- Projected growth within the RRCSD service is expected to utilize most of the available hydraulic capacity in the treatment facilities. Although the RRCSD Treatment Plant Master Plan identifies only minor hydraulic conveyance improvements are needed, feedback from operations staff following a spill that occurred at the WWTP in January 2025 indicates that there may be additional limitations related to processing of peak flows that need to be considered.
- Several condition-related improvements at the WWTP are necessary to provide continued long-term treatment reliability.
- The collection system has significant I&I issues and portions of the collection system become inundated under river flood conditions resulting from significant storm events. Therefore, extensive collection system upgrades are needed and costs of these improvements have not been defined. Connection to the RRCSD WWTP will need to bypass the existing collection system to avoid potential compounding impacts. Moreover, even with this provision in place, management of I&I must be addressed before the facility accepts additional flows.

[3] As noted previously in this Chapter, the RRCSD Treatment Plant Master Plan identifies the potential need to treat loads in excess of this load value and recommends additional monitoring during peak flow events to confirm this finding.

[4] Additional study of the available storage needs to equalize peak day flows at the RRCSD WWTP may be needed in light of the recent (January 2026) spill event.

- The RRCSD WWTP is not ideally situated with respect to protection from potential hazards, as follows:
  - The site is adjacent to a designated FEMA flood zone, as further detailed in Chapter 7 of this report.
  - The site is in an area that has a strong or very strong earthquake hazard potential, a high landslide hazard potential, a high susceptibility liquefaction potential.
  - Although the site itself is in an area with a low or very low wildfire hazard potential, the site is adjacent to a high wildfire hazard area.
- The RRCSD WWTP is far from the majority of the West Sonoma County population centers as compared to other treatment facilities in the region.
- There are limited opportunities for the beneficial reuse of treated effluent near the WWTP.
- The recently acquired 394-acre forested property surrounding the WWTP may offer potential opportunities for future expansion of storage and/or land disposal capacity, depending on the project needs. But this site has restrictions for onsite uses and challenging topography that could preclude the ability to construct new infrastructure within this area. RRCSD staff estimate that about 3 percent of the area may be available for land application. This needs to be evaluated further before a determination of dry-season disposal potential can be made.

2.3 GCSD SERVICE AREA AND FACILITIES

This section details the GCSD service area and wastewater facilities, focused on the following topics:

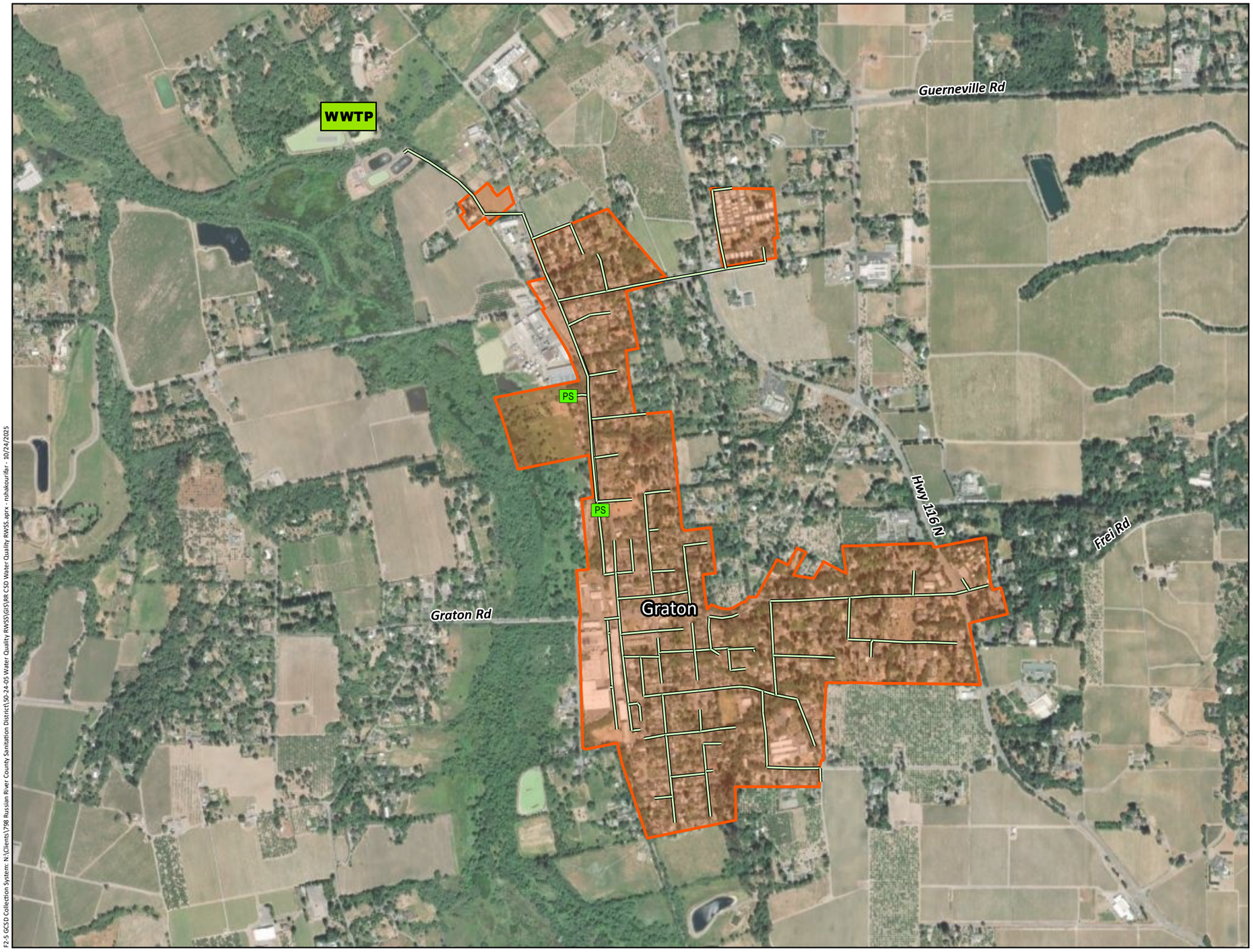
- Service area overview
- Regulatory requirements
- Wastewater characteristics
- Treatment facilities
- Recycled water operations
- Opportunities and constraints

2.3.1 GCSD Service Area Overview

GCSD provides wastewater collection, treatment and disposal for a portion of the unincorporated community of Graton. The GCSD service area and general layout of the GCSD collection system are shown on Figure 2-5. The collection system consists of the following:

- 6.2 miles of gravity pipe
- 0.3 miles of force main
- Two lift stations

Influent wastewater is conveyed north for treatment at the GCSD WWTP. A condition assessment conducted in early 2024 revealed that, by length, over 50 percent of GCSD gravity pipelines as well as both force mains connected to the lift stations require replacement, repair or maintenance. GCSD intends to pursue grant funding to complete these improvements.

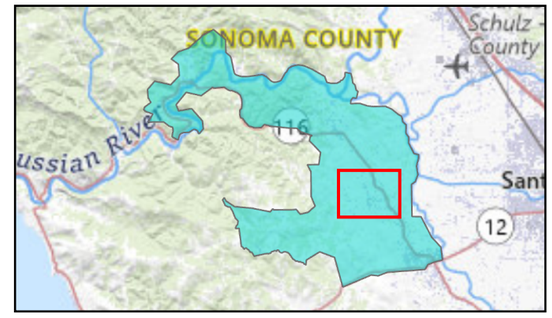


Service Area

Collection System

PS Pump Station

WWTP Wastewater Treatment Plant



F2-5 GCSD Collection System: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - nshakouri8ar - 10/24/2025

Prepared by:

WEST YOST

0 0.25 0.5 Miles

N

Prepared for:

Russian River County Sanitation District

Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

GCSD Service Area and Collection System

Figure 2-5

The GCSD service area consists of:

- 1,700 residents
- 644 ESDs, including commercial and institutional customers[5]

Between 2010 and 2020, Graton's residential population decreased an average of 0.1 percent per year, based on U.S. census data, suggesting the service area is unlikely to experience significant population change within the next 10 years. GCSD staff indicated the possibility for connecting about 50 ESDs in the next 10 years.

Two other new flow and load sources also need consideration with any future planning for the GCSD WWTP. In July of 2024, an apple processing facility operated by Manzana Products was connected to the GCSD collection system. Manzana estimates the facility will produce an average of 37,000 gallons per day (gpd) of process wastewater, with BOD concentrations half that of typical domestic wastewater. GCSD will also receive an additional average flow of 0.028 mgd from OCSD estimated to begin in August 2028, once the planned Occidental-Graton Pipeline is constructed.

The community of Graton has historically had DAC status and was pursuing DAC funding for some necessary collection system improvements. However, an updated DAC study is needed to establish the current DAC status. GCSD charges annual service rates for sewer service, with a current annual rate of $1,574 per ESD.

2.3.2 GCSD Regulatory Requirements

GCSD produces tertiary effluent, which is permitted for discharge to Atascadero Creek, a tributary of the Russian River, from October 1 through May 14. Between May 15 and September 30, discharge to Atascadero Creek is not allowed, and GCSD beneficially reuses recycled water via irrigation of permitted recycled water use areas. (A portion of the flow may also be applied via land disposal on District-owned property.) The effluent limits for receiving water and recycled water discharge required by the soon-to-be-adopted NPDES Permit for GCSD WWTP are listed in Table 2-5.

GCSD can reliably meet the current ammonia limits of 13 mg/L (maximum daily) and 5.6 mg/L (average monthly) - with only one violation of these limits in the past five years, but the next permit will include the more stringent nitrogen limits (Ammonia Impact Ratio) found in the recently renewed (2024) FWD permit. **Based on this information, GCSD WWTP is expected to need significant improvements to achieve additional nitrogen removal for continued surface water discharge.**

[5] GCSD defines an ESD as having sewer flow of 150 gpd, BOD concentration of 250 mg/L and TSS concentration of 300 mg/L (Table 13 of 2025 GCSD Sewer Rate Study draft report).

Table 2-5. GCSD Effluent Limitations from Tentative 2025 Discharge Permit

Parameter	Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Receiving Water Discharge (October 1 – May 14)[a]					
BOD, mg/L	10	15	-	-	-
TSS, mg/L	10	15	-	-	-
Total Coliform, MPN/100 mL	-	2.2	23	-	240
pH	-	-		6.5	8.5
Residual Chlorine, mg/L	0.01	-	0.02	-	-
Manganese, mg/L[b]	50	-	100	-	-
Ammonia Impact Ratio[c]	1.0	-	1.0	-	-
Nitrate-Nitrogen,[b] mg/L	10	-	20	-	-
2,3,7,8-TCDD (Dioxin) Equivalents, µg/L	1.4 x 10-8	2.8 x 10-8	-	-	-
Turbidity, NTU	-	-	2/5[d]	-	10
Recycled Water Discharge (May 15 – September 30)					
pH	-	-	-	6.0	9.0
Total Dissolved Solids, mg/L	500	-	-	-	-
Turbidity, NTU	-	-	2/5[d]	-	10

(a) Discharges to the Atascadero Creek also cannot exceed one percent of river flow.
(b) Tentative permit includes new effluents limits for manganese and nitrate.
(c) An Ammonia Impact Ratio of 1.0 means the applicable ammonia standards are applied to the discharge with no dilution credit. Values of the ammonia standards vary depending on pH and temperature data for the receiving water. Based on a preliminary review of recent data, standards applied to the discharge could be as low as 3.5 and 8.7 mg/L for average monthly and average weekly, respectively.
(d) Effluent turbidity cannot exceed 2 NTU on average during any 24-hour period or 5 NTU more than 5 percent of the time during any 24-hour period.

2.3.3 GCSD Wastewater Characteristics

GCSD WWTP influent wastewater characteristics have been defined using influent flow and water quality data from January 2019 to April 2024. Notably, this period precedes the recent Manzana connection.

Calculated flow statistics for the WWTP are presented in Table 2-6 for current and projected conditions, as well as the portion estimated for anticipated new connections. Calculated influent concentration and load statistics are shown in Table 2-7.

Table 2-6. GCSD Current and Projected Influent Flows, mgd

Flow Statistic	Current[a]	Projected			
		OCSD[b]	Manzana Process Water	Anticipated New GCSD Connections	Total Projected
ADWF	0.08	0.028	0.037	0.009[c]	0.15
AAF	0.13	0.037	0.037	0.009	0.21
Maximum 30-Day Flow	0.47	0.072	0.045[d]	0.053	0.64
Maximum 7-Day Flow	0.89	0.11	0.045[d]	0.10	1.1
PDF	1.2	0.13	0.045	0.13	1.5

(a) Current values based on influent flow data from January 2019 to April 2024.
(b) Projected OCSD flows from Table 2-15.
(c) New connections ADWF based on 60 new ESDs (including 10 ESDs for Manzana domestic wastewater) and 124 gpd per ESD, calculated from current ADWF of 80,000 gpd and 644 ESDs.
(d) Maximum 30-day flows for Manzana process water not defined. Assuming maximum 30-day and maximum 7-day flows equal to PDF.

Table 2-7. GCSD Current and Projected Influent Water Quality

Water Quality Statistic	Current[a]		Projected			
	Average	Maximum	OCSD[b]	Manzana Process Water	Anticipated New GCSD Connections	Total Projected
Concentrations, mg/L						
BOD	320	840	490	190	*320*	270[c]
TSS	290	680	430	160	*290*	240[c]
Loads, lb/day						
BOD	260	690	130	60	20[d]	470
TSS	240	550	110	50	20[d]	420
30-Day Maximum BOD	390		190	60	40[e]	680
30-Day Maximum TSS	360		170	50	40[e]	620

(a) Current values based on influent data from January 2019 to April 2024.
(b) Projected OCSD loads from Table 2-16.
(c) Total projected BOD and TSS concentrations calculated from respective total average loads and total projected AAF (Table 2-6).
(d) New connections average loads calculated from current average concentrations and AAF for new connections (Table 2-6).
(d) New connections 30-day maximum loads calculated from current 30-day maximum concentrations and maximum 30-day flow for new connections (Table 2-6).

2.3.4 GCSD Treatment Facilities

The GCSD WWTP was originally constructed in 1976, with significant upgrades in 2012 focused primarily on adding filtration to produce tertiary effluent. A site layout is shown on Figure 2-6. The treatment processes, as shown schematically on Figure 2-7, include the following:

- Headworks with grit chamber, comminutor, and manual bar screen;
- Two, 1.24 MG partial mix aerated treatment ponds, which are operated in series;
- One, 1.2 MG settling pond;
- Suspended air flotation (SAF) for solids removal (mostly algae from settling pond surface) upstream of filtration;
- 5,000-gallon surge tank, with two, 250 gpm transfer pumps;
- Two Fuzzy Filters; and
- Chlorine disinfection.

Solids from the SAF process are composted onsite and applied to GCSD property surrounding the WWTP. Treated effluent is directed to two effluent storage ponds with volumes of 13.8 MG and 9.1 MG. The treated flows are held in these ponds until it is directed to recycled water customers or discharged to the Atascadero Creek.

F2-6 GCSD WWTP Layout: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - nshakourifar - 10/27/2025

Prepared by:

WEST YOST

N

0 150 300 Feet

Prepared for:

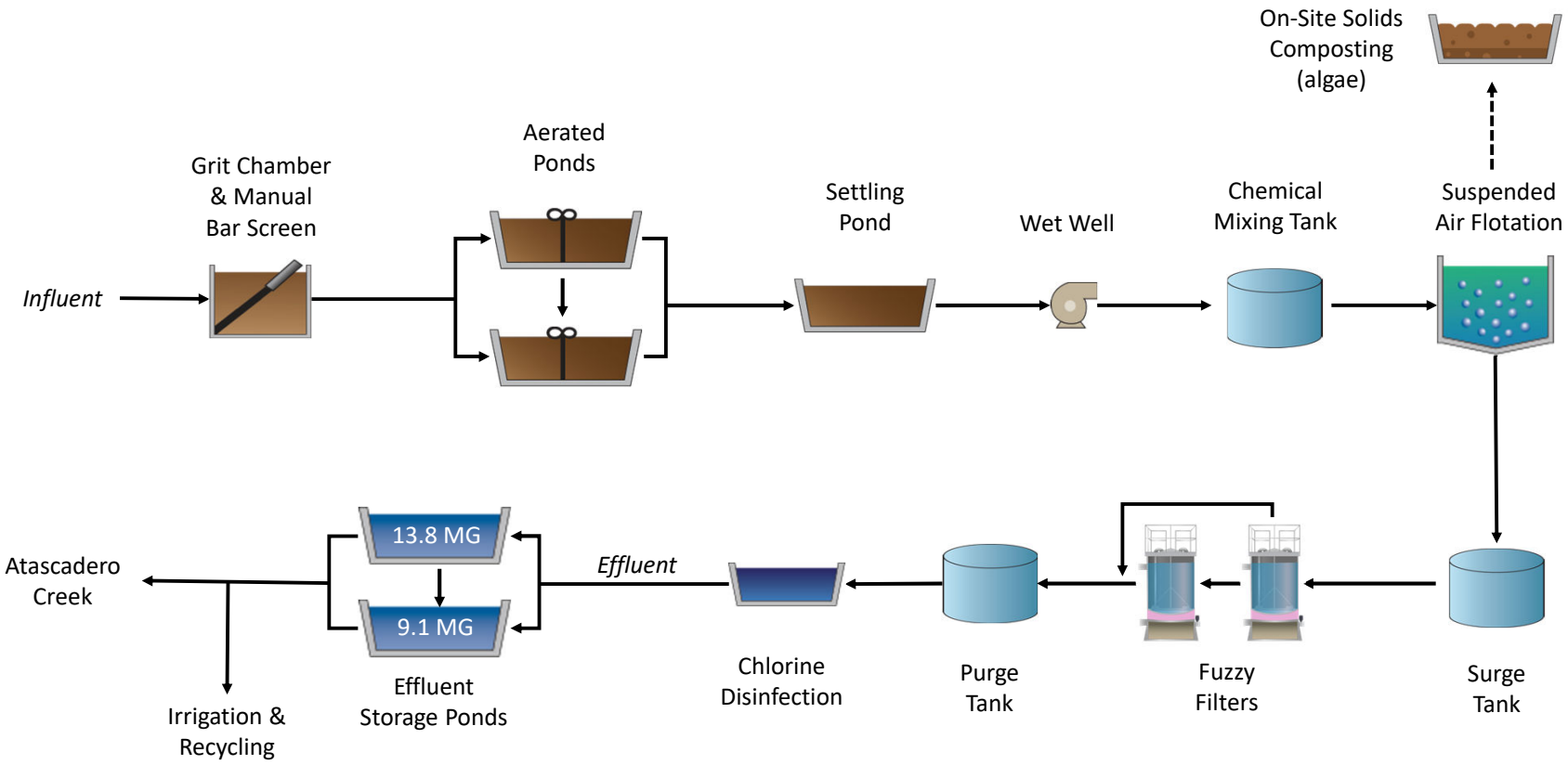
Russian River County Sanitation District
Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

GCSD WWTP Site Layout

Figure 2-6

Figure 2-7. GCSD WWTP Process Schematic



A spreadsheet-based, pond model analysis was conducted to determine the treatment capacity of the existing GCSD WWTP treatment ponds. For this analysis, the effluent BOD treatment target is set to 30 mg/L to meet a definition of "oxidized wastewater" ahead of tertiary treatment. The process model relies on an assumption of first-order rate kinetics, with the rate coefficient based on a partial mix aerated pond configured for Ponds 1 and 2 and a facultative pond for the settling pond. Key inputs and modeling results for current and projected conditions are presented in Table 2-8. **As shown, the GCSD WWTP ponds do not provide adequate treatment capacity to produce 30 mg/L ahead of the filtration process.**

Table 2-8. GCSD WWTP Treatment Pond Capacity Evaluation

Scenario	ADWF,[(a)] mgd	Maximum 30-Day Flow, mgd	Maximum 30-Day BOD Load, lb/day	Secondary Effluent BOD, mg/L
Current Flows	0.08	0.47	390	36
Future Flows	0.15	0.64	680	**56**[(b)]

(a) Maximum 30-day flows are used in the modeling, but ADWF is shown for reference.
(b) Secondary effluent notable above 30 mg/L indicates inadequate secondary treatment.

Available capacity of the other treatment unit processes has been evaluated with a simplified analysis based on peak flows. The results of that evaluation are provided in Table 2-9. **As shown, the GCSD WWTP flow-based treatment facilities do not provide adequate treatment capacity to treat the projected influent flows.**

Table 2-9. GCSD Flow-Based Capacity Evaluation

Key Statistic for Defining Capacity	Treatment Process of Interest	Projected Influent Value	Current Design Capacity
Peak Influent Flow	Influent screens	1.5 mgd[(a)]	0.85 mgd[(b)]
	Grit Removal		
Equalized Peak Influent Flow/Peak Week Flow	SAF	1.1 mgd	0.58 mgd
	Filtration		0.58 mgd
	Disinfection		0.51 mgd[(c)]

(a) Value shown in peak daily flow. Peak influent flow could be 2 to 3 times this value (or higher).
(b) Reported peak design flow for the original facility. Capacity of existing headworks facility is not defined.
(c) Disinfection capacity based on 30-minute detention time.

Based on the information presented in Table 2-8 and Table 2-9, the GCSD WWTP will require additional treatment capacity to process the anticipated future flows. In addition to the capacity-related improvements discussed above, the GCSD WWTP has identified the following projects that will be needed in the near term:

- **Installation of a mechanical bar screen at the WWTP headworks;**
- **Installation of a disinfection system that can produce effluent water quality that meets "disinfected tertiary recycled water" standards; and**
- **Replacement of the existing temporary pumping facility that is used to convey effluent from the treatment facilities to the storage ponds/outfall in the Atascadero Creek with a new, permanent pump station.**

2.3.5 GCSD Recycled Water Operations

Between May 15 and September 30, GCSD disposes or beneficially reuses an average of 50 AFY of recycled water via irrigation on the following sites:

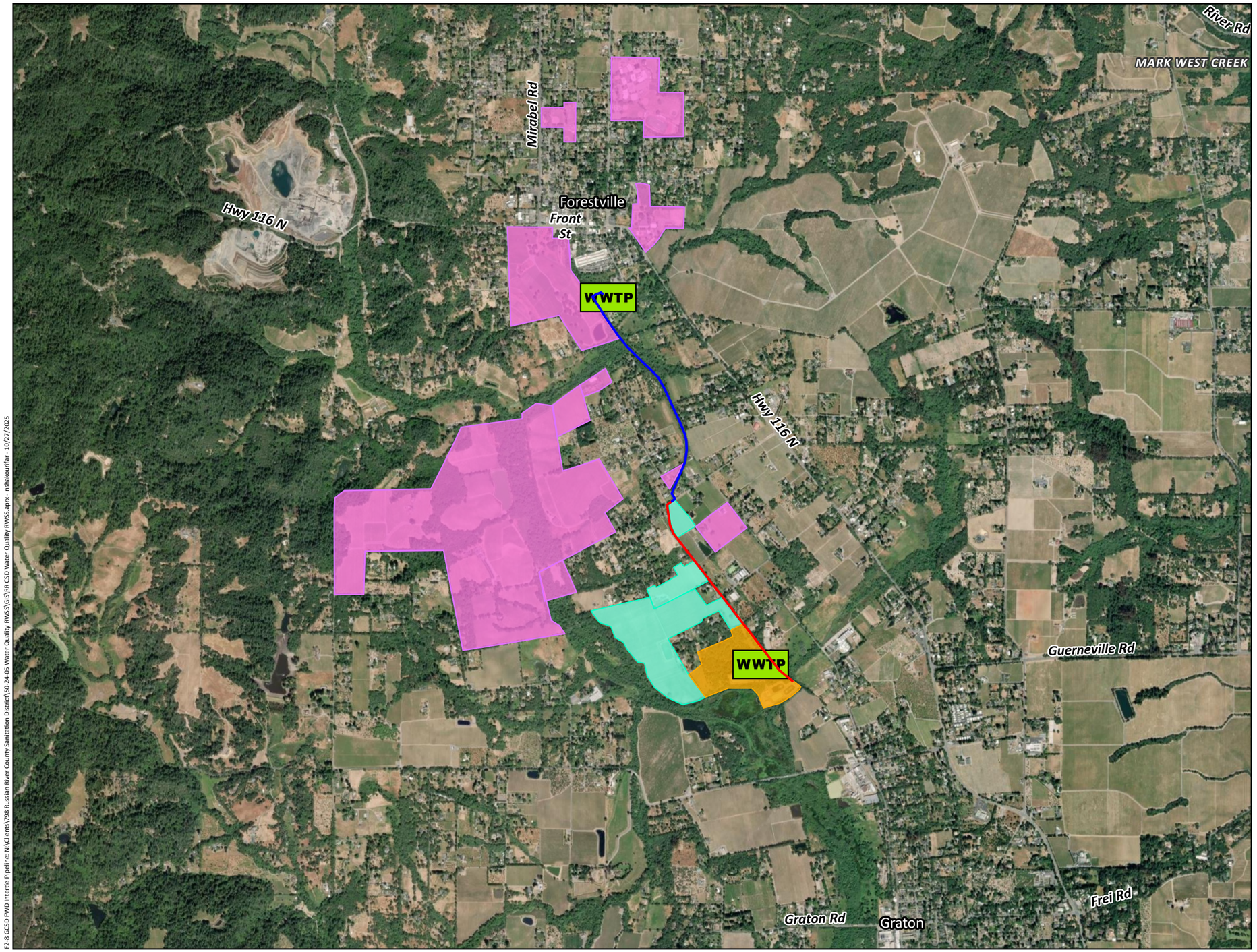
- Three vineyards covering around 103 acres (beneficial reuse)
- A 20.5-acre field owned by GCSD (land disposal)

GCSD distributes recycled water to its customers along a 1.7-mile intertie pipeline that connects to the FWD WWTP. A layout of the intertie pipeline and GCSD and FWD recycled water customers is shown on Figure 2-8. The intertie consists of a portion of the original 8-inch ductile iron (DI) pipeline and a newer 6-inch polyvinyl chloride (PVC) pipe, which connects to the 8-inch DI pipe approximately halfway between the two agency's WWTPs. The segment of DI pipe closer to the FWD WWTP could potentially be repurposed. West Yost has recently and separately worked with GCSD on a condition assessment of this intertie pipeline, and recommended slip-lining the currently unused portion of the intertie pipeline with a non-metallic pipeline to avoid further impacts from pipeline corrosion.

The intertie pipeline allows the two agencies to share recycled water facilities, including storage and distribution to customers. The two agencies do not currently have a formal agreement on shared resources, but typical operations involve the following:

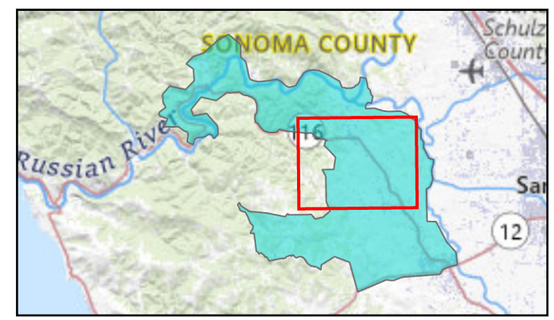
- Storage of FWD flows in the GCSD storage ponds during the late summer/early fall period - prior to the start of the surface water discharge season.
- Irrigation of water from the GCSD storage ponds at FWD customer sites.

GCSD and FWD staff have expressed an interest in working together to optimize beneficial reuse operations. Both agencies have also expressed an interest in zero surface water discharge (i.e., reuse only) in lieu of improvement treatment to meet ammonia and nitrate effluent water quality standards.



Graton CSD Customers
Graton CSD Property
Forestville WD Customers
Graton Intertie Segment
Forestville Intertie Segment
WWTP Wastewater Treatment Plant
Potential Irrigation Area

Notes:
1. Highlighted property boundaries are approximate.
2. Intertie pipeline alignment is approximate.



F2-8 GCSD FWD Intertie Pipeline: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - ndsakourifar - 10/27/2025

Prepared by:
WEST YOST

N
0 2,000 4,000 Feet

Prepared for:
Russian River County Sanitation District
Water Quality and Recycled Water Supply Feasibility Study
Sonoma Water

GCSD-FWD Recycled Water Intertie Pipeline and Recycled Water Users
Figure 2-8

2.3.6 GCSD Regionalization Opportunities and Constraints

GCSD has several opportunities that could be beneficial to potential regionalization strategies and/or acceptance of additional wastewater from neighboring unsewered communities, including:

- The planned connection with OCSD raises the possibility of adding dischargers from unsewered communities near OCSD, such as the Camp Meeker DAC.
- The existing intertie pipeline and working relationship with FWD could allow the districts to reduce costs by collaborating on WWTP upgrades, which will be necessary at both facilities.
- GCSD has significant storage capacity, which could be leveraged to expand its recycled water program.
- GCSD owns an approximate 20.5-acre parcel adjacent to the WWTP that is currently used for land disposal and could be leveraged for another purpose.
- The existing GCSD service area has nearby unsewered parcels that are likely good candidates for expanded service.
- The WWTP is in an aera of relatively low environmental hazard risk, as follows:
  - not a landslide hazard area,
  - very low wildfire hazards, and
  - moderate susceptibility to liquefaction.

GCSD also faces some constraints, as follows:

- The capacity provided by the WWTP is not adequate to treat the currently anticipated flows and loads and will need to be expanded.
- The WWTP also requires several condition-related improvements.
- The Regional Water Board is in the process of adopting a new NPDES permit for GCSD WWTP, which is expected to include nitrogen effluent limits unachievable without significant treatment upgrades.
- The WWTP is mapped within a FEMA flood zone, as detailed in Chapter 7 of this report.
- The WWTP is mapped in an area with a strong to severe earthquake hazard.
- Winter surface water discharge to Atascadero Creek is complicated and expensive due to the discharge location.

2.4 FWD SERVICE AREA AND FACILITIES

This section details the FWD service area and wastewater facilities, focused on the following topics:

- Service area overview
- Regulatory requirements
- Wastewater characteristics
- Treatment facilities
- Recycled water operations
- Opportunities and constraints

2.4.1 FWD Service Area Overview

FWD provides wastewater collection, treatment and disposal for a portion of the unincorporated community of Forestville. The FWD service area and general layout of the FWD collection system are shown on Figure 2-9.

FWD has two separate, interconnected service areas: Forestville Central and Mirabel Heights. The Forestville Central service area, just north of the treatment plant, is served by a 6.5-mile gravity collection system. North of downtown and abutting the Russian River is the Mirabel Heights neighborhood. Wastewater from the neighborhood is conveyed by gravity to the northerly Terminal Lift Station. These flows are pumped to a junction at the south end of the neighborhood, where they combine with flows from a lift station operated by Steelhead Beach County Park, then flow by gravity to an intermediate pump station. The Mirabel Heights force main then connects to the Forestville Central gravity main at Van Keppel Road. The final combined flows are then conveyed by gravity to the FWD WWTP.

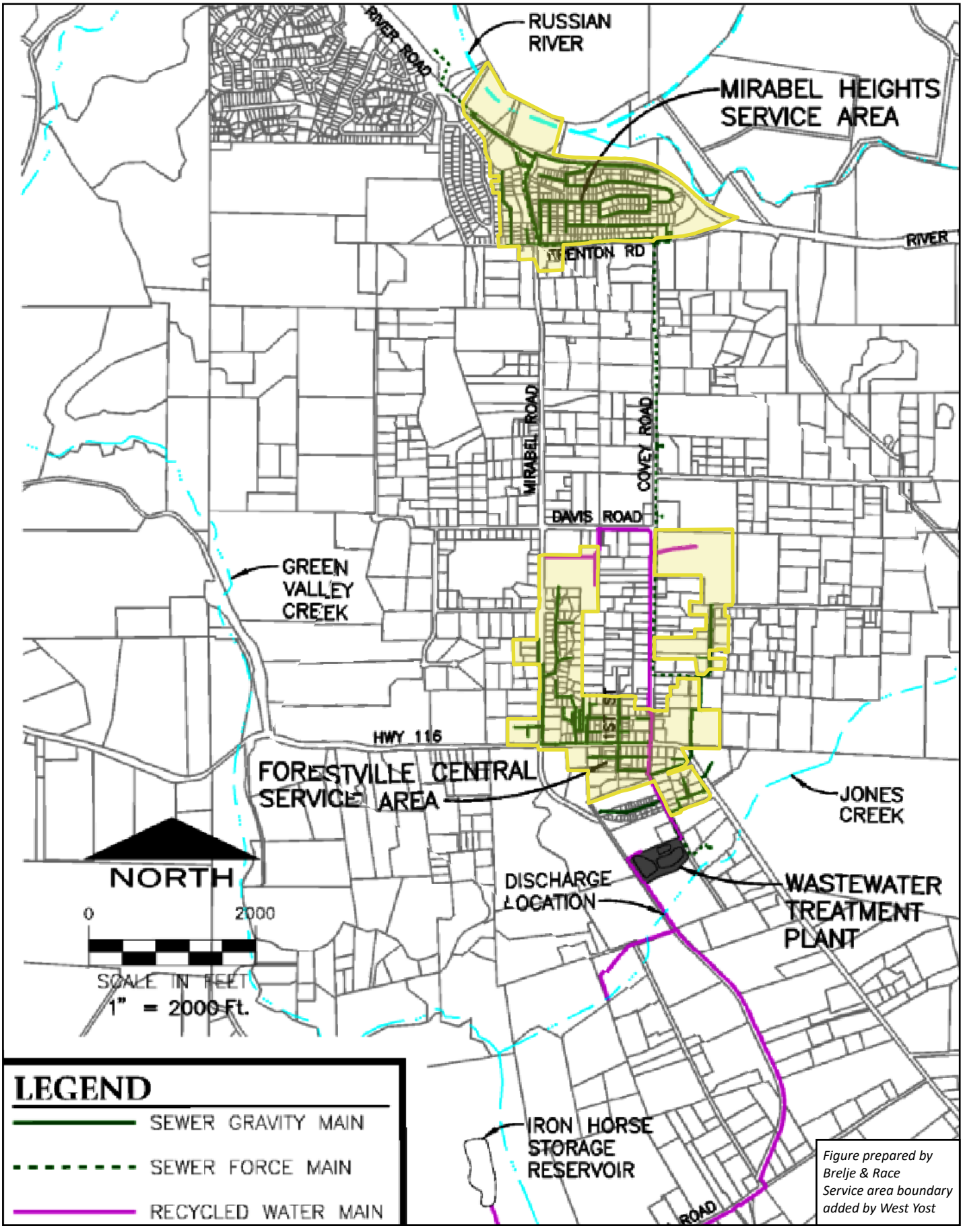
The FWD service area consist of:

- 930 residents
- 660 ESDs, including commercial and institutional customers[6]

Between 2010 and 2020, Forestville's residential population decreased an average of 0.1 percent per year, based on U.S. census data, suggesting the service area is unlikely to experience significant population change within the next 10 years. FWD has identified up to 50 ESDs of existing unsewered parcels within the service area that could potentially be added to the collection system.

Forestville does not currently qualify as a DAC. The current annual sewer service rate for FWD customers is $1,531 per ESD.

[6] FWD defines an ESD as having sewer flow of 140 gpd and BOD and TSS concentrations of 324 mg/L (Exhibit A of 2022 FWD Resolution No. 421).



Prepared by:
WEST YOST

Prepared for:
Russian River County Sanitation District
Water Quality and Recycled Water Supply Feasibility Study
Sonoma Water

FWD Wastewater Service Area and Collection System

Figure 2-9

2.4.2 FWD Regulatory Requirements

FWD produces tertiary effluent, which is permitted for discharge to Jones Creek, a tributary of the Russian River, from October 1 through May 14. Between May 15 and September 30, discharge to Jones Creek is not allowed, and FWD beneficially reuses recycled water via irrigation of permitted recycled water use areas. The effluent limits for receiving water and recycled water discharge required by the current NPDES Permit are listed in Table 2-10.

As shown in Table 2-10, the FWD WWTP is required to provide reliable ammonia and nitrate removal - which is not possible with a pond-based treatment system like the FWD WWTP. In response to repeated exceedances of nitrate and ammonia effluent limits, the Regional Water Board issued FWD a Time Schedule Order (TSO) for nitrate and ammonia in 2018. The TSO requires full compliance with the final nitrate and ammonia limits by March 1, 2026.[7] Reliably meeting nitrogen limits will require treatment upgrades at the FWD WWTP. **Based on this information, the FWD WWTP is expected to need significant improvements to achieve additional nitrogen removal for continued surface water discharge.**

Table 2-10. FWD Effluent Limitations from Current Discharge Permit

Parameter	Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Receiving Water Discharge (October 1 – May 14)[(a)]					
BOD, mg/L	10	15	-	-	-
TSS, mg/L	10	15	-	-	-
Total Coliform, MPN/100 mL	-	2.2	23	-	240
pH	-	-	-	6.5	8.5
Residual Chlorine, mg/L	0.01	0.02	-	-	-
Cyanide, µg/L	4.4	7.9	-	-	-
Dichlorobromomethane, µg/L	0.56	1.1	-	-	-
Ammonia Impact Ratio[(b)]	1.0	1.0	-	-	-
Nitrate, Total (as N), mg/L	10	-	-	-	-
Manganese, mg/L	50	100	-	-	-
Turbidity, NTU	-	-	2/5[(c)]	-	10
Recycled Water Discharge (May 15 – September 30)[(d)]					
Nitrate, Total (as N), mg/L	10	-	-	-	-
Total Dissolved Solids, mg/L	500	-	-	-	-
pH	-	-	-	6.0	9.0
Turbidity, NTU	-	-	2/5[(c)]	-	10

(a) Discharges to the Jones Creek cannot exceed one percent of river flow.
(b) An Ammonia Impact Ratio of 1.0 means the applicable ammonia standards are applied to the discharge with no dilution credit. Values of the ammonia standards vary depending on pH and temperature data for the receiving water. Based on a preliminary review of recent data, standards applied to the discharge could be as low 6.9 and 18 for average monthly and average weekly, respectively.
(c) Effluent turbidity cannot exceed 2 NTU on average during any 24-hour period or 5 NTU more than 5 percent of the time during any 24-hour period.
(d) The recycled water limits also apply to transfers to GCSD storage ponds.

[7] FWD is working with the Regional Water Board on an extension of this timeline beyond March 2026.

2.4.3 FWD Wastewater Characteristics

FWD WWTP influent wastewater characteristics have been defined using influent flow and water quality data from January 2019 to April 2024. Calculated flow statistics for the WWTP are presented in Table 2-11 for current and projected conditions. Calculated influent concentration and load statistics are shown in Table 2-12.

Table 2-11. FWD Current and Projected Influent Flows, mgd

Flow Statistic	Current[a]	Anticipated New Connections[b]	Projected[b]
ADWF	0.059	0.005[c]	0.064
AAF	0.080	0.005	0.085
Maximum 30-Day Flow	0.23	0.019	0.25
Maximum 7-Day Flow	0.36	0.029	0.39
PDF	0.73	0.058	0.79

(a) Current values based on influent flow data from January 2019 to April 2024.
(b) Flows were estimated by applying the same ratios between ADWF and other flow statistics observed under current conditions.
(c) New connections ADWF based on 50 new ESDs and an ADWF per ESD of 95 gpd per FWD Ordinance Number 83, which defines median single-family annual usage as 34,600 gallons.

Table 2-12. FWD Current and Projected Influent Water Quality

Water Quality Statistic	Current[a]		Anticipated New Connections	Projected
	Average	Maximum		
Concentrations, mg/L				
BOD	280	700	280	
TSS	260	670	260	
Loads, lb/day				
BOD Load	160	400	10[b]	170
TSS Load	150	390	10[b]	160
30-Day Maximum BOD Load[c]	250		20[d]	270
30-Day Maximum TSS Load[c]	230		20[d]	250

(a) Current values based on influent data from January 2019 to April 2024.
(b) New connections average loads calculated from current average concentrations and ADWF for new connections (Table 2-11).
(c) New connections 30-day maximum loads calculated from current 30-day maximum concentrations and maximum 30-day flow for new connections.
(d) BOD and TSS measurements were not recorded frequently enough to calculate 30-day running average concentrations or loads. For planning purposes, the maximum 30-day BOD and TSS loads have been calculated as 1.5 times the average load.

2.4.4 FWD Treatment Facilities

The FWD WWTP is located south of the FWD collection system. A layout of the treatment plant site is shown on Figure 2-10, and a treatment process schematic on Figure 2-11.

The tertiary treatment process consists of the following:

- Headworks with rotary screen;
- Three-cell aeration pond, with a total volume of 2.9 MG;
- Settling/EQ pond with a total volume of 0.75 MG;
- Membrane filtration, with two trains each having 36 modules; and
- Chlorine disinfection.

Treated effluent is directed to a 2.3-MG effluent storage pond where it is held prior to reuse or discharge to the Jones Creek. FWD also provides recycled water to Iron Horse Vineyards which has its own 14.7-MG reservoir for recycled water storage.

A spreadsheet-based, pond model analysis was conducted to determine the treatment capacity of the existing FWD WWTP treatment ponds using the same approach described for the GCSD WWTP ponds. Key inputs and modeling results for current and projected conditions are presented in Table 2-13.

Table 2-13. FWD WWTP Treatment Pond Capacity Evaluation

Scenario	Equivalent ADWF,[(a)] mgd	Maximum Month Flow, mgd	Maximum 30-Day BOD Load, lb/day	Secondary Effluent BOD, mg/L
Current Flows	0.061	0.24	250	16
Future Flows	0.065	0.25	270	18

(a) Maximum 30-day flows are used in the modeling, but ADWF is shown for reference.

A simplified analysis of available capacity of the remaining systems based on peak flows is provided in Table 2-14.

Table 2-14. FWD Flow-Based Capacity Evaluation

Key Statistic for Defining Capacity	Treatment Process of Interest	Projected Influent Value	Current Design Capacity
Peak Influent Flow	Influent screens	0.8 mgd[(a)]	2.0 mgd[(b)]
	Grit Removal		
Equalized Peak Influent Flow	Filtration	0.09 mgd/ 0.4 mgd[(c)]	0.16 mgd/ 0.29 mgd[(d)]
	Disinfection	0.4	0.58 mgd[(e)]

(a) Value shown in peak daily flow. Peak influent flow could be 2 to 3 times this value (or higher).
(b) Reported capacity of the rotary screen. Flows can be bypassed around the screen if needed.
(c) Anticipated summer/winter equalized peak based on AA and Peak Week flows.
(d) The filters can theoretically process a net average of 200 gpm each. In practice, each of the two filter units has able to process approximately 50 to 60 gpm during summer months, and 100 gpm during winter month. (Recycled Water Engineering Report, Brelje and Race, August 2018)
(e) Disinfection capacity based on 105-minute detention time.

F2-10 FWD WWTP Layout: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - nshakourifar - 10/27/2025

Prepared by:

WEST YOST

0 100 200 Feet

N

Prepared for:

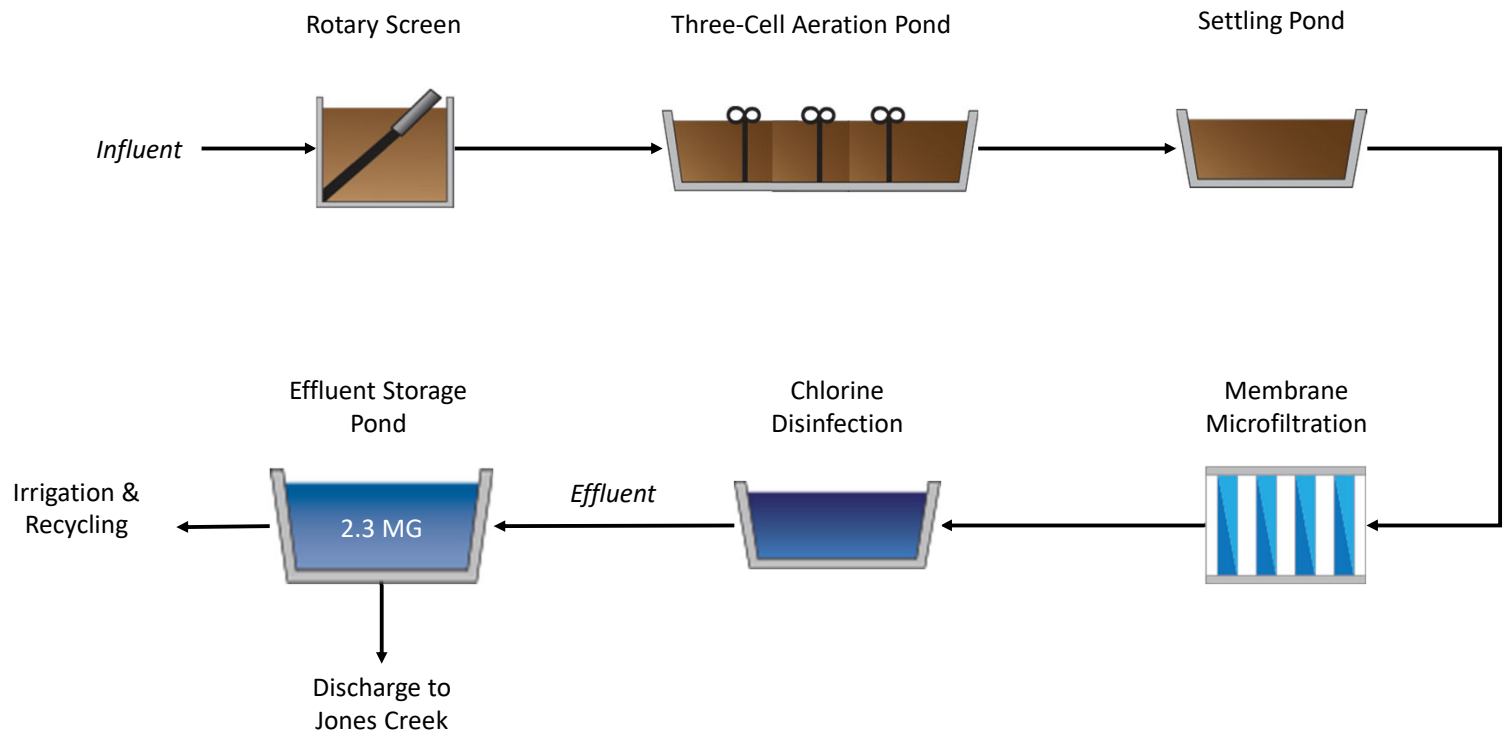
Russian River County Sanitation District
Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

FWD WWTP Site Layout

Figure 2-10

Figure 2-11. FWD WWTP Process Schematic



Based on the information presented in Table 2-13 and Table 2-14, the FWD WWTP should have more than adequate capacity for current and planned connections with the exception of the filtration system, which may be limited to process flows during peak wet-season periods.

2.4.5 FWD Recycled Water Operations

Between May 15 and September 30, FWD beneficially reuses approximately 84 AFY of recycled water for the following uses:

- A recycled water fill station at the WWTP, where permitted residential and commercial users can collect recycled water for hauling.
- 198 acres of agricultural land comprising mostly vineyards.
- Approximately 18 acres of turf landscape, which includes local school grounds and parks.
- Approximately six acres of landscape irrigation that includes a mixture of turf and landscape vegetation.

As previously noted, FWD and GCSD work together to manage their effluent/recycled water facilities. In addition, FWD reports recycled water deliveries to existing users are significantly lower than irrigation demands – suggesting a potential to deliver more flow to these users.

2.4.6 FWD Regionalization Opportunities and Constraints

FWD has several opportunities that could be beneficial to potential regionalization strategies and/or acceptance of additional wastewater from neighboring unsewered communities, including:

- The WWTP receives relatively low flows and loads compared to its rated design capacity and could likely accommodate increased influent loads.
- The WWTP is not adjacent to a FEMA flood zone.
- The WWTP has relatively low seismic risk, as it is:
  - Not in a landslide hazard area,
  - In an area with very low susceptibility to liquefaction,
- The WWTP is in an area with low or very low potential for wildfire hazard.
- The existing intertie pipeline and working relationship with GCSD could allow the districts to reduce costs by collaborating on WWTP upgrades, which will be necessary at both facilities.
- FWD is reported to have significant recycled water demands, which could be leveraged to bring additional flows into the existing recycled water program.
- The existing FWD service area includes and has other nearby unsewered parcels that are likely good candidates for expanded service.

FWD also faces significant constraints to regionalization:

- The WWTP is mapped within a strong to severe earthquake hazard area.
- The membrane filters are nearing the end of their useful life and are not able to meet their rated treatment capacity. Replacement of the system will be needed. In addition, a pre-treatment step may be required to support long-term membrane filtration.

- The WWTP cannot meet current nitrogen effluent limits without significant treatment upgrades.
- The WWTP has limited effluent storage capacity.
- Winter surface water discharge to Jones Creek is complicated and expensive for the facility.

2.5 OCSD SERVICE AREA AND FACILITIES

This section details the OCSD service area and wastewater facilities, focused on the following topics:

- Service area overview
- Wastewater characteristics
- Current and future operations
- Opportunities and constraints

2.5.1 OCSD Service Area Overview

OCSD provides wastewater collection and disposal for a portion of the unincorporated community of Occidental. Sonoma Water manages and operates the OCSD facilities.

The OCSD services area and collection system are shown on Figure 2-12. The collection system comprises:

- 1.6 miles of gravity pipe
- 0.6 miles of force main
- One lift station, updated for truck filling in 2017 ("PS" on the figure)

The lift station is used to convey raw wastewater to the WWTP site, which is currently used for storage. All wastewater is ultimately hauled from a truck filling station to the Airport WWTP south of the Town of Windsor and about 11 miles from the OCSD WWTP site.

The OCSD service area consists of the following:

- 610 residents
- 273 ESDs,[8] including commercial and institutional customers
- 99 connections

The service area is primarily comprised of commercial users in the downtown area of Occidental. Between 2010 and 2020, Occidental's residential population grew an average of 0.15 percent per year, based on U.S. census data. However, no growth is planned or expected for the OCSD service area.

Occidental does not qualify as a DAC. The customer annual service rates are $3,006 per ESD for Fiscal Year 2024/2025.

[8] OCSD defines an ESD as having sewer flow of 66 gallons per day and BOD and TSS concentrations of 250 mg/L (Exhibit A of OCSD rate ordinance [2024 Ordinance No. 6484 – 100 OCSD]).

Service Area

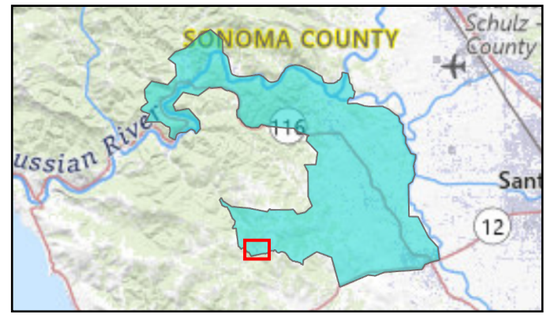
Collection System

PS Pump Station

WWTP Wastewater Treatment Plant

Note: WWTP is currently used for storage not treatment.

Note:
Occidental WWTP site is now primarily used for storage.



F2-12 OCSD Collection System: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - nshakourifar - 10/27/2025

Prepared by:

WEST YOST

N

0 0.1 0.2 Miles

Prepared for:

Russian River County Sanitation District
Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

OCSD Service Area and Collection System

Figure 2-12

2.5.2 OCSD Wastewater Characteristics

Truck hauling volume data from January 2019 to April 2024 was used to define influent wastewater characteristics. Table 2-15 and Table 2-16 present the calculated flow and water quality statistics, respectively. These represent both current and projected OCSD flows and loads, as no growth is assumed for the OCSD service area.

Table 2-15. OCSD Current and Projected Influent Flow Statistics, mgd

Flow Statistic	Current/Projected[a]
ADWF	0.028
AAF	0.037
Maximum 30-Day Flow	0.072
Maximum 7-Day Flow	0.11
PDF[b]	0.13

(a) Based on wastewater hauling data from January 2019 to April 2024. Zero growth in OCSD flows is assumed over the planning period.
(b) A water balance on the OCSD system was completed using hauling volume data, water level data from OCSD influent holding ponds and CIMIS precipitation and evapotranspiration data from January and February of 2023. Based on the water balance, peak hour flows during the period were as high as 0.53 mgd, and PDF as high as 0.16 mgd.

Table 2-16. OCSD Current and Projected Influent Water Quality Statistics

Water Quality Statistic	Current/Projected[a]	
	Average	Maximum
Concentrations, mg/L		
BOD	490	930
TSS	430	980
Loads, lb/day		
BOD Load	130	320
TSS Load	110	300
30-Day Maximum BOD Load[b]	190	
30-Day Maximum TSS Load[b]	170	

(a) Based on influent data from January 2019 to April 2024. Zero growth in OCSD loads is assumed over the planning period.
(b) BOD and TSS measurements were not recorded frequently enough to calculate 30-day running average concentrations or loads. For planning purposes, the maximum 30-day BOD and TSS loads have been calculated as 1.5 times the average load.

To further evaluate influent flows, a water balance of the OCSD system was completed using the following:

- Hauling volume data
- Water level data from OCSD influent holding ponds
- CIMIS precipitation and evapotranspiration data from January and February of 2023

Based on the water balance, PDF was estimated to be 0.16 mgd and peak hour flows were estimated to be as high as 0.53 mgd.

The calculated OCSD WWTP average influent BOD and TSS concentrations are about 1.5 times higher than the respective average influent concentrations of the other West County facilities. These higher concentrations could reflect OCSD's larger fraction of commercial flows. The Occidental to Graton Pipeline Feasibility Study, which relied on influent data from 2007 to 2017, defined a higher average BOD concentration of 584 mg/L but a similar average TSS concentration of 424 mg/L.

2.5.3 OCSD Facilities

As previously noted, OCSD no longer provides wastewater treatment at the OCSD WWTP site as OCSD began hauling wastewater to the Airport WWTP in 2017 for treatment and disposal.

The OCSD facilities are as follows:

- Influent lift station, which conveys flow to the former WWTP site about half a mile away;
- The former WWTP 0.65 MG and 0.22 MG aerated ponds are used for EQ and longer term storage;
- Hauling truck filling site, which is adjacent to the influent lift station and can fill directly from the storage ponds or the 0.04 MG influent lift station wet well.

A schematic of this process is shown on Figure 2-13. Trucking takes place between 2 and 5 days per week, with multiple 3,800-gallon loads hauled each day.

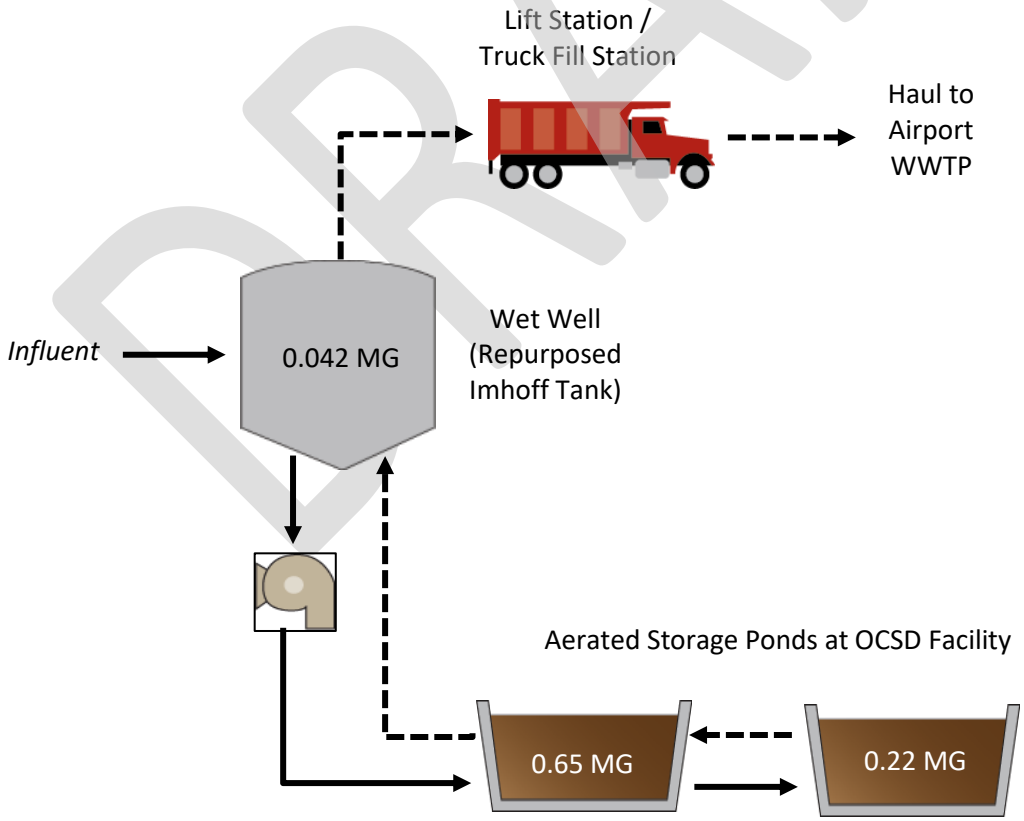


Figure 2-13. OCSD Current Operations Schematic

To control odor, the ponds are kept at an operational water depth of three feet and continue to be aerated. OCSD evaluates accumulation of solids in the ponds annually and has had solids removed every few years.

Design of a new raw wastewater pipeline from the OCSD lift station to the GCSD WWTP has recently been funded and is underway. The funding source for the construction and connection fee has yet to be determined. Construction of the pipeline is anticipated to be completed in 2028 or 2029, pending securing of additional funding.

The proposed pipeline and pump station will be designed for 0.26 mgd, twice the recent OCSD PDF of 0.13 mgd. This sizing was based on an assumed pumping for 12 hours per day. However, the GCSD WWTP may not be able to accept all peak influent flows from OCSD under current operating conditions. In that case, OCSD may still need to haul a portion of the OCSD flows to another WWTP.

2.5.4 OCSD Regionalization Opportunities and Constraints

The planned Occidental-Graton wastewater pipeline and pump station provide some opportunities that could be beneficial to potential regionalization strategies and/or acceptance of additional wastewater from neighboring unsewered communities in that the facilities are proposed to be sized for twice the anticipated PDF for the OCSD service area. This planned sizing, combined with the available EQ storage at the former OCSD WWTP site, potentially allows for additional flows from unsewered homes/communities nearby.

Constraints related to OCSD include the following:

- Once the size of the new pipeline and pump station are set (designed), accommodating additional flows will be limited.
- The GCSD WWTP treatment capacity would need to be expanded to accept additional flows, as discussed in the prior section dedicated to GCSD.
- Odor concerns from the OCSD site neighbors could impact long-term site use for EQ storage.

2.6 COMBINED SERVICE AREA FLOWS AND LOADS

The following tables present the combined ESD, flow and load information, based on the information presented in the previous sections:

- Table 2-17: The number of projected ESDs from the West County service areas
- Table 2-18: Proposed design (projected) flows
- Table 2-19: Proposed design (projected) BOD and TSS loads

Table 2-17. Projected West County ESDs

Service Area	Number of ESDs/Connections[(a)]
RRCSD	3,621
OCSD	273
GCSD	714
FWD	711
Total Projected ESDs	**5,319**

(a) As noted in the previous sections, each agency currently defines ESDs differently, as shown below:
- RRCSD: 1 ESD has sewer flow = 120 gpd and BOD/TSS = 200 mg/L
- OCSD: 1 ESD has sewer flow = 66 gpd and BOD/TSS = 250 mg/L
- GCSD: 1 ESD has sewer flow = 150 gpd, BOD = 250 mg/L and TSS = 300 mg/L
- FWD: 1 ESD has sewer flow = 140 gpd and BOD/TSS = 324 mg/L

Table 2-18. Proposed Design Flows for West County Agencies

Scenario	ADWF, mgd	AAF, mgd	Maximum 30-Day Flow, mgd	Maximum 7-Day Flow, mgd	PDF, mgd
Projected RRCSD Flows	0.38	0.66	2.2	3.5[(a)]	4.2/5.0[(a)]
Projected GCSD/OCSD Flows	0.15	0.21	0.64	1.1	1.5
Projected FWD Flows	0.064	0.085	0.25	0.39	0.79
Total Combined Flows	**0.59**	**0.96**	**3.1**	**5.0**	**7.8**

(a) Equalized flow. The RRCSD Treatment Plant Master Plan indicates that Peak Day flows through the WWTP can be equalized to 5.0 mgd with use of existing Emergency Storage Pond. If 0.4 MG EQ basin is also available, flows can be equalized to 4.2 mgd. RRCSD Treatment Plant Master Plan indicates that un-equalized maximum 7-day flow is 3.65 mgd and un-equalized sustained peak flows are 5.2 mgd. These findings may need additional study in light of the recent (January 2026) spill event.

Table 2-19. Proposed Design BOD and TSS Loads for West County Agencies

Scenario	BOD Loads, lb/day		TSS Loads, lb/day	
	Average Annual	Maximum 30-day	Average Annual	Maximum 30-day
Projected RRCSD Loads	1,310	2,620	1,310	2,620
Projected GCSD/OCSD Loads	470	680	420	620
Projected FWD Loads	170	270	160	250
Total Combined Loads	**1,950**	**3,570**	**1,890**	**3,490**