TOWN OF WINDSOR

Recycled Water Storage & Use Study

Brelje & Race CONSULTING CIVIL ENGINEERS

WOODARD &CURRAN

October 2020

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1. INTRODUCTION

The Town of Windsor through the Windsor Water District (Town) operates the Windsor Water District Water Reclamation Facility (WRF). The WRF provides treatment of the Town's wastewater to meet Title 22 disinfected tertiary recycled water standards. In 2001, the Town adopted a Water Reclamation Master Plan (Master Plan) establishing a plan for wastewater treatment, storage, and reuse to serve the Town through projected 2020 General Plan build-out conditions. The Master Plan memorialized the Town's recycled water use priorities as the following:

- Priority 1: Urban Reuse within the Town limits or sphere of influence
- Priority 2: Agricultural reuse outside of Windsor utilizing both the Town's distribution system and the Geysers Pipeline
- Priority 3: Reuse at the Geysers
- Priority 4: Discharge to Mark West Creek

Consistent with these priorities, the Town has strived to maximize recycled water use to offset the Town's potable water demand while also establishing itself as a regional recycled water provider serving agricultural users in Sonoma County through its storage and distribution facilities. Additionally, the Town has provided recycled water to the Geysers Steam Field and maintained the ability to seasonally discharge treated effluent (recycled water) to Mark West Creek as necessary.

The Town's National Pollutant Discharge Elimination System (NPDES) permit limits the WRF treated effluent discharge to Mark West Creek by imposing seasonal discharge prohibitions (consistent with the Basin Plan), instantaneous flow limits (typically 10% of natural creek flow), and annual phosphorus load limits stepping downward to zero by October 1, 2022. The Town has undertaken this study to determine how to maximize its recycled water resources in order to significantly reduce future effluent discharges to Mark West Creek. As part of this effort the Town has revisited its priorities and reaffirmed the previous prioritization of use of its recycled water while also establishing the following goals for the recycled water program:

- Maximize recycled water use
- Minimize discharge to Mark West Creek
- Pursue reliable/adaptable disposal options
- Maintain permit compliance
- Demonstrate fiscal responsibility
- Develop regional partnerships as appropriate

This Recycled Water Storage and Use Study (Study) evaluates the Town's existing recycled water system and defines a path forward based upon these goals. The Study timeline is to 2040, consistent with the planning horizon of the Town's General Plan.

2. RECYCLED WATER BASELINE SUMMARY

This section describes the Town's existing facilities to treat, store and distribute recycled water.

2.1 Existing Water Reclamation Facility

The WRF provides treatment and disinfection to produce disinfected tertiary recycled water. The treatment processes at the WRF include:

- Headworks with influent screening and grit removal
- Aeration basins using the Biolac® extended aeration process
- Secondary clarifiers
- Advanced Water Treatment (AWT) Facilities including flocculation tanks, tertiary clarification, and sand filtration
- Ultraviolet (UV) disinfection

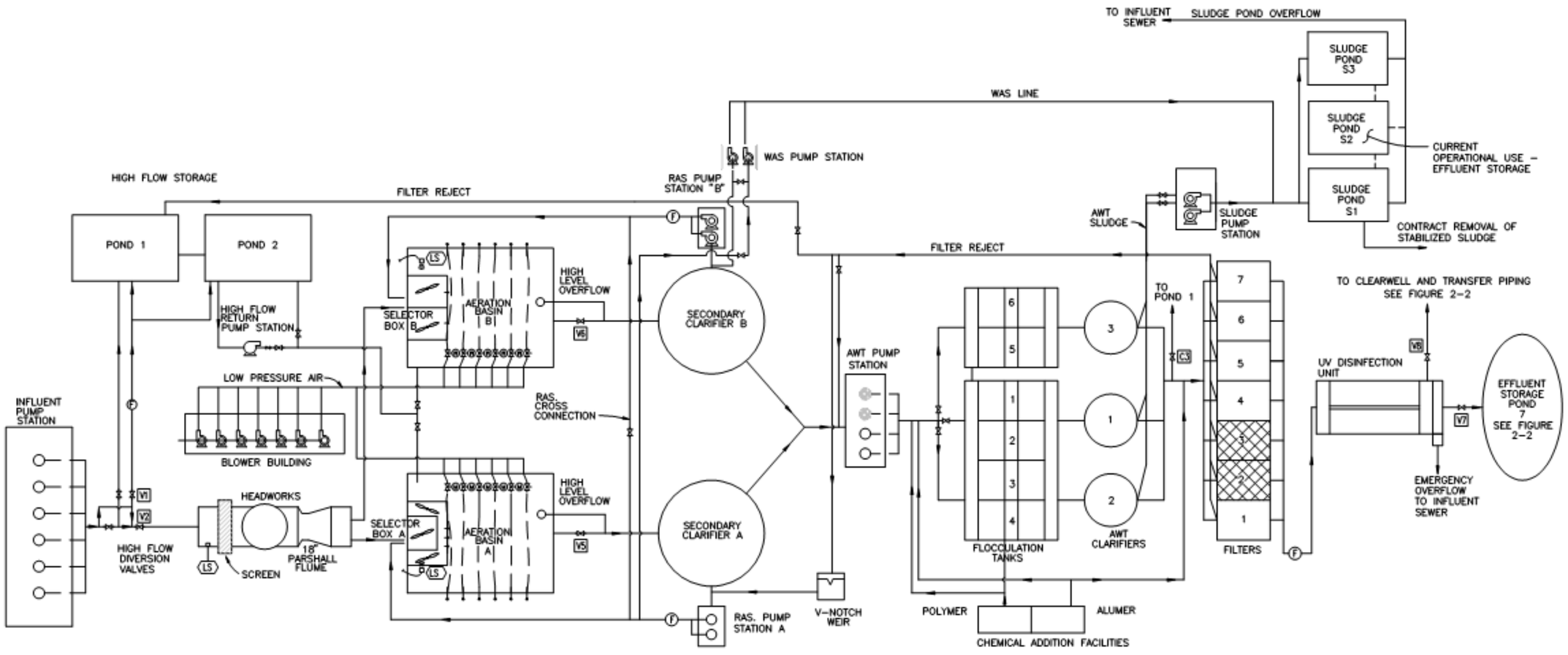
According to the current NPDES permit, the WRF design capacity for average dry weather flow (ADWF) is 2.25 MGD and the peak week capacity is 7.2 MGD. However, the current permitted ADWF capacity is limited to 1.9 MGD based on the current reclamation storage capacity.

During wet weather events, excess flow is diverted to the High Flow Equalization Ponds 1 and 2, which is then pumped from the ponds to the Biolac® basins when flows to the facility recede and there is available capacity to treat diverted flow. Figure 2-1 provides a schematic of the flow path.

Treated effluent (recycled water) is either pumped to the Geysers Steam Field or to effluent storage ponds where it is either distributed for beneficial use or discharged to Mark West Creek. Discharge to Mark West Creek is permitted only between October 1 and May 14. Between October 1 through October 31 and May 1 through May 14, the discharge may not exceed one percent of the natural flow of the creek, and between November 1 and April 30 the discharge may not exceed ten percent of the natural flow.

As part of its Water Reclamation Facility Modernization Study (Hazen and Sawyer, 2019), the Town studied phosphorus removal alternatives including process changes to meet future net zero phosphorus loading limits. By optimizing current secondary biological unit processes, the Town determined that effluent phosphorus concentrations could be reduced to approximately 1.75 mg/L. To further reduce the phosphorus concentration, alternatives including chemical removal, enhanced biological phosphorus removal (EBPR) and ultrafiltration were evaluated. Ultrafiltration was the only process determined to be able to reduce the concentration to zero, but was determined to be infeasible due to high costs. Although the use of enhanced chemical treatment, which cannot achieve zero phosphorous would also require purchase of phosphorus offset credits, implementing chemical removal was determined to be the most economically viable option for the Town and was accepted by the North Coast Regional Water Quality Control Board (RWQCB). Testing of the chemical phosphorus removal at the WRF in 2015 resulted in average effluent phosphorus concentration of 1 mg/L.

Figure 2-1: Windsor WRF Process Flow Diagram



NOTE

1. DRAIN PIPELINES ARE NOT SHOWN.

2.2 Existing Recycled Water Storage, Distribution & Use Facilities

Figure 2-2 and Figure 2-3 provide an overview of the Town's existing reclamation facilities, storage ponds and use areas.

Figure 2-2: Windsor Recycled Water Storage Schematic

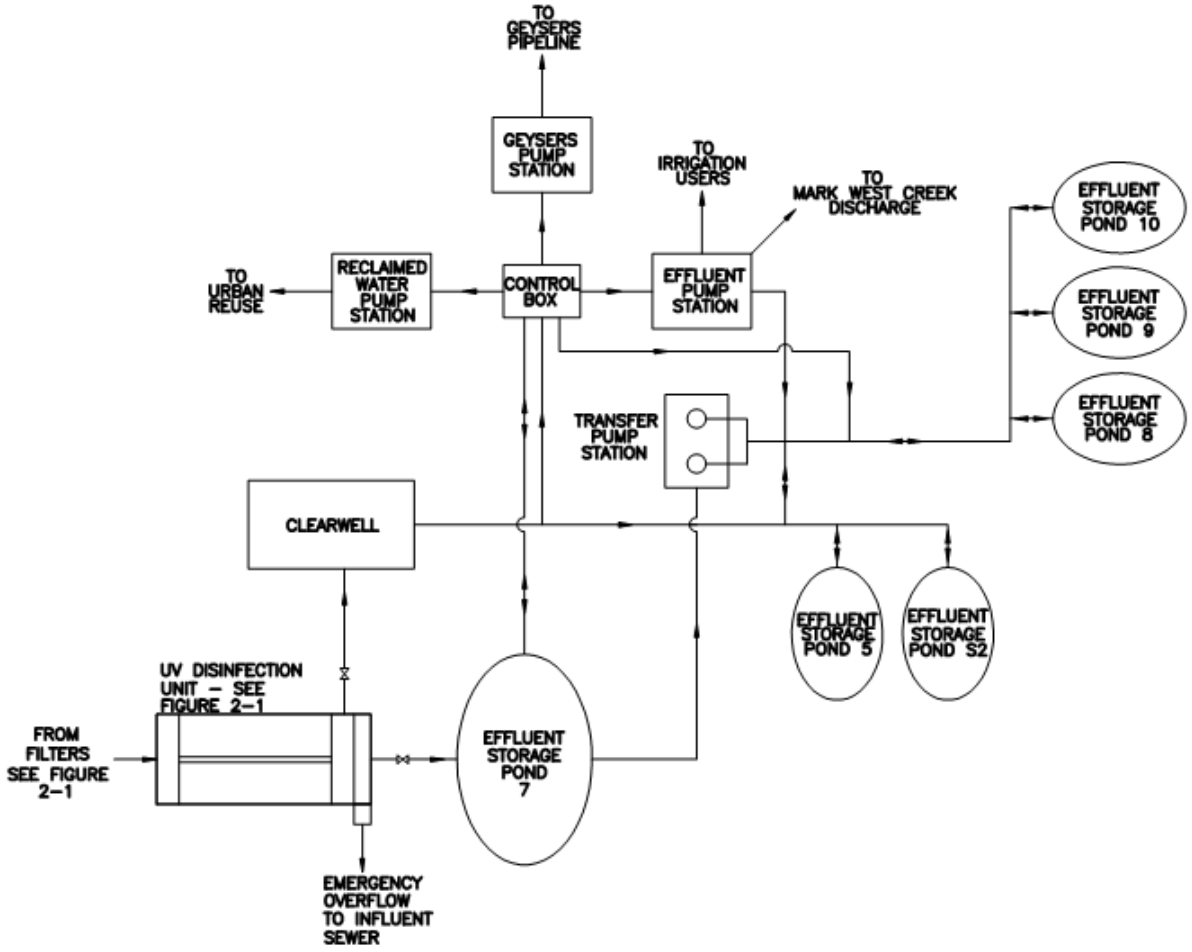
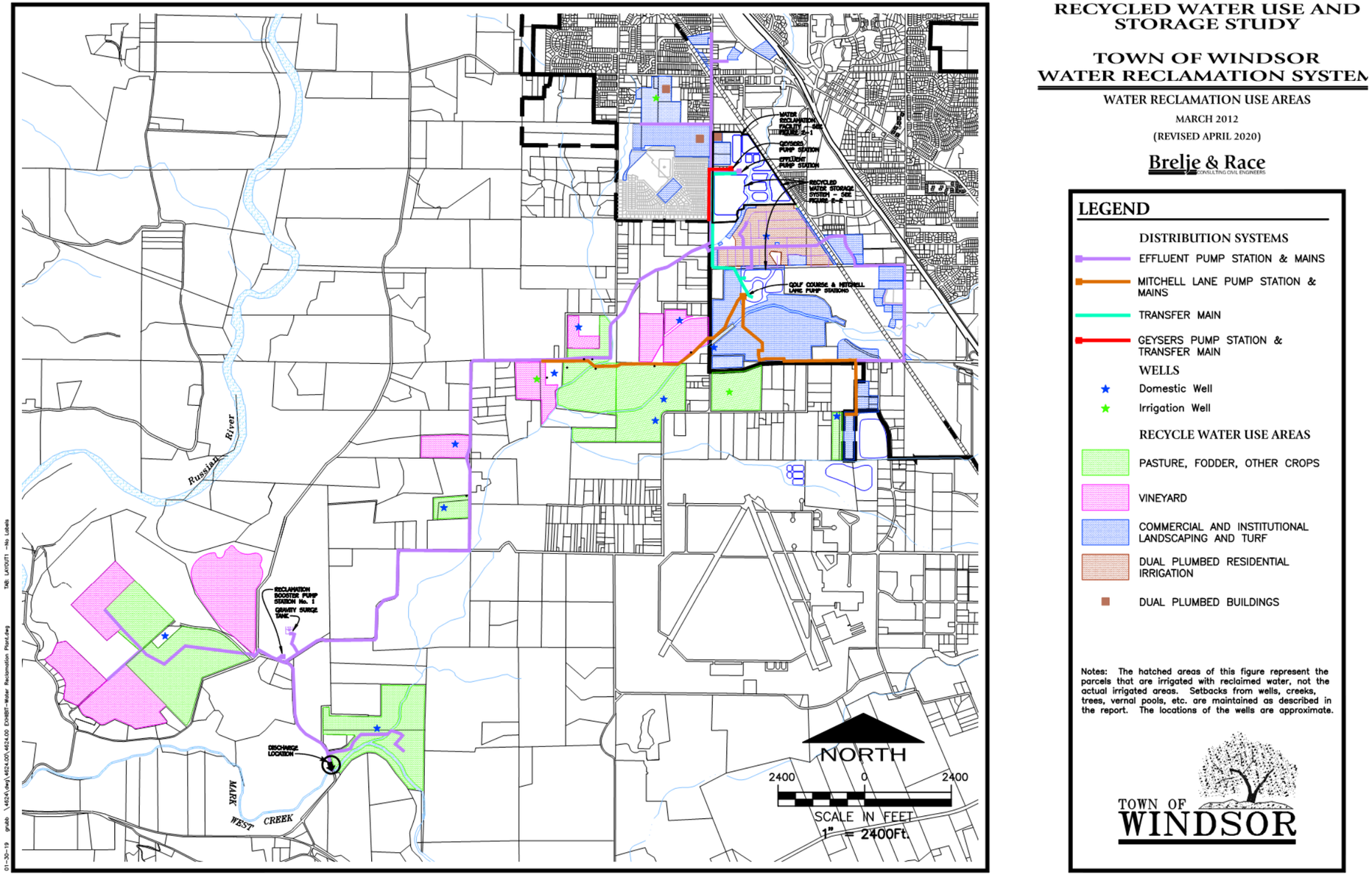


Figure 2-3: Windsor Recycled Water Reclamation Use Areas



RECYCLED WATER USE AND STORAGE STUDY

TOWN OF WINDSOR WATER RECLAMATION SYSTEM

WATER RECLAMATION USE AREAS

MARCH 2012

(REVISED APRIL 2020)

Brelje & Race CONSULTING CIVIL ENGINEERS

LEGEND

DISTRIBUTION SYSTEMS

- EFFLUENT PUMP STATION & MAINS
- MITCHELL LANE PUMP STATION & MAINS
- TRANSFER MAIN
- GEYSERS PUMP STATION & TRANSFER MAIN

WELLS

- Domestic Well
- Irrigation Well

RECYCLE WATER USE AREAS

- PASTURE, FODDER, OTHER CROPS
- VINEYARD
- COMMERCIAL AND INSTITUTIONAL LANDSCAPING AND TURF
- DUAL PLUMBED RESIDENTIAL IRRIGATION
- DUAL PLUMBED BUILDINGS

Notes: The hatched areas of this figure represent the parcels that are irrigated with reclaimed water, not the actual irrigated areas. Setbacks from wells, creeks, trees, vernal pools, etc. are maintained as described in the report. The locations of the wells are approximate.

TOWN OF WINDSOR

2.2.1 Effluent Storage

The Town currently has six effluent storage ponds: S2, 5, 7, 8, 9 and 10. Ponds S2, 5 and 7 are located in the south portion of the Town's WRF site. Ponds 8, 9 and 10 are located north of the Windsor Golf Course and south of Mitchell Lane. As documented in the Modernization Study, the total volume of these ponds is 143.7 million gallons (MG). The storage capacities of the individual ponds are presented in Table 2-1.

Table 2-1: Treated Effluent Storage Pond Capacity

Pond	Normal Storage Capacity (MG)
S2[1]	6.9
5	14.4
7	78.5
8	12.0
9	15.1
10	16.8
Total	143.7

[1]Pond S2 was originally built to hold sludge but has been repurposed as an effluent storage pond.

The storage ponds are operated on an annual cycle tied to the water year. From October 1 to May 14, the ponds are filled. Discharge to Mark West Creek may also occur during this period, as necessary to avoid over-filling the ponds and reserve storage capacity for potential late season rain events. From April to October, recycled water is conveyed to urban and agricultural irrigation users, and the ponds are generally drawn down to minimum levels by October 1. The standard storage curve that the Town uses to operate their storage facilities is shown in Figure 2-4 along with total effluent storage for the period of January 1, 2017 to October 9, 2019. Pond specific storage data for this same period is shown in Figure 2-5.

The storage data shows that Ponds S2, 5, 9, and 10 are operated so they are completely emptied prior to the start of the rainy season. However, Ponds 7 and 8 are operated so pond levels fluctuate but are never completely empty at any point during the year. Based on current operations that implement the standard storage curve shown in Figure 2-4, an aggregate of approximately 25 MG of effluent is stored in Ponds 7 and 8 at all times. For the purposes of this study, 25 MG is considered the existing pond dead storage. Therefore, the effective total storage capacity is 118.7 MG.

Figure 2-4: Historical Total Effluent Storage Data (January 2017 to October 2019)

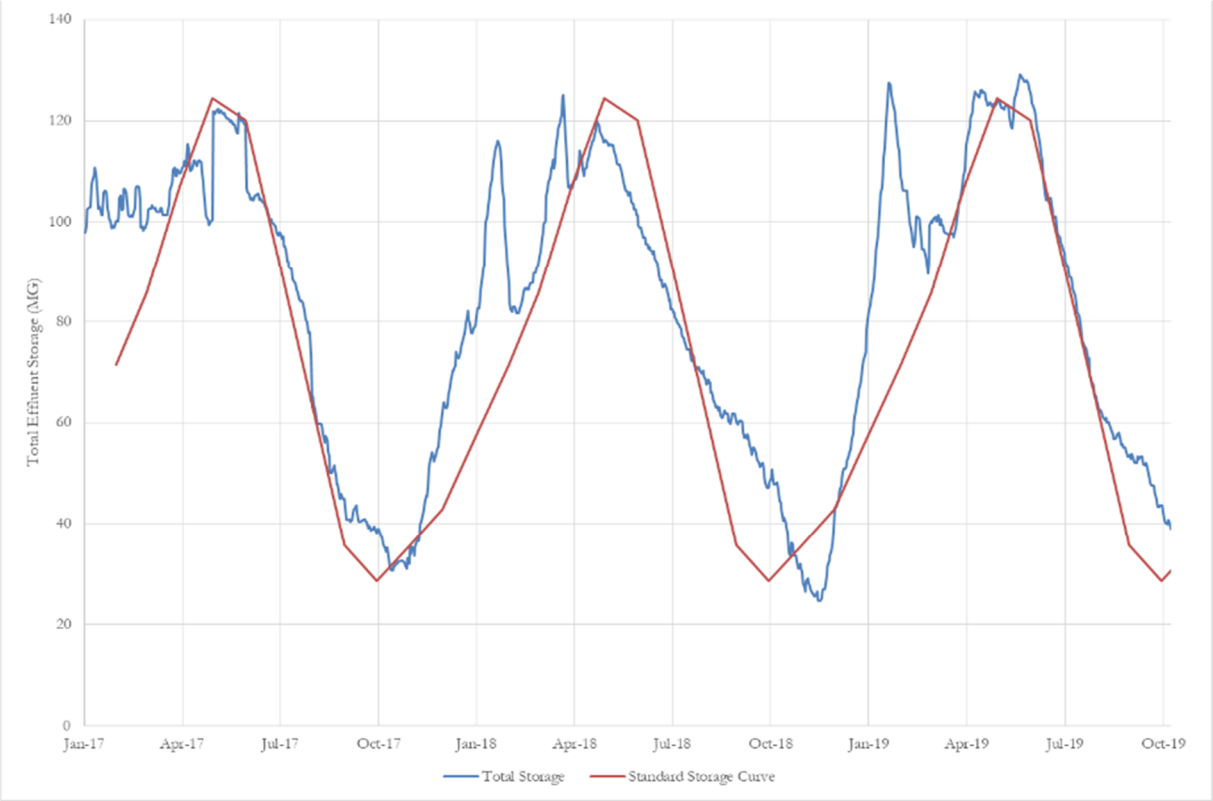
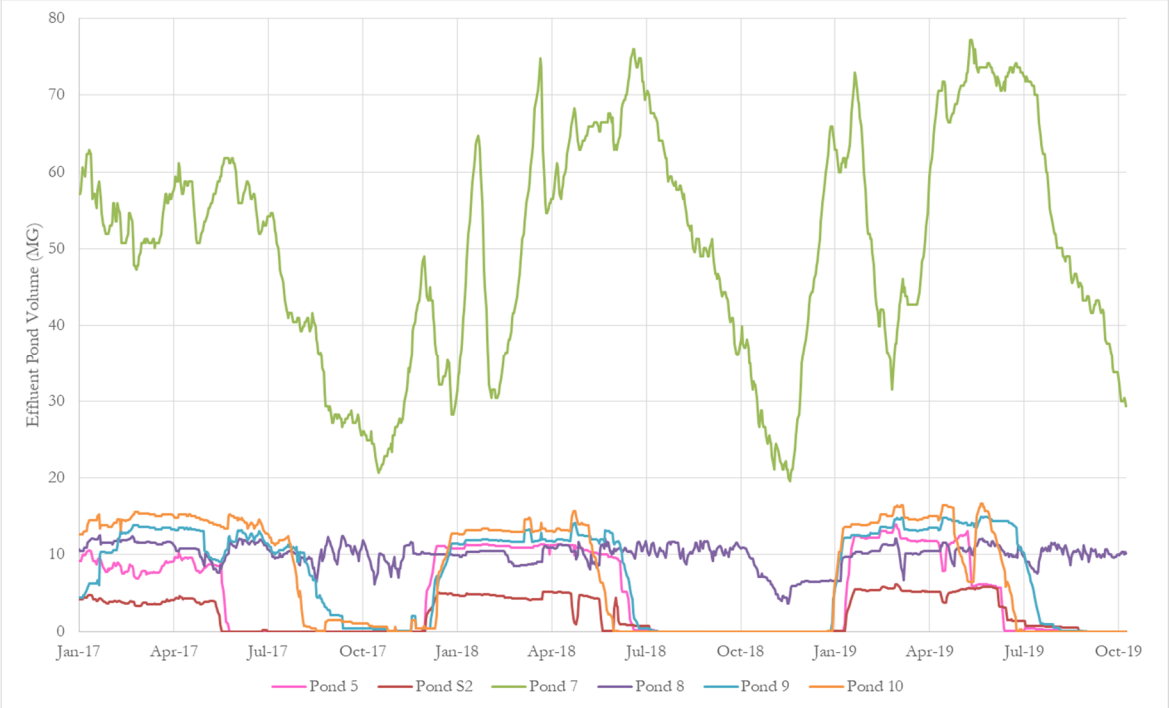


Figure 2-5: Pond Specific Effluent Storage Data (January 2017 to October 2019)



2.2.2 Effluent Distribution

Recycled water is conveyed from the storage ponds through the Effluent Pump Station and the Geysers Pump Station. The Effluent Pump Station discharges to a 20-inch diameter pipeline that runs southwest from the WRF towards Mark West Creek with smaller branches running to the north and east. The Effluent Pump Station sends water from the WRF to urban and agricultural recycled water customers, and during the discharge season, it also conveys flows to discharge to Mark West Creek. The Geysers Pump Station, which is owned by the Town and operated by the City of Santa Rosa (City), sends flows through the City's Geysers Pipeline to the Geysers Steam Field. Table 2-2 and Table 2-3 present the pumping capacity at the two pump stations.

Table 2-2: Effluent Pump Station Capacity

Parameter	Design Criteria
Number of Pumps	4
Capacity of Pumps 1 and 2	500 GPM
Capacity of Pump 3	1,100 GPM
Capacity of Pump 4	2,500 GPM
Pump Station Design Flow	4,600 GPM or 6.6 MGD

Source: Town of Windsor (2002)

Table 2-3: Geysers Pump Station Capacity

Parameter	Design Criteria
Number of Pumps	4 (3 duty + 1 standby)
Capacity of Pumps (each)	0.56 MGD
Pump Station Design Flow	1.67 MGD

Source: Modernization Study (2019)

2.2.3 Existing Use

The Town currently reuses approximately two-thirds of its tertiary treated wastewater, distributing approximately half of that amount to the Geysers Steam Field for energy production with the remainder used to meet urban and agricultural demands, including the Windsor Golf Course. Table 2-4 summarizes recycled water use and Mark West Creek disposal from recent years.

Table 2-4: Annual Recycled Water Use and Disposal

Use	Volume (MG)[1]
Urban	132
Agricultural	68
Geysers	208
Mark West Creek Disposal	155

Note:

1. Data from 2014-2017 (Modernization Study, 2019)

For urban and agricultural use, irrigation potential is discussed in terms of equivalent acres, which is defined as an acre of land that used 30 inches of irrigation water in an average year. As illustrated in Table 2-5, recent recycled water demand from the Town's urban and agricultural customers has been less than the customers' potential based on estimated equivalent acres.

Table 2-5: Existing Urban and Agricultural Customers' Annual Demand

Use	Potential Demand[1]		Recent Use[2]
	Equivalent acres	Volume (MG)	Volume (MG)
Urban	212	172	132
Agriculture[3]	289	235	68
Total	**501**	**407**	**200**

Notes:

1. Data from 2019 (Water Reclamation System Engineering Report, 2019)
2. Data from 2014-2017 (Modernization Study, 2019)
3. Approximately 109 equivalent acres of the Agriculture land is Town-owned property.

Urban Use

Urban use has accounted for roughly a third of the recycled water use at an average of 132 MG/yr between 2014 and 2017. Recycled water is used to meet seasonal irrigation demands at Windsor Golf Course, high school athletic fields, parks, and commercial, institutional, and residential landscaping. Together these users provide 212 equivalent acres of irrigation. Windsor Golf Course is the major urban user, accounting for over half of the recycled water use with its 108 equivalent acres of irrigation.

Consistent with the number one priority of the 2001 Master Plan, serving urban users with the Town limits of sphere of influence, the Town is among a handful of California communities that have pioneered the delivery of recycled water to residential customers for irrigation. Lawns within the Vintage Greens development account for 25 equivalent acres of irrigation.

In addition to landscape irrigation, the Windsor High School and Windsor Fire Protection District Station No. 2 also use recycled water for toilet flushing. This recycled water is served by the WRF's No. 3 Water System which is effluent sent directly from the treatment facility and additionally disinfected with hypochlorite.

Agricultural Use

The major agricultural users are Santa Rosa Junior College Shone Farm which provides 94 equivalent acres of irrigation with its pasture, vineyard and orchards, and Gallo's Monte Bianco vineyard, which provides 11 equivalent acres. In addition to these two major customers, the recycled water system serves several other vineyards and pasturelands, which comprise another 95 equivalent acres of irrigation, and 89 equivalent acres of Town-owned pastureland. The Town-owned pastureland properties are listed in Table 2-6. The Town-owned land is irrigated as needed to avoid discharge. Together the existing agricultural use sites comprise 289 equivalent acres of irrigation.

Table 2-6: Town-Owned Pastureland

User Name	Equivalent Acres
Hudson Field D	34
Hudson Field E	7
Hudson Field F	8
Hudson Field G	6
Laguens 1	3.7
Laguens 2	13
Laguens 3	17
Total	**89**

Though the total non-discretionary agricultural equivalent acres of irrigation are comparable to the urban equivalent acreage, average agricultural recycled water use from 2014 to 2017 was 68 MG/yr, which is only about half of the urban recycled water use. The demand for and the amount of agricultural irrigation is highly dependent on weather, and agricultural fields, particularly Town-owned pasture, provide the only recycled water disposal during wet years. For example, in 2019 the Town irrigated 74.25 MG of recycled water on Town-owned pasture, as a result reducing the volume of effluent to be discharged and preventing the potential of an emergency discharge outside of the permitted discharge season. The annual volume required for irrigation on Town-owned properties is determined by the water balance model, discussed in Section 3.

Geysers Steam Field

The Town provides recycled water to the Geysers Steam Field project according to the terms of an agreement with the City of Santa Rosa that is effective until December 31, 2037. Currently the WRF delivers 0.7 MGD from October to May and 0.2 MGD from June to September, for an annual average of 0.53 MGD or 193 MG/yr. Under the existing agreement, with one-year advance written notice, the Town may increase its deliveries up to 0.92 MGD from October to May and 0.42 MGD from June to September, for an annual average of 0.75 MGD or 274 MG/yr. With two-year advanced written notice, the Town may increase its deliveries up to 1.52 MGD from October to May and 0.70 MGD June to September, for an annual average of 1.25 MGD or 456 MG/yr.

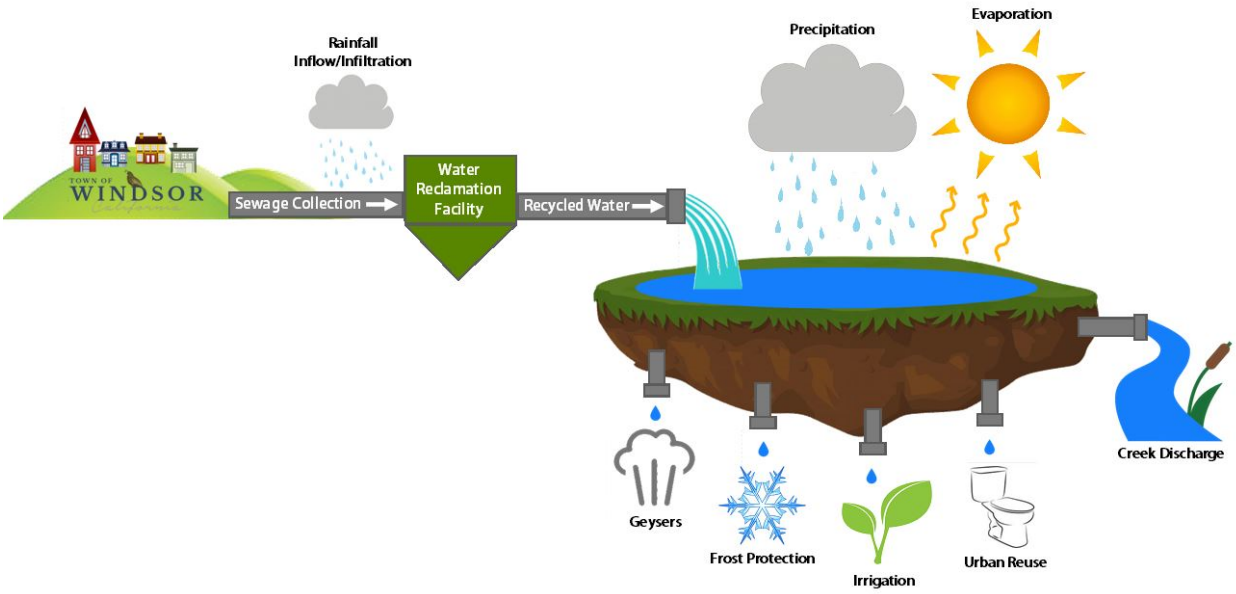
3. WATER BALANCE MODEL BACKGROUND

In 2015, the Town's existing water balance model (model) was modified to meet NPDES permit goals. The revised water balance used in the Modernization Study analyzes the impact of operational changes on volumes of discharge to Mark West Creek (MWC). For this Recycled Water Use and Storage Study, the modified model was used to estimate the required volumes of storage to reduce or eliminate surface water discharge, the impact of increasing discharge to the Geysers and the area of irrigation land necessary to dispose of stored recycled water, including reliance on Town-owned properties.

The model considers the treatment facility average dry weather flow (ADWF), weather condition, storage capacity, and irrigation factors to estimate the required MWC discharge volume on a monthly time step.

For each month period, the total influent to the treatment facility is calculated by adding the estimated collection system inflow and infiltration to the ADWF. The net inflow to storage is then calculated by adding the direct rainfall into storage and subtracting pond evaporation. To calculate the remaining total storage volume at the end of the month, the Geysers disposal, irrigation demands, and creek discharge is subtracted from the net inflow and then added to the remaining storage from the previous month. The volume of creek discharge is determined by a target storage curve that mimics the operational decisions that may be made by the Town to ensure that there is sufficient storage throughout the winter months. See figure 3-1 for a flow diagram of the model.

Figure 3-1: Water Balance Model Flow Diagram



The factors in the model that are weather condition dependent (dry, average, and wet) include irrigation demand, collection system inflow and infiltration, rainfall, MWC flow and the consequential maximum allowable discharge rates. Inflow and infiltration are calculated based on a percentage of the ADWF. Table 3-1 summarizes the weather dependent factors for three weather conditions, dry, average and wet years. These weather conditions were defined when the model was originally developed using monthly precipitation data from 1970 to 1996. The dry and wet year condition was determined based on a 10 year recurrence interval.

Table 3-1: Weather Dependent Factors

	Weather Condition		
	Dry	Average	Wet
Irrigation Demand per Eq. Acre (inches per year)	36.7	30.0	23.6
Total Collection System Inflow and Infiltration for 2040 flows (MG per year)	67.8	211.6	347.3
Rainfall (inches per year)	21.25	38.98	61.27

All Geysers and irrigation demands are met prior to discharging to MWC. The model output is based on the assumption that irrigation customers are utilizing their full potential irrigation demand. The volume discharged to MWC is determined by the volume above the target storage curve to the maximum of the permitted discharge volume. Any additional volume is then stored. Historically, the Town has used the standard storage curve, as defined in Table 3-2, to operate and manage the existing storage. The standard storage curve was developed to minimize risk of filling the storage ponds too early in the season to protect against high flows during a potential late winter storm. This was accomplished by encouraging discharge to MWC early in the season and retaining a 13 percent storage buffer. Recently the Town's goals for the recycled water program of maximizing recycled water use, reducing discharge to MWC, and maintaining permit compliance led to redevelop the standard storage curve. To more successfully achieve these priorities, a revised storage curve was developed and defined as presented in Table 3-2. The revised storage curve discourages early season discharge to MWC and reduces the storage buffer to 10 percent. For the analysis in this report, the "Revised Storage Curve" was used. It should be noted that the storage curve is defined in the model as a percentage of the total storage, therefore in the model runs for scenarios including additional storage volumes, the storage curve scales based on the percentages.

Table 3-2: Storage Curve

Month	Standard Storage Curve (% of total storage)	Revised Storage Curve (% of total storage)	Standard Storage Curve Volumes for Existing Storage (MG)	Revised Storage Curve Volumes for Existing Storage (MG)
October	25%	15%	35.9	21.6
November	30%	35%	43.1	50.3
December	40%	60%	57.5	86.2
January	50%	75%	71.9	107.8
February	60%	90%	86.2	129.3
March	75%	90%	107.8	129.3
April	87%	90%	125.0	129.3
May	54%	85%	120.7	122.1
June	65%	60%	93.4	86.2
July	45%	40%	64.7	57.5
August	25%	25%	35.9	35.9
September	20%	15%	28.7	21.6

4. RECYCLED WATER MANAGEMENT STRATEGY DEVELOPMENT AND ANALYSIS

4.1 Flow Projections and Baseline Conditions

Strategies developed and analyzed for this Study use population growth and wastewater flow projections consistent with the Town's 2040 General Plan and Wastewater Treatment Modernization Study. These projections, shown in Table 4-1, have an average annual growth rate of 1.4%, which is within the Town's Growth Control Ordinance limit of 1.5%. Compared to the average annual growth rates of the last two decades, these projections may be higher than actual growth. Since 2000, the annual growth rate has averaged 1.2%, and in the last decade it has averaged just 0.7%.

Table 4-1: Growth and Wastewater Flow Projections

Year	Population Estimate	ADWF (MGD)	Annual Average Flow (MGD)
2020	28,900	1.4	2.4
2021	29,300	1.4	2.4
2022	29,700	1.5	2.5
2023	30,100	1.5	2.5
2024	30,500	1.5	2.5
2025	30,900	1.5	2.6
2026	31,400	1.5	2.6
2027	31,800	1.6	2.6
2028	32,200	1.6	2.7
2029	32,700	1.6	2.7
2030	33,100	1.6	2.7
2031	33,600	1.6	2.8
2032	34,100	1.7	2.8
2033	34,500	1.7	2.9
2034	35,000	1.7	2.9
2035	35,500	1.7	2.9
2036	36,000	1.8	3.0
2037	36,500	1.8	3.0
2038	37,000	1.8	3.1
2039	37,500	1.8	3.1
2040	38,000	1.9	3.1

Table 4-2 presents model estimates of recycled water deliveries and creek discharge under dry, average, and wet year types given the current, projected 2030 and projected 2040 wastewater flows and the Town's existing recycled water storage and Geysers discharge program (baseline conditions). The current and projected 2040 estimates serve as bookends for anticipated conditions, with the projected 2030 estimate offering an additional data point to address the uncertainty in future growth. If growth continues at a rate similar to the past ten years, the projected 2030 flows may be more representative of future conditions within this Study's planning horizon.

Model Results:

It is important to note, the model assumes that the Town is maximizing use of its storage, following the revised storage curve presented in Chapter 3. In the future, this will require adding recycled water demands to the system. Without additional recycled water use by new customers or increased irrigation to Town-owned properties to divert the water being stored, the creek discharge volumes would be greater than estimated below. The model also assumes that, in dry years, the Town would reduce its Geysers discharge to 90% of the required annual amount. Per the Town's agreement with the City, if the Town meets at least 90% of the expected deliveries, penalties will not be assessed. The dry year reductions in Geysers discharge will minimize shortfalls in deliveries to irrigation customers.

Through this report, the following variables are included when presenting model results:

- Recycled Water Delivered: This is the amount of recycled water that theoretically would be delivered assuming storage is maximized to reduce creek discharge and that the ponds are at the minimum level by the end of the water year (following the revised storage curve).

- Additional Recycled Water Demand Required: This is a measure of whether the baseline system has sufficient irrigation demand to use the stored water. It is the difference between recycled water delivered and the baseline system's existing 501 equivalent acres. When a numeric value is shown for this variable, it indicates that more recycled water is stored than can be used within the baseline system. An entry of "Not Applicable" (n/a) for this variable indicates that the full potential of the baseline system's demand is sufficient to divert the stored water. In practice, because customers may choose not to use recycled water to meet their full irrigation needs, the Town may need to secure additional recycled water users even when the model results show n/a. As an illustration, between 2014 and 2017, an average of 247 equivalent acres (or 200 MG) of recycled water were used compared to the potential 501 equivalent acres (or 408 MG).

- Unmet Recycled Water Commitment: This is a measure of whether the full potential of the baseline customers' demands can be fulfilled. The baseline system includes land that is irrigated by customers as well as land that is irrigated at the Town's discretion. The unmet recycled water commitment is the difference between recycled water delivered and the 392 equivalent acres of non-discretionary customer demand.

- Creek Discharge: This is the total volume of water that would be discharged to Mark West Creek over the water year. Creek discharge occurs when the WRF effluent exceeds the combination of irrigation and Geysers demand and storage volume remaining as defined by the revised storage curve. The mismatch between the discharge season and the irrigation season may result in discharges in years when there is also unmet customer demand.

- Emergency Discharge: This is the volume of creek discharge that exceeds the allowed percentages or that occur outside of the permitted discharge season.

Table 4-2: Model Results Given Baseline Recycled Water System

Year	2020			2030			2040		
ADWF	1.4 MGD			1.6 MGD			1.9 MGD		
Storage	143.7 MG			143.7 MG			143.7 MG		
Geysers Discharge[1]	0.53 MGD			0.53 MGD			0.53 MGD		
Weather Condition	Dry	Avg	Wet	Dry	Avg	Wet	Dry	Avg	Wet
Recycled Water Delivered (Equivalent Acres)	317	395	427	390	459	492	444	516	550
Additional Recycled Water Demand Required[2] (Equivalent Acres)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	15	49
Unmet Recycled Water Commitment[3] (Equivalent Acres)	75	n/a	n/a	2	n/a	n/a	n/a	n/a	n/a
Creek Discharge (MG)	0	112	285	39	179	370	82	252	459
Emergency Discharge (MG)	0	0	5	0	0	15	0	0	26

Notes:

1. To minimize shortfalls for irrigation customers, during dry years, the Geysers discharge is assumed to be 90% of the required annual amount.
2. Recycled water delivered represents the amount of recycled water that theoretically would be delivered assuming storage is maximized to reduce creek discharge and that the ponds are at the minimum level by the end of the water year (following the revised storage curve). The additional demand required is the difference between recycled water delivered and the baseline system's existing 501 equivalent acres.
3. Baseline system includes land that is irrigated at the Town's discretion. The unmet recycled water commitment is the difference between recycled water deliveries and the 392 equivalent acres of non-discretionary customer demand.

As indicated by the model results, given current flows and baseline conditions, during dry years the Town would be unable to meet the full potential of customer demand (even with the 90% reduction in Geysers discharge). As wastewater flows increase, the dry year shortfalls decrease, but creek discharges and correspondingly phosphorus loading increase and begin to occur even in dry years under current conditions. Emergency discharges, which are discharges in excess of the allowed percentages or that occur outside of the permitted discharge season, also increase as wastewater flows increase.

4.2 Recycled Water Management Strategies

Due to the Town's NPDES permit annual phosphorus load limits stepping downward to zero by October 1, 2022, strategies to comply with this limit must be implemented. Investing in phosphorus removal credits is a viable method to achieve net zero phosphorus discharge and has been accepted by the North Coast RWQCB. However, as a long-term solution, pursuing phosphorus credits alone is incompatible with the Town's goal of maximizing recycled water use and reducing discharge to Mark West Creek. Additionally, relying on purchasing phosphorus credits may become cost prohibitive. The demand for phosphorus credits and correspondingly their cost are anticipated to increase with increasing regulation on phosphorus discharges. As such, through this Study, the Town considered the following strategies to enhance its recycled water program:

- Strategy 1: Increase Geysers Capacity
- Strategy 2: Interagency Storage
- Strategy 3: Increase Town Storage

These methods also address permit non-compliance from emergency discharges, which the model suggests would occur in a wet year under current conditions.

Recycled water management scenarios were then developed based on feasible implementation of these strategies and were then further analyzed to develop a future road map for the Town. Feasibility was analyzed based on permit compliance, reliability and adaptability, maximizing irrigation and reducing creek discharge, regional collaboration, and fiscal impact.

4.2.1 Strategy 1: Increase Geysers Capacity

The Town's agreement with the City of Santa Rosa for conveyance of recycled water to the Geysers Steam Field includes the delivery schedule outlined in Table 4-3. Once the Town operates under the next tier, the annual delivery commitment cannot be reduced. The Town is required to deliver a minimum of 90 percent of the annual delivery commitment and if the Town were unable to deliver this minimum volume, penalties would be levied. Additionally, the agreement includes a payment schedule, which escalates annually regardless of the volume of water delivered by the Town.

Table 4-3: Geysers Delivery Schedule

Step	Tier	Annual Delivery (MG)	Annual Average Flow (MGD)
Initial (Current)	1	193	0.53
Future	2	274	0.75
Maximum	3	456	1.25

Increasing Geysers discharge to Tier 2 would eliminate the emergency discharges under the current wastewater flows of 1.4 MGD. Though as the wastewater flows increase, wet year emergency discharges would reoccur. Table 4-4 summarizes model results assuming an increase to Tier 2.

Table 4-4: Model Results of Increasing Geysers Discharge to Tier 2

Year	2020			2040		
ADWF	1.4 MGD			1.9 MGD		
Storage	143.7 MG			143.7 MG		
Geysers Discharge[1]	0.75 MGD			0.75 MGD		
Weather Condition	Dry	Avg	Wet	Dry	Avg	Wet
Recycled Water Delivered (Equivalent Acres)	264	343	370	400	471	505
Additional Recycled Water Demand Required[2] (Equivalent Acres)	n/a	n/a	n/a	n/a	n/a	4
Unmet Recycled Water Commitment[3] (Equivalent Acres)	128	49	22	n/a	n/a	n/a
Creek Discharge (MG)	0	74	246	39	208	414
Emergency Discharge (MG)	0	0	0	0	0	19

Notes:

1. To minimize shortfalls for irrigation customers, during dry years, the Geysers discharge is assumed to be 90% of the required annual amount.
2. Recycled water delivered represents the amount of recycled water that theoretically would be delivered assuming storage is maximized to reduce creek discharge and that the ponds are at the minimum level by the end of the water

year (following the revised storage curve). The additional demand required is the difference between recycled water delivered and the baseline system's existing 501 equivalent acres.

3. Baseline system includes land that is irrigated at the Town's discretion. The unmet recycled water commitment is the difference between recycled water deliveries and the 392 equivalent acres of non-discretionary customer demand.

Increasing Geysers discharge to Tier 3 would eliminate emergency discharges for the full range of wastewater flows anticipated throughout the Study's planning horizon. It would also eliminate average year discharges for a portion of the planning horizon. Table 4-5 summarizes model results assuming an increase to Tier 3.

Table 4-5: Model Results of Increasing Geysers Discharge to Tier 3

Year	2020			2040		
ADWF	**1.4 MGD**			**1.9 MGD**		
Storage	143.7 MG			143.7 MG		
Geysers Discharge[1]	1.25 MGD			1.25 MGD		
Weather Condition	Dry	Avg	Wet	Dry	Avg	Wet
Recycled Water Delivered (Equivalent Acres)	107	230	260	300	379	422
Additional Recycled Water Demand Required[2] (Equivalent Acres)	n/a	n/a	n/a	n/a	n/a	n/a
Unmet Recycled Water Commitment[3] (Equivalent Acres)	285	162	132	92	13	n/a
Creek Discharge (MG)	0	0	135	0	100	304
Emergency Discharge (MG)	0	0	0	0	0	0

Notes:

1. To minimize shortfalls for irrigation customers, during dry years, the Geysers discharge is assumed to be 90% of the required annual amount.
2. Recycled water delivered represents the amount of recycled water that theoretically would be delivered assuming storage is maximized to reduce creek discharge and that the ponds are at the minimum level by the end of the water year (following the Revised Storage Curve). The additional demand required is the difference between recycled water delivered and the baseline system's existing 501 equivalent acres.
3. Baseline system includes land that is irrigated at the Town's discretion. The unmet recycled water commitment is the difference between recycled water deliveries and the 392 equivalent acres of non-discretionary customer demand.

To fully eliminate average year discharges for the planning horizon, the Geysers discharge would need to increase to an annual average of 1.88 MGD, which exceeds both the Town and City's agreed upon delivery schedule and the Geysers Pump Station capacity. Table 4-6 summarizes model results assuming this increase.

Table 4-6: Model Results of Increasing Geysers Discharge to Eliminate Average Year Discharges

Year	2020			2040		
ADWF	1.4 MGD			1.9 MGD		
Storage	143.7 MG			143.7 MG		
Geysers Discharge[1]	1.88 MGD			1.88 MGD		
Weather Condition	Dry	Avg	Wet	Dry	Avg	Wet
Recycled Water Delivered (Equivalent Acres)	23	40	168	115	245	297
Additional Recycled Water Demand Required[2] (Equivalent Acres)	n/a	n/a	n/a	n/a	n/a	n/a
Unmet Recycled Water Commitment[3] (Equivalent Acres)	369	352	224	277	147	96
Creek Discharge (MG)	0	0	5	0	0	162
Emergency Discharge (MG)	0	0	0	0	0	0

Notes:

1. To minimize shortfalls for irrigation customers, during dry years, the Geysers discharge is assumed to be 90% of the required annual amount.
2. Recycled water delivered represents the amount of recycled water that theoretically would be delivered assuming storage is maximized to reduce creek discharge and that the ponds are at the minimum level by the end of the water year (following the Revised Storage Curve). The additional demand required is the difference between recycled water delivered and the baseline system's existing 501 equivalent acres.
3. Baseline system includes land that is irrigated at the Town's discretion. The unmet recycled water commitment is the difference between recycled water deliveries and the 392 equivalent acres of non-discretionary customer demand.

4.2.2 Strategy 2: Interagency Storage

The Town in conjunction with the City of Santa Rosa and Sonoma Water (formally known as the Sonoma County Water Agency) have evaluated joint use of recycled water infrastructure and storage ponds. The evaluation demonstrated that a joint storage program could provide additional storage for the Town's recycled water at the Airport-Larkfield-Wikiup Sanitation Zone's recycled water reservoirs. Additional interagency storage volume has not been determined; however, past mutual aid agreements with Sonoma Water have been based on 50 MG of storage available to the Town. For the purposes of this study, 50 MG will be used as the anticipated volume available to the Town utilizing the Interagency Storage option.

Taking advantage of the available interagency storage would eliminate the emergency discharges under the current wastewater flows of 1.4 MGD. The potential for wet year emergency discharges would reoccur as the wastewater flows increase. Table 4-7 summarizes the model results.

Table 4-7: Model Results of Utilizing Available Interagency Storage

Year	2020			2040		
ADWF	1.4 MGD			1.9 MGD		
Storage	193.7 MG			193.7 MG		
Geysers Discharge[1]	0.53 MGD			0.53 MGD		
Weather Condition	Dry	Avg	Wet	Dry	Avg	Wet
Recycled Water Delivered (Equivalent Acres)	339	443	496	480	551	625
Additional Recycled Water Demand Required[2] (Equivalent Acres)	n/a	n/a	n/a	n/a	50	124
Unmet Recycled Water Commitment[3] (Equivalent Acres)	53	n/a	n/a	n/a	n/a	n/a
Creek Discharge (MG)	0	80	258	49	225	428
Emergency Discharge (MG)	0	0	0	0	0	21

Notes:

1. To minimize shortfalls for irrigation customers, during dry years, the Geysers discharge is assumed to be 90% of the required annual amount.
2. Recycled water delivered represents the amount of recycled water that theoretically would be delivered assuming storage is maximized to reduce creek discharge and that the ponds are at the minimum level by the end of the water year (following the Revised Storage Curve). The additional demand required is the difference between recycled water delivered and the baseline system's existing 501 equivalent acres.
3. Baseline system includes land that is irrigated at the Town's discretion. The unmet recycled water commitment is the difference between recycled water deliveries and the 392 equivalent acres of non-discretionary customer demand.

The model estimates that even with utilizing 50 MG of interagency storage, the Town would still need to discharge to the creek in average years with the current ADWF, which suggests that interagency storage alone will not effectively address the Town's goal of reducing creek discharge. In addition, a Joint Use Program may also likely include provisions for the Town to accept water as part of a mutual aid agreement with Sonoma Water. This would also increase the need additional recycled water use by new customers or increased irrigation to Town-owned properties.

4.2.3 Strategy 3: Increase Town Storage

In the recent Modernization Study, the Town considered options to increase storage capacity through optimization of the existing storage ponds. As noted in that study, lateral expansion of the existing ponds would be difficult due to constraints of surrounding neighborhoods, creeks, and bordering railroad tracks. Furthermore, it would be difficult to maintain WRF operations while performing construction on the ponds. Those challenges aside, due to the sheer volume of storage required to eliminate creek discharges, physical modification of existing storage was determined to be an impractical means of meeting the goals of this Study. Optimization of existing storage was limited to redefining the storage curve as discussed in Chapter 3.

The model was used to estimate the volume of storage required to fully eliminate discharge in an average year and in a wet year, assuming no change to the existing Geysers discharge volume. The model estimates that with the Geysers discharge at the current Tier 1 deliveries, the Town would need a total of 490 MG of storage in an average year and 1,263 MG of storage in a wet year to eliminate discharge through 2040. For the Town to be able to dispose of the stored water under these conditions, the irrigation area would need to be increased by approximately two times the current area in an average year and four times the current area in a wet year. Securing storage and irrigation land required to fully eliminate discharges in an average year would be challenging. Securing enough storage and irrigation land to fully eliminate discharge in a wet year is neither feasible nor fiscally responsible considering a wet year only

occurs 10% of the time. Therefore storage options previously investigated were assumed to be the most feasible option for building future storage.

Alternatives for creating new storage were investigated as part of the 2001 Master Plan. The preferred alternative, known as the Eastside Road Storage Project, involved construction of a new 215 MG reservoir. Due to the cost of the project and environmental mitigations required, Town Council elected to move forward with connection to the Geysers pipeline and defer the Eastside Road Storage Project to a future, undetermined date.

Construction of a 215 MG recycled storage reservoir, similar to the previously proposed Eastside Road Reservoir would result in elimination of emergency discharges and average year discharges for current wastewater flows. However, under projected 2040 wastewater flows, both would reoccur. Table 4-8 summarizes the model results.

Table 4-8: Model Results of Implementing Eastside Road Storage

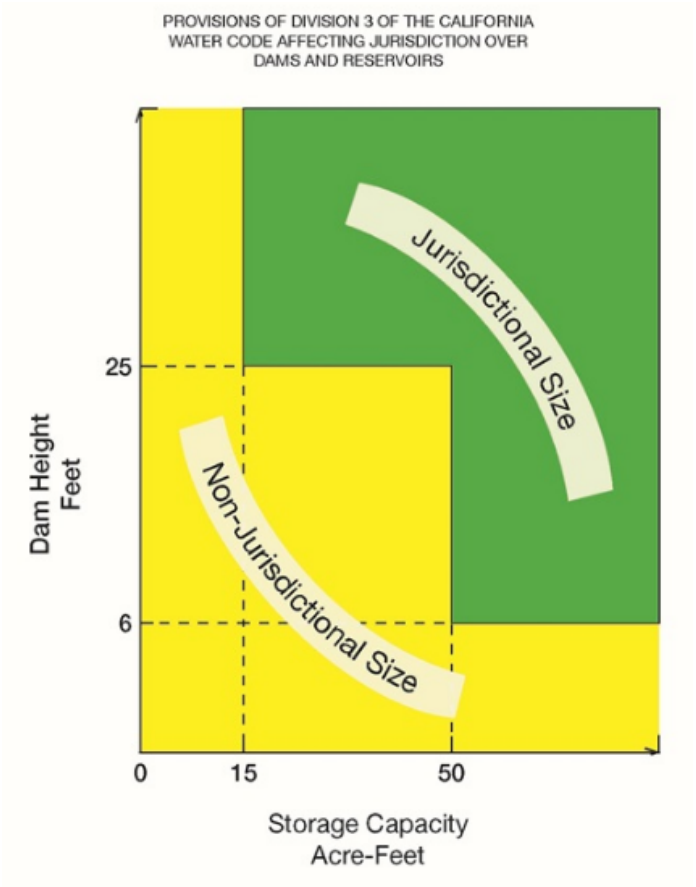
Year	2020			2040		
ADWF	**1.4 MGD**			**1.9 MGD**		
Storage	358.7 MG			358.7 MG		
Geysers Discharge[1]	0.53 MGD			0.53 MGD		
Weather Condition	Dry	Avg	Wet	Dry	Avg	Wet
Recycled Water Delivered (Equivalent Acres)	357	532	553	558	752	853
Additional Recycled Water Demand Required[2] (Equivalent Acres)	n/a	31	52	57	251	352
Unmet Recycled Water Commitment[3] (Equivalent Acres)	35	n/a	n/a	n/a	n/a	n/a
Creek Discharge (MG)	0	0	179	0	99	348
Emergency Discharge (MG)	0	0	0	0	0	6

Notes:

1. To minimize shortfalls for irrigation customers, during dry years, the Geysers discharge is assumed to be 90% of the required annual amount.
2. Recycled water delivered represents the amount of recycled water that theoretically would be delivered assuming storage is maximized to reduce creek discharge and that the ponds are at the minimum level by the end of the water year (following the Revised Storage Curve). The additional demand required is the difference between recycled water delivered and the baseline system's existing 501 equivalent acres.
3. Baseline system includes land that is irrigated at the Town's discretion. The unmet recycled water commitment is the difference between recycled water deliveries and the 392 equivalent acres of non-discretionary customer demand.

The Town's existing storage reservoirs are outside the Department of Water Resources Division of Safety of Dams (DSOD) jurisdiction as each have a storage capacity less than the volume and/or dam height of a jurisdictional sized reservoir as graphically illustrated in Figure 4-1. For the storage quantity and dam height being discussed in this Study, a proposed new reservoir would fall within DSOD jurisdiction. The Eastside Road Storage Project with its 215 MG (660 acre-feet) of storage had a proposed dam height of 115 feet.

Figure 4-1: Division of Safety of Dams Jurisdictional Dam and Reservoir Sizing



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4.3 Recycled Water Management Scenarios Analyzed

Building off the preliminary strategy investigations discussed above, and considering input from the community and direction from the Town Council, four scenarios were developed for further analysis. Each scenario is designed to eliminate emergency and average year discharges.

An increase in Geysers discharge is incorporated into each to offset the substantial storage volume and irrigation acreage that would otherwise be needed. Without increasing Geysers discharge, the required storage volume significantly exceeds that known to be feasible. Since the Town and City's agreement for conveyance to the Geysers expires at the end of 2037, inherent in each of these scenarios is some uncertainty about the long-term reliability beyond 2037. Nonetheless, increased use of the Geysers is a sensible approach because it takes advantage of disposal capacity that the Town has already committed to paying for through 2037.

4.3.1 Scenario 1: Maximize Geysers Discharge

This scenario achieves elimination of average year discharges solely through increasing Geysers discharge, reaching an annual average of 1.88 MGD or 686 MG/year by 2040.

The model results previously presented for this scenario are presented in Table 4-9.

Table 4-9: Scenario 1 Model Results

Year	2020			2040		
ADWF	1.4 MGD			1.9 MGD		
Storage	143.7 MG			143.7 MG		
Geysers Discharge[1]	1.88 MGD			1.88 MGD		
Weather Condition	Dry	Avg	Wet	Dry	Avg	Wet
Recycled Water Delivered (Equivalent Acres)	23	40	168	115	245	297
Additional Recycled Water Demand Required[2] (Equivalent Acres)	n/a	n/a	n/a	n/a	n/a	n/a
Unmet Recycled Water Commitment[3] (Equivalent Acres)	369	352	224	277	147	96
Creek Discharge (MG)	0	0	5	0	0	162
Emergency Discharge (MG)	0	0	0	0	0	0

Notes:

1. To minimize shortfalls for irrigation customers, during dry years, the Geysers discharge is assumed to be 90% of the required annual amount.
2. Recycled water delivered represents the amount of recycled water that theoretically would be delivered assuming storage is maximized to reduce creek discharge and that the ponds are at the minimum level by the end of the water year (following the Revised Storage Curve). The additional demand required is the difference between recycled water delivered and the baseline system's existing 501 equivalent acres.
3. Baseline system includes land that is irrigated at the Town's discretion. The unmet recycled water commitment is the difference between recycled water deliveries and the 392 equivalent acres of non-discretionary customer demand.

Infrastructure Required

The infrastructure required for this scenario is limited to an expansion of the Geysers Pump Station. To meet an annual average of 1.88 MGD, it is assumed that the Geysers Pump Station would need to deliver 2.3 MGD between October and May and 1.1 MGD between June and September. The maximum flow of 2.3 MGD could be met through use of all four pumps in the existing Geysers Pump Station, but it would exceed the pump station's firm capacity of 1.67 MGD. To meet the new flow requirements, installation of a fifth pump for a 4-duty, 1-standby configuration is assumed.

Cost

A planning level capital cost for this scenario is shown below. The incremental cost to operate the expanded pump station is considered negligible.

Table 4-10: Scenario 1 Preliminary Cost Estimate

	Estimated Costs
Capital Costs	
Geysers Pump Station Expansion	$150,000
Construction Cost Subtotal	**$150,000**
Construction Contingency (30%)	$45,000
Construction Cost Total	**$195,000**
Engineering, Admin, Environmental, Legal (25%)	$49,000
Total Capital Cost	**$244,000**
O&M Costs	
Annual Storage	--
Annual Distribution[1]	--
Total Annual O&M	--

Notes:
1. The incremental cost to operate the expanded pump station is considered negligible.

Institutional Considerations

Renegotiation of the Town's agreement with the City for conveyance to the Geysers would be required. The potential to amend the agreement has not yet been explored with the City. However, there is no evidence that the City would not be open to considering a potential increase of the Town's contributions.

With respect to the Town's goals of maximizing irrigation and regional collaboration, this scenario has significant shortcomings. This major commitment of flow to the Geysers means the Town would not be able to meet its existing recycled water irrigation commitment in any year types – let alone expand recycled water deliveries. Implementation of this scenario would require communication with customers regarding the recycled water system's reduced level of service for irrigation.

4.3.2 Scenario 2: Interagency Storage

This scenario involves the Town's use of 50 MG of existing storage at Sonoma Water's Airport wastewater treatment plant and incremental increase of Geysers discharge to an annual average of 1.65 MGD or 602 MG/year by 2040.

The model results for a hypothetical implementation scenario are presented in Table 4-11. The 2020 result illustrates how accessing an additional 50 MG of storage and increasing Geysers discharge to Tier 3 (1.25 MGD) would eliminate average year discharges at current wastewater flows. Model results show how the combination of an additional 50 MG of storage and increasing Geysers discharge to 1.65 MGD would eliminate average year discharges under the projected 2040 flows.

Table 4-11: Scenario 2 Model Results

Year	2020			2040		
ADWF	**1.4 MGD**			**1.9 MGD**		
Storage	193.7 MG			193.7 MG		
Geysers Discharge[1]	1.25 MGD			1.65 MGD		
Weather Condition	Dry	Avg	Wet	Dry	Avg	Wet
Recycled Water Delivered (Equivalent Acres)	109	237	320	171	345	395
Additional Recycled Water Demand Required[2] (Equivalent Acres)	n/a	n/a	n/a	n/a	n/a	n/a
Unmet Recycled Water Commitment[3] (Equivalent Acres)	283	155	72	221	47	n/a
Creek Discharge (MG)	0	0	0	0	0	189
Emergency Discharge (MG)	0	0	0	0	0	0

Notes:

1. To minimize shortfalls for irrigation customers, during dry years, the Geysers discharge is assumed to be 90% of the required annual amount.
2. Recycled water delivered represents the amount of recycled water that theoretically would be delivered assuming storage is maximized to reduce creek discharge and that the ponds are at the minimum level by the end of the water year (following the Revised Storage Curve). The additional demand required is the difference between recycled water delivered and the baseline system's existing 501 equivalent acres.
3. Baseline system includes land that is irrigated at the Town's discretion. The unmet recycled water commitment is the difference between recycled water deliveries and the 392 equivalent acres of non-discretionary customer demand.

Infrastructure Required

Town use of Airport recycled water reservoirs requires an intertie between the Town's distribution system and the Airport's as well as modifications of controls to facilitate water transfers to and from the tertiary storage reservoir.

An expansion of the Geysers Pump Station is also assumed as part of this scenario. To meet an annual average of 1.65 MGD, it is assumed that the Geysers Pump Station would need to deliver 2.0 MGD between October and May and 0.9 MGD between June and September. Similar to Scenario 1: Maximize Geysers Discharge, the increased maximum flow could be met by using all four of the existing Geysers Pump Station pumps, but for the pump station's firm capacity to cover the new maximum flow, installation of a fifth pump is recommended.

Cost

The cost estimate for this scenario is based on costs from the 2005 Joint Use Study and escalated to 2020 dollars. The incremental costs of using Airport recycled water reservoirs for storage of the Town's recycled water and operating the expanded Geysers Pump Station are considered negligible.

Table 4-12: Scenario 2 Preliminary Cost Estimate

	Estimated Costs
Capital Costs	
Interties and Modifications of Controls	$485,000
Geysers Pump Station Expansion	$150,000
Construction Cost Subtotal	**$635,000**
Construction Contingency (30%)	$191,000
Construction Cost Total	**$826,000**
Engineering, Admin, Environmental, Legal (25%)	$207,000
Total Capital Cost	**$1,033,000**
O&M Costs	
Annual Storage	--
Annual Distribution[1]	--
Total Annual O&M	--

1. The incremental cost to operate the joint system is negligible.

Institutional Considerations

The Town's NPDES permit provides the opportunity for a Joint Use Program to transfer recycled water between the WRF and either the Airport wastewater treatment plant of the City's Laguna Wastewater Treatment Plant. The Joint Use Program requires an operating and management plan and would allow for tertiary treated recycled water to comingle with Airport or City recycled water to be used in the Windsor recycled water distribution system. To take advantage of the available storage capacity at the Airport wastewater treatment plant, an agreement with Sonoma Water is needed to address operational, regulatory, and legal opportunities and constraints. Staff from the Town and Sonoma Water have developed a draft agreement for the transfer and use of recycled water.

Implementation of the infrastructure for this scenario would also allow Sonoma Water to transfer excess water to the Town. This would help to address the Town's existing dry year shortfalls as well as shortfalls that are caused by committing more flows to the Geysers. However, during wet years this also may require additional disposal options either through the addition of new recycled water users or increased irrigation on Town-owned properties.

Additionally, renegotiation of the Town's agreement with the City for conveyance to the Geysers would be required. The potential to amend the agreement has not yet been explored with the City. However, there is no evidence that the City would not be open to considering a potential increase of the Town's contributions.

4.3.3 Scenario 3: Increase Town Storage

This scenario involves construction of a 215 MG reservoir to be owned and operated by the Town and incremental increase of Geysers discharge to an annual average of 1.25 MGD or 456 MG/year by 2040.

The model results for a hypothetical implementation scenario are presented in Table 4-13. The 2020 result illustrates how, if the additional storage were available today, average and dry weather year creek discharges could be eliminated without increasing Geysers discharge. With the projected 2040 flows, an increase in Geysers discharge to Tier 3 (1.25 MGD) is required in addition the increased storage capacity to eliminate average year discharges.

Table 4-13: Scenario 3 Model Results

Year	2020			2040		
ADWF	**1.4 MGD**			**1.9 MGD**		
Storage	353.7			353.7		
Geysers Discharge[1]	0.53 MGD			1.25 MGD		
Weather Condition	Dry	Avg	Wet	Dry	Avg	Wet
Recycled Water Delivered (Equivalent Acres)	357	532	553	321	565	687
Additional Recycled Water Demand Required[2] (Equivalent Acres)	0	31	52	0	64	186
Unmet Recycled Water Commitment[3] (Equivalent Acres)	35	n/a	n/a	72	n/a	n/a
Creek Discharge (MG)	0	0	179	0	0	198
Emergency Discharge (MG)	0	0	0	0	0	0

Notes:

1. To minimize shortfalls for irrigation customers, during dry years, the Geysers discharge is assumed to be 90% of the required annual amount.
2. Recycled water delivered represents the amount of recycled water that theoretically would be delivered assuming storage is maximized to reduce creek discharge and that the ponds are at the minimum level by the end of the water year (following the Revised Storage Curve). The additional demand required is the difference between recycled water delivered and the baseline system's existing 501 equivalent acres.
3. Baseline system includes land that is irrigated at the Town's discretion. The unmet recycled water commitment is the difference between recycled water deliveries and the 392 equivalent acres of non-discretionary customer demand.

Infrastructure Required

The infrastructure requirements for this scenario include construction of a reservoir and connection of the reservoir to recycled water distribution system.

Because the Geysers discharge remains within the existing firm capacity, no pump station modifications are required.

Cost

The estimated cost for this scenario is based on costs from the 2007 Eastside Road Storage Project, escalated to 2020 dollars.

Table 4-14: Scenario 3 Preliminary Cost Estimate

	Estimated Costs
Capital Costs	
Reservoir	$17,215,000
Reservoir Connection to Distribution System	$2,205,000
Construction Cost Subtotal	**$19,420,000**
Construction Contingency (30%)	$5,826,000
Construction Cost Total	**$25,246,000**
Engineering, Admin, Environmental, Legal (25%)	$6,312,000
Total Capital Cost	**$31,558,000**
Annual Storage	$229,000
Annual Distribution	$36,000
Total Annual O&M	**$265,000**

Institutional Considerations

The additional storage offers the opportunity to expand irrigation customer base furthering the Town's goal of maximizing irrigation. In fact, this scenario requires irrigation expansion. Preferably the Town would secure new contract irrigators to accommodate the additional recycled water volumes stored during average years, and Town-owned lands would be used to dispose of excess water in wet years.

4.3.4 Scenario 4: Hybrid Interagency/Town/Geysers

This scenario would involve pursuing agreement with Sonoma Water for 50 MG of interagency storage, construction of 210 MG of storage to be owned and operated by the Town and incrementally increasing Geysers discharge to an annual average of 1.25 MGD or 456 MG/year by 2040.

The model results for a hypothetical implementation scenario are presented in Table 4-15. Similar to Scenario 3: Increase Town Storage, the 2020 results demonstrate if the additional storage were available today, average and dry weather year creek discharges could be eliminated without increasing Geysers discharge, and with the projected 2040 flows, an increase in Geysers discharge is required in combination with the storage to eliminate average year discharges.

Table 4-15: Scenario 4 Model Results

Year	2020			2040		
ADWF	**1.4 MGD**			**1.9 MGD**		
Storage	403.7			403.7		
Geysers Discharge[1]	0.53 MGD			1.25 MGD		
Weather Condition	Dry	Avg	Wet	Dry	Avg	Wet
Recycled Water Delivered (Equivalent Acres)	362	608	771	326	578	760
Additional Recycled Water Demand Required[2] (Equivalent Acres)	0	107	271	0	77	259
Unmet Recycled Water Commitment[3] (Equivalent Acres)	30	n/a	n/a	66	n/a	n/a
Creek Discharge (MG)	0	0	149	0	0	167
Emergency Discharge (MG)	0	0	0	0	0	0

Notes:

1. To minimize shortfalls for irrigation customers, during dry years, the Geysers discharge is assumed to be 90% of the required annual amount.
2. Recycled water delivered represents the amount of recycled water that theoretically would be delivered assuming storage is maximized to reduce creek discharge and that the ponds are at the minimum level by the end of the water year (following the Revised Storage Curve). The additional demand required is the difference between recycled water delivered and the baseline system's existing 501 equivalent acres.
3. Baseline system includes land that is irrigated at the Town's discretion. The unmet recycled water commitment is the difference between recycled water deliveries and the 392 equivalent acres of non-discretionary customer demand.

Infrastructure Required

The infrastructure requirements for this scenario include an intertie and modified controls to connect the Town's and Airport's distribution systems, construction of a new reservoir and connection of the reservoir to the Town's recycled water distribution system.

Because the Geysers discharge remains within the existing firm capacity, no pump station modifications are required.

Cost

The estimated cost for this scenario is based on costs from the 2005 Joint Use Study and 2007 Eastside Road Storage Project, escalated to 2020 dollars.

Table 4-16: Scenario 4 Preliminary Cost Estimate

	Estimated Costs
Capital Costs	
Interties and Modifications of Controls	$485,000
Reservoir	$17,215,000
Reservoir Connection to Distribution System	$2,205,000
Construction Cost Subtotal	**$19,905,000**
Construction Contingency (30%)	$5,972,000
Construction Cost Total	**$25,877,000**
Engineering, Admin, Environmental, Legal (25%)	$6,469,000
Total Capital Cost	**$32,346,000**
Annual Storage	$229,000
Annual Distribution	$36,000
Total Annual O&M	**$265,000**

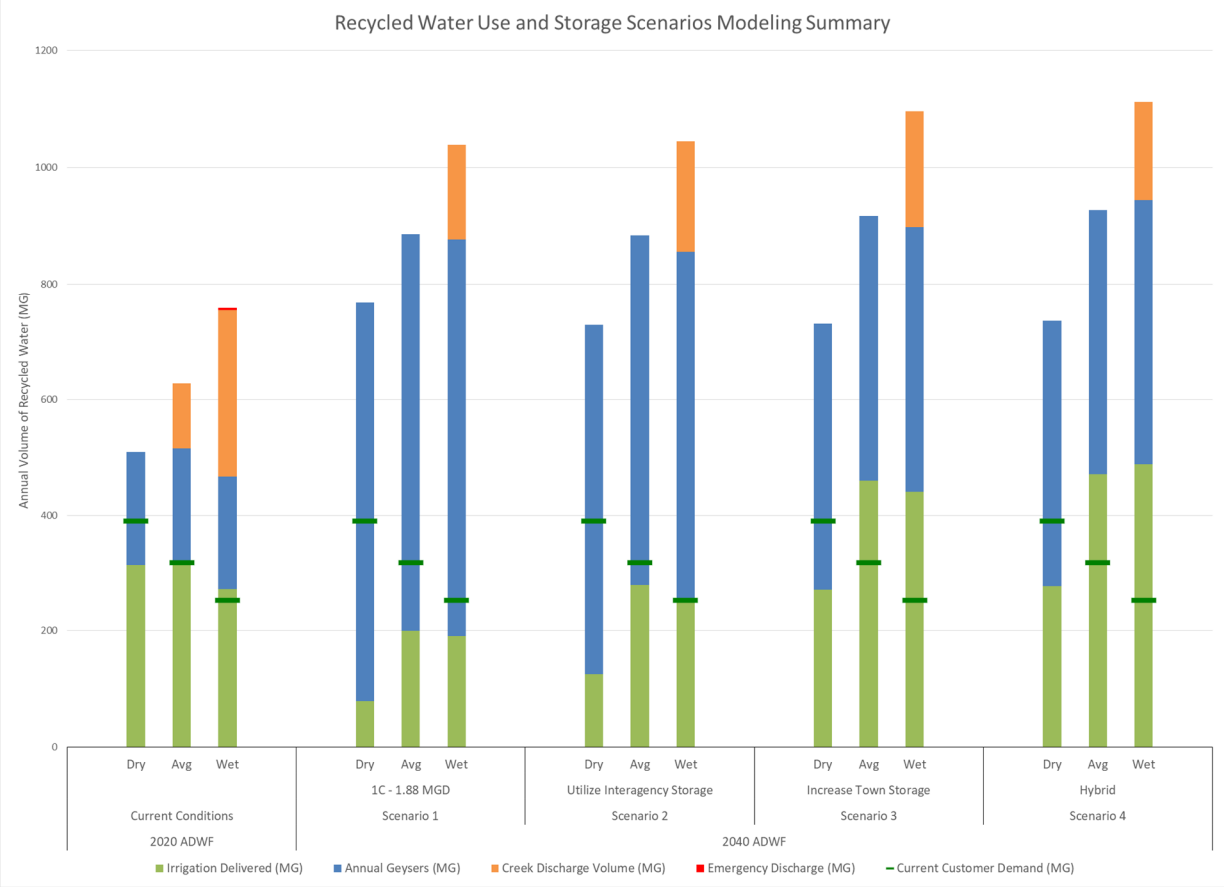
Institutional Considerations

Similar to Scenario 3: Increase Town Storage, this scenario requires irrigation expansion, which can be seen both as providing an opportunity to expand the customer base and creating additional pressure on the Town to manage irrigation demands. Unlike the solo Town storage option, this scenario offers the potential to serve customers in Sonoma Water's service area through the intertie between the two agencies' recycled water systems. Recycled water delivery in the Airport Business Park could offset potable water use within the Windsor Water District water service area. The intertie also provides for potential transfers from Sonoma Water to the Town in dry years. An agreement with Sonoma Water would be needed to coordinate these transfers.

4.3.5 Recycled Water Management Scenario Comparison

The 2040 model results for each of the scenarios are combined and compared against current conditions in Figure 4-2. The figure clearly illustrates how all the scenarios meet the criteria of eliminating emergency discharges and average year discharges. The figure also illuminates a tradeoff that is made between scenarios which rely more heavily on Geysers discharge (i.e. Scenario 1: Maximize Geysers Discharge and Scenario 2: Interagency Storage) and scenario with a large storage component (i.e. Scenario 3: Increase Town Storage and Scenario 4: Hybrid Interagency/Town/Geysers). With greater commitment to the Geysers, there will be greater shortfalls in recycled water deliveries within the Town and to agricultural customers; however, that also means less reliance on irrigation customers whose demand has been variable over the years. Conversely, by investing in storage capacity, customer shortfalls would be limited to dry years, but the greater reliance on irrigators will require the Town to coordinate closely with customers to ensure the stored water is diverted before the wet weather season.

Figure 4-2: Scenario Modeling Summary



Scored against the Town's recycled water goals, the scenarios perform as follows:

- **Maintain permit compliance** – All of the scenarios score equally well for this criterion. To maintain compliance with the flow limitations, each eliminates emergency discharges. For compliance with the new zero phosphorus limit, all the scenarios eliminate average year discharge and rely on phosphorus credits to offset discharges in wet years.

- **Pursue reliable/adaptable disposal options** – Reliance on the Geysers versus irrigators present different reliability considerations. With the Geysers, short-term reliability is great. The concern is long-term reliability given its uncertain lifespan. The greater the Town's commitment to the Geysers, the larger the impact of later having those flows curtailed or terminated. Adapting to a sharp decrease or cutoff in the Geysers discharge will be more challenging than adapting to changes in individual irrigators' demands that occur over time. However, with irrigation the Town faces ongoing uncertainty regarding customers' annual consumption, changes in land use, and future regulatory limitations. Beyond the expected climatic fluctuations in irrigation demand, the Town has been challenged by economics dis-incentivizing continued or expanded use of recycled water.

  Scenario 2: Interagency Storage and Scenario 4: Hybrid Interagency/Town/Geysers offer the greatest potential to adapt to changes in demand are those the incorporate interagency storage. Since these scenarios

involve an intertie with neighboring recycled water system, they pave the way for transfers of water as another means of disposal.

Scenario 3: Increase Town Storage and Scenario 4: Hybrid Interagency/Town/Geysers rely on the new storage remaining in service throughout the majority of the year to limit required discharge in particular, emergency discharge. As storage infrastructure ages, it can become less reliable when repairs are required. The Town has had to perform repairs on Ponds 5, 9 and 10 all within the last 5 years which required taking these ponds out of service for at least part of a storage season. If pond repairs are required during a wet weather year, this could result in more creek discharge or even emergency discharges.

When weighing all these factors, the scenarios are ranked evenly though they each have different benefits and drawbacks.

- **Maximize recycled water use and reduce discharge to Mark West Creek** –preferred scenarios are Scenario 3: Increase Town Storage and Scenario 4: Hybrid Interagency/Town/Geysers. Both of those scenarios allow for expansion to new customers and minimize shortfalls for existing customers. Scenario 1: Maximize Geysers Discharge is the least preferred as it impacts existing recycled water customers the most. Implementation of that scenario would result in insufficient supply to meet customers' demands under all year types. Scenario 2: Interagency Storage also has a notable impact on existing customers, though not as sizeable as Scenario 1. Neither Scenario 1 nor Scenario 2 allows for expansion of the customer base.

- **Develop regional partnerships as appropriate –** The two scenarios which rely on regional collaboration, namely Scenario 2: Interagency Storage and Scenario 4: Hybrid Interagency/Town/Geysers, best achieve this goal. Though Scenario 3: Increase Town Storage does not explicitly include a regional component, it offers opportunities for regional water management and falls in the middle of the road with respect to this goal. Scenario 1: Maximize Geysers Discharge, which does not address regional partnership, ranks last.

- **Demonstrate fiscal responsibility –**The minimal investment required for Scenario 1: Maximize Geysers Discharge makes it the preferred scenario with respect to fiscal responsibility. Scenario 2: Interagency Storage, with its modest cost and multiple funding selling points, also is an attractive scenario. Scenario 3: Increase Town Storage and Scenario 4: Hybrid Interagency/Town/Geysers, with their substantial costs, are the least attractive despite the potential to obtain outside funding to offset the Town's cost. Between the two, Scenario 4 ranks higher because its regional aspect increases its potential to secure funding.

The end result of the scenarios comparison, which is summarized in Table 4-17, is that there is not a clear favorite among the scenarios. There are, however, clear tradeoffs, a clear hierarchy in cost and fundability, and a clear path for pursuing collaboration. With this understanding, the next chapter offers a road map forward.

Table 4-17: Recycled Water Management Scenario Comparison

	Scenario 1: Maximize Geyser Discharge	Scenario 2: Utilize Interagency Storage	Scenario 3: Increase Town Storage	Scenario 4: Hybrid Interagency/ Town/Geysers
Permit Compliance				
Emergency Discharges	All alternatives designed to eliminate emergency discharges, thus this is not a differentiator among alternatives.			
Phosphorus Discharges	All alternatives designed to eliminate average year discharges with phosphorus credits used for wet year discharges, thus this is not a differentiator among alternatives.			
Reliable/Adaptable				
Reliance on Geysers	• exceeds Town's existing allocation • requires renegotiation of agreement	• exceeds Town's existing allocation • requires renegotiation of agreement	• maximizes Town's existing allocation	• maximizes Town's existing allocation
Reliance on Irrigators	• minimizes risk from Town's variable customer demand	• reduces risk from Town's variable customer demand • paves way for transfers of excess water	• requires significant coordination with an expanded customer base	• requires significant coordination with an expanded customer base • paves way for transfers of excess water
Maximize Irrigation/Reduce Discharge				
Customer Shortfalls	• significant shortfalls occur in all year types	• significant shortfalls in dry years • shortfalls also occur in average years	• shortfalls limited to dry years	• shortfalls limited to dry years
Opportunity to Expand Customer Base	• no	• no	• yes	• yes
Regional Collaboration				
Joint Recycled Water Management	• not addressed	• with Sonoma Water	• provides potential	• with Sonoma Water
Fiscal Impact				
Capital Cost	$240,000	$1,000,000	$32,000,000	$32,000,000
Funding Selling Points	• increases recycled water use	• regional collaboration • increases reliability of recycled water system • increases recycled water use	• increases reliability of recycled water system • increases recycled water use	• regional collaboration • increases reliability of recycled water system • increases recycled water use

Best Good Fair Poor Not Addressed

5. RECYCLED WATER ROAD MAP

5.1 Recommendations

5.1.1 Short-Term Plan (Next 10 years)

The short-term recommendation consists of increasing Geysers discharge and pursuing joint use of existing Airport wastewater treatment plant reservoirs while advancing plans for additional storage.

Increase Geysers Discharge

The Town's long-term objective is to eliminate emergency and average year discharges. If the Town's aim was to eliminate average year discharges straightaway, an increase to the Geysers Tier 3 (1.25 MGD) would be required. However, as previously indicated, this course of action would severely limit recycled water deliveries to the Town's existing customers. As wastewater flows increase, the recycled water supply likewise would increase, but even with the projected 2040 ADWF of 1.9 MGD, there would be average year shortfalls (see Table 4-5). The Town's agreement with the City commits the Town to maintaining increased flow rates, once requested, for the remainder of the contract term (i.e. through 2037). Since the Town cannot decrease its Geysers deliveries and because of the uncertainty around the wastewater flow projections, it is recommended that the Town allow average year discharges to continue for the next few years. The tradeoff being made is greater discharge to Mark West Creek in the immediate term in exchange for greater flexibility with longer term planning.

Increasing to Geysers Tier 2 (0.75 MGD) was selected as a first step. This increase would eliminate emergency discharges up to an ADWF of 1.46 MGD. Average year discharges would continue though at lower volumes. Based on current wastewater flow, the average year discharge would decrease from an estimated 112 MG to 74 MG. There would be an impact to existing irrigation customers with the model predicting a shortfall of 49 equivalent acres in average years (see Table 4-4), and this shortfall would be offset through a joint storage agreement. Subsequent increases in Geysers discharge would depend on customers' use of recycled water over the next few years and the Town's actual rate of growth. If usage remains significantly below the estimated demand such that the modelled shortfalls become a non-issue, it is recommended that the Town increase up to Tier 3. If customer demand rebounds, it is recommended that the Town remain at the Tier 2 discharge and focus on bringing additional storage online to meet average year demands while also eliminating creek discharge.

Pursue a Joint Storage Agreement

During this study and at the direction from Town Council, the Town began discussions with Sonoma Water regarding joint recycled water management and formed an Airport/Windsor Joint Storage and Reuse Working Group. The group has developed a draft agreement for joint recycled water management, addressing operational, regulatory, and legal opportunities and constraints. It is recommended that the Town continue to pursue a Joint Use Program and seek an agreement with Sonoma Water and approval of the North Coast RWQCB.

The combination of an additional 50 MG of joint storage plus Geysers Tier 2 (0.75 MGD) would reduce average year discharges to 46 MG given current wastewater flow. Again, for the next few years it is recommended that the Town allow average year discharges to continue, allowing time for the long-term plan to be verified.

Advance Plans for New Storage

The Town's discussions with Sonoma Water regarding joint storage should explore whether implementation of additional storage on the magnitude of the Eastside Road Storage Project could enhance regional recycled water management. The City of Santa Rosa should also be included in these discussions.

The Town has long owned the site of the Eastside Road Storage Project, having purchased the land with the intent of constructing a storage reservoir. Preliminary engineering and environmental documentation were previously completed for the Eastside Road Storage Project, demonstrating its feasibility, and providing a path forward for implementation, but the Town has struggled with moving forward with the project due in part to the associated loss of woodland. A regional storage project which could be sited elsewhere while providing the Town similar disposal and irrigation benefits would be an ideal outcome of collaboration with Sonoma Water and the City.

If the other agencies are not interested in pursuing a new storage project, the Town should move forward with implementation of the Eastside Road Storage Project on its own. In the short-term this would involve completing the design and secure funding for construction. A new storage project such as the Eastside Road Storage Project could have potential regional benefits and would be favorable to receive grants and other funding to implement.

Conduct Recycled Water Market Assessment

It is recommended that the Town conduct a recycled water market assessment to, first, understand the recent reductions in recycled water use among the existing customer base and, second, assess the potential to capture additional non-potable demands in its service area or through transfers to Sonoma Water and the City's service areas. Implementation of a new storage ponds like the Eastside Road Storage Project will only be beneficial if there is somewhere to dispose of or utilize the stored water. If customer demand is insufficient, the Town may need to implement strategies to encourage existing customers to utilize their entire allotted volume of recycled water, add to its discretionary irrigation lands or change the long-term plan.

5.1.2 Long-Term Plan (10-years and beyond)

The long-term recommendation is to construct the Eastside Road Storage Project or achieve a total of 210 MG of additional storage. Assuming a minimum of 50 MG of storage in Sonoma Water's Airport Reservoirs is secured, the Town needs an additional 160 MG to eliminate average year discharges through the planning horizon.

Construct New Storage

The timeframe for construction of new storage depends on the results of the recycled water market assessment.

If the market assessment determines recycled water demand is considerably less than the increased supply, the Town should defer construction of new storage until the ADWF reaches 1.59 MGD. That is the point at which the maximum Geysers discharge, together with 50 MG of joint storage volume, is just sufficient to eliminate average year discharge. If wastewater flows grow as projected, the new storage will be needed circa 2030. If wastewater flows grow more slowly, construction of additional storage may not be triggered during this planning horizon.

If the market assessment concludes that there is customer demand for the increased supply, the Eastside Road Storage Project or similar volume of storage should be implemented as soon as feasible. If it were possible to provide 210 MG of additional storage today, average year discharges could be eliminated. Since that is not possible, the short-term plan of increasing Geysers discharge to Tier 2 strikes a balance between reducing average year discharges and maintaining supplies for customers, allowing time for the long-term storage solution to be implemented.

Connect Additional Customers and Discretionary Lands

Consistent with recommendations of the recycled water market assessment, the Town should coordinate with customers to connect them to the recycled water system and secure additional Town-owned irrigation lands, if needed.

5.2 Cost Estimate

The preliminary cost estimates presented in Chapter 4 accounted for capital and O&M costs associated with operation of new infrastructure associated with each scenario. Because the impetus for this study was to find alternative means to reduce the Town's discharge to Mark West Creek, the cost estimates presented here factor in the cost of continued creek discharges. These costs include purchasing phosphorus credits and sampling required whenever there are discharges.

Phosphorus credit projects completed by the City have cost as much as $67 per pound. As regulation on phosphorus discharges increase, the demand and correspondingly cost for phosphorus credits are anticipated to increase. For this Study, phosphorus credits are conservatively estimated at $100 per pound. Assuming 1 mg/L of phosphorus in the Town's effluent, phosphorus credits would cost $834/MG creek discharge. Under baseline conditions, with 112 MG of creek discharge in average years, phosphorus credits would cost $93,000/year. Given baseline conditions and projected 2040 ADWF, creek discharge would increase to 252 MG in average years and phosphorus credits would cost $210,000/year.

In an average discharge season, the Town spends approximately $11,000 for laboratory analysis. When accelerating monitoring is required due to a bioassay failure, this cost can increase dramatically. For planning purposes, sampling is estimated at $22,000 per year.

5.2.1 Short-Term Plan (Next 10 years)

The infrastructure required for implementation of the short-term recommendation is similar to Scenario 2: Utilize Joint Storage except it does not require an expansion of the Geysers Pump Station. The estimated capital cost is $789,000.

The cost associated with creek discharges will vary depending on the year type, Town growth and when joint storage comes online. In the cost estimate below, creek discharge with Geysers increased to Tier 2 (0.75 MGD), current wastewater flows and no additional storage was chosen to represent phosphorus offset costs.

Table 5-1: Short-Term Recommendation Cost Estimate

	Estimated Costs		
Capital Costs			
Interties and Modifications of Controls	$485,000		
Construction Cost Subtotal	**$485,000**		
Construction Contingency (30%)	$146,000		
Construction Cost Total	**$631,000**		
Engineering, Admin, Environmental, Legal (25%)	$158,000		
Total Capital Cost	**$789,000**		
O&M Costs	Dry Year	Ave Year	Wet Year
Annual Storage	**--**	**--**	
Annual Distribution	**--**	**--**	**--**
Annual Phosphorus Offset[1]	**--**	$62,000	$205,000
Annual Sampling	--	$22,000	**$**22,000
Total Annual O&M	--	**$84,000**	**$227,000**

Notes:

1. Cost based on the current ADWF of 1.4 MGD, Geysers discharge of 0.75 MGD and no additional storage.

5.2.2 Long-Term Plan (10 years and beyond)

The infrastructure required for implementation of the long-term recommendation is similar to Scenario 3: New Town Storage. However, with 50 MG of additional storage implemented as part of the short-term recommendations, in the long-term phase only 160 MG is needed compared to the 210 MG from Scenario 3. To be conservative, the same $32 million capital cost is used here.

Since the long-term recommendation is to eliminate average year discharges, only wet year discharges remain in the long-term. The cost associated with the wet year discharges will vary depending on Town growth and when additional increases in Geysers discharge occur. In the cost estimate below, creek discharge with projected 2040 wastewater flows and Geysers increased to Tier 3 (1.25 MGD) flows was chosen to represent phosphorus offset costs.

Table 5-2: Long-Term Recommendation Cost Estimate

	Estimated Costs		
Capital Costs			
Reservoir	$17,215,000		
Reservoir Connection to Distribution System	$2,205,000		
Construction Cost Subtotal	**$19,420,000**		
Construction Contingency (30%)	$5,826,000		
Construction Cost Total	**$25,246,000**		
Engineering, Admin, Environmental, Legal (25%)	$6,312,000		
Total Capital Cost	**$31,558,000**		
O&M Costs	Dry Year	Ave Year	Wet Year
Annual Storage	$229,000	$229,000	$229,000
Annual Distribution	$36,000	$36,000	$36,000
Annual Phosphorus Offset[1]	**--**	--	$165,000
Annual Sampling	--	--	**$**22,000
Total Annual O&M	**$265,000**	**$265,000**	**$452,000**

Notes:

1. Cost based on 2040 projected ADWF of 1.9 MGD, Geysers discharge of 1.25 MGD and 210 MG additional storage.

5.3 Institutional Considerations

5.3.1 Stakeholder Outreach

Staff conducted a public workshop on November 18, 2019 to receive input from recycled water users and other stakeholders. A public meeting was held on June 3, 2020 at the Town Council meeting to review the study plan and present preliminary strategy development of this Recycled Water Use and Storage Study. Staff continues to provide opportunities for public outreach and education on our recycled water program.

Outreach to customers is an important component of the recommended recycled water market assessment. Reliance on storage requires receptors for the recycled water, and customer consumption is preferred over Town use of discretionary lands. Securing customer commitments in the form of letters of intent or users' agreements would help substantiate recycled water demands and confirm facility sizing. If customers are hesitant to commit to use of recycled water, the Town should communicate the need to move towards greater reliance on the Geysers and the associated level of service impacts to the Town's customers.

Collaboration with Sonoma Water and the City is also a key part of the recommendations. An agreement with Sonoma Water is needed to implement the Joint Use project, and outreach to the City is needed to expand joint recycled water management opportunities that could include additional interties or storage projects.

Discussions with the City is needed to consider increased Geysers delivery and potential changes in the delivery schedule. The long-term recommendations assume that continued use of the Geysers is possible though the existing agreement expires in 2037. The Town is interested in exploring the potential to adjust flows to discharge more during winter months or to adjust by water year.

5.3.2 Funding Opportunities

In addition to the customary financing methods (i.e. pay-as-you-go through cash reserves and operating revenues and traditional bond financing), the recommended plan could be financed through a combination of grants, low-interest loan programs and regional partnerships. Potential funding sources include:

- **U.S. Bureau of Reclamation (Reclamation) WaterSMART Title XVI Water Infrastructure Improvements for the Nation (WIIN) and Drought Response Program –** The WIIN Program provides grant funding for planning, design and construction of water recycling treatment and conveyance facilities for projects that have a Title XVI Feasibility Study. Up to 25% of total project costs can be funded. To be eligible for WIIN funding, projects must receive a Determination of Feasibility from Reclamation, but unlike the traditional Title XVI Water Reuse & Reclamation Grant Program, projects funded through WIIN do not require congressional authorization.

  The Drought Response Program is intended increase the reliability of water supply; improve water management; implement systems to facilitate the voluntary sale, transfer or exchange of water; and provide benefits for fish, wildlife, and the environment to mitigate impacts caused by drought. The maximum grant award is 50% of project costs capped at $300,000 for projects that can be completed within two years and $750,000 for projects that can be completed within three years. Projects with Title XVI congressional authorization or deemed eligible for WIIN funding are excluded from the Drought Response Program. Additionally, in the most recent Funding Opportunity Announcement (FOA), water reclamation projects estimated to cost over $20 million were deemed ineligible. If this criterion is carried forward to future FOAs, the Oceanview joint storage project could be eligible, but a project of the magnitude of the Eastside Road Storage Project would not be eligible.

- **U.S. Environmental Protection Agency (USEPA) Water Infrastructure Finance and Innovation Act (WIFIA)** – WIFIA provides loan for construction of water infrastructure including water recycling projects. The interest rate is equal to the U.S. Treasury rate of similar maturity, and the loan term may be up to 35 years. For large communities like Windsor (i.e. population greater than 25,000), the minimum project size is $20 million. WIFIA can fund up to 49% of the project costs with total federal assistance not to exceed 80% of project costs. A non-refundable application fee of $100,000 is required for large communities. The application fee will be applied towards the USEPA's financial, technical, and legal advisory costs, which are estimated to range between $150,000 and $500,000; costs in excess of the application fee will be due upon execution of the loan. Additional fees may be required to support administration of the loan.

- **California Department of Water Resources (DWR) Integrated Regional Water Management (IRWM) Program** – Current funding for the IRWM Program is through Proposition 1 (Prop 1), which allocated $26.5 million in grant funds for the North Coast IRWM Region. Round 1 of the Prop 1 IRWM Program awarded $12.7 million to North Coast projects, leaving $13.8 million for future rounds. The IRWM Program gives preference to multi-beneficial, interagency projects. Thus, pursuit of a regional storage solution that increases recycled water use, enhances recycled water reliability, and minimizes impacts to Mark West Creek would be more attractive than new storage serving the Town alone. To be eligible for funding, the Town's projects need to be included in the North Coast IRWM Plan.

- **State Water Resources Control Board (SWRCB) Clean Water State Revolving Fund (CWSRF) loan program and Water Recycling Funding Program (WRFP)** – CWSRF loans offer a lower interest rate than bonds, at half of the General Obligation bond at the time of the financing agreement. In the past decade, the interest rate has ranged from 1.2% to 2.7%. As of April 23, 2020, the interest rate is 1.4%. Loan terms may be 20- or 30-years. Repayment begins one year after construction is complete.

The WRFP currently follows the CWSRF application process and is funded through the same revolving fund, which was recently determined to have a sustainable funding capacity of $587 million. Prop 1 had allocated $625 million to provide recycled water projects 1%-interest loans and grant funding of 35% of project costs up to a maximum of $15 million. The Prop 1 WRFP funds are fully allocated. Once Prop 1 loan repayments commence, construction grant funding will be available again.

- **California Infrastructure and Economic Development Bank (I-Bank) Infrastructure SRF (ISRF) Program** – The ISRF Program provides low-interest loan financing to public agencies for a wide variety of infrastructure projects such as water supply, parks and recreation facilities, sewage collection and treatment, and water treatment and distribution projects. Funding is available in amounts up to $25 million with loan terms up to 30 years. The interest rate is set at the time the loan is approved. The I-Bank recommends applications be submitted upon completion of design as construction must begin within 6 months of the I-Bank's loan commitment with completion within 2 years.

  Projects funded through the ISRF Program must demonstrate economic development and sustain long-term employment opportunities. Job creation can be established for the storage projects by showing the connection between increasing the WRF's permitted ADWF capacity and supporting the Town's continued growth. A regional storage project could provide an even stronger basis for economic development by showing how it supports the growth of multiple communities.

- **Regional Partnership** – Developing multi-beneficial regional solutions has the benefit of bringing in partners to share in project costs relative to their respective benefits. Moreover, a previous study already demonstrated that partnering with Sonoma Water and the City on a regional storage project would result in significant cost savings due to reduced infrastructure and operation costs.

5.3.3 Environmental Review

Implementation of a Joint Use Storage program with Sonoma Water would rely primarily on existing facilities with minor modifications and are likely to fall under a California Environmental Quality Act (CEQA) Categorical Exemption. Construction of new storage would likely require environmental review under the CEQA. These projects demonstrate independent utility and can be addressed under separate environmental documents.

For new storage, the Town could proceed with the Eastside Road Storage Project as previously defined in the 2008 Supplemental Environmental Impact Report (EIR). If the Town selects an alternate storage project (e.g. substantial change to the design of the Eastside Road Storage Project or a joint storage project at another location), environmental documentation will need to be prepared for the new project. If CWSRF funding is pursued, an update to the 2008 Supplemental EIR will be required because the program requires that the CEQA documentation be less than 5 years old at the time a financing agreement is executed for the project. The less than 5-year old requirement also applies to federal cross-cutting requirements like the cultural resources' record search and biological survey.

If the Town obtains Reclamation funding for a project, compliance with the National Environmental Policy Act (NEPA) will be required before construction begins. The level of effort will be dictated by Reclamation as the lead federal agency.

5.3.4 Contingency Plans

The eventual decline of the Geysers poses a threat to the future viability of the recommended plan. However, for this Study's 20-year planning horizon, the Geysers are believed to be dependable with the Town's continued Geysers discharge contingent on an extension of the agreement with the City. If the use of the Geysers were restricted or terminated, the Town should pursue more flexibility in discharge. Just as the Town was able to increase Mark West Creek discharge from 1% to 10%, the Town could work with the North Coast RWQCB to identify conditions under

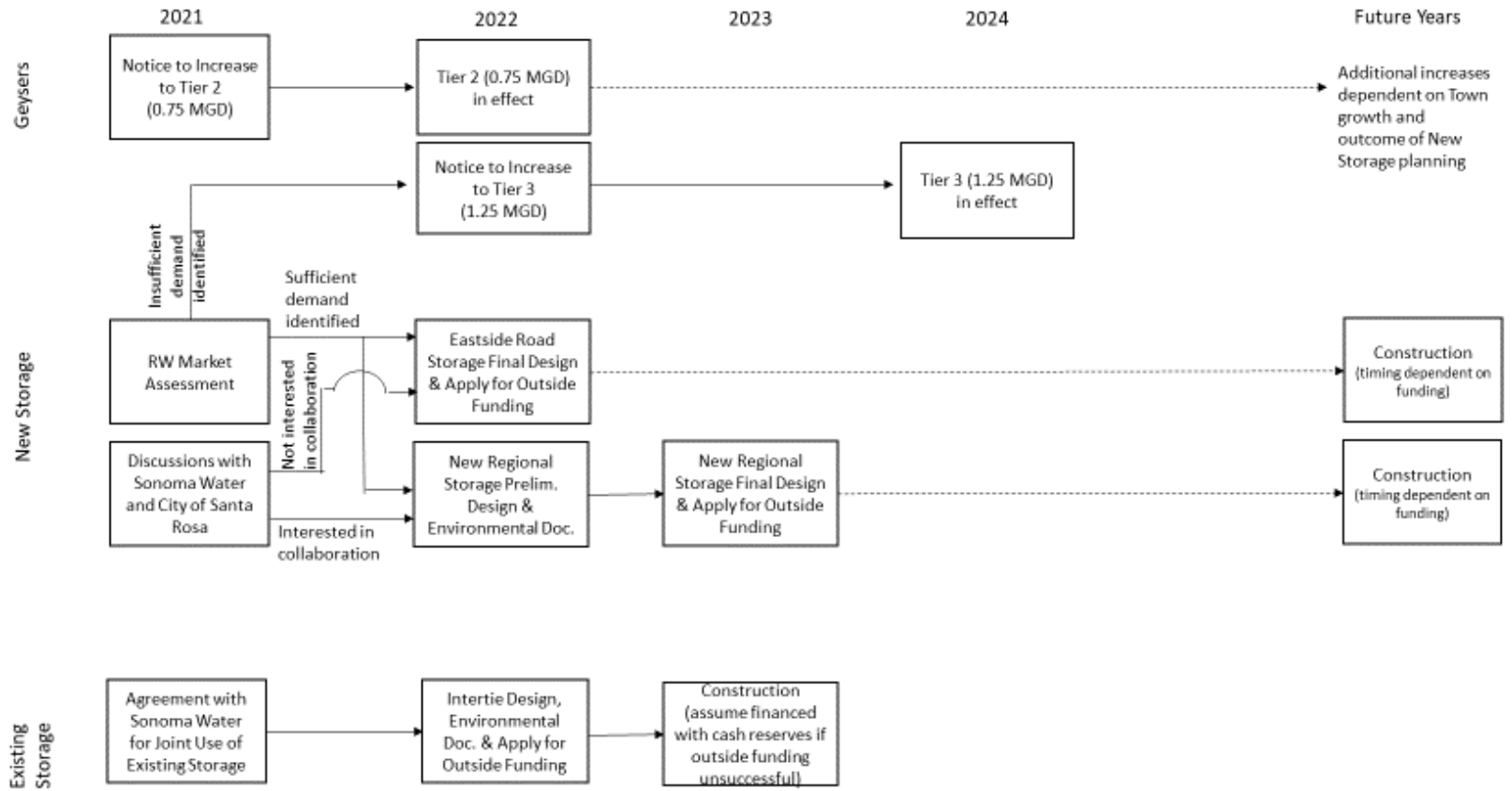
which greater discharge would be beneficial for the region. The Town may also consider discharge to the Russian River which could allow a higher volume of discharge as well as some phosphorus discharge.

Declining customer interest in recycled water is another risk with which the Town must consider. If the recycled water market assessment indicates their insufficient demand to support a large storage project or if demands identified in the market assessment do not materialize, the Town should again defer the storage plans. If the Town can secure an extension of the Geysers contract, an increase beyond Tier 3 and the corresponding expansion of the Geysers Pump Station should also be pursued. If an increase in Geysers is not possible, the Town may move towards groundwater replenishment.

5.4 Implementation Plan and Schedule

Figure 5-1 identifies initial steps for the Town to take with respect to increasing Geysers discharge, assessing new storage, and pursuing joint storage. How implementation unfolds (next steps and timing) will depend on the results of these first steps and the rate of Town growth.

Figure 5-1: Implementation Plan and Schedule



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