Ross Valley Sanitary District

Year-End Capital Program Report FY 2022/23

July 2022 - June 2023

District Mission

We provide our customers with high quality wastewater collection service, through a system that has no avoidable sanitary sewer overflows, at the lowest sustainable cost, in order to protect public health and the environment.

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ROSS VALLEY SANITARY DISTRICT

Year-End Capital Program Report
FY 2022/23
July 2022-June 2023

Prepared by: Patrick Filipelli
Senior Business Systems Analyst

Date: November 5, 2023

Reviewed by: Steve Moore
General Manager

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INTRODUCTION

Ross Valley Sanitary District (RVSD or District) follows a prioritized plan for infrastructure assessment, replacement and rehabilitation. Over the last ten years, the District has invested in its infrastructure to bring the system up to a better level of service, including through the Capital Program projects. FY 2022/23 was the tenth year of implementation of what was planned as a 7-year Capital Program Implementation Plan in the 2013 Infrastructure Asset Management Plan (IAMP).

The IAMP was intended to be a dynamic planning tool that is adjusted as needed to address future issues and priorities that may arise. Project packaging, prioritization and schedules were changed since 2013 based on updated data and risk assessment results, but the vast majority of commitments in the 2013 IAMP were completed by this year. This year the District completed most of the last pump station improvements project to complete the 2013 IAMP plan, at the Larkspur Pump Station (PS14) and PS24 and PS25 on South Eliseo Drive.

A 2021 IAMP update was completed in September 2021 and now guides the Capital Program. The 2021 IAMP is a risk-based prioritization of assets for capital and in-house repair, and most of the District's assets assessed during the IAMP update were determined to be moderate to low risk based on the various risk model calculations for each asset type. In the current 5-year financial forecast, budgeted project and labor support needs are following a steady-state capital improvement level, a pay-go plan that should not require any additional financing by revenue bonds, etc.

Year-End Capital Program Report

This report is the sixth year-end Capital Program Report since the IAMP and presents a snapshot of the Capital Program on completion of the tenth year of the IAMP implementation. This year-end report aggregates the project status and financials over the fiscal year. It documents the progress on the Capital Program as compared to the IAMP Capital Program Implementation Plan and provides some detail as to projects that were completed in FY 2022/23, the 10-year emergency repair history, and on-call sanitary sewer construction services and capitalized repairs.

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INFRASTRUCTURE ASSET MANAGEMENT PLAN (IAMP)

The District's capital and operations and maintenance (O&M) programs are both guided by its Infrastructure Asset Management Plan (IAMP). The capital projects discussed in this Year-End Capital Program Report are among the last projects completed under the previous 2013 IAMP. The 2021 IAMP update, completed in FY 2021/22, presents a prioritized plan for infrastructure replacement that is based on a comprehensive risk model of the system and represents a financially and institutionally sustainable path forward. In the 2021 IAMP, each asset in the system is assigned a risk-based score which assists in prioritizing pipe segments and manholes for grouping into gravity sewer improvement projects going forward. Force main and pump station (especially smaller lift station) assets not comprehensively evaluated in the 2013 IAMP were addressed in this update as well. The 2021 IAMP includes a summary report, gravity main assessment, manhole assessment, creek crossing assessment, hydraulic modeling, I&I Reduction Plan, Force Main Assessment, Lift Station Assessment and Integrated Capital Improvement Plan. A budget and schedule of improvements is recommended in the Integrated Capital Improvement Plan (Chapter 9).

The District's first IAMP was prepared in October 2013 as part of the requirements for complying with the May 13, 2013 San Francisco Bay Regional Water Quality Control Board (RWQCB) Order No. R2-2013-0020, a Cease and Desist Order (CDO). The IAMP recommendations replaced recommendations from RVSD's previous capital improvement planning document, the Sewer System Replacement Master Plan (SSRMP, 2007).

The 2013 IAMP presented a prioritized plan for infrastructure replacement to meet the following specific requirements of the CDO over seven years (2013-2020):

- Replace or rehabilitate specific pipes with Grade 5 structural defects by June 30, 2018. If certain conditions are met, this action may be deferred up to June 30, 2021.
- Prioritize rehabilitation or replacement of other pipes using a methodology that considers condition and risk factors. The District must rehabilitate, on a three-year rolling average, 4 miles of pipe per year (over the seven-year planning timeframe).
- Prioritize pump station, force main, and trunk line capital improvement needs and integrate these replacements, and their needed funding, into the District's Capital Improvement Plan (CIP).
- The proposed capital needs must consider the project implementation schedule from the District's SSRMP. The SSRMP projects must be completed by June 30, 2019, or later if approved by the Executive Officer.
- Provide an ongoing process for the assessment and prioritization of pipeline, force main, and pump station replacement and rehabilitation based on the results of condition assessments completed.

Gravity Sewer Improvement Projects

Three different groupings of gravity sewer projects were presented in the 2013 IAMP:

Group A and B – 45 pipes were required to be rehabilitated in two projects in FY 2013/14 per the CDO. These are referred to as the Group A and B projects.

Sewer Rehabilitation – The 2013 IAMP used a custom numerical database model to assign risk to every mainline and trunk line pipe segment in the CMMS database. This model, also known as the Sewer Main Asset Replacement Tool (SMARTool), was developed in Microsoft® Access. The IAMP represented a snapshot in time that was documented in the District's computerized maintenance management system (CMMS) as of May 2013. At that time, 40% of the District's pipelines had not been condition assessed.

Data from additional condition assessment and asset inventory were integrated into updates to the SMARTool results in 2014 and 2015. Sewer rehabilitation project scope and prioritization were reevaluated based on these updated results.

Capacity Improvements – Capacity improvement projects from the SSRMP were reevaluated in the IAMP. The following capacity projects were recommended in the implementation plan:

- Miracle Mile (San Anselmo) (Completed)
- Lower Butterfield/Meadowcroft (San Anselmo) (Completed)
- Manor Easement (Kentfield) (Partially Completed / Postponed, Capacity Impacts Not Observed)
- Spruce/Park/Merwin/Broadway (Fairfax) (Postponed, Capacity Impacts Not Observed)

Four capacity improvement projects were included but recommended for further study:

- Upper Butterfield (Sleepy Hollow) (Postponed, Capacity Impacts Not Observed)
- Westbrae/Hawthorne (Fairfax) (Postponed, Capacity Impacts Not Observed)
- Laurel Grove/McAllister (Kentfield) (Completed)
- Sonoma/Nokomis (San Anselmo) (Partially Completed / Postponed, Capacity Impacts Not Observed)

Since the IAMP, additional information and alternative approaches have been applied to evaluate and further study the capacity needs in the collection system. For example, a much narrower scope of work relieved capacity deficiencies on Miracle Mile, at significant cost savings and without the major disruption to the community at this critical location at the Hub in San Anselmo. Deployment of SmartCover level monitors in manholes has also been used to collect system performance data and provide an alarm if levels rise too high in the manholes during wet weather, for instance at the Manor Easement, Westbrae-Hawthorne, Upper Butterfield and Spruce-Fairfax locations.

Gravity Improvement Projects for future years will be defined based on risk-based assessments in the 2021 IAMP, as well as updated condition assessment and maintenance information from the crews and addressing causes of sanitary sewer overflows (SSOs). The FY 2022/23 Gravity Sewer Improvements Project, completed this year, is the first of these projects defined based on the 2021 IAMP, maintenance information and SSO information. The Woodland Capacity and Creek Crossings Project and Lift Stations 20, 31 & 32 Improvements Project, both currently under construction, are the next projects defined based on the 2021 IAMP.

Pump Station Rehabilitation Projects

Pump stations were evaluated in the 2013 IAMP, and improvements were recommended for 6 pump stations (PS 12, 13, 14, 15, 24 and 25). The projects include full pump station rehabilitation of PS 12 Bon Air, PS 13 Greenbrae, and major electrical improvements at PS 15 Kentfield. Notices of Completion were issued for these projects in FY 2019/20. The three remaining pump stations, PS 14 Larkspur, PS 24 (650 S. Eliseo) and PS 25 (1350 S. Eliseo), were mostly completed in FY 2022/23 with a few items remaining before filing the notice of completion.

The 2021 IAMP includes a minor pump station assessment and recommends lift station rehabilitation projects. In FY 2022/23, the highest priority rehabilitation projects were in the design phase, and include LS 20 (Larkspur Landing A), LS 31 and LS 32 (Riviera Circle, Larkspur), and LS 30 (Heather Gardens).

Force Main Projects

Force main assessments were conducted for the 2013 IAMP and force main appurtenances projects (e.g., air valves, isolation (plug) valves, cathodic protection, and bypass force main rehabilitation projects) were recommended. The 2019/20 Force Main Appurtenances Project, including replacement of five air release valves and three plug valves on the system, completed construction in FY 2020/21.

The 2021 IAMP provided desktop assessment of all the District's force mains and included field evaluations of FM-33 and FM-14 that cross Corte Madera Creek, as well as FM-13 and FM-1. The field assessments concluded that there were no deficiencies that warranted rehabilitation projects. Force mains will be periodically assessed based on the IAMP recommendations.

Flow Monitoring and Other Plans and Studies

Flow monitoring and additional condition assessment were recommended in both the 2013 IAMP and 2021 IAMP. The District uses SmartCovers in manholes to collect flow data at 60 key locations, and has Supervisory Control and Data Acquisition (SCADA) at each of its 19 pump stations, enabling remote monitoring of its gravity sewer system and pump stations. A Flow Monitoring Study was recommended in the 2021 IAMP to be conducted in FY 2021/22 to compare flows to 2006 and 2014 and determine the impact of the $127 Million capital program, in-house repair program and the lateral replacement program (ordinance, grants and loans) on flows. The Wastewater Collection System Capacity Evaluation was completed in FY 2022/23, and identified eight areas in the system that have capacity-related issues with surcharging in modeled gravity sewers as well as gravity sewers subject to backwater-induced surcharging. The updated flow monitoring and modeling determined that one of the three remaining capacity projects listed in the 2013 IAMP, Spruce-Park-Merwin-Broadway, is still needed. Overall, the recalibration of the hydraulic model indicates that the predicted peak design flows in the RVSD collection system are decreasing when compared to 2006. Based on the results summarized in the capacity evaluation, it is clear that RVSD's investment in collection system upgrades and I&I reduction has had a measurable impact in peak modeled flows.

CAPITAL PROGRAM IMPLEMENTATION

Project descriptions and status for Capital Projects discussed below are included in Appendix A.

2013 IAMP Plan and Capital Program Implementation Progress

Projects and activities and associated costs and a preliminary implementation timeline were presented in the 2013 IAMP. The cumulative cost of the recommended CIP and the miles of pipe to be completed are shown on the following figure over the 7-year plan.

Figure 1. IAMP Capital Program Implementation Plan

The actual progress in miles of pipe completed and total capital expenditures is shown on the following figure. These expenditures do not include debt service, so they are directly comparable to the IAMP budgeted costs. Note that these lengths do not include any work done by District crews, such as the Repair Crew lining repairs and Condition Assessment Crew support of Inflow and Infiltration Reduction Program work. Such District efforts are integral to its CDO compliance approach, and yield a commensurate amount of rehabilitated pipe length, but are discussed in the Year-End Metrics Report and not described in this Year-End Capital Program Report.

Figure 2. IAMP Capital Program Implementation Progress

Gravity Sewer Improvement Projects

The following gravity sewer improvement projects were completed prior to FY 2022/23:

- FY 2014 Gravity Sewer Rehab Group A
- FY 2014 Gravity Sewer Rehab Group B
- Magnolia Avenue Trunk Line Rehabilitation
- FY 2014/15 Pipeline Rehabilitation Projects, including:
    - Rehabilitation
    - Manor Easement capacity improvement
    - McAllister capacity improvement
- 2016 Magnolia Ave Sewer Rehabilitation and Town of San Anselmo FY2015/16 Magnolia Ave Paving Project
- Large Diameter Gravity Sewer Rehabilitation Project I

- Large Diameter Gravity Sewer Rehabilitation Project II-1
- Baywood Ct Creek Crossing Replacement (Emergency Resolution 17-1532)
- Large Diameter Gravity Sewer Rehabilitation Project II-2
- FY 2015/16 Gravity Sewer Improvements Project
- FY 2016/17 Gravity Sewer Rehabilitation Project
    - The Miracle Mile Capacity Project recommended in the 2013 IAMP was added to this scope
- FY 2016/17 Gravity Sewer Improvement Project - Nokomis and Meadowcroft, primarily:
    - Meadowcroft capacity improvement
    - Nokomis capacity improvement (Sonoma was determined to not be required during design)
- Large Diameter Gravity Sewer Project II-3A - Upper Shady Lane/ Ross Common, including:
    - Upper Shady Lane capacity improvement
- FY 2016/17 Gravity Sewer Improvement Project – Butterfield/Meadowcroft-Arroyo, including:
    - Rehabilitation
    - Lower Butterfield capacity improvement
- Large Diameter Gravity Sewer Project II-3B - Lower Shady Lane/Poplar
- Laurel Grove Sewer Rehabilitation Project
- Butterfield/Arroyo-Kenrick Gravity Sewer Improvements Project
- Ross Creek Sewer Removal Project

The following gravity sewer improvement projects were completed in FY 2022/23:

- FY 2020/21 Gravity Sewer Improvements Project
- FY 2022/23 Gravity Sewer Improvements Project

The following gravity sewer improvement projects were in design phase in FY 2022/23:

- Woodland Capacity and Creek Crossings Project
- FY 2023/24 Gravity Sewer Improvements Project
- Winship Bridge Sewer Relocation
- Nokomis Bridge Sewer Relocation
- Meadow Way Bridge Sewer Relocation

Pump Station Rehabilitation Projects

The following pump station rehabilitation projects were completed prior to FY 2022/23:

- Portions of PS 15 Kentfield Pump Station Improvements identified in the IAMP
- PS 15 Kentfield Comminutor Replacement
- PS 12 Bon Air and PS 13 Greenbrae Pump Station Rehabilitation Projects
- PS 15 Kentfield Pump Station Improvements

The following pump station rehabilitation projects were mostly completed during FY 2022/23:

- PS 14, 24, & 25 Pump Stations Improvements Project

The following pump station rehabilitation projects were in design phase in FY 2022/23:

- LS 20, 31 and 32 Lift Stations Improvements Project
- LS 30 Lift Station Improvements Project (Heather Gardens)

Force Main Projects

The following force main projects were completed prior to FY 2022/23:

- FY 2014/15 Force Main Appurtenance Project
- FY 2019/20 Force Main Appurtenance Project

Other Capital Projects

The following other capital projects were completed prior to FY 2022/23:

- Larkspur Excavation and Remediation Project at 2000 Larkspur Landing Circle, the former RVSD wastewater treatment plant, to remove soils contaminated by trace levels of PCBs in accordance with U.S. EPA requirements.

The following other capital projects were in construction phase in FY 2022/23:

- Andersen Building Improvements Project

Plans and Studies

The following plans and studies were completed prior to FY 2022/23:

- Flow Monitoring Study
- Large Diameter Condition Assessment
- Infrastructure Asset Management Plan (IAMP) Update

The following plans and studies were completed in FY 2022/23:

- Wastewater Collection System Capacity Evaluation

CAPITAL PROGRAM FINANCIALS

In FY 2022/23, combined capital program earnings for gravity sewer improvement, pump station, and other projects totaled $7.3 million[1] for construction contracts and $1.6 million for professional services agreements. Two capital projects were completed in FY 2022/23; project summary sheets are included in Appendix B.

Construction Financials

Construction financials are included in Table 1. Construction billings were close to the expected spending of $7.6 million. Remaining budget was moved forward to FY 2023/24 because the projects will still be completed. Payments to the contractor and associated retention were 96% of the total budget amount.

Professional Services Financials

Professional services financials are included in Table 2.

[1] $6.7 million due to contractor plus $600 thousand in retention balance at the end of the year

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YEAR-END CAPITAL PROGRAM REPORT
FY 2022/23 JULY 2022 - JUNE 2023

Table 1. Capital Improvement Projects – Construction Phase Financials – FY 2022/23 Year End

																												FY 2022/23	
	Construction			Construction Contract							Progress Billings through FY 2022/23 Year End ($000)																		
Project	Probable Construction Cost in Budget	Updated Probable Construction Cost	FY 2022/23 Construction Budget	Award Month	Completion Month[2]	Contractor	Contract Amount	Change Orders Total	% of Original Contract	Revised Contract Amount	Payments prior FY	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Total Payments FY 2022/23	Total Payments to Date	Retention Balance	Total Billed to Date	Contract Amount Remaining
GRAVITY SEWER IMPROVEMENT PROJECTS																													
FY 20/21 Gravity Sewer Improvements Project	5,100	4,370	750	Jun-2021	Nov-2022	Glosage Engineering, Inc.	4,370	**1,013**	**23.2%**	5,383	4,834					280								**280**	5,114	269	5,383	0
FY 22/23 Gravity Sewer Improvements Project	1,975	3,258	3,000	Sep-2022	Jun-2023	Glosage Engineering, Inc.	1,975	**1,283**	**64.9%**	3,258							672	39		1,171	1,213			**3,095**	3,095	163	3,258	0
Pump Station Projects																													
PS 14, 24, 25 Larkspur Pump Station Improvements	1,633	1,633	1,100	Jul-2021	Nov-2023	Pacific Infrastructure Corp.	1,633	**106**	**6.5%**	1,739	315	218	203		304		170					137	265	**1,297**	1,613	85	1,697	41
OTHER																													
Andersen Building Improvements	2,900	2,800	2,800	Mar-2022	Dec-2023	Kirby Construction Company, Inc.	2,404	**280**	**11.7%**	2,684	72	13	95	193	360	165	238	143		442			373	**2,022**	2,094	110	2,204	480
Total for Projects In/Budgeted for Construction FY 2022/23	11,608	12,061	7,650				**10,381**	**2,682**	**25.8%**	13,063	5,221	231	299	193	664	445	1,080	182		1,614	1,213	137	637	**6,695**	11,915	627	12,543	521
Construction FY 2022/23																													

Key:

Construction work is completed (Final Completion)
Construction work is awarded or in progress

Notes:

1. Dollar amounts are in thousands ($000)
2. Completion month is anticipated Board acceptance and filing the Notice of Completion, not the construction work (in the field) completion

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Table 2. Capital Improvement Projects – Professional Services Contract Financials – FY 2022/23 Year End

Project and Consultant	Professional Services Contract					Billings through FY 2022/23				Payment History		
	Contract Date	Contract Amount	Amendment Total	% of Original Contract	Revised Contract Amount	Q1	Q2	Q3	Q4	Payments FY 2022/23	Payments Prior FY	Payments to Date
GRAVITY SEWER IMPROVEMENT PROJECTS												
FY 22/23 Gravity Sewer Improvements Project										**355**		**208**
Harris and Associates (ENG/ESDC)	Nov-2021	305	35	11%	340	72	20	11	4		210	317
Integral Consulting, Inc. (ENV)	May-2022	58		0%	58		16	5	19			40
Psomas (CM)	Sep-2022	386		0%	386		15	124	70			208
FY 23/24 Gravity Sewer Improvements Project										**435**		**435**
Harris and Associates (ENG/ESDC)	Nov-2022	599		0%	599			84	342			427
Jill Barnes (PM)	Aug-2022	14		0%	14		9					9
Winship Capacity Improvements and Bridge Sewer Relocation										**53**		**53**
Harris and Associates (ENG/ESDC)	Jan-2021	129		0%	129		15					15
Jill Barnes (PM)	Dec-2018	129		0%	129	5	9	7				21
Integral Consulting, Inc. (ENV)	Jan-2023	32		0%	32			10	7			17
Woodland Capacity And Creek Crossings Project										**196**		**196**
Harris and Associates (ENG/ESDC)	Aug-2022	286		0%	286	12	109	66				188
Integral Consulting, Inc. (ENV)	Sep-2023	56		0%	56				8			8
FY 20/21 Gravity Sewer Improvements Project										**110**		**797**
Harris and Associates (ENG/ESDC)	Jul-2020	378		0%	378			12			311	322
Park Engineering, Inc.(CM)	May-2021	516		0%	516		66		15		328	409
Jill Barnes (PM)	Feb-2021	25		0%	25						24	24
Integral Consulting, Inc. (ENV)	Mar-2021	13	28	217%	41		17				24	41
PUMP STATION PROJECTS												
LS 20, 31 & 32 Lift Station Improvements Project										**111**		**271**
Nute Engineering (ENG)	Feb-2020	235		0%	235	46	29	29	6		161	271
PS 14, 24, & 25 Pump Station Improvements Project										**133**		**466**
Psomas (CM)	Apr-2021	223		0%	223	25	39	26	11		62	163
Nute Engineering (ENG)	Feb-2020	235	85	36%	320	12	10	9	2		271	304
OTHER												
Andersen Building Improvements Project										**184**		**204**
Rosalyn Brandt Design(PM)	Jan-2020	12	20	167%	32	5	10	35	51		20	121
Park Engineering, Inc.(CM)	Nov-2021	177		0%	177			45	39			84
Total CIP Professional Services		3,811	168	4%	3,979	177	365	463	572	**1,577**	1,411	**2,631**

Key:

Construction work is in progress

Project is in Design (Construction work not started)

Project Completed

Notes:

1. Amounts are in thousands of dollars.
2. One contract (per consultant) may be distributed across multiple construction projects for tracking.

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EMERGENCY REPAIR PROJECTS

Over the last 10 years, the District has completed 12 emergency repairs that were often brought to the Board for action (when the repair was expected to cost greater than $15,000) to declare or review and terminate an emergency. These emergency repair projects are summarized below.

55% of the emergency repair projects are identified during response to an SSO and 55% involve a creek crossing; the 2021 IAMP Update includes a creek crossing assessment task and review/update to the likelihood of failure and consequence of failure criteria in the risk model.

Table 3. Emergency Repair History

Name	Board /GM	Month(s)	Asset	Cause	SSO	Creek	Slide	Pipe Repair	CIPP Line	Replace	Manhole	Approximate Cost
Westbrae Trunkline	Board	Jul 2013	150 LF of 8-inch with aerial creek crossing	Age/joint	X	X		X	X		X	$ 70,000
Greenbrae Force Main	Board	Sep-Oct 2013	30-inch RCP force main in ARV vault	Pipe material	X			X				$ 50,000
11 Evergreen	Board	Nov 2013	20 LF of 6-inch in bridge over creek	Age/Joint	X	X		X				$ 10,000
3 Boardwalk 1	GM	Jun-Jul 2016	10 LF of 8-inch in tidal zone	Structural collapse		X		X				$ 70,000
Ichabod easement	Board	Sep-Nov 2016	340 LF of 10-inch with aerial creek crossing	Bank erosion	X	X		X	X			$ 100,000
31 Ellsworth	Board	Mar-Jun 2017	Easement below pipeline failed, no damage to sewer	Slide			X					$ 20,000
Baywood Ct	Board	Sep 2017 to Feb 2018	240 LF of 14-inch across creek	Tree/Age		X				X		$ 460,000
9 Summit Rd	Board	Jul 2019 to Nov 2019	200 LF of 4-inch pipe	Slide	X		X					$ 145,000
31 Ellsworth	Board	Jun 2020 to Oct 2020	Damaged easement threatening stability of sewer	Slide			X					$ 83,000
Bolinas Ave Storm Drain	Board	Aug 2020	Reinstate 104 LF of 8-inch pipe, severed by storm drain project	Contractor damaged				X		X		$ 66,000
15 Mitchell, Fairfax	GM	April 2021	20 LF of asbestos cement pipe replaced, night work Maggioria & Ghilotti	AC pipe failure				X		X		$ 18,000
104 Calumet	GM	June 2022	129 LF of 6-inch sewer bridge across creek	Excessive line cleaning pressure	X	X			X			$ 11,000
		Total	**1,213 LF**									**$ 1,103,000**

AS-NEEDED, ON-CALL SEWER SYSTEM CONSTRUCTION SERVICES

Table 4. As-Needed, On-Call Sewer System Construction History

Name	Contractor	Month	Asset	Cause	SSO	Creek	Slide	Pipe Repair	CIPP Line	Replace	Manhole	Pipe Burst	Approximate Cost
4 Woodside Way, Ross	Maggiora & Ghilotti	July 2020	Remove lamphole, replace with manhole	Broken lamphole connection				X					$ 17,500
Harvard Drive, LK	JNG Pipelines	January 2022	Replace 80 LF of main via open cut	Raised sanitary sewer main to avoid City storm drain project						X			$ 30,000
473 Scenic Ave, SA	Condor Constructio n	August 2022	Replace 90 LF of 6-inch main	Defective fittings on District main	X			X		X			$ 8,000
		Total	**170 LF**										**$ 55,500**

DISTRICT CAPITALIZED REPAIRS

Table 5. District Capitalized Repairs History

Name	Contractor	Board /GM	Month	Asset	Cause	SSO	Creek	Slide	Pipe Repair	CIPP Line	Replace	Manhole	Approximate Cost
100 W. Oak Knoll, SA	Condor Construction	GM	November 2020	15 LF of 6-inch sewer	Age/Failure				X		X		$1,200
110 Forest Ave, FX	Condor Construction	GM	February 2021	Rod hole replacement, lower lateral	Age/Erosion				X			X	$16,500
471 Redwood Rd, SA	H&R Underground	GM	August 2021	Repair of Grade 5 defect on 6-inch pipe	Defective installation				X				$8,800
123 Terrace Ave, KF	H&R Underground	GM	September 2021	Repair of Grade 5 defect on 6-inch pipe	Age/Failure				X		X		$6,500
66 Walnut Ave, LK	H&R Underground	GM	September 2021	Repair of Grade 5 defect on 6-inch pipe in private easement	Age/Failure				X		X	X	$10,000
644 Goodhill Rd, KF	JNG Pipelines	GM	January 2022	Removal of failed rod hole, repair Grade 5 defect on 6-inch pipe in private easement, replaced 110 LF pipe bursting	Slide/Age			X	X		X	X	$40,000
515 Los Cerros	JNG Pipelines	GM	March 2022	Increased size of lower lateral, 15 LF of 6-inch lateral	SSO	X					X		$9,000
Citron Fire Rd	Glosage Engineering	GM	March 2022	Pipe Burst 215 LF of 6-inch pipe, install new MH	Age/Failure						X	X	$43,000
50 Bella Vista Ave, SA	JNG Pipelines	GM	September 2022	Replace Manhole	Defective manhole caused SSO							X	$13,300
639 Magnolia Ave, LK	JNG Pipelines	GM	September 2022	Install new MH, remove blind-tee	New MH							X	$15,500
Spring Grove Manholes	Coastside Concrete	GM	September 2022	Spot repair on 6-inch main, Install 2 new MH's	Improve access, pipe failure				X			X	$22,500
16 Bolinas	Glosage Engineering	GM	December 2022	Abandon 27 LF of 8-inch main, abandon 1 MH	Capital improvement							X	$9,250

250 Bon Air	Glosage Engineering	GM	March 2023	Repair 8 LF of 8" force main	Damaged by contractor				X				$9,015
33 Evergreen	JNG Pipelines	GM	May 2023	Install 130 LF of new 6-inch pipe via open-cut	Private property construction				X				$58,250
771 Magnolia	Glosage Engineering	GM	May 2023	Pipe burst 236 LF of 6-inch pipe, install new MH	Failure, sidewalk condition				X		X	X	$19,732
Smith Lane, SA	Glosage Engineering	GM	June 2023	Pipe burst 177 LF of 6-inch pipe	Age/failure	X			X		X		$46,974
101 Calumet	Glosage Engineering	GM	September 2023	Replace damaged MH, Pipe burst 30 LF of 6-inch pipe	Paving contractor damage, age/failure of pipe				X		X	X	$15,210
			Total	**826 LF**									**$ 344,731**

APPENDIX A. PROJECT DESCRIPTIONS AND STATUS

Gravity Sewer Improvement Projects

Project Name	Project Description	Status
As-Needed, On Call Sanitary Sewer System Construction Services	As-needed repair and replacement of sewer system infrastructure including urgent and emergency pipe repairs and installation of manholes	Ongoing/As-Needed
District Capitalized Repairs	Annual repair, restoration, and improvement of gravity sewer pipeline infrastructure	Ongoing/As-Needed
FY 2015/16 Gravity Sewer Improvements	6.7 miles of rehabilitation/replacement of gravity sewers in Kent Woodlands Upper, Southwood, and Winship areas.	Completed
FY 2016/17 Gravity Sewer Rehabilitation Project	8.4 miles of rehabilitation/replacement and restoration by repair of gravity sewers in Butterfield/Woodside, Scenic, Tamalpais, and Madrone areas	Completed
FY 2016/17 Gravity Sewer Improvements Nokomis/ Meadowcroft	0.6 mi of diversion and replacement gravity sewer in San Anselmo including new diversion and replacement gravity sewer by open-cut (~1,900 LF), pipe bursting (~350 LF), pipe reaming (~440LF), and cured-in-place pipe (~350 LF) methods, including the Nokomis and Lower Butterfield capacity improvements	Completed
FY 2016/17 Gravity Sewer Improvements Butterfield/ Meadowcroft-Arroyo	0.4 mi of diversion and replacement gravity sewer in San Anselmo including open-cut and pilot-tube guided boring methods in Meadowcroft Dr, Willow Way, and Butterfield Rd between Meadowcroft and Arroyo	Completed
FY 2016/17 Gravity Sewer Improvements Butterfield/ Arroyo-Kenrick	0.3 mi of diversion and replacement gravity sewer in San Anselmo including open-cut methods in Butterfield Rd between Arroyo and Kenrick	Completed
Laurel Grove Sewer Rehabilitation Project	Replacement of approximately 4,436 feet of pipe, mostly by pipe bursting and upsizing the diameter of the trunk line under Laurel Grove Avenue between Sir Francis Drake Blvd. and Makin Grade.	Completed
FY 2020/21 Gravity Sewer Improvements	2 mi of gravity sewer rehabilitation and additional restoration predominately in the Sequoia Park area of San Anselmo, South Eliseo Drive between Bon Air Rd. and Corte Real, and near Rancheria and Evergreen in Kent Woodlands	Completed
FY 2022/23 Gravity Sewer Improvements	Replace approximately 1 mile of sewer segments prioritized in the 2021 IAMP Update and recent SSOs, primarily installed via the pipebursting method	Completed
FY 2023/24 Gravity Sewer Improvements	Rehabilitate approximately 3 miles of rehabilitation and upsizing of gravity sewer mostly by trenchless pipebursting and some open cut/trench construction to remove sags. Sewers are higher risk assets prioritized in the 2021 IAMP update, gravity lines with maintenance and access issues and sanitary sewer overflow (SSO) sites identified through SSMP	Design
Inflow and Infiltration Reduction Program	I&I reduction on gravity sewers, including joint grouting, CIPP lining, manhole rehabilitation, and other I&I reduction work	Ongoing
Large Diameter Gravity Sewer Rehabilitation Project II-1	Rehabilitation of high priority Techite and non-reinforced concrete large diameter pipe, ranging from 18- to 36-inch diameter, on the Original 1920s Trunk Sewer, Ross Valley Trunk Line and the Shady Lane Trunk Sewer	Completed

Large Diameter Gravity Sewer Rehabilitation Project II-2	Rehabilitation of Techite and non-reinforced concrete large diameter pipe, ranging from 18- to 36-inch diameter, on the Original 1920s Trunk Sewer and Ross Valley Trunk Line through Downtown San Anselmo	Completed
Large Diameter Gravity Sewer Rehabilitation Project II-3A – Upper Shady Lane/Ross Common	0.4 miles of trunk sewer reconstruction in Ross, including portions of the Shady Lane Trunk Sewer including Upper Shady Lane and Ross Common	Completed
Large Diameter Gravity Sewer Rehabilitation Project II-3B - Lower Shady Lane/Poplar	0.8 miles of trunk sewer reconstruction in Ross, including portions of the Shady Lane Trunk Sewer including rehabilitation in Lower Shady Lane and Poplar Avenue and parallel sewer installation in Poplar Avenue	Completed
Ross Creek Sewer Removal Project	Remove abandoned 24" sewer from creek bed of Ross Creek at the Shady Lane bridge	Completed
Woodland Capacity and Creek Crossings Project	Upgrade trunk line along Woodland Road to increase capacity and improve multiple creek crossings of Tamalpais Creek and tributaries. Replace 3,086 LF of sewers via pipe bursting, 911 LF of sewers via open cut. Replace 5 creek crossings with siphons, deep burial, or pipebursting beneath the creek bed	Design
Winship Capacity Improvements and Bridge Sewer Relocation	Replace an under-sized 6" line on Winship Bridge by installing a 210 foot-long 6" and 8"siphon through a steel casing installed at the base of a new bridge over San Anselmo Creek that will be constructed by the Town of Ross.	Design

Pump Station Projects

PUMP STATION PROJECTS		
LS 30 Heather Gardens Lift Station Improvements	Pump station relocation/separation from storm water pump station.	Design
LS 20, 31, & 32 Lift Station Improvements	Pump station rehabilitation to submersible pumps.	Design
Riviera Circle Pump Station Improvements Riviera Circle pump station equipment upgrades, LS 33, 34, 35, and 36	Riviera Circle pump station equipment upgrades, LS 33, 34, 35, and 36	Planning
PS 12 Bon Air and PS 13 Greenbrae Pump Station Rehabilitation Projects	Full pump station rehabilitation to improve the capacity, operation, and reliability of PS 12 Bon Air and PS 13 Greenbrae pump stations.	Completed
PS 15 Kentfield Comminutor Replacement	Replacement of the grinders at PS 15 Kentfield.	Completed
PS 15 Kentfield Pump Station Improvements Project	Replace variable frequency drives and miscellaneous electrical and instrumentation improvements at PS 15 Kentfield.	Completed
Pump Station Equipment Upgrades	Annual maintenance rehabilitation/ replacement of pump station mechanical and electrical components.	Ongoing/As-Needed
Lift Station Evaluation	Evaluation of the District's minor pump stations	Completed
PS 14, 24, & 25 Pump Station Improvements Project	Improve the capacity, operation, backup power and reliability of PS 14, 24, & 25.	Construction

Force Main Projects

FORCE MAIN PROJECTS		
FY 2019/20 Force Main Appurtenance Projects	Isolation and air release valves, bypass connections, and corrosion protection. Includes isolation and air release valves on FM,-13, -14, -24 and -33.	Completed

Other Capital Projects

OTHER CAPITAL PROJECTS		
Larkspur Excavation and Remediation Project at 2000 Larkspur Landing Circle	Remove and replace approximately 40,000 cubic yards of PCB contaminated soil	Completed
Andersen Building Improvements Project	District Headquarters Consolidation Project at 1111 Andersen Dr., San Rafael, CA	Construction

APPENDIX B. PROJECTS COMPLETED IN FY 2022/23

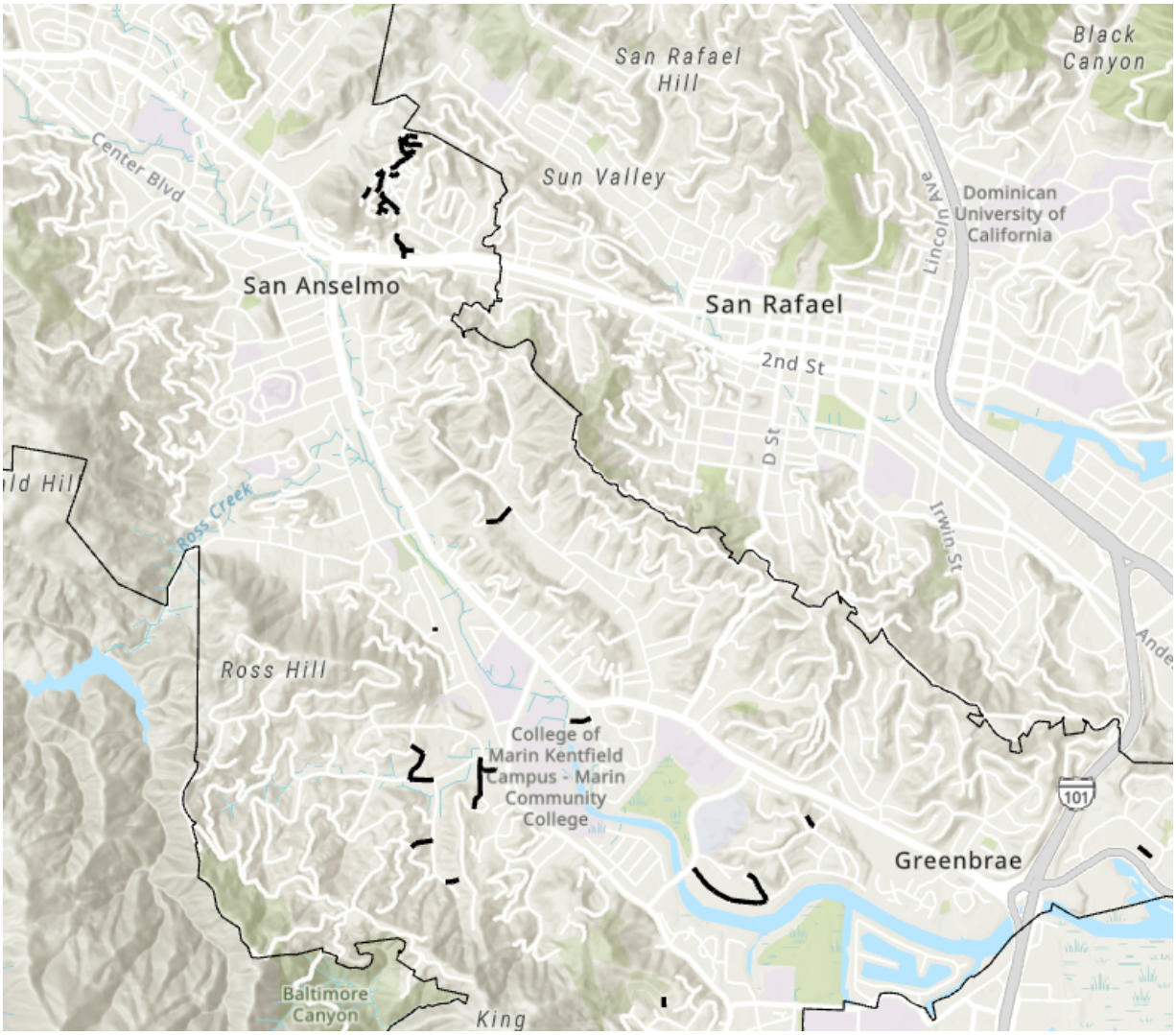
Two projects were completed in FY 2022/23: FY 2020/21 Gravity Sewer Improvements Project and FY 2022/23 Gravity Sewer Improvements Project.

FY 2020/21 Gravity Sewer Improvements Project

Project Name:	FY 2020/21 Gravity Sewer Improvements Project		
Project Type:	Gravity Sewer Improvements		
Project Description:	Structural rehabilitation, I&I reduction, SSO reduction, and O&M improvements		
Community(ies):	Greenbrae, Kentfield, Larkspur, San Anselmo		
Engineer:	Harris and Associates		
Contractor:	Glosage Engineering, Inc.		
Construction Manager:	Park Engineering, Inc.		
Award Month:	June 2021	Contract Date:	June 16, 2021
Notice to Proceed:	June 16, 2021	Final Completion:	November 16, 2022
Board Acceptance:	November 16, 2022	Notice of Completion:	November 16, 2022

CONSTRUCTION FINANCIALS			
Project Costs ($000) by Fiscal Year			
Fiscal Year	2021/22	2022/23	**TOTAL**
Construction	4,834	549	**5,383**

Map of the Project

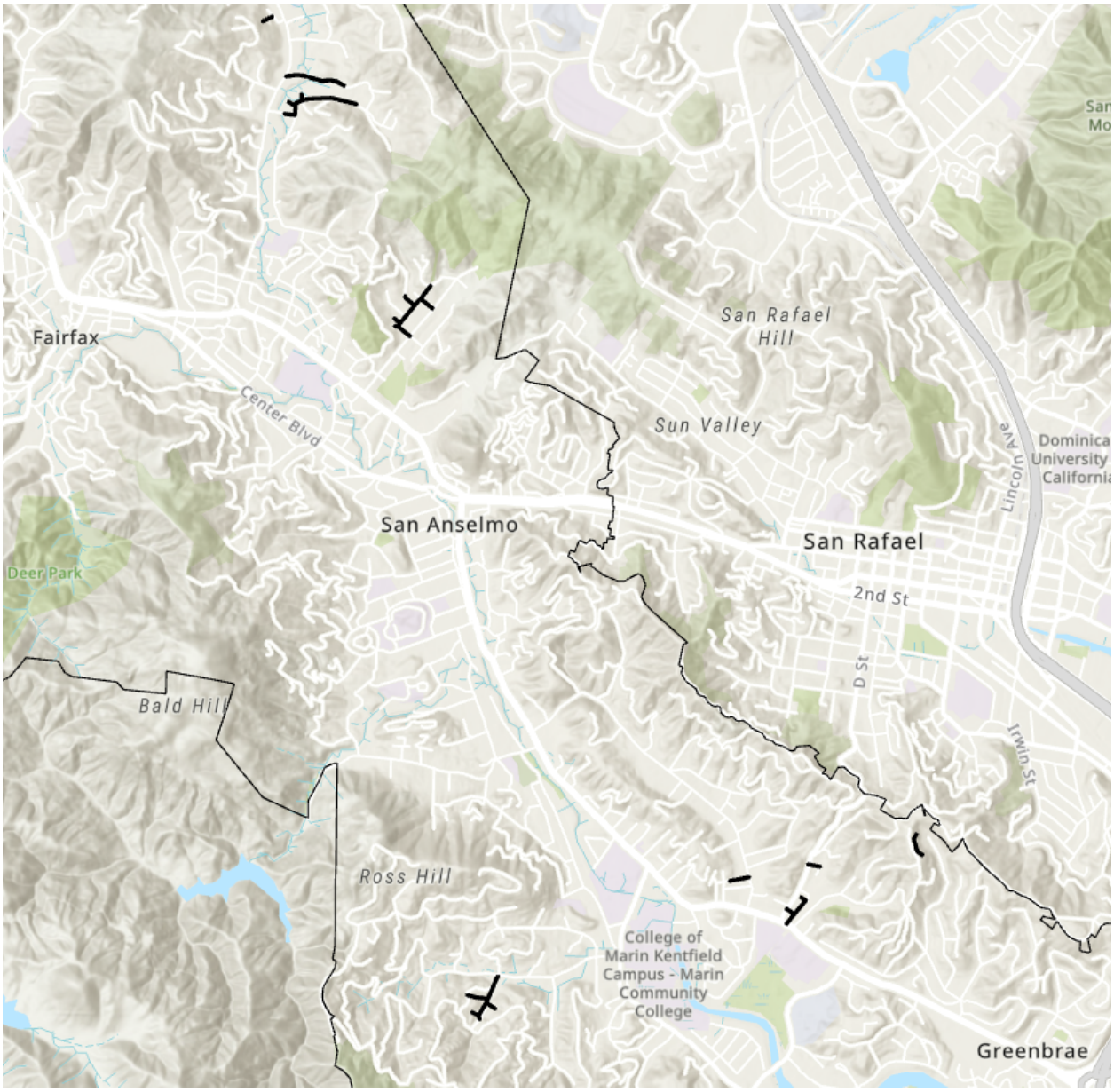


FY 2022/23 Gravity Sewer Improvements Project

Project Name:	FY 2022/23 Gravity Sewer Improvements Project		
Project Type:	Gravity Sewer Improvements		
Project Description:	Structural rehabilitation, I&I reduction, SSO reduction, and O&M improvements		
Community(ies):	Greenbrae, Kentfield, San Anselmo, Sleepy Hollow		
Engineer:	Harris and Associates		
Contractor:	Glosage Engineering, Inc.		
Construction Manager:	Psomas		
Award Month:	September 2022	Contract Date:	September 22 2022
Notice to Proceed:	November 28, 2022	Final Completion:	April 2023
Board Acceptance:	June 21, 2023	Notice of Completion:	June 21, 2023

CONSTRUCTION FINANCIALS		
Project Costs ($000) by Fiscal Year		
Fiscal Year	2022/23	**TOTAL**
Construction	3,258	3,258

Map of the Project



D APPENDIX C. ACRONYMS, ABBREVIATIONS, TERMS, AND DEFINITIONS

ADWF	Average Dry Weather Flow
ARV	air release valve
CBT	Competency Based Training program
CCTV	closed circuit television
CDO	Cease and Desist Order
CIP	Capital Improvement Plan or Program
CIPP	cured-in-place pipe; a pipe lining method
CIWQS	California Integrated Water Quality System
CMMS	Computerized Maintenance Management System
CMSA	Central Marin Sanitation Agency
COF	Consequence of Failure
Design Storm	10-year 24-hour design storm (USCS Type IA rainfall distribution curve)
District	Ross Valley Sanitary District
EMS	Enterprise Management System
FM	force main
FOG	Fats, Oil, and Grease
ft	feet
FY	Fiscal Year; July to June
gal	gallons
GIS	Geographic Information Systems
GPS	Global Positioning System for satellite-based location information
HFC	High Frequency Cleaning, <1 year
hr	hour
IAMP	Infrastructure Asset Management Plan
I&I	Infiltration and Inflow
in	inches
InfoNet	District's CMMS software
JPA	Joint Powers Authority (part of CMSA)
kWh	kilowatt-hour; unit of energy
LF	linear feet
LOF	Likelihood of Failure

LOS	Level of Service
LRGP	Lateral Replacement Grant Program
LRLP	Lateral Replacement Loan Program
LS	Lift Station
MACP	Manhole Assessment and Certification Program ©
MG	million gallons; measure of flow volume.
mgd	million gallons per day; measure of flow rate
mi	miles
O&M	Operations and Maintenance
PACP	Pipeline Assessment and Certification Program ©
PS	Pump Station
PSL	Private Sewer Lateral
PWWF	Peak Wet Weather Flow
QA/QC	quality assurance and quality control
RDI/I	rainfall-dependent infiltration/inflow
R Factor	wet weather I&I volume/rain volume onto tributary area, as percent (a measure of how much of the rain that falls makes its way into the sanitary sewer pipes)
RVSD	Ross Valley Sanitary District
RWQCB	Regional Water Quality Control Board
SCADA	supervisory control and data acquisition
SMARTool	Sewer Main Asset Replacement Tool; risk model used in 2013-15
SOP	Standard Operating Procedure
SSMP	Sewer System Management Plan
SSO	Sanitary Sewer Overflow
USA	Underground Service Alert
VFD	variable frequency drive
WWPF	wet weather peaking factor
WWTP	wastewater treatment plant
yr	Year