NOTICE AND AGENDA
Regular Board Meeting
Sanitary District No. 5 of Marin County
Thursday, May 20, 2021

5:00 P.M. REGULAR BOARD MEETING

CORONA VIRUS (COVID-19) ADVISORY NOTICE

Consistent with Executive Orders No. N-25-20 and No. N-29-20 from the Executive Department of the State of California, the Meeting will not be physically open to the public and all Board Members and Staff will be teleconferencing into the meeting.

How to Submit Public Comments:
Comments submitted prior to the commencement of the meeting will be presented to the Board and included in the public record for the meeting.

Public Comments are to be submitted via email to rdohrmann@sani5.org.

In addition, members of the public who are calling in, will have the opportunity to provide public comments by following the steps below:

How to Participate in the Meeting:
Join Zoom Meeting by clicking on the following link:

https://us02web.zoom.us/j/6230620778

Meeting ID: 623 062 0778

or join by phone:

Call in number: (669) 900-9128 Participant Code: 623 062 0778

ROLL CALL

PUBLIC COMMENTS: The public is invited to address the Board on items that do not appear on the agenda and that are within the subject matter jurisdiction of the Board. The Brown Act does not allow the Board to take action on any public comment. Please limit public comments to no more than three minutes.

DIRECTORS' COMMENTS AND/OR AGENDA REQUESTS:

CONSENT CALENDAR:

1. Approval of April 15, 2021 Regular Board Meeting Minutes and May 6, 2021 Special Board Meeting Minutes (Dohrmann)
2. Review and receive all electronic fund transfers (EFTs) and approve warrants from April 14th through May 11th, 2021 (JP Morgan Chase Bank, check no. 8199 through check no. 8242, all transactions totaling $538,857.01) and receive April 2021 payroll, in the sum of $113,935.13 (Dohrmann)
3. Receipt of financial reports for April 2021 (Dohrmann)

MANAGEMENT REPORTS:

4. District Management Summary Report (Rubio)

NEW BUSINESS:

5. Presentation by HDR regarding "Sanitary District No.5 of Marin County Renewable Energy Study" final report -Action (Rubio)

NEW BUSINESS (cont'd):

6. Introduction of 2088 Paradise Drive new owners (neighboring SD5 Tiburon Pump Station #4), and discussion of future plans for the neighboring property re Tiburon Station #4 (Rubio) – **Discussion only**

7. Presentation by Eric Hohmann re future plans for the Mallard Properties (Rubio) – **Discussion only**

8. PUBLIC HEARING: Fiscal Year 2021-2022 Budget

    a. Public Comment

    b. Set Hearing for Consideration of Adoption of FY2021-2022 Final Budget at Regular Board Meeting on June 17th, 2021 (Rubio) – Action

9. Consideration of adoption of Resolution No. 2021-01: Determination of Appropriations Limit for the Tiburon Zone of Sanitary District No. 5 of Marin County for Fiscal Year 2021-2022 (Rubio) – Action

10. Review and approval of the FY2021-2022 SD5 Organizational Chart and Publicly Available Pay Scale and Resolution No. 2021-02: A Resolution of the Board of Directors of Sanitary District No. 5 of Marin County Adopting the Annual Cost of Living Increase (2.5%) for all Sanitary District No. 5 of Marin County Employees – Represented, Unrepresented, both effective on July 1, 2021 (Rubio) – Action

11. Consideration of Adoption of Resolution No. 2021-03: A Resolution Approving and Adopting Fiscal Year 2021-2022's Financial Reserve/Fund Policies for the Belvedere and Tiburon / Paradise Cove Zones (Rubio) – Action

UNFINISHED BUSINESS:

COMMITTEE REPORTS:

12. Capital Improvement Program Committee (Moody/Arias-Montez)

13. Finance & Fiscal Oversight Committee (Benediktsson/Arias-Montez)

14. Governance Committee (Moody/Carapiet)

15. Personnel Committee (Benediktsson/Snyder)

OTHER BUSINESS:

ENVIRONMENTAL:

CORRESPONDENCE:

INFORMATIONAL ITEMS:

16. "Genome Sequencing of Sewage Detects Regionally Prevalent SARS-CoV-2 Variants," published January/February 2021, Vol. 12, Issue 1 e02703-20, by Alexander Crits-Christoph, Rose S. Kantor, Matthew R. Olm, Oscar N. Whitney, Basem Al-Shayeb, Yue Clare Lou, Avi Flamholz, Lauren C. Kennedy, Hannah Greenwald, Adrian Hinkle, Jonathan Hetzel, Sara Spitzer, Jeffery Koble, Asako Tan, Fred Hyde, Gary Schroth, Scott Kuersten, Jillian F. Banfield, Kara L. Nelson (Melinda M. Pettigrew*, Editor);* (https://mbio.asm.org/content/12/1/e02703-20)

17. "Challenges in Measuring the Recovery of SARS-CoV-2 from Wastewater," published on March 3, 2021, by Rose S. Kantor, Kara L. Nelson, Hannah D. Greenwald, and Lauren C. Kennedy; Published in Environmental Science Technology, 2021, 55, 3514-3519; (https://pubs.acs.org/doi/10.1021/acs.est.0c08210)

18. "Where coronavirus variants emerge, surges follow – new research suggests how genomic surveillance can be an early warning system," published on May 5, 2021, by Bart C. Weimer and Darwin Bandoy; (https://apnews.com/article/genomics-science-health-coronavirus-pandemic-ac470d1f342e47cdb460bab4d8a00d2c)

CONVENE TO CLOSED SESSION

19. Convene to Closed Session (the public may provide comments regarding the closed session item(s) just prior to the Board beginning the Closed Session. Closed Sessions are not open to the public).

    a) Conference with Legal Counsel – Anticipated Litigation

    Initiation of litigation pursuant to Government Code section 54956.9(d)(4): (1 potential case)

20. Report out of Closed Session

ADJOURNMENT

The Board will be asked to adjourn the meeting to a Regular Board Meeting on June 17, 2021, at 5:00 P.M.

The Board of Directors may, at its discretion, consider agenda items out of the order in which they appear above.
Accessible public meetings: Upon request, the District will provide written agenda materials in appropriate alternate formats, or disability-related modification or accommodation, including auxiliary aids or services to enable individual with disabilities to participate in public meetings. Please submit written requests to the District at P.O. Box 227, Tiburon, CA 94920 or rdohrmann@sani5.org at least two days prior to the meeting.

Minutes of a Regular Board Meeting
Sanitary District No. 5 of Marin County
Thursday, April 15, 2021

5:00 P.M. REGULAR BOARD MEETING

CORONA VIRUS (COVID-19) ADVISORY NOTICE

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ROLL CALL by President Richard Snyder at 5:00 P.M.

ROLL CALL	Directors present:	Richard Snyder, President John Carapiet, Vice President Omar Arias-Montez, Secretary Catharine Benediktsson, Director Tod Moody, Director
	Staff present:	Tony Rubio, District Manager Robin Dohrmann, Office Manager
	Others in attendance:	Benjamin Stock, Burke, Williams, & Sorensen, LLC Matthew Cunha-Rigby, HDR, Inc. Mary Martis, HDR, Inc

PUBLIC COMMENTS: The public is invited to address the Board on items that do not appear on the agenda and that are within the subject matter jurisdiction of the Board. The Brown Act does not allow the Board to take action on any public comment. Please limit public comments to no more than three minutes.

There were no public comments at this time.

DIRECTORS' COMMENTS AND/OR AGENDA REQUESTS:

- Director Moody recommended continued discussion re COVID19 data and its effects on SD5
- Director Moody requested revisiting Item #10 re energy goals for SD5
- Vice President Carapiet requested SD5 Staff research a project in progress at Mallard Road in Belvedere

CONSENT CALENDAR:

1. Approval of March 18, 2021 Regular Board Meeting Minutes (Dohrmann)
2. Review and receive all electronic fund transfers (EFTs) and approve warrants from March 10th through April 13th, 2021 (JP Morgan Chase Bank, check no. (7831A and) 8139 through check no. 8198, all transactions totaling $231,023.14) and receive March 2021 payroll, in the sum of $95,620.31 (Dohrmann)
3. Receipt of financial reports for March 2021 (Dohrmann)

Discussion by the Board. Motion (Benediktsson/Moody) to approve Items No. 1 through No. 3 on the Consent Calendar. Passed unanimously.

President Snyder moved to New Business, Item #5 (5:05 p.m.), for consideration, as described on the agenda to this time.

NEW BUSINESS:

5. Review and discuss presentation by HDR regarding "Sanitary District No.5 of Marin County Renewable Energy Study" draft report (Rubio)

Matthew Cunha-Rigby from HDR, Inc. presented a visual report, in draft form to include feedback from Board Members. Discussion by the Board only.

President Snyder moved to Management Reports (5:34 p.m.), for consideration, as described on the agenda to this time.

MANAGEMENT REPORTS:

4. District Management Summary Report (Rubio)

District Manager, Tony Rubio, presented a written and verbal report on current District issues, responding to questions from the Board. Discussion by the Board.

President Snyder moved to New Business, Item #6 (5:41 p.m.), for consideration, as described on the agenda to this time.

NEW BUSINESS (cont'd):

6. Review and accept "Sanitary District No.5 of Marin County Collection System Master Plan" Final Report as prepared by HDR – Action (Rubio)

Discussion by the Board. Motion (Moody/Carapiet) to accept "Sanitary District No.5 of Marin County Collection System Master Plan" Final Report as prepared by HDR. Passed unanimously.

7. Review and discuss Covid-19 Government-mandated shutdown effects to Commercial Sewer Service Fee revenue for Fiscal Year 2021-2022 – **discussion only** (Rubio)
8. Review and Discuss CPI data for 2020 SF Bay All Consumers - data used to establish Cost of Living Increase for employees as required by the Memorandum of Understanding for Fiscal Year 2021-2022 – **discussion only** (Rubio)
9. Review and Discuss section 9.4.1 of the Memorandum of Understanding between SD5 and the SD5 represented employees. Classic employees to pay additional 1% towards pension – **discussion only** (Rubio)
10. Discussion regarding future procurement of District vehicles in reference to the Ark newspaper article "Tiburon declares climate emergency, echoing state emissions, energy goals" – **discussion only** (Rubio)

President Snyder moved to New Business, Item #12 (6:10 p.m.), for consideration, as described on the agenda to this time.

12. Review and discuss total project cost and project time duration on the Cove Road Force Main Project, cost breakdown per zone and related discussion of contract terms on capital projects, administration of capital projects, use of consultants, and selection of consultants, oversight over contractors and consultants, and cost and time overruns – Action (Rubio)

Discussion by the Board. No action taken.

President Snyder moved to New Business, Item #11 (6:29 p.m.), for consideration, as described on the agenda to this time.

11. Review and approve progress payment #10 & #11 for the Cove Road Force Main Project Completion – Action (Rubio)

Discussion by the Board. Motion (Carapiet/Moody) to approve progress payment #10 & #11 for the Cove Road Force Main Project Completion. Passed unanimously.

UNFINISHED BUSINESS: None.

COMMITTEE REPORTS:

13. Capital Improvement Program Committee (Moody/Arias-Montez) – CIP Action Item Log provided
14. Finance & Fiscal Oversight Committee (Benediktsson/Arias-Montez) – verbal synopsis provided
15. Governance Committee (Moody/Carapiet) – N/A
16. Personnel Committee (Benediktsson/Snyder) – N/A

OTHER BUSINESS: None.

ENVIRONMENTAL: None.

CORRESPONDENCE: None.

INFORMATIONAL ITEMS:

17. Article "DeFazio Introduces $50B Bill for Wastewater Treatment Infrastructure," by Tom Ichniowski (Benediktsson)

18. Article "This tech recycles toilet water in Silicon Valley high-rises: Even the poop gets a second life," by Adele Peters (Benediktsson)

CONVENE TO CLOSED SESSION (6:39 p.m.)

19. Convene to Closed Session (the public may provide comments regarding the closed session item(s) just prior to the Board beginning the Closed Session. Closed Sessions are not open to the public).

    a) Conference with Legal Counsel – Anticipated Litigation
    Initiation of litigation pursuant to Government Code section 54956.9(d)(4): (5 potential case)

20. Report out of Closed Session (6:44 p.m.)

No action taken, direction given to District Manager and District Counsel.

ADJOURNMENT

The Board adjourned at 6:45 p.m. to a Special Board Meeting on May 6, 2021, at 5:00 p.m.

Approved:

Richard Snyder
President, Board of Directors

Attest:

Omar Arias-Montez
Secretary, Board of Directors

Minutes of a Special Board Meeting at Sanitary District No. 5 of Marin County Thursday, May 6, 2021

2:00 P.M. SPECIAL BOARD MEETING – BUDGET WORKSHOP

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Call in number: (669) 900-9128 Participant Code: 623 062 0778

2:00 P.M. SPECIAL BOARD MEETING – OPEN SESSION

CALL TO ORDER by President Richard Snyder at 2:00 P.M.

ROLL CALL

Directors present:
Richard Snyder, President
John Carapiet, Vice President
Omar Arias-Montez, Secretary
Catharine Benediktsson, Director
Tod Moody, Director

Staff present:
Tony Rubio, District Manager
Robin Dohrmann, Office Manager

PUBLIC COMMENTS: The public is invited to address the Board on items that do not appear on the agenda and that are within the subject matter jurisdiction of the Board. The Brown Act does not allow the Board to take action on any public comment. Please limit public comments to no more than three minutes.

There were on public comments at this time.

DIRECTORS' COMMENTS AND/OR AGENDA REQUESTS:

- Director Moody suggested actively searching for qualifying federal and/or state grants for Special Districts/wastewater utilities, etc.

NEW BUSINESS

1. Review and approve Cove Road Force Main Project change orders #12 through #16, and final progress payment #11, in the amount of $189,361 (one hundred eighty-nine, three hundred sixty one dollars only) for final closeout (Rubio) – Action

Discussion by the Board. Motion (Carapiet/Arias-Montez) to approve Change Orders #12 through #16, and final progress payment #11, in the amount of $189,361 (one hundred eighty-nine, three hundred sixty one dollars only) for final closeout. Passed (4-1-0-0).

2. BUDGET WORKSHOP

A. Review Fiscal Year 2021-2022 Preliminary Budget (Rubio)
   i. Operating budget review
   ii. Capital budget review
   iii. Capital Improvement Program

B. Review and discuss SD5 Strategic Plan. Provide updates to plan consistent with FY2021-2022 Budget Review (Rubio) – Action

Discussion by the Board. Item #2B was tabled to the Regular Board Meeting on May 20, 2021

C. Review and consideration of Fiscal Year 2021-2022 Preliminary SD5 Reserve Policies for the Tiburon and Belvedere zones (Rubio) – Action

Discussion by the Board. Item #2C was tabled to the Regular Board Meeting on May 20, 2021

3. Consideration of approval of Fiscal Year 2021-2022 Preliminary Budget in preparation for Public Notice to be provided at the May 20, 2021 Regular Board Meeting for consideration of approval and adoption of the Fiscal Year 2021-2022 Final Budget (Rubio) – Action

Discussion by the Board. Motion (Benediktsson/Arias-Montez) to approve of Fiscal Year 2021-2022 Preliminary Budget in preparation for Public Notice to be provided at the May 20, 2021 Regular Board Meeting for consideration of approval and adoption of the Fiscal Year 2021-2022 Final Budget. Passed unanimously.

ADJOURNMENT

The Board adjourned at 4:43 p.m.to a Regular Board Meeting on May 20, 2021, at 5:00 p.m. at the Main Plant of Sanitary District No. 5 of Marin County.

Approved:

Richard Snyder
President, Board of Directors

Attest:

Omar Arias-Montez
Secretary, Board of Directors

Sanitary Distr. No.5 of Marin Co.
Warrant List Summary
April 14 through May 11, 2021

Item #2

Date	Num	Name	Memo	Amount
JP Morgan Chase - Primary 7399				
05/06/21	EFT	Replacement Benefit Fund	Cust ID: 4163206459, Robert Lynch RBF Charges, CalPERS, May 2021	-341.64
05/06/21	EFT	CalPERS	EFT Health Premium, May 2021, Cust #4163206459	-14,248.69
05/06/21	EFT	PERS	EFT PERS Retirement, April 2021	-18,141.48
04/15/21	8199	Comcast Business	Acct# 8155 30 011 0149465, Bus. Voice, Internet & Cable, Feb-Mar-Apr, 2021	-1,214.14
04/15/21	8200	Maggiora & Ghilotti, Inc.	M&G Project #7716 - Cove Rd. Force Main Replacement Project, February 2021	-216,413.42
04/15/21	8201	Special District Risk Management Authorit	Member #7665, Life, Vision, DDS & LTD Ins., May 2021	-1,433.23
04/15/21	8202	State Water Resources Control Board	A Rubio Cert Renewals - April 2021	-110.00
04/15/21	8203	Verizon Wireless	Acct #0342125502-00001: iPhones, March 2021	-310.31
04/15/21	8204	Cintas Corporation #626	Acct #626-00821, PPE/Safetywear + Service, March 2021	-55.68
05/11/21	8205	Access Answering Service	Acct #4080C, Answering Service, May 2021	-60.00
05/11/21	8206	APG Neuros, Inc.	M.P Maint. Supplies, April 2021	-158.88
05/11/21	8207	AT&T	Acct #960732-76375559, April 2021	-961.04
05/11/21	8208	Atlas Copco Compressors, LLC	Cust #4000110864, M.P. parts & Srvc, April 2021	-660.00
05/11/21	8209	BAAQMD	Cust #10FZ3A1523 & 25GU8E2957, Plant #1523 & #22957, SD5 BAAQMD Permits, ...	-15,288.00
05/11/21	8210	Bank of New York Mellon Trust Company	Acct#: TIB/BELV2012, MPR Bond Admin & Dissem Fee, Mar 2021	-950.00
05/11/21	8211	Banshee Networks, Inc.	Computer/IT Support, March 2021	-3,494.70
05/11/21	8212	Brelje and Race Laboratories, Inc.	M.P./P.C. Plant Samples, February & March 2021	-3,230.00
05/11/21	8213	Caltest Analytical Laboratory	M.P./P.C. Lab Sampling, April 2021	-2,184.05
05/11/21	8214	Cintas Corporation #626	Acct #626-00821, PPE/Safetywear + Service, April 2021	-177.29
05/11/21	8215	CWEA	Certificate Renwals, May 2021	-576.00
05/11/21	8216	DKF Solutions Group, LLC	My Safety Officer Monthly Subscription, April 2021	-350.00
05/11/21	8217	Environmental Resource Associates	Acct #S057001, M.P. Lab Supplies, April 2021	-1,448.50
05/11/21	8218	Environmental Systems Research Institute	Cust #356200, ArcGIS Maintenance, April 2021 (FY21-22 AJE)	-700.00
05/11/21	8219	Fastenal Company	CASA10962, M.P. Supplies, April 2021	-3,273.86
05/11/21	8220	Frank Olsen Co.	Pump & Valve Replacement Program, April 2021	-3,231.81
05/11/21	8221	HDR Engineering, Inc.	Consulting, MCSD5 Cllxn Sys Mstr Plan + Alt Energy Study, April 2021	-16,357.75
05/11/21	8222	JM Integration, LLC	M.P. Parts & Service, April 2021	-2,010.64
05/11/21	8223	JWC Environmental	Cust ID #5034423, M.P. Supplies + Parts & Service, April 2021	-2,611.38
05/11/21	8224	Larry Walker Associates, Inc.	Tech Support for M.P. NPDES Reg. Assistance, March 2021	-411.00
05/11/21	8225	Maggiora & Ghilotti, Inc.	M&G Project #7716 - Cove Rd. Force Main Replacement Project, May 2021	-189,361.08
05/11/21	8226	Marin Municipal Water District	Water, Feb - Apr 2021	-1,374.03
05/11/21	8227	McCampbell Analytical, Inc.	M.P. Monitoring, Chron Tox Testing, April 2021	-1,112.50
05/11/21	8228	Mill Valley Refuse Service, Inc.	Acct #032945, SLUDGE TRANSPORT, March 2021	-1,800.00
05/11/21	8229	Ongaro & Sons, Inc.	Client #1082,TPS#2, April 2021	-70.00
05/11/21	8230	Peterson	Cust #:5656305, BPS#1, April 2021	-1,259.31
05/11/21	8231	Ram Print and Communications	Admin/Off Supplies, SD5 stamp, March 2021	-75.78
05/11/21	8232	SWRCB-DWOCP	A Rubio Cert Renewals - April 2021 (FY21-22 AJE)	-160.00
05/11/21	8233	Town of Tiburon	Fuel, March 2021	-933.70
05/11/21	8234	U.S. Bank	Acct#:4246-0441-0158-3635, March-April 2021	-581.18
05/11/21	8235	Univar	Cust ID #STDT001, Chemicals, April 2021	-11,503.21
05/11/21	8236	USA BlueBook	Cust #933682, Safety/PPE Supplies, April 2021	-1,406.44
05/11/21	8237	VWR International, LLC	Acct #80012138, Lab Supplies, April 2021	-248.48
05/11/21	8238	Water Components & Building Supply	Acct #454, M.P. Maint. Supplies, April 2021	-559.00
05/11/21	8239	WorkSmart Automation, Inc.	SD5 Comm System Maintenance, May 2021 (AJE FY21-22)	-11,262.08
05/11/21	8240	Driscoll, Stephen	EE Incentive, April 2021	-1,000.00
05/11/21	8241	La Torre, Daniel P.	Standby Mileage Reimb, Oct - Dec, 2020	-1,108.80
05/11/21	8242	Rubio, Antonio	Board Room Chairs Reimb + Testing + Travel Reimb. re WEF Conference, May 2021	-4,637.93
Total JP Morgan Chase - Primary 7399				-538,857.01
TOTAL				**-538,857.01**

Sanitary Distr. No.5 of Marin Co.
Warrant List Detail
April 14 through May 11, 2021

Date	Num	Name	Memo	Account	Class	Paid Amount
05/06/21	**EFT**	**Replacement Benefit Fund**	**Cust ID: 4163206459, Robert Lynch RBF Charges, CalPERS, May 2021**	**JP Morgan Chase - Primary 7399**		
			Inv#100000016387491, Replacement Benefit Fund Charges - Robert Lynch CalPERS for May 2021	8019 · PERS Retirement	Belvedere	-122.81
			Inv#100000016387491, Replacement Benefit Fund Charges - Robert Lynch CalPERS for May 2021	8019 · PERS Retirement	Tiburon:Paradise Cove	-8.87
			Inv#100000016387491, Replacement Benefit Fund Charges - Robert Lynch CalPERS for May 2021	8019 · PERS Retirement	Tiburon	-209.96
TOTAL						-341.64
05/06/21	**EFT**	**CalPERS**	**EFT Health Premium, May 2021, Cust #4163206459**	**JP Morgan Chase - Primary 7399**		
			Active Employee Health Premium - May 2021	8020.05 · Employee Health	Belvedere	-4,797.05
			Active Employee Health Premium - May 2021	8020.05 · Employee Health	Tiburon:Paradise Cove	-345.60
			Active Employee Health Premium - May 2021	8020.05 · Employee Health	Tiburon	-8,201.03
			Retiree Health Premium - May 2021	8022.05 · Reitree Health	Belvedere	-308.45
			Retiree Health Premium - May 2021	8022.05 · Reitree Health	Tiburon:Paradise Cove	-22.22
			Retiree Health Premium - May 2021	8022.05 · Reitree Health	Tiburon	-527.33
			Active Employee Health Premium - May 2021 - Admin Fee	8020.05 · Employee Health	Belvedere	-11.51
			Active Employee Health Premium - May 2021 - Admin Fee	8020.05 · Employee Health	Tiburon:Paradise Cove	-0.83
			Active Employee Health Premium - May 2021 - Admin Fee	8020.05 · Employee Health	Tiburon	-19.68
			Retiree Health Premium - May 2021 - Admin Fee	8022.05 · Reitree Health	Belvedere	-5.39
			Retiree Health Premium - May 2021 - Admin Fee	8022.05 · Reitree Health	Tiburon:Paradise Cove	-0.39
			Retiree Health Premium - May 2021 - Admin Fee	8022.05 · Reitree Health	Tiburon	-9.21
TOTAL						-14,248.69
05/06/21	**EFT**	**PERS**	**EFT PERS Retirement, April 2021**	**JP Morgan Chase - Primary 7399**		
			Retirement April 2021(Classic 1600 Rate): ER @ 14.194 %; EE @ 3.0%	8019.05 · PERS Retirement	Belvedere	-4,756.61
			Retirement April 2021(Classic 1600 Rate)	8019.05 · PERS Retirement	Tiburon:Paradise Cove	-342.69
			Retirement April 2021(Classic 1600 Rate)	8019.05 · PERS Retirement	Tiburon	-8,131.89
			Retirement April 2021(PEPRA Rates: ER @ 7.732%; EE @ 6.75%	8019.05 · PERS Retirement	Belvedere	-1,765.25
			Retirement April 2021(PEPRA Rate)	8019.05 · PERS Retirement	Tiburon:Paradise Cove	-127.18
			Retirement April 2021(PEPRA Rate)	8019.05 · PERS Retirement	Tiburon	-3,017.86
TOTAL						-18,141.48
04/15/21	**8199**	**Comcast Business**	**Acct# 8155 30 011 0149465, Bus. Voice, Internet & Cable, Feb-Mar-Apr, 2021**	**JP Morgan Chase - Primary 7399**		
			Bundle: Cable ($84.90) + Fees ($27.05), 3.12.2021 - 4.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Belvedere	-40.25
			Bundle: Cable ($84.90) + Fees ($27.05), 3.12.2021 - 4.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon:Paradise Cove	-2.90
			Bundle: Cable ($84.90) + Fees ($27.05), 3.12.2021 - 4.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon	-68.80
			Bundle: Internet ($134.85), 3.12.2021 - 4.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Belvedere	-48.48
			Bundle: Internet ($134.85), 3.12.2021 - 4.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon:Paradise Cove	-3.49
			Bundle: Internet ($134.85), 3.12.2021 - 4.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon	-82.88
			Bundle: Land Line Phones ($243.00) + Fees ($41.60), 3.12.2021 - 4.11.2021	8531 · Main Plant Telephones	Belvedere	-102.31
			Bundle: Land Line Phones ($243.00) + Fees ($41.60), 3.12.2021 - 4.11.2021	8532 · Paradise Cove Telephones	Tiburon:Paradise Cove	-7.37
			Bundle: Land Line Phones ($243.00) + Fees ($41.60), 3.12.2021 - 4.11.2021	8531 · Main Plant Telephones	Tiburon	-174.92
			Bundle: Taxes & Fees (+/- $5 - varies/mo), 3.12.2021 - 4.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Belvedere	-2.32
			Bundle: Taxes & Fees (+/- $5 - varies/mo), 3.12.2021 - 4.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon:Paradise Cove	-0.17
			Bundle: Taxes & Fees (+/- $5 - varies/mo), 3.12.2021 - 4.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon	-3.97
			Bundle: Taxes & Fees (+/- $5 - varies/mo), 3.12.2021 - 4.11.2021	8531 · Main Plant Telephones	Belvedere	-2.32
			Bundle: Taxes & Fees (+/- $5 - varies/mo), 3.12.2021 - 4.11.2021	8532 · Paradise Cove Telephones	Tiburon:Paradise Cove	-0.17
			Bundle: Taxes & Fees (+/- $5 - varies/mo), 3.12.2021 - 4.11.2021	8531 · Main Plant Telephones	Tiburon	-3.97
			Bundle: Cable ($84.90) + Fees ($27.05), 4.12.2021 - 5.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Belvedere	-88.19
			Bundle: Cable ($84.90) + Fees ($27.05), 4.12.2021 - 5.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon:Paradise Cove	-6.37
			Bundle: Cable ($84.90) + Fees ($27.05), 4.12.2021 - 5.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon	-150.76
			Bundle: Internet ($134.85), 4.12.2021 - 5.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Belvedere	-23.64
			Bundle: Internet ($134.85), 4.12.2021 - 5.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon:Paradise Cove	-1.70
			Bundle: Internet ($134.85), 4.12.2021 - 5.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon	-40.41
			Bundle: Land Line Phones ($243.00) + Fees ($41.60), 4.12.2021 - 5.11.2021	8531 · Main Plant Telephones	Belvedere	-124.11
			Bundle: Land Line Phones ($243.00) + Fees ($41.60), 4.12.2021 - 5.11.2021	8532 · Paradise Cove Telephones	Tiburon:Paradise Cove	-8.94
			Bundle: Land Line Phones ($243.00) + Fees ($41.60), 4.12.2021 - 5.11.2021	8531 · Main Plant Telephones	Tiburon	-212.18
			Bundle: Taxes & Fees (+/- $5 - varies/mo), 4.12.2021 - 5.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Belvedere	-2.43
			Bundle: Taxes & Fees (+/- $5 - varies/mo), 4.12.2021 - 5.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon:Paradise Cove	-0.18
			Bundle: Taxes & Fees (+/- $5 - varies/mo), 4.12.2021 - 5.11.2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon	-4.15
			Bundle: Taxes & Fees (+/- $5 - varies/mo), 4.12.2021 - 5.11.2021	8531 · Main Plant Telephones	Belvedere	-2.43

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			Bundle: Taxes & Fees (+/- $5 - varies/mo), 4.12.2021 - 5.11.2021	8532 · Paradise Cove Telephones	Tiburon:Paradise Cove	-0.18
			Bundle: Taxes & Fees (+/- $5 - varies/mo), 4.12.2021 - 5.11.2021	8531 · Main Plant Telephones	Tiburon	-4.15
TOTAL						-1,214.14
04/15/21	**8200**	**Maggiora & Ghilotti, Inc.**	**M&G Project #7716 - Cove Rd. Force Main Replacement Project, February 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #11612, Progress Payment #10, Force Main Replacement Project (100.0% Belv), thru February 2021	9311.2 · Cove Rd FM - Const, Ph I	Belvedere	-29,667.00
			Retention Withheld re PP#10 (100.0% Belv), thru February 2021	Retainage Payable	Belvedere	1,483.38
			Inv #11612, Progress Payment #10, Force Main Replacement Project (100.0% Tib), thru February 2021	9311.2 · Cove Rd FM - Const, Ph I	Tiburon	-198,137.00
			Retention Withheld re PP#10 (100.0% Tib), thru February 2021	Retainage Payable	Tiburon	9,907.20
TOTAL						-216,413.42
04/15/21	**8201**	**Special District Risk Manageme...**	**Member #7665, Life, Vision, DDS & LTD Ins., May 2021**	**JP Morgan Chase - Primary 7399**		
			Employee Life & ADD Insurance - Inv #35214 - May 2021	8020.05 · Employee Health	Belvedere	-44.00
			Employee Life & ADD Insurance - Inv #35214 - May 2021	8020.05 · Employee Health	Tiburon:Paradise Cove	-3.17
			Employee Life & ADD Insurance - Inv #35214 - May 2021	8020.05 · Employee Health	Tiburon	-75.23
			Employee LTD Insurance - Inv #35214 - May 2021	8020.05 · Employee Health	Belvedere	-117.15
			Employee LTD Insurance - Inv #35214 - May 2021	8020.05 · Employee Health	Tiburon:Paradise Cove	-8.44
			Employee LTD Insurance - Inv #35214 - May 2021	8020.05 · Employee Health	Tiburon	-200.27
			Employee DDS Insurance - Inv #35214 - May 2021	8020.05 · Employee Health	Belvedere	-301.59
			Employee DDS Insurance - Inv #35214 - May 2021	8020.05 · Employee Health	Tiburon:Paradise Cove	-21.73
			Employee DDS Insurance - Inv #35214 - May 2021	8020.05 · Employee Health	Tiburon	-515.60
			Employee Vision Insurance - Inv #35214 - May 2021	8020.05 · Employee Health	Belvedere	-52.50
			Employee Vision Insurance - Inv #35214 - May 2021	8020.05 · Employee Health	Tiburon:Paradise Cove	-3.78
			Employee Vision Insurance - Inv #35214 - May 2021	8020.05 · Employee Health	Tiburon	-89.77
TOTAL						-1,433.23
04/15/21	**8202**	**State Water Resources Control ...**	**A Rubio Cert Renewals - April 2021**	**JP Morgan Chase - Primary 7399**		
			A. Rubio - SWRCB Cert Renewal (#10590) Application Fee: WWTP Operator, Grade V, Exp: 7.1.2021 - ...	6025 · Dues & Subscriptions	Belvedere	-39.55
			A. Rubio - SWRCB Cert Renewal (#10590) Application Fee: WWTP Operator, Grade V, Exp: 7.1.2021 - ...	6025 · Dues & Subscriptions	Tiburon:Paradise Cove	-2.85
			A. Rubio - SWRCB Cert Renewal (#10590) Application Fee: WWTP Operator, Grade V, Exp: 7.1.2021 - ...	6025 · Dues & Subscriptions	Tiburon	-67.60
TOTAL						-110.00
04/15/21	**8203**	**Verizon Wireless**	**Acct #0342125502-00001: iPhones, March 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #9877016623: Monthly Charges ($301.60) New NASPO MA 152 Agmnt - March 2021	8531 · Main Plant Telephones	Belvedere	-108.43
			Inv #9877016623: Monthly Charges ($301.60) New NASPO MA 152 Agmnt - March 2021	8532 · Paradise Cove Telephones	Tiburon:Paradise Cove	-7.81
			Inv #9877016623: Monthly Charges ($301.60) New NASPO MA 152 Agmnt - March 2021	8531 · Main Plant Telephones	Tiburon	-185.36
			Inv #9877016623: Taxes, Gov't Surcharges & Fees - March 2021	8531 · Main Plant Telephones	Belvedere	-3.13
			Inv #9877016623: Taxes, Gov't Surcharges & Fees - March 2021	8532 · Paradise Cove Telephones	Tiburon:Paradise Cove	-0.23
			Inv #9877016623: Taxes, Gov't Surcharges & Fees - March 2021	8531 · Main Plant Telephones	Tiburon	-5.35
TOTAL						-310.31
04/15/21	**8204**	**Cintas Corporation #626**	**Acct #626-00821, PPE/Safetywear + Service, March 2021**	**JP Morgan Chase - Primary 7399**		
			Inv#8389, #1699, #2685, #0831, PPE/Safetywear, March 2021	8520 · Personal Protection/Safety Wear	Belvedere	-20.02
			Inv#8389, #1699, #2685, #0831, PPE/Safetywear, March 2021	8520 · Personal Protection/Safety Wear	Tiburon:Paradise Cove	-1.44
			Inv#8389, #1699, #2685, #0831, PPE/Safetywear, March 2021	8520 · Personal Protection/Safety Wear	Tiburon	-34.22
TOTAL						-55.68
05/11/21	**8205**	**Access Answering Service**	**Acct #4080C, Answering Service, May 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #25744, Answering Service, May 2021- SSO & Alarm Notifications	8510 · Data/Alarms/IT Supp & Licensi...	Belvedere	-21.57
			Inv #25744, Answering Service, May 2021- SSO & Alarm Notifications	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon:Paradise Cove	-1.55
			Inv #25744, Answering Service, May 2021- SSO & Alarm Notifications	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon	-36.88
TOTAL						-60.00

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05/11/21	**8206**	**APG Neuros, Inc.**	**M.P Maint. Supplies, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #13805, M.P. Maint. Supplies (Sm. & Lg. Pre Filters), April 2021	7021 · Plant Maintenance Supplies	Belvedere	-58.64
			Inv #13805, M.P. Maint. Supplies (Sm. & Lg. Pre Filters), April 2021	7021 · Plant Maintenance Supplies	Tiburon	-100.24
TOTAL						-158.88
05/11/21	**8207**	**AT&T**	**Acct #960732-76375559, April 2021**	**JP Morgan Chase - Primary 7399**		
			PC Plant Telephones, April 2021	8532 · Paradise Cove Telephones	Tiburon:Paradise Cove	-332.38
			PC Pumps & Lines Telephones, April 2021	8533 · Pumps & Lines Telephones	Tiburon:Paradise Cove	-175.07
			Tib Pumps & Lines Telephones, April 2021	8533 · Pumps & Lines Telephones	Tiburon	-308.19
			Physical line install @ M.P. Office, April 2021 (415-435-3918)	8533 · Pumps & Lines Telephones	Belvedere	-53.67
			Physical line install @ M.P. Office, April, 2021 (415-435-3918)	8533 · Pumps & Lines Telephones	Tiburon	-91.73
TOTAL						-961.04
05/11/21	**8208**	**Atlas Copco Compressors, LLC**	**Cust #4000110864, M.P. parts & Srvc, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #1121038234 & #1121038237, M.P. Parts & Srvc., M.P. Air Compressor, April 2021	7022 · Plant Maint. Parts & Service	Belvedere	-243.61
			Inv #1121038234 & #1121038237, M.P. Parts & Srvc., M.P. Air Compressor, April 2021	7022 · Plant Maint. Parts & Service	Tiburon	-416.39
TOTAL						-660.00
05/11/21	**8209**	**BAAQMD**	**Cust #10FZ3A1523 & 25GU8E2957, Plant #1523 & #22957, SD5 BAAQMD Permits, May 2021 (AJE FY21-22)**	**JP Morgan Chase - Primary 7399**		
			Inv #4KA07, Main Plant BAAQMD Permit, Plant #1523 - Processing Fee (6.1.21 - 6.30.21)	7062 · Permits/Fees - General	Belvedere	-12.15
			Inv #4KA07, Main Plant BAAQMD Permit, Plant #1523 - Processing Fee (6.1.21 - 6.30.21)	7062 · Permits/Fees - General	Tiburon	-20.77
			Inv #4KA07, Main Plant BAAQMD Permit, Plant #1523 - Toxic Inventory Fee (6.1.21 - 6.30.21)	7062 · Permits/Fees - General	Belvedere	-1.38
			Inv #4KA07, Main Plant BAAQMD Permit, Plant #1523 - Toxic Inventory Fee (6.1.21 - 6.30.21)	7062 · Permits/Fees - General	Tiburon	-2.37
			Inv #4KA07, Main Plant BAAQMD Permit to Operate, Plant #1523 (6.1.21 - 6.30.21)	7062 · Permits/Fees - General	Belvedere	-445.75
			Inv #4KA07, Main Plant BAAQMD Permit to Operate, Plant #1523 (6.1.21 - 6.30.21)	7062 · Permits/Fees - General	Tiburon	-761.92
			Inv #4KA07, Main Plant BAAQMD Permit, Plant #1523 - Processing Fee May 2021 (7.1.2021 - 5.30.202...	7062 · Permits/Fees - General	Belvedere	-133.64
			Inv #4KA07, Main Plant BAAQMD Permit, Plant #1523 - Processing Fee May 2021 (7.1.2021 - 5.30.202...	7062 · Permits/Fees - General	Tiburon	-228.44
			Inv #4KA07, Main Plant BAAQMD Permit, Plant #1523 - Toxic Inventory Fee May 2021 (7.1.2021 - 5.3...	7062 · Permits/Fees - General	Belvedere	-15.23
			Inv #4KA07, Main Plant BAAQMD Permit, Plant #1523 - Toxic Inventory Fee May 2021 (7.1.2021 - 5.3...	7062 · Permits/Fees - General	Tiburon	-26.02
			Inv #4KA07, Main Plant BAAQMD Permit to Operate, Plant #1523 May 2021 (7.1.2021 - 5.30.2022) (AJ...	7062 · Permits/Fees - General	Belvedere	-4,903.25
			Inv #4KA07, Main Plant BAAQMD Permit to Operate, Plant #1523 May 2021 (7.1.2021 - 5.30.2022) (AJ...	7062 · Permits/Fees - General	Tiburon	-8,381.08
			Inv #4JZ95, TPS#5 Permit to Operate, Plant #22957, May 2021 (5.1.2021 - 6.30.2021)	7062 · Permits/Fees - General	Tiburon	-42.67
			Inv #4JZ95, TPS#5 Permit to Operate, Plant #22957 - Processing Fee, May 2021 (5.1.2021 - 6.30.2021)	7062 · Permits/Fees - General	Tiburon	-16.67
			Inv #4JZ95, TPS#5 Permit to Operate, Plant #22957, May 2021 (6.1.2021 - 4.30.2022) (AJE FY21-22)	7062 · Permits/Fees - General	Tiburon	-213.33
			Inv #4JZ95, TPS#5 Permit to Operate, Plant #22957 - Processing Fee, May 2021 (6.1.2021 - 4.30.20...	7062 · Permits/Fees - General	Tiburon	-83.33
TOTAL						-15,288.00
05/11/21	**8210**	**Bank of New York Mellon Trust ...**	**Acct#: TIB/BELV2012, MPR Bond Admin & Dissem Fee, Mar 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #: 252-2364384, MPR Rev Bond - Administration Fee, 2.16.2021 - 6.30.2021	6025 · Dues & Subscriptions	Belvedere	-246.61
			Inv #: 252-2364384, MPR Rev Bond - Administration Fee, 2.16.2021 - 6.30.2021	6025 · Dues & Subscriptions	Tiburon	-453.39
			Inv #: 252-2364384, MPR Rev Bond - Dissemination Agent Fee 7.1.2021 - 2.15.2022	6025 · Dues & Subscriptions	Belvedere	-88.08
			Inv #: 252-2364384, MPR Rev Bond - Dissemination Agent Fee 7.1.2021 - 2.15.2022	6025 · Dues & Subscriptions	Tiburon	-161.92
TOTAL						-950.00
05/11/21	**8211**	**Banshee Networks, Inc.**	**Computer/IT Support, March 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #14832 + #14833, Troubleshooting, IT & security renewals + maintenance of all SD5 systems, M...	8510 · Data/Alarms/IT Supp & Licensi...	Belvedere	-1,256.34
			Inv #14832 + #14833, Troubleshooting, IT & security renewals + maintenance of all SD5 systems, M...	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon:Paradise Cove	-90.51
			Inv #14832 + #14833, Troubleshooting, IT & security renewals + maintenance of all SD5 systems, M...	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon	-2,147.85
TOTAL						-3,494.70

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05/11/21	**8212**	**Brelje and Race Laboratories, Inc.**	**M.P./P.C. Plant Samples, February & March 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #134206 + #134207, M.P. Samples for February & March 2021	7051 · Main Plant Lab Monitoring	Belvedere	-959.66
			Inv #134206 + #134207, P.C. Samples for February & March 2021	7052 · Paradise Cove Monitoring	Tiburon:Paradise Cove	-630.00
			Inv #134206 + #134207, M.P. Samples for February & March 2021	7051 · Main Plant Lab Monitoring	Tiburon	-1,640.34
TOTAL						-3,230.00
05/11/21	**8213**	**Caltest Analytical Laboratory**	**M.P./P.C. Lab Sampling, April 2021**	**JP Morgan Chase - Primary 7399**		
			M.P. - B: #0424, #0661, #0808, #0811, #0838, #1020, April 2021	7051 · Main Plant Lab Monitoring	Belvedere	-645.19
			P.C.: Inv #0402, #0759, April 2021	7052 · Paradise Cove Monitoring	Tiburon:Paradise Cove	-436.05
			M.P. - t: #0424, #0661, #0808, #0811, #0838, #1020, April 2021	7051 · Main Plant Lab Monitoring	Tiburon	-1,102.81
TOTAL						-2,184.05
05/11/21	**8214**	**Cintas Corporation #626**	**Acct #626-00821, PPE/Safetywear + Service, April 2021**	**JP Morgan Chase - Primary 7399**		
			#4080365589, #4081034116, #4081700168, #4082380869, #4083006538, PPE/Safetywear, April 2021	8520 · Personal Protection/Safety Wear	Belvedere	-63.74
			#4080365589, #4081034116, #4081700168, #4082380869, #4083006538, PPE/Safetywear, April 2021	8520 · Personal Protection/Safety Wear	Tiburon:Paradise Cove	-4.59
			#4080365589, #4081034116, #4081700168, #4082380869, #4083006538, PPE/Safetywear, April 2021	8520 · Personal Protection/Safety Wear	Tiburon	-108.96
TOTAL						-177.29
05/11/21	**8215**	**CWEA**	**Certificate Renwals, May 2021**	**JP Morgan Chase - Primary 7399**		
			D LaTorre (#47792), Plant Maint. Tech (G1), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Belvedere	-32.71
			D LaTorre (#47792), Plant Maint. Tech (G1), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Tiburon:Paradise Cove	-2.36
			D LaTorre (#47792), Plant Maint. Tech (G1), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Tiburon	-55.93
			S Driscoll (#34976), Plant Maint. Tech (G1), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Belvedere	-32.71
			S Driscoll (#34976), Plant Maint. Tech (G1), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Tiburon:Paradise Cove	-2.36
			S Driscoll (#34976), Plant Maint. Tech (G1), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Tiburon	-55.93
			T Rubio (ID#39532),Biolsolids Land Application Mgmnt (G1), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Belvedere	-32.71
			T Rubio (ID#39532),Biolsolids Land Application Mgmnt (G1), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Tiburon:Paradise Cove	-2.36
			T Rubio (ID#39532),Biolsolids Land Application Mgmnt (G1), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Tiburon	-55.93
			T Rubio (ID#39532), Environmental Compliance Inspector (G1), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Belvedere	-32.71
			T Rubio (ID#39532), Environmental Compliance Inspector (G1), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Tiburon:Paradise Cove	-2.36
			T Rubio (ID#39532), Environmental Compliance Inspector (G1), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Tiburon	-55.93
			T Rubio (ID#39532), Collxn Syst. Maint. (G4), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Belvedere	-38.11
			T Rubio (ID#39532), Collxn Syst. Maint. (G4), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Tiburon:Paradise Cove	-2.75
			T Rubio (ID#39532), Collxn Syst. Maint. (G4), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Tiburon	-65.14
			T Rubio (ID#39532), Mechanical Tech (G4), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Belvedere	-38.11
			T Rubio (ID#39532), Mechanical Tech (G4), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Tiburon:Paradise Cove	-2.75
			T Rubio (ID#39532), Mechanical Tech (G4), 7.1.2021 - 6.30.2022 (AJE FY2021-2022)	6025 · Dues & Subscriptions	Tiburon	-65.14
TOTAL						-576.00
05/11/21	**8216**	**DKF Solutions Group, LLC**	**My Safety Officer Monthly Subscription, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #10830, My Safety Officer Monthly Subscription Fee, April 2021	8515 · Safety	Belvedere	-125.83
			Inv #10830, My Safety Officer Monthly Subscription Fee, April 2021	8515 · Safety	Tiburon:Paradise Cove	-9.07
			Inv #10830, My Safety Officer Monthly Subscription Fee, April 2021	8515 · Safety	Tiburon	-215.10
TOTAL						-350.00
05/11/21	**8217**	**Environmental Resource Associ...**	**Acct #S057001, M.P. Lab Supplies, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #970653, M.P. Lab Supplies - pH/chlorine Lab Testing, April 2021	7025 · Lab Supplies & Chemicals	Belvedere	-534.64
			Inv #970653, M.P. Lab Supplies - pH/chlorine Lab Testing, April 2021	7025 · Lab Supplies & Chemicals	Tiburon	-913.86
TOTAL						-1,448.50

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05/11/21	**8218**	**Environmental Systems Resear...**	**Cust #356200, ArcGIS Maintenance, April 2021 (FY21-22 AJE)**	**JP Morgan Chase - Primary 7399**		
			Inv#26011768, ArcGIS for Desktop Basic Single User Primary & Secondary Maint., 7.1.21-6.30.22 (A...	8510 · Data/Alarms/IT Supp & Licensi...	Belvedere	-251.65
			Inv#26011768, ArcGIS for Desktop Basic Single User Primary & Secondary Maint., 7.1.21-6.30.22 (A...	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon:Paradise Cove	-18.13
			Inv#26011768, ArcGIS for Desktop Basic Single User Primary & Secondary Maint., 7.1.21-6.30.22 (A...	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon	-430.22
TOTAL						-700.00
05/11/21	**8219**	**Fastenal Company**	**CASA10962, M.P. Supplies, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #CASA168262, M.P. Supplies, April 2021	7021 · Plant Maintenance Supplies	Belvedere	-1,182.66
			Inv #CASA168262, M.P. Supplies, April 2021	7021 · Plant Maintenance Supplies	Tiburon	-2,021.50
			Inv #CASA168262, M.P. Lab Supplies, April 2021	7025 · Lab Supplies & Chemicals	Belvedere	-25.73
			Inv #CASA168262, M.P. Lab Supplies, April 2021	7025 · Lab Supplies & Chemicals	Tiburon	-43.97
TOTAL						-3,273.86
05/11/21	**8220**	**Frank Olsen Co.**	**Pump & Valve Replacement Program, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #246752, P&L Pumps & Valves Rplcmnt - April 2021	9306 · PS Pump & Valve Replacements	Belvedere	-3,231.81
TOTAL						-3,231.81
05/11/21	**8221**	**HDR Engineering, Inc.**	**Consulting, MCSD5 Cllxn Sys Mstr Plan + Alt Energy Study, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #1200341024, HDR Collection System Master Plan, April 2021	6017 · Consulting Fees	Belvedere	-3,977.44
			Inv #1200341024, HDR Collection System Master Plan, April 2021	6017 · Consulting Fees	Tiburon:Paradise Cove	-286.55
			Inv #1200341024, HDR Collection System Master Plan, April 2021	6017 · Consulting Fees	Tiburon	-6,799.81
			Inv #1200339242, HDR Alternative Energy Study, April 2021	6017 · Consulting Fees	Belvedere	-1,903.18
			Inv #1200339242, HDR Alternative Energy Study, April 2021	6017 · Consulting Fees	Tiburon:Paradise Cove	-137.11
			Inv #1200339242, HDR Alternative Energy Study, April 2021	6017 · Consulting Fees	Tiburon	-3,253.66
TOTAL						-16,357.75
05/11/21	**8222**	**JM Integration, LLC**	**M.P. Parts & Service, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #21047, M.P. Parts & Service, Calibrations @ M.P. Flow Meters, April 2021	7022 · Plant Maint. Parts & Service	Belvedere	-722.83
			Inv #21047, P.C. Parts & Service, Calibrations @ P.C. Flow Meters, April 2021	7041 · Paradise Parts & Service	Tiburon:Paradise Cove	-52.08
			Inv #21047, M.P. Parts & Service, Calibrations @ M.P. Flow Meters, April 2021	7022 · Plant Maint. Parts & Service	Tiburon	-1,235.73
TOTAL						-2,010.64
05/11/21	**8223**	**JWC Environmental**	**Cust ID #5034423, M.P. Supplies + Parts & Service, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #106115, M.P. Parts - April 2021	7021 · Plant Maintenance Supplies	Belvedere	-51.65
			Inv #106115, M.P. Parts - April 2021	7021 · Plant Maintenance Supplies	Tiburon	-88.29
			Inv #106102, M.P. Parts & Srvc, Grinder Motor - April 2021	7022 · Plant Maint. Parts & Service	Belvedere	-912.21
			Inv #106102, M.P. Parts & Srvc, Grinder Motor - April 2021	7022 · Plant Maint. Parts & Service	Tiburon	-1,559.23
TOTAL						-2,611.38
05/11/21	**8224**	**Larry Walker Associates, Inc.**	**Tech Support for M.P. NPDES Reg. Assistance, March 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #00113.10-19, M.P. Regulatory Assistance, thru March 2021	7061 · Main Plant NPDES Renewal	Belvedere	-151.70
			Inv #00113.10-19, M.P. Regulatory Assistance, thru March 2021	7061 · Main Plant NPDES Renewal	Tiburon	-259.30
TOTAL						-411.00

Sanitary Distr. No.5 of Marin Co.
Warrant List Detail
April 14 through May 11, 2021

Date	Num	Name	Memo	Account	Class	Paid Amount
05/11/21	**8225**	**Maggiora & Ghilotti, Inc.**	**M&G Project #7716 - Cove Rd. Force Main Replacement Project, May 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #11612, Progress Payment #11, Force Main Replacement Project (61.0% Belv), thru February 2021	9311.2 · Cove Rd FM - Const, Ph I	Belvedere	-121,589.74
			Retention Withheld re PP#11 (61.0% Belv), thru February 2021	Retainage Payable	Belvedere	6,079.49
			Inv #11612, Progress Payment #11, Force Main Replacement Project (39.0% Tib), thru February 2021	9311.2 · Cove Rd FM - Const, Ph I	Tiburon	-77,737.71
			Retention Withheld re PP#11 (39.0% Tib), thru February 2021	Retainage Payable	Tiburon	3,886.88
TOTAL						-189,361.08
05/11/21	**8226**	**Marin Municipal Water District**	**Water, Feb - Apr 2021**	**JP Morgan Chase - Primary 7399**		
			Cust #:424793, Golden Gate BPS - Water, February - April 2021	8541 · Water	Belvedere	-77.20
			Cust #:424791, Cove Rd. BPS - Water, February - April 2021	8541 · Water	Belvedere	-81.29
			Cust #138856, Mar West TPS - Water, February - April 2021	8541 · Water	Tiburon	-77.20
			Cust #100098, M.P. - Water, 2020 - February - April 2021	8541 · Water	Belvedere	-420.16
			Cust #100098, M.P. - Water, 2020 - February - April 2021	8541 · Water	Tiburon	-718.18
TOTAL						-1,374.03
05/11/21	**8227**	**McCampbell Analytical, Inc.**	**M.P. Monitoring, Chron Tox Testing, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #2104A53, M.P. Monitoring, DEC Chronic Acute Toxicity Testing, April 2021	7053 · Chronic Toxicity	Belvedere	-410.62
			Inv #2104A53, M.P. Monitoring, DEC Chronic Acute Toxicity Testing, April 2021	7053 · Chronic Toxicity	Tiburon	-701.88
TOTAL						-1,112.50
05/11/21	**8228**	**Mill Valley Refuse Service, Inc.**	**Acct #032945, SLUDGE TRANSPORT, March 2021**	**JP Morgan Chase - Primary 7399**		
			Sludge Transport/Exchange only, 3.2.21 (2x), 3.12.21, 3.20.21, 3.26.21	7029 · Main Plant Sludge Disposal	Belvedere	-664.38
			Sludge Transport/Exchange only, 3.2.21 (2x), 3.12.21, 3.20.21, 3.26.21	7029 · Main Plant Sludge Disposal	Tiburon	-1,135.62
TOTAL						-1,800.00
05/11/21	**8229**	**Ongaro & Sons, Inc.**	**Client #1082,TPS#2, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #84588: Backflow Prevention Testing @ BPS#3, Meter #200479147 (HID#816), April 2021	7011 · Pumps & Lines Maintenance	Belvedere	-70.00
TOTAL						-70.00
05/11/21	**8230**	**Peterson**	**Cust #:5656305, BPS#1, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #SW270053053, Inspection/Service re BPS#1, April 2021	7011 · Pumps & Lines Maintenance	Belvedere	-1,259.31
TOTAL						-1,259.31
05/11/21	**8231**	**Ram Print and Communications**	**Admin/Off Supplies, SD5 stamp, March 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #290442 - Refill+ new SD5 date stamp, March 2021	6047 · Office Supplies	Belvedere	-27.24
			Inv #290442 - Refill+ new SD5 date stamp, March 2021	6047 · Office Supplies	Tiburon:Paradise Cove	-1.96
			Inv #290442 - Refill+ new SD5 date stamp, March 2021	6047 · Office Supplies	Tiburon	-46.58
TOTAL						-75.78

Sanitary Distr. No.5 of Marin Co.
Warrant List Detail
April 14 through May 11, 2021

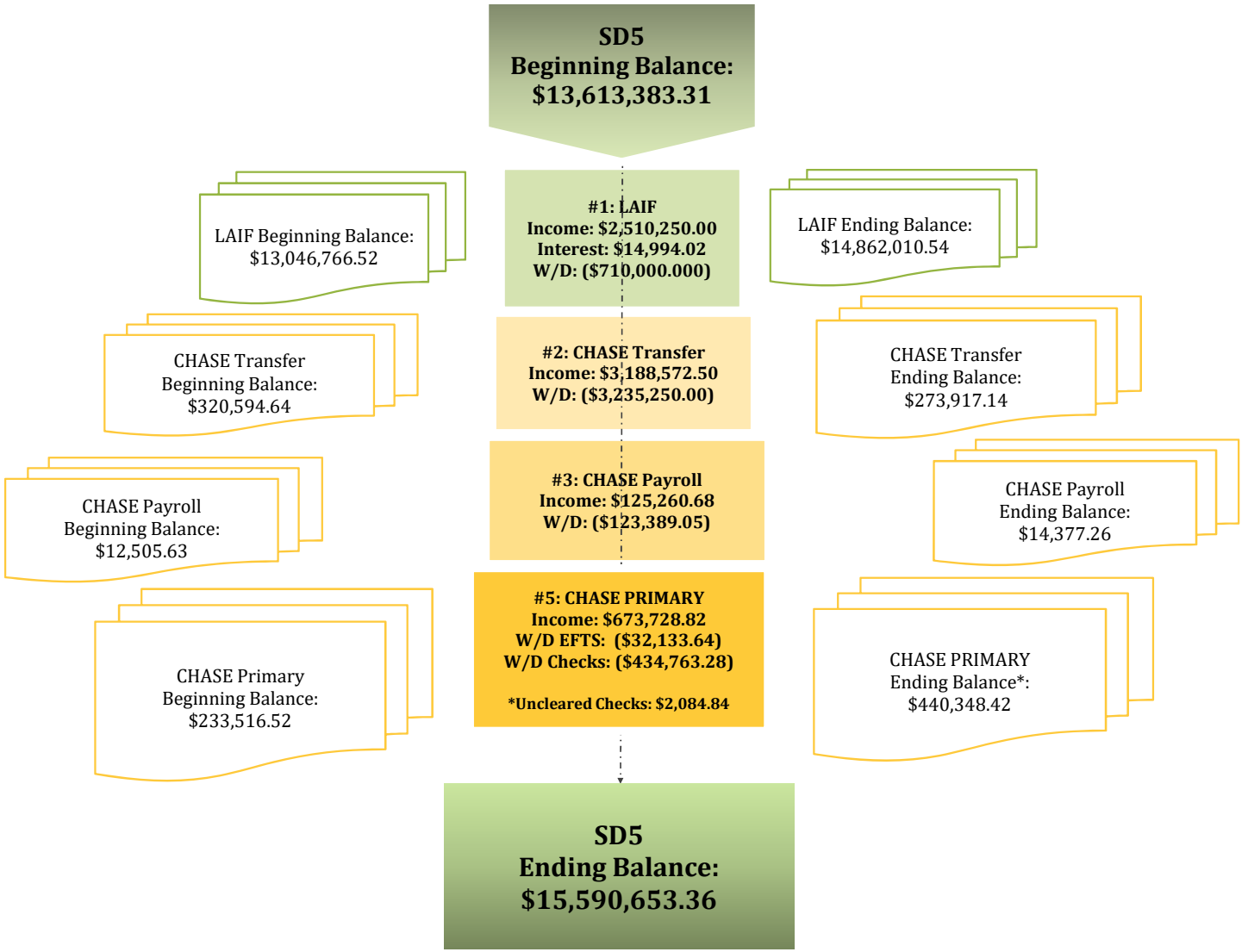
Date	Num	Name	Memo	Account	Class	Paid Amount
05/11/21	**8232**	**SWRCB-DWOCP**	**A Rubio Cert Renewals - April 2021 (FY21-22 AJE)**	**JP Morgan Chase - Primary 7399**		
			A. Rubio - SWRCB Certification Request: Water Distribution Operator (G:D2), 7.1.2021-6.30.22 (F...	6025 · Dues & Subscriptions	Belvedere	-21.57
			A. Rubio - SWRCB Certification Request: Water Distribution Operator (G:D2), 7.1.2021-6.30.22 (F...	6025 · Dues & Subscriptions	Tiburon:Paradise Cove	-1.55
			A. Rubio - SWRCB Certification Request: Water Distribution Operator (G:D2), 7.1.2021-6.30.22 (F...	6025 · Dues & Subscriptions	Tiburon	-36.88
			A. Rubio - SWRCB Certification Request: Water Treatment Operator (G:T2), 7.1.2021-6.30.22 (FY21-...	6025 · Dues & Subscriptions	Belvedere	-21.57
			A. Rubio - SWRCB Certification Request: Water Treatment Operator (G:T2), 7.1.2021-6.30.22 (FY21-...	6025 · Dues & Subscriptions	Tiburon:Paradise Cove	-1.55
			A. Rubio - SWRCB Certification Request: Water Treatment Operator (G:T2), 7.1.2021-6.30.22 (FY21-...	6025 · Dues & Subscriptions	Tiburon	-36.88
			A. Rubio - SWRCB Cert Renewal (#10590) Application Fee: WWTP Operator, Grade V, Exp: 7.1.2021 - ...	6025 · Dues & Subscriptions	Belvedere	-14.38
			A. Rubio - SWRCB Cert Renewal (#10590) Application Fee: WWTP Operator, Grade V, Exp: 7.1.2021 - ...	6025 · Dues & Subscriptions	Tiburon:Paradise Cove	-1.04
			A. Rubio - SWRCB Cert Renewal (#10590) Application Fee: WWTP Operator, Grade V, Exp: 7.1.2021 - ...	6025 · Dues & Subscriptions	Tiburon	-24.58
TOTAL						-160.00
05/11/21	**8233**	**Town of Tiburon**	**Fuel, March 2021**	**JP Morgan Chase - Primary 7399**		
			Fuel, March 2021	7071 · Fuel	Belvedere	-335.67
			Fuel, March 2021	7071 · Fuel	Tiburon:Paradise Cove	-24.18
			Fuel, March 2021	7071 · Fuel	Tiburon	-573.85
TOTAL						-933.70
05/11/21	**8234**	**U.S. Bank**	**Acct#:4246-0441-0158-3635, March-April 2021**	**JP Morgan Chase - Primary 7399**		
			#0822:/9545: Zoom	6018.1 · Meetings & Travel	Belvedere	-19.77
			#0822:/9545: Zoom	6018.1 · Meetings & Travel	Tiburon:Paradise Cove	-1.42
			#0822:/9545: Zoom	6018.1 · Meetings & Travel	Tiburon	-33.80
			#0822:/9545: IT Office supplies (chargers & wires, etc.), Amazon + Office Supplies, Amazon	6047 · Office Supplies	Belvedere	-32.64
			#0822:/9545: IT Office supplies (chargers & wires, etc.), Amazon + Office Supplies, Amazon	6047 · Office Supplies	Tiburon:Paradise Cove	-2.35
			#0822:/9545: IT Office supplies (chargers & wires, etc.), Amazon + Office Supplies, Amazon	6047 · Office Supplies	Tiburon	-55.81
			#0822:/9545: Return-receipt postage re add'l Violation Notices, USPO	6056 · Postage	Belvedere	-13.56
			#0822:/9545: Return-receipt postage re add'l Violation Notices, USPO	6056 · Postage	Tiburon:Paradise Cove	-0.98
			#0822:/9545: Return-receipt postage re add'l Violation Notices, USPO	6056 · Postage	Tiburon	-23.19
			#0822:/9545: Steadypower.com, BPS #1	7011 · Pumps & Lines Maintenance	Belvedere	-363.83
			#0822:/9545: Disinfectant, 3.26.21	7023 · Janitorial Supplies & Service	Belvedere	-12.49
			#0822:/9545: Disinfectant, 3.26.21	7023 · Janitorial Supplies & Service	Tiburon	-21.34
TOTAL						-581.18
05/11/21	**8235**	**Univar**	**Cust ID #STDT001, Chemicals, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #49051624, Inv #49116822, Sodium Bisulfite 25% ($1.163/Gal), April 2021	7024 · Main Plant Chemicals	Belvedere	-4,135.40
			Inv #49051624, Inv #49116822, Sodium Bisulfite 25% ($1.163/Gal), April 2021	7042 · Paradise Supplies & Chemicals	Tiburon:Paradise Cove	-297.93
			Inv #49051624, Inv #49116822, Sodium Bisulfite 25% ($1.163/Gal), April 2021	7024 · Main Plant Chemicals	Tiburon	-7,069.88
TOTAL						-11,503.21
05/11/21	**8236**	**USA BlueBook**	**Cust #933682, Safety/PPE Supplies, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #559436, SD5 Collxn System Chemicals, April 2021	7024 · Main Plant Chemicals	Belvedere	-54.55
			Inv #559436, P.C. Collxn System Chemicals, April 2021	7042 · Paradise Supplies & Chemicals	Tiburon:Paradise Cove	-1,258.64
			Inv #559436, SD5 Collxn System Chemicals, April 2021	7024 · Main Plant Chemicals	Tiburon	-93.25
TOTAL						-1,406.44
05/11/21	**8237**	**VWR International, LLC**	**Acct #80012138, Lab Supplies, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #8804325156, Inv #8804328627, Lab Supplies for digesters, April 2021	7025 · Lab Supplies & Chemicals	Belvedere	-91.71
			Inv #8804325156, Inv #8804328627, Lab Supplies for digesters, April 2021	7025 · Lab Supplies & Chemicals	Tiburon	-156.77
TOTAL						-248.48

Sanitary Distr. No.5 of Marin Co.
Warrant List Detail
April 14 through May 11, 2021

Date	Num	Name	Memo	Account	Class	Paid Amount
05/11/21	**8238**	**Water Components & Building ...**	**Acct #454, M.P. Maint. Supplies, April 2021**	**JP Morgan Chase - Primary 7399**		
			Inv #30553295, M.P. Maint. Supplies - April, 2021	7021 · Plant Maintenance Supplies	Belvedere	-181.71
			Inv #30553224, P.C. Supplies - April, 2021	7042 · Paradise Supplies & Chemicals	Tiburon:Paradise Cove	-66.69
			Inv #30553295, M.P. Maint. Supplies - April, 2021	7021 · Plant Maintenance Supplies	Tiburon	-310.60
TOTAL						-559.00
05/11/21	**8239**	**WorkSmart Automation, Inc.**	**SD5 Comm System Maintenance, May 2021 (AJE FY21-22)**	**JP Morgan Chase - Primary 7399**		
			Inv #5072, Back-up License re TopView, Grandstream port re SCADA app, May 2021	8510 · Data/Alarms/IT Supp & Licensi...	Belvedere	-885.12
			Inv #5072, Back-up License re TopView, Grandstream port re SCADA app, May 2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon:Paradise Cove	-63.77
			Inv #5072, Back-up License re TopView, Grandstream port re SCADA app, May 2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon	-1,513.19
			Inv #5072, Back-up License re Workstation (Wonderware) 60k w/ CS re SCADA app, May - June, 2021	8510 · Data/Alarms/IT Supp & Licensi...	Belvedere	-527.27
			Inv #5072, Back-up License re Workstation (Wonderware) 60k w/ CS re SCADA app, May - June, 2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon:Paradise Cove	-37.99
			Inv #5072, Back-up License re Workstation (Wonderware) 60k w/ CS re SCADA app, May - June, 2021	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon	-901.42
			Inv #5072, Back-up License re Workstation (Wonderware) 60k w/ CS re SCADA app, (AJE 7.1.2021 - ...	8510 · Data/Alarms/IT Supp & Licensi...	Belvedere	-2,636.33
			Inv #5072, Back-up License re Workstation (Wonderware) 60k w/ CS re SCADA app, (AJE 7.1.2021 - ...	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon:Paradise Cove	-189.93
			Inv #5072, Back-up License re Workstation (Wonderware) 60k w/ CS re SCADA app, (AJE 7.1.2021 - ...	8510 · Data/Alarms/IT Supp & Licensi...	Tiburon	-4,507.06
TOTAL						-11,262.08
05/11/21	**8240**	**Driscoll, Stephen**	**EE Incentive, April 2021**	**JP Morgan Chase - Primary 7399**		
			Employee Incentive/Con't Ed Stipend: Completion of CSU Advanced WWT, April 2021, Cert #565501	8005 · Employee Incentives	Belvedere	-359.50
			Employee Incentive/Con't Ed Stipend: Completion of CSU Advanced WWT, April 2021, Cert #565501	8005 · Employee Incentives	Tiburon:Paradise Cove	-25.90
			Employee Incentive/Con't Ed Stipend: Completion of CSU Advanced WWT, April 2021, Cert #565501	8005 · Employee Incentives	Tiburon	-614.60
TOTAL						-1,000.00
05/11/21	**8241**	**La Torre, Daniel P.**	**Standby Mileage Reimb, Oct - Dec, 2020**	**JP Morgan Chase - Primary 7399**		
			Standby Mileage Reimb. for Belvedere P&L, Jan - May, 2021	6018.2 · Standby Mileage Expense R...	Belvedere	-974.40
			Standby Mileage Reimb. for Tiburon P&L, Jan - May, 2021	6018.2 · Standby Mileage Expense R...	Tiburon	-100.80
			Standby Mileage Reimb. for M.P. alarm, Jan - May, 2021 (Belv)	6018.2 · Standby Mileage Expense R...	Belvedere	-12.40
			Standby Mileage Reimb. for M.P. alarm, Jan - May, 2021 (Tib)	6018.2 · Standby Mileage Expense R...	Tiburon	-21.20
TOTAL						-1,108.80
05/11/21	**8242**	**Rubio, Antonio**	**Board Room Chairs Reimb + Testing + Travel Reimb. re WEF Conference, May 2021**	**JP Morgan Chase - Primary 7399**		
			SD5 Board Room Chairs - reimbursement, 4.15.2021	6018.1 · Meetings & Travel	Belvedere	-1,366.10
			SD5 Board Room Chairs - reimbursement, 4.15.2021	6018.1 · Meetings & Travel	Tiburon:Paradise Cove	-98.42
			SD5 Board Room Chairs - reimbursement, 4.15.2021	6018.1 · Meetings & Travel	Tiburon	-2,335.48
			Reimbursement for Travel Expenses for AWWA / WEF Utility Conference, 8.3.2021 - 8.6.2021, (AJE F...	6018.1 · Meetings & Travel	Belvedere	-195.28
			Reimbursement for Travel Expenses for AWWA / WEF Utility Conference, 8.3.2021 - 8.6.2021, (AJE F...	6018.1 · Meetings & Travel	Tiburon:Paradise Cove	-14.07
			Reimbursement for Travel Expenses for AWWA / WEF Utility Conference, 8.3.2021 - 8.6.2021, (AJE F...	6018.1 · Meetings & Travel	Tiburon	-333.85
			Reimbursement for Travel & Meetings (Mileage, lodging + meal/diem), SWRCB T2 & D2 Operator Testi...	6018.1 · Meetings & Travel	Belvedere	-105.96
			Reimbursement for Travel & Meetings (Mileage, lodging + meal/diem), SWRCB T2 & D2 Operator Testi...	6018.1 · Meetings & Travel	Tiburon:Paradise Cove	-7.63
			Reimbursement for Travel & Meetings (Mileage, lodging + meal/diem), SWRCB T2 & D2 Operator Testi...	6018.1 · Meetings & Travel	Tiburon	-181.14
TOTAL						-4,637.93

CASH FLOW CHART

SANITARY DISTRICT NO. 5 OF MARIN COUNTY: APRIL 2021



CalPERS Pension Accrued Liability (6.30.19): $ 10,234,881.00

CalPERS Pension Market Value Assets (6.30.19): $10,023,308.00

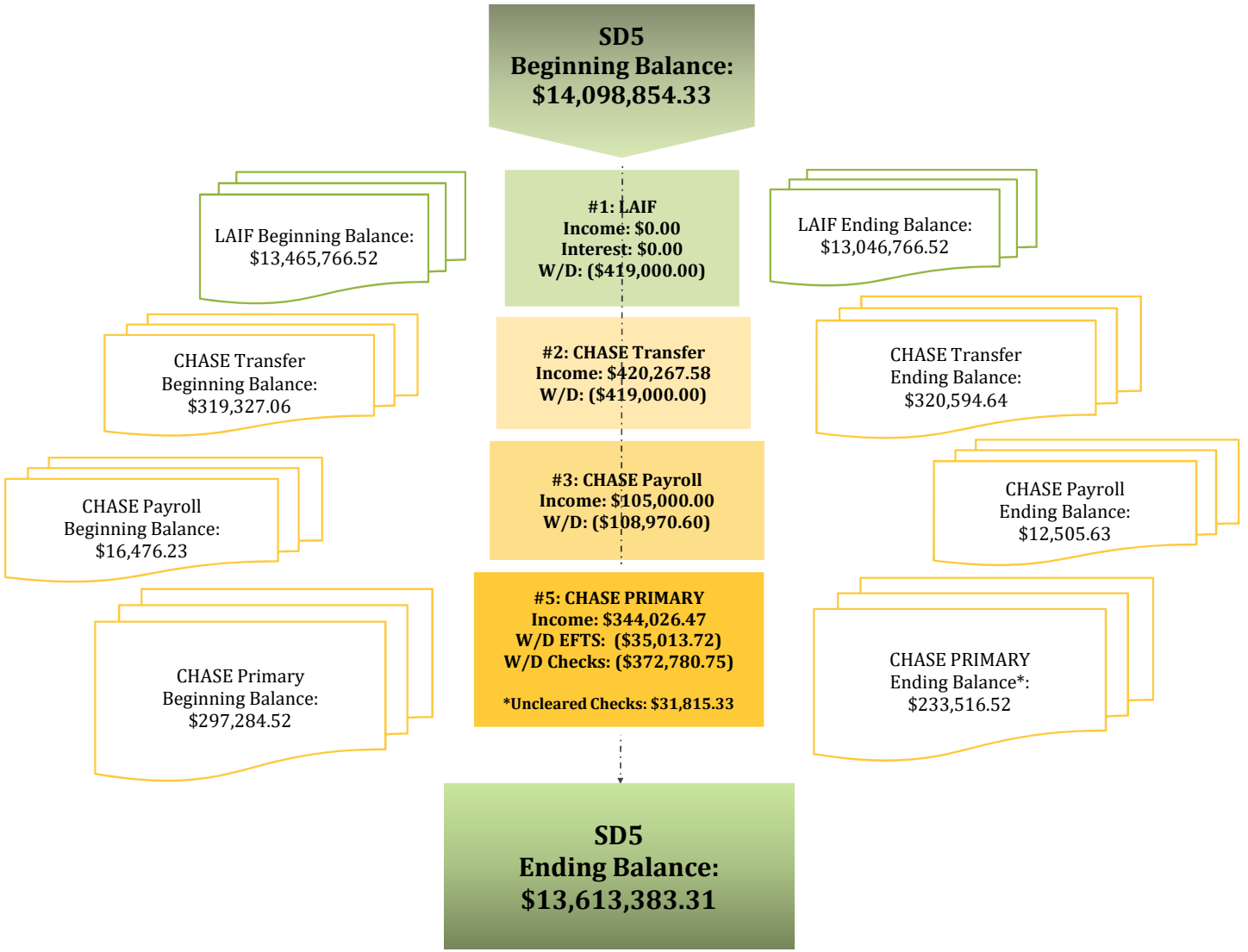
CalPERS CERBT/OPEB Beginning Balance: $960,819.29

CalPERS CERBT/OPEB Ending Balance: $997,075.83

MPR REFI (Principal Balance) Balance: $7,240,000.00

CASH FLOW CHART

SANITARY DISTRICT NO. 5 OF MARIN COUNTY: MARCH 2021



CalPERS Pension Accrued Liability (6.30.19): $ 10,234,881.00

CalPERS Pension Market Value Assets (6.30.19): $10,023,308.00

CalPERS CERBT/OPEB Beginning Balance: $648,238.89

CalPERS CERBT/OPEB Ending Balance: $960,819.29

MPR REFI (Principal Balance) Balance: $7,240,000.00

MAY 10, 2021

SANITARY DISTRICT NO 5 - 0400-2116
PO BOX 227
BELVEDERE TIBURON, CA 94920

CHECK DATE : 04/15/2021 WEEK 16
PERIOD BEGIN : 04/01/2021
PERIOD END : 04/15/2021

Dear Paychex Preview Client,

Enclosed are your payroll reports and checks. Please verify that all information is accurate and correct. If there are any questions or concerns, please contact us immediately.

If you have tax deposits due, ensure the deposits are initiated at least one banking day prior to the due date to avoid penalties. We will assume that these deposits were made on the due dates and they will be reflected on your returns accordingly.

This is a summary of your payroll transactions of the check date of 04/15/2021. It does not reflect miscellaneous administrative charges. Please refer to your Paychex Human Resource Services invoice(s) for any additional cash required for this check date.

PAYROLL TOTALS

DIRECT DEPOSIT DEBITED FROM YOUR ACCOUNT	39462.45		
READYCHEX DEBITED FROM YOUR ACCOUNT	0.00	NUMBER OF PAYROLL CHECKS	18
TOTAL NET PAYROLL	39462.45		
BILLING PAYMENT	263.75	Withdrawal made by PAYCHEX INC. on above check date.	
AMOUNT DEBITED FROM TAX ACCOUNT	20134.15		
TOTAL TAX LIABILITY DUE BY CLIENT	0.00		
TOTAL TAX LIABILITY	20134.15	**NUMBER OF CHECKS PRINTED**	18
ADJUSTMENTS TO TAX LIABILITY			
TOTAL ADJUSTMENTS	-0.00		
TOTAL NET PAYROLL, TAX LIABILITY, AND SERVICES	59596.60		
TOTAL COST OF PAYROLL	59860.35	NUMBER OF MANUAL/VOID TRANSACTIONS	0

Important: If you filed Form 7200, Advance Payment of Employer Credits Due to COVID-19, please notify your Paychex representative so that credits are accurately reported on Form 941.

TAX DEPOSITS DUE

TAX AGENCY	TAXPAY	NON-TAXPAY	DUE DATE	
FEDERAL	17150.67		04/21/2021	Deposit made by PAYCHEX INC. on your behalf.
STATE - CA	2983.48		04/21/2021	Deposit made by PAYCHEX INC. on your behalf.

APR 27, 2021

REVERSAL OF VR DIRECT DEPOSIT + REISSUANCE.

SANITARY DISTRICT NO 5 - 0400-2116
PO BOX 227
BELVEDERE TIBURON, CA 94920

CHECK DATE : 04/30/2021-2 WEEK 18
PERIOD BEGIN : 04/16/2021
PERIOD END : 04/30/2021

TL
4/27/21

Dear Paychex Preview Client,

Enclosed are your payroll reports and checks. Please verify that all information is accurate and correct. If there are any questions or concerns, please contact us immediately.

If you have tax deposits due, ensure the deposits are initiated at least one banking day prior to the due date to avoid penalties. We will assume that these deposits were made on the due dates and they will be reflected on your returns accordingly.

This is a summary of your payroll transactions of the check date of 04/30/2021. It does not reflect miscellaneous administrative charges. Please refer to your Paychex Human Resource Services invoice(s) for any additional cash required for this check date.

PAYROLL TOTALS

DIRECT DEPOSIT DEBITED FROM YOUR ACCOUNT	-1223.05		
READYCHEX DEBITED FROM YOUR ACCOUNT	0.00	NUMBER OF PAYROLL CHECKS	1
MANUAL CHECKS	0.00		
TOTAL NET PAYROLL	-1223.05		
BILLING PAYMENT	26.50	Withdrawal made by PAYCHEX INC. on above check date.	
AMOUNT DEBITED FROM TAX ACCOUNT	-1042.27		
TOTAL TAX LIABILITY DUE BY CLIENT	0.00		
TOTAL TAX LIABILITY	-1042.27	**NUMBER OF CHECKS PRINTED**	1
ADJUSTMENTS TO TAX LIABILITY			
TOTAL ADJUSTMENTS	-0.00		
TOTAL NET PAYROLL, TAX LIABILITY, AND SERVICES	-2265.32		
TOTAL COST OF PAYROLL	-2238.82	NUMBER OF MANUAL/VOID TRANSACTIONS	1

Important: If you filed Form 7200, Advance Payment of Employer Credits Due to COVID-19, please notify your Paychex representative so that credits are accurately reported on Form 941.

TAX DEPOSITS DUE

TAX AGENCY	TAXPAY	NON-TAXPAY	DUE DATE	
FEDERAL	16519.02		05/05/2021	Deposit made by PAYCHEX INC. on your behalf.
STATE - CA	2865.51		05/05/2021	Deposit made by PAYCHEX INC. on your behalf.

APR 27, 2021

SANITARY DISTRICT NO 5 - 0400-2116
PO BOX 227
BELVEDERE TIBURON, CA 94920

CHECK DATE : 04/30/2021 WEEK 18
PERIOD BEGIN : 04/16/2021
PERIOD END : 04/30/2021

Dear Paychex Preview Client,

Enclosed are your payroll reports and checks. Please verify that all information is accurate and correct. If there are any questions or concerns, please contact us immediately.

If you have tax deposits due, ensure the deposits are initiated at least one banking day prior to the due date to avoid penalties. We will assume that these deposits were made on the due dates and they will be reflected on your returns accordingly.

This is a summary of your payroll transactions of the check date of 04/30/2021. It does not reflect miscellaneous administrative charges. Please refer to your Paychex Human Resource Services invoice(s) for any additional cash required for this check date.

PAYROLL TOTALS

DIRECT DEPOSIT DEBITED FROM YOUR ACCOUNT	35636.75		
READYCHEX DEBITED FROM YOUR ACCOUNT	0.00	NUMBER OF PAYROLL CHECKS	16
TOTAL NET PAYROLL	35636.75		
BILLING PAYMENT	250.05	Withdrawal made by PAYCHEX INC. on above check date.	
AMOUNT DEBITED FROM TAX ACCOUNT	20426.80		
TOTAL TAX LIABILITY DUE BY CLIENT	0.00		
TOTAL TAX LIABILITY	20426.80	**NUMBER OF CHECKS PRINTED**	16
ADJUSTMENTS TO TAX LIABILITY			
TOTAL ADJUSTMENTS	-0.00		
TOTAL NET PAYROLL, TAX LIABILITY, AND SERVICES	56063.55		
TOTAL COST OF PAYROLL	56313.60	NUMBER OF MANUAL/VOID TRANSACTIONS	0

Important: If you filed Form 7200, Advance Payment of Employer Credits Due to COVID-19, please notify your Paychex representative so that credits are accurately reported on Form 941.

TAX DEPOSITS DUE

TAX AGENCY	TAXPAY	NON-TAXPAY	DUE DATE	
FEDERAL	17346.02		05/05/2021	Deposit made by PAYCHEX INC. on your behalf.
STATE - CA	3080.78		05/05/2021	Deposit made by PAYCHEX INC. on your behalf.

Sanitary Distr. No.5 of Marin Co.
Comparative Balance Sheet
As of April 30, 2021

	Apr 30, 21	Mar 31, 21	$ Change
ASSETS			
Current Assets			
Checking/Savings			
Local Agency Investment Fund			
Belvedere			
Belvedere Operating	3,652,737.28	3,148,014.06	504,723.22
Belvedere Operating Reserve	516,923.05	516,923.05	0.00
Belvedere Capital & CIP Reserve	2,168,491.17	1,840,399.58	328,091.59
Belvedere PERS Retirement Trust	366,215.00	366,215.00	0.00
Belvedere Disaster Recovery Fnd	356,250.00	356,250.00	0.00
Total Belvedere	7,060,616.50	6,227,801.69	832,814.81
Tiburon			
Tiburon Operating	1,947,624.18	1,323,618.97	624,005.21
Tiburon Operating Reserve	683,930.00	683,930.00	0.00
Tiburon Capital & CIP Reserve	3,512,349.86	3,153,925.86	358,424.00
Tiburon PERS Retirement Trust	661,740.00	661,740.00	0.00
Tiburon Disaster Recovery Fund	643,750.00	643,750.00	0.00
Total Tiburon	7,449,394.04	6,466,964.83	982,429.21
Local Agency Investment Fund - Other	352,000.00	352,000.00	0.00
Total Local Agency Investment Fund	14,862,010.54	13,046,766.52	1,815,244.02
JP Morgan Chase - Primary 7399	438,263.58	210,981.19	227,282.39
JP Morgan Chase - Payroll 7506	8,932.96	7,261.33	1,671.63
JP Morgan Chase - Transfer 7522	273,917.14	320,594.64	-46,677.50
Total Checking/Savings	15,583,124.22	13,585,603.68	1,997,520.54
Accounts Receivable			
Accounts Receivable	37,476.11	19,120.43	18,355.68
Total Accounts Receivable	37,476.11	19,120.43	18,355.68
Other Current Assets			
Petty Cash	881.92	881.92	0.00
Total Other Current Assets	881.92	881.92	0.00
Total Current Assets	15,621,482.25	13,605,606.03	2,015,876.22
Fixed Assets	19,228,004.19	19,228,004.19	0.00
Other Assets			
Debt Issuance Cost	93,188.00	93,188.00	0.00
Total Other Assets	93,188.00	93,188.00	0.00
TOTAL ASSETS	**34,942,674.44**	**32,926,798.22**	**2,015,876.22**
LIABILITIES & EQUITY			
Liabilities			
Current Liabilities			
Accounts Payable			
2000 · Accounts Payable	-78,249.12	-48,378.72	-29,870.40
Total Accounts Payable	-78,249.12	-48,378.72	-29,870.40
Other Current Liabilities			
Deferred Income for Permits	2,300.00	2,300.00	0.00
Compensated Absences Current	133,202.91	133,202.91	0.00
Retainage Payable	158,903.35	147,512.77	11,390.58
MPR Rev Bond Interest Payable	50,341.00	50,341.00	0.00
MPR Rev Bonds Payable Current	660,000.00	660,000.00	0.00
Total Other Current Liabilities	1,004,747.26	993,356.68	11,390.58
Total Current Liabilities	926,498.14	944,977.96	-18,479.82
Long Term Liabilities			
2061 · OPEB Related Liability	809,282.00	809,282.00	0.00
Pension-related Liabilities	-484,265.00	-484,265.00	0.00
MPR Revenue Bonds Payable	7,240,000.00	7,240,000.00	0.00
Total Long Term Liabilities	7,565,017.00	7,565,017.00	0.00
Total Liabilities	8,491,515.14	8,509,994.96	-18,479.82
Equity			
3900 · Net Assets	26,485,416.11	26,485,416.11	0.00
Net Income	-34,256.81	-2,068,612.85	2,034,356.04
Total Equity	26,451,159.30	24,416,803.26	2,034,356.04
TOTAL LIABILITIES & EQUITY	**34,942,674.44**	**32,926,798.22**	**2,015,876.22**

Sanitary Distr. No.5 of Marin Co.
Annual Budget vs Actual Expenses
July 2020 through April 2021

	Jul '20 - Apr 21	Budget	$ Over Budget	% of Bu...
Ordinary Income/Expense				
Income				
5000 · Property Taxes				
5001.2 · TEETER	828,278.45	700,000.00	128,278.45	118.3%
5002 · UNSEC	16,276.23	13,000.00	3,276.23	125.2%
5003 · PUNS / PRIOR UNSECURED	493.50	0.00	493.50	100.0%
5004 · REDEMPTION / RDMPT	529.01	500.00	29.01	105.8%
5006 · SPLU	332.41	100.00	232.41	332.4%
5041 · SUPSEC	12,529.33	15,000.00	-2,470.67	83.5%
5043 · SECU	86.54	0.00	86.54	100.0%
5046 · Excess ERAF	388,631.21	250,000.00	138,631.21	155.5%
5280 · HOPTR	1,844.73	3,333.00	-1,488.27	55.3%
5483 · Other tax	7,119.91			
Total 5000 · Property Taxes	1,256,121.32	981,933.00	274,188.32	127.9%
5007 · Sewer Service Charge				
5007.1 · Sewer Service - Tiburon Ops	2,347,006.43	2,523,700.00	-176,693.57	93.0%
5007.5 · Sewer Service - Tiburon Cap	112,807.04	121,313.00	-8,505.96	93.0%
5007.2 · Sewer Service-Belv Ops	1,340,409.96	1,400,843.00	-60,433.04	95.7%
5007.3 · Sewer Service-Belv Cap	875,143.69	914,600.00	-39,456.31	95.7%
5007.4 · Other User Fees	0.00	24,826.00	-24,826.00	0.0%
Total 5007 · Sewer Service Charge	4,675,367.12	4,985,282.00	-309,914.88	93.8%
5201 · Interest				
5201.1 · Interest County of Marin	136.53			
5201.2 · Interest LAIF	66,292.09	156,402.00	-90,109.91	42.4%
Total 5201 · Interest	66,428.62	156,402.00	-89,973.38	42.5%
5900.3 · Connection Fees				
5900.30 · Connection Permit Fees	6,675.00	11,062.00	-4,387.00	60.3%
5900.31 · Collection	103,159.07	100,000.00	3,159.07	103.2%
5900.34 · Treatment	100,541.93	100,000.00	541.93	100.5%
Total 5900.3 · Connection Fees	210,376.00	211,062.00	-686.00	99.7%
5900.4 · Inspection Permit Fees	19,170.50	11,062.00	8,108.50	173.3%
5900.5 · SASM Expense Reimb.	53,596.54	101,680.00	-48,083.46	52.7%
5900.9 · Other Income	0.00	100.00	-100.00	0.0%
5900.10 · Paradise Sewer Line Ext. Fees	0.00	13,806.00	-13,806.00	0.0%
Total Income	6,281,060.10	6,461,327.00	-180,266.90	97.2%
Gross Profit	6,281,060.10	6,461,327.00	-180,266.90	97.2%
Expense				
6000 · Administrative Expenses				
6001 · Advertising	365.00	1,000.00	-635.00	36.5%
6008 · Audit & Accounting	28,350.03	35,000.00	-6,649.97	81.0%
6017 · Consulting Fees	323,349.31	200,000.00	123,349.31	161.7%
6018 · Travel & Meetings				
6018.1 · Meetings & Travel	2,123.54	7,000.00	-4,876.46	30.3%
6018.2 · Standby Mileage Expense Reimb	6,305.80	8,000.00	-1,694.20	78.8%
Total 6018 · Travel & Meetings	8,429.34	15,000.00	-6,570.66	56.2%
6020 · Continuing Education	3,001.78	10,000.00	-6,998.22	30.0%
6021 · County Fees	16,570.52	16,500.00	70.52	100.4%
6024 · Director Fees	2,700.00	9,000.00	-6,300.00	30.0%
6025 · Dues & Subscriptions	20,658.52	34,000.00	-13,341.48	60.8%
6026 · Elections	250.00	9,000.00	-8,750.00	2.8%
6033 · Insurance Property & Liability				
6033.1 · PLP Public Entity Phys Damage	23,377.31	23,301.00	76.31	100.3%
6033.2 · General Liability	43,337.00	43,291.00	46.00	100.1%
6033.3 · Physical Property Damage - Auto	3,730.00	1,435.00	2,295.00	259.9%
Total 6033 · Insurance Property & Liability	70,444.31	68,027.00	2,417.31	103.6%

Sanitary Distr. No.5 of Marin Co.
Annual Budget vs Actual Expenses
July 2020 through April 2021

	Jul '20 - Apr 21	Budget	$ Over Budget	% of Bu...
6039 · Legal	21,514.50	50,000.00	-28,485.50	43.0%
6047 · Office Supplies	8,442.01	13,000.00	-4,557.99	64.9%
6056 · Postage	745.53	1,000.00	-254.47	74.6%
6059 · Pollution Prevention/Public Edu	5,018.19	5,000.00	18.19	100.4%
6065 · Miscellaneous Expense	0.00			
Total 6000 · Administrative Expenses	509,839.04	466,527.00	43,312.04	109.3%
7000 · Ops & Maintenance Expenses				
7010 · Pumps & Lines Maintenance				
7011 · Pumps & Lines Maintenance	38,053.15	50,000.00	-11,946.85	76.1%
7013 · Emergency Line Repair	16,803.18	50,000.00	-33,196.82	33.6%
Total 7010 · Pumps & Lines Maintenance	54,856.33	100,000.00	-45,143.67	54.9%
7020 · Main Plant Maintenance				
7021 · Plant Maintenance Supplies	16,953.58	15,000.00	1,953.58	113.0%
7022 · Plant Maint. Parts & Service	100,573.71	100,000.00	573.71	100.6%
7023 · Janitorial Supplies & Service	5,037.84	9,000.00	-3,962.16	56.0%
7024 · Main Plant Chemicals	59,265.59	105,000.00	-45,734.41	56.4%
7025 · Lab Supplies & Chemicals	8,243.41	15,000.00	-6,756.59	55.0%
7027 · Electrical & Instrument	3,036.10	5,000.00	-1,963.90	60.7%
7028 · Grounds Maintenance	3,890.76	5,000.00	-1,109.24	77.8%
7029 · Main Plant Sludge Disposal	28,414.41	40,000.00	-11,585.59	71.0%
Total 7020 · Main Plant Maintenance	225,415.40	294,000.00	-68,584.60	76.7%
7040 · Paradise Cove Plant Maint				
7041 · Paradise Parts & Service	9,655.35	10,000.00	-344.65	96.6%
7042 · Paradise Supplies & Chemicals	4,985.25	5,000.00	-14.75	99.7%
7043 · Paradise Sludge Disposal	2,645.00	8,000.00	-5,355.00	33.1%
Total 7040 · Paradise Cove Plant Maint	17,285.60	23,000.00	-5,714.40	75.2%
7050 · Monitoring				
7051 · Main Plant Lab Monitoring	33,980.50	50,000.00	-16,019.50	68.0%
7052 · Paradise Cove Monitoring	11,163.05	15,000.00	-3,836.95	74.4%
7053 · Chronic Toxicity	0.00			
Total 7050 · Monitoring	45,143.55	65,000.00	-19,856.45	69.5%
7060 · Permits/Fees				
7061 · Main Plant NPDES Renewal	2,858.00			
7062 · Permits/Fees - General	42,698.41	41,000.00	1,698.41	104.1%
7063 · Paradise Cove Permits/Fees	7,500.18	8,000.00	-499.82	93.8%
7064 · Paradise Cove NPDES Renewal	4,828.50	40,000.00	-35,171.50	12.1%
Total 7060 · Permits/Fees	57,885.09	89,000.00	-31,114.91	65.0%
7070 · Truck Maintenance				
7071 · Fuel	6,815.08	8,000.00	-1,184.92	85.2%
7072 · Truck Maintenance	22,229.14	8,000.00	14,229.14	277.9%
Total 7070 · Truck Maintenance	29,044.22	16,000.00	13,044.22	181.5%
Total 7000 · Ops & Maintenance Expenses	429,630.19	587,000.00	-157,369.81	73.2%
8000 · Salaries and Benefits Expenses				
8001 · Salaries	961,149.33	1,143,549.00	-182,399.67	84.0%
8003 · Overtime	90,215.24	100,000.00	-9,784.76	90.2%
8004 · Standby Pay	60,789.88	72,450.00	-11,660.12	83.9%
8005 · Employee Incentives	12,000.00	45,000.00	-33,000.00	26.7%
8006 · Vacation Buyout	27,098.98	25,000.00	2,098.98	108.4%
8013 · Payroll Taxes	79,124.38	98,212.00	-19,087.62	80.6%
8015 · Payroll/Bank Fees	5,418.16	5,500.00	-81.84	98.5%
8016 · Car Allowance	6,000.01	6,000.00	0.01	100.0%
8019 · PERS Retirement				
8019.05 · PERS Retirement	115,864.06	253,061.00	-137,196.94	45.8%
8019.08 · PERS Retirement - CalPERS UAL	96,367.00	20,000.00	76,367.00	481.8%
8019.10 · PERS Retirement Trust	0.00	313,250.00	-313,250.00	0.0%
8019 · PERS Retirement - Other	0.00			
Total 8019 · PERS Retirement	212,231.06	586,311.00	-374,079.94	36.2%

Sanitary Distr. No.5 of Marin Co.
Annual Budget vs Actual Expenses
July 2020 through April 2021

	Jul '20 - Apr 21	Budget	$ Over Budget	% of Bu...
8020 · Employee Health				
8020.05 · Employee Health	160,364.29	200,653.00	-40,288.71	79.9%
8021 · Employee Health Deductions	-2,290.04			
Total 8020 · Employee Health	158,074.25	200,653.00	-42,578.75	78.8%
8022 · Retiree Health				
8022.05 · Reitree Health	55,692.00	80,994.00	-25,302.00	68.8%
8022.10 · CERBT/OPEB Annual Arc Contribtn	0.00	72,400.00	-72,400.00	0.0%
Total 8022 · Retiree Health	55,692.00	153,394.00	-97,702.00	36.3%
8023 · Workers Comp Insurance	39,318.00	50,250.00	-10,932.00	78.2%
Total 8000 · Salaries and Benefits Expenses	1,707,111.29	2,486,319.00	-779,207.71	68.7%
8500 · Other Operating Expenses				
8510 · Data/Alarms/IT Supp & Licensing	87,960.34	80,000.00	7,960.34	110.0%
8515 · Safety	26,316.69	20,000.00	6,316.69	131.6%
8520 · Personal Protection/Safety Wear	5,981.17	15,000.00	-9,018.83	39.9%
8530 · Telephone				
8531 · Main Plant Telephones	7,581.22	11,000.00	-3,418.78	68.9%
8532 · Paradise Cove Telephones	3,168.99	4,000.00	-831.01	79.2%
8533 · Pumps & Lines Telephones	4,368.19	7,000.00	-2,631.81	62.4%
Total 8530 · Telephone	15,118.40	22,000.00	-6,881.60	68.7%
8540 · Utilities				
8541 · Water	5,950.11	5,000.00	950.11	119.0%
8542 · Main Plant Utilities	141,191.59	180,000.00	-38,808.41	78.4%
8543 · Paradise Cove Utilities	14,030.23	13,500.00	530.23	103.9%
8544 · Pump Station Utilities	35,688.09	35,000.00	688.09	102.0%
Total 8540 · Utilities	196,860.02	233,500.00	-36,639.98	84.3%
Total 8500 · Other Operating Expenses	332,236.62	370,500.00	-38,263.38	89.7%
Total Expense	2,978,817.14	3,910,346.00	-931,528.86	76.2%
Net Ordinary Income	3,302,242.96	2,550,981.00	751,261.96	129.4%
Other Income/Expense				
Other Expense				
9100 · Capital Expenditures				
9200 · Main Plant Equipment Capital				
9209 · Screw Press Blend Redundancy	0.00	15,000.00	-15,000.00	0.0%
9212 · M.P. Headworks Grinder Rplcmnt	23,486.90	15,000.00	8,486.90	156.6%
9218 · Generator Control Panel	0.00	35,000.00	-35,000.00	0.0%
9219 · Cl2 Flash Mixer	12,160.81	15,000.00	-2,839.19	81.1%
9220 · M.P. Office + Bath Flooring	0.00	15,000.00	-15,000.00	0.0%
9221 · Portable Fuel Storage Tank	0.00	15,000.00	-15,000.00	0.0%
9225.95 · SCADA Upgrade & Replacement	18,850.01			
9229.8 · Vehicle Replacement	3,000.00			
Total 9200 · Main Plant Equipment Capital	57,497.72	110,000.00	-52,502.28	52.3%
9300 · Pumps & Lines Capital				
9303 · Lateral Camera	362.71			
9306 · PS Pump & Valve Replacements	0.00	50,000.00	-50,000.00	0.0%
9307 · PS Generator Replacement	54.98			
9311 · Cove Rd Force Main Project				
9311.1 · Cove Rd FM - Engineering	5,656.80			
9311.2 · Cove Rd FM - Const, Ph I	2,141,789.88	1,200,000.00	941,789.88	178.5%
Total 9311 · Cove Rd Force Main Project	2,147,446.68	1,200,000.00	947,446.68	179.0%
9312 · Force Main Rehab - Mltpl Sites	0.00	700,000.00	-700,000.00	0.0%
9313 · Manholes/Rodholes	15,097.72	70,000.00	-54,902.28	21.6%
9314 · Portable Emergency Generators	95,587.89	75,000.00	20,587.89	127.5%
9227.8 · Rodder/Vactor Truck	7,891.43			
Total 9300 · Pumps & Lines Capital	2,266,441.41	2,095,000.00	171,441.41	108.2%

Sanitary Distr. No.5 of Marin Co.
Annual Budget vs Actual Expenses
July 2020 through April 2021

	Jul '20 - Apr 21	Budget	$ Over Budget	% of Bu...
9400 · Paradise Cove Capital				
9401 · P.C. Sewer Line Rehab Prog	0.00	500,000.00	-500,000.00	0.0%
9402 · P.C. Flow Meter Replacement	19,501.62			
9404 · P.C. Infl WWI Access Replcmnt	0.00			
9406 · P.C. Plant Grating Replacement	1,730.73	20,000.00	-18,269.27	8.7%
9415 · P.C. Paint @ Treatment Plant	52,759.00			
Total 9400 · Paradise Cove Capital	73,991.35	520,000.00	-446,008.65	14.2%
9500 · Undesignated Capital				
9510 · Undesignated Cap - M.P.	0.00	25,000.00	-25,000.00	0.0%
9520 · Undesignated Cap - P.C. Plant	26,546.75	10,000.00	16,546.75	265.5%
9530 · Undesignated Cap - P & L	0.00	50,000.00	-50,000.00	0.0%
Total 9500 · Undesignated Capital	26,546.75	85,000.00	-58,453.25	31.2%
Total 9100 · Capital Expenditures	2,424,477.23	2,810,000.00	-385,522.77	86.3%
9700 · Debt Service				
9730 · Debt Service - MPR Project				
9734 · MPR Refi - Principal	660,000.00	660,000.00	0.00	100.0%
9735 · MPR Refi - Interest	190,432.26	190,457.00	-24.74	100.0%
Total 9730 · Debt Service - MPR Project	850,432.26	850,457.00	-24.74	100.0%
Total 9700 · Debt Service	850,432.26	850,457.00	-24.74	100.0%
Total Other Expense	3,274,909.49	3,660,457.00	-385,547.51	89.5%
Net Other Income	-3,274,909.49	-3,660,457.00	385,547.51	89.5%
Net Income	**27,333.47**	**-1,109,476.00**	**1,136,809.47**	**-2.5%**

Sanitary Distr. No.5 of Marin Co.
Zone Report
April 2021

	Paradise C... (Tiburon)	Tiburon - Other (Tiburon)	Total Tiburon	Belvedere	TOTAL
Ordinary Income/Expense					
Income					
5000 · Property Taxes					
5001.2 · TEETER	14,090.08	334,674.21	348,764.29	0.00	348,764.29
5004 · REDEMPTION / RDMPT	1.07	25.38	26.45	0.00	26.45
5041 · SUPSEC	107.90	2,562.80	2,670.70	0.00	2,670.70
5046 · Excess ERAF	6,484.13	154,014.25	160,498.38	0.00	160,498.38
5483 · Other tax	138.51	3,290.01	3,428.52	0.00	3,428.52
Total 5000 · Property Taxes	20,821.69	494,566.65	515,388.34	0.00	515,388.34
5007 · Sewer Service Charge					
5007.1 · Sewer Service - Tiburon Ops	39,943.67	948,761.15	988,704.82	0.00	988,704.82
5007.5 · Sewer Service - Tiburon Cap	1,919.86	45,601.46	47,521.32	0.00	47,521.32
5007.2 · Sewer Service-Belv Ops	0.00	0.00	0.00	564,568.18	564,568.18
5007.3 · Sewer Service-Belv Cap	0.00	0.00	0.00	368,602.36	368,602.36
Total 5007 · Sewer Service Charge	41,863.53	994,362.61	1,036,226.14	933,170.54	1,969,396.68
5201 · Interest					
5201.2 · Interest LAIF	0.00	7,388.68	7,388.68	7,605.34	14,994.02
Total 5201 · Interest	0.00	7,388.68	7,388.68	7,605.34	14,994.02
5900.3 · Connection Fees					
5900.30 · Connection Permit Fees	0.00	300.00	300.00	500.00	800.00
5900.31 · Collection	0.00	23,074.21	23,074.21	9,659.00	32,733.21
5900.34 · Treatment	0.00	20,259.79	20,259.79	6,955.00	27,214.79
Total 5900.3 · Connection Fees	0.00	43,634.00	43,634.00	17,114.00	60,748.00
5900.4 · Inspection Permit Fees	0.00	1,842.50	1,842.50	1,300.00	3,142.50
5900.5 · SASM Expense Reimb.	0.00	11,580.59	11,580.59	6,775.09	18,355.68
Total Income	62,685.22	1,553,375.03	1,616,060.25	965,964.97	2,582,025.22
Gross Profit	62,685.22	1,553,375.03	1,616,060.25	965,964.97	2,582,025.22
Expense					
6000 · Administrative Expenses					
6001 · Advertising	0.00	0.00	0.00	0.00	0.00
6008 · Audit & Accounting	0.00	0.00	0.00	0.00	0.00
6017 · Consulting Fees	488.22	15,015.32	15,503.54	7,863.73	23,367.27
6018 · Travel & Meetings					
6018.1 · Meetings & Travel	1.42	33.80	35.22	19.77	54.99
6018.2 · Standby Mileage Expense Reimb	0.00	72.22	72.22	407.21	479.43
6018.3 · SASM Mileage Reimbursement	0.00	29.46	29.46	17.23	46.69
Total 6018 · Travel & Meetings	1.42	135.48	136.90	444.21	581.11
6020 · Continuing Education	0.00	0.00	0.00	0.00	0.00
6021 · County Fees	250.99	5,961.53	6,212.52	0.00	6,212.52
6025 · Dues & Subscriptions	11.54	273.84	285.38	160.19	445.57
6026 · Elections	6.48	153.64	160.12	89.88	250.00
6033 · Insurance Property & Liability					
6033.1 · PLP Public Entity Phys Damage	205.16	4,868.44	5,073.60	2,847.71	7,921.31
Total 6033 · Insurance Property & Liability	205.16	4,868.44	5,073.60	2,847.71	7,921.31
6039 · Legal	269.58	6,397.08	6,666.66	3,741.84	10,408.50
6047 · Office Supplies	18.98	467.88	486.86	273.67	760.53
6056 · Postage	10.97	264.23	275.20	154.57	429.77
6059 · Pollution Prevention/Public Edu	38.64	916.99	955.63	536.37	1,492.00
6065 · Miscellaneous Expense	-1.55	-36.85	-38.40	-21.55	-59.95
Total 6000 · Administrative Expenses	1,300.43	34,417.58	35,718.01	16,090.62	51,808.63
7000 · Ops & Maintenance Expenses					
7010 · Pumps & Lines Maintenance					
7011 · Pumps & Lines Maintenance	-27,819.97	-16,018.98	-43,838.95	-16,690.25	-60,529.20
7013 · Emergency Line Repair	0.00	35,794.27	35,794.27	0.00	35,794.27
Total 7010 · Pumps & Lines Maintenance	-27,819.97	19,775.29	-8,044.68	-16,690.25	-24,734.93

Sanitary Distr. No.5 of Marin Co.
Zone Report
April 2021

	Paradise C... (Tiburon)	Tiburon - Other (Tiburon)	Total Tiburon	Belvedere	TOTAL
7020 · Main Plant Maintenance					
7021 · Plant Maintenance Supplies	-1,293.35	-870.07	-2,163.42	-1,173.53	-3,336.95
7022 · Plant Maint. Parts & Service	89.49	29,292.76	29,382.25	17,064.68	46,446.93
7023 · Janitorial Supplies & Service	0.00	307.39	307.39	179.81	487.20
7024 · Main Plant Chemicals	0.00	-5,591.27	-5,591.27	-3,271.26	-8,862.53
7025 · Lab Supplies & Chemicals	0.00	1,167.68	1,167.68	683.11	1,850.79
7026 · SASM Supplies & Chem	0.00	7,001.34	7,001.34	4,096.06	11,097.40
7027 · Electrical & Instrument	0.00	158.10	158.10	92.49	250.59
7028 · Grounds Maintenance	0.00	2,018.88	2,018.88	1,181.12	3,200.00
7029 · Main Plant Sludge Disposal	0.00	1,207.23	1,207.23	706.27	1,913.50
Total 7020 · Main Plant Maintenance	-1,203.86	34,692.04	33,488.18	19,558.75	53,046.93
7040 · Paradise Cove Plant Maint					
7041 · Paradise Parts & Service	1,749.11	-1,046.62	702.49	-602.98	99.51
7042 · Paradise Supplies & Chemicals	-1,644.14	10.37	-1,633.77	0.00	-1,633.77
Total 7040 · Paradise Cove Plant Maint	104.97	-1,036.25	-931.28	-602.98	-1,534.26
7050 · Monitoring					
7051 · Main Plant Lab Monitoring	0.00	3,697.52	3,697.52	2,163.18	5,860.70
7052 · Paradise Cove Monitoring	724.85	0.00	724.85	0.00	724.85
7053 · Chronic Toxicity	0.00	-1,245.72	-1,245.72	-728.78	-1,974.50
Total 7050 · Monitoring	724.85	2,451.80	3,176.65	1,434.40	4,611.05
7060 · Permits/Fees					
7061 · Main Plant NPDES Renewal	-882.50	-5,875.56	-6,758.06	-3,437.44	-10,195.50
7062 · Permits/Fees - General	0.00	6,697.84	6,697.84	3,918.29	10,616.13
7063 · Paradise Cove Permits/Fees	58.33	-58.33	0.00	0.00	0.00
7064 · Paradise Cove NPDES Renewal	4,828.50	0.00	4,828.50	0.00	4,828.50
7060 · Permits/Fees - Other	0.00	-2,021.41	-2,021.41	-1,182.40	-3,203.81
Total 7060 · Permits/Fees	4,004.33	-1,257.46	2,746.87	-701.55	2,045.32
7070 · Truck Maintenance					
7071 · Fuel	23.70	562.31	586.01	328.92	914.93
7072 · Truck Maintenance	-26.95	-247.46	-274.41	-380.06	-654.47
Total 7070 · Truck Maintenance	-3.25	314.85	311.60	-51.14	260.46
Total 7000 · Ops & Maintenance Expenses	-24,192.93	54,940.27	30,747.34	2,947.23	33,694.57
8000 · Salaries and Benefits Expenses					
8001 · Salaries	2,427.47	53,053.54	55,481.01	31,032.31	86,513.32
8030 · Salaries Reimbursed by SASM	0.00	4,549.79	4,549.79	2,661.80	7,211.59
8003 · Overtime	310.06	7,357.71	7,667.77	4,303.76	11,971.53
8004 · Standby Pay	169.85	4,030.38	4,200.23	2,357.51	6,557.74
8006 · Vacation Buyout	97.88	2,322.63	2,420.51	1,358.58	3,779.09
8007 · Voluntary Deductions	0.00	0.00	0.00	0.00	0.00
8008 · Deferred Comp 457	0.00	0.00	0.00	0.00	0.00
8013 · Payroll Taxes	288.27	6,686.71	6,974.98	4,001.31	10,976.29
8015 · Payroll/Bank Fees	13.99	332.07	346.06	194.24	540.30
8019 · PERS Retirement					
8019.05 · PERS Retirement	383.59	9,223.44	9,607.03	5,265.57	14,872.60
8019 · PERS Retirement - Other	-22.99	-585.39	-608.38	-341.62	-950.00
Total 8019 · PERS Retirement	360.60	8,638.05	8,998.65	4,923.95	13,922.60
8020 · Employee Health					
8020.05 · Employee Health	332.07	7,879.87	8,211.94	4,609.18	12,821.12
8021 · Employee Health Deductions	-3.94	-93.66	-97.60	-54.78	-152.38
Total 8020 · Employee Health	328.13	7,786.21	8,114.34	4,554.40	12,668.74
8022 · Retiree Health					
8022.05 · Reitree Health	22.61	536.54	559.15	313.84	872.99
Total 8022 · Retiree Health	22.61	536.54	559.15	313.84	872.99
8023 · Workers Comp Insurance	-51.80	-1,229.20	-1,281.00	-719.00	-2,000.00
Total 8000 · Salaries and Benefits Expenses	3,967.06	94,064.43	98,031.49	54,982.70	153,014.19

Sanitary Distr. No.5 of Marin Co.
Zone Report
April 2021

	Paradise C... (Tiburon)	Tiburon - Other (Tiburon)	Total Tiburon	Belvedere	TOTAL
8500 · Other Operating Expenses					
8510 · Data/Alarms/IT Supp & Licensing	-585.80	-13,648.82	-14,234.62	-8,068.92	-22,303.54
8515 · Safety	2,310.28	442.33	2,752.61	258.75	3,011.36
8520 · Personal Protection/Safety Wear	14.38	341.33	355.71	199.66	555.37
8530 · Telephone					
8531 · Main Plant Telephones	0.00	1,229.94	1,229.94	719.44	1,949.38
8532 · Paradise Cove Telephones	384.22	0.00	384.22	0.00	384.22
8533 · Pumps & Lines Telephones	175.07	333.09	508.16	14.57	522.73
Total 8530 · Telephone	559.29	1,563.03	2,122.32	734.01	2,856.33
8540 · Utilities					
8542 · Main Plant Utilities	0.00	8,098.74	8,098.74	4,738.20	12,836.94
8543 · Paradise Cove Utilities	1,268.70	0.00	1,268.70	0.00	1,268.70
8544 · Pump Station Utilities	251.70	1,682.18	1,933.88	1,379.14	3,313.02
Total 8540 · Utilities	1,520.40	9,780.92	11,301.32	6,117.34	17,418.66
Total 8500 · Other Operating Expenses	3,818.55	-1,521.21	2,297.34	-759.16	1,538.18
Total Expense	-15,106.89	181,901.07	166,794.18	73,261.39	240,055.57
Net Ordinary Income	77,792.11	1,371,473.96	1,449,266.07	892,703.58	2,341,969.65
Other Income/Expense					
Other Expense					
9100 · Capital Expenditures					
9200 · Main Plant Equipment Capital					
9225.94 · Bus. Server Upgrade & Rplcmt	128.83	3,280.50	3,409.33	1,914.42	5,323.75
9219 · Cl2 Flash Mixer	0.00	7,672.26	7,672.26	4,488.55	12,160.81
9225.95 · SCADA Upgrade & Replacement	488.22	11,585.21	12,073.43	6,776.58	18,850.01
Total 9200 · Main Plant Equipment Capital	617.05	22,537.97	23,155.02	13,179.55	36,334.57
9300 · Pumps & Lines Capital					
9307 · PS Generator Replacement	0.00	-44,914.01	-44,914.01	-45,103.70	-90,017.71
9311 · Cove Rd Force Main Project					
9311.1 · Cove Rd FM - Engineering	0.00	3,568.88	3,568.88	2,087.92	5,656.80
9311.2 · Cove Rd FM - Const, Ph I	0.00	198,137.00	198,137.00	29,695.78	227,832.78
Total 9311 · Cove Rd Force Main Project	0.00	201,705.88	201,705.88	31,783.70	233,489.58
9313 · Manholes/Rodholes	0.00	0.00	0.00	15,097.72	15,097.72
9314 · Portable Emergency Generators	0.00	44,914.01	44,914.01	45,103.70	90,017.71
9227.8 · Rodder/Vactor Truck	-12.41	-294.37	-306.78	-172.20	-478.98
Total 9300 · Pumps & Lines Capital	-12.41	201,411.51	201,399.10	46,709.22	248,108.32
9400 · Paradise Cove Capital					
9406 · P.C. Plant Grating Replacement	1,730.73	0.00	1,730.73	0.00	1,730.73
Total 9400 · Paradise Cove Capital	1,730.73	0.00	1,730.73	0.00	1,730.73
9500 · Undesignated Capital					
9520 · Undesignated Cap - P.C. Plant	26,546.75	0.00	26,546.75	0.00	26,546.75
Total 9500 · Undesignated Capital	26,546.75	0.00	26,546.75	0.00	26,546.75
Total 9100 · Capital Expenditures	28,882.12	223,949.48	252,831.60	59,888.77	312,720.37
Total Other Expense	28,882.12	223,949.48	252,831.60	59,888.77	312,720.37
Net Other Income	-28,882.12	-223,949.48	-252,831.60	-59,888.77	-312,720.37
Net Income	**48,909.99**	**1,147,524.48**	**1,196,434.47**	**832,814.81**	**2,029,249.28**

Sanitary Distr. No.5 of Marin Co.
Monthly O.T. Report
April 2021

Type	Date	Num	Name	Memo	Amount	Balance
Bilsborough, Chad						
Check	04/15/21	1051-3942	Bilsborough, Chad	1.0 Hrs. O.T. @ 2.0x	82.44	82.44
Check	04/15/21	1051-3943	Bilsborough, Chad	20.0 Hr. O.T. @ 1.5x	1,483.92	1,566.36
Total Bilsborough, Chad					1,566.36	1,566.36
Cottrell, Rulon						
Check	04/29/21	1201-3961	Cottrell, Rulon	40.0 Hrs. Comp Buy-Out	2,320.04	2,320.04
Total Cottrell, Rulon					2,320.04	2,320.04
Dohrmann, Robin						
Check	04/15/21	1051-3945	Dohrmann, Robin	7.25 Hrs. O.T. @ 1.5x	630.76	630.76
Check	04/29/21	1201-3963	Dohrmann, Robin	12.0 Hrs. O.T. @1.5x	1,044.02	1,674.78
Check	04/29/21	1201-3963	Dohrmann, Robin	0.25 Hrs. O.T. @ 2.0x	29.00	1,703.78
Total Dohrmann, Robin					1,703.78	1,703.78
Driscoll, Stephen						
Check	04/15/21	1051-3947	Driscoll, Stephen	9.0 Hrs. O.T. @ 1.5x	783.01	783.01
Total Driscoll, Stephen					783.01	783.01
La Torre, Daniel P.						
Check	04/15/21	1051-3950	La Torre, Daniel P.	11.2 Hrs. O.T. @ 1.5x	928.02	928.02
Check	04/29/21	1201-3966	La Torre, Daniel P.	10.0 Hrs. O.T. @ 1.5x	828.59	1,756.61
Check	04/29/21	1201-3967	La Torre, Daniel P.	5.0 Hrs. O.T. @ 1.5x	414.29	2,170.90
Check	04/29/21	1201-3967	La Torre, Daniel P.	1.5 Hrs. O.T. @ 2.0x	165.72	2,336.62
Total La Torre, Daniel P.					2,336.62	2,336.62
Rosser, John						
Check	04/29/21	1201-3970	Rosser, John	40.0 Hrs. O.T. @ 1.5x - Comp Buy Out	2,104.34	2,104.34
Check	04/29/21	1202-3974	Rosser, John	40.0 Hrs. Comp-Buy Out (Non-Memo) - ERROR	2,104.34	4,208.68
Check	04/29/21	1202-3974	Rosser, John	Was Paid (vs. Memo) - ERROR/REVERSED	-2,104.34	2,104.34
Total Rosser, John					2,104.34	2,104.34
Triola, Joseph						
Check	04/15/21	1051-3957	Triola, Joseph	9.0 Hrs. O.T. @ 1.5x	710.21	710.21
Check	04/15/21	1051-3957	Triola, Joseph	0.5 Hrs. O.T. @ 2.0x	52.61	762.82
Check	04/29/21	1201-3973	Triola, Joseph	5.0 Hrs. O.T. @ 1.5x	394.56	1,157.38
Total Triola, Joseph					1,157.38	1,157.38
TOTAL					**11,971.53**	**11,971.53**

Sanitary District No. 5 of Marin County

District Management Report

April 2021

Contents:

- Transmittal Memo
- Financial/Budgetary
- HR & Personnel
- Business Administration
- Collection System Performance
- Treatment Plant Performance – Paradise Cove
- Treatment Plant Performance – Main Plant
- Pollution Prevention Activities
- Continuing Education & Safety Training
- Capital Improvement Projects

Transmittal Memo

Date: May 20, 2021

To: Board of Directors

From: Tony Rubio, District Manager/ Chief Plant Operator

Subject: Management Report for April 2021

Fiscal Status

Period Covered:	July 1, 2020 –April 30, 2021
Percent of Fiscal Year:	83 %
Percent of Budgeted Income to Date:	97.2%
Percent of Budgeted Expenditures to Date:	76.2% (operating only)

Personnel

Separations:	None
New Hires:	None
Promotions:	None
Recruitment Activities:	None

Regulatory Compliance

MP Collection System WDR Compliance:	Full Compliance with all regulations
PC Collection System WDR Compliance:	Full Compliance with all regulations
MP NPDES Permit Compliance:	Full Compliance with all regulations
PC NPDES Permit Compliance:	Full Compliance with all regulations
BAAQMD Compliance:	Full Compliance with all regulations
Bio-Solids Compliance:	Full Compliance with all regulations
Significant Comments:	None

Summary of Operational Highlights are on the following pages.

Significant Events for the Month of April 2021 Include:

Financial/Budgetary/Business Administration

- Scanning project underway as time allows- 1980's Main Plant upgrade documents being scanned
- Work on fiscal year 2021-2022 budget.
- Created new comprehensive budget for customer use and website.
- Preparing end of fiscal year purchase orders.
- Looking into upgrading Infor MP2 system to newer and more user-friendly Infor EAM system (CMMS system, computerize maintenance management system)

HR and Personnel

- Office remains closed to the public through the end of April. Will be considering opening office back up to the public on June 15 in conjunction with state approved re-opening guidelines
- Extended offer of employment to top candidate for the vacant Collection System Maintenance Position

Continuing Education and Safety Training.

- Education incentive program utilized by one of the staff members this reporting period.

Collection System Performance

Main Plant Tiburon/Belvedere:

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- Rodding work completed in the Tiburon Zone.
- Annual Pump station pump and electrical PM's being performed.
- 2 SSO's Category 3 SSO's reported to RWQCB- 2 in Belvedere (8 Eucalyptus, 127 Golden gate) month of March

Paradise Cove:

- Submitted No Spill report for month of March to RWQCB on CIWQS

Treatment Plant Performance

Paradise Cove:

- Submitted 1st Quarter 2021 SMR and DMR to the RWQCB
- L2000 controller troubleshooting by JM integration

Main Plant:

- Submitted March 2021 SMR and DMR to the RWQCB
- Wastewater Samples continue to be collected and sent to the University of California Berkeley for Covid-19 study
- Scheduled Emergency Generator control panel replacement.
- New hypochlorite and bisulfite bids came in from BACC- increase in cost from last year. Bid docs to be included in next months board meeting.

Pollution Prevention Activities

- Remote meetings with P2 Group

Capital Improvement Projects

- Completed rehabilitation of 6 manholes- 3 in Belvedere 3 in Tiburon.
- New flooring scheduled to arrive this month for installation in break room and office
- New appliances were ordered for staff break room as part of the breakroom remodeling efforts. Scheduled for install late June.
- 3hp Flygt submersible pumps to be ordered prior to end of fiscal year as well as new manhole frame and covers for manhole rehabilitation work.

Glossary of Terms

- **B.O.D. (Biochemical Oxygen Demand):** Measurement of the effluent's capacity to consume dissolved oxygen to stabilize all remaining organic matter. The permit limits for our effluent for discharge into San Francisco bay require that we remove 85% influent B.O.D. and meet a weekly average of less than 45mg/l and a monthly average of less than 30 mg/l B.O.D.
- **TSS (Total Suspended Solids):** Measurement of suspended solids in the effluent. Our permit requires that we move at least 85% of the influent TSS and that the effluent limit is less than 45 mg/l as a weekly average and less than 30 mg/l as a monthly average.
- **Chlorine Residual:** The plant effluent is disinfected with hypochlorite (chlorine "bleach") and then the residual chlorine is neutralized with sodium bisulfite to protect the bay. The effluent chlorine residual limit is 0.0 mg/l which we monitor continuously.
- **pH:** pH is a measurement of acidity with pH 7.0 being neutral and higher pH values being basic and lower pH values being acidic. Our permit effluent pH must stay within the range of 6.0-9.0, which we monitor continuously.
- **Coliform:** Coliform bacteria are the indicator organism for determination of the efficiency of the disinfection process. The lab culture samples of our effluent and the presence of coliform is an indication that pathogenic organisms may be present. This is reported as MPN/100 (number of colifom bacteria in 100 milliliters sample).
- **Flow Through Bioassay:** A 96 hour test in which we test the toxicity of our effluent to tiny fish (sticklebacks) in a flow through tank to determine the survivability under continuous exposure to our effluent. Our permit requires that we maintain a 90^{th} percentile survival of at least 70% and an 11 sample median survival of at least 90%. In layman's terms, this means that out of the last 11 samples only one bioassay may fall below 70% survival and the middle value when all 11 samples are placed in numerical order must be at least 90%.
- **Metals Analysis:** Our permit requires that we analyze our effluent for many different metals on a monthly basis. We have permit limits for some metals. The metals are stated as a daily max and a monthly average limit. The daily max limit is the number we cannot exceed on any sample and the monthly average applies to all samples collected in any month. (although usually we are only required to take one).
- **F.O.G. (Fats, oils and grease):** Quarterly we are required to monitor our effluent for Fats, Oils and Grease.

Glossary of terms continued…

- **Headworks:** The point where all raw wastewater enters the treatment plant. In this building wastewater goes through 3 grinders to grind up all large objects that could possibly damage our influent and sludge pumps further down the treatment process.
- **Primary Sedimentation:** The next treatment process is a physical treatment process where solids that settle or float are removed and sent to the digesters for further processing.
- **Activated Sludge:** Next is the activate sludge process. This process is a biological wastewater treatment process that uses microorganisms to speed up the decomposition of wastes. When activated sludge is added to wastewater, the microorganisms feed and grow on waste particles in the wastewater. As the organisms grow and reproduce, more and more waste is removed, leaving the wastewater partially cleaned. To function efficiently, the mass of organisms needs a steady balance of food and oxygen. These tasks are closely monitored by the operations staff.
- **Secondary Clarification:** Next is secondary clarification, like primary sedimentation/clarification, this also is a physical treatment process where solids that settle or float are removed and sent to the next treatment process. The difference between Secondary Clarification and primary sedimentation is that the solids removed from the secondary clarifiers goes to 2 places. Some goes to waste to the DAFT and some goes back to the activated sludge process for further treatment. (*Microorganisms must be returned to the activated sludge process to keep an equal balance of food and microorganisms*).
- **DAFT (dissolved air floatation thickener):** Next is the DAFT. The dissolved air floatation thickening process uses air bubbles to thicken WAS(waste active sludge) solids removed from the secondary clarifier, by floating solids to the tank surface, where they are removed and sent to the digesters for final processing.
- **Sludge Digestion:** In the anaerobic digestion process, all the organic material removed from the primary sedimentation tanks and DAFT's are digested by anaerobic bacteria. The end products are methane, carbon dioxide, water and neutralized organic matter.
- **Solids Handling:** This is the process where all the neutralized sludge from the digester is finally treated. Sludge from the digester is pumped to the screw press where it is conditioned with a polymer (chemical that reacts with the sludge to remove the water from the sludge and bind the sludge particles together) in order to dewater the sludge and produce a dry cake for final disposal to the Redwood landfill.

Glossary of terms continued…

- **Disinfection:** This is the end point for the wastewater- at this point wastewater flows through the chlorine contact tank. This contact tank allows for enough contact time for chlorine solution to disinfect the wastewater. Sodium bisulfite is introduced at the end of the tank to neutralize any residual chlorine to protect the bay.
- **MLSS (mixed liquor suspended solids):** Suspended solids in the mixed liquor of an aeration tank measured in mg/l
- **MCRT (mean cell resident time):** An expression of the average time that a microorganism will spend in the activated sludge process.
- **SVI (sludge volume index):** This is a calculation used to indicate the settling ability of activated sludge in the secondary clarifier.
- **RAS (return activated sludge):** The purpose of returning activated sludge, is to maintain a sufficient concentration of activated sludge in the aeration tank.
- **WAS (waste activated sludge):** To maintain a stable process, the amount of solids added each day to the activated sludge process are removed as WAS. We track this by our MCRT which averages 3 days
- **TWAS (thickened waste activated sludge):** The WAS is thickened in the DAFT and the thickened sludge is then pumped to the digester.
- **MPN (most probable number):** Concentrations of total coliform bacteria are reported as the most probable number. The MPN is not the absolute count of the bacteria but a statistical estimate of their concentration.
- **Bio-solids:** Anaerobic digested sludge is pumped to a screw press where excess water is removed to reduce the volume (and weight) thus producing an end result called bio-solids.
- **Polymer:** Organic polymers are added to digested sludge to bring out the formation of larger particles by bridging to improve processing.

ACWA Assoc of California Water Agencies
AWWA American Water Works Association
BACWA Bay Area Clean Water Agencies
CASA California Association of Sanitation Agencies
CSRMA: California Sanitation Risk Management Authority
CalARP California Accidental Release Prevention Program
CDO Cease and Desist Order
CEQA California Environmental Quality Act
CFR Code of Federal Regulations
CIWMB California Integrated Waste Management Board
CSO Combined Sewer Overflow
CWA Clean Water Act
CWARA Clean Water Authority Restoration Act
DHS Dept of Health Services
EBEP Enclosed Bays and Estuaries Plan
EIS/EIR Environmental Impact Statement/Report
ERAF Educational Reserve Augmentation Fund
FOG Fats, Oils and Grease
ISWP Inland Surface Waters Plan
LAFCO Local Agency Formation Commission
MACT Maximum Achievable Control Technology (air controls)
MMP Mandatory Minimum Penalty
MUN Municipal Drinking Water Use
NGOs Non Governmental Organizations
NPDES Nat'l Pollutant Discharge Elimination System
NTR National Toxics Rule
OSHA: Occupational Safety and Health Administration
POTWs Publicly Owned Treatment Works
QA/QC Quality Assurance / Quality Control
RFP Request For Proposals
RFQ Request For Qualifications
SEP Supplementary Environmental Projects
SFEI: San Francisco Estuary Institute
SSO Sanitary Sewer Overflow
SWRCB State Water Resources Control Board
WDR Waste Discharge Requirements
WERF Water Environment Research Foundation
WMI Watershed Management Initiative
WRDA Water Resource Development Act
WQBEL Water Quality Based Effluent Limitation
Agency

APWA American Public Works Association
BAAQMD Bay Area Air Quality Management District
BAPPG: Bay Area Pollution Prevention Group
CSDA California Special Districts Association
CAAQS California Ambient Air Quality Standard
CARB California Air Resources Board
CECs Constituents of Emerging Concern
CIWQS California Integrated Water Quality System
CMOM Capacity, Management, Operation and Maintenance
CPUC California Public Utilities Commission
CTR California Toxics Rule
CWAP Clean Water Action Plan
CWEA California Water Environment Association
DTSC Dept of Toxic Substances Control
EDW Effluent Dominated Water body
EPA Environmental Protection Agency
ESMP Electronic Self-Monitoring Report
GASB Government Accounting Standards Board
JPA Joint Powers Authority
LOCC League of California Cities
MCL Maximum Contaminant Level
MOU Memorandum of Understanding
NACWA National Association of Clean Water Agencies
NOX Nitrogen Oxides
NRDC Natural Resources Defense Council
OWP: Office of Water Programs
PCBs Poly Chlorinated Biphenyls
PPCPs Pharmaceutical and personal Care Products
Region IX Western Region of EPA (CA, AZ, NV & HI)
RMP Risk Management Program
RWQCB Regional Water Quality Control Board
SIP State Implementation Policy (CTR/NTR criteria)
SRF State Revolving Fund
SSMP Sewer System Management Plan
TMDL Total Maximum Daily Load
WEF Water Environment Federation
WET Whole Effluent Toxicity or Waste Extraction Test
WRFP Water Recycling Funding Program
WWTP Wastewater Treatment Plant
WWWIFA Water and Wastewater Infrastructure Financing

Item #5

Renewable Energy Study

Sanitation District No. 5 of Marin County

May 20, 2021

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Executive Summary

Introduction

Sanitation District No. 5 of Marin County (SD5) is assessing the feasibility of integrating on-site renewable energy systems at their wastewater treatment plants (WWTP) and pump stations throughout Tiburon and Belvedere. This study assesses the existing electricity use for SD5, including summaries for each WWTP and pump station, and reviews each of the facilities and identifies those where on-site renewable energy generation is feasible. Conceptual cost estimates for each proposed system and return on investment (ROI) calculations for the Main Tiburon WWTP are provided. The study provides recommendations for the SD5 facilities where renewable energy systems should be considered further.

Approach and Workflow

HDR and SD5 reviewed the WWTPs and pump stations to determine those that would be suitable for on-site renewable energy generation. HDR and SD5 reviewed various renewable energy system types and determined that solar photovoltaic systems would be considered. HDR then developed conceptual plans, with the intent to demonstrate the renewable energy potential for each location where generation was determined to feasible. Cost estimates and an ROI analysis were completed to provide SD5 with an understanding of the financial impacts of installing renewable energy at their facilities.

Findings and Next Steps

On-site renewable energy is feasible and may be developed at several SD5 facilities. However, SD5 has low utility rates the result in an ROI that exceeds 20 years. If SD5 determines that solar energy should be developed at its facilities, then the following locations warrant further consideration, conceptual development, and cost analysis:

- Main Tiburon WWTP
- Main Tiburon WWTP, Hillside Location
- Tiburon Pump Station 5, Mar West
- Tiburon Pump Station 7, Tiburon Blvd MT
- Paradise Cove WWTP
- Belvedere Pump Station 9, 85 Lagoon Rd (Belvedere Corporate Yard)

1.0 Introduction

1.1 Project Background

SD5 is considering on-site renewable generation to reduce its carbon footprint. This study is intended to outline the feasibility of on-site renewable energy opportunities across SD5's facilities and to provide SD5 with cost and payback information related to the systems.

The study aligns with SD5's mission to protect public health and the environment through effective and economical wastewater treatment. The District's mission is outlined below, as stated on the SD5 website:

> *Sanitary District No.5 of Marin County is a special District, which while meeting or exceeding all applicable local, state and federal laws and regulations, is dedicated to the protection of public health and the environment through effective and economical collection, conveyance, treatment and disposal of wastewater*

1.2 Goals and Objectives

The primary goal for this study is to determine whether renewable energy systems are feasible for SD5 and whether they are a cost-effective investment for the District.

The individual objectives for this study are to:

- Benchmark current annual energy use for the District
- Review potential renewable energy systems and determine those that are considered feasible for the District to pursue.
- Assess each of the districts wastewater treatment plants (WWTP) and pump stations to determine those that viable for an on-site renewable energy installation.
- Calculate the potential renewable energy generation for each of the sites where renewable energy is determined to be viable.
- Determine anticipated system costs and identify the likely payback duration.
- Prioritize the locations for which SD5 should consider installing renewable energy systems.

1.3 Report Purpose and Organization

SD5 will use this Renewable Energy Study as a reference and baseline for assessing renewable energy opportunities across its network of WWTPs and pump stations in Belvedere and Tiburon.

The following sections are included in the study:

1. SD5 Facilities and Energy Use
2. Renewable Energy Opportunities
3. System Interconnection
4. SD5 Renewable Energy Potential
5. Cost and Ownership Options
6. Recommendations

1.4 Assumptions and Dependencies

The analyses and recommendations in this Study are based on the following assumptions and dependencies:

- The information, data and interpretations obtained from the data sources and reports provided are assumed to be accurate and correct. No attempt has been made to verify these sources of information.
- SD5's annual energy use data for the referenced 12-month period is an accurate interpretation of average annual energy use for the District.

1.5 Abbreviations and Definitions

The following abbreviations and definitions are used in this report:

HDR	HDR Engineering
MCE	Marin Clean Energy
NEM	Net-Energy Metering
NREL	National Renewable Energy Laboratory
PG&E	Pacific Gas and Electric
PV	Solar photovoltaic
REC	Renewable Energy Credit
SD5	Sanitation District No. 5 of Marin County
TOU	Time of Use
WWTP	Wastewater treatment plant

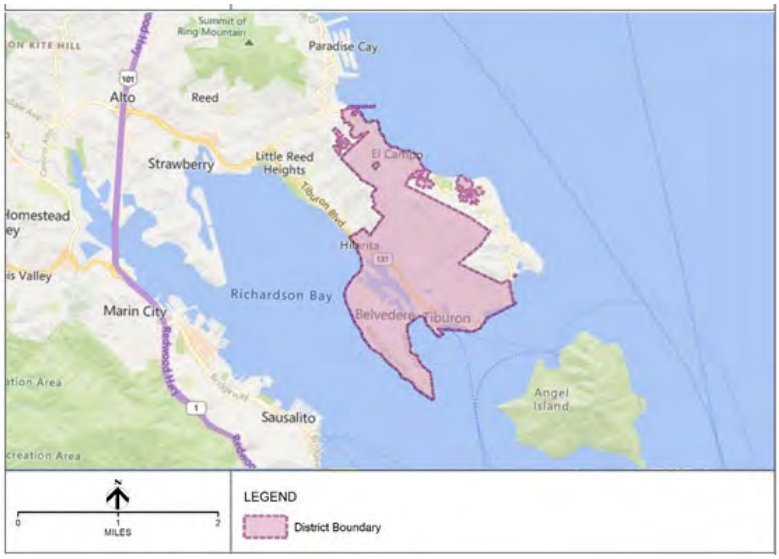
2.0 SD5 Facilities and Energy Use

SD5 is a special district established in 1922 that has been providing wastewater collection and treatment services to parts of the Tiburon Peninsula and the City of Belvedere since the early 1940s (SD5, 2020c). It currently provides services to more than 3,500 households and covers approximately 2,550 acres.

2.1 Service Area and Population Served

Located on the Tiburon Peninsula north of the city of San Francisco and on the San Francisco Bay, SD5 serves a population of approximately 8,400 people in the town of Tiburon, the city of Belvedere, and the surrounding, unincorporated areas (Figure 1). SD5's Main Treatment Plant collection system consists of 28.8 miles of gravity sewer line, 2.6 miles of force main, and 22 pump stations. The treatment plant provides secondary treatment of residential and commercial wastewater. The Paradise Cove collection system has an additional 1.5 miles of gravity sewer line, 2.3 miles of force mains and two pump stations that direct wastewater flow to the Paradise Cove treatment plant.

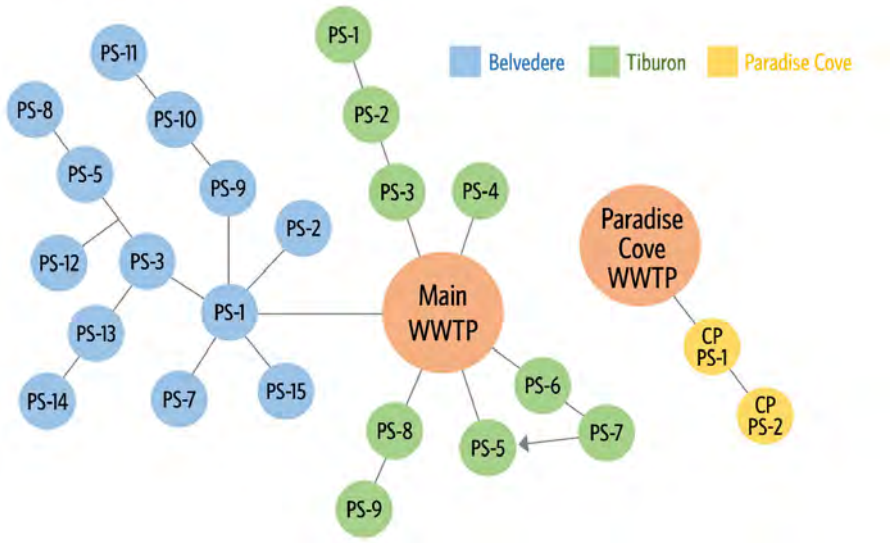
Figure 1 – SD5 Service Area



Source: SD5

SD5 collection system infrastructure is divided into two systems as shown in Figure 2: (1) the Main Treatment Plant collection system, which services all of the City of Belvedere and the southeastern and central portion of the Tiburon peninsula and (2) the Paradise Cove collection system, which services the northern portion of the Tiburon peninsula along the coast. Where gravity flow is not viable, SD5 pumps wastewater to its treatment plants through 24 pump stations and about 4.5 miles of force mains.

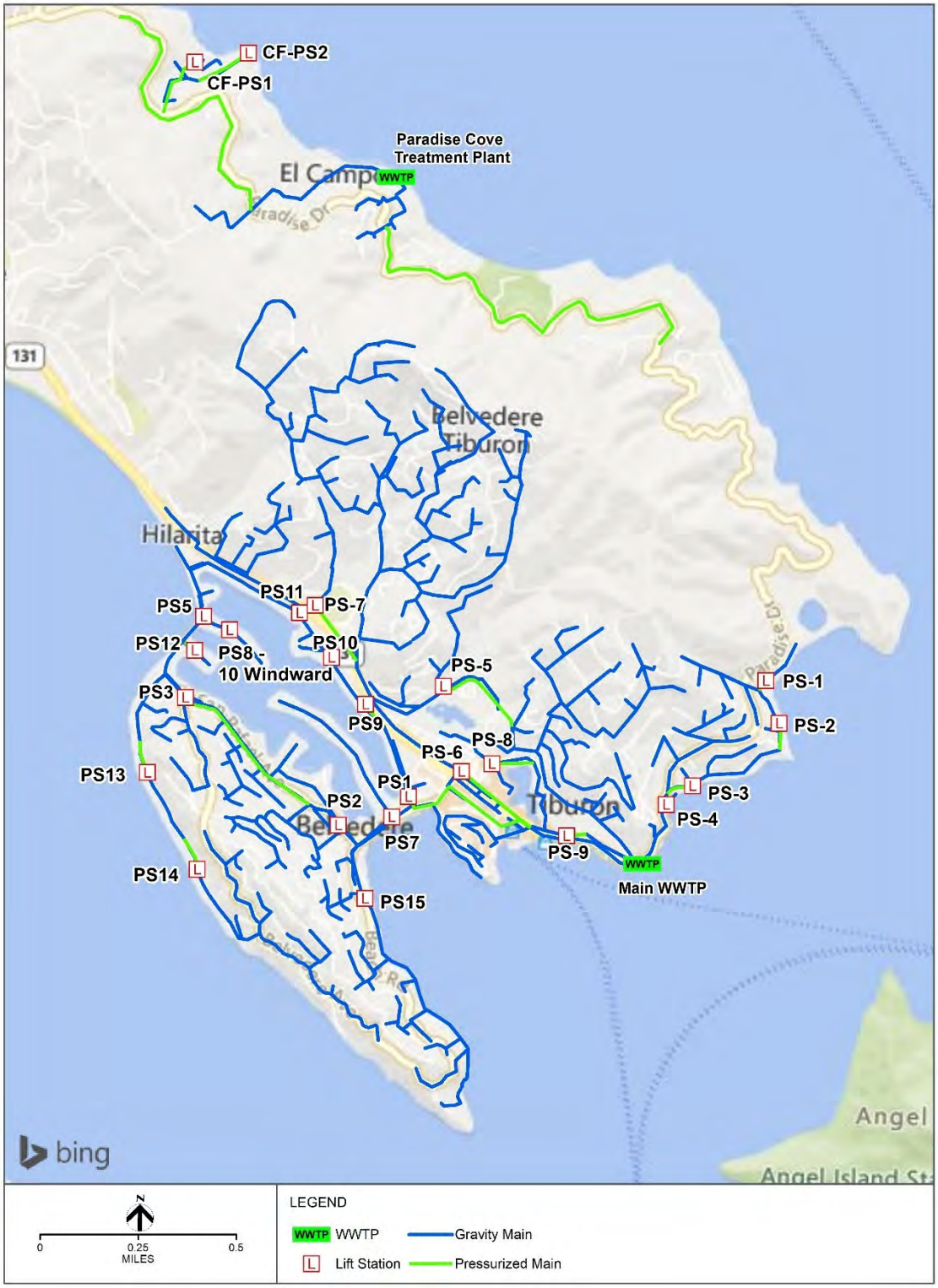
Figure 2 – SD5 Collection System and Lift Station Numbers



Source: SD5

The Main Tiburon WWTP, the Paradise Cove WWTP, and the 24 pump stations are located across Tiburon and Belvedere, as indicated in Table 3. This study benchmarks the current energy use at each of these locations and assesses whether each one is feasible for an on-site renewable energy system.

Figure 3 – SD5 Collection System and Lift Station Locations



Source: SD5

2.2 Current Energy Usage

SD5 uses both electricity and natural gas in its operations. This study looks at a full 12 months of data, from February 2020 through January 2021, to establish baseline energy use for the organization. This energy use is used to determine the impacts and/or sizing of any proposed renewable energy systems. During this period, SD5 used 1,256,007 kWh of electricity and 3,528 therms of natural gas. This usage data, broken out by each SD5 facility, is provided in Table 1.

Table 1 – SD5 Annual Energy Use, February 2020 to January 2021

Service Area	Lift station number	PG&E Account Name	Annual Natural Gas Use (therms)	Annual Electricity Use (kWh)
Tiburon	Main WWTP PS-8, PS-9	Mar West St, 2001 Paradise Drv	3,331	1,045,185.50
Paradise Cove	PC WWTP	Paradise Cove	0	75,931.35
Tiburon	PS-1, PS-2	About 2440 Mar East Opp 2514 Mar East St	28	9,509.35
Tiburon	PS-3, PS-4	S/W COR Solano & Mar East, Solano & Mar East St SW	24	12,250.57
Tiburon	PS-5	Mar West	0	40,440.60
Tiburon	PS-6	Tib Blvd COR/Beach, Corner Beach & Tiburon Blvd	23	2,173.25
Tiburon	PS-7	Tiburon Blvd MT, Tib Blvd Btw Reed Sch	19	4,678.42
Belvedere	PS-1, PS-7	Cove Road	28	23,575.68
Belvedere	PS-2	ACR 532 San Rafael Ave.	0	6,646.16
Belvedere	PS-3	CRNR San Rafael Ave, 00 Golden Gate Ave	17	9,569.20
Belvedere	PS-5	00 San Rafael Ave	20	1,413.62
Belvedere	PS-8	10 Windward Rd	0	1,072.05
Belvedere	PS-9	85 Lagoon Rd	0	2,227.05
Belvedere	PS-10	ABT 66 Lagoon Rd	0	1,110.36
Belvedere	PS-11	ABT 46 Lagoon Rd	0	1,465.50
Belvedere	PS-12	00 Edgewater Rd	0	1,096.61
Belvedere	PS-13	W Shore Road	0	1,850.68
Belvedere	PS-14	End of W Shore Road	0	3,300.06
Belvedere	PS-15	98 Beach Rd	0	2,350.96
Paradise Cove	CF-PS1	33 Seafirth Pl Pump Station	0	8,707.03
Paradise Cove	CF-PS2	95 Seafirth Rd	0	1,453.62
		Total	**3,528**	**1,256,006.96**

2.3 Energy Purchases

SD5 participates in the Marin Clean Energy (MCE) program, where electricity is distributed by PG&E, but generated and/or procured through Marin Clean Energy. SD5 is enrolled in the MCE Light Green service,

which means that 60 percent of the electricity currently used by the organization is considered clean renewable power, sourced from either wind, solar, geothermal, small hydro, or biomass. Table 2 outlines the amount of current SD5 electricity that is considered clean power.

Table 2 – SD5 Annual Electricity Use, MCE Light Green Clean Power

Data Year	Total Electricity Use (kWh)	MCE Light Green Carbon Free Renewables (kWh)	Other Electricity Use (kWh)
February 2020 – January 2021	1,256,006.96	753,604.18 *(60 percent)*	502,402.78 *(40 percent)*

On-site renewable electricity generation systems, from sources such as wind and solar, will offset total electricity use used by SD5. By enrolling in the MCE Light Green service, 60 percent of the total net electricity used will be sourced from carbon free renewable sources. This means that if renewable energy systems are installed at SD5 facilities, but the total value of renewable energy generated on-site is less than the total value of energy consumed, then a static 60 percent of the remaining energy used will be carbon free.

On-site sources of renewable combustion, such as biogas, will offset natural gas use. This study will focus on opportunities for on-site renewable electricity generation only. The existing natural gas use will be excluded from the analysis. If SD5 wishes to reduce its carbon emissions from natural gas combustion, then it may consider electrification upgrades or the purchase of carbon offsets. These options are outside the scope of this analysis.

3.0 Renewable Energy Opportunities

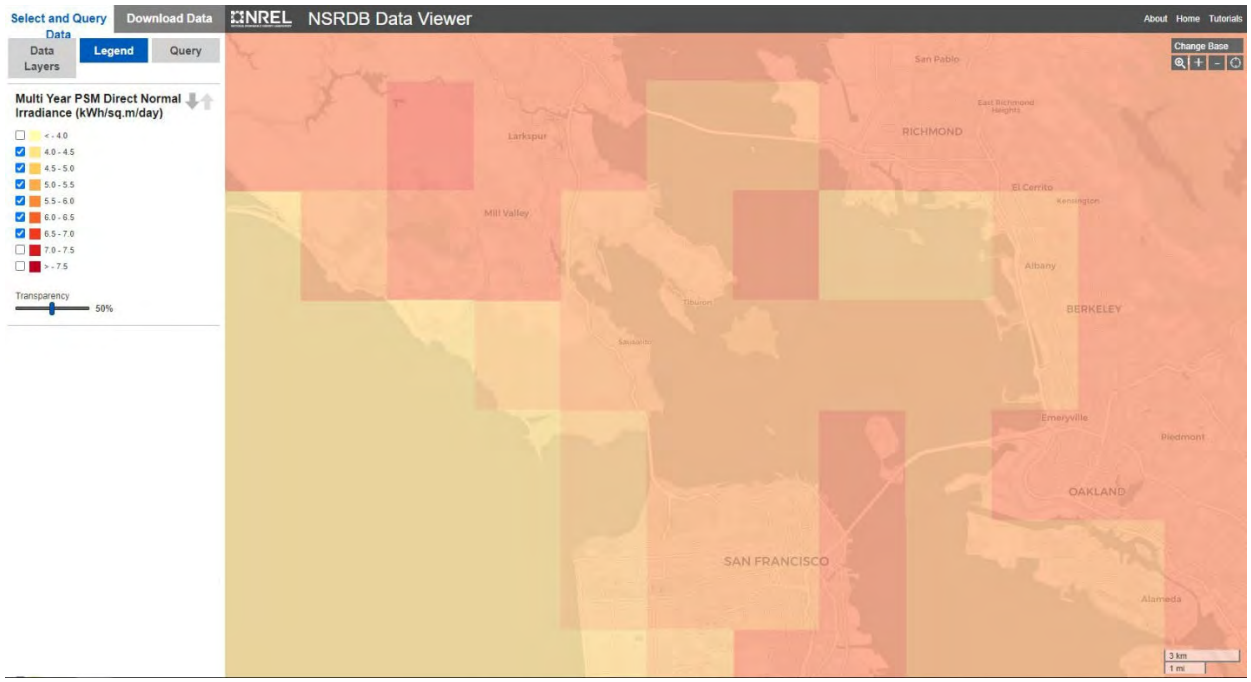
3.1 Renewable Energy

This study assessed five renewable energy sources to determine those that would be viable options to for further development and consideration. These sources include solar photovoltaic, solar hot water, wind, tidal power, biofuels, and offsets.

3.1.1 Solar Energy

The National Renewable Energy Laboratory (NREL) publishes solar resource data for the U.S., providing annual average daily total solar resources averages over a given surface area by state, and annual average photovoltaic solar resource data for a reference panel tilt for the entire country. The current data shows that Belvedere and Tiburon receives between 5.5 and 6.0 kWh/m2/day of solar insolation, averaged over the course of the calendar year.

Figure 4 – Solar Resource Map, Belvedere and Tiburon



Source: NREL, National Solar Radiation Database (NSRDB) Data Viewer, 2021

3.1.1.1 Photovoltaic (PV) Panels

Photovoltaic (PV) panels, also known as solar panels, convert light into electricity. These panels utilize solar modules and solar cells to generate electricity. PV systems can be installed in several methods, typically ground mounted, roof mounted, and canopy mounted. They are likely suitable for all locations that offer optimal solar generation conditions, which require a mostly clear, south facing orientation with minimal shading from potential obstructions.

3.1.1.2 Solar Hot Water (SHW)

SHW systems use evacuated tube or flat plate collectors to capture solar energy and use it to heat water. Evacuated tube collectors are more expensive than flat plate collectors, but they are commonly used in cold climates because they are more efficient and can heat water to significantly higher temperatures. The hot water generated by SHW systems can be used to supplement domestic hot water or to provide necessary supply for HVAC systems. Although SHW systems are an efficiency measure for

3.1.2 Wind

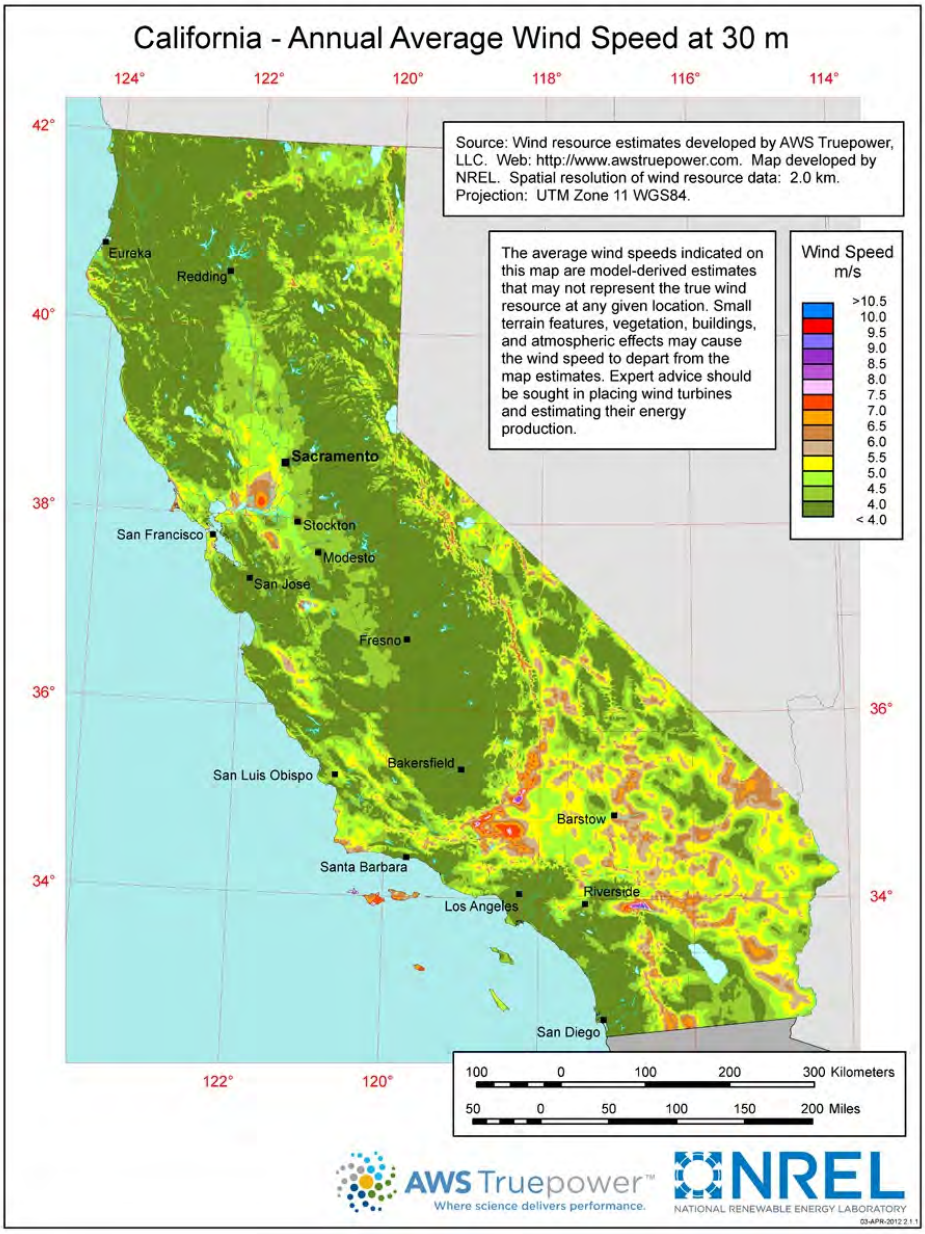
Wind energy, or wind power, is the process through which wind is used to generate electricity. A wind turbine uses the flow of wind to turn blades that then rotate a generator to create electricity.

NREL publishes wind resource data for different heights above the ground plane for each state within the U.S. The 30-meter height is typically assessed for small scale wind projects, which are typically installed between 15 meters and 40 meters in height. Areas with good exposure to prevailing winds and annual average wind speeds of 4 meters per second or more are considered to have suitable wind resources for small projects.

The 30 meter residential-scale wind resource map for California shows that the San Francisco Bay Area has an average annual wind speed at 30 meters between 4 and 5 meters per second, which generally

suggests that the area is not ideal, but may be suitable for small scale wind projects. Local weather data for the Oakland International Airport shows that the average wind-speed is around 4.41 meters per second at an elevation of approximately 20 meters. This results in a capacity factor around 17 percent for wind turbines, which is not sufficient to make wind energy a feasible solution. It also suggests that large wind turbines would be required to make wind a feasible solution; however, large wind turbines would likely impact views for residents and visitors. Based on this information, wind is not considered a realistic solution for SD5.

Figure 5 – California Wind Resource Map



Source: NREL, 2021

3.1.3 Tidal Power

Tidal power uses moving water to produce electricity, drawing from a large volume of flow or change in water levels to turn turbines. The SD5 Paradise Cove WWTP is located adjacent to the San Francisco Bay, with the opportunity to harness energy from the changing tides. However, tidal power projects are cost-prohibitive and are only suited for high tidal environments and high energy sites. Per the U.S. Energy Information Administration, the U.S. does not have any commercial operating tidal energy power plants. Although the resource is available, this system type is not recommended due to cost concerns, the low amount of energy used at the Paradise Cove site, and for the potential permitting and environmental concerns associated with development in the San Francisco Bay.

3.1.4 Biofuels

Biofuel energy utilizes the combustion of fuels derived from digesting organic matter to generate electricity. Biomass is not recognized as a renewable resource due to the emissions associated with the combustion process. To be considered a renewable resource, biofuels must be a byproduct of an anaerobic process, such as the methane produced from wastewater treatment or composting. SD5 generates digester gas that could be used as a biofuel source for an on-site combined heat and power (CHP) cogeneration system. These biofuels qualify as a renewable resource because the impacts of their combustion are less harmful than the impacts of their direct emissions. However, this is not considered a viable resource for SD5, as the facility does not treat an adequate volume of wastewater to generate the biogas needed to make a CHP economically viable. Per the EPA, influent flow rates of 5 million gallons per day or greater are needed to create a consistent source of energy to make CHP cost-effective. For this reason, biofuel is not included as part of the renewable energy study. If SD5 would like to look more closely at this as a renewable resource, then a separate study is required.

3.1.5 Other Carbon Offsets and Renewable Energy Sources

Other carbon offsets and/or renewable energy sources that are not outlined in this section, including, but not limited to, the MCE Deep Green or MCE Local Sol programs, Carbon Offsets and/or Renewable Energy Credits (RECs), and the Climate Action Reserve's Forest Project Protocol are not included in this analysis. These sources may be considered by SD5 to further reduce or offset any carbon emissions that are not eliminated through on-site renewable energy systems, or if on-site renewable energy is determined to be not feasible or cost effective.

3.2 Recommended System Type

Solar energy, specifically PV, is the most appropriate and cost-effective approach to generate clean energy for SD5. Wind, wave turbines, solar hot water, and biofuel energy sources are not considered feasible or cost-effective at this time and are not proposed for any of the SD5 facilities. Carbon offsets are also an option for SD5 to further reduce their carbon footprint.

4.0 System Interconnection

4.1 Utility Companies

PG&E provides electricity distribution and natural gas service to SD5 facilities. Since SD5 is enrolled in the MCE Light Green, electricity is generated and procured through MCE. To have a grid connected

renewable energy system on-site, SD5 will need to complete an interconnection agreement with the utility and meet all their requirements for interconnection.

4.2 Interconnection Requirements

The California Public Utility Commission (CPUC) allows electricity customers to participate in renewable energy net-metering (NEM) and net-metering aggregation (NEMA) programs with their local utility. Customers who receive their energy under a CCA program, such as MCE, are eligible for NEM. CCA customers get a credit for the non-generation portion of rates from PG&E, and the CCA may provide a generation credit. Where CCA's have their own NEM programs, customers must still go through PG&E's interconnection process and receive permission to operate their generating facility from PG&E.

4.2.1 Energy Net-Metering

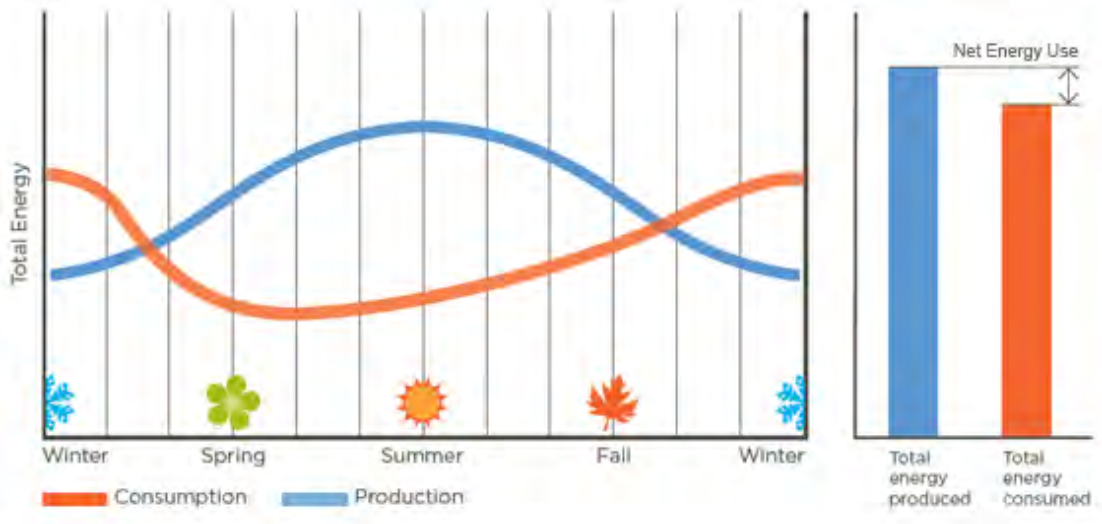
NEM is the process through which owners of on-site renewable energy systems are credited for the renewable energy that is generated and added to the grid. This allows owners to utilize electricity whenever it is needed, rather than when it is produced. Each month, the owner is credited for each kWh of electricity generated, and then billed against that credit for each kWh of electricity used. During periods of peak generation, the credits may exceed the amount of electricity used, with the additional credits carrying over to future months to offset periods of time the amount of electricity generated is less than the amount of electricity used. Over the course of a 12-month period, the owner will be billed or reimbursed for the delta between the amount of electricity generated compared to the amount of electricity used, with net usage being billed monthly. Figure 6 outlines the annual energy net metering accounting that determines the amount of electricity the District would be billed for.

Figure 6 – Energy Net Metering

Source: PG&E, 2021

Figure 7 outlines the typical fluctuations in energy consumption and solar energy production throughout the year. During the winter, solar production is lower due to shorter days and lower sun angles. During the summer, solar production is higher due to the longer days and higher sun angles. Depending on the size of the system, if designed to offset at least 100 percent of the electricity at any given District location, then it is likely that energy consumption will exceed energy production during the winter, but that energy production will exceed energy consumption during the summer. Accounting for the entire year, under energy net metering, the higher production during the summer will offset the lower production during the winter.

Figure 7 – Annual Net Energy Use



Source: International Living Future Institute, 2017

4.2.2 Net-Metering Aggregation

In NEM programs, renewable energy that is generated and credited to the customer's account may only be used to offset the electricity that is used at a single electricity meter.

Net-Metering Aggregation (NEMA) is the process through which the credits that are allocated for the renewable electricity generated, when greater than the amount of electricity used, may be used to offset electricity used at other meters under the owner's account. Customers are eligible if all of the metered accounts are owned, leased or rented by the same PG&E customer of record, and the meters must be located on the same property as the renewable generator or on properties adjacent or contiguous to it.

Although all SD5's facilities are under the same account with PG&E, they are located throughout Belvedere and Tiburon and would not be considered adjacent or contiguous with the property on which any renewable energy system may be located. For this reason, NEMA programs likely do not apply and are considered not applicable for the systems outlined in this study.

4.2.3 Credit and Usage Billing Rates

All credits received by the renewable energy system owner for the electricity generated will offset all units of electricity used at a one to one ratio. Any electricity generated that is more than the electricity used, over the course of the 12-month period, will be purchased by the utility and paid to the owner at the designated wholesale rate, minus distribution costs. MCE customers who generate more electricity than they've used, will receive payment from MCE for the excess generation at twice the published wholesale rate. Any electricity used that is more than the electricity generated will be billed to the owner at the standard retail rate, including distribution costs.

Table 3 – MCE NEM Program Credit and Usage

	MCE NEM Program
Usage Cycle	12 Months, April through March
Generation Accrual	Credits (renewable electricity generated) accrue at retail rates and are applied toward your monthly bills during the year. If you generate more electricity than you use during a month, you will receive a credit for excess generation. This credit is automatically applied toward future electricity usage within the same 12-month cycle starting each April.
Surplus Generation	Annual surplus generation is credited at two times the wholesale rate (double what PG&E offers) on MCE's annual cash out date each spring. Cash-out payments over $50 will be automatically processed annually. You will receive a check, sent to the mailing address tied to your electric account. Payments under $50 will be added to your retail credit balance for the next 12-month cycle. Cash-out payments are subject to a maximum of $5,000 per account.
Billing	Billing occurs monthly and retail credits for excess generation are applied toward bills as they accumulate.

4.2.3.1 Time of Use Billing Rates

California utilities use a time of use rate plan in which rates vary depending on the season, day of the week, and time of day. These rates are typically identified as Peak, Part-Peak, and Off-Peak, with Peak rates often being twice as expensive as Off-Peak rates. Electricity generated by a solar system and sent back to the grid is credited at the time of use retail rate in effect at that time. If a PV system has battery storage, then power generated during Off-Peak periods may be stored on-site and sent to the gride later in the day during a Peak period, when the credit is more valuable.

4.2.4 Application for Interconnection

To connect the PV system to the electric grid and participate in NEM, SD5 will need to complete an Application for Interconnection with PG&E, and have it approved prior to the PV system being operational. All PV systems must meet all requirements for interconnection to be approved and SD5 will need to pay any fees associated with the application review. Any Application for Interconnection approved by PG&E is eligible to participate in NEM with MCE.

Table 4 – Interconnection Requirements

	Interconnection Requirements	SD5 Renewable Energy Systems
System Type	Eligible renewable generators include solar, wind, hydro, biogas, biomass, wave, tidal, fuel cells running on biogas, and others.	Solar renewable energy generation is proposed.
System Size	Standard NEM: 30 kW or less Expanded NEM: 30 kW to 1 MW	The proposed solar systems are within the size thresholds established for Standard and Expanded NEM.

Additional information regarding the PG&E NEM program is available on their website, at: https://www.pge.com/en_US/for-our-business-partners/interconnection-renewables/simple-solar-wind/contractor-resources/standard-nem-process-and-requirements.page?WT.mc_id=Vanity_standardnem&ctx=large-business.

4.3 Code Requirements

All PV systems must comply with the requirements outlined in the applicable version of the California Building Code, including but not limited to, Part 3 – California Electrical Code, Part 6 – California Energy Code, and Part 9 – California Fire Code. These codes stipulate testing, access and setback requirements that may impact and define the areas deemed to be solar ready.

5.0 SD5 Renewable Energy Potential

5.1 Facilities Feasibility Assessment

HDR and SD5 reviewed the WWTPs and each of the pump stations to determine whether they were suitable for on-site solar energy generation. Table 5 summarizes the findings of this assessment and identifies each of the locations for which a PV system is proposed.

Table 5 – SD5 Facilities, PV Feasibility Assessment

Service Area	Lift station number	PG&E Account Name	PV Proposed (Y/N)	Notes
Tiburon	Main WWTP PS-8, PS-9	Mar West St, 2001 Paradise Drv	Y	Good rooftop location with large electrical service and loads. Potential for large array on the adjacent hill.
Paradise Cove	PC WWTP	Paradise Cove	Y	Large site with E/SE exposure. Likely shading from the SW/W due to the large hill adjacent to the site.

Service Area	Lift station number	PG&E Account Name	PV Proposed (Y/N)	Notes
Tiburon	PS-1, PS-2	About 2440 Mar East Opp 2514 Mar East St	Y	Located between two homes. Solar access is viable with a canopy above the facility.
Tiburon	PS-3, PS-4	S/W COR Solano & Mar East, Solano & Mar East St SW	Y	Located between two homes and includes adjacent parking space. Solar access is viable with a canopy above the facility.
Tiburon	PS-5	Mar West	Y	S/SE exposure. Shading from adjacent trees may impact production. Likely location for an elevated canopy near the entrance.
Tiburon	PS-6	Tib Blvd COR/Beach, Corner Beach & Tiburon Blvd	N	Not feasible. Facility is located on the NW façade of the Bank of America.
Tiburon	PS-7	Tiburon Blvd MT, Tib Blvd Btw Reed Sch	Y	SW exposure. Shading from adjacent trees may impact production. Likely location for an elevated canopy near the entrance.
Belvedere	PS-1, PS-7	Cove Road	Y	Good solar access. Panels location feasible on the SE/SW roof surfaces and in the paved open space to the north of the building. Tree may shade afternoon solar access for the paved open space.
Belvedere	PS-2	ACR 532 San Rafael Ave.	Y	Small SE exposure on rooftop. Shading concerns from trees and adjacent homes.
Belvedere	PS-3	CRNR San Rafael Ave, 00 Golden Gate Ave	N	Located in a small, acute angled area of land at a street intersection. Likely not feasible due to NE exposure and shading from adjacent hill.
Belvedere	PS-5	00 San Rafael Ave	N	Good solar access. However, likely not feasible due to issues with obstructing views for adjacent homeowners.
Belvedere	PS-8	10 Windward Rd	N	Not feasible. Narrow, shaded facility adjacent to a single-family home.

Service Area	Lift station number	PG&E Account Name	PV Proposed (Y/N)	Notes
Belvedere	PS-9	85 Lagoon Rd	Y	Pump station not feasible. Heavily shaded location along the road. Belvedere Corporate Yard is adjacent to the pump station and may be feasible for a rooftop PV system.
Belvedere	PS-10	ABT 66 Lagoon Rd	N	Not feasible. Heavily shaded location along the road.
Belvedere	PS-11	ABT 46 Lagoon Rd	N	Not feasible. Heavily shaded location along the road.
Belvedere	PS-12	00 Edgewater Rd	N	Not feasible. Located on the north side of a residential fence.
Belvedere	PS-13	W Shore Road	N	Marginal W exposure. Will be shaded for much of the day from adjacent trees.
Belvedere	PS-14	End of W Shore Road	N	Not feasible. Significant shading from adjacent trees.
Belvedere	PS-15	98 Beach Rd	N	Not feasible. Located on the east side of a large hill with significant shading from adjacent trees.
Paradise Cove	CF-PS1	33 Seafirth Pl Pump Station	Y	Very good south exposure. Opportunity for small elevated canopy system above the facility.
Paradise Cove	CF-PS2	95 Seafirth Rd	Y	Opportunity for ground mounted system on the open space down the hill from the facility. SD5 will need to confirm ownership and development potential of the site. The paved area at the site of the facility is not feasible due to shading and obstructed views.

Most of the pump stations are not considered to be viable locations for renewable energy. The stations that are not considered viable are generally located in areas that have significant shading from adjacent trees and structures, or they are in locations where additional structures would likely create issues within the community due to impacts on views. For the pump stations that are considered viable, most of these have decent solar access, available space, and limited impacts on adjacent homes or views. Both the Main Tiburon WWTP and the Paradise Cove WWTP are considered viable for renewable energy.

5.2 Basis of Design

Conceptual plans are provided for each of the facilities determined to be viable for renewable energy, with the intent to maximize the solar generation potential while sizing the proposed systems to supply no more than 110 percent of the current electricity use for that location.

All calculations for the performance of the proposed systems are based on the following equipment, constituting a conceptual Basis of Design (BOD). It is likely that any system undergoing detailed design and ultimately being constructed at a referenced facility will have performance aspects that differ from this BOD. These calculations are meant to convey the renewable energy potential for each site and are not intended to demonstrate detailed design for any of the system locations.

5.2.1 PV Module

The calculations use the SunPower 450W Maxeon 5 Module as the basis of design (BOD) for the conceptual layouts and generation potential calculations. They have an efficiency of 22.2 percent and a minimum warranted power output of 92 percent of the first 25 years of use. The maximum annual degradation factor is 0.25 percent and the anticipated lifespan is 40 years. Refer to Figure 8 for specific electrical data for the Maxeon 5 Modules.

Figure 8 – SunPower 450W Maxeon 5 Electrical Data

MAXEON 5 COM POWER: 430–450 W

Electrical Data			
	SPR-MAX5-450-COM	SPR-MAX5-440-COM	SPR-MAX5-430-COM
Nominal Power (Pnom)[1]	450 W	440 W	430 W
Power Tolerance	+5/0%	+5/0%	+5/0%
Panel Efficiency	22.2%	21.7%	21.2%
Rated Voltage (Vmpp)	44.0 V	43.4 V	42.7 V
Rated Current (Impp)	10.2 A	10.2 A	10.1 A
Open-Circut Voltage (Voc) (+/–3%)	51.9 V	51.69 V	51.2 V
Short-Circuit Current (Isc) (+/–3%)	11.0 A	10.9 A	10.9 A

Source: SunPower

Other sustainability elements for the SunPower Maxeon 5 Module include Cradle to Cradle Bronze Certification, International Living Future Institute (ILFI) Red-List Material Compliance with a Declare Label for material ingredient reporting, a 100% recyclable panel system, and a top score with the Silicon Valley Toxics Coalition.

5.2.1.1 Bifacial PV Modules

The BOD Maxeon 5 product is a monofacial module, which uses solar cells on one side of the module to generate electricity. Bifacial modules have solar cells on both sides of the module, which generates electricity from direct solar radiation on the top surface and from reflected solar radiation on the bottom surface.

This analysis does not assess the production associated with a bifacial module. To accurately predict the performance for these panels, a detailed design and cost analysis study should be completed for the specific PV systems that are being considered. This analysis will require reflectivity data for the surface above which the PV system will be installed. Any increase in production should be reviewed against the

bifacial PV system cost increases, including both modules and the mounting structure, to determine whether they are cost-effective relative to a typical monofacial PV system.

5.2.1.2 PV System Design Assumptions

5.2.1.2.1 PV Module Orientation

Each of the proposed PV systems are oriented towards the south, where possible. For locations where a direct southern exposure is not possible, the PV system is oriented to align with existing roofs or lot line boundaries.

5.2.1.2.2 PV Module Tilt Angles

The calculations assume a PV module tilt angle of 5 degrees, unless otherwise indicated in this report. This tilt angle allows the system to maximize generation within a given footprint, as more PV modules may be placed within the footprint because the interrow spacing requirements are reduced due to decreased shading impacts. The 5-degree tilt angle also reduces maintenance and allows water to shed off the surface.

5.2.1.2.3 System Losses

The calculations assume an annual derate factor of 0.859 (14.1 percent) in accordance with NREL methodology. This derate factor is outlined the Table 6.

Table 6 – Solar Derate Factors

Derate Factor	Value
Soiling	2.0%
Nominal Nearby Object Shading*	3.0%
Snow	0.0%
Mismatch	2.0%
AC/DC Wiring	2.0%
Diodes and Connections	0.5%
Light-Induced Degradation	1.5%
PV Module Nameplate DC Rating	1.0%
Age	0.0%
System Availability	3.0%
Grand Total	**14.1%**

** Nominal nearby object shading is adjusted for locations where nearby object shading is expected to exceed NREL base derate factors.*

5.2.2 Inverters

Inverters convert the DC electricity generated by the PV system into AC electricity useable for the grid. The BOD system and the calculations provided in this study do not include any specific inverter manufacturers or models. This analysis assumes that any inverters are at least 96 percent efficient and will be sized to match the system size and generation provided at a specific location. All inverters must be certified to UL 1741 and be eligible with the California Energy Commissioners list. Any future detailed design shall confirm whether the system shall use a central inverter system or a microinverter system.

5.2.2.1 Central Inverters

A central inverter converts the DC electricity produced by the entire PV system into AC electricity. It is typically located in a central location that is close to the utility meter.

5.2.2.2 Microinverters

Microinverters are smaller units connected to the back of each individual PV module. This system is generally more expensive than a central inverter but offers operational efficiencies because any impacts on a specific module's production from shading or other elements does not reduce the output from the rest of the PV system.

5.2.3 Battery Storage System

Battery storage systems offer several benefits to solar projects, including the ability to provide backup power in the event of a power outage. For locations with electricity TOU rates, batteries provide owners with the ability to save costs and shift electricity usage from peak periods to off-peak periods, either by storing power generated on-site to be fed back to the grid during peak periods, or by pulling electricity from the grid during off-peak periods to be used during peak periods.

Solar systems combined with batteries typically see storage requirements in the 2-4-hour range, which allows for load shifting and minimal backup power during an outage. Storage requirements for systems requiring more extensive backup power may need 24 hours or more of storage, which is costly and requires a large area for the batteries.

Batteries are measured in their Depth of Discharge (DoD), which is measure of how much power can be used relative to the amount of power that can be stored by a battery, with the higher DoD being more efficient; and on their cycle lives, which is the number of times a battery may be fully discharged and full recharged, with more cycle lives indicating a longer lifespan. Energy and power density are other metrics that refer to the amount of energy stored relative to the volume and/or weight of the battery. Depending on the needs for a specific system – the storage time, the DoD, cycle lives, and/or energy/power density – these requirements may influence the type of battery that is used, likely either lithium ion or vanadium redox flow.

5.2.3.1 Lithium Ion

Lithium ion batteries are the primary battery storage system used for commercial solar systems at the scale that the District is considering. They are smaller and lighter than alternatives, with a good energy/power density that makes them great for portable applications. The DoD is approximately 80 percent and the cycle lives are generally in the 4,000-5,000 range prior to needing replacement. Lithium ion batteries are an established technology that can support various system sizes – residential, commercial, micro-grid. There are multiple manufacturers, including LG and Tesla, and they are considered most cost-effective for projects with energy storage requirements under 8 hours.

5.2.3.2 Vanadium Redox

Vanadium redox flow batteries (VRFB) are an alternative to solid state batteries like lithium ion. VRFBs use liquid to store and transfer electricity. They have a higher DoD value than lithium ion batteries, exceeding 90 percent, which allows for more efficient use of electricity, and they have much longer cycle lives that allow them to last significantly longer prior to replacement. The primary drawback to VRFB's are the higher upfront cost and the energy/power density, which requires more space to locate the battery. VRFB's are more feasible in applications where the storage requirements exceed 8-10 hours and there is adequate space to locate the battery. Typically, PV systems have storage needs in the 2-4-hour range, where VRFB's are not considered cost-effective compared to lithium ion batteries.

5.2.3.3 Battery Recommendation

Based on the size of the proposed systems for the District and the limited storage and backup power requirements, lithium ion batteries are the recommended system type. For certain locations with higher electricity usage and larger proposed systems, like the Main Tiburon WWTP, VRFBs may be considered, if they are available through local solar providers.

The District should perform a detailed assessment of battery types, in coordination with any proposed PV systems and battery operating needs, to determine the best solution for the installation. Batteries are likely not feasible for the smaller, remote pump stations, as they will require interface with a localized controls system.

5.2.4 Mounting System

PV systems can be located and mounted in a variety of locations – building roofs and facades, parking lots, parking garages, and open space. Depending on the proposed location, the PV system should utilize a mounting system that maximizes generation potential, minimizes system costs, and minimizes impacts on its surrounding environment. The following mounting methods are referenced options for the proposed SD5 PV systems.

5.2.4.1 Roof Mounted

Roof mounted systems allow PV modules to be located on both steep and low-sloped roofs. The racking systems can mount the PV modules perpendicular to the slope of the roof, or they can provide a custom tilt to maximize generation based on the solar access for the given site. Roof mounted systems are proposed for the Main Tiburon WWTP and a few of the pump stations.

Figure 9 – Example, Roof Mounted PV System

Source: HDR

5.2.4.2 Ground Mounted

Ground mounted systems allow PV modules to be placed in areas of open space. The racking systems can mount the PV modules at any angle to maximize generation based on the solar access for the given site. Ground mounted systems are proposed for the hill adjacent to the Main Tiburon WWTP.

Figure 10 – Example, Ground Mounted PV System

Source: HDR

5.2.4.3 Canopy Mounted

Canopy mounted systems allow PV modules to be located above a useable plane. These mounting systems are typically used over parking lots, where the elevated PV system allows the area to generate power and provide storage for vehicles. These systems may also be used to maximize the solar area while maintaining required clearances over roof mounted equipment.

Figure 11 shows an example of a canopy mounted system that spans an entire area. Depending on the length of the span, the structural columns can be located at the edges of the structure, leaving the area underneath canopy clear of obstructions. This canopy system is a good option for the Main Tiburon WWTP and the Paradise Cove WWTP, where it could span above any buildings and rooftop equipment. Any canopy mounted system would need to be designed to allow crane access to necessary equipment, which may necessitate design for disassembly and reassembly. This type of structure maximizes the solar area by minimizing the area required for setbacks and access aisles.

Figure 12 shows an example of a carport canopy mounted systems. These structures are commonly located above the parking spaces in a parking lot, while the drive aisle is open. The structural columns are in the middle of the canopy, with the PV modules placed on cantilevering beams to span the planned width. The entire canopy is generally tilted at a set angle, which butts the PV modules together and eliminates spacing requirements. These systems are good options for several pump stations.

Figure 11 – Example, Canopy Mounted PV System

Source: HDR

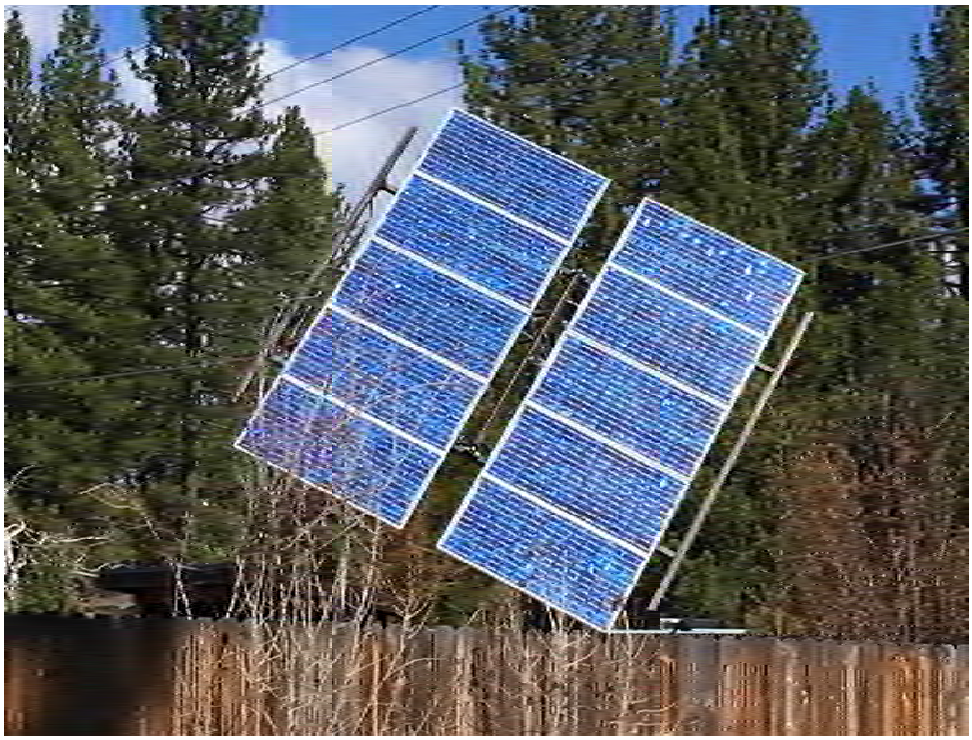
Figure 12 – Example, Carport Mounted PV System

Source: HDR

5.2.4.4 Active Tracking Systems

Active tracking systems allow the PV modules to rotate along dual axes, which optimally orients the system towards the sun to maximize production throughout each day and throughout different times of the year. These mounting systems are more expensive and include motors and other moving parts that increase maintenance. These systems would be good options for several SD5 locations, including the Belvedere Cove Road pump station.

Figure 13 – Example, Active Tracking PV System



Source: HDR

5.3 Proposed Systems

5.3.1 Main Tiburon WWTP

The Main Tiburon WWTP is the largest consumer of energy for the District, and the largest opportunity for significant solar system development across the District's facilities. The District may consider both roof mounted and ground mounted systems at the Main Tiburon WWTP site.

Figure 14 outlines the anticipated maximum extent of PV that could be developed at the WWTP. It is possible that the District would develop a system of this size in phases, or that the District may consider developing only a small portion of the PV shown.

Figure 15 outlines a possible ground mounted PV system footprint for the hill that is adjacent to the WWTP. This area offers potential for a significant amount of PV generation with minimal operational or space impacts for the WWTP. However, the land is not owned by the District, and any development would need to be approved by and coordinated with the local landowner.

Prior to developing any PV system at the site, the District and its Consultant(s) shall verify that the PG&E distribution system and transformer capacity can support the proposed system. It is possible that a large system may require upgrades to the distribution system that would increase anticipated system costs.

5.3.1.1 WWTP Roof Mounted Systems

The WWTP footprint is not a uniform shape and much of the roof is utilized for equipment. Certain areas of the roof are shaded by equipment and vegetation. This limits the area that is available for a PV system. Figure 14 indicates three (3) systems – an elevated canopy system, a typical roof mounted system, and a typical roof mounted system for a future roof.

5.3.1.1.1 WWTP Canopy Mounted Systems

The elevated canopy mounted system, shown in red, is proposed because it elevates the PV system above the rooftop equipment and allows the District to maximize the area that could be allocated to solar generation. It also extends the allowable footprint for the system because it reduces the required setbacks of the fire code. If a system of this type is pursued, then it must accommodate required vertical clearances for equipment and it must support fire access to the facility. A structural engineer will need to assess the existing building and confirm that it can support the additional load from the proposed structure and PV system. If the building cannot support a system of this size, then a smaller system will need to be proposed.

5.3.1.1.2 WWTP Roof Mounted Systems

The typical roof mounted systems, shown in green, are proposed for roof areas without any equipment impacts. Some of the typical roof mounted systems are located on sloped roofs, while others are located on flat membrane roofs. These systems can be developed individually or together as a single project.

5.3.1.1.3 WWTP Future Roof Construction

The typical roof mounted system, shown in blue, is proposed for a potential roof expansion at the southeast end of the building. If this roof extension is constructed, then it can be designed and built to support a small, integrated PV system.

Figure 14 – Main Tiburon WWTP PV Potential, Roof Mounted Systems

5.3.1.2 WWTP Hillside Ground Mounted System

The District has previously assessed the potential for a ground mounted system on the adjacent hillside. To make this system viable, the District will need to work with the property Owner to receive a legal agreement and easement for the development of the system. The system should be connected to the Main WWTP electricity meter for the District to take credit for the solar generation as part of the utility energy net-metering agreement. Landscaping would need to be included in the project scope.

Not considering the legal agreements that will be required to develop the hillside system, this system would likely be the easiest and least intrusive means of developing a large-scale PV system to offset the District's electricity use. Given the scale of the system, the costs per kW of system size, would likely be lower and would lead to a more cost-effective approach for the District.

Figure 15 – Main Tiburon WWTP PV Potential, Hillside System

5.3.1.3 WWTP Battery Systems

Battery storage should be considered for this location. Battery storage can be used to provide backup power or to shift the time during which the electricity is fed back into the grid, likely increasing the cost effectiveness of the system. It is also possible to pull power from the grid during off-peak times and then use it during peak-periods, helping to reduce utility costs. Depending on the storage quantity and duration needs, either lithium ion or VRFB may be suitable.

Given the potential size of the system, both on the WWTP roof and immediate site, and on the adjacent hillside, there is the possibility to provide a large battery system to store the power generated. If pursued, it is important that the battery system be sized to not exceed the current demand use at the site, as a system sized to exceed the current demand will increase demand charges and decrease the cost effectiveness of the system.

5.3.2 Paradise Cove WWTP

The Paradise Cove WWTP is the second largest consumer of energy for the District and the second largest site available for a PV system. The site is located on the northeast side of a large hill, which limits solar access. Any system would likely be shaded for most of the afternoon, especially during the winter months, which reduces generation potential during the peak TOU electricity period.

Figure 16 outlines a possible canopy mounted PV system, which would extend over the entire WWTP. The footprint of the system is flexible and must be designed to allow vehicular access to the site and to allow SD5 to provide any necessary maintenance to the plant. The system could be larger or smaller than indicated.

Solar is not considered suitable for the building in the southwest portion of the site, as its solar access is limited to a northeast exposure. The southwest exposure will be shaded by the hill.

Prior to developing any PV system at the site, the District and its Consultant(s) shall verify that the PG&E distribution system and transformer capacity can support the proposed system. It is possible that the system size will be limited by the capacity of the electrical distribution system. It will also be important to provide a site-specific shading analysis to determine likely reductions in electricity generation that would not be accounted for in preliminary solar calculations.

5.3.2.1 Battery Systems

Battery storage should be considered for this location, as the solar generation potential during the mornings is much higher than the during the afternoon, and battery storage could shift the time during which the electricity is fed back into the grid, likely increasing the cost effectiveness of the system.

Figure 16 – Paradise Cove WWTP PV Potential

5.3.3 Tiburon PS-1, About 2440 Mar East

Tiburon PS-1 is in a residential area with moderate solar access. It is located between two homes and has open access for southeast to southwest exposures. There is an adjacent tree, to the east-northeast of the pump station, that could cause shading issues during the early morning.

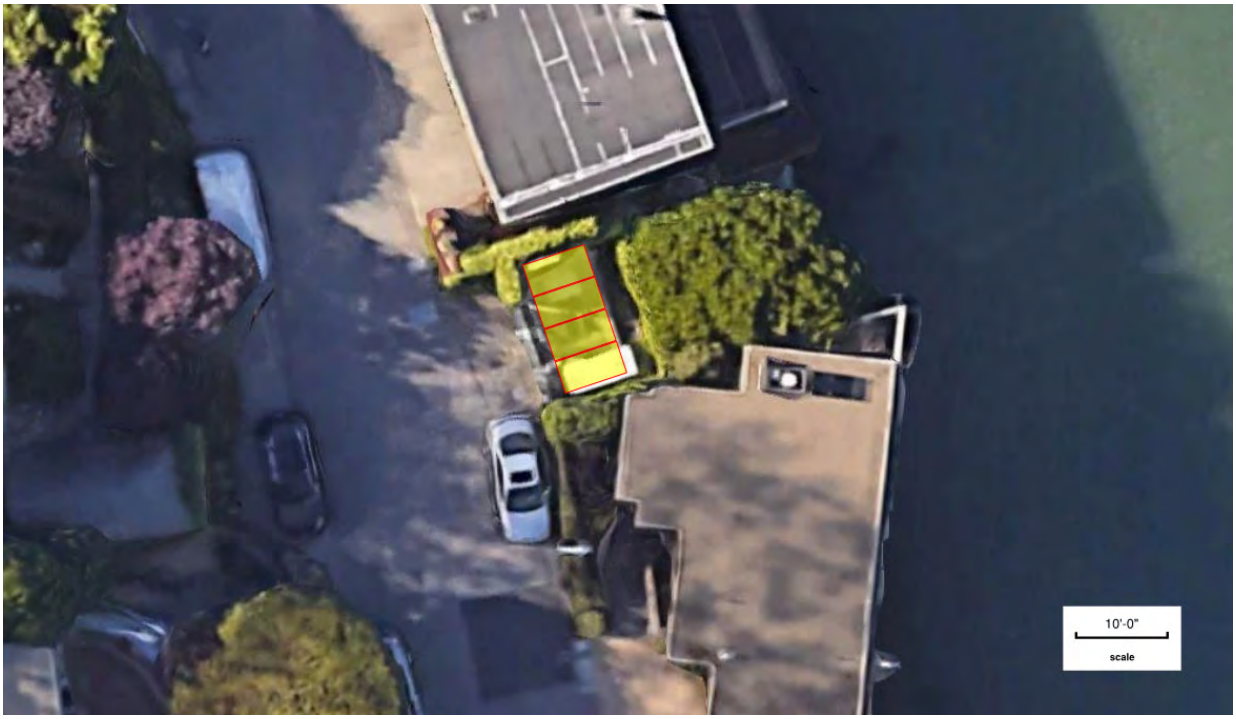
Given the system size, it will likely be more expensive per unit of energy generated than it would be at a larger system and may not be a cost-effective investment. This system may be considered if there are issues associated with the visibility of the pump station.

Figure 17 shows a possible canopy mounted PV system, which would extend over the footprint of the pump station. The panels would face in the south-southeast direction, along the same access as the pump station.

5.3.3.1 Battery Systems

Battery storage may not feasible for this location. Batteries are recommended for locations with more power generation and a direct data connection to SD5 facilities.

Figure 17 – Tiburon PS-1 PV Potential



5.3.4 Tiburon PS-3, S/W COR Solano & Mar East

Tiburon PS-3 is in a residential area with moderate solar access. It is located between two homes and has open access to the southeast. There is an adjacent tree, directly to the south, that will cause shading issues if allowed to continue growing. At the moment, the tree is lower than the pump station and its canopy does not extend into the pump stations solar access zone.

Given the system size, it will likely be more expensive per unit of energy generated than it would be at a larger system and may not be a cost-effective investment. This system may be considered if there are issues associated with the visibility of the pump station.

Figure 18 shows a possible canopy mounted PV system, which would extend over the footprint of the pump station. The panels would face in the southeast direction, along the same access as the pump station.

5.3.4.1 Battery Systems

Battery storage may not feasible for this location. Batteries are recommended for locations with more power generation and a direct data connection to SD5 facilities.

Figure 18 – Tiburon PS-3 PV Potential

5.3.5 Tiburon PS-5, Mar West

Tiburon PS-5 is located close to the Main Tiburon WWTP and has moderate solar access. The pump station itself is heavily shaded by trees on the east, north and west sides of the site. The entrance to the site does have direct south facing solar access, which is great for solar power generation.

Figure 19 shows a possible canopy mounted PV system, which would extend over the entrance and driveway to the pump station. The panels would face in the southeast direction, adjacent to and along the same access as the roadway. This minimizes conflicts with the adjacent vegetation. The canopy should be designed to maintain vehicular access to the site, and the structure should be elevated to eliminate clearance issues for maintenance vehicles. Rooftop solar systems are not considered feasible due to the shading on the pump station buildings.

5.3.5.1 Battery Systems

Battery storage may be feasible for this location and should be assessed if this location is considered for future solar development.

Figure 19 – Tiburon PS-5 PV Potential

5.3.6 Tiburon PS-7, Tiburon Blvd MT

Tiburon PS-7 has moderate solar access. The pump station itself is within a narrow yard oriented towards the southwest. Portions of the site are shaded by trees to the east, south, and west, which could impact solar generation.

The site has a relatively small annual electricity usage, so fewer PV modules are needed than the site can support. Figure 20 shows a possible canopy mounted or active tracking PV system, which would be sized to meet the current electricity needs for the site. An overhead canopy system could be designed to allow for future expansion, as indicated in the Figure. An active tracking PV system, though more expensive up front, would optimize generation by orienting the system to maximize solar access throughout the day. If a canopy structure is preferred, then it should be designed to maintain vehicular access to the site, and the structure should be elevated to eliminate clearance issues for maintenance vehicles.

5.3.6.1 Battery Systems

Battery storage may not feasible for this location. Batteries are recommended for locations with more power generation and a direct data connection to SD5 facilities.

Figure 20 – Tiburon PS-7 PV Potential

5.3.7 Belvedere PS-1, Cove Road

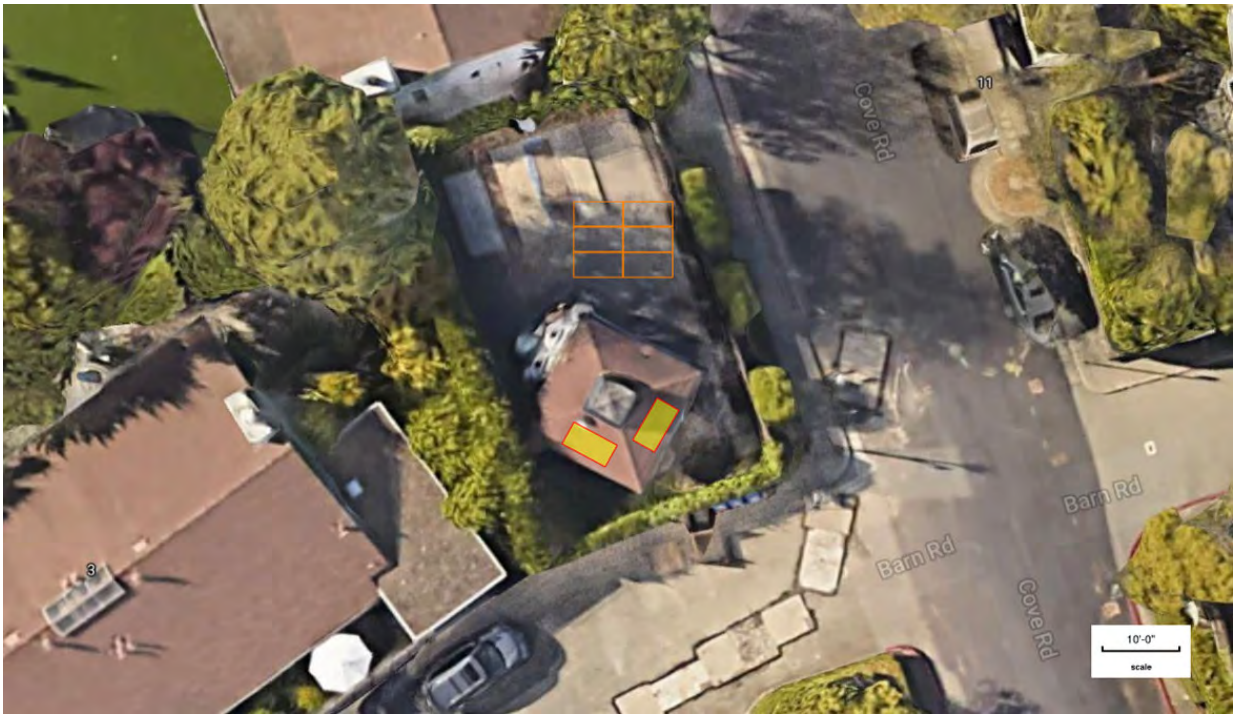
Belvedere PS-1 is in a residential area with good solar access. It is located at the corner of an intersection, with rooftops facing southeast and southwest. The primary issue for this location is limited space available for PV modules. Each rooftop can support approximately one module, for a total of two. There is an option to add an active tracking system behind the pump station building, however, this may impede access to the site, and if considered should be coordinated with maintenance and access requirements.

Figure 21 shows the two rooftop modules and the possible canopy mounted PV system, which would extend over the footprint of the pump station. The panels would face in the southeast direction, along the same access as the pump station.

5.3.7.1 Battery Systems

Battery storage may not feasible for this location. Batteries are recommended for locations with more power generation and a direct data connection to SD5 facilities.

Figure 21 – Belvedere PS-1 PV Potential



5.3.8 Belvedere PS-2, ACR 532 San Rafael Ave.

Belvedere PS-2 is in a residential area with moderate solar access. It is located adjacent to two larger buildings, with an accessible rooftop facing southeast. The primary issue for this location is the shading that will likely result from adjacent trees and taller buildings. This location could support approximately three PV modules.

Figure 21 shows the three rooftop modules, which would face in the southeast direction.

5.3.8.1 Battery Systems

Battery storage may not feasible for this location. Batteries are recommended for locations with more power generation and a direct data connection to SD5 facilities.

Figure 22 – Tiburon PS-2 PV Potential

5.3.9 Belvedere PS-9, 85 Lagoon Rd (Belvedere Corporate Yard)

The Belvedere Lagoon Rd pump stations are not suitable for solar energy generation due to space limitations and significant shading from nearby vegetation. However, Belvedere PS-9 is located adjacent to the Belvedere Corporate Yard, which has good solar access.

If the District would like to research this system further, then the District will need to work with the City to receive a legal agreement and easement for the development of the system. The system should be connected to the PS-9 electricity meter for the District to take credit for the solar generation as part of the utility energy net-metering agreement. Not considering the legal agreements that will be required to place a system on this rooftop, this system would be a relatively simple and cost-effective means of developing solar energy to offset the District's electricity use.

Figure 23 shows a possible roof mounted PV system, which would extend over the footprint of the pump station. The panels could face in either the southeast or southwest orientation, along the same access as the building.

The primary issue with this location is the limited electricity use associated with the Lagoon Rd pump stations. The Belvedere Corporate Yard roof has the capacity to generate significantly more electricity than the pump stations uses. The District may want to consider developing a system that is smaller in size to meet the usage for the PS-9. If the District were to develop a large rooftop system as shown, then it would sell excess power to the utility at a reduced rate, reducing the cost-effectiveness of the system.

5.3.9.1 Battery Systems

Battery storage may be feasible for this location and should be assessed if this location is considered for future solar development.

Figure 23 – Belvedere PS-9 PV Potential

5.3.10 Paradise Cove CF-PS1, 33 Seafirth Pl Pump Station

Paradis Cove CF-PS1 is in a residential area with good solar access. It is located at the south parking area for a community pool and has open access for southeast to southwest exposures. There are limited shading issues from nearby vegetation.

Given the system size, it will likely be more expensive per unit of energy generated than it would be at a larger system and may not be a cost-effective investment. This system may be considered if there are issues associated with the visibility of the pump station.

Figure 24 shows a possible canopy mounted PV system, which would extend over the footprint of the pump station. The panels would face in the south-southwest direction, along the same access as the pump station.

5.3.10.1 Battery Systems

Battery storage may not feasible for this location. Batteries are recommended for locations with more power generation and a direct data connection to SD5 facilities.

Figure 24 – Paradise Cove CF-PS1 PV Potential

5.3.11 Paradise Cove CF-PS2, 95 Seafirth Rd

Paradise Cove CF-PS2 has good solar access. The pump station itself is at the end of residential road and the District felt that any solar systems would be met with resistance due to impacts on views towards the bay.

Immediately to the east of the pump station is an open terrace that at a lower elevation than the residential road. This terrace has open solar access and a ground mounted system is proposed for this location.

The site has a relatively small annual electricity usage, so fewer PV modules are needed than the site can support. Figure 25 shows a possible ground mounted system, which would be sized to meet the current electricity needs for the site. The system could be designed to allow for future expansion, as indicated in the Figure.

It is not known whether the District controls this property. If the District would like to research this system further, then the District will need to identify the Owner, and if necessary, receive a legal agreement and easement for the development of the system. The system should be connected to the CF-PS2 electricity meter for the District to take credit for the solar generation as part of the utility energy net-metering agreement.

5.3.11.1 Battery Systems

Battery storage may not feasible for this location. Batteries are recommended for locations with more power generation and a direct data connection to SD5 facilities.

Figure 25 – Paradise Cove CF-PS2 PV Potential

5.4 Proposed Systems Summary

5.4.1 SD5 Facilities PV Systems Generation Potential

If SD5 was to develop all the PV systems outlined in this study to maximize the generation potential, then the District could offset up to 74.2 percent of its annual electricity use. These systems have a predicted annual electricity generation of 931,901.78 kWh, which results in a net-annual electricity use of 324,105.18 kWh. The summary of the generation potential across the SD5 facilities outlined in study are shown in Table 7.

Table 7 – SD5 Facilities, PV System Generation Summary

Service Area	Lift station number	PG&E Account Name	Annual Electricity Use (kWh)	Predicted Electricity Generation (kWh)	Net Electricity Use (kWh)	% Reduction
Tiburon	Main WWTP PS-8, PS-9	Mar West St, 2001 Paradise Drv	1,045,185.50	*341,687* *(roof)* *485,141* *(hill)* 826,828 (total)	218,357.5	79.1%
Paradise Cove	PC WWTP	Paradise Cove	75,931.35	68,910.40	7,020.94	90.8%
Tiburon	PS-1, PS-2	About 2440 Mar East Opp 2514 Mar East St	9,509.35	2,492.50	7,016.85	26.2%
Tiburon	PS-3, PS-4	S/W COR Solano & Mar East, Solano & Mar East St SW	12,250.57	3,089.40	9,161.17	25.2%
Tiburon	PS-5	Mar West	40,440.60	18,542.90	21,897.70	45.9%
Tiburon	PS-6	Tib Blvd COR/Beach, Corner Beach & Tiburon Blvd	2,173.25	-	2,173.25	-
Tiburon	PS-7	Tiburon Blvd MT, Tib Blvd Btw Reed Sch	4,678.42	4,980.60	(-302.18)	106.5%
Belvedere	PS-1, PS-7	Cove Road	23,575.68	1,239.20	22,336.48	5.3%
Belvedere	PS-2	ACR 532 San Rafael Ave.	6,646.16	1,924.70	4,721.46	29.0%
Belvedere	PS-3	CRNR San Rafael Ave, 00 Golden Gate Ave	9,569.20	-	9,569.20	-
Belvedere	PS-5	00 San Rafael Ave	1,413.62	-	1,413.62	-
Belvedere	PS-8	10 Windward Rd	1,072.05	-	1,072.05	-
Belvedere	PS-9	85 Lagoon Rd	2,227.05	30,842.80	(-28,615.8)	1,385%
Belvedere	PS-10	ABT 66 Lagoon Rd	1,110.36	-	1,110.36	-
Belvedere	PS-11	ABT 46 Lagoon Rd	1,465.50	-	1,465.50	-
Belvedere	PS-12	00 Edgewater Rd	1,096.61	-	1,096.61	-
Belvedere	PS-13	W Shore Road	1,850.68	-	1,850.68	-
Belvedere	PS-14	End of W Shore Road	3,300.06	-	3,300.06	-
Belvedere	PS-15	98 Beach Rd	2,350.96	-	2,350.96	-
Paradise Cove	CF-PS1	33 Seafirth Pl Pump Station	8,707.03	1,877.30	6,829.73	21.6%
Paradise Cove	CF-PS2	95 Seafirth Rd	1,453.62	2,016.90	(-563.28)	138.8%
		Total	**1,256,006.96**	**962,744.58**	**295,489.38**	**76.7%**

Since SD5 is enrolled in the MCE Light Green Clean Power plan, 60 percent of the net-annual electricity use is sourced from carbon free renewables. The net-annual "other electricity use" that is not sourced from carbon free renewables totals 118,195.75 kWh.

Table 8 – SD5 Annual Electricity Use with Potential PV Systems, MCE Light Green Clean Power

Data Year	Total Net Electricity Use (kWh)	MCE Light Green Carbon Free Renewables (kWh)	Other Electricity Use (kWh)
February 2020 – January 2021	295,489.38	177,293.63 *(60 percent)*	118,195.75 *(40 percent)*

If SD5 wanted to source 100 percent of the electricity use across the District from renewables, then it could either purchase RECs from a carbon offset provider to offset the remaining net-annual "other electricity use", or it could upgrade the MCE Deep Green Clean Power program. MCE's rate schedule notes that the increase in costs to upgrade from the MCE Light Green Clean Power program to the MCE Deep Green Clean Power program is $0.01 per kWh. Based on a net-annual electricity use of 295,489.38 kWh, this cost would be approximately $2,954.90/year. If SD5 decided not to install on-site renewable energy, but instead offset all electricity use with MCE Deep Green Power, then the additional cost for the annual electricity use of 1,256,006.96 kWh would be $12,560.07/year.

6.0 Cost and Ownership Options

The District has a variety of means through which a solar system can be purchased, installed, and operated. Each ownership model has its benefits and drawbacks, and each one comes with its own costs. These options are outlined below.

6.1 Federal Tax Credits

The U.S. Federal Government offers a Federal Income Tax Credit (ITC) for qualified renewable energy systems. This ITC allows eligible owners to deduct a percentage of the cost of the solar system from their federal taxes. If the ITC exceeds the owner's tax liability, then the remaining ITC will carry over to the following year.

As a local government entity, SD5 is not eligible for these tax credits. However, third parties are eligible for the tax credit, and in the event SD5 elects to pursue a third party owned and operated system, the third party may factor some of the tax savings into any system cost agreements.

6.2 Ownership Options

6.2.1 Direct Ownership

In a direct ownership model, SD5 finances, owns and maintains the renewable energy system. The installed costs include all elements of the solar system, including the mounting structure, solar panels, inverters, and wiring. There may be additional costs associated with connecting to the local utility infrastructure, which may include, but are not limited to, increased transformer size, and upgraded distribution lines.

6.2.2 Third Party Owned and Operated Systems

In a third-party ownership model, SD5 engages in a contract with a qualified third-party to have them install, own, and operate a renewable energy system. The costs associated with each model vary depending on the terms and conditions for each one.

6.2.2.1 Solar Leases

Solar leases are agreements with a third party, where the third party would charge the District a flat monthly fee for the system, regardless of the amount of energy generated by the system. This ownership model is not preferred, as the cost generally outweighs that of a power purchase agreement (PPA), especially as the system ages and the amount of electricity generated is reduced.

6.2.2.2 Power Purchase Agreements (PPA)

A PPA is an agreement with a third-party, where the third party would charge SD5 an agreed upon rate for each unit of electricity that is generated by the system. The agreed upon rate may exceed the rate that SD5 currently pays to the local utility; however, these rates usually have a lower escalation rate than is typical for electricity purchased from the utility. Over the life of the system, the agreed upon PPA rate usually becomes less than the local utility rate, which typically makes this ownership model cost-effective.

The benefits of this ownership model are:

- PPAs do not require any up-front investment from SD5. The third-party fully finances the system and can make a return on its investment by charging an agreed upon rate per unit of electricity. This rate, when paid over the life of the system, offsets the up-front investment and any interest that is paid by the third-party.
- The third party typically maintains and operates the system. SD5 will not need to provide ongoing maintenance.
- As a third-party owned system, PPAs are eligible for the Federal ITC. The PPA agreement may pass some of the ITC savings to SD5 in the form of a reduced electricity rate.

The drawbacks of this ownership model are:

- It is possible that the local utility rates do not escalate as expected, which could result in the SD5 paying more money over the life of the system than they would in other ownership models.

6.2.2.3 Pre-Paid Power Purchase Agreements (PPA)

A Pre-Paid PPA is an agreement with a third-party, where SD5 would fully finance the system up-front, however, it is technically owned by the third party for an agreed upon time. This agreement allows the third-party to share the Federal ITC with SD5, reducing up-front costs associated with the direct ownership model.

The benefits of this ownership model are:

- The Pre-Paid PPA could reduce the up-front cost for SD5, as the third-party shares the Federal ITC savings with SD5 at an agreed upon percentage. This could make the system more cost-effective than a direct ownership model.
- The Pre-Paid PPA includes maintenance of the system for duration of the contract, at which point the ownership and maintenance transfers to SD5.

The drawbacks of this ownership model are:

- It is tied closely to the Federal ITC rate. When the ITC rate sunsets, this agreement may be less attractive to third party providers, and there may be fewer bidders and options available for SD5.

6.2.2.4 Renewable Energy Credits

All qualified electricity generated by a renewable energy system may be bought and sold on an open market as a renewable energy credit (REC). These RECs are often purchased by individuals, organizations, or utilities looking to offset their regular energy use. Third-party owned and operated systems often do not retain the RECs associated with the system in their contracts, as the ability to sell these credits on the open market increases their profitability. Any contract agreed to between the SD5 and a third-party should include the RECs, or else the renewable energy generated by the system is allocated to the REC purchaser.

6.3 Potential Costs

6.3.1 Direct Ownership

HDR used recent cost estimates, developed in 2021, for other solar photovoltaic systems in the San Francisco Bay Area and California to determine the costs below. HDR also contacted local renewable energy providers to review and validate the numbers outlined in the cost estimates associated with the direct ownership model for ground mounted, roof mounted, and parking canopy mounted solar installations. The general feedback from local providers was the values indicated in the cost estimates were likely high, though costs are highly dependent on actual site conditions. The costs identified below provide low, mid, and high-cost ranges. The low-cost range indicates feedback from local suppliers, the mid-cost range indicates the lower cost estimates for other solar projects in the San Francisco Bay Area, and the high-cost range indicates the higher cost estimates for other solar projects in the California. It is likely that small systems, such as those proposed for the pump stations, will fall on the high end of the cost range, while larger systems will fall within the low to mid cost range.

These installed costs include all elements of the solar system, including the mounting structure, solar panels, inverters, and wiring. There may be additional costs associated with connecting to the local utility's distribution lines, which may include, but are not limited to, increased transformer size and upgraded distribution lines. Depending on market conditions at the time the RFP is released, actual proposed costs may vary from those shown below.

Table 9 – PV System Cost Estimates, Direct Ownership

	Low-Cost Range	Mid-Cost Range	High-Cost Range
Roof Mounted	$3,500 per kW	$4,550 per kW	$5,200 per kW*
Ground Mounted	+ 7%	+10%	+15%
Canopy Mounted	+ 10%	+ 20%	+ 25%*

** Canopy Mounted, High-Cost Range percent increase may be higher than the 25% indicated. Custom architectural systems with higher end materials could add up to 75% to the roof mounted system costs indicated in this table.*

Table 10 provides approximate system cost estimates for each of the systems outlined in Section 5.3. These costs are representative only and it is possible that actual proposed system costs may higher or lower, depending on site specific factors that are assessed once a project is selected.

Table 10 – SD5 Facilities, Cost Summary, Direct Ownership, Mid-Cost Range

Service Area	Lift station number	PG&E Account Name	Proposed PV System Size (kW)	PV Cost Estimate	Cost Value
Tiburon	Main WWTP PS-8, PS-9	Mar West St, 2001 Paradise Drv	554 (Roof)	$3,024,840	Canopy, Mid-Range
Tiburon	Main WWTP PS-8, PS-9	Mar West St, 2001 Paradise Drv	741 (Hill)	$3,708,705	Ground, Mid-Range
Paradise Cove	PC WWTP	Paradise Cove	48.6	$265,356	Canopy, Mid-Range
Tiburon	PS-1, PS-2	About 2440 Mar East Opp 2514 Mar East St	1.8	$11,700	Canopy, High-Range
Tiburon	PS-3, PS-4	S/W COR Solano Mar East, Solano & Mar East St SW	2.3	$14,950	Canopy, High-Range
Tiburon	PS-5	Mar West	13.5	$73,710	Canopy, Mid-Range
Tiburon	PS-6	Tib Blvd COR/Beach, Corner Beach & Tiburon Blvd	-	-	-
Tiburon	PS-7	Tiburon Blvd MT, Tib Blvd Btw Reed Sch	3.6	$19,656	Canopy, Mid-Range
Belvedere	PS-1, PS-7	Cove Road	0.9	$5,850	Canopy, High-Range
Belvedere	PS-2	ACR 532 San Rafael Ave.	1.4	$9,100	Canopy, High-Range
Belvedere	PS-3	CRNR San Rafael Ave, 00 Golden Gate Ave	-	-	-
Belvedere	PS-5	00 San Rafael Ave	-	-	-
Belvedere	PS-8	10 Windward Rd	-	-	-
Belvedere	PS-9	85 Lagoon Rd Belvedere Corporate Yard	22.5	$102,375	Roof, Mid-Range
Belvedere	PS-10	ABT 66 Lagoon Rd	-	-	-
Belvedere	PS-11	ABT 46 Lagoon Rd	-	-	-
Belvedere	PS-12	00 Edgewater Rd	-	-	-
Belvedere	PS-13	W Shore Road	-	-	-
Belvedere	PS-14	End of W Shore Road	-	-	-
Belvedere	PS-15	98 Beach Rd	-	-	-
Paradise Cove	CF-PS1	33 Seafirth Pl Pump Station	1.4	$9,100	Canopy, High-Range
Paradise Cove	CF-PS2	95 Seafirth Rd	1.4	$7,007	Ground, Mid-Range
		Total	**1,392.4**	**$7,252,349**	-

6.3.2 Third Party Ownership

Potential costs for third party ownership will need to be determined by solar providers. These costs are specific to the individual terms and conditions proposed by each company. In general, SD5 can expect the following:

- A traditional PPA will cost more per unit of electricity than is currently paid to the local utility, with an assumed payback over the life of the system.
- A pre-paid PPA may cost less than the direct ownership model. The actual pre-paid PPA cost depends on the Federal ITC rate that each bidder proposes to share with the SD5.

6.4 Return on Investment Analysis

The Return on Investment (ROI) Analysis assumes that a smaller system at the Main WWTP in Tiburon would be developed, rather than the full extent of PV that could be developed as indicated in Figure 14. The smaller system, shown in Figures 28-30, is selected for the cost analysis because it is a more manageable size, and likely provides a representative assessment of the payback that would be associated with a PV system that may be developed on-site. The Main WWTP is also selected because it likely includes adequate electricity distribution infrastructure to support a larger system size, and because the analysis may account for the cost savings associated with demand reductions, in addition to usage reductions.

The ROI Analysis looks at three (3) different options – one that is aligned with the WWTP's southeast orientation (137 degrees), one that faces due south (180 degrees), and one that is aligned with the WWTP's southwest orientation (227 degrees). This accounts for the varying amounts of generation for each system, based on the orientation and the time of day for when the power is generated and fed back to the grid.

The ROI Analysis also looks at two values associated with the referenced system, a simple payback and a multi-year payback. The simple payback identifies the duration over which the annual utility savings would exceed the system first cost, based on the first year of performance and utility savings. The multi-year payback period factors in reduced PV system performance over time and the expected increase in utility rates due to inflation.

Although the analysis provides costs associated with both a roof mounted system and a canopy mounted system, Figures 28-30 show the system footprint associated with a canopy mounted system. The costs associated with a roof mounted system are provided for reference and are intended to inform the District as the cost-effectiveness of each system type.

6.4.1 SD5 Utility Rates

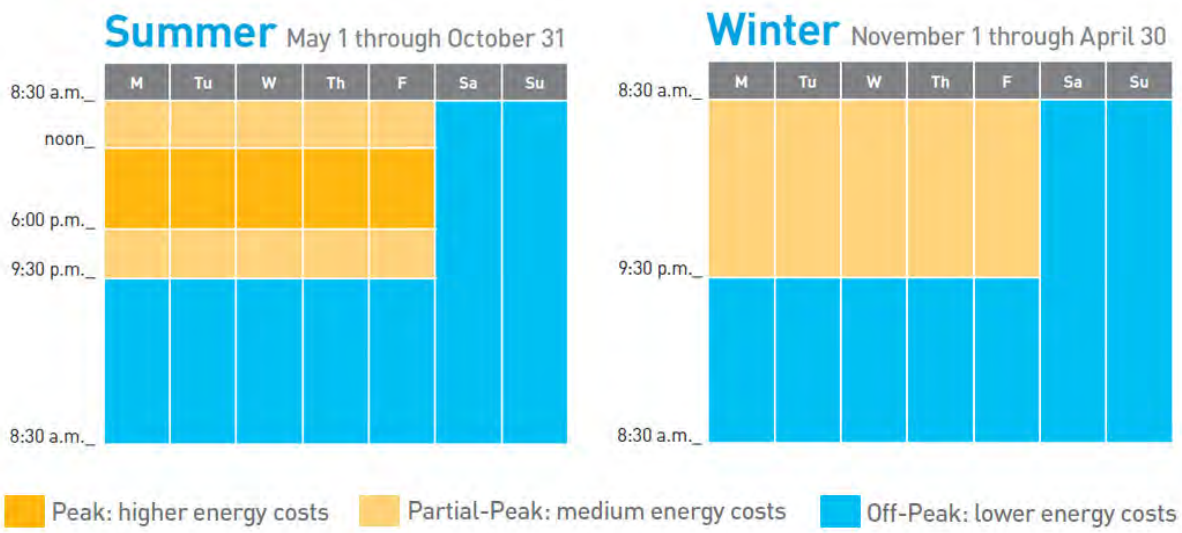
The cost analysis is based on the 2021 rates for PG&E Rate Schedule E19S, with enrollment in MCE Light Green service. These rates are described in Figure 26. The analysis aligns periods of generation with the time of use rate schedule for time the electricity is generated. The TOU rate schedule is provided in Figure 27. The analysis assumes that all electricity is fed back into the grid at the time and rate for when it is generated, and that no battery storage is used to shift the time of use rate. The current demand charges for the Main Tiburon WWTP and any potential reductions due to PV are also factored into the analysis.

Figure 26 – PG&E / MCE Rate Schedule E19S, 2021

Provider	Season	Type	TOU Period	$/kWh
PG&E	Summer	Energy	Peak	$ 0.02418
PG&E	Summer	Energy	Part Peak	$ 0.02418
PG&E	Summer	Energy	Off Peak	$ 0.02418
PG&E	Winter	Energy	Part Peak	$ 0.02418
PG&E	Winter	Energy	Off Peak	$ 0.02418
MCE	Summer	Energy	Peak	$ 0.11800
MCE	Summer	Energy	Part Peak	$ 0.07100
MCE	Summer	Energy	Off Peak	$ 0.03900
MCE	Winter	Energy	Part Peak	$ 0.06400
MCE	Winter	Energy	Off Peak	$ 0.04700

Provider	Season	Type	TOU Period	$/kW
PG&E	Summer	Demand	Peak	$ 5.71500
PG&E	Summer	Demand	Part Peak	$ 2.13000
PG&E	Summer	Demand	Max Demand	$ 23.00500
PG&E	Winter	Demand	Part Peak	$ 0.07000
PG&E	Winter	Demand	Max Demand	$ 23.00500
MCE	Summer	Demand	Peak	$ 14.78000
MCE	Summer	Demand	Part Peak	$ 3.65000

Figure 27 – PG&E / MCE Time of Use Schedules



Source: PG&E

6.4.2 Main Tiburon WWTP, 137 Degree Azimuth PV System

The 137 Degree Azimuth System includes 108 PV modules and faces southeast. This system will have more production during the morning hours, but less during the evening hours when electricity is more expensive. It is expected to generate 65,665 kWh/year and reduce annual electricity costs by 6,662.78/year. Figure 26 shows the footprint of system. Table 11 outlines the potential ROI.

Figure 28 – Main Tiburon WWTP, PV System for ROI Analysis, 137 Degree Azimuth

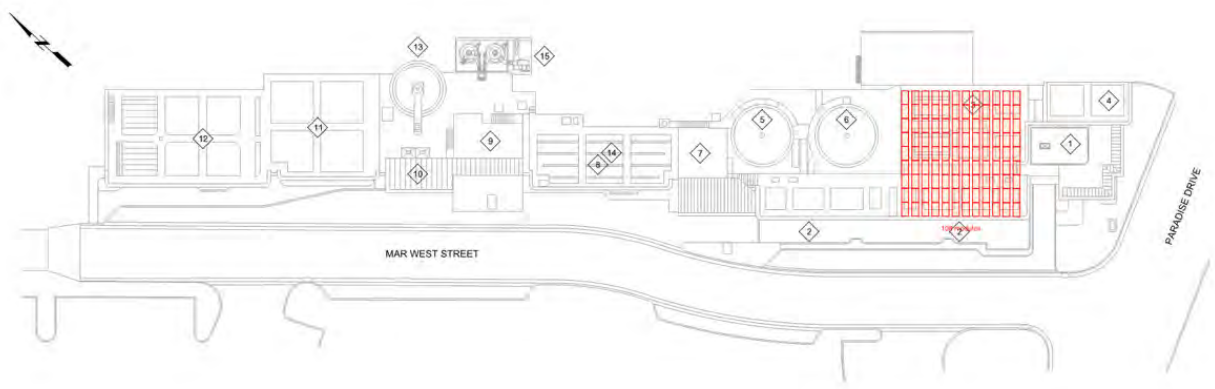


Table 11 – PV System ROI Analysis, 137 Degree Azimuth

	Roof Mounted Low-Cost Range	Roof Mounted Mid-Cost Range	Canopy Mounted Low-Cost Range	Canopy Mounted Mid-Cost Range
Unit Cost	$3,500 per kW	$4,550 per kW	$3,850 per kW	$5,460 per kW
System First Cost	$170,100	$221,130	$187,110	$265,356
Annual Generation	65,664.94 kWh			
Annual Savings	$6,662.78			
Simple Payback	25.53 years	33.19 years	28.08 years	39.83 years
Multi-Year Payback	23.89 years	30.99 years	26.25 years	37.14 years

Based on this analysis, a roof mounted system at the low-cost range would have a simple payback of 25.5 years and multi-year payback of 23.9 years. A typical performance warranty for a PV system, depending on manufacturer, is approximately 25 years, so the low-cost range could be considered cost effective. The mid-cost range roof mounted system and the canopy mounted systems have multi-year paybacks exceeding 25 years, which may not be considered cost effective.

6.4.3 Main Tiburon WWTP, 180 Degree Azimuth (South) PV System

The 180 Degree Azimuth System includes 106 PV modules and faces south. This system will have more direct solar access throughout the day than the 137- or 227-degree azimuth systems. It is expected to generate 65,663 kWh/year and reduce annual electricity costs by 6,680/year. Figure 27 shows the footprint of system. Table 12 outlines the potential ROI.

Figure 29 – Main Tiburon WWTP, PV System for ROI Analysis, 180 Degree Azimuth (South)

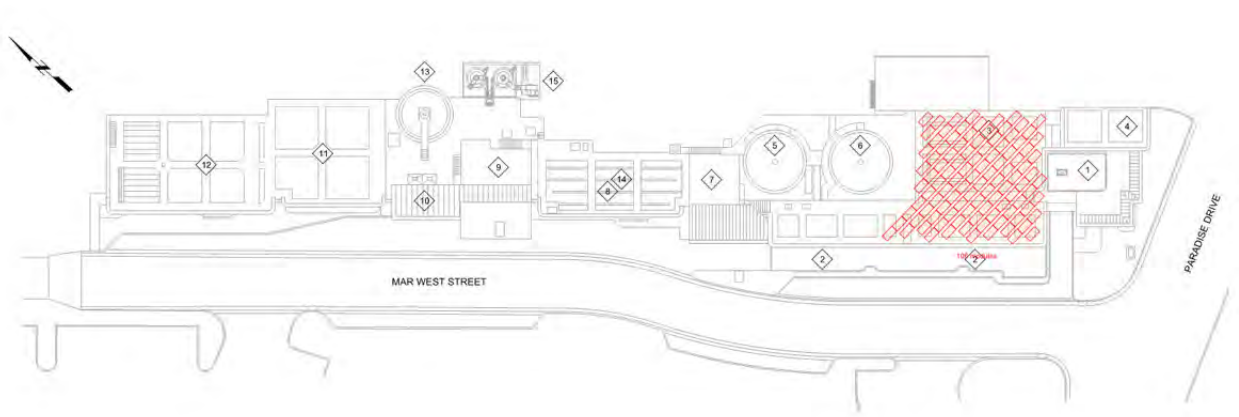


Table 12 – PV System ROI Analysis, 180 Degree Azimuth

	Roof Mounted Low-Cost Range	Roof Mounted Mid-Cost Range	Canopy Mounted Low-Cost Range	Canopy Mounted Mid-Cost Range
Unit Cost	$3,500 per kW	$4,550 per kW	$3,850 per kW	$5,460 per kW
System First Cost	$166,950	$217,035	$183,645	$260,442
Annual Generation	65,622.82 kWh			
Annual Savings	$6,679.85			
Simple Payback	24.99 years	32.49 years	27.49 years	38.99 years
Multi-Year Payback	23.39 years	30.34 years	25.71 years	36.36 years

Based on this analysis, a roof mounted system at the low-cost range would have a simple payback of 25.0 years and multi-year payback of 23.4 years. A typical performance warranty for a PV system, depending on manufacturer, is approximately 25 years, so the low-cost range could be considered cost effective. The mid-cost range roof mounted system and the canopy mounted systems have multi-year paybacks exceeding 25 years, which may not be considered cost effective.

6.4.4 Main Tiburon WWTP, 227 Degree Azimuth PV System

The 227 Degree Azimuth System includes 108 PV modules and faces southwest. This system will have more production during the afternoon hours when electricity is more expensive. It is expected to generate 65,869 kWh/year and reduce annual electricity costs by 6,727/year. Figure 28 shows the footprint of system. Table 13 outlines the potential ROI.

Figure 30 – Main Tiburon WWTP, PV System for ROI Analysis, 227 Degree Azimuth

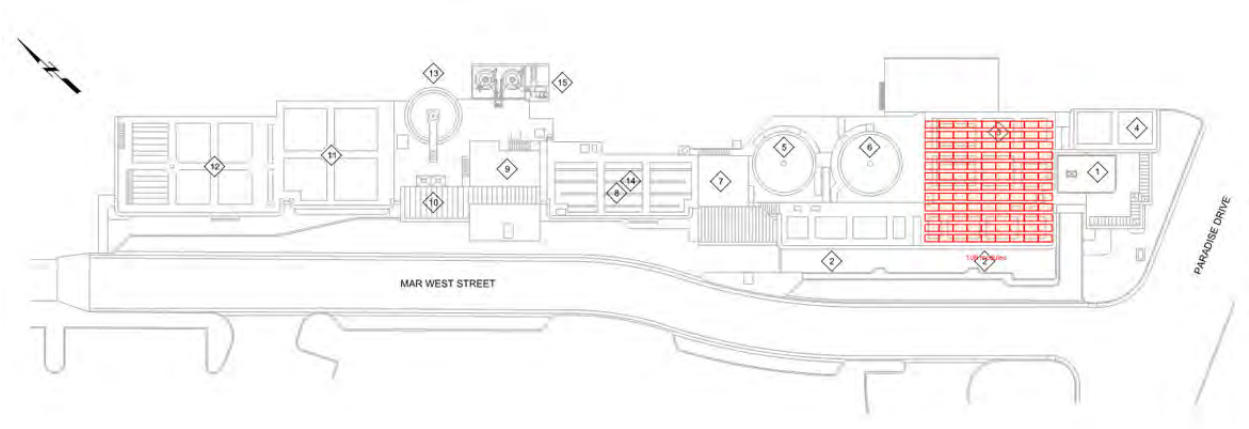


Table 13 – PV System ROI Analysis, 227 Degree Azimuth

	Roof Mounted Low-Cost Range	Roof Mounted Mid-Cost Range	Canopy Mounted Low-Cost Range	Canopy Mounted Mid-Cost Range
Unit Cost	$3,500 per kW	$4,550 per kW	$3,850 per kW	$5,460 per kW
System First Cost	$170,100	$221,130	$187,110	$265,356
Annual Generation	65,869.06 kWh			
Annual Savings	$6,727.01			
Simple Payback	25.29 years	32.87 years	27.81 years	39.45 years
Multi-Year Payback	23.66 years	30.69 years	26.01 years	36.79 years

Based on this analysis, a roof mounted system at the low-cost range would have a simple payback of 25.3 years and multi-year payback of 23.7 years. A typical performance warranty for a PV system, depending on manufacturer, is approximately 25 years, so the low-cost range could be considered cost effective. The mid-cost range roof mounted system and the canopy mounted systems have multi-year paybacks exceeding 25 years, which may not be considered cost effective.

6.4.5 ROI Assessment

The District has low utility rates for California, with the average summer day costing just over 9 cents per kWh. This makes the ROI for solar systems longer than for other projects in California. Depending the acceptable ROI timeframe for the District, solar systems may or may not be feasible given the 20+ year payback associated with the different system options. If local solar companies were to propose systems with a lower first cost than those outlined in this study, then the systems would have a more favorable ROI period.

7.0 Recommendations

Renewable energy generation is a viable opportunity for the District and several of the SD5 facilities are suitable for on-site PV systems. The District should review this study and determine the preferred locations, sizes, and budgets for any on-site PV systems that should be considered further.

The ROI analysis shows that the District has relatively low electricity rates, which limits the cost-effectiveness of the proposed systems. If the referenced ROI period is not an acceptable investment, then the District should determine the acceptable payback that would be required to warrant the procurement and installation of on-site PV systems.

This study provides overall generation potential, conceptual plans, and cost estimates for the suitable SD5 facilities. Additional refinement, design and cost analyses may be necessary to determine whether a specific system should be pursued and whether it meets the ROI targets for the District.

7.1 Recommendation

If the District would like to move forward with assessing or developing on-site renewable energy at the SD5 facilities, the following locations are recommended for further consideration:

- Main Tiburon WWTP
- Main Tiburon WWTP, Hillside Location
- Tiburon PS-5, Mar West
- Tiburon PS-7, Tiburon Blvd MT

The following locations pose additional challenges, but may also be considered if additional renewable energy generation is desired or if the recommended locations are determined to no longer be feasible:

- Paradise Cove WWTP
- Belvedere PS-9, 85 Lagoon Rd (Belvedere Corporate Yard)

The individual pump stations are not recommended due to the limited generation potential and the higher costs that would be attributed to systems of the size. If the District wants to develop PV systems in these areas to demonstrate their commitment to sustainability, then they are viable and may be warranted. If this is the case, the District shall review the assessment in this study and determine which locations should be considered.

May 17, 2021

Dear Board Members,

I wanted to give a brief introduction of my clients, Janice and Francis (Matt) Mathews. Matt and Jan have lived in Mill Valley for over 30 years,. They have two daughters, Jenelle and Macey. They have been very involved in their community, including Kiddo!, Tam Valley PTA President, Master Gardener program, Historical Society Board member, current Mill Valley Streamkeepers Board member, and current Mill Valley Chamber of Commerce Board member. Matt has been in the real estate development business for over 40 years, and the Mathews have completed renovations on commercial and residential properties they have purchased in San Francisco, Marin, Sonoma and Trinity Counties. After completing a renovation, the property becomes a "family member" and are typically never sold. Their strategy is to buy, renovate, hold and manage. Their most recent project was repurposing and renovation of the Mill Valley Lumber Yard. Matt and Jan were very involved working with the community and the City on the entitlement of the property, then worked with their architect on the renovation design, and oversaw all aspects of the renovation, and now the management of the property. As a retired contractor, Matt gets involved on a daily basis: he is the first one up on the ladder in the morning and often the last one wrapping things up at the end of the day. So all of his projects are completed with excellent craftsmanship and on a timely basis. Both Jan and Matt feel that getting to know the neighbors is an important part of any project, and they develop long lasting relationships. Even though the Mathews have not yet closed on 2088 Paradise Drive, they have already been invited to several gatherings at the neighbor Noreen's home, where they were introduced to numerous other neighbors as well. The Mathews look forward to meeting the rest in the near future.

If you haven't been by the Mill Valley Lumber Yard yet, I hope you get a chance to soon, as it will exemplify the attention to detail and quality that is the Mathews' hallmark. Additionally feel free to talk with the Senior Planner, Lisa Newman, or others in the building and planning department of Mill Valley regarding our collaborative efforts, as well as feel free to get feedback from the Mill Valley City Council.

Sincerely,

A. Mark Waldman, P.E.
President and Principal Engineer

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Sanitary District No. 5 of Marin County

FY 2021 - 2022 Preliminary Budget

May 20, 2021

Prepared by:

Richard Snyder, President
John Carapiet, Vice President
Omar Arias-Montez, Secretary
Tod Moody, Director
Catharine Benediktsson, Director
Tony Rubio, District Manager
Robin Dohrmann, Office Manager

Sanitary District No. 5 of Marin County

Consolidated Budget FY 2021-2022

	2020-2021 Budget	2020-2021 Actuals *	2021-2022 Budget		% Diff.	Tib Zone	Belv Zone
Income							
Property Taxes	981,933	1,260,325	1,156,133		18%	1,156,133	0
Tib Sewer Service Charge Revenue	2,669,839	2,459,813	2,333,700		-13%	2,333,700	0
Belv Sewer Service Charge Revenue	2,315,443	2,215,554	2,175,144		-6%	0	2,175,144
Interest	156,402	88,929	100,000		-36%	63,090	36,910
Treatment & Collection Fees	200,000	221,603	200,000			128,070	71,930
Paradise Sewer Extension Fees	13,806	13,806	14,040		2%	14,040	0
Other Income	100	-	100			63	37
Connection & Inpsection Permit Fees	22,124	28,446	27,000		22%	17,034	9,966
SASM Expense Reimbursement	101,680	73,375	100,000		-2%	62,951	37,049
Total Budgeted Income	**6,461,327**	**6,361,851**	**6,106,117**		**-5%**	**3,775,081**	**2,331,035**
Expense							
Operating Expenses	3,902,346	4,130,020	4,072,123	***	4%	2,617,540	1,454,240
Capital Expenses	3,660,460	3,650,470	2,588,740		-29%	1,910,270	753,470
Total Budgeted Expenses	**7,562,806**	**7,780,490**	**6,660,863**		-12%	**4,527,810**	**2,207,710**
Net Ordinary Income	**-1,101,479**	**-1,418,639**	**-554,746**		**-50%**	**-752,729**	**123,325**

* Actual numbers are based on estimates, as of 5.18.2021

*** Operating Expenses does not include CalPERS Reserve Funding for FY21-22

Sanitary District No. 5
of Marin County

Operating Budget

FY 2021- 2022

Operating Assumptions

Operating Revenue Assumptions:

- Paradise Cove flow represents 2.92% of total flow for District. This percentage reflects Paradise Cove's share of the District-wide revenues
- Tiburon Sewer Service (including Paradise Cove) Charge is $1,034 per EDU (Equivalent Dwelling Unit)
- Belvedere Sewer Service Charge is $1,985.00 per EDU. 64.0% of this revenue is allocated for operational needs to meet reserve/fund policy requirements
- Interest revenue for LAIF (Local Agency Investment Fund) accounts is estimated at 1.06% for FY 2021-2022
- "Other Income" account reflects Outstanding A/R, Private Lateral SSO Reimbursements, CAL-Card incentive payments, and CSRMA PLP Dividends

Operating Expense Assumptions:

- "County fees" account reflects Property Tax Collection fees imposed by County (per SB2557) and annual LAFCO (Local Agency Formation Commission) fees
- Salary categories include 2.5% COLA increase
- PERS Classic Members' Employer Contribution Retirement rate is 14.02%, and Employer-paid Employee Contribution rate is 7.96% for FY 2021-2022
- SD5 PERS Classic Members/Employees are scheduled for 4.00% reimbursement to the District for Employer-paid Employee Contribution rate; PEPRA members contribute 6.75% via mandatory Employee-Paid Contribution rate
- Workers compensation premium based on 41.363% composite rate, with an 1.32% experience modification factor
- Paradise Cove operating expense is 2.92% of operating expenses in applicable District-wide categories; this is based on Paradise Cove's average annual percentage of influent flow from the 2020 calendar year
- Belvedere operating expense is 37.05% of main plant-related categories, and 35.96% of expenses that pertain to all three zones; this is based on Belvedere's average annual percentage of influent flow from the 2020 calendar year
- CalPERS Reserve is fully funded at 100.00% of CalPERS Market Value Assets, as of 6.30.2021

Formulas for Determining Percentage Breakdowns (Operating & Capital)

Belvedere only = 100%

Tiburon only = 100%

Paradise Cove only = 100%

Shared Belvedere : Tiburon = 37.05% : 62.95%

Shared Tiburon : Paradise Cove = 95.43% : 4.57%

Shared Belvedere : Tiburon : Paradise Cove = 35.96% : 61.11% : 2.92%

	2020-2021 Operations Budget	2020-2021 Estimated to Close	2021-2022 Operations Budget		Breakdown by Zone		
					Tib Ops	P.C. Ops	Belv Ops
Operating Income							
Tiburon Sewer Service Charge - Ops	2,523,700	2,307,208	2,283,000	-9.5%	2,178,667	104,333	
Belvedere Sewer Service Charge - Ops	1,400,843	1,340,410	1,300,000	-7.2%			1,300,000
Other User Fees	24,826	41,712	38,700	55.9%	38,700		
Interest Earnings	156,402	88,929	100,000	-36.1%	61,115	2,920	35,965
Connection & Inspection Permit Fees	22,124	28,446	27,000	22.0%	16,501	788	9,711
SASM Expense Reimbursement	101,680	73,375	100,000	-1.7%	62,951		37,049
Other Income	100	100	100	0.0%	61	3	36
Total Income	**4,229,670**	**3,880,178**	**3,848,800**	**-9.00%**	**2,357,995**	**108,044**	**1,382,761**

	2020-2021 Operations Budget	2020-2021 Estimated to Close	2021-2022 Operations Budget		Breakdown by Zone		
					Tib Ops	P.C. Ops	Belv Ops
Expense							
Administrative Expenses							
Advertising	1,000	500	1,000	0%	611	29	360
Audit & Accounting	35,000	40,000	40,000	12.5%	24,446	1,168	14,386
Consulting Fees	200,000	350,000	150,000	-33.3%	91,673	4,380	53,948
Travel & Meetings	15,000	14,383	15,000	0.0%	9,167	438	5,395
Continuing Education	10,000	7,000	10,000	0.0%	6,112	292	3,597
County Fees	16,500	16,570	16,590	0.5%	15,832	758	0
Directors Fees	9,000	7,000	9,000	0.0%	5,500	263	3,237
Dues & Subscriptions	34,000	30,000	31,000	-9.7%	18,946	905	11,149
Elections	9,000						
Insurance PLP General Liability	43,291	39,235	45,000	3.8%	27,502	1,314	16,184
PLP (GL) Rating Ajustments		8,204					
PLP (GL) Dividends		-10,401					
Insurance APIP (Real) Property	23,301	25,857	25,000	6.8%	15,279	730	8,991
Insurance Damage - Auto	1,435	3,780	4,000	64.1%	2,445	117	1,439
Legal	50,000	40,000	50,000	0.0%	30,558	1,460	17,983
Office Supplies	13,000	10,000	10,000	-30.0%	6,112	292	3,597
Postage	1,000	900	1,000	0.0%	611	29	360
Pollution Prevention	5,000	5,000	5,000	0.0%	3,056	146	1,798
Miscellaneous Expense							
Total Administrative	**466,527**	**588,028**	**412,590**	**-13.1%**	**257,847**	**12,321**	**142,421**
Ops & Maintenance Expenses							
Pumps & Lines Maintenance							
Pumps & Lines Maintenance	50,000	75,000	75,000	33.3%	45,836	2,190	26,974
Emergency Line Repairs	50,000	1,700	50,000	0.0%	25,000		25,000
Total Pumps & Lines Maintenance	**100,000**	**76,700**	**125,000**	**20.0%**	**70,840**	**2,190**	**51,970**

	2020-2021 Operations Budget	2020-2021 Estimated to Close	2021-2022 Operations Budget		Breakdown by Zone		
					Tib Ops	P.C. Ops	Belv Ops
Main Plant Maintenance							
Plant Maintenance Supplies	15,000	21,000	25,000	40.0%	15,738		9,263
Plant Maint. Parts & Service	100,000	106,000	130,000	23.1%	81,835		48,165
Janitorial Supplies & Service	9,000	6,000	9,000	0.0%	5,666		3,335
Main Plant Chemicals	105,000	100,000	111,000	5.4%	69,875		41,126
Lab Supplies & Chemicals	15,000	20,000	20,000	25.0%	12,590		7,410
Electrical & Instrument	5,000	5,000	15,000	66.7%	9,443		5,558
Grounds Maintenance	5,000	5,000	5,000	0.0%	3,148		1,853
Main Plant Sludge Disposal	40,000	39,750	41,000	2.4%	25,810		15,191
Total Main Plant Maintenance	**294,000**	**302,750**	**356,000**	**17.4%**	**224,102**	**0**	**131,898**
Paradise Cove Plant Maintenance							
Paradise Parts & Service	10,000	12,000	10,000	0.0%		10,000	
Paradise Supplies & Chemicals	5,000	7,000	5,000	0.0%		5,000	
Paradise Sludge Disposal		3,000					
Total Paradise Cove Plant Maintenance	**15,000**	**22,000**	**15,000**	**0.0%**	**0**	**15,000**	**0**
Monitoring							
Main Plant Lab Monitoring	50,000	38,329	45,000	-11.1%	28,328		16,673
Paradise Cove Monitoring	15,000	15,000	15,000	0.0%		15,000	
Main Plant Outfall: SASM			6,500		397,248		233,773
Total Monitoring	**65,000**	**53,329**	**60,000**	**-8.3%**	**28,328**	**15,000**	**16,673**
Permits/Fees							
Main Plant NPDES Renewal							
Permits/Fees - General	41,000	60,000	50,000	18.0%	31,475		18,525
Paradise Cove Permits/Fees	8,000	8,000	9,000	11.1%		9,000	
Paradise Cove NPDES Renewal	40,000	20,000					
Total Permits/Fees	**89,000**	**88,000**	**59,000**	**-50.8%**	**31,475**	**9,000**	**18,525**

	2020-2021 Operations Budget	2020-2021 Estimated to Close	2021-2022 Operations Budget		Breakdown by Zone		
					Tib Ops	P.C. Ops	Belv Ops
Truck Maintenance							
Fuel	8,000	15,000	15,000	47%	9,167	438	5,395
Truck Maintenance	8,000	25,000	10,000	20%	6,112	292	3,597
Total Truck Maintenance	16,000	40,000	25,000	36.0%	15,279	730	8,991
Total Ops & Maintenance Expenses	**579,000**	**582,780**	**640,000**	**9.5%**	**370,023**	**41,920**	**228,057**
Salaries & Benefits							
Salaries	1,143,549	1,143,550	1,353,783	16%	827,365	39,530	486,888
Overtime	100,000	100,000	100,000	0%	61,115	2,920	35,965
Standby Pay	72,450	74,188	76,043	5%	46,473	2,220	27,349
Employee Incentives	45,000	20,000	70,000	36%	42,781	2,044	25,176
Vacation Buyout	25,000	27,000	30,000	17%	18,335	876	10,790
Payroll Taxes	98,212	101,535	101,047	3%	61,755	2,951	36,342
Payroll/Bank Fees	5,500	6,250	6,250	12%	3,820	183	2,248
Car Allowance	6,000	6,000	6,000	0%	3,667	175	2,158
PERS Retirement							
PERS Monthly Contributions	253,061	250,000	304,705	17%	186,220	8,897	109,587
PERS Replacement Benefit Fund (RLL)		350	350				
PERS UAL Payment	20,000	96,367	20,000	0%	12,223	584	7,193
SD5 Retirement Trust	313,250	285,295					
Total PERS Retirement	**586,311**	**632,012**	**325,055**	**-80.4%**	**198,443**	**9,481**	**116,780**
Employee Health, Dental, Vision, Life Ins., & LTDI	200,653	183,003	223,418	10%	136,542	6,524	80,352
Retiree Health	80,994	70,000	77,127	-5%	47,136	2,252	27,739
CERBT/OPEB Current Employee Contributions	72,400	118,400	164,400	56%	100,473	4,800	59,126
Workers Comp Insurance	50,250	49,944	55,000	9%	33,613	1,606	19,781
Total Salaries & Benefits	**2,486,319**	**2,531,882**	**2,588,123**	**3.9%**	**1,581,517**	**75,563**	**930,693**

	2020-2021 Operations Budget	2020-2021 Estimated to Close	2021-2022 Operations Budget		Breakdown by Zone		
					Tib Ops	P.C. Ops	Belv Ops
Other Operating Expenses							
Data/Alarms/IT Support & Licensing	80,000	115,000	100,000	20%	61,115	2,920	35,965
Safety	20,000	30,000	40,000	50%	24,446	1,168	14,386
Personal Protection Equipment/Uniforms	15,000	12,000	15,000	0%	9,167	438	5,395
Telephone							
Main Plant Telephones	11,000	9,500	11,000	0%	6,925		4,076
Paradise Cove Telephones	4,000	3,800	4,000	0%		4,000	
Pumps & Lines Telephones	7,000	6,000	7,000	0%	6,680	320	
Total Telephone	**22,000**	**19,300**	**22,000**	0.0%	**13,605**	**4,320**	**4,076**
Utilities							
Water	5,000	8,000	8,000	38%	5,036		2,964
Main Plant Utilities	180,000	200,000	200,000	10%	125,900		74,100
Paradise Cove Utilities	13,500	16,800	18,000	25%		18,000	
Pump Station Utilities	35,000	42,800	45,000	22%	27,502	1,314	16,184
Total Utilities	**233,500**	**267,600**	**271,000**	13.8%	**158,438**	**19,314**	**93,248**
Total Other Operating Expenses	**370,500**	**443,900**	**448,000**	17.3%	**266,771**	**28,160**	**153,070**
Total Operating Expense	**3,902,346**	**4,146,590**	**4,088,713**	4.6%	**2,476,160**	**157,960**	**1,454,240**

Sanitary District No. 5 of Marin County

Capital Budget

FY 2021- 2022

Capital Assumptions

Capital Revenue Assumptions:

- Secured Property Tax (TEETER) is a general revenue of the District (Tiburon zone only) and is subject to CA State tax shifts
- Supplemental property tax applies (Tiburon zone only) as homes are re-valued and sold
- Excess ERAF (Educational Revenue Augmentation Fund) reimbursement is announced mid-year
- HOPTR = Home Owner Property Tax Relief
- Belvedere capital income is set at 36.0% of its sewer service charge revenue to meet reserve/fund policy requirements
- Paradise Drive Sewer Line Extension Fee income estimated: 1 homes @ $12,838.01 (3.0% CPI Increase) each

Capital Expense Assumptions:

- New capital projects are indicated in notes
- Supplemental property tax applies (Tiburon zone only) as homes are re-valued and sold
- Excess ERAF (Educational Revenue Augmentation Fund) reimbursement is announced mid-year
- HOPTR = Home Owner Property Tax Relief
- Paradise Drive Sewer (Jancheski) Line Extension Fee income estimated: 1 home @ $14,040.32 (1.70% CPI Increase) each; Vogt Extended Sewer Line Fee estimate is $3,2060.25 (5.0% negotiated annual increase) each
- Belvedere capital expense is 37.05% of total main plant-related expenditures, based on Belvedere's average annual percentage of influent flow from the 2020 calendar year
- Tiburon capital expense is 62.95% of total main plant-related expenditures, based on Tiburon's average annual percentage of influent flow from the 2020 calendar year
- The remaining (bond payments only) Tiburon Main Plant Rehabilitation (MPR) was refinanced in FY19-20. The new “MPR Refi Loan” amount for Tiburon remains at the same expense ratio (64.78%) of the total project-related expenditures, based on the MPR Bond split
- The remaining (bond payments only) Belvedere Main Plant Rehabilitation (MPR) was refinanced in FY19-20. The new “MPR Refi Loan” amount for Belvedere remains at the same expense ratio (35.22%) of the total project-related expenditures, based on the MPR Bond split

	2020-2021 Capital Budget	2020-2021 Estimated to Close	2021-2022 Capital Budget		Breakdown by Zone		
					Tib Cap	P.C. Cap	Belv. Cap
Capital Income							
Property Taxes							
Property Tax Current Secured - Capital	700,000	828,278	825,000	15%	787,298	37,703	0
Prop Tax Current Unsecured	13,000	16,276	15,000	13%	14,315	686	0
Supplemental Assessment Current	15,000	15,512	12,000	-25%	11,452	548	0
Supplemental Assessment Redm	500				0	0	0
Supplemental Unsecured	100	878	300	67%	286	14	0
Prop Tax Prior Unsecured	0	494	500	100%	471	23	0
Excess ERAF (Educational Revenue Augmentation Fund)	250,000	388,631	300,000	17%	286,290	13,710	0
HOPTR	3,333	3,136	3,333	0%	3,181	152	0
Other Tax (Unitary, RR, Misc.)		7,120			0	0	0
Total Property Taxes	**981,933**	**1,260,325**	**1,156,133**	**15%**	1,103,298	52,835	0
Tiburon Sewer Service Charge - Capital	121,313	110,894	12,000	-911%	11,452	548	0
Belvedere Sewer Service Charge - Capital	914,600	875,144	866,300	-6%	0	0	866,300
Connection Fees							
Collection	100,000	103,933	100,000	0%	61,115	2,920	35,965
Treatment	100,000	117,670	100,000	0%	61,115	2,920	35,965
Total Connection Fees	**200,000**	**221,603**	**200,000**	**0.0%**	**122,230**	**5,840**	**71,930**
Paradise Drive Sewer Line Extension Fees	13,806	13,806	14,040	1.70%	0	14,040	0
Total Capital Income	**1,249,719**	**1,221,447**	**1,092,340**	**-14.4%**	**1,236,979**	**73,264**	**938,230**

	2020-2021 Capital Budget	2020-2021 Estimated to Close	2021-2022 Capital Budget		Breakdown by Zone		
					Tib Cap	P.C. Cap	Belv. Cap
Capital Expenditures				Relevant Splits			
Main Plant Equip Capital Expense							
9202.1 - M.P. Drainage - Infl. Sample Rm Drain+Secondary Drain			75,000		47,213		27,788
9202.2 - M.P. Drainage - Load-out & Filtering			30,000		18,885		11,115
9204.1 - M.P. Boiler - Exhaust Stainless Pipling Replacement			30,000		18,885		11,115
9205.0 - M.P. Influent Pump Replacement			40,000		25,180		14,820
9208.0 - M.P. Chemical Feed Tansfer Pump Replacement			20,000		12,590		7,410
9209.0 - M.P. Screw Press Poly Blend Redundancy	15,000		35,000	-11%	22,033		12,968
9212.0 - M.P. Headworks Grinder Replacement	15,000	23,487	25,000	40%	15,738		9,263
9212.1 - M.P. Headworks Explosion Proof Electric Hoist			10,000		6,295		3,705
9218.0 - M.P. Generator Control Panel	35,000						
9219.0 - Cl2 Flash Mixer	15,000	12,161	15,000	0%	9,443		5,558
9220.0 - Office, Bath & Breakroom Floor Replacement	15,000						
9221.0 - Portable Fuel Storage Tank	15,000						
9225.94 - Bis. Server Replacement + Upgrade		5,324					
9225.95 - SCADA Upgrade & Replacement		18,850					
9229.8 - Vehicle Replacement		3,000					
Total Main Plant Equip Capital Expense	**110,000**	**62,821**	**280,000**	**61%**	**176,260**	**0**	**103,740**
Pumps & Lines Capital				Relevant Splits			
9227.8 - Rodder / Vactor Truck		7,891					
9301.0 - Tiburon Sewer Line Rehab			1,000,000		1,000,000		
9304.0 - Belvedere Sewer Line Rehab			100,000				100,000
9305.1 - Belvedere Wet Well Rahabilitation (BPS#7)			75,000				75,000
9305.2 - Tiburon Wet Wells Rehabilitation (TPS#4)		363	50,000		50,000		
9306.0 - PS Pump & Valve Replacement Program	50,000	3,286	50,000	0%	25,000		25,000
9307.0 - PS Generator Replacement (BPS #1 + roof)			100,000				100,000
9311.1 - Cove Rd. Force Main - Engineering		5,657					
9311.2 - Cove Rd. Force Main - Construction	1,200,000	2,341,117					
9312.0 - Force Main Rehab - Multiple Sites	700,000				50,000		25,000
9313.0 - Man Hole Rehabilitation	70,000	15,098	75,000	7%	50,000		25,000
9314.0 - 100kw Portable Emergency Generator	75,000	95,588					
Total Pumps & Lines Capital	**2,095,000**	**2,469,000**	**1,450,000**	**-44.5%**	**1,175,000**	**0**	**350,000**

	2020-2021 Capital Budget	2020-2021 Estimated to Close	2021-2022 Capital Budget		Breakdown by Zone		
					Tib Cap	P.C. Cap	Belv. Cap
Paradise Cove Capital				Relevant Splits			
9401.0 - P.C. Sewer Line Rehab	500,000						
9402.0 - P.C. Flow Meter Replacement		19,502					
9403.1 - P.C. Communications Upgrade - Cellular			20,000			20,000	
9406.0 - P.C. Plant Grating Replacement	20,000	1,731					
9415.0 - P.C. Paint at Treatment Plant		52,759					
Total Paradise Cove Capital	**520,000**	**73,991**	**20,000**		**0**	**20,000**	**0**
Undesignated Capital							
Undesignated Cap - Main Plant	25,000		25,000	0%	15,738		9,263
Undesignated Cap - Paradise Cove Plant	10,000	26,547	10,000	0%		10,000	
Undesignated Cap - P&L	50,000		50,000	0%	25,000		25,000
Total Undesignated Capital	**85,000**	**26,547**	**85,000**	**0%**	**40,738**	**10,000**	**34,263**
Debt Service							
Debt Service - MPR Bond Principal							
Debt Service - MPR Bond Interest		167,675	950	100%	615		335
Debt Service - MPR Bond REFI Principal	660,000	660,000	595,000	-11%	385,441		209,559
Debt Service - MPR Bond REFI Interest	190,457	190,432	157,790	-21%	102,216		55,574
Total Debt Service	**850,457**	**1,018,107**	**753,740**	**-12.8%**	**488,273**	**0**	**265,467**
Total Capital Expenditures	**3,660,460**	**3,650,470**	**2,588,740**	**-41.4%**	**1,880,270**	**30,000**	**753,470**

Sanitary District No. 5 of Marin County

Capital Improvement Program

FY 2021/2022 – FY2030/2031

IMPROVEMENT PROGRAM

Project Descriptions	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	TOTAL
Main Plant	245,000	240,000	350,000	290,000	565,000	585,000	290,000	430,000	695,000	40,000	3,730,000
Tiburon Pumps & Lines	1,150,000	550,000	850,000	175,000	1,350,000	175,000	675,000	400,000	650,000	75,000	6,050,000
Belvedere Pumps & Lines	350,000	825,000	825,000	775,000	275,000	775,000	175,000	775,000	375,000	775,000	5,925,000
Paradise Cove	30,000	85,000	30,000	570,000	10,000	35,000	35,000	30,000	160,000	35,000	1,020,000
MPR Debt Service + 2020 Refi	752,360	752,790	752,848	752,534	751,848	750,793	749,360	752,496	750,198	752,466	7,517,693
TOTAL	2,527,360	2,452,790	2,807,848	2,562,534	2,951,848	2,320,793	1,924,360	2,387,496	2,630,198	1,677,466	24,242,693

MAIN PLANT CAPITAL IMPROVEMENT PROGRAM

M.P. Project Description	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	TOTAL
Screw Press 3W Filtering Unit	30,000										30,000
Dry Weather Influent Pump	40,000							40,000			80,000
Wet Weather Influent Pump						60,000					60,000
M.P. Boiler Exhaust Piping	30,000										30,000
Headworks Grinder Replacement		15,000			15,000			15,000			45,000
Headworks Explosion-proof Electric Hoist	10,000										10,000
Chemical Feed Transfer Pump	20,000								20,000		40,000
(Utility) Truck Purchase		75,000						75,000			150,000
MP & Secondary Drain Replacements	75,000										75,000
Aeration Basin Diffuser Upgrade			200,000								200,000
Emergency Generator Replacement							250,000				250,000
Maintenance Shop-Rehabilitation					500,000	500,000					1,000,000
Headworks Grinder Retrofit-Channel Monster			50,000								50,000
Digester Roof Recoating and Cleaning				250,000				250,000			500,000
Dry Weather Primary Tank Cover Replacement		100,000									100,000
Odor Control System Rehabilitation									650,000		650,000
Headworks Valve and Check Valve Replacement			75,000								75,000
MP Valve and Piping Replacement Program		25,000			25,000			25,000			75,000
Cl2 Flash Mixer	15,000			15,000			15,000			15,000	60,000
MPR Bond Refi	752,360	752,790	752,848	752,534	751,848	750,793	749,360	752,496	750,198	752,466	7,517,693
Undesignated Capital Projects	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	250,000
Treatment Plant Total	**245,000**	**240,000**	**350,000**	**290,000**	**565,000**	**585,000**	**290,000**	**430,000**	**695,000**	**40,000**	**3,730,000**

MAIN PLANT CAPITAL IMPROVEMENT PROJECTS

Main Plant Project Name	*DESCRIPTION*
Odor Control Upgrade	This Project will evaluate current odor control system and vulnerabilities and also provide for options to replace, add to or enhance the current system.
Dry Weather Influent Pump	These funds will be used to purchase one new dry weather influent pump. These were not part of the MPR project.
Wet Weather Influent Pump	These funds will be used to purchase one new Wet Weather Influent Pump. These were not part of the MPR project.
Headworks Grinder Replacement	These funds will be used to replace grinders that have a usefule life of 5-10 years. Grinders were not replaced during MPR Project only the cutting cartridges were replaced.
Truck Purchase	These funds will be used to replace the Utility truck from the current fleet of vehicles.
Emergency Outfall Rehabilitation	This project will consist of rehabilitating the abandoned effluent outfall pipe in order to have it available for use during emergency situations. Emergency Preparedeness
Waste Gas Burner Rehabilation	Tiger mag flow meters with Krohne flow meters. These were not part of the MPR project. This project will evaluate current waste gas burner system and will be enhanced or replaced, dependent on evaluation report.
Aeration Basin Diffuser Upgrade	This project consists of replacing the current diffusers in the off line aeration basin with new style diaphram type diffusers like the online aeration basin this did not get upgraded during the MPR project
Underground Pipe & Valve Rehabilitation	These funds will be used for the replacement of non-working valves and rusted-out pipes in the shipping/receiving area, as well as next to the secondary clarifiers, as identified during the MPR Project.
Maint Shop/Replacement/Ops Control Room	This project will consist of replacing a 35+ y.o. corregated metal maintenance shop, not rehabbed during the MPR Project. Consideration will be given to making the building 2 stories for a a new operator/maintenance control room.
Sludge Box Replacement	Replacement of Biosolids container, used for hauling bio-solids to Redwood landfill.
Emergency Generator Replacement	This project will consist of replacing the Main Plant Emergency Generator. These were not part of the MPR project. Generator is currently serviceable but planning and budgeting needs to be in line for 2024/25.
Outfall Difuser Upgrades	Current condition of outfall is serviceable. Outfall is inspected every 5 years and must budget a reasonable amount for repairs or upgrades, as determined by future reports.
Undesignated Capital Projects	These funds will be used for unforseen projects, which may come up after the MPR project is complete.
MPR Bond	Main Plant Rehabilitation Completed in 2014 - Bond Payments to show true annual CIP projections.

TIBURON CAPITAL IMPROVEMENT PROGRAM

Tiburon Project Description	**2021/2022**	**2022/2023**	**2023/2024**	**2024/2025**	**2025/2026**	**2026/2027**	**2027/2028**	**2028/2029**	**2029/2030**	**2030/2031**	TOTAL
Sewer Line Rehabilitation Program	1,000,000		500,000		500,000		500,000		500,000		3,000,000
Pump and Valve Replacement Program	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	250,000
Force Main Rehabilation TPS #2- 357lf-6"		200,000									200,000
Force Main Rehabilation TPS #3- 379lf-6"			200,000								200,000
Force Main Rehabilation TPS #5-1303lf 8"					750,000						750,000
Force Main Rehabilation TPS #7-903lf-6"								300,000			300,000
Man Hole Rehabilation	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	500,000
TPS #2 Wet Well Rehabilitation									75,000		75,000
TPS #3 Wet Well Rehabilitation							75,000				75,000
TPS #4: Wet Well Rehabilitation	50,000										50,000
TPS #6 Wet Well Rehabilitation				75,000							75,000
TPS #7 Wet Well rehabilitation						75,000					75,000
TPS #9 Wet Well Rehabilitation		250,000									250,000
Portable Pump Replacement			50,000								50,000
Undesignated Capital Projects	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000			200,000
Tiburon Total	**1,150,000**	**550,000**	**850,000**	**175,000**	**1,350,000**	**175,000**	**675,000**	**400,000**	**650,000**	**75,000**	**6,050,000**

TIBURON ZONE PUMPS & LINES CAPITAL IMPROVEMENT PROJECTS

Tiburon Zone Pumps & Line Project Name	*DESCRIPTION*
Sewer Line Rehabilitation Program	These fund will be used for the ongoing Board approved 10 year sewer rehabilitation program. 10,137 lf of pipe remain to be rehabbed/replaced from the Harris Report.
Pump Station Pump and Valve Replacement Program	The District has 24 pump stations with 2-3 pumps in each station. The life expectancy for these pumps are 7-10 years. Therefore the District has a program to replace pumps over a period of time instead of replacing them all at once.
Pump Station Generator Replacement	The District has standby generators located at many of the Pump Stations. Some generators were installed between 1980 - 1983. These generators (in most cases) are located along the waterfront. The salt air has wreaked havoc on some of these generators; All have been replaced as of 7/1/2018
Pump Station Control Panel - Upgrade	These funds will be used for replacement of control panels at the District Pump Stations. The control panels are of various ages, of which most are extremely old/obsolete. / With the exception of stations #6 & #7, which are furthest away from marine conditions, all SD5 tiburon control panels have been replaced as of 7/1/2018
Man Hole Rehabilitation	This project will consist of rehabilitating or replacing man holes in the Tiburon area that have have defeciencies due to hydrogen sulfide detoriation.
CCTV Sewer System New PACP Data	This project will consist of retelevising the entire collection system in order to provide updated information regarding the condition of the system and to assist in establishing a new CIP project regarding sewer line rehabilitation
Station No.5 Replacement	This is a phased project of upgrading the main pump station in the Tiburon Zone: *Phase I* has been completed, which replaced the motor control center/electrical controls and the installation of a diesel powered standby emergency generator *Phase II* has also been completed, which converted the dry-pit configuration into a wet-pit configuration, thus eliminating the need for dry-pit centrifugal pumps (whic are now obsololete). The old pumps were replaced with 2 new submersible flygt pumps for standarization with District requirements. This also eliminated a confined-space entry situation. Phase III consists of rehabilitating the force main servicing this site. It is the last phase of this project anticipated around 2024
Flow Meter Installation Project	This project will consist of installing flow meters at certain corresponding pump stations to record flows from each site. This will assist with flow monitoring and assist in the District's continued effort to reduce I&I.
Vactor Truck Purchase	This purchase will allow the District to clean sewer lines more frequently at typical "hot spot" areas (e.g., downtown area, Pt. Tiburon,Tiburon Blvd., Penninsula, San Rafael Ave., etc.). SD5 will also to perform more frequent cleaning at the Main Plant grit chamber, headworks and split box, as well as pump and transport solids from Paradise Cove back to the Main Plant. Recyle Water will be used for sewer cleaning activities
Force Main Rehabilation Project	This project will consist of rehabilitating several force mains in the Tiburon Zone. Station #2, #3, #6 & #7
Pump Station Communications Project	Phase I completed. Master radio at the Main Plant has been upgraded, as well as the radio at Station #5. As new control panels come on-line in the Tiburon Zone, funds will be needed to bring the remaining 8 sites into the Main Plant communication network.
Undesignated Capital Projects	These funds are for unforeseen problems within the collection system.

BELVEDERE CAPITAL IMPROVEMENT PROGRAM

Belvedere Project Description	**2021/2022**	**2022/2023**	**2023/2024**	**2024/2025**	**2025/2026**	**2026/2027**	**2027/2028**	**2028/2029**	**2029/2030**	**2030/2031**	**TOTAL**
Sewer Line Rehabilitation Program	100,000	500,000		500,000		500,000		500,000		500,000	2,600,000
Pump and Valve Replacement Program	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	250,000
BPS #1 Control Panel Replacement		250,000									250,000
BPS #1 Emergency Generator& Roof Replacmnt	100,000										100,000
BPS #2 Force Main&Wet Well Rehabilitation				200,000							200,000
BPS #3 Force Main& Wet Well Rehabilitation Proj			750,000								750,000
BPS #7: Wet Well Rehabilitation	75,000										75,000
BPS#5,#8,#12 Wet Well Rehabilitation Project						200,000					200,000
BPS #9,#10,#11 Wet Well Rehabilitation					200,000						200,000
BPS #13 Force Main Rehabiltation Project										200,000	200,000
BPS #14 Force Main Rehabiltation Project								200,000			200,000
Power Feed Improvement Project (BPS#9,#10,#11)									300,000		300,000
San Rafael Ave Diverter Line Install							100,000				100,000
Man Hole Rehabilitation	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	250,000
Undesignated Capital Projects	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	250,000
Belvedere Total	**350,000**	**825,000**	**825,000**	**775,000**	**275,000**	**775,000**	**175,000**	**775,000**	**375,000**	**775,000**	**5,925,000**

BELVEDERE ZONE PUMPS & LINES CAPITAL IMPROVEMENT PROJECTS

Belvedere Zone Pumps & Line Project Name	*DESCRIPTION*
Sewer Line Rehabilitation Program	These funds will be used for the ongoing Board approved 10-year sewer rehabilitation program. 7,644 lf of pipe remain to be rehabbed/replaced from the Harris Reports.
Pump Station Rehabilitation Program	The District has 24 pump stations with 2-3 pumps in each station. The life expectancy for these pumps are 7-10 years. Therefore, the District has a program to replace pumps over a period of time instead of replacing them all at once.
Pump Station Control Panel Replacement	Within the Belvedere Zone, there are many pump stations with single-phase power with capacitors installed in the panel to generate three-phase power. The District is replacing the generators to new standardized control panels. To date - station #15, 14,13,12,5 & 3 control panels have been replaced. Need to purchase panels for #2 &#7
Pump Station Generator Replacement	Standby generators at the Belvedere pump stations were installed in the early 1980. Station #3 Generator recently replaced need to replace station #1 & #2 Generators
Pump Station Comm. Upgrade Project	These funds will be used to provide alarming and communication back to the Main Plant SCADA system, The new communication equipment will be standardized
Cove Rd. Force Main Replacement	These fund will be used to replace 2107 lf of 10' force main. The force main has blown out on two occasions prior to 2005. According to previous Staff, it was difficult to find good pipe material to connect to, when making the repair. Recently the forcemain was compromised as a result of a 3rd party. Same issue was encountered when repairing. The current pipe size also lacks capacity during major wet weather events.
Lagoon Rd. Power Feed Improvement Project	Lagoon Rd. has 3 pump stations which pump sewage to one another. These station have no back-up power. These funds would be available to purchase a generator and install power conduits to connect all three stations in order to provide immediate back up power to these sites and it also reduce staff overtime. Emergency prepardeness
Flow Meter Installation Project	This project will consist of installing flow meters at certain corresponding pump stations to record flows from each site. This will assist with flow monitoring and assist District's continued effort to reduce I&I.
San Rafael Ave. Diverter Project	This project will consist of evaluating current flows and collection system capacity at the intersection of Westshore and San Rafael Ave., feeding into TPS #3.
Manhole Rehabiliation Project	This Project will consist of rehabilitating or replacing man holes in the Tiburon area that have have defeciencies due to hydrogen sulfide detoriation.
CCTV Sewer System	This project will consist of retelivziing the belvedere collection system in order to get an updated condition of the sewer system and to assist in establishing an updated CIP program for sewer rehabilitation projects.
Undesignated Capital Projects	These monies are for unforeseen problems within the collection system.

PARADISE COVE PLANT CAPITAL IMPROVEMENT PROGRAM

Paradise Cove Project Description	**2021/2022**	**2022/2023**	**2023/2024**	**2024/2025**	**2025/2026**	**2026/2027**	**2027/2028**	**2028/2029**	**2029/2030**	**2030/2031**	**TOTAL**
Paradise Sewer Line Rehab Project				500,000							500,000
Grit Removal Project		50,000									50,000
Plant Grating Replacement- Fiberglass							25,000				25,000
Communications Upgrade - Cellular	20,000										20,000
Blower Replacement			20,000					20,000			40,000
UV Disenfection				60,000							60,000
Pump Replacement Program		25,000				25,000				25,000	75,000
Paint Treatment Plant									150,000		150,000
Undesignated Capital Projects	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000
Paradise Cove Total	**30,000**	**85,000**	**30,000**	**570,000**	**10,000**	**35,000**	**35,000**	**30,000**	**160,000**	**35,000**	**1,020,000**

PARADISE COVE ZONE PUMPS & LINES CAPITAL IMPROVEMENT PROJECTS

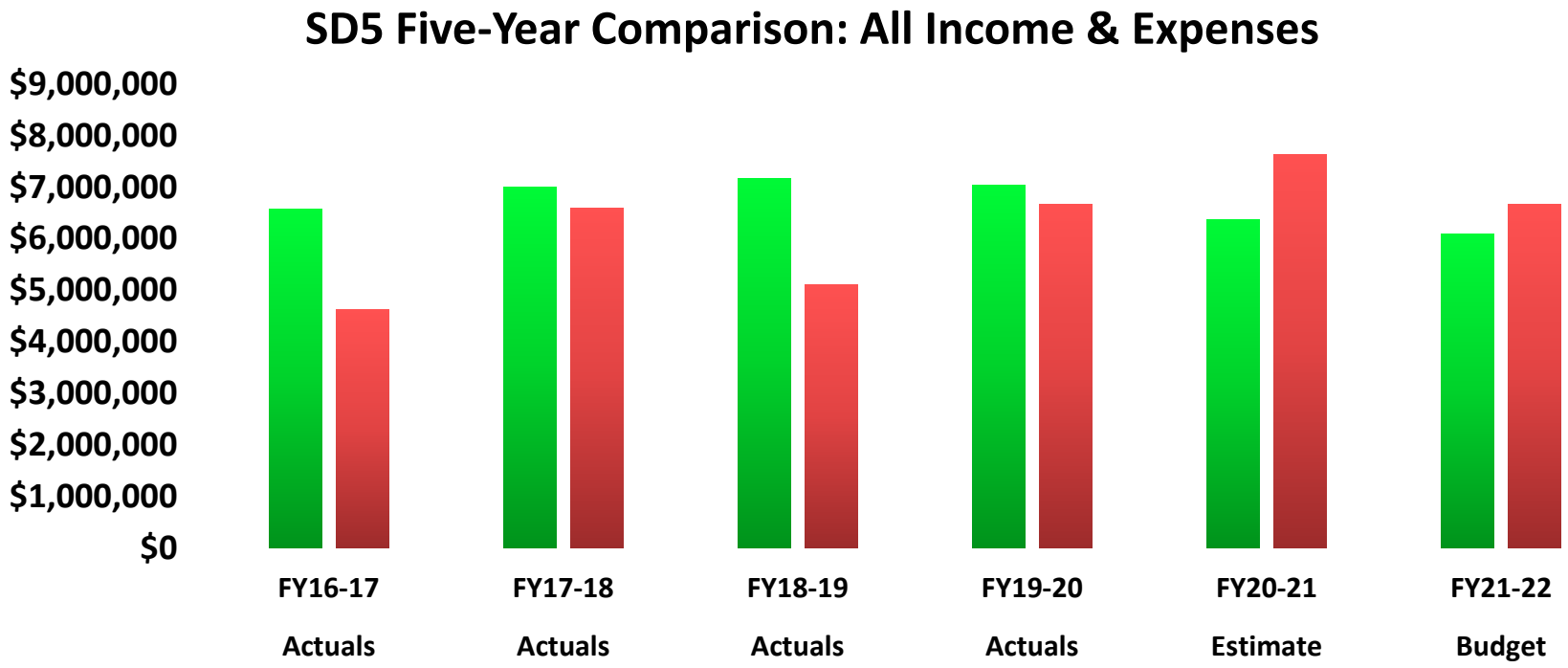
Paradise Cove Project Name	*DESCRIPTION*
Influent Pump Replacement Program	Currently there are 6 grinder-style pumps in service at ParadiseCove. Each has a usefule life of 7-10 years. This program is established to replace pumps as needed; not all at once.
Package Plant Coating	Due to its close proximty to the bay, the metal package-plants require marine coatings every 7-10 years.
Influent Well Access Cover Replacement	This project consists of replacing the current access covers with fixed, mounted, flush-to-the-ground, traffic-rated, as there is limited space at the Paradise Cove Plant.
Blower Replacement	The current blowers were installed as part of the 2009 start-up of the upgraded plant. They have a useful life of 7-15 years. SD5 must begin to replace them soon.
Plant Grating Replacement	This project will consist of replacing the current grating with non-rusting fiberglass grating.
Grit Removal Project	This project will consist of evaluating the Paradise Cove Plant for possible grit removal systems in order to prolong the life of the pumps.
UV Disinfection	Possible installation of UV disinfection, which would eliminate the transportation of chemicals to the Paradise Cove plant. Will need a feasbility study. Language included in current permit for future installation date, if feasible.
Undesignated Capital Projects	These funds will be used for unforseen projects.

Sanitary District No. 5
of Marin County

Five-Year History: Detailed Comparison

FY 2016/2017 – FY2020/2021

	Actuals FY16-17	Actuals FY17-18	Actuals FY18-19	Actuals FY19-20	Estimate FY20-21	Budget FY21-22
Total Income	$6,574,936	$6,999,136	$7,175,659	$7,041,786	$6,361,937	$6,100,973
Total Expenses	$4,626,159	$6,594,620	$5,118,771	$6,662,256	$7,632,266	$6,663,259



	Actuals FY16-17		Actuals FY17-18		Actuals FY18-19		Actuals FY19-20		Estimate FY20-21 (as of 5.17.2021)		BUDGET FY21-22
Ordinary Income/Expense											
Income											
5000 · Property Taxes											
5001.2 · Prop Tax Current Secured - Cap	692,382.26		747,671.64		802,789.43		825,273.51		828,278.45		825,000.00
5002 · Prop Tax Current Unsecured	13,791.23		13,400.78		14,602.17		15,490.09		16,276.23		15,000.00
5003 · Prop Tax Prior Unsecured	557.01		790.81		577.23		623.98		493.50		500.00
5006 · Suppl Unsecured	226.61		914.69		153.53		1,329.82		878.47		300.00
5041 · Suppl Assessment - Current	15,480.13		18,450.91		17,833.96		17,938.81		15,511.66		12,000.00
5043 · Suppl Assessment - Redemption	3,757.96		0.00		576.94		351.60		86.54		0.00
5046 · Excess ERAF	317,953.45		322,493.70		368,831.93		347,087.15		388,631.21		300,000.00
5280 · HOPTR	3,802.18		3,773.58		3,748.37		3,727.82		3,136.04		3,333.00
5483 · Other Tax (Unitary, RR, Misc.)			5,970.54		6,809.63		8,369.56		7,119.91		3,700.00
Total 5000 · Property Taxes	**1,047,950.83**	**3.00%**	**1,113,114.03**	**6.22%**	**1,215,923.19**	**9.24%**	**1,220,192.34**	**0.35%**	**1,260,412.01**	**3.30%**	**1,159,833.00**
5007 · Sewer Service Charge											
5007.1 · Sewer Service - Tiburon Ops	2,130,009.00		1,782,023.48		2,013,740.22		2,457,932.86		2,307,207.76		2,283,000.00
5007.5 · Sewer Service - Tiburon Cap	674,081.48		945,393.11		461,737.65		223,392.96		110,894.15		12,000.00
5007.2 · Sewer Service-Belv Ops	997,893.32		1,102,361.07		1,359,848.48		1,392,534.36		1,340,409.96		1,300,000.00
5007.3 · Sewer Service-Belv Cap	1,344,579.28		1,258,777.49		960,118.22		920,645.65		875,143.69		866,300.00
5007.4 · Other User Fees	26,067.14		24,826.00		228,464.88		42,021.76		41,711.56		38,700.00
Total 5007 · Sewer Service Charge	**5,172,630.22**		**5,113,381.15**		**5,023,909.45**		**5,036,527.59**		**4,675,367.12**		**4,500,000.00**
5201 · Interest											
5201.1 · Interest County of Marin	65.95		323.86		1,778.65		0.00		136.53		0.00
5201.2 · Interest LAIF	74,341.81		156,338.13		303,511.86		280,649.26		88,792.09		100,000.00
Total 5201 · Interest	**74,407.76**		**156,661.99**		**305,290.51**		**280,649.26**		**88,928.62**		**100,000.00**
5900.3 · Connection Fees											
5900.30· Connection Permit Fees	4,400.00		9,500.00		5,250.00		16,752.00		7,775.00		7,000.00
5900.31 · Collection	68,448.00		248,652.00		196,705.00		179,736.81		103,933.07		100,000.00
5900.34 · Treatment	86,682.00		257,826.00		320,389.00		212,785.19		117,669.93		100,000.00
Total 5900.3 · Connection Fees	**159,530.00**		**515,978.00**		**522,344.00**		**409,274.00**		**229,378.00**		**207,000.00**
5900.4 · Inspection Permit Fees	17,150.00		16,700.00		22,990.00		16,174.00		20,670.50		20,000.00
5900.5 · SASM Expense Reimb.	102,988.24		83,300.61		85,202.00		65,504.74		73,375.00		100,000.00
5900.9 · Other Income	279.17		0.00		0.00		100.00		0.00		100.00
5900.10 · Paradise Sewer Line Ext. Fees	0.00		0.00		0.00		13,364.00		13,806.00		14,040.00
Total Ops & Capital Income	**6,574,936.00**	**4.00%**	**6,999,136.00**	**6.45%**	**7,175,659.00**	**2.52%**	**7,041,786.00**	**-1.87%**	**6,361,937.00**	**-9.65%**	**6,100,973.00**

	Actuals FY16-17	Actuals FY17-18	Actuals FY18-19	Actuals FY19-20	Estimate FY20-21	Budget FY21-22
Expense						
6000 · Administrative Expenses						
6001 · Advertising	65.00	171.24	1,428.77	422.85	500.00	1,000.00
6008 · Audit & Accounting	30,548.58	25,666.11	25,052.03	27,848.17	40,000.00	40,000.00
6017 · Consulting Fees	94,145.84	130,145.58	101,260.61	138,030.88	350,000.00	150,000.00
6018 · Travel & Meetings						
6018 ·1 Travel & Meetings - Other	5,113.36	6,905.03	6,133.68	5,988.32	6,816.46	7,000.00
6018.2 · Standby Mileage Expense Reimb	6,786.64	6,377.62	7,765.05	7,785.45	7,519.88	8,000.00
Total 6018 · Travel & Meetings	**11,900.00**	**13,282.65**	**13,898.73**	**13,805.99**	**14,383.03**	**15,000.00**
6020 · Continuing Education	3,744.23	5,282.98	4,772.91	6,417.44	7,000.00	10,000.00
6021 · County Fees	15,690.49	16,702.69	17,230.26	15,950.36	16,570.52	16,590.00
6024 · Director Fees	6,700.00	6,500.00	5,700.00	7,300.00	7,000.00	9,000.00
6025 · Dues & Subscriptions	10,993.46	10,521.21	10,611.10	20,333.64	30,000.00	31,000.00
6026 · Elections	230.24	0.00	2,199.28	0.00	0.00	0.00
6033 ·2 PLP General Liability	23,352.91	11,453.45	29,353.50	37,774.84	39,235.00	45,000.00
PLP (GL) Rating Ajustments	-4,233.00	-4,240.00	-4,235.00	-771.00	8,204.00	0.00
PLP (GL) Dividends	-7,977.00	-8,962.00	-8,567.00	-9,818.00	-10,401.00	0.00
6033 ·1 Alliant Public Entity Phys Damage (Realty)	12,406.00	10,745.00	12,984.00	16,214.00	25,857.00	25,000.00
6033 ·3 (APD) Physical Property - Auto	1,248.00	1,231.00	1,342.00	1,227.00	3,780.00	4,000.00
6039 · Legal	75,666.07	54,668.73	40,527.88	33,527.90	40,000.00	50,000.00
6047 · Office Supplies	6,015.77	10,667.61	3,596.03	4,043.84	10,000.00	10,000.00
6056 · Postage	863.93	386.56	646.67	1,589.01	900.00	1,000.00
6059 · Pollution Prevention/Public Edu	2,863.31	2,346.80	4,141.94	2,429.92	5,000.00	5,000.00
6065 · Miscellaneous Expense	1,554.05	0.00	151.00		0.00	0.00
Total 6000 · Administrative Expenses	**285,778.00**	**286,570.00**	**262,095.00**	**316,327.00**	**588,029.00**	**412,590.43**
7000 · Ops & Maintenance Expenses						
7010 · Pumps & Lines Maintenance						
7011 · Pumps & Lines Maintenance	248,143.93	184,139.63	167,193.31	206,314.25	75,000.00	75,000.00
7013 · Emergency Line Cleaning/Repair	50,644.22	84,393.61	46,160.51	33,294.64	1,700.00	50,000.00
7015 · Inflow & Infiltration Study	0.00	0.00	0.00	0.00	0.00	0.00
Total 7010 · Pumps & Lines Maintenance	**298,788.00**	**268,533.00**	**213,354.00**	**239,609.00**	**76,700.00**	**125,000.00**
7020 · Main Plant Maintenance						
7021 · Plant Maintenance Supplies	5,718.58	9,408.58	7,971.94	19,431.85	21,000.00	25,000.00
7022 · Plant Maint. Parts & Service	40,448.84	58,224.01	47,313.85	129,771.23	106,000.00	130,000.00
7023 · Janitorial Supplies & Service	5,430.65	4,218.03	7,440.41	5,882.20	6,000.00	9,000.00
7024 · Main Plant Chemicals	75,920.48	102,771.14	97,497.63	94,229.90	100,000.00	111,000.00
7025 · Lab Supplies & Chemicals	65,830.16	56,438.21	18,902.70	62,744.99	20,000.00	20,000.00
7027 · Electrical & Instrument	88.24	1,373.17	4,620.27	5,876.28	5,000.00	15,000.00
7028 · Grounds Maintenance	2,919.87	2,162.32	3,037.58	7,890.20	5,000.00	5,000.00
7029 · Main Plant Sludge Disposal	24,122.52	26,949.06	22,334.68	33,493.32	39,750.00	41,000.00
7030 · Main Plant Outfall	0.00	0.00	0.00	0.00	0.00	6,500.00
Total 7020 · Main Plant Maintenance	**220,479.00**	**261,545.00**	**209,119.00**	**359,320.00**	**302,750.00**	**362,500.00**

	Actuals FY16-17	Actuals FY17-18	Actuals FY18-19	Actuals FY19-20	Estimate FY20-21	Budget FY21-22
7040 · Paradise Cove Plant Maint						
7041 · Paradise Parts & Service	11,209.84	6,468.21	3,072.15	8,994.83	12,000.00	10,000.00
7042 · Paradise Supplies & Chemicals	10,982.53	3,464.33	2,837.11	4,385.28	7,000.00	5,000.00
7043 · Paradise Sludge Disposal	8,104.67	5,520.35	8,320.56	9,845.00	3,000.00	0.00
Total 7040 · Paradise Cove Plant Maint	**30,297.00**	**15,453.00**	**14,230.00**	**23,225.00**	**22,000.00**	**15,000.00**
7050 · Monitoring						
7051 · Main Plant Lab Monitoring	43,484.06	39,245.25	49,644.92	45,510.27	38,328.50	45,000.00
7052 · Paradise Cove Monitoring	12,783.00	9,755.86	17,617.00	14,983.40	15,000.00	15,000.00
7053 · Chronic Toxicity Program Eval	0.00	1,845.00	1,845.00	1,917.50	1,200.00	15,000.00
7065 · Dilution Study			0.00	18,917.31	0.00	0.00
Total 7050 · Monitoring	**56,267.00**	**50,846.00**	**69,107.00**	**81,328.00**	**54,529.00**	**75,000.00**
7060 · Permits/Fees						
7061 · Main Plant NPDES Renewal	0.00	21,628.75	4,320.50	7,295.00	3,300.00	0.00
7062 · Permits/Fees - General	44,287.15	31,705.63	38,165.51	40,740.40	60,000.00	50,000.00
7063 · Paradise Cove Permits/Fees	4,085.47	5,913.63	5,672.48	6,175.00	8,000.00	9,000.00
7064 · Paradise Cove NPDES Renewal	7,994.50	0.00	0.00	0.00	20,000.00	0.00
Total 7060 · Permits/Fees	**56,367.00**	**59,248.00**	**48,158.00**	**54,210.00**	**91,300.00**	**59,000.00**
7070 · Truck Maintenance						
7071 · Fuel	6,519.78	6,947.07	6,599.36	14,932.08	15,000.00	10,000.00
7072 · Truck Maintenance	4,090.32	9,344.39	6,675.22	5,581.19	25,000.00	15,000.00
Total 7070 · Truck Maintenance	**10,610.00**	**16,291.00**	**13,275.00**	**20,513.00**	**40,000.00**	**25,000.00**
Total 7000 · Ops & Maintenance Expenses	**672,808.00**	**671,916.00**	**567,243.00**	**778,205.00**	**587,279.00**	**661,500.00**
8000 · Salaries and Benefits Expenses						
8001 · Salaries	876,077.32	969,329.98	918,999.39	1,067,517.87	1,143,550.00	1,353,783.24
8003 · Overtime	138,034.13	77,636.89	145,295.17	135,674.44	100,000.00	100,000.00
8004 · Standby Pay	46,537.03	66,746.35	70,268.42	71,679.14	74,187.91	76,042.61
8005 · Employee Incentives	0.00	0.00	5,000.00	19,500.00	20,000.00	70,000.00
8006 · Vacation Buyout	22,318.11	20,199.25	41,125.19	27,281.72	27,000.00	30,000.00
8013 · Payroll Taxes	92,848.33	90,835.07	87,995.01	98,101.49	101,535.04	101,047.01
8015 · Payroll/Bank Fees	5,110.12	7,990.68	3,178.18	5,939.59	6,250.00	6,250.00
8016 · Car Allowance	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
8019 · PERS Retirement						
PERS Monthly Contributions	143,748.80	157,286.99	156,446.70	153,127.59	250,000.00	304,704.98
PERS Replacement Benefit Fund (RLL)	2,617.41	20,370.72	4,279.08	0.00	350.00	350.00
PERS Side Fund/UAL Payment	254,448.00	740,733.00	0.00	132,419.00	96,367.00	20,000.00
PERS UAL (SD5) Trust Fund	40,195.00	93,955.00	294,400.00	286,554.77	285,295.00	0.00
Total 8019 · PERS Retirement	**441,009.00**	**1,012,346.00**	**455,126.00**	**572,101.00**	**632,012.00**	**325,054.98**
8020 · Employee Health						
8020.05 · Employee Health	153,584.98	165,321.18	177,013.30	190,901.75	187,751.00	225,917.60
8021 · Employee Health Deductions	-8,943.46	-9,380.02	-4,490.17	-2,991.36	-4,748.05	-2,500.00
Total 8020 · Employee Health	**144,642.00**	**155,941.00**	**172,523.00**	**187,910.00**	**183,003.00**	**223,417.60**
8022 · Retiree Health	56,322.48	53,670.16	54,508.84	95,745.21	70,000.00	78,000.00
CERBT/OPEB Retiree Annual Arc Contribution*	37,096.83	65,700.00	66,644.28	70,200.00	118,400.00	164,400.00
Total 8022 · Retiree Health	**93,419.00**	**119,370.00**	**121,153.00**	**165,945.00**	**188,400.00**	**242,400.00**
8023 · Workers Comp Insurance	18,474.00	18,905.00	19,055.00	30,735.94	50,250.00	55,000.00
W.C. Rating Adjustments	1,763.00	-6,551.00	880.00		1,694.00	0.00
W.C. Dividend +/or Rebate	-2,000.00	-2,322.00	-2,000.00	-2,000.00	-2,000.00	-2,000.00
Total 8023 · Workers Comp Insurance	**18,237.00**	**10,032.00**	**17,935.00**	**28,736.00**	**49,944.00**	**53,000.00**
Total 8000 · Salaries and Benefits Expenses	**1,977,889.00**	**2,664,670.00**	**2,044,598.00**	**2,386,386.00**	**2,531,882.00**	**95.00**

	Actuals FY16-17	Actuals FY17-18	Actuals FY18-19	Actuals FY19-20	Estimate FY20-21	Budget FY21-22
8500 · Other Operating Expenses						
8510 · Data/Alarms/IT Supp & Licensing	43,893.01	75,105.92	92,264.32	83,779.99	115,000.00	100,000.00
8515 · Safety	13,619.19	11,283.79	7,595.41	23,472.06	30,000.00	40,000.00
8520 · Personal Protection/Safety Wear	10,965.86	8,539.90	15,922.60	8,216.49	12,000.00	15,000.00
8530 · Telephone						
8531 · Main Plant Telephones	8,806.47	8,004.61	8,161.57	9,707.08	9,500.00	11,000.00
8532 · Paradise Cove Telephones	2,496.15	3,663.92	4,064.58	3,814.21	3,800.00	4,000.00
8533 · Pumps & Lines Telephones	3,677.57	6,533.07	6,216.14	5,830.34	6,000.00	7,000.00
Total 8530 · Telephone	**14,980.00**	**18,202.00**	**18,442.00**	**19,352.00**	**19,300.00**	**22,000.00**
8540 · Utilities						
8541 · Water	3,618.35	3,699.49	4,971.70	7,744.56	8,000.00	8,000.00
8542 · Main Plant Utilities	179,694.22	168,332.98	174,652.34	179,270.96	200,000.00	200,000.00
8543 · Paradise Cove Utilities	13,814.41	14,027.27	13,935.20	14,842.64	16,800.00	18,000.00
8544 · Pump Station Utilities	42,120.85	33,210.82	35,171.49	35,727.84	42,800.00	45,000.00
Total 8540 · Utilities	**239,248.00**	**219,271.00**	**228,731.00**	**237,586.00**	**267,600.00**	**271,000.00**
Total 8500 · Other Operating Expenses	**322,706.00**	**332,403.00**	**362,955.00**	**372,407.00**	**443,900.00**	**448,000.00**
Total OPERATING Expenses	**3,259,515.00**	**3,955,893.00**	**3,237,225.00**	**3,853,659.00**	**4,151,424.00**	**4,109,419.00**

	Actuals FY16-17	Actuals FY17-18	Actuals FY18-19	Actuals FY19-20	Estimate FY20-21	Budget FY21-22
9100 · Capital Expenditures						
9200 · Main Plant Equipment Capital						
9201 · LED Lighting Upgrade		25,066.15	25,571.38			
9203 · Slurry Seal & Parking Plan		0.00	0.00			
9202.1 · M.P. Drainage Sample Rm Drain+2nd Drain Replacement						75,000.00
9202.2 · M.P. Drainage Load-out + Filtering						30,000.00
9204 · M.P. Boiler (Exhaust) Replacement		62,855.00	5,550.75			30,000.00
9205 · Influent Sumps/RAS Cover Rplcmt						
9206 · Infl Dry Weather Pump Rplcmt	32,163.94					40,000.00
9207 · Infl Wet Weather Pump Rplcmt	56,927.58					
9208 · M.P. Chemical Feed Pump Replacement	8,643.46					20,000.00
9209 · Screw Press Blend Redundancy			15,733.84			
9210 · Sludge Box Replacement		15,442.00				
9211 · Odor Control Upgrades						
9212 · M.P. Headworks Grinder Replacement			18,829.83	19,588.07	23,486.90	25,000.00
9212.1 · Explosion-proof Electric Hoist						10,000.00
9213 · Flare Rehabilitation						
9214 · Underground Pipe & Valve Replacement				12,307.96		
9215 · M.P. Restroom Remodels (2)						
9217 · M.P. Maint. Shop Replacement /Ops Control						
9218 · M.P. Generator Control Panel						
9219 · M.P. Cl2 Flash Mixer					12,160.81	15,000.00
9220 · M.P. Office & Bath Floor Replacement						
9221 · M.P. Portable Fuel Storage						
9225.94 · Server Upgrade + Replacement					5,323.75	
9225.95 · SCADA Upgrade					18,850.00	
9229.8 · Vehicle Replacement					3,000.00	
Total 9200 · Main Plant Equipment Capital	**97,735.00**	**103,363.00**	**65,686.00**	**31,896.00**	**59,821.00**	**245,000.00**

	Actuals FY16-17	Actuals FY17-18	Actuals FY18-19	Actuals FY19-20	Estimate FY20-21	Budget FY21-22
9300 · Pumps & Lines Capital						
9301 · Tiburon Sewer Line Rehab Prog	120,306.13	440,376.23	439,893.30	723,554.74		1,000,000.00
9302 · Pump Station Control Panel Upgr	62,832.36	85,524.81	60,247.88	37,178.11		
9303 · Lateral Camera			13,750.48		362.71	
9304 · Belvedere Sewer Line Rehab Prog	78,578.93	195,439.87	344,441.80	891,836.07		100,000.00
9305 · Valve/Wet Well Lid Cover Replac						
9305.1 · Wet Well Rehabilitation - Belvedere						75,000.00
9305.2 · Wet Well Rehabilitation - Tiburon						50,000.00
9306 · PS Pump & Valve Replacement	50,938.12	48,660.54		52,247.95	3,286.79	50,000.00
9307 · PS Generator Replacement	24,529.79	60,284.50		16,123.19		
9308 · Station #5 Rebuild/4 Pumps/Gen						
9308.1 · Mar West PS#5, Phase I-Design						
9308 · Station #5 Rebuild/4 Pumps/Gen - Other						
9308.11 · Mar West PS#5, Phase I-Constr						
9308.2 · Mar West PS#5, Phase II-Constr		790,046.72				
Total 9308 · Station #5 Rebuild	**0.00**	**790,046.72**	**0.00**	**0.00**		
9309 · Cove Rd. BPS #1 Generator Replacement					0.00	100,000.00
9310 · Belv Pump Station Comm. Project			46,640.69		0.00	
9311.1 · Cove Rd Force Main Rplcmnt - Engineering			19,260.00	14,250.00	5,656.80	
9311.2 · Cove Rd Force Main Rplcmnt - Constr., Ph I					2,341,117.33	
9312 · Force Main Rehab - Multiple Sites					0.00	
9313 · Man Hole Rehabilitation				17,811.00	15,097.72	75,000.00
9314 · Portable Emergency Generators		34,462.47		997.14	95,587.89	
9227.8 · Vactor Truck		21,785.00		310,144.91	7,891.43	
9315 · TPS Comm/Radio Upgrade Project	33,465.60	0.00	41,747.19		0.00	
Total 9300 · Pumps & Lines Capital	**370,651.00**	**1,676,580.00**	**965,981.00**	**2,064,143.00**	**2,469,001.00**	**1,450,000.00**
9400 · Paradise Cove Capital						
9401 · P.C. Sewer Line Rehab Prog						
9402 · P.C. Flow Meter Replacement					19,501.62	
9403.1 · P.C. Communication Upgrade - Cellular						20,000.00
9404 · P.C. Inf WWI Access Replacement				8,141.00		
9405 · P.C. Generator Replacement	49,903.24	899.22			0.00	
· P.C. Painting at Plant				52,058.23	52,759.00	
9406 · P.C. Plant Grating Rplcmnt - Fiberglass					1,730.73	
9410 · P.C. U.V. Disinfection						
Total 9400 · Paradise Cove Capital	**49,903.00**	**899.00**	**0.00**	**60,199.00**	**73,991.00**	**20,000.00**
9500 · Undesignated Capital						
9510 · Undesignated Cap - M.P.		33,817.00		14,684.13		25,000.00
9520 · Undesignated Cap - P.C. Plant	6,357.50				26,546.75	10,000.00
9530 · Undesignated Cap - P&L			32,479.97			50,000.00
Total 9500 · Undesignated Capital	**6,358.00**	**33,817.00**	**32,480.00**	**14,684.00**	**26,547.00**	**85,000.00**
Total 9100 · Capital Expenditures	**524,647.00**	**1,814,659.00**	**1,064,147.00**	**2,170,922.00**	**2,629,360.00**	**1,800,000.00**

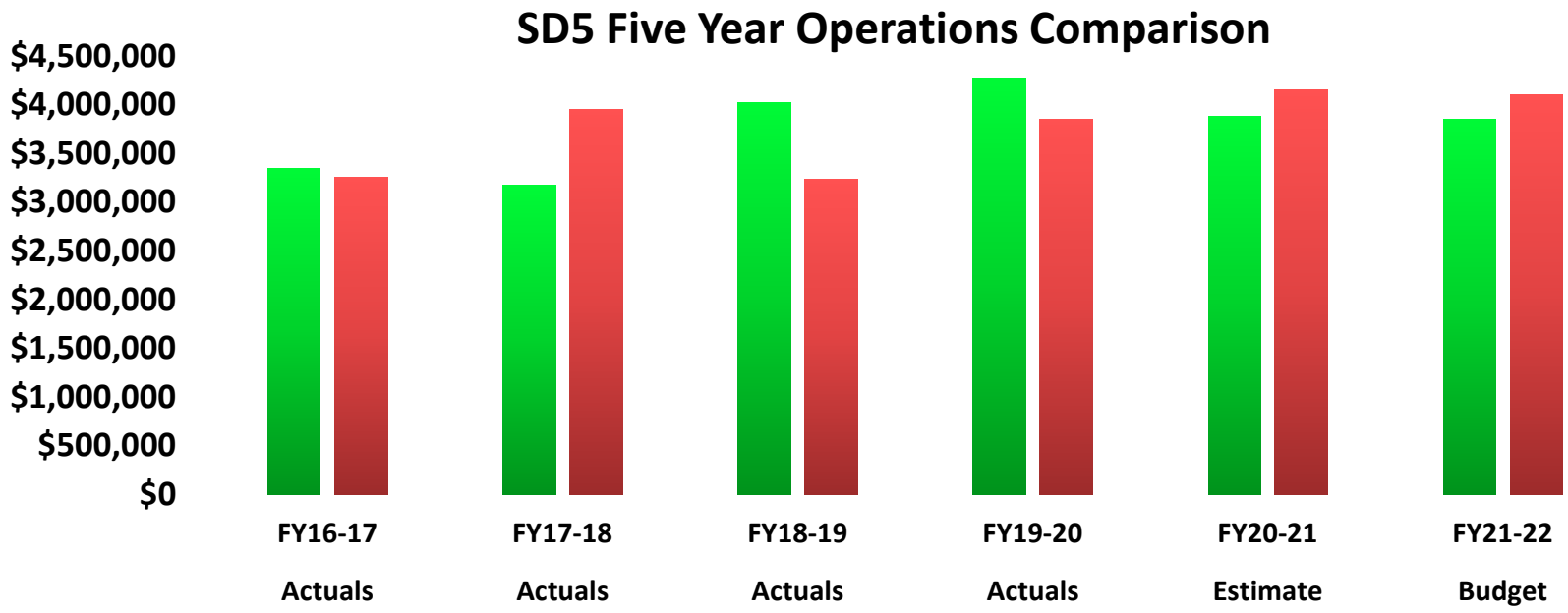
	Actuals FY16-17	Actuals FY17-18	Actuals FY18-19	Actuals FY19-20	Estimate FY20-21	Budget FY21-22
9700 · Debt Service						
9720 · Belvedere Loan						
9723 · Belvedere WestAm Loan Prin						
Total 9720 · Belvedere Loan						
9730 · Debt Service - MPR Project						
9731 · Debt Service MPR Bond Principal	450,000.00	450,000.00	460,000.00	470,000.00		
9732 · Debt Service MPR Bond Interest	391,996.84	374,067.94	356,348.79	167,675.00		
9734 · Debt Service MPR REFI Principal					660,000.00	595,000.00
9735 · Debt Service MPR REFI Interest					190,432.26	157,790.00
Total 9730 · Debt Service - MPR Project	841,997.00	824,068.00	817,399.00	637,675.00	851,482.00	753,840.00
Total 9700 · Debt Service	**841,997.00**	**824,068.00**	**817,399.00**	**637,675.00**	**851,482.00**	**753,840.00**
Total CAPITAL Expense	**1,366,644.00**	**2,638,727.00**	**1,881,546.00**	**2,808,597.00**	**3,480,842.00**	**2,553,840.00**
Total Ops & Capital Expense	**4,626,159.00**	**6,594,620.00**	**5,118,771.00**	**6,662,256.00**	**7,632,266.00**	**6,663,259.00**
Total Ops & Capital Net Income	**1,948,777.00**	**404,516.00**	**2,056,888.00**	**379,530.00**	**-1,270,329.00**	**-562,286.00**

Sanitary District No. 5
of Marin County

Five-Year History: Operating Comparison

FY 2016/2017 – FY2021/2022

	Actuals FY16-17	Actuals FY17-18	Actuals FY18-19	Actuals FY19-20	Estimate FY20-21	Budget FY21-22
Total OPS Income	$3,353,195	$3,175,373	$4,020,786	$4,271,669	$3,880,078	$3,848,800
Total OPS Expenses	$3,259,515	$3,955,893	$3,237,225	$3,853,659	$4,151,424	$4,109,419

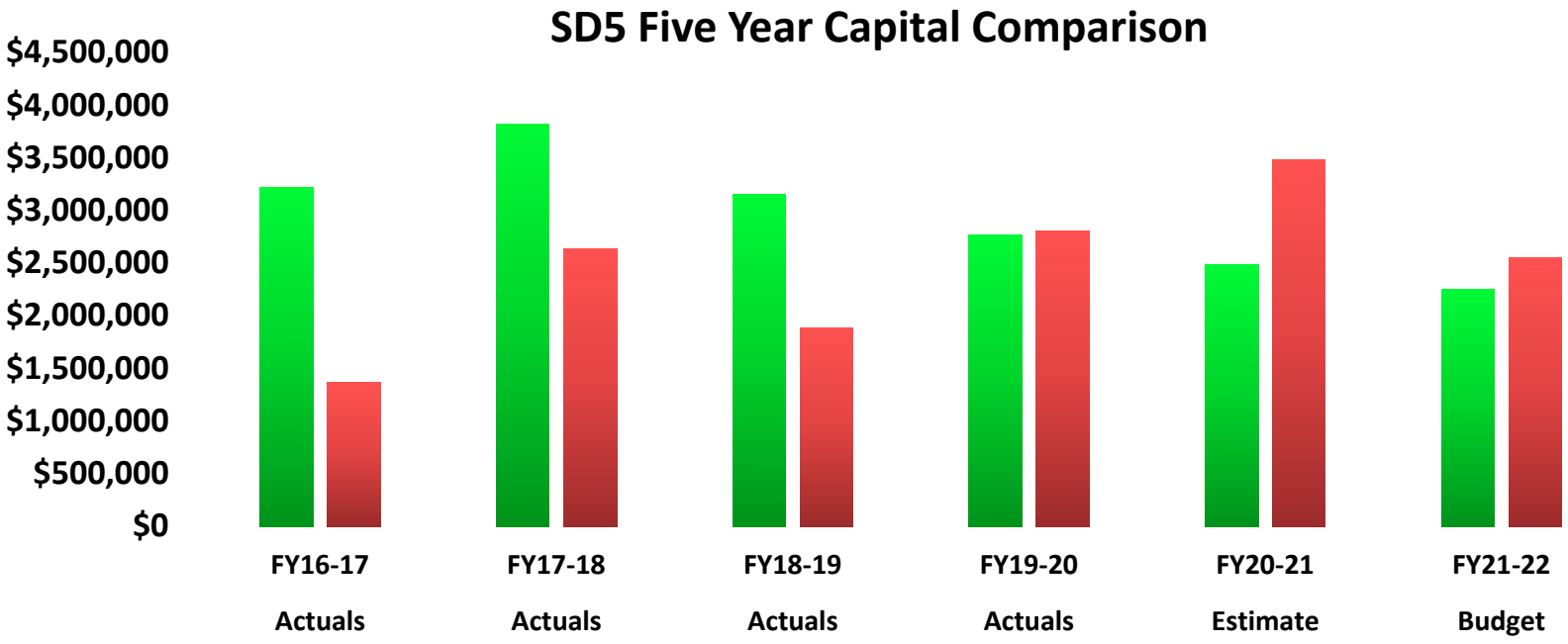


Sanitary District No. 5
of Marin County

Five-Year History: Capital Comparison

FY 2016/2017 – FY2021/2022

	Actuals FY16-17	Actuals FY17-18	Actuals FY18-19	Actuals FY19-20	Estimate FY20-21	Budget FY21-22
Total Capital Income	$3,221,742	$3,823,763	$3,154,873	$2,770,117	$2,481,859	$2,252,173
Total Capital Expenses	$1,366,644	$2,638,727	$1,881,546	$2,808,597	$3,480,842	$2,553,840

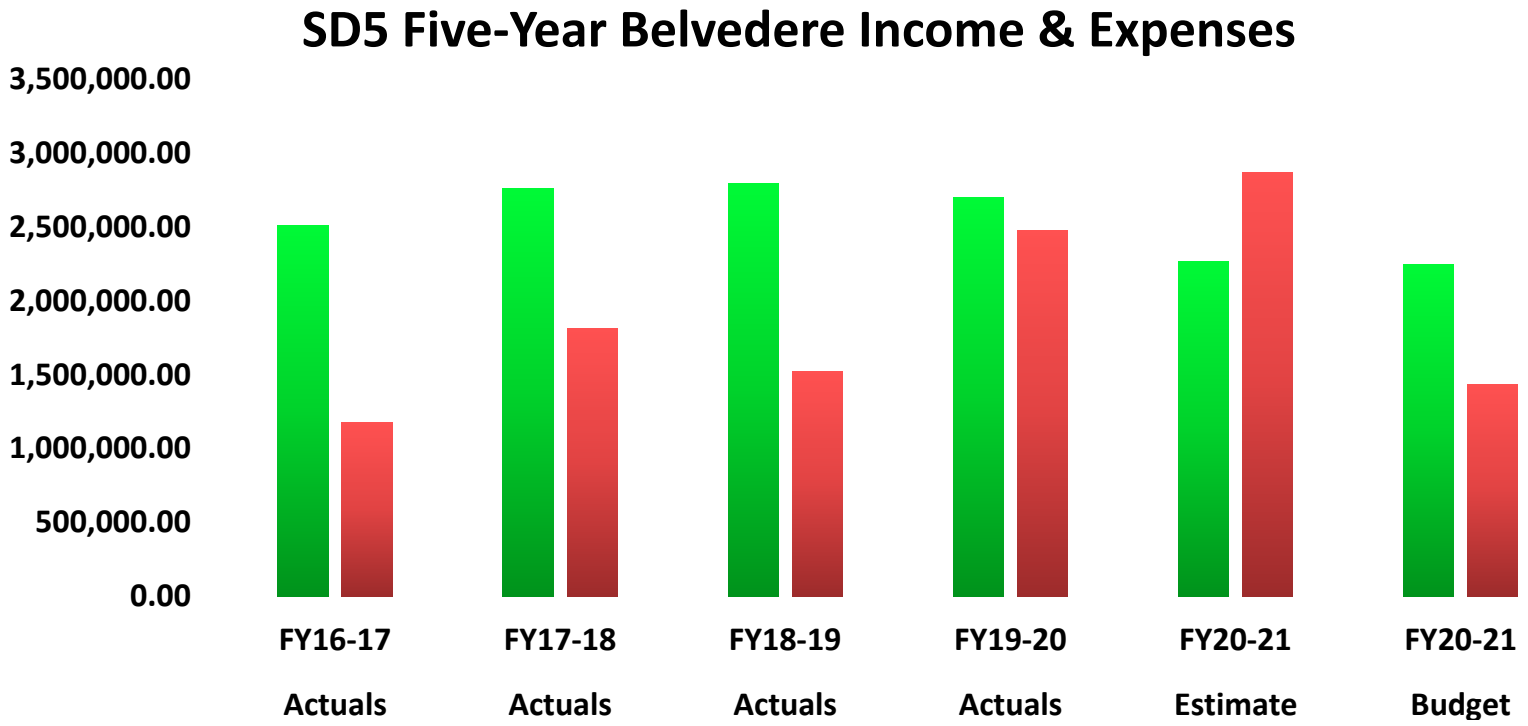


Sanitary District No. 5
of Marin County

Five-Year History: Zone Comparison

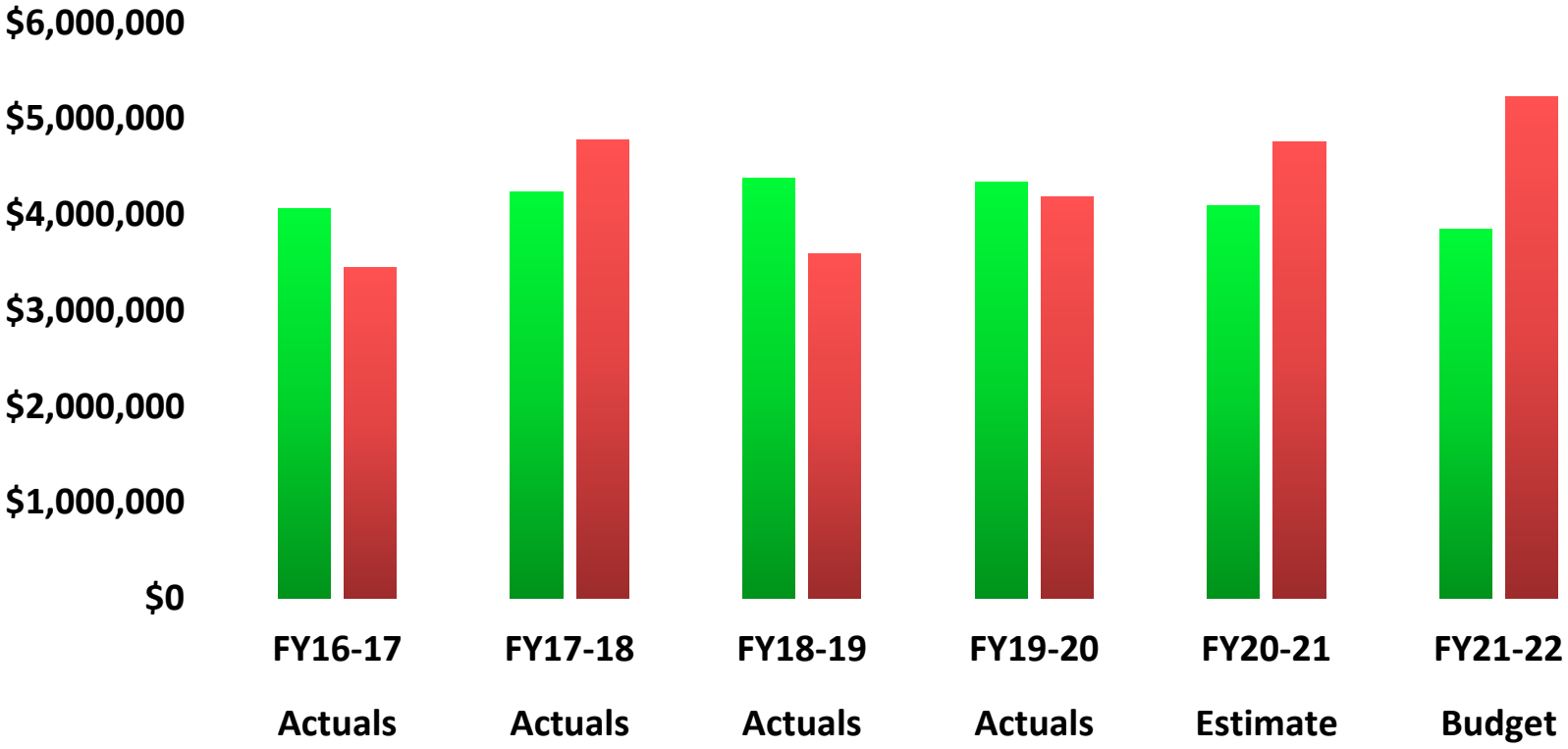
FY 2016/2017 – FY2021/2022

	Actuals FY16-17	Actuals FY17-18	Actuals FY18-19	Actuals FY19-20	Estimate FY20-21	Budget FY20-21
Total Belvedere Income	2,510,937.06	2,762,519.03	2,798,998.24	2,699,969.62	2,270,872.00	2,249,026.00
Total Belvedere Expenses	1,174,352.77	1,815,375.75	1,522,994.60	2,475,003.32	2,871,778.85	1,436,258.00



	Actuals FY16-17	Actuals FY17-18	Actuals FY18-19	Actuals FY19-20	Estimate FY20-21	Budget FY21-22
Total Tiburon Income	$4,063,999	$4,236,617	$4,376,661	$4,341,816	$4,091,065	$3,851,947
Total Tiburon Expenses	$3,451,806	$4,779,244	$3,595,776	$4,187,253	$4,760,487	$5,227,001

SD5 Five-Year Tiburon Income & Expenses

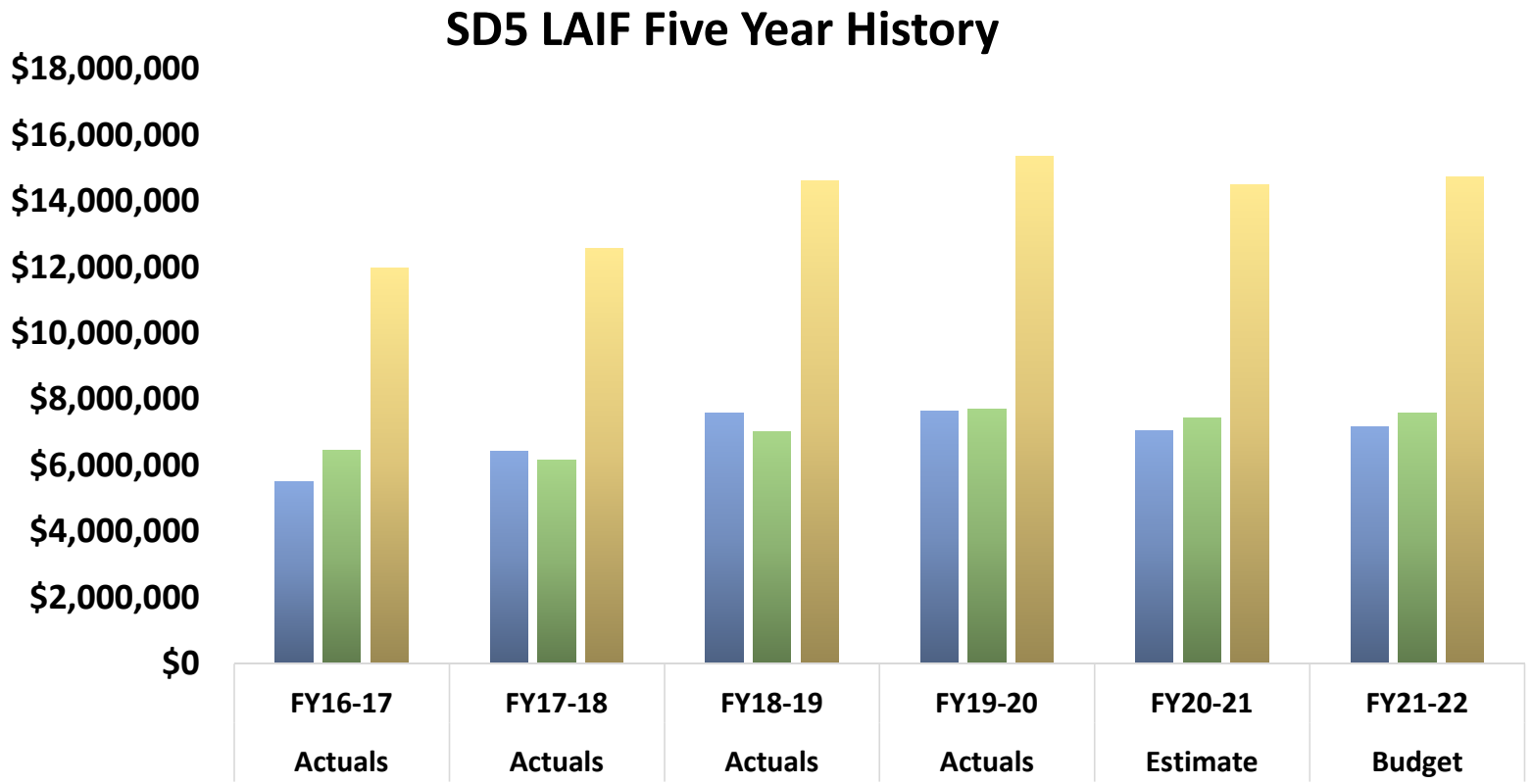


Sanitary District No. 5
of Marin County

Five-Year History:
Local Agency Investment Fund (LAIF) Comparison

FY 2016/2017 – FY2021/2022

	Actuals FY16-17	Actuals FY17-18	Actuals FY18-19	Actuals FY19-20	Estimate FY20-21	Budget FY21-22
Total LAIF - Belvedere	$5,525,448	$6,424,672	$7,595,164	$7,652,144	$7,060,617	$7,187,579
Total LAIF - Tiburon	$6,453,225	$6,147,834	$7,023,817	$7,723,155	$7,449,394	$7,572,632
SD5 LAIF Balance	$11,978,673	$12,572,505	$14,618,981	$15,375,299	$14,510,011	$14,760,211



SD5 LAIF BALANCE HISTORY

	Actuals Jun 30, 17	Actuals Jun 30, 18	Actuals Jun 30, 19	Actuals June 30, 20	Estimate *June 30, 2021*	Projection *June 30, 2022*
Local Agency Investment Fund						
Belvedere						
Belvedere Operating	1,106,322.19	3,269,832.33	3,692,092.99	3,604,760.86	*3,662,702.28*	*3,735,956.33*
Belvedere Operating Reserve	1,649,484.76	192,560.00	284,923.05	400,923.05	*516,923.05*	*527,261.51*
Belvedere Capital & CIP Reserve	2,756,461.71	2,558,239.36	3,109,367.66	3,035,594.94	*2,168,491.17*	*2,211,860.99*
Belvedere PERS Retirement Trust	13,179.61	47,790.00	152,530.00	254,615.00	*356,250.00*	*356,250.00*
Belvedere Disaster Recovery Fnd	0.00	356,250.00	356,250.00	356,250.00	*356,250.00*	*356,250.00*
Total Belvedere	**5,525,448.27**	**6,424,671.69**	**7,595,163.70**	**7,652,143.85**	***7,060,616.50***	***7,187,578.83***
Tiburon						
Tiburon Operating	906,018.99	2,640,032.40	2,106,182.56	2,204,697.69	*1,965,614.18*	*2,004,926.46*
Tiburon Operating Reserve	3,994,211.29	322,400.00	414,430.00	548,730.00	*683,930.00*	*697,608.60*
Tiburon Capital & CIP Reserve	1,525,684.02	2,455,291.37	3,583,834.92	3,865,887.47	*3,512,349.86*	*3,582,596.86*
Tiburon PERS Retirement Trust	27,310.20	86,360.00	275,620.00	460,090.00	*643,750.00*	*643,750.00*
Tiburon Disaster Recovery Fund	0.00	643,750.00	643,750.00	643,750.00	*643,750.00*	*643,750.00*
Total Tiburon	**6,453,224.50**	**6,147,833.77**	**7,023,817.48**	**7,723,155.16**	***7,449,394.04***	***7,572,631.92***
Total Local Agency Investment Fund	**11,978,672.77**	**12,572,505.46**	**14,618,981.18**	**15,375,299.01**	***14,510,010.54***	***14,760,210.75***

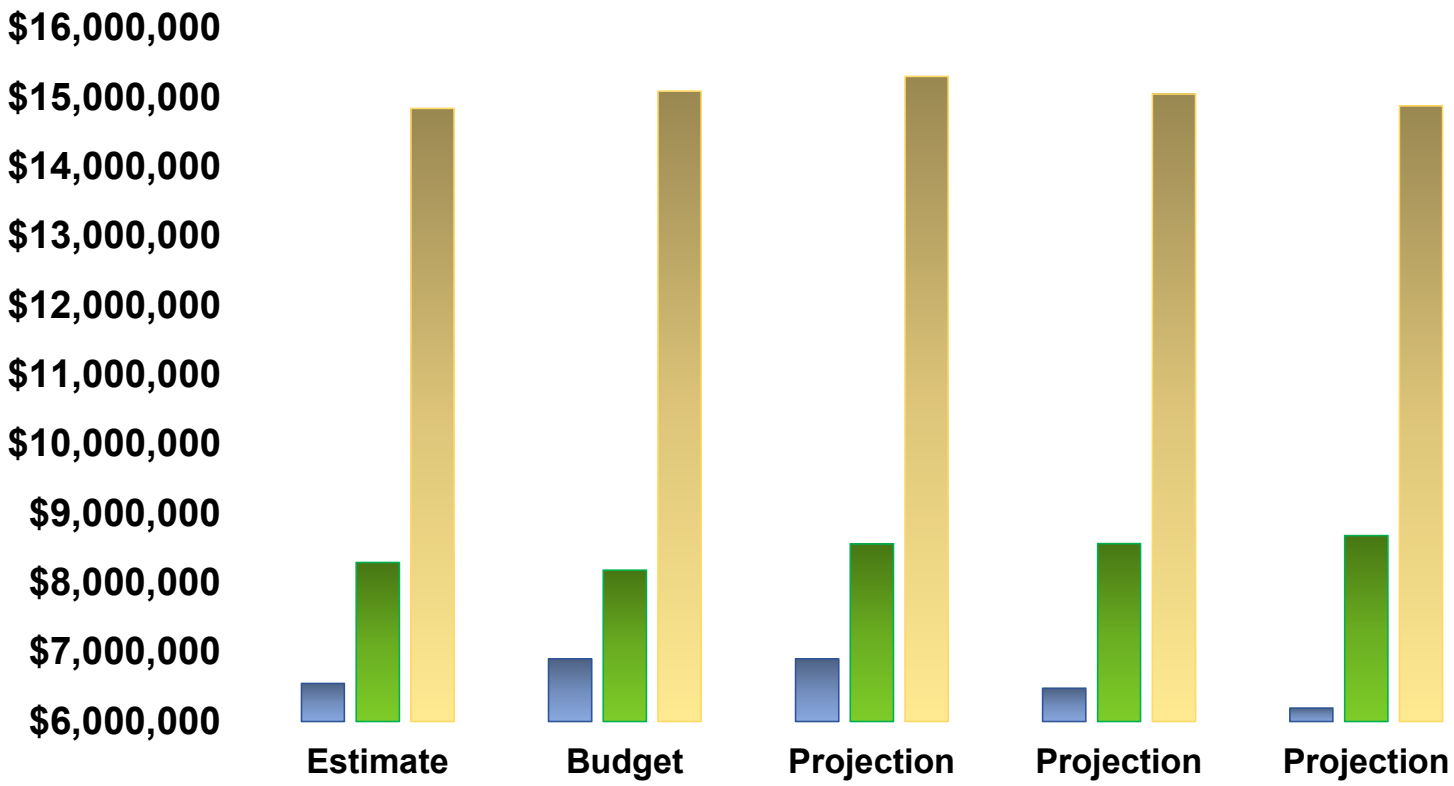
Sanitary District No. 5
of Marin County

Five -Year Projection:
Local Agency Investment Fund (LAIF) Comparison

FY 2020/2021 – FY2024/2025

	Estimate FY20-21	Budget FY21-22	Projection FY22-23	Projection FY23-24	Projection FY24-25
Total Belvedere LAIF + Cash Balance	$6,547,744	$6,902,096	$6,902,096	$6,478,819	$6,193,458
Total Tiburon LAIF + Cash Balance	$8,290,599	$8,181,575	$8,561,656	$8,566,174	$8,680,190
Total SD5 LAIF + Cash Balance	$14,838,343	$15,083,671	$15,297,089	$15,044,994	$14,873,649

SD5 Five-Year LAIF + Cash Projections



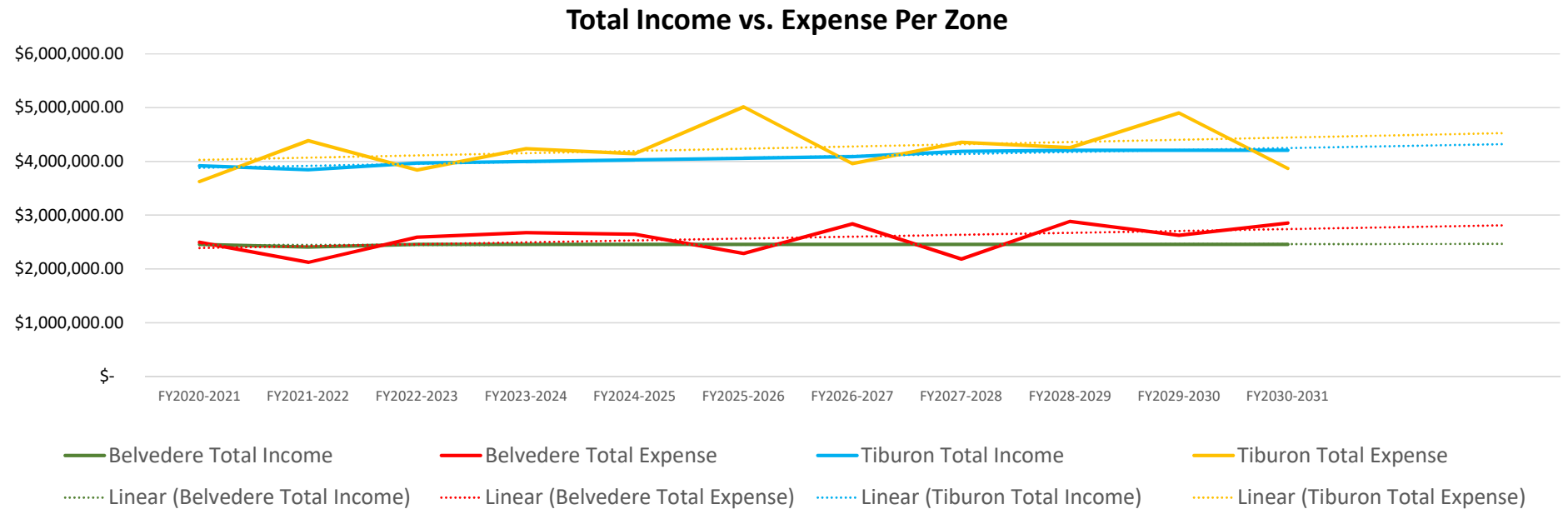
	Budget FY2020-2021	FY2021-2022	FY2022-2023	FY2023-2024	FY2024-2025	FY2025-2026
Belvedere Property Tax Income	0.00	0.00	0.00	0.00	0.00	0.00
Tiburon Property Tax Income	1,260,412.01	1,285,620.25	1,311,332.66	1,337,559.31	1,364,310.49	1,391,596.70
Belvedere Sewer Service Charge Income	2,215,553.65	2,215,553.65	2,215,553.65	2,215,553.65	2,215,553.65	2,215,553.65
Tiburon Sewer Service Charge Income	2,459,814.39	2,459,814.39	2,459,814.39	2,459,814.39	2,459,814.39	2,459,814.39
Belvedere Operating Expense	1,175,358.29	1,216,495.83	1,259,073.18	1,303,140.75	1,348,750.67	1,395,956.95
Tiburon Operating Expense	2,071,656.03	2,144,163.99	2,219,209.73	2,296,882.07	2,377,272.94	2,460,477.50
Belvedere Capital Expense	1,521,374.66	350,000.00	825,000.00	825,000.00	825,000.00	775,000.00
Tiburon Capital Expense	947,331.67	1,150,000.00	550,000.00	850,000.00	175,000.00	1,350,000.00
Paradise Cove Capital Expense	100,832.44	30,000.00	85,000.00	30,000.00	570,000.00	10,000.00
Main Plant Capital Expense	60,280.00	245,000.00	240,000.00	350,000.00	290,000.00	565,000.00
Belvedere MPR DEBT CIP	0.00	0.00	0.00	0.00	0.00	0.00
Tiburon MPR DEBT CIP	0.00	0.00	0.00	0.00	0.00	0.00
Belvedere MPR REFI Debt (CIP)	232,452.00	204,276.00	209,559.00	214,842.00	220,125.00	220,125.00
Tiburon MPR REFI Debt (CIP)	427,548.00	375,724.00	385,441.00	395,158.00	404,875.00	404,875.00
Belvedere Total Income	**2,215,553.65**	**2,215,553.65**	**2,215,553.65**	**2,215,553.65**	**2,215,553.65**	**2,215,553.65**
Belvedere Total Expense	**2,951,434.30**	**1,861,201.33**	**2,382,216.18**	**2,472,167.75**	**2,500,914.67**	**2,599,623.45**
Belvedere Net Income	(735,880.65)	354,352.32	(166,662.53)	(256,614.10)	(285,361.02)	(384,069.80)
Belvedere LAIF (Cash) + Net Income	**6,547,743.79**	**6,902,096.11**	**6,735,433.58**	**6,478,819.48**	**6,193,458.46**	**5,809,388.66**
Tiburon Total Income	**3,720,226.40**	**3,745,434.64**	**3,771,147.05**	**3,797,373.70**	**3,824,124.88**	**3,851,411.09**
Tiburon Total Expense	**3,585,398.79**	**3,854,458.49**	**3,391,066.73**	**3,792,855.07**	**3,710,108.94**	**4,581,811.00**
Tiburon Net Income	134,827.61	(109,023.85)	380,080.31	4,518.63	114,015.94	(730,399.90)
Tiburon LAIF (Cash) + Net Income	**8,290,599.09**	**8,181,575.24**	**8,561,655.55**	**8,566,174.18**	**8,680,190.12**	**7,949,790.22**
SD5 TOTAL CASH BALANCE	**14,838,342.88**	**15,083,671.35**	**15,297,089.13**	**15,044,993.66**	**14,873,648.58**	**13,759,178.88**

Sanitary District No. 5
of Marin County

SD5 Income & Expense History & Projection:
Tiburon & Belvedere

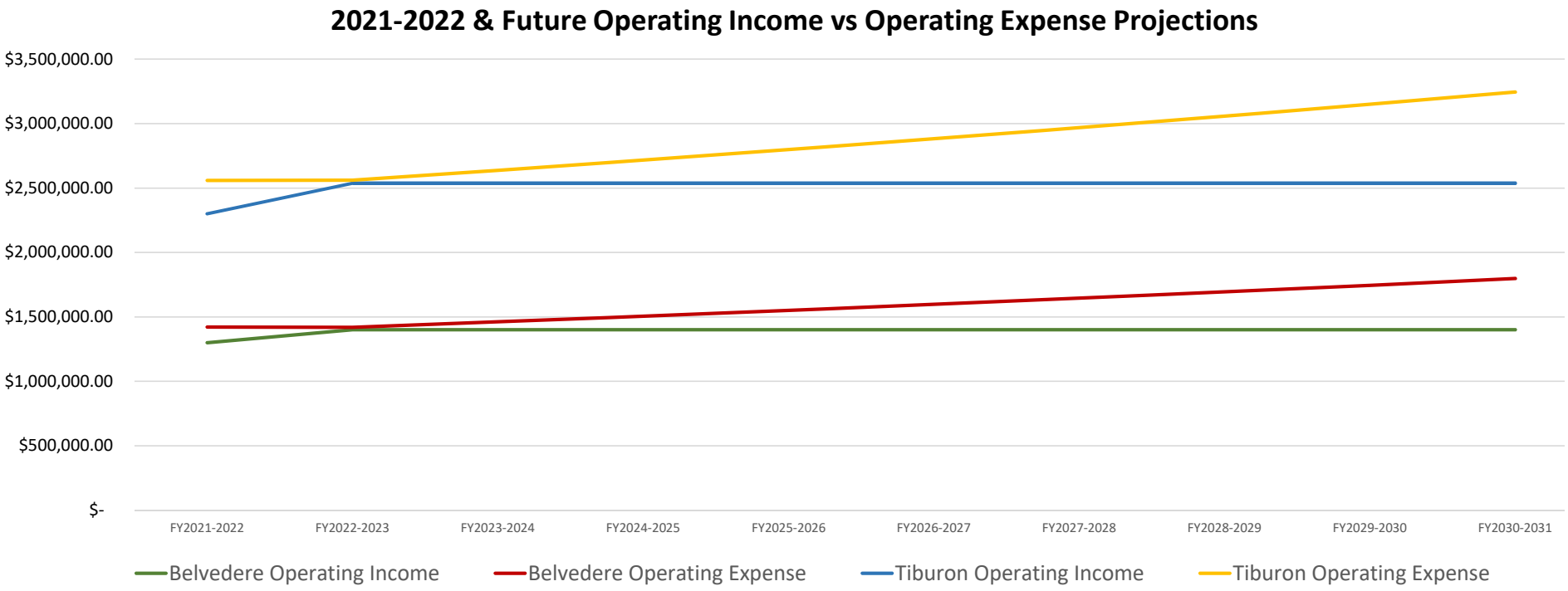
FY 2020/2021 – FY2030/2031

21-22 Budget Projections	FY2020-2021	FY2021-2022	FY2022-2023	FY2023-2024	FY2024-2025	FY2025-2026	FY2026-2027	FY2027-2028	FY2028-2029	FY2029-2030	FY2030-2031
Belvedere Total Income	$ 2,455,642.00	$ 2,405,642.00	$ 2,455,642.00	$ 2,455,642.00	$ 2,455,642.00	$ 2,455,642.00	$ 2,455,642.00	$ 2,455,642.00	$ 2,455,642.00	$ 2,455,642.00	$ 2,455,642.00
Belvedere Total Expense	$ 2,497,520.00	$ 2,120,557.00	$ 2,591,601.00	$ 2,672,695.00	$ 2,645,436.00	$ 2,286,613.00	$ 2,839,765.00	$ 2,183,931.00	$ 2,883,383.00	$ 2,626,164.00	$ 2,850,069.00
Tiburon Total Income	$ 3,920,032.00	$ 3,842,781.00	$ 3,965,985.00	$ 3,995,985.00	$ 4,025,985.00	$ 4,055,985.00	$ 4,085,985.00	$ 4,185,985.00	$ 4,205,985.00	$ 4,205,985.00	$ 4,205,985.00
Tiburon Total Expense	$ 3,624,511.00	$ 4,387,284.00	$ 3,841,083.00	$ 4,234,444.00	$ 4,139,368.00	$ 5,014,174.00	$ 3,960,434.00	$ 4,354,218.00	$ 4,256,315.00	$ 4,898,802.00	$ 3,869,009.00



Please note: Capital Expense Assumptions are rough estimates of future capital work and fiscal year status may change from year to year

21-22 Budget Projections	FY2021-2022	FY2022-2023	FY2023-2024	FY2024-2025	FY2025-2026	FY2026-2027	FY2027-2028	FY2028-2029	FY2029-2030	FY2030-2031
Belvedere Operating Income	$ 1,300,000.00	$ 1,400,834.00	$ 1,400,834.00	$ 1,400,834.00	$ 1,400,834.00	$ 1,400,834.00	$ 1,400,834.00	$ 1,400,834.00	$ 1,400,834.00	$ 1,400,834.00
Belvedere Operating Expense	$ 1,421,481.00	$ 1,419,125.00	$ 1,461,699.00	$ 1,505,550.00	$ 1,550,717.00	$ 1,597,238.00	$ 1,645,155.00	$ 1,694,510.00	$ 1,745,345.00	$ 1,797,706.00
Tiburon Operating Income	$ 2,300,000.00	$ 2,537,000.00	$ 2,537,000.00	$ 2,537,000.00	$ 2,537,000.00	$ 2,537,000.00	$ 2,537,000.00	$ 2,537,000.00	$ 2,537,000.00	$ 2,537,000.00
Tiburon Operating Expense	$ 2,559,000.00	$ 2,560,770.00	$ 2,637,593.00	$ 2,716,721.00	$ 2,798,223.00	$ 2,882,169.00	$ 2,968,634.00	$ 3,057,693.00	$ 3,149,424.00	$ 3,243,907.00



Please note: Income projections assume no change in Sewer Service Charge revenue, nor does it account for interest earnings and ins pection fees. Operating Expense asssumptions account for 3% annual increase across all operating expense line items.

Agenda – Notes of Explanation
Sanitary District No. Regular Board Meeting
May 20, 2021

Consideration of Adoption of Resolution No. 2021-01: Determination of Appropriations Limit for Fiscal Year 2021 - 2022 (Dohrmann)

MEMORANDUM:

Appropriation limits are established to determine the maximum amount SD5 can accept in tax revenue from the County of Marin each year. As mandated by the California Department of Finance, following is the methodology used to calculate the Appropriations Limit for Sanitary District No. 5 of Marin County, for the fiscal year 2021-2021:

1.	Appropriations Limit for FY2020-2021		$2,655,369.30
2.	Tiburon Population Change (-0.46%)		0.9954
3.	CA Per Capita Income Change of Prior Year (5.73%)		x 1.0573
4.	FY 2020-2021 Adjustment Factor (0.9954 x 1.0573):		= 1.0524
5.	**FY 2021-2022 Appropriations Limit ($2,655,369.30 x 1.0524):**	**=**	**$2,794,510.65**

RECOMMENDATION:

Review and Approve Appropriation Limits for FY2021-2022 in the amount of **$2,794,510.65**

Robin Dohrmann
Office Manager

ATTACHMENTS:

- Resolution No. 2020-04: Determination of Appropriation Limit for Fiscal Year 2020-2021
- CA Board of Equalization article on ARTICLE XIII B Constitution Government Spending Limitation
- California Department of Finance, May, 2020: Price & Population Information re: Appropriation Limits

http://www.dof.ca.gov/forecasting/demographics/estimates/documents/priceandpopulation2021.pdf

DEPARTMENT OF FINANCE
OFFICE OF THE DIRECTOR

Gavin Newsom ▪ Governor
State Capitol ▪ Room 1145 ▪ Sacramento CA ▪ 95814-4998 ▪ www.dof.ca.gov

May 2021

Dear Fiscal Officer:

Subject: Price Factor and Population Information

Appropriations Limit
California Revenue and Taxation Code section 2227 requires the Department of Finance (Finance) to transmit an estimate of the percentage change in population to local governments. Each local jurisdiction must use their percentage change in population factor for January 1, 2021, in conjunction with a change in the cost of living, or price factor, to calculate their appropriations limit for fiscal year 2021-22. Attachment A provides the change in California's per capita personal income and an example for utilizing the price factor and population percentage change factor to calculate the 2021-22 appropriations limit. Attachment B provides the city and unincorporated county population percentage change. Attachment C provides the population percentage change for counties and their summed incorporated areas. The population percentage change data excludes federal and state institutionalized populations and military populations.

Population Percent Change for Special Districts
Some special districts must establish an annual appropriations limit. California Revenue and Taxation Code section 2228 provides additional information regarding the appropriations limit. Article XIII B, section 9(C) of the California Constitution exempts certain special districts from the appropriations limit calculation mandate. The code section and the California Constitution can be accessed at the following website: http://leginfo.legislature.ca.gov/faces/codes.xhtml.

Special districts required by law to calculate their appropriations limit must present the calculation as part of their annual audit. Any questions special districts have on this requirement should be directed to their county, district legal counsel, or the law itself. No state agency reviews the local appropriations limits.

Population Certification
The population certification program applies only to cities and counties. California Revenue and Taxation Code section 11005.6 mandates Finance to automatically certify any population estimate that exceeds the current certified population with the State Controller's Office. **Finance will certify the higher estimate to the State Controller by June 1, 2021**.

Please Note: The prior year's city population estimates may be revised. The per capita personal income change is based on historical data. Given the stay-at-home orders due to COVID-19, growth in the coming years may be substantially lower than recent trends.

If you have any questions regarding this data, please contact the Demographic Research Unit at (916) 323-4086.

KEELY MARTIN BOSLER
Director
By:

/s/ Erika Li

Erika Li
Chief Deputy Director

Attachment

May 2021

Attachment A

A. **Price Factor**: Article XIII B specifies that local jurisdictions select their cost of living factor to compute their appropriation limit by a vote of their governing body. The cost of living factor provided here is per capita personal income. If the percentage change in per capita personal income is selected, the percentage change to be used in setting the fiscal year 2021-22 appropriation limit is:

Per Capita Personal Income

Fiscal Year (FY)	Percentage change over prior year
2021-22	5.73

B. Following is an example using sample population change and the change in California per capita personal income as growth factors in computing a 2021-22 appropriation limit.

2021-22:

Per Capita Cost of Living Change = 5.73 percent
Population Change = -0.46 percent

Per Capita Cost of Living converted to a ratio: $\frac{5.73 + 100}{100} = 1.0573$

Population converted to a ratio: $\frac{-0.57 + 100}{100} = 0.9943$

Calculation of factor for FY 2021-22: $1.0573 \times 0.9943 = 1.0513$

Fiscal Year 2021-22

Attachment B
Annual Percent Change in Population Minus Exclusions*
January 1, 2020 to January 1, 2021 and Total Population, January 1, 2021

County City	Percent Change 2020-2021	--- Population Minus Exclusions --- 1-1-20	 1-1-21	Total Population 1-1-2021
Marin				
Belvedere	-0.58	2,078	2,066	2,066
Corte Madera	-0.55	10,084	10,029	10,029
Fairfax	-0.36	7,525	7,498	7,498
Larkspur	-0.54	12,260	12,194	12,194
Mill Valley	-0.50	14,623	14,550	14,550
Novato	-0.10	53,532	53,477	53,486
Ross	-0.35	2,556	2,547	2,547
San Anselmo	-0.41	12,741	12,689	12,689
San Rafael	-0.62	59,385	59,016	59,016
Sausalito	-0.45	7,388	7,355	7,355
Tiburon	-0.57	9,510	9,456	9,456
Unincorporated	-0.47	64,535	64,229	66,888
County Total	-0.43	256,217	255,106	257,774

*Exclusions include residents on federal military installations and group quarters residents in state mental institutions, state and federal correctional institutions and veteran homes.

CHAPTER 5

GOVERNMENT APPROPRIATIONS LIMIT: ARTICLE XIIIB OF THE CALIFORNIA CONSTITUTION

HIGHLIGHTS

- What is the Appropriations Limit
- Expenditures Versus Appropriations
- How the Appropriations Limit Works
- History of the State's Limit
- Relationship Between State and Local Limits

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1. IN BRIEF: WHAT IS THE APPROPRIATIONS LIMIT?

Proposition 4 approved by the voters in November 1979 added California Constitution, Article XIIIB. Article XIIIB limits the level of most appropriations from tax sources that the state and most local government entities are permitted to make in any given year. The limit for each year is equal to the limit for the prior year, adjusted for changes in the cost-of-living and population. Various other adjustments are also required. The first year in which appropriations limits applied to state and local governments in California was fiscal year (FY) 1980-81.

Article XIIIB also requires state and local governments to return to taxpayers (or in certain cases, K-14 education programs) any tax revenues in excess of the amount that can be appropriated in any given FY.

This constitutional provision also contains requirements that the state reimburse local governments and school districts for the costs of complying with state mandates, and requires the Legislature to establish a prudent state reserve fund.

Article XIIIB was significantly modified by two initiative constitutional amendments approved by the state's voters in November 1988, Propositions 98 and 99. Proposition 111, approved by the voters in June 1990, made several additional significant revisions in the appropriations limit. Changes made by these propositions are noted in the following sections.

2. EXPENDITURES VERSUS APPROPRIATIONS

The terms "appropriations limit" and "spending limit" or "expenditure limit" are often used interchangeably, and there is some confusion about the difference between appropriations and expenditures.

An appropriation is an action by the Legislature to set aside an amount of money for a specified purpose. In short, an appropriation authorizes money to be spent. Appropriations are made in the annual Budget Bill, or in individual bills providing for specific governmental programs.

The actual expenditure of money occurs later, and is implemented by the State Controller. Writing checks is a ministerial function of the Controller. The Controller has no authority to expend money that has not been appropriated by the Legislature.

The amount of an expenditure on a program may not equal the appropriation for that program. For example, if the number of clients for a particular government service is actually less than anticipated, the appropriation may be larger than the amount actually spent.

Article XIIIB sets forth a limit on the amounts that may be appropriated from government proceeds of taxes. In the remainder of this chapter, Article XIIIB will be referred to as an appropriations limit, although in casual conversation and popular press it is often called a spending limit.

3. HOW THE APPROPRIATIONS LIMIT WORKS

Most of the operative provisions of Article XIIIB are provided in the Constitution. Some features required statutory implementation, which was accomplished by legislation enacted in 1980, and again in 1990 for changes made by Proposition 111.

The paragraphs below describe how the appropriations limit works, based on both constitutional and statutory provisions. Opinions provided by the Legislative Counsel and the Attorney General have contributed to our interpretation of the provisions of Article XIIIB.

Which Governmental Agencies Have Limits. Article XIIIB applies to the state and to most units of local government -- cities, counties, K-12 school districts, community college districts, and special districts. Each governmental entity has its own appropriations limit. The few local governmental entities that are not subject to an appropriations limit are:

- Special districts in existence on January 1, 1987 that did not levy a property tax rate in excess of 12.5% in FY 1977-78; and

- New special districts formed since that time by a vote of the people that are not funded from proceeds of taxes.

Which Revenues Are Subject to Limit. Article XIIIB places a limit on appropriations from most, but not all, government revenue sources. The limit applies to appropriations from proceeds of taxes from both the general fund and special funds of government entities. Proceeds of taxes include tax revenues, interest earnings on invested tax revenues, and any revenues collected by a regulatory license fee or user charge in excess of the amount needed to cover the cost of providing the regulation, product, or service.

Appropriations from non-tax revenues are excluded from the limit. Examples of non-tax proceeds include lottery proceeds, tidelands oil revenues, federal funds, proceeds from the sale of government property, revenues from regulatory license fees or user charges equal to the amount needed to cover the cost of providing the function, gifts, and borrowed funds.

Proposition 111 excluded appropriations from the following revenue sources from the limit:

- Gas and diesel tax revenues above nine cents per gallon;

- Sales and use taxes collected on gas and diesel taxes above nine cents per gallon; and

- Truck weight fees that exceed those in effect on January 1, 1990.

Which Appropriations Are Subject to Limit. Appropriations for almost all government functions are subject to limitation under Article XIIIB. However, there are some important exceptions.

The original Proposition 4 provided that the following appropriations are not limited, even if made from proceeds of taxes:

- Subventions from the state to local governments and schools, the use of which is unrestricted (these subventions are not subject to the state's limit, but instead are counted as subject to the local entity's limit);

- Appropriations to pay for costs of complying with federal laws and court mandates;

- Payments for interest and redemption charges on pre-existing (i.e., pre-Proposition 4) or voter-approved bonded indebtedness;

- Withdrawals from previously appropriated reserve funds; and

- Refunds of taxes.

Proposition 99, adopted by the voters in November 1988, created another major category of appropriations not subject to the limit. These are appropriations of new tax moneys from cigarette and tobacco products resulting from tax increases imposed by Proposition 99. Under that statutory initiative, beginning in FY 1988-89, state revenues from those new or increased cigarette and tobacco taxes are set aside in special accounts for expenditure on treatment or research of tobacco-related diseases, tobacco health education programs, and wildlife preservation and related programs. All such appropriations are exempt from limitation under Article XIIIB.

Proposition 111 excluded capital outlay from the appropriations limit. This change reflects the fact that while capital outlay appropriations are made during a single budget year, they reflect long-term investments that are utilized over a number of years.

Appropriations directly related to an emergency, such as a fire, earthquake, or other natural disaster, were also excluded from the limit by Proposition 111. No reduction in future limits is required for appropriations made for these emergency purposes.

The "Base Year" Limit. The first year that limits were in effect was FY 1980-81. The base year for determining the appropriations limit in FY 1980-81 was FY 1978-79. Actual appropriations in the FY 1978-79 fiscal year that had been financed by the proceeds of taxes were the starting point. Appropriations not subject to limitation (see above) were subtracted from that figure and this became the "base year" level of appropriations for computing all subsequent years' limits.

Proposition 111 updated the base year for calculating the limit for each government entity to FY 1986-87. For fiscal years beginning with FY 1990-91, the limit for each entity is the FY 1986-87 limit adjusted annually as specified by Article XIIIB as amended by Proposition 111.

Base year appropriations limits for new local government entities incorporated after the enactment of Article XIIIB are to be established by local agency formation commissions or county formation review commissions, and approved by the voters of the incorporation or formation elections.

Annual Adjustments to the Limit. The appropriations limit for each year since FY 1980-81 is calculated by adjusting the base year limit for changes in the cost-of-living

and population. Proposition 111, passed by the voters in June 1990, revised each of the adjustment factors. Specifically, annual adjustments to limits, either upward or downward, are made as follows:

- Cost-of-Living.

  State and schools. Governments' limits are adjusted by the change in California per capita personal income.

  Local agencies (except schools). Limits are adjusted by the change in California per capita personal income or the change in the local property tax roll due to the addition of new nonresidential construction.

- Population.

  State. The population factor is calculated by adding: (a) the change in the state's total population weighted by the percent of the budget spent on non-educational programs, and (b) the change in average daily attendance (ADA) for K-14 education weighted by the percentage of the budget spent on K-14 education.

  Local agencies. The population factor is the percentage change in the jurisdiction or in the county in which the jurisdiction is located. Special districts located in two or more counties may use the change in the county in which the district has the highest assessed valuation.

  Counties. The population change for counties can be calculated by using one of three methods: (a) the percentage change in population within the county; (b) the percentage change in population for both the county itself and contiguous counties; or (c) the percentage change in population within the incorporated portion of the county.

  K-14 Schools. The change in population is the percentage change in average daily attendance.

- Program Transfers. Limits of governmental entities are modified to reflect transfers of financial responsibility from one level of government to another. The limit of the new service provider is increased by the amount the former service provider's limit is reduced.

- Funding Transfers. Adjustments either upward or downward are made to account for transfers of program funding sources, for example from tax revenues (subject to limit) to fees (not subject to limit).

The level of appropriations actually made by a government entity in any year does not have any bearing on the calculation of the appropriations limit for the subsequent years. Each year's limit is computed based on the prior year's limit, not the prior year's appropriations.

If the governing body actually appropriates less money than what would be permitted by the limit, it has "room" under its limit, and the limit will be further adjusted the following year for cost-of-living and population changes. A government entity does not "lose" room under its limit for the future by appropriating less than the maximum permitted in any year.

Appropriations Permitted in Excess of the Limit. Article XIIIB sets forth two circumstances under which governments may make appropriations in excess of their limits:

- Emergency. Appropriations for declared emergencies do not count towards and may be made in excess of the limit. Proposition 111 removed the requirement that the limits for future years must be reduced over a three-year period so that there would be no total increase in allowable appropriations.

- Voter Approval. Article XIIIB permits voters of a jurisdiction to authorize an increase in the appropriations limit. However, no voter-approved increase may be in effect for more than four years. At the end of the four-year period, either the voters must approve another increase or the limit must return to the level it would otherwise have been.

When Revenues Exceed the Appropriations Limit. A government entity may receive revenues during a fiscal year that exceed its appropriations limit. Proposition 111 allows governments to average appropriations over a two year period before becoming subject to the excess revenue provisions of Article XIIIB. In other words, a government entity can offset appropriations that exceeds its appropriations limit in one year of a two-year period by appropriating less than the limit in the other year. If revenues exceed the appropriations limit after taking this two-year averaging into account and authority to appropriate is not provided by either an emergency declaration or voter approval, Article XIIIB as amended by Propositions 98 and 111 sets forth a process for disposing of the excess state revenues:

- Education Programs. After the two-year averaging period, 50% of any excess revenues are transferred to the State School Fund for elementary, secondary and community college education. A portion of this excess revenue (25%) may effectively be built into the base used to calculate future funding required by Proposition 98 if the excess funds are used for a specified purpose. The transfer to education is not required if the state's average expenditure per student and average class size is equal to or exceeds that of the ten states with

the best performance in these areas.

- Return of Excess. The 50% of excess revenues remaining after the transfer to education must be returned to taxpayers within the following two years. The return can be made through a reduction in the tax rate or as a fee reduction.

4. HISTORY OF THE STATE'S LIMIT, FYs 1980-81 TO 2006-07

How the Limit is Administered. Under statute, the Governor must submit to the Legislature along with the budget an estimate of the state's appropriations limit for the budget year. The estimate is subject to the budget process, and the official limit is established in the annual Budget Bill. The Department of Finance and the Legislative Analyst's Office have developed the methodologies necessary to compute the limit annually.

Effect of the State's Limit FYs 1980-81 to 1986-87. For the first five years that Article XIIIB was operative, it essentially had no constraining effect on state budgets. Changes in population and CPI outpaced the growth in state revenue in the early 1980s, so that actual revenues received were the constraint on the level of state spending until FY 1986-87.

During this period unused "room" under the state's appropriations limit peaked in FY 1982-83 at $3.4 billion, and declined steadily after that. A decline in the rate of inflation after that time reduced the rate at which the limit was raised annually, while at the same time a robust economy brought steady growth in state revenues. In late 1986, analysts were predicting that by FY 1987-88, the Article XIIIB appropriations limit would begin to function as a significant constraint on state spending.

However, an unanticipated surge in tax revenues in the spring of 1987 caught most observers by surprise. That revenue surge, caused primarily by taxpayer reaction to the federal Tax Reform Act of 1986, pushed the state substantially over its appropriations limit for the first time during the 1986-87 fiscal year. The state ended that fiscal year with $1.1 billion in excess revenues.

FY 1986-87 Rebate of Excess Revenues. During FY 1986-87 Article XIIIB required excess revenues to be returned by means of a tax rate reduction or fee reduction. The method selected to deal with the $1.1 billion in excess state revenues for the 1986-87 FY was to send rebate checks to 11.1 million personal income taxpayers.

The Limit Today. Revisions to the limit calculation implemented by Proposition 111 have continued to result in room under the appropriations limit since 1986. For example, California is expected to be almost $12 billion under the appropriations cap in FY 2007-08.

5. RELATIONSHIP BETWEEN THE STATE'S AND LOCAL GOVERNMENTS' LIMITS

Subventions. As noted above, subventions from the state to local governments that are unrestricted as to the purposes for which they may be spent are not counted as state expenditures subject to limit, but rather are counted against the local limit.

With respect to K-12 school districts, a portion of a district's revenue limit apportionment from the state constitutes a subvention for purposes of Article XIIIB. Subventions are defined as amounts necessary to fund the "foundation program," after taking into account local tax revenues. The "foundation program" represents a computed value that generally is less than the revenue limit amount. The balance of the regular apportionment, as well as apportionments for categorical programs, are not considered to be subventions. State subventions for community college districts are determined similarly.

Reporting Requirements. Legislation enacted in 1987 requires local entities to include information in their annual budget documents relating to their appropriations limits and their appropriations subject to the limit. Proposition 111 requires that the annual calculation of a local government entity's appropriations limit shall be part of that entity's annual financial audit.

6. CODE

California Constitution, Article XIIIB

Government Code Sections 7900-7914

Education Code Sections 41203-41206

RESOLUTION NO. 2021-01

SANITARY DISTRICT NO. 5 OF MARIN COUNTY

A RESOLUTION APPROVING THE DETERMINIATION OF THE APPROPRIATIONS LIMIT FOR THE TIBURON ZONE OF SANITARY DISTRICT NO. 5 OF MARIN COUNTY FOR FISCAL YEAR 2021-2022

WHEREAS, the provisions of Article XIIIB of the California Constitution were implemented by the State Legislature in Government Code Sections 7900 through 7914, and;

WHEREAS, Sanitary District No. 5 of Marin County is required to adopt an "appropriations limit" annually by resolution, and;

WHEREAS, Sanitary District No. 5 of Marin County's "appropriations limit" is determined by a mathematical calculation set forth in Government Code Section 7902, and;

WHEREAS, Sanitary District No. 5 of Marin County has performed, or caused to be performed, the mathematical calculation set forth in Government Code Section 7902.

NOW, THEREFORE, BE IT RESOLVED, by the Board of Directors of Sanitary District No. 5 of Marin County, California, as follows:

1. Pursuant to Article XIIIB of the California Constitution, the District's maximum limit for the appropriation of tax proceeds for the fiscal year of 2021-2022 is TWO MILLION, SEVEN HUNDRED NINETY-FOUR THOUSAND, FIVE HUNDRED TEN DOLLARS and SIXTY-FIVE CENTS ($2,794,510.65).

2. The calculations for the appropriations limit are available in the Administration Office of the District.

* * * * *

Resolution No. 2021-01
May 20, 2021

I certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly passed and adopted by the Board of Directors of Sanitary District No. 5 of Marin County, California, at a meeting thereof held on the 20th of May, 2021, by the following vote:

AYES, and in favor thereof, Directors: RICHARD SNYDER, JOHN CARAPIET, OMAR ARIAS-MONTEZ, CATHARINE BENEDIKTSSON, TED MOODY

NOES, Directors: NONE

ABSENT, Directors: NONE

ABSTAIN, Directors: NONE

Approved:

Richard Snyder
President, Board of Directors

Attest:

Omar Arias-Montez
Secretary, Board of Directors

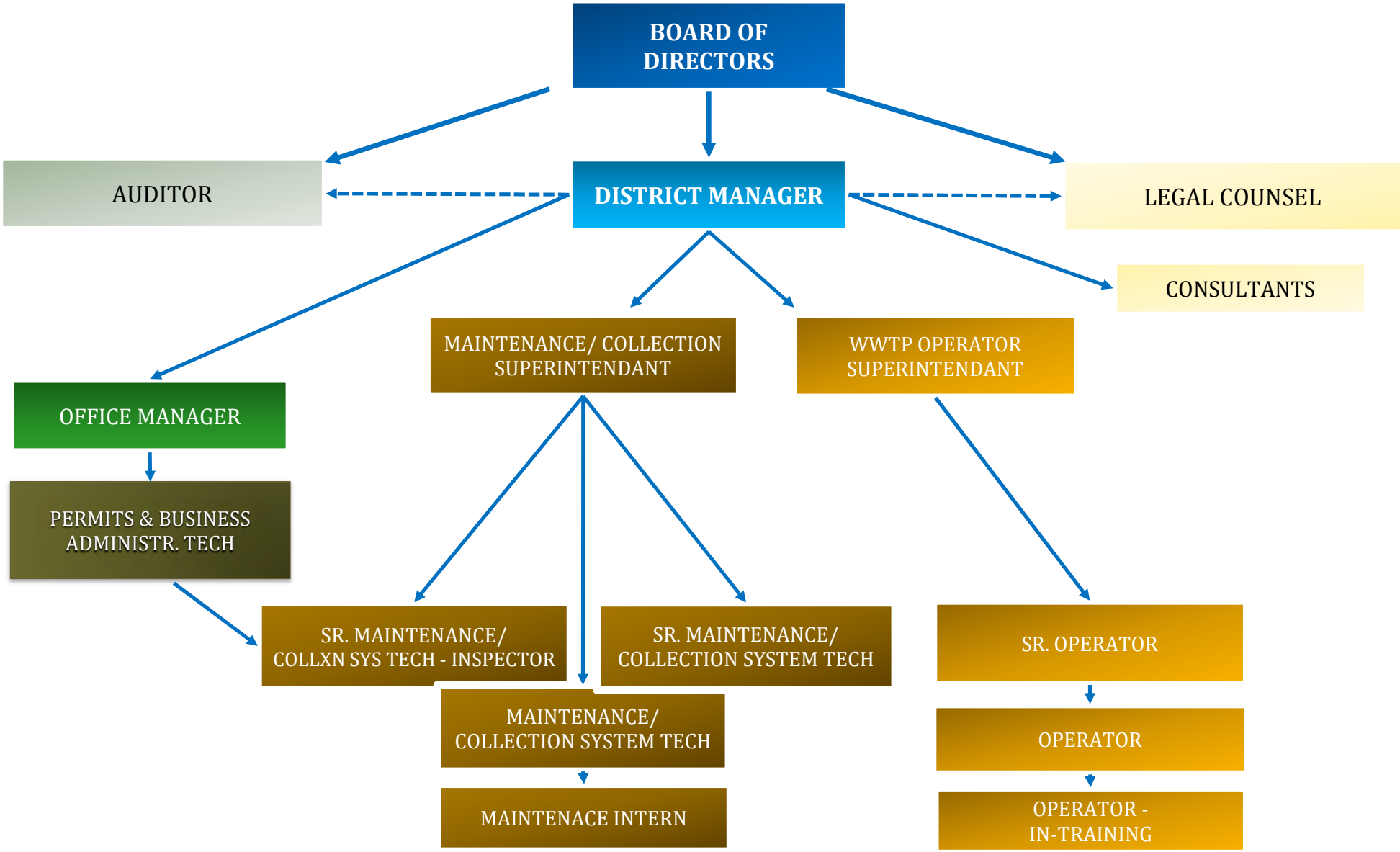
Sanitary District No. 5 of Marin County
Pay Scale - Comparison of Salary Ranges and Steps by Classifications
All Classifications - Filled and Vacant
2.5% Increase for Each Salary Step, Approved on June 17, 2021
July 1, 2021 through June 30, 2022

Salary Step	Monthly Salary	Hourly Rate	District Manager	Senior Wastewater Treatment Plant Operations Superintendent	Office Manager	Wastewater Treatment Plant Permits & Business Administrative Tech	Senior Wastewater Treatment Plant Operator Safety Coordinator	Senior Wastewater Treatment Plant Operator Pollution Prevention Coordinator	Wastewater Treatment Plant Operator	Senior Wastewater Treatment Plant Maint & Collections Superintendent	Senior Wastewater Treatment Plant Maint & Collections System Tech	Senior Wastewater Treatment Plant Maint & Collections Construction Inspector	Wastewater Treatment Plant Maint & Collections System Tech	Maintenance Intern (Hrly Rate, max 975 hrs/FY)
47	23,057.38	133.02												
46	22,495.01	129.77												
45	21,423.82	123.59												
44	20,403.63	117.71												
43	19,432.03	112.10												
42	18,506.70	106.77												
41	17,625.43	101.68												
40	16,786.12	96.84												
39	15,986.78	92.23												
38	15,225.51	87.84												
37	14,500.48	83.65												
36	13,809.98	79.67												
35	13,152.36	75.88												
34	12,526.06	72.26												
33	11,929.58	68.82												
32	11,361.51	65.54												
31	10,820.48	62.42												
30	10,305.22	59.45												
29	9,814.50	56.62												
28	9,347.14	53.92												
27	8,902.04	51.36												
26	8,478.13	48.91												
25	8,074.41	46.58												
24	7,689.92	44.36												
23	7,323.73	42.25												
22	6,974.98	40.24												
21	6,642.84	38.32												
20	6,326.51	36.50												
19	6,025.25	34.76												
18	5,738.33	33.10												
17	5,465.08	31.53												
16	5,204.84	30.03												
15	4,956.99	28.60												
14	4,720.94	27.24												
13	4,496.13	25.94												
12	4,282.03	24.70												
11	4,078.13	23.53												
10	3,883.93	22.41												
9	3,698.98	21.34												
8	3,522.84	20.32												
7	3,355.08	19.36												
6	3,195.32	18.43												
5	3,043.16	17.56												
4	2,898.25	16.72												
3	2,760.24	15.92												
2	2,628.80	15.17												
1	2,503.62	14.44												

Item #10A

SANITARY DISTRICT NO. 5 OF MARIN COUNTY

ORGANIZATION CHART FOR FY2021-2022



RESOLUTION NO. 2021-02

SANITARY DISTRICT NO. 5 OF MARIN COUNTY

A RESOLUTION APPROVING THE ANNUAL COST OF LIVING INCREASE FOR ALL SANITARY DISTRICT NO. 5 OF MARIN COUNTY EMPLOYEES – REPRESENTED, UNREPRESENTED AND MANAGEMENT

The District Board of Sanitary District No. 5 of Marin County finds and determines it is appropriate to set forth in written form, the terms and conditions of service for the Represented Employees, as established in the Memorandum of Understanding, Implemented on December 19, 2012, and any Unrepresented Employees, as specified per individual Employment Contract.

WHEREAS, in accordance with the Adopted Memorandum of Understanding, approved on April 20, 2017, in Section 7, Classifications and Salaries, under Subsection 7.1, Pay Scale, "Effective July 1, 2017, employees shall receive an annual Cost of Living Allowance ("COLA") increase based on the San Francisco-Oakland-San Jose Consumer Price Index for all Urban Consumers ("CPI") using the CPI annual average for the calendar year immediately preceding the commencement of the District's fiscal year. The minimum COLA increase shall be 2.5% and the maximum COLA increase shall be 3.5%. The COLA increase shall be implemented as a salary adjustment effective July 1, of each fiscal year during the term of this agreement", and;

WHEREAS, Sanitary District No. 5 of Marin County is required to implement the annual COLA increase for Represented Employees, and;

WHEREAS, Sanitary District No. 5 of Marin County is to assure any Unrepresented Employees not covered by the Memorandum of Understanding, as stated in Unrepresented Employee Benefits Plan Section 12., Salaries, Pay Scale, "Effective July 1, 2017, employees shall receive an annual Cost of Living Allowance ("COLA") increase based on the San Francisco-Oakland-San Jose Consumer Price Index for all Urban Consumers ("CPI") using the CPI annual average for the calendar year immediately preceding the commencement of the District's fiscal year. The minimum COLA increase shall be 2.5% and the maximum COLA increase shall be 3.5%. The COLA increase shall be implemented as a salary adjustment effective July 1, of each fiscal year", and;

WHEREAS, Sanitary District No. 5 of Marin County is to assure any Management Employees not covered by the Memorandum of Understanding, as stated in exclusive Agreements for Employment in Section IV., Compensation, "[Management Employee] is eligible for any annual cost of living increases granted across-the-board to District employees," matching the COLA increase provided to Represented Employees.

NOW, THEREFORE, BE IT RESOLVED, by the Board of Directors of Sanitary District No. 5 of Marin County, California, as follows:

1. The salaries for all employees of Sanitary District No. 5 of Marin County, as stated on the attached Publicly Available Pay Scale Chart, which reflects an annual Cost of Living increase of 2.5%, effective July 1, 2021, are hereby incorporated in and made part of this Resolution.

Resolution No. 2021-02
May 20, 2021

* * * * *

I certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly passed and adopted by the Board of Directors of Sanitary District No. 5 of Marin County, California, at a meeting thereof held on the 20th of May 2021, by the following vote:

AYES, and in favor thereof, Directors: RICHARD SNYDER, JOHN CARAPIET, OMAR ARIAS-MONTEZ, CATHARINE BENEDIKTSSON, TED MOODY

NOES, Directors: NONE

ABSENT, Directors: NONE

ABSTAIN, Directors: NONE

Approved:

Richard Snyder
President, Board of Directors

Attest:

Omar Arias-Montez
Secretary, Board of Directors

SD5 RESERVE POLICY
RESOLUTION NO. 2021-03
May 20, 2021

Item #11A

	OPERATING RESERVE*	CAPITAL IMPROVEMENTS RESERVE	CALPERS RETIREMENT RESERVE*	DISASTER RECOVERY RESERVE*
FUNDING ORDER	#1	#2	#3	#4
FUNDING PURPOSE	To provide sufficient working capital to cover annual operating expenses and cash flow needs, should typcial operating funds not be available during the fiscal year	To provide adequate funding A) to support both treatment plants' operation and conveyence systems, B) to fund debt payments of financed capital projects, C) to finance capital projects as listed in the District's budgeted CIP Plan, and D) to reserve funds for future plant +/or systemic sewer line renovations E) 2012 Main Plant Rehabilitation (MPR) Bond Service	To provide sufficient annual funding of CalPERS potential losses, as described in the CalPERS' Annual Actuarial Valuation Reports under the Miscellaneous Plan's Share of Pool's Investments, Assets & Non-Assets	To provide a level of emergency capital for disaster recovery efforts until long-term financing is established
CURRENT BALANCE	**$1,200,855* Current Operating Reserve Fund $5,628,300* Current Operating Fund**	**$5,680,840 (Current Capital & Capital Reserve Balance)**	**$1,000,000***	**$1,000,000***
TARGET BALANCE	**$2,500,000*****	**$15,000,000*****	**$1,000,000***	**$1,000,000***
PROPOSED ANNUAL FUNDING	**5% of Sewer Service Charges (FY19/20 Total SS Ops Revenue = $3,900,00) 5% of Sewer Service Charges ≈ $195,000****	**TBD per Annum**	**$1,000,000***	**$1,000,000***
FUNDING PROCESS	≈5% of revenues received for sewer service charges (based on annual flow rates) is to be funded each Fiscal Year, until target balance is achieved; no add'l funding required thereafter. If reserve subsequently dips below target balance, funding is to be reinstated.	Based on Capital needs per annum. Sewer service charges, property taxes and other capital-related funds received to be assessed annualy and funded as cashflow permits, based on annual projects; any remaining funds will be reserved for long-term capital needs. (see Funding Purpose above, Items C &D)	3.5% of SD5's Pooled Plan Share of CalPERS Market Value Asset is to be funded each Fiscal Year, until target balance is achieved; no add'l funding required thereafter. If reserve subsequently dips below target balance, funding is to be reinstated.	To be funded one time only, from current Capital Reserve Account. No additional funding requred, once target balance is achieved. Finance Committee will evaluate the need to reinstate.
AUTHORITY REQUIRED FOR FUNDING & WITHDRAWALS	District Manager is authorized to make withdrawals as necessary, to cover operating shortfalls, upon review by the Finance Comitee, as set forth in this Reserve policy. All other transfers to be presented for review by the Finance Comittee and recommended prior to withdrawal. Board approval is required for atypical funding.	District Manager is authorized to make monthly withdrawals for debt payments and capital improvement projects underway, upon review by the Finance Comitee, as set forth in this Reserve policy. All other transfers to be presented for review by the Finance Comittee and recommended prior to withdrawal. Board approval is required for atypical funding.	District Manager is authorized to make withdrawals for payments to CalPERS for unfunded liabilities upon review by the Finance Comitee, as set forth in this Reserve policy. All other transfers to be presented for review by the Finance Comittee and recommended prior to withdrawal. Board approval is required for atypical funding.	All withdrawals and transfers to be presented for review by the Finance Comittee and recommended to the Board for approval.

* Balances based on SD5 Balance Sheet, as of 5.18.2021

*** Target Balances @ Disaster Recovery & CalPERS Retirement Splits are based on SD5's Historical split: Belvedere @ 35.625% ; Tiburon @ 64.375%

EXHIBIT A: BELVEDERE
SD5 RESERVE POLICY
RESOLUTION NO. 2021-03
May 20, 2021

	OPERATING RESERVE*	CAPITAL IMPROVEMENTS RESERVE	CALPERS RETIREMENT RESERVE*	DISASTER RECOVERY RESERVE*
	#1	#2	#3	#4
FUNDING PURPOSE	To provide sufficient working capital to cover annual operating expenses and cash flow needs, should typcial operating funds not be available during the fiscal year	To provide adequate funding A) to support both treatment plants' operation and conveyence systems, B) to fund debt payments of financed capital projects, C) to finance capital projects as listed in the District's budgeted CIP Plan, and D) to reserve funds for future plant +/or systemic sewer line renovations E) 2012 Main Plant Rehabilitation (MPR) Bond Service	To provide sufficient annual funding of CalPERS potential losses, as described in the CalPERS' Annual Actuarial Valuation Reports under the Miscellaneous Plan's Share of Pool's Investments, Assets & Non-Assets	To provide a level of emergency capital for disaster recovery efforts until long-term financing is established
CURRENT BALANCE	**$516,925* Current Operating Belvedere Reserve Fund Working Belvedere Ops Fund: $3,662,700***	**Belvedere: $2,168,490* Current Capital & Capital Reserve Balance**	**$356,250***	**$356,250***
TARGET BALANCE	**Belvedere: $890,625*****	**Belvedere: $5,343,750*****	**Belvedere: $356,250*****	**Belvedere: $356,250*****
PROPOSED ANNUAL FUNDING	**(FY19-20: $1,400,000*) 5% of Sewer Service Charges 5% of Sewer Service Charges ≈ $70,000***	**TBD per Annum**	**N/A**	**N/A**
FUNDING PROCESS	≈5% of revenues received for sewer service charges (based on annual flow rates) is to be funded each Fiscal Year, until target balance is achieved; no add'l funding required thereafter. If reserve subsequently dips below target balance, funding is to be reinstated.	Based on Capital needs per annum. Sewer service charges, property taxes and other capital-related funds received to be assessed semi-annually and approtioned as needed, based on annual projects; any remaining funds will be reserved for long-term capital needs. (see Funding Purpose above, Items C &D)	3.5% of SD5 Plan's Share of the CalPERS Pool's Market Value Asset is to be funded each Fiscal Year, until target balance is achieved; no add'l funding required thereafter. If reserve subsequently dips below target balance, funding is to be reinstated.	To be funded one time only, from current Capital Reserve Account. No additional funding requred, once target balance is achieved. If reserve subsequently dips below target balance, funding to be reinstated.
AUTHORITY REQUIRED FOR FUNDING & WITHDRAWALS	District Manager is authorized to make withdrawals as necessary, to cover operating shortfalls, as set forth and approved in this Reserve Policy. All other transfers to be presented for review by the Finance Comittee, recommended to and approved by the Board prior to withdrawal.	District Manager is authorized to make monthly withdrawals for debt payments and capital improvement projects underway, upon review by the Finance Comitee, as set forth in this Reserve policy. All other transfers to be presented for review by the Finance Comittee, recommended to and approved by the Board prior to withdrawal.	District Manager is authorized to make withdrawals for payments to CalPERS for unfunded liabilities. All other transfers to be presented for review by the Finance Comittee, recommended to and approved by the Board prior to withdrawal.	All withdrawals and transfers to be presented for review by the Finance Comittee and recommended to the Board for approval.

* Balances based on SD5 Balance Sheet, as of 5.18.2021

*** Target Balances @ Disaster Recovery & CalPERS Retirement Splits are based on SD5's Historical split: Belvedere @ 35.625% ; Tiburon @ 64.375%

EXHIBIT B: TIBURON/PARADISE COVE
SD5 RESERVE POLICY
RESOLUTION NO. 2021-03
May 20, 2021

	OPERATING RESERVE*	CAPITAL IMPROVEMENTS RESERVE	CalPERS RETIREMENT RESERVE*	DISASTER RECOVERY RESERVE*
FUNDING ORDER	#1	#2	#3	#4
FUNDING PURPOSE	To provide sufficient working capital to cover annual operating expenses and cash flow needs, should typcial operating funds not be available during the fiscal year	To provide adequate funding A) to support both treatment plants' operation and conveyence systems, B) to fund debt payments of financed capital projects (MPR), C) to finance capital projects as listed in the District's budgeted CIP Plan, and D) to reserve funds for future plant +/or systemic sewer line renovations	To provide sufficient annual funding of CalPERS potential losses, as described in the CalPERS' Annual Actuarial Valuation Reports under the Miscellaneous Plan's Share of Pool's Investments, Assets & Non-Assets	To provide a level of emergency capital for disaster recovery efforts until long-term financing is established
CURRENT BALANCE	**$683,930* Current Operating Tiburon Reserve Fund Working Tiburon Ops Fund: $1,965,600***	**Tiburon: $3,512,350* Current Capital & Capital Reserve Balance**	**$643,750***	**$643,750***
TARGET BALANCE	**Tiburon: $1,609,375*****	**Tiburon: $9,656,250*****	**Tiburon: $643,750*****	**Tiburon: $643,750*****
PROPOSED ANNUAL FUNDING	**(FY19-20: $2,500,000*) 5% of Sewer Service Charges 5% of Sewer Service Charges ≈$125,000****	**TBD per Annum**	**N/A**	**N/A**
FUNDING PROCESS	≈5% of revenues received for sewer service charges (based on annual flow rates) is to be funded each Fiscal Year, until target balance is achieved; no add'l funding required thereafter. If reserve subsequently dips below target balance, funding is to be reinstated.	Based on Capital needs per annum. Sewer service charges, property taxes and other capital-related funds received to be assessed semi-annually and approtioned as needed, based on annual projects; any remaining funds will be reserved for long-term capital needs. (see Funding Purpose above, Items C &D)	3.5% of SD5 Plan's Share of the CalPERS Pool's Market Value Asset is to be funded each Fiscal Year, until target balance is achieved; no add'l funding required thereafter. If reserve subsequently dips below target balance, funding is to be reinstated.	To be funded one time only, from current Capital Reserve Account. No additional funding requred, once target balance is achieved. If reserve subsequently dips below target balance, funding is to be reinstated.
AUTHORITY REQUIRED FOR FUNDING & WITHDRAWALS	District Manager is authorized to make withdrawals as necessary, to cover operating shortfalls, as set forth and approved in this Reserve Policy. All other transfers to be presented for review by the Finance Comittee, recommended to and approved by the Board prior to withdrawal.	District Manager is authorized to make monthly withdrawals for debt payments and capital improvement projects underway, upon review by the Finance Comitee, as set forth in this Reserve policy. All other transfers to be presented for review by the Finance Comittee, recommended to and approved by the Board prior to withdrawal.	District Manager is authorized to make withdrawals for payments to CalPERS for unfunded liabilities. All other transfers to be presented for review by the Finance Comittee, recommended to and approved by the Board prior to withdrawal.	All withdrawals and transfers to be presented for review by the Finance Comittee and recommended to the Board for approval.

* Balances based on SD5 Balance Sheet, as of 5.18.2021

*** Target Balances @ Disaster Recovery & CalPERS Retirement Splits are based on SD5's Historical split: Belvedere @ 35.625% ; Tiburon @ 64.375%

RESOLUTION NO. 2021-03

SANITARY DISTRICT NO. 5 OF MARIN COUNTY

A RESOLUTION APPROVING AND ADOPTING FISCAL YEAR 2021-2022 FINANCIAL RESERVE/FUND POLICIES FOR THE BELVEDERE AND TIBURON/PARADISE COVE ZONES

WHEREAS, Sanitary District No. 5 of Marin County ("SD No. 5") owns and operates sewer collection systems for the collection, treatment, and disposal of wastewater from the local service area which are highly capital intensive and expensive to operate and maintain; and

WHEREAS, the sewer collection systems operated by SD No. 5 serve two separate zones, the Belvedere Zone, and the Tiburon/Paradise Cove Zone; and

WHEREAS, on December 1, 2003, SD No. 5 adopted Resolution No. 2003-18 which established financial reserve policies and amounts for various SD No. 5 funds, relating to its sewer collection system servicing the Tiburon/Paradise Cove Zone; and

WHEREAS, in accordance with the annexation terms and conditions adopted by SD No. 5, the Belvedere Zone is financially self-supporting, and all funds collected in the Belvedere Zone are used for the Belvedere Zone sewer collection system and the Belvedere Zone's portion of shared operational costs and capital expenditures in the Main Treatment Facility; and

WHEREAS, the Belvedere Zone is funded by user fees that are generally set once per year, and thereafter available to SD No. 5 two times per year based upon the collection and distribution of the monies by SD No. 5's agent, the County of Marin Tax Collector's office; and

WHEREAS, the Tiburon/Paradise Cove Zone is funded substantially through the collection of property taxes and user fees that are generally set once per year, and thereafter available to SD No. 5 two times per year based upon the collection and distribution of the monies by SD No. 5's agent, the County of Marin Tax Collector's Office; and

WHEREAS, on July 2, 2007, SD No. 5 adopted Resolution No. 2007-08 which repealed Resolution No. 2003-18 and established updated financial reserve policies and amounts for both the Belvedere Zone, and the Tiburon/Paradise Cove Zone; and

WHEREAS, on January 25, 2011, SD No. 5 adopted Resolution No. 2011-02 which repealed Resolution No. 2007-08, and established further updated financial reserve/fund policies and target amounts for both the Belvedere Zone, and the Tiburon/Paradise Cove Zone; and

WHEREAS, on June 19, 2012, SD No. 5 adopted Resolution No. 2012-03, which repealed Resolution No. 2011-02 and establishes further updated financial reserve/fund policies and target amounts for both the Belvedere Zone, and the Tiburon/Paradise Cove Zone; and

WHEREAS, prudent financial management requires that local governments establish strong and well-considered and developed policies related to the collection and use of public funds for operations and maintenance and capital asset replacement; and

WHEREAS, SD No. 5's customers, the public, and other agencies receiving sewer collection services should be able to understand how and for what purposes SD No. 5 financial reserves in excess of annual operating requirements are maintained and managed; and

WHEREAS, SD No. 5 has substantial requirements to accumulate reserve funds for the renewal and replacement of infrastructure and facilities, including bond debt, to allow SD No. 5 to meet the treatment and disposal requirements placed upon it by the State and Federal government operating permits; and

WHEREAS, certain funding agreements previously entered into by SD No. 5 with the State Water Resources Control Board and the Environmental Protection Agency require SD No. 5 to properly fund and maintain those facilities funded through grant funding at levels appropriate for the replacement and renewal of the assets at the lowest life cycle costs; and

WHEREAS, varying requirements and conditions need to be applied to separate reserves/funds based upon their source and use of the funds; and

WHEREAS, it is prudent for the Board of Directors of Sanitary District No. 5 of Marin County, California ("the Board") to review and analyze necessary funds in order to be able to respond to changes and variations in cash flow at SD No. 5 based upon an assessment of the risks and possibilities of financial disasters resulting from actions outside of SD No. 5's control, such as acts of God, fires, unusual changes in the prices of commodities from suppliers, and man-made disasters that may affect the ability of SD No. 5 to adequately and quickly change the means available to supplement revenues of SD No. 5; and

WHEREAS, the Board believes that it is good public policy to identify a clear and well articulated rationale for the accumulation and management of SD No. 5's reserves/funds; and

WHEREAS, the Board desires to further update the District's financial reserve/fund policies and target amounts for both the Belvedere Zone, and the Tiburon/Paradise Cove Zone, by amending Exhibits A and B;

NOW THEREFORE BE IT RESOLVED, by the Board of Directors of Sanitary District No. 5 of Marin County, California, that the following policies be utilized for the designation of restricted reserves/funds for operating needs and prudent financial management of the various operating funds of SD No. 5 with respect to the Tiburon/Paradise Cove Zone and the Belvedere Zone:

1. All funds belonging to the Tiburon/Paradise Cove Zone and the Belvedere Zone are hereby designated and restricted for each zone as follows:

    a. Operating Reserve Fund
    b. Capital Improvements Reserve Fund
    c. Disaster Recovery Reserve Fund
    d. CalPERS Retirement Reserve Fund

    These restricted reserves/funds, and all restricted reserves/funds designated hereinafter, shall be established respectively as identified in updated **Exhibit A** (the Belvedere Zone), and updated **Exhibit B** (the Tiburon/Paradise Cove Zone), attached hereto, and hereby made a part of this Resolution.

2. All funds deposited in the Capital Improvement Reserve Fund for the Belvedere Zone and the Tiburon/Paradise Cove Zone are hereby designated for the purpose of upgrading and/or replacement of sewage collection, treatment, and disposal facilities, which comprise the present or future sewerage facilities of SD No. 5.

3. All funds collected from connection fee revenue and deposited in the Capital Reserve Fund for the Belvedere Zone and the Tiburon/Paradise Cove Zone are hereby restricted for the construction and acquisition of future improvements related to the expansion or enhancement of capacity or operating conditions at SD No. 5.

4. All designated reserves/funds established by this Resolution shall be identified, reviewed, and confirmed or modified each year as part of SD No. 5's annual budget process.

5. Funds to be used from the reserves shall only be available upon direction and authorization of the Board based upon a detailed report and evaluation of the use of the funds including a proposed method for the reestablishment of the affected reserve balance.

* * * * *

I hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly passed and adopted by the Board of Directors of Sanitary District No. 5 of Marin County, California, at a meeting thereof duly held on the 20th day of May 2021, by the following vote:

AYES, and in favor thereof, Directors: Richard Snyder, John Carapiet, Omar Arias-Montez, Catharine Benedikt Egan, Tod Moody

NOES, Directors: None

ABSENT, Directors: None

ABSTAIN, Directors: None

Approved:

Richard Snyder
President, Board of Directors

Attest:

Omar Arias-Montez
Secretary, Board of Directors

DECISION/ACTION ITEM LOG
CIP Committee: May 11, 2021
Sanitary District No. 5 of Marin County

Item #12

ACTIVE ITEMS SHEET

No.	Item	Submission Date	Responsible Party	DECISION ONLY Due	DECISION ONLY / Completed	ACTION REQUIRED Due	ACTION REQUIRED / Completed	Comment/Reference Document
29	Cove Rd. Force Main Replacement Project	3.12.19	Nute/TR/CIP					Nute Preparing Bid Docs, as of 3.12.19; Waiting for CalTrans response re horizontal drilling, as of 5.14.19; Still working w/ CalTrans, waiting for approval, as of 11.12.19; Design Review from Nute, 12.10.19, 1.14.19, 2.11.20; Received Caltrans Permit, 3.9.2020; Notice for Sealed Bid @ Marin IJ on 4.28.2020 w/ Bids due 5.19.2020; Posted RFP at SD5 Wesbite, (http://www.sani5.org/about/contracts-proposals-bidding), 5.5.2020; Project granted to Maggiora & Ghilotti, Inc.; Work to begin on 7.27.2020; Job well underway and progressing smoothly, as of 10.13.2020; ~~Job is 70% complete, as of 11.10.2020;~~ ~~Job is 95% complete, as of 2.9.2021; Project substantially completed as of 2.25.2021;~~ **Final/close-out billing to be approved at 5.20.21 Board Meeting**
31	FY2020-2021 Sewer Rehab Project		CIP/TR					Small project for Paradise Cove; Enginnering to begin in ~~Dec 2020, as of 7.14.2020; Jan 2021, as of 12.8.2020;~~ **Will begin once SD5 Collection System Master Plan is in place, as of April 13, 2021**
32	SD5 Collection Sytsem Master Plan		CIP/TR					Posted RFP at SD5 Wesbite, (http://www.sani5.org/about/contracts-proposals-bidding), 5.5.2020; Revised RFP from HDR, as of 7.14.2020; ~~Underway, as of 11.10.2020; CIP asking final questions.tweaking reports, etc., as of 2.9.2021;~~ **Presenting Final Draft @ 4.15.2021 Regular Board Mtg**

RESEARCH ARTICLE
Clinical Science and Epidemiology

Item #16

Genome Sequencing of Sewage Detects Regionally Prevalent SARS-CoV-2 Variants

Alexander Crits-Christoph,[a,b] Rose S. Kantor,[c] Matthew R. Olm,[d] Oscar N. Whitney,[e] Basem Al-Shayeb,[a,b] Yue Clare Lou,[a,b] Avi Flamholz,[e*] Lauren C. Kennedy,[c] Hannah Greenwald,[c] Adrian Hinkle,[c] Jonathan Hetzel,[f] Sara Spitzer,[f] Jeffery Koble,[f] Asako Tan,[f] Fred Hyde,[j] Gary Schroth,[f] Scott Kuersten,[j] Jillian F. Banfield,[b,g,h,i] Kara L. Nelson[b,c]

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ABSTRACT Viral genome sequencing has guided our understanding of the spread and extent of genetic diversity of SARS-CoV-2 during the COVID-19 pandemic. SARS-CoV-2 viral genomes are usually sequenced from nasopharyngeal swabs of individual patients to track viral spread. Recently, RT-qPCR of municipal wastewater has been used to quantify the abundance of SARS-CoV-2 in several regions globally. However, metatranscriptomic sequencing of wastewater can be used to profile the viral genetic diversity across infected communities. Here, we sequenced RNA directly from sewage collected by municipal utility districts in the San Francisco Bay Area to generate complete and nearly complete SARS-CoV-2 genomes. The major consensus SARS-CoV-2 genotypes detected in the sewage were identical to clinical genomes from the region. Using a pipeline for single nucleotide variant calling in a metagenomic context, we characterized minor SARS-CoV-2 alleles in the wastewater and detected viral genotypes which were also found within clinical genomes throughout California. Observed wastewater variants were more similar to local California patient-derived genotypes than they were to those from other regions within the United States or globally. Additional variants detected in wastewater have only been identified in genomes from patients sampled outside California, indicating that wastewater sequencing can provide evidence for recent introductions of viral lineages before they are detected by local clinical sequencing. These results demonstrate that epidemiological surveillance through wastewater sequencing can aid in tracking exact viral strains in an epidemic context.

KEYWORDS coronavirus, environmental microbiology, genomics, metagenomics

The COVID-19 pandemic caused by SARS-CoV-2 reached the United States at the start of 2020, with multiple early introduction events in the states of Washington, California, and New York (1). Since then, the total number of cases in the country has surpassed 14 million, with over 275,000 deaths and enormous implications for public health (2). While clinical viral cases have been tracked mostly with quantitative reverse transcriptase PCR (RT-qPCR), there has also been extensive whole viral genome sequencing of clinical cases, generating over 75,000 genomes globally, including 17,000 from the United States and 2,500 from California (GISAID EpiCov database as of 23 August 2020) (3).

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Genomic epidemiology, the analysis of viral and microbial genomes in order to make inferences about pathogen evolution, transmission, and spread, has played an important role in improving our understanding of the transmission dynamics of the SARS-CoV-2 pandemic (4). Early in the pandemic, this approach revealed multiple introduction events into California and viral lineages present at different abundances across counties in Northern California (5). Genome sequencing was also used to show that there was unexpectedly frequent community spread of a specific genotype after early introduction in Washington State (6). Genome sequencing in the New York City area identified multiple viral introduction events from Europe (7), and sequencing in the Mission district of San Francisco identified distinct viral strains in a single neighborhood, with transmission between family clusters (8).

Unlike many respiratory viruses, RNA of SARS-CoV-2 and other coronaviruses can be detected in human feces (9–11). Before the COVID-19 pandemic, members of the *Coronaviridae* had been previously identified in municipal wastewater through both RT-qPCR and shotgun metagenomic and metatranscriptomic sequencing (12, 13). Since the start of the COVID-19 pandemic, wastewater RT-qPCR has quantified the amount of SARS-CoV-2 RNA in sewage to estimate the abundance of the virus across many different municipal regions globally (14–22). Prior work showed that shotgun wastewater sequencing can provide information about many viruses simultaneously (12, 23, 24) and enable genome-resolved (25) and phylogenetic analyses (26, 27). In one study, a SARS-CoV-2 consensus genome was obtained from sewage via targeted amplification and long-read sequencing, allowing for phylogenetic analysis of the predominant lineage (27). Here, we show that sequencing of viral concentrates and RNA extracted directly from wastewater can identify multiple SARS-CoV-2 genotypes at various abundances known to be present in communities, as well as additional genotypic variants not yet observed in local clinical sequencing efforts.

RESULTS AND DISCUSSION

Metatranscriptomic detection of SARS-CoV-2 and other viruses in wastewater. Twenty-four-hour 1-liter composite samples of raw sewage were collected from wastewater treatment facilities in Alameda and Marin Counties in Northern California between 19 May 2020 and 15 July 2020 (see Table S1 in the supplemental material). We extracted nucleic acids from samples using three methods that enriched for viral particles (ultrafiltration) or total RNA (RNA silica columns or silica milk). SARS-CoV-2 viral RNA was first detected using a RT-qPCR assay (see Materials and Methods) of the N gene and C_q values ranged from 29.5 to 36.2, or an estimated ~2 to ~553 genome copies/μl of RNA. From this we estimate that there were 2.8×10^5 genome copies/liter of wastewater on average across our samples (see Table S1). For each sample, 40 to 50 μl of RNA was prepared for sequencing, implying an estimated ~4,438 viral genome copies on average were contained within each sequencing library.

After cDNA synthesis from the total RNA, samples were enriched for a panel of human respiratory viruses using a commercially available oligo-capture approach (Illumina respiratory virus panel; see Materials and Methods) and sequenced on a NextSeq 550 to produce on average 12 million 2×75 bp reads per sample. Reads were mapped to the human genome to estimate the amount of human RNA/DNA in the samples (0.7 to 16% of reads per sample). Sequencing reads were then mapped to a dereplicated set of all eukaryotic viruses contained in the RefSeq database, and stringently filtered to include only high-quality reads matching reference sequences with >97% identity (see Materials and Methods). Viral abundances and SNVs (single nucleotide variants) were then calculated using the metagenomic strain-typing program inStrain v1.12. We detected SARS-CoV-2 at various abundances of sequenced RNA/DNA (0 to 14%) across samples (Fig. 1a and b; see also Table S1). Sequencing relative abundance of SARS-CoV-2 was not strongly correlated with RT-qPCR genome copy quantification, likely due to the variability introduced by different extraction methods. Viral enrichment by ultrafiltration achieved higher relative abundances of SARS-CoV-2

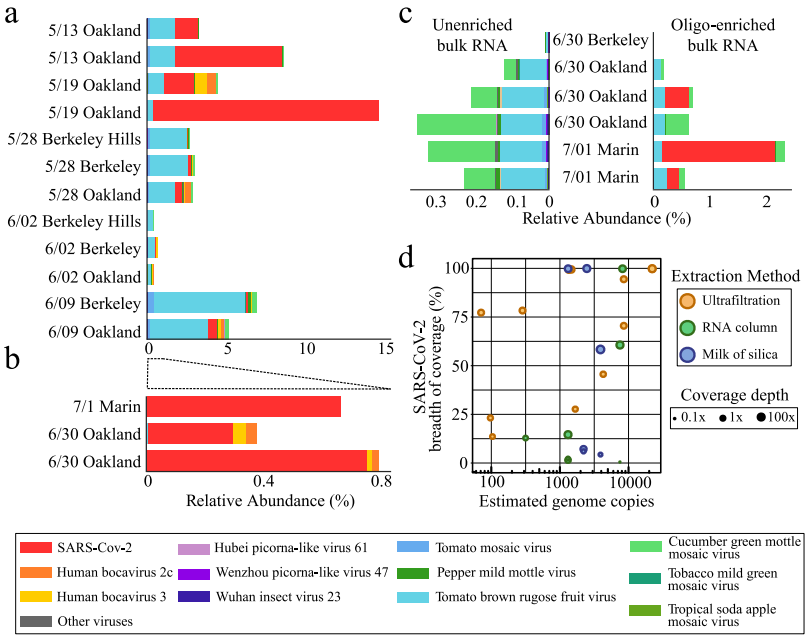

FIG 1 Characterized viruses detected in enriched and unenriched wastewater metatranscriptomes. The relative abundances of viruses with eukaryotic hosts in the RefSeq database as a percentage of total sequencing reads derived from the sample in Amicon ultrafiltration (viral fractionation) (a) and total RNA column and milk of silica samples (b). All samples were enriched with the Illumina respiratory virus panel. (c) Relative abundances of RefSeq viruses in unenriched metatranscriptomics (left) and the same samples after oligonucleotide enrichment with the Illumina respiratory virus panel. (d) The relationship between the quantity of viral genome copies in 40 μl of purified RNA and SARS-CoV-2 genome completeness (measured in breadth of coverage) for each sample. Samples are colored by extraction methodology, and the size of the point corresponds to the mean SARS-CoV-2 depth of coverage.

RNA, although these experiments were time-intensive and often had lower absolute genome copy number recovery according to RT-qPCR. In addition, we sequenced replicates from one set of samples with rRNA depletion but no viral enrichment. Without enrichment, we were able to only detect fewer than 40 total SARS-CoV-2 read pairs (Fig. 1c; see also Table S1). While this illustrates the difficulty of detecting specific viruses in wastewater in unenriched sequencing data sets, larger sequencing efforts may overcome this limitation by sequencing more deeply.

Other human viruses identified in the wastewater sequencing included Human bocaviruses 2c and 3 (Fig. 1a and b), both of which are respiratory viruses sometimes capable of causing gastroenteritis, and are included in the Illumina respiratory virus panel. Bocaviruses have been identified in sewage samples previously (28, 29). Picornavirus-like viruses were also detected (Fig. 1c). The most abundant viruses in the data were plant viruses including cucumber green mottle mosaic virus and pepper mild mottle virus (PMMoV) (Fig. 1a). These viruses are known to be highly abundant in human wastewater (30) and have been used as fecal loading controls in wastewater SARS-CoV-2 quantification (19). Near-complete (>95% breadth of coverage) genomes were obtained for SARS-CoV-2, bocavirus 3, PMMoV, and other plant viruses (see Table S2), implying that these viruses were at high enough abundance in the data set for exact genomic analysis.

Recovery of complete and nearly complete SARS-CoV-2 viral genomes from wastewater. Complete consensus viral genomes are required to perform viral lineage tracking for genomic epidemiology. We obtained complete consensus SARS-CoV-2 genomes (breadth of coverage >99%) from 7 of 22 samples (31%), while large-scale patient sequencing efforts have for example obtained genomes for ~80% of samples (31). Only samples with RT-qPCR C_T values <33 (~25 genome copies/μl) yielded complete consensus genomes (Fig. 1d), but we also recovered at least one genome using each of our three extraction methods. The mean depth of coverage for each complete

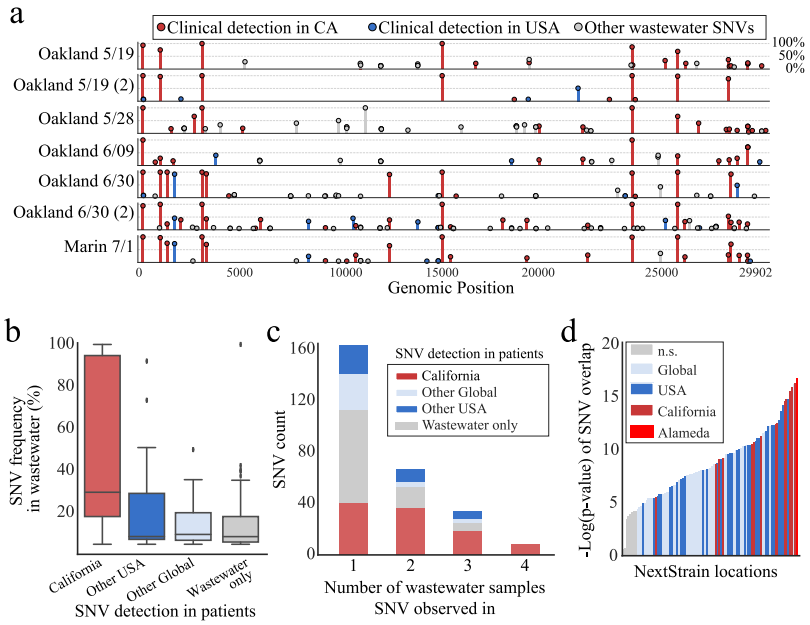

FIG 2 SARS-CoV-2 SNVs in wastewater samples. (a) Allele frequencies of SARS-CoV-2 in wastewater metatranscriptomes for each sample. Each point is a SNV by location on the SARS-CoV-2 genome (*x* axis), and the height of the bar (*y* axis) is the frequency of the alternative allele (relative to the reference genome EPI_ISL_402124) at that position. Wastewater SNVs are colored based on whether they have previously been observed in clinical samples from California, the United States, or neither. (b) Wastewater SARS-CoV-2 frequencies grouped by whether they have been observed in clinical samples from different regions. Most highly abundant SNVs have been observed previously in California or elsewhere in the United States. (c) SARS-CoV-2 SNVs grouped by the number of wastewater samples observed in (out of seven high-quality samples). Most SNVs that were observed in two or more samples have been observed clinically in California. (d) Multiple hypothesis adjusted (Bonferroni correction) *P* value distribution of hypergeometric tests for overlap between all wastewater SNVs observed and the variants clinically observed and reported in each location (a county level designation in the United States). Alameda County was the most significant comparison.

genome ranged from 7× to 107× after filtering and removal of PCR duplicates. The consensus genomes from Alameda County, and the one from Marin County, were all within 4-bp differences of each other. These consensus genomes were found to be unlikely to be chimeric, as a BLAST analysis identified SARS-CoV-2 genomes that were 100% identical at all nongapped positions (see Table S3) obtained from patients in northern California. Consensus genomes may represent predominant SARS-CoV-2 lineages in the population in the serviced areas during the summer of 2020. The results demonstrate genomic accuracy for recovery of consensus SARS-CoV-2 genomes so long as sufficient coverage is achieved in metatranscriptomic data sets.

Identification of alternative SARS-CoV-2 variants in wastewater populations recovers locally reported clinical genotypes. While consensus genotypes can describe the predominant genotype of a virus in a metatranscriptome, the strength of wastewater-based sampling and sequencing lies in the ability to identify alternative genotypes in the population being sampled. Using a recently developed pipeline for metagenomic SNV calling (32), we identified putative SNVs that are variable within the viral population sampled in each wastewater sample after read mapping to the SARS-CoV-2 reference genome EPI_ISL_402124 (Fig. 2a; see also Table S4). Due to the large-scale sequencing efforts of SARS-CoV-2 in patients in both northern California and worldwide, we established that these SNVs had also been detected in genomes from individual patients. Across all samples, 50% of SNVs observed in wastewater samples at >10% frequency were also observed in patient-derived viral genomes from California; 61% were observed in viral genomes from the United States, and 71% were observed in any viral genomes collected worldwide. SNVs that have been observed in California patients had significantly higher allele frequencies in the wastewater samples than

those that were not detected in clinical cases (mean, 48 versus 15%, respectively; $P < 0.01$ [two-sided *t* test]) (Fig. 2b). This is likely because the more abundant a SNV is in the population, the more likely it is to be sampled in wastewater and in the clinic. Further, several of the same SNVs were observed across samples, and these recurrent SNVs were, on average, 2.3× more likely to be observed in California or U.S. patient-derived genomes than SNVs observed once (Fig. 2c). Taken together, these are strong signals that deeper sequencing of wastewater and combining information across samples better recapitulates true viral genomic variation in the sampled population.

More than 75,000 patient-derived SARS-CoV-2 genomes have been sequenced and deposited into the GISAID database globally, including 2,500 genomes obtained from patients in California. To understand the context of the viral genomic variation we observed within wastewater samples, we used a hypergeometric test to calculate the likelihood of overlap by chance between the set of wastewater variants and the set of variants observed in viruses from patients in a given region. This computes the probability of observing a certain amount of overlap in variants by chance and accounts for the fact that some regions have far more sequenced patient genomes and correspondingly more alleles than others. For example, the probability of the observed overlap between wastewater variants and California clinical variants having occurred by chance was calculated to be $P < 10^{-10}$, indicating a high likelihood of nonrandom overlap. By further comparing the probabilities of SNV overlap between patient genotypes and wastewater genotypes at the NextStrain "location" level (corresponding to counties and/or cities), we found the highest likelihood of nonrandom overlap between all wastewater genotypes observed and clinical genotypes from Alameda County (Fig. 2d), the location that the wastewater samples were also derived from.

Identification of potential lineage transmission events previously undetected in local patient-based sequencing at time of sampling. Some clinical SARS-CoV-2 viral strains can be differentiated by more than one SNV. Across the wastewater data set, we observed one pair and one triplet of SNVs that were shared by clinical isolates. The pair and triplet of SNVs each occurred at similar frequencies, supporting their linkage in wastewater genomes (Fig. 3a and b). In addition to the SNVs that also have been observed clinically in California, there were four SNVs recurrent across wastewater samples that had not been previously observed in California but had been observed elsewhere in the United States (Fig. 3c). Two adjacent SNVs (14222G and 14223C) are associated with a single viral strain that has been often observed in clinical samples in Washington State. Another two SNVs (8083A and 1738T) are not linked, but both have been observed in different clinical genomes of four other states in the United States. Interestingly, these variants appear to have arisen or arrived in the United States only during the month of July, suggesting that they may be detected in clinical samples from California in the near future.

Overall, this study demonstrated that wastewater sequencing can accurately identify genotypes of viral strains that are clinically detected in a region and those not yet detected by clinical sequencing. Another key advantage of this method is that it does not rely on specific PCR primers, which can fail to detect SARS-CoV-2 strains with mutations in the primed sequence (33). With more intensive wastewater sampling, this approach also has the potential to reveal patterns of virus distribution within communities, helping to elucidate the transmission and spread of diseases during epidemics. Perhaps most significantly, the results indicate that wastewater sequencing can detect recent introductions of SARS-CoV-2 genotypes and other disease-causing viruses at a population scale.

MATERIALS AND METHODS

Sample collection and extraction. Twenty-four-hour 1-liter composite samples were collected at four different wastewater interceptors in the San Francisco Bay Area (labeled "Berkeley," "Berkeley Hills," "Oakland," and "Marin," based roughly on the municipal areas each services). The time-weighted composite samples were collected using autosamplers that draw from influent every 15 min into 24-hourly bottles, which were then combined and mixed, and subsamples were taken for analysis. Samples were immediately processed by extraction via three different methods. The first method was ultrafiltration

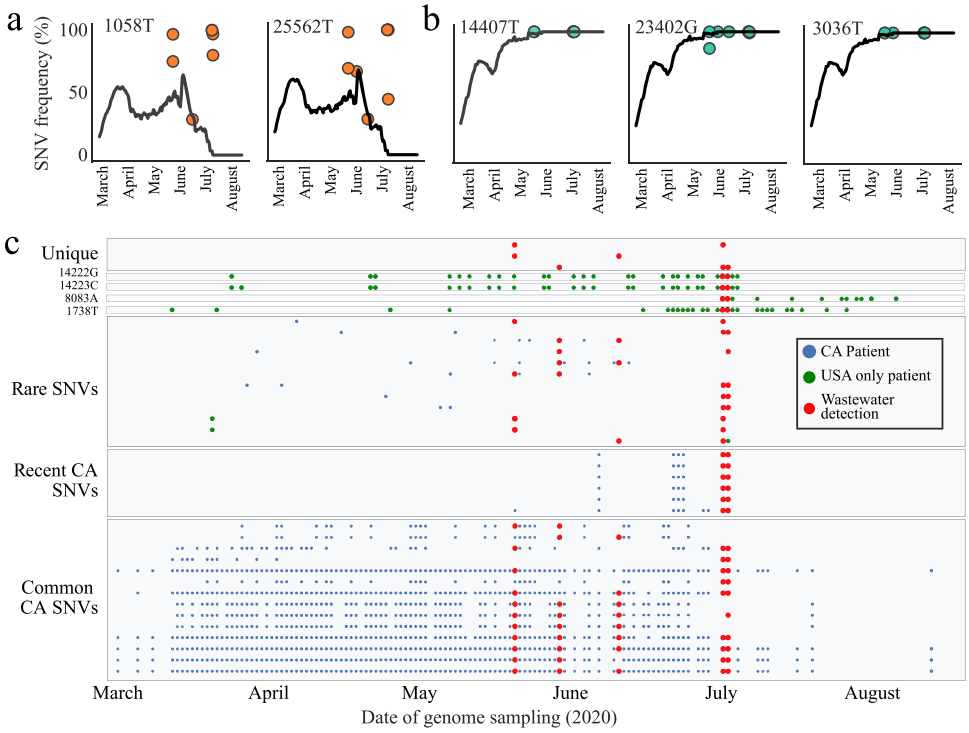

FIG 3 Time series of SARS-CoV-2 genotypes in California wastewater compared to patients. (a) Frequencies of two SNVs found in the same viral lineage across California clinical samples (black lines) and within each wastewater sample (orange points). (b) Frequencies of three SNVs found in the same viral lineage across California clinical samples (black lines) and within each wastewater sample (green points). (c) Time series of detection for recurrent wastewater genotypes in clinical samples versus wastewater samples. Each row on the *y* axis is a SNV, and the presence of a point along the *x* axis indicates when that SNV was detected in either a clinical sample or a wastewater sample.

with Amicon Ultra-15 100-kDa centrifugal filter units. Wastewater was heat inactivated in a water bath at 60°C for 90 min. Wastewater samples were then filtered on 0.22-μm SteriFlip filter units. While we found that the 0.22-μm filtration step, which was implemented to reduce clogging of the Amicon ultrafilter, did result in a loss of RNA (data not shown), we believe the methods recovered a sufficient quantity of viral RNA to adequately profile their genetic diversity. Amicon filter units were prepared by incubation with 1% bovine serum albumin in 1× phosphate-buffered saline (PBS) on ice for 1 h and then spun, loaded with 2 ml of PBS, and spun again to rinse. Amicon 100-kDa centrifugal filter units were then loaded with 15 ml of wastewater filtrate (flowthrough) and spun in a swinging-bucket rotor at 4,750 × *g* for 30 min at 4°C. Flowthrough was discarded, and amicons were reloaded with sample until all sample volume (40 ml) had been processed. For three samples (see Table S1), we processed more than 40 ml per sample but found that this did not improve the resulting SARS-CoV-2 genome quality in this specific instance. For all Amicon centrifuge-concentrated samples, the final volume of the concentrate was ~250 μl. RNA was then extracted with a Qiagen AllPrep DNA/RNA minikit. The second extraction method, direct RNA extraction with silica columns, began with viral and bacterial lysis of samples with 9.5 g of NaCl per 40 ml of wastewater and filtration on a 5-μm polyvinylidene fluoride (polyvinylidene difluoride) filter. The resulting filtrate (flowthrough) was then loaded onto a Zymo III-P silica spin column via vacuum manifold, and RNA was directly eluted from this column. Details of this protocol are available elsewhere (https://www.protocols.io/view/v-2-direct-wastewater-rna-capture-and-purification-bjr9km96). The third extraction method, "milk of silica," began with sample lysis and filtration, as in the second method. Filtered lysate is bound to free silicon dioxide particulate, eluted from the particulate, and concentrated via isopropanol precipitation. This protocol is also available online (https://www.protocols.io/view/direct-wastewater-rna-extraction-via-the-34-milk-o-biwfkfbn).

RT-qPCR and genome copy quantification. The number of viral genome copies in each sample was determined via probe-based qRT-PCR on an Applied Biosystems QuantStudio 3 real-time PCR system with the Thermo Fisher TaqPath 1-Step RT-qPCR Master Mix or TaqMan Fast Virus 1-Step Master Mix. The primer set and probe were purchased as part of the 2019-CoV RUO kit (IDT), and our quantification used the previously published CDC N1 assay (34). Either 2 or 5 μl of sample was used for each reaction (see Table S1) in a 10- or 20-μl reaction, respectively. Cycling conditions were 25°C for 2 min, 50°C for 15 min, 95°C for 2 min, and 45 cycles of 95°C for 3 s and 55°C for 30 s. A standard curve for absolute quantification of viral genome copies was generated with synthetic RNA standards of the SARS-CoV-2 genome (Twist Biosciences).

Library preparation and sequencing. Sequencing for a first set of samples was performed at the Microbial Genome Sequencing Center (Pittsburgh, PA) in three independent sequencing runs. A Maxima double-stranded cDNA RT kit (Thermo Fisher) was used to generate cDNA. An Illumina Flex for Enrichment kit paired with an Illumina Respiratory Virus Oligo Panel (Illumina, Inc.) was used to enrich for respiratory virus cDNA with 15 PCR cycles in the final step. The libraries were then sequenced on a NextSeq 550 to yield on average 119 Mbp of 2×75 bp paired-end sequencing reads. For a second set of samples (see Table S1), rRNA depletion was performed, and oligonucleotide capture enriched and unenriched sequencing strategies were compared. The rRNA depletion was done using RiboZero Plus supplemented with a comprehensive "Gut Microbiome" probe set. Libraries were prepared using the Illumina RNA Prep with Enrichment (L) Tagmentation protocol. The rRNA-depleted samples were amplified for 20 cycles. Enrichment was performed using the Illumina Respiratory Virus Oligo Panel.

Metatranscriptomic viral abundances. The abundances of viruses within wastewater were obtained by mapping reads with Bowtie 2 (35) to an index of all viral genomes downloaded from the RefSeq Database (release 201). For abundance calculations, mapped read pairs with MAPQ $>$ 20 and pair percent identity to the reference $>$95% were retained using inStrain v1.3.2 (32). Duplicate reads were removed with the clumpify.sh dedup command from the BBTools software suite (Bushnell 2014). Only viral genomes with at least 10% breadth of genomic coverage obtained were reported.

SARS-CoV-2 variant analysis. Seven samples with nearly complete SARS-CoV-2 breadth of genomic coverage ($>$99%) were further investigated for a strain-resolved analysis. SNV calling was performed using inStrain v1.3.2 on all read pairs with $>$90% average nucleotide identity to the SARS-CoV-2 reference. An absolute minimum of two read pairs supporting a variant allele was required for any SNV to be considered in further analysis. PCR duplicates were removed with the markdup command in the Sambamba package (36). All analysis and SNV locations reported are with respect to the reference genome "hCoV-19/Wuhan/WIV04/2019|EPI_ISL_402124|2019-12-30|China." Consensus genomes from each sample were created using a custom Python script that required a minimum of three reads supporting each genomic position. A multiple sequence alignment of publicly available SARS-CoV-2 genomes and their metadata were downloaded from the GISAID (3) EpiCov database on 23 August 2020. The multiple sequence alignment was processed with a custom Python script to obtain a list of variants for each genome with respect to the WIV04 reference sequence. We removed from all analyses the genomic positions recommended to be masked from SARS-CoV-2 alignments by https://virological.org/t/masking-strategies-for-sars-cov-2-alignments/480. Hypergeometric distributions were calculated with the stats.hypergeom function in scipy (37) to compare wastewater samples to all clinical data from each NextStrain "location" with at least 20 genomes deposited. The following parameters were used for hypergeometric distribution testing: the total number of SNVs observed across all clinical SARS-CoV-2 genomes, the number of SNVs observed in wastewater, the number of clinical SNVs in a region, and the observed overlap between the two. The reproducible code is available at https://github.com/alexcritschristoph/wastewater_sarscov2.

Data availability. Sequencing data for this project has been released under NCBI BioProject ID PRJNA661613. Processed data, reproducible code, and workflows for the analyses performed are available at https://github.com/alexcritschristoph/wastewater_sarscov2.

SUPPLEMENTAL MATERIAL

Supplemental material is available online only.

TABLE S1, XLSX file, 0.01 MB.

TABLE S2, XLSX file, 0.1 MB.

TABLE S3, XLSX file, 0.03 MB.

TABLE S4, XLSX file, 0.02 MB.

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Perspective

Challenges in Measuring the Recovery of SARS-CoV-2 from Wastewater

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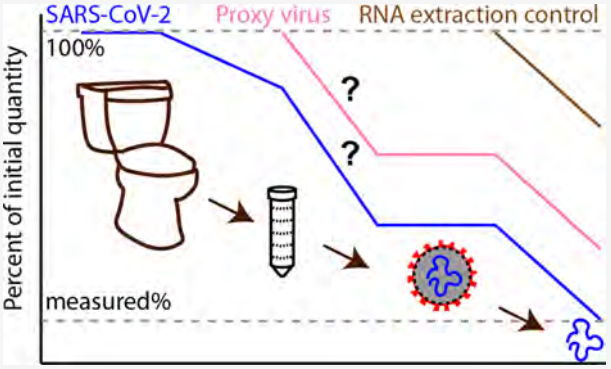
ABSTRACT: Wastewater-based epidemiology is an emerging tool for tracking the spread of SARS-CoV-2 through populations. However, many factors influence recovery and quantification of SARS-CoV-2 from wastewater, complicating data interpretation. Specifically, these factors may differentially affect the measured virus concentration, depending on the laboratory methods used to perform the test. Many laboratories add a proxy virus to wastewater samples to determine losses associated with concentration and extraction of viral RNA. While measuring recovery of a proxy virus is an important process control, in this piece, we describe the caveats and limitations to the interpretation of this control, including that it typically does not account for losses during RNA extraction. We recommend reporting the directly measured concentration data alongside the measured recovery efficiency, rather than attempting to correct the concentration for recovery efficiency. Even though the ability to directly compare SARS-CoV-2 concentrations from different sampling locations determined using different methods is limited, concentration data (uncorrected for recovery) can be useful for public health response.



Wastewater-based epidemiology (WBE) of SARS-CoV-2 is being employed across the globe to monitor the spread of COVID-19. While most laboratory methods used to date rely on the polymerase chain reaction (PCR) to measure the gene copies of SARS-CoV-2 RNA in a wastewater or sludge sample, there is no standardized method.[1] Many methods concentrate viruses from sewage prior to RNA extraction, using ultrafiltration, polyethylene glycol precipitation, electronegative membrane filtration, or ultracentrifugation.[2,3] Alternatively, some methods extract RNA directly from sewage[4,5] or sludge.[6,7] To compare results across methods and laboratories, internal standards and reportable metrics are needed. These include quality controls such as concentration and extraction method blanks, no-template PCR reaction controls, and PCR positive controls or standards.[5,8] One key metric, the recovery efficiency, was recently reported to vary over 7 orders of magnitude across different methods, with most values between 0.5 and 100%.[5] Despite the emphasis being placed on the use of process controls,[9] the field lacks a standardized approach for interpretation of recovery controls. In this perspective, we describe factors that may influence the recovery of SARS-CoV-2 in wastewater, current practices to account for recovery efficiency, and potential challenges for standardizing the measurement of recovery efficiency. We conclude by suggesting appropriate uses of recovery controls and making recommendations for how to incorporate recovery controls into WBE data reporting.

FACTORS AFFECTING RECOVERY OF SARS-COV-2 FROM WASTEWATER

The factors that potentially influence the measured concentration of SARS-CoV-2 in wastewater (RNA gene copies/L or copies/g sludge) are illustrated in Figure 1. Starting at the left of the figure, the main steps that could lead to a decrease in recovery include degradation in the sewer or during sample transport and storage;[10−12] losses during virus concentration;[13] losses during RNA extraction;[14] and incomplete reverse transcription or PCR inhibition.[15] Losses in each of these steps may vary across methods and by sample, owing in part to the highly variable nature of wastewater and the stage at which the wastewater was sampled (e.g., raw wastewater collected at a building, at a treatment plant, or primary sludge).

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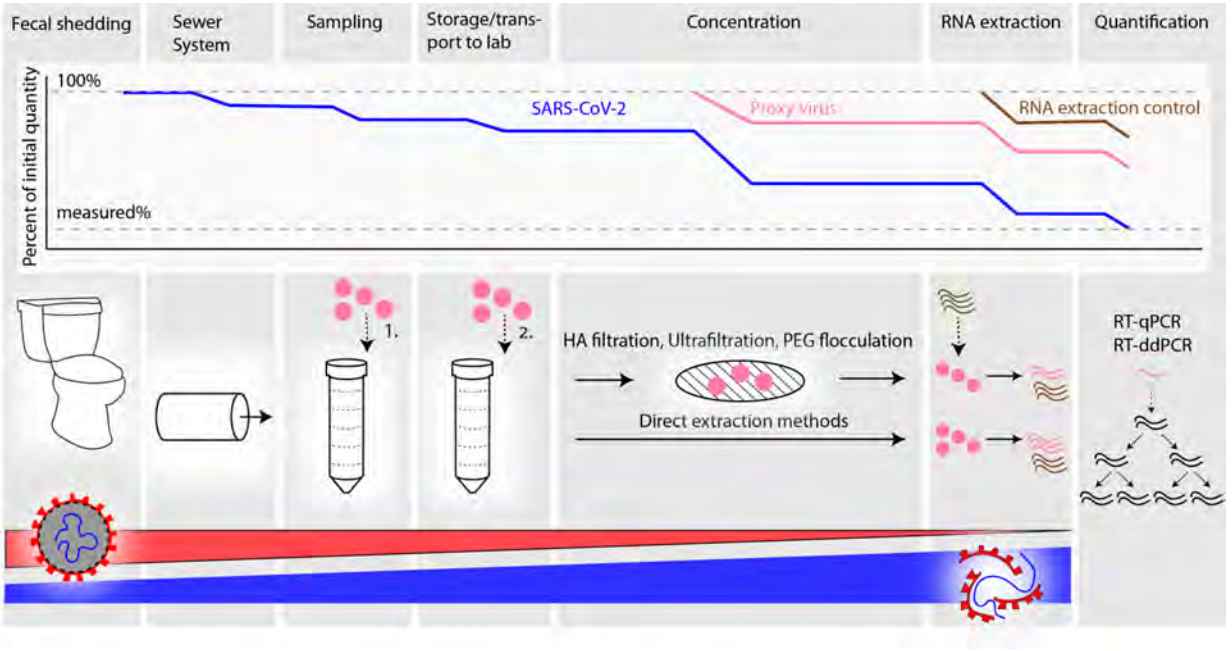

Figure 1. Factors affecting quantification of SARS-CoV-2 from wastewater. SARS-CoV-2 likely exists in wastewater along a continuum of intact (red) and nonintact (blue) viruses, and the ratio of these forms, and their association with solids, changes during transport of the sewage, sampling, and sample processing. For a sludge sample, there may also be loss of signal during primary settling. Spike-in proxy virus controls (pink) can be added 1) at the point of sampling prior to storage or 2) after storage at the beginning of sample processing. Proxy virus controls can account for degradation during storage and loss of signal due to incomplete recovery during concentration (pink line). A second control would be required to independently quantify the loss of signal during RNA extraction (brown line) because the spike control is affected by loss during RNA extraction.

A critical factor affecting recovery in each of these steps is the form of SARS-CoV-2 in wastewater. Wurtzer et al. (2020) used propidium monoazide (PMA) treatment prior to RT-qPCR to distinguish protected and unprotected forms of SARS-CoV-2. In wastewater samples collected from different locations and times, they reported that the majority of SARS-CoV-2 RNA was present in wastewater in unprotected forms (e.g., RNA from lysed virus, accessible to PMA) rather than in infectious (e.g., culturable) or other protected forms.[12] Bivins et al. (2020) measured the decay of infectious SARS-CoV-2 added to wastewater. They reported much faster decay of infectious virus than the RNA signal (determined by PCR).[10] For simplicity, we define a continuum of states in which SARS-CoV-2 may exist, from intact virus particles (Figure 1, red) to lysed viruses with RNA still present (i.e., ribonucleoproteins and free RNA), which we will refer to as "nonintact" viruses (Figure 1, blue).[12] Given reported decay rates, the ratio of these forms could change during transport of the sewage, sample storage, and sample processing (Figure 1), but more data on the stability of these different forms is needed. The extent to which the overall measured signal decreases in the wastewater may depend on the fraction of SARS-CoV-2 present in intact and nonintact forms, which can vary widely by sample.[12] For example, the nonintact fraction is susceptible to degradation by RNases, and more of this signal may be lost if there is a virus concentration step that incompletely captures nonintact viruses. We describe the implications of this factor on recovery efficiency in greater detail below.

CURRENT PRACTICES AROUND RECOVERY CONTROLS AND INTERPRETATION OF RECOVERY EFFICIENCY

To operationalize WBE for SARS-CoV-2, an ideal recovery control would accurately quantify the difference between the measured quantity of SARS-CoV-2 and the actual quantity (Figure 1) and could be consistently applied across samples, methods, and laboratories. In reality, multiple recovery controls may be required, and some losses may not be quantifiable. First, there is no way to accurately measure the loss of SARS-CoV-2 signal that occurs in a specific sample prior to sample collection. One alternative is to model these losses in the sewer system based on rates of free RNA and virus degradation in sewage that have recently been determined experimentally.[8,10,16] Another approach that has been presented is to normalize the SARS-CoV-2 concentration to an endogenous RNA viral control, such as pepper mild mottle virus (PMMoV).[17,18] This normalization would accurately account for SARS-CoV-2 signal loss only if the degradation rate of the control is similar to that of SARS-CoV-2.[1,19] Notably, normalization to an endogenous fecal indicator virus in wastewater may also serve to account for dilution that occurs in the sewer.[1]

To measure losses during virus concentration, current protocols typically employ a proxy virus of known titer, such as another enveloped virus. Proxies used to date include bovine coronavirus (BCoV),[20] bovine respiratory syncytial virus (BRSV),[20] bacteriophage Phi6,[13] human coronavirus OC43,[5] human coronavirus HCoV-E,[21] murine hepatitis virus (MHV),[13,22] F-specific RNA phages,[23] vesicular stomatitis virus (VSV),[18] and in some cases, an inactivated form of SARS-CoV-2 itself.[11] The spike-in proxy virus control (Figure 1; pink circles) can be added at the point of sampling, in which case it

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may capture degradation that occurs during sample storage or after storage immediately before sample processing, in which case only losses after this step are captured (Figure 1; locations 1 and 2, respectively). To mimic the partitioning of SARS-CoV-2 via adsorption to solids, the proxy virus can be incubated in the wastewater for a defined period of time prior to concentration and/or RNA extraction.[18] To calculate recovery efficiency, the proxy is added or "spiked" into wastewater samples at a known concentration. The input (A) and output (B) quantities of the proxy are then determined, and the recovery efficiency (C) is calculated by dividing the total output quantity (B) by the total input quantity (A).[5]

Complicating this calculation, there is no "gold standard" approach to measure the stock concentration of the proxy virus and the input quantity (A). The most common approach to date appears to be that RNA is extracted from the proxy virus stock solution and quantified alongside the spiked wastewater samples via qRT-PCR or RT-ddPCR. Intrinsic to this approach, **the recovery efficiency measurement may not account for losses during RNA extraction**. Another implication is that if a different method is used for RNA extraction of the proxy virus stock solution (A) than for wastewater (B), and the extraction efficiency differs, a bias is introduced. Notably, if the method used to quantify the proxy virus in wastewater (B) is more efficient than the method used to quantify the pure proxy virus (A), the recovery efficiency could be measured to be greater than 100%. Even if the same extraction method is used for both the virus stock solution and the samples, RNA extraction efficiencies can vary depending on the matrix, such that extraction of a pure stock of proxy virus may have a different percent yield than extraction of RNA from wastewater viral concentrate. Perhaps the most direct measure of the stock solution could be obtained by electron microscopy, but if RNA is present in nonintact virions, that RNA will not be measured in (A) but will be included in the measurement of (B) via PCR. Another option is infectivity assays, but these typically underestimate the number of total virions by several orders of magnitude.[24] Lastly, as an alternative to RNA extraction, some researchers have proposed heat-treating the virus stock solution to lyse intact viruses and then input directly to PCR (Aaron Best and Benjamin Kopek, personal communication).

To account for losses during RNA extraction, some laboratories add an encapsidated control RNA, free RNA standard, or RNA virus not found in wastewater to viral concentrates (for concentration methods)[20,23] or to wastewater samples (for direct extraction methods)[25] prior to extraction (Figure 1). This RNA is directly quantified via PCR and compared to RNA recovered after extraction. For direct extraction methods that rely on binding RNA to silica columns, the results from our own preliminary experiments indicate that a short RNA spike does not accurately represent the recovery efficiency of long RNAs such as the SARS-CoV-2 genome. Methods for accounting for RT-qPCR inhibition have been documented elsewhere[26] and are not further discussed here.

THE CHOICE OF PROXY VIRUS CAN AFFECT THE MEASURED RECOVERY EFFICIENCY

Any chosen proxy may not accurately model the effects on SARS-CoV-2 of the biological and physicochemical processes that occur during the concentration, extraction, and quantification steps. It has been reported that different proxy viruses for SARS-CoV-2 show varying recovery efficiencies in the same samples.[27] Factors that could explain these differences include size, stability, surface characteristics, and solids-association.[13,22] The observed recovery efficiency could also differ depending on the input concentration of the proxy and the chemical characteristics of the wastewater, due to factors such as viral aggregation.[28] In addition, the concentration of the proxy relative to the concentration of SARS-CoV-2 may impact whether the recovery efficiency is applicable to SARS-CoV-2.[29] Thus, the discrepancy between the recovery efficiencies measured using the proxy virus and the actual recovery efficiency of SARS-CoV-2 may be unique to each proxy virus, each concentration method, and even each sample.

THE FORM OF SARS-COV-2 AND THE PROXY VIRUS IN WASTEWATER MAY AFFECT RECOVERY

As presented in Figure 1, we hypothesize that the ratio of RNA in intact to nonintact virus particles may change with travel time in the sewer system, sample storage time, and storage temperature.[10,12] In addition, the ratio of RNA in intact to nonintact viruses may depend on the sample matrix type (e.g., sludge compared to wastewater[13]), the composition of the wastewater (e.g., presence of surfactants[30,31]), and other environmental factors (e.g., temperature in the sewer system or wet weather[16]). It is possible that these different forms of SARS-CoV-2 will have different concentration efficiencies across different methods.[32] Concerningly, given that the ratio of intact to nonintact viruses appears to vary from sample to sample,[12] the recovery efficiency of concentration-based methods may vary in a way that is not reflected by the recovery control. We hypothesize that the high recovery of SARS-CoV-2 reported for some direct extraction methods may be due to the potential of these methods to recover the RNA from nonintact viruses.[5,32] Ultimately, results from direct extraction and concentration-extraction methods may not be comparable (even with normalization to a recovery control) because they measure different fractions of the intact and nonintact signals. Lastly, the fraction of intact and nonintact viruses may differ for the proxy virus and SARS-CoV-2 in wastewater and even between batches of the proxy virus.

APPROPRIATE USE OF RECOVERY CONTROLS AND RECOVERY EFFICIENCY

Despite the limitations and challenges with the use of proxy viruses, recovery controls and measurement of recovery efficiency are an essential component of any WBE method. As already practiced by many groups,[13,18,20,22,23,33,34] recovery controls can be useful to verify consistent performance of a method within a single laboratory across sample types and over time (e.g, changes in concentration and extraction efficiency). However, inclusion of a separate RNA extraction control is also needed to account for the extraction efficiency, as discussed above. Another important use of recovery efficiency is to assess and compare the analytical sensitivity of methods;[5] sensitivity is an important characteristic of methods being used to discriminate between a positive and negative presence of SARS-CoV-2 (e.g., in congregate living facilities) or for quantifying the concentration in low prevalence settings.

While it is tempting to divide the measured SARS-CoV-2 concentration by the recovery efficiency of the proxy with the aim to report a "true" value of SARS-CoV-2 in the wastewater, this calculation can produce misleading data due to the many

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caveats and biases described above. Additionally, if recovery efficiency varies between measurements or methods (e.g., more than an order of magnitude), the error propagation that results from dividing measured concentration by recovery efficiency could produce a final data set with much larger magnitudes of error than the original data. Thus, the propagated error due to quantitative incorporation of recovery efficiency may confound comparisons of SARS-CoV-2 measurements across laboratories and methods. Lastly, because SARS-CoV-2 exists in multiple forms in wastewater, different concentration and/or direct extraction methods cannot be easily compared simply by including a recovery control.

RECOMMENDATIONS

For the reasons described above, we believe it is important to report the directly measured concentrations of SARS-CoV-2 (gene copies per L wastewater or per g sludge) and the respective measurement of recovery efficiency and other quality control data. The protocol used for measuring the recovery efficiency should be publicly available and should include the details that can affect the measurement (e.g., chosen proxy virus, preparation of proxy virus, how the spike was quantified, concentration of the spike, and the stage in the analysis at which the proxy was spiked). While the availability of a reliable source of a proxy virus that all laboratories could use, prepared and quantified using a standardized approach, would help to address some of the sources of variability in how recovery efficiency is measured, it will not be sufficient to overcome all of the biases. Further research is needed to characterize the form of SARS-CoV-2 in wastewater and changes in the ratio of intact to nonintact viruses during travel in the sewer and sample storage.

Given that there is no unbiased method for measuring recovery of SARS-CoV-2, we caution against using concentrations measured via different methods to compare COVID-19 occurrence, regardless of whether the concentrations are adjusted for the apparent recovery efficiency. Alternatively, trend analyses based on measurements determined via different methods at the same site may be compared without correcting for recovery efficiency.[35] Nonetheless, the strongest types of quantitative analysis rely on measurements conducted consistently with a single method, without correcting for recovery efficiency, such as assessing temporal trends at a single sampling site[6,7,11,18,33,35] or comparison of samples across sites measured by the same method.[20,23,34] These analyses can be conducted on the measured concentrations of SARS-CoV-2; correcting for recovery efficiency is not necessary and may introduce more bias than it corrects for.

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Notes

The authors declare no competing financial interest.

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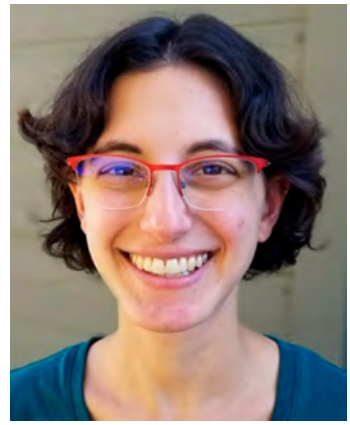

Dr. Rose Kantor is a postdoctoral scholar in Environmental Engineering at U.C. Berkeley. Since April 2020, she has led a team researching and performing wastewater monitoring for SARS-CoV-2 in the San Francisco Bay Area. Her broader research interests are in microbiology of engineered environments and microbial biotechnologies that improve environmental and human health. She has previously used high-throughput sequencing and meta-omics techniques to study microbial communities in advanced water treatment for potable reuse and in mining wastewater bioremediation. Rose earned her B.A. in Biology from Carleton College (2010) and her Ph.D. in Microbiology from U.C. Berkeley (2016).

Dr. Kara Nelson is a Professor of Environmental Engineering and Associate Dean of Equity and Inclusion in the College of Engineering at U.C. Berkeley. She teaches courses on innovation in the water sector, drinking water and wastewater treatment processes, pathogen detection, and inactivation, taking into consideration the wide range of contexts that exist in low- to high-income countries. Her research program investigates practices for water reuse, disinfection, nutrient recovery, and international WASH (water, sanitation, and hygiene).

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Close

THE CONVERSATION

Academic rigor, journalistic flair

Sequencing the whole genome of patient virus samples lets scientists watch for new variants. Sergei Malgavko/TASS via Getty Images

Where coronavirus variants emerge, surges follow – new research suggests how genomic surveillance can be an early warning system

May 5, 2021 8.10am EDT

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Genomic surveillance programs have let scientists track the coronavirus over the course of the pandemic. By testing patient samples, researchers are able to diagnose COVID-19. But they're also able to use genetic changes in the virus to recreate its travel routes and identify the emergence of new viral variants.

As microbiologists, we examined how quickly the coronavirus genome has mutated during the pandemic and then figured out how quickly these changes led to new cases and rapid disease spread.

By connecting genetic change with the appearance of new clusters of disease, our research suggests how genome surveillance can provide a new early warning of what's to come. Daily reports on how the virus is evolving could sound the alarm before case numbers explode.

Mutations happen and can be tracked

Starting around 2012, researchers began to develop genome sequencing as a way for public health experts to track infectious diseases. Basically they are able to "read" an organism's whole genetic code, the long list of A, C, G and T molecules that comprise the blueprints for the proteins that carry out the cell's functions.

When pathogens infect a host, they reproduce themselves. Changes to the genetic code can happen at this point – like typos you might make copying down a page of text, substituting an A for a T in one spot, for instance. These changes are mutations. They provide new instructions to the next generation that can give them new capabilities – maybe they are better able to move between hosts, survive and initiate outbreaks or cause new symptoms.

Multiple versions of the same organism, but with variations in the genetic code, circulate during a disease outbreak. Depending on how successful they are at infecting new hosts and spreading, various versions can become more or less common.

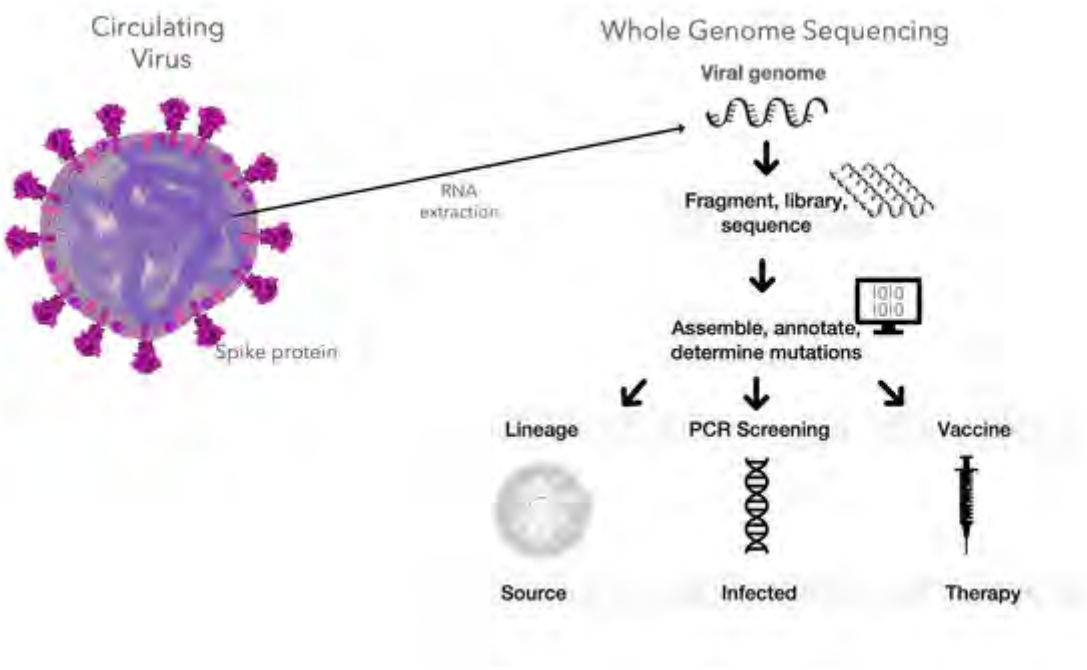
Historically, public health labs tracked disease outbreaks by the name of the pathogen – SARS, salmonella, Ebola and so on. But as the speed and accuracy of genome sequencing increased, researchers realized that the same pathogen can be divided into many different subpopulations based on genetic variation.

These are the variants you hear about with regard to the coronavirus – the B.1.1.7 strain that first emerged in the U.K., the B.1.617 version that was identified in India, and the B.1.427 and B.1.429 variants that both originated in California. All are technically classified as the same SARS-CoV-2 virus, but they may have quite different features.

Screening isn't the same as sequencing

When a person's sample is tested for SARS-CoV-2, the lab uses a technique called PCR to identify whether certain coronavirus genes are present. This method is good for screening – diagnosing whether the person in fact has COVID-19 or not. It also provides important surveillance data about how many people have the coronavirus in a particular time and place.

But it doesn't sequence the whole genome, which is made up of 30,000 nucleotides – those As, Gs, Cs and Ts. The PCR screening test just looks for one small stretch of the coronavirus's genetic code – the gene related to the virus's spike protein that helps it infect human cells. This technique won't flag mutations happening in other parts of the genome because it's not looking for them.



Sequencing the genetic material of the coronavirus can help researchers trace the travel routes of the virus, diagnose infected people and inform research into vaccines and therapeutics. Bart Weimer and Darwin Bandoy, CC BY-ND

Other mutations are definitely occurring, though. Sequencing the entire genomes of coronavirus samples creates a massive list of variants. Our work tackles this ever-changing list to show that not only do mutations in the spike gene lead to new outbreak clusters – additional mutations in other genes increase outbreaks, too.

Connecting variants and outbreaks

To figure out the role of these mutations, we directly linked the variants present at a certain time and place with the coronavirus's reproductive number, known as R for short. R is a way to quantify the intensity of an infectious disease outbreak. It stands for how many additional people an infected person will spread the germ to.

But R doesn't tell you what version of the viral genome was passed along. By directly linking R and the variant present, we were able to pinpoint the specific mutation that was emerging and increasing viral spread. We found that as new variants became more common, COVID-19 diagnoses surged.

By merging genomics with classical epidemiology, we created a tool that factors in rising variants and R to warn how quickly cases will spread and which variants are more likely to trigger new outbreaks.

To test this approach, we linked the SARS-CoV-2 genotype to the daily R during the first three months of the pandemic using 150 genomes. Our method predicted the near future of outbreaks in four different countries that each had various levels of mandated social interventions.

This preliminary evidence relied on a small number of genome sequences, but it was all the data available from the early stages of the pandemic. As the pandemic continues, labs are sequencing thousands of genomes across the globe weekly. We replicated our initial estimates using 20,000 genomes from the U.K. and arrived at the same observation – new variants led to more transmission,

variants are continuing to expand and will continue to increase in prevalence as the pandemic continues.

By incorporating genome sequencing data with information about transmissibility, we created a kind of early warning system, allowing us to forecast spreading events. In the real world, advance warning like this could inform public health decisions about social interventions. People can prepare for predicted outbreaks. A bonus is that our model also would show when highly contagious variants are declining – providing solid evidence to support loosening restrictions to allow a return to normalcy.

Just as valuable as early warning, variant information could help officials know when it's safer to lift restrictions. SOPA Images/LightRocket via Getty Images

Scanning the horizon for future threats

We believe that public health is at the dawn of integrating genome sequencing with infectious disease tracking. We envision a reference library of pathogen genomes, representing the diversity of their many emerging variants. It could be a new tool for epidemiologists, a part of routine surveillance programs that can last beyond the current pandemic.

In the future, scientists hopefully won't need to wait for an outbreak to grow. Our research suggests that by identifying a rise in variants early, public health officials can quickly respond – before the inevitable rise in new disease cases. We think this kind of early warning system can increase the public's safety for any pathogen and reduce outbreaks for all types of organisms.

Infectious diseases Genome Coronavirus Viral reproduction number Genomic sequencing Whole-genome sequencing Infectious disease dynamics R0 Reproduction number R0 number SARS-CoV-2 COVID-19 testing transmission rates COVID-19 transmission Genomic surveillance Coronavirus variants SARS-CoV-2 variants Variants

Martin La Monica
Deputy Editor for science coverage

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TOP STORIES

NEWS

Coronavirus digest: EU states 'must monitor sewage systems' for COVID

The European Union has called on member states to monitor wastewater to detect COVID outbreaks early. Brazil President Jair Bolsonaro's opponents have accused him of not buying enough vaccines. Follow DW for more.

Authorities in Marseille, France, have taken regular samples from wastewater to detect the presence of COVID-19

The European Commission on Sunday called on EU member states to regularly monitor sewage systemsfor fresh outbreaks of the coronavirus.

"It is crucial that EU countries set up effective wastewater monitoring systems as soon as possible and ensure the relevant data are immediately made available to health authorities," Environment Commissioner Virginijus Sinkevicius told the German newspaper *Welt am Sonntag*.

She said they were an "inexpensive, fast and reliable source of information about the spread of the virus and its variants in the population." Large cities and municipalities should analyze at least two samples weekly in what Sinkevicius said was "a proven concept in public health insurance."

Some European countries have already begun monitoring sewage systems and were able to forewarn about worsening outbreaks. Wastewater systems are also used to gain knowledge about the extent of the use of illegal drugs in the population.

Using wastewater monitoring to fight COVID-19

Here is the other coronavirus-related news from around the world.

Asia Pacific

The UK said on Sunday it will send an additional 1,000 oxygen ventilators to India, as a group of doctors staged their own intervention by offering long-distance telemedicine from Britain.

A German military aircraft with 120 ventilators reached India late Saturday, as the South Asian country grapples with a catastrophic new wave of infections.

A shortage of oxygen in hospitals has worsened the rising death toll in India, which has now reached 215,542. On Sunday, the country of some 1.3 billion people recorded 3,689 deaths from the coronavirus.

Taiwan has also shipped medical supplies to India, including 150 oxygen concentrators and 500 oxygen cylinders, joining more than a dozen other states that have offered help.

On Sunday, vote counting began in five Indian states from elections held in March and early April. Prime Minister Narendra Modi has been censured for holding election rallies before the votes that critics say became superspreader events for the virus.

In Australia, the fourth-largest city of Perth faces a second snap lockdown in less than a month, after a hotel security guard and two of his housemates tested positive for the coronavirus.

As a precaution, nightclubs will close and a weekend football match at which 45,000 people were previously expected to attend will now be closed to spectators. Perth only emerged from a three-day lockdown last week.

Australia has all but stamped out community infections after closing its borders to non-citizens in March 2020, recording just 29,800 cases and 910 deaths. The country has banned citizens who had been in India within 14 days from returning home, threatening them with fines and jail.

Africa

As of May 4, Nigeria is to ban travelers coming from India, Brazil and Turkey due to the rapid spread of coronavirus in those countries, a presidential committee said.

India's COVID-19 vaccine rollout in disarray

"Non-Nigerian passport holders and non-residents who visited Brazil, India or Turkey within Fourteen (14) days preceding travel to Nigeria, shall be denied entry into Nigeria," Boss Mustapha, chairman of the presidential steering committee on COVID-19, said in a statement.

Indian government 'ignored' warnings, scientists allege — Manira Chaudhary reports

Europe

A German hotel chain is suing the government over what it says is the unfair distribution of COVID relief funds. The Dorint Hotel group, along with other similar establishments, have been closed to tourists since November to reduce the spread of the virus.

Meanwhile, Germany's seven-day incidence rate fell for the sixth day in a row, to 146.5 cases per 100,000 people.

The development is a welcome sight for German hospitals, which are starting to see a "slight easing" in new infections, the head of the German hospital federation DKG said on Sunday.

"We are looking at about two weeks of relatively constant numbers in terms of new infections, which gives us confidence that we don't have to be concerned about an exponential rise in patients in need of intensive care," DKG President Gerald Gass told the mass-circulation *Bild* newspaper.

Some 5,019 COVID patients are being treated in intensive care units — compared to a peak of 5,106 on April 26, the paper reported.

Can a patent waiver speed up the global COVID vaccination drive?

In Spain, bullfighting fans were allowed to return to the arena for the first time since the start of the pandemic. A charity event to support the industry was held in Madrid, with authorities capping attendance to 6,000. Spectators sat in assigned seats and were required to wear masks.

The Czech Republic will allow everyone aged 16 and up to register for a COVID vaccine starting on June 1. Prime Minister Andrej Babis announced the move on Sunday, saying that if vaccine supplies remain stable as planned the age threshold could be lowered each week by five years. Currently, vaccines are available to all people age 55 or older.

In Belgium, police forcibly broke up a party at a park in Brussels on Saturday, after hundreds of people defied a ban to protest COVID-19 restrictions.

Some protesters tossed bottles at officers and set off fireworks before authorities moved in. Police deployed water cannons and fired tear gas at the crowds to get them to disperse, as 132 people were arrested.

Pope Francis has launched a month-long prayer marathon to hasten the end of the pandemic with a prayer at St. Peter's Basilica in the Vatican before some 150 believers.

The series will be streamed live each day this month at 6 p.m local time (1600 GMT/UTC) from different Catholic shrines across the world.

They range from Fatima in Portugal and Lourdes in France to shrines in Poland, Nigeria, Cuba and South Korea as well as the Basilica of the Shrine of the Immaculate Conception in Washington DC.

In Russia just 9 million people — or 6% of the population — have so far received their first and second vaccine doses, state television reported.

Russian scientists have developed three vaccines. The first of which — Sputnik V — has been on the Russian market for almost nine months.

Russia offers all-inclusive vaccine tours

Despite Sputnik V's proven effectiveness, surveys of Russians find that many have no desire to be vaccinated due to skepticism over the safety of the shots. In addition to vaccine hesitancy, there are also reports of many Russian regions struggling to obtain doses.

Americas

Several thousand people in Brazil marched Saturday in support of far-right President Jair Bolsonaro, ignoring a surging pandemic. Rallies took place in Brasilia, Sao Paulo and Rio de Janeiro.

Brazil with more than 403,000 COVID-19 deaths, is second only to the United States, and Bolsonaro faces widespread criticism for not taking the pandemic more seriously.

Last week, a Senate commission of inquiry was established to examine the government's handling of the health crisis, with many experts saying it has been incompetent and irresponsible.

Key opposition leaders on Saturday took part in a May Day workers' event on social media and used their speeches to hit out at the president. Among them were former president Luiz Inacio Lula da Silva, who is expected to challenge Bolosonaro in next year's election.

"This is a sad May Day for the workers of our country, a day of mourning for the 400,000 lives lost to COVID-19, many of them because the government of Bolsonaro refused to buy the vaccines that were being offered," Lula said.

In Canada, tens of thousands of people rallied Saturday at Montreal's Olympic Stadium, against COVID restrictions. The protesters, mostly unmasked and ignoring social distancing rules, said the curbs imposed by the Quebec government were "unjustified."

Signs in the crowd expressed opposition to masks, curfew and health passports. A heavy police presence was on hand, although the event proceeded largely in a festive atmosphere to the rhythm of drums.

Starting Monday, the nightly curfew in Montreal will begin at 9:30 p.m., instead of 8 p.m, officials said.

rs, mm, jsi/sms (AFP, AP, dpa, Reuters)

Reporter - Vaccinating Against COVID-19 in Alaska

DW RECOMMENDS

Fact check: COVID-19 vaccines — Why are people missing their second shot?

Nearly 8% of Americans who have received their first BioNTech-Pfizer or Moderna shot have not returned for their second dose, according to recent CDC data. Just how effective is a single dose?

Coronavirus: At least 18 killed in India COVID hospital fire

Dozens of other patients were rescued at the hospital in Bharuch, western India. The incident comes as India's health care system struggles amid an unprecedented surge in coronavirus cases.